

User's Manual

MP-26x/MP-27x Multimedia Home Gateway

Version 4.4.0

Document #: LTRT-23510



Table of Contents

1	Introduction	23
2	Package Contents and Prerequisites	27
3	Hardware Description	29
3.1	Physical Description	29
3.1.1	Front Panel	29
3.1.1.1	Front-Panel Buttons Description	30
3.1.1.2	Front-Panel LEDs Description	31
3.1.2	Rear Panel	34
3.1.2.1	Device Rear-Panel Port Description	35
3.1.2.2	Rear-Panel LEDs Description	36
3.2	Cabling the Device	37
3.3	Mounting the Device	39
	Device Gateway	41
4	Device Quick Setup	43
4.1	Preparing Initial Configuration	43
4.2	Configuring WAN Access	44
4.2.1	Configuring xDSL	44
4.2.1.1	Configuring WAN ATM over DSL (ADSL)	44
4.2.1.2	Configuring WAN PTM over DSL (VDSL)	45
4.2.2	Configuring WAN Ethernet	45
4.2.3	Configuring 3G USB Modem	46
4.3	Configuring Wireless LAN (Wi-Fi)	47
4.4	Configuring SIP Signaling Protocol	48
4.5	Registering the Handset to the Base Unit	50
5	Getting Started with the Web Interface	51
5.1	Logging into the Web Interface	51
5.2	Menu Bar Description	52
5.3	Managing Tables	55
5.4	Configuring Users	56
5.5	Associated Elements	59
5.5.1	Configuring Scheduler Rules	59
5.5.2	Configuring Network Objects	61
5.5.3	Configuring Protocols	63
5.6	Logging out the Web Interface	64
6	Viewing a Graphical Display of the Device's Network	65
7	Configuring Computers for Connecting to the Device's Network	69
7.1	Wired Computers	69
7.1.1	Configuring Computers Running on Windows XP	69
7.1.2	Configuring Computers Running on Linux	70
7.2	Connecting Computers to the Device's Wireless Network	71
8	Setting up your Device	73
8.1	Setting up an Internet Connection using the Web Interface	73

8.1.1	WAN ATM over DSL.....	75
8.1.1.1	Point-to-Point Protocol over Ethernet (PPPoE)	75
8.1.1.2	PPPoA.....	76
8.1.1.3	Routed ETHoA	76
8.1.1.4	Bridged ETHoA	76
8.1.2	WAN PTM over DSL.....	77
8.1.2.1	Manual IP Address Ethernet Connection	77
8.1.2.2	Automatic IP Address Ethernet Connection.....	78
8.1.2.3	Point-to-Point Protocol over Ethernet (PPPoE)	78
8.1.2.4	Point-to-Point Tunneling Protocol (PPTP).....	79
8.1.2.5	Layer 2 Tunneling Protocol (L2TP)	79
8.1.3	WAN Ethernet.....	80
8.1.3.1	Manual IP Address Ethernet Connection	80
8.1.3.2	Automatic IP Address Ethernet Connection.....	81
8.1.3.3	PPPoE	81
8.1.3.4	PPTP	82
8.1.3.5	L2TP	83
8.2	Using the Automatic Dialer for Internet Connection	84
8.2.1	Recommended Configuration	84
8.2.2	Setting up and Starting the Automatic Dialer.....	86
8.2.3	Quitting Automatic Dialer for Manual Configuration	87
8.3	Setting up a Wireless LAN Network.....	88
9	Configuring VoIP Parameters	89
9.1	Configuring the SIP Signaling Protocol	90
9.1.1	Configuring Proxy Redundancy.....	95
9.2	Configuring Dialing Parameters.....	97
9.2.1	Syntax for Digit Maps and Dial Plans	100
9.3	Configuring Media Streaming	102
9.3.1	Configuring Codecs	103
9.3.1.1	Supported Codecs.....	103
9.3.1.2	Packetization Time	103
9.4	Configuring Voice and Fax	104
9.5	Configuring Supplementary Services.....	108
9.5.1	Auto Attendant	111
9.5.1.1	Creating an Auto Attendant Message	111
9.5.1.2	Configuring Auto Attendant on Device	115
9.5.1.3	Saving Auto Attendant Recordings on USB.....	115
9.5.1.4	Configuring Auto Attendant using Web Interface.....	116
9.6	Configuring Micro PBX Line Settings.....	117
9.7	Configuring Line Extensions	119
9.8	Configuring Speed Dialing	121
9.9	Enabling Polarity Reversal.....	123
9.10	Bluetooth	124
9.10.1	Pairing Mobile Devices to Device using Bluetooth	124
9.10.2	Unpairing a Mobile Device using the Web.....	125
9.10.3	Auto Connecting a Mobile Device	126
9.10.4	Synchronizing the Phonebook.....	127
9.10.4.1	Synchronizing the Phonebook using the Device.....	127
9.10.4.2	Synchronizing the Phonebook using the Web	127
9.10.5	Associating DECT Handset with a Synchronized Phonebook	129
9.10.6	Deleting a Phonebook	130
9.10.7	Routing an Incoming Call.....	130
10	Making VoIP Calls with your Analog Telephones	131

10.1	Making a Call.....	131
10.2	Answering a Waiting Call.....	131
10.3	Putting a Call on Hold.....	132
10.4	Transferring a Call.....	132
10.5	Forwarding Calls to another Phone	133
10.6	Establishing a 3-Way Conference Call.....	134
11	Quality of Service	135
11.1	QoS Wizard.....	136
11.2	Configuring Traffic Shaping	137
11.2.1	Configuring Traffic Shaping	138
11.2.2	Configuring Shaping Classes	140
11.2.2.1	Class Rules	141
11.3	Configuring Traffic Priority	143
11.4	Configuring DSCP Mapping.....	147
11.5	Configuring 802.1p Mapping.....	149
11.6	Configuring Class Statistics	150
11.7	Configuring Basic VoIP QoS Example	151
12	Network Connections	153
12.1	Configuring a WAN Connection	153
12.1.1	WAN DSL Connections	155
12.1.1.1	Determine Protocol Type Automatically (PVC Scan)	157
12.1.1.2	PPPoE	158
12.1.1.3	PPPoA	160
12.1.1.4	Routed ETHoA or Bridged ETHoA	161
12.1.1.5	IPoA.....	163
12.1.2	WAN Ethernet Connections.....	165
12.1.2.1	External DSL Modem using PPPoE	165
12.1.2.2	External Cable Modem without Authentication	166
12.1.2.3	External Cable Modem with L2TP	169
12.1.2.4	DHCP	172
12.1.2.5	Manual IP Address	174
12.2	LAN Connection	177
12.2.1	Wireless LAN.....	177
12.2.1.1	Enabling and Disabling the Wireless Network	178
12.2.1.2	Configuring Wireless Properties under the Settings Tab	179
12.2.1.3	Configuring Wireless Properties under the Wireless Tab	180
12.2.1.4	Advanced Tab	197
12.2.2	LAN Hardware Ethernet Switch.....	198
12.2.2.1	General Tab	199
12.2.2.2	Settings Tab	199
12.2.2.3	Switch Tab.....	200
12.2.2.4	Advanced Tab	201
12.3	Editing Network Connections and Advanced Configuration	202
12.3.1	General Tab.....	202
12.3.2	Settings Tab.....	203
12.3.2.1	Internet Protocol Settings	204
12.3.3	Routing Tab	207
12.3.4	Wireless Tab.....	208
12.3.5	Switch Tab	208
12.3.6	Bridging Tab	209
12.3.7	PPP Tab	209
12.3.8	PPTP Tab	211
12.3.9	Advanced Tab.....	212

12.4	VLAN Settings	213
12.4.1	Settings Tab.....	216
12.4.1.1	IP Address Distribution.....	217
12.4.2	Routing Tab	219
12.4.3	Advanced Tab.....	220
12.5	LAN-WAN Bridge Settings.....	221
12.5.1	Editing LAN-WAN Bridging	223
13	Remote Device Management.....	225
13.1	Overview	225
13.1.1	Remote Configuration.....	225
13.1.2	Remote Management	227
13.1.2.1	Firmware Upgrade.....	227
13.1.2.2	Status and Performance Monitoring.....	228
13.1.2.3	Alarms, Notifications and Logging.....	229
13.2	Enabling Remote Management	230
13.3	Securing Remote Management with Certificates	232
13.4	Remote Configuration and Management Interfaces.....	236
13.4.1	Embedded Web Server	236
13.4.2	TR-069 and TR-104 CPE WAN Management Protocol	237
13.4.2.1	Configuring the Device via TR-069 and TR-104	238
13.4.2.2	Monitoring the Device Status via TR-069 and TR-104	246
13.4.2.3	Security Concerns and Measures	250
13.4.3	Syslog	251
13.4.4	Automatic File Download	251
13.4.4.1	Firmware File Download.....	251
13.4.4.2	Configuration File Download	251
13.4.4.3	Security Concerns and Measures	252
13.4.5	Telnet CLI	252
14	Security.....	253
14.1	General Security Level Settings.....	254
14.2	Configuring Access Control	256
14.3	Configuring Port Forwarding.....	258
14.4	Configuring a DMZ Host	262
14.5	Configuring Port Triggering.....	263
14.6	Configuring Website Restrictions.....	266
14.7	Configuring NAT	269
14.8	Viewing Current Connections	272
14.9	Configuring Advanced Filtering.....	273
14.10	Viewing the Security Log	277
15	Advanced Networking Features.....	281
15.1	IP Address Distribution	281
15.1.1	Configuring the DHCP Server	282
15.1.2	Configuring DHCP Relay	283
15.1.3	Viewing DHCP Clients	284
15.1.4	Configuring Static DHCP Clients	284
15.2	Configuring a DNS Server	286
15.3	Configuring Dynamic DNS.....	288
15.4	Configuring Routing Rules.....	291
15.4.1	Managing Routing Table Rules	291
15.4.2	Configuring Routing Protocols.....	292

15.5	Enabling PPPoE Relay	293
15.6	Selecting Regional Settings for Analog Lines	294
16	Home Media	295
16.1	Universal Plug and Play	295
16.1.1	Enabling Universal Plug and Play on the Device	295
16.1.2	Adding UPnP-enabled PC to Home Network	296
16.1.3	Monitoring Connection between the Device and Internet.....	297
16.1.4	Making Local Services available to PCs on Internet	298
17	Add-On Servers and Disk Management	301
17.1	External File Server	301
17.1.1	Automatic File Sharing.....	302
17.2	Disk Management	304
17.2.1	Disk Partitions	306
17.2.1.1	Connecting a Mass Storage Device	306
17.2.1.2	Formatting a Partition	309
17.2.1.3	Checking a Partition	310
17.2.1.4	Deleting a Partition	310
17.2.2	System Storage Area.....	311
17.2.3	RAID Management	313
17.2.3.1	Creating a RAID Device	313
17.2.3.2	Using a RAID Device.....	315
17.2.3.3	Maintaining a RAID Device	315
17.2.3.4	Replacing RAID Underlying Devices.....	315
17.3	Print Server	317
17.3.1	Connecting and Setting up a Printer on Windows	318
17.3.2	Print Protocols	319
17.3.2.1	Internet Printing Protocol.....	320
17.3.2.2	Microsoft Shared Printing (Samba)	328
17.3.2.3	Line Printer Daemon (LPD)	331
17.3.3	Storing and Using Printer Drivers	339
18	Media Sharing.....	341
18.1	Share Music, Pictures and Video on My Local Network	342
18.2	Automatically Share Media in All Folders.....	343
19	Maintenance	345
19.1	Enabling the Feature Key	345
19.2	Viewing the Device Software Version	347
19.3	Configuring Date and Time.....	348
19.4	Backup and Restore	350
19.4.1	Backing up Data	350
19.4.2	Restoring Data.....	352
19.5	Configuration File	353
19.5.1	Uploading Configuration File from PC on the Network.....	355
19.5.2	Uploading Configuration File from a Remote Server.....	357
19.5.3	Encrypting the Configuration File using CLI	359
19.5.4	Automatic Upload using SIP NOTIFY Message	360
19.6	Firmware Upgrade.....	361
19.6.1	Upgrading the Device from a Computer on the Network.....	362
19.6.2	Upgrading the Device from the Internet.....	364
19.7	Configuring System Settings	366
19.8	Rebooting the Device	369

19.9 Restoring Factory Settings	370
20 Diagnostics and Performance Monitoring	371
20.1 Diagnostics.....	371
20.1.1 Running the Ping Test	372
20.1.2 Running the ARP Test.....	372
20.1.3 Running a Traceroute	373
20.1.4 Running the PVC Scan Test.....	373
20.1.5 Running the OAM Ping Test.....	374
20.2 Performance Monitoring	375
20.2.1 Viewing Network Connections Status.....	375
20.2.2 Viewing the System Log	376
20.2.3 Viewing CPU Statistics	377
20.2.4 Viewing VoIP Traffic Statistics.....	381
20.2.5 Viewing Internet Connection Utilization	382
21 Local Support and Troubleshooting.....	383
Device Cordless DECT Phone	387
22 Overview	389
23 Safety Instructions	391
24 Getting Started	393
24.1 Installing the DECT Phone	393
24.2 Powering the Handset	394
24.2.1 Charging the Handset.....	394
24.2.2 Checking the Battery Level.....	395
24.2.3 Switching the Base Unit On or Off.....	395
24.2.4 Switching the Handset On or Off.....	395
24.2.5 Replacing the Batteries.....	396
24.3 Getting to Know Your Phone	397
24.3.1 Overview of the Handset	397
24.3.2 Handset LCD Screen Description.....	400
24.3.2.1 Menu Structure	401
24.3.2.2 Entering Text and Digits	403
24.3.3 Viewing the Device Base Unit Status using DECT LED.....	404
24.4 Upgrading the Device and the Base Unit	405
24.5 Defining the Device Handset Line.....	406
24.6 Registering the Handset to Base Unit	407
24.7 Checking the Handset Signal Strength	408
25 General Phone Operation	409
25.1 Making an External Call.....	409
25.1.1 Pre-dialing.....	409
25.1.2 Direct Dialing	409
25.1.3 Calling from your Phonebook	409
25.1.4 Calling from the Call List.....	410
25.1.5 Establishing a Second Call.....	410
25.1.6 Redialing a Number	410
25.2 Answering a Call	411
25.3 Answering or Rejecting a Second Call.....	411
25.4 Ending a Call	411

25.5	Adjusting Earpiece and Speakerphone Volume During a Call	412
25.6	Muting a Call	412
25.7	Rejecting Incoming Calls	412
25.8	Turning Off the Ringer	413
25.9	Using the Speakerphone	413
25.10	Redial List	414
25.10.1	Saving a Redial Number to the Phonebook	414
25.10.2	Deleting a Number from the Redial List.....	415
25.10.3	Deleting the Entire Redial List	415
25.11	Locking the Keypad	416
25.12	Paging the Handset.....	416
25.13	Call Handling for Multiple, Registered Handsets.....	417
25.13.1	Calling (Intercom) another Handset.....	417
25.13.2	Transferring an External Call to Another Extension	417
25.13.2.1	Announced Call Transfer.....	417
25.13.2.2	Unannounced Call Transfer	418
25.13.3	Transferring an External Call to another External Call	418
25.13.4	Toggling between External and Internal Calls	418
25.13.5	Three-Way Conference Calls	419
25.13.5.1	Making a Three-Way Conference Call with another Handset and an External Party	419
25.13.5.2	Making a Three-Way Conference Call with your Handset and two External Calls.....	419
26	Phonebook.....	421
26.1	Adding a New Contact	421
26.2	Editing a Contact	422
26.3	Viewing Contacts.....	422
26.4	Deleting a Contact.....	423
26.5	Deleting All Contacts	424
27	Call List	425
27.1	Viewing the Call List	425
27.2	Saving a Call List Number to the Phonebook.....	426
27.3	Dialing a Call List Number	426
27.4	Deleting a Call List Number	427
27.5	Deleting the Entire Call List	428
28	Retrieving Voice Messages	429
29	Clock and Alarm	431
29.1	Date and Time.....	431
29.1.1	Changing the Date Format	431
29.1.2	Changing the Time Format.....	431
29.1.3	Setting the Time and Date	432
29.2	Alarm.....	433
29.2.1	Setting the Alarm	433
29.2.2	Defining the Alarm Melody.....	434
29.2.3	Disabling the Alarm.....	434
29.2.4	Switching Off or Snoozing the Alarm	434
30	Customizing the Handset	435
30.1	Adjusting Speaker and Earpiece Volume.....	435

30.2	Ring Settings	436
30.2.1	Choosing the Internal Ringer Melody	436
30.2.2	Choosing the External Ringer Melody	436
30.2.3	Adjusting the Ringer Volume	437
30.3	Alert Tones	438
30.3.1	Setting the Key Tone	438
30.3.2	Setting the Battery Low Tone	438
30.4	Setting the Display Language	439
30.5	Selecting a Wallpaper	439
30.6	Setting the Contrast Level	439
30.7	Activating or Deactivating Automatic Answer	440
30.8	Selecting a Base Station	440
30.9	Resetting Handset to Factory Defaults	441
31	Base Settings	443
31.1	Manage Handsets	443
31.1.1	Renaming the Handset	443
31.1.2	De-Registering a Handset	444
31.2	Changing the PIN Number	445
31.3	Resetting the Base to Factory Defaults	445
31.4	Viewing the Product Version	446
32	Factory Defaults	447
33	Troubleshooting	449
Appendices		451
A	Backup Battery Pack	453
B	Specifications	459

List of Figures

Figure 1-1: Device Typical Application (e.g., MP-264)	25
Figure 3-1: Front Panel of Models without DECT (e.g., MP-264)	29
Figure 3-2: Front Panel of Models with DECT (e.g., MP-264-DB)	30
Figure 3-3: Rear Panel Model (e.g., MP-264-DB)	34
Figure 3-4: Cabling the Device (e.g., MP-264)	37
Figure 3-5: Wall Mount Bracket (e.g., MP-264)	39
Figure 3-6: Attaching Phone Base to Wall Mount	40
Figure 4-1: Language Selection (e.g., MP-264)	43
Figure 4-2: Login Screen	43
Figure 4-3: WAN ATM over DSL	44
Figure 4-4: Automatic IP Address WAN Ethernet Connection	45
Figure 4-5: WAN 3G USB Modem	46
Figure 4-6: Advanced 3G Settings	46
Figure 4-7: Wi-Fi Settings	47
Figure 4-8: Signaling Protocol	48
Figure 4-9: Line Settings	48
Figure 4-10: Line Settings	49
Figure 5-1: Login Screen	51
Figure 5-2: Typical Table Structure	55
Figure 5-3: Users Screen	56
Figure 5-4: Users Settings Screen	57
Figure 5-5: Group Settings Screen	58
Figure 5-6: Scheduler Rules Screen	59
Figure 5-7: Edit Scheduler Rule Screen	59
Figure 5-8: Edit Time Segment Screen	60
Figure 5-9: Edit Hour Range Screen	60
Figure 5-10: Network Objects Screen	61
Figure 5-11: Edit Network Objects Screen	61
Figure 5-12: Edit Item Screen	62
Figure 5-13: Advanced - Protocols	63
Figure 5-14: Advanced - Protocols - Edit Service	64
Figure 5-15: Advanced - Protocols - Edit Service - Server Ports	64
Figure 6-1: Map View Screen (e.g., MP-264)	65
Figure 7-1: Internet Protocol (TCP/IP) Properties Dialog Box	70
Figure 7-2: Available Wireless Networks (e.g., MP-264)	71
Figure 7-3: Connect to a Network – PIN Code	72
Figure 8-1: Quick Setup Screen	74
Figure 8-2: PPPoE WAN DSL Internet Connection	75
Figure 8-3: PPPoA WAN DSL Internet Connection	76
Figure 8-4: Routed ETHoA WAN DSL Internet Connection	76
Figure 8-5: Bridged ETHoA WAN DSL Internet Connection	76
Figure 8-6: PTM Manual IP Address Ethernet Connection	77
Figure 8-7: PTM Automatic IP Address Ethernet Connection	78
Figure 8-8: PTM Point-to-Point Protocol over Ethernet (PPPoE)	78
Figure 8-9: PTM Point-to-Point Tunneling Protocol (PPTP)	79
Figure 8-10: PTM Layer 2 Tunneling Protocol (L2TP)	79
Figure 8-11: WAN Ethernet - Manual IP Address Ethernet Connection	80
Figure 8-12: Automatic IP Address WAN Ethernet Connection	81
Figure 8-13: PPPoE WAN Ethernet Connection	81
Figure 8-14: PPTP WAN Ethernet Connection	82
Figure 8-15: L2TP WAN Ethernet Connection	83
Figure 8-16: Wireless Group in Quick Setup Screen	88
Figure 9-1: Signaling Protocol Tab Screen	90
Figure 9-2: Configuring Proxy Redundancy	96
Figure 9-3: Dialing Tab Screen	97
Figure 9-4: Media Streaming Tab Screen	102
Figure 9-5: Voice and Fax Tab Screen	104

Figure 9-6: Services Tab Screen.....	108
Figure 9-7: Sound Recorder	111
Figure 9-8: Save As Dialog Box	112
Figure 9-9: Sound Selection Dialog box.....	112
Figure 9-10: Audacity Window	113
Figure 9-11: Export File Dialog Box	114
Figure 9-12: Specify Uncompressed Options Dialog Box	114
Figure 9-13: Auto Attendant Web Fields	116
Figure 9-14: Line Settings Tab	116
Figure 9-15: Line Settings Tab Screen.....	117
Figure 9-16: Line Settings Screen for a New Line	118
Figure 9-17: Extension Settings Tab Screen.....	119
Figure 9-18: Extension Settings Screen.....	120
Figure 9-19: Speed Dial Tab Screen.....	121
Figure 9-20: Speed Dial Settings Screen (Proxy Destination)	121
Figure 9-21: Speed Dial Settings Screen (Local Line Destination)	122
Figure 9-22: Speed Dial Settings Screen (Direct Call Destination).....	122
Figure 9-23: Telephone Interface Tab Screen	123
Figure 9-24: Bluetooth Screen (e.g., MP-264)	124
Figure 9-25: Device Names Screen	125
Figure 9-26: Bluetooth Initial Screen (e.g., MP-264).....	125
Figure 9-27: Unpairing Device Screen	126
Figure 9-28: Auto Connect Screen.....	126
Figure 9-29: Bluetooth Tab Screen (e.g., MP-264)	127
Figure 9-30: Bluetooth Initial Screen (e.g., MP-264).....	129
Figure 9-31: Phonebooks Screen.....	129
Figure 9-32: Bluetooth Initial Screen	130
Figure 11-1: QoS Wizard Tab Screen.....	136
Figure 11-2: Quality of Service – Traffic Shaping Screen	138
Figure 11-3: Add Device Traffic Shaping Screen	138
Figure 11-4: Edit Device Traffic Shaping Screen	139
Figure 11-5: Add Shaping Class Screen.....	140
Figure 11-6: Edit Shaping Class.....	140
Figure 11-7: Traffic Priority Screen	144
Figure 11-8: Add Traffic Priority Rule Screen.....	145
Figure 11-9: DSCP Settings Screen.....	147
Figure 11-10: Edit DSCP Settings.....	148
Figure 11-11: 802.1p Settings Screen.....	149
Figure 11-12: Class Statistics Screen	150
Figure 11-13: Edit Device Traffic Shaping.....	151
Figure 11-14: QoS - Edit Device Traffic Shaping - Submitting the Configuration	152
Figure 12-1: Network Connections Screen	154
Figure 12-2: Connection Wizard Screen	154
Figure 12-3: WAN ATM over DSL Properties.....	155
Figure 12-4: WAN PTM over DSL Properties.....	156
Figure 12-5: Determine Protocol Type Automatically (PVC Scan) Screen	157
Figure 12-6: Scan User Defined VPI/VCI Screen.....	157
Figure 12-7: DSL PVC Parameters Configuration Screen	158
Figure 12-8: Configuring Point-to-Point Protocol over Ethernet (PPPoE) Screen	158
Figure 12-9: Connection Summary Screen	159
Figure 12-10: DSL PVC Parameters Configuration Screen	160
Figure 12-11: Point-to-Point Protocol over ATM (PPPoA) Screen.....	160
Figure 12-12: Connection Summary Screen	161
Figure 12-13: DSL PVC Parameters Configuration Screen	162
Figure 12-14: Ethernet Connection over ATM (ETHoA) Screen	162
Figure 12-15: Connection Summary Screen	163
Figure 12-16: Routed IP over ATM (IPoA) Screen.....	163
Figure 12-17: Connection Summary Screen	164
Figure 12-18: Internet Connection.....	165

Figure 12-19: Point-to-Point Protocol over Ethernet (PPPoE) Screen.....	165
Figure 12-20: PPPoE Connection Summary.....	166
Figure 12-21: Internet Connection – Underlying Device	166
Figure 12-22: Internet Connection – External Cable Modem	167
Figure 12-23: Internet Cable Modem Connection - Ethernet	167
Figure 12-24: Ethernet Connection Summary.....	167
Figure 12-25: Internet Connection – Underlying Device	169
Figure 12-26: Internet Connection – External Cable Modem.....	169
Figure 12-27: Internet Cable Modem Connection - L2TP	170
Figure 12-28: Layer 2 Tunneling Protocol (L2TP) Screen	170
Figure 12-29: L2TP Connection Summary.....	171
Figure 12-30: Internet Connection – Underlying Device	172
Figure 12-31: Internet Connection – External Cable Modem.....	172
Figure 12-32: Internet Connection – External Cable Modem.....	173
Figure 12-33: Ethernet Connection Screen.....	173
Figure 12-34: DHCP Connection Summary	173
Figure 12-35: Internet Connection – Underlying Device	174
Figure 12-36: Internet Connection – Ethernet Connection (e.g., MP-264)	174
Figure 12-37: Ethernet Connection Screen.....	175
Figure 12-38: Manual IP Address Configuration Screen.....	175
Figure 12-39: Manual IP Connection Summary	176
Figure 12-40: Network Connections Screen Displaying LAN Wireless Interface.....	177
Figure 12-41: LAN Wireless 802.11n Access Point Properties (General Tab) Screen.....	178
Figure 12-42: LAN Wireless 802.11 Access Point Properties (Settings Tab) Screen.....	179
Figure 12-43: LAN Wireless 802.11 Access Point Properties (Wireless Tab) Screen.....	180
Figure 12-44: Wireless Network Group in Wireless Tab Screen.....	181
Figure 12-45: MAC Filtering	182
Figure 12-46: MAC Filtering Settings	182
Figure 12-47: MAC Address Added to MAC Filtering Table	182
Figure 12-48: Network Connections.....	183
Figure 12-49: LAN Wireless 802.11n Access Point Properties.....	184
Figure 12-50: Wireless Tab – WPS.....	185
Figure 12-51: Click Go Button	186
Figure 12-52: Registration Successfully Completed	186
Figure 12-53: Client Pin Code	187
Figure 12-54: WPS Group in Wireless Tab Screen	188
Figure 12-55: Configuring WPA Security	189
Figure 12-56: Configuring WPA2 Security	190
Figure 12-57: Configuring Non-WEP Security.....	190
Figure 12-58: Configuring Encryption Key in Windows Wireless Client.....	191
Figure 12-59: Configuring Authentication Only Security	192
Figure 12-60: Transmission Parameters in Wireless Tab Screen.....	193
Figure 12-61: Virtual APs Table	194
Figure 12-62: New Virtual AP	194
Figure 12-63: Firewall Blocking Access to All Other LANs	195
Figure 12-64: Example Virtual AP	196
Figure 12-65: Wireless Advanced Tab	197
Figure 12-66: Network Connections Screen	198
Figure 12-67: LAN Hardware Ethernet Switch Screen.....	198
Figure 12-68: LAN Hardware Ethernet Switch Screen – Settings Tab	199
Figure 12-69: LAN Hardware Ethernet Switch Screen – Switch Tab.....	200
Figure 12-70: Port Settings Screen	200
Figure 12-71: LAN Hardware Ethernet Switch Screen – Advanced Tab	201
Figure 12-72: Editing Connection - General Tab (For Example, WAN Ethernet)	202
Figure 12-73: Editing Connection - Settings Tab (For Example, WAN Ethernet)	203
Figure 12-74: Automatically Obtaining an IP Address	204
Figure 12-75: Manually Defining DNS Server	205
Figure 12-76: IP Address Distribution - DHCP Server	206
Figure 12-77: IP Address Distribution - DHCP Relay.....	206

Figure 12-78: DHCP Relay Server Address	206
Figure 12-79: Editing Connection - Routing Tab (For Example, WAN Ethernet)	207
Figure 12-80: Route Settings Screen	208
Figure 12-81: Editing Connection - PPP Tab	209
Figure 12-82: Editing Connection - PPTP Tab	211
Figure 12-83: Editing Connection - Advanced Tab (For Example, WAN Ethernet)	212
Figure 12-84: Additional IP Address Settings Screen	212
Figure 12-85: Connection Wizard Screen	213
Figure 12-86: Advanced Connection	214
Figure 12-87: VLAN Interface	214
Figure 12-88: Connection Summary	215
Figure 12-89: IP Address Distribution - DHCP Server	217
Figure 12-90: IP Address Distribution - DHCP Relay	218
Figure 12-91: DHCP Relay Server Address	218
Figure 12-92: IP Address Distribution - Disable DHCP	218
Figure 12-93: Advanced Routing Properties	219
Figure 12-94: Internet Connection Firewall	220
Figure 12-95: Bridge Options	221
Figure 12-96: Network Bridging Screen	221
Figure 12-97: Adding New Network Bridging	222
Figure 12-98: Connection Summary - Configure Existing Bridge	222
Figure 12-99: Bridging Tab	223
Figure 12-100: VLAN Settings Screen	224
Figure 12-101: Bridge Filter Screen	224
Figure 13-1: Remote Management Interfaces (e.g., MP-264)	226
Figure 13-2: Remote Administration Screen	231
Figure 13-3: New Certificates Screen (e.g., MP-264)	232
Figure 13-4: Create Self Signed X509 Certificate Screen	233
Figure 13-5: New Self Signed X509 Certificate Screen (e.g., MP-264)	233
Figure 13-6: Newly Created Self-Signed Certificate (e.g., MP-264)	233
Figure 13-7: File Download Window (e.g., MP-264)	234
Figure 13-8: Load MP264's Local Certificate (e.g., MP-264)	234
Figure 13-9: CA's Certificates Page (e.g., MP-264)	235
Figure 13-10: Load CA's Certificate Page	235
Figure 13-11: TR-069 CPE WAN Management Protocol (e.g., MP-264)	237
Figure 14-1: Firewall in Action (e.g., MP-264)	253
Figure 14-2: General Security Level Settings	254
Figure 14-3: Access Control	256
Figure 14-4: Add Access Control Rule	256
Figure 14-5: Port Forwarding Screen	259
Figure 14-6: Add Port Forwarding Rule	259
Figure 14-7: Selecting Protocol Type	259
Figure 14-8: Specifying Public IP Address	260
Figure 14-9: Select Check Box of Port Forwarding Rule (Active)	261
Figure 14-10: DMZ Host	262
Figure 14-11: Port Triggering	263
Figure 14-12: Adding Port Triggering Rules	264
Figure 14-13: Edit Service Server Ports	264
Figure 14-14: Edit Service Server Ports	264
Figure 14-15: Edit Service Opened Ports	265
Figure 14-16: New Port Triggering Rule	265
Figure 14-17: Website Restrictions	266
Figure 14-18: Restricted Website	266
Figure 14-19: Add a Specific Host	267
Figure 14-20: Add a Specific Schedule	267
Figure 14-21: NAT Screen	269
Figure 14-22: Adding a NAT IP Address	269
Figure 14-23: Adding NAT/NAPT Rule	270
Figure 14-24: Connections Screen	272

Figure 14-25: Advanced Filtering	273
Figure 14-26: Add Advanced Filter.....	274
Figure 14-27: Add a Specific Host.....	275
Figure 14-28: Set Priority Rule	275
Figure 14-29: Security Log	277
Figure 14-30: Security Log Settings	278
Figure 15-1: DHCP Server Summary.....	282
Figure 15-2: DHCP Settings Screen	282
Figure 15-3: DHCP Settings.....	283
Figure 15-4: DHCP Relay Server Address Screen	283
Figure 15-5: DHCP Connection Screen	284
Figure 15-6: DHCP Connection Settings Screen	285
Figure 15-7: DNS Server	286
Figure 15-8: DNS Entry	286
Figure 15-9: Personal Domain Name (Dynamic DNS) Screen	288
Figure 15-10: Personal Domain Name (Dynamic DNS) - Adding	289
Figure 15-11: Routing Rules	291
Figure 15-12: Route Settings Screen	291
Figure 15-13: PPPoE Relay Screen.....	293
Figure 15-14: Regional Settings Screen	294
Figure 16-1: Advanced - Universal Plug n Play (e.g., MP-264)	295
Figure 16-2: My Network Places (e.g., MP-264)	296
Figure 16-3: Internet Connection Status	297
Figure 16-4: Internet Connection Properties (e.g., MP-264)	298
Figure 16-5: Advanced Settings	299
Figure 16-6: Service Settings	299
Figure 16-7: Service Settings – Add Service.....	300
Figure 17-1: File Server Screen	301
Figure 17-2: File Server Share Settings Screen.....	302
Figure 17-3: User Screen	303
Figure 17-4: File Server Screen with the Share	303
Figure 17-5: Disk Management Screen.....	304
Figure 17-6: Manually Defining System Storage Area	305
Figure 17-7: Disk Information	306
Figure 17-8: Partition Type	307
Figure 17-9: Partition Size	307
Figure 17-10: Partition Format	307
Figure 17-11: Partition File System	308
Figure 17-12: Partition Summary	308
Figure 17-13: Formatting Complete – Partition Ready.....	308
Figure 17-14: Partition Properties	309
Figure 17-15: Partition Format	309
Figure 17-16: Partition Format	310
Figure 17-17: Disk Management Screen – Check Box Cleared	312
Figure 17-18: RAID Properties Screen.....	313
Figure 17-19: Partition Format Screen	314
Figure 17-20: Partition File System Screen.....	314
Figure 17-21: Partition Summary Screen	314
Figure 17-22: Added RAID Devices	315
Figure 17-23: Advanced – Print Server Screen.....	317
Figure 17-24: Advanced – Printer Screen	318
Figure 17-25: Disk and Printer Shares	318
Figure 17-26: Printer Screen – IPP URL (Windows).....	320
Figure 17-27: Local or Network Printer	321
Figure 17-28: Specify a Printer.....	321
Figure 17-29: Printer Screen – IPP URL (Linux)	322
Figure 17-30: Linux CUPS Management	322
Figure 17-31: Add Printer	323
Figure 17-32: Printer Name	323

Figure 17-33: Printing Protocol.....	324
Figure 17-34: IPP URL	324
Figure 17-35: Print & Fax	325
Figure 17-36: Printer Browser – IP Printer	326
Figure 17-37: Print & Fax – New IPP Printer.....	327
Figure 17-38: Print & Fax	328
Figure 17-39: Printer Browser – Default Browser	329
Figure 17-40: Printer Browser – More Printers.....	329
Figure 17-41: Printer Browser – MP264.....	330
Figure 17-42: Printer Browser – Printer Model (e.g., MP-264).....	330
Figure 17-43: Print & Fax – New Samba Printer	331
Figure 17-44: Local Printer	332
Figure 17-45: Select a Printer Port.....	332
Figure 17-46: Add Port	333
Figure 17-47: Additional Port Information.....	333
Figure 17-48: Printer Port Monitor Configuration	334
Figure 17-49: Add Printer Wizard.....	335
Figure 17-50: Print & Fax	336
Figure 17-51: Printer Browser – LPD Printer.....	337
Figure 17-52: Print & Fax – New LPD Printer	338
Figure 17-53: Disk and Printer Shares (e.g., MP-264).....	339
Figure 18-1: Media Sharing Screen	341
Figure 18-2: Media Sharing Screen - Expanded	343
Figure 18-3: Folder Settings	343
Figure 18-4: Shared Partitions.....	344
Figure 19-1: Feature Key Screen	345
Figure 19-2: Reboot Screen	346
Figure 19-3: About Screen (e.g., MP-264)	347
Figure 19-4: Date and Time Screen	348
Figure 19-5: Time Server Settings Screen	349
Figure 19-6: Backup and Restore Screen	350
Figure 19-7: Edit Backup Screen	351
Figure 19-8: Restore Screen	352
Figure 19-9: Configuration File Screen	353
Figure 19-10: Upload Configuration File (e.g., MP-264)	355
Figure 19-11: Loading Configuration File from a PC on the Network	355
Figure 19-12: Successful Configuration File Uploading (e.g., MP-264).....	355
Figure 19-13: Upload Configuration File (e.g., MP-264)	357
Figure 19-14: Firmware Upgrade Screen (e.g., MP-264).....	362
Figure 19-15: Upgrade From a Computer in the Network Screen	363
Figure 19-16: Confirming Firmware Upgrade Screen (e.g., MP-264)	363
Figure 19-17: Upgrading in Progress Screen.....	363
Figure 19-18: Firmware Upgrade (e.g., MP-264)	364
Figure 19-19: Partial View System Settings Screen (e.g., MP-264)	366
Figure 19-20: Reboot Screen (e.g., MP-264)	369
Figure 19-21: Restore Factory Settings Screen.....	370
Figure 20-1: Diagnostics Screen	371
Figure 20-2: Running a Ping Test	372
Figure 20-3: Running an ARP Test	372
Figure 20-4: Running a Traceroute	373
Figure 20-5: Running a PVC Scan	373
Figure 20-6: Running an OAM Ping Test	374
Figure 20-7: Network Connections Screen	375
Figure 20-8: System Log Screen.....	376
Figure 20-9: CPU Screen	379
Figure 20-10: VoIP Screen	381
Figure 20-11: Internet Connection Utilization – By Computer Screen	382
Figure 20-12: Internet Connection Utilization – By Application Screen	382
Figure 21-1: No Internet Connection Error	383

Figure 21-2: Example - No VoIP Service / Service Not Configured Error	384
Figure 24-1: Plastic Tab Jutting out from Battery Compartment.....	393
Figure 24-2: Attaching Handset Cradle to Base Unit (e.g., MP-264)	393
Figure 24-3: Handset Charging in Cradle.....	394
Figure 24-4: Installing Batteries.....	396
Figure 24-5: Areas of the Handset	397
Figure 24-6: Areas of the Handset LCD Screen.....	400
Figure 24-7: Handset Keypad	403
Figure 24-8: About MP264 Screen (e.g., MP-264).....	405
Figure 24-9: Line Settings Screen.....	406
Figure 24-10: Defining Line 1 Properties.....	406
Figure A-1: Backup Battery Pack	455

List of Tables

Table 1-1: Available Models	24
Table 3-1: Front-Panel Buttons Description	30
Table 3-2: Front-Panel LEDs Description.....	31
Table 3-3: Front-Panel LED Descriptions for Automatic Dialer Feature	33
Table 3-4: Rear-Panel Ports Description (e.g., MP-264-DB)	35
Table 3-5: Rear-Panel LEDs Description	36
Table 5-1: Menu Description	52
Table 5-2: Table Action Icons Description.....	55
Table 6-1: Map View Icon Description.....	66
Table 9-1: Signaling Protocol Tab Parameters Description	91
Table 9-2: Dialing Tab Parameters Description	98
Table 9-3: Dial Plan (for Left of '=' Sign) and Digit Map Syntax	100
Table 9-4: Digit Map Example	101
Table 9-5: Media Streaming Tab Parameters Description	103
Table 9-6: Voice and Fax Tab Parameters Description	105
Table 9-7: Services Tab Parameters Description	109
Table 12-1: Wireless Tab – Basic Wireless Access Point Parameters Description.....	181
Table 12-2: Settings Tab - Parameter Descriptions	204
Table 12-3: Routing Parameters	207
Table 12-4: PPP Tab Parameter Descriptions	210
Table 12-5: PPTP Tab Parameter Descriptions	211
Table 12-6: VLAN Interface - General Communication Parameters	216
Table 12-7: IP Address Distribution Parameters.....	217
Table 12-8: DHCP Relay	217
Table 12-9: Assigning Static IP Addresses to Network Computers	218
Table 12-10: Routing Parameters	219
Table 13-1: Main Configuration Parameter Groups	226
Table 13-2: Status and Performance Monitoring Parameters.....	228
Table 13-3: Notifications and Logged Events	229
Table 13-4: Severity of Logged Events	229
Table 13-5: Operations per Configuration/Management Interface.....	236
Table 13-6: InternetGatewayDevice.WANDevice.i.WANConnectionDevice.i.WANIPConnection.i.....	238
Table 13-7: InternetGatewayDevice.LANDevice.i.LANEthernetInterfaceConfig.....	240
Table 13-8: InternetGatewayDevice.LANDevice.i.LANHostConfigManagement.....	240
Table 13-9: InternetGatewayDevice.Services.VoiceService.i.Capabilities	241
Table 13-10: InternetGatewayDevice.Services.VoiceService.i.Capabilities.Codecs	244
Table 13-11: InternetGatewayDevice.Services.VoiceService.i.VoiceProfile.....	244
Table 13-12: InternetGatewayDevice.Services.VoiceService.i.VoiceProfile.i.SIP	245
Table 13-13: InternetGatewayDevice.DeviceInfo.....	246
Table 13-14: InternetGatewayDevice.WANDevice.i.WANConnectionDevice.i. WANIPConnection.i.Stats.....	247
Table 13-15: InternetGatewayDevice.LANDevice.i.LANEthernetInterfaceConfig.i.Stats	248
Table 13-16: InternetGatewayDevice.Services.VoiceService.i.VoiceProfile.i.Line.i.Stats	248
Table 14-1: Behavior for the Three Security Levels.....	255
Table 17-1: IPP, Samba, and LPD Specifications.....	319
Table 21-1: LST Messages in Web Interface	383
Table 21-2: LST Voice Messages	384
Table 21-3: Field Descriptions.....	385
Table 24-1: Handset Description	398
Table 24-2: Handset LCD Icon Descriptions	400
Table 24-3: Handset LCD Menus and Submenus	401
Table 24-4: Handset LCD Menus and Submenus Accessed using Navigation Keys	402
Table 24-5: DECT LED Description	404
Table 32-1: Factory Defaults	447
Table 33-1: Troubleshooting.....	449
Table A-1: Backup Battery Pack LED Descriptions	456
Table A-2: Backup Battery Pack Environment Operating Conditions	457

Table B-1: Router and VoIP Software Specifications (e.g., MP-264)	459
Table B-2: DECT Phone Specifications (e.g., MP-264)	463

Reader's Notes

Notice

This document describes the installation and configuration of AudioCodes MP26x/MP27x Multimedia Home Gateway Version 4.4.0.

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Date Published: July-22-2014

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WEEE EU Directive

Pursuant to the WEEE EU Directive, electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.

Customer Support

Customer technical support and service are generally provided by AudioCodes' Distributors, Partners, and Resellers from whom the product was purchased. For technical support for products purchased directly from AudioCodes, or for customers subscribed to AudioCodes Customer Technical Support (ACTS), contact support@audiocodes.com.

Abbreviations and Terminology

Each abbreviation, unless widely used, is spelled out in full when first used. When the term 'device' is used, it refers to MP-264.

Regulatory Information

The Regulatory Information can be viewed at www.audiocodes.com/library.

Related Documentation

Document Name
MP-264 Multimedia Home Gateway Quick Guide

Warnings and Safety Information



Note: Open source software may have been added and/or amended for this product. For further information please visit our website at: <http://audiocodes.com/support> or contact your AudioCodes sales representative.



Warning: Before connecting MP-264 to power:

- Use only the AC/DC power adapter supplied with MP-264. Do not use any other power adapter. This power adapter is a 12 VDC +/-10%, tolerance, 2A, limited power source wall-mount Class II power supply adapter.
- Ensure that the VAC ratings match.
- Ensure that you have read the Regulatory Information, obtained from www.audiocodes.com/library.



Warning: The **Phone 1** and **Phone 2** ports are not specifically designed for 3-wire-connected equipment. 3-wire-connected equipment might not respond to incoming ringing when attached to these ports.

For Customers in Canada:

This Class [B] digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [B] est conforme à la norme NMB-003 du Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

The County Code Selection feature is disabled for products marketed in the US/Canada.

IC Radiation Exposure Statement

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

Documentation Feedback

AudioCodes continually strives to produce high quality documentation. If you have any comments (suggestions or errors) regarding this document, please fill out the Documentation Feedback form on our Web site at <http://www.audiocodes.com/downloads>

1 Introduction

The MP26x/MP27x Residential Gateway is a sophisticated, feature-rich, multimedia home gateway for broadband networks with multi-play support. With xDSL2+ modem, multiple antenna wireless LAN connectivity, Digital Enhanced Cordless Telecommunications (DECT) handsets supporting High Definition (HD) Voice-over-IP (VoIP), and optional battery backup, this is a true all-in-one gateway for Multi-play services.

**Notes:**

- Throughout this document, the term *device* is used to represent MP-262/MP-263/MP-264/MP-272 models.
- Throughout this document, screenshots displayed of the Web management interface use the MP-264 as an example.

The device is ideal for operators, seeking new revenue generators with state-of-the-art features, such as:

- ADSL2+/VDSL2 modem up to 100 Mbps
- 10/100/1000 Ethernet WAN port (optional connection to cable modem or FTTH ONU)
- Optional xDSL WAN backup using 3G USB dongles
- HD VoIP telephony and PBX capabilities, including flexible configuration of individual SIP accounts per DECT extension
- Four 10/100/1000 Ethernet LAN ports
- High-speed wireless network (802.11 b/g/n), up to 150 Mbps
- Router, Firewall, NAT and advanced traffic prioritization mechanisms
- Two FXS ports for analog phones and fax machines
- Guaranteed Quality of Service (QoS) for IPTV service
- Print server and File server, accessible from every computer on the home network
- Advanced TR-069 management, interoperable with leading Auto-Configuration Servers (ACS)
- Optional battery backup for up to four hours standby

The device is based on AudioCodes' MP-2xx line of Residential Gateways and AudioCodes VoIPerfect™ software architecture. The device is interoperable with various softswitches and supports advanced TR-069 management, working with market leading Auto-Configuration Servers (ACS). Other management tools, such as a friendly HTTP-based Web GUI, and Command Line Interface (CLI) are also available.

The device is available in the following models:

Table 1-1: Available Models

Model	WAN Access	LAN	Wi-Fi	FXS	DECT	USB 2.0	Bluetooth
MP-262	VDSL2 / ADSL2+ / Eth WAN	4 x FE*	802.11b/g/n	2	-	2	-
MP-262-DB	VDSL2 / ADSL2+ / Eth WAN	4 x FE*	802.11b/g/n	2	√	2	√
MP-264	VDSL2 / ADSL2+ / GbE WAN	4 x GbE*	802.11b/g/n	2	-	2	-
MP-264-DB	VDSL2 / ADSL2+ / GbE WAN	4 x GbE*	802.11b/g/n	2	√	2	√
MP-263	VDSL2 / ADSL2+ / GbE	4 x FE	802.11b/g/n	2	-	2	-
MP-263-DB	VDSL2 / ADSL2+ / GbE	4 x FE	802.11b/g/n	2	√	3	√
MP-272	GbE WAN	4 x FE	802.11b/g/n	2	-	2	-
MP-272-DB	GbE WAN	4 x FE	802.11b/g/n	2	√	2	√

*When Ethernet WAN is used, the number of LAN ports is reduced to 3.



Notes:

- FE refers to Fast Ethernet.
- The WAN Ethernet is the “last” port (4th in MP-262/4 and 5th in MP-263/MP-272). It automatically turns into a LAN port when the DSL is in use.

The figure below illustrates the typical applications supported by the device:

Figure 1-1: Device Typical Application (e.g., MP-264)



Reader's Notes

2 Package Contents and Prerequisites

The device is shipped with the following items:

- 1 x RJ-11 telephone cable
- 1 x RJ-45 Ethernet cable
- 12V AC/DC power adaptor (use only supplied)
- DECT handset and cradle

Make sure that all these items are included. If any items are missing, contact your sales representative.

The following prerequisites are required (not supplied by AudioCodes):

- A broadband Internet connection
- xDSL cable (if required)
- Analog telephones
- Additional RJ-11 telephone cable (if required)
- Additional RJ-45 Ethernet cables (if required)

Reader's Notes

3 Hardware Description

This section describes the physical description and cabling of the device.

3.1 Physical Description

The device provides ports, buttons, and LEDs on its front and rear panels.

3.1.1 Front Panel

The front panel provides LEDs for displaying various operating status and button(s) for activating various features such as Wi-Fi. The type of LEDs and buttons depend on the model. For more information on the LEDs, see Section 3.1.1.2 on page 31. For more information on the buttons, see Section 3.1.1.1 on page 30.

The figures below display the front panels of the MP-264 models.

Figure 3-1: Front Panel of Models without DECT (e.g., MP-264)

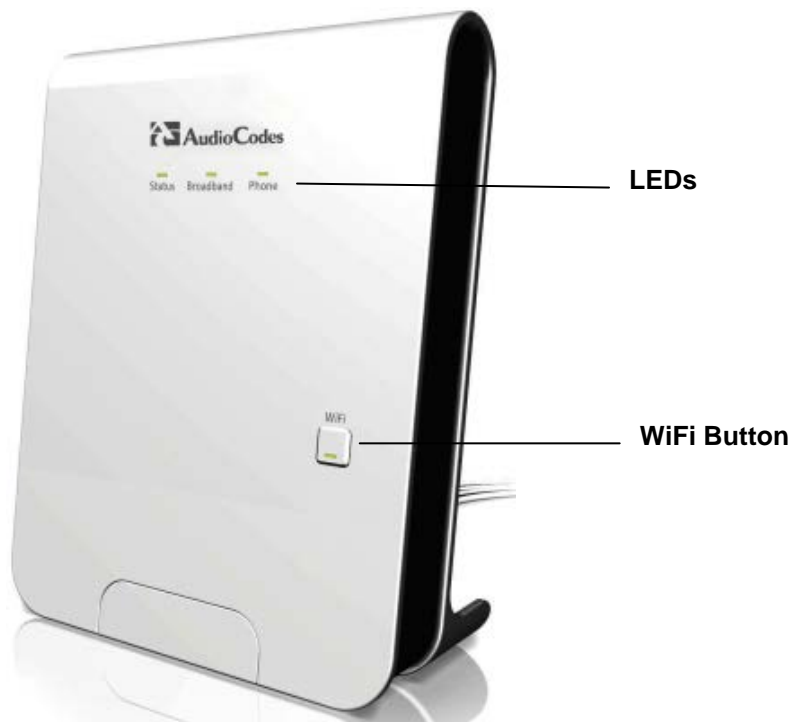


Figure 3-2: Front Panel of Models with DECT (e.g., MP-264-DB)



3.1.1.1 Front-Panel Buttons Description

The buttons on the front panel are described in the table below:

Table 3-1: Front-Panel Buttons Description

Label	Description
WiFi	Enables/disables Wi-Fi connectivity (802.11 b/g/n).
	Activates Wi-Fi Protected Setup (WPS)
DECT ¹	Registers the handset to the device base unit.
	Activates Paging mode.
	Enables/disables DECT.
Bluetooth ²	Enables/disables Bluetooth.
	Activates "Discoverable" feature.
	Downloads Phonebook.

¹

This button is available only on the MP-262-DB, MP-263-DB, MP-264-DB and MP-272-DB models.

²

This button is available only on the MP-262-DB, MP-263-DB, MP-264-DB and MP-272-DB models.

3.1.1.2 Front-Panel LEDs Description

The LEDs on the front panel are described for general functionality and for the Automatic Dialer feature.

Table 3-2: Front-Panel LEDs Description

LED	Color	State	Description
Status	Green	On	Device start-up successful
		Slow Blinking	Software upgrade in progress. Note: During software upgrade, the Broadband and Phone LEDs also blink green.
		Slow Blinking	Battery backup is in use and there is no power from the AC electrical outlet.
		Fast Blinking	Battery is low and there is no power from the AC electrical outlet.
	Red	On	Reboot (automatic, by default) or indicates a problem
Broadband	Green	On	WAN port is successfully connected and IP address acquired successfully
		Blinking	Software upgrade in progress
	Red	On	WAN IP address has not yet been acquired from the ISP (i.e. in the process of acquiring or has failed to acquire).
	-	Off	WAN Ethernet cable is not connected – no WAN link
Phone	Green	On	All configured phones are registered to the Proxy server
		Blinking	Software upgrade in progress
	Red	On	At least one of the phones failed to register to the Proxy server
	-	Off	No Proxy server is configured
WiFi	Green	On	Wi-Fi is enabled and active
	Red	Off	Wi-Fi is disabled
	Orange Green	Blinking	WPS is active
DECT	Green	On	DECT is enabled and there is at least one registered handset.
	Green	Flashing	Base is available for handset registration. To register a handset, see Section 24.4 on page 405.
	Green	Flash Fast	Base is being upgraded. Note: Do not power off the unit during the upgrade process.
	Red	On	The base unit is on but no handset is registered to it.
	Red	Flashing	Malfunction in DECT cordless phone.

LED	Color	State	Description
	Red	Flashes (3 times)	Attempting to register more than the allowed number of handsets to the base unit (i.e., more than five).
	Amber	Flashing	Handset is being paged. To page (locate) the handset, see Section 25.12 on page 416.
	-	Off	DECT is disabled.
Bluetooth	Red	Solid	Bluetooth is enabled but no device is connected.
	Red	Flashing	Malfunction in device.
	Green	Solid	Bluetooth is enabled and a mobile device is connected.
	Green	Slow Flashing	Bluetooth is 'Discoverable'.
	Green	Fast Flashing	Phone booth synchronization is in process.
	-	Off	Bluetooth is disabled.



Note: When the device is powered-up, the Status, Broadband and Phone LEDs are all lit in red for a few seconds and then green. The Status LED remains lit in red.

3.1.1.2.1 General LEDs Description

The general description of the device front-panel LEDs are described in the table below.
For a description of DECT LEDs, see Section 24.3.3 on page 404.

3.1.1.2.2 LEDs for Automatic Dialer Feature

The table below describes the front-panel LEDs behavior when the Automatic Dialer feature is used (described in detail in Section 8.1.3).

Table 3-3: Front-Panel LED Descriptions for Automatic Dialer Feature

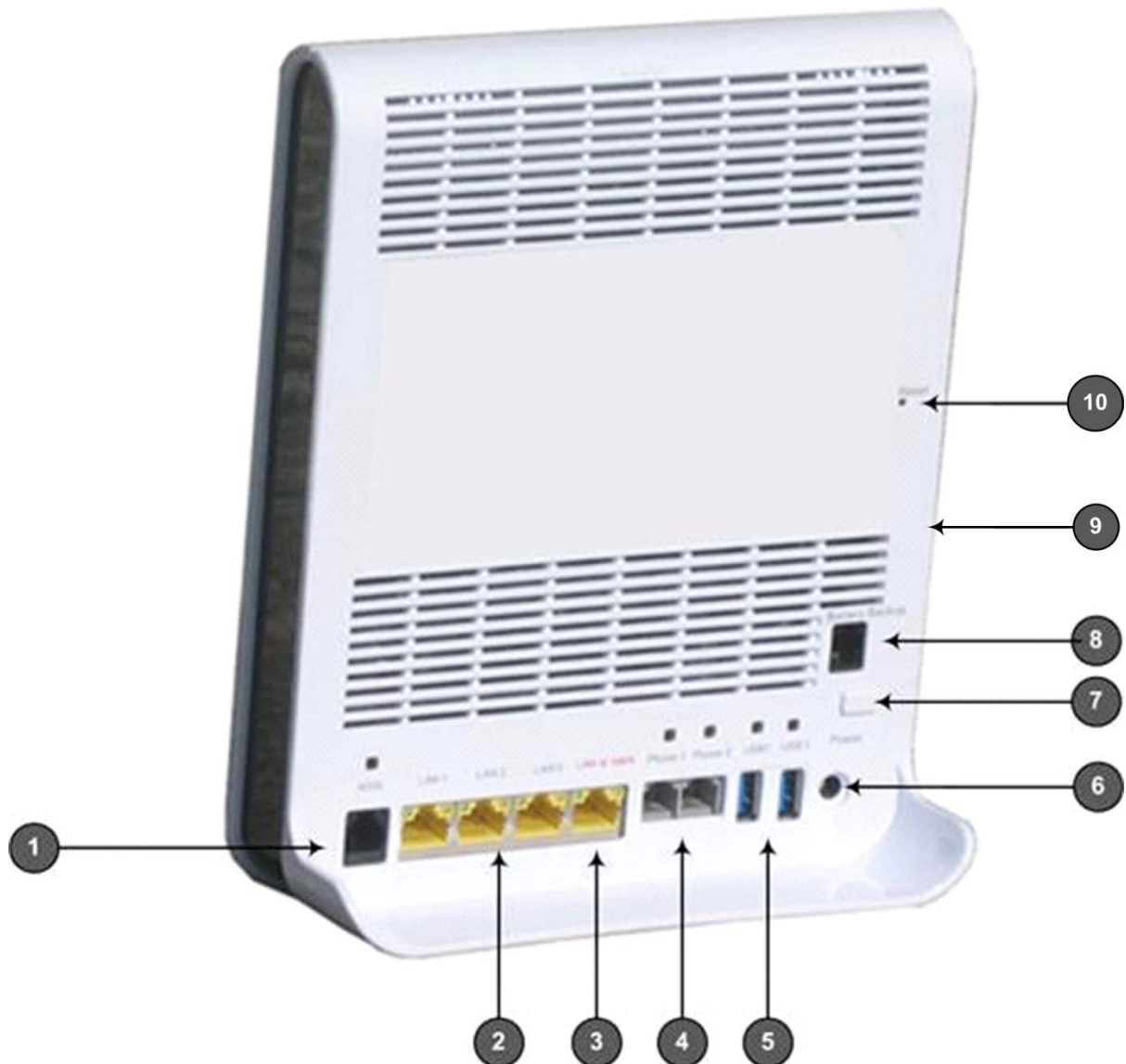
Stage	LED		
	Status	Broadband	Phone
Before WAN physical link detection	Green	Blinking Red	Off
During automatic dialer operation	Green	Blinking Green	Off
Automatic dialer success	Green	Green	Green*
Automatic dialer failure	Green	Red	Off

* The **Phone** LED lights green only after the device connects to the Internet, downloads its configuration file, and then registers to the VoIP service.

3.1.2 Rear Panel

The rear panel provides the ports for connecting the various interfaces. The figure below displays the rear panel of the device.

Figure 3-3: Rear Panel Model (e.g., MP-264-DB)



3.1.2.1 Device Rear-Panel Port Description

The ports of the rear panel are described in the table below:

Table 3-4: Rear-Panel Ports Description (e.g., MP-264-DB)

Item	Label	Description
1	xDSL	RJ-11 port for connecting xDSL/xDSL2+ modem (up to 24 Mbps)
2	LAN	3 x RJ-45 10/100/1000 Base-T Ethernet LAN ports
3	LAN/WAN	1 x RJ-45 10/100/1000 Base-T Ethernet LAN or Ethernet WAN port
4	Phone	2 x RJ-11 FXS ports for connecting analog phones and fax machines
5	USB ³	USB Type A port for print or file servers, or for optional WAN backup using a 3G USB dongle Note: The device provides only one USB port in this location.
6	Power	Power plug for connecting the supplied AC/DC power adapter. A button is located above this port to switch on the device.
7	On/Off	On/Off button
8	Battery Backup	Port for connecting an optional battery backup, providing up to four hours standby power. (The external battery backup system connects to this port and the Power plug using a splitter cable.)
9	USB1	USB port (located on the side panel, as shown in Figure 3-3)
10	Reset	Reset pin button for resetting the device

³ The MP-264-DB model provides two USB ports in this location.

3.1.2.2 Rear-Panel LEDs Description

The LEDs on the rear panel are described in the table below:

Table 3-5: Rear-Panel LEDs Description

LED	Color	State	Description
xDSL	Green	On	xDSL physical link is up
		Slow Blinking	xDSL link is synchronizing
		Fast Blinking	xDSL attempting to train (establishing a connection with the Internet Service Provider)
	-	Off	No physical xDSL link
LAN / WAN	Yellow	Slow Blinking	Connected at 10 Mbps
		Fast Blinking	Connected at 100 Mbps
		Steady On	Connected at 1000 Mbps
	Green	Blinking	Activity - there is traffic
		Steady On	There is no activity
	-	Both Off	Disconnected
Phone	Green	On	Phone is off-hook
		Slow Blinking	Phone is ringing
		Fast Blinking	The device is currently being upgraded
	-	Off	Phone is on-hook and not ringing
USB	Green	On	USB device is connected
		Off	No USB device is connected

3.2 Cabling the Device

The procedure below describes the cabling of the device.



Warning:

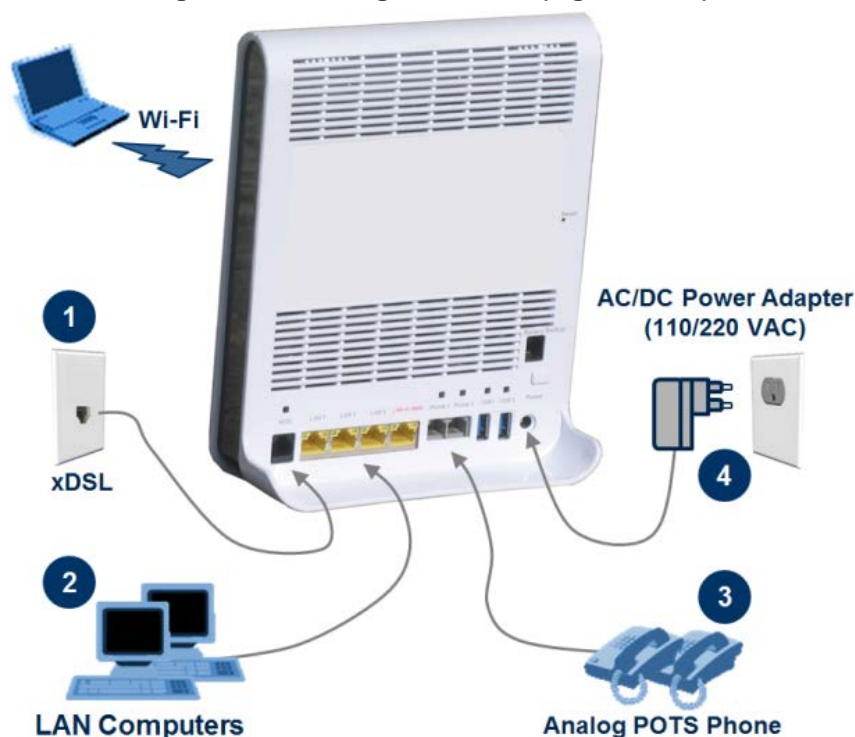
- Use **only** the AC/DC power adapter supplied with the device. Do not use any other power adapter.
- Ensure that the VAC ratings match.
- Ensure that you have read the device's Regulatory Information, obtained from www.audiocodes.com/library.



Note: The cabling procedures for the device models are identical and therefore, no distinction is made between the models in this section. However, for convenience, this section uses the MP-264-DB model as an example.

The figure below displays a summary of the cabling procedures.

Figure 3-4: Cabling the Device (e.g., MP-264)



➤ **To cable the device:**

1. Connect the device to the Internet. The cabling depends on the Internet connection:
 - **xDSL:** connect the xDSL port (located on the rear panel and labeled **xDSL**) to the telephone socket, using an RJ-11 telephone cable.
 - **WAN Ethernet:** connect the LAN4/WAN port (located on the rear panel and labeled **LAN 4/WAN**) to an external modem, using a CAT-5 Ethernet cable.



Note: Use minimum 26 AWG wire for cabling the xDSL port to the public switched telephone network (PSTN).

2. Connect the LAN Ethernet ports (labeled **LAN 1 - 4**) to your LAN computers, using RJ-45 CAT-5 Ethernet cables.
3. Connect the telephone ports (labeled **Phone 1 - 2**) to analog telephones, using RJ-11 telephone cables.
4. Connect the device to a standard 110/220 VAC electrical wall outlet, using the **supplied** AC/DC power adapter.

When the device is powered on, the **Status** LED is lit. After initialization completes (about two minutes), this LED changes from red to green. If no power is received by the device, press the **Power** button located on the rear panel to switch it on.

3.3 Mounting the Device

You can place the device on a desktop or mount it on a wall. For desktop mounting, the device provides integrated rubber feet on its base so that it sits firmly on a desktop. Alternatively, you can hang your device on a wall, using the supplied device wall-mounting bracket, as described in this section.

Wall mounting consists of the following main procedural stages:

- Preparing the mounting screws on the wall
- Hanging the mounting bracket on the wall
- Attaching the device to the mounting bracket

Before you begin, ensure that you have the following items:

- Wall-mounting bracket (supplied)
- 2 x screws
- 2 x wall anchors
- Screwdriver

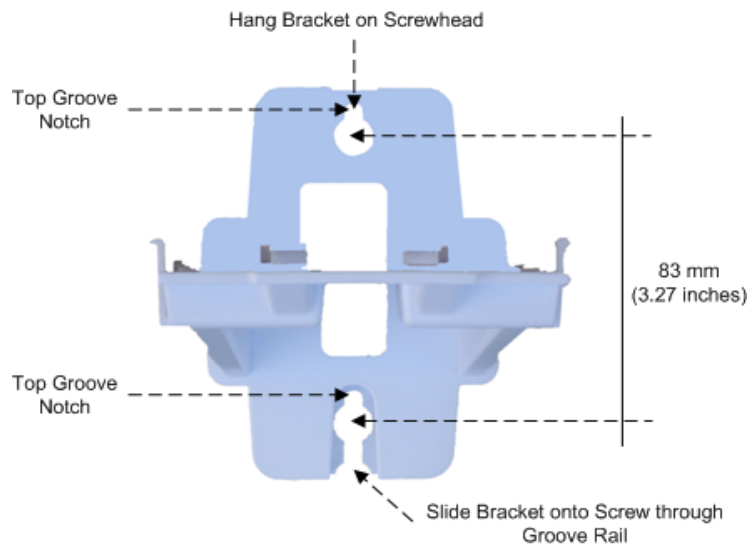


Note: When choosing a wall on which to mount the device, consider cable limitations and wall structure.

➤ **To wall-mount the device:**

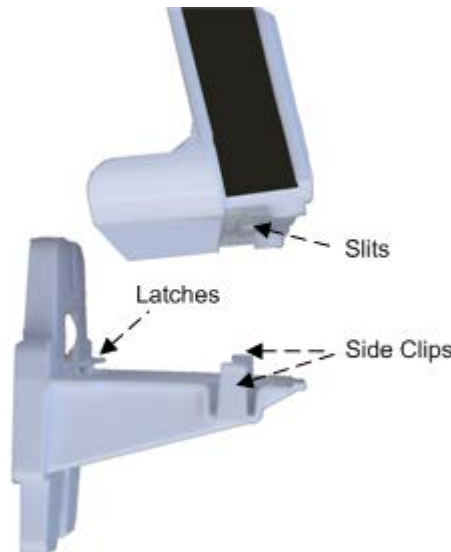
1. Prepare the wall-mounting screws:
 - a. Drill two holes in the wall according to the wall-mounting bracket dimensions. The vertical distance between the holes should be 83 mm (3.27 inches).
 - b. Insert a wall anchor into each hole.
 - c. Using a screwdriver, drive screws of the appropriate size into the anchors, leaving approximately 4 mm (0.16 inches) of the screw head jutting out. This protrusion will allow you to hang the mounting bracket on the screw head.

Figure 3-5: Wall Mount Bracket (e.g., MP-264)



2. Hang the mounting bracket on the wall screws:
 - a. Gently slide the mounting bracket onto the lower screw so that the screw enters the bracket's bottom screw groove rail. As you lower the bracket onto the screw, ensure that the upper screw fits into the bracket's top screw groove.
 - b. Gently pull down on the mounting bracket so that both screw heads sit firmly and securely in the top notch of the screw grooves.
3. Attach the device to the wall-mounting bracket:
 - a. Three slits at the base (bottom) of the device are covered by rubber caps. Remove these caps.
 - b. With its rear panel facing the mounting bracket, hold the device at an angle and slide the base of the device under the two latches located on the mounting bracket.
 - c. Align the three slits on the device base with the three protruding humps located on the front of the mounting bracket. Align the clip holes on either side of the device with the clips on the mounting bracket.
 - d. While gently pressing down on the device, press the clips inwards so that the clips snap into the base of the device.

Figure 3-6: Attaching Phone Base to Wall Mount



If for any reason, you want to remove the device from the wall, follow the procedure below:

- **To dismount the device from the wall:**
1. Press the mounting bracket clips inwards.
 2. Lift the device base off the mounting bracket.



Part I

Device Gateway

Part I describes the configuration of the device router and VoIP gateway functionality.

Reader's Notes

4 Device Quick Setup

This section describes how to quickly configure your device for connecting it to the Internet (WAN).

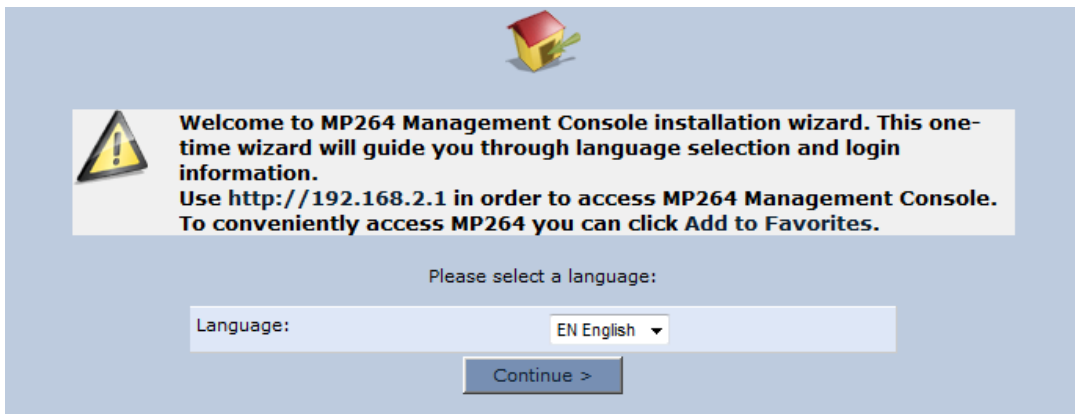
4.1 Preparing Initial Configuration

The procedure below describes how to prepare the initial configuration.

➤ **To initially prepare for configuration:**

1. Connect the cables as shown in Section 3.2 on page 37.
2. Power on the device.
3. From your browser, enter the device's default IP address (**192.168.2.1**); the following screen appears:

Figure 4-1: Language Selection (e.g., MP-264)



The screenshot shows a web-based installation wizard for the MP264 Management Console. At the top, there is a small icon of a yellow house with a red roof. Below it, a warning icon (a yellow triangle with an exclamation mark) is next to the text: "Welcome to MP264 Management Console installation wizard. This one-time wizard will guide you through language selection and login information. Use <http://192.168.2.1> in order to access MP264 Management Console. To conveniently access MP264 you can click Add to Favorites." Below this text, it says "Please select a language:". There is a "Language:" label followed by a dropdown menu currently set to "EN English". At the bottom, there is a "Continue >" button.

4. From the 'Language' drop-down list, select the desired language for the Web graphical user interface (GUI) display.
5. Click **Continue**; the 'Login Setup' screen appears.
6. In the 'User Name' and 'Password' fields, define a login username and password, respectively and then click **Continue**.

Figure 4-2: Login Screen



The screenshot shows the login screen of the MP264 Management Console. At the top, there is a small icon of a yellow house with a red roof. Below it, the word "Login" is displayed. Below that, it says "For setting up the gateway, enter your username and password:". There are three input fields: "Language:" with a dropdown menu set to "EN English", "User Name:" with a text box, and "Password (case sensitive):" with a text box and a "Show password" checkbox. At the bottom, there is a "Continue >" button.

4.2 Configuring WAN Access

The procedure below describes how to configure WAN Access, which can be configured either by xDSL, WAN Ethernet or 3G USB Modem.

4.2.1 Configuring xDSL

When configuring WAN Access via xDSL, the following options are available:

- WAN ATM over DSL (ADSL)
- WAN PTM over DSL (VDSL)

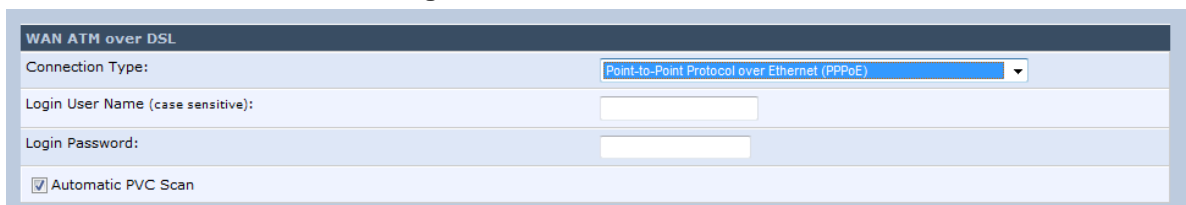


Note: For more configuration information, refer to Section 8 on page 73 and Section 12 on page 153.

4.2.1.1 Configuring WAN ATM over DSL (ADSL)

1. In the Quick Setup page under the **WAN ATM over DSL** group, from the 'Connection Type' drop-down list, select the required connection type.
2. The device supports the following **WAN ATM over DSL** connection types:
 - Point-to-Point Protocol over Ethernet (PPPoE)
 - Point-to-Point Protocol over ATM (PPPoA)
 - Routed Ethernet Connection over ATM (Routed ETHoA)
 - LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA)

Figure 4-3: WAN ATM over DSL



3. Click **OK**.

4.2.1.2 Configuring WAN PTM over DSL (VDSL)

1. In the Quick Setup page under the **WAN PTM over DSL** group, from the 'Connection Type' drop-down list, select the required connection type.

WAN PTM over DSL	
Connection Type:	Automatic IP Address Ethernet Connection ▼
Name:	WAN PTM over DSL
Status:	Down
MAC Address:	00:90:8f:3f:f6:5c

2. The device supports the following **WAN PTM over DSL** connection types:
 - Manual IP Address Ethernet Connection
 - Automatic IP Address Ethernet Connection
 - Point-to-Point Protocol over Ethernet (PPPoE)
 - Point-to-Point Tunneling Protocol (PPTP)
 - Layer 2 Tunneling Protocol (L2TP)
3. Click **OK**.

4.2.2 Configuring WAN Ethernet

1. In the Quick Setup page under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select the required connection type.

Figure 4-4: Automatic IP Address WAN Ethernet Connection

WAN Ethernet	
Connection Type:	Automatic IP Address Ethernet Connection ▼
Name:	WAN Ethernet
Status:	Connected
MAC Address:	00:90:8f:27:f2:44
IP Address:	10.13.22.66
Subnet Mask:	255.255.0.0
Default Gateway:	10.13.0.1
DNS Server	10.1.1.11 10.1.1.10

2. The device supports the following **WAN Ethernet** connection types:
 - Manual IP Address Ethernet Connection
 - Automatic IP Address Ethernet Connection
 - Point-to-Point Protocol over Ethernet (PPPoE)
 - Point-to-Point Tunneling Protocol (PPTP)
 - Layer 2 Tunneling Protocol (L2TP)
3. Click **OK**.

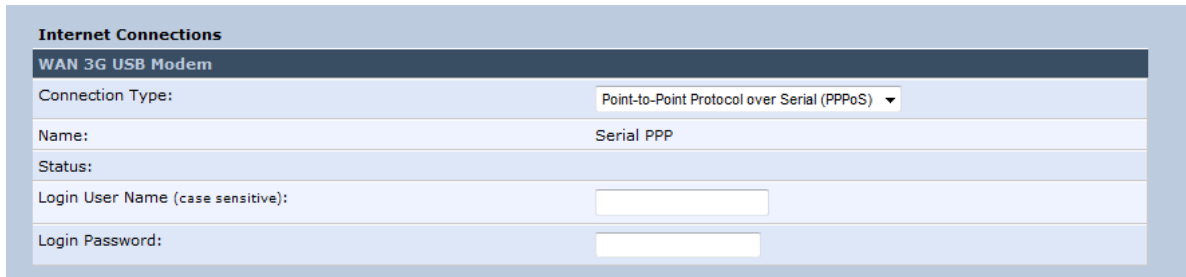
4.2.3 Configuring 3G USB Modem

The procedure below describes how to configure a WAN connection using a 3G cellular modem. The 3G cellular modem is connected to the device's physical port.

➤ **To configure a WAN connection using a 3G cellular modem:**

1. In the Quick Setup page under the **WAN 3G USB Modem** group, select the required connection type from the 'Connection Type' drop-down list.

Figure 4-5: WAN 3G USB Modem




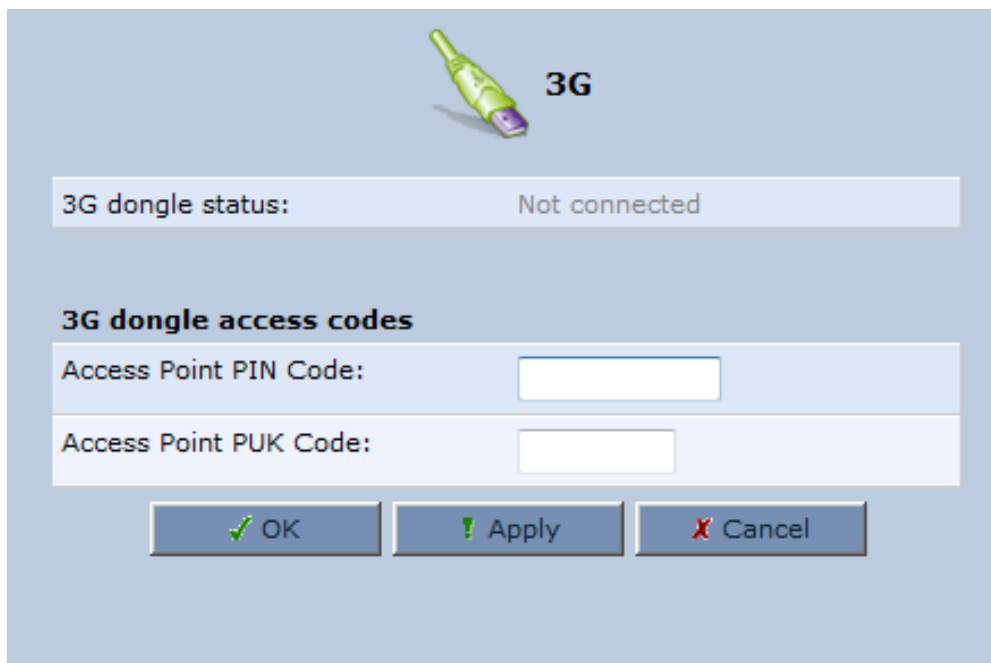
2. Enter your login user name and password.
3. Click **OK**.
4. In the 'Advanced' screen, click the **3G**  icon; the '3G' screen appears.

Figure 4-6: Advanced 3G Settings



5. In the 'Access Point PIN Code' field, enter the modem's personal identification number (PIN), obtained from your Internet Service Provider.
6. In the Access Point PUK Code field, enter the SIM's PIN Unlock Key obtained from your Internet Service Provider.
7. Click **OK**.

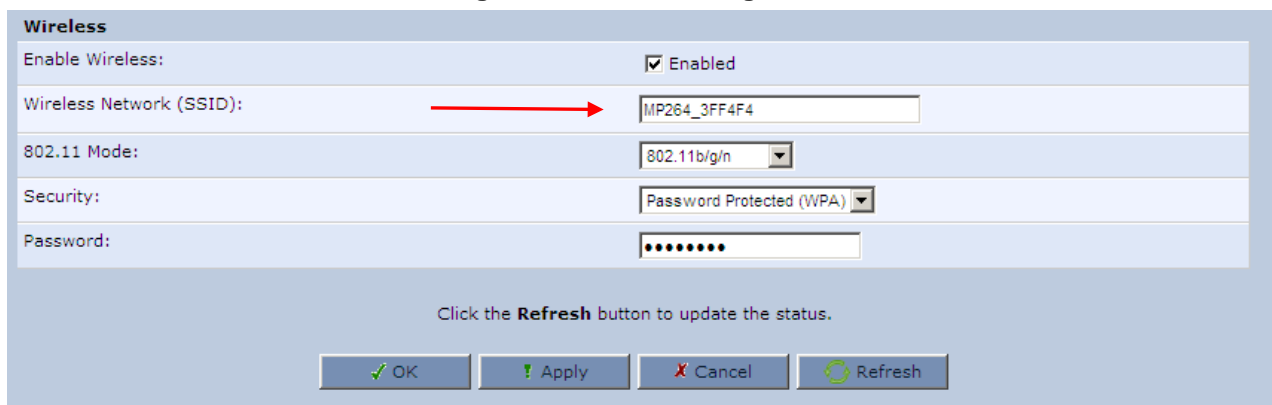
4.3 Configuring Wireless LAN (Wi-Fi)

The procedure below describes how to configure Wi-Fi.

➤ **To configure Wi-Fi:**

1. In the Quick Setup page, under the **Wireless** group, in the 'Wireless Network (SSID)' field, enter your preferred SSID.
2. From the 'Security' field drop-down list, select **Password Protected (WPA)**.
3. In the 'Password' field, enter the Wi-Fi password.

Figure 4-7: Wi-Fi Settings



Wireless

Enable Wireless: ☒ Enabled

Wireless Network (SSID):

802.11 Mode:

Security:

Password:

Click the **Refresh** button to update the status.

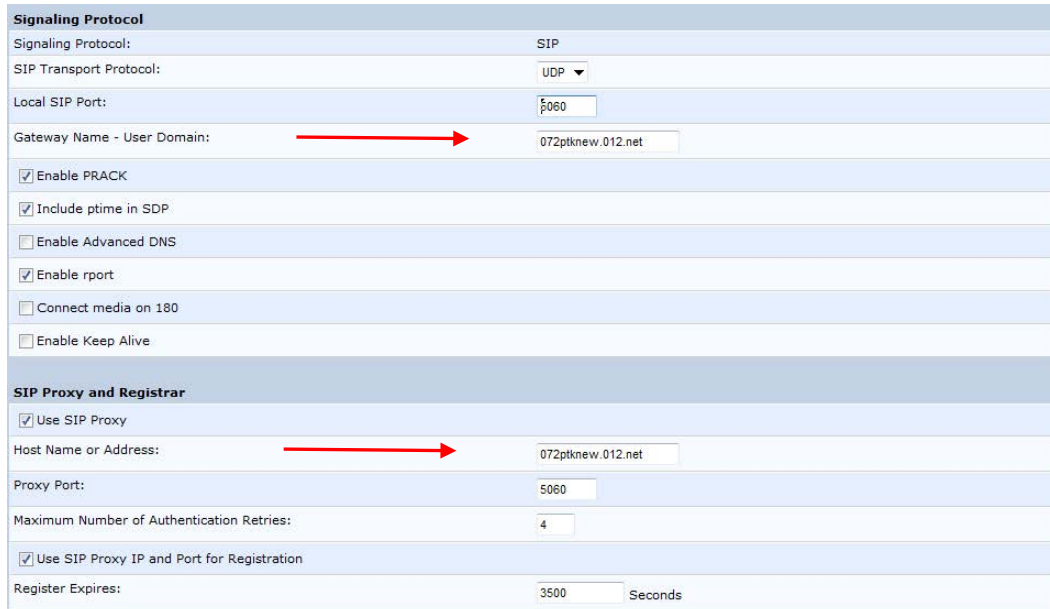
4.4 Configuring SIP Signaling Protocol

The procedure below describes how to configure the SIP Signaling Protocol.

➤ **To configure the SIP Signaling Protocol:**

1. Click the 'Voice Over IP' menu in the side menu bar; the 'Voice Over IP' screen appears.
2. On the 'Signaling Protocol' page, enter the **Gateway Name** and then enter the **Host Name** as shown in the following screen:

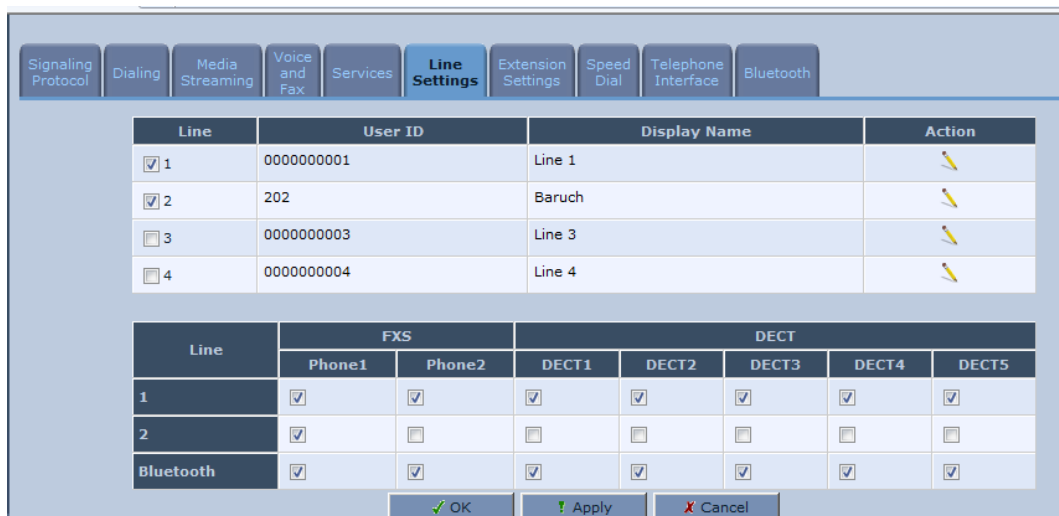
Figure 4-8: Signaling Protocol



Signaling Protocol	
Signaling Protocol:	SIP
SIP Transport Protocol:	UDP
Local SIP Port:	5060
Gateway Name - User Domain:	072ptknew.012.net
<input checked="" type="checkbox"/> Enable PRACK	
<input checked="" type="checkbox"/> Include ptime in SDP	
<input type="checkbox"/> Enable Advanced DNS	
<input checked="" type="checkbox"/> Enable rport	
<input type="checkbox"/> Connect media on 180	
<input type="checkbox"/> Enable Keep Alive	
SIP Proxy and Registrar	
<input checked="" type="checkbox"/> Use SIP Proxy	
Host Name or Address:	072ptknew.012.net
Proxy Port:	5060
Maximum Number of Authentication Retries:	4
<input checked="" type="checkbox"/> Use SIP Proxy IP and Port for Registration	
Register Expires:	3500 Seconds

3. Click the **Line Settings** tab; the following screen appears.

Figure 4-9: Line Settings



Line	User ID	Display Name	Action
<input checked="" type="checkbox"/> 1	0000000001	Line 1	
<input checked="" type="checkbox"/> 2	202	Baruch	
<input type="checkbox"/> 3	0000000003	Line 3	
<input type="checkbox"/> 4	0000000004	Line 4	

Line	FXS		DECT				
	Phone1	Phone2	DECT1	DECT2	DECT3	DECT4	DECT5
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bluetooth	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

OK Apply Cancel


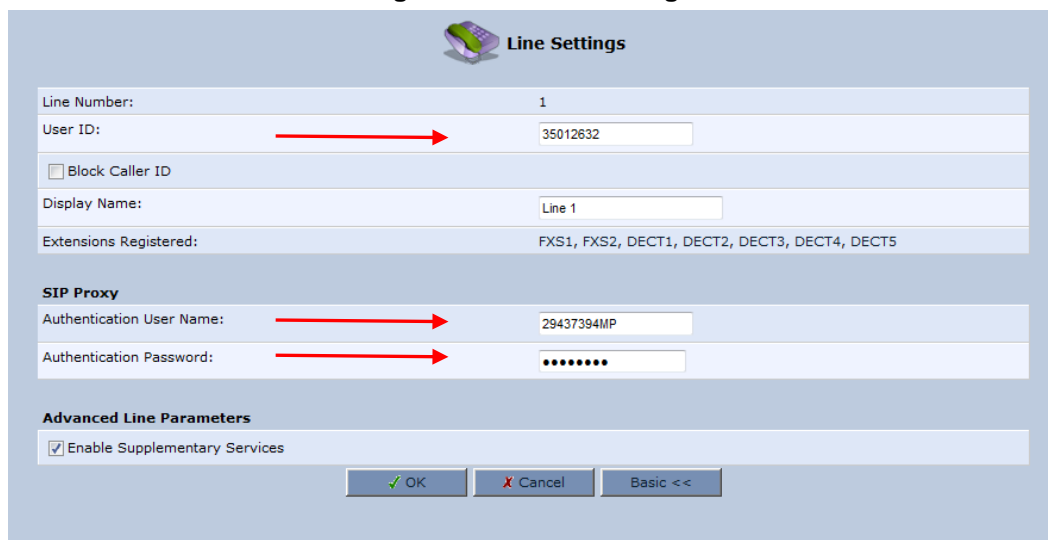
4. Select the **One Line Configuration**; the table lists the lines according to the selected line configuration mode.
5. Click the corresponding **Edit**  icon to configure the line; the following screen appears:

Figure 4-10: Line Settings






The screenshot shows the 'Line Settings' configuration screen. At the top, there is a header with a phone icon and the title 'Line Settings'. Below this, the 'Line Number' is set to '1'. The 'User ID' field contains '35012632', with a red arrow pointing to it from the left. There is a checkbox for 'Block Caller ID' which is unchecked. The 'Display Name' field contains 'Line 1'. The 'Extensions Registered' field lists 'FXS1, FXS2, DECT1, DECT2, DECT3, DECT4, DECT5'. Below these fields is a section titled 'SIP Proxy' containing 'Authentication User Name' (set to '29437394MP', with a red arrow pointing to it) and 'Authentication Password' (masked with dots, with a red arrow pointing to it). At the bottom is a section titled 'Advanced Line Parameters' with a checked checkbox for 'Enable Supplementary Services'. At the very bottom are three buttons: 'OK' (with a green checkmark), 'Cancel' (with a red X), and 'Basic <<'.

6. In the 'User ID' field, enter the phone's VoIP user ID used for identification to initiate and accept calls.
7. In the 'Authentication User Name' field, enter the user name received from your VoIP service provider.
8. In the 'Authentication Password' field, enter the password received from your VoIP service provider.
9. Click **OK**.

4.5 Registering the Handset to the Base Unit

The procedure below describes how to register the handset to the base unit.

➤ **To register the Handset to the Base Unit:**

1. On the handset, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the Registration  icon, and then press the **Select** softkey.
3. On the device base unit, press the 'DECT' **LED** button until (2 – 5 seconds) it starts flashing green; the base unit enters registration mode.
4. Press the  navigation keys to choose the Base 1, and then press the **Select** softkey; the registration process begins and the "Registering - Waiting" is displayed.

For advanced configuration or for problems with configuration, refer to Part I on page [41](#) and Part II on page [387](#) in this document.

5 Getting Started with the Web Interface

The device's embedded Web server (*Web interface*) provides a user-friendly Web-based management tool that allows you to configure and monitor the device. This chapter describes how to access, navigate in, and configure parameters with the Web interface.

5.1 Logging into the Web Interface

The procedure below describes how to log in to the device's Web interface.

➤ **To log in to the device's Web interface:**

1. Connect a PC directly to the LAN port (labeled **LAN 1**) of the device.
2. On your PC, open a Web browser (e.g., Internet Explorer) and in the URL field, enter ***http://mp264.home*** (or 192.168.2.1). If your device is already connected to the network and you know its IP address, then enter its IP address instead. The 'Login' screen appears:

Figure 5-1: Login Screen



3. From the 'Language' drop-down list, select the desired language for the Web graphical user interface (GUI) display.
4. In the 'User Name' and 'Password' fields, define a login username and password, respectively. This is applicable only if this is your first time that you are logging in to the Web interface. If you have logged in before, then enter the username and password that you defined previously.
5. Click **Continue**; the 'Quick Setup' screen appears, allowing you to quickly set up an Internet connection (as described in Chapter 6 on page 65).


















Notes:














- The default username and password is "admin" (case-sensitive).
- If you wish to view the entered password (instead of asterisks), then select the 'Show password' check box.
- You can later change the username and password as described in Section 5.4 on page 368.
- If the Web interface is inactive for 15 minutes after logging in, the 'Login' screen appears again, prompting you to re-login.











5.2 Menu Bar Description

The Web interface screens are conveniently grouped into related themes under specific menus. These menus are located in the menu bar. The table below describes these menus.

Table 5-1: Menu Description

Menu	Description																		
Home	Displays the Map View (refer to Chapter 6 on page 65).																		
Quick Setup	Displays the 'Quick Setup' screen for quickly setting up an Internet connection with the device (see Section 8.1 on page 73).																		
Network Connections	Displays the 'Network Connections' screen for configuring network connections: <ul style="list-style-type: none">LAN (see Section 12.2 on page 177)WAN (see Chapter 12 on page 153)VLANs (see Section 12.4 on page 213)LAN-WAN bridging (see Section 12.5 on page 221)																		
Security	Displays the 'Security' screen for configuring security-related features such as Website restrictions (see Chapter 14 on page 253).																		
Voice Over IP	Displays the 'Voice Over IP' screen for configuring the VoIP parameters to use the device's VoIP functionality to place and receive calls over the Internet using a standard telephone set and DECT handset (see Chapter 9 on page 89).																		
QoS	Displays the 'Quality Of Service' screen for configuring Quality of Service (QoS) for the device (see Chapter 11 on page 135).																		
Advanced	<div>Displays the 'Advanced' screen for configuring system parameters (e.g., DHCP server and DNS) and for administrative functions (e.g., changing password, setting date and time, and upgrading the system).</div> <table><thead><tr><th>Icon</th><th>Name</th><th>Description</th></tr></thead><tbody><tr><td></td><td>3G</td><td>Displays 3G dongle status and 3G dongle access codes (see Section 4.2.3 page 46).</td></tr><tr><td></td><td>About MP2xx</td><td>Displays technical information about the device, including version number (see Section 19.1 on page 345).</td></tr><tr><td></td><td>Backup and Restore</td><td>Backup user and system data (see Section 19.3 on page 348).</td></tr><tr><td></td><td>Certificates</td><td>Manages digital certificates (see Section 13.3 on page 232).</td></tr><tr><td></td><td>Configuration File</td><td>Loads the Configuration File to the device (see Section 19.5 on page 353). Note: You can hide the Configuration File icon, by running the following CLI command in a Telnet session with the device:</td></tr></tbody></table>	Icon	Name	Description		3G	Displays 3G dongle status and 3G dongle access codes (see Section 4.2.3 page 46).		About MP2xx	Displays technical information about the device, including version number (see Section 19.1 on page 345).		Backup and Restore	Backup user and system data (see Section 19.3 on page 348).		Certificates	Manages digital certificates (see Section 13.3 on page 232).		Configuration File	Loads the Configuration File to the device (see Section 19.5 on page 353). Note: You can hide the Configuration File icon, by running the following CLI command in a Telnet session with the device:
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Menu	Description	
		conf_set rmt_config/hide_config_file_page 1. This is useful, for example, in scenarios where you want to prevent a user accessing the Web interface to change the configuration file.
	 DNS Server	Alias a dynamic IP address to a static hostname (see Section 15.2 on page 286).
	 Diagnostics	Performs networking diagnostics (see Section 20.1 on page 371).
	 Disk Management	Manages different disks connected to the device (see Section 17.2 on page 304).
	 Feature Key	Defines the features and capabilities allowed by the specific license you purchased. (see Section 19.1 on page 345).
	 File Server	Creates a file server on the device (see Section 17.1 on page 301).
	 Firmware Upgrade	Upgrades the device's firmware (see Section 19.6 on page 361).
	 IP Address Distribution	Modifies the DHCP server for each LAN device and displays a list of DHCP clients in the local network (see Section 15.1 on page 281).
	 Media Sharing	Enables media sharing on local networks and in all folders (see Section 18 on page 341).
	 Network Objects	Defines groups of LAN devices for system rules (see Section 5.5.2 on page 61).
	 PPPoE Relay	Enables PPPoE relay on the device (see Section 15.5 on page 293).
	 Personal Domain Name (Dynamic DNS)	Displays and modifies the DNS hosts table (see Section 15.2 on page 286).
	 Print Server	Shares a LAN printer (see Section 17.3 on page 317).
	 Protocols	Manages protocols (see Section 5.5.3 on page 63).























Menu	Description		
		Reboot	Restarts MP-264 (see Section 19.7 on page 366).
		Regional Settings	Modifies the regional settings (see Section 9.10.5 on page 129).
		Remote Administration	Configures remote administration privileges (see Section 13.2 on page 230).
		Restore Factory Settings	Restores default factory settings (see Section 19.9 on page 370).
		Routing	Manages routing policies (see Section 15.4 on page 291).
		Scheduler	Defines time segments for system rules (see Section 5.5.1 on page 59).
		System Settings	Modifies administrator settings, including the device's host name (see Section 15.5 on page 293).
		Time Settings	Configures the local date and time (see Section 19.3 on page 348).
		Universal Plug and Play	Configures Universal Plug-and-Play (UPnP) parameters (see Section 16.1 on page 295).
		Users	Configures Users (see Section 5.4 on page 56).
		WINS Server	Registers host names and IP addresses of WINS clients.
System Monitoring	Displays the 'System Monitoring' screen for viewing various statuses such as network and traffic statistics (see Chapter 15.6 on page 294).		
Logout	Logs off the device's Web interface.		

5.3 Managing Tables

Tables appear throughout the Web interface for configuring the device. This section describes the how to use these tables to configure the device.





The figure below displays a typical table in the Web interface:

Figure 5-2: Typical Table Structure

 Network Connections		
Name	Status	Action
 LAN Bridge	Connected	 
 LAN Wireless 802.11n Access Point	Disabled	
 LAN Hardware Ethernet Switch	1 Ports Connected	
 WAN 3G USB Modem	Down	
 WAN DSL	Disabled	
 WAN ATM over DSL	Down	
 WAN PTM over DSL	Down	
 WAN Ethernet	Connected	
 Serial PPP	Waiting for Underlying Connection (WAN 3G USB Modem - Down)	 
New Connection		
<div> <div>Internet Connection Setup</div> <div>Status</div> </div>		

Each table row denotes an entry in the table. The table also provides 'Action' icons for performing various tasks. These icons are described in the table below.

Table 5-2: Table Action Icons Description

Action Icon	Name	Description
	New	Adds a new row to the table or opens another screen for adding an entry.
	Edit	Modifies a row entry in the table.
	Remove	Deletes a row entry in the table.
	Download	Downloads a file to a folder on your computer.


5.4 Configuring Users



The 'Users' screen allows you to add new users and assign login usernames and passwords. You may also group users according to your preferences. The default user is "Administrator" with "admin" (case-sensitive) as the username and password.



➤ **To configure users:**

1. In the 'Advanced' screen, click the **Users**  icon; the 'Users' screen appears.

Figure 5-3: Users Screen

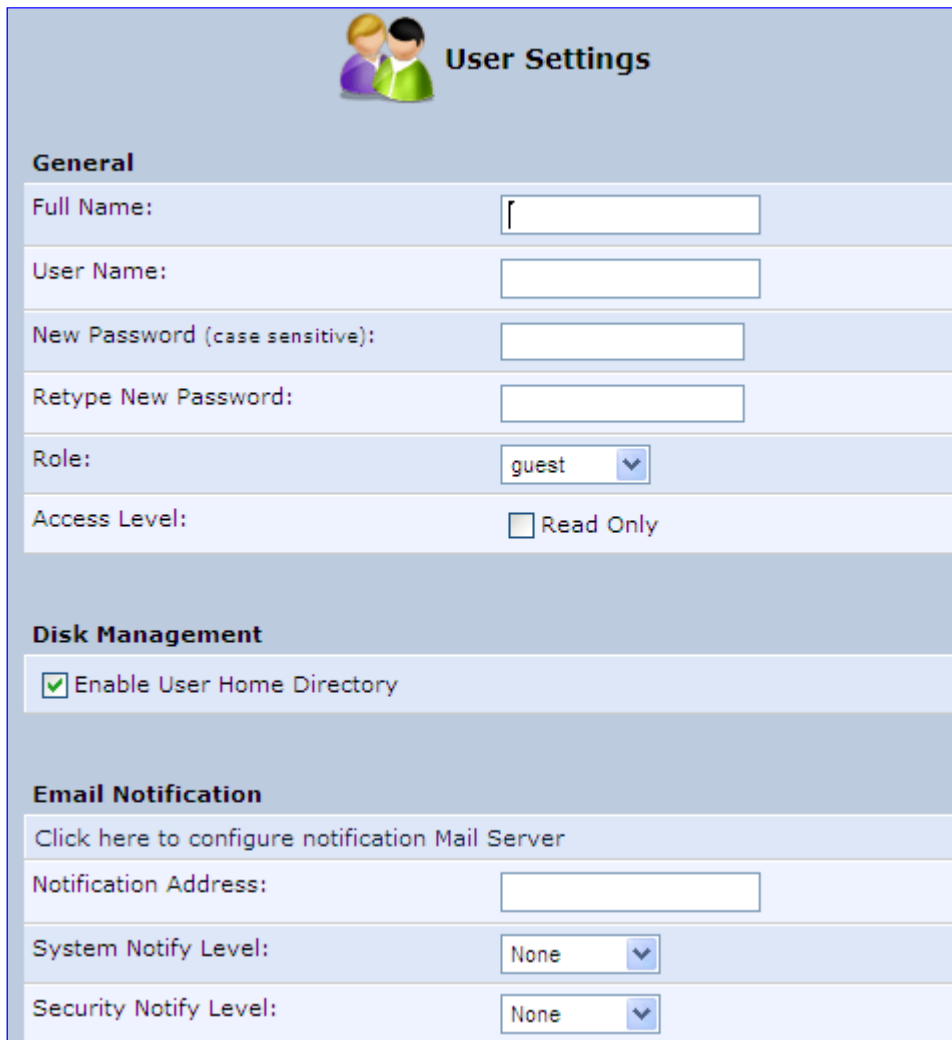
 **Users**

Users					
Full Name	User Name	Role	Access Permissions	Feature Permissions	Action
Administrator	admin	admin	Telnet Serial Console Wireless Permissions Microsoft File and Printer Sharing Access Internet Printer Access	Firewall Basic Permissions Qos Basic Permissions System Monitoring Permissions	
New User					

Groups			
Name	Description	Members	Action
Users		Home user	
New Group			

2. In the **Users** table, click the **New User**  icon; the 'Users Settings' screen appears.

Figure 5-4: Users Settings Screen



The 'User Settings' screen is a web form with a light blue header and a light blue background. At the top, there is an icon of two people and the title 'User Settings'. The form is divided into three sections: 'General', 'Disk Management', and 'Email Notification'. The 'General' section contains fields for 'Full Name', 'User Name', 'New Password (case sensitive)', 'Retype New Password', 'Role' (a dropdown menu with 'guest' selected), and 'Access Level' (a checkbox for 'Read Only'). The 'Disk Management' section contains a checkbox for 'Enable User Home Directory'. The 'Email Notification' section contains a link 'Click here to configure notification Mail Server', a 'Notification Address' field, and two dropdown menus for 'System Notify Level' and 'Security Notify Level', both with 'None' selected.

User Settings	
General	
Full Name:	<input type="text"/>
User Name:	<input type="text"/>
New Password (case sensitive):	<input type="text"/>
Retype New Password:	<input type="text"/>
Role:	<input type="text" value="guest"/>
Access Level:	<input type="checkbox"/> Read Only
Disk Management	
<input checked="" type="checkbox"/> Enable User Home Directory	
Email Notification	
Click here to configure notification Mail Server	
Notification Address:	<input type="text"/>
System Notify Level:	<input type="text" value="None"/>
Security Notify Level:	<input type="text" value="None"/>

3. Add a new user by configuring the following fields:
- Full Name:** Enter a remote user's full name.
 - User Name:** Enter a user name to access your home network.
 - New Password:** Enter a new password for the remote user. If you do not want to change the remote user's password leave this field empty.
 - Retype New Password:** If a new password was assigned, enter it again to verify correctness.
 - Role:** User's role indicating privilege level, where "admin" possesses all privileges.
 - Access Level – Read Only:** Select this check box if you want this user to have read-only privileges.
 - Disk Management:** By default, this option is selected. When activated, it creates a directory for the user in the 'Home' directory of the system storage area. This directory is necessary when using various applications such as the mail server.

- h. **Email Notification:** You can use email notification to receive indications of system events for a predefined severity classification. The available types of events are 'System' or 'Security' events. The available severity of events is 'Error', 'Warning' and 'Information'. If the 'Information' level is selected, the user receives notification of the 'Information', 'Warning' and 'Error' events. If the 'Warning' level is selected, the user receives notification of the 'Warning' and 'Error' events etc.
 - ◆ **Click here to configure notification mail server:** This opens the 'System Settings' screen (see Section 15.5 on page 293) where you can define an outgoing mail server.
 - ◆ **Notification Address:** user's email address.
 - ◆ **System Notify Level:** By default, the 'None' option is selected, which means that the device does not send notifications to a remote host. To activate the feature, select one of the following notification types:
 - ✓ Error
 - ✓ Warning
 - ✓ Information
 - ◆ **Security Notify Level:** The remote security notification level can be one of the following:
 - ✓ None
 - ✓ Error
 - ✓ Warning
 - ✓ Information

4. Click **OK**.

➤ **To configure user groups:**



1. In the 'Users' screen, under the **Groups** group, click **New Group**  icon; the 'Group Settings' screen appears.

Figure 5-5: Group Settings Screen



The screenshot shows the 'Group Settings' screen. At the top, there is a header with an icon of two people and the title 'Group Settings'. Below the header, there are two input fields: 'Name:' with the value 'Group' and 'Description:' which is empty. Below these fields is a section titled 'Group Members' containing a list of users with checkboxes next to them: 'Administrator', 'Home user', and 'Mike'. All checkboxes are currently unchecked.

2. In the 'Name' field enter a name for the group.
3. In the 'Description' field, enter a brief description of this group.
4. In the 'Group Members' list, select the users that you want to assign to this group.
5. Click **OK**.

5.5 Associated Elements

You can define certain elements and then use them later when configuring various features throughout the Web interface. This is very convenient in that it eliminates the need to re-configure the same element, especially if used in multiple configuration areas. These elements include the following:

- Scheduler Rules – see Section 5.5.1 on page 59
- Network Objects – see Section 5.5.2 on page 61
- Protocols – see Section 5.5.3 on page 63

5.5.1 Configuring Scheduler Rules

Scheduler rules are used for limiting the activation of firewall rules to specific time periods, specified in days of the week, and hours.

➤ To define a Rule:


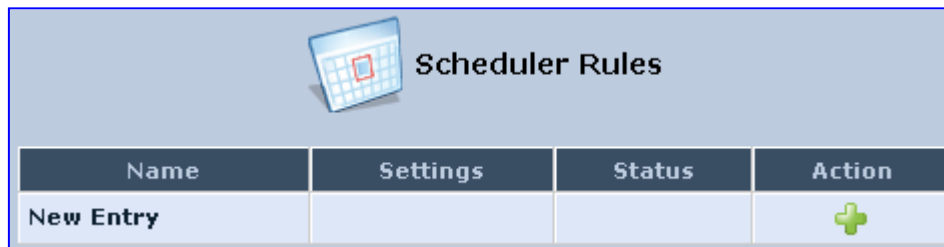

1. In the 'Advanced' screen, click the **Scheduler**  icon; the 'Scheduler Rules' screen appears.

Figure 5-6: Scheduler Rules Screen

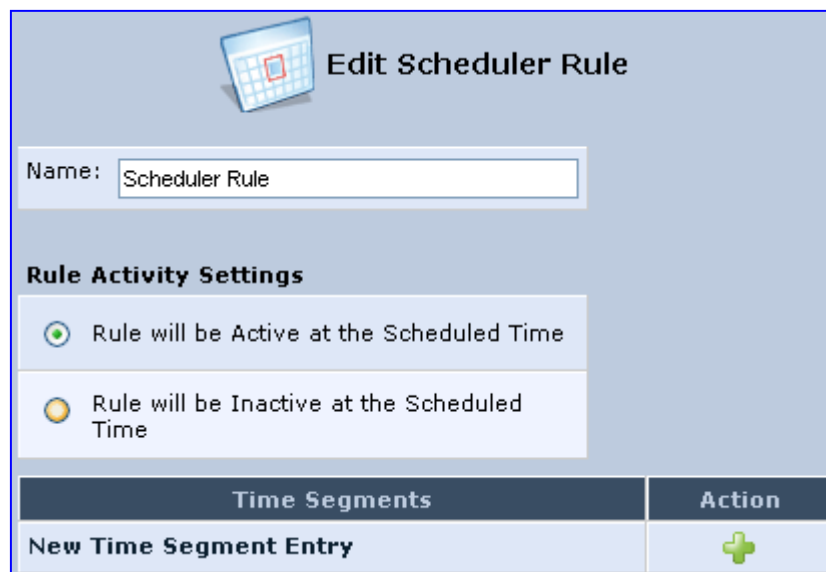


The 'Scheduler Rules' screen features a header with a calendar icon and the title 'Scheduler Rules'. Below the header is a table with four columns: Name, Settings, Status, and Action. The first row of the table contains the text 'New Entry' under the Name column and a green plus icon under the Action column.


Name	Settings	Status	Action
New Entry			

2. Click the **New**  icon; the 'Edit Scheduler Rule' screen appears.

Figure 5-7: Edit Scheduler Rule Screen



The 'Edit Scheduler Rule' screen features a header with a calendar icon and the title 'Edit Scheduler Rule'. Below the header is a form with a 'Name' field containing the text 'Scheduler Rule'. Under the 'Rule Activity Settings' group, there are two radio button options: 'Rule will be Active at the Scheduled Time' (selected) and 'Rule will be Inactive at the Scheduled Time'. At the bottom, there is a table with two columns: Time Segments and Action. The first row of the table contains the text 'New Time Segment Entry' under the Time Segments column and a green plus icon under the Action column.

Time Segments	Action
New Time Segment Entry	

3. In the 'Name' field, specify a name for the scheduler rule.
4. Under the **Rule Activity Settings** group, specify if the rule is active or inactive during the designated time period, by selecting the appropriate check box.


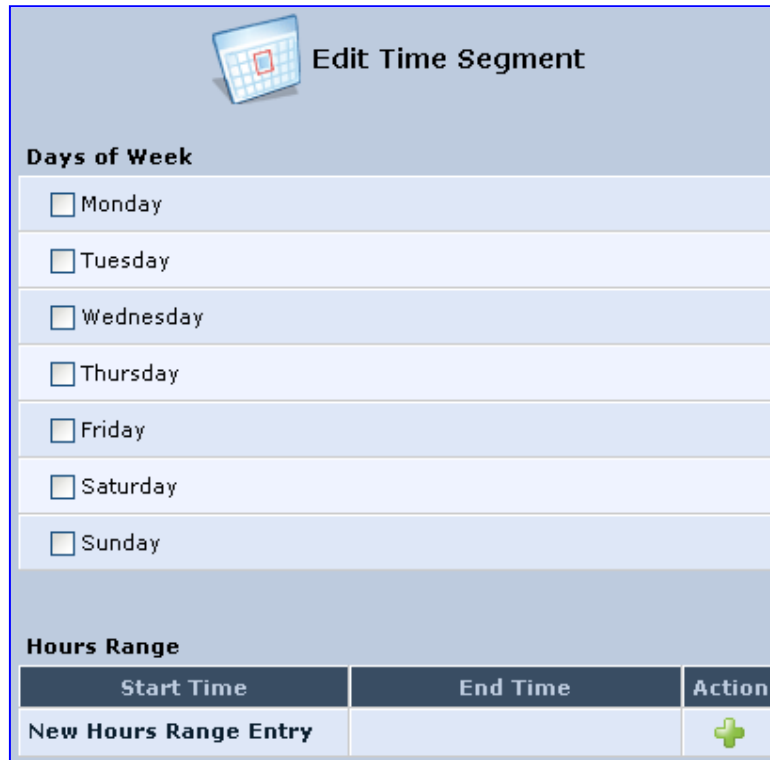
5. Click the **New**  icon to define the time segment to which the rule applies; the 'Edit Time Segment' screen appears.

Figure 5-8: Edit Time Segment Screen



Edit Time Segment

Days of Week

☐ Monday

☐ Tuesday

☐ Wednesday

☐ Thursday

☐ Friday

☐ Saturday

☐ Sunday

Hours Range

Start Time	End Time	Action
New Hours Range Entry		


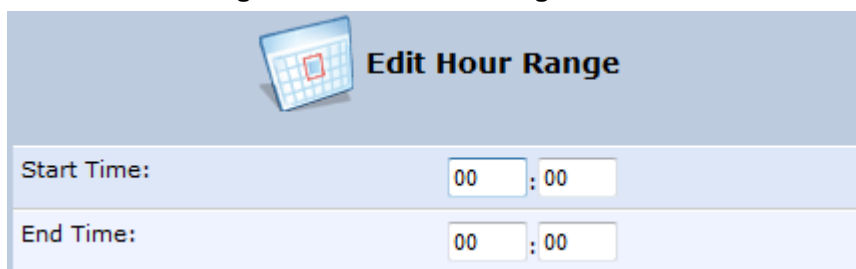
- a. Under the **Days of Week** group, select the days of the week for which you want the rule to be active.
- b. In the **Hours Range** table, click the **New**  icon to define an active or inactive hourly range; the 'Edit Hour Range' screen appears.

Figure 5-9: Edit Hour Range Screen



Edit Hour Range

Start Time: :

End Time: :

- c. In the 'Start Time' and 'End Time' field, enter the time interval in which the scheduler rule is active or inactive.
6. Click **OK** to save the settings.

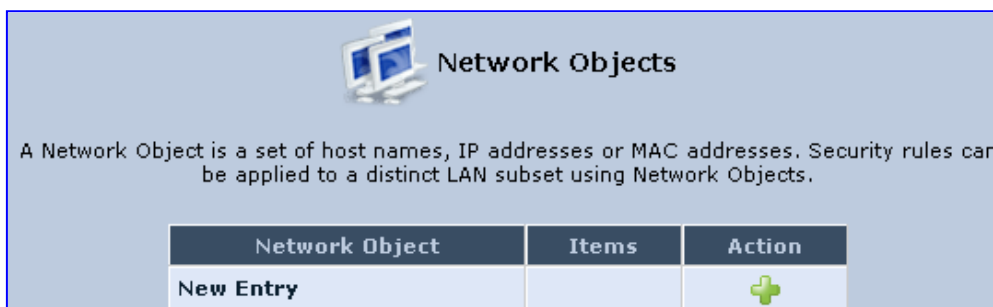
5.5.2 Configuring Network Objects

Network objects is a method used to logically define a set of LAN hosts, according to one or more MAC address, IP address, and host name. Defining such a group can assist when configuring other system rules. For example, you can use network objects to apply security rules based on host names instead of IP addresses. This may be useful, since IP addresses change from time to time. Moreover, it is possible to define network objects according to MAC addresses, making rule application more persistent against network configuration settings.

➤ **To define a network object:**

1. In the 'Advanced' screen, click the **Network Objects**  icon; the 'Network Objects' screen appears.

Figure 5-10: Network Objects Screen



The 'Network Objects' screen features a title bar with a laptop icon and the text 'Network Objects'. Below the title bar, a descriptive paragraph states: 'A Network Object is a set of host names, IP addresses or MAC addresses. Security rules can be applied to a distinct LAN subset using Network Objects.' At the bottom, there is a table with three columns: 'Network Object', 'Items', and 'Action'. The first row of the table contains 'New Entry' under 'Network Object' and a green plus icon under 'Action'.

Network Object	Items	Action
New Entry		+

2. Click the **New**  icon; the 'Edit Network Object' screen appears.

Figure 5-11: Edit Network Objects Screen



The 'Edit Network Object' screen features a title bar with a laptop icon and the text 'Edit Network Object'. Below the title bar, there is a section titled 'Network Object' containing a 'Description:' label and a text input field with the value 'Global Object'. Below this, there is a section titled 'Items' containing a table with two columns: 'Item' and 'Action'. The first row of the table contains 'New Entry' under 'Item' and a green plus icon under 'Action'.

Item	Action
New Entry	+


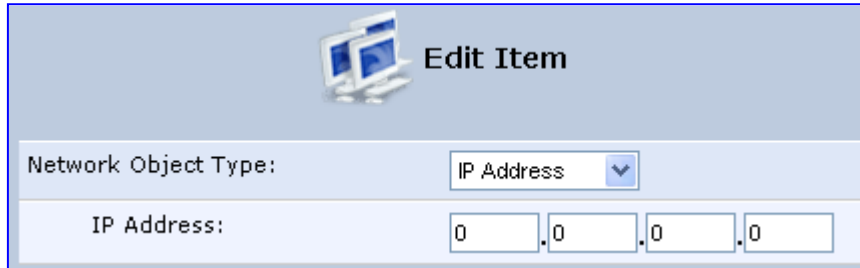
3. In the 'Description' field, enter a name for the network object, and then click the **New**  icon; the 'Edit Item' screen appears.

Figure 5-12: Edit Item Screen



4. From the 'Network Object Type' drop-down lists, select a source address type:

- IP Address
- IP Subnet
- IP Range
- MAC Address
- Host Name
- DHCP Option (supporting options 60, 61, and 77)
- All Private IP Addresses

When selecting a method from the drop-down list, the screen refreshes, presenting the respective fields by which to enter the relevant information.

5. Click **OK** to save the settings.








5.5.3 Configuring Protocols

The Protocols feature incorporates a list of preset and user-defined applications and common port settings. You can use protocols in various security features such as Access Control and Port Forwarding. You may add new protocols to support new applications or edit existing ones according to your needs.

➤ **To define a protocol:**

1. In the 'Advanced' screen, click the **Protocols**  icon; the 'Protocols' screen appears.

Figure 5-13: Advanced - Protocols

 Protocols		
Protocols	Ports	Action
FTP	TCP Any -> 21	 
HTTP	TCP Any -> 80	 
HTTPS	TCP Any -> 443	 
IMAP	TCP Any -> 143	 
L2TP	UDP Any -> 1701	 
Ping	ICMP Echo Request	 
POP3	TCP Any -> 110	 
SMTP	TCP Any -> 25	 
SNMP	UDP Any -> 161	 
Telnet	TCP Any -> 23	 
TFTP	UDP 1024-65535 -> 69	 
Traceroute	UDP 32769-65535 -> 33434-33523	 
<u>New Entry</u>		


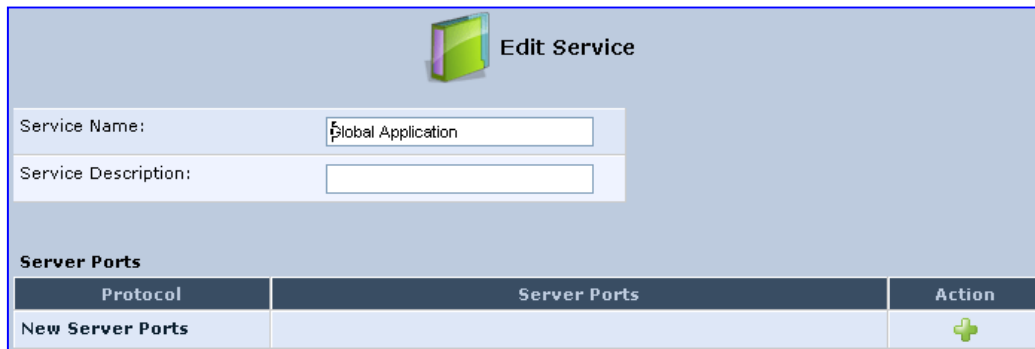

2. Click the **New**  icon; the 'Edit Service' screen appears.

Figure 5-14: Advanced - Protocols - Edit Service



The 'Edit Service' screen features a title bar with a folder icon and the text 'Edit Service'. Below the title bar, there are two input fields: 'Service Name' with the text 'Global Application' and 'Service Description' which is empty. At the bottom, there is a table titled 'Server Ports'.

Protocol	Server Ports	Action
New Server Ports		


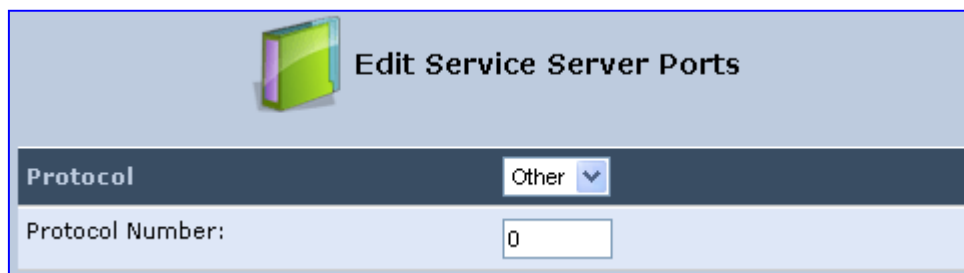
3. In the 'Service Name' field, enter the name of the service, and then click the **New**  icon; the 'Edit Service Server Ports' screen appears.

Figure 5-15: Advanced - Protocols - Edit Service - Server Ports



The 'Edit Service Server Ports' screen has a title bar with a folder icon and the text 'Edit Service Server Ports'. Below the title bar, there is a 'Protocol' dropdown menu currently set to 'Other' and a 'Protocol Number' input field containing the value '0'.

4. You may choose any of the protocols available in the drop-down list, or add a new one by selecting 'Other'. When selecting a protocol from the drop-down list, the screen refreshes, presenting the respective fields by which to enter the relevant information.
5. Select a protocol and enter the relevant information.
6. Click **OK** to save the settings.

5.6 Logging out the Web Interface

To log out of the device's Web interface, click the **Logout** menu in the menu bar. When you have logged out, the 'Login' screen is displayed, allowing you to re-login, if desired.

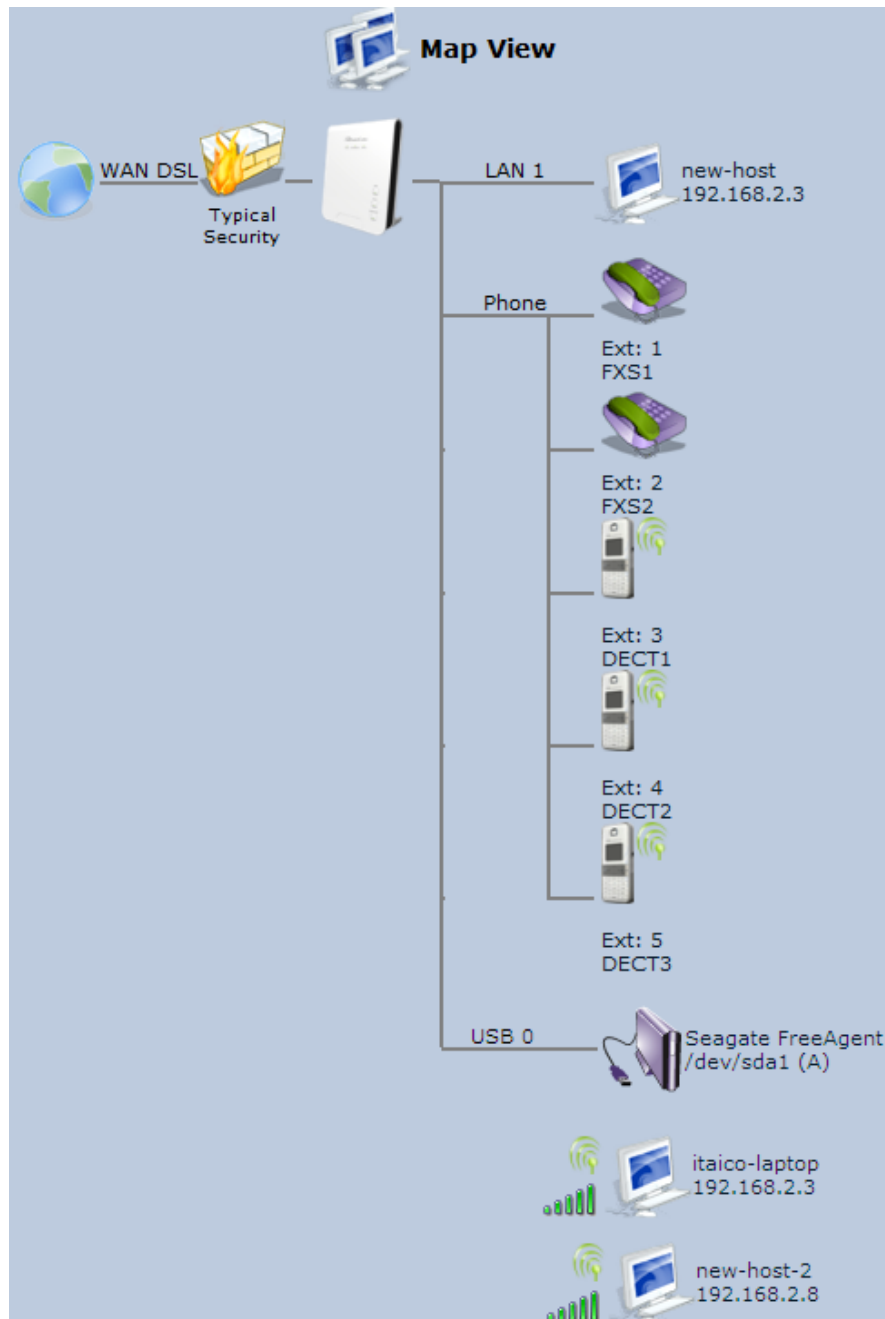
6 Viewing a Graphical Display of the Device's Network

The Web interface allows you to view a graphical display of the network elements connected to the device. This is displayed in the 'Map View' screen, accessed by clicking the **Home** menu in the menu bar.

You can click a displayed network element icon to access the relevant screen for configuring the element.











The figure below displays an example of a network map for a deployed device:




Figure 6-1: Map View Screen (e.g., MP-264)



The table below describes the possible icons that can be displayed in the 'Map View' screen:

Table 6-1: Map View Icon Description

Icon	Description
	Depicts the Internet connection (e.g., WAN Ethernet). Click this icon to open the 'Quick Setup' screen (see Section 8.1 on page 73).
	Depicts the firewall. The height of the wall (yellow "bricks") corresponds to the security level (Minimum, Typical or Maximum). Click this icon to open the 'General Tab' screen (see Section 14.1 on page 254).
	Depicts the device and displays the currently software version. Click this icon to open the 'Quick Setup' screen (see Section 8.1 on page 73).
	Depicts an analog telephone connected to MP-264. Click this icon to open the 'Extension Settings' screen (see Section 9.7 on page 119).
	Depicts a DECT handset registered to the device. Click this icon to open the 'Extension Settings' screen (see Section 9.7 on page 119).
	Depicts a computer (host) in the device's network. Each computer connected to the network appears below the network symbol of the network through which it is connected. This host is either a DHCP client that has received an IP lease from the device, or a host with a static IP address, auto-detected by the device. Click this icon to open the 'Host Information' screen, displaying network information of the host. Note: The device recognizes a physically connected host and displays it in the Network Map only after network activity from that host has been detected (e.g. trying to browse to the Web management or to surf the Internet).
	Depicts a computer connected to the Internet through the device's Wi-Fi network. Click this icon to open the 'Host Information' screen, displaying network information of the host. The bars indicate the signal strength of the WiFi device.
	Depicts a host whose DHCP lease has expired and not renewed. The DHCP lease is renewed automatically, unless the host is no longer physically connected to the device. This icon also depicts a static IP host that has no network activity.
	Depicts a file server (hard drive) that is connected to the device (typically through the USB port). Click this icon to view the file server configuration.
	Depicts a printer that is connected to the device and is shared by network users. Click this icon to view the printer's settings.

Icon	Description
	Depicts a USB driver.
	Depicts a USB disk-on-key that is connected to the device.
	Depicts a disconnected device.

Reader's Notes

7 Configuring Computers for Connecting to the Device's Network

This chapter describes how to configure computers to connect to the device's network, and includes the following main areas:

- Connecting wired computers – see Section 7.1 on page 69
- Connecting wireless network computers – see Section 7.2 on page 71

7.1 Wired Computers

This section describes how to configure computers that connect to the device's network through a LAN cable (i.e., wired).

You can configure the network interface of the computer using one of the following methods:

- Statically define an IP address and DNS address
- Automatically obtain an IP address using the device embedded DHCP server

This section describes how to configure the computers network for the following operating systems (OS):

- Windows XP – see Section 7.1.1 on page 69
- Linux – see Section 7.1.2 on page 70



Note: It is recommended to set the computers to automatically obtain their IP addresses (from a DHCP server).

7.1.1 Configuring Computers Running on Windows XP

The procedure below describes how to configure a computer running on Windows XP OS to automatically obtain its IP address (from a DHCP server, for example, MP-264).

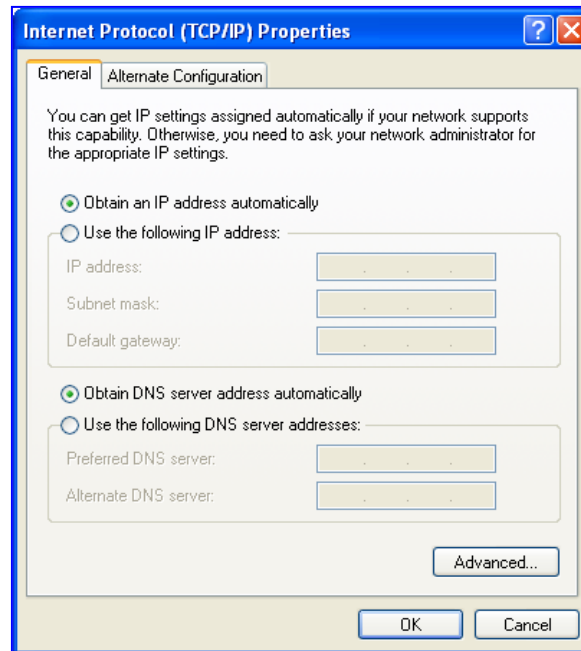


Note: For computers running Windows, the setup procedure is generally unnecessary as Windows' default network settings are to obtain an IP address automatically. However, it is recommended to follow the setup procedure to verify that all communication parameters are valid and that the physical cable connections are correct.

➤ **To configure a computer running Windows XP for dynamic IP addressing:**

1. Access 'Network Connections' from the Control Panel.
2. Right-click the **Ethernet connection** icon, and then choose **Properties**.
3. Under the **General** tab, select the 'Internet Protocol (TCP/IP)' component, and then click the **Properties** button; the 'Internet Protocol (TCP/IP) Properties' dialog box is displayed.

Figure 7-1: Internet Protocol (TCP/IP) Properties Dialog Box



4. Select the **Obtain an IP address automatically** option.
5. Select the **Obtain DNS server address automatically** option.
6. Click **OK** to save the settings.

7.1.2 Configuring Computers Running on Linux

The procedure below describes how to configure a computer running on Linux operating system to automatically obtain its IP address from a DHCP server. The DHCP server can be the device's embedded DHCP server.

➤ To configure a computer running Linux for dynamic IP addressing:

1. Log in to the Linux computer as a super-user, by entering the following command:

```
su
```

2. View the network devices and allocated IP addresses, by typing the following command:

```
ifconfig
```

3. At the prompt, type the following command:

```
pump -i <dev>
```

Where <dev> is the network device name.

4. View the new allocated IP address, by typing the following command:

```
ifconfig
```

5. Make sure that no firewall is active on the device (<dev>).

7.2 Connecting Computers to the Device's Wireless Network

This section describes how to configure the LAN computers to connect to the device's wireless network. If your computer has wireless capabilities, Windows automatically recognizes the device's wireless network and creates a wireless connection.

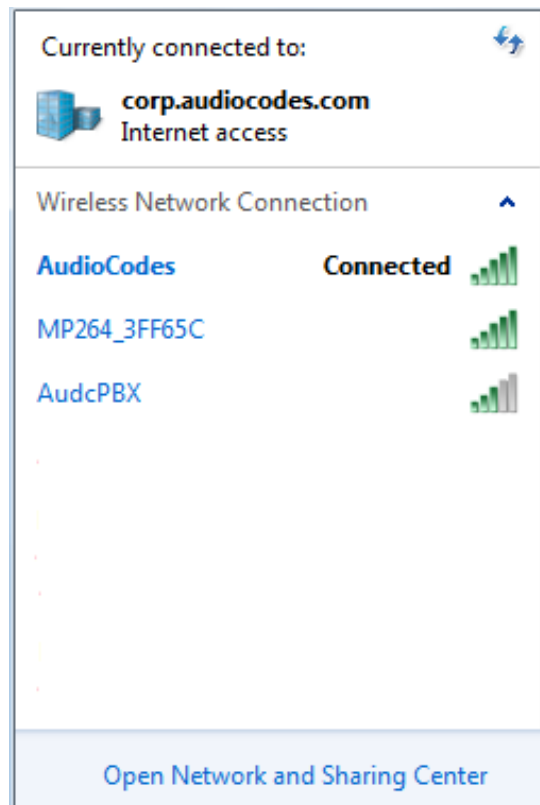
**Notes:**

- To configure the device's LAN wireless connection, see Section 12.2.1 on page 177.
- This section is based on computers running Microsoft Windows 7.

➤ **To configure a computer to connect to the device's wireless network:**

1. On the Windows taskbar, right-click the **Wireless Network Connection** icon, and then choose **View Available Wireless Connections**;

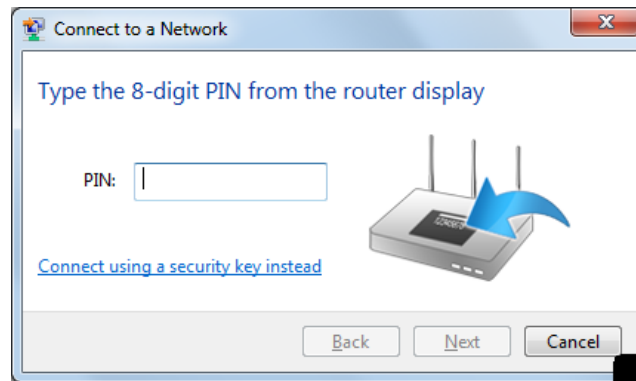
Figure 7-2: Available Wireless Networks (e.g., MP-264)



2. Select the device's wireless network name (i.e., "**MP264-3FF65C**"); your computer establishes a wireless connection with the MP-264, indicated by the display of "Connected".

3. Enter your PIN code as supplied by your Service Provider.

Figure 7-3: Connect to a Network – PIN Code



8 Setting up your Device

This section describes how to configure the device for connecting it to the Internet (WAN). You can connect the device to the Internet using one of the following methods:

- Configuring the device through the Web interface – see Section 8.1 on page 73
- Using the device's Automatic Internet Dialer Detection feature – see Section 8.1.3 on page 80



Notes:

- Your device automatically detects the physical WAN type (i.e., Ethernet or xDSL). To change the WAN type, you must restore the device to factory settings (see Section 19.9).
- When connected to xDSL, the **LAN4/WAN** Ethernet port can be used for Ethernet LAN interface.
- When connected to an external modem through the Ethernet **LAN4/WAN** port and the device obtains an IP address, the xDSL interface is disabled.
- If the Automatic Dialer feature is shipped preconfigured (i.e., enabled), then the device automatically detects the Internet dialer type and therefore, Internet connection configuration is unnecessary. However, it is recommended to manually configure the Internet connection **after** the Automatic Dialer process has completed (successfully or not). For more information on the Automatic Dialer feature, see Section 8.1.3 on page 80.

8.1 Setting up an Internet Connection using the Web Interface


You can quickly and easily set up a basic Internet connection using the Web interface's 'Quick Setup' screen (as shown in Figure 8-1). This screen is displayed when you log in to the Web interface (or you can click the **Quick Setup** menu from the menu bar).



Notes:

- Before configuring the device's Internet connection, ensure that you have obtained relevant technical information on the Internet connection type from your Internet Telephony Service Provider (ITSP). For example, whether you are connected to the Internet using a static or dynamic IP address, or what protocols such as PPTP or PPPoE are used to communicate over the Internet.
- For advanced configuration of the WAN network, use the **Network Connections** menu, as described in Section 12.1 on page 153.

Figure 8-1: Quick Setup Screen

 **Quick Setup**

Internet Connections

WAN 3G USB Modem

Connection Type:	Point-to-Point Protocol over Serial (PPPoS) ▼
Name:	Serial PPP
Status:	Waiting for Underlying Connection (WAN 3G USB Modem - Down)
Login User Name (case sensitive):	admin
Login Password:	••••••••

WAN ATM over DSL

Connection Type:	No Internet Connection ▼
------------------	--------------------------

WAN PTM over DSL

Connection Type:	Automatic IP Address Ethernet Connection ▼
Name:	WAN PTM over DSL
Status:	Down
MAC Address:	00:90:8f:3f:f6:5c

WAN Ethernet

Connection Type:	Automatic IP Address Ethernet Connection ▼
Name:	WAN Ethernet
Status:	Connected
MAC Address:	00:90:8f:3f:f6:5c
IP Address:	10.13.22.36
Subnet Mask:	255.255.0.0
Default Gateway:	10.13.0.1
DNS Server	10.1.1.11 10.1.1.10

Wireless

Enable Wireless:	<input checked="" type="checkbox"/> Enabled
------------------	---

Click the **Refresh** button to update the status.

You can configure one of three main Internet connection types:

- WAN ATM over DSL – see Section 8.1.1 on page 75
- WAN PTM over DSL – see Section 8.1.2 on page 77
- WAN Ethernet – see Section 8.1.3 on page 80

8.1.1 WAN ATM over DSL

The device supports the following WAN ATM over DSL connection types:

- Point-to-Point Protocol over Ethernet (PPPoE)
- Point-to-Point Protocol over ATM (PPPoA)
- Routed Ethernet Connection over ATM (Routed ETHoA)
- LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA)



Notes:

- If you do not need an Internet (WAN ATM over DSL) connection, then in the 'Quick Setup' screen, from the 'Connection Type' drop-down list, select 'No Internet Connection'.
- By default, the 'Automatic PVC Scan' check box is selected. This means that the device configures the VPI, VCI, and encapsulation parameters automatically. To configure these parameters manually, clear this check box (for more information, see Section 12.1.1.1 on page 157).

8.1.1.1 Point-to-Point Protocol over Ethernet (PPPoE)

The procedure below describes how to connect to the Internet by PPPoE.

➤ To configure the PPPoE connection:

1. Under the **WAN ATM over DSL** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Protocol over Ethernet (PPPoE)'.

Figure 8-2: PPPoE WAN DSL Internet Connection

WAN ATM over DSL	
Connection Type:	Point-to-Point Protocol over Ethernet (PPPoE)
Login User Name (case sensitive):	<input type="text"/>
Login Password:	<input type="password"/>
<input checked="" type="checkbox"/> Automatic PVC Scan	

2. Configure the following (provided by your ITSP):
 - Login user name
 - Login password
3. Click **OK**.

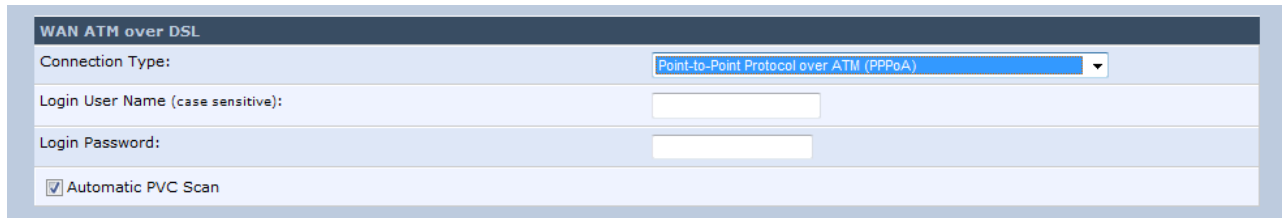
8.1.1.2 PPPoA

The procedure below describes how to connect to the Internet by PPPoA.

➤ **To configure PPPoA connection:**

1. Under the **WAN ATM over DSL** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Protocol over ATM (PPPoA)'.

Figure 8-3: PPPoA WAN DSL Internet Connection



The screenshot shows the 'WAN ATM over DSL' configuration section. The 'Connection Type' dropdown menu is set to 'Point-to-Point Protocol over ATM (PPPoA)'. Below this, there are input fields for 'Login User Name (case sensitive):' and 'Login Password:'. At the bottom, there is a checkbox labeled 'Automatic PVC Scan' which is checked.

2. Configure the following (provided by your ITSP):
 - Login user name
 - Login password
3. Click **OK**.


8.1.1.3 Routed ETHoA

The procedure below describes how to connect to the Internet by ETHoA.

➤ **To configure routed ETHoA connection:**

1. Under the **WAN ATM over DSL** group, from the 'Connection Type' drop-down list, select 'Routed Ethernet Connection over ATM (Routed ETHoA)'.

Figure 8-4: Routed ETHoA WAN DSL Internet Connection



The screenshot shows the 'WAN ATM over DSL' configuration section. The 'Connection Type' dropdown menu is set to 'Routed Ethernet Connection over ATM (Routed ETHoA)'. Below this, there is a checkbox labeled 'Automatic PVC Scan' which is checked.

2. Click **OK**.

8.1.1.4 Bridged ETHoA

The procedure below describes how to connect to the Internet by bridged ETHoA.

➤ **To configure bridged ETHoA connection:**

1. Under the **WAN ATM over DSL** group, from the 'Connection Type' drop-down list, select 'LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA)'.

Figure 8-5: Bridged ETHoA WAN DSL Internet Connection



The screenshot shows the 'WAN ATM over DSL' configuration section. The 'Connection Type' dropdown menu is set to 'LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA)'. Below this, there is a checkbox labeled 'Automatic PVC Scan' which is checked.

2. Click **OK**.

8.1.2 WAN PTM over DSL

The device supports the following WAN PTM over DSL connection types:

- Manual IP Address Ethernet Connection
- Automatic IP Address Ethernet Connection
- Point-to-Point Protocol over Ethernet (PPPoE)
- Point-to-Point Tunneling Protocol (PPTP)
- Layer 2 Tunneling Protocol (L2TP)



Notes:

- If you do not need an Internet (WAN ATM over DSL) connection, then in the 'Quick Setup' screen, from the 'Connection Type' drop-down list, select 'No Internet Connection'.
- By default, the 'Automatic PVC Scan' check box is selected. This means that the device configures the VPI, VCI, and encapsulation parameters automatically. To configure these parameters manually, clear this check box (for more information, see Section 12.1.1.1 on page 157).

8.1.2.1 Manual IP Address Ethernet Connection

The procedure below describes how to connect to the Internet by Manual IP Address Ethernet Connection.

➤ To configure the Manual IP Address Ethernet Connection:

1. Under the **WAN PTM over DSL** group, from the 'Connection Type' drop-down list, select 'Manual IP Address Ethernet Connection'.

Figure 8-6: PTM Manual IP Address Ethernet Connection

WAN PTM over DSL	
Connection Type:	Manual IP Address Ethernet Connection ▼
IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0

2. According to your ISP's instructions, specify the following parameters:
 - IP Address
 - Subnet Mask
 - Default Gateway
 - Primary DNS Server
 - Secondary DNS Server
3. Click **OK**.

8.1.2.2 Automatic IP Address Ethernet Connection

The procedure below describes how to connect to the Internet by Automatic IP Address Ethernet Connection.

➤ **To configure the Automatic IP Address Ethernet Connection:**

1. Under the **WAN PTM over DSL** group, from the 'Connection Type' drop-down list, select 'Automatic IP Address Ethernet Connection'; the following screen appears:

Figure 8-7: PTM Automatic IP Address Ethernet Connection



WAN PTM over DSL	
Connection Type:	Automatic IP Address Ethernet Connection
Name:	WAN PTM over DSL
Status:	Down
MAC Address:	00:90:8f:3f:f6:5c

2. See Section 12 on page 153 for additional configuration information.

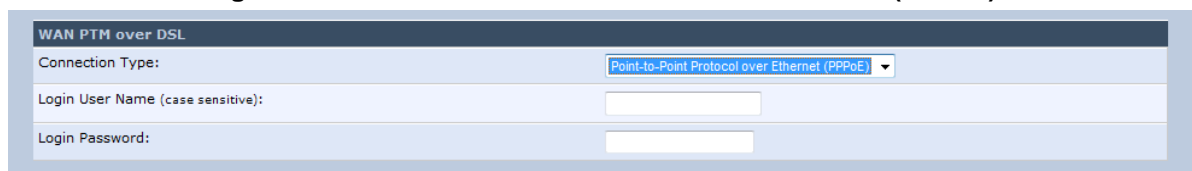
8.1.2.3 Point-to-Point Protocol over Ethernet (PPPoE)

The procedure below describes how to connect to the Internet by Point-to-Point Protocol over Ethernet (PPPoE).

➤ **To configure the Point-to-Point Protocol over Ethernet (PPPoE):**

1. Under the **WAN PTM over DSL** group, from the 'Connection Type' drop-down list, select 'Manual IP Address Ethernet Connection'.

Figure 8-8: PTM Point-to-Point Protocol over Ethernet (PPPoE)



WAN PTM over DSL	
Connection Type:	Point-to-Point Protocol over Ethernet (PPPoE)
Login User Name (case sensitive):	<input type="text"/>
Login Password:	<input type="password"/>

2. Configure the PPPoE login username and password (provided by your ITSP).
3. Click **OK**.

8.1.2.4 Point-to-Point Tunneling Protocol (PPTP)

The procedure below describes how to connect to the Internet by Tunneling Protocol (PPTP).

➤ **To configure the Point-to-Point Tunneling Protocol (PPTP):**

1. Under the **WAN PTM over DSL** group, from the 'Connection Type' drop-down list, select 'Tunneling Protocol (PPTP)'.

Figure 8-9: PTM Point-to-Point Tunneling Protocol (PPTP)

The screenshot shows the 'WAN Ethernet' configuration page. The 'Connection Type' is set to 'Point-to-Point Tunneling Protocol (PPTP)'. Below this, there are input fields for 'PPTP Server Host Name or IP Address', 'Login User Name (case sensitive)', and 'Login Password'. The 'Internet Protocol' is set to 'Obtain an IP Address Automatically'.

2. Configure the following (provided by your ITSP):
 - PPTP Server Host Name or IP Address
 - Login user name
 - Login password
3. From the 'Internet Protocol' drop-down lists, select the method for assigning an IP address (provided by your ITSP).
4. Click **OK**.

8.1.2.5 Layer 2 Tunneling Protocol (L2TP)

The procedure below describes how to connect to the Internet by Layer 2 Tunneling Protocol (L2TP).

➤ **To configure the Layer 2 Tunneling Protocol (L2TP):**

1. Under the **WAN PTM over DSL** group, from the 'Connection Type' drop-down list, select 'Layer 2 Tunneling Protocol (L2TP)'.

Figure 8-10: PTM Layer 2 Tunneling Protocol (L2TP)

The screenshot shows the 'WAN Ethernet' configuration page. The 'Connection Type' is set to 'Layer 2 Tunneling Protocol (L2TP)'. Below this, there are input fields for 'L2TP Server Host Name or IP Address', 'Login User Name (case sensitive)', and 'Login Password'. The 'Internet Protocol' is set to 'Obtain an IP Address Automatically'.

2. Configure the following (provided by your ITSP):
 - L2TP Server Host Name or IP Address
 - Login user name
 - Login password
3. From the 'Internet Protocol' drop-down lists, select the method for assigning an IP address (provided by your ITSP).
4. Click **OK**.

8.1.3 WAN Ethernet

The device supports the following WAN Ethernet connection types:

- Manual IP Address Ethernet Connection
- Automatic IP address
- Point-to-Point Protocol over Ethernet (PPPoE)
- Point-to-Point Tunneling Protocol (PPTP)
- Layer 2 Tunneling Protocol (L2TP)



Notes:

- Automatic IP address is the default connection type.
- If you do not need an Internet (WAN Ethernet) connection, then in the 'Quick Setup' screen, from the 'Connection Type' drop-down list, select 'No Internet Connection'.

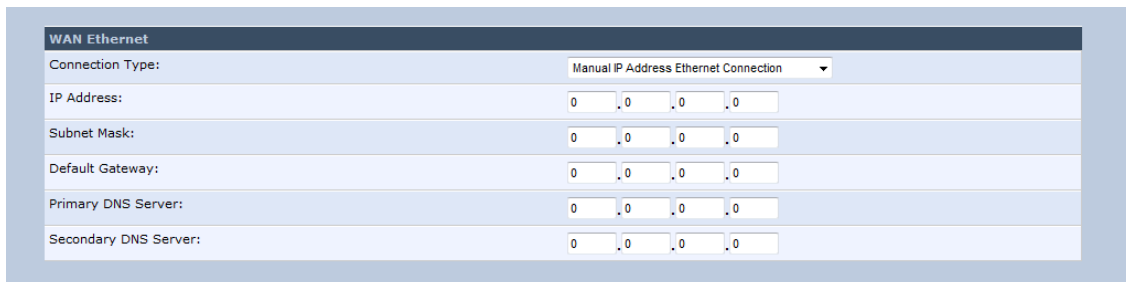
8.1.3.1 Manual IP Address Ethernet Connection

The procedure below describes how to connect to the Internet using a manually defined IP address.

➤ To configure a manual IP address connection:

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Manual IP Address Ethernet Connection'.

Figure 8-11: WAN Ethernet - Manual IP Address Ethernet Connection



WAN Ethernet	
Connection Type:	Manual IP Address Ethernet Connection
IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0

2. According to your ISP's instructions, specify the following parameters:
 - IP address
 - Subnet mask
 - Default Gateway
 - Primary DNS server
 - Secondary DNS server

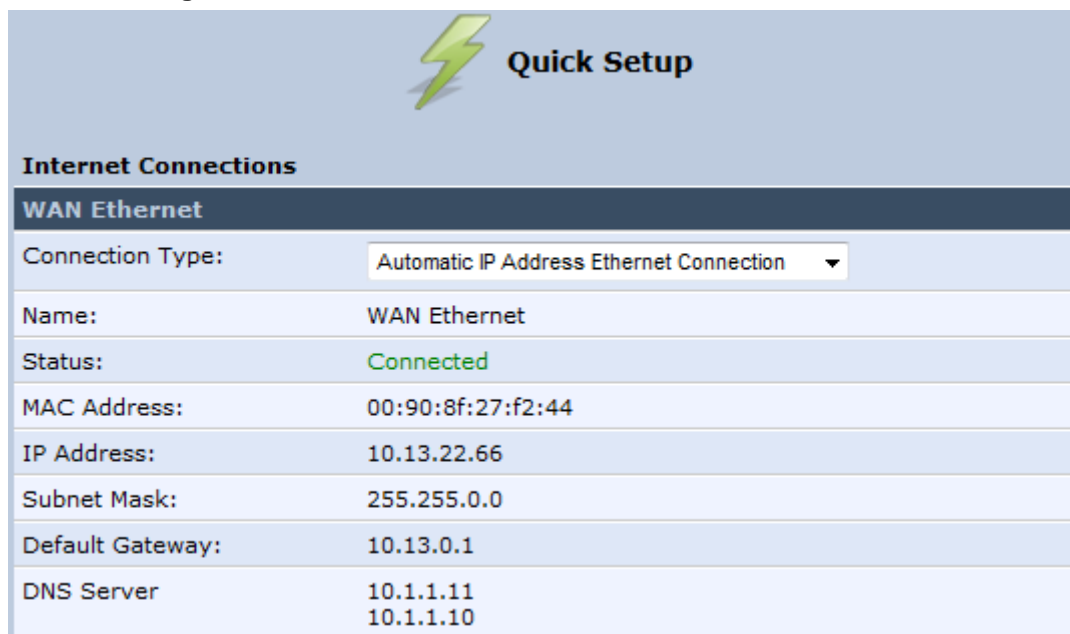
8.1.3.2 Automatic IP Address Ethernet Connection

The procedure below describes how to connect to the Internet by automatically obtaining a WAN IP address and DNS IP address from a DHCP server on the WAN. This method is the default connection type.

➤ **To configure automatic IP address connection:**

- Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Automatic IP Address Ethernet Connection'.

Figure 8-12: Automatic IP Address WAN Ethernet Connection



The screenshot shows the 'Quick Setup' window with a lightning bolt icon. Under the 'Internet Connections' section, the 'WAN Ethernet' group is selected. The 'Connection Type' is set to 'Automatic IP Address Ethernet Connection'. The status is 'Connected'. The configuration details are as follows:

WAN Ethernet	
Connection Type:	Automatic IP Address Ethernet Connection
Name:	WAN Ethernet
Status:	Connected
MAC Address:	00:90:8f:27:f2:44
IP Address:	10.13.22.66
Subnet Mask:	255.255.0.0
Default Gateway:	10.13.0.1
DNS Server	10.1.1.11 10.1.1.10

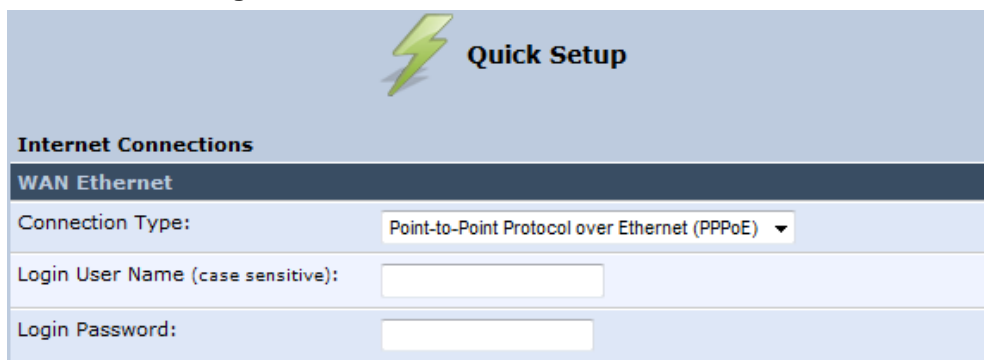
8.1.3.3 PPPoE

The procedure below describes how to connect to the Internet by PPPoE

➤ **To configure PPPoE connection:**

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Protocol over Ethernet (PPPoE)'.

Figure 8-13: PPPoE WAN Ethernet Connection



The screenshot shows the 'Quick Setup' window with a lightning bolt icon. Under the 'Internet Connections' section, the 'WAN Ethernet' group is selected. The 'Connection Type' is set to 'Point-to-Point Protocol over Ethernet (PPPoE)'. The configuration details are as follows:

WAN Ethernet	
Connection Type:	Point-to-Point Protocol over Ethernet (PPPoE)
Login User Name (case sensitive):	<input type="text"/>
Login Password:	<input type="password"/>

2. Configure the PPPoE login username and password (provided by your ITSP).

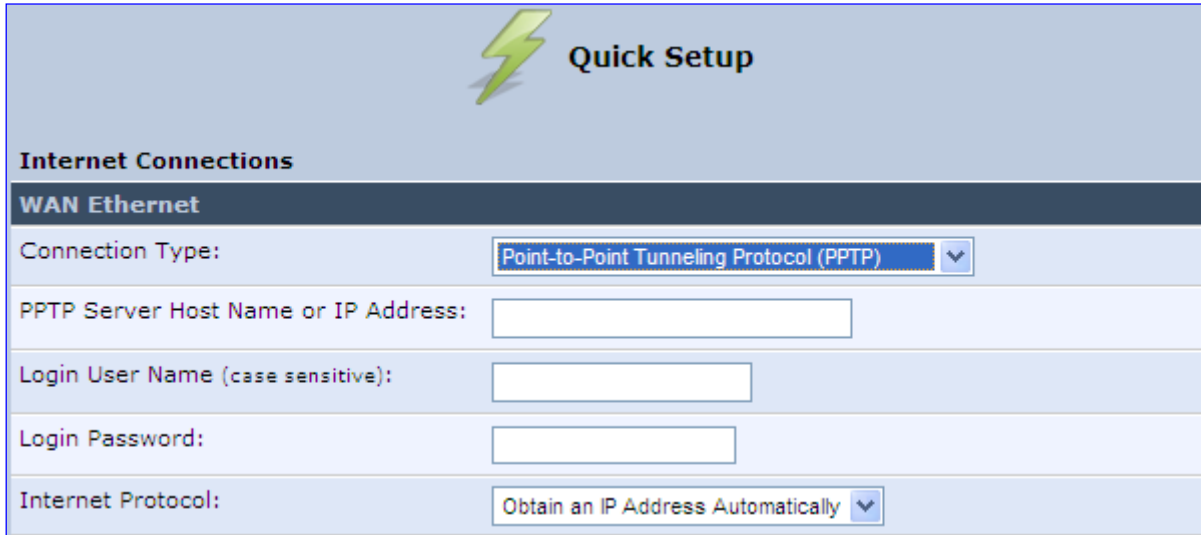
8.1.3.4 PPTP

The procedure below describes how to connect to the Internet by PPTP.

➤ **To configure PPTP connection:**

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Tunneling Protocol (PPTP)'.

Figure 8-14: PPTP WAN Ethernet Connection



The screenshot shows the 'Quick Setup' interface for 'Internet Connections'. Under the 'WAN Ethernet' section, the 'Connection Type' is set to 'Point-to-Point Tunneling Protocol (PPTP)'. Below this, there are input fields for 'PPTP Server Host Name or IP Address', 'Login User Name (case sensitive)', and 'Login Password'. The 'Internet Protocol' is set to 'Obtain an IP Address Automatically'.

Internet Connections	
WAN Ethernet	
Connection Type:	Point-to-Point Tunneling Protocol (PPTP) ▼
PPTP Server Host Name or IP Address:	<input type="text"/>
Login User Name (case sensitive):	<input type="text"/>
Login Password:	<input type="password"/>
Internet Protocol:	Obtain an IP Address Automatically ▼

2. Configure the following (provided by your ITSP):
 - PPTP Server Host Name or IP Address
 - Login user name
 - Login password
3. From the 'Internet Protocol' drop-down lists, select the method for assigning an IP address (provided by your ITSP).

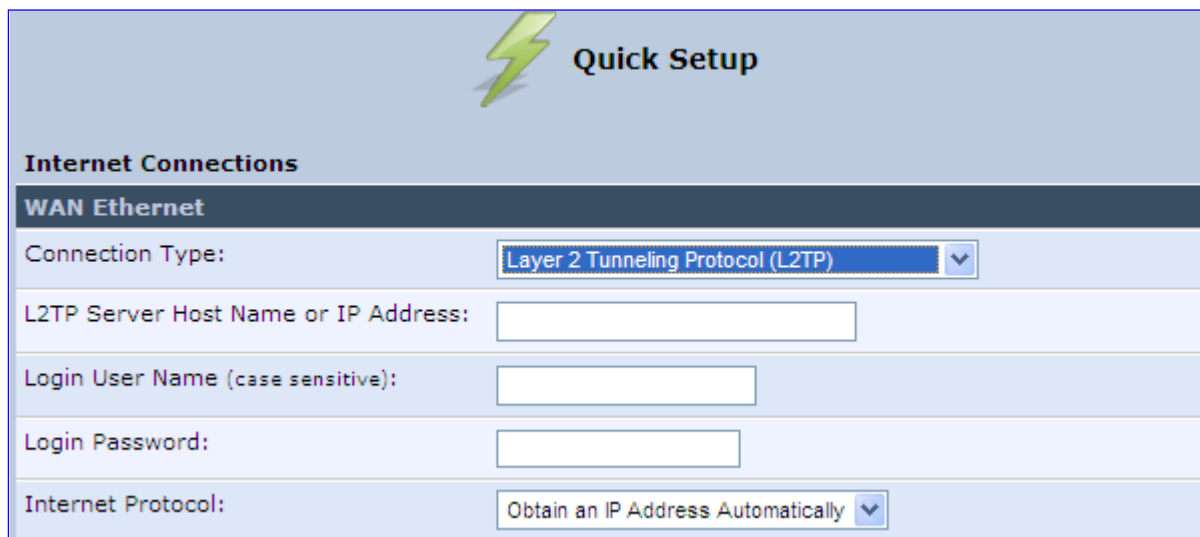
8.1.3.5 L2TP

The procedure below describes how to connect to the Internet by L2TP.

➤ **To configure L2TP connection:**

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Layer 2 Tunneling Protocol (L2TP)'.

Figure 8-15: L2TP WAN Ethernet Connection



The screenshot shows the 'Quick Setup' window with a lightning bolt icon. Under the 'Internet Connections' section, the 'WAN Ethernet' group is selected. The 'Connection Type' is set to 'Layer 2 Tunneling Protocol (L2TP)'. Below this, there are input fields for 'L2TP Server Host Name or IP Address', 'Login User Name (case sensitive)', and 'Login Password'. The 'Internet Protocol' is set to 'Obtain an IP Address Automatically'.

Internet Connections	
WAN Ethernet	
Connection Type:	Layer 2 Tunneling Protocol (L2TP) ▼
L2TP Server Host Name or IP Address:	<input type="text"/>
Login User Name (case sensitive):	<input type="text"/>
Login Password:	<input type="password"/>
Internet Protocol:	Obtain an IP Address Automatically ▼

2. Configure the following (provided by your ITSP):
 - L2TP Server Host Name or IP Address
 - Login user name
 - Login password
3. From the 'Internet Protocol' drop-down lists, select the method for assigning an IP address (provided by your ITSP).

8.2 Using the Automatic Dialer for Internet Connection

The Automatic Dialer feature allows the service provider to use one type of pre-configured devices for all the following Internet connection types:

- WAN Ethernet (DHCP, LT2P or PPPoE)
- WAN xDSL (PPPoE)

In the Private Labeling process, the factory setting is burned with the parameters of the different dialers. When powered-up at the customer site, the device first detects the physical WAN type (xDSL or Ethernet) and then attempts the relevant WAN connection methods. The indication for a successful result is connection (i.e., receipt of an IP address) and a ping test.

This section describes the recommended process for using the Automatic Dialer.

8.2.1 Recommended Configuration

The recommended factory settings for the Automatic Dialer feature are shown below:

```
(auto_dialer_detect
  (enabled(1))
  (done(0))
  (connection_type
    (0
      (type(DHCP))
      (enabled(1))
      (max_dialer_conn_time(20))
    )
    (1
      (type(L2TP))
      (enabled(1))
      (server_ip(<Server Name or IP>))
      (username(<User Name>))
      (password(<Password>))
      (max_dialer_conn_time(120))
    )
    (2
      (type(PPPOE))
      (enabled(1))
      (username(<User Name>))
      (password(<Password>))
      (max_dialer_conn_time(120))
    )
  )
  (auto_detect_retries(15))
```

```
(ping_retries(4))
(ping_retries_timeout(2))
(xDSL
  (vpi(8))
  (vci(48))
  (encap(LLC))
)
)
(system
  (network
    (internet_url(<Address or Domain Name for Ping Test>))
  )
)
```



Note: If the xDSL section in the factory settings is omitted, the device performs an automatic PVC scan. When configuring manual PVC values (VPI and VCI), the connection is faster.

8.2.2 Setting up and Starting the Automatic Dialer

The procedure below describes how to setup and start the Automatic Dialer feature.

➤ **To setup and start Automatic Dialer:**

1. Power off the device.
2. Connect the xDSL or Ethernet cables.



Note: If you are using an xDSL connection, do not connect any cable to the **WAN/LAN4** port. Connecting this port causes the Automatic Dialer to fail.

3. Power on the device; the Automatic Dialer begins its operation and you can view the progress status by checking the device's LEDs (see Section 3.1.1.2.1 on page 33).



Notes:

- If the connection is xDSL, the Automatic Dialer usually connects in the first iteration (after less than 10 seconds, when configuring manual PVC). In some cases, the Automatic Dialer may connect in the second iteration (up to 4 minutes).
- If the connection is WAN Ethernet:
 - For DHCP, the connection is fast.
 - For L2TP, the connection takes up to ~2 minutes.
 - For PPPoE, the connection can take up to ~4 minutes.

8.2.3 Quitting Automatic Dialer for Manual Configuration

If, for any reason, you need to manually configure the Internet connection, you first need to stop the Automatic Dialer feature and then manually configure the connection, as described below,

➤ **To quit Automatic Dialer and manually configure the Internet connection:**

1. Power off the MP-264.
2. Disconnect the WAN xDSL or Ethernet cable.
3. Power on the device.
4. Wait for the Automatic Dialer process to end (i.e., the **Broadband** LED stops blinking).
5. Log in to the device's Web interface.
6. Manually configure the Internet connection using the 'Quick Setup' screen (see Section 8.1 on page 73). This ensures that the Automatic Dialer feature does not re-activate itself after the device resets.

Once the device successfully connects to the Internet, it downloads its configuration file from the user-defined server on which the file is located.



Note: The configuration file must include the following parameter to indicate that Automatic Dialer is no longer needed: **auto_dialer_detect/done = 1**.

8.3 Setting up a Wireless LAN Network

The 'Quick Setup' screen provides basic parameters to quickly setup a wireless (or Wi-Fi) network.



Note: For advanced wireless network settings, see Section 12.2.1 on page 177.

➤ **To quickly setup a wireless network:**

1. Access the 'Quick Setup' screen. The Wireless group in the screen is shown below:

Figure 8-16: Wireless Group in Quick Setup Screen

Wireless	
Enable Wireless:	<input checked="" type="checkbox"/> Enabled
Wireless Network (SSID):	<input type="text" value="John"/>
802.11 Mode:	<input type="text" value="802.11b/g/n"/>
Security:	<input type="text" value="Password Protected (WPA)"/>
Password:	<input type="password" value="••••••••"/>

2. Select the 'Enable Wireless' check box to enable the wireless network.
3. In the 'Wireless Network (SSID)' field, enter the name of your wireless network.
4. From the '802.11 Mode' drop-down list, select the required wireless communication standard.
5. From the 'Security' drop-down list, select the type of security protocol. If you selected 'Password Protected', then enter the password in the 'Password' field.
6. Click **OK**.

9 Configuring VoIP Parameters

The VoIP parameters are mainly configured in the 'Voice over IP' screen. This screen is accessed by clicking the **Voice over IP** menu in the side menu bar. The 'Voice over IP' screen provides tabs for configuring the following:

- Signaling protocol (i.e., Session Initiation Protocol / SIP) – see Section 9.1 on page 89
- Dialing – see Section 9.2 on page 96
- Media streaming – see Section 9.3 on page 102
- Voice and fax – see Section 9.4 on page 104
- Supplementary services – see Section 9.5 on page 108
- Line settings – see Section 9.6 on page 110
- Line extensions – see Section 9.7 on page 119
- Speed dials – see Section 9.8 on page 121
- Telephone interfaces – see Section 9.9 on page 123
- Bluetooth – see Section 9.10 on 124

In addition to the above, you can select the region in which your device is located so that your analog telephone complies with the line standards (e.g., line impedance) of the area. For more information, see Section 9.10.5 on page 129.



Notes:

- By default, the 'Voice over IP' screens initially display only basic parameters. To view all the parameters, click the **Advanced** button in the required screen.
- Once you have configured the VoIP parameters, you can start using your analog telephones, as described in Chapter 9.10.6 on page 130. For using your DECT handset(s), see **Part II**.

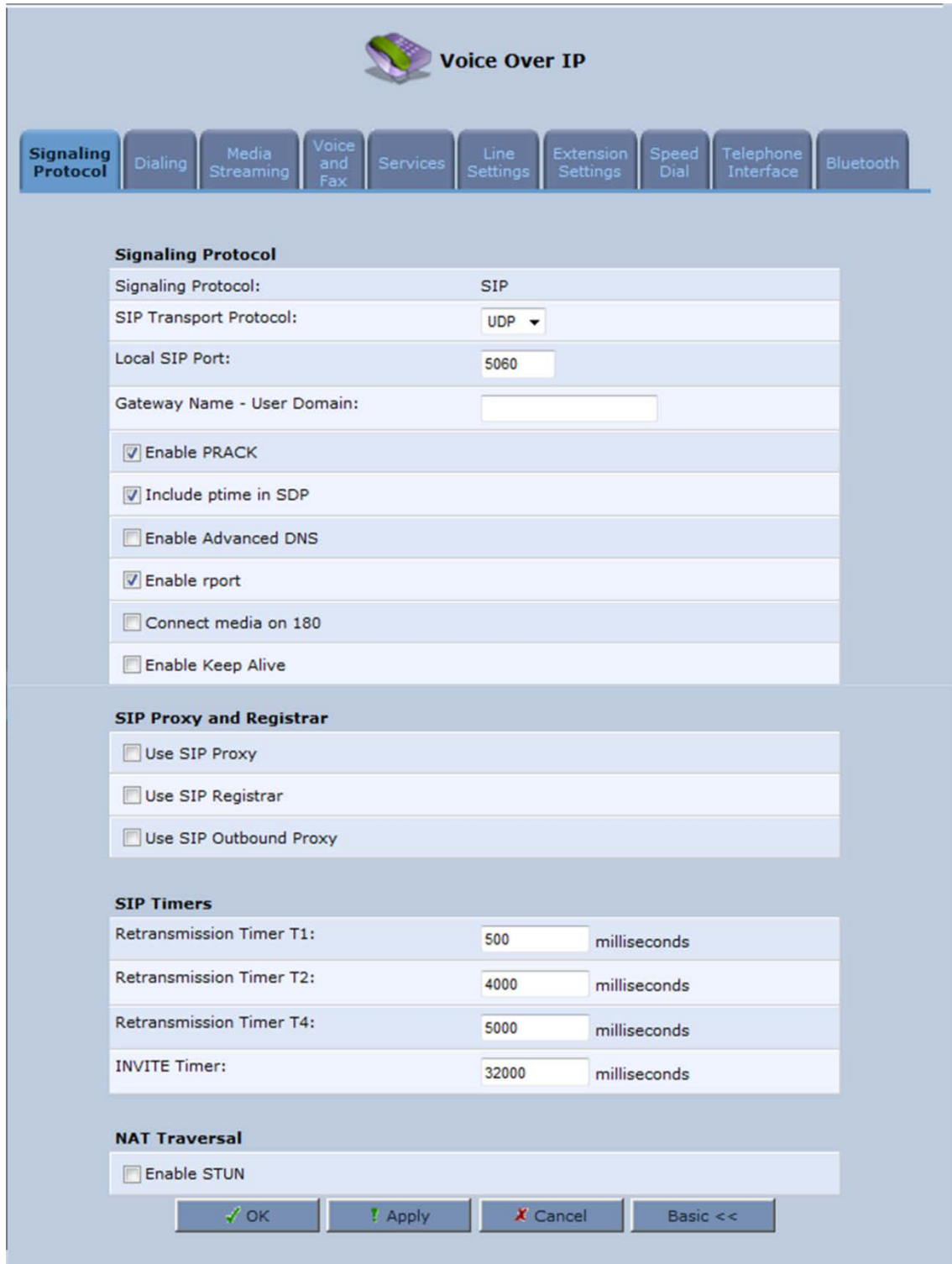
9.1 Configuring the SIP Signaling Protocol


The procedure below describes how to configure the SIP parameters.

➤ **To configure SIP parameters:**

1. From the menu bar, click the **Voice Over IP** menu; the following screen appears:

Figure 9-1: Signaling Protocol Tab Screen



 **Voice Over IP**

Signaling Protocol

Signaling Protocol: SIP

SIP Transport Protocol: UDP

Local SIP Port: 5060

Gateway Name - User Domain:

☒ Enable PRACK

☒ Include ptime in SDP

☐ Enable Advanced DNS

☒ Enable rport

☐ Connect media on 180

☐ Enable Keep Alive

SIP Proxy and Registrar

☐ Use SIP Proxy

☐ Use SIP Registrar

☐ Use SIP Outbound Proxy

SIP Timers

Retransmission Timer T1: 500 milliseconds

Retransmission Timer T2: 4000 milliseconds

Retransmission Timer T4: 5000 milliseconds

INVITE Timer: 32000 milliseconds

NAT Traversal

☐ Enable STUN

OK Apply Cancel Basic <<

2. Configure the parameters, as required. For a description of the parameters displayed on this screen, see [Table 9-1](#).
3. Click **OK** to save your settings.

Table 9-1: Signaling Protocol Tab Parameters Description

Parameter	Description
Signaling Protocol Group	
Signaling Protocol	(Read-only field.) Displays the signaling protocol running on the device. Note: Currently, only SIP is supported.
SIP Transport Protocol	Defines the SIP transport type - UDP (default), TCP, or TLS. Note: This parameter appears only in 'Advanced' mode.
Local SIP Port	Defines the UDP / TCP port on which the SIP stack listens. The default port is 5060. Note: This parameter appears only in 'Advanced' mode.
Local SIP TLS Port	Defines the TLS port on which the SIP stack listens. The default port is 5060. Note: This parameter appears only if you select 'TLS' as the SIP transport protocol.
Gateway Name - User Domain	Defines the device's domain name which is sent in the SIP From header of outgoing INVITE messages. Note: This parameter appears only in 'Advanced' mode.
Enable PRACK	When enabled, the device replies with a PRACK message upon receipt of a reliable provisional response. The device does not initiate reliable provisional responses. Note: This parameter appears only in 'Advanced' mode.
Include ptime in SDP	When enabled, the device adds the ptime field to the SDP message body. Note: This parameter appears only in 'Advanced' mode.
Enable Advanced DNS	Currently, this parameter is not supported.
Advanced DNS Type	Currently, this parameter is not supported. Note: This parameter is available only if the 'Enable Advanced DNS' check box is selected.
Enable rport	When enabled, the device adds the rport parameter to the relevant SIP message fields. Note: This parameter appears only in 'Advanced' mode.
Connect media on 180	When enabled, media is connected upon receipt of SIP 180, 183, or 200 messages. When this parameter is disabled, media is connected upon receipt of 183 and 200 messages only. Note: This parameter appears only in 'Advanced' mode.
Enable Keep Alive	When enabled, a keep-alive notification is sent every user-defined interval to the SIP registrar server. Note: This parameter appears only in 'Advanced' mode.

Parameter	Description
Keep-Alive Type	<p>The type of keep-alive mechanism sent to the SIP registrar:</p> <ul style="list-style-type: none"> • Using SIP OPTIONS: sends SIP OPTIONS messages • Using an Empty UDP packet: sends empty UDP packets <p>Note: This parameter is available only if the 'Enable Keep Alive' check box is selected.</p>
Keep-Alive Period	<p>Defines the periodic interval for keep-alive messages.</p> <p>Note: This parameter is available only if the 'Enable Keep Alive' check box is selected.</p>
SIP Proxy and Registrar	
Use SIP Proxy	<p>When checked, outgoing calls are routed to the configured SIP proxy. If the 'Use SIP Proxy IP and Port for Registration' check box is also selected, the configured SIP proxy is also used as the registrar, allowing incoming calls.</p>
Host Name or Address	<p>Defines the IP address or host name of the SIP proxy.</p> <p>Note: This parameter is available only if the 'Use SIP Proxy' check box is selected.</p>
Proxy Port	<p>Defines the port (UDP, TCP, or TLS) of the SIP proxy.</p> <p>Note: This parameter is available only if the 'Use SIP Proxy' check box is selected.</p>
Maximum Number of Authentication Retries	<p>Defines how many times authenticated register messages are re-sent if SIP 401 or 407 responses with a different "nonce" are received.</p> <p>Note: This parameter is available only if the 'Use SIP Proxy' check box is selected.</p>
Use SIP Proxy IP and Port for Registration	<p>When selected (default), the SIP proxy's IP address and port is also used for registration. When selected, there is no need to configure the address / port of the registrar (only the 'Register Expires' and 'Register Expires Failed' parameters – described later).</p> <p>Note: This parameter is available only if the 'Use SIP Proxy' check box is selected.</p>
Sip Security	<p>The device's firewall can be configured to block incoming packets that have the SIP signaling port as their destination. You can configure up to two SIP entities (for example, the SIP Proxy or an SBC), which are not blocked by the firewall.</p> <p>The default value is 'Allow all SIP traffic'.</p> <p>Note: This parameter is available only if the 'Use SIP Proxy' check box is selected.</p>
Address Type	<p>Selects the address type of the additional SIP entity - IP address or host name.</p> <p>Note: This parameter is available only if the 'Sip Security' field is set to 'Allow SIP traffic from Proxy and Additional SIP Entity'.</p>
SIP Entity Address	<p>Defines the address or host name (depending on the settings of the 'Address Type' field) of the additional SIP entity.</p> <p>Note: This parameter is available only if the 'Sip Security' field is set to 'Allow SIP traffic from Proxy and Additional SIP Entity'.</p>
Use Redundant Proxy	<p>Enables the use of a redundant proxy.</p> <p>Note: This parameter is available only if the 'Use SIP Proxy IP and Port for Registration' check box is selected.</p>

Parameter	Description
Redundant Proxy Address	Defines the IP address of the redundant proxy. Note: This parameter is available only if the 'Use Redundant Proxy' check box is selected.
Redundant Proxy Port	Defines the port of the redundant proxy. Note: This parameter is available only if the 'Use Redundant Proxy' check box is selected.
Redundant Proxy Keep Alive Period	Defines the interval between keep-alive packets (SIP OPTIONS) which are used by the proxy redundancy mechanism to check the connection status. Note: This parameter is available only if the 'Use Redundant Proxy' check box is selected.
Switch back to Primary SIP proxy when available	When selected, the device switches back to the primary proxy server when communication with it returns.
Use SIP Registrar	When selected, enables the use of a separate SIP registrar server.
Registrar Address	Defines the IP address or host name of the registrar server. Note: This parameter is available only if the 'Use SIP Registrar' check box is selected.
Registrar Port	Defines the port (UDP or TCP) of the registrar server. Note: This parameter is available only if the 'Use SIP Registrar' check box is selected.
Register Expires	Defines the registration timeout, in seconds. Note: This parameter is available only if the 'Use SIP Registrar' or 'Use SIP Proxy IP and Port for Registration' check box is selected.
Register Failed Expires	Defines the timeout between registration attempts in case of a registration failure (e.g. due to a network problem). Note: This parameter is available only if the 'Use SIP Registrar' or 'Use SIP Proxy IP and Port for Registration' check box is selected.
Use SIP Outbound Proxy	When selected (default), an outbound SIP proxy is used (all SIP messages are sent to this server as the first hop). Note: This parameter appears only in 'Advanced' mode.
Outbound Proxy IP	Defines the IP address of the outbound Proxy. If this parameter is set, all outgoing messages (including registration messages) are sent to this Proxy according to the Stack behavior. Note: This parameter is available only if 'Use SIP Outbound Proxy' is selected.
Outbound Proxy Port	The Port on which the outbound Proxy listens. Note: This parameter is available only if 'Use SIP Outbound Proxy' is selected.
SIP Timers Note: This group appears only in 'Advanced' mode.	
Retransmission Timer T1	The SIP T1 retransmission timer according to RFC 3261
Retransmission Timer T2	The SIP T2 retransmission timer according to RFC 3261
Retransmission Timer T4	The SIP T4 retransmission timer according to RFC 3261
INVITE Timer	The SIP INVITE timer according to RFC 3261

Parameter	Description
NAT Traversal	
Enable STUN	When selected, the SIP STUN Manager is enabled. The SIP STUN Manager resolves private addresses to public addresses. Note: This parameter appears only in 'Advanced' mode.
STUN Server Address	Defines the IP address of the STUN server used to resolve private addresses. Note: This parameter is available only if 'Enable STUN' is selected.
STUN Server Port	Defines the port of the STUN server. Note: This parameter is available only if 'Enable STUN' is selected.
Subnet Mask	Defines the subnet mask address of the STUN server used to resolve private addresses. Note: This parameter is available only if 'Enable STUN' is selected.

9.1.1 Configuring Proxy Redundancy

The Redundant Proxy feature allows the configuration of a backup SIP proxy server to increase Quality of Service (QoS). Once this feature is enabled, the device identifies cases where the primary proxy does not respond to SIP signaling messages. In these cases, the device registers to the redundant proxy and seamlessly continues normal functionality, without any noticeable connectivity failure or malfunction with the primary proxy.

The Redundant Proxy feature includes two operational modes:

- **Asymmetric mode:** This mode assigns the primary proxy a higher priority for registration over the redundant proxy. Once the device is registered to the primary proxy, it sends keep-alive messages (using SIP OPTIONS messages) to the primary proxy. If the primary proxy does not respond, the device registers to the redundant proxy, but continues sending keep-alive messages to the primary proxy. If the primary proxy responds to these keep-alive messages, the device re-registers to the primary proxy.
- **Symmetric mode:** In this mode, both proxies are assigned the same priority for registration. Once the device is registered to a proxy (primary or redundant), it sends keep-alive messages to this proxy. The device switches proxies only once the proxy to which it has registered, does not respond.

In both modes, the following applies:

- If the device is not registered (i.e., if the proxy server - redundant or primary - to which the device currently tries to register does not respond), the device attempts to register to an alternative proxy. These attempts continue until the device successfully registers.
- If this feature is enabled and you reboot the device, it registers to the last proxy to which it was trying to register (not necessarily to the primary proxy).

➤ **To configure proxy redundancy:**

1. From the menu bar, click the **Voice Over IP** menu; the **Signaling Protocol** tab screen appears.
2. Define a primary proxy server (under the **SIP Proxy and Registrar** group):
 - a. Select the 'Use SIP Proxy' check box.
 - b. In the 'Host Name or Address' field, enter the primary proxy's IP address.
 - c. In the 'Proxy Port' field, enter the primary proxy's port number.
3. Define a redundancy proxy server (under the **SIP Proxy and Registrar** group):
 - a. Select one of the following check boxes: 'Use SIP Registrar' or 'Use SIP Proxy IP and Port for Registration'.
 - a. Select the 'Use Redundant Proxy' check box.
 - b. In the 'Redundant Proxy Address' field, enter the redundant proxy's IP address or DNS name.
 - c. In the 'Redundant Proxy Port' field, enter the redundant proxy's port number.

- d. In the 'Redundant Proxy Keep Alive Period' field, enter the rate (in seconds) of the keep-alive messages for sending to the proxy. The valid range is 10 to 86,400 seconds (i.e., 24 hours). The default value is 60 sec.
- e. To toggle between Symmetric and Asymmetric modes, use the 'Switch back to Primary SIP proxy when available' check box.
 - ◆ **Asymmetric mode** - select the check box (i.e., mark it)
 - ◆ **Symmetric mode** - clear the check box

Figure 9-2: Configuring Proxy Redundancy

SIP Proxy and Registrar	
2-a →	<input checked="" type="checkbox"/> Use SIP Proxy
2-b →	Host Name or Address: <input type="text" value="10.33.2.36"/>
2-c →	Proxy Port: <input type="text" value="5060"/>
	Maximum Number of Authentication Retries: <input type="text" value="4"/>
3-a →	<input checked="" type="checkbox"/> Use SIP Proxy IP and Port for Registration
	Register Expires: <input type="text" value="3600"/> Seconds
	Register Failed Expires: <input type="text" value="60"/> Seconds
	Sip Security: <input type="text" value="Allow All SIP traffic"/>
3-a →	<input checked="" type="checkbox"/> Use Redundant Proxy
3-b →	Redundant Proxy Address: <input type="text" value="10.33.2.15"/>
3-c →	Redundant Proxy Port: <input type="text" value="5060"/>
3-d →	Redundant Proxy Keep Alive Period: <input type="text" value="60"/> Seconds
3-e →	<input checked="" type="checkbox"/> Switch back to Primary SIP proxy when available
	<input type="checkbox"/> Use SIP Outbound Proxy

4. Click **OK** to save your settings.

9.2 Configuring Dialing Parameters

The procedure below describes how to configure the dialing parameters.

➤ **To configure dialing parameters:**

1. In the 'Voice Over IP' screen, click the **Dialing** tab; the following screen appears.

Figure 9-3: Dialing Tab Screen

The screenshot shows the 'Dialing' tab selected in a configuration menu. The menu includes tabs for Signaling Protocol, Dialing, Media Streaming, Voice and Fax, Services, Line Settings, Extension Settings, Speed Dial, Telephone Interface, and Bluetooth. The 'Dialing Parameters' section contains the following settings:

- Dialing Timeout: 5 Seconds
- Phone Number Size: 15 Digits
- ☒ Enabled dialing complete key
- Complete dialing key: #
- Dial Tone Timeout: 30 Seconds
- Reorder tone timeout: 40 Seconds
- Unanswered call timeout: 60 Seconds
- Howler tone timeout: 120 Seconds
- Flash min: 100 milliseconds
- Flash max: 1000 milliseconds
- ☐ Enable Re-Answer Timeout
- Send DTMF Out-Of-Band: RFC2833
- Digit Map: (empty text field)
- Dial Plan: (empty text field)

The 'Key Sequence' section contains:

- Flash keys sequence style: Flash only

At the bottom are four buttons: OK (with a green checkmark), Apply (with a green exclamation mark), Cancel (with a red X), and Basic <<.

2. Configure the parameters, as required. For a description of the parameters displayed on this screen, see [Table 9-2](#).
3. Click **OK** to save your settings.

Table 9-2: Dialing Tab Parameters Description

Parameter	Description
Dialing Parameters	
Dialing Timeout	Defines the duration (in seconds) of allowed inactivity between dialed digits. When you work with a proxy, the number you have dialed before the dialing process has timed out is sent to the proxy as the user ID to be called. This is useful for calling remote parties without creating a speed dial entry (assuming the remote party is registered with the proxy).
Phone Number Size	Defines the maximum length of shortcut numbers that you can enter and the maximum number of digits that you can dial.
Enabled dialing complete key	When selected (default), you can define a key that when pressed forces the device to make a call to the dialed digits even if there is no match in the dial plan or digit map. The key is defined in the 'Complete dialing key' field, which appears when this parameter is selected. Note: This parameter appears only in 'Advanced' mode.
Complete dialing key	Defines the key that when pressed forces the device to make a call to the dialed digits even if there is no match in the dial plan or digit map. The default value is the pound (#) key. Note: This parameter is available only if the 'Enabled dialing complete key' is selected.
Dial Tone Timeout	Defines the duration of the dial tone (in seconds). If the limit is exceeded, the dial tone stops and you a reorder tone is played.
Reorder Tone Timeout	Defines the duration (in seconds) of the reorder tone. The reorder tone is played, for example, when the device receives a SIP 486 response. If the limit is exceeded, the reorder tone stops and a howler tone is played. Note: This parameter appears only in 'Advanced' mode.
Unanswered call timeout	Defines the timeout before the device automatically sends a SIP CANCEL message. When the device makes a call and the other side doesn't answer, the device sends a CANCEL message after this timeout. Note: This parameter appears only in 'Advanced' mode.
Howler Tone Timeout	Defines the duration (in seconds) of the howler tone. If the limit is exceeded, the howler tone stops playing. The howler tone informs a user that the user's phone has been left in an off-hook state. Note: This parameter appears only in 'Advanced' mode.
Flash min	Defines the duration (in ms) after which you can begin to perform a flash hook.
Flash max	Defines the maximum duration (in ms) that the flash hook button can be pressed, after which the call is disconnected.
Enable Re-Answer Timeout	When selected, the 'Re-Answer Timeout' field appears, allowing you to define the timeout after on-hooking an active call and then off-hooking it again. Once this time expires and the phone has not been off-hooked again, the call is disconnected.
Send DTMF Out-Of-Band	Defines how the DTMF tones are sent ('Inband', 'RFC2833', or 'Via SIP'). DTMFs are the tones generated by your telephone's keypad. Note: This parameter appears only in 'Advanced' mode.

Parameter	Description
Digit Map	<p>Defines formats (or patterns) for the dialed number. A match to one of the defined patterns terminates the dialed number. For an explanation on digit map syntax, see Section 9.2.1 on page 100.</p> <p>Note: This parameter appears only in 'Advanced' mode.</p>
Dial Plan	<p>Defines patterns to translate to specific SIP destination addresses. For dial plan syntax rules for patterns entered to the left of the '=' sign, see Section 9.2.1 on page 100.</p> <p>Note: This parameter appears only in 'Advanced' mode.</p>
Key Sequence	
Flash keys sequence style	<p>Defines the key sequence with the flash button:</p> <ul style="list-style-type: none"> ▪ 'Flash only' (default) = uses only the phone's Flash button. There are three scenarios: <ul style="list-style-type: none"> ✓ During an existing call, if the user presses Flash, the call is put on hold, a dial tone is heard and the user is able to initiate a second call. Once the second call is established, on-hooking transfers the first (held) call to the second call. ✓ During an existing call, if the user presses Flash, the call is put on hold and a dial tone is heard. The user can initiate a second call and establish a 3-way conference by again pressing Flash after the second call is initiated. ✓ During an existing call, if a call comes in (call waiting), pressing Flash puts the active call on hold and answers the waiting call; pressing Flash again toggles between these two calls. ▪ 'Flash + digits sequence' = Flash button with a key sequence: <ul style="list-style-type: none"> ✓ Flash + 1 holds a call or toggles between two existing calls. ✓ Flash + 2 makes a call transfer. ✓ Flash + 3 establishes a 3-way conference. ▪ 'Send Flash Hook Via SIP' = you can modify the SIP INFO message that is sent upon Flash. You can change the Content Type header field and Message Body field. <p>Note: This parameter appears only in 'Advanced' mode.</p>
SIP INFO Header	<p>When the key sequence is set to 'Send Flash Hook Via SIP', you can modify the Content Type header field of the SIP INFO message.</p> <p>For example: "application/broadsoft; version = 1.0"</p> <p>Note: This parameter appears only when the 'Flash keys sequence style' field is set to 'Send Flash Hook Via SIP'.</p>
SIP INFO Body	<p>When the key sequence is set to 'Send Flash Hook Via SIP', you can modify the Message Body field of the SIP INFO message.</p> <p>For example: " event flashhook"</p> <p>Note: This parameter appears only when the 'Flash keys sequence style' field is set to 'Send Flash Hook Via SIP'.</p>

9.2.1 Syntax for Digit Maps and Dial Plans

Digit maps and dial plans are defined using special syntax rules, configured in the 'Dialing' screen (refer to 'Configuring Dialing Parameters' on page 96).

- **Digit Maps:** A phone's digit map allows MP-20x to know when an entered (dialed) telephone number is complete and therefore, when it should **immediately** initiate the call. If the phone digit map is defined incorrectly, MP-20x might start to dial before the telephone user has entered all the required digits. A digit map is defined either by a (case insensitive) "string" or by a list of strings. Each string in the list is an alternative numbering scheme, specified either as a set of digits or as an expression over which MP-20x attempts to find a shortest possible match. The syntax that can be used in each numbering scheme is described in the table below.
- **Dial Plans:** A dial plan translates specific patterns into specific SIP destination addresses. For example, dial plan rule "4xxx=Line_\\\@10.1.2.3" sends a dialed number consisting of the digit 4 followed by any three digits to IP address 10.1.2.3. The syntax of the pattern on the left of the equal (=) sign is described in the table below.

Table 9-3: Dial Plan (for Left of '=' Sign) and Digit Map Syntax

Type	Syntax
Digit	A digit from "0" to "9".
DTMF	A digit or one of the symbols "A", "B", "C", "D", "#", or "*".
Wildcard "x"	The symbol "x" denotes any digit from "0" through "9".
Range	Two digits separated by a hyphen ("-") and enclosed by square brackets. For example, the digit pattern "[2-5]" denotes any dialed digit that matches 2, 3, 4, or 5.
Separation of Patterns	The bar " " symbol is used to separate multiple digit patterns in your digit map.

An example of a digit map is shown below and described in the subsequent table:

[2-9]11|0|100|101|1[2-9]xxxxxxxx|*xx|4xxx

Table 9-4: Digit Map Example

Digit Pattern	Description	Example
[2-9]11	Received dialed number that begins with any digit from 2 through 9, and ends with digits 11.	211, 311, 411, 511, 611, 711, 811, 911
0	Received dialed number of 0	0
100	Received dialed number of 100	100
101	Received dialed number of 101	101
1[2-9]xxxxxxxx	Received dialed number that begins with digit 1, followed by any digit from 2 through 9, and then followed by any nine digits.	19222244445
*xx	Received dialed number that begins with the star * sign (star key), followed by any two digits	*44
4xxx	Received dialed number that begins with digit 4 followed by any three digits	4162



Note: Digit patterns that are not included in the digit map are still allowed and will be dialed after the defined dialing timeout (5 seconds, by default). Therefore, this replaces the need to use the symbol "T" in the digit map.

9.3 Configuring Media Streaming

The procedure below describes how to configure the media streaming parameters.

➤ **To configure media streaming parameters:**

1. In the 'Voice Over IP' screen, click the **Media Streaming** tab; following screen appears.

Figure 9-4: Media Streaming Tab Screen



Media Streaming Parameters

Local RTP Port Range - Contiguous Series of 28 Ports Starting From: 5004

DTMF Relay RFC2833 Payload Type (default value 101): 101

G.726/16 Payload Type (default value 98): 98

Quality of Service Parameters

Type Of Service (Hex): 0xb8

Wide-Band Restrictions

☒ Enabled

Codecs

Codecs Priority	Supported Codecs	Packetization Time (milliseconds)
1st Codec	G.711, 64kbps, u-Law	20
2nd Codec	G.711, 64kbps, A-Law	20
3rd Codec	G.729, 8kbps	20
4th Codec	[None]	10
5th Codec	[None]	10
6th Codec	[None]	10

OK Apply Cancel Basic <<

2. Select the 'Enabled' check box under "Wide-Band Restrictions", to restrict Wide-band codecs on FXS ports.
3. Configure the parameters, as required. For a description of the parameters displayed on this screen, see [Table 9-5](#).
4. Click **OK** to save your settings.

Table 9-5: Media Streaming Tab Parameters Description

Parameter	Description
Media Streaming Parameters	
Local RTP Port Range - Contiguous Series of 8 Ports Starting From:	Defines the port range for Real Time Protocol (RTP) voice transport.
DTMF Relay RFC 2833 Payload Type	Defines the RTP payload type used for RFC 2833 DTMF relay packets. The range is 0-255. The default is 101.
G.726/16 Payload Type	Defines the RTP payload type used for 16 kbps G.726 packets. The range is 0-255. The default is 98.
Quality of Service Parameters	
Type of Service (Hex)	This is a part of the IP header that defines the type of routing service to be used to tag outgoing voice packets originated from the device. It is used to inform routers along the way that this packet should get specific QoS. Leave this value as 0xb8 (default) if you are unfamiliar with the Differentiated Services IP protocol parameter.
Codecs	
1 st - 6 th Codec	Defines the voice codec. For more information, see 9.3.1 on page 103 .

9.3.1 Configuring Codecs

Codecs define the method of relaying voice data. Different codecs have different characteristics, such as data compression and voice quality. For example, G.723 is a codec that uses compression, so it is good for use where bandwidth is limited but its voice quality is not as good compared to other codecs such as the G.711.

9.3.1.1 Supported Codecs

To make a call, at least one codec must be enabled. Moreover, all codecs may be enabled for best performance. When you start a call to a remote party, your available codecs are compared against the remote party's to determine the codec used. The priority by which the codecs are compared is according to their order of appearance in the table (descending order). To change the priorities, rearrange the codecs in the required order.

If there is no codec that both parties have made available, the call attempt fails. Note that if more than one codec is common to both parties, you cannot force which of the common codecs that were found are used by the remote party's client. If you do wish to force the use of a specific codec, leave only that codec checked.

9.3.1.2 Packetization Time

The Packetization Time is the length of the digital voice segment that each packet holds. The default is 20 millisecond packets. Selecting 10 millisecond packets reduces the delay but increases the bandwidth consumption.

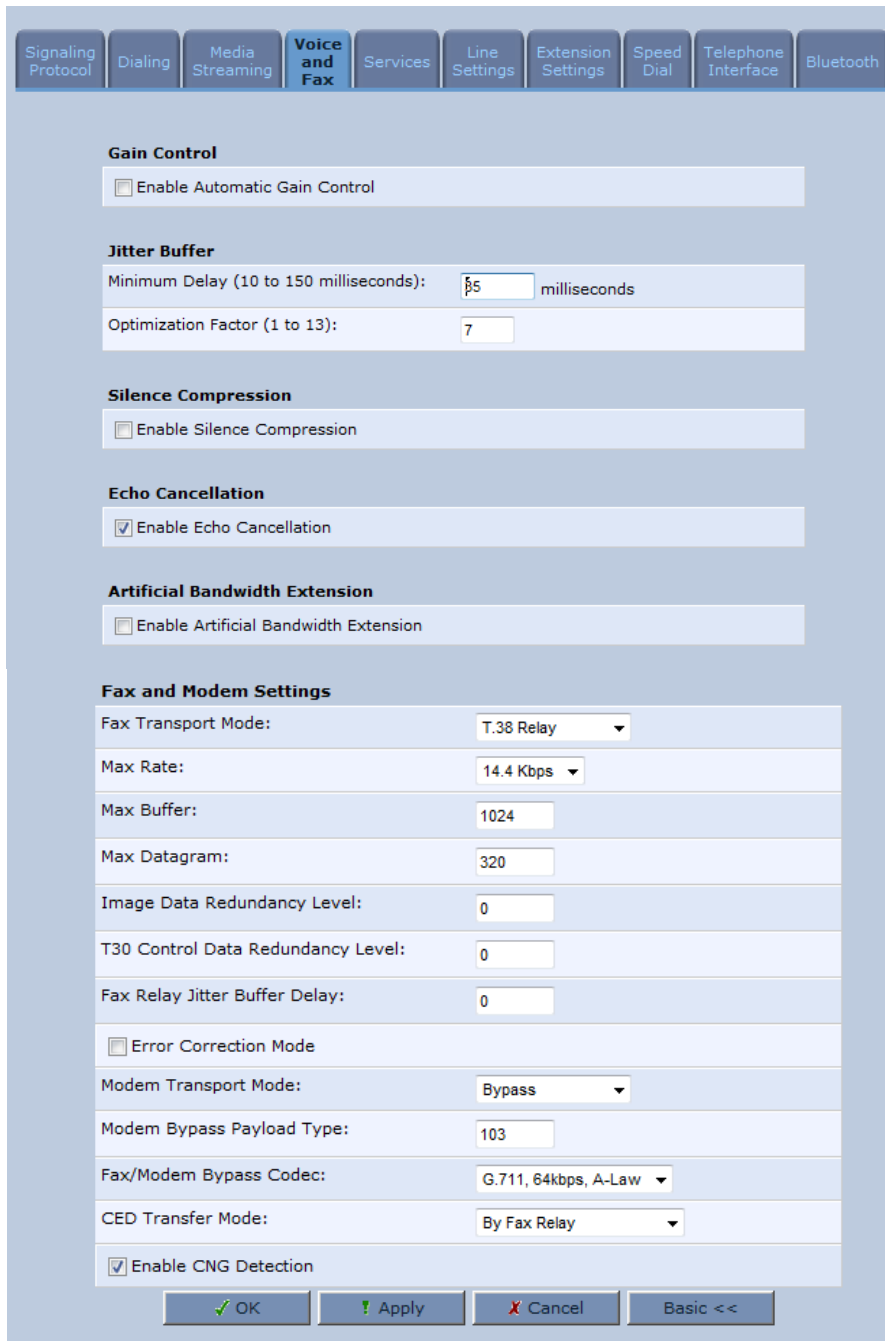
9.4 Configuring Voice and Fax

The procedure below describes how to configure the voice and fax parameters.

➤ **To configure voice and fax parameters:**

1. In the 'Voice Over IP' screen, click the **Voice and Fax** tab and then click **Advanced**; the following screen appears.

Figure 9-5: Voice and Fax Tab Screen



The screenshot displays the 'Voice and Fax' configuration screen. At the top, there is a navigation bar with tabs: Signaling Protocol, Dialing, Media Streaming, **Voice and Fax** (selected), Services, Line Settings, Extension Settings, Speed Dial, Telephone Interface, and Bluetooth. The main content area is divided into several sections:

- Gain Control:** Contains a checkbox for 'Enable Automatic Gain Control' which is currently unchecked.
- Jitter Buffer:** Contains two input fields: 'Minimum Delay (10 to 150 milliseconds):' set to 85 milliseconds, and 'Optimization Factor (1 to 13):' set to 7.
- Silence Compression:** Contains a checkbox for 'Enable Silence Compression' which is currently unchecked.
- Echo Cancellation:** Contains a checkbox for 'Enable Echo Cancellation' which is checked.
- Artificial Bandwidth Extension:** Contains a checkbox for 'Enable Artificial Bandwidth Extension' which is currently unchecked.
- Fax and Modem Settings:** Contains a series of configuration options:
 - Fax Transport Mode: T.38 Relay (dropdown)
 - Max Rate: 14.4 Kbps (dropdown)
 - Max Buffer: 1024 (input field)
 - Max Datagram: 320 (input field)
 - Image Data Redundancy Level: 0 (input field)
 - T30 Control Data Redundancy Level: 0 (input field)
 - Fax Relay Jitter Buffer Delay: 0 (input field)
 - Error Correction Mode: (checkbox, unchecked)
 - Modem Transport Mode: Bypass (dropdown)
 - Modem Bypass Payload Type: 103 (input field)
 - Fax/Modem Bypass Codec: G.711, 64kbps, A-Law (dropdown)
 - CED Transfer Mode: By Fax Relay (dropdown)
 - Enable CNG Detection: (checkbox, checked)

At the bottom of the screen, there are four buttons: OK (with a green checkmark), Apply (with a green exclamation mark), Cancel (with a red X), and Basic <<.

2. Select the 'Enable Artificial Bandwidth Extension' check box to enable this setting.

3. Configure the parameters, as required. For a description of the parameters displayed on this screen, see [Table 9-6](#).
4. Click **OK** to save your settings.

Table 9-6: Voice and Fax Tab Parameters Description

Parameter	Description
Gain Control	
Enable Automatic Gain Control	Enables the Automatic Gain Control (AGC) mechanism. The AGC mechanism adjusts the level of the received signal to maintain a steady (configurable) volume level.
Automatic Gain Control Direction	Defines the AGC direction (local or remote user). Note: This parameter appears only if the 'Enable Automatic Gain Control' check box is selected.
Target Energy	Defines the signal energy value (in dBm) that the AGC attempts to attain. The range is 0 to -63 dBm. The default value is -19 dBm. Note: This parameter appears only if the 'Enable Automatic Gain Control' check box is selected.
Jitter Buffer	
Minimum Delay	Defines the initial and minimal delay of the adaptive jitter buffer mechanism, which compensates for network problems. The value should be set according to the expected average jitter in the network (in milliseconds). The default is 35 msec.
Optimization Factor	Defines the adaptation rate of the jitter buffer mechanism. Higher values cause the jitter buffer to respond faster to increased network jitter. The default is 7.
Silence Compression	
Enable Silence Compression	Enables silence compression, which reduces the network bandwidth consumption. The default is disabled.
Enable G.711/G.726 Comfort Noise	Enables the Comfort Noise generation feature. When enabled and silence is detected, the device transmits a series of parameters called Silence Information Descriptor (SID), which are used to reproduce the local background noise at the remote (receiving) side. Note: This parameter appears only if the 'Enable Silence Compression' check box is selected.
Echo Cancellation	
Enable Echo Cancellation	Enables (default) echo cancellation (disabling echo cancellation should be done for testing purposes only).
Fax and Modem Settings	
Fax Transport Mode	Selects the way fax calls are handled: <ul style="list-style-type: none"> ✓ Transparent = Fax is transferred in-band (like a voice call) - can be used if the codec is G.711 ✓ T.38 Relay = Fax is relayed to the remote side according to the T.38 standard ✓ Voice Band Data = Switch to G.711 via SIP messaging ✓ Bypass = An automatic switch to AudioCodes' proprietary payload type (102, 103).

Parameter	Description
Max Rate	Defines the maximum fax rate. 2.4 Kbps, 4.8 Kbps, 7.2 Kbps, 9.6 Kbps, 12 Kbps or 14.4 Kbps (default). Note: This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Max Buffer	Defines the maximum amount of T.38 data stored on the devices. The valid range is 128 to 2048. The default is 1024. Note: This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Max Datagram	Defines the maximum total size of TCP/UDPTL packets that can be received at the remote gateway. The valid range is 160 to 1020. The default is 320. Note: This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Image Data Redundancy Level	Defines the level for output Image Data (2400...14400 bps). <ul style="list-style-type: none"> 0 = No redundancy 1 to 3 = Redundancy level Note: This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
T30 Control Data Redundancy Level	Defines the redundancy level for output T.30 Control Data (300 bps). <ul style="list-style-type: none"> 0 = No redundancy 1 to 7 = Redundancy level Note: This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Fax Relay Jitter Buffer Delay	Defines the Fax Relay Jitter Buffer. <ul style="list-style-type: none"> 0 = Adaptive Jitter Buffer. The device sets the Jitter Buffer size automatically and then adapts it according to network conditions. 1 to 511 = Fixed Jitter Buffer size (in msec). Note: This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Error Correction Mode	Enables (default) fax error correction mode (ECM). Note: This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Fax Bypass Payload Type	Defines the payload type for fax in Bypass mode. Note: This parameter appears only if 'Fax Transport Mode' is set to 'Bypass'.
Modem Transport Mode	Selects the way modem calls are handled: <ul style="list-style-type: none"> Transparent = Data is transferred in-band (like a voice call). This can be used if the codec is G.711. Voice Band Data = Switch to G.711 via SIP messaging. Bypass = An automatic switch to AudioCodes' proprietary payload type (102, 103). Note: If the Fax transport mode is Bypass or VBD, it must match the Modem transport mode.
Modem Bypass Payload Type	Defines the payload type for modems in Bypass mode. Note: This parameter appears only if 'Modem Transport Mode' is set 'Bypass'.

Parameter	Description
Fax/Modem Bypass Codec	Defines the codec for the VBD and Bypass modes. PCMA (default) or PCMU. G.711 64 kbps A-Law -OR- G.711 64 kbps u-Law
CED Transfer Mode	<ul style="list-style-type: none"> By Fax Relay: When the device is the receiver side, Switch to Fax relay is enabled upon CED. This allows a high reliable fax-over-IP call establishment at the beginning of CED tone. In Voice Or PCM Bypass: When the device is the receiver side, to avoid possible conflicts with low-speed modems, the CED (ANS) relay by FoIP protocol may be disabled by setting the CED transfer mode to 'In Voice Or PCM Bypass'. In this case, the device does not initiate the Fax Relay on detecting CED tone in absence of CNG, but switches to VBD or remains in voice mode (depends on the Modem Transport Mode). the device switches to FoIP later when it defines exactly that a monitored call is the fax call (CED and CND or V.21 Preamble).
Enable CNG Detection	Enables detection of the fax CNG signal. When the local fax machine connected to the device receives a fax, the device switches to T.38 fax relay upon detection of the CED signal from the local fax. If the local fax machine sends a fax, the device switches to T.38 only after detecting the CNG signal from the local side and the CED signal from the remote side. If this check box is selected, the device switches to T.38 relay immediately upon detection of the CNG signal from the local side, without waiting for the CED signal from the remote side. The default is disabled.
Switch to Fax only by the Answering Side	When setting this parameter to "Enable", the device, as the fax sender, will not send a T.38 Re-Invite and will wait for the answering side to initiate the T.38 session.

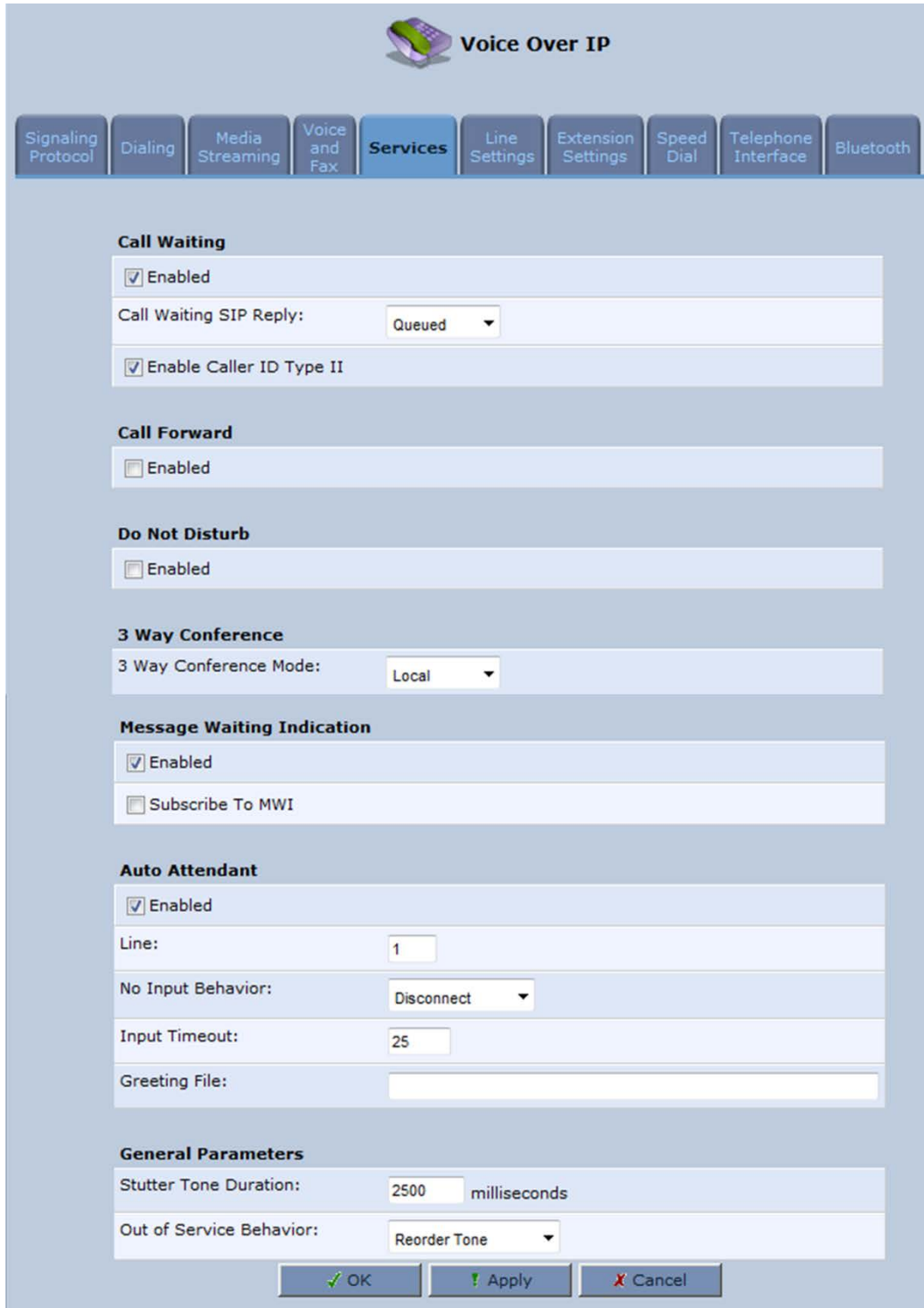
9.5 Configuring Supplementary Services

The procedure below describes how to configure the services parameters.

➤ **To configure supplementary services:**

1. In the 'Voice Over IP' screen, click the **Services** tab; the following screen appears.

Figure 9-6: Services Tab Screen



The screenshot shows the 'Voice Over IP' configuration interface. At the top, there is a header with a telephone icon and the text 'Voice Over IP'. Below this is a row of tabs: Signaling Protocol, Dialing, Media Streaming, Voice and Fax, **Services** (selected), Line Settings, Extension Settings, Speed Dial, Telephone Interface, and Bluetooth. The main content area is divided into several sections, each with a title and a set of controls:

- Call Waiting**: Includes a checkbox for 'Enabled' (checked), a dropdown for 'Call Waiting SIP Reply:' (set to 'Queued'), and a checkbox for 'Enable Caller ID Type II' (checked).
- Call Forward**: Includes a checkbox for 'Enabled' (unchecked).
- Do Not Disturb**: Includes a checkbox for 'Enabled' (unchecked).
- 3 Way Conference**: Includes a dropdown for '3 Way Conference Mode:' (set to 'Local').
- Message Waiting Indication**: Includes a checkbox for 'Enabled' (checked) and a checkbox for 'Subscribe To MWI' (unchecked).
- Auto Attendant**: Includes a checkbox for 'Enabled' (checked), a text field for 'Line:' (set to '1'), a dropdown for 'No Input Behavior:' (set to 'Disconnect'), a text field for 'Input Timeout:' (set to '25'), and a text field for 'Greeting File:' (empty).
- General Parameters**: Includes a text field for 'Stutter Tone Duration:' (set to '2500' milliseconds) and a dropdown for 'Out of Service Behavior:' (set to 'Reorder Tone').

At the bottom of the form are three buttons: 'OK' (with a green checkmark), 'Apply' (with a green exclamation mark), and 'Cancel' (with a red X).

2. Configure the parameters, as required. For a description of the parameters displayed on this screen, see [Table 9-7](#).
3. Click **OK** to save your settings.

Table 9-7: Services Tab Parameters Description

Parameter	Description
Call Waiting	
Enabled	Enables the Call Waiting feature.
Call Waiting SIP Reply	Defines the SIP response (180 Ringing or 182 Queued - default) sent when another call arrives while a call is in progress. Note: This parameter appears only if Call Waiting is enabled.
Enable Caller ID Type II	Enables caller ID of a waiting call (Called Caller ID type 2). Note: This parameter appears only if Call Waiting is enabled.
Call Forward	
Enabled	Enables call forwarding. The Call Forward feature permits a user to redirect incoming calls addressed to another number. The user's ability to originate calls is unaffected by Call Forward. Note: The Call Forward feature is functional only when MP-264 is registered to a proxy.
Call Forward Type	Defines the type of call forwarding: <ul style="list-style-type: none"> ▪ Unconditional: Incoming calls are forwarded independently of the status of the endpoint. ▪ Busy: Incoming calls are forwarded only if the endpoint is busy, i.e., if all lines are active. ▪ No Reply: Incoming calls are forwarded only if the endpoint does not answer before a user-defined timeout (see 'Time for No Reply Forward' parameter). Note: This parameter appears only if Call Forward is enabled.
Time for No Reply Forward	Defines the timeout after which the call is forwarded if the endpoint does not answer. If you specify 5 seconds, for example, and 'No Reply' is selected for parameter 'Call Forward Type' (see above), incoming calls are forwarded only after 5 seconds lapse. Note: This parameter is available only when 'No Reply' is selected for the parameter 'Call Forward Type'.
Key Sequence	Defines the key sequence to activate call forwarding. The default is *72 but users can modify to any sequence of up to 2 digits, i.e., *n or *nm.
Do Not Disturb	
Enabled	Enables the Do Not Disturb (DND) feature. This feature allows you to prevent incoming calls from ringing at your phone. When enabled, callers receive a busy signal or an announcement. The DND is activated using the phone keypad. The default is disabled.
Key Sequence	Defines the key sequence to activate and deactivate the DND feature.
3 Way Conference	
3 Way Conference Mode	Selects how 3-way conference calls are handled: <ul style="list-style-type: none"> ▪ Local: locally by the device ▪ Remote: by a remote media server (RFC 4240)

Parameter	Description
Media Server Address	The address of the remote media server that handles conference calls. Note: This parameter is available only when 'Remote' is selected for the parameter '3 Way Conference Mode'.
Message Waiting Indication	
Enabled	If a user has an unheard voice mail message, a stutter dial tone is heard when the user picks up the phone. In addition, the device generates an FSK signal to the phone to indicate that a message is waiting. If the telephone connected to the device supports this feature, an MWI 'envelope icon' is displayed.
Subscribe to MWI	Select this check box if you must register with a MWI subscriber server. If so, configure the three parameters below.
MWI Server IP Address or Host Name	Defines the IP address or host name of the MWI server. Note: This parameter is available only when the check box 'Subscribe to MWI' is selected.
MWI Server Port	Defines the port number of the MWI server. Note: This parameter is available only when the check box 'Subscribe to MWI' is selected.
MWI Subscribe Expiration Time	Defines the interval between registrations. Note: This parameter is available only when the check box 'Subscribe to MWI' is selected.
Auto Attendant	
Enabled	Enables/Disables the Auto Attendant feature.
Line	Enables line numbers as they appear in the Line Settings tab.
Input Timeout	Enables the time in seconds, from the beginning of the Auto Attendant message, until the conversation disconnects, if the user hasn't received any input. This field should be set to the length of the Auto Attendant message itself, plus a few seconds to allow the user to press the required extension or to repeat the message.
Greeting File	Defines the file name of the Auto Attendant message (.pcm), recorded in Section 9.5.1.1.
General Parameters	
Stutter Tone Duration	When you enable message waiting and an unheard message exists, a stutter tone is played to the phone for the duration configured by this parameter and/or when you activate the call forwarding feature (see Section 10.5 on page 134).
Out of Service Behavior	Defines the tone which is played instead of a dial tone if the user configured a registrar IP and the registration failed. When the Reorder tone is selected, a Reorder tone is played instead of a dial tone. If "No Tone" is selected, then no tone is played.

9.5.1 Auto Attendant

Auto-attendant (AA) is a PBX feature that enables a caller to select which of the extensions are to be reached. Upon receiving an incoming call, the system plays a short announcement and the caller responds with DTMF digits.

Fully featured AA systems (normally part of PBX systems), support complex operations such as multiple AA levels, different definitions for working and non-working hours, interaction with Voicemail and more. Currently only basic AA features are implemented for residential and SOHO use.

9.5.1.1 Creating an Auto Attendant Message

The procedure below describes how to record the Auto Attendant message that is played when calling an Auto Attendant-configured line.

The Auto Attendant message can be created using:

- Windows XP
- Windows 7

9.5.1.1.1 Windows XP

The procedure below describes how to create an Auto Attendant message using Windows XP.

➤ **To create an Auto Attendant message using Windows XP:**

1. Access the Windows **Sound Recorder** program (**Start > Programs > Accessories > Entertainment > Sound Recorder**).
2. Click the **Record** button and record the message.

Figure 9-7: Sound Recorder



The recording should be made using the following example:

"Hello, you've reached _____,

For ___[User allocated to phone connected to FXS2]__ - press 1.

For ___[User allocated to DECT1]__ - press 2.

For ___[User allocated to DECT2]__ - press 3.

For ___[User allocated to DECT3]__ - press 4.

For ___[User allocated to DECT4]__ - press 5.

For ___[User allocated to DECT5]__ - press 6.

For ___[User allocated to phone connected to FXS1 (usually operator/secretary)]__ - press 0.

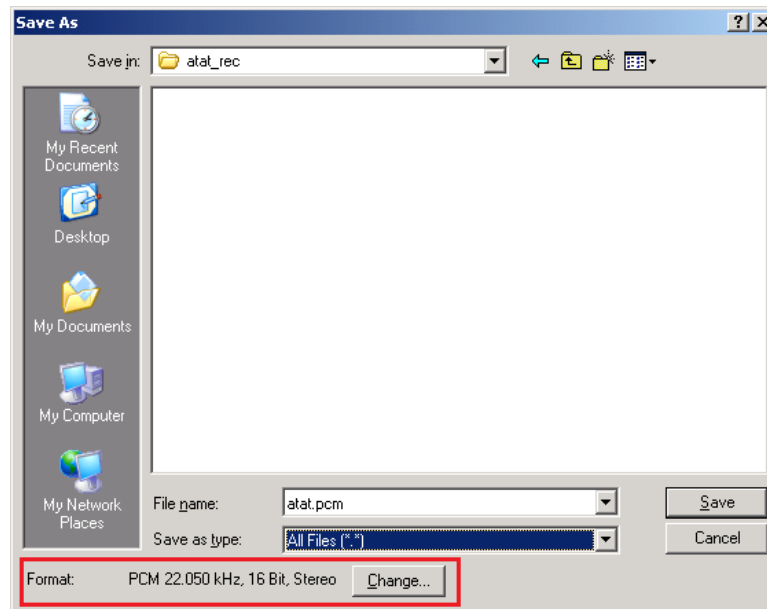
To repeat this message, press 9."



Note: You can skip the lines that are not connected or allocated.

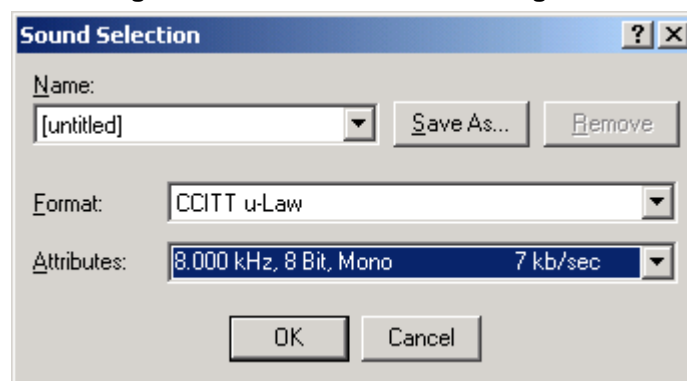
3. Click **File > Save As...**; the **Save As** dialog box appears.

Figure 9-8: Save As Dialog Box



4. Click **Change**; the **Sound Selection** dialog box appears.
5. From the 'Format' drop-down list, select **CCITT u-Law**.
6. From the 'Attributes' drop-down list, select **8.000 kHz, 8 Bit, Mono** and then click **OK**.

Figure 9-9: Sound Selection Dialog box



The **Save As...** dialog box re-appears.

7. Enter the name of the *.pcm* file and then click **Save**.

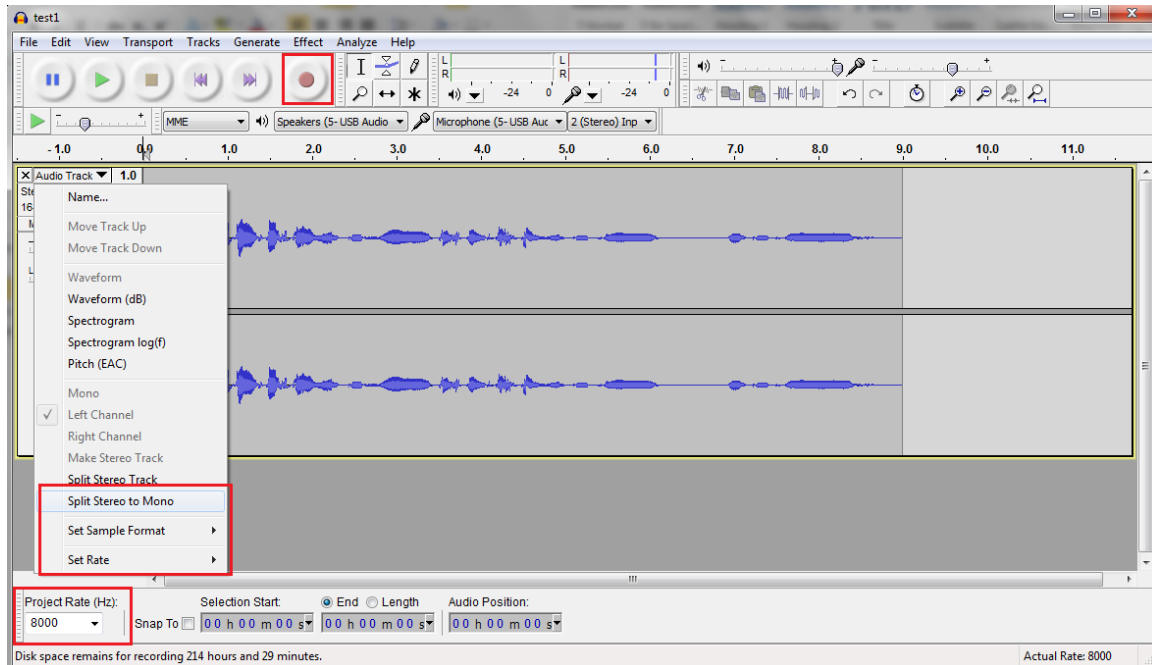
9.5.1.1.2 Windows 7

The procedure below describes how to create an Auto Attendant message using Windows 7.

➤ **To create an Auto Attendant message using Windows 7:**

1. From <http://audacity.sourceforge.net/>, download and install **Audacity** Version 1.3.
2. Start **Audacity**.

Figure 9-10: Audacity Window



3. From the 'Project Rate (Hz)' drop-down list, select **8000**.
4. Click the red **Record** icon to start the recording.

The recording should be made using the following example:

"Hello, you've reached _____,

For __[User allocated to phone connected to FXS2]__ - press 1.

For __[User allocated to DECT1]__ - press 2.

For __[User allocated to DECT2]__ - press 3.

For __[User allocated to DECT3]__ - press 4.

For __[User allocated to DECT4]__ - press 5.

For __[User allocated to DECT5]__ - press 6.

For __[User allocated to phone connected to FXS1 (usually operator/secretary)]__ - press 0.

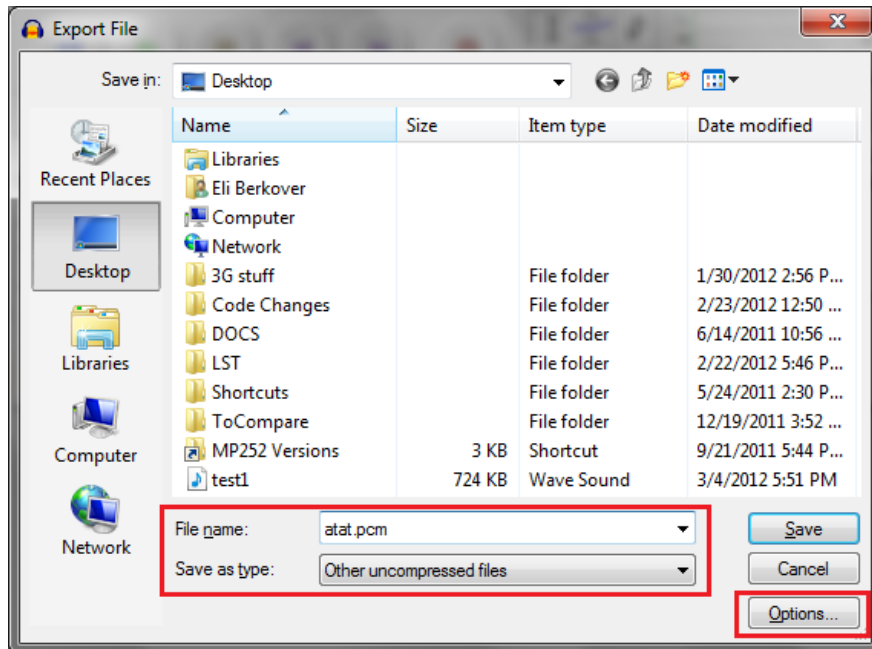
To repeat this message, press 9."



Note: You can skip the lines that are not connected or allocated.

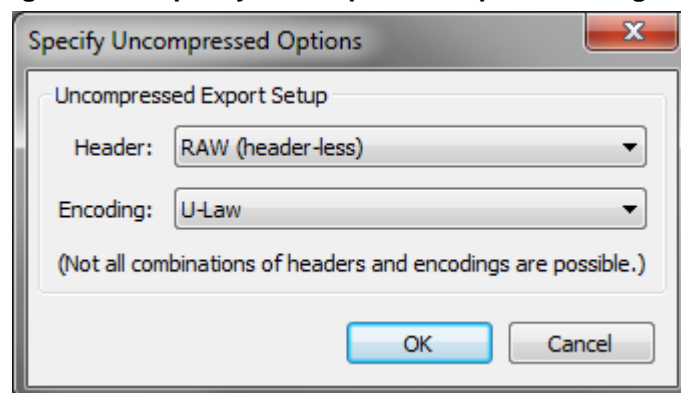
5. When the recording has been completed, from the 'Audio Track' drop-down list, select **Split Stereo to Mono** (as shown in the previous figure).
6. Click on the **X** next to the 2nd line's **Audio Track** icon so that only one recording track appears on the screen.
7. From the 'Audio Track' drop-down list, select **Set Sample Format > 16 bit PCM**.
8. From the 'Audio Track' drop-down list, select **Set Rate > 8000 Hz**.
9. Click **File > Export**; the 'Export File' dialog box appears.

Figure 9-11: Export File Dialog Box



10. In the 'File name' field, enter the name of the file (.pcm).
11. From the 'Save as type' drop-down list, select **Other uncompressed files**.
12. Click **Options...**; the **Specify Uncompressed Options** dialog box appears.

Figure 9-12: Specify Uncompressed Options Dialog Box



13. From the 'Header' drop-down list, select **RAW (header-less)**.
14. From the 'Encoding' drop-down list, select **U-law**.
15. Click **OK**.
16. In the 'Export File' dialog box, click **Save**.

9.5.1.2 Configuring Auto Attendant on Device

The following procedures describe how to configure the Auto Attendant feature on the device.

9.5.1.3 Saving Auto Attendant Recordings on USB

Saving Auto Attendant Recordings on USB can be performed as described below.

➤ **To save Auto Attendant recordings on USB:**

1. Record an Auto Attendant message as described in Section 9.5.1.1.
2. Copy the file to the main directory in the USB storage device.
3. Insert the USB storage device into a USB port on the device.



Note: Under current implementation, the USB storage device must be plugged into the device during startup, and each time that the device reboots. The USB storage device can be extracted after all the three main LEDs (Status, Broadband, and Phone) are lit green. We recommend leaving the USB storage device plugged into the device throughout the operation of the device.

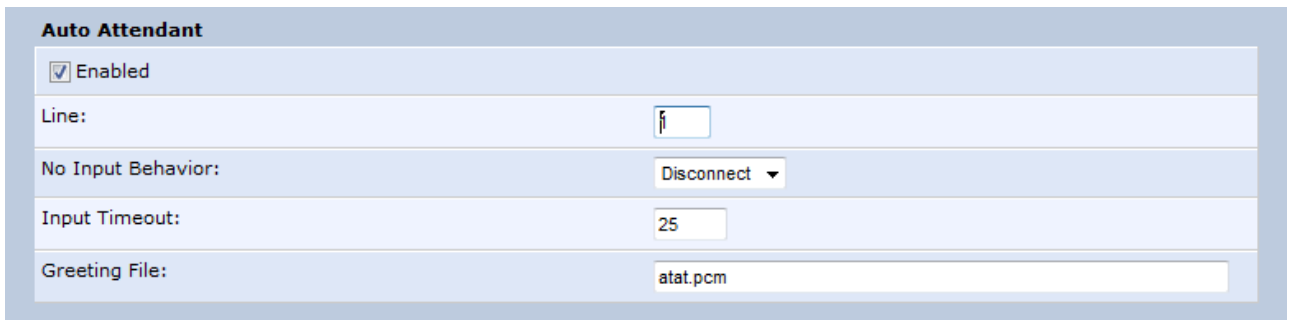
9.5.1.4 Configuring Auto Attendant using Web Interface

The procedures for Configuring Auto Attendant using the Web Interface as described below.

➤ **To configure Auto Attendant using the Web interface:**

1. Access the device Web interface tool by opening the Web browser.
2. Enter the username and password.
3. Access the 'Voice Over IP' page and then click the **Services** tab.
4. Under the **Auto Attendant** group, select the **Enabled** check box.
5. Configure the Auto Attendant fields as shown below.

Figure 9-13: Auto Attendant Web Fields



Auto Attendant	
<input checked="" type="checkbox"/> Enabled	
Line:	<input type="text" value="1"/>
No Input Behavior:	Disconnect ▼
Input Timeout:	25
Greeting File:	atat.pcm

- **Enabled** – Enables/Disables the Auto Attendant feature.
- **Line** – Enables line numbers as they appear in the **Line Settings** tab.

Figure 9-14: Line Settings Tab



Line	User ID	Display Name
<input checked="" type="checkbox"/> 1	222	Line 1
<input checked="" type="checkbox"/> 2	333	Line 2
<input checked="" type="checkbox"/> 3	444	Line 3
<input checked="" type="checkbox"/> 4	555	Line 4

- **Input Timeout** – Enables the time in seconds, from the beginning of the Auto Attendant message, until the conversation disconnects, if the user hasn't received any input. This field should be set to the length of the Auto Attendant message itself, plus a few seconds to allow the user to press the required extension or to repeat the message.
 - **Greeting File** – Defines the file name of the Auto Attendant message (.pcm), recorded in Section 9.5.1.1. There is presently no need to set the other parameters.
6. Click **OK**.

9.6 Configuring Micro PBX Line Settings

Before you can make phone calls, you need to configure lines. Lines are logical SIP ID numbers (i.e., telephone numbers) which are registered to a SIP proxy server and for which you are charged for calls you make on it.

- With a micro PBX line setting configuration, you can associate any phone extension to any line.
 - When you receive an incoming call, all the registered extensions on the line ring, and you can answer from any one of them. When you do answer, the other extensions stop ringing.
 - If you receive another incoming call when you already have an established call on one extension, all the idle extensions ring, and the busy extension hears a call waiting tone.
 - You can make outgoing calls from any of the extensions, using the first line of this extension.
 - You can make multiple concurrent calls (i.e., each extension makes a call to a different destination and at the same time).



Notes:

- You can perform call hold, call transfer, and three-way conferencing between the internal extensions.
- Each SIP account (proxy) supports up to four concurrent calls.
- The device supports up to two concurrent HD VoIP conversations when using the G.722 or AMR-WB coders.

➤ To configure lines:

1. In the 'Voice Over IP' screen, click the **Line Settings** tab; the following screen appears.

Figure 9-15: Line Settings Tab Screen

Voice Over IP

Signaling Protocol | Dialing | Media Streaming | Voice and Fax | Services | **Line Settings** | Extension Settings | Speed Dial | Telephone Interface

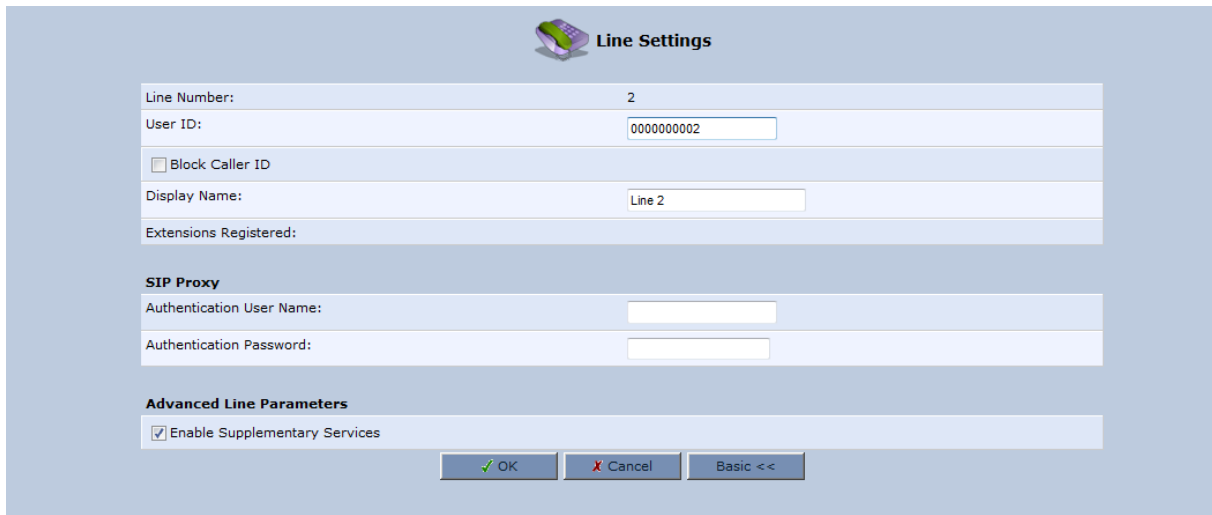
Line	User ID	Display Name	Action
<input checked="" type="checkbox"/> 1	0000000001	Line 1	
<input checked="" type="checkbox"/> 2	0000000002	Line 2	
<input checked="" type="checkbox"/> 3	0000000003	Line 3	
<input checked="" type="checkbox"/> 4	0000000004	Line 4	

Line	FXS		DECT				
	Phone1	Phone2	DECT1	DECT2	DECT3	DECT4	DECT5
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

OK Apply Cancel

2. For each line, click the corresponding **Edit**  icon to configure the line; the following screen appears:

Figure 9-16: Line Settings Screen for a New Line



The screenshot shows the 'Line Settings' window for a new line. It contains the following fields and sections:

- Line Number:** 2
- User ID:** 0000000002
- ☐ **Block Caller ID**
- Display Name:** Line 2
- Extensions Registered:**
- SIP Proxy**
 - Authentication User Name:**
 - Authentication Password:**
- Advanced Line Parameters**
 - ☒ **Enable Supplementary Services**

At the bottom, there are three buttons: **OK** (with a green checkmark), **Cancel** (with a red X), and **Basic <<**.

The screen displays the following read-only information:

- **Line Number:** line number
 - **Extensions Registered:** extensions registered to this line
3. In the 'User ID' field, enter phone's VoIP user ID used for identification to initiate and accept calls.
 4. To hide the phone's ID from the remote party, select the 'Block Caller ID' check box.
 5. In the 'Display Name' field, enter a name to intuitively identify the line. This is also displayed to remote parties as your caller ID.
 6. Under the **SIP Proxy** group, define the SIP proxy server:
 - a. In the 'Authentication User Name' field, enter the user name received from your VoIP service provider. This is used when sending a response to Unauthorized or Proxy Authentication Requested (401/407).
 - b. In the 'Authentication Password' field, enter the password received from your VoIP service provider. This is used when sending a response to Unauthorized or Proxy Authentication Requested (401/407).
 7. In the 'Line Voice Volume' field, enter the voice volume of the line (i.e., the gain from the network toward the local phone). The default is 0 dB.
 8. To enable supplementary services on this line, select the 'Enable Supplementary Services' check box.
 9. To enable automatic dialing (which automatically dials a user-defined phone number when the line is off-hooked longer than a user-defined time), do the following:
 - a. Select the 'Enable Automatic Dialing' check box.
 - b. In the 'Automatic Dialing Timeout' field, enter the time after which automatic dialing is activated if the user has not started dialing before this timeout. When set to 0, automatic dialing is performed immediately.
 - c. In the 'Automatic Dialing Destination' field, enter the destination that is automatically dialed. This can be a phone number or a domain name (for example, user@101.10.13.2 or user@domain name).
 10. Click **OK** to save your settings.

9.7 Configuring Line Extensions

Extensions are the physical telephony extensions on the device. These can be FXS ports (for analog POTS telephones) or cordless DECT handsets. Once you have defined these lines, you can do the following:

- Define an arbitrary name for each extension (to help you identify the extension).
- Activate registration of the lines with the proxy server
- Activate registration of the DECT handset with the device base unit



Notes:

- You can also register the DECT handset with the base unit by pressing the **DECT** button on the device front panel, as described in Section 24.6 on page 407.
- To verify successful registration with a SIP proxy server, you can check the following indications:
 - The **Phone** LED is lit green
 - In the **Voice over IP** tab screen (**System Monitoring** menu), the 'SIP Registration' field displays "Registered" for the configured lines (see Section 20.2.4 on page 381).

➤ To configure line extensions:

1. In the 'Voice Over IP' screen, click the **Extension Settings** tab; the following screen appears.

Figure 9-17: Extension Settings Tab Screen

Extension	Type	Status	Extension Name	Action
1	FXS	On Hook	Phone1	[Edit]
2	FXS	On Hook	Phone2	[Edit]
3	DECT	Idle	DECT1	[Edit] [Delete]
4	DECT	Idle	DECT2	[Edit] [Delete]
5	DECT	Not Registered	DECT3	[Edit]
6	DECT	Not Registered	DECT4	[Edit]
7	DECT	Not Registered	DECT5	[Edit]

Click the **Refresh** button to update the status.


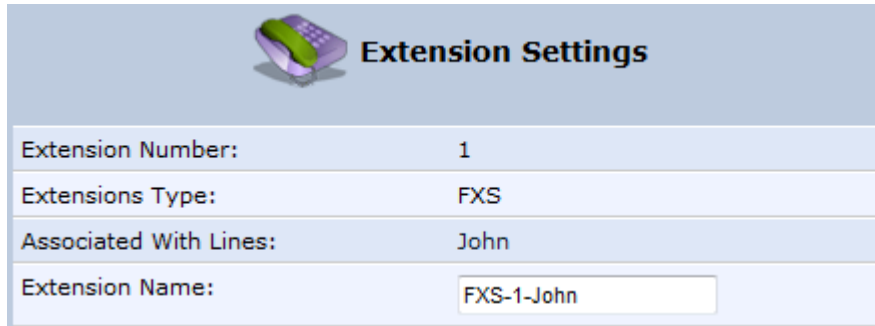

2. For each line extension, click the corresponding **Edit**  icon to define a name for the extension; the following screen appears:

Figure 9-18: Extension Settings Screen



 Extension Settings	
Extension Number:	1
Extensions Type:	FXS
Associated With Lines:	John
Extension Name:	<input type="text" value="FXS-1-John"/>

3. Click **OK** to save your settings.
- **To register the lines:**
1. In the 'Extension Settings Tab; screen; click the **Register** button.

9.8 Configuring Speed Dialing

Use the 'Speed Dial Settings' screen to associate a called party's contact parameters (including the IP address of his/her ATA and Line ID) with a number that you'll dial to call the called part. The number of speed-dialing codes that can be defined is unlimited. Use the screen to define a destination type: Proxy, Local Line or Direct Call.



Note: When connecting the device to a World-Wide SIP Server, you don't need to configure 'Speed Dial Settings'.

➤ **To configure speed dialing:**

1. In the 'Voice Over IP' screen, click the **Speed Dial** tab; the following screen appears:

Figure 9-19: Speed Dial Tab Screen

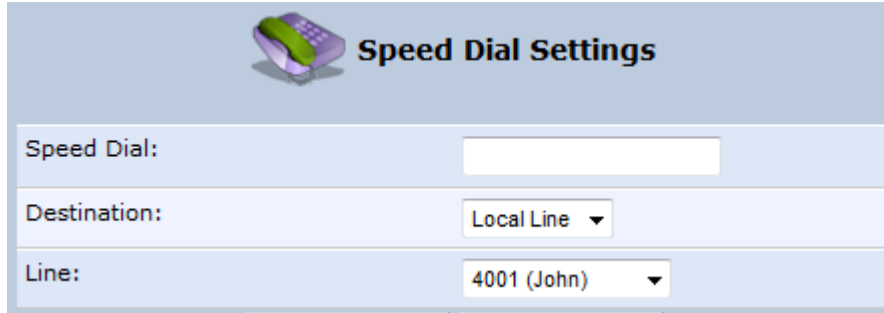


2. Click the **New**  icon; the 'Speed Dial Settings' screen appears.

Figure 9-20: Speed Dial Settings Screen (Proxy Destination)

3. In the 'Speed Dial' field, enter the shortcut number (i.e., speed dial) which you dial to call the party defined below.
4. From the 'Destination' drop-down list, select the destination type.
 - **Proxy:** If you select this option (as shown in the figure above), then in the 'User ID' field, enter the user ID to call.
 - **Local Line:** If you select this option, then from the 'Line' drop-down list, select the configured local line on your device.

Figure 9-21: Speed Dial Settings Screen (Local Line Destination)

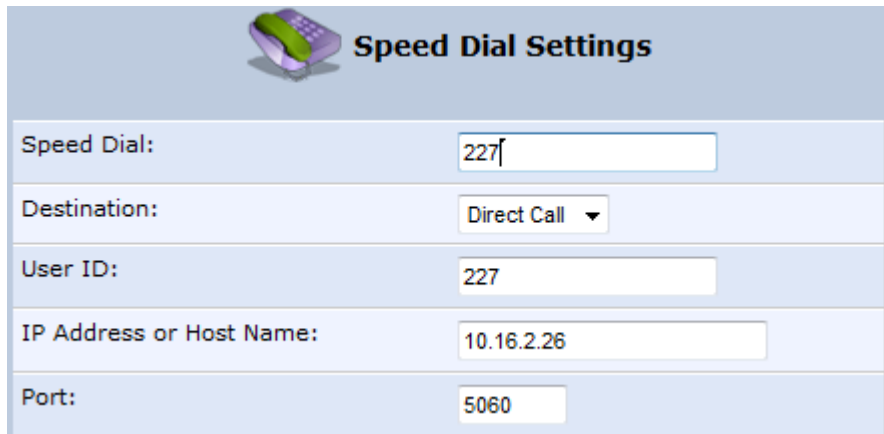


The screenshot shows the 'Speed Dial Settings' window with a telephone icon. It contains three rows of settings:

Field	Value
Speed Dial:	[Empty text box]
Destination:	Local Line ▼
Line:	4001 (John) ▼

- **Direct Call:** if you select this option, then configure the following:
 - a. In the 'User ID' field, enter the user ID to call.
 - b. In the 'IP Address or Host Name' field, enter the remote party's IP address or host name.
 - c. In the 'Port' field, enter the SIP UDP or TCP port of the remote party.

Figure 9-22: Speed Dial Settings Screen (Direct Call Destination)



The screenshot shows the 'Speed Dial Settings' window with a telephone icon. It contains five rows of settings:

Field	Value
Speed Dial:	227
Destination:	Direct Call ▼
User ID:	227
IP Address or Host Name:	10.16.2.26
Port:	5060

5. Click **OK** to save your settings.

9.9 Enabling Polarity Reversal

The procedure below describes how to enable polarity reversal. When this feature is enabled, the analog port (FXS) interface polarity is reversed to indicate the start of a VoIP session, and is reversed back when the VoIP session ends.

➤ **To enable polarity reversal:**

1. In the 'Voice Over IP' screen, click the **Telephone Interface** tab; the following screen appears:

Figure 9-23: Telephone Interface Tab Screen



2. Select the 'Enabled' check box to enable the Polarity Reversal feature.
3. Click **OK** to apply your settings.

9.10 Bluetooth

The device gateway supports Bluetooth. The sub-sections below describe Bluetooth functionality.

9.10.1 Pairing Mobile Devices to Device using Bluetooth

Before connecting the device to a mobile device through Bluetooth, note the following:



Notes:

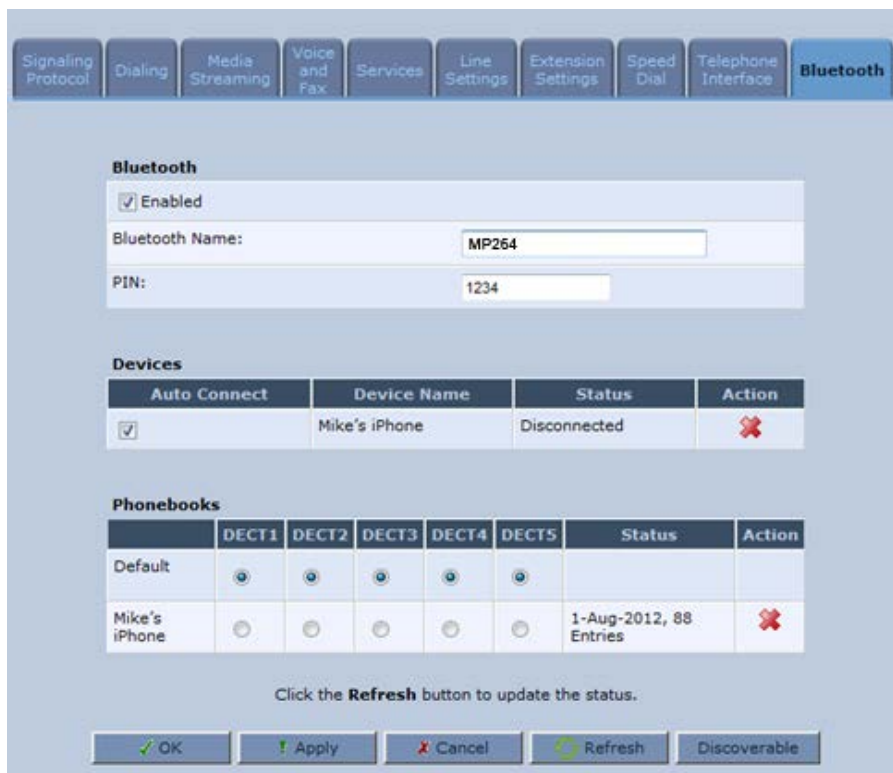
- The mobile device should be in the same room as the device.
- The mobile device should be not more than four meters (line of sight) from the device.
- The mobile device and the device should be placed in areas where mobile coverage is reasonable for regular mobile calls, without call failures or voice interference.


The procedure below shows how to pair the device gateway to mobile devices using Bluetooth.


➤ To pair the mobile device:

1. In the 'Voice Over IP' screen, access the **Bluetooth** tab; the following screen appears.

Figure 9-24: Bluetooth Screen (e.g., MP-264)



Auto Connect	Device Name	Status	Action
<input checked="" type="checkbox"/>	Mike's iPhone	Disconnected	

DECT1	DECT2	DECT3	DECT4	DECT5	Status	Action
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	1-Aug-2012, 88 Entries	

2. Under the **Bluetooth** group, select the **Enabled** check box to enable the device.
3. By default the 'Bluetooth Name' is "MP264" and the 'PIN' is "1234". You can change these values if you wish.

4. Enable **Bluetooth** on your mobile device (phone).
5. Place the mobile device not more than four meters (in line of sight) from the device.
6. Activate the Bluetooth Discovery process (pairing) by one of the following:
 - On the device, press the **Bluetooth** button for five seconds until the LED begins blinking green.



or

- On the Web interface, click **Discoverable**; the paired mobile phone name appears under the **Devices** group, as shown in the figure below.

Figure 9-25: Device Names Screen

Devices		
Auto Connect	Device Name	Status
<input checked="" type="checkbox"/>	HTC Sensation XE with Beats Aud	Disconnected
<input checked="" type="checkbox"/>	EliB's iPhone	Connected



Note: If the Bluetooth LED on the device is off, Bluetooth is disabled and cannot connect a device to the device.

9.10.2 Unpairing a Mobile Device using the Web

The procedure below describes how to unpair a mobile device using the Web.

- **To unpair a mobile device using the Web:**
- 1. In the 'Voice Over IP' screen, access the **Bluetooth** tab; the following screen appears.

Figure 9-26: Bluetooth Initial Screen (e.g., MP-264)

Bluetooth
☒ Enabled
 Bluetooth Name: MP264
 PIN: 1234

Devices

Auto Connect	Device Name	Status	Action
<input checked="" type="checkbox"/>	Mike's iPhone	Connected	

Phonebooks

	DECT1	DECT2	DECT3	DECT4	DECT5	Status	Action
Default							
Mike's iPhone						1-Aug-2012, 88 Entries	

Click the **Refresh** button to update the status.



2. Under the **Devices** group, click the Remove icon  corresponding to the mobile device that you wish to unpair, as shown in the figure below.

Figure 9-27: Unpairing Device Screen

Devices			
Auto Connect	Device Name	Status	Action
<input type="checkbox"/>	Mike's iPhone	Connected	

3. Follow the instructions on your mobile device.

9.10.3 Auto Connecting a Mobile Device

Auto Connect allows a mobile device to be automatically connected by the device when it is in range.

When your mobile device connects to the device via Bluetooth the first time, it remembers the mobile device. When you turn on your mobile device and bring it within range of the device, it will be automatically connected by the device (if no other device is already connected).

➤ To Auto Connect mobile device:

- On the Web interface, select the 'Auto Connect' check box; the paired mobile phone name appears under the **Devices** group, as shown in the figure below.

Figure 9-28: Auto Connect Screen

Devices			
Auto Connect	Device Name	Status	Action
<input checked="" type="checkbox"/>	Mike's iPhone	Connected	



Note: To disable Auto Connect, clear the 'Auto Connect' check box under the Devices group.

9.10.4 Synchronizing the Phonebook

The procedures below describe how to synchronize the device Embedded Web Server's Phonebook table with mobile device entries. The synchronization can be done using the device or using the Web.



Note: There are some phone types that may request approval before synchronizing the Phonebook.

9.10.4.1 Synchronizing the Phonebook using the Device

The procedure below describes how to synchronize the device Phonebook table with mobile device entries.

➤ **To synchronize the Device Phonebook using the Device:**

1. Pair the mobile device to the device as shown in Section 9.10.1 on page 124.
2. When the mobile device is connected and the Bluetooth LED is solid green, short press the **Bluetooth** button; a Phonebook download is initiated from the mobile device to the device.

9.10.4.2 Synchronizing the Phonebook using the Web

The procedure below describes how to synchronize the device's Embedded Web Server's Phonebook table with mobile device entries.

➤ **To synchronize the Device's Phonebook using the Web:**

1. Browse to the device's Embedded Web Server via the default gateway IP address.
2. In the 'Voice Over IP' screen, click the **Bluetooth** tab and verify that your mobile device is synchronized; the following screen appears:

Figure 9-29: Bluetooth Tab Screen (e.g., MP-264)

Sync Icon

3. In the Phonebooks table, click the **Sync** icon and wait for a few seconds until the 'Status' column shows the number of entries ported from your device (the **Bluetooth** LED on the device stops blinking green).
4. Select any handset to associate with this Phonebook.



Note: There may be a situation where there is no more room on the device to store contact details. In this case, the Bluetooth LED flashes red twice quickly, to indicate that the synchronization did not complete successfully.

9.10.5 Associating DECT Handset with a Synchronized Phonebook

The procedure below describes how to associate a DECT handset with a synchronized Phonebook.

➤ **To associate a DECT Handset with a Synchronized Phonebook:**

1. In the 'Voice Over IP' screen, access the **Bluetooth** tab; the following screen appears.

Figure 9-30: Bluetooth Initial Screen (e.g., MP-264)

Bluetooth

☒ Enabled

Bluetooth Name:

PIN:

Devices

Auto Connect	Device Name	Status	Action
<input checked="" type="checkbox"/>	Mike's iPhone	Connected	

Phonebooks

	DECT1	DECT2	DECT3	DECT4	DECT5	Status	Action
Default							
Mike's iPhone						1-Aug-2012, 88 Entries	

Click the **Refresh** button to update the status.

2. Synchronize the Phonebook as shown in Section 9.10.2 on page 125.
3. Under the **Phonebooks** group, select any handset with any phonebook.
4. Click **OK**.

Figure 9-31: Phonebooks Screen

Phonebooks							
	DECT1	DECT2	DECT3	DECT4	DECT5	Status	Action
Default							
EliB's iPhone						1-Jan-2003, 520 Entries	
HTC Sensation XE with Beats Aud						Not Synced	


9.10.6 Deleting a Phonebook

The procedure below describes how to delete a phonebook from the Web.

➤ **To delete a phonebook from the Web:**

1. In the 'Voice Over IP' screen, access the **Bluetooth** tab; the following screen appears.

Figure 9-32: Bluetooth Initial Screen



Bluetooth

☒ Enabled





Bluetooth Name: MP264

PIN: 1234

Devices


Auto Connect	Device Name	Status	Action
<input checked="" type="checkbox"/>	Mike's iPhone	Connected	

Phonebooks

	DECT1	DECT2	DECT3	DECT4	DECT5	Status	Action
Default							
Mike's iPhone						1-Aug-2012, 88 Entries	

Click the **Refresh** button to update the status.

OK Apply Cancel Refresh Discoverable

2. Under the **Phonebooks** group, select the phonebook from the mobile device you associated in Section 9.10.5 on page 129.
3. Click the **Remove**  icon corresponding to the phonebook that you want to delete; the phonebook is removed.

9.10.7 Routing an Incoming Call

The procedure below describes how to route an incoming cellular call to the associated extension.

➤ **To route an incoming call:**

1. Place an incoming call from any device to the mobile phone connected to the device, via Bluetooth.
2. Make sure that all extensions related to the Bluetooth are ringing and that they establish a call with the far side. If the far side is available in the phonebook synced with the device, you will view its caller ID displayed in the DECT handset.

10 Making VoIP Calls with your Analog Telephones

Analog telephone users that are connected to the device can place calls, put calls on hold, transfer calls, and establish three-way conferences. This chapter describes how to perform these operations.



Note: For information on using the DECT phone, see **Part II**.

10.1 Making a Call

The procedure below describes how to make a call.

➤ **To make a call:**

1. Pick up the phone.
2. Make sure that you can hear a dial tone
3. Dial the remote party's number or the user-defined speed dial number (if configured in Section 9.8 on page 121).



Note: When calling another internal extension, dial “*0” for FXS1, “*1” for FXS2, “*2” for DECT1, “*3” for DECT2” and so on.

10.2 Answering a Waiting Call

The procedure below describes how to answer a waiting call. This depends on how you configured the flash-hook functionality, using the 'Flash keys sequence style' parameter in Section 9.2 on page 97. To enable call waiting, see Section 9.5 on page 108.

➤ **To answer a waiting call when 'Flash only' is set:**

1. When you hear a call waiting tone (during a call), press the flash key button on your phone; the active call is put on hold and switches to the waiting call.
2. To return to the original call, press the flash button again. You can toggle from one party to another by pressing the flash button.

➤ **To answer a waiting call when 'Flash + digits sequence' is set:**

1. When you hear the call waiting tone (during a call), press the flash key button on your phone and then press the '1' key; the original call is put on hold and switches to the waiting call.
2. To return to the original call, press flash + 1 again. You can toggle from one party to another by pressing flash + 1.

10.3 Putting a Call on Hold

The procedure below describes how to put a call on hold. This depends on how you configured the flash-hook functionality, using the 'Flash keys sequence style' parameter in Section 9.2 on page 97.

➤ **To put the remote party on hold when 'Flash only' is set:**

- During a call, press the flash key button on your phone; a dial tone is heard. At this point you can initiate a second call by dialing another party's number.



Note: If you press the flash key button again before the second party answers, the call is established with the original call. If, however, the second party answers and you press the flash key button, a 3-way conference is established.

➤ **To put the remote party on hold when 'Flash + digits sequence' is set:**

1. Press the flash key button key and then press the '1' key on your phone; the phone plays a dial tone. At this point you can initiate a second call by dialing another party's number.
2. To cancel the hold state and resume the previous phone call, press the flash key button and then press '1'.

10.4 Transferring a Call

The procedure below describes how to transfer an established call to another destination. This depends on how you configured the flash-hook functionality, using the 'Flash keys sequence style' parameter in Section 9.2 on page 97.

➤ **To transfer a call when 'Flash only' is set:**

1. During a call with party B, press the flash key button on your phone; party B is placed on hold and a dial tone is heard.
2. Dial party C's number.
3. You can wait for C to answer or not.
4. On-hook your phone; party B is now transferred to party C.

➤ **To transfer a call when 'Flash + digits sequence' is set:**

1. During a call with party B, press the flash key button and then press the '1' key on the phone; party B is placed on hold and a dial tone is heard.
2. Dial party C's number.
3. You can wait for C to answer or not.
4. Press the flash key button key and then press '2'; party B is transferred to party C (and a warning tone is heard).

10.5 Forwarding Calls to another Phone

The procedure below describes how to automatically forward incoming (received) calls to another phone. Before you can forward calls, you need to enable and configure call forwarding as described in Section 9.5 on page 108.



Note: The Call Forward feature is functional only when the device is registered to a proxy.

➤ **To forward calls to another phone:**

1. Pick up the phone and make sure that you can hear a dial tone.
2. Dial the call forward key sequence (according to your configuration), for example, *32; a dial tone is heard.
3. Dial the number of the phone to where you want calls forwarded; a stutter tone is heard.
4. Replace the receiver; all incoming calls are forwarded. Every time you pick up the phone receiver, a stutter tone is played (for the length of time, as you configured for the 'Stutter Tone Duration' parameter).

➤ **To deactivate call forwarding:**

1. Pick up the phone; a stutter tone is heard.
2. Dial the call forward key sequence.
3. Replace the receiver.
4. To make sure that call forwarding has been de-activated, pick up the phone again; a regular dial tone should be heard (not the stutter tone).

10.6 Establishing a 3-Way Conference Call

The procedure below describes how to establish a 3-way conference call. The method for doing this depends on how you configured the flash-hook functionality, using the 'Flash keys sequence style' parameter in Section 9.2 on page 97. In addition, to configure 3-way conferencing, see Section 9.5 on page 108.

➤ **To establish a 3-way conference call when 'Flash only' is set:**

1. During a call with party B, press the flash key button on your phone; Party B is placed on hold and a dial tone is heard.
2. Dial party C's number and wait until the call is established.
3. Press the flash key button again to add parties B and C to a 3-way conference call.
4. To end the 3-way conference call, on-hook your phone (or alternatively, press the flash key button again).

➤ **To establish a 3-way conference call when 'Flash + digits sequence' is set:**

1. During a call with party B, press the flash key button on your phone and then press the '1' key; Party B is placed on hold and a dial tone is heard.
2. Dial party C's number and wait until the call is established.
3. Press the flash key button and then press the '3' key to add B and C to a 3-way conference call.
4. To end the 3-way conference call, on-hook your phone (or alternatively, press the flash key button and then press the '3' key).

11 Quality of Service

Network-based applications and traffic are growing at a high rate, producing an ever-increasing demand for bandwidth and network capacity. For obvious reasons, bandwidth and capacity cannot be expanded infinitely, requiring that bandwidth-demanding services be delivered over existing infrastructure, without incurring additional, expansive investments.

The next logical means of ensuring optimal use of existing resources are Quality of Service (QoS) mechanisms for congestion management and avoidance. QoS refers to the capability of a network device to provide better service to selected network traffic. This is achieved by shaping the traffic and processing higher priority traffic before lower priority traffic.

As QoS is dependent on the "weakest link in the chain", failure of but a single component along the data path to assure priority packet transmission can easily cause a VoIP call or a Video on Demand (VoD) broadcast to fail miserably. QoS must therefore obviously be addressed end-to-end.

The following are the potential bottleneck areas that need be taken into consideration when implementing an end-to-end QoS-enabled service.

- **The Local Area Network:** LANs have finite bandwidth, and are typically limited to 100 Mbps. When given the chance, some applications consume all available network bandwidth. In business networks, a large number of network-attached devices can lead to congestion. The need for QoS mechanisms is more apparent in wireless LANs, where bandwidth is even more limited (typically no more than 20 Mbps on 802.11g networks).
- **The Broadband Router:** All network traffic passes through and is processed by the broadband router. It is therefore a natural focal point for QoS implementation. Lack of sufficient buffer space, memory or processing power, and poor integration among system components can result in highly undesirable real-time service performance. The only way to assure high QoS is the use of proper and tightly-integrated router operating system software and applications, which can effectively handle multiple real-time services simultaneously.
- **The Broadband Connection:** Typically, the most significant bottleneck of the network, this is where the high speed LAN meets limited broadband bandwidth. Special QoS mechanisms must be built into routers to ensure that this sudden drop in connectivity speed is taken into account when prioritizing and transmitting real-time service-related data packets.
- **The Internet:** Internet routers typically have a limited amount of memory and bandwidth available to them, so that congestions may easily occur when links are over-utilized, and routers attempt to queue packets and schedule them for retransmission. One must also consider the fact that while Internet backbone routers take some prioritization into account when making routing decisions, all data packets are treated equally under congested conditions.



Note: For recommended QoS configuration see Section 11.7 on page 151.

11.1 QoS Wizard

The QoS wizard allows you to configure your QoS parameters according to predefined profiles, with just a few clicks. A chosen QoS profile automatically defines QoS rules, which you can view and edit in the rest of the QoS tab screens.

The QoS wizard also allows you to define the WAN bandwidth.

➤ To use the QoS Wizard:

1. From the menu bar, click the **QoS** menu link; the 'Quality of Service' screen appears with the **QoS Wizard** tab selected by default.

Figure 11-1: QoS Wizard Tab Screen



The screenshot shows the 'Quality of Service' configuration page. At the top, there's a 'Quality of Service' header with a globe icon. Below it is a tab bar with 'QoS Wizard' selected, followed by 'Traffic Priority', 'Traffic Shaping', 'DSCP Settings', '802.1p Settings', and 'Class Statistics'. The main content area is divided into two sections. The first section, 'WAN Devices Bandwidth (Rx/Tx):', has a dropdown menu set to 'User Defined'. Below this are input fields for 'Rx Bandwidth:' and 'Tx Bandwidth:', both set to '0' Kbps. The second section, 'QoS Profiles', lists several profiles with radio buttons: 'Default' (selected), 'P2P User', 'Triple Play User', 'Home Worker', 'Gamer', and 'Priority By Host'. Each profile has a description and a list of application priorities (e.g., HTTP/HTTPS, TCP ACKs, VoIP, Video, Games Related Traffic). At the bottom, a note states: 'Note: Choosing a new QoS profile will cause all previous configuration settings to be lost'.

2. Define bandwidth limitation. From the 'WAN Devices Bandwidth (Rx/Tx)' drop-down list, select 'User Defined' if you want to define specific Rx and Tx bandwidth limitations, or select the Rx/Tx optional values provided in the drop-down list.
3. In the **QoS Profiles** group, select a QoS profile.
4. Click **OK**.



Note: Selecting a new QoS profile deletes all previous QoS settings.

11.2 Configuring Traffic Shaping

Traffic Shaping is the solution for managing and avoiding congestion where a high speed LAN meets limited broadband bandwidth. A user may have, for example, a 100 Mbps Ethernet LAN with a 100 Mbps WAN interface router. The router may communicate with the ISP using a modem with a bandwidth of 2 Mbps. This typical setup makes the modem, having no QoS module, the bottleneck. The router sends traffic as fast as it is received, while its well-designed QoS algorithms are left unused. Traffic shaping limits the bandwidth of the router, artificially forcing the router to be the bottleneck.

A traffic shaper is essentially a regulated queue that accepts uneven and/or bursty flows of packets and transmits them in a steady, predictable stream so that the network is not overwhelmed with traffic.

While Traffic Priority allows basic prioritization of packets, Traffic Shaping provides more sophisticated definitions such as:

- Bandwidth limit for each device
- Bandwidth limit for classes of rules
- Prioritization policy
- TCP serialization on a device

You can also define QoS traffic shaping rules for a default device. These rules are used on a device that has no definitions of its own. This enables the definition of QoS rules on Default WAN, for example, and their maintenance even if the PPP or bridge device over the WAN is removed.

The device also supports dynamic traffic shaping during a call. Traffic shaping is critical in residential VoIP gateways because of the bottleneck created in the xDSL or Cable modem, mainly in the upload direction. Dynamic traffic shaping ensures a minimum bandwidth for VoIP calls. Without dynamic traffic shaping, traffic shaping limits the bandwidth at all times, even if the user is not making a VoIP call and therefore, the service provider needs to configure the QoS traffic shaping transmit (Tx) bandwidth according to the user's specific upload bandwidth. Configuring a lower value results in a lower upload bandwidth (not only during VoIP calls).

Dynamic traffic shaping enables the service provider to configure two upload traffic shaping bandwidth parameters:

- "Tx Bandwidth" - for all traffic
- "Tx Bandwidth during Call" - for VoIP calls

The device normally uses the "Tx Bandwidth" value. When the user makes a VoIP call (i.e. any phone/s connected to the device is ringing or off-hook), the device switches to use the "Tx Bandwidth during Call" value.

11.2.1 Configuring Traffic Shaping

The procedure below describes how to configure traffic shaping.

➤ **To add a traffic shaping device:**

1. From the menu bar, click the **QoS** menu, and then click the **Traffic Shaping** tab.

Figure 11-2: Quality of Service – Traffic Shaping Screen




2. Click the **New**  icon; the 'Add Device Traffic Shaping' screen appears.

Figure 11-3: Add Device Traffic Shaping Screen



3. From the 'Device' drop-down list, select the device for which you want to shape traffic. The list includes all interfaces (e.g., All LAN Devices, All WAN Devices) and VPNs such as PPOE, PPTP and L2TP (if defined). For example, select 'WAN Ethernet', and then click **OK**; the 'Edit Device Traffic Shaping' screen appears.

Figure 11-4: Edit Device Traffic Shaping Screen



Edit Device Traffic Shaping

Device: WAN Ethernet

Tx Traffic Shaping

Tx Bandwidth: Specify 97656 Kbps

TCP Serialization: Disabled

Queue Policy: Class Based

Class ID	Name	Priority	Bandwidth		Status	Action
			Reserved	Maximum		
default	default	4	0 Kbps	Unlimited	Active	
New Entry						

☐ Enable Dynamic Traffic Shaping

Rx Traffic Policing

Rx Bandwidth: Specify 97656 Kbps

Queue Policy: Policer

Class ID	Name	Bandwidth		Status	Action
		Reserved	Maximum		
New Entry					

- Under the **Tx Traffic Shaping** group, from the 'Tx Bandwidth' drop-down list, select 'Specify' and define the device's maximum transmission bandwidth rate in the corresponding field. The purpose is to limit the bandwidth of the WAN interface to that of the weakest outbound link, for instance, the DSL speed provided by the ISP. This forces the device to be the network bottleneck, where sophisticated QoS prioritization can be performed. If the device's bandwidth is not limited correctly, the bottleneck is an unknown router or modem on the network path, rendering the device QoS useless. To configure unlimited bandwidth, select 'Unlimited'.
- Under the **Rx Traffic Policing** group, from the 'Rx Bandwidth' drop-down list, select 'Specify' and define the device's maximum receive bandwidth rate in the corresponding field. This limits the device's bandwidth receipt rate to that of the DSL modem.
- From the 'TCP Serialization' drop-down list, select whether to enable TCP serialization. The screen refreshes, displaying the 'Maximum Delay' field. This allows you to define the maximum allowed transmission time frame (in milliseconds) of a single packet. Any packet that requires a longer time to be transmitted is fragmented to smaller sections. This avoids transmission of large, bursty packets that may cause delay or jitter for real-time traffic such as VoIP.
- Select the 'Enable Dynamic Traffic Shaping' check box if you want to configure traffic shaping specifically for VoIP calls (see Section 11.2 on page 137). When selected, the 'Tx Bandwidth During VoIP Call' field appears. Enter the bandwidth for VoIP calls. The device normally uses the "Tx Bandwidth" parameter value. When the user makes a VoIP call (i.e. any phone connected to the device is ringing or off-hook), the device switches to use the "Tx Bandwidth during Call" parameter value.

11.2.2 Configuring Shaping Classes

The bandwidth of a device can be divided to reserve constant portions of bandwidth to user-defined traffic types. Such a portion is known as a *Shaping Class*. When not used by its user-defined traffic type or owner (for example, VoIP), the class is then available to all other traffic. However when needed, the entire class is reserved solely for its owner. Moreover, you can limit the maximum bandwidth that a class can use even if the entire bandwidth is available.

When a shaping class is defined for a specific traffic type, two shaping classes are created. The second class is the 'Default Class', responsible for all the packets that do not match the defined shaping class or any other classes that may be defined on the device. This can be viewed in the Class Statistics screen.

➤ To add a shaping class:



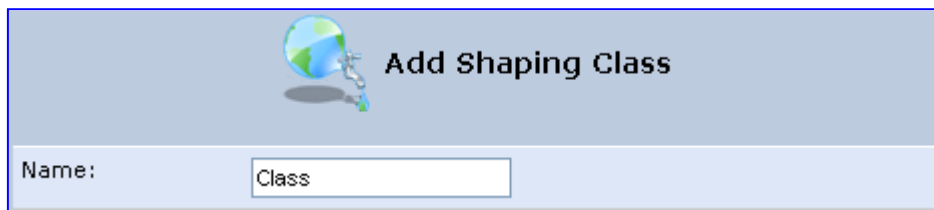
1. From the menu bar, click the **QoS** menu, and then click the **Traffic Shaping** tab.
2. Click the **Edit**  icon corresponding to the added Device (e.g., WAN); the 'Edit Device Traffic Shaping' screen appears.
3. Under the **Tx Traffic Shaping** group, click the **New**  icon; the 'Add Shaping Class' screen appears.

Figure 11-5: Add Shaping Class Screen



The 'Add Shaping Class' screen features a header with a globe icon and the title 'Add Shaping Class'. Below the header is a single form field labeled 'Name:' with the placeholder text 'Class'.


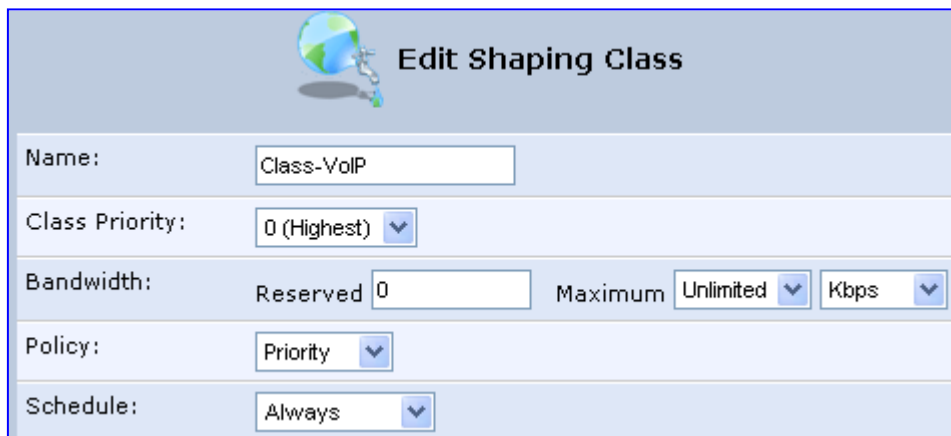
4. In the 'Name' field, enter a name for the class, and then click **OK**; the 'Edit Device Traffic Shaping' screen appears.
5. Edit the newly added shaping class, by clicking the corresponding **Edit**  icon; the 'Edit Shaping Class' screen appears.

Figure 11-6: Edit Shaping Class



The 'Edit Shaping Class' screen features a header with a globe icon and the title 'Edit Shaping Class'. Below the header are several form fields: 'Name:' with the value 'Class-VoIP', 'Class Priority:' with a dropdown menu showing '0 (Highest)', 'Bandwidth:' with 'Reserved' set to '0' and 'Maximum' set to 'Unlimited' (both with dropdown arrows), and units 'Kbps' (also with a dropdown arrow), 'Policy:' with a dropdown menu showing 'Priority', and 'Schedule:' with a dropdown menu showing 'Always'.

6. In the 'Name' field, modify the class name, if required.
7. From the 'Class Priority' drop-down list, select the priority level for the class, where zero is the highest and seven the lowest.

8. In the 'Bandwidth' field, define the bandwidth for the class:
 - **Reserved:** reserved (i.e., guaranteed) bandwidth (Committed Information Rate / CIR) in kbps.
 - **Maximum:** specify the maximum bandwidth
9. From the 'Policy' drop-down list, select the policy for routing packets within the class:
 - **Priority:** Priority queuing uses multiple queues so that traffic is distributed among queues based on priority. This priority is defined according to packet priority, which can be defined explicitly by a DSCP value or an 802.1p value.
 - **FIFO:** First In First Out. This priority queue ignores any previously-marked packet priority.
 - **Fairness:** The fairness algorithm ensures no starvation by granting all packets a certain level of priority.
 - **RED:** Random Early Detection. Utilizes statistical methods to drop packets in a 'probabilistic' way before queues overflow. Dropping packets in this way slows a source down enough to keep the queue steady and reduces the number of packets that would be lost when a queue overflows and a host is transmitting at a high rate.
10. From the 'Schedule' drop-down list, select the scheduler rule (defined in Section 5.5.1 on page 59) that defines the time segments during which the class can be active. By default, the class is always active.
11. Click **OK** to save your settings.

11.2.2.1 Class Rules

Class rules define which packets belong to the class. Without class rules, the shaping class has no effect. Each class can have outbound and inbound rules for outgoing and incoming traffic respectively. For example, you can define that all outgoing packets from computer A in your LAN belong to your VoIP class. These packets are limited to the class settings (bandwidth, schedule, etc.). In addition, you can define the traffic protocol and priority for each rule (this is not mandatory as in Traffic Priority rules).

11.2.2.1.1 Inbound and Outbound Data

The device can control outgoing data easily. It can queue packets, delay them, give precedence to other packets, or drop them. This helps in resolving upload (Tx) traffic bottlenecks and in most cases is sufficient. However, in the case of download (Rx) traffic bottlenecks, the ability to control the flow is much more limited. The device cannot queue packets, since in most cases the LAN is much faster than the WAN and when the device receives a packet from the WAN, it passes it immediately to the LAN.

QoS for ingress data has the following limitations, which do not exist for outgoing data:

- QoS can only be applied to TCP streams (UDP streams cannot be delayed)
- No borrowing mechanism
- When reserving Rx bandwidth, it is strictly taken from the bandwidth of all other classes

In addition, the device cannot control the behavior of its WAN (usually the ISP), which may not have proper QoS handling. Let's look at a scenario of downloading a large file and surfing the Internet at the same time. Downloading the file is distinguished by small requests, followed by very large responses. This may result in blocking HTML traffic at the ISP. A solution for such a scenario is limiting the bandwidth of low-priority TCP connections (such as file download).

To add outbound and inbound class rules, see [11.3](#) on page [143](#).



Note: The hierarchy of the class rules is determined by the order of their addition to the class. For example, if your first rule is match packets with any source address, any destination address, and any protocol to this class; then all packets traversing the device are associated with the specific class. Any rules defined later do not have any effect.

11.3 Configuring Traffic Priority

Traffic Priority allows you to manage and avoid traffic congestion by defining inbound and outbound priority rules for each device on your gateway. These rules determine the priority assigned to packets traveling through the device. QoS parameters (DSCP marking and packet priority) are set per packet, on an application basis.

You can set QoS parameters using flexible rules, according to the following parameters:

- Source/destination IP address, MAC address or host name
- Device
- Source/destination ports
- Limit the rule to specific days and hours

The device supports two priority marking methods for packet prioritization:

- DSCP
- 802.1p Priority

The matching of packets by rules is connection-based, known as Stateful Packet Inspection (SPI), using the same connection-tracking mechanism used by the firewall. Once a packet matches a rule, all subsequent packets with the same attributes receive the same QoS parameters, both inbound and outbound.

A packet can match more than one rule, and therefore:

- The first class rule has precedence over all other class rules (scanning is stopped once the first rule is reached).
- The first traffic-priority (classless) rule has precedence over all other traffic-priority rules.
- There is no prevention of a traffic-priority rule conflicting with a class rule. In this case, the priority and DSCP setting of the class rule (if given) takes precedence.

Connection-based QoS also allows inheriting QoS parameters by some of the applications that open subsequent connections. For instance, you can define QoS rules on SIP and the rules then apply to both control and data ports (even if the data ports are unknown). This feature applies to all applications that have ALG at firewall:

- Any
- User Defined (FTP, HTTP, HTTPS, TFTP, IMAP, PING, POP3, SMTP, Telnet, L2TP, Traceroute or any other protocol)

➤ **To set traffic priority rules:**

1. From the menu bar, click the **QoS** menu, and then select the **Traffic Priority** tab; the 'Traffic Priority' screen appears.

Figure 11-7: Traffic Priority Screen



QoS Input Rules

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
All Devices						New Entry
WAN Ethernet Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Bridge Rules						New Entry
LAN Ethernet Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
Serial PPP Rules						New Entry

QoS Output Rules

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
All Devices						New Entry
WAN Ethernet Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Bridge Rules						New Entry
LAN Ethernet Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
Serial PPP Rules						New Entry

This screen is divided into two identical groups - 'QoS Input Rules' and 'QoS Output Rules' - for prioritizing inbound and outbound traffic respectively. Each group lists all the devices on which rules can be set. You can set rules on all devices at once by clicking the **New Entry** link corresponding to 'All Devices'

2. After clicking the appropriate **New Entry** link, the 'Add Traffic Priority Rule' screen appears.

Figure 11-8: Add Traffic Priority Rule Screen

Add Traffic Priority Rule

Matching

Source Address: Any

Destination Address: Any

Protocol: Any

☐ DSCP

☐ Priority

☐ Device

☐ Length

☐ Connection Duration

☐ Connection Size

Operation

☐ Set DSCP

☐ Set Priority

☒ Set Rx Class Name: No RX class names available

☒ Set Tx Class Name: No TX class names available

Apply QoS on: Connection

Logging

☐ Log Packets Matched by This Rule

Schedule: Always

OK Cancel

3. Under the **Matching** group, configure the matching characteristics:
 - a. From the 'Source Address' drop-down list, select 'Any', 'User Defined' or the host as the source address of the packets sent to or received from the network object. If you have created network objects (see Section 5.5.2 on page 61), then these are also displayed in the list (or you can create one by selecting 'User Defined').
 - b. From the 'Destination Address' drop-down list, select the network object for the destination address of the packets sent to or received from the network object. See Step 3 above for a detailed explanation on the options.
 - c. From the 'Protocol' drop-down list, select the protocol. You can apply the rule to all protocols (i.e., 'Any') or select an already defined protocol. You can create a new protocol by selecting 'User Defined', and then following the procedure described in Section 5.5.3 on page 63.
 - d. To match DSCP, select the 'DSCP' check box, and then enter the DSCP markings.
 - e. To match priority, select the 'Priority' check box, and then select the priority of the packets.
 - f. To match the Device, select the 'Device' check box, and then select the Device interface.

11.4 Configuring DSCP Mapping

To understand Differentiated Services Code Point (DSCP), one must first be familiarized with the Differentiated Services (DiffServ) model. DiffServ is a Class of Service (CoS) model that enhances best-effort Internet services by differentiating traffic by users, service requirements and other criteria. Packets are specifically marked, allowing network nodes to provide different levels of service, as appropriate for voice calls, video playback or other delay-sensitive applications, via priority queuing or bandwidth allocation, or by choosing dedicated routes for specific traffic flows.

DiffServ defines a field in IP packet headers referred to as DSCP. Hosts or routers passing traffic to a DiffServ-enabled network typically mark each transmitted packet with an appropriate DSCP. The DSCP markings are used by DiffServ network routers to appropriately classify packets and to apply particular queue handling or scheduling behavior.

The device provides a table of predefined DSCP values, which are mapped to 802.1p priority marking method. You can edit or delete any of the existing DSCP setting, as well as add new entries.

➤ **To view and set DSCP rules:**

1. From the menu bar, click the **QoS** menu link, and then click the **DSCP Settings** tab; the following screen appears:

Figure 11-9: DSCP Settings Screen



DSCP Value (hex)	802.1p Priority	Action
0x0	0 (Queue 0 - Low)	 
0x2	0 (Queue 0 - Low)	 
0x4	4 (Queue 1 - Medium)	 
0x6	4 (Queue 1 - Medium)	 
0x8	2 (Queue 0 - Low)	 
0xA	1 (Queue 0 - Low)	 
0xC	3 (Queue 0 - Low)	 
0xE	2 (Queue 0 - Low)	 
0x10	7 (Queue 2 - High)	 
0x12	6 (Queue 2 - High)	 
0x14	7 (Queue 2 - High)	 
0x16	6 (Queue 2 - High)	 
0x18	5 (Queue 1 - Medium)	 
0x1A	5 (Queue 1 - Medium)	 
0x1C	5 (Queue 1 - Medium)	 
0x1E	5 (Queue 1 - Medium)	 
0x2E	7 (Queue 2 - High)	 
New Entry		



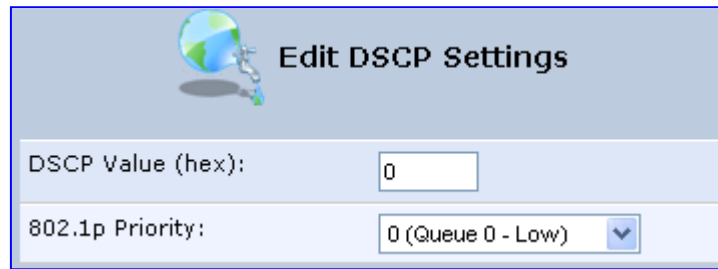
2. To edit an existing entry, click its corresponding **Edit**  icon. To add a new entry, click the **New**  icon. In both cases, the 'Edit DSCP Settings' screen appears:

Figure 11-10: Edit DSCP Settings



3. In the 'DSCP Value (hex)' field, enter a hexadecimal number for the DSCP value.
4. In the '802.1p Priority' drop-down list, select an 802.1p priority level (each priority level is mapped to low, medium, or high priority).
5. Click **OK** to save your settings.



Note: The DSCP value overriding the priority of incoming packets with an unassigned value (priority 0, assumed to be a no-priority-set) is '0x0'. By default, this value is mapped to 802.1p priority level '0 -Low', which means that such packets receive the lowest priority.

11.5 Configuring 802.1p Mapping

The IEEE 802.1p priority marking method is a standard for prioritizing network traffic at the data link/MAC sub-layer. 802.1p traffic is simply classified and sent to the destination, with no bandwidth reservations established.

The 802.1p header includes a 3-bit prioritization field, which allows packets to be grouped into eight levels of priority. The device maps these eight levels to three main priorities: high, medium and low. By default, values six and seven are mapped to high priority, which may be assigned to network-critical traffic. Values four and five are mapped to medium priority, which may be applied to delay-sensitive applications, such as interactive video and voice. Values three to zero are mapped to low priority, which may range from controlled-load applications down to 'loss eligible' traffic. The zero value is normally used for best-effort traffic. It is the default value for traffic with unassigned priority.

➤ **To set 802.1p rules:**

1. From the menu bar, click the **QoS** menu link, and then click the **802.1p Settings** tab; the following screen appears:

Figure 11-11: 802.1p Settings Screen



802.1p Value	Queue
0	Queue 1 - Low
1	Queue 0 - Lowest
2	Queue 0 - Lowest
3	Queue 1 - Low
4	Queue 2 - High
5	Queue 2 - High
6	Queue 3 - Highest
7	Queue 3 - Highest

OK Apply Cancel

2. The eight 802.1p values are pre-configured with the three priority levels: high, medium and low. You can change these levels for each of the eight values in their respective drop-down list.
3. Click **OK** to save the settings.

11.6 Configuring Class Statistics

The device provides accurate, real-time information on the traffic passing through your defined device classes. For example, the amount of packets sent, dropped, or delayed are just a few of the parameters that you can monitor per each shaping class.

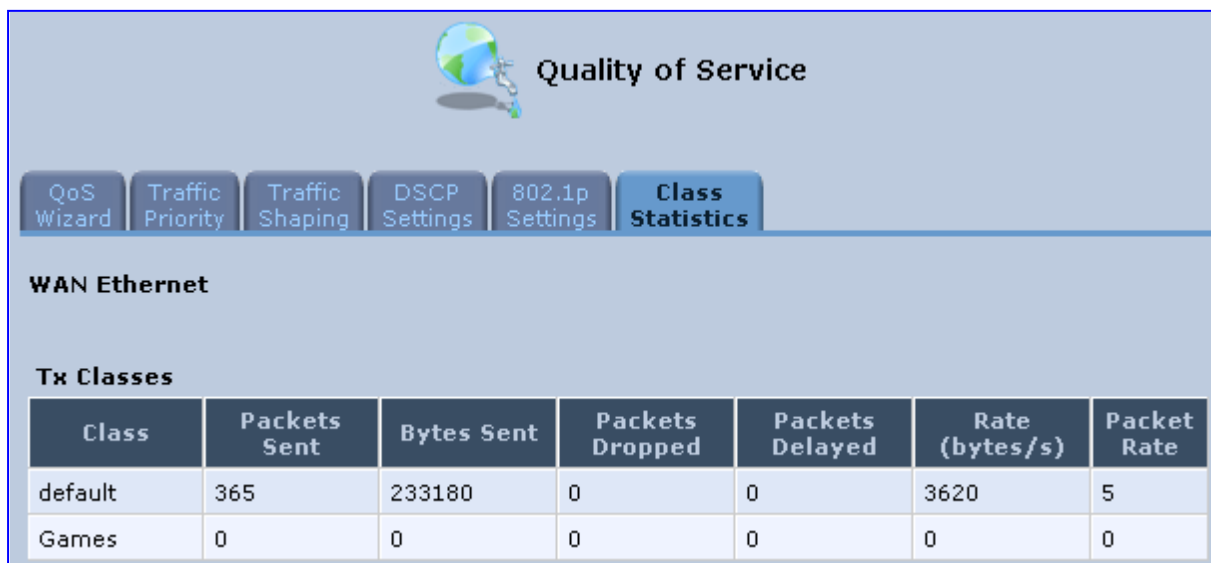


Note: Class statistics are available only if you have defined at least one class (otherwise no information is displayed).

➤ **To view your class statistics:**

- From the menu bar, click the **QoS** menu link, and then click the **Class Statistics** tab; the following screen appears:

Figure 11-12: Class Statistics Screen



11.7 Configuring Basic VoIP QoS Example

The 'Traffic Shaping' feature only ensures priority to calls that originate from *inside* MP-264. When giving VoIP priority over data, the bottleneck is effectively moved from the Cable / xDSL modem into the device. To give priority to calls from the LAN, you must define a traffic priority rule (for SIP and RTP from the device on the LAN).

This section recommends a minimal QoS configuration that ensures sufficient QoS for VoIP calls when the device is connected behind a broadband (cable or DSL) modem with limited uplink bandwidth and the user runs bandwidth-consuming applications on the PC.

Since most modems do not have any priority mechanisms, the Tx bandwidth of the device should be limited according to the modem's uplink bandwidth. Since the device automatically gives higher priority to VoIP packets (in its internal queues), it is not necessary to define traffic shaping classes.

➤ To configure basic QoS for VoIP:


1. From the menu bar, click the **QoS** menu link, and then click the **Traffic Shaping** tab; the 'Traffic Shaping' screen appears.
2. Click the **New**  icon; the screen 'Add Device Traffic Shaping' appears.
3. From the 'Device' drop-down list, select 'Default WAN Device' (or your PPTP/L2TP connection you have created), and then click **OK**; the 'Edit Device Traffic Shaping' screen appears.
4. Limit the Tx bandwidth (in the 'Tx Bandwidth' field) according to your modem's uplink bandwidth.
5. To prevent jitter in outgoing RTP packets, from the 'TCP Serialization' drop-down list, select 'Enabled', and then in the 'Maximum Delay' field, define the maximum allowed delay (e.g. 20 milliseconds). This causes long TCP packets to be fragmented when there is an active voice call.

Figure 11-13: Edit Device Traffic Shaping



Device: Default WAN device

Tx Traffic Shaping

Tx Bandwidth: Specify kbps

TCP Serialization: Enabled

Maximum Delay: ms

Devices: WAN Ethernet

Queue Policy: Class Based

Class ID	Name	Priority	Bandwidth		Status	Action
			Reserved	Maximum		
default	default	4	0 Kbps	Unlimited	Active	
New Entry						

☐ Enable Dynamic Traffic Shaping

Rx Traffic Policing


Rx Bandwidth: Unlimited

Devices: WAN Ethernet

Queue Policy: None






6. Click **OK** to apply the new definition.

Figure 11-14: QoS - Edit Device Traffic Shaping - Submitting the Configuration



Quality of Service

QoS Wizard
Traffic Priority
Traffic Shaping
DSCP Settings
802.1p Settings
Class Statistics

Device	Tx Bandwidth (Kbps)	Rx Bandwidth (Kbps)	TCP Serialization	Action
<input checked="" type="checkbox"/> Default LAN device				 
<input checked="" type="checkbox"/> Default WAN device	250	Unlimited	20 ms (640 bytes)	 
New Entry				

7. Click **OK** again.

12 Network Connections

This chapter provides a detailed description on how to configure the following network connections:

- WAN – see Section 12.1 on page 153
- LAN – see Section 12.2 on page 177
- VLANs – see Section 12.4 on page 213
- LAN-WAN Bridging – see Section 12.5 on page 221

12.1 Configuring a WAN Connection

This section describes how to configure your WAN Internet (WAN Ethernet or WAN DSL) connection.

The WAN connection is configured in the 'Network Connections' screen, which provides a connection wizard that guides you through the network configuration stages.



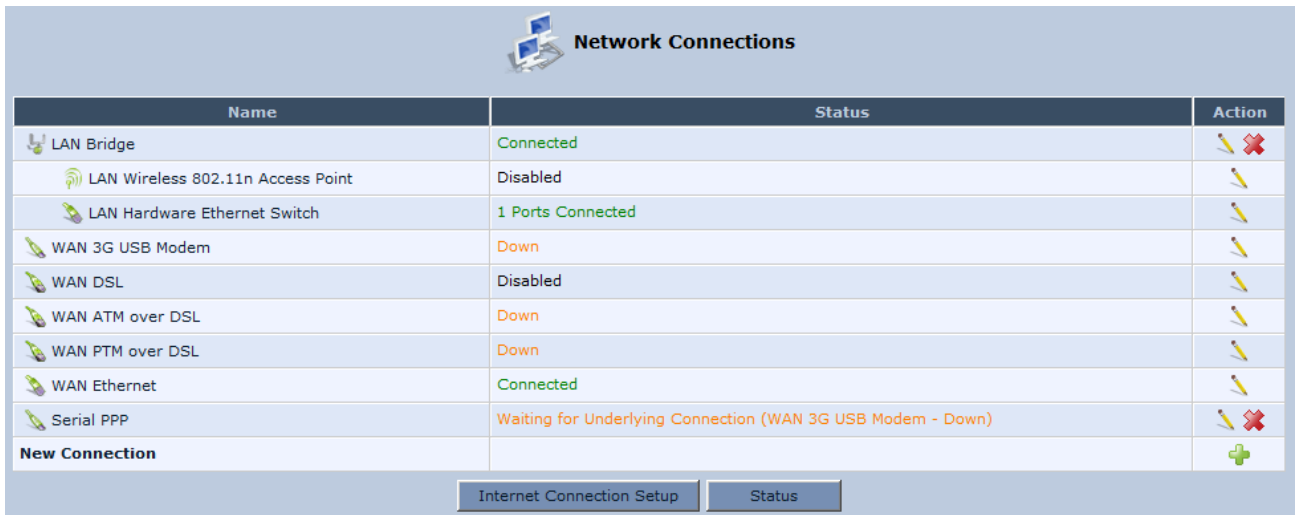
Notes:













- To quickly configure a basic WAN connection, use the 'Quick Setup' screen, as described in Section 8.1 on page 73.
- Before configuring the device Internet connection, ensure that you have obtained relevant technical information on the Internet connection type from your Internet Telephony Service Provider (ITSP). For example, whether you are connected to the Internet using a static or dynamic IP address, or what protocols such as PPTP or PPPoE are used to communicate over the Internet.
- The device automatically detects the physical WAN type (i.e., Ethernet or xDSL). To change the WAN type, you must restore the device to factory settings (see Section 19.9).
- When connected to xDSL, the **LAN4/WAN** Ethernet port can be used for Ethernet LAN interface.
- When connected to an external modem through the Ethernet **LAN4/WAN** port and the device obtains an IP address, the xDSL interface is disabled.
- If the Automatic Dialer feature is shipped preconfigured (i.e., enabled), then the device automatically detects the Internet dialer type and therefore, Internet connection configuration is unnecessary. However, it is recommended to manually configure the Internet connection **after** the Automatic Dialer process has completed (successfully or not). For more information on the Automatic Dialer feature, see Section 8.1.3 on page 80.

➤ **To start the Connection Wizard:**

1. From the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.

Figure 12-1: Network Connections Screen



Name	Status	Action
LAN Bridge	Connected	 
LAN Wireless 802.11n Access Point	Disabled	
LAN Hardware Ethernet Switch	1 Ports Connected	
WAN 3G USB Modem	Down	
WAN DSL	Disabled	
WAN ATM over DSL	Down	
WAN PTM over DSL	Down	
WAN Ethernet	Connected	
Serial PPP	Waiting for Underlying Connection (WAN 3G USB Modem - Down)	 
New Connection		

Internet Connection Setup Status

2. Click the **New**  icon; the 'Connection Wizard' screen appears:

Figure 12-2: Connection Wizard Screen



Choose the type of network connection you want to create, based on your network configuration and your networking needs.

☒ **Internet DSL Connection**
Connect to the Internet using your DSL connection so you can browse the Web and read Email.

☐ **Internet Connection**
Connect to the Internet using your external DSL modem, Cable modem or Ethernet connection so you can browse the Web and read Email.

☐ **Advanced Connection**
Manually configure a new connection.

3. Select the required network connection group:
 - **Internet DSL Connection:** configures an Internet connection when using the device integrated DSL modem (see Section 12.1.1 on page 155)
 - **Internet Connection:** configures an Internet connection when using an external DSL modem, Cable modem or Ethernet connection modem (see Section 12.1.2 on page 165)
 - **Advanced Connection:** configures the WAN connection types as well as network bridging and VLANs



Notes:

- For configuring VLANS, see Section 12.4 on page 213.
- For configuring network bridging, see Section 12.5 on page 221.

12.1.1 WAN DSL Connections

You can configure the following WAN DSL connection types:

- Determine Protocol Type Automatically (PVC scan) – see Section 12.1.1.1 on page 157
- Point-to-Point Protocol over Ethernet (PPPoE) – see Section 12.1.1.2 on page 158
- Point-to-Point Protocol over ATM (PPPoA) – see Section 12.1.1.3 on page 160
- Routed Ethernet Connection over ATM (Routed ETHoA) – see Section 12.1.1.4 on page 161
- LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA) – see Section 12.1.1.4 on page 161
- Routed IP over ATM (IPoA) – see Section 12.1.1.5 on page 163

If you have established a **WAN ATM over DSL** connection, you can view the properties of this connection as described below.

➤ **To view the WAN ATM over DSL properties:**


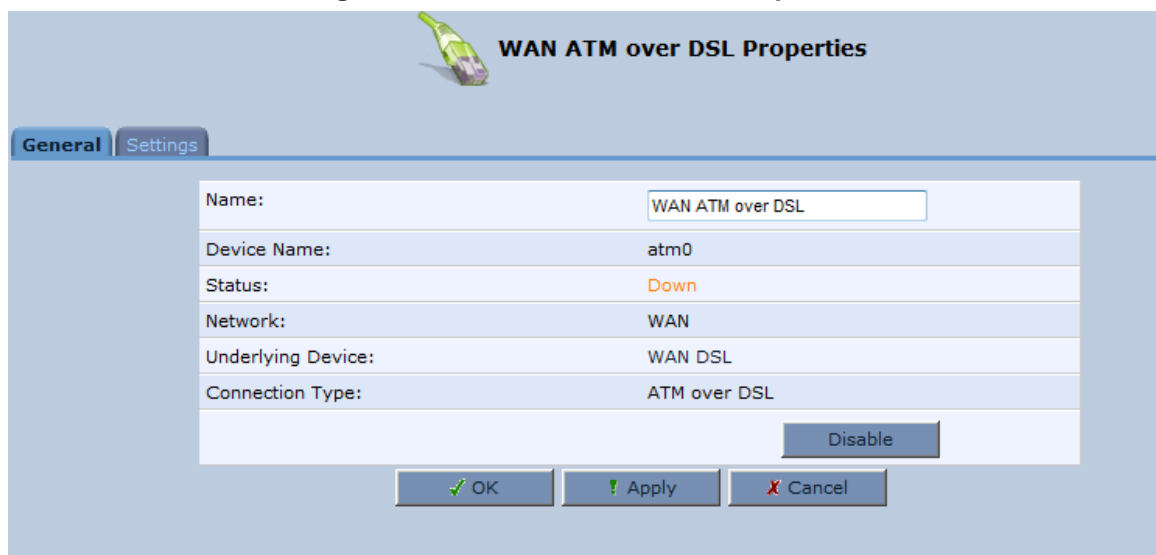
- In the 'Network Connections' screen, click the **Edit**  icon corresponding to the **WAN ATM over DSL** network connection; the 'WAN ATM over DSL Properties' screen appears:

Figure 12-3: WAN ATM over DSL Properties



WAN ATM over DSL Properties	
Name:	WAN ATM over DSL
Device Name:	atm0
Status:	Down
Network:	WAN
Underlying Device:	WAN DSL
Connection Type:	ATM over DSL

Disable

OK Apply Cancel

If you have established a **WAN ATM over DSL** connection, you can view the properties of this connection as described below.

➤ **To view the WAN PTM over DSL properties:**


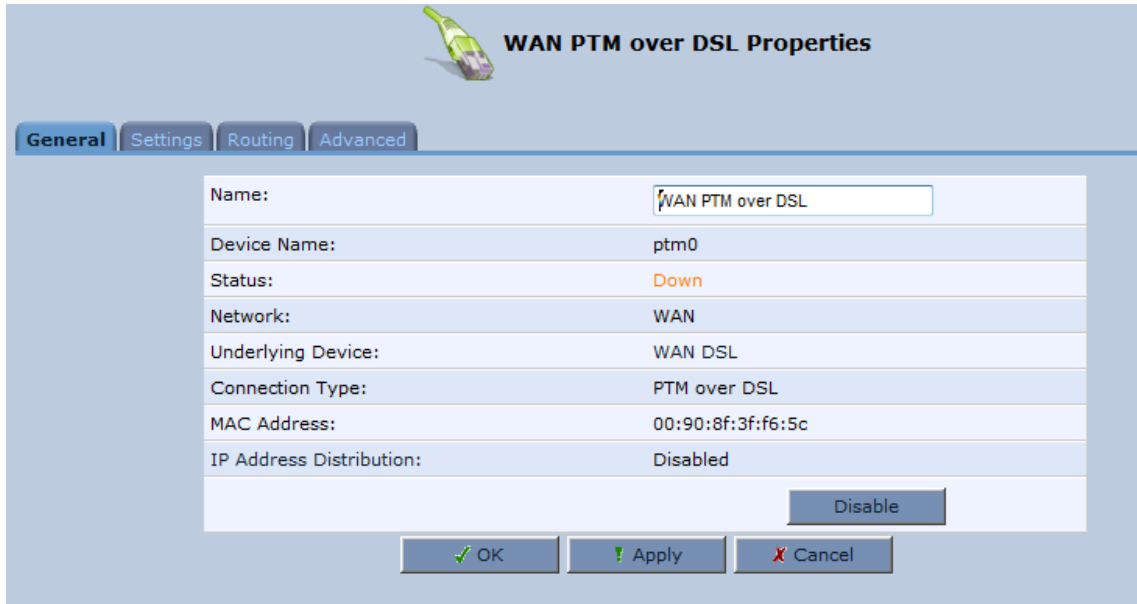
- In the 'Network Connections' screen, click the **Edit**  icon corresponding to the **WAN PTM over DSL** network connection; the 'WAN PTM over DSL Properties' screen appears:

Figure 12-4: WAN PTM over DSL Properties




WAN PTM over DSL Properties	
Name:	WAN PTM over DSL
Device Name:	ptm0
Status:	Down
Network:	WAN
Underlying Device:	WAN DSL
Connection Type:	PTM over DSL
MAC Address:	00:90:8f:3f:f6:5c
IP Address Distribution:	Disabled
<input type="button" value="Disable"/>	
<input type="button" value="OK"/> <input type="button" value="Apply"/> <input type="button" value="Cancel"/>	

12.1.1.1 Determine Protocol Type Automatically (PVC Scan)

The Determine Protocol Type Automatically (PVC Scan) connection type automatically scans for a VPI/VCI pair, necessary when connecting to DSL. If such a pair is not found, your service provider should supply you with one.

➤ **To automatically scan for a VPI / VCI pair:**

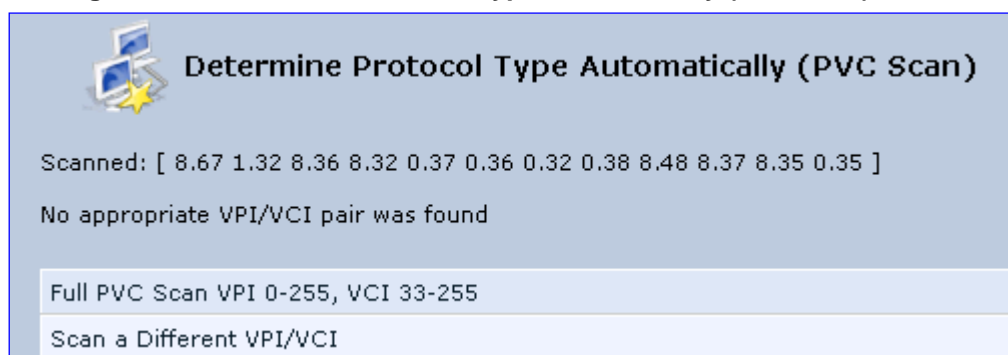
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.



Note: You can also create a PVC connection using the **Advanced Connection** option.

3. Select the **Determine Protocol Type Automatically (PVC Scan)** option, and then click **Next**; the scan begins, refreshing the screen every few seconds to display the progress.

Figure 12-5: Determine Protocol Type Automatically (PVC Scan) Screen



Determine Protocol Type Automatically (PVC Scan)

Scanned: [8.67 1.32 8.36 8.32 0.37 0.36 0.32 0.38 8.48 8.37 8.35 0.35]

No appropriate VPI/VCI pair was found

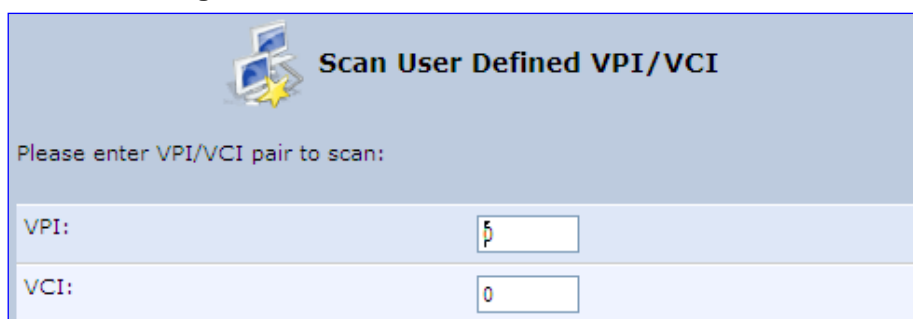
Full PVC Scan VPI 0-255, VCI 33-255

Scan a Different VPI/VCI

You can click the following links:

- **Full PVC Scan VPI 0-255, VCI 33-255:** initiates a longer, more thorough scan, between VPI 0-255 and VCI 33-255.
- **Scan a Different VPI/VCI:** scans for specific VPI/VCI pair. The 'Scan User Defined VPI/VCI' screen appears (as shown below). Enter the VPI/VCI pair you wish to scan and then click **OK**.

Figure 12-6: Scan User Defined VPI/VCI Screen



Scan User Defined VPI/VCI

Please enter VPI/VCI pair to scan:

VPI: 5

VCI: 0

12.1.1.2 PPPoE

PPPoE relies on two widely accepted standards, PPP and Ethernet. PPPoE enables your home network PCs that communicate on an Ethernet System network to exchange information with PCs on the Internet. PPPoE supports the protocol layers and authentication widely used in PPP and enables a point-to-point connection to be established in the normally multipoint architecture of Ethernet. A discovery process in PPPoE determines the Ethernet MAC address of the remote device to establish a session.

➤ **To create a PPPoE connection:**


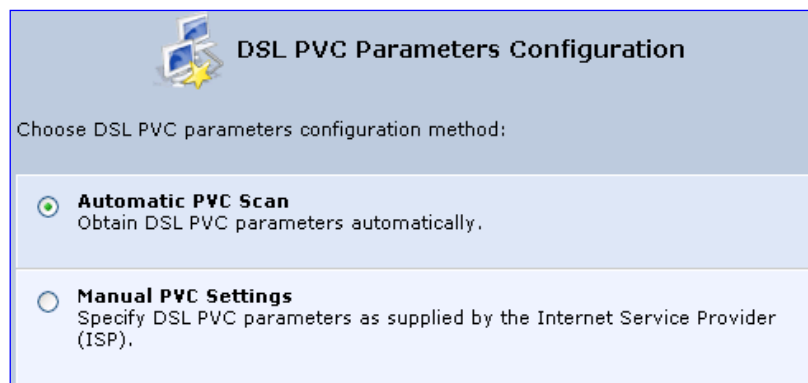
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.
3. Select the **Point-to-Point Protocol over Ethernet (PPPoE)** option, and then click **Next**; the 'DSL PVC Parameters Configuration' screen appears.

Figure 12-7: DSL PVC Parameters Configuration Screen



DSL PVC Parameters Configuration

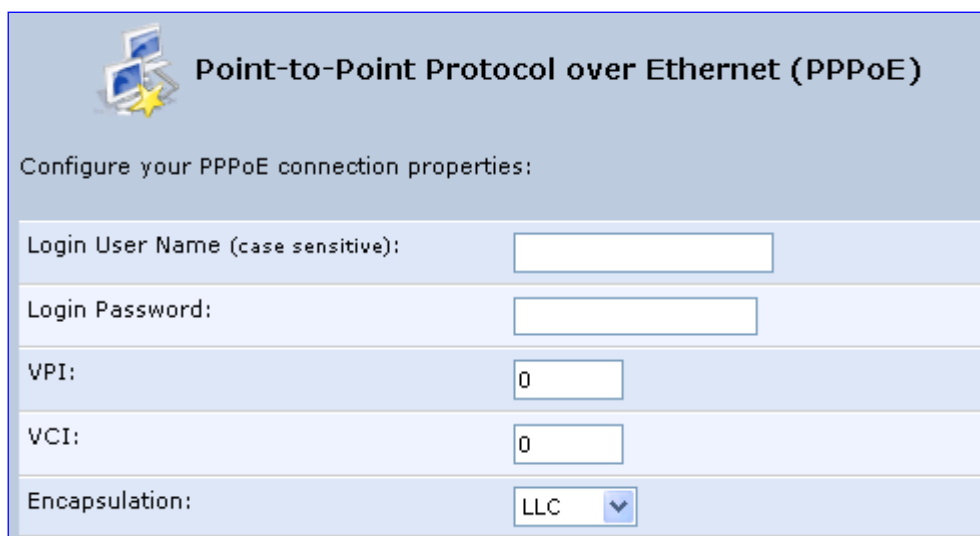
Choose DSL PVC parameters configuration method:

☒ **Automatic PVC Scan**
Obtain DSL PVC parameters automatically.

☐ **Manual PVC Settings**
Specify DSL PVC parameters as supplied by the Internet Service Provider (ISP).


4. Select one of the following options:
 - **Automatic PVC Scan:** If you want to obtain the DSL PVC parameters automatically
 - **Manual PVC Settings:** If you do not want to obtain the DSL PVC parameters automatically
5. Click **Next**; the 'Point-to-Point Protocol over Ethernet (PPPoE)' screen appears.

Figure 12-8: Configuring Point-to-Point Protocol over Ethernet (PPPoE) Screen



Point-to-Point Protocol over Ethernet (PPPoE)

Configure your PPPoE connection properties:

Login User Name (case sensitive):	<input type="text"/>
Login Password:	<input type="password"/>
VPI:	<input type="text" value="0"/>
VCI:	<input type="text" value="0"/>
Encapsulation:	LLC 

6. Enter your PPPoE login username and password (provided by your ITSP).
7. If you selected the **Manual PVC Settings** option in the previous step, you also need to configure the following:
 - VPI and VCI pair of identifiers.
 - Encapsulation method - LLC, VCMux, or VCMux HDLC.

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.

8. Click **Next**; the 'Connection Summary' screen appears:

Figure 12-9: Connection Summary Screen



9. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
10. Click **Finish** to save the settings; the new PPPoE connection is added to the 'Network Connections' screen.

12.1.1.3 PPPoA

PPPoA is a standard for incorporating the popular PPP protocol into a DSL connection that uses ATM as its networking protocol. From the PC, IP packets travel over an Ethernet connection to the device, which encapsulates the PPP protocol to the IP packets and transports them to the service provider's DSLAM over ATM.

➤ **To create a PPPoA connection:**


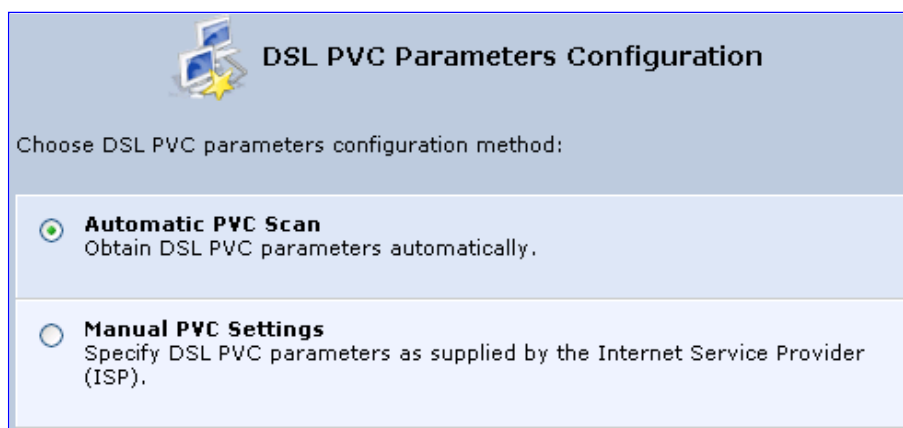
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.
3. Select the **Point-to-Point Protocol over ATM (PPPoA)** option, and then click **Next**; the 'DSL PVC Parameters Configuration' screen appears.

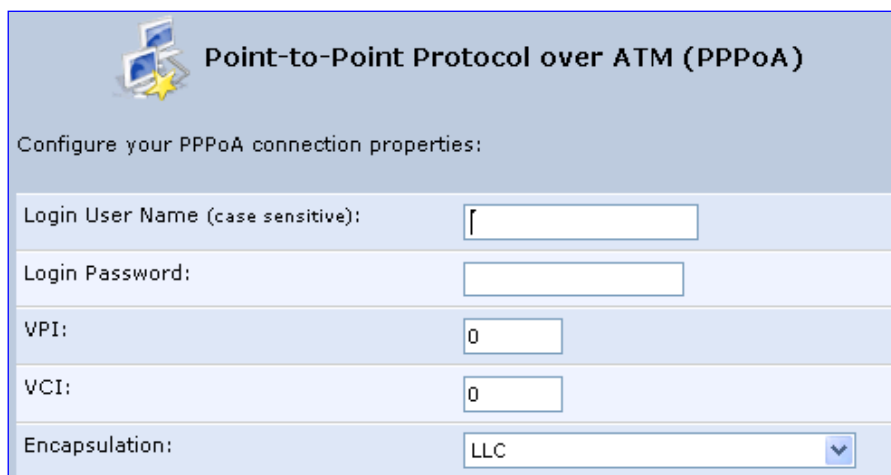
Figure 12-10: DSL PVC Parameters Configuration Screen



The screenshot shows the 'DSL PVC Parameters Configuration' window. It has a title bar with a laptop icon and the title 'DSL PVC Parameters Configuration'. Below the title bar, it says 'Choose DSL PVC parameters configuration method:'. There are two radio button options: 'Automatic PVC Scan' (selected) with the description 'Obtain DSL PVC parameters automatically.', and 'Manual PVC Settings' with the description 'Specify DSL PVC parameters as supplied by the Internet Service Provider (ISP)'.

4. Select one of the following options:
 - **Automatic PVC Scan:** If you want to obtain the DSL PVC parameters automatically
 - **Manual PVC Settings:** If you do not want to obtain the DSL PVC parameters automatically
5. Click **Next**; the 'Point-to-Point Protocol over ATM (PPPoA)' screen appears.

Figure 12-11: Point-to-Point Protocol over ATM (PPPoA) Screen



The screenshot shows the 'Point-to-Point Protocol over ATM (PPPoA)' window. It has a title bar with a laptop icon and the title 'Point-to-Point Protocol over ATM (PPPoA)'. Below the title bar, it says 'Configure your PPPoA connection properties:'. There are five input fields: 'Login User Name (case sensitive):', 'Login Password:', 'VPI:', 'VCI:', and 'Encapsulation:'. The 'VPI' and 'VCI' fields have the value '0'. The 'Encapsulation' field is a dropdown menu with 'LLC' selected.

6. Enter your PPPoA login username and password (provided by your ITSP).

7. If you selected the **Manual PVC Settings** option in the previous step, you also need to configure the following:
 - VPI and VCI pair of identifiers.
 - Encapsulation method - LLC, VCMux, or VCMux HDLC.

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.

8. Click **Next**; the 'Connection Summary' screen appears:

Figure 12-12: Connection Summary Screen




9. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
10. Click **Finish** to save the settings; the new PPPoA connection is added to the 'Network Connections' screen.

12.1.1.4 Routed ETHoA or Bridged ETHoA

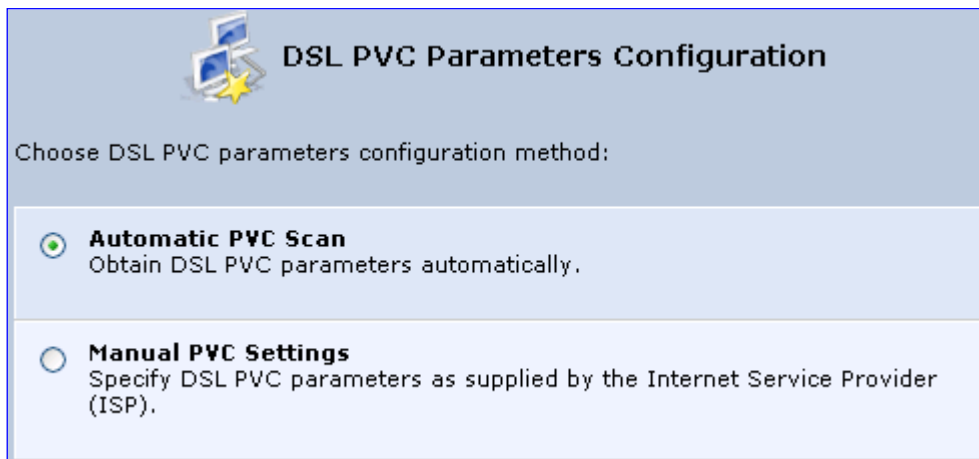
The Ethernet over ATM (ETHoA) connection allows transport of Ethernet frames on DSL connections. When creating an ETHoA connection, it is bridged to the LAN. You must configure a dialup connection on the LAN computer with your ITSP's user name and password.

➤ To create an ETHoA connection:

1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.

3. Select one of the following options:
 - **Routed Ethernet Connection over ATM (Routed ETHoA):**
 - a. Click **Next**; the 'DSL PVC Parameters Configuration' screen appears.

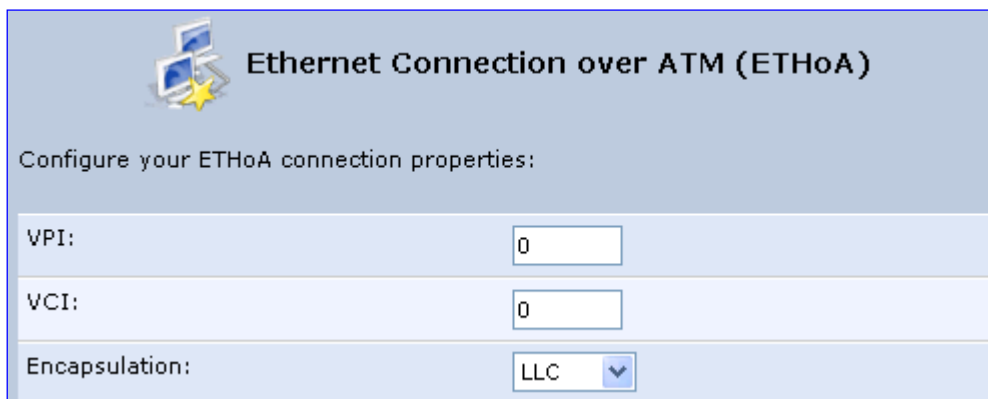
Figure 12-13: DSL PVC Parameters Configuration Screen



The screenshot shows the 'DSL PVC Parameters Configuration' screen. At the top, there is a title bar with a computer icon and the text 'DSL PVC Parameters Configuration'. Below the title bar, the instruction 'Choose DSL PVC parameters configuration method:' is displayed. There are two radio button options: 'Automatic PVC Scan' (selected) with the description 'Obtain DSL PVC parameters automatically.', and 'Manual PVC Settings' with the description 'Specify DSL PVC parameters as supplied by the Internet Service Provider (ISP)'.

- b. Select one of the following options:
 - ✓ **Automatic PVC Scan:** If you want to obtain the DSL PVC parameters automatically
 - ✓ **Manual PVC Settings:** If you do not want to obtain the DSL PVC parameters automatically
 - **LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA):**
 - a. Click **Next**; the 'Ethernet Connection over ATM (ETHoA)' screen appears.

Figure 12-14: Ethernet Connection over ATM (ETHoA) Screen



The screenshot shows the 'Ethernet Connection over ATM (ETHoA)' screen. At the top, there is a title bar with a computer icon and the text 'Ethernet Connection over ATM (ETHoA)'. Below the title bar, the instruction 'Configure your ETHoA connection properties:' is displayed. There are three input fields: 'VPI:' with a text box containing '0', 'VCI:' with a text box containing '0', and 'Encapsulation:' with a dropdown menu showing 'LLC'.

4. If you selected the **Manual PVC Settings** option, you also need to configure the following:
 - VPI and VCI pair of identifiers.
 - Encapsulation method - LLC, VCMux, or VCMux HDLC.

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint..

- Click **Next**; the 'Connection Summary' screen appears:

Figure 12-15: Connection Summary Screen



- Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
- Click **Finish** to save the settings; the new ETHoA connection is added to the 'Network Connections' screen.

12.1.1.5 IPoA

Routed IP over ATM (IPoA) is a standard for transmitting IP traffic in an ATM network.

➤ **To create an IPoA connection:**


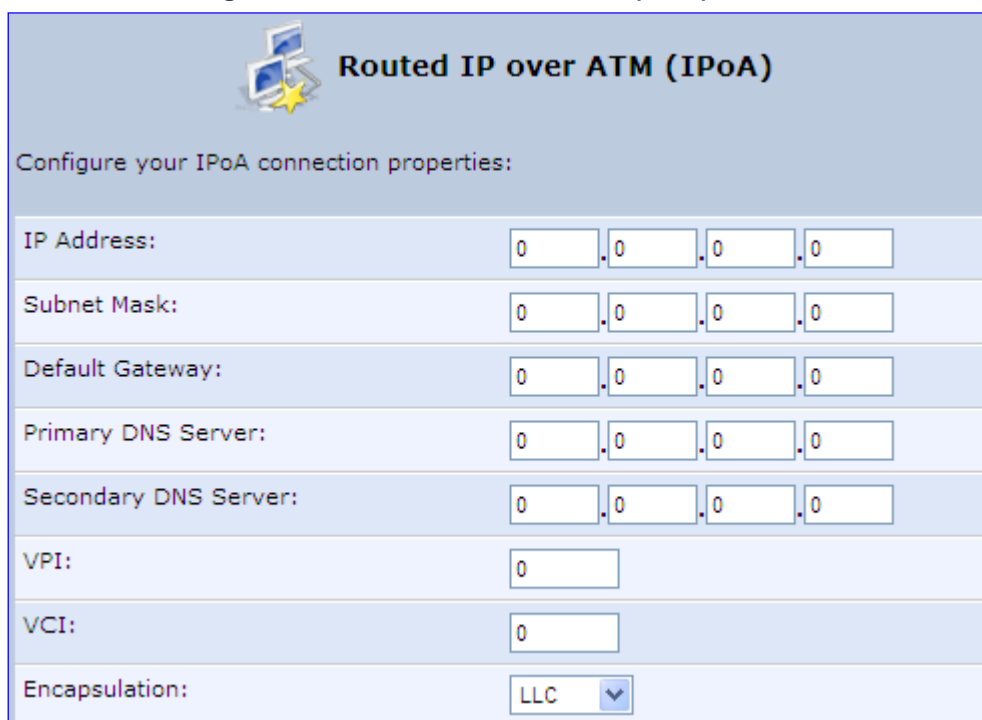
- In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
- Select the **Advanced Connection** option, and then click **Next**; the 'Advanced Connection' screen appears.
- Select the **Routed IP over ATM (IPoA)** option, and then click **Next**; the 'Routed IP over ATM (IPoA)' screen appears.

Figure 12-16: Routed IP over ATM (IPoA) Screen



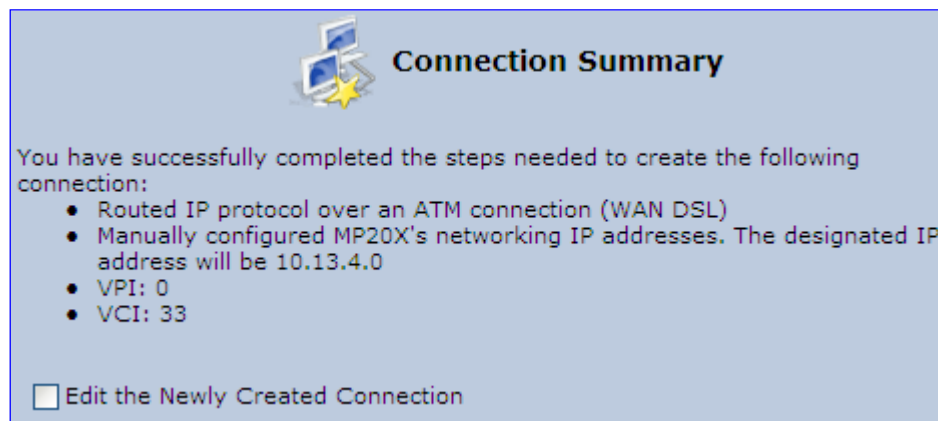
Configure your IPoA connection properties:	
IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0
VPI:	0
VCI:	0
Encapsulation:	LLC ▼

4. Enter the IP address and networking parameters.
5. Enter the following parameters:
 - VPI and VCI pair of identifiers.
 - Encapsulation method: LLC, VCMux, or VCMux HDLC.

ATM is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.

6. Click **Next**; the 'Connection Summary' screen appears:

Figure 12-17: Connection Summary Screen



7. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
8. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.1.2 WAN Ethernet Connections

You can configure the following WAN Ethernet connection types:

- The device connected to an external DSL modem and using PPPoE – see Section 12.1.2.1 on page 165
- The device connected to an external Cable modem without authentication – see Section 12.1.2.2 on page 166
- The device connected to an external Cable modem using L2TP – see Section 12.1.2.3 on page 169
- Automatic IP address using DHCP – see Section 12.1.2.4 on page 172
- Manual IP address – see Section 12.1.2.5 on page 174

12.1.2.1 External DSL Modem using PPPoE

The procedure below describes how to configure an Internet connection using PPPoE when the device is connected to an external DSL modem.

➤ **To create a PPPoE connection for external DSL modem:**


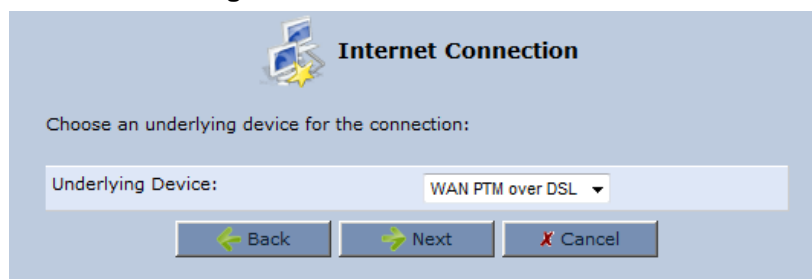
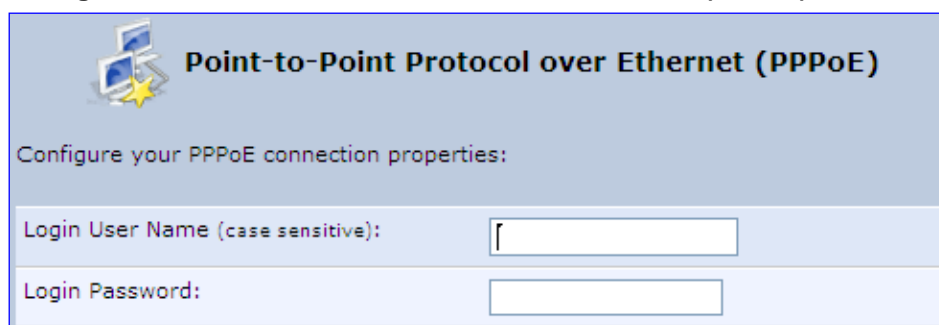
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.

Figure 12-18: Internet Connection



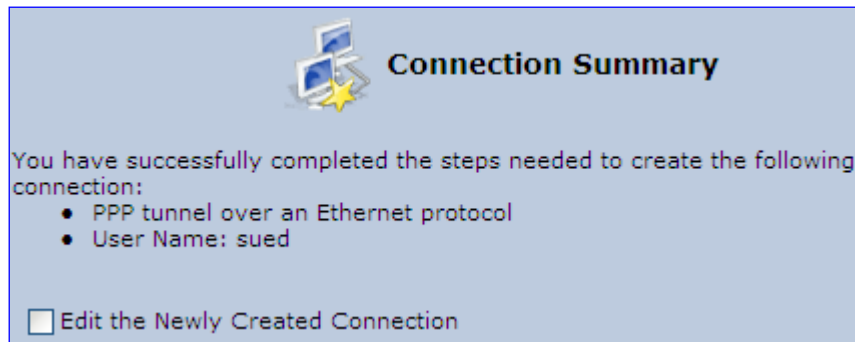
3. From the 'Underlying Device' drop-down menu, select the Underling Device, and then click **Next**.
4. Select the **External DSL Modem** option, and then click **Next**; the 'Point-To-Point Protocol over Ethernet (PPPoE)' screen appears.

Figure 12-19: Point-to-Point Protocol over Ethernet (PPPoE) Screen



5. Enter the login PPPoE username and password.
6. Click **Next**; the screen 'Connection Summary' opens.

Figure 12-20: PPPoE Connection Summary



7. Select the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
8. Click **Finish** to save the settings; the new PPPoE connection is added to the 'Network Connections' screen.

12.1.2.2 External Cable Modem without Authentication

The procedure below describes how to configure an Internet connection when the device is connected to an external Cable modem and the ITSP does not require a username nor password to connect.

➤ To create an Ethernet connection for external Cable modem:


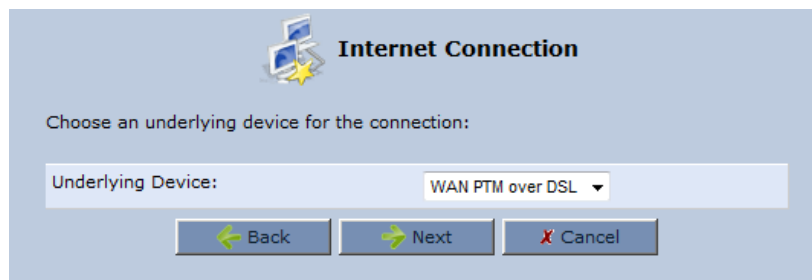
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.

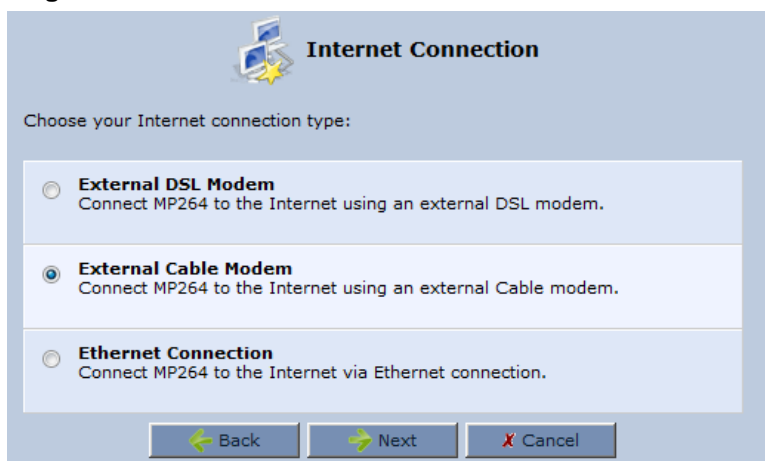
Figure 12-21: Internet Connection – Underlying Device



3. From the 'Underlying Device' drop-down menu, select the Underling Device, and then click **Next**.

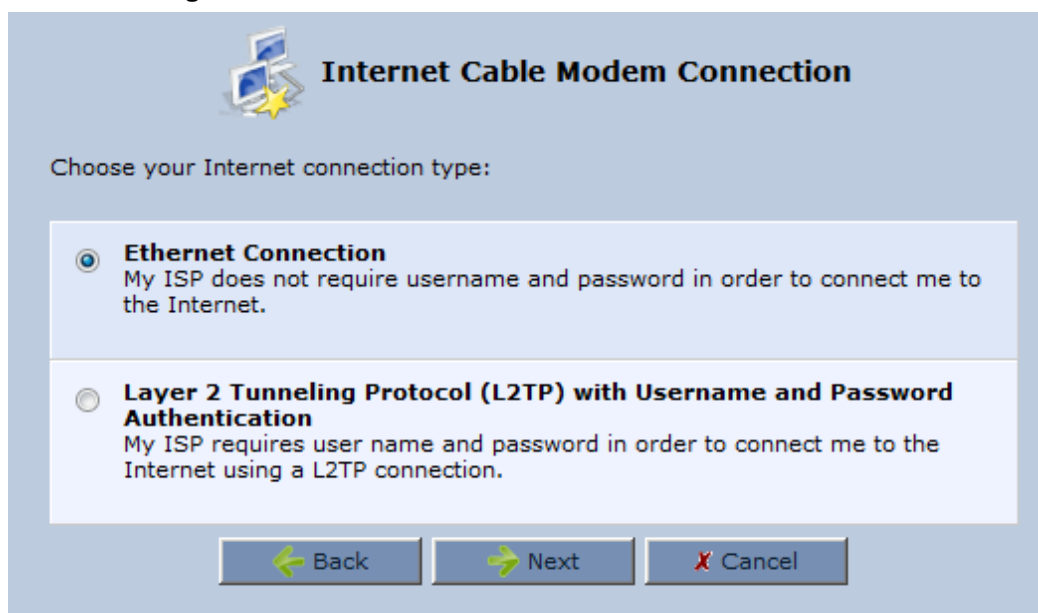
4. Select the **External Cable Modem** option, and then click **Next**.

Figure 12-22: Internet Connection – External Cable Modem



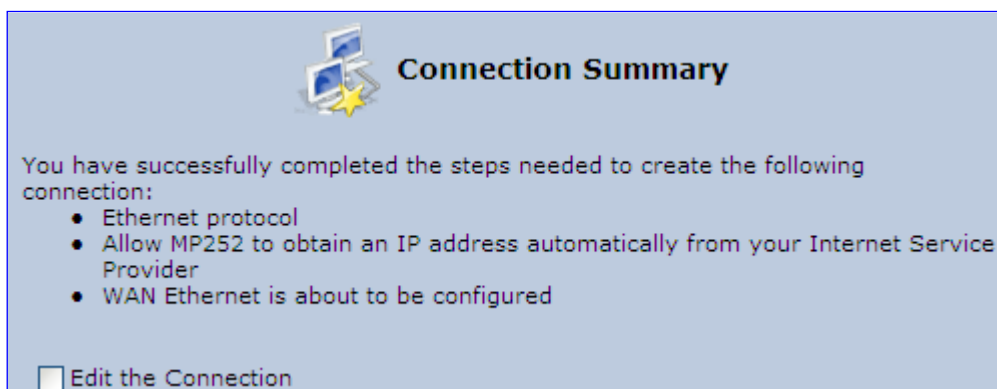
The 'Internet Cable Modem Connection' screen appears.

Figure 12-23: Internet Cable Modem Connection - Ethernet



5. Select the **Ethernet Connection** option; the 'Connection Summary' screen appears.

Figure 12-24: Ethernet Connection Summary



6. Select the 'Edit the Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
7. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.1.2.3 External Cable Modem with L2TP

You can connect the device to the Internet using an external cable modem where the connection is L2TP. L2TP is an extension to the PPP protocol, enabling the device to create VPN connections. Derived from Microsoft's PPTP and Cisco's Layer 2 Forwarding (L2F) technology, L2TP encapsulates PPP frames into IP packets either at the remote user's PC or at an ISP that has an L2TP Remote Access Concentrator (LAC). The LAC transmits the L2TP packets over the network to the L2TP Network Server (LNS) at the corporate side

➤ **To create L2RP for external Cable modem:**


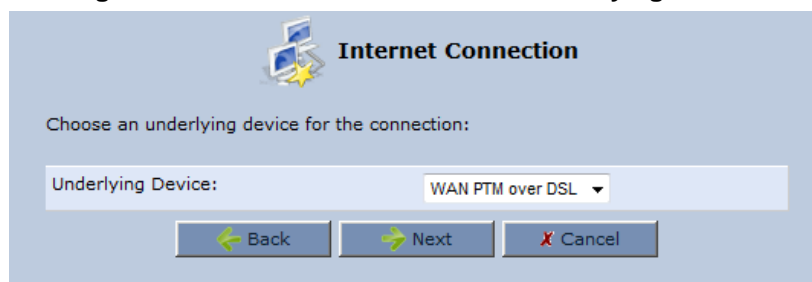
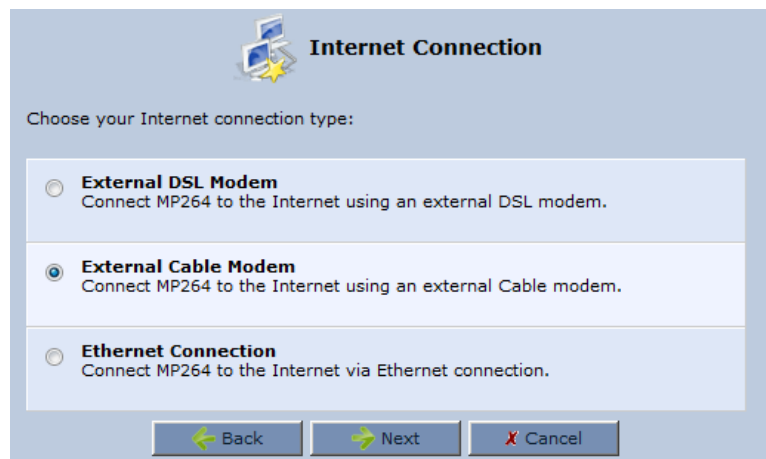
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.

Figure 12-25: Internet Connection – Underlying Device



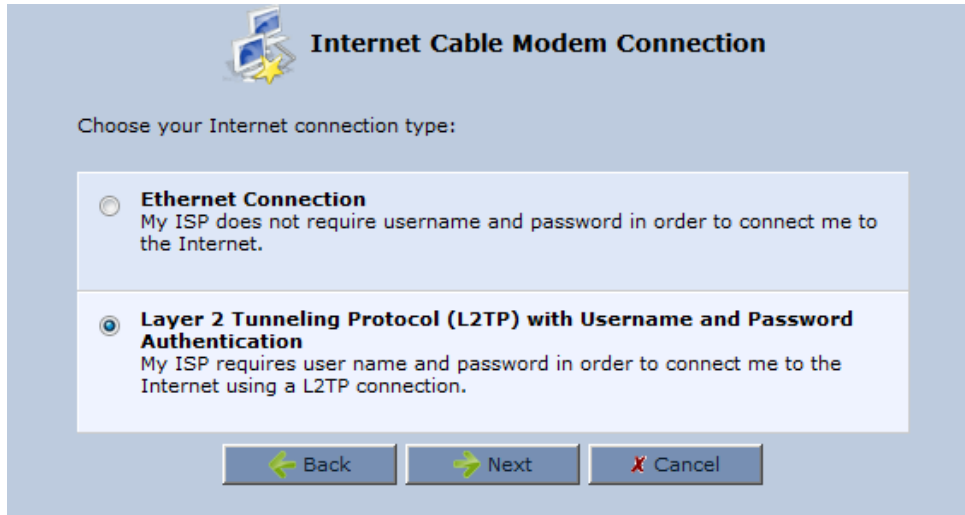
3. From the 'Underlying Device' drop-down menu, select the Underling Device, and then click **Next**.
4. Select the **External Cable Modem** option, and then click **Next**;

Figure 12-26: Internet Connection – External Cable Modem



5. Select the **External Cable Modem** option, and then click **Next**; the 'Internet Cable Modem Connection' screen appears.

Figure 12-27: Internet Cable Modem Connection - L2TP



Internet Cable Modem Connection

Choose your Internet connection type:

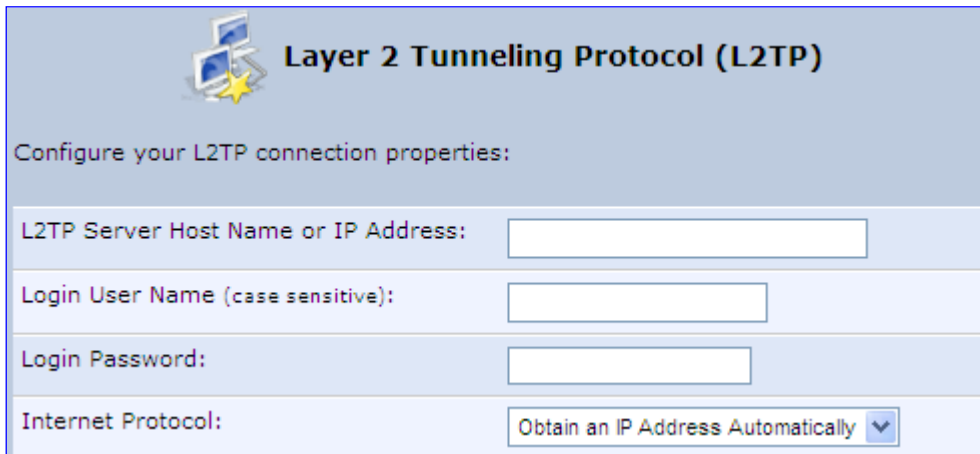
☐ **Ethernet Connection**
My ISP does not require username and password in order to connect me to the Internet.

☒ **Layer 2 Tunneling Protocol (L2TP) with Username and Password Authentication**
My ISP requires user name and password in order to connect me to the Internet using a L2TP connection.

[Back](#) [Next](#) [Cancel](#)

6. Select the **Layer 2 Tunneling Protocol (L2TP) with Username and Password Authentication** option; the 'Layer 2 Tunneling Protocol (L2TP)' screen appears.

Figure 12-28: Layer 2 Tunneling Protocol (L2TP) Screen



Layer 2 Tunneling Protocol (L2TP)

Configure your L2TP connection properties:

L2TP Server Host Name or IP Address:

Login User Name (case sensitive):

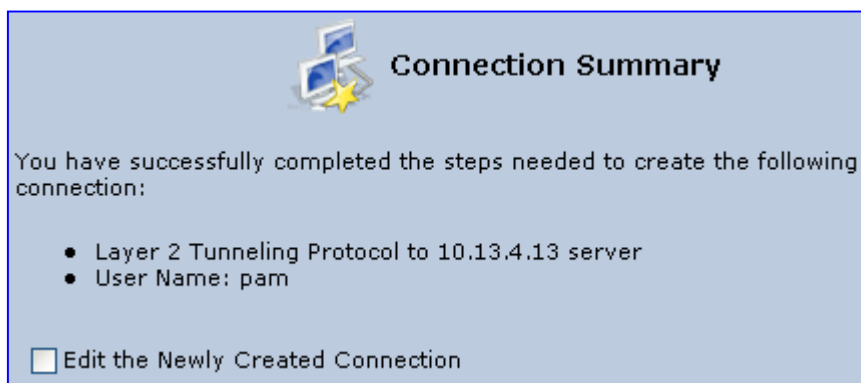
Login Password:

Internet Protocol:

7. Enter the L2TP server host name or IP address provided by your ITSP.
8. Enter the login user name and password provided by the administrator of the network you are trying to access.
9. From the 'Internet Protocol' drop-down list, select whether the IP address is obtained automatically or select 'Use the Following IP Address' and define the IP address.

10. Click **Next**; the screen 'Connection Summary' opens.

Figure 12-29: L2TP Connection Summary



11. Select the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
12. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.1.2.4 DHCP

The Dynamic Host Configuration Protocol (DHCP) connection for the physical WAN Ethernet, allows the device to obtain an IP address automatically from the service provider when connecting to the Internet.

➤ **To create a DHCP connection:**


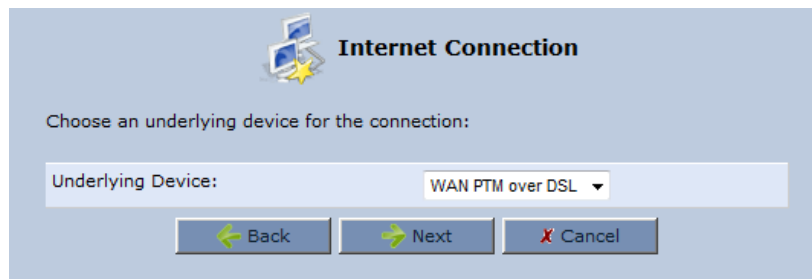
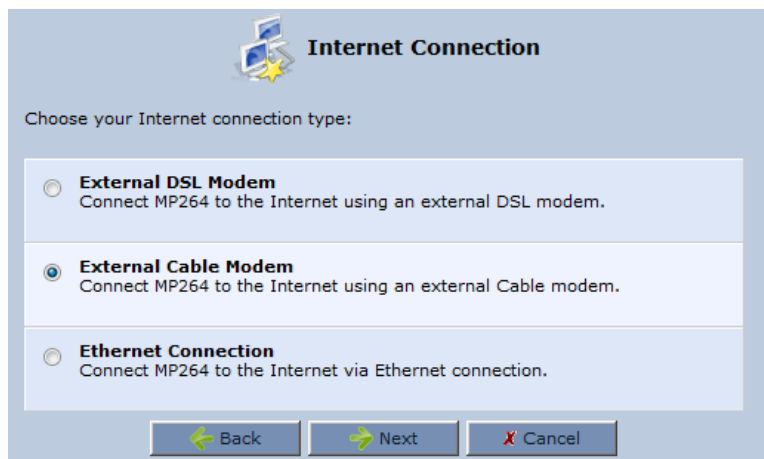
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.

Figure 12-30: Internet Connection – Underlying Device



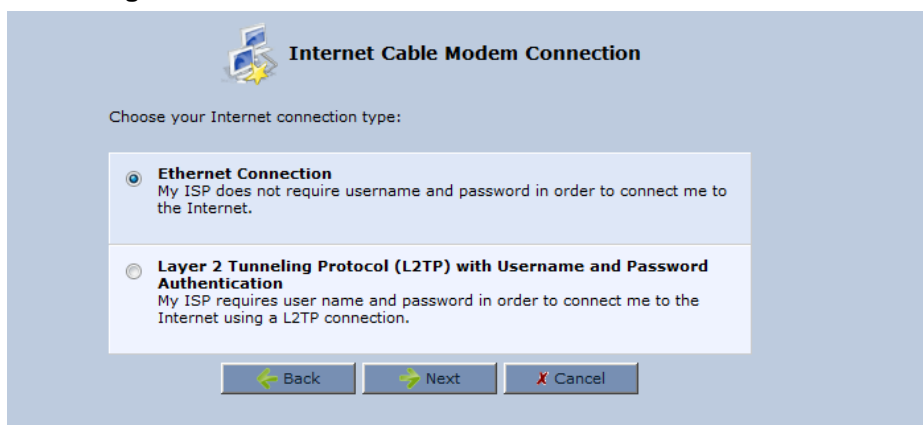
3. From the 'Underlying Device' drop-down menu, select the Underling Device, and then click **Next**.
4. Select the **External Cable Modem** option, and then click **Next**;

Figure 12-31: Internet Connection – External Cable Modem



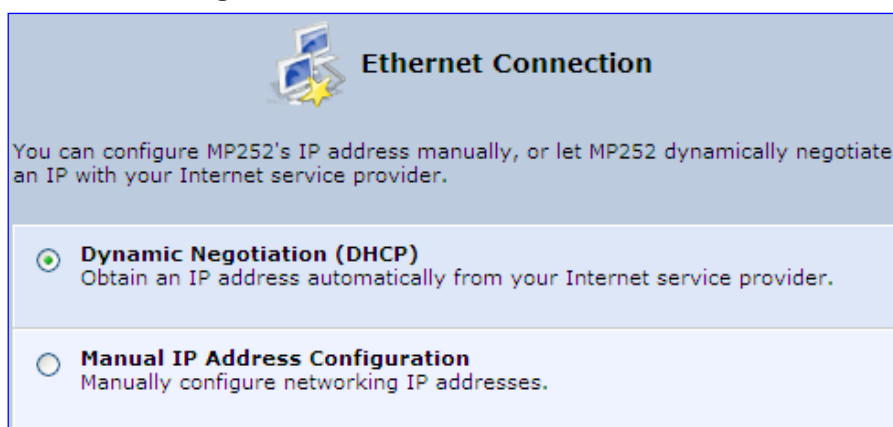
The 'Internet Cable Modem Connection' screen appears.

Figure 12-32: Internet Connection – External Cable Modem



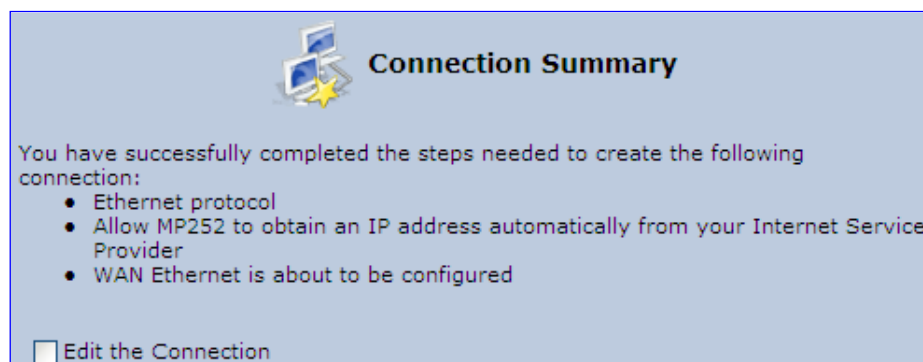
5. Select the **Ethernet Connection** option, and then click **Next**; the 'Ethernet Connection' screen appears.

Figure 12-33: Ethernet Connection Screen



6. Select the Dynamic Negotiation (DHCP) option, and then click **Next**; the screen 'Connection Summary' opens.

Figure 12-34: DHCP Connection Summary



7. Select the 'Edit the Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
8. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.1.2.5 Manual IP Address

The Manual IP Address feature is used to manually configure the networking IP addresses when connecting to the Internet.

➤ **To manually configure the IP address:**


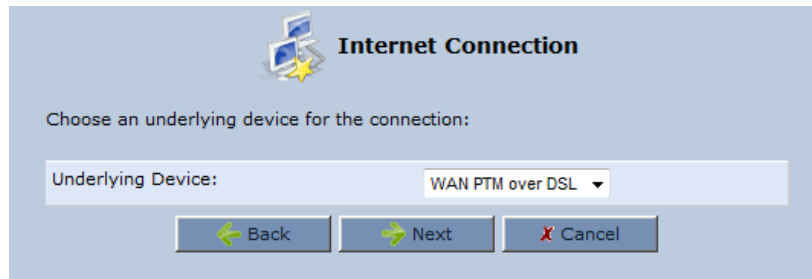
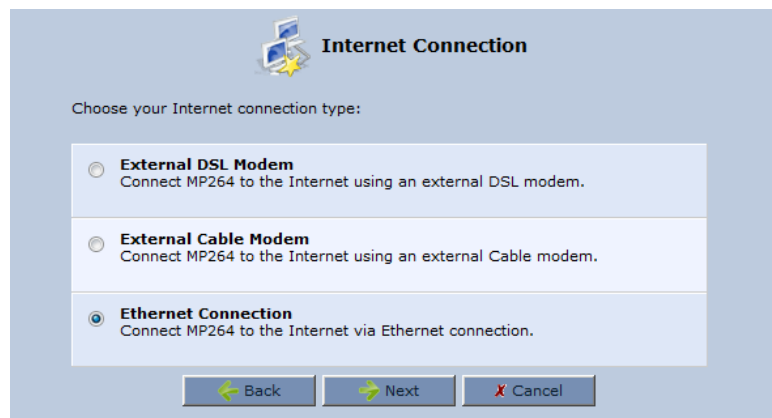
1. In the 'Network Connections' screen, click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.

Figure 12-35: Internet Connection – Underlying Device



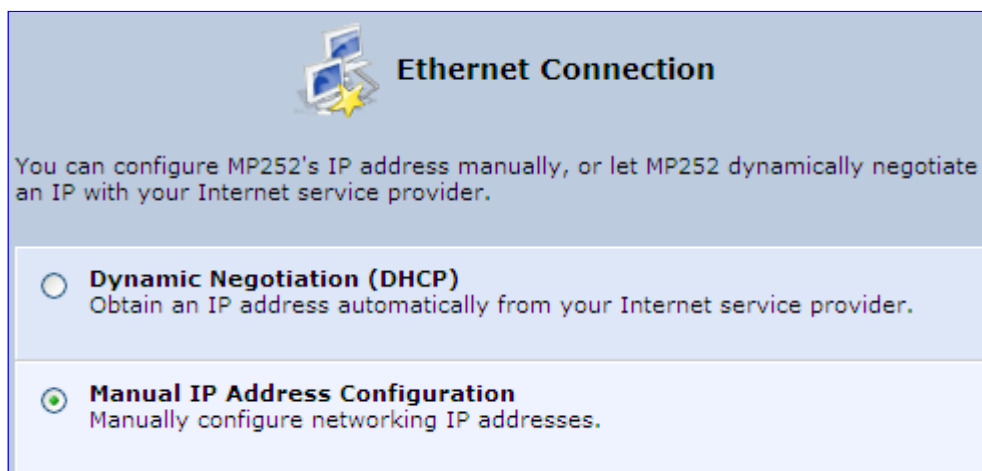
3. From the 'Underlying Device' drop-down menu, select the Underling Device, and then click **Next**.
4. Select the **Ethernet Connection** option, and then click **Next**; the following screen appears.

Figure 12-36: Internet Connection – Ethernet Connection (e.g., MP-264)



5. Select the **Ethernet Connection** option, and then click **Next**; the 'Ethernet Connection' screen appears.

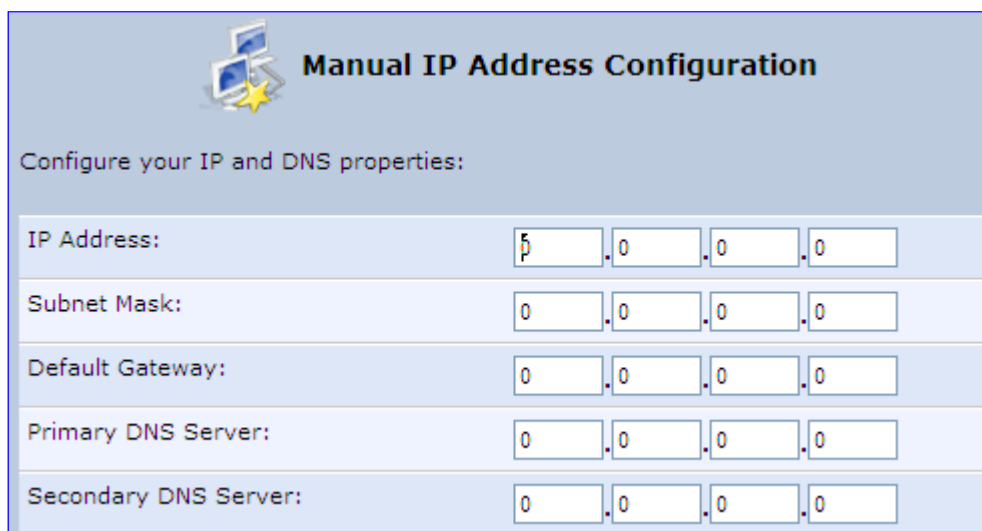
Figure 12-37: Ethernet Connection Screen



The screenshot shows the 'Ethernet Connection' window. At the top, there is a title bar with a laptop icon and the text 'Ethernet Connection'. Below the title bar, a message states: 'You can configure MP252's IP address manually, or let MP252 dynamically negotiate an IP with your Internet service provider.' There are two radio button options: 'Dynamic Negotiation (DHCP)' with the description 'Obtain an IP address automatically from your Internet service provider.' and 'Manual IP Address Configuration' with the description 'Manually configure networking IP addresses.' The 'Manual IP Address Configuration' option is selected, indicated by a filled radio button.

6. Select the **Manual IP Address Configuration** option, and then click **Next**; the screen 'Manual IP Address Configuration' opens.

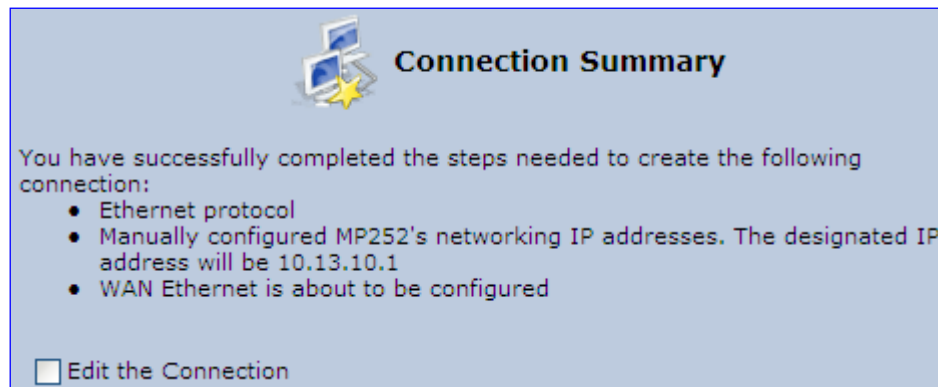
Figure 12-38: Manual IP Address Configuration Screen



The screenshot shows the 'Manual IP Address Configuration' window. At the top, there is a title bar with a laptop icon and the text 'Manual IP Address Configuration'. Below the title bar, a message states: 'Configure your IP and DNS properties:'. There are five rows of input fields, each with a label on the left and four small input boxes on the right, separated by dots. The labels are: 'IP Address:', 'Subnet Mask:', 'Default Gateway:', 'Primary DNS Server:', and 'Secondary DNS Server:'. The input boxes contain the following values: '5', '0', '0', '0' for IP Address; '0', '0', '0', '0' for Subnet Mask; '0', '0', '0', '0' for Default Gateway; '0', '0', '0', '0' for Primary DNS Server; and '0', '0', '0', '0' for Secondary DNS Server.

7. Configure the IP address and other network parameters, and then click **Next**; Select the Manual IP Address Configuration option, and then click **Next**; the 'Connection Summary' screen appears.

Figure 12-39: Manual IP Connection Summary



8. Select the 'Edit the Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
9. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.2 LAN Connection

This section describes how to configure the following the device LAN connections:

- Wireless LAN
- LAN hardware Ethernet switch

12.2.1 Wireless LAN

This section describes how to configure the device wireless network. This network is configured in the 'Network Connections' screen, which provides a connection wizard that guides you through the network configuration stages.

























Notes:

- To establish a wireless network connection between a PC and the device, you must also configure the PC for wireless connectivity (see Section 7.2 on page 71).
- You can also configure and enable the wireless LAN in the 'Quick Setup' screen.

➤ **To configure the Wireless LAN:**

1. From the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.

Figure 12-40: Network Connections Screen Displaying LAN Wireless Interface

 Network Connections		
Name	Status	Action
 LAN Bridge	Connected	 
 LAN Wireless 802.11n Access Point	Disabled	
 LAN Hardware Ethernet Switch	1 Ports Connected	
 WAN 3G USB Modem	Down	
 WAN DSL	Disabled	
 WAN ATM over DSL	Down	
 WAN PTM over DSL	Down	
 WAN Ethernet	Connected	
 Serial PPP	Waiting for Underlying Connection (WAN 3G USB Modem - Down)	 
New Connection		
<div> <div>Internet Connection Setup</div> <div>Status</div> </div>		

The 'Status' column corresponding to the wireless LAN network ('LAN Wireless 802.11n Access Point') displays whether the wireless connection is enabled or disabled.


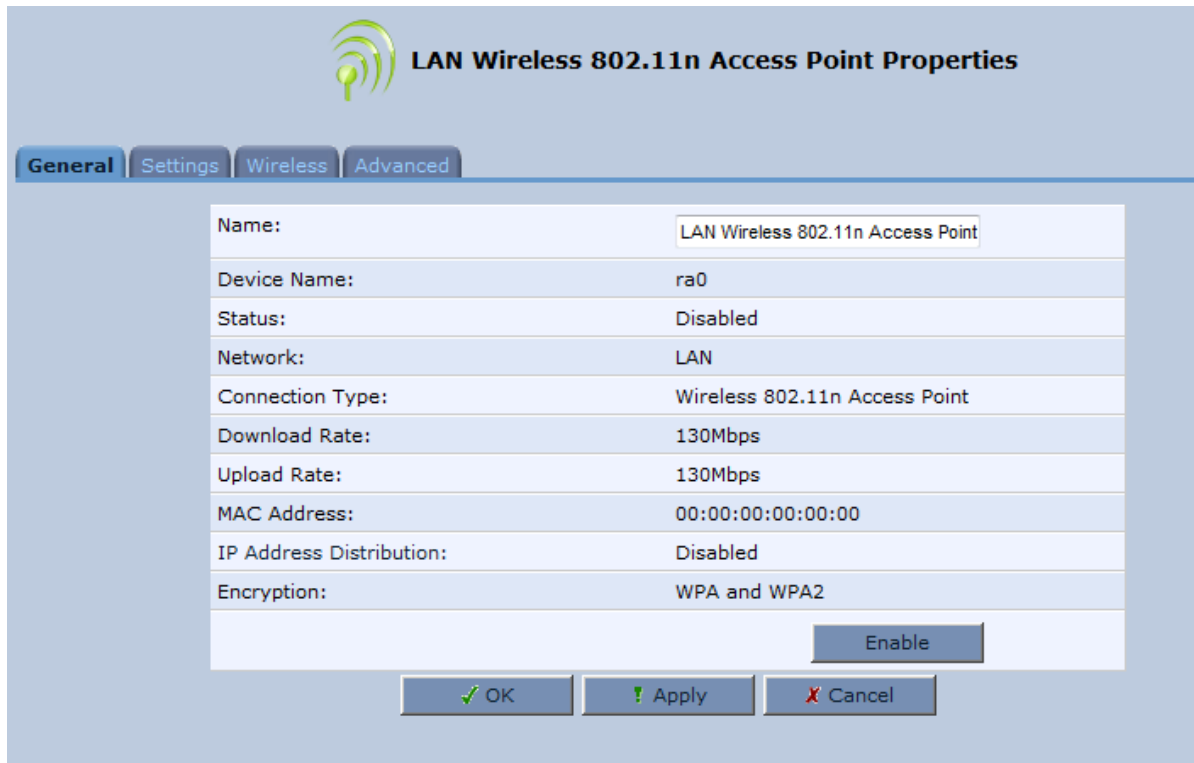
2. Click the **Edit**  icon corresponding to the 'LAN Wireless 802.11n Access Point' network name; the 'LAN Wireless 802.11n Access Point Properties' screen appears, displaying the contents of the **General** tab.

Figure 12-41: LAN Wireless 802.11n Access Point Properties (General Tab) Screen



LAN Wireless 802.11n Access Point Properties	
Name:	LAN Wireless 802.11n Access Point
Device Name:	ra0
Status:	Disabled
Network:	LAN
Connection Type:	Wireless 802.11n Access Point
Download Rate:	130Mbps
Upload Rate:	130Mbps
MAC Address:	00:00:00:00:00:00
IP Address Distribution:	Disabled
Encryption:	WPA and WPA2
<input type="button" value="Enable"/>	
<input type="button" value="OK"/> <input type="button" value="Apply"/> <input type="button" value="Cancel"/>	

3. In the 'Name' field, enter an arbitrary name for your wireless network.

The **General** tab also allows you to enable or disable the wireless connection (for more information, see Section 12.2.1.1 on page 178). In addition, it displays various statistics such as download and upload rate, and whether encryption is enabled or disabled. These parameters can be configured using the other tabs, as described in the subsequent sections.

12.2.1.1 Enabling and Disabling the Wireless Network

Once you have configured the device wireless network connection, you can enable and disable it, as required.

➤ To enable or disable the wireless network, do one of the following:

- Press the **WiFi** button located on the front panel of the device (see Section 3.1.1 on page 29)
- In the 'LAN Wireless 802.11n Access Point Properties (General Tab)' screen (see Section Figure 12-41 on page 178), click the **Enable** or **Disable** button.
- In the 'Quick Setup' screen (see Figure 8-1 on page 74), under the **Wireless** group, select the Enable Wireless check box.

12.2.1.2 Configuring Wireless Properties under the Settings Tab

The procedure below describes the configurations under the **Settings** tab of the 'LAN Wireless 802.11 Access Point Properties' screen.



Note: Since the device's wireless network is configured to operate with default settings, it is recommended to leave the settings in this screen at their default values.

➤ **To configure the wireless parameters under the Settings tab:**

1. Click the **Settings** tab.

Figure 12-42: LAN Wireless 802.11 Access Point Properties (Settings Tab) Screen

LAN Wireless 802.11n Access Point Properties	
General	Settings
Wireless	Advanced
Device Name:	ra0
Status:	Connected
Schedule:	Always
Network:	LAN
Connection Type:	Wireless 802.11n Access Point
Physical Address:	00 : 90 : 8f : 27 : 58 : e8
MTU:	Automatic 1500

2. From the 'Scheduler' drop-down list, select the Scheduler rule during which this network connection is active. To ensure that the network is always active, select 'Always'. To define Scheduler rules, see Section 5.5.1 on page 59.
3. From the 'Network' drop-down list, select the network (LAN, WAN, or DMZ) to which this new network is related.
4. In the 'Physical Address' field, define the physical address of the network card used for your network.
5. From the 'MTU' drop-down list, select the largest packet size permitted for Internet transmission (i.e., MTU / Maximum Transmission Unit). By default, it is set to 'Automatic', whereby the device selects the best MTU for your Internet connection. If you modify this field, ensure that the range is 1200 to 1500.
6. Click **OK** to save your settings.

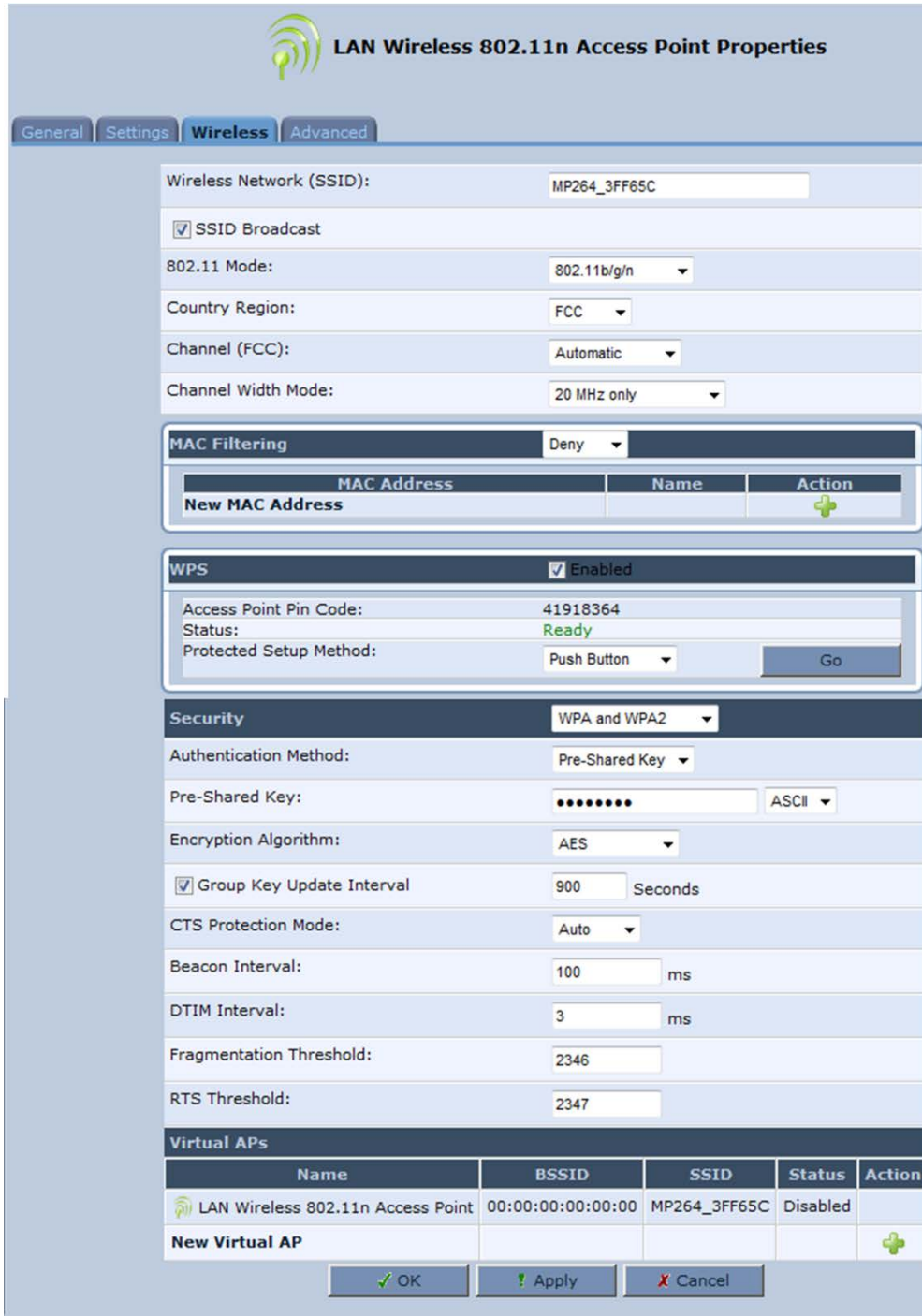
12.2.1.3 Configuring Wireless Properties under the Wireless Tab

The procedure below describes the configurations under the **Wireless** tab of the 'LAN Wireless 802.11 Access Point Properties' screen.

➤ **To configure the wireless parameters under the Wireless tab:**

1. Click the **Wireless** tab.

Figure 12-43: LAN Wireless 802.11 Access Point Properties (Wireless Tab) Screen



LAN Wireless 802.11n Access Point Properties

General Settings **Wireless** Advanced

Wireless Network (SSID): MP264_3FF65C

☒ SSID Broadcast

802.11 Mode: 802.11b/g/n

Country Region: FCC

Channel (FCC): Automatic

Channel Width Mode: 20 MHz only

MAC Filtering Deny

MAC Address	Name	Action
New MAC Address		+

WPS ☒ Enabled

Access Point Pin Code: 41918364

Status: Ready

Protected Setup Method: Push Button Go

Security WPA and WPA2

Authentication Method: Pre-Shared Key

Pre-Shared Key: ASCII

Encryption Algorithm: AES

☒ Group Key Update Interval 900 Seconds

CTS Protection Mode: Auto

Beacon Interval: 100 ms

DTIM Interval: 3 ms

Fragmentation Threshold: 2346

RTS Threshold: 2347

Virtual APs

Name	BSSID	SSID	Status	Action
LAN Wireless 802.11n Access Point	00:00:00:00:00:00	MP264_3FF65C	Disabled	+
New Virtual AP				+

OK Apply Cancel

2. Refer to the subsequent sections for a description of the parameters in this screen.

12.2.1.3.1 Wireless Network Group

This group in the **Wireless** tab screen configures the basic wireless access point settings.

Figure 12-44: Wireless Network Group in Wireless Tab Screen

Wireless Network (SSID):	MP264_3FF65C
<input checked="" type="checkbox"/> SSID Broadcast	
802.11 Mode:	802.11b/g/n
Country Region:	FCC
Channel (FCC):	Automatic
Channel Width Mode:	20 MHz only

The table below describes the parameters in this group:

Table 12-1: Wireless Tab – Basic Wireless Access Point Parameters Description

Parameter	Description
Wireless Network (SSID)	Enter the name of the wireless network. This name is needed for a wireless device to attach to your wireless network (see Section 7.2 on page 71). Note: The default wireless (Wi-Fi) network name (SSID) is "MP264" (and is unsecured).
SSID Broadcast	Select this check box to enable the SSID's broadcast. SSID broadcast is used to hide the name of the AP (SSID) from clients.
802.11 Mode	Select the wireless communication standard that is compatible with your client's wireless card: 802.11b/g Mixed, 802.11g Only, 802.11b Only, 802.11b/g/n, 802.11g/n, 802.11n Only.
Country Region	Select the Wi-Fi country region for allowing only permitted channels (frequencies) for the region. Note: This parameter determines the available channel options listed in the 'Channel' parameter.
Channel (FCC)	Select the appropriate channel to correspond with your network settings. All devices in your wireless network must broadcast on different channels to function correctly. Note: The available channels depend on the country region (configured by the 'Country Region' parameter) in which you are operating the device. For example, if you selected 'FCC' as the country region, the available channels from which you can select conform to the U.S.A. Regulatory Authority FCC (Federal Communications Commission).
Channel Width Mode	Select the available transmit data rate of the wireless network: 20 MHz only or 20/40 MHz dynamic.
Virtual APS	
Virtual APS	You can set up multiple virtual wireless LAN's on the device. Such virtual wireless LANs are referred to as "Virtual APS" (virtual access points). For a detailed description on configuring Virtual APS, see 'Virtual Access Points' on page 194.

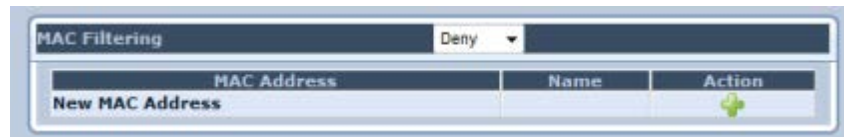
12.2.1.3.2 Configuring MAC Filtering

The procedure below describes how to filter wireless users according to their MAC addresses. You can define a list of MAC addresses and for the entire list, either allow or deny access.

➤ **To define MAC filtering:**

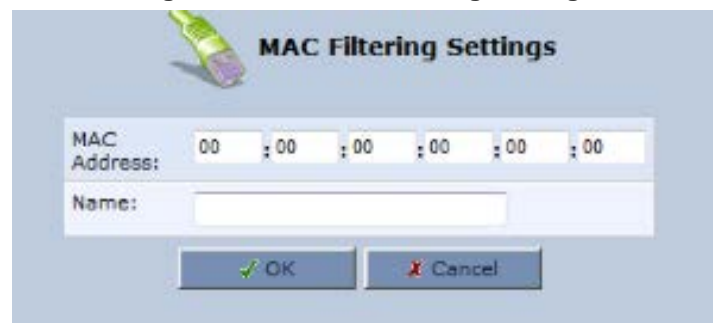
1. From the 'MAC Filtering Mode' drop-down list, select either 'Allow' or 'Deny' (or 'Disable' if you do not want use MAC filtering).

Figure 12-45: MAC Filtering



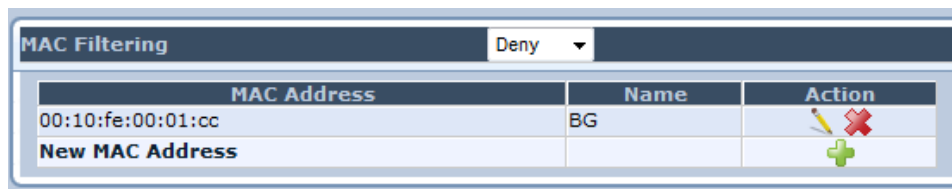
2. In the **MAC Filtering Table**, click the **New MAC Address**  icon; the 'MAC Filtering Settings' screen appears.

Figure 12-46: MAC Filtering Settings



3. In the 'MAC Address' field, enter the MAC address to be filtered.
4. In the 'Name' field, enter the descriptive name of the computer.
5. Click **OK**; the MAC address is listed in the MAC Filtering table.

Figure 12-47: MAC Address Added to MAC Filtering Table

























12.2.1.3.3 Enabling WPS

The procedure below describes how to enable WPS. WPS is a method for simplifying the security setup and management of wireless networks. This feature is disabled by default. By enabling it, you can control the setup of your wireless security, which is defined under the **Security** group (see Section 12.2.1.3.4 on page 189).

➤ **To enable WPS:**

1. From the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.

Figure 12-48: Network Connections

 Network Connections		
Name	Status	Action
 LAN Bridge	Connected	 
 LAN Wireless 802.11n Access Point	Disabled	
 LAN Hardware Ethernet Switch	1 Ports Connected	
 WAN 3G USB Modem	Down	
 WAN DSL	Disabled	
 WAN ATM over DSL	Down	
 WAN PTM over DSL	Down	
 WAN Ethernet	Connected	
 Serial PPP	Waiting for Underlying Connection (WAN 3G USB Modem - Down)	 
New Connection		
<div>Internet Connection Setup Status</div>		



2. Click the **Edit**  icon corresponding to the 'LAN Wireless 802.11n Access Point - Virtual AP Properties' page; the LAN Wireless 802.11n Access Point Properties page appears.

Figure 12-49: LAN Wireless 802.11n Access Point Properties


LAN Wireless 802.11n Access Point Properties

General
Settings
Wireless
Advanced

Wireless Network (SSID): MP264_3FF65C

☒ SSID Broadcast

802.11 Mode: 802.11b/g/n ▼

Country Region: FCC ▼

Channel (FCC): Automatic ▼

Channel Width Mode: 20 MHz only ▼

MAC Filtering
Deny ▼

MAC Address	Name	Action
New MAC Address		+

WPS
☒ Enabled


Access Point Pin Code: 41918364
Status: Ready
Protected Setup Method: Push Button ▼

Go

Security
WPA and WPA2 ▼

Authentication Method: Pre-Shared Key ▼
Pre-Shared Key: •••••••• ASCII ▼
Encryption Algorithm: AES ▼
☒ Group Key Update Interval 900 Seconds
CTS Protection Mode: Auto ▼
Beacon Interval: 100 ms
DTIM Interval: 3 ms
Fragmentation Threshold: 2346
RTS Threshold: 2347

Virtual APs

Name	BSSID	SSID	Status	Action
 LAN Wireless 802.11n Access Point	00:00:00:00:00:00	MP264_3FF65C	Disabled	
New Virtual AP				+

OK
Apply
Cancel

3. Click the **Wireless** tab; the following screen appears:

Figure 12-50: Wireless Tab – WPS

The screenshot shows the 'LAN Wireless 802.11n Access Point Properties' web interface. The 'Wireless' tab is selected. The 'WPS' section is highlighted with a red box. The 'WPS' checkbox is checked and labeled 'Enabled'. Below it, the 'Access Point Pin Code' is 41918364, the 'Status' is 'Ready', and the 'Protected Setup Method' is 'Push Button'. A 'Go' button is next to the 'Push Button' dropdown.

LAN Wireless 802.11n Access Point Properties

General Settings **Wireless** Advanced

Wireless Network (SSID): MP264_3FF65C

☒ SSID Broadcast

802.11 Mode: 802.11b/g/n

Country Region: FCC

Channel (FCC): Automatic

Channel Width Mode: 20 MHz only

MAC Filtering Deny

MAC Address	Name	Action
00:10:fe:00:01:cc	BG	
New MAC Address		

WPS ☒ Enabled

Access Point Pin Code: 41918364

Status: Ready

Protected Setup Method: Push Button

Security WPA and WPA2

Authentication Method: Pre-Shared Key

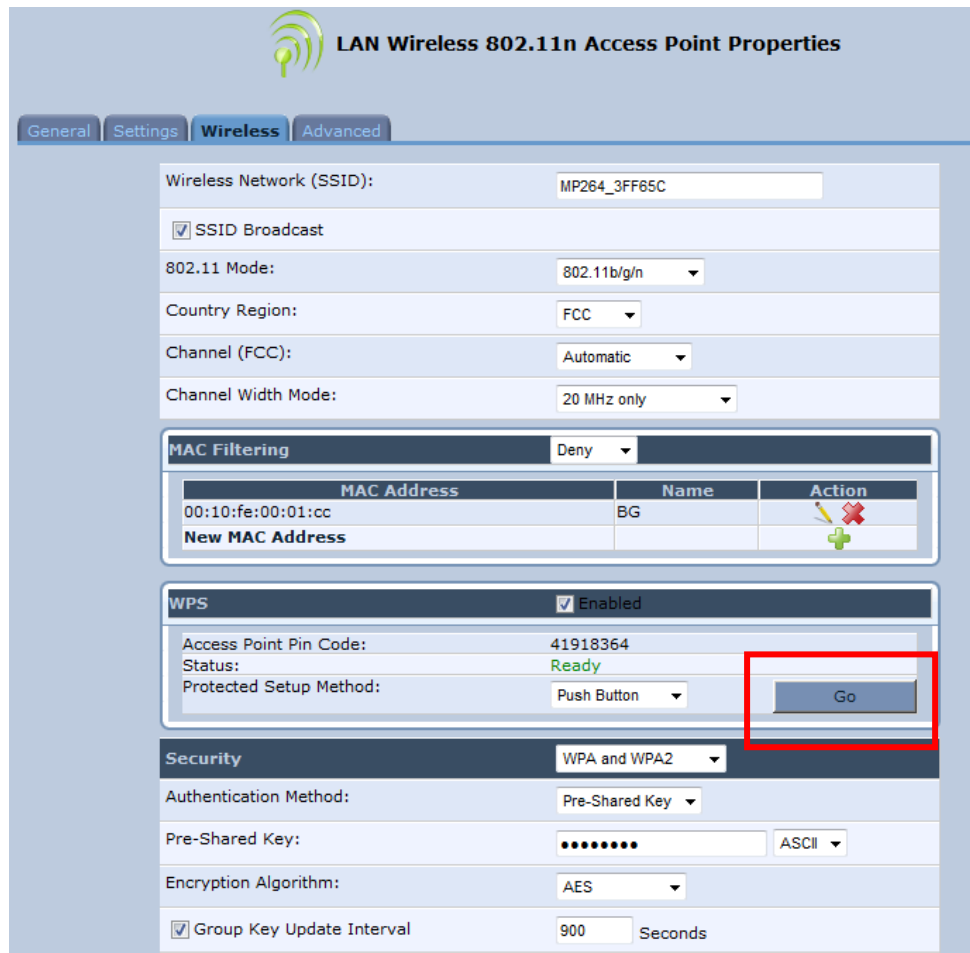
Pre-Shared Key: ASCII

Encryption Algorithm: AES

☒ Group Key Update Interval 900 Seconds

4. Select the 'WPS' check box.
5. Under the Security group, from the 'Authentication Method' drop-down list, select **Pre-Shared Key**.
6. There are three ways that a client can connect using WPS to the device's wireless network:
 - **Push Button:**
 - a. Invoke a connection to the access point from the client.
 - b. In the Web interface, from the 'Protected Setup Method' drop-down list, select **Push Button**.
 - c. Press the **WiFi** button on the device for three seconds (or click the **Go** button on the device Web interface as shown below).

Figure 12-51: Click Go Button



LAN Wireless 802.11n Access Point Properties

General Settings Wireless Advanced

Wireless Network (SSID): MP264_3FF65C

☒ SSID Broadcast




802.11 Mode: 802.11b/g/n

Country Region: FCC

Channel (FCC): Automatic

Channel Width Mode: 20 MHz only

MAC Filtering: Deny

MAC Address	Name	Action
00:10:fe:00:01:cc	BG	 
New MAC Address		

WPS ☒ Enabled

Access Point Pin Code: 41918364

Status: Ready

Protected Setup Method: Push Button

Go

Security: WPA and WPA2

Authentication Method: Pre-Shared Key

Pre-Shared Key: ASCII

Encryption Algorithm: AES

☒ Group Key Update Interval: 900 Seconds

- An "Enrollee Registration has been successfully completed" message appears in the Status field.

Figure 12-52: Registration Successfully Completed



New MAC Address 

WPS ☒ Enabled

Access Point Pin Code: 2578866

Status: Enrollee registration has been successfully completed

Protected Setup Method: Push Button

Go

Security: WPA



Note: You have 125 seconds to connect the device with the WPS client.

- **Connection to a Client by its PIN Number**
 - a. On the Web interface, from the 'Protected Setup Method' drop-down list, select **Client PIN Code**; the following screen appears:

Figure 12-53: Client Pin Code

The screenshot shows the 'LAN Wireless 802.11n Access Point Properties' web interface. The 'Wireless' tab is selected. The 'WPS' section is highlighted with a red box. The 'Protected Setup Method' is set to 'Client Pin Code'. The 'Go' button is visible next to the 'Client Pin Code' field.

MAC Address	Name	Action
00:10:fe:00:01:cc	BG	
New MAC Address		

WPS	Enabled
Access Point Pin Code:	41918364
Status:	Ready
Protected Setup Method:	Client Pin Code
Client Pin Code:	

Go

- b. Enter the PIN generated by the client into "Client Pin Code" field and then click **Go**.
- c. An "Enrollee Registration has been successfully completed" message appears in the Status field.

- **Connection from a Client Using an Access Point PIN**
 - a. From the client, invoke a connection to the access point using the Access Point PIN.
 - b. From the Web interface, enter the **Access Point Pin Code** from the screen below, into the **Access Point PIN** field on the client.

Figure 12-54: WPS Group in Wireless Tab Screen

WPS	<input checked="" type="checkbox"/> Enabled
Access Point Pin Code:	26179247

12.2.1.3.4 Configuring Wireless Security

The procedure below describes how to configure wireless security.



Note: WPS supports only the WPA security protocol. Therefore, when enabled (see Section 12.2.1.3.3 on page 183), only the WPA protocols are available (in the 'Security' drop-down list described below).

➤ **To define wireless security:**

1. From the 'Security' drop-down list, select the type of security protocol; the screen refreshes, displaying parameters relevant to the selected protocol:
 - **None:** disables security on your wireless connection.
 - **WPA:** WPA (Wi-Fi Protected Access) is a data encryption method for 802.11 wireless LANs.
 - **WPA2:** WPA2 (Wi-Fi Protected Access 2) provides stronger data protection and network access control. It provides enterprise and consumer Wi-Fi users with a high level of assurance that only authorized users can access their wireless networks.

Figure 12-55: Configuring WPA Security

Security	WPA ▼	
Authentication Method:	Pre-Shared Key ▼	
Pre-Shared Key:	<input type="text"/>	ASCII ▼
Encryption Algorithm:	AES ▼	
<input checked="" type="checkbox"/> Group Key Update Interval	<input type="text" value="900"/>	Seconds

Configure the following fields:

- a. **Authentication Method:** select the required authentication method ('Pre-Shared Key' and '802.1x').
- b. **Pre-Shared Key:** this field appears only if you selected 'Pre-Shared Key' in the 'Authentication Method' field. Enter your encryption key (using either an ASCII or a Hex value), by selecting the value type in the drop-down list provided.
- c. **Encryption Algorithm:** select 'TKIP' (Temporal Key Integrity Protocol), 'AES' (Advanced Encryption Standard) or both ('TKIP and AES') for the encryption algorithm.
- d. **Group Key Update Interval:** select this check box, and then enter the time interval in seconds for updating a group key.

- **WPA2:** WPA2 is an enhanced version of WPA, and defines the 802.11i protocol.

Figure 12-56: Configuring WPA2 Security

Security		WPA2
Authentication Method:		802.1X
<input checked="" type="checkbox"/> Pre Authentication		
PMK Cache Period:		10 Minutes
Encryption Algorithm:		AES
<input checked="" type="checkbox"/> Group Key Update Interval		900 Seconds

- Authentication Method:** select the authentication method ('Pre-Shared Key' and '802.1x').
 - Pre-Shared Key:** this field appears only if you selected this authentication method. Enter your encryption key in either an ASCII or a Hex value (by selecting the value type in the drop-down list provided).
 - Pre Authentication:** This field appears only when selecting the 802.1x authentication method. Select this option to enable the device to accept RADIUS authentication requests from computers connected to other access points. This enables roaming from one wireless network to another.
 - PMK Cache Period:** This field appears only when selecting the 802.1x authentication method. This field defines the number of minutes before deletion (and renewal) of the Pairwise Master Key used for authentication.
 - Encryption Algorithm:** encryption algorithm for WPA2 is the Advanced Encryption Standard (AES).
 - Group Key Update Interval:** Defines the time interval in seconds for updating a group key.
- **WPA and WPA2:** WPA and WPA2 is a mixed data encryption method. For a description of these fields, see WPA and WPA2 above.
 - **Non-802.1x WEP:** data encryption method utilizing a statically defined key for wireless clients that do not use 802.1x for authentication, but use WEP for encryption. You may define up to four keys, but use only one at a time.

Figure 12-57: Configuring Non-WEP Security

Security		Non-802.1X WEP	
<input type="checkbox"/> Inter Client Privacy			
WEP Keys			
Active	Encryption Key	Entry Method	Key Length
<input checked="" type="radio"/> 1		ASCII	40 bit
<input type="radio"/> 2		ASCII	40 bit
<input type="radio"/> 3		ASCII	40 bit
<input type="radio"/> 4		ASCII	40 bit

- a. **Inter Client Privacy:** select this check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.
- b. **WEP Keys table:**
 - ✓ **Active:** select the encryption key to be activated.
 - ✓ **Encryption Key:** enter the encryption key until the entire field is filled. The key cannot be shorter than the field's length.
 - ✓ **Entry Method:** select the character type for the key: ASCII or HEX.
 - ✓ **Key Length:** select the key length in bits: 40 or 104 bits.



Note: The encryption key must be defined in the wireless Windows client as well. This is done in the Connection Properties Configuration window (your encryption key is entered in both the 'Network key' and 'Confirm network key' fields, as shown in the figure below).

Figure 12-58: Configuring Encryption Key in Windows Wireless Client

The screenshot shows the 'john_smith properties' dialog box with the 'Authentication' tab selected. The 'Network name (SSID)' field contains 'john_smith'. Below this, the 'Wireless network key' section is expanded, showing 'This network requires a key for the following:'. The 'Network Authentication' dropdown is set to 'Shared', and the 'Data encryption' dropdown is set to 'WEP'. The 'Network key' and 'Confirm network key' fields are both filled with dots, indicating they are masked. The 'Key index (advanced)' dropdown is set to '1'. There is an unchecked checkbox labeled 'The key is provided for me automatically'. At the bottom of the dialog, there is an unchecked checkbox labeled 'This is a computer-to-computer (ad hoc) network; wireless access points are not used'. The 'OK' and 'Cancel' buttons are located at the bottom right of the dialog.

- **Web Authentication:** wireless clients attempting to connect to the wireless connection (Internet) receive a Web Authentication screen, requiring the clients to authenticate themselves before they are able to use the connection. To add a Web client user, click the **Click here to add a user** link. The device keeps record of authenticated clients. To clear this list, click the **Clean Mac List** button. Clients need to re-authenticate themselves to use the wireless connection.

Figure 12-59: Configuring Authentication Only Security

Security	Web Authentication ▼
Authentication Method:	Web Authentication
Click here to add a user	
Clean Mac List	

12.2.1.3.5 Configuring Transmission Properties

The procedure below describes how to configure wireless transmission properties.

➤ **To configure the transmission properties:**

1. Access the **Wireless** tab screen.

Figure 12-60: Transmission Parameters in Wireless Tab Screen



CTS Protection Mode:	Auto	▼
Beacon Interval:	100	ms
DTIM Interval:	1	ms
Fragmentation Threshold:	2346	
RTS Threshold:	2347	

2. From the 'CTS Protection Mode' drop-down list, select whether you want to enable or disable this feature (Select 'Always' to enable CTS or 'Auto' to have the device automatically decide whether or not to use this feature). CTS Protection Mode boosts your device's ability to intercept 802.11g and 802.11b transmissions. Conversely, CTS Protection Mode decreases performance. Leave this feature disabled unless you encounter severe communication difficulties between the device and 802.11g products.
3. In the 'Beacon Interval' field, enter how often the beacon packet is sent. A beacon is a packet broadcast by the device to synchronize the wireless network.
4. In the 'DTIM Interval' field, enter the Delivery Traffic Indication Message (DTIM) countdown value that informs wireless clients of the next opportunity to receive multicast and broadcast messages. This value ranges between 1 and 16384.
5. In the 'Fragmentation Threshold' field, enter the packet size threshold above which packets are fragmented into multiple packets. Try to increase the fragmentation threshold if you encounter high packet error rates. Do not set the threshold too low, since this can result in reduced networking performance.
6. In the 'RTS Threshold' field, enter the packet threshold size below which the Request to Send (RTS) / Clear to Send (CTS) mechanism are not active. This sends RTS packets to the wireless client to negotiate the dispatching of data. The wireless client responds with a CTS packet, signaling that transmission can commence. If you encounter inconsistent data flow, try a slight reduction in the RTS threshold size.

12.2.1.3.6 Adding Virtual Access Points

You can set up multiple virtual wireless LAN's on the device, limited. Such virtual wireless LANs are referred to as "Virtual APs" (virtual access points). In the **Wireless** tab's screen, under the section 'Virtual APs' section, the device's physical wireless access point is displayed first, and on top of which virtual connections may be created.






Figure 12-61: Virtual APs Table


Virtual APs				
Name	BSSID	SSID	Status	Action
 LAN Wireless 802.11n Access Point	00:90:8f:27:5b:00	guyy_252	Connected	
New Virtual AP				

➤ **To create a virtual connection:**

1. In the **Wireless** tab's screen, under the section 'Virtual APs' section, click the **New Virtual AP** link; the screen refreshes, displaying the new virtual connection.

Figure 12-62: New Virtual AP

Virtual APs				
Name	BSSID	SSID	Status	Action
 LAN Wireless 802.11n Access Point	00:90:8f:27:5b:00	guyy_252	Connected	
 LAN Wireless 802.11n Access Point - Virtual AP	00:90:8f:27:5b:01	guyy_252	Connected	 
New Virtual AP				

The new virtual connection is also added to the list of connections in the 'Network Connections' screen (**Network Connections** menu), and is configurable like any other connection (by clicking its corresponding **Edit**  icon).

A useful implementation of Virtual AP's is to define a virtual connection with a different SSID value to dedicate it for guest access. Through this connection, guests are able to access the WAN, but they are denied access to other wireless LANs provided by the device. To do so, perform the following:

2. Set a firewall rule that blocks access to all other device LANs (**Security** menu > **Advanced Filtering** tab).

Figure 12-63: Firewall Blocking Access to All Other LANs

 **Security**

General Access Control Port Forwarding DMZ Host Port Triggering Website Restrictions NAT Connections **Advanced Filtering** Log

Input Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
Initial Rules						New Entry
LAN Bridge Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
WAN ETHoA Rules						New Entry
WAN PPPoE Rules						New Entry
LAN Wireless 802.11n Access Point - Virtual AP Rules						
<input checked="" type="checkbox"/> 0	Any	192.168.1.0		Drop	Active	 
New Entry						
Final Rules						New Entry


3. In the **Wireless** tab's screen, click the **Edit**  icon corresponding to the Virtual AP to open the virtual connection's 'LAN Wireless 802.11n Access Point - Virtual AP Properties' screen:
 - a. In the 'Internet Protocol' section under the 'Settings' sub-tab, enter an IP address for the connection by selecting 'Use the Following IP Address'.
 - b. In the 'IP Address Distribution' section, select 'DHCP Server' and enter the IP range from which IP addresses will be granted to wireless guests.
 - c. Click **OK**.

Figure 12-64: Example Virtual AP



LAN Wireless 802.11n Access Point - Virtual AP Properties

General Settings Routing Wireless Advanced

Device Name: ra8

Status: Connected

Schedule: Always

Network: LAN

Connection Type: Wireless 802.11n Access Point

Physical Address: 00:90:8f:27:5b:01

MTU: Automatic 1500

Underlying Connection: LAN Wireless 802.11n Access Point

Internet Protocol Use the Following IP Address

IP Address: 192 . 168 . 5 . 1

Subnet Mask: 255 . 255 . 255 . 0

DNS Server No DNS Server

IP Address Distribution DHCP Server

Start IP Address: 192 . 168 . 5 . 2

End IP Address: 192 . 168 . 5 . 20

Subnet Mask: 255 . 255 . 255 . 0

Lease Time in Minutes: 60

☒ Provide Host Name If Not Specified by Client

After performing this procedure, you have secured all of your wireless connections. A guest is only able to connect to the "Guests" wireless LAN, from which only the WAN access is granted.

12.2.1.4 Advanced Tab

The **Advanced** tab allows you to enable your firewall on your wireless network connection as well as define alias names.

Figure 12-65: Wireless Advanced Tab

The screenshot shows the 'LAN Wireless 802.11n Access Point Properties' dialog box with the 'Advanced' tab selected. The tab bar includes 'General', 'Settings', 'Wireless', and 'Advanced'. The main content area has three sections: 'Internet Connection Firewall' with an 'Enabled' checkbox, 'Internet Connection Fastpath' with a checked 'Enabled' checkbox, and 'Additional IP Addresses' which is a table with columns 'IP Address', 'Subnet Mask', and 'Action'. The table has one row labeled 'New IP Address' with a green plus icon in the 'Action' column.

LAN Wireless 802.11n Access Point Properties		
General Settings		
Internet Connection Firewall <input type="checkbox"/> Enabled		
Internet Connection Fastpath <input checked="" type="checkbox"/> Enabled		
Additional IP Addresses		
IP Address	Subnet Mask	Action
New IP Address		

- **Internet Connection Firewall:** Your device's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box.
- **Internet Connection Fastpath:** Select this check box to utilize the Fastpath algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN
- **Additional IP Addresses:** You can add alias names (additional IP addresses) to the device by clicking the **New IP Address** link. This enables you to access the device using these aliases in addition to the IP address (e.g., 192.168.2.1) and <http://mp264.home>.















12.2.2 LAN Hardware Ethernet Switch

The LAN Hardware Ethernet Switch interface represents the physical ports on the device.

➤ **To configure the LAN hardware Ethernet switch:**


1. From the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.

Figure 12-66: Network Connections Screen

Name	Status	Action
 WAN Ethernet	Connected	
 LAN Bridge	Connected	 
 LAN Hardware Ethernet Switch	3 Ports Connected	
 LAN Wireless 802.11n Access Point	Connected	
 WAN DSL	Up	
 LAN Ethernet	Connected	
New Connection		

1. Click the **LAN Hardware Ethernet Switch** link; the **LAN Hardware Ethernet Switch Properties** screen appears:

Figure 12-67: LAN Hardware Ethernet Switch Screen


LAN Hardware Ethernet Switch Properties

General Settings Switch Advanced

Name:

LAN Hardware Ethernet Switch

Device Name:

eth0

Status:

1 Ports Connected

Network:

LAN

Connection Type:

Hardware Ethernet Switch

Download Rate:

100 Mbps

Upload Rate:

100 Mbps

MAC Address:

00:90:8f:1a:73:63

IP Address Distribution:

Disabled

Received Packets:

246235

Sent Packets:

12972

Time Span:

21:07:07

Disable

12.2.2.1 General Tab

- The **General** tab allows you to assign a name to this connection as well as disable or enable the connection, by clicking the **Enable** or **Disable** buttons respectively.

12.2.2.2 Settings Tab

The **Settings** tab screen is displayed below:

Figure 12-68: LAN Hardware Ethernet Switch Screen – Settings Tab

The screenshot shows the 'LAN Hardware Ethernet Switch Properties' dialog box with the 'Settings' tab selected. The dialog has four tabs: 'General', 'Settings', 'Switch', and 'Advanced'. The 'Settings' tab contains the following fields and controls:

Device Name:	eth0
Status:	1 Ports Connected
Schedule:	Always ▼
Network:	LAN ▼
Connection Type:	Hardware Ethernet Switch
Physical Address:	50 : 90 : 8f : 3f : f6 : 5c
MTU:	Automatic ▼ 1500

At the bottom of the dialog are three buttons: 'OK' (with a green checkmark), 'Apply' (with a green exclamation mark), and 'Cancel' (with a red X).

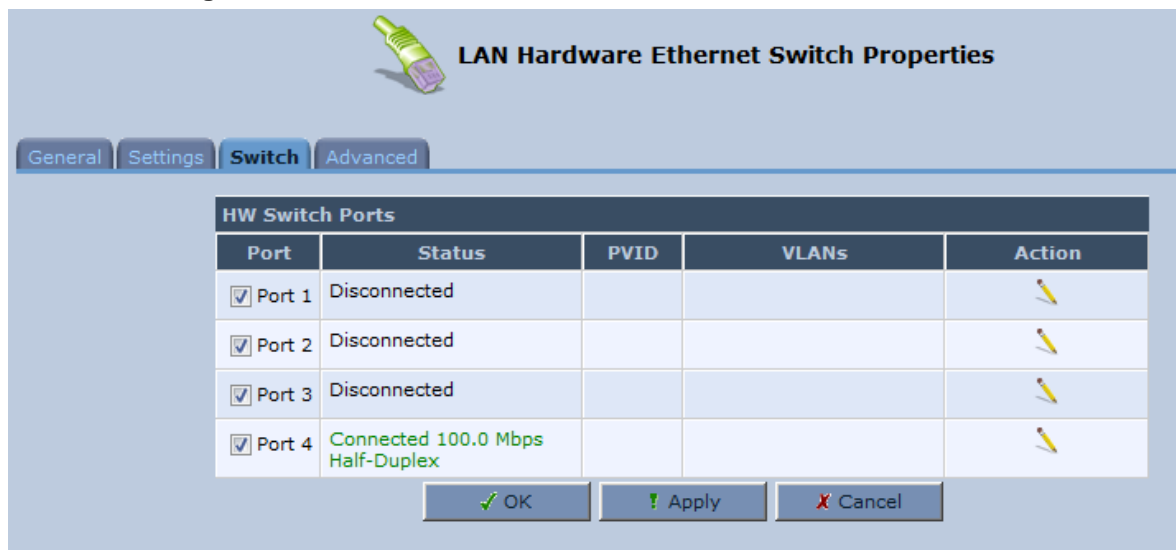
The **Settings** tab provides you with the following parameters

- **Schedule:** By default, the connection is always active. However, you can configure scheduler rules to define time segments during which the connection is active. Once a scheduler rule(s) is defined, the drop-down list allows you to choose between the available rules.
- **Network:** Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection.
- **Physical Address:** The physical address of the network card used for your network. Some cards allow you to change this address.
- **MTU:** Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

12.2.2.3 Switch Tab

The **Switch** tab screen is displayed below:

Figure 12-69: LAN Hardware Ethernet Switch Screen – Switch Tab

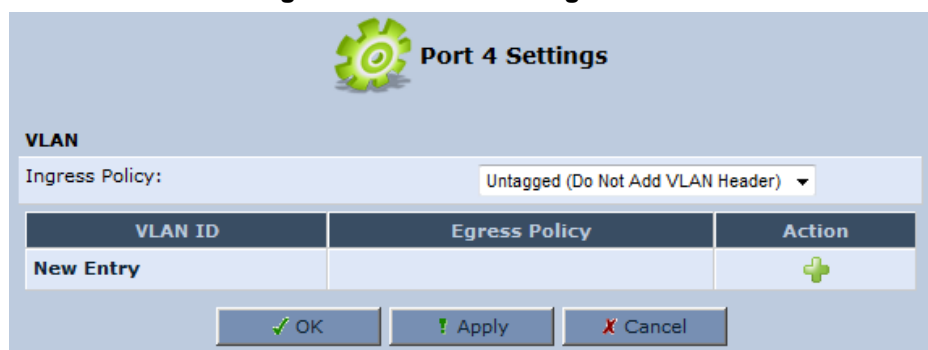


The **Switch** tab screen displays the hardware switch ports properties. The switch ports are physical sockets on the device to which different cables connect. The table in this screen consists of a list of all available ports, their status, and the VLANs of which they are members. Untagged packets (packets without a VLAN tag) that arrive at a port are tagged with the VLAN number that appears under the Port VLAN Identifier ('PVID') column.

➤ **To edit the configuration of a port:**

1. Click a connected port's **Edit**  icon, the Port Settings screen appears.

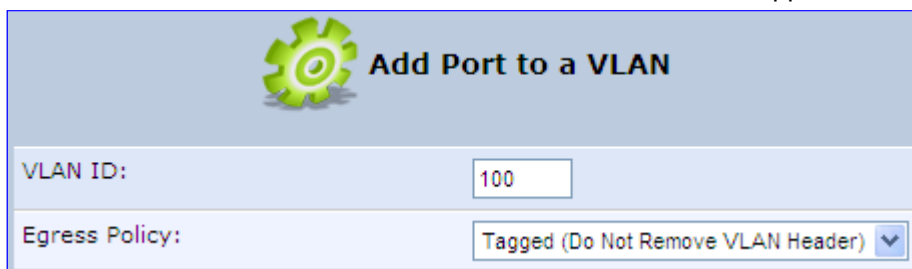
Figure 12-70: Port Settings Screen



2. Ingress (incoming packets):
 - a. From the 'Ingress Policy' drop-down list, select whether or not to tag incoming packets with the port's VLAN header.
 - b. If the 'Tagged (Add VLAN Header)' option is selected, in the 'Default VLAN ID' field, enter the port's VLAN identifier.

3. Egress (outgoing packets):

- a. Click the **New**  icon; the Add Port to a VLAN screen appears.



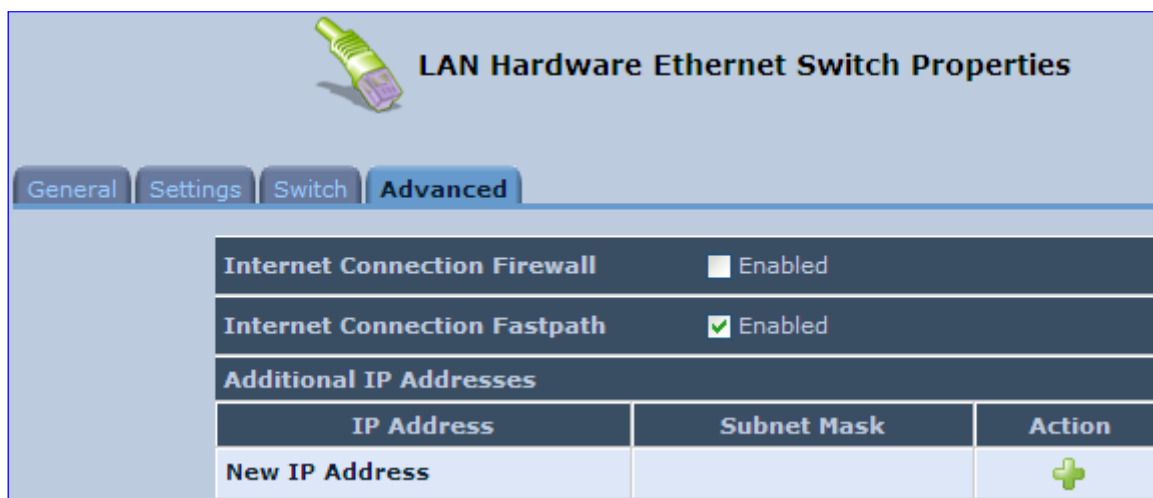
The 'Add Port to a VLAN' screen features a green gear icon and the title 'Add Port to a VLAN'. It contains two input fields: 'VLAN ID' with the value '100' and 'Egress Policy' with the value 'Tagged (Do Not Remove VLAN Header)' and a dropdown arrow.

- b. In the 'VLAN ID' field, enter the VLAN ID for this port.
 c. From the 'Egress Policy' drop-down list, select whether or not to remove the VLAN tag from outgoing packets.

12.2.2.4 Advanced Tab


The **Advanced** tab screen is displayed below:

Figure 12-71: LAN Hardware Ethernet Switch Screen – Advanced Tab



The 'LAN Hardware Ethernet Switch Properties' screen has a green Ethernet cable icon and the title 'LAN Hardware Ethernet Switch Properties'. It features four tabs: 'General', 'Settings', 'Switch', and 'Advanced' (which is selected). The 'Advanced' tab contains the following settings:


- Internet Connection Firewall:** ☐ Enabled
- Internet Connection Fastpath:** ☒ Enabled
- Additional IP Addresses:**

IP Address	Subnet Mask	Action
New IP Address		

- **Internet Connection Firewall:** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box.
- **Internet Connection Fastpath:** Select this check box to utilize the Fastpath algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN. By default, this feature is enabled.
- **Additional IP Addresses:** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the IP address (e.g., 192.168.2.1) and the <http://mp264.home>.

12.3 Editing Network Connections and Advanced Configuration

You can edit created network connections listed in the 'Network Connections' screen. Editing network connections also allows you to perform additional configuration which is unavailable when first creating the network connection.

As many of the editing screens are similar between the different network connections, this section only provides a general description of the screens provided when the connection's **Edit**  icon is clicked.

12.3.1 General Tab

The **General** tab displays mainly read-only properties of the connection.

The main actions that can be done in this tab screen include the following:

- Modifying the connection name – in the 'Name' field
- Enabling and disabling the connection, by clicking the **Enable** or **Disable** button respectively

Below shows an example of a **General** tab screen, displaying the 'Name' field and the **Disable** button.

Figure 12-72: Editing Connection - General Tab (For Example, WAN Ethernet)



The screenshot shows the 'WAN Ethernet Properties' window with the 'General' tab selected. The window has a title bar with a network icon and the title 'WAN Ethernet Properties'. Below the title bar are four tabs: 'General', 'Settings', 'Routing', and 'Advanced'. The 'General' tab is active and displays a list of properties for the 'WAN Ethernet' connection. The properties are as follows:

Name:	WAN Ethernet
Device Name:	eth1
Status:	Connected
Network:	WAN
Underlying Device:	LAN Hardware Ethernet Switch
Connection Type:	Ethernet
Download Rate:	100.0 Mbps
Upload Rate:	100.0 Mbps
MAC Address:	00:90:8f:27:f2:44
IP Address:	10.13.22.32
Subnet Mask:	255.255.0.0
Default Gateway:	10.13.0.1
DNS Server:	10.1.1.11 10.1.1.10
IP Address Distribution:	Disabled
Received Packets:	13710
Sent Packets:	1167
Time Span:	0:40:40

At the bottom right of the window is a 'Disable' button.

12.3.2 Settings Tab

The top part of the Settings tab screen displays general communication parameters. It is recommended not to change the default values in this screen unless you are familiar with the networking concepts they represent. Since your device is configured to operate with the default values, no parameter modification is necessary.

Figure 12-73: Editing Connection - Settings Tab (For Example, WAN Ethernet)



The screenshot shows the 'WAN Ethernet Properties' window with the 'Settings' tab selected. The window has four tabs: 'General', 'Settings', 'Routing', and 'Advanced'. The 'Settings' tab contains the following configuration options:

- Device Name:** eth1
- Status:** Connected
- Schedule:** Always (dropdown menu)
- Network:** WAN (dropdown menu)
- Connection Type:** Ethernet
- Physical Address:** 50 : 90 : 8f : 27 : 58 : e4
- MTU:** Automatic (dropdown menu) 1500
- Underlying Connection:** LAN Hardware Ethernet Switch
- Internet Protocol:** Obtain an IP Address Automatically (dropdown menu)
- ☐ Override Subnet Mask
- DHCP Lease:** Renew (button) Release (button)
- Expires In:** 42980 minutes
- DNS Server:** Obtain DNS Server Address Automatically (dropdown menu)
- IP Address Distribution:** Disabled (dropdown menu)

The Settings tab screen allows you to configure the following:

Table 12-2: Settings Tab - Parameter Descriptions

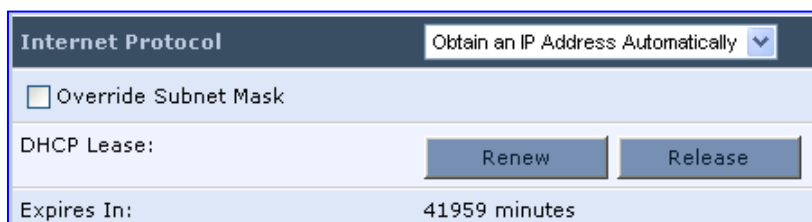
Parameter	Description
Schedule	You can select a Scheduler rule that defines time segments during which the connection is active. To configure scheduler rules, see Section 5.5.1 on page 59.
Network	Select whether the connection relates to a LAN, WAN, or DMZ connection. Every network connection can be configured as one of these types. This provides flexibility and increased functionality. For example, you may define that a LAN Ethernet connection on the device operates as a WAN network. This means that all hosts in this LAN will be referred to as WAN computers, both by computers outside the device and by the device itself. WAN and firewall rules may be applied, such as on any other WAN network. Another example, is that a network connection can be defined as a DMZ (Demilitarized) network. Although the network is physically inside the device, it will function as an unsecured, independent network, for which the device merely acts as a router.
Physical Address	The physical address of the network card used for your network.
MTU	Maximum Transmission Unit (MTU) species the largest packet size permitted for Internet transmission. In the default setting, 'Automatic', the device selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you change to 'Manual', you can enter the largest packet size, you should leave this value in the 1200 to 1500 range.
Internet Protocol	For a description, see Section 12.3.2.1.

12.3.2.1 Internet Protocol Settings

The 'Internet Protocol' group defines the Internet Protocol options. Select one of the following Internet Protocol options from the 'Internet Protocol' drop-down list:

- **No IP Address**
- **Obtain an IP Address Automatically:** Your WAN connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address.

Figure 12-74: Automatically Obtaining an IP Address



The server that assigns the device with an IP address also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' check box and specifying your own mask instead.

You can click the **Release** button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the **Renew** button to renew the leased IP address.

For defining DNS and DHCP servers, see sections 12.3.2.1.1 and 12.3.2.1.2 respectively.

- **Use the Following IP Address:** Your WAN connection can be configured using a permanent (static) IP address. Your service provider should provide you with this IP address, subnet mask and the default MP-264 IP address.

Internet Protocol		Use the Following IP Address
IP Address:	0	0
Subnet Mask:	0	0
Default Gateway:	0	0

For defining DNS and DHCP servers, see sections 12.3.2.1.1 and 12.3.2.1.2 respectively.

12.3.2.1.1 DNS Server

Domain Name System (DNS) is the method by which websites or domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP.

From the 'DNS Server' drop-down list, you can select one of the following methods:

- **Obtain DNS Server Address Automatically:** the connection automatically obtains a DNS server address.
- **Use the Following DNS Server Addresses:** manually configure DNS server - specify up to two different DNS server addresses - one primary, the other secondary:

Figure 12-75: Manually Defining DNS Server

DNS Server		Use the Following DNS Server Addresses
Primary DNS Server:	0	0
Secondary DNS Server:	0	0

- **No DNS Server:** select this if there is no DNS server.

12.3.2.1.2 IP Address Distribution

The 'IP Address Distribution' section allows you to configure the device's Dynamic Host Configuration Protocol (DHCP) server parameters. The DHCP automatically assigns IP addresses to network PCs. If you enable this feature, make sure that you also configure your network PCs as DHCP clients.

Select one of the following options from the 'IP Address Distribution' drop-down list:


- **Disabled:** Select this option to statically assign IP addresses to your network computers.
- **DHCP Server:** Enables DHCP server:

Figure 12-76: IP Address Distribution - DHCP Server

IP Address Distribution		DHCP Server
Start IP Address:	<input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/>	
End IP Address:	<input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/>	
Subnet Mask:	<input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/>	
Lease Time in Minutes:	<input type="text" value="0"/>	
<input type="checkbox"/> Provide Host Name If Not Specified by Client		


- **Start IP Address:** The first IP address that may be assigned to a LAN host. Since the device's default IP address is 192.168.2.1, this address must be 192.168.2.2 or greater.
 - **End IP Address:** The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.
 - **Subnet Mask:** A mask used to determine to what subnet an IP address belongs.
 - **Lease Time In Minutes:** Each device is assigned an IP address by the DHCP server for this amount of time when it connects to the network. When the lease expires, the server determines if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use become available for other computers on the network.
 - **Provide Host Name If Not Specified by Client:** If the DHCP client does not have a host name, the device automatically assigns one for him
- **DHCP Relay:** The device can act as a DHCP relay in case you would like to dynamically assign IP addresses from a DHCP server other than device's DHCP server. Note that when selecting this option, you must also change the device's WAN to work in routing mode.

Figure 12-77: IP Address Distribution - DHCP Relay

IP Address Distribution		DHCP Relay
Address	Action	
<u>New IP Address</u>		

1. Click the **New**  icon; the 'DHCP Relay Server Address' screen appears:

Figure 12-78: DHCP Relay Server Address



DHCP Relay Server Address

IP Address:

2. Specify the IP address of the DHCP server, and then click **OK** to save the settings.

12.3.3 Routing Tab

You can choose to setup your device to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Figure 12-79: Editing Connection - Routing Tab (For Example, WAN Ethernet)

WAN Ethernet Properties

General Settings **Routing** Advanced

Routing Mode: NAPT

Device Metric: 3

☒ Default Route

☐ Multicast - IGMP Proxy Default

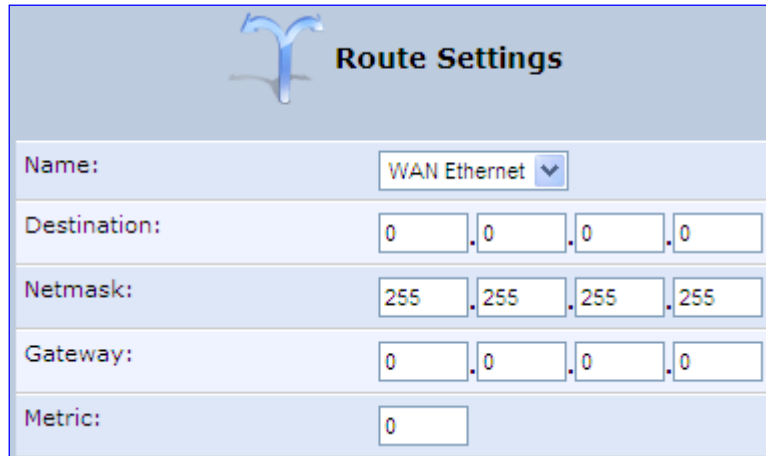
Routing Table

Name	Destination	Gateway	Netmask	Metric	Status	Action
New Route						

Table 12-3: Routing Parameters

Parameter	Description	
Routing Mode	Select one of the following Routing modes:	
	Route	Use route mode if you want your device to function as a router between two networks.
	NAPT	Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.
Device Metric	The device metric is a value used by the device to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.	
Default Route	Select this check box to define this device as a the default route.	
Multicast - IGMP Proxy Default	IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups.	
Routing Table	Allows you to add or modify routes when this device is active. Click the New icon to add a route (as shown in the figure below) or edit existing routes.	

Figure 12-80: Route Settings Screen



The screenshot shows the 'Route Settings' screen. At the top, there is a blue icon of a Y-junction and the title 'Route Settings'. Below this, there are five rows of input fields:

- Name:** A dropdown menu with 'WAN Ethernet' selected.
- Destination:** Four input boxes containing '0', '0', '0', and '0' separated by dots.
- Netmask:** Four input boxes containing '255', '255', '255', and '255' separated by dots.
- Gateway:** Four input boxes containing '0', '0', '0', and '0' separated by dots.
- Metric:** A single input box containing '0'.

- **Name:** Select the network device.
- **Destination:** destination host, subnet address, network address, or default route. The destination for a default route is 0.0.0.0.
- **Netmask:** This is used in conjunction with the destination to determine when a route is used.
- **Gateway:** Enter the device's IP address.
- **Metric:** A measurement of the preference of a route. Typically, the lowest metric is the most preferred route. If multiple routes exist to a given destination network, the route with the lowest metric is used.

12.3.4 Wireless Tab

For a description of the **Wireless** tab, see Section 12.2.1.3 on page 180.



Note: This tab is applicable only to LAN Wireless connections.

12.3.5 Switch Tab

For a description of the **Switch** tab, see Section 12.2.2.3 on page 200.



Note: This tab is applicable only to LAN Hardware Ethernet Switch connections.

12.3.6 Bridging Tab

For a description of the **Bridging** tab, see Section 12.5.1 on page 223.



Note: This tab is applicable only to LAN-WAN Bridging connections.

12.3.7 PPP Tab

The **PPT** tab displays the PPPoE settings.



Note: This tab is applicable only to PPP connections.

Figure 12-81: Editing Connection - PPP Tab

The screenshot shows the 'WAN PPPoE Properties' dialog box with the 'PPP' tab selected. The dialog has a title bar with a green Ethernet cable icon and the text 'WAN PPPoE Properties'. Below the title bar are five tabs: 'General', 'Settings', 'Routing', 'PPP' (selected), and 'Advanced'. The main content area is divided into several sections:

- Service Name:** A text box with the placeholder '(should be filled only if specified by provider):'.
- On Demand:** A checkbox labeled '(will attempt to connect only when packets are sent)'.
- Time Between Reconnect Attempts:** A numeric input box set to '30' followed by the text 'Seconds'.
- PPP Authentication:** A section header followed by:
 - Login User Name (case sensitive):** A text box containing 'SueD'.
 - Login Password:** A text box filled with dots.
 - Support Un-encrypted Password (PAP):** A checked checkbox.
 - Support Challenge Handshake Authentication (CHAP):** A checked checkbox.
 - Support Microsoft CHAP (MS-CHAP):** A checked checkbox.
 - Support Microsoft CHAP Version 2 (MS-CHAP v2):** A checked checkbox.
- PPP Compression:** A section header followed by:
 - BSD:** A dropdown menu set to 'Allow'.
 - Deflate:** A dropdown menu set to 'Allow'.

Table 12-4: PPP Tab Parameter Descriptions

Parameter	Description
On Demand	Use PPP on demand to initiate the PPP session only when packets are actually sent over the Internet.
Idle Time Before Hanging Up	Specify the amount of idle time (during which no data is sent or received) that should elapse before the gateway disconnects the PPP connection. Note: This parameter appears only if On Demand is selected.
Time Between Reconnect Attempts	Specify the duration between PPP reconnected attempts, as provided by your ISP.
PPP Authentication	<p>PPP supports four authentication protocols: Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), Microsoft CHAP version 1, and Microsoft CHAP version 2.</p> <p>This section allows you to select the authentication protocols your device may use when negotiating with a PPTP server. Select all the protocols if no information is available about the server's authentication protocols. Note that encryption is performed only if 'Microsoft CHAP', 'Microsoft CHAP version 2', or both are selected.</p> <ul style="list-style-type: none"> ▪ Login User Name: login username according to ISP ▪ Login Password: login password according to ISP ▪ Support Un-encrypted Password (PAP): PAP is a simple, plaintext authentication scheme. The username and password are requested by your networking peer in plain text. PAP, however, is not a secure authentication protocol. Man-in-the-middle attacks can easily determine the remote access client's password. PAP offers no protection against replay attacks, remote client impersonation, or remote server impersonation. ▪ Support Challenge Handshake Authentication (CHAP): CHAP is a challenge-response authentication protocol that uses MD5 to hash the response to a challenge. CHAP protects against replay attacks by using an arbitrary challenge string per authentication attempt. ▪ Support Microsoft CHAP: Select this check box if you are communicating with a peer that uses Microsoft CHAP authentication protocol. ▪ Support Microsoft CHAP Version 2: Select this check box if you are communicating with a peer that uses Microsoft CHAP Version 2 authentication protocol.
PPP Compression	<p>The PPP Compression Control Protocol (CCP) is responsible for configuring, enabling, and disabling data compression algorithms on both ends of the point-to-point link. It is also used to signal a failure of the compression/decompression mechanism in a reliable manner. For each compression algorithm, select one of the following from the drop down menu.</p> <ul style="list-style-type: none"> ▪ Reject: Reject PPP connections with peers that use the compression algorithm. ▪ Allow: Allow PPP connections with peers that use the compression algorithm. ▪ Require: Ensure a connection with a peer is using the compression algorithm.

12.3.8 PPTP Tab

The **PPTP** tab displays the PPTP settings.



Note: This tab is applicable only to PPTP connections.

Figure 12-82: Editing Connection - PPTP Tab

The screenshot shows the 'PPTP Properties' window. It has a title bar with a cloud icon and the text 'PPTP Properties'. Below the title bar are six tabs: 'General', 'Settings', 'Routing', 'PPP', 'PPTP', and 'Advanced'. The 'PPTP' tab is selected and highlighted. Inside the PPTP tab, there is a text input field labeled 'PPTP Server Host Name or IP Address:' which contains the text '10.13.10.6'.

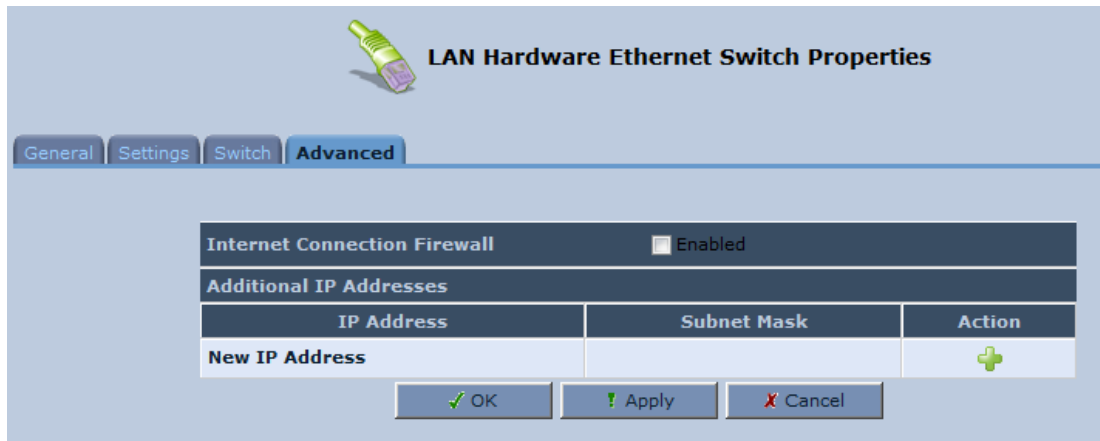
Table 12-5: PPTP Tab Parameter Descriptions

Parameter	Description
PPTP Server Host Name or IP Address	PPTP server host name or IP address provided by your ISP.

12.3.9 Advanced Tab

The **Advanced** tab provides various advanced configurations.

Figure 12-83: Editing Connection - Advanced Tab (For Example, WAN Ethernet)



LAN Hardware Ethernet Switch Properties

General Settings Switch **Advanced**

Internet Connection Firewall ☒ Enabled

Additional IP Addresses

IP Address	Subnet Mask	Action
New IP Address		+


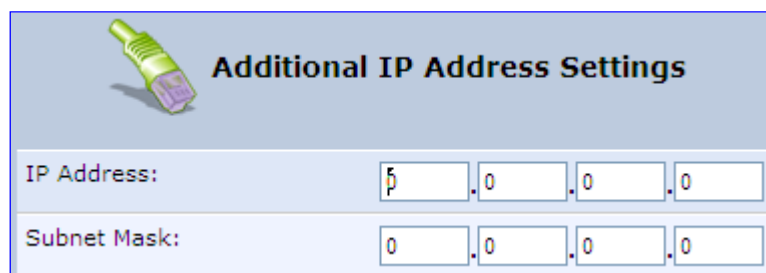
- **Internet Connection Firewall:** Your device's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. You can click the **Internet Connection Firewall** link to access the 'Security' screen (see Section 14.1 on page 254).
- **Additional IP Addresses:** You can also add alias names (additional IP addresses) to the device, by clicking the **New**  icon. This enables you to access the device using these aliases in addition to the default IP addresses.

Figure 12-84: Additional IP Address Settings Screen



Additional IP Address Settings

IP Address:

Subnet Mask:

12.4 VLAN Settings

You can create VLANs for your LAN and WAN interfaces.

➤ **To create a new VLAN interface:**

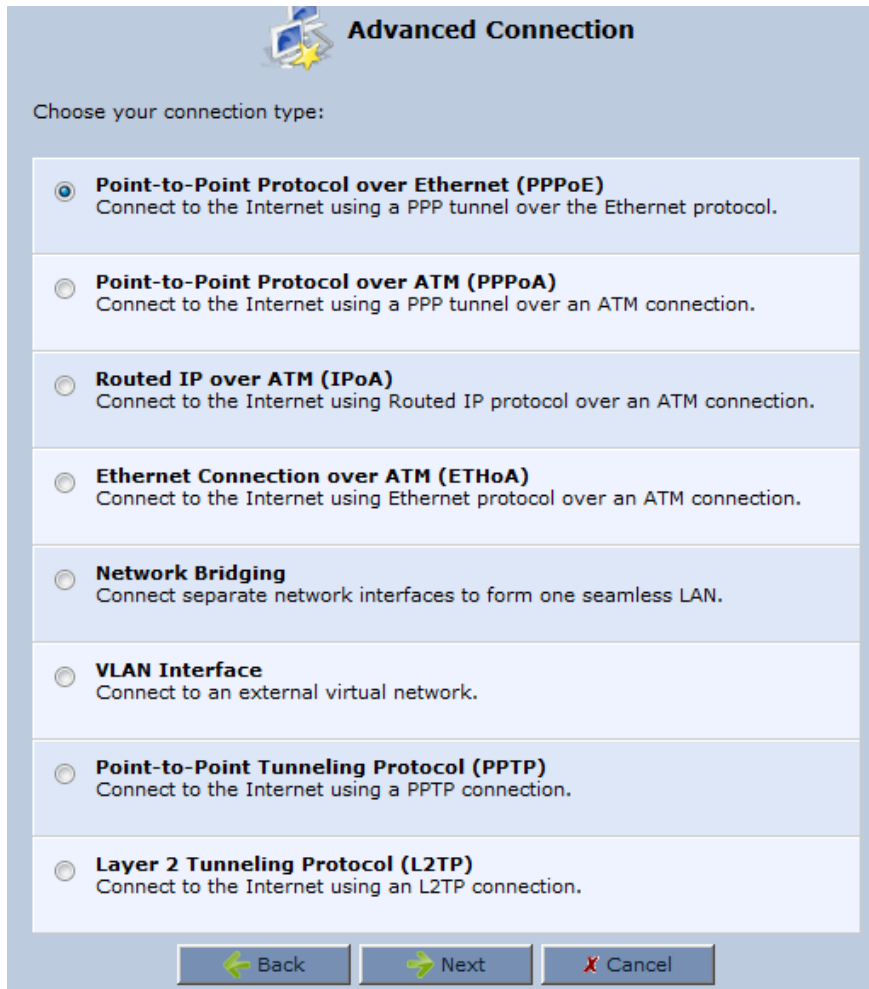
1. From the menu bar, click the **Network Connections** menu, and then in the screen 'Network Connections' click the **New**  icon; the 'Connection Wizard' screen appears.

Figure 12-85: Connection Wizard Screen



2. Select the 'Advanced Connection' option, and then click **Next**; the 'Advanced Connection' screen appears.

Figure 12-86: Advanced Connection



Advanced Connection

Choose your connection type:

- ☒ **Point-to-Point Protocol over Ethernet (PPPoE)**
Connect to the Internet using a PPP tunnel over the Ethernet protocol.
- ☐ **Point-to-Point Protocol over ATM (PPPoA)**
Connect to the Internet using a PPP tunnel over an ATM connection.
- ☐ **Routed IP over ATM (IPoA)**
Connect to the Internet using Routed IP protocol over an ATM connection.
- ☐ **Ethernet Connection over ATM (ETHoA)**
Connect to the Internet using Ethernet protocol over an ATM connection.
- ☐ **Network Bridging**
Connect separate network interfaces to form one seamless LAN.
- ☐ **VLAN Interface**
Connect to an external virtual network.
- ☐ **Point-to-Point Tunneling Protocol (PPTP)**
Connect to the Internet using a PPTP connection.
- ☐ **Layer 2 Tunneling Protocol (L2TP)**
Connect to the Internet using an L2TP connection.

Back Next Cancel

3. Select the 'VLAN Interface' option, and then click **Next**; the 'VLAN Interface' screen appears.

Figure 12-87: VLAN Interface



VLAN Interface

Configure new VLAN interface:

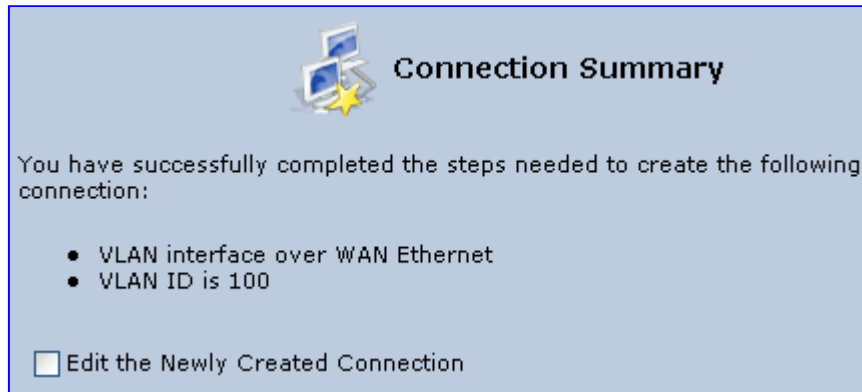
Underlying Device: WAN Ethernet

VLAN ID: 1

4. From the 'Underlying Device' drop-down list, select the underlying device (device's Ethernet connections) for this interface.

5. In the 'VLAN ID' field, enter a value to serve as the VLAN ID, and then click **Next**; the 'Connection Summary' screen appears.

Figure 12-88: Connection Summary



6. Check the 'Edit the Newly Created Connection' check box to be routed to the new connection's configuration screen after clicking **Finish**.
7. Click **Finish** to save the settings; the new VLAN interface is added to the network connections list; it's configurable like any other connection.

12.4.1 Settings Tab

The **Settings** tab of the 'VLAN Properties' displays general communication parameters. It's recommended to leave the values in this screen at their defaults unless you're familiar with the networking concepts they represent. Since your Telephone Adapter is configured to operate with the default values, no parameter modification is necessary. You can configure the following general connection settings:

Table 12-6: VLAN Interface - General Communication Parameters

Parameter	Description
Schedule	By default, the connection is always active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined (via Advanced>Scheduler Rules), this field changes to a drop-down list, allowing you to choose between the available rules. To configure scheduler rules, see Section 10.11.
Network	Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the drop-down list. For detailed information, see Section 4.2.
Physical Address	The physical address of the network card used for your network.
MTU	MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the Telephone Adapter selects the best MTU for your Internet connection. In case you change to manual, you can enter the largest packet size, you should leave this value in the 1200 to 1500 range.
Underlying Connection	The Ethernet device that the connection is implemented over.

Select one of the following Internet Protocol options from the 'Internet Protocol' drop down menu:

- No IP Address
- Obtain an IP Address Automatically
- Use the Following IP Address

Note that according to the selection you make in the 'Internet Protocol' drop down menu, the screen refreshes and displays relevant configuration settings.

- **No IP Address:** Select 'No IP Address' if you require that your Telephone Adapter has no IP address. This can be useful if you are working in an environment where you are not connected to other networks, such as the Internet.
- **Obtain an IP Address Automatically:** Your WAN connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address. The server that assigns the Telephone Adapter with an IP address also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead. You can click the **Release** button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the **Renew** button to renew the leased IP address.
- **Use the Following IP Address:** Your WAN connection can be configured using a permanent (static) IP address. Your service provider should provide you with this IP address, subnet mask and the default Telephone Adapter IP address.

12.4.1.1 IP Address Distribution

The 'IP Address Distribution' section allows you to configure the device's Dynamic Host Configuration Protocol (DHCP) server parameters. The DHCP automatically assigns IP addresses to network PCs. If you enable this feature, make sure that you also configure your network PCs as DHCP clients. For a comprehensive description of this feature, see Section 10.28.

Select one of the following options from the 'IP Address Distribution' drop-down list:

Table 12-7: IP Address Distribution Parameters

Parameter	Description
DHCP Server	Start IP Address The first IP address that may be assigned to a LAN host. Since the device's default IP address is 192.168.2.1, this address must be 192.168.2.2 or greater.
End IP Address	The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.
Subnet Mask	A mask used to determine to what subnet an IP address belongs. An example of a subnet mask value is 255.255.0.0.
Lease Time In Minutes	Each device is assigned an IP address by the DHCP server for a this amount of time, when it connects to the network. When the lease expires the server determines if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use become available for other computers on the network.
Provide Host Name If Not Specified by Client	If the DHCP client does not have a host name, the device automatically assigns one for him.

Figure 12-89: IP Address Distribution - DHCP Server

Table 12-8: DHCP Relay

Parameter	Description
DHCP Relay	Your device can act as a DHCP relay in case you would like to dynamically assign IP addresses from a DHCP server other than your Telephone Adapter's DHCP server. Note that when selecting this option you must also change the device's WAN to work in routing mode. For detailed information, see Section 10.28.2.

1. After selecting 'DHCP Relay' from the drop down list, a **New IP Address** link appears:

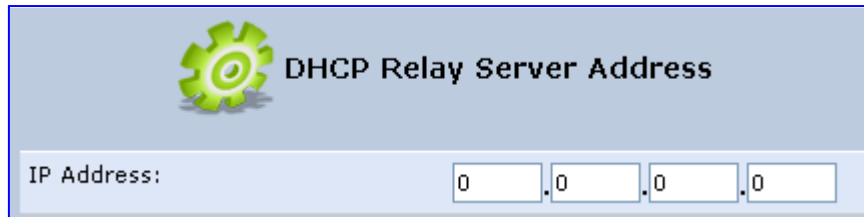
Figure 12-90: IP Address Distribution - DHCP Relay




IP Address Distribution DHCP Relay [New IP Address](#)

2. Click the **New IP Address** link; the 'DHCP Relay Server Address' screen appears:

Figure 12-91: DHCP Relay Server Address



 **DHCP Relay Server Address**

IP Address: . . .

3. Specify the IP address of the DHCP server.
4. Click **OK** to save the settings.

Table 12-9: Assigning Static IP Addresses to Network Computers

Parameter	Description
Disabled	Select 'Disabled' from the drop-down list to statically assign IP addresses to your network computers.

Figure 12-92: IP Address Distribution - Disable DHCP



IP Address Distribution Disabled

12.4.2 Routing Tab

You can choose to setup your Telephone Adapter to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Figure 12-93: Advanced Routing Properties

WAN Ethernet Properties

General Settings **Routing** Advanced

Routing Mode: NAPT ▼

Device Metric: 3

☒ Default Route

☐ Multicast - IGMP Proxy Default

Routing Table

Name	Destination	Gateway	Netmask	Metric	Status	Action
New Route						+

Table 12-10: Routing Parameters

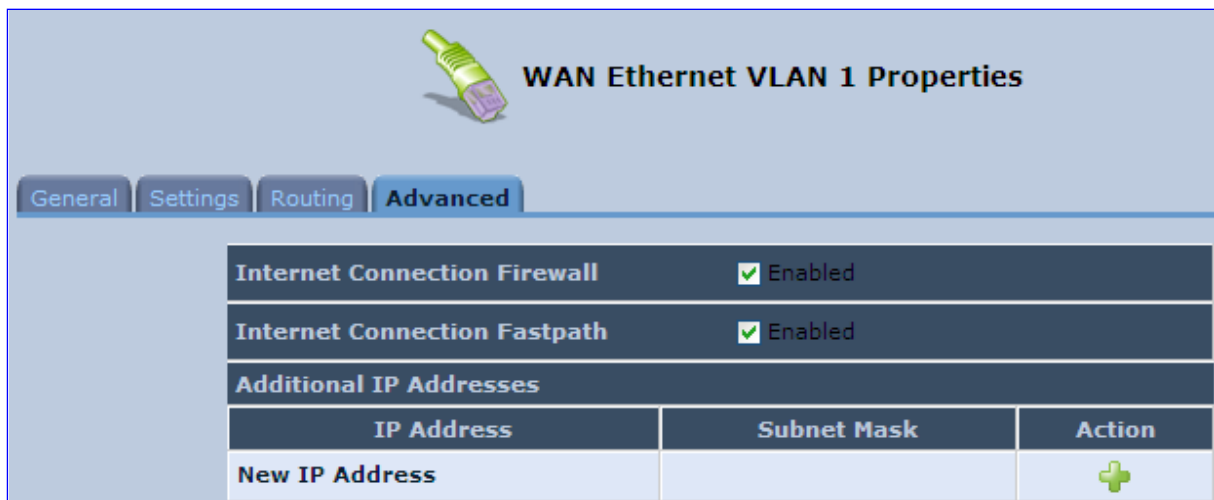
Parameter	Description
Routing	Select 'Advanced' or 'Basic' routing.
Routing Mode	<p>Select one of the following Routing modes:</p> <ul style="list-style-type: none"> ▪ Route: Use route mode if you want your device to function as a router between two networks. ▪ NAT: Network Address Translation (NAT) translates IP addresses to a valid, public address on the Internet. This adds security since internal LAN addresses are not transmitted over the Internet. In addition, NAT allows many addresses to exist behind a single valid address. Use the NAT routing mode if your LAN consists of a single device, otherwise collisions may occur if more than one device attempts to communicate using the same port. ▪ NAPT: Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.
Device Metric	The device metric is a value used by the device to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.
Default Route	Select this check box to define this device as a the default route.


Parameter	Description
Multicast	IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.
Routing Table	Allows you to add or modify routes when this device is active. Use the New Route button to add a route or edit existing routes.

12.4.3 Advanced Tab


Your Telephone Adapter's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. For detailed information on your device's security features, see Section 5.

Figure 12-94: Internet Connection Firewall



 **WAN Ethernet VLAN 1 Properties**

General Settings Routing **Advanced**

Internet Connection Firewall	<input checked="" type="checkbox"/> Enabled
Internet Connection Fastpath	<input checked="" type="checkbox"/> Enabled
Additional IP Addresses	
IP Address	Subnet Mask
New IP Address	

You can add alias names (additional IP addresses) to the device by clicking the 'New IP Address' link. This enables you to access the device using these aliases in addition to the IP address (e.g., 192.168.2.1) and *http://mp264.home*.

12.5 LAN-WAN Bridge Settings

A WAN-LAN bridge is a bridge over WAN and LAN devices. In such a setup, computers on the device LAN side can get IP addresses that are known on the WAN side.

➤ **To configure an existing bridge or create a new one:**


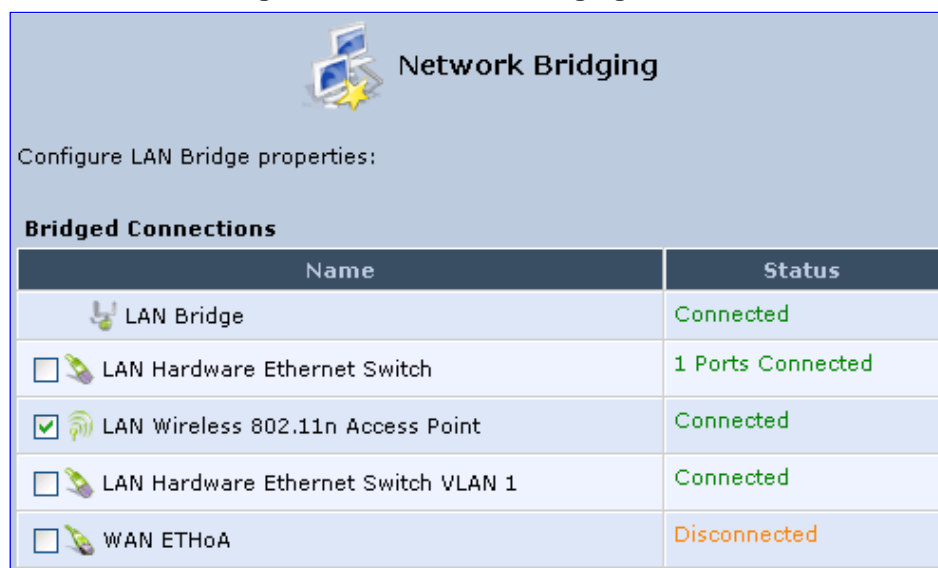
1. From the menu bar, click the **Network Connections** menu, and in the screen 'Network Connections' click the **New**  icon; the 'Connection Wizard' screen appears.
2. Select the 'Advanced Connection' option, and then click **Next**; the 'Advanced Connection' screen appears.
3. Select the 'Network Bridging' option, and then click **Next**; the screen 'Bridge Options' opens.

Figure 12-95: Bridge Options



4. Select whether to configure an existing bridge (this option only appears if a bridge exists) or to add a new one:
 - **Configure Existing Bridge:** Select this option and then click **Next**; the screen 'Network Bridging' opens, allowing you to add new connections or remove existing ones, by selecting or clearing their respective check boxes.

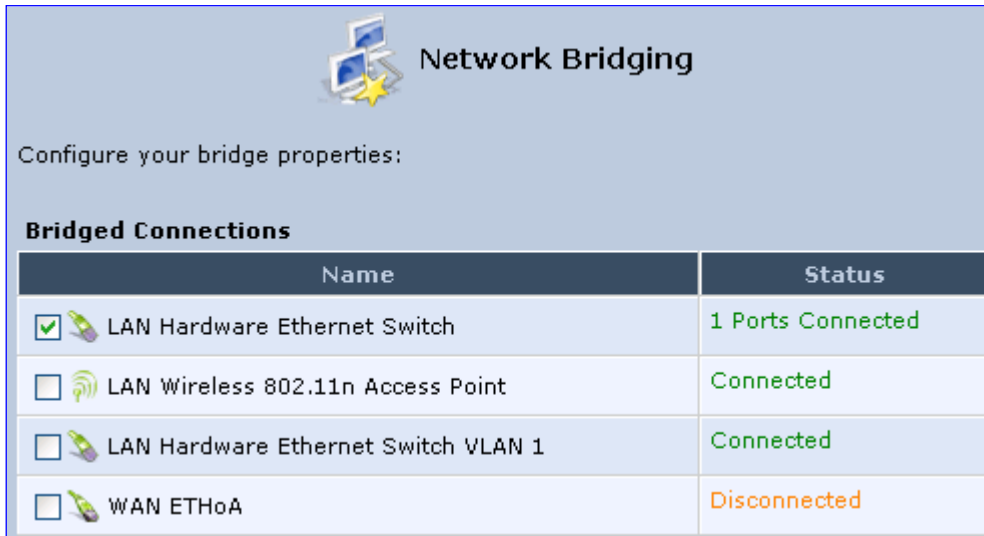
Figure 12-96: Network Bridging Screen



For example, checking the WAN check box creates a LAN-WAN bridge.

- **Add a New Bridge:** Select this option and then click **Next**; a different 'Network Bridging' screen appears, allowing you to add a bridge over the unbridged connections, by selecting their respective check boxes.

Figure 12-97: Adding New Network Bridging



Network Bridging

Configure your bridge properties:

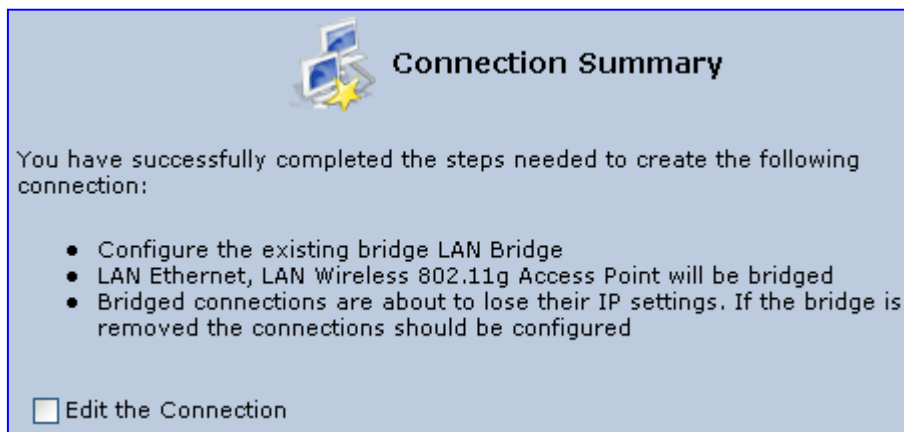
Bridged Connections

Name	Status
<input checked="" type="checkbox"/> LAN Hardware Ethernet Switch	1 Ports Connected
<input type="checkbox"/> LAN Wireless 802.11n Access Point	Connected
<input type="checkbox"/> LAN Hardware Ethernet Switch VLAN 1	Connected
<input type="checkbox"/> WAN ETHoA	Disconnected

Important notes:

- The same connections cannot be shared by two bridges.
 - A bridge cannot be bridged.
 - Bridged connections lose their IP settings.
5. Click **Next**; the screen 'Connection Summary' opens, corresponding to your changes.

Figure 12-98: Connection Summary - Configure Existing Bridge



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Configure the existing bridge LAN Bridge
- LAN Ethernet, LAN Wireless 802.11g Access Point will be bridged
- Bridged connections are about to lose their IP settings. If the bridge is removed the connections should be configured

☐ Edit the Connection

6. Select the check box 'Edit the Connection' to be routed to the new connection's configuration screen after clicking **Finish**.
7. Click **Finish** to save the settings; the new bridge is added to the network connections list; it's configurable like any other bridge.

12.5.1 Editing LAN-WAN Bridging

You can edit existing LAN-WAN bridges that are listed in the Connections list. This is done in the **Bridging** tab, which allows you to specify the LAN and WAN devices that you would like to join under the network bridge.

➤ **To edit LAN-WAN bridging:**


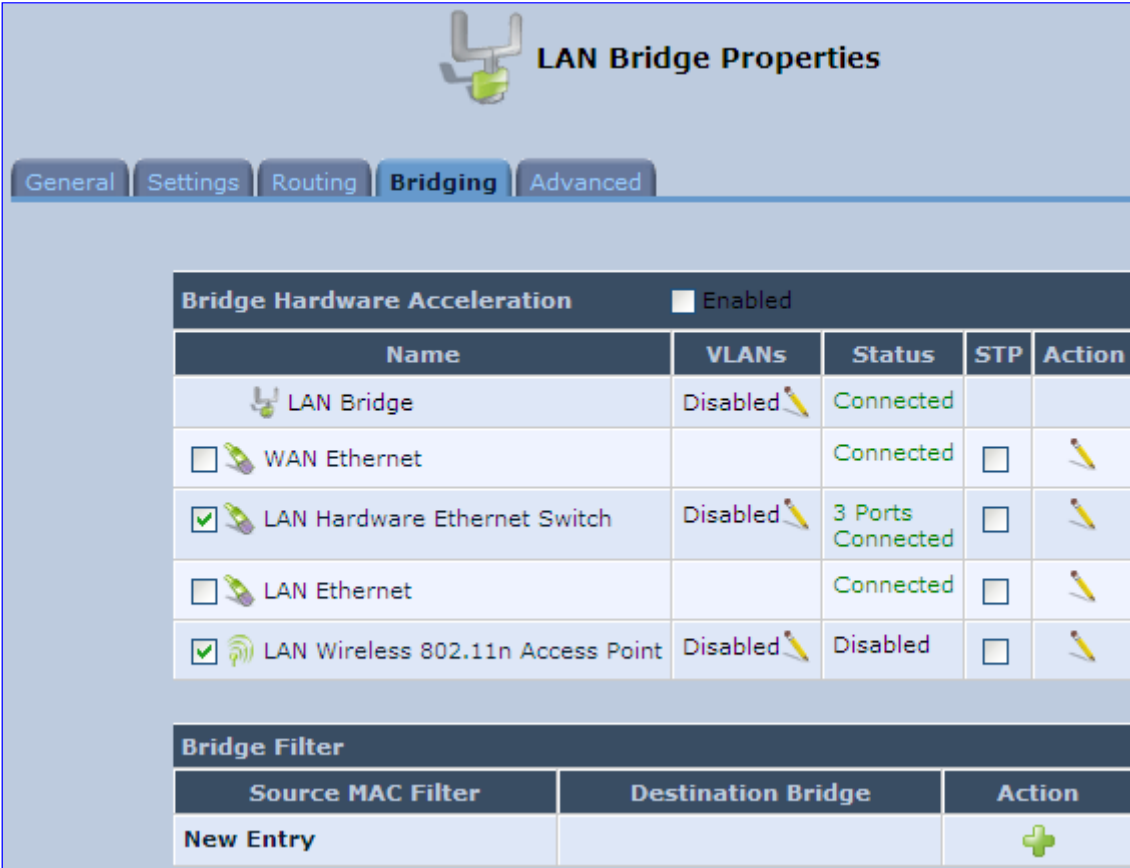













1. From the menu bar, click the **Network Connections** menu, and then in the screen 'Network Connections' click the **Edit**  icon corresponding the bridged network; the 'Connection Wizard' screen appears.
2. Click the **Bridge** tab; the LAN Bridge Properties screen appears.

Figure 12-99: Bridging Tab



Bridge Hardware Acceleration				
<input type="checkbox"/> Enabled				
Name	VLANs	Status	STP	Action
 LAN Bridge	Disabled 	Connected		
<input type="checkbox"/>  WAN Ethernet		Connected	<input type="checkbox"/>	
<input checked="" type="checkbox"/>  LAN Hardware Ethernet Switch	Disabled 	3 Ports Connected	<input type="checkbox"/>	
<input type="checkbox"/>  LAN Ethernet		Connected	<input type="checkbox"/>	
<input checked="" type="checkbox"/>  LAN Wireless 802.11n Access Point	Disabled 	Disabled	<input type="checkbox"/>	

Bridge Filter		
Source MAC Filter	Destination Bridge	Action
New Entry		

3. Select the check boxes corresponding to the connection names that you want to bridge, or clear the check boxes of connections that you do not want to bridge.
4. Select the 'Bridge Hardware Acceleration' check box to utilize the Fastpath algorithm, which enhances packet flow, resulting in faster communication between the LAN and the WAN (excluding the wireless connection).
5. Select the 'STP' check box to enable the Spanning Tree Protocol (STP) on the device. You should use this to ensure that there are no loops in your network configuration, and apply these settings if your network consists of multiple switches, or other bridges apart from those created by the device


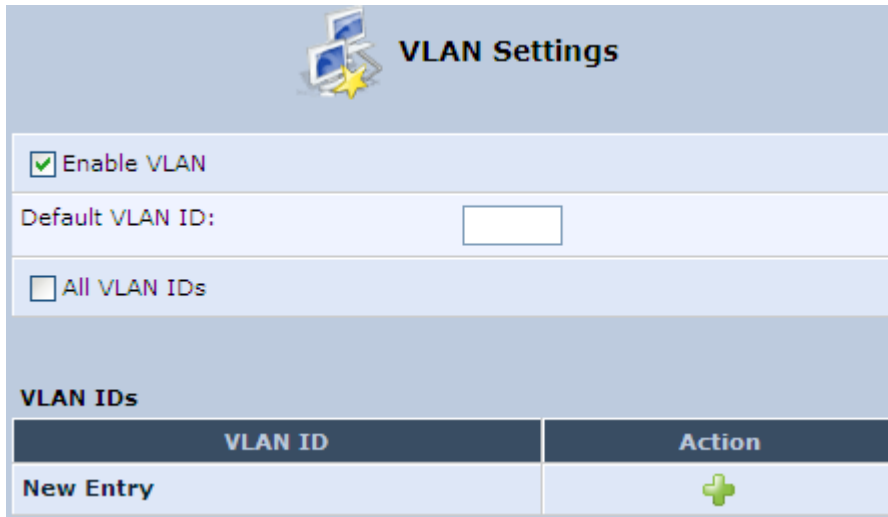
6. To configure VLANs for each network connection in the bridge:
 - a. Click the **Edit**  icon in the 'VLANs' column corresponding to a network that you want to assign specific Virtual LANs; the 'VLAN Settings' screen appears.

Figure 12-100: VLAN Settings Screen



The 'VLAN Settings' screen features a header with a laptop icon and the title 'VLAN Settings'. Below the header, there is a section with a checked 'Enable VLAN' checkbox. Underneath, the 'Default VLAN ID' is shown in a text box. A section labeled 'All VLAN IDs' contains an unchecked checkbox. At the bottom, a table titled 'VLAN IDs' has two columns: 'VLAN ID' and 'Action'. The first row of the table shows 'New Entry' under 'VLAN ID' and a green plus icon under 'Action'.




- b. Select the 'Enable VLAN' check box to enable VLANs on this connection; the screen refreshes and additional parameters appear.
 - c. In the 'Default VLAN ID' field, enter a VLAN ID for this connection or add additional VLANs by clicking the **New**  icon, and then enter another VLAN ID.
7. To create a traffic filtering rule on the bridge to enable direct packet flow between the WAN and the LAN (i.e., Bridge Filtering):
 - a. In the 'Bridge Filter' table, click the **New**  icon; the 'Bridge Filter' screen appears.

Figure 12-101: Bridge Filter Screen



The 'Bridge Filter' screen has a header with a router icon and the title 'Bridge Filter'. The main content area is divided into four sections: 'Matching' with a 'Source Address' dropdown menu showing 'Add...'; 'Operation' with a 'Bridge:' dropdown menu showing 'LAN Bridge (br0)'; and 'Schedule' with a dropdown menu showing 'Always'.

- b. From the 'Source Address' drop-down list, select a Network Object (defined in Section 5.5.2 on page 61) or create a new one by clicking 'User Defined'. You can define a traffic filtering rule that enables direct packet flow between the WAN and the LAN host that will be placed under the WAN-LAN bridge. This filtering rule can be based on either a LAN host's MAC address or one of its DHCP options.
 - c. From the 'Operation' drop-down list, select the bridge.
 - d. Click **OK**.

13 Remote Device Management

This chapter provides an overview of the device's remote configuration and management support. In addition, this chapter describes how to enable and secure remote management, as well configure the device through TR069.

13.1 Overview

The device is designed to be mass-deployed. One of the keys to guarantee end-user satisfaction and true toll-quality service in mass field deployment is comprehensive remote configuration and management capabilities:

- Automatic and remote configuration updates
- Automatic and remote firmware updates
- Remote diagnosis of problems reported by the user
- Remote collection of statistical information regarding the quality of the service
- Remote notifications of problems in the service

13.1.1 Remote Configuration

By default, the device is provided with factory default settings, which are common to all gateway devices (except for the MAC address). The factory settings allow the user to connect to the device's Web interface through the LAN.

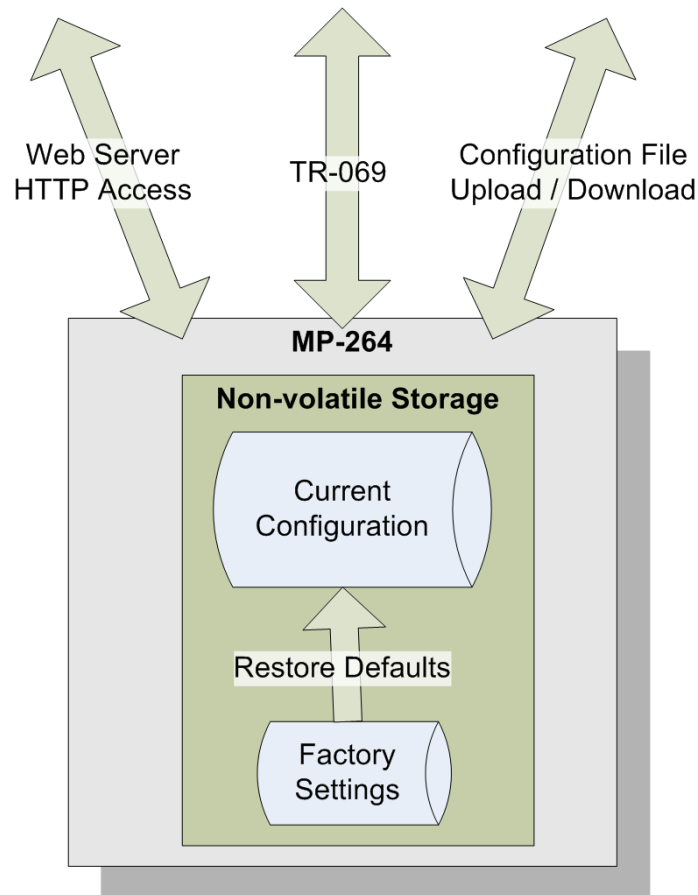
By default, the WAN interface is configured for DHCP (i.e., automatically obtains its IP address from a DHCP server). The default configuration should not include any VoIP service provider settings (such as a SIP proxy).

In some cases, AudioCodes can ship devices that are pre-configured with some customer-specific parameters. This set of parameters is usually defined as the new "factory settings" for the specific customer.

The device's factory default settings and the current configuration running on the device are stored on the device's non-volatile flash memory. The current configuration can be remotely updated using several configuration interfaces:

- HTTP-based Web server
- TR-069
- Configuration file upload/download

Figure 13-1: Remote Management Interfaces (e.g., MP-264)



All configuration interfaces access the same internal configuration repository. The configuration file represents the complete set of the device configuration parameters. Specific configuration interfaces (e.g. TR-069) might support access only to a sub-set of these configuration parameters.

At any time, the factory settings can be restored using the Web interface or by pressing the **Reset** pin-hole button while the device is being powered up.

The table below lists the main device configuration parameter groups:

Table 13-1: Main Configuration Parameter Groups

Group	Description
VoIP	Parameters relating to the VoIP functionality (e.g. analog interface, SIP signaling, voice and fax, media streaming)
WAN Interface	The main WAN Internet connection (this group is also referred to as the "Quick Setup").
Network Connections	Configuration of all network connections (LAN and WAN), including advanced connections such as VLANs.
Security	Parameters relating to the internal firewall.
QoS	Configuration of Quality of Service parameters such as priorities and traffic shaping.
System / Advanced	Configuration of system parameters such as Remote Update and Remote Access and advanced parameters such as Dynamic DNS, UPnP.

A typical set of parameters that a service provider may want to configure include the following:

- Remote access and/or automatic firmware and configuration update parameters
- VoIP configuration: SIP proxy, line settings (User IP, Password)
- QoS parameters (e.g. traffic shaping)

13.1.2 Remote Management

Remote management includes the following:

- Firmware upgrade
- Status and performance monitoring
- Alarms, notifications, and logs

13.1.2.1 Firmware Upgrade

Service providers require the ability to update the device's firmware in the field (e.g. in case of maintenance releases or releases that support new required features). The process is required to be automatic, allowing mass update, which is robust and fail-safe.

The device's firmware is stored on the non-volatile flash memory. The device's flash memory is capable of storing a recovery firmware that ensures a fail-safe operation (even if the user unplugs the power during the firmware burning process).

The device's firmware can be upgraded using one of the following mechanisms:

- The new firmware can be "pushed" (uploaded) to the device, using the device's Web interface
- The new firmware can be "pulled" (downloaded) by the device from a remote HTTP, FTP, or TFTP server

The device has two areas in flash memory for storing the firmware image. One area is active, while the other is "burned" during the upgrade process.

If the upgrade process was successful, the new image is set as "active", while the other area will be used for the next upgrade. If upgrade is not successful, the one that is still active remains valid.

The remote firmware download process can be triggered by one of the following:

- The device checks for a new firmware upon MP-264 restart
- The device periodically checks for a new firmware
- Manual trigger using CLI, TR-069 or Web



Note: Unless forced, the device downloads and upgrades to the new firmware only if its version number is higher than the firmware version currently running on the device. The version number is not taken from the image file name, but from the header of the image file.

13.1.2.2 Status and Performance Monitoring

The ability to remotely monitor the status of the device is critical to the service provider, who wants to support users without having to send a technician on site (avoiding the "truck roll"). The service provider may want to know the current status of the device (e.g. is it registered to the SIP proxy, is the phone off-hook) or some statistical information (e.g. average packet loss during a call).

The device maintains a set of status and performance information internally. This information (or parts of it) can be retrieved via the different management interfaces (e.g. Web, or TR-069).

The table below describes the status and performance monitoring (statistical) information available in the device.

Table 13-2: Status and Performance Monitoring Parameters

Group	Description
VoIP	<ul style="list-style-type: none"> ▪ Current status information per line: <ul style="list-style-type: none"> ✓ Phone state ✓ Registration status ✓ Source, codec and type of current call ✓ Packet loss, jitter and delay of current call
Network Connections	<ul style="list-style-type: none"> ▪ Current status information per interface: <ul style="list-style-type: none"> ✓ Connection status ✓ Allocated IP address ✓ Received and transmitted packets
System	<ul style="list-style-type: none"> ▪ Software version information ▪ Hardware version information ▪ System Up time

13.1.2.3 Alarms, Notifications and Logging

Instead of periodically polling the device to obtain its current status, the service provider may want the device to notify abnormal events or to send regular reports to a logging server. Both options are supported by the device. The table below lists the relevant interfaces for alarms and notifications.

Table 13-3: Notifications and Logged Events

Group	Notifications and Logged Events
VoIP	<ul style="list-style-type: none"> ▪ Notifications: Registration error or timeout ▪ Logged Events: <ul style="list-style-type: none"> ✓ End of call (Call Detail Record logging) ✓ SIP messages logging (optional - for debugging)
Network Connections	<ul style="list-style-type: none"> ▪ Notifications: Connection up / down
Security	<ul style="list-style-type: none"> ▪ Logged Events: Security log (configurable)
System	<ul style="list-style-type: none"> ▪ Notifications: <ul style="list-style-type: none"> ✓ System restart ✓ Firmware / configuration update ▪ Logged Events: Debug-level logging (optional)

Note that the terms Alarm and Notification represent the same thing. The difference between alarm/notification and logging is that an alarm is normally used to represent an abnormal event (e.g. registration error), while logged events can represent either regular events (e.g. end of call) or abnormal events.

The table below lists the event severity levels defined in the device. Typically, events with severity of Error or Emergency are notified in addition to being logged.

Table 13-4: Severity of Logged Events

Severity	Description
Debug	Debug-level messages.
Notice	Normal but significant condition. Notices requiring attention at a later time. Non-error conditions that might require special handling.
Error	Recoverable / temporary error condition.
Emergency	System is unusable. The most severe messages that prevent continuation of operation, such as immediate system shutdown.

13.2 Enabling Remote Management

You can access and manage the device not only from within the home network, but also from the Internet. This allows you to view or change settings while travelling. It also enables you to allow your ISP to change settings or help you troubleshoot functionality or communication issues from a remote location.

Remote access to the device is blocked by default to ensure the security of your home network. However, remote access is supported by the following services, and you may use the 'Remote Access Configuration' screen to selectively enable these services if they are needed.

**Notes:**

- Telnet and Web-Management can be used to modify the settings of the firewall or to disable it. You can also change local IP addresses and other settings, making it difficult or impossible to access the device from the home network. Therefore, remote access to Telnet or HTTP services should be blocked and should only be permitted when absolutely necessary.
- Encrypted remote administration is done using a secure SSL connection that requires an SSL certificate. When accessing the device for the first time using encrypted remote administration, you are prompted by your browser with a warning regarding certificate authentication. This is because the device's SSL certificate is self-generated. When encountering this message under these circumstances, ignore it and continue. It should be noted that even though this message appears, the self-generated certificate is safe, and provides you with a secure SSL connection. You can also assign a user-defined certificate to the device.


➤ **To enable remote access to the device services:**

1. In the 'Advanced' screen, click the **Remote Administration**  icon; the 'Remote Administration' screen appears.

Figure 13-2: Remote Administration Screen

2. Select the services that you would like to make available to computers on the Internet.
 - **Allow Incoming WAN Access to Web-Management:** Allows access (from a Web browser) to the Web management interface and to all system settings and parameters. Both secure (HTTPS) and non-secure (HTTP) access is available.
 - **Allow Incoming WAN Access to the Telnet Server:** Allows access to the command-line session and to all system settings and parameters (using a text-based terminal).
 - **Diagnostic Tools:** Allows remote access for ping and trace route (over UDP) troubleshooting.
 - **TR-069:** TR-069 is a WAN management protocol for communication between Customer Premise Equipment (CPE) and an Auto-Configuration Server (ACS). It defines a mechanism that encompasses secure auto-configuration of a CPE, and also incorporates other CPE management functions into a common framework.
3. Click **OK** to save your changes.

13.3 Securing Remote Management with Certificates

The **Certificates**  icon allows you to configure certificates. When a service provider implements remote provisioning in which a unique configuration file (per device) is placed on a server located on the WAN, the service provider can ensure that only its deployed device units are able to connect to the HTTP server via HTTPS. This is performed by using a certification validation process (client-server).

There are two types of certificates:

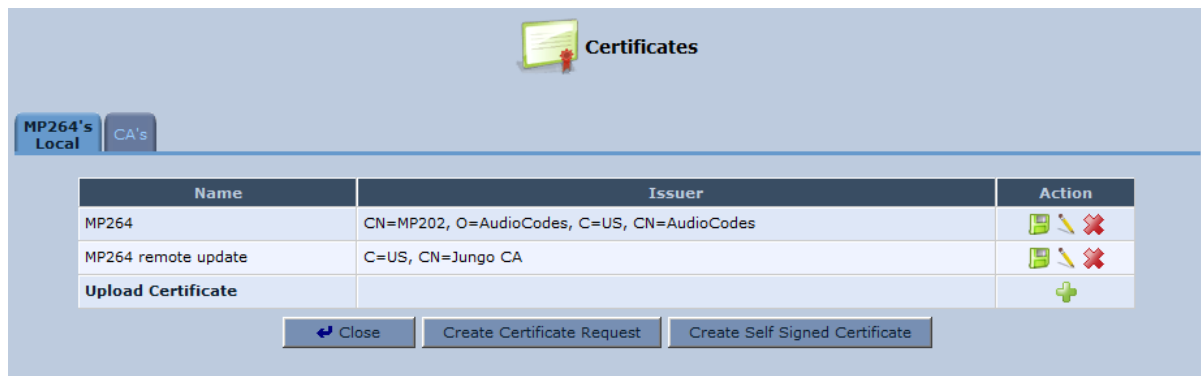
- Self-signed certificates
- Certificate Authority (CA) signed certificates

The procedure below describes how to operate with self-signed certificates.

➤ To operate with self-signed certificates:

1. In the 'Advanced' screen, click the  icon; the 'Certificates' screen appears.

Figure 13-3: New Certificates Screen (e.g., MP-264)



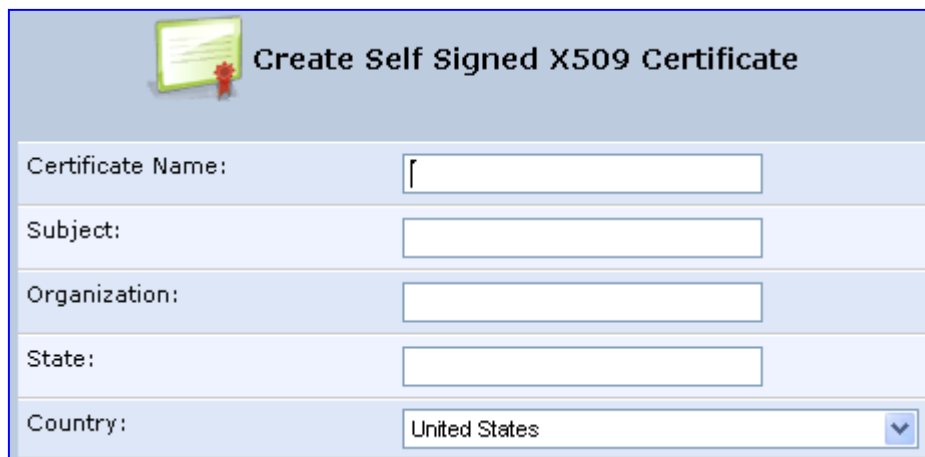
2. Create a self-signed certificate:



Note: You can also create a self-signed certificate using the free OpenSSL utility.

- a. Select the **MP264's Local** tab.
- b. Click the **Create Self Signed Certificate** button; the 'Create Self Signed X509 Certificate' screen appears.

Figure 13-4: Create Self Signed X509 Certificate Screen



Create Self Signed X509 Certificate

Certificate Name:

Subject:

Organization:

State:

Country:

- c. Enter the fields as required, and then click **Generate**; a message appears notifying you that the device is generating the certificate.
- d. After a few moments, click **Refresh**; the 'New Self Signed X509 Certificate' screen appears.

Figure 13-5: New Self Signed X509 Certificate Screen (e.g., MP-264)



New Self Signed X509 Certificate

Owner: MP264

Name:

Subject: CN=WAN, O=XYZ, ST=Illinois, C=US, CN=New Certificate

Issuer: CN=WAN, O=XYZ, ST=Illinois, C=US, CN=New Certificate

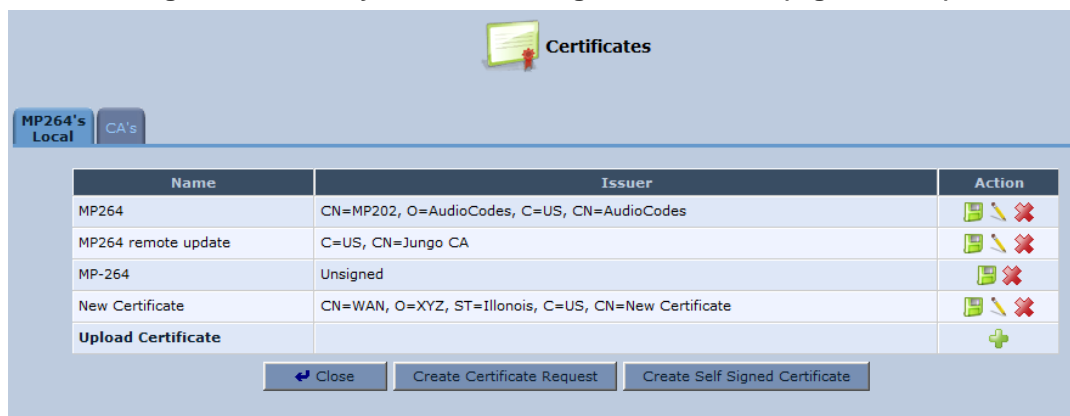
Validity Period:

Not Before: Oct 18 09:32:42 2012 GMT

Not After: Oct 13 09:32:42 2032 GMT

- e. Click **OK**; the new certificate appears listed in the 'Certificates' screen.

Figure 13-6: Newly Created Self-Signed Certificate (e.g., MP-264)



Certificates

MP264's Local CA's

Name	Issuer	Action
MP264	CN=MP202, O=AudioCodes, C=US, CN=AudioCodes	
MP264 remote update	C=US, CN=Jungo CA	
MP-264	Unsigned	
New Certificate	CN=WAN, O=XYZ, ST=Illinois, C=US, CN=New Certificate	
Upload Certificate		


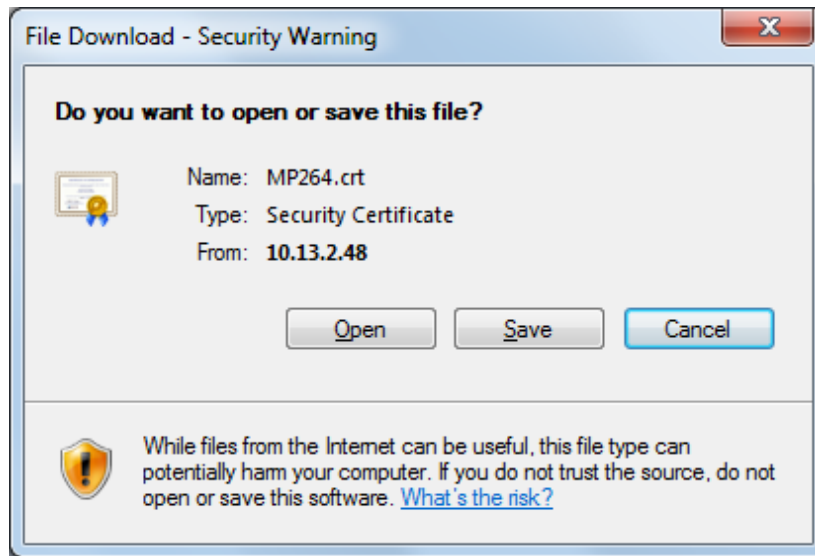
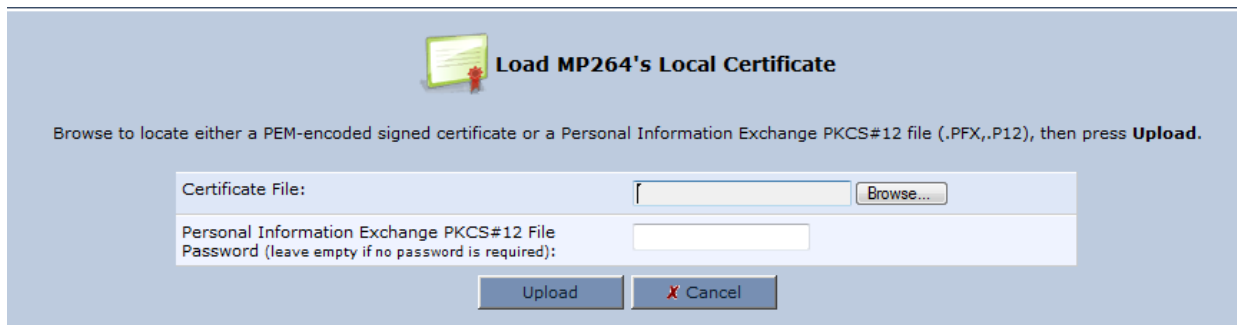
- f. In the 'Certificates' screen, click the **Download**  icon corresponding to the new self-signed certificate that you created; the 'File Download' window appears.

Figure 13-7: File Download Window (e.g., MP-264)



- g. Click **Save**, and then browse to the folder to where you want to save the file; the file is saved as a *.crt file.
3. Configure the Apache server, by configuring the SSLCACertificateFile parameter to point to the location where the certificate file is located. Since this is a self-signed certificate, you are also considered the CA.
4. Load the self-signed certificate to the device:
 - a. In the 'Certificates' screen, click the **Upload Certificate** link; the 'Load MP264's Local Certificate' screen appears.

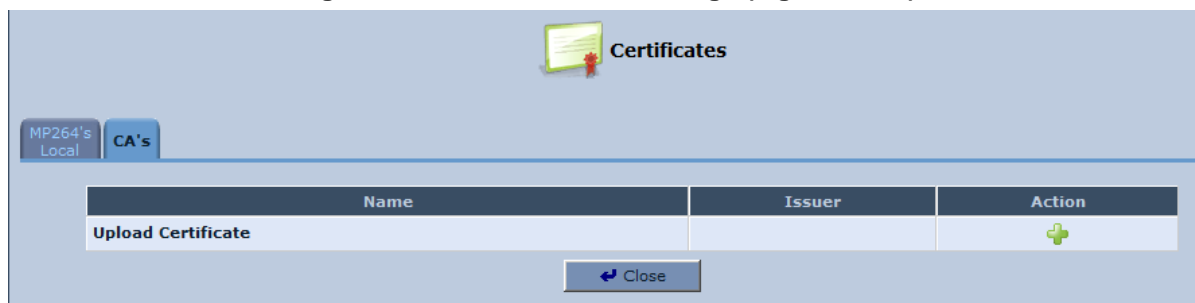
Figure 13-8: Load MP264's Local Certificate (e.g., MP-264)



- b. Click **Browse**, locate the certification file that you created, and then click **Upload** to load the file.

5. Load the CA's certificate to the device:
 - a. Select the **CA's** tab; the 'CA's' screen appears.

Figure 13-9: CA's Certificates Page (e.g., MP-264)




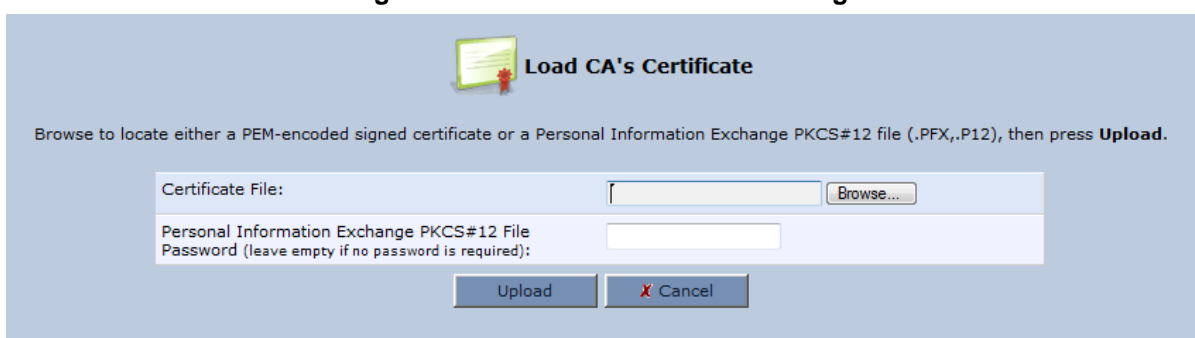
- b. Click the **New**  icon; the 'Load CA's Certificate' screen appears.

Figure 13-10: Load CA's Certificate Page



- c. Click **Browse**, locate the CA certification file that you created, and then click **Upload** to load the file.
6. Configure the Apache server, using the following parameters:
 - **SSLCACertificateFile**: Set the path to the CA's certificate.
 - **SSLCertificateFile**: Set the path to your signed certificate.
 - **SSLCertificateKeyFile**: Set the path to your private key.

13.4 Remote Configuration and Management Interfaces

The device supports the following remote configuration and management interfaces:

- Web server (GUI) over HTTP/HTTPS
- TR-069 and TR-104
- Syslog
- Firmware or configuration file download through HTTP/HTTPS and FTP/TFTP
- CLI over Telnet/SSH

The table below lists the possible operations over these different interfaces:

Table 13-5: Operations per Configuration/Management Interface

Operation	Web GUI	TR-069	Syslog	File D/L	CLI
Configuration Update	Yes	Yes	No	Yes	Yes
Firmware Upgrade	Yes	Yes	No	Yes	Yes
Status Monitoring	Yes	Yes	No	No	Yes
Debugging and Diagnostics	Yes	No	Yes	No	Yes

Service providers can choose to combine several management interfaces.

13.4.1 Embedded Web Server

The device provides an embedded Web server with a rich Graphical User Interface (GUI). The Web server can be accessed from the local LAN interface (e.g. by the home user) or from the WAN interface (e.g. by the service provider support personnel). The Web GUI provides easy and intuitive configuration of all the device parameters (i.e., VoIP, network interfaces, security, QoS and advanced system settings). In addition, the Web GUI provides status monitoring pages, diagnostic pages and enabled firmware upgrade.

Typically, service providers do not want to configure each device manually and therefore, they do not use the Web server in live deployments. However, the Web server is still useful for:

- Trying different configurations in the lab during the integration phases
- Creating mass-configuration template files
- Debugging special customer problems (by accessing the Web server from the WAN interface)

Since the Web server allows all configuration and management operations, it is important to protect it. The following security measures are available:

- The Web server is user and password protected. Several users can be defined. A special user with limited-access (only to the 'Quick Setup' screen) can be defined.
- The access to the Web server can be blocked from the WAN and/or LAN interfaces.
- Access to the Web server can be limited to specific IP addresses.
- Secured HTTP (HTTPS) is supported. It is possible to enable HTTPS-only, if required.
- The HTTP and/or HTTPS port can be modified (from the default 80 and 8080).

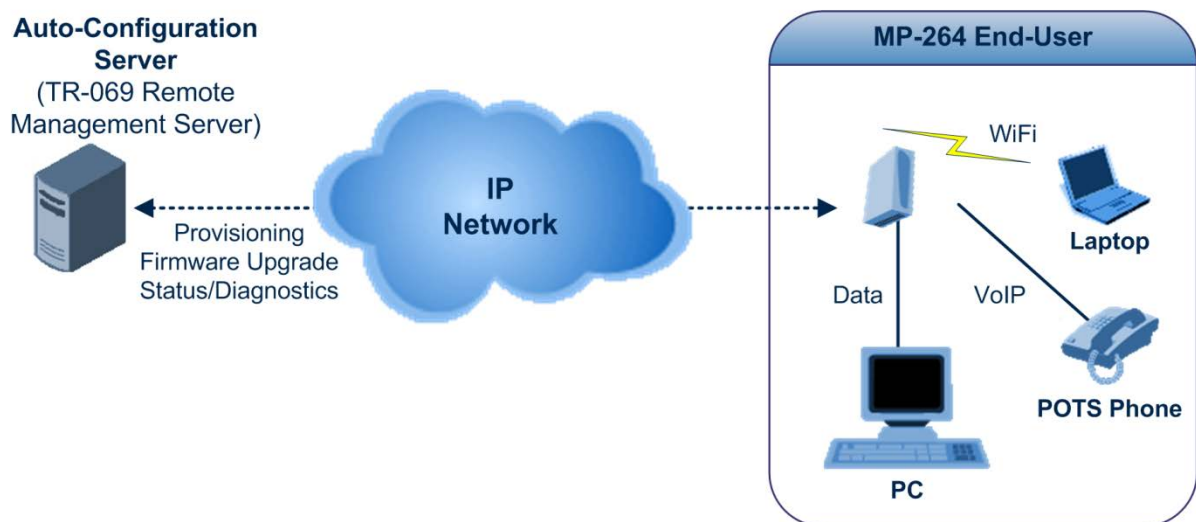
13.4.2 TR-069 and TR-104 CPE WAN Management Protocol

TR-069 is a WAN management protocol intended for communication between Customer Premise Equipment (CPE) or residential devices (such as the device), and an Auto-Configuration Server (ACS), residing on the service provider's side. It defines a mechanism that encompasses secure auto configuration of CPE, and also incorporates other CPE management functions into a common framework. In simpler terms, TR-069 is a protocol that enables remote server management of the device. Such a protocol is useful, for example, for remotely and securely controlling the device by the CPE provider. The standard is published by the DSL Forum. TR-069 runs over SOAP/HTTP and enables device configuration, management (including firmware upgrade), and status monitoring. TR-104 is an extension of TR-069 for VoIP configuration and monitoring.

The TR standards are published by the DSL forum:

- **TR-069:** <http://www.broadband-forum.org/technical/download/TR-069.pdf>
- **TR-104:** <http://www.broadband-forum.org/technical/download/TR-104.pdf>

Figure 13-11: TR-069 CPE WAN Management Protocol (e.g., MP-264)



The TR-069 protocol allows an ACS to provision a CPE or collection of CPE based on a variety of criteria. The provisioning mechanism includes specific provisioning parameters and a general mechanism for adding vendor-specific provisioning capabilities as needed. The provisioning mechanism allows CPE provisioning at the time of initial connection to the broadband access network, and the ability to re-provision at any subsequent time. This includes support for asynchronous ACS-initiated re-provisioning of CPE. TR-069 defines several Remote Procedure Call (RPC) methods, as well as a large number of parameters, which may be set or read. Some of these methods and parameters are defined as mandatory.



Notes:

- The device was tested for interoperability with two ACS vendors – Motive and FriendlyTR69. Working with other ACS types may require specific interoperability effort.
- The parameter values in the subsequent tables are sample values only taken from an ACS.

13.4.2.1 Configuring the Device via TR-069 and TR-104

TR-069 allows basic configuration of the device. The configuration is defined in a hierarchical tree-like structure according to the TR-069 standard.

13.4.2.1.1 Configuring the WAN Interface

Table 13-6: InternetGatewayDevice.WANDevice.i.WANConnectionDevice.i.WANIPConnection.i

TR-069/TR-104 Parameter	Configuration File Parameter	Description
AddressingType	mt_cwmp_param_wan_connection_ip_addressing_type_get/set	The method used to assign an address to the WAN side interface of the CPE for this connection: <ul style="list-style-type: none"> “DHCP” “Static”
ConnectionStatus	mt_cwmp_param_wan_connection_ip_status_get	Current status of the connection: <ul style="list-style-type: none"> “Unconfigured” “Connecting” “Connected” “PendingDisconnect” “Disconnecting” “Disconnected”
ConnectionType	mt_cwmp_param_wan_connection_ppp_type_get	Specifies the connection type of the connection instance: <ul style="list-style-type: none"> “Unconfigured” “IP_Routed” “DHCP_Spoofed” “PPPoE_Bridged” “PPPoE_Relay” “PPTP_Relay” “L2TP_Relay”
DefaultGateway	mt_cwmp_param_wan_connection_ip_default_gateway_get/set	The IP address of the default gateway for this connection. This parameter is configurable only if the AddressingType is Static.
DNSEnabled	mt_cwmp_param_wan_connection_ip_dns_enabled_get/set	Whether or not the device should attempt to query a DNS server across this connection.
DNSOverrideAllowed	mt_cwmp_param_wan_connection_ip_dnsoverrideallowed_get/set	Whether or not a manually set, non-empty DNS address can be overridden by a DNS entry received from the WAN.
DNSServers	mt_cwmp_param_wan_connection_xxx_dnsservers_get/set(i)	Comma-separated list of DNS server IP addresses for this connection. Support for more than three DNS Servers is optional.
Enable	mt_cwmp_param_wan_connection_xxx_enable_get/set(1)	Enables or disables the connection instance. On creation of a WANIPConnection instance, it is initially disabled.
ExternalIPAddress	mt_cwmp_param_wan_connection_xxx_externalip_get(i)	The external IP address used by NAT for this connection. This parameter is configurable only if the AddressingType is Static.

TR-069/TR-104 Parameter	Configuration File Parameter	Description
MaxMTUSize	<code>mt_cwmp_param_wan_con n_ip_max_mtu_size_get/set(i)</code>	The maximum allowed size of an Ethernet frame from LAN-side devices.
Name	<code>mt_cwmp_param_wan_con n_xxx_name_get/set(i)</code>	User-readable name of this connection.
NATEnabled	<code>mt_cwmp_param_wan_con n_xxx_nat_enabled_get/set(i)</code>	Indicates if NAT is enabled for this connection.
PortMappingNumberOfEntries	-	Total number of port mapping entries.
PossibleConnectionTypes	-	A comma-separated list indicating the types of connections possible for this connection instance. Each element of the list is an enumeration of: <ul style="list-style-type: none"> ▪ "Unconfigured" ▪ "IP_Routed" ▪ "IP_Bridged"
RouteProtocolRx	<code>mt_cwmp_param_wan_con n_xxx_route_protocol_rx_get/set</code>	Defines the Rx protocol to be used: <ul style="list-style-type: none"> ▪ "Off" ▪ "RIPv1" (Optional) ▪ "RIPv2" (Optional) ▪ "OSPF" (Optional)
RSIPAvailable	<code>mt_cwmp_param_wan_con n_xxx_rsip_available_get(i)</code>	Indicates if Realm-specific IP (RSIP) is available as a feature on the device.
ShapingRate	-	Rate to shape this connection's egress traffic to. If less than or equal to 100, in percentages of the rate of the highest rate-constrained layer over which the packet travels on egress. The rate is limited over the window period specified by ShapeWindow. If greater than 100, in bits per second. A value of -1 indicates no shaping.
SubnetMask	<code>lan_host_config_managem ent_get/set rg_conf dhcps/ netmask</code>	Subnet mask of the WAN interface. This parameter is configurable only if the AddressingType is Static.
SpecVersion	""	Currently, 1.0 is the only available version.
Uptime	-	The time in seconds that this connection has been up.

13.4.2.1.2 Configuring the LAN Interface

Table 13-7: InternetGatewayDevice.LANDevice.i.LANEthernetInterfaceConfig

TR-069/TR-104 Parameter	Configuration File Parameter	Description
Enable	device_eic_enable_get/set	Enables or disables this interface.
MACAddress	device_mac_address_get	The physical address of the interface.
MaxBitRate	device_max_bit_rate_get	The maximum upstream and downstream bit rate available for this connection: <ul style="list-style-type: none"> ▪ "10" ▪ "100" ▪ "1000" ▪ "Auto"
Status	device_status_get	The status of the interface: <ul style="list-style-type: none"> ▪ "Up" ▪ "NoLink" ▪ "Error" ▪ "Disabled"

Table 13-8: InternetGatewayDevice.LANDevice.i.LANHostConfigManagement

TR-069/TR-104 Parameter	Configuration File Parameter	Description
AllowedMACAddresses	allowed_mac_addresses_get/set	Represents a comma-separated list of hardware addresses that are allowed to connect to this connection if MACAddressControlEnabled is 1 for a given interface.
DHCPLeaseTime	dhcp_lease_time_get/set	Specifies the lease time in seconds of client assigned addresses. A value of -1 indicates an infinite lease.
DHCPRelay	dhcp_relay_get/set	Determines if the DHCP server performs the role of a server (0) or a relay (1) on the LAN interface.
DHCPServerEnable	lan_host_config_management_get/set rg_conf dhcps/enable	Enables or disables the DHCP server on the LAN interface.
DNSServers	dhcps_dns_servers_get/set	Comma-separated list of DNS servers offered to DHCP clients. Support for more than three DNS Servers is optional.
DomainName	domain_name_get/set	Sets the domain name for clients on the LAN interface.
IPRouters	ip_routers_get/set	Comma-separated list of IP addresses of routers on this subnet. Also known as default gateway. Support for more than one Router address is optional.

TR-069/TR-104 Parameter	Configuration File Parameter	Description
MaxAddress	<code>lan_host_config_management_get/set</code> <code>rg_conf dhcps/end_ip</code>	Specifies the last address in the pool to be assigned by the DHCP server on the LAN interface.
MinAddress	<code>lan_host_config_management_get/set</code> <code>rg_conf dhcps/start_ip</code>	Specifies the first address in the pool to be assigned by the DHCP server on the LAN interface.
SubnetMask	<code>lan_host_config_management_get/set</code> <code>rg_conf dhcps/ netmask</code>	Specifies the client's network subnet mask.

13.4.2.1.3 Configuring VoIP via TR-104

Table 13-9: InternetGatewayDevice.Services.VoiceService.i.Capabilities

TR-069/TR-104 Parameter	Configuration File Parameter	Description
ButtonMap	-	Support for a configurable button map. A true value indicates support for a configurable button map via the <code>VoiceService.{i}.VoiceProfile.{i}.ButtonMap</code> object.
DSCPCoupled	-	A true value indicates that the CPE is constrained such that transmitted call control packets use the same DSCP marking as transmitted RTP packets. If the value is true, the CPE must not support the <code>DSCPMark</code> parameter for call control.
EthernetTagging Coupled	-	A true value indicates that the CPE is constrained such that transmitted call control packets use the same Ethernet tagging (VLAN ID Ethernet Priority) as transmitted RTP packets. If the value is true, the CPE must not support the <code>VLANIDMark</code> or <code>EthernetPriorityMark</code> parameters within a call control object (e.g., SIP, MGCP, or H323).
FaxPassThrough	-	Support for fax pass-through. A true value indicates support for the parameter <code>VoiceService.{i}.VoiceProfile.{i}.FaxPassThrough</code> . (True if <code>voip/audio/fax/fax_transport_mode</code> equals Bypass)
FaxT38	-	Support for T.38 fax. A true value indicates support for the object <code>VoiceService.{i}.VoiceProfile.{i}.FaxT38</code> .
MaxLineCount	<code>voip/num_of_fxs_lines</code>	Maximum number of lines supported across all profiles.

TR-069/TR-104 Parameter	Configuration File Parameter	Description
MaxProfileCount	-	Maximum number of distinct voice profiles supported.
MaxSessionCount	-	Maximum number of voice sessions supported across all lines and profiles. (This might differ from MaxLineCount if each line can support more than one session for CPE provided conference calling. This value can be less than the product of MaxLineCount and MaxSessionsPerLine.)
MaxSessionsPer Line	-	Maximum number of voice sessions supported for any given line across all profiles. A value greater than one indicates support for CPE provided conference calling.
ModemPassThrough	-	Support for modem pass-through. A true value indicates support for the parameter VoiceService.{i}.VoiceProfile.{i}.ModemPassThrough.
NumberingPlan	-	Support for a configurable numbering plan. A true value indicates support for a configurable numbering plan via the VoiceService.{i}.VoiceProfile.{i}.NumberingPlan object.
PSTNSoftSwitch Over	-	A true value indicates the device is capable of supporting the PSO_Activate Facility Action, which allows a call to be switched to a PSTN FXO. Note: Currently, this parameter is not supported.
Regions	<code>pkg\mgt\lib\mgt_regional_settings.c slic_dsp_general_and_regional_settings_params_array</code>	Comma-separated list of geographic regions supported by the device. Each item in the list must be an alpha-2 (two-character alphabetic) country code as specified by ISO 3166. An empty list indicates that the device does not support region-based customization. Note: This format is currently not supported.
RingGeneration	-	Support for ring generation. A true value indicates support for control of ring generation via the VoiceService.{i}.VoiceProfile.{i}.Line.{i}.Ringer object. A true value also indicates that the RingDescriptionsEditable, PatternBasedRingGeneration and FileBasedRingGeneration parameters in this object are present.
RTCP	-	Support for RTCP.

TR-069/TR-104 Parameter	Configuration File Parameter	Description
RTPRedundancy	-	Support for RTP payload redundancy as defined in RFC 2198. A true value indicates support for VoiceService.{i}.VoiceProfile.{i}.RTP.Redundancy.
SignalingProtocols	voip/signalling/protocol	<p>Signal protocol:</p> <ul style="list-style-type: none"> ▪ "SIP" ▪ "MGCP" <p>Each entry can be appended with a version indicator in the form "/X.Y". For example: "SIP/2.0".</p> <p>Note: Only one protocol is supported at a time.</p>
SRTP	-	<p>Support for SRTP.</p> <p>Note: Currently, SRTP is not supported.</p>
ToneGeneration	-	<p>Support for tone generation. A true value indicates support for the object VoiceService.{i}.VoiceProfile.{i}.Tone.</p> <p>A true value also indicates that the ToneDescriptionsEditable, PatternBasedToneGeneration and FileBasedToneGeneration parameters in this object are present.</p>
VoicePortTests	-	Support for remotely accessible voice-port tests. A true value indicates support for the VoiceService.{i}.PhylInterface.{i}.Tests object.

Table 13-10: InternetGatewayDevice.Services.VoiceService.i.Capabilities.Codecs

TR-069/TR-104 Parameter	Configuration File Parameter	Description
Codec	voip/codecs/i/name	Identifier of the type of codec.
EntryID	voip/codecs/i/	Unique identifier for each entry in the table.
PacketizationPeriod	voip/codecs/i/ptime	<p>Comma-separated list of supported packetization periods (in milliseconds), or continuous ranges of packetization periods. Ranges are indicated as a hyphen-separated pair of unsigned integers.</p> <p>For example:</p> <ul style="list-style-type: none"> ▪ "20" indicates a single discrete value. ▪ "10, 20, 30" indicates a set of discrete values. ▪ "5-40" indicates a continuous inclusive range. ▪ "5-10, 20, 30" indicates a continuous range in addition to a set of discrete values. <p>A range must only be indicated if all values within the range are supported.</p> <p>Note: Currently, only a single ptime per codec is supported.</p>

Table 13-11: InternetGatewayDevice.Services.VoiceService.i.VoiceProfile

TR-069/TR-104 Parameter	Configuration File Parameter	Description
DTMFMethod	voip/out_of_band_dtmf	<p>Method by which DTMF digits must be passed:</p> <ul style="list-style-type: none"> ▪ "InBand" ▪ "RFC2833" ▪ "SIPInfo"
Enable	-	<p>Enables or disables all lines in this profile, or places it into a quiescent state:</p> <ul style="list-style-type: none"> ▪ "Disabled" ▪ "Quiescent" ▪ "Enabled" <p>On creation, a profile must be in the Disabled state.</p> <p>In the Quiescent state, in-progress sessions remain intact, but no new sessions are allowed. Support for the Quiescent state in the device is optional. If this parameter is set to "Quiescent" in the device that does not support the Quiescent state, it must treat it the same as the Disabled state.</p>
Name	-	<p>String to easily identify the profile instance.</p> <p>Note: Currently, this is not supported.</p>

TR-069/TR-104 Parameter	Configuration File Parameter	Description
NumberOfLines	voip/num_of_fxs_lines	Number of instances of Line within this VoiceProfile.

Table 13-12: InternetGatewayDevice.Services.VoiceService.i.VoiceProfile.i.SIP

TR-069/TR-104 Parameter	Configuration File Parameter	Description
OutboundProxy	voip/ signalling/sip/sip_outbound_proxy/addr	Host name or IP address of the outbound proxy. If a non-empty value is specified, the SIP endpoint must send all SIP traffic (requests and responses) to the host indicated by this parameter and the port indicated by the OutboundProxyPort parameter. This must be done regardless of the routes discovered using normal SIP operations, including use of Route headers initialized from Service-Route and Record-Route headers previously received. The OutboundProxy value is not used to generate the URI placed into the Route header of any requests.
OutboundProxyPort	voip/ signalling/sip/sip_outbound_proxy/proxy	Destination port for connecting to the outbound proxy. This parameter must be ignored unless the value of the OutboundProxy parameter in this object is non-empty.
ProxyServer	voip/signalling/sip/proxy_address or voip/signalling/sip/sip_registrar/addr	Host name or IP address of the SIP proxy server.
ProxyServerPort	voip/signalling/sip/proxy_port or voip/signalling/sip/sip_registrar/port	Destination port for connecting to the SIP server.
ProxyServerTransport	voip/signalling/sip/transport_protocol	Transport protocol for connecting to the SIP server. Must be chosen from among the transports supported.
RegisterExpires	voip/signalling/sip/proxy_timeout	Register request Expires header value (in seconds).
RegistrarServerTransport	voip/signalling/sip/transport_protocol	Transport protocol for connecting to the SIP server. Must be chosen from among the transports supported.
UserAgentPort	voip/signalling/sip/port	Port for incoming call control signaling.
UserAgentTransport	voip/signalling/sip/transport_protocol	Transport protocol for incoming call control signaling.

13.4.2.1.4 Upgrading Firmware via TR-069

TR-069 contains a built-in mechanism for the device firmware upgrade.

13.4.2.2 Monitoring the Device Status via TR-069 and TR-104

The service provider can monitor the status of the device via TR-069 and TR-104.

13.4.2.2.1 Device Information

Table 13-13: InternetGatewayDevice.DeviceInfo

TR-069/TR-104 Parameter	Configuration File Parameter	Description
Description	manufacturer/description	A full description of the device (string).
DeviceLog	""	Vendor-specific log(s).
HardwareVersion	Manufacturer/hardware/version	A string identifying the particular device model and version.
Manufacturer	manufacturer/vendor_name	A string identifying the manufacturer of the device, i.e., AudioCodes.
ManufacturerOUI	manufacturer/vendor_oui	Organizationally unique identifier of the device manufacturer. Represented as a six hexadecimal-digit value using all upper-case letters and including any leading zeros.
ModelName	manufacturer/model_number	A string identifying the model name of the device.
ProductClass	manufacturer/product_class	Identifier of the class of product for which the serial number applies. That is, for a given manufacturer, this parameter is used to identify the product or class of product over which the SerialNumber parameter is unique.
ProvisioningCode	cwmp/provisioning_code	Identifier of the primary service provider and other provisioning information, which may be used by the Server to determine service provider-specific customization and provisioning parameters. If non-empty, this argument must be in the form of a hierarchical descriptor with one or more nodes specified. Each node in the hierarchy is represented as a 4-character sub-string, containing only numerals or upper-case letters. If there is more than one node indicated, each node is separated by a "." (dot). For example, "TLCO" and "TLCO.GRP2".
SerialNumber	Manufacturer/hardware/serial_num	Serial number of the device.

TR-069/TR-104 Parameter	Configuration File Parameter	Description
SoftwareVersion	system/external_version	A string identifying the software version currently installed in the device. To allow version comparisons, this element must be in the form of dot-delimited integers, where each successive integer represents a more minor category of variation. For example, 3.0.21 where the components mean Major.Minor.Build.
UpTime	-	Time in seconds since the device was last reset.

13.4.2.2WAN Status

Table 13-14: InternetGatewayDevice.WANDevice.i.WANConnectionDevice.i.WANIPConnection.i.Stats

TR-069/TR-104 Parameter	Configuration File Parameter	Description
EthernetBytesReceived	mt_cwmp_param_wan_conn_ip_stats_get (STAT_RX_BYTES)	Total number of bytes received over all connections within the same WANConnectionDevice that share a common MAC address since the device was last reset.
EthernetBytesSent	mt_cwmp_param_wan_conn_ppp_stats_get (STAT_TX_BYTES)	Total number of bytes sent over all connections within the same WANConnectionDevice that share a common MAC address since the device was last reset.
EthernetPacketsReceived	mt_cwmp_param_wan_conn_ppp_stats_get (STAT_RX_PACKETS)	Total number of Ethernet packets received over all connections within the same WANConnectionDevice that share a common MAC address since the device was last reset.
EthernetPacketsSent	mt_cwmp_param_wan_conn_ppp_stats_get	Total number of Ethernet packets sent over all connections within the same WANConnectionDevice that share a common MAC address since the device was last reset.

13.4.2.2.3 LAN Status

Table 13-15: InternetGatewayDevice.LANDevice.i.LANEthernetInterfaceConfig.i.Stats

TR-069/TR-104 Parameter	Configuration File Parameter	Description
BytesReceived	mt_voip_get_state (line, state)	Total number of bytes received over the interface since the device was last reset.
BytesSent	mt_voip_get_state(line, state)	Total number of bytes sent over the interface since the device was last reset.
PacketsReceived	mt_voip_get_state(line, state)	Total number of packets received over the interface since the device was last reset.
PacketsSent	mt_voip_get_state(line, state)	Total number of packets sent over the interface since the device was last reset.

13.4.2.2.4 VoIP Status via TR-104

Table 13-16: InternetGatewayDevice.Services.VoiceService.i.VoiceProfile.i.Line.i.Stats

TR-069/TR-104 Parameter	Configuration File Parameter	Description
ResetStatistics	-	When set to one, it resets the statistics for this voice line. Always False when read.
PacketsSent	mt_voip_get_state(line, state)	Total number of RTP packets sent for this line.
PacketsReceived	mt_voip_get_state(line, state)	Total number of RTP packets received for this line.
BytesSent	mt_voip_get_state(line, state)	Total number of RTP payload bytes sent for this line.
BytesReceived	mt_voip_get_state(line, state)	Total number of RTP payload bytes received for this line.
PacketsLost	mt_voip_get_state(line, state)	Total number of RTP packets that have been lost for this line.
Overruns	-	Total number of times the receive jitter buffer has overrun for this line.
Underruns	-	Total number of times the receive jitter buffer has underrun for this line.
IncomingCalls Received	-	Total incoming calls received.
IncomingCalls Answered	-	Total incoming calls answered by the local user.
IncomingCalls Connected	-	Total incoming calls that successfully completed call setup signaling.
IncomingCallsFailed	-	Total incoming calls that failed to successfully complete call setup signaling.

TR-069/TR-104 Parameter	Configuration File Parameter	Description
OutgoingCallsAttempted	-	Total outgoing calls attempted.
OutgoingCallsAnswered	-	Total outgoing calls answered by the called party.
OutgoingCallsConnected	-	Total outgoing calls that successfully completed call setup signaling.
OutgoingCallsFailed	-	Total outgoing calls that failed to successfully complete call setup signaling.
CallsDropped	-	Total calls that were successfully connected (incoming or outgoing), but dropped unexpectedly while in progress without explicit user termination.
TotalCallTime	-	Cumulative call duration (in seconds).
ServerDownTime	-	The number of seconds the device is unable to maintain a connection to the server. Applies only to SIP.
ReceivePacketLossRate	mt_voip_get_state(line, state)	Current receive packet loss rate (in percentage).
FarEndPacketLossRate	-	Current far-end receive packet lost rate (in percentage).
ReceiveInterarrivalJitter	-	Current receive interarrival jitter (in microseconds).
FarEndInterarrivalJitter	-	Current Interarrival jitter (in microseconds) as reported from the far-end device via RTCP.
RoundTripDelay	mt_voip_get_state	Current round-trip delay (in microseconds).
AverageReceiveInterarrivalJitter	-	Average receive interarrival jitter (in microseconds) since the beginning of the current call.
AverageFarEndInterarrivalJitter	-	Average far-end interarrival jitter (in microseconds) since the beginning of the current call.
AverageRoundTripDelay	-	Average round-trip delay (in microseconds) since the beginning of the current call. This is the average of the RoundTripDelay statistics accumulated each time the delay is calculated.

13.4.2.3 Security Concerns and Measures

The CPE WAN Management Protocol is designed to allow a high degree of security in the interactions that use it. The CPE WAN Management Protocol is designed to prevent tampering with the transactions that take place between a CPE and ACS, provide confidentiality for these transactions, and allow various levels of authentication.

The following security mechanisms are incorporated in this protocol:

- The protocol supports the use of SSL/TLS for communications transport between CPE and ACS. This provides transaction confidentiality, data integrity, and allows certificate-based authentication between the CPE and ACS.
- The HTTP layer provides an alternative means of CPE authentication based on shared secrets.

13.4.3 Syslog

Syslog is a standard protocol for reporting and logging of messages over IP network and is defined by RFC 3164. The device enables the service provider to configure a Syslog server and a severity level above which errors are sent to the server. Typically, only error-level messages should be sent to the Syslog server (in order not to flood it with irrelevant debug-level information). For debugging, it is possible to temporarily allow logging for debug-level messages (e.g. for SIP messages).

Many free Syslog servers exist, including Kiwi Syslog Daemon (<http://www.kiwisyslog.com>).



Note: Since Syslog is used only to output messages from the device, it does not contain any security concerns.

13.4.4 Automatic File Download

A practical, straight-forward and easy to implement method for mass configuration and firmware update is automatic file download from a remote file server (via HTTP, FTP, or TFTP). This method is used by many service providers.

13.4.4.1 Firmware File Download

The device's firmware files contain information about the target product type and the firmware version information.

13.4.4.2 Configuration File Download

The device supports two configuration file formats, a ***.conf** file and an ***.ini** file. Both files define the same parameters, but in a different format; the ***.conf** file has a hierarchical tree-like structure and the ***.ini** file is "flat" (defining the full path for each parameter).

As with the firmware file, the configuration file can be "pushed" to the device via the Web server or "pulled" by the device from a remote server. This section refers only to the second option.

When the device downloads a file from a remote server, it performs the following actions:

- Decrypts the file, if it is encrypted.
- Checks that the file version is later than the current configuration file version (if it is not later, the new configuration is not used).
- Checks the software version with which the configuration file was created (if the file was created with a later software version, it is not used).

- Merges the configuration file with the current configuration:
 - Parameters that appear in the new file are modified or added
 - Parameters that do not appear in the new file remain in their existing value


Notes:

- It is recommended that the configuration file (that is downloaded from the network), contains only the small subset of parameters that the service provider needs to update remotely.
- To create the configuration file, it is recommended to use the device that is restored to factory settings, modify the required parameters using the Web GUI, and then upload the configuration file from the device with the option to get only the modified configuration fields enabled.

13.4.4.3 Security Concerns and Measures

The main security hazard in automatic file download is that a hacker can force the device to download a file from the hacker's server instead of the service provider's legitimate server. Another concern is exposing information such as the SIP proxy IP address and user and password information in the configuration file (if the hacker is sniffing the network).

The following security measures are available to prevent this:

- The configuration file can be encrypted using 3DES with pre-configured key. This prevents the user from learning the format of the file and obtaining information from it.
- HTTPS can be used to further encrypt the transport.
- HTTPS certificates can be used to allow the device to authenticate the server and also to prevent the user from acquiring the file from the server.

13.4.5 Telnet CLI

The device features a Command Line Interface (CLI) over Telnet. The CLI enables the service provider to manage the device (e.g. reboot, force a firmware upgrade), to obtain information about the status of the device (e.g. VoIP calls, network interfaces, version information), to change the configuration and to perform different debugging tasks (e.g. enable debug logging, enable packet recording).

Typically, the CLI interface is only used for debugging and diagnostics, since it does not allow mass configuration and monitoring.

Since the CLI allows all configuration and management operations, it is important to protect it. The following security measures are available:

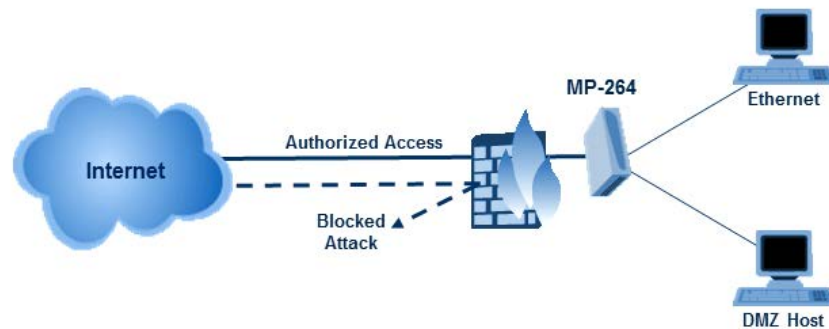
- The CLI is user and password protected (same as the Web).
- Telnet access can be blocked from the WAN and/or LAN interfaces.
- It is possible to limit Telnet access to specific IP addresses.

14 Security

The device's security suite includes comprehensive and robust security services: Stateful Packet Inspection Firewall, user authentication protocols and password protection mechanisms. These features together allow users to connect their computers to the Internet and simultaneously be protected from the security threats of the Internet.

The firewall, which is the cornerstone of your device's security suite, has been exclusively tailored to the needs of the residential/office user and has been pre-configured to provide optimum security.

Figure 14-1: Firewall in Action (e.g., MP-264)



The device firewall provides both the security and flexibility that home and office users seek. It provides a managed, professional level of network security while enabling the safe use of interactive applications, such as Internet gaming and video-conferencing.

Additional features, including surfing restrictions and access control, can also be easily configured locally by the user through a user-friendly Web-based interface, or remotely by a service provider.

The device firewall supports advanced filtering, designed to allow comprehensive control over the firewall's behavior. You can define specific input and output rules, control the order of logically similar sets of rules and make a distinction between rules that apply to WAN and LAN network devices.

The Web-based management screens in the Security section feature the following:

- The 'General' screen allows you to choose the security level for the firewall (see 'General Security Level Settings' on page 254).
- The 'Access Control' screen can be used to restrict access from the home network to the Internet (see 'Local Servers (Port Forwarding)' on page 258).
- The 'Port Forwarding' screen can be used to enable access from the Internet to specified services provided by computers in the home network and special Internet applications (see 'Port Forwarding' on page 258).
- The 'DMZ Host' screen allows you to configure a LAN host to receive all traffic arriving at the device, which does not belong to a known session (see 'Port Triggering' on page 263).
- The 'Port Triggering' screen allows you to define port triggering entries, to dynamically open the firewall for some protocols or ports. (see 'Remote Administration' on page 291).
- The 'Website Restrictions' allow you to block LAN access to a certain host or web site on the Internet (see 'Website Restrictions' on page 266).
- 'Advanced Filtering' allows you to implicitly control the firewall setting and rules (see 'Advanced Filtering' on page 272).
- 'Security Log' allows you to view and configure the firewall Log (see Security Log).

14.1 General Security Level Settings

Use the 'Security Settings' screen to configure the device's basic security settings.

Figure 14-2: General Security Level Settings



The firewall regulates the flow of data between the home network and the Internet. Both incoming and outgoing data are inspected and then either accepted (allowed to pass through the device) or rejected (barred from passing through the device) according to a flexible and configurable set of rules. These rules are designed to prevent unwanted intrusions from the outside, while allowing home users access to the Internet services that they require.

The firewall rules specify what types of services available on the Internet may be accessed from the home network and what types of services available in the home network may be accessed from the Internet. Each request for a service that the firewall receives, whether originating in the Internet or from a computer in the home network, is checked against the set of firewall rules to determine whether the request should be allowed to pass through the firewall. If the request is permitted to pass, then all subsequent data associated with this request (a "session") are also allowed to pass, regardless of its direction.

For example, when you point your Web browser to a Web page on the Internet, a request is sent out to the Internet for this page. When the request reaches the device, the firewall identifies the request type and origin--HTTP and a specific PC in your home network, in this case. Unless you have configured access control to block requests of this type from this computer, the firewall allows this request to pass out onto the Internet (see 'WAN PPPoE' on page 212 for more on setting access controls). When the Web page is returned from the Web server the firewall associates it with this session and allows it to pass, regardless of whether HTTP access from the Internet to the home network is blocked or permitted.

Note that it is the *origin of the request*, not subsequent responses to this request, that determines whether a session can be established or not.

You can choose from among three pre-defined security levels for the device: Minimum, Typical, and Maximum (the default setting). The table below summarizes the behavior of the device for each of the three security levels.

Table 14-1: Behavior for the Three Security Levels

Security Level	Requests Originating in the WAN (Incoming Traffic)	Requests Originating in the LAN (Outgoing Traffic)
Maximum Security (Default)	Blocked: No access to home network from Internet, except as configured in the Local Servers, DMZ host and Remote Access screens	Limited: Only commonly- used services, such as Web- browsing and e-mail, are permitted
Typical Security	Blocked: No access to home network from Internet, except as configured in the Local Servers, DMZ host and Remote Access screens	Unrestricted: All services are permitted, except as configured in the Access Control screen
Minimum Security	Unrestricted: Permits full access from Internet to home network; all connection attempts permitted.	Unrestricted: All services are permitted, except as configured in the Access Control screen

These services include Telnet, FTP, HTTP, HTTPS, DNS, IMAP, POP3 and SMTP.

The list of allowed services at 'Maximum Security' mode can be edited in the screen's 'Access Control on page 256'.

Some applications (such as some Internet messengers and Peer-To-Peer client applications) tend to use these ports if they cannot connect with their own default ports. When applying this behavior, these applications are not blocked outbound, even at Maximum Security Level.

➤ **To configure the device's security settings:**

(See the figure 'General Security Level Settings' on page 254.)

1. Choose from among the three predefined security levels described in the table above. 'Maximum Security' is the default setting.

Using the Minimum Security setting may expose the home network to significant security risks, and thus should only be used, when necessary, for short periods of time.

2. Check the 'Block IP Fragments' check box to protect your home network from a common type of hacker attack that could make use of fragmented data packets to sabotage your home network. Note that some UDP-based services make legitimate use of IP fragments. You need to allow IP fragments to pass into the home network to make use of these select services.
3. In the 'TCP Session timeout' field, enter the time-to-live (TTL) in units of seconds for TCP sessions. The valid range is 1 to 3600 hours (default is an hour).
4. Click **OK** to save the changes.

14.2 Configuring Access Control

You may want to block specific computers within the home network (or even the whole network) from accessing certain services on the Internet. For example, you may want to prohibit one computer from surfing the Web, another computer from transferring files using FTP, and the whole network from receiving incoming e-mail.

Access Control defines restrictions on the types of requests that may pass from the home network out to the Internet, and thus may block traffic flowing in both directions. In the e-mail example given above, you may prevent computers in the home network from receiving e-mail by blocking their *outgoing* requests to POP3 servers on the Internet.

There are services you should consider blocking, such as popular game and file sharing servers. For example, to ensure that your employees do not put your business at risk from illegally traded copyright files, you may want to block several popular P2P and file sharing applications.

➤ To view and allow/restrict these services:

1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **Access Control** tab; the screen 'Access Control' opens.

Figure 14-3: Access Control




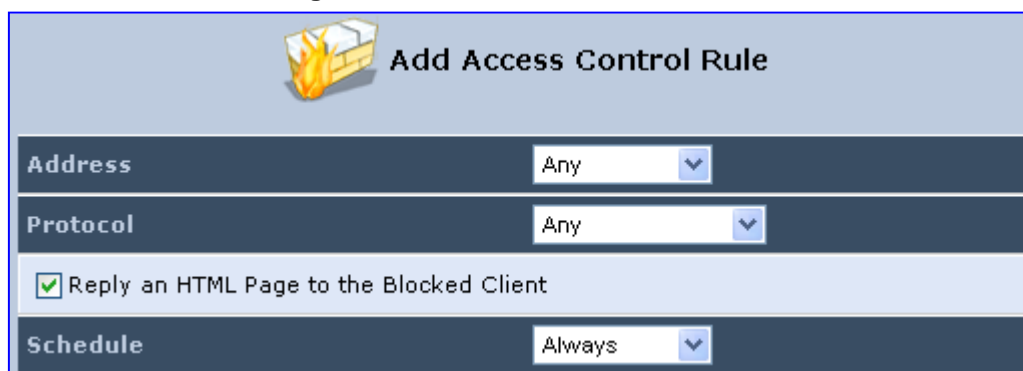

2. Click the **New**  icon; the screen 'Add Access Control Rule' opens (see the figure below).


Figure 14-4: Add Access Control Rule



3. The parameter 'Address' enables you to specify the computer or group of computers for which you would like to apply the access control rule. You can select between any or a specific computer address in your LAN. If you choose the 'Specify Address' option, the screen refreshes, and an 'Add' link appears. Click it to specify a computer address. Specify an address by creating a 'Network Object'.

4. The parameter 'Protocol' lets you select or specify the type of protocol to be used. In addition to the list of popular protocols it provides, you may also choose any or a specific protocol. If you choose option 'Specify Protocol', the screen refreshes and an 'Add' link appears. Click it to specify a protocol address.
5. The parameter 'Schedule' allows you to define the time period during which this rule takes effect. You can select between 'Always' or a specific schedule. If you choose the option 'Specify Schedule', the screen refreshes and an 'Add' link appears. Click it to specify a schedule.
6. Click **OK** to save your settings; the 'Access Control' screen displays a summary of the rule that you just added. Click the **Edit**  icon to edit the access control rule for the service; the screen 'Edit Service' opens.
7. Select the network group to which you would like to apply the rule and the schedule during which the rule takes effect.
8. Click **OK** to save your changes and return to the 'Access Control' screen.

You can disable an access control rule and make the service available without having to remove the service from 'Access Control'. This can be useful when making the service only temporarily available and when expecting to reinstate the restriction in the future.

- To temporarily disable rule, clear the check box adjacent to the service name.
- To reinstate the restriction at a later time, recheck it.
- To remove a rule, click the **Remove**  icon for the service; the service is removed from 'Access Control'.



Note: When Web Filtering is enabled, HTTP services cannot be blocked by Access Control.

14.3 Configuring Port Forwarding

By default, MP-264 blocks all external users from connecting to or communicating with your network. Therefore, the system is safe from hackers who may try to intrude on the network and damage it. However, you may want to expose your network to the Internet in certain limited and controlled ways to enable some applications to work from the LAN (game, voice and chat applications, for example) and to enable Internet access to servers in the home network. The Port Forwarding feature supports both of these functionalities.

The 'Port Forwarding' screen lets you define the applications that require special handling by the device. You must select the application's protocol and the local IP address of the computer using or providing the service. If required, you can add new protocols in addition to the most common ones provided by the device.

For example, to use an FTP application on one of your PCs, select 'FTP' from the list and enter the local IP address or host name of the designated computer; all FTP-related data arriving at the device from the Internet is then forwarded to the specified computer.

Similarly, to grant Internet users access to servers inside your home network, you must identify each service that you want to provide and the PC that provides it. For example, to host a Web server inside the home network you must select 'HTTP' from the list of protocols and enter the local IP address or host name of the computer that hosts the Web server. When an Internet user points her browser to the external IP address of the device, it forwards the incoming HTTP request to the computer that is hosting the Web server.

Additionally, port forwarding enables you to redirect traffic to a different port instead of the one to which it was designated. If for example you have a Web server running on your PC on port 8080 and you want to grant access to this server to anyone who accesses the device via HTTP, do the following:

- Define a port forwarding rule for the HTTP service, with the PC's IP or host name.
- Specify 8080 in the field 'Forward to Port'.

All incoming HTTP traffic is now forwarded to the PC running the Web server on port 8080.

When setting a port forwarding service, you must ensure that the port is not already in use by another application, which may stop functioning. A common example is when using SIP signaling in Voice over IP - the port used by the device's VoIP application (5060) is the same port on which port forwarding is set for LAN SIP agents.



Note: Some applications, such as FTP, TFTP, PPTP and H323, require the support of special specific Application Level Gateway (ALG) modules in order to work inside the home network. Data packets associated with these applications contain information that allows them to be routed correctly. An ALG is needed to handle these packets and ensure that they reach their intended destinations. The device is equipped with a robust list of ALG modules in order to enable maximum functionality in the home network. The ALG is automatically assigned based on the destination port.

➤ **To add a new port forwarding service :**

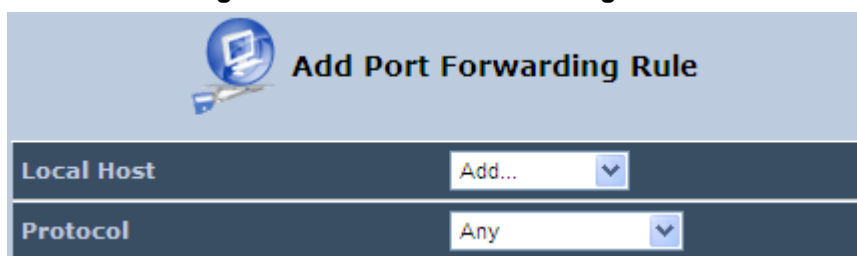
1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **Port Forwarding** tab; the screen 'Port Forwarding' opens.

Figure 14-5: Port Forwarding Screen



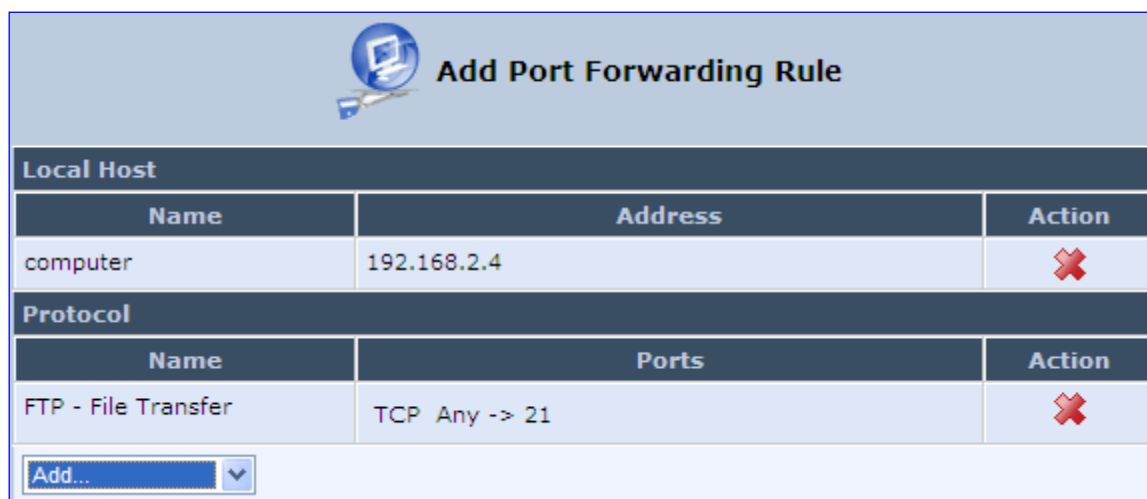
2. Click the **New**  icon; the screen 'Add Port Forwarding Rule' opens.

Figure 14-6: Add Port Forwarding Rule



3. From the 'Local Host' drop-down list, select the network object (defined in Section 5.5.2 on page 61) or define one now by selecting the 'User Defined' option. This is the IP address or host name of the computer that provides the service (the 'server'). **Note:** Only one LAN computer can be assigned to provide a specific service or application.
4. From the 'Protocol' drop-down list, select the type of protocol (defined in Section 5.5.3 on page 63) or select 'User Defined' to define one now. You can select multiple protocols for this rule.

Figure 14-7: Selecting Protocol Type



5. Click the **Advanced** button to configure advanced settings:
 - a. Select the 'Specify Public IP Address' check box if you want to apply this rule on the device's non-default IP address defined in the 'NAT' screen (see Section 14.7 on page 269). Enter the additional external IP address in the 'Public IP Address' field.

Figure 14-8: Specifying Public IP Address



Add Port Forwarding Rule

Local Host		
Name	Address	Action
DHCP	miked	✗

Protocol		
Name	Ports	Action
FTP - File Transfer	TCP Any -> 21	✗

Add... ▼

☒ Specify Public IP Address

Public IP Address: 0 . 0 . 0 . 0

Forward to Port: Same as Incoming Port ▼

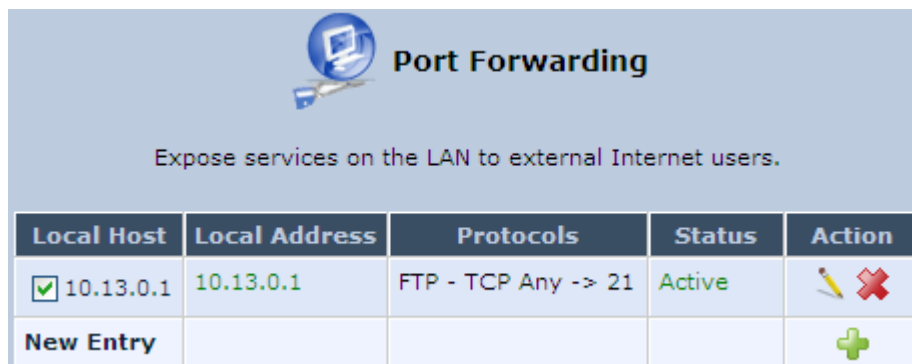
Schedule: Always ▼

- b. By default, the device forwards traffic to the same port as the incoming port. If you wish to redirect traffic to a different port, then from the 'Forward to Port' drop-down list, select the 'Specify', and then enter the port number in the field provided.
- c. By default, the rule is always active. However, you can select a schedule rule that defines the time during which the rule may be active. From the 'Schedule' drop-down list, select a defined Schedule rule (defined in Section 5.5.1 on page 59) or define a new one quickly by selecting 'User Defined'.

6. Click **OK** to save changes.

You can disable a port forwarding rule to make a service unavailable without having to remove the rule from the screen 'Port Forwarding'. This can be useful when making the service temporarily unavailable and when expecting to reinstate it in the future.

Figure 14-9: Select Check Box of Port Forwarding Rule (Active)



- To temporarily disable a rule, clear the check box next to the service name.
- To reinstate it at a later time, select the check box.
- To remove a rule, click the **Remove** icon for the service; the service is permanently removed.

14.4 Configuring a DMZ Host

The DMZ (Demilitarized) Host feature allows one local computer to be exposed to the Internet. Designate a DMZ host to:

- Use a special-purpose Internet service, such as an on-line game or video-conferencing program, that is not present in the Local Servers list and for which no port range information is available.
- To expose one computer to all services, without restriction, irrespective of security.

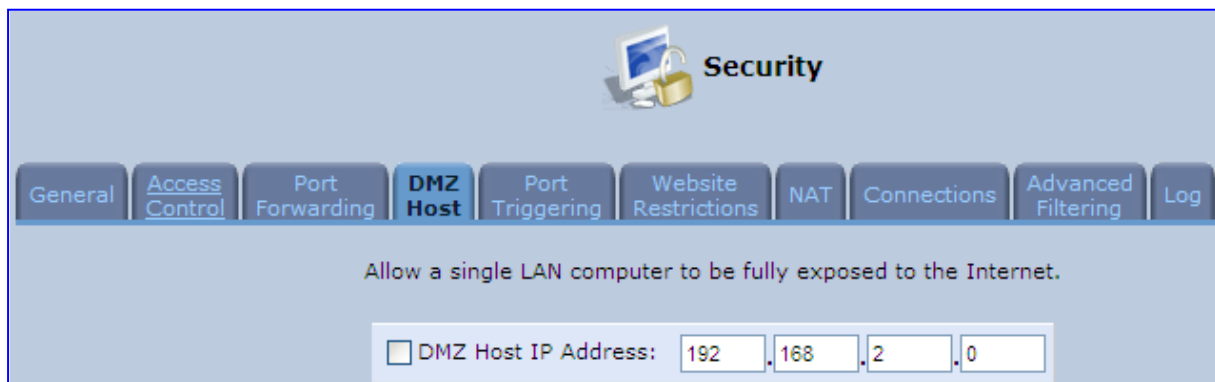
Warning: A DMZ host is not protected by the firewall and may be vulnerable to attack. Designating a DMZ host may also put other computers in the home network at risk. When designating a DMZ host, you must consider the security implications and protect it if necessary.

An incoming request for access to a service in the home network, such as a Web-server, is fielded by the device. The device forwards this request to the DMZ host (if one is designated) unless the service is being provided by another PC in the home network (assigned in Local Servers), in which case that PC receives the request instead.

➤ To designate a local computer as a DMZ Host:

1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **DMZ Host** tab; the screen 'DMZ Host' opens.

Figure 14-10: DMZ Host



2. Enter the local IP address of the computer to be designated as a DMZ host. Note that only one LAN computer can be a DMZ host at any time.
3. Click **OK** to save your changes and return to the screen 'DMZ Host'.

You can disable the DMZ host so that it does not fully exposed to the Internet, but keep its IP address recorded on the 'DMZ Host' screen. This may be useful if you wish to disable the DMZ host but expect that you may want to enable it again in the future.

- To disable the DMZ host so that it is not fully exposed to the Internet, clear the check-box next to the DMZ IP designation and click **OK**.
- To re-enable the DMZ host later, recheck the check-box.

14.5 Configuring Port Triggering

Port triggering can be used for dynamic port forwarding configuration. By setting port triggering rules, you can allow inbound traffic to arrive at a specific LAN host, using ports different than those used for the outbound traffic. This is called port triggering since the outbound traffic triggers to which ports inbound traffic is directed.

For example, consider a gaming server that is accessed using UDP protocol on port 222. The gaming server responds by connecting the user using UDP on port 333 when starting gaming sessions. In such a case you must use port triggering, since this scenario conflicts with the following default firewall settings:

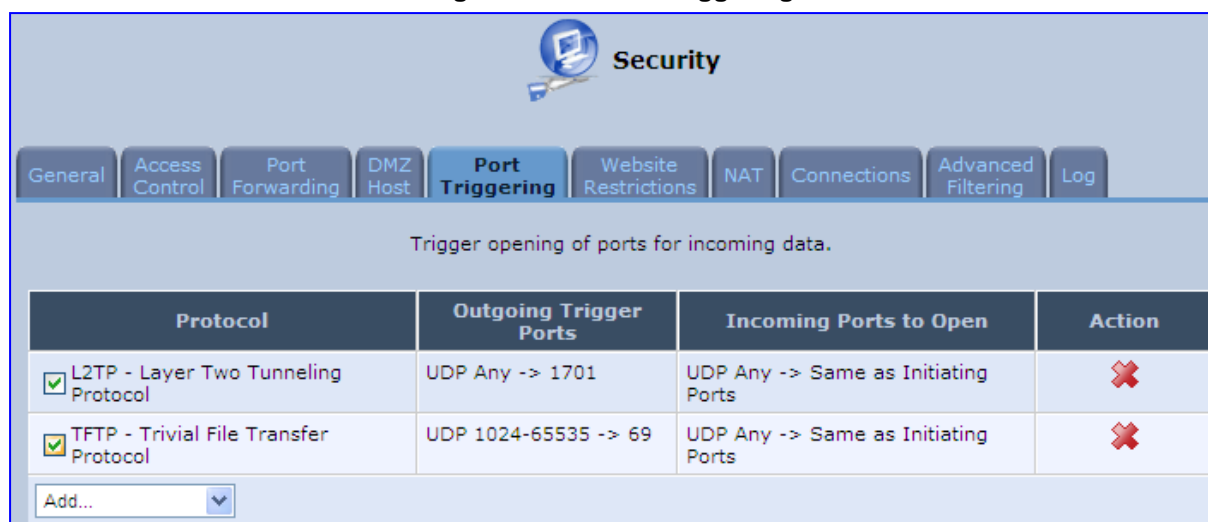
- The firewall blocks inbound traffic, by default.
- The server replies to the device's IP, and the connection is not sent back to your host, since it is not part of a session.

To solve this, you need to define a Port Triggering entry, which allows inbound traffic on UDP port 333, only after a LAN host generated traffic to UDP port 222. This results in accepting the inbound traffic from the gaming server and sending it back to the LAN Host which originated the outgoing traffic to UDP port 222.

➤ **To view port triggering settings:**

1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **Port Triggering** tab; the screen 'Port Triggering' opens. The screen lists all port triggering entries.

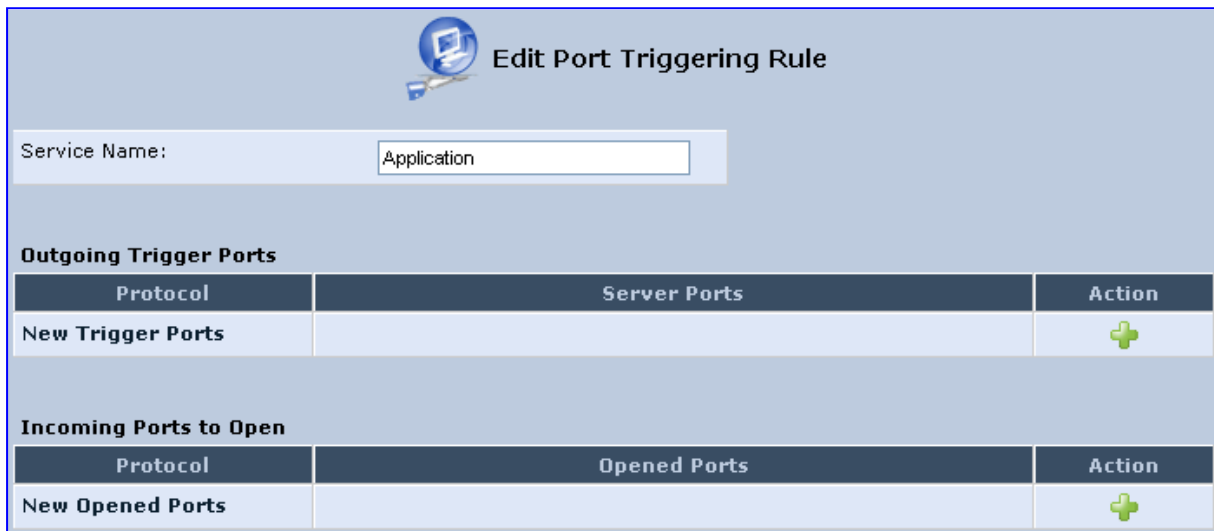
Figure 14-11: Port Triggering



➤ **To add an entry for the gaming example above:**

1. From the drop-down list, select 'User Defined' to add an entry; the screen 'Edit Service' opens.


Figure 14-12: Adding Port Triggering Rules




Edit Port Triggering Rule

Service Name:

Outgoing Trigger Ports

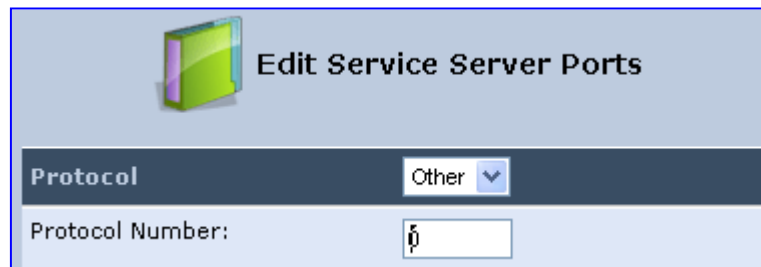
Protocol	Server Ports	Action
New Trigger Ports		

Incoming Ports to Open

Protocol	Opened Ports	Action
New Opened Ports		

2. Enter a name for the service (e.g., 'game_server'), and then click the link **New Trigger Ports**; the screen 'Edit Service Server Ports' opens.

Figure 14-13: Edit Service Server Ports



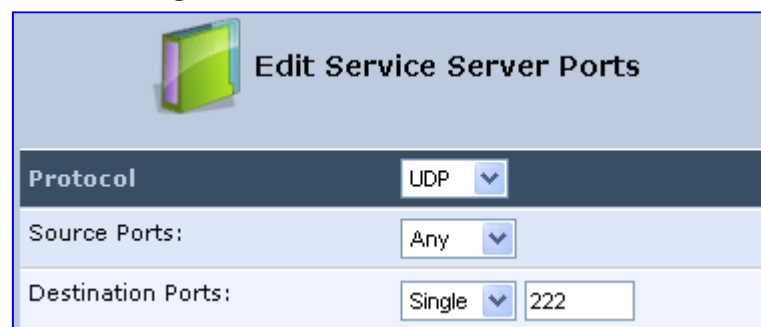
Edit Service Server Ports

Protocol:

Protocol Number:

3. In the 'Protocol' drop-down list, select 'UDP'; the screen refreshes, providing source and destination port options.
4. Leave the 'Source Ports' drop-down list at its default 'Any'. In the 'Destination Ports' drop-down list, select 'Single'; the screen refreshes again, providing an additional field in which you should enter '222' as the destination port.

Figure 14-14: Edit Service Server Ports



Edit Service Server Ports

Protocol:

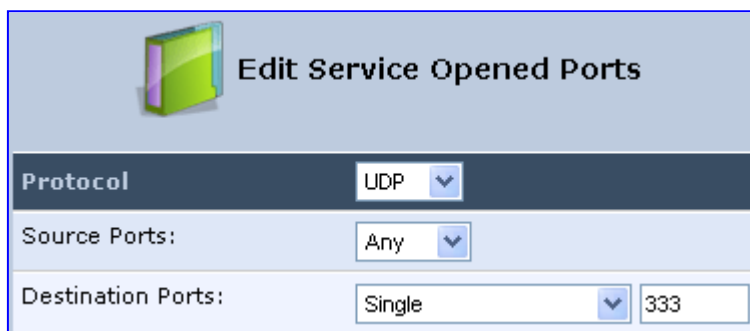
Source Ports:

Destination Ports:

5. Click **OK** to save the settings.

6. In the screen 'Edit Service', click the link **New Opened Ports**; the screen 'Edit Service Opened Ports' opens.
7. Similar to the trigger ports screen, select UDP as the protocol, leave the source port at 'Any', and enter a 333 as the single destination port.

Figure 14-15: Edit Service Opened Ports



Edit Service Opened Ports

Protocol: UDP

Source Ports: Any

Destination Ports: Single 333

8. Click **OK** to save the settings; the screen 'Edit Service' presents your entered information. Click **OK** again to save the port triggering rule; the screen 'Port Triggering' now includes the new port triggering entry.

Figure 14-16: New Port Triggering Rule



Security

General Access Control Port Forwarding DMZ Host **Port Triggering** Website Restrictions NAT Connections Advanced Filtering Log

Trigger opening of ports for incoming data.

Protocol	Outgoing Trigger Ports	Incoming Ports to Open	Action
<input checked="" type="checkbox"/> L2TP - Layer Two Tunneling Protocol	UDP Any -> 1701	UDP Any -> Same as Initiating Ports	
<input checked="" type="checkbox"/> TFTP - Trivial File Transfer Protocol	UDP 1024-65535 -> 69	UDP Any -> Same as Initiating Ports	
<input checked="" type="checkbox"/> Game Server	UDP Any -> 222	UDP Any -> 333	

Add...

You can disable a port triggering rule without having to remove it from the screen 'Port Triggering':

- To temporarily disable a rule, clear the check box corresponding to the service name.
- To reinstate it later, simply reselect the check box.
- To remove a rule, click the **Remove** icon for the service; the service is permanently removed.

There may be a few default port triggering rules listed when you first access the port triggering screen. Note that disabling these rules may result in impaired device functionality.

14.6 Configuring Website Restrictions

You can configure the device to block specific Internet websites so that they cannot be accessed from computers in the home network. Moreover, restrictions can be applied to a comprehensive and automatically-updated table of sites to which access is not recommended.

➤ **To block access to a website:**

1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **Website Restrictions** tab; the screen 'Website Restrictions' opens.

Figure 14-17: Website Restrictions



2. Click the **New**  icon; the 'Restricted Website' screen appears.

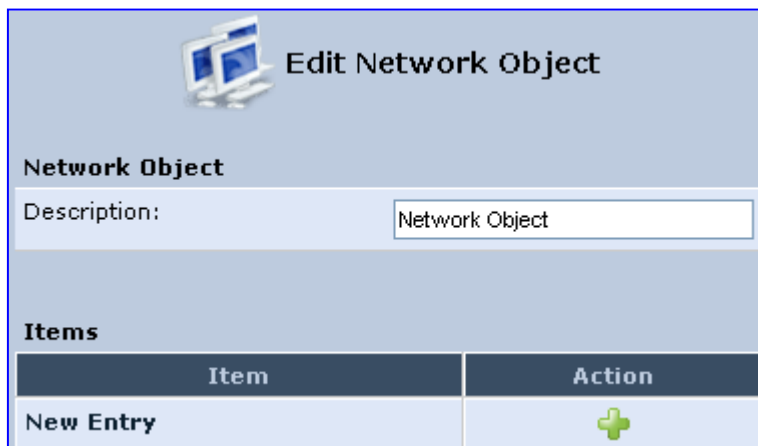
Figure 14-18: Restricted Website



3. Enter the website address (IP address or URL) that you would like to make inaccessible from your home network (all Web pages within the site are also blocked). If the website address has multiple IP addresses, the device resolves all additional addresses and automatically adds them to the restrictions table.

4. The 'Local Host' drop-down list provides you the ability to specify the computer or group of computers for which you would like to apply the website restriction. You can select between any or a specific computer address in your LAN. If you choose the option 'User Defined', the screen refreshes and the 'Edit Network Object' appears:

Figure 14-19: Add a Specific Host




Edit Network Object

Network Object

Description:

Items

Item	Action
New Entry	


5. Click the **New**  icon to specify a computer address. Specify an address creating a 'Network Object'.
6. The parameter Schedule allows you to define the time period during which this rule takes effect. You can select between 'Always' or a specific schedule. If you choose the option 'User Defined', the screen 'Edit Scheduler Rule' appears:

Figure 14-20: Add a Specific Schedule



Edit Scheduler Rule


Name:

Rule Activity Settings

☒ Rule will be Active at the Scheduled Time

☐ Rule will be Inactive at the Scheduled Time

Time Segments	Action
New Time Segment Entry	

7. Click the **New**  icon to specify the time segment, and then click **OK**.
8. Click **OK** to save the settings; the device attempts to find the site. 'Resolving...' appears in the Status column while the site is being located (the URL is 'resolved' into one or more IP addresses).
9. Click the **Refresh** button to update the status if necessary. If the site is successfully located, 'Resolved' appears in the status bar; if not, 'Hostname Resolution Failed' appears.

➤ **If the device fails to locate the website:**

1. Use a Web browser to verify that the website is available. If it is, then you probably entered the website address incorrectly.
2. If the website is unavailable, return to the screen 'Website Restrictions' later and click the button **Resolve Now** to verify that the website can be found and blocked by the device.
3. You can edit the website restriction by modifying its entry under the column 'Local Host' in the screen 'Website Restrictions'.


➤ **To modify an entry:**

1. Click the icon **Edit** for the restriction; the screen 'Restricted Website' opens. Modify the website address, group or schedule as required.
2. Click **OK** to save your changes and return to the screen 'Website Restrictions'.

➤ **To ensure that all current IP addresses corresponding to the restricted websites are blocked:**

1. Click the button **Resolve Now**; the device checks each of the restricted website addresses and ensures that all IP addresses at which this website can be found are included in the IP addresses column.

You can disable a restriction to make a website available again without having to remove it from the screen 'Website Restrictions'. This can be useful when making the website temporarily available and when expecting to block it again in the future.

- To temporarily disable a rule, clear the check box adjacent to the service name.
- To reinstate it at a later time, recheck the check box.
- To remove a rule, click the **Remove**  icon for the service; the service is permanently removed.

14.7 Configuring NAT

The device features a configurable Network Address Translation (NAT) and Network Address Port Translation (NAPT) mechanism, allowing you to control the network addresses and ports of packets routed through your gateway. When enabling multiple computers on your network to access the Internet using a fixed number of public IP addresses, you can statically define which LAN IP address will be translated to which NAT IP address and/or ports.

By default, the device operates in NAPT routing mode. However, you can control your network translation by defining static NAT/NAPT rules. Such rules map LAN computers to NAT IP addresses. The NAT/NAPT mechanism is useful for managing Internet usage in your LAN, or complying with various application demands. For example, you can assign your primary LAN computer with a single NAT IP address, in order to assure its permanent connection to the Internet. Another example is when an application server with which you wish to connect, such as a security server, requires that packets have a specific IP address – you can define a NAT rule for that address.

➤ To define a NAT:

1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **NAT** tab; the screen 'NAT' opens.

Figure 14-21: NAT Screen

2. Before configuring NAT/NAPT rules, you must first enter the additional public IP addresses obtained from your ISP as your NAT IP addresses, in the 'NAT IP Addresses Pool' section. The primary IP address used by the WAN device for dynamic NAT should not be added to this table.
 - a. To add a NAT IP address, click the **New** icon; the 'Edit Item' screen appears.

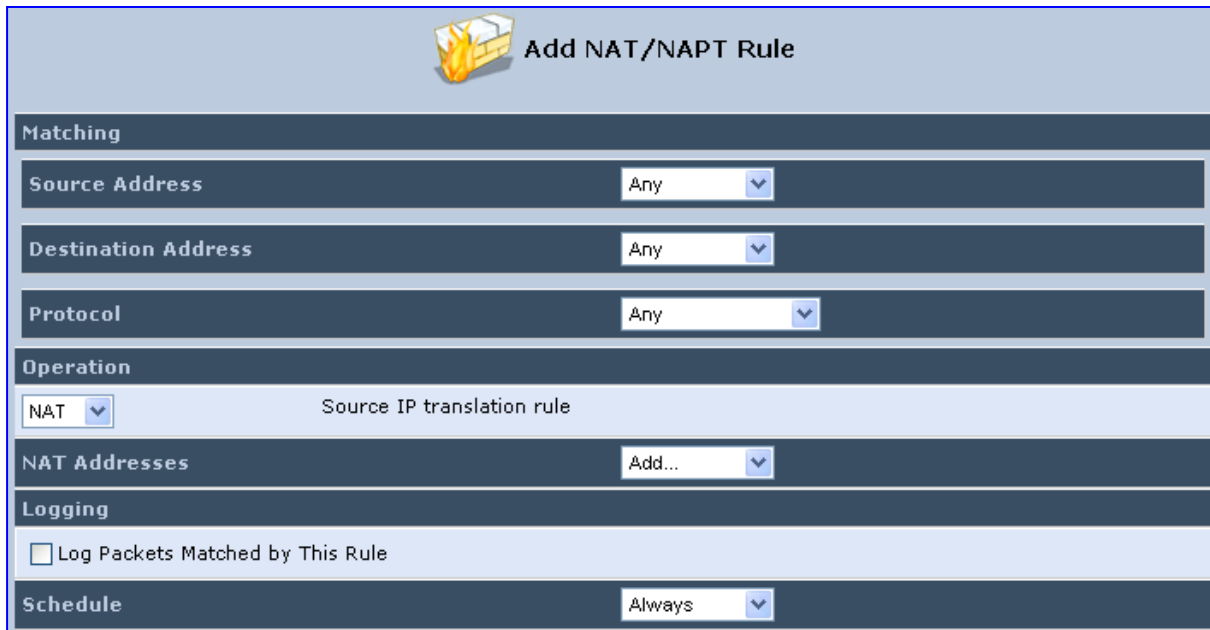
Figure 14-22: Adding a NAT IP Address

- b. From the 'Network Object Type' drop-down list, select between IP address, subnet or range, and then enter the information respectively, and click **OK** to save the settings.

To add a new NAT/NAPT rule:

- a. In the 'NAT/NAPT Rule Sets' section, click the **New Entry** link; the 'Add NAT/NAPT Rule' screen appears.

Figure 14-23: Adding NAT/NAPT Rule



Add NAT/NAPT Rule

Matching

Source Address: Any

Destination Address: Any

Protocol: Any

Operation

NAT: NAT Source IP translation rule

NAT Addresses: Add...

Logging

☐ Log Packets Matched by This Rule

Schedule

Always

This screen is divided into two main sections: 'Matching' and 'Operation'. The 'Matching' section defines the LAN addresses to be translated to the external addresses, which are defined in the 'Operation' section.

3. 'Matching' section (define characteristics of the packets matching the rule):
 - a. **Source Address:** source address of packets sent or received by the device. You can select the computer or group of computers on which you would like to apply the rule. To apply the rule on all the LAN hosts, select 'Any'. If you would like to add a new address, select the 'User Defined'. This commences a sequence to add a new Network Object, representing the new host.
 - b. **Destination Address:** destination address of packets sent or received by the device. This address can be configured in the same manner as the source address. This entry enables further filtration of the packets.
 - c. **Protocol:** specifies a traffic protocol. Selecting the 'Show All Services' option expands the list of available protocols. Select a protocol or add a new one using the 'User Defined' option. This commences a sequence that adds a new Service, representing the protocol. Using a protocol requires observing the relationship between a client and a server to distinguish between the source and destination ports.

4. Operation section (define the operation to apply on the IP addresses, matching the criteria defined above): NAT or NAPT.
 - **NAT Addresses:** NAT address into which the original IP address is translated. The drop-down list displays all of your available NAT addresses/ranges from which you can select an entry. If you would like to add a single address or a sub-range from the given pool/range, select the 'User Defined' option. This commences a sequence that adds a new Network Object, representing the new host.
 - **NAPT Address:** NAPT address into which the original IP address is translated. The drop-down list displays all of your available NAPT addresses/ranges from which you can select an entry. If you would like to add a single address or a sub-range from the given pool/range, select the 'User Defined' option. This commences a sequence that adds a new Network Object, representing the new host. . Note, that in this case the network object may only be an IP address, as NAPT is port-specific.
 - ♦ **NAPT Ports:** specify the port(s) of the IP address into which the original IP address is translated. Enter a single port or select 'Range' (the screen refreshes, enabling you to enter a range of ports).
5. Select the 'Log Packets Matched by This Rule' check box to log the first packet from a connection that was matched by this rule.
6. By default, the 'Schedule' rule is always active. However, you can configure scheduler rules to define time segments during which the rule may be active.
7. Click **OK** to save the settings.

14.8 Viewing Current Connections

The connection list displays all the connections that are currently open, as well as various details and statistics. You can use this list to close an undesired connection by clicking its corresponding action icon. The basic display includes the name of the protocol, the different ports it uses, and the direction in which the connection was initiated.

➤ To view currently open connections:

1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **Connections** tab; the screen 'Connections' opens.
2. From the Connections Per Page drop-down list, select the number of connections that you want displayed per page. To browse to the next page, click the ➡ icon or the page number located at the bottom left of the page.

Figure 14-24: Connections Screen



The screenshot shows the 'Security' configuration page with the 'Connections' tab selected. It displays a summary of active connections and a detailed list below.

Active Connections: 11
Approximate Max. Connections: 181

Connection List Connections Per Page: 10

Number	Protocol	LAN IP:Port	MP252 IP:Port	WAN IP:Port	Direction	Action
1	TCP	10.13.22.32:80	10.13.22.32:80	10.13.22.25:1915	Incoming	✖
2	TCP	10.13.22.32:80	10.13.22.32:80	10.13.22.25:1914	Incoming	✖
3	UDP	239.255.255.250:1900	239.255.255.250:1900	10.13.22.13:63882	Incoming	✖
4	UDP	10.13.22.32:123	10.13.22.32:123	213.28.138.38:123	Outgoing	✖
5	UDP	239.255.255.250:1900	239.255.255.250:1900	10.13.2.17:53546	Incoming	✖
6	TCP	192.168.2.2:57061	10.13.22.32:57061	80.179.55.90:110	Outgoing	✖
7	TCP	192.168.2.2:57060	10.13.22.32:57060	80.179.55.90:110	Outgoing	✖
8	TCP	192.168.2.2:57059	10.13.22.32:57059	80.179.55.90:110	Outgoing	✖
9	TCP	192.168.2.2:57057	10.13.22.32:57057	17.149.34.67:5223	Outgoing	✖
10	TCP	192.168.2.2:57056	10.13.22.32:57056	17.149.36.195:5223	Outgoing	✖

1 2 ➡

To display additional details in the Connection list, click the **Advanced** button.

The 'Approximate Max. Connections' value displays the amount of additional concurrent connections possible.

14.9 Configuring Advanced Filtering

Advanced filtering is designed to allow comprehensive control over the firewall's behavior. You can define specific input and output rules, control the order of logically similar sets of rules and make a distinction between rules that apply to WAN and LAN devices.

➤ **To view the device's advanced filtering options:**

- From the menu bar, click the **Security** menu, and in the screen 'Security', click the **Advanced Filtering** tab; the 'Advanced Filtering' opens.

Figure 14-25: Advanced Filtering



Security

General Access Control Port Forwarding DMZ Host Port Triggering Website Restrictions NAT Connections **Advanced Filtering** Log

Input Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
Initial Rules						New Entry
LAN Bridge Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
WAN ETHoA Rules						New Entry
WAN PPPoE Rules						New Entry
Final Rules						New Entry

Output Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
Initial Rules						New Entry
LAN Bridge Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
WAN ETHoA Rules						New Entry
WAN PPPoE Rules						New Entry
Final Rules						New Entry

ALG Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
Input						
<input checked="" type="checkbox"/> 0	Any	Any	FTP - TCP Any -> 21	ALG FTP	Active	  
<input checked="" type="checkbox"/> 1	Any	Any	SIP - UDP Any -> 5060	ALG SIP	Active	   

This screen is divided into two identical sections, one for 'Input Rule Sets' and the other for 'Output Rule Sets', which are for configuring inbound and outbound traffic, respectively. Each section is comprised of subsets, which can be grouped into three main subjects:

1. Initial rules - rules defined here are applied first, on all devices.
2. Network devices rules - rules can be defined per the device.
3. Final rules - rules defined here are applied last, on all devices.

Numerous rules are automatically inserted by the firewall to provide improved security and block harmful attacks.

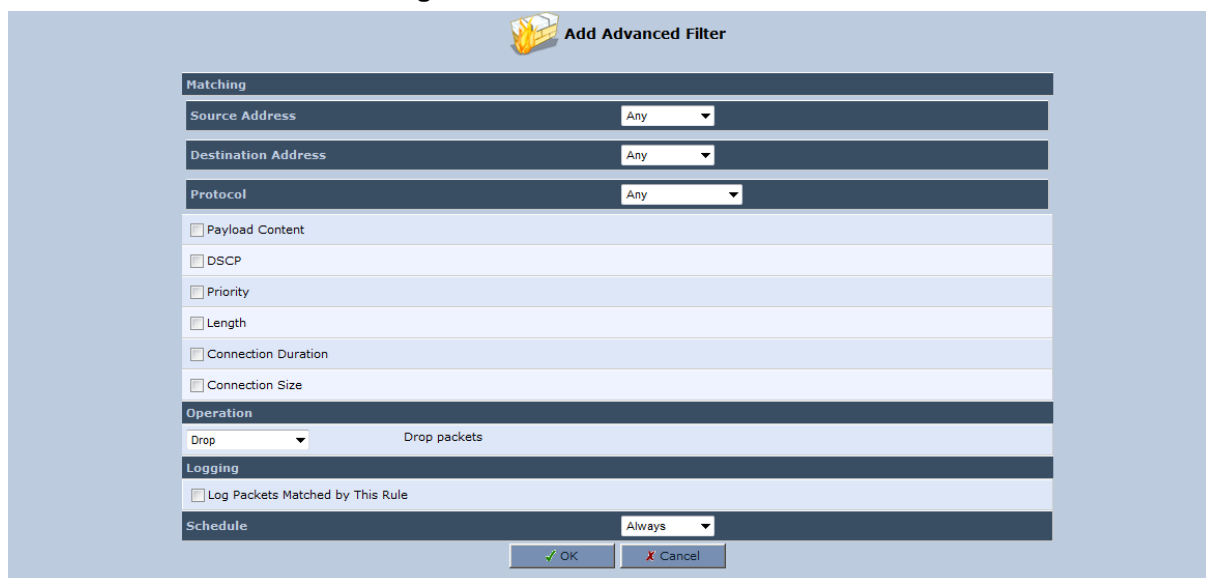


Note: The order of appearance of the firewall rules determines the sequence by which they are applied.

➤ **To configure an advanced filtering rule:**

1. After choosing the traffic direction and the device on which to set the rule, click the corresponding link **New Entry**; the screen 'Add Advanced Filter' opens.

Figure 14-26: Add Advanced Filter



Add Advanced Filter

Matching

Source Address Any

Destination Address Any

Protocol Any

☐ Payload Content
 ☐ DSCP
 ☐ Priority
 ☐ Length
 ☐ Connection Duration
 ☐ Connection Size

Operation

Drop Drop packets

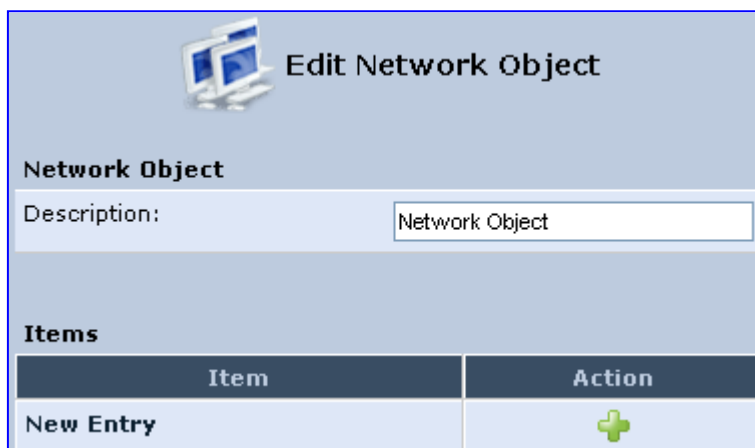
Logging

☐ Log Packets Matched by This Rule

Schedule Always

2. In the section 'Matching', define a match between IP addresses and a traffic protocol:
 - a. Configure the source address of the packets sent to or received from the network object. To add an address, select the option 'User Defined' from the drop-down list; the screen 'Edit Network Object' appears.

Figure 14-27: Add a Specific Host

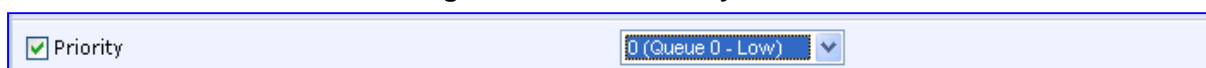


Item	Action
New Entry	+

Click the **New** + icon; this commences a sequence that adds a new network object.

- b. Configure the destination address of the packets sent to or received from the network object. This address can be configured in the same manner as the source address.
 - c. From the 'Protocol' drop-down list, select a specific traffic protocol or add a new one (by selecting 'User Defined'); the 'Edit Services' screen appears. Click the link **New Server Ports**; this commences a sequence that adds a new protocol.
3. Select the check box 'DSCP' to mark a DSCP value on packets matching this rule; the screen refreshes, allowing you to enter the hexadecimal value of the DSCP.
4. Select the check box 'Priority' to add a priority to the rule; the screen refreshes, allowing you to select between one of eight priority levels, zero being the lowest and seven the highest (each priority level is mapped to low/medium/high priority). This sets the priority of a packet on the connection matching the rule, while routing the packet.

Figure 14-28: Set Priority Rule



☒ Priority 0 (Queue 0 - Low) ▼

5. Select the check box 'Length' to specify the length of packets or the length of their data portion.
6. In the section 'Operation', define the action of the rule:
 - **Drop:** Deny access to packets that match the source and destination IP addresses and service ports defined in 'Matching'.
 - **Reject:** Deny access to packets that match the source and destination IP addresses and service ports defined in 'Matching' and sends and sends an ICMP error or a TCP reset to the origination peer.
 - **Accept Connection:** Allow access to packets that match the source and destination IP addresses and service ports defined in 'Matching'. The data transfer session is handled using Stateful Packet Inspection (SPI).

- **Accept Packet:** Allow access to packets that match the source and destination IP addresses and service ports defined in 'Matching'. The data transfer session is not handled using Stateful Packet Inspection (SPI), meaning that other packets that match this rule are not automatically allowed access. For example, this can be useful when creating rules that allow broadcasting.
7. Under the section 'Logging', select the parameter 'Log Packets Matched By This Rule' to log the first packet from a connection that was matched by this rule.
 8. By default, the 'Schedule' rule is always active. However, you can configure scheduler rules to define time segments during which the rule may be active.
 9. Click **OK** to save the settings.

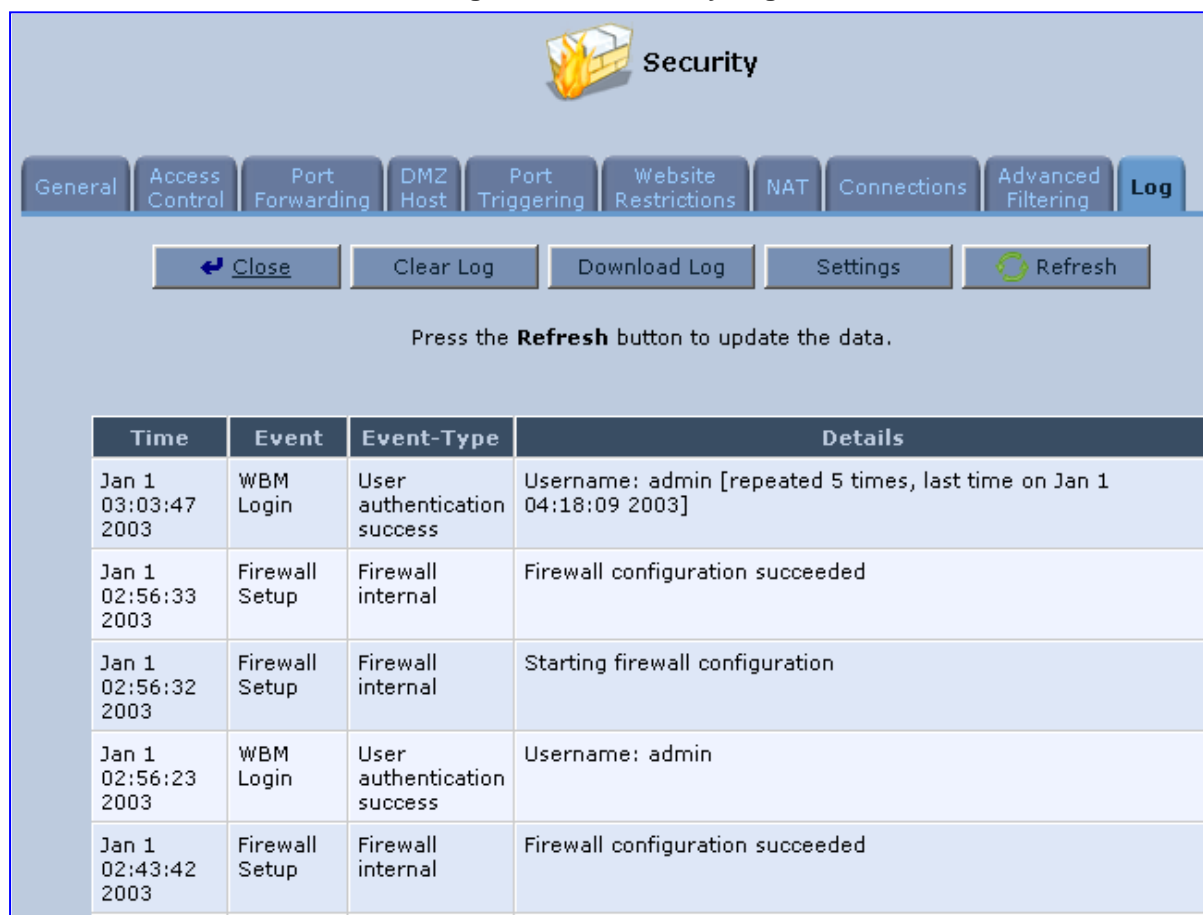
14.10 Viewing the Security Log

The Security log displays a list of firewall-related events, including attempts to establish inbound and outbound connections, attempts to authenticate at an administrative interface (Web-based management or Telnet terminal), firewall configuration and system start-up.

➤ **To view the Security Log:**

1. From the menu bar, click the **Security** menu, and in the screen 'Security', click the **Log** tab; the screen 'Log' opens.

Figure 14-29: Security Log



Time	Event	Event-Type	Details
Jan 1 03:03:47 2003	WBM Login	User authentication success	Username: admin [repeated 5 times, last time on Jan 1 04:18:09 2003]
Jan 1 02:56:33 2003	Firewall Setup	Firewall internal	Firewall configuration succeeded
Jan 1 02:56:32 2003	Firewall Setup	Firewall internal	Starting firewall configuration
Jan 1 02:56:23 2003	WBM Login	User authentication success	Username: admin
Jan 1 02:43:42 2003	Firewall Setup	Firewall internal	Firewall configuration succeeded

2. The log table displays the following:
 - **Time:** to determine the time the event occurred.
 - **Event:** type of event. There are five types of events:
 - ◆ **Inbound Traffic:** The event is a result of an incoming packet.
 - ◆ **Outbound Traffic:** The event is a result of outgoing packet.
 - ◆ **Firewall Setup:** Configuration message.
 - ◆ **WBM Login:** Indicates that a user has logged in to WBM.
 - ◆ **CLI Login:** Indicates that a user has logged in to CLI (via Telnet).
 - **Event-Type:** textual description of the event:
 - ◆ **Blocked:** The packet was blocked. The message is color-coded red.
 - ◆ **Accepted:** The packet was accepted. The message is color-coded green.
 - **Details:** details of the packet or the event, such as protocol, IP addresses, ports, etc.

➤ **To change the security log settings:**

1. In the 'Log' screen, click **Settings**; the screen 'Log Settings' opens.

Figure 14-30: Security Log Settings

 **Log Settings**

Accepted Events

☐ Accepted Incoming Connections

☐ Accepted Outgoing Connections

Blocked Events

☐ All Blocked Connection Attempts

<input type="checkbox"/> Winnuke	<input type="checkbox"/> Multicast/Broadcast	<input type="checkbox"/> ICMP Replay
<input type="checkbox"/> Defragmentation Error	<input type="checkbox"/> Spoofed Connection	<input type="checkbox"/> ICMP Redirect
<input type="checkbox"/> Blocked Fragments	<input type="checkbox"/> Packet Illegal Options	<input type="checkbox"/> ICMP Multicast
<input type="checkbox"/> Syn Flood	<input type="checkbox"/> UDP Flood	<input type="checkbox"/> ICMP Flood
<input type="checkbox"/> Echo Chargen		

Other Events

☐ Remote Administration Attempts

☐ Connection States

Log Buffer

☐ Prevent Log Overrun

2. Select the types of activities for which you would like to have a log message generated.
 - **Accepted Events:**
 - ♦ **Accepted Incoming Connections:** Write a log message for each successful attempt to establish an inbound connection to the home network.
 - ♦ **Accepted Outgoing Connections:** Write a log message for each successful attempt to establish an outgoing connection to the public network.
 - **Blocked Events:**
 - ♦ **All Blocked Connection Attempts:** Write a log message for each blocked attempt to establish an inbound connection to the home network or vice versa. You can enable logging of blocked packets of specific types by disabling this option, and enabling some of the more specific options below it.
 - ♦ **Specific Events:** Specify the blocked events that should be monitored. Use this to monitor specific event such as SynFlood. A log message is generated if either the corresponding check-box is checked, or the check-box 'All Blocked Connection Attempts' is checked.
 - **Other Events:**
 - ♦ **Remote Administration Attempts:** Write a log message for each remote-administration connection attempt, whether successful or not.
 - ♦ **Connection States:** Provide extra information about every change in a connection opened by the firewall. Use this option to track connection handling by the firewall and Application Level Gateways (ALGs).
 - **Log Buffer:**
 - ♦ **Prevent Log Overrun:** Select this check box in order to stop logging firewall activities when the memory allocated for the log fills up.
3. Click **OK** to save the settings.

Reader's Notes

15 Advanced Networking Features

This chapter describes various advanced networking features such as DHCP.

15.1 IP Address Distribution

The device's Dynamic Host Configuration Protocol (DHCP) server makes it possible to easily add computers that are configured as DHCP clients to the home network. It provides a mechanism for allocating IP addresses and delivering network configuration parameters to such hosts. The device's default DHCP server is the LAN bridge.

A client (host) sends out a broadcast message on the LAN requesting an IP address for itself. The DHCP server then checks its list of available addresses and leases a local IP address to the host for a specific period of time and simultaneously designates this IP address as 'taken'. At this point, the host is configured with an IP address for the duration of the lease.

The host can choose to renew an expiring lease or let it expire. If it chooses to renew a lease then it also receives current information about network services, as it did with the original lease, allowing it to update its network configurations to reject any changes that may have occurred since it first connected to the network. If the host wishes to terminate a lease before its expiration it can send a release message to the DHCP server, which then makes the IP address available for use by others.

The device embedded DHCP server provides the following features:

- Displays a list of all DHCP host devices connected to the device
- Defines the range of IP addresses that can be allocated to the LAN
- Defines the length of time for which dynamic IP addresses are allocated
- Provides the above configurations for each LAN device and can be configured and enabled / disabled separately for each LAN device
- Can assign a static lease to a LAN PC so that it receives the same IP address each time it connects to the network even if this IP address is within the range of addresses that the DHCP server may assign to other computers
- Provides the DNS server with the host name and IP address of each PC that is connected to the LAN


In addition, the device can act as a DHCP relay, escalating DHCP responsibilities to a WAN DHCP server. In this case, the device acts merely as a router, while its LAN hosts receive their IP addresses from an external DHCP server on the WAN.



With the device's optional Zero Configuration Technology feature, the IP Auto Detection method detects statically-defined IP addresses in addition to the device's DHCP clients. It learns all the IP addresses on the LAN and integrates the collected information with the database of the DHCP server. This allows the DHCP server to issue valid leases, thus avoiding conflicting IP addresses used by other computers in the network.

➤ **To view services currently provided by the DHCP server:**

- In the 'Advanced' screen, click the **IP Address Distribution**  icon; the 'IP Address Distribution' screen appears.

Figure 15-1: DHCP Server Summary



Name	Service	Subnet Mask	Dynamic IP Range	Action
LAN Bridge	DHCP Server	255.255.255.0	192.168.2.1 - 192.168.2.254	
WAN Ethernet	Disabled			



Note: If the 'Service' column displays "Disabled", then DHCP services are not being provided to hosts connected to the network through the device interface. This means that the device does not assign IP addresses to these computers, which is useful if you wish to work with static IP addresses only.

15.1.1 Configuring the DHCP Server

The procedure below describes how to edit a service provided by the DHCP server.

➤ **To edit the DHCP server settings for a device:**



1. In the 'IP Address Distribution' screen, click the **Edit**  icon corresponding to the entry that you want to edit; the DHCP Server settings for this device are displayed.

Figure 15-2: DHCP Settings Screen



DHCP Settings for WAN Ethernet

IP Address Distribution		DHCP Server
Start IP Address:	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>	
End IP Address:	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>	
Subnet Mask:	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>	
Lease Time in Minutes:	<input type="text" value="0"/>	
<input type="checkbox"/> Provide Host Name If Not Specified by Client		

2. From the 'IP Address Distribution' drop-down list, select whether to disable the device DHCP server, or enable DHCP (the device serves as a DHCP server or DHCP relay).

3. In the 'Start IP Address' and 'End IP Address' fields, define the IP address range. This determines the number of hosts that may be connected to the network in this subnet. The 'Start IP Address' field specifies the first IP address that may be assigned in this subnet; the 'End IP Address' field specifies the last IP address in the range.
4. In the 'Subnet Mask' field, define the subnet to which an IP address belongs (e.g., 255.255.0.0).
5. In the 'Lease Time in Minutes' field, define the time for which each device is assigned an IP address by the DHCP server when it connects to the network. When the lease expires, the server determines if the computer has disconnected from the network. If it has, then the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use become available for other computers on the network.
6. Select the 'Provide Host Name If Not Specified by Client' check box to enable the device to assign clients a default name if they do not have a host name.
7. Click **OK**.

15.1.2 Configuring DHCP Relay

The device can act as a DHCP relay if you want to dynamically assign IP addresses from a DHCP server other than the device's DHCP server. .



Note: When implementing DHCP relay, you must configure the WAN of the device to operate in routing mode.

➤ **To configure a device as a DHCP relay:**


1. In the 'IP Address Distribution' screen, click the **Edit**  icon corresponding to the entry that you want to edit; the DHCP Server settings for this device are displayed.
2. From the 'IP Address Distribution' drop-down list, select the 'DHCP Relay' option; the 'DHCP Settings' screen appears.

Figure 15-3: DHCP Settings

DHCP Settings for LAN Bridge	
IP Address Distribution	DHCP Relay
Address	Action
New IP Address	


3. Click the **New**  icon; the 'DHCP Relay Server Address' screen appears.

Figure 15-4: DHCP Relay Server Address Screen

DHCP Relay Server Address

IP Address:

4. In the 'IP Address' field, enter the IP address of the DHCP server.

5. Click **OK** to save your changes.
6. Click **OK** once more in the 'DHCP Settings' screen.
7. Change the device's WAN to operate in routing mode:
 - a. On the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.
 - b. Click the **Edit**  icon corresponding to the WAN Ethernet connection; the 'WAN Ethernet Properties' screen appears.
 - c. Click the **Routing** tab.
 - d. From the 'Routing Mode' drop-down list, select 'Route'.
 - e. Click **OK** to save the settings.









15.1.3 Viewing DHCP Clients

The procedure below describes how to view a list of hosts (computers) that are allocated IP addresses by the DHCP server.

➤ **To view a list of computers currently recognized by the DHCP server:**

1. In the 'IP Address Distribution' screen, click the **Connection List** button; the 'DHCP Connections' screen appears.

Figure 15-5: DHCP Connection Screen

 DHCP Connections							
Host Name	IP Address	Physical Address	Lease Type	Connection Name	Status	Expires In	Action
itaico-laptop	192.168.2.3	00:13:02:39:88:00	Dynamic	LAN Bridge	Active	36 Minutes	  
TW-Laptop	192.168.2.4	00:14:c2:e4:3d:f0	Dynamic	LAN Bridge	Active	49 Minutes	  
New Static Connection							

15.1.4 Configuring Static DHCP Clients

The procedure below describes how to define a static (fixed) IP address for a DHCP client.

➤ **To define a DHCP client with a fixed IP address:**


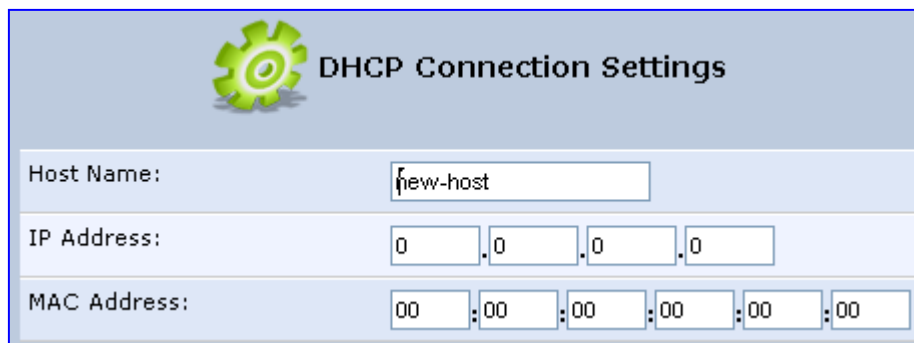
1. In the 'IP Address Distribution' screen, click the **Connection List** button; the 'DHCP Connections' screen appears.
2. Click the **New**  icon; the 'DHCP Connection Settings' screen appears.

Figure 15-6: DHCP Connection Settings Screen



DHCP Connection Settings

Host Name:

IP Address:

MAC Address: : : : : :


3. In the 'Host Name' field, enter a host name for this connection.
4. In the 'IP Address' field, enter the fixed IP address to be assigned to the computer.
5. In the 'MAC Address' field, enter the MAC address of the computer's network card.



Note: The device's fixed IP address is actually assigned to the specific network card's (NIC) MAC address installed on the LAN computer. If you replace this network card then you must update the device's entry in the DHCP Connections list with the new network card's MAC address.

6. Click **OK** to save the settings; the 'DHCP Connections' screen reappears displaying the defined static connection. This connection can be edited or deleted.

15.2 Configuring a DNS Server

The **DNS Server**  icon allows you to manage the device's Domain Name System (DNS) server. The DNS server does not require configuration. However, you can view the list of computers known by the DNS, edit the host names or IP addresses of computers in the list, or manually add a new computer to the list.

DNS provides a service that translates domain names into IP addresses and vice versa. The device's DNS server is an auto-learning DNS, which means that when a new computer is connected to the network, the DNS server learns its name and automatically adds it to the DNS table. Other network users may immediately communicate with this computer using either its name or its IP address.

The device's DNS server also provides the following functionalities:


- Shares a common database of domain names and IP addresses with the DHCP server.
- Supports multiple subnets within the LAN simultaneously.
- Automatically appends a domain name to unqualified names.
- Allows new domain names to be added to the database using the device's Web interface.
- Permits a computer to have multiple host names.
- Permits a host name to have multiple IPs (needed if a host has multiple network cards).

➤ To add a new host computer to the DNS table:

1. In the 'Advanced' screen, click the  icon; the DNS table is displayed.


Figure 15-7: DNS Server



DNS Server			
Host Name	IP Address	Source	Action
sue	10.13.2.1	User Defined	 
New DNS Entry			

2. Click the **New**  icon; the 'DNS Entry' screen appears.


Figure 15-8: DNS Entry




DNS Entry	
Host Name:	<input type="text" value="new-host"/>
IP Address:	<input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/>

3. Enter the computer's host name and IP address.
4. Click **OK** to save your changes.

➤ **To edit the host name or IP address of an entry:**

1. Click the **Edit**  icon corresponding to the host that you want to edit; the 'DNS Entry' screen appears.
2. If the host was manually added to the DNS Table, you can modify its host name and/or IP address. If it wasn't, you can only modify its host name.
3. Click **OK** to save your changes.

➤ **To remove a host from the DNS table:**

- Click the **Remove**  icon corresponding to the host that you want to delete; the entry is removed from the table.

15.3 Configuring Dynamic DNS

The Dynamic DNS (DDNS) feature allows you to alias a dynamic IP address to a static hostname, allowing your computer to be more easily accessible from various locations on the Internet. Typically, when you connect to the Internet, your ITSP assigns an unused IP address from a pool of IP addresses, and this address is used only for the duration of a specific connection. Dynamically assigning addresses extends the usable pool of available IP addresses, whilst maintaining a constant domain name.

When using the DDNS service, each time the IP address provided by your ITSP changes, the DNS database changes accordingly to reflect the change. In this way, even though your IP address changes often, your domain name remains constant and accessible.

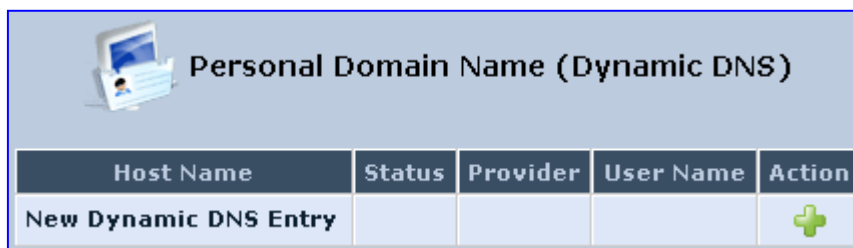
To be able to use the Dynamic DNS (DDNS) feature, you must first open a free DDNS account at <http://www.dyndns.org/account/create.html>. When applying for an account, you need to specify a user name and password. Have them readily available when customizing the device's DDNS support. For detailed information on DDNS, see <http://www.dyndns.org>.

➤ To open a dynamic DNS account:

1. In the 'Advanced' screen, click the **Personal Domain Name (Dynamic DNS)** icon; the 'Personal Domain Name (Dynamic DNS)' screen appears.



Figure 15-9: Personal Domain Name (Dynamic DNS) Screen




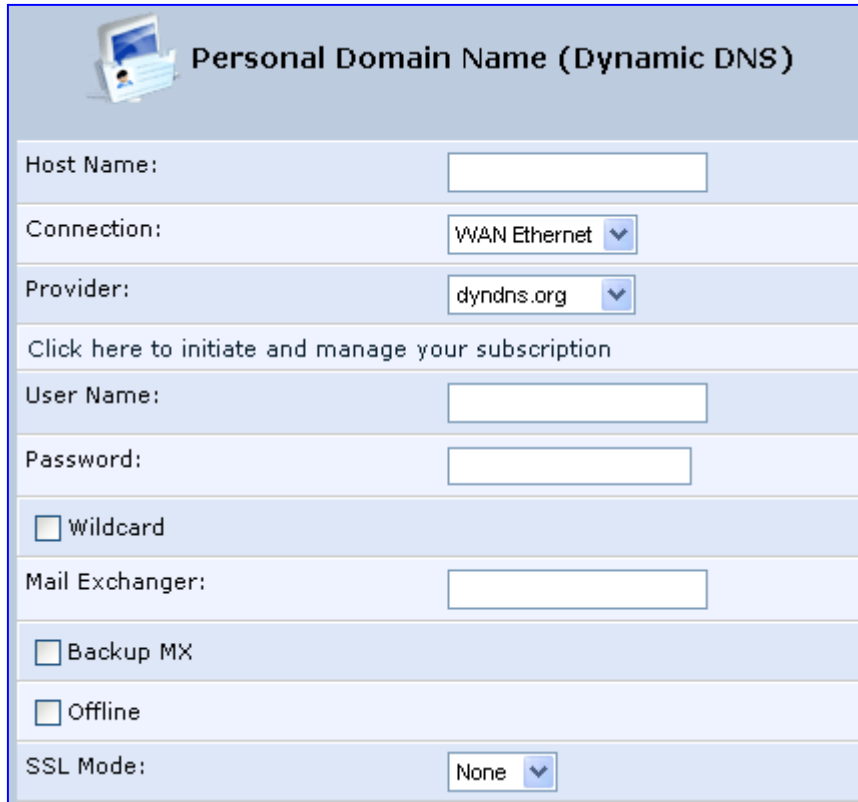

2. Click the **New**  icon to add a new connection; the 'Personal Domain Name (Dynamic DNS)' screen appears.

Figure 15-10: Personal Domain Name (Dynamic DNS) - Adding

 Personal Domain Name (Dynamic DNS)	
Host Name:	<input type="text"/>
Connection:	WAN Ethernet ▼
Provider:	dyndns.org ▼
Click here to initiate and manage your subscription	
User Name:	<input type="text"/>
Password:	<input type="password"/>
<input type="checkbox"/> Wildcard	
Mail Exchanger:	<input type="text"/>
<input type="checkbox"/> Backup MX	
<input type="checkbox"/> Offline	
SSL Mode:	None ▼

3. In the 'Host Name' field, enter your full DDNS domain name.
4. From the 'Connection' drop-down list, select the connection to which you want to couple the DDNS service. The DDNS service uses only the selected device, unless failover is enabled. In this case, the failed-to device is used instead (assuming its route rules consent), until the chosen device is up again. In a single WAN scenario, this field appears as static text (non-configurable). This is applicable if you have multiple WAN devices.
5. From the 'Provider' drop-down list, select your DDNS service provider and then click the link **Click here to initiate and manage your subscription** to open the selected provider's account creation Web page. For example, if you select 'dyndns.org', the following page opens: <http://www.dyndns.com/account>.
6. In the 'User Name' and 'Password' fields, enter your DDNS user name and password, respectively.
7. To enable use of special links (such as such as `www.<your host>.dyndns.org`), select the 'Wildcard' check box.
8. In the 'Mail Exchanger' field, enter your mail exchange server address to redirect all e-mails arriving at your DDNS address to your mail server.
9. To designate the mail exchange server as a backup server, select the 'Backup MX' check box.

10. To temporarily take your site offline (i.e., prevent traffic from reaching your DDNS domain name), select the 'Offline' check box. This redirects DNS requests to an alternative, predefined URL. The availability of this feature depends on your DDNS account's level of service. The redirection URL must be configured through the account as well.
11. From the 'SSL Mode' drop-down list, select the certificate validation method used by the device to validate the DDNS server's certificate upon secured connection to DDNS using HTTPS:
 - **None:** The server's certificate is not validated.
 - **Chain:** Validates the entire certificate chain. When selecting this option, the screen refreshes, displaying the 'Validate Time' drop-down list for selecting whether or not to validate the certificate's expiration time ('Ignore' or 'Check' respectively). If the certificate has expired, the connection terminates immediately.
 - **Direct:** Ensures that the server's certificate is directly signed by the root certificate. This option also provides the 'Validate Time' drop-down list for validation of the certificate's expiration time, as described above.
12. Click **OK**.

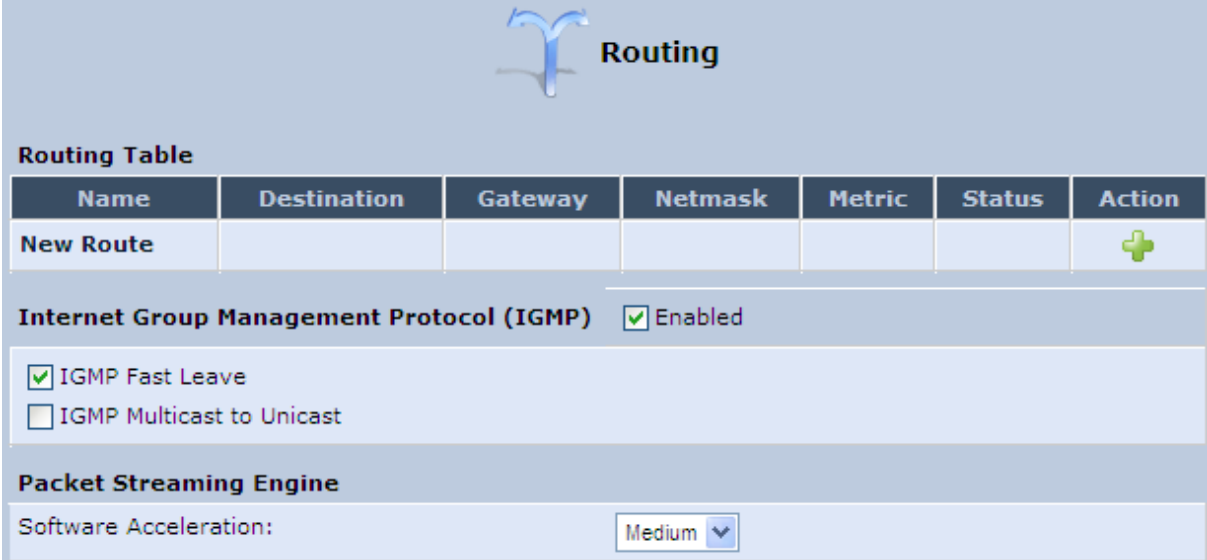
15.4 Configuring Routing Rules

This section describes how to configure routing rules and enable routing protocols. These are configured in the 'Routing' screen, as described below.

➤ **To access the Routing screen:**

- In the 'Advanced' screen, click the **Routing**  icon; the 'Routing' screen appears.

Figure 15-11: Routing Rules



The screenshot shows the 'Routing' configuration screen. At the top, there is a blue header with a stylized 'Y' icon and the word 'Routing'. Below this is a section titled 'Routing Table' containing a table with columns: Name, Destination, Gateway, Netmask, Metric, Status, and Action. The first row is 'New Route' with a green plus icon in the Action column. Below the table, there is a section for 'Internet Group Management Protocol (IGMP)' which is 'Enabled' (checked). It includes two sub-options: 'IGMP Fast Leave' (checked) and 'IGMP Multicast to Unicast' (unchecked). At the bottom, there is a 'Packet Streaming Engine' section with a 'Software Acceleration' dropdown menu set to 'Medium'.

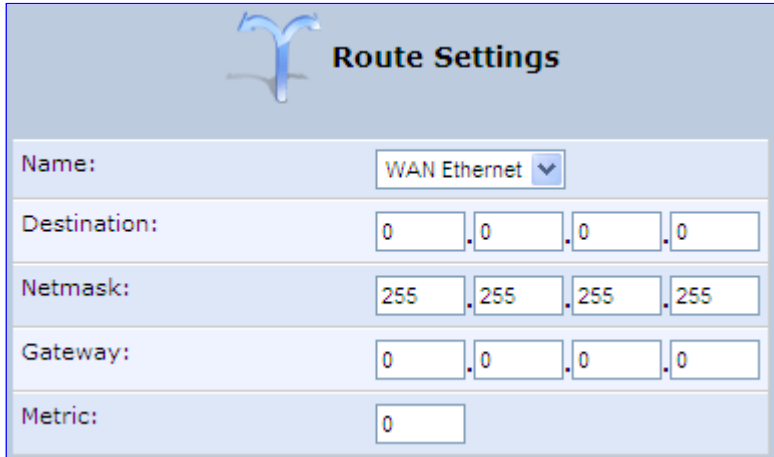
15.4.1 Managing Routing Table Rules

The procedure below describes how to add routing rules.

➤ **To add routing tables:**

1. In the 'Advanced' screen, click the **New**  icon in the **Routing Table**; the 'Route Settings' screen appears.

Figure 15-12: Route Settings Screen



The screenshot shows the 'Route Settings' configuration screen. It has a blue header with a stylized 'Y' icon and the text 'Route Settings'. Below the header, there are several input fields: 'Name' with a dropdown menu showing 'WAN Ethernet', 'Destination' with four input boxes containing '0', '0', '0', and '0', 'Netmask' with four input boxes containing '255', '255', '255', and '255', 'Gateway' with four input boxes containing '0', '0', '0', and '0', and 'Metric' with a single input box containing '0'.

2. From the 'Name' drop-down list, select the network device for which you want to add a routing rule.

3. In the 'Destination' field, enter the destination host, subnet address, network address, or default route. The destination for a default route is "0.0.0.0".
4. In the 'Netmask' field, enter the network mask that used in conjunction with the destination to determine when a route is used.
5. In the 'Gateway' field, enter the device's IP address.
6. In the 'Metric' field, enter the measurement of the preference of a route. Typically, the lowest metric is the most preferred route. If multiple routes exist to a given destination network, the route with the lowest metric is used.
7. Click **OK** to save your settings.

15.4.2 Configuring Routing Protocols

The device supports IGMP multicasting, which allows hosts connected to a network to be updated whenever an important change occurs in the network. A multicast is simply a message that is sent simultaneously to a pre-defined group of recipients. When you join a multicast group you receive all messages addressed to the group, similar to an e-mail message sent to a mailing list.

IGMP multicasting enables UPnP capabilities over wireless networks and may also be useful when connected to the Internet through a router. When an application running on a computer in the home network sends out a request to join a multicast group, the device intercepts and processes the request. If the device is set to 'Minimum Security', no further action is required. However, if the device is set to 'Typical Security' or 'Maximum Security', you must add the group's IP address to the device's 'Multicast Groups' screen. This allows incoming messages addressed to the group to pass through the device's firewall and on to the correct LAN computer.

➤ To configure routing protocols:

1. In the 'Advanced' screen, under the **Internet Group Management Protocol (IGMP)** group, do the following:
 - a. Select the 'Enabled' check box to enable IGMP multicasting.
 - b. Select the 'IGMP Fast Leave' check box if you want the device to stop forwarding traffic to a host that is the only subscriber, immediately upon request (without query delay).
 - c. Select the 'IGMP Multicast to Unicast' check box to enable the device to convert the incoming multicast data stream into unicast format to route it to the specific LAN host that requested the data. In this way, the device prevents flooding the rest of the LAN hosts with irrelevant multicast traffic.
2. Under the **Packet Streaming Engine** group, from the 'Software Acceleration' drop-down list, select the packet flow speed:
 - **None:** Packet Streaming Engine (PSE) is disabled
 - **Medium:** PSE is active (recommended)
 - **High:** PSE traffic is prioritized over other traffic
3. Click **OK**.

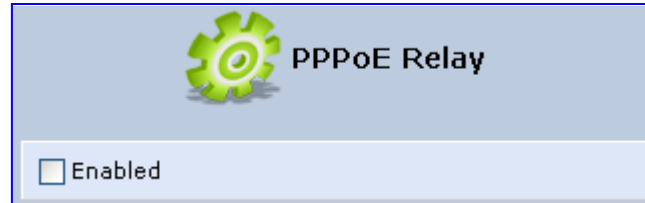
15.5 Enabling PPPoE Relay

PPPoE relay enables the device to relay packets on PPPoE connections while keeping its designated functionality for any additional connections.

➤ **To enable PPPoE relay:**

1. In the 'Advanced' screen, click the **PPPoE Relay**  icon; the 'PPPoE Relay' screen appears.

Figure 15-13: PPPoE Relay Screen



2. Select the 'Enabled' check box.
3. Click **OK**.

15.6 Selecting Regional Settings for Analog Lines

The behavior and parameters of analog telephone lines vary between countries. The set of Call Progress Tones, the protocol used for caller ID and the analog line impedance are all location-specific. The device enables users to select the country they reside in and the device automatically selects the correct regional settings.

➤ **To select your present location:**


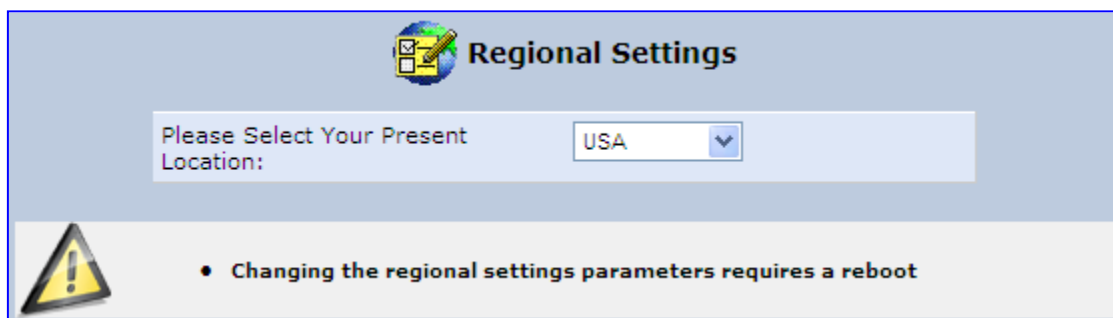
1. In the 'Advanced' screen, click the **Regional Settings**  icon; the 'Regional Settings' screen appears.
2. Select the country from the drop-down list. If your current location is not listed, contact your service provider.

Figure 15-14: Regional Settings Screen



3. Click **OK**.
4. Reboot the device for your settings to take effect.

16 Home Media

16.1 Universal Plug and Play

Universal Plug-and-Play (UPnP) is a networking architecture that provides compatibility among networking equipment, software, and peripherals. UPnP-enabled products can seamlessly connect and communicate with other UPnP-enabled devices without the need for user configuration, centralized servers, or product-specific device drivers. This technology leverages existing standards and technologies, including TCP/IP, HTTP 1.1 and XML, facilitating the incorporation of UPnP capabilities into a wide range of networked products for the home.

UPnP technologies are rapidly adopted and integrated into widely-used consumer products such as Windows XP. Therefore it is critical that today's Residential Gateways be UPnP-compliant. Your device is at the forefront of this development, offering a complete software platform for UPnP devices. This means that any UPnP-enabled control point (client) can dynamically join the network, obtain an IP address and exchange information about its capabilities and those of other computers on the network. They can subsequently communicate with each other directly, thereby further enabling peer-to-peer networking. And this all happens automatically, providing a truly zero-configuration network.

16.1.1 Enabling Universal Plug and Play on the Device

The procedure below describes how to enable the Universal Plug and Play (UPnP) feature on the device.

➤ **To enable UPnP:**


1. In the 'Advanced' screen, click the **Universal Plug and Play**  icon; the 'Universal Plug and Play' screen appears.

Figure 16-1: Advanced - Universal Plug n Play (e.g., MP-264)



2. Select the 'Allow Other Network Users to Control MP264's Network Features' to enable the UPnP feature. This allows you to define UPnP services on any of the LAN hosts.
3. Select the 'Enable Automatic Cleanup of Old Unused UPnP Services' to enable automatic cleanup of invalid rules. This feature checks the validity of all UPnP services every five minutes, and removes old and obsolete services, unless a user-defined rule depends on them.
4. From the 'WAN Connection Publication' drop-down list, select which WAN information is published by the device. By default, the device publishes only its main WAN connection, which is controllable by UPnP entities. However, you may select the 'Publish All WAN Connections' option if you wish to grant UPnP control over all of the device's WAN connections.

16.1.2 Adding UPnP-enabled PC to Home Network

If your computer is running an operating system that supports UPnP such as Windows XP, you can add the computer to your home network and access the Web-based Management directly from Windows.

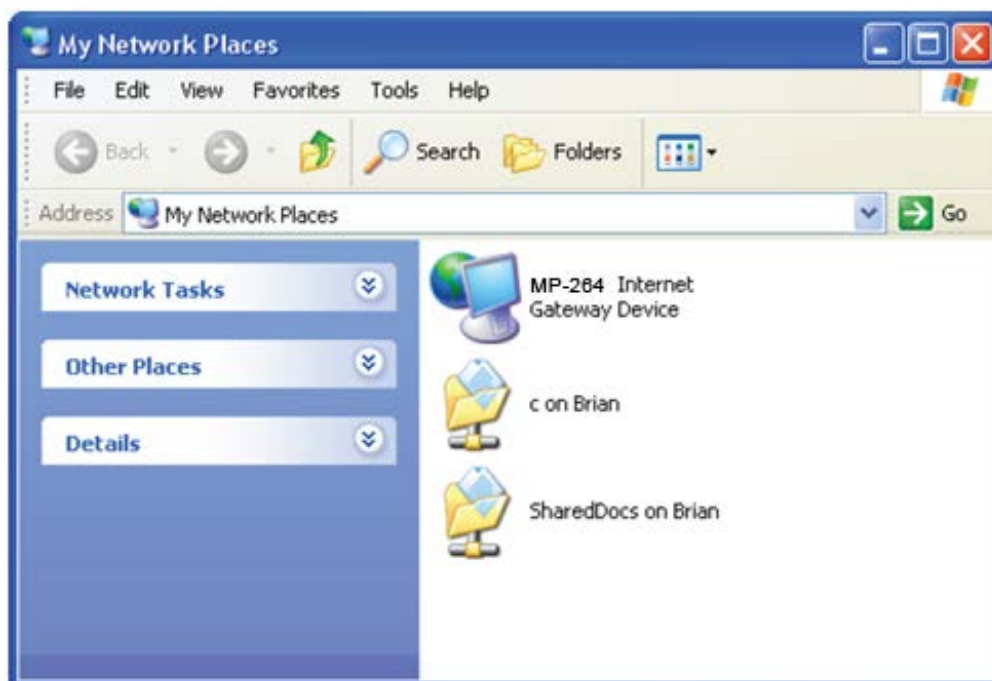
➤ **To add a UPnP-enabled computer to the home network:**

- Connect the PC to the device; the PC automatically recognizes and adds to the home network. The device is added to 'My Network Places' as the Internet Gateway Device and allows configuration via a standard Windows interface. A message appears on the notification area of the taskbar notifying that the PC has been added to the network.

➤ **To access the Web-based management directly from Windows:**

1. Open the 'My Network Places' window by double-clicking its desktop icon.

Figure 16-2: My Network Places (e.g., MP-264)



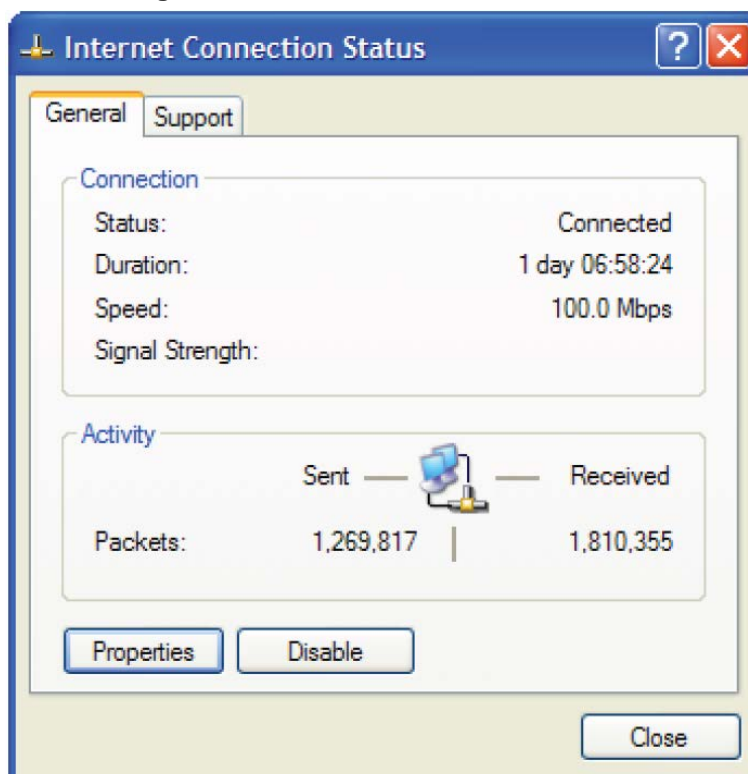
2. Double-click the **Internet Gateway Device** icon. The device Web interface 'Login' screen appears in a browser window. This method is similar to opening a browser window and typing in '192.168.1.1'.

16.1.3 Monitoring Connection between the Device and Internet

The procedure below describes how to monitor the status of the connection between the device and the Internet.

- **To monitor the status of the connection between the device and the Internet:**
 1. Open the 'Network Connections' control panel.
 2. Double-click the **Internet Connection** icon. The 'Internet Connection Status' window appears:

Figure 16-3: Internet Connection Status



16.1.4 Making Local Services available to PCs on Internet

You can make services provided by computers in the home network available to computers on the Internet. For example, you may designate a PC in your home network to act as a Web server, allowing computers on the Internet to request pages from it. Or a game that you want to play over the Internet may require that specific ports be opened to allow communication between your PC and other players.

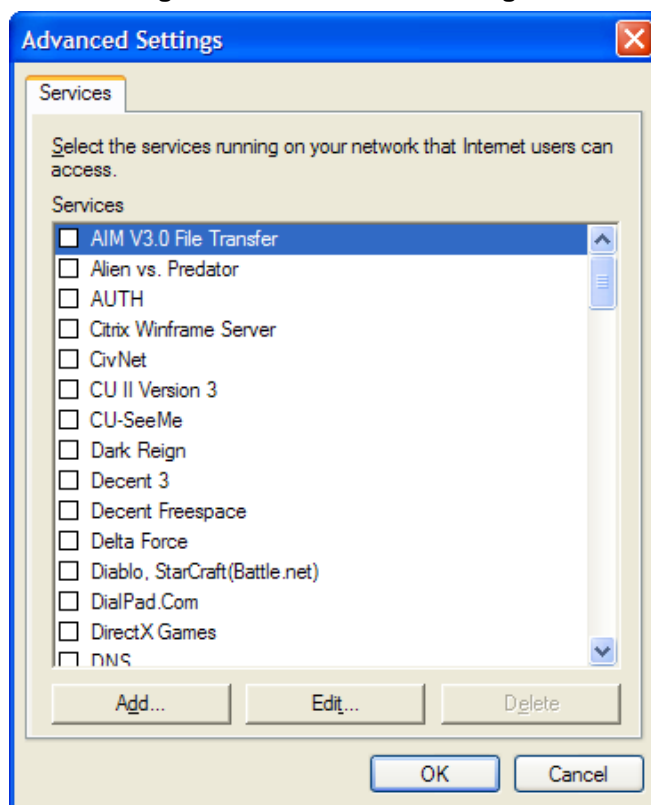
➤ **To make local services available to computers on the Internet:**

1. Open the 'Network Connections' control panel.
2. Right-click 'Internet Connection', and then choose **Properties**; the 'Internet Connection Properties' window appears.

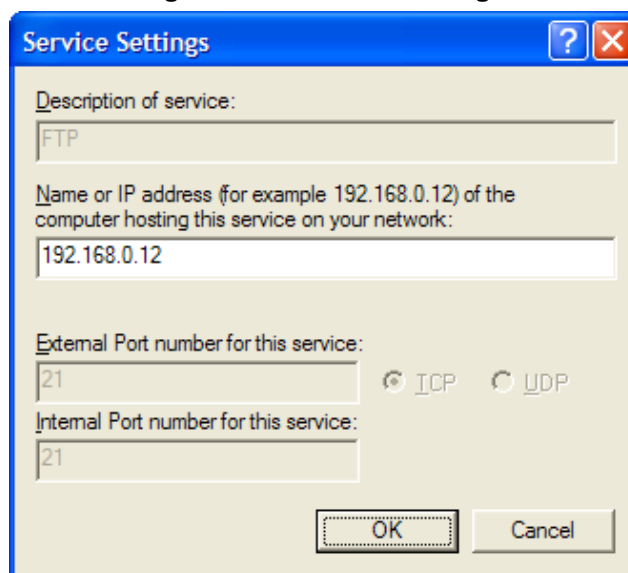
Figure 16-4: Internet Connection Properties (e.g., MP-264)



3. Click the **Settings** button; the 'Advanced Settings' window.

Figure 16-5: Advanced Settings

4. Select a local service that you would like to make available to computers on the Internet; the 'Service Settings' window automatically appears.

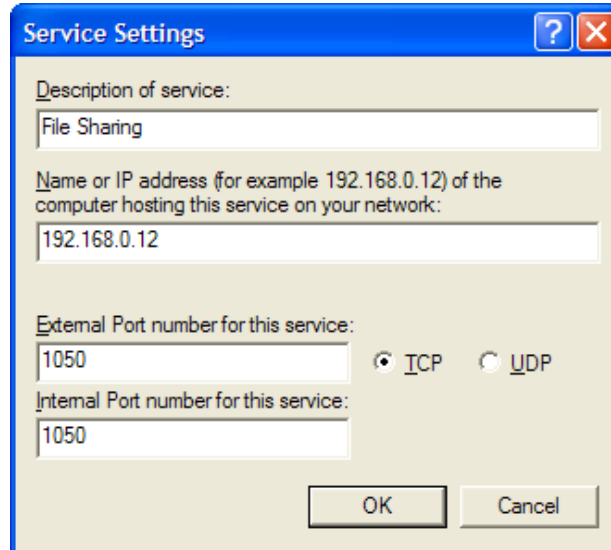
Figure 16-6: Service Settings

5. Enter the local IP address of the computer that provides this service and then click **OK**.
6. Select other services as desired and repeat the previous step for each.
7. Click **OK** to save the settings.

➤ To add a local service that is not listed in the 'Advanced Settings' window:

1. Follow steps 1-3 above.
2. Click the **Add** button; the 'Service Settings' window appears.

Figure 16-7: Service Settings – Add Service



3. Complete the fields as indicated in the window.
4. Click **OK** to close the window and return to the 'Advanced Settings' window; the service is selected.
5. Click **OK** to save the settings.

17 Add-On Servers and Disk Management

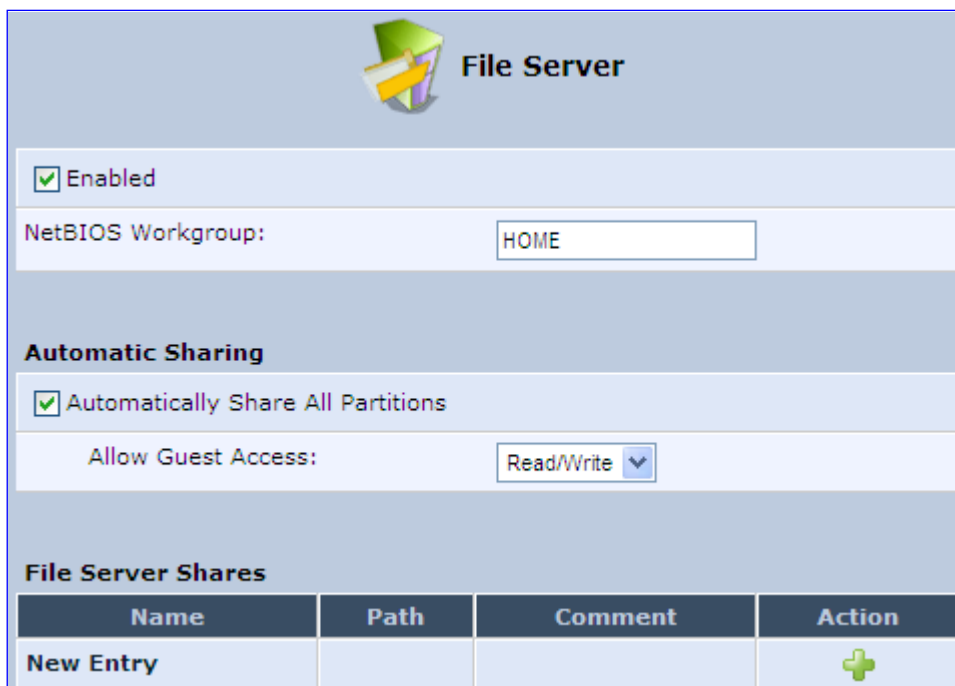
17.1 External File Server

The device provides a file server utility, allowing you to perform various tasks on your files, such as manage file server shares and define access control lists. The file server utility complements the device's disk management.


➤ **To configure the file server:**

1. In the 'Advanced' screen, click the **File Server**  icon; the screen 'File Server' opens.

Figure 17-1: File Server Screen



The 'File Server' configuration screen features a title bar with a folder icon and the text 'File Server'. Below this, there are several sections: 1. A section with a checked 'Enabled' checkbox. 2. A 'NetBIOS Workgroup:' label followed by a text box containing 'HOME'. 3. An 'Automatic Sharing' section with a checked 'Automatically Share All Partitions' checkbox. 4. An 'Allow Guest Access:' label followed by a dropdown menu set to 'Read/Write'. 5. A 'File Server Shares' section containing a table with four columns: 'Name', 'Path', 'Comment', and 'Action'. The table has one row with 'New Entry' in the 'Name' column and a green plus icon in the 'Action' column.

Name	Path	Comment	Action
New Entry			

2. Configure the following:
 - **Enabled:** Select or clear this check box to enable or disable this feature.
 - **NetBIOS Workgroup:** The device workgroup name that is displayed in the Windows network map of LAN hosts.
 - **Automatic Sharing:**
 - ♦ **Automatically Share All Partitions:** A partitioned storage device connected to the device is automatically displayed and shared by all LAN computers. This feature is enabled by default.

- ◆ **Allow Guest Access:** From the drop-down list, select a permission level, according to which the LAN users access the share:
 - ✓ **Read/Write:** Every LAN user can read and write the shared files without authentication.
 - ✓ **Read Only:** Every LAN user can only read the shared files.
 - ✓ **Disabled:** LAN users must authenticate themselves to access the share. They can use the share according to their permissions defined in the 'User Settings' screen.
- **File Server Shares:** Define file shares on your disk partitions, as described in the following sections.

17.1.1 Automatic File Sharing

By default, all partitions are automatically shared and displayed.

➤ To share specific directories or partitions:

1. Clear the 'Automatically Share All Partitions' check box, and then click **Apply**. The list of all automatically shared partitions disappears.
2. In the 'File Server Shares' table, click **New**  icon to define a new share; the 'File Server Share Settings' screen appears.

Figure 17-2: File Server Share Settings Screen



The screenshot shows the 'File Server Share Settings' window. It has a title bar with a folder icon and the text 'File Server Share Settings'. Below the title bar are three input fields: 'Name:' with the text 'share', 'Path:', and 'Comment:'. Below these fields are two sections: 'Users' and 'Groups'. Each section contains a table with three columns: 'Name', 'Access Level', and 'Action'. In the 'Users' section, the first row has 'New User' in the Name column and a plus icon in the Action column. Similarly, in the 'Groups' section, the first row has 'New Group' in the Name column and a plus icon in the Action column.

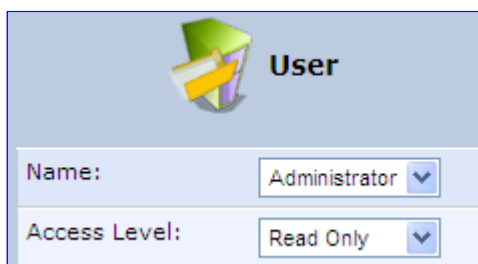
Users		
Name	Access Level	Action
New User		

Groups		
Name	Access Level	Action
New Group		

3. Enter the share's name (default is "share"), path, and (optionally) comment. The share's name is not case sensitive. Even if entered in upper-case letters, the name is displayed in lower case after saving the setting.

4. Associate a user or group of users with the share to grant them access to the shared files, by clicking the **New User** or **New Group** link in the Users or Groups table. Note that the user's settings must have the 'Microsoft File and Printer Sharing Access' check box selected under the 'Permissions' section (see 'Configuring Users' on page 56); the 'User' screen appears:




Figure 17-3: User Screen



The 'User' screen features a header with a folder icon and the title 'User'. Below this, there are two dropdown menus. The first is labeled 'Name:' and has 'Administrator' selected. The second is labeled 'Access Level:' and has 'Read Only' selected.

- a. From the 'Name' drop-down list, select the user name and the allowed access.
 - b. Click **OK**.
5. Click **OK** to save the settings. The 'File Server' screen appears, displaying the share.

Figure 17-4: File Server Screen with the Share


File Server Shares			
Name	Path	Comment	Action
share	A, B/my_documents		 
New Entry			

Click the share's name to view its content. The screen refreshes as the share is accessed. This screen enables you to modify and view the content of your file share. In the upper section of this screen, you can modify your file share by adding files or directories to it. Use the drop-down list to select an action:

- **Upload a File:** Uploads a file to the share. The screen refreshes - enter the location of the file to upload, or click the **Browse** button to browse for the file. Click the **Upload** button to upload the file.
- **Upload a Directory:** You can also upload an entire directory of files, by performing the following:
 - a. Create a tarball archive out of the target directory.
 - b. Enter the location of the archive, or click the **Browse** button to browse to its location.
 - c. Click the **Upload** button to upload the archive.
- **Create a new Directory:** You can create a new directory by simply typing its name and clicking **Go**.
- **Paste from Clipboard:** This option appears only after using the 'Copy to Clipboard' option to copy a directory or file from one directory to another.

The lower section of the screen displays your share's content. You can click the different directory names to access them or you can download, rename, copy or remove the directories using the standard action icons.

17.2 Disk Management

The **Disk Management**  icon allows you to configure disk management. The device can operate as a disk manager for either internal disks connected through IDE, or external storage devices connected through USB or FireWire. Your home-network's LAN devices can share this storage device as a mapped network drive and exchange information without directly accessing each other. The Web interface provides disk management utilities such as partitioning and formatting.

An internal disk or a connected storage device appears in the Network Map (see Section 6 on page 65). You can view information about the disk by clicking its icon.

The device supports storage devices with FAT32, NTFS, and Linux EXT2/3 file systems. These file systems have different sharing and security settings. If the connected storage device or at least one of its partitions has the NTFS file system, a message appears in the 'Disk Management' screen appears.

➤ To configure disk management:

1. In the 'Advanced' screen, click the  icon; the 'Disk Management' screen appears.

Figure 17-5: Disk Management Screen



The screenshot shows the 'Disk Management' web interface. At the top, there's a header with a disk icon and the title 'Disk Management'. Below this, there's a section with a checked 'Enabled' checkbox. A status bar indicates '1 Disks Connected'. The 'System Storage Area' section shows a status of 'OK' and a checked checkbox for 'Automatically Create System Storage Area'. The 'Disks' section contains a table with one entry: a SanDisk SanDisk Cruzer (Rev: 8.02) USB storage device with a size of 3.743GB and a partition /dev/sda1 (A). The 'RAID Devices' section has a table with columns for Device, Name, Type, Status, Total Space, Free Space, RAID, and Action. The first row is 'Add RAID Device' with a green plus icon in the Action column.

Device	Description	Type	Size	Partitions
/dev/sda	SanDisk SanDisk Cruzer (Rev: 8.02)	usb-storage	3.743GB	/dev/sda1 (A)

Device	Name	Type	Status	Total Space	Free Space	RAID	Action
Add RAID Device							



Note: To define a system storage area, the disk or at least one of its partitions should be formatted. This storage area holds the data used by the device's services. For security, it is recommended to format the disk or its partition in the EXT2 or EXT3 file system, although FAT32 is supported as well.

2. To enable disk management, select the 'Enabled' check box.

3. To set the first identified formatted partition as the location of the system storage area, select the 'Automatically Create System Storage Area' check box. This setting is valid until the storage device is disconnected. When reconnected, the device may select another partition for this purpose. To define the system storage area manually, clear this check box. The screen refreshes, displaying the 'System Storage Area' field in which you must enter the partition's letter. In this scenario, the setting remains permanent even after the storage device is disconnected and reconnected afterwards.

Figure 17-6: Manually Defining System Storage Area

System Storage Area	
Status:	The system storage disk <A> is not connected, mounted and formatted. Advanced web, VoIP and mail services are disabled
<input type="checkbox"/> Automatically Create System Storage Area	
System Storage Area:	<input type="text" value="A"/>

4. In the **Disks** table, you can view a list of your connected storage devices. The 'Device' column displays the names the device grants connected devices. Click this link to view the device's 'Disk Information' screen. If a disk is partitioned, the 'Partitions' column displays its partition names. If the partitions are formatted, their name includes a letter.
5. In the **RAID Devices** table, you can view the RAID devices (if configured).

17.2.1 Disk Partitions

This section describes how to configure partition and format storage devices.

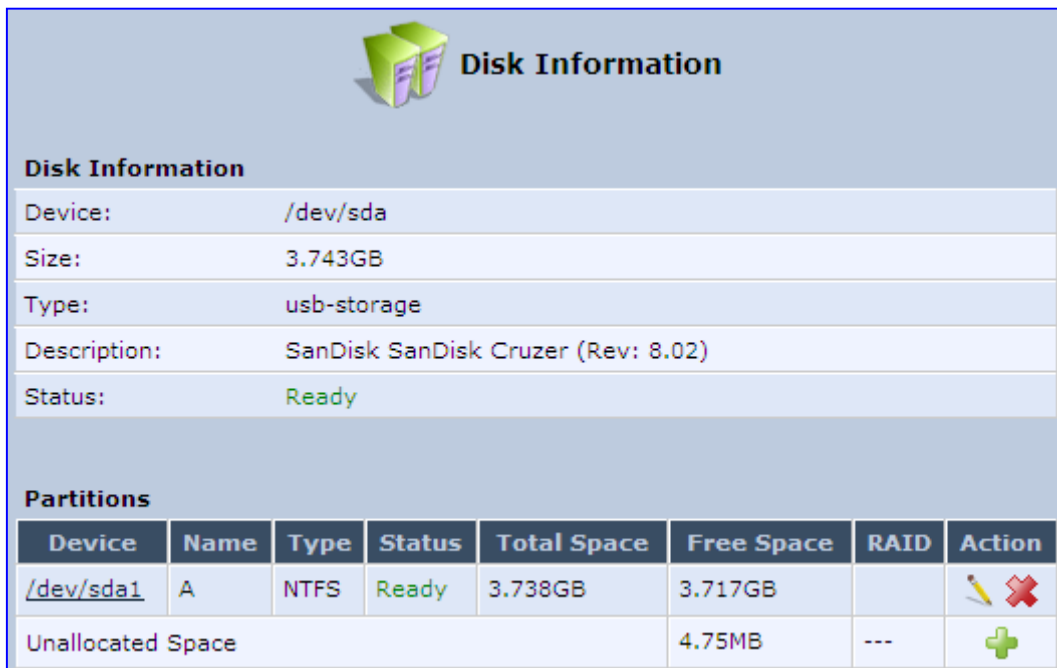
17.2.1.1 Connecting a Mass Storage Device

To set up a file server that is shared by all LAN computers, you need to connect a mass storage device (e.g. disk-on-key or hard drive) to the USB port on the device. A mass storage device must first be partitioned and formatted. If your device is already partitioned, it is recommended that you delete its partitions before proceeding, as a partition can only be added on unallocated disk space.

➤ **To add a Windows formatted partition:**

1. In the **Disks** table in the 'Disk Management' screen, click the disk device link. The 'Disk Information' screen appears.




Figure 17-7: Disk Information



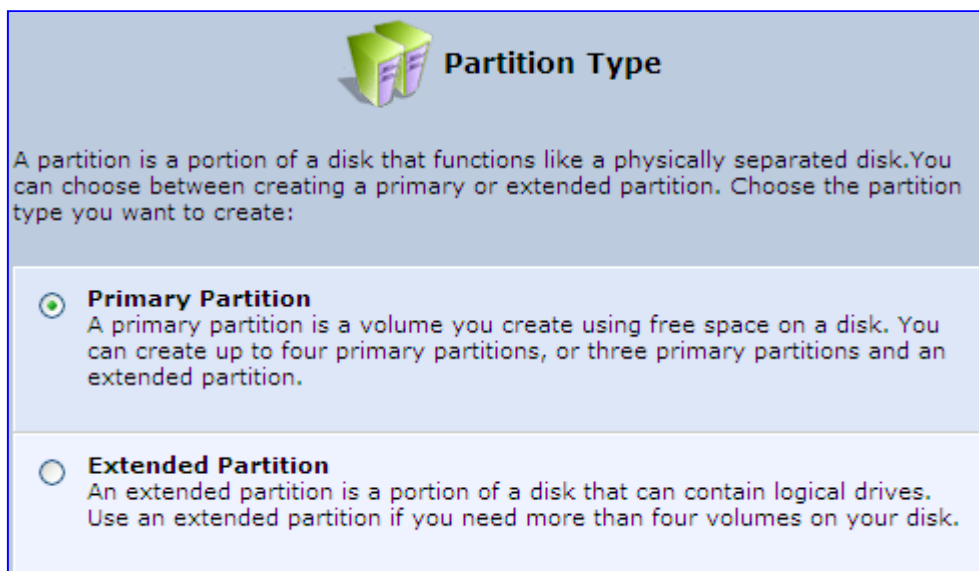
The screenshot shows the 'Disk Information' window. At the top, there is a title bar with a green and yellow icon and the text 'Disk Information'. Below the title bar, the 'Disk Information' section contains a table with the following data:

Device:	/dev/sda
Size:	3.743GB
Type:	usb-storage
Description:	SanDisk SanDisk Cruzer (Rev: 8.02)
Status:	Ready

Below the 'Disk Information' section, there is a 'Partitions' section. It contains a table with the following data:

Device	Name	Type	Status	Total Space	Free Space	RAID	Action
/dev/sda1	A	NTFS	Ready	3.738GB	3.717GB		 
Unallocated Space					4.75MB	---	

2. In the 'Partitions' table, click the **Add New Partition** icon; the 'Partition Type' screen appears.

Figure 17-8: Partition Type

The 'Partition Type' screen features a title bar with a green and purple icon and the text 'Partition Type'. Below the title bar, a paragraph explains that a partition is a portion of a disk that functions like a physically separated disk and that the user can choose between creating a primary or extended partition. Two radio buttons are present: 'Primary Partition' (selected) and 'Extended Partition'. The 'Primary Partition' option includes a description: 'A primary partition is a volume you create using free space on a disk. You can create up to four primary partitions, or three primary partitions and an extended partition.' The 'Extended Partition' option includes a description: 'An extended partition is a portion of a disk that can contain logical drives. Use an extended partition if you need more than four volumes on your disk.'

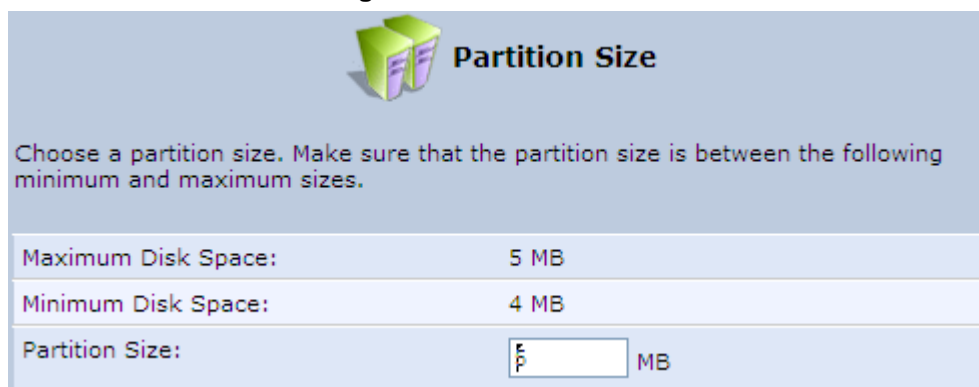
Partition Type

A partition is a portion of a disk that functions like a physically separated disk. You can choose between creating a primary or extended partition. Choose the partition type you want to create:

☒ **Primary Partition**
A primary partition is a volume you create using free space on a disk. You can create up to four primary partitions, or three primary partitions and an extended partition.

☐ **Extended Partition**
An extended partition is a portion of a disk that can contain logical drives. Use an extended partition if you need more than four volumes on your disk.

3. Select 'Primary Partition', and then click **Next**; the 'Partition Size' screen appears.

Figure 17-9: Partition Size

The 'Partition Size' screen features a title bar with a green and purple icon and the text 'Partition Size'. Below the title bar, a paragraph instructs the user to choose a partition size and ensure it is between the following minimum and maximum sizes. A table displays the 'Maximum Disk Space' as 5 MB and the 'Minimum Disk Space' as 4 MB. Below the table, the 'Partition Size' is shown as a text input field with a 'MB' unit label.

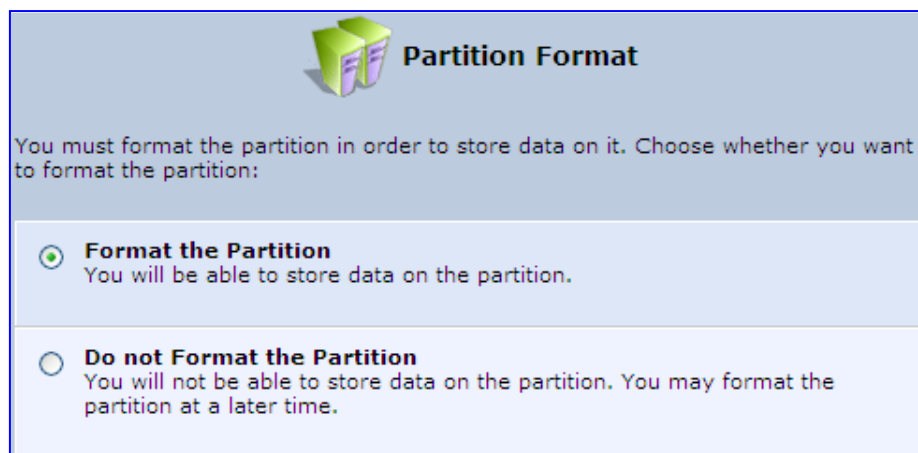
Partition Size

Choose a partition size. Make sure that the partition size is between the following minimum and maximum sizes.

Maximum Disk Space:	5 MB
Minimum Disk Space:	4 MB

Partition Size: MB

4. Enter a volume for the new partition (in megabytes), and then click **Next**; the 'Partition Format' screen appears.

Figure 17-10: Partition Format

The 'Partition Format' screen features a title bar with a green and purple icon and the text 'Partition Format'. Below the title bar, a paragraph states that the user must format the partition in order to store data on it and that they should choose whether to format the partition. Two radio buttons are present: 'Format the Partition' (selected) and 'Do not Format the Partition'. The 'Format the Partition' option includes a description: 'You will be able to store data on the partition.' The 'Do not Format the Partition' option includes a description: 'You will not be able to store data on the partition. You may format the partition at a later time.'

Partition Format

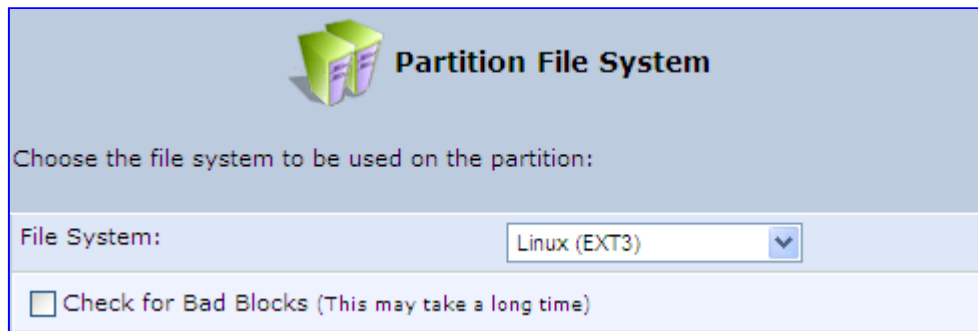
You must format the partition in order to store data on it. Choose whether you want to format the partition:

☒ **Format the Partition**
You will be able to store data on the partition.

☐ **Do not Format the Partition**
You will not be able to store data on the partition. You may format the partition at a later time.

5. Select 'Format the Partition', and then click **Next**; the 'Partition File System' screen appears.

Figure 17-11: Partition File System



Partition File System

Choose the file system to be used on the partition:

File System: Linux (EXT3) ▼

☐ Check for Bad Blocks (This may take a long time)

6. Select 'Windows (FAT32) (LBA)' as the file system for the partition and then click **Next**; the 'Partition Summary' screen appears.

Figure 17-12: Partition Summary



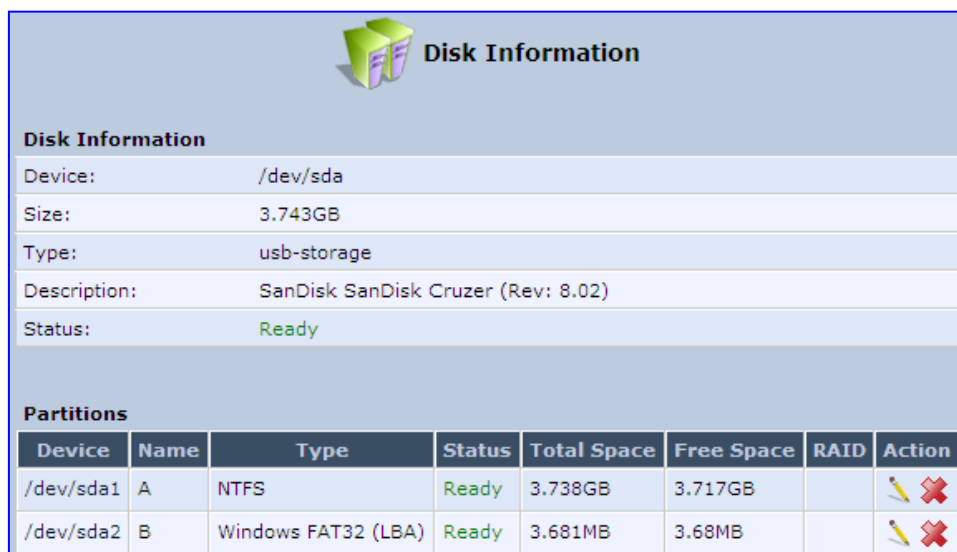
Partition Summary

You have successfully completed the steps needed to create the following new partition:

- Partition Type: Primary
- Size: 5 MB
- File System: Windows (FAT32) (LBA)
- Disk will be set offline

7. Click **Finish** to create the new partition; the 'Disk Information' screen reappears, refreshing as the partition formatting progresses, until the status changes to 'Ready'.





Figure 17-13: Formatting Complete – Partition Ready



Disk Information

Device:	/dev/sda
Size:	3.743GB
Type:	usb-storage
Description:	SanDisk SanDisk Cruzer (Rev: 8.02)
Status:	Ready

Partitions

Device	Name	Type	Status	Total Space	Free Space	RAID	Action
/dev/sda1	A	NTFS	Ready	3.738GB	3.717GB		 
/dev/sda2	B	Windows FAT32 (LBA)	Ready	3.681MB	3.68MB		 

The new partition names are designated as "A", "B" etc., and appear under the 'Name' column of the 'Partitions' section.

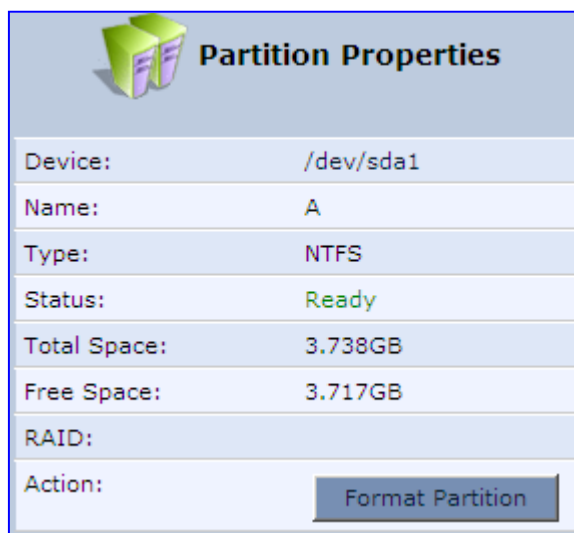
17.2.1.2 Formatting a Partition

A partition can be formatted in EXT2, EXT3, FAT32 and NTFS file systems.

➤ **To partition a disk:**

1. In the **Disks** table in the 'Disk Management' screen, click the disk device link; the 'Disk Information' screen appears.
2. In the 'Partitions' table, click the **Edit Partition** icon of the partition you would like to edit; the 'Partition Properties' screen appears.

Figure 17-14: Partition Properties

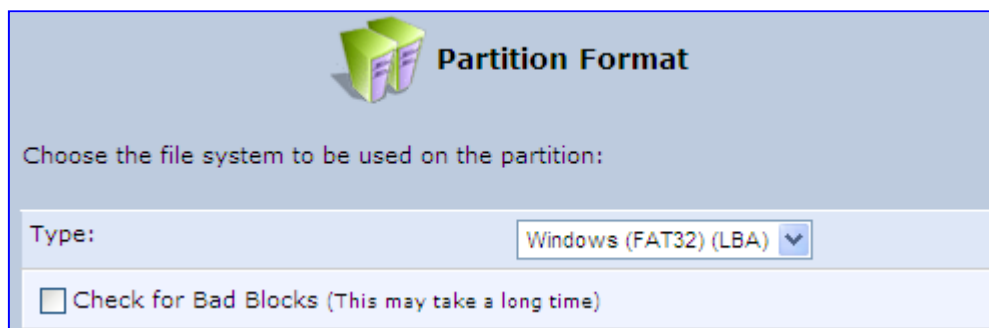


The 'Partition Properties' dialog box displays the following information:

Device:	/dev/sda1
Name:	A
Type:	NTFS
Status:	Ready
Total Space:	3.738GB
Free Space:	3.717GB
RAID:	
Action:	<button>Format Partition</button>

3. Click **Format Partition**; the 'Partition Format' screen appears.

Figure 17-15: Partition Format



The 'Partition Format' dialog box prompts the user to choose a file system. It includes a dropdown menu for 'Type' set to 'Windows (FAT32) (LBA)' and a checkbox for 'Check for Bad Blocks (This may take a long time)' which is currently unchecked.

4. Select a file system for the partition and then click **Next**. A warning screen appears, alerting you that all the data on the partition will be lost.
5. Click **OK** to format the partition; the screen refreshes as the partition formatting progresses. When the format is complete, the status will change to 'Ready'.

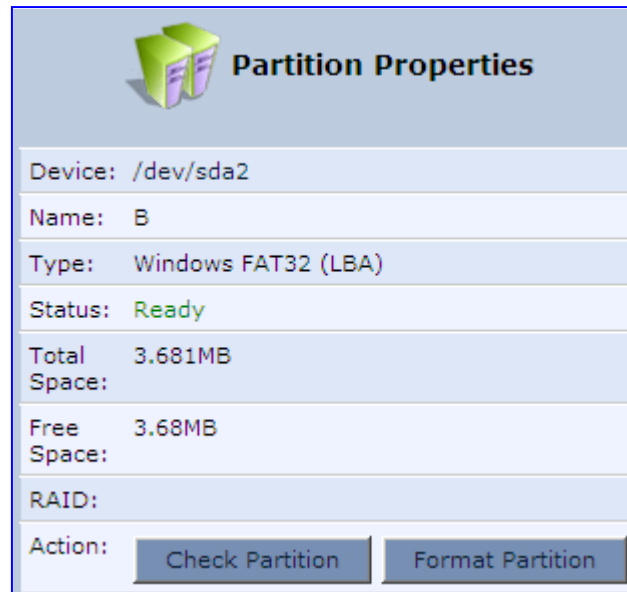
17.2.1.3 Checking a Partition

The procedure below describes how to check a partition.

➤ **To check a partition:**

1. In the **Disks** table in the 'Disk Management' screen, click the disk device link; the 'Disk Information' screen appears.
2. In the 'Partitions' section, click the **Edit Partition** icon of the partition you would like to check; the 'Partition Properties' screen appears.

Figure 17-16: Partition Format



The image shows a 'Partition Properties' dialog box with a light blue header and a white body. At the top left is a 3D icon of two stacked disks. The title 'Partition Properties' is on the right. Below the header, there are several rows of information: 'Device: /dev/sda2', 'Name: B', 'Type: Windows FAT32 (LBA)', 'Status: Ready' (in green), 'Total Space: 3.681MB', and 'Free Space: 3.68MB'. Below these is a 'RAID:' label with no value. At the bottom, under an 'Action:' label, are two buttons: 'Check Partition' and 'Format Partition'.

Device:	/dev/sda2
Name:	B
Type:	Windows FAT32 (LBA)
Status:	Ready
Total Space:	3.681MB
Free Space:	3.68MB
RAID:	
Action:	<input type="button" value="Check Partition"/> <input type="button" value="Format Partition"/>

3. Click **Check Partition**; a warning screen appears, alerting you that the partition will be set to offline.
4. Click **OK**; the screen refreshes as the partition checking progresses. When the check is complete, the status changes to 'Ready'.

17.2.1.4 Deleting a Partition

The procedure below describes how to delete a partition.

➤ **To delete a partition:**

1. In the **Disks** table in the 'Disk Management' screen, click the disk device link; the 'Disk Information' screen appears.
2. In the 'Partitions' section, click the **Remove Partition** icon of the partition you would like to delete; a warning screen appears, alerting you that all the data on the partition will be lost.
3. Click **OK** to delete the partition.

17.2.2 System Storage Area

The device uses a specific location on a storage device for storing data used by its various services. The following are the services that use the system storage area:

- Printer spool and drivers
- Mail server spool
- Backup of the device's configuration file (rg_conf)
- PBX-related audio files for voice mail, auto attendants and music on-hold
- FTP server
- Mail boxes information
- Users' home directories
- Web server content

Prior to enabling these services, you should create either EXT2/3 (recommended) or FAT32 partitions, as described in the previous sections, and define at least one of them as the system storage area.




Note: Data cannot be written to partitions formatted with NTFS, unless the device is based on the Conexant Solos, Mindspeed Malindi2 or Freescale platform. Consequently, if you define an NTFS partition as the system storage area, the services mentioned earlier will not operate on the device.

➤ **To define a system storage area:**

1. Under the **System Storage Area** group in the 'Disk Management' screen, clear the 'Automatically Create System Storage Area' check box; the screen refreshes displaying the 'System Storage Area' field, in which you must enter the partition's letter.

Figure 17-17: Disk Management Screen – Check Box Cleared


Disk Management

☒ Enabled

Status: 1 Disks Connected

System Storage Area

Status: OK

☐ Automatically Create System Storage Area

System Storage Area:

Disks

Device	Description	Type	Size	Partitions
/dev/sda	SanDisk SanDisk Cruzer (Rev: 8.02)	usb-storage	3.743GB	/dev/sda1 (A) /dev/sda2 (B)

RAID Devices

Device	Name	Type	Status	Total Space	Free Space	RAID	Action
Add RAID Device							+

2. Click **OK** to save the settings.

If you wish to view the system directories, verify that the system storage area is shared. Then, browse to \\mp264 (use a Windows Explorer window if you are using a browser other than Internet Explorer).

17.2.3 RAID Management

The device supports Redundant Array of Independent Disks (RAID) on storage devices connected to it by USB or by FireWire. A RAID device is a logical device that has physical devices underlying it. These physical devices are disk partitions. The supported RAID levels are:

- Level 0 – Provides data striping, or spreading out blocks of each file across multiple disk drives, but no redundancy. This improves performance but does not deliver fault tolerance. If one drive fails then all data in the array is lost.
- Level 1 – Provides disk mirroring. This is a technique in which data is written to two duplicate disks simultaneously, providing data redundancy. This method improves performance and delivers fault tolerance.
- Level 5 – With a minimum of three disks, this level provides data striping and utilizes one disk for backup information, which enables it to restore any other disk in the array.

Before creating the RAID device, you must create disk partitions (as described previously) on the different disk drives. Each RAID device can have multiple underlying devices (partitions). When using RAID1, it is recommended that these partitions be of the same size to avoid disk-space loss due to mirroring. A disk partition configured with RAID can no longer be managed as a regular partition, but only be controlled by the RAID device. From the moment RAID is configured, it is the RAID device that can be shared, scanned, formatted and mounted as a regular partition.

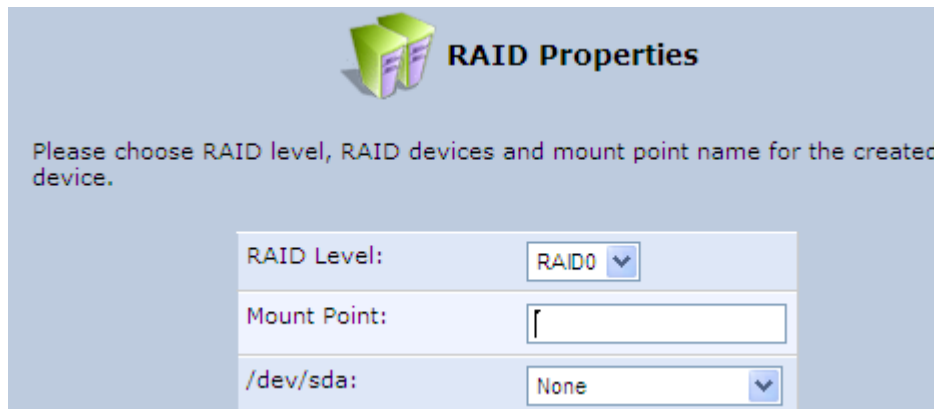
17.2.3.1 Creating a RAID Device

The procedure below describes how to create a RAID device.

➤ **To create a RAID device:**

1. In the **RAID Devices** table in the 'Disk Management' screen, click the **Add RAID Device** link; the 'RAID Properties' screen appears:

Figure 17-18: RAID Properties Screen



RAID Properties

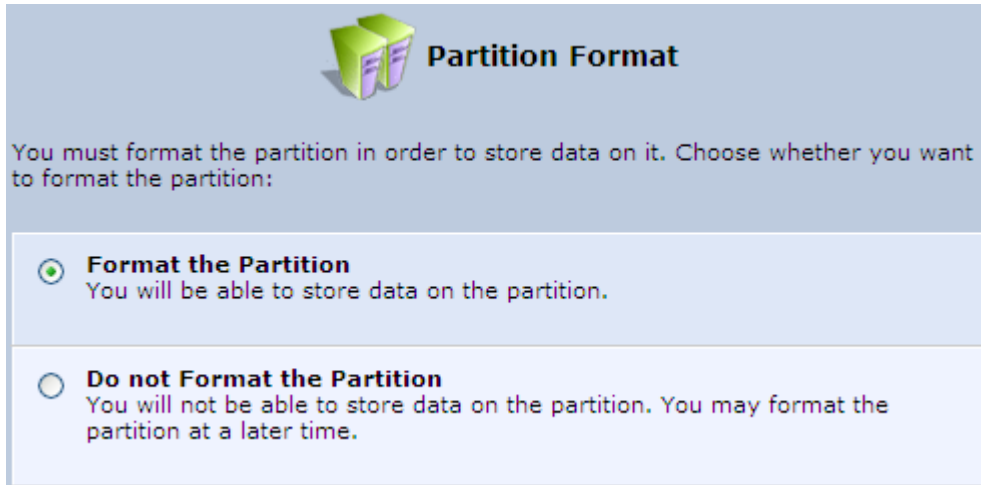
Please choose RAID level, RAID devices and mount point name for the created device.

RAID Level:	RAID0 ▼
Mount Point:	<input type="text"/>
/dev/sda:	None ▼

2. From the 'RAID Level' drop-down list, select the RAID level (RAID0, RAID1 or RAID5).
3. In the 'Mount Point' field, enter a name for the mount point of the RAID device.
4. Choose the underlying devices (your pre-configured partitions) in the next drop-down lists. For RAID1 you may choose only one device and later add another one.

5. Click **Next**; the 'Partition Format' screen appears.

Figure 17-19: Partition Format Screen



Partition Format

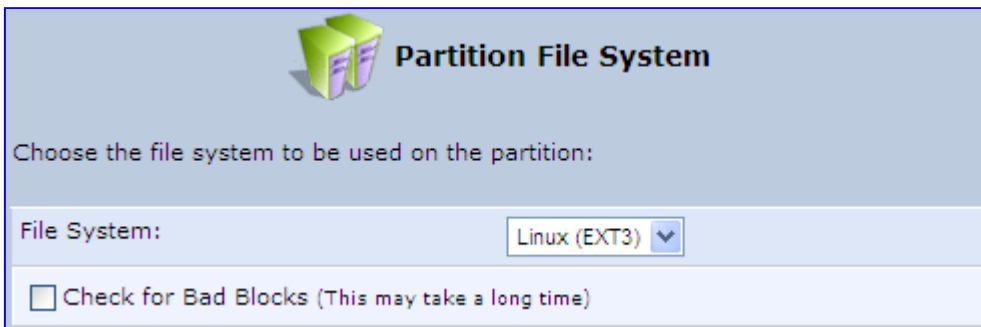
You must format the partition in order to store data on it. Choose whether you want to format the partition:

☒ **Format the Partition**
You will be able to store data on the partition.

☐ **Do not Format the Partition**
You will not be able to store data on the partition. You may format the partition at a later time.

6. Select 'Format the partition' and then click **Next**.

Figure 17-20: Partition File System Screen



Partition File System

Choose the file system to be used on the partition:

File System:

☐ Check for Bad Blocks (This may take a long time)

7. Select the format type, and then click **Next**; the 'Partition Summary' screen displays a summary of the chosen device properties.

Figure 17-21: Partition Summary Screen



Partition Summary

You have successfully completed the steps needed to create the following new partition:






- Partition Type: RAID
- RAID Level: RAID1
- Mount Point: Mount_0
- Devices:
 - /dev/sda1 **Device is online**
- **Online underlying devices will be taken offline. This may cause some disk based services to stop.**
- File System: Linux (EXT3)

8. Click the **Finish** button to execute the RAID device creation.

As soon as a RAID device is created, its formatting begins. If the device is RAID1 and has two underlying devices, its re-synchronization process (partition mirroring) begins simultaneously. During re-synchronization the RAID device is fully usable and can be mounted and used.

The figure below depicts a successful configuration of two RAID devices as they appear in the **Raid Devices** table in the 'File Server' screen. The first is RAID0, consisting of two underlying partitions (one on each disk), and the second is RAID1, consisting of another set of underlying partitions. Note that the RAID0 total space is the sum of the two partitions, while the RAID1 total space is the size of one partition (due to mirroring).

Figure 17-22: Added RAID Devices

Device	Name	Type	Status	Total Space	Free Space	RAID	Action
/dev/md0	mount_0	Linux (EXT3)	Ready	154.8MB	142.8MB	RAID0: /dev/sda1, /dev/sdb1	 
/dev/md1	mount_1	Linux (EXT3)	Ready	41.39MB	35.23MB	RAID1: /dev/sda2, /dev/sdb2	 
Add RAID Device							


17.2.3.2 Using a RAID Device

When RAID is configured over the existing partitions, these partitions are no longer independent. It is therefore necessary that you update the location of the system storage area:

1. In the 'Disk Management' screen, verify that the 'Automatically Create System Storage Area' check box is selected. If you wish to define the system storage area manually, clear the check box and enter the name of the designated mount point.
2. Click **OK** to save the settings.

17.2.3.3 Maintaining a RAID Device

A RAID device differs from a regular partition by not being part of a physical disk. It therefore resides and is maintained on the device. RAID maintenance is divided into two aspects:

- Maintaining the RAID device itself:
 - In the **RAID Device** table in the 'Disk Management' screen, click the **Edit**  icon of the RAID device; the 'RAID Properties' screen appears in which you can:
 - ◆ Enable or disable the RAID device using the 'Enabled' check box.
 - ◆ Change the mount point assigned to the device.
 - ◆ Add or remove the underlying devices (can be done for RAID1 and RAID5 only).
- Maintaining the partition:
 - In the 'RAID Properties' screen, click the device name; the 'Partition Properties' screen appears in which you can check and format the RAID partition.

17.2.3.4 Replacing RAID Underlying Devices

Adding or removing a RAID underlying device can only be performed on RAID1 and RAID5 configurations. RAID1 can operate with just one device (although mirroring is unavailable), and RAID5 can operate with one device less than its original amount of devices.

The names of the RAID underlying devices appear on the 'RAID Properties' screen. Each device is followed by a status:


- Active: The device is controlled by RAID.
- Inactive: The device failed to join the RAID array or does not exist.
- Faulty: The device joined the RAID array but was marked as faulty due to an error. It is inactive and should be replaced.

Replacing a device on RAID1 or RAID5 is done by first removing the faulty device and then adding a new one. The new device's size must be at least the size of the existing one.

➤ **To remove a faulty device from RAID1:**

1. In the 'RAID Properties' screen, click the faulty device's **Delete** icon.
2. Click **OK**.

➤ **To add a new device instead of the one removed:**

1. In the **RAID Device** table in the 'Disk Management' screen, click the **Edit**  icon of the RAID device; the 'RAID Properties' screen appears with a drop-down list allowing you to choose the new partition to be added.
2. Choose the partition, and then click **OK**.

After adding a new device, RAID1 starts a recovery process in which the content of the existing partition is mirrored to the new device. If the addition or recovery fails, the device status is set to inactive (this status appears in the 'RAID Properties' screen. In such cases, the device should be removed and another may be added. You can manipulate your disk partitions. However, it is recommended to configure your disks before setting up RAID. Once RAID is configured, you will not be able to delete an underlying partition, or create a new partition on a disk that one of its partitions is underlying RAID, unless you disable or delete the RAID device. Changing a disk's partition table when its partitions are under RAID (even if RAID is disabled) may result in the need to reconstruct the RAID.

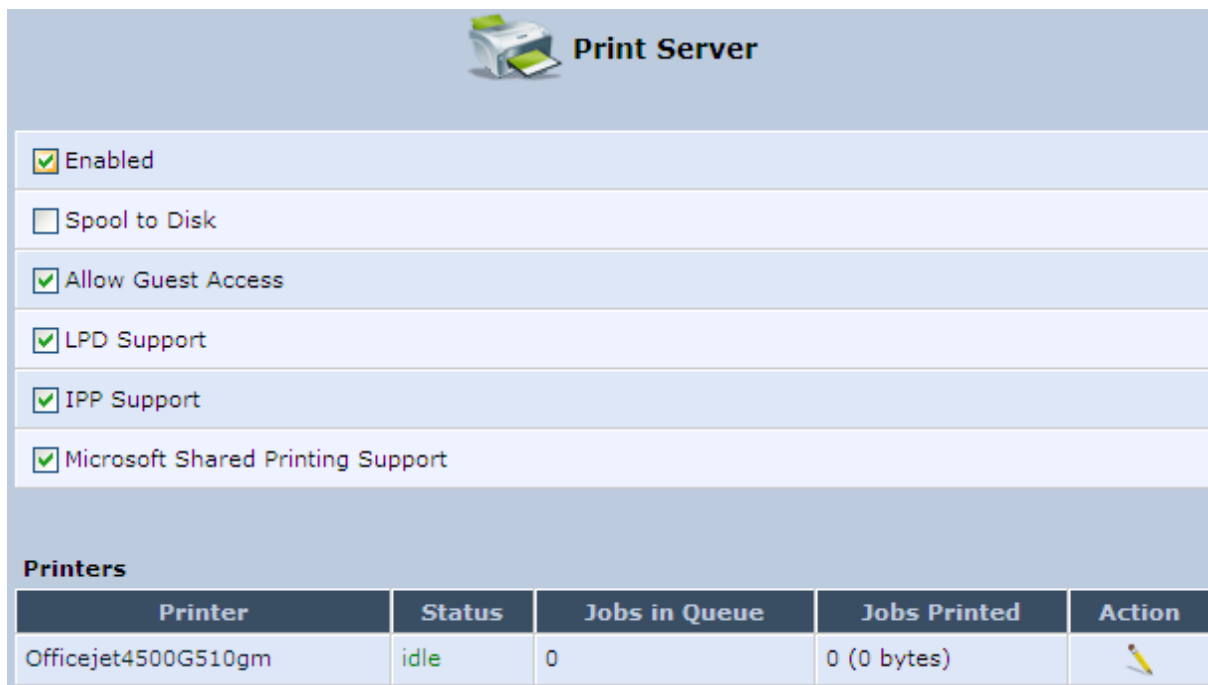
17.3 Print Server

The device includes a print server that allows printers attached to the device through the USB connection(s) to be shared by all computers on the LAN. Such a printer appears in the Network Map. You can access the printer settings directly, by clicking the printer icon in the Network Map or as described below.

➤ **To configure a print server:**

1. In the 'Advanced' screen, click the **Print Server**  icon; the 'Print Server' screen appears.

Figure 17-23: Advanced – Print Server Screen



Print Server

☒ Enabled

☐ Spool to Disk


☒ Allow Guest Access

☒ LPD Support

☒ IPP Support

☒ Microsoft Shared Printing Support

Printers

Printer	Status	Jobs in Queue	Jobs Printed	Action
Officejet4500G510gm	idle	0	0 (0 bytes)	



2. Select or clear (as required) the following check boxes:
 - **Enabled:** Enables or disables the print server feature.
 - **Spool to Disk:** Allows print jobs to be written to a disk before printing.
 - **Allow Guest Access:** Allows network users that have not logged in with a username and password to use the shared printer. If you want to restrict access to the network printer, you can clear this check box and grant user-specific permissions by creating a user set to 'Internet Printer Access' (see Section 5.4).
 - **LPD Support:** Enables the LPD protocol.
 - **IPP Support:** Enables the IPP protocol.
 - **Microsoft Shared Printing Support:** Enables the Samba protocol.
3. The **Printers** table lists the device printers, their status as well as their print job information. To view the printer's properties and optionally, to define a new name for the printer, click the **Edit**  icon corresponding to the printer; the 'Printer' screen appears.

Figure 17-24: Advanced – Printer Screen

 **Printer**

Name:	Officejet4500G510gm
IPP URL:	http://MP252.home:631/printers/Officejet4500G510gm
Model:	HP Officejet 4500 G510g-m
Status:	idle
Jobs Printed:	0 (0 bytes)
<input checked="" type="checkbox"/> Create Default Device Mode	

4. To change the displayed name of the printer, in the 'Name' field, enter a new name.
5. To set the printer as the default printer, select the 'Create Default Device Mode' check box.

17.3.1 Connecting and Setting up a Printer on Windows

The procedure below describes how to set up a network printer that is connected to the device USB port and shared by all LAN computers, running on the Windows operating system.

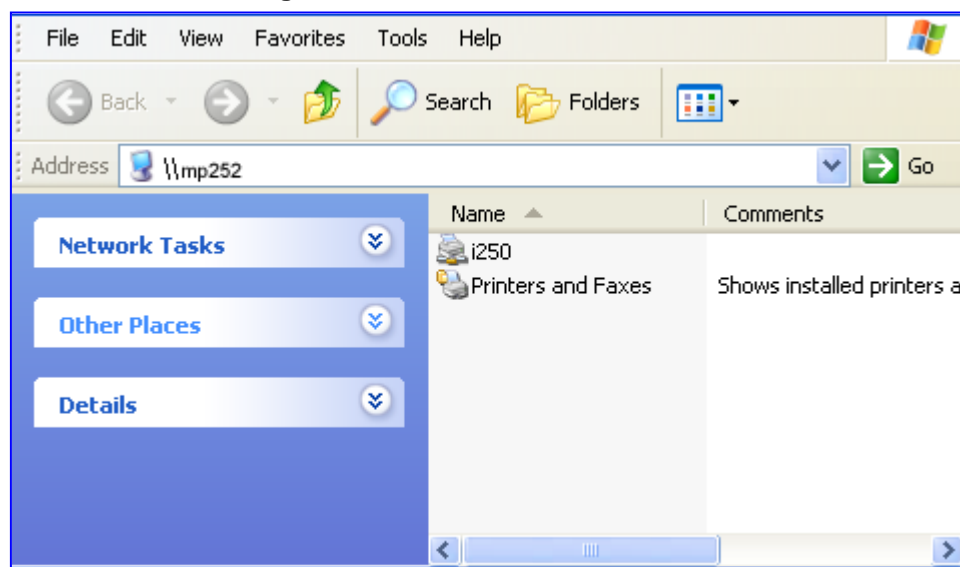


Note: The above configuration must be applied to each LAN PC individually in order to use the network printer.

➤ To set up a printer running on Windows:

1. Download the print driver to your computer.
2. Access the device LAN network where the disk and printer shares available on the device are displayed:

Figure 17-25: Disk and Printer Shares



3. Select the printer icon that you want to designate as a LAN printer; a warning appears.
4. Click **Yes**; you are prompted to select a printer driver from a list. If unavailable, you can either browse to a location on your computer where you have stored the driver, or click **Have Disk** and insert the CD containing the driver (supplied with your printer). After a short upload and installation of the driver, the printer's print queue window appears, determining that the printer is ready for use. The new printer is added to your "Printers and Faxes" list as a network printer (to view this list press, in Windows Control Panel, select "Printers and Faxes"). As any printer, you can choose to make it your default printer, or specify its use when printing.
5. Print a test page by right-clicking the printer icon in the disk and printer shares window and selecting **Properties**; the 'Print Test Page' button is located at the bottom of the **General** tab.

17.3.2 Print Protocols

The Samba protocol with which you have created a network printer in the previous section, allows you to upload Windows print drivers to the device, enabling all Windows-based LAN hosts to connect to the network printer.

The device provides two additional protocols for computers to connect to its printers:

- Internet Printing Protocol (IPP) - the recommended protocol, offering fast installation and ease of use.
- Line Printer Daemon (LPD) - legacy network printing protocol, which should only be used for printing from computers that do not support IPP.

The following table compares the specifications of the three protocols:

Table 17-1: IPP, Samba, and LPD Specifications

Specification	IPP	Samba	LPD
Installation	Easy	Easy	Difficult
Driver upload	None	Supported	None
Supported clients	Windows, Unix, Mac	Windows, Mac	Windows, Unix, Mac
Job feedback and control	Print queue monitor and management console	Print queue monitor and management console	Management console only
Printer control	Print queue monitor	None	None
Access controls	Print and administrator	Print permission only	None



Note: **For Mac Users:** When connecting a print server to a MAC computer, you must verify that the printer connected to MP-264 is supported by Mac OS as a network printer. Supported printers are marked with an "X" at the following URL: <http://docs.info.apple.com/article.html?artnum=301175#hpdrivers>.

17.3.2.1 Internet Printing Protocol

This section describes how to connect computers to the device printers, using the IPP protocol.

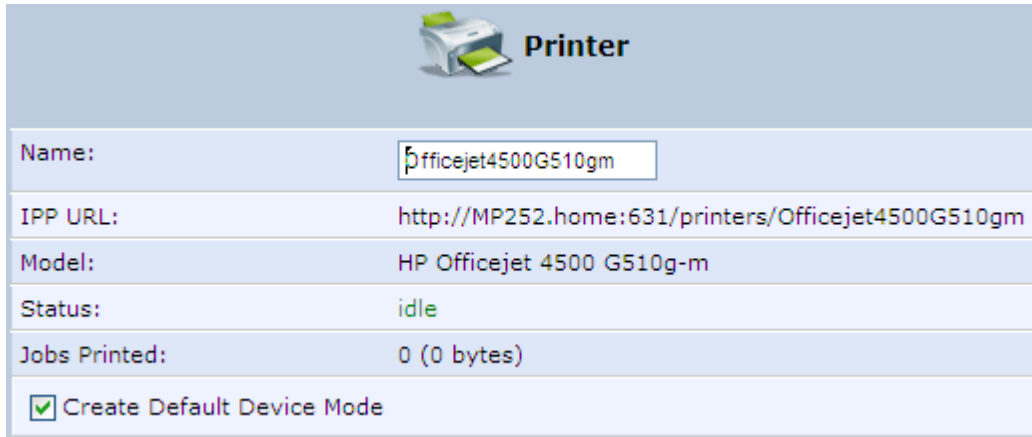
17.3.2.1.1 Setting Up an IPP Printer on Windows

The procedure below describes how to set up an IPP printer on Windows XP.

➤ **To set up an IPP printer on Windows:**

1. In the 'Network Map' screen, click the printer icon to view the 'Printer' screen.

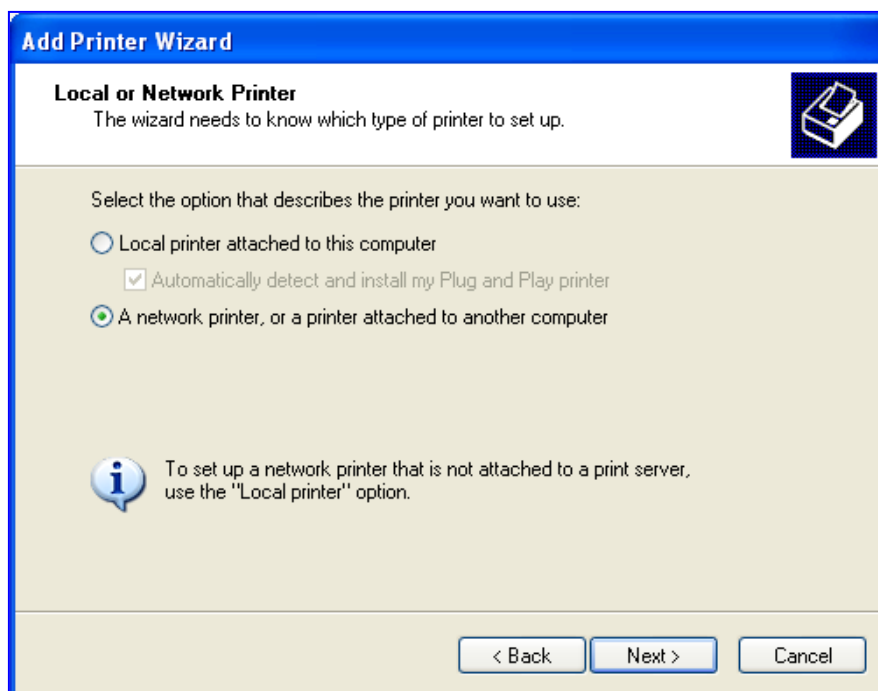
Figure 17-26: Printer Screen – IPP URL (Windows)



Printer	
Name:	Officejet4500G510gm
IPP URL:	http://MP252.home:631/printers/Officejet4500G510gm
Model:	HP Officejet 4500 G510g-m
Status:	idle
Jobs Printed:	0 (0 bytes)
<input checked="" type="checkbox"/> Create Default Device Mode	

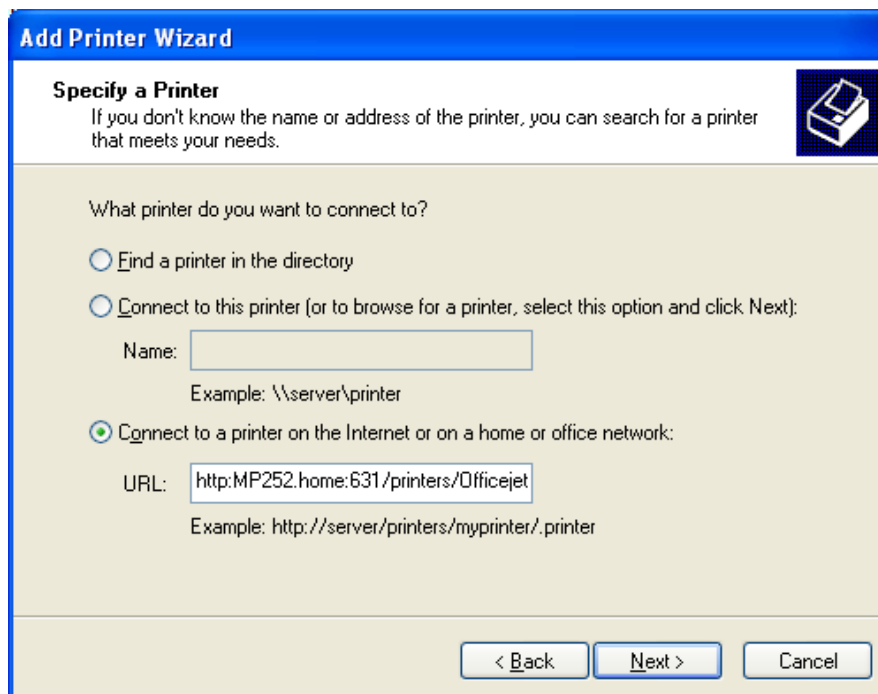
2. Copy the IPP URL to the clipboard.
3. On your Windows computer connected to the device, from the **Start** menu, point to **Settings**, then **Printers and Faxes**, and then click **Add Printer**; the Add Printer Wizard starts.
4. Click **Next** to proceed with the wizard sequence.
5. Select 'A network printer...' and then click **Next**.

Figure 17-27: Local or Network Printer



6. Select 'Connect to a printer on the Internet...', and then paste the printer's IPP URL in the 'URL' field, and then click **Next**.

Figure 17-28: Specify a Printer



7. You may be asked to select the driver's make and model or its location. If so, provide the location on the device to where you have uploaded the driver (e.g. "\\MP264A"), and click **Next**.
8. Click **Finish** to exit the wizard.

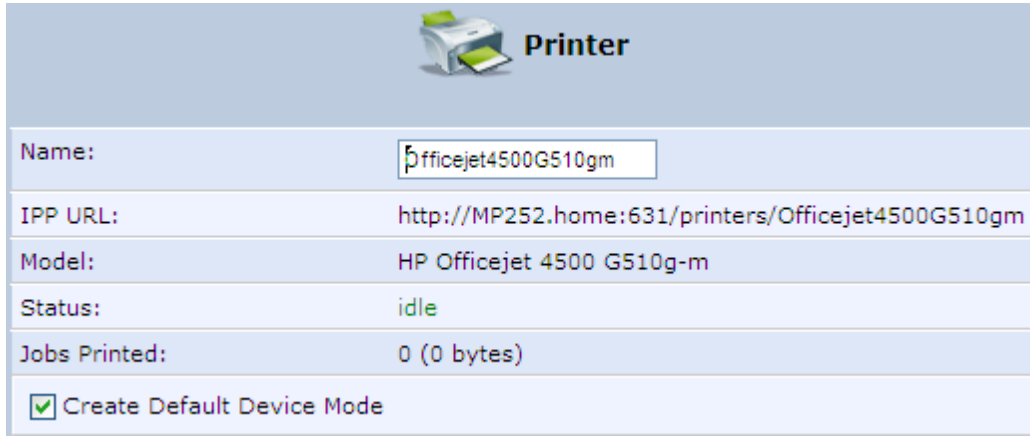
17.3.2.1.2 Setting Up an IPP Printer on Linux


The procedure below describes how to set up an IPP printer on Linux operating systems. You should use CUPS Daemon (CUPSD) when operating with Linux.

➤ **To set up an IPP printer on Linux:**

1. In the 'Network Map' screen, click the printer icon to view the 'Printer' screen.

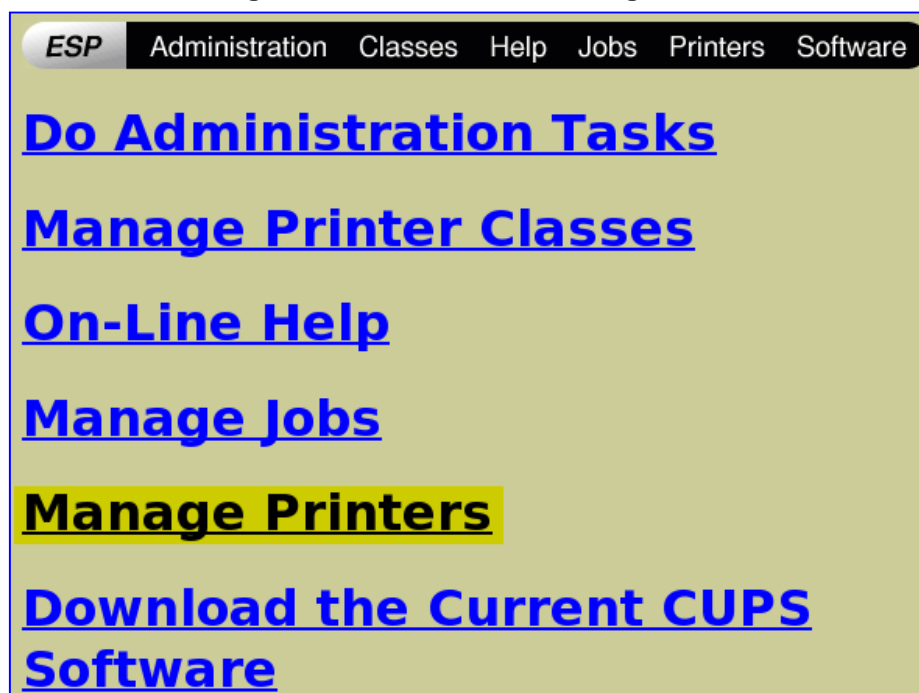
Figure 17-29: Printer Screen – IPP URL (Linux)



 Printer	
Name:	Officejet4500G510gm
IPP URL:	http://MP252.home:631/printers/Officejet4500G510gm
Model:	HP Officejet 4500 G510g-m
Status:	idle
Jobs Printed:	0 (0 bytes)
<input checked="" type="checkbox"/> Create Default Device Mode	

2. Copy the IPP URL to the clipboard.
3. On your Linux computer connected to the device, browse to <http://localhost:631>, and then choose **Manage Printers**.

Figure 17-30: Linux CUPS Management



4. Click **Add Printer**.

Figure 17-31: Add Printer



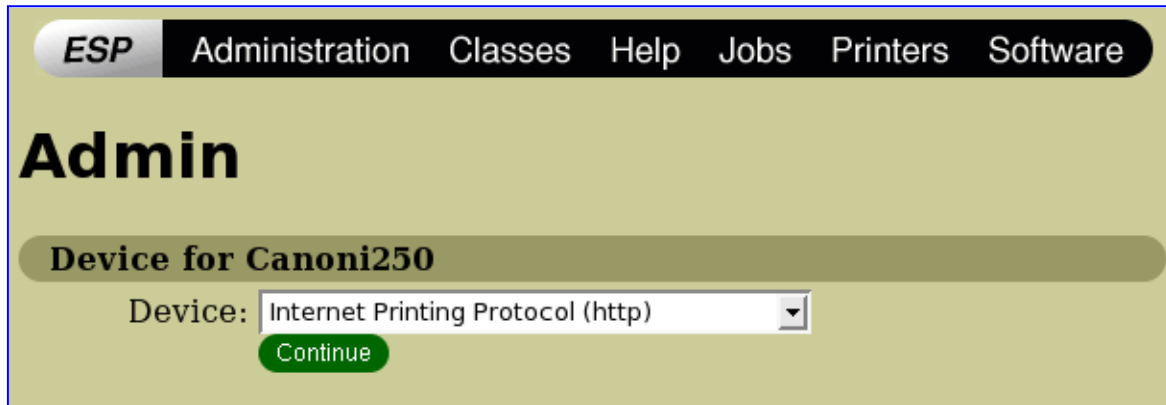
5. In the 'Name' field, type the printer's name and then click **Continue**.

Figure 17-32: Printer Name

The screenshot shows the 'Admin' interface with a navigation bar containing 'ESP', 'Administration', 'Classes', 'Help', 'Jobs', 'Printers', and 'Software'. The main heading is 'Admin'. Below it is a section titled 'Add New Printer'. This section contains three input fields: 'Name:' with the value 'Officejet4500', 'Location:', and 'Description:'. A green 'Continue' button is located at the bottom right of the form.

6. From the 'Device' drop-down list, select 'Internet Printing Protocol (http)' and then click **Continue**.

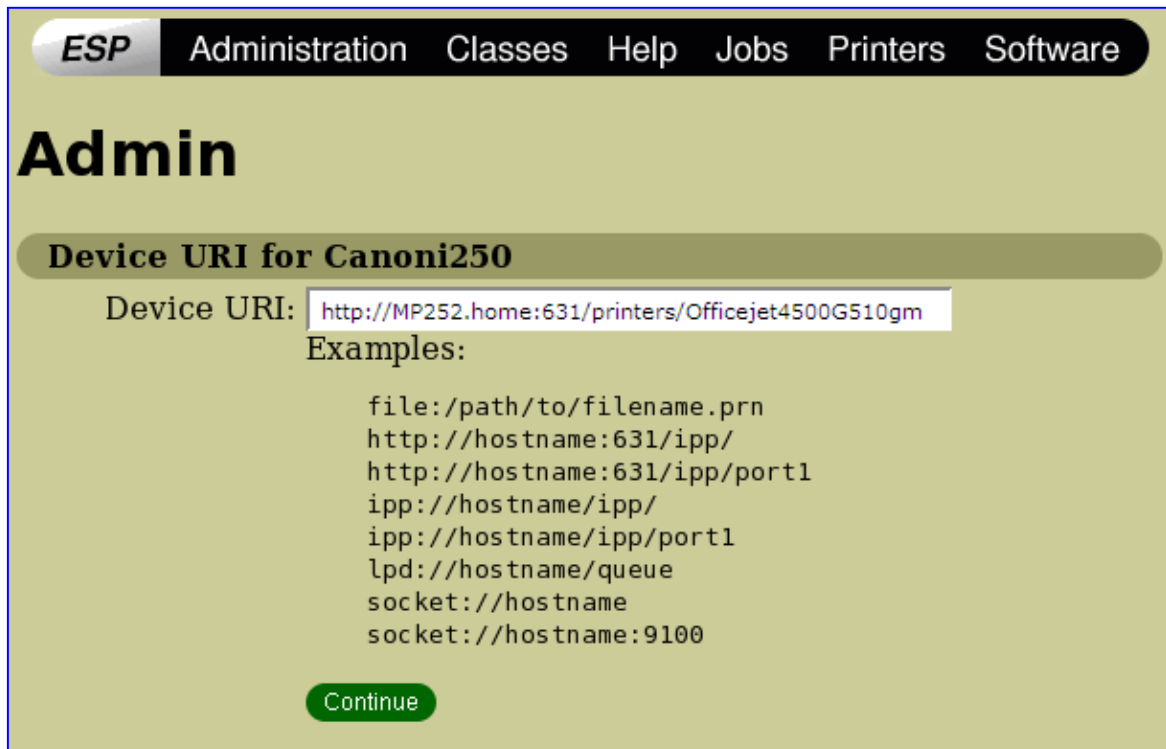
Figure 17-33: Printing Protocol



The screenshot shows the 'Admin' interface with a navigation bar containing 'ESP', 'Administration', 'Classes', 'Help', 'Jobs', 'Printers', and 'Software'. Below the navigation bar, the title 'Admin' is displayed. Underneath, there is a section titled 'Device for Canoni250'. In this section, the 'Device' dropdown menu is open, showing 'Internet Printing Protocol (http)' as the selected option. A green 'Continue' button is located below the dropdown.

7. Paste the printer's IPP URL in the 'Device URI' field, and then click **Continue**.

Figure 17-34: IPP URL



The screenshot shows the 'Admin' interface with a navigation bar containing 'ESP', 'Administration', 'Classes', 'Help', 'Jobs', 'Printers', and 'Software'. Below the navigation bar, the title 'Admin' is displayed. Underneath, there is a section titled 'Device URI for Canoni250'. In this section, the 'Device URI' field contains the URL 'http://MP252.home:631/printers/Officejet4500G510gm'. Below the field, there is a list of examples for device URIs: 'file:/path/to/filename.prn', 'http://hostname:631/ipp/', 'http://hostname:631/ipp/port1', 'ipp://hostname/ipp/', 'ipp://hostname/ipp/port1', 'lpd://hostname/queue', 'socket://hostname', and 'socket://hostname:9100'. A green 'Continue' button is located at the bottom of the section.

8. The next window displays a manufacturer drop-down list. Select your printer's manufacturer and click **Continue**.
9. The next window displays a printer model drop-down list. Select your printer's model and click **Continue**.
10. The last window displays the following confirmation message: 'Printer has been added successfully'.
11. To test your printer's connection from a Linux PC, open a shell and enter the following command:

```
$ echo hello | lpr -P<Printer Name>
```

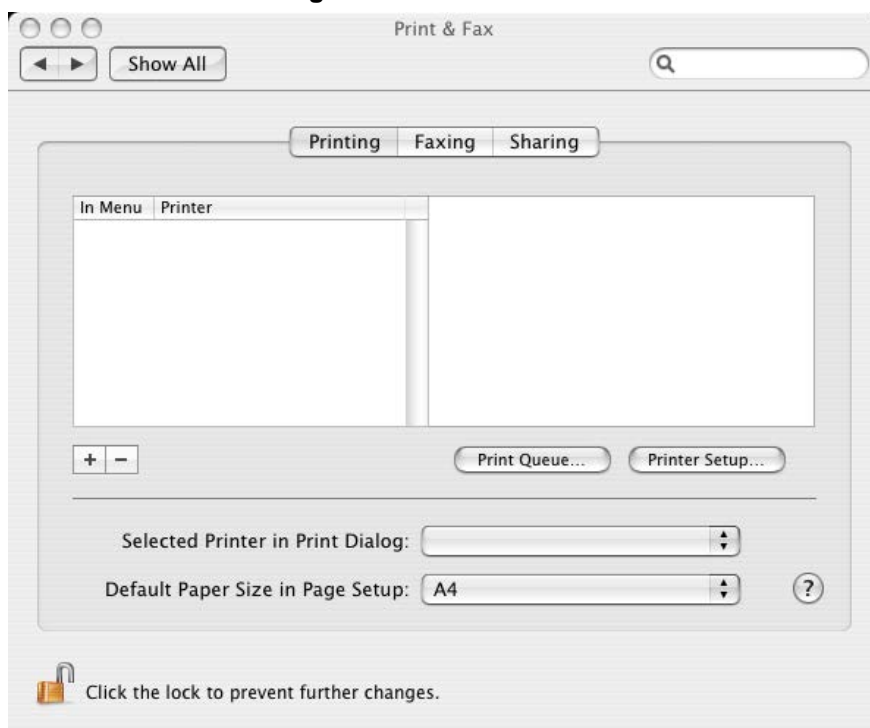
17.3.2.1.3 Setting Up an IPP Printer on Mac

The procedure below describes how to set up an IPP printer on Mac operating systems.

➤ **To set up an IPP printer on Mac:**

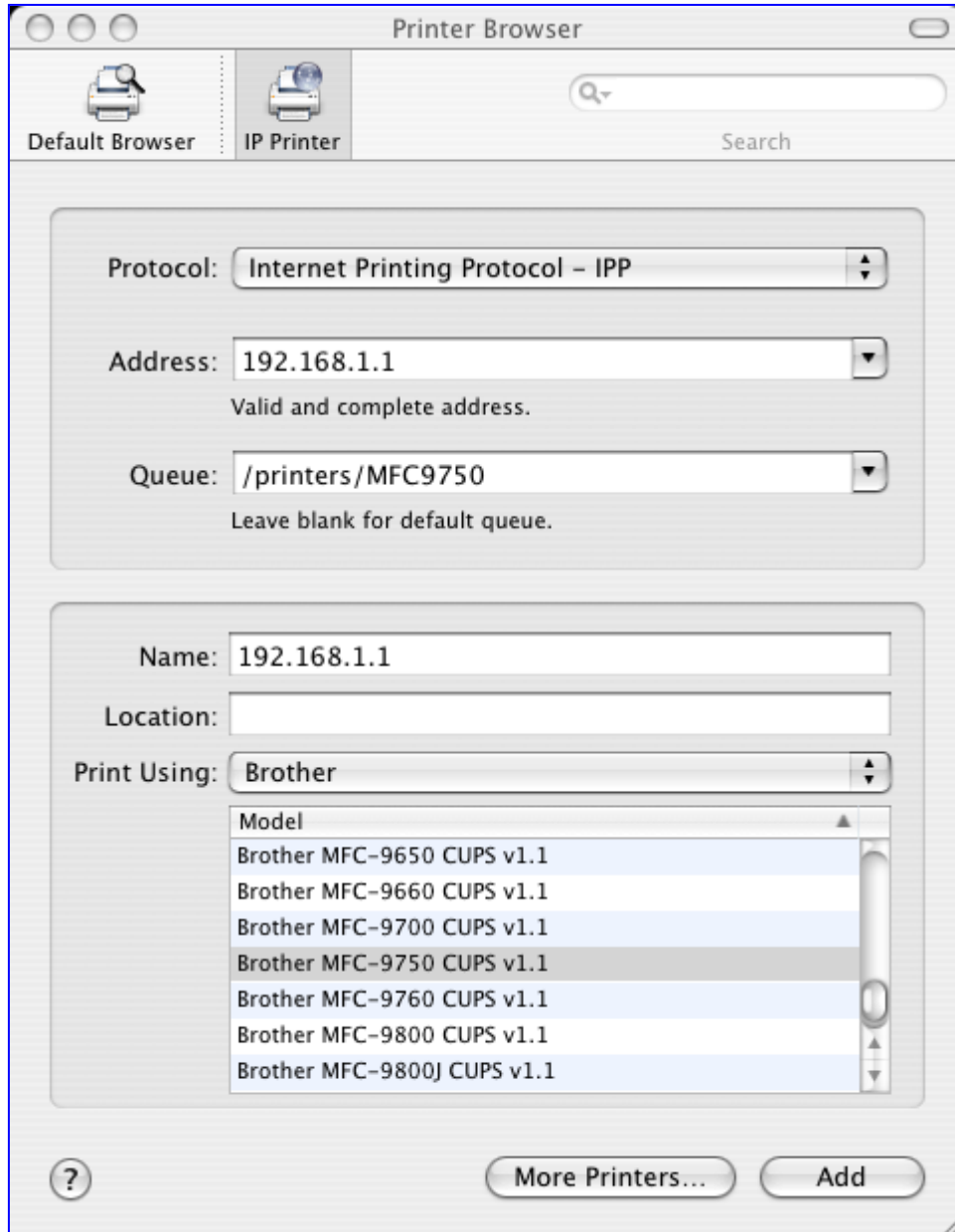
1. On your Mac computer connected to the device, open the 'Print & Fax' utility from 'System Preferences'; the 'Print & Fax' screen appears.

Figure 17-35: Print & Fax



2. Click the + (add) button; the 'Printer Browser' screen appears.
3. Select the **IP Printer** tab.

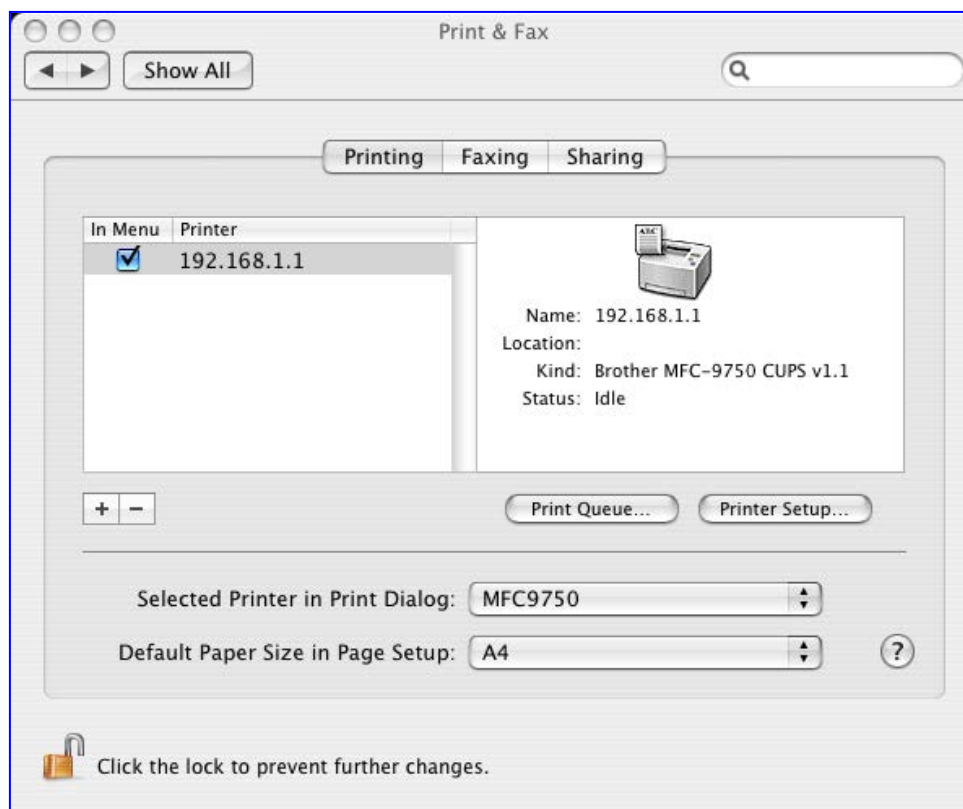
Figure 17-36: Printer Browser – IP Printer



4. In this screen, configure the following:
 - a. From the 'Protocol' drop-down list, select IPP.
 - b. In the 'Address' field, enter the device's IP address (192.168.1.1).
 - c. In the 'Queue' field, enter the section of the path containing the folder and printer names, as it appears in the 'Printer' screen. For example, "/printers/MFC9750".
 - d. The 'Name' and 'Location' fields are optional; the default name is the gateway's IP address.
 - e. From the 'Print Using' drop-down list, select your printer's make and model.

5. Click the **Add** button; the new printer appears in the 'Print & Fax' screen.

Figure 17-37: Print & Fax – New IPP Printer



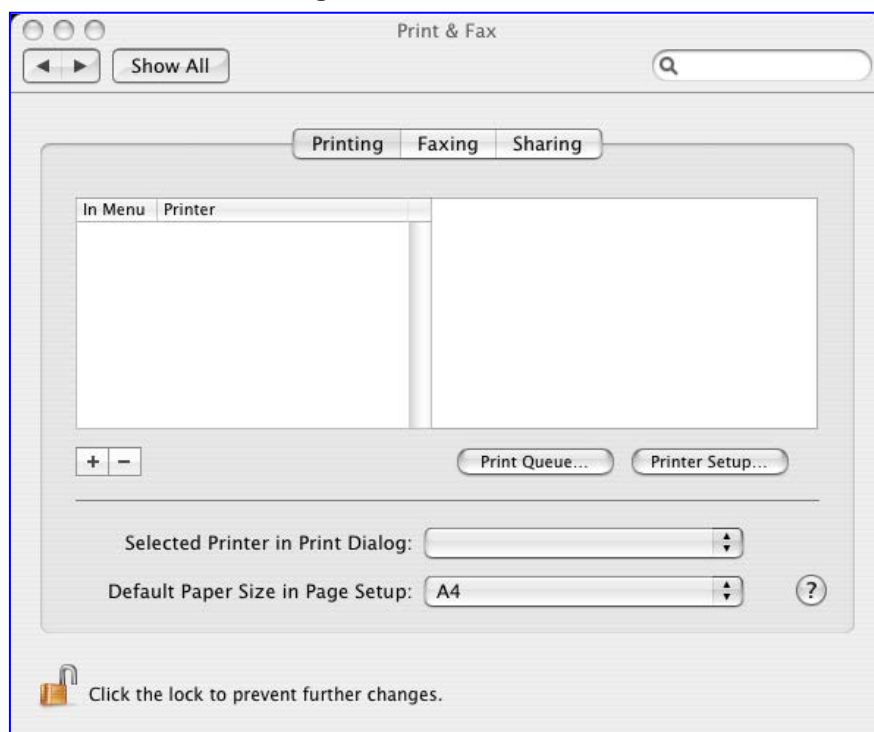
17.3.2.2 Microsoft Shared Printing (Samba)

The procedure below describes how to set up Microsoft Shared Printing (Samba).

➤ **To set up Microsoft shared printing (Samba):**

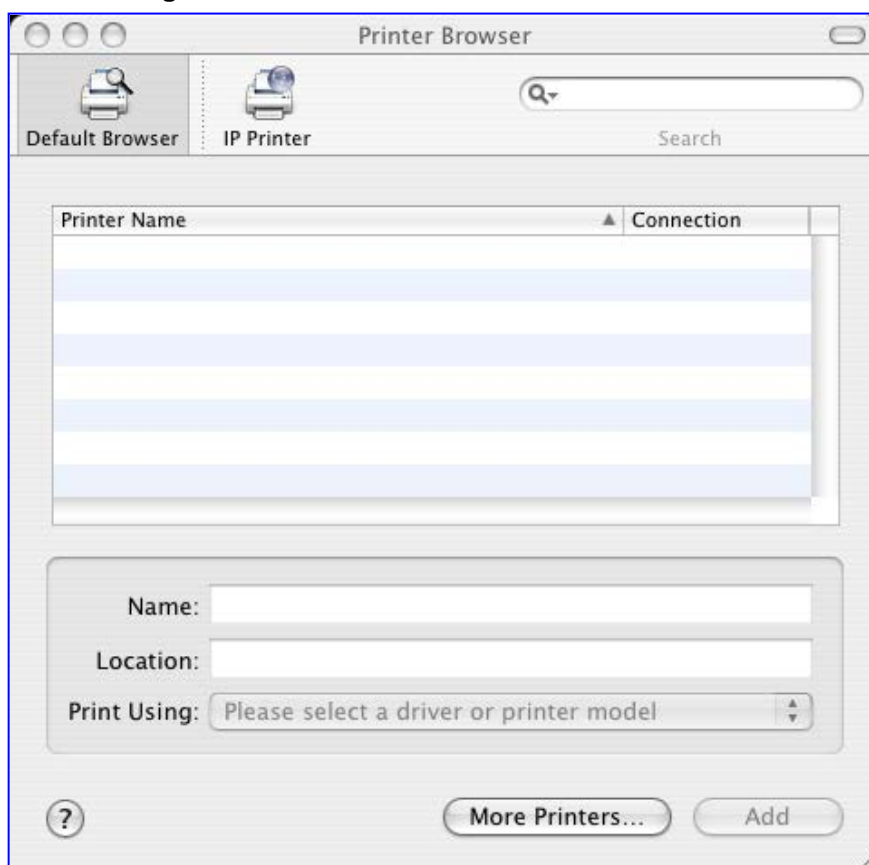
1. On your Mac computer connected to the device, open the 'Print & Fax' utility from 'System Preferences'; the 'Print & Fax' screen appears.

Figure 17-38: Print & Fax



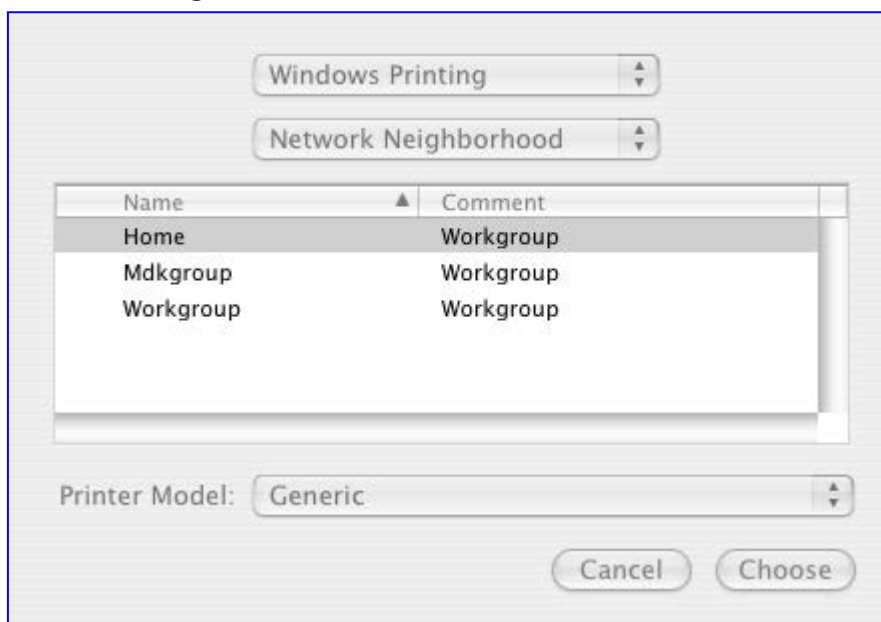
- Click the + (add) button; the 'Printer Browser' screen appears.

Figure 17-39: Printer Browser – Default Browser



- Click the **More Printers** button; the following screen appears.

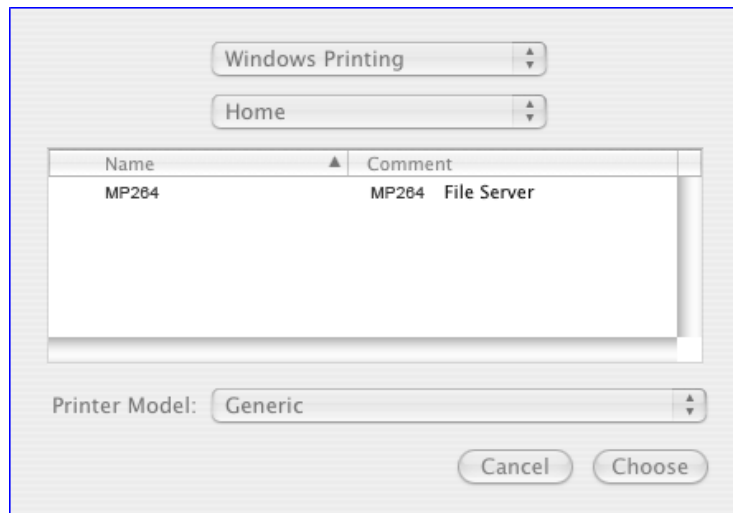
Figure 17-40: Printer Browser – More Printers



- From the second drop-down list, select 'Network Neighborhood'.

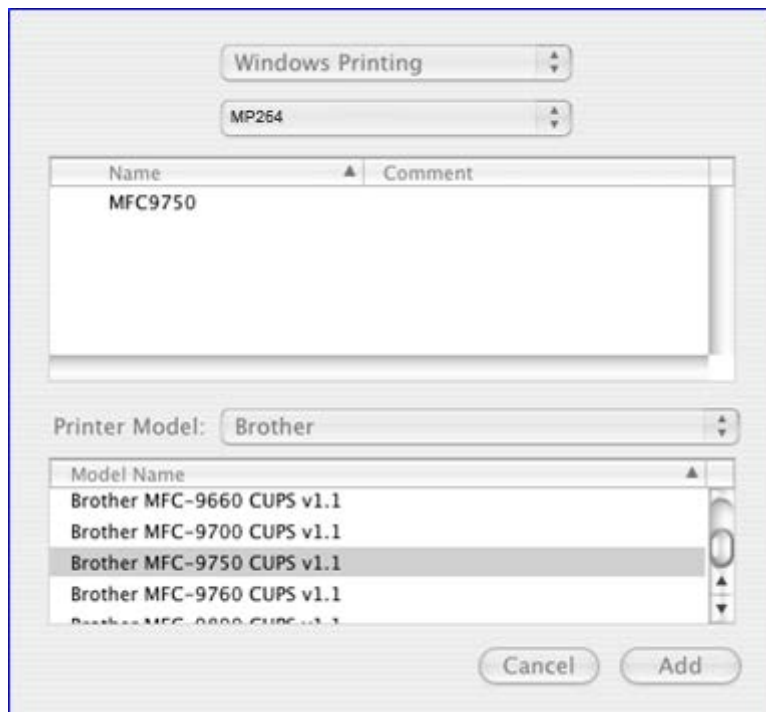
5. Select the 'Home' workgroup and then click **Choose**.

Figure 17-41: Printer Browser – MP264



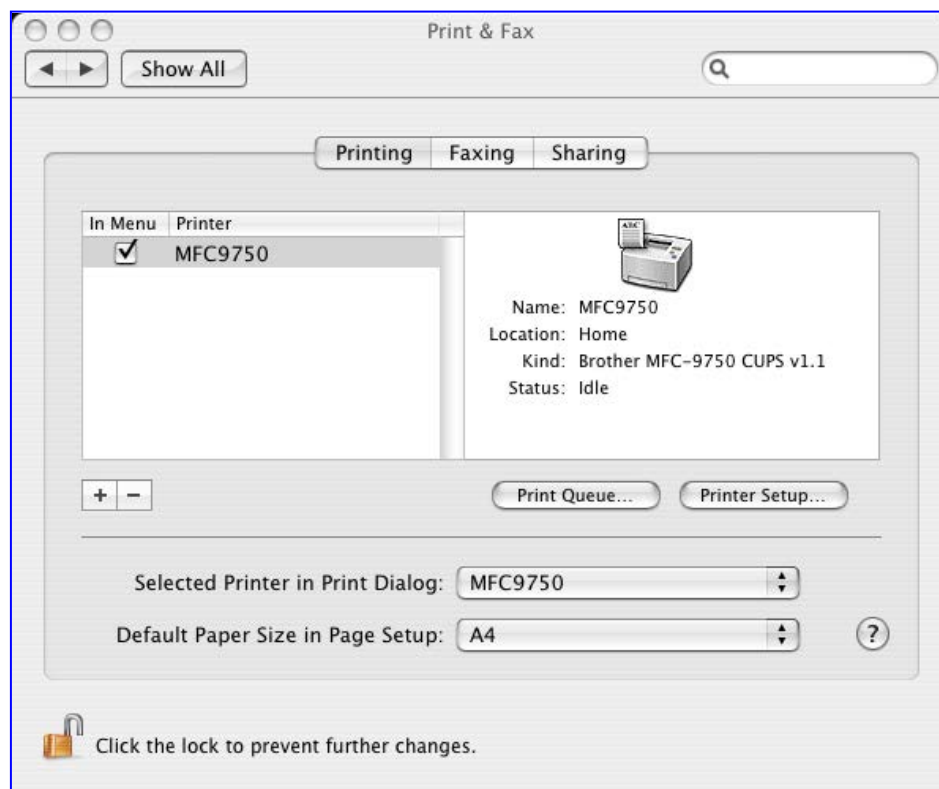
6. Select MP264, and then click **Choose**.
7. Select the printer, and from the 'Printer Model' drop-down list, select your printer's make and model.

Figure 17-42: Printer Browser – Printer Model (e.g., MP-264)



8. Click **Add**; the new printer appears in the 'Print & Fax' screen.

Figure 17-43: Print & Fax – New Samba Printer



17.3.2.3 Line Printer Daemon (LPD)

This section describes how to connect computers to the device printers, using the LPD protocol.

17.3.2.3.1 Setting Up an LPD Printer on Windows

Before configuring the LPD protocol on a LAN PC, ensure that a print driver for the specific printer is installed.



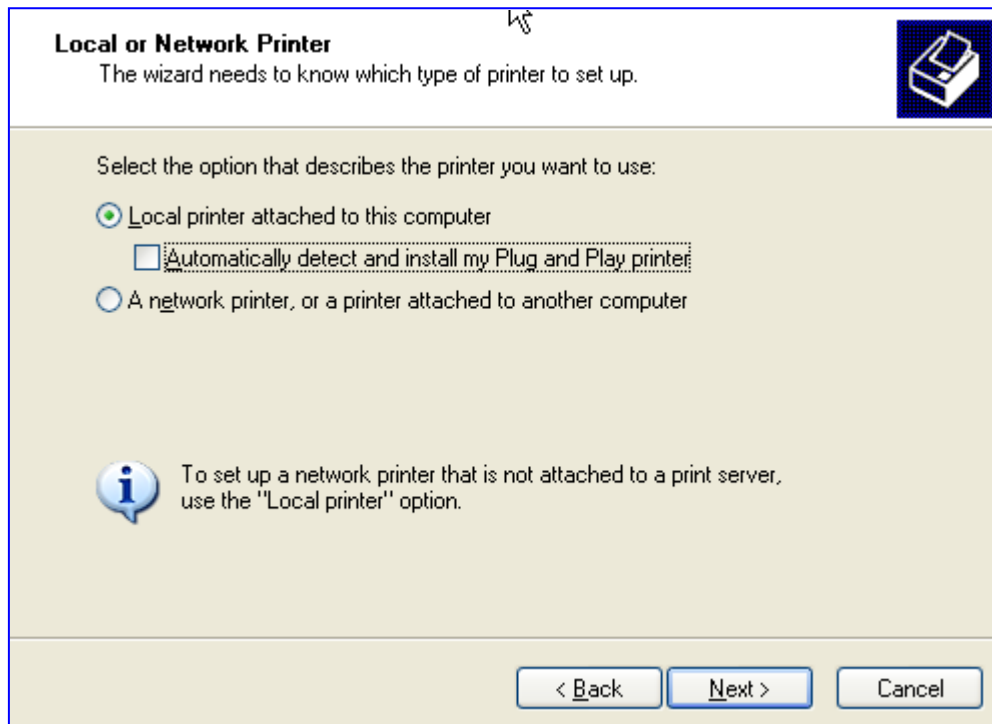
Note: The following configuration must be applied to each LAN PC individually in order to use the network printer.

➤ To set up an LPD printer on Windows:

1. On your Windows computer connected to the device, from the **Start** menu, point to **Settings**, then **Printers and Faxes**, and then click **Add Printer**; the Add Printer Wizard starts.
2. Click **Next** to proceed with the wizard sequence.
3. Select 'Local printer attached to this computer' and then click **Next**.

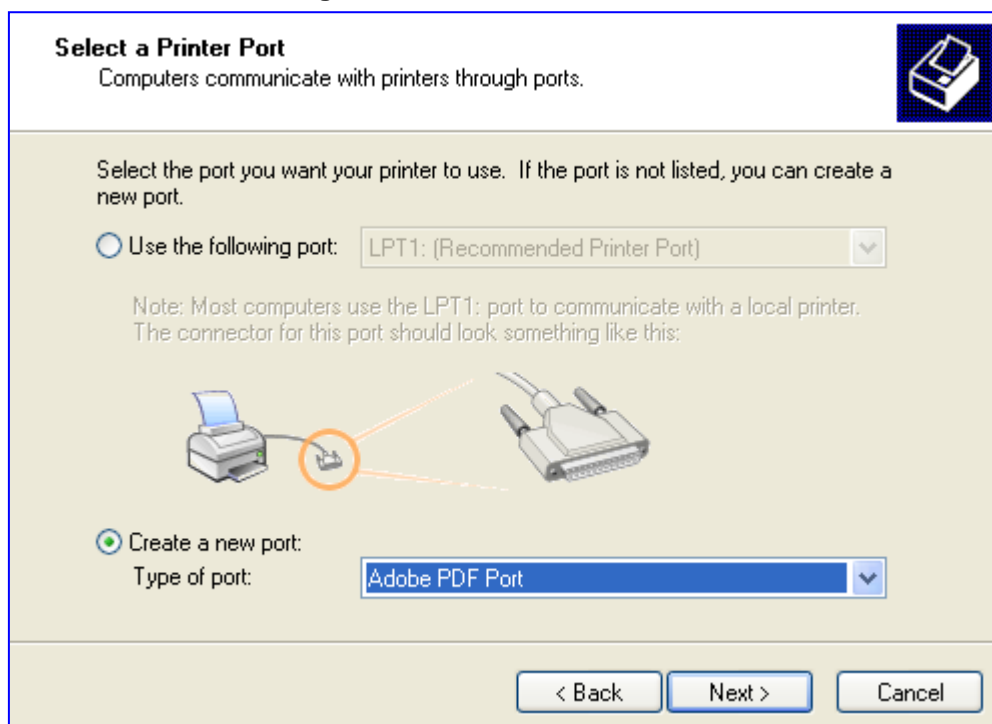
4. Clear the 'Automatically detect and install my Plug and Play printer', and then click **Next**.

Figure 17-44: Local Printer



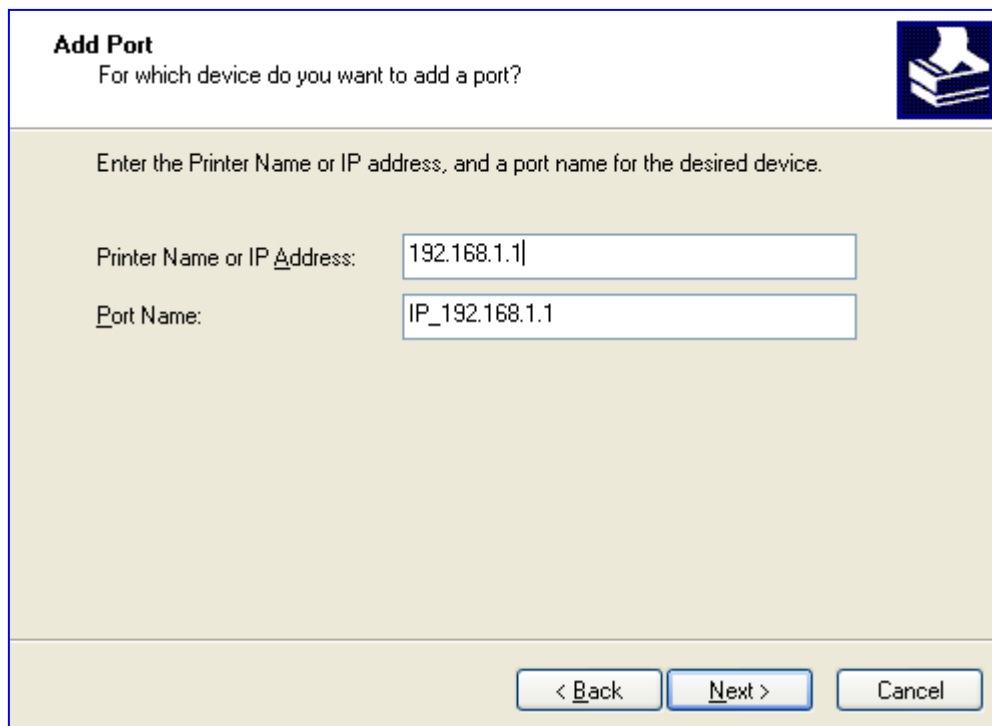
5. Select the 'Create a new port' option.
6. From the 'Type of port' drop-down list, select 'Standard TCP/IP Port'.

Figure 17-45: Select a Printer Port



7. Click **Next** to activate the 'Add Standard TCP/IP Printer Port Wizard'.

8. Click **Next** to proceed with the new wizard.
9. In the 'Printer Name or IP Address' field, specify 192.168.1.1, and then click **Next**.

Figure 17-46: Add Port

Add Port
For which device do you want to add a port?

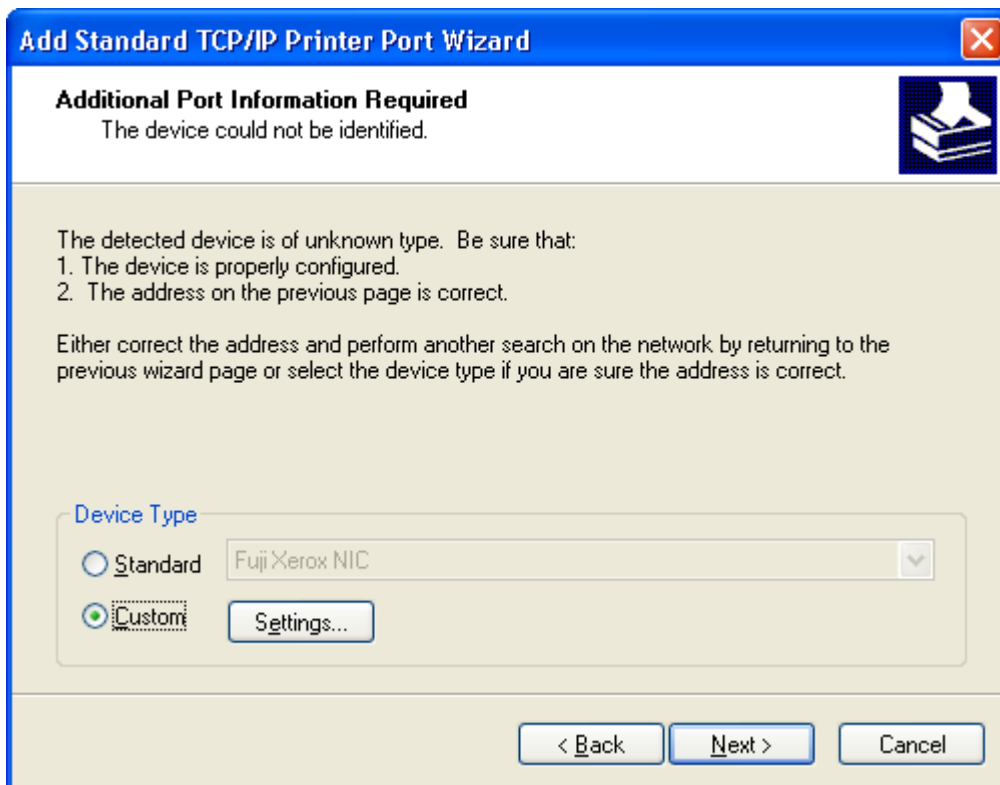
Enter the Printer Name or IP address, and a port name for the desired device.

Printer Name or IP Address: 192.168.1.1

Port Name: IP_192.168.1.1

< Back Next > Cancel

10. Select the 'Custom' option, and then click **Settings**.

Figure 17-47: Additional Port Information

Add Standard TCP/IP Printer Port Wizard

Additional Port Information Required
The device could not be identified.

The detected device is of unknown type. Be sure that:

1. The device is properly configured.
2. The address on the previous page is correct.

Either correct the address and perform another search on the network by returning to the previous wizard page or select the device type if you are sure the address is correct.

Device Type

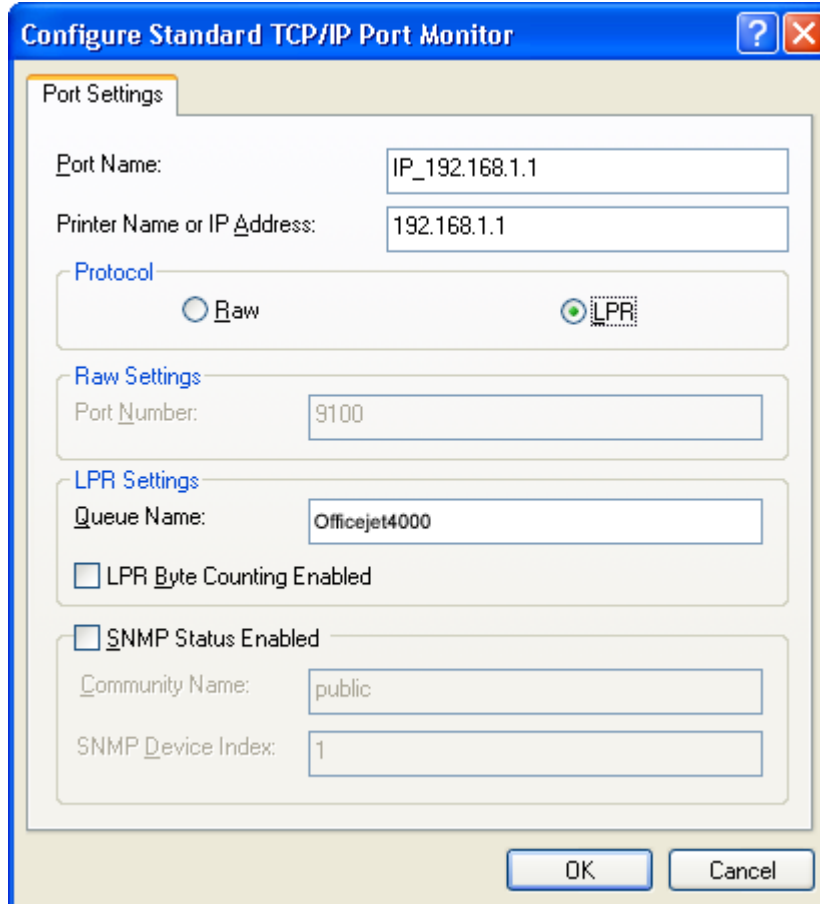
☐ Standard Fuji Xerox NIC

☒ Custom Settings...

< Back Next > Cancel

11. In the 'Configure Standard TCP/IP Port Monitor' window, configure the following parameters:
 - a. Select the 'LPR' option.
 - b. In the device's Web interface, open the 'Print Server' screen.
 - c. Copy the printer's name (for example, "Officejet4000") and paste it in the 'Queue Name' field of the port monitor configuration window.

Figure 17-48: Printer Port Monitor Configuration



Configure Standard TCP/IP Port Monitor

Port Settings

Port Name: IP_192.168.1.1

Printer Name or IP Address: 192.168.1.1

Protocol

☐ Raw ☒ LPR

Raw Settings

Port Number: 9100

LPR Settings

Queue Name: Officejet4000

☐ LPR Byte Counting Enabled

☐ SNMP Status Enabled

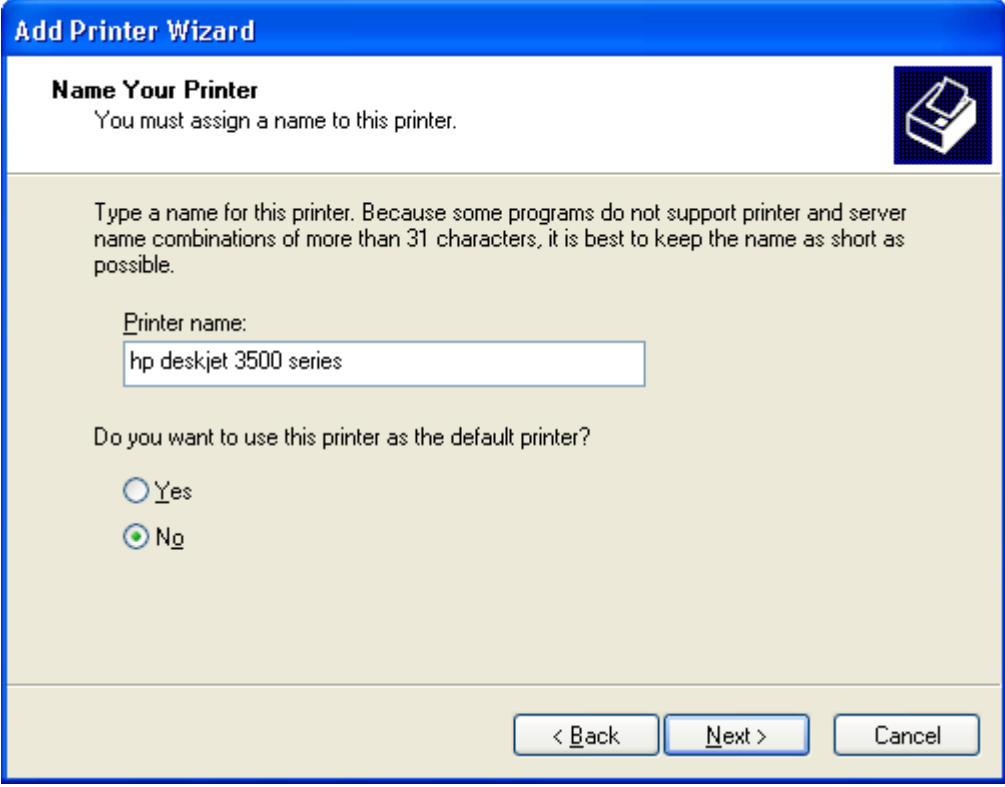
Community Name: public

SNMP Device Index: 1

OK Cancel

12. Click **OK**, and then click **Finish**; the 'Add Printer Software' wizard reappears.

Figure 17-49: Add Printer Wizard



The screenshot shows a Windows-style dialog box titled "Add Printer Wizard". The main heading is "Name Your Printer", followed by the instruction "You must assign a name to this printer." in the top right corner. Below this, a text box contains the name "hp deskjet 3500 series". A question "Do you want to use this printer as the default printer?" is followed by two radio buttons: "Yes" (unselected) and "No" (selected). At the bottom are three buttons: "< Back", "Next >", and "Cancel".

Add Printer Wizard

Name Your Printer
You must assign a name to this printer.

Type a name for this printer. Because some programs do not support printer and server name combinations of more than 31 characters, it is best to keep the name as short as possible.

Printer name:
hp deskjet 3500 series

Do you want to use this printer as the default printer?

☐ Yes
☒ No

< Back Next > Cancel

13. Select your printer manufacturer and model from the lists. If it does not appear in the lists, click 'Have disk' to specify the driver location.
14. Specify the name you want to give the printer, and whether you want it to be the default printer. Click **Next**.
15. Click **Next** to proceed to the final wizard screen.
16. Select **Yes** to print a test page.
17. Click **Finish** to complete the setup procedure.

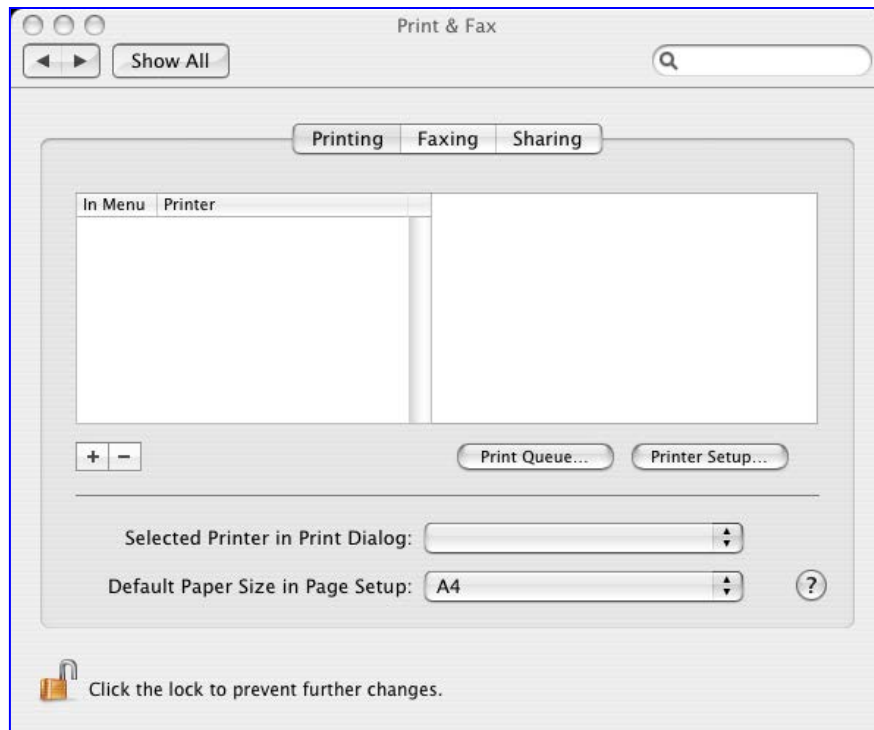
17.3.2.3 Setting Up an LPD Printer on Mac

The procedure below describes how to set up an LPD printer on Mac operating systems.

➤ **To set up an LPD printer on Mac:**

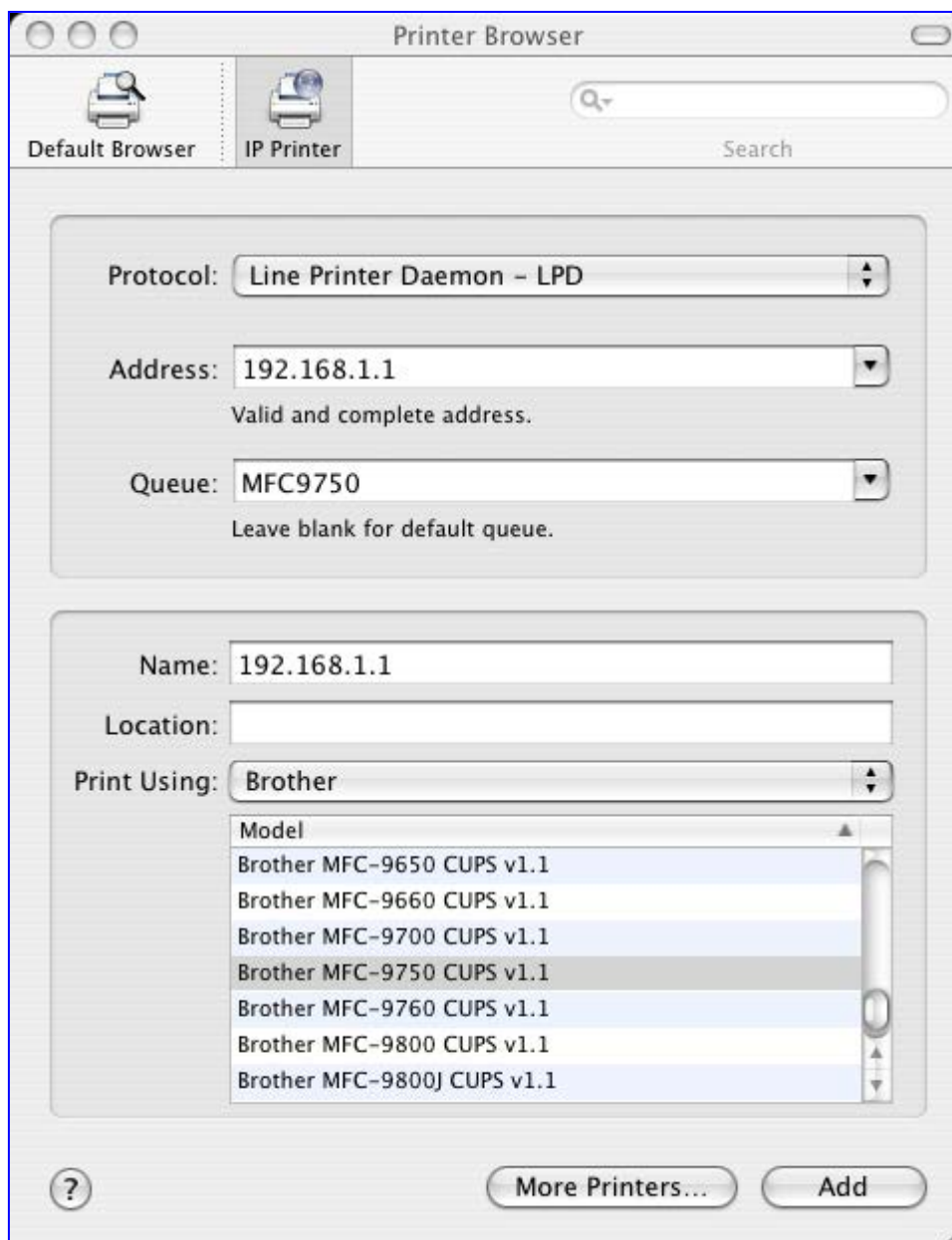
1. On your Mac computer connected to the device, open the 'Print & Fax' utility from 'System Preferences'; the 'Print & Fax' screen appears.

Figure 17-50: Print & Fax



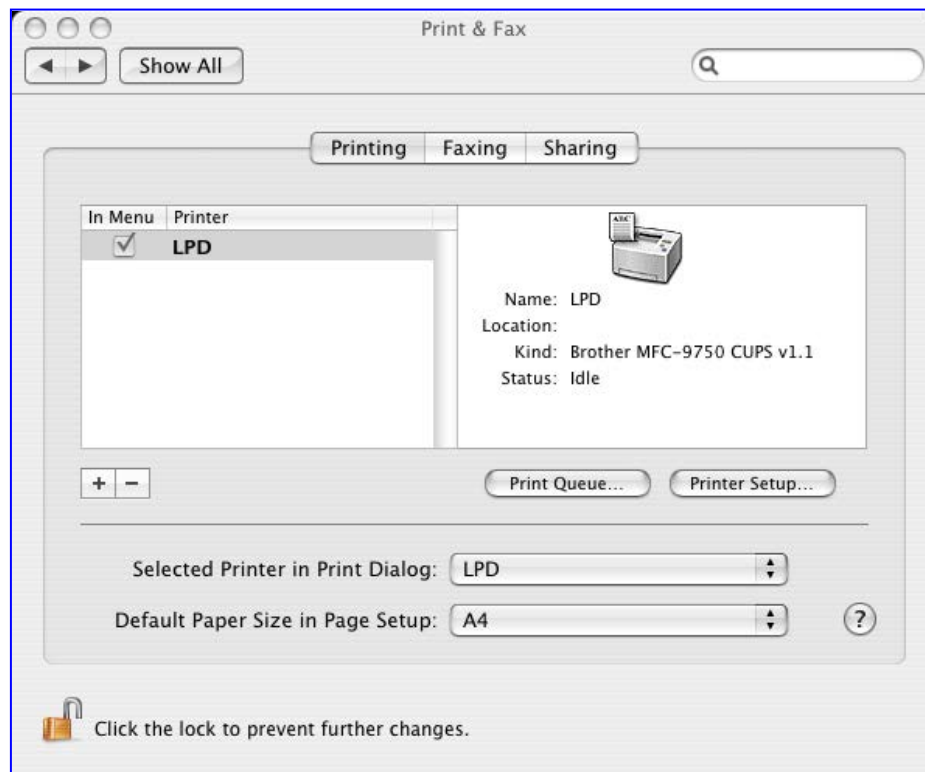
2. Click the + (add) button; the 'Printer Browser' screen appears.
3. Select the **IP Printer** tab and the configure the following:
 - a. From the 'Protocol' drop-down list, select LPD.
 - b. In the 'Address' field, enter the device's IP address (192.168.1.1).
 - c. In the 'Queue' field, enter the printer's name as it appears in the 'Printer' screen of the Web interface. For example, MFC9750.
 - d. The 'Name' and 'Location' fields are optional; the default name is the gateway's IP address.
 - e. From the 'Print Using' drop-down list, select your printer's make and model.

Figure 17-51: Printer Browser – LPD Printer



4. Click **Add**; the new printer appears in the 'Print & Fax' screen.

Figure 17-52: Print & Fax – New LPD Printer



17.3.3 Storing and Using Printer Drivers

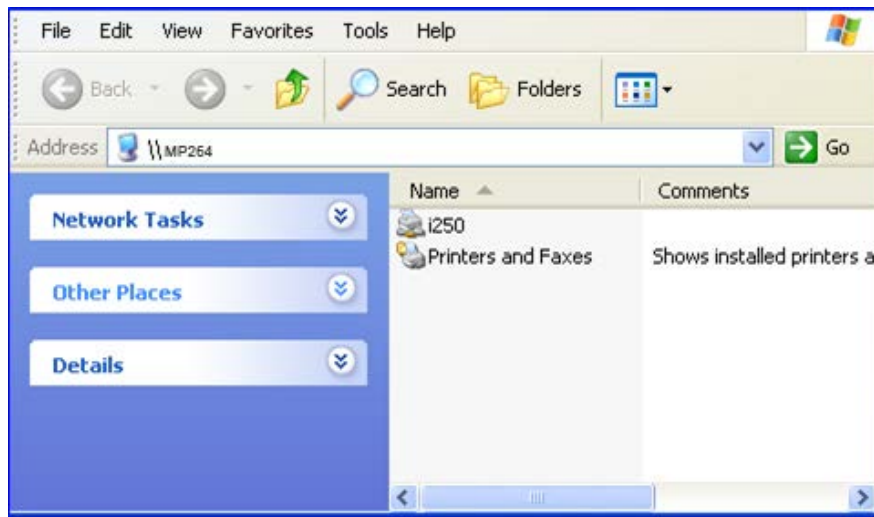
As explained earlier in this chapter, to use a shared printer connected to the device, a driver for the printer must be installed on the LAN computer from which the print job is to be sent. You can use the device file server to store printer drivers.

The drivers should be uploaded from a Windows computer and stored in the system storage area that you have created on one of the disk partitions. The printer can then be installed on other LAN computers using the driver stored on the device.

➤ **To upload the driver files to the device:**

1. From Window's **Start** menu, click **Run**, and then type "cmd" to open a command shell.
2. At the prompt, type **net use** to view the list of shares and their status.
3. Type **net use /del \\mp264\share-B** to delete the specific network mapping entry. Alternatively, you can use **net use /del *** to delete all network mapping entries.
4. Type **net use * \\openrg\print\$ [Admin's password] [/user:admin]**. This ensures that you are logged into the print server using the Admin user and have the permissions to upload files.
5. Browse to \\mp264 (use a Windows Explorer window if you are using a browser other than Internet Explorer). Should a Windows login dialog box appear, enter your Web username and password. The following window appears, displaying the disk and printer shares available on the device.

Figure 17-53: Disk and Printer Shares (e.g., MP-264)



6. Click **Printers and Faxes**.
7. Right-click the printer icon and then select **Properties**.
8. If your operating system does not already have the driver, you will be asked if you want to install it now. Click **No**.
9. Select the **Advanced** tab, and then click **New driver**; the 'Add Printer Driver Wizard' on the device starts. You are prompted to select a printer driver from a list. If unavailable, you can either browse to a location on your computer where you have stored the driver, or click **Have Disk** and insert the CD containing the driver (supplied with your printer).
10. Click **OK**; the driver is uploaded to the device's system storage directory (e.g. "\\mp264\\A").

Reader's Notes

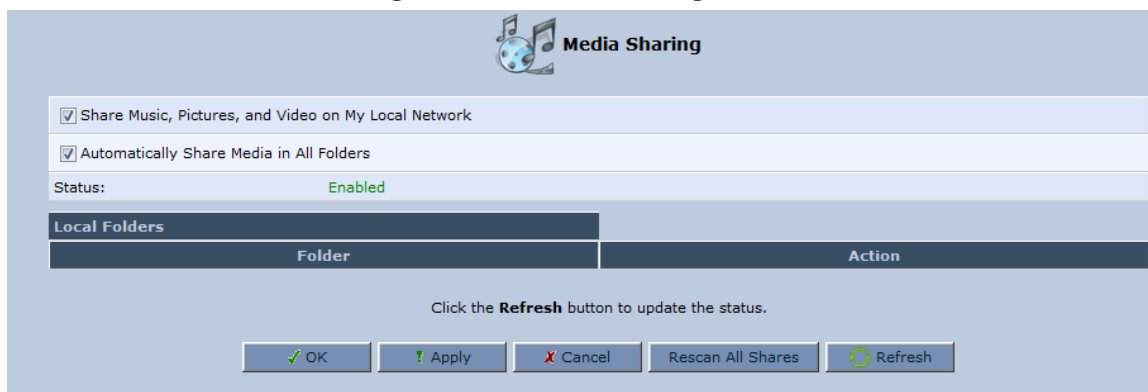
18 Media Sharing

Media Sharing enables you to share and stream media files from a storage device connected to a media server. The procedure below shows how to enable media sharing on the device.

➤ **To enable media sharing:**

- In the 'Advanced' screen, click the **Media Sharing**  icon; the 'Media Sharing' screen appears.

Figure 18-1: Media Sharing Screen



The following two options appear on the 'Media Sharing' screen:

- Share Music, Pictures, and Video on My Local Network
- Automatically Share Media in All Folders

18.1 Share Music, Pictures and Video on My Local Network

By default, this option is selected. To disable media sharing, deselect this option.

18.2 Automatically Share Media in All Folders

If this option is selected, all partitions and folders on the storage device are automatically shared.

➤ **To disable automatic sharing and manually share a specific folder:**

1. Deselect the 'Automatically Share Media in All Folders' check box and click **Apply**; the screen refreshes. A new section appears, enabling you to create and manage a list of manually shared partitions and their folders.

Figure 18-2: Media Sharing Screen - Expanded

Folder	Title	Action
Add Folder		+

2. Click the 'Add Folder' link, or the Add Folder  icon; the 'Folder Settings' screen appears.

Figure 18-3: Folder Settings

Folder:

Title:

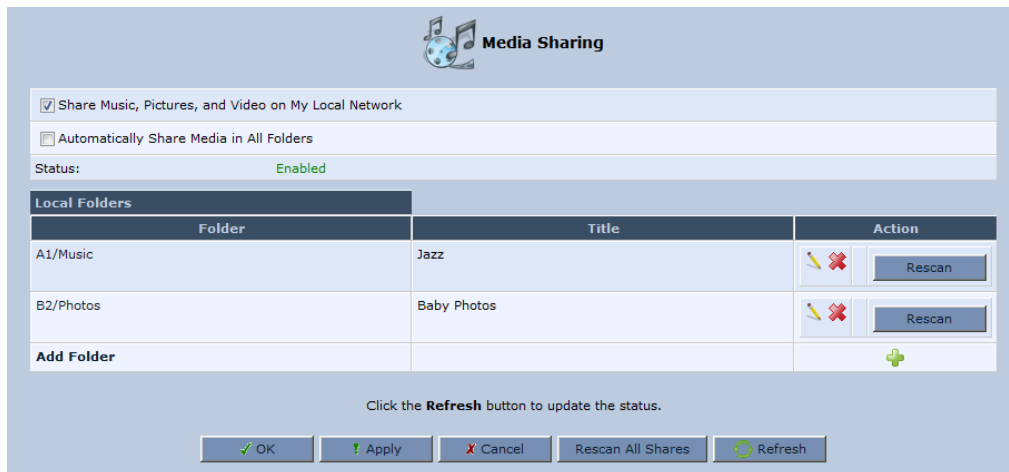
3. In the 'Folder' field, enter the exact path (for example, A1/Music, where 'A1' is a partition's letter, and 'Music' is a folder on this partition).
4. In the 'Title' field, enter a descriptive title for the folder (for example, 'Jazz').



Note: 'Title' is a mandatory field.

5. Click **OK** to save the settings; the 'Media Sharing' screen appears, displaying the shared partition. If necessary, repeat the same procedure to share additional partitions and their folders.

Figure 18-4: Shared Partitions





The screenshot shows the 'Media Sharing' window. At the top, there's a header with a globe icon and the title 'Media Sharing'. Below the header, there are two checkboxes: 'Share Music, Pictures, and Video on My Local Network' (checked) and 'Automatically Share Media in All Folders' (unchecked). The status is 'Enabled'. Below this is a table titled 'Local Folders' with columns 'Folder', 'Title', and 'Action'. The table contains two rows: 'A1/Music' with title 'Jazz' and 'B2/Photos' with title 'Baby Photos'. Each row has an 'Edit' icon (pencil), a 'Remove' icon (red X), and a 'Rescan' button. Below the table is an 'Add Folder' button with a green plus icon. At the bottom, there's a message: 'Click the **Refresh** button to update the status.' and a row of buttons: 'OK', 'Apply', 'Cancel', 'Rescan All Shares', and 'Refresh'.

Folder	Title	Action
A1/Music	Jazz	[Edit] [Remove] [Rescan]
B2/Photos	Baby Photos	[Edit] [Remove] [Rescan]
Add Folder		[+]

Click the **Refresh** button to update the status.

[OK] [Apply] [Cancel] [Rescan All Shares] [Refresh]

You can edit the partition or folder sharing settings by clicking the  Edit icon.

You can also remove a partition or a folder from the shares list by clicking the  Remove icon.



Note: If you want to change the Sharing settings, click **Rescan** before trying to access the shared media remotely. Clicking **Rescan** updates the media database with the current shared media content and its path. The more disk space the media files occupy, the longer the scanning process may take.

19 Maintenance

This section describes various maintenance procedures for the device.

19.1 Enabling the Feature Key

The Feature Key is a string stored in the device's non-volatile flash memory, defining the features and capabilities allowed by the specific license you purchased. The device only allows you to utilize those features allowed by the integral Feature Key.



Note: The Feature Key is an encrypted key provided by AudioCodes only.

The features that can be enabled by the Feature Key include the following:

- Print Server
- File Server
- LST
- 3G Backup
- DECT
- Bluetooth
- Auto Attendant
- VoIP

In the future, you may want to order additional features from AudioCodes. The procedure below describes how to enable new features on the Feature Key.

➤ **To enable new features on the Feature Key:**


1. In the 'Advanced' screen, click the **Feature Key**  icon; the 'Feature Key' screen appears displaying the already enabled features on your device.

Figure 19-1: Feature Key Screen



Feature	Status
Print Server	Enabled
File Server	Enabled
LST	Enabled
3G Backup	Enabled
DECT	Enabled
Bluetooth	Enabled
Auto Attendant	Enabled

Key

Key:


2. Open the Feature Key file you received from AudioCodes, (it should open in Notepad), select and copy the key string and paste it into the Key field.
3. Click OK; the following screen appears:

Figure 19-2: Reboot Screen



4. Click **OK** to reboot.
5. The newly-enabled feature displays "Enabled" in the **Status** column.

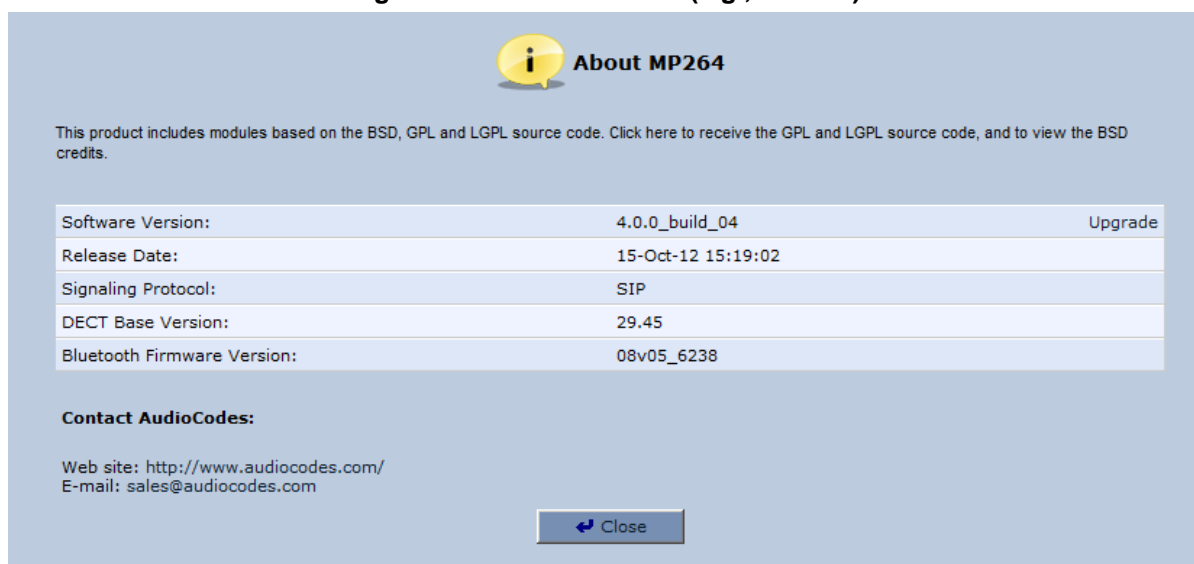
19.2 Viewing the Device Software Version

The **About device**  icon displays information about the device. This includes the software version, release date, signaling protocol, and DECT base unit version ⁴. You can also upgrade the software running on the device, by clicking the **Upgrade** link (for more information, see Section 19.6 on page 361).

➤ **To view information about the device:**

- In the 'Advanced' screen, click the  icon; in the example below, the 'About MP-264' screen appears.

Figure 19-3: About Screen (e.g., MP-264)



Note:

- The version upgrade percentage progress display updates when a screen refresh is done.
- DECT LED blinks fast when its upgrade takes place. You must not power off the unit during this time.

⁴

The DECT feature is applicable only to the MP-264-DB model.

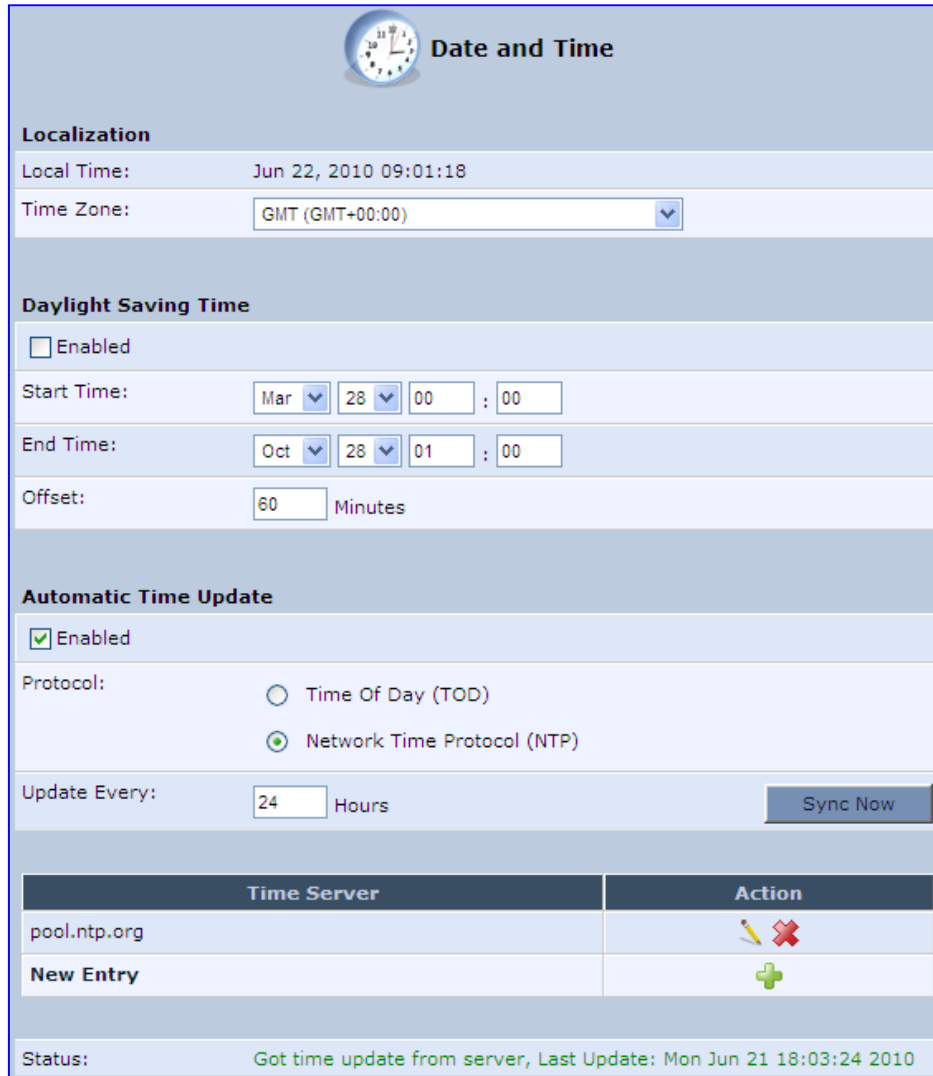
19.3 Configuring Date and Time

The procedure below describes how to set the date and time.

➤ **To configure date, time and daylight savings time settings:**

1. In the 'Advanced' screen, click the **Time Settings**  icon; the 'Date & Time' screen appears.

Figure 19-4: Date and Time Screen



Date and Time

Localization

Local Time: Jun 22, 2010 09:01:18

Time Zone: GMT (GMT+00:00) ▼

Daylight Saving Time

☐ Enabled

Start Time: Mar 28 00 : 00

End Time: Oct 28 01 : 00




Offset: 60 Minutes

Automatic Time Update

☒ Enabled

Protocol: ☐ Time Of Day (TOD) ☒ Network Time Protocol (NTP)

Update Every: 24 Hours Sync Now

Time Server	Action
pool.ntp.org	 
New Entry	

Status: Got time update from server, Last Update: Mon Jun 21 18:03:24 2010

2. From the 'Time Zone' drop-down list, select the local time zone. The device can automatically detect daylight saving setting for selected time zones.


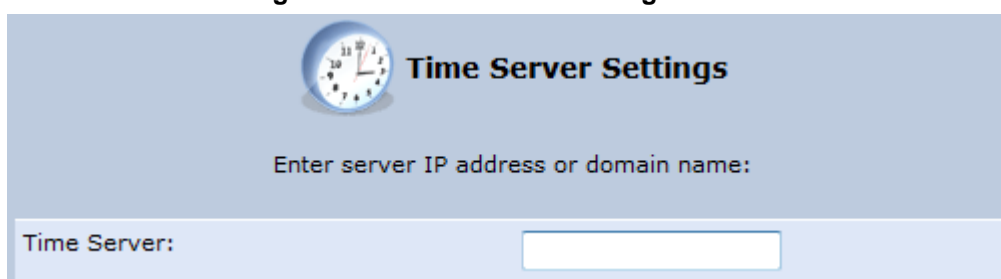

3. Under the **Daylight Saving Time** group, configure the daylight saving settings for your time zone (if they are not automatically detected):
 - **Enabled:** Select this check box to enable daylight saving time.
 - **Start:** Date and time when daylight saving starts.
 - **End:** Date and time when daylight saving ends.
 - **Offset:** Daylight saving time offset.
4. For the device to perform an automatic time update, under the **Automatic Time Update** group, do the following:
 - a. Select the 'Enabled' check box.
 - b. Select the protocol to be used for time update, by selecting either the 'Time of Day' or 'Network Time Protocol' option.
 - c. In the 'Update Every' field, specify how often to perform the update.
 - d. You can define NTP servers, by clicking the **New**  icon; the 'Time Server Settings' screen appears.

Figure 19-5: Time Server Settings Screen

The image shows a screenshot of the 'Time Server Settings' screen. At the top, there is a clock icon and the title 'Time Server Settings'. Below the title, it says 'Enter server IP address or domain name:'. At the bottom, there is a label 'Time Server:' followed by a text input field.

- e. In the 'Time Server' field, enter the IP address of the Time server (NTP), and then click **OK**.

19.4 Backup and Restore

The **Backup and Restore**  icon allows you to configure the device backup facility for backing up data, stored in the system storage area, to external USB disks. You may specify backups to run automatically at scheduled times.

Two prerequisites must be met before enabling the backup mechanism:

- The file server feature must be activated and configured
- The file server must consist of at least two disks



Note: The backup is done at the directory level. In other words, it is not possible to backup a single stand-alone file.

19.4.1 Backing up Data

The procedure below describes how to backup data.

➤ **To backup data:**


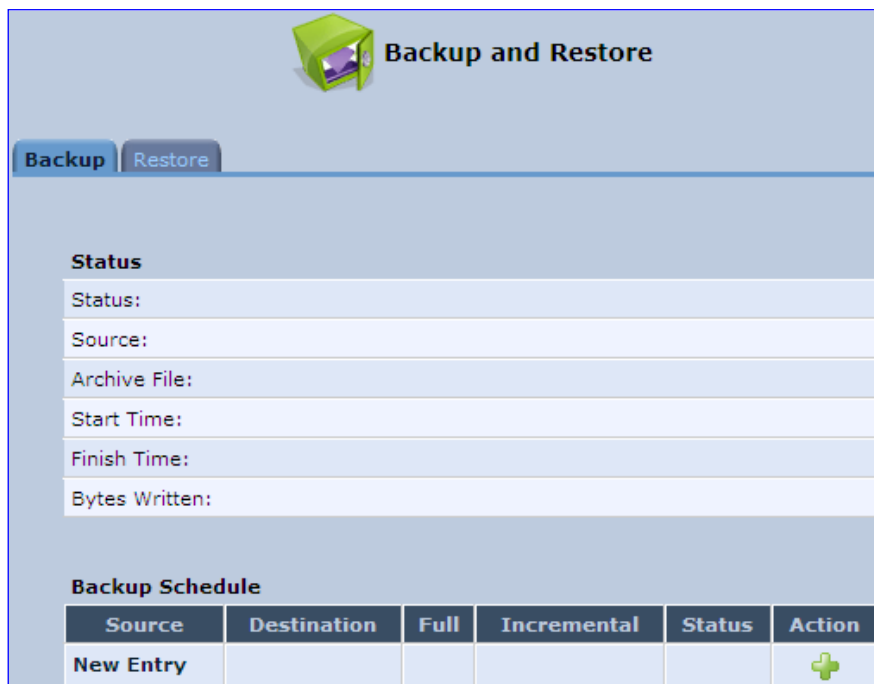
1. In the 'Advanced' screen, click the  icon; the 'Backup and Restore' screen appears.
2. Select the **Backup** tab.

Figure 19-6: Backup and Restore Screen



Source	Destination	Full	Incremental	Status	Action
New Entry					


3. In the 'Backup Schedule' table, click the **New**  icon; the 'Edit Backup' screen appears.

Figure 19-7: Edit Backup Screen

4. In the 'Source' field, type the source to backup, for example, "A/homes".
5. In the 'Destination' field, type the destination of the backup files, for example, "B/backups". It is recommended that the destination is an external storage device.
6. Choose between full backup, incremental backup, or both, by scheduling a time for the backup operation. You can choose between daily, weekly or monthly backups in the 'Schedule' drop-down lists.



Note: When scheduling a monthly backup, use a day that exists in all months (i.e. from 1st till 28th day), as backups do not run on months with more than 30 days.

7. Click **OK** to save the schedule settings.
8. Click **Backup Now** to run the backup operation immediately. When backing up, the screen displays the status and progress of the operation.

19.4.2 Restoring Data

The procedure below describes how to restore data.

➤ **To restore data:**


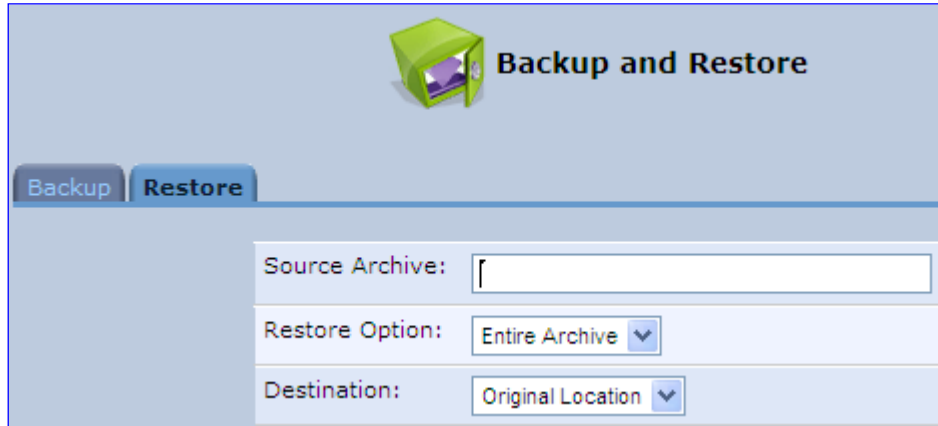

1. In the 'Advanced' screen, click the  icon; the 'Backup and Restore' screen appears.
2. Select the **Restore** tab; the 'Restore' screen appears.

Figure 19-8: Restore Screen



3. In the 'Source Archive' field, type the source to restore, for example, "A/homes".
4. From the 'Restore Option' drop-down list, select whether to restore the entire archive or only a subdirectory. If you choose subdirectory, a second field appears in which you must enter the name of the subdirectory relative to the source archive. For example, to restore "A/homes/john", type "john" as the subdirectory.
5. From the 'Destination' drop-down list, select a destination for which to restore the archive. You can choose the original location or any other directory. If you choose another directory, a second field appears in which you must enter the name of the directory. Note that the path of the restored directory is created under the path of the destination directory. For example, if you specify the directory "A/restore_dir", the result is "A/restore_dir/A/homes/john".

19.5 Configuration File

The **Configuration File**  icon allows you to view, save, and load the device configuration file. Therefore, you can backup and restore your current configuration.

The device also supports configuration file encryption, allowing you to load encrypted configuration files (using the file name extensions *.cfx or *.inx). For more information on encrypting a configuration file, see Section 19.5.3 on page 359.

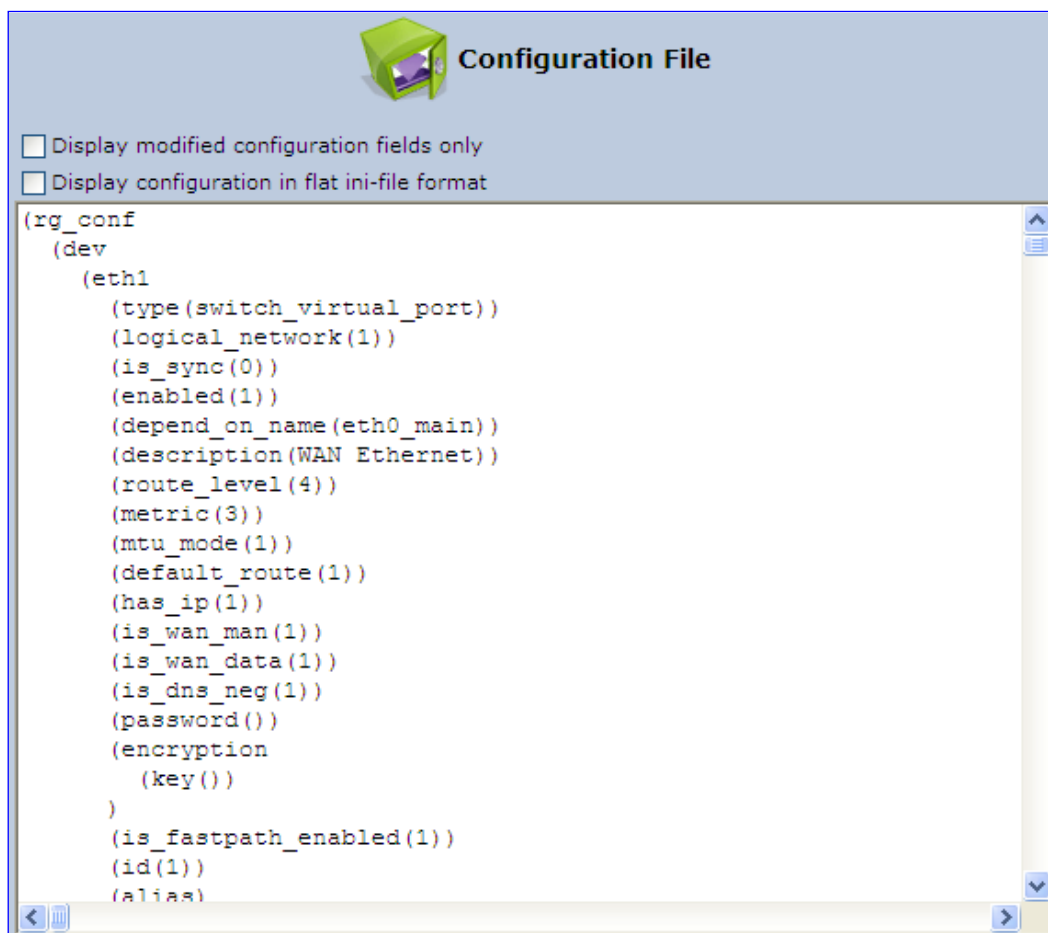
The device allows you to use un-encrypted passwords in the configuration file (*.cfg or *.ini) that you want to load, and then encrypt the passwords before burning to flash. This is achieved by using the format {"<value>"} in the configuration file for password fields which are normally encrypted. Below are two examples of this feature:

- **ini file:** rg_conf/voip/line/1/auth_password={"foobaa"}
- **cfg file:** (auth_password({"foobaa"}))

➤ To save and restore the configuration file:

1. In the 'Advanced' screen, click the  icon; the 'Configuration File' screen appears, showing the entire contents of the configuration file.

Figure 19-9: Configuration File Screen



2. You can customize the displayed configuration file, by selecting the following check boxes:
 - **Display modified configuration fields only:** Displays only the configuration parameters that have values other than default values.
 - **Display configuration in flat ini-file format:** Displays the configuration file in flat INI-file format.
3. To back up your current configuration to a file on your PC, click **Download Configuration File**. The saved configuration file can be used as a backup for the specific the device's configuration for creating a configuration file for remote configuration update, and for debugging and diagnostics. When creating a configuration backup, disable the two display check boxes (i.e. save a full configuration file in the hierarchic **conf** format). This file can be loaded back to the same device, using the procedure described in Section 19.5.1 on page 355.



Note: The file is generated according to the selected display option (in Step 2).

4. To restore your configuration from a file saved on your PC, click **Upload Configuration File**.



Note: Do not load this file to a different device as it includes the MAC address, which is unique to the device from where it was saved.

When creating a file for remote configuration update, it is recommended to only select the 'Display modified configuration fields only'. This ensures that the file includes only parameters that were modified from their default value. You can choose the conf format or the flat ini-file format. In both cases, it is recommended to review the file and ensure that only the parameters that the user has intended to modify appear. This file can be placed on an FTP or HTTP server for mass configuration update, as described in Remote Configuration Download.



Note: When rebooting, the device restores the settings from its configuration file. However, if reboot attempts fail three times consecutively, the device resets the configuration file by restoring factory defaults before attempting to reboot.

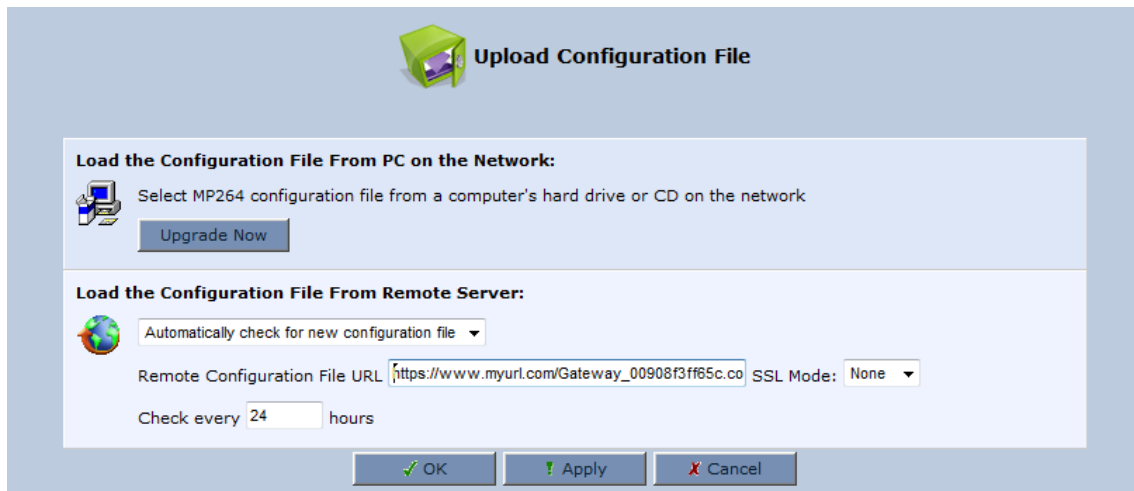
19.5.1 Uploading Configuration File from PC on the Network

The procedure below describes how to upload a configuration file from a PC on the network to the device.

➤ **To upload a configuration file to the device from a PC on the network:**

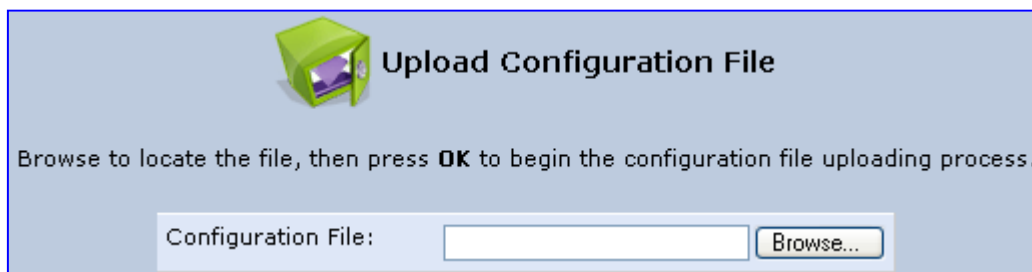
1. Click the **Upload Configuration File**; the screen 'Upload Configuration File' opens.

Figure 19-10: Upload Configuration File (e.g., MP-264)



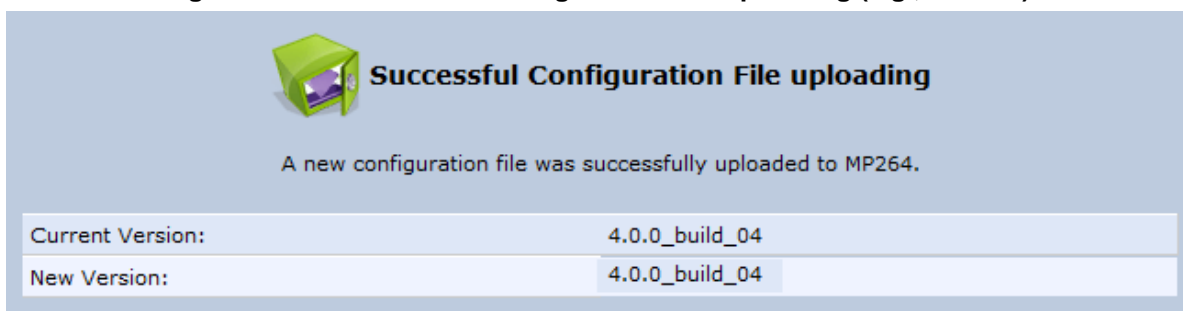
2. Under the 'Load the Configuration File From a PC on the Network' group, click **Upgrade Now**; the screen 'Upload Configuration File' opens.

Figure 19-11: Loading Configuration File from a PC on the Network



3. Enter the path of the configuration file or click **Browse** and navigate to the configuration file on your PC.
4. Click **OK**; the file starts loading from the PC to the device. When loading is complete, the screen 'Successful Configuration File Loading' opens, prompting you to confirm configuration file load.

Figure 19-12: Successful Configuration File Uploading (e.g., MP-264)



Current Version:	4.0.0_build_04
New Version:	4.0.0_build_04

5. Click **OK** to confirm; the upgrade process commences and takes a couple of minutes to complete. At the conclusion of the file load process, the device automatically reboots. When the device completes the reboot, the new configuration file is applied and the 'Login' screen appears, prompting you to login again.
6. Login with your username and password.



Note: During the load process, it is recommended not to power down the device nor stop the file load process to avoid damage to the main firmware. However, if you do, the device runs a recovery firmware image (also stored on its flash memory). Except for the analog or VoIP interfaces, the recovery image supports all interfaces and enables the device to reconnect to the Internet and then download the primary software.

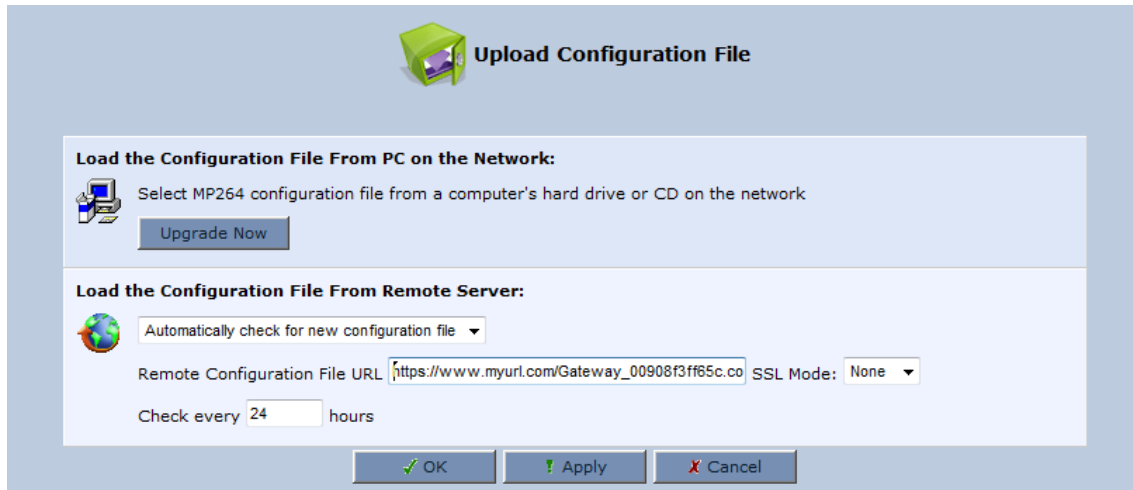
19.5.2 Uploading Configuration File from a Remote Server

The procedure below describes how to upload a configuration file to the device from a remote server. This allows you to keep your configuration up-to-date, by performing daily checks for a newer configuration file each time the device restarts (i.e., automatic update), or manually checking for a newer configuration file.

➤ **To upload the device's configuration file from a remote server:**

1. Click the **Upload Configuration File**; the screen 'Upload Configuration File' opens.

Figure 19-13: Upload Configuration File (e.g., MP-264)



2. Under the 'Load the Configuration File From Remote Server' group, select the checking method and interval:
 - **Automatically check for new configuration file**
 - **Automatic configuration file check disabled**
3. In the 'Remote Configuration File URL' field, enter the URL address of the remote server where the configuration file is located. The URL format is as follows: **protocol://server/filename.<conf/ini>**, for example:
 - ftp://10.10.10.10/MP20x_<MAC>.conf
 - http://20.20.20.20/MP20x_<MAC>.ini

Where <MAC> is the MAC address of the device.
4. In the 'Check every' field, enter the interval (in hours) for which the device periodically checks for a new configuration file. If set to 0, the device checks only once for a new configuration file, and this occurs after it restarts.
5. From the 'SSL Mode' drop-down list, select the type of Secure Socket Layer (SSL) certificate's validation method for accessing the remote server using HTTPS for the following purposes: downloading a new firmware file, downloading a new configuration file, and TR-069. Upon connection, the device validates the server's certificate using the selected method:
 - **None:** Do not validate the server's certificate (if you do not have a certificate).
 - **Chain:** Validate the entire certificate chain (if you have a certificate, but not necessarily signed by a root CA).
 - **Direct:** Ensure that the server's certificate is signed by the root certificate (CA).
6. Click **OK**; the download process begins. When downloading completes, a confirmation screen appears, prompting you to confirm loading the new version.

7. Click **OK** to confirm. The upgrade process begins and takes about one minute to complete. At the conclusion of the upgrade process, the device automatically reboots and the new software version runs.

If a new version is unavailable, click the **Check Now** button to perform an immediate check (instead of waiting for the next scheduled one). The screen displays a green "Check in progress..." message.


Notes:

- For additional security, the device can be configured to use HTTPS client-server certification when connecting to a remote server (see Section 13.3 on page 232).
- The configuration file can have one of the following two formats: a hierarchical conf file (indicated by file extension *.conf) or a flat ini file (indicated by file extension .ini).
- The parameter '/rmt_config/version' defines the version of the configuration file. The device uses the new configuration file only if the version that is defined in this file is later than the current version. By default, the 'version' is set to 0. This means that each time Service Providers' operations personnel require the device to download a new configuration file, they need to increment the 'version' parameter in the new file (in the .conf file, the 'version' parameter is under the section 'rmt_config'). To simplify the procedure, it is possible to use the current date in YYYYMMDD format as the version field.
- The remote configuration file must include only a subset of the complete MP20x.conf file. A recommended procedure is to start with the device restored to its factory settings, modify using the embedded Web server the parameters that should appear in the remote configuration file, and then upload (save) the configuration file. You must save only the modified parameters, as described in 'Remote Administration' on page 291.
- The string <MAC> enables the ISP to pre-configure all its deployed the devices with the same URL and file details (under rmt_config/url) and still have each device download its unique configuration file. Once the URL is configured with the string <MAC>, the device that is trying to update its configuration file automatically replaces <MAC> with its own unique MAC address. For example, if there's a device with a WAN MAC address 00:01:02:03:04:05, the ISP can configure the url to http://myserver.com/my_conf_file_<MAC>.conf - and place a file called 'my_conf_file_00_01_02_03_04_05.conf' on the server.
- Downloading a configuration file from a remote server can also be performed from the CLI:
 - 1) Using Telnet, access the device, and then enter the user name and password.
 - 2) Enter the command **rmt_config**, for example:
rmt_config -u http://myserver.com/my_conf_file.conf
 - 3) Enter **rmt_config** without any arguments for more help information.

19.5.3 Encrypting the Configuration File using CLI

Encrypted files include the file name extension *.cfx (instead of *.cfg) or *.inx (instead of *.ini). After the device loads the encrypted file from the HTTP server, it automatically identifies the encrypted file by its file name extensions *.cfx or *.inx, and subsequently decrypts the file before saving it to flash memory.

The following procedure describes how to encrypt configuration files.

➤ **To encrypt a configuration file:**

- Run the following CLI shell command (on Linux or Windows PC with OpenSSL installed):

```
openssl des3 -in <original file> -out <encrypted file> -k  
<password> -S <salt value>
```

Where,

- *<original file>* is the original clear-text configuration file (*.cfg or *.ini file).
- *<encrypted file>* is the output file (an encrypted *.cfx or *.inx file).
- *<password>* is the password that is used to encrypt the file.
- *<salt value>* is the 8 bytes of a special key value that is combined with the password. The format is 16 hexadecimal digits [0-9,A-F].

An example of this command is shown below:

```
openssl des3 -in c:\temp\try_enc_conf.cfg -out  
c:\temp\try_enc_conf.cfx -k MyPassword123456 -S 0123456789ABCDEF
```



Notes:

- You can choose any <salt value> – the device does not have to know about it.
- A password can be pre-configured in the device, using the following CLI command:
conf set_obscure/rmt_config/password <password>
For example: tftp://1.2.3.4/file
- You can also define the password in a configuration file that you download from the server.
- If you don't define a password in the configuration file, a default password is used. Different default passwords are defined per customer, according to the config-file url hostname.

19.5.4 Automatic Upload using SIP NOTIFY Message

You can enable automatic configuration update for the device from a remote server, using the SIP NOTIFY message. The contents of the configuration file can initiate ("push") the remote server to update the device to a desired configuration version.

➤ **To "push" a configuration file when a change of parameter is needed:**

1. Create a new configuration file with the required change.
2. Place the file on the HTTP server.
3. Send the SIP NOTIFY message to the device; the device integrates the contents of the new file and reboots.

➤ **To "push" a configuration file and initiate an upgrade or downgrade:**

1. Create a new configuration file that includes two important entries:
 - a. In *rg_conf/rmt_upd/chech_sync_version*, configure the details of the version to which you want the device to upgrade or downgrade, for example:


```
( rmt_upd
                                ( check_sync_version(2.6.0_build_1) )
          )
```
 - b. You may need to update the URL address from where the device is downloading the firmware (the path is configured in *rmt_upd/url*).



Note: In the case of a downgrade, the service provider MUST provide a configuration file based on a template that matches the version to which the device is downgrading.

2. Place the file on the HTTP server.
3. Send the SIP NOTIFY message to the device; the device integrates the contents of the new file and reboots. After rebooting, the device compares the currently running version with the version which is configured in *rmt_upd/chech_sync_version* and then determines whether to connect to the *rmt_upd/url* for downloading the new *.rmt file. Once the file is downloaded, its headers are parsed, and only if it represents the same version which was configured in the value of *rmt_upd/chech_sync_version*, does the upgrade/downgrade process begin.

19.6 Firmware Upgrade

The device provides a built-in mechanism for upgrading its software image. There are two methods for upgrading the software image:

- **Upgrading from a Computer on the Network:** This method uses a software image file that is pre-downloaded on a PC's disk drive or located on an accompanying CD. (See Section 19.6.1 on page 362.)
- **Upgrading from the Internet:** This method also referred to as 'Remote Update', upgrades your firmware by remotely downloading an updated software image file. (See Section 19.6.2 on page 363.)

The device provides a flash memory of 16 MB, which is capable of storing two firmware images. In addition to the primary firmware, the device also stores a recovery firmware, which is used only if the primary image is missing or damaged (e.g. if the user unplugs the power during firmware upgrade). Except for the analog or VoIP interfaces, the recovery image supports all interfaces and enables the device to reconnect to the Internet and download the primary firmware.

The software contains the DECT firmware. After the device re-boots, the software compares the burnt DECT firmware, with the embedded firmware. If different, an automatic upgrade of the DECT takes place. During that time, the DECT LED blinks fast, and no DECT operations are possible. This upgrade takes approximately three minutes.



Note: During the upgrade process, do **NOT** power off the device.

19.6.1 Upgrading the Device from a Computer on the Network

The procedure below describes how to upgrade the device from a software image file located on a local computer or network.

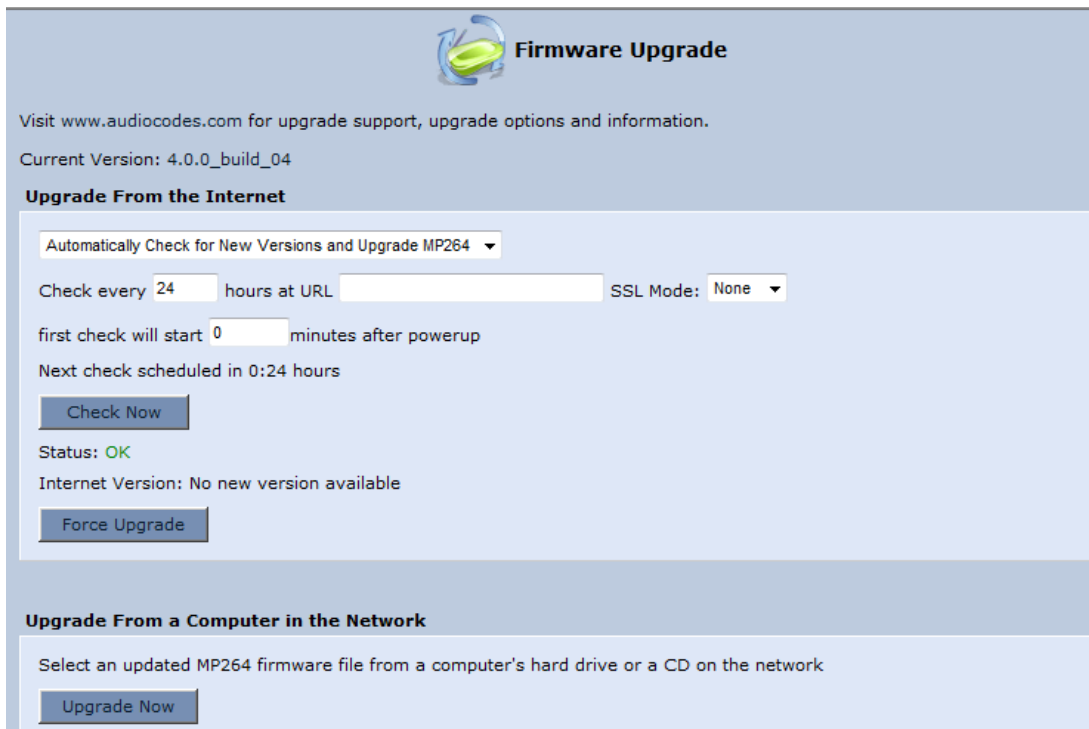


Note: You can only use files with an *.rmt extension when performing the firmware upgrade procedure.

➤ To upgrade the device software image using a locally available .rmt file:

1. In the 'Advanced' screen, click the **Firmware Upgrade**  icon; the 'MP264 Firmware Upgrade' screen appears.

Figure 19-14: Firmware Upgrade Screen (e.g., MP-264)



Firmware Upgrade

Visit www.audiocodes.com for upgrade support, upgrade options and information.

Current Version: 4.0.0_build_04

Upgrade From the Internet

Automatically Check for New Versions and Upgrade MP264 ▼

Check every 24 hours at URL SSL Mode: None ▼

first check will start 0 minutes after powerup

Next check scheduled in 0:24 hours

Status: OK

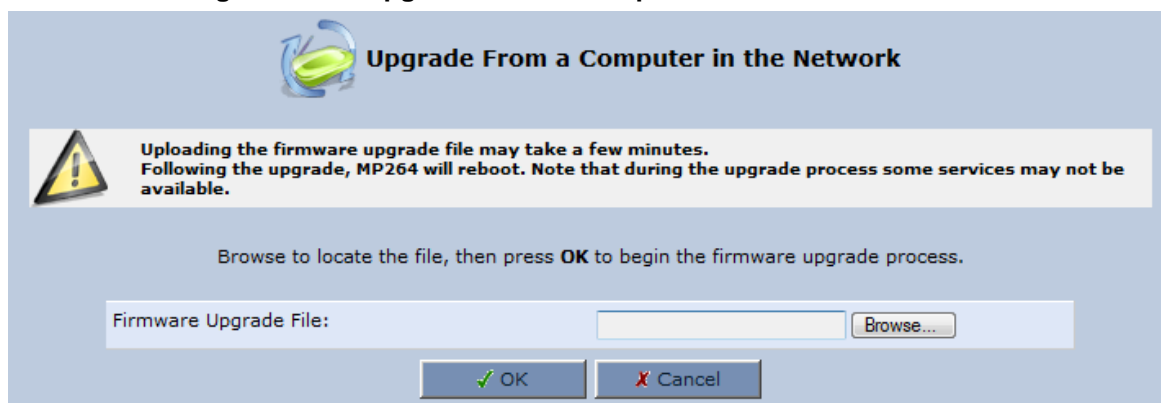
Internet Version: No new version available

Upgrade From a Computer in the Network

Select an updated MP264 firmware file from a computer's hard drive or a CD on the network

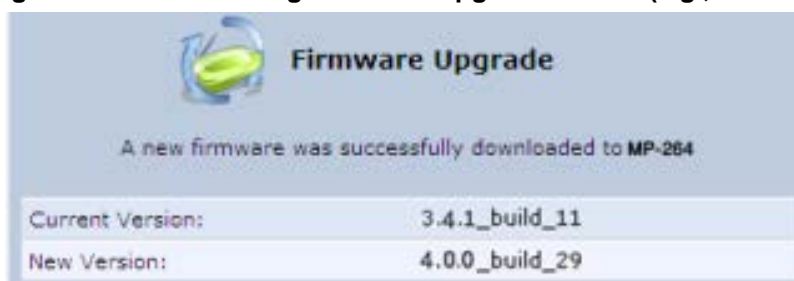
2. Under the **Upgrade From a Computer in the Network** group, click the **Upgrade Now** button; the 'Upgrade From a Computer in the Network' screen appears.

Figure 19-15: Upgrade From a Computer in the Network Screen



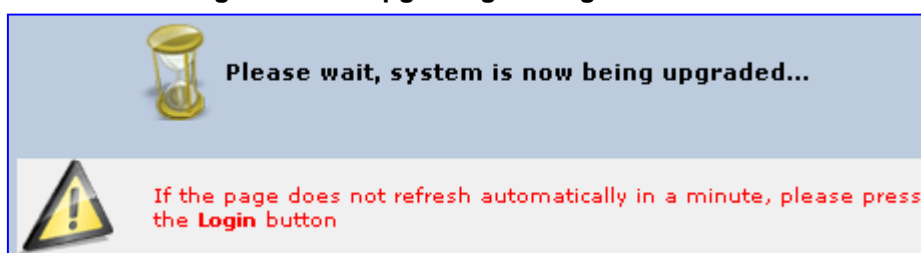
3. In the 'Firmware Upgrade File' field, enter the path to the software image file or click **Browse** and navigate to the rmt file on your PC.
4. Click **OK**; the device uploads the file from your PC. When loading is complete, you are prompted to confirm upgrade to the new version.

Figure 19-16: Confirming Firmware Upgrade Screen (e.g., MP-264)



5. Click **OK** to confirm; the upgrade process commences (a few minutes).

Figure 19-17: Upgrading in Progress Screen



At the conclusion of the upgrade process, the device automatically reboots and the new software version now runs on the device, maintaining your configurations and settings.

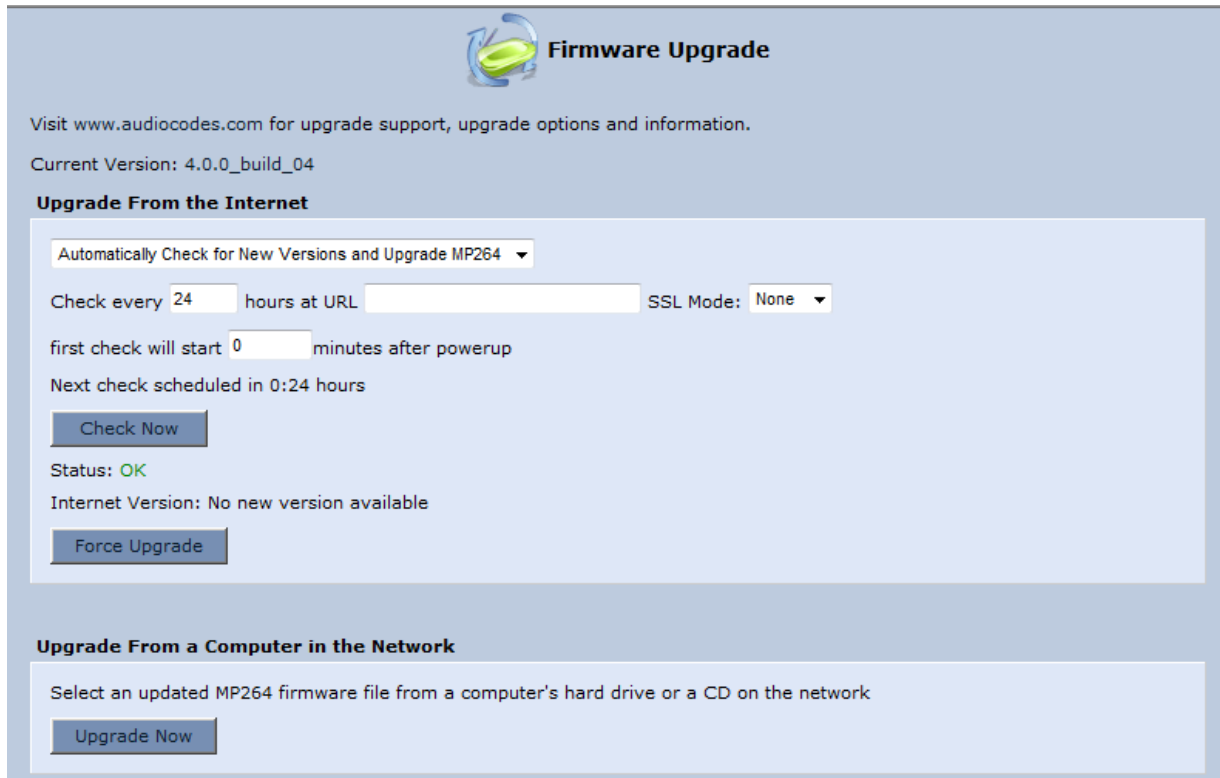
19.6.2 Upgrading the Device from the Internet

The Remote Update mechanism helps you keep your software image up-to-date, by performing routine daily checks for newer software versions, as well as letting you perform manual checks. These updates are from a user-defined URL.

➤ **To upgrade the device's software image from the Internet:**

1. In the 'Advanced' screen, click the **Firmware Upgrade** icon; the 'MP64 Firmware Upgrade' screen appears.

Figure 19-18: Firmware Upgrade (e.g., MP-264)



2. Under the **Upgrade From the Internet** group, select the utility's checking method and interval:
 - **Automatically Check for New Versions and Upgrade device:** The device automatically checks for new versions every user-defined interval (defined in the 'Check every' field) at the URL address defined in the 'URL' field. You can define the time (in minutes) after which the first check commences after the device is reset.
 - **Automatically Check for New Versions and Notify via Email:** **Note:** Currently, this feature is not functional.
 - **Automatic Check Disable:** The device checks for a new version at the URL address defined in the 'URL' field, when you click the **Check Now** button.

The result of the last performed check is displayed between the **Check Now** and **Force Upgrade** buttons, indicating whether a new version is available or not.
3. If a new version is available:
 - a. Click the **Force Upgrade** button. A download process begins. When downloading is complete, you are prompted to confirm upgrade to the new version.

- b. Click **OK** to confirm. The upgrade process begins and takes about one minute to complete. At the conclusion of the upgrade process, the device automatically reboots with the new software version.
4. If a new version is unavailable:
 - a. Click the **Check Now** button to perform an immediate check (instead of waiting for the next scheduled one). The screen displays the "Check in progress" message.
 - b. Click the **Refresh** button until the check is complete and the result is displayed.

19.7 Configuring System Settings

The 'System Settings' screen allows you to configure various device System and Management parameters.

➤ **To configure device System and Management settings:**

1. In the 'Advanced' screen, click the **System Settings**  icon; the 'System Settings' screen appears.

Figure 19-19: Partial View System Settings Screen (e.g., MP-264)

System	
MP264's Hostname:	MP264
Local Domain:	home
MP264	
<input checked="" type="checkbox"/> Automatic Refresh of System Monitoring Web Pages	
<input checked="" type="checkbox"/> Warn User Before Configuration Changes	
Session Lifetime:	900 Seconds
User Interface Theme:	AC_MP202
Management Application Ports	
Primary HTTP Management Port:	80
Secondary HTTP Management Port:	8080
Primary HTTPS Management Port:	443
Secondary HTTPS Management Port:	8443
Primary Telnet Port:	23
Secondary Telnet Port:	8023
Secure Telnet over SSL Port:	992
Management Application SSL Authentication Options	
Primary HTTPS Management Client Authentication:	None
Secondary HTTPS Management Client Authentication:	None
Secure Telnet over SSL Client Authentication:	None



Note: Due to the size of the 'System Settings' screen, the figure above provides only a partial display.

2. Under the **System Settings** group, configure the following:
 - In the 'MP264's Hostname' field, enter the device's host name. The host name is the device's URL address.
 - In the 'Local Domain' field, enter your network's local domain.
3. Under the **MP264** group, do the following:
 - **Automatic Refresh of System Monitoring Web Pages:** select this check box to enable automatic refreshing of system monitoring Web interface pages.
 - **Warn User Before Network Configuration Changes:** select this check box to activate user warnings before network configuration changes take effect.
 - **Session Lifetime:** duration of idle time (in seconds) in which the Web session remains active. When this duration times out, you must re-login.
 - **User Interface Theme:** Defines a different GUI theme that affects the GUI design and available parameters. For more information, contact your AudioCodes distributor.
 - **Language:** select a language for the Web interface GUI.
4. Under the **Management Application Ports** group, define the following ports:
 - Primary/secondary HTTP management ports
 - Primary/secondary management HTTPS ports
 - Primary/secondary Telnet ports
 - Secure Telnet over SSL ports
5. Under the **Management Application SSL Authentication Options** group, configure whether the following is required:
 - Primary/Secondary HTTPS Management Client Authentication
 - Secure Telnet over SSL Client Authentication
6. Under the **System Logging** group, do the following:
 - **System Log Buffer Size:** size of the system log buffer in kilobytes.
 - **Remote System Notify Level:** The device sends notifications to a remote host (None, Error, Warning, Information)
 - **Persistent System Log:** saves the system log to the device flash memory. This prevents the system log from being erased when the device reboots.
7. Under the **Security Logging** group, do the following:
 - **Security Log Buffer Size:** size of the security log buffer in Kilobytes
 - **Remote Security Notify Level:** None, Error, Warning, Information
 - **Persistent Security Log:** saves the security log to the flash. This prevents the security log from being erased when the device reboots.



Note: Do not leave the persistent logging feature enabled permanently, as continuous writing of the log files to the flash memory reduces the device's performance.

8. Under the **Outgoing Mail Server** group, do the following:
 - **Server:** hostname of your outgoing (SMTP) server.
 - **From Email Address:** Each email requires a 'from' address and some outgoing servers refuse to forward mail without a valid 'from' address for anti-spam reasons.
 - **Port:** port used by your outgoing mail server.
 - **Server Requires Authentication:** If your outgoing mail server requires authentication, select this check box and enter your user name and password in the subsequent 'User Name' and 'Password' fields respectively.

To define email notifications per User to receive indications of system and security events, see Section 5.4 on page 56.
9. The **Swap** group configures the Swap feature that enables you to free a portion of the RAM by creating a swap file on the storage device connected to the device. This is especially useful for platforms with a small RAM. To activate this feature:
 - a. Verify that a storage device is connected to the device.
 - b. Select the 'Enabled' check box.
 - c. In the 'Swap Size' field, enter a swap file size in megabytes.
 - d. Click **Apply**; a swap file is created on the storage device and the read-only 'Status' field changes to "Ready".
10. Under the **Host Information** group, select the 'Enable Auto Detection of Host Services' check box to enable the device to auto-detect its LAN hosts' properties, available services, traffic statistics, and connections.
11. Under the **Installation Wizard** group, select the 'Use Installation Wizard Pre-configured Values' check box to have the wizard skip the steps for which parameters had been preconfigured and saved in the factory settings file (rg_factory).

19.8 Rebooting the Device

The procedure below describes how to reboot the device.

➤ **To reboot the device:**

1. In the 'Advanced' screen, click the **Reboot**  icon; the 'Reboot' screen appears.

Figure 19-20: Reboot Screen (e.g., MP-264)



2. Click **OK** to reboot the device. This may take up to one minute.
3. To re-enter the Web interface after rebooting the device, refresh your Internet browser.

You can also reboot the device using a manual procedure, as described below:

➤ **To manually reboot the device:**

- Insert a paper clip (or any other similar pointed object) into the Reset pin-hole button located on the rear panel of the device, and keep the button pressed for at least 1 second (but no more than 5 seconds); the device reboots.

19.9 Restoring Factory Settings

You can restore the device to factory default settings. This is useful when, for example, you are initially creating a new network or when you cannot recall changes made to the network.



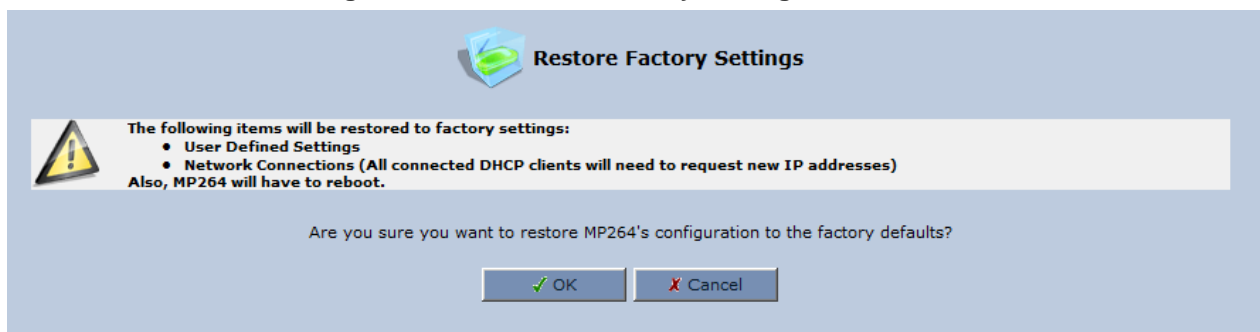
Notes:

- If you are accessing the device's Web interface from the WAN, restoring factory default settings causes the connection with the device to be lost, since access to the Web interface from the WAN is blocked by default.
- **All** Web-based management settings and parameters are restored to their default values. This includes the administrator username and password

➤ To restore the device to default settings:

1. In the 'Advanced' screen, click the **Restore Factory Settings**  icon; the 'Restore Factory Settings' screen appears.

Figure 19-21: Restore Factory Settings Screen



2. Click **OK** to restore the device's factory default settings.

If the device Web interface cannot be accessed (for example, if the password is unknown or if the LAN is disabled), you can restore default settings manually, as described below:


➤ To manually restore the device to default settings:

- Insert a paper clip (or any other similar pointed object) into the Reset pin-hole button located on the rear panel of the device, and keep the button pressed for **at least seven seconds**. While the device sets all its parameters to default, the **Status**, **Broadband**, and **Phone** LEDs blink red. After this, the **Status** LED is lit steady red while the device reboots.

20 Diagnostics and Performance Monitoring

This chapter provides diagnostics and performance monitoring procedures.

20.1 Diagnostics

The **Diagnostics**  icon allows you to test network connectivity. In addition, it allows you to view statistics such as the number of packets transmitted and received, round-trip time, and success status. The test tools are platform-dependent and are not available simultaneously.

The **Diagnostics**  icon displays the 'Diagnostics' screen, as described below.

➤ **To access the 'Diagnostics' screen:**


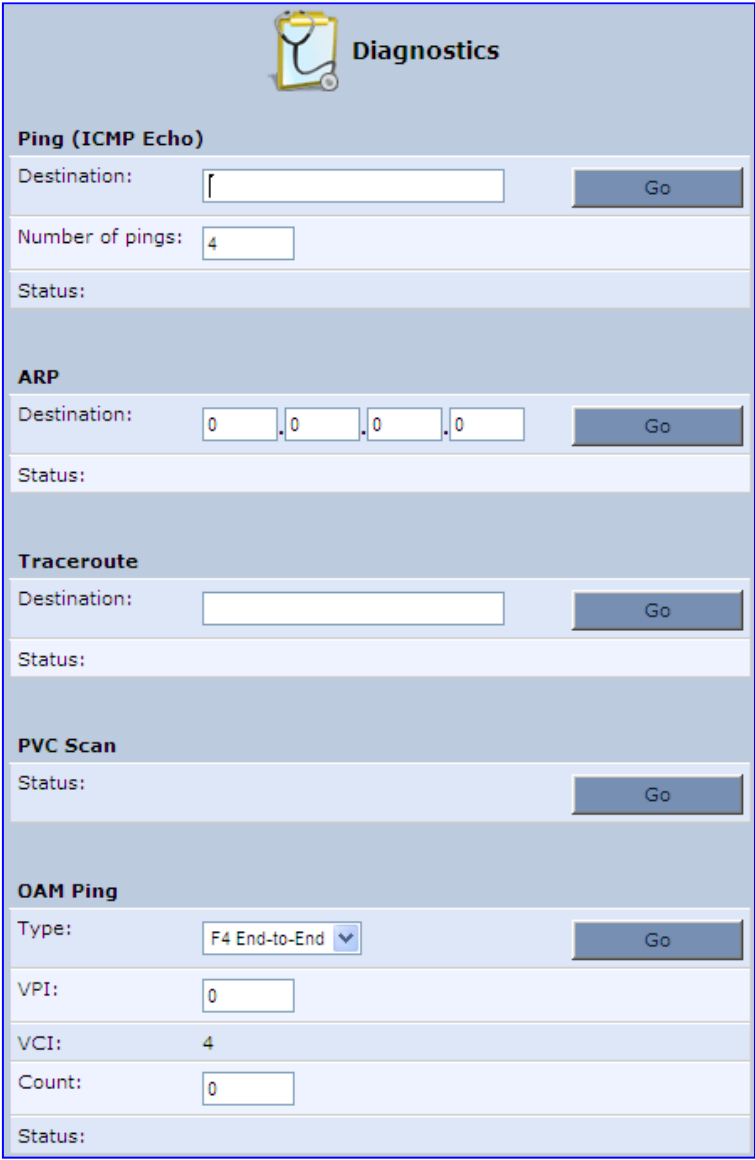
- In the 'Advanced' screen, click the  icon.

Figure 20-1: Diagnostics Screen



The screenshot shows the 'Diagnostics' screen with a header containing a clipboard icon and the title 'Diagnostics'. Below the header, there are five test tool sections, each with a title, input fields, and a 'Go' button. The sections are: 1. 'Ping (ICMP Echo)' with a 'Destination' text box and a 'Number of pings' box set to 4. 2. 'ARP' with four numeric input boxes for IP address (all set to 0) and a 'Status' label. 3. 'Traceroute' with a 'Destination' text box and a 'Status' label. 4. 'PVC Scan' with a 'Status' label. 5. 'OAM Ping' with a 'Type' dropdown menu (set to 'F4 End-to-End'), and numeric input boxes for 'VPI' (0), 'VCI' (4), and 'Count' (0), plus a 'Status' label.

Diagnostics	
Ping (ICMP Echo)	
Destination:	<input type="text"/>
Number of pings:	<input type="text" value="4"/>
Status:	
ARP	
Destination:	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>
Status:	
Traceroute	
Destination:	<input type="text"/>
Status:	
PVC Scan	
Status:	
OAM Ping	
Type:	<input type="text" value="F4 End-to-End"/>
VPI:	<input type="text" value="0"/>
VCI:	<input type="text" value="4"/>
Count:	<input type="text" value="0"/>
Status:	

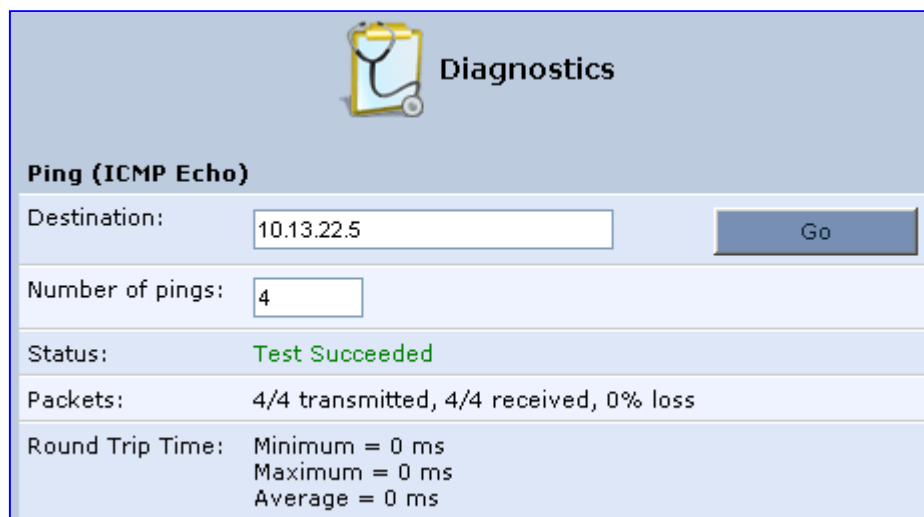
20.1.1 Running the Ping Test

The procedure below describes how to run a ping (ICMP) test in the 'Diagnostics' screen. This test is done under the **Ping (ICMP Echo)** group.

➤ To run a ping test:

1. In the 'Destination' field, enter the IP address or URL to be tested.
2. In the 'Number of pings' field, enter the number of pings you want to perform.
3. Click **Go**; after a few seconds, diagnostic statistics are displayed. If no new information is displayed, click the **Refresh** button.

Figure 20-2: Running a Ping Test



The screenshot shows the 'Diagnostics' section with a stethoscope icon. Under the 'Ping (ICMP Echo)' group, the 'Destination' field contains '10.13.22.5' and the 'Number of pings' field contains '4'. A 'Go' button is to the right of the destination field. Below these fields, the 'Status' is 'Test Succeeded' in green. The 'Packets' row shows '4/4 transmitted, 4/4 received, 0% loss'. The 'Round Trip Time' row shows 'Minimum = 0 ms', 'Maximum = 0 ms', and 'Average = 0 ms'.

20.1.2 Running the ARP Test

The ARP test is used to query the physical address (i.e., MAC) of a host.

The procedure below describes how to run an Address Resolution Protocol (ARP) test in the 'Diagnostics' screen. This test is done under the **ARP** group.

➤ To run an ARP test:

1. in the 'Destination' field, enter the IP address of the target host.
2. Click **Go**; after a few moments, diagnostic statistics is displayed. If no new information is displayed, click **Refresh**.

Figure 20-3: Running an ARP Test



The screenshot shows the 'Diagnostics' section with the 'ARP' group selected. The 'Destination' field contains '10.20.2.48' and a 'Cancel' button is to its right. The 'Status' row shows 'Testing...' in orange.

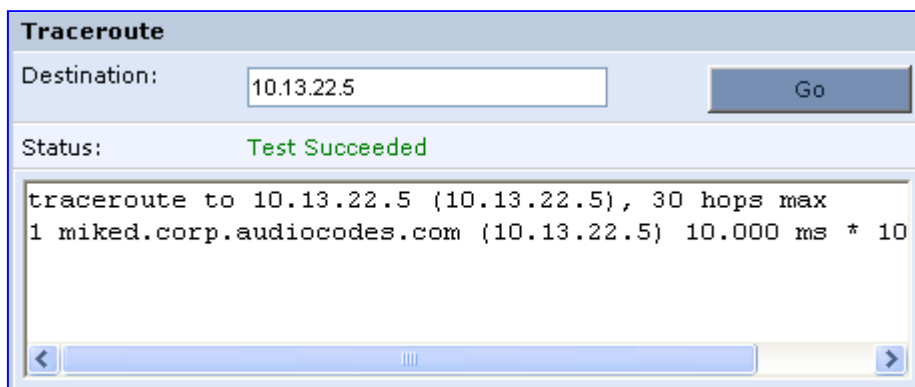
20.1.3 Running a Traceroute

The procedure below describes how to run a traceroute test in the 'Diagnostics' screen. This test is done under the **Traceroute** group.

➤ **To run a traceroute:**

1. In the 'Destination' field, enter the IP address or URL to be tested.
2. Click **Go**; a traceroute commences, constantly refreshing the screen.

Figure 20-4: Running a Traceroute



3. To stop the trace and view the results, click **Cancel**.

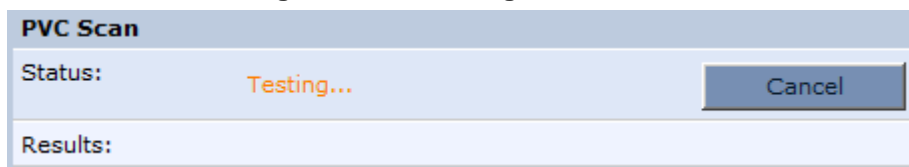
20.1.4 Running the PVC Scan Test

The procedure below describes how to run a Permanent Virtual Circuit (PVC) scan in the 'Diagnostics' screen.

➤ **To run a PVC scan:**

- Under the **PVC Scan** group, click **Go**; in a few moments, diagnostic statistics is displayed. If no new information is displayed, click **Refresh**.

Figure 20-5: Running a PVC Scan



20.1.5 Running the OAM Ping Test

The Operation and Maintenance (OAM) ping test checks the status of a Virtual Channel (VC) of the Asynchronous Transfer Mode (ATM) connection to the remote Network Access Concentrator (NAC). Each of the ATM's virtual channels has an address that consists of a Virtual Path Indicator (VPI) and Virtual Channel Indicator (VCI). The OAM ping test sends a request, either a VP loopback (F4) or a VC loopback (F5), and receives a reply from the NAC at the other end of the ATM connection.

The procedure below describes how to run an OAM Ping test in the 'Diagnostics' screen. This test is done under the **OAM Ping** group.

➤ To run an OAM ping test:

1. From the 'Type' drop-down list, select the type of OAM ping to run:
 - F4 End-to-End
 - F4 Segment
 - F5 End-to-End
 - F5 Segment
2. In the 'VPI' field, enter the channel's VPI value.
3. In the 'VCI' field, enter the channel's VCI value. This is applicable only if you are checking the VC loopback (F5).
4. In the 'Count' field, enter a number of the ping packets sent to the destination address.
5. Click **Go**; in a few moments, diagnostic statistics is displayed. If no new information is displayed, click **Refresh**.

Figure 20-6: Running an OAM Ping Test

OAM Ping	
Type:	Type: F4 End-to-End VPI: 2, VCI: 4, 4 times. Cancel
Status:	Testing...
Cells:	0/4 transmitted, 0/4 received

20.2 Performance Monitoring

This section describes how to view the device performance statistics.


20.2.1 Viewing Network Connections Status

The device constantly monitors traffic within the local network and between the local network and the Internet. You can view up-to-the-second statistical information about data received from and transmitted to the Internet (WAN) and about data received from and transmitted to computers in the local network (LAN).

➤ **To view network connections:**

1. From the menu bar, click the **System Monitoring** menu.
2. Select the **Network Connections** tab.

Figure 20-7: Network Connections Screen



Name	WAN Ethernet	LAN Hardware Ethernet Switch	LAN Bridge	WAN DSL	GSM Modem	LAN Ethernet	LAN Wireless 802.11n Access Point	Serial PPP
Device Name	eth1	eth0_main	br0	atm0	gsm0	eth0	ra0	ppp400
Status	Connected	1 Ports Connected	Connected	Disabled	Up	Connected	Connected	Waiting for Underlying Connection (GSM Modem - Up)
Network	WAN	LAN	LAN	WAN	WAN	LAN	LAN	WAN
Underlying Device	LAN Hardware Ethernet Switch	LAN Ethernet	LAN Hardware Ethernet Switch				LAN Hardware Ethernet Switch	GSM Modem
Connection Type	Ethernet	Hardware Ethernet Switch	Bridge	DSL	USB Serial	Ethernet	Wireless 802.11n Access Point	Serial PPP
Download Rate	100.0 Mbps	100.0 Mbps	100.0 Mbps		1.0 Mbps	100.0 Mbps	130.0 Mbps	1.0 Mbps
Upload Rate	100.0 Mbps	100.0 Mbps	100.0 Mbps		1.0 Mbps	100.0 Mbps	130.0 Mbps	1.0 Mbps
MAC Address	00:90:8f:27:f2:44	00:90:8f:27:f2:44	00:90:8f:27:f2:45			00:90:8f:27:f2:44	00:90:8f:27:f2:48	
IP Address	10.13.22.66		192.168.2.1					
Subnet Mask	255.255.0.0		255.255.255.0					
Default Gateway	10.13.0.1							
DNS Server	10.1.1.11 10.1.1.10							

3. Click the **Refresh** button to update the display or click the **Automatic Refresh On** button to automatically refresh the displayed parameters. To reset the counters, click the **Reset Statistics** button.

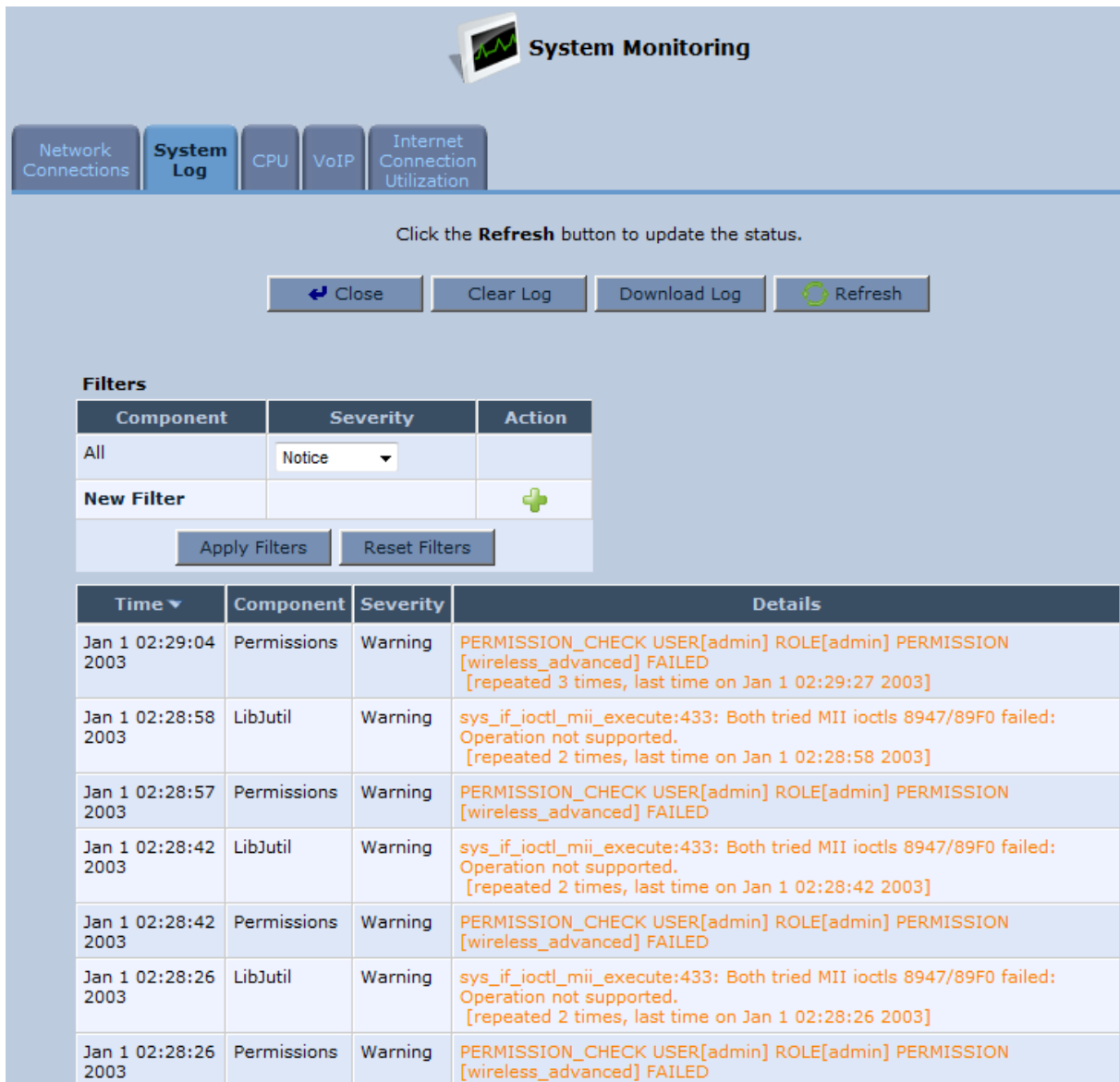
20.2.2 Viewing the System Log

The 'System Log' screen displays a list of the most recent activity that has occurred on the device.

➤ **To view the system log:**

1. From the menu bar, click the **System Monitoring** menu.
2. Select the **System Log** tab.

Figure 20-8: System Log Screen



Click the **Refresh** button to update the status.

Close Clear Log Download Log Refresh

Filters

Component	Severity	Action
All	Notice	
New Filter		+

Apply Filters Reset Filters

Time	Component	Severity	Details
Jan 1 02:29:04 2003	Permissions	Warning	PERMISSION_CHECK USER[admin] ROLE[admin] PERMISSION [wireless_advanced] FAILED [repeated 3 times, last time on Jan 1 02:29:27 2003]
Jan 1 02:28:58 2003	LibJutil	Warning	sys_if_ioctl_mii_execute:433: Both tried MII ioctls 8947/89F0 failed: Operation not supported. [repeated 2 times, last time on Jan 1 02:28:58 2003]
Jan 1 02:28:57 2003	Permissions	Warning	PERMISSION_CHECK USER[admin] ROLE[admin] PERMISSION [wireless_advanced] FAILED
Jan 1 02:28:42 2003	LibJutil	Warning	sys_if_ioctl_mii_execute:433: Both tried MII ioctls 8947/89F0 failed: Operation not supported. [repeated 2 times, last time on Jan 1 02:28:42 2003]
Jan 1 02:28:42 2003	Permissions	Warning	PERMISSION_CHECK USER[admin] ROLE[admin] PERMISSION [wireless_advanced] FAILED
Jan 1 02:28:26 2003	LibJutil	Warning	sys_if_ioctl_mii_execute:433: Both tried MII ioctls 8947/89F0 failed: Operation not supported. [repeated 2 times, last time on Jan 1 02:28:26 2003]
Jan 1 02:28:26 2003	Permissions	Warning	PERMISSION_CHECK USER[admin] ROLE[admin] PERMISSION [wireless_advanced] FAILED

To update the display, click the **Refresh** button. To clear the list of logged events, click the **Clear Log** button. To save the logged events to a file (comma-separated values file) on your PC, click the **Download Log** button.

20.2.3 Viewing CPU Statistics

The 'CPU' screen displays the following system parameters:

- **Gateway ID:** Serial number of the device. This number also appears on the printed label located on the rear panel of the device.
- **System Has Been Up For:** Time that has passed since the device was last started.
- **Load Average:** Average number of processes that are either in a runnable or uninterruptible state. A process in the runnable state is either using the CPU or waiting to use the CPU. A process in the uninterruptible state is waiting for I/O access, e.g. waiting for the disk. The averages are taken over the three time intervals. The meaning of the load average value varies according to the number of CPUs in the system. This means for example, that a load average of 1 on a single-CPU system means that the CPU was loaded all the time, while on a 4-CPU system this means that the CPU was idle 75% of the time.
- **Processes:** Processes currently running on the device and their virtual memory usage. The amount of memory granted for each process is displayed as follows:
 - **Total Virtual Memory (VmData):** Amount of memory currently utilized by the running process.
 - **Heap size (VmSize):** Total amount of memory allocated for the running process.

➤ **To view the CPU statistics:**

1. From the menu bar, click the **System Monitoring** menu.
2. Select the **CPU** tab.

Figure 20-9: CPU Screen



By default, the screen is automatically refreshed. To disable automatic refresh, click **Automatic Refresh Off**, and then click the **Refresh** button each time you want to update the display.

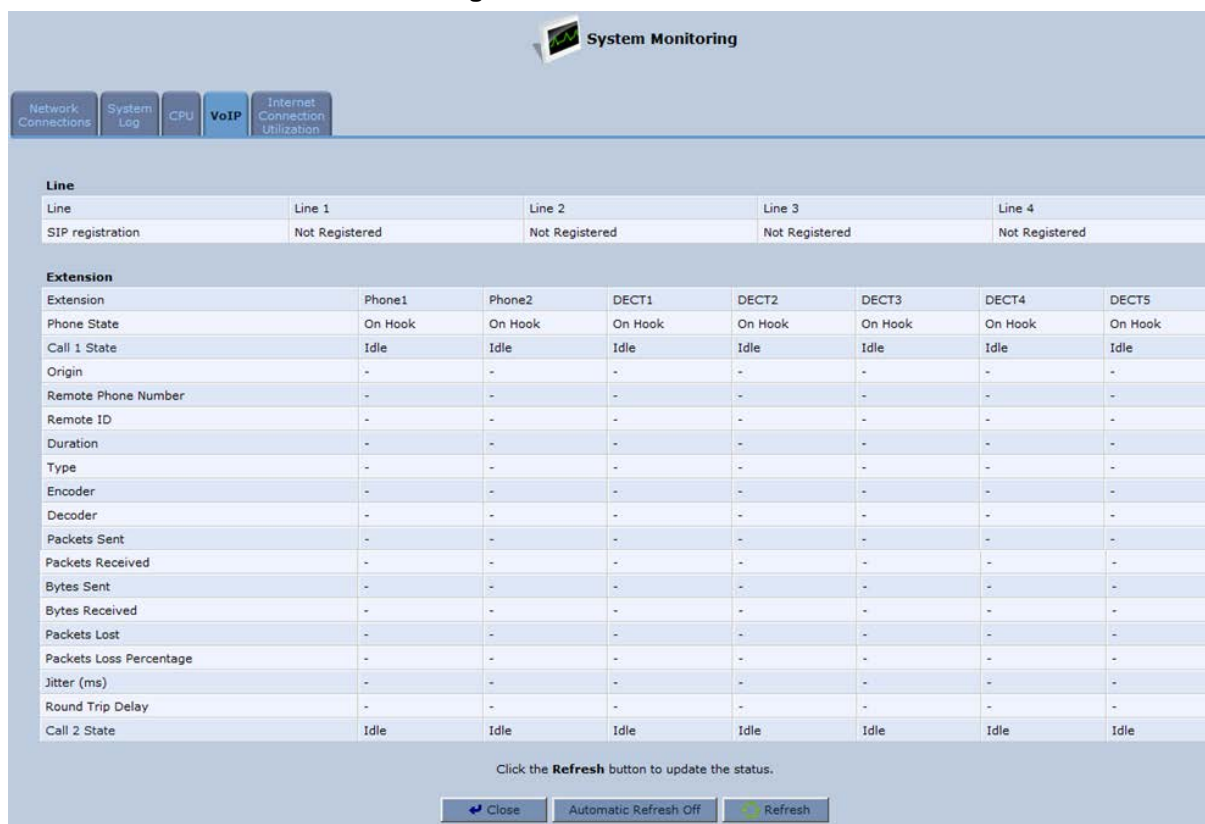
20.2.4 Viewing VoIP Traffic Statistics

The 'VoIP' screen displays information on VoIP traffic and settings.

➤ **To monitor VoIP traffic:**

1. From the menu bar, click the **System Monitoring** menu.
2. Select the **VoIP** tab.

Figure 20-10: VoIP Screen



By default, the screen is automatically refreshed. To disable automatic refresh, click **Automatic Refresh Off**, and then click the **Refresh** button each time you want to update the display.

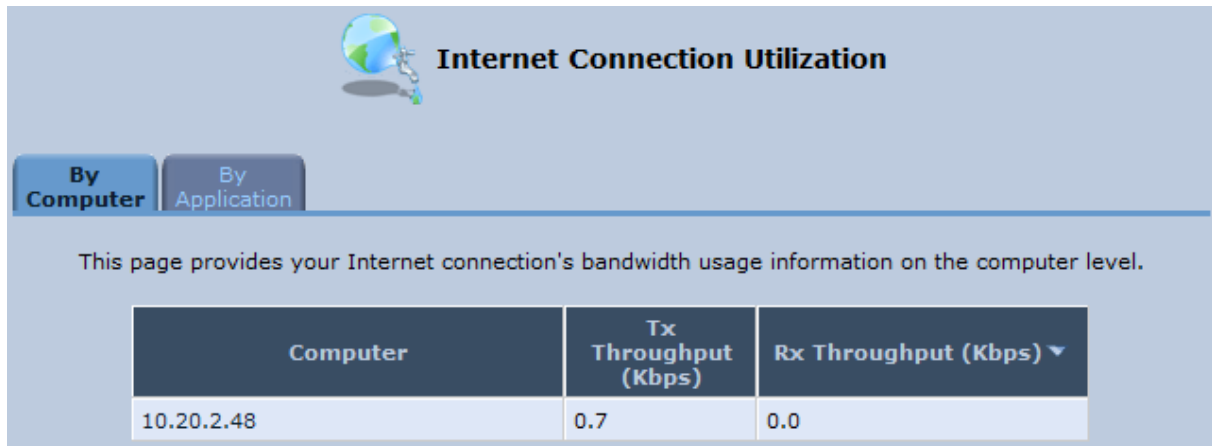
20.2.5 Viewing Internet Connection Utilization

The 'Internet Connection Utilization' screen displays the Internet connection bandwidth usage information per computer and application.

➤ **To monitor Internet connection usage:**

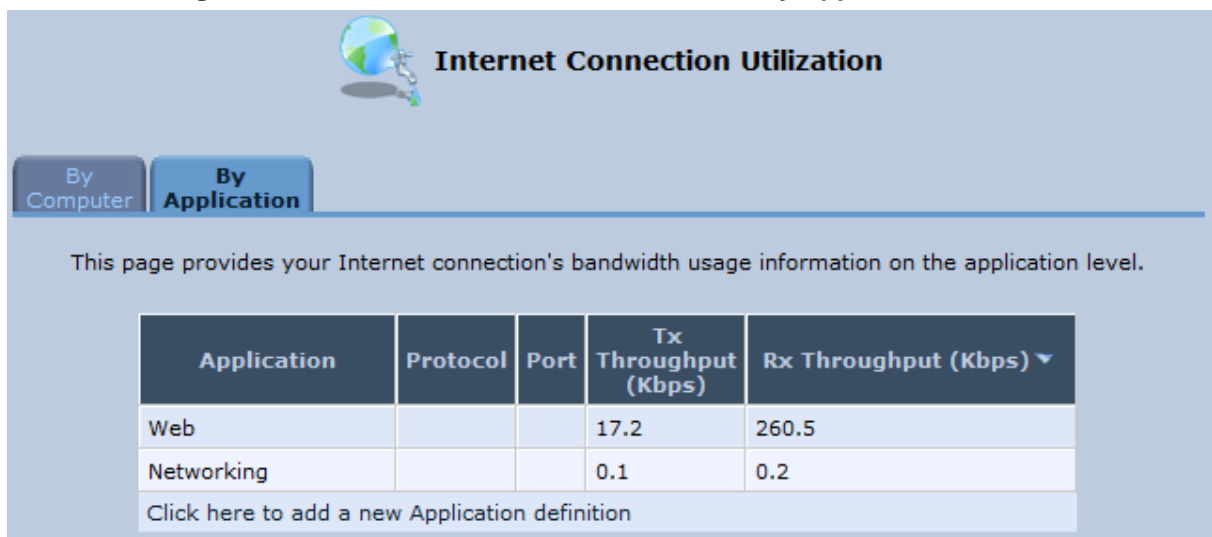
1. From the menu bar, click the **System Monitoring** menu.
2. Select the **Internet Connection Utilization** tab. By default, the **By Computer** tab is selected.

Figure 20-11: Internet Connection Utilization – By Computer Screen



3. To view bandwidth utilization per application, click the **By Application** tab.

Figure 20-12: Internet Connection Utilization – By Application Screen



By default, the screen is automatically refreshed. To disable automatic refresh, click **Automatic Refresh Off**, and then click the **Refresh** button each time you want to update the display.

21 Local Support and Troubleshooting

This chapter provides information regarding Local Support and Troubleshooting (LST). The table below lists different types of error messages that appear in the Web interface.

Table 21-1: LST Messages in Web Interface

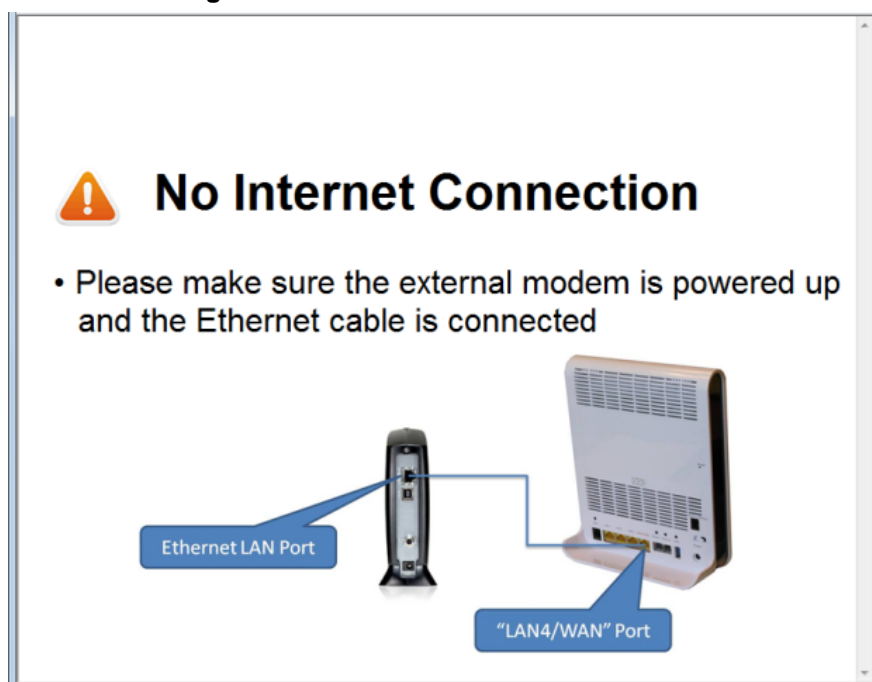
Error	Message
Authentication Error	Please check Internet connection User and Password
No Internet Connection	Please make sure the device is properly connected to an xDSL line
No Internet Connection	Please make sure the external modem is powered up and the Ethernet cable is connected
No Internet Connection	Please make sure the external modem is properly connected to the wall xDSL or cables jack.
Bad Internet Connection	Please make sure the xDSL cable between the device and the xDSL wall jack is properly connected



Note: For customization of HTML pages and voice notifications (for LST), contact AudioCodes.

The following error message appears when there is no internet connection:

Figure 21-1: No Internet Connection Error



The following page appears if the VoIP service is not configured correctly:

Figure 21-2: Example - No VoIP Service / Service Not Configured Error



The following table lists different error voice messages that can be heard on DECT handsets and FXS ports.

Table 21-2: LST Voice Messages

Description
Please make sure the xDSL cable between the device and the xDSL wall jack is properly connected.
Please make sure the device is properly connected to an xDSL line.
Authentication Error
Bad Internet Connection
Please check Internet connection's User and Password.
Please make sure the external modem is properly connected to the wall xDSL or cables jack.
Please make sure the external modem is powered up and the Ethernet cable is connected.
No Internet Connection
Service not configured



Note: For customization of HTML pages and voice notifications (for LST), contact AudioCodes.

LST is disabled by default, and configurable under this section in the configuration file:

```
MP264> conf print internal/lst/
(lst
  (enabled(0))
  (adsl_cable_qos
    (line_attenuation
      (downstream(60))
      (upstream(60))
    )
  (snr_margin
    (downstream(6))
```



```

        (upstream(6))
    )
)
(connectivity_test
    (enabled(1))
    (ok_interval(600))
    (nok_interval(30))
)
)

```

:

Table 21-3: Field Descriptions

Fields	Description
enabled	Defines if the whole operation of the LST is enabled or not.
adsl_cable_qos	Includes: <ul style="list-style-type: none"> line_attenuation – if xDSL line attenuation exceeds those limits, the relevant message will appear. snr_margin – if xDSL SNR exceeds those limits, the relevant message will appear.
connectivity_test	Confirms internet connectivity. The device performs an “HTTP GET” to a configurable site (see below). If the connectivity is OK, it is performed every “ok_interval” (in seconds). If a problem is already detected, the period is changed to “nok_interval” (in seconds).

The configurable site used for internet connectivity:

```

MP264> conf print system/network/internet_url
(internet_url(www.google.com))

```

Reader's Notes



Part II

Device Cordless DECT Phone

Part II describes the installation and configuration of the device Digital Enhanced Cordless Telecommunications (DECT) VoIP telephone.

Reader's Notes

22 Overview

AudioCodes DECT phone offers the following main features:

- DECT technology providing high-definition voice quality, security and range
- Interference free for crystal clear conversations - no interference with other wireless networks and other electronic devices
- Up to 5 handsets can be registered to the device base station
- Call hold
- Call transfer
- Auto-answer
- Call muting
- Silent ring mode
- Stores dialed, received and missed calls
- Last number redial
- Hands-free conversations using handset speakerphone
- Phonebook directory of up to 150 contacts - easy to store and dial
- Three-way conference calls between outside call and between handsets
- Intercom between handsets
- Configurable LCD screen properties - contrast level and background wallpaper
- Handset volume control
- Built-in alarm clock with snooze
- Multi-language support for displaying the LCD screen
- Page/handset locator
- Selectable ring tones
- Keypad lock capability to prevent accidental pressing of keys
- Wall-mount bracket included
- Comfortable handset size

Reader's Notes

23 Safety Instructions

Before using your DECT phone, read the following safety instructions:

1. Read and understand all the instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water (for example, near a bath tub, kitchen sink, swimming pool).
5. Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
6. Unplug this product from the wall outlet and refer servicing to AudioCodes under the following conditions:
 - When the power supply cord or plug is damaged or frayed.
 - If the product does not operate normally by following the operating instructions.
 - If the product has been dropped and the cabinet has been damaged.
 - If the product exhibits a distinct change in performance.
7. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
8. Do not use the telephone to report a gas leak in the vicinity of the leak.
9. Use only the supplied nickel-metal hydride cell (NiMH) rechargeable batteries! The operation periods for the handsets are only applicable with the default battery capacities.
10. Use only the supplied 12VDC +/-10%, tolerance, 2A, limited power source wall mount Class II power supply adapter. Before connecting the device to power, ensure that the VAC ratings match.
11. The use of other battery types or non-rechargeable batteries/primary cells can be dangerous. These may cause interference and/or unit damages. The manufacturer will not be held liable for damage arising from such non-compliance.
12. Do not use third-party charging bays. The batteries may be damaged.
13. Please note the correct polarity while inserting the batteries.
14. Do not immerse batteries in water, do not place in fire.



Caution

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

Reader's Notes

24 Getting Started

24.1 Installing the DECT Phone

The procedure below describes how to install the DECT phone on the device unit.

➤ **To install the DECT phone:**

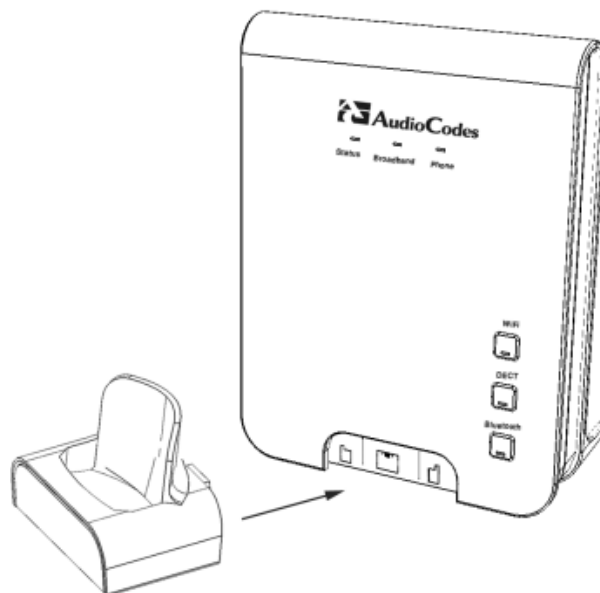
1. The handset is shipped with rechargeable batteries already installed in the battery compartment. However, a plastic sheath separates the batteries from the handset's electrical circuit. Before you can charge the handset, you need to remove this plastic sheath. On the handset, pull out the plastic tab jutting out from the battery compartment. This closes the battery circuit and provides power to the handset.

Figure 24-1: Plastic Tab Jutting out from Battery Compartment



2. On the lower part of the device front panel, remove the cover protecting the connector for the handset cradle.
3. Attach the handset cradle to the unit by inserting it into the exposed groove and then pushing it up so that it clicks on to the connector. Attach the removed cover to the front of the cradle.

Figure 24-2: Attaching Handset Cradle to Base Unit (e.g., MP-264)



4. Place the handset in the cradle and leave to charge for at least 16 hours prior to initial use.

24.2 Powering the Handset

24.2.1 Charging the Handset

Once you have installed the batteries, you need to charge them before initial operation.



Note: Charge the batteries for at least 16 hours before initial use.

➤ **To charge the handset:**


1. Ensure that the device is connected to power.
2. Place the handset in the charging cradle of the base unit so that the bottom of the phone sits in the base cradle. When correctly inserted in the cradle, the phone begins charging, indicated by the display of the charging levels of the battery  icon in the phone's screen. For checking battery level, see Section 24.2.2 on page 395.

Figure 24-3: Handset Charging in Cradle



Notes:

- During a call, if your handset batteries are low, your handset will play a warning tone. Replace the handset on the base to recharge them.
- Your phone can sound an alert tone when the battery is low. To activate this alert, see Section 30.3.2 on page 438.

24.2.2 Checking the Battery Level

The battery icon located in the main screen, displays the current battery level, as shown below:



Handset battery is fully charged.



Handset battery is two-thirds charged.



Handset battery is one-third charged.



Handset battery is empty and needs charging. This icon flashes.

Your handset may power down if it is not charged after the battery is empty. If you are in a call and the battery is low, an alert tone is sounded. You can enable or disable this alert tone feature (see Section 30.3.2 on page 438).

24.2.3 Switching the Base Unit On or Off

To operate your phone, the base station must be on. You can turn the base station on or off as described in the procedure below:

➤ **To switch the base on or off:**

- On the device, press (for more than five seconds) the **DECT** LED button. When the base station is switched off, the **DECT** LED is lit red. When switched on, the LED is green or another color depending on the state of the phone. For a description of the **DECT** LED, see Section 24.3.3 on page 404.

24.2.4 Switching the Handset On or Off

When you place the handset in the base unit to charge, the handset automatically turns on. You can turn the handset on or off, as described in the procedure below:

➤ **To switch the handset on or off:**

- On the handset, continually press the  button until the handset switches off or on.

24.2.5 Replacing the Batteries

The handset is shipped with rechargeable batteries. However, if you need to replace them, follow the procedure described in this section.



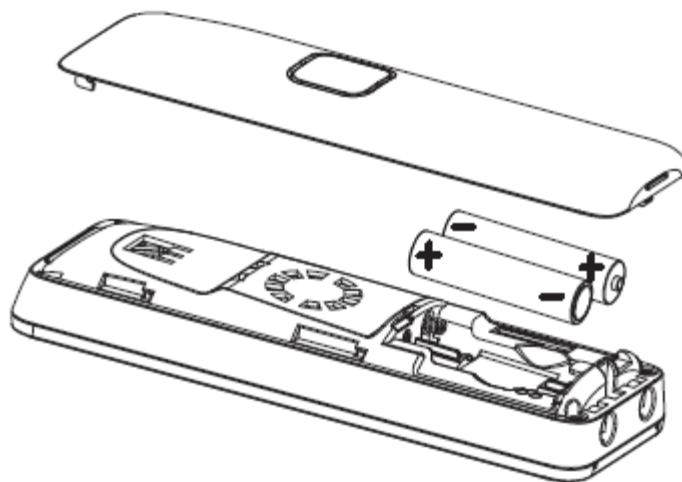
Warnings:

- Risk of explosion if battery is replaced by an incorrect battery type; use only the nickel-metal hydride cell (NiMH) rechargeable batteries as provided with your phone. The manufacturer will not be held liable for damage arising from such non-compliance.
- Verify correct polarity of the batteries when inserting the batteries. Incorrect polarity may damage the product.
- The operation periods for the handset are only applicable with the default battery capacities.
- Do not use third-party charging bays to charge the batteries.
- Do not immerse batteries in water and do not place in fire.
- Do not mix old and new batteries.
- Do not open or mutilate the batteries. Released electrolyte from the batteries is corrosive and may cause burns or injury to the eyes or skin. The electrolyte is toxic and may be harmful if swallowed.
- Do not allow conductive materials such as rings, bracelets, or keys to touch the batteries, otherwise a short circuit may cause the batteries and/or the conductive material to overheat and cause burns.
- Avoid touching the battery ends (+, -) or the base unit contacts.

➤ To install the handset batteries:

1. Remove the battery compartment cover, by sliding the cover out from the base of the phone toward the top end (in the direction of the arrow label printed on the cover). You can use your thumb to push at the base of the cover.
2. Remove the old batteries (if any) and then place the two batteries (supplied) into the battery compartment, as indicated.
3. Slide the battery compartment cover back into place.

Figure 24-4: Installing Batteries



24.3 Getting to Know Your Phone

24.3.1 Overview of the Handset

The areas of the handset are shown in the figure below and described in the subsequent table.

Figure 24-5: Areas of the Handset

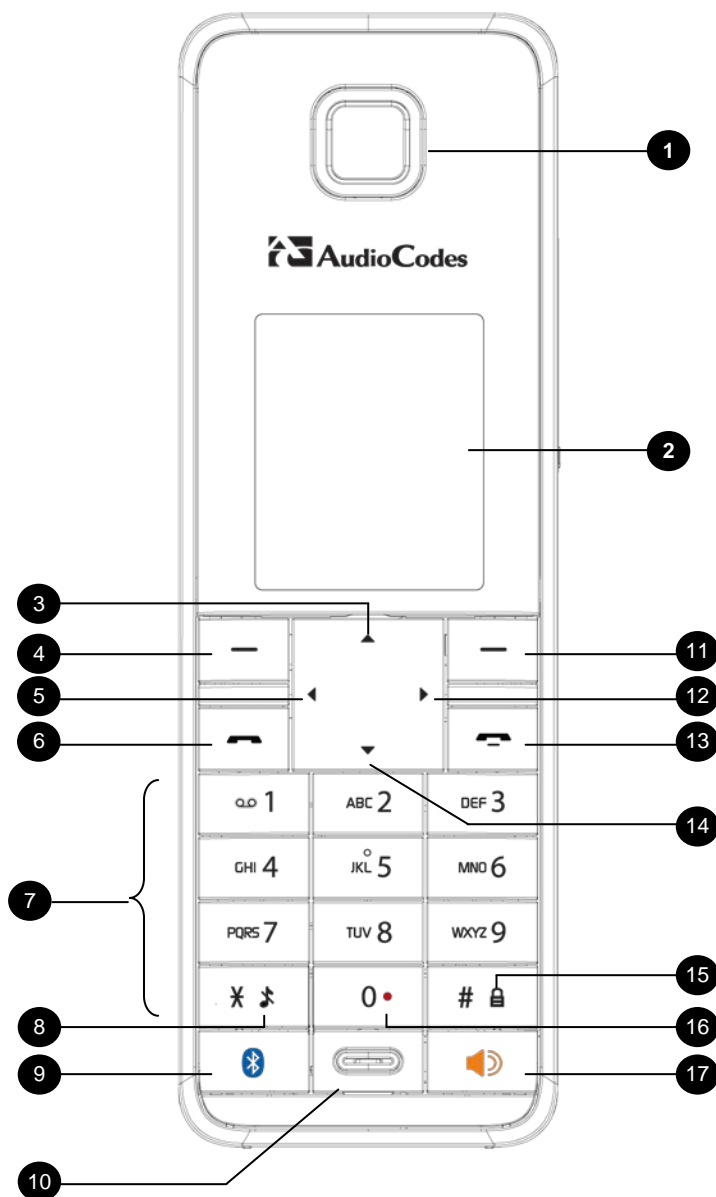















Table 24-1: Handset Description

Item	Label	Description
1	-	Earpiece
2	-	LCD display
3		Up Arrow / Redial List <ul style="list-style-type: none"> In idle mode: Press to access the redial list. In menu mode: Press to scroll up the menu items In Phonebook list / Redial list / Call List: Press to scroll up the list During a call: Press to increase the volume
4		Left Softkey <ul style="list-style-type: none"> In idle mode: Press to access the main menu In submenu mode: Press to confirm selection During a call: Press to access the submenu
5		Left Arrow <ul style="list-style-type: none"> In idle mode: Press to list the registered handsets and FXS ports. In editing/pre-dialing mode: Press to move the cursor one character to the left. During a second call: press and hold to conference your calls.
6		Talk On <ul style="list-style-type: none"> In idle / pre-dialing mode : Press to make a call In Redial list / Call List/ Phonebook entry: Press to make a call to the selected entry in the list During ringing: Press to answer a call
7	-	Alphanumeric Keypad, * (Star), # (Hash) Press to insert a digit / character / * / # <ul style="list-style-type: none"> * key in idle mode: Long press to turn on/off the ringer * key in editing mode: Long press to switch the character set * key during a call: Short press to switch to tone dialing mode temporarily if using pulse dialing mode currently # key in editing mode: Long press to toggle between uppercase or lowercase character input # key in Idle mode: Long press to turn on / off the keypad lock 0 key in pre-dialing / number editing mode: Long press to insert a pause
8		Silence button (with asterisk key) silences the phone (ringer switched off).
9		Bluetooth Note: This button will be supported in the next applicable release.
10	-	Microphone

Item	Label	Description
11		Right Softkey <ul style="list-style-type: none"> In idle mode: Press to access the phonebook In sub-menu mode: Press to go back to previous level In editing / pre-dialing mode: Press to clear a character / digit In editing / pre-dialing mode: Long press to delete all the characters / digit During a call: <ul style="list-style-type: none"> ✓ Press to display a list of registered handsets and FXS ports. ✓ Navigate to the required handset/FXS port. ✓ Press the Left Softkey to select the handset/FXS port you want to transfer the call to. ✓ The call is then transferred.
12		Right Arrow <ul style="list-style-type: none"> In idle mode: Press to view the Missed Calls list. In pre-dialing / editing mode: Press to move the cursor one character to the right. During a second call: Press to toggle between calls.
13		Talk Off <ul style="list-style-type: none"> During a call: Press to end a call and go back to idle screen When there are two calls and the second is an outgoing call: Press to transfer the first call to the user of the second call. In menu / editing mode: Press to go back to idle screen In Idle: Press and hold to power off the handset When the handset is power off: Press and hold to power on the handset
14		Down / Call List <ul style="list-style-type: none"> In idle mode: Press to access the call list In menu mode: Press to scroll down the menu items In Phonebook list / Redial list / Call List: Press to scroll the list During a call: Press to decrease the volume
15		Keypad lock button to lock the keypad.
16		Record button to record conversations. Note: This will be functional in the next applicable release.
17		Speakerphone <ul style="list-style-type: none"> During a call: Press to turn on / off the speakerphone. Call List / Phonebook entry: Press to make a call with speakerphone During ringing: Press to answer a call with speakerphone

24.3.2 Handset LCD Screen Description

The handset LCD provides various icons that are displayed according to the current status and operational mode of the phone. An example of the phone's LCD is shown below and the icons are described in the table below.

Figure 24-6: Areas of the Handset LCD Screen

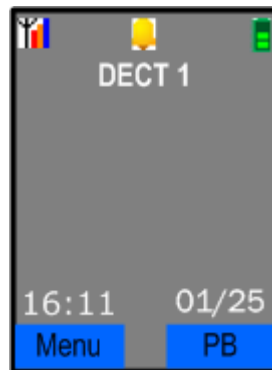

















Table 24-2: Handset LCD Icon Descriptions

Icon	Description
	Steady when the handset is in range of the base. Additional bars (red, orange, and blue) are displayed as the signal strength increases.
	Flashes when the handset is not registered to the base, in marginal range or out of range of the base. When the handset is out of range, the LCD displays "Out of Range" message.
	The alarm is set. When the alarm time is reached, this icon flashes. This icon disappears when the alarm is off.
	Intercom is in progress.
	Phone is ringing (i.e., incoming call).
	Call is in progress.
	Hands-free is in use.
	Headset is in use.
	Ringer is switched off.
	Keypad is locked.
HD	Current call is high definition (HD) voice quality Note: HD calls require the G.722 or AMR-WB codecs.

Icon	Description
	Handset battery is fully charged.
	Handset battery is one-third charged.
	Handset battery is two-thirds charged.
	Handset battery is empty and needs charging. This icon flashes.
	Message Waiting Indication

24.3.2.1 Menu Structure

Your phone provides various features and functions that are grouped in the menus.

➤ **To access the Menu list and its submenus:**















1. Press the **Menu** softkey.
2. Use the 4-way navigation  keys to navigate to the required menu.
3. Press the **Select** softkey to access the required menu.
4. To drill-down submenus, use the  navigation keys to select the required submenu and then the **Select** softkey to access it.

Table 24-3: Handset LCD Menus and Submenus

Menu Icon		Menu Name	Submenus
Unselected	Selected		
		Call List (See Section 27 on page 425)	<ul style="list-style-type: none"> ▪ Call List ▪ Missed Calls ▪ Received Calls ▪ Redial List
		Clock/Alarm (see Section 28 on page 429)	<ul style="list-style-type: none"> ▪ Date & Time ▪ Alarm
		Base Settings (See Section 31 on page 443)	<ul style="list-style-type: none"> ▪ Manage HS ▪ Line Settings ▪ Modify PIN ▪ BS Default ▪ Product Version

Menu Icon		Menu Name	Submenus
Unselected	Selected		
		Phonebook (See Section 26 on page 421)	<ul style="list-style-type: none"> View Add Edit Delete Delete All <p>Note: If the Phonebook is empty, then only the Add submenu appears.</p>
		HS Settings (See Section 30 on page 435)	<ul style="list-style-type: none"> Audio Setup Ring Setup Tone Setup Language Wallpaper Contrast Auto Answer Select Base HS Default
		Registration	<ul style="list-style-type: none"> Base 1 Base 2 Base 3 Base 4









The following menus or submenus can also be accessed using the  navigation keys when the phone is in idle mode:

Table 24-4: Handset LCD Menus and Submenus Accessed using Navigation Keys

Pressed Key	Accessed Menu/Submenu	Description
	Redial List	Navigate to the phone number that you want to redial, and then press the  button. For detailed description on redialing calls, see Section 25.1.5 on page 410.
	Call List	Navigate to the phone number that you want to dial, and then press the  button. For a detailed description on dialing from the Call List, see Section 25.1.4 on page 410.
	Intercom	This submenu allows you to make intercom calls between handsets. Navigate to the handset that you want to call. For a detailed description on making intercom calls, see Section 25.13.1 on page 417.
	Missed Calls List	Navigate to the phone number that you want to redial, and then press the  button. For detailed description on redialing calls, see Section 25.1.5 on page 410.

24.3.2.2 Entering Text and Digits

Your phone allows you to enter strings consisting of letters, digits (numbers) and/or symbols. These are required, for example, when defining the handset name and adding phonebook contacts. In addition, your phone supports a variety of character sets including Latin, Russian, Spanish, and Hebrew.

The character strings are entered using the phone's keypad keys.

Figure 24-7: Handset Keypad



Each key allows you to enter numerous characters in addition to those printed on the keys label. The number 1 key provides commonly used characters such as @ and #.

➤ **To select a character:**

- Press the key consecutively until the required character is displayed.

➤ **To toggle between upper and lowercase letters:**


- Press the # key until you hear a beep.

➤ **To toggle between character sets (languages):**

- Press the star key (*) until you hear a beep.

In editing mode, a cursor is displayed to indicate the current text-entry position. It is positioned at the right of the last character entered.

Writing tips:

- Once a character is selected, the cursor moves to the next position after a short pause.
- You can move the cursor within the text by using the 4-way navigation  keys to modify the text entry.
- Press the **Clear** softkey to delete the last character.
- Press and hold the **Clear** softkey to delete the entire text string.

24.3.3 Viewing the Device Base Unit Status using DECT LED

The **DECT** LED is located on the front panel of the device and indicates the operating status of the cordless phone, as described in the table below:

Table 24-5: DECT LED Description

Color	State	Description
Green	On	The base unit is ready to make or receive calls with the handset.
Green	Flashing	The base is available for handset registration. To register a handset, see Section 24.4 on page 405
Green	Flash Fast	The base is being upgraded. Note: Do not power off the unit during the upgrade process.
Red	On	The base unit is on but no handset is registered to it.
	Flashing	There is a malfunction in DECT cordless phone.
	Flashes (3 times)	Attempting to register more than the allowed number of handsets to the base unit (i.e., more than five).
Amber	Flashing	The handset is being paged. To page (locate) the handset, see Section 25.12 on page 416.
-	Off	The phone is switched off. To switch the phone on or off, see Section 24.2.3 on page 395.

24.4 Upgrading the Device and the Base Unit

If the software version currently running on the device is older than Version 3.3.0 build 17, you need to upgrade the device as well as your device base unit.



Note: If you are a registered customer, you can download the latest device software file and base unit software file from AudioCodes Web site at <http://www.audiocodes.com/downloads>.

You can view the current software version running on the device by using the Web interface, as follows:


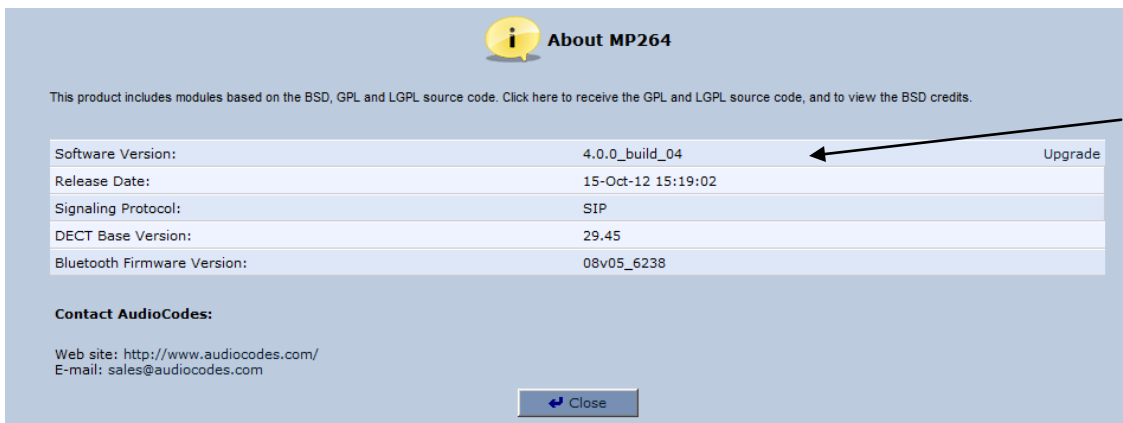
1. Access the device Web interface.
2. From the menu pane, select the **Advanced** menu, and then click the **About MP264**  icon; the 'About MP264' screen appears.

Figure 24-8: About MP264 Screen (e.g., MP-264)




Software Version

Software Version:	4.0.0_build_04	Upgrade
Release Date:	15-Oct-12 15:19:02	
Signaling Protocol:	SIP	
DECT Base Version:	29.45	
Bluetooth Firmware Version:	08v05_6238	

Contact AudioCodes:
 Web site: <http://www.audiocodes.com/>
 E-mail: sales@audiocodes.com

Close

➤ **To upgrade the device and base unit software versions:**

1. Upgrade the device software version using the Web interface's 'Firmware Upgrade' screen (**Advanced** menu > **Firmware Upgrade**  icon). For more information, see Section 19.6 on page 361.
2. After the device re-boots, the software compares the burnt DECT firmware, with the embedded firmware. If different, an automatic upgrade of the DECT takes place.



Note: During the upgrade process, do **NOT** power off the device.

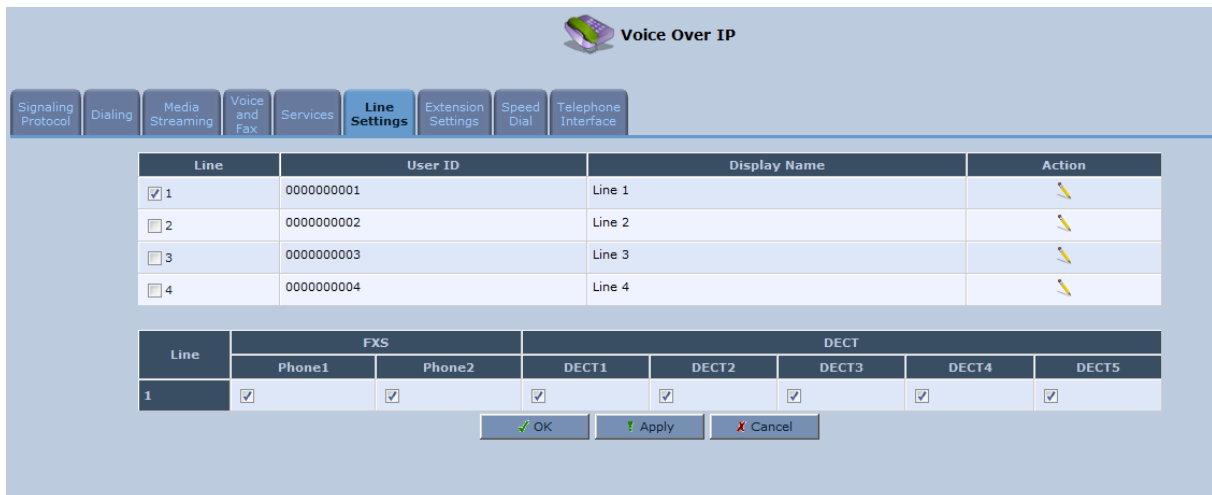
24.5 Defining the Device Handset Line

Before you can operate the phone, the handset needs to be defined as one of the device phone lines. By default, the handset is automatically assigned **Line 3** of the device. Configuration of this line is done using the device Web interface, as described below.

➤ **To define the handset phone line on the device:**

1. Access the device Web interface.
2. From the menu pane, select the **Voice Over IP** menu; the 'Voice Over IP' screen.
3. Select the **Line Settings** tab; the 'Line Settings' screen appears.

Figure 24-9: Line Settings Screen



The screenshot shows the 'Voice Over IP' configuration page. At the top, there's a 'Voice Over IP' header with a handset icon. Below it is a navigation bar with tabs: Signaling Protocol, Dialing, Media Streaming, Voice and Fax, Services, **Line Settings** (selected), Extension Settings, Speed Dial, and Telephone Interface. The main content area contains two tables. The first table lists four lines with checkboxes, User IDs, Display Names, and Edit icons. The second table shows detailed settings for Line 1, including FXS (Phone1, Phone2) and DECT (DECT1 to DECT5) checkboxes. At the bottom are 'OK', 'Apply', and 'Cancel' buttons.

Line	User ID	Display Name	Action
<input checked="" type="checkbox"/> 1	0000000001	Line 1	
<input type="checkbox"/> 2	0000000002	Line 2	
<input type="checkbox"/> 3	0000000003	Line 3	
<input type="checkbox"/> 4	0000000004	Line 4	

Line	FXS		DECT				
	Phone1	Phone2	DECT1	DECT2	DECT3	DECT4	DECT5
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>


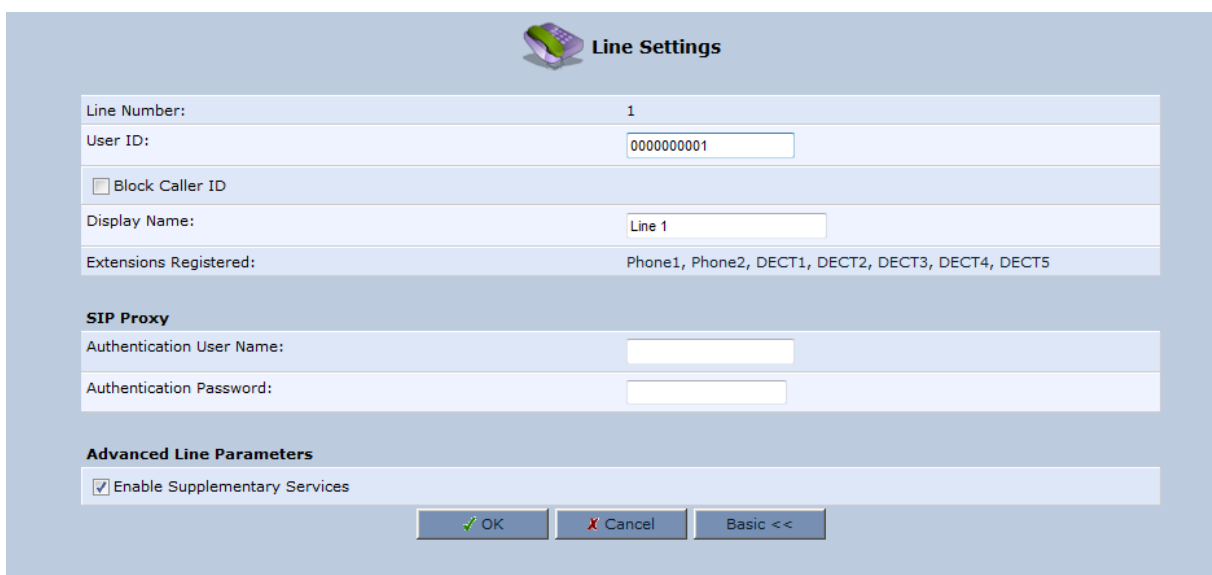
4. Click the **Edit**  icon corresponding to Line 1.

Figure 24-10: Defining Line 1 Properties



The screenshot shows the 'Line Settings' form for Line 1. It has a 'Line Settings' header with a handset icon. The form contains several sections: 'Line Number' (1), 'User ID' (0000000001), 'Block Caller ID' (checkbox), 'Display Name' (Line 1), and 'Extensions Registered' (Phone1, Phone2, DECT1, DECT2, DECT3, DECT4, DECT5). Below these are 'SIP Proxy' settings for 'Authentication User Name' and 'Authentication Password'. The 'Advanced Line Parameters' section has a checkbox for 'Enable Supplementary Services'. At the bottom are 'OK', 'Cancel', and 'Basic <<' buttons.

Line Number: 1

User ID: 0000000001

☐ Block Caller ID

Display Name: Line 1

Extensions Registered: Phone1, Phone2, DECT1, DECT2, DECT3, DECT4, DECT5

SIP Proxy

Authentication User Name:

Authentication Password:

Advanced Line Parameters

☒ Enable Supplementary Services




5. Define the following line settings:
 - **User ID:** phone number (extension) of the device handset
 - **Display Name:** String displayed to remote parties as your caller ID
 - **Authentication User Name:** User name (obtained from your service provider) used when sending a response to Unauthorized or Proxy Authentication Requested (401/407)
 - **Authentication Password:** Password (obtained from your service provider) used when sending a response to Unauthorized or Proxy Authentication Requested (401/407)

24.6 Registering the Handset to Base Unit

Before you can use your handset, you need to register it to the base unit. Up to five handsets can be registered to the base unit. If the handset is not registered to the base unit, the following is displayed on its screen:

- 📶 icon flashes
- "Out of Range" message appears in idle state

➤ To register the handset to the base:

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Registration**  icon, and then press the **Select** softkey.
3. On the M-264 base unit, press the **DECT** LED button until (2 – 5 seconds) it starts flashing green; the base unit enters registration mode. (The registration mode remains active for 30 seconds, after which the **DECT** LED stops flashing. Therefore, proceed to the next step before this interval expires.)
4. Press the  navigation keys to choose the base unit (i.e., "Base 1") to which you want to register the handset, and then press the **Select** softkey; the registration process begins and the "Registering - Waiting" is displayed.
5. When the handset identifies the base, it displays its radio frequency (RF) identification (each base has a unique RF ID). Click the **Accept** softkey to confirm (or press the **Rej** softkey to cancel registration).
6. On some handsets, you are prompted to enter a PIN code. The default PIN code is 0000 (see Section 31.2 on page 445 for defining the PIN code).

If the handset successfully registers to the base, a confirmation tone is heard and the 📶 icon stops flashing. The handset is automatically allocated the next available handset number. This handset number is displayed on the handset screen in idle mode. The base unit to which the handset is successfully registered is marked with an asterisk "*" in the **Registration** menu (see Section 30.8 on page 440).

24.7 Checking the Handset Signal Strength

The antenna  icon displays the signal strength between your handset and the base unit:



Signal strength is excellent.



Signal strength is good.



Signal strength is poor.



When the icon is steady, the handset is in range of the base (but signal strength is weak). When the icon flashes, it indicates that the handset is out of range and there is no link with the base unit.

As the distance between the handset and the base increases, so the signal strength decreases and vice versa.



Notes:

- The maximum range between the base station and the handset is approximately 300 meters. Depending on the surrounding conditions as well as spatial and structural factors, the range may be reduced. The range indoors is normally less than outdoors.
- If your handset has lost its link with the base unit, you cannot make or receive calls. In addition, many other phone functions cannot be performed.

25 General Phone Operation

This chapter describes general phone operation procedures.

25.1 Making an External Call



External calls are calls made to remote parties other than another registered headset (if any) to the device base.



Note: Your handset automatically displays the duration of every call. This is shown in hours, minutes and seconds format (HH:MM:SS).



25.1.1 Pre-dialing

Preparatory dialing is when you first enter the phone number and only then dial it. This therefore, allows you to make changes to the number before making the call.

1. Enter the phone number; the number is displayed on the screen. You can make changes to the number before dialing. Press the **Clear** softkey to delete digits to the left of the cursor.
2. Press  or  to dial the number.




25.1.2 Direct Dialing

Direct dialing is when you activate dialing and only then enter the phone number.

1. Press  or  to take the line.
2. Enter the phone number; the phone waits a few seconds and then dials the number.





25.1.3 Calling from your Phonebook

If you have added any contacts to your phonebook, you can dial from the phonebook.

1. Press the **PB** softkey to access the phonebook.
2. Press the  navigation keys to choose the desired phonebook entry, and then press the **Select** softkey.
3. Press  or  to dial the selected phonebook entry.

25.1.4 Calling from the Call List




You can dial numbers from previously received or missed calls, which are stored in the Call List:

1. Press the  navigation key to access the Call List.
2. Press the  navigation keys to select the desired entry, and then press the **Select** softkey.
3. Press  or  to dial the selected entry.

25.1.5 Establishing a Second Call





While you are in an active call, you can establish a second call. When you establish a second call, the first call is put on hold. You can toggle between the calls by placing one call on hold while speaking to the other call (see Section 25.13.4 on page 418).

To establish a second call, do one of the following:

- **Making a second call directly:**
 1. Press ; the Predialing screen appears.
 2. Dial the desired number, and then press  again.
- **Making a second call to a contact in your phonebook:**
 1. Press the **Menu** softkey, and then choose **Phonebook**.
 2. Select a number from the phonebook, and then press .
- **Manually placing the first call on hold before making a second call:**
 1. Press the **Hold** softkey to place the current call on hold.
 2. Establish a second call by doing one of the previously mentioned methods.

25.1.6 Redialing a Number

You can dial numbers that were previously dialed, which are stored in the Redial List.



1. Press the  navigation key to access the Redial List.
2. Press the  navigation keys to select the desired number, and then press the **Select** softkey.
3. Press  or  to dial the selected entry.

25.2 Answering a Call

When you receive a call, your phone rings and the following is displayed on your screen:

- “Incoming Call”
- Calling number is displayed

➤ **To answer a call:**


- **If the handset is not on the base:** When the phone rings, press  or .
- **If the handset is on the base and when Auto Answer is set to On:** When the phone rings, pick up the handset.

25.3 Answering or Rejecting a Second Call


While you are talking on the phone, you can receive a second call. The phone provides the following indications of a second incoming call:

- A beep tone is sounded.
- The “Call Waiting” message is displayed on the screen with the details (name and number) of the calling party.

➤ **To answer a second call:**

- Press  to answer the call; the call with the second call party is established and the first call is put on hold.


➤ **To reject a second call:**

- Press  to reject the second call.

Once you have answered the second call, you can toggle between the calls by placing one call on hold and speaking to the other call (see Section 25.13.4 on page 418).

25.4 Ending a Call

To end call, you can do one of the following:

- Press .
- Place the handset on the charger.

When you end the call, the screen displays “Released”.

25.5 Adjusting Earpiece and Speakerphone Volume During a Call

During a call, you can adjust the volume of the handset earpiece and hands-free. There are five volume levels provided on the handset. This is done during an ongoing call.

➤ To adjust the earpiece and hands-free volume:

- During a call, press the up / down  navigation keys to increase or decrease the volume level respectively. The screen displays the current volume setting.





Notes:

- When you end the call, the selected volume applies to all future calls, until it is modified again.
- To adjust the earpiece and speaker volume when the phone is in idle state, see Section 30.1 on page 435.

25.6 Muting a Call

You can talk to someone nearby without letting the caller hear you during a call. This is done by muting the microphone of the handset.

➤ To mute and un-mute a call:

1. To mute the call:
 - a. During a call, press the **Menu** softkey.
 - b. Press the  navigation keys to select the **Mute** option, and then press the **Select** softkey; the microphone is muted and "Call Muted" is displayed on the screen.
2. To un-mute the call:
 - a. Press the **Menu** softkey.
 - b. Press the  navigation keys to select the **Unmute** option, and then press the **Select** softkey; the microphone is un-muted and you can now converse with the caller.

25.7 Rejecting Incoming Calls






When receiving an incoming call, all extensions on the line are ringing. You can press the **Reject** softkey, which disconnects the call on all the extensions. The caller hears a busy ringtone.

Alternatively, you can press the **Menu** softkey and then press **Reject**.

25.8 Turning Off the Ringer

You can turn off the ringer of the handset for audibly notifying of incoming calls.



➤ **To turn off and on the ringer:**

1. To turn off the ringer: In idle mode, press and hold  (shares the  key) key to turn off the ringer. The  icon is displayed on the screen.
2. In silent mode, press and hold the  key to turn on the ringer. The  icon disappears.

25.9 Using the Speakerphone

While you are in a call, you can switch from the earpiece to the built-in speaker on your handset. This allows hands-free conversations.

➤ **To activate the speakerphone:**

- While in a call, press the  key. To turn off the speaker and return to the earpiece mode, press the  key once again.

25.10 Redial List

The number of stored numbers in the Redial List is configurable. By default, a maximum of 30 missed calls, 30 incoming calls and 30 outgoing calls can be stored in the Redial List. If the number that you called also appears in the phonebook, then the contact name is displayed in the list, instead of the number.

The Redial List allows you to do the following:

- Redial a listed number (see Section [25.1.5](#))
- Add a listed number to the phonebook
- Delete a listed number
- Delete all entries in the Redial List



Note: If there are no numbers in the Redial List, the screen displays “List Empty”.

25.10.1 Saving a Redial Number to the Phonebook

You can save a number listed in the Redial List to the phonebook.

➤ **To save a listed number to the phonebook:**

1. Press the ▲ navigation key to access the Redial List.
2. Press the ◀ navigation keys to select the desired number, and then press the **Select** softkey.
3. Press the **Menu** softkey.
4. Press the ▶ navigation keys to choose the **Add to PB** option, and then press the **Select** softkey; the phonebook is accessed with the number already appearing in the Number field.
5. Enter the details (i.e., name) of the contact in the phonebook. For a detailed description of adding contacts to the phonebook, see Section [26.1](#).

25.10.2 Deleting a Number from the Redial List

You can delete a number from the Redial List.

➤ **To delete an entry in the Redial List:**

1. Press the ▲ navigation key to access the Redial List.
2. Press the ▲/▼ navigation keys to select the desired number, and then press the **Select** softkey.
3. Press the **Menu** softkey.
4. Press the ▲/▼ navigation keys to choose the **Delete** option, and then press the **Select** softkey; the "Delete Confirm" message is displayed.
5. Press the **OK** softkey to confirm deletion.

25.10.3 Deleting the Entire Redial List

You can delete all the entries in the Redial List.





➤ **To delete all entries in the Redial List:**

1. Press the ▲ navigation key to access the Redial List.
2. Press the **Select** softkey.
3. Press the **Menu** softkey.
4. Press the ▲/▼ navigation keys to choose the **Delete All** option, and then press the **Select** softkey; the "Delete Confirm" message is displayed.
5. Press the **OK** softkey to confirm deletion.

25.11 Locking the Keypad

You can lock the keypad to prevent accidental presses on the handset while carrying it around. This can be done only when the handset is in idle mode.

➤ To lock the keypad:

1. To lock the keypad: In idle mode, press and hold the  key (shares the # key); the  icon is displayed.
2. To unlock the keypad: In idle mode, press and hold the  key, the  icon disappears.



Note: You are unable to make any calls when the keypad is locked.

25.12 Paging the Handset

You can locate the handset by paging the handset from the base.

➤ To page a handset:

- On the base unit, shortly (less than two seconds) press the **DECT** button; the LED changes to orange and all handsets registered to the base ring for up to 60 seconds and “Incoming Call – HS Locator” is displayed on the LCD. You can stop the paging by pressing any key on the handset except the **Silent** softkey.

25.13 Call Handling for Multiple, Registered Handsets

The device supports multiple, registered handsets. This section describes call handling between multiple registered handsets. This includes how to make internal calls, transfer external calls from one handset to another handset, and make conference calls.


25.13.1 Calling (Intercom) another Handset

An intercom call is a call from one handset to another handset that is also registered to the device base unit.



Note: An intercom call can only involve two handsets that share the same base unit.



➤ **To call (intercom) another handset:**

1. Press the ◀ navigation key; the screen displays a list of the registered handsets and FXS ports.
2. Press the ▲ navigation keys to select the handset to which you want to make a call.
3. Press the **Select** softkey; the called handset or FXS port rings.
4. On the called handset, press  to establish the internal call.

25.13.2 Transferring an External Call to Another Extension

You can transfer an external call (i.e., not a call from another handset) received on one handset, to another handset.



➤ **To transfer an external call to another extension:**

1. Press the  Right Softkey to display a list of registered handsets and FXS ports.
2. Navigate to the required handset/FXS port.
3. Press the  Left Softkey to select the handset/FXS port you want to transfer the call to. The call is then transferred.

25.13.2.1 Announced Call Transfer

An announced call transfer is when you can speak to the handset to where you want to transfer the external call before transferring the call.

➤ **To make an announced call transfer:**



1. During the call with the external call, press the ◀ navigation key; the screen displays a list of the registered handsets.
2. Press the ▲ navigation keys to select the handset to where you want to transfer the call.
3. Press the **Select** softkey; the external call is automatically put on hold and the called handset rings.
4. On the called handset, press  or  to establish an internal call between the handsets.

5. On the calling handset, press the **Menu** softkey, and then choose the **Transfer** option; the external call is transferred to the called handset and the current call with the calling handset is terminated.

25.13.2.2 Unannounced Call Transfer

An unannounced call transfer is when you transfer the external call to a handset without speaking to the handset to where the call is transferred.

➤ **To make an unannounced call transfer:**

1. During the call with the external call, press the ◀ navigation key; the screen displays a list of the registered handsets.
2. Press the ⬆ navigation keys to select the handset to where you want to transfer the call.
3. Press the **Select** softkey; the external call is automatically put on hold and the called handset rings.
4. On the calling handset, press the **Menu** softkey, and then choose the **Transfer** option; the external call is transferred to the called handset and the current call with the calling handset is terminated.
5. On the called handset, press  or  to receive the transferred call.

25.13.3 Transferring an External Call to another External Call

If you have two external calls, one an active call and the other a waiting call (or call on hold), you can transfer the active call to the waiting call party.

➤ **To transfer an external call to a remote party:**

1. Press the **Menu** softkey, and then select the **Transfer** option
2. Press the **OK** softkey to confirm the transfer; the two external call parties are connected, and you are disconnected from the calls.

25.13.4 Toggling between External and Internal Calls

If you have established an external call, you can establish another call (i.e., internal or external) and then toggle between these calls. When one call is active, the other call is on hold.

➤ **To toggle between calls:**

- Press the ▶ navigation key; the currently active call is put on hold and the currently held party is now active.

25.13.5 Three-Way Conference Calls



You can create three-way conference calls composed of the following call party types:

- Two handsets and an external party
- Your handset and two external calls

25.13.5.1 Making a Three-Way Conference Call with another Handset and an External Party

The conference call feature allows one external call to be shared with two handsets (in intercom). The three parties can share the conversation and no network subscription is required.

➤ **To make a three-way conference with another handset and an external call:**

1. During the call with the external call, press the ◀ navigation key; the screen displays a list of the registered handsets.
2. Press the ▲ navigation keys to select the handset with which you want to establish a three-way conference call.
3. Press the **Select** softkey; the external call is automatically put on hold and the called handset rings.
4. On the called handset, press  or  to establish the internal call.
5. On the calling handset, press and hold the ◀ navigation key for 3 seconds to establish the 3-way conference call.



Note: If any handset hangs up during the conference call, the other handset still remains connected with the external call.

25.13.5.2 Making a Three-Way Conference Call with your Handset and two External Calls

You can make a three-way conference call between your handset and two external calls. This can be done when you have two external calls, where you are talking with one and the other call is waiting (on hold).

➤ **To make a three-way conference with two external calls:**

1. Press the **Menu** softkey, and then choose the **Conference** option.
2. Press the **OK** softkey to confirm the conference; the two external calls parties are included in your conference call.

Reader's Notes





26 Phonebook

Your handset can store up to 150 phonebook contacts. Each phonebook contact can have a name of up to 12 characters long and a phone number of up to 24 digits.

26.1 Adding a New Contact

Follow the procedure below for adding a new contact to your phonebook.

➤ **To add a new contact to a phonebook:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Phonebook**  icon.
3. Press the **Select** softkey to access the Phonebook.
4. Press the  navigation keys to choose the **Add** option, and then press the **Select** softkey.
5. Enter the contact details, using the  navigation keys to move from one field to the next:
 - **First Name:** first name
 - **Last Name:** family name
 - **Number:** phone number



Note: The name and phone number are mandatory fields.

6. Press the **OK** softkey to save the phonebook entry.








Note: The phonebook displays the contacts in alphabetical order.

26.2 Editing a Contact

You can edit contacts listed in your phonebook.



➤ To edit a phonebook contact:

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Phonebook**  icon.
3. Press the **Select** softkey to access the Phonebook.
4. Press the  navigation keys to choose the **Edit** option, and then press the **Select** softkey.
5. Press the  navigation keys to choose the contact that you want to edit, and then press the **Select** softkey; the contact's details are displayed.
6. Press the **Select** softkey to edit the contact's details.
7. Press the  navigation keys to move between fields, and then edit the fields as required.
8. When you have completed your modification, ensure that you are in the melody field, and then press the **OK** softkey; the "Saved" message is displayed.




26.3 Viewing Contacts

You can view a list of all contacts in your phonebook.

➤ To view all contacts in your phonebook:

1. In idle state, press the **PB** softkey; the phonebook opens, displaying a list of the contacts.
2. Search a contact, by performing one of the following:
 - **Navigation keys:** Scroll through the list of contacts using the  navigation keys.
 - **Search feature:** Using the keypad, enter the name of the contact. As you enter letters, the phonebook locates contacts that match the entered letters. For example, if you want to search for the contact "Sue", as you press the key for the es letter ("s"), the phonebook locates contacts whose names begin with this string. As you enter the next letter (i.e., "u"), so the contacts whose names begin with "su" appear, and so on.
3. To view the details of a contact, press the  navigation keys to select the contact, and then press the **Select** softkey.





You can also view the list of phonebook contacts from the Menu list:

4. In idle state, press the **Menu** softkey.
5. Press the  navigation keys to scroll to the **Phonebook**  icon.
6. Press the **Select** softkey to access the Phonebook.
7. Press the  navigation keys to choose the **View** option, and then press the **Select** softkey.
8. Follow steps 2 through 3 of the procedure above.

26.4 Deleting a Contact

You can delete a selected contact in the phonebook.


➤ **To delete a contact in the phonebook:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Phonebook**  icon.
3. Press the **Select** softkey to access the Phonebook.
4. Press the  navigation keys to choose the **Delete** option, and then press the **Select** softkey.
5. Press the  navigation keys to choose the contact that you want to delete, and then press the **Select** softkey; the contact's details are displayed.
6. Press the **Select** softkey; the "Delete Confirm" message is displayed.
7. Press the **OK** softkey to confirm deletion (or the **Back** softkey to cancel); the contact is removed from the phonebook.

26.5 Deleting All Contacts

You can delete all contacts from the phonebook.

➤ **To delete all contacts from the phonebook:**

1. In idle state, press the **Menu** softkey.
2. Press the ◀▶ navigation keys to scroll to the **Phonebook**  icon.
3. Press the **Select** softkey to access the Phonebook.
4. Press the ▲▼ navigation keys to choose the **Delete All** option, and then press the **Select** softkey; the “Delete Confirm” message is displayed
5. Press the **OK** softkey to confirm deletion (or the **Back** softkey to cancel); all contacts are removed from the phonebook.

27 Call List

If you have subscribed to a Caller Line Identification (also referred to as Caller ID) service with your network service provider, then when your phone rings for an incoming call, the phone displays the calling number (and the associated name of the caller if listed in your phonebook). If the caller's number is withheld, "Withheld" is displayed. If the caller's number is unavailable, "Out Of Area" is displayed.


The phone's Call List stores up to 30 missed calls, 30 incoming calls and 30 outgoing calls, displaying the date and time of the calls.

27.1 Viewing the Call List

All unanswered (missed) and answered (received) calls are saved in the Call List with the latest call displayed at the top of the list. When the Call List is full, the oldest call is replaced by a new call.

Missed calls are marked with an asterisk (*) at the beginning of the missed call entry. Once the missed call has been read, the * is removed.






You can view the Call List by performing one of the following:

- In the idle state, press the ▼ navigation key.
or
- Using the Menu:
 1. In idle state, press the **Menu** softkey.
 2. Press the ◀▶ navigation keys to scroll to the **Call List**  icon, and then press the **Select** softkey to access the Call List.
 3. Press the ▲ navigation keys to choose one of the following options:
 - ◆ **Call List:** displays recently answered and missed calls
 - ◆ **Missed Calls:** displays only unanswered calls
 - ◆ **Received Calls:** displays only answered calls
 - ◆ **Redial List:** displays calls that were previously dialed
 4. Press the **Select** softkey to access the selected option; the call details—call duration and date and time of the call—are displayed.

27.2 Saving a Call List Number to the Phonebook

You can save a number in the Call List to your phonebook.




➤ To save a Call List entry to the phonebook:

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Call List**  icon.
3. Press the **Select** softkey to access the Call List.
4. Press the  navigation keys to choose the required Call List option (see previous Section)
5. Press the  navigation keys to choose the entry that you want to add to the phonebook, and then press the **Select** softkey.
6. Press the **Menu** softkey.
7. Press the  navigation keys to choose the **Add to PB** option, and then press the **Select** softkey; the phonebook is accessed, prompting you to enter the contact's details (the phone number as appearing in the Call List is automatically entered in the phonebooks Number field). For a description on adding contacts to the phonebook, see Section 26.1 on page 421.

27.3 Dialing a Call List Number

You can dial a number listed in the Call List.




➤ To dial a number listed in the Call List:

1. Access the Call List menu (see Section 27.1 on page 425).
2. Press the  navigation keys to choose the required Call List option (e.g., Missed Calls), and then press the **Select** softkey.
3. Press the  navigation keys to choose the entry that you want to dial, and then press the **Select** softkey.
4. Press  to dial the number.

27.4 Deleting a Call List Number

You can delete an entry in the Call List.



➤ **To delete a number in the Call List:**

1. Access the Call List menu (see Section 27.1 on page 425).
2. Press the  navigation keys to choose the required Call List option (e.g., Missed Calls), and then press the **Select** softkey.
3. Press the  navigation keys to choose the entry that you want to delete, and then press the **Select** softkey.
4. Press the **Menu** softkey.
5. Press the  navigation keys to choose the **Delete** option, and then press the **Select** softkey; the “Delete Confirm” message is displayed
6. Press the **OK** softkey to confirm deletion (or the **Back** softkey to cancel); the entry is removed from the Call List.

27.5 Deleting the Entire Call List

You can delete all entries listed in the Call List. When you delete all entries, all entries in the Call List, Missed Calls, Received Calls, and Redial List groups are deleted. If you access the Call List after deleting all entries, the “List Empty” message is displayed.

➤ **To delete a number in the Call List:**

1. Access the Call List menu (see Section 27.1 on page 425).
2. Press the  navigation keys to choose the required Call List option (e.g., Missed Calls), and then press the **Select** softkey.
3. Press the **Select** softkey once again.
4. Press the **Menu** softkey.
5. Press the  navigation keys to choose the **Delete All** option, and then press the **Select** softkey; the “Delete Confirm” message is displayed.
6. Press the **OK** softkey to confirm deletion (or the **Back** softkey to cancel); all entries are removed from the Call List.


28 Retrieving Voice Messages

A “Voice Message” message, together with the **Call** and **Back** softkeys, appear on the DECT display to indicate that a new voice message has been received.

➤ **To listen to voice messages now:**

1. Press the **Call** softkey; the voice mail is activated.
2. Follow the voice mail instructions.

➤ **To listen to voice messages later:**

1. Press the **Back** softkey.
2. The “Voice Message” message disappears and the MWI symbol  appears.
3. When you are ready to listen to voice messages, press “1”.



Note: Ensure that the “1” key is configured as a speed dial to the ISP’s number (see Section 9.8 on page 121) and that Stutter Tone Duration has been enabled (see Table 9-7 on page 109).

Reader's Notes

29 Clock and Alarm

You can set the phone's date and time as well as set an alarm.






29.1 Date and Time

You can set the phone's date and time as well as determine the format of the date and time.

29.1.1 Changing the Date Format

You can change the date format. This can be either DD-MM (for example, 25-12) or MM-DD (for example, 12-25).






➤ **To change the date format:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Clock/Alarm**  icon, and then press the **Select** softkey to access the menu.
3. Press the  navigation keys to choose the **Date & Time** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Date Format** option, and then press the **Select** softkey.
5. Press the  navigation keys to choose the desired format, and then press the **Select** softkey; the new date format is applied and the "Saved" message is displayed.

29.1.2 Changing the Time Format

You can change the time format. This can be either 12-hour format (for example, 5:30 PM) or 24-hour format (for example, 17:30).








➤ **To change the time format:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Clock/Alarm**  icon, and then press the **Select** softkey to access the menu.
3. Press the  navigation keys to choose the **Date & Time** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Time Format** option, and then press the **Select** softkey.
5. Press the  navigation keys to choose the desired format, and then press the **Select** softkey; the new time format is applied and the "Saved" message is displayed.

29.1.3 Setting the Time and Date

You can set the current time and date.

➤ **To set the time and date:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Clock/Alarm**  icon, and then press the **Select** softkey to access the menu.
3. Press the  navigation keys to choose the **Set Date/Time** option, and then press the **Select** softkey.
4. Press the  navigation keys to access the time or date area.
5. To set the time:
 - To move between hours, minutes and AM/PM (depending on format), use the  navigation keys.
 - If the selected format is 12 hours (see Section 29.1.2 on page 431), then to select AM or PM, use the  navigation keys.
6. To set the date, use the  navigation keys to move between day, month and year. Set the date according to the format that you selected in Section 29.1.2 on page 431.






Note: If you enter an invalid value, an error tone is emitted and the cursor flashes on the incorrect entry.

7. Press the **OK** softkey to save the new date and time.


29.2 Alarm

Your phone provides a built-in alarm clock. You can select the melody to play when the alarm time is reached. You can also activate the snooze time so that when the alarm rings, you can stop it temporarily and the alarm will sound again at the end of the snooze period (i.e., two minutes).


When an alarm is set, the alarm  icon appears on the screen. When the alarm time is reached, the alarm  and **Alarm/Clock**  icons flash on the screen, and the alarm melody plays for 45 seconds.










Notes:

- When the alarm sounds, you can stop it or snooze it even if the handset keypad is locked (described in Section 25.11 on page 416).
- The alarm volume level is the same as the settings of the handset ringer volume (see Section 25.5 on page 412). If the handset ringer is set to Volume Off, the alarm still sounds at Volume 1 level.
- During an external or internal call, if an alarm is set and the alarm time is reached, the alarm  icon and "Alarm On" flashes on the screen and the current call display details (i.e., call duration etc.) disappear. Once you press any key to activate the snooze or press the **Off** softkey to disable the alarm, the current call details is displayed again on the screen.
- If the phone rings for an incoming call and the alarm time is reached, the alarm does not sound. However, if the snooze alarm is enabled, the alarm sounds again at the end of the snooze period provided that the phone is not ringing or in paging mode at the end of the snooze period.

29.2.1 Setting the Alarm

The alarm time is set as described below. When the alarm is set, the alarm  icon is displayed on the main screen.






➤ To set the alarm:

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Clock/Alarm**  icon, and then press the **Select** softkey to access the menu.
3. Press the  navigation keys to choose the **Alarm** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Alarm On** option, and then press the **Select** softkey.
5. Press the  navigation keys to move between hours, minutes, and AM/PM. If the time format is 12 hours (see Section 29.1.2 on page 431), then to select AM or PM, use the  navigation keys.
6. Press the **OK** softkey.
7. Press the  navigation keys to choose whether you want the snooze functionality (**Snooze On**), and then press the **Select** softkey; the alarm time is saved and the alarm icon is displayed on the main screen.

29.2.2 Defining the Alarm Melody

You can define the melody that is played when the alarm sounds.





➤ To set the alarm melody:

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Clock/Alarm**  icon, and then press the **Select** softkey to access the menu.
3. Press the  navigation keys to choose the **Alarm** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Alarm Melody** option, and then press the **Select** softkey; a list of melodies is displayed.
5. Press the  navigation keys to choose the required melody (a sample of the melody is played when you highlight a melody), and then press the **Select** softkey; the melody is applied to the alarm and the "Saved" message is displayed.

29.2.3 Disabling the Alarm





You can set the alarm to off so that it does not ring at all.

➤ To set the alarm to off:

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Clock/Alarm**  icon, and then press the **Select** softkey to access the menu.
3. Press the  navigation keys to choose the **Alarm** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Alarm Off** option, and then press the **Select** softkey.

29.2.4 Switching Off or Snoozing the Alarm

When the alarm rings, you can either switch it off entirely or you can snooze the alarm so that it switches off temporarily and then rings again after two minutes.

- To switch off the alarm when it rings, press the **Off** softkey or  key; the alarm  icon disappears from the main screen.
- To activate the snooze alarm when it rings, press the **Snooze** softkey or any other key except the **Off** softkey or  key; the alarm  icon remains displayed in the main screen.






30 Customizing the Handset

Your phone comes with a selection of settings that you can change to personalize your handset.

30.1 Adjusting Speaker and Earpiece Volume

You can adjust the speaker volume as well as the earpiece volume. The phone supports five volume levels from which you can choose.

➤ **To adjust the volume:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Audio Setup** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Speaker Volume** or **Ear Volume** option to adjust the speaker or earpiece volume respectively, and then press the **Select** softkey.
5. Press the  navigation keys to select the volume level.
6. Press the **OK** softkey; the volume level is saved.








Note: You can also adjust the volume during a call, as described in Section 25.5 on page 412.

30.2 Ring Settings

30.2.1 Choosing the Internal Ringer Melody

You can select the ringer melody that is played when an incoming call is received from another handset registered to the device base.






➤ **To select the internal ringer melody:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Ring Setup** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Internal Ringer** option (a sample of the melody is played when browsing the list), and then press the **Select** softkey; a list of melodies is displayed.
5. Press the  navigation keys to choose the desired melody, and then press the **Select** softkey; the melody is saved.

30.2.2 Choosing the External Ringer Melody

You can select the ringer melody that is played when an incoming call is received from an external party.












➤ **To select the external ringer melody:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Ring Setup** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **External Ringer** option (a sample of the melody is played when browsing the list), and then press the **Select** softkey; a list of melodies is displayed.
5. Press the  navigation keys to choose the desired melody, and then press the **Select** softkey; the melody is saved.

30.2.3 Adjusting the Ringer Volume

You can adjust the handset's ringer volume.

➤ **To adjust the ringer volume:**






1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Ring Setup** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Ring Volume** option, and then press the **Select** softkey; a volume bar is displayed indicating the volume level.
5. To increase the volume, press the  or  navigation keys; to decrease the volume, press the  or  navigation keys. Levels filled in with color indicate the selected volume level. The respective volume level is played during your selection.
6. To silence the ringer, press the  or  navigation keys until "Volume Off" is displayed. when the ringer is off, the  icon is displayed on the main screen.
7. Press the **OK** softkey to save your settings.

30.3 Alert Tones

30.3.1 Setting the Key Tone

A single beep is emitted when you press a key on the handset. You can set whether only a beep is emitted upon any key pressed or only Dual Tone Multi Frequencies (DTMF) tones are emitted (when numbers 0-9 and symbols * and # are pressed), or both. You can also turn off the key tone.





➤ **To set the key tone:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Tone Setup** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **Key Tone** option, and then press the **Select** softkey.
5. Press the  navigation keys to choose the required key tone:
 - **Beep:** a beep is emitted when any key is pressed
 - **DTMF:** only DTMF tones are emitted (and this occurs only when pressing the digit keys - numbers 0-9 and the symbols * and #)
 - **Beep and DTMF:** beep and DTMF are activated
 - **Off:** no tone is emitted
6. Press the **Select** softkey to save your settings.

30.3.2 Setting the Battery Low Tone

You can turn on the alert tone when low battery and out of range are detected.





➤ **To set the key tone:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Tone Setup** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the **On** or **Off** option to switch on or off the low battery alert tone respectively, and then press the **Select** softkey.

30.4 Setting the Display Language

The handset can be displayed in English, Spanish, or Hebrew.





➤ **To set the display language:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Language** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the desired language, and then press the **Select** softkey; the saved message appears in the language selected and the display is changed accordingly.

30.5 Selecting a Wallpaper

You can set a wallpaper image that is displayed in the background on the main screen.





➤ **To select a wallpaper:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Wallpaper** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the desired wallpaper. Each time you press the key, the wallpaper is displayed in the background.
5. Press the **Select** softkey to apply the wallpaper.

30.6 Setting the Contrast Level

You can set the contrast level to suit your screen visibility.





➤ **To set the contrast level:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Contrast** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the desired contrast level. As you browse through the level options, the contrast is displayed accordingly.
5. Press the **Select** softkey to save your settings.

30.7 Activating or Deactivating Automatic Answer

Auto Answer allows you to answer an incoming call by simply picking up the handset from the charging cradle/base. When this function is activated, you do not need to press a key to answer the call.





➤ **To activate or deactivate Auto Answer feature:**

1. In idle state, press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Auto Answer** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose whether you want to activate Auto Answer (**On** option) or deactivate it (**Off** option).
5. Press the **Select** softkey to save your settings.

30.8 Selecting a Base Station

Your handset can only operate with one base unit. If your handset is registered to more than one base unit, you can select the base unit to use.

➤ **To select a base for the handset:**

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Select Base** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the desired base unit, and then press the **Select** softkey; if the selected base is successfully found, "Saved!" is displayed; otherwise, "Fail" is displayed.






Note: The currently used base is displayed with an asterisk "*".

30.9 Resetting Handset to Factory Defaults

You can reset your handset settings to default settings. When you reset the handset, all your settings related to the handset are deleted and restored to factory defaults, except your phonebook entries which remain unchanged.

➤ **To reset the handset to factory defaults:**

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **HS Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **HS Default** option, and then press the **Select** softkey; you are prompted to enter your PIN number.
4. Enter your 4-digit PIN number, and then press the **OK** softkey. (For defining the PIN number, see Section 31.2 on 445.)
5. Press the **OK** softkey again to confirm reset; if the PIN code is correct and the handset is restored to default, a confirmation tone is played and the screen returns to idle. If the PIN code is incorrect, "PIN Invalid" is displayed and you are unable to restore the handset to defaults.

Reader's Notes

31 Base Settings

The procedures below describe the base settings of the handset.






31.1 Manage Handsets

The sub-sections below describe how to rename and de-register a handset.

31.1.1 Renaming the Handset

By default, your handset name is "DECT". You can assign a different name to your handset. The handset name is displayed on the main screen in idle state.

➤ **To rename the handset:**

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Base Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Manage HS** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the handset that you want to rename, and then press the **Select** softkey.
5. Press the  navigation keys to choose the **Rename HS** option, and then press the **Select** softkey.
6. Using the alphanumerical keypad, enter the required name for the handset. Press the **Clear** softkey to delete characters to the left of the cursor or press and hold the **Clear** softkey to delete the whole character string.
7. Press the **OK** softkey to save the new name; the handset name is saved and "Saved" is displayed.



Note: The handset name can be up to 12 characters.







31.1.2 De-Registering a Handset

You can de-register a handset from the base unit. The antenna icon on the de-registered handset will be off. On certain handsets, you are prompted to enter the 4-digit PIN in order to de-register a handset from the base station.



Note: You cannot de-register the handset that you are currently using.




➤ To de-register a handset:

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Base Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Manage HS** option, and then press the **Select** softkey.
4. Press the  navigation keys to choose the handset that you want to de-register, and then press the **Select** softkey.
5. Press the  navigation keys to choose the **Delete HS** option, and then press the **Select** softkey; the "Delete Confirm" message is displayed.
6. Press the **OK** softkey to confirm; the handset is de-registered and "HS Deleted" is displayed.
7. Press the  navigation keys to choose whether to enable (**Intercept ON**) or disable (**Intercept OFF**) call interception, and then press the **Select** softkey; the "Saved" message is displayed.

31.2 Changing the PIN Number

A four-digit personal identification number (PIN) number is required for changing various settings of the base unit. The PIN number is used to protect your phone against unauthorized use. The default system PIN number is 0000.

➤ **To change the PIN number:**

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Base Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Modify PIN** option, and then press the **Select** softkey.
4. In the **Old PIN** field, enter the current PIN number, and then press the **OK** softkey.
5. In the **New PIN** field, enter a new four-digit PIN number, and then press the **OK** softkey.
6. In the **Confirm** field, enter the new PIN number again, and then press the **OK** softkey; the new PIN number is saved and "Saved" is displayed.






Note: If the old PIN code is incorrect, "Old PIN Invalid" is displayed and you are returned to the **Modify PIN** option.

31.3 Resetting the Base to Factory Defaults

You can reset your base settings to default settings. When you reset the base, all your settings related to the base are deleted and restored to factory defaults, except your phonebook entries which remain unchanged.





➤ **To reset the base to factory defaults:**

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Base Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **BS Default** option, and then press the **Select** softkey; you are prompted to enter your PIN number.
4. For certain phones you may be prompted to enter your four-digit PIN number, and then press the **OK** softkey. (For defining the PIN number, see Section 31.2 on 445.)
5. Press the **OK** softkey again to confirm reset; if the PIN code is correct and the base is restored to default, a confirmation tone is played and "Reset" is displayed. If the PIN code is incorrect, "PIN Invalid" is displayed and you are unable to restore the base to defaults.

31.4 Viewing the Product Version

You can view the firmware, hardware, and EEPROM version of your phone.

➤ **To view the product version:**

1. Press the **Menu** softkey.
2. Press the  navigation keys to scroll to the **Base Settings**  icon, and then press the **Select** softkey.
3. Press the  navigation keys to choose the **Product Version** option, and then press the **Select** softkey.
4. Press the  navigation keys and then press the **Select** softkey to choose the option whose version you want to view:
 - **Firmware:** displays the firmware currently running on the phone
 - **Hardware:** displays the hardware version of the phone
 - **EEPROM:** displays the version of the non-volatile memory
5. Once the version of a particular option is displayed, press the **Select** softkey to return to the previous screen to choose a different option, as listed in Step 4.

32 Factory Defaults

The table below lists the factory defaults of various settings:

Table 32-1: Factory Defaults


Feature	Default
Handset Settings	
External Ring	Melody 1
Internal Ring	Melody 1
Handset Ring Volume	Volume 3
Earpiece Volume	Volume 3
Speaker Volume	Volume 3
Key Tone	Beep and DTMF
Battery Tone	On
Language	English
Ringer Off	Off
Wallpaper	Wallpaper 1
Contrast	Level 3
Keypad Locked	Off
Auto Answer	On
Alarm	Off
Base Settings	
Date	Automatic from base
Time	Automatic from base
System PIN for HS/BS	0000

Reader's Notes

33 Troubleshooting

If you have difficulty with your phone, please try the suggestions listed below:

Table 33-1: Troubleshooting

Problem	Possible Cause	Solution
No Dialing Tone when  Pressed	<ol style="list-style-type: none"> 1 The connection cord of the base unit is not plugged in. 2 The adapter cord is not plugged in correctly in the base unit. 3 The line is busy, as another handset is used. 4 Wrong connection cord (no Euro AS). 	<ol style="list-style-type: none"> 1 Check the connections. Unplug and plug back in the mains. Check that the telephone line cord has been plugged into the base unit and the phone socket. 2 Check the base unit plug and the 220V plug (remove and plug-in). 3 Wait until the line is unoccupied. 4 Use the original connection cord.
When Connected to PBX, No Connection and/or Wrong Connection After Dialing	Dialing prefix is required.	Insert the dialing prefix
Phone Displays "Searching"	<ol style="list-style-type: none"> 1 Base unit out of range. 2 Base unit not connected to mains. 	<ol style="list-style-type: none"> 1 Reduce the range between the handset and base. 2 Connect base unit to mains.
Unable to Make Calls	Service not activated or wrong operator or wrong setting	Check your subscription with network or change the dial mode.
No Display	Empty battery	Recharge battery.
No Conference Call	Incorrect or no configuration for conference call feature	Ensure that 3 Way Conference is configured in the Web interface (Voice Over IP > Services tab).

Reader's Notes



Part III

Appendices

Reader's Notes

A Backup Battery Pack

The sub-sections below describe the operation of AudioCodes' Device Backup Battery Pack.

A.1 What's in the Kit

The following items are supplied in the kit:

- Backup Battery Pack unit
- Device AC power cord

A.2 Safety Instructions



Warning: Risk of explosion if battery is replaced by an incorrect type.

Before using your Backup Battery Pack, read the following safety instructions:

1. Read and understand all the instructions.
2. Follow all warnings and instructions marked on the product.
3. All product maintenance, including battery replacement should be performed by authorized personnel only.
4. Batteries should be replaced with the same type and rating.
5. Unplug this product from the wall power outlet and from the device before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
6. Do not use this product near water (for example, near a bath tub, kitchen sink, swimming pool).
7. Do not overload wall outlets and extension cords, as this can result in the risk of fire or electric shock.
8. Unplug this product from the wall outlet and refer servicing to AudioCodes under the following conditions:
 - When the power supply cord or plug is damaged or frayed.
 - If the product does not operate normally by following the operating instructions.
 - If the product has been dropped and the cabinet has been damaged.
 - If the product exhibits a distinct change in performance.
9. The Backup Battery Pack must be plugged to grounded mains outlet with 100-240 VAC 50/60 Hz, using a power cord with 0.75mm² three-pronged wiring.

10. The Backup Battery Pack output is 12V 2500mA and must only be used with the device unit. Do not attempt to connect this Backup Battery Pack to any other unit.
11. Note the correct polarity while inserting the batteries.
12. Do not immerse batteries in water and do not place in fire.
13. To disconnect the Backup Battery Pack unit from the power, disconnect from the grounded power outlet.

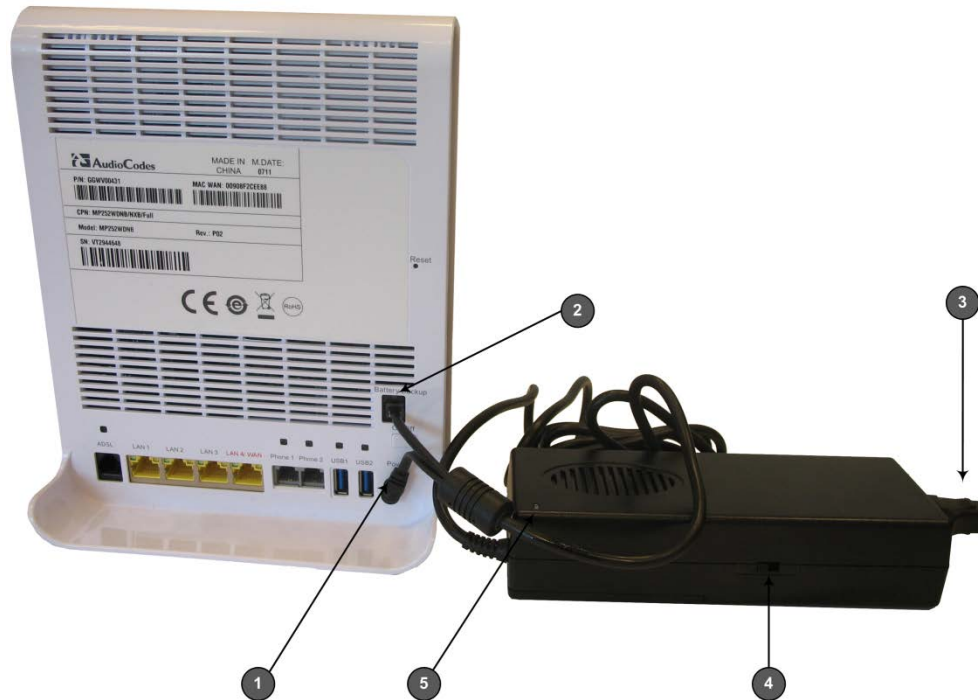


Do not attempt to open the unit in order to avoid Electric Shock (aside from the battery compartment). In the event of a malfunction of this unit, contact your authorized AudioCodes dealer.

A.3 Connecting the Backup Battery Pack

The procedure below describes how to connect the Backup Battery Pack.

Figure A-1: Backup Battery Pack



1. Connect the Backup Battery Pack power wire to the device power socket.
2. Connect the Backup Battery Pack Signal Control wire to the device RS-9 socket.
3. Connect one end of the device AC power cord to the power socket on the Backup Battery Pack and the other end to the grounded power outlet.
4. Turn on the Backup Battery Pack switch.
5. When the batteries are fully charged, the LED on the Backup Battery Pack is displayed green (it takes 16 hours to fully charge the Backup Battery Pack upon initial use).

A.4 Backup Battery Pack Operations

Once the Backup Battery Pack is connected and its LED is displayed steady green, it is ready to serve as a stand-alone power source to the device, whenever there is an AC mains outlet failure.

The Backup Battery Pack switch should be always be in "On" position whenever you wish to charge the Backup Battery Pack and for it to function as a stand-alone power backup source in the event of a AC mains outlet failure.



Warning: If the Backup Battery Pack switch is in Off position, the unit is not disconnected from the AC mains outlet; electric current still flows through this unit.



Warning: In the backup power mode (when Backup Battery Pack serves as a stand-alone power source to the MP 264), a minimum of 50 minutes of operating time is available. Additional time may be available if the MP 264 device utilization is moderate. In this mode, the MP 264 USB functionality is disabled.

A.5 Backup Battery Pack LED Statuses

The following table describes the Backup Battery Pack LED statuses.

Table A-1: Backup Battery Pack LED Descriptions

State	LED Color & Status	
	Green	Red
AC Power On & Battery Charging	Off	On
AC Power On & Battery Full	On	Off
AC Power Off & No Load	Off	Off
AC Power Off & Battery in Use	Blinking	Off
AC Power Off & Battery Low	Off	Blinking

A.6 Environment Conditions

The table below describes the environment operating conditions for the Backup Battery Pack.

Table A-2: Backup Battery Pack Environment Operating Conditions

Condition	Description
Operating Temperature	0°C ~40°C, the temperature rise of adapter surface should be less than 20°C
Operating Relative Humidity	10% ~90%
Storage Temperature	-20°C ~+80°C
Relative Humidity	5% ~95%
Storage Period*	6 months

*Batteries should be used within six months of the date of manufacture.

Reader's Notes

B Specifications

The sub-sections below describe the specifications of AudioCodes' Device Gateway and DECT.



Note: For the list of features available in the current software version, refer to the latest *Release Notes*.

B.1 Device Gateway Specifications

The specifications for the router and VoIP functionality are listed in the table below:

Table B-1: Router and VoIP Software Specifications (e.g., MP-264)

Feature	Details
WAN Access	
ADSL	<ul style="list-style-type: none"> ADSL (ITU-TG.992.1,AnnexA,B), ADSL2 (ITU-TG.992.3 Annex A,B,I,J,L,M), ADSL2+(ITU-TG.992.5 Annex A,B,I,J,M) Multiple VC/PPP connections
VDSL Profiles	<ul style="list-style-type: none"> VDSL2 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a profiles (ITU-T G.993.2)
Ethernet WAN	<ul style="list-style-type: none"> 10/100/1000Base-TMbps Ethernet port, configurable for optional connection to Cable/xPON modems
3G Backup (Optional)	<ul style="list-style-type: none"> Support for 3G USB dongles for primary WAN backup including: <ul style="list-style-type: none"> ✓ HUAWEI E160 ✓ HUAWEI K3765 ✓ HUAWEI E1756 Movistar ✓ HUAWEI E1750 ✓ HUAWEI E1756 ✓ ZTE MF110 ✓ HUAWEI E156 ✓ ZTE MF626 ✓ Vertex
Data Routing and Security	
Data Protocols	<ul style="list-style-type: none"> IPv4 (IPv6 ready) PPPoE PPPoA PPTP L2TP DNS Proxy Dynamic DNS DHCP Client, Server and Proxy IP Multicast (IGMP proxy, snooping) NAT – RFC 3022 Application Layer Gateway (ALG) Port Triggering UPnP auto-configuration and port-forwarding (IGD)

Feature	Details
QoS	<ul style="list-style-type: none"> IEEE 802.1p/Q (QoS & VLAN Tagging) ToS/Diffserv QoS Traffic Prioritization and Shaping
Data Security and Firewall	<ul style="list-style-type: none"> SPI Firewall URL Filtering Advanced Access Control Denial of Service Prevention Configuration File Encryption Web Authentication HTTPS Provisioning IPSec
SIP Security	<ul style="list-style-type: none"> SIP over TLS (SIPS)
Wireless LAN	
Wireless Standards	<ul style="list-style-type: none"> Integrated 802.11b/g/n 2x2 WiFi Access Point Multiple SSID support Up to 300Mbps
Wireless Security	<ul style="list-style-type: none"> 802.1x Authentication WPA WPA2 WPA/WEK Mixed Mode TKIP Encryption MAC Filtering WPS Web Authentication
Voice over IP	
Signaling Protocols	<ul style="list-style-type: none"> SIP over TCP/UDP – RFC 3261 Interoperability with leading Softswitches Up to 7 individual SIP accounts with 4 concurrent calls
Media Processing	<ul style="list-style-type: none"> Voice Codecs: <ul style="list-style-type: none"> ✓ G.711μ/a-law ✓ G.729A/B ✓ G.722 (for HD VoIP) ✓ G.722.2(WB-AMR) ✓ Analog Signaling Caller ID (Bellcore, ETSI, DTMF) ✓ MWI DTMF Detection and Generation, in-band and out-of-band Customized Tones Generation T.38 Fax Relay, VBD (Voice Band Data), Bypass High definition Fax over HTTPS for Enhanced Reliability and Security
DECT	<ul style="list-style-type: none"> GAP and CAT-iq 2.0 compliance (MP2xx-DB) Software upgradability to comply with future CAT-iq versions Up to 5 registered DECT handsets An optional DECT handset design
Micro PBX (Optional)	<ul style="list-style-type: none"> Up to 7 lines/telephone numbers with flexible assignment to DECT extensions Call Waiting

Feature	Details
	<ul style="list-style-type: none"> ▪ Call Hold ▪ Call Transfer ▪ Call Forward ▪ Hot Line ▪ 3-Way Conference with local mixing ▪ Auto Attendant ▪ Hunt Group ▪ Do Not Disturb ▪ Flexible Dialing Plan
Mobile@Home (Optional)	<ul style="list-style-type: none"> ▪ Mobile phone connection via Bluetooth ▪ Address book sharing ▪ Use of DECT/POTS handset to receive mobile calls at home
Home Media	
Files Server	<ul style="list-style-type: none"> ▪ Support for USB 1.1/2.0 NTFS/FAT32 storage devices ▪ Windows networking and file sharing, WINS server
Print Server	<ul style="list-style-type: none"> ▪ Support for USB 1.1/2.0 printers ▪ LPD, ▪ Microsoft Printer-sharing Protocol (CIFS), Internet Printing Protocol (IPP) Printer administration, management, and diagnostics via simple web-based interface
Media Server (Optional)	<ul style="list-style-type: none"> ▪ UPnP AV Media Server (1.0, 2.0) for streaming audio/video content anywhere in the local network
Parental Control (Optional)	<ul style="list-style-type: none"> ▪ Advanced Content Filtering ▪ Separate profile per child ▪ YouTube clean enforcement ▪ Online time management ▪ Web parent portal for profile management
Management and Configuration	
Auto Provisioning	<ul style="list-style-type: none"> ▪ Automated firmware and configuration upgrade via HTTP/HTTPS/TFTP/FTP
Administration and Diagnostics	<ul style="list-style-type: none"> ▪ Internal Web Server for Configuration and Management ▪ TR-069, TR-104, TR-111 ▪ CLI over Telnet ▪ Advanced debugging and diagnostics tools ▪ Integrated BroadSoft PacketSmart agent for Voice Quality of Experience(QoE) management ▪ Local Support and Troubleshooting with web interception and voice notification

Feature	Details
Physical Specifications	
Weight and Dimensions	170 x 225 x 35mm, 560g
Power	Power +12 VDC, 2.5A External Power Adaptor, 100-240 VAC/50-60 Hz
Environmental	<ul style="list-style-type: none">▪ Operating Temperature: 0 to 45°C▪ Storage Temperature: -25 to 80°C
Battery Backup	Optional battery backup for up to 2 hours idle/30 min. talk time (FXS)
Temperature Range	Operating Temperature 0° to 40°C, Storage Temperature -25° to 80°C

B.2 Device DECT Specifications

The specifications of the device DECT phone are listed in the table below:

Table B-2: DECT Phone Specifications (e.g., MP-264)

Feature	Details
Standard	DECT, GAP and CAT-iq 1.0 certified (functional according to CAT-iq2) Software upgradable to comply with future CAT-iq versions
Number of Channels	10
Frequency	1.88 GHz to 1.90 GHz for EU DECT 1.92 GHz to 1.93 GHz for US DECT
Operating Range	Up to 300 meters outdoors Up to 50 meters indoors
Operating Time	Standby: 100 hours approx. Talking: 6 hours approx.
Battery Charging Time	16 hours approx.
Number of Handsets	Up to 5 registered DECT handsets per the device
Handset Dimensions	46.6 x 29 x 156 mm (W x D x H)
Handset Weight	119.1 g (with battery)
Handset Design	Optional DECT handset design
Battery Type	NiMH (rechargeable battery) AAA size
Battery Rating	600 mAh 1.2V

User's Manual

MP26x/MP27x Multimedia Home Gateway

Version 4.4.0

Document #: LTRT-23510



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