



Qualcomm Product Support Tool (QPST™) 2.7

User Guide

80-V1400-3 L

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Revision history

Revision	Date	Description
80-V0893-1 Rev. –	Jan 2000	Initial release of QCTest Suite, Version 2.2
80-V0893-2 Rev. –	Jan 2000	Updated to reflect changes incorporated in Version 2.3
80-V1249-1 Rev. –	Mar 2000	Updated to reflect changes incorporated in Version 2.4; reformatted for Qualcomm CDMA Technologies licensees
80-V1249-6 Rev. –	Jun 2000	Updated to reflect removal of copy protection key; DCN number updated to match build number
80-V1400-1 X1	Jul 2000	<ul style="list-style-type: none"> ▪ Changed name of product to QPST from QCTest Suite ▪ Updated text and screen shots to reflect name change ▪ Changed DCN because of name change and revision handling ▪ Added Roaming List Editor information (Chapter 8) ▪ Updated to reflect other software changes in Version 2.5
80-V1400-1 X2	Sep 2000	Added CDMA-2 and Broadcast SMS tab information to the Service Programming section
80-V1400-2 X1	Dec 2000	Documentation is for Version 2.6. Software changes have been made at a detailed level, which do not affect the document's contents for this revision.
80-V1400-2 X1	Mar 2001	Updated to reflect changes incorporated in Version 2.7 by adding models to hardware requirements table
80-V1400-2 X2	Apr 2001	Updated for MSP-1000 Software Download support
80-V1400-3 X3	Oct 2001	Updated list of supported models; added explanations of MM Audio, gpsOne [®] , M.IP, and NAS tabs to Service Programming; updated Roaming List Editor to support 683A+1xEV
80-V1400-3 Rev. A	Mar 2002	MSP-1000 is no longer supported. Updated Chapters 5 and 8; revision numbering system has been changed for internal tracking purposes only
80-V1400-3 Rev. B	Mar 2003	Editorial updates
80-V1400-3 Rev. C	Dec 2003	Added chapters on RF NV Manager GUI Application, FTM RF Evaluation GUI Application; revised Chapters 1, 2, 5, and 8
80-V1400-3 D	Mar 2004	Added chapter on QCNView; updated RF NV Manager GUI Application and FTM RF Evaluation GUI Application
80-V1400-3 E	May 2004	Updated RF NV Manager GUI Application and FTM RF Evaluation GUI Application
80-V1400-3 F	Jun 2004	Updated FTM RF Evaluation GUI Application
80-V1400-3 G	Feb 2005	Added Gang Flash Image Application
80-V1400-3 H	Apr 2005	Added Camera mode, PMIC, GSM BER, WCDMA BER, and CDMA RF Calibration
80-V1400-3 J	Mar 2006	Updated Gang Flash Image Application
80-V1400-3 K	Aug 2006	Updated Software Download Application; added description of QPST Automation Server
80-V1400-3 L	Sep 2010	Updated chapter on Roaming List Editor

Note: There is no Rev. I, O, Q, S, X, or Z per Mil. standards.

1 Introduction

1.1 Purpose

This guide describes how to use the component applications of the Qualcomm Product Support Tool (QPST™) software.

1.2 Scope

This user guide is written for technicians, administrators, and other personnel who operate QPST. It assumes that you are familiar with:

- Basic CDMA technology
- Microsoft Windows NT 4.0, Windows 2000, or Windows XP

If you are installing QPST on Windows NT 4.0, Windows 2000, or Windows XP, you must have Administrator access to the workstation on which QPST is to be installed; contact your own computer support organization if you need this type of access granted.

1.3 Conventions

Button names appear in a bold font, e.g., Click **Browse**.

Function declarations, function names, type declarations, and code samples appear in a different font, e.g., #include.

Code variables appear in angle brackets, e.g., <number>.

Commands and command variables appear in a different font, e.g., **copy a:*. * b:**.

Parameter types are indicated by arrows:

- Designates an input parameter
- ← Designates an output parameter
- ↔ Designates a parameter used for both input and output

Shading indicates content that has been added or changed in this revision of the document.

1.4 References

Reference documents, which may include QUALCOMM®, standards, and resource documents, are listed in Table 1-1. Reference documents that are no longer applicable are deleted from this table; therefore, reference numbers may not be sequential.

Table 1-1 Reference documents and standards

Ref.	Document	
Qualcomm		
Q1	<i>Application Note: Software Glossary for Customers</i>	CL93-V3077-1
Q2	<i>Application Note: Factory Test Mode Logging API</i>	80-V9147-1
Q3	<i>QCT Tools File System Interface Control Document</i>	80-B5750-1
Resources		
R1	<i>Factory Test Mode CDMA 1x RF Commands Document</i>	—
R2	<i>Bluetooth V1.1 Specifications Book</i>	—

1.5 Technical assistance

For assistance or clarification on information in this guide, submit a case to Qualcomm CDMA Technologies at <https://support.cdmatech.com/>.

If you do not have access to the CDMA Tech Support Service website, register for access or send email to support.cdmatech@qualcomm.com.

1.6 Acronyms

For definitions of terms and abbreviations, see [Q1].

2 Getting Started

This chapter provides information needed to install and run the QPST™ applications, including the operating system and hardware requirements. It also provides support for installing the phone hardware and security adapter used by QPST.

2.1 What is QPST?

QPST is a set of Windows tools designed to interface with, control, and test CDMA phones that contain Qualcomm ASICs. The QPST server can keep track of multiple phones on local host machines.

QPST currently consists of the server application, which has no interface, and five component, or “client,” applications. Two standalone utilities, QCNView and Roaming List Editor, complete the QPST tool set.

The client applications include:

- QPST Configuration
- Service Programming
- Software Download
- RF NV Item Manager
- EFS Explorer

[Table 2-1](#) describes the functions provided by each QPST client.

Table 2-1 QPST client applications

Client	Functions
QPST Configuration	<ul style="list-style-type: none">▪ Provides basic phone status display (MIN, ESN, model)▪ Allows phone control and monitoring
Service Programming	<ul style="list-style-type: none">▪ Saves service programming data to file▪ Allows the download of the same service programming file to multiple phones▪ Allows dialing plan, carrier information, and roaming list download
Software Download	<ul style="list-style-type: none">▪ Downloads software to Qualcomm phones▪ Backs up and restores nonvolatile (NV) memory contents between downloads
RF NV Item Manager	<ul style="list-style-type: none">▪ Accesses a SURF™ phone's NV items that control RF usage
EFS Explorer	<ul style="list-style-type: none">▪ Allows navigation of the embedded file system (EFS) of phones that support it▪ Provides file-management capabilities

1 [Table 2-2](#) describes the functions provided by the standalone utilities.

2 **Table 2-2 QPST standalone utilities**

Utility name	Function
QCNView	Formats QCN files created by the various clients
Roaming List Editor	Edits a phone's roaming protocol information

3 2.2 System requirements

4 Hardware and operating system requirements for QPST are outlined in the following sections.

5 2.2.1 Hardware

6 [Table 2-3](#) describes the hardware items required to operate QPST. These items represent the
7 minimum requirements for normal operation. If your hardware meets or exceeds these
8 requirements, then no upgrade is necessary to use QPST.

9 **Table 2-3 QPST hardware requirements**

Item	Description
Computer	Desktop or laptop computer, 166 MHz Pentium with Layer 2 cache or better
RAM	32 MB or greater
Hard drive	Application requires 20 MB of available space
CD-ROM drive	For installing QPST
Video monitor	Minimum display resolution of 800x600
Serial communications	Free serial I/O (COM) ports for up to eight QPST-to-phone connections
Qualcomm SURF or FFA phones	Mobiles based on the MSM3100™, MSM3300™, MSM5000™, MSM5100™, MSM5105™, MSM5500®, MSM6000™, MSM6025™, MSM6050™, MSM6100™, MSM6200™, MSM6250®, MSM6300®, or MSM6500® device
Data cables	Appropriate data cables for attaching each model of phone used with QPST to the computer's serial (COM) port

10 2.2.2 Operating system

11 The computer must be running Windows XP or Windows 7. It is advisable to run only those
12 device drivers normally used by the operating system or mentioned in this guide. Otherwise, you
13 may experience operating anomalies, conflicts, or random failures while using QPST.

14 2.3 Setting up QPST

15 QPST installation occurs in the following stages:

- 16 1. Setting up a laptop or desktop computer
- 17 2. Connecting phones to the computer
- 18 3. Installing the QPST software
- 19 4. Initial startup

1 This section contains the information needed for setting up and configuring QPST. For
2 information about your computer or mobile phone, refer to the user guide provided for that
3 product.

4 For more information or assistance during system setup, contact Qualcomm Technical Support at
5 support.cdmatech@qualcomm.com.

6 **2.3.1 Setting up the computer**

7 Before installing QPST, you must first set up the computer:

- 8 ■ Make sure the desktop or laptop computer is ready to power up and has Windows XP or
9 Windows 7 operating system.
- 10 ■ Windows XP or Windows 7 users must have Administrator privileges for the system. After
11 QPST is installed, you can run it from any Windows XP or Windows 7 user account.
- 12 ■ At least one available serial I/O port (COM 1 to 9) is required for connecting the test phone to
13 the computer.
- 14 ■ The computer hard disk must have 20 MB of free space to store and run QPST. Additional
15 space is recommended for storing backup and download files.

16 **2.3.2 Connecting phones**

17 The following sections describe how to connect a Qualcomm phone to the QPST computer. You
18 may need a 9-pin-to-25-pin adapter to connect the serial computer of the data cable to a 25-pin
19 port. QPST can monitor up to eight serial ports and attached SURF phones.

20 Phones may be connected anytime QPST is running; the server and its components will recognize
21 their presence.
22

2.3.2.1 Connecting SURF phones

Figure 2-1 illustrates how to connect SURF phones.

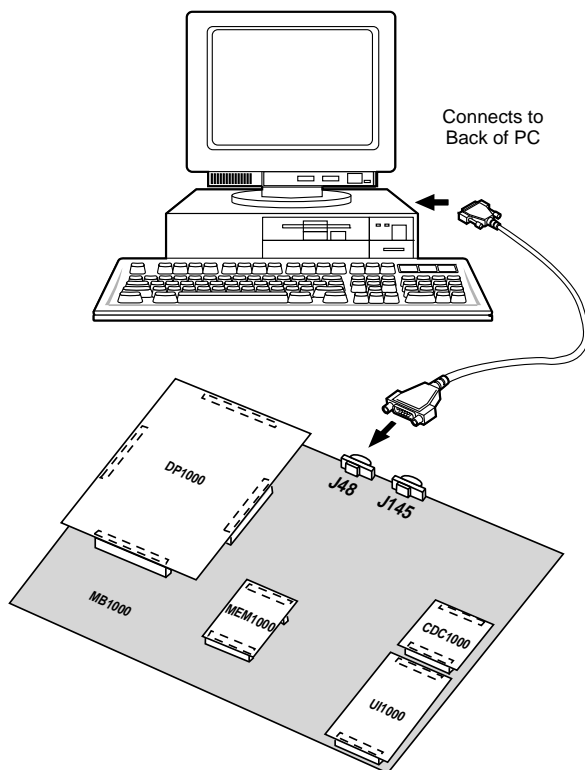


Figure 2-1 Connecting SURF phones

1. Plug the female end of the included serial cable into the 16550 Serial I/O card or the serial port connector of the PC.
2. Plug the male end of the included serial cable into the PC interface connector (UART1) on the SURF development system.

CAUTION: For service programming, use either the UART1 or UART2 connector. For software upgrades, use only the UART1 connector.

2.3.2.2 Connecting Form Factor Accurate (FFA) phones

Figure 2-2 illustrates how to connect a Qualcomm FFA3100-800, FFA3100-1900, or FFA3100-TM to the QPST computer using a TDIP connector and black box. Other types of interface cables may be available for the phones you will be using.

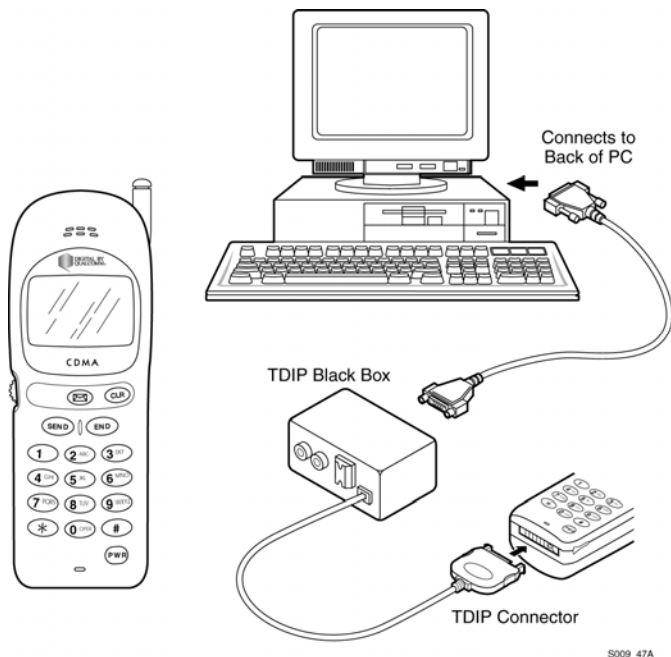


Figure 2-2 Connecting FFA phones

2.3.3 Installing QPST software

To install the QPST software:

1. Use Explorer to locate the file setup.exe in the CD's root directory. Double-click this file to launch the setup program.
2. To continue the installation, follow the instructions provided by the installer. This could include additional reboots depending on your operating system version and that of certain system files that QPST may need to update.
3. After rebooting your computer, relaunch the setup program by double-clicking the file setup.exe in the CD's root directory. When the Setup Complete dialog appears, the application has been installed successfully.
4. To complete installation, click **Finish** or press **enter**.

2.3.4 QPST initial start

To start QPST for the first time, from the Start menu, select Programs → QPST → QPST Configuration.

This starts the QPST Configuration application, which lets you set up phones and start other QPST applications. See Chapter 0 for more information on the QPST Configuration application.

2.4 QPST server

The QPST server runs when:

- QPST Configuration application is started
- Any client application, such as Service Programming, is started and requires the QPST server

When the QPST server is running, you will see its icon (a globe) on the Windows taskbar.

- To display the server's connection status, hold the pointer over the icon.
- To open a menu for starting the QPST client applications or stopping the QPST, right-click the QPST server icon.
- To open the QPST Configuration application, double-click the QPST icon.
- To shut down the QPST server, right-click its icon on the Windows taskbar, then select Stop QPST Server from the menu that appears. Avoid shutting down the server if any QPST client applications are running.
- To enable or disable the server's automatic shutdown feature, right-click the server's icon on the Windows taskbar, then select Auto Server Shutdown from the pop-up menu that appears. When this menu item appears with a check mark, the server shuts itself off when it detects that no client applications are running. Otherwise, the server continues to run until you stop it yourself or shut down Windows.

You can also control the server from the QPST Configuration application as described in Section 3.5.

2.5 QPST help

QPST's Help menus give you access to online hypertext information about using each application in QPST.

To open QPST Help from any component application, select Contents from the Help menu, or press **F1**.

3 QPST Configuration

QPST Configuration is the client application used to monitor the status of:

- Active phones
- Available serial ports
- Active clients

QPST Configuration can run concurrently with other QPST clients.

To start QPST Configuration, from the Start menu, select Programs → QPST → QPST Configuration.

3.1 Active phones

The Active Phones tab lists the phones currently connected to the QPST server, as shown in [Figure 3-1](#).

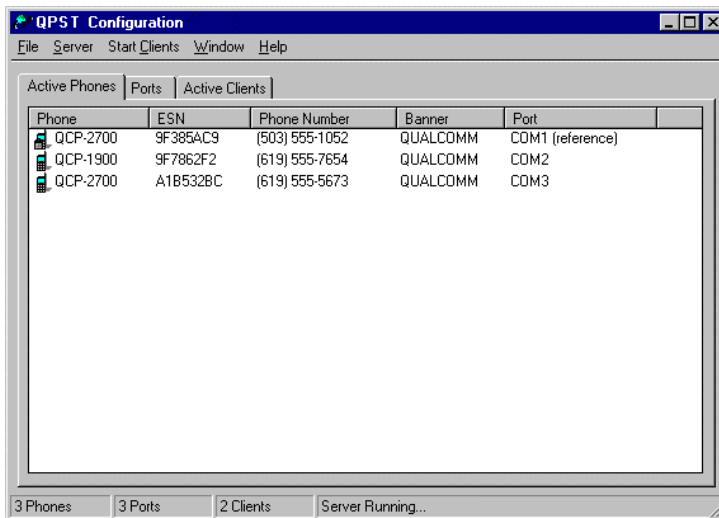


Figure 3-1 Active Phones tab dialog

1 [Table 3-1](#) describes the information listed for each connected phone.

2 **Table 3-1 Phone information**

Column	Description
Phone	Type of phone connected to the QPST server at this port
ESN	Phone's electronic serial number
Phone Number	Telephone number assigned to this phone
Banner	Phone's current banner (user-configurable text)
Port	Serial (COM) port to which the phone is connected and a user-definable label to identify the port, if one exists

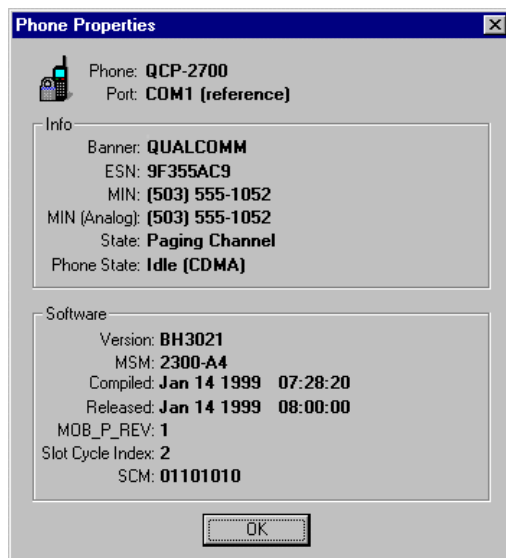
3
4 Click any column heading on this tab to sort the entries on the tab by the values in that column, in
5 ascending order. Hold down the Shift key while clicking a heading to sort similarly in descending
6 order.

7 **NOTE:** Phones that are currently being accessed by another QPST client are listed with a distinctive icon
8 which indicates that they have been “locked” by that client.



10 This locking indicator is provided to prevent multiple clients that are sharing the same
11 pool of phones from disrupting operations in progress by trying to access the same phone
simultaneously.

12 To view the properties of a phone listed in the Active Phones tab, double-click its entry. The
13 Phone Properties dialog appears and lists information for the phone, as shown in [Figure 3-2](#).



15 **Figure 3-2 Phone Properties dialog**

16 The icon in [Figure 3-2](#) indicates that a phone is locked by another QPST client.

17 **NOTE:** You cannot get properties for a phone that is in the process of receiving a software download.

The information in the Phone Properties dialog is described in [Table 3-2](#).

Table 3-2 Phone Properties dialog information

Item	Description
Phone	Model designation of the phone
Port	Serial (COM) port to which the phone is connected
Banner	User-definable banner that appears on this phone
ESN	Phone's electronic serial number, a read-only hexadecimal number set by the manufacturer
MIN	Phone's mobile identification number – The phone number
MIN (Analog)	Phone's analog mobile identification number – The analog phone number
State	Phone's CDMA machine state: Sync Channel, Paging Channel, Traffic Channel, and so on
Phone State	Phone's current state of operation: Idle, Initialization, Conversation, and so on
Version	Phone's software version
MSM	Phone's ASIC revision number, or "Unknown," listed with the phone's vocoder version (major_ver.minor_ver)
Compiled	Date the phone's software was compiled (includes the month, day, year, and timestamp)
Released	Date the phone's software was released (includes the month, day, year, and timestamp)
MOB_P_REV	Mobile Protocol Revision, or CDMA air interface protocol version that the phone supports
Slot Cycle Index	Phone's currently set slot cycle index value; controls the frequency at which the phone checks the paging channel in slotted sleep mode
SCM	Station class mark that specifies the phone hardware's transmit and receive capabilities

3.2 Ports

Click the **Ports** tab to display the serial ports available on your computer, as shown in [Figure 3-3](#).

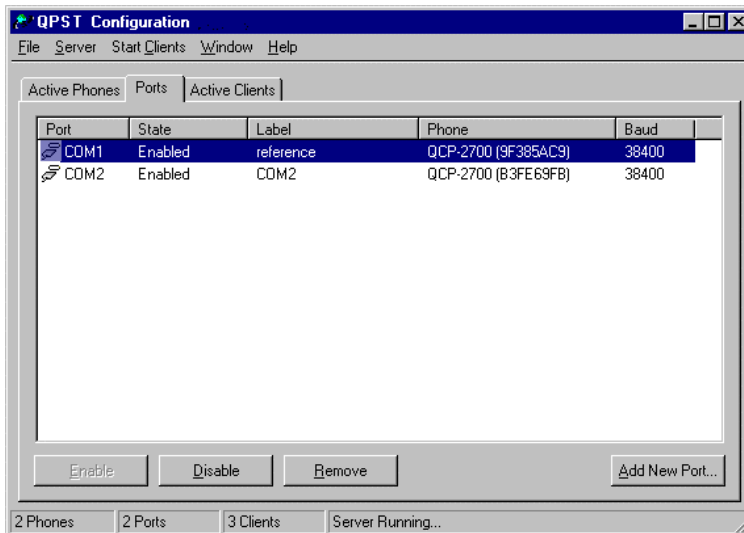


Figure 3-3 Ports tab

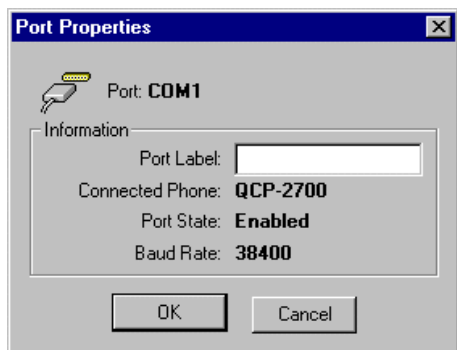
[Table 3-3](#) describes the information listed for each serial port.

Table 3-3 Ports tab information

Column	Description
Port	Available ports on host computer
State	Enabled, Disabled, Not Available, or Pending
Label	A text label you can assign by double-clicking on a port
Phone	Banner text
Baud	Baud rate of the serial port, set automatically by QPST

Click any column heading on this tab to sort the entries on the tab by the values in that column, in ascending order. Hold down **shift** while clicking a heading to sort similarly in descending order.

1 Double-click a port's entry to display the Port Properties dialog, as shown in [Figure 3-4](#).



2
3 **Figure 3-4 Port Properties dialog**

4 This dialog lets you assign a custom name to the port to more easily identify it in the list. To
5 assign a name, type it in the Port Label box and click **OK**.

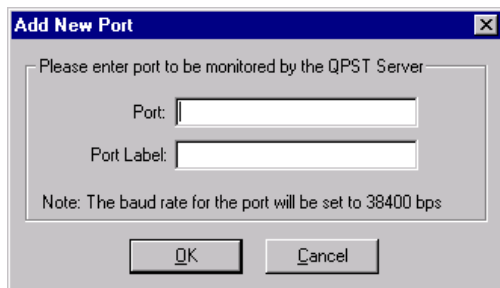
6 If there are serial ports on your computer that you do not want accessed by QPST applications,
7 you can disable them or remove them from the list of available ports entirely by clicking **Disable**
8 or **Remove**.

9 When you select a port and click **Disable**, QPST checks the port for an attached phone that is
10 locked for exclusive access, and will not disable the port if it finds one. A disabled port still
11 appears in the list of ports displayed by the Configuration application but is no longer monitored
12 for attached phones.

13 To return a port that is disabled back into use, click its entry on this tab, then click **Enable**.

14 When you select a port and click **Remove**, that port's state is changed to Pending, which means
15 that the port is still being monitored and can be used until the server restarts. After you restart the
16 server, the port will no longer be monitored or displayed in the list of ports.

17 To add a new serial port, or to add one that was previously removed, click its entry on this tab,
18 then click **Add New Port**. The Add New Port dialog appears prompting you for the serial port's
19 designation (COM*number*) and an optional label for the port, as shown in [Figure 3-5](#).



20
21 **Figure 3-5 Add New Port dialog**

3.3 Active Clients

Click the Active Clients tab to see a list of the currently running client applications, as shown in [Figure 3-6](#).

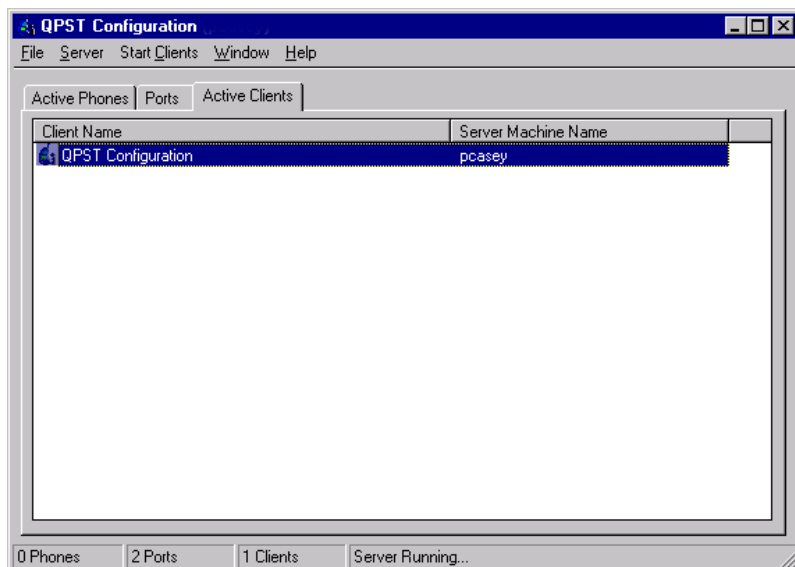


Figure 3-6 Active Clients tab

Clicking any column heading on this tab sorts the entries on the tab by the values in that column, in ascending order. Holding down Shift while clicking a heading sorts similarly in descending order.

Additionally, you can double-click a client entry in the list to view that client application's properties, including the version number, as shown in [Figure 3-7](#).

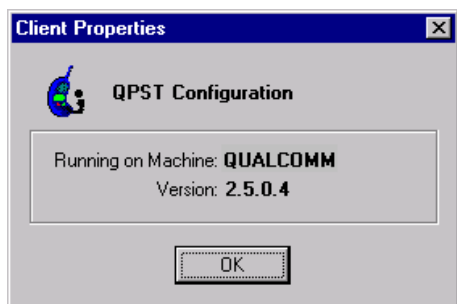


Figure 3-7 Client Properties dialog

3.4 Starting other QPST applications

QPST Configuration provides a Start Clients menu that allows you to run the other QPST client applications without having to access the Start menu or the QPST server's icon on the Windows taskbar.

3.5 Server menu

QPST Configuration also provides a Server menu that contains two commands:

- Start/Stop QPST Server
- Properties

When the server is running, the Server menu displays a Stop QPST Server command that allows you to stop the server. When the server is not running, the Start QPST Server command is available on the menu. Together, these commands allow you to cycle the server off and on in case you encounter any system problems while running it.

NOTE: Close any other QPST clients that are running before stopping the QPST server.

If you select Properties from the Server menu, a dialog appears that lists all currently registered components of QPST, as shown in [Figure 3-8](#).

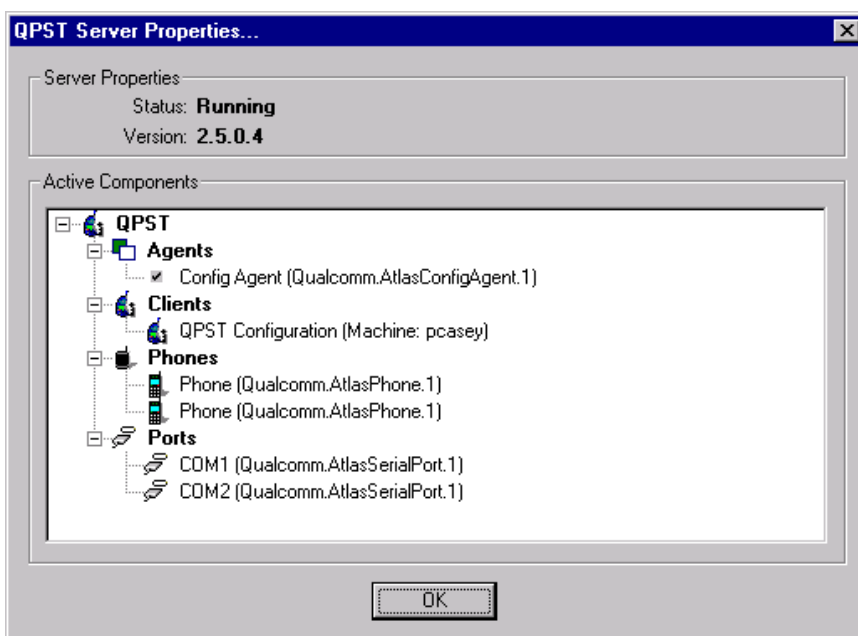


Figure 3-8 Server Properties dialog

While this information may be of use to Qualcomm technical support representatives and other advanced users, it has little utility for most QPST users.

4 Service Programming

Service Programming (SP) is the QPST client application used to provide service programming for CDMA phones that contain Qualcomm ASICs. With it, you can save SP data to a file, then download the data in that file to multiple phones.

The SP application accesses settings regardless of the phone's internal memory implementation. It is feature-aware and displays settings pages appropriate to the phone being programmed.

To start SP, from the Start menu, select Programs → QPST → Service Programming. The first window appears, as shown in [Figure 4-1](#).

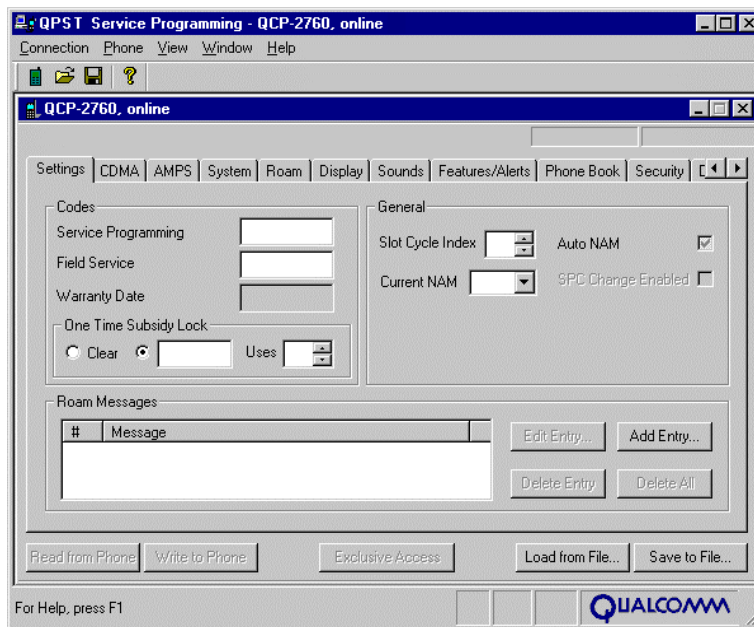


Figure 4-1 Service Programming first window

NOTE: The tabs and fields that you see in the SP application are specific to the model of phone being programmed and may be different from the illustrations in this book. The items listed for each tab in this chapter include all options for all phones currently supported by the SP application. If no phone is currently connected, a dialog precedes the screen shown in [Figure 4-1](#).

1 The SP client consists of up to 17 settings page tabs:

- Settings
- CDMA
- CDMA-2
- AMPS
- System
- Roam
- Display
- Sounds
- Features/Alerts
- Phone Book or PRI
- Security
- Data/Web
- Broadcast SMS
- Multimedia audio
- gpsOne®
- Mobile IP
- Nonaccess Stratum

2
3 The settings on these tabs are described in the following sections.

4 The title bar of this application indicates the phone being programmed (by model number), the
5 phone's connection status (online or offline), and the origin of any data read into the application
6 (from phone or from file).

7 The following buttons, described in [Table 4-1](#), appear at the bottom of the Service Programming
8 window and apply to all settings on all tabs.

9 **Table 4-1 Service Programming window buttons**

Button	Description
Read from Phone	Reads the current data from the phone
Write to Phone	Writes all settings to the phone
Exclusive Access	Places a lock on a shared phone, use this to prevent other clients from making changes to the phone you are programming, prior to writing to it
Load from File	Reads default or previously saved data to the Service Programming tabs
Save to File	Saves settings to a file you specify

10 **NOTE:** When you click either **Write to Phone** or **Save to File**, all current SP parameters are copied to
11 the QPST server. Any changes you make in the Service Programming tabs during this copy
12 process are not written to the phone or saved to file until the next time you click the button. So,
13 the contents of the SP tabs at the moment you click the button are what is written or saved,
14 regardless of what you type while waiting for the process to complete.

4.1 Settings tab

Figure 4-2 depicts the Settings tab.

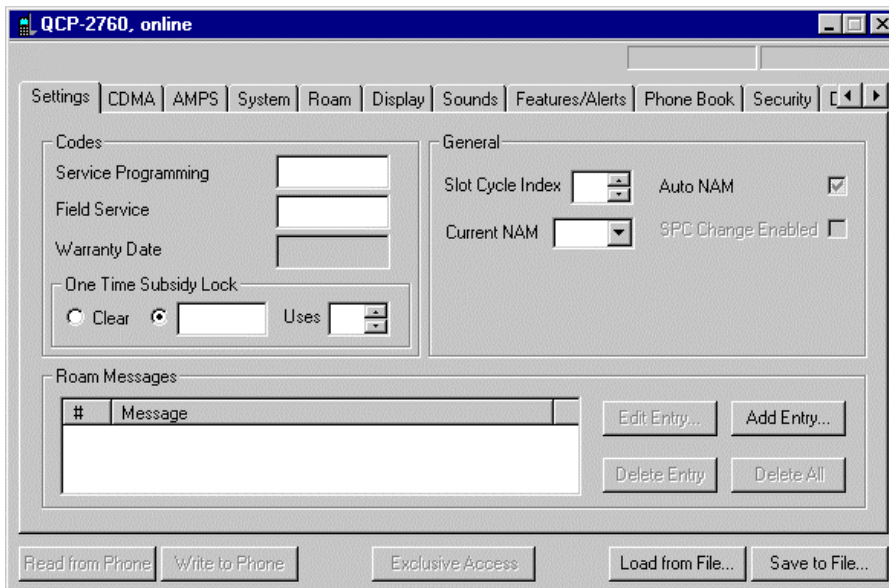


Figure 4-2 Settings tab

The items displayed on the Settings tab are described in Table 4-2.

Table 4-2 Settings tab information

Setting	Description
Service Programming	6-digit numerical code that allows access to Service Programming
Field Service	6-digit numerical code that allows access to the phone's Debug menus
Warranty Date	Read-only date of manufacture code
One Time Subsidy Lock	6-digit numerical code that allows limited access to Service Programming; to disable it, click the Clear option button; to enable it, click the option button next to the text box, then type a 6-digit code; you can also specify a number in the Uses box to specify the number of times the code can be used
Restriction Password	4-digit alphanumeric password used to restrict access to WLL phones
Slot Cycle Index	Value, 0 to 7, corresponding to the slot cycle, the duration and frequency that the phone checks the paging channel; 7 is the largest slot cycle value, and the default is 1
Current NAM	Drop-down list specifying the NAM to use; number of NAMs supported depends on the phone's software
Auto NAM	When checked, this check box specifies that the NAM is autoselected when roaming
SPC Change Enabled	Toggles the ability to change the SPC from a default value to a nondefault one through IS-683-A OTASP

Setting	Description
Dialing Plan	Dialing plan to be used for WLL phones. Settings are: <ul style="list-style-type: none"> ▪ None ▪ US ▪ India DOT ▪ India DOT (Long) ▪ Russia, Myanmar ▪ Russia (Moscow) ▪ Programmable ▪ Brazil
Restriction Level	Password restriction levels for WLL phones. Settings are: <ul style="list-style-type: none"> ▪ No Restriction ▪ Default Level 1 through Default Level 9
Roam Messages	This area of the tab lets you specify text messages to override the roaming messages preprogrammed in the phone. The buttons in this area let you add, edit, and delete these messages. Specify a location number to designate the memory location of the message you want to replace, along with a message of up to 12 characters
Edit Entry	Click this button to edit the roaming message currently selected in the Roam Message list
Add Entry	Click this button to specify a new roaming location and message
Delete Entry	Click this button to delete the roaming message currently selected in the Roam Message list
Delete All	Click this button to delete all the roaming messages in the Roam Message list

4.2 CDMA tab

Figure 4-3 depicts the CDMA tab.

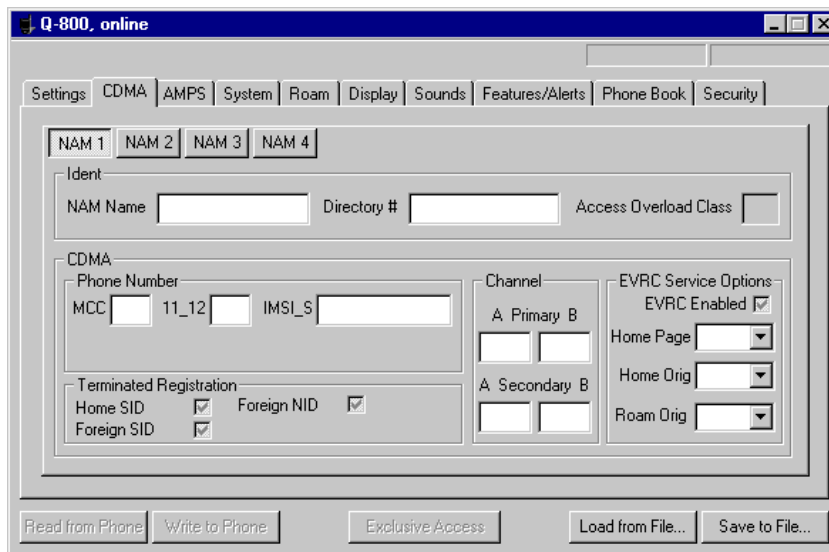


Figure 4-3 CDMA tab

1 The items displayed on the CDMA tab are described in [Table 4-3](#).

2 Click the NAM buttons to view settings for the various NAMs.

3 **Table 4-3 CDMA tab information**

Setting	Description
NAM Name	Service provider or carrier name, up to 12 characters, for the given NAM
Directory #	Phone directory number, 10 decimal digits (0–9)
Access Overload Class	Access overload class for each NAM, normally set to the last digit of the CDMA phone number; 10=Test, 11=Emergency, 12–15 are reserved; some phones will override settings other than these
Phone Number MCC	3-digit Mobile Country Code corresponding to the first three digits of the IMSI number
Phone Number 11_12	2-digit IMSI_11_12 number corresponding to the fourth and fifth digits of the IMSI number
Phone Number IMSI_S	10-digit CDMA International Mobile Station Identity, the CDMA phone number
Terminated Registration Home SID	Toggles CDMA Mobile-terminated home registration for the given NAM
Terminated Registration Foreign SID	Toggles CDMA Mobile-terminated foreign SID Registration for the given NAM
Terminated Registration Foreign NID	Toggles CDMA Mobile-terminated foreign NID Registration for the given NAM
Channel Primary A	Primary CDMA channel for the given NAM: 11-bit channel number (1–2047); default channel is 283
Channel Primary B	Primary CDMA channel for the given NAM: 11-bit channel number (1–2047); default channel is 384
Channel Secondary A	Secondary CDMA channel for the given NAM: 11-bit channel number (1–2047); default channel is 691
Channel Secondary B	Secondary CDMA channel for the given NAM: 11-bit channel number (1–2047); default channel is 777
EVRC Service Options EVRC Enabled	Toggles the EVRC service options; when enabled, the phone will select an EVRC call if the Home Page/Home Orig/Roam Orig type matches that of the base station
EVRC Service Options Home Page	EVRC service options home page type: Wild, IS96A, EVRC, 13K, or IS96
EVRC Service Options Home Orig	EVRC service options home orig type: Wild, IS96A, EVRC, 13K, or IS96
EVRC Service Options Roam Orig	EVRC service options roam orig type: Wild, IS96A, EVRC, 13K, or IS96

4

4.3 CDMA-2 tab

Figure 4-4 depicts the CDMA-2 tab.

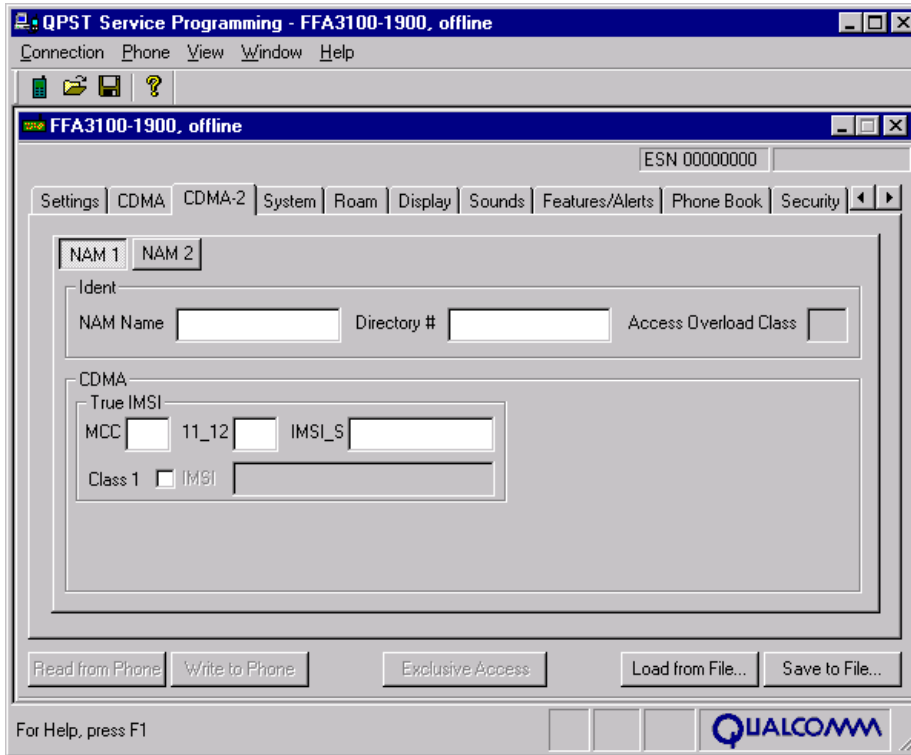


Figure 4-4 CDMA-2 tab

The items displayed on the CDMA-2 tab are described in Table 4-4. Click the NAM buttons to view settings for the various NAMs.

Table 4-4 CDMA-2 tab information

Setting	Description
NAM Name	Service provider or carrier name, up to 12 characters, for the given NAM
Directory #	Phone directory number, 10 decimal digits (0–9)
Access Overload Class	Access overload class for each NAM, normally set to the last digit of the CDMA phone number; 10=Test, 11=Emergency, 12–15 are reserved; some phones will override settings other than these
True IMSI MCC	3-digit Mobile Country Code corresponding to the first three digits of the IMSI number
True IMSI 11_12	2-digit IMSI_11_12 number corresponding to the fourth and fifth digits of the IMSI number
True IMSI IMSI_S	10-digit CDMA International Mobile Station Identity, the CDMA phone number
True IMSI Class 1	If unchecked, allows entry of the Class 0 IMSI into the MCC, 11_12, and IMSI_S fields, if checked, allows entry of the Class 1 IMSI into the IMSI field
IMSI	7–14 digit Class 1 IMSI

4.4 AMPS tab

Figure 4-5 depicts the AMPS tab.

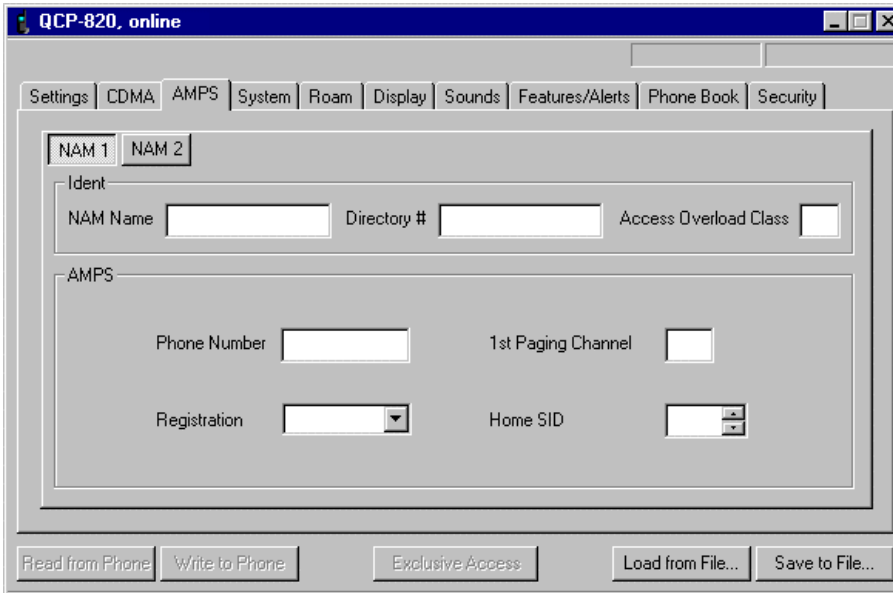


Figure 4-5 AMPS tab

The items displayed on the AMPS tab are described in [Table 4-5](#).

Click the NAM buttons to view settings for the various NAMs.

Table 4-5 AMPS tab information

Setting	Description
NAM Name	Service provider or carrier name of up to 12 characters for the given NAM
Directory #	10-digit phone directory number
Access Overload Class	Access overload class for each NAM, normally set to the last digit of the CDMA phone number; 10=Test, 11=Emergency, 12–15 are reserved; some phones will override settings other than these
Phone Number	AMPS area code and phone number for the given NAM
Registration	Specifies whether the phone will perform an autonomous registration; settings are: <ul style="list-style-type: none"> ▪ Disabled ▪ Yes ▪ Hide – Hide means yes, but makes whereabouts unknown
1st Paging Channel	First analog channel (11-bit value: 1–2047) for the given NAM – 333 for carrier A, 334 for carrier B
Home SID	Cellular Service Provider ID – The analog home system ID for the given NAM

4.5 System tab

Figure 4-6 depicts the System tab.

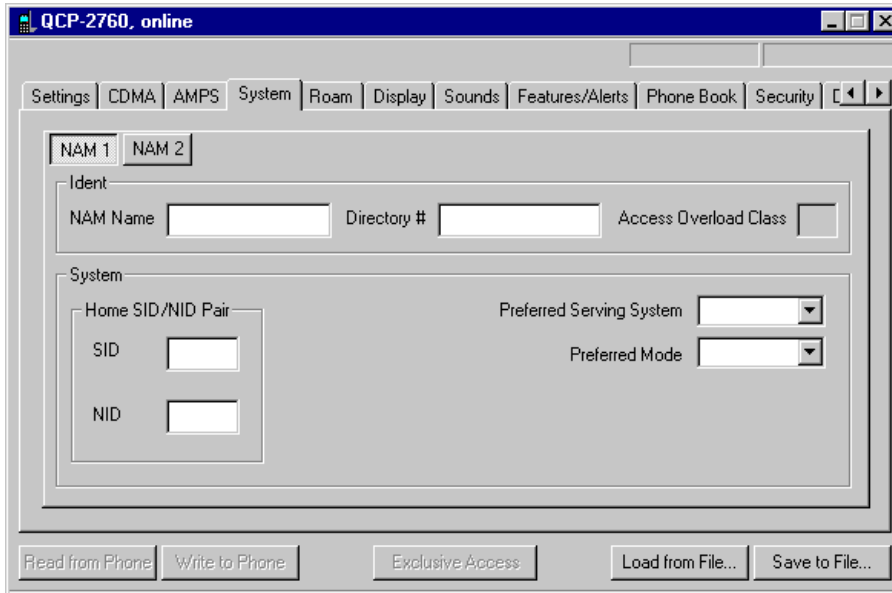


Figure 4-6 System tab

The items displayed on the System tab are described in Table 4-6.

Click the NAM buttons to view settings for the various NAMs.

Table 4-6 System tab information

Setting	Description
NAM Name	User-selectable name of up to 12 characters for the given NAM
Directory #	10-digit phone directory number
Access Overload Class	Access overload class for each NAM, normally set to the last digit of the CDMA phone number; 10=Test, 11=Emergency, 12–15 are reserved; some phones override settings other than these
Home SID/NID Pairs	CDMA Home SID/NID pairs for the given NAM, Cellular; first SID cannot be 0; all SIDs must be same parity; one pair for PCS; SID can be 0
Lock SID List	SID lockout list for the given NAM
Preferred Serving System	Preferred server – Standard, A Only, B Only, or Home Only
Preferred Mode	Preferred phone mode – Automatic or Digital Only

4.6 Roam tab

Figure 4-7 depicts the Roam tab.

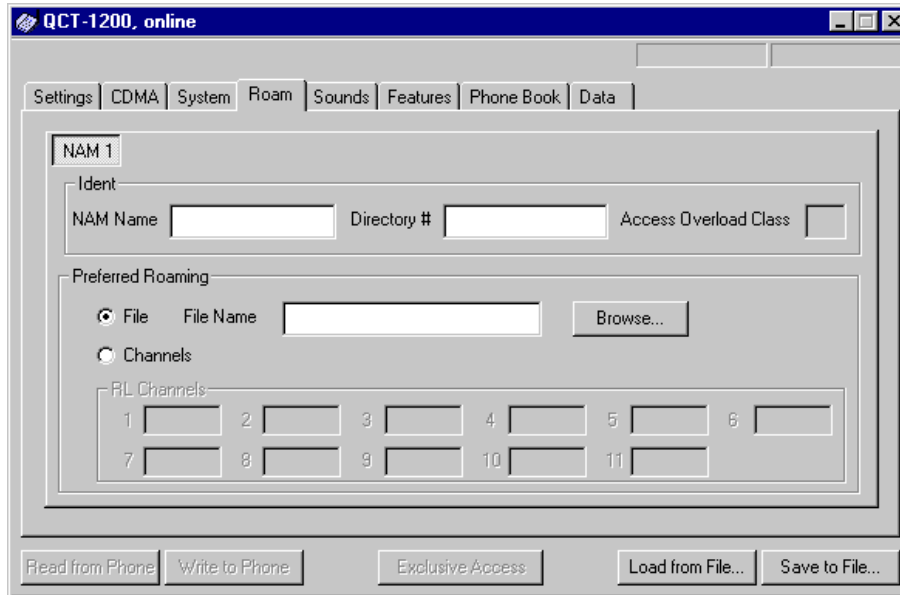


Figure 4-7 Roam tab

The items displayed on the Roam tab are described in Table 4-7.

Click the NAM buttons to view settings for the various NAMs.

Table 4-7 Roam tab information

Setting	Description
NAM Name	Name for the given NAM of up to 12 characters.
Directory #	10-digit phone directory number.
Access Overload Class	Access overload class for each NAM, normally set to the last digit of the CDMA phone number; 10=Test, 11=Emergency, 12–15 are reserved; some phones override settings other than these
Preferred Roaming Enabled	Toggles the use of the preferred roaming list (PRL)
File	File containing the PRL read from a phone or file, or one you wish to write into the phone; click Browse to locate a file; on phones that support preferred roaming channels, you must select the File option button to specify this file
Channels	Selecting the Channels option, for WLL phones that support it, allows you to enter up to 11 preferred roaming channels on this tab which will be used to create a roaming list

4.7 Display tab

Figure 4-8 depicts the Display tab.

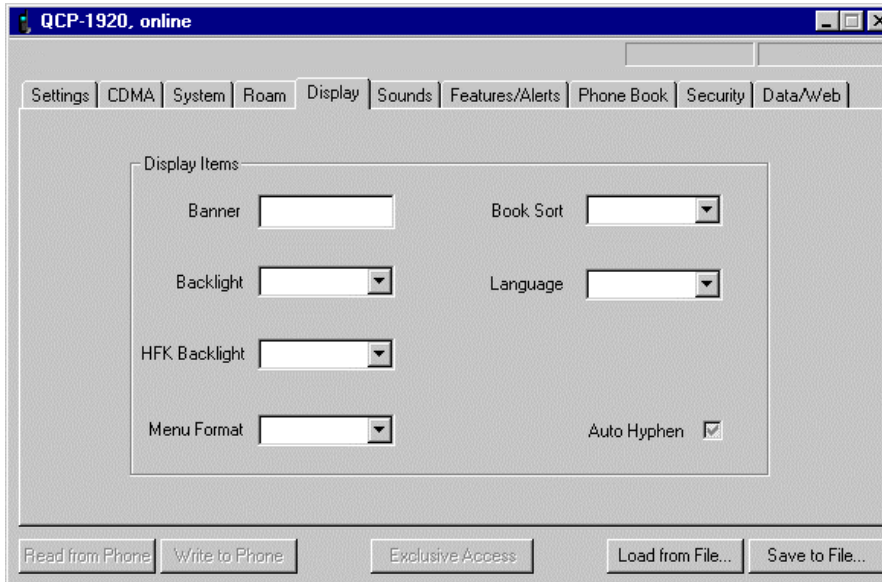


Figure 4-8 Display tab

The items displayed on the Display tab are described in Table 4-8.

Table 4-8 Display tab information

Setting	Description
Banner	Banner to be displayed when the phone is idle, up to 12 characters Note: If the Banner setting on this tab appears blank after being read from a phone, the Banner field may seem like it will not accept any input. This is because the field actually contains 12 spaces, and cannot accept any more input. To type a banner value in the field, first drag the cursor over the blanks. You can then type a banner value of up to 12 characters.
Backlight	Drop-down list of backlight settings specific to the current phone model
HFK Backlight	Drop-down list of hands-free kit backlight settings corresponding to the list of Backlight settings
Menu format	Drop-down list of menu format settings, Long or Short
Book Sort	Drop-down list of phone book sorting methods – Location # or Alphabetic
Language	Language selection for the phone menus – English, Español, Français, Português
Show Time Available	Toggles whether the time is displayed, if available
Auto Hyphen	Toggles autohyphen feature

4.8 Sounds tab

Figure 4-9 depicts the Sounds tab.

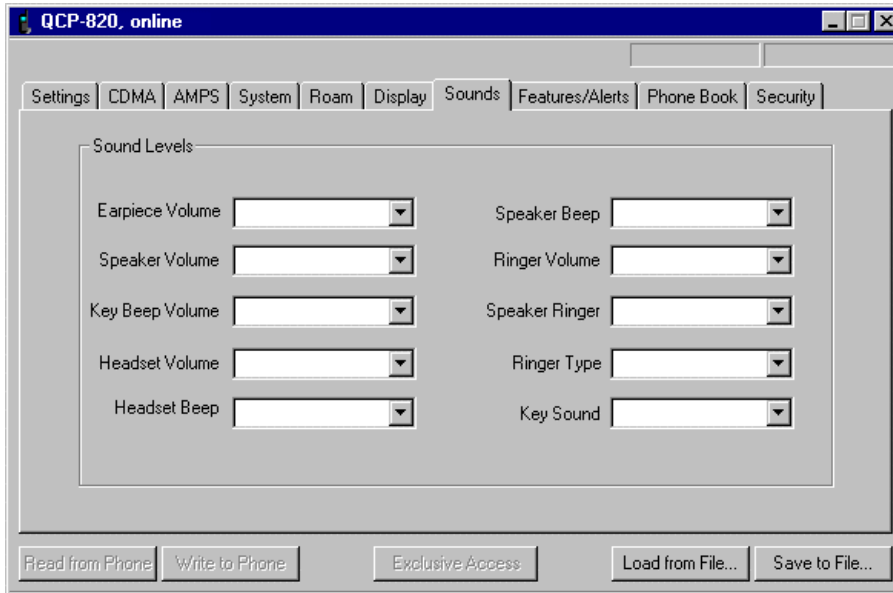


Figure 4-9 Sounds tab

The drop-down list items displayed on the Sounds tab are described in Table 4-9. For all items, the available settings correspond to those on the handset.

Table 4-9 Sounds tab information

Setting	Description
Earpiece Volume	Handset earpiece volume level settings
Speaker Volume	Hands-free kit speaker volume level settings
Key Beep Volume	Keypad beep volume level settings
Headset Volume	Hands-free kit headset volume level settings
Headset Beep	Hands-free kit headset beep volume level settings
Speaker Beep	Hands-free kit speaker key beep volume level settings
Ringer Volume	Ringer volume level settings
Speaker Ringer	Hands-free kit speaker ringer level settings
Ringer Type	Ringer type options
Key Sound	Key sound options, tones or clicks
Ringer Frequency	Specifies the ringer frequency for WLL phones – 17 Hz, 20 Hz (the default), 25 Hz, or 50 Hz

4.9 Features/Alerts tab

Figure 4-10 depicts the Features/Alerts tab.

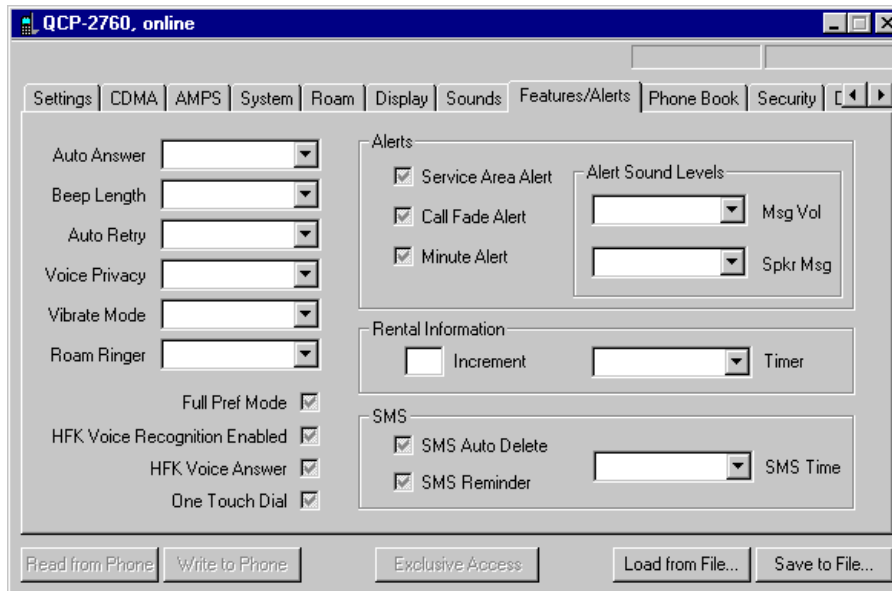


Figure 4-10 Features/Alerts tab

The items displayed on the Features/Alerts tab are described in Table 4-10.

Table 4-10 Features/Alerts tab information

Setting	Description
Auto Answer	Toggles autoanswer feature – On or off
Beep Length	Toggles the length, standard or long, of a keypress tone as heard by the system that you dialed (usually a voicemail system); the difference may or may not be audible in the phone's earpiece, depending on the phone model
Auto Retry	Drop-down list of autoretry options – Off, 10, 30, or 60 sec
Voice Privacy	Specifies the voice privacy level – Standard or Enhanced
Vibrate Mode	Vibrate mode setting – Ring, Vibrate/Ring, or Vibrate Only
Roam Ringer	Determines ringer type for incoming calls when roaming; settings are Off, Roam Ringer, or Prompt
Full Pref Mode	Toggles the full set of preferred mode options on the phone's network menu
HFK Voice Recognition Enabled	Toggles voice recognition functionality when used with hands-free kit
HFK Voice Answer	Toggles voice answer functionality when used with hands-free kit
One Touch Dial	When checked, enables one- (or two-) touch dialing feature
Any Key Answer	When checked, pressing any key will answer an incoming call
Carrier Info Filename	Name of the carrier information file to be loaded
Pay Phone Enabled	Toggles Pay Phone feature in WLL phones
DSP Answer Detect Enabled	Toggles DSP Answer detection in WLL phones
Bell Modem Enabled	Toggles Bell Modem functionality in WLL phones

Setting	Description
Dialing Plan File	Lets you specify a dialing plan (DPT) file to be read into a WLL phone
AFax Mode	Specifies the AFax mode for WLL phones, Standard or QC Mode
Polarity Reversal Timeout	Specifies the polarity reversal timeout for WLL phones, 0–255
Send Timeout	Specifies the send timeout for WLL phones, 4–20
Service Area Alert	Toggles whether a sound will alert the user when entering/exiting a service
Call Fade Alert	Toggles whether a sound will alert the user when a call is lost
Minute Alert	Toggles whether a sound will alert the user every 60 sec during a call
Voice Priv Alert	Toggles whether a sound will alert the user when call privacy is not assured
SMS Alert	Controls the short message service alert that sounds when the user receives a text message; settings are Off, On, +Reminder
Alert Sound Levels Msg Vol	Volume setting for alerts on phones
Alert Sound Levels Spkr Msg	Volume setting for alerts on the hands-free or car kit
Rental Information Increment	Specifies the increment, in seconds, on which rental billing is based; smallest possible increment is 6 sec
Rental Information Timer	Sets the rental billing timer function
SMS Auto Delete	Indicates whether SMS message gets deleted when memory is full and new messages arrive
SMS Reminder	Toggles reminder beep when SMS messages arrive
SMS Time	Toggles whether the short message service timestamp will be displayed as received or adjusted from UTC time

1

4.10 Phone Book tab

Figure 4-11 depicts the Phone Book tab.

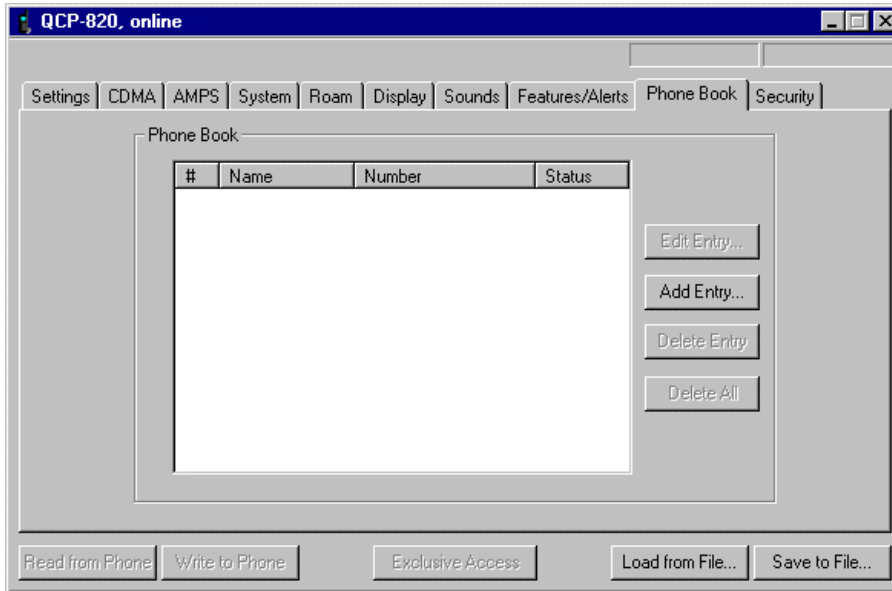


Figure 4-11 Phone Book tab

The columns and buttons displayed on the Phone Book tab are described in [Table 4-11](#).

Table 4-11 Phone Book tab information

Column/Button	Description
#	Memory location where the number will be stored in the phone
Name	String that identifies this number, up to 12 characters
Number	Phone number of up to 32 digits; can include the pound (#), star (*), and dash (-) characters as well as the letters L, P, and T
Status	Whether this number is Public or Secret (restricted)
Entry Type	For WLL phones, this column displays the type of number for each entry in the phone book, based on its memory location
Voice Mail Messages	For WLL phones, this read-only field displays the number of waiting voice mail messages
Edit Entry	Click this button to edit the selected phone book entry in the resulting Edit Entry dialog
Add Entry	Click this button to add a new phone book entry in the resulting Add Entry dialog
Delete Entry	Click this button to delete the selected phone book entry
Delete All	Click this button to delete all phone book entries

4.11 Security tab

Figure 4-12 depicts the Security tab.

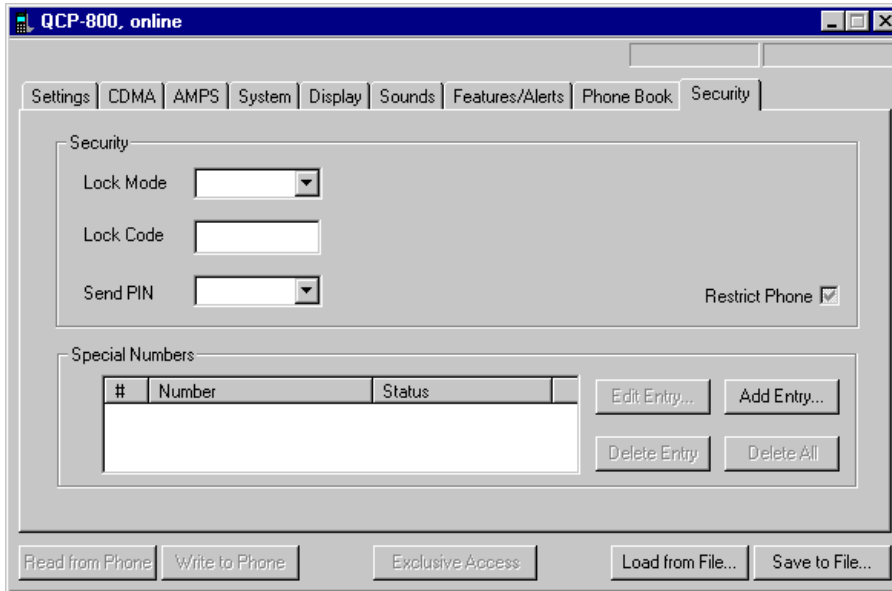


Figure 4-12 Security tab

The items displayed on the Security tab are described in [Table 4-12](#).

Table 4-12 Security tab information

Item	Definition
Lock Mode	Specifies the phone's lock mode – Never or On power-up
Lock Code	4-digit lock code
Send PIN	Send PIN setting – Never or Prompt
Restrict Phone	Toggles the restricted dialing setting for the phone
#	Memory location where the special number will be stored in the phone
Number	Special phone number of up to 32 digits; can include the pound (#), star (*), and dash (-) characters as well as the letters L, P, and T; special numbers are those that can be dialed when the phone is locked
Status	Whether this special number is Priority, E911, or OTASP
Edit Entry	Click this button to edit the special number entry in the resulting Edit Entry dialog
Add Entry	Click this button to add a new special number entry in the resulting Add Entry dialog
Delete Entry	Click this button to delete the selected special number entry
Delete All	Click this button to delete all special number entries

4.12 Data/Web tab

Figure 4-13 depicts the Data/Web tab.

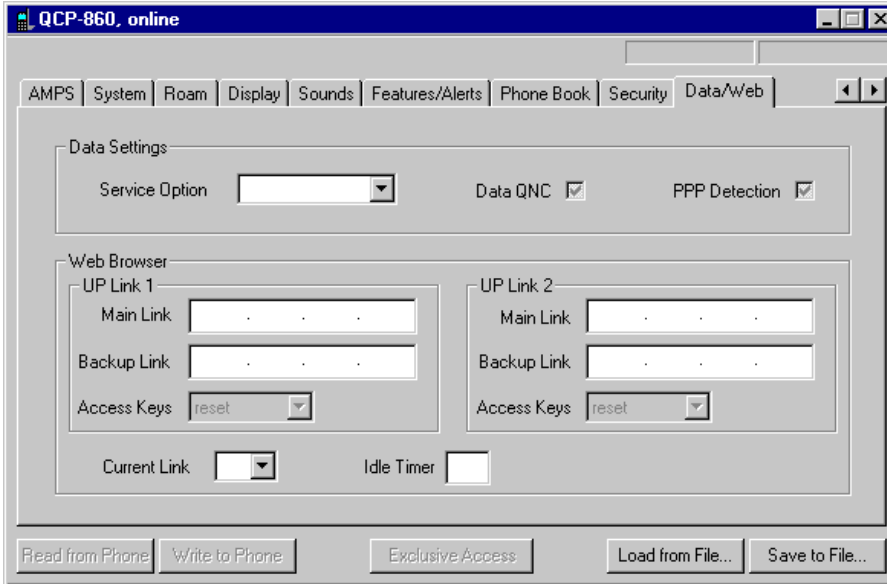


Figure 4-13 Data/Web tab

The items displayed on the Data/Web tab are described in Table 4-13.

Table 4-13 Data/Web tab information

Setting	Definition
Service Option	Specifies which data standard the phone uses to offer data services; settings are Pre-707, Qualcomm Proprietary, or IS-707
Data QNC	Toggles whether the phone uses Quick Net Connect (when checked) or simple packet data for packet services
PPP Detection	Toggles PPP autopacket detection
Main Link	Main IP address for the first or second UP.Link™ server
Backup Link	Backup IP address for the first or second UP.Link server
Access Keys	Specifies whether the phone's preprogrammed UP.Link access key can be reset over the air; settings are Keep or Reset
Current Link	Current link (1 or 2) that the browser accesses
Idle Timer	Maximum idle time, in seconds, before the browser disconnects

4.13 Broadcast SMS tab

Figure 4-14 depicts the Broadcast SMS tab.

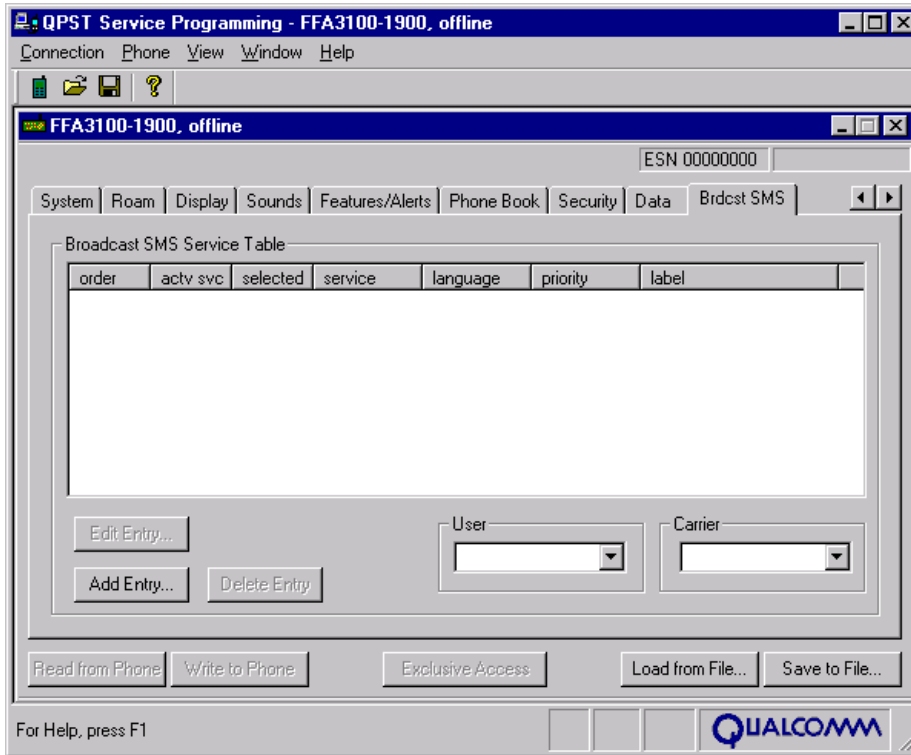


Figure 4-14 Broadcast SMS tab

The items displayed on the Broadcast SMS tab are described in Table 4-14.

Table 4-14 Broadcast SMS tab information

Column	Description
Order	Shows the position of this entry in the Broadcast SMS table
Actv Svc	Active service (yes/no)
Selected	Selected entry (yes/no)
Service	Category of service for this entry
Language	National language associated with this entry
Priority	Priority of this entry
Label	A label assigned to the entry, maximum of ten characters
User	User activation mode
Carrier	Carrier enable mode

4.14 Multimedia audio tab

Figure 4-15 depicts the Multimedia audio tab.

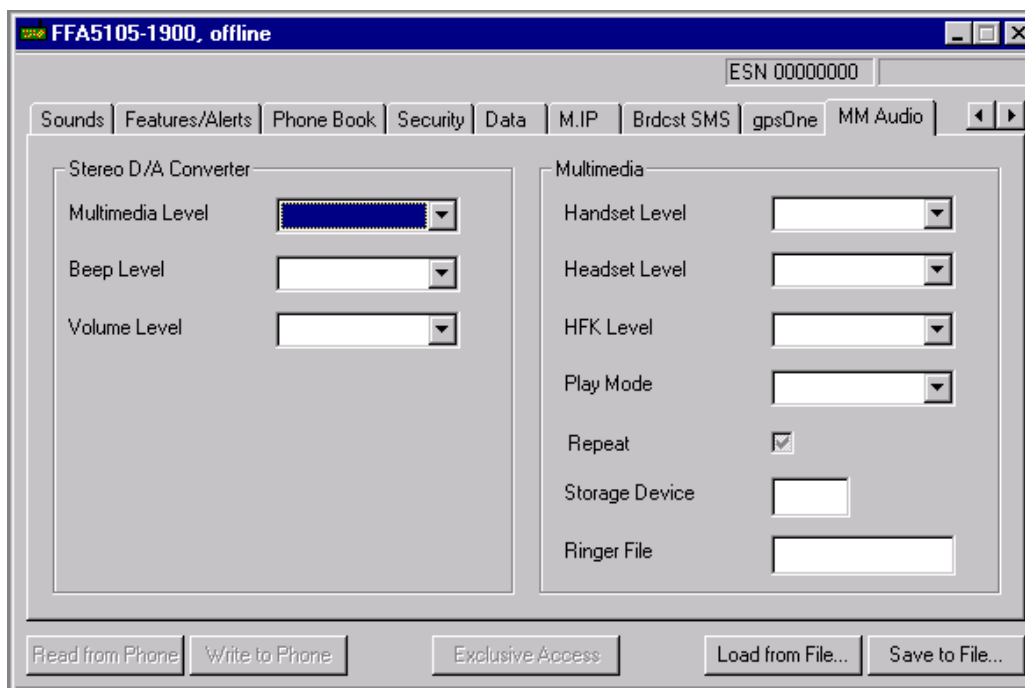


Figure 4-15 Multimedia audio tab

The items displayed on the Multimedia audio tab are described in [Table 4-15](#).

Table 4-15 Multimedia audio tab information

Setting	Description
Multimedia level	Multimedia audio level (1-4)
Beep level	Multimedia beep level (off, 1-4)
Volume level	Multimedia volume level (1-4 or 1-7 depending on F_UI_SEVEN_LEVEL_SND_BIT feature bit setting)
Handset level	Handset level (1-4)
Headset level	Headset level (1-4)
HFK level	Hands-free kit level (1-4)
Play mode	Continuous or single mode
Repeat	Repeat mode
Storage device	MMC storage device 0-255
Ringer file	Name of ringer files in mobile's file system (40 characters)

4.15 gpsOne

Figure 4-16 depicts the gpsOne tab.

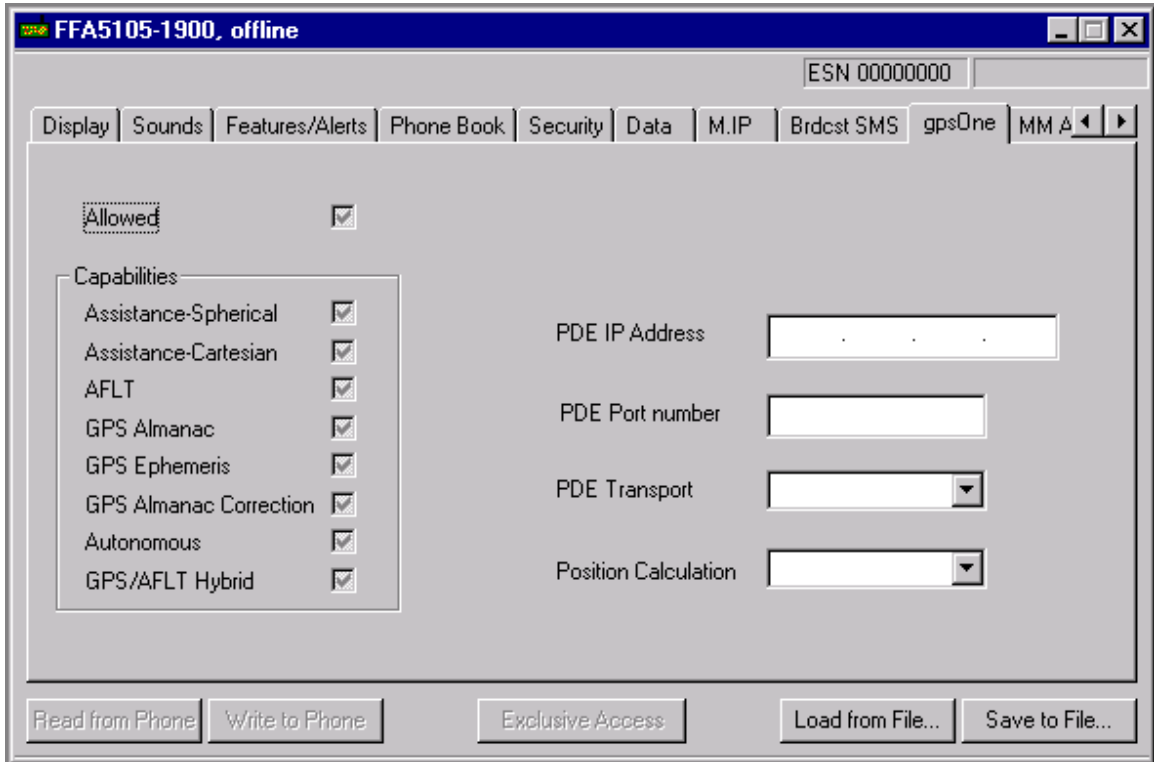


Figure 4-16 gpsOne tab

The items displayed on the gpsOne tab are described in Figure 4-16.

Table 4-16 gpsOne tab information

Setting	Description
Allowed	gpsOne allowed
Capabilities	Capabilities to enable
PDE IP address	IP address of PDE in dotted-decimal format
PDE port number	PDE port number in decimal
PDE transport	Choice of IP or DBM
Position calculation	Choice of Mobile or PDE

4.16 Mobile IP

Figure 4-17 depicts the Mobile IP tab.

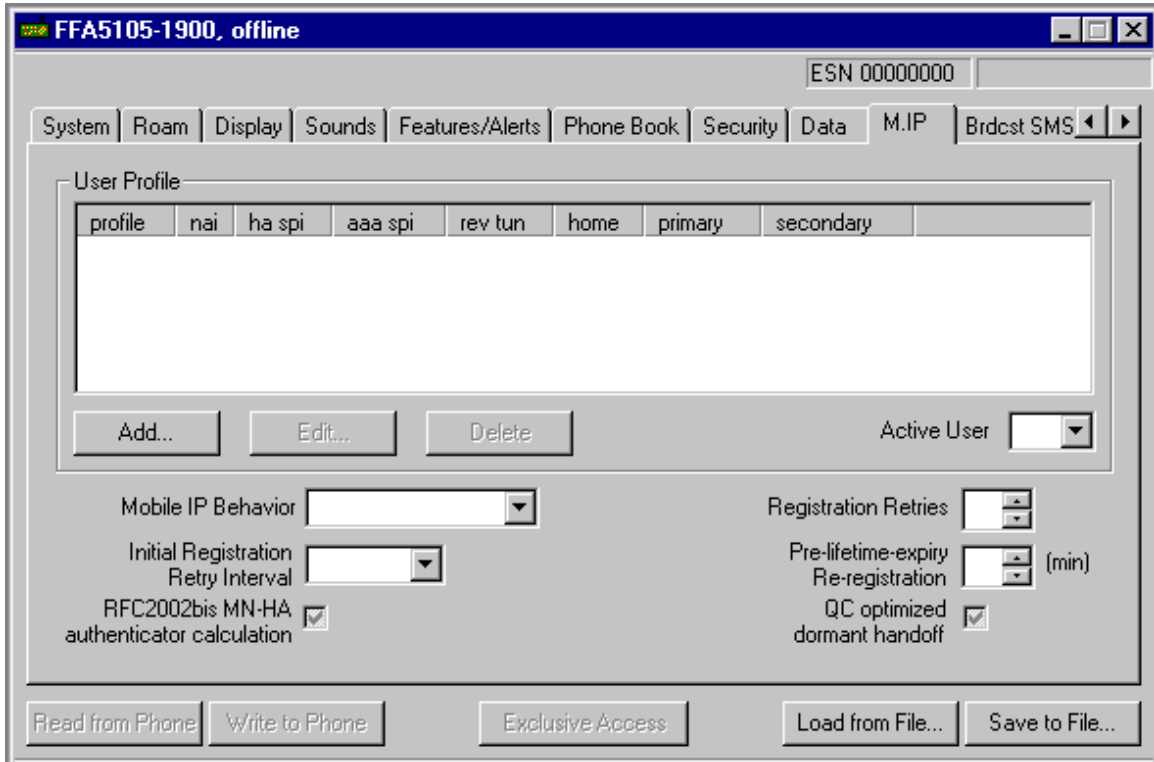


Figure 4-17 Mobile IP tab

The items displayed on the Mobile IP tab are described in Table 4-17.

Table 4-17 Mobile IP tab – User profile list

Setting	Description
profile	Profile number (0-5)
nai	Network Access Identifier
ha spi	Mobile Node – Home Agent Security Parameter Index (hexadecimal)
aaa spi	Mobile Node – Authentication Authorization Accounting Security Parameter Index (hexadecimal)
rev tun	Reverse tunneling preference
home	Home IP address
primary	Primary Home Agent IP address
secondary	Secondary Home Agent IP address

1 **Table 4-18 Mobile IP tab – User profile control group**

Setting	Description
Add	Press to add a new user profile; see "Adding or Editing a User Profile"
Edit	Select a user profile and click Edit to modify that profile; see "Adding or Editing a User Profile"
Delete	Select the last profile, click Delete to remove it
Active User	Selects the profile Mobile IP will use

2
3 **Table 4-19 Mobile IP tab – General settings**

Setting	Description
Mobile IP behavior	<ul style="list-style-type: none"> ▪ Simple IP only – Mobile IP disabled ▪ Mob + Simp f/back – Mobile IP Preferred; in the initial M.IP registration, if the network does not support Mobile IP, then the mobile automatically reverts to Simple IP ▪ Mob IP only – Mobile IP only; the mobile will make data calls only when the network supports Mobile IP
Initial registration retry interval	Time for the first retry, 1000-2750 ms in 250-ms increments
RFC2002bis MN-HA authenticator calculation	Selects RFC2002bis MN-HA authenticator calculation method; otherwise, RFC2002 (SPI excluded) method is used
Registration retries	Number of times the mobile will retry a registration attempt (0-3)
Pre-lifetime-expiry reregistration	The time before Mobile IP registration expiration to attempt reregistration (0-63 min)
QC optimized dormant handoff	Qualcomm protocol revision 6 Mobile IP handoff optimization enable

4
5 The User Profile list displays all defined user profiles. If you have less than six profiles defined,
6 you may click **Add** to append a new profile to the end of the profile list. You can edit an existing
7 profile by double-clicking it, or by selecting it (with a single click) and then clicking **Edit** or
8 pressing **enter**. If you add or edit a profile, QPST will display the Mobile IP Profile dialog box.

1
2 **Figure 4-18** Dialog box when editing or adding a Mobile IP user profile

3 The items displayed on the Mobile IP profile dialog box are described in [Table 4-20](#).

4 **Table 4-20** Mobile IP profile dialog box

Setting	Description
NAI	Network Access Identifier string, up to 72 characters
HA Shared Secret	Home Agent shared secret; you may retain the value presently in the mobile, enter a new value in hexadecimal (up to 16 bytes), or enter a new value as text (up to 16 ASCII characters)
AAA Shared Secret	Authentication Authorization Accounting shared secret; you may retain the present value or change it as with HA Shared Secret
MN-HA SPI	Mobile Node – Home Agent Security Parameter Index; enter a hexadecimal number or leave blank to leave the SPI unset
MN-AAA SPI	Mobile Node – Authentication Authorization Accounting Security Parameter Index; same data entry as MN-HA SPI
Rev Tunnel Preferred	Enables reverse tunneling preference
Home address	Home IP address
Primary HA address	Primary Home Agent IP address; 0.0.0.0 = dynamic, 255.255.255.255 = not set
Secondary HA address	Secondary Home Agent IP address; uses same two reserved values as Primary HA address
OK	Click OK to complete adding or changing this profile
Cancel	Click Cancel to abort adding or changing this profile

4.17 Nonaccess stratum

Figure 4-19 depicts the Nonaccess Stratum (NAS) tab.

The screenshot shows a software window titled "SURF5200-FDD, offline" with a status bar indicating "ESN 00000000". The main area is labeled "NAS" and contains several input fields and checkboxes. On the left, there are three input boxes for "TAC", "FAC", and "SNR" under the heading "IMEI". To the right, under "GSM A5 Algorithms Supported", there are seven checkboxes labeled "A5-1" through "A5-7", all of which are checked. Below these are three dropdown menus for "UE RAT", "GSM UE Op Class", and "UMTS UE Op Class". To the right of these are two input boxes for "UE SMS" and "UE SM". At the bottom of the window, there are five buttons: "Read from Phone", "Write to Phone", "Exclusive Access", "Load from File...", and "Save to File...".

Figure 4-19 NAS tab

The items displayed on the NAS tab are described in Table 4-21.

Table 4-21 NAS tab information

Setting	Description
TAC	IMEI's Type Approval Code, 6 digits
FAC	IMEI's Final Assembly Code, 2 digits
SNR	IMEI's Serial Number field, 6 digits
UE RAT	UEs Radio Access Technology, GSM only UMTs only, GSM and UMTS
GSM UE Op Class	GSM operating class for the UEC, class A, B, or C
UMTS UE Op Class	UMTS operating class for the UE, class A, B, or C
UE SMS	SMS value associated with the UE, 0-15
US SM	SM value associated with the UE, 0-15
GSM A5 Algorithms Supported	Which A5 algorithms the UE supports

5 Software Download

Software Download is the QPST client application used to:

- Download software to a phone from a Qualcomm Phone Image (.HEX or .MBN) file
- Backup and restore the NV memory in a Qualcomm phone

To start Software Download, from the Start menu, select Programs → QPST → Software Download. The first window, as shown in [Figure 5-1](#), appears.

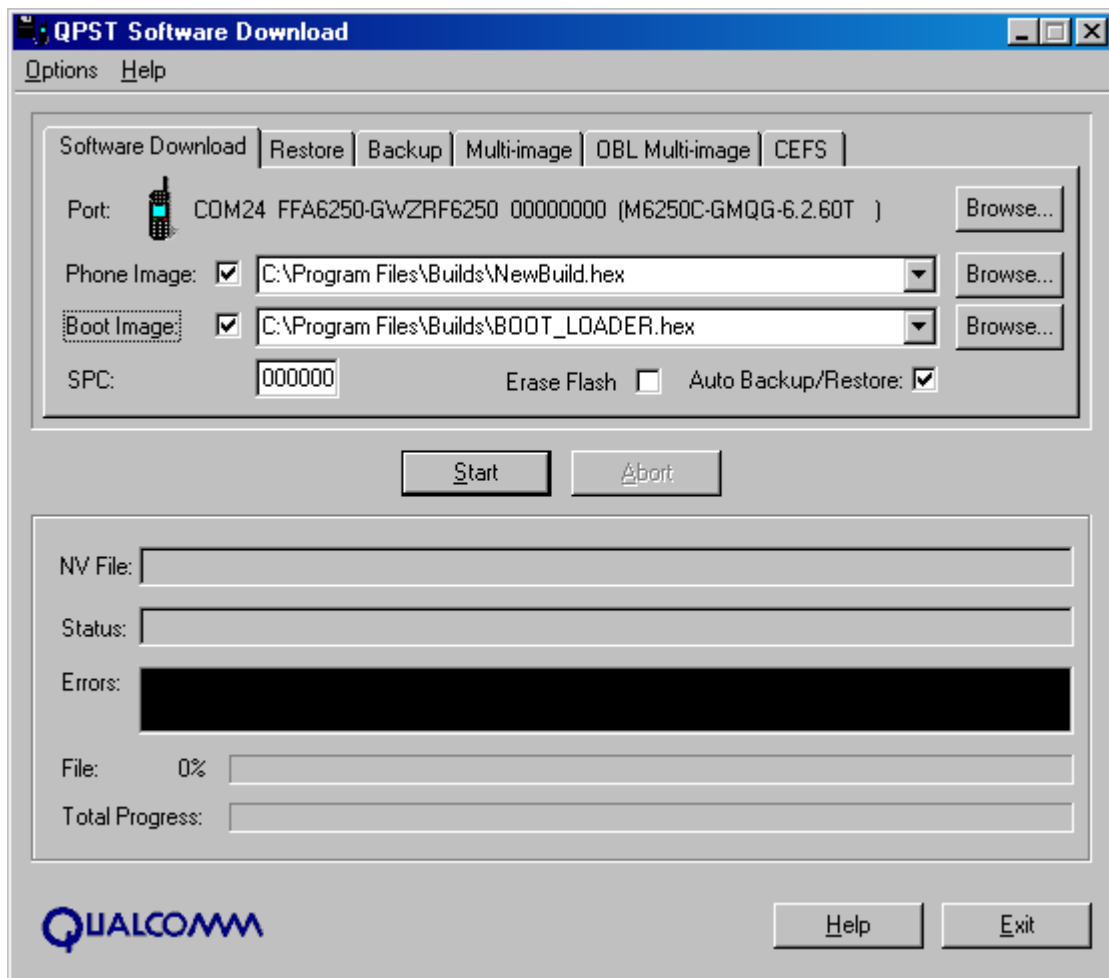


Figure 5-1 Software Download first window

5.1 Downloading phone software

Qualcomm phones use either single-image or multi-image software download. Examine the phone software release notes to determine the download type.

For any type of software download, select Auto Backup/Restore to make a backup copy of the NV items in your phone before the download starts. QPST will restore the NV items after loading the new phone build only if the new build uses a different NV version than the previous build.

5.1.1 Selecting a phone

To select a phone to download to:

1. Click **Browse** located next to the Port description to display the Select Port dialog shown in [Figure 5-2](#).
2. Click to select the phone to which you want to download software.
3. Click **OK**.

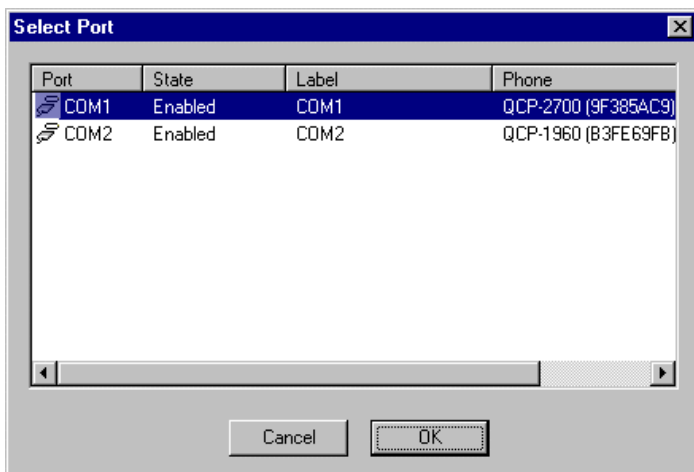


Figure 5-2 Select Port dialog

5.1.2 Specifying a filename

When required by a tab or dialog, you can specify the name of a file in several ways:

- Type a path and filename in the filename control.
- Click **Browse** to search for a file. Use the dialog shown in [Figure 5-3](#) to locate the file to download.
- Drag and drop a file from Windows Explorer to the filename control.
- Select a filename from the filename control's history list.

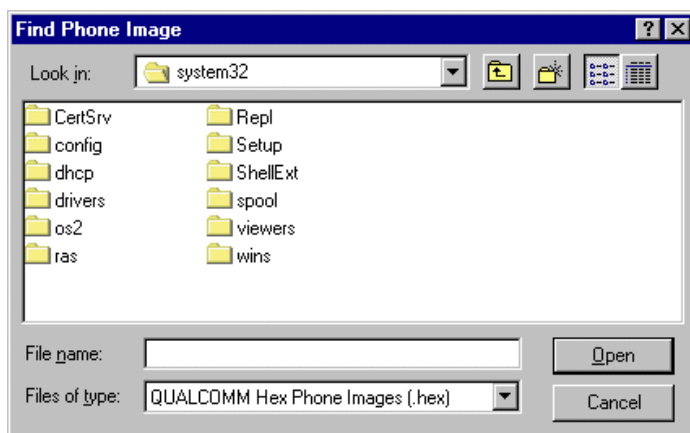


Figure 5-3 Find Phone Image dialog

5.1.3 Single-image download (Software Download tab)

If the phone uses a NOR Flash device, single-image download requires just the phone image .HEX file.

For a NAND Flash, single-image download can send the NAND boot loader, the phone image, or both to the phone. You can download a boot loader only to a phone that uses NAND Flash.

To perform a single-image download, select the Software Download tab. Select the files you wish to download with the Phone Image and Boot Image check boxes. Click **Browse** to locate files to download. Note that the boot loader file is usually named BOOT_LOADER.HEX.

Select the Erase Flash check box only in cases where you know the download will fail because of an incompatible Flash configuration. Flash erase is supported only by NAND Flash phones, and only on limited phone models. A Flash erase will take several minutes to complete.

5.1.4 Multi-image download (Multi-image tab)

By default, multi-image download (Figure 5-4) sends a set of files, all from the same PC directory, to the phone. The files all have standard names.

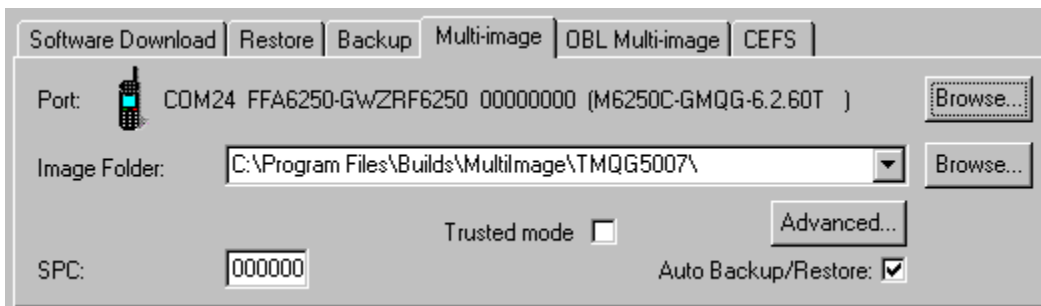


Figure 5-4 Multi-image tab

To select a subset of the default set of files, or to alter the filenames or locations, click **Advanced**. Use the dialog shown in Figure 5-5 to select the files you wish to download by selecting the check box next to the filename. Click **Browse** to specify a different filename.

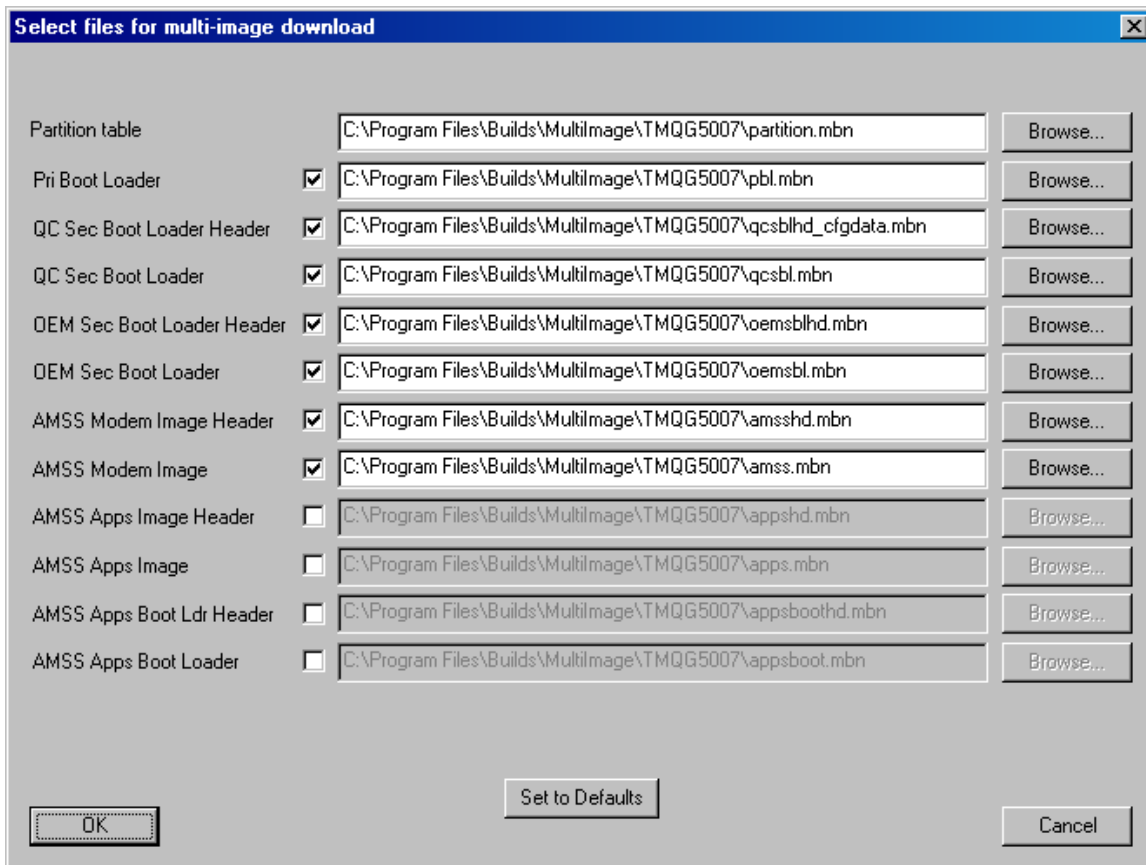


Figure 5-5 Advanced dialog box

1 If a file requires a header file, you must download both files.

2 QPST informs you if the partition table in the Flash device does not match the contents of the
3 partition.mbn file. If you decide to continue the download, QPST will erase the Flash and
4 download all the default image files.

5 If you have the phone configured for trusted boot, select the Trusted mode check box on the
6 Multi-image tab. In this case, QPST will not download the primary boot loader to the phone
7 because the Flash device contains a read-only copy of this module.

8 Before sending a file to the phone, QPST compares a hash code generated from the image in the
9 phone to the hash code for the file on the PC. If they match, QPST does not send the file. Not all
10 phones support hash code calculation. In this case, QPST will always send the file, if enabled.

11 See [Table 5-1](#) for additional comments.

12 **Table 5-1 Multi-image download file types**

File type	Default name	Comments
Partition table	partition.mbn	Required for any download
Primary boot loader	pbl.mbn	Required if Trusted mode check box is not set
Qualcomm secondary boot loader header	qcsblhd_cfgdata.mbn	
Qualcomm secondary boot loader	qcsbl.mbn	
OEM secondary boot loader header	oemsblhd.mbn	Required if oemsbl selected for download
OEM secondary boot loader	oemsbl.mbn	
AMSS modem image header	amsshd.mbn	Required if AMSS selected for download
AMSS modem image	amss.mbn	The modem processor image
AMSS application processor image header	appshd.mbn	Used only by dual-core MSM chipsets; required if apps selected for download
AMSS application processor image	apps.mbn	Used only by dual-core MSM chipsets
AMSS application processor boot loader header	appsboothd.mbn	Used only by dual-core MSM chipsets; required if appsboot selected for download
AMSS application processor boot image	appsboot.mbn	Used only by dual-core MSM chipsets

5.1.5 One-time programmable boot loader (OBL Multi-image tab)

OBL multi-image download (Figure 5-6) is similar to the standard multi-image download but uses a special Flash memory device that contains a write-once region used for the OTP boot loader.

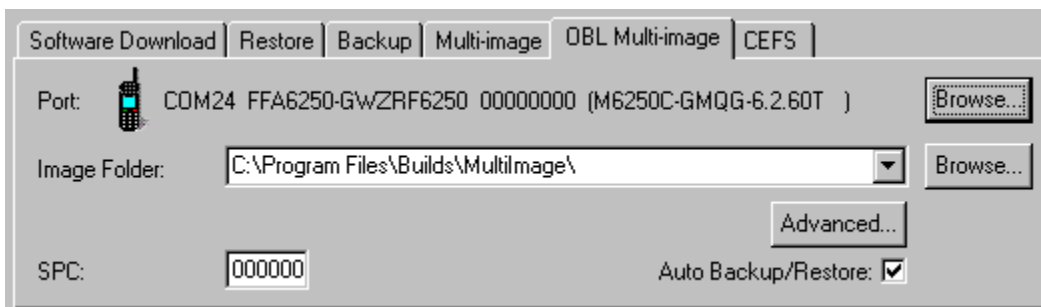


Figure 5-6 OBL Multi-image tab

This download uses one additional file, the OTP Boot Loader (obl.mbn). You can configure the files downloaded with the Advanced dialog (Figure 5-5) in the same manner as multi-image download.

If QPST detects that the OTP boot loader in the phone has been write-protected, it will not attempt to send the pbl.mbn file to the phone.

5.1.6 Canonical EFS download (CEFS tab)

CEFS download (Figure 5-7) does not update the phone image. Instead, it replaces the contents of the phone's file system with the contents of the CEFS file. You must also have a partition file that matches the build in the phone, since the download application must know the location of the file system in Flash memory. CEFS download does not have an NV backup/restore option since NV items are saved in the file system.

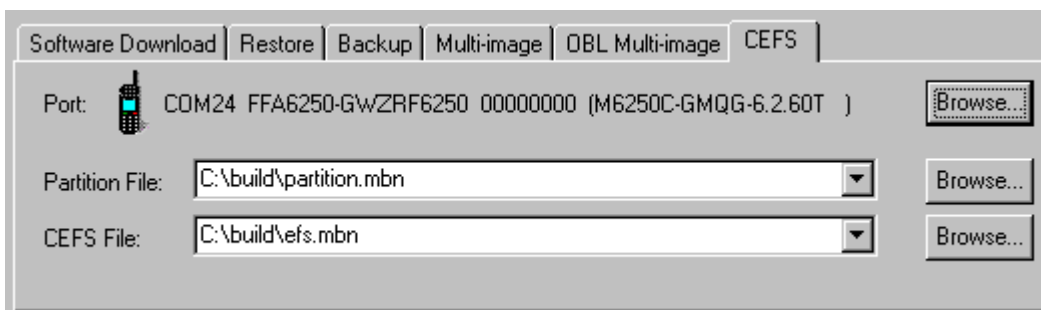


Figure 5-7 The CEFS tab

5.1.7 Starting the download

To start the download:

1. Type the SPC for the selected phone in the SPC box.
2. Click **Start**. You will see the progress of the download in the lower portion of the QPST Software Download window.

To stop the process at any time, click **Abort**.

NOTE: The Auto Backup/Restore check box provides the ability to skip the NV memory save and restore steps. By default this option is enabled, and the phone's NV items are backed up to a file before download and restored afterwards. Disable this option only if you want the phone's NV memory to be erased after the download. The phone will not function properly with its NV memory erased.

5.2 Saving and restoring NV memory

Items in a phone's NV memory are backed up automatically during the download process if the Auto Backup/Restore check box is checked. You can also save and restore them manually. The Backup and Restore tabs let you select files for backing up or restoring phone settings.

5.2.1 Backing up NV items

To back up a phone's NV memory:

1. Click the Backup tab to access the backup options.
2. Click **Browse** located next to the Port description, select the target phone from the resulting Select Port dialog, and click **OK**.
3. Click **BROWSE** located next to the QCN File box, use the resulting Find Phone Memory File dialog to specify the file in which to save the backup, and click **OK**.
4. Type the SPC for the selected phone into the SPC box.
5. Click **Start**. You will see the progress of your backup in the lower portion of the dialog.

To stop the backup at any time, click **Abort**.

5.2.2 Restoring NV items

To restore a phone's NV memory from a backup (QCN) file:

1. Click the **Restore** tab to access the restore options.
2. Click **Browse** located next to the Port description, select the target phone from the resulting Select Port dialog, and click **OK**.
3. Click **Browse** located next to the QCN File box, use the resulting Find Phone Memory File dialog to specify the backup file to restore, and click **OK**.
4. Type the SPC for the selected phone into the SPC box.
5. Click **Start**. You will see the progress of restore process in the lower portion of the dialog.

To stop the restore process at any time, click **abort**.

5.3 Changing Software Download settings

From the Options menu, select Settings. The Software Download Settings dialog appears, containing a text box for specifying an NV Backup Directory, as shown in Figure 5-8.

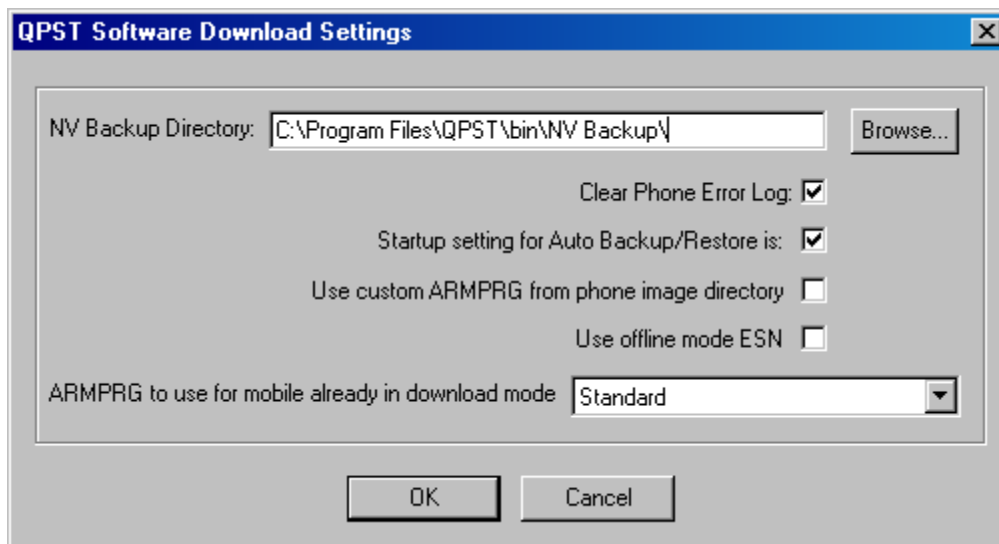


Figure 5-8 Software Download Settings dialog

This dialog lets you specify where to write the files that the Software Download application uses to back up NV items during downloads.

To change the directory used for this purpose:

1. Click **Browse**.
2. Select an alternate directory from the resulting dialog.
3. Click **OK** to accept your change.

The Clear Phone Error Log check box on this dialog indicates whether the phone's error log is cleared at the conclusion of a download. This option is enabled by default. To disable it and keep the phone's error log contents after a download, clear this check box before clicking **OK**.

The "Startup setting for Auto Backup/Restore is:" check box allows you to select the default value for Auto Backup/Restore. When the Software Download application starts, it will use this as the initial setting for Auto Backup/Restore on the Software Download tab.

1 Qualcomm ships several boot loader programs (ARMPRG) with QPST. The Software Download
2 application will select one to use based on the mobile's model number. To bypass automatic
3 selection place a custom version named armprg.hex in the same folder as the file you wish to
4 download, and select "Use custom ARMPRG from phone image directory."

5 Software Download cannot determine which ARMPRG to use for a mobile already in download
6 mode. Prior to starting a download to a mobile in this state, select the type of MSM™ (Mobile
7 Station Modem) the mobile uses in the selection box next to "ARMPRG to use for mobile already
8 in download mode."

9 Software Download will name the NV backup file based on the ESN of the phone. For phones
10 that use an R-UIM card, the ESN will come from the card. To bypass this and use the ESN from
11 the phone's NV memory, select the "Use offline mode ESN" check box.

6 EFS Explorer

The EFS Explorer application lets you navigate the embedded file system (EFS) of phones that support EFS. It is similar in function to the Windows Explorer program on a PC.

To start EFS Explorer, from the Start menu, select Programs → QPST → EFS Explorer.

6.1 EFS Explorer toolbar







The EFS Explorer application provides a toolbar that gives you quick access to functions that are available on the application's File and Phone menus, as shown in [Figure 6-1](#).



Figure 6-1 EFS Explorer toolbar

Descriptions of the toolbar buttons are provided in [Table 6-1](#).

Table 6-1 EFS Explorer toolbar buttons

Button	Function
	Displays the Phone Selection dialog, which allows you to select a phone for reading or writing NV items
	Requests an exclusive lock on the connected phone so that no other users or applications can access it
	Refreshes the current view of the phone's EFS
	Navigates to the parent directory of the current directory
	Displays the Options dialog used to set EFS Explorer preferences
	Displays information about the EFS Explorer application

6.2 Selecting a phone

When EFS Explorer launches, it displays a Phone Selection dialog that lists the phones currently being monitored by the QPST server, as shown in [Figure 6-2](#).

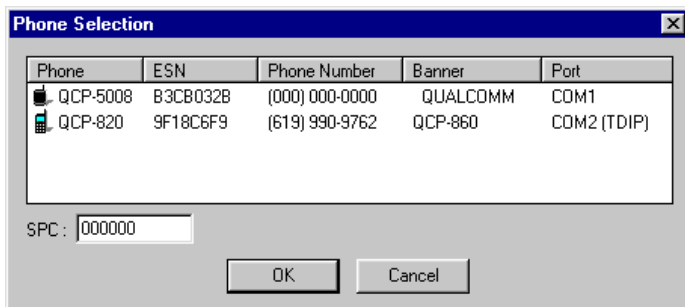


Figure 6-2 EFS Phone Selection dialog

To select a phone to explore:

1. Click to select it from the list of connected phones.
2. Type an SPC value in the SPC field.
3. Click **OK**.

When you click **OK**, the EFS Explorer window appears, showing the top, or root, level of the phone's EFS.

You can change the connected phone anytime by select Connect from the Phone menu to reaccess the Phone Selection dialog, as shown in [Figure 6-3](#).

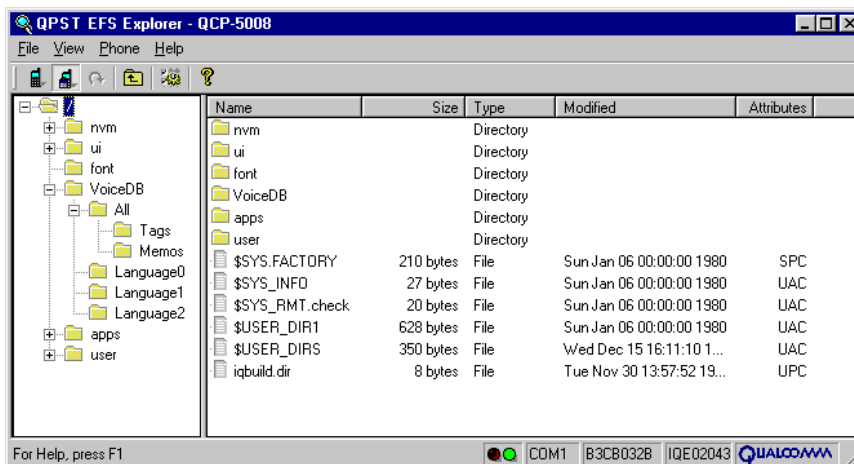


Figure 6-3 EFS Explorer application window

The application's status bar at the bottom of the window displays the COM port, ESN, and software build of the connected phone. In [Figure 6-3](#), the build number is IQE02043.

The red/green status indicators to the left of the COM port information report the phone's "readiness." For example, if the phone is reset, the indicator will appear red, and then green again when the phone comes back online.

1 As with other QPST applications, you can lock the phone for exclusive access.

2 You can navigate in the application by using the mouse or keyboard just as you would in any
3 other Windows application directory window.

4 The EFS Explorer window is divided into two panes:

- 5 ■ The left pane contains an expandable directory tree.
- 6 ■ When you select a folder in the directory tree, a listing of subfolders and files within that
7 folder appears in the right pane.

8 To move files within the EFS Explorer, you can select one or more files and drag them to another
9 directory.

10 To copy the files, hold down Ctrl when dropping the files just as you would in any other
11 Windows Explorer application. You can drop the files into a folder in the tree pane (on the left) or
12 the list pane (on the right). A directory in the tree pane that has subdirectories will automatically
13 expand when you drag the mouse over it.

14 **NOTE:** You can only drag files, not directories.

15 You can choose different display types for the file list (large icons, small icons, list, or detailed
16 list) from the View menu. To sort the detail (Name, Size, Type, and so on), click the heading of
17 the column by which you want the list sorted. Clicking the column heading toggles between
18 ascending and descending order.

19 To refresh the current list, press **F5**.

20

6.3 Creating a directory

When you create a directory in the phone's EFS, the directory is created on the phone and the file structure list is refreshed.

To create a directory:

1. Navigate to the location where you want to create a new directory.
2. From the File menu, select New → Directory. The Create Directory dialog, as shown in [Figure 6-4](#), appears.

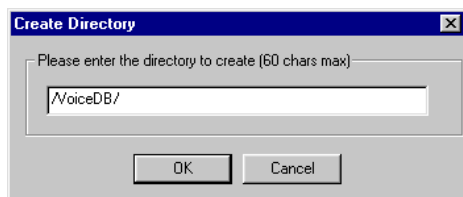


Figure 6-4 EFS Create Directory dialog

3. Type a name for the file in the field.
4. Click **OK**.

6.4 Copying a file to the phone

When you create a new file in the phone's EFS, you can specify a local or network file to copy to the phone and specify the creation date and attribute information.

To create a new file:

1. Navigate to the location where you want to create a new file.
2. From the File menu, select New → File. The Write File to Phone dialog as shown in [Figure 6-5](#) appears.



Figure 6-5 Write File to Phone dialog

3. In the file selection field, do one of the following:
 - Type the fully qualified name of the file on your local PC or network server that you want to copy to the phone.
 - Click **Browse** and navigate to the file.
4. If needed, edit the file path and name that is displayed in the path/filename field.
5. Select Overwrite, Attribute, and Creation Date options as needed.
6. Click **OK**.

You can also copy files to the phone by dragging. You can drag a file from any Windows folder and drop it into the desired location in the EFS Explorer in either the directory tree or file listing display. Remember that you can only drag files, not directories.

6.5 Copying a file from the phone

When you copy a file from the phone's EFS, you are prompted to specify the destination path (local or network) for that file.

To copy a file from the phone:

1. Select the file to be copied.
2. From the File menu, select Copy from Phone. The Copy File from Phone dialog, as shown in [Figure 6-6](#) appears.

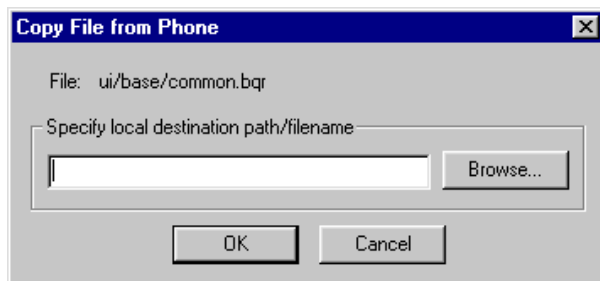


Figure 6-6 Copy File from Phone dialog

3. In the field, if the destination directory is different from the directory that is displayed, do one of the following:
 - Type the fully qualified name of the destination directory.
 - Click **Browse** and navigate to the destination directory.
4. Click **OK**. The selected file is copied from the phone to the location that you specified.

6.6 Opening a file

To view a file listed in the EFS Explorer, do one of the following:

- Double-click the file.
- Click the file and then select File → Open.

When you do this, the file on the phone is copied temporarily to your PC, and the default viewer that is associated with that file type is launched. If no viewer is associated with the file, the Windows Open With dialog appears, prompting you to specify an application. The temporary files are deleted automatically when the application closes.

6.7 Viewing or changing file properties

To view the current properties of a file or modify them, select File → Properties. In the displayed File Attributes dialog, shown in Figure 6-7, you can change the file's properties as needed. Click **OK** when finished.



Figure 6-7 File Attributes dialog

6.8 Deleting files or directories

The EFS Explorer application lets you delete files and directories. Directories containing files or subdirectories can also be deleted.

To delete a file or directory, do one of the following:

- Right-click the file or directory to be deleted, then click **Delete** from the displayed menu.
- Click the file, then choose File → Delete.
- Click the file, then press **delete** on the keyboard.

Then, respond to the prompt in the warning dialog that is displayed.

6.9 Setting EFS Explorer preferences

You can adjust some program preferences by selecting Edit → Preferences or by selecting the appropriate toolbar icon. The EFS Explorer Options dialog appears. [Figure 6-8](#) depicts the Operations tab dialog.

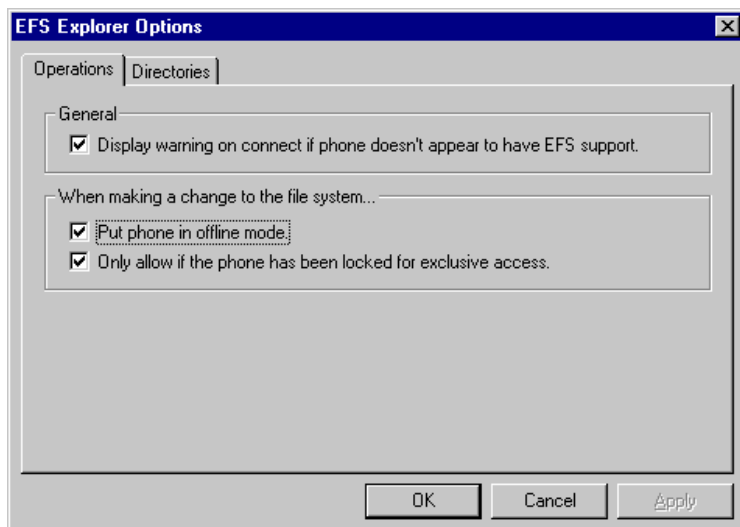


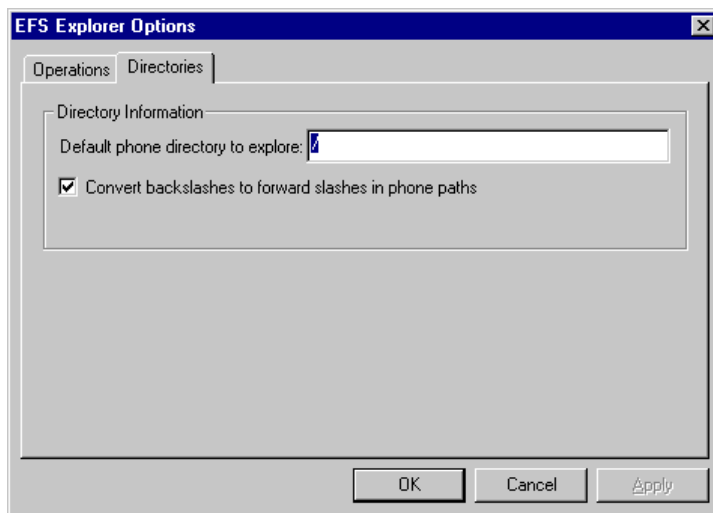
Figure 6-8 EFS Explorer Options Operations tab dialog

The Operations tab in this dialog enables you to specify the preferences described in [Table 6-2](#).

Table 6-2 EFS Explorer Options Operations tab information

Option	Description	Default
Display a warning	When selected, displays a warning dialog if the phone you select for exploring does not have EFS support	Selected
Offline mode	When selected, takes the phone offline before attempting operations that will modify the file system of the phone	Selected
Exclusive only	When selected, allows file system operations only if the EFS Explorer application has an exclusive lock on the phone Note: Unlike the other preferences, this setting is reset to the default whenever you close the EFS Explorer.	Selected

1 [Figure 6-9](#) depicts the Directories tab dialog.



2

3 **Figure 6-9 EFS Explorer Options Directories tab dialog**

4 The Directories tab dialog enables you to specify the preferences described in [Table 6-3](#).

5 **Table 6-3 EFS Explorer Options: Directories tab information**

Option	Description	Default
Default directory	Default directory when exploring will begin	/
Convert backslashes	When selected, backslashes (\) will be converted automatically to forward slashes (/) for paths that you specify	Selected

6

7 QCNView

QCNView is a standalone utility for viewing QCN files, which are used by various QPST utilities such as Software Download and Service Programming for backing up and restoring a phone's NV memory.

To start QCNView, from the Start menu, select Programs → QPST → QCNView.

To view a QCN file, choose File → Open and navigate to the file you want to view. You can open as many QCN files as needed. Each open file will be displayed in a separate window in QCNView, with tabs for Tree View and Text View, as shown in Figure 7-1 and Figure 7-2.

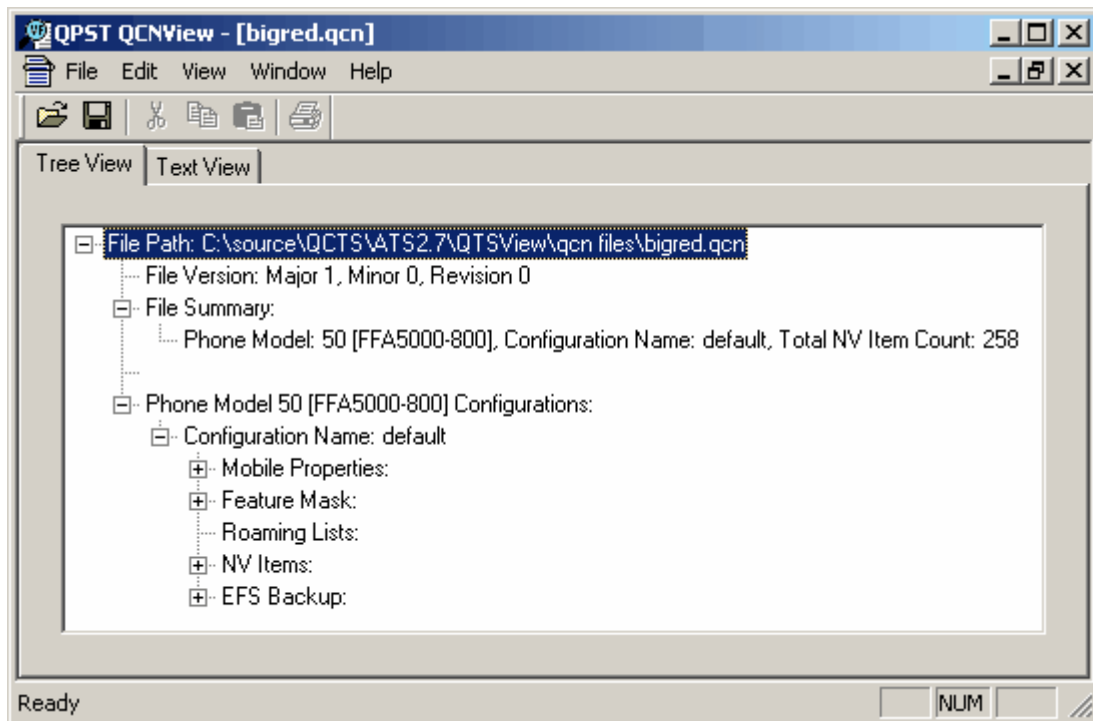
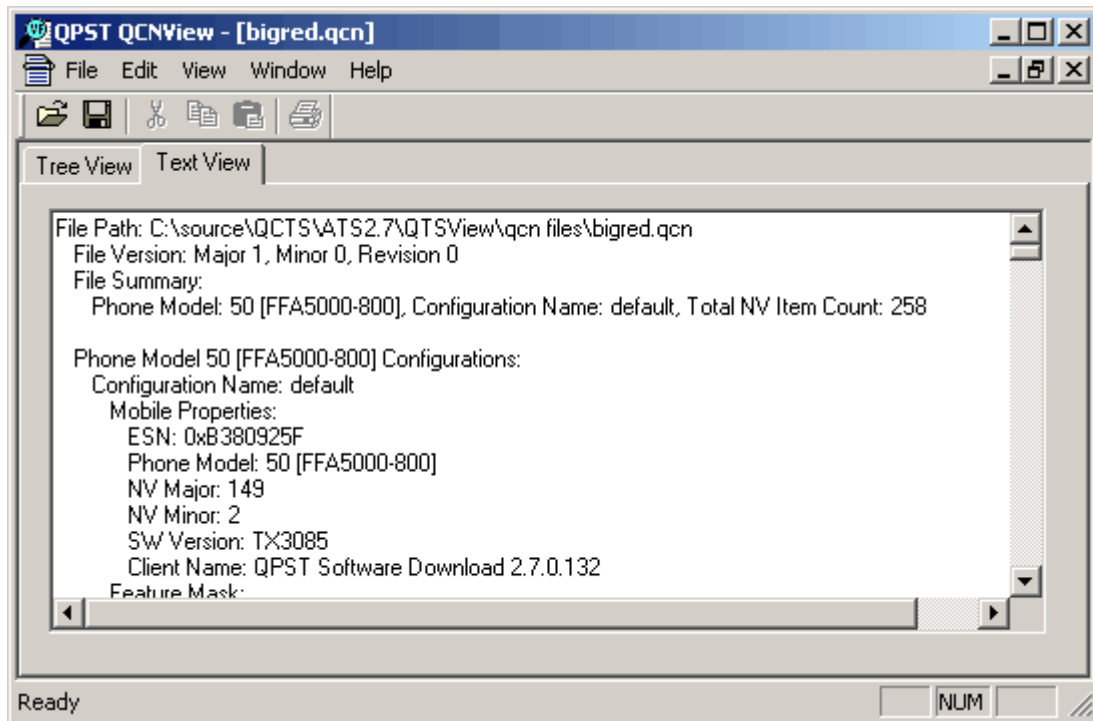


Figure 7-1 QCNView tree view



1
2 **Figure 7-2 QCNView text view**

3 In the Tree View tab, you can expand or collapse sections of the tree to display the information of
4 interest to you.

5 In the Text View tab, you can select a range of text (or select all via Edit → Select All), copy the
6 information to the clipboard, and then paste it into a document in another application. You can
7 change the font of the Text View tab by choosing Edit → Font. You can save a text-only copy of
8 the file by choosing File → Save As.

9 QCNView also supports command line usage for saving a text-only copy of a file. To do this,
10 invoke QCNView from a command prompt with the switch -s, an input file path, and an output
11 file path. For example, to generate an ASCII text file named “outfile.txt” from a binary file
12 named “infile.qcn”:

13 `C:\>QCNView.exe -s infile.qcn outfile.txt`

14

8 Roaming List Editor

NOTE: Numerous changes were made in this chapter.

The Roaming List Editor is a standalone utility that displays a phone's roaming protocol information. You may use this tool to edit an existing roaming list file, create a new roaming list, or print the contents of a roaming list.

To start Roaming List Editor, from the Start menu, select Programs → QPST → RL Editor.

8.1 Supported file types

Roaming List Editor can be used to create, open, and edit the following file types:

- PRL files [*.prl]
- MSPL files [*.mspl]
- MLPL files [*.mlpl]
- PLMN files
 - EPLMN files [*.eplmn]
 - UPLMN files [*.uplmn]
 - OPLMN files [*.oplmn]
- 3GPPBST files [*.3GppBst]
- Technology Order files [*.tot]

8.2 Operating modes

Roaming List Editor operating modes consist of Edit, Text View, and Command Line, which are described in detail in this chapter.

The Roaming List Editor has two user interface modes:

- Edit mode
- Text View mode

Roaming List Editor always begins in Edit mode for PRL files. All roaming list creation and modification occurs in Edit mode. Text View mode presents a roaming list file formatted entirely as text. You can see a file in Text View mode by clicking the Text View icon on the toolbar. You can save from Text View mode into an ASCII text file (as opposed to the standard binary roaming list file). You can subsequently reopen the ASCII file with the Roaming List Editor and work with it exactly as you would a standard binary file.

NOTE: If you click the Text View icon before entering all required information in the Edit mode window, a warning appears notifying you of the first field where an entry is missing or incorrect. You must correct all errors before using Text View mode.

Roaming List Editor also supports a third mode, Command Line mode. This mode is useful when specific commands need to be applied to a roaming list file without any user interaction.

8.2.1 Edit mode

All of the file types require an editing record area, and some require editing tabs. The file types requiring tab editing are *.mlpl and *.3GppBst.

Working with records

To add another record, right-click in the Record area of the window to display the contextual menu and select Insert Record as illustrated in [Figure 8-1](#). The new record will be inserted above the record you right-clicked, or at the end of the table if you did not click any record. Continue as before, selecting a type for the new record and entering values for all corresponding fields.

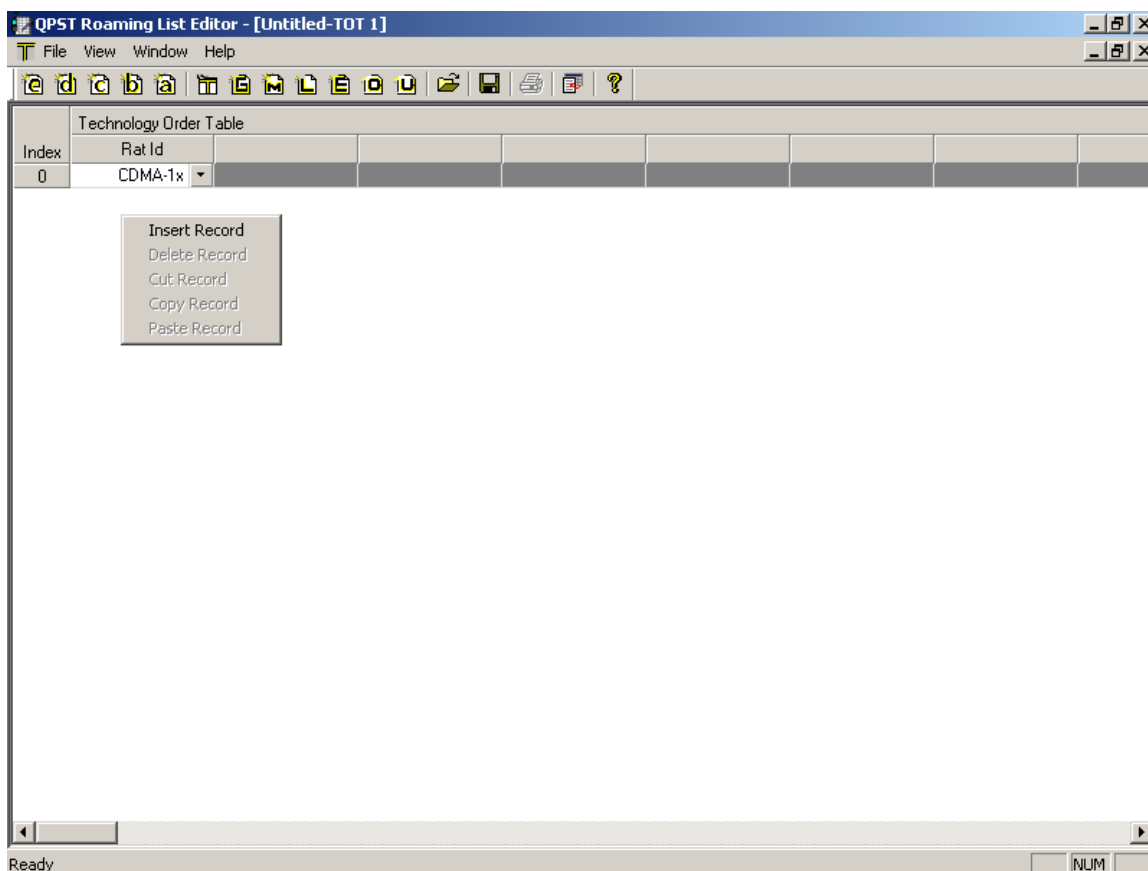


Figure 8-1 Roaming List Editor Insert Record

Deleting, cutting, and copying a record may all be done by right-clicking the record to display the contextual menu and selecting the appropriate option as illustrated in Figure 8-2

- To delete a record from the table, select Delete Record.
- To cut a record from the table and place it on the clipboard, select Cut Record.
- To copy a record from the table and place it on the clipboard, select Copy Record.

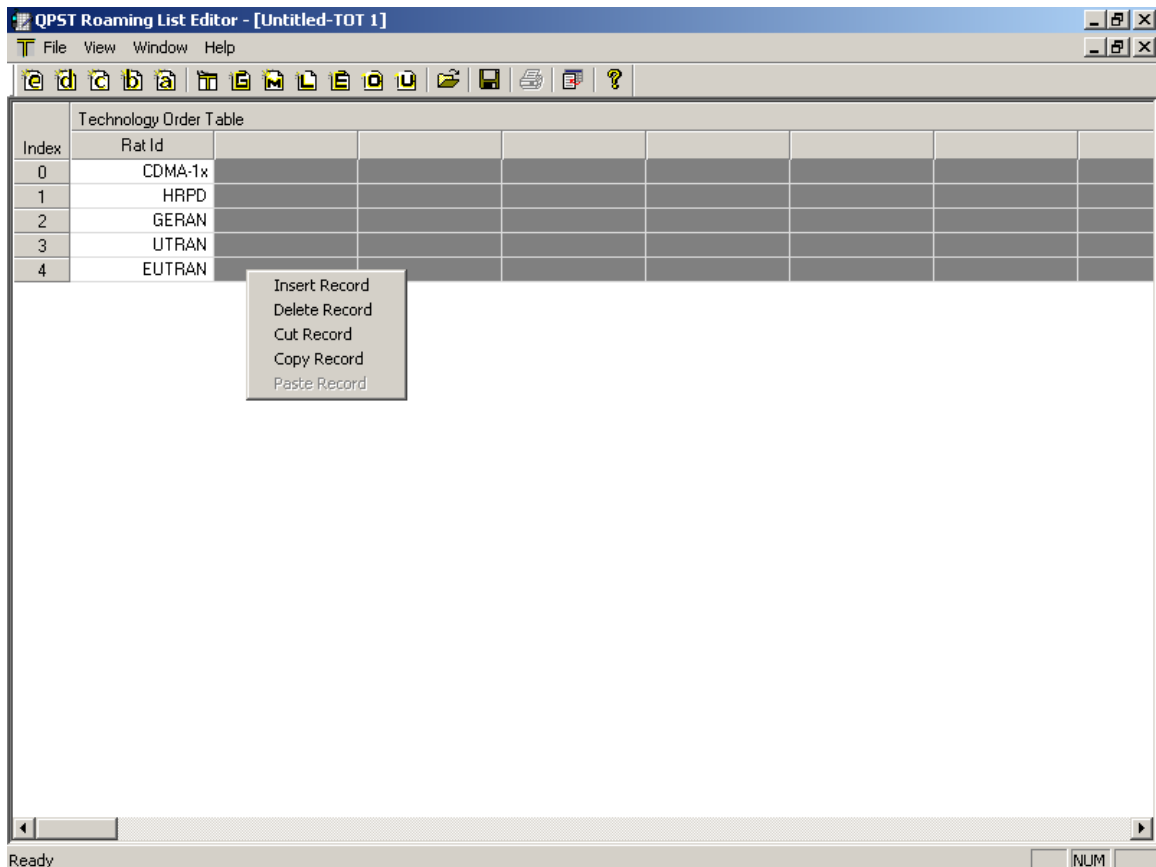


Figure 8-2 Roaming List Editor Delete, Cut, or Copy Record

To paste a record from the clipboard into the table, right-click in the acquisition record or system record area of the window to display the contextual menu and select Paste Record. The new record will be inserted above the record you right-clicked, or at the end of the table if you did not click any record.

NOTE: The Delete, Cut, Copy, and Paste commands apply to the record level, not to individual fields within a record, even if only one field appears to be selected.

To delete entries or selections from individual fields, press **delete**.

Working with tabs

A new tab is created by double-clicking beside the existing tabs as illustrated in [Figure 8-3](#). To delete a tab, right-click it and select Delete Tab from the popup menu. A message box appears confirming the action. Select Yes and the tab is deleted. A shortcut for deleting the tab is to double-click on the tab. Open a tab by left-clicking on it.

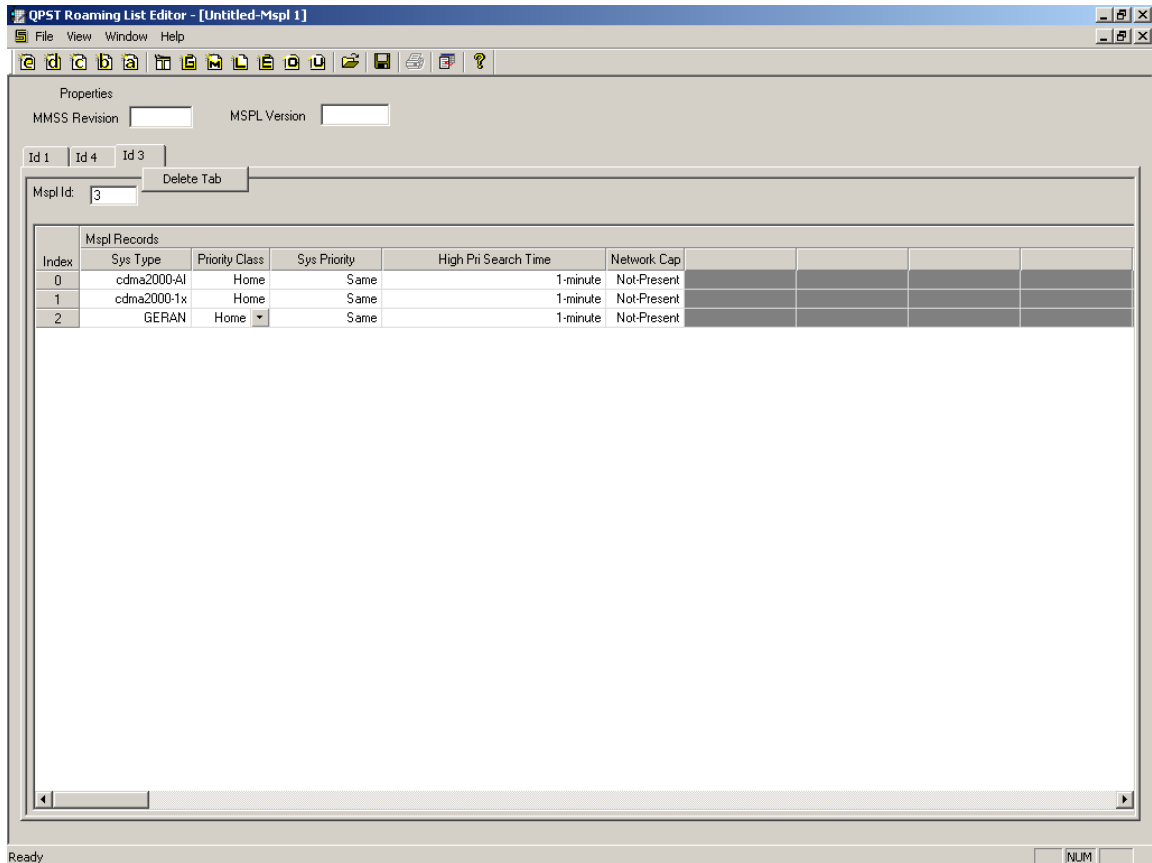


Figure 8-3 Roaming List Editor Delete Tab

8.2.1.1 PRL files

Roaming List Editor opens in Edit mode with a new empty roaming list file displayed. You can then open or create additional roaming lists using the File menu.

The Edit mode window is divided into three areas:

- Properties – see Section 8.2.1.1.1
- Acquisition Records – see Section 8.2.1.1.2
- System Records – see Section 8.2.1.1.3

The Edit mode of the Roaming List Editor is illustrated in Figure 8-4.

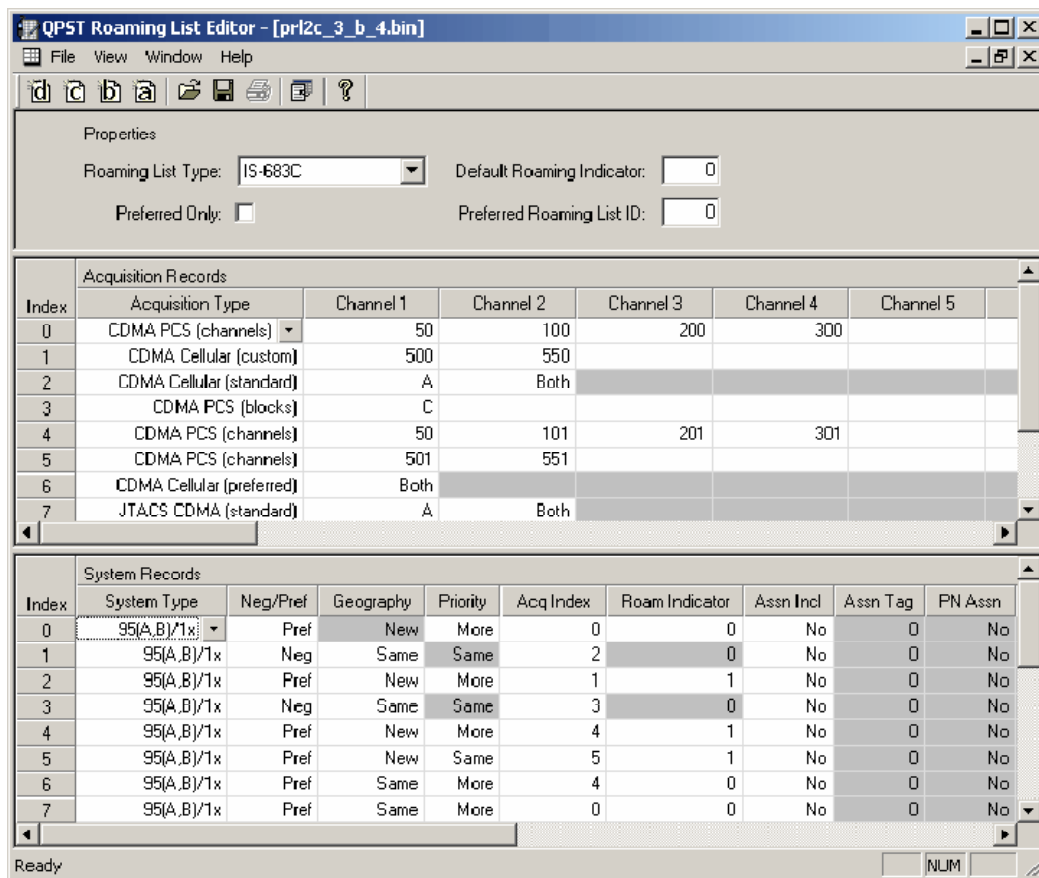


Figure 8-4 Roaming List Editor Edit mode for PRL files

8.2.1.1.1 Properties

As illustrated in Figure 8-5, the upper area of the Edit mode window defines roaming list properties. These include Roaming List Type, Preferred Only, Default Roaming Indicator, and Preferred Roaming List ID.



Figure 8-5 Roaming List Editor Edit mode – Properties

The Roaming List Editor supports four roaming list file types – IS-683A, IS-683B, IS-683C, and IS-683D. You can change the type by selecting from the Roaming List Type drop-down list in the Properties area. Changing from a newer standard to an older standard, e.g., D to C, may result in data loss if any records in the file apply only to the newer standard. The Roaming List Editor will display a warning before making such a conversion.

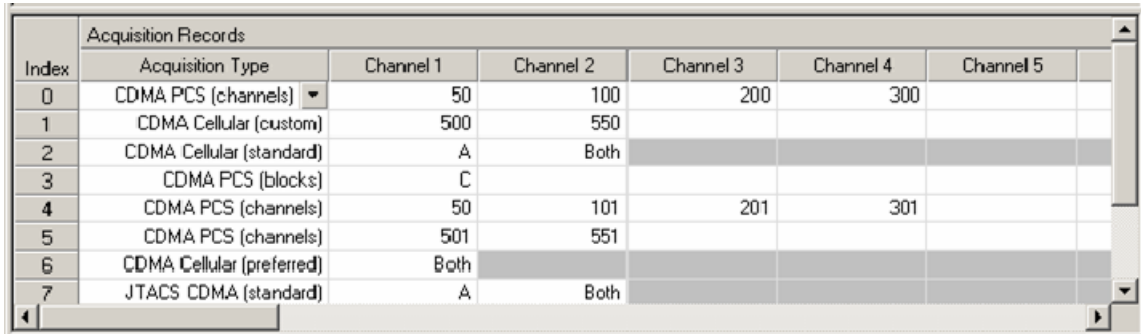
The Preferred Only check box specifies that System Records with the Neg/Pref field set to “Neg” are to be ignored.

The Default Roaming Indicator field specifies which roaming indicator is displayed by default. Each System Record can have its own Roaming Indicator setting as well.

The Preferred Roaming List ID field specifies the System Record index of the preferred roaming list.

8.2.1.1.2 Acquisition records

As illustrated in [Figure 8-6](#), the middle area of the Edit mode window defines acquisition records for the roaming list.



Index	Acquisition Type	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
0	CDMA PCS (channels)	50	100	200	300	
1	CDMA Cellular (custom)	500	550			
2	CDMA Cellular (standard)	A	Both			
3	CDMA PCS (blocks)	C				
4	CDMA PCS (channels)	50	101	201	301	
5	CDMA PCS (channels)	501	551			
6	CDMA Cellular (preferred)	Both				
7	JTACS CDMA (standard)	A	Both			

Figure 8-6 Roaming List Editor Edit mode – Acquisition records

An acquisition record contains parameters that the mobile station can use to acquire a system. Each type of acquisition record is tailored for use in acquiring a particular kind of system.

Select the acquisition record type from the drop-down list in the first field. Values for the other fields can then be filled in, according to the acquisition type.

Create new acquisition records as needed (using the contextual menu, right-click and select Insert Record) to define settings for all desired acquisition types.

Note that the field titles at the top of the acquisition record table are updated according to the type of record that is currently selected.

The acquisition record table must contain at least one valid acquisition-type definition.

Permissible entries

The Roaming List Editor ensures that the value in each field of each acquisition record is valid for the selected acquisition type. [Table 8-1](#) describes the permissible values in all types of acquisition records.

NOTE: The “Roaming list format” column specifies the oldest format in which this acquisition type is available; e.g., “A” means the acquisition type is available in IS-683A and higher; “C” means the acquisition type is available in IS-683C and higher.

Table 8-1 Permissible values in acquisition records

Acquisition type	Field	Permissible values	Roaming list format
Analog Cellular	System	Select A, B, or Both.	A
CDMA Cellular (standard)	System	Select A, B, or Both.	A
	Channel	Select Pri, Sec, or Both.	A
CDMA Cellular (custom)	Channel 1-32	Enter a channel value within the range 1 to 799, 801 to 1039, 1041 to 1199, or 1201 to 1600, inclusive. A minimum of one channel must be specified.	A
CDMA Cellular (preferred)	System	Select A, B, or Both.	A
CDMA PCS (blocks)	Block 1-6	Select A, B, C, D, E, F, or Any. A minimum of one block must be specified.	A
CDMA PCS (channels)	Channel 1-32	Enter a channel value within the range of 25 to 1175, inclusive. A minimum of one channel must be specified.	A
JTACS CDMA (standard)	System	Select A, B, or Both.	B
	Channel	Select Pri, Sec, or Both.	B
JTACS CDMA (custom)	Channel 1-32	Enter a channel value. A minimum of one channel must be specified.	B
2GHz Band (channel)	Channel 1-32	Enter a channel value. A minimum of one channel must be specified.	B
CDMA Generic	Note: A minimum of one band/channel pair must be specified.		
	Band 1-16	Select a band class from the menu – 800-MHz-Cellular, PCS, TACS, JTACS, Korean-PCS, NMT-450, IMT-2000, or 700-MHz-Cellular.	C
	Channel 1-16	Enter a channel value for the selected band class.	C
HDR Generic	Note: A minimum of one band/channel pair must be specified.		
	Band 1-16	Select a band class from the menu – 800-MHz-Cellular, PCS, TACS, JTACS, Korean-PCS, NMT-450, IMT-2000, or 700-MHz-Cellular.	C
	Channel 1-16	Enter a channel value for the selected band class.	C

Acquisition type	Field	Permissible values	Roaming list format
GSM Generic	Band 1-32	Select a band class from the menu – GSM-450, GSM-480, GSM-750, GSM-850, P-GSM-900, E-GSM-900, R-GSM-900, DCS-1800, or PCS-1900. A minimum of one band must be specified.	D
UMTS Generic	Note: A minimum of one band/UARFCN pair must be specified.		
	Band 1-16	Select a band class from the menu – 2.1GHz, 1.9GHz, or 1.7GHz.	D
	UARFCN 1-16	Enter a UTRA Absolute Radio Frequency Channel Number, or leave blank to indicate that no UARFCN is included.	D
GSM/UMTS Pref	Preferred System	Select GSM or UMTS.	D
GSM/UMTS Pref Generic	Note: A minimum of one system/band/UARFCN triplet must be specified.		
	System 1-10	Select a system from the menu – GSM, UMTS.	D
	Band 1-10	Select a band class from the menu. If system is GSM – GSM-450, GSM-480, GSM-750, GSM-850, P-GSM-900, E-GSM-900, R-GSM-900, DCS-1800, or PCS-1900. If system is UMTS – 2.1GHz, 1.9GHz, 1.7GHz.	D
	UARFCN 1-10	If system is UMTS, enter a UTRA Absolute Radio Frequency Channel Number, or leave blank to indicate that no UARFCN is included.	D
Undefined	Data Length	Enter a value for the number of bytes of undefined data in the record. These bytes will all be set to 0.	D

8.2.1.1.3 System records

As illustrated in [Figure 8-7](#), the lower area of the Edit mode window defines system records for the roaming list.

Index	System Type	Neg/Pref	Geography	Priority	Acq Index	Roam Indicator	Assn Incl	Assn Tag	PN Assn
0	95(A,B)/1x	Pref	New	More	0	0	No	0	No
1	95(A,B)/1x	Neg	Same	Same	2	0	No	0	No
2	95(A,B)/1x	Pref	New	More	1	1	No	0	No
3	95(A,B)/1x	Neg	Same	Same	3	0	No	0	No
4	95(A,B)/1x	Pref	New	More	4	1	No	0	No
5	95(A,B)/1x	Pref	New	Same	5	1	No	0	No
6	95(A,B)/1x	Pref	Same	More	4	0	No	0	No
7	95(A,B)/1x	Pref	Same	More	0	0	No	0	No

Figure 8-7 Roaming List Editor Edit mode – System records

A system record contains parameters that the mobile station can use for identifying an acquired system, for determining whether an acquired system is the optimal system on which to operate, and for determining the mobile station's roaming status.

Select the system record type from the drop-down list in the first field. Values for the other fields can then be filled in according to the system type.

Create new system records as needed (using the contextual menu, right-click and select Insert Record) to define settings for all desired system types. Each system record must reference a valid acquisition record (using the Acquisition Index field). Multiple system records may reference the same acquisition record, but not all acquisition records need to be referenced by system records.

Note that the field titles at the top of the system record table are updated according to the type of record that is currently selected.

The system record table must contain at least one valid system type definition.

Permissible entries

The Roaming List Editor ensures that the value in each field of each system record is valid for the selected system type. [Table 8-2](#) describes the permissible values in all types of system records.

NOTE: The “Roaming list format” column specifies the oldest format in which this system type is available; e.g., “A” means the system type is available in IS-683A and higher; “C” means the system type is available in IS-683C and higher.

Table 8-2 Permissible values in system records

System type	Field	Permissible values	Roaming list format
Any	Neg/Pref	Select Pref or Neg. <ul style="list-style-type: none"> ▪ Pref – Mobile station is allowed to operate on the system associated with this record. ▪ Neg – Mobile station is not allowed to operate on the system associated with this record. 	A
	Geography	Select New or Same. Same means the geographical region is the same as the previous system record. Note that the value of this field in the first system record is always New.	A
	Priority	Select Same or More. More means the system associated with this system record is more desirable than the system associated with the next system record. If this is the last system record in a geographical region, or if the Neg/Pref field in the next system record is Neg, this field has no meaning.	A
	Acq Index	Enter an acquisition index corresponding to the Index field in the acquisition table for the record associated with this system record. Note that multiple system records can reference the same acquisition record.	A
	Roam Indicator	Enter a roaming indicator value within the range 0 to 255, inclusive. Note that this value overrides the default setting in the Properties area.	A

System type	Field	Permissible values	Roaming list format
Any (cont.)	Assn Incl	Select No or Yes. Yes means this system record is part of a set that shares a PN offset assignment (co-located) or which can reach the same PSDN (associated), as specified by the three fields, Assn Tag, PN Assn, and Data Assn.	C
	Assn Tag	Enter a number that specifies the set to which this system record belongs. All of the system records in the same geography with the same Assn Tag form a set.	C
	PN Assn	Select No or Yes. Yes means the system identified by this system record has the same PN assignment as other systems in the same geography with the same Assn Tag and whose PN Assn field is also Yes.	C
	Data Assn	Select No or Yes. Yes means the system identified by this system record can reach the same set of PDSNs as other systems in the same geography with the same Assn Tag and whose PN Assn field is also Yes.	C
95(A,B)/1x	SID	Enter a system ID value within the range 1 to 32767, or enter 0 to indicate a wild card system ID.	A
	NID	Enter a network ID value within the range 0 to 65534, or enter 0 to indicate a wild card network ID	A
IS-856	Subnet ID	Enter a subnet ID value formatted according to the IPv6 protocol – a 128-bit address composed of eight 16-bit values separated by colons, followed by a slash and a length value within the range 0 to 127. Enter /0 to indicate a wild card subnet ID. It is not necessary to specify leading zeros for a subfield, but there must be at least one numeral in every subfield, e.g., 0000:0000:0000:0000:0000:0000:0100:0000/104 is equivalent to 0:0:0:0:0:0:100:0/104. Only the number of bits specified by the length are actually written to the roaming list file.	C
PLMN-based (public land mobile network)	PLMN Type	Select a value from the menu – Select Mode, PLMN Only, PLMN+Single LAC, or PLMN+Multi-LAC. The setting for this field determines the types of the remaining fields in the record. <ul style="list-style-type: none"> ▪ Select Mode – PLMN and LAC are not included ▪ PLMN Only – PLMN is included but LAC is not ▪ PLMN+Single LAC – PLMN and LAC are included ▪ PLMN+Multi-LAC – PLMN and multiple LACs are included 	D
	PLMN	(This field is defined only if the PLMN Type field is Select Mode.) Select a value from the menu – Any PLMNs, Allowed PLMNs, or Home PLMN <ul style="list-style-type: none"> ▪ Any PLMNs – Limited-service network selection mode ▪ Allowed PLMNs – Automatic network selection mode 	D

System type	Field	Permissible values	Roaming list format
PLMN-based (public land mobile network) (cont.)	MCC (mobile country code)	(This field is defined only if the PLMN Type field is not Select Mode.) Enter a value for the MCC portion of the PLMN. The format is three decimal digits.	D
	MNC (mobile network code)	(This field is only defined if the PLMN Type field is not Select Mode.) Enter a value for the MNC portion of the PLMN. The format is two or three decimal digits. If only two digits are specified, the third digit will be stored as 0xF.	D
	Network Sel Mode	(This field is only defined if the PLMN Type field is not Select Mode.) Select a value from the menu – Manual or Automatic.	D
	LAC (Location Area Code)	(This field is only defined if the PLMN Type field is PLMN+Single LAC.) Enter a value for the LAC of the system associated with this record.	D
	LAC Count	(This field is only defined if the PLMN Type field is PLMN+Multi-LAC.) Enter a value within the range 1 to 15 for the number of LACs included in this record.	D
	LAC 1-15	(These fields are only defined if the PLMN Type field is PLMN+Multi-LAC, and the number is dependent on the value of the LAC Count field.) Enter a value for the corresponding LAC of the system associated with this record.	D
Undefined	Data Length	Enter a value for the number of bytes of undefined data in the record. These bytes will all be set to 0.	D

8.2.1.2 MSPL files

You can create MSPL files using the file menu or the toolbar (see red circle in [Figure 8-8](#)). To open an existing file, use the file menu or the toolbar (see [Section 8.4](#)). The MSPL window consists of the following sections:

- Properties
- ID view

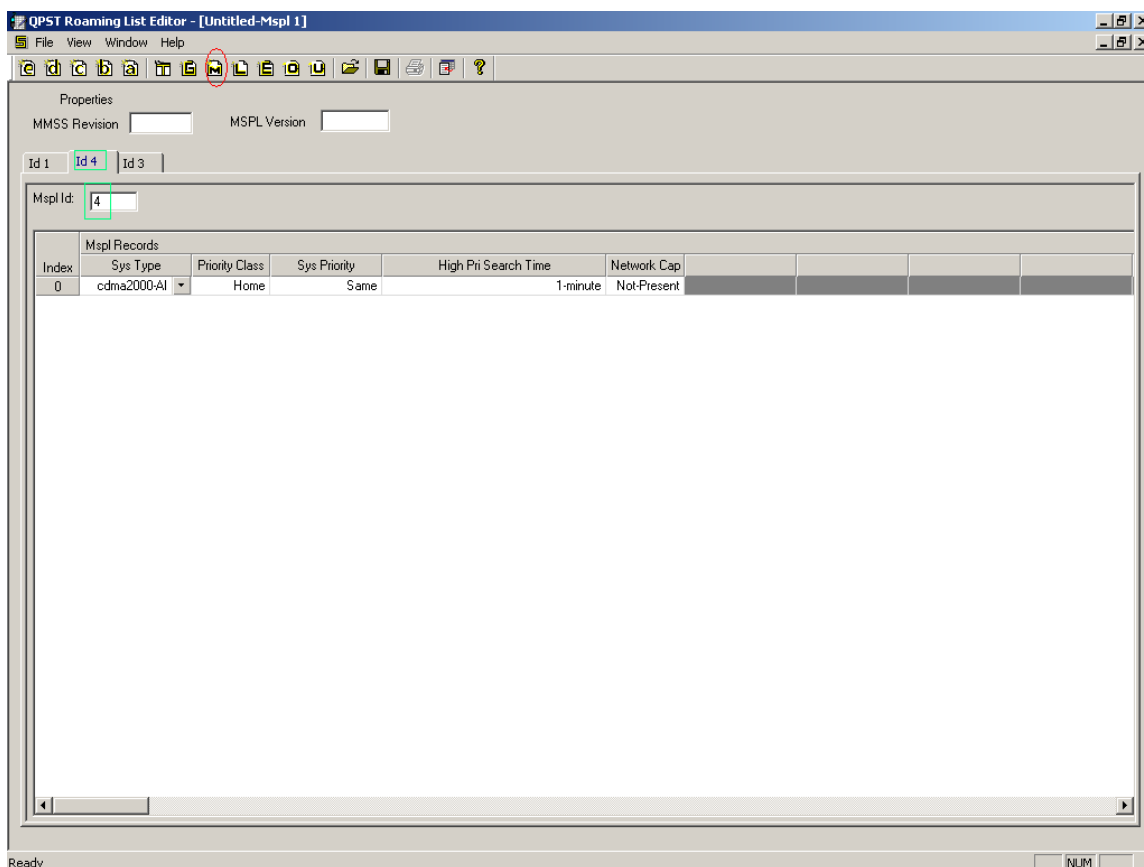


Figure 8-8 Roaming List Editor Edit mode for MSPL files

Properties

The properties section consists of MMSS Revision and MSPL Revision. These fields are common for all the tabs. These fields are mandatory.

ID view

This part of the screen is multi-tabbed. MSPL ID is common for all the records within the tab. It is a mandatory field for each tab. On opening a new file, a single tab with a single record is created with default values. Each record consists of five fields – Sys Type, Priority Class, Sys Priority, High Pri Search Time, and Network Cap. They are filled using the drop-down box.

The ID indicated at the top of the tab reflects the MSPL ID. It is initialized onto “-1” on create. When an MSPL ID field is updated, it is reflected correspondingly. This helps in navigation since the MSPL ID (green boxes in [Figure 8-8](#)) need not be sequential.

8.2.1.3 MLPL files

You can create MLPL files using the file menu or the toolbar (see red circle in [Figure 8-8](#)). To open an existing file, use the file menu or the toolbar (see [Section 8.4](#)). The MLPL window consists of the following sections:

- Properties
- ID view

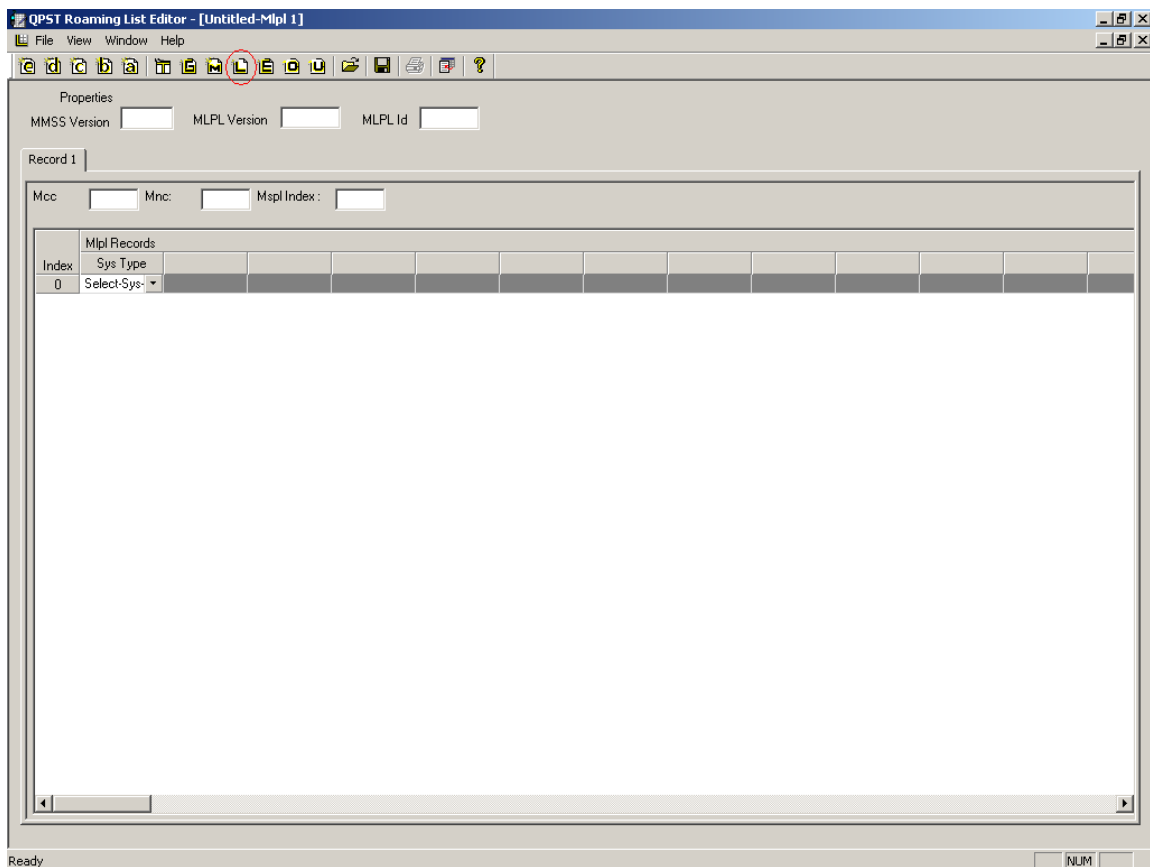


Figure 8-9 Roaming List Editor Edit mode for new MLPL files

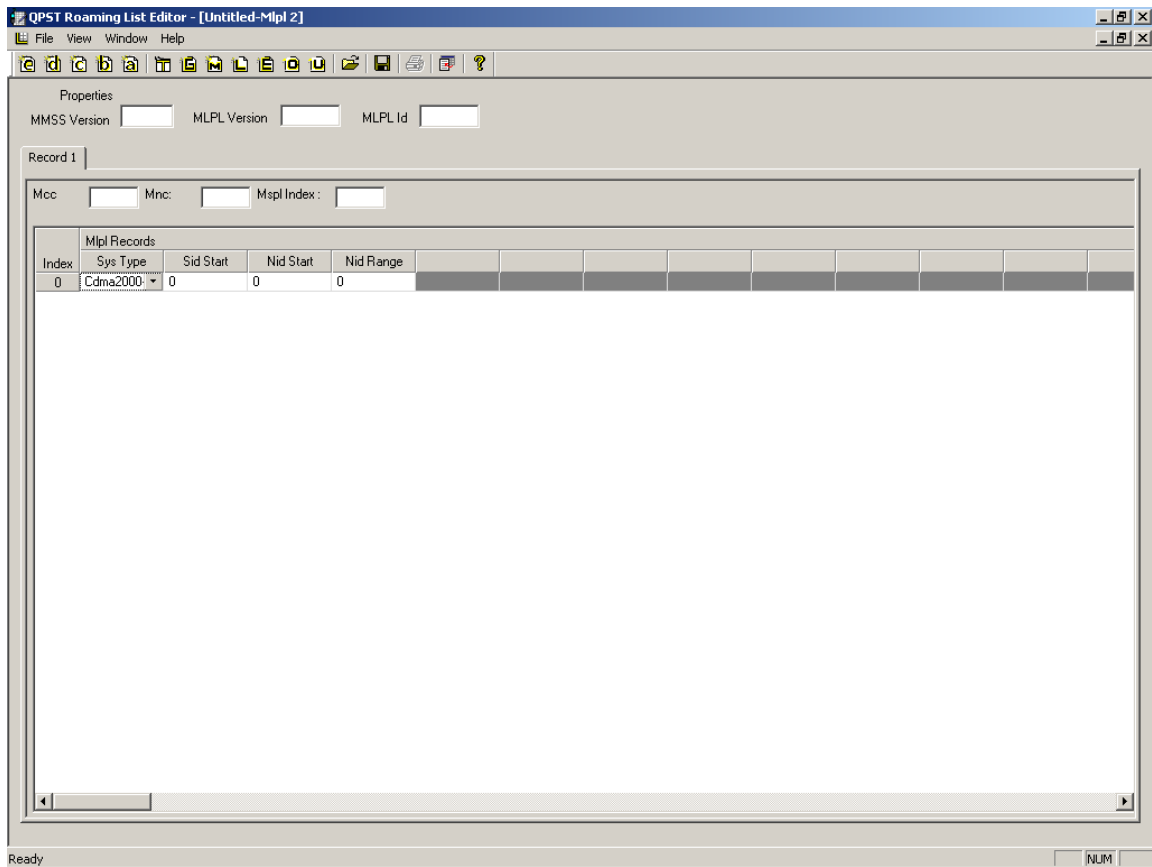
Properties

The properties section consists of MMSS Revision, MLPL Version, and MSPL ID. These fields are common for all the tabs and are mandatory.

ID view

This part of the screen is multi-tabbed. Mcc, Mnc, and MSPL Index fields are for all the records within the tab. Mcc and Mnc are not mandatory fields, but MSPL Index is mandatory. The wild card Mnc “FFF” is supported. Records in the view are also not mandatory. However, in each tab, there should be at least one completed row or Mcc or Mnc field. The record ID on the tab (labeled “Record”) is sequential. Some of the records contain explicit Mcc and Mnc fields, e.g., GSM Sys type. The Mcc and Mnc for these records should be mandatorily in 3-digit format.

- 1 On opening a new file, a single tab with a single record is created with Sys Type Field (see
- 2 [Figure 8-10](#)). On selection of the system type, fields related to the system type are enabled.



- 3
- 4 **Figure 8-10 Relevant fields enabled on selecting Sys Type**

8.2.1.4 PLMN files

Three types of PLMN files are supported – EHPLMN, OPLMN, and UPLMN. You can create any of these file types using the file menu or the toolbar (see [Figure 8-11](#); EHPLMN is denoted by a red circle, OPLMN by an orange circle, and UPLMN by a yellow circle). To open an existing file, use the file menu or the toolbar (see [Section 8.4](#)). The file type selected appears as a caption of the view (see green box in [Figure 8-11](#)).

PLMN view is single-tabbed with a record view. All PLMN file types contain Mcc and Mnc Fields. OPLMN and UPLMN additionally contain UMTS Present, LTE Present, and GSM Present Fields. All fields are mandatory.

On opening a new file, a single record is created. Mcc and Mnc are initialized to 0 and, if present, the other three fields are initialized to “NO.” PLMN files do not support Mnc wild cards.

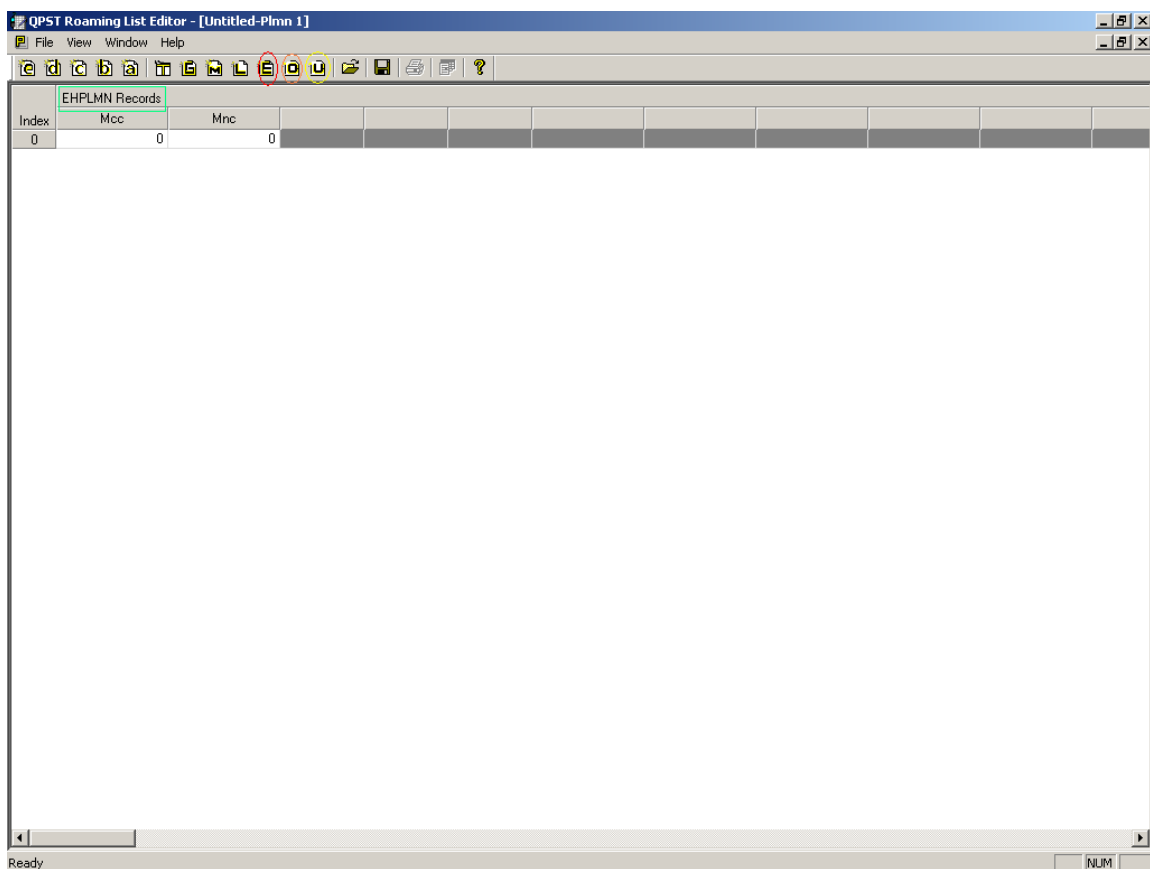
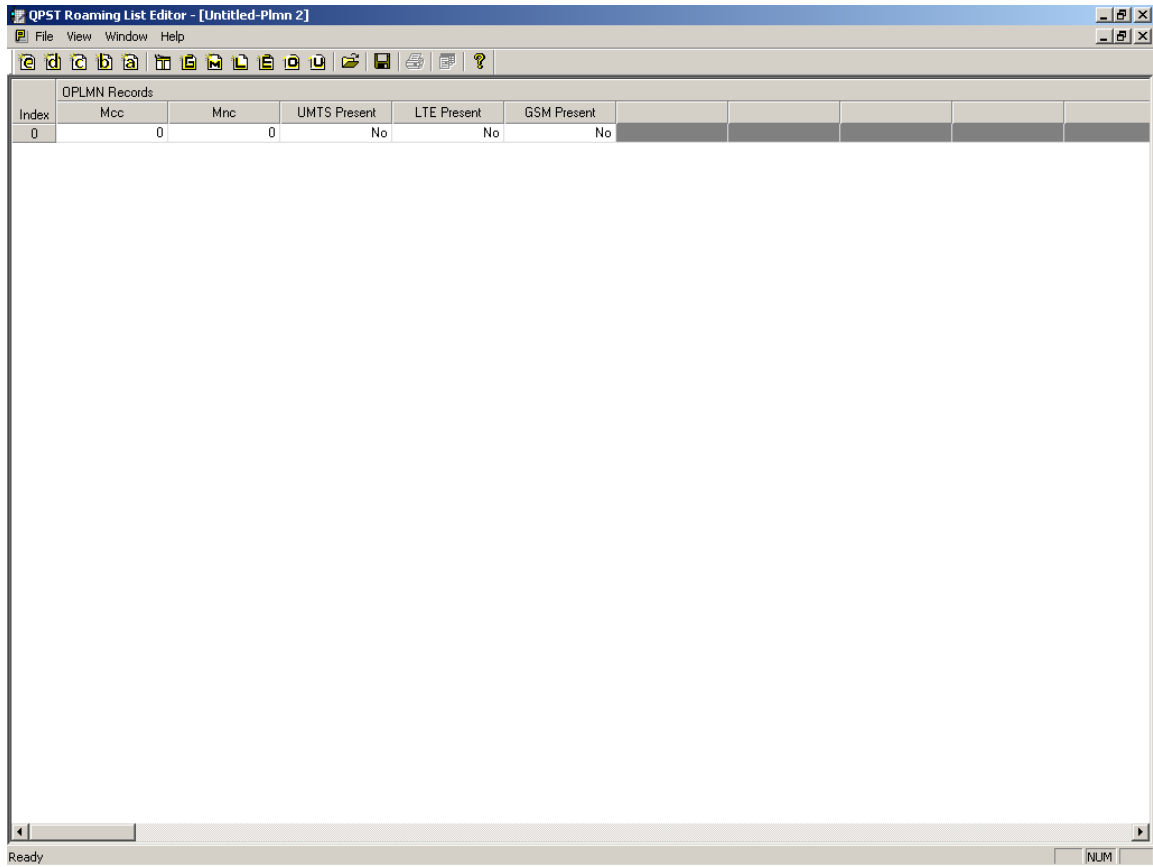


Figure 8-11 Roaming List Editor Edit mode for new EHPLMN files

1

Figure 8-12 shows Edit mode for new OPLMN files.



2

3

Figure 8-12 Roaming List Editor Edit mode for new OPLMN files

8.2.1.5 Technology order table files

You can create a new technology order table file using the file menu or the toolbar (see red circle in Figure 8-13). To open an existing file, use the file menu or the toolbar (see Section 8.4).

The Technology Order Table View is single-tabbed with a record view. It contains a single Rat ID field in each record. On opening a new file, a single record initialized to cdma-1x is created. The value of the Rat ID field is unique within a Technology Order Table file, i.e., the same value cannot be repeated in more than one row of the same file.

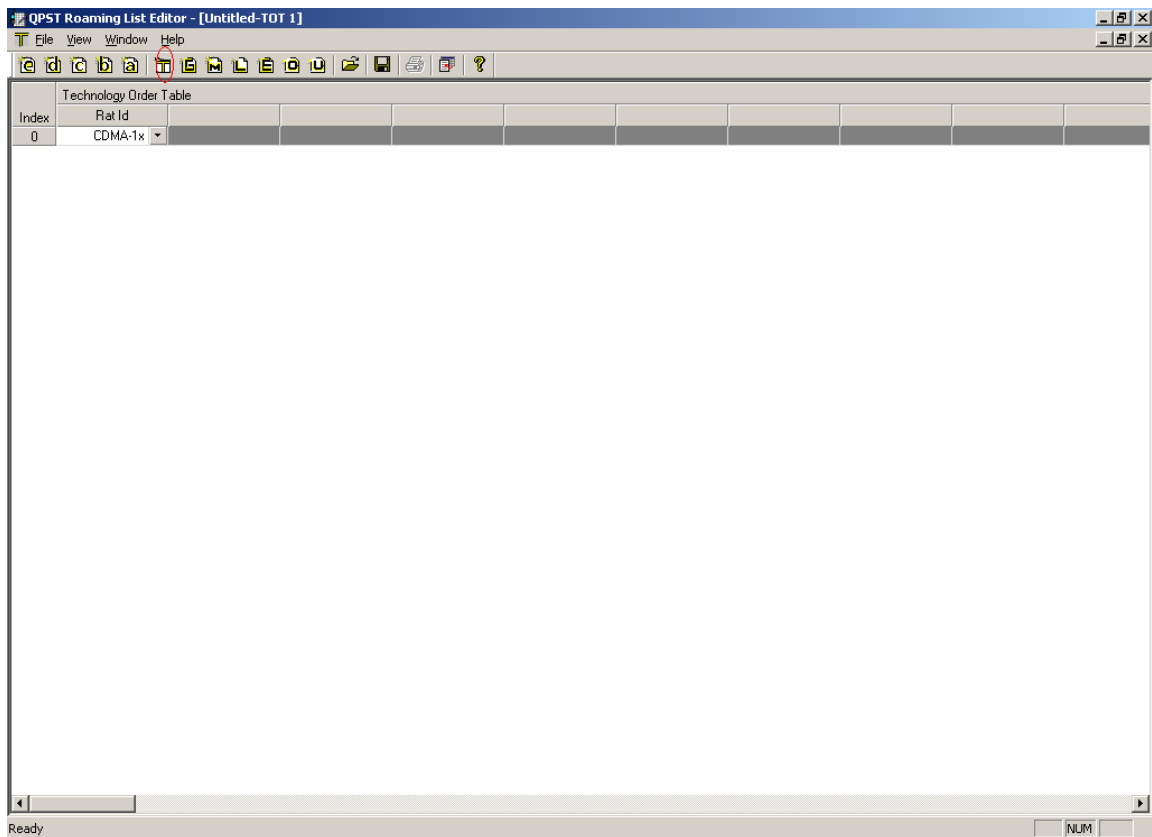


Figure 8-13 Roaming List Editor Edit mode for new technology order table files

8.2.1.6 3GPPBST files

You can create new 3GPPBST files using the file menu or the toolbar (see red circle in [Figure 8-14](#)). To open an existing file, use the file menu or the toolbar (see [Section 8.4](#)). The 3GPPBST file window consists of the following sections:

- Properties
- ID view

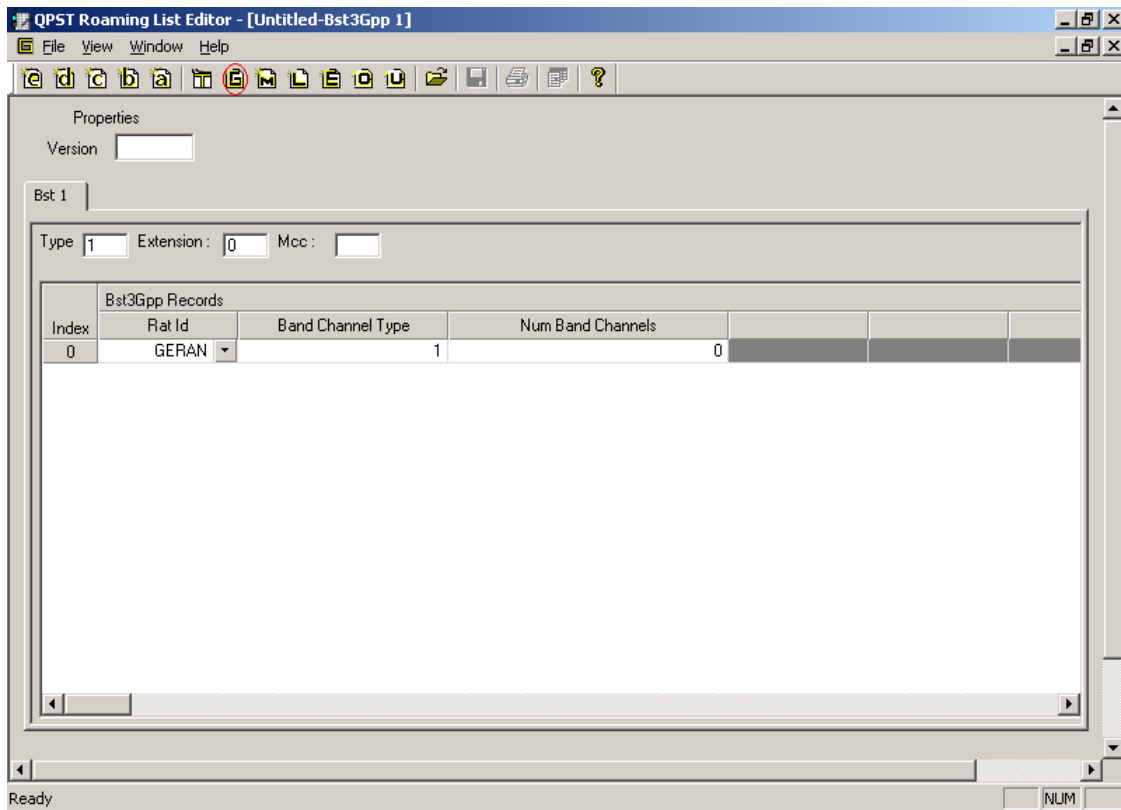


Figure 8-14 Roaming List Editor Edit mode for new 3GPPBST files

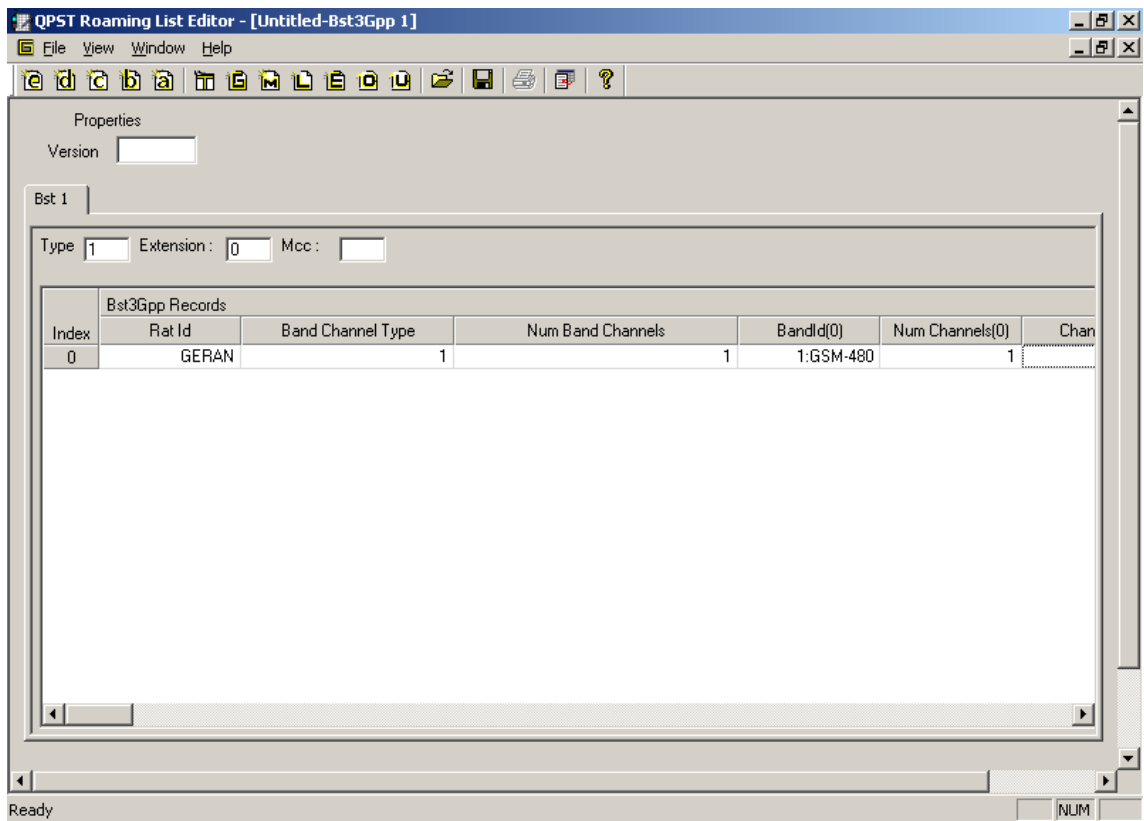
Properties

The properties section consists of the Version field. It is common for all the tabs and is a mandatory field.

1 ID view

2 This part of the screen is multi-tabbed. Mcc field is common for all the records within the tab and
 3 is a mandatory field. At least one record should be present in each tab in the ID View. On
 4 opening a new file, a single tab with a single record is created, with Rat ID initialized to GERAN
 5 and Num Band Channels to 0. The Bst ID on the tab (labeled “Bst”) is sequential (see
 6 [Figure 8-15](#)).

7 Upon increasing the number of band channels, an equivalent number of Band ID and number of
 8 channels fields are created. Band ID is uninitialized and the number of channels is initialized to 0.
 9 The drop-down contents of Band ID are determined based on the Rat ID. Upon changing the Rat
 10 ID, Band ID values get mapped to the corresponding band ID for the new Rat ID. Upon
 11 increasing the number of channels, an equivalent number of channels fields are created.



12 **Figure 8-15 Relevant fields get enabled on filling data**

13

8.3 Text View mode

Text View mode presents a roaming list file formatted entirely as text, as shown in [Figure 8-16](#). You can see a file in Text View mode by clicking the Text View icon on the toolbar. You can save from Text View mode into an ASCII text file (as opposed to the standard binary roaming list file). You can subsequently reopen the ASCII file with the Roaming List Editor and work with it exactly as you would a standard binary file.

NOTE: If you click the Text View icon before entering all required information in the Edit mode window, a warning is displayed notifying you of the first field where an entry is missing or incorrect. You must correct all errors before using Text View mode.

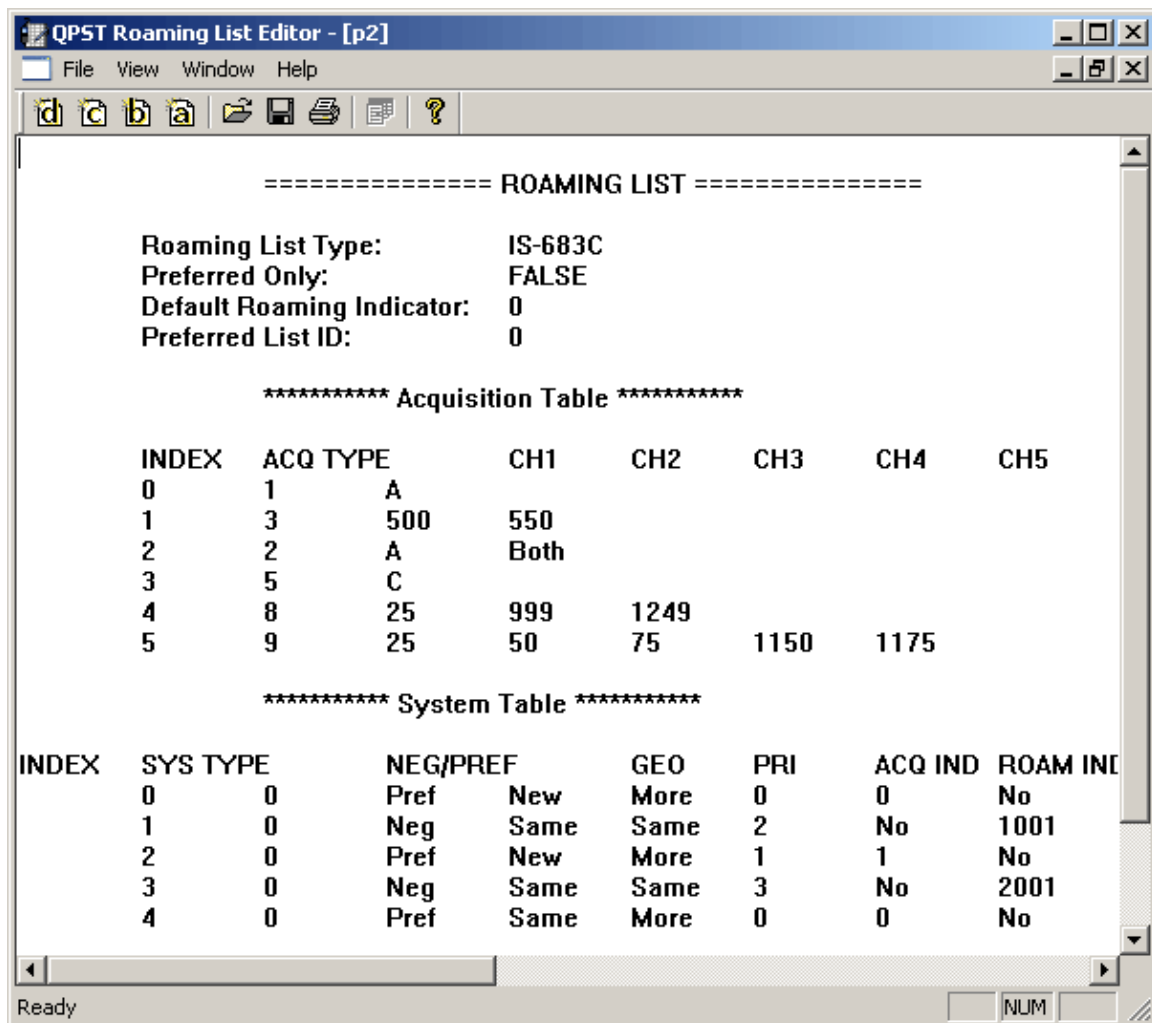


Figure 8-16 Roaming List Editor Text View mode

8.4 Operating conventions

8.4.1 Use of mouse

Use your computer's mouse with Roaming List Editor's Edit mode as you would when using any Windows application.

- Left-click to select a toolbar icon, menu item, or field in the Roaming List Editor, or to switch the focus out of a field
- Right-click to open a pop-up menu for edit functions

8.4.2 Toolbar

The Roaming List Editor toolbar, shown in [Figure 8-17](#), allows you to:

- Create a new roaming list in any of the supported formats (e, d, c, b, a)
- Create new file types
 - T – Technology order
 - G – 3GPPBST
 - M – MSPL
 - L – MLPL
 - E – EHPLMN
 - O – OPLMN
 - U – UPLMN
- Open a roaming list file or save a roaming list file
- Print a roaming list; printing is available only in Text View mode
- View a roaming list in Text View mode
- Display Roaming List Editor Help topics

You can show or hide the toolbar by selecting View → Toolbar.



Figure 8-17 Roaming List Editor toolbar

8.4.3 Special keys

Use the **tab** and **enter** keys to accept entered data and move through fields in each area of the Edit mode window. In a field containing a drop-down list, press **enter** to open the list, and then use the up and down arrow keys to highlight an entry in the list. Pressing **enter** again selects the highlighted item.

The left and right arrow keys move the focus through the cells of a row. The up and down keys move the focus within an open drop-down list.

Use **esc** if you are typing a new entry in a table field and want to revert to the previous value.

Use **delete** to clear an entry from a table field.

8.5 Command Line mode

Roaming List Editor can also be used in Command Line mode. This mode is useful when specific commands need to be applied to a roaming list file without any user interaction.

To use the Command Line mode, invoke the Roaming List Editor from a command prompt with one of the supported command line options described in the following paragraphs.

Convert file from Binary to ASCII: -f

This option takes a binary file as input and generates an ASCII text file as output. For example, to generate an ASCII text file named “outfile.txt” from a binary file named “infile.prl”:

```
C:\>RLEditor.exe -f infile.prl outfile.txt
```

If the command fails to execute properly (perhaps due to a malformed input file), no output file will be generated.

Convert file from ASCII to Binary: -u

This option takes an ASCII text file as input and generates a binary file as output. For example, to generate a binary file named “outfile.prl” from an ASCII text file named “infile.txt”:

```
C:\>RLEditor.exe -u infile.txt outfile.prl
```

If the command fails to execute properly, no output file will be generated.

NOTE: The format of the input ASCII text file must strictly follow the format generated by the Roaming List Editor when it saves an ASCII text file; any deviation from this format will result in failure of the command. A suggested method to ensure adherence to the proper format is to start by converting a binary file into an ASCII text file, modifying that file as needed, then converting it back to binary.

9 Using the QPST Automation Server

This chapter describes the Automation Server and documents the interfaces and methods available for a script to perform automation functions.

NOTE: All examples use the Perl language.

9.1 The QPST Automation server

The Automation Server is an application that acts as an interface between a scripting language (or another application) and the QPST port server. The QPST port server allocates and monitors ports that you assign to it through the QPST Configuration application. The Automation Server's user interface allows you to select a port for your script to use, and to monitor the progress of commands for errors (Figure 9-1).

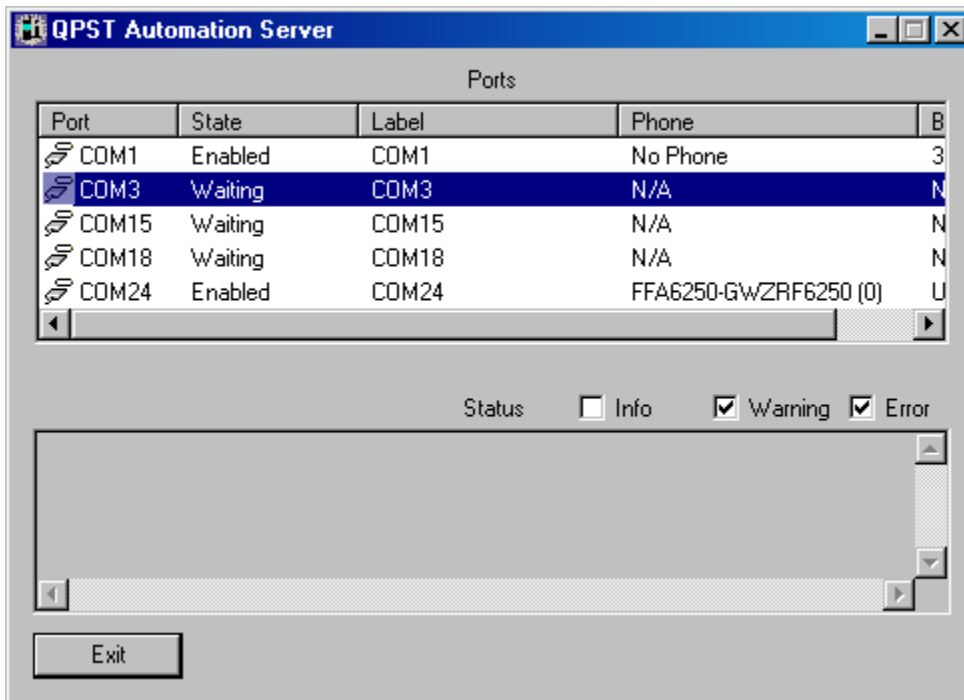


Figure 9-1 QPST Automation Server user interface

The Automation Server user interface is invisible by default. You must enable it with ShowWindow as discussed in Section 9.4.2.

The upper window (Ports) allows you to select a COM port by clicking the row associated with that port. Your script can retrieve a pointer to the Port Proxy interface for the selected port with `GetSelectedPort`. You can only select ports that you have added through the QPST Configuration application. If your script does not make the user interface visible, use `GetPort` to retrieve a Port Proxy interface for a named COM port.

The lower window (Status) displays the processing status of the Automation APIs.

9.2 Using automation with other languages

The automation interfaces are derived from the Microsoft IDispatch interface.

C++ clients should use the IDispatch interface rather than an interface's v-table. That is, you should create stubs that call IDispatch methods (`GetIDsOfNames`, `Invoke`) rather than link directly against the interface's v-table. The interfaces are intended for scripting languages that use late binding, such as Perl. New methods may be added to an interface in the future. This will not affect Perl applications, but would cause C++ clients that used v-table binding to fail.

9.3 The root automation interface

Starting the QPST Automation server through a Perl script will return a pointer to the server's root automation interface:

```

use Win32::OLE;
use Win32::OLE::Variant;
$prod_id = "QPSTAtmnServer.Application";
eval
{
    $qpst = Win32::OLE->GetActiveObject($prod_id)
};
die "$prod_id not installed" if $@;
unless (defined $qpst)
{
    $qpst = Win32::OLE->new($prod_id, sub {$_[0]->Quit;}) or die "Oops,
cannot start $prod_id";
}
if (defined $qpst)
{
    # $qpst now set to the Automation server root interface
    # Code to use the automation interface goes here

    undef $qpst;
}

```

You use the root interface to obtain pointers to other interfaces and control basic QPST operations.

9.4 Error checking

If you call a method that returns an interface, you should check for success by ensuring that the method “defined” the interface. See the example in Section 9.3 (if (defined \$qpst)).

Each method returns status to the Perl interpreter. If Win32::OLE->LastError() + 0 return a nonzero number (the +0 forces Perl to evaluate the return status as a number), then the interface method encountered an error. The nonzero value returned by LastError() is in the Microsoft HRESULT format.

The following subsections describe the root automation interface methods.

9.4.1 GetPortList()

GetPortList returns an interface that describes the ports currently allocated to QPST. The method takes a snapshot of the port status, and the interface provides functions to return the cached information to your script. See Section 9.5 for details.

```
$port_list = qpst->GetPortList();
```

9.4.2 ShowWindow()

This method shows the Automation Server user interface. When the Automation server starts, its user interface is invisible by default.

```
$qpst->ShowWindow();
```

9.4.3 HideWindow()

This method hides the Automation Server user interface.

```
$qpst->HideWindow();
```

9.4.4 Quit()

This method tells the Automation server to quit.

```
$qpst->Quit();
```

Generally, it is called by a Perl destructor:

```
Win32::OLE->new($prod_id, sub {$_[0]->Quit;})
```

9.4.5 GetPort(comPort)

This method returns a pointer to the Port Proxy interface for the port named comPort. The Port Proxy interface can return additional interfaces that provide Software Download, EFS, and provisioning support functions. See Section 9.4.7 for details.

```
$port = $qpst->GetPort("COM1");
```

9.4.6 GetSelectedPort()

GetSelectedPort returns a Port Proxy interface for the port selected in the Automation Server's user interface. See Section 9.6 for details.

```
$port = $qpst->GetSelectedPort();
```

9.4.7 GetCOMPortList()

GetCOMPortList returns a COM Port List interface. This interface lists all the COM ports on your system and indicates port type and whether the port has been allocated to QPST. See Section 9.5 for details.

```
$com_list = $qpst->GetCOMPortList();
```

9.4.8 AddPort (comPort, portLabel)

This method adds the port named comPort to QPST with the label portLabel. It performs the same function as the Configuration Application Add New Port button.

```
$qpst->AddPort("COM2", "Serial Port 2");
```

9.4.9 RemovePort(comPort)

This method removes the port named comPort from QPST. It performs the same function as the Configuration Application Remove button.

```
$qpst->RemovePort("COM2");
```

9.4.10 EnablePort(portName)

This form of EnablePort returns the current state of the port named portName; 0 = port disabled, nonzero = port enabled. It performs the same function as the Configuration Application Enable and Disable buttons.

You should examine the EnablePort property only if the port is assigned to QPST (AssignedToQPST on the COM Port List interface returns nonzero for this port).

```
$state = $qpst->EnablePort("COM2");
```

9.4.11 EnablePort(portName, newState)

This command changes the state of the port named portName to newState. 0 = disable the port, 1 = enable the port. You should change this property only if this port is assigned to QPST.

```
$qpst->SetProperty('EnablePort', "COM2", 1);
```

(The "\$qpst->{EnablePort("COM2")} = 1;" syntax does not compile in Perl.)

9.5 Port List interface

The Port List interface returns a snapshot of information about a port. The information is cached at the time GetPortList() is called.

You can retrieve this interface from the Automation Server root interface:

```
$port_list = qpst->GetPortList();
If (defined $port_list)
{
}
```

9.5.1 Version()

This method returns the version of QPST as a string.

```
$version = $port_list->Version();
```

9.5.2 PhoneCount()

This method returns the count of COM ports allocated to QPST.

```
$port_count = $port_list->PhoneCount();
```

NOTE: For the remaining functions in this section, $0 \leq i < \text{\$port_count}$.

9.5.3 PortName(\$i)

This method returns the name of the COM port as a string.

```
$port_name = $port_list->PortName($i);
```

9.5.4 PortLabel(\$i)

This method returns the QPST port label.

```
$port_label = $port_list->PortLabel($i);
```

9.5.5 IsUSB(\$i)

This method returns 0 if the port is serial, 1 if the port is USB.

```
$is_usb = $port_list->IsUSB($i);
```

9.5.6 PhoneMode(\$i)

This method returns the mode of the phone as detected by QPST. Modes are listed in [Table 9-1](#).

```
$phone_mode = $port_list->PhoneMode($i);
```

Table 9-1 Phone mode values

Phone mode	Meaning
0	No phone detected
2	Phone in Download mode
3	Phone in Diagnostic mode
4	Phone offline and in Diagnostic mode
6	Phone in streaming Download mode

9.5.7 PhoneStatus(\$i)

This method returns the status of the phone. Status values are listed in [Table 9-2](#).

```
$phone_status = $port_list->PhoneStatus($i);
```

Table 9-2 Phone status values

Phone status	Meaning
0	No phone detected
5	Phone ready

NOTE: For the remaining functions, phone mode must be either 3 or 4 and status must be 5.

9.5.8 ModelNumber(\$i)

This method returns the phone's mobile model number.

```
$model_number = $port_list->ModelNumber($i);
```

9.5.9 BuildId(\$i)

This method returns the phone's build information.

```
$build_id = $port_list->BuildId($i);
```

9.5.10 ESN(\$i)

This method returns the ESN of the phone on the port.

```
$esn = $port_list->ESN($i);
```


9.5.11 IMEI(\$i)

This method returns the phone's IMEI.

```
$imei = $port_list->IMEI($i);
```

9.5.12 MEID(\$i)

This method returns the phone's MEID.

```
$meid = $port_list->MEID($i);
```

9.6 The Port Proxy interface

This interface works with the active port. It can return pointers to other interfaces. To get a pointer to the Port Proxy interface, use the root QPST interface:

```
$port = $qpst->GetSelectedPort();
- or -
$port = $qpst->GetPort("COM1");
if (defined $port)
{
}
```

9.6.1 EFS

The EFS interface returns a pointer to the phone's embedded file system interface. See Chapter 0 for more information on this interface.

NOTE: The EFS interface only works with phones that support the EFS 2.0 protocol.

```
$efs = $port->EFS;
if (defined $efs)
{
}
```

9.6.2 SoftwareDownload

This method returns a pointer to the Software Download interface. See Chapter 0 for more information on this interface.

```
$software_download = $port->SoftwareDownload;
if (defined $software_download)
{
}
```

9.6.3 Provisioning

This method returns a pointer to the phone provisioning interface. See Section 9.10 for more information.

```

5     $provisioning = $port->Provisioning;
6     if (defined $provisioning)
7     {
8     }

```

9.6.4 Reset()

Reset sends a reset command to the phone.

```

12    $port->Reset();

```

9.6.5 Offline()

Offline sends a command to the phone to change it to offline mode. Use Reset to restart the phone and return it to online status.

```

17    $port->Offline();

```

9.6.6 SendSPC(spc)

This method sends the Service Provisioning unlock code. “spc” is a six-digit character string. If you send an incorrect string, the phone will disconnect from QPST for 1 min.

```

22    $port->SendSPC("123456");

```

9.6.7 SendCommand(cmd, tmo)

This method sends an arbitrary command “cmd” to the phone and gets a response. It uses a command timeout value of “tmo” ms.

For example, to send a 1-byte command (\$command) and get a reply (\$reply):

```

27
28    $timeout_in_ms = 2000;
29    $diag_cmd = pack "C", $command;
30
31    $diag_request_var = Variant(VT_ARRAY | VT_UI1, length $diag_cmd);
32    $diag_request_var->Put($diag_cmd);
33
34    $reply = $port->SendCommand($diag_request_var, $timeout_in_ms);
35
36    if (defined $reply)
37
38        # use the unpack command to turn $reply into an list of
39        # fields using $unpack_mask
40        @reply_values = unpack $unpack_mask, $diag_reply;
41    }

```

9.6.8 LockPhone()

This method sets the QPST state of the phone to locked to block cooperating QPST GUI applications from using this phone.

```
$port->LockPhone();
```

9.6.9 UnlockPhone()

This method unlocks a phone locked previously with LockPhone.

```
$port->UnlockPhone();
```

9.6.10 Phone information functions

These functions return the same information as the Port List interface:

PortName	PortLabel
IsUSB	PhoneMode
PhoneStatus	ModelNumber
BuildId	ESN
IMEI	MEID

9.7 The COM Port List interface

This interface enables you to examine all system COM ports. You can determine the port type (USB/Serial) and whether you have the port assigned to QPST.

```
$port_list = $qpst->GetCOMPortList();
if (defined $port_list)
{
}
```

9.7.1 PortCount

This method returns the number of COM ports.

```
$port_count = $port_list->PortCount;
```

NOTE: For the rest of the functions in this section, $0 \leq i < \text{\$port_count}$.

9.7.2 PortName(\$i)

This method returns the name of the COM port.

```
$port_name = $port_list->PortName($i);
```

9.7.3 PortType(\$i)

This method returns the port type as a string:

- Serial – Conventional UART serial port
- USB/Unknown – Unknown type USB COM port, or non-Qualcomm device driver
- USB/QC Data Modem – Qualcomm data modem
- USB/QC Diagnostic – Qualcomm diagnostic port
- USB/QC NMEA – Qualcomm gpsOne
- Assigned – A disconnected USB phone, port still assigned to QPST
- Waiting – A disconnected USB phone from a previous QPST session

QPST works only with serial or USB/QC diagnostic port types. If a phone on a port of Assigned or Waiting type reconnects to the PC, QPST will begin to use it again.

```
$port_type = $port_list->PortType($i);
```

9.7.4 AssignedToQPST(\$i)

This method returns nonzero if the port is in use by QPST, 0 if not.

```
$port_asgn = $port_list->AssignedToQPST($i);
```

9.7.5 DeviceDescription(\$i)

This method returns a device description string from the USB device driver.

```
$port_desc = $port_list->DeviceDescription($i);
```

9.8 Software Download interface

Methods on this interface allow you to download a new software build to a phone. You must determine which method to use based on your knowledge of the target phone:

- NAND vs. NOR Flash
- Single-image vs multi-image download

You must also know what setting to use for:

- Trusted boot (secure boot) vs nontrusted boot
- The Service Provisioning Code (SPC)

To get a pointer to this interface, use the Port Proxy interface:

```
$software_download = $port->SoftwareDownload;
```

After a download operation completes, use `GetErrorMessage` to test the success of the operation:

```
$error_message = $software_download->GetErrorMessage();
```

This will return an empty string if the operation succeeded; otherwise, it will return a description of the error.

CAUTION: An unsuccessful software download will generally render the phone unusable. The only recovery is to reprogram the Flash device through the phone's JTAG interface.

NOTE: Before calling any of these methods, ensure the phone is ready and in Diagnostic mode (status equal 5 and phone mode 3 or 4).

9.8.1 BackupNV

This method backs up the phone's NV data to a QCN file.

→ `$nv_backup_path` = file path for a QCN-type file to save the NV contents for the new phone build, e.g., `c:\download\backup.qcn`

→ `$spc` = the six-digit service provisioning code, e.g., 123456

```
$software_download->BackupNV($nv_backup_path, $spc);
```

9.8.2 RestoreNV

This method restores NV data to a phone from a QCN file.

→ \$nv_backup_path = file path for a QCN-type file to save the NV contents for the new phone build, e.g., c:\download\backup.qcn

→ \$spc = the service provisioning code, six-digit characters, e.g., 123456

→ \$allow_esn_mismatch = 0 to verify the ESN in the backup file matches phone, 1 to bypass this test; recommended setting is 0

```
$software_download->RestoreNV($nv_backup_path, $spc, $allow_esn_mismatch);
```

9.8.3 NANDFlash

This method returns 0 for a NOR Flash, 1 for a NAND Flash.

```
$nand_flash = $software_download->NANDFlash;
```

9.8.4 DownloadPhoneImage

This method downloads a new build to a single-image phone that uses NOR or NAND Flash.

→ \$phone_image_path = file path of the hex-format file to download, e.g., c:\download\build.hex

→ \$model_check_override = 0 to perform the model number check, 1 to bypass this test; recommended setting is 0

→ \$clear_phone_error_log = 0 to keep the current error log, 1 to clear the error log; recommended setting is 1.

→ \$nv_backup_path = file path for a QCN-type file to save the NV contents for the new phone build, e.g., c:\download\backup.qcn

→ \$spc = the six-digit service provisioning code, e.g., 123456

```
$software_download->DownloadPhoneImage
```

```
(
    $phone_image_path,
    $model_check_override,
    $clear_phone_error_log,
    $nv_backup_path,
    $spc
);
```

9.8.5 DownloadBootImage

This method downloads a boot image to a single-image phone that uses NAND Flash.

→ \$boot_image_path = file path of the hex file to download, e.g., c:\download\build.hex

→ \$spc = the six-digit service provisioning code, e.g., 123456

```
$software_download->DownloadBootImage($boot_image_path, $spc);
```

9.8.6 DownloadPhoneAndBootImage

This method downloads both the boot image and phone image to a single-image NAND phone.

→ \$phone_image_path = file path of the hex file to download, e.g., c:\download\build.hex

→ \$boot_image_path = file path of the hex file to download, e.g., c:\download\build.hex

→ \$model_check_override = 0 to perform the model number check, 1 to bypass this test; recommended setting is 0

→ \$clear_phone_error_log = 0 to keep the current error log, 1 to clear the error log; recommended setting is 1

→ \$nv_backup_path = file path for a QCN-type file to save the NV contents for the new phone build, e.g., c:\download\backup.qcn

→ \$spc = the six-digit service provisioning code, e.g., 123456

```
$software_download->DownloadPhoneAndBootImage
(
    $phone_image_path,
    $boot_image_path,
    $model_check_override,
    $clear_phone_error_log,
    $nv_backup_path,
    $spc
);
```

9.8.7 MultiImageDownload

This method downloads a set of files to a phone that uses a multi-image configuration.

→ \$phone_image_path = a path to a directory that contains hex-format files to download. The path MUST end with a “\” character. The download files must use standard names:

Required files

partition.mbn	pbl.mbn
qcsbl.mbn	qcsblhd_cfgdata.mbn
oemsbl.mbn	oemsblhd.mbn
amss.mbn	amsshd.mbn

Optional files

apps.mbn and appshd.mbn

appsboot.mbn and appsboothd.mbn

NOTE: The pbl.mbn file is used only if \$useTrustedMode is set to 0.

→ \$nv_backup_path = file path for a QCN-type file to save the NV contents for the new phone build, e.g., “c:\download\backup.qcn”

→ \$spc = the six-digit service provisioning code, e.g., 123456

→ \$overridePrtnTable = 0 to fail the download if partition.mbn doesn't match the partition table in the phone, 1 to re-partition the phone's flash. Repartitioning the flash device requires erasing the entire flash device. A failure after this point will render the phone unusable. You should only set this to 1 if GetErrorMessage() returned an error string indicating a partition table mismatch.

→ \$useTrustedMode = 0 to use non-trusted boot (requires pbl.mbn file), 1 to use trusted boot.

→ \$clear_phone_error_log = 0 to keep the current error log, 1 to clear the error log.
Recommended setting is 1.

→ \$model_check_override = 0 to perform the model number check, 1 to bypass this test.
Recommended setting is 0.

```
$software_download->MultiImageDownload
(
    $phone_image_path,
    $nv_backup_path,
    $spc,
    $overridePrtnTable,
    $useTrustedMode,
    $clear_phone_error_log,
    $model_check_override
);
```

9.8.8 DownloadCEFS_Image

This method downloads a canonical EFS image that will replace the phone's current EFS contents. You can extract a CEFS file from the phone using the QPST Gang Image application.

→ \$cefs_path = path to the CEFS file.

→ \$partition_path = path to the partition.mbn file.

```
$software_download->DownloadCEFS_Image
(
    $cefs_path,
    $partition_path
);
```


9.9 EFS (phone file system) interface

This interface allows you to modify the contents of the phone's file system.

NOTE: The EFS interface only works with phones that support the EFS 2.0 protocol.

You can get the EFS interface from the Port Proxy interface:

```
$efs = $port->EFS;
if (defined $efs)
{
}
```

NOTE: The phone protects some of its file system directories. You will receive an error if you try to access one of these directories.

9.9.1 EFSVersion

This method returns the EFS protocol version used by the phone. The methods on the EFS interface only work with phones that support version 2 of the protocol.

Example

```
$version = $efs->EFSVersion;
if ($version == 2)
{
    # Add code here that calls methods through $efs.
}
else
{
    print "Incompatible EFS version\n";
}
```

9.9.2 EFSMaxName

This method returns the MAX_NAME field from the EFS2_DIAG_QUERY command.

Example

```
$efs_max_name = $efs->EFSMaxName;
print "max name $efs_max_name\n";
```

9.9.3 EFSMaxPath

This method returns the MAX_PATH field from the EFS2_DIAG_QUERY command.

Example

```
$efs_max_path = $efs->EFSMaxPath;
print "max path $efs_max_path\n";
```

9.9.4 EFSMaxLinkDepth

This method returns the MAX_LINK_DEPTH field from the EFS2_DIAG_QUERY command.

Example

```
$efs_max_link_depth = $efs->EFSMaxLinkDepth;
print "max link depth $efs_max_link_depth\n";
```

9.9.5 EFSMaxFileSize

This method returns the MAX_FILE_SIZE field from the EFS2_DIAG_QUERY command.

Example

```
$efs_max_file_size = $efs->EFSMaxFileSize;
print "max file size $efs_max_file_size\n";
```

9.9.6 EFSMaxDirEntries

This method returns the MAX_DIR_ENTRIES field from the EFS2_DIAG_QUERY command.

Example

```
$efs_max_dirs = $efs->EFSMaxDirEntries;
print "max dirs $efs_max_dirs\n";
```

9.9.7 EFSMaxMounts

This method returns the MAX_MOUNTS field from the EFS2_DIAG_QUERY command.

Example

```
$efs_max_mnts = $efs->EFSMaxMounts;
print "max mounts $efs_max_mnts\n";
```

9.9.8 CopyPCToPhone

This method copies a file from the PC to EFS.

Example

```
$efs->CopyPCToPhone($efs_path, $pc_path);
→ $efs_path = destination path, e.g., /tmp/test.txt
→ $pc_path = source path, e.g., c:\doc\test.txt
```

NOTE: This method uses SHCreateStreamOnFile to access the file on the PC. That function will return an error if it cannot parse the \$pc_path or access the file.

9.9.9 CreateDirectoryAndWriteFile

This method creates intermediate directories to the EFS file named in `$efs_path`, if necessary, then uses `CopyPCToPhone` to copy the file from `$pc_path` to `$efs_path`.

Example

```
$efs->CreateDirectoryAndWriteFile($efs_path, $pc_path);
```

9.9.10 CopyPhoneToPC

This method copies a file from EFS to the PC.

Example

```
$efs->CopyPhoneToPC($efs_path, $pc_path);
```

→ `$efs_path` = destination path, e.g., `/tmp/test.txt`

→ `$pc_path` = source path, e.g., `c:\doc\test.txt`

NOTE: This method uses `SHCreateStreamOnFile` to access the file on the PC. That function will return an error if it cannot parse the `$pc_path` or access the file.

9.9.11 CopyFile

This method copies a file from one point in the EFS file system to a different point.

Example

```
$efs->CopyFile($old_efs_path, $new_efs_path);
```

→ `$old_efs_path` = path to the existing file, e.g., `/tmp/test.txt`

→ `$new_efs_path` = destination, e.g., `/doc/doc1.txt`

9.9.12 DirList

This method returns an object that contains a list of files and properties. The method returns only the filename, not the complete path.

Example

```
$dir_iter = $efs->DirList($efs_path);
```

→ `$efs_path` = path to directory, e.g., `/tmp`

← `$dir_iter` = pointer to the `IItDirContents` interface on a directory iterator object.

9.9.12.1 Directory iterator object (\$dir_iter)

9.9.12.1.1 Count

This method returns the count of files/directories/links/etc. in the object.

Example

```
$count = $dir_iter->Count;
```

NOTE: For the following examples under this heading, $0 \leq i < \text{Count}$.

9.9.12.1.2 EntryName

This method returns the filename, not the complete path to the file.

Example

```
$name = $dir_iter->EntryName($i);
print "name $name\n";
```

9.9.12.1.3 EntryType

This method returns the file type.

Example

```
%file_type_list = qw (
    0 file
    1 dir
    2 link);
$type = $file_type_list{$dir_iter->EntryType($i)};
print " type $type\n";
```

NOTE: You can enumerate the entire file system by using DirList on subdirectories (entry type 1).

9.9.12.1.4 Mode

This method returns the file mode as a string.

Example

```
$fmode = $dir_iter->Mode($i);
print " mode $fmode\n";
```

The mode can contain any combination of file protections "S_IXOTH", "S_IWOTH", "S_IROTH", "S_IXGRP", "S_IWGRP", "S_IRGRP", "S_IXUSR", "S_IWUSR", "S_IRUSR", and one of file type "S_ISCHR", "S_ISDIR", "S_ISBLK", "S_ISREG", "S_ISLNK", "S_ISITM".

9.9.12.1.5 EntrySize

This method returns the size of the entry in bytes.

Example

```
$fsize = $dir_iter->EntrySize($i);  
print " size $fsize\n";
```

9.9.12.1.6 AccTime

This method returns the last access time as a string.

Example

```
$atime = $dir_iter->AccTime($i);  
print " acc time $atime\n";
```

9.9.12.1.7 ModTime

This method returns the modification time as a string.

Example

```
$mtime = $dir_iter->ModTime($i);  
print " mod time $mtime\n";
```

9.9.12.1.8 ChgTime

This method returns the status change time.

Example

```
$ctime = $dir_iter->ChgTime($i);  
print " chg time $ctime\n";
```

9.9.13 RecursiveDirList

This method returns the same kind of object as DirList, but recursively traverses the directory tree starting at \$efs_path.

Example

```
$dir_iter = $efs->RecursiveDirList($efs_path);
```

9.9.14 StatFile

This method returns file properties. Note that this method uses references to Variant data types.

Example

```
$mode = Variant(VT_BSTR | VT_BYREF, "");
$size = Variant(VT_I4 | VT_BYREF, 0);
$nlink = Variant(VT_I4 | VT_BYREF, 0);
$atime = Variant(VT_BSTR | VT_BYREF, "");
$mtime = Variant(VT_BSTR | VT_BYREF, "");
$ctime = Variant(VT_BSTR | VT_BYREF, "");
$efs->StatFile($efs_path, $mode, $size, $nlink, $atime, $mtime, $ctime);
```

→ \$efs_path = path to file.

← \$nlink = number of links to the file

← \$mode, \$size, \$atime, \$mtime, \$ctime = as described in the directory iterator object section.

9.9.15 StatLink

This method returns file properties. Note that this method uses references to Variant data types.

Example

```
$mode = Variant(VT_BSTR | VT_BYREF, 0);
$atime = Variant(VT_BSTR | VT_BYREF, 0);
$mtime = Variant(VT_BSTR | VT_BYREF, 0);
$ctime = Variant(VT_BSTR | VT_BYREF, 0);
$efs->StatLink($efs_path, $mode, $atime, $mtime, $ctime);
```

→ \$efs_path = path to file.

← \$mode, \$atime, \$mtime, \$ctime = as described in the directory iterator object section.

9.9.16 Mkdir

This method creates a new directory.

Example

```
$efs->Mkdir($new_efs_path);
```

→ \$new_efs_path = directory path to create.

9.9.17 Rmdir

This method removes a directory, which must be empty.

Example

```
$efs->Rmdir($efs_path);
```

→ \$efs_path = directory to delete.

9.9.18 ReadLink

This method translates a link to the path it represents.

Example

```
$fs_name = Variant(VT_BSTR | VT_BYREF, "");
```

```
$efs->ReadLink($efs_path, $fs_name);
```

→ \$efs_path = path to the link

← \$fs_name = translation of the link to an absolute path

9.9.19 Rename

This method renames a file.

Example

```
$efs->Rename($old_efs_path, $new_efs_path);
```

→ \$old_efs_path = path to existing file

→ \$new_efs_path = new name for file

9.9.20 StatFS

This method returns file system parameters.

Example

```

$fs_id      = Variant(VT_I4      | VT_BYREF, 0);
$fs_type    = Variant(VT_BSTR    | VT_BYREF, "");
$blk_size   = Variant(VT_I4      | VT_BYREF, 0);
$tot_blks   = Variant(VT_I4      | VT_BYREF, 0);
$avail_blks = Variant(VT_I4      | VT_BYREF, 0);
$free_blks  = Variant(VT_I4      | VT_BYREF, 0);
$max_size   = Variant(VT_I4      | VT_BYREF, 0);
$n_files    = Variant(VT_I4      | VT_BYREF, 0);
$max_n_files = Variant(VT_I4      | VT_BYREF, 0);

$efs->StatFS($efs_path, $fs_id,
            $fs_type, $blk_size,
            $tot_blks, $avail_blks,
            $free_blks, $max_size,
            $n_files, $max_n_files);

```

→ \$efs_path = path to file system, e.g., “/”, “/mmc1”, etc.

The return parameters are described by the File System ICD (see [Q3]).

9.9.21 CreateLink

This method creates a link to a file.

Example

```

$efs->CreateLink($old_efs_path, $new_efs_path);

```

→ \$old_efs_path = existing file path

→ \$new_efs_path = path to new link

9.9.22 Delete

This method deletes a file or link.

Example

```

$efs->Delete($efs_path);

```

→ \$efs_path = path to file to delete

9.9.23 RemoveTree

This method deletes a subdirectory tree including the named directory.

Example

```
$efs->RemoveTree($efs_path, $allow_root_delete);
→ $efs_path = path to sub-directory tree.
→ $allow_root_delete = set to 1 to allow "/" as $efs_path. If set to 0,
RemoveTree will return an error if the root directory is used for
$efs_path.
```

9.9.24 IsDirectoryEmpty

This method returns a Boolean value indicating whether the directory is empty.

Example

```
$is_empty = $efs->IsDirectoryEmpty($efs_path);
→ $efs_path = path to directory.
← $is_empty = returns 1 if the directory is empty, otherwise 0.
```

9.9.25 GetLastError

This method returns extended error information, then clears this error information. It is valid only when Win32::OLE->LastError() + 0 (the HRESULT) returns nonzero.

EFS commands sent to the phone return an `errnum` value to indicate command success or failure. An `errnum` of 0 indicates success. The code returned as the third parameter of `GetLastError` returns the `errnum` if the phone rejected the command. Error codes 1 through 512 represent phone `errnum` values 0 through 511. Error code 513 indicates an `errnum` > 511.

Error codes > 513 represent QPST internally detected errors. EFS directories protected by the phone will return `EFS_bad_cmd_response` because the phone's diagnostic interface rejects the command.

The text returned in the first parameter is generally the name of the EFS command that failed.

An HRESULT of 0x80042190 indicates QPST performed a normal error recovery. An HRESULT of 0x80042191 indicates an unexpected QPST error.

Because QPST calls Microsoft functions that also return HRESULTs, you could receive an error relayed back to you from that function.

Example

```
$description = Variant(VT_BSTR | VT_BYREF, "");
$guid        = Variant(VT_BSTR | VT_BYREF, "");
$help_ctx    = Variant(VT_I4   | VT_BYREF, 0);
$help_file   = Variant(VT_BSTR | VT_BYREF, "");
$prog_src    = Variant(VT_BSTR | VT_BYREF, "");

$efs->GetLastError($description, $guid, $help_ctx, $help_file, $prog_src);
```

```
1      my (%error_desc_list) = qw (
2          2 EPERM
3          3 ENOENT
4          7 EEXIST
5          10 EBADF
6          13 ENOMEM
7          14 EACCES
8          17 EBUSY
9          19 EXDEV
10         20 ENODEV
11         21 ENOTDIR
12         22 EISDIR
13         23 EINVAL
14         25 EMFILE
15         27 ETXTBSY
16         29 ENOSPC
17         30 ESPIPE
18         35 FS_ERANGE
19         37 ENAMETOOLONG
20         40 ENOTEMPTY
21         41 ELOOP
22         302 ENOCARD
23         303 EBADFMT
24         304 ENOTITM
25         513 EFS_invalid_status
26         514 EFS_invalid_bytes_read
27         515 EFS_fd_mismatch
28         516 EFS_path_too_long
29         525 EFS_cmd_resp_mismatch
30         528 EFS_wr_offset_mismatch
31         530 EFS_incompat_version
32         533 EFS_bad_cmd_response);
33
34     $context_text = $error_desc_list{$help_ctx};
35     if (!defined $context_text)
36     {
37         $context_text = $help_ctx;
38     }
```

9.10 Provisioning interface

This interface allows you to change provisioning data in the phone, such as NV items and roaming lists. You must get a pointer to the provisioning interface from the Port Proxy interface:

```
$provisioning = $port->Provisioning;
```

For NV items, you must know the item number, whether the item uses an index (NAM or other index), and whether the item is protected by the SPC. For the purposes of this interface, the NAM index is zero-based.

You must set the phone offline before calling any function that writes an NV item or PRL. Some items are protected by the SPC. You will have to send this to the phone before you can access these items.

NOTE: NV items are always 128 bytes long.

9.10.1 GetNVItem(itemNumber)

This method returns the contents of NV item “itemNumber”.

```
$nv_item_data = $provisioning->GetNVItem($nv_item_number);
if (defined $nv_item_data)
{
    @nv_item_fields = unpack $nv_item_description, $nv_item_data;
}
```

9.10.2 SendNVItem(itemNumber, itemData)

This method sets NV item “itemNumber” to value “itemData”. This works only when the phone is offline. The “itemData” variable is a Microsoft safearray.

NOTE: To write an item protected by the SPC, you must unlock the phone by sending the SPC before writing the item.

```
# Create 128-byte safearray to hold request
# $nv_item_data contains NV item data created with 'pack'.
$nv_data_var = Variant(VT_ARRAY | VT_UI1, 128);
$nv_data_var->Put($nv_item_data);
# You must set the mobile offline to write NV items.
$port->Offline();
# Some NV items require sending the SPC before writing the item.
# You would do that here.
# Write the NV item.
$provisioning->SendNVItem($nv_item_number, $nv_data_var);
# Write the next NV item..
```

9.10.3 GetPRL(namIndex, rlFilePath)

This method creates a file on the PC named “rlFilePath” and saves the contents of the preferred roaming list from NAM “namIndex” in it. You can create and edit PRL files with the QPST PRL Editor.

```
$provisioning->GetPRL($prl_nam_index, $prl_file_name);
```

9.10.4 SendPRL (namIndex, rlFilePath)

This method writes a new PRL from the PC file “rlFilePath” to NAM “namIndex”.

```
$provisioning->SendPRL($prl_nam_index, $prl_file_name);
```

9.10.5 GetNVItemIndexed(itemNumber, itemIndex)

This method returns the contents of NV item “itemNumber” at index “itemIndex”.

```
$nv_item_data = $provisioning->GetNVItemIndexed($nv_item_number, $nv_item_index);
```

9.10.6 SendNVItemIndexed(itemNumber, itemIndex, itemData)

Write NV item “itemNumber” to value “itemData” at index “itemIndex”. See SendNVItem for an example of how to create \$nv_data_var.

```
$provisioning->SendNVItemIndexed($item_number, $item_index, $nv_data_var);
```