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Master Software Tools
Software User Guide

**This edition of the user guide describes
the functions, features, and capabilities of
Master Software Tools version 1.26**

/Anritsu

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Chapter 1 General Information

1-1 Introduction

Anritsu Master Software Tools version 1.25 is a Microsoft Windows 2000 and Windows XP compatible program for transferring and editing saved measurements to a PC, along with markers and limit lines. The program provides the ability to modify display parameters, to overlay multiple traces, to upload and download traces, to print traces using local or networked printers, to create and modify language files, and to edit and to add new cables, signal standards, antennas, and Pass/Fail files. The program also provides the ability to convert **.dat** files from the Handheld Software Tools program that is used on other Anritsu products into the new file formats. Master Software Tools is designed to work with Windows 2000 or Windows XP. It does not function on earlier versions of the Microsoft Windows operating system.

1-2 Features

- Download measurements (that are saved in an instrument memory) to a PC for storage and analysis.
- Capture live traces from the instrument in order to view them and save them on a PC.
- Upload measurements from a PC to the instrument memory.
- Compare multiple traces by using drag, drop, and trace overlay features (for Spectrum Analyzer measurements only).
- Add, delete, and modify Limit Lines and Markers.
- Modify the Cable List or add new cables to instruments by using the Cable Editor.
- Modify the Antenna List or add new antennas to instruments by using the Antenna Editor.
- Modify the Signal Standard List or add new Signal Standards to instruments by using the Signal Editor.
- Create, download, or edit existing Pass/Fail mode lists for WCDMA/HSDPA and GSM/GPRS/EDGE measurements.
- Display power level, calibration status, and GPS information along with a measurement, in one report.
- Create custom language files that can be uploaded to an instrument in order to customize the instrument softkey labels and messages.
- Export measurement data as text files for use in spreadsheets or other documents, and create reports in HTML format for use in a variety of applications.
- Export measurements as graphic files (**.jpg** format).
- Export measurements as CSV (Comma Separated Value format) files.
- Easily update an instrument with the latest firmware that is available from the Anritsu Web site: http://www.us.anritsu.com
- Store an unlimited number of data traces to a PC, thereby easing the task of analyzing and monitoring historical performance.
- Establish a connection to a PC by using a USB, Ethernet LAN, or Direct Ethernet connection.
- Display measurement locations by using Microsoft Map Point and GPS location mapping.

1-3 System Requirements

Minimum requirements and recommendations are:

- Microsoft Windows 2000 or Windows XP.
- Intel Pentium 233 MHz microprocessor minimum (Pentium III 350 MHz or better recommended).
- 128 MB of RAM minimum (256 MB or above recommended).
- Hard disk drive with approximately 80 MB of available space (an additional 80 MB of free space for storage of captured plots is recommended).
- A USB port (USB 1 required, USB 2.0 recommended) or an Ethernet 10/100 Base T connection for communication with the instrument.

1-4 Installation

To install the Master Software Tools version 1.26 program:

1. Insert the Anritsu Master Software Tools disk into the CDROM drive. The installation will begin automatically on most PCs.

2. If the autorun feature is disabled in your computer, then click on the Windows Start menu and select Run. Type: X:\Setup.exe, where X is the drive letter of the CDROM drive that contains the Master Software Tools disk.

3. Follow the installation prompts as directed.

4. Choices are provided to install supported firmware packages and documentation. These are optional components, but installing the firmware and documentation files for your Anritsu instrument is recommended.

5. Although the latest possible firmware files are provided on the installation CD, Master Software Tools can send notification of new releases and helpful information for installing any instrument updates. For more details, refer to *Product Updates on page 5-3*.

6. The USB driver is installed as a separate process. This installation process is initiated automatically. Please follow the prompts carefully.

Note: Master Software Tools has not completed the Microsoft XP compatibility testing, so a dialog box about Microsoft Logo Testing may appear. Installation of Master Software Tools may be safely continued.

Chapter 2 Quick Start Information

2-1 Introduction

This quick start information is intended for more advanced users who already have a basic understanding of the software. This chapter describes some of the more commonly used features that are needed to get started. All tools that are covered here are covered in more depth in *Chapter 3, Using Master Software Tools*.

2-2 Software Capabilities

The following sections describe some of the available functions and options.

Connecting the Instrument

The simplest method of connecting this instrument to a computer is by using a USB cable. After connecting the USB cable to your computer and to the instrument, select USB from the Connection drop-down menu in the toolbar. For large batches of data, use the Ethernet option that is described in the connection section of this guide because it offers faster data transfers.

Capturing or Retrieving Traces

To save the measurement that is currently on the instrument, select **Capture Current Measurement** from the **Sync** menu. This action will capture and download the trace onto your computer. This command is also available as a button in the tool bar. The button icon is an arrow pointing downward. (The button with the icon of an upward pointing arrow is for uploading measurements from the PC to the instrument.)

To retrieve a trace that was saved in the instrument, select **Device** from the file browser on the left side of the screen, then select the desired measurements. The saved trace is opened and can then be saved in the connected computer.

Limit Lines, Changing Scale, and Adding Markers

These features are accessible through the **Edit Graph** button in the workspace toolbar, or through the various context menus (mouse menus) that are displayed by right-clicking on a measurement.

Context Menus

Many menu functions are also available by right-clicking with the mouse. This usually opens a context-specific menu (a mouse menu) of available functions, commands, and options.

Overlaying Traces

To overlay two or more traces, click the **Edit Graph** button in the workspace toolbar. Select **Trace Math & Overlays,** then add or remove the desired files by selecting the appropriate button.

Saving, Opening, Creating New, and Printing Files

These controls, and most other Master Software Tools controls, are similar to those that are used by standardized Windows programs. They are listed under the **File** menu.

Folder Spectrogram

Folder Spectrogram provides a simulated 3-dimensional view of a large amount of data in one set of graphs. To create a spectrogram, navigate to **File | New... | Folder Spectrogram.** Then (from the browse file dialog box) select the desired folder to be used to produce a spectrogram. All SPA (Spectrum Analyzer) and IA (Interference Analyzer) measurements in the folder are organized chronologically and can be displayed in a variety of modes. Videos of the traces can be created and can be used in presentations. For more information about video files, refer to *Create AVI on page 4-5*.

Changing Settings and Options

To change almost any of the interface, printing, or networking options, navigate to **Tools | Program Options.** A variety of settings and options are available and are sorted under the General, Report Generator, and Internet Settings tabs.

Solving Network Problems

After checking cables and connections, check the Internet Settings tab in the **Program Options** menu. Check the proxy server settings. If proxy server is ON and should not be ON, then this causes access problems. Also, computer security settings may hinder access. If using an office network, then after evaluating these basic troubleshooting methods, contact your network administrator.

Chapter 3 Using Master Software Tools

3-1 Introduction

The core function of Master Software Tools is to view and edit measurement files that are collected by supported Anritsu instruments. This guide is written with the assumption that the user knows and understands the instrument that is being used. Many different kinds of measurements are described, but the meanings of the measurements and the measured parameters are not included in this guide.

The first step in using Master Software Tools is opening a measurement file. Measurement files may come from a variety of sources, but usually are captured as active measurements from a connected instrument, are downloaded as a stored measurement from a connected instrument, or are opened as a previous measurement that is already stored on a local hard disk (or accessible network drive.)

The first time that a measurement is opened with Master Software Tools, existing measurements will probably not be available on a local PC, so first consider how to get a measurement directly from an instrument. The first step is to establish a connection.

3-2 Connection

The instrument can be connected to the PC by using a USB connection, an Ethernet LAN connection, or a Direct Ethernet connection.

USB Connection

The instrument can be connected to the PC using the included USB cable (3-2000-1360 USB A/5-pin mini-B Cable). Connect the cable to the USB port on the computer and to the USB port (refer to Figure 3-1) on the instrument. When using the USB cable to connect to the instrument, select **Connection** from the menu bar, and then **Connect: USB** to establish a connection. If a USB connection was already established in a previous session, then the **Connect: USB** icon will be displayed on the tool bar. Click on the icon to connect to the instrument. The **Connect: USB** icon will change from red to green when communication is established. If the status bar is turned on (**View Status Bar**), then a message at the bottom displays **Connected to device using USB** when communication is established.
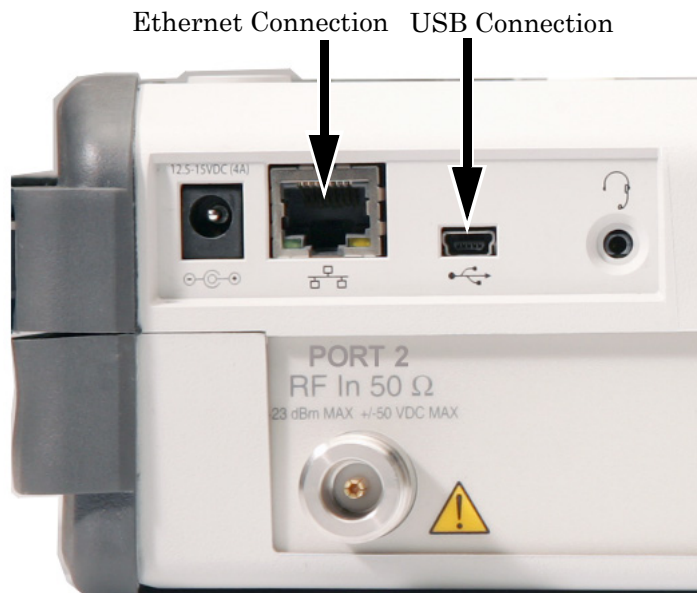
Figure 3-1. Typical Instrument Connection Ports

Ethernet LAN Connection

The RJ-45 connector is used to connect the instrument to a local area network (LAN) by using a standard Ethernet cable (refer to Figure 3-1). Integrated into the connector on the instrument are two LEDs. The amber LED indicates the presence of LAN voltages— a live LAN connection—and the green LED flashes to show that LAN traffic is present.

The Network Connection window can be used to search the local subnet (hub) for connected instruments. Double click on the matching IP address of an instrument to establish a connection to that instrument. The **Connect: Ethernet** icon will change from red to green when communication is established. If the status bar is turned on, then a message at the bottom displays **Connected to Ethernet** when communication is established.

To set or view the IP address of the instrument:

1. On the instrument, press the **Shift** key, then the **System** (8) key.

2. Select the System Options soft key, and then the Ethernet Config soft key. The Ethernet Editor will display the IP information. When using DHCP, the Ethernet cable must be connected before the instrument is turned on in order to set the IP address.

3. Press the **Esc** key to close the Ethernet Editor dialog box.

4. On the PC, open the Connection window and select **Enter IP Address.**

5. Enter the IP address of the instrument as shown in the Ethernet Editor dialog box.

6. Click on the **Connect: Ethernet** icon to establish the connection. The icon will change from red to green when communication is established.

Direct Ethernet Connection

To use a direct Ethernet connection, the instrument address must be set as follows:

1. On the instrument, press the **Shift** key, then the **System** (8) key.

2. Select the System Options soft key, and then the Ethernet Config soft key.

3. Press the Type soft key to select **Manual.**

4. Set the IP address to `10.0.0.2` using the soft keys or the Left/Right arrow keys to select the field to be modified. Use the keypad, the Up/Down arrow keys, or the rotary knob to enter the input. Press **Enter** to accept the changes.

5. Set the Subnet mask to `255.255.255.0` and press **Enter.**

6. On the computer click **Start | Settings | Control Panel.**

7. Double-click on **Network Connections.**

8. Double-click on the Local Area connection to which the instrument is connected and click on **Properties.**

9. In the scroll box, select **Internet Protocol (TCP/IP).**

10. Set the IP address to `10.0.0.1.`

11. Set the submask to `255.255.255.0.`

12. Click **OK** or **Close** for each window that is open.

13. Reboot both the computer and the instrument.

For quick access, the connection drop-down list in the Master Software Tools toolbar will keep a history of the last ten units that were connected. Clicking on any entry in this list directs the software to attempt to re-establish that connection.

3-3 Downloading and Uploading Measurement Files

After a connection has been established, the software is ready to retrieve stored measurements or to capture the current measurement on a connected instrument. (The status of the connection is shown in the application status bar along the bottom edge of the window and also is shown by the color of the icon in the **Connection** button of the main toolbar. Green indicates connected. Red indicates no connection.)

In order to capture the current measurement, press the **Capture Current Measurement** button in the main toolbar (the icon is an arrow pointing downward, illustrated in Figure 3-2.) This retrieves the measurement from the unit and displays the measurement. The measurement appearance is very similar to the display on the instrument. Master Software Tools is designed to closely approximate the look and feel of the instrument displays so that learning two entirely different displays is not required.

In order to upload a measurement back to a connected instrument, press the **Upload** button (the icon is an arrow pointing upward, illustrated in Figure 3-2) on the main toolbar. In the Sync menu, this function is labeled **Upload Active Window.** This automatically determines the file type and stores it in the appropriate location on the instrument.
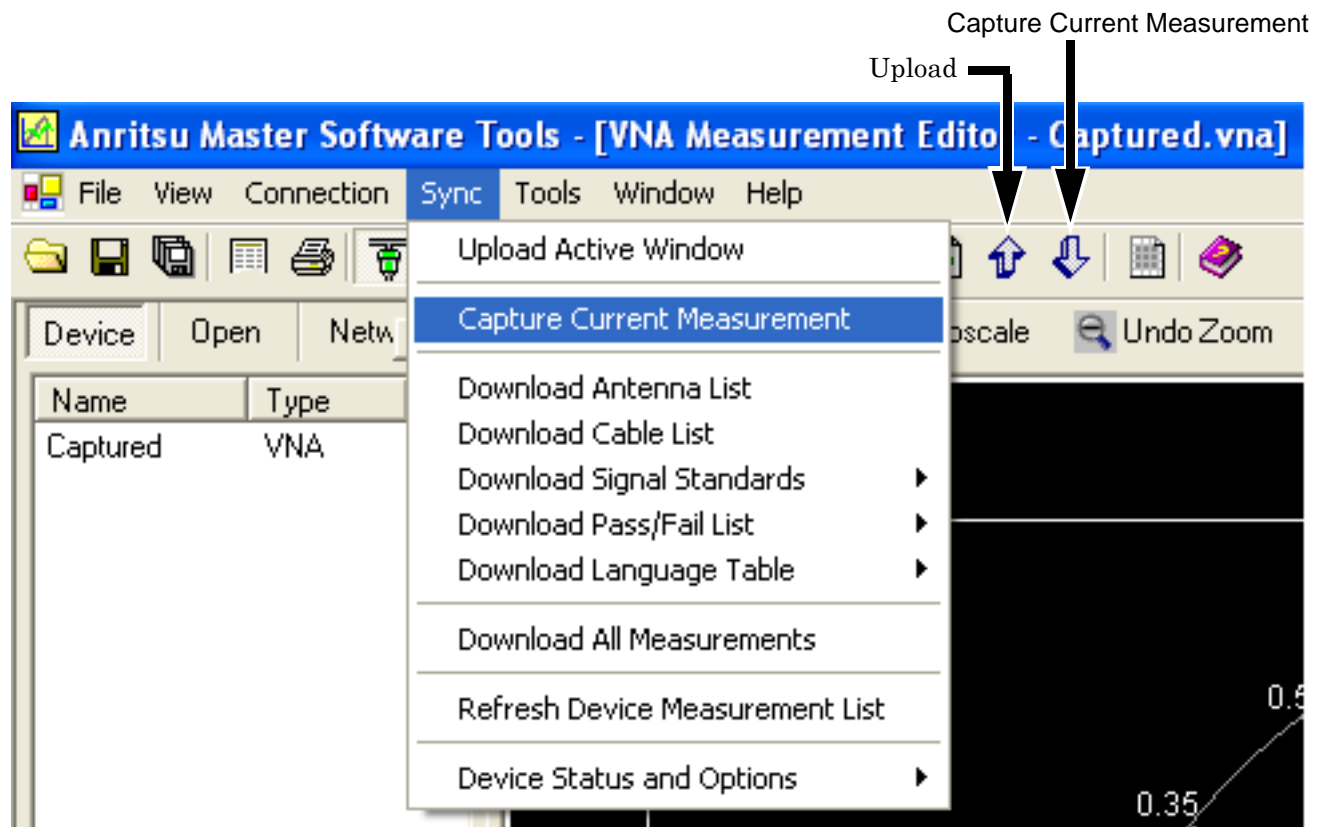
Figure 3-2.   Capture Current Measurement Menu and Button

The instrument has three different memory locations where files can be stored. Select the appropriate location before downloading or uploading. By default, the internal memory is used on the instrument and is also used by Master Software Tools.

Note: A compact flash card or a USB memory stick must be installed before this type of memory becomes accessible.

After a connection is established, Master Software Tools searches the instrument for a file list. This file list is displayed along the left side of the application window under the Device tab. To open any file in this list, double-click with the mouse, or select the file and press **Enter** on the keyboard.

By default, whenever a file from the instrument is opened, a local copy is retrieved and stored on the local hard disk. The location where this file is stored is found under the Local tab along the left side of the application window. This tab displays a folder and a file list. Browse to the desired location for file storage. Double click a file in this Local list to open it in Master Software Tools.

At the bottom-left of the application window is a Measurement Preview/File Summary window. Whenever a file is selected, either in the Device or in a Local file list, a preview is generated and displayed. For most measurement modes, this is a picture indicating approximately how the file will appear when opened. For some file types, such as Antenna and Cable lists, no such graphical preview is available. In this case, the File Summary window shows an overview of the file contents. The Measurement Preview/File Summary attempts to track the program focus. When a file is selected either in the Device or in the Local file list, the preview shows that selected file. When an open measurement window is selected, the File Summary is for the measurement in the selected window.

Tabs are located along the left side of the application window with the following labels: Local, Device, Open, and Network. These tabs allow access to local files (on the local PC), available devices (internal memory, compact flash, or USB memory), open files (currently open measurements in the Master Software Tools window), and network devices (instruments that are connected to the available network).
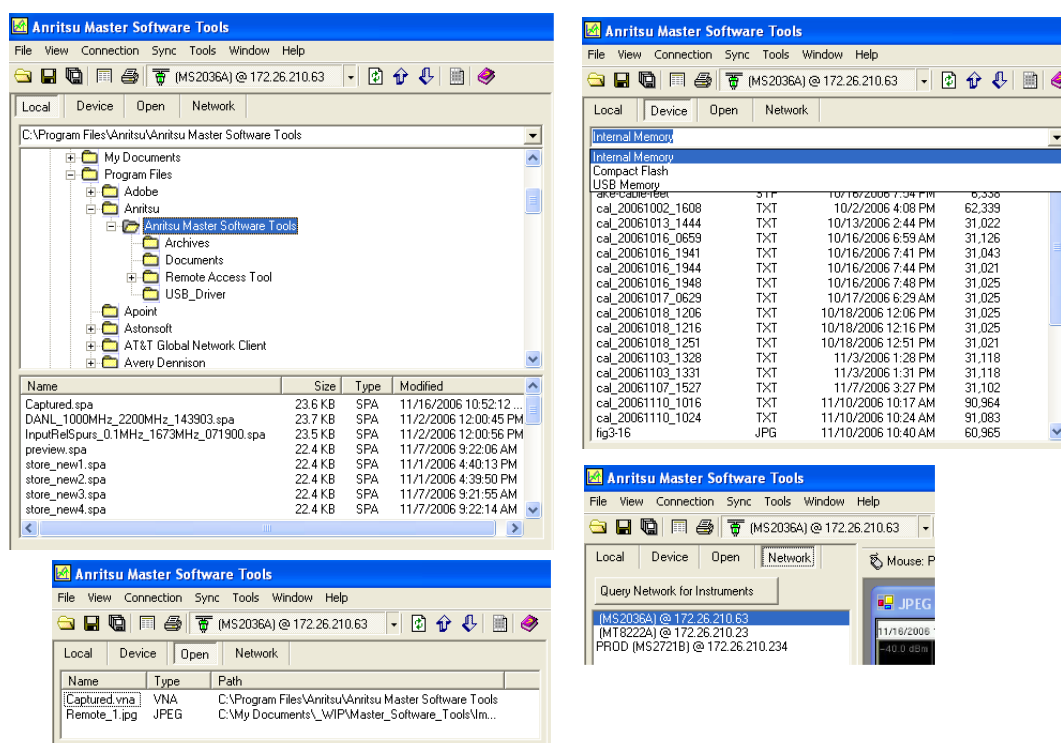
Figure 3-3. Local, Device, Open, and Network Tabs

The Network device list contains a list of all supported devices on the LAN. This list is not automatically generated and must be manually refreshed. Press the **Query Network for Instruments** button to populate or refresh this list. The **Query Network for Instruments** button is available only when the Network device list is open. A device that shows up in this list is not necessarily available. Each instrument can maintain only a single Ethernet connection, so if a device is busy when a connection is initiated, then Master Software Tools fails to connect. Double-clicking a device in this list will initiate a connection request.

A summary of each network device may be selected. The summary will appear in the File Summary area below the list. By default, this feature is turned OFF. Because many devices may already be in use, significant time can be consumed waiting for the Device Summary request to time-out. To turn on the Network Device Summary feature, use the Program Options screen that is found under the Tools main menu.

3-4 Handling Files

Standard Windows operating system options for handling files are included in the File main menu. Measurement file actions that are available from this menu include: Open, Save, Save As (with a changed name), Export, Print, and Close. These are standard operations and behave in a manner similar to other Windows applications. A few file operations are specific to Master Software Tools and are described in the following sections.

3-5 Exporting Measurement Data

When exporting measurement data from Master Software Tools, the measurement file is saved in a standard text-based file format that can be read by other common applications. This is a CSV (Comma Separated Value) format that is supported by Microsoft Excel and by other spreadsheet and data programs.

The CSV format changes slightly in different countries, depending upon customary use of commas and decimal points when expressing numbers. The Export dialog box has a File Type drop-down list with four options. Select the option that is appropriate for the file destination.

Master Software Tools CSV format options:

- `CSV (Comma delimited: #.##, #.##)(*.csv),` where a period indicates the decimal, and a comma separates the numbers.
- `CSV (Semi-colon delimited: #,##; #,##)(*.csv),` where a comma indicates the decimal, and a semicolon separates the numbers.
- `Text (Tab delimited: #.## [Tab] #.##)(*.txt),` where a period indicates the decimal, and a tab separates the numbers.
- `Text (Tab delimited: #,## [Tab] #,##)[*.txt),` where a comma indicates the decimal, and a tab separates the numbers.

The File Type drop-down selection defaults to the file type that is appropriate for the Regional Settings of the PC. If many files are being sent to another area, then the Regional Settings could be changed in order to take advantage of the default instrument setting.

Some measurement types, such as VNA, have a number of additional options for exporting measurement data. These options are available by clicking the **Edit Graph** button in the Measurement Toolbar, which opens the Plot Setup dialog box.

Exporting S2P-Formatted VNA Files

VNA (Vector Network Analyzer) also has a specific export function for exporting S2P-formatted data files. This option is available under the File main menu only if a VNA file is open and active. Select this function for a standard Save File dialog box. Choose a filename and a destination and then press **Ok** to export the measurement in ***.S2P** format.

The S2P format is an industry standard that is recognized by many simulation programs. S2P files are ASCII text files and can be viewed or edited by any standard text editor. The data in the files is not case sensitive.

3-6 Creating Measurement Reports

Master Software Tools will create a standard report from any open measurement file. Reports are also available for non-measurement files, such as Antenna lists, Cable Lists, Language Tables, and so forth. Reports are formatted HTML files that are designed to be viewed in an Internet Browser. Several options determine what is included in a report, such as company name, company logo, and a signature line. These options are selected from the Program Options dialog box, which is available under the Tools main menu.

Saving JPEG Images from Open Measurements

A picture of a measurement can be captured as a JPEG image. This function is available under the File menu, but it is available only if the active window supports this function. Options are available for the saving of JPEG images, such as image quality and compression level, and whether or not to invert the colors in order to save on printer ink and toner. These options are available from the Program Options dialog box in the Tools main menu.

A menu option is also available to create JPEG images from all measurements that are in a specified folder. This is an automatic process. When this option is selected, the instrument prompts for a folder pathway for the folder that contains the measurement files to be processed. Then, using the JPEG settings that are found under Program Options, Master Software Tools opens each file in the selected folder and creates a JPEG image. The output images are stored in an Image sub-folder under the specified source folder.

Printing All Open Measurements

Select the Print All option under the File menu to print all of the open measurements. A dialog box opens to allow specification of the layout and the number of measurements per page. The number of measurements to be printed on each page is not limited by the software, but needs to be set to an appropriate number for resolution and readability. Unless directed otherwise, Master Software Tools automatically sets size and format of each measurement for optimal printing. If many measurements are desired on a page, then space can be conserved by turning off marker tables.

3-7 Editing Measurements

Each measurement type has a specific set of parameters that can be edited. Many of these parameters are common across most measurement types, and these parameters are described briefly in the following section. Functions and Edits that are specific to each measurement type are described in later sections that are related to those modes.

Measurement Toolbar

The Measurement toolbar is across the top of the Display Window. It contains common functions that are available to most (but not all) measurement types. When a function is not applicable for the active window, the associated toolbar button is disabled.

3-8 Mouse Functions

Click on the arrow in the Mouse drop-down box to select the desired mouse function. The available mouse functions are as follows:

- Position
- Distance
- Zoom
- Drag Overlay

The label on the toolbar button for the mouse function changes to indicate which of the four functions has been selected by appending the function title after the word mouse. For example, when position is selected, the button label changes to **Mouse: Position.** The drag overlay funtion is abbreviated as **Mouse: Overlay.**

Position

With the mouse function set to **Position**, place the cursor on a point of the trace and click the left mouse button to display frequency and amplitude values. For DTF measurements, distance and amplitude values are displayed. Drag the mouse while holding the left mouse button, and the coordinate display will indicate changing measurement values as the mouse position changes.

Distance

Place the cursor on a point in the plot, then click the left mouse button and drag the mouse pointer to display the difference in frequency or amplitude values. Whether vertical or horizontal distance is shown depends upon how the mouse is moved. The greatest distance gets displayed, so when measuring small distances, better results are obtained by following straight lines, either up or down.

Zoom

To zoom in on a portion of a measurement, position the mouse cursor at a virtual corner of the area to be expanded. Press the left mouse button and drag the mouse to the opposite virtual corner. When the mouse button is released, the display is redrawn to zoom in on the selected area. To undo the zoom, right click and select **Undo Zoom,** or click on the **Undo Zoom** button in the tool bar at the top of the display.

Drag Overlay

With the mouse in Drag Overlay mode, and two or more traces open, use the left mouse button to drag a trace from one window to another.

To undo the trace overlay, select the **Undo Trace Overlay** button at the top of the display. Up to five plots can be overlaid.

Autoscale

Autoscale expands the vertical scale to spread the measurement over 70% to 80% of the measurement window. When this is done, the number of horizontal graticule lines is reduced by an amount that depends upon the vertical spread of the measurement that is being autoscaled.

Undo Zoom

Regardless of how many times the user has zoomed in on a measurement, clicking the **Undo Zoom** button sets the active measurement window to display the entire sweep. Zoom steps are not undone one at a time, but all at once.

3-9 Overlays

Clicking on this button toggles any overlaid traces ON or OFF. If no traces have been overlaid, then no action occurs. Overlay files must be of the same file type and should have the same frequency range. The base measurement is used to determine the automatic frequency range. If a measurement that does not overlap in frequency is overlaid, then the overlapping measurement does not show in the plot without manually adjusting the plot range in the Plot Setup dialog box. Overlays may be added to a measurement in several ways.

Drag from Local File List

Click and drag a similar measurement file from the Local File list onto the measurement window where the overlay is desired. The mouse does not need to be in Drag Overlay mode for this operation.

Drag from Windows Explorer

Click and drag a similar measurement file from Windows Explorer or from the Windows Desktop onto the desired measurement window. Master Software Tools does not distinguish the file source, but responds as long as the file is a compatible (same measurement type) file.

Drag a Similar Measurement

To drag an open measurement, the mouse must be in Drag Overlay mode. Otherwise, the mouse function will be to show plot coordinates, distance scale, or zooming. With the mouse in Drag Overlay mode, click anywhere on the source measurement and drag it over the target measurement. If Master Software Tools determines that the files are not compatible, then no change occurs.

Browse for overlay measurement files in the Plot Setup dialog box. Overlay files may also be selected by using the file browser in the Plot Setup dialog box. To access this screen, click the **Edit Graph** button in the Measurement Toolbar and select the **Trace Math & Overlays** tab page. From this tab, up to 6 files may be selected for overlay. Individual overlay files are listed in the **Overlay Traces** section of the dialog box and may be turned on and off without dissociating the files. Clicking the **Overlays** button on the Measurement Toolbar toggles all of the checkboxes in this window on and off.

Overlay Issues

Measurment overlays require that specific conditions be met, either to allow the overlay to occur or to allow the overlaid measurement to be displayed.

Dragging from the Device File List

When an overlay is added to a measurement, the overlay filename is stored in the original measurement file. Files can be saved and reloaded while maintaining the file overlay associations, and if the files are moved together, then the overlays are still associated and are shown when the base file is reloaded. In other words, a file cannot be overlayed directly from the device. It must be copied to the local PC disk space first so that a filename exists to be associated with the base file.

Dragging Open Measurement Files

For a similar reason, overlay of files sometimes cannot be achieved by dragging open measurement files inside the Display Window. Depending upon the options that have been selected, opening a device file may or may not automatically save the file in the local disk space. (By default, all files that are opened from a connected instrument are saved locally.) If this option is turned off, then a remote file can be opened directly without creating a local copy of the measurement file. In this situation, this measurement cannot be overlayed onto another measurement because no local filename is associated with the measurement.

Note: A measurement must be saved locally before it can be overlayed.

Frequency Range of Base Measurement File

Master Software Tools uses the base measurement file to set the frequency (x-axis) range when displaying data. If the frequency range of the overlaid measurement does not overlap the frequency range of the base measurement, then the overlaid measurement does not show on the plot screen. The x-axis range can be reset in the Plot Setup dialog box.

Overlay File Name at Top of Graph

When a measurement is overlayed, the filename appears across the top of the graph in the measurement window. If no filename appears, then the file did not overlay correctly, either because the file does not exist in the local disk space, or because it is an incompatible file type.

3-10 Edit Graph (The Plot Setup Dialog Box)

This Measurement Toolbar button opens a Plot Setup dialog box. This dialog box is different for each measurement type. For some measurement types, the dialog box offers more choices than for other measurement types.

Each Measurement window also has a context menu (mouse menu) that is accessible by right-clicking the graph with the mouse. Many of the settings on the context menu are duplicated in the Plot Setup dialog box. If a single option is being changed, then the context menu is more convenient to use. When changing more options, or changing advanced options that are not available on the context menu, the Plot Setup dialog box is more convenient.

SPA Mouse Menu   VNA Mouse Menu
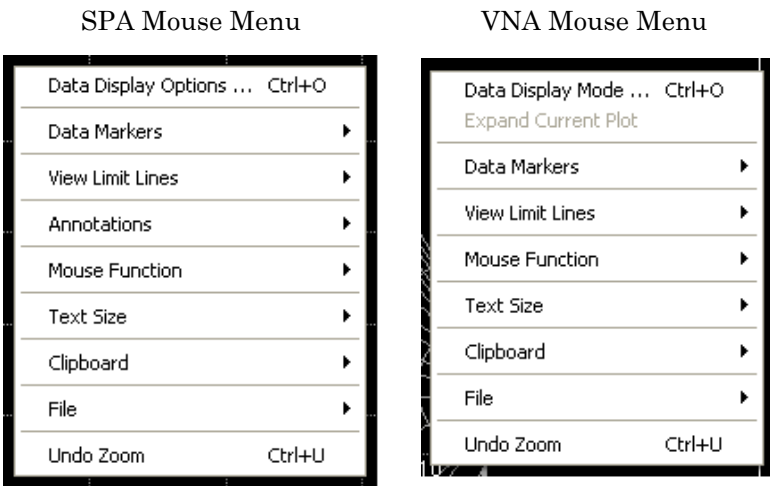
Figure 3-4. Example Context (Mouse) Menus

3-11 Common Options

These options are common to almost all supported measurement types and are described here in general terms. For specific options not included here, refer to the section of this User Guide specific to the measurement type of interest.

Text Size

The default text size can be adjusted for all measurement windows. If a window is reduced to a size that is too small for the selected text size, the text size is automatically reduced, but is automatically enlarged again to the selected value if the window is enlarged sufficiently.

Marker Table

Many measurement types support data markers. When monitoring a supported measurement type, the visibility of the marker table can be toggled on and off. The marker table must be visible in order to turn specific markers on and off, but the position of markers can be adjusted without using the marker table.

Marker Shape

Marker shape can be either Line or Triangle. This sets the shape of the data markers that are displayed on the graph.

Limit Lines

Many measurement types support upper and lower limit lines on the data plots. In the Plot Setup dialog box, the limit lines can be turned on and off (upper and lower separately) and can be reset to specified values. When a limit line is reset, it is reduced to two nodes spanning 90% of the x-axis range and is set above or below the vertical data range. A special context menu is associated with each node in a limit line. The menu is described in more detail in section *Working with Limit Lines on page 3-11*.

Plot Range

For measurements that consist of x/y data sets, the x-axis and y-axis ranges can be set in the Plot Setup dialog box. Some measurements have fixed ranges. Generally, if the range can be changed on the instrument, then the range can also be changed in Master Software Tools. If the range is fixed in the instrument, then it is fixed in Master Software Tools.

For measurement types with variable plot limits, the display can also be varied by using the mouse in Zoom mode. The plot limits that are set in the Plot Setup dialog box are not the visible zoom limits, but are the limits to which a plot is reset when using the undo zoom function (via the **Undo Zoom** button in the tool bar).

When a measurement is saved in Master Software Tools, the zoom range is not saved. Any changes made to the plot limits in the Plot Setup dialog box are saved and become the default limits if the measurement is recalled, either in Master Software Tools or on an instrument.

Plot Mode

In several cases, a data set that is stored on an instrument may contain valid data for more than one view mode. For example, GSM measurements are taken in one of four modes, and the saved measurement file contains valid data for all four views. In this example, the Plot Setup dialog box allows the selection of alternate views from the data.

In other cases, data can be translated into alternate views. VNA data sets that are stored as x/y data can be translated into Smith chart data. Similarly, some VNA measurements can be converted to Group Delay measurements even though this is not the view that was originally saved. These alternate views are accessed through the Plot Setup dialog box.

Measurement Overlays

Measurement types that support overlays have a tab in the Plot Setup dialog box for choosing overlay files and for turning on and off specific overlay associations. To add an overlay, click the **Add** button and browse to the desired file. To remove an overlay, select it in the list and press the **Remove** button. An overlay can be temporarily hidden by unchecking it in the list.

Overlay files can also be moved up and down in the overlay list. This is useful for measurement types (SPA and VNA, Spectrum Analyzer and Vector Network Analyzer) that allow trace math because the trace math typically is performed between the base trace and the first overlay.

Trace Math

This option is currently available only for SPA and VNA traces. When Trace Math is active, the base trace is added to the first overlay, the base trace is subtracted from the first overlay, or the first overlay is subtracted from the base trace.

Trace Smoothing

This option is available only for SPA and VNA traces, and is normally useful only with VNA data. This option allows for the trace to be smoothed by a simple moving average. The smoothing shape is either rectangular or weighted. A weighted smoothing gives more weight in the averaging of points that are closer (along the x-axis) to the original point.

The smoothing window is set with a percent value. When set to 2% for example, the smoothing window is 2% of the total trace width. If the trace would have 500 points (in this 2% example), then the smoothing window would have 10 points (2% of 500), which means that each point would be averaged with 5 points on each side of it.

The original trace and the smoothed trace can be on screen together, which gives a clear overview of the effect of the smoothing. Smoothing affects trace math. Both can be on simultaneously, and the trace that is a result of the trace math is smoothed.

Note: Saving a file in Master Software Tools does not save every change made to a measurement. Typically, these files exist as an image of a stored measurement on an instrument. Only parameter changes that could have been changed on the instrument are saved in the measurement file. For example, a change of text size is not saved in the measurement file, but edits to limit lines are saved.

3-12 Working with Limit Lines

Many measurement types support limit lines. To turn on limit lines, use the Plot Setup dialog box (**Edit Graph** button on the measurement toolbar) or use the Limit Line menu options on the measurement context menu.

Limit lines are defined by a series of nodes. All limit lines must have at least two nodes, a beginning node and an ending node. Segmented limit lines have more than two nodes and can take on more complex shapes. To edit a limit line, select a node and right-click for the Node context menu. This provides a number of options to quickly set or reset limit lines, and to add, move, and remove nodes. Nodes are sometimes difficult to select. When the mouse pointer is directly over a limit line node, the node changes shape.

Editing a Single Limit Line

Limit lines can be edited in several ways.

Method 1 (Enter the Value of the Limit Line)

1. Right Click on the Display Window.

2. Select **Data Display Mode...**

3. Enter the value of the upper limit line, lower limit line, or both. This deletes all but the beginning and ending nodes. A node is an inflection point or end point on a limit line.

Method 2 (Enter the Value of the Nodes)

1. Turn on the limit line.

2. Place the cursor on the start node or end node and click once on the node.

3. Right-Click and select **Edit Node.**

4. Enter the frequency and the amplitude of the start node.

5. Move the cursor to the end node.

6. Right-click and select **Edit Node.**

7. Enter the frequency and the amplitude of the end node.

Method 3 (Drag the Start and End Points)

1. Turn on the limit line.

2. Place the cursor on the start node and drag it to the desired position.

3. Place the cursor on the end node and drag it to the desired position.

Editing Segmented Limit Lines

Segmented limit lines can be created in Master Software Tools.

1. Right-click on the Display Window and select **View Limit Lines.**

2. Right-click on the start or stop node and then select **Add Node** in order to add a node or select **Delete Node** in order to delete a node.

3. Use the left mouse button and drag the new node to its new location, or select **Edit Node** and enter the desired amplitude and frequency value of the new node.

3-13 Using Markers

Markers are supported for many graph types. If an instrument measurement mode supports markers, then Master Software Tools also supports markers for those measurements. A marker table can be turned on at the bottom of the measurement window through the measurement context menu or by using the Plot Setup dialog box.

To turn on an individual marker (or reference marker, where available), click the box at the left of the marker in the marker table. To adjust a marker, select it and drag with the mouse, or select it and rotate the mouse scroll button. A marker can also be selected by clicking its entry in the marker table and them moving it with the mouse scroll button. The marker location can be entered directly by selecting the marker (or reference marker) in the marker table and typing the desired values.

Note: Frequency markers are entered in MHz.

3-14 Annotating Graphs

SPA (Spectrum Analyzer) and IA (Interference Analyzer) measurements support Graph annotations. A graph annotation is a note that is added to a graph in a rectangular area, which is connected to a specific point on the measurement curve by a vertical line. Text is added to an annotation by double-clicking the annotation box with the mouse. The annotation can automatically include the frequency and power level at the referenced location.

To add an annotation, select **Annotations** on the measurement context menu (the mouse menu), and then select **Add New Note** from the Annotations sub-menu. Annotations can be added, removed, and hidden. Hidden annotations do not show on the display, but they do not lose their place nor their text.

To position an annotation box, click and hold with the left mouse button while dragging it to the desired location.
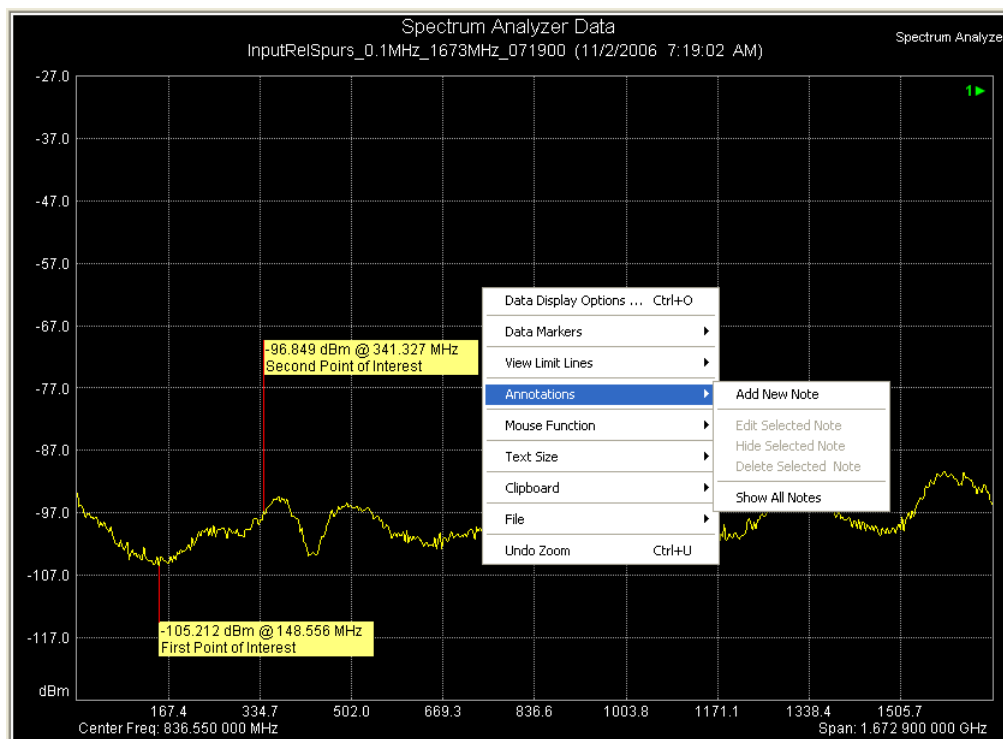
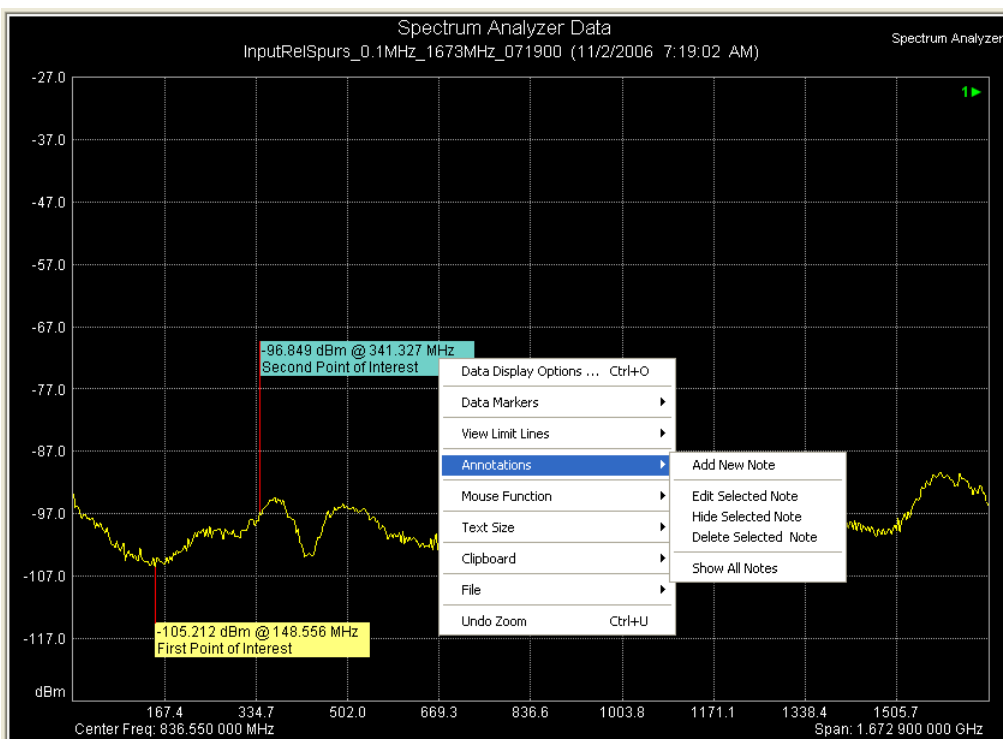**Figure 3-5.** Annotation Context Menu (Click in Measurement Window)

Figure 3-6. Annotation Context Menu (Click in Annotation Box)

Chapter 4 Support Files

4-1 Introduction

Support files for measurements include:

- Antenna lists
- Signal standard files
- Cable lists
- Pass/Fail test definitions
- Language tables
- Instrument setup files
- Calibration files
- JPEG images
- Reports
- Exported files
- Folder Spectrogram files
- Measurement map files.

Some of these files originate on the instrument and can be edited in Master Software Tools and uploaded back to the instrument in order to change instrument behavior. Other files are created as Master Software Tools files and cannot be uploaded to an instrument. Each file type has an associated view or editor. These files have characteristics in common, both with each other and with standard measurement files.

In general, any file that can be opened in Master Software Tools can be saved, printed, exported, and turned into a report. In the unusual case where one or more of these options is not available, the option is either not shown or is shown disabled (menu option line grayed out). If a file can be uploaded, then the **Upload** button is enabled when the file is active and when an active device connection exists.

The following descriptions describe how to edit a file from a connected instrument, because this is the most common situation. These files can be saved locally and then recalled by using the **File | Open...** menu function, or by pressing the Open button on the main toolbar. The **File | Open...** menu function opens the Open Measurement File dialog box. The **Open** button in the toolbar opens a list of available files.

4-2 Antenna Editor (Antenna.txt)

The Antenna Editor is used to edit antenna lists. A single antenna file on the Anritsu instrument is shared among all measurement modes. This Antenna file has multiple antenna definitions, each with a series of frequency and amplitude values that define the antenna response characteristics.

To edit an antenna file, it must be opened. A file is usually downloaded from an instrument. To download a file, connect to the instrument and select **Sync | Download Antenna List** from the main menu. The antenna list is retrieved and opened in Master Software Tools. Unless the auto-save feature under Program Options has been turned off, the file will automatically be saved to a local disk space using the path as shown in the File Summary preview (under the Local tab on the left side of the application window).

The antenna file on the instrument is named Antenna.txt, and this is the default name that is used by Master Software Tools. The antenna list can be edited and saved on a local PC under any desired filename, but if uploaded, then it must be named Antenna.txt, or it will not be recognized by the instrument.

To add a new antenna to the list, enter the new antenna name at the bottom of the list. Then add frequency and amplitude points to the antenna definition by entering the values in the list. Either Antenna Factor (dB) or Antenna Gain (dBi) values can be added. The editor will calculate the other to match. For faster entry, the Antenna editor automatically advances to the next field in the current amplitude column as you type values and press **Enter.**

4-3 Signal Standards Editor (SignalStd.sig)

The signal standards editor is organized in a tree structure. When a signal standards file is opened, many standards are shown in a connected list with a **+** sign at the right. To edit an entry, expand the definition by clicking the **+** symbol.

Standard editing functions are available in a right-click context menu (mouse menu). This feature provides Cut, Copy, and Paste operations, as well as adding new signal standards and deleting unwanted entries.

To edit a value, select it in the list and begin typing. An edit box exists at the top of the window for convenience. Press **Enter** after editing the value in order to automatically shift focus to the next field.

The Anritsu instruments that are supported by Master Software Tools originally had separate signal standards lists for each measurement mode. These changed in the Autumn of 2006 to a new file format that is shared by all measurement modes. This causes some complications because Master Software Tools must remain backward compatible while supporting the new composite signal standards file format. While this bit of historical trivia does not matter much to end users, it does explain some complications in the user interface that deals with signal standards files.

If a download of the SPA signal standards file is initiated, then Master Software Tools first seeks the composite file. If the composite file is not found, then it seeks and downloads the SPA-specific signal standards file. When uploading, Master Software Tools restores what it found: a SPA-specific file or the composite file, depending upon which type of file was downloaded.

Depending upon the version of firmware in your instrument, both SPA and GSM signal standards may need to be edited in order to effect a change in both places. The file types are distinguished by the filename extensions. The separate signal standards files have a **.txt** file extension, and the composite file is named SignalStd.sig.

Although a signal standards file can be given any filename in a local disk space, the instrument recognizes only the original name, SignalStd.sig. Upload composite signal standards files with this name only.

4-4 Cable Editor (Cablelist.txt)

The cable editor provides a list of cable definitions. To edit a cable definition, select the field to be modified and enter a new value. New cables can be added by entering the values in the last row, which is empty. To remove a cable, select it and press **Delete.** The software prompts for confirmation.

As with antennas and signal standards, the cable list file must have the expected filename in order to be recognized and used by the instrument. The instrument name for this file is Cablelist.txt. This is the name of any cable list that is downloaded from an Anritsu instrument. If it is saved locally under a different name, then the original name must be restored (to Cablelist.txt) before uploading the file to an instrument.

4-5 Pass/Fail Test Editor (TestModels.txt)

The GSM, WCDMA, and Fixed WiMAX measurement modes support a Pass/Fail measurement mode. In order to edit the Pass/Fail test definition file, connect to the instrument, select **Sync | Download Pass/Fail** from the main menu and follow the sub-menus to the desired file type. This opens the Pass/Fail test definition file in the Master Software Tools Pass/Fail Test Editor.

From the toolbar Sync menu, and then from the Download Pass/Fail List sub-menu, choose either WCDMA/HSDPA PASS/FAIL LIST or GSM/GPRS/EDGE PASS/FAIL LIST.

To edit, select the field to be modified and enter a new value. The Pass/Fail editor attemps to present all possible parameters and values in a simple grid. As different rows are selected, the column headings change in order to reflect the values and units of the selected parameter. Some test parameters have fewer constraints than others, so some field values are blank. The bottom of the Pass/Fail Editor provides information about parameter types and units.

Pass/Fail test definitions need to be named TestModels.txt in order to be recognized by the instrument.

4-6 Setup Files (*.stp)

Setup files, which can be saved and recalled on an instrument, can be downloaded into Master Software Tools. Currently these files canot be edited, but you can view, save, print, export, and create a report from a setup file.

When a setup file is opened, only the file header is presented. The window may be resized to show other parameters, but these parameters are not in an easily readable format and cannot be edited.

The purposes for downloading setup files are to store them and to upload a common setup file to a number of instruments to ensure that they are all configured in the same manner.

4-7 Calibration Files (Cal*.txt)

As with setup files, calibration files cannot be edited in Master Software Tools. Calibration files also have no facility for printing, exporting, or creating reports. No benefit is derived from uploading a calibration file from one instrument into another or from recalling a calibration file in Master Software Tools, but these files are stored in the user memory space and have a common syntax and a **.txt** extension. These files may be viewed. The filename syntax (**Cal*.txt**) allows quick identification of the file type.

4-8 JPEG Files (*.jpg)

The instruments that are supported by Master Software Tools all provide a function to capture the current screen and save the displayed measurement as a JPEG image file. These files are in the Device File list and can be seen when an instrument is connected to Master Software Tools. The viewer provides a method to see these stored image files. A JPEG file cannot be edited in Master Software Tools, but can be printed from Master Software Tools. Refer also to *JPEG Save Options on page 5-4* for additional information about saving JPEG files.

4-9 Reports (*.htm)

All measurement files and most support files can be saved in a report. The report format is an HTML file that can be displayed in an Internet browser. Reports typically have a header with company name, logo, date and time stamp, and GPS coordinates of the measurement. This header is followed by a picture of the measurement, a table of relevant parameters for the measurement, and the instrument on which the measurement was captured. A signature line is at the bottom.

All of the items in the header and in the signature line may be eliminated or preconfigured by using the Report tab of the Program Options dialog box. This dialog is accessed through the **Tools | Program Options** menu.

Reports are created with a temporary filename in a temporary folder on the local computer. To store a report, save it to a separate location. The main section of the report contains a JPEG image of the measurement. This image is created in the same location where the active measurement file is located in the local disk space.

Reports are not intended for electronic storage. They are produced to review and print. The measurement file itself should be saved for long term storage. The report can always be regenerated from the source measurement file. Reports provide a useful way to create hard copies of complete measurements, which are more complete than would be achieved by printing the measurements themselves.

4-10 Exported Files (*.csv, *.txt)

Exported files may have either a ***.csv** or ***.txt** filename format, depending upon the method chosen to create the export file. When exporting a file, select the correct option from the **Save as type:** drop-down list. The options are designed to assist with differences across cultural and geographic world regions. Choose among the following: comma delimited, semicolon delimited, tab delimited with a period for decimal separator, and tab delimited with a comma for decimal separator.

These file conventions are chosen to work well with Microsoft Excel when using different regional settings. Master Software Tools is designed to default to the most likely option based upon the regional settings of the PC. If the exported file is intended for another part of the world, different settings may be required in order for the files to be opened correctly.

4-11 Folder Spectrogram Files (*.spg)

A Folder Spectrogram file is a special composite file that is created from all of the SPA or IA spectrum measurement files that are in a selected folder. All of the files (that are to be used) in the folder are assumed to have the same frequency range, which is the frequency range of the first file.

A Folder Spectrogram file is especially useful to get a composite view of a large number of traces that are stored using **Save on Event.** This mode of the instrument allows a spectrum analyzer trace to be stored each time that a set criterion is met, such as peak amplitude above some preset limit, or at the end of each trace sweep. Many thousands of saved traces can quickly accumulate this way, and viewing and evaluating each one is difficult.

Folder Spectrogram files allow a user to quickly review all traces and pick out the specific traces of interest. Several different graphs are provided to review the composite data sets, and post-capture filtering can be done based upon specified criteria.

To create a Folder Spectrogram file, select from the main menu **File | New | Folder Spectrogram.** The Folder Spectrogram dialog box has the title bar name **Browse For Folder.** The message above the file browse box states:

> This function is specific to SPA and IA Spectrum files. It provides an overview from a folder of similar data sets. Select a folder of SPA trace files for the spectrogram.

Select a folder containing the SPA (or IA) traces of interest. After a folder is selected, Master Software Tools will open each file and create a single composite file containing all of the data. This composite file is named Folder.spg. All of the trace data is sorted according to the measurement time stamp, and a spectrogram display is presented. Depending upon the number of files, creation of the composite spectrogram file may take from approximately 5 seconds to 30 seconds. Open the Folder.spg file to load the spectrogram data more quickly. If files are added or removed, and if a recreated composite data file is desired, then repeat the Folder Spectrogram operation.

A number of graphical views are available. They are described in the following sections.

Spectrogram

A spectrogram shows signal versus time in a simulated three-dimensional top view, with the x-axis being frequency, the y-axis being time, and color showing power. Below the spectrogram is a view of the currently selected trace. The selected trace is indicated by a red line on the spectrogram. To select a different trace, use the mouse or cursor keys to move the red line. To the right of the spectrogram is a bar that adjusts the contrast of the spectrogram.

Peak Power

Peak power shows the highest power at each frequency.

Total Power

Total power shows how much power is present over time in that band.

Peak Freq.

Peak frequency shows which frequency has delivered the highest power over time.

Time Chart

The time chart shows the number of occurrences per time increment. The number of time increments depends upon the size of the window. The earliest and latest measurements set the start and stop time increments with the intervening increments being uniformly distributed (in time).

Average

Average shows the lowest, highest, and average power levels of all frequencies.

Folder Spectrogram Context Menu

Select the context menu (mouse menu) by right-clicking the mouse over the Folder Spectrogram Window. This gives access to a menu of advanced options and features.

Edit Graph / Data Display Option

File Filter: Filtered files are displayed in the box to the right of the selections. The filtered file list is sorted based upon the selected column, either filename or frequency of peak or measurement time stamp. Filtered files show up in red in the spectrogram and time chart display modes.

None: No Filtration.

Limit Line
Measurement: Shows only traces that go above or below the set limit lines.

Deviation from the
Average (dB): Filters out files that deviate from the average by more than a specified amount of dB. Upper and lower ranges are set in addition to the filter window width.

JPEG & AVI Settings

JPEG Options: Choose between Small (320x240), Medium (640x480), Large (1024x768), or customized ratio. The Quality may also be selected.

AVI Options: Choose between Small (320x240), Large (640x480, or customized ratio. The frame rate may also be changed as desired. One frame is one trace.

Save Window as JPEG

Saves the current window as a JPEG image file.

Export to CSV (Spreadsheet)

Saves the Folder Spectrogram composite data file as a CSV (comma separated values) file that can be imported into a spreadsheet application.

Save All to JPEG

Saves all traces in JPEG format. This action creates a sub-folder named Images, where all images are stored.

Create AVI

Creates an AVI video file of the traces. This action creates a file called Folder.avi in the same folder as the trace files. When done creating the file, a message is displayed to ask if the file should be played on the default video player.

4-12 Measurement Map Files (*.ptm)

If Microsoft MapPoint is installed, then a Measurement Map can be created to show the location of all open measurements (as Pushpins on a map). The Measurement Map display allows the creation of driving instructions to points of interest, such as cell towers. Measurement Maps can be created only from measurement files that contain GPS location information.

If GPS is not installed in an instrument, then this option is not available.

Measurement Map files can be saved as standard MapPoint map files and can be loaded into Microsoft MapPoint independent of Master Software Tools.

Notice is provided when MapPoint is installed and the active measurement contains GPS coordinate information. The GPS coordinates are displayed in the Measurement Toolbar. In this situation, the GPS coordinates are push buttons to launch a Measurement Map that will display the location of the active measurement file. Additional measurements can be added to an open Measurement Map by dragging and dropping the measurement onto the status bar area of the Measurement Map window.

4-13 MapInfo Export Files (*.mif)

When a file containing GPS coordinates is active, an **Export to MapInfo** option can be found under the File main menu. This option creates a MapInfo **.mif** file and an accompanying **.mid** file. These files contain import information for MapInfo with a complete summary of the measurement and its location. A separate copy of MapInfo is required in order to use these files. If this feature is desired, then refer to the MapInfo product documentation about importing **.mif** files.

4-14 Trace Indexing and the Trace Catalog

The Trace Index is a database containing the location and key parameters of all measurement files that are on the local hard disk. If many measurement files are collected and are spread across a number of folders, then this is a convenient way to organize, locate, and manipulate measurements. This feature is particularly useful for users who accumulate many measurement files.

From the main menu, select **Tools | Full Trace Retrieval** to open the Trace Retrieval Dialog box.

The window message reads:

> "When a unit has many saved traces (more than a few hundred) the response can be very slow. If you have too many traces, you may not be able to retrieve them using normal procedures. This function will retrieve all the saved measurements, but it does require an open Ethernet connection - USB is not supported."

Two buttons are provided, each followed by a text box for entering a path and filename. The buttons are labeled **Destination** and **Retrieve All.**

For saving a measurent, the path and filename can be entered in the destination text box, or select the **Destination** button, and the Browse For Folder window opens. The window message reads:

> "Select a folder to save the remote measurent files to."

And a menu tree of folders and files is provided for the selection.

Trace Catalog

With the Trace Catalog, a user can perform the following tasks:

- Index all supported files on the hard disk.
- Index measurement files on a network drive.
- Store multiple indexes for different clients or regions.
- Perform automated indexing on a fixed schedule.
- View files in either a detailed list or as thumbnails.
- Archive files (Zip) from multiple folders.
- Cut and copy measurement files.
- Open measurements for editing.
- Select just the measurement types that are of interest.
- Sort measurements by name, date, or key measurement parameters.
- View statistics on number and location of all supported file types.
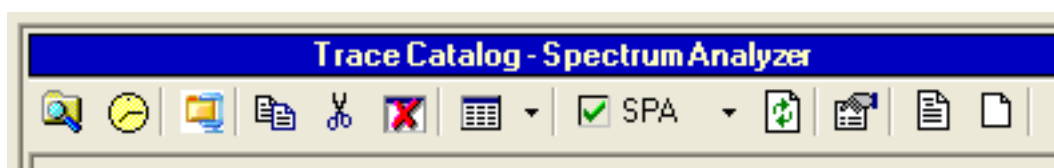- Locate missing measurements that are hard to find.

Figure 4-1. Trace Catalog Menu Bar

Trace Catalog Menu Toolbar Buttons:

Figure 4-1 shows the trace catalog menu toolbar butttons. From left to right, the buttons have the following functions:

-   Refresh the trace index now.

-   Index and Scheduling options. This button opens the dialog box that is shown in Figure 4-2.

- Create a Zip archive from the database

-   Copy files to clipboard

- Remove files from index only

-   Delete file from index and PC – Permanent

-   Show file list
    - Details (shown in fig)
    - List – Small icons
    - List – Large icons (shown in fig)

-   File selection list.
    - Drop-down to select file types. The drop-down list of file types is shown in Figure 4-2. The button label changes to show the type of files that have been selected to be displayed in the list.

- Reload the file list

-   Trace database summary. xxx

- View the indexing log

- Clear the indexing log

Figure 4-2, *Trace File Indexing Dialog Box*, shows the file indexing location and schedule. This dialog box is opened with the Index and Scheduling options button.
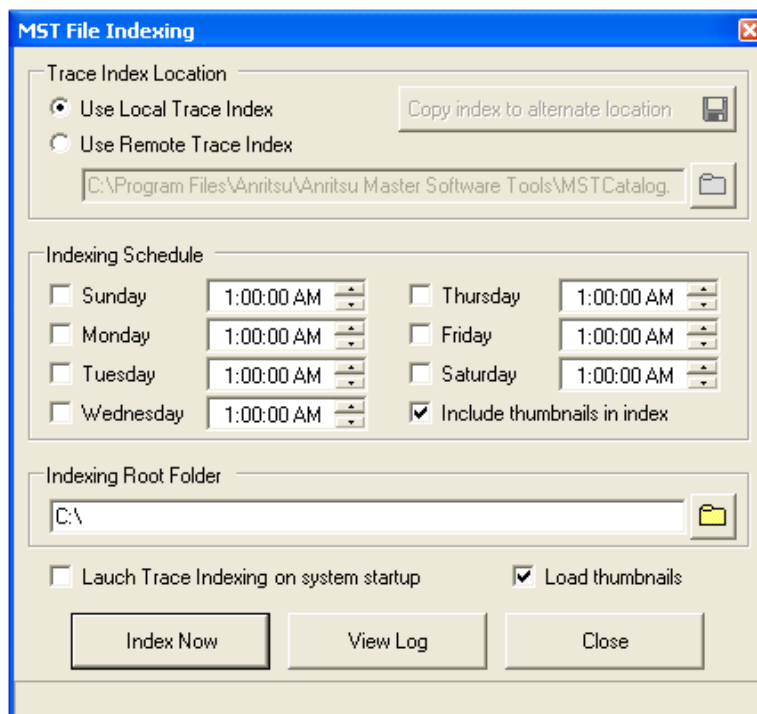

Figure 4-2.   Trace File Indexing Dialog Box

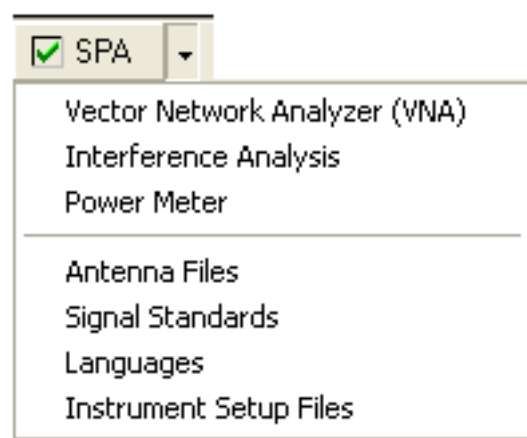Figure 4-3, shows the drop-down file selection list.

Figure 4-3.   Trace File Selection Drop-Down List

Figure 4-4 shows the file selection list as it displays file details.

Figure 4-4. Trace Catalog File View with File Details

Figure 4-5, shows the file selection list as it displays files as large icons.
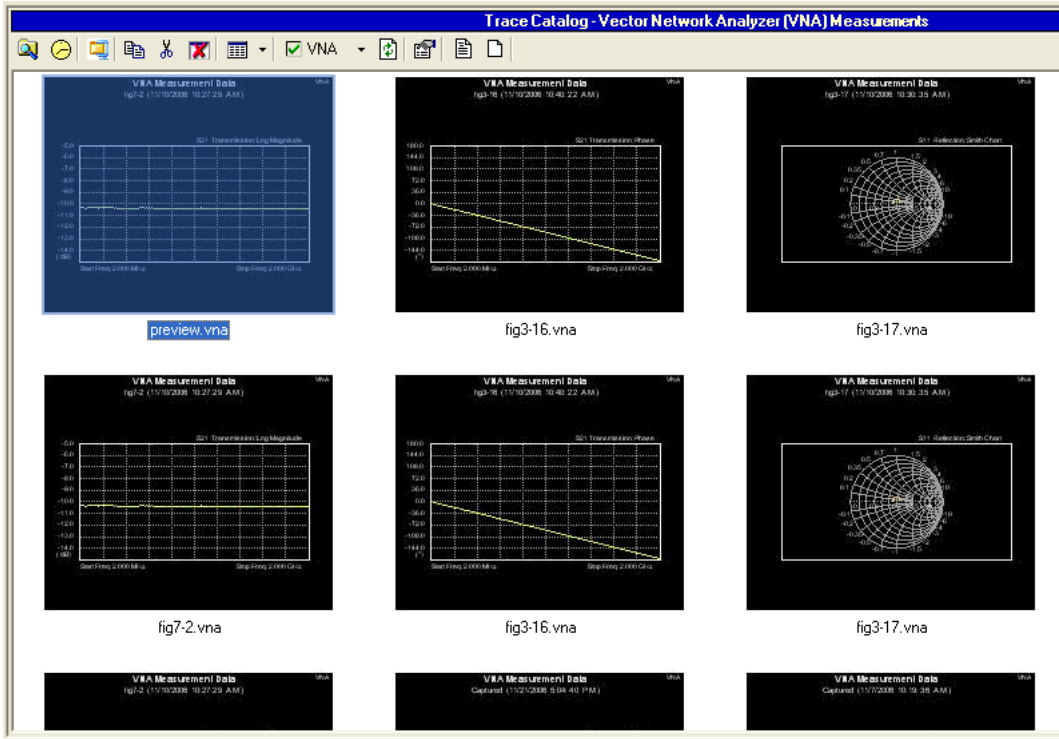
Figure 4-5. Trace Catalog File View with Large Icons

Figure 4-6, shows the trace catalog database summary dialog box.

Catalog Database Summary

Indexed on Wednesday, November 22, 2006 5:44:11 PM
File size: 462,848 Bytes
File count: 44
 SPA: 9
 VNA: 11
 WCDMA: 0
 GSM/Edge: 0
 IA: 5
 CS: 0
 PM: 4
 T1/E1:   0
 HiPM: 0
 Fixed WiMAX: 0
 O-Scope: 0
 TestModels: 0
 Antennas: 2
 Cables: 0
 SigStds: 3
 SigStds: 3
 Languages: 6
 Setups: 1

OK

Figure 4-6. Trace Catalog Database Summary

Chapter 5 Instrument Overview

5-1 Introduction

This chapter describes advanced features and program options as well as the built-in report generator.

5-2 Advanced Tools and Program Options

The following advanced features and program options are available under the Tools main menu.

Group Edit

This tool allows modification of a large number of measurement files at one time.

All of the following attributes can be reset:

- Measurement title
- Measurement subtitles
- Limit lines
- Marker positions
- Plot scaling

Specify a particular file type on which to operate and chose whether to modify files in a specified folder or to modify all currently open measurement files. When modifying open files, changes can be viewed as they occur. The changes are temporary unless the files are saved.

> **Caution:** Any changes that are made directly to measurement files are irreversible.
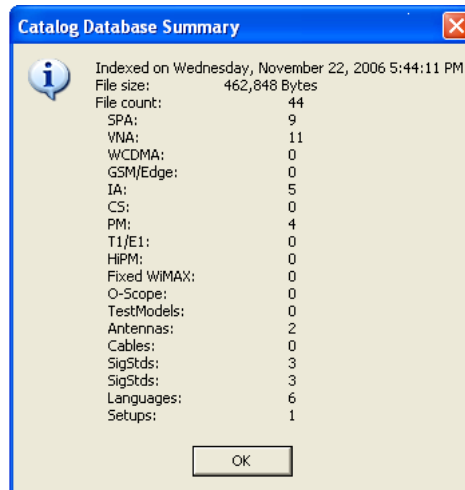
Full Trace Retrieval

This tool simplifies the retrieval of large numbers of traces from an instrument into a user-specified directory via a USB connection or an Ethernet connection. When an Instrument contains many measurement files, this tool can be used to retrieve all measurements at once. The process can be slow if the number of existing measurements exceeds several hundred.

VNA Measurement Calculator

This tool translates certain values into other units. It can show Real and Imaginary values, Magnitude, Phase, Return Loss, Reflection Coefficient, and Transmission Power. Enter a value in any field, and the other fields are adjusted automatically.

DAT File Conversion Tool

This utility is used to convert saved traces (**.dat** files) from an Anritsu S332D, MS2711D, MT8212A, or MT8212B to the format that is used by Master Software Tools. This conversion is not a reversible process because no equivalent utility exists to convert newer traces to the older format. The trace files in the old format are not deleted, and the new format uses different filename extensions, **.spa** or **.vna** instead of **.dat.** If desired, the old traces remain available for use with the Handheld Software Tools program.

Procedure

1. Open the **Tools** menu in Master Software Tools and select DAT File Conversion Tool.
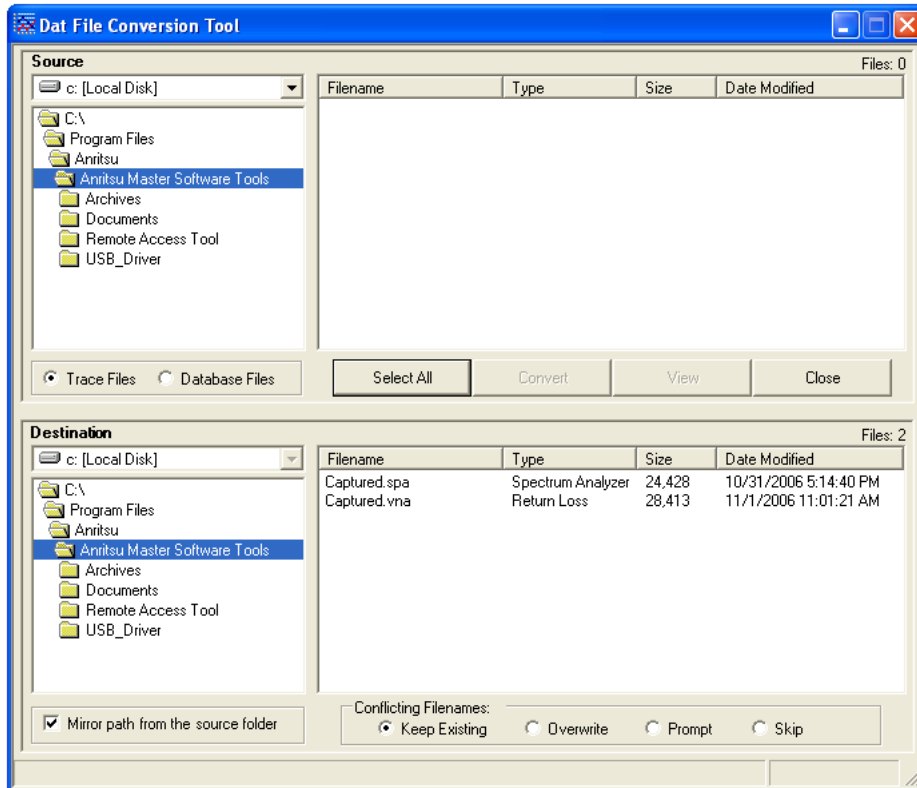
Figure 5-1.   DAT File Conversion Tool Dialog Box

2. In the Source area at the top area of the window, navigate to the directory that contains the traces that are to be converted.

3. In the Destination area, select the directory into which the converted traces are to be placed.

4. Select the Conflicting Filenames option that is to be used – Keep Existing, Overwrite, Prompt (for a decision), or Skip (skip the conversion of the file for which a conflict exists).

5. Select the measurement or measurements to be converted.

6. Click the **Convert** button. Note that the new traces appear in the destination window.

Before the conversion, select **View** to preview the file in the new format, if desired.

5-3 Product Updates

For instrument firmware updates, if Internet access is available, then the program can be set to automatically check the Anritsu Customer Service Internet site for available updates to the firmware and to Master Software Tools itself. When the application starts, it will check for updates to any instrument that is supported by Master Software Tools. If an update is found, then a message box is displayed in order to inform the user. The notification may not be applicable because Master Software Tools cannot determine, at this point, which instruments are to be used.

When the Product Updates window opens, a list of firmware packages is presented. These firmware packages are available either locally on your PC or at the Anritsu Customer Support Internet site. Notice the Status column. The term Ready indicates that the firmware file is already present locally and is ready to be uploaded to an instrument.

A status of Available indicates that the firmware package is available on the Anritsu Internet site and must be downloaded before it can be installed. Available firmware packages are downloaded by pressing the Retrieve File button. In order to retrieve a file, an active Internet connection must be present—this is indicated in the upper right-hand corner by the green square (which is a red square if no connection is available.)

Firmware Upgrade Procedure

1. The file status must be Ready.

2. Master Software Tools must be connected to the instrument before entering this screen. An active connection to an instrument is indicated by a green square in the upper right-hand corner.

3. Select from the list the package that is to be installed. Master Software Tools can usually pick the correct package, but verify that it matches your instrument model.

4. Press the **Install to Unit** button.

5. Watch the status indicator in Master Software Tools and on the instrument. When the firmware update is complete, the unit will automatically reboot.

Emergency Repair

If something goes wrong during the upgrade procedure, an emergency repair procedure is available. To initiate an emergency repair, open the Product Updates window, and select the firmware package to be installed (this should be a known good package). Press the **Emergency Repair** button and carefully follow the instructions.

Obsolete Firmware Packages

Under unusual circumstances, a previous version of instrument firmware may be needed. A copy of the firmware archive (**.zip**) file must be available in the Archive sub-folder under the Master Software Tools application folder (usually `C:\Program Files\Anritsu\Master Software Tools`). Select the Show Obsolete Files check box to include out-of-date firmware packages in the file list. Select the desired file and follow the instructions in section *Firmware Upgrade Procedure*.

MST Update Procedure

After retrieving the file, exit Master Software Tools. Uninstall the current version of Master Software Tools. Unzip the new file into a temporary folder. Install the new file as described in section *Installation on page 1-2*.

5-4 Trace Rename Utility

This utility application can be used to quickly rename (filename, measurement title, and/or measurement subtitle) a large set of measurement files in a very systematic way. If many hours are required to rename your traces, then this tool can be a real time saver, doing in minutes what might require half your working day. To use this utility effectively requires some forethought in how the measurements are taken. If this is of interest, then open the utility—it has its own help file with detailed instructions.

5-5 Program Options

The Program Options dialog box is accessed through the main menu via **Tools | Program Options.**
Following is a summary of each option.

General Options Tab

Program Elements

Display Trace Preview/Summary

This window, on the bottom-left of the screen, can be toggled between showing the selected measurement
or showing information about the file: File type, last saved, size, modified, and location on the network
or hard drive.

Display Network Unit

Information

When browsing units on the network, this option displays the unit information in the File Summary
window under the browser.

Show Toolbar

This option allows displaying the toolbar in the top part of the display.

Display Status Bar

This option allows displaying the status bar located at the very bottom of the Master Software Tools
window.

JPEG Save Options

Show Measurement Parameters

This option displays the following information as part of the JPG file: Trace mode, reference level offset,
input attenuation, resolution bandwidth (RBW), video bandwidth (VBW), type of detection, start
frequency, center frequency, stop frequency, frequency span, reference level, and scale.

Show Device Parameters

This option displays the information of the device that collected the data, including its Serial Number,
Base Version, Software Version, when the data was taken, and its name, if applicable.

Invert Colors When Saving

This option inverts all of the colors, so black becomes white or yellow becomes blue, for better visibility
and more economical printing.

JPEG Quality

This option allows the user to determine the quality level of JPEG images when stored.

MapPoint Region

Measurements that contain GPS location information can be displayed with Microsoft MapPoint in Master
Software Tools. When a map window is initially opened, any measurements that contain GPS data and are
currently open are automatically placed on the map. The measurement is placed at the geographic location on
the map that is indicated by the GPS data. Microsoft MapPoint must be purchased separately. Choices
are: North America or Europe.

File Transfers & Confirmations

Get Remote File List On Connect

Some instruments may have hundreds (or thousands) of stored traces. This can slow access time when connecting and retrieving the device file list. If not selected, then Master Software Tools does not automatically receive information about the files that are present on the instrument.

Automatically Save Remote Files

If this option is checked, then files that are downloaded from the instrument are automatically saved to the local hard drive and placed in the currently selected local directory.

Confirm Download From the Instrument

This option displays a message when download has been completed.

Confirm Upload From the Instrument

This option displays a message when upload has been completed.

Confirm Overwrite When Uploading

This option displays a message when files that are uploaded to the instrument are being overwritten.

Measurement Print Options

Print Measurement Parameters

When a measurement is displayed, relevant measurement parameters are shown in the File Summary box at the lower left-hand side of the application window. When this option is checked, this same measurement summary information is included in a table below a printed measurement.

Print Device Parameters

This option includes the following information on the print-out: instrument serial number, base firmware version, applications firmware version, date and time that the measurement was saved, and the user-defined instrument name.

Default to Landscape Orientation

Printed measurements default to Landscape Orientation when this option is selected. This option must be changed in the Print Properties dialog box each time that a measurement is printed—this setting affects only the default setting in this dialog box.

Remember Printer Selection

This option enables Master Software Tools to remember previous printer selections. Otherwise, the system default printer is automatically selected. If a preferred printer is desired for Master Software Tools (other than the normal default printer), then this option allows the preferred printer to be the default for this application only.

Mouse Mode Settings

Apply Mouse Mode to All Windows

When selected, this option applies the current mouse mode to all open windows. When the mouse mode is changed (for instance, from position to distance) in any open measurement window, is that change desired in all open windows? If so, then select this option. If this option is set to off, then each measurement window can have a different mouse mode setting.

5-6 Report Generator

Report Header

The report header displays any of the following on the report:

- Report Title
- Company
- Prepared For
- Location
- Date & Time
- Company Logo: Click the folder button, which engages a file browser, to find the logo file.
- Logo Alignment (in other words, left, right, or center aligned)

Open With

- Default HTML Editor (in other words, Microsoft Word, FrontPage, and so forth)
- Default Internet Browser (in other words, Internet Explorer, and so forth)
- Other (User Specified): Click the folder button, which engages a file browser, to find the appropriate application, or enter the full path manually.

Signature Line

This option shows a signature line with Prepared By and Approved By lines.

Internet Settings

Automatic Update Notification

This option automatically check for updates from Anritsu's Product Support Internet site

Proxy Settings

Use a Proxy Server to access Internet content. If your internet access is through a proxy server, then a username, password, and domain are required. This information is available from your system administrator.

5-7 Language Editor

The Language Editor allows for modification of the language that is already in the instrument (except English) and also provides the ability to add two custom languages to the instrument.

Modifying or Defining a Language

The standard language files that are provided in the instrument may be modified, except for the default English file. In addition, two Custom files are available (in English) that may be completely rewritten in another language if desired. For most entries, a limit exists on message length because of the need to fit the message on a soft key or in a message box. The fonts that are used for the on-screen messages are proportional, meaning that different characters can take different amounts of space. Some creativity may be necessary in order to fit the words into the allotted space. Ideally, the customized language message should not take up significantly more space than the English equivalent. Always test the customized language by uploading it into the instrument and reviewing the menus to be sure that the key labels fit into the available space and are fully discernible.

To modify a language file, select the Sync menu, select Download Language Table, and select System Language File. Select the language to be modified by clicking on the plus sign to the left of the language name. The file tree expands to show the three groups of labels that are available for editing. Select the group of labels that are to be edited: Button Captions, Generic Text, or Parameter Names.

Note: Special fonts for some languages must be installed on the system in order to edit those languages. Please contact your font vendor for specifics.

In order to change the label of a parameter, click to select the Parameter that is to be changed and type the new text in the bottom window. Save the modified language file to the PC hard disk, then upload it into the instrument.

Note: Before uploading to the instrument, the files are to be saved as **vna.znc** for the VNA language file, and **system.znc** for the system language file

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Chapter 6 Automatic Firmware Updates

6-1 Introduction

Master Software Tools can be used to update the UMTS Master, VNA Master, BTS Master, Spectrum Master, and Spectrum Analyzer (MT8220A, MS2024A, MS2026A, MT8222A, MS2721A, MS2717A) firmware and also to download available product information, such as Anritsu Application Notes. The PC that is running Master Software Tools must be connected to the Internet for these updates to be successful.

6-2 Procedure

1. Establish a connection to the unit as described in section *Connection on page 3-1*.

2. Open the Tools menu, then select Product Updates.

> **Note:** Always connect the Ethernet cable (if using DHCP) to the instrument before turning the instrument on. f the instrument is already on, then turn it off and back on to allow the software to recognize the Ethernet connection. When using an Ethernet connection with no more than one instrument on the network, always verify that the IP address that is selected is the IP address of the correct instrument to be updated. To verify the IP address, press the **Shift** and **System** (8) keys on the instrument, select the System Options soft key, and then the Ethernet Config soft key to view the instrument IP address.

3. Select the product from the list that is shown in the Product Updates window.

4. Select the **Check for Updates** button. Master Software Tools will connect to the Anritsu Internet site and display information about the available update files.

5. Review the status. If the file is listed as Ready, then it is already on the PC and ready to be uploaded to the unit. If it is listed as Available, then it is not on the local PC, but is available from the Anritsu Internet site. Press **Retrieve File** to download the file.

6. Select **Revision Details** for revision update information to determine if the update is desired.

7. If the update is desired, then select **Retrieve File** to download the update.

> **Note:** Connection with the Internet has been established when the Internet indicator in the upper-right corner of the window is green.

> **Note:** The check box enables the application to automatically check for updates at startup on a weekly basis. If this is left unchecked, then update checking is only performed manually when the Check for Update button is pressed.
> Also note that the MST.zip file is ONLY an update tool for the measurement editor and is NOT a complete Master Software Tools package. The MST_CD_Vx.xx.zip file is a complete CD-ROM image of the Master Software Tools package, including all of the latest applications packages and user guides.

8. Compare the right pane (displaying the version on your PC) to the left pane (available version to install) on order to determine if updating the firmware is required.

9. If the update is required, then select **Install to Unit.**

10. If updating a very old firmware version, then a prompt may request making menu selections on the unit. Follow the instructions very carefully. If this step is omitted, then the application must be recovered with the **Emergency Repair** button after reconnecting to the unit.

Note: Be aware of the **Show Obsolete Files** checkbox. This checkbox always appears in unchecked condition. If checked, then the list of available files expands to include all firmware archives that are on the PC, including obsolete or beta versions. Installing one of these should be done only under direction from an Anritsu Customer Support representative. Unless instructed to do so, leave this box unchecked.

Appendix A Applications and Files

Supported Applications and File Types

A-1 Supported Anritsu instruments

- MS2721A – Spectrum Master
- MS8911A - Digital Broadcast Field Analyzer
- MS2024A - Handheld VNA Master
- MS2026A - Handheld VNA Master
- MT8220A – UMTS Master
- MT8222A – BTS Master
- MS2034A – VNA Master
- MS2036A – VNA Master
- MS2717A - Economy Spectrum Analyzer

A-2 Supported File Types

```
SPA files............................*.spa
VNA files............................*.vna
WCDMA/HSDPA files....................*.wcd
GSM/GPRS/EDGE files..................*.edg
Channel Scanner files................*.cs
Interference Analyzer files..........*.ia, *.iac
Power Meter files....................*.pm
Hi-Accuracy Power Meter files........*.hipm
T1 measurement files.................*.t1
Fixed WiMAX measurement files........*.wmxd
BTS Master measurement files.........*.scope
JPEG files...........................*.jpg
Language files.......................*.znc
Measurement map files................*.ptm
Folder Spectrogram files.............*.fsg
Setup files..........................*.stp
Antenna, Cable, Signal Standards......*.txt
Signal Standard files................*.sig
```

Appendix B Menu Structure

Master Software Tools Menu Structure
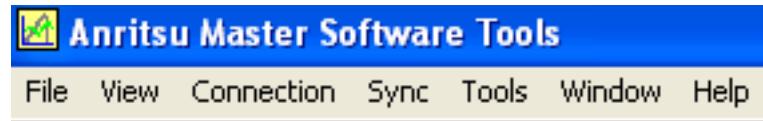
Figure B-1. Menu Bar – Master Software Tools

B-1 File

New

Antenna File

Opens an empty Antenna file in the Antenna Editor

Cable File

Opens an empty Cable file in the Cable Editor

Signal Standard File

Opens an empty Signal Standard file

> GSM/GPRS/Edge
>
> SPA/IA/CS
>
> VNA
>
> WCDMA/HSDPA

Pass Fail

Opens an empty Pass/Fail file

> GSM/GPRS/Edge
>
> WCDMA/HSDPA
>
> Fixed WiMAX

Cable File

Opens an empty Cable file in the Cable Editor

Folder Spectrogram

Creates a new Folder Spectrogram.

Measurement Map

Creates a new Measurement Map using MapPoint

Open

Displays the file open dialog box. Use the File Type drop-down list to filter for specific measurement types.

Save

Saves the contents of the active child window.

Save as

Displays the Save File dialog box to rename/save an open file.

Save All

Saves all open measurements without prompting.

Close

Closes the active measurement window.

Close All

Closes all open measurements.

Export CSV

Opens the Export dialog box to save the active measurement to a standard text file format readable by spreadsheets, etc.

Create Report

Creates a standard report from the active measurement.

Save JPG

Saves the active window in jpg format.

Save Folder as JPEGs

Creates a JPEG image from all measurements in a selected folder.

Print

Opens the Print dialog box for the active window.

Print All

Prints all open measurements. User can select number of measurements/page.

Exit

Closes all open measurement windows, disconnects any instrument connected to Master Software Tools and exits the Master Software Tools program.

B-2 View

Measurement Preview / Summary Window

Toggles the display of the Preview/Summary window that is normally displayed at the bottom left corner of the application window.

Network Unit Summary

Toggle. When active selecting a unit in the device list will show Unit Summary information in the Preview window.

Toolbar

Toggles the display of the application main toolbar.

Status Bar

Toggles the display of the application status bar.

Trace Catalog

Toggles the display of the Trace Catalog.

B-3 Connection

Connect USB

Connect to an Anritsu instrument through an attached USB cable.

Connect Ethernet

Connect to an Anritsu instrument through an Ethernet connection.

Disconnect

Disconnect from a connected Anritsu instrument.

Enter IP Address

Enter a target IP address to use when making an Ethernet connection.

Refresh Network List

Refresh the Network Device List. This is a list of Anritsu instruments visible on the Local Area Network.

B-4 Sync

Upload Active Window

Upload the file displayed in the active window to the instrument.

Capture Current Measurement

Download the current measurement on the connected instrument.

Download Antenna List

Download the Antenna list stored on the connected instrument.

Download Cable List

Download the Antenna list stored on the connected instrument.

Download Signal Standards

Download the Signal Standards list stored on the connected instrument. This is specific to each measurement mode for the connected instrument.

> **SM/GPRS/Edge**
>
> **SPA/IA/CS**
>
> **VNA**
>
> **WCDMA/HSDPA**

Download Pass/Fail List

Download the Pass/Fail test definition file stored on the connected instrument. This is specific to each measurement mode for the connected instrument.

> **GSM/GPRS/Edge**
>
> **WCDMA/HSDPA**

Download Language Tables

Sub-menus are displayed to download the language file for each supported application. Your instrument will not support all the options shown.

Download All Measurements

Use this option to download all saved instruments at once to a single folder on your PC.

Refresh Device Measurement List

Refresh the list of saved measurements shown for the instrument you are connected to.

Device Status and Options

Display Unit Summary

Display instrument status, firmware revisions and installed options for the connected instrument.

Get Options (Config file)

Get a Config file containing installed option information. If you purchase additional options, this file must be sent to an Anritsu support center to create a new License file.

Set Options (License File)

A License file contains information about the installed and active options in your Anritsu instrument. To activate additional options a new License file must be obtained from Anritsu Customer Support.

B-5 Tools

Group Edit

Allows you to change common features simultaneously on a large set of similar measurement files.

Full Trace Retrieval

Similar to Sync-Download All. This function retrieve all files stored in the internal user memory space of the connected instrument. This can be faster (especially on older instruments) than Sync-Download All, but it requires an Ethernet connection – USB is not supported.

VNA Measurement Calculator

This tool translates certain values into other units. It can show Real, Imaginary, Magnitude, Phase, Return Loss, Reflection Coefficient, and Transmission Power.

DAT File Conversion Tool

Convert supported file types from Anritsu's legacy Handheld Software Tools format to the file format supported by Master Software Tools. Conversion is one-way.

Trace Rename Utility

A utility application to quickly rename files and to reset measurement titles and sub-titles in a quick and systematic way.

Product Updates

Opens a dialog box used to upgrade the firmware in supported Anritsu instruments. Use also to locate and download upgrade files from Anritsu's Customer Support Internet site.

Program Options

Dialog box used to set various Master Software Tools program options.

B-6 Windows

Cascade

Causes all open windows to overlap in a descending left-to-right order.

Tile Vertical

Rearranges all open windows to so nothing is hidden – preference is given to an over-under arrangement.

Tile Horizontal

Rearranges all open windows to so nothing is hidden – preference is given to a left-right arrangement.

Print All

Brings up the Print All dialog box to print all open measurements. User can select measurements/page.

Close All

Closes all open Master Software Tools windows.

B-7 Help

Help Contents

Display this help file.

Contacting Anritsu Customer Support

Information on contacting Anritsu Customer support.

Anritsu on the Web ...

Opens the default Internet Browser to the Anritsu Customer Support Internet site.

App Notes and Instrument Documentation

Opens a sub-menu to access installed application notes and instrument manuals.

About Master Software Tools

Standard application About box with copyright information.

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