User Manual

Tektronix

**CSS50
Cable Television System Software**

071-0030-02

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CSS50 Cable Television System Software User Manual

Preface

The CSS50 Cable Television System Software is Microsoft Windows 95- and NT-based software to control and display measurement results of Cable TV test equipment.

This manual supports software versions 2.1, 2.0, and 1.0 of the CSS50 Cable Television System Software. Following is a list of test equipment supported by the each version of the CSS50 software.

Software Version 2.0 and 2.1	Software Version 1.0
2714 and 2715 Spectrum Analyzers	2714 and 2715 Spectrum Analyzers
DS1000 series demodulators (NTSC and PAL)	DS1001 NTSC demodulator
VM100 and VM101 Video Measurement Sets	VM100 Video Measurement Set

The point and click user interface makes operation easy, even for the inexperienced user. Making a measurement is as simple as selecting a channel and measurement type and clicking a mouse. In addition, the package can automatically monitor all in-service baseband and RF measurements and signal an alarm when a measurement exceeds a specified limit.

Measurement results are displayed in a table of channel vs. measurement type. For any measurement on a particular channel, the user simply clicks the mouse on that data cell, and a window appears with more information.

As with other Windows-based software, CSS50 data is exportable to other Windows-based software, such as Microsoft Excel, for in-depth data analysis.

What's in this Manual

This manual assumes that you are familiar with Windows 95 or NT4.0. Please refer to the Windows tutorial in the Windows reference manual for more information if you are not comfortable with Windows.

This manual is organized as three primary chapters and a set of appendices. The three primary chapters and their contents are:

- *Getting Started.* Covers software installation.

- *Operating Basics.* A tutorial for the beginning user.

■ *Reference.* Provides detailed information about the software. Describes the worksheet, the menu bar and menus, and advanced information on setups and measurements.

The contents of the appendices are:

■ A Menu Map to give you a quick overview of the software.

■ A listing of error messages.

■ An explanation of how to use the Channel Table Editor.

■ Guidelines for using the CSS50 application to meet FCC measurement requirements for monitoring a cable system.

■ Information about the CSS50 files (how to archive worksheets, file sizes, and other information).

■ A cabling diagram showing connections between the controlling PC and test equipment.

■ How to control a 2714 or 2715 spectrum analyzer over a modem.

■ Information about software version 1.0 not included in other sections of the manual.

Contacting Tektronix

Product Support	For application-oriented questions about a Tektronix measurement product, call toll free in North America: 1-800-TEK-WIDE (1-800-835-9433 ext. 2400) 6:00 a.m. – 5:00 p.m. Pacific time
	Or contact us by e-mail: tm_app_supp@tek.com
	For product support outside of North America, contact your local Tektronix distributor or sales office.
Service Support	Contact your local Tektronix distributor or sales office. Or visit our web site for a listing of worldwide service locations.
	http://www.tek.com
For other information	In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.
To write us	Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000

Getting Started

Installation

This chapter describes the computer requirements and how to install the CSS50 Cable Television System Software.

Contents of CSS50 Package

- Two 3½ inch diskettes

- This manual

Hardware Requirements

Table 1–1 lists the computer requirements for the CSS50 software to operate properly.

Table 1–1: Personal computer requirements

Requirements	Details	Recommendations
66 MHz, 486 with hard drive		Pentium recommended
Microsoft Windows 95 or NT4.0		
VGA display		
8 MB of RAM		16 MB recommended
4 MB of hard drive free space		
I/O ports (requirements based on equipment setup)	GPIB or RS 232 for 2714 or 2715	GPIB: National Instruments GPIB hardware and Software for Windows RS-232: Desktop National Instruments AT-232/2 (or AT-232/4) Laptop National Instruments PCMCIA-232/2
	RS-232 for DS1000 series	
	RS-232 for VM100 or VM101	
	RS-232 for Violations Reporting	
Video display board (optional)	View Picture Mode	Video Blaster

Step-by-Step Procedure to Install the CSS50 Software

1. Close all open applications on your PC.

2. Insert disk 1 into your disk drive.

3. Click on Start in the Windows 95 main screen. This displays a task list.

4. From the task list, select Run... This displays the Run dialog window.

5. Type `A:\Setup.exe` in the entry field (substitute the character A with the character of your disk drive).

6. Click on OK.

7. Follow the software installation prompts.

Results of the Software Installation

The installation adds the following items, directories, and files.

Windows Program Items

CSS50 (Windows 95 only)

For Windows NT, you can create a shortcut to the CSS50.exe on your desktop. Refer to the Windows NT help text for shortcuts.

Directories Created

CSS50

■ Sub-directories of CSS50:

HELP   LIMITS

The Help directory contains the online help files. See *Appendix E* for how to edit these to fit your special requirements.

The Limits directory contains an NTSC limits file (ntsc.lim) and a PAL limits file (pal.lim).

Hardware Installation

Minimum Equipment Installation

You can use the software without having all equipment installed. If you install only some of the equipment, use Table 1–2 to determine the available measurements.

Table 1–2: Equipment required to make the various measurements

Measurement	RF[1]	BB[2]
Visual Carrier Level	✔	
Visual Carrier Frequency	✔	
Aural Carrier Level	✔	
Aural Frequency Offset	✔	
Second Aural Carrier Level	✔	
Second Aural Frequency Offset	✔	
Average Power	✔	
Carrier to Noise	✔	
Desired to Undesired	✔	
CSO	✔	
CTB	✔	
Cross Modulation	✔	
Adjacent Channel Leakage	✔	
In-Channel Response[3]	✔	✔
Hum/LFD[3]	✔	✔
FCC Baseband		✔
Modulation Depth	✔	
Aural Deviation	✔	
Signal to Noise		✔
Waveform Distortion		✔

[1] **RF equipment includes the 2714 or 2715 spectrum analyzers.**

[2] **BB (Baseband) equipment includes: the VM100 or VM101 video measurement set and DS1000 series television demodulators.**

[3] **If both columns are checked, use either RF or BB equipment to make the measurement.**

Test Equipment

The following test equipment is required to complete this installation:

- A 2714 or 2715 Cable TV Spectrum Analyzer. If something is instrument specific, then one or the other is called out.

  - If the 2714 or 2715 has option 03 installed, a GPIB cable (012-0991-01) is required.

  - If the 2714 or 2715 has option 08 installed, an RS-232 cable is required. The 25-pin RS-232 cable is Tektronix part number 012-1380-00. The 9-pin RS-232 cable is Tektronix part number 012-1379-00.

- A VM100 (NTSC) or VM101 (PAL) video measurement set

- A DS1000 series television demodulator (NTSC or PAL video standard)

- Two RS-232 cables are needed to connect both a video measurement set (VM100 or VM101) and a demodulator (DS1000 series) to the PC. The cables are Tektronix part number 012-0991-01 (1 meter length).

Please see *Appendix F* for how the equipment should be connected for proper operation. (You need not use all of the equipment; see Table 1–2 for more information.) See the test equipment manuals for any additional hardware information.

The CSS50 software can only communicate with one of each type of test equipment at any one time. For example, if you have two 2714s or 2715s in your system, CSS50 can only use one of them to make its measurements.

To Install the Equipment

Use the following procedures to install the equipment.

GPIB Board   If you use a 2714 or 2715 spectrum analyzer with a GPIB port, install the National GPIB hardware and Software for Windows using the instructions provided in the National manuals.

RS-232 Board/Card   Install the RS-232 hardware and software using the instructions provided from the manufacturer.

2714 or 2715   Configure your 2714 or 2715 spectrum analyzer as indicated in Table 1–3 for GPIB or Table 1–4 for RS-232.

Table 1–3: 2714 or 2715 (Option 03) GPIB

Status	Online
GPIB address	1[1]
Power on SRQ	On or Off
EOI/LF mode	LF/EOI
Talk only mode	Off

[1] **This must be a unique address between 0 and 29**

Table 1–4: 2714 or 2715 (Option 08) RS-232

Status	Online
Baud rate	9600[1]
Data bits	8
Parity	None
EOL	LF
Flow control	Hard (RTS/CTS)
Echo	Off
Verbose	Off

[1] **Device baud rate is selectable through the Connections menu. Other communications parameters must be set to these values.**

VM100 or VM101   Configure your video measuremnet set as indicated in Table 1–5.

Table 1–5: VM100 or VM101 RS-232

Baud rate	9600[1]
Stop bits	1
Parity	None
Flow control	None
Remote address	Not applicable

[1] **Device baud rate is selectable through the CSS50 Connections menu. Other communications parameters must be set to these values.**

DS1000 Series   Configure your DS1000 series demodulator as indicated in Table 1–6.

Table 1–6: DS1000 series RS-232

Unit address	Not applicable
RTS/CTS	Disabled
RS485	Not applicable
Baud rate	9600[1]
Start bits	1
Stop bits	1
Data bits	8
Parity	None

[1]   **Device baud rate is fixed at 9600. Other communications parameters must be set to these values.**

Select the Demodulator and Configure the Connections

The CSS50 software must know if a DS1000 series demodulator is connected in your system. The first time that you run the CSS50 software you need to check that the software knows your equipment setup.

1. Start the software by clicking on the icon (created during software installation).

2. When the start-up is complete, choose Demodulator from the Configure menu. The display will be similar to Figure 1–1. The check mark indicates the selection.
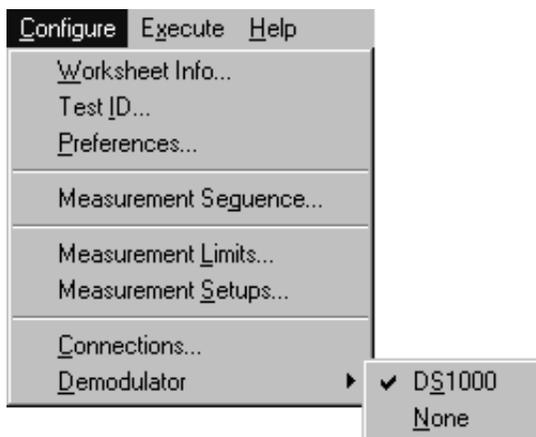
Figure 1–1: Demodulator selection, from the Configure menu

3. If you choose DS1000, you are presented with the demodulator setups dialog box (Figure 1–2).
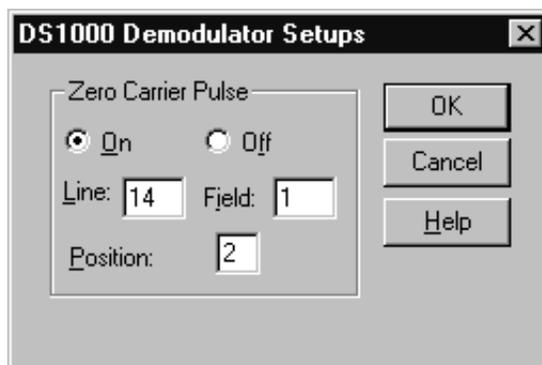
Figure **1–2: DS1000 Demodulator Setups dialog box**

4. Set the demodulator parameters as required for your equipment configuration.

For NTSC, the Line entry must be in the range of 10 to 20 and the Field set to 1 or 2. Baseband Hum measurements use Field 1 only.

For PAL, the Line entry must be in the range of 6 to 16 or 319 to 329. The Field entry is disabled (grayed out). Baseband Hum measurements use the Line range of 6 to 16 only.

Zero Carrier Pulse must be set to On for Baseband Hum measurements. Select a quiet line in the video signal to put the zero carrier pulse on.

Position is where within the video line the pulse is placed. The range is 0 to 4 where 0 is at the start of the video line and 4 is at the end.

NOTE. The video standard (NTSC or PAL) is defined in the channel table attached to the current worksheet. See Appendix C: Channel Table Editor *for information about channel tables.*

Now set the communication parameters for each piece of test equipment.

1. Choose Connections from the Configure menu. The Connections dialog box looks similar to the one shown in Figure 1–3.

2. Enter the RS-232 configurations for the VM100 or VM101 video measurement set, the DS1000 series demodulator, and the 2714 or 2715 spectrum analyzer.
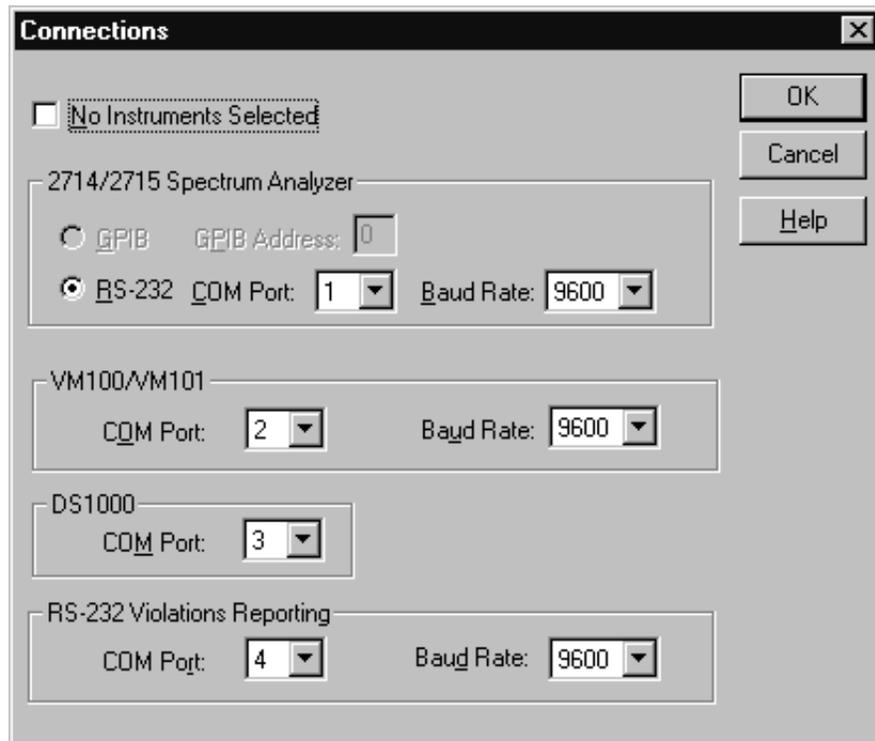
Figure 1–3: Connections dialog box

3. If the 2714 or 2715 has an RS-232 connection instead of a GPIB, it must be entered along with the baud rate and the correct Communications (Com) Port.

> ⚠ *CAUTION. To ensure proper operation and prevent software conflicts, verify that no two instruments are assigned to the same port. This applies even if an instrument is not connected or used.*

4. Set the RS-232 Violations Reporting Com Port and Baud rate if you need to have errors reported for the RS-232 Port. An additional Com Port is required. If you are not using violations reporting, set the com port to a value not used or doesn't exist to avoid conflict with other instruments.

5. For learning purposes, selecting No Instruments Selected allows the application to run without any instrumentation connected. Random numbers are generated to approximate measurement results.

6. Click on OK when the dialog box has been set up correctly.

Operating Basics

Basic Tutorial

The goal of this section is to familiarize you with the basic layout of a worksheet, how to set up a worksheet, and make simple measurements.

Before beginning the tutorial, please check your hardware for the proper connections. (*Appendix F* gives a cabling diagram.) Double-checking the hardware helps prevent errors that are hardware related.

If you want more information on an individual command, please refer to the on-line help or the *Menu Bar* section, beginning on page 3–11.

This tutorial assumes that a mouse is available. If a mouse is not available, make selections using the ALT key plus the underlined letter of the command. For example ALT+f means to press the ALT key and the f key at the same time.

By the end of this chapter, you should be able to do the following:

- Select cells

- Enter Worksheet Header information

- Make simple measurements

- Enter the Results Detail display

- Enter the Global View

- Define a Measurement Sequence

- Execute a Measurement Sequence

- Define a Measurement Sequence using the Auto Selection buttons

- View the broadcast picture on the computer monitor

- Set up your printer

- Print out assorted reports

Purpose of Software

The purpose of the CSS50 software is to simplify the time-consuming and tedious tasks of measuring and recording the results of measurements associated with a cable TV system. To make a measurement on a particular channel, simply select the cell where the channel and measurement intersect and double-click the left mouse button. The results are printed in the cell. Print out the reports and the job is completed. Of course, this is a cable system and there are many channels and many measurements. The software allows you to make many measurements rapidly by selecting several channels or measurements.

Start the Software

CSS50

1. Start the PC with Windows 95 or NT4.0.

2. Start the CSS50 application.

   a. For Windows 95 — Choose CSS50 from the Start menu.

   b. For Windows NT4.0 — Choose CSS50 from where you installed the application (or use the shortcut if one has been created).

The initial display is called a worksheet. This worksheet is blank except for the measurement list running across the top row and a channel list running down the left column.

Description of the Worksheet

Figure 2–1 identifies the elements of the worksheet.
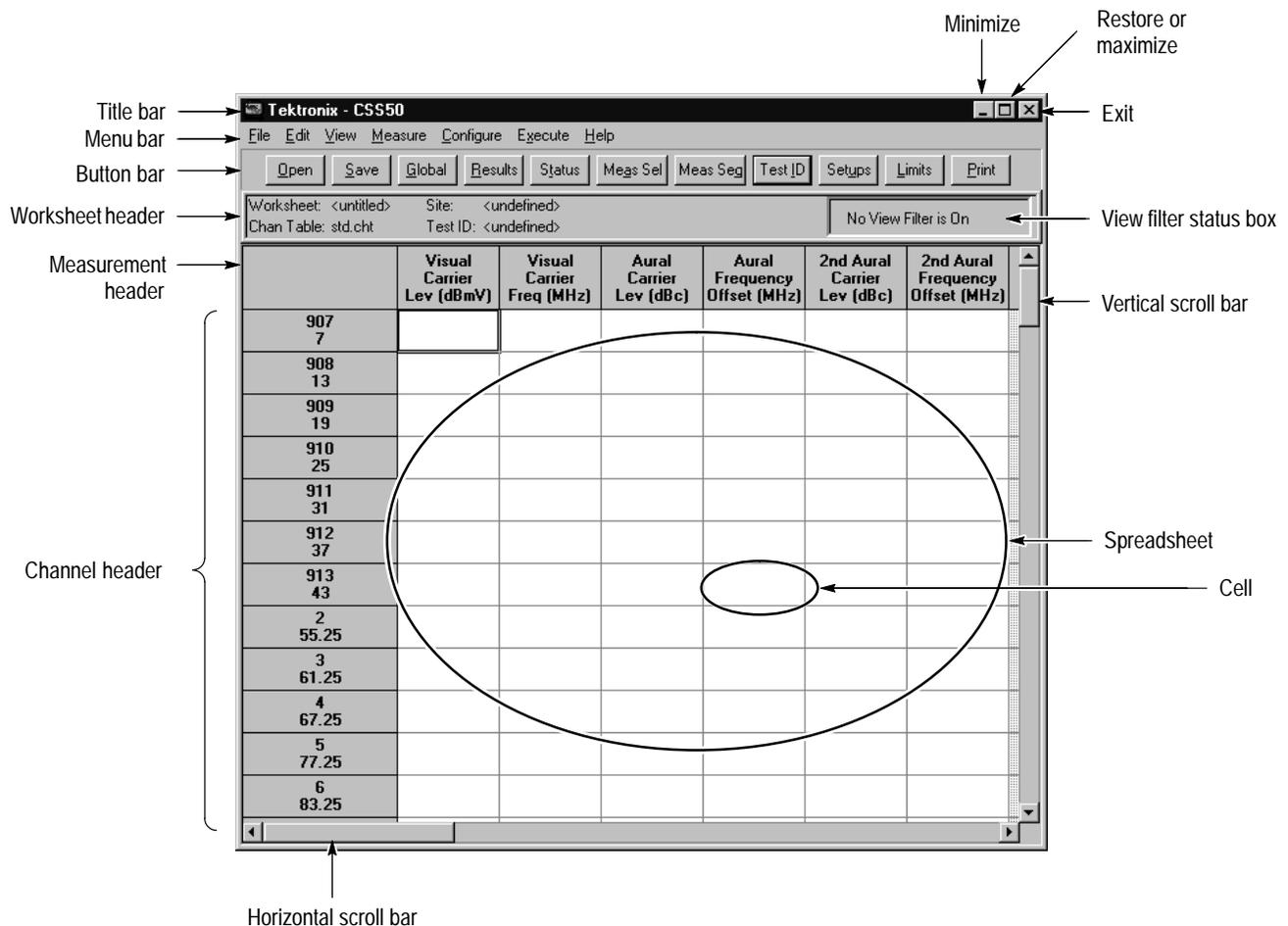
Figure 2–1: The default worksheet

Elements of the Worksheet   The following paragraphs describe the various parts of the worksheet.

Mouse Pointer. (Not shown in figure.) The mouse pointer can take many shapes, dependent upon the functions available. If the pointer is a cross, it selects cells in the spreadsheet. If it is an arrow, it chooses commands. If it is an hourglass, the software is busy and no new actions are available.

Title Bar. This shows the name of the application, "Tektronix — CSS50".

Minimize Button. Shrinks the application to an icon.

Maximize Button. Makes the application window fill the entire display area.

Restore Button. Returns the application window to its previous size.

Control Menu Box. Contains the standard Windows commands: Restore, Move, Size, Minimize, Maximize, Close, and Switch To.

Menu Bar. Provides access to the CSS50 menus.

Button Bar. Contains the command buttons. The command buttons are shortcuts with equivalents in the Menu Bar.

Channel Row Header. Lists channels by number and center frequency.

Measurement Column Header. Lists measurements.

Vertical Scroll Bar. Moves the spreadsheet vertically. Note that the Measurement Header remains along the top as a reference.

Horizontal Scroll Bar. Moves the spreadsheet horizontally. Note that the Channel Header remains along the side as a reference.

Spreadsheet. Contains all of the cells, the Measurement Header, and the Channel Headers.

Cell. A single cell (box) on the spreadsheet — the intersection of one measurement and one channel. See *Cell Coloring* on page 2–22 about the meaning of cell colors.

Elements of the Worksheet Header

Figure 2–2 illustrates the Worksheet Header, which lists important information about a worksheet. You can edit this information in various ways depending upon which piece you would like to change. (For how to set up a worksheet, see page 2–13.)

| Worksheet: <untitled> | Site: <undefined> | No View Filter is On |
| Chan Table: std.cht | Test ID: <undefined> | |

Figure 2–2: The worksheet header

Worksheet. The name of the current worksheet. It is called <untitled> if the worksheet has not been saved.

Chan Table. This file lists the channels in the system under test. There must be a Channel Table or the CSS50 will not run. The default channel table is std.cht.

Site. An additional identifier for the worksheet. Site is intended to be the location where the measurement takes place. Only one Site is allowed for each worksheet. The Site name <undefined> is a valid name.

Test ID. The name that you give to a test. The test ID could be the name of the person who is making the measurements, the measurement test point, or any other identifier. A single worksheet can have multiple Test IDs sub-dividing measurements made at a single Site (such as Pre-converter and Post-converter). The test ID name <undefined> is a valid name.

View Filter Box. Tells how much of the spreadsheet is in view or is available. The options for the box are: "No View Filter is On" (the entire spreadsheet is in view), "View Selected Filter is On" (display only selected measurements and channels), "View Sequence Filter is On" (display only measurements made with a Measurement Sequence), and "View Test ID Filter is On" (display only measurements made with the current Test ID). Note that only displayed channels are available for measurements.

Navigation

This section explains how to get around in the software. All actions are first explained for the mouse and then for the keyboard. If you are familiar with Windows command selection, skip to *Scroll Through the Spreadsheet* on page 2–9.

Choose from the Menu Bar

Step	Mouse	Keyboard
1	Single-click the left mouse button on the desired menu from the Menu Bar.	Press the ALT key plus the underlined letter in the menu.
2	Single-click the left mouse button on the desired command.	Press the underlined letter for the desired command or use the arrow key to scroll, then press Enter.

Example: Open a worksheet

Step	Mouse	Keyboard
1	Single-click the left mouse button on the word "File" on the Menu Bar.	Press ALT+f.

This displays the drop-down File menu shown in Figure 2–3.

Figure 2–3: The drop-down File menu

Step	Mouse	Keyboard
2	Single-click the left mouse button on the word "Open".	Press o.

This displays the dialog box shown in Figure 2–4.
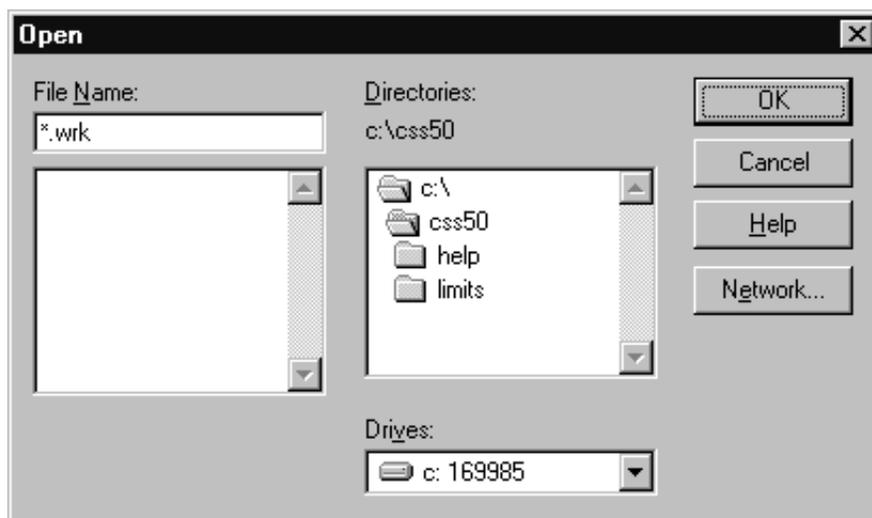
Figure 2–4: Open dialog box

Step	Mouse	Keyboard
3	Single-click the left mouse button on the Cancel command button to close the Open dialog box without opening a file.	Press ESC to close the Open dialog box without opening a file.

Choose from the Button Bar

Mouse	Keyboard
Single-click the left mouse button on the desired command button.	Press the ALT key plus the underlined letter from the command button. or Press TAB to place the cursor in the Button Bar, then press either TAB or the arrow keys to select the command button. (Be careful using the arrow keys. They will scroll off the Button Bar and into the spreadsheet.) Press ENTER to choose the selected command button.

Example: Open the Test ID dialog box

Step	Mouse	Keyboard
1	Single-click the left mouse button on the Test ID command button.	Press ALT+i.

This displays the Test ID dialog box shown in Figure 2–5.
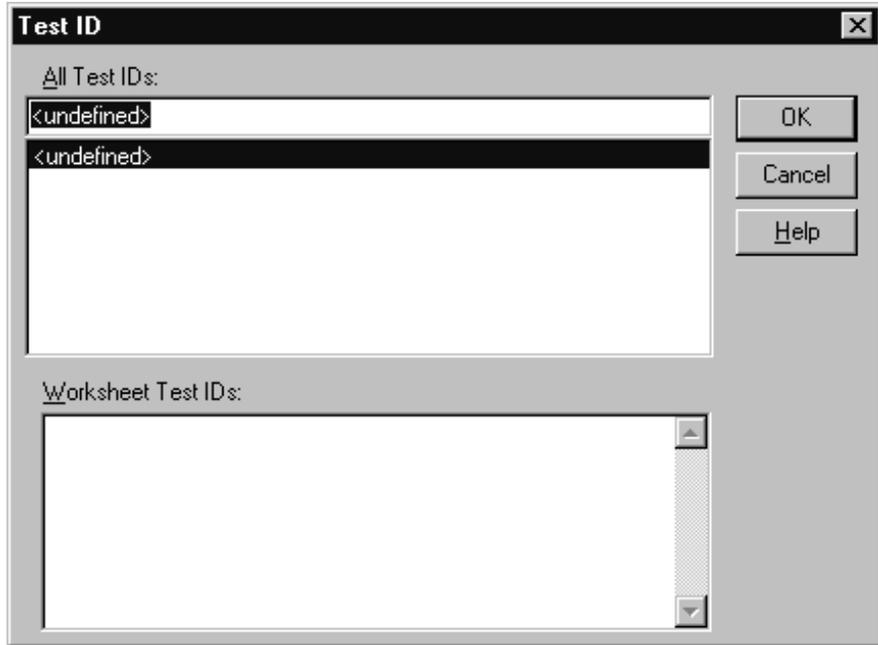
Figure 2–5: Test ID dialog box

Step	Mouse	Keyboard
2	Single-click the left mouse button on the Cancel command button, to close the dialog box without making any changes.	Press ESC.

Special Command Button Keyboard Shortcuts

Many dialog boxes have two special command buttons: OK and Cancel.

To choose OK from the keyboard, press ENTER with anything highlighted except the Cancel button.

To choose Cancel from the Keyboard, either press ESC or press TAB until the Cancel command button is highlighted, then press ENTER.

Scroll Through the Spreadsheet

Mouse	Keyboard
Either: Click on the left, right, up, or down scroll arrows in the Vertical or Horizontal Scroll Bar with the left mouse button. This moves the spreadsheet one vertical row or one horizontal column at a time. or Click on the scroll box in the Vertical or Horizontal Scroll Bar with the left mouse button, then hold down the left mouse button and drag the scroll box to the desired position. Release the mouse button.	Place the cursor in the spreadsheet. To scroll the spreadsheet to the desired position, use the arrow keys if you are in the Button Bar or ESC if you are on the Menu Bar. The spreadsheet display will move every time you move to a cell that is off screen. The HOME, END, PAGE UP, and PAGE DOWN are also available to move quickly through the spreadsheet. HOME. Moves to the first cell in the current channel. END. Moves to the last cell in the current row that has a measurement made for any channel. PAGE UP. Moves the spreadsheet up one page. (Measurement stays the same and the current channel is the next channel that was just off screen to the top.) Nothing happens if the top channel is currently visible. PAGE DOWN. Moves the spreadsheet down one page. (Measurement stays the same and the current channel is the next channel that was just off screen to the bottom.) Nothing happens if the bottom channel is currently visible.

Example: Display the FCC Baseband measurement for channel 3

Step	Mouse	Keyboard
1	Click on the Horizontal Scroll Bar box with the left mouse button. Hold down the left mouse button and drag the cursor until it is all the way to the right side of the Horizontal Scroll Bar. The FCC Baseband column is visible.	Place the cursor on the spreadsheet. Press the right arrow key until the FCC Baseband column is visible.
2	Click on the Vertical Scroll Bar down arrow with the left mouse button until channel 3 is visible. The spreadsheet looks similar to Figure 2–6. Notice the position of the boxes in the Vertical and Horizontal Scroll Bar.	Press the down arrow key until channel 3 is visible. The spreadsheet looks similar to Figure 2–6. The FCC Baseband cell for channel 3 is selected (using the std.cht Channel Table). Notice the position of the boxes in the Vertical and Horizontal Scroll Bar.
3	Reverse the steps to return to the spreadsheet to display the first column.	
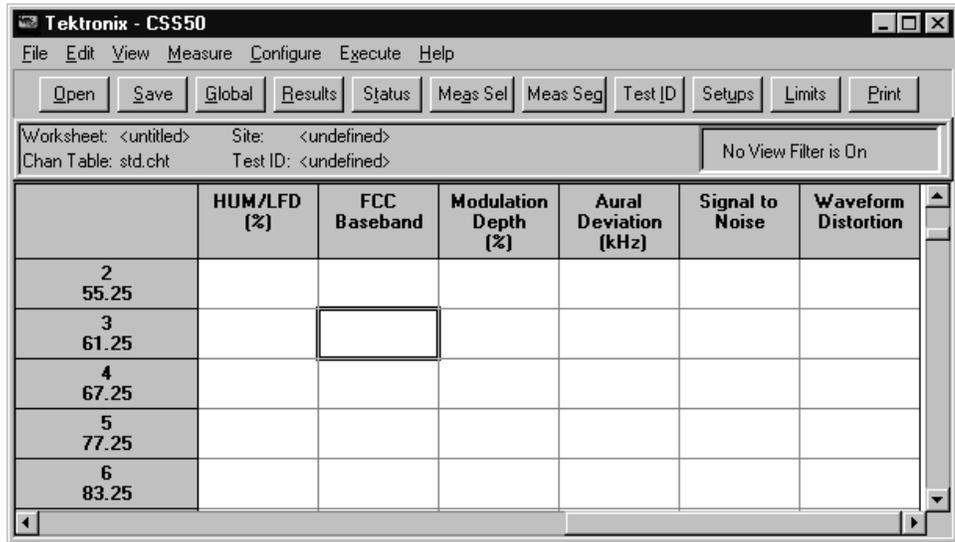
Figure 2–6: The spreadsheet scrolled to the FCC Baseband column

Select a Cell from the Spreadsheet

Mouse	Keyboard
Single-click the left mouse button on the desired cell.	Press ESC or the arrow keys until the cursor is in the spreadsheet. Use the arrow keys to move the cell outline to the desired cell.

Example: Select Carrier to Noise cell for channel 3

Mouse	Keyboard
Place the mouse cursor anywhere in the cell. Single-click the left mouse button. The selected cell is outlined.	Use the arrow keys to move the cell outline to the desired cell.

The selected cell on the spreadsheet looks similar to Figure 2–7.
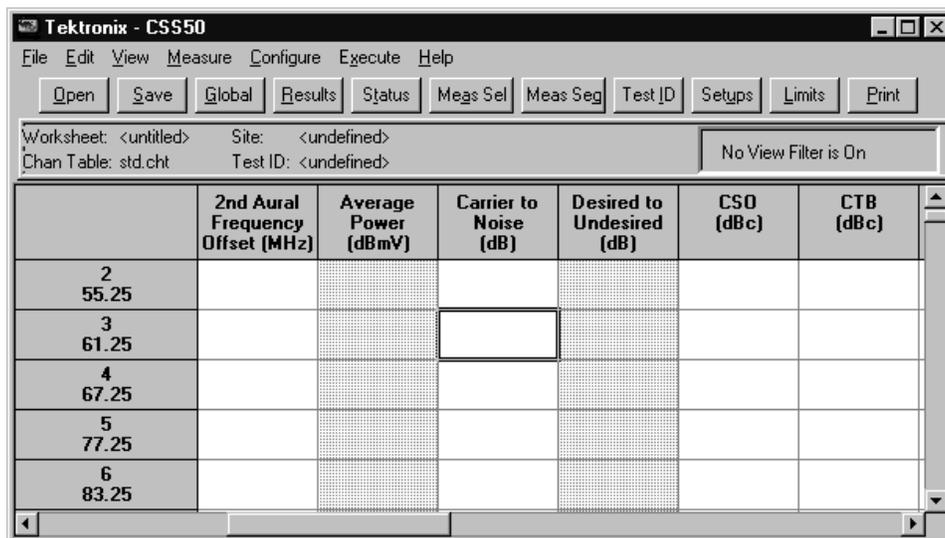
Figure 2–7: A single cell selected on the spreadsheet

Select a Group of Cells   Select a group of adjacent cells (rows, columns, or block).

NOTE. You can only select adjacent cells. If non-adjacent cells need to be measured as a group, use a Measurement Sequence (see page 2–24).

Step	Mouse	Keyboard
1	Click on one of the corner cells in the desired group.	Press the arrow keys until one corner cell of the desired group is selected.
2	Hold down the left mouse button and drag the mouse until all of the desired cells have reversed color. (When the cell color reverses, it indicates selection. The first cell does not reverse color.)	Hold down the SHIFT button. Use the arrow keys to move around the spreadsheet until the desired group of cells has reversed color. (When a cell reverses color — it has been selected. The first cell does not reverse color.)
3	Release the left mouse button.	Release the SHIFT button.

Example: Select channels 3-4's carrier levels and frequencies

Step	Mouse	Keyboard
1	Single-click on the second channel's Visual Carrier Level cell.	Use the arrow keys to place the cursor around the second channel's Visual Carrier Level cell (Channel 3).
2	Start the mouse pointer in the selected cell, then hold down the left mouse button and drag the mouse cursor until the desired cells have reversed color. Release the left mouse button. The selected cells keep the reversed color, except for the original corner cell which is outlined.	Hold down the SHIFT key and use the arrow keys to select the desired cells. The selected cells reverse color, except for the original corner cell which is outlined.

The spreadsheet resembles Figure 2–8. Note that the selected cells have reversed in color except for the corner cell which is outlined.
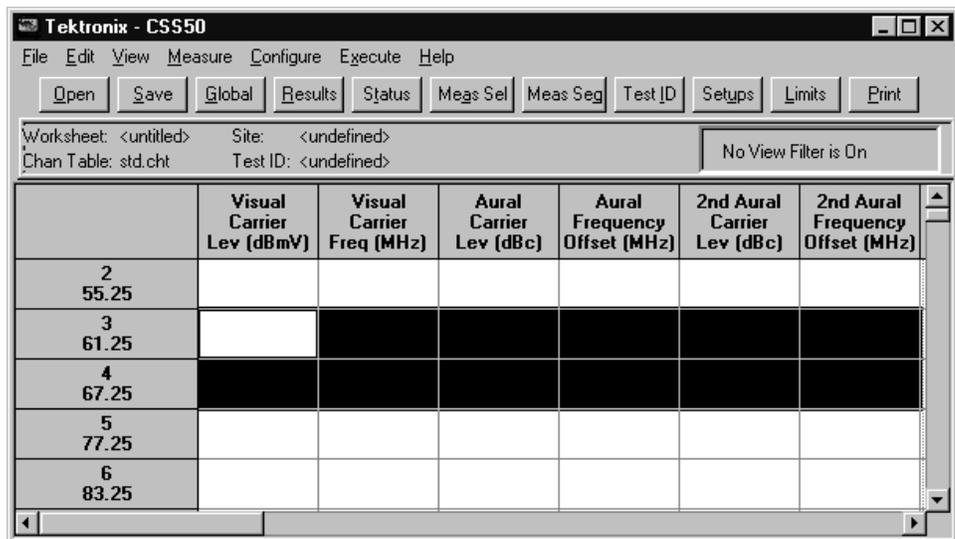
Figure 2–8: A group of cells selected on the spreadsheet

Selecting an entire row or column

Mouse	Keyboard
Single-click on the name of the measurement or channel in the Measurement or Channel Header.	To select an entire row, place the cursor anywhere in the row and press SHIFT+space-bar. To select an entire column, place the cursor anywhere in the column and press CTRL+spacebar.

Select the Entire Spreadsheet. You can select the entire spreadsheet three ways:

Select the entire spreadsheet

Mouse	Keyboard
Click with the left mouse button on the upper left cell where the Channel and Measurement Headers intersect.	Press CTRL+SHIFT+spacebar. Select the Edit menu by pressing ALT+e, then choose Select All by pressing s.

Setting Up a Worksheet

There are four parts to a worksheet definition: Site, Test ID, Channel Table, and Worksheet name. The Worksheet is the main file that stores everything. Each Worksheet may only have one Site and one Channel Table associated with it. If the Channel Table or Site changes, the software automatically gives you the option to start a new worksheet or rename the Site in the current worksheet. You will now create a new worksheet for practice.

Enter a Site and Description

1. From the File menu, choose New. If a worksheet has already been defined, the following Warning dialog box (Figure 2–9) may be displayed:
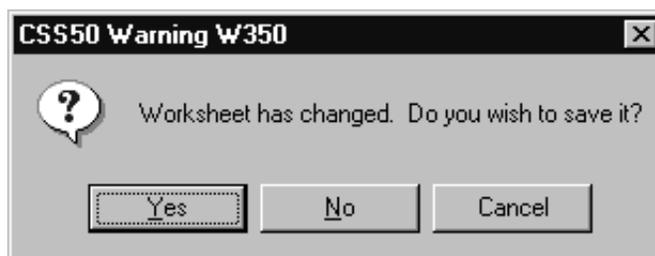
Figure 2–9: Worksheet has changed warning

2. Do not save the old worksheet; click on No.

This displays the New dialog box, as shown in Figure 2–10.
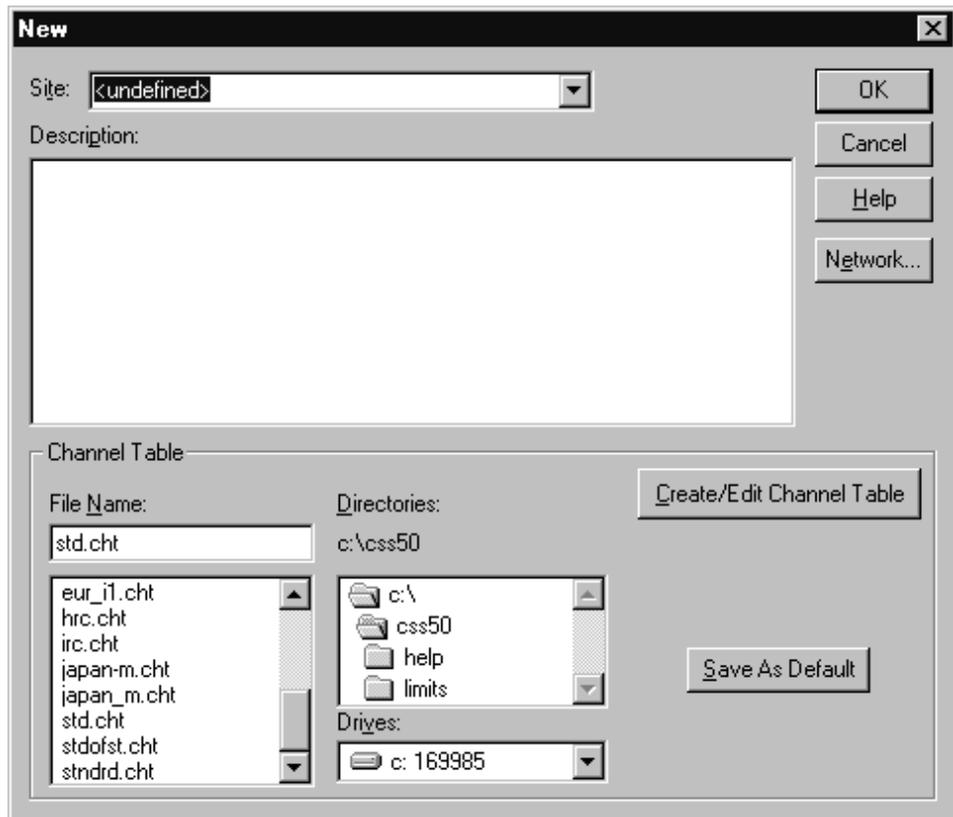
Figure 2–10: New dialog box

3. Select the Site box and enter an appropriate site name (for example, "Tektronix – Beaverton").

Mouse	Keyboard
Click on the Site box. Type in your site name or click on the arrow box to select an existing Site name. (Use a site name appropriate to your setup.)	Press TAB until the cursor is in the Site list box and type in your site name.

4. Select the Description text box.

Mouse	Keyboard
Click the left button in the Description text box.	Press ALT+p or TAB.

5. Enter the description: `This worksheet is for practice only.`

6. Select std.cht as the Channel Table by clicking on std.cht in the list box. (This is the default selection.)

7. Leave the New dialog box and save the changes by clicking on OK.

8. From the File menu, choose Save As. The Save As dialog box appears, as shown in Figure 2–11.
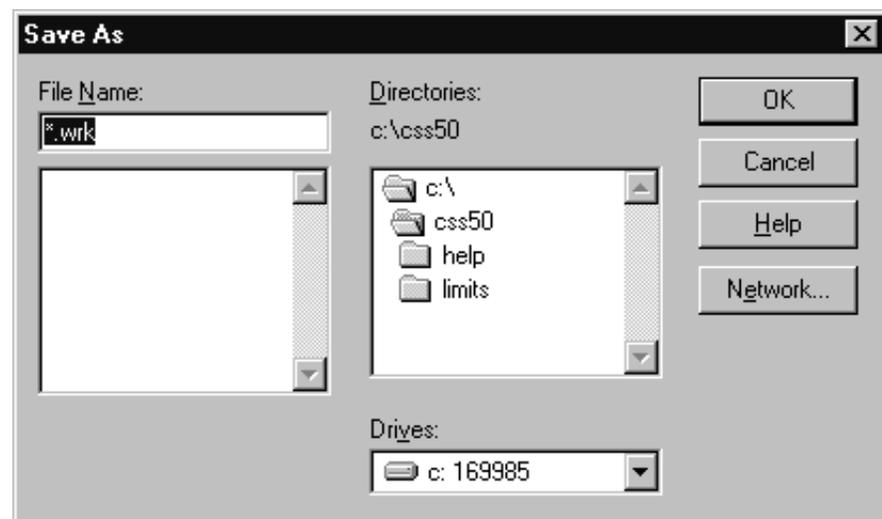
Figure 2–11: Save As dialog box

9. In the File Name combo box, type: `example`.

10. Click on OK. The title "example.wrk" is in the worksheet header.

Enter a Test ID

1. From the Configure Menu, choose Test ID or click on Test ID in the Button Bar. This displays the Test ID dialog box shown in Figure 2–12.
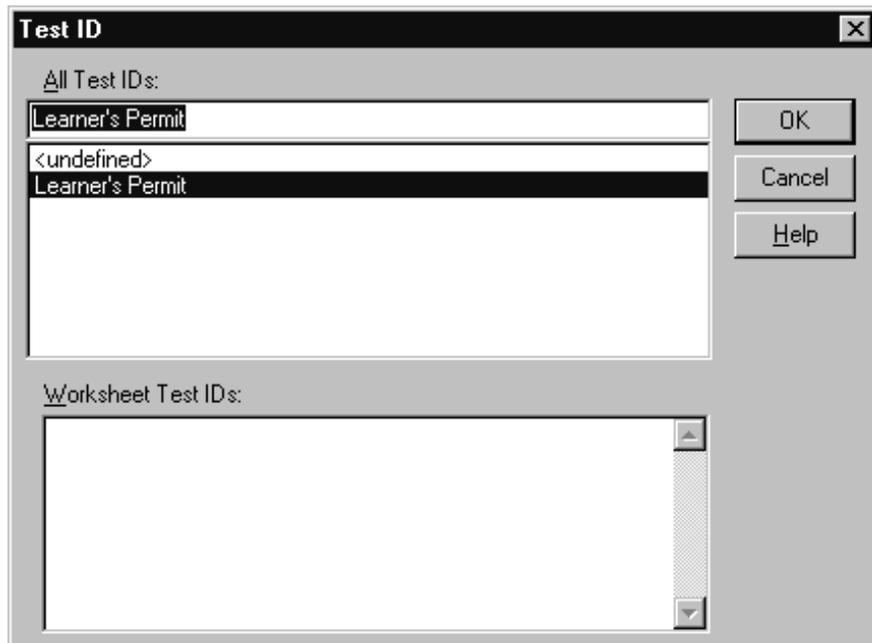
Figure 2–12: The initial display of the Test ID dialog box

2. Select a Test ID.

Mouse	Keyboard
Type in a Test ID or select from the combo box: click on the arrow in the list box (if present) and then select one from the list. The example uses "Learner's Permit".	Type in the Test ID or select one from the list box by scrolling through the list by pressing the down arrow key. The example uses "Learner's Permit".

3. Leave the Test ID dialog box and save the changes by clicking on OK.

The worksheet header should look similar to Figure 2–13.
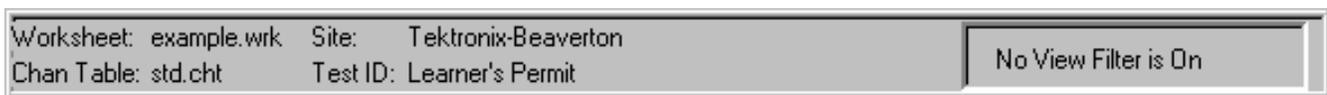
Figure 2–13: The worksheet header after filling in all information

Attach or Change a Channel Table

See *Advanced Setups Tutorial* on page 2–37 or *Appendix C: Channel Table Editor* if the Channel Table must be changed.

Make Simple Measurements

You now have enough background to begin making simple measurements and you have created a new worksheet so you won't overwrite an existing one.

NOTE. Do not use the 2714 Spectrum Analyzer (or 2715 Spectrum Analyzers with firmware below version 12.01.95) to take digital measurements. The 2714 will not run digital measurements (Average Power, Desired to Undesired, and Adjacent Channel Leakage), but uses the same channel table format as the 2715. If the software attempts to take a digital measurement using the 2714, measurements returned will be incorrect, errors will be returned, or the software will behave unpredictably.

One Measurement for One Channel

To make one measurement on one channel, select a cell. From the Measure menu, choose Current Selection (or click on Meas Sel in the Button Bar) or double-click on a cell with the left mouse button.

The measurement results appear in the cell, replacing any previous results. (The previous results are not necessarily lost. See *Measurement History Group* on page 2–48.)

Only one measurement on one channel takes place, unless you select one of the first six measurements: Visual Carrier Level, Visual Carrier Frequency, Aural Carrier Level, Aural Frequency Offset, Second Aural Level, and Second Aural Frequency Offset. Select any of these cells and all six measurements are always taken.

Example: Measure Carrier Levels and Frequencies for the channel 2

Mouse	Keyboard
Select the cell by single-clicking the left mouse button.	Place the cursor in the spreadsheet, then use the arrow keys to select the cell.

Execute the measurement.

Mouse	Keyboard
Either double-click with the left mouse button, choose Current Selection from the Measure menu, or click on Meas Sel in the Button Bar.	Either choose Current Selection from the Measure menu or choose Meas Sel from the Button Bar.

A dialog box then appears, telling you that the software application is busy making measurements.
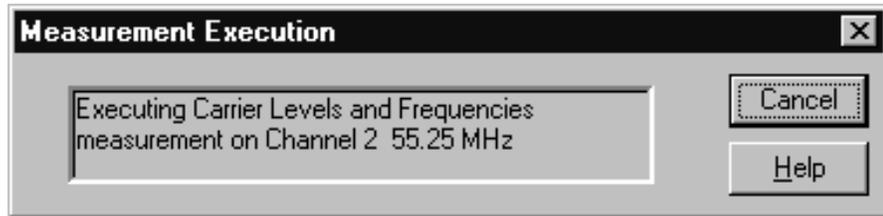
Figure 2–14: Measurement Execution dialog box

If you chose the wrong measurement or channel, click on Cancel to stop the measurement. (Cancel stops after the current measurement. Cancel does nothing when making a single measurement.)

The CSS50 software might respond with a message to turn off the scrambling if that particular channel has scrambling enabled and the requested measurement requires the channel. (When all of the measurements for the channel are finished, then another message reminds you to turn the scrambling back on.)

The CSS50 software might also respond with the Message box shown in Figure 2–15.
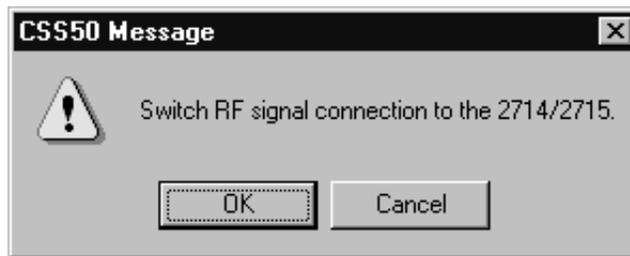
Figure 2–15: Switch RF signal message

This is an optional dialog box warning you to double check your equipment setup. The measurement halts until you click on OK. To stop the measurement click on Cancel. (You can turn this message box on or off; see *Configuration Preferences*, page 2–47.)

If everything is properly connected, click on OK.

The CSS50 software responds with the dialog box in Figure 2–16 to let you know that it is working on the measurement.
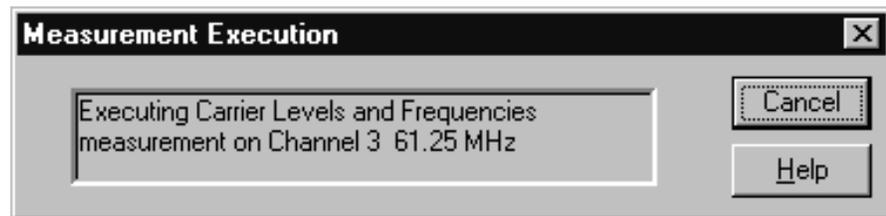
Figure 2–16: Measurement Execution dialog box

Again, you can cancel the measurement at this point by clicking on Cancel.

The first four or six cells for the selected channel are filled in. (There are only four measurements made in the following example because std.cht does not have the Second Aural Frequency set. If this Channel Table field has a value, then the last two measurements are available.)

Repeat this measurement for the next two channels on the list. The resulting spreadsheet looks similar to Figure 2–17.

Figure 2–17: The spreadsheet after making a few measurements

Make Several Measurements at a Time

To make several measurements on adjacent cells:

1. Select the cells.

2. From the Measure menu, choose Current Selection or double-click on the channel name in the Channel Header. This makes all the measurements on the selected channel.

Use the same procedure to run one measurement for all the channels:

1. Select all the channels for that measurement

2. From the Measure menu, choose Current selection or double-click on the Measurement Header.

Remember, you cannot use this method to make measurements on non-adjacent cells because they cannot be selected together. Use a Measurement Sequence (see page 2–24) to make measurements on non-adjacent cells.

Since it usually takes a little while for groups of measurements to complete, you can switch to other Windows applications while the measurements are executing.

Example: Make FCC Baseband Measurements for Several Channels.

1. Scroll the spreadsheet horizontally to display the FCC Baseband measurement column.

2. Select the first three channels for an FCC Baseband measurement. From the Measure menu, choose Current Selection. A dialog box similar to Figure 2–18 appears.
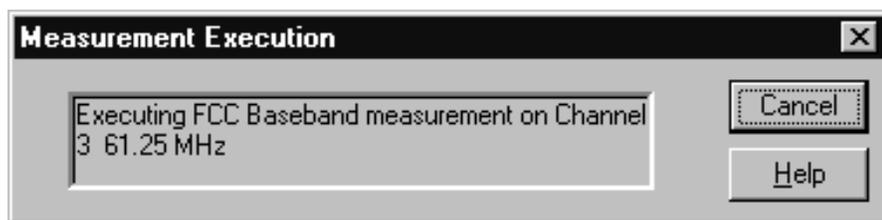
Figure 2–18: Measurement Execution dialog box

3. If you need to stop the measurement, click on Cancel. The current measurement will finish but no further measurements will be made. (Press ESC, RETURN, or the spacebar to cancel the measurement.)

4. The next dialog box tells you that a measurement is going to be made on the next channel (see Figure 2–19). This allows you to tune the external pre-selector, if necessary.
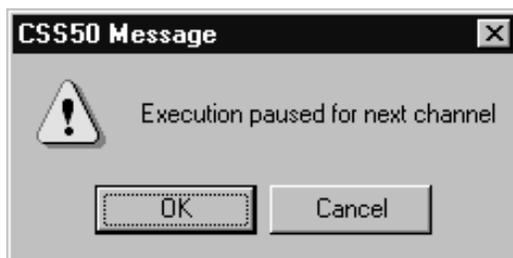
Figure 2–19: Execution paused message

This dialog box repeats three times, once for each channel.

5. If you need to stop the measurement, click on Cancel.

The spreadsheet cells should look similar to Figure 2–20.

Figure 2–20: The spreadsheet cells after making a group of measurements

Note that this measurement only gives Pass/Fail results instead of numerical results. There are several separate measurements under this Measurement Header. If you want to see the individual results of each of these measurements, Differential Gain, Differential Phase, and Chrominance-to-Luminance Delay, enter the Results Detail display.

Results Detail Display　The Results Detail display gives more information than a single cell can hold. There are three ways to enter a cell's Results Detail display from the worksheet:

- Single click on the cell using the RIGHT mouse button.

- Select a cell, then click on Results in the Button Bar.

- Select a cell, then from the View menu, choose Results Detail.

Example: Results Detail for FCC Baseband for channel 3.

1. Select channel 3's FCC Baseband measurement cell.

2. Click on Results in the Button Bar. See Figure 2–21 for the dialog box.
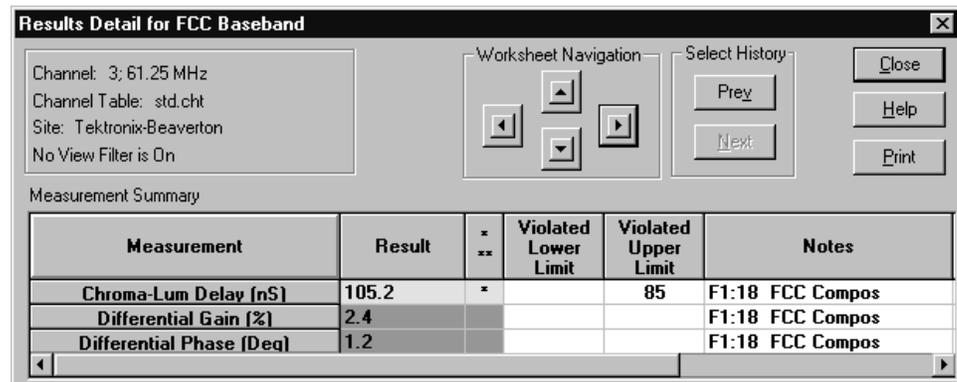
Figure 2–21: Results Detail dialog box

3. Scroll to the right to view the Date & Time and the Test ID for these measurements. Click on Close to return to the spreadsheet.

There is more information on this display under *Results Detail Display* on page 2–56.

Cell Coloring

The cells have different colors: white, green, yellow, red, blue, or gray. These colors indicate the range of the measurement results.

■ White means that there are no limits assigned to that measurement or no measurements have been made.

■ Green means that the measurement is passing.

■ Yellow means that the measurement is in the Caution range.

■ Red means that the measurement has dropped into the Alarm state. The Limits File defines these ranges. Limits are covered in *Defining Limits*, page 2–73.

■ Blue indicates that an error occurred in the measurement, making the results invalid. All of the results in the cell must be in error for the cell to be blue, otherwise the cell will take on the color of the worst case valid measurement.

■ Gray cells are inactive and can have no measurements made on them. For example, digital-only measurements are grayed out on analog channels.

Global View   This display shows all of the measurements for many channels at a time. This view does not give numerical results, only pass, warning, alarm, unknown/not defined, or error-in-measurement indications based on the color of the cells.

Enter the Global View by clicking on Global in the Button Bar or, from the View menu, choose Global View.

The display should be similar to Figure 2–22.

Figure 2–22: Global View of the spreadsheet

The colors tell the health of the system and can give you an overall view of how the system is performing.

You can select a cell on this display and then go to the Results Detail display for that cell by clicking on View Results Detail. Also, by selecting the entire worksheet, you can go to the Status Report. If you select an entire row, you can go to the Channel Summary. If you select an entire column, you can go to the Measurement Summary.

Click on Close to close the Global View and return to the spreadsheet.

Define and Use a Measurement Sequence

Suppose you need to make several measurements on a couple of different channels on a regular basis. These measurements and channels are not close enough on the worksheet to select the cells and use Current Selection from the Measure menu. You do not have to do the measurements one cell at a time. Instead, you can use a Measurement Sequence. A Measurement Sequence is a list of measurements that you define and run whenever you need. You can only define one Measurement Sequence at a time.

Now define a simple Measurement Sequence to make Carrier Level and Frequency, FCC Baseband, and Signal to Noise measurements for your first, third, and fifth channels.

Define a Measurement Sequence

1. Clear the spreadsheet.

   a. From the Edit menu, choose Select All.

   b. From the Edit menu, choose Clear.

2. From the Configure menu, choose Measurement Sequence. The Measurement Sequence dialog box appears (see Figure 2–23). Which Measurements Sequence dialog box appears depends on the Regional Setting Properties specified in the Windows Control Panel.

NOTE. The CSS50 software also uses the Windows Regional Setting Properties to define the display of the decimal symbol used for measurement values.

For example, setting the Regional Setting to the United States produces values displayed as 1234.00. *Regional Settings for many countries other than the Untied States produce values displayed as* 1234,00.

If you change the Regional Setting, you must remove the existing CSS50.ini and ctloader.ini files and restart the CSS50 program. See page E–5 about removing these files.

Measurement Sequence box with the Windows Regional Setting set to United States
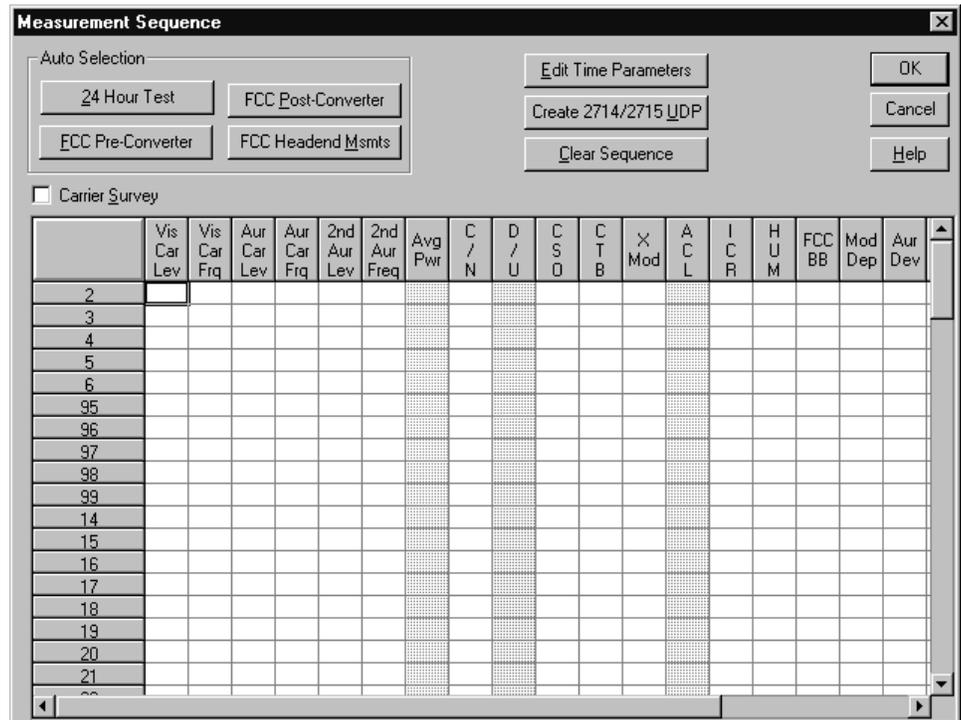
Measurement Sequence box with the Windows Regional Setting not set to the United States
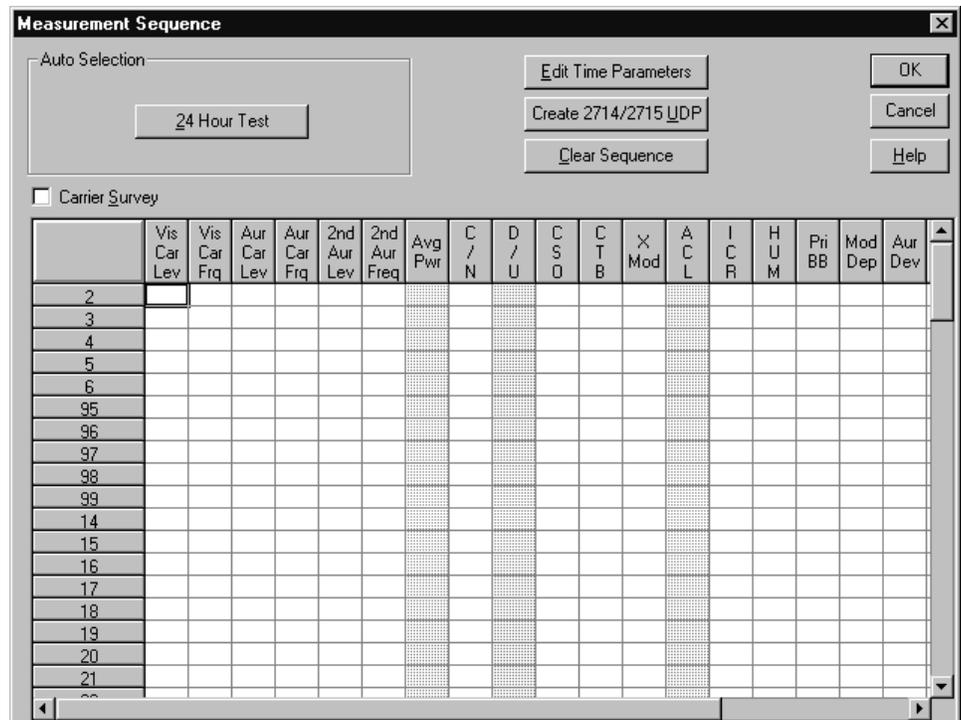
Figure 2–23: Measurement Sequence dialog boxes

3. Select the Carrier Levels and Frequencies, FCC Baseband, and Signal to Noise for channels 2, 4, and 6.

Mouse	Keyboard
Double-click those cells. (To deselect: double-click on the cell again.)	Press TAB until the cursor is in the spreadsheet. Use the arrow keys to move to the cell, then select the cell by pressing the spacebar. (To deselect: press the spacebar again.)

Your dialog box should resemble Figure 2–24.
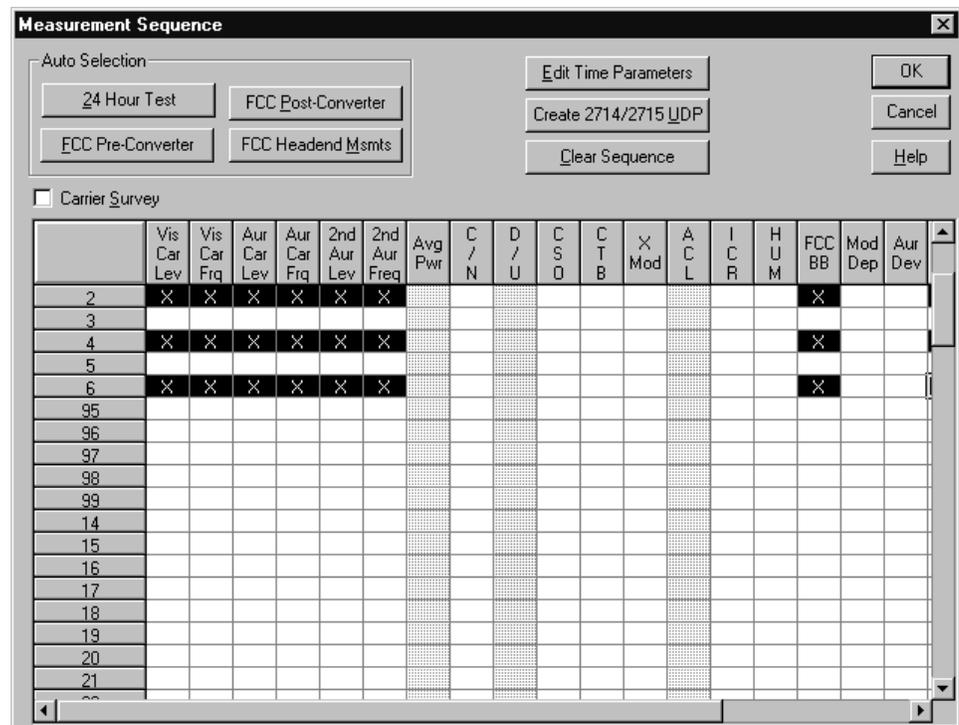
Figure 2–24: Measurement Sequence dialog box after measurements are selected

4. Click on Edit Time Parameters to display the Time Parameters dialog box (Figure 2–25).
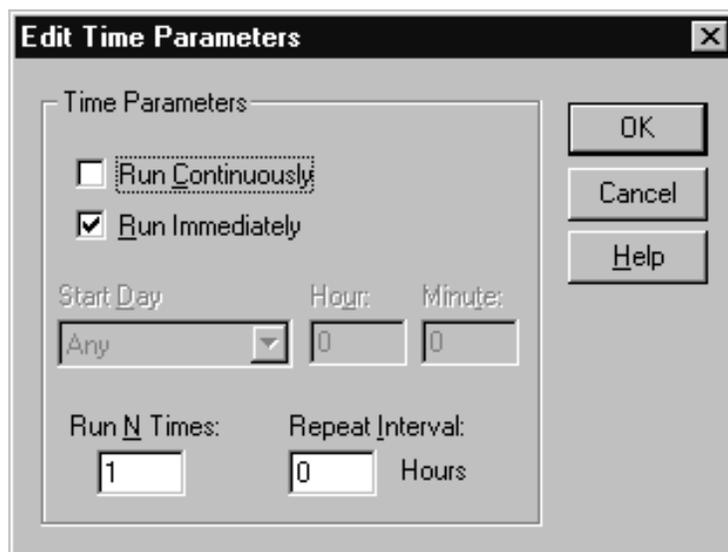
Figure 2–25: Edit Time Parameters dialog box

5. Select the Run Immediately option.

6. Enter 1 in the Run N Times text box.

7. Enter 0 in the Repeat Interval text box.

8. The rest of the options in the Edit Time Parameters dialog box are gray, indicating they are not available. Click on OK to save the changes and return to the Measurement Sequence dialog box. Refer to page 3–55 for more detail about the Time Parameters dialog box.

9. Click on OK to accept the Measurement Sequence. The display returns to the worksheet.

Run the Measurement Sequence

1. Click on Meas Seq in the Button Bar or choose Measurement Sequence from the Measure menu. The dialog box Figure 2–26 appears indicating the sequence is running along with messages for each measurement being made.
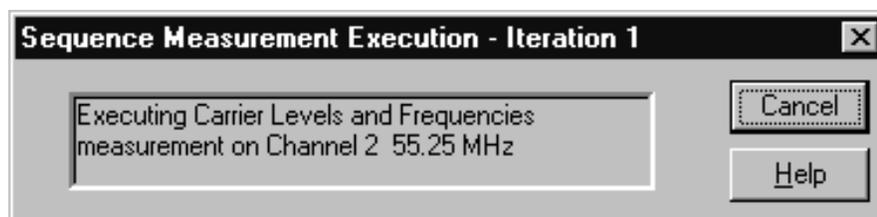
Figure 2–26: Dialog box indicating a measurement sequence is running

2. If you want the Measurement Sequence to stop, click on Cancel; otherwise allow the sequence to run. The Measurement Sequence runs through once. (It will take a while.)

NOTE. If you would like to be able to change to another application while the Measurement Sequence is running, before you start the Measurement Sequence, size the window so the other application icons or windows are visible. Click on another icon or window to change applications. You can also use ALT+TAB to change applications. When the sequence is complete, the CSS50 application automatically becomes the active window.

At the end of the Measurement Sequence, the dialog box in Figure 2–27 appears.
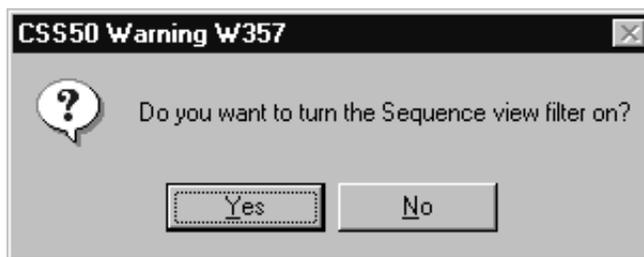
Figure 2–27: Prompt to turn on the Sequence filter

3. Click on Yes. Now only the measurements made with the Measurement Sequence are visible and the View Filter box says that the Measurement Sequence View Filter is on (see Figure 2–28). For more information on View Filters, see page 2–67 in *Advanced Measurements Tutorial*.

Figure 2–28: Measurement sequence results with view sequence filter on

4. Choose Measurement Sequence Results from the View menu to turn the Measurement Sequence View Filter off and return to a normal display.

Measurement Sequences Using Auto Selection

In the Measurement Sequence dialog box, there are four Auto Selection buttons to allow you to quickly set up a Measurement Sequence to run on a regular basis. The four buttons are FCC Pre-Converter, FCC Post-Converter, FCC Headend Msmts, and 24 Hour Test. You can add other measurements to the sequence either before or after choosing an Auto Selection command button.

NOTE. Non-US countries have only the 24 Hour Test button available; the rest of the Auto Selection buttons are for FCC (a US regulatory agency) required measurements.

Table 2–1 lists the measurements available under the Auto Selection command buttons. They all have Carrier Levels and Frequencies for all channels. Other measurements are for user-selected channels only.

Table 2–1: Measurements executed by Auto Selection buttons

Channels that are measured	Auto Selection button			
	FCC pre-converter	FCC post-converter	FCC headend	24 hour test[1]
All Channels	Carrier Levels and Frequencies	Carrier Levels and Frequencies	Carrier Levels and Frequencies	Carrier Levels and Frequencies
Selected Channels	ICR	Carrier to Noise Ratio	FCC Baseband	
Selected Channels		CSO		
Selected Channels		CTB		
Selected Channels		Cross Modulation		
Selected Channels		Hum		

[1] The 24 Hour Test is automatically set to run 4 times at 6 hour intervals.

Set Up an Auto Selection Measurement Sequence

1. From the Configure menu, choose Measurement Sequence. The Measurement Sequence dialog box appears.

2. Click on Clear Sequence to erase any old Measurement Sequence information.

Mouse	Keyboard
Click on Clear Sequence with the left mouse button.	Press ALT+c.

3. Click on FCC Pre-Converter from the Auto Selection group. The FCC Pre-Converter Measurements dialog box appears as shown in Figure 2–29.
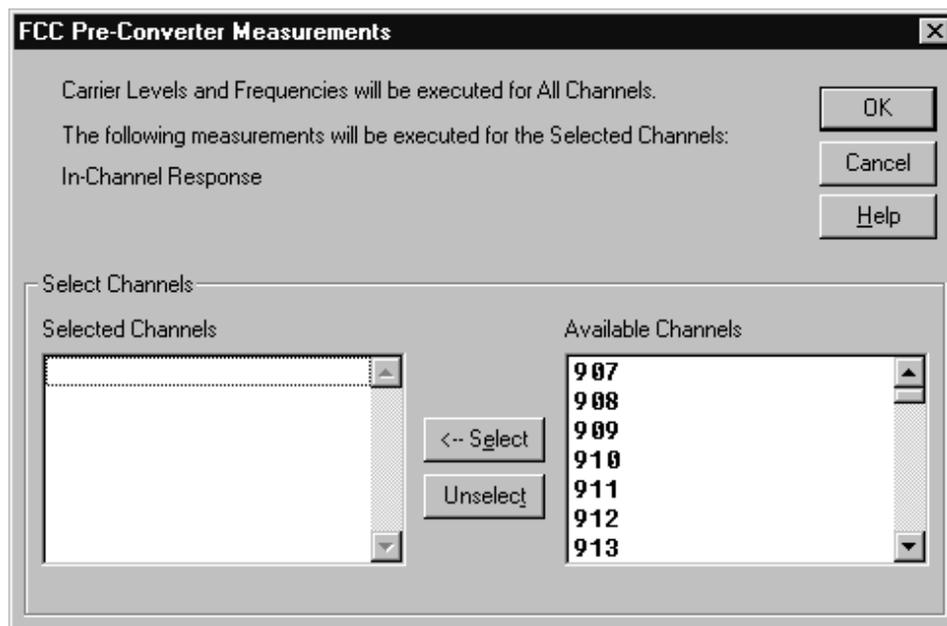
Figure 2–29: FCC Pre-Converter Measurements dialog box

4. Select several channels from the Available Channels list box and place them in the Selected Channels list box. The In-Channel Response measurement will be executed for the selected channels.

Mouse	Keyboard
Double-click the left mouse button on the channel name for single channels. For several channels, click on the first channel with the left mouse button, then hold down SHIFT and click on the last channel in the list with the left mouse button. Then choose the <–Select command button.	Press TAB until the cursor is in the Available Channels list box. Use the arrow keys to select a channel or, to select several channels at a time, hold down SHIFT while moving through the list with the arrow keys. Add the selected channel(s) to the Selected Channels list box by pressing ALT+e.

5. Click on OK to return to the Measurement Sequence dialog box.

NOTE. You can add other measurements to be made on the selected channels.

The Measurement Sequence dialog box should look similar to Figure 2–30.
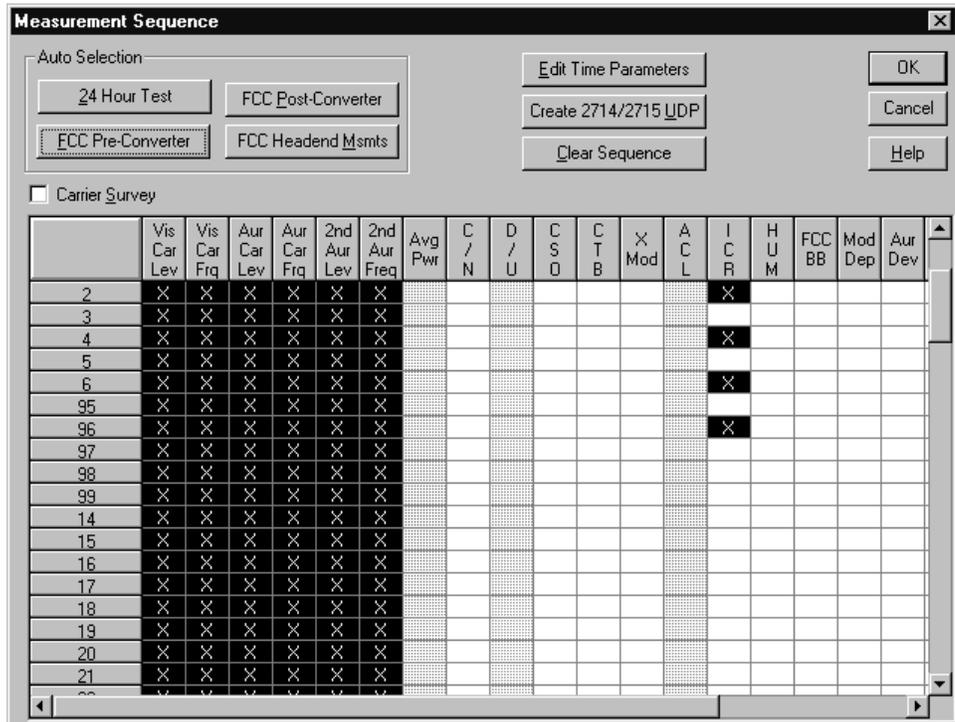
Figure 2–30: Measurement Sequence dialog box (after using Auto Selection with additional measurements)

6. Click on OK to return to the spreadsheet.

Run an Auto Selection Measurement Sequence. You run the Auto Selection Measurement Sequence in the same way that you run any other Measurement Sequence by selecting Meas Seq button or selecting Sequence from the the Measure menu.

Carrier Survey. The Carrier Survey check box in the Measurement Sequence dialog box allows you to quickly select all of the Carrier Level and Frequency measurements. See page 3–54 for more details on the Carrier Survey check box.

Display the Picture (Optional)

You can see what the broadcast signal looks like while you are making measurements. For example, if your first channel failed its last FCC Measurements check and you would like to view the picture distortion, you can display the picture directly on the computer screen. The Picture command displays the complete active picture of the channel that the demodulator is tuned to at the time. You can select the current channel with the Tune to Channel command.

To use the Picture command, you must have a video board and software driver installed in your PC. (The CSS50 package does not include the video board and driver). The video board and driver must be active when the Picture command is called. The default driver is the Video Blaster. For information on using other drivers, refer to page 3–37.

Use the following procedure to display your first channel:

1. From the Start task bar, start your video driver.

2. Return to the CSS50 application.

3. Configure your equipment to provide the desired video signal to the video card in the PC.

4. From the View menu, choose Picture.

   The picture is displayed on the computer screen.

5. To leave the Picture display from the control menu box in the picture window, choose Close. Or you can hide the picture by clicking anywhere in the CSS50 application window.

Print (Optional)

Now that you have some data to look at, it is time to print out some worksheets and reports.

1. Check your printer setups. From the File menu, choose Print Setup. The Print Setup dialog box appears, as shown in Figure 2–31.
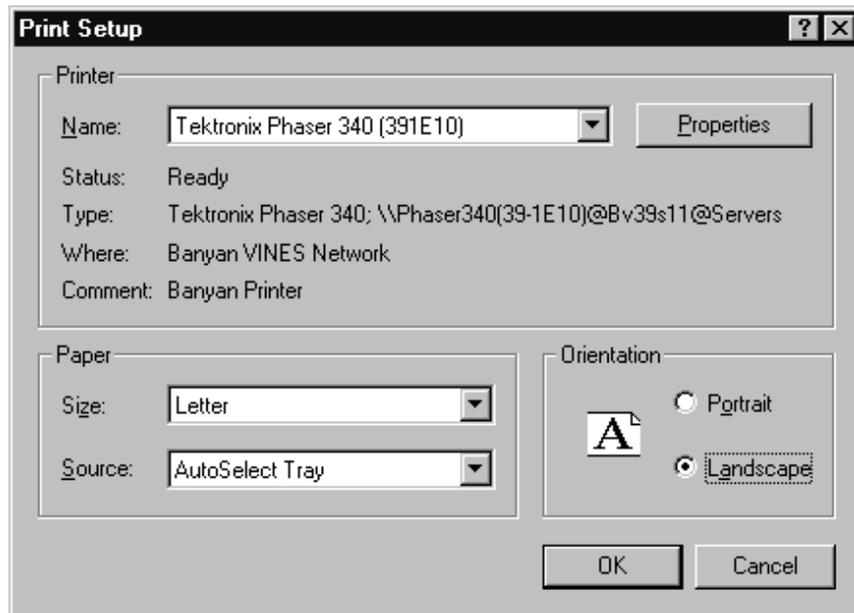
Figure 2–31: Print Setup dialog box

This dialog box is identical to the standard Windows Print Setup dialog box. When the printer is set correctly, click on OK. The printer is now ready to use.

NOTE. As a general rule, use landscape orientation for easier-to-read reports.

Before printing out a worksheet, select the View Used option from Measurements and Channels dialog box in the View menu. This automatically limits the display to measurements and channels that have results.

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2. From the File menu, choose Print. The dialog box shown in Figure 2–32 appears.
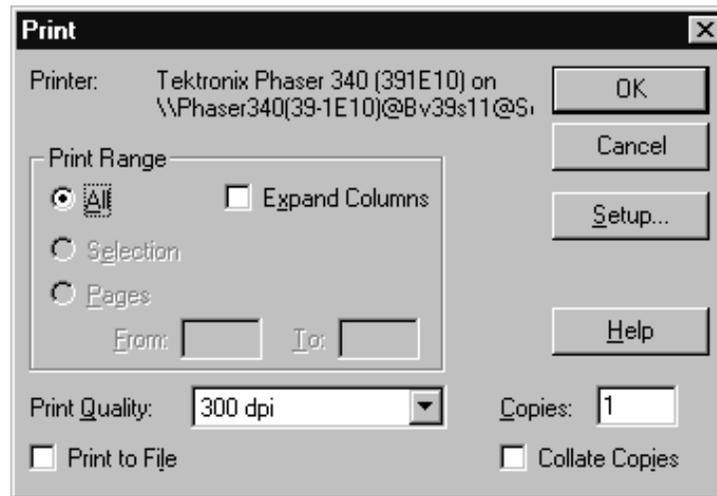
Figure 2–32: Print dialog box

3. Select the appropriate options and then click on OK to print.

Print Out the Worksheet

Click on Print in the Button Bar. The entire worksheet prints.

NOTE. The Expand Columns option in the Print dialog box expands all of the measurements which would normally only show Pass, Caution, or Alarm, to show all of the numerical results. For example, FCC Baseband expands to 3 columns to display all of the measurements. The columns that expand are: CSO, CTB, Hum/LFD, FCC Baseband, and Waveform Distortion.

Print Out the Results Detail Display

1. Display the Results Detail for the first channel of the FCC Baseband measurement. (Select the cell, then click on Results in the Button Bar, or click on the cell with the right mouse button.)

2. Click on Print in the Results Detail Display.

3. Click on Close to leave the Results Detail Display.

End of the Tutorial

You have completed the basic tutorial. At this point, you should be able to do the following:

- Select cells. (See page 2–10.)

- Enter worksheet header information. (See page 2–13.)

- Make simple measurements. (See page 2–17.)

- Enter the Results Detail display. (See page 2–21.)

- Enter the Global View. (See page 2–23.)

- Define a Measurement Sequence. (See page 2–24.)

- Execute a Measurement Sequence. (See page 2–27.)

- Define a Measurement Sequence using the Auto Selection buttons. (See page 2–29.)

- View the broadcast on the computer monitor. (See page 2–33.)

- Set up your printer. (See page 2–33.)

- Print out assorted reports. (See page 2–35.)

If you don't feel comfortable with any of the above topics, review them before continuing.

Advanced Setups Tutorial

This section explains how to set up your system to give you only the information that you want and to give you the most accurate measurements. The following topics are covered:

- Selecting and configuring the demodulator

- Reviewing the RS-232 and GPIB connections

- Setting how the measurements are made

- Setting the measurement setups for the 2714 or 2715

- Setting the correct VITS locations

- Attaching a different Channel Table

- Selecting whether or not to collect history

- Selecting the Power Level Units

- Turning the user prompts and alarm messages on or off

Select and Configure the Demodulator

From the Configure menu, choose Demodulator (see Figure 2–33). Next, choose either the DS1000 or None, depending on whether a DS1000 series demodulator is in your system. A check mark indicates the selection.
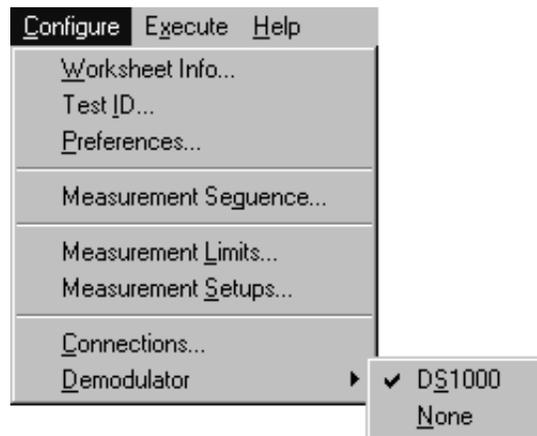
Figure 2–33: Selecting Demodulator from the Configure menu

Connections

The first time you run the CSS50 application or any time the test equipment connections change, choose Connections from the Configure menu to tell the software what the instrument connections are. Figure 2–34 shows the Connections dialog box when the DS1000 series demodulator is selected. If None is selected, then the whole Demodulator group is grayed out.

⚠ *CAUTION. To ensure proper operation and prevent software conflicts, verify that no two instruments are assigned to the same port or GPIB address. This applies even if an instrument is not connected or used.*
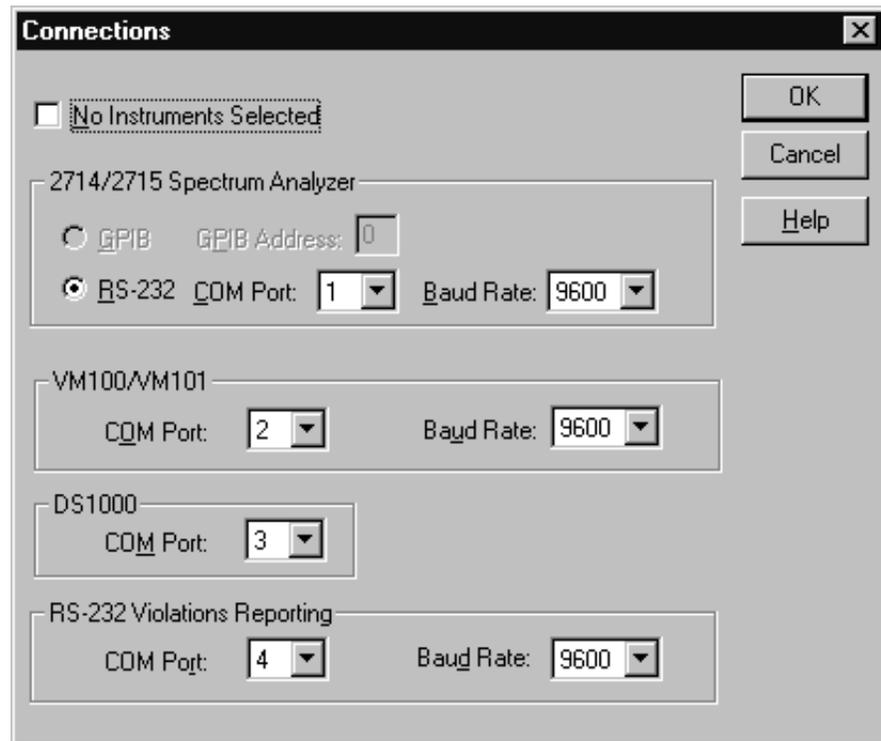
Figure 2–34: Connections dialog box

Configure Measurement Setups

There are many different ways that your system can execute measurements. The Measurement Setups dialog box tells the CSS50 software how your system needs to be set up to make measurements and to get the best results. There are setup parameters that affect all channels and some that are channel specific.

From the Configure menu, choose Measurement Setups, or click on Setups in the Button Bar. The Measurement Setups dialog box looks similar to Figure 2–35.
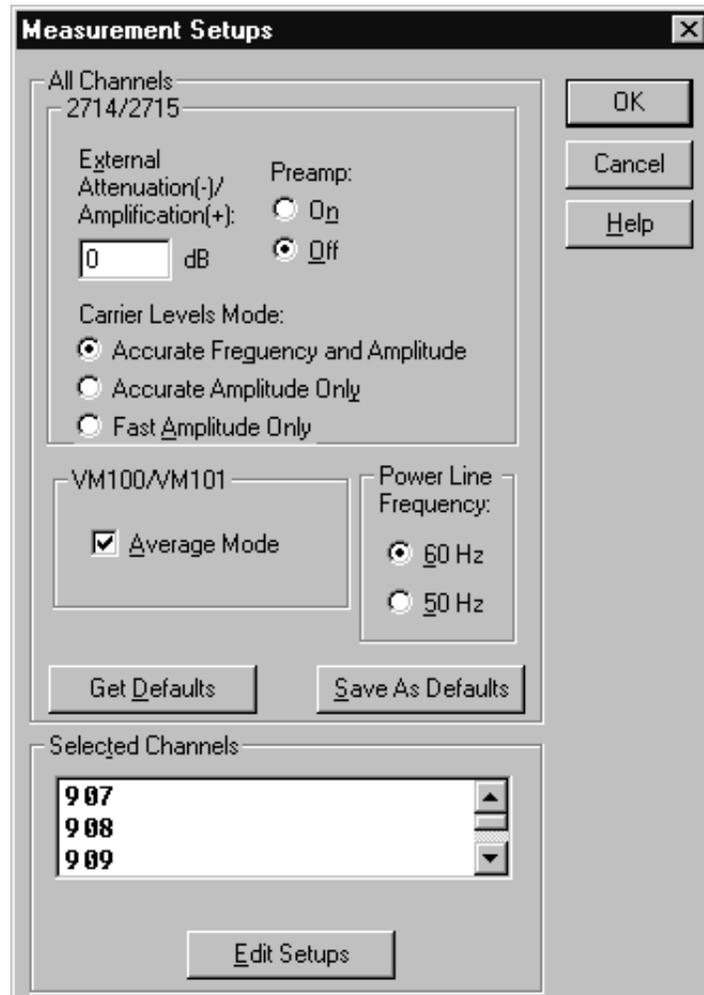
Figure 2–35: Measurement Setups dialog box

The All Channels Group

The All Channels group contains settings that specify how measurements are made on all channels.

2714/2715 Sub-group

■ External Attenuation/Amplification. Enter the attenuation or amplification (in dB) of the test point in this text box. For example, if you are taking measurements at a 10 dB down test point, enter −10 dB.

■ Preamp. The Preamp allows increased sensitivity when measuring low level signals. Select On or Off to match your measurement needs. See the 2714 manual for more information on the correct settings.

NOTE. *The 2715 automatically sets the preamp as required for each measurement.*

■ Carrier Levels Mode. These option buttons select how the Carrier Level measurements are made. This includes both regular measurements and Carrier Surveys. The options are given below:

> Accurate Frequency and Amplitude (recommended)
> Accurate Amplitude Only
> Fast Amplitude Only

VM100/VM101 Sub-Group

■ Average Mode.Use averaging to reduce the effect of noise on your signal. This selection turns Average Mode in the VM100 or VM101 on or off. If checked, measurements will be slower (depending on the Signal-to-Noise on the input signal) but more accurate and with less variation. If not checked, measurements will be faster.

Power Line Frequency Sub-group

Select the power line frequency of your system.

■ 60 Hz (60 Hz is not selectable if the channel table video standard is set to PAL.)

■ 50 Hz

Get Defaults

This command button loads all of the previously saved default values into the All Channels group text boxes and option buttons.

Save As Defaults

This command button saves all of the current text box and option button settings as the default values. The default values are automatically loaded whenever a new worksheet is created. They are also available through the Get Defaults command button.

Selected Channels Group
The Selected Channels group allows you to further customize measurements to individual channels. Some reasons why you might want different setups for different channels are: different locations of the VITS lines, no VITS signals on some channels (measurements must be made using RF), or inability to turn the carrier off on some channels (need to use other methods to make measurements).

In Auto mode the VM100 or VM101 finds the VITS signals if they exist. In manual mode the VM100 or VM101 tries to make the measurement on the specified line. In either mode, if the VITS signals are not correct, the measurement will not be made. See page 3–70 for more detail about the VITS group.

To enter the Edit Setups dialog box for channel 2, double-click on channel 2 in the Selected Channels list box or with channel 2 highlighted, click on Edit Setups. See Figures 2–36 and 2–36 for thee Edit Setups dialog boxes for both NTSC and PAL.

Figure 2–36: Edit Setups dialog box for channel 2 (NTSC)
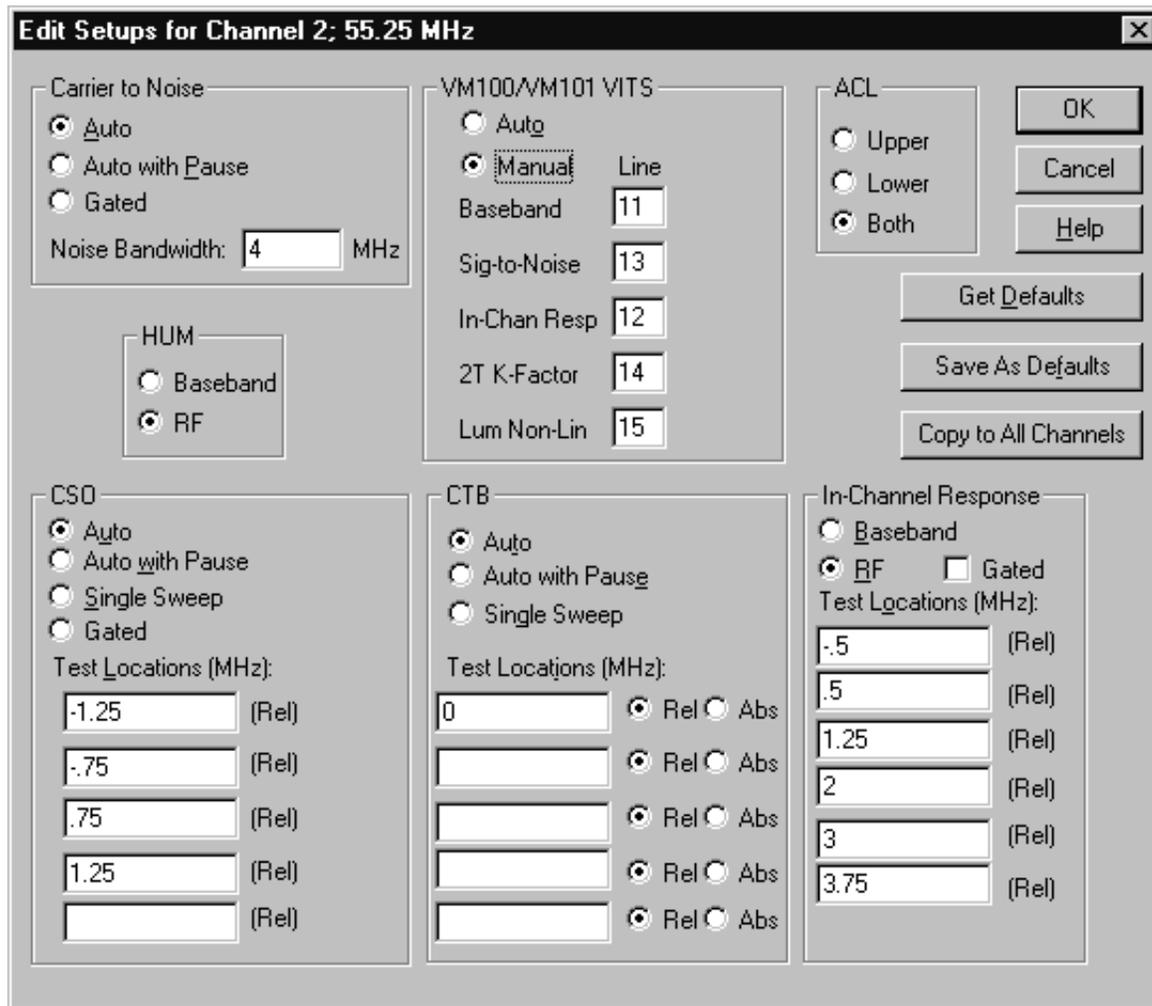
Figure 2–37: Edit Setups dialog box for channel 2 (PAL)

Carrier To Noise Group. Select the Auto, Auto with Pause, or Gated (the 2715 calls this "in service" measurements) option button. Auto with Pause expects the carrier to be turned off and will prompt the operator to do so. Gated (Gated measurements are only available for the 2715) allows you to make the measurements on a "quiet" or unmodulated line. (The quiet line is found in the Channel Table Editor. See Appendix C, page C–24, for more information.) This allows you to make the measurements without taking the system out of service.) In the Noise Bandwidth text box, enter the bandwidth for the noise calculation.

Hum Group. Select how to make the Hum measurement. The options are to use RF (2714 or 2715) or Baseband (VM100 or VM101). Make sure the demodulator is set up correctly for Hum measurements. See page 3–76 for details.

VM100 or VM101 VITS Group. Select Auto or Manual mode.

Auto causes the VM100 or VM101 to automatically search for the appropriate test signals. You don't have to enter the VITS locations. This is the recommended mode

Manual always has the VM100 or VM101 use the specified line and field for the test signal. (Field is removed if the channel table video standard is set to PAL.) Manual mode is faster but if the required signal is not present, the measurement will fail.

The video standard (NTSC or PAL) is defined in the channel table attached to the current worksheet. See *Appendix C: Channel Table Editor* for information about channel tables.

NOTE. The VITS group in the Edit Setups dialog box is slightly different for CSS50 software versions below 2.0. See Appendix H: V1.0 Software *about these differences.*

CSO Group. The measurement options are: Auto, Auto with Pause, Single Sweep, or Gated. Auto performs this measurement without turning the carrier off. Auto with Pause expects the carrier to be turned off and will prompt the operator to do so. Single Sweep also expects the carrier to be turned off and will prompt the user to turn it off. It also performs all of the measurements in one sweep, instead of one sweep for each test location. Gated means that the measurement is made on a "quiet" (unmodulated) line. This is only available for the 2715.

Enter the frequency locations (relative to the visual carrier) where this measurement should be made.

ACL Group. Measures the power in the channels adjacent to the digital channel under test. This is a headend test with the 2715 connected to the test port of the modulator. Select Upper to measure the power in the upper adjacent channel only, Lower to measure the lower adjacent channel only, or Both to measure both the upper and lower channels.

CTB Group. The measurement options are: Auto, Auto with Pause, or Single Sweep. Auto performs this measurement without turning the carrier off. Auto with Pause expects the carrier to be turned off and will prompt the user to do so. Single Sweep also expects the carrier to be turned off and will prompt the user to turn it off. It also performs all of the measurements in one sweep, instead of one sweep for each test location.

In the text boxes, enter either the absolute or relative frequency locations (relative to the visual carrier) where you want this measurement made.

In-Channel Response Group. Make the In-Channel Response measurement using either Baseband (using the VM100 or VM101) or RF methods (using the 2714 or 2715).

Enter the frequencies (relative to the visual carrier) where you want the measurement calculated (6 locations must be entered for RF) in the Test Locations text boxes.

If using the RF method the signal could also be gated. (Gated means that the measurement is made on a test line and the carrier does not need to be turned off.) The 2715 is the only instrument that can perform gated measurements.

Command Buttons for the Edit Setups for Channel XX Dialog Box. There are three special command buttons located in the Edit Setups for Channel XX dialog box. They are Get Defaults, Save as Defaults, and Copy to All Channels.

■ Get Defaults. The Get Defaults command button takes the default Measurement Setup values from the CSS50 initialization file (CSS50.ini) and places them in the text boxes. It also sets the option buttons to the default values. You select which groups of default values you want loaded using the check boxes as shown in Figure 2–38.
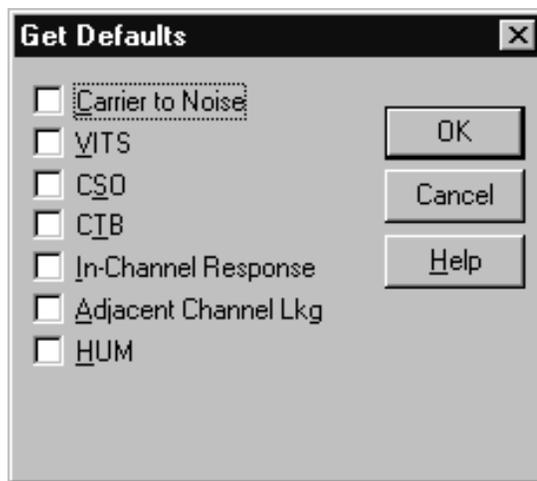
Figure 2–38: Get Defaults dialog box

■ Save as Defaults. This command button takes the current entries in the text boxes and selections of the option buttons and stores them as the default Measurement Setup values in the CSS50 initialization file. It only saves as defaults, the groups selected in the check. The rest keep the current defaults. When a new worksheet starts, these defaults load automatically. You can also

load these defaults into selected channels using the Get Defaults command button when editing the setups for those channels.

■ Copy to All Channels. The Copy to All Channels command button takes the settings on the current Edit Setups for Channel dialog box for the selected groups and copies them to all of the channels. However, if the current channel is digital, CTB and CSO setups are copied only to digital channels. Similarly, if the current channel is analog, CTB and CSO setups are copied only to analog channels.

NOTE. For both Save As Defaults and Copy to All Channels, the changes take place immediately. You don't need to wait until you exit the dialog box.

Leave the Edit Setups for Channel XX Dialog Box. Save all of the changes and leave the Edit Setups for Channel XX dialog box and return to the Measurements Setup dialog box by clicking on OK.

Leave the Measurement Setups Dialog Box

Save all of the changes, leave the Measurement Setups dialog box and return to the spreadsheet by clicking on OK.

Attach a Different Channel Table

NOTE. The CSS50 software only recognizes a Channel Table by its name, not its contents. It will not load a changed Channel Table into an instrument if it already has a Channel Table by that name.

There will always be a Channel Table associated with a worksheet (the default), so you can make measurements without changing the Channel Table. (If the default Channel Table is corrupt or not available, the system will always try to load the std.cht Channel Table.) Please see Appendix C or the on-line help for more information about the Channel Table Editor. This section only deals with changing from one Channel Table to another.

1. Choose Worksheet Info from the Configure menu. The Worksheet Info dialog box appears (see Figure 2–39).
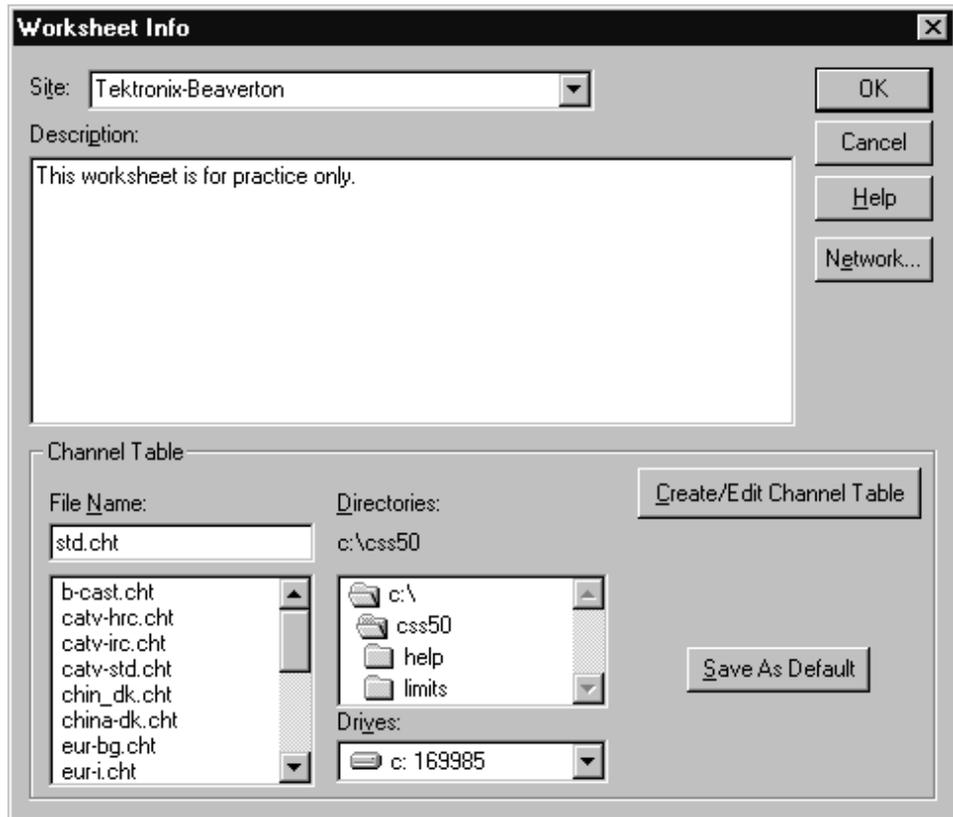
Figure 2–39: Worksheet Info dialog box used to change the Channel Table

2. Select a Channel Table file from the list.

3. Click on OK to save the changes and exit the dialog box. The Warning in Figure 2–40 may appear if there are measurements in the current worksheet. This is to remind you that you are creating a new worksheet whenever you change the Channel Table. (Only one Channel Table is allowed in each worksheet.)
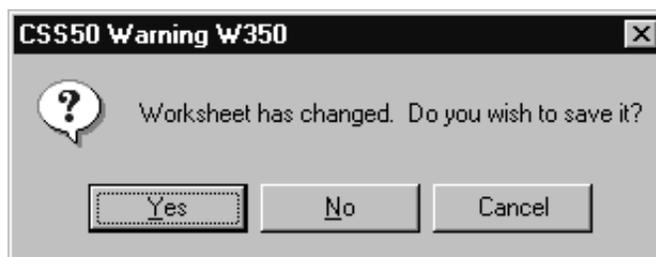
Figure 2–40: Warning message that the worksheet has changed

4. Click on Yes to save the old worksheet. The new worksheet, with the new Channel Table, is <untitled>.

You are now ready to make measurements using the new Channel Table and worksheet. If this Channel Table does not exist in the 2714/2715 (by name), the CSS50 software will automatically load it when needed.

The DS1000 series demodulator loads the frequencies from the channel table only as needed. It does not load the Channel Table into its own memory.

Configuration Preferences

There are several ways to configure the CSS50 application that are not directly related to making measurements. These options are located in the Configure menu under Preferences.

From the Configure menu, choose Preferences. The Preference dialog box looks like Figure 2–41.
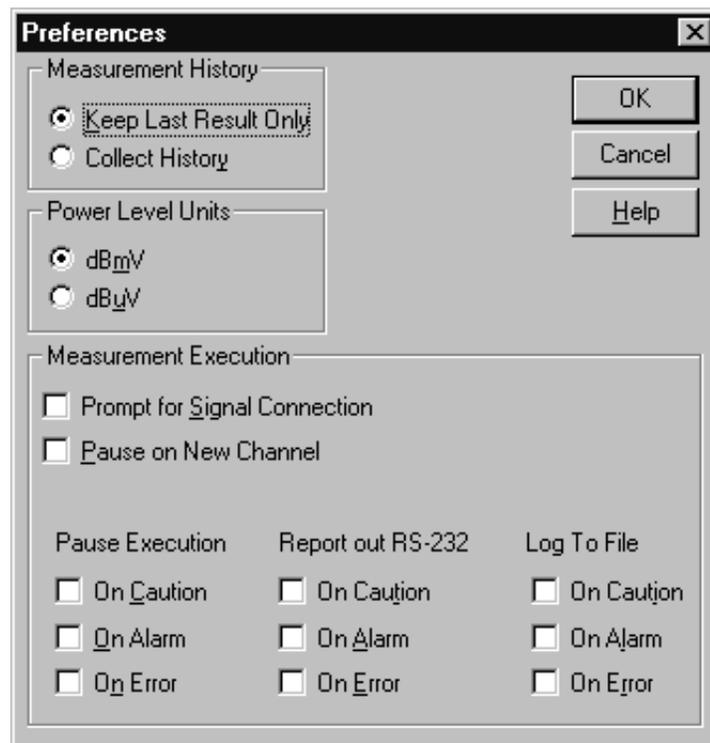
Figure 2–41: Preferences dialog box

There are three Preferences groups. They are: Measurement History, Power Level Units, and Measurement Execution.

Measurement History Group

This group allows you to collect history or keep only the results of the last measurement. If you choose to collect history, the previous results are saved but not visible on the spreadsheet. The spreadsheet is actually three dimensional (the three dimensions are Channel, Measurement, and Time) but only two dimensions are visible (Channel and Measurement). Only the top (most recent) measurement of the time stack is visible on the spreadsheet. The three-dimensional spreadsheet structure is illustrated by Figure 2–42.
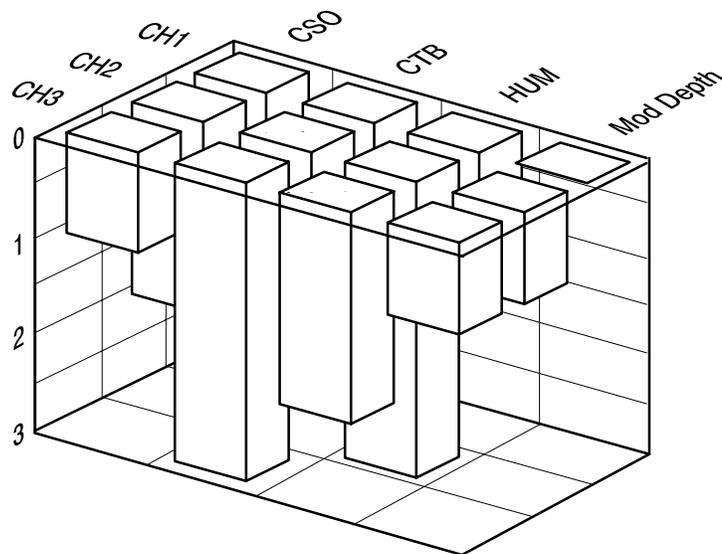
Figure 2–42: A three-dimensional view of a spreadsheet

When Collect History is selected, measurement results are saved beginning with the current measurement (what is currently in the spreadsheet).

An example of why you would want history collected on a measurement is the 24 Hour variation test. This measurement is performed by running the Carrier Levels and Frequencies four times in a 24 hour period and comparing the collected results. Another example is a measurement that is failing sporadically. By taking the measurement over a period of time and collecting the history, a trend might become evident.

The way that the history is saved is best illustrated by an example of the life of a cell, as shown in Figure 2–43.

Turn history on.
Make 2 more measurements

Stack after 4 more
measurements

Turn history off here

Measurements
in the "stack"

| 3 |
| 2 |
| 1 |

| 7 |
| 3 |
| 2 |
| 1 |

| 9 |
| 8 |
| 7 |
| 3 |
| 2 |
| 1 |
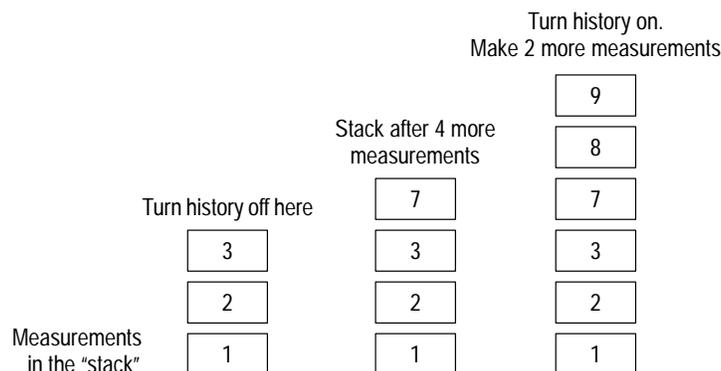
Figure 2–43: The effect of turning Collect History off and then on

The first column in Figure 2–43 shows three measurements made with Collect History turned on. After the third measurement, the history is turned off and four more measurements are made (for a total of seven). The results are shown in the second column. You still have the first three measurements stored in history, measurements four through six have been written over, and measurement seven is presently displayed in the cell. After the seventh measurement, Collect History is turned back on and two more measurements are made (for a total of nine). The results are shown in the third column. The first three measurements are still there and seven through nine are added to the history stack.

If you want to view the history of a measurement, one way is to look at the Results Detail display. In this display, you can flip through the results to see what the measurement results were in the past (a lot like flipping through sheets in a log book). Refer to page 2–56 for more detail.

Power Level Units Group   The option buttons select between Visual Carrier Level and Average Power Level units in dBmV (referenced to 1 mV) or dBuV (referenced to 1 µV).

Measurement Execution Group   These check boxes select the following options:

■ whether or not to prompt the operator to make the required equipment connections before a requested measurement is executed

■ whether or not to pause on a new channel

■ the type of action to take (if any) if a measurement falls into an alarm or caution range or has some type of error

Prompt for Signal Connection. An example of this type of prompt is a dialog box requesting the operator to properly connect the signal under test to the test equipment. You must click on OK to continue the measurement. This allows the

operator to manually switch the RF signal between the 2714/2715 and demodulating equipment using one RF signal tap rather than requiring a splitter.

If this option is checked and a measurement is executed that requires both RF and baseband testing, all of the RF measurements are done first. Then all of the baseband measurements, so the connection only needs to be changed once.

Pause on New Channel. If you want to be informed that measurements are ready to begin on a new channel, select this check box. If it is turned on, the measurements stop whenever a new channel is encountered until you click on the OK button. One of the things this allows you to do is tune an external preselector to a new channel.

Alarm, Caution, or Error Conditions. These check boxes allow you to be notified in several ways if an error, alarm, or caution flag occurs during a measurement. Three different actions can occur: a report can go out the RS-232 port, the condition can be logged to a file, or the measurements can be stopped and an alarm message posted. You can use any combinations of these options.

The Pause Execution check boxes stop the measurements if a measurement is encountered that is in Alarm (cell is red), Caution (cell is yellow), or Error (cell is blue) until the user clicks on OK. It is useful for system monitoring because it forces you to become aware of bad or non-standard conditions.

Report out RS-232 sends a Violations Report out a Com Port (set with the Connections dialog box). Based on the selections, the following information is sent: Site Name, Measurement Column Heading, Channel Number, Program, Condition Type (alarm, caution, or error), and Date/Time. This information is tab-delimited and packetized. (For more information on intercepting an alarm, see *Measurement Execution* on page 3–51.)

Log To File sends a violations report to a log file (available only if the worksheet has been named and saved). The log file created is put in the same directory as the worksheet file and has the same base worksheet name, with a ".log" extension. The same information, in the same format, is logged to the file as is sent out RS-232. There is no byte count or checksum and a CR/LF is appended to each message.

Set the Preferences   Set the Preferences to:

- Collect History
- dBmV Power Level Units
- Prompt for Signal Connection
- Pause on New Channel
- Pause Execution — On Alarm

Make Measurements Using the Defined Preferences

1. Select the first two channels' Carrier Levels and Frequencies.

2. From the Measure menu, choose Current Selection. First, you are prompted to connect the 2714/2715 (see Figure 2–44). If necessary, connect the input signal to the 2714/2715, then click on OK to continue. (Cancel stops the measurement and returns you to the spreadsheet.)

CSS50 Message ✕

⚠ Switch RF signal connection to the 2714/2715.

[OK]   [Cancel]
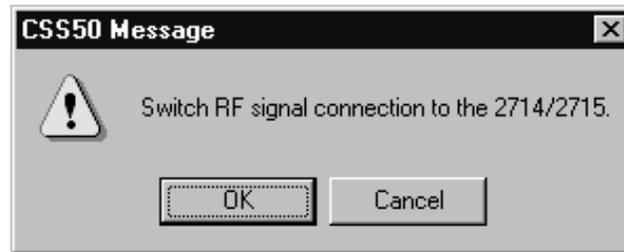
Figure 2–44: Prompt to connect the input signal to the 2714 or 2715

The software pauses at the next channel, as shown in Figure 2–45.

CSS50 Message ✕

⚠ Execution paused for next channel

[OK]   [Cancel]
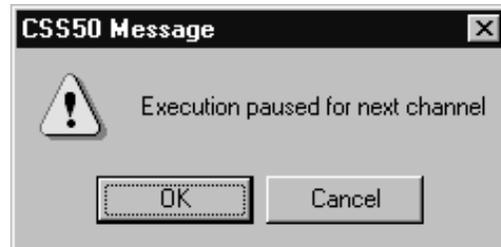
Figure 2–45: Message box stating that the measurements are paused

3. If necessary, tune the preselector to the channel, then click on OK to continue. If any of your measurement results fall into the Alarm range, Figure 2–46 is displayed.
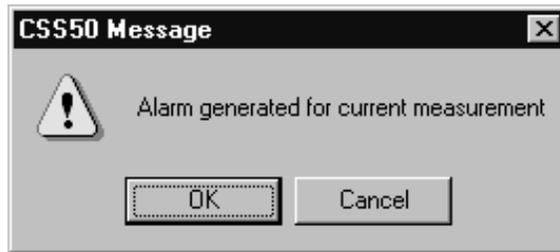
Figure 2–46: Message box displayed when a measurement result falls into an Alarm range

4. Click on OK to continue making measurements. (You have another option. You could click on Cancel to stop making measurements and handle the measurement alarm.) When the measurements are finished with the first channel, the Paused for Next Channel message is displayed, as shown in Figure 2–47.

Figure 2–47: Message box stating that the measurement is paused

5. If necessary, tune the preselector, then click on OK to finish making the measurements.

Review

Now that you have completed this section you should be able to do the following:

- Pick and set up the demodulator. (page 2–37)

- Review the RS-232 and GPIB connections. (page 2–38)

- Set how measurements are made. (page 2–38)

- Set the measurement setups for the 2714/2715. (page 2–39)

- Set the correct VITS location. (page 2–43)

- Attach a different Channel Table. (page 2–45)

- Select whether or not to collect history. (page 2–48)

- Select the Power Level Units. (page 2–49)

- Turn the user prompts and alarm messages on or off. (page 2–49)

Advanced Measurements Tutorial

This section deals with advanced measurement and display topics:

- Viewing the history of a measurement

- Copying data to other Windows applications

- Viewing violations

- Using the various View Filters

- Changing and defining limits

- Defining a User Defined Program (UDP)

- Loading the results of a UDP back into the application

Reset the Preferences and Worksheet for this Chapter

1. Make a new worksheet and call it "example.wrk". (Overwrite any old worksheets.)

2. From the Configure menu, choose Preferences. Set Preferences to:

   - Collect History

   - dBmV Power Level Units

   - No Prompt for Signal Connection (unless necessary for your equipment setup)

   - No Pause on New Channel (unless necessary for your equipment setup)

   - No Pause on Cautions, Alarms, or Errors

   - No Report Out RS-232 on Cautions, Alarms, or Errors

   - No Log To File on Cautions, Alarms, or Errors

3. From the Configure menu, choose Measurement Setups. Make the appropriate selections for your system.

4. From the Configure menu, choose Worksheet Info. Select the std.cht Channel Table (or other appropriate Channel Table). Select a Site name. (The examples use Tektronix – Beaverton.)

Make Measurements to Collect History

1. Select the first two channels' Hum/LFD and FCC Baseband.

2. From the Measure menu, choose Current Selection or click on Meas Sel in the Button Bar.

3. Repeat three or four times to collect history for these measurements.

Results Detail Display

We have collected some history and are ready to view the Results Detail display.

Enter the Results Detail Display for your first channel HUM/LFD:

1. Select the Hum/LFD cell of your first channel.

2. Click on Results in the Button Bar; or click on the cell with the right mouse button; or, from the View menu, choose Results Detail. The Results Detail dialog box is shown in Figure 2–48.
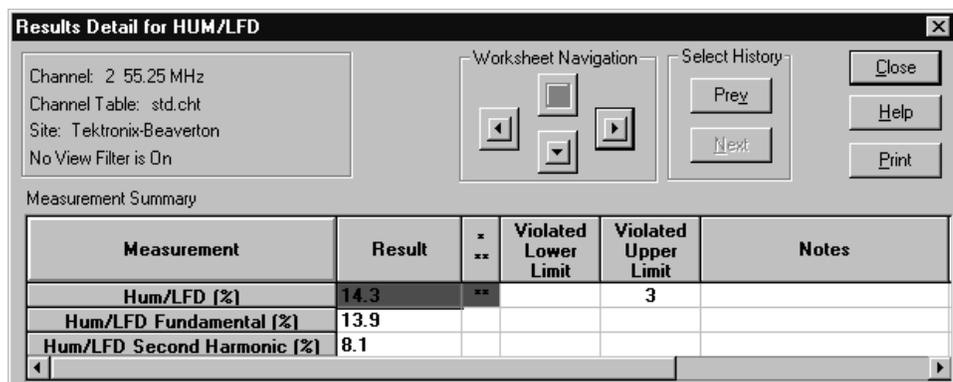
Figure 2–48: Results Detail dialog box for the HUM/LFD measurement

Note that the Select History Next command button is gray but the Prev button is black. This indicates that you are looking at the most recent measurement results and there is history on that measurement.

3. Scroll the Results Detail dialog box horizontally to display the Date/Time and Test ID. Note the time of the measurement.

4. Scroll back to the far left of the Results Detail dialog box.

Look at the History of this Measurement

1. Click on Prev. Note that this information is from the previous time you made this measurement. Confirm this by scrolling horizontally to the Date/Time.

2. Click on Prev again.

3. Repeat until the Prev command button is gray. You are now at the first measurement for this cell on this worksheet.

4. Click on Next until you are back to the most recent measurement. (The Next command button is gray.)

Move Around in the Results Detail Display

You use the Worksheet Navigation arrows to move between channels and measurements without leaving the Results Detail Display.

1. Move to the FCC Baseband measurement for your first channel by clicking on the right Worksheet Navigation arrow. Note that the Title Bar of the dialog box changes to reflect the different measurement. The Results Detail display is shown in Figure 2–49.
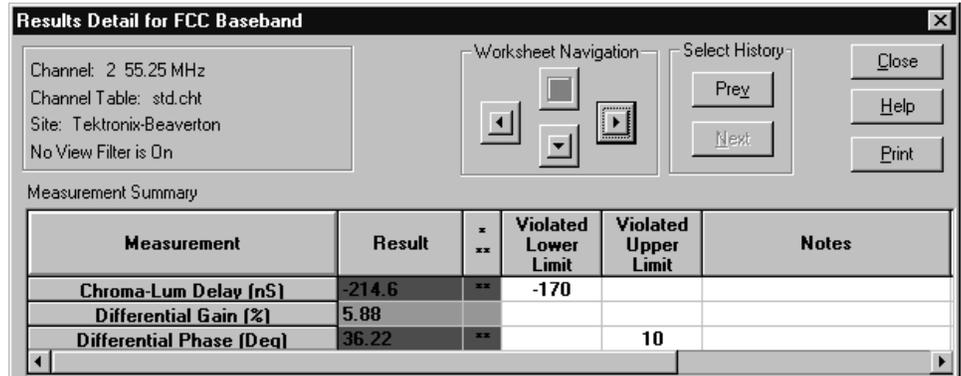
Figure 2–49: Results Detail dialog box for the FCC Baseband measurement

2. Move to the FCC Baseband measurement for your second channel by clicking on the Worksheet Navigation down arrow.

3. Move to the Hum/LFD measurement for your second channel. Click on the Worksheet Navigation left arrow.

4. Move back to where you started (Hum/LFD for the first channel). Click on the Worksheet Navigation up arrow.

NOTE. The equipment making the measurements places the information that you see in the Notes Field. Please see Notes *under* Measurement Summary *on page 3–30 for how to decode this information.*

5. Click on Close to leave the Results Detail Display and return to the worksheet.

NOTE. The active cell in the worksheet is the last cell navigated to in the Results Detail Display.

Status Report and View Violations Displays

The Status Report is available to give an impression for how the system is doing as a whole. The Status Report lists all of the measurements and channels with the worst measurement results (based on the active View Filter). The Violations Display is available from the Status Report and it lists all of the measurement Cautions and Alarms.

1. Make all of the measurements for the first three channels. The worksheet looks like Figure 2–50.

NOTE. In older 2714 firmware versions, anytime you are making a CSO measurement, a message that the 2714 is executing a CTB measurement appears on the 2714's display. Although unexpected, it is correct and only an artifact of the method that older firmware versions of the 2714 use to measure CSO.

Figure 2–50: The worksheet with three channels and their measurements

2. To display the Status Report either click on Status in the Button Bar or choose Status Report from the View menu. This displays the Status Report dialog box as shown in Figure 2–51. The measurements are in the same order as they are in the spreadsheet with the addition of the Visual Carrier Level (Adjacent) results. The worst case is listed for each measurement.

Channel	Measurement	Type	Result	* **	Violated Lower Limit	Violated Upper Limit
3	Visual Carrier Level (dBmV)	Max	64.5			
2		Min	34.3			
3, 2	Visual Carrier Level Diff. (dB)	Max-Min	30.3	**		10
2, 3	Visual Carrier Level Adj. (dB)	Max	30.3	**		3
2	Visual Carrier Frequency (MHz)	Max Dev	54.958551	**	55.225	
3	Aural Carrier Level (dBc)	Max	-4.2	**		-6.5
2		Min	-35.4	**	-17	
3	Aural Frequency Offset (MHz)	Max Dev	4.491601	**	4.495	
3	Carrier to Noise (dB)	Min	23.6	**	43	
3	CSO (dBc)	Max	-33.9	**		-51
3	CTB (dBc)	Max	-43.8	**		-51
2	Cross Modulation (dBc)	Max	-38.2	**		-51
3	In-Channel Response (dB)	Max	3.7	**		2
3	Hum/LFD (%)	Max	9	**		3
3	Chroma-Lum Delay (nS)	Max	197.3	**		170
2		Min	19.5			
3	Differential Gain (%)	Max	18.02	*		10

Figure 2–51: Status Report dialog box

3. Click on View Violations display to see all of the measurement results that are either in Caution or Alarm states. (See Figure 2–52.) The Violations are first sorted by Alarms and Cautions (Alarms first), then by channel number (same order as the spreadsheet), and finally by the measurements. In the View Violations dialog box shown in Figure 2–52, all of the measurement alarms for channel 2 are first, then channel 3, and so forth. From the View Violations dialog box, you can go to the Results Detail display.

Figure 2–52: View Violations display

4. Place the cursor somewhere in the Aural Carrier Level for Channel 2 row.

5. Either double-click the left mouse button in that cell, single-click with the right mouse button, or click on View Results Detail (see Figure 2–53.) This is the same Results Detail display that you would access by selecting that channel and measurement cell from the spreadsheet and then either clicking the right mouse button or clicking on Results in the Button Bar.

Figure 2–53: Results Detail display

6. Close this display and return to the View Violations display.

7. Close the View Violations dialog box. You are now back to the Status Report. Notice that you can enter the Results Detail display from this dialog box.

8. Enter the Results Detail display for your first entry in the Status Report. (Place the cursor anywhere in the first row. Either double click with the left mouse button, single click with the right mouse button, or click on Results Detail to enter the Results Detail Display.)

9. Close the Results Detail display. You are back to the Status Report.

10. Close the Status Report and return to the spreadsheet.

Quick Summary of the Status Report and View Violations

The Status Report and View Violations display are two nested reports or measurement summaries of what is going on in the worksheet. Either can access the Results Detail display for any measurement result of interest.

Print any of these by clicking on Print in the dialog box.

The View Filter also affects these displays. (See page 2–67 for more information on the View Filter.)

If the Include History check box is selected, the results include all of the measurement results collected. If it is not checked, then only the most recent measurement results are included.

You know how to collect measurement results and one way to display history. What if you want to take results that you have collected and use them for reports

or to graph trends? You can transfer the data to other programs such as Excel or Word, through either the Copy or Export commands.

Copy and Export

Copy and Export are the two ways of getting data out of the spreadsheet and into other Windows applications for additional processing or to include information in reports. Copy moves the data to the Windows Clipboard, while Export saves the data as a results (*.wsr) file.

Copy to the Clipboard

There are many reasons why you might want to move a few cells of data from the CSS50 application into some other Windows application. You might want to average some of the measurements or make a graph of some channels that seem to be deteriorating or paste them into a report. The easiest way of getting a few cells of data is to copy them to the Clipboard using Copy from the Edit menu.

Copy Cells to the Clipboard

1. Select the Carrier to Noise cell for the first channel and make that measurement several times.

2. With that cell still selected, from the Edit menu, choose Copy. The Copy dialog box appears as shown in Figure 2–54.
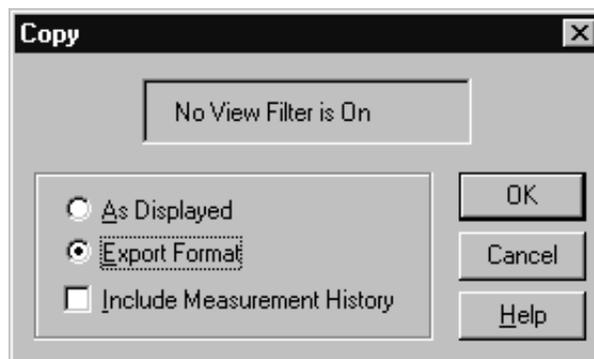
Figure 2–54: Copy dialog box

3. Select the Export Format option button and the Include Measurement History check box.

4. Click on OK. The information from the spreadsheet is copied to the Clipboard.

Paste the Clipboard Data into Excel

1. Start the Excel application.

2. Select the first cell in the Excel sheet.

3. From the Excel Edit menu, choose Paste. This loads the new data into the sheet. (You may need to change the format width of the columns in order to read the data.) The resulting spreadsheet looks similar Figure 2–55.

Figure 2–55: The results of pasting the Clipboard data into Excel

4. Use Switch To, from the Excel Control Box, to return to the CSS50 application.

Use the Copy As Displayed Format. There is a difference between copying data As Displayed and in Export Format. The As Displayed format will not copy any history or header information such as Site or Test ID. In this format, only the Measurement and Channel Header information follow the cell data. This is useful if you only want to process the data and don't want any additional information.

1. Select the Carrier to Noise cell for the first four channels and make some measurements.

2. With those cells still selected, choose Copy from the Edit menu. The Copy dialog box appears as shown in Figure 2–56.
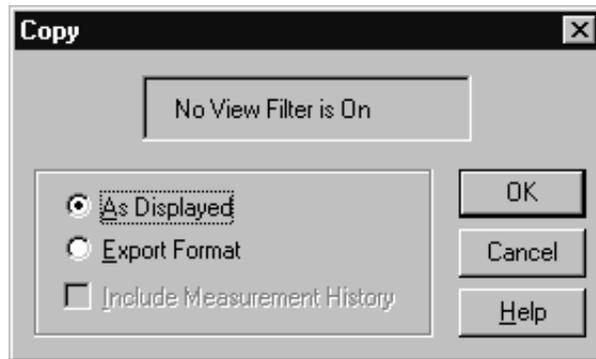
Figure 2–56: Copy dialog box

3. Select the As Displayed option button.

4. Click on OK. The information from the spreadsheet is copied to the Clipboard.

Paste the Clipboard Data into Excel

1. Switch to the Excel application.

2. Select a cell in the spreadsheet.

3. From the Edit menu, choose Paste. This loads the new data into the spreadsheet. Figure 2–57 shows the results. Notice the differences between the two spreadsheets (see Figure 2–55 and Figure 2–57).
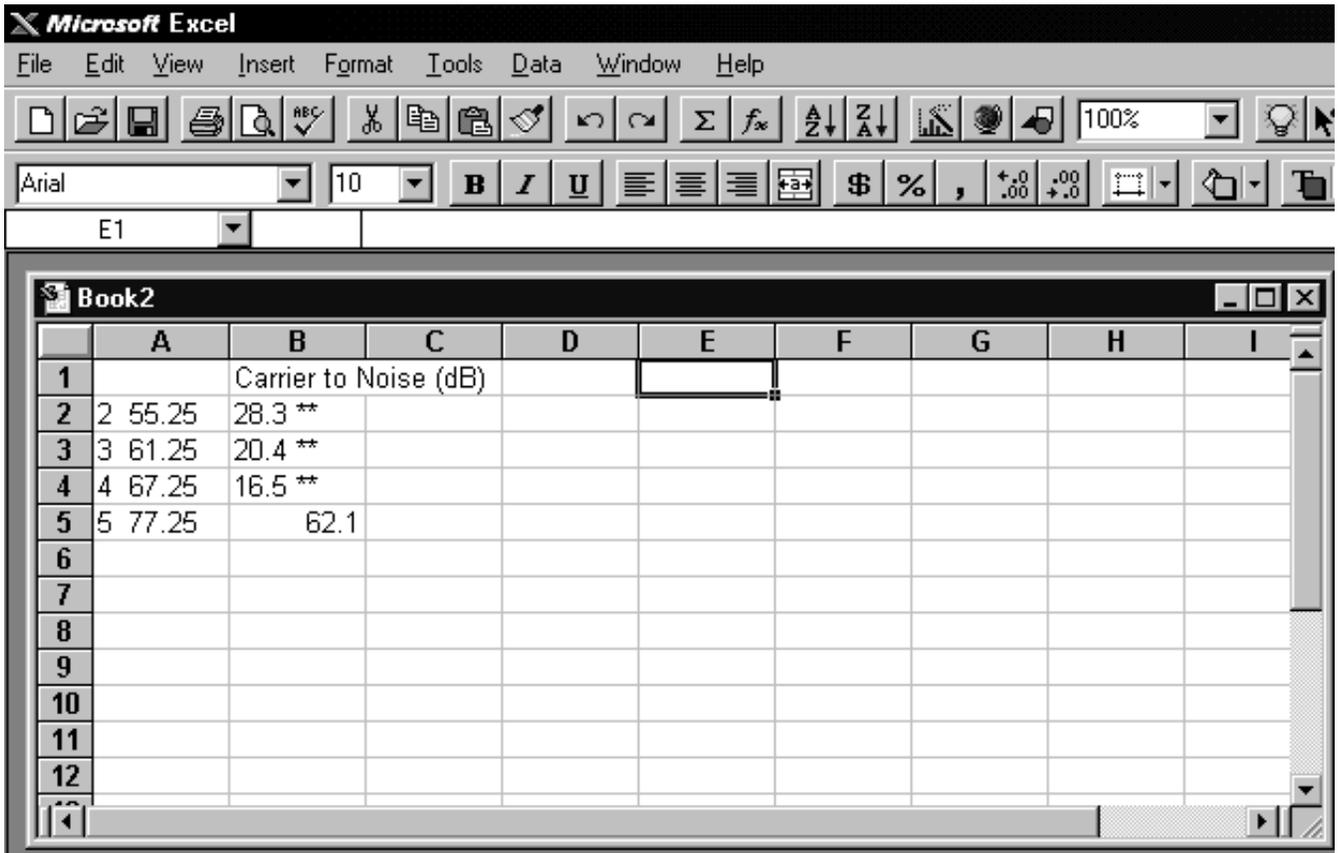
Figure 2–57: The result of the Copy As Displayed pasted into Excel

4. Use Excel to make a graph of the measurement results' trend, similar to the one shown in Figure 2–58.
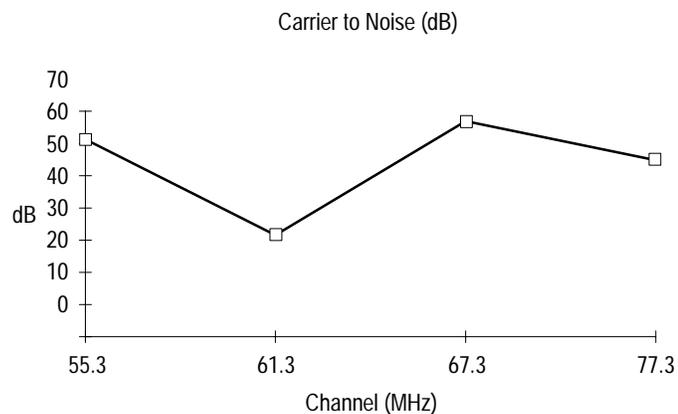
Figure 2–58: Data for the Carrier to Noise Ratio for four channels

5. Switch back to CSS50 application.

Using Export   Use Export when you want to save the results to a file instead of just to the clipboard. This is useful for archiving the measurement results without needing to save all of the files necessary to archive an entire worksheet.

1. From the File menu, choose Export. The Export dialog box looks similar to Figure 2–59.
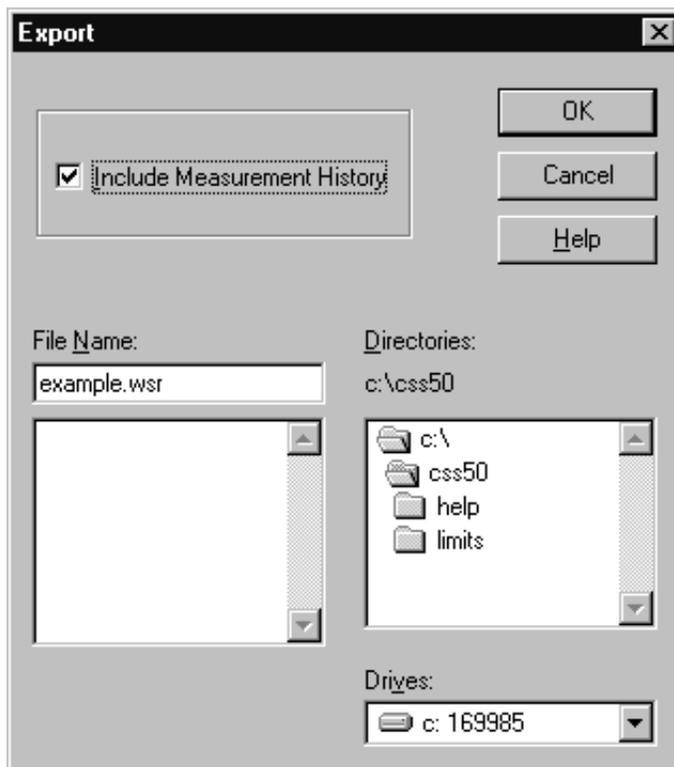
Figure 2–59: Export dialog box

2. The worksheet name with a ".wsr" extension is automatically inserted in the File Name combo box. If you want a different filename, type it in the File Name combo box.

3. Select Include Measurement History.

4. Click on OK to export the data to a file.

5. Clear the worksheet (including history) to be ready for the next exercises.

View Filters

There may be times when you do not want to see the entire list of measurements and channels on the spreadsheet, rather only the few that you are working with at the moment. You can simplify the spreadsheet down to only the interesting cells, through the use of three View Filters. They are: Measurements and Channels, Sequence Results, and Test ID. These filters hide any measurements results that you are not currently interested in. The View Filters affect most of the other displays such as Global View and Results Detail. These displays only show the same measurement results as the main spreadsheet.

The View Filter affects Copy operations; if you cannot see it, you cannot select it. Export always sends the entire worksheet to the *.wsr file, regardless of the View Filter Status.

Only one View Filter can be on at a time and the filter that is on is displayed in the View Filter Status Box in the Worksheet Header.

If a View Filter is on, many other operations are locked out. For example, if Measurement Sequence View Filter is on, Meas Sel from the Button Bar is unavailable.

Measurements and Channels View Filter

Set the View Filter so that only the first four measurements for the first two channels are in view.

1. Select the Carrier Level and Frequency measurements for the first two channels. Make the measurements.

2. From the View menu, choose Measurements and Channels. The Measurements and Channels dialog box appears as shown in Figure 2–60.
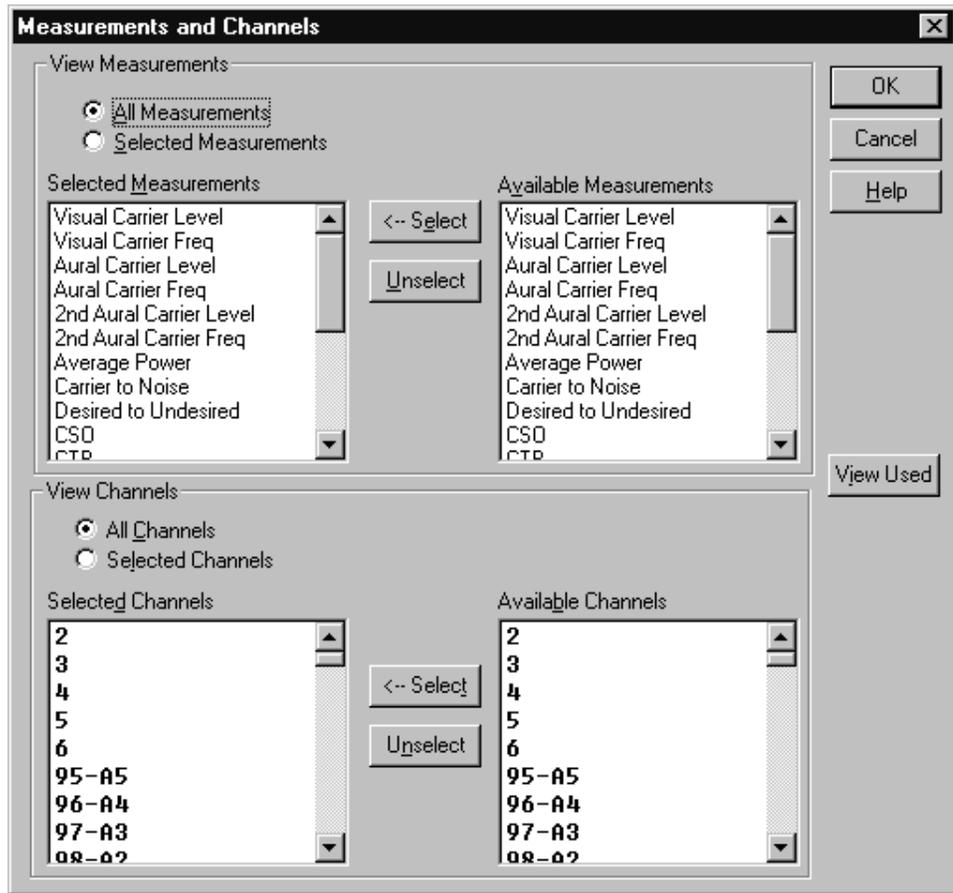
Figure 2–60: Measurements and Channels View Filter dialog box

3. Under the View Measurements group, select the Selected Measurements option.

4. Select everything except Carrier Levels and Frequencies (Visual Carrier Level, Visual Carrier Frequency, Aural Carrier Level, and Aural Carrier Frequency) from the Selected Measurements list box. (Hint: select 2nd Aural Carrier Level, then scroll to the bottom of the list. Hold down the SHIFT key and click on the last measurement.)

5. Click on Unselect to remove all of these measurements. (The only measurements left in the Selected Measurements list box are Carrier Levels and Frequencies.)

6. Under the View Channels group, click on Selected Channels.

7. Select everything except the first two channels from the Selected Channels list box.

8. Click on Unselect to remove these channels. (Only the first two channels, 2 and 3, remain in the Selected Channels list box.) The Measurements and Channels dialog box now resembles Figure 2–61.
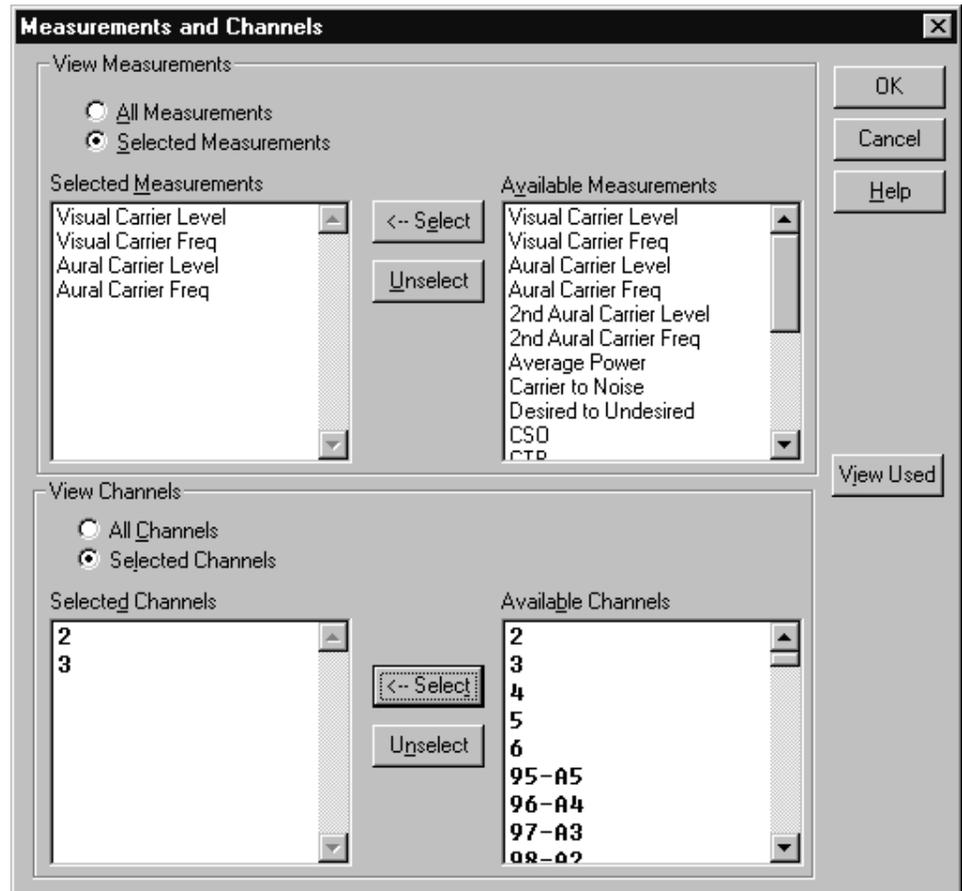
Figure 2–61: Measurement and Channels dialog box

9. Click on OK to save the changes and leave the dialog box. The spreadsheet looks similar to the one shown in Figure 2–62.

Figure 2–62: The Spreadsheet with the Measurement and Channels View Filter on

NOTE. Notice that although the first six measurements are tied together under most circumstances, the View Filter allows them to be viewed separately. If you request one of these measurements, the CSS50 software will try to make all six even if they are not in view. (It cannot make the Second Aural Measurements if they are not enabled in the Channel Table.)

10. Return to the full spreadsheet. From the View menu, choose Measurements and Channels. The view automatically switches back to the full display. You can toggle between the filtered and full view by selecting/deselecting Measurements and Channels from the View menu.

Measurement Sequence Results View Filter

If you only want to see the results from the last Measurement Sequence, use the Measurement Sequence Results View Filter. At the end of every Measurement Sequence execution you are prompted if you want this filter turned on.

For example: define a Measurement Sequence, run it, and then display only its results using the View Filter.

1. Clear the present spreadsheet. (From the Edit menu, choose Select All. Then from the Edit Menu, choose Clear and select the check boxes to delete Current Values and Measurement History.)

2. From the Configure menu, choose Measurement Sequence. (You are now in the Measurement Sequence dialog box.)

3. Click on Clear Sequence to clear the Measurement Sequence.

4. Select the following measurements for the first four channels:

- Carrier Levels and Frequencies

- FCC Baseband

- Signal to Noise

- Waveform Distortion

5. Click on Edit Time Parameters. (You are now in the Edit Time Parameters dialog box.)

6. Select the Run Immediately check box and make sure that the Run Continuously check box is not checked.

7. Click on OK to save the changes and leave the Edit Time Parameters dialog box. (You are back to the Measurement Sequence dialog box.)

8. Click on OK save the changes and leave the Edit Measurement Sequence dialog box. (You are back to the spreadsheet.)

9. Click on Meas Seq in the Button Bar to run the Measurement Sequence. At the end of the Measurement Sequence, a dialog box similar to Figure 2–63 is displayed.
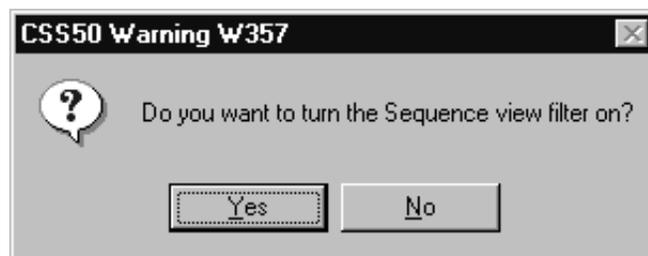
Figure 2–63: Prompt to turn on the Sequence filter

10. Click on Yes to turn on the Measurement Sequence View Filter. The spreadsheet looks similar to the one shown in Figure 2–64. Notice that there are no Second Aural measurements. They are not enabled in this Channel Table.

Figure 2–64: The spreadsheet with the Measurement Sequence Results filter on

11. Turn off the Measurement Sequence Results filter. From the View menu, choose Measurement Sequence Results. This toggles the View Filter off. You are back to the standard spreadsheet display.

NOTE. If you went in and defined a new Measurement Sequence and ran it, then turned on the Measurement Sequence Results filter, you will see only the results from the last Measurement Sequence — not the old one.

Test ID Results View Filter

There are times when you only want to see a subset of the measurements made at a particular site. This is when the Test ID Results View Filter is useful. For example, if Pre-Converter and Post-Converter measurements are made under different Test IDs, then they can be viewed separately using the Test ID Results View Filter.

You have been operating under the Test ID "Learner's Permit." Now change your Test ID, make a few measurements under that ID, and look at the results using the Test ID View Filter.

1. Click on Test ID in the Button Bar.

2. Type: `Training Wheels` in the text box.

3. Click on OK.

4. Select the Hum/LFD measurement for the first four channels.

5. From the Measurement menu, choose Current Selection.

6. From the View menu, choose Test ID Results. The results should be similar to Figure 2–65.

Figure 2–65: The results of turning on the Test ID Results filter

7. Click on Test ID in the Button Bar.

8. Display the selection of Worksheet Test IDs and select "Learner's Permit". (The Worksheet Test IDs are the Test IDs used in the current worksheet. The other list is all of the Test IDs ever used.)

9. Click on OK to save the change and exit the Test ID dialog box. You will only see the measurements that you made under the Learner's Permit Test ID — not the Hum/LFD measurements.

10. From the View menu, choose Test ID Results to turn the View Filter off and return to the normal spreadsheet with measurements collected from both Test IDs displayed.

Defining Limits

Limits files determine how to characterize your measurement results. Results can be passing, in alarm, in caution, or have no limits defined. You can change the range of these values to suit your own application. In fact, you can have a different set of limits for every channel. For example, the premium and the public access channels may have their own unique Limits files.

Edit a Limits File   First, enter a Limits file to see the information contained there.

⚠️ *CAUTION. When you edit a Limits file, the changes affect all worksheets using that Limits file.*

1. Click on Limits in the Button Bar, or, from the Configure menu, choose Measurement Limits. This displays the Measurement Limits dialog box, as shown in Figure 2–66.
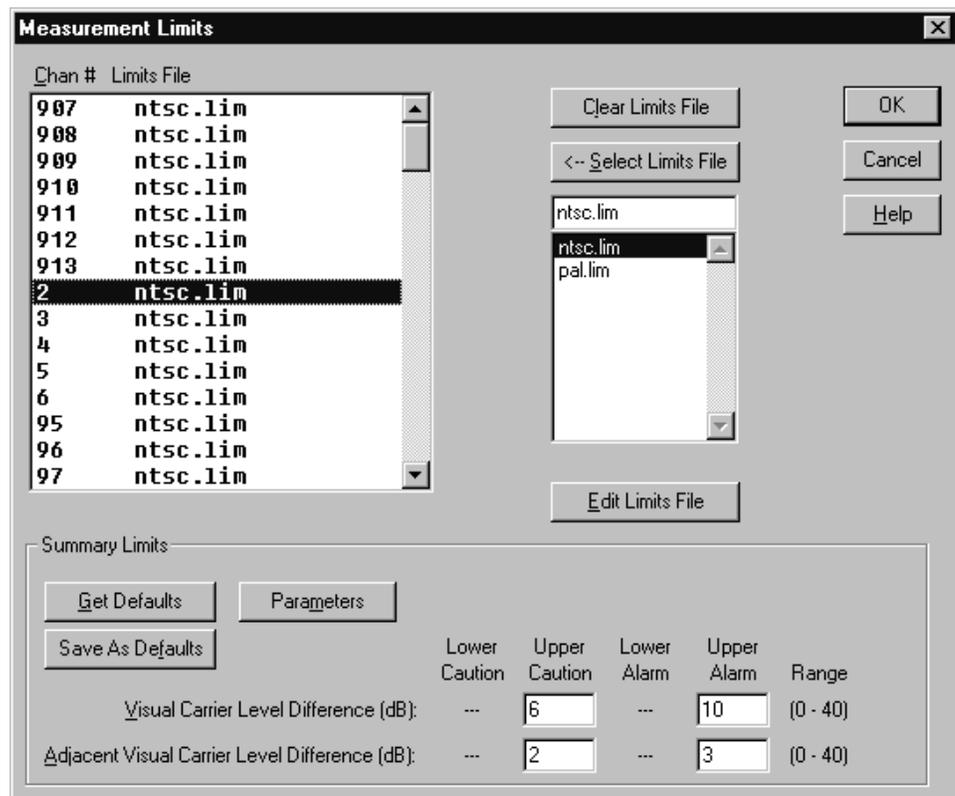
Figure 2–66: Measurement Limits dialog box

In the present setup, all of the channels have the same Limits file associated with them, "ntsc.lim". Now take a look at the contents of this file (or whatever Limits file you might like).

2. Select a Limits file from the Limits file combo box (the example uses ntsc.lim).

3. Click on Edit Limits File. Figure 2–67 shows the Edit Limits File – ntsc.lim dialog box.

	Range Lower Limit	Alarm Lower Limit	Caution Lower Limit		Caution Upper Limit	Alarm Upper Limit	Range Upper Limit	Units
Visual Carrier Level	-10						70	dBmV
Visual Carrier	-300	-25	-5		5	25	300	kHz
Vis. Car. Level Variation	0				5	8	40	dB
Aural Carrier Level	-40	-17	-14		-9	-6.5	0	dBc
Aural Frequency Offset	-20	-5	-3		3	5	20	kHz
2nd Aural Carrier Level	-40	-17	-14		-9	-6.5	0	dBc
2nd Aural Freq Offset	-20	-5	-3		3	5	20	kHz
Average Power	-20						70	dBmV
Carrier to Noise	10	43	45				70	dB
Desired to Undesired	10	35	40				70	dB
CSO	-80				-54	-51	-20	dBc
CTB	-80				-54	-51	-20	dBc
Cross Modulation	-80				-54	-51	-20	dBc
Adj. Channel Leakage	-80				-45	-40	-20	dBc
In-Channel Response	0				1.5	2	8	dB
Hum/LFD	0				2	3	15	%

Figure 2–67: Edit Limits File – ntsc.lim dialog box

Three of the columns (Range Lower Limit, Range Upper Limit, and Units) define the allowable ranges. These columns are not editable. The other four columns define the Alarm and Caution ranges.

The Caution and Alarm columns define the way the measurement results are categorized. See Figure 2–68 for an example of the three types of measurements and the different limits that they require. The Aural Frequency Offset requires both upper and lower limits. The Carrier to Noise Ratio has only lower limits. The ICR has only upper limits.

Aural carrier frequency

Carrier to noise

ICR

Figure 2–68: How limits work

If you attempt to enter an Upper or Lower Limit outside the ranges defined, you receive an error message (as shown in Figure 2–69) that the value is out of range and are returned to that cell to re-enter an acceptable value.
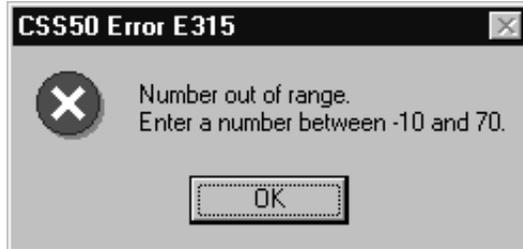
Figure 2–69: An example of an error message

You can edit the Alarm and Caution ranges to as tight or loose a specification as desired as long as the value is in the acceptable range and maintains the relationship:

Alarm Lower Limit < Caution Lower Limit < Caution Upper Limit < Alarm Upper Limit

Note that there are different measurements in the Limits file depending on the video standard (NTSC or PAL). The video standard is defined in the channel table attached to the current worksheet. See *Appendix C: Channel Table Editor* for information about channel tables.

Practice editing the Limits file by tightening the Alarm and Caution limits on a few measurements and then save it as a new Limits file. (Remember, any change that you make to a Limits file affects all channels and worksheets using that file.)

⚠ *CAUTION. When you edit a Limits file, the changes affect ALL worksheets using that Limits file.*

Edit the Limits File

1. Click on Clear Limits. This erases all of the old limit values.

2. Click on Get Defaults. This loads the limit values corresponding to the default Limits file.

3. Select the Visual Carrier Frequency measurement–Caution Lower Limit cell. (Present value is –5 in the example.)

4. Type −4. (Values automatically overwrite.)

5. Move the cursor to the Caution Upper Limit cell.

6. Type 4.

7. Select the Visual Carrier Frequency measurement–Alarm Lower Limit cell.

8. Enter −20.

9. Press TAB to move to the Alarm Upper Limit.

10. Enter 20.

11. Click on Save As Limits File to save the file.

12. Save this as a new file.

13. You are prompted for a new name and the cursor is already in the list box. Type in learners.

14. Click on OK to leave the Edit Limits dialog box. You are back to the Measurement Limits dialog box.

Attach a Limits File to a Channel

1. Select the first channel on the list. (In the example, it is channel 2.)

2. Select your file "learners.lim" from the Limits list box. The selected file appears in the box at the top of the list box.

3. Attach the file to the channel. Either double click on the file name with the left mouse button or choose the Select Limits File command button.

The Limits file for channel 2 is now "learners.lim".

Remove a Limits File from a Channel

1. Select your second channel. (In the example, it is channel 3.)

2. Remove the Limits file associated with that file. Choose the Clear Limits File command button. Channel 3 no longer has a Limits file associated with it and the Limits File column is blank. (You know that a measurement has no defined limits when the results are in white cells on the spreadsheet.)

Return to the Spreadsheet to See the Results

1. Click on OK to save the changes and return to the spreadsheet. Notice that the Alarm and Caution ranges have tightened (and may have changed colors) and that all measurements in the second channel are now in white cells.

2. Click on Limits in the Button Bar to return to the Measurement Limits dialog box.

3. Change your first two channels back to their previous Limits file, "ntsc.lim".

4. Click on OK to save the changes and return to the spreadsheet.

Summary Limits Group

The Summary Limits affect all of the channels and are not associated with any particular Limits file. Edit the Visual Carrier Level Difference and the Adjacent Visual Carrier Level Difference like any other text box. Click on the text box and enter a number between 0.0 and 40.0 to set the Alarm and Caution flags.

The results of these limits are not available on the main spreadsheet, but rather in the reports (such as the Status Report and the Measurement Summary for the Carrier Levels and Frequencies).

Visual Carrier Level Difference. These calculated results look at the results of the Visual Carrier Level measurements to find the highest and lowest level across all channels. The difference between them is the result.

Adjacent Visual Carrier Level Difference. These are calculated results that show the difference in Visual Carrier Level between two channels that are adjacent in frequency.

NOTE. If you have a View Filter on so that not all channels are displayed, the calculated results do not comply with FCC requirements, because the CSS50 software only looks at the displayed channels. Make sure no View Filters are on when you want to check these results.

Set the Summary Limits. Click on Limits in the Button Bar. Figure 2–70 shows a portion of the Measurement Limits dialog box.
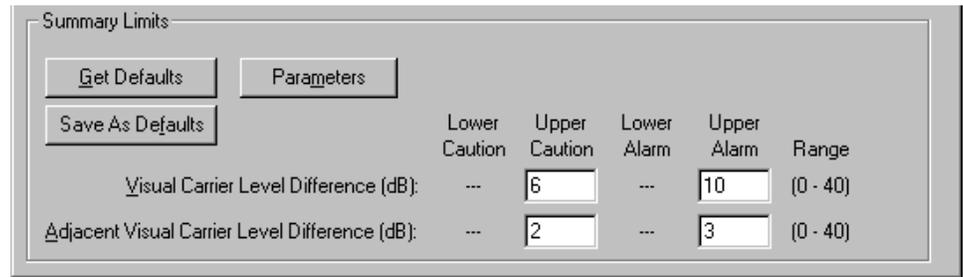
Figure 2–70: Summary Limits (located at the bottom of the Limits dialog box)

Edit the text boxes as required.

Click on Parameters to set the window for adjacent channels. This dialog box (see Figure 2–71) defines what constitutes an adjacent channel. Any adjacent channels that are outside of this frequency window are not included in the calculations. Select what is required for your system and then click on OK.
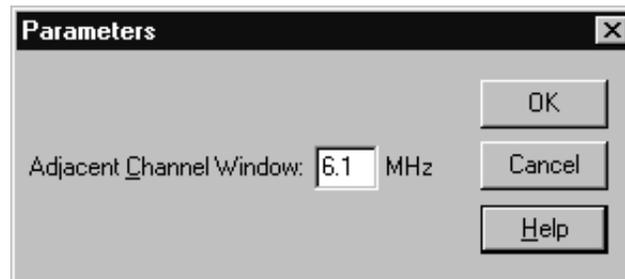
Figure 2–71: Parameters dialog box

Click on OK to save the changes to the measurement limits and exit the Measurement Limits dialog box.

The 2714/2715 User Defined Program (UDP)

There are many times when tests need to be run at a remote location away from the convenience of the computer running the CSS50 application, but you still want to incorporate the data into the spreadsheet. The answer is to generate a User Defined Program (UDP). A UDP is basically a Measurement Sequence run on the 2714/2715 at a remote location. When the remote testing is completed, return the results to the CSS50 application and the spreadsheets and reports are very similar to the data collected directly with the CSS50 application. For example: a worksheet is used to generate a UDP for the 2714/2715. The 2714/2715 is removed and taken to various field test locations, using the UDP for measurement results gathering.

Remember that the UDP carries not only the Measurement Sequence instructions, but also much of the header and configuration information. Table 3–7, on page 3–57, gives a complete list. It is important to check the following dialog boxes to make sure that they describe the way that you want the UDP to operate:

- Worksheet Info, from the Configure menu (the Channel Table)

- Test ID

- Measurement Setups, from the Configure menu

- Preferences, from the Configure menu

- Edit Time Parameters (from the Measurement Sequence dialog box)

A good example of a typical UDP is a 24 Hour Test with a few extra measurements specific to your application.

Define a UDP   The following procedures describe how to define a UDP.

Define a Worksheet, Channel Table, and Test ID

1. Choose New from the File menu.

2. In the Description group, type `This worksheet is only for practicing writing and retrieving data from UDPs.`

3. Select the std.cht from Channel Table in the list box.

4. Select <undefined> from the Site combo box. (There is no need to define the Site — that information is not transferred to the 2714/2715.)

5. Click on OK to save the changes and return to the spreadsheet.

6. From the File menu, choose Save As.

7. Enter the new worksheet name `remote.wrk`.

8. Click on OK to save the worksheet and return to the spreadsheet.

9. From the Configure menu, choose Test ID.

10. Type `Learner's Remote` in the text box.

11. Click on OK to save the change and return to the spreadsheet. The Worksheet Header looks similar to Figure 2–72.

```
Worksheet: remote.wrk    Site:    <undefined>
Chan Table: std.cht      Test ID: Learner's Remote          No View Filter is On
```

Figure 2–72: Worksheet header after being edited for the UDP

Define the Measurement Setups and Preferences

1. From the Configure menu, choose Measurement Setups.

2. Set the 2714/2715 Power Line Frequency and Preamp option buttons to match your system (at the remote location).

3. Enter the External Attenuation/Amplification in the text box to match the remote location. (The Average group does not matter for UDPs since they are only significant for baseband and do not apply to the 2714/2715.)

4. Select a channel from the list box, then click on Edit Setups.

5. Make the appropriate selections from the various groups.

6. Click on OK to return to the Measurement Setups dialog box. Repeat as necessary for all channels.

7. Click on OK to save the changes and return to the spreadsheet.

8. From the Configure menu, choose Preferences.

9. Select the Collect history option.

10. Do not select any of the check boxes.

11. Click on OK to save the changes and return to the spreadsheet.

Define the Measurement Sequence

1. From the Configure menu, choose Measurement Sequence.

2. Click on Clear Sequence to remove any previous Measurement Sequence.

3. Click on 24 Hour Test Auto Selection.

4. Click on Create 2714/2715 UDP. The dialog box appears as shown in Figure 2–73.
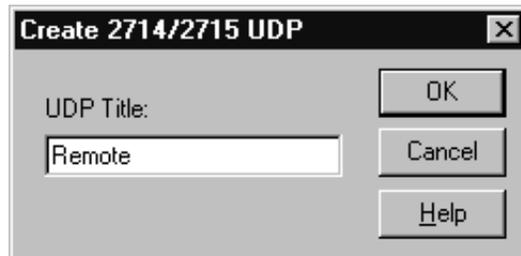
Figure 2–73: Create 2714/2715 UDP dialog box

5. Enter `Remote` in the text box.

6. Accept this UDP title (the same as the worksheet) by clicking on OK. The UDP "Remote" is generated and loaded into the 2714/2715. This title appears in the 2714/2715's USER DEF menu.

7. The Create 2714/2715 UDP dialog box goes away if the UDP was successful in loading; if it fails an error message appears. The most common error is having more than nine UDPs defined in a single instrument. At the instrument, delete one or more UDPs and then try again.

Run the UDP

1. Take the 2714/2715 to the remote location and connect it to the test point.

2. Define the 2714/2715 SITE parameter. "Beaverton – Remote 1" is the example. The Site name is not defined in the UDP, therefore it must be done on location in the 2714/2715.

3. Execute the UDP using the 2714/2715 front panel keys (see the 2714/2715 "USER DEF" menu). Allow the 2714/2715 to run until all measurements are collected. (This will take 24 hours to complete – but it can be stopped after one iteration.)

Now that you have gathered the data, it needs to be loaded back into a CSS50 worksheet.

Get Stored Results from the 2714/2715

This menu item retrieves all the measurement results currently stored in the NVRAM of the connected 2714/2715. The results are not erased from the 2714/2715 memory after they are retrieved. Results are only erased using specific 2714/2715 front panel keystrokes. It is a good practice to always Import into a new worksheet or one set up specifically for importing, so that no information in the current worksheet is inadvertently overwritten.

1. From the File menu, choose Open.

2. Select the remote worksheet used to define the UDP.

3. Click on OK.

4. From the Measure menu, choose Get Stored Results from the 2714/2715. Figure 2–74 shows the dialog box.

   Within the dialog box, the results are grouped according to Site and Channel Table name. The directory is alphabetical by site name. Count is the number of measurement results contained in the group specified by the Site and Chan Table columns. Results File is the name of the results file to which a particular group of results has been exported.

   Note that in Figure 2–74 there is no results file for the selected site. This is because the data has not yet been exported to a results file. Before results can be imported, it must first be exported into a *.wsr file.

Figure 2–74: Get Stored Results dialog box

5. Click on Export Results to export some results (the example uses Site 888) into a *.wsr file. Figure 2–75 shows the Export dialog box.

Figure 2–75: Export Results dialog box

6. Enter a name for the destination file in the File Name combo box. The example uses the name "bringin.wsr".

7. Click on OK. You are returned to the Get Stored Results dialog box as shown in Figure 2–76. Notice that the Site 888 now has the bringin.wsr results file associated with it and the Export button is disabled.
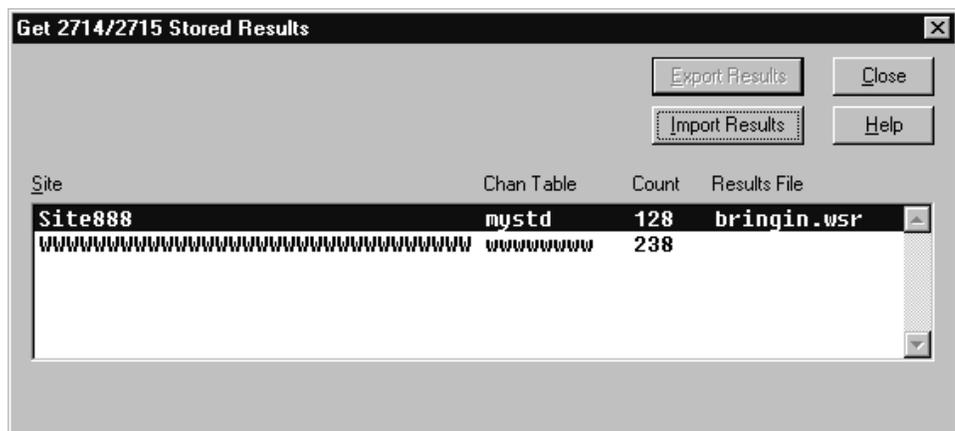
Figure 2–76: Get Stored Results dialog box (site results exported to a results file)

8. Click on Import Results to load the information into the current worksheet. Because no Site name is defined for this worksheet, the Site name in the exported file does not match and the warning shown in Figure 2–77 appears.
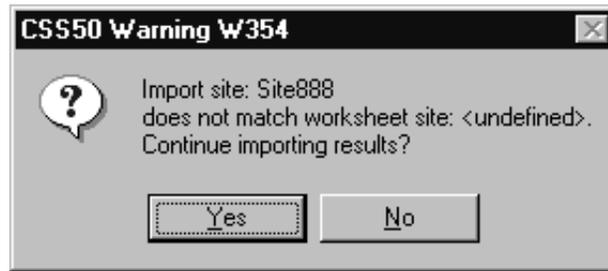
Figure 2–77: Site name and worksheet site name mismatch warning

9. Click on Yes to continue importing the results. The Warning shown in Figure 2–78 then appears.
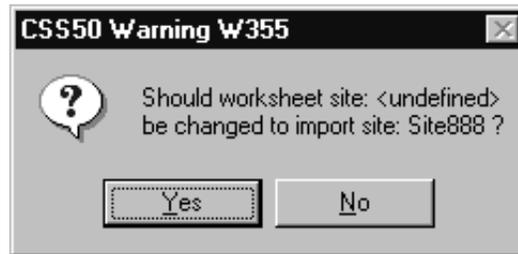
Figure 2–78: Site name and imported site name mismatch warning

10. Click on Yes to change the worksheet site name to the site from the 2714/2715. Clicking on No will attribute the imported measurement results to the Site name currently in the worksheet even if it is undefined. If the Channel Table in the worksheet does not match the one from the 2714/2715, the warning shown in Figure 2–79 appears.
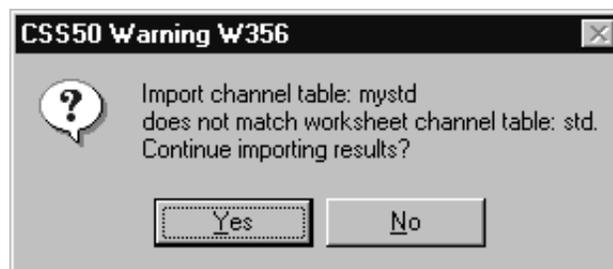
Figure 2–79: 2714/2715 and worksheet Channel Tables mismatch warning

11. Click on Yes. The dialog box shown in Figure 2–80 appears. This dialog box is the result of a mismatch in the Channel Table. There will always be mismatches in the Channel Table because the 2714 (or 2715) stores only the channel number as the channel ID, while the CSS50 software stores channel number, tag, program name, and nominal visual carrier.
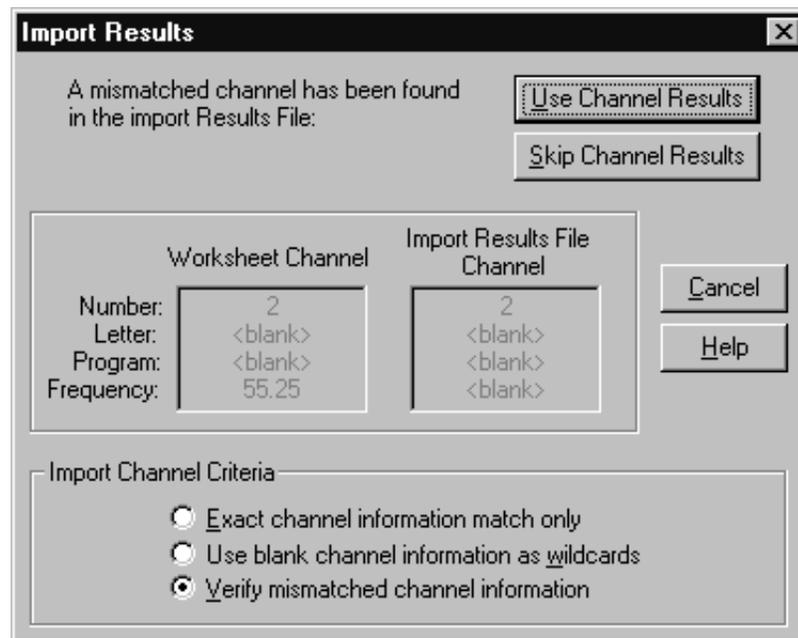
Figure 2–80: Import Results dialog box

12. Select "Use blank channel information as wildcards" in the Import Channel Criteria sub-group.

Note that there are three Import Channel Criteria option buttons:

- Exact channel information match only

- Use blank channel information as wildcards

- Verify mismatched channel information

Generally, when using Import to get results from a 2714 (or 2715) into a worksheet, "Use blank channel information as wildcards" is the most efficient option, since there will never be an exact match. Although you could go through and verify each channel to make sure that the channel numbers match, using the "Use blank channel information as wildcards" selection is the most efficient way to load the data, because it reduces further prompts.

NOTE. Results for Channel Numbers not in the Worksheet's Channel Table are always ignored. You are notified that they were not loaded at the end of the import process. Any cell without results data or in error condition will not be imported. Cells that have more than one measurement will have all valid data imported and the Error data results left blank. Results from a channel table that has mismatches in the channel header, no destination channel, an inactive destination cell, or a user requested skip will not be imported.

Keep in mind that the destination channel must also be of the same type (analog or digital) as that of the imported data. For example, suppose the imported data has an Average Power result on channel 63; this means that channel 63 is a digital channel. If channel 63 in the worksheet is an analog channel, the Average Power destination cell is inactive; thus, the channel 63 Average Power result will not be imported.

13. Select the Use Channel Results option button to load that channel's results and continue the import process. If there are no more mismatches, the import process is completed when a message box similar to Figure 2–81 appears. Make sure that the number of results transferred is similar to that listed in the Count column of the Get 2714/2715 Stored Results dialog box shown in Figure 2–76 (this is a cross check).
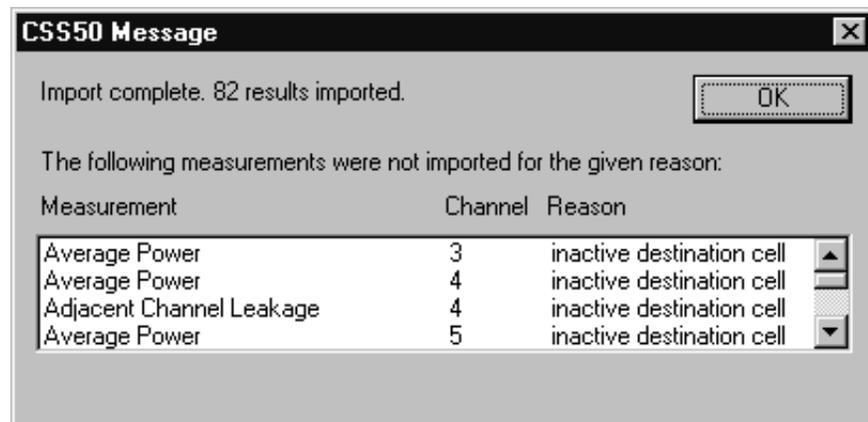
Figure 2–81: Message box that tells you that the import procedure is finished

Reference

Overview

This chapter contains several sections that describe the CSS50 software in detail. Three sections (*Parts of the Worksheet*, *Control Menu Box*, and *Menu Bar*) provide in-depth descriptions of all the menu commands available in the CSS50 software.

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Parts of the Worksheet

This section describes the various parts of the CSS50 worksheet. Each of the parts of the worksheet are identified in Figure 3–1.
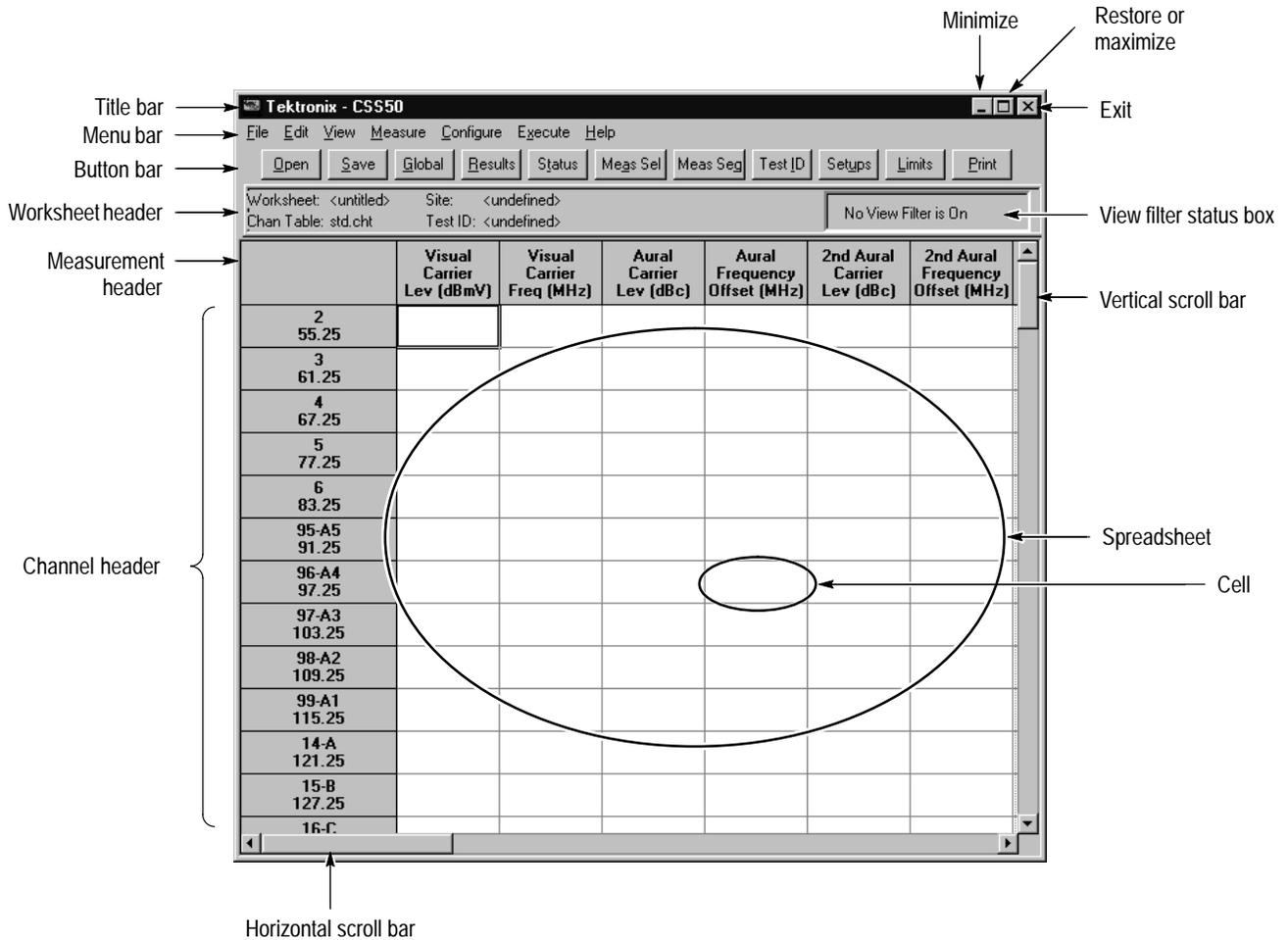
Figure 3–1: Parts of the CSS50 worksheet

Title Bar

The Title Bar displays the name of the application that created the window. The active application's Title Bar is highlighted. The Title Bar is also a handle for moving the window. Place the cursor in the Title Bar then hold down the left mouse button to move the window to the desired position.)

Minimize Button

The Minimize button quickly shrinks the application to an icon, same as the Menu Control Box command, Minimize. (See page 3–10.)

Maximize Button

The Maximize command makes the application window fill the entire display. (The Restore button replaces it when the window is at its maximum size.) This is the same as the Maximize command from the Menu Control Box. (See page 3–10.)

Restore Button

The Restore button quickly returns the application window to it previous size. This is the same as the Menu Control Box command Restore. (The Maximize button replaces it whenever the window is not at its maximum size.) (See page 3–9.)

Worksheet Header

The worksheet name, Channel Table, Site, Test Id and View Filter status are all listed in the Worksheet Header (see Figure 3–2).

| Worksheet: example.wrk | Site: | Tektronix-Beaverton | | View Sequence Filter is On |
| Chan Table: std.cht | Test ID: | Learner's Permit | | |

Figure 3–2: The worksheet header

Worksheet   The worksheet name generally ends in ".wrk". (It is good practice to make sure that it ends in .wrk for file organization.) Change using the Save As command (in the File menu; refer to page 3–13). This stays with the worksheet whenever it is saved.

Chan Table   The Channel Table determines what channels are available. Edit using the Create/Edit Channel Table command button in Worksheet Info, from the Configure menu (see page 3–46) or Channel Table Editor from the Execute menu (see page 3–77). If you change the Channel Table name, you are prompted to

save the worksheet as a new one because only one Channel Table is allowed for each worksheet. The Channel Table file should end in ".cht".

NOTE. Use care when editing the Channel Table. See the warnings and explanations in Appendix C: Channel Table Editor *for more information.*

Site   Site specifies the location where the measurements take place, but there are no defined values that this space must have. Change using the Configure menu, Worksheet Info (see page 3–46). If you change the Site, you are asked if you want to create a new worksheet because only one Site name can be associated with any worksheet. If you choose not to create a new worksheet, all of the measurement results are then associated with the new Site name.

Test ID   This could be a person's name, operator number, test session identification, or whatever is the most appropriate for your particular application. Multiple Test IDs for each worksheet are allowed. An example of multiple Test IDs for one worksheet is to separate the Pre-converter, Post-converter, and 24 Hour results from the same Site.

View Filter Status Box   This box tells if a View Filter is on. The choices are: No View Filter is On, View Selected Filter is On, View Sequence Filter is On, and View Test ID Filter is On. Enable the View Filters through the View menu, see page 3–24.

Channel Header

This is the list of channels defined by the Channel Table. Change using the Create/Edit Channel Table command button (from the Configure menu, Worksheet Info, see page 3–46). There are up to four fields in each Channel cell. They are: Number, Tag, Visual Frequency, and Program.

- Number. The number by which this channel is commonly known.

- Tag. A 3-character designation for the channel, such as "AAA" or "2-B".

- Program. A 6-character identifier for the channel, usually used for the channel's call letters or abbreviated name.

- Visual Frequency. The frequency of the visual carrier.

You can edit which fields are displayed using the Row Header Fields from the View menu (see page 3–41).

The Channel Table Editor defines these fields; see *Appendix C*.

Measurement Header

The Measurement Header is the measurement list. The measurement list includes (additional measurements made under this Header are in parentheses):

- Visual Carrier Level

- Visual Carrier Frequency

- Aural Carrier Level

- Aural Frequency Offset

- Second Aural Carrier Level

- Second Aural Frequency Offset

- Average Power

- Carrier to Noise

- Desired to Undesired

- CSO (5 beat locations and amplitudes)

- CTB (5 beat locations and amplitudes)

- Cross Modulation

- Adjacent Channel Leakage

- In-Channel Response

- HUM/LFD (Total, Fundamental, and 2nd Harmonic)

- FCC Baseband or Primary Baseband (if non-US)
  (Chrominance/Luminance Delay, Differential Gain, and Differential Phase)

- Modulation Depth

- Aural Deviation

- Signal to Noise
  If NTSC: S/N NTC-7 Lum Weighted
  If PAL: S/N 567 Lum Weighted

- Waveform Distortion (2T K-factor and Luminance Non-linear Distortion)

Vertical Scroll Bar

The Vertical Scroll Bar moves the spreadsheet up and down, allowing access to all channels. You can either click on the up or down arrow boxes to move one step at a time, or click and hold the box, dragging it to the desired position.

Horizontal Scroll Bar

The Horizontal Scroll Bar moves the spreadsheet right and left, allowing access to all measurements. To use the Horizontal Scroll Bar, either click on the right or left arrows to move one step at a time, or click and hold the box, dragging it to the desired position.

Cursor

The cursor can take on one of several shapes depending upon the functions available to it.

It is a cross when it is in the spreadsheet. From there it can select cells in the spreadsheet, request a measurement on a selected cell, or go to the Results Detail display.

It is an arrow if it is in the menu portion of the display. From there it moves through the menu.

It can also be an hourglass. If the cursor is an hourglass, the software is busy processing a command. You cannot request any more actions until it turns back into either an arrow or a cross.

It can be a two-or four-headed arrow for sizing the application window.

If no mouse is available, the cursor is either a box around a cell or command button, reversed text on the command line, reversed cells in the spreadsheet, or a two-or four-headed arrow for sizing the window.

Title Bar Menu Box

The Control menu box contains standard Windows commands used to manipulate the application window and change to other applications (see Figure 3–3). Move the cursor into the title bar area and click the right mouse button.

Figure 3–3: Title Bar menu

Restore

The Restore command returns the CSS50 application window to its previous size and position. It is often used to change an icon back into a window. It performs the same functions as the Restore command button on the upper right hand corner of the worksheet. (See page 3–4.)

Move

Move allows different placements of the CSS50 window. This is equivalent to clicking on the Title Bar and holding down the left mouse button to reposition the display. The Move command is only available if the application window is not at its maximum size (when the Maximize button, in the upper right corner, is available).

To use Move with the keyboard:

1. Choose Move. (Press ALT+spacebar, then type m.)

2. Press the arrow keys until the window is in the desired position.

3. Press Enter to place the window in the new position or press ESC to stop moving the window.

Size

Size allows you to change the size of the application window. Size is not available when the application window is maximized. (See the Windows manual.)

To change the size of the window using the keyboard:

1. Press ALT+spacebar to enter the Control menu box.

2. Press s to choose Size. The cursor changes to a 4–headed arrow.

3. Press the arrow keys to change the size of the window. The cursor changes to a 2–headed arrow.

4. Press Enter to accept the new size or press ESC to cancel changing the size of the window.

Minimize

The Minimize command changes the application to an icon. The application is still running but it is no longer the active window. The CSS50 software stays in the same operating state as when it was converted to an icon. This performs the same function as the Minimize button (small box with the down arrow) on the upper right corner of the worksheet. (See page 3–4.)

Maximize

The Maximize command changes an icon to an active window. This also changes a sized window into one that fills the entire display. Maximize performs the same function as the Maximize command button (small box with an up arrow) on the upper right corner of the worksheet. (See page 3–4.)

Close

Close halts any Measurement Sequence in progress, closes the CSS50 application window and exits the application.

Menu Bar

The Menu Bar lists the available menus. There are seven menus: File, Edit, View, Measure, Configure, Execute, and Help. If you are using a mouse, click on the word with the left mouse button to open the drop down menu associated with each. If a mouse is not available, then press ALT+the underlined letter of the selected menu item to make the drop-down menu available. For example: to get the File menu, press ALT+f. The following sections describe each menu item.

File

The File menu is used to open, save, import, export and print files (see Figure 3–4).
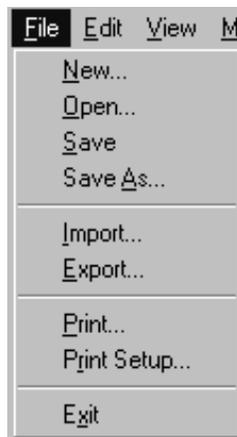
Figure 3–4: File menu

New New creates a new worksheet. New automatically sets all Measurement Setups and Limits files to defaults, not what is in the current worksheet. All results in the current worksheet are either saved to that worksheet or deleted. New also erases any Measurement Sequences that may have been defined.

There are three fields in the New dialog box; see Figure 3–5. The fields are: Site, Description, and Channel Table.
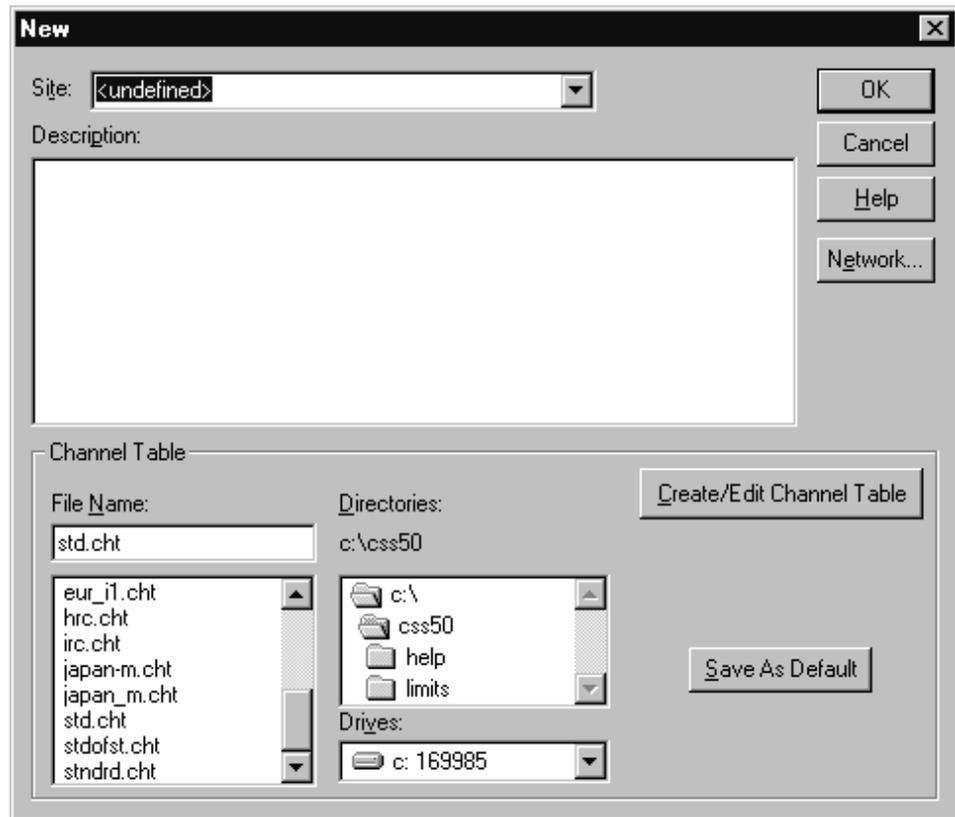
Figure 3–5: New dialog box

■ Site. Site specifies the location where the measurements take place. The Site field has a default value of undefined; the Site field can remain undefined.

■ Description. Fill this field with anything that may be relevant to this worksheet. For example, how certain measurements are made and the serial numbers of the test equipment. You can copy this information to the Windows' Clipboard and then attach it to an Excel spreadsheet. Carriage returns are allowed in this field.

■ Channel Table. This field specifies the Channel Table for the worksheet. The Channel Table defines the channels available, their frequencies, and other important information. You can change or edit the current Channel Table by using the Create/Edit Channel Table command button. Editing the Channel Table without changing the name is not recommended. Please see Appendix C for more information about editing a Channel Table.

There are two command buttons in the Channel Table field; the command buttons are Create/Edit Channel Table and Save As Default.

- Create/Edit Channel Table. This command button launches the Channel Table Editor. Use the Channel Table Editor to add, delete, or change information in a Channel Table. See Appendix C for more information on the Channel Table Editor.

- Save As Default. This command button allows you to save the current Channel Table as the default. This will cause the selected Channel Table to automatically load every time the CSS50 software starts.

Open   Opens an existing worksheet. (See Figure 3–6.)
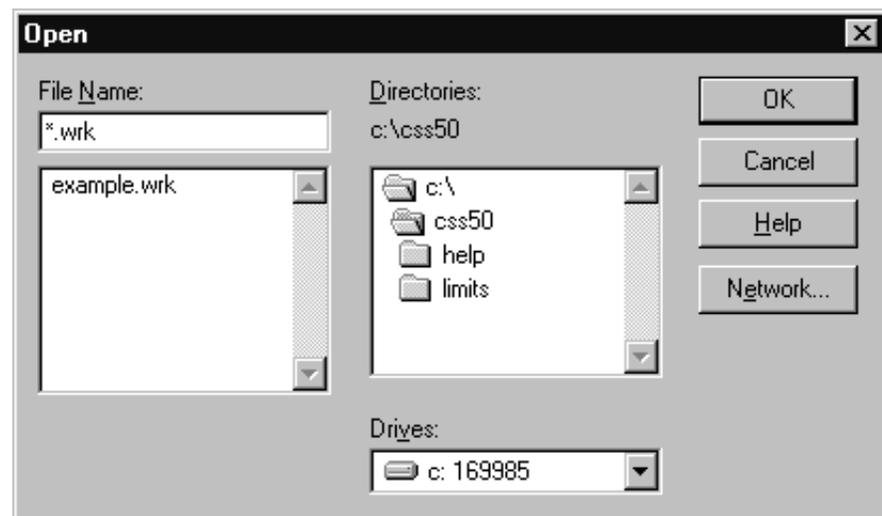
Figure 3–6: Open dialog box

Save   The Save command saves the changes made to the present worksheet.

Save As   The Save As command saves the present worksheet under a new name. The worksheet name has the same naming restrictions as any other MS-DOS file (no more than 8 characters; some names such as LPT1 are not allowed; etc.) See Figure 3–7 for an example of the dialog box. Notice that existing worksheet names appear in gray.
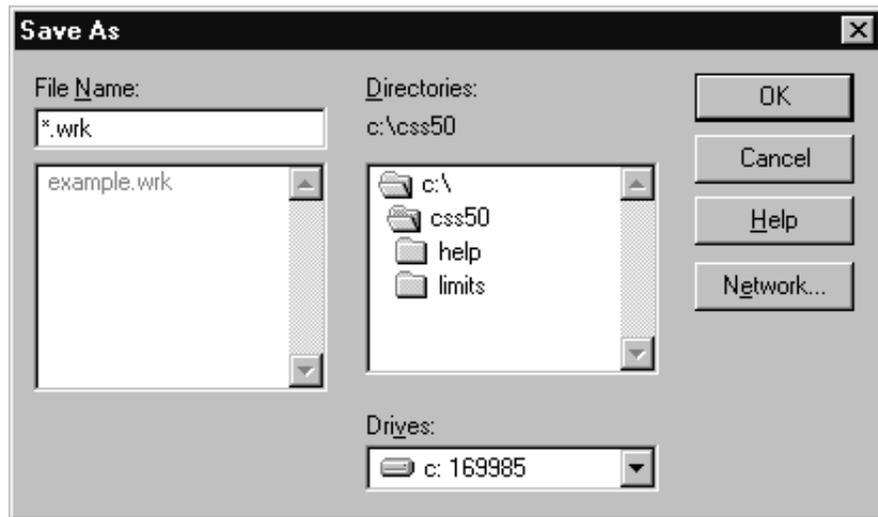
Figure 3–7: Save As dialog box

Import   The Import command brings in data from another source (see Figure 3–8). An acceptable source is results data previously exported from the CSS50 software. Import can be used to load data collected at remote locations such as a 2714/2715 UDP (User Defined Program). If the Channel Table or Site does not match the present worksheet, you are asked if you want to continue importing the results. If the Channel Table does not match and you continue to import, the results will map to the Channel Number, skipping any channel not in the worksheet's Channel Table. If the Site does not match, you have the option to choose if you want to use the worksheet Site or the imported data's Site.

It is good practice to import into a blank worksheet to minimize the possibility of conflicts and unexpected data placement. If you don't write to a blank worksheet, Import will not overwrite your work. History is automatically turned on before an Import takes place, and turned off again when Import is complete. For example, you have data in one cell. Import data into that cell (with Keep only Last Result set in the Preferences menu). Your data is still there and the imported data falls into its place in the history stack (either before or after the current results).

The data is stored in the worksheet according to Date/Time. If the data that you are importing is older than the current data in the worksheet, then the imported data is not visible in the worksheet. It is available in Results Detail with View History turned on.

Any cell that has no results data or is in Error condition does not get imported. Cells that have more than one measurement will have all valid data imported and the Error data results left blank. Also, results from channels that are not in the worksheet's Channel Table are ignored.

The destination channel must also be of the same type (analog or digital) as that of the imported data. For example, suppose the imported data has an Average Power result on channel 63; this means that channel 63 is a digital channel. If channel 63 in the worksheet is an analog channel, the Average Power destination cell is inactive; thus, the channel 63 Average Power result will not be imported.
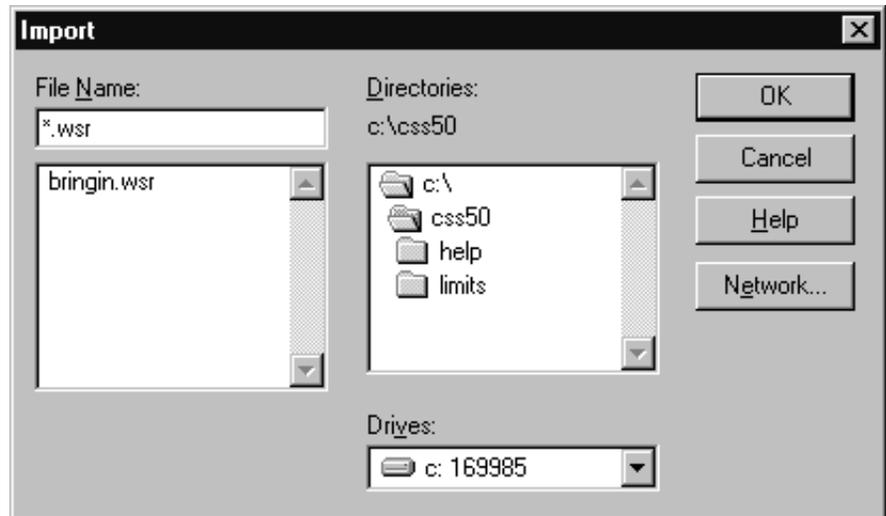
Figure 3–8: Import dialog box

Export The Export command (see Figure 3–9) sends the results worksheet data out to a ".wsr" file, so that other applications, such as Excel, can process the data.
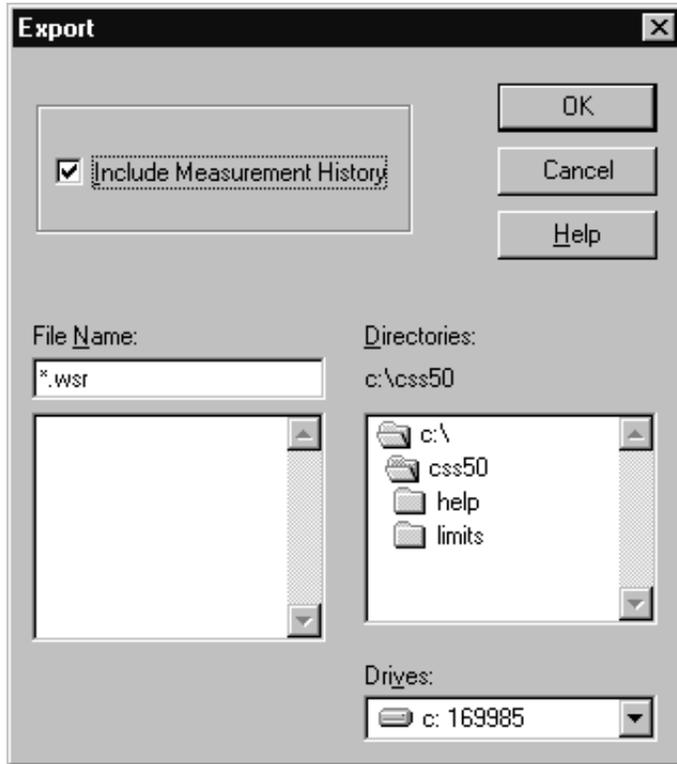
Figure 3–9: Export dialog box

The export file includes all Worksheet Header information.

If only certain cells need to be exported, use Copy (under Edit; see page 3–21) and copy the data to the clipboard.

The main difference between using Copy from the Edit menu (Export Format option) and using Export is that Export sends data to a named file while Copy copies the data to the clipboard.

Print The Print command sends the spreadsheet to the printer. (See Figure 3–10.) Within the Print dialog box, the Setup command button is identical to choosing Print Setup from the File menu.
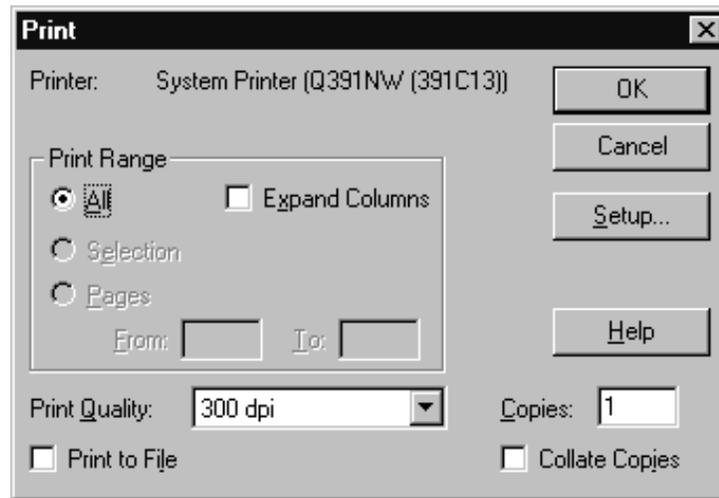
Figure 3–10: Print dialog box

The Print dialog box allows you to choose if you are going to print out the worksheet as it appears in the display or with certain columns expanded to display additional information.

If you do not use the Expand Columns option, the measurement results cells print just as they are shown in the worksheet. The main concern with using this method is that some cells only display PASS, CAUTION, or ALARM. You may need more information.

Printing using Expand Columns fills in all cells with detailed measurements that would otherwise print only pass/fail. The columns that expand are: CSO, CTB, Hum, FCC Baseband, and Waveform Distortion. A concern with using this format is that it produces long reports. (See Table 3–1.) What is printed from each cell in the expanded mode is all of the results that you would normally find in the Results Detail display. Since printing using Expand Columns creates such a long printout, you should use the Measurements and Channels View Filter from the View menu to limit the measurements printed in each worksheet. For example, to print out all of the information from a worksheet in a more useful format, you might print one expanded worksheet of the RF measurements and one for the Baseband measurements.

NOTE. To print some reports (ones with many columns), you may want to change from portrait to landscape orientation. Use the Print Setup command to make the required changes.

You can save paper if you only print out measurements and channels that have results associated with them. Use the View Used command button from

Measurements and Channels dialog box in the View menu. (See page 3–37 for more details.)

Table 3–1: Measurements under each measurement header

Measurement header	Measurements under the measurement header
Visual Carrier Lev (dBmV)	Visual Carrier Level (dBmV)
Visual Carrier Freq (MHz)	Visual Carrier Frequency (MHz)
Aural Carrier Lev (dBc)	Aural Carrier Level (dBc)
Aural Frequency Offset (MHz)	Aural Frequency Offset (MHz)
2nd Aural Carrier Lev (dBc)	2nd Aural Carrier Level (dBc)
2nd Aural Frequency Offset (MHz)	2nd Aural Frequency Offset (MHz)
Average Power (dBmV)	Average Power (dBmV)
Carrier to Noise (dB)	Carrier to Noise (dB)
Desired to Undesired (dB)	Desired to Undesired (dB)
CSO (dBc)	CSO Loc 1 (dBc)
	CSO Offset 1 (MHz)
	CSO Loc 2 (dBc)
	CSO Offset 2 (MHz)
	CSO Loc 3 (dBc)
	CSO Offset 3 (MHz)
	CSO Loc 4 (dBc)
	CSO Offset 4 (MHz)
	CSO Loc 5 (dBc)
	CSO Offset 5 (MHz)
CTB (dBc)	CTB Loc 1 (dBc)
	CTB Offset 1 (MHz)
	CTB Loc 2 (dBc)
	CTB Offset 2 (MHz)
	CTB Loc 3 (dBc)
	CTB Offset 3 (MHz)
	CTB Loc 4 (dBc)
	CTB Offset 4 (MHz)
	CTB Loc 5 (dBc)
	CTB Offset 5 (MHz)
Cross Modulation (dBc)	Cross Modulation (dBc)

Table 3–1: Measurements under each measurement header (cont.)

Measurement header	Measurements under the measurement header
Adjacent Channel Lkg. (dBc)	Adjacent Channel Leakage (dBc)
In-Channel Response (dB)	In-Channel Response (dB)
HUM/LFD (%)	Hum/LFD (%)
	Hum/LFD Fundamental (%)
	Hum/LFD Second Harmonic (%)
FCC Baseband	Chroma-Lum Delay (nS)
	Differential Gain (%)
	Differential Phase (Deg)
Modulation Depth (%)	Modulation Depth (%)
Aural Deviation (kHz)	Aural Deviation (kHz)
Signal to Noise (NTSC)	S/N NTC7 Lum Weighted (dB)
Signal to Noise (PAL)	S/N 567 Lum Weighted (dB)
Waveform Distortion	2T K-factor (%Kf)
	Lum Non-linear Distort (%)

Print Setup   Sets up the printer so that it can properly print worksheets and reports. (See Figure 3–11.) This is identical to the standard Windows' printer setup. Please see the *Windows User's Guide* or on-line Help for more information.
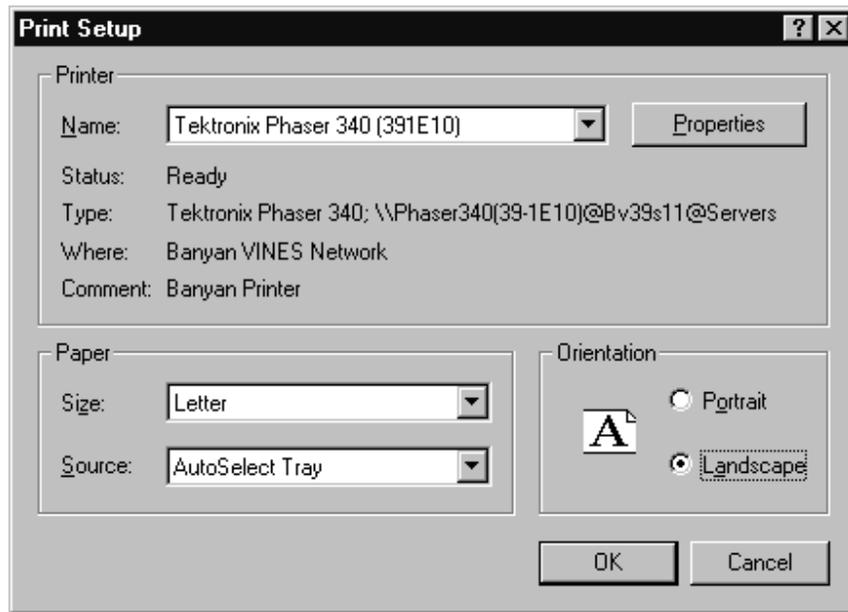
Figure 3–11: Print Setup dialog box

NOTE. Most worksheets and reports are more readable if printed using Land-scape orientation.

Exit   Exit closes the CSS50 application.

Edit

The Edit menu is used to manipulate the contents of selected cells (see Figure 3–12).
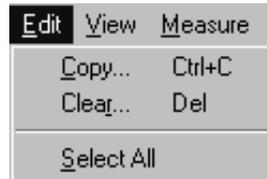
Figure 3–12: Edit menu

Copy   The Copy command (see Figure 3–13) copies the contents of the selected cells to the Windows Clipboard. You are prompted if you want the cells in Export format or As Displayed. If you select Export format, you also have a choice of whether to include the measurement history (if Collect History is selected under Preferences in the Configure menu). In Export format, not only is the displayed cell data copied to the clipboard, but also the Results Detail information. If you chose the As Displayed format, only the data in the selected cells along with the Measurement and Channels Headers are copied to the clipboard. The result of copying one cell with history (using export format) into Word for Windows is given in Table 3–2.
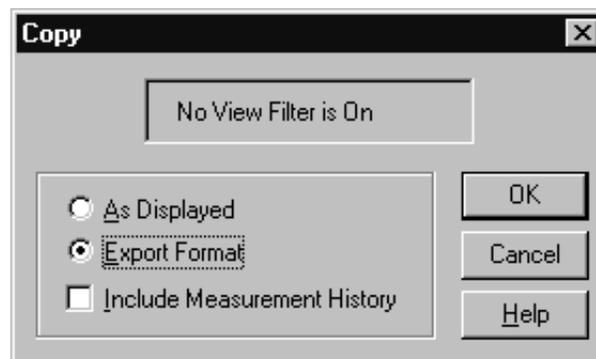
Figure 3–13: Copy dialog box

Table 3–2: The results of copying one cell with history into Word for Windows

Worksheet File	Site												
	Tektronix Beaverton												
Channel Table	Video Standard	Aural Offset											
2715.cht	NTSC	.5											
Channel	Freq	Program	Viol	LL	UL	S/N Weighted (dB)	Viol	LL	UL	Notes	Date/ Time	Test ID
2	.25		**			.8	**				9/7/1997 13:44:35	Training Wheels
2	.25					.2					9/7/1997 13:44:22	Training Wheels
2	.25					.3					9/7/1997 13:44:18	Training Wheels
2	.25					.7					9/7/1997 13:42:53	Training Wheels

Below is a description of how Table 3–2 was created:

1. Select one cell from the worksheet.

2. Choose copy from the Edit menu.

3. Select Export format and include measurement history.

4. Choose OK.

5. Open the desired Word for Windows document.

6. Place the cursor in the desired location in the Word document.

7. Choose Paste from the Edit menu, placing the cell information into the document.

8. Select all of the data that was just pasted into the document.

9. From the Table menu, choose Convert Text to Table.

10. Select "Tabs" as the column spacer.

11. Choose OK.

12. Adjust the column width as necessary.

The As Displayed format only copies the displayed cell contents and Channel and Measurement Headers associated with the selected cells to the clipboard.

The results of copying one cell using the As Displayed format are shown in Table 3–3.

Table 3–3: Results of copying a cell using the As Displayed format

	Carrier to Noise (dB)
2 55.25	41**

Clear The Clear command (see Figure 3–14) deletes the current value and/or all history for the selected cells. There is always a warning to verify that you really want to delete the contents of the cells. Select Cancel if you do not want results deleted.
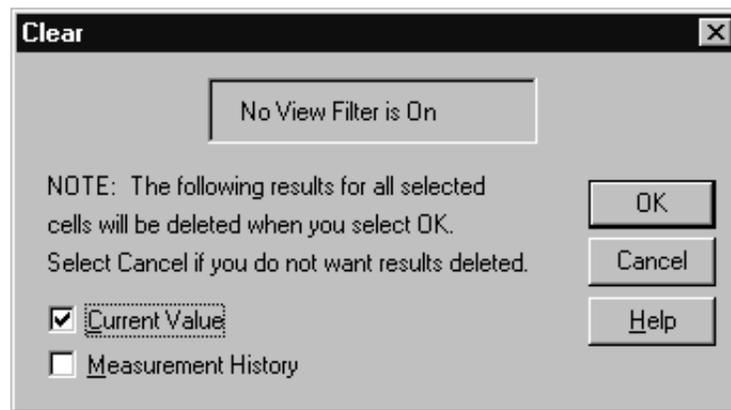
Figure 3–14: Clear dialog box

Select All The Select All command selects all of the cells in the spreadsheet. If you are using a mouse, you can obtain the same results by clicking the left mouse button on the upper left corner of the spreadsheet.

View

The View menu (see Figure 3–15) allows you to see the spreadsheet data presented in several different ways, such as filtered or consolidated into reports.
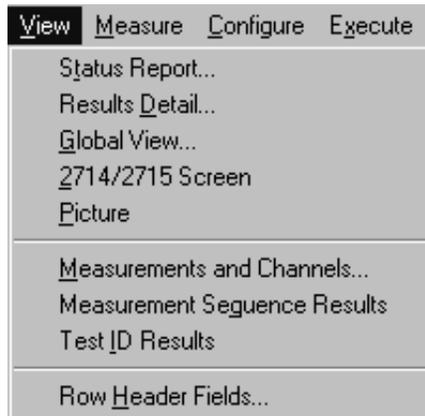
Figure 3–15: View menu

Status Report Choosing Status Report from the View menu (see Figure 3–16) is the same as choosing the Status command button on the Button Bar (see page 3–79). A shortcut for getting to this display is to click the right mouse button on the upper left corner of the spreadsheet. Any of these methods displays the Status Report for the current worksheet.

Figure 3–16: Status Report dialog box

The Status Report lists the extremes for all of the measurement results. It is basically a summary of all Measurement Summaries (see page 3–33). Table 3–4 lists the measurement results given in the Status Report. If there are no results for a measurement, it is skipped in the Status Report. You can limit the channel and measurements in the Status Report by using the View Filters (see *Measurements and Channels* on page 3–37). Optionally, you can include the measurement History.

Table 3–4: The Measurement summaries in the status report

Measurement	Max	Min	Max-Min	Max Dev	Max Abs
Visual Carrier Level (dBmV or dBuV)[1]	x	x			
Visual Carrier Level Diff. (dB)[2]			x		
Variation (dB)[3]	x				
Visual Carrier Level Adj. (dB)[4]	x				
Visual Carrier Frequency (MHz)[5]				x	
Aural Carrier Level (dBc)	x	x			
Aural Frequency Offset (MHz)[6]				x	

Table 3–4: The Measurement summaries in the status report (cont.)

Measurement	Max	Min	Max-Min	Max Dev	Max Abs
2nd Aural Carrier Level (dBc)	x	x			
2nd Aural Frequency Offset (MHz)				x	
Average Power (dBmV or dBuV)[1]	x	x			
Carrier to Noise (dB)		x			
Desired to Undesired (dB)		x			
CSO (dBc)	x				
CTB (dBc)	x				
Cross Modulation (dBc)	x				
Adjacent Channel Leakage	x				
In-Channel Response (dB)	x				
Hum/LFD (%)[7]	x				
Chroma-Luma Delay (nS)	x	x			
Differential Gain (%)	x	x			
Differential Phase (Deg)	x	x			
Modulation Depth (%)	x	x			
Aural Deviation (kHz)	x	x			
S/N NTC7 Lum Weighted (dB)[8]		x			
S/N 567 Lum Weighted (dB)[9]		x			
2T K-factor (%Kf)	x				
Lum Non-linear Distortion (%)	x				

[1] **Absolute power level.**

[2] **Difference between the maximum and minimum values of all channels measured.**

[3] **If four or more Visual Carrier Levels measurements are being summarized for a single channel. Difference between the maximum and minimum values for the several measurements done over time on a given channel. (Variation appears only if Collect History is selected in the Preferences dialog box.)**

[4] **Maximum difference between two adjacent channels. See Summary Limits Group (page 2–78) to set limits, a definition of Adjacent, and types of channels to include.**

[5] **Maximum deviation from nominal as defined in the Channel Table. The value shown is the measured frequency, the violated limits are shown as nominal + limit offset as defined in the Limits file. Variations always include both current and all previous data, whether history is selected or not.**

[6] **Maximum deviation from nominal as defined in the Channel Table.**

[7] **Total Hum.**

[8] **NTSC systems only.**

[9] **PAL systems only.**

The Result column (see Figure 3–16 on page 3–25) is color coded in the same manner as the worksheet: green is passing; yellow is Caution; red is Alarm; and white is no limits defined or no measurements made. Blue is an error.

Blue indicates that an error occurred in the measurement, which makes the results invalid. The cell will be blue only if all of the results in the cell are invalid. If any of the results are valid, the cell takes on the color for the worst case valid measurement. If a measurement is invalid, <undefined> is loaded in the Results Displays.

The * and ** column replaces the color information on a monochrome display. The * symbol means that the measurement was in the caution range, while ** means that the measurement was in the alarm range.

Violated Lower Limit is filled in with the lower limit if it was exceeded or Violated Upper Limit is filled in with the upper limit if the Upper limit was exceeded.

The 24 Hour Carrier Level Variation is in the Status Report only if there are at least 4 measurements in the last 24 hours on a single channel, whether or not history is selected. This is the channel with the worst 24 hour Carrier Level variation.

There are two command buttons: View Violations and View Results Detail. The View Violations display is explained next. (Results Detail is explained on page 3–28.)

View Violations. Display the View Violations dialog box by choosing the View Violations command button on the Status Report. This dialog box shows all the measurements and channels that are in error. (They have either a single or double asterisk, * or **.) Only the individual measurements are in this display (see Figure 3–17). Passing measurements are not shown here, as they are not in violation.

This display is sorted by Alarm/Caution, then channel number, and finally by measurement.

This display can also go to the Results Detail display for a selected cell by using the View Results Detail command button or clicking the right mouse button on the desired cell. (Results Detail is explained on page 3–28.)

Return to the Status Report dialog box by choosing the Close command button.

Figure 3–17: View Violations dialog box

Results Detail   The Results Detail dialog box (see Figure 3–18) displays more information about a measurement than can be contained in a cell on the spreadsheet. For example: the FCC Baseband measurement only gives a pass/caution/alarm indication on the spreadsheet. The Results Detail display lists all the measurements under this group, along with the numerical results. You can also view the history of the measurement by using the Next and Previous command buttons.
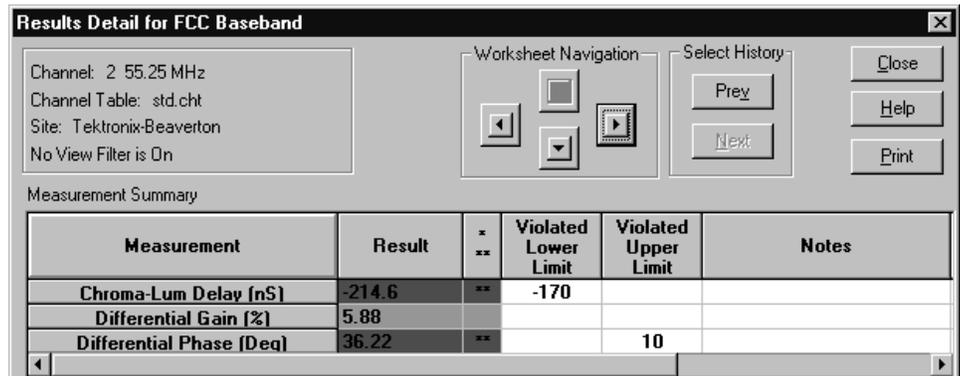
Figure 3–18: Results Detail dialog box

You can get to the Results Detail dialog box many ways:

- Click the right mouse button on a cell in the spreadsheet.

- Press the Results command button on the Button Bar.

- Choose Results Detail from the View menu.

- Click on View Results Detail in the Status Report.

- Click the right mouse button on a cell in the Status Report.

- Click on View Results Detail in View Violations.

- Click the right mouse button on a cell in View Violations.

- Click on View Results Detail in the Global View.

- Click the right mouse button on a cell in Global View.

Worksheet Navigation. Use the four arrows to move around in the spreadsheet while staying in Results Detail. The type of View Filter determines where the channel and measurement the navigation arrows take you. You cannot move to a channel or measurement that is not displayed.

- Up arrow. Moves up a channel while staying in the same measurement.

- Down arrow. Moves down a channel while staying in the same measurement.

- Left arrow. Stays in the same channel but moves left one measurement.

- Right arrow. Stays in the same channel but moves right one measurement.

Select History. Use these command buttons to display measurement history:

■ Prev. This command button selects the previous measurement results (history).

■ Next. This command button selects the next most recent measurement (history).

Measurement Summary. The summary lists the results for each measurement:

■ Measurement. Lists the measurements contained under the Measurement Header in the spreadsheet. For example, FCC Baseband has Chrominance to Luminance Delay, Differential Gain, and Differential Phase.

■ Result. Lists the numerical results of a measurement.

■ * and **. Flags whether a given measurement was in violation of either the Caution limits (*) or the Alarm limits (**).

■ Violated Lower Limit. If the results violated the lower limit defined by the Limits file, then the limit is printed in this column.

■ Violated Upper Limit. If the results violate the upper limit defined by the Limits file, then the limit is printed in this column.

■ Date/Time. Date and time of the measurement. This comes from the internal clock of the instrument making the measurement, unless the measurement is invalid (an error), then the time comes from the PC. (Use the horizontal scroll bar to view this column.)

■ Test ID. The Test ID when the measurement was made. (Use the horizontal scroll bar to view this column.)

■ Notes. Notes from the test equipment about how a measurement was made. One note is available for each cell, so it is replicated for each measurement within a cell. Table 3–5 lists the notes that the instruments (either the 2714 or 2715 or the VM100 or VM101) place in the Notes field for each of the different measurements.

If the measurement cannot be made, an event number (error number) appears in the notes field. If the event came from the 2714 or 2715 then it would appear as "`2714/2715 E:###`". If the event came from the VM100 or VM101 then it would appear as "`-###; message`". Use the event number to cross reference to the instrument documentation (the *2714 and 2715 Spectrum Analyzer Programmer* manual or the VM100 or VM101 Video Measurement Set user manual) to find out what failed during the measurement.

If an RS-232 communication error occurs, a communication error is reported in the Notes field. If a communication error occurs during a measurement,

the spreadsheet cell turns blue (error). In the Results Detail view, the measured value may be displayed but it might not be correct.

Table 3–5: Explanation of the Notes Field

Measurement	Notes field[1]	Meaning
Visual Carrier Level	sddd.d dB ext ofst [2]	External attenuation or amplification in dB
Visual Carrier Frequency	—	
Aural Carrier Level	—	
Aural Frequency Offset		
Average Power	sddd.d dB ext ofst [2]	External attenuation or amplification in dB
Carrier to Noise	sddd.dZ ddd.dZ ∗ [3]	Noise Bandwidth and Noise Frequency (in Hz) and 2 dB flag [4] G if gated
Desired to Undesired	ddd.dZ ∗[3]	Noise Bandwidth (in Hz) and 2 dB flag
CSO	#Loc ∗ #Loc ∗ Example: 1A∗ 3R∗ 4R∗ [3] #Loc #Loc #Loc ∗ [3]	Stored only Interactive only Beat number, location type, and 2 dB flag [4]
CTB	Same as CSO	Beat number, location type, and 2 dB flag
Cross Modulation	—	
Adjacent Channel Leakage	∗ [3]	2 dB flag
In-Channel Response [5,7]	sddd.dZ/sddd.dZHz G### [6] Fd:dd Test Signal	Min/Max Frequency Offset and signal type (RF) G### is the line number of the test line Field, Line #, and Test Signal (BB)
Hum/LFD[7]	60 Hz (or 50 Hz) Power RF (or BB) ZCR pulse not found	Line Frequency and signal type (RF or baseband) The Zero Carrier Reference Pulse was not found. See page 1–7 for information about setting the ZCR pulse.
FCC Baseband [7]	fd:dd Test Signal Example: F1:16 FCC Compos	Any note is from the VM100 or VM101 Field 1, Line 16, Test signal is FCC Composite
Modulation Depth	—	
Aural Deviation	—	
Signal to Noise [7]	fd:dd Test Signal Example: F1:16 FCC Compos	Any note is from the VM100 or VM101 Field 1, Line 16, Test signal is FCC Composite

Table 3–5: Explanation of the Notes Field (Cont.)

Measurement	Notes field[1]	Meaning
Waveform Distortion [7]	fd:dd Test Signal	Any note is from the VM100 or VM101
	Example: F1:16 FCC Compos	Field 1, Line 16, Test signal is FCC Composite

[1]   s = sign (+ or –)
    d = decimal number
    Z or ZHz = frequency (Hz) in engineering notation (kHz or MHz)
    # = 1 –5
    Loc = A(bsolute) or R(elative)
    RF or BB = signal Type RF or Baseband

[2]   This note is not available for stored measurements retrieved from the 2714 or 2715.

[3]   If an asterisk is present, the measured value is within 2 dB of the analyzer noise floor. The actual value may be better than the one indicated.

[4]   The results of the Carrier to Noise and CSO measurements may be 1000 larger than measurement. This indicates that the Quiet Lines measured were no longer quiet at the end of the test. The true answer may be better than the one indicated.

    The results of the Carrier to Noise and CSO measurements may also be 2000 larger than measured. This indicates that the mixer level was raised above the optimum to allow the video modulator board to work. The true answer may be better than the one indicated.

    Note also that the 1000 and 2000 flags are additive, so the result could be 3000 above what was measured indicating that both conditions occurred.

[5]   The RF or BB signal type indicator may not appear if both offset frequencies are negative. The In-Channel Response Frequency range is not available for stored measurement retrieved from the 2714.

[6]   G### is only inserted from the 2715.

[7]   The most common error messages from the VM100 or VM101 are:
    –322   Improper VITS   Using the VM100/VM101 manual VITS mode, the line entered to make a measurement on did not contain a proper VITS signal.
    –325   No VITS signal   Using the VM100/VM101 auto VITS mode, an appropriate VITS signal on this channel could not be found.
    –361   No Video   The VM100/VM101 was not able to lock onto a video signal. Check the cable connections.

Exceptions. The Results Detail display generally only gives the results for a single cell; the exception to this is for the first six cells: the Visual and Aural Carrier Levels and Frequencies. These measurements are grouped together into one Results Detail display. Also if there are four or more of the measurements made in the last 24 hours, then a summary of the Carrier Levels measurements over the past 24 hours is provided. The summary includes the total visual carrier level variation and each individual measurement value with a Time/Date stamp. (See Figure 3–19.)

Visual Carrier Level Variation (24 Hour)					
Measurement	**Result**	**x xx**	**Violated Lower Limit**	**Violated Upper Limit**	**Notes**
Variation (dB)	52	xx		8	
Visual Carrier Level (dBmV)	4.7				
Visual Carrier Level (dBmV)	45.7				
Visual Carrier Level (dBmV)	56.8				
Visual Carrier Level (dBmV)	12.9				

Figure 3–19: The 24 hour Carrier Summary display

Measurement and Channel Summaries

Select an entire spreadsheet row or column, click on Results (or click on the Measurement or Channel Header with the right mouse button), then you can access special displays called Channel Summary (row selected) or Measurement Summary (column selected). (A right mouse click on the Channel or Measurement Header name also accesses these reports.) These displays are a cross between Status Reports and Results Detail displays. The View Filter affects these displays. Information in hidden rows or columns is not contained in the Measurement or Channel Summaries. The results contained in the measurement history can also be incorporated into these summaries.

The Channel Summary (see Figure 3–20) displays violations for the selected channel. You can move to a different channel by using the Select Channel navigation arrows. You can also select a cell and view the Results Detail for the measurement for that channel.

Channel Summary for Channel 3

Channel Table: std.cht
Site: Tektronix-Beaverton
No View Filter is On

Select Channel

View Results Detail   Close

☐ Include History   Help

Print

All Violations

Channel	Notes	Date Time	Test ID
3		06/19/1997 06:57:31	Learner's Remote
3		06/19/1997 06:57:31	Learner's Remote
3		06/19/1997 06:57:31	Learner's Remote
3		06/19/1997 06:57:32	Learner's Remote
3		06/19/1997 06:57:33	Learner's Remote
3		06/19/1997 06:57:35	Learner's Remote
3		06/19/1997 06:57:37	Learner's Remote

Visual Carrier Level Variation (24 Hour)

Measurement	Result	x xx	Violated Lower Limit	Violated Upper Limit	Notes
Variation (dB)	52	xx		8	
Visual Carrier Level (dBmV)	4.7				
Visual Carrier Level (dBmV)	45.7				
Visual Carrier Level (dBmV)	56.8				
Visual Carrier Level (dBmV)	12.9				

Figure 3–20: Example of a Channel Summary

The example in Figure 3–20 gives the Visual Carrier Level Variation. This information is always present in a Channel Summary if there are four Visual Carrier Level measurements in a 24 hour period, regardless of whether or not Include History is selected.

The Measurement Summary (see Figure 3–21) gives the Status Report information for just the selected measurement. You can move to other measurements using the Navigation arrows. The View Violations command button will go to the View Violations display for only the selected measurement. The View Results Detail command button goes to the Results Detail display for the selected channel measurement. If the Include History check box is checked, then the worst case of the measurement in this worksheet is displayed. Otherwise, the worst-case current measurement results are displayed.

Measurement Summary for Carrier Levels and Frequencies

Channel Table: std.cht
Site: Tektronix-Beaverton
No View Filter is On

Navigation

View Results Detail
View Violations
☐ Include History

Close
Help
Print

Channel	Measurement	Type	Result	x xx	Violated Lower Limit	Violated Upper Limit
40	Visual Carrier Level (dBmV)	Max	68.5			
96		Min	-9.5			
40, 96	Visual Carrier Level Diff. (dB)	Max-Min	78.1	xx		10
3	Variation (dB)	Max	52	xx		8
96, 97	Visual Carrier Level Adj. (dB)	Max	68.6	xx		3
81	Visual Carrier Frequency (MHz)	Max Dev	565.54837	xx		565.275
14	Aural Carrier Level (dBc)	Max	-1.9	xx		-6.5
45		Min	-39.8	xx	-17	
28	Aural Frequency Offset (MHz)	Max Dev	4.480173	xx	4.495	
None	2nd Aural Level (dBc)	Max				
None		Min				
None	2nd Aural Frequency Offset (MHz)	Max Dev				

Figure 3–21: Example of a Measurement Summary

Global View   This is a condensed view of the standard spreadsheet display (see Figure 3–22). All of the measurements and channels are in the same order as the spreadsheet. This view allows for a quick overview of how the system is doing as a whole. White blocks indicate that there are no defined limits, or no measurement results. Green blocks mean the measurement is passing. Yellow blocks indicate that the measurement is in the Caution range. Red blocks indicate that the measurement has violated the Alarm limits. Blue means that an error occurred in making the measurement and the results are invalid. Gray means that the measurement cannot be performed on that channel (analog–only measurement cannot be taken on digital channels and digital–only measurements cannot be taken on analog channels). See Appendix C, *Channel Table Editor*, for more details on this Channel Table field.

Figure 3–22: Global View dialog box

Access the Result Detail display along with the Channel and Measurement Summaries (see page 3–28) from the Global View by selecting a cell, a row, or a

column and clicking the right mouse button. You could also use the View Results Detail command button.

Access the Status Report from the Global View by clicking the right mouse button at the intersection of the Measurement and Channel header.

2714/2715 Screen   The 2714/2715 Screen command displays a copy of what is presently on the 2714 or 2715 screen. This includes displayed traces and readouts.

NOTE. Place the analyzer in Single Sweep mode and be sure the current sweep is complete before requesting a 2714/2715 Screen. If the analyzer is not in Single Sweep mode and the current sweep is not complete, there may be inconsistencies between the marker readout text, the marker positions, and the waveforms, because the analyzer updates these values asynchronously with respect to the query for the values.

Picture   The Picture command displays a video picture of what is presently on a given channel (shows a complete active picture). To use the Picture command, you must have a video board and software driver installed in your PC. (The CSS50 package does not include the video board and driver). This default driver is the Video Blaster. The video board and driver must be active when the Picture command is called. The displayed picture is the video source connected to the video board.

The CSS50.INI file must be edited if any driver other than the Video Blaster is used. The line "Video Driver=XXXXXX" in the CSS50.INI file must have the XXXXXX changed to match the title that appears in your video driver's Title Bar.

Any other details about the operation of Picture are controlled by your video driver.

Use ALT+TAB to jump between the video driver application and CSS50 application.

Measurements and Channels   This is a View Filter that determines which channels and measurements are on the spreadsheet (see Figure 3–23). There are All and Select options for both measurements and channels. You can select whatever measurements and channels are important to view at the moment without "losing" any measurements. This allows you to configure the spreadsheet to show only what you need to see at the moment and eliminate all extraneous information without deleting anything. All View Filters are mutually exclusive.
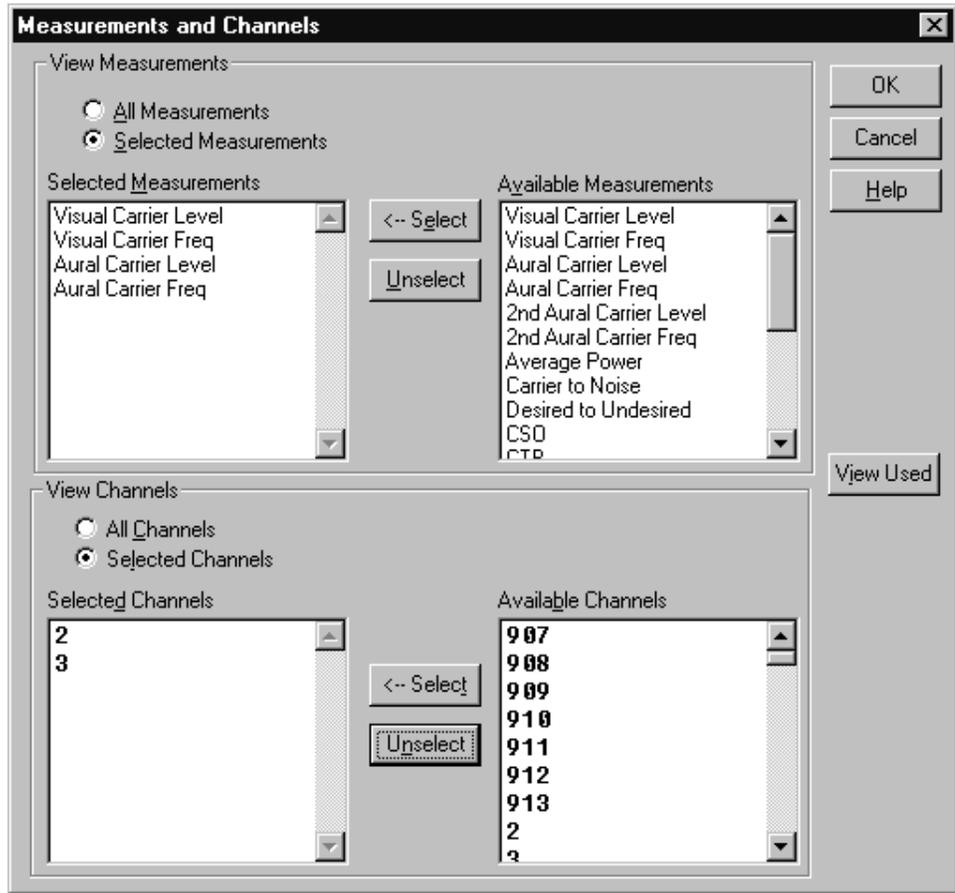
Figure 3–23: Measurements and Channels dialog box

The View Filter status box displays the following message when this filter is on: View Selected Filter is On. The spreadsheet looks like Figure 3–24 when the Measurement and Channel View Filter is selected as shown in Figure 3–23.

Figure 3–24: Worksheet with Measurements and Channel View Filter on

To turn this View Filter off, select the Measurements and Channels command from the View menu.

NOTE. You cannot select a measurement or channel unless it is viewable. Therefore, if only some channels and measurements are in view and the Select All command (from the Edit menu) is used, the "hidden" measurement cells are not selected. The exception to this rule is the Carrier Level and Frequency measurement. If you select one of the six measurements, all these measurements are made, whether they are visible or not.

If you select all channels, by clicking on one of the Carrier Level and Frequency Measurement headers and the Average Power header, you are still given the option to do a Carrier Survey, even if all channels are not viewable.

When you return to All for the Measurements and Channels options, the list of selected measurements and channels remains. You can toggle between the filtered and full display quickly.

If the View Filter is on and you are trying to Import results that would enter a hidden row or column, you are warned that all of your imported results are not immediately viewable.

You can switch to any other View Filter by choosing it from the View menu.

There is a special command button, View Used, for this dialog box. This command allows you to automatically filter out all channels and measurements that have no results. View Used is particularly useful for printing out worksheets.

Use this command button immediately before printing reports to minimize the amount of blank space.

NOTE. The View Filters also affect the Status Report, Measurement Summaries, Channel Summaries, and the Results Detail display.

Measurement Sequence Results

When this filter is active, only those measurements made with the most recent Measurement Sequence execution are on the spreadsheet. The measurements displayed are not necessarily the current Measurement Sequence. (See page 3–53 for how to define a Measurement Sequence.) For example, if you have defined and executed a Measurement Sequence that only measures the Signal to Noise Ratio for four selected channels, then only those four channels' S/N measurements are displayed on the spreadsheet when this View Filter is on. The rest of the measurements are only hidden. They are still part of the worksheet and are available as soon as the Measurement Sequence Results filter is switched off.

If no measurements on the worksheet are associated with a Measurement Sequence, then you will get a warning message (see Figure 3–25) telling you that there are no measurement results associated with a Measurement Sequence and therefore the View Filter will not be applied.
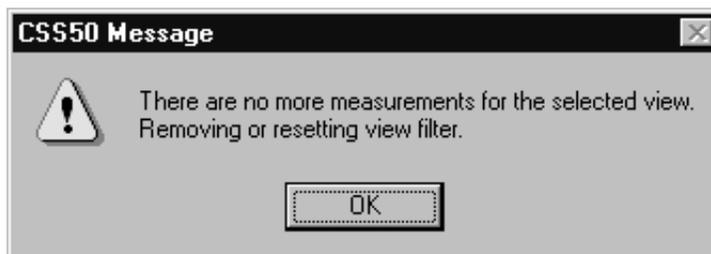
Figure 3–25: No measurements for sequence message

The View Filter status box has the message View Sequence Filter is On, and there is a check mark in front of Measurement Sequence Results in the View menu. To turn the View Filter off, just choose Measurement Sequence Results from the View menu again, or choose any other View Filter.

The following is a list of commands that are disabled when the Measurement Sequence View Filter is on:

■ Import, from the File menu

■ Current Selection from the Measure menu and Meas Sel from the Button Bar

- Double click on a cell to make a measurement

- Get Stored Results from the 2714 or 2715, from the Measure menu

These commands are disabled because the results are not immediately viewable.

You can switch to any other View Filter by choosing it from the View menu.

Test ID Results   This View Filter only displays cells that have measurements tagged with the currently displayed Test ID. Therefore, if only a few of the measurements on the current worksheet were made under the current Test ID, then only those few measurements are displayed. If no measurements on the worksheet were made under the current Test ID, then a warning message is displayed that there are no measurements with that Test ID and will not apply the Test ID filter. (This is the same warning message as Measurement Sequence Results.) Select the Test ID using the Configure menu. (See page 3–48.)

If the Test ID View Filter is on, then the View Filter Status Box contains the message View Test ID View Filter is On. There is also a check mark in front of Test ID Results in the View menu. To turn the Test ID View Filter off, choose Test ID Results from the View menu again or choose another View Filter.

If the Test ID Results View Filter is on and you are trying to import results that would enter a hidden row or column, you are warned that all of your imported results are not immediately viewable.

You can change which Test ID you are viewing. In the Test ID dialog box, select one of the Used in Worksheet Test IDs and the View Filter will automatically switch to that Test ID. You can only select from the Used in Worksheet Test IDs.

Row Header Fields   The Row Header Fields command allows you to select what information is given in the Channel Header (see Figure 3–26). You can display the Channel Number & Tag, the Program Name, and/or the Channel Frequency. You must select at least one. Initially all three options are always chosen. When all three are selected, the Header column width is slightly larger than if one or two of the options is selected.
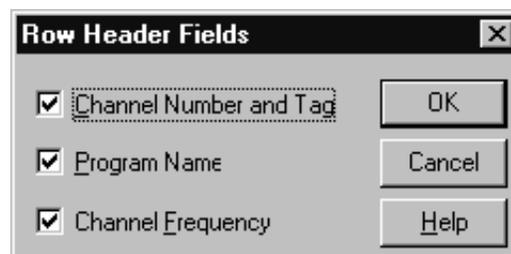
Figure 3–26: Row Header Fields dialog box

Measure

The Measure menu (see Figure 3–27) is used to make measurements, tune the demodulator and the 2714 or 2715 to a specific channel, and recall results from 2714 or 2715.

Measure Configure Execute Help

   Current Selection
   Sequence

   Tune to Channel

   Get Stored Results from 2714/2715...
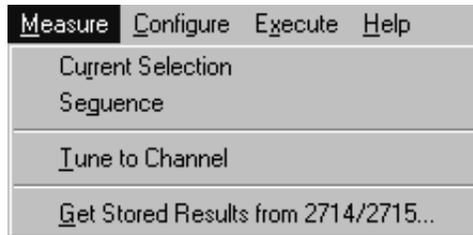
Figure 3–27: Measure menu

Current Selection
The Current Selection makes the measurements for the selected cells. This is true with the exception of the Visual, Aural Carrier Level, and Frequency cells. Select any of these measurements and all six are performed for the channel. To perform all measurements for a single channel, select the entire row. Conversely, if you want one measurement for all channels, select the entire column. This is the same as Meas Sel from the Button Bar (see page 3–79). For a single cell, you can achieve the same result as Current Selection by double-clicking on the cell with the left mouse button. For a single row or column, you can achieve the same results by double-clicking on the measurement or channel name.

If at least one of the Carrier Levels and Frequencies measurements (Visual Carrier Levels, Visual Carrier Frequency, Aural Carrier Level, Aural Frequency Offset, Second Aural Carrier Level, or Second Aural Frequency Offset) is selected for all analog channels and Average Power measurements are selected for all digital channels, a message is displayed to allow the user to do a Carrier Survey instead of a series of individual carrier level and Average Power measurements.

The advantages and disadvantages of selecting the Carrier Survey are listed below.

Advantage:

■ Faster measurement execution

Disadvantages:

■ The Pause For New Channel preference will not pause for new channels within the survey

■ All measurement results are tagged with the same date and time

■ The CSS50 display is not updated until the survey is finished. (You might think that the software has crashed.)

Whether you select individual measurements or the survey, the measurements will still be made in the mode specified in the Measurement Setups dialog box.

Sequence

If a Measurement Sequence is available (see *Measurement Sequence*, page 3–53), then selecting Sequence performs the Measurement Sequence. This is the same as clicking on Meas Seq in the Button Bar (see page 3–79).

Note that the computer is not strictly dedicated to the CSS50 application while performing a Measurement Sequence. You can switch to other applications during a Measurement Sequence.

Tune to Channel

Tune to Channel tunes the demodulator and the 2714 or 2715 to the selected channel. It will also set the Channel Table in the instrument, if it is not already active. Select the channel by selecting a cell from the desired channel, then choose Tune to Channel. It will report an error if the channel cannot be tuned.

Get Stored Results from 2714/2715

Use this menu item (see Figure 3–28) to retrieve all the CATV measurement results currently stored in the NVRAM of the connected 2714 or 2715. The Notes field is not as complete as if it was done directly from the CSS50 application. The results are not erased from the 2714 or 2715 memory after they are retrieved. Results can only be erased using specific 2714 or 2715 front panel keystrokes.

Figure 3–28: Get Stored Results dialog box

Since results from the 2714 or 2715 can come from multiple Channel Tables and Sites, the measurement results are grouped according to Site and Channel Table name. Ordering within the directory is alphabetical by site name. Count is the actual number of measurement results contained in the group specified by the Site and Chan Table columns. Results File is the name of the results file to which a particular group of results has been exported.

Use the Export Results command button to export the results from the instrument's NVRAM into a results file, *.wsr. Use the Import Results command button to bring the results file into a CSS50 worksheet.

When the Export is complete there will be a ".wsr" file in the Results File Column in the Get Stored Results dialog box. This file is ready to be imported into a worksheet.

The Import Results dialog box (see Figure 3–29) gives several choices of how the data is imported into the worksheet:

- Exact channel information match only

- Use blank channel information as wildcards

- Verify mismatched channel information

Figure 3–29: Import Results dialog box

The top two choices will automatically load as much data as it can without any user intervention. The last option allows you to check and verify all information before loading any data.

Generally, when using Import to get results from an instrument into a worksheet, "Use blank channel information as wildcards" is the most efficient option since there will rarely be an exact match. This is because the instrument only stores the channel number as the channel ID, while the CSS50 software stores the channel number, program name, and nominal visual carrier. You could go through and verify each channel if desired, to make sure that the channel numbers match, but generally, the "Use blank channel information as wildcards" selection would be the most efficient way to load the data, because it will reduce further prompts.

NOTE. If any of the results that you are importing contain results from CSO or CTB measurements, you may end up importing more results than listed in the results column because of the way that the CSS50 software distinguishes results (with older firmware versions of the 2714).

Any cell without results data or in Error condition will not be imported. Cells that have more than one measurement will have all valid data imported and the Error data results left blank.

If you are Importing results from a Channel Table that has mismatches in the Channel Header, you are flagged during the import process so that you are aware

of any problems and can fix them. The only exception to this is if the Channel Number does not exist in the import worksheet Channel Table. In this case, you are warned at the end of the import process with the message given in Figure 3–30.

If you are importing results from a channel table that has mismatches in the channel header, no destination channel, an inactive destination cell, or a user requested skip, you are warned at the end of the import process as shown in Figure 3–30.
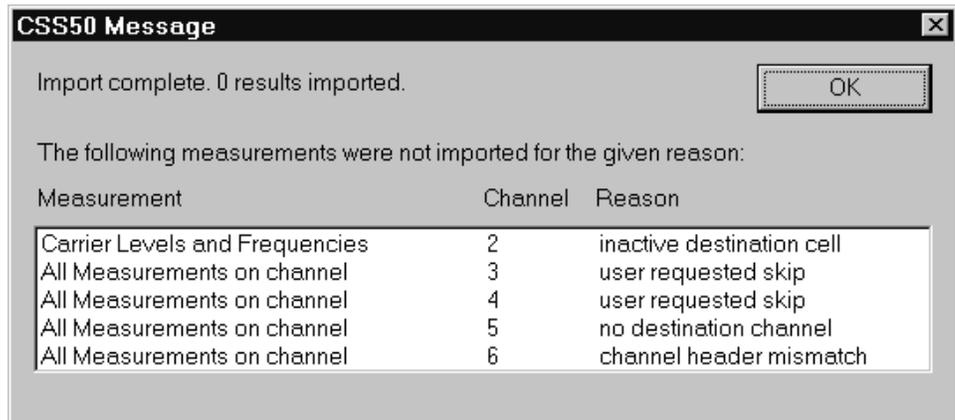
Figure 3–30: Imported results messages

Configure

Use the Configure menu (see Figure 3–31) to set up worksheets, measurements, and test equipment.
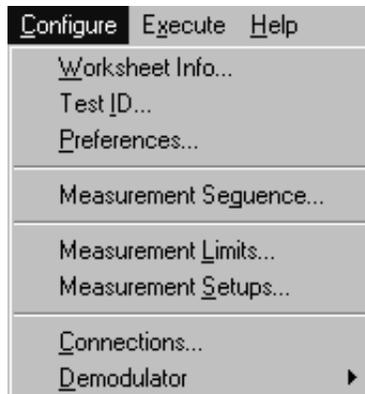
Figure 3–31: Configure menu

Worksheet Info   Worksheet Info edits the Site, Channel Table, and description for the current worksheet. (See Figure 3–32.)
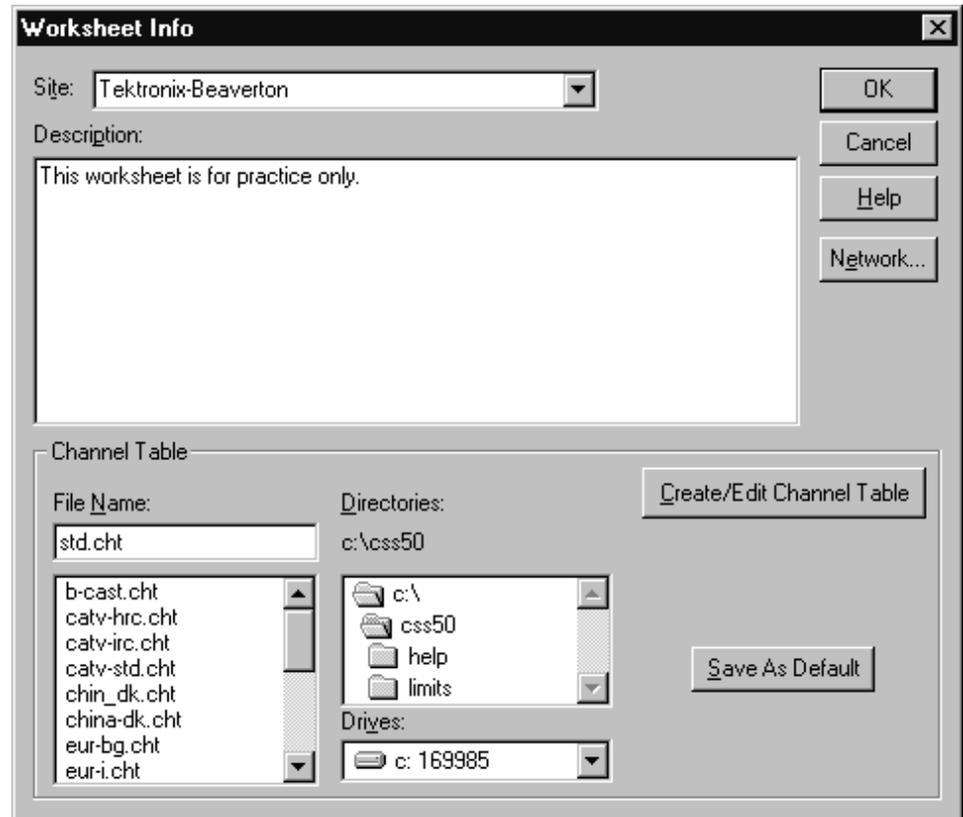
Figure 3–32: Worksheet Info dialog box

Site. The Site combo box defines the location where the measurements are made. Only one Site is allowed per worksheet. If you change the Site, you are queried whether you want to save the worksheet under a new name or overwrite the old Site name. If you choose to overwrite the old name all of the history previously collected under the old Site name will now be tagged with the new Site name.

<Undefined> is an acceptable Site name. "Blank" (nothing in the field at all) is not acceptable and an error message will appear if "blank" is in the Site field.

Channel Table. This associates a certain Channel Table with a worksheet. The Channel Table is a list of all of the available channels, their frequency, their program name, etc. Only one Channel Table is allowed per Worksheet. If you want to change the Channel Table, start with an empty worksheet.

Create/Edit Channel Table. See *Appendix C: Channel Table Editor* for more information and warnings on editing the Channel Table. Edit the Channel Tables with caution.

Save as Default. This command button allows you to save the Channel Table in the combo box as the default Channel Table. When starting the CSS50 software, the default Channel Table loads automatically.

Description. Put any information that might be relevant into this field. How the measurements were made, the serial numbers of the equipment used, who did the measurements, and the dates are examples of things that you might want to load into this field. This field is limited to 500 characters. Carriage returns are allowed.

Use this field is to meet the FCC documentation requirements by entering:

- Identification of instruments (make, model, most recent calibration date)

- Description of procedures utilized

- Statement of qualifications of the person(s) performing the tests

The field is fully editable. The information can be copied to the clipboard using CNTRL+INSERT or CNTRL+C, and then attached to the worksheet name cell in Excel as a text note.

Test ID   The Test ID is the name of the operator, test point, or whatever identifier is most appropriate. The Test ID dialog box consists of a combo box and a list box: All Test IDs and Worksheet Test ID (see Figure 3–33). All Test IDs lists all of the Test IDs that have ever been used. Enter new Test IDs here. Worksheet Test IDs are the IDs used in the current worksheet.
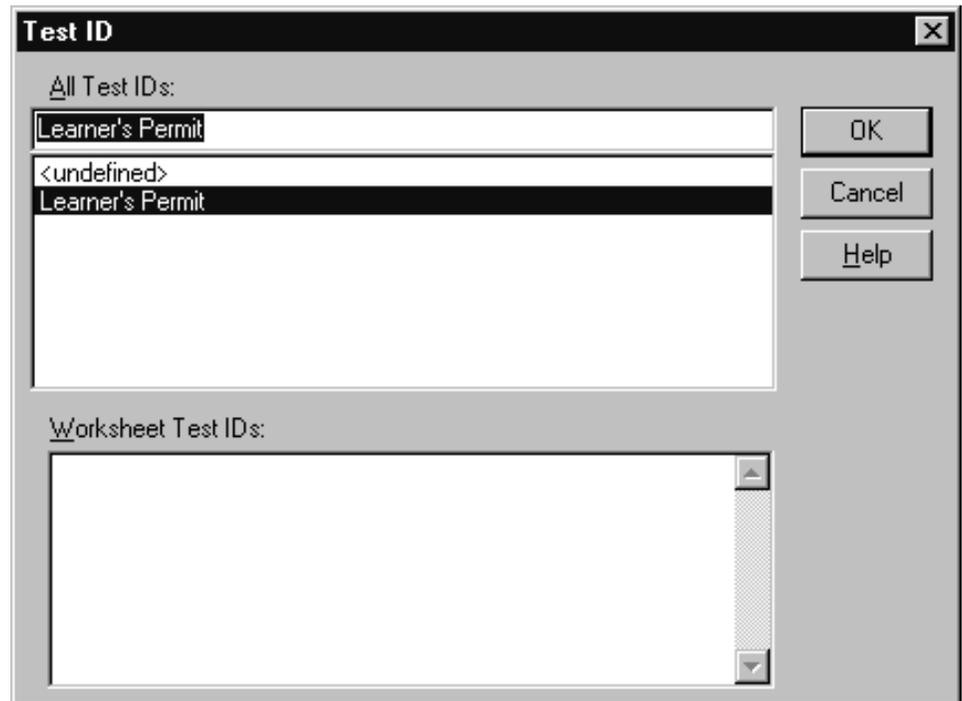
Figure 3–33: Test ID dialog box

Use this field to flag certain measurements and then use the View Filter, so only cells that have a measurement associated with the selected Test ID are displayed. To quickly change the Test ID you want to filter, select the Test ID from the Worksheet Test IDs group and the View Filter will switch to that Test ID.

Also change the Test ID using the Test ID command button from the Button Bar (see page 3–79).

Preferences   This dialog box (see Figure 3–34) sets the way results are collected and displayed.
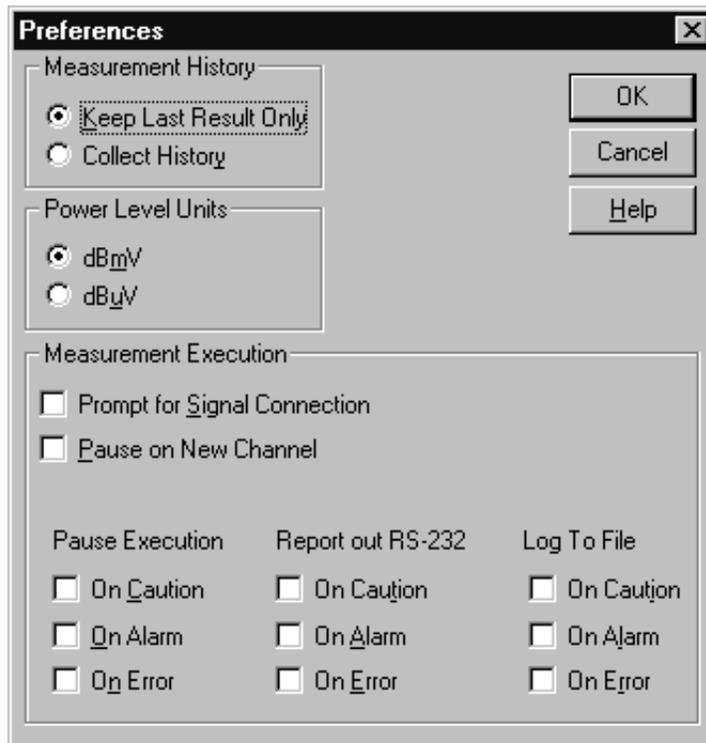
Figure 3–34: Preferences dialog box

Measurement History. History (the previous measurement results) can be collected or only the most recent measurement saved. If History is turned off and then turned back on, the measurements are saved beginning with the current measurement displayed on the worksheet. Turning history off does not erase any results previously stored when history was on. For an illustration of how this works, see Figure 3–35.
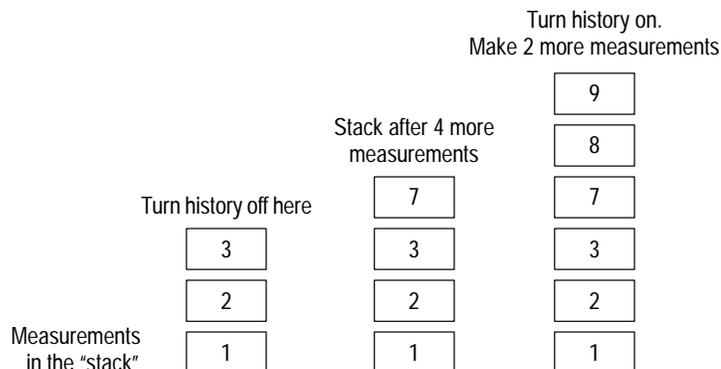
Figure 3–35: How measurements are saved when history is turned off, then on

Power Level Units. Choose one of the two formats to display the Visual Carrier Level and Average Power units:

dBmV [referenced to 1 mV (10^{-3} volts)]
dBuV [referenced to 1 μV (10^{-6} volts)]

Measurement Execution. These check boxes determine whether the measurements will stop and flag certain conditions, and how you are notified of these conditions.

The first option is Prompt for Signal Connection. It is used if your RF feed to the test equipment is on a switch instead of a splitter. If it is on a switch you need to be able to switch the RF feed into either the 2714 or 2715 or the demodulator as needed. If this check box is selected, the measurement order is changed from: left to right then top to bottom — to: left to right and top to bottom for the RF measurements, then left to right and top to bottom for the baseband measurements. This is done so that the user only has to change the connection once.

The second option is Pause on New Channel. It is used when the pre-selector needs to be tuned for each channel or some other manual adjustment needs to be done whenever the channels change.

The third option is a set of options that determine how non-standard conditions are treated. The "non-standard" conditions include: measurement results in Caution, Alarm, or Error. The Caution and Alarm conditions are set through the limits file that is associated with a particular channel. The Limit files are set using the Measurement Limits command from the Configure menu. See page 3–61 for more information on the Measurement Limits. The Error condition only occurs if a measurement cannot be made or the measurement results from the instrument are out of the allowable range.

The ways these "non-standard" conditions could possibly be handled include: Report out RS-232, Pause Execution, or Log To File.

Pause Execution is appropriate for user interactive measurements. You can watch it make the measurements and fix any problems that occur. If the measurements are stopped because this is set, you have two choices: OK continues making measurements; Cancel drops out.

Report out RS-232 sends a Violation Report out the Com Port (set with Connections, from the Preferences menu). Based on the conditions selected, the following information is sent: Site Name, Measurement Column Heading, Channel Number/Tag/Program, Condition Type (alarm, caution, or error), and Date/Time. This information is tab delimited and packetized ASCII text.

Each Violation Report is one packet and each packet consists of three items:

- A one byte Byte Count that gives the number of bytes in the Violation Report (this includes the checksum)

- The Violation Report in ASCII text

- A one byte checksum (simple addition, including the Byte Count)

An additional reporting option is to broadcast a message to all active Windows applications that have registered to intercept this message. This function allows you to perform additional processing when an alarm occurs. To receive these messages, your Windows application must execute the following line of code:

```
nAlarmMsg = RegisterWindowMessage("WM_POST_ALARM_MESSAGE");
```

The variable nAlarmMsg represents the unique Windows message number. To intercept it, simply test for nAlarmMsg in the main messaging loop. The severity of the nonstandard condition is indicated by msg.lParam (Action = 1, Alarm = 2, and Error = 3). For example:

```
MSG msg;
while (getMessage(&msg, NULL, 0, 0))
{
    if (msg.message == nAlarmMsg)
    {
        if(msg.lParm == 1)
            MessageBox(NULL, "Got Caution Message!", NULL, MB_OK);
        else if (msg.lParm == 2)
            MessageBox(NULL, "Got Alarm Message!", NULL, MB_OK);
        else if (msg.lParm == 3)
            MessageBox(NULL, "Got Error Message!", NULL, MB_OK);
    }
}
```

NOTE. This option is not "set" anywhere. It is automatically available whenever an alarm, caution, or error result is encountered.

Log To File sends a violations report to a log file when any of the selected conditions occur. The Log To File options are only available if a worksheet has been named and saved. See *Setting Up a Worksheet* beginning on page 2–13.

The log file is created in the same directory as the worksheet file and has the same base name, with a ".log" extension. The same information, in the same format, is logged to the file as is sent out RS-232.

The information recorded in the log file is the site name, measurement name, channel (number, program, and tag), condition encountered (alarm, caution, or

error), and the date and time it occurred. Each of these fields is tab separated to allow easy importing into other applications such as Excel.

To help ensure that measurements are being performed, a keep-alive message is also logged. This message is logged whenever a group of measurements (including a single measurement) is started and whenever an iteration of a measurement sequence is started. This is useful when performing repetitive measurement sequences.

Measurement Sequence   The Measurement Sequence dialog box (see Figure 3–36) allows you to program a set of measurements to execute every time you click on Meas Seq in the Button Bar or Measurement Sequence is chosen from the Measure menu. This allows a regularly used set of measurements to be invoked with a single mouse click instead of running each individual measurement one at a time.
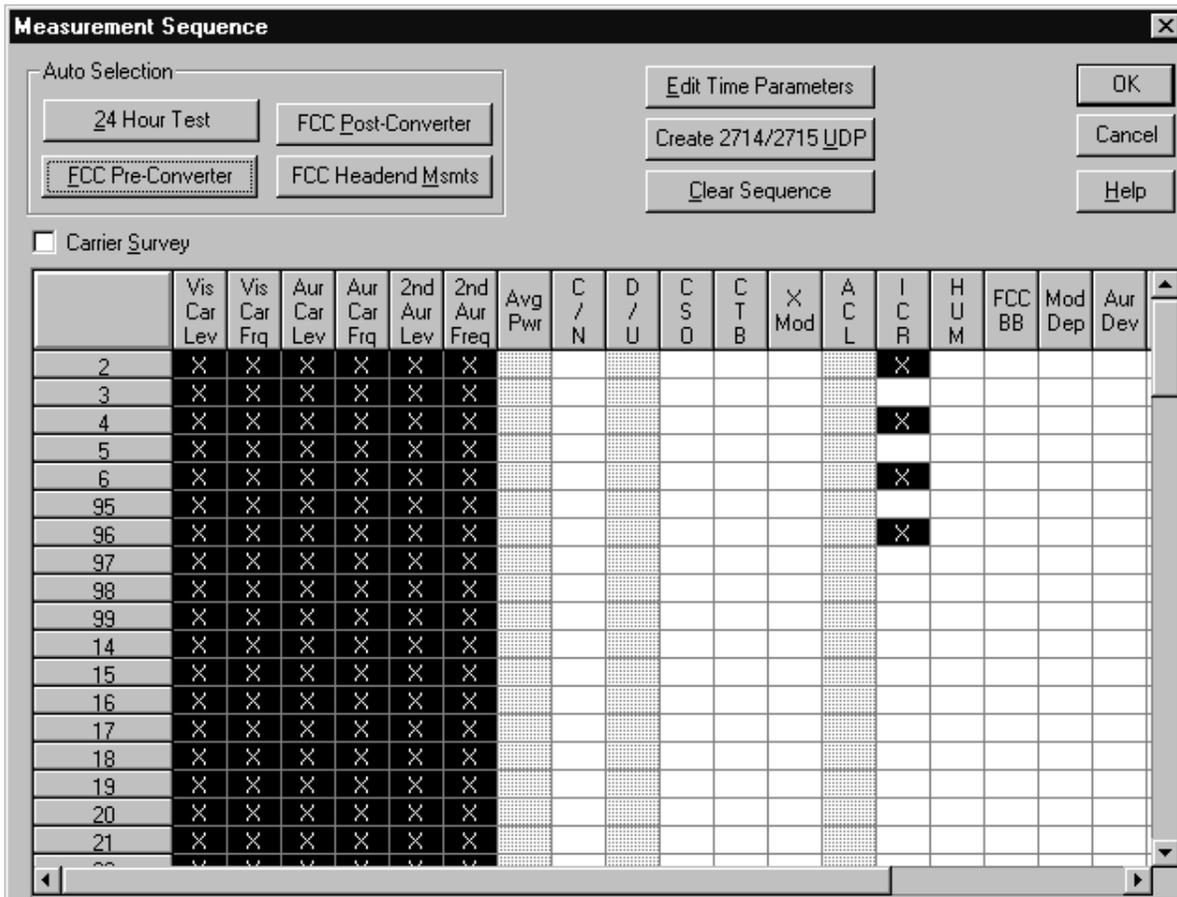
Figure 3–36: Measurement Sequence dialog box

An "X" in a cell indicates that the channel and measurement are part of the Measurement Sequence. Select as many or few cells as needed to define a Measurement Sequence. When all of the desired cells are selected, click on OK; the Measurement Sequence immediately loads and is stored under the Meas Seq command button.

To speed up the process for likely groups of measurements, there are four predefined "Auto Selection" Measurement Sequences. They are: FCC Pre-and Post Converter Measurements, FCC Headend Measurements, and 24 Hour Measurements. If the country is not United States, then only the 24 Hour Test automatic selection button is available. The Country is selected from the Windows Control Panel, International icon. Table 3–6 give a list of measurements included in the Auto Selections. These measurements are executed on the channels selected by the user. Whenever one of these Auto-Selection command buttons is chosen, it loads the measurements immediately into the Measurement Sequence. Additional measurements are then added or deleted as desired by the user to complete a Measurement Sequence.

Table 3–6: Auto Configure buttons

	Auto Selection Button			
Channels	FCC pre-converter	FCC post-converter	FCC headend	24 hour test[1]
All Channels	Carrier Levels and Frequencies	Carrier Levels and Frequencies	Carrier Levels and Frequencies	Carrier Levels and Frequencies
Selected Channels	ICR	Carrier to Noise Ratio	FCC Baseband	
Selected Channels		CSO		
Selected Channels		CTB		
Selected Channels		Cross Modulation		
Selected Channels		Hum		

[1] The 24 Hour Test automatically includes 4 repetitions at 6-hour intervals.

There are other options on the Measurement Sequence menu. They include: Carrier Survey, Edit Time Parameters, Generate 2714/2715 UDP, and Clear Sequence.

If you want to make the Carrier Levels and Frequencies measurements (Visual Carrier Levels, Visual Carrier Frequency, Aural Carrier Level, Aural Frequency Offset, Second Aural Carrier, and Second Aural Frequency) and Average Power

measurements on all channels in the Measurement Sequence, then you can do a Carrier Survey instead of a series of individual measurements. (A carrier survey makes all of the Aural, Visual Carrier Amplitude, Frequency, and Average Power measurements first, and then the rest of the selected measurements.) The advantages and drawbacks of selecting the Carrier Survey are as follows:

Advantages:

- Faster measurement execution

- Smaller UDP size (allows for more measurements to be loaded before exceeding the UDP size limit)

Disadvantages:

- The Pause For New Channel preference will not pause for new channels within the survey

- All measurement results are tagged with the same date and time

Whether you select individual measurements or the survey, the measurements will still be made in the mode specified in the Measurement Setups dialog box.

The Edit Time Parameters dialog box tells the sequence when to start, and how many times to run. (See Figure 3–37.)
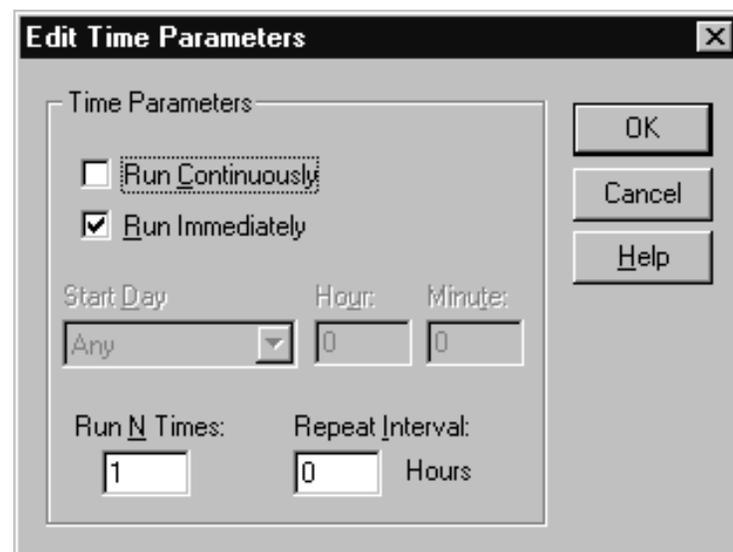
Figure 3–37: Edit Time Parameters dialog box

Run Continuously runs the Measurement Sequence in an infinite loop. It runs through the entire Measurement Sequence and then starts over again until you click on Cancel.

Run Immediately starts the Measurement Sequence whenever the Meas Seq command button (or equivalent) is chosen.

If the Run Immediately check box is not selected, then the Start Day needs to be selected from the list box. Your options are Any or a particular day of the week. Any means "today."If running continuously, Any means "every day." If a specific day of the week is selected, then the Measurement Sequence will not start until the computer's internal clock reaches that day. Enter the starting Hour and Minute (in 24-hour time) that you want it to start in the Hour and Minute text box.

Please note that the Start Time is only defined by the internal clock for the PC running the CSS50 software, if the Measurement Sequence is run directly from CSS50 application. If a UDP is generated and the Measurement Sequence is run from a remote location, then the internal clock of the 2714 or 2715 is used as the timing reference. (All time/date stamps for a measurement are from the internal clock of the 2714 or 2715.)

Use the Run N Times text box, if you want the Measurement Sequence not to run continuously. You enter the number of times in the Run N Times text box and the Repeat Interval in its text box. If you only want the sequence to run once, enter "1" in the Run N Times box and "0" in the Repeat Interval text box.

If you are running a Measurement Sequence several times and the Measurement Sequence is longer than the Repeat Interval, the Measurement Sequence will simply start the next run as soon as the previous one completes.

The Repeat Interval must be an integer number of hours. The Repeat Interval counts from the Measurement Sequence start time.

Create 2714/2715 UDP. If a Measurement Sequence is being defined for a 2714 or 2715 to use at a remote location, then you use the Create 2714/2715 UDP (User Defined Program) command button. This command button converts the CSS50 Measurement Sequence into a UDP and immediately loads it into the 2714 or 2715. The instrument can then use the UDP to make measurements later at a remote location. You can load the results back into the CSS50 application using the Get Stored Results from 2714/2715 command (located in the Measure menu, see page 3–43).

Up to nine UDPs can be stored in each 2714 or 2715. If the 2714 or 2715 will not load a UDP, it may already have nine UDPs. The CSS50 software allows up to 28 characters with no commas or semicolons for the UDP title (see Figure 3–38).
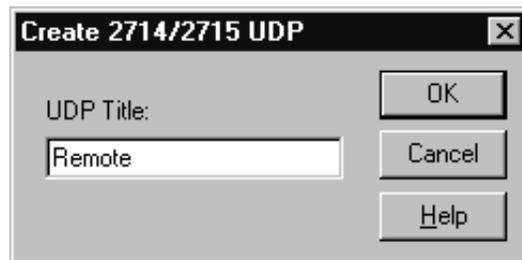
Figure 3–38: Generate 2714/2715 UDP dialog box

When running a UDP, the preferred amplitude units may not be reflected on the 2714 or 2715 display. This does not make a difference, since the units convert to the desired value when the results load into the CSS50 worksheet.

Be careful when defining a Measurement Sequence for a UDP. Remember that all header and preference information must be correct before the UDP is loaded into the 2714 or 2715. The information sent includes: Channel Table, Measurement Execution Preferences (Pause on New Channel and Prompt for Signal Connection), Start Day and Time, Repeat Interval, Repeat Count (Run N Times), Visual Carrier Level Units, and Test ID (Operator Field in the 2714 or 2715 –not editable at the 2714 or 2715). See Table 3–7 for a complete list of what is loaded into the 2714 or 2715 when a UDP is created.

Table 3–7: Information loaded into the 2714 or 2715 when creating a UDP

Parameter	Where edited
Title	User entered at the Generate 2714/2715 UDP prompt
Run N Times	The Edit Time Parameters, from the Measurement Sequence dialog box (Configure menu)
Repeat Interval	
Start Day	
Start Hour	
Start Minute	
Prompt for Signal Connection	From Preferences in the Configure menu
Pause on New Channel	From Preferences in the Configure menu
Channel Table	From the Worksheet Info dialog box (Configure menu)
Test ID	From Test ID (Configure menu)
Reference Level Units	From Preferences (Configure menu)
Measurement Setups[1] (for the individual channels)	From the Measurement Setups dialog box (Configure menu)
Power Line Frequency	From the Measurement Setups dialog box (Configure menu)

Table 3–7: Information loaded into the 2714 or 2715 when creating a UDP (cont.)

Parameter	Where edited
External Attenuation/Amplification	From the Measurement Setups dialog box (Configure menu)
Preamp	From the Measurement Setups dialog box (Configure menu)
Measurements on Channels[2]	From the Measurement Sequence (Configure menu)

[1] If the Gated option is selected for one or more measurements and you are trying to send the UDP to a 2714, you are given a warning that Gated is not supported and allowed to continue with Auto mode.

[2] If a digital measurement (Average Power, Desirable to Undesirable, or Adjacent Channel Leakage) is selected for one or more channels and you are trying to send the UDP to a 2714 or 2715 that does not support digital measurements (2715 if firmware version 09-30-94 or earlier) a warning is displayed that digital measurements are not supported and will be skipped.

If a baseband video test is selected and you are trying to create a 2714/2715 UDP, you are given a warning that baseband video tests (FCC Baseband, Signal to Noise, and Waveform Distortion) are not supported by the 2714 or 2715, and the tests will be skipped.

If any of the conditions described in notes 1 or 2 were encountered, a summary of the warnings is displayed. You will be given a chance to continue generating the UDP, with the problems handled as indicated, by selecting OK, or you can quit generating the UDP by selecting CANCEL.

UDPs are not necessarily fully automated. Many measurements require operator input to collect results. Table 3–8 lists the measurements that may require operator input, the type of input required, and the circumstances that cause the operator input to be required.

Table 3–8: Measurements that require operator input

Measurements	Operator input required			
	Turn carrier on/off	Turn modulation on/off	Turn scrambling on/off	Turn test signal on/off
Carrier to Noise	1		6	
Desired to Undesired	2			
CSO	1		6	
CTB	1			
Cross Modulation		2		
ICR			6	5
Hum/LFD			3 (RF only)	

Table 3–8: Measurements that require operator input (cont.)

Measurements	Operator input required			
	Turn carrier on/off	Turn modulation on/off	Turn scrambling on/off	Turn test signal on/off
Modulation Depth			3 (RF only)	
Aural Deviation				
Audio				7
ALL			4	
Explanations	1. Auto with Pause or Single Sweep only. (Change via Measurement Setups from the Configure menu.)			
	2. Always prompts.			
	3. Only prompts if the channel is flagged as scrambled in the Channel Table.			
	4. Always prompts you to turn off scrambling as soon at it reaches a measurement that requires the scrambling turned off. Will also prompt you to turn the scrambling back on after making all measurements for that channel.			
	5. Only if this measurement is not made using Gated.			
	6. Only if this measurement is made using Gated and the channel is flagged as scrambled in the channel table.			
	7. Audio measurements may require that the ASG100 Test Sequence be started.			

To generate a user defined program (UDP) that will run unattended, select the measurement modes shown in Table 3–9. Desired to Undesired and Cross Modulation always require user intervention; they cannot be run unattended in a UDP.

Table 3–9: Modes for unattended UDPs

Measurement	Mode
Carrier Levels and Frequencies	Any mode
Average Power	Accurate Amplitude
Carrier to Noise	Auto or Gated[1]
CSO[2]	Auto[3] or Gated[1]
CTB	Auto[3]
Adjacent Channel Leakage	Any mode
In-Channel Response	Gated[4]
Hum/LFD	Any mode[4]

Table 3–9: Modes for unattended UDPs (cont.)

Measurement	Mode
Modulation Depth	Any mode[4]
Aural Deviation	Any mode

[1] For Gated mode to work without user intervention in Carrier to Noise and CSO measurements, the channel must not be scrambled. If the channel is scrambled, Carrier to Noise and CSO must be run in Auto mode to avoid user intervention.

[2] On digital channels, CSO and CTB always run in Auto with Pause mode. This mode requires user intervention. To avoid user intervention, make sure CSO and CTB are not selected for digital channels.

[3] Measure Beat in an empty adjacent channel.

[4] If the channel is scrambled, ICR, Hum/LFD, and Modulation Depth cannot be run without user intervention.

The selected Channel Table must exist in the instrument when the UDP is run or an error message will occur. The Channel Table is not loaded into the instrument by the UDP. Use the Channel Table Editor to load the Channel Table into the instrument. (See *Appendix C: Channel Table Editor.*)

The Site is not part of the UDP and it is the operator's responsibility to correctly load it into the instrument before the UDP is run. This way the same UDP can be run at several Sites.

Measurement Sequences in Non-US Countries. If you are using the CSS50 software in a country other than the U.S., your Measurement Sequence dialog box will probably look different. See Figure 3–39. (The operating country is defined in the Regional Setting Properties specified in the Window Control Panel.) The differences are due to FCC (a US regulatory body) requirements. If you want to use the FCC Auto Selection buttons, change your country to United States, delete the CSS50.ini file, and restart the CSS50 application.

NOTE. Deleting the CSS50.ini file allows the software to create a new .ini file to update the decimal symbol used to display measurement values.

For example, setting the Regional Setting to the United States produces values displayed as 1234.00. *Regional Settings for many countries other than the Untied States produces values displayed as* 1234,00.
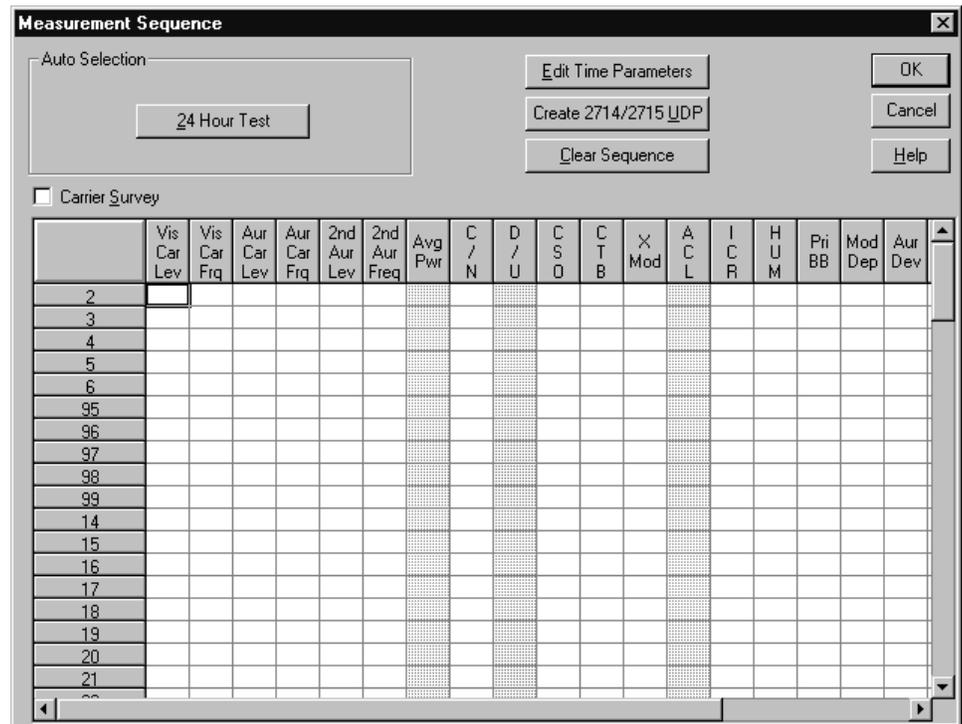
Figure 3–39: Measurement Sequence dialog box (non-U.S.)

Measurement Limits
The Measurements Limits file defines the alarm and caution levels for the measurement results. There are two default Limits files (ntsc.lim and pal.lim) that come with the CSS50 application, but you can edit the files to conform to your needs. Each channel can have a different Limits file assigned (for example, one for premium channel, one for local, and one for cable access) or one Limits file for all the channels. Attach a Limits file to a channel using the <--Select Limits File command button. See Figure 3–40.
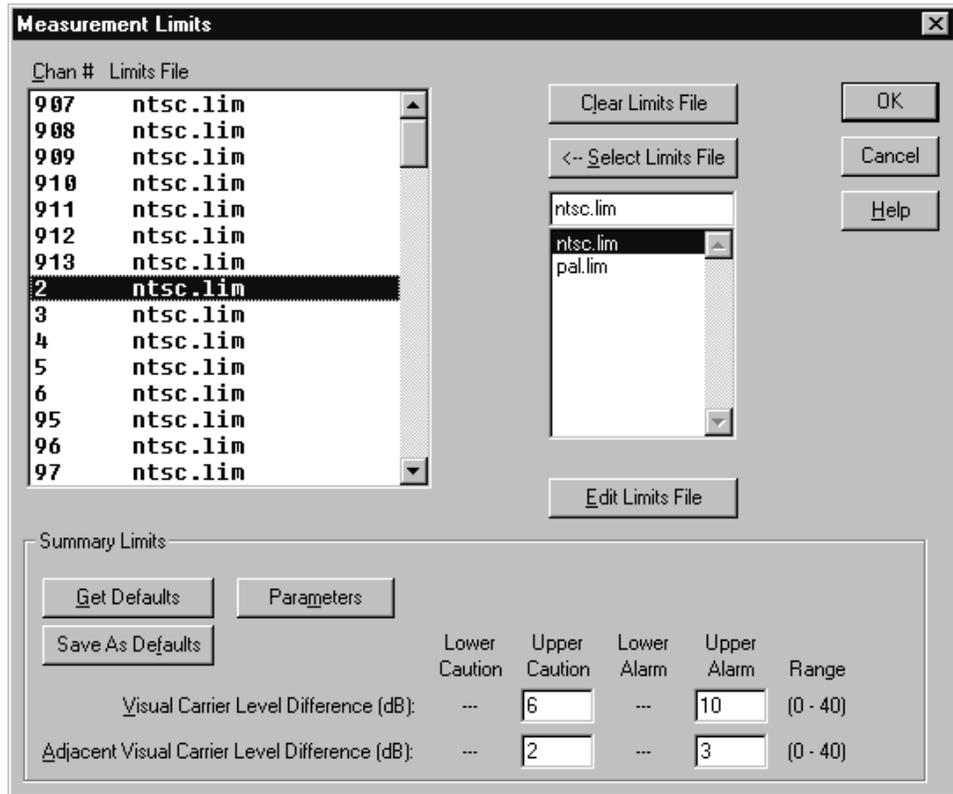
Figure 3–40: Measurement Limits dialog box

Clear Limits File. The Clear Limits File command button removes the limits file from selected channels. You can still make measurements and save results without a Limits file, but there will be no Caution, Alarm, or Passing flags in the results. As soon as a Limits file is attached to a channel all of the measurement results made for that channel are flagged according to that Limits file.

<--Select Limits File. This command button attaches the selected Limits File in the Limits file combo box to the selected channel. All results for that channel are flagged according to the new Limits file (including all history).

Edit Limits File. This command button allows you to edit the selected Limits file from the Limits File list box shown in Figure 3–41.

CAUTION. Any changes made by editing a Limits file affect all worksheets using that Limits file, not just the current worksheet.

Figure 3–41: Edit Limits File dialog box

The dialog box "Edit Limits File - ntsc.lim" contains the following table:

	Range Lower Limit	Alarm Lower Limit	Caution Lower Limit		Caution Upper Limit	Alarm Upper Limit	Range Upper Limit	Units
Visual Carrier Level	-10						70	dBmV
Visual Carrier	-300	-25	-5		5	25	300	kHz
Vis. Car. Level Variation	0				5	8	40	dB
Aural Carrier Level	-40	-17	-14		-9	-6.5	0	dBc
Aural Frequency Offset	-20	-5	-3		3	5	20	kHz
2nd Aural Carrier Level	-40	-17	-14		-9	-6.5	0	dBc
2nd Aural Freq Offset	-20	-5	-3		3	5	20	kHz
Average Power	-20						70	dBmV
Carrier to Noise	10	43	45				70	dB
Desired to Undesired	10	35	40				70	dB
CSO	-80				-54	-51	-20	dBc
CTB	-80				-54	-51	-20	dBc
Cross Modulation	-80				-54	-51	-20	dBc
Adj. Channel Leakage	-80				-45	-40	-20	dBc
In-Channel Response	0				1.5	2	8	dB
Hum/LFD	0				2	3	15	%

NOTE. The Visual Carrier Frequency, Aural Frequency Offset, and Second Aural Frequency Offset are specified in deviation from nominal.

If you want to edit a Limits file, start by making a copy of one of the provided Limits files and edit the copied file rather than the original. To copy the file select the Save As Limits File command button, enter a new name for the Limits file, and then click on OK.

The Limits file must be in the Limits sub-directory under the directory that contains the CSS50.exe file. The Limits file should end in ".lim" to help simplify your file management.

You can't edit the Range columns or the Units (they are shown for user information only), but the Limits columns are editable. Figure 3–42 shows how the Upper and Lower Limits work to flag measurement results. Those four columns are editable, but they are limited by the Range Limits. If you attempt to enter a value outside those defined by the Range limits, you will get an error message, that cell will be highlighted, and it will expect a correct value to be entered.

Aural carrier frequency

Alarm	Caution	Good	Caution	Alarm	Upper and lower limits

−5   −3   3   5   kHz

Carrier to noise

Alarm	Caution	Good	Only lower limits

43   45   dB

ICR

Good	Caution	Alarm	Only upper limits

1.5   2   dB
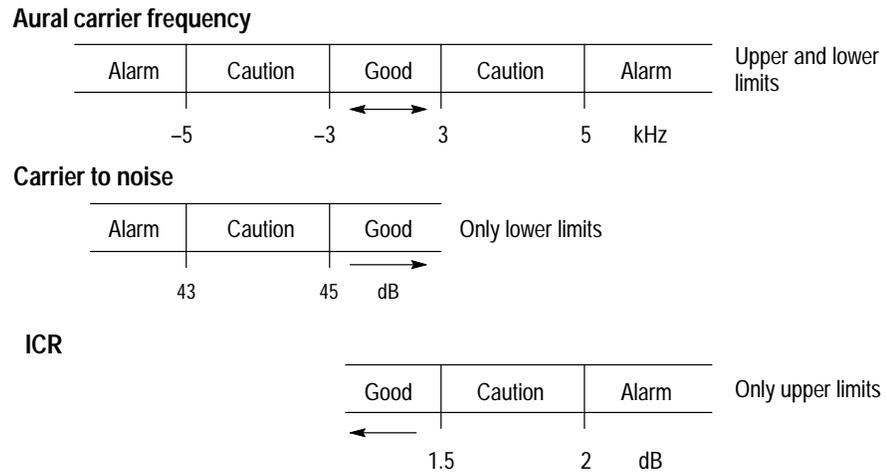
Figure 3–42: How the upper and lower limits work

The command buttons in the Edit Limits File dialog box are:

- Open Limits File. The Open Limits File command button allows you to select a different Limits File to edit. The name of the Limits file that you are currently editing is in the Title Bar for the Edit Limits dialog box.

- Save As Limits File. Save As Limits File command button saves any changes made to the current Limits file (the one whose name is in the Title Bar). Don't forget that any changes made to this Limits file are reflected in every worksheet that uses that Limits file.

- Get Defaults. Get Defaults places all of the default values into the Edit Limits dialog box.

- Save As Defaults (See Figure 3–43). This command button takes all of the current values in the Limits file and saves them to a new Limits file which is then used as the default Limits file. The default Limits file values are loaded into the current Limits file using the Get Defaults command button. It also is used as the Limits file for all channels whenever a new worksheet is defined or you start making measurements without defining any worksheet. This new Limits file can have the same name as the file you were editing but it would help your file management to call it, "Default" or something similar, so that you can remember what you are using as the default Limits file.
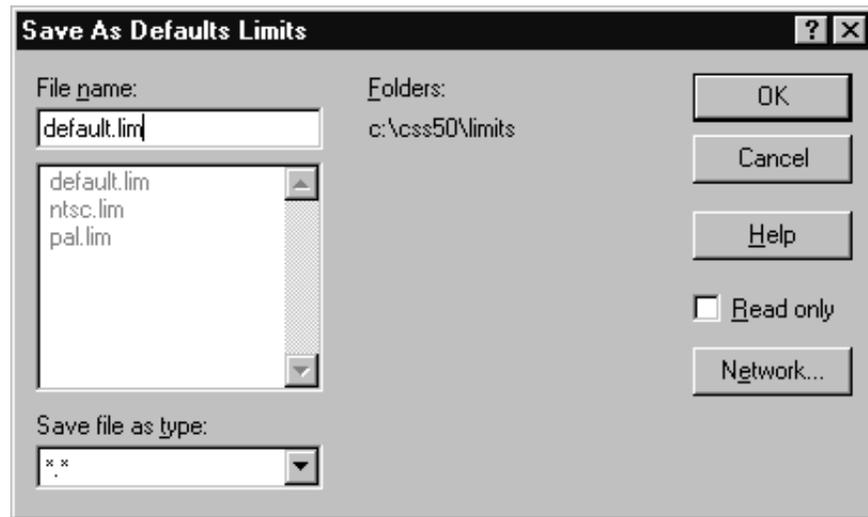
Figure 3–43: Save As Defaults dialog box

- Clear Limits. This command button clears all of the limits from all of the measurements. If this is done by accident, you can recover by choosing the Cancel Command button.

Summary Limits. The Summary Limits at the bottom of the Limits window are global parameters in that they apply to all channels (see Figure 3–44).
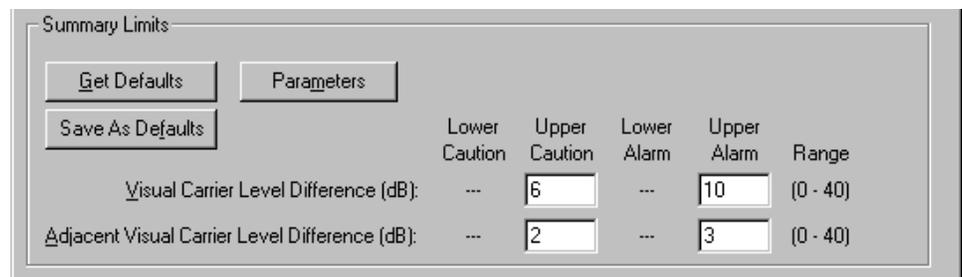
Figure 3–44: Summary Limits (part of the Measurement Limits dialog box)

Visual Carrier Level Differences defines the range that the Visual carrier can vary across all channels. Adjacent Visual Carrier Level Difference is the amount of variation in amplitude between two channels that are next to each other in frequency. The Adjacent results may be misleading if a View Filter is on because channels next to each other in the worksheet are not necessarily next to each other in frequency.

NOTE. If a View Filter is on, some measurement results can be misleading. Take note of the View Filter Status when interpreting results.

These parameters are not visible on the worksheet; rather they are part of the Status Report, Results Detail, and Measurement Summary.

The Get Defaults command button loads the default values into the Summary limits. The Save As Defaults button sets the current values as the defaults.

Click on Parameters to set the window for adjacent channels. This dialog box (see Figure 3–45) defines what constitutes an adjacent channel. Any adjacent channels that are outside of this frequency window are not included in the calculations. Select what is required for your system and then click on OK.

NOTE. This is not used by the Adjacent Channel Leakage measurement. ACL selects adjacent channels based on the width of the digital channel under test.
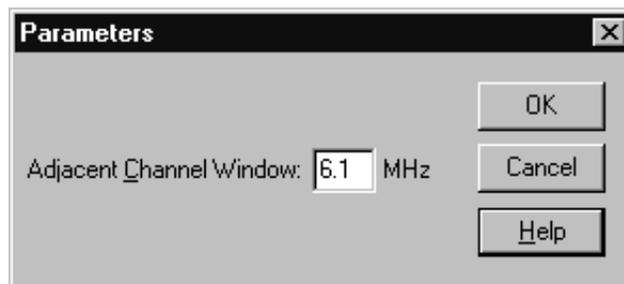
Figure 3–45: Parameters dialog box

Measurement Setups   There are many different ways that test equipment can be set up. The configuration tells the CSS50 software how your system is set up to retrieve the correct results. Find this item under the Configure menu, Measurement Setups. There are setups that affect all channels and some that are channel specific. The Measurement Setups dialog box is shown in Figure 3–46.
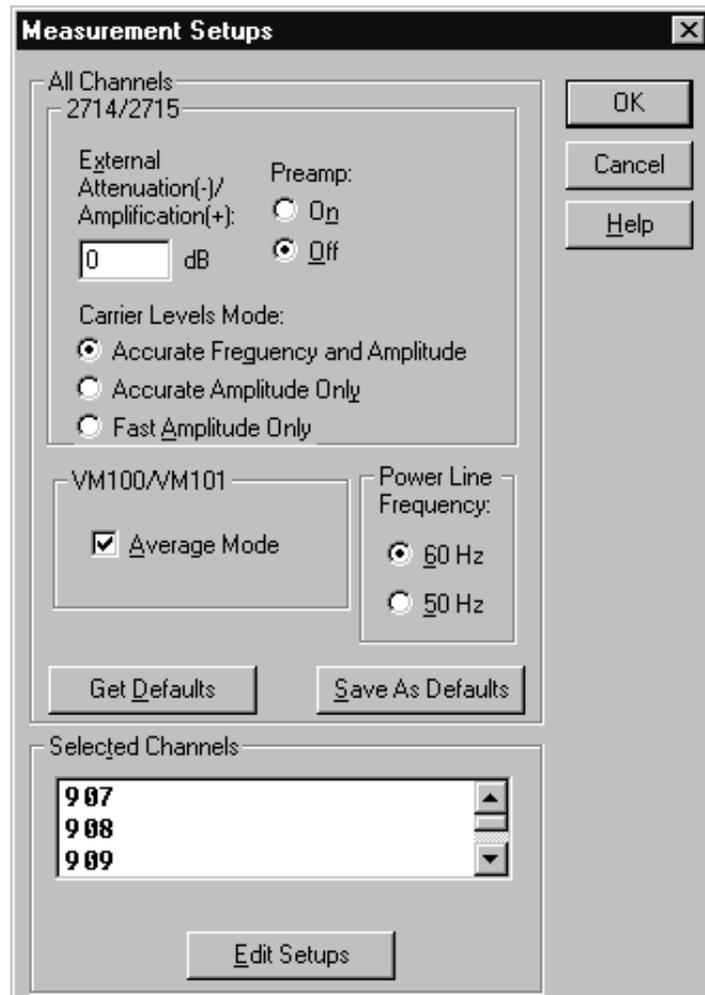
Figure 3–46: Measurement Setups dialog box

All Channels Group. The All Channels group allows you to customize measurements. The All Channels group categories include Get Defaults, Save As Defaults, VM100/VM101, Power Line Frequency, and 2714/2715.

■ 2714/2715 Sub-group. This group allows you to set up the software to match your equipment setup.

External Attenuation/Amplification. Enter the necessary attenuation or amplification (in dB) needed to compensate for losses or gains in your system in this text box. For example, if a measurement is being made at a 20 dB down test point, enter –20 in the text box.

Preamp. Select the On or Off option button to match your equipment setup. The Preamp is generally "on" in low-level signal conditions to improve the

resolution of the measurements. Set the Preamp according to the specifications in the 2714 manual. The 2715 automatically uses the optimum preamp setting and then resets it back to the value selected to this option button.

Carrier Levels Mode. This setup specifies the mode used when making carrier level measurements. The options are: Accurate Frequency and Amplitude, Accurate Amplitude Only, and Fast Amplitude Only. The selection applies to individual carrier level measurements as well as surveys.

NOTE. It is recommended that you use Accurate Frequency and Amplitude for any FCC measurements.

■ VM100/VM101 Sub-group. This group allows you to set the VM100/VM101 Average Mode on or off for measurements. If on, measurements will be slower (depending on the Signal-to-Noise on the input signal) but more accurate and with less variation. If off, measurements will be faster.

■ Power Line Frequency subgroup. Select either 50 or 60 Hz to match the power line frequency of your system. (60 Hz is not selectable if the channel table video standard is set to PAL.)

Get Defaults. This command button loads all of the previously saved default values into the All Channels group text boxes and option buttons.

Save As Defaults. This command button saves all of the current text box and option button settings as the default values. The default values are automatically loaded whenever a new worksheet is created. They are also available through the Get Defaults command button.

Selected Channels Group. The Selected Channels Group allows you to continue customizing measurements down to the individual channel. The categories found under Selected Channels are: Carrier to Noise, VM100/VM101 VITS, ACL, HUM, CSO, CTB, and In-Channel Response.

Edit the individual channels by choosing the Edit Setups command button. The dialog box is shown in Figure 3–47.

NOTE. The VM100/VM101 VITS group in the Edit Setups dialog box is slightly differenct for CSS50 software versions below 2.0. See Appendix H: Version 1.0 Software *about these differences.*

Figure 3–47: Edit Setups dialog box (NTSC)

Carrier to Noise Group. Select the Auto, Auto with Pause, or Gated option button. Auto with Pause requires that the carrier be turned off in order to make the measurement. The measurement will stop and prompt you to turn off the carrier and wait for you to respond that the carrier is off before it will continue making measurements. Auto makes the measurement without taking the channel out of service or requiring any operator interface. Gated makes the measurement on a non-modulated line, therefore there is no requirement to turn the carrier off or take the channel out of service. Gated is only available for the 2715.

Enter the bandwidth for the noise calculation in the Noise Bandwidth text box.

Hum Group. Select either Baseband or RF option buttons for how to make the Hum measurement. If Baseband, the VM100 or VM101 makes the measurement. If RF, then the 2714 or 2715 makes the measurement.

NOTE. The demodulator's Zero Carrier Pulse must be turned on and set to the appropriate Line and Field in the Demodulator Setups dialog box. See page 3–76 for more information about the demodulator setup.

CSO Group. Select the way you want the CSO measurement performed by selecting Auto, Auto with Pause, Single Sweep, or Gated option Buttons. For digital channels, only Auto with Pause is available. Gated is called "in service" on the 2714 or 2715 instruments. This allows measurements to be made on-line with no modulation.

Enter up to five relative test locations for the CSO measurement in the Test Locations text boxes. Be sure to take into consideration the way that the 2714 or 2715 handles CSO and CTB measurements if you are doing a measurement setup for a UDP.

VM100/VM101 VITS Group. Select either Auto or Manual mode.

Auto mode causes the VM100 or VM101 to automatically search for the appropriate test signals (the Line and Field boxes are not editable). If an appropriate signal is found, the measurement is run using that line for the test signal. If an appropriate signal is not found, the measurement fails. Auto is the recommended mode.

Manual mode is provided for experienced users who need precise control over which test signals are used for the baseband measurements. For each of the five baseband measurements, the user can specify exactly which Line and Field to use for obtaining the test signal. (Field is removed if the channel table video standard is set to PAL.) If an appropriate signal is found on the specified line, the measurement is run using that line for the test signal. If an appropriate signal is not found on the specified line, the measurement fails.

Table 3–10 lists the five baseband measurements you can enter the Line and Field when using Manual mode. The table also provides the individual measure-ments made and the allowable values for Line and Field for each baseband measurement.

NOTE. The VITS group in the Edit Setups dialog box is slightly different for CSS50 software versions below 2.0. See Appendix H: V1.0 Software *about these differences.*

Table 3–10: VITS Line and Field ranges

Baseband measurements	Measurements and ranges
Baseband	Applies to the Chroma-Luma Delay, Differential Gain, and Differential Phase measurement NTSC:　Line = 9 – 263　　Field = 1 or 2 PAL:　　Line = 6 – 310 or 318 – 623
Sig-to-Noise	Applies to the Signal-to-Noise measurement NTSC:　Line = 9 – 263　　Field = 1 or 2 PAL:　　Line = 6 – 310 or 318 – 623
In-Chan Resp	Applies to the In Channel Response measurement NTSC:　Line = 9 – 263　　Field = 1 or 2 PAL:　　Line = 6 – 310 or 318 – 623
2T K-Factor	Applies to the 2T K-Factor measurement in the waveform distortion group NTSC:　Line = 9 – 263　　Field = 1 or 2 PAL:　　Line = 6 – 310 or 318 – 623
Lum Non-Lin	Applies to the Luminance Non-Linear Distortion measurement in the waveform distortion group NTSC:　Line = 9 – 263　　Field = 1 or 2 PAL:　　Line = 6 – 310 or 318 – 623

See the VM100 or VM101 Video Measurement Sets user manual for more detailed explanations on these measurements and values.

NOTE. HUM does not use a VITS signal so is not included in the VM100/VM101 VITS group. In order to do the HUM measurement, the demodulator's Zero Carrier Reference Pulse must be turned on and set to the appropriate Line and Field in the Demodulator Setups dialog box. In the Configure menu bar, select DS1000 under Demodulator to obtain the demodulator setup dialog box. See page 3–76 for more information about the demodulator setup.

CTB Group. Select the way you want the CTB measurement made using the Auto, Auto with Pause, or Single Sweep option buttons. For digital channels, only Auto with Pause is available.

Enter up to five test locations for the CTB measurement in the Test Locations text boxes. Select either the Rel (relative) or Abs (absolute) option buttons for each test location. Again, be sure to take into consideration the way that the 2714 or 2715 handles CSO and CTB measurements if you are doing a measurement setup for a UDP.

ACL Group. Measures the power in the channels adjacent to the digital channel under test. This is a headend test with the 2715 connected to the test port of the modulator. Select Upper to measure the power in the upper adjacent channel only, Lower to measure the lower adjacent channel only, or Both to measure both the upper and lower channels.

In-Channel Response Group. Selects how you want the In-Channel Response (ICR) measurement executed.

Select either the Baseband or RF option button. The baseband option uses the VM100 or VM101 while the RF uses the 2714 or 2715 to make the ICR measurement. Sometimes, you only have one or the other piece of equipment available and this measurement can be made either way.

If you select the RF option you can also make that measurement Gated. Gated is called "in service" on the 2715 instruments. This allows measurements to be made on-line with no modulation.

If you select the RF option, enter the relative frequencies where you want the measurement calculated (six locations must be entered) in the Test Locations text boxes.

Command Buttons for the Edit Setups for Channel XX Dialog Box. There are three special command buttons located on the upper right hand corner of the Edit Setups for Channel dialog box. They are Get Defaults, Save as Defaults, and Copy to All Channels.

Get Defaults. The Get Defaults command button takes the default values and places them in the text boxes. It also sets the option buttons to the default values. The dialog box below appears, allowing you to decide what measurements should get the default values. (See Figure 3–48.)
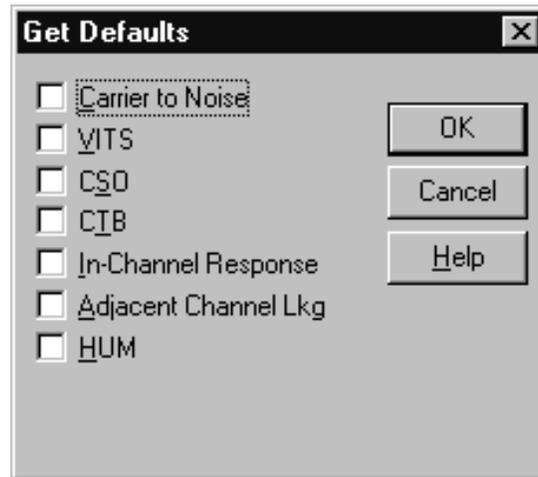
Figure 3–48: Get Defaults dialog box

Save as Defaults. This command button takes the current entries in the text boxes
and selected check boxes and stores them as the default values. Load these
default values into selected channels using the Get Defaults command button
when you are editing the setups for those channels. These become the default
values whenever a new worksheet is created. (See Figure 3–49.)
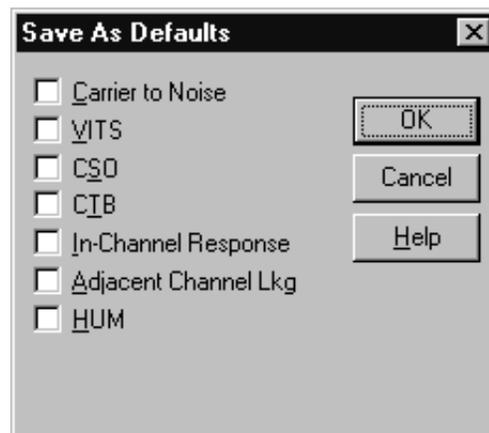
Figure 3–49: Save As Defaults dialog box

Copy to All Channels. The Copy to All Channels command button takes all of the
settings for the selected measurements and copies the current values to all
channels. (See Figure 3–50.) Note that CSO and CTB settings are handled in a
special way. If the current channel is digital, CSO and CTB setups are copied

only to digital channels. Similarly, if the current channel is analog, CSO and CTB setups are copied only to analog channels.
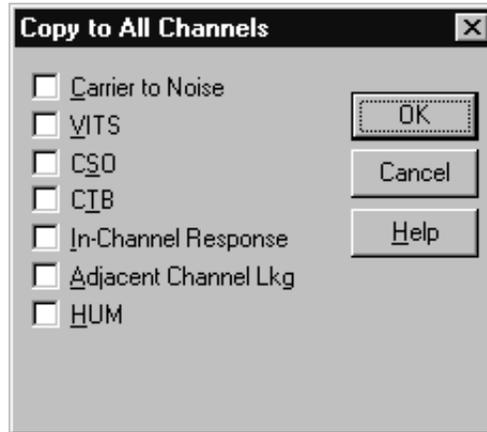
Figure 3–50: Copy to All Channels dialog box

Connections The Connections dialog box sets up the GPIB and RS-232 control connections. The allowable GPIB addresses are from 0 to 29. Figure 3–51 shows the Connections dialog box if the DS1000 demodulator has been selected in the Demodulator menu. If None (no demodulator) is selected in the Demodulator menu, then the whole demodulator group is grayed out.

Choosing No Instruments Selected allows the application to simulate measurements for learning purposes.

CAUTION. To ensure proper operation and prevent software conflicts, verify that no two instruments are assigned to the same port or GPIB address. This applies even if an instrument is not connected or used.
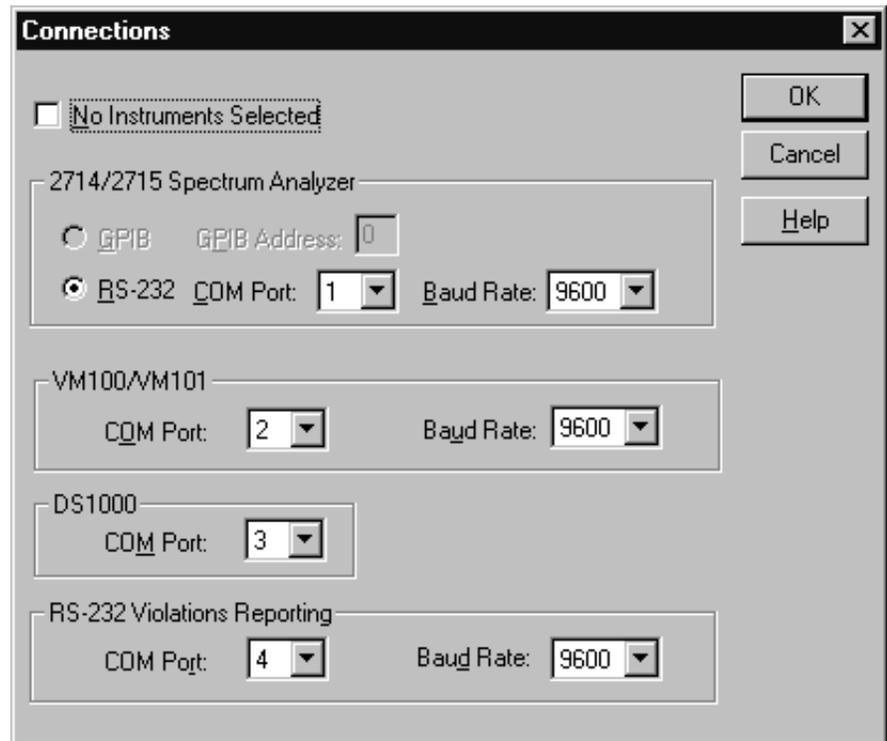
Figure 3–51: Connections dialog box

2714/2715 Spectrum Analyzer Group

■ GPIB. If your system uses the GPIB, enter the address of the 2714 or 2715 in the GPIB Address text box.

■ RS-232. If your 2714 or 2715 uses RS-232 instead of GPIB, select the correct Com port from the Com Port list box and the correct baud rate from the Baud Rate list box.

VM100/VM101 Group

■ RS-232. Select the correct Com port from the Com Port list box and the correct baud rate from the Baud Rate list box.

DS1000 Group

■ RS-232. Select the correct Com port from the Com Port list box. The baud rate is fixed at 9600.

RS-232 Violations Reporting Group. This group sets the parameter for a port that will receive error messages from the CSS50 application if one of the measure-

ments is in a "non-standard condition". Select the Com Port and the Baud Rate. For more information on the RS-232 Violations report, please see page 3–51.

Demodulator The Demodulator command selects between a DS1000 series demodulator or None (see Figure 3–52).

Figure 3–52: Demodulator menu

If None is selected, then during measurement execution, no checking is made for a demodulator. If the demodulator is selected, then during measurements the following occurs:

■   If making a baseband measurement and the specified demodulator is not found, an error message is displayed and the measurement is terminated.

If the DS1000 is selected, then an additional dialog box appears, as shown in Figure 3–53.
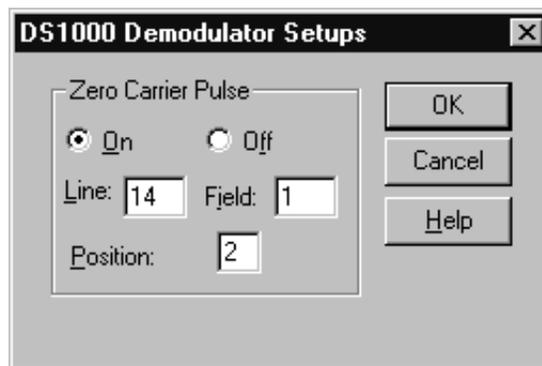
Figure 3–53: Demodulator Setups dialog box

Set these values as required for your system. Zero Carrier Pulse is used for Hum measurements and must be on for Hum measurements. These values automatically override the front panel instrument settings.

For NTSC, the Line entry must be in the range of 10 to 20 and the Field set to 1 or 2. Baseband Hum measurements use Field 1 only.

For PAL, the Line entry must be in the range of 6 to 16 or 319 to 329. The Field entry is disabled (grayed out). Baseband Hum measurements use the Line range of 6 to 16 only.

Zero Carrier Pulse must be set to On for Baseband Hum measurements. Select a quiet line in the video signal to put the zero carrier pulse on.

Position is where within the video line the pulse is placed. The range is 0 to 4 where 0 is at the start of the video line and 4 is at the end.

Execute

The Execute menu allows you to launch the Channel Table Editor without leaving the CSS50 application.

Channel Table Editor   The Channel Table Editor is a separate application that allows you to edit and create Channel Tables to load into the instruments. This command launches this application or, if it is already started, this command switches to it. For more information on this application, please see Appendix C.

Help

The Help menu (see Figure 3–54) provides access to the CSS50 online help.
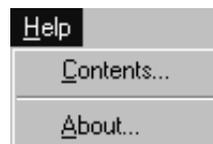
Figure 3–54: Help menu

Contents   Contents lists all of the available help topics (see Figure 3–55). These topics are accessed by scrolling until the desired topic is highlighted and then clicking on OK or double clicking on the name. There are some general topics, then all the menus and their associated commands are listed. At the end of the list are the measurement help files. The measurement help files give a brief description of the measurement, and the files have room for you to add your own notes about the measurements. For details on editing these Help files, see *Adding Information to the Help Files*, in *Appendix E*, on page E–2.
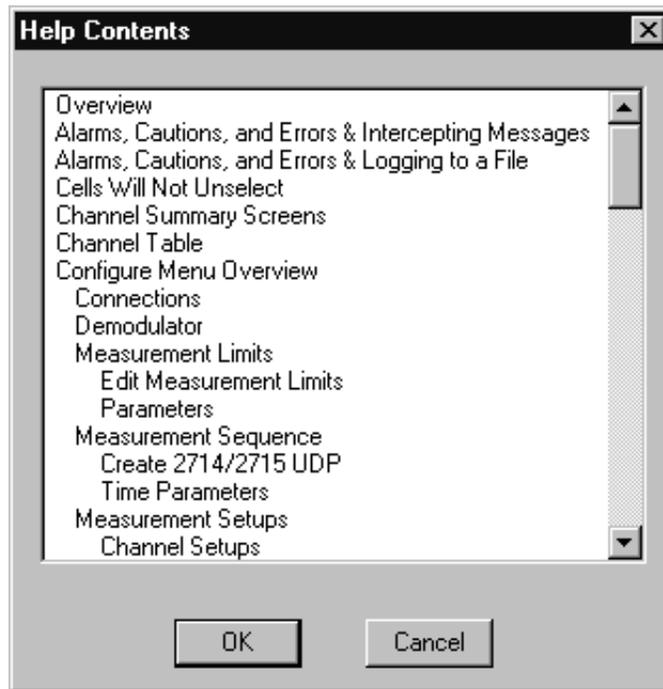
Figure 3–55: Help Contents dialog box

These same topics are available from the Help command buttons in most dialog boxes.

Make sure that you close the Help dialog box when you are finished. Only one open dialog box is allowed at a time. Close the Help dialog boxes by choosing Close from the Help Window Control Box or by pressing ALT+F4.

About   The About dialog box gives the version number of the CSS50 software and other information (see Figure 3–56). Click on OK to leave this dialog box.

Figure **3–56: About dialog box**

Button Bar

 The same as Open in the File menu on the Menu Bar. (See page 3–13.)

 The same as Save in the File menu on the Menu Bar. (See page 3–13.)

 The same as Global View in the View menu on the Menu Bar. (See page 3–36.)

 The same as Results Detail in the View menu on the Menu Bar. (See page 3–28.)

 Same as the Status Report in the View menu on the Menu Bar. (See page 3–24.)

 Same as Current Selection in the Measure menu on the Menu Bar. (See page 3–42.)

 Same as Measurement Sequence in the Measure menu on the Menu Bar. (See page 3–43)

 Same as Test ID in the Configure menu on the Menu Bar. (See page 3–48.)

 Same as Measurement Setups in the Configure menu on the Menu Bar. (See page 3–66.)

 Same as Measurement Limits from the Configure menu on the Menu Bar. (See page 3–61.)

 Same as Print in the File menu on the Menu Bar. (See page 3–16.)

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CSS50 Cable Television System Software User Manual

Appendices

Appendix A: Menu Map

This chapter is a quick reference to all of the commands available from the CSS50 Menu Bar along with a brief description of what they do.

Table A–1: CSS50 Menu Bar menu map

Menu	Command	Description
File	New	Creates a new worksheet. All Measurement Setups and Limits files are automatically set to defaults, instead of what is in the current worksheet.
	Open	Opens an existing worksheet and makes it active.
	Save	Saves all changes made to the current worksheet.
	Save As	Saves the current worksheet under a new name.
	Import	Imports data from stored results files into the current worksheet.
	Export	Exports the worksheet results data out to a ".wsr" file so that applications (such as Excel) can process the data.
	Print	Prints the worksheet on the selected printer.
	Print Setup	Sets up the printer.
	Exit	Exits the CSS50 application.
Edit	Copy	Copies the contents of the selected cells into the Windows Clipboard.
	Clear	Deletes the current value and/or all history for the selected cells.
	Select All	Selects all of the cells in the spreadsheet.
View	Status Report	The Status Report lists the extremes for all of the measurement results.
	Results Detail	The Results Detail dialog box displays more information about a measurement than can be contained in a cell on the spreadsheet. Also used to summarize individual measurements and channels.
	Global View	This is a condensed view of the standard spreadsheet display.
	2714/2715 Screen	Displays a copy of what is displayed on the 2714 or 2715 screen.
	Picture	The Picture command displays a video picture of what is presently on a given channel. (Requires video display hardware.)
	Measurements and Channels	This is a View Filter that determines which channels and measurements are on the spreadsheet. (Hides rows and columns on the spreadsheet.)
	Measurement Sequence Results	This is a View Filter that displays only those measurements made with the most recent Measurement Sequence execution.
	Test ID Results	This is a View Filter that displays only cells that have measurements tagged with the currently selected Test ID.
	Row Header Fields	This command determines what channel information is given in the row header. It can include any combination of the following: Channel Number and Tag, Program Name, or Channel Frequency.

Table A–1: CSS50 Menu Bar menu map (cont.)

Menu	Command	Description
Measure	Current Selection	Executes measurements for the currently selected cells.
	Sequence	Executes the currently defined Measurement Sequence.
	Tune to Channel	Tunes the instruments to the selected channel.
	Get Stored Results from 2714/2715	Retrieves all the CATV measurement results currently stored in the NVRAM of the connected 2714 or 2715.
Configure	Worksheet Info	Enables you to specify worksheet Info such as the Site, Channel Table, and description for the current worksheet.
	Test ID	Brings up a dialog box that enables you to specify a test identifier such as Technician Name, Test Number, etc. There are two groups in the dialog box: All Test IDs and Worksheet Test ID. The All Test IDs group lists all of the Test IDs that have ever been used. The Worksheet Test IDs are the IDs used in the current worksheet.
	Preferences	Enables you to set preferences in the way results are collected and displayed.
	Measurement Sequence	Brings up a dialog box that enables you to program a set of measurements that will be executed as a Measurement Sequence. This allows a regularly used set of measurements to be called with a single keystroke.
	Measurement Limits	Brings up a dialog box that enables you to define the Alarm and Caution levels for the measurement results.
	Measurement Setups	Brings up a dialog box that enables you to control how measurements are executed in the instruments.
	Connections	Brings up a dialog box that enables you to set the GPIB and RS-232 control connections.
	Demodulator	This command selects the demodulator.
Execute	Channel Table Editor	Allows you to switch to or start the Channel Table Editor application.
Help	Contents	Lists all of the available help topics.
	About	Displays the CSS50 version number and other information.

Appendix B: Error, Warning, and Informational Messages

The tables in this appendix explain the various types of messages you may encounter when using CSS50. In the following tables, the term XX represents information that is dependent on the situation. In practice, XX is replaced by an instrument name, filename, or number, as appropriate.

Error Messages

Error messages tell you when CSS50 was unable to complete a task as required. These messages can occur because of equipment malfunctions, corrupted files, or missing information that must be supplied before CSS50 can continue.

Table B–1: Error messages

Error number	Error message	Explanation
E61	No GPIB0 Board Found	GPIB is not installed or the name of the GPIB board is not "GPIB0".
E62	GPIB is not System Control	GPIB card is not configured for System Controller.
E63	GPIB Write Error	A device on the GPIB has prevented data transfer. Check all instruments.
E64	GPIB Read Error	A device on the GPIB has prevented data transfer. Check all instruments.
E65	No Listener on Bus	No GPIB devices are connected to the controller or they are all turned off.
E66	GPIB Timeout, device not responding	Device too slow in responding to command. Instrument may need to be initialized.
E67	GPIB DOS Error	GPIB.DLL not found or incorrect version.
E68	GPIB General Failure	Problem with GPIB driver. Refer to National Instrument's GPIB manual for troubleshooting and possible reinstallation.
E103	RS-232 Write Error	Unable to write to the RS-232 device. Check Cable and device RS-232 settings.
E104	RS-232 Read Error	Unable to read from the RS-232 device. Check Cable and device RS-232 settings.
E105	RS-232 Timeout, device not responding	RS-232 device not responding in sufficient time. Device may need to be reinitialized.
E106	RS-232 port not available for this application.	RS-232 is in use by another application. Close down all other applications that use RS-232.
E220	Cannot communicate with XX.	Cannot communicate with specified instrument. Check that the settings in the Connections dialog match match the instrument. Check that the cabling is correct.
E221	Unknown 2714/2715 firmware version.	The firmware version of the 2714 or 2715 is not recognized by the CSS50 software and therefore the current operation cannot proceed. Obtain the correct firmware version.

Table B–1: Error messages (cont.)

Error number	Error message	Explanation
E222	Cannot allocate memory for 2714 /2715 stored results	System running low on memory. Try closing other applications.
E223	Stored results in 2714/2715 are corrupt	The results file(s) in the 2714/2715 are corrupt. The results could not be retrieved. You may need to delete all stored results from the 2714/2715.
E224	Existing 2714/2715 stored results partially loaded	Some, not all, existing 2714/2715 stored results were successfully loaded from the instrument. Usually indicates corrupt stored results. Remove the stored results from the 2714/2715.
E225	Cannot load existing 2714/2715 stored results	None of the stored results currently found in the 2714/2715 could be loaded. Usually indicates corrupt stored results. Remove the stored results from the 2714/2715.
E226	The selected channel cannot be set in the 2714/2715	2714/2715 failed to tune to the channel requested. Channel Table may be incorrect.
E228	The selected channel table cannot be set in the 2714/2715	Problem occurred in loading a Channel Table to the 2714/2715. Verify Channel Table with the Channel Table Editor (CTLOADER) application. Either the channel table is invalid, or there is no available slot in the instrument.
E230	You must manually delete duplicate UDP title: 'XX' first and then retry	There already is a UDP with that name loaded into the 2714/2715. If you really want to use that name delete the old name first.
E231	The UDP menu is full. You must manually delete a UDP from the 2714/2715 first and then retry.	The 2714/2715 only has room for 9 UDPs. Delete one or more before trying to load the UDP again.
E232	Reserved	
E233	UDP is too large to load, aborting operation	There is a limit on the number of measurements that can be in a UDP. Delete some of the measurements and try to reload.
E234	UDP may be too large to execute in the 2714/2715	Delete the UDP from the 2714/2715, remove some of the measurements from the Measurement Sequence, then reload the UDP.
E235	Gated setup option not available with 2714. Use Auto instead?	Gated Carrier to Noise and CSO measurements can only be made on the 2715. Enter Yes to run in Auto mode instead.
E236	Gated setup option not available with 2714. Turn gated off?	Gated In Channel Response measurements can only be made on the 2715. Enter Yes to run without Gated mode.
E237	Reserved	

Table B–1: Error messages (cont.)

Error number	Error message	Explanation
E239	The following problems were found in the Measurement Sequence:	
	The Gated setup option is not supported by 2714s. C/N, CSO and ICR will be run in the non-gated mode	When creating a 2714 UDP, one or more Carrier to Noise, CSO, or In Channel Response measurements specified Gated measurement setups. Since this is not supported by the 2714, the setup was changed to run without the gated option.
	Digital measurements are not supported by the attached 2714/2715. All digital tests (Avg Pwr, D/U and ACL) will be skipped	One or more Average Power, Desired to Undesired, or Adjacent Channel Leakage measurements were requested. These digital tests are not supported by 2714s and are not supported by 2715s with Firmware Version 09.30.94 or earlier. The UDP may still be generated, but the digital measurements will be skipped.
	Only RF measurements are supported by the 2714s and 2715s. All non-RF measurements (FCC Baseband, S/N, and Wfm Dist) will be skipped	
	See the Create 2714/2715 UDP help topic for additional details	
E240	Reserved	
E241	Reserved	
E242	Unknown response received from 2714/2715	The content of the query response was not what was expected. Try the operation again.
E243	The selected channel's frequency cannot be set in the DS1000	The frequency setting for the channel to be measured is outside the tuning range of the DS1000 series demodulator.
E244	VM100 firmware version is older than minimum requirement of 2.17.	CSS50 supports VM100 firmware versions 2.17 and higher. Please update your VM100 in order to perform baseband measurements.
E245	NTSC/PAL Video Standard mismatch detected between Demodulator, Video Measurement Set and Channel Table	These three items must be consistent for NTSC or PAL. If the Video Standard for the channel table is set to NTSC, a VM100 and an NTSC DS1000 demodulator must be used. If the Video Standard for the channel table is set to PAL, a VM101 and a PAL DS1000 demodulator must be used.
E300	Error initializing CSS50.	The file has become corrupted. Try reloading the application from the master disk.
E301	CSS50 already running.	Only one copy of the CSS50 software can be run at a time. Use the software that is already open.
E302	Error creating window.	Running low on memory. Try closing other applications.
E303	Memory allocation error, operation canceled.	Running low on memory. Try closing other applications.
E304	Instrument connections could not be initialized.	Check the instrument's connections and the cabling. Make sure that the address is correct.
E305	Error opening file: XX.	The file is corrupt or not in the proper format. File cannot be found.

Table B–1: Error messages (cont.)

Error number	Error message	Explanation
E306	Error closing file: XX	The file as been corrupted or the computer is out of memory space.
E307	Error writing file: XX Possibly out of disk space.	Free some disk space and then try again.
E308	Corrupted data in file: XX.	The file is not in the correct format.
E309	End of file encountered in file: XX.	The file has been corrupted.
E310	XX file XX is not valid	The file is corrupt or the wrong file type. File is found but it is the wrong file type.
E311	One or more Limits files not found or invalid	The limits files requested in the current worksheet either are not in the correct directory, in the correct format, or don't exist. Limits files must be in the Limits sub-directory of the executable file.
E312	Error writing CSS50.INI file	Out of memory or the application is corrupted.
E313	Error writing WIN.INI file	File has been corrupted.
E314	Invalid number	The text box is expecting either a number or a letter and received the other. Retry with valid data.
E315	Number out of range. Enter a number between XX and YY	Enter a valid number.
E316	CSO offset fell within CTB range of +/- XX MHz	Change the CSO offset so that it is outside of the CTB range or change the CTB range.
E317	Site cannot be blank	Blank is not a valid Site name. Enter one or select <undefined>.
E318	Test ID cannot be blank	Blank is not a valid test ID. Enter one or select <undefined>.
E319	UDP title cannot contain commas or semicolons, and cannot be blank	Change the UDP title in the text box to remove the invalid characters.
E320	Undefined measurement ID	The measurement ID does not exist.
E321	Creation and loading of UDP 'XX' failed	The UDP could not load. Check the 2714/2715 for adequate UDP (NVRAM) space.
E322	Maximum number of measurements stored in Worksheet, operation canceled	A Worksheet will only hold 16,000 measurements. Any measurements previously made have been loaded. Create a new Worksheet or delete some measurements before continuing.
E323	Maximum amount of clipboard data has been exceeded	Try using the Export command instead of the Copy command to move data into other applications, or select smaller blocks of data to copy.
E324	An error occurred while copying data to the clipboard	The clipboard data is invalid. Try again.
E325	An error occurred while clearing measurement for row XX column XX	The measurements could not be cleared.
E326	Select a cell, entire column, or entire row	The Results Detail display needs to know what information you want.
E327	No Limits file selected	Select a Limits file from the combination box, before choosing Select Limits File.
E328	Select at least one measurement and channel for viewing	The View Filter will not allow a blank data display. Pick at least one measurement and one channel from the selections.

Table B–1: Error messages (cont.)

Error number	Error message	Explanation
E329	No stored results selected	Select one of the stored results directory entries from the 2714/2715 to export.
E330	Error initializing help	Files are corrupted.
E331	Only 1 help window may be open at a time	Close the open help window before trying to open another one. The Help window may be under another window.
E332	Help topic not found	The Help file has been lost. Make sure that there is a help sub-directory in the CSS50 executable directory. Check to see if there are any *.hlp files in that sub-directory.
E333	Video driver XX not active	The Video driver must be running before Picture, from the View menu, can activate. Make sure that your Video driver is one that is supported by this application. Make sure that the Video driver title from the Switch To window for the Video driver is the same name as is in the CSS50.INI file.
E334	Channel Table Editor not found	The Channel Table Editor application (CTLOADER) is not in the CSS50 executable directory.
E335	Error printing report	An error occurred printing a report. Ensure that print options were appropriately selected and the printer is correctly connected to the PC.
E336	Channel Table file XX not found or is invalid	The Channel Table requested either cannot be found or is corrupt. Request another Channel Table and try again.
E337	Default Channel Table file 'XX' is not found or is invalid	The default Channel Table either cannot be found or is corrupt. Request another Channel Table and try again.
E340	Limits relationship violated: XX >= YY	Caution and Alarm lower and upper limits must adhere to the relationship: Alarm lower limit < Caution lower limit < Caution upper limit < Alarm upper limit.
E341	Select one or more check boxes	Select at least one check box to indicate which item(s) should be used.
E342	Error loading file xx.dll	The indicated DLL could not be loaded; probably because it isn't in the CSS50 working directory.
E343	Number out of range. Enter a number between XX1 and YY1 or between XX2 and YY2.	Enter a valid number in either of the two ranges.
E1000	Error opening file: 'XX'	The file is corrupt or not in the proper format.
E1001	Memory allocation error, operation canceled	Running low on memory. Try closing other applications.
E1011	Number out of range. Enter a number between XX and YY	Enter a number between the stated limits.
E1012	Error writing file: XX Possibly out of disk space	The stated file could not be written.
E1013	XX file XX is not valid	The stated file is corrupt or of the wrong type.
E1014	Error initializing help	Help files are corrupted.
E1015	Only 1 help window may be open at a time	Close the open Help window before trying to open another one. The Help window may be under another window.

Table B–1: Error messages (cont.)

Error number	Error message	Explanation
E1016	Help topic not found	The Help file has been lost. Make sure that there is a help sub-directory in the CSS50 executable directory. Check to see if there are any *.hlp files in that sub-directory.
E1017	Error creating window	Running low on memory. Try closing other applications.
E1018	Error writing CTLOADER.INI file	Out of memory or the application is corrupted.
E1019	Error writing WIN.INI file	File has been corrupted.
E1020	CTLOADER already running	Only one copy of CTLOADER can be run at a time. Use the copy that is already open.
E1023	Error printing spreadsheet	An error occurred printing a report. Ensure that print options were selected appropriately, and that the printer is properly connected to the PC.
E1024	Invalid channel table name	The channel table filename specified is not valid.
E1025	Attempted write to read-only file	The Channel Table file is write protected. Select a different save file name.
E1026	Table Info was incomplete in the selected file	A Channel Table file must have table information for at least one channel. The file may be corrupt.
E1027	Selected file has too many channels –– truncated	The Channel Table file has more channels than the application can handle. All possible channels were loaded.
E1028	Error initializing CTLOADER	One or more executable files have become corrupted. Try reloading the application from the master disk.
E1029	Select at least one item or press CAN-CEL	This dialog requires a selection.
E1030	Selected table name is too long or contains incompatible characters	A Channel Table being read into the application from an instrument has a name which cannot be converted into a DOS-compatible file name.
E1031	No channel tables found in instrument	For Transfer:Delete operation, there are no Channel Tables in the specified instrument which can be deleted. For Transfer:From operation, there are no Channel Tables in the instrument of any type.
E1032	GPIB is non-functional or not installed	GPIB was selected for communicating with the selected instrument, but is not installed for Windows.
E1033	Cannot expand table further (500 Channels Max)	The application cannot handle more channels.
E1034	No filename has been defined –– Save file first	CTLOADER cannot send a Channel Table to an instrument until a filename has been defined (since this is where the table name is derived from). Save the Channel Table to a file first, then transfer to an instrument.
E1035	Channel Table 'XX' contains one or more invalid fields. Use Limit Check to verify.	When opening the Channel Table file, one or more fields were found to not meet the limits or data type requirements. Use Limit Check to find out which field(s) were invalid.
E1040	Channel Table File Read Error: XX	The Channel Table is corrupt at the specified line and column.
E1041	Directory read error in XX	Could not read the Channel Table directory in the specified instrument.
E1042	Attempted write to read-only table in XX	The specified Channel Table cannot be overwritten. Select a new file name, from which the instrument Channel Table name is derived.

Table B–1: Error messages (cont.)

Error number	Error message	Explanation
E1043	All channel table slots used in XX. Delete a table first	Cannot send a table to the specified instrument, since all Channel Table slots are used.
E1045	Channel Table name too long for XX (YY characters max)	The Channel Table name is too long for the specified instrument. Select a shorter file name and retry.
E1046	Incompatible video standard for XX	The Video Standard for the stated channel is incompatible with the stated instrument.
E1047	Incompatible channel width for XX. Enter a number between XX and YY	The Channel Width for the stated channel is incompatible with the stated instrument.
E1048	Incompatible aural offset for XX. Enter a number between XX and YY	The Aural Offset for the stated channel is incompatible with the stated instrument.
E1049	Incompatible channel number for XX. (record YY) Enter a number between XX and YY	The Channel Number for the stated channel is incompatible with the stated instrument.
E1050	Incompatible visual frequency for XX. (record YY) Enter a number between XX and YY	The Visual Carrier Frequency for the stated channel is incompatible with the stated instrument.
E1051	Incompatible lower channel edge for XX. (record YY) Enter a number between XX and YY	The lower channel edge for the stated channel is incompatible with the stated instrument. The lower channel edge is calculated by adding the Channel Edge parameter with the Visual Carrier Frequency parameter.
E1052	Incompatible channel type for XX. (record YY)	The Channel Type for the stated channel is incompatible with the stated instrument.
E1053	Incompatible test pulse offset frequency for XX. (record YY) Enter a number between XX and YY	The test pulse offset frequency for the stated channel is incompatible with the stated instrument.
E1054	Incompatible channel-specific aural offset for XX. (record YY)	The Aural Offset for the stated channel is incompatible with the stated instrument.
E1055	Channel Edge out of range for XX. (record YY) Enter a number between XX and YY	The channel edge for the stated channel is incompatible with the stated instrument.
E1056	Incompatible channel tag for XX. (record YY)	The tag for the stated channel is incompatible with the stated instrument.
E1057	Incompatible second aural offset for XX. (record YY) Enter a number between XX and YY	An invalid value was detected for the second aural offset. Enter a valid selection.
E1058	Incompatible C/N bandwidth for XX. (record YY) Enter a number between XX and YY	The C/N bandwidth for the stated channel is incompatible with the stated instrument.
E1059	Incompatible amplitude offset for XX. (record YY) Enter a number between XX and YY	The amplitude offset for the stated channel is incompatible with the stated instrument.
E1060	Channels must be in frequency order for XX. (record YY)	All channels for the stated instrument must be listed in order of ascending visual carrier frequency. The stated channel (at least) is out of order.

Table B–1: Error messages (cont.)

Error number	Error message	Explanation
E1061	Too many channels in XX, table XX	The Channel Table in the specified instrument contains more channels than the application can handle.
E1062	Too many channels in file XX	The Channel Table file has more channels than the application can handle.
E1063	Too many channels for XX	The specified instrument cannot store all of the channels in the current Channel Table.
E1064	Incomplete channel table information	The application read all of the Channel Table information possible, but was not able to read all channels.
E1065	Channel Table XX is unavailable. Select it in the YY and try again	The read-only channel tables in the 2714/2715 are not readable via RS-232 or GPIB unless they are selected first. Select the table via the 2714/2715 menu system and try again.
E1066	Transfer was incomplete –– Unknown Error	The channel table was transmitted to the instrument, but was not found in the instrument when checked at a later time.
E1067	Invalid GPIB Address for XX	Check the Connections information for the instrument in the Transfer: Connections menu selection.
E1068	Channel Table is in use in instrument XX and cannot be deleted or overwritten	Select a different table in the instrument before attempting to delete or overwrite the table.
E1069	Channel Table name is incompatible with XX	Some of the characters in the Channel Table name are inappropriate for the stated instrument.
E1070	Channel Tables in the XX are incompatible with this version	All channel tables in the stated instrument are incompatible with the current version of CTLOADER.
E1071	Channel Table XX already exists. Delete it first	When attempting to transfer a channel table to an instrument, a channel table with the same name was found. Delete it from the instrument first.
E1072	Cannot overwrite an XX NVRAM Fixed table	When attempting to transfer a channel table to an instrument, a fixed channel table of the same name was found. Enter a different name to transfer the table to the instrument.
E1073	Incompatible second aural offset for XX. (record YY)	For the 2714/2715, the second aural offset must be a number within the acceptable range.
E1074	Incompatible quiet line with XX. (record YY) Enter a number between XX and YY	Enter a number within range.
E1075	Incompatible white line with XX. (record YY) Enter a number between XX and YY	Enter a number within range.
E1076	Incompatible ICR test line with XX. (record YY) Enter a number between XX and YY	Enter a number within range.
E1078	Duplicate channel numbers are not allowed for XX. (There are duplicate channel number YY's.)	Assign unique channel numbers to each channel.
E1080	Multiple channel widths are incompatible with THIS 2714/2715 (1st difference at record nnn)	2714 and 2715 instruments with firmware versions 09.29.94 and earlier will not accept multiple channel widths. Use the Copy Field to End command to make all widths the same.

Warning Messages

Warning messages tell you when CSS50 needs additional information from you before it can continue or that, if you continue, there may be a loss of information or settings because of the action being taken.

Table B–2: Warning messages

Warning number	Warning message	Explanation
W350	Worksheet has changed. Do you wish to save it?	Save your changes or they will be deleted.
W351	Limits have changed. Do you wish to save them?	Save the changes or they will be deleted and the Limits file will revert to its previous values.
W352	Attempt to save the Worksheet and exit the application	Memory is getting full. Save what you can and exit CSS50. Then attempt to restart the application.
W353	Selected items will be copied to all channels. Proceed?	Whatever was previously in those channels will be overwritten.
W354	Import site: XX does not match worksheet site: XX Continue importing results?	All of the data being imported will be given the current worksheet Site if the import continues.
W355	Should worksheet site: XX be changed to import site: YY ?	You can change the worksheet Site name to match the import site name. If you do, any data previously in the worksheet will be associated with the new Site name.
W356	Import channel table: XX does not match worksheet channel table: YY Continue importing results?	The results will be loaded into any channel numbers that match. Data without a channel match in the worksheet is ignored.
W357	Do you want to turn the Sequence view filter on?	The Sequence View Filter will allow you to see only the results of the Measurement Sequence and not the entire spreadsheet.
W358	Do you want to turn measurement history collection on?	Older data will be overwritten if the Measurement History collection is not turned on.
W359	If you have edited your worksheet Channel Table, changes will not take effect until you create a new worksheet	The Channel Table was edited and has changed (although the name has not changed); you should put the edited Channel Table in a new Worksheet.
W360	No channels found which match the specified Carrier Level Difference Parameters	This would occur if the Channel Table included all analog channels and you selected the Digital Channels Only from the Parameters dialog box. It affects the Max, Min, and Max-Min values which would be displayed as blanks.
W361	No channels found which match the specified Adjacent Channel Difference Parameters	This would occur if either no adjacent channels fell within the specified adjacent channel window, or if there weren't two channels within the range which were of the specified channel type. The results will be displayed as blanks.
W362	If you edit your worksheet channel table, changes will not take effect until you create a new worksheet	When making most changes to the worksheet channel table, it is necessary to create a new worksheet to have those changes take effect.

Table B–2: Warning messages (cont.)

Warning number	Warning message	Explanation
W363	Carrier levels have been selected on all channels. Run Survey instead?	Your measurement selection includes carrier levels on all channels. You can run a survey substantially faster. Possible drawbacks are that all results have the same date/time stamp and the spreadsheet is not updated until the survey completes. Select Yes to run the Survey, or No to run individual carrier level measurements on each channel.
W1100	Channel Table changed. Do you wish to save it?	Answer YES, if the current Channel Table is to be saved to a file.
W1101	Multiple channel widths are incompatible with some 2714/2715 (first difference at record nnn)	The channel table contains more than one channel width. 2714 and 2715 instruments with firmware versions 09.29.94 or earlier will not accept a channel table with multiple channel widths. (See error 1080 on page B–8.)

Informational Messages

Informational messages tell you when something has changed; for example, when a file import has been completed.

Table B–3: Informational messages

Message	Explanation
Instrument connections have been changed.	The connection information of the equipment has been changed in the Channel Table Editor.
Import complete. XX results imported.	The data has been loaded into the worksheet.
Import complete. XX results imported. Note: Some results were not imported due to Channel Header Mismatch.	This message appears at the end of an import. It only appears if there were mismatches in the Channel Table Header (channel number, frequency, tag, or program). For most of these cases, mismatches are flagged during the import process and you are allowed to overwrite any mismatches. The exception is channel number. If the channel number does not match, then it is simply skipped and you are not flagged except for this message.
There are no measurements for the selected view.	The View Filter must have some valid measurements and channels before it is allowed to be enabled.
There are no more measurements for the selected view. Removing View Filter.	After clearing the selected cells, the View Filter is no longer valid. It will revert back to normal view.
A tunable channel cannot be determined from current selection.	More than one channel has been selected. Select one cell, then try again.
No stored results were retrieved from the 2714/2715.	No results files or they were empty.
Only a sequence may be executed when the sequence view filter is active.	No other measurement can be made.
A sequence has not been defined.	You cannot run a Measurement Sequence. Use Measurement Sequence, from the Configure menu, to create a Measurement Sequence.

Table B–3: Informational messages (cont.)

Message	Explanation
Some of the imported results may not be displayed due to an active view filter.	You may have imported more data than is displayed. Turn the View Filter off to display all of the data.
Default Limits file XX not found or invalid.	Create a new Limits default file by choosing the Save As Default Limits command button, from the Edit Limits File dialog box
Limit check passed for specified instrument.	All parameters in the Channel Table were within limits for the 2714/2715.

CSS50 Cable Television System Software User Manual

Appendix C: Channel Table Editor

The purpose of Channel Table Editor is to create and edit Channel Tables. You create Channel Tables in the Channel Table Editor and then load them into the test equipment for automated testing and measurement gathering. Although CSS50 can call the Channel Table Editor, it is also a standalone application.

What's in this appendix:

- Starting the Channel Table Editor

- Creating a new Channel Table

- Editing an existing Channel Table

- Loading a Channel Table into the test equipment

- Notes on usage

- Channel Tables provided with CSS50

- Overview of the Channel Table Editor commands

Starting the Channel Table Editor

To start the Channel Table Editor, select Channel Table Editor from the Execute menu or Create/Edit Channel Table from the Worksheet Info dialog box of the Configure menu. The Create/Edit Channel Table command button calls the Channel Table Editor.

NOTE. When starting from the Worksheet Info dialog box, it is not good practice to type a name into the combo box on the Worksheet Info dialog box before going into the Channel Table Editor. Select a name from the list provided. You can change Channel Tables once you've entered the Channel Table Editor. Always include the ".cht" filename extension.

The results (with the standard Channel Table std.cht loaded) are in Figure C–1.

Rec #	Chan #	Program	Tag	Visual or Center Freq (MHz)	Chan Width (MHz)	Channel Edge (MHz)	2714/ 2715 Channel Type	2714/2715 Second Aural (MHz)	Scram- ble	Use White
1	907			7.000000	6.000	-1.250000	CATV	0.00	No	No
2	908			13.000000	6.000	-1.250000	CATV	0.00	No	No
3	909			19.000000	6.000	-1.250000	CATV	0.00	No	No
4	910			25.000000	6.000	-1.250000	CATV	0.00	No	No
5	911			31.000000	6.000	-1.250000	CATV	0.00	No	No
6	912			37.000000	6.000	-1.250000	CATV	0.00	No	No
7	913			43.000000	6.000	-1.250000	CATV	0.00	No	No
8	2			55.250000	6.000	-1.250000	CATV	0.00	No	No
9	3			61.250000	6.000	-1.250000	CATV	0.00	No	No
10	4			67.250000	6.000	-1.250000	CATV	0.00	No	No
11	5			77.250000	6.000	-1.250000	CATV	0.00	No	No
12	6			83.250000	6.000	-1.250000	CATV	0.00	No	No
13	95		A5	91.250000	6.000	-1.250000	CATV	0.00	No	No
14	96		A4	97.250000	6.000	-1.250000	CATV	0.00	No	No
15	97		A3	103.250000	6.000	-1.250000	CATV	0.00	No	No
16	98		A2	109.250000	6.000	-1.250000	CATV	0.00	No	No
17	99		A1	115.250000	6.000	-1.250000	CATV	0.00	No	No
18	14		A	121.250000	6.000	-1.250000	CATV	0.00	No	No
19	15		B	127.250000	6.000	-1.250000	CATV	0.00	No	No
20	16		C	133.250000	6.000	-1.250000	CATV	0.00	No	No
21	17		D	139.250000	6.000	-1.250000	CATV	0.00	No	No
22	18		E	145.250000	6.000	-1.250000	CATV	0.00	No	No
23	19		F	151.250000	6.000	-1.250000	CATV	0.00	No	No

Figure C–1: Main window of the Channel Table Editor

Creating a New Channel Table

Use the following procedure to create a new channel table which is not based on an existing channel table.

Clear the Channel Table   From the File menu, choose New. This clears the Channel Information and loads the default values into the Table Information.

Edit the Table Information   **1.** Choose the Edit Table Information command button from the Button Bar. This displays the Edit Table Information dialog box as shown in Figure C–2.
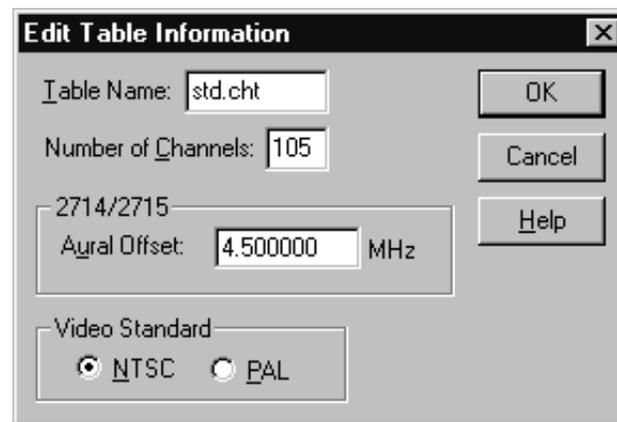

Figure C–2: Edit Table Information dialog box

2. Enter a name for the new Channel Table in the Table Name text box (for this example, enter `test1`). The `.cht` filename extension is added automatically.

3. Enter the number of channels.

4. Enter the appropriate Aural Offset value for your system.

5. Select the correct Video Standard option button, either NTSC or PAL.

6. Click on OK to save the changes and exit the Edit Table Information dialog box.

Edit a Channel   1. Start with the first channel as shown in Figure C–3.

Figure C–3: Test1.cht Channel Table before beginning the edits

2. Enter data into the Chan #, Program, Tag, and Visual Frequency text boxes.

3. Fill in the rest of the data by selecting the cell and either selecting from the drop-down list box or entering data in the text box. (See page C–23 for more details on the various Channel Table fields.)

NOTE. If you are using the keyboard, use ALT+↓ *to open the field's drop-down list boxes.*

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4. Click on Save. The application window now looks similar to Figure C–4.

Figure C–4: Channel Table Editor with one channel's data entered

Creating a Channel Table from an Existing Channel Table

In the previous section you learned how to create a Channel Table. While you can create a channel table from scratch, it would take a long time to do so, editing one channel at a time. It is much easier to take an existing Channel Table and edit it to conform to your needs.

Editing an Existing Channel Table

1. From the File menu, choose Open. The dialog box shown in Figure C–5 appears.
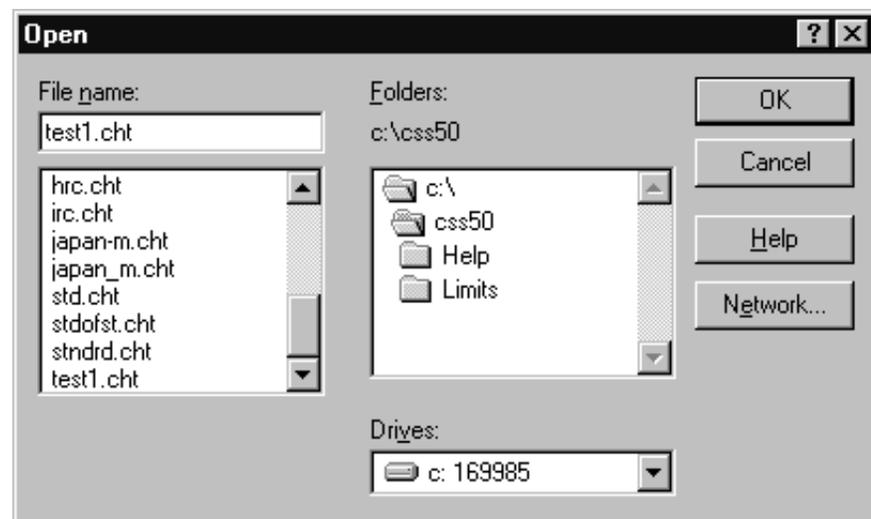
Figure C–5: Open dialog box

2. Select "std.cht" from the File Name list box. This Channel Table comes with the CSS50 application.

3. Click on OK. The Channel Table will load and will appear similar to Figure C–6.

Rec #	Chan #	Program	Tag	Visual or Center Freq (MHz)	Chan Width (MHz)	Channel Edge (MHz)	2714/ 2715 Channel Type	2714/2715 Second Aural (MHz)	Scram- ble	Use White
1	907			7.000000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
2	908			13.000000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
3	909			19.000000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
4	910			25.000000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
5	911			31.000000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
6	912			37.000000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
7	913			43.000000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
8	2			55.250000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
9	3			61.250000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
10	4			67.250000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
11	5			77.250000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼
12	6			83.250000	6.000	-1.250000	CATV ▼	0.00	No ▼	No ▼

Figure C–6: The std.cht Channel Table

4. From the File menu, choose Save As. The dialog box looks similar to Figure C–7.
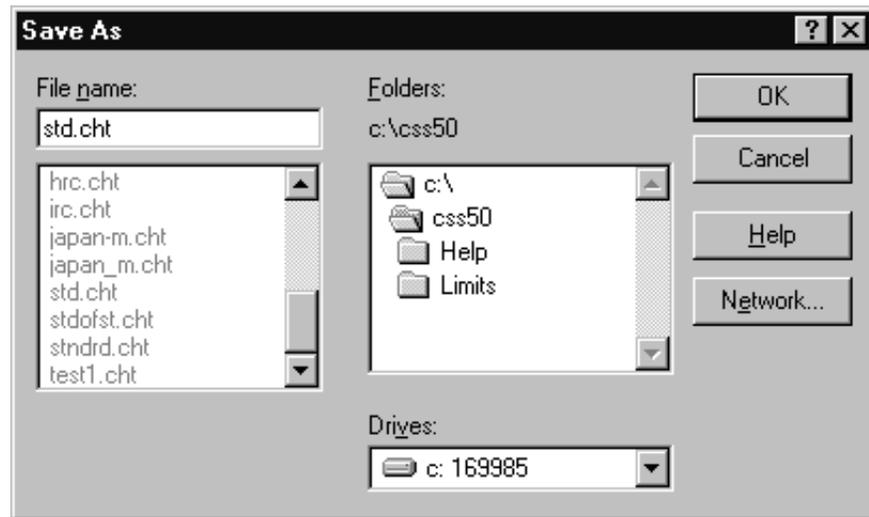
Figure C–7: Save As dialog box

5. Enter learners in the File Name text box.

NOTE. The Channel Table Editor automatically adds the ".cht" filename extension.

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6. Click on OK to save the changes and leave the Save As dialog box. Changes are made in your learners.cht and not the std.cht file.

7. Select the first channel and make any changes that might be required for your system.

8. Repeat these steps for all channels in your system.

9. If any fields are the same for all channels, click on Copy Fields in the Button Bar. Figure C–8 shows the resulting dialog box.
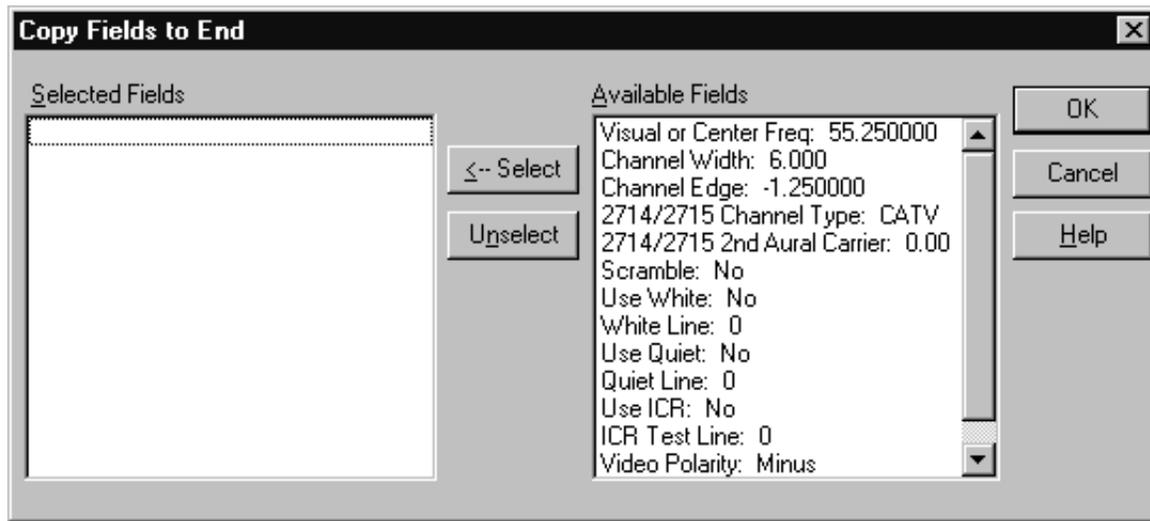
Figure C–8: Copy Fields to End dialog box

10. Select all of the fields you want to be the same as the channel that you are editing.

11. Click on OK to copy these fields to all channels below it in the Channel Table.

12. If there are any channels that are not in your system, select the channel (by clicking on the REC # cell) and click on Delete to remove them.

13. From the File menu, choose Save to save the edited Channel Table.

Loading a Channel Table into the Test Equipment

Now that you have created a custom Channel Table for your system, you must load it into the test equipment.

1. From the Transfer menu, choose To.

2. The channel table will be downloaded to the 2714 or 2715.

These are the basics that you need to use the Channel Table Editor application with the CSS50 application.

Channel Table Cautions

When creating or using a channel table, follow these cautions to ensure that the software functions properly.

Matching Channel Tables in the CSS50, Test Equipment, and the Cable System

The Channel Table used by the software must match the Channel Table in the 2714 or 2715. Also, the Channel Tables used by the software and the equipment must match the cable system connected to the equipment. If any of the three do not match, measurements you take will be incorrect, errors will be returned, or the software will behave unpredictably.

The 2714 will not run digital measurements, but uses the same channel table format as the 2715. If the software attempts to take a measurement on digital channels using the 2714, measurements returned will be incorrect, errors will be returned, or the software will behave unpredictably.

Channel Table Names

For the CSS50 measurements to execute properly, the corresponding Channel Table in the 2714 or 2715 must be identical to the Channel Table specified in the CSS50 Worksheet Header. If the CSS50 software finds that the Channel Table in the 2714 or 2715 does not match (by NAME) the channel table that the CSS50 is using, the CSS50 loads the Channel Table it is using into the 2714 or 2715.

This scheme allows you to easily switch to different named Channel Tables as follows:

1. Choose Worksheet Info from the Configure menu.

2. In the Channel Table group, select a new table from the combo box.

3. Click on OK to end the worksheet Info dialog. At this point a new worksheet is created. A message appears, allowing you to save the old worksheet.

4. When a measurement executes on this new worksheet, the CSS50 software automatically selects the new Channel Table in the 2714 or 2715. If the named Channel Table does not exist in the instrument, the Channel Table loads into the instrument before making the measurement.

The CSS50 software detects Channel Table mismatches by comparing the Channel Table name only. It does not compare the contents of the Channel Tables. Therefore, use caution when editing named Channel Tables. For instance, assume the current worksheet is using a Channel Table named MYSYS-TEM.CHT and that this Table exists in the 2714 or 2715. Now suppose the Channel Table is edited, using the Channel Table Editor to add channel 78, and then saved under the same name, MYSYSTEM.CHT. Upon returning to the CSS50 worksheet, notice that the new channel is not present in the spreadsheet. Also notice that the new channel will not be present in the MYSYSTEM table in the 2714 or 2715. So that even if a new worksheet is created, which includes the edited Channel Table, the new channel will still not be accessible in the instrument for the measurements. This is because the CSS50 compares Channel Table names and not contents.

Use the following guidelines for editing existing Channel Tables:

If an existing Channel Table is edited in any way, it is easiest to save it under a different name. Then create a new worksheet to use this Channel Table.

If an existing Channel Table must be edited and saved to the same name, perform the following steps:

1. Start with the Channel Table as the current one in the worksheet. (Its name is in the Worksheet Header.)

2. Choose Worksheet Info from the Configure menu. The current Channel Table is already selected in the Channel Table Group combo box.

3. Click on Create/Edit Channel Table to start the Channel Table Editor.

4. The Current Table is in the editing buffer of the Channel Table Editor. Edit the Table as required and then save the Channel Table, using the same name.

5. If a Channel Table using the same name currently exists in the 2714 or 2715, delete it from the 2714 or 2715.

NOTE. You can't delete a channel table from the 2714 or 2715 if it is the selected table.

6. Use To, from the Transfer menu, to transfer the edited Channel Table to the 2714 or 2715.

7. Exit the Channel Table Editor and return to the CSS50 Worksheet Info dialog box.

8. Click on Cancel to return to the CSS50 worksheet.

9. Choose New from the file menu to create a new worksheet to use the "edited" Channel Table.

Out of Bounds Limits

The Channel Table fields have limits. If these limits are exceeded you will be able to open the Channel Table but will be given a warning that there is a problem with the file. Use the Limits Check, from the Transfer menu, to find the problems and correct them.

Independent Operation

The Channel Table Editor is an application that can be used independently of the CSS50. However, do not perform any Channel Table Loader operations while measurements are taking place using CSS50. Do not change or load a Channel Table while an instrument is using the table.

Channel Table Names

If you enter the Channel Table Editor from CSS50 via the Create/Edit Channel Table command button and you make a new Channel Table, the Channel Table list is not immediately updated in the Worksheet Info dialog box when you

return to the CSS50 application. You must close the dialog box and open it again before the new Channel Table appears in the list.

The Channel Table is not changed unless you create a new worksheet. This prevents you from corrupting data on the current worksheet.

DS1000 Series and Channel Tables   The software does not download Channel Tables into the DS1000 series demodulators as it does with the 2714 or 2715. When the demodulator needs to be tuned to a different channel, that channel's frequency is obtained from the channel table and then the demodulator is tuned to that frequency.

Channel Tables Provided

Channel Tables provided with CSS50 represent Channel Tables pre-loaded in the 2714 or 2715. The only exception is STDOFST.CHT, which is not associated with any instrument. If you must edit a Channel Table, you should rename it, being careful not to use a name from the list in Table C–1.

Table C–1: Channel Tables provided with CSS50

From what instrument	Channel table name	Contents/function
2714 or 2715	STD.CHT[1]	United States CATV standard channels
	HRC.CHT	United States CATV HRC (Harmonically Related Carriers) channels
	IRC.CHT	United States CATV IRC (Increment-Related Carriers) channels
None	B-CAST.CHT	North America VHF/UHF Broadcast channels
	CATV-HRC.CHT	United States CATV HRC (Harmonically Related carriers) channels
	CATV-IRC.CHT	United States CATV IRC (Increment-Related Carriers) channels
	CATV-KOR.CHT	Korean CATV standard channels
	CATV-STD.CHT	United States CATV standard channels (no T-Channels)
	CHINA-DK.CHT	China system D/K UHF/VHF
	CHIN_DK.CHT	China system D/K UHF/VHF

Table C–1: Channel Tables provided with CSS50 (cont.)

From what instrument	Channel table name	Contents/function
	EUR-BG.CHT	European system B/G UHF/VHF and CATV
	EUR-I.CHT	European system I UHF
	EUR_I.CHT	European system I UHF
	EUR_I1.CHT	European system I UHF
	JAPAN-M.CHT	Japan system M UHF/UHF
	JAPAN_M.CHT	Japan system M UHF/UHF
	SDTOFST.CHT	United States CATV standard channels with common frequency offsets applied
	STNDRD.CHT	United States CATV standard channels (no T-Channels, frequency limited to channel 94)

1   **The tuning range of a DS1000 series demodulator is 55.25 MHz to 801.25 MHz for NTSC and 45.25 MHz to 860.25 MHz for PAL. Attempting to tune to channels outside this range, like the T-Channels (907 – 913) will result with the error message "The selected channel's frequency cannot be set in the DS1000."**

Overview

This section goes through each of the menu commands and gives a brief description of what they are and how they work.

Figure C–9: Title Bar menu

Restore. The Restore command returns the Channel Table Editor application window to its previous size and position. It is often used to change an icon back into a window. It will also change the window between two different sizes and positions. It performs the same functions as the Restore command button (small box with both up and down arrows) on the upper right hand corner of the worksheet.

Move. Move allows different placements of the Channel Table Editor window. This is equivalent to clicking on the Title Bar and holding down the left mouse button to reposition the display. The Move command is only allowed if the application window is not at its maximum size.

To use Move with the keyboard:

1. Choose Move. (Press ALT+spacebar, then type m.)

2. Press the arrow keys until the window is in the desired position.

3. Press ESC to stop moving the window.

Size. Size allows you to change the size of the application window.

Minimize. The Minimize command changes the application to an icon. The application is still running but it is no longer the active window. Channel Table Editor stays in exactly the same operating state as when it was converted to an icon. This performs the same function as the Minimize button (small box with the down arrow) on the upper right hand corner of the worksheet. (See Figure 3–1 on page 3–3.)

Maximize. The Maximize command changes the application from an icon back to the active window. This also changes a sized window into one that fills the entire display area. Maximize performs the same function as the Maximize command button (small box with an up arrow) on the upper right corner of the worksheet.

Close. Closes the Channel Table Editor application window and exits the application.

Menu Bar
The Menu Bar of the Channel Table Editor (see Figure C–10) provides access to all of the Channel Table Editor's functions.
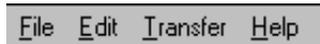
File   Edit   Transfer   Help

Figure C–10: Menu Bar

File. The File menu (see Figure C–11) contains the basic Windows file manipulation commands, described in the following paragraphs.

Figure C–11: File menu

- New. New empties the Channel Table and gives you a blank Channel Table. New prompts for save if the current Channel Table has been modified.

- Open. Open loads a previously existing Channel Table. A dialog box prompts for a file. See Figure C–12.
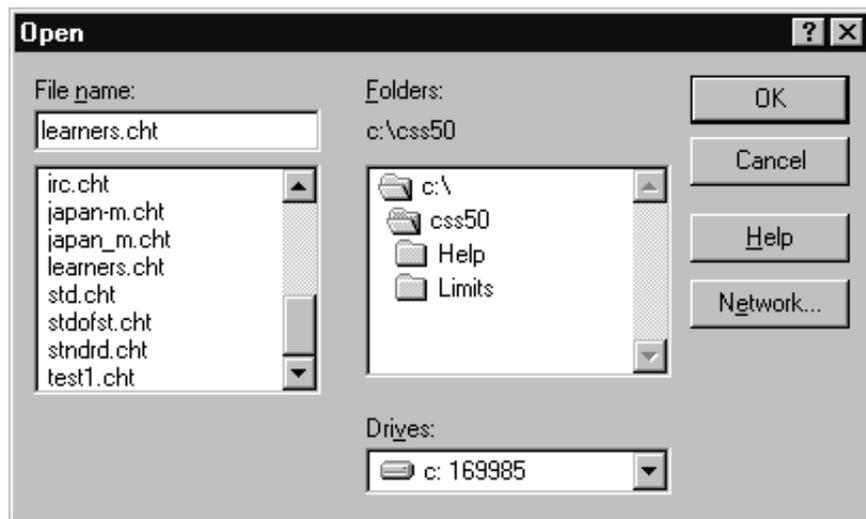
Figure C–12: Open dialog box

- Save. Saves the changes made to the Channel Table to the file specified in the main Window caption. If the Channel Table has no name, it will prompt you for one.

- Save As. Saves a Channel Table under a new name. See Figure C–13.
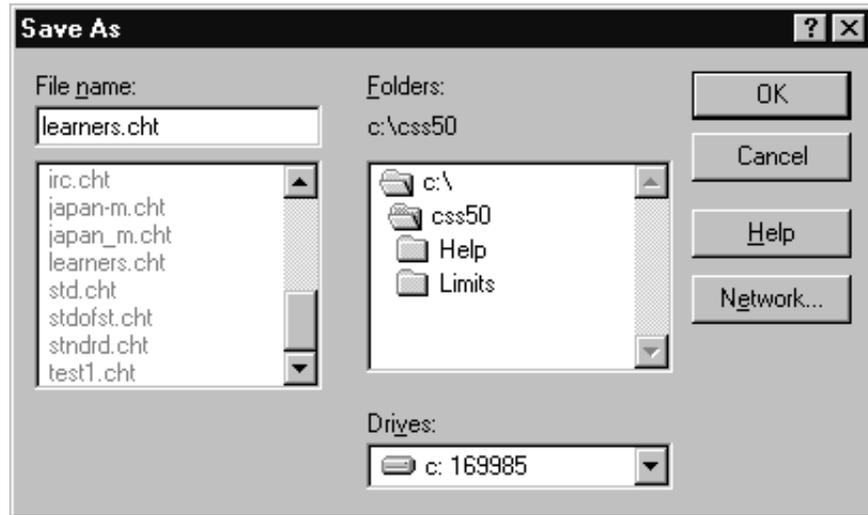
Figure C–13: Save As dialog box

■ Print. Prints the current Channel Table. See the Windows manual for more information on this dialog box. See Figure C–14.
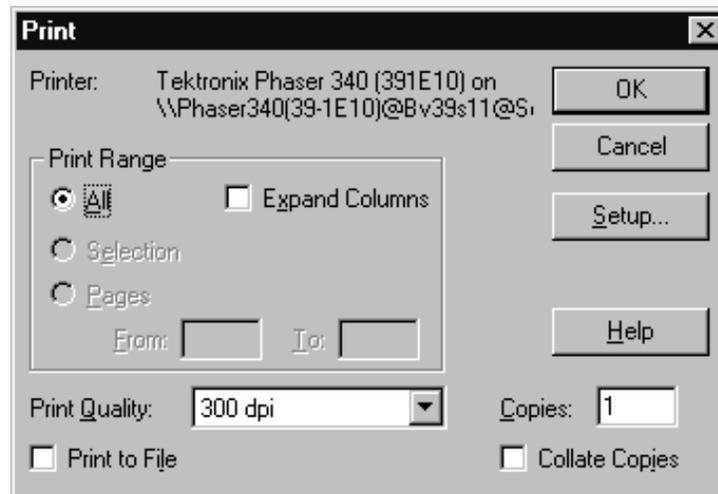
Figure C–14: Print dialog box

■ Print Setup. The Print Setup dialog box allows you to configure the printer as required. See Figure C–15. This is the same dialog box accessed through the Setup command button in the Print dialog box.
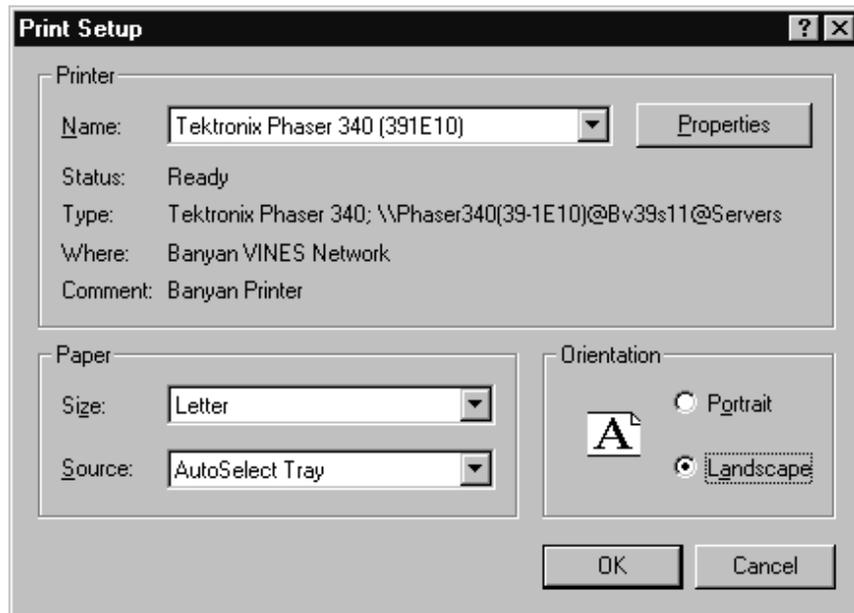
Figure C–15: Print Setup dialog box

■ Exit. Closes the Channel Table Editor application. Prompts for confirmation if the current Channel Table has been modified.

Edit. The Edit menu (see Figure C–16) contains the commands used to modify the Channel Table. They are: Insert, Delete, Append, Copy Fields to End, Edit Table Info, and Sort.
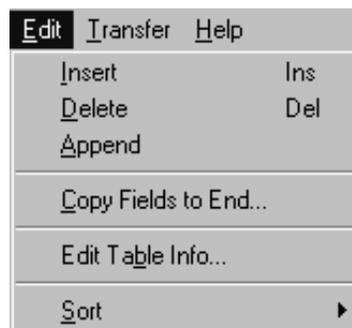
Figure C–16: Edit menu

■ Insert. The same as Insert from the Button Bar. Insert places a blank row into the Channel Table (only the default values are filled in). The channel is placed just before the selected (active) channel.

■ Delete. Removes the selected channel from the Channel Table. Same as Delete from the Button Bar. This command is only available when a channel has been selected.

■ Append. Functions the same as Insert, except it adds the new channel to the end of the Channel Table.

■ Copy Fields to End. This command allows you to copy the selected channel fields to all of the channels below the selected one in the Channel Table. See Figure C–17. Use this command to quickly make "universal" changes.
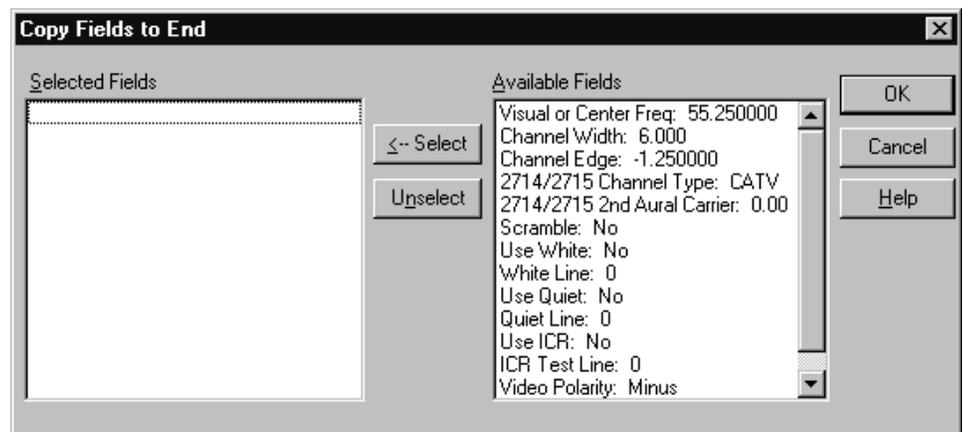
Figure C–17: Copy Fields to End dialog box

■ Edit Table Info. Edit Table Info opens the Edit Table Information dialog box filled with the information that is standard throughout the Channel Table. See Figure C–18.
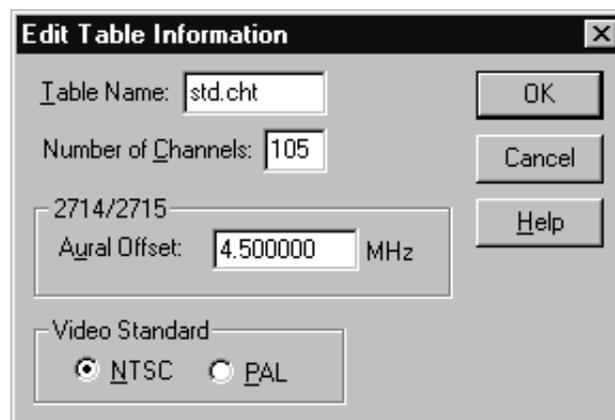
Figure C–18: Edit Table Information dialog box

Table Name. The name of the Channel Table.

Number of Channels. The number of channels in the Channel Table. If you edit this number to increase the number of channels, blank channels are added to the end of the Channel Table. The maximum number of channels available is 500. If you decrease the number of channels, the channels are deleted beginning with the last channel in the Channel Table and working backward.

NOTE. The maximum number of channels that the instruments can handle is 200.

Aural Offset. The nominal difference between the visual and aural carriers. The 2714 or 2715 uses this parameter.

Video Standard. Either NTSC or PAL.

■ Sort. You can sort the channel table three ways:

By Channel Number. Sorts the entire Channel Table using the channel number as the sort key.

By Frequency. Sorts the entire Channel Table by frequency.

By Program. Sorts the entire Channel Table by program.

Transfer. The Transfer menu loads the Channel Table into the 2714 or 2715 and can also extract or delete Channel Tables from the instrument. The commands in the Transfer menu are shown in Figure C–19.
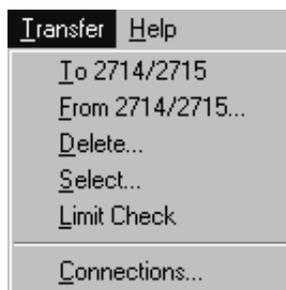
Figure C–19: Transfer menu

■ To 2714/2715. Takes the current Channel Table and loads it into the 2714 or 2715.

NOTE. *If the Channel Table is currently in use by the instrument, this command will be refused.*

■ From 2714/2715. Extracts an existing Channel Table from the 2714 or 2715 and puts it in a format the Channel Table editor can use. It prompts for confirmation if the current Channel Table has been modified, but not saved to a file, since it will be overwritten during this operation.

The dialog box shown in Figure C–20 appears. It lists all of the Channel Tables currently in the 2714 or 2715. Select which Channel Table you want copied, then click on OK. The Channel Table is then copied from the 2714 or 2715 to the Channel Table Editor window.
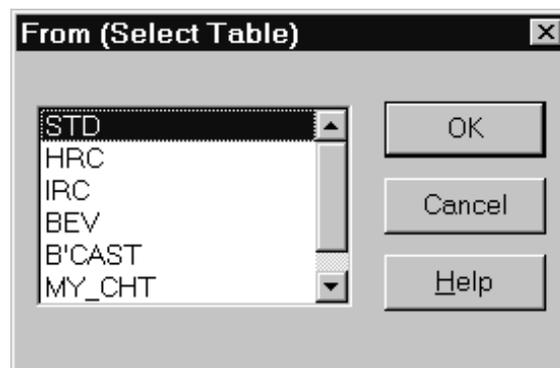
Figure C–20: From (Select Table) dialog box

■ Delete. Deletes a Channel Table from the 2714 or 2715.

The dialog box shown in Figure C–21 appears. Notice this list is different than the one in Figure C–20 for the From command. The From command lists all of the Channel Tables, while the Delete command only lists user-created Channel Tables. This prevents accidentally erasing built-in Channel Tables.

NOTE. *If the Channel Table is currently in use by the 2714 or 2715, this command will be refused.*
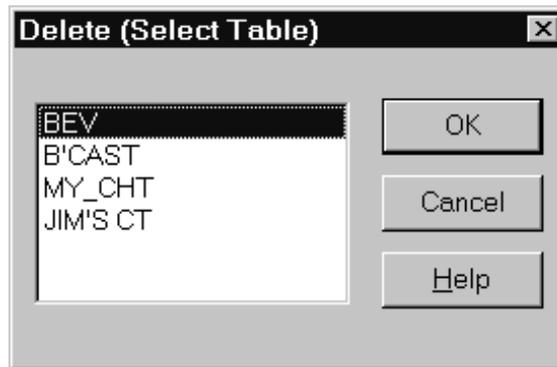
Figure C–21: Delete (Select Table) dialog box

■ Select. This command allows you to make a specific Channel Table in the 2714 or 2715 active. You are given a list of the current Channel Tables in that instrument similar to the From list in Figure C–20. You select the desired Channel Table from that list.

To update a channel table that is in use:

1. Select a channel table other than the one in use.

2. Delete the channel table you intend to update from the 2714 or 2715.

3. Send the updated channel table to the 2714 or 2715.

4. Select the updated channel table in the 2714 or 2715.

■ Limit Check. Limit Check checks all of the Channel Table data for compatibility with the 2714 or 2715. If any problems are found with the Channel Table data, a message box is displayed, describing the first problem found. See Figures C–22 and C–23.
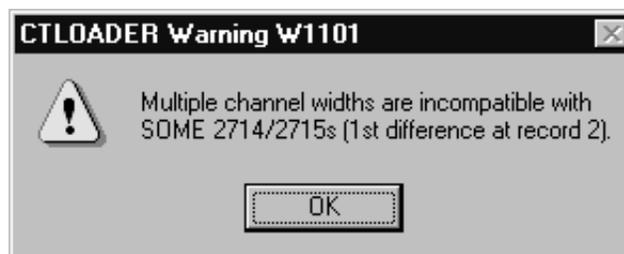
Figure C–22: Multiple channel widths are incompatible with 2714 and 2715 warning

Figure C–23: Limit Check passed message

■ Connections. Use the Connections dialog box (shown in Figure C–24) to set the GPIB and RS-232 port addresses for the 2714 or 2715 in the Channel Table Editor. This is for loading and retrieving Channel Tables in the 2714 or 2715 NVRAM. If the 2714 or 2715 settings were correct in the CSS50 application they will not need to be edited here. (Any changes in this dialog box affect both applications.).
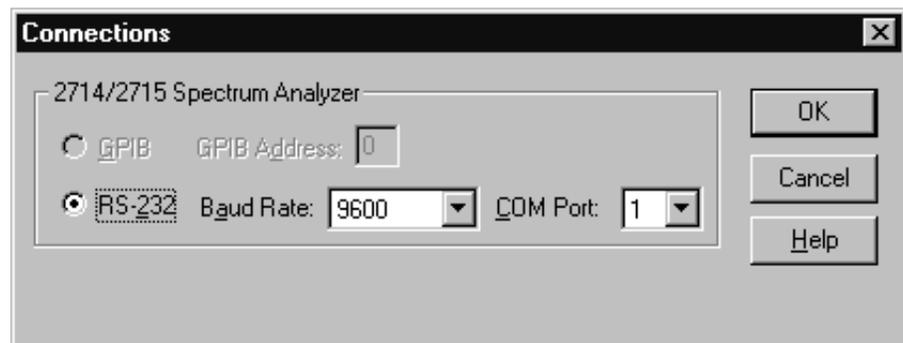
Figure C–24: Connections dialog box

Help. The Help menu contains access for on-line help.

■ Contents. Contents displays information about Channel Table Editor, including a description of the main window.

■ About. Displays the version number and copyright information. See Figure C–25.
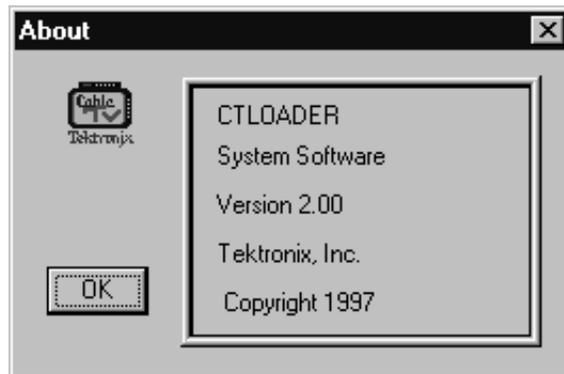
Figure C–25: Channel Table Editor About dialog box

Button Bar

	Open	Opens an existing Channel Table. Same as Open from the File menu. (See page C–14.)
	Save	Updates the Channel Table information. Same as Save from the File menu. (See page C–14.)
	Insert	The same as Insert from the Edit menu. (See page C–16.)
	Delete	The same as Delete from the Edit menu. (See page C–17.)
	Copy Fields	The same as Copy Fields to End from the Edit menu. (See page C–17.)
	Edit Table Info	This is the information that is the same for every channel of a Channel Table: the Name, Number of Channels, Aural Offset, and the video standard. This command button is the same as double-clicking on the Table Information list box or choosing Edit Table Info, from the Edit menu. (See page C–17.)
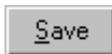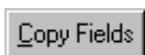
Channel Table Fields

Chan # . The commonly known number of this channel.

Program. A 6-character identifier for the channel, used for the channel's call letters or abbreviated name.

Tag. A 3-character designation for the channel, such as "AAA" or "2 B". It must be uppercase alphanumeric (0-9 and A-Z, space is OK as long as there are additional valid characters).

Visual or Center Freq. The visual carrier frequency in MHz or the channel's center frequency for digital channels.

Channel Width. The width of the channel. In 2714 or 2715 instruments with firmware version 09.29.94 or earlier, only one channel width can be specified and it applies to all channels. To unambiguously determine a channel width when sending to one of these instruments, all channel widths must be the same. You can use the Copy Field to End command to make all channel widths the same.

Channel Edge. The frequency difference between the visual or center frequency and the lower bound of the frequency allocation. For example, for analog channel 2 in the USA, the Visual or Center Freq is set to 55.25 MHz, the Channel Edge is set to –1.25 MHz, and the Channel Width is set to 6.0 MHz. For digital channels, the Channel Edge should be one-half of the Channel Width. For example, a digital channel centered between 57 and 60 MHz should have the following values in the channel table: Visual or Center Freq set to 58.5 MHz, Channel Width set to 3 MHz, and Channel Edge set to –1.5 MHz.

2714/2715 Channel Type. The type of signals transmitted on this channel: CATV, FM, Pilot, or Digital.

2714/2715 Second Aural. The offset between the visual carrier and the second aural carriers. This value must be at least 200 kHz above the first aural carrier and below the channel edge. Only used by the 2715 and firmware version 1.12.94 and later of the 2714.

Scramble. Whether or not this channel is scrambled.

Use White. Selects whether the white line or the whole field should be used in the amplitude measurements.

White Line. The location of the white line.

Use Quiet. Selects whether the quiet line or the whole field should be used in the Carrier to Noise and CSO measurements. If Use Quiet Line is NO, then the instrument will auto search for unmodulated lines on which to make Carrier to Noise and CSO measurements. If Use Quiet Line is YES, then the instrument will use the line number supplied in the Quiet Line field (below). (2715 only.)

Quiet Line. The quiet line in the video signal used for making the Carrier to Noise and CSO measurements. It must be between 9 and 525.

Use ICR. The ICR measurement should be made using the specified test line. If Use ICR is NO, then this measurement is skipped. If you attempt to make a measurement on a channel with Use ICR set to NO, the instrument will try to execute the measurement, but color the results cell blue to indicate that there was a problem with the measurement. (2715 only.)

ICR Test Line. The location of the ICR test line in the video signal. This line number is placed in the Notes field for the measurement results. The test line can be either multiburst or Philips GCR ghost canceling signal or Sin(x)/x. You can change the ICR Test Line from the 2715's front panel and the value will be stored in the instrument's Channel Table (2715 only).

Video Polarity. Polarity of the video signal.

Sync Polarity. Polarity of the sync pulse.

Appendix D: FCC Measurements

NOTE. The methods given in this chapter are just suggestions. It is the operator's responsibility to comply with FCC requirements.

This chapter discusses how to perform FCC Headend and Field measurements. Most of the information is not applicable outside of the Unites States. Use it as a starting point to help you define your own procedures to meet FCC Measurement requirements. This chapter assumes you are familiar with the following concepts:

- Configuring Worksheets

- Defining Measurement Sequences

- Generating 2714/2715 UDPs

- Getting 2714/2715 Stored Results

- Importing/Exporting Measurement Results

- Viewing Results

- Using the Clipboard

Organizing Worksheets and Measurement Results

The FCC testing requirements result in large numbers of measurement results, even for modest systems. Organizing these results in a reasonable way allows for quick access to the results for verification, analysis, and reporting. The directory structure shown in Figure D–1 is a good example of how to organize FCC performance test results. The remainder of this chapter describes how to create this structure, fill it with test results, and access the results for verification, analysis, and reporting.

For example, create the directory structure shown in Figure D–1, using the Windows Explorer. You can place this directory tree anywhere, but not in your LIMITS directory for CSS50. It is good practice not to put anything in the Limits directory except Limits files.
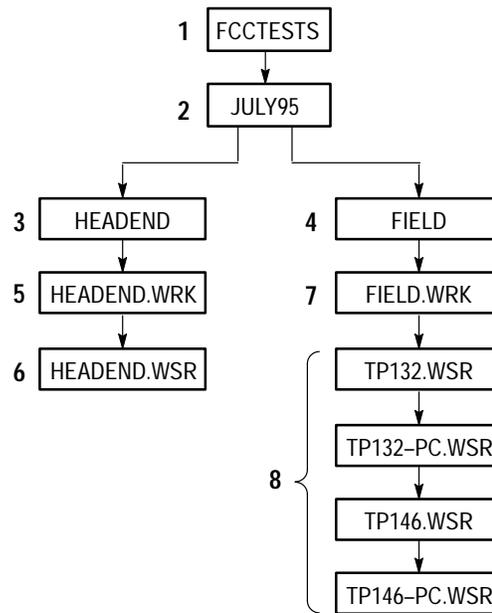
Figure D–1: Organization of files for logical record keeping

1. FCCTESTS is a directory that contains all of the FCC type measurement results.

   Group each test session by the month and year performed. A test session is defined as all the FCC required twice-yearly performance tests for a particular system.

2. JULY95 is a sub-directory of the FCCTESTS directory that contains all of the measurement results for July of 1995.

   Group the performance tests by those required at the Headend (output of modulating or processing equipment) and those required at the field test sites (for example, subscribers' terminals).

3. HEADEND is a sub-directory of JULY95 that contains the results of the Headend measurements for that month. (Notice that there are no files above this level – only directories.)

4. FIELD is a sub-directory of JULY95 that contains all of the field measurements made that month. (Again, notice that there are no files above this level – only directories.)

5. HEADEND.WRK is the worksheet used to define, control, and collect results for this Headend test session.

6. HEADEND.WSR contains the actual results from this Headend test session.

7. FIELD.WRK is the worksheet used to define, control, and collect results for this field test session.

8. The rest of the files are the actual measurement results from the TP132 and TP146 test Sites (Test IDs) collected during this session.

FCC Headend Measurements

The FCC Headend measurement requirements consist of a series of RF and baseband measurements taken on a set of channels at the Headend.

The following describes how to use a Measurement Sequence to perform all the available Headend measurements and how to collect and present the measurement results.

Configure a New Worksheet

Configure a new worksheet to match the system and testing methods.

1. Choose New, from the File menu.

   ■ Set the Channel Table and Site name to match the system. For example, use STD.CHT for Channel Table and Headend name for Site.

2. Set up the worksheet items listed below from the Configure menu:

   ■ Test ID – Set to a test session identifier or operator name such as "Headend Test 7-16-1995".

   ■ Preferences – Measurement History is not required for this example, so set it to Keep Last Result Only.

   ■ Measurement Limits

   ■ Measurement Setups

Define the Measurement Sequence

Define the Measurement Sequence used to execute the required measurements.

1. Choose Measurement Sequence from the Configure menu.

2. Define the measurements by choosing the FCC Headend Msmts command button. This provides a method to easily select the required measurements. Carrier Levels and Frequencies are automatically selected for all channels.

3. Select specific test channels for the FCC Baseband measurements (which includes chroma-luma delay, differential gain, and differential phase) using the Select command button. These are the system-specific test channels chosen to comply with the FCC regulations on number of test channels based on system frequency limit.

4. Select the OK button when the selected test channel list is correct. The Measurement Sequence dialog box displays the selected FCC Headend measurements.

5. Define the Measurement Sequence execution time parameters by choosing the Edit Time Parameters command button.

6. Set it up to run immediately, 1 time.

7. Select OK to return to the Measurement Sequence dialog.

8. Select OK to return to the worksheet.

9. Execute the Measurement Sequence using the Exec Seq command button on the Button Bar, or Measurement Sequence, from the Measure menu.

    The Measurement Sequence executes the FCC Headend measurements.

10. When the sequence is complete, answer Yes to turn on the Measurement Sequence View filter. The worksheet displays only the results from the Measurement Sequence just completed (that is, the FCC Headend performance tests).

Summarize the Measurement Sequence Results

1. Choose Global View, from the View menu, to look for measurement cautions and/or alarms.

2. Display a Status Report by selecting all of the cells in the Global View and choose the Results Detail command button.

3. If you wish, print the report using the Print button.

4. Choose Close to leave the Status Report.

5. Choose Close to leave the Global View.

6. Choose Export, from the File menu, to save the measurement results to a results file for archiving and importing to other report tools.

    a. In the directory list box select: FCCTESTS/JULY95/HEADEND.

    b. In the File Name, enter HEADEND.WSR.

    c. Choose OK to export the results.

7. Optionally, use Select All and then Copy, from the Edit menu, to copy the results to the Clipboard for transfer to other tools, (for example, MS-Excel, or MS-Word). Once the results are exported or copied, use other data analysis tools (such as MS Excel) to generate complete FCC Proof Reports.

Save the Worksheet   Use Save As, from the File menu, to save the worksheet for future reference.

1. Choose Save As from the File menu.

2. In the directory list box, select FCCTESTS/JULY95/HEADEND.

3. In the File Name box, enter HEADEND.WRK.

4. Select OK to save the worksheet.

FCC Field Measurements

The FCC field measurement requirements consist of a series of, primarily, RF measurements taken on a channel set at various points in the system. Since the 2714 or 2715 Spectrum Analyzer can make all of the required measurements, the following describes how to define and use 2714 or 2715 User Defined Programs (UDPs from Measurement Sequences) to perform the field measurements and how to collect and present the measurement results.

FCC field testing uses three separate UDPs: one for the pre-converter performance tests, one for the post-converter performance tests, and one for the visual carrier 24-hour variation and 30M Carrier Level Performance Test.

NOTE. The CSS50 package is transportable to field test sites for collection of performance test results at RF and Baseband using a Measurement Sequence. This is a direct extension of the procedures explained in previous chapters and further discussion is not included.

Use the three UDPs at each of the required test Sites. Note that since the measurement setup parameters (for example, external attenuation/amplification) are loaded into the UDPs, these parameters are set the same for each test Site. If each Site needs different parameters, create separate UDPs for each test Site. For example, the external attenuation/amplification setup defines the test point loss for the Carrier to Noise measurements. The FCC requires levels measured at the subscriber terminals and at the end of cable drops (locations with 0 dB offset).

Using the UDP measurement method described, remove the 2714 or 2715 from the CSS50 package and take it to the various test Sites for measurement execution and storage of results (in the 2714 or 2715 NVRAM). Later, reconnect the 2714 or 2715 to the CSS50 package for results collection and presentation.

Define the FCC Field Measurements Post-Converter Worksheet

Configure a new worksheet to match the system and testing methods used for the FCC Post-Converter measurements. Use File/New and set up the worksheet items listed below.

1. In the Worksheet Info dialog box, select the Post-Converter Channel Table, STD_PC.CHT, in the Worksheet Info dialog.

NOTE. Measurements taken at the output of the converter require a Channel Table that retains the channel identifier (that is, channel number) but has the visual carrier frequency for each channel set to the output visual carrier of the converter. The procedures below assume that the STD.CHT Channel Table is the primary table and the post-converter table exists as STD_PC.CHT (Standard Table, Post-Converter). You must create STD_PC.CHT to fit your own needs.

Define the Site name later from the 2714 or 2715 front panel at each test Site.

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2. In the Preferences dialog box, the Pause on New Channel preference can be used to allow manual tuning of the set top converter for each new test channel.

3. Use the Measurement Setups dialog box to specify whatever is required for your system and test methods.

NOTE. This worksheet is only used to define the FCC Post-Converter UDP and will not be saved (it is not necessary to save the file to create the UDP). Therefore, it is not necessary to define measurement limits at this time.

Define the Post-Converter UDP

1. Set the Test ID for the worksheet to "FCC Post-Converter" using the Test ID button on the Button Bar or the Test ID selection from the Configure menu.

2. Choose Measurement Sequence, from the Configure menu.

3. Define the measurements by selecting the FCC Post-Converter button.

   a. Carrier Levels and Frequencies are automatically selected for all channels.

   b. Select the specific test channels in the Select Channels group using the Select command button. These are the system specific test channels chosen to comply with the FCC regulations on number of test channels based on system frequency limit. Select the channels that require these additional measurements:

   ■ Carrier to Noise

   ■ CTB

- CSO

- Cross-Modulation (coherent disturbances)

- Hum (mode set to RF for all channels)

    c. Select the OK button when the selected test channel list is complete. The Measurement Sequence dialog box displays the selected FCC Post-Converter measurements.

4. Define the Measurement Sequence execution time parameters by selecting the Edit Time Parameters command button.

    a. Set to run immediately, 1 time.

    b. Select OK to return to the Measurement Sequence dialog.

5. Create a 2714 or 2715 UDP from the current Worksheet and Measurement Sequence setup using the Create 2714/2715 UDP button.

    a. Enter FCC Post-Converter for the UDP title and select OK.

    b. The UDP is created and loaded into the 2714 or 2715.

    c. Verify that the selected Channel Table (STD_PC.CHT) exists in the 2714 or 2715. This is not done automatically at UDP generation time — it must be explicitly done using the Channel Table Loader (see *Appendix C*).

    d. Select OK to return to the Worksheet.

Define the Pre-Converter Worksheet

Use New, from the File menu, to select the STD.CHT Channel Table. This will result in a new worksheet being created (the worksheet used to define the FCC Post-Converter UDP was only necessary for that task and does not need to be saved). Configure the items listed below for the new worksheet to match the system and testing methods:

1. Create a new worksheet by selecting New from the File menu.

2. In the Worksheet Info dialog box, select the Pre-Converter Channel Table, STD_PC.CHT, in the Worksheet Info dialog.

3. Define the measurements from the Measurement Sequence dialog box by selecting the FCC Pre-Converter button.

4. Set preferences as required in the Preferences dialog box. (For example, select "Pause on New Channel" if an external preselector is used. This allows for manual tuning of the preselector for each channel.)

5. Specify the Measurement Limits. Limits are not formally part of the generated UDP but are defined here to support importing the measurement results.

6. Specify the Measurement Setups (select Edit Setups from the measurement Setups dialog box). Verify that the required test channels have In-Channel Response set to RF measurement method.

NOTE. Define the Site name later from the 2714 or 2715 front panel at each test Site.

Define the Pre-Converter UDP

1. Set the Test ID for the worksheet to FCC Pre-Converter using the Test ID button on the button bar or Test ID selection, from the Configure menu.

2. Select Measurement Sequence from the Configure menu.

3. Select the Clear Sequence command button.

4. Define the measurements by selecting the FCC Pre-Converter button. This selection provides an easy method to select the required measurements:

   a. Carrier Levels and Frequencies are automatically selected for all channels.

   b. In-Channel Response is selected for all the test channels in the Selected Channels list box. (Verify that the In-Channel Response measurement setup is RF for each of the required test channels.)

5. Select the specific test channels in the Select Channels group using the Select button. These are the system specific test channels chosen to comply with the FCC regulations on number of test channels based on system frequency limit.

6. Choose the OK button when the selected test channel list is correct. The Measurement Sequence dialog box now displays the selected FCC Pre-Converter measurements.

7. Define the Measurement Sequence execution time parameters by selecting the Edit Time Parameters command button. Set to run immediately, 1 time.

8. Select OK to return to the Measurement Sequence dialog.

9. Create a 2714 or 2715 UDP from the current Worksheet and Measurement Sequence setup using the Create 2714/2715 UDP button.

   a. Enter "FCC Pre-Converter" for the UDP title and click on OK. This creates the 2714 or 2715 UDP and loads it into the 2714 or 2715.

    b. Verify that the selected Channel Table (STD) exists in the 2714 or 2715. This is not done automatically at UDP generation time — it must be explicitly done using the Channel Table Loader (see Appendix C).

    c. Select OK to return to the Worksheet.

Define the UDP for Visual Carrier Level and Level Variation (30M) Measurements

Define the Measurement Sequence for the visual carrier level and level variation (30M cable) measurement.

1. Set the Test ID for the worksheet to "FCC Visual Level/Var (30M)" using the Test ID button on the Button Bar or the Test ID item, from the Configure menu.

2. Optionally, if any measurement setups or preferences need changing (based on system test methods), enter the new parameters using Measurement Setups and Preferences, from the Configure menu. For example, the Pause for New Channel preference may have been selected for the pre-converter measurements (assuming the use of an external preselector). Now, for the visual level and level variation measurements, you are not likely to want to pause on each new channel.

3. Choose Measurement Sequence, from the Configure menu.

4. Choose the Clear Sequence command button.

5. Define the measurements by choosing the 24 Hour Test command button. This selection provides easy selection of the required measurements. (Carrier Levels and Frequencies are selected for all channels)

6. Define the Measurement Sequence execution time parameters by selecting the Edit Time Parameters command button.

7. Verify that Run Immediately, Run 4 Times, and Repeat Interval = 6 Hours are selected. These parameters are set automatically when using the 24 Hour Test button.

8. Select OK to return to the Measurement Sequence dialog.

9. Create a 2714 or 2715 UDP from the current Worksheet and Measurement Sequence setup using the Create 2714/2715 UDP command button.

    a. Enter "FCC Visual Level/Var (30M)" for the UDP title and select OK. This creates the UDP and loads it into the 2714 or 2715.

    b. Verify that the selected Channel Table (STD) is loaded in the 2714 or 2715. This is not done automatically at UDP generation time — it must be explicitly done using the Channel Table Loader (see Appendix C).

    c. Select OK to return to the Worksheet.

10. Use Save As, from the File menu, to save the worksheet for future reference.

    a. In the directory list box select FCCTESTS/JUL95/FIELD

    b. In the File Name box enter FIELD.WRK.

    c. Select OK to save the worksheet.

Execute the UDPs at Each Test Site

Once the UDPs are defined and loaded, the 2714 or 2715 can be removed from the CSS50 package and taken independently to each test Site for measurement execution and results collection. (Remember to load the correct Channel Tables into the 2714 or 2715.)

The 2714 or 2715 has limited on-board results storage capacity. Therefore, it may be desirable to remove all currently stored measurement results before executing the UDP at the first test Site. See the 2714 or 2715 manual for more information on its measurement storage capacity. Also, in order to provide more on-board storage capacity, remove additional items such as stored settings and waveforms, unused Channel Tables, etc., from the 2714 or 2715 NVRAM. See the 2714 or 2715 user manual for specifics on these operations.

1. At each test Site, first enter the Site name into the 2714 or 2715 using the 2714 or 2715 front panel keys (see the 2714 or 2715 user manual for specifics on this operation). This allows tagging each measurement result with the correct measurement Site. Use these Site name tags to encapsulate measurement results by individual Sites. For this example, we are collecting results at only two test Sites (TP132 and TP146). The FCC requires a minimum of six test Sites; for explanation purposes we are only using two. Enter Site name "TP132" before starting any UDPs at the first Site, and "TP146" at the second Site.

2. After entering the Site name, execute each UDP, by selecting the UDP name in the 2714/2715 USER DEF menu. The 2714 or 2715 will sequence through the measurements and store the results. (The UDP automatically stores all measurement results in the 2714 or 2715 NVRAM.) Depending on the chosen preferences and measurement setups, the 2714 or 2715 may present various prompts for user action during the execution of the UDP.

3. Repeat step 2 for the second test Site. Remember to enter the new Site name in the 2714 or 2715.

Collecting and Presenting Measurement Results

1. When finished collecting data at the test Sites, re-connect the 2714 or 2715 to the CSS50 package.

2. Open the Worksheet used to create the FCC field test UDPs using Open, from the File menu.

    a. In the directory list box, select FCCTESTS/JUL95/FIELD.

b. In the File Name box, enter FIELD.WRK.

c. Select OK to open the worksheet. Check that the Channel Table is STD.CHT. If it is not, select that Channel Table before continuing. Also, for the importing of results, as described below, enable Measurement History. Select the Collect History button in the Measurement History group of the Preferences dialog box, from the Configure menu.

Retrieve the Stored Results Use the following procedure to retrieve stored results:

1. Retrieve the stored FCC field test results from 2714 or 2715 using Get Stored Results from 2714/2715, from the Measure menu.

2. The CSS50 software will retrieve all measurement results from the 2714 or 2715 and present a directory of results grouped by Site name and Channel Table name. The listed Sites should match the two test Sites (TP132 and TP146) and the Channel Table names should match the system (STD and STD_PC.CHT for this example).

3. Use the Export button to save each group of results into separate results files, as shown in Table D–1, for later importing into the worksheet or other programs.

Table D–1: How the results are exported from the 2714 or 2715

Site	Channel table	Results file
TP132	STD	TP132.WSR[1]
TP132	STD_PC	TP132_PC.WSR[2]
TP146	STD	TP146.WSR[3]
TP146	STD_PC	TP145_PC.WSR[4]

[1] FCC Pre-Converter and Visual Level/Var (30M) results for TP132.

[2] FCC Post-Converter results for TP132.

[3] FCC Pre-Converter and Visual Level/Var (30M results for TP146.

[4] FCC Post-Converter results fro TP146.

Export the results groups as follows:

a.   From the directory list box, select FCCTESTS/JUL95/FIELD.

b.   In the File Name box, enter the Results File names as shown in Table D–1 for each results group.

c.   Note that the Import button can be used to load results into the worksheet after the results have been exported to a results file. (Import, from the File menu, can be used the same way.)

■   Worksheets always contain results for a single Site and single Channel Table. This effectively encapsulates the results into the particular measurements taken at a particular Site.

■   Grouping of results on a per Site basis implies that results from several Sites must be imported and summarized individually on a Site by Site basis.

d.   For this example, we will use the File/Import menu item to load, analyze, and report the measurement results. Select Close to return to the worksheet.

4.   Now that the FCC field test results have been retrieved from the 2714 or 2715 and stored into results files, we have all the measurement results analysis and summarization capabilities of the CSS50 at our disposal. First, import the results from TP132 using File/Import.

a.   Choose Import, from the File menu.

b.   From the directory list box, select FCCTESTS/JUL95/FIELD.

c.   In the File Name box, enter TP132.WSR.

d.   Select OK to import the results.

■   We want to make the worksheet Site name match the Site name of the results we are importing. Therefore, select Yes when prompted about changing worksheet Site to match import Site. (This prompt will appear only if the worksheet Site does not match the Site of the results being imported.)

■   The 2714 or 2715 stores only the channel number as a channel ID. The CSS50 stores Channel Number, Letter (Tag), Program Name, and Nominal Visual Carrier Frequency. Therefore, a channel mismatch message is displayed. Select the "Use blank channel information as wildcards" option button in the Import Channel Criteria group. This will allow importing of all appropriate results without further prompts. Select the Use Channel Results button to continue.

e. The results from TP132.WSR are loaded into the worksheet. These are the FCC Pre-Converter and FCC Visual Level/Var (30M) results. To import the FCC Post-Converter results, repeat steps 4, a-d above using File Name TP132_PC.WSR. Note that the Site name override prompts are not presented since the Site name is the same as the results previously imported.

f. Answer Yes to the prompt about Channel Table name mismatch. We want to import the results regardless of whether they were generated with std.cht or std-pc.cht.

NOTE. The FCC Post-Converter results were generated using the special post-converter Channel Table as described above. Here we are importing those results into a worksheet that uses the normal STD Channel Table. This is acceptable because the 2714 or 2715 stores only the channel number as the channel identifier and therefore all the results are placed into the correct spreadsheet cells without conflict. However, since the "Post-Converter" Channel Table we used had all the visual carrier frequencies set to a single value, the counted visual carrier frequencies for the FCC Post-Converter results will reflect that one single channel frequency value and will not match the STD Channel Table values. This will result in alarm status for the visual carrier frequency results for the Post-Converter measurements. Therefore, a worksheet status report done without any Test ID Results view filter in place will result in unwarranted alarms for the visual carrier frequency results. The remainder of the procedure describes how to use the Test ID Results view filter to prevent this situation.

---

5. At this point, all the measurement results for Site TP132 have been loaded into the worksheet. Remember that each set of results (as generated by the FCC Pre-Converter, FCC Post-Converter, and FCC Visual Level/Var (30M) UDPs) has been tagged with a different Test ID. The results from each UDP can be viewed separately using the View/Test ID Results menu item.

6. Select FCC Pre-Converter for the worksheet Test ID.

7. Use View/Test ID Results to enable the Test ID Results view filter.

8. The displayed results are now only those generated from the FCC Pre-Converter UDP at test Site TP132.

9. The Global View (from the View menu) can be used to pinpoint trouble channels. The Status Report and Results Detail screens can be used to further analyze data. Copy, from the Edit menu, and Export, from the File menu, can be used to transfer data or results files to other analysis tools.

10. Once the results are copied or exported, other data analysis tools (such as MS Excel or MS Word) can be used to generate complete FCC Proof Reports.

11. Steps 3 through 10 can be repeated as needed for each set of results.

Results from other test Sites can be imported and analyzed using the same procedure.

Appendix E: CSS50 Files

This appendix covers the following topics:

- Naming conventions

- Starting CSS50 with special worksheets

- Adding information to the Help files

- How to archive worksheets

- The CSS50.ini file

File Naming Conventions

CSS50 has very few restrictions on its file names. However, there are defaults, and it is good practice to use them to avoid confusion. All worksheets should end in ".wrk" and all exported data results should end in ".wsr". Table E–1 gives the general conventions.

Table E–1: Types of files associated with CSS50 and their naming conventions

Type of file	Naming conventions
Worksheet	*.wrk
Exported Results File	*.wsr
Limits File	*.lim
Channel Table File	*.cht

User Aids

There are a few methods that you can use to make using CSS50 quicker and easier for your application.

Start CSS50 with a Specific Worksheet

You can have CSS50 start with a worksheet already loaded. This is ideal if you like to start each session with a new worksheet to keep the measurements separate. The problem is that many of your channels have special Limits files assigned to them and different Measurement Setups. You don't want to take the time to remember which ones they are and set them. Make a "template" worksheet that defines all these things and then automatically load it every time CSS50 runs.

The easiest method to do this is from a CSS50 shortcut icon.

First, create the template.wrk worksheet.

1. Create a shortcut to the CSS50 application.

2. From the Windows 95 desktop, select the CSS50 shortcut icon.

3. Click the right mouse button and choose Properties, from the File menu.

4. In the Target box, after CSS50.EXE, type: "template.wrk".

NOTE. The template.wrk file (or any .wrk file you name) must already reside in the CSS50 directory in order for the shortcut to start with the named worksheet.

---

5. Choose OK.

The next time you start CSS50 from that shortcut icon, your template worksheet, "template.wrk", will automatically load and be ready to run. (Make sure that you save it under a new file name right away to avoid changing template.wrk unexpectedly.) You could create and define several CSS50 shortcut icons, each one with a different template ready to go for the different uses. For example, you can have one for getting stored results from the 2714/2715 and one for local data gathering.

Adding Information to the Help Files

The help files are completely editable using a basic text editor. (They were created using Notebook from Windows.) The only restriction is that only 80 characters per line are allowed.

There are several reasons why you might want to edit the help files, for example:

■ To put a check list in the UDP help text to make sure that all of the appropriate preferences are set before the UDP is generated.

■ To put reminders of which channels need to have special Limits files attached to them in the Limits file dialog box.

There are also help topics at the end of Contents in the Help menu for you to fill in with your own information. These are the help files for the measurements. They are there for you to note how the tests are to be performed, how often, what time of day, and so forth—whatever you might need to put in these files. The help topics and the files that you need to edit for each topic are listed in Table E–2.

Table E–2: Help topics and their associated files

Help topics	File to edit
Adjacent Channel Leakage	acl.hlp
Aural deviation	aurdev.hlp
Average Power	avgpwr.hlp
Carrier Levels and Frequencies	levfreq.hlp
Carrier to Noise	carnoise.hlp
Cross Modulation	crossmod.hlp
CSO	cso.hlp
CTB	ctb.hlp
Desired to Undesired	desundes.hlp
FCC Baseband	fccbase.hlp
Hum/LFD	hum.hlp
In Channel Response	icr.hlp
Modulation Depth	moddepth.hlp
Signal to Noise	signoise.hlp
Waveform distortion	wfmdist.hlp

No Instrument Mode   Sometimes you may want to use CSS50 for demonstrations or training without any equipment installed. It would also be nice if some results (even if they are meaningless) were generated. CSS50 has a "dummy" mode available that will generate somewhat random numbers for results. Select No Instruments Selected in Configure/Connections.

NOTE. You cannot make any measurements when in the No Instruments Selected mode.

How to Archive a Worksheet

There are times when you want to save a worksheet someplace other than where you have been working with it, either for archiving purposes or to send the results or setups to someone else.

For example: an MSO (Multiple System Operator) may want to define particular Limits files and Measurement Sequences for the individual operators to use. There could be one worksheet for the Pre-converter Measurements, one for the Post-converter measurement, and another for 24 Hour Variation. These could be

the "master worksheets" so that the individual operators don't have to waste time creating them. Also, when the results return to the MSO, the data will drop right into their worksheet for evaluation.

Which Files to Save

To properly archive a worksheet, you must save several files. The following is a list of files required to properly save and then completely reconstruct a worksheet.

The Worksheet File. It should end in ".wrk". It is the name in the Worksheet entry in the Worksheet Header.

The Channel Table File. It should end in ".cht". Find the name in the Channel Table entry in the Worksheet Header.

All Attached Limits Files. Find them in the sub-directory "limits" under the directory that contains the CSS50.exe file. You can find the needed Limits files by scrolling through the Channel - Limits list box in the Measurement Limits dialog box.

NOTE. When you reconstruct a worksheet from archived files, make sure that the limit files are placed into a sub-directory called "limits" under the directory that contains the CSS50.exe file.

CAUTION. Make sure you don't overwrite any existing files during reconstruction.

The WIN.ini File

The Cable TV Software and the Channel Table Editor place initialization settings in the WIN.ini file under the heading of CSS50 Connections. Initialization settings are only inserted in the file when necessary.

If the initialization settings in the WIN.ini file become corrupt for some reason, the CSS50 Connections section of the file can be completely deleted (but not while the application is running). The next time the software is run it will create a new CSS50 Connections section in the WIN.ini file when necessary.

The CSS50.ini File

The CSS50.ini file is created when the CSS50 program is started for the first time. The CSS50.ini saves your preferences for the program. This file is then used every time you restart the program.

This section lists all of the lines in a typical CSS50.ini file, how they affect the application, and where they are editable. They can always be edited at the CSS50.ini file itself, but that is not a good practice, because it is error prone and CSS50 provides access to most of the parameters anyway. Unless that particular field can only be edited in the CSS50.ini file, edit them in the CSS50 application. (An example is the Demodulator topics that can only be edited via the CSS50.ini file.)

Sometimes you may want (or need) to delete this file to cause the creation of a new CSS50.ini file. For example if you want to change the decimal and grouping symbols used for measurement values (or the file was corrupted).

The file can be completely deleted (not while the application is running, though) and the next time that CSS50 is run, a new CSS50.ini file will be created. Some defaults may then need to be recreated to match your previous preferences.

Table E–3: Contents of the CSS50.ini file

Line in CSS50.ini file	Description
[CSS50]	General control of the CSS50 application window
Maximized=0	0 = Main window not maximized 1 = Main window maximized
Position=172,28,797,498	The last location of the upper left and lower right corners of the main application window in xy coordinates
[Sites]	This topic lists all of the Sites. This list of Sites continues to grow as you add more Sites in the Worksheet Info dialog box. The only way to remove Sites is to delete them from this file.
Num Sites=2	Total number of Sites in the list
Site Index=0	Which Site is loaded whenever a new worksheet is created or CSS50 is initially loaded
Site0=	Site names
Site1=Tektronix	
[Test ID]	This topic lists all of the Test IDs in your list. This list of Test IDs continues to grow as you add more Test IDs in the Test ID dialog box. The only way to remove Test IDs is to delete them from this file.
Num Test IDs=4	Number of Test IDs in the list
Test ID Index=0	Which Test ID is the default. The default is loaded for all new worksheets or when CSS50 is first started.
Test ID0=Learner's Permit	Test ID names

Table E–3: Contents of the CSS50.ini file (cont.)

Line in CSS50.ini file	Description
Test ID1=	
Test ID2=Training Wheels	
Test ID3=TP888	
[File Defaults]	Default Channel Table file and Picture driver
Channel Table File=c:\css50\std.cht	This is the Channel Table file used for new worksheets. Update this with the Worksheet Info dialog box (under the Configure Menu).
Video Driver=VIDEO KIT	Used by View Picture. It can only be edited here. The Video Driver should be in the caption displayed by the Program Manager. This is the name of the Video Blaster board.
[Preferences]	These remember the last settings from the Preference dialog box (in the Configure menu).
Units=0	0 = dBmV 1 = dBV
History=1	0 = Save only most recent measurement 1 = Save History
Signal Connect=0	0 = Do not prompt for signal connection 1 = Prompt for signal connection
Pause on Channel=0	0 = Do not pause on new channel 1 = Pause on new channel
Pause on Alarm=0	0 = Do not pause on measurement alarm 1 = Pause on measurement alarm
Pause on Caution=0	0 = Do not pause on measurement caution 1 = Pause on measurement caution
Pause on Error=0	0 = Do not pause on measurement error 1 = Pause on measurement error
Report out RS232 on Error=0	0 = Do not report out the RS-232 port on measurement error 1 = Report out the RS-232 port on measurement error
Report out RS232 on Alarm=0	0 = Do not report out the RS-232 port on measurement alarm 1 = Report out the RS-232 port on measurement alarm
Report out RS232 on Caution=0	0 = Do not report out the RS-232 port on measurement caution 1 = Report out the RS-232 port on measurement caution
[Measurement Limits]	Edit these from the Configure menu, Measurement Limits.
Default Limits File=ntsc.lim	Can update via the Save As Defaults command button in the Edit Limits dialog box
Sys Vis Car Level Caution UL=6	Edit this in the Summary Limits in the Measurement Limit Dialog box using Save As Defaults.
Sys Vis Car Level Alarm UL=10	Edit this in the Summary Limits in the Measurement Limit Dialog box using Save As Defaults.
Adj Vis Car Level Caution UL=2	Edit this in the Summary Limits in the Measurement Limit Dialog box using Save As Defaults.

Table E–3: Contents of the CSS50.ini file (cont.)

Line in CSS50.ini file	Description
Adj Vis Car Level Alarm UL=3	Edit this in the Summary Limits in the Measurement Limit Dialog box using Save As Defaults.
[Measurement Setups]	Edit these parameters using the Measurement Setups command from the Configure menu. These values are the ones that have been stored using "Saved As Default".
Ext Atten Amp=0	The value in dB of the 2714 external attenuation/amplification
2714/2715 Preamp=0	0 = off 1 = on
Power Line Freq=60	60 = 60 Hz 50 = 50 Hz
Carrier Levels Mode=0	0 = Accurate Frequency and Amplitude 1 = Accurate Amplitude only 2 = Fast Amplitude only
VM100 Average Mode=1	0 = averaging off 1 = averaging on
Carrier Noise Mode=0	0 = Auto 1 = Auto with Pause 2 = Gated
Noise Bandwidth=4e+006	In Hz
CSO Mode=0	0 = Auto 1 = Auto with Pause 2 = Single Sweep 3 = Gated
CSO Loc1=–1.25e+006	
CSO Loc2=–750000	
CSO Loc3=750000	
CSO Loc4=1.25e+006	
CSO Loc5=UNDEFINED	
CTB Mode=0	0 = Auto 1 = Auto with Pause 2 = Single Sweep
CTB Loc1=0	
CTB Loc1 Abs/Rel=1	0 = Abs 1 = Rel
CTB Loc2=UNDEFINED	
CTB Loc2 Abs/Rel=1	0 = Abs 1 = Rel
CTB Loc3=UNDEFINED	
CTB Loc3 Abs/Rel=1	0 = Abs 1 = Rel
CTB Loc4=UNDEFINED	

Table E–3: Contents of the CSS50.ini file (cont.)

Line in CSS50.ini file	Description
CTB Loc4 Abs/Rel=1	0 = Abs 1 = Rel
CTB Loc5=UNDEFINED	
CTB Loc5 Abs/Rel=1	0 = Abs 1 = Rel
ICR Mode=0	0 = RF 1 = baseband
ICR Gated=0	0 = not gated 1 = gated
ICR RF Loc1=–500000	
ICR RF Loc2=500000	
ICR RF Loc3=1e+006	
ICR RF Loc4=2e+006	
ICR RF Loc5=3e+006	
ICR RF Loc6=3.58e+006	
ACL Mode=2	0=Upper 1=Lower 2=Both
Hum Mode=0	0 = RF 1 = baseband
VITS Mode=1	0 = Automatic 1 = Manual
NTSC Multiburst Line=17	VITS information
NTSC Multiburst Field=1	
NTSC Composite Line=18	
NTSC Composite Field=1	
NTSC Combination Line=17	
NTSC Combination Field=2	
NTSC Noise Line=12	
NTSC Noise Field=1	
NTSC Color Bars Line=17	
NTSC Color Bars Field=2	
PAL Baseband Line=19	
PAL Signal-to-Noise Line=6	
PALIn-Chan Resp Line=18	
PAL2T K-Factor Line=17	
PAL Lum Non-Lin Line=17	

Table E−3: Contents of the CSS50.ini file (cont.)

Line in CSS50.ini file	Description
[Demodulator]	
Demod=3	0 = N/A 1 = N/A 2 = N/A 3 = DS1001 4 = none
ZCP State=1	1 = on 0 = off
ZCP Line=13	Video line on which to place the zero carrier pulse, 10 to 20.
ZCP Field=1	Video field on which to place the zero carrier pulse, 1 or 2.
ZCP Position=2	Position within the video line where the zero carrier pulse is placed. Values are 0 through 4. 0 places the pulse toward the beginning of the video line and 4 places the pulse toward the end.

Appendix F: Cable Diagram

Figure F–1 shows how to connect the CSS50 Cable Television Measurement Package to the test equipment. CSS50 can operate with only some of the test equipment connected, but it cannot make measurements requiring those instruments not present. See Table 1–2 on page 1–3 for a list of equipment required to make measurements.
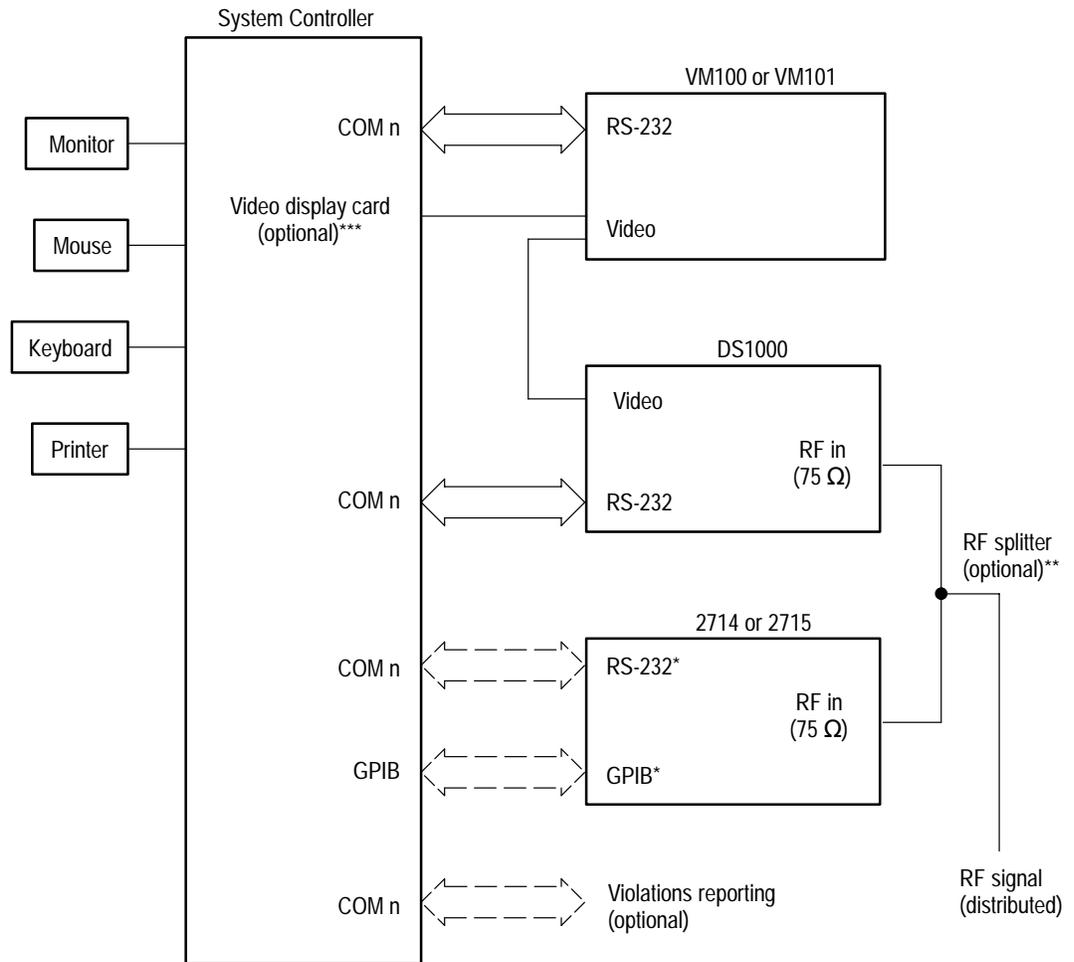
*One, not both
**RF signal can be manually switched between the 2714 or 2715 and DS1000
***For View Picture only

Figure F–1: Cable diagram

CSS50 Cable Television System Software User Manual

Appendix G: Controlling a 2714 or 2715 Over a Modem

This section describes a method of using the CSS50 Cable Television System Software to control a 2714 or 2715 analyzer remotely over modems. This section assumes you are using the Windows Hyper Terminal program; however, you can use any equivalent program. The Windows Hyper Terminal program is used to dial the modem and establish communication with the remote modem and analyzer. The Hyper Terminal program is then exited and the CSS50 software is started. The Software doesn't know or care whether it is talking to the analyzer directly or if there are modems in between. When the user is done using the software, it is exited and the Hyper Terminal program is restarted and used to hang up the modems.

To ensure reliable operation, you should use modems that support hardware flow control and error correction. Some operations (for example, sending a large channel table) send large binary files to the 2714 or 2715. At baud rates of 2400 and higher, the 2714 or 2715 may not be able to keep up with the PC. If any data is lost or corrupted, the 2714 or 2715 may operate unpredictably. This is especially inconvenient if the analyzer is at a remote location. Using hardware flow control and error correction allows reliable performance.

The details of the setups for the PC, modems and 2714 or 2715 follow. The modem commands listed are from the standard Hayes command set. If the commands for your modems are different, use the appropriate commands to configure the features as described below.

Terminal Program Settings

Set the Terminal communications settings as shown in Table G–1.

Table G–1: Settings for Windows Terminal program

Communication setting	Value
Baud rate	9600
Data bits	8
Stop bits	1
Parity	none
Flow control	hardware
Parity check	unchecked
Carrier detect	unchecked
Connector	com2

A baud rate of 9600 is the fastest the 2714/2715 can handle. The port can be set to use whatever baud rate is available.

The CSS50 Software Connections settings must match the port and baud rate selected in the Windows Terminal program.

Local Modem Settings

Set up the local modem with the commands shown in Table G–2.

Table G–2: Settings for local modem

Command	Description
Baud rate	Since the PC starts by sending "AT" commands to the modem, the modem determines the rate of the incoming "AT" characters and communicates with the PC at that rate. 9600 is recommended.
AT &F	Start with known factory settings.
AT \N3	AutoReliable connection. Makes the fastest possible connection and uses the best possible error correction and data compression. (Optional).
AT &K3	Enable RTS/CTS hardware flow control.
AT &Q5	Use asynchronous error correction mode.
AT &D0	Ignore on-to-off transitions of DTR. This keeps the modem from hanging up when the Terminal program is exited and the PC drops DTR before the CSS50 software is started.
AT N1	Connect at the highest rate supported by both modems. (Optional).
AT &W0	Write these settings in profile 0. This profile is loaded and used when the modem is turned on.

Remote Modem Settings

Connect the remote modem to a terminal to establish these settings and store them. Set up the modem with the following commands:

Table G–3: Settings for remote modem

Command	Description
Baud rate	The modem determines the rate based on the incoming "AT" commands sent to it during configuration. The rate at which the terminal talks to the modem during this configuration session is remembered by the modem and is the rate at which the modem will communicate with the device at the remote end. A baud rate of 9600 is recommended.
AT &F	Start with known factory settings.

Table G–3: Settings for remote modem (cont.)

Command	Description
AT \N3	AutoReliable connection. Makes the fastest possible connection and uses the best possible error correction and data compression. (Optional).
AT &K3	Enable RTS/CTS hardware flow control.
AT &Q5	Use asynchronous error correction mode.
AT N1	Connect at the highest rate supported by both modems. (Optional).
AT S0=n	Sets the modem to auto-answer on the nth ring. Note that the "0" in "S0" is a zero.
AT Q1	Disable results codes. The 2714/2715 does not understand results codes and will generate syntax error messages if it receives them.
AT E0	Inhibit command echo. The 2714/2715 should not be sending anything to the modem before the link is established, so this is just an added precaution.
AT &W0	Write these settings in profile 0. This profile is loaded and used when the modem is turned on.

2714 or 2715 Settings

Press the UTIL/4/0/2 keys to get to the RS-232 settings menu. Configure the 2714 or 2715 as shown in Table G–4.

Table G–4: Settings for the 2714 or 2715

	Setting	Value
0	STATUS	ONLINE
1	BAUD	Must match the remote modem setting
2	DATA BITS	8
3	PARITY	NONE
4	EOL	CRLF
5	FLOW CONTROL	HARD (RTS/CTS)
6	ECHO	OFF
7	VERBOSE	OFF

Appendix H: Version 1.0 Software

This appendix provides additional information that pertains only to software version 1.0.

Edit Setups Dialog Box

The Edit Setups dialog box for version 1.0 software is slightly different than version 2.0. The VITS group was slightly modified. Figure H–1 shows the version 1.0 dialog box and a description of the VITS group follows.
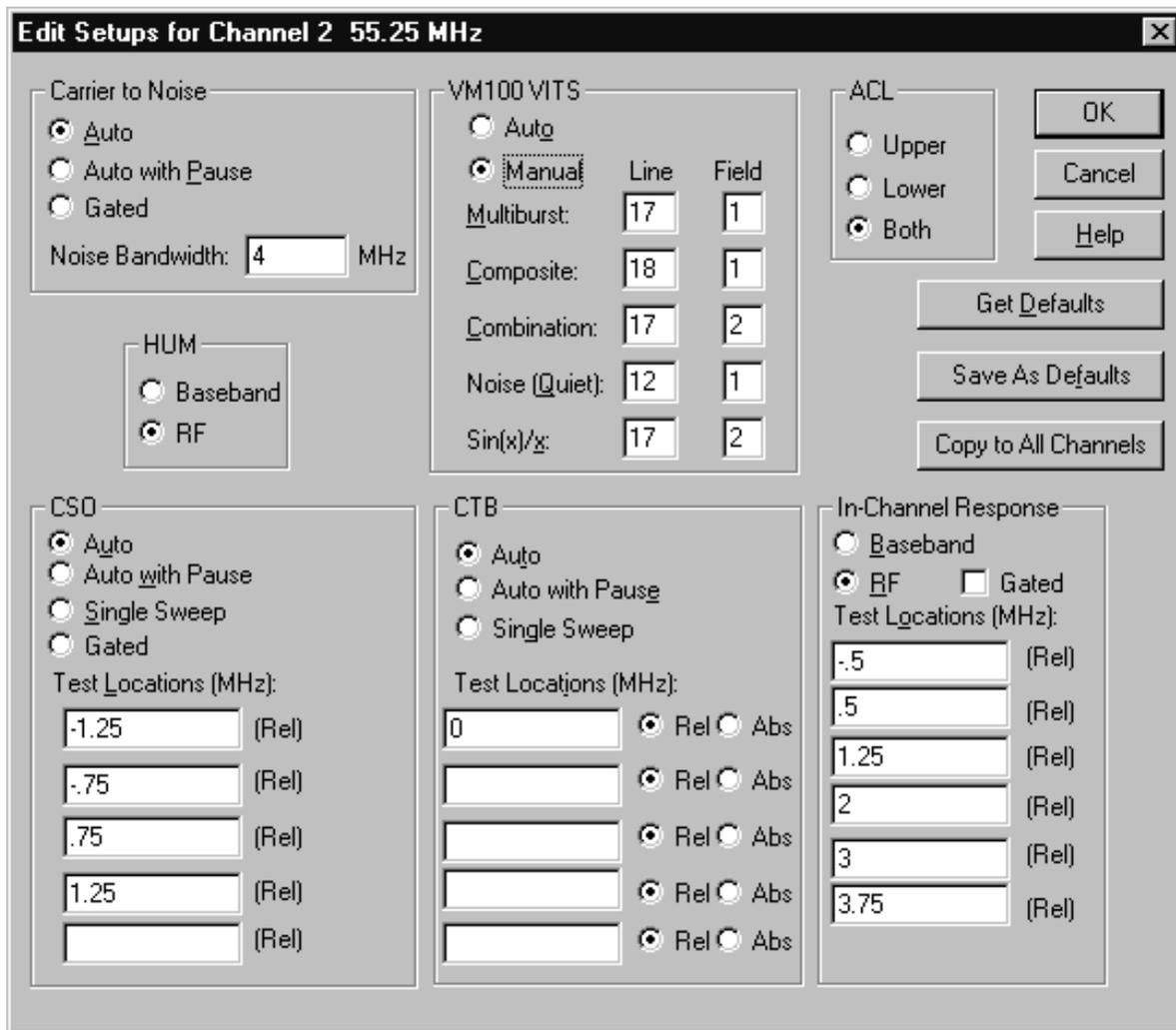
Figure H–1: The Edit Setups dialog box (version 1.0)

VM100 VITS Group. Select Auto or Manual to enter the locations of the various VITS lines in the Line and Field text boxes. Auto causes the VM100 to automatically search for the appropriate test signals. Manual always has the VM100 use the specified line for the test signal. If the required signal is not present, the measurement will fail.

For example, running In-Channel Response uses the Line and Field locations entered in the Multiburst row. The VITS signal in the specified Line and Field does not have to be a Multiburst signal but it does have to be a signal appropriate for the measurement. Refer to the VM100 User manual for a list of test signals the VM100 can use for measuring Frequency Response.

The VITS signals selectable for making the measurements in the NTSC measurement list are: Multiburst, Composite, Combination, Noise (Quiet), and Sin(x)/x. You don't have to enter the VITS locations for Auto mode; the VM100 will search for them whenever they are required to make a measurement.

The CSS50 baseband measurements are arranged into five groups, with each group requiring a particular test signal as given in Table 3–10.

Table H–1: Required VITS signal for each measurement

Group	Required Test Signal
Waveform Distortion Group	Any one of lines F1:9–20 or F2:9–20.
	This is the 2T K-Factor and Luminance Nonlinearity measurements in the VM100.
	Uses the Line and Field locations entered in the Composite row using manual mode.
Baseband Group	Any one of lines F1:9–20 or F2:9–20.
	This is the Chroma-Luma Delay, Differential Gain, and Differential Phase measurements in the VM100.
	Uses the Line and Field locations entered in the Composite row using manual mode.
In-Channel Response Group	Any one of lines F1:9–20 or F2:9–20.
	This is the Frequency Response measurement in the VM100.
	Uses the Line and Field locations entered in the Multiburst row using manual mode.
Signal to Noise Group	Any one of lines F1:9–20 or F2:9–20.
	This is the Signal-to-Noise Ratio in the VM100.
	Uses the Line and Field locations entered in the Noise (Quiet) row using manual mode.

Glossary

Glossary

Accuracy
The closeness of the indicated value to the true value.

ACL (Adjacent Channel Leakage)
The power in the channels adjacent to the channel under test that is due to leakage from the channel under test.

Aural Deviation
The peak FM deviation measured for the selected channel.

Average Power
The integral of the power spectral density of all screen locations between the edges of the channel.

Carrier Levels and Frequencies
Carrier levels is the peak amplitude with the preamp off. Carrier Frequencies is the frequency measured against the frequency of the internal counter of the instrument.

Carrier to Noise
The ratio of the carrier to noise amplitude with the default noise floor normalized to 4 MHz relative to the visual carrier peak.

Cross Modulation
The peak fundamental component of 3rd order distortion at the horizontal sync frequency (AM) measured on the unmodulated visual carrier.

CSO (Composite Second-Order)
Distortion from second-order intermodulation distortion.

CTB (Composite Third-Order or Triple Beat)
Distortion from third-order intermodulation distortion.

Desired to Undesired
The ratio of the average power of the desired signal to the average power of undesired signals.

Hum/LFD
Hum/Low Frequency Disturbance is the power line frequency measured on an unmodulated visual carrier and low frequency disturbance measured on the modulated carrier.

In Channel Response
The maximum variance in amplitude within a specified frequency range within a particular channel, given a flat input over that same range.

Modulation Depth

The percent amplitude modulation measured from sync tip to the lowest white level in 10 sweeps.

UDP (User Defined Program)

A measurement sequence loaded into a 2714/2715 and run at a remote location.

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