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tech tips

Collecting And Printing Data With The SL754D "CHANNELIZER"™

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A very powerful feature of the SL754D "CHANNELIZER" is its Auto Inspect test function. The Auto Inspect function allows the SL754D to take system measurements and store the results automatically. This automatic test saves time and enhances the repeatability and accuracy of your testing, whether they are preventative maintenance tests, end of line tests, or FCC Proof of Performance tests.

This Tech Tip reviews how to connect the SL754D in order to transfer test data to a printer or personal computer. For more detailed information on the Auto Inspect test, refer to the SL754D Operation And Application Manual supplied with your SL754D.

Understanding The Auto Inspect Test

Before we go into details of how to get the test data out of your SL754D, let's briefly review how the SL754D Auto Inspect function collects the test data.

The Auto Inspect function is activated by pressing the front panel key labeled AUTO INSPECT. When an Auto Inspect test is initiated, the instrument will scan each channel in the present channel plan and perform all MEASUREMENTS tests on those channels. MEASUREMENTS functions include RF CARRIER, A/V, C/N, AND HUM. It is possible to set up the SL754D to either test HUM on all channels or only on a single channel during an AUTO INSPECT test. The AUTO INSPECT measurements are identical to the manual MEASUREMENTS of the SL754D.

SL754 AUTO INSPECT REPORT

Site: 2-754D TEST2
Date: 06/13/97
Time: 02:10 PM

System: _____
Location: _____
Engineer: _____

Channel Plan: Custom 1 - FCC
Tolerance: NONE
Probe Offset: 0.0 dB

Sencore SL754 Serial# 6131286B
Cal Date: 5/9/97
Cal Offset: 0.0 dB

Noise Reference: 51.00 MHz
Noise Level: -22.2 dBmV
Hum Reference: CH 2
Hum Level: 13.0 %

Pilots Freq.   Level
Lo: CH 2   8.6 dBmV
Hi: CH 36   -5.6 dBmV

MEASUREMENT		TOLERANCE	PASS/FAIL
Tilt:	-14.2 dB	—.- dB	PASS
P/V:	15.5 dB	—.- dB	PASS
Flat:	10.4 dB	—.- dB	PASS
CH-CH:	2.7 dB	—.- dB	PASS
Max A/V:	16.4 dB	—.- dB	PASS
Min A/V:	10.0 dB	—.- dB	PASS
Min C/N:	12.2 dB	—.- dB	PASS
Max HUM:	13.0 %	—.- %	PASS
All CH:	20.9 dBmV	—.- dBmV	PASS
All CH >:	-10.0 dBmV	—.- dBmV	PASS
All CH <:	10.0 dBmV	—.- dBmV	PASS

CHANNEL	FREQUENCY	VIDEO	AUDIO	A/V	HUM	P/F	TEST FAILED
2	55.25	+8.2	-3.8	12.0	3.0	PASS	
3	61.25	+8.8	-5.4	14.2	--.-	PASS	
4	67.25	+8.9	-3.8	12.7	--.-	PASS	
5	77.25	+8.5	-5.4	13.9	--.-	PASS	
6	83.25	+10.9	+0.0	10.9	--.-	PASS	
14	121.25	+3.6	-8.9	12.5	--.-	PASS	
15	127.25	+3.7	-10.6	14.3	--.-	PASS	
16	133.25	+3.2	-9.7	12.9	--.-	PASS	
17	139.25	+2.7	-11.2	13.9	--.-	PASS	
18	145.25	+0.4	-14.8	15.2	--.-	PASS	
20	157.25	-6.0	-21.7	15.7	--.-	PASS	
21	163.25	-8.0	-20.3	12.3	--.-	PASS	
22	169.25	-8.9	-22.9	14.0	--.-	PASS	
7	175.25	-10.0	-21.5	11.5	--.-	PASS	
8	181.25	-9.4	-21.2	11.8	--.-	PASS	
9	187.25	-8.2	-18.2	10.0	--.-	PASS	
10	193.25	-5.5	-16.4	10.9	--.-	PASS	
11	199.25	-3.8	-15.1	11.3	--.-	PASS	
12	205.25	-5.3	-17.9	12.6	--.-	PASS	
13	211.25	-4.9	-17.8	12.9	--.-	PASS	
23	217.25	-6.7	-19.7	13.0	--.-	PASS	
24	223.25	-4.7	-16.4	11.7	--.-	PASS	
25	229.25	-3.6	-20.0	16.4	--.-	PASS	

Fig. 1: Tabular printout of an AUTO INSPECT test from the SL754D.

A maximum of 4,000 measurements may be stored in the SL754D's memory. Depending on the size of the channel plan being used, the results of an individual AUTO INSPECT test may vary in how much memory they consume. For example, the 4,000 total measurements may be divided in the following manner:

Channel Plan Size	Total Available AUTO INSPECT Sites
40	100
50	80
80	50

Of course, the smaller the channel plan is, the faster the AUTO INSPECT function will be completed. Typical speed of an AUTO INSPECT test should not exceed a couple of minutes for a 40 channel system. If the time does exceed two minutes, it may be an indication that the RF levels are not stable enough for the instrument to take accurate measurements on the system.

Connecting The SL754D To A Printer

After you have executed an AUTO INSPECT test and the data has been stored to the SL754D's memory, you can review the data directly on the SL754D's display or you can print a hard copy of the data. The SL754D's serial RS-232 port and built-in software allow you to produce a printed output in either a tabular or graphic (spectral) format as Figures 1 and 2 show respectively. Before you can successfully print, however, you must make the proper hardware connections between your SL754D and the printer, and set the printer to the SL754D's communications protocol.

Hardware Configuration

The SL754D requires a serial connection to a serial printer. **(You cannot connect a parallel printer directly to the SL754D.)** Computers, modems, and some printers have serial ports that support two-line (plus ground) communication.

Most printers use a 25-pin connector. Most printers necessitate the following wiring configuration between the SL754D and the printer, as shown in Fig. 3. Note the SL754D's RxD pin (receive data - pin #2) must connect to the printer's TxD pin (transmit data - pin #2 on a 25-pin connector). The SL754D's TxD pin (transmit data - pin #3) must connect to the printer's RxD pin (receive data - pin #3 on a 25-pin connector). Lastly, the SL754D's Gnd pin (ground - pin #5) must connect to the printer's Gnd pin (ground - pin #7 on a 25-pin connector).

You may also choose to wire your own cable, or to use a ready-made adapter. If you choose to use a ready-made 9 to 25 pin adapter cable, be sure to select one that

SL754 AUTO INSPECT REPORT

Site: 2-754D TEST2
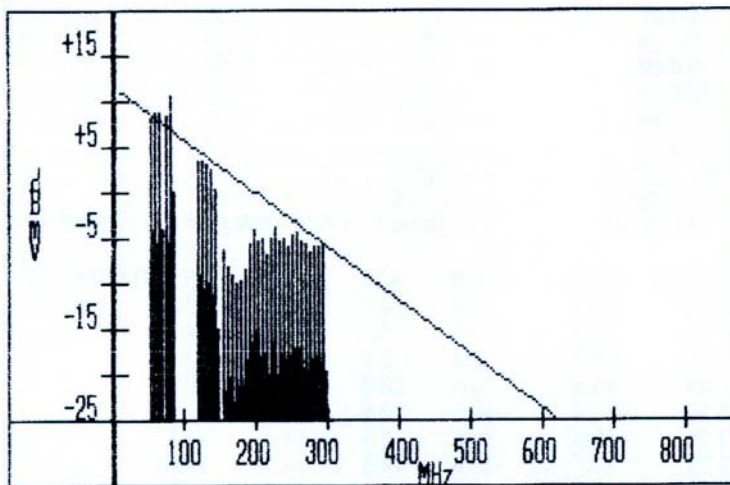Date: 06/13/97
Time: 02:10 PM

System: _____
Location: _____
Engineer: _____

Channel Plan: Custom 1 - FCC
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Max A/V:	16.4 dB	--.- dB	PASS
Min A/V:	10.0 dB	--.- dB	PASS
Min C/N:	12.2 dB	--.- dB	PASS
Max HUM:	13.0 %	--.- %	PASS
All CH:	20.9 dBmV	--.- dBmV	PASS
All CH >:	-10.0 dBmV	--.- dBmV	PASS
All CH <:	10.9 dBmV	--.- dBmV	PASS

Chart 2. Common Load Test's combination of readouts and likely causes.

To SL754D male DB9		To computer or printer serial port female DB9	or	female DB25
pin 2 RxD	to	pin 3 TxD		pin 2 TxD
pin 3 TxC	to	pin 2 RxD		pin 3 RxD
pin 5 Gnd	to	pin 5 Gnd		pin 7 Gnd

connects to TxD and RxD pins as Fig. 3 shows. This can be checked with the use of an ohmmeter to verify continuity of pins between both ends of the cable.

If you are attempting to use a serial printer that has a 9-pin connector, you will simply need to make sure that the SL754D's RxD pin connects to the printer's TxD pin and the SL754D's TxD pin connects to the printer's RxD pin. Ground (Gnd) pins should be connected straight through on pin 5.

Use the following information to ease in determining the proper cable and connections needed for connecting a printer.

There are many other possibilities that may exist in the gender and pin count of your printer's RS-232 connection. Ready-made adapters are available from most computer stores to adapt these variations in connector styles. Two common adapters include:

Gender Changer: Converts a male connector to a female connector.

Null Modem: An adapter or cable that exchanges pins 2 and 3.

You may encounter printers and RS-232 cables and connectors that are different from what we have described here. If all else fails, determine the proper wiring configuration of the interface you are connecting to by referring to the wiring diagram. Then use an ohmmeter to make sure your connections are correct.

Protocol Configuration

In addition to the proper hardware connection, serial printers must also be configured for the proper data protocol. Protocol is the "language and rate" at which the data is transferred. Table 1 summarizes the protocol necessary to interface with the SL754D.

Table 1. Data Protocol Settings

Baud Rate	9600 (default), 4800, 2400, 1200
Data Bits	8
Stop Bits	1
Hand Shake	Xon/Xoff
Parity	None
Driver	Epson (default), Seiko

Your printer must be set to accept these parameters. Typically these settings are selected by DIP switches located somewhere on the printer. You will need to refer to the Operation Manual for your printer for specific information on setting the DIP switches. Do not be intimidated by the need to set the DIP switches as this is a very common procedure that is usually explained very clearly in the printer instruction manual.

Many new models of printers have no DIP switches and store this protocol in software. For those models, refer to the Operation Manual for setting the protocol.

Note: Not all printers are able to print "special graphics" characters. If your printer cannot, you will be able to print data in the tabular format, but not in the "spectral" graphics format.
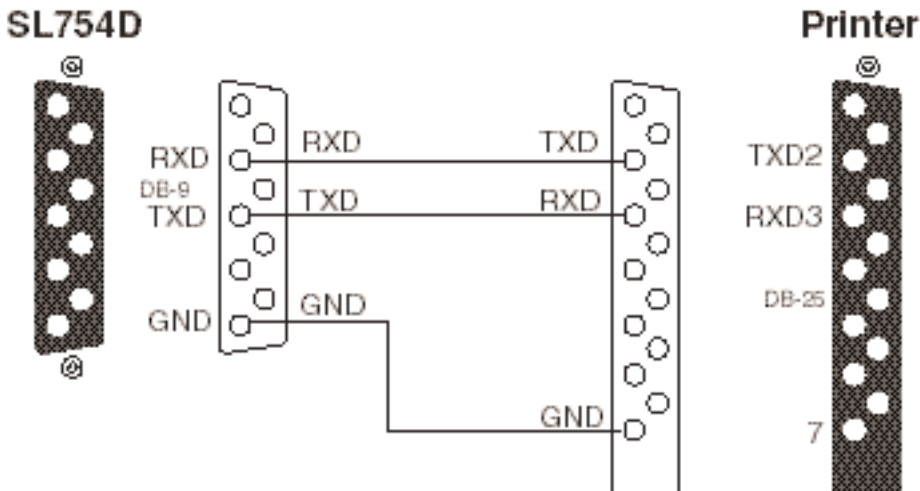
Connecting The SL754D To A Computer

Connecting your SL754D to a computer allows you to download the data from the SL754D's memory to a computer. The SL754D downloads the data to the computer in a standard ASCII format. Microsoft Windows Terminal, or Microsoft Windows 95 Hyperterminal allow the data to be captured by the PC as the SL754D "prints" the data. The same procedure of setting the data protocol is also necessary for capturing data as it is for printing when used with a serial printer.

Fig. 3: Required connections between the SL754D and a 25-pin serial printer connector.

Once captured, the SL754D's data can be used by many software programs such as Lotus1-2-3,™ Microsoft Works,™ Microsoft Word,™ and Microsoft Excel™ since it is stored as a text file (.txt). When capturing data to a PC, only the SL754D's tabular mode of printing can be used, as graphic characters sent by the SL754D when printing in the "spectral" mode do not have an ASCII value, and will be printed as erroneous characters.

The computer may also be used to control the SL754D. As such, all the SL754D's functions can be selected using the computer. A complete set of commands is listed in the SL754D's Operation and Application Manual.

The connections between your SL754D and a computer's serial port are similar to those described above for connecting to a printer. As shown in Fig. 3, the SL754D's RxD line must connect to the computer's TxD line and the SL754D's TxD line must be connected to the computer's RxD line.

Notice that the TxD and RxD pins are numbered differently on 9-pin connectors than on 25-pin connectors. You will need to use a "Null Modem" cable or adapter when connecting your SL754D to a computer's (or printer's) 9-pin serial port to accomplish the correct RxD and TxD connection.

Use the following steps as a guide when connecting your SL754D to a computer and downloading data:

1. Connect the SL754D's serial port to the serial port on the computer. (The SL754D's RxD pin must tie to the computer's TxD pin and the SL754D's TxD pin must tie to the computer's RxD pin).

2. Configure the computer's serial port for the protocol settings listed in Table 1 (**File.., Properties** (Windows95 Hyperterminal), or **Settings, Communications…** (Windows 3.xx Terminal).

3. Click on **Transfer(s)** from the tool bar, then select **Capture Text** (Windows 95 Hyperterminal), or **Receive Text File** (Windows 3.xx Terminal).

4. Name the data file that will be retrieved from the SL754D. Use a **.txt** extension at the end of the file name so that the file may be accessed by other programs. Press **ENTER,** or click **OK,** the computer is now ready to accept the data from the SL754D.

5. At this time, print data from the SL754D just as if the PC were a serial printer. The data will automatically scroll across the screen and be saved to the named file.

6. Once the transfer is complete, disconnect the transfer by clicking on **Transfer, Capture Text, Stop** (Windows 95 Hyperterminal), or **Transfers, Stop** (Windows 3.xx Terminal). At this time, the newly stored file is available for use by any program that can open a file with a .txt extension.