

Signature 1000HN Cable Analyzer User's Guide

Version 4.0
Major Revision
1 December, 1999



CIRRIIS
An ISO 9001 Certified Company

Signature 1000HN Cable Analyzer User's Guide
Version 4.0

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1 December, 1999

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Salt Lake City, Utah 84119-2026
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I Need Your Help!

As Senior Editor, it's my responsibility to constantly improve the manuals and other documentation we include with our equipment. We try hard, but we know we'll never please everyone. If you were in my chair, how would you change the documentation to make it better? Here's your chance to take gripes, suggestions and (we hope) praise directly to the guy who can change things. Please fax or mail this form to me, or contact me by e-mail.

Thanks!

Van Nielson
Senior Editor, Technical Documentation

1000HN User's Guide

Attach more pages if needed

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Introduction to the Cirris 1000HN

Lets get started!

The Cirris 1000HN cable analyzer is an easy-to-use machine that will allow you to test cables quickly, and with little fuss. In simple terms, the process of using your 1000HN goes like this:

1. Install an expansion box if you want to use one (see page 10 for details). Once you have installed the box the first time, you probably won't have to do this again.
2. Install connector adapters to match the cables you want to test (see page 9 for details).
3. Check the test option settings; reset the options if you need to (see page 17 for details).
4. Either:
 - Learn a Sample Cable (a cable you know is built correctly) of the kind you want to test (see page 23 for details), or...
 - Retrieve the wirelist data for the kind of cable you want to test from the analyzer's memory (see page 31 for details)

This completes programming the analyzer for testing cables. If you have connected a Sample Cable to learn it, disconnect it now.

5. Connect the first cable you want to test.
6. Test the cable (see page 27 for details).
7. Record and/or or print the test results (see page 30 for details).

That's it! We'll show you how to do each of these steps in this manual.

What your order should contain

Your order should contain these things in addition to this manual:

- 1000HN main unit, including a wall transformer with cord, to provide power for the analyzer.
- Hand-held test probe.
- Whatever connector adapters you have ordered (usually shipped in a 3 x 5-inch card file). You may also have ordered an optional tilt stand, or an optional frame stand. If so, these should be included.
- An expansion box if you have ordered one.

Section 1: Work With the Hardware

The Cirris 1000HN system consists of a main unit, and an optional expansion box. To connect the cables you want to test to the analyzer, you use connector adapters which match the connectors on the cable you want to test.

In this section, we will explain how to work with the hardware. We will show you how to install your connector adapters, how to install the expansion box, and how to disassemble the analyzer in case you need to replace one of its subassemblies, or its EPROM.

How to install connector adapters

To install connector adapters onto the Cirris 1000HN, follow these steps:

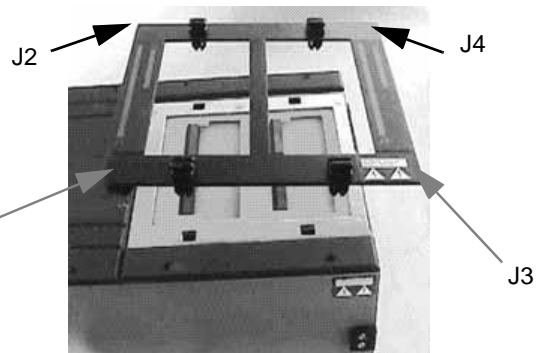
1. Turn the four twistlock fasteners on the adapter cover plate to unlock them, and remove the cover plate.



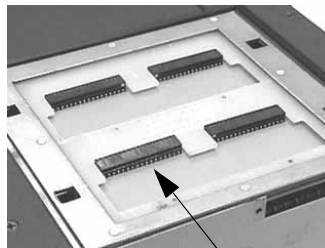
Twistlock fastener locked



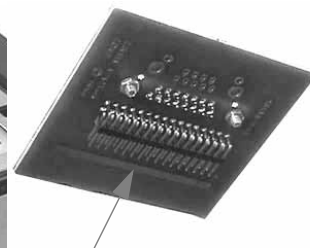
Twistlock fastener unlocked



2. Plug in the connector adapters. Be sure the pins on the bottom of each adapter are lined up properly, so they don't bend as they are inserted into the sockets. To line the pins up properly, press the adapter against the inside edge of the metal frame, and have the bottom of the adapter card resting on the plastic adapter support.

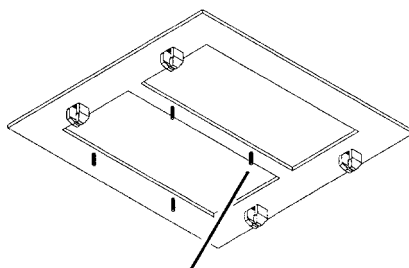


These horizontal pin sockets...



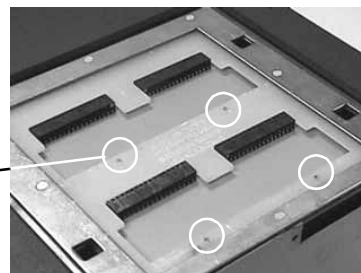
...accept the adapter connector pins on the bottom of each adapter

3. Replace the cover plate, making sure the small alignment pins on its underside fit into the corresponding holes on the scanner's upper surface.



Each cover plate alignment pin...

...fits into a hole in the scanner's upper surface.



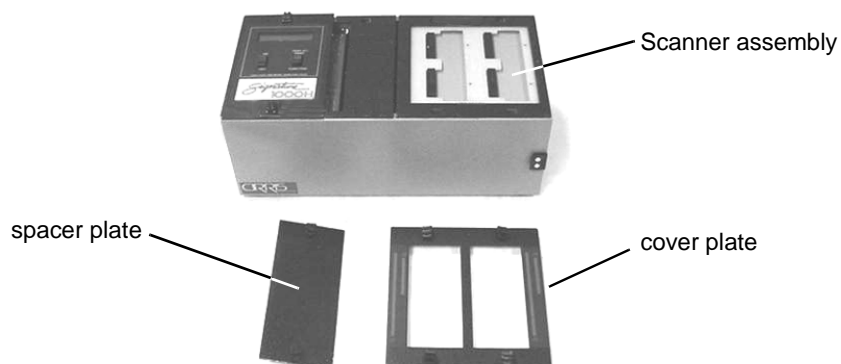
4. Lock the twistlock fasteners to hold the adapters firmly in place.

How to install an expansion box

To increase the number of available test points, you can install an expansion box on your 1000HN. You can set up your system to have as many as 256 test points.

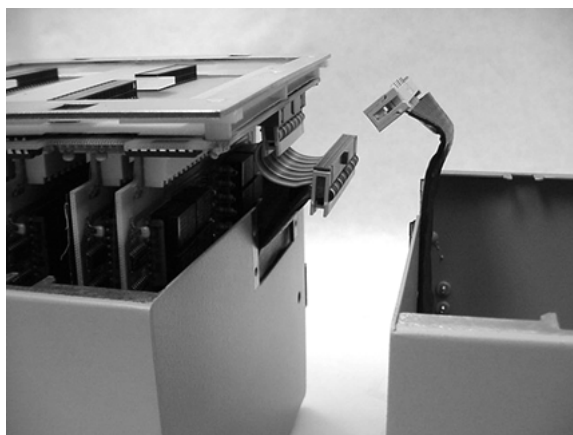
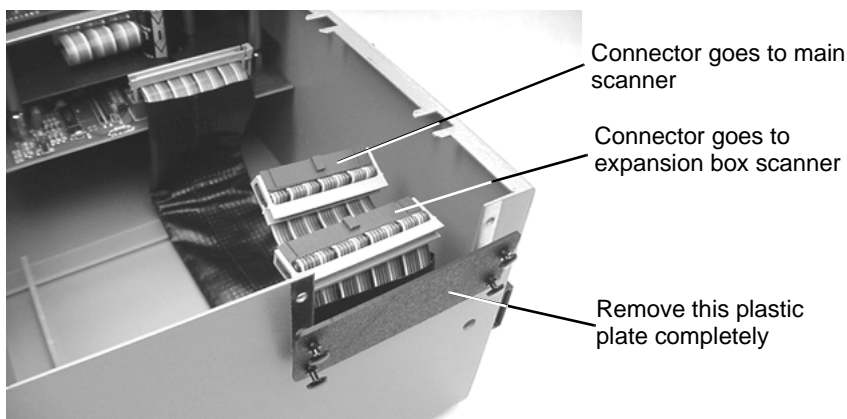
To install an expansion box, follow these steps:

1. Unlock the twistlock fasteners on the top of the analyzer's spacer and cover plates, and on the top of the expansion box. Remove the cover plate and the spacer plate.



2. Lift the scanner assemblies out of both the main unit and the expansion box.
(**Note:** Your expansion box may have a black plastic plate covering the opening where you will be routing the scanner cable. Once the scanner has been removed, push the plastic rivets out from the inside of the chassis, and remove the plastic plate.)
 - For photographic clarity in the top photo, we've removed the scanner assembly from the main unit, and disconnected it. You see the connector

that plugs into the main unit's scanner assembly, and the connector that plugs into the scanner assembly in the expansion box. You also see the plastic plate in the main unit's cable routing opening partially removed. You should remove the plate completely. Make sure the connections to both the main unit's scanner and the scanner in the expansion box are secure.

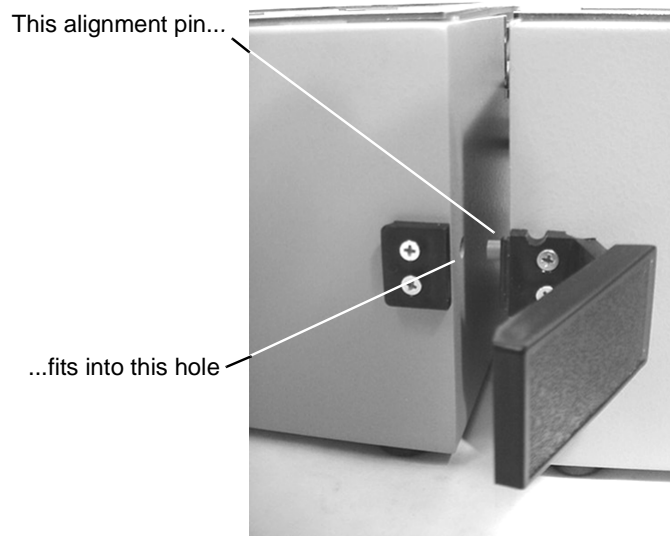


This view shows the cables that connect the main unit to the expansion box as they should appear just before you plug them together. Be sure the connectors are well-seated, and that the connection is secure.

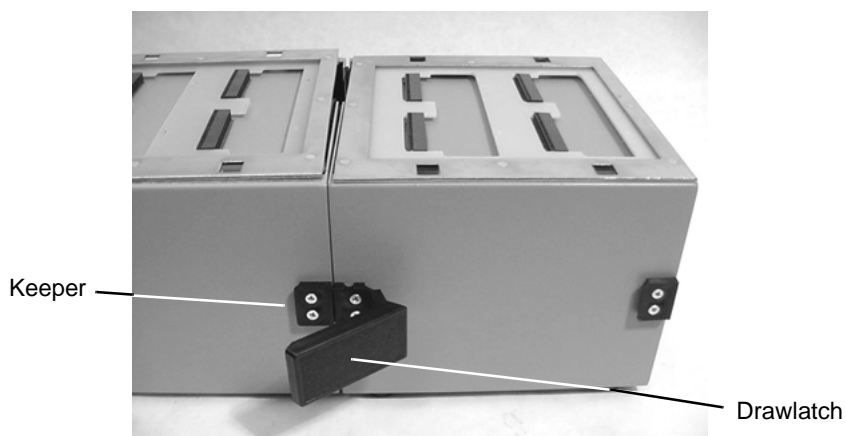
Gently lower both scanners into their boxes, routing the connecting cables through the openings in the side of each box.

3. Slide the two metal boxes together. The alignment pins in the side of one box

should fit into the round openings in the side of the next box.

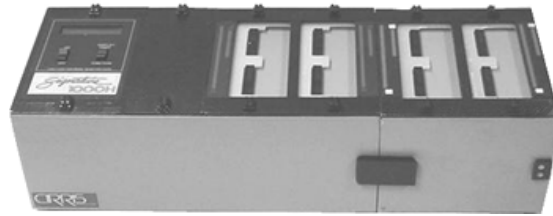


4. Once the two boxes are in position, hook the drawlatches on one box over the keepers on the other box, then close the drawlatches to lock the boxes securely together.



Once the boxes are together (aligned by the alignment pins and holes) hook the drawlatches over the keepers on each side of the analyzer, then snap the drawlatches shut. Replace the coverplates.

5. This photo shows your 1000HN as it should look with an expansion box installed, and the spacer plate and coverplates in place.

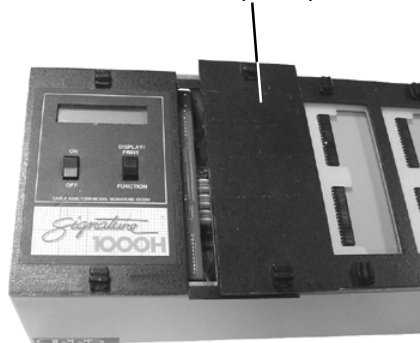


How to change the EPROM

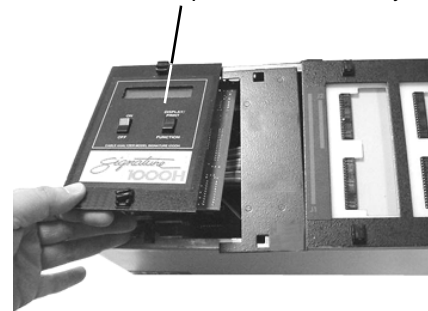
You may need to change the EPROM on the microprocessor assembly. To do this, follow these steps:

1. Disconnect the wall transformer from the wall outlet, then disconnect the power cable from the socket on the back of the analyzer.
2. Unlock the twistlock fasteners, remove the spacer plate, then gently raise the microprocessor assembly out of the box.

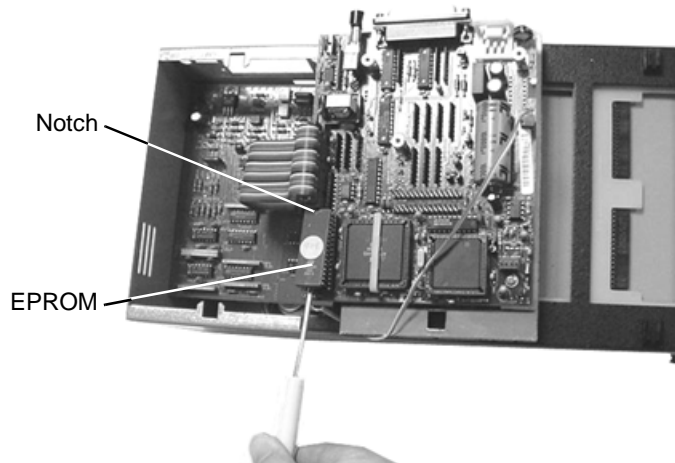
Remove the spacer plate...



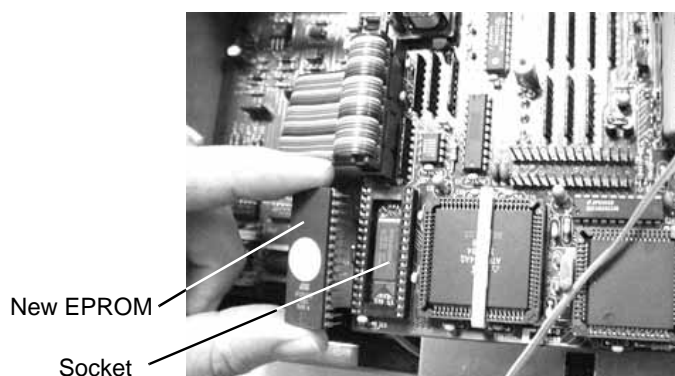
...then lift out the processor assembly



3. Turn the processor assembly over gently. Using a small, flat-bladed screwdriver, carefully pry the EPROM out of its socket, and remove it.



4. Gently align the pins on the new EPROM with the holes in the socket.



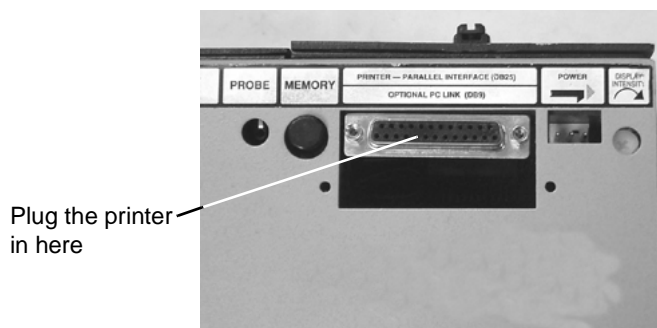
Gently place the new EPROM on the socket, and align the pins. Be careful not to bend the pins!

5. Carefully push the new EPROM down into the socket using even pressure. Be careful not to misalign or bend the pins!
6. Gently lower the microprocessor assembly back into the box. Replace the spacer plate, then lock the twistlock fasteners. Your unit is reassembled.

Adding a printer

The 1000HN works with almost any printer that has an Epson/Centronics parallel interface. **WARNING!!** Connecting the analyzer to a printer with an RS-232 serial interface will cause serious damage to the analyzer, and is not covered by your factory warranty.

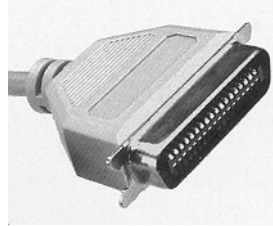
To connect the printer, use a standard Epson/Centronic parallel interface cable, readily available from almost any PC dealer. Plug one end of the cable into the printer, and the other end into the analyzer's parallel printer socket as shown in the photo.



How do I know if I have a parallel printer?

To see if you have a parallel printer, look for the parallel connector on the printer. Printers usually have a parallel interface located in back. Many printers have both a

serial and a parallel connector. To work with the 1000HN your printer must have a 36-position female ribbon connector similar to the one shown here.



**Can I use one printer
with more than one
analyzer?**

Yes. To use your printer with more than one analyzer, use a switchbox. To change which analyzer the printer is receiving information from, simply change the switch setting on the box.

**How do I use a printer
without an on-line/off-
line switch?**

If your printer does not happen to have an on-line/off-line switch, you can use either of two solutions:

- Add a switch by placing a switch in the wire to pin 11 of the Epson/Cen-tronics printer cable. When pin 11 on either side of the cable is open, the analyzer will see the printer as being off-line, and will display informa-tion rather than send it to the printer. When you close the switch so that pin 11 is closed, information will be sent to the printer.
- If you have a switch box available, you can connect the cable to the switchbox, and use its switch as the on-line/off-line switch.

**Changing the
company name**

To change the company name that appears in the documentation produced by the 1000HN, you can order an EPROM change from Cirris Systems. Replace the EPROM. For details on how to do this, see page 13.

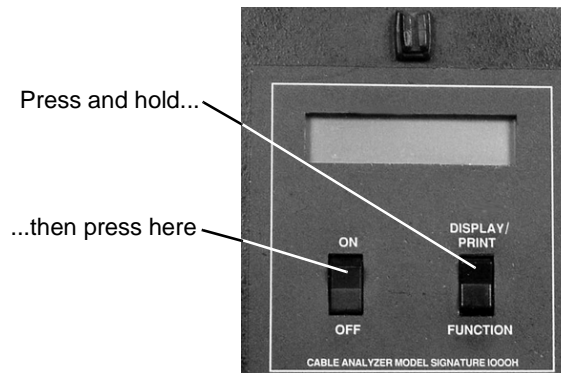
Section 2: Check the Option Settings

Overview: The Cirris 1000HN has eleven test options. Before we learn a Sample Cable, we'll make sure they are set to their factory defaults.

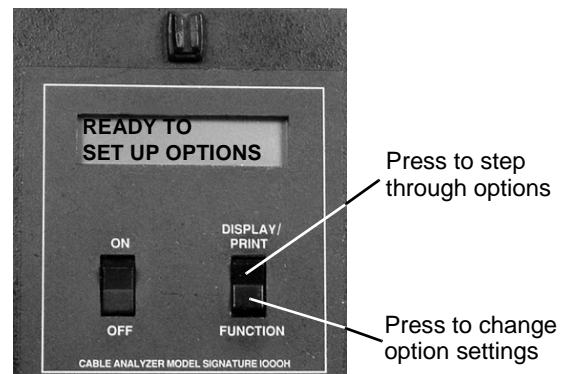
How to check the option settings

To check the option settings, do these things:

1. Press in and hold the **Display/Print** switch as you turn on the analyzer by pressing the **On** switch. Hold **Display/Print** until **Ready To Set Up Options** appears.



2. Once **Ready To Set Up Options** appears in the display, release **Display/Print**.



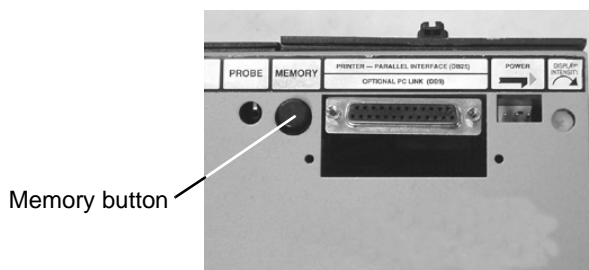
3. Select the **Create Test From** option by pressing **Display/Print**.
 - If the setting is **SAMPLE CABLE**, go on to the next option by pressing **Display/Print**
 - To change the option setting, press **Function** until **SAMPLE CABLE** appears, then go on to the next option by pressing **Display/Print**.

4. Continue stepping through the options by pressing **Display/Print**, changing the settings as necessary by pressing **Function**, until all the options are set as shown in this table: When you are done, **Ready to Learn** will appear on the display.

Factory Default Option Settings	
Option	Setting
Create Test From	SAMPLE CABLE
Connection Resistance	AUTO
Hipot Voltage	300 V
Insulation Resistance	10 MΩ
Hipot Duration	100mS
Apply Hipot to	ALL ADAPTER PINS
Auto Hipot	OFF
Error Tones are	LOW
Sorted Wire List is	OFF
Count All Cables is	OFF
Auto Print is	OFF

What to do if you go past the value you want

If you want to go backward through either the options or settings, press in and hold the **Memory** button on the back of the analyzer, while pressing **Display/Print** or **Function**. **Note:** All options or settings will roll over to the beginning when you are going forward or backward.



Your option settings are saved

When you set the value you want, it is saved once it is displayed on the screen. Turn off the analyzer, the analyzer will use those settings when you power it up again.

Section 3: What the Option Settings Mean

Overview

The Cirris 1000HN has eleven test option settings which you set to meet your testing requirements. In this section, we'll tell you what each of the settings means.

Create Test From

Gives you the option to create a new test setup from a new Sample Cable, your last test setup, or by learning a complex cable that contains resistors and/or diodes in addition to ordinary wire connections.

SAMPLE CABLE: Use this setting to learn standard simple cables (cables that contain only wires and connectors).

LAST TEST SETUP: Use this setting when you need to use the same test setup each time you turn on the analyzer. Useful when testing large batches of the same type cable. Will help protect your test setup from a power failure, or if you accidentally turn on the analyzer with an untested cable connected.

COMPLEX ASSEMBLY: Use this setting to learn a cable that contains resistors, diodes, or divider networks in addition to ordinary wires and connectors. When you use this setting, the Connection Resistance refers to the resistance level that definitely separates wires from resistors. The analyzer sets this to 5 Ω . You may change the setting to meet your needs. Using the Connection Resistance CALC mode may help you determine a good setting.

Connection Resistance

Specifies the **maximum** resistance a connection can have and still be considered good. For example, if you set the Connection Resistance to 10 Ω , the analyzer will consider all connections with resistances less than 10 Ω as good, and those with resistances greater than 10 Ω as bad.

Range: .5 Ω , 1 Ω , 2 Ω , 5 Ω , 10 Ω , 20 Ω , 50 Ω , 100 Ω , 200 Ω , 500 Ω , 1K Ω , AUTO, CALC.

AUTO mode: When you set the Connection Resistance to AUTO, the 1000HN measures the resistance of each connection in your Sample Cable, then automatically sets the Connection Resistance threshold to a value 20% higher than the largest resistance measured in the Sample Cable. The 20% margin of error is increased for resistances less than 1 Ω .

CALC mode: Setting the Connection Resistance to CALC causes the 1000HN to measure the resistance of the connections in the Sample Cable in the same way you would measure them with an ohmmeter. In this mode, the analyzer can only measure resistances up to 6K Ω . After the analyzer calculates the resistance of the Sample Cable, it prompts **RESISTANCE READY**. Press the Display/Print switch to display all resistances measured below 6Kohms.

Hipot Voltage

Range: Off, 50V, 100V, 200V, 300V, 400V, 500V, 630V. Specifies what voltage will be applied during hipot testing, between pins that should not be connected. This deter-

mines how effective the insulation on a cable is during a test. The higher the voltage you set, the higher the insulation resistance the analyzer can detect. Voltage settings will affect the range of insulation resistance settings available to you. **Warning!!** Do not subject cable assemblies to voltages higher than they are designed to handle, because this may damage them. For example, ribbon cable is usually designed to handle up to 300 volts.

Insulation Resistance

The available range for each hipot voltage setting is shown in the table below. This setting selects the minimum resistance between wires that should not be connected. When you select an Insulation Resistance setting, you are specifying the minimum resistance that two unconnected nets can have between them, and still be considered good when the hipot voltage is applied.

This table shows how the Hipot Voltage setting limits what Insulation Resistance settings are available.

Hipot Voltage vs. Insulation Resistance Settings	
Hipot Voltage	Available Range of Insulation Resistance Settings
OFF	Not Applicable.
50 V	5MΩ, 10MΩ, 20MΩ.
100 V	5MΩ, 10MΩ, 20MΩ, 50MΩ.
200 V	5MΩ, 10MΩ, 20MΩ, 50MΩ, 100MΩ.
300 V	5MΩ, 10MΩ, 20MΩ, 50MΩ, 100MΩ.
400 V	5MΩ, 10MΩ, 20MΩ, 50MΩ, 100MΩ, 200MΩ.
500 V	5MΩ, 10MΩ, 20MΩ, 50MΩ, 100MΩ, 200MΩ.
630 V	5MΩ, 10MΩ, 20MΩ, 50MΩ, 100MΩ, 200MΩ, 500MΩ.

Hipot Duration

Range: 10ms, 100ms., 1 second, 2 seconds, 5 seconds, 10 seconds, 30 seconds, 1 minute. This setting determines the length of time voltage will be applied to each **NET** during hipot testing. The longer the setting, the more likely the analyzer is to detect faults which occur over time (intermittents); but testing will take longer. **Important!** The system will not perform a hipot test until a cable has passed a conductance test. Once leakage above the set threshold is detected, the high voltage is switched off.

Apply Hipot To

This setting determines whether the hipot voltage will be applied to all adapter pins (whether they have connections or not), or only to those adapter pins that are connected to other pins. The available settings are **ALL ADAPTER PINS**, or **CONNECTIONS ONLY**. The **CONNECTIONS ONLY** setting is generally faster, since only connected pins will be hipot tested.

Auto Hipot

This option lets you choose between automatic and manual hipot testing. When this option is **ON**, the analyzer will automatically begin a hipot test on a cable as soon as that cable passes a resistance test. You can repeat the hipot test by pressing the

Function switch.

When this option is **OFF**, a cable won't be hipot tested (after passing a resistance test) until you press the **Function** switch. The **Function** switch becomes a "push-to-test" switch on the hipot test.

Error Tones When the analyzer detects errors, it emits a series of sharp beeps. This setting allows you to set the volume of these beeps. The available settings are **Off**, **Low**, and **High**.

Sorted Wire List When this option is **ON**, it changes the order that errors appear in a net. For example, pin J1-01 will always come before pin J1-14 if they are connected in the same net. When this option is **OFF**, the order that pins appear in a net is determined by the scanning order of the analyzer.

Count All Cables Once the analyzer is programmed, and you've begun testing cables, the analyzer begins to count the cables you test. When this option is **ON**, the printout from your tests shows the total number of cables tested, as well as the number of cables which tested as good. When this option is **OFF**, the printout will show only the number of cables that tested as good.

Auto Print When a printer is connected to the analyzer and this option is **ON**, the system will print a one-line report when each cable being tested is disconnected, indicating whether that cable tested as good, bad, or intermittent. When this option is **OFF**, the system will not print each result automatically.

Section 4: Learn a Sample Cable, Store it in Memory

Overview: In this chapter, we will show you how to learn a Sample Cable, then store the wirelist from that cable in one of the analyzer's permanent memory locations.

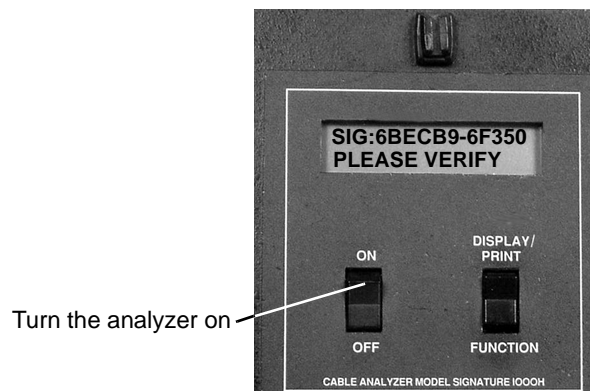
Memory in the 1000HN The Signature 1000HN has 50 permanent memory locations you can store wirelists in. You can store wirelists in these locations, retrieve wirelists from them, and delete wirelists from them. There is also one temporary memory location called "Last Learned."

Last Learned When the analyzer learns a new Sample Cable, the wirelist data from that cable is stored in the temporary "Last Learned" memory location. It stays there until you either save it in one of the permanent memory locations, or overwrite it by learning another Sample Cable.

Learn a Sample Cable Before you can learn a Sample Cable, you must install the right cable adapters on your 1000HN (see page 9 for instructions on how to do this).

To learn the Sample Cable do these things:

1. Connect the Sample Cable you want to learn to the connector adapters already installed on the 1000HN. Turn on the analyzer by pressing the **On** switch. The analyzer will learn the cable, then prompt **Please Verify**.



2. To verify that the Sample Cable has been learned correctly, press **Display/Print**.
 - If you have a printer connected to the analyzer, when you press **Display/Print**, the analyzer will print out the cable's wirelist information. The printout is your cable documentation. Compare the printed information to the Sample Cable's specification sheet or build list to be sure the cable is a good one.

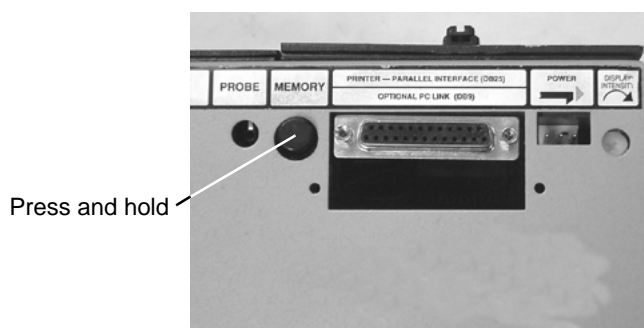
- If you don't have a printer connected to the analyzer, pressing **Display/Print** causes the analyzer to prompt wirelist information in its display. Repeatedly press **Display/Print** to step through the wirelist, transcribing the information to a blank documentation form (see page 75) as you go. Compare the transcribed information to the Sample Cable's specification sheet or build list to be sure it's a good cable.

3. Disconnect the Sample Cable from the analyzer.

Store the Sample Cable in memory

Now that you've learned the Sample Cable, and verified that the wirelist data is correct, you may store the cable in the analyzer's memory. To store the cable, do these things:

1. Press and hold in the **Memory** button (located on the back of the analyzer as shown in this photo).



2. When you press the **Memory** button, the analyzer will prompt **Ready To Save Learned Cable**. Continue to hold the **Memory** button in for instructions 3 and 4.



Hold in the **MEMORY** button while you step by pressing here

3. While continuing to hold in the **Memory** button, press **Display/Print** to select a memory location. The analyzer will default to the first unused memory location. Each time you press **Display/Print**, the analyzer prompts the next unused memory location. For example, if location #1 is empty, the display will prompt **Mem-**

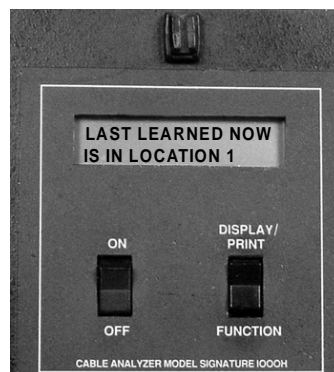
ory Location 1 Is Now Unused. Keep pressing Display/Print until you find the memory location you want. **Note:** If the display prompts **No Memory Available**, all of the analyzer's memory locations are full. You'll have to delete a wirelist to make room available. See page 33 for instructions on how to do this.

4. When you have located an available memory position, continue holding the Memory button in, and press Function to save the newly-learned wirelist to that memory location. The display will prompt **Memorizing Last Learned Cable**.



Hold the MEMORY button in while you press here

5. Release the Memory button. The display will prompt **Last Learned Now Is In Location X**. The wirelist is now stored in the analyzer's memory.



What to do if you see an error message

If you get an error message such as **Learned Cable Resis Error** or **Insulation Resis < Auto.XXXX** while you're trying to learn a Sample Cable, check the following:

1. If the error message is **Learned Cable Resis Error**, the cable may have resistances that fall between the Connection Resistance and Insulation Resistance settings.
 - Press Display/Print to locate points with resistance errors, and document them. If the cable is correctly built, change the resistance settings to accommodate the cable. See page 17 for details on how to do this.

Section 4: Learn a Sample Cable, Store it in Memory / What to do if you see an error message

- If the cable is not built correctly, use another Sample Cable that does not contain the errors, and repeat the learning process. **Note:** If you disconnect the cable with the error, or if you press the **Memory** button, the analyzer will enter the test mode.
2. If the error message is **Insulation Resis < Auto .XXXX**, check to see if the Connection Resistance is set to **AUTO**, and the Auto resistance is higher than the Insulation Resistance setting.
- Change the Insulation Resistance setting to be equal to or higher than the **AUTO** Connection Resistance setting prompted in the display. See 1000HN for details on how to change the setting.

Section 5: Test Your First Cable

How to test your first cable

Now that you have installed any expansion boxes you will be using, have installed your connector adapters, have checked the option settings, and have programmed the analyzer by learning a Sample Cable (see page 23), or by retrieving a cable from the analyzer's memory (see page 31), you are ready to test your first cable.

To test your first cable, follow these steps:

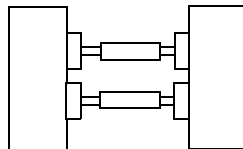
1. Disconnect and remove the Sample Cable from the analyzer.
2. Connect the cable you want to test to the analyzer.
 - Once you have connected the cable, the analyzer will automatically begin the test. (**Note:** If you have set the **Auto Hipot** option to **OFF**, the analyzer will stop after the continuity and conductance tests, prompt **Ready To Hipot**, and wait for you to press **Function** to begin the hipot test.)
 - **WARNING!! Do not connect a powered ("live") cable to the analyzer!** This will seriously damage your analyzer, and will immediately void any stated or implied warranty.

Check the display, interpret the sounds

As the analyzer does cable tests, it will display results on its LCD display, and will emit sounds. Here's how to interpret what you see and hear:

If a cable is good:

The display prompts the same alphanumeric signature as the Sample Cable. The display will show **Good R<X.XΩ**. The analyzer will emit a steady clicking sound.

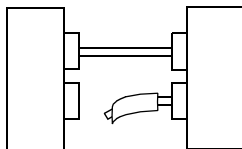
A rectangular box representing the LCD display. It contains two lines of text: "SIG:XXXXXX-XXXX" on the top line and "GOOD R<XXXΩ" on the bottom line.

SIG:XXXXXX-XXXX
GOOD R<XXXΩ

- To continue testing, disconnect the good cable, then replace it with another cable you want to test.

If a connection is missing:

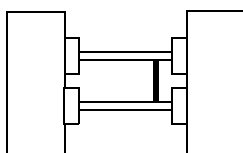
The display prompts **Open Detected**, and the analyzer emits a series of single beeps.



OPEN DETECTED

If the analyzer detects a short:

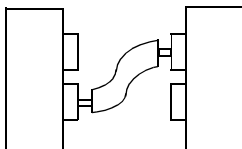
The display prompts **Short Detected**, and the analyzer emits a series of double beeps.



SHORT DETECTED

If both opens and shorts are detected:

The display prompts **Errors Detected**, and the analyzer emits a series of triple beeps.



ERRORS DETECTED

If an insulation short is detected:

The display prompts either **Bad R> XΩ** or **Insulation Short**. Both prompts indicate that the measured resistance is higher than the Connection Resistance setting, and lower than the Insulation Resistance setting. The analyzer emits a series of double beeps.

BAD R>.xΩ

or

INSULATION SHORT

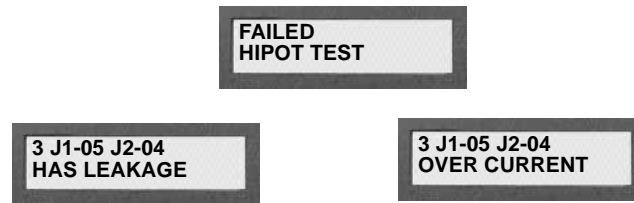
Interpreting hipot test results

If you have set the **AUTO Hipot** option to **ON**, the analyzer will automatically hipot test each cable after the cable passes the resistance tests. If this option has been set to **OFF**, the analyzer will prompt **Ready to Hipot**, and you will have to press **Function** to begin the hipot test.

Note: During the test, the analyzer prompts the net being hipot tested and **Hipot Test**. If you happen to touch any uninsulated part of the cable under test, you may experience a mild but annoying electrical shock, and cause the hipot test to fail.

Failed Hipot Test

If the hipot test detects errors, the analyzer prompts **Failed Hipot Test**. Press **Display/Print** to step through the errors detected. The display will prompt the problem nets as either **Has Leakage**, or as **Over Current**.



- **Has Leakage** indicates that there is weak insulation between pins or bare wires that nearly touch. These defects have the potential to become short circuits. At the most sensitive settings, contamination from fingerprints or body oils deposited while handling connectors may cause a cable to fail.
- **Over Current** indicates that the cable has excessive capacitance for the selected hipot voltage setting or if the resistance of the leak is sufficiently low (approximately 500 Kohms). If the cable has too much capacitance, try using a lower hipot voltage.

Dielectric Fail:

This indicates that the analyzer detected electrical arcing between nets during the hipot test. If the analyzer can isolate the nets that are arcing during the test, it will prompt them in the display. If it cannot isolate the specific nets that are arcing, it will prompt **Undetermined Net**.



Intermittent

If a cable develops shorts or opens after it first tests as good, the display prompts an intermittent error. The analyzer emits a steady series of clicks as though the cable were good.

- Press **Display/Print** to show the error condition that existed when the intermittent occurred.
- Clear the intermittent by pressing the **Memory** button on the back of the analyzer.

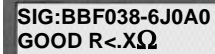


Passed Hipot Test

If the hipot test is successful, the analyzer briefly prompts **Passed Hipot Test**, then cycles to a continuous resistance test and prompts **Good R<.XΩ**. The analyzer emits a steady clicking sound after each newly-completed continuity/conductance test. To repeat the hipot test, press **Function** again. The conductance test always follows a successful hipot test, and continues until you remove the cable.



PASSED HIPOT TEST



SIG:BBF038-6J0A0
GOOD R<.XΩ

Print or transcribe an error list

If the analyzer detects errors, it can prompt where the error is in a cable. To do this, press **Display/Print** while the cable is still connected to the analyzer. If you have a printer connected to your analyzer, it will automatically print out an error list. If you don't have a printer, keep pressing **Display/Print** to step through the errors as you transcribe them to a cable documentation form (see page 75).

Section 6: Retrieve a Cable from Memory

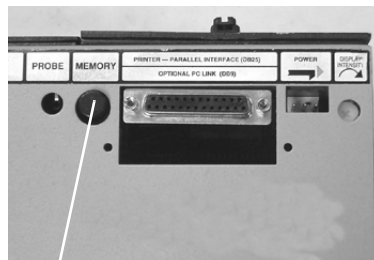
Why retrieve a cable?

Before the 1000HN can test cables, it has to be programmed with wirelist data for the cables you intend to test. You can avoid having to re-learn a Sample Cable each time you want to test, by storing the learned information in the analyzer's memory (see page 24 for instructions on how to do this). Once the information is stored, all you have to do to set up for testing is to install the correct cable adapters on the analyzer, then retrieve the cable data from memory in order to program the analyzer.

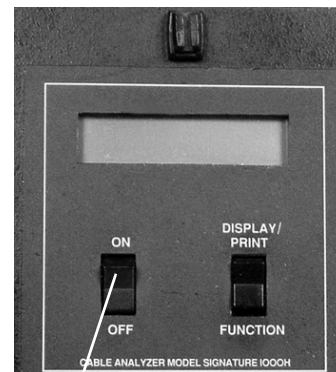
How to retrieve a cable

To retrieve a learned cable's data from memory and program the analyzer for testing, do these things:

1. Install the connector adapters that mate with the cables you want to test (see page 9 for instructions on how to do this).
2. Hold in the **Memory** button as you turn on the analyzer. Continue holding in the **Memory** button as you do the next step. The analyzer will prompt **Ready To Access Memory Locations**.



Press and hold...

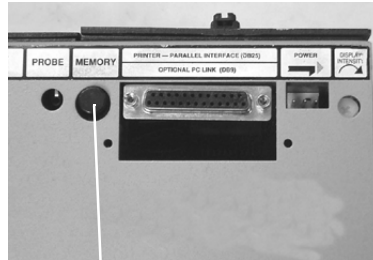


...as you turn the analyzer on

3. Continue holding in the **Memory** button while you press **Display/Print** to step through the Sample Cables stored in the analyzer's memory. The first time you press the switch the display prompts the signature of the cable in the "Last Learned" memory location. When you press **Display/Print** again, the analyzer

Section 6: Retrieve a Cable from Memory / How to retrieve a cable

prompts the signature for the cable stored in permanent memory location number 1 (there can be as many as 50 of these). Continue pressing **Display/Print** until you see the signature for the kind of cable you want to test.



Continue to hold...



...while you step through the cable signatures

4. When the display prompts the signature for the kind of cable you want to test, release the **Memory** button.
 - If the display prompts **Ready To Test**, the analyzer has retrieved the Sample Cable data, the correct adapters are in place, and you are ready to test cables.
 - If the display prompts **JX Adapter Sig: Should Be**, this means that the adapters you have installed don't go with the Sample Cable you've retrieved. Read the display to get the correct adapters and their positions, then install them. **Note:** It's OK to install adapters without turning off the analyzer when it is in this mode. Once you've installed the correct adapters, the display will prompt **Ready To Test**.



Cable retrieved, adapters are correct. You are ready to test.



Installed adapters are not correct. Install correct adapters. When you've done that, prompt will change to **Ready to Test**.

Section 7: Delete a Cable from Memory

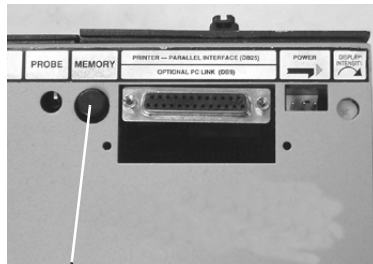
Why delete a cable?

The Cirris 1000HN has 50 permanent memory locations for storing cable information. You may need to delete cables to make room for new wirelists, or to discard wirelists you no longer use for testing.

How to delete a cable

To delete a cable from the analyzer's memory, do these things:

1. Hold in the **Memory** button as you turn on the analyzer. Continue holding in the button as you do the next step. The analyzer will prompt **Ready To Access Memory Locations**.

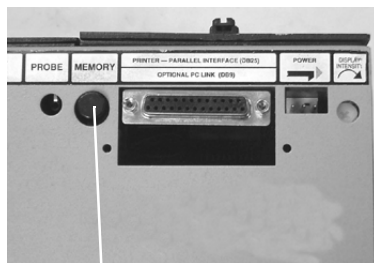


Press and hold...



...as you turn the analyzer on

2. Continue holding in the **Memory** button while you press **Display/Print** to step through the Sample Cables stored in the analyzer's memory, until you come to the signature of the cable you want to delete. (Remember, the first cable displayed will be the cable in the "Last Learned" memory location. It cannot be deleted.) When you come to the cable you want to delete, the display should prompt **Mem. Location X Sig: XXXXXX-XXXX**, indicating the memory location and signature of the cable.



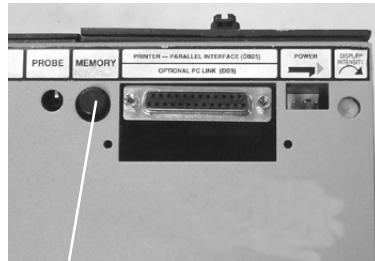
Continue to hold...



3. Continue to hold in the **Memory** button while you press **Function** to select the

Section 7: Delete a Cable from Memory / How to delete a cable

cable for deletion. Continue to hold down the **Function** switch as you do the next step.

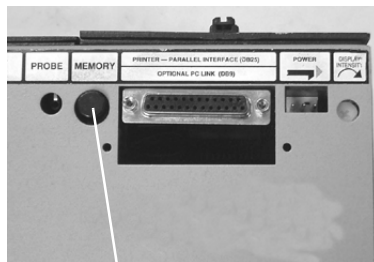


Continue to hold...



...while you press here to select the cable for deletion

4. Delete the Sample Cable you've selected by first releasing the **Memory** button, then releasing the **Function** switch. When you release the **Memory** button, the prompt will change to **Mem Location X Is Now Unused**. When you release the **Function** switch, the prompt will change to **Ready To Learn**. The memory location is now empty.



First release this button...



...then release this button

Section 8: Print a Directory of Cables Stored in Memory

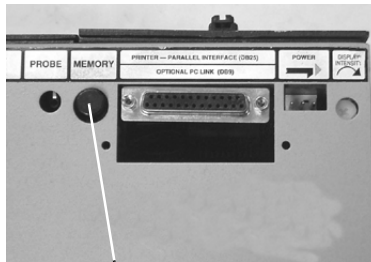
Overview

If you have a printer connected to your 1000HN, you can print a directory that shows all the Sample Cables stored in the analyzer's memory. The directory will show the memory location number, and the signature of the Sample Cable stored in each memory location. **Important Note!** For photographic clarity, we've removed the printer cable in the views shown here. For your printer to work, it must be connected to the analyzer.

Print out a directory

To print out a directory of the Sample Cables stored in the analyzer's memory, do these things:

1. Make sure the printer is properly connected to the analyzer, and is turned on.
2. Press and hold in the **Memory** button as you turn on the analyzer. Continue to hold in the **Memory** button as you do the next step.

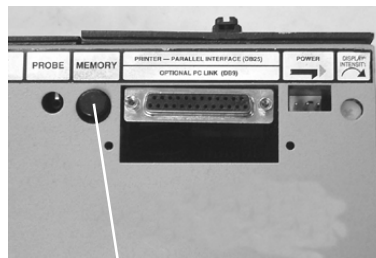


Press and hold this button...
(Note: Printer cable is not shown)



...as you turn the analyzer on

3. As you continue to hold in the **Memory** button, press **Display/Print** once. This causes the display to prompt **Press Function To Print Dir.**



Continue to hold this button in...
(Note: Printer cable is not shown)



...as you press here

Section 8: Print a Directory of Cables Stored in Memory / Print out a directory

4. When the display prompts **Press Function To Print Dir**, press the Function switch. If your printer is properly connected to the analyzer, turned on, and on-line (selected), it will print a directory showing the signatures of all the cables stored in memory, and their corresponding location numbers.



Press here to print a directory

5. Release the Memory button.

Section 9: Cable Documentation and Signatures

What is cable documentation?

Cable documentation is a printed record of a Sample Cable's unique signature, the adapters used to test it, and the test parameters used to test it. It also contains a complete list of the interconnections in the cable, and any notes necessary to help you build the cable.

Why prepare cable documentation?

When you prepare complete documentation, you prepare a standard set of information from which future cables will be built. The 1000HN can help you prepare documentation by learning a Sample Cable. Once the cable has been learned, you can either transcribe it by hand onto a documentation form (see page 75), or print it out if you have a printer connected to your analyzer.

Once the cable has been completely documented and stored in memory, you won't need to keep an array of "known good" cables handy for comparison. If the signature prompted by the analyzer after each test matches the signature in the cable's documentation, you can be sure the cable is correctly built according to your specifications.

You can store Sample Cable information in the analyzer's memory. When you retrieve that information from memory, you program the analyzer just as if you'd learned a real Sample Cable. The analyzer will prompt the Sample Cable's alphanumeric signature, and which connector adapters to install. See page 24 for information on how to store a Sample Cable in memory, and page 31 for information on how to retrieve a cable from memory.

Please see next page...

How to interpret cable documentation

The documentation your 1000HN produces contains all the information you will need to precisely duplicate test setups. This example shows a typical wirelist with the cable signature, parameter signature, adapter signatures, and resistance settings.

SIGNATURE 1000HN CABLE DOCUMENTATION

A CABLE SIGNATURE: BBF038

C **D** PARAMETER SIGNATURE: KX8NJ

D J1 ADAPTER SIGNATURE: 03FAC1

F J2 ADAPTER SIGNATURE: F5B4E0

F CABLE DESCRIPTION

G PARAMETER SETTINGS:

CONNECTION RESISTANCE	AUTO <.5 OHM
HIPOT VOLTAGE	300 V
INSULATION RESISTANCE	>50 M ohm
DURATION PER NET	100 mS
APPLY HIPOT TO	ALL ADAPTER PINS

B CABLE PART NO.: _____

E CONNECTOR DESCRIPTION: _____

CONNECTOR DESCRIPTION: _____

M B.40

WIRE LIST:

H NO. COMMON CONNECTIONS

I 1 J1-01 J2-01

2 J1-02 J2-03

3 J1-03 J2-02

4 J1-04 J2-04 J2-20

J TOTAL CABLES TESTED: 50

INTERMITTENT CABLES TESTED: 6

GOOD CABLES TESTED: 40

K DATE: _____

L NOTES: _____

A. This example shows a cable with the cable signature BBF038. Both this signature and the five-digit parameter signature (see item C below) must match those prompted in the display when you are preparing to test cables.

B. This blank area is left so you can write in the cable's part number.

C. This is the five-digit parameter signature that represents the voltage and resistance settings you have selected for testing the cable. This signature must match the one shown in the analyzer's display for the resistance and voltage levels to be the same.

D. These are the connector adapter signatures. In this example, the signature for the adapter in position J1 should be 03FAC1. The signature for the adapter in position J2 should be F5B4E0.

E. This blank area is for writing a brief description of the connector adapters.

F. This blank section is for writing a cable description.

G. This section shows the test parameters. Our example shows that the Connection Resistance is set on **AUTO**, and that the Insulation Resistance High Voltage option is set to 50 MΩ.

H. Each net (each group of interconnected pins) is identified by a *net number*. The net numbers appear directly under the number heading **NO.** and are immediately followed by the connected points that comprise that net.

I. The interconnections that comprise each net appear after each net number, and are shown directly under the heading **COMMON CONNECTIONS**. The numbers J1, J2,

J3, and J4 indicate the adapter position. The number after the hyphen is the specific pin to which a connection is made.

J. Our example shows that a total of 50 cables has been tested. Forty of these tested as good. Six cables tested as having intermittent errors, and four tested simply as bad. This breakdown of good and bad cables appears on the documentation because the analyzer's **Count All Cables** option was set to **ON**. When this option is set to **OFF**, the printout shows only the number of cables which tested as good.

K. This blank area is for writing in the date of the test.

L. This is a section left open for writing in any additional notes. You may wish to include a drawing of the cable here.

M. This shows the EPROM revision number your analyzer is equipped with.

How signatures work

Signatures are the working basis of the 1000HN system. When the 1000HN learns a Sample Cable (a cable that you know is built correctly), it computes and displays a cable signature for that Sample Cable. This signature becomes part of your cable documentation for that kind of cable.

- When the signature prompted by the analyzer matches the signature in your cable documentation, you know that your test setup is correct.
- When the signature of a cable you are testing matches the documented signature during a test, you know the cable under test is correctly built.

Types of signatures

The 1000HN uses three types of signatures:

1. The *cable* signature.
2. The *parameter* signature.
3. The *connector adapter* signature(s).

The cable signature

The first six characters in a signature (as displayed by the 1000HN) are called the *cable* signature. This six-character alphanumeric number represents a summary of the interconnections in a cable. When the analyzer learns a cable, it computes this unique signature based on the cable's interconnections, and the connector adapters in use.

The parameter signature

When the 1000HN displays a signature, it first displays the six-digit cable signature, then a hyphen. The five-digit alphanumeric number that follows the hyphen is the *parameter* signature. It represents the voltage and resistance settings you have selected. **Note:** If you select the same voltage and resistance settings for two different kinds of cables, both kinds will have the same parameter signature, but different cable signatures.

The connector adapter signature(s)

The connector adapters you use to connect your cables to the 1000HN have unique, six-character *connector adapter* signatures. Each kind of adapter has its own adapter signature. These signatures help you verify that your test setups are correctly done.

They appear on the labels attached to the adapters, and on your cable documentation (see item D on page 38). When the adapter signatures match those found on your cable documentation, you have installed the correct adapters.

How connector adapters are supported

The 1000HN uses connector adapters mounted on small printed circuit boards to connect the cables you want to test to the analyzer's scanner assembly. Cirris Systems can provide adapters for nearly all popular connectors. You can also make an exterior adapter cable to adapt to any connector with up to 120 pins by using an optional frame mount stand. Call us at 801-973-4600 or 800-441-9910 for more details.

Types of adapters

There are three general adapter types available for the 1000HN. These are:

1. *Single-high* adapters. These are for connectors with up to 28 pins. They occupy one "J" position on the analyzer's scanner.



Example: An ADBP-15 single-high adapter



Single-high adapter mounted in scanner position J1.

2. *Double-high* adapters. These are for connectors with from 29 to 64 pins. They occupy two "J" positions on the analyzer's scanner.



Example: ADPG-37 double-high adapter



Double-high adapter mounted in scanner positions J1, J2

3. *Quad-high* adapters. These are for connectors with up to 120 pins. They occupy four "J" positions on the analyzer's scanner. To use more than one of these at one time, you must use an expansion box.



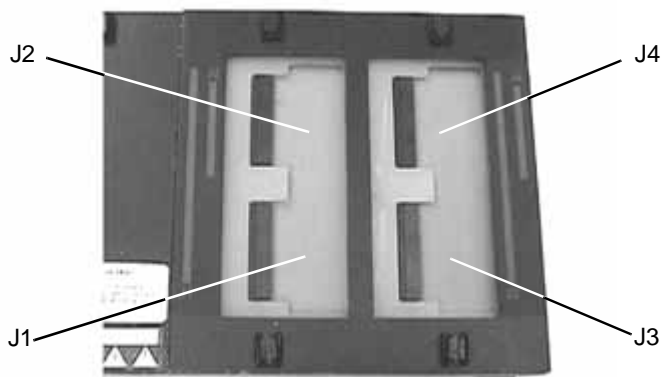
Example: AD5P-10A quad-high adapter



Quad-high adapter mounted in scanner positions J1, J2, J3, J4

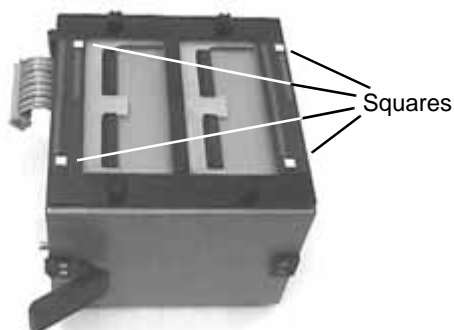
How connector adapters are placed on the analyzer

The 1000HN analyzer itself has four connector adapter positions on its scanner assembly, marked J1 through J4. Each position has 32 points, for a total of 128 available points.



How connector adapters are placed on the expansion box

The expansion box has four connector adapter positions on its scanner assembly. These positions are not marked. They each have a white square on which you may write in the adapter position number. The analyzer recognizes the positions for the expansion box as J5 through J8 (256 available test points).



1000HN with 1 expansion box installed. Eight "J" positions (256 test points) are available.

Expansion box with white squares at all four adapter positions

Order of adapter positions

In your cable documentation, connector adapter positions appear in sequential order beginning with J1. However, if you install either a double-high or a quad-high connector adapter (see page 9), some adapter positions are eliminated. In this photo, position J2 is eliminated because a double-high adapter has been installed in positions J1 and J2. A single-high adapter has been installed in position J4. In this example, the next position sensed by the analyzer during testing will be J4. The cable documentation will show interconnections for J1 and J4, but not J2 or J3.



Double-high adapter in J1-J2, single-high adapter in J4

**Install adapters
lowest-numbered first**

When you install connector adapters, you must install them beginning with the lowest-numbered “J” positions first. For example, if you intend to use adapter positions J2 and J4, first install the connector adapter at position J2. Then install the connector adapter at position J4. If you don’t do this (especially if you’re installing more than one type of adapter), you may find that the connector adapters won’t fit the scanner assembly correctly.

**Sample wirelist
showing connector
adapters**

Here is a portion of a cable’s printed documentation showing how single-high and double-high connector adapters usually appear.

SIGNATURE 1000HN CABLE DOCUMENTATION

CABLE SIGNATURE: Z06A1 CABLE PART NUMBER:-----
PARAMETER SIGNATURE: 6J0A0
J1-ADAPTER SIGNATURE: D507F1 CONNECTOR DESCRIPTION-----
J4-ADAPTER SIGNATURE: 03FAC1 CONNECTOR DESCRIPTION-----
CABLE DESCRIPTION:-----

CONNECTION RESISTANCE <AUTO.5 ohm
HIPOT VOLTAGE 300 V
INSULATION RESISTANCE > 10 M ohm
DURATION PER NET 100 MS
APPLY HIPOT TO ALL ADAPTER PINS
NO. COMMON CONNECTION LIST:
1 J1-01 J4-01
2 J1-02 J4-02
3 J1-04 J4-08
4 J1-05 J4-09
5 J1-03 J4-03

Section 10: Select a Test Procedure

Types of Tests

Using the Cirris 1000HN, you can perform two different kinds of tests. These are:

1. Simple tests.
2. Hipot tests.

Simple Tests

Simple tests are used for testing cables made up of only wires and connectors. These cables have no resistors, capacitors, diodes, or any active circuitry. Set the Connection Resistance to a low number (typically less than 10 Ω). Depending on the capacitance of the cable, set the Insulation Resistance to a higher setting.

This table will give you general guidelines for setting up simple tests. You can adjust the settings to meet your specific needs.

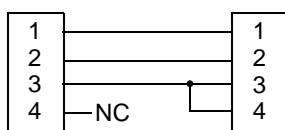
General Guidelines for Simple Tests (continued on next page)					
Test Type	Conn. Resis.	Ins. Resis	Hipot Voltage	Hipot Duration	Comments
Calculating resistances only	CALC	N/A	OFF	N/A	Use <i>CALC</i> to help you determine where to set your Conn. Resis. threshold. <i>CALC</i> several cables, then set your own threshold. Do not use <i>CALC</i> for testing!
Automatic test	AUTO	N/A	OFF	N/A	<i>AUTO</i> selects a Conn. Resis. threshold for you. It takes the highest resistance measured between any two points and adds 20%. Warning! If you get a Sample Cable with a high resistance when learning in <i>AUTO</i> , you may be testing at a much higher threshold than you want. Use <i>CALC</i> to determine a proper connection threshold, then set it yourself.
Fast test	1K Ω	N/A	OFF	N/A	The fastest possible test. This setting effectively makes the analyzer act like a continuity tester.
Long cable test	10 Ω	5.0M Ω	100V	100mS	These settings are for low Connection Resistance, mild hipot testing. They allow you to test cables that are long, or that have high capacitances.

Typical test	0.5Ω	100MΩ	300V	100mS	Use these settings when low connection resistance is important, and the cable has little capacitance. Low connection resistance may require careful adapter maintenance. The hipot test will not work on extremely long cables.
Stringent test	0.5Ω	500MΩ	630V	10 seconds	Use these settings for slow, stringent testing when you need low connection resistance and extremely good insulation resistance. Maintain connector adapters carefully! Works only with clean adapters in low relative humidity.

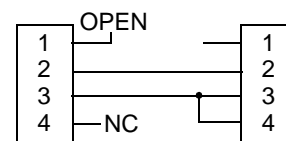
Hipot Testing

The purpose of hipot testing is to test the effectiveness of the insulation on a cable assembly. When you hipot test, you are making sure that there is extremely high electrical resistance between points that should not be connected in the cable or harness.

Important note! Before the analyzer performs a hipot test, it performs a connection resistance test (sometimes called a continuity test) to make sure that all connections in the cable are correct. If the analyzer finds any open or shorted connections during the continuity test, it will not perform the hipot test.

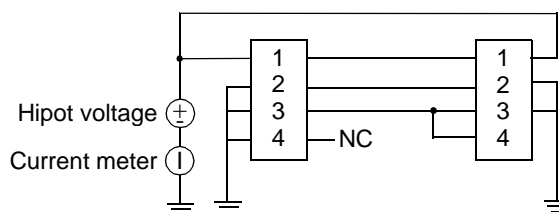


This is a known-good cable with all connections intact.



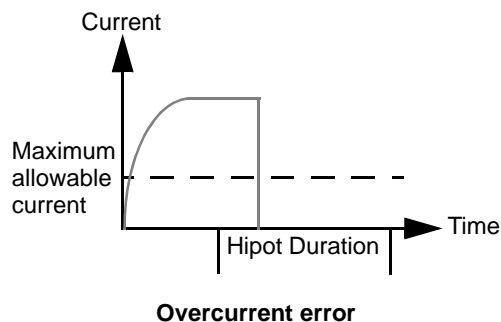
Example of the same cable with an open connection. The hipot test cannot be done on this cable.

Once a cable passes the continuity test, the analyzer can begin a hipot test. The analyzer applies high voltage to a group of connected pins (“nets”). The remaining pins are tied together. In the example below, we see net number 1 being hipot tested.

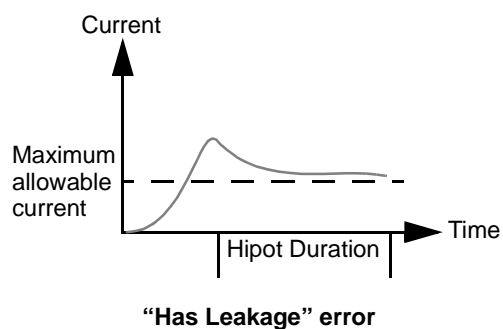


Remember that each net the analyzer tests has capacitance to every other net. That means there is a current surge as this capacitance is charged. The analyzer carefully monitors this current surge. The amount of current tells the analyzer how much energy is being delivered to the cable. If the current delivered is excessive, the

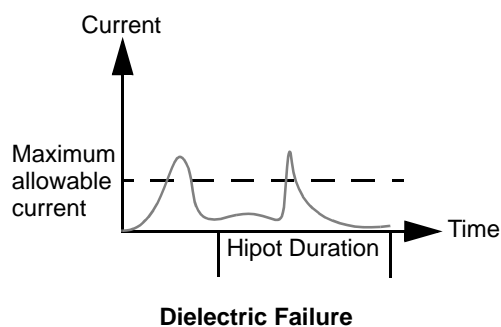
amount of energy delivered might be dangerous; therefore, the analyzer shuts off the high voltage and fails that net, labeling it “Over Current.”



If the current surge subsides to an acceptable level, the hipot test continues. The analyzer has already calculated the maximum amount of current it will allow based on the Insulation Resistance and Hipot Voltage option settings you’ve chosen (see page 20). The current flow is monitored during the hipot duration you have set, to make sure it does not exceed the maximum allowed current. If the current flow stays below the maximum allowed current for the hipot duration, the net passes the test. If it does not stay below the maximum allowed current, the net fails the hipot test, and the analyzer labels it “Has Leakage.” **Note:** The analyzer does not check where the current flows; it only knows that too much current is leaving the high voltage power supply.



If the current flow spikes above the maximum allowable current during the hipot duration, the analyzer shuts off the high voltage, and labels the cable as having a dielectric failure.



Tips on selecting Hipot Voltage settings

Remember, when you select a hipot voltage, you are setting the amount of voltage to be applied between pins that are not connected. Remember these things when you select hipot voltage settings:

- The more voltage you use, the more likely the analyzer is to detect contamination between pins, or frayed wires that almost create a short circuit. However, higher test voltages only work well on cables with little pin-to-pin capacitance.
- Higher voltage settings require greater pin-to-pin spacing on cable connectors.
- Subjecting a cable assembly to excessive voltage may degrade its future performance. Use the lowest voltage setting that still finds insulation problems in a cable. Most cables require no more than 630 volts. Most ribbon cables are designed to handle a maximum of about 300 volts.
- The hipot test applies high voltage to a net (a group of connected pins) and measures the current that flows from the net. The analyzer does not determine which net or pin the current is flowing to. This means that if several nets have leakage, you cannot tell which nets leak to each other.

Hipot voltage and capacitance problems

Excessive capacitance in a cable assembly is a major consideration when you are deciding on what Hipot Voltage, Hipot Duration, and Insulation Resistance settings to use. If a cable has shielding or a grounded net, capacitance problems are more likely to occur. Remember these things:

- In general, the higher the capacitance a cable has, the lower a hipot voltage setting you'll be able to use. See page 20 for further information.
- If you find that a cable has excessive capacitance, first try lowering the Hipot Voltage setting. You may also set the Single Net Error option to Is Ignored. This will cause the analyzer to ignore a single-net hipot failure. (A single-net hipot failure is an indication of the presence of a net with high capacitance, a net with too many points, or a net that tests as borderline.) Normally, hipot failures show up with at least two failed nets.
- If you've set the Apply Hipot option to Connections Only, the analyzer will not detect leakage of a single net to any unconnected pins.

Tips on selecting Insulation Resistance settings

Remember, when you select an Insulation Resistance setting, you are specifying the lowest resistance that should appear between unconnected points. See page 20 for more information on Insulation Resistance versus Hipot Voltage settings. Remember these things:

- Using the highest setting might increase your chances of finding some kinds of errors. You might not want to use an extremely high setting. Oil, solder flux, or fingerprints left over from the manufacturing process can become conductive in high relative humidity conditions.

Section 10: Select a Test Procedure / Tips on selecting Insulation Resistance settings

- If you are testing in relative humidity conditions above 75%, you may have more failures when you test at 500 megohms, or even 200 megohms.
- In general, select an Insulation Resistance setting that is lower than the resistance of normal contamination on the cable.

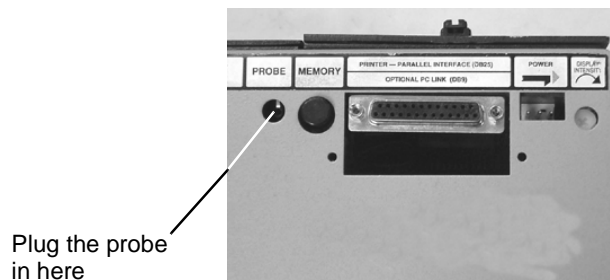
Section 11: Rework and Guided Assembly

The hand-held test probe

You can connect a hand-held test probe (provided with your analyzer) to the 1000HN. It will help you quickly identify test points as you rework or assemble cables. **Note:** The probe works only when the analyzer is in the rework mode. It will not function when the analyzer prompts **Ready to Test** or **Please Verify**.

Installing the probe

Plug the probe into the connector labeled **Probe** on the back of the analyzer. This photo shows the location of the probe jack.



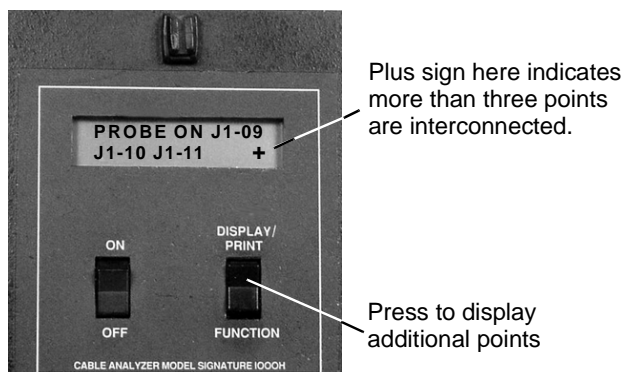
Example: Identifying test points using the probe

While the analyzer is in the test mode, touch the tip of the probe to the connector pin or wire you want to identify. For example, if you touch the probe tip to position J1, pin 11, the analyzer will prompt **Probe On J1-11**.



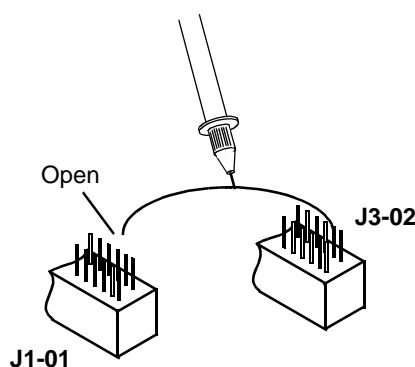
Displaying multiple interconnected pins

Up to three different pins can be displayed at the same time. If more than three pins are interconnected, a plus sign (+) will appear in the lower right-hand corner of the display. To view any additional interconnections, press **Display/Print**.



Using the probe to identify an open circuit

Using the probe, the analyzer can detect which end of an interconnection has an open. When the analyzer prompts an open, use the sharp metal tip of the probe to pierce the insulation of the wire that should connect between the two pins. The pin shown in the display is the pin that has a good connection to the wire. The pin that is **not** displayed is the open.



Rework instructions

Before you begin reworking a cable assembly, remember these things:

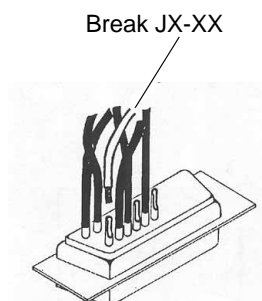
- If you have a printer connected to your analyzer, either turn it off or disconnect it.
- When the analyzer displays errors, pressing **Display/Print** once will put the analyzer into rework mode. If you press **Display/Print** twice, the analyzer will just prompt all the errors it detects.

Please see next page...

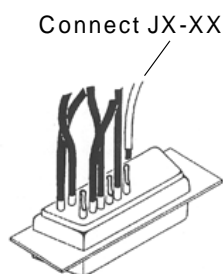
Removing shorts within a net

If the analyzer detects a short, follow these steps:

1. Press **Display/Print** once to put the analyzer into rework mode. The analyzer will prompt **Break JX-XX**, where X indicates the adapter position and the pin number. Break all connections indicated in the display



2. When you break a connection, the analyzer will prompt the next short. When all the shorts have been broken, the analyzer will prompt the net and point to which you should connect JX-XX. Connect JX-XX to the point indicated in the display.



3. Once you've corrected all the shorted connections, the analyzer will either prompt **Good Cable**, or **Connect JX-XX**. If the analyzer prompts **Break JX-XX**, you have created another short. Go back to step 2 and try again. **Note:** The

analyzer may prompt **Intermittents** as you rework the connection. To clear this prompt, press the **Memory** button on the back of the analyzer.



Cable has been corrected

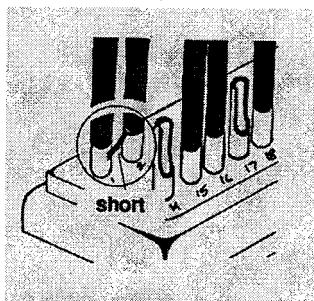


You've created another short.
Go back and try again

Removing shorts between nets

If the analyzer detects short circuits in the cable or harness you are testing, it will tell you where to make cuts to correct the shorts. This will happen if two nets should become shorted. To correct a detected short, do these things:

1. The analyzer will prompt **Cut JX-XX From JX-XX**, where X indicates the adapter positions and pin number.



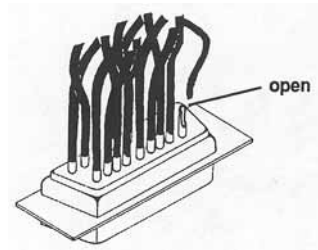
2. Locate the short between the nets, and remove it.

Please see next page...

Correcting opens

If the analyzer prompts **Connect JX-XX to JX-XX** indicates that the cable you're testing has an open circuit. To correct an open, follow these steps:

1. Locate the open circuit prompted in the analyzer's display.



2. Make the correct connections in the cable as indicated.
 - Once you've connected all the opens, the analyzer should prompt **Good Cable**.
 - If you should happen to create another short, the analyzer will prompt **Break JX-XX**.

Guided Assembly

Building cables pin-to-pin

To use guided assembly to build pin-to-pin cables, follow these steps:

1. Following the documentation for the kind of cable you want to build, install the correct connector adapters onto the 1000HN, then replace the cover plate.
2. Either connect a Sample Cable of the kind you want to build, or retrieve the correct wirelist from memory (see 1000HN for instructions on how to do this). **If you use a retrieved wirelist**, skip step 3, and go directly to step 4.
3. Turn on the analyzer and learn the Sample Cable, then disconnect the Sample Cable.
4. Install the same kinds of connectors used in the Sample Cable onto the cable adapters already installed in the analyzer.
5. Make the first connection in your cable that is specified in the documentation. The analyzer should prompt **Open Detected**.
 - If the analyzer prompts **Errors Detected**, you have not connected two points that should be connected; you have created a short instead. If you have created a short, break it, and go back to make the first good connection.
6. Once the analyzer prompts **Open Detected**, press **Display/Print** once. The analyzer will prompt you with the next set of points you should connect.

7. Connect the next set of points prompted by the analyzer. If the connection is correct, the analyzer will display **Attach JX-XX to JX-XX**.
8. Repeat the last step by connecting the next set of points prompted. If you create a short, the analyzer will prompt **Break JX-XX**.
9. Continue connecting points as prompted by the 1000HN until the analyzer prompts **Good Cable** or **Ready To Hipot**. This indicates you have finished wiring the assembly.

Building cables that have one end terminated with a connector

To build cables that have only one end terminated, follow these steps:

1. Following the documentation for the kind of cable you want to build, install the right cable adapters onto the analyzer, and replace the cover plate.
2. Either connect a Sample Cable of the kind you want to build to the analyzer, or retrieve the wirelist for the kind of cable you want to build from the analyzer's memory (see page 31 for instructions on how to do this). **If you use a wirelist retrieved from memory**, skip step 3 and go directly to step 4.
3. Turn on the analyzer and learn the Sample Cable, then disconnect the Sample Cable.
4. Insert the connector on the terminated end of the cable into the cable adapter on the analyzer.
5. Insert an empty connector of the type correct for the cable into the other cable adapter on the analyzer.
6. Plug the probe into the **Probe** jack on the back of the analyzer.
7. Make the first connection specified in your cable's documentation. The analyzer should prompt **Open Detected**.
 - If the analyzer prompts **Errors Detected**, you have created a short instead of connecting the two points that should be connected. Break the short, check your build list, and try again until the analyzer prompts **Open Detected**.
8. Press **Display/Print** to enter rework mode.
9. Probe the loose end of one of the wires. The display will prompt **Probe On JX-XXX**. Connect this wire to the appropriate pin on the empty connector, according to your cable documentation.
10. If you create an error, the display will read **Break JX-XXX**. Remove the error, then try reconnecting the loose wire at the correct position.
11. Continue until the display reads either **Good Cable**, or **Ready to Hipot**.

Section 12: Troubleshooting

What is in this section?

In this section we will tell you how to deal with three basic kinds of trouble which may occur when you are working with your 1000HN. These are:

- Error messages as prompted by the analyzer in its display.
- General problems with the analyzer.
- Problems with printing.

Need more help? Call us!

Each section will help you solve problems you might have with your analyzer. You may be able to correct some of the problems yourself. If you find that the problem is a defective microprocessor or scanner assembly, or if for some other reason you cannot solve the problem yourself, please contact our customer support team at Cirris by calling 1-801-973-4600, or 1-800-441-9910. When you call, please have the following information ready:

- What model of analyzer do you have?
- Purchase date (if you know it).
- What is the analyzer's serial number?
- What have you done to try to solve the problem?

Please have your analyzer set up near your telephone so you can duplicate troubleshooting steps as our customer service team talks with you.

Please see next page...

Error Messages

Every time you turn on your analyzer, it performs a complete self-test. If there is a problem in one of its systems, the analyzer will display an error message. If you see any of these error messages, call us at 801-973-4600 or 800-441-9910. This section lists all of the possible error messages, and some of the possible causes.

10 V HIGH

10 V LOW

10 V NOISY

Problem: The main power supply (located on the microprocessor assembly) is not working properly. This supply is powered from the wall mount transformer cube.

Possible Causes:

- A loose cable from the microprocessor assembly to the analog board
- Loose (or bad) wall transformer.
- Bad microprocessor assembly.
- Bad analog board.
- Bad scanner assembly.
- Incorrect line voltage in use (for example, 120 volts instead of 240).
- Line voltage is either too high or too low.

8 V HIGH

8 V LOW

8 V NOISY

Problem: The measurement power supply (located on the analog board) is not working properly.

Possible Causes:

- A loose cable from the microprocessor assembly to the analog board.
- Bad microprocessor assembly.
- Bad analog board.

NEG V HIGH

NEG V LOW

NEG V NOISY

Problem: The negative voltage supply (located on the microprocessor assembly) is not working.

Possible Causes:

- A loose cable from the microprocessor assembly to the analog board.
- A loose cable from the analog board to the scanner boards.
- Bad microprocessor assembly.
- Bad scanner assembly.
- Bad analog board.

Please see next page...

6.2 ma ERROR xxx
110 < X 180

Problem: The current source (located on the analog board) needed for this test is not working.

Possible Causes:

- A loose cable from the microprocessor assembly to the analog board.
- Bad analog board.

OFFSET_C BAD xxx
66 < X <79

OFFSET C_BAD xxx
X > 100 ON G8

OFFSETF_HxxxLxxx
36 < X , 47

OFFSET COARSE
CANT GET TO 25

OFFSET FINE
CANT GO TO 23

Problem: The measurement system (located on the analog board) cannot control the input signal.

Possible Causes:

- A loose cable from the microprocessor assembly to the analog board.
- Bad analog board.

LOW CURRENT CAL
ERROR xxx

OFFSET CAL ERROR
nnn

GAIN xx X vvv

CANT ADJUST
OFFSET COARSE

CANT ADJUST
OFFSET FINE

CALIB. # xxx
HI<= LO

CALIB # xxx
HI-LO=vv OPB=nnn

Problem: The analyzer was unable to calibrate the measurement system (located on the analog board).

Possible Causes:

- Bad analog board.

Please see next page...

HV ERROR x nnnnnn

Problem: A problem with the high voltage system (located on the analog board) was found.

Possible Causes:

- The relative humidity in the surrounding environment is above 75%.
- The analyzer has been exposed to solvents or contamination.
- Moisture has condensed on the analyzer.
- A loose cable between the analog board and the scanner assemblies.
- Bad scanner assembly.
- Bad analog board.

**SOURCE VOLTAGE
< 3 V**

Problem: The current source (located on the analog board) used to test the scanners is not working properly.

Possible Causes:

- A loose cable between the analog board and the scanner assemblies.
- A loose daughter board on a scanner assembly.
- Bad daughter board.
- Bad scanner assembly.
- Adapter on scanner has pin connected to earth ground.

**MISSING SCANNER
FIRST POSITION**

Problem: The first scanner cannot be found.

Possible Causes:

- A loose cable between the analog board and the first scanner assembly.
- The first scanner daughter card is not installed.
- Loose daughter board in first scanner position.
- First scanner daughter card is bad.
- Bad analog board.

Please see next page...

SCANNER OUT OF SEQUENCE

Problem: One of the scanners is missing, or is not connected correctly to the analyzer.

Possible Causes:

- Scanner boards not installed properly.
- A loose cable from the analog board to the scanner board.
- Loose scanner daughter card.
- Bad scanner daughter card.
- Bad scanner mother board.
- Bad cable from analog board to scanner boards.
- Bad analog board.

**BOX n DB V PT nn
SCR ERR**

**BOX n DB V PT nn
SNK ERR**

**BOX n DB v PT nn
CLR ERR**

Problem: A test point on a scanner board is not functioning properly. The point is located on daughter board 'v' on scanner assembly 'n.'

Possible Causes:

- Loose scanner daughter board.
- Cable or harness presently connected to analyzer has a point connected to earth ground or to some power source.
- A loose cable from the analog board to the scanner assembly.
- Bad scanner daughter board.
- Bad analog board.

General Problems with the Analyzer

There are problems you may see with the analyzer that are not detected by the analyzer's own internal tests. We will talk about those here.

Problem: No display and no sound. The analyzer's display is totally blank.

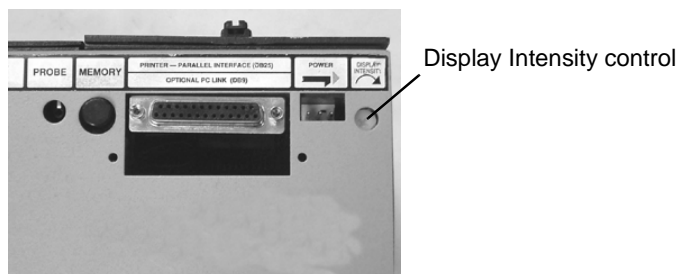
Possible Causes:

- Bad 10 VAC wall mount transformer.
- The intensity control for the display is not adjusted correctly.
- Bad microprocessor assembly.

Things to do:

1. Be sure the wall transformer is plugged into a live wall outlet, then feel if it is warm. If the transformer stays cold, it is probably bad. If the outlet is good and the transformer is bad, call Cirris to replace the transformer.
2. If the transformer feels warm, check to see if the microprocessor assembly feels warm. It should warm up within about five minutes after you turn it on. If it is still cold after five minutes, the transformer is bad. Call Cirris to replace it.

3. If the microprocessor assembly feels warm and the display has a blue background, but is otherwise blank, adjust the Display Intensity control at the back of the analyzer by turning it clockwise. If the display is still blank, call Cirris to replace the microprocessor assembly.



4. If the microprocessor assembly is warm, but the display is totally blank, or there is no blue background showing in the display, call Cirris to replace the microprocessor assembly.

Problem: Display shows a darkened row, or gibberish characters.

Possible Causes:

- Display Intensity control is not adjusted properly.
- Scanner assembly is bad.
- Microprocessor assembly is bad.

Things to do:

1. If both rows of the display are dark, try adjusting the Display Intensity control at the back of the analyzer by turning it counterclockwise. If this does not solve the problem, go to step 2.
2. Turn off the analyzer, disconnect the microprocessor from the rest of the system, then turn on the microprocessor. The analyzer should prompt **10 V LO**. If it does, the analog board or one of the scanner boards is bad. Call Cirris to replace it.
3. If the problem is not solved after the microprocessor is disconnected, the microprocessor assembly is probably bad. Call Cirris to replace it.

Problem: When a cable is disconnected, the display still prompts **Please Verify**.

Possible Causes:

- A cable adapter is bad, or adapting cables are bad.
- The scanner assembly is defective.

Things to do:

1. Remove the cable adapters from the analyzer while the analyzer is still on. If the analyzer still prompts **Please Verify**, the scanner is probably defective. Call Cirris to replace it.
2. If the analyzer prompts **Ready To Test** after step one is done, you have unwanted connections in your cable adapters or adapting cables.

Problem: Connections are not recognized by the analyzer.

Possible Causes:

- Bad cable adapters or adapting cables.
- Bad scanner assembly.

Things to do:

1. Using the hand-held test probe as a diagnostic tool, use the sharp steel tip of the probe to pierce the insulation on the connecting wire for the connection that is not being recognized. The pin which is displayed by the analyzer when the insulation is pierced is the pin that makes a connection to the wire. The pin that is not displayed is the one that is open. Remove the connector and check the connector adapter with the probe to see if the missing pin is recognized there. If it is recognized at the test adapter, you may have a worn contact, or contaminants such as solder flux on the contacts.
2. If you are using an adapting cable, move back to the test point on the adapter connected to the analyzer, and see if the analyzer will recognize it there. If the analyzer recognizes the point, the adapting cable is bad. Rework the adapting cable.
3. If you are using an AUNV-64, or AHR2-64 adapter, be aware that some pins are used to identify these adapter's signatures. Because they are incorporated into the adapter signature, these connections may cause test points to no longer be recognized. If this is the case, you have miswired your connections, and you will have to rework them.
 - To isolate a problem with an AUNV adapter, remove all connections to pin 31, 32, 33, and 34 on a 34-pin connector adapter.
 - If you are using an AHR2-64 adapter, make sure there are no connections to pins 33 and 34.
 - If after removing these connections you can now identify these pins with the probe, you have found the type of miswire described above. Rework your adapting cable.
 - It is possible the adapter is bad. Check for worn connectors on the adapter. Also check for continuity of the adapter pin on the bottom of the adapter to the test connector on top. If you find open or worn connections, replace the adapter.
 - If you find a bad pin after all these tests, call Cirris to replace the scanner assembly.

Please see next page...

Problem: The analyzer stops operating while it is being used.

Possible Causes:

- Damage from static electricity.
- Bad microprocessor assembly.
- Overheating.

Things to do:

1. If static electricity may be a problem, be sure the safety ground on the wall plug is connected. Take measures to control static in your work area.
2. If the microprocessor is bad, call Cirris Systems to replace the microprocessor assembly.
3. If overheating may be a problem, let the analyzer cool for a few minutes. If it comes back on, you may want to direct a cooling fan on the analyzer.

Problem: Speaker problem. There is no sound, but the display works.

Possible Causes:

- The Error Tones option is set to OFF.
- The speaker inside the analyzer is not plugged in.
- The microprocessor assembly is bad.

Things to do:

1. If you hear clicking sounds for cables that test as good, but no sounds for cables that test as bad, the Error Tones option is set to OFF. See page 17 for instructions on how to change the option setting.
2. Connect the speaker wire to the microprocessor assembly.
3. If the speaker wire is connected, but the sounds still do not work, call Cirris to replace the microprocessor assembly.

Problem: The sounds the analyzer makes disturb others.

Things to do:

- Set the Error Tones option to OFF or Low.
- Place tape over the speaker opening in the metal case to dampen the sounds.
- Disconnect the speaker from the microprocessor.

Please see next page...

Problem: Analyzer will not learn a cable.

Possible Causes:

- The Create Test From option is set to Last Cable.
- The Connection Resistance threshold, or Insulation Resistance threshold is not set properly.

Things to do:

1. You cannot learn a cable's wirelist when the Create Test From option is set to Last Cable. Change the option setting to Sample Cable. See page 17 for instructions on how to do this.
2. If the Insulation Resistance is set to less than the Connection Resistance (which can take place if the Connection Resistance option is set to AUTO), then the analyzer will prompt **Insulation Resis <AUTO.XXX**. The Insulation Resistance should be raised to a value above the Connection Resistance setting.

Problems with Printing

Printer failures usually take place because of one of four things:

1. User error.
2. A bad printer.
3. A bad cable.
4. A bad microprocessor assembly.

These guidelines will help you solve printing problems:

Problem: Nothing prints.

Possible Causes:

- Printer is not on-line (selected).
- Cable between analyzer and printer is not connected properly.
- The printer has a serial instead of a parallel interface.
- A bad cable.
- A bad printer.
- A bad microprocessor assembly.

Things to do:

1. Make sure the printer is turned on, on-line (selected), and not out of paper.
2. Check the cable connections at the analyzer and the printer. The cable should be firmly connected to the back of the analyzer where it is marked Printer-Parallel Interface. Check the connection at the printer end too.
3. Your printer must have a parallel cable interface. Do **not** use a printer with an RS-232 serial interface. You will damage the analyzer.
4. The cable running from the analyzer to the printer may be bad. Try another cable

to see if it works.

5. The printer may be bad. Try using another printer, or test your original printer and cable with a standard computer. If the printer does not work with the PC, it is probably bad.
6. If the cable and printer work with a PC, the microprocessor assembly inside the analyzer is probably bad. Call Cirris to replace it.

Problem: Characters missing in printout.

Possible Causes:

- Bad printer cable.
- Printer cable is too long.
- Printer is incompatible with the analyzer.
- Microprocessor assembly inside the analyzer is bad.

Things to do:

1. Verify that the printer cable is correctly built. Check for shorts in pin 11.
2. If the printer cable is more than 10 feet long, you may have printing problems. The electrical signals from the printer become too weak to work well as the cable gets longer. Use a shorter printer cable.
3. Try using the printer cable with a PC. If it works, the printer probably is not compatible with the analyzer.
4. If the cable and printer work with a PC, the analyzer's microprocessor assembly is probably bad. Call Cirris to replace it.

Problem: Wrong characters in printout.

Possible Causes:

- Bad printer cable.
- Bad printer.
- Printer cable too long.
- Microprocessor assembly inside the analyzer is bad.

Things to do:

1. The printer cable may be bad. Check for shorts, opens, or miswires on pins 2 through 9. Either fix the cable, or replace it with a good cable.
2. The printer may be bad. Try using another printer with the analyzer, or test your original printer cable and printer with a PC. If the printer does not work with a PC, the printer is bad. Replace the printer. If the printer and cable do work with a PC, the analyzer's microprocessor assembly is probably bad.
3. The printer cable may be too long. Your printer cable should not be longer than 10 feet. The printer signals get too weak to work properly if the cable is longer than 10 feet.
4. If you have another Cirris 1000HN analyzer available, it is possible to exchange

microprocessor assemblies. If using a different microprocessor assembly solves the problem, the original microprocessor is bad. Call Cirris to replace it.

Section 13: Specifications

Test Point Capacity	128 points expandable to 256 points.
Test Levels	5 VDC @ 6mA max. current.
Connection resistance sensitivity	0.1 to 1Kohms \pm 4%, also 1Kohm to 6 Kohm, 1M \pm 10%.
Insulation resistance sensitivity	5M, 10M, 20M, 50M, 100M, 200M Ω \pm 10%, and 500 Mohms \pm 20%.
Typical test rate	Tests 256 points in less than 1 second, 128 points in less than 0.3 seconds.
Maximum points per net	50 points.
Maximum capacitance per net	@50V 0.1 microfarad, 100 V 0.1 microfarad, 200 V 0.03 microfarad, 300 V 15 nanofarad, 400 V 7 nanofarad, 500 V 4 nanofarad, 630 V 3 nanofarad.
Humidity	Will test without error in environments with zero to 75% relative humidity. Relative humidity above 75% will affect performance.
HV energy limit	Current limited to 6ma max. for ten ms duration.
Printer output	Standard Epson/Centronics-type parallel interface. Pinout matches IBM PC parallel port.
Probe	For test point identification.
Memory	Nonvolatile storage for up to 50 wirelists. Lithium battery backup.
Power	105-135 VAC, 60Hz 16 Watts (210-260 VAC 50Hz optional).
Size	Main unit: 13"w X 6.5" d X 5" h./33 X 16.5 X 13 cm. Expansion box: 6" w X 6.5" d X 5" high/15 x 16.5 x 13 cm.
Weight	Main unit: 9 lbs. (4 kgs.) Expansion box: 5 lbs. (2.3 kgs.)
Display	2-line x 16-character LCD
Warranty	1 year parts and labor. Replacement modules available next working day.

Section 14: Statement of Warranty

Cirris Systems Corporation warrants the 1000HN Cable Analyzer to be free of defects in materials and workmanship for a period of one (1) year from the date of delivery to you, as evidenced by receipt of your warranty registration form. In the event a defect develops due to normal use during the warranty period, Cirris Systems will repair or replace the analyzer with a new or reconditioned unit of equal value. For this warranty to be valid you must complete and return the warranty registration card.

In the event of replacement with a new or reconditioned model, the replacement unit will continue the warranty period of the original analyzer. Replacement units will be returned by the same method shipped; generally within one (1) working day.

If analyzer failure results from accident, abuse, or misapplication, Cirris Systems Corporation shall have no responsibility to replace the analyzer or refund the purchase price. Defects arising from such causes will be considered a breach of this warranty. Cirris Systems Corporation is not responsible for special, incidental, or consequential damages resulting from any breach of warranty, or under any other legal theory, including lost profits, downtime, goodwill, damage to or replacement of equipment and property, and any costs of recovering materials used with the Cirris 1000HN Analyzer.

ANY IMPLIED WARRANTIES ARISING OUT OF SALES OF THE 1000HN ANALYZER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE ABOVE STATED ONE (1) YEAR PERIOD. Cirris Systems SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGE, EXPENSES, OR ECONOMIC LOSS.

Some states do not allow limitations on length, or implied warranty, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Cirris Systems Corporation
Salt Lake City, Utah.

PLEASE RECORD PURCHASE DATE AND SERIAL NUMBER BELOW.

DATE: _____
SERIAL NUMBER: _____

Section 15: Glossary

cable signature	A six-character alphanumeric code that changes with any change in interconnections. Valid characters include the numbers 0 through 9, and the letters A through F.
connection resistance	Option setting that allows you to select the <u>maximum</u> allowable resistance that a “good” connection can have.
connector adapter	Connector adapters are adapters mounted on small printed circuit boards, that allow you to connect the cables you want to test to the 1000HN. There are three types (single-high, double-high, quad-high). Each adapter has its own unique adapter signature. Adapters are usually kept organized in a 3 x 5-inch card file. You identify the adapter by its signature, either on the cardboard sleeve in which the adapter is shipped, or by the signature printed on the label on the adapter itself. Adapters are identified by the connector they mate to, not the connector mounted on the adapter.
connector adapter position	The location either on the analyzer’s main unit, or on an expansion box where connector adapters are mounted. The main unit has four such positions, marked as J1, J2, J3, J4. Each expansion box also has four connector adapter positions.
control	The regulation of manufacturing or assembly processes; particularly the use of a cable signature for verifying the test setup against the documentation.
cable documentation	The written definition of how a cable should be constructed. Usually consists of a wirelist, and a complete set of notes on what connectors, materials, and special techniques should be used to build the cable successfully.
hipot	<i>Hipot</i> stands for Hlgh POTential. Hipot tests are done to verify that the resistance between pins that are not supposed to be connected is sufficiently high. Generally used to check the effectiveness of insulation and/or spacing between conductors in a cable.
hipot duration	The length of time for which hipot voltage is applied to each <u>net</u> during hipot testing.
Insulation Resistance	Option setting that allows you to select the <u>minimum</u> allowable resistance between points that should not be connected.
insulation short	An <i>insulation short</i> occurs when the resistance of a connection is <u>higher</u> than the Connection Resistance setting, and <u>lower</u> than the Insulation Resistance setting. In other words, the connection has a resistance too high for the analyzer to see it as a “good” connection, and too low for the analyzer to see it as effective insulation.
interconnection	A situation where continuity exists between two connector pins. Continuity most commonly exists here because a wire connects the two pins.

intermittent	The 1000HN detects an <i>intermittent</i> fault when a cable is seen to develop shorts, opens, or excessive resistance after it has already tested as good.
known-good cable	A known-good cable is a cable that you know is built correctly. We most often refer to such a cable as a <i>Sample Cable</i> . You can program the 1000HN to test cables which are supposed to be like the Sample Cable by letting the analyzer learn the Sample Cable. When the list of interconnections and the other properties of a cable you are testing are not the same as those of the Sample Cable, the signature of the cable you are testing will not match the signature of the Sample Cable. This signature mismatch will be reported as a “bad” cable.
last test setup	The last wirelist (including all test parameters and adapter information) learned by the analyzer. This can be loaded into the analyzer for testing either by learning a Sample Cable, or by retrieving the wirelist information for a cable from the analyzer’s memory.
memory location	The 1000HN has one “last learned” memory location, and as many as 50 “permanent” memory locations. The number of available locations depends upon the size of the wirelists being stored. Large wirelists take up more memory space than small ones do. You can load cable information into the analyzer for testing by retrieving the information from one of these memory locations. It is also possible to delete old wirelist information from specific memory locations to free up memory for storing new cable information.
microprocessor	The electronic assembly which includes the LCD display. As you look at the analyzer from above, the microprocessor assembly is located to the left.
miswire	A type of interconnection error where a one pin is <u>incorrectly</u> connected to another pin. For example, if a connection is supposed to exist between pins 5 and 6, but actually exists between pins 5 and 7, the error will be reported as a miswire.
net	Any group of pins which are connected together. The analyzer automatically assigns a number to each group of interconnected pins (called <i>nets</i>). This number appears on the left-hand side of printed documentation, and in the left-hand side of the analyzer’s LCD display.
open	A kind of interconnection error where there is no continuity between two connector pins which <u>are</u> supposed to be connected. A connection which the cable’s master documentation says should exist, does <i>not</i> in fact exist in the cable.
parameter signature	When it displays signatures, the analyzer displays a six-digit alphanumeric <i>cable signature</i> followed by a hyphen. After the hyphen, the analyzer displays a five-digit alphanumeric known as the <i>parameter signature</i> . The parameter signature represents the various test options you have selected for your test setup. Two different kinds of cables will always have different cable signatures; but they may have the same parameter signature if the option settings for both types were identical.
pin	An electrical contact point within a connector. In this manual, the word “pin” is used in place of terms such as “point,” “contact,” “socket,” “termination,” etc.

Sample Cable	A <i>Sample Cable</i> is a cable you know is built correctly according to your master build list.
scanner assembly	If you look at the analyzer from above, the scanner assembly is located on the right-hand side of the unit's top. This assembly contains the "J" positions onto which you install your connector adapters. It also contains the electronics which control continuity testing between all connector pins in all possible combinations.
setup	The steps involved in preparing the analyzer to test cables.
short	A kind of interconnection error where there is continuity between two points that are <u>not</u> supposed to be connected. A connection is present that does not appear in the master cable documentation.

Section 16: Blank Forms to Photocopy

What are these for?

We have designed three forms that we believe will help you document the cables you test. They are:

- **Master Parts List:** This form will help you keep track of cables by their part numbers and cable signatures.
- **Directory of Wirelists Stored in Analyzer's Memory:** This form allows you to easily write down which cable's information is stored in each of the analyzer's permanent memory locations. Remember that there are a maximum of 50 memory positions available, and that the number of positions actually available depends on the size of the wirelist you are storing. Large wirelists take up more memory than small ones do.
- **Cable Documentation Form:** This form lets you keep track of signatures, option settings, and net lists for each cable you test.

PHOTOCOPY THESE!

You should photocopy these forms instead of writing directly on them. That way you'll have a fresh supply of blank forms whenever you need them.

Master Parts List

Cable Part Number

Description

Signature

[illegible]

Directory of Wirelists Stored in Analyzer's Memory

Memory Location	Cable Description	Signature
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
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22		
23		
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25		
26		
27		
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30		
31		
32		
33		
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38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		

Cable Documentation Form

Memory Location #: _____

Cirris Analyzer Model: _____

Cable Signature: _____
(first six characters)

Parameter Signature: _____
(last five characters)

Cable Description: _____

Adapter Signatures for:

Main unit	1st Expansion Box	2nd Expansion Box	3rd Expansion Box
J1 _____	J5 _____	J9 _____	J13 _____
J2 _____	J6 _____	J10 _____	J14 _____
J3 _____	J7 _____	J11 _____	J15 _____
J4 _____	J8 _____	J12 _____	J16 _____

Notes:

Note: All of these options may not appear in your particular type of analyzer.

Create Test From	_____
Connection Resistance	_____
Hipot Voltage	_____
Insulation Resistance	_____
Hipot Duration	_____
Apply Hipot To	_____
Single Net Error	_____
Auto Hipot	_____
Error Tones Are	_____
Sorted Wire List is	_____
Count All Cables is	_____
Auto Print is	_____

Net Number	Common Interconnections
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

List continues on back

Net Number	Common Interconnections
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
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