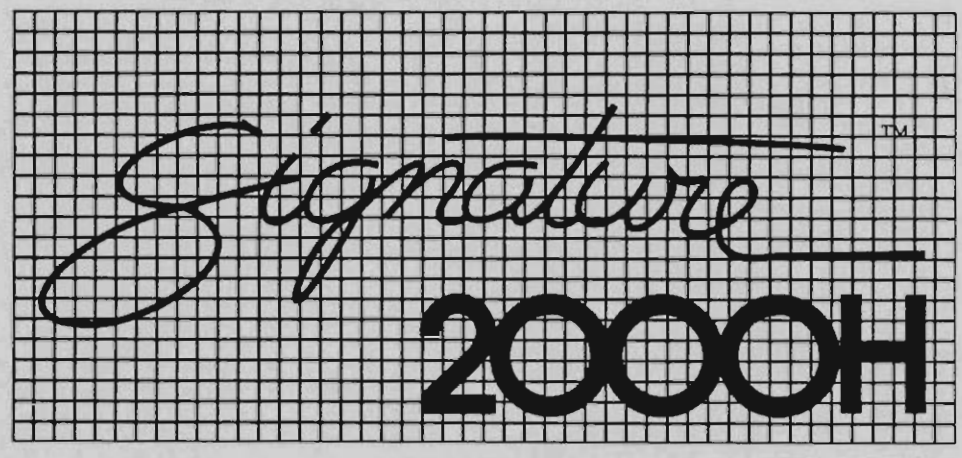
Cable Documentation, Control, & Hipot Testing System



System Manual

CIRRIS SYSTEMS CORP.

Notice

CIRRIS SYSTEMS CORP. reserves the right to make improvements to the system and product described in this manual and to this manual at any time without notice.

CABLE DOCUMENTATION, CONTROL, & TESTING SYSTEM
SIGNATURE 2000H
USER MANUAL
Ver. 1.01
August , 1990

WARNING!

The Signature 2000H constitutes a shock hazard that is limited to 3 mA for 10 milliseconds. Persons wearing pacemaker implants or with heart conditions are advised not to use the Signature 2000H. For more information refer to page 2-15.

WARRANTY

The Signature 2000H continuity test system is warranted for a one (1) year period. Limitations do apply, and the warranty registration must be returned to CIRRIS SYSTEMS for validation. Please return the registration card included with this manual.

FCC INTERFERENCE WARNING

This equipment complies with the requirements in part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception, requiring the operator to take whatever steps necessary to correct the interference.

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Salt Lake City, Utah 84119

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This Signature 2000H System Manual has five sections:

SECTION 1: Overview of the System —— This introduces the Signature 2000H cable documentation, control, and hipot testing system. It provides you with a basic understanding of what the system does and how it works. This section explains the various components of the system including the analyzer, connector adapters, and cable documentation. You need to understand these parts of the system before you can set up and use it. If you have questions about terms used, or their definition within the context of this manual, refer to the "Glossary" on page 4-1.

SECTION 2: How to Use the System —— This explains how to install connector adapters and how to prepare a controlled setup for testing cables. This section explains how signatures are used to verify connector adapters and cables before you create cable documentation. Instructions on how to document and test cables follow. Also included is a guide to setting system options and how to use the system's nonvolatile memory.

SECTION 3: Application Notes —— This gives detailed information about expanding your use of the analyzer. There are instructions on how to use the probe, and how you can use the analyzer for guided assembly and how to rework cables with bad connections. It gives instructions on how to use a frame mount stand to create custom fixturing and suggests options for using a printer with the system. Instructions on how to disassemble the analyzer and how to attach an optional tilt stand are also covered.

SECTION 4: Appendix —— This contains a glossary that defines terms used in this manual. If you should encounter a problem refer to the trouble shooting guide. In it you will find advice for resolving problems that might occur. The appendix is where you will find a list of the Signature 2000H analyzer's specifications and features. Cable documentation for an Epson/Centronics printer cable is included so you may build your own cable to connect the analyzer to a printer. In addition lists of all standard connector adapters available from CIRRIS SYSTEMS are included for your convenience. They are arranged according to part numbers as well as signatures. Finally, there are the warranty/factory service policy and a service request form in the event your Signature 2000H analyzer should ever require servicing.

SECTION 5: Cable Documentation —— This section is critical for checking cable quality assurance. In it you will find blank forms for cable documentation and cable assembly master lists. This section is where you are encouraged to keep the documentation for all the cables you test. By keeping all your documentation together you are assured of having a complete, easily located reference of all wire lists for the cables you test. You are encouraged to keep updated copies of your cable documentation.

Congratulations on your purchase of the Signature 2000H Continuity/Hipot Testing System. CIRRIS SYSTEMS CORP. is anxious to satisfy you, our customer. We appreciate your business and hope you will feel free to contact us with your future testing needs.

Every effort has been made to make the Signature 2000H analyzer easy to understand and use without compromising its capabilities. But the analyzer and its various hardware components are only half of a continuity/hipot test system. In addition to how well the analyzer works, success also depends on how well you manage the Signature 2000H System. In order to implement a complete cable quality system, and have it succeed, you need to consider the role of people.

Testing needs vary. To help you successfully integrate the Signature 2000H with your production there are six important tasks we encourage you to review before you begin to use your analyzer. Depending on your operations, some or all of these tasks may already be in place. We hope that by outlining their importance first you will be able to more easily implement an entire system that will result in quality cable assemblies.

These six tasks include:

1. assigning the task of creating documentation
2. assigning the task of controlled setup
3. assigning testing
4. deciding on manufacturing flow, cable marking, and labeling
5. assigning final inspection
6. managing the system

The following are suggestions on how you might implement these tasks in your continuity testing:

1. ASSIGNING THE TASK OF CREATING DOCUMENTATION

The person assigned to create accurate documentation has a critical task. Documentation should be created for all assemblies, stored in one place, and made available for quick reference. For this reason we encourage you to keep all documentation in the Signature 2000H System binder. An effective quality system depends on accurate documentation. Documentation must always be crosschecked against the best information available to prevent building and testing with information containing errors.

2. ASSIGNING THE TASK OF CONTROLLED SET UP

The individual assigned the task of setting up the analyzer for testing has an essential role. Make this the assignment of someone who is familiar with the system and is fully instructed in: (1) the importance of signature verification; (2) how to interpret documentation; and (3) where to go for help.

3. ASSIGNING TESTING

The Signature 2000H is easy to use for those assigned the task of testing assemblies. If scrap and rework are problems it may be particularly effective to place the unit right at the point of cable assembly. Catching and stopping errors where they occur is the most effective way to implement a quality assurance program.

4. DECIDING ON MANUFACTURING FLOW, CABLE MARKING, AND LABELING

When those doing the assembly also do their own test and rework, manufacturing flow is simplified and feedback on problems improves. Give careful consideration to the flow of cables to avoid cables that may miss testing, or mixing defective cables with tested cables.

5. ASSIGNING FINAL INSPECTION

A cable that is electrically correct, one verified by the analyzer, does not assure quality. A cable must still be visually inspected for workmanship, correct markings, wire type, strain reliefs, and similar requirements. Review inspection criteria and requirements with the inspector. The final inspector should do additional sample testing of cables if assembly workers are doing their own testing.

6. MANAGING THE SYSTEM

This job is never complete. You should make occasional checks to verify that:

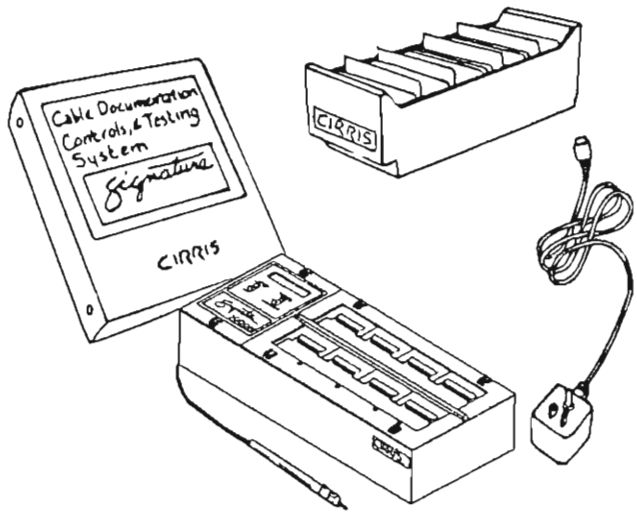
1. the quality of documentation is maintained
2. the procedure for the test set up is followed
3. labeling and marking is done
4. manufacturing flow is followed
5. the final inspection is effective

Finally, watch for complaints and other quality feedback to detect weaknesses in your system as it is implemented.

UNPACKING THE SYSTEM

Remove the Signature 2000H components from your shipping carton. The items in your shipping carton should include:

1. the Signature 2000H binder containing this manual and a place for assembly documentation
2. the Signature 2000H Analyzer
3. a wall plug-in transformer
4. probe
5. connector adapters (if purchased) contained in a 3 x 5 file



In combination with these items you may wish to add a printer to complement the system. Integrating a printer with the Signature 2000H System is a helpful option that will be discussed later.

RETURN YOUR WARRANTY REGISTRATION

Because of the care taken in producing the Signature 2000H System, we are confident that it will serve you for years to come. In case it ever becomes necessary to service your analyzer, it is essential you fill out the warranty card and return it to CIRRIS SYSTEMS CORP. Please answer all of the questions on the card so we may better understand your application of the Signature 2000H System.

WARRANTY REGISTRATION SIGNATURE 2000H

COMPANY NAME_____ PURCHASE DATE _____

ADDRESS _____ PURCHASED FROM_____

CITY/STATE/ZIP CODE SERIAL NUMBER

_____

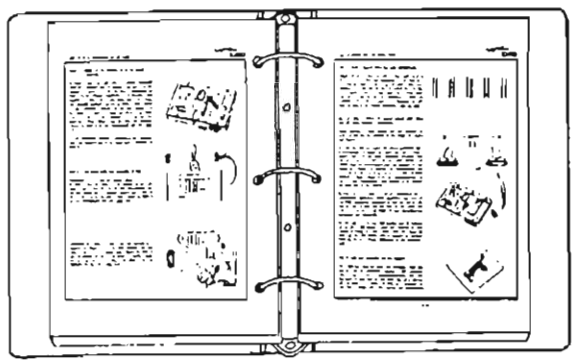
TO BETTER FILL YOUR NEEDS IN THE FUTURE, PLEASE COMPLETE THE FOLLOWING:

TYPE OF BUSINESS:
( ) COMPUTER EQUIPMENT MANUFACTURER
( ) OTHER EQUIPMENT MANUFACTURER
( ) CABLE ASSEMBLY HOUSE
( ) SERVICE, INSTALLATION, OR REPAIR ORGANIZATION
( ) SYSTEM INTEGRATOR
( ) OTHER

INTENDED USAGE:
( ) INCOMING INSPECTION
( ) PRODUCTION TESTING BY ASSEMBLY PERSONNEL
( ) FINAL TEST

READ YOUR MANUAL

The Signature2000H Analyzer is unlike any device you have used in the past. The analyzer is easy to use. However, correct application will require understanding this manual. This manual not only explains the use of the analyzer, it also explains implementation of the Signature 2000H System. While it is not necessary to totally change to this system, we recommend a review of the entire manual so you may judge which concepts will best serve your needs.



Finally, if you are unfamiliar with terms used in this manual, consult the glossary provided in the appendix, page 4-1.

SIGNATURE 2000H FUNCTIONS

The Signature 2000H System is an innovative tool for achieving quality in cables. Its success is based on making critical manufacturing tasks easy to do. These tasks are:

1. preparing cable assembly documentation;
2. verifying the test set up; and
3. testing cables.

1. PREPARING CABLE ASSEMBLY DOCUMENTATION

This task is to prepare information that accurately details a cable's construction. The documentation then becomes the standard to which cables will be tested. The analyzer simplifies this effort by deriving the list of interconnections of a known good cable. This list can be displayed on command or printed on a sheet of paper. In the example documentation at right the first interconnection sensed was J1 pin 1 connected to J2 pin 1. No other pins are connected to these two pins.

SIGNATURE 2000H CABLE DOCUMENTATION

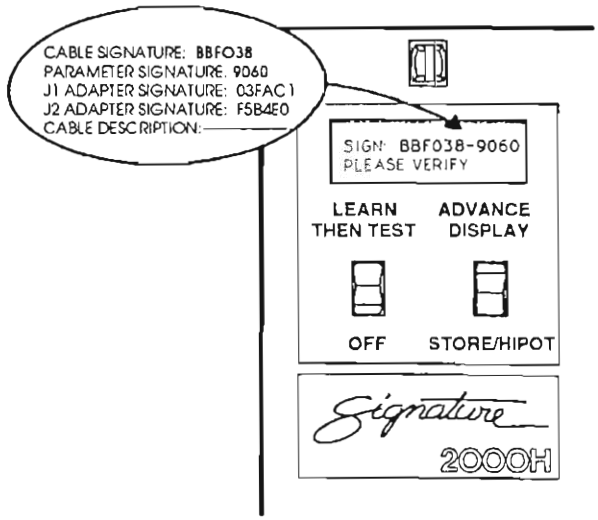
CABLE SIGNATURE: BBF038 CABLE PART NUMBER:_____
PARAMETER SIGNATURE: 9060
J1 - ADAPTER SIGNATURE: 03FAC1 CONNECTOR DESCRIPTION:_____
J2 - ADAPTER SIGNATURE: F5B4E0 CONNECTOR DESCRIPTION:_____
CABLE DESCRIPTION:_____

IGNORE UNUSED:	ON
CONDUCTANCE RESISTANCE THRESHOLD:	AUTO .5 ohm
HIPOT VOLTAGE SETTING:	300 V
DURATION PER NET:	10 mS
INSULATION RESISTANCE THRESHOLD.	100 M ohm

SORTED WIRE LIST
NO. COMMON CONNECTION LIST;
1 J1-01 J2-01
2 J1-02 J2-03
3 J1-03 J2-02
4 J1-04 J2-04 J2-02
5 J1-07 J2-07

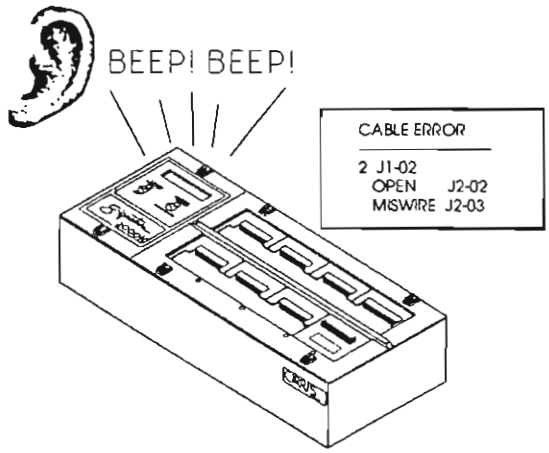
2. VERIFYING THE TEST SET UP (CONTROL)

The task of verification quickly eliminates the chance of misinterpreting documentation, or starting with a bad sample cable, when preparing to test. There is 100% verification that what is documented is what will be tested when you verify the test setup. To accomplish this the analyzer generates a signature. This signature is an assembly's entire interconnection list condensed into a six digit code. This signature appears on the analyzer's display and is matched against the signature in the documentation. This is as effective as crosschecking each item in the interconnection list. For example, in the illustration at right the documented signature is BBF038-9060. The analyzer is displaying the same signature that is in the documentation. This confirms that the correct interconnection list and test parameters are programmed into the analyzer.



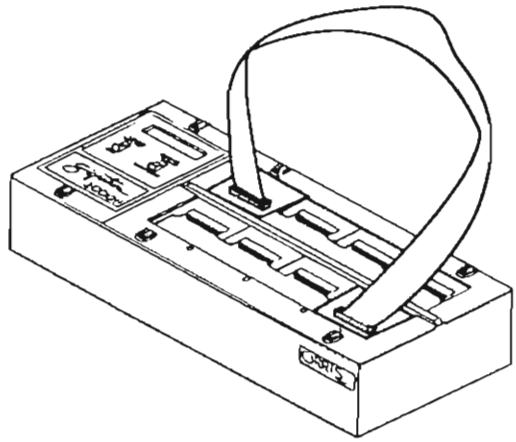
3. TESTING CABLES

The task of testing cables follows signature verification and proceeds as fast as assemblies can be connected and disconnected. Test results are given by both sight and sound. With the touch of a switch specific errors are displayed or printed out. In fact, testing is so simple that you can do it at the time of cable assembly. Errors caught where they occur will minimize scrap and rework. As an aid in rework the analyzer can also display or print the errors of defective cables.



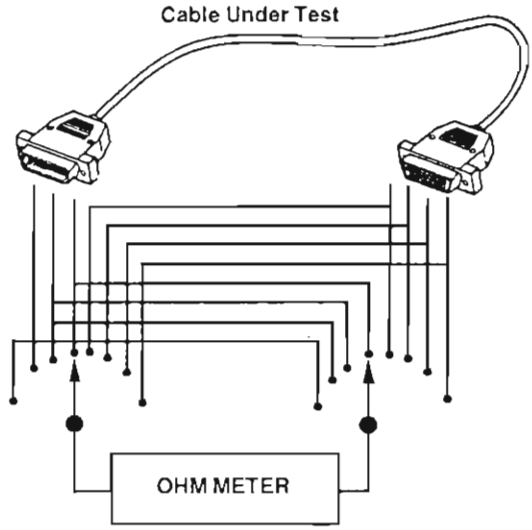
GENERAL OPERATION

The analyzer uses the first cable you connect to determine correct wiring for all subsequent cables. After you turn it on, the analyzer identifies and stores a complete list of interconnections and test parameters from the cable attached. When documenting a cable, this memorized information is displayed or sent to the printer. In the future, when equivalent cables are to be tested, the list of interconnections and test parameters can again be learned from a sample cable or, if the information is stored in one the analyzer's 50 memory locations, it can be programmed from memory. The analyzer then derives the cable's signature from this information for you to verify. A matching signature confirms the analyzer is ready to test using the same list of interconnections and test parameters as in the documentation.



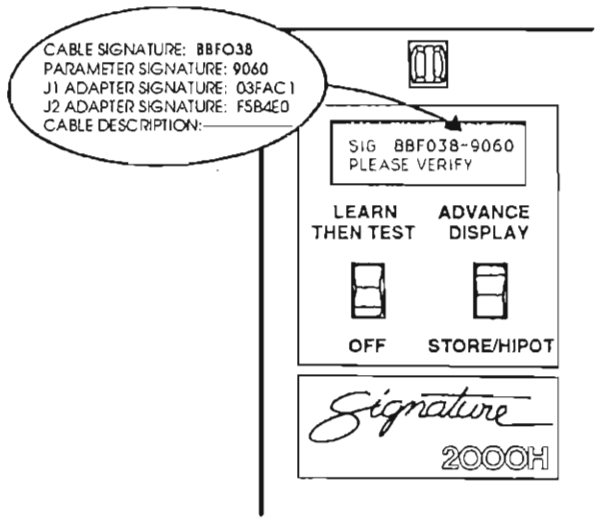
HOW INTERCONNECTIONS ARE SENSED

Interconnections are sensed with a scanner controlled by the analyzer's microprocessor assembly. The scanner operates like two switches that test resistance between all possible points. It does not matter what pattern of interconnections exists since all possible combinations are sensed when learning a cable's interconnections. Then, when each cable is tested, all possible combinations are again sensed. Any differences sensed between the information held in the analyzer's memory and those sensed during testing are displayed (or printed) as errors.



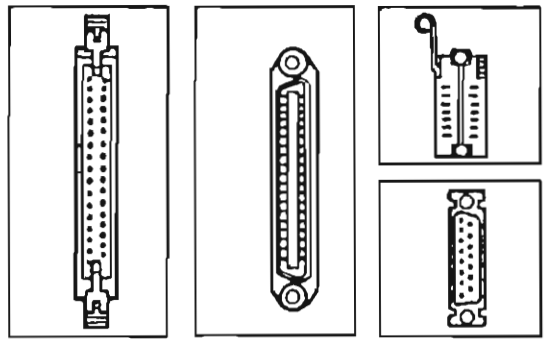
HOW SIGNATURES WORK

Signatures are not used to test cables. A mismatch indicates an incorrect cable, but does not indicate a specific error. Signatures allow you to verify that the analyzer has memorized a sample cable which matches the documentation. Based on the interconnections sensed the microcomputer will derive one of 16 million different signatures codes. This technique provides a nearly nonexistent chance that an identical signature might appear for cables with different interconnections. Therefore, you are always testing to your original documentation when signatures are matched during test setup. The cable signature (the first six characters) represents the match of the pattern of interconnections. The second signature (the next four characters) is a match of test settings, such as as test voltage and resistance.



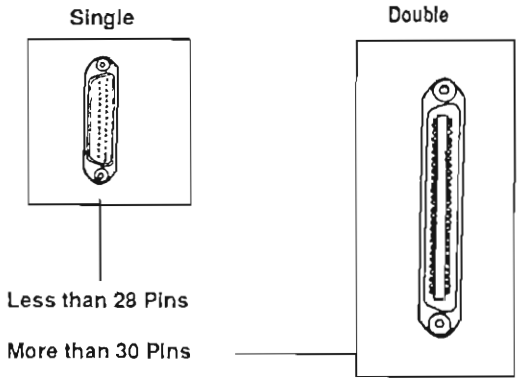
HOW DIFFERENT CONNECTORS ARE SUPPORTED

The Signature 2000H analyzer supports a variety of cable connectors by using mating adapters mounted on small boards. These adapters, locked in place under a cover plate, are connected to the scanner underneath. Adapters are available from CIRRIS SYSTEMS for popular connectors. As an alternative, you may construct an exterior adapting cable to adapt to any connector with up to 64 pins.



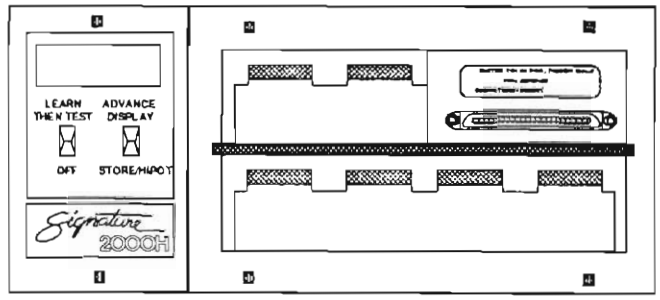
SINGLE HIGH AND DOUBLE HIGH ADAPTERS

Two sizes of connector adapters exist: single high and double high. The single high adapter is used when a connector has less than 28 pins. The double high adapter is used when a connector has 30 to 64 pins. In the illustration at right is an example of a single high adapter with 25 pins and a double high adapter with 36 pins.



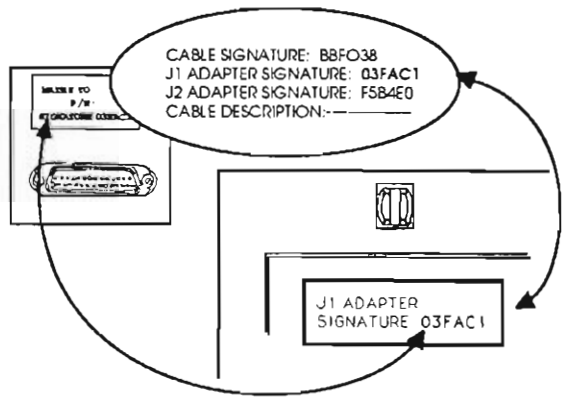
HOW CONNECTOR ADAPTERS ARE POSITIONED

The analyzer has four adapter positions: J1, J2, J3, and J4. In all documentation, the connector pins of J1 are listed first, followed by J2, J3, and J4. Aside from the order listed in the documentation, there is no material difference in adapter positions. In the example to the right a single high adapter is installed in J1 and no adapter is in J2. When a double high adapter is used, the top adapter position is eliminated (J2 or J4). In the example to the far right there is no J4 because J3 is a double high adapter.



CONNECTOR ADAPTER SIGNATURES

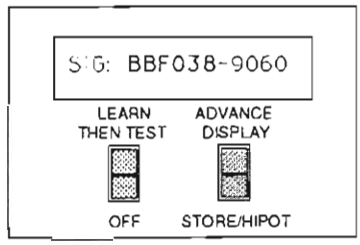
Connector adapters have signatures that identify the type of connector in use. These signatures assure the correct connector has been used and help identify errors in the documented test set-up. The adapter signature appears on the adapter itself, in the documentation generated, and in the analyzer's display. Therefore, a matching cable signature not only verifies correct interconnections, it also confirms that the correct connectors have been used.



The 2000H performs three types of tests: (1) a continuity test; (2) a conductance test; and (3) a hipot test.

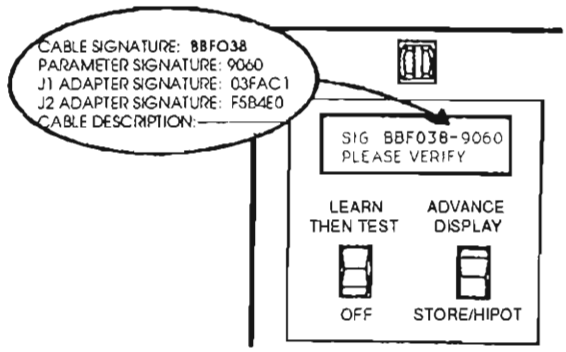
CONTINUITY TEST

The first test is for continuity. The analyzer compares the pattern of a cable's connections to the wire list information programmed in the 2000H's memory. This test verifies that points which should be connected are connected and that points that should not be connected are not. The pattern verification begins automatically when you attach cables for testing. The first six characters in a 2000H signature represent the pattern of a wire list's interconnections. When the analyzer displays the same six characters that appear in your documentation it indicates the pattern of interconnections match. These six characters will also match the same signature generated with the 1000, 1000M, 1000H, 2000, and 5000A analyzers.



The first six characters in the signature represent the pattern of a wire list's interconnections.

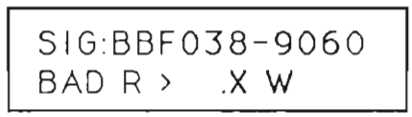
NOTE: The next four characters represent the test parameter settings. These characters will vary with changes in the resistance threshold and voltage settings.



When the display prompts the same six characters in your documentation the pattern of interconnections match.

CONDUCTANCE TEST

The conductance test occurs along with the continuity test when you attach cables for testing. The analyzer checks the resistance of all connections as it determines each NET (each group of pins that should be connected together). For a connection to be good the resistance measured should be below the resistance threshold within ohms or fractions of an ohm. If this test fails the display prompts "BAD R > .X" indicating it has exceeded the resistance threshold that is currently set.



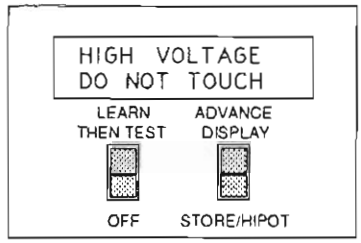
How Resistances are Verified (cont.)

HIPOT TEST

The third test performed is the hipot test. Hipot testing verifies that the insulation between unconnected pins is sufficiently high (measured in millions of ohms). Hipot testing is done at high voltage (50 to 630 VDC). The actual voltage, duration , and resistance threshold settings are parameters for the hipot test. This information is represented by the last four characters of the signature. If a specific conductance threshold is set this information is also included in the parameter signature.

SIG:BBF038-9060

During a hipot test the analyzer emits a ticking sound while its display prompts "HIGH VOLTAGE DO NOT TOUCH." This test immediately follows a successful continuity and conductance test when the AUTO HIPOT option is set to on. When AUTO HIPOT is set to off the display prompts "READY TO HIPOT." You must press the STORE/HIPOT switch to initiate the test.



TICK TICK TICK TICK TICK

If the analyzer detects insulation resistance below the set threshold it will prompt "FAILED HIPOT TEST" and wait for you to press ADVANCE DISPLAY to look at specific errors, or press STORE/HIPOT to retest.

FAILED
HIPOT TEST

If the analyzer finds that insulation resistances are high enough the display briefly prompts "PASSED HIPOT TEST."

PASSED
HIPOT TEST

CONTINUOUS TEST

Once the cable has passed a hipot test it automatically cycles to a continuous pattern and conductance test. The analyzer display prompts "GOOD R < .X" and emits a clicking sound after each newly completed test. This continuous test provides an extra chance to detect intermittents. To repeat a hipot test just press the STORE/HIPOT switch again. The conductance test always follows a successful hipot test and continues until the cable is removed. This automatic test sequence saves time by eliminating button pushing.

SIG:BBF038-9060
GOOD R < .X W

CLICK! CLICK!

Range of Test Resistance

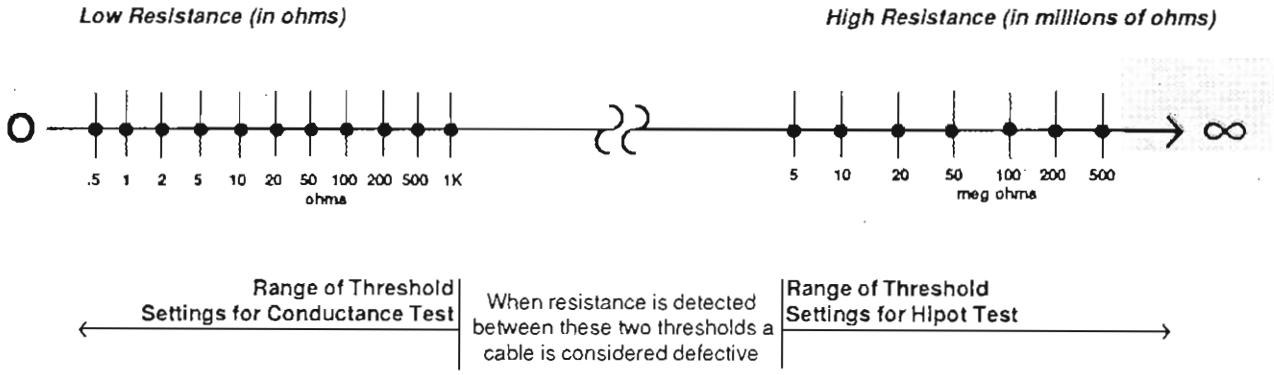
Theoretically, measurements between pins that are connected should be 0 ohms while resistance between pins not connected should be infinite. Despite theory, however, all cables have some resistance in their pins and in the wires that connect them. In addition, with sufficient voltage insulation can break down between pins that should not connect. To help you detect these inconsistencies the Signature 2000H does both a conductance and hipot test. The conductance test verifies that resistance between connected pins is sufficiently low. The hipot test verifies that resistance between pins that should not connect is sufficiently high. Below is a table showing the range of resistance for conductance and hipot testing.

CONDUCTANCE TEST FOR CONNECTION RESISTANCE

This verifies that resistance between connected pins is sufficiently low.

HIPOT TEST FOR INSULATION RESISTANCE

This verifies that the resistance between pins that do not connect is sufficiently high.



For conductance testing acceptable resistances must be below a threshold setting from .5 ohms to 1k ohm.

For hipot testing acceptable resistances must be above a threshold hold setting from 5 meg ohms to 500 meg ohms.

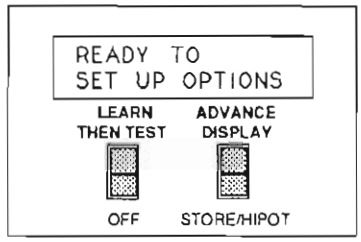
The resistance threshold for the conductance test can be set between .5 to 1k ohm to detect whether an assembly's connections are good or bad. Setting lower resistance thresholds increases your ability to detect cold solder joints and poorly crimped or corroded connector pins. These weak connections have the potential of becoming opens. Please note that cable assembly design, especially wire length, can create resistance that may limit your ability to use the lowest thresholds.

The resistance threshold for the hipot test can be set between 5 to 500 meg ohms. Higher thresholds will require higher test voltage. The hipot resistance determines the effectiveness of an assembly's insulation. This also detects contamination between pins or bare wires that nearly touch. Weak insulation has the potential of allowing shorts to occur. However, it is not reasonable to always use the highest resistance threshold requiring the highest voltage. Insulation between wires and pins might not be designed to withstand such voltage.

The Signature 2000H has ten system options. The first five options control test parameter settings for conductance and hipot testing. These permit you to either set or calculate resistance, specify voltage, set the duration of applied voltage, and set insulation resistance. The remaining five options change the settings of analyzer features . These allow you to customize testing procedures by locking the analyzer's memory, turning on or off error tones, and monitoring the total number of cables tested.

HOW SYSTEM OPTIONS ARE ACCESSED

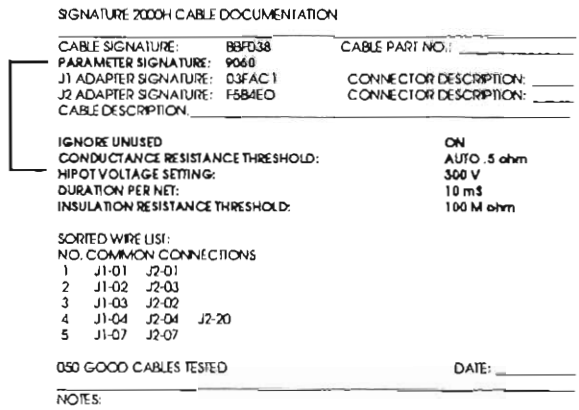
You access system options by pressing the ADVANCE DISPLAY switch as you turn on the analyzer. You continue to press the ADVANCE DISPLAY switch until the display prompts "READY TO SET UP OPTIONS." Then you release the ADVANCE DISPLAY switch to display the first option. Options are set by pressing the STORE/HIPOT switch. Once you set an option you press the ADVANCE DISPLAY switch to display the next option.



Press ADVANCE DISPLAY and hold while pressing LEARN THEN TEST

SYSTEM OPTIONS THAT CONTROL TEST PARAMETERS

The five system options that control test parameters are IGNORE UNUSED, CONDUCTANCE RESISTANCE THRESHOLD, HIPOT VOLTAGE, HIPOT DURATION, and INSULATION RESISTANCE THRESHOLD. The way you set these options will determine the parameter signature — the last four characters of the ten-character signature — for the cable you intend to test. These settings will also appear in your 2000H documentation. An explanation of these options and how to set them appear on page 2-1 "HOW TO SET SYSTEM OPTIONS."



SIGNATURE 2000H CABLE DOCUMENTATION

CABLE SIGNATURE: B8F038 CABLE PART NO.: _____
PARAMETER SIGNATURE: 9060
J1 ADAPTER SIGNATURE: 03FAC1 CONNECTOR DESCRIPTION: _____
J2 ADAPTER SIGNATURE: F5B4E0 CONNECTOR DESCRIPTION: _____
CABLE DESCRIPTION: _____

IGNORE UNUSED	ON
CONDUCTANCE RESISTANCE THRESHOLD:	AUTO .5 ohm
HIPOT VOLTAGE SETTING:	500 V
DURATION PER NET:	10 mS
INSULATION RESISTANCE THRESHOLD:	100 M ohm

SORTED WIRE LIST:

NO.	COMMON	CONNECTIONS	
1	J1-01	J2-01	
2	J1-02	J2-03	
3	J1-03	J2-02	
4	J1-04	J2-04	J2-20
5	J1-07	J2-07	

050 GOOD CABLES TESTED DATE: _____

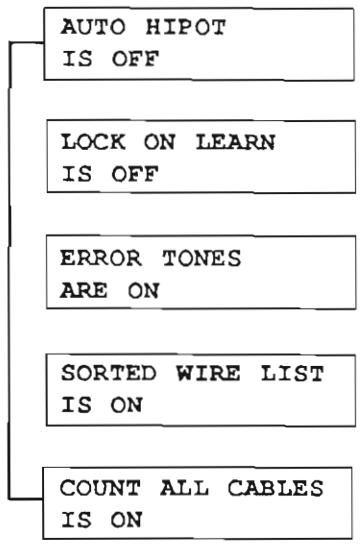
NOTES:

The parameter signature corresponds to the five test parameter settings

SYSTEM OPTIONS THAT CHANGE ANALYZER FEATURES

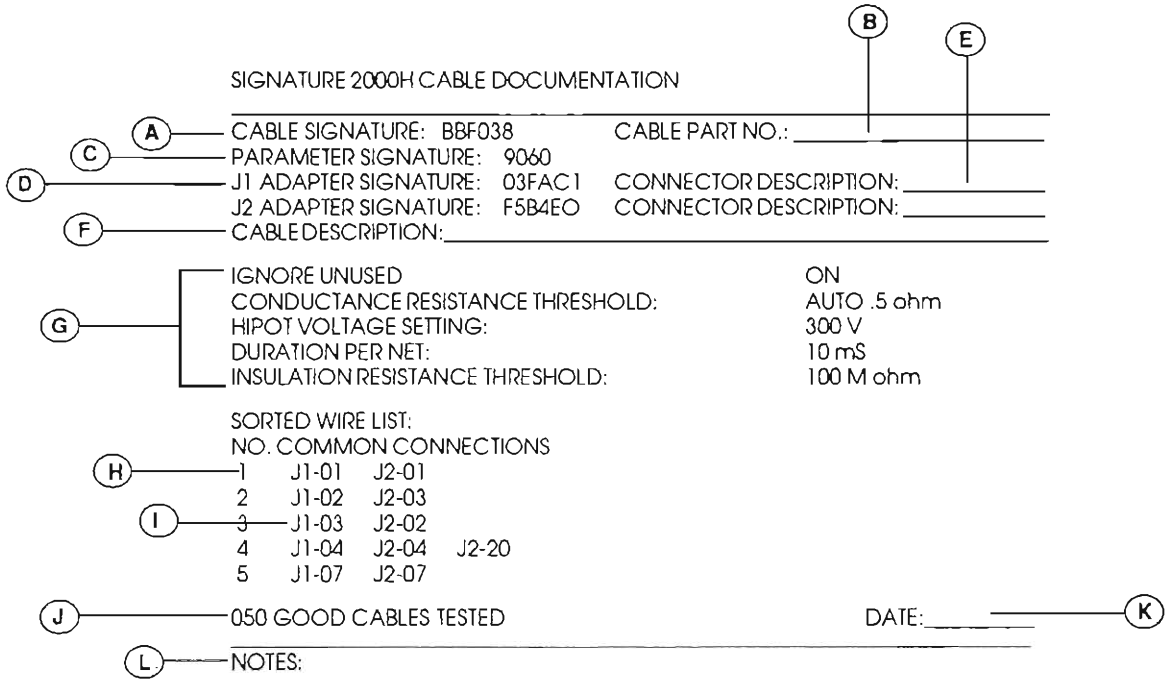
The five options that change analyzer features are AUTO HIPOT, LOCK ON LEARN, ERROR TONES, SORTED WIRE LIST, and COUNT ALL CABLES. These system options do not affect test parameters. However, they do affect they way you test by letting you alter the analyzer's operation. An explanation of these options and how to set them appear on page 2-1, "HOW TO SET SYSTEM OPTIONS."

The analyzer features are controlled by these system options



Signature 2000H Cable Documentation

Signature 2000H Documentation may be printed out or transcribed by hand. Your documentation contains all the necessary information for assuring that test setups are precisely duplicated. A separate section labeled "CABLE DOCUMENTATION" is provided for you at the back of this manual. It contains blank sheets for maintaining complete and accurate records of all your cable documentatiohn. The example below illustrates a typical wire list with cable signature, parameter signature, adapter signatures, and a printout of parameter settings.



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

B. The blank provided for a handwritten cable part number is used to organize and reference the cable documentation.

C. This is the four-digit parameter signature which must match the display to ensure consistent test parameters are used for testing.

D. This adapter signature identifies the connector adapter which should be installed in position J1.

E. This blank provided for a connector description should be filled in for quick identification.

F. The blank provided for a cable description is helpful for those occasions when a cable is built to a special requirement, i.e. an IBM PC to parallel printer cable.

G. These are the test parameters (indicated by the parameter signature) they include the resistance threshold, hipot voltage, hipot duration, and the insulation resistance threshold.

H. Each NET (a group of interconnected pins) is identified by a "NET" number. One number is assigned to each NET. In this example the "NET" number is 1.

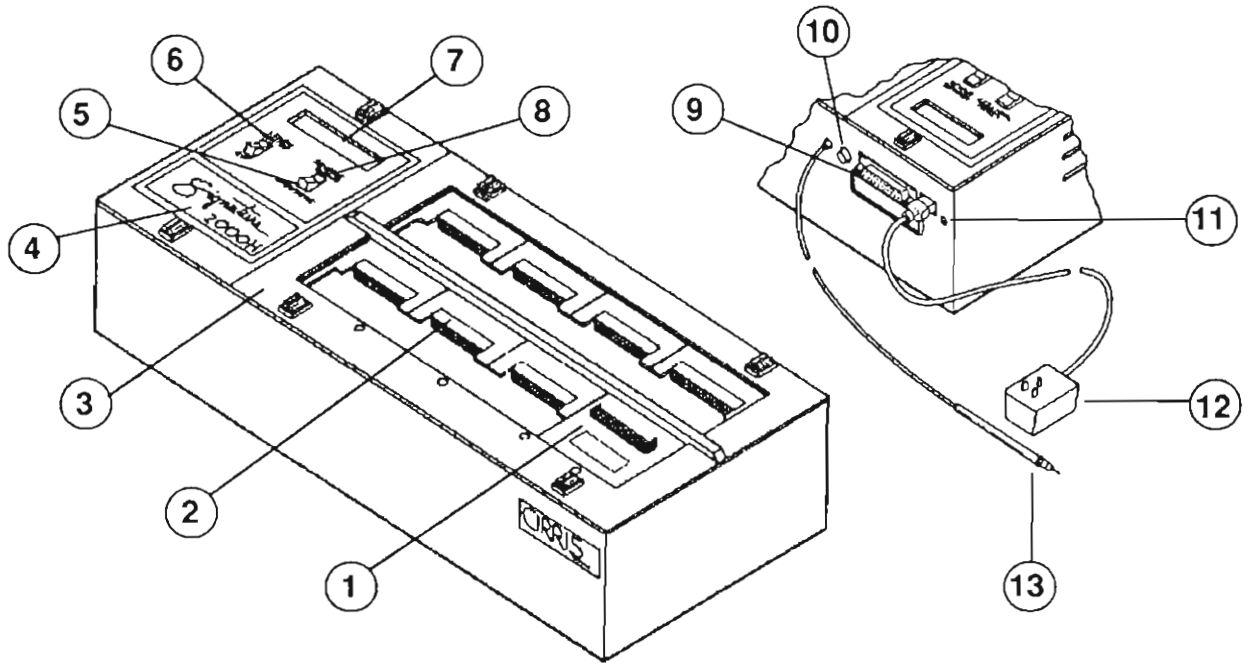
I. The interconnections which comprise each NET appear after each "NET" number. The numbers J1, J2, J3, and J4 indicate the adapter position. The number after the hyphen is the specific pin to which connection is made.

J. This example shows 50 good cables have been tested.

K. A blank is provided for you to enter the date of the test.

L. A section is provided for notes. This additional information is not part of the interconnection list, but is an important part of the cable definition. In large organizations a cable drawing or operation sheet will provide this information.

The analyzer provides a quick and accurate way to document and hipot test cables. It can easily handle any wire pattern from a simple ribbon cable to discrete wired cables with scrambled interconnections. The illustration below identifies the analyzer's component parts.



1. The CONNECTOR ADAPTER mounts in the analyzer and mates to the connectors of the cable to be tested.

2. The SCANNER ASSEMBLY, exposed when connector adapters are not in place, makes connection to the adapters and senses the cable's interconnections.

3. The COVER PLATES hold the connector adapters in position. These covers plates are held down by quarter turn fasteners.

4. The MICROPROCESSOR ASSEMBLY is locked into place by quarter turn fasteners.

5. The STORE/HIPOT SWITCH stores wire list of cable under test into nonvolatile memory and initiates hipot testing.

6. The LEARN THEN TEST SWITCH applies power to the analyzer and starts the sequence of learning interconnections from a sample cable.

7. The DISPLAY provides a readout of cable information and errors.

8. The ADVANCE DISPLAY SWITCH advances information in the display or, if a printer is connected, causes information to be printed.

9. The PRINTER OUTPUT CONNECTOR provides output to an optional printer for a printout of cable interconnections or errors.

10. The MEMORY button enables access to wire lists maintained in nonvolatile memory.

11. In the rear is a small round hole marked DISPLAY INTENSITY. Clockwise rotation of the control through this hole increases display intensity.

12. The WALL PLUG-IN TRANSFORMER supplies power for the analyzer. The plug from the transformer enters at the small rectangular hole in the back of the analyzer. The ridge on the front edge of the plug faces down.

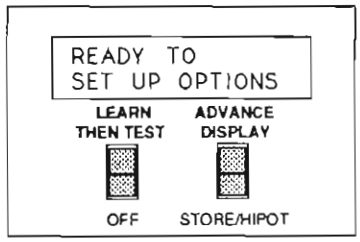
13. The PROBE allows for location and identification of contacts and loose wires.

How to Set 2000H Systems Options

The Signature 2000H has ten system options. The following explains how to access, select and set these options, as well as how to use them.

TO BEGIN

To set the 2000H options you must first access the READY TO SET UP OPTIONS mode. Do the following:

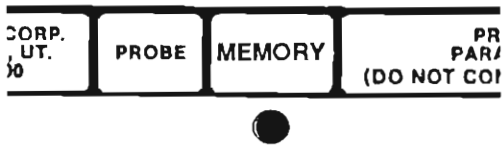


Press ADVANCE DISPLAY and hold while pressing LEARN THEN TEST

STEP 1. Press and hold the ADVANCE DISPLAY switch as you turn on the analyzer by pressing the LEARN THEN TEST switch.

STEP 2. Continue holding the ADVANCE DISPLAY switch until the display prompts "READY TO SET UP OPTIONS."

*NOTE: Options display in sequential order. If you accidentally pass an option you can return to it by holding in the **MEMORY** button (at the back of the analyzer) while pressing ADVANCE DISPLAY. Holding in this button reverses the order in which options and settings can be accessed.*



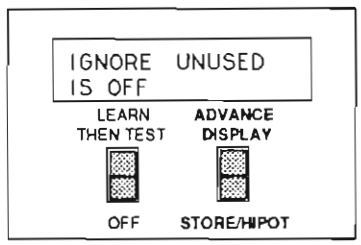
Memory Button

IGNORE UNUSED

HOW TO SELECT: After completing instructions in steps #1 and #2 release the ADVANCE DISPLAY switch. The display changes to "IGNORE UNUSED IS. . . " and indicates if it is "ON" or "OFF."

HOW TO SET: To set this option simply press the STORE/HIPOT switch. Each time STORE/HIPOT is pressed the option changes to either "ON" or "OFF."

IGNORE UNUSED has two settings: OFF and ON. This option allows for faster hipot testing, especially if your testing requires periods of long hipot duration. When this option is set to **ON** the system applies high voltage only to pins that are connected to other pins. When this option is set to **OFF** the system applies high voltage to all pins in adapters that are in use. However, when set to **ON**, faster testing will not detect leakage between two unused pins in a connector.



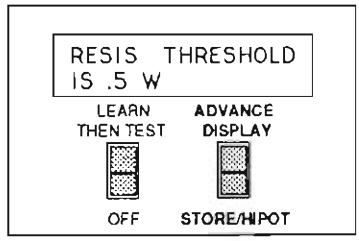
Press ADVANCE DISPLAY to select then press STORE/HIPOT to set

CONDUCTANCE RESISTANCE THRESHOLD

HOW TO SELECT: To select the RESISTANCE THRESHOLD option press ADVANCE DISPLAY until the display prompts "RESIS THRESHOLD IS . . . " indicating the current setting.

HOW TO SET: To set the resistance threshold simply press STORE/HIPOT. Each time you press STORE/HIPOT the display prompts the next resistance setting.

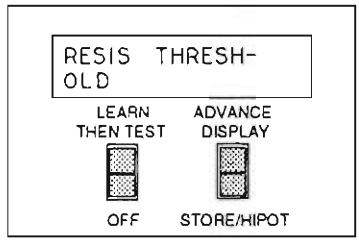
This option indicates how effective your connections are as measured in resistance. You can set resistance thresholds to .5, 1, 2, 5, 10, 20, 50, 100, 200, 500, and 1K ohms. You may also select the parameter settings CALC and AUTO (see below). Setting lower resistance levels increases your ability to detect weak connections, cold solder joints, and corroded or worn connector contacts. Cable assembly design, especially wire length, can create resistance that may limit your ability to use low resistance values.



Press ADVANCE DISPLAY to select then press STORE/HIPOT to set from .5 to 1k ohms

RESISTANCE THRESHOLD: CALC

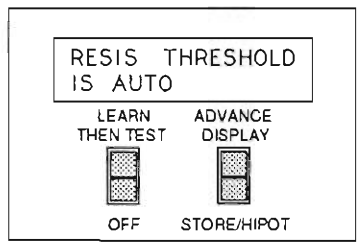
Setting the RESISTANCE THRESHOLD to CALC alters the 2000H's test mode so it measures the resistance of connections in the same way you would measure them with a voltage ohm meter (VOM). After setting the RESISTANCE THRESHOLD option to CALC you can display or print the resistance of each interconnection detected.



RESISTANCE THRESHOLD set to CALC

RESISTANCE THRESHOLD: AUTO

When the RESISTANCE THRESHOLD is set to AUTO the 2000H computes the test parameter settings of a sample assembly during the LEARNING CABLE mode. The analyzer measures an assembly's resistance and sets a threshold allowing for a margin of error (usually 20%, more if less than 1 ohm) above the resistance measurements. The analyzer then displays or prints any connections above that computed threshold*.



RESISTANCE THRESHOLD set to AUTO*

**NOTE: The parameter signature no longer reflects the actual resistance threshold used in testing. Be sure to always compare the computed resistance threshold against your acceptable test parameter specifications.*

Consider using the analyzer's memory to maintain your test parameter information rather than risk having it change with different sample cables.

If you would like to lower the computed threshold use a shorter sample cable (less resistance). If you would like to increase the computed threshold use a longer sample cable (more resistance) or add a resistor.

* When you set resistance threshold to AUTO, and if the computed resistance threshold is greater that 6K, then the analyzer will only test for continuity

HIPOT VOLTAGE

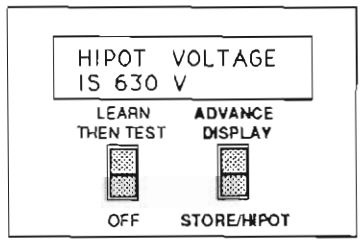
HOW TO SELECT: To select the HIPOT VOLTAGE option press ADVANCE DISPLAY until the display prompts "HIPOT VOLTAGE IS . . . " and indicates the current setting.

HOW TO SET: To set the HIPOT VOLTAGE for testing you simply press the STORE/HIPOT switch. Each time you press STORE/HIPOT the display prompts the next voltage setting.

When you set this option you are specifying the voltage to be applied between pins that should not be interconnected. This determines how effective insulation is during a test. The higher you set voltage, the smaller will be the detectable high resistance leak. Setting higher voltages may help detect contamination between pins or bare wires that nearly touch. You can set the 2000H to 50, 100, 200, 300, 400, 500, or 630 volts. If voltage is set to **OFF** the system will not conduct a hipot test.

NOTE: Subjecting an assembly to excessive voltage may degrade its future performance. Be careful not to apply voltage higher than what your assembly is designed to handle. For example, ribbon cable is usually designed to handle up to 300 volts.

NOTE: Voltage settings will affect the range of available resistance thresholds. Refer to the chart on page 2-4 for more information.



Press ADVANCE DISPLAY to select then press STORE/HIPOT to set from 50 to 630 V

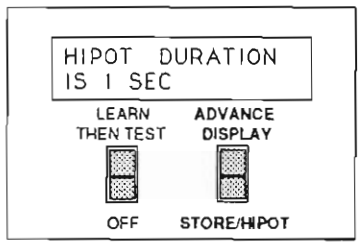
HIPOT DURATION

HOW TO SELECT: To select the HIPOT DURATION option press ADVANCE DISPLAY until the display prompts "HIPOT DURATION IS... " and indicates the current setting.

HOW TO SET: To set HIPOT DURATION press the STORE/HIPOT switch. Each time you press STORE/HIPOT the display increases in duration. You can set duration in increments from 10 milliseconds to 1 minute.

This setting represents the actual length of time voltage will be applied to each NET for hipot testing. Increasing hipot duration increases your ability to detect faults that occur over time; however, testing will take longer. For example, if you had two 25 D connectors connected pin to pin, a hipot duration of 1 minute would require a total test time of 25 minutes to complete.

NOTE: The system will not hipot test until a conductance test is successful. Also, as soon as leakage above the set threshold is detected high voltage turns off.

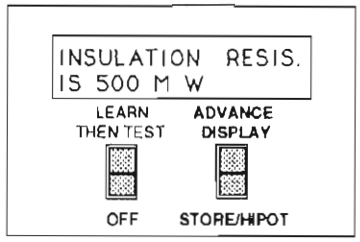


Press ADVANCE DISPLAY to select then press STORE/HIPOT to set from 10 millisecond to 1 minute

INSULATION RESISTANCE THRESHOLD

HOW TO SELECT: To select the INSULATION RESISTENCE THRESHOLD option press ADVANCE DISPLAY until the display prompts "INSULATION RESIS . . . " and indicates the current setting.

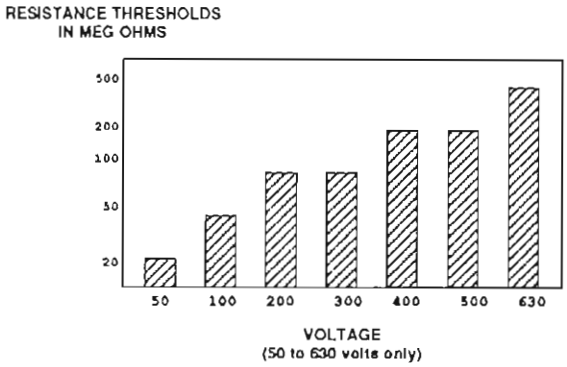
HOW TO SET: To set an insulation resistence threshold simply press the STORE/HIPOT switch. Each time you press STORE/HIPOT the display prompts the next insulation threshold setting.



Press ADVANCE DISPLAY to select then press STORE/HIPOT to set from 5 to 500 M Ω

Use this option to test the resistance between points that should not be connected. You can set insulation resistance thresholds to 5, 10, 20, 50, 100, 200, and 500 meg ohms. However, the highest available setting will be determined by the amount of hipot voltage you set.

NOTE: Measuring extremely high resistances requires increasing voltage. There is a measurable limit to the resistance of each setable voltage level as shown in the table at right.

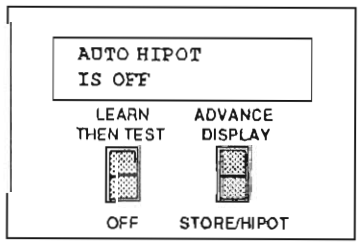


AUTO HIPOT

HOW TO SELECT: To select the AUTO HIPOT option press ADVANCE DISPLAY until the display prompts "AUTO HIPOT IS . . . " and indicates if it is "OFF" or "ON."

HOW TO SET: To set this option simply press the STORE/HIPOT switch. Each time STORE/HIPOT is pressed the option changes to either "ON" or "OFF."

The AUTO HIPOT option lets you choose between automatic or manual hipot testing. When this option is **ON** a hipot test immediately follows a good conductance test. A hipot test can be repeated by pressing STORE/HIPOT. When this option is **OFF** an assembly is not hipot tested until you press the STORE/HIPOT switch. Hipot testing with AUTO HIPOT set to **OFF** can help eliminate test failure and the possiblity of electrical shock when bare wires or other connections are exposed.



Press ADVANCE DISPLAY to select then press STORE/HIPOT to set

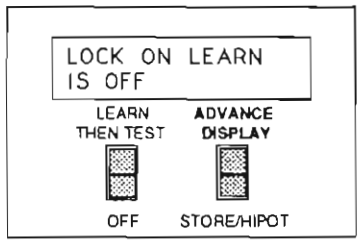
LOCK ON LEARN

HOW TO SELECT: To select the LOCK ON LEARN option press ADVANCE DISPLAY until the display prompts " LOCK ON LEARN IS . . . " and will indicate if it is "ON" or "OFF."

HOW TO SET: To set this option simply press the STORE/HIPOT switch. Each time STORE/HIPOT is pressed the option changes to either "ON" or "OFF."

Using LOCK ON LEARN helps prevent accidentally learning a bad cable assembly. This happens when there is a power failure, or by accidentally pressing the OFF/LEARN THEN TEST switch when a bad assembly is attached to the analyzer. This lock provides an extra level of protection from these kinds of accidents when you test the same cable assembly for many days. When set to **ON** the last learned wire list will always be used for testing. When set to **OFF** the analyzer operates as usual; i.e. turning from OFF to LEARN THEN TEST will cause the analyzer to program from any attached cable.

NOTE: You can still program from memory when LOCK ON LEARN is ON if you hold in the MEMORY button while turning the analyzer on.



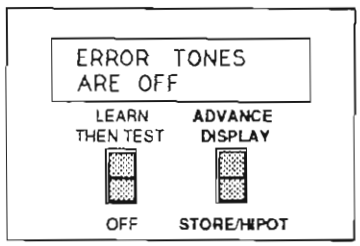
Press ADVANCE DISPLAY to select then press STORE/HIPOT to set

ERROR TONES

HOW TO SELECT: To select the ERROR TONES option press ADVANCE DISPLAY until the display prompts "ERROR TONES ARE . . . " indicating if ERROR TONES are "ON" or "OFF."

HOW TO SET: To set this option press the STORE/HIPOT switch. Each time STORE/HIPOT is pressed the option changes to either "ON" or "OFF."

When the analyzer detects errors it emits a series of sharp beeps. If these tones become an annoyance, especially when you anticipate that connecting an assembly to the analyzer will take a long time, you can turn them off. When the ERROR TONES option is set to ON the analyzer emits beeps when detecting errors. When the ERROR TONES OPTION is OFF the analyzer is silent when detecting errors.



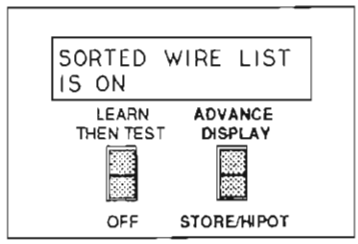
Press ADVANCE DISPLAY to select

SORTED WIRE LIST

HOW TO SELECT: To select the SORTED WIRE LIST option press ADVANCE DISPLAY until the display prompts "SORTED WIRE LIST IS. . ."and indicates if it is "ON" or "OFF."

HOW TO SET: To set this option simply press the STORE/HIPOT switch. Each time STORE/HIPOT is pressed the option changes to either "ON" or "OFF."

This option is useful when working with discrete wire connectors. For example, a wire list for a 25 pin D connector would sort J1-01 to be in the first NET. The second NET, however, would sort J1-14 (or the next higher pin) as the first pin in that NET, etc. When SORTED WIRE LIST is set to **ON** it changes the order that pins appear in a NET. In this instance, pin J1-01 will always precede J1-14 if they are in the same NET. When SORTED WIRE LIST is **OFF** the order that pins appear in a NET is determined by the wire position of an IDC connector.



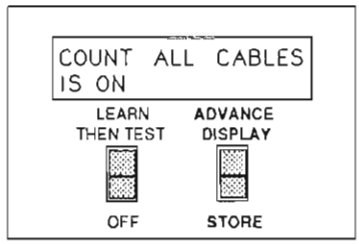
Press ADVANCE DISPLAY to select then press STORE/HIPOT to set

COUNT ALL CABLES

HOW TO SELECT: To select the COUNT ALL CABLES option press ADVANCE DISPLAY until the display prompts "COUNT ALL CABLES IS. . . "and indicates if it is "ON" or "OFF."

HOW TO SET: To set this option simply press the STORE/HIPOT switch. Each time STORE/HIPOT is pressed the option changes to either "ON" or "OFF."

Once the analyzer is programmed it begins to count the cables tested. When this option is **ON** the printout shows the total number of cables tested since being programmed, as well as the number of good cables. When this option is **OFF** the printout shows only the number of good cables tested.

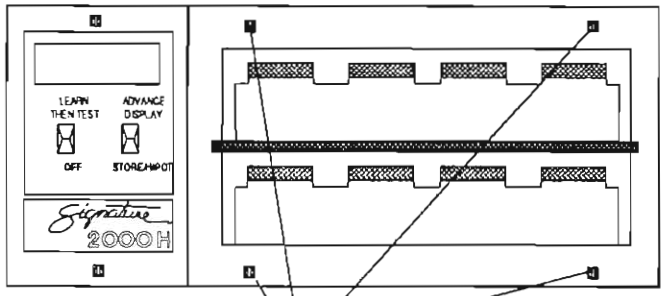


Press ADVANCE DISPLAY to select then press STORE to set

The Signature 2000H uses interchangeable adapter cards with connectors mounted on them. These mate to the assembly under test. The following describes the general procedure for installing standard connector adapters when preparing a controlled setup. For instructions on how to prepare a controlled setup with custom fixturing refer to page 3-3, "CUSTOM FIXTURING WITH THE FRAME MOUNT STAND."

STEP 1. Remove the Cover Plate

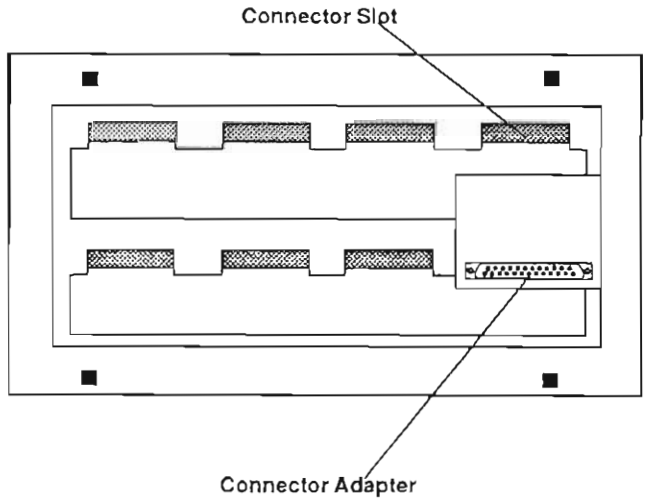
Install connector adapters with the LEARN THEN TEST switch in the **OFF** position, or when the display prompts that you have installed the wrong adapters for the wire list programmed from memory. It is best to remove only one cover plate at a time to avoid confusion as to where it belongs. The quarter turn fasteners at the top and bottom of the cover plate must first be unlocked (in the unlocked position the fastener is turned so its slot is horizontal). If this is difficult to do by hand it can be rotated more easily with a coin. Then the cover plate can be lifted up.



Cover plate fasteners. Turn slots horizontal.

STEP 2. Place Adapter Below Connector Slot

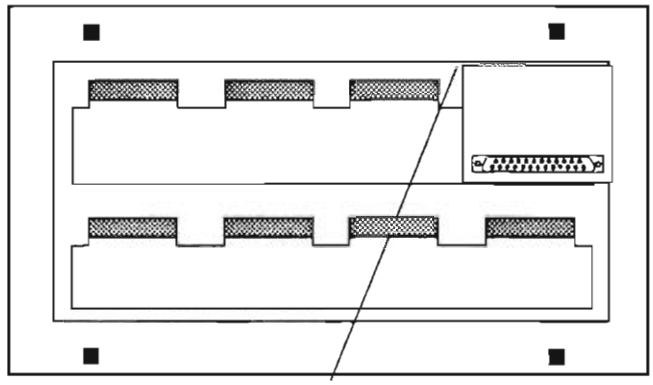
After you remove the cover plate you then position an adapter below the connector slot. If you use a single height adapter, it must be positioned under the connector slots for both adapter positions



STEP 3. SLIDE ADAPTER UP INTO CONNECTION SLOT

The adapter should mate with the connector on the scanner underneath it. To fit them together simply press down on the adapter and slide it up into the metal frame.

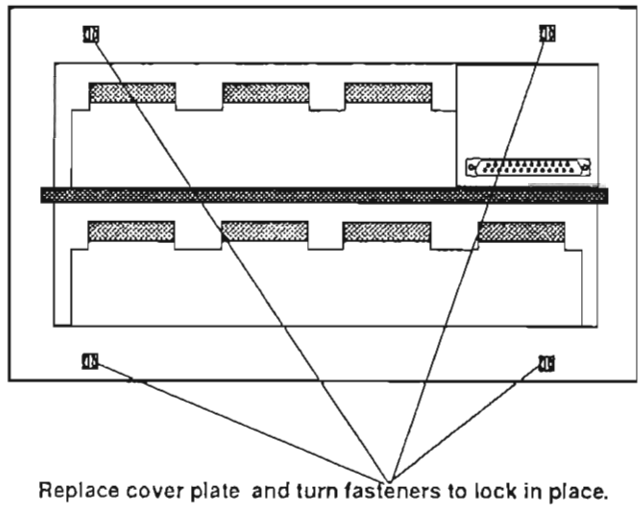
NOTE: Never force adapters into place since it could damage pins on the bottom of the adapter. When properly installed, adapters should be flush with the surface of the metal frame. They will also fit in against the left side of the frame. The two holes used to postion the cover plate on the scanner should be exposed. If an adapter does not install properly remove it, check for bent pins, then reinstall it.



Slide up into place. Do not force.

STEP 4. LOCK THE COVER PLATE IN PLACE

After you have installed your connector adapter you must put the cover plate back in place and lock it. The cover plate has small pins that position it on the scanner underneath. These pins hold the adapters to the left. They also prevent you from interchanging the cover plates. The cover plates should always sit flush on the surface of the metal frame. Then the two fasteners are locked (slots turned back to the vertical position).

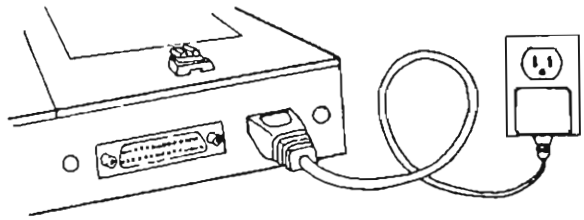


Replace cover plate and turn fasteners to lock in place.

Documentation is key to quality assurance. If you test without using proper documentation you are only checking the consistency of a batch of cables — you are not actually testing. Thinking you can test without proper documentation will not tell you whether or not you are testing with the correct wire list.

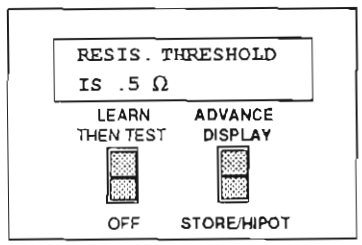
STEP 1. CONNECT THE POWER

First, connect the low voltage power plug end of the wall plug-in transformer into the back of the analyzer. Then plug the transformer into an AC outlet. The transformer requires a three-prong outlet for safety and immunity from static electricity.



STEP 2. SET TEST PARAMETERS

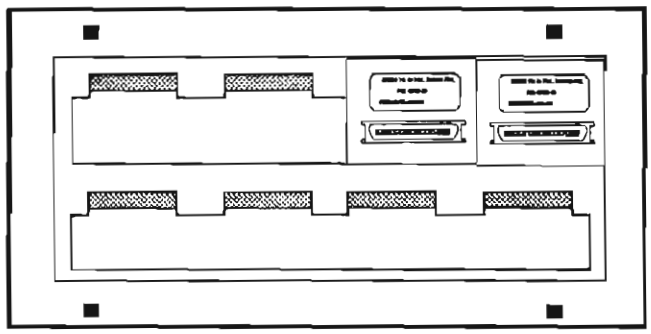
Proper test parameters may enhance cable quality by identfying problems or latent defects that would not show up with standard continuity testing. Test parameters need to be chosen carefully so as not to substantially exceed the specifications of the wire and connectors under test. By using excessive test levels the analyzer will identify defects when there are really no defects. Conversely, insufficient test levels will allow defects to go undetected that the analyzer is capable of locating. Other parameters may increase test time without any improvement in quality. If you use the same test parameters for all your cables you do not need to change them each time you document a cable. To select these settings refer to page 2-1, "HOW TO SET 1000H SYSTEMS OPTIONS."



Press ADVANCE DISPLAY to select then press STORE/HIPOT to set from .5 to 1k ohms

STEP 2. SET UP THE ANALYZER

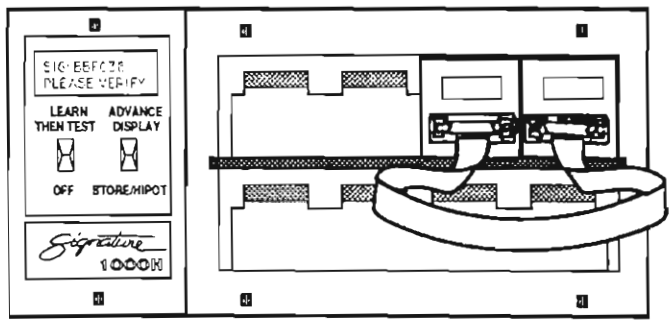
Select the connector adapters that mate with your cable's connectors and install them in the analyzer. Unused connector adapters left in the analyzer are not recognized and have no effect on cable signatures.



STEP 3. LEARN CABLE'S INTERCONNECTIONS

Plug your sample cable into the connector adapters and switch the analyzer from OFF to LEARN THEN TEST. The display will first prompt "LEARNING CABLE" then change to "PLEASE VERIFY." A series of rising tones will be sounded to signal that the cable's interconnections have been learned.

NOTE: If the analyzer did not learn the cable the LOCK ON LEARN option is set to ON. It must be set to OFF before learning an assembly. See Part 1, "How to Set System Options," page 2-5.

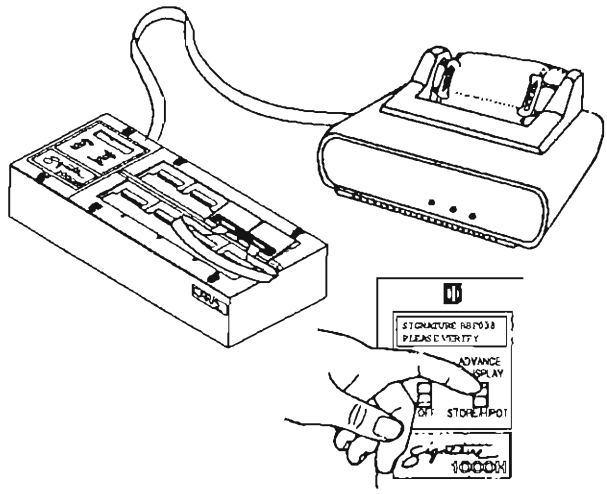


STEP 4. CREATE DOCUMENTATION

PROCEDURE 1: With a printer

Adding a printer will significantly enhance the value of your Signature 2000H. All aspects of selecting and using a printer are discussed in a separate section in the application notes. See "HOW TO USE A PRINTER" pages 3-1 and 3-2 in the application notes.

If you have connected a printer adjust the paper feed so printing will begin at the top of the sheet. Press the ADVANCE DISPLAY switch and the documentation should begin to print out.



PROCEDURE 2: Without a printer

If you have not connected a printer transcribe the cable signature on a blank Signature 2000H cable documentation form (these are provided in the section of this manual tabbed "CABLE DOCUMENTATION"). Next depress ADVANCE DISPLAY for test parameters, adapter signature, and the wire list and transcribe them.

Computed thresholds (RESISTANCE THRESHOLD set to AUTO) may vary depending upon differences in adapters and sample assemblies, etc. This may create problems for consistency in the controlled setup. Either plan to keep the parameter settings and wire list stored in analyzer memory or increase the resistance threshold limits in your documentation to accomodate these differences.

Fill in the part number, cable description, adapter descriptions, and other notes necessary to properly build the cable. If a drawing exists be sure to include it. Check the documentation you transcribe against the best information available to make sure the documented interconnections are correct. MAKE SURE ALL NECESSARY INFORMATION ON THIS FORM IS FILLED IN AND CORRECT.

SIGNATURE 2000H CABLE DOCUMENTATION

CABLE SIGNATURE:_____ CABLE PART NUMBER:_____
PARAMETER SIGNATURE: _____
J1 - ADAPTER SIGNATURE:_____ CONNECTOR DESCRIPTION_____
J2 ADAPTER SIGNATURE:_____CONNECTOR DESCRIPTION:_____
CABLE DESCRIPTION:_____

IGNORE UNUSED:	ON
CONDUCTANCE RESISTANCE THRESHOLD:	AUTO .5 ohm
HIPOT VOLTAGE SETTING:	300 V
DURATION PER NET:	10 mS
INSULATION RESISTANCE:	100 M ohm

NO. COMMON CONNECTION LIST:
1
2
3
4
5

NOTES:

STEP 5. ADD PART NUMBER TO MASTER LIST

Enter the cable part number in the master list and put the cable documentation form in its proper section. Proceed to "HOW TO SET UP THE ANALYZER (controlled setup)" page 2-10.

NOTE: You only need to document an assembly once. Thereafter, when you prepare to test that assembly, proceed with the controlled setup.

CABLE ASSEMBLY MASTER LIST

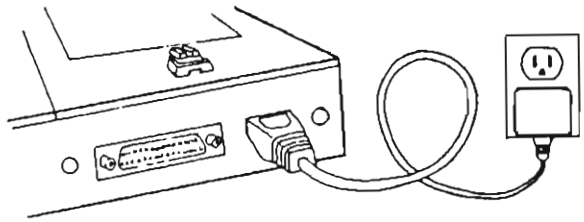
PART NO.	DESCRIPTION	SIGNATURE
80-40525	RS-232 MODEM	BBF038-4060
80-48640	EPSON/CENTRONICS	8043B9-A800
80-45020	20 TO 20 PIN IDC	E0A903-E460
80-47025	26 IDC TO DB25P	47EC29-1040

Before you can begin testing cables with the Signature 2000H you must first prepare a controlled setup. A correctly prepared controlled setup ensures that the standards to which you test are accurate. A controlled setup begins with your cable documentation. The documentation for your "known good" assemblies will include all the information necessary for identifying a good cable. The following steps explain the procedure for setting up the analyzer, installing connector adapters, learning a sample assembly, and verifying the controlled setup.

NOTE: If you use LOCK ON LEARN you bypass the following procedure each time the analyzer is turned on. LOCK ON LEARN is most useful when the analyzer is dedicated to testing a single assembly. See Part 1, "How to Set System Options," page 2-5.

STEP 1. CONNECT THE POWER

First, connect the low voltage power plug end of the wall plug-in transformer into the back of the analyzer. Then plug the transformer into an AC outlet. The transformer requires a three-prong outlet for safety and immunity from static electricity.



STEP 2. START WITH DOCUMENTATION

Start with the cable documentation form for the cable you want to test. If you cannot locate it, or if one does not yet exist, you must create the documentation before proceeding. Refer to "HOW TO DOCUMENT CABLES," page 2-8.

SIGNATURE 2000H CABLE DOCUMENTATION

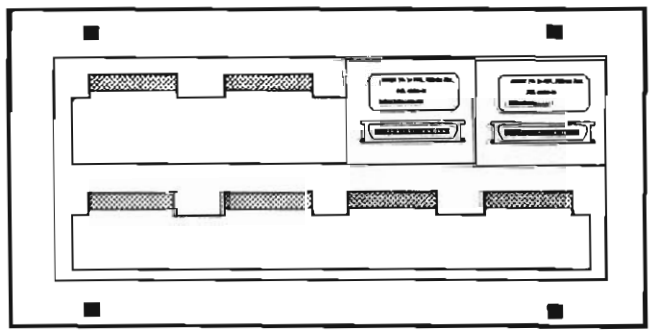
CABLE SIGNATURE: 88F038 CABLE PART NUMBER:_____
PARAMETER SIGNATURE: 9060
J1 - ADAPTER SIGNATURE: 03FAC1 CONNECTOR DESCRIPTION:_____
J2 ADAPTER SIGNATURE: F5B4E0 CONNECTOR DESCRIPTION:_____
CABLE DESCRIPTION:_____

IGNORED UNUSED:	ON
CONDUCTANCE RESISTANCE THRESHOLD	AUTO .5 ohm
HIPOT VOLTAGE SETTING	300 V
DURATION PER NET:	10 mS
INSULATION RESISTANCE THRESHOLD:	100 M OHM

NO. COMMON CONNECTION LIST:
1 J1-01 J2-01
2 J1-02 J2-03
3 J1-03 J2-02
4 J1-04 J2-04 J2-02
5 J1-07 J2-07

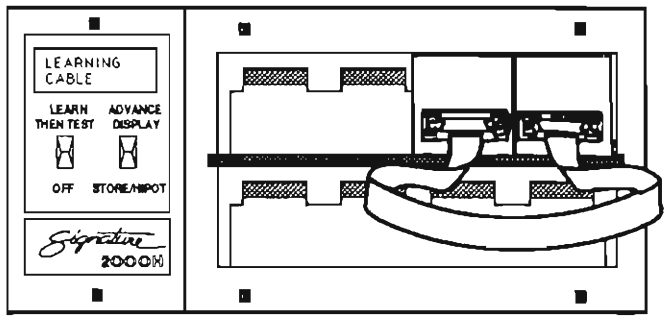
STEP 3. INSTALL THE CONNECTOR ADAPTERS

Install the connector adapters in the positions (J1, J2, etc., up to J4) specified in your documentation. Be sure any special adapting cables or fixtures are connected before proceeding to STEP 5.



STEP 4. LEARN THE CABLE'S INTERCONNECTIONS

Plug your sample cable into the adapters and switch the analyzer from OFF to LEARN THEN TEST. The display will prompt "LEARNING CABLE" then "PLEASE VERIFY." Then the analyzer will emit a series of rising tones indicating the cable's interconnections have been learned.



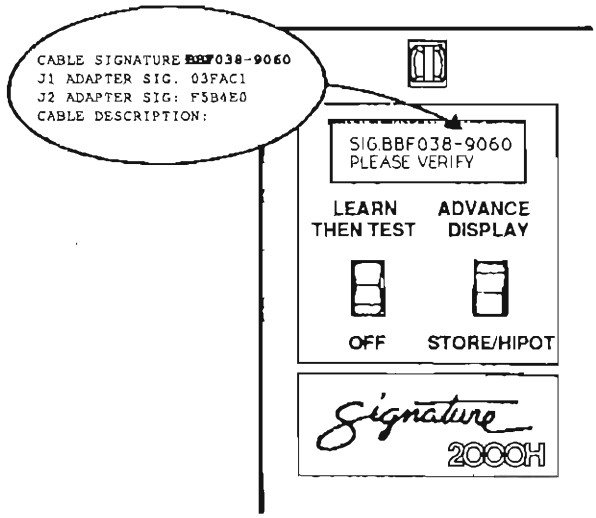
STEP 5. VERIFY SIGNATURES OF THE TEST SETUP

Compare the cable signature from the Cable Documentation Form to the signature displayed on the analyzer and proceed according to the following results:

A. IF SIGNATURES MATCH THE DOCUMENTATION

If the signature matches remove the cable and the analyzer will prompt "READY TO TEST." If you have set the RESISTANCE THRESHOLD option to AUTO compare the computed resistance on the display with that defined in your documentation. If the resistance value is the same or lower proceed to the section "HOW TO TEST (general continuity)," page 2-13.

NOTE: You can also begin testing without removing the assembly by pressing the MEMORY button at the back of the analyzer.



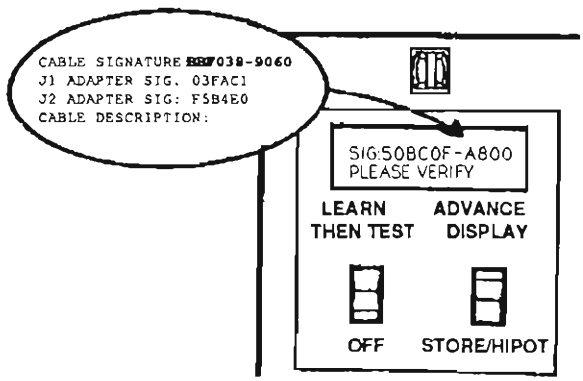
The cable documentation and the signature displayed match

B. IF THE CABLE SIGNATURE DOES NOT MATCH THE DOCUMENTATION (first six characters)

If the signature does not match proceed to the section, "WHAT TO DO IF CABLE SIGNATURE DOES NOT MATCH," page 2-12.

C. IF THE TEST PARAMETERS SIGNATURE DOES NOT MATCH (the next four characters)

Access the System Options mode (see page 2-1) and adjust the test parameter settings until they conform to those specified in the documentation.

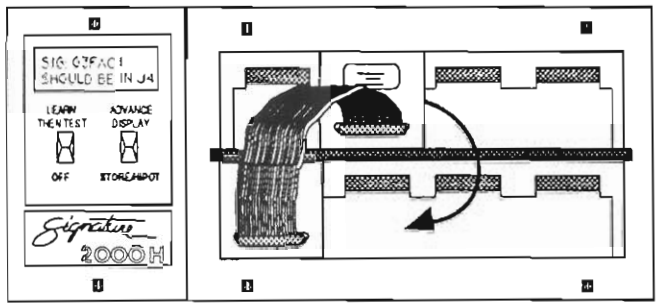


The cable documentation and the signature displayed do not match

STEP 1. CHECK IF AN ADAPTER IS IN THE WRONG POSITION

Without removing the cable press the ADVANCE DISPLAY switch. Step through the parameter settings until the adapter signatures are displayed. Compare the J1 adapter signature to the adapter signature from your cable documentation form. If the adapter signature is different it is installed in the wrong position. Continue to press the ADVANCE DISPLAY switch to check the installation of each connector adapter in the same manner. If any adapter signature does not match, you must install the correct adapter in the correct position. After installing the required adapter, return to STEP 4 of "HOW TO SET UP THE ANALYZER," page 2-11.

If the connector adapter signatures are correct, then the sample cable is incorrect. Proceed to STEP 2.

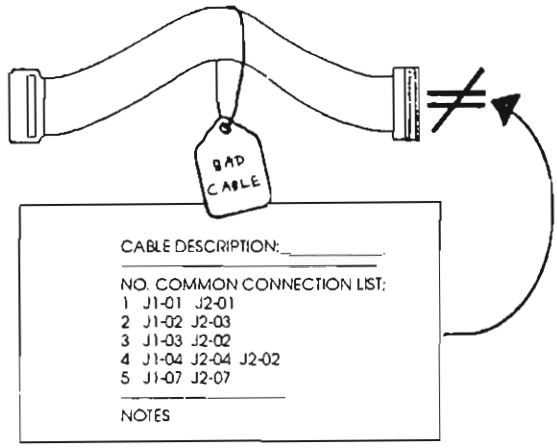


Check that Adapters Are In the Correct Position

STEP 2. CHECK IF THE CABLE USED FOR LEARNING IS BAD

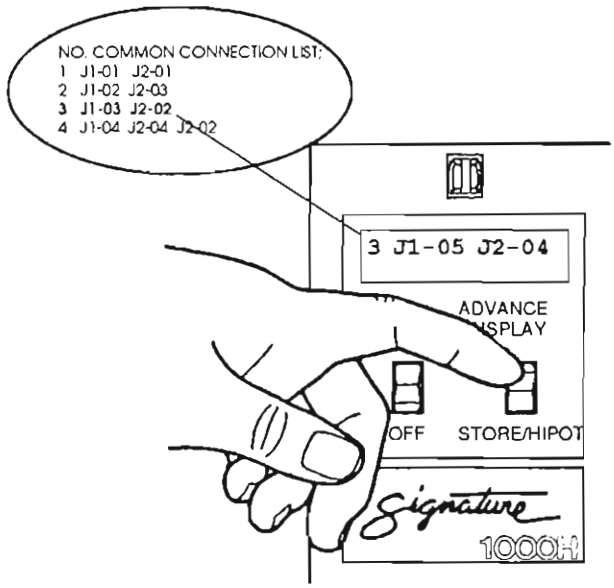
Try another sample cable

If STEP 1 did not identify an adapter error it is possible the sample cable does not match the documentation. Choose another sample cable, one that should be correct, then return to STEP 4 of the "HOW TO SET UP THE ANALYZER," page 2-11. If you still have a different signature it is likely both sample cables are bad. Therefore, follow "STEP 3" below.



STEP 3. IDENTIFY THE ERROR AND CORRECT IT

Another alternative is to step through the bad sample cable's interconnections and compare them to the documentation until you locate the error(s). By pressing the ADVANCE DISPLAY switch you can "step through" the cable's interconnections. Each time you press ADVANCE DISPLAY the display will prompt a NET and corresponding group of interconnections. Compare these with your documentation. After correcting errors return to STEP 4 of the "HOW TO SET UP THE ANALYZER," page 2-11.

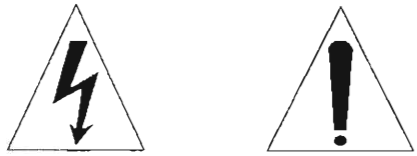


The Signature 2000H tests the continuity and conductance of an assembly's interconnections as well as hipot test. Once the analyzer verifies the pattern of interconnections and levels of resistance a hipot test occurs, either automatically or after the display prompts "READY TO HIPOT" and you press the STORE/HIPOT switch. The following instructions explain the procedures for general testing.

OPERATOR DISCOMFORT

The Signature 2000H is designed to meet and exceed the strictest safety specifications. Although it does not present danger to healthy individuals, you may be occasionally surprised by an annoying, but mild, electric shock. Depending on the voltage setting the greatest shock possible will be only 3 mil amps for 10 milliseconds. This will usually result in a hipot test failure. Small shocks occur only when you happen to touch a connection point during hipot test. If this becomes a problem during hipot testing consider doing the following to improve testing and avoid operator discomfort:

⇐ **PLEASE NOTE**



1. AUTO HIPOT

Change the AUTO HIPOT option setting from ON to O F F. When this setting is set to OFF the analyzer does not automatically hipot assemblies during test. Since hipot testing is not automatic when AUTO HIPOT is set to OFF the analyzer display prompts "READY TO HIPOT" after testing the continuity and conductance of an assembly's interconnections. This requires you to manually press the STORE/HIPOT switch to complete a hipot test. Manual control of the hipot test will give you ample time to remove your hands from any cable connections in order to avoid the possibility of shock.

2. WEAR RUBBER GLOVES

Latex rubber gloves are sufficient for insulating your hands.

NOTE: Do not use gloves designed for electrostatic discharge (ESD). They will increase the potential for shock and the chance of test failures. These gloves are commonly pink or black in color.

TO BEGIN

The display should presently prompt "READY TO TEST." If the display prompts "PLEASE VERIFY" at any time during testing then STEP 5 of the "HOW TO SET UP THE ANALYZER" must be redone. This will happen when there is any interruption of power, including use of the LEARN THEN TEST SWITCH. In some cases this problem can be eliminated with the LOCK ON LEARN setting (see page 2-5).

READY TO TEST

SIG: BBF038
PLEASE VERIFY

STEP 2. CONNECT THE CABLE, THEN CHECK THE DISPLAY OR RECOGNIZE THE SOUNDS

Plug the cable to be tested into the connector adapters.

IF A CABLE IS GOOD: If AUTO HIPOT is set to OFF the analyzer will display READY TO HIPOT. If AUTO HIPOT is set to ON the analyzer will automatically hipot test after a successful conductance test and display "GOOD R< .X Ω."

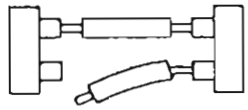
READY TO HIPOT OR GOOD R< .X W

FOR A GOOD CABLE THE DISPLAY WILL PROMPT

IF A CABLE IS MISSING CONNECTIONS: The display will prompt "OPEN DETECTED" and an error tone will be heard every few seconds. This tone might be heard just as a cable is being connected or disconnected. If "GOOD CABLE" is otherwise displayed, a bad cable is not indicated.

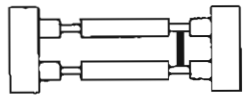
NOTE: The ERROR TONES option setting can turn sounds off. See page 2-5.

OPEN DETECTED
BEEP!



IF A CABLE HAS WRONG INTERCONNECTIONS: The display will prompt "SHORT DETECTED" and the analyzer will emit two error tones every few seconds.

SHORT DETECTED
BEEP! BEEP!

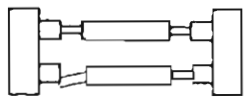


IF A CABLE HAS BOTH OPENS AND SHORTS: The display will prompt "ERRORS DETECTED" and the analyzer will emit three error tones every few seconds.

ERRORS DETECTED
BEEP! BEEP! BEEP!

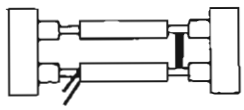
IF A CABLE HAS WEAK CONNECTIONS: (Resistance higher than the conductance threshold) The display will prompt " BAD R > .X Ω" X will be the resistance threshold setting that has been exceeded. This indicates too much resistance in a connection possibly caused by a cold solder joint or poorly crimped or corroded connector pin. These kinds of defects have the potential of becoming opens.

BAD R < .X W



IF A CABLE EXHIBITS INTERMITTENT PROBLEMS: (i.e., it develops shorts, opens, or excessive resistance after testing good) the display will prompt the error condition as described above. When the cable becomes good again, the display will prompt "INTERMITTENT"and the analyzer will click. Advancing the display will show the error condition that existed when the intermittent occured.

INTERMITTENT
CLICK! CLICK!



STEP 3. INITIATE HIPOT TEST

If the AUTO HIPOT option is set to ON the analyzer will automatically hipot test after the cable passes the continuity/conductance test. If it is set to OFF then the analyzer will prompt "READY TO HIPOT" after the continuity pattern and conductance tests and wait for you to press STORE/HIPOT.

READY TO
HIPOT

During the hipot test the analyzer display prompts "HIGH VOLTAGE DO NOT TOUCH." If you happend to touch any uninsulated part of the assembly under test you might experience a shock and cause the hipot test to fail..

HIGH VOLTAGE
DO NOT TOUCH

If the hipot test detects errors the analyzer display will prompt "FAILED HIPOT TEST." Press ADVANCE DISPLAY to step through the errors detected. The display will prompt the problem NETs and either "HAS LEAKAGE" or "OVER CURRENT":

FAILED
HIPOT TEST

HAS LEAKAGE indicates weak insulation between pins or bare wires that nearly touch. These defects have the potential of becoming shorts. On the most sensitive thresholds, contamination from finger prints or body oils while handling connectors may cause an assembly to fail.

3 J1-05 J2-04
HAS LEAKAGE

OVER CURRENT will display if the cable has excessive capacitance for the selected hipot voltage or if the resistance of the leak is sufficiently low (approximatley 500K ohms). If the cable has excessive capacitance, a lower hipot voltage may correct the failure (please refer to Specifications and Features in the Appendix, page 4-2, for the hipot voltages and corresponding capacitance limits).

3 J1-05 J2-04
OVER CURRENT

If a test fails and you correct the problem while the assembly is still attached to the analyzer, you can press the STORE/HIPOT switch to retest. Be sure to rework the cable or clearly mark results.

If the hipot test is successful the analyzer display will briefly prompt "PASSED HIPOT TEST." The test automatically cycles to a continuous continuity pattern and conductance test. The display then prompts "GOOD R < .X Ω" and emits a clicking sound after each newly completed continuity/conductance test. This continuous test provides an extra chance to detect intermittents. To repeat a hipot test just press the STORE/HIPOT switch again. The conductance test always follows a successful hipot test and continues until the cable is removed. This automatic test sequence saves time by eliminating button pushing.

PASSED
HIPOT TEST

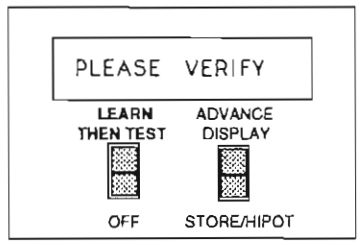
SIG: BBF038-9060
GOOD R < .X W

CLICK! CLICK!

The Signature 2000H has 50 memory locations. Once you learn a sample cable's wire list you can store it, including all test parameters and resistance settings, by doing the following:

STEP 1: Learn a Wire List from a Sample Cable

Connect a sample cable to the analyzer. Press the LEARN THEN TEST switch. The display will show the attached cable's signature and prompt "PLEASE VERIFY." If you have not created documentation for the sample, do so by following the instructions that begin on page 2-8. Then remove the cable. The display must prompt "READY TO TEST" before proceeding with STEP 2.

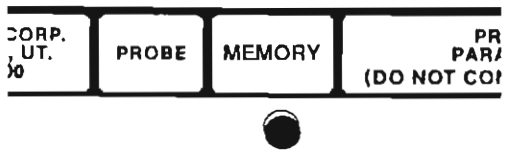


Attach sample cable and press LEARN THEN TEST

STEP 2. Press and Hold the Memory Button

The ACCESS STORED CABLES button is located at the back of the analyzer, between the probe jack and printer parallel interface. Press and hold the MEMORY button and keep it pressed during steps 3 and 4. The display should prompt "READY TO SAVE LEARNED CABLE."

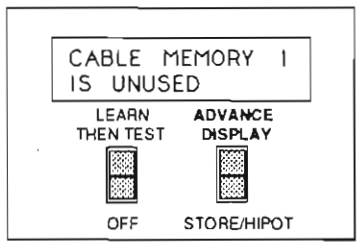
NOTE: if the display prompts "NO UNUSED MEMORY CABLE AVAILABLE" you have used all of the analyzer's 50 memory locations. See 'HOW TO DELETE A WIRE LIST FROM MEMORY" page 2-18, to create more room.



Press and hold MEMORY button

STEP 3: Press Advance Display to Select Next Available Memory Location

Memory locations for wire lists are labeled 1 through 50. Each time you press ADVANCE DISPLAY the next available memory location is displayed. While still holding the MEMORY button press and release the ADVANCE DISPLAY switch. This selects the first available memory location for the wire list. If location #1 is not in use the display will prompt "MEMORY CABLE 1 IS NOW UNUSED."

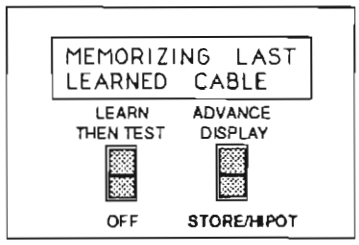


Press ADVANCE DISPLAY to select memory location

STEP 4: Press Store to Save Sample Cable's Wire List to Memory

As you continue to hold the MEMORY button press the STORE/HIPOT switch (the opposite of ADVANCE DISPLAY). The display will prompt "MEMORIZING LAST LEARNED CABLE." You can now release the ACCESS STORED CABLES BUTTON. The display will prompt "LAST LEARNED NOW IS IN MEMORY 1." The wire list is stored in the analyzer's memory.

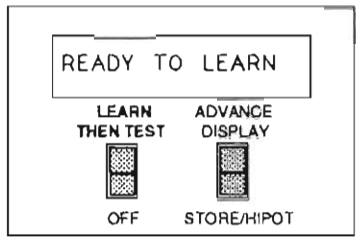
NOTE: be sure to write the memory location on your documentation.



Press STORE switch to save wire list to memory

STEP 1: TURN ON THE LEARN THEN TEST SWITCH

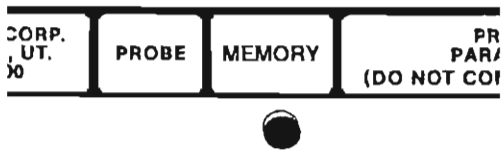
Start with the LEARN THEN TEST switch in the OFF position and no cable connected to the analyzer. Press LEARN THEN TEST. The display prompts "READY TO LEARN."



Turn on the LEARN THEN TEST switch

STEP 2: HOLD DOWN THE MEMORY BUTTON

The MEMORY button is located at the back of the analyzer between the probe jack and the parallel printer interface. When you press this button the display will prompt "READY TO ACCESS MEMORIZED CABLES." Press and hold the button as you continue through STEP 3.



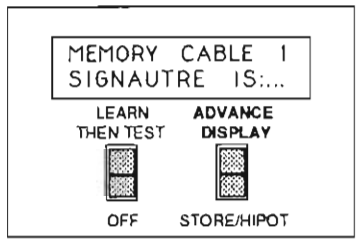
Press and hold MEMORY button

STEP 3: PRESS ADVANCE DISPLAY TO SELECT A STORED WIRE LIST

As you press and hold the ACCESS STORED CABLES button press the ADVANCE DISPLAY switch. Each time you press the ADVANCE DISPLAY switch the analyzer's display prompts a wire list programmed into memory. Continue to press ADVANCE DISPLAY until the display prompts the wire list you want.

NOTE: The last learned wire list will always display first. Then, the next wire list displayed will be identified as "MEMORY CABLE 1 SIGNATURE IS: . . ."

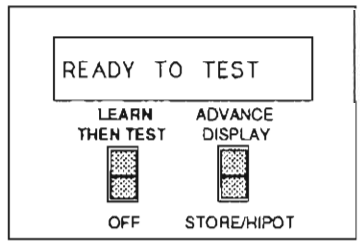
To program a wire list simply release the MEMORY button when the display prompts the wire list you want. This programs the analyzer for testing.



Press ADVANCE DISPLAY to select a stored wire list

IF THE DISPLAY PROMPTS: "READY TO TEST"

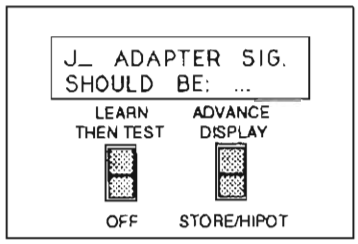
If the display prompts "READY TO TEST" the analyzer is programmed and you have installed the correct connector adapters. You can begin testing.



The analyzer is programmed and correct adapters installed

IF THE DISPLAY PROMPTS: "J_ ADAPTER SIG. SHOULD BE. . ."

If the display prompts "J _ADAPTER SIG. SHOULD BE. . ." you installed the wrong adapters for testing with the wire list programmed in the analyzer's memory. Read the display to identify the correct adapters and install them (it's OK to change adapters without turning off the analyzer when in this mode). Once you have installed the correct adapters the display will prompt "READY TO TEST."



If adapters are wrong, read display to identify correct ones

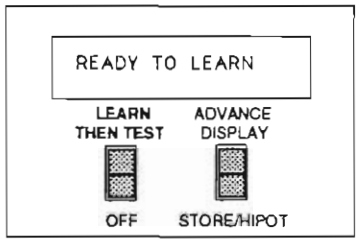
How to Delete a Wire List from Memory

You may want to delete an obsolete wire list or, if all 50 memory locations are filled, make room for another wire list. The following steps explain how to delete unwanted wire lists without accidentally deleting ones you wish to keep.

STEP 1: PRESS LEARN THEN TEST

Begin with the analyzer switched off and with no cables connected. Press LEARN THEN TEST. The display will prompt "READY TO LEARN."

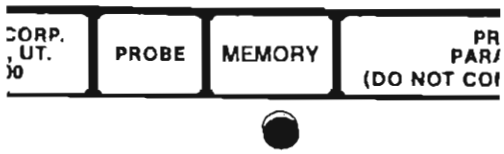
NOTE: A wire list cannot be deleted when testing a cable or when the display prompts "READY TO TEST."



Press LEARN THEN TEST

STEP 2: PRESS AND HOLD THE MEMORY BUTTON

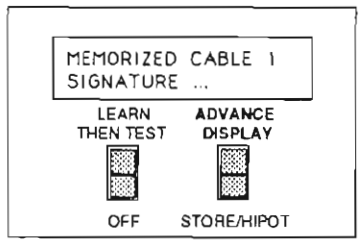
Press and hold the button. The display will prompt "READY TO ACCESS MEMORIZED CABLES." Continue to press and hold the MEMORY button during steps 3, 4, and 5.



Press and hold MEMORY button

STEP 3: PRESS ADVANCE DISPLAY TO SELECT WIRE LIST YOU WANT TO DELETE

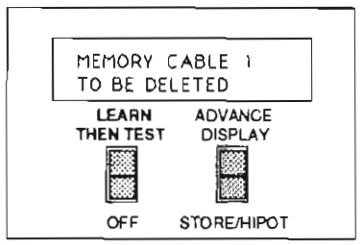
To select the wire list you want to delete press ADVANCE DISPLAY. The *first* time you press ADVANCE DISPLAY the display will prompt the last learned wire list. Thereafter, each time you press the ADVANCE DISPLAY the display prompts one of the wire lists stored in the analyzer's memory. Select the wire list you want to delete. The display will prompt "MEMORIZED CABLE __ SIGNATURE_____" showing the memory location and signature of the wire list to be deleted.



Press ADVANCE DISPLAY to select wire list you want to delete

STEP 4: HOLD DOWN STORE SWITCH TO SELECT DELETE

As you continue to hold the MEMORY button press the STORE switch (the opposite side of ADVANCE DISPLAY). The display will prompt "MEMORY CABLE. . .TO BE DELETED." Keep the STORE switch depressed as you continue through step 5.



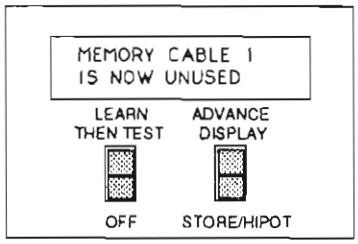
Hold down STORE/HIPOT switch to select DELETE

STEP 5: RELEASE MEMORY BUTTON THEN RELEASE STORE SWITCH

First, release the MEMORY button. The display will prompt "MEMORY CABLE __ IS NOW UNUSED." Second, release the STORE/HIPOT switch.

NOTE: You must release the MEMOYR button before the STORE/HIPOT switch or the wire list will not be deleted from memory.

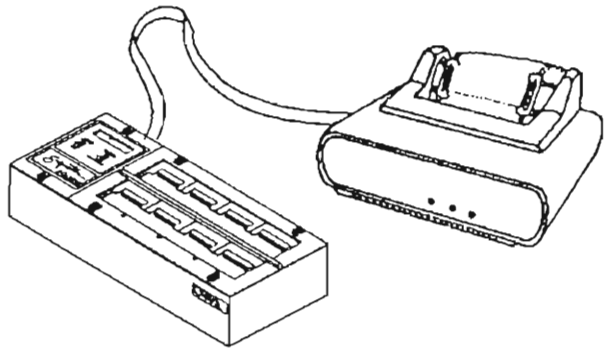
When the display prompts "READY TO LEARN" the deletion is complete.



Release MEMORY button

How to Print a Wire List Directory

The Signature 2000H has 50 memory locations for storing wire lists. You can print a wire list directory of these lists to keep track of which list is stored in which memory location. To print a wire list directory do the following:

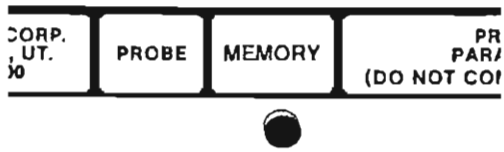


STEP 1: CONNECT PRINTER TO THE ANALYZER

Connect your printer to the analyzer. The printer must be on-line. If you are not familiar with what type of printer you have, or how to connect it, see "HOW TO USE A PRINTER," page 3-1.

STEP 2: HOLD DOWN THE MEMORY BUTTON

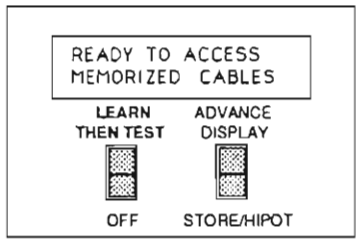
The MEMORY button is located at the back of the analyzer between the probe jack and the parallel printer interface. When you press this button the display will prompt "READY TO ACCESS MEMORIZED CABLES." Press and hold the button as you continue through STEP 4.



Press and hold MEMORY button

STEP 3: TURN ON THE LEARN THEN TEST SWITCH

While holding the MEMORY button turn the analyzer on by pressing LEARN THEN TEST. The display prompts "READY TO ACCESS STORED CABLES."



Holding MEMORY button turn the analyzer on by pressing the LEARN THEN TEST. Then . . .

STEP 4: PRESS ADVANCE DISPLAY TO INITIATE PRINTING WIRE LIST DIRECTORY

As you press and hold the MEMORY button press the ADVANCE DISPLAY switch. If you have your printer connected and on-line it will print a directory of all wire lists by signature and their memory location.

. . . press ADVANCE DISPLAY to initiate printing

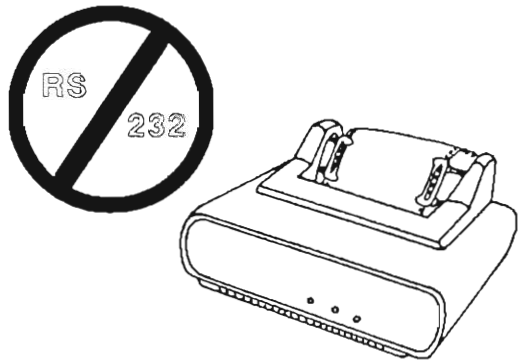
SIGNATURE 2000H CABLE DOCUMENTATION

STORED WIRE LISTS: DATE:

CABLE	SIGNATURE	S.N.
1	80CC62-Q190	
2	94DDE0-6040	
3	A16AC1-3A10	
4	A9EC52-23G1	
5	43D922-30LL	
6	59E3D0-40B5	
7	787AE0-A800	

CHOOSE THE CORRECT PRINTER

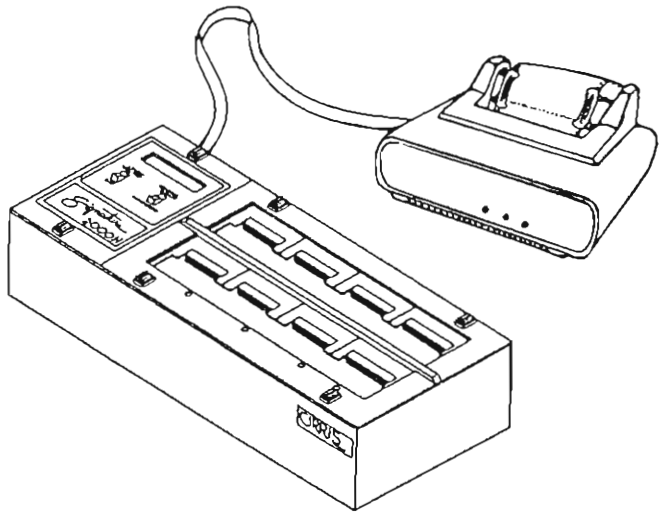
Adding a printer will significantly enhance the value of your Signature2000H. The analyzer works with almost any printer that has an EPSON/CENTRONICS parallel interface. In operations where many analyzers are in use one printer is usually all that is required (your need for a printer may only be occasional for printing documentation).



NOTE: CONNECTING THE PRINTER TO AN RS-232 SERIAL INTERFACE WILL CAUSE SERIOUS DAMAGE TO THE ANALYZER AND IS NOT COVERED BY THE WARRANTY. Many printers with an EPSON/CENTRONICS parallel interface are available at a cost of no more than $200. Examples of compatible printers are the OKIDATA 182, or the IBM Proprinter.

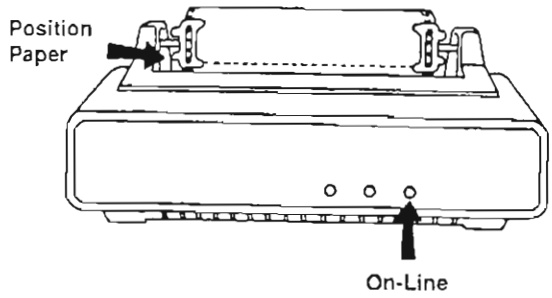
STEP 1. CONNECT PRINTER TO THE ANALYZER

The same cable you use to connect your printer to the IBM Personal Computer (PC) will connect your printer to the analyzer. If you prefer to construct your own cable you will find a wire list definition for a sample cable in the appendix, page 4-3, that is acceptable for most printers. Use this cable to connect your printer to the analyzer.



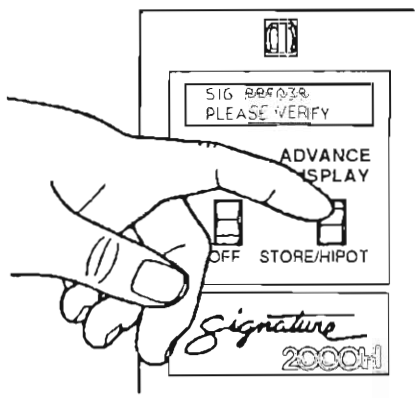
STEP 2. ADJUST THE PAPER POSITION

Printing begins where you position the paper. Plug in your printer, turn it on, then set the paper to the top of the form.



STEP 3. PUT PRINTER ON-LINE (SELECTED) THEN PRESS ADVANCE DISPLAY

The printer will begin a print-out when ADVANCE DISPLAY is pressed if the printer is on-line (selected). This is done by activating the required switch on the printer before you press ADVANCE DISPLAY. On some printers this switch will need to be pressed each time the analyzer's LEARN THEN TEST switch is turned on. Documentation is printed when the analyzer display prompts "PLEASE VERIFY" or "GOOD CABLE." Errors are printed out when an error message is displayed. Directing information back to the display requires putting the printer off-line, or disconnecting it from the analyzer.

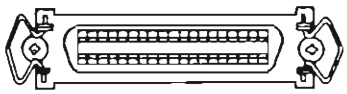


CAN I USE A SERIAL PRINTER?

NO. The Signature Analyzer does not work with a serial printer. Connecting the analyzer to a serial interface will cause serious damage to the analyzer and void your warranty. Since the most frequent use of a printer is to create initial cable documentation you may not find it necessary to have a printer connected at all times. Therefore, it may be practical to borrow a parallel printer from some other area of your operations when you need to create documentation. However, if you need to frequently document assemblies the investment in an inexpensive parallel printer will be worthwhile. A good parallel printer can be purchased for approximately $200. Of course, you can always transcribe documentation by hand using a copy of the cable documentation forms provided with this manual.

HOW DO I KNOW IF I HAVE A PARALLEL PRINTER?

To see if you have a parallel printer look at its connector. The connector is usually located at the back of the printer. A parallel printer will have a female, 36 position ribbon connector as in the illustration below.



Female, 36 Position Ribbon Connector

CAN I USE ONE PRINTER WITH MORE THAN ONE ANALYZER?

To use one printer with multiple analyzers use a switch-box. By connecting multiple analyzers to a switch-box each analyzer can quickly access the printer by simply turning the select switch.

HOW DO I USE A PRINTER WITHOUT AN ON-LINE/OFF-LINE SWITCH?

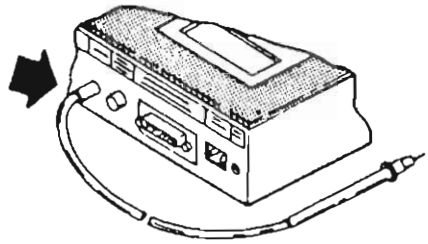
If you use a printer that does not happen to have an on-line/off-line switch you can simulate one without having to repeatedly disconnect the printer from the analyzer. Simply add a switch in the wire to pin 11 of the EPSON/CENTRONICS printer cable. When pin 11 is open the analyzer will recognize that the printer is off-line and information will be displayed rather than printed. When you are ready to document simply make the connection to pin 11 by closing the switch. Of course, if you have a switch-box available you can connect the cable to the switch box and use its switch as the on-line/off-line switch.

HOW DO I CHANGE THE COMPANY NAME ON PRINTOUTS?

You can order an EPROM change for $25 from CIRRIS SYSTEMS that will print out your company name on all your documentation. The EPROM, located on the bottom of the microprocessor assembly, can be easily changed (see "DISASSEMBLY GUIDE," page 3 4). Do not attempt to burn your current EPROM.

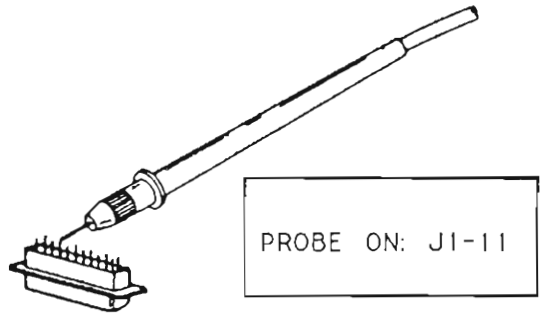
STEP 1. PLUG PROBE INTO BACK OF ANALYZER

Plug the probe into the connector labeled PROBE at the back of the analyzer.



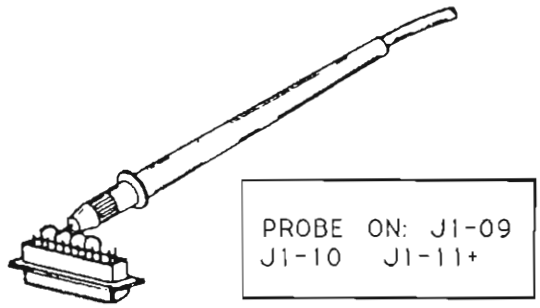
STEP 2. TOUCH A POINT AND READ DISPLAY

The probe is active only when the analyzer in the test mode (it doesn't work when the display prompts "READY TO LEARN" or "PLEASE VERIFY"). While in the test mode touch the probe tip to the connector pin or wire you want to identify. For example, if you touch the probe tip to J1 pin 11, the display will prompt "PROBE ON J1-11."



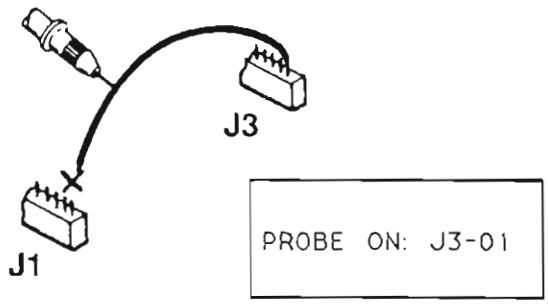
STEP 3. PRESS ADVANCE DISPLAY FOR OTHER POINTS

Up to three pins are displayed at the same time. If more than three pins are interconnected a plus sign (+) will appear in the lower right corner of the display. To view the additional interconnections press ADVANCE DISPLAY.



OTHER USES FOR THE PROBE

The probe is often capable of identifying which end of an interconnection has an open. When an open is displayed penetrate the insulation of the wire that should connect between the two pins. The pin identified in the display is the pin making proper connection to the wire. The pin not displayed has a defective termination (i.e. no connection between wire and pin).

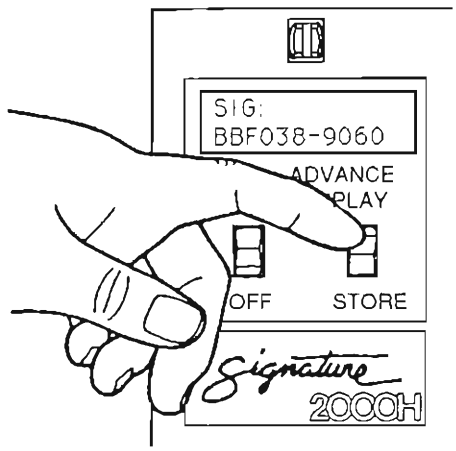


The analyzer can be used during rework to speed up the process of correcting errors. This works best for cables that are limited to two pins in each NET. When using the analyzer to guide rework the printer must be disconnected or off-line (that is, not selected), otherwise errors will print out as you rework the cable's interconnections.

STEP 1. PRESS ADVANCE DISPLAY

After a bad cable has been detected simply press ADVANCE DISPLAY once. Whenever an error is fixed the analyzer responds with a single click. Whenever a new error occurs the analyzer responds with a single beep.

NOTE: Pressing ADVANCE DISPLAY a second time causes specific errors to be displayed — not the rework instructions.



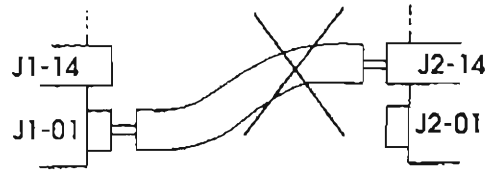
STEP 2. HOW TO REMOVE SHORTS

In the illustration at right pins are displayed that should not connect. Breaking connections is usually easy and the analyzer will prompt the next error as soon as the short currently displayed is removed. Pay close attention to the display. A rework example for a pin that should not be connected, but presently is connected, would be shown as "BREAK J2-14."

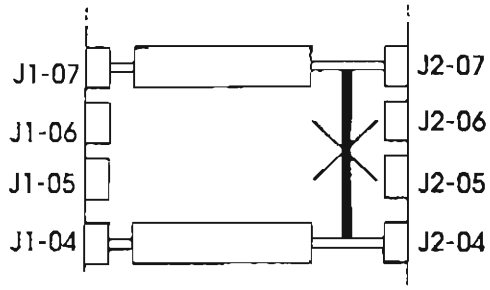
When NETs having multiple connections are shorted together the short between them needs to be removed. An example of this error would be indicated as "CUT J1-04 J2-04 FROM J1-07 J2-07."

Some errors can be at either end of a cable and more than one pin will be identified. Be sure to determine at which end the error is before you remove wires. An example of this error would be "BREAK J1-02 OR J2-02."

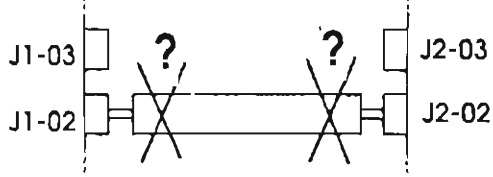
When the word "CONNECT" is displayed all shorts and miswires have been removed and only opens remain. Proceed to the next step.



Break J2-14



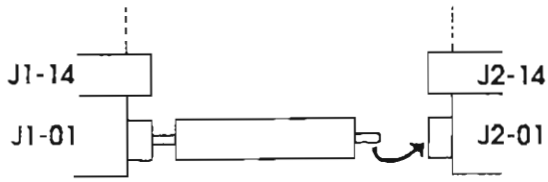
Cut J1-04 J2-04 From J1-07 J2-07



Break J1-02 OR J2-02

STEP 3. HOW TO CORRECT OPENS

When correcting opens rework is directed by specific commands as in the example "CONNECT J1-01 TO J2-01." If a short is detected during this step the analyzer automatically returns to STEP 2. When "GOOD CABLE" is displayed, the rework is complete.

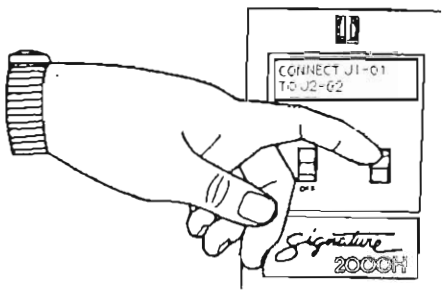


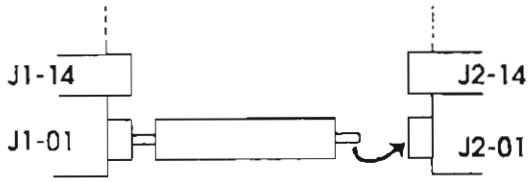
Connect J1-01 TO J2-01

HOW TO USE THE ANALYZER TO DIRECT CABLE ASSEMBLY

This is a special application of: "HOW TO USE THE ANALYZER TO GUIDE REWORK." The analyzer can give step by step instructions to build a cable assembly. Begin with your connectors and make the first connection. Then follow the steps in the "HOW TO USE THE ANALYZER TO GUIDE REWORK", beginning on page 3-4.

To identify a random wire and where it should connect just touch the wire to a previously made correct connection. The display will then prompt to break this connection identifying the pin at the other end of the wire you are holding. Break this connection and the display will prompt to CONNECT. The two pins identified will be the pin at the other end of the wire and the pin the wire should connect to. You may also use the probe to touch a loose end and identify where it goes.

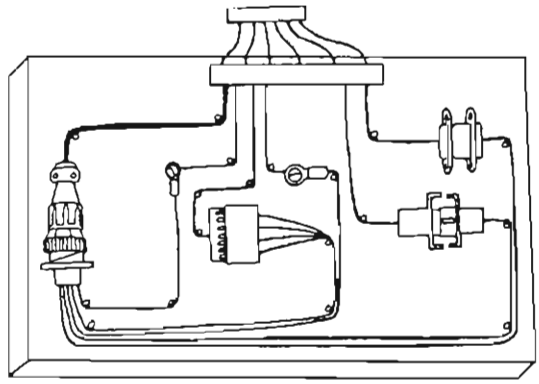




Connect J1-01 TO J2-01

VERIFYING HARNESS ASSEMBLIES WITH THE ANALYZER

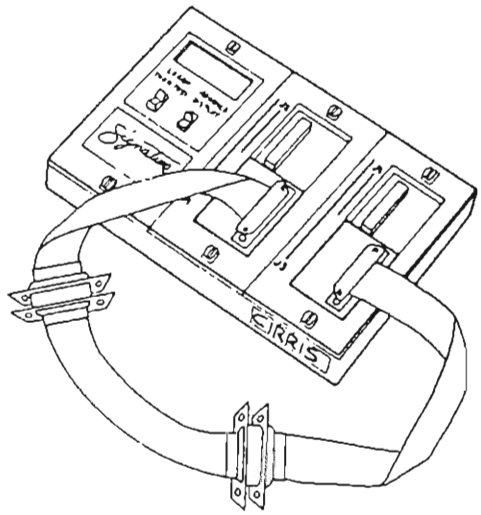
Harnesses with less than 128 termination points can be easily verified with the analyzer. Select connector adapters with a sufficient number of pins and create an interface cable. This cable connects from the analyzer to each termination point on the harness board. Then, label the termination points with equivalent pin numbers. Proceed after this preparation to document and test as though the harness were a cable assembly. It may be especially helpful to apply "HOW TO USE THE ANALYZER TO DIRECT CABLE ASSEMBLY."



Backplane Assembly

VERIFYING EXTREMELY SHORT CABLES

Some cables are so short that they will not reach between two adapters. If so, a small cable to extend the cable length must be used. Don't forget to document and test this extension cable. This same cable extension is useful if the cable under test is awkward to handle. Also, extremely high usage can wear out adapters. At times it may be easier to replace the extension cable than the adapter. If a short cable to be tested is an IDC type it is often convenient to build a daisy chain, a series of desired cables followed by a small gap of connecting ribbon cable to the next desired cable. Test the assembly as a daisy chain and then cut away the ribbon cable that attaches between the desired cables.



Short Cable Between Two Adapters with Fixturing

VERIFYING CABLES WITH TOO MANY CONNECTIONS

These cables are easy to test if they consist of a daisy chain of identical connectors with identical interconnections. Just plug in each identical connector in succession for verification. If the interconnections are not identical, then each feasible combination of connectors must be checked. This will result in documenting and testing several different connector combinations. CIRRIS SYSTEMS provides a range of products to handle large point counts in a single test.

Daisy Chain Assembly

Custom Fixturing with Frame Mount Stand

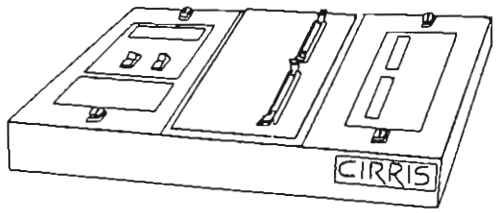
The frame mount stand allows you to create custom fixtures for connectors not available from Cirris Systems. These fixtures then connect to standard Cirris adapters plugged into the analyzer.

NOTE: The illustrations at right demonstrate how the frame mount stand installs on a 1000/1000M series Cirris Analyzer. The 2000H requires that adapters and frame mount stand be installed from front to back rather than right to left. Except for adapter and frame mount orientation the procedure is identical to following description.

To install the frame mount stand do the following:

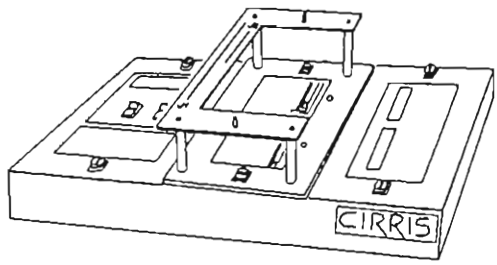
STEP 1. INSTALL ADAPTERS

Install the standard CIRRIS adapters you intend to use with your own custom fixture into the analyzer.



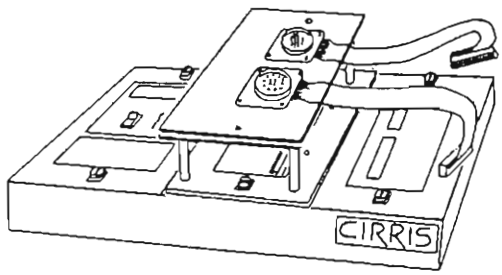
STEP 2. INSTALL FRAME MOUNT STAND

Install the frame mount stand over the standard CIRRIS adapters in place of the cover plate.



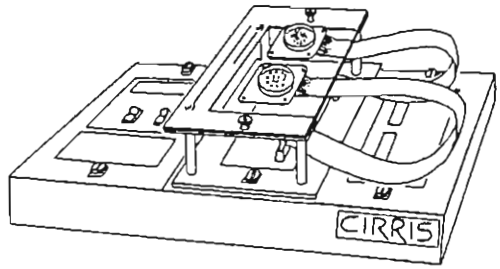
STEP 3. INSTALL CUSTOM FIXTURE

Install your custom fixture (which may be built with either a CIRRIS ACLP clear lexan plate or PCB plate) over the frame mount stand's post guides and secure with thumb screws.



STEP 4. ATTACH ASSEMBLY

With your custom fixture mounted on the frame mount stand and connected to the analyzer via standard CIRRIS adapters, you are ready to attach assemblies for testing.



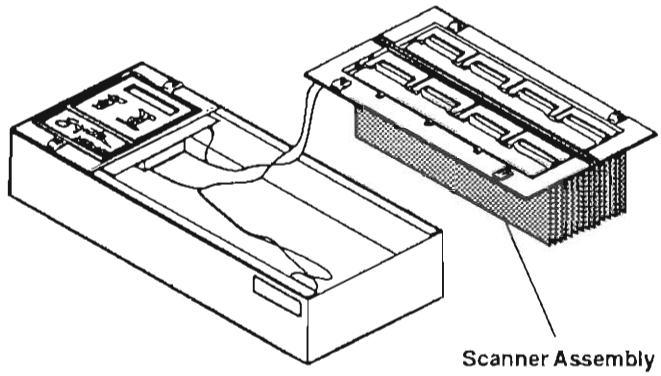
Occasionally it may be necessary to disassemble your analyzer. At Cirris Systems we work constantly to improve our products to help you achieve quality in your testing. When you are sent an update in the program software you can easily install it yourself once you have access to the analyzer's microcomputer assembly. When it becomes necessary to disassemble your analyzer do the following:

WARNING

Never attempt disassembly without first turning off the analyzer and disconnecting the wall mount transformer. If power is applied during disassembly you will significantly increase the shock hazard and damage the electronics

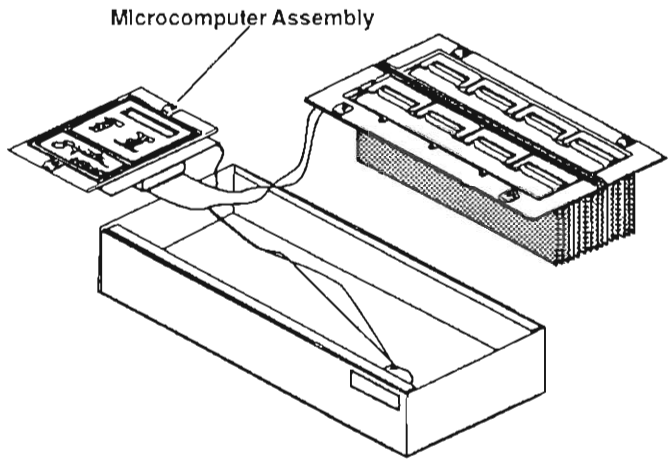
STEP 1. REMOVE SCANNER ASSEMBLY

You do not need special tools to disassemble the analyzer. The scanner may be removed by unlocking and removing both cover plates. Now the scanner should lift out of the analyzer's base. The cable connecting the scanner to the microcomputer assembly may also be disconnected.



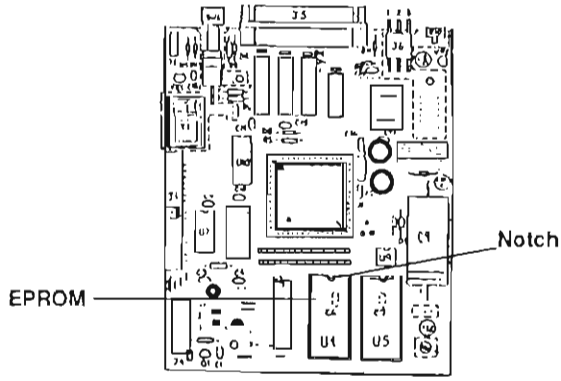
STEP 2. REMOVE MICROCOMPUTER ASSEMBLY

The microcomputer assembly can be removed only after the scanner, power connection, and printer cables have been removed. Release the quarter turn fasteners at top and bottom of the microcomputer assembly and lift it out from the bottom. The speaker connector may now be disconnected.



STEP 3. EPROM CHANGE

It may become necessary to change the program of the analyzer to enhance performance at a future date. The part containing this program (an EPROM) can be identified by the white sticker on its surface. This device, if replaced, must be carefully inserted into its socket in the same orientation and with all of its pins connecting.

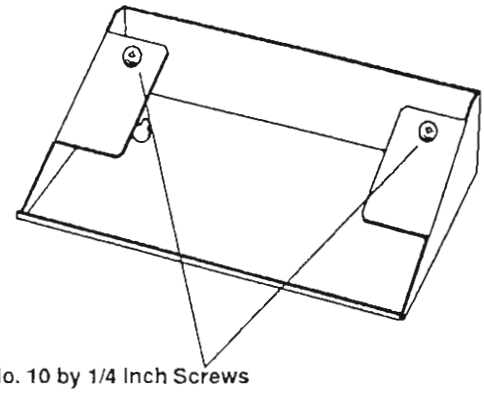


Bottom view of analyzer's microprocessor assembly showing location of EPROM

The optional analyzer tilt stand is easily attached to your analyzer. There is no need to disassemble the analyzer for this procedure.

STEP 1. ADJUST TILT STAND SCREWS

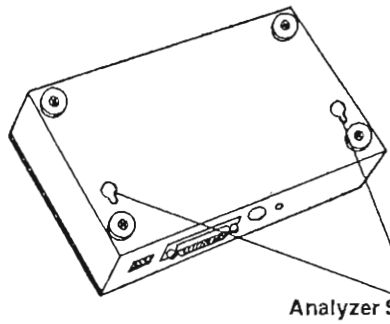
First, check to see if the No. 10 by 1/4 inch screws are adjusted adequately to accommodate the thickness of the analyzer's chassis. The screws are preset for easy assembly, however, this setting may change slightly during shipping.



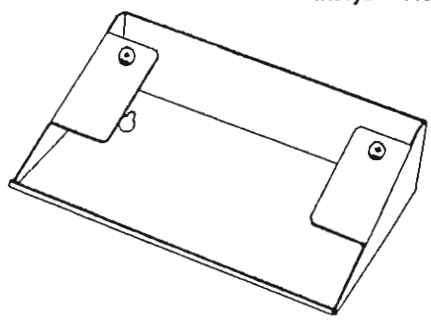
No. 10 by 1/4 Inch Screws

STEP 2. ATTACH TILT STAND

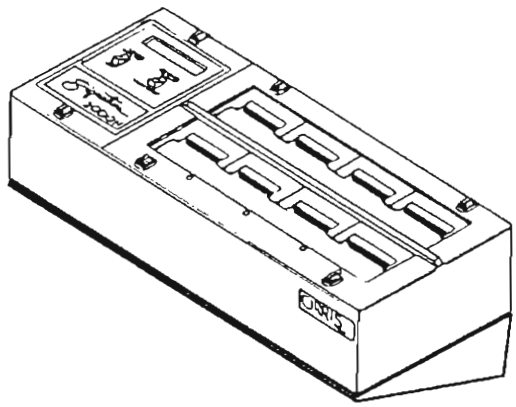
Position the tilt stand's screws into the slots at the back of the analyzer. Then slide the analyzer into place.



Analyzer Slots



Once securely positioned the analyzer sits on the tilt stand at a thirty degree angle.



CABLE SIGNATURE: A six character code that changes with any change in interconnections. Valid characters include the numbers 0 through 9, and the letters A through F.

CONDUCTANCE: The ability of an assembly's interconnections to conduct electric current; i.e. low resistance.

CONTINUITY: An electrical connection between two points.

CONNECTOR ADAPTER POSITION: One of the analyzer's four locations (J1, J2, etc. up to J8) where you mount connector adapters.

CONTROL: The regulation of manufacturing or assembly processes; particularly the use of a cable signature for verifying the test set up to the documentation.

DOCUMENTATION: The written definition of how a cable should be constructed.

HIPOT: Testing to verify that the resistance between pins which do not connect is sufficiently high.

HIPOT DURATION: The length of time high voltage is applied. For hipot testing the 1000H has the capacity for applying voltage for durations from 10 mS to 1 minute.

INTERCONNECTION: Continuity between two connector pins, usually by a wire connecting them.

LAST LEARNED: The last wire list programmed into the analyzer, either from memory or a sample cable.

LEARN CABLE INTERCONNECTIONS: The self-programming process of the analyzer where interconnections are sensed from a sample cable. This data, in a list form, is stored and maintained in the analyzer's memory as long as power is applied.

MEMORY LOCATION: The Signature 1000H has 50 memory locations for storing wire lists.

MICROPROCESSOR ASSEMBLY: The controlling electronics, including the display, located on the left-hand side of the analyzer.

MISWIRE: A type of interconnection error where a pin is connected to the wrong pin.

NET: Any group of pins connected together. The analyzer assigns a number to each group of connected pins (called a NET). This number appears on the left side of the documentation and display.

OPEN: An error where there is no continuity between two connector pins that were defined as being interconnected in the documentation.

PARAMETER SIGNATURE: The four character code which follows the cable signature and represents the test parameters as specified by the option settings.

PIN: An electrical contact point within a connector. In this manual "pin" is used in place of "point," "contact," "socket," "termination," etc.

RESISTANCE: The measure of an assembly's ability to oppose an electric current.

SAMPLE CABLE: The first cable used by the analyzer to load the list of interconnections into its memory. Errors between this cable and the documentation are identified by a signature mismatch.

SCANNER ASSEMBLY: The switching device that makes a continuity test between all connector pins in all possible combinations.

SET UP: The operations involved to prepare the analyzer to test cables as defined in the documentation.

SHORT: A type of interconnection error where there is continuity between two connector pins that has not been shown in the documentation.

STANDARD CONNECTOR ADAPTERS: Connector adapters are organized in a 3" x 5" card file. When organized in this manner you can identify an adapter by the signature label on its cardboard carrier. Notice that adapters are identified by the connector they mate to, not the connector mounted on the adapter.

TEST SET UP: The preparatory work with the cable analyzer before testing can begin.

TESTING: The process where interconnections are verified within a cable.

Specifications

CAPACITY:	256 points max. (four 28 pin or two 64 pin connectors)
CAPACITANCE PER NET MAX:	@ 50V. 1mF, 100V .1mF, 200V .03mF, 300V 15nF, 400V 7nF, 500V 4nF, 630V 3nF This specification limits the length of cables that can be tested.
CONTROLS:	LEARN THEN TEST ADVANCE DISPLAY STORE/HIPOT ACCESS STORED CABLES
DISPLAY:	2 line X 16 character backlit LCD
HV ENERGY LIMIT:	Current limited to 3 ma max for 10 ms duration
MAXIMUM CABLE LENGTH:	100 ft. (limited by capacitance) 152.4 m
MEMORY:	Nonvolatile storage of up to 50 wirelists. Lithium battery backup.
POINTS PER NET:	50 max.
POWER:	105-135 VAC, 60 Hz. 10 Watts
PRINTER OUTPUT:	Compatible with EPSON/ CENTRONICS-type parallel printer. Pin-out matches IBM PC parallel port
PROBE:	For test point identification
SENSITIVITY:	Conductance: .5, 1, 5, 10, 20, 50 100, 200, 500, 1000 ohms & AUTO ± 10% Hipot: 5 meg, 10 m,eg, 20 meg, 50 meg, 100 meg, 200 meg, and 500 meg ohms ± 10% (± 20% on highest ranges) Resistances above 20 meg require higher voltages
SIGNATURE:	6 digit hexadecimal for interconnections 4 digit hexidecimal for test parameters
SIZE:	18"w x 7"d x 5" h (45 cm x 18 cm d x 12 cm h)
TEST LEVELS:	Conductance: 5 VDC Hipot: OFF, 50, 100, 200, 300, 400, 500, 630 VDC ± 10%
TEST POINTS:	256 max.
TEST RATE:	Conductance: 128 points per second. Hipot: 10 ms, 100 ms, 1 sec, 10 sec, 1 min per NET
WEIGHT:	12 lbs 5.5 kg

FEATURES

CONNECTOR ADAPTERS

Adapters are available for common connectors and are easily modified to meet your special connector requirements. The analyzer also verifies correct connectors by using adapter signatures. Connector pin numbers are labeled to match the connector.

DOCUMENTATION FOR WIRING, CONNECTORS, and PARAMETERS

The wiring list, connector identification, and parameter setting programmed into the analyzer's memeory are available for printout. This information becomes the hard copy documentation of each unique assembly. All future assemblies are then tested against this standard. Printouts also provide proof of testing by identifying the number of good cables tested.

SELF-PROGRAMMING

When the analyzer is turned on, the wiring pattern of the cable attached is stored as a wire list in memory. There is never a need for time consuming set up requiring tapes, diskettes or typing.

SIGNATURE ANALYSIS

The analyzer derives a unique cable signature (a mathematical reduction of the wire list and adapter signatures into a six-character code) to verify correct programming. When programming the analyzer, the operator compares the signature against the documented standard to assure correct programming. A similar parameter signature is used to verify that the parameters are set properly.

WARRANTY: 1 year parts and labor. Replacement modules available next working day

SIGNATURE 1000 CABLE DOCUMENTATION

CABLE SIGNATURE: 51C63A CABLE PART NO:
J1 ADAPTER SIGNATURE: 03FAC1 CONNECTOR DESCRIPTION: DB 25P
J3 ADAPTER SIGNATURE: 43D922 CONNECTOR DESCRIPTION: 36 POS, Champ 57 Series Ribbon
CABLE DESCRIPTION: Signature 1000 to Epson/Centronics Printer Cable

NO.	COMMON CONNECTION LIST	
1.	J1-01	J3-01
2	J1-02	J3-02
3	J1-03	J3-03
4	J1-16	J3-31
5	J1-04	J3-04
6	J1-05	J3-05
7	J1-18	J3-19
8	J1-06	J3-06
9	J1-19	J3-20
10	J1-07	J3-07
11	J1-20	J3-21
12	J1-08	J3-08
13	J1-21	J3-22
14	J1-09	J3-09
15	J1-22	J3-23
16	J1-23	J3-24
17	J1-11	J3-11
18	J1-24	J3-25
19	J1-25	J3-26

NOTES: Wire List by Signal

NO. DB-25P	36 Pos. Ribbon		
1	J1-01	J3- 01	-Strobe
2	J1-02	J3-02	+Data Bit 0
3	J1-03	J3-03	+Data Bit 1
5	J1-04	J3-04	+Data Bit 2
6	J1-05	J3-05	+Data Bit 3
8	J1-06	J3-06	+Data Bit 4
10	J1-07	J3-07	+Data Bit 5
12	J1-08	J3-08	+Data Bit 6
14	J1-09	J3-09	+Data Bit 7
17	J1-11	J3-11	+Busy 4 J1
4	J1-16	J3-31	Initialize Printer/Input Prime
7	J1-18	J3-19	Return (GND)
9	J1-19	J3-20	Return (GND)
11	J1-20	J3-21	Return (GND)
13	J1-21	J3-22	Return (GND)
15	J1-22	J3-22	Return (GND)
16	J1-23	J3-22	Return (GND)
18	J1-24	J3-25	Return (GND)
19	J1-25	J3-26	Return (GND)

The following is a list of standard adapters available from CIRRIS SYSTEMS as of July, 1989. Adapters are arranged according to their part number.

PART NO.	DESCRIPTION	SIGNATURE
ABRF-14	MATES TO: 14 POS. RIBBON FEM.	9C1FC0
ABRF-24	MATES TO: 24 POS. RIBBON FEM	B4D1E0
ABRF-36	MATES TO: 36 POS. RIBBON FEM.	F8E7F0
ABRF-50	MATES TO: 50 POS. RIBBON FEM.	528D01
ABRM-14	MATES TO: 14 PIN RIBBON MALE	2D95B1
ABRM-24	MATES TO: 24 PIN RIBBON MALE	CA18C1
ABRM-36	MATES TO: 36 PIN RIBBON MALE	43D922
ABRM-50	MATES TO: 50 PIN RIBBON MALE	C31A52
AC56-SD	MATES TO:2-56 POS. 156" CD. EDGE FEM.	5EDC11
ACEF-10	MATES TO: 10 POS. .1" CD. EDGE FEM.	E154B1
ACEF-20	MATES TO: 20 POS. .1" CD. EDGE FEM.	C824C1
ACEF-26	MATES TO: 26 POS. .1" CD. EDGE FEM.	CDAFC1
ACEF-30	MATES TO: 30 POS. .1" CD. EDGE FEM.	6A5252
ACEF-34	MATES TO: 34 POS. .1" CD. EDGE FEM.	AB3552
ACEF-36	MATES TO: 36 POS. .1" CD. EDGE FEM.	272752
ACEF-40	MATES TO: 40 POS. .1" CD. EDGE FEM.	A9EC52
ACEF-44	MATES TO: 44 POS. .1" CD. EDGE FEM.	CC1462
ACEF-50	MATES TO: 50 POS. .1" CD. EDGE FEM.	80CC62
ACEF-60	MATES TO: 60 POS. .1" CD. EDGE FEM.	94DDE0
ACEF-64	MATES TO: 64 POS. .1" CD. EDGE FEM.	D507F1
AD3P-24	MATES TO: 24 PIN .3" MALE DIP	F946A2
ADBP-09	MATES TO: 9 PIN D-SUB MALE	ACEFA1
ADBP-15	MATES TO: 15 PIN D-SUB MALE	81E9B1
ADBP-25	MATES TO: 25 PIN D-SUB MALE	03FAC1
ADBP-37	MATES TO: 37 PIN D-SUB MALE	476232
ADBP-50	MATES TO: 50 PIN D-SUB MALE	56A2D1
ADBS-09	MATES TO: 9 SOCKET D-SUB FEM.	1A59C0
ADBS-15	MATES TO: 15 SOCKET D-SUB FEM.	7E63D0
ADBS-25	MATES TO: 25 SOCKET D-SUB FEM.	F5B4E0
ADBS-37	MATES TO: 37 SOCKET D-SUB FEM.	FFBBF0

PART NO.	DESCRIPTION	SIGNATURE
ADBS-50	MATES TO: 50 SOCKET D-SUB FEM.	3EB8D1
ADIP-14	MATES TO: 14 PIN MALE DIP	66FC81
ADIP-16	MATES TO: 16 PIN MALE DIP	0F8391
ADIP-18	MATES TO: 18 PIN MALE DIP	42E833
ADIP-20	MATES TO: 20 PIN MALE DIP	2E8AA1
ADIP-24	MATES TO: 24 PIN MALE DIP	4EAEB1
ADIP-40	MATES TO: 40 PIN MALE DIP	ED0412
ADPG-09	MATES TO: 09 PIN D-SUB MALE	ACEFA1
ADPG-15	MATES TO: 15 PIN D-SUB MALE	81E9B1
ADPG-25	MATES TO: 25 PIN D-SUB MALE	03FAC1
ADPG-37	MATES TO: 37 PIN D-SUB MALE	476232
ADPG-50	MATES TO: 50 PIN D-SUB MALE	56A2D1
ADSG-09	MATES TO: 09 POS. D-SUB FEM.	1A59C0
ADSG-15	MATES TO: 15 POS. D-SUB FEM.	7E63D0
ADSG-25	MATES TO: 25 POS. D-SUB FEM.	F5B4E0
ADSG-37	MATES TO: 37 POS. D-SUB FEM.	FF8BF0
ADSG-50	MATES TO: 50 POS. D-SUB FEM.	3EBBD1
AHDS-SD	MATES TO: 15-30 .1" POS. FEM.	BB1321
AHDS-SS	MATES TO: 1-14 .1" POS. FEM.	D709E0
AHED-10	MATES TO: 10 POS .1" FEM.	36BCC0
AH50-10	MATES TO: 10 PIN DUAL ROW .050"	23BDA1
AH50-20	MATES TO: 20 PIN DUAL ROW .050"	0A8DB1
AH50-30	MATES TO: 30 PIN DUAL ROW .050"	B6CC43
AH50-40	MATES TO: 50 PIN DUAL ROW .050"	D336763
AH50-60	MATES TO: 60 PIN DUAL ROW .050"	6C3652
AH50-80	MATES TO: 80 PIN DUAL ROW .050"	15A904
AHED-14	MATES TO: 14 POS .1" FEM.	B872D0
AHED-16	MATES TO: 16 POS .1" FEM.	59E3D0
AHED-20	MATES TO: 20 POS .1" FEM.	1D8CD0
AHED-24	MATES TO: 24 POS .1" FEM.	5543E0
AHED-26	MATES TO: 26 POS .1" FEM.	1218E0
AHED-30	MATES TO: 30 POS .1" FEM..	DC84F0
AHED-34	MATES TO: 34 POS .1" FEM. CONN.	1E67F0

PART NO.	DESCRIPTION	SIGNATURE
AHED-40	MATES TO: 40 POS .1" FEM. CONN.	1C1FF0
AHED-44	MATES TO: 44 POS. .1" FEM. CONN.	3F4601
AHED-50	MATES TO: 50 POS .1" FEM. CONN.	F2FE01
AHED-60	MATES TO: 60 POS .1" FEM. CONN.	711421
AHED-64	MATES TO: 64 POS .1" FEM. CONN.	D507F1
AHED-SD	MATES TO: 30-60 POS. .1" FEM.	711421
AHED-SS	MATES TO: 2-28 POS. .1" FEM.	787AE0
AHR2-64	MATES TO: 64 POS-32 EACH HEADER	D507F1
AMDP-62	MATES TO: 62 PIN MD-SUB MALE	D507F1
AMJ4-04	MATES TO: 4 PIN MODULAR PLUG	2E75A1
AMJ6-06	MATES TO: 6 PIN MODULAR PLUG	6684A1
AMJ8-08	MATES TO: 8 PIN MODULAR PLUG	787AE0
AMJK-SP	MATES TO: 4,6,&8 PIN MOD. PLUGS	EF1D1
APCD-26	MATES TO: 26 PIN DUAL ROW PCB	187832
APCD-60	MATES TO: 60 PIN DUAL ROW PCB	187832
APCF-28	MATES TO: 28 PIN FULL FOUR ROW PCB	187832
APCF-60	MATES TO: 60 PIN FULL FOUR ROW PCB	187832
APCS-26	MATES TO: 26 PIN SPECIAL CENTER PCB	163072
APCS-60	MATES TO: 60 PIN SPECIAL CENTER PCB	163072
APCU-28	MATES TO: 28 PIN UNIVERSAL PCB	187832
APCU-60	MATES TO: 60 PIN UNIVERSAL PCB	187832
ARFG-36	MATES TO: 36 POS. RIBBON FEM	F837F0
ARFG-50	MATES TO: 50 POS. RIBBON FEM	528D01
ASIL-SD	MATES TO: 13-24 .156" POS. FEM.	CEBA32
ASIL-SS	MATES TO: 1-12 .156" POS.V.35 FEM.	3BAF92
AVDS-34	MATES TO: 34 POS. FEM.	274D03
AVDS-34	MATES TO: 34 PIN MALE	274D03
AVM1-64	MATES TO: VME 64 PIN .1"	910693
AVM2-32	MATES TO: 32 PIN .2" VME	910693
AVM2-64	MATES TO: VME 64 PIN .2"	B98064
AVDP-34	MATES TO: 34 PIN V.35 MALE	FEA574
AVDS-34	MATES TO: 34 POS. V.35 FEM.	274D03

The following is a list of standard adapters available from CIRRIS SYSTEMS as of July, 1989. Adapters are arranged according to their signatures.

SIGNATURE	PART NO.	DESCRIPTION
0A8DB1	AH50-20	MATES TO: 20 PIN DUAL ROW .050
03FAC1	ADBP-25	MATES TO: 25 PIN D-SUB MALE
03FAC1	ADPG-25	MATES TO: 25 PIN D-SUB MALE
0D48D1	AMJ8-08	MATES TO: 8 PIN MODULAR PLUG
0F8391	ADIP-16	MATES TO: 16 PIN MALE DIP
1218E0	AHED-26	MATES TO: 26 PIN .1" FEM. CONN.
15A904	AH50-80	MATES TO 80 PIIN ..050 DUAL ROW
163072	APCS-26	MATES TO: 26 PIN SPECIAL CENTER PCB
163072	APCS-60	MATES TO: 60 PIN SPECIAL CENTER PCB
187832	APCD-26	MATES TO: 26 PIN DUAL ROW PCB
187832	APCD-60	MATES TO: 60 PIN DUAL ROW PCB
187832	APCF-28	MATES TO: 28 PIN FULL FOUR ROW PCB
187832	APCF-60	MATES TO: 60 PIN FULL FOUR ROW PCB
187832	APCU-28	MATES TO: 28 PIN UNIVERSAL PCB
187832	APCU-60	MATES TO: 60 PIN UNIVERSAL PCB
1A59C0	ADBS-09	MATES TO: 9 SOCKET D-SUB FEM.
1A59C0	ADSG-09	MATES TO: 09 PIN D-SUB FEM
1C1FF0	AHED-40	MATES TO: 40 PIN .1" FEM. CONN.
1D8CD0	AHED-20	MATES TO: 20 PIN .1" FEM. CONN.
1E67F0	AHED-34	MATES TO: 34 PIN .1" FEM. CONN.
23DBA1	AH50-10	MATES TO: 10 PIN DUAL ROW .050"
240FE1	ABAK-40	MATES TO: 40 POS. BCKPLN FEM.
2647E1	ABAK-34	MATES TO: 34 POS. BCKPLN FEM.
272752	ACEF-36	MATES TO: 36 POS..1" CD. EDGE FEM.
274D03	AVDS-34	MATES T: 34 POS. V.35 FEM
2D95B1	ABRM-14	MATES TO: 14 POS. RIBBON MALE
2E75A1	AMJ4-04	MATES TO: 4 PIN MODULAR PLUG
2EBAA1	ADIP-20	MATES TO: 20 PIN MALE DIP
36BCC0	AHED-10	MATES TO: 10 PIN .1" FEM. CONN.
3BAF92	ASIL-SS	MATES TO: 1-12 .156" POS. FEM.

SIGNATURE	PART NO.	DESCRIPTION
3C9991	AVM2-32	MATES TO: 32 PIN .2" VME
3F4601	AHED-44	MATES TO: 44 POS. .1" FEM. CONN.
3EBBD1	ADBS-50	MATES TO: 50 SOCKET D-SUB FEM.
3EBBD1	ADSG-50	MATES TO: 50 PIN D-SUB FEM.
42E833	ADIP-18	MATES TO: 18 PIN MALE DIP
43D922	ABRM-36	MATES TO: 36 POS. RIBBON MALE
476232	ADBP-37	MATES TO: 37 PIN D-SUB MALE
476232	ADPG-37	MATES TO: 37 PIN D-SUB MALE
4EAEB1	ADIP-24	MATES TO: 24 PIN MALE DIP
528D01	ABRF-50	MATES TO: 50 POS. RIBBON FEM.
5543E0	AHED-24	MATES TO: 24 PIN .1" FEM. CONN
56A2D1	ADBP-50	MATES TO: 50 PIN D-SUB MALE
56A2D1	ADPG-50	MATES TO: 50 PIN D-SUB MALE
59E3D0	AHED-16	MATES TO: 16 PIN .1" FEM. CONN.
5EDC11	AC56-SD	MATES TO: 64 POS. 156" CD EDGE FEM.
6684A1	AMJ6-06	MATES TO: 6 PIN MODULAR PLUG
66FC81	ADIP-14	MATES TO: 14 PIN MALE DIP
6A5252	ACEF-30	MATES TO: 30 POS..1" CD. EDGE EM.F
6C3652	AH50-60	MATES TO: 60 PIN DUAL ROW .050"
711421	AHED-60	MATES TO: 60 PIN .1" FEM. CONN.
787AE0	AHED-SS	MATES TO: 2-28 POS. .1" FEM.
787AE0	AMJ8-08	MATES TO: 8 PIN MODULAR PLUG
7E63D0	ADBS-15	MATES TO: 15 SOCKET D-SUB FEM.
7E63D0	ADSG-15 1	MATES TO: 5 PIN D-SUB FEM.
80CC62	ACEF-50	MATES TO: 50 POS..1" CD. EDGE FEM.
81E9B1	ADBP-15	MATES TO: 15 PIN D-SUB MALE
81E9B1	ADPG-15	MATES TO: 15 PIN D-SUB MALE
910693	AVM1-64	MATES TO: VME 64 PIN .1"
910693	AVM2-64	MATES TO: VME 64 PIN .2"
94DDE0	ACEF-60	MATES TO: 60 POS..1" CD. EDGE FEM.
9C1FC0	ABRF-14	MATES TO: 14 POS. RIBBON FEM.
A16AC1	ABAK-20	MATES TO: 20 POS. BCKPLN FEM.
A6E5D1	ABAK-26	MATES TO: 26 POS. BCKPLN FEM.

SIGNATURE	PART NO.	DESCRIPTION
A9EC52	ACEF-40	MATES TO: 40 POS..1" CD. EDGE FEM.
AB3552	ACEF-34	MATES TO: 34 POS..1" CD. EDGE FEM
ACEFA1	ADBP-09	MATES TO: 9 PIN D-SUB MALE
ACEFA1	ADPG-09	MATES TO: 09 PIN D-SUB MALE
B4D1E0	ABRF-24	MATES TO: 24 POS. RIBBON FEM.
B6CC43	AH50-30	MATES TO 30 POS. .050" DUAL ROW
B872D0	AHED-14	MATES TO: 4 PIN .1" FEM. CONN.
BB1321	AHDS-SD	MATES TO: 15-30 .1" POS. FEM.
C31A52	ABRM-50	MATES TO: 50 POS. RIBBON MALE
C824C1	ACEF-20	MATES TO: 20 POS. .1" CD. EDGE FEM.
CA18C1	ABRM-24	MATES TO: 24 POS. RIBBON MALE
CC1462	ACEF-44	MATES TO: 44 POS. .1" CD EDGE FEM.
CDAFC1	ACEF-26	MATES TO: 26 POS..1" CD. EDGE FEM.
CEBA32	ASIL-SD	MATES TO: 13-24 .156" POS. FEM.
D36763	AH50-50	MATES TO: 50 PIN DUAL ROW .050
D507F1	ACEF-64	MATES TO: 64 POS. .1: CD. EDGE FEM.
D507F1	AHED-64	MATES TO: 64 PIN .1" FEM. CONN.
D507F1	AHR2-64	MATES TO: 64 POS-32 EACH HEADER
D507F1	AMDP-62	MATES TO 62 PIN ME-SUB MALE
D709E0	AHDS-SS	MATES TO: 1-14 .1" POS. FEM.
DC84F0	AHED-30	MATES TO: 30 PIN .1" FEM. CONN.
E154B1	ACEF-10	MATES TO: 10 POS..1" CD. EDGE FEM.
ED0412	ADIP-40	MATES TO: 40 PIN MALE DIP
EF11D1	AMJK-SP	MATES TO: 4,6,&8 PIN MOD. PLUGS
F2FE01	AHED-50	MATES TO: 50 PIN .1" FEM. CONN.
F5B4E0	ADBS-25	MATES TO: 25 SOCKET D-SUB FEM.
F5B4E0	ADSG-25	MATES TO: 25 PIN D-SUB FEM.
F8E7F0	ABRF-36	MATES TO: 36 POS. RIBBON FEM.
F946A2	AD3P-24	MATES TO: 24 PIN .3" MALE DIP
FB6753	AH50-40	MATES TO: 10 PIN DUAL ROW .050
FFBBF0	ADBS-37	MATES TO: 37 SOCKET D-SUB FEM.
FFBBF0	ADSG-37	MATES TO: 37 PIN D-SUB FEM.

The following diagnostic guide will help you trouble-shoot problems that might occur with the Signature 2000H. In many instances you may be able to diagnose and correct a problem yourself. This guide is designed to help you locate certain problems and resolve them. If you determine that a problem is due to a scanner assembly or microprocessor assembly failure, or are unable to resolve the problem, please contact our customer support team at CIRRIS SYSTEMS by calling 1 (800) 441-9910 or 1 (801) 973-4600. When you call please have the following information available:

1. **What model of analyzer do you have?**
2. **Purchase date, if known?**
3. **What is the serial number?**
4. **What diagnostic procedures have you followed?**

In addition, please have your analyzer near your telephone so you can duplicate trouble-shooting steps with our customer support team.

NOTE: Before using this guide you should know how to remove the microprocessor assembly and scanner assembly. Refer to the "DISASSEMBLY GUIDE," page 3-8, for more information.

NO DISPLAY AND NO SOUND: The display is totally blank

POSSIBLE CAUSES

A. defective 10 VAC Wall mount transformer

B. the intensity control is not adjusted properly

C. defective microprocessor assembly

DIAGNOSTIC PROCEDURES

1. Check to see if the transformer is plugged into an outlet then feel if it is warm. If it remains cold it is likely the transformer is defective or the outlet does not have power. If you are certain the outlet is OK then call CIRRIS to replace the transformer.

2. If the transformer is warm check the temperature of the microprocessor assembly. It takes approximately five minutes for the microprocessor assembly to become warm. If it is still cold after five minutes it is still likely the transformer is defective. Call CIRRIS to replace the transformer.

3. If the microprocessor assembly is 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 then it is likely the microprocessor assembly is defective. 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 back ground, then it is likely the microprocessor is defective. Call CIRRIS to replace the microprocessor assembly.

DISPLAY PROMPTS A DARKENED ROW OR GIBBERISH

POSSIBLE CAUSES

A. DISPLAY INTENSITY not properly adjusted

B. defective scanner assembly

C. defective microprocessor assembly

DIAGNOSTIC PROCEDURES

1. If both rows of the display are dark it is possible the DISPLAY INTENSITY control is not properly adjusted. Locate the control at the back of the analyzer and readjust the intensity by turning it counter-clockwise. If this does not solve the problem continue with procedure #2.

2. Disconnect the scanner assembly from the microprocessor assembly. If the display now reads "SCANNER FAILURE" it is likely the scanner assembly is bad. Call CIRRIS to replace the scanner assembly.

3. If the problem still appears after disconnecting the microprocessor it is likely the microprocessor assembly is bad. Call CIRRIS to replace the microprocessor assembly.

WHEN CABLE IS REMOVED THE DISPLAY STILL PROMPTS "PLEASE VERIFY"

POSSIBLE CAUSE

A. defective adapter or adapting cables

B. defective scanner assembly

DIAGNOSTIC PROCEDURE

1. Remove adapters while the analyzer is still ON. If the display still prompts "PLEASE VERIFY" it is likely the scanner assembly is defective. Call CIRRIS to replace the scanner assembly.

2. If the display prompts "READY TO TEST" after completing the above step, you have unwanted connections in the adapter or adapting cables.

CONNECTIONS ARE NOT RECOGNIZED BY THE ANALYZER

POSSIBLE CAUSE

A. defective adapters or adapting cables

B. defective scanner assembly

DIAGNOSTIC PROCEDURE

1. Using the probe as diagnostic tool, penetrate the connecting wire for the connection that is not being recognized (this is the same approach as identifying which end of a cable has an open). The pin identified by the probe is the one that makes a connection to the wire. The pin not identified 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 on the contacts such as flux.

   If you are using an adapting cable then move back to the test point on the adapter attached to the analyzer and see if you can recognize the test point there. If you can then the failure is in the adapting cable. Rework the cable.

a. If you are using an AUNV-62, AUNV-64, or AHR2-64 adapter be aware that some pins are used to identify these adapters' 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 will need to rework them.

   To isolate a problem with an AUNV adapter do the following. Disconnect any connections to pins 63 and 64 on an AUNV-62 connector adapter, or remove all connections to pins 31, 32, 33, & 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 diagnosed the type of miswire described above. Rework your adapting cable.

b. It is possible the adapter is defective. Check for worn connections on adapter. Also check for continuity of the adapter pin on the bottom of the adapter to the test connector on top. For worn or open connections replace the adapter.

2. If you have a defective pin after these tests call CIRRIS for a scanner assembly replacement.

THE ANALYZER STOPS OPERATING WHILE BEING USED

POSSIBLE CAUSE	DIAGNOSTIC PROCEDURE
A. static electricity	1. If static electricity is causing problems make sure the safety ground on the wall plug is connected. Take measures to control static electricity in your work area.
B. defective microprocessor assembly	2. If you determine the microprocessor assembly is defective change the microprocessor assembly or call CIRRIS SYSTEMS.
C. overheating	3. Let the analyzer cool for a few minutes. If it comes back on you may want to direct a cooling fan on the analyzer.

SPEAKER PROBLEM: No sound, but the display works

POSSIBLE CAUSE	DIAGNOSTIC PROCEDURE
A. ERROR TONES are set to OFF	1. If you hear clicks for good cables, but no sounds emit for bad cables, ERROR TONES are OFF. To change this setting see Part 1, "How to Set System Options," page 2-5.
B. speaker not plugged in.	2. Connect the speaker wire to the microprocessor assembly. See "Disassembly Guide," page 3-8.
C. defective microprocessor assembly	3. If the speaker wire is connected, call CIRRIS to replace the microprocessor assembly.

SPEAKER PROBLEM: Sounds are distracting to others

SOLUTION

1. Set ERROR TONES option to OFF
3. Place tape over speaker opening to dampen sound.
2. Disconnect speaker.

ANALYZER WILL NOT LEARN ASSEMBLY

A. LOCK ON LEARN is set to ON

1. You cannot learn an assembly's wire list when LOCK ON LEARN is set to ON. To change this setting see Part 3, "How to Use System Options," page 2-12.

PRINTER PROBLEMS

General cause for printer failure can usually be narrowed down to (1) user error, (2) a defective printer, (3) a defective cable, or (4) a defective microprocessor assembly. Once you have eliminated user error by checking that the printer is plugged into a power source, turned on, and correctly connected to your analyzer use the following guidelines to help isolate problems.

NOTHING PRINTS

POSSIBLE CAUSE

A. printer not on line (i.e. selected)

B. cable not properly connected between analyzer and printer

C. printer has a serial instead of a parallel interface

D. a defective cable

E. a defective printer

F. a defective microprocessor assembly

DIAGNOSTIC PROCEDURE

1. Check to make certain you have the printer turned on and on-line. Also make certain it is not out of paper.

2. Check the cable connections. The cable should be securely attached to the back of the analyzer where it is marked "PRINTER OUTPUT PARALLEL INTERFACE." Check the corresponding connection to your printer.

3. The printer must have a parallel cable interface. *Do not use a printer with an RS 232 serial interface.* Attempting to do so will damage the analyzer.

4. It is possible the cable you are using for the analyzer/printer interface is defective. If the cable does not work with another printer it is likely the cable is defective. Replace it with a good cable or fix the cable. To fix the cable check it first with the analyzer then rework it according to the wiring described in the documentation on page 4-3, "CABLE DOCUMENTATION: Epson/ Centronics Printer Cable." Then check the reworked cable once again to verify the signature displayed on the analyzer matches the signature in the documentation. If you don't have the appropriate connectors you can ring them out by hand.

5. To check if your printer is defective try using another printer or test your original printer and cable with an IBM PC. If the printer does not work with a PC it is likely the printer is defective.

6. If the cable and printer work with a PC it is likely the microprocessor assembly is defective. Call CIRRIS to replace the microprocessor assembly.

CHARACTERS MISSING IN PRINTOUT

POSSIBLE CAUSE

A. defective cable

B. printer cable too long

C. printer incompatibility

D. defective microprocessor assembly

DIAGNOSTIC PROCEDURES

1. Verify the printer cable. Check for shorts in pin 11.

2. If your printer cable is over 20 feet long problems may occur. The printer signal decays as cable length increases. Use a shorter cable.

3. If cable length is sufficient then try it with a PC. If characters are still missing it is likely the printer is not compatible.

4. If the cable and printer work with a PC then it is likely the microprocessor assembly is defective. Call CIRRIS for a replacment.

WRONG CHARACTERS IN PRINTOUT

POSSIBLE CAUSE

A. defective printer cable

B. defective printer

C. printer cable too long

D. defective microprocessor assembly

DIAGNOSTIC PROCEDURES

1. It is possible the printer cable is defective. Check for shorts, opens or miswires on pins 2 through 9. Either fix the cable or replace with a known good cable.

2. To determine if the printer is defective try using another printer or test your original printer and cable with an IBM PC. If the printer does not work with a PC the printer is defective. Replace the printer. If the cable and printer work with a PC it is likely the microprocessor assembly is defective.

3. It is possible the printer cable is too long. Check cable length. Your printer cable should not exceed 20 feet. The printer signal decays as cable length increases. Use a shorter cable.

4. If you have another analyzer available it is also possible to exchange microprocessor assemblies. If the problem is corrected with a different microprocessor assembly it is likely the original one is defective. Call CIRRIS SYSTEMS.

SIGNATURE 2000H STATEMENT OF WARRANTY

CIRRIS SYSTEMS CORP. warrants the Signature 2000H 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 CORP. 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 CORP. 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 Signature 2000H Analyzer.

ANY IMPLIED WARRANTIES ARISING OUT OF SALES OF THE SIGNATURE 2000H 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, CORP.
Salt Lake City, Utah

PLEASE RECORD PURCHASE DATE AND SERIAL NUMBER BELOW.

DATE: _____

SERIAL NUMBER: _____

In many cases minor problems can be resolved by following the diagnostic procedures outlined in the "TROUBLE SHOOTING GUIDE," pages 4-4 through 4-10. When a problem occurs that you cannot resolve call CIRRIS SYSTEMS' toll free **PRIORITY ONE CUSTOMER SUPPORT** number **1 (800) 441-9910 or 1 (801) 973-4600.**

RMA or SERVICE REPAIR NUMBER

When you call CUSTOMER SUPPORT a service representative will assist you in locating the problem and then direct you to fill out a SERVICE REQUEST FORM. If an assembly needs to be replaced the representative should also give you a return merchandise authorization number (RMA) or a service repair number. Be sure to record this number in the space provided on your service request form. This number is used as a reference for the repair.

ASSEMBLY LOAN and OVERNIGHT SHIPMENT

CIRRIS SYSTEMS offers an assembly loan and overnight shipment service which furnishes you with a replacement assembly (a "swap out") while your defective assembly is being repaired. This service is provided free during the warranty period; however, a $25 freight charge is applied to all non warranty repairs in addition to normal repair charges. A temporary shipping invoice is also sent with each replacement assembly. This invoice is processed as an actual invoice only if the swapped out assembly is not returned within thirty (30) days.

COST OF REPAIRS

As long as there is no abuse problem* repair costs are covered under warranty. Repair costs will vary. Many times a repair charge may be only $25. The maximum repair charge per assembly is $150 (an analyzer has a least two assemblies, depending upon the model). The $150 per assembly charge is applied only when an analyzer has been significantly damaged by abuse. For more information on what constitutes abuse refer to the section below.

THE SERVICE REQUEST FORM

To make certain we get your problem solved and solved right it is essential we get accurate information about the problem you experience. Therefore, please fill out the SERVICE REQUEST FORM that follows this page. If you cannot locate the SERVICE REQUEST FORM please tell the service representative when you call. He or she will ask you for the necessary information and complete the service request. An additional request form will be sent with the replacement assembly.

*CONDITIONS OF ABUSE

EXTERNAL POWER SOURCES: Never attach the analyzer to a cable that is also connected to a powered piece of equipment or another power source. For example, if a cable connected to the analyzer for testing is also connected to a 120 AC outlet the microprocessor and scanner assemblies will be destroyed.

UNAUTHORIZED MODIFICATIONS: Any modifications made to the analyzer that are attributable to analyzer failure constitutes a breach of warranty.

ACCIDENTS: Analyzer failure caused by spilled liquids, or obvious physical damage are not covered by warranty.

If service becomes necessary please fill in this form and return it with the failed assembly or analyzer.

SEND TO: CIRRIS SYSTEMS CORP.
1991 Parkway Blvd.
Salt Lake City, Utah 84119

PRIORITY ONE/CUSTOMER SUPPORT
1 (800) 441-9910 or
1 (801) 973-4600

RMA or SERVICE REPAIR NUMBER (call for number)_____

DATE: _____/_____/_____ SERIAL NUMBER: _____

CUSTOMER NAME: _____

ADDRESS: _____

CITY/STATE/ZIP: _____

TELEPHONE NUMBER: _____

Contact person in case a phone call is necessary: _____

SYMPTOMS:

_____

_____

_____

_____

_____

_____ SOLID FAILURE _____ INTERMITTENT FAILURE

_____ WARRANTY REPAIR (under 1 year) PURCHASE DATE _____/_____/_____

_____ REPAIR AND RETURN PLEASE CONTACT IF REPAIR CHARGES EXCEED: _____

P.O. NUMBER IF REQUIRED_____

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