Signature 1000HK Cable Analyzer Performance Verification Manual

Version 1.10
12 October, 2000

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General Information

Firmware

Your analyzer may be equipped with any of several different versions of firmware. The firmware version your analyzer has is displayed as the analyzer powers up.

The version number should be: K.10C

- If your analyzer is equipped with firmware version K.10C or later, you can complete a basic calibration, and calibrate for capacitance testing. **Note**: Your analyzer must be equipped with the correct hardware to do capacitance testing. The C in the version number indicates that your analyzer is equipped for capacitance testing. Note: The 1000HK Analyzer cannot do 4-wire testing.

If you need to upgrade the firmware in your 1000HK, telephone Cirris Systems at 801-973-4600 or 800-441-9910 for assistance.

Things to remember

- You should check the calibration of your 1000HK at least once per year. Also check the calibration whenever you suspect the analyzer may not be operating properly. You cannot adjust the calibration yourself. If the analyzer does not pass the calibration tests, telephone Cirris Systems at 801-973-4600 or 800-441-9910 for assistance.
- Keep the adapter receptacles, and the area surrounding the analyzer free from dust, metal particles, and other debris. Keep all liquids away from your 1000HK. Liquid spills can pose a hazard, can severely damage the analyzer, and will immediately void its warranty.
- If you are wearing a cardiac pacemaker, an insulin pump, or any other electronically controlled medical device, you should not do high-voltage testing with the Cirris 1000HK cable analyzer!

Your packing list

In addition to your analyzer (with its wall transformer power supply) and this manual, you will need a Zero Ohm Adapter, a Resistor Leak Adapter, and a Capacitance Adapter to complete calibration of your 1000HK.

Set Up the Analyzer to Perform the Calibration

Set up the hardware

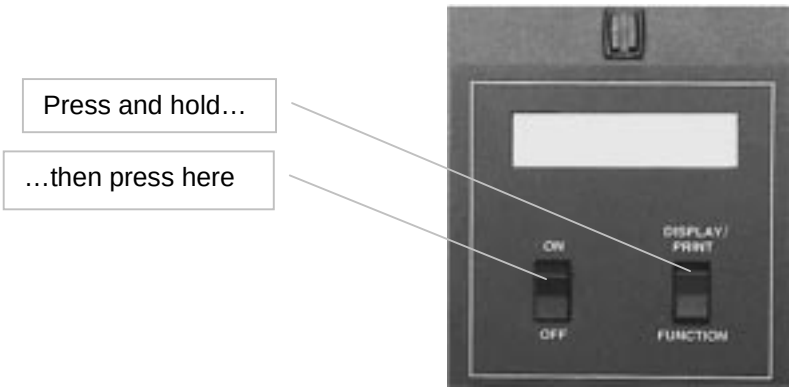
To prepare the analyzer's hardware for calibration, do these things:

- Install any expansion boxes you want to use. For information on how to do this, see your *1000HK User's Guide*. **Note**: In our examples, we will use a 1000HK with no expansion boxes.
- Make sure the analyzer is turned off, then connect the power cord to the analyzer, and plug the analyzer into a live, well-grounded wall outlet.

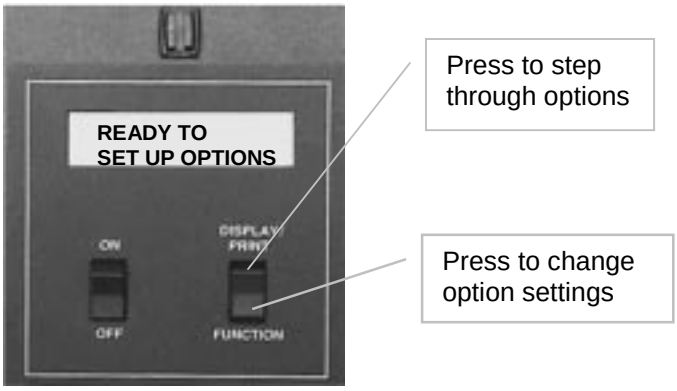
Set the options for testing signal routing

To set the options for testing signal routing, do these things:

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



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



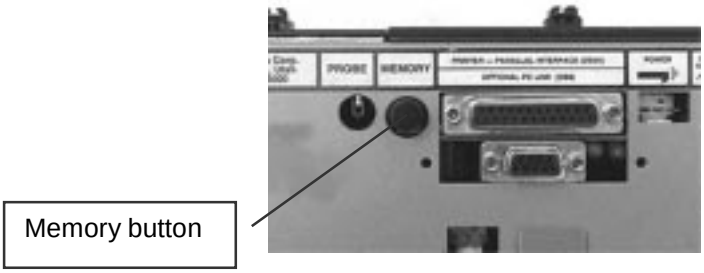
3. Select the **Create Test From** option by pressing *Display/Print*.
   - If the setting is **SAMPLE CABLE**, go on to the next option by pressing *Display/Print*.
   - To change the option setting, press Function until **SAMPLE CABLE** appears, then go on to the next option by pressing *Display/Print*.
4. Continue stepping through the options by pressing *Display/Print*, changing the settings as necessary by pressing *Function*, until all the options are set as shown in this table. When you are done**,** **Ready To Learn** will appear in the display.

First Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	<.1Ω
Hipot Voltage	OFF
Insulation Resistance	>5MΩ
Error Tones Are	HIGH
Sorted Wire List Is	OFF
Count All Cables Is	OFF
Auto Print Is	OFF

5. Turn the analyzer off.

What do to if you go past the value you want

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

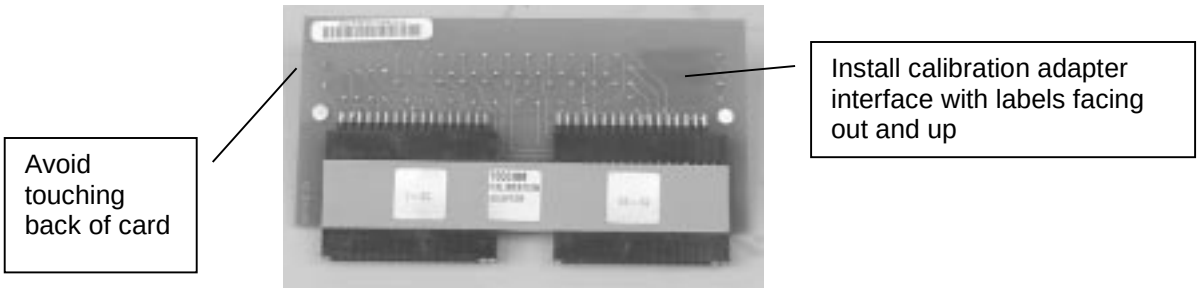


Get your data sheets ready

To make keeping track of your test results easy, we have provided a set of data sheets at the back of this manual. **Photocopy these**! That way, you will have clean sets of data sheets available whenever you need them. AS you go through the calibration tests on your 1000HK, write your test results onto the photocopies.

Adapter Interface Connection

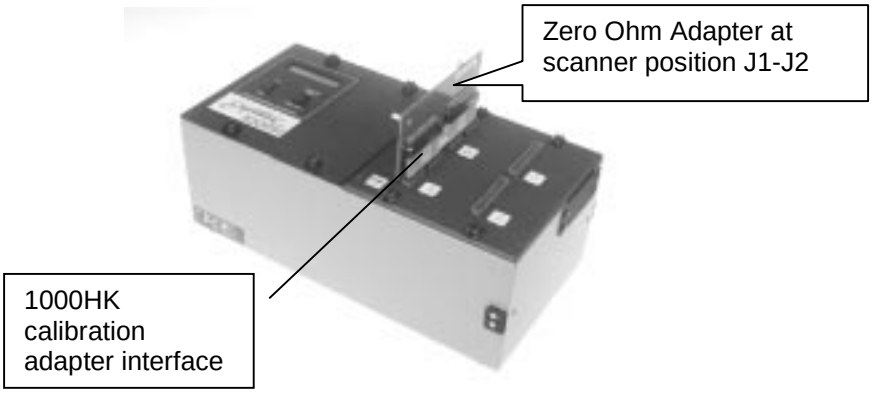
Each adapter should plug into the adapter interface with the top of the adapter facing toward the analyzer's LCD display. The interface adapter is used with <u>both</u> the Zero Ohm and Resistor Leak adapters.



Test the Signal Routing System

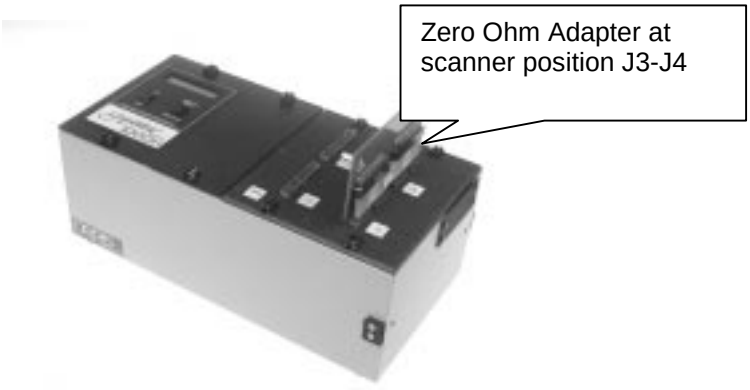
To test the signal routing system in your Cirris 1000HK, do these things:

1. Using the calibration adapter interface, install the Zero Ohm Adapter in position J1-J2 as shown here.



2. Turn on the analyzer. The analyzer will prompt **Learning Cable** for several seconds, then the prompt should change to **SIG:7F5527-6N030 PLEASE VERIFY**. Write the signature you see on the data sheet, compare it with the Correct Signature shown in the table, and check off either Pass or Fail. Turn off the analyzer.

3. Install the Zero Ohm Adapter in position J3-J4 as shown here.



4. Turn on the analyzer. The analyzer will prompt **Learning Cable** for several seconds, then the prompt should change to **SIG:94C424-6N030 Please Verify**. Write the signature you see on the data sheet, compare it with the Correct Signature shown in the table, and check off either Pass or Fail. Turn off the analyzer.

5. If you have installed expansion boxes, continue moving the Zero Ohm adapter from "J" position to "J" position. At each "J" position, turn on the analyzer.
   - Turn off the analyzer before you move the Zero Ohm Adapter to the next "J" position.
   - Read the signature from the display, write it into the appropriate blank table on the data sheet, compare the signature you see to the Correct Signature shown in the table, then check off Pass or Fail.

To make things easier, this table shows what the correct signatures should be for the "J" positions on the expansion boxes.

Zero Ohm Adapter in "J "Position	Correct Signature
J5-J6	5CC1A1-6N030
J7-J8	D3A34A-6N030
J9-J10	51A15E-6N030
J11-J12	C50EFB-6N030
J13-J14	E93078-6N030
J15-J16	719A99-6N030

Test the Resistance Measurement System

To test the Resistance Measurement system in the Cirris 1000HK, do these things:

1. Check the option settings. They should not have changed.
2. Install **the Resistor Leak Adapter** in position J1-J2 as shown here.

3. Turn on the analyzer. The analyzer will prompt **Learning Cable** for several seconds. The prompt will then change to **Learned Cable Resistance Error**.

4. Press *Display/Print*. The analyzer will prompt with a "J" value, and the first resistance value. Write the displayed resistance value into the Resistance Seen blank in the table on the data sheet. Compare the resistance value prompted by the analyzer with the Correct Resistance shown in the table on the data sheet. This value is also shown in the table below.
   - If the displayed resistance falls either on the Correct Resistance, or between the MAXimum and MINimum resistance limits shown in the table, check off Pass.
   - If the displayed resistance value falls outside the resistance limits shown in the table, check off Fail.
5. Turn off the analyzer.

6. Continue moving the Resistor Leak Adapter from "J" position to "J" position. Your are actually repeating steps 2, 3, 4, and 5. As you write the values you see into the table on the data sheet, check each displayed resistance value carefully against the correct value (and allowable ranges) shown. Check off Pass or Fail as you go.

To make things easier, this table shows the correct resistances and the allowable ranges for each of the "J" positions, including those found on expansion boxes.

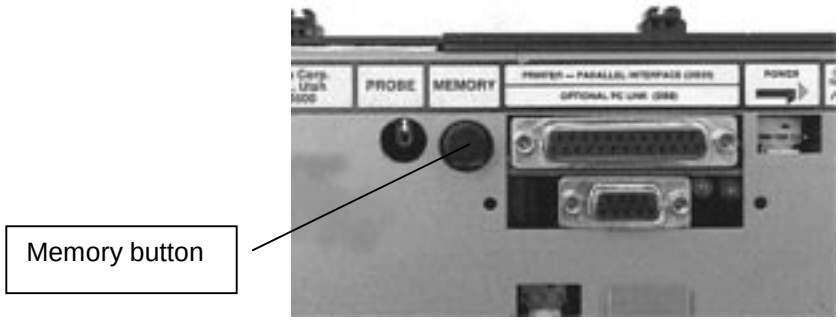
"J" Position	Correct Resis.	MINimum Limit	MAXimum Limit
J1-003-J1-007	10 ohms	9.4 ohms	10.5 ohms
J1-005-J1-009	100 ohms	95 ohms	104 ohms
J1-011-J1-015	1.00K ohms	960 ohms	1040 ohms
J1-013-J1-019	9.09K ohms	8.65K ohms	9.55K ohms
J1-025-J1-029	85.0K ohms	80.9K ohms	89.3K ohms

7. Press *Display/Print* a sixth time. The analyzer will prompt **Learned Cable Resistance Error**.

Test the Resistance Threshold System

To test the Resistance Threshold system within the Cirris 1000HK, do these things:

1. Press the *Memory* button on the back of the analyzer.



2. The analyzer should prompt **SIG: 73F716-6N030 Please Verify**. Write the displayed signature into the decision table found on the data sheet. (Insulation Resistance set at 5 Mohms.)
   - If the Signature Seen matches the Correct Signature, check off Pass.
   - If the Signature Seen does not match the Correct Signature, check off Fail.
3. Press the *Memory* button again. The analyzer should prompt **SIG: 73F716-6N030 Insulation Short**.

4. Press *Display/Print*. Write the "NCJ" value seen into the NCJ Value Seen blank in the table on the data sheet. Compare the value seen with the Correct Value shown, then check off Pass or Fail.
5. Keep pressing *Display/Print* until you have checked six "NCJ" values. To make things easier, this table shows the six NCJ values you should see.

Row	Correct Value
1	NC J1-031
2	NC J1-032
3	NC J1-040
4	NC J1-042
5	NC J1-044
6	NC J1-046

6. Press *Display/Print* again. The analyzer should prompt **SIG: 73F716-6N030 Insulation Short**. Turn the analyzer off.

7. Reset the test options to the settings shown in this table (see page 6 for instructions on how to set the options).

Second Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	<.1Ω
Hipot Voltage	OFF
Insulation Resistance	**>500KΩ**
Error Tones Are	HIGH
Sorted Wire List Is	OFF
Count All Cables Is	OFF
Auto Print Is	OFF

8. Turn on the analyzer. The analyzer will prompt **Learning Cable** for several seconds. The prompt should then change to **Learned Cable Resistance Error**.

9. Press the *Memory* button on the back of the analyzer. The analyzer should prompt **SIG: 73F716-6J030 Please Verify**.

10. Write the displayed signature into the blank on the data sheet (Insulation Resistance set at 500 ohms), compare it with the Correct Signature, and check off Pass or Fail.
11. Press the *Memory* button again. The analyzer should prompt **SIG: 73F716-6J030 Insulation Short**.
12. Press *Display/Print*. The analyzer should prompt with the first of two NCJ Insulation Short values, and **Insulation Short**. Write it into the table on the data sheet, compare it with the correct value shown, then check off Pass or Fail.
13. Press *Display/Print* again. The analyzer should prompt with the second and last of two NCJ Insulation Short values. Write it into the table as before, compare it with the correct value shown, and

check off Pass or Fail. To make things easier, this table shows the correct NCJ values that should be displayed.

Row	Correct Value
1	NC J1-031
2	NC J1-032

Safety Warnings!

The following portions of the calibration procedure involve working with high voltages.

- Only someone experienced in working with high voltages should perform these tests.
- **No one** who is wearing a cardiac pacemaker, an insulin pump, or any other electronically controlled medical device should do hipot testing using the Cirris 1000HK Cable Analyzer.

Special voltmeter required!

For hipot testing at 630 volts, a special voltmeter will be required. This voltmeter must be capable of measuring at least 700 volts DC. This is beyond the safe range for most ordinary voltmeters.

Special equipment for testing above 1000 volts

For testing above 1000 volts DC, your voltmeter must be equipped with a high voltage probe, which must have at least 50 Megohms of input resistance, and be able to safely withstand over 1500 volts DC.

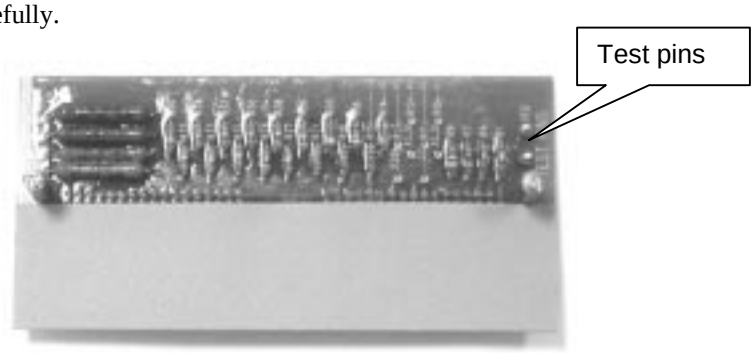
Special procedures

When you are measuring hipot voltages, begin the hipot test, measure the voltage, then turn the analyzer off immediately. High voltage may still be applied to the test points even when it is not showing on your meter.

Testing the Hipot System

To test the hipot system inside your Cirris 1000HK, do these things:

1. Connect your voltmeter's probes to the test points on the Resistor Leak Adapter as shown. Be sure to check the polarity carefully.



2. Reset the test options to those settings shown here (see page 6 for instructions on how to set the options).

Third Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	**<5MΩ**
Hipot Voltage	**50V**
Insulation Resistance	**>5MΩ**
Hipot Duration	**10 SEC**
Apply Hipot To	**ALL ADAPTER PINS**

Single Net Error	**FAILS HIPOT**
Auto Hipot	**OFF**
Error Tones Are	HIGH
Sorted Wire List Is	OFF
Count All Cables Is	OFF
Auto Print Is	OFF

3. Turn the analyzer off.

4. Turn the analyzer on. The analyzer will prompt **Learning Cable** for several seconds. The prompt should then change **to SIG: EA7A29-2J6NT Please Verify**. Write the displayed signature into the table on the data sheet (50 volt test), then complete the usual check-off steps.

5. Press the *Memory* button. The analyzer will prompt **SIG: EA7A29-2J6NT Ready To Hipot**.

6. Press *Function*. The analyzer will prompt **Hipot Test**.

7. Read the hipot voltage displayed on your voltmeter. Write this voltage into the table on the data sheet (50 volt test). Compare your measured voltage with the Correct Voltage and the MINimum and MAXimum limits shown in the table. Complete the usual check-off steps. **Note***: The analyzer will continue to apply high voltage* to each pin or net on the high voltage adapter if it is allowed to continue running. It will take a long time to finish the test.
   - To shut off the high voltage, **turn the analyzer off** to abort the test once you have read and recorded the voltage. This will happen on all high voltage tests.

To make things easier, this table shows the Correct Voltage, and the MINimum and MAXimum limits for this part of the test.

Correct Voltage	MINimum Limit	MAXimum Limit
50 Volts	45 Volts	55 Volts

8. Reset the test options to the settings shown here. **Careful!!** You are now setting the hipot voltage to a level that can be dangerous to you and your voltmeter.

Fourth Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	**AUTO**
Hipot Voltage	**630V**
Insulation Resistance	>5MΩ
Hipot Duration	10 SEC

Apply Hipot To	ALL ADAPTER PINS
Single Net Error	FAILS HIPOT
Auto Hipot	OFF
Error Tones Are	HIGH
Sorted Wire List Is	OFF
Count All Cables Is	OFF

9. Turn the analyzer off.

10. Turn the analyzer on. The analyzer will prompt **Learning Cable** for several seconds. The prompt should then change to **SIG: 73F716-EJ67V Please Verify**.

11. Write the displayed value into the table on the data sheet (630 volt test), then complete the usual check-off steps.
12. Press the *Memory* button. The analyzer will prompt **SIG: 73F716-EJ67V Ready To Hipot**.

13. Press *Function*. The analyzer will prompt **Hipot Test**.

14. Measure the hipot voltage using your voltmeter. Write the voltage (read from your voltmeter) into the Voltage Seen blank (630 volt test) in the table on the data sheet. Compare the voltage you have measured with the Correct Voltage and the MINimum and MAXimum limits shown in the table, and complete the usual check-off step.
    - To shut off the hipot voltage, turn the analyzer off to abort the test once you have read and recorded the voltage.

To make things easier, this table shows the Correct Voltage and the MINimum and MAXimum voltage limits for this part of the test.

Correct Voltage	MINimum Limit	MAXimum Limit
630 Volts	567 Volts	693 Volts

Important Note! The 1000 volt test is *optional*. If you do not intend to use the analyzer at 1000 volts, go directly to the next section (testing the Insulation Resistance Detection System).

15. Change the option settings to those shown in this table (see page 6 for instructions on how to do this). **Caution!** You are setting the analyzer to place 1000 volts across the test points. *This is a dangerous voltage* to you and your equipment if you do not treat it with respect. Double-check everything before you apply the test voltage. Be certain your voltmeter is equipped with a special high voltage test probe. The probe must have at least 50 Megohms of input resistance, and must be able to withstand at least 1500 volts DC. Set the meter's controls properly for this measurement**. The meter will be destroyed** if you do not take these precautions!

Fifth Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	AUTO
Hipot Voltage	**1000V**
Insulation Resistance	**>10MΩ**
Hipot Duration	10 SEC
Apply Hipot To	ALL ADAPTER PINS
Single Net Error	FAILS HIPOT
Auto Hipot	OFF
Error Tones Are	HIGH
Sorted Wire List Is	OFF
Count All Cables	OFF
Auto Print	OFF

16. Turn the analyzer off.
17. Turn the analyzer on. The analyzer will prompt **Learning Cable** for several seconds. The prompt should then change to **SIG:73F716-KJXXV Please Verify**. **Note**: Since the Connection Resistance is set to Auto, the two digits represented by X's may not be the same as those that appear in your analyzer's display.

18. Write the displayed signature into the table on the data sheet (1000 volt test), then complete the usual compare and check-off steps.
19. Press the *Memory* button. The analyzer should prompt **SIG:73F716-KJXXV Ready To Hipot**.

20. Press *Function*. The analyzer will prompt **Hipot Test**.

21. Measure the voltage using your voltmeter. Write the voltage (read from your voltmeter) into the Voltage Seen blank (1000 volt test) in the table on the data sheet. Compare the voltage you have measured with the Correct Voltage, and the MINimum and MAXimum limits shown in the table, and complete the usual check-off step.
    - To shut off the hipot voltage, turn the analyzer off once you have read and recorded the voltage.

To make things easier, this table shows the Correct Voltage and the MINimum and MAXimum voltage limits for this part of the test.

Correct Voltage	MINimum Limit	MAXimum Limit
1000 Volts	900 Volts	1100 Volts

Test the Insulation Resistance Detection System

To test the Insulation Resistance Detection System inside the Cirris 1000HK, do these things:

1. Change the options to the ones shown in the table (see page 6 for instructions on how to do this).

Sixth Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	AUTO
Hipot Voltage	**50V**
Insulation Resistance	**>5MΩ**
Hipot Duration	**100mS**
Apply Hipot To	ALL ADAPTER PINS
Single Net Error	FAILS HIPOT
Auto Hipot	OFF
Error Tones Are	HIGH
Sorted Wire List Is	OFF
Count All Cables	OFF
Auto Print	OFF

2. Turn the analyzer off.
3. Turn the analyzer on. The analyzer will prompt **Learning Cable** for several seconds. The prompt should then change **to SIG: 73F716-2JXXL**. **Note**: Because the Connection Resistance is set to Auto, the two digits represented here by X's may not be the same as those shown in your analyzer's display.

4. Write the displayed signature into the table on the data sheet (50 volt test), then complete the usual check-off procedure.
5. Press the *Memory* button. The analyzer will prompt **Ready to Hipot**.

6. Press *Function*. The analyzer will prompt **Hipot Test**. The test will proceed, then the analyzer will prompt **Failed Hipot Test**.

7. Press *Display/Print.* The analyzer will prompt with the first of six NCJ values, and **Has Leakage**. Write the displayed NCJ value into the first row blank on the data sheet, and complete the usual compare and check-off procedure. Continue pressing *Display/Print*, then recording NCJ values until you have completed all six tests. To make things easier, this table shows the NCJ values you should see.

Row	Correct Value
1	NC J1-031
2	NC J1-032
3	NC J1-040
4	NC J1-042
5	NC J1-044
6	NC J1-046

8. Press *Display/Print* a seventh time. The analyzer should prompt **SIG: 73F716-2JXXL Ready to Hipot**.

9. Change the options to the settings shown in this table (see page 6 for instructions on how to do this). **Caution!** You are setting the analyzer to hipot test at 1000 volts.

Seventh Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	**<5MΩ**
Hipot Voltage	**1000V**
Insulation Resistance	**>500MΩ**
Hipot Duration	100mS
Apply Hipot To	ALL ADAPTER PINS
Single Net Error	FAILS HIPOT
Auto Hipot	OFF
Error Tones Are	HIGH
Sorted Wire List Is	OFF
Count All Cables	OFF
Auto Print	OFF

10. Turn the analyzer off.
11. Turn the analyzer on. The analyzer will prompt **Learning Cable** for several seconds. The prompt should then change to **INSULATION RESIS RESET TO 100MΩ**.

12. If you have not already done so, **disconnect your voltmeter** from the analyzer.
13. Press the *Memory* button. The analyzer will prompt **SIG: EA7A29-KX6NJ Ready To Hipot**. Write the displayed signature into the table on the data sheet (1000 volt test), then complete the usual compare and check-off steps.

14. Press *Function*. The analyzer should prompt **Failed Hipot Test**.

15. Press *Display/Print*. The analyzer should prompt with the first of four NCJ values, **and Has Leakage**. Write the value into the first row of the table shown in the data sheet, then complete the usual compare and check-off step. Continue pressing *Display/Print*, then writing down the NCJ values in the table. Only four NCJ values should be shown. Check for any extra or missing values. The values you see, and the Correct Values shown in the table must match exactly for the analyzer to pass the test.

To make things easier, this table shows the values you should see.

Row	Correct Value
1	NC J1-38
2	NC J1-39

16. Turn the analyzer off.

This completes the performance verification of your Cirris 1000HK cable analyzer. If the analyzer did not pass all of the tests as given in this manual, telephone Cirris Systems at 801-973-4600 or 800-441-9910 for assistance. There are no internal adjustments you can make yourself to bring the analyzer into compliance.

Calibration Data Sheets for Cirris 1000HK

Calibration Date: ____/____/_____

Analyzer Serial Number: _____

Calibration Performed By: _____

Test the Signal Routing System

Zero Ohm Adapter at J1-J2	Signature Seen	Correct Signature	Pass	Fail
		7F5527-6N030		

Zero Ohm Adapter at J3-J4	Signature Seen	Correct Signature	Pass	Fail
		94C424-6N030		

Zero Ohm Adapter at J5-J6	Signature Seen	Correct Signature	Pass	Fail
		5CC1A1-6N030		

Zero Ohm Adapter at J7-J8	Signature Seen	Correct Signature	Pass	Fail
		D3A34A-6N030		

Zero Ohm Adapter at J9-J10	Signature Seen	Correct Signature	Pass	Fail
		51A15E-6N030		

Zero Ohm Adapter at J11-J12	Signature Seen	Correct Signature	Pass	Fail
		C50EFB-6N030		

Zero Ohm Adapter at J13-J14	Signature Seen	Correct Signature	Pass	Fail
		E93078-6N030		

Zero Ohm Adapter at J15-J16	Signature Seen	Correct Signature	Pass	Fail
		719A99-6N030		

Test the Resistance Measurement System

Row	"J" Position	Resis. Seen	Correct Resis.	MIN Limit	MAX Limit	Pass	Fail
1	J1-003N J1-007		10 Ω	9.4Ω	10.5Ω		
2	J1-005 J1-009		100Ω	95Ω	104Ω		
3	J1-011 J1-015		1000Ω	960Ω	1040Ω		
4	J1-013 J1-019		9.09KΩ	8.65KΩ	9.55KΩ		
5	J1-025 J1-029		85.0KΩ	80.9KΩ	89.3KΩ		

Test the Resistance Threshold System

Insulation Resis. Set at 5MΩ	Signature Seen	Correct Signature	Pass	Fail
		73F716-6N030		

Row	NC J Value Seen	Correct NC J Value	Pass	Fail
1		NC J1-031		
2		NC J1-032		
3		NC J1-040		
4		NC J1-042		
5		NC J1-044		
6		NC J1-046		

Insulation Resis. Set at 500Ω	Signature Seen	Correct Signature	Pass	Fail
		73F716-6J030		

Row	NC J Value Seen	Correct NC J Value	Pass	Fail
1		NC J1-031		
2		NC J1-032		

Test the Hipot System

50 Volt Test	Signature Seen	Correct Signature	Pass	Fail
		EA7A29-2J6NT		

Voltage Seen	Correct Voltage	MIN. Limit	MAX. Limit	Pass	Fail
	50 Volts	45 Volts	55 Volts		

630 Volt Test	Signature Seen	Correct Signature	Pass	Fail
		73F716-EJ67V		

Voltage Seen	Correct Voltage	MIN. Limit	MAX. Limit	Pass	Fail
	630 Volts	567 Volts	693 Volts		

1000 Volt Test	Signature Seen	Correct Signature	Pass	Fail
		73F716-KJ(XX)V		

Voltage Seen	Correct Voltage	MIN. Limit	MAX. Limit	Pass	Fail
	1000 Volts	900 Volts	1100 Volts		

Note: Since the Connection Resistance is set to "AUTO" the two digits "XX" may not be the same as those that appear in your analyzer's display.

Test the Insulation Resistance Detection System

50 Volt Test	Signature Seen	Correct Signature	Pass	Fail
		73F716-2J(XX)L		

Note: Since the Connection Resistance is set to "AUTO," the two digits "XX" may not be the same as those that appear in your analyzer's display.

Row	NC J Value Seen	Correct NC J Value	Pass	Fail
1		NC J1-031		
2		NC J1-032		
3		NC J1-040		
4		NC J1-042		
5		NC J1-044		
6		NC J1-046		

1000 Volt Test	Signature Seen	Correct Signature	Pass	Fail
		EA7A29-KX6NJ		

Row	NC J Value Seen	Correct NC J Value	Pass	Fail
1		NC J1-038		
2		NC J1-039		

This is the end of the Data Sheets

Index