Cirris 1000LC User's Guide

Version 2.0

Major Revision
January, 1999

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The Cirris 1000LC is a true cable analyzer. It includes cable testing features that are normally found only on more expensive equipment. Its small size, light weight, and easy-to-use design make it a good choice for the test bench, or for the field service technician who needs a cable analyzer small and light enough for the tool kit.

Test capacity and power options

The analyzer can test cables which have up to 128 test points, and will test any pattern of interconnections including jumpers, and crossed wires. The analyzer's power options let you use it on the production floor where an AC power source is available, or in the field using either a NiCad battery, or a standard 9-volt alkaline battery.

Warning about live cables!

Cables which are connected to a voltage or a current source ("live" cables) should never be tested on the 1000LC. *Testing live cables will severely damage the analyzer, and void its warranty.*

ON and OFF buttons   Cable Token contact   Connector JA   Connector JB

Menu button   Enter button   List button   Print button   Change button
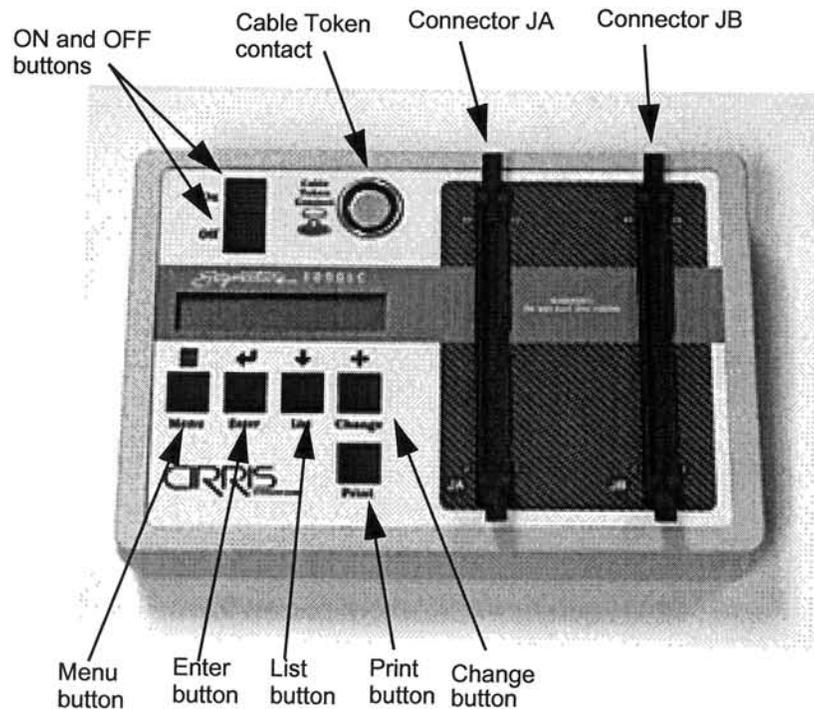
**Test point
identification**

On the analyzer's top panel, you'll find two 64-pin connectorslabeled JA and JB. They provide a total of 128 test points (pins). The analyzer identifies these these points by number. Pins 1, 2, 63, and 64 are labeled on each of the two connectors. Here, you see an example of the analyzer displaying a pin identification. The display shows that the tip of the hand-held test probe (see Section 7 for details) is touching connector JB, pin number 1. Any of the 128 available pins can be identified and displayed in the same way.

PROBE ON
JB01

Probe is shown with tip touching pin #1
on connector JB.
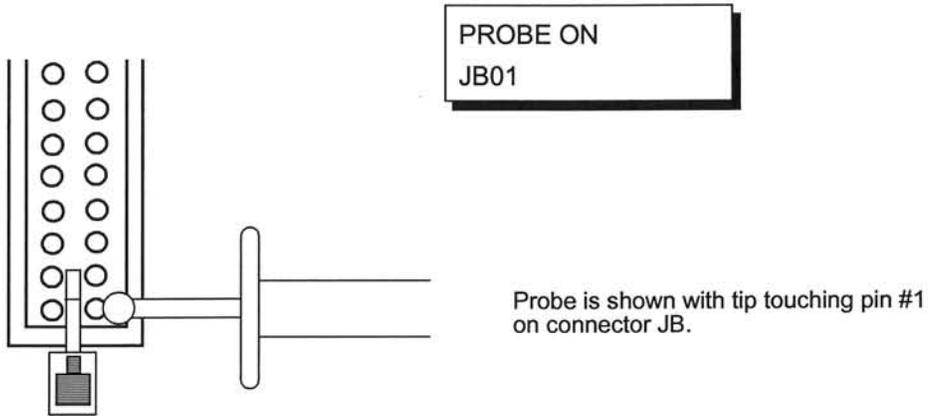
**Section 2:
The AC
Adapter**

**Installing the AC
Adapter**

The Signature 1000LC comes with an AC adapter. To connect it to the analyzer, plug the wall adapter's power cord into the power supply port on the analyzer's rear panel. Plug the AC adapter "cube" itself into a wall outlet (110-135 VAC, 50-60 Hz).

In addition, there are two battery options:

- NiCad

- Alkaline

In our instructions here, we'll assume you're using the analyzer with its AC wall adapter. For information on using a NiCad or an alkaline battery, see Figure , "There are four options for powering your Cirris 1000LC Cable Analyzer. these are:," on page 17.

Probe port   9-pin serial port
                    (for printer)   Power port
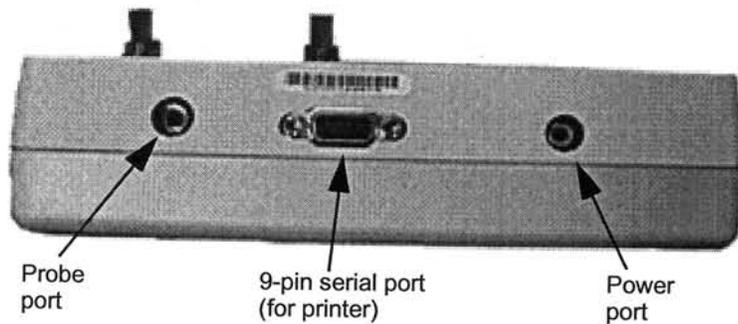
Section 3: Symbols and Buttons

What they are and how they work

The Cirris 1000LC uses five different symbols to guide you through learning and testing cables. Each of these symbols corresponds to a button on the analyzer's top panel. Here, we'll describe each button, and how to use it.

Menu Symbol

≡

Pressing this button always causes the analyzer to return to its USE LAST CABLE prompt. This allows you to quickly prepare to test a cable using cable information already stored in the analyzer's memory. You can return to the USE LAST CABLE prompt at any time by pressing this button. This will cancel whatever operation you've been doing.

Enter Symbol

↵

This button initiates an action. It's a sort of "do it" button. It serves in much the same way as an ENTER or a RETURN key does on a computer's keyboard.

List Symbol

↓

Press this button to display wirelist data, initiate steps, etc.

Change Symbol

✚

Press this button only when you're setting the analyzer's Error Tone and Baud Rate options. Once you set the option to the value you want, press the LIST button to accept the setting.

Print Button

PRINT

Press this button to document a cable or print test results when you have a printer connected to the LC. You can also use it to print a wirelist for the last cable stored in memory. If you don't have a printer, you'll have to transcribe displayed information to paper

Note: If you press Print when the display prompts LEARN CABLE, USE LAST CABLE, ATTACH CABLE, or TEST LIST, you'll get the the error message PRINTER NOT READY-PIN 4. Press and briefly hold the Menu button to get back to the USE LAST CABLE screen. **Note**: The PRINT button also won't work as the display prompts SET OPTIONS.

Section 4: Error Tones and Baud Rate

The 1000LC has two options: **Error Tones** and **Baud Rate**. Error tones give you audible feedback about test results. They can be set to Loud, Soft, or Off. Baud rate controls the speed at which information is sent by the analyzer to your printer.

Setting the Error Tones

To set the **Error Tones** option, do these things:

1. Turn the analyzer on.

2. Press the LIST button twice to display SET OPTIONS.

3. Press the ENTER button to display the **Error Tones** option.

4. Press the CHANGE button to change the setting (Loud, Soft, or Off are the possible settings).

5. Press the ENTER button to accept the setting.

6. Press either the LIST or the MENU button.

    •   Pressing the LIST button displays the **Baud Rate** option.

    •   Pressing the MENU button exits to the USE LAST CABLE prompt

Setting the Baud Rate

The **Baud Rate** option controls the rate at which the analyzer sends information to your printer. Rates of 300, 1200, and 9600 baud are possible.
To set the **Baud Rate** option, do these things:

1. Turn the analyzer on.

2. Press the LIST button twice to display SET OPTIONS.

3. Press the ENTER button to display the **Error Tones** option.

4. Press the ENTER button to scroll to the **Baud Rate** option.

5. Press the CHANGE button to toggle to the setting you want to use (300, 1200, 9600 baud settings are possible).

6. Press the ENTER button to accept the setting and press MENU to exit to the USE LAST CABLE prompt.

If your printer prints "garbage," check the printer's controls, and the cable connections at the printer and the analyzer. If all the printer's controls and cable connections appear to be set up correctly, try resetting the analyzer's baud rate.

Section 5: Learning and Testing Cables

A note about fixtures

Unless you intend to only test cables that have female 64-pin IDC connectors, you'll need to build a set of fixtures that adapt your cables to the 1000LC. To get you started, we've included a 64-pin ribbon cable that mates to the analyzer's connectors. Follow the instructions in Appendix 1 of this manual to create your first set of fixtures using this cable. Remember to wire your fixtures carefully, and to check them for wiring errors. If you don't, you can't be certain that your test results are valid

How the analyzer works

First you install fixtures that mate to the type of cable you want to test into the connectors marked JA and JB. You then connect a Sample Cable to the fixtures. (A *Sample Cable* is a cable that's accurately built to specifications, and that you know is good.) As the analyzer "programs" itself to test cables (once you've connected a Sample Cable for learning), these things happen:

It learns a Sample Cable. When you turn the analyzer on, it scans the Sample Cable and learns the cable's pattern of interconnections

It calculates a signature. Next, the analyzer calculates a six-digit hexadecimal "signature" for the data. This signature is a form of shorthand. It represents the Sample Cable's pattern of interconnections in a simple, easy-to-check form.

It stores the cable data. The 1000LC records the Sample Cable's signature and interconnection data in its memory. This data remains in the analyzer's memory until you replace it by learning another Sample Cable, or by reading in new data from a Cable Token (see page 19).

It compares the data to cables you test. You disconnect the Sample Cable, then connect a cable you want to test. The analyzer scans the interconnections of the new cable, and compares it to the pattern for the Sample Cable stored in memory. If the interconnection data matches, the analyzer prompts GOOD, and displays the same signature as that for the Sample Cable. If the data does **not** match, the analyzer prompts BAD, and displays a *different* signature.

Learning a Sample Cable

Before you can test a cable, you must load the analyzer's memory with data from a Sample Cable. You can do this by learning a Sample Cable (as discussed here), or by reading data (learned at an earlier time, and stored in a Token) from a Cable Token (see page 19).

To learn a Sample Cable, do these things:

1. Install fixtures that mate to the kind of cable you want to test on connectors JA and JB of the 1000LC.

2. Connect your Sample Cable to the fixtures.

3. Turn on the analyzer, then press the LIST button to display LEARN CABLE.

4. Press the ENTER button.

5. The learning sequence begins, and the analyzer prompts LEARNING CABLE.

6. Verify the cable by pressing the LIST button.

The analyzer will prompt a cable signature, and give you the choice of testing the cable or displaying its wirelist. The first time you learn a Sample Cable, step through the wirelist data using the LIST button. Compare the wirelist data prompted in the display with your cable's build list or spec sheet. The wirelists and signatures should match. Now that you know the signature is correct, write it into your cable specs. The next time you learn this Sample Cable, simply check the displayed signature against the signature (known to be correct) shown in the cable's documentation. If they match, the cable has been learned correctly.

Testing a cable

After the analyzer has learned a Sample Cable (or you've loaded cable data from a Cable Token), you can begin testing. To test a cable, do these things:

1. Disconnect the Sample Cable from the fixtures mounted on the 1000LC. (The analyzer prompts ATTACH CABLE.)

2. Connect the cable you want to test to the analyzer. (The analyzer begins to test. When it's finished, it will prompt the following:

   • If the analyzer prompts GOOD, this means that the new cable matches the data stored in memory. The analyzer produces a series of clicks, and displays a signature identical to that of the Sample Cable.

   ```
   ┌─────────────────────────┐
   │          GOOD           │
   │   SIG:XXXXXX↓ LIST       │
   └─────────────────────────┘
   ```
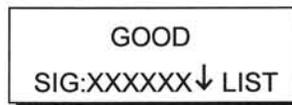
   • If the analyzer prompts ERROR SIG:000000, this means that the new cable does ***not*** match that stored in memory. The analyzer produces a series of beeps, and displays a signature different than that of the Sample Cable.

Note: Errors can be Opens, Shorts, Miswires.
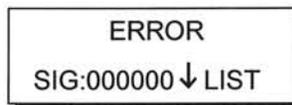
   ```
   ┌─────────────────────────┐
   │          ERROR          │
   │   SIG:000000 ↓ LIST      │
   └─────────────────────────┘
   ```

Displaying errors

You can use the LIST button to display any errors that the analyzer detects (shorts, opens, miswires). You can also use it to display good connections if needed.

Printing an error list

Do you have a printer connected to the analyzer? You can print the error list by pressing the PRINT button.

The "Use Last Cable" feature

This feature lets you use the data from the last test setup when you turn on the analyzer, without having to connect the Sample Cable and relearn it. This is because the analyzer always "remembers" the last cable stored in its memory until you either replace it by learning another Sample Cable, or by reading data from a Cable Token.

To use the last test setup stored in the analyzer's memory, do these things:

1. Connect the cable you want to test.

2.   Turn the analyzer on. (The analyzer prompts USE LAST CABLE.)

3.   Press the ENTER button. (The analyzer prompts with the signature of the last cable learned.)

4.   Press the ENTER button.

The analyzer begins to test. When it's finished, it will prompt the following:

- If the analyzer prompts GOOD, this means that the new cable matches the Sample Cable data stored in memory. The analyzer produces a series of clicks, and displays a signature identical to that of the Sample Cable.

```
┌─────────────────────────┐
│        GOOD             │
│  SIG:XXXXXX ↓ LIST      │
└─────────────────────────┘
```

- If the analyzer prompts ERROR SIG:000000, this means that the new cable does not match that stored in memory. The analyzer produces a series of beeps, and displays a signature different than that of the Sample Cable.

```
┌─────────────────────────┐
│       ERROR             │
│  SIG:000000 ↓ LIST      │
└─────────────────────────┘
```

Section 6:
Cable Tokens

The analyzer can store the data for only one cable at a time in its internal memory. To free up the analyzer's memory without losing the data that's already been learned, you can record the data stored in the memory to a Cable Token. The tokens are available from Cirris Systems. Call us at (801) 973-4600 or (800) 441-9910.

Why use Cable Tokens?

Cable Tokens allow you to store a library of cable data in a simple, easy-to-carry form. There's no need to carry lots of Sample Cables with you on field service calls, or onto the production floor.

How Cable Tokens work

Each token can contain the data for one cable. Before you can use this data to test cables, you have to read the data stored on the Cable Token into the analyzer's memory. When you do this, you replace the data stored in the analyzer's memory with the data from the Cable Token.

How to write data to a Cable Token

To avoid losing data that's already been learned from a Sample Cable, you should store it on a Cable Token. Here's how:

1. Turn the analyzer on.

2. Place a blank Cable Token on the analyzer's Cable Token contact, and hold it firmly in place. (The analyzer prompts READ TOKEN).

3. Press the LIST button to change the prompt to WRITE TOKEN.

4. Press the ENTER button to start the write sequence.

When the writing sequence is complete, the analyzer prompts CABLE DATA WRITE COMPLETE. When you remove the token from the contact, the analyzer returns to where it was in a process before the writing sequence was started.

Note: If you move the Cable Token on the Cable Token Contact, or remove it from the contact during the writing sequence, the analyzer will prompt WRITE ERROR. You **must** hold the token firmly in place during the writing sequence.

How to read data from a Cable Token into memory

To load the Sample Cable data from a Cable Token into the analyzer's memory prior to testing cables, do these things:

1. Turn the analyzer on.

2. Place the Cable Token that contains the data for the kind of cable you wish to test onto the Cable Token Contact. Be sure to hold the token firmly in place. (The analyzer will prompt READ TOKEN.)

3. Press the ENTER button to start the reading sequence.

When the reading sequence is complete, the analyzer will prompt CABLE DATA READ COMPLETE.

Note: If you move the Cable Token on the Cable Token Contact, or remove it from the contact during the reading sequence, the analyzer will prompt READ ERROR DATA NOT VALID. You **must** hold the token firmly in place during the reading sequence.

Whenever the analyzer is turned on, it can sense the presence of a token touching the Cable Token Contact. Once the correct prompt appears in the display, the procedure you follow to read from or write to a token is the same as that given above. When you remove the token from the contact, the analyzer's prompt will return to what it was before you placed the token on the contact. **Note**: The Cable Token read and write functions will **not** work when the analyzer displays SET OPTIONS.

Your analyzer package includes a hand-held test probe. Use it to identify test points in your cables and fixtures. When you touch a point with the tip of the probe, the analyzer identifies that point, and prompts it in the display. You'll find this especially useful for checking fixtures to make sure their wiring matches their build lists.

Installing the hand-held test probe

Plug the probe into the port marked "PROBE" on the analyzer's rear panel as shown in the photo.
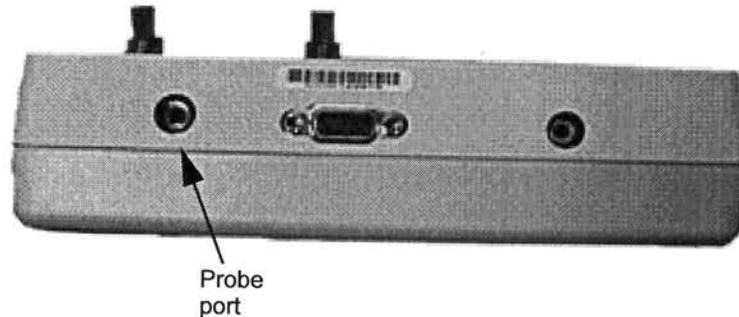
Probe
port

Using a wrist strap

If you prefer, you can substitute a standard static-control wrist strap for the hand-held test probe, and identify test points by touching them with your fingertip instead of the probe tip. Simply connect the strap's 0.175-inch banana plug into the same port as if it were the hand-held test probe.

When does the probe work?

The probe works when the analyzer is in test mode ("good" or "error" is flashing on the analyzer's display), or when the analyzer prompts ATTACH CABLE CANCEL TEST.

When you touch the probe to a test point, the analyzer identifies that point, and displays it. The analyzer can identify only the first three interconnected points in any single array of interconnected points.

Section 8: Power Options

Power options for the 1000LC

There are four options for powering your Cirris 1000LC Cable Analyzer. these are:

- AC adapter (adapts the analyzer to run on 110-135 VAC 50-60 Hz.). This is the standard power supply shipped with the analyzer.

- A Nickel Cadmium ("NiCad") battery (can be recharged in-place in the 1000LC using the analyzer's internal charging circuit).

- A standard 9-volt alkaline battery (NEDA 1604 standard 9-volt) which cannot be recharged.

- A standard 9-volt Nickel Metal Hydride (NmH) battery. This battery can be recharged, but **not** in-place using the charging circuit in the 1000LC. To recharge this type of battery, you'll have to *leave the jumper block in the 1000LC configured for an* **alkaline** battery. You should remove the Nickel Metal Hydride battery from the 1000LC, and recharge the battery using the appropriate external battery charger.

Using the AC adapter

To use the 1000LC with its AC adapter do these things:

1. Connect the wall transformer's power cord to the analyzer by plugging the cord into the power port on the back of the analyzer as shown in the photo.
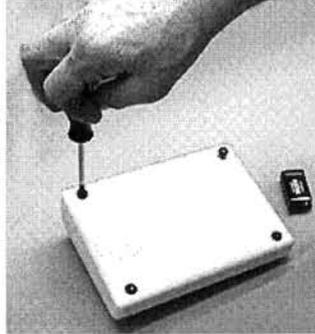

Power port
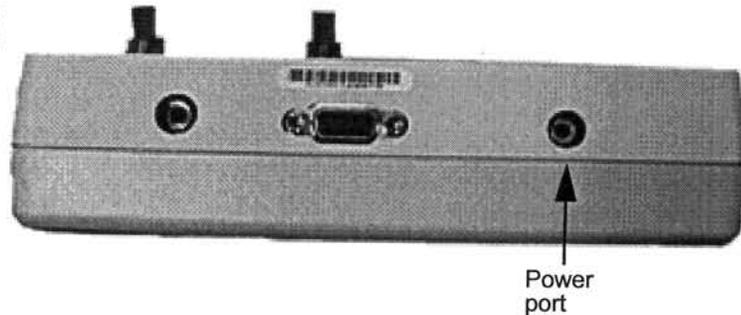
2. Plug the wall transformer ("cube") into a standard 110 VAC, 50-60 Hz. wall outlet.

Using an alkaline battery

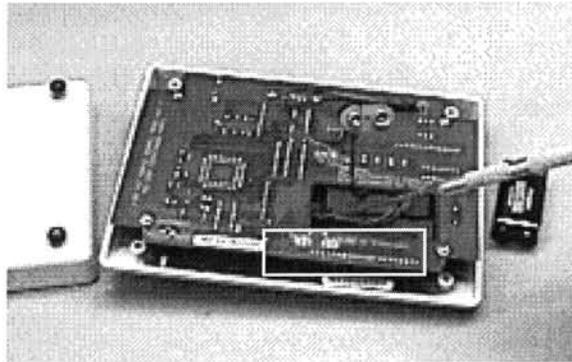To install an alkaline battery (standard NEDA 1604 9-volt) do these things:

1. Remove the four screws from the bottom of the case.

2. Gently separate the two halves of the case.

White rectangle shows location of diagram for connecting battery.

Scriber is pointing to connector which is used to configure the jumper block.

3. Locate the diagram on the circuit board that shows how to connect the battery.

   - **Pay careful attention to configuring the jumper block**. The jumper block <u>must</u> be connected as shown here, for the analyzer to work using an alkaline battery. **Warning!** If the jumper block is configured for a NiCad battery when an alkaline battery is installed in the LC, the alkaline battery may explode when the analyzer's AC adapter is used. The LC will send current to the battery (meant to recharge the NiCad). Alkaline batteries cannot be recharged this way. Instead, the battery may bulge, leak, or even explode. *This will damage the analyzer, and void its warranty*!
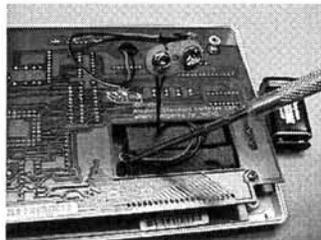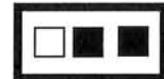

Scriber is pointing to the connector you use to configure the jumper block.
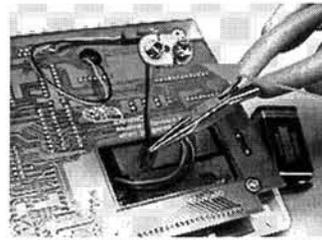
Pull the connector gently off of the pins. Position it as shown at right to set the 1000LC up for using an alkaline battery.

Snap 9-volt battery onto this connector

Jumper connector placed for using alkaline battery

4. Reassemble the analyzer once the battery has been installed.

**Alkaline battery life**　A fully-charged alkaline battery will power the analyzer for about 25 hours.

Using the NiCad battery with the AC adapter　To install a 9-volt NiCad battery, do these things:

1.　Remove the four screws from the bottom of the case.

2.　Gently separate the two halves of the case.

3.　Locate the diagram on the circuit board that shows how to connect the battery (see step 2 under "Using an alkaline battery" for a photo showing the location of the diagram on the circuit board).

4.　Pay careful attention to configuring the jumper block. The jumper block must be connected as shown here, or the battery will not recharge when the AC adapter is used.
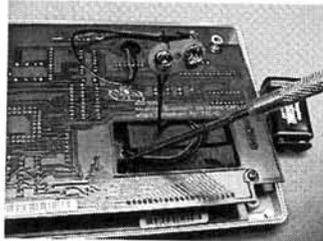
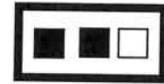Snap 9-volt battery onto this connector

Scriber is pointing to the connector you use to configure the jumper block.
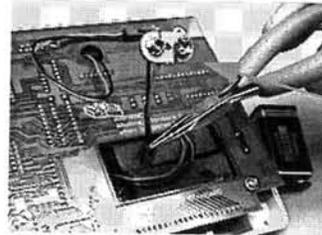
Pull the connector gently off of the pins. Position it as shown at right to set the 1000LC up for using an NiCad battery.

Jumper connector placed for using NiCad battery

Recharging the NiCad battery　To recharge the NiCad battery, connect the wall transformer to the port marked "Power" on the analyzer's rear panel. Plug the transformer itself into a standard wall outlet (110-135 VAC 50-60 Hz.).

- A fully-charged 100mA-hour NiCad will power the analyzer for about five hours.

Using a Nickel Metal Hydride (NmH) battery　It is possible to use a standard 9-volt Nickel Metal Hydride (NmH) battery to power the 1000LC. The thing to remember is that the charging circuit built into the 1000LC is **not** designed for charging Nickel Metal Hydride batteries.

To use a Nickel Metal Hydride battery in the analyzer, you should leave the jumper block configured for an **alkaline** battery. To recharge the battery, you'll have to remove it from the analyzer, and charge the battery using an external battery charger designed for charging Nickel Metal Hydride batteries. Reinstall the charged battery into the LC using the same procedure as you'd use for an alkaline battery.

- A fully-charged Nickel Metal Hydride battery will power the analyzer for about 8 hours.

Section 9: Setting Up a Printer

What kind of printer may I use?   You can only use a serial printer with your Cirris 1000LC. Parallel printers will not work.

Serial port pinout   The serial printer port on the Cirris 1000LC is configured as a standard 9-pin RS-232 interface:

- Pin 2 = TX data to printer (transmit line)

- Pin 3 = RX data from printer (receive line)

- Pin 4 = DTR/BUSY (busy from printer)

- Pin 5 = Ground

Note: The receive and transmit lines must *not* be reversed!

Baud Rates   The *baud rate* is the rate at which the analyzer sends data to your printer. On the 1000LC, this parameter can be set to 300, 1200, or 9800 baud. **Note**: If you don't set the baud rate to match the rate at which your printer is supposed to receive data, printing won't work correctly. For instructions on setting the analyzer's baud rate, see page 13.

Other settings   The printer should be set for 8 data bits, no parity. Your printer should be selected (on-line), with the DTR signal ready on power-up.

Printer port
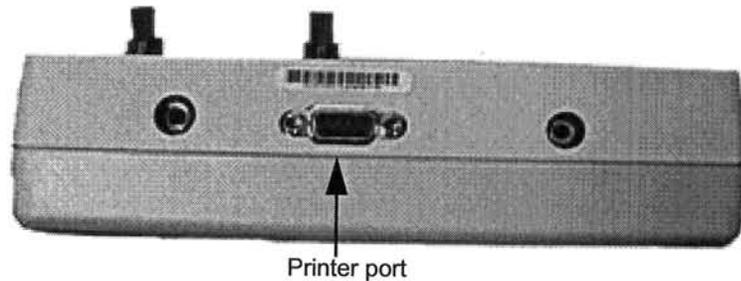
Section 10: How to Fix Problems

What about error messages?

There are a number of error messages which the analyzer may display. Here, we'll discuss what they are, what their causes may be, and what corrective action to take when you see them.

ATTACH CABLE

The analyzer hasn't detected a cable connected to it for learning or testing. Connect a cable to the analyzer.

WARNING
LOW BATTERY

The analyzer is detecting a low operating voltage. Something may be wrong with the AC adapter (or the electrical outlet it's plugged into), or the battery may be low. This warning shows up most often when the analyzer is being used on battery power. If you're using a NiCad battery, plug the analyzer's AC adapter into an electrical outlet (110-135 VAC, 50-60 Hz.) to recharge the battery. If you're using an alkaline battery, either replace the battery with a fresh one, or use the AC adapter and an electrical outlet (110-135 VAC, 50-60 Hz.).

ERROR ON JAXX
WILL NOT GO LOW

The analyzer cannot make the displayed test point go logic low. Look for possible connections from this test point to some voltage source. If no such connections are present, there may be a malfunction in the analyzer. Call Cirris Systems for assistance at (801) 973-4600 or (800) 441-9910.

ERROR ON JAXX
WILL NOT GO HIGH

The analyzer cannot make the displayed test point go logic high. Look for possible connections to ground, or to a negative voltage source. If no such connections are present, there may be a malfunction in the analyzer. Call Cirris Systems for assistance at (801) 973-4600 or (800) 441-9910.

ROM DEVICE
CHECKSUM ERROR

The analyzer's internal ROM has failed. Call Cirris Systems for assistance at (801) 973-4600 or (801) 441-9910.

Having trouble with the printer?

If your printer prints "garbage" (or prompts `Printer Not Ready-Pin 4`) when you attempt to get a printout, be sure that the printer and the cable you're using are both serial devices. Check the printer's controls, and the cable connections at both the printer, and the analyzer. All OK? Try resetting the analyzer's baud rate (see page 13 for instructions on how to do this).

Appendix 1: Creating Fixtures for the 1000LC

Why create fixtures?

To use the 1000LC, you'll need to create fixtures that adapt the analyzer's male 64-pin IDC connectors to the connectors on the cables you want to test. To help you, we've included a 64-pin IDC ribbon cable with your analyzer, that you can use to create your first set of fixtures. We'll show you how to do these things:

- Check the ribbon cable and analyzer.

- Build fixtures.

- Verify fixture interconnections, and correct any shorts or opens.

- Document a Sample Cable connected to your fixtures.

Checking the analyzer and the ribbon cable

Before you start building fixtures with the 64-pin IDC ribbon cable, connect it to the analyzer and check that it has the right signature. Do these things:

1. Install the ribbon cable onto the connectors marked JA and JB on the analyzer.

2. Press the ON button. When the analyzer prompts USE LAST CABLE, press the LIST button (for No).

3. Press the ENTER button (for Yes) when the analyzer prompts LEARN CABLE.

The analyzer should prompt LEARNING CABLE, then change to CABLE SIG:E3248D. This is the correct signature for the ribbon cable.

Note: If the analyzer doesn't prompt the signature E3248D, you might not have the connectors firmly seated in positions JA and JB. Check the connectors to make sure they're seated well, then turn off the analyzer and repeat steps 1 through 3. If the signature still doesn't match, you have a bad cable. Press the LIST button and step through the cable's wirelist data. The cable's connectors should be wired one-to-one. Compare the data prompted on the analyzer's display with the cable documentation included at the end of this appendix.

Building fixtures

Here we'll explain how to build two different fixtures using the ribbon cable we've provided. Your specific cable requirements may vary, however, the basic principles apply for creating fixtures for all kinds of cables and connectors. To begin, do these things:

1. Cut the 64-pin ribbon cable in half.

2. Starting with wire #1 (the brown wire) peel back however many wires you need on each half of the ribbon cable, to attach to the connector you intend to use for your fixture. (**Note**: Whether you peel wires back individually, or in groups will depend upon the type of connectors you use.)

3. Locate pin #1 in your connector.

4. Connect wire #1 to pin #1 on the connector.

5. Continue to connect all the ribbon cable wires to the corresponding pins in the connector for your fixture.

Verifying fixtures   Once you've created your fixtures, you need to verify that they're built correctly. This will eliminate the problem of running into errors when you're testing a cable, only to discover that the error isn't in the cable you're testing, but in the fixturing.

Fixing shorts   A correctly wired fixture does not have any connections between its test points. Therefore, the fixture shouldn't have a signature. To check for shorted connections in your fixturing cable, do these things:

1. Install the first fixture in connector JA on the 1000LC.

2. Press the ON button. When the analyzer prompts USE LAST CABLE, press the LIST button (for No).

3. Press the ENTER button (for Yes) when the analyzer prompts LEARN CABLE.

   • If there are no short circuits in the fixture, the analyzer will briefly prompt LEARNING CABLE. The prompt will then change to ATTACH CABLE TO TESTER.

   • If the cable has a short circuit, the analyzer will briefly prompt LEARN- ING CABLE; then the prompt will change to CABLE SIG:XXXXXX TEST LIST. To locate the short(s), press the LIST button and step through the cable data. As you determine which points are shorted, cor- rect them. Repeat the procedure to make sure the error(s) no longer exist.

4. Repeat this procedure with the second fixture.

Fixing opens   After you've checked your fixturing for short circuits, you need to verify that no wires are missing, and that all the test points correspond to the connectors on the ana- lyzer. To check for open circuits, do these things:

1. Plug the probe into the PROBE port on the analyzer's back panel.

2. Install the first fixture in connector JA on the analyzer.

3. Short any two pins in the new mating connector with a jumper wire or a clip lead.

4. Press the ON button. When the analyzer prompts USE LAST CABLE, press the LIST button (for No).

5. Press the ENTER button (for Yes), when the analyzer prompts LEARN CABLE.(The analyzer will briefly prompt LEARNING CABLE. The prompt will then change to CABLE SIG:XXXXXX. TEST LIST.)

6. Remove the jumper wire or clip lead. Use the tip of the hand-held test probe to

touch each pin position on the fixture's connector.

- If the fixture isn't missing any connections, the analyzer will prompt each point as you touch it with the probe. Compare each point with your connector to be sure they're in the right order.

- If the fixture has a missing connection, the analyzer will not prompt a test point when you touch a position with the probe. No response indicates that an open is present. An incorrect test point number indicates swapped wires. As you locate errors, correct them. Repeat steps 1 through 5 to make sure the error(s) no longer exist.

7. Repeat this procedure with the second fixture.

Preparing your test setup with new fixtures

Now that you've verified that your fixtures are built correctly, you can use them to prepare your test setup. Do these things:

1. Install the fixtures in the connectors marked JA and JB on the 1000LC.

2. Connect a Sample Cable to the fixtures.

3. Press the ON button. Press the LIST button (for No) when the analyzer prompts USE LAST CABLE.

4. Press the ENTER button (for Yes) when the analyzer prompts LEARN CABLE.(The analyzer will briefly prompt LEARNING CABLE. The prompt will then change to CABLE SIG:XXXXXX TEST LIST.

5. Press the LIST button to step through the cable data. Write down the connections prompted in the analyzer's display.

6. Compare the written wirelist with the original build list or spec sheet that describes the Sample Cable's pattern of interconnections.

- If the two lists match, the analyzer is ready to test cables.

- If the two lists don't match, repeat steps 1 through 6 using another Sample Cable.

Documenting your setup

It is important that you record enough information about your test setup so you can reproduce it. We recommend that you take time to do these things:

- Record the Sample Cable's signature. This represents the cable's pattern of interconnections.

- Write down the type of fixtures, their test point configuration, and which one goes in connector JA and JB.

- Record the Sample Cable's wirelist (its list of interconnections arranged by nets).

- Did you connect several small connectors to the same ribbon cable used for your fixtures? If so, did you offset them to avoid sharing the same test points? Write it down.

- Did you connect your fixtures one-to-one, or did you choose another pin order? Write it down.

You can write this information on a sheet of paper (as a wirelist), or record it in a Cable Token, noting the cable's signature and name on the Cable Token card.

Options to consider when designing fixtures

Here are a few suggestions you might consider when you're designing and building your fixtures:

Using more than one connector per fixture. If you have several different connectors with small numbers of points, you may want to connect them to a single set of fixtures. Start with test point JA01 for the first connector, JA21 for the second connector, etc. This will help you recognize each connector by pin position.

Daisy chain fixtures. For several different connectors, each with many points, use a series of mating IDC connectors attached in a daisy chain sequence, each following the last on the adapting cable.

Custom numbering on IDC connectors. For popular IDC connectors such as D-subs or Centronics, just add the mating connectors you need to the end of the fixture cable. Although it may seem easy, note that the pin number follows the conductor number of the flat ribbon cable. If you have discrete wires in your cables, you may want to wire your fixture to a discrete connector so you can order the pin numbering the way you want.

0.1" dual-row headers

For testing connectors 0.1" dual-row headers with fewer pins than the connectors used on the analyzer, you have several options:

- You can purchase the male versions of the connectors from Panduit (part number 057-XXX-135S, where XXX is the number of pins in the connector, from Thomas and Betts (part number 622-6406ES), or from 3M (part number 4664-7201).

- You can also use an adapting cable like the 64-pin ribbon that we've supplied, and plug the male header with wire-wrap-length pins into the end. However, if you do this, even-numbered pins become odd-numbered because of the way the header connectors relate to each other.

Different types of connectors on the same fixture

You can consolidate different types of connectors on the same fixture. To do this, build a fixture cable that has two or more connectors forming a "Y," or many connectors sprouting from one 64-pin connector. This eliminates the need for more 64-pin headers like those on the analyzer.

Specifications

Test point capacity: 128 points (two 64-pin connectors provided on analyzer; user creates fixturing).

Test voltage: 9 volts (current limited to 1.8 mA).

Sensitivity: Interconnections (connections, open circuits, short circuits) are detected at a single threshold of $4K\Omega \pm 20\%$.

Max. capacitance: 0.1 microfarad (effective for most cables shorter than 5000 feet).

Testing rate: 0.5 seconds per test for cables shorter than ten feet.

Signature: Six-digit hexadecimal. This is a code derived from the cable's pattern of interconnections.

Display: Two-line 16-character Liquid Crystal Display (LCD).

Memory: Internal memory stores last cable (last test setup) learned (with backup). External memory on Cable Tokens, one cable per token.

Printer output: RS-232 serial port using DB9 female connector. Data rates of 300, 1200, 9600 baud, 8 data bits, no parity.

Hand-held test probe: For point identification. Input jack accepts standard 0.175" banana plug.

Temp. range for operation: 40 to 110 degrees F, 5 to 45 degrees C.

Power options: 9-volt wall transformer (110-135 VAC, 50-69 Hz., 0.2 watts to 9-volt), standard 9-volt battery (NEDA 1604) 25 hours on 500mA hour alkaline battery or 5 hours on 7.2 volt 100mA hour NiCad. NiCad can be recharged in place using the 1000LC's AC adapter. To save battery power, the analyzer will power down after being left idle for approximately 5 minutes.

You may use a standard 9-volt Nickel Metal Hydride (NmH) battery to power the analyzer. This battery **cannot** be recharged using the charging circuit built into the 1000LC. You should leave the analyzer's jumper block configured for an **alkaline** battery. To recharge the Nickel Metal Hydride battery, you should remove it from the 1000LC, and charge the battery using an external battery charger designed for charging Nickel Metal Hydride batteries. Reinstall the battery as if it were a standard alkaline type. A fully-charged Nickel Metal Hydride should power the analyzer for about 8 hours.

Size: 8.5"Wx 5.5"Dx2.2"H or 21Wx13.5Dx5.5H cm.

Weight: 1.10 pounds, 0.50 kilograms.

Glossary

alkaline battery
A long-life 9-volt conventional battery that cannot be recharged using the charging circuit in the Cirris 1000LC. When this battery goes "dead," you should replace it with a new, fully-charged battery.

baud rate
The number of signal events per second at which data is sent. Can be roughly equivalent to the number of characters per second being sent to a printer by the 1000LC.

cable data
The learned pattern of interconnections that the analyzer sees as representing a cable.

cable signature
A six-character hexadecimal code that changes with any change in interconnections within a cable. Valid characters include the numbers zero through 9, and the letters A through F.

Cable Token
A small memory device which can store data for one cable. The 1000LC's Cable Token Contact is used to do read/write operations on these tokens. Visually, the tokens resemble the small "button" batteries used in cameras, calculators, etc.

connector position
The 64-pin IDC connectors labeled JA and JB found on the analyzer's top panel. The two connectors provide a total of 128 test points.

documentation, build list, spec sheet
Written material (wirelists, diagrams, etc.) which defines precisely how a cable should be constructed.

fixtures, fixturing
The adapters you build to allow the cables you intend to test to mate to the analyzer's two 64-pin IDC connectors.

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

logic low
In digital logic, that voltage level which the system uses to represent a zero.

logic high
In digital logic, that voltage level which the system uses to represent a one.

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").

NiCad battery
A special 9-volt battery which can be recharged repeatedly in-place using the 1000LC's charging circuit and AC adapter.

Nickel Metal Hydride (NmH) battery
A special 9-volt battery which can recharged using an external charger designed for Nickel Metal Hydride batteries. This type of battery <u>cannot</u> be recharged using the internal charging circuit built into the Cirris 1000LC. You should leave the analyzer's jumper block configured for an **alkaline** battery. Remove the Nickel Metal Hydride cell from the analyzer, recharge the battery using the appropriate external charger, then reinstall the battery as though it were a standard alkaline type.

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

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

Sample Cable
A cable that has been carefully built to specifications. The analyzer learns the pattern of interconnections in this cable, stores this data, then compares the data from cables you're testing against this data. If the data is the same, the cable you're testing is "good." If the data is different, the cable you're testing is "bad."

short
A type of interconnection error where there is continuity between two connector pins that has not been shown in the documentation. Simply stated, this is an unintended connection.

test set up
Preparing the analyzer for testing cables using your documentation as a guide.

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