II. CONNECTIONS

WARNINGS

BEFORE PLUGGING IN THE ML4400 TO AN AC POWER SOURCE, VERIFY THAT THE CORRECT VOLTAGE (115 OR 230) HAS BEEN SELECTED VIA THE VOLTAGE SELECTOR SWITCH AT THE UPPER RIGHT OF THE REAR PANEL.

DO NOT INSERT OR REMOVE ANY CAPTURE MODULE, AND DO NOT CONNECT OR DISCONNECT ANY LOGIC POD OR MICROPROCESSOR POD FROM THE ML4400, WITHOUT FIRST POWERING DOWN THE ML4400 VIA THE POWER SWITCH AT THE LOWER RIGHT OF THE REAR PANEL. FAILURE TO DO SO MAY DAMAGE THE UNIT.

A. MAINFRAME AND CAPTURE MODULES ("Capture Cards")

The ML4400 Capture Modules (SC-4400 and HS-4400) simply slide in and out of their horizontal slots in the mainframe, located behind the hinged front-panel keyboard. To access the four Capture Module slots, depress the keyboard release button on the bottom of the unit, just behind the "X" key on the key-pad, then pull the keyboard out and up. A swivel-out bar at the upper margin of the opening will prop the keyboard up.

The two 64-socket connectors on the rear of the Module mate with the pin connectors of the Mother Board at the rear of the analyzer. The two 50-pin connectors at the front of the Module remain easily accessible to the user for mating with the socket connectors of a Logic Pod or Microprocessor Pod.

B. CAPTURE MODULES ("CARDS") AND 100-, 200-, AND 400-MHZ LOGIC PODS

Three of the four Logic Pods--the 100-MHz (LP-4050), the 200-MHz (LP-8200), and the 400-MHz (LP-4400)--connect directly to the Capture Modules. [For the Expansion Logic Pod (LP-8025), see Section II-A.3, below.] The installed Capture Modules are accessible via the hinged front-panel keyboard.

NOTE: The 100-MHz Logic Pod is used only with the Standard Capture Module (SC-4400), and the 200-MHz and 400-MHz Logic Pods are used only with the High-Speed Capture Module (HS-4400).

The 100-MHz Pod has two cables that each terminate with a 40-socket connector; these connectors mate with the two 40-pin connectors of the Standard Capture Module.

The 200-MHz Pod has two cables that each terminate with 50-socket connectors which mate with the two 50-pin connectors of the High-Speed Capture Module.

The 400-MHz Logic Pod has five cables that each terminate with a 50-socket connector. At least two of these connectors mate with the the two pin connec-

tors on one High-Speed Capture Module; this gives the user four-channel operation. To add channels in increments of four (up to a total of sixteen), connect one more Logic Pod cable to one more High-Speed Capture Module. (When using more than one Capture Module with the 400-MHz Logic Pod, only the first Module has two Logic Pod cables connected to it; the other three Modules each have only one cable.)

Then, (for all three pods), to fully seat the connector pins in the sockets, push the four latch/ejectors on the Capture Module connector inward. (To remove the Logic Pod, reverse this procedure; i.e., push these latch/ejectors outward to eject the Pod's socket connectors.)

The Pod cables feed through an opening in the bottom of the ML4400 so that the hinged keyboard may be easily closed after connecting the Pods.

C. 100-MHZ LOGIC POD AND EXPANSION LOGIC POD

The fourth Logic Pod, the Expansion Logic Pod (LP-8025), does not connect with a Capture Module, but with a 100-MHz Pod. The Expansion Pod has a 60-pin socket connector which mates directly with the 60-pin connector on the side of the 100-MHz Pod (there is no cable between the two).

D. LOGIC POD AND SYSTEM UNDER TEST (VIA PROBES)

1. LOGIC POD PROBE SETS

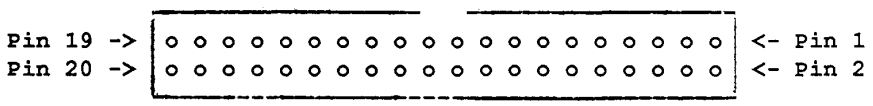
The 100-MHz Logic Pod (LP-4050) has five sets of probe wires for connecting the Pod to the circuit under test. Four of these sets are identical, with each containing ten twisted pairs of wires that function as ten data probes and ten ground wires, for a total of 40 data probes, each with its own ground. The fifth probe set contains six pairs of wires: four for the External Clock, two Clock Qualifiers, and six grounds.

The Expansion Logic Pod (LP-8025) has the same four probe sets (each with ten pairs of wires) as does the 100-MHz Logic Pod. But the Expansion Pod doesn't have a fifth (six-pair) probe set because it operates as an extension of the 100-MHz Pod, and so uses that Pod's six-pair probe set (for the External Clock, Clock Qualifiers, and grounds).

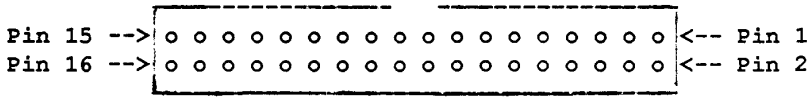
The 200-MHz and 400-MHz Logic Pods each have two ten-pair probe sets which appear identical to the four probe sets of the 100-MHz Pod. However, their functions differ slightly because these Pods have no separate probe set for the External Clock and Clock Qualifier; instead, they use two of the ten wire pairs on one set for these functions and their grounds, and two wire pairs are unused. This leaves eight data wires on each set. Each of these Pods, then, accommodates a total of 16 data wires.

2. PIN ASSIGNMENTS ON POD CONNECTORS

(View is looking toward the connectors on the Pod.)



20-Pin Connector



16-Pin Connector

3. PROBE CLIPS

Two types of probe clips are available (and selectable at time of purchase): a microhook and a two-part clamp. In addition, when either of these types of probe clips is disconnected from its wire, a sleeve socket attached to the end of each wire provides an alternate method of connecting the wire to the circuit pin under test.

4. PROBE SET COLOR CODING

Each data wire and its probe cap and probe tip are color-coded with the standard electronic color code, and Wires 0-1 are connected to the odd pin numbers (1-19), respectively. All ground wires are beige, with black caps and black tips, and are connected to even-numbered connector pins.

Figures II-A, II-B, and II-C, below, list the color coding schemes for the LP-4050 ten-pair set, the LP-4050 six-pair set, and the LP-8200/LP-4400 ten-pair set. These color coding schemes are also available onscreen and can be accessed via the S. FUNC key, then the PROBE COLORS softkey (F4). Only the scheme applicable to the active ML4400 configuration will be displayed.

NOTE: The color coding of a probe tip corresponds to the ML4400 probe number; the color coding of a probe wire corresponds to the pin connector number on the Pod. These two sets of colors do not correspond on a one-to-one basis, but are offset by one; see the probe color schemes in the three figures below.

Figure II-A

PROBE COLOR CODES
FOR LP-4050/LP-8025 TEN-PAIR SET

Conn. Pin No.	Color			Probe Number*			
	Wire	Cap	Tip	1st Set	2nd Set	3rd Set	4th Set
1	Brown	Gray	Black	0	10	20	30
3	Red	Gray	Brown	1	11	21	31
5	Orange	Gray	Red	2	12	22	32
7	Yellow	Gray	Orange	3	13	23	33
9	Green	Gray	Yellow	4	14	24	34
11	Blue	Gray	Green	5	15	25	35
13	Violet	Gray	Blue	6	16	26	36
15	Gray	Gray	Violet	7	17	27	37
17	White	Gray	Gray	8	18	28	38
19	Black	Gray	White	9	19	29	39
Evens	Beige	Black	Black	Grd	Grd	Grd	Grd

* Depends upon which Pod connector the probe set connects to.

Figure II-B

PROBE COLOR CODES
FOR LP-4050 SIX-PAIR SET

Conn. Pin No.	Color			Probe Number
	Wire	Cap	Tip	
5	Brown	Red	Brown	Clock 1
7	Red	Red	Red	Clock 2
9	Orange	Red	Orange	Clock 3
11	Yellow	Red	Yellow	Clock 4
13	Green	Blue	Brown	Qual. 1
15	Blue	Blue	Red	Qual. 2
Evens	Beige	Black	Black	Ground

Figure II-C

PROBE COLOR CODES
FOR LP-8200/LP-4400 TEN-PAIR SET

Conn. Pin No.	Color			Probe Number	
	Wire	Cap	Tip	1st Set	2nd Set
1	Brown	Gray	Black	0	8
3	Red	Gray	Brown	1	9
5	Orange	Gray	Red	2	10
7	Yellow	Gray	Orange	3	11
9	Green	Gray	Yellow	4	12
11	Blue	Gray	Green	5	13
13	Violet	Gray	Blue	6	14
15	Gray	Gray	Violet	7	15
17	White	Gray	Gray	Ext.Clock	Not used
19	Black	Gray	White	Qualifier	Not used
Evens	Beige	Black	Black	Ground	Ground

E. STANDARD CAPTURE MODULE AND MICROPROCESSOR PODS

Some of the Microprocessor Pods connect directly with the Standard Capture Module, while others require the use of an intermediary Adaptor pod (AD-4100), as explained below.

NOTE: The Microprocessor Pods are not used with the High-Speed Capture Module, nor is the Adaptor.

1. ADAPTOR FOR ML4100 MICROPROCESSOR PODS (AD-4100)

Many of the ML4400's Microprocessor Pods were originally designed as part of the earlier ML4100 Logic Analyzer system. Each of these ML4100 Pods is fully functional with the later ML4400 system, but requires using an Adaptor (AD-4100), an optional accessory, as an intermediary between it and the Capture Module. The user needs one Adaptor per Microprocessor Pod, up to a maximum of four (since four is the maximum number of Microprocessor Pods that can be used simultaneously by the ML4400 system).

The ML4100 Microprocessor Pods, all of which require this Adaptor, are:

8I-080	Intel 8085, 8031/32, 8035/39/40
16I-086	Intel 8086/8088 (with 8087)
8M-080	Motorola 6800, 6802/6808
8M-089	Motorola 6809, 6809E
16M-680	Motorola 68000, 68010
8N-080	NSC800
8R-065	Rockwell 6502, 65CX02, 6512, 65C112
8Z-080	Zilog Z80

The ML4100 Serial Analysis Data Pod (8RS-232) also requires this Adaptor.

2. STANDARD CAPTURE MODULE AND ADAPTOR OR ML4400 MICROPROCESSOR POD

The ML4400 Microprocessor Pods (excluding the ML4100 Pods, listed above in Section II.A.5.a) and the Adaptor (for use with the ML4100 Pods) connect directly to Standard Capture Modules. The two 40-socket connectors at the ends of the 2-inch-wide cables of the Pod or Adaptor mate with the two 40-pin connectors of the Capture Module (accessible via the hinged front-panel keyboard).

Then, to fully seat the pins in the sockets, push the four latch/ejectors on the Capture Module connector inward. (To remove the Microprocessor Pod or the Adaptor, reverse this procedure; i.e., push these latch/ejectors outward to eject the pod's socket connectors.)

The Pod cables feed through an opening in the bottom of the ML4400 so that the hinged keyboard may be easily closed after connecting the Pods.

3. ADAPTOR AND ML4100 MICROPROCESSOR POD

The ML4100 Microprocessor Pods (listed above in Section II-A.5.a) connect to the Adaptor (which is connected directly to a Standard Capture Module). The 60-socket connector at the end of the Microprocessor Pod's 3-inch-wide cable mates with the 60-pin connector of the Adaptor.

F. MICROPROCESSOR POD AND MICROPROCESSOR

The Microprocessor Pod cable labeled "Processor Clip" terminates in a DIP clip. To connect the Pod to the microprocessor, simply clamp the DIP clip directly onto the target microprocessor, taking care to align Pin 1 on the microprocessor with Pin 1 on the cable (refer to the Pod label).

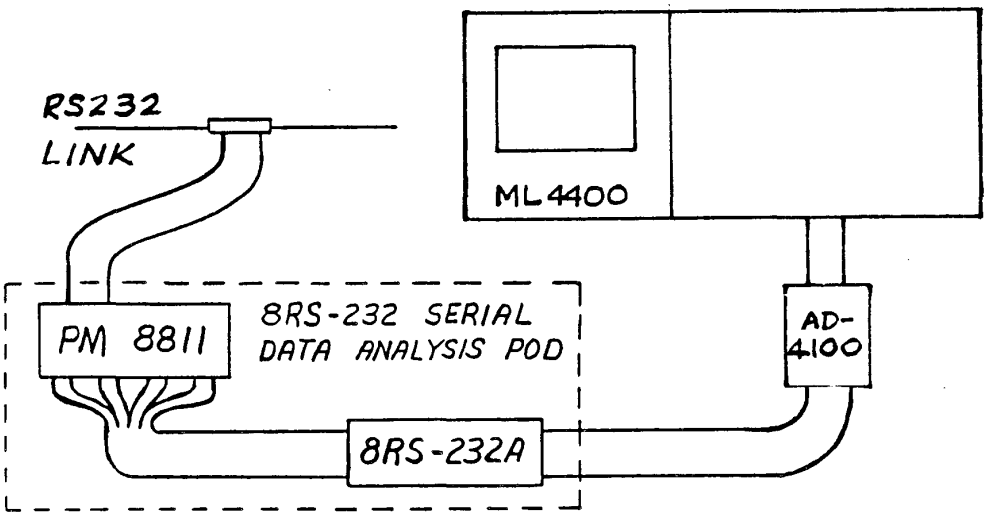
The probe color codes for the Microprocessor Pods are given in the sections of this manual describing each Pod (Sections V, VI, and VII, for 8-bit, 16-bit, and 32-bit Pods, respectively).

G. OPTIONAL PERIPHERAL EQUIPMENT

1. SERIAL DATA ANALYSIS POD (8RS-232)

The Serial Data Analysis Pod consists of two parts: an Arium 8RS-232A plus a Philips Serial Data Pod (PM8811). (NOTE: This pod requires the use of one Adaptor (AD-4100) per pod.)

Figure II-D



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a. Arium Pod (8RS-232) and Philips Pod (PM8811)

The Arium and Philips pods are connected by a cable attached to the Arium pod which is labeled "TO PM8811" and sublabeled "CLOCK/STATUS, STATUS, DATA, CONTROL", and which terminates in four 15-socket connectors. These connectors mate with the four 15-pin connectors (with matching sublabels) on the side of the PM8811.

b. Arium Pod, Adaptor, and Standard Capture Module

The unlabeled Arium Pod cable terminates in a 60-socket connector; this mates with the 60-pin connector on the 3-inch-wide cable of the Adaptor. The socket connectors of the Adaptor's other (2-inch-wide) cables then mate with the pin connectors on a Standard Capture Module (behind the hinged keyboard).

c. Philips Pod and RS-232 Link

The Philips Pod comes with a cable which terminates in a D-shell connector on one end and a "T" connector (twin D-shells) on the other end. The socket connector mates with the Pod connector labeled "RS232C/V24", and the "T" connector attaches to the external RS232C link.

2. ROM EMULATOR POD(S) AND ML4400

The ROM Emulator Pod cable connecting it with the mainframe has a 16-socket connector at its Pod end, which mates with the 16-pin connector labeled "IN" on the Pod. The other end terminates in a D-shell connector, which mates with the connector on the ML4400 rear panel labeled "ROM EMULATOR".

If a second ROM Emulator Pod is being used, a second cable connects the first Pod's pin connector labeled "OUT" with the second Pod's "IN" connector.

Two different kinds of ROM plug cables are used to connect the Pod to the system under test, depending upon the size of the ROM to be emulated. Both cables terminate at the Pod end in a 26-socket connector, which mates with the 26-pin connectors labeled "ROM PLUGS" on the Pod. The other end is a ROM plug that has either 24 pins or 28 pins.

Each pod will emulate up to four 2716s, up to four 2732s, up to two 2764s, and one 27128.

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