



# Instructions

## 12RM99 MNEMONICS ROM PACK

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When the 12RM99 Mnemonics ROM Pack is purchased with no option specified, it can be programmed to configure a 1240 Logic Analyzer to acquire and disassemble data from the microprocessor of your choice. This manual contains generic information, including the blank tables on pages 3 & 4 and 7 & 8. You can fill in these tables to correspond with the way you program the pack.

When the 12RM99 is purchased with one of the options that preprogram it for a particular microprocessor, you should substitute the specific version of pages 3 & 4 and 7 & 8 for the generic ones that appear in this manual.

Insert this manual at the back of your *1240 Logic Analyzer Operator's Manual*, or in the 1240 Optional Accessories binder.

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**PLEASE CHECK FOR CHANGE INFORMATION  
AT THE REAR OF THIS MANUAL**

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## OVERVIEW

### THIS MANUAL

This manual describes the use of the 12RM99 Mnemonics ROM Pack. When it has been correctly programmed, the 12RM99 Mnemonics ROM Pack can configure a 1240 Logic Analyzer for use with one of many microprocessors. This manual explains how to connect the 1240 to the microprocessor, how to acquire data, and how to display the acquired data. It also describes the four data display formats available when a 12RM99 Mnemonics ROM Pack is installed in the 1240 and how you can get a printout of these state table displays.

### OTHER MANUALS

To use the 12RM99 Mnemonics ROM Pack, you should also be familiar with the operation of the 1240 Logic Analyzer and the microprocessor that the 12RM99 is to be used with. Refer to the *1240 Logic Analyzer Operator's Manual* and the manufacturer's microprocessor manual.

### OPTIONS AND SUBSTITUTE PAGES

When you order the 12RM99 with an option, it comes preprogrammed for use with a particular microprocessor. When ordered for a particular microprocessor, substitute manual pages are included which replace pages 3 & 4 and 7 & 8 of this manual.

### 40-PIN UNIVERSAL PROBE INTERFACE KIT (UPIK40)

If your microprocessor is in a 40-pin DIP package, you can purchase a UPIK40 to provide the necessary connections to the processor. You can make your connections once to configure the UPIK40, then use it to make repeated reconNECTIONS to your microprocessor quickly and easily.

## ROM PACK INSTALLATION

### MINIMUM CONFIGURATION

In order to acquire data from a microprocessor using the 12RM99 Mnemonics ROM Pack, it is necessary to have a 1240 Logic Analyzer equipped with the correct number of 1240D2 18-channel Data Acquisition Cards to support the microprocessor being disassembled. This is normally two 1240D2s for 8-bit microprocessors, three for 16-bit ones.

#### NOTE

*The 12RM99 Mnemonics ROM Pack will not set up the 1240 or disassemble data when it is installed in a 1240 with less than the correct number of 1240D2 acquisition cards.*

## INSTALLING THE ROM PACK

**CAUTION**

*Static discharge can damage the semiconductor devices in a Mnemonics ROM Pack. Discharge static from a pack before installing it by momentarily laying the pack, label side up, on the top of the 1240.*

To install the 12RM99 Mnemonics ROM Pack in your 1240 Logic Analyzer, locate the slot on the right side of the instrument, beneath the probe connectors. Insert the connector end of the ROM Pack, with the label up, past the hinged slot cover and into the memory pack connector. (The mechanical design of the pack ensures that it cannot be installed incorrectly.) Refer to Figure 1.

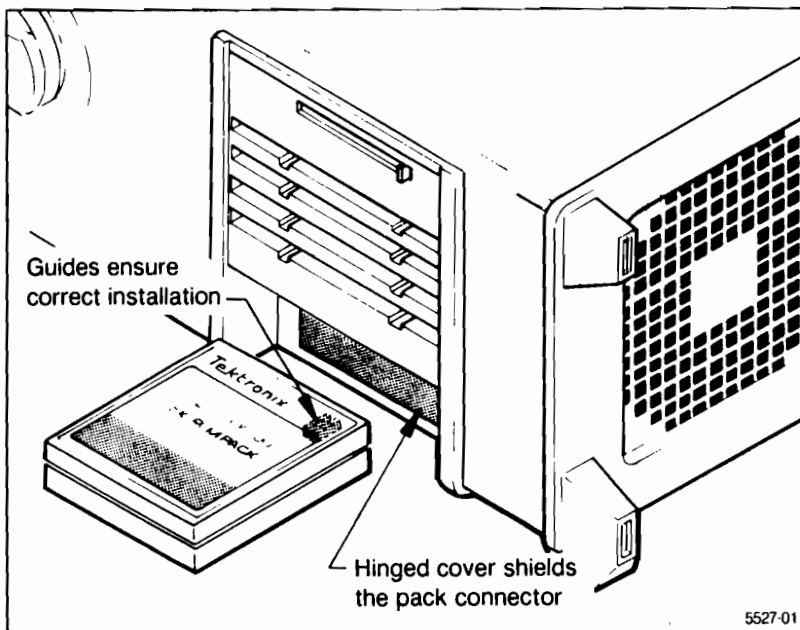


Figure 1. Installing the ROM Pack in a 1240.

## LOADING THE ROM PACK CONTENTS

**NOTE**

*The 1240 should use the same power ground as the system under test. Otherwise, differences between system grounds may cause inconsistent acquisition.*

If the 1240 has not been powered up, the contents of the ROM Pack will be loaded automatically at power-up. If the 1240 is on, enter the Storage Memory Manager menu, remove any other ROM Pack, install the 12RM99 Mnemonics ROM Pack, and press the LOAD NEW PACK soft key. The ROM Pack is now loaded.

**CAUTION**

*Do not remove the ROM Pack while you are in any menu other than Storage Memory Manager. Removing it at any other time may cause complete disruption of the 1240's internal memory. To restore the 1240, turn it off and back on.*

## REMOVING THE ROM PACK

To unload the ROM Pack from the 1240, enter the Storage Memory Manager menu, pull the ROM Pack straight out of the 1240 (it is not necessary to power down), and press LOAD NEW PACK.

**CAUTION**

*After removing the ROM Pack, do not leave the Storage Memory Manager menu without pressing the LOAD NEW PACK soft key. Doing so may cause complete disruption of the 1240's internal memory. To restore the 1240, turn it off and back on.*

## CONNECTING TO THE MICROPROCESSOR

Table 1 can be filled in to show how connections to the microprocessor should be made if the processor is in a 40-pin DIP package. If the microprocessor has a different package style, you will have to make your own table.

*NOTE*

*Be sure to connect a USER'S GND lead from each acquisition probe to the microprocessor ground. Otherwise, invalid data may be acquired.*

**Table 1**  
**MICROPROCESSOR PINOUT WITH POD AND CHANNEL ASSIGNMENTS**

1240 Pod, Ch.	Signal Name	Microprocessor Pin Numbers	Signal Name	1240 Pod, Ch.
		1	40	
		2	39	
		3	38	
		4	37	
		5	36	
		6	35	
		7	34	
		8	33	
		9	32	
		10	31	
		11	30	
		12	29	
		13	28	
		14	27	
		15	26	
		16	25	
		17	24	
		18	23	
		19	22	
		20	21	

**IF YOU BUY A UPIK40**

If your microprocessor is in a 40-pin DIP package, you can buy a Universal Probe Interface Kit (UPIK40) and configure your own probe interface.

If you use a UPIK40, you can fill out Table 2 to document its wiring. Indicate which pod and color of wire should be connected to the UPIK40's bus block. You should also label the lead sets in the UPIK40 with pod numbers appropriate to your 1240 pod and lead assignments.

**Table 2**  
**PROBE INTERFACE CONNECTIONS**

1	40
2	39
3	38
4	37
5	36
6	35
7	34
8	33
9	32
10	31
11	30
12	29
13	28
14	27
15	26
16	25
17	24
18	23
19	22
20	21

## THE SETUP SUPPLIED BY THE ROM PACK

When the 12RM99 Mnemonics ROM Pack is loaded into a 1240 with the appropriate number of 1240D2 cards, several things happen:

- The 1240 enters Operation Level 2, ADVANCED STATE ANALYSIS.

### NOTE

*If you manually leave level 2 for levels 0 or 1, you will ruin the setup supplied by the ROM Pack. (Using level 3 will not cause a problem.)*

- All 1240D2 chaining is turned off.
- The thresholds are set to TTL on the 1240D2s used by this ROM Pack.
- All polarities are set to 1 (positive - true) on the 1240D2s used by this ROM Pack.
- CNTL, ADDR, and DATA groups are established and clocked by T2.
- The radices of the CNTL group are set to BINary.
- The radices of the ADDR and DATA groups are set to HEXadecimal.
- Certain channels on the 1240D2s that are used for disassembly may be reserved for use by the 1240 in postprocessing the acquired data. Do not attempt to use these channels.

### NOTE

*If you attempt to use the 12RM99 Mnemonics ROM Pack in a 1240 that does not have a sufficient number of 1240D2s, the 1240 setup will not be modified.*

## MENU AND DATA DISPLAY DIFFERENCES

- The Timebase, Memory Config, and Channel Grouping menus are set up by the ROM Pack. Do not change these settings except as described in the subsection, *What You May Change* (following).
- Every menu that uses groups contains the CNTL, ADDR, and DATA groups set up by the ROM Pack.
- If a 1200C01 RS232C COMM Pack or a 1200C11 Parallel Printer COMM Pack is installed, the COMM PORT CONTROL menu is replaced by the LINE PRINTER OUTPUT menu. Line printer operation is described later in this manual.
- In the State Table display, GLITCHES ON/OFF is replaced by a FORMAT select field that allows you to choose a data display format. The choices are STATE, ABSOLUTE, HARDWARE, and SOFTWARE. The differences between these formats are discussed in detail later in this manual. You can still choose between GLITCHES ON or GLITCHES OFF in the Timing Diagram menu; the State Table display will reflect that choice.
- Depending on how the 12RM99 is programmed, a new soft key, MARK OPCODE, may also appear in the lower left corner of the State Table menu. If present, this key is used to help the 12RM99 Mnemonics ROM Pack correctly identify FETCH cycles at the beginning of memory or after discontinuities in the data. The use of this key is described later in this manual under the heading *Mark Opcode Key*.
- In the Timing Diagram display, the active cursor value at the bottom of the display is shown in STATE, ABSOLUTE, or HARDWARE format depending on the selection made in the State Table menu. (If you select SOFTWARE disassembly in the State Table menu, readouts in the Timing Diagram will appear in HARDWARE format.)

## WHAT YOU MAY CHANGE

Much of the setup provided by the 12RM99 Mnemonics ROM Pack cannot be disturbed without seriously impairing the disassembly of your data, but you can safely make the following modifications:

- You may change radices anywhere, but your choices will be ignored in some display formats.
- You may reorganize the CNTL group; the ROM Pack will retain its own internal grouping for processing purposes.
- You may change anything having to do with timebase T1; the 12RM99 Mnemonics ROM Pack only uses T2.
- You may change the configuration or grouping of any acquisition cards not used by the ROM Pack (as long as you do not chain the 1240D2s). The 12RM99 Mnemonics ROM Pack uses the highest-numbered 1240D2 (18-channel) acquisition cards.

### NOTE

*Do not chain your 18-channel cards. Doing so disrupts the setup supplied by the ROM Pack.*

## STORING AND USING A MODIFIED SETUP

When you have created and verified a modified setup for your 1240 that is compatible with the Mnemonics ROM Pack, you can store it and retrieve it using the following procedures:

### Storing a Modified Setup

- Go to the Storage Memory Manager menu (UTILITY key).
- Remove the Mnemonics ROM Pack.
- Install a RAM Pack, press LOAD NEW PACK, and store your setup (FILETYPE: SETUP, STORED IN: PACK).

### Using a Modified Setup

- Go to the Storage Memory Manager menu (UTILITY key).
- Install your RAM Pack, press LOAD NEW PACK, and load the file containing the modified setup.
- Store that setup in the 1240's internal RAM (FILETYPE: SETUP, STORED IN: RAM).
- Remove the RAM Pack, install the Mnemonics ROM Pack, and press LOAD NEW PACK.
- Retrieve your modified setup from the 1240's internal RAM and proceed.



## DATA QUALIFICATION AND TRIGGERING

### IDENTIFYING CYCLE TYPES

To use either the Global or Sequential Event Recognizers effectively, you need to be able to identify cycle types. Cycle types are decoded from the channels of the CNTL group. Fill in Table 3 with the names of the signals in the CNTL group. Then fill Table 4 with specific cycle types and the CNTL group values that correspond to them.

**Table 3**  
**CNTL GROUP SIGNALS**

CHAN.	SIGNAL NAME
7	
6	
5	
4	
3	
2	
1	
0	

**Table 4**  
**IDENTIFYING CYCLE TYPES**

CYCLE TYPE	CNTL GROUP 7654 3210

### SPECIFYING CYCLE TYPES

To specify a particular cycle type as a condition for data qualification or triggering, enter the values shown in Table 4 for that cycle type in the CNTL field of the event recognizer.

**CNTL Group Modification.** You may split up the CNTL group, or rearrange its channels, or change its radix, without affecting disassembly. The ROM Pack maintains for its internal use a version of the group as it originally set it up. This allows you to take individual channels out of the CNTL group or create your own sub-groups with names that suggest the sub-set of channels you include or the way you are using them. (Of course, reorganization of the CNTL group means that you can no longer use the values in Table 4.)

## RESERVED CHANNELS

Frequently, the post-acquisition process will generate additional cycle type information. You can use the un-used channel 8 of any of the pods used by the ROM Pack to store this information. Record how these channels are used on this page to complete documenting your own version of the 12RM99.

## DISPLAYING DISASSEMBLED DATA

This section uses sample menu displays from the 12RM21 6800 Mnemonics ROM Pack. If your 12RM99 has been preprogrammed with an option, expect certain differences.

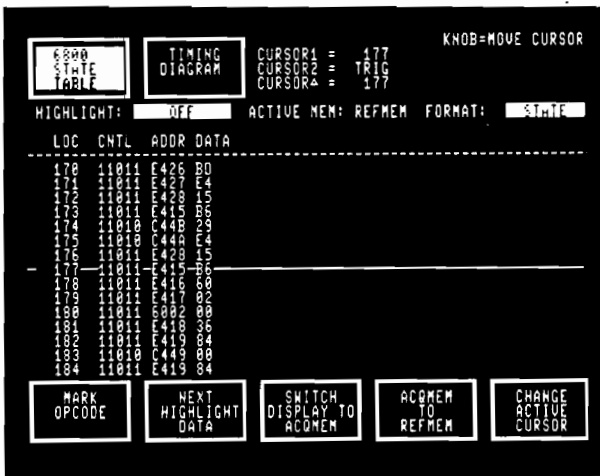
### DISPLAY FORMATS

The mnemonics and cycle-type information generated by the 12RM99 Mnemonics ROM Pack is available in the STATE TABLE display (accessed by pressing the DATA key). You have three choices of disassembly formats in addition to the standard state table display. You select the display format by placing the blinking field cursor in the FORMAT field and using the SELECT keys to indicate your choice.

#### NOTE

*If you attempt to use the 12RM99 Mnemonics ROM Pack in a 1240 that does not have at least the correct number of 1240D2s, you will get an INSUFFICIENT 1240D2 CARDS TO SUPPORT DISASSEMBLY message in the State Table menu and only the (standard) STATE TABLE display format will be available.*

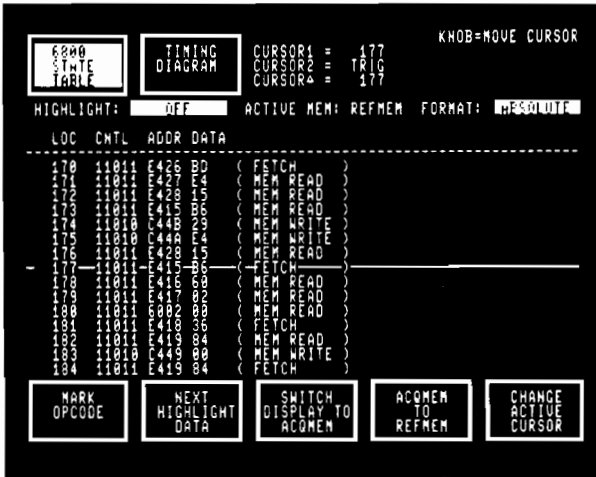
**STATE.** This is the standard 1240 State Table format that you get without the 12RM99 Mnemonics ROM Pack installed. This format is also the only one available in AUTO-RUN or when you have fewer than the required number of 1240D2 cards installed (FORMAT field is not present). Look at Figure 2.



4839 01

Figure 2. STATE format is standard without the ROM Pack.

**ABSOLUTE.** This format is like the STATE format, but is enhanced by the addition of cycle-type information. Look at Figure 3.



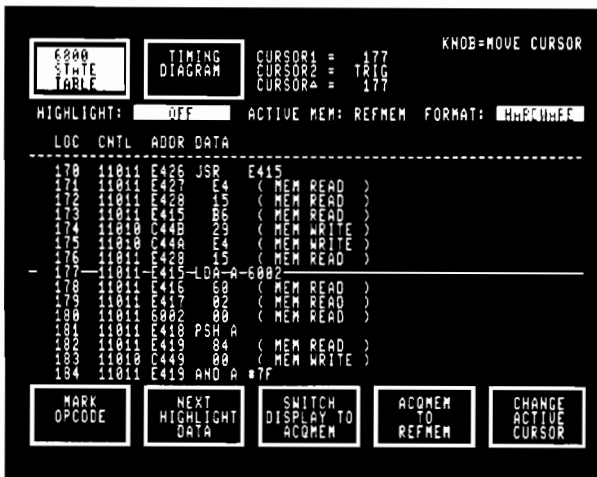
4839 02

Figure 3. ABSOLUTE format adds cycle type information.

**HARDWARE.** In this format, instruction mnemonics are displayed in the DATA group on opcode fetch cycles, and cycle-type information is provided on all other cycles.

**NOTE**

User choices of display radix are overridden in the HARDWARE display format. The ADDR and DATA groups are always shown in HEX. To see the data in these groups in your choice of radix, use the FORMAT select field to switch back and forth between this format and ABSOLUTE or STATE.



4839 03

Figure 4. HARDWARE format shows instruction mnemonics.

**SOFTWARE.** This display format is designed to look like a source code listing and thus make analysis of the program flow easier. It is similar to **HARDWARE** except that all groups other than **ADDR**, **CNTL**, and **DATA** are suppressed, and certain bus cycle types (such as **DMA**s) may be suppressed.

The suppression of cycles resulting from the transition from any other format to **SOFTWARE** may cause the data cursors to move.

#### NOTE

*User choices of display radix are overridden in the **SOFTWARE** display format. The **ADDR** and **DATA** groups are always shown in **HEX**. To see the data in these groups in your choice of radix, use the **FORMAT** select field to switch back and forth between this format and **ABSOLUTE** or **STATE**.*

```

6000 STATE TABLE
TIMING DIAGRAM
CURSOR1 = 177
CURSOR2 = TRIG
CURSOR4 = 177
KNOB=MOVE CURSOR

HIGHLIGHT: OFF ACTIVE MEM: REFMEM FORMAT: SOFTWARE

LOC  CNTL  ADDR  DATA
-----
164  11011  4440  F4 ( MEM READ )
165  11011  4440  F29 ( MEM READ )
166  11011  4229  BIT A #88
168  11011  4229  BIT A #426
170  11011  4229  JSR #415
174  11011  4440  F29 ( MEM WRITE )
175  11011  4440  F4 ( MEM WRITE )
177  11011  4440  LDA #002
180  11011  0000  PSH A ( MEM READ )
182  11011  0000  PSH A ( MEM WRITE )
184  11011  0000  AND A #7F
185  11011  0000  CMP #17
188  11011  4440  BCC #E421
190  11011  4440  PUL A

```

MARK OPCODE    NEXT HIGHLIGHT DATA    SWITCH DISPLAY TO ACQMEM    ACQMEM TO REFMEM    CHANGE ACTIVE CURSOR

4839 04

Figure 5. **SOFTWARE** format suppresses non-fetch instruction reads.

## MARK OPCODE KEY

If present, this soft key is used to re-invoke the algorithm that processes data just after it has been acquired. You use this key to help the 12RM99 Mnemonics ROM Pack correctly identify a FETCH cycle, as distinguished from other MEM READ cycles.

This key will be present if the microprocessor does not provide a means for determining whether a particular MEM READ cycle is actually a Fetch read, an Operand Data read, or Garbage read. Consequently, when the ROM Pack begins to process data at the beginning of memory, it has to make an assumption that may not be valid, i.e., that the first MEM READ cycle that it encounters is a FETCH. If it was not really a FETCH, erroneous disassembly will occur. Even if the initial guess is correct, the processing algorithm may be thrown off again if:

- data qualification causes discontinuities in the acquired data.
- an illegal opcode is executed. The cycle-by-cycle operation of the microprocessor during the execution of illegal opcodes is unpredictable.

In any case, the disassembly algorithm may get back in sync with correct disassembly, but you can help the ROM Pack correct its faulty assumptions and make the disassembly correct throughout the acquired memory by using the MARK OPCODE soft key. You can tell that faulty disassembly has occurred from one of the following symptoms:

- You may get an *illegal opcode* indication.
- You may get a *missing data* indication.
- Or, you may simply get the wrong mnemonic at that point and have to consult your assembler program listing to verify that something is not right.

Once you identify a location where faulty disassembly appears to have occurred, use the MARK OPCODE soft key to fix the problem. The effect of pressing this key depends on the current identification of the cycle that the active cursor is on:

- If the active cursor is on a MEM READ cycle, that cycle is changed to a FETCH and the postprocessing algorithm is rerun from that point to the end of memory.
- If the active cursor is on a FETCH cycle, that cycle is changed to a MEM READ the next MEM READ in memory is found and changed to a FETCH and the postprocessing algorithm is rerun from that point to the end of memory.
- If the active cursor is on neither a FETCH cycle nor a MEM READ cycle, an error message is displayed and the postprocessor is not rerun.

If data qualification has caused multiple discontinuities in the acquired data, it may be necessary to use the MARK OPCODE soft key several times. Begin applying it at the beginning of the acquired memory (lowest location numbers) and apply it again wherever the discontinuities have led to faulty disassembly.

Once you have helped the 12RM99 Mnemonics ROM Pack correctly identify the FETCH cycles, you do not have to use this key again (unless you edit that memory), because the opcode markings are stored on reserved channels and transferred with that memory whenever you move it.

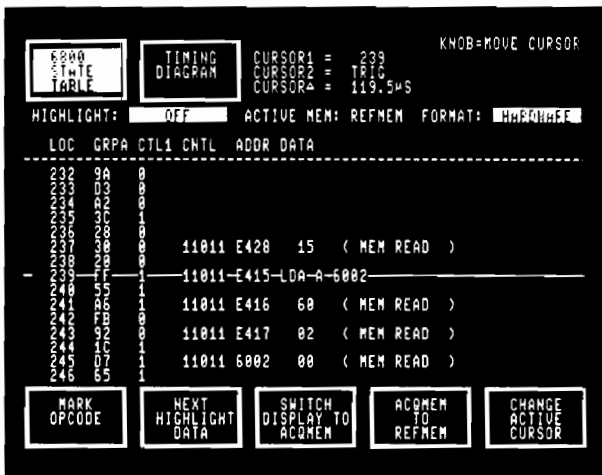
### TIMING DISPLAYS

In the Timing Diagram menu, the active cursor value readout at the bottom of the data display reflects your choice of disassembly FORMAT in the State Table menu, with one exception: When you select SOFTWARE in the State Table menu, the readout in the Timing Diagram will be in HARDWARE format (to prevent suppression of cursor readouts on some cycles).

### DUAL-TIMEBASE DISPLAYS

As noted earlier in this manual, you may use T1 with any acquisition cards in your 1240 that are not used by the 12RM99 Mnemonics ROM Pack. The ROM Pack only uses the two or three 18-channel cards with the highest pod numbers, so you may use T1 with any lower-numbered 18-channel cards and any 9-channel cards in the instrument.

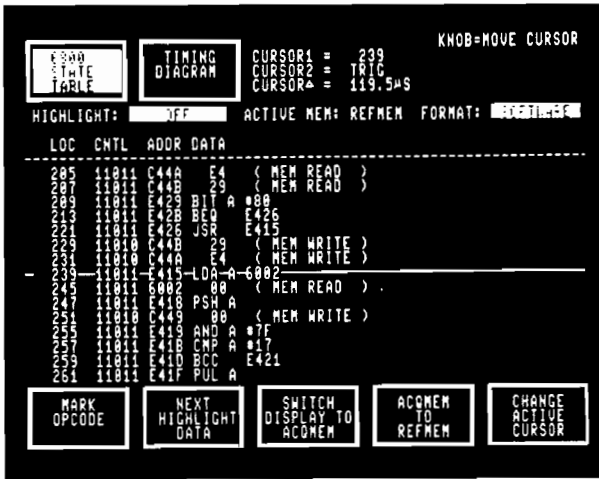
In the STATE, ABSOLUTE, and HARDWARE formats, the data acquired on T1 is correlated with the T2 data acquired from the microprocessor. Refer to Figure 6 to see T1 data correlated with the microprocessor data.



4839 05

Figure 6. T1 data correlated with 6800 data.

When you select SOFTWARE as the data display format, T1 data is suppressed in the interest of giving you the best possible overview of the program flow. Refer to Figure 7 and compare it with Figure 6.



-48.39 (X)

Figure 7. T1 data is suppressed in SOFTWARE format.

### EDITING THE REFERENCE MEMORY

If you edit your reference memory and your ROM Pack has a MARK OPCODE soft key, you will need to use it to put the correct information on the reserved channels. Go to the State Table display and select HARDWARE as the display format. Position the active cursor on a correctly disassembled instruction just ahead of the edited area of your modified memory (lower location number). Then push the MARK OPCODE key twice. The first use of the key changes the FETCH to a MEM READ; the second changes it back, but the postprocessor will have re-examined all of the data between the active cursor and the end of memory and re-identified it.

If the user is modifying ADDR, DATA, or CNTL group values, we suggest the use of channel 8 of the lowest two pods for marking opcode fetch cycles and operands. For each opcode fetch, a 1 appears in the Opcode Fetch channel (channel 8 of the lowest pod). For each operand, a 1 appears in the Operand channel (channel 8 of the second lowest pod).

#### NOTE

*Please verify the location and type of reserved channels by referring to the information on page 7.*



## NON-STANDARD DISASSEMBLIES

When the 12RM99 Mnemonics ROM Pack encounters an unexpected combination of data, or when part of the data is missing, one of the indications shown in Figure 8 appears.

Figure 8 shows a disassembler interface with the following elements:

- Header:** E000 STATE TABLE, TIMING DIAGRAM, CURSOR1 = 375, CURSOR2 = TRIG, CURSOR3 = 375, KNOB=MOVE CURSOR
- Options:** HIGHLIGHT: OFF, ACTIVE MEM: REFMEM, FORMAT: HRRQWRF
- Table:**

LOC	GRPA	CTL1	CNTL	ADDR	DATA
368			11011	D145	AND B E000
369			11011	D146	E0 ( MEM READ )
370			11011	D147	00 ?
371			11011	D148	00 ( MEM READ )
372			11011	D149	00
373			11011	D148	BIT A #00
374			11011	D149	00 ( MEM READ )
375			11011	D14A	BIT B ***
376			11011	D14B	00 **ILLEGAL**
377			11011	D14C	BIT A C0
378			11011	D14D	C0 ( MEM READ )
379			11011	00C0	27 ( MEM READ )
380			11011		( INTERRUPT SEQUENCE )
381			11011	004F	C0 ( MEM READ )
382			11011	80C0	27 ( MEM READ )
383			11011	D150	BIT A #00
- Callouts:**
  - 1: Points to the instruction at address 371 (00 ?).
  - 2: Points to the instruction at address 376 (BIT A C0).
  - 3: Points to the instruction at address 375 (BIT B \*\*\*).
- Buttons:** MARK OPCODE, NEXT HIGHLIGHT DATA, SWITCH DISPLAY TO ACQMEM, ACQMEM TO REFMEM, CHANGE ACTIVE CURSOR

**1** *Illegal cycle type* arises from an unexpected combination of control channel values. This indication can occur in every display format except STATE. It can be caused by a misconnected or defective connection to the microprocessor, or by a setup that has been modified and is no longer correct, or by a problem with your system under test.

**2** *Missing data - operand not disassembled* signals that part of the instruction was not stored in the acquisition memory. This can arise at the end of memory or when some sort of data qualification has prevented the complete storage of an instruction. A single asterisk is displayed for each missing hexadecimal digit or register name.

**3** *Illegal opcode fetch* indication. If this occurs, the illegal opcode is displayed. This indication usually occurs when a problem in your software has caused an attempted execution at an erroneous address.

**NOTE**

*Illegal opcodes can disrupt the disassembly process, since illegal opcodes may generate cycles that appear as memory reads. Use the MARK OPCODE key (if there is one) to mark the next valid opcode.*

Figure 8. Non-standard disassemblies.

## LINE PRINTER OUTPUT

When the 12RM99 Mnemonics ROM Pack is installed in a 1240 that also has a 1200C01 RS232C or 1200C11 Parallel Printer COMM Pack installed, the UTILITY menu presents a soft key labeled LINE PRINTER OUTPUT replacing the COMM PORT CONTROL key. The menu accessed by this key allows you to send your state data displays to a line printer in the current format. Refer to Figures 9 and 10.

The screenshot shows a terminal window with the following content:

```

STORAGE MEMO MANAGER  LINE PRINTER OUTPUT  INOB=SELECT
PRINTER INTERFACE PARAMETERS:
1  NEW LINE CHARACTERS (IN HEX)  20 20 XX XX
2  LINES PER PAGE  20
3  NEW PAGE CHARACTERS (IN HEX)  20 XX XX XX
4  ACTIVE MEM: ADDRMEM
5  PRINT LIMITS ARE:  FIXED
6  LIMITS:  255 266
7  PRINT DATA
  
```

7

4839 08

- 1 NEW LINE CHARACTERS: Use these hexadecimal fields to define a string of from one to four characters that will be appended to each line. The first field must have an entry, but the last three fields can be filled with Xs (don't cares).
- 2 LINES PER PAGE: Use this decimal field to specify the number of lines that will be printed on each page. Valid values range from 1 to 99.
- 3 NEW PAGE CHARACTERS: Use these hexadecimal fields to define a string of from one to four characters that will follow the end of every page. The first field must have an entry, but the last three fields can be filled with Xs (don't cares).
- 4 ACTIVE MEM: This field is for information only. Change the active memory in the State Table or Timing Diagram menus.
- 5 PRINT LIMITS ARE: Use this field to indicate whether the area of active memory to be printed will be defined by FIXED LIMITS or BETWEEN CURSORS. When BETWEEN CURSORS is selected, the area of the active memory that will be printed is defined by the data cursors (inclusive).
- 6 LIMITS: This field becomes active when FIXED LIMITS is selected in the PRINT LIMITS ARE field. Entries here specify the first and last line of memory to be printed. When PRINT LIMITS ARE: BETWEEN CURSORS, this field displays the locations of the cursors.
- 7 PRINT DATA: Touch this soft key to start the transmission of data. It will remain lighted during the transfer. Use the STOP key to interrupt the transmission, if necessary.

Figure 9. LINE PRINTER OUTPUT menu when 1200C11 is installed.

## NOTE

Do not attempt to control the 1240 remotely using an RS232C COMM Pack while any Mnemonics ROM Pack is installed.

STORAGE MEMORY MANAGER      LINE PRINTER OUTPUT      KNOB=SELECT

PRINTING INTERFACE PARAMETERS:

1 — BAUD RATE 1200      PARITY EVEN

2 — NEW LINE DELAY TIME (IN HEX) 0.05

3 — LINES PER PAGE 20

4 — NEW PAGE DELAY TIME (IN HEX) 0.15

ACTIVE MEM: ACGMEM

PRINT LIMITS ARE: PAGED

LIMITS: 255

PRINT DATA

4839-09

- 1 BAUD RATE: Use this field to specify the baud rate at which the 1240 will supply data to the printer. The available choices are: 110, 134.5, 150, 300, 600, 1200, 2400, 4800, and 9600.
- 2 PARITY: Use this field to make parity choices of ODD, EVEN, and NONE. If your printer uses the 8th (parity) bit for something other than parity, set this field to NONE.
- 3 NEW LINE DELAY TIME: Use this field to specify the minimum time delay between the transmission of successive lines by the 1240. The choices range from NONE to 9.9 SEC in 100 ms steps.
- 4 NEW PAGE DELAY TIME: Use this field to specify the minimum amount of time delay between the transmission of the last line of one page and the first line of the next page. The choices range from NONE to 9.9 SEC in 100 ms steps.
- 5 PRINT DATA: Touch this soft key to start the transmission of data. Use the STOP key to interrupt the transmission, if necessary. This key places the 1240 ONLINE when the 1200C01 RS232C COMM Pack is installed. If the device being transmitted to is capable of transmitting back, spurious remote commands can affect the operation of the 1240. Also, during a PRINT DATA operation, the 1200C01 parameters are modified. Therefore, do not attempt to control the 1240 remotely via RS232C while any Mnemonics ROM Pack is installed.

**Figure 10.** LINE PRINTER OUTPUT menu when 1200C01 is installed. Refer to Figure 9 for a description of those fields that are the same in both menus. Refer to the *RS232C COMM Pack 1200C01 Operator's Manual* for information on handshaking protocols and the use of null modems.

## ERROR MESSAGES

When used with a 12RM99 Mnemonics ROM Pack, the 1240 Logic Analyzer uses the standard error messages plus the following:

**MOVE ACTIVE CURSOR TO A READ CYCLE** — This message indicates that the active cursor was not on either a MEM READ or a FETCH cycle when you pressed the MARK OPCODE soft key.

**APPLYING SEARCH PATTERN - PLEASE WAIT** — This message occurs briefly twice during a data acquisition with the 12RM99 Mnemonics ROM Pack installed, unless PATTERN SEARCH DISABLED is selected.

**CONFIG ERROR** — This message always appears in the State Table display after power-up with a 12RM99 Mnemonics ROM Pack installed. It indicates that the setup used to acquire the current acquisition memory and the current setup from the 12RM99 Mnemonics ROM Pack are inconsistent. Acquiring new data should make this message go away. (Refer to the *Reference Information* section of the *1240 Logic Analyzer Operator's Manual* for a complete discussion of this message.) This message also appears in the LINE PRINTER OUTPUT menu if the current configuration does not permit a PRINT DATA operation to be performed.

**INSUFFICIENT 1240D2 CARDS TO SUPPORT DISASSEMBLY** — This message indicates that your instrument does not have enough 18-channel cards to support the use of this Mnemonics ROM Pack.

**NO VALID DATA ACQUIRED** — This message indicates that either no T2 data was acquired or that the acquired data was so heavily qualified that what was left of it disappeared during (SOFTWARE) disassembly.

**PRESS "STOP" TO TERMINATE OPERATION** — This message tells you the correct way to stop a PRINT DATA operation. Since letting the printing operation finish or stopping it are your only choices once a printout is in progress, the 1240 assumes that you want to stop printing if you touch any key.

**MEMORY TIMEBASE ASSIGNMENTS WILL NOT SUPPORT DISASSEMBLY** — The memory being displayed cannot be disassembled because it was acquired with a setup that does not support disassembly. Go to the Storage Memory Manager menu and press LOAD NEW PACK to get a setup that will support disassembly. Then, acquire new data using that setup.

## REPLACEABLE PARTS LIST

### 12RM99 MNEMONICS ROM PACK

**(For part numbers of option parts see your local Tektronix representative)**

NUMBER	TEK. P/N	DESCRIPTION
<b>ELECTRICAL (REFER TO SCHEMATIC IN 1240 SERVICE MANUAL)</b>		
A43	670-8172-00	CKT. BOARD ASSY: 32/64K MEMORY ROM PACK (U200, U300 EPROMs ARE NOT PART OF A43)
A43C100	281-0775-00	CAP, FIXED, CER, DI: 0.1 uF, 20%, 50V
A43C400	281-0775-00	CAP, FIXED, CER, DI: 0.1 uF, 20%, 50V
<b>CHASSIS PARTS</b>		
U200	156-2195-00	MICROCKT, DGTL: 16384 x 8 EPROM
U300	156-2195-00	MICROCKT, DGTL: 16384 x 8 EPROM
<b>MECHANICAL (REFER TO EXPLODED VIEW DRAWING)</b>		
1	334-6106-00	1 MARKER, IDENT: MKD 12RM99 ROM PACK
2	200-2503-01	1 COVER, ROM PACK: TOP (ATTACHING PARTS)
3	211-0012-00	4 SCREW, MACHINE: 4.40 x 0.375, PHD, STL — — * — —
4	- - - - -	CKT BOARD ASSY: 32/64K MEMORY ROM PACK (SEE A43 REPL)
5	131-0993-00	2 • BUS CONDUCTOR: 2 WIRE, BLACK
6	131-0608-00	6 • TERMINAL, PIN: 0.365 L x 0.025 PH BRZ GOLD
7	136-0755-00	2 • SKT, PL-IN ELEC: MICROCIRCUIT, 28 DIP
8	337-3122-00	1 SHIELD, ELEC: STATIC
9	200-2504-01	1 COVER, ROM PACK: BOTTOM
<b>STANDARD ACCESSORIES</b>		
	070-5527-00	MANUAL, TECH: INSTRUCTION

