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# **ADVANTEST<sup>®</sup>**

**ADVANTEST CORPORATION**

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**INSTRUCTION  
MANUAL**

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**TR47251**

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**Personality Kit**

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MANUAL NUMBER 47251 OEA 605

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TR47251  
PERSONALITY KIT  
INSTRUCTION MANUAL

PREFACE

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PREFACE

This manual applies to the system disk P47251-001FJ V2.0.



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RECORD OF REVISIONS

RECORD OF REVISIONS

Rev. No.	Date	Remarks	Rev. No.	Date	Remarks
OEA	May 22/86				



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LIST OF EFFECTIVE PAGES

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Pages with ( ) are deleted.





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LIST OF RELATED MANUALS

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LIST OF RELATED MANUALS

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TR4725	Logic Analyzer	
TR47250	Personality Kit	
TR47251	Personality Kit	
TR47252	Personality Kit	
TR47241	Personality Kit	
TR47242	Personality Kit	
TR47243	Personality Kit	



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1.1 HOW TO USE THIS INSTRUCTION MANUAL

1. GENERAL INFORMATION

1.1 HOW TO USE THIS INSTRUCTION MANUAL

The ADVANTEST TR4725 Logic Analyzer instruction manual consists of the TR4725 instruction manual (hereafter called the main unit instruction manual) and all of the personality kit instruction manuals (the PK instruction manual).

For beginners of logic analyzer, ADVANTEST recommends reading in the order of Chapter 1 and Chapter 2, Section 2.8 "Panel Descriptions" of the main unit instruction manual and then Chapters 1, 2 and 3 of the PK instruction manual for familiarization of the operating procedures (Chapters 2 and 3 of the main unit instruction manual are not necessary to read.)

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1.2 TR47251 GENERAL DESCRIPTIONS

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1.2 TR47251 GENERAL DESCRIPTIONS

The TR47251 8086/88 Personality Kit is the plug-in probe for state analysis used by installing in the TR4725 Logic Analyzer main unit. The major features of this personality kit are as follows:

- (1) Measures the MAX/MIN mode of 8086 (16-bit data bus) or 8088 (8-bit data bus).
- (2) Analysis can be easily performed even with complicated prefetching since the hardware emulates the queue in the 8086/88 CPU.
- (3) State analysis has been expedited since 8086/88 mnemonic is also available, along with numeric values, for analysis of the captured data.
- (4) Data capturing is assigned to special hardware, thus high accuracy analysis can be performed with a smaller probe.
- (5) State analysis efficiency has been upgraded since symbols and codes are defined and provided for setting measuring conditions or analyzing measured data.
- (6) Complicated applications are enabled by more than one trace window condition and memory fragmentation for setting trace conditions.
- (7) Measurement labor-saving, standardization, and automation have been achieved by the application of high performance user interface, such as the use of the interactive menu procedure and the simple-to-use disk operation.
- (8) The major system software provided with the system disk attached to the personality kit ensures the upgrading of the performance functions along with the system disk updated revision.

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1.3 UNPACKING AND INSPECTION

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1.3 UNPACKING AND INSPECTION

1.3.1 Appearance Check and Component Confirmation

Upon receiving the TR47251 Personality Kit, inspect the product appearance to check for any damage caused by transportation.

Next, check the component quantity and ratings according to the following list. If any inadequacy or defect or damage is found, contact your nearest ADVANTEST representative. The addresses and telephone numbers are listed at the end of this manual.

Item name	Model name	Q'ty
Personality board		1
Microprocessor probe	TR14725-10	1
40-pin DIP clip cable	A04725-11	1
40-pin DIP plug cable	A04725-12	1
Probe test adapter		1
40-pin DIP IC package		1
System software package	P47251-001FJ	2
Blank disk	MF-200	2
Disk storage case		1
Miscellaneous container		1
Personality kit storage case	J47251	1
Instruction manual		1

*MEMO*



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TR47251  
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2.1 INTRODUCTION

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2. MEASUREMENT PREPARATION AND PREPARATORY INFORMATION

2.1 INTRODUCTION

Be sure to read this chapter if using this probe for the first time. This chapter describes the operations preparatory to measurement and the necessary preparatory information. The description is constructed so that the reader can understand the contents of it while actually operating the probe. Therefore, place the probe within reach when reading this manual for operation.

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2.2 PERSONALITY BOARD INSTALLATION METHOD

2.2 PERSONALITY BOARD INSTALLATION METHOD

Follow the following procedures for installing the personality board. (The personality board is not installed in the TR4725 main unit when shipped.)

- (1) Check that the power is turned OFF.
- (2) Remove the four machine screws (3mm;+) from the main unit cover and remove the upper cover.
- (3) When an other personality board is already installed, remove it. Markers "1" and "2" are affixed on the personality board slot (refer to Figure 2-1).
- (4) Install the personality board with marker "1" on the board ejector into the slot "1". Then, connect the 50-pin flat cable to the connector in the center of the board.
- (5) Mount the four machine screws to re-set the upper cover.

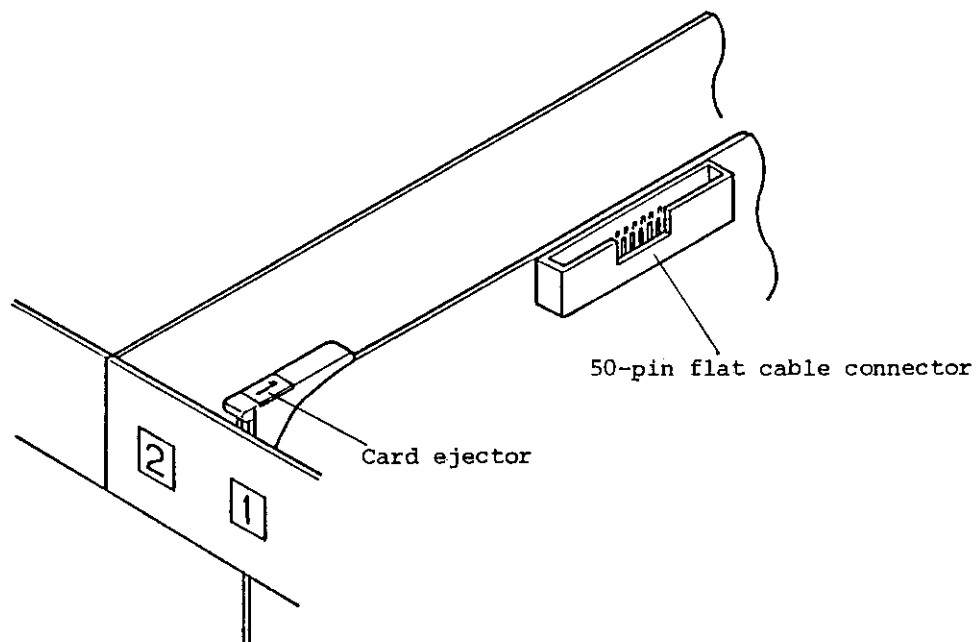


Figure 2-1 Personality Board Installation Method

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2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

Perform the following procedures to connect probe to the system to be measured using 8086/88:

2.3.1 Connecting Microprocessor Probe

Figure 2-2 shows the shape and parts names of the microprocessor probe.

(1) Connecting the microprocessor probe to the main unit

Two connectors with the name plates "C" and 'D' are provided at the cable end of the microprocessor probe (TR14725-10). Insert respectively the two connectors to the probe slots in the main unit rear panel. The connectors can be locked by screws.

(2) Connecting the microprocessor probe and SUT

There are two procedures to connect the microprocessor probe to the SUT (System Under Test): by using DIP clip cable or DIP plug cable. These are illustrated respectively in Figures 2-3 and 2-4.

Either procedure is applicable when the target microprocessor uses a socket. Only DIP clip cable is applicable when soldering is used for the target microprocessor. The connecting must be performed without mistaking pin 1 position no matter which procedure is adopted.

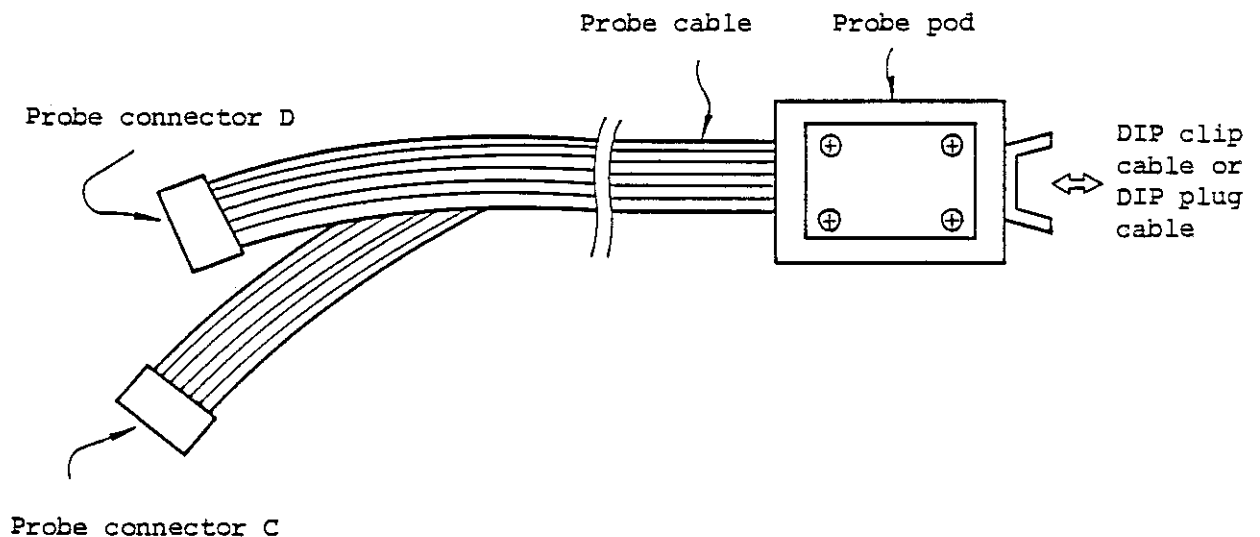


Figure 2-2 Microprocessor Probe Shape and Parts Names

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2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

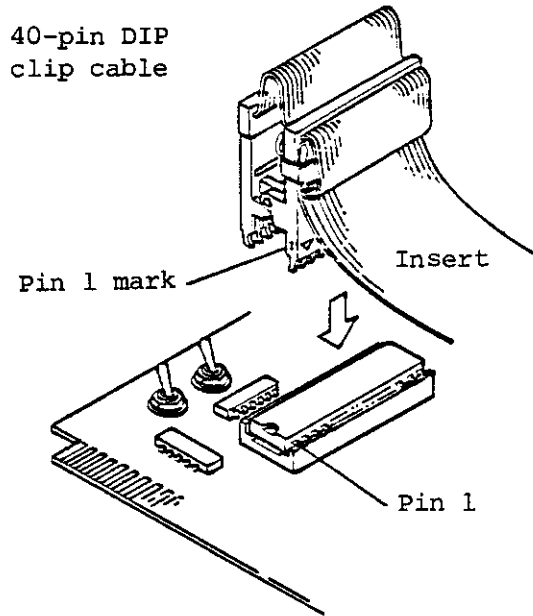


Figure 2-3 The Use of DIP Clip Cable

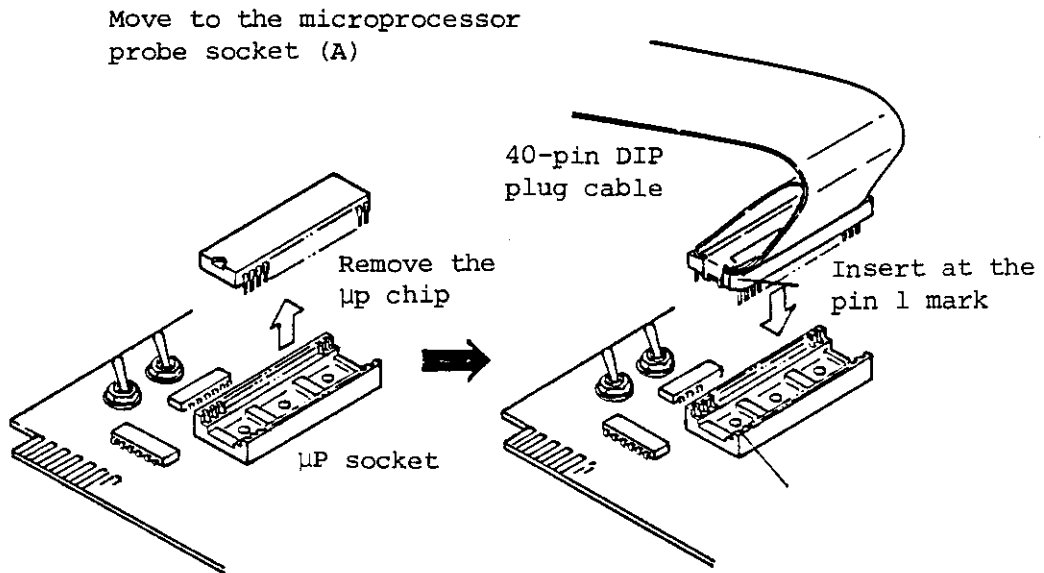


Figure 2-4 The Use of DIP Plug Cable

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2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

2.3.2 Connecting Data Acquisition Probe E/F

Two probes, data acquisition probe E (TR14702-01; hereafter called probe E) and data acquisition probe F (TR14702-02; hereafter called probe F), are used to capture data from the system under test (hereafter called SUT). Each probe can capture signals of eight channels. The shapes and parts names of probe E/F are shown in Figure 2-5.

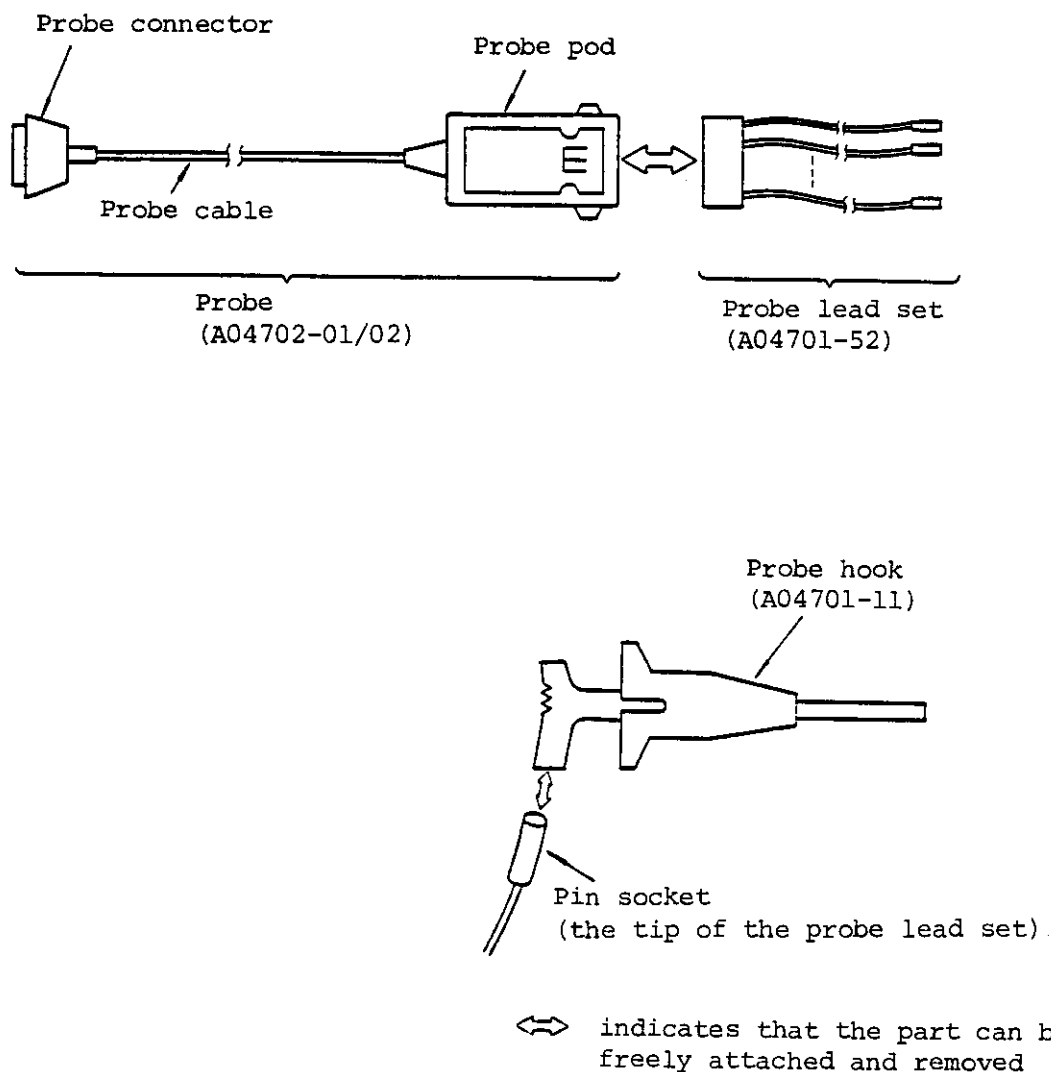


Figure 2-5 Probe E/F Shape and Parts Names (standard configuration)

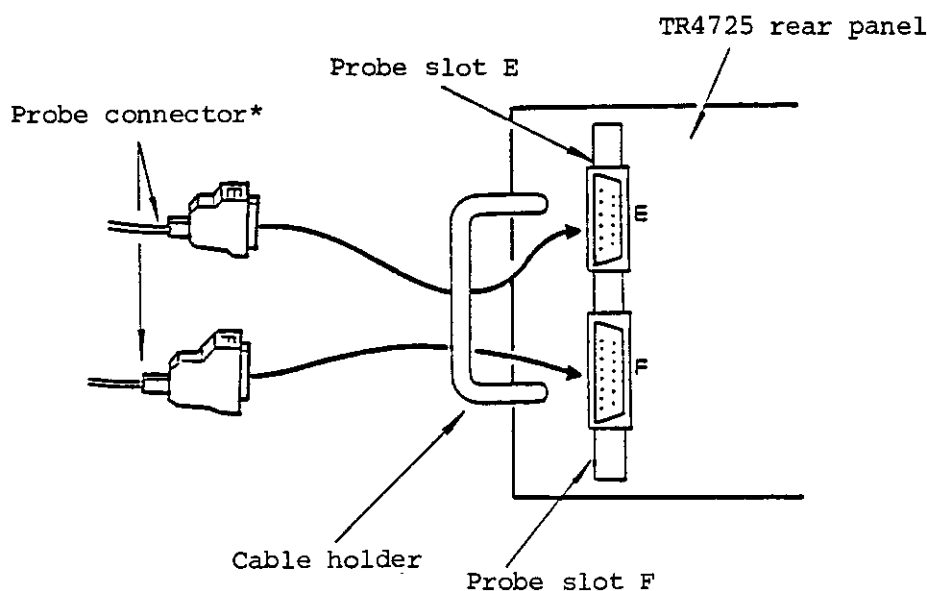
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2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

First, connect the probe to the TR4725 main unit. connect the probe E cable connector to the probe slot E ('E' is marked at the rear panel) and the probe F cable connector to the probe slot F after each probe connector is put through the cable holder at the left of the rear panel as shown in Figure 2-6.

Caution

Before connecting probe E/F, make sure to turn OFF the power of the main unit.



\*: Insert the connector name plate E/F upward

Figure 2-6 Connecting Probe E/F to the TR4725 Main Unit

Next, connect probe to SUT. As a standard procedure, use the probe lead set (A04701-52) with pin socket to connect probe to SUT via probe hook (A04701-11; single hook). When the pin which is suitable for pin socket is found in SUT, direct connection with the pin socket is possible. The stock No. and size of the pin socket is as follows:

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2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

Manufacturer	Stock No.	Suitable size
AUGAT KK-JAPAN	LSG-2BG2-1	0.51mm $\phi$ ~ 0.76mm $\phi$

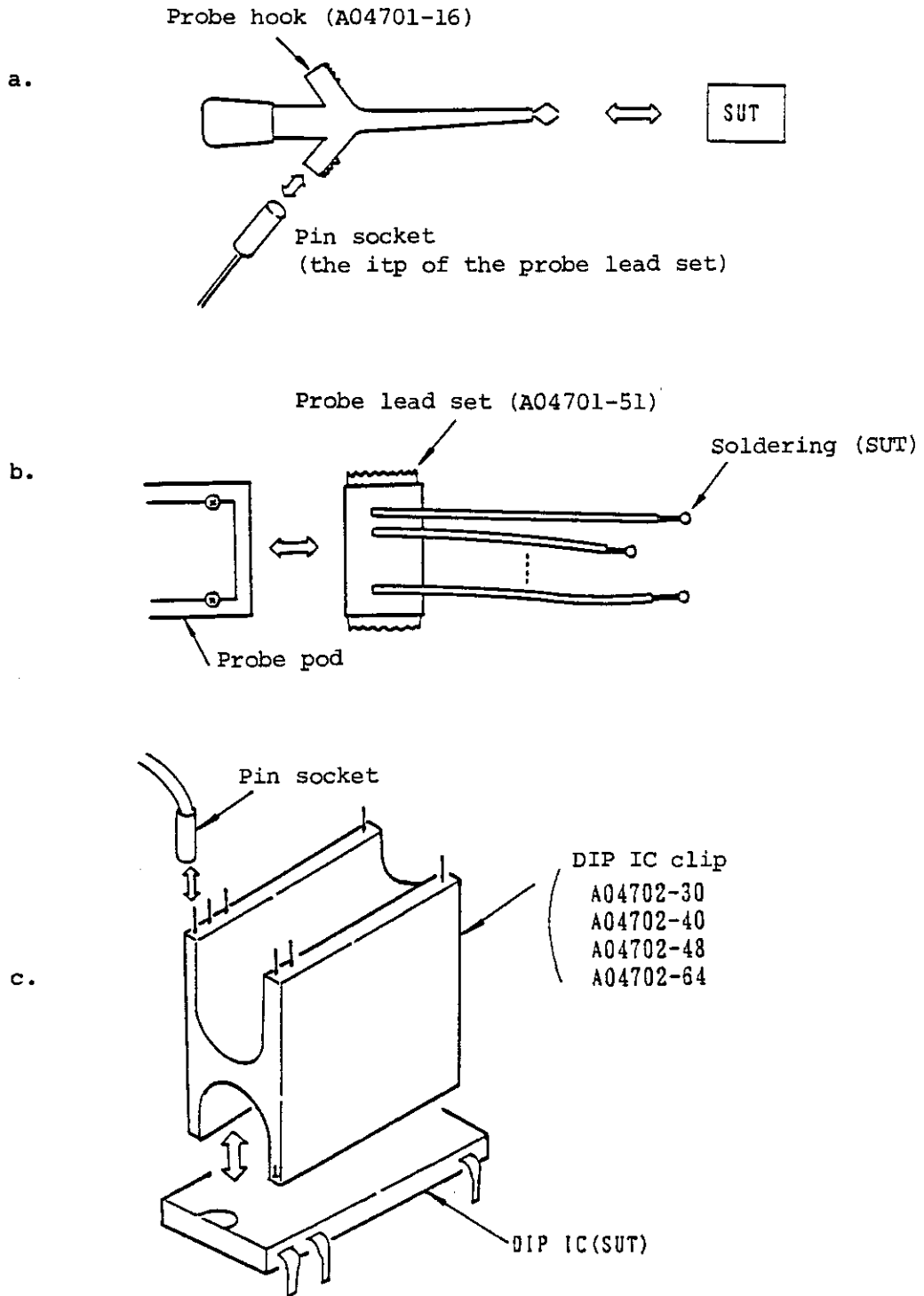
If necessary, probe can be connected to the SUT by using other optional accessories. Instead of the standard probe hook, the probe hook with a double hook tip-pin (A04701-16; double hook) can be used. (Refer to Figure 2-7 (a).)

Use the probe lead set (A04701-51) when soldering is used instead of probe hook or pin socket for connection. In this case, the connection of eight channels can be performed in one procedure (refer to Figure 2-7 (b)).

The use of the DIP IC clip (A04702-30/40/48/64) makes the connecting with DIP IC easier. In this case, connect the pin socket to the pin of the clip. (Refer to Figure 2-7 (c).)

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2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST



\*: Match and then insert at pin 1.

Figure 2-7 Connecting SUT with Optional Accessories



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2.4 USE OF THE MICROPROCESSOR PROBE

2.4 USE OF THE MICROPROCESSOR PROBE

(1) Use of the microprocessor probe socket

There are two sockets A and B on the microprocessor probe (TR14725-10). Insert the removed target microprocessor into socket A when connecting probe and the SUT with the DIP plug cable. When 8086/88 is used in MIN mode, insert another microprocessor, which has the same model type with an equivalent or better performance capability used by the SUT, into probe socket B.

(2) Use of the status LEDs on the microprocessor probe

The following six status LEDs can be found on the microprocessor probe monitoring the state of the SUT microprocessor:

- CLK : Lights when clock signal is applied.
- RESET: Lights when reset signal is applied.
- READY: Lights when ready signal is applied.
- NMI : Lights when NMI signal is applied.
- INTR : Lights when INTR signal is applied.
- RQ/HOLD: Lights when RQ signal is applied in MAX mode, and lights when HOLD signal is applied in MIN mode.

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2.5 LOADING THE SYSTEM SOFTWARE

2.5 LOADING THE SYSTEM SOFTWARE

The software (system software) which controls the operation of the personality kit is loaded from the system disk (P47251-001FJ) to the internal memory and executed. The built-in floppy disk drive is used for the system software loading.

Insert the system disk into the floppy disk drive, turn ON the POWER switch, and then loading starts automatically.

As shown in Figure 2-8, the following messages are displayed for loading:

```
TR47251
```

8086/88 PK

System software loading in progress

Self-test ended

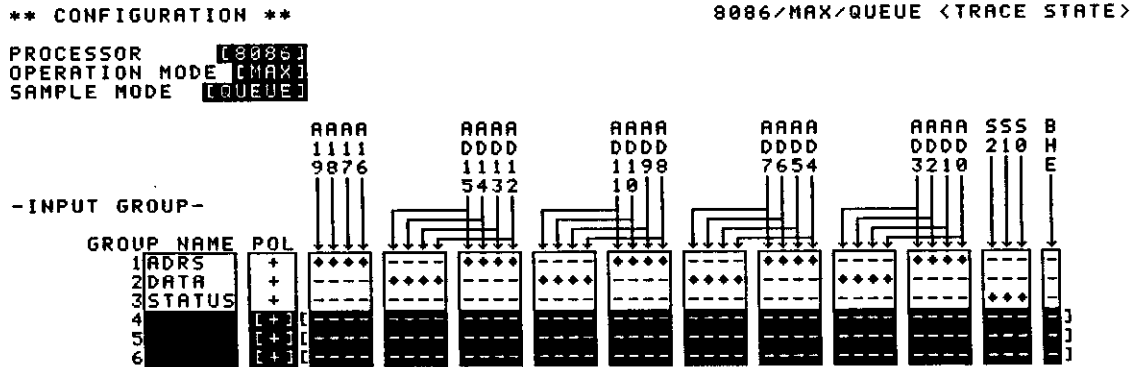
054725 V2.1 Copyright 1985 ADVANTEST CORPORATION

Figure 2-8 Screen Display for Loading

Loading requires approximately one minute. At the end of loading, CONFIGURATION (corresponds to CONFIG key) menu is displayed and the system enters into enabled state as shown in Figure 2-9.

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2.5 LOADING THE SYSTEM SOFTWARE



03-FEB-86 14:38

Figure 2-9 Screen Display at the End of Loading (CONFIG Menu screen)

When the screen as shown in Figure 2-10 is displayed, it indicates that the internal clock is not functioning properly. Set the precise time by referring to Section 8.1 of the main unit instruction manual.

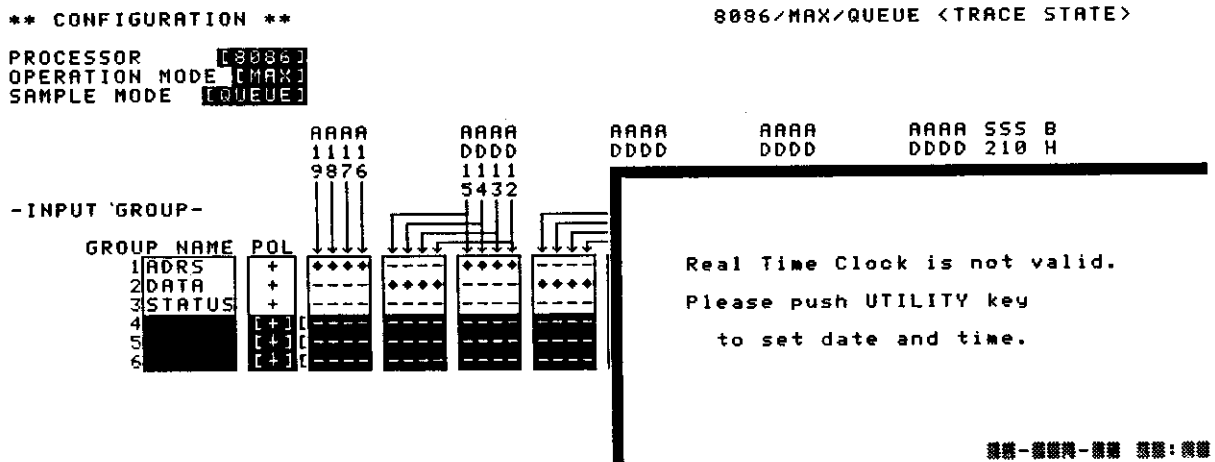


Figure 2-10 Screen Display Requesting Built-in Clock Setting

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2.5 LOADING THE SYSTEM SOFTWARE

---

The display as shown in Figure 2-11 appears, requiring insertion of the system disk when the system disk is not inserted in the floppy disk drive when the POWER switch is turned ON. When the system disk is inserted, even when this display is shown, loading will start automatically. After the display of Figure 2-8, the display of either Figure 2-9 or Figure 2-10 appears and the system enters into operation-enabled state.

```
TR47251
```

8086/88 PK

Please enter TR47251 8086/88 PK System Software Package !



Self-test ended

054725 U2.1 Copyright 1985 ADVANTEST CORPORATION

Figure 2-11 Screen Display Requesting System Disk Insertion

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2.6 CRT DISPLAY FORMATS AND MEANINGS

2.6 CRT DISPLAY FORMATS AND THEIR MEANINGS

One sample data file is stored in the system disk for the explanation from Sections 2.6 to 2.9. To better understand the operation, read the following descriptions while actually operating the personality kit.

Press  <sup>CONFIG</sup> on the upper right of the front panel. Then, the menu display as shown in Figure 2-9 will appear (the same display as shown after the loading of the system software). The setting of the input channel configuration is enabled on the CONFIG menu screen.

Press  <sup>TRACE</sup> and the display as shown in Figure 2-12 will appear. The setting of the trace condition is enabled on the TRACE menu screen.

\*\* TRACE SPECIFICATION \*\*

8086/MAX/QUEUE <TRACE STATE>

[TRACE STATE]

```
-----  
[ STORE1 = [1024] states DELAY = +0000  
1  
GROUP [ADRS ] [DATA ] [STATUS] [HEX ] [HEX ] [HEX ]  
RADIX [HEX ] [HEX ] [CODE ] [HEX ] [HEX ] [HEX ]  
ENBL1 [ ] [XXXX] [XXXX] [(abs) X]  
TRIG1 [ ] [XXXX] [XXXX] [(abs) X]  
[OR0] [ ] [XXXX] [XXXX] [(abs) X]  
DSBL1 [ ] [XXXX] [XXXX] [(abs) X]  
TRIG PASS = [00] TRIG OUT(SYNC) [OFF]  
[STOP ]
```

03-FEB-86 14:40

Figure 2-12 TRACE Menu Screen (TRACE SPECIFICATION)

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2.6 CRT DISPLAY FORMATS AND MEANINGS

Press  and the display as shown in Figure 2-13 will appear. Analysis of the captured data is enabled on the DISPLAY menu screen.

```

** DISPLAY **                                8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS ] [DATA ] [STATUS] [      ] [      ] [      ] [      ] [      ]
RADIX [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
[LN]  +-----+-----+-----+-----+-----+-----+-----+-----+

```

03-FEB-86 14:42

Figure 2-13 DISPLAY Menu Screen

Basic measurement is executed in the State Only and S & T analyzers by interacting with the above three menu screens (configuration, trace specification, and display) and the menu screen by SYMDEF key (symbol definition).

Press  on the lower center of the front panel twice. The file is read out and the data is displayed on the screen (refer to Figure 2-14).

```

** DISPLAY **   from F0:DISP.REG (86,Q)      8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS ] [DATA ] [STATUS] [      ] [      ] [      ] [      ] [      ]
RADIX [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
[LN]  +-----+-----+-----+-----+-----+-----+-----+-----+
0000  FFFF0      EA      4
0001  FFFF1      83      4
0002  FFFF2      0D      4
0003  FFFF3      00      4
0004  FFFF4      FE      4
0005  FED83      B8      4
0006  FED84      00      4
0007  FED85      A0      4
0008  FED86      8E      4
0009  FED87      D8      4
0010  FED88      C6      4
0011  FED89      06      4
0012  FED8A      14      4
0013  FED8B      00      4
0014  FED8C      00      4
0015  A0014      xx00     6
0016  FED8D      C6      4

```

F0:DISP.REG, gotten ↑scroll 03-FEB-86 14:45

Figure 2-14 Sample Data for Explanation

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2.6 CRT DISPLAY FORMATS AND MEANINGS

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Each CRT display format contains a specific definition. The operation has been made easier by sustaining definition consistency through the whole displays.

- (1) "Normal display": Usually displayed by characters or diagrams in green; used for displaying fixed information such as header word or measured data.

This indication is equivalent to headers such as DISPLAY on the upper left of the screen or measured data (list) in the above sample data.

- (2) "Inverse display": Indicates inversed luminance of the character or diagram. This is called "menu item". The user can use this to set or revise data. [HEX] is equivalent to this display in the above sample data.
- (3) "Normal blink display": Blinks to display "normal display"; used to display the status of the error message, measurement or I/O execution. By pressing any numeric key (for instance, 0) when the display as shown in Figure 2-14, the message called "normal blink display" is displayed on the bottom line of the CRT display.
- (4) "Inverse blink display": Blinks to display "Inverse display", indicates the "menu item" that can be currently entered. The blinking portion, in particular, is called "input prompt". The display format of [ADRS] immediately after GET is equivalent to this.
- (5) "Half tone display": Indicates the half luminance which is used for measurement execution or I/O operation. The "input prompt" cannot be moved to the "menu item" which is turned to half-tone display (the setting of data to the menu item becomes disabled).

Press  on the lower center of the front panel twice, and the display as shown in Figure 2-15 will appear. The menu display (e.g. main menu) other than the smaller menu display newly appearing on the CRT display (e.g. sub-menu) is called "half-tone display". Pay attention when referencing the display of figures since the "half-tone display" cannot be printed on the screen which is output by a video plotter (as shown in Figure 2-15).

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2.6 CRT DISPLAY FORMATS AND MEANINGS

\*\* DISPLAY \*\*      from F0:DISP.REG (86,Q)                      8086/MAX/QUEUE <TRACE STATE>

GROUP	[ADRS ]	[DATA ]	[STATUS]	[ ]	[ ]	[ ]	[ ]	[ ]
RADIX	[HEX ]	[HEX ]	[HEX ]	[HEX ]	[HEX ]	[HEX ]	[HEX ]	[HEX ]
[LN]								
0000	FFFF0	EA	4					
0001	FFFF1	83	4					
0002	FFFF2	0D	4					
0003	FFFF3	00	4					
0004	FFFF4	FE	4					
0005	FED83	B8	4					
0006	FED84	00	4					
0007	FED85	A8	4					
0008	FED86	8E	4					
0009	FED87	08	4					
0010	FED88	C6	4					
0011	FED89	06	4					
0012	FED8A	14	4					
0013	FED8B	00	4					
0014	FED8C	00	4					
0015	A0014	xx00	6					
0016	FED8D	C6	4					

\*\* FD OPERATION \*\*

OPERATION [DIRECTORY] of [MENU]  
DRIVE [F0:]

F0: \_\_\_name\_\_\_blks\_\_\_attri\_\_\_date\_\_\_\_\_  
DISP.REG      54 DSP\_S 01-FEB-86 16:12

03-FEB-86 14:47

Figure 2-15 FD Menu Screen




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2.7 INPUTTING DATA TO MENU ITEMS






2.7 INPUTTING DATA TO MENU ITEMS

The menu display corresponding to keys of MENU and I/O key groups can be displayed by pressing the key accordingly.

More than one menu items are presented on the menu display. The menu display corresponding to the MENU key group is called main menu display. The menu display corresponding to the I/O key group is called sub-menu display. The sub-menu display can be called or deleted at any time to the main menu display (when deleting, press any key of the MENU key group or

). The main menu display becomes half-tone display when the sub-menu display is called. Try to enter keys to actually understand their functions. The four basic rules for inputting data to the menu items are as follows:



- o The menu item for data inputting is displayed inversely.
- o The menu item (input prompt) for inputting data (currently permitted) by pressing the ENTRY key is displayed by inverse blink display.



o Input prompt can be moved by     or .


- o The menu item enclosed in brackets can be selected by the SELECT key.


- (1) The menu item enclosed in brackets:

For the menu item enclosed in brackets, data is input by pressing SELECT

(  ,  ) key to select from the chain data group.

The data group is selected in due order with  key; in inverse order with  key. Pay attention that the same menu item of the selectable data group can be different according to the ambient conditions. The

selection range of the data group can be referenced beforehand with  (refer to item (1) of Section 2.6). No syntax error will occur with the data input by SELECT key, thus this method is adopted by the TR4725 as much as possible. The normal display enclosed in brackets are also menu items. However, data input is not allowed because of only one menu item selection. This inputting method is adopted for most of menu items is DISPLAY menu screen. Try to observe how the display can be changed for

the data group in the GROUP or RADIX menu item by pressing .

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2.7 INPUTTING DATA TO MENU ITEMS

(2) The menu items not enclosed in brackets:

For menu items that are not enclosed in brackets, data can be input by pressing any ENTRY keys other than the SELECT key. These menu items are designed for defining GROUP, SYMBOL, and CODE names (these are for the state analysis section only) or calling/storing file name and require numeric values of binary, octal, decimal, and hexadecimal. The initial character (or digit) of each menu item becomes the input prompt when the

input prompt item is moved by    . Next, the system is set

to NIBBLE mode by entering either  or input data of one character

(or one digit). When  or  is pressed, input prompt can shift one character (or one digit) at a time (LED of NIBBLE key is lit), NIBBLE mode is released and the input prompt is moved to the next menu item (menu item of the right on the same line or the left end on the next line). For the menu item such as the one selected by GET/SAVE key (requesting file name) which can only enter one character at a time, NIBBLE mode is automatically set and the LED of the key is lit.

No explanation of the menu display of SYMDEF (not used for timing only analyzer) or PROGRAM key that execute a line of the menu items is given in this section.

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2.8 USE OF HELP KEY

---

2.8 USE OF HELP KEY

assists the user by providing useful information for operating this personality kit. It has two functions: HELP (menu item) and HELP (key). HELP (menu item) displays the data input related information (an active-type of information which changes with the measuring conditions) to each menu item. For the menu item which uses the SELECT key, the selectable data group when

/  is pressed is displayed.

HELP (key) displays the key-related information (a static-type of information which does not change with the measuring conditions) which includes basically the key function summary, the summary of the related key functions, and the index to the instruction manual. The operating method for each function differs.

(1) HELP (menu item) function

This function is available whenever the data input to the menu item is

possible (system disk is not necessarily required). When  is pressed and then released, the HELP screen is displayed on the lower right or lower left of the CRT display avoiding the input prompt menu items. The examples are shown in Figures 2-16 and 2-17. The HELP screen can be deleted by pressing any key including the scroll knob. However, whichever key is pressed, its function remains valid (for instance: when the ENTRY key is pressed, data input is executed. Turning the scroll knob can delete HELP screen without affecting the main menu screen). Test the HELP function in DISPLAY menu screen.

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2.8 USE OF HELP KEY

```

** DISPLAY **      from F0:DISP.REG (86,Q)      8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS ] [DATA ] [STATUS] [ ] [ ] [ ] [ ] [ ]
RADIX [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
[LLN]-----+-----+-----+-----+-----+-----+-----+-----+
0000 FFFF0 EA 4
0001 FFFF1 83 4
0002 FFFF2 0D 4
0003 FFFF3 00 4
0004 FFFF4 FE 4
0005 FED83 B8 4
0006 FED84 00 4
0007 FED85 A0 4
0008 FED86 8E 4
0009 FED87 D8 4
0010 FED88 C6 4
0011 FED89 06 4
0012 FED8A 14 4
0013 FED8B 00 4
0014 FED8C 00 4
0015 A0014 xx00 6
0016 FED8D C6 4

```

NEXT:→[DATA ]→[STATUS]→  
PREV:→[ ]→[STATUS]→

↑scroll 03-FEB-86 14:48

Figure 2-16 HELP (menu item) Function Display Example (1)

```

** TRACE SPECIFICATION **      8086/MAX/QUEUE <TRACE S&T(S+T)>
[TRACE S&T(S+T)]-----[TRIG] disarms TRIG_T-----QuickVIEW [OFF]
[ STORE1 = [1024] states DELAY = +0000
1
  GROUP [ADRS ] [DATA ] [STATUS] [ ] [ ] [ ] [ ] [ ]
  RADIX [HEX ] [HEX ] [HEX ] [CODE ] [HEX ] [HEX ] [HEX ] [HEX ]
  ENBL1 XXXXX XXXX [(abs) X]
  TRIG1 [ ] XXXXX XXXX [(abs) X]
  [DR0] XXXXX XXXX [(abs) X]
  DSBL1 XXXXX XXXX [(abs) X]
] TRIG PASS = 001 TRIG OUT<SYNC> [OFF]

```

NEXT:→[ADRS ]→[DATA ]→  
PREV:→[STATUS]→[DATA ]→

CLOCK RATE [ 10ns]  
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Figure 2-17 HELP (menu item) Function Display Example (2)

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2.8 USE OF HELP KEY

(2) HELP (key) function

This function is available only when the system disk is installed in the floppy disk drive and the system is under the key entry enabled state. The HELP screen is displayed on the right or the left side of the CRT

avoiding the menu item of the input prompt when HELP is pressed along with other desired function key. The display examples are shown in Figures 2-18 and 2-19.

```

** DISPLAY **      from F0=DISP.REG (86,Q)      8086/MAX/QUEUE <TRACE S&T(S+T)>
GROUP [ADRS ] [DATA ] [STATUS] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
RADIX [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
-----+-----+-----+-----+-----+-----+-----+-----+
0000  FFFF0      EA      4
0001  FFFF1      83      4
0002  FFFF2      0D      4
0003  FFFF3      00      4
0004  FFFF4      FE      4
0005  FED83      B8      4
0006  FED84      00      4
0007  FED85      A0      4
0008  FED86      8E      4
0009  FED87      D8      4
0010  FED88      C6      4
0011  FED89      06      4
0012  FED8A      14      4
0013  FED8B      00      4
0014  FED8C      00      4
0015  A0014      xx00     6
0016  FED8D      C6      4

```

```

** HELP ** UTILITY
VERSION UP NEWS AVAILABLE IN NEXT PAGES

HELP information
not available until V2.0

↑scroll  03-FEB-86 14:53

```

Figure 2-18 HELP (key) Function Display Example (1)

```

** TRACE SPECIFICATION **      8086/MAX/QUEUE <TRACE S&T(S+T)>
[TRACE S&T(S+T)]-----[TRIG1] disarms TRIG_T-----QuickVIEW [OFF]
┌ STORE1 = [1024] states  DELAY = +0000
├
├ GROUP [ADRS ] [DATA ] [STATUS] [HEX ] [HEX ] [HEX ]
├ RADIX [HEX ] [HEX ] [CODE ] [HEX ] [HEX ] [HEX ]
└

```

```

** HELP ** DISPLAY

HELP information
not available until V2.0

C) [OFF]

CLOCK RATE [ 10ns]

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```

Figure 2-19 HELP (key) Function Display Example (2)

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2.8 USE OF HELP KEY

When the scroll mark is displayed on the bottom line of the CRT, it indicates that the further data exist. The latest data can be displayed

by turning the scroll knob or pressing PAGE   keys.

Pressing any key, other than the scroll knob, can delete the HELP (key) screen. However, the EDIT and ENTRY keys can only be used to delete the screen, and the original key function becomes invalid.

The information displayed by the HELP (key) function and the currently displayed menu screen are not directly relates. Data is read and displayed from the system disk onto the HELP (key) screen, so the system disk must be installed in the floppy disk drive. When the system disk is not installed and this function is attempted to activate, the message as shown in Figure 2-20 is displayed. Test this function.

```

** DISPLAY **   from F0:DISP.REG (86,0)           8086/MAX/QUEUE <TRACE S&T(S+T)>
GROUP [ADRS ] [DATA ] [STATUS] [          ] [          ] [          ] [          ] [          ]
RADIX [HEX  ] [HEX  ] [HEX  ] [HEX  ] [HEX  ] [HEX  ] [HEX  ] [HEX  ]
-----+-----+-----+-----+-----+-----+-----+-----+-----
[Ln]  | FFFF0 | EA | 4 |
0000  |-----|----|---|
0001  | FFFF1 | 83 | 4 |
0002  | FFFF2 | 0D | 4 |
0003  | FFFF3 | 00 | 4 |
0004  | FFFF4 | FE | 4 |
0005  | FED83 | B8 | 4 |
0006  | FED84 | 00 | 4 |
0007  | FED85 | A0 | 4 |
0008  | FED86 | 8E | 4 |
0009  | FED87 | D8 | 4 |
0010  | FED88 | C6 | 4 |
0011  | FED89 | 06 | 4 |
0012  | FED8A | 14 | 4 |
0013  | FED8B | 00 | 4 |
0014  | FED8C | 00 | 4 |
0015  | A0014 | xx00 | 6 |
0016  | FED8D | C6 | 4 |

```

```

** HELP ** DISPLAY

Please enter TR47251 8086/88 PK
system software package!

Push HELP key again.

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```

Figure 2-20 Screen Requesting System Disk Insertion by the HELP (key) Function

Screens are configured from combination of main menu, sub-menu, HELP (menu item), and (menu item), and HELP (key) screens and the attached screen

other than the main menu screen can be deleted completely by pressing  .

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2.9 USER DISK PREPARATION

2.9 USER DISK PREPARATION

The explanations of the previous sections are for actually operating the Personality Kit by its system disk, while this section deals with storing the measuring conditions, measured data, and programs on the user disk. The user disk is prepared by using the operation examples in Chapter 3. Disk formatting is required for preparing a user disk from a blank one. Remove the used system disk from the floppy disk drive and replace it with a blank disk.

Press  and then  four times, and the screen as shown in Figure 2-21 will appear.

```

** DISPLAY ** from F0:DISP.REG (86,Q)          8086/MAX/QUEUE <TRACE S&T(S+T)>
GROUP [ADRS ] [DATA ] [STATUS] [ ] [ ] [ ] [ ] [ ] [ ]
RADIX [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
[LN]--+-----+-----+-----+-----+-----+-----+-----+
0000  FFFF0      EA      4
0001  FFFF1      83      4
0002  FFFF2      0D      4
0003  FFFF3      00      4
0004  FFFF4      FE      4
0005  FED83      B8      4
0006  FED84      00      4
0007  FED85      A0      4
0008  FED86      8E      4
0009  FED87      D8      4
0010  FED88      C6      4
0011  FED89      06      4
0012  FED8A      14      4
0013  FED8B      00      4
0014  FED8C      00      4
0015  A0014      xx00     6
0016  FED8D      C6      4

```

```

** FD OPERATION **
OPERATION [FORMAT ]
DRIVE     [F0: ]
DESCRIPTION [ ]

```

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Figure 2-21 Disk Format

Next, press  twice to move the input prompt to the menu item "DESCRIPTION" and input characters of less than 20 character long (For instance: "MY DISK"). Then, press . The screen will ask "FORMAT?". Press the green key on the bottom right corner of the front panel and then  to start formatting. When the screen as shown in Figure 2-22 appears, it indicates the end of formatting. (The green key is the shift key, and "Y" is entered by the operations described above.)

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2.9 USER DISK PREPARATION

```

** DISPLAY ** from F0:DISP.REG (86,Q)      8086/MAX/QUEUE <TRACE S&T(S+T)>
GROUP [ADRS ] [DATA ] [STATUS] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
RADIX [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
[LN] +-----+-----+-----+-----+-----+-----+-----+-----+
0000 FFFF0 EA 4
0001 FFFF1 83 4
0002 FFFF2 8D 4
0003 FFFF3 00 4
0004 FFFF4 FE 4
0005 FED83 B8 4
0006 FED84 00 4
0007 FED85 A0 4
0008 FED86 8E 4
0009 FED87 D8 4
0010 FED88 C6 4
0011 FED89 06 4
0012 FED8A 14 4
0013 FED8B 00 4
0014 FED8C 00 4
0015 A0014 xx00 6
0016 FED8D C6 4

```

```

** FD OPERATION **
OPERATION [FORMAT ]
DRIVE [F0:]
DESCRIPTION [ ]
F0:-----
DISK ID : TR47251 USER DISK
DESCRIPTION :
AVAILABLE AREA : 2530 blocks
USED AREA : 2 blocks
BAD AREA : 0 block
03-FEB-86 15:01

```

Figure 2-22 Display at the end of Disk Formatting

Press  and then press  twice, and the data that is currently displayed on the screen is written into the disk. When  is pressed twice consecutively, the file names stored in the user disk is read. The file that was written just now should bear the file name DISP.S1 (the name is automatically named by the TR4725). Perform the following procedures to call the file. Press  and turn the scroll knob clockwise, and the file bearing the DISP.S1 will appear in the file name menu item. Next, again press  and the file read from the user disk is displayed on the CRT. The fact that the displayed data belongs to the file named DISP.S1 is displayed on the first line of the CRT.

To delete the file press  and then press  twice, and the command "PURGE" will appear. Move the input prompt to the menu item "NUMBER OF DELETED FILE" and set the numeric data of "01" with the SELECT key. Then press  to start the execution of PURGE to delete the file. Any blank disk which is 3.5 inches, 80 tracks and dual side-double density is applicable, no matter what brand. (For instance: the OM-D4440 model of SONY, or the ADVANTEST A09502 model with a set of ten disks).



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3.1 INTRODUCTION

---

3. OPERATION EXAMPLES

3.1 INTRODUCTION

This chapter is to help beginners when learning how to operate the Personality Kit to gain a better understanding of the probe by providing some measuring examples.

The detailed operating procedures are described in the main unit instruction manual from Chapters 4 to 6, and Chapter 4 of the PK instruction manual. It is not necessary to read through all these manuals from the beginning. However, it is recommended to reference the important portions of them after learning the use of the probe from the following examples.

The operating procedures of the TR4725 are based on the operating rule of consistency, and thus can be operated by analogy. The following examples contain, along with the contents of Chapters 4 to 6 of the main unit instruction manual, the contents of the relations of the individual functions described in the PK instruction manual Chapter 4. Again, emphasis is on actual operation while reading the examples.

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INSTRUCTION MANUAL

3.2 SIMPLE EXAMPLES OF TIMING ANALYSIS

3.2 SIMPLE EXAMPLES OF TIMING ANALYSIS

Connect probe E/F to the main unit (refer to Section 2.3.2) and load the system software (refer to Section 2.5).

The screen should display **\*\* CONFIGURATION \*\***. Then, press  <sup>TRACE</sup> to set the measuring mode to TRACE TIMING. Next, apply the suitable signal (TTL level is recommended) to the channel No. 7 of the probe F. Signal is displayed on the channel (label name: PRB\_F7) on the upper most position as shown in Figure 3-1. The sampling clock at this moment is 10 ns (100 MHz).

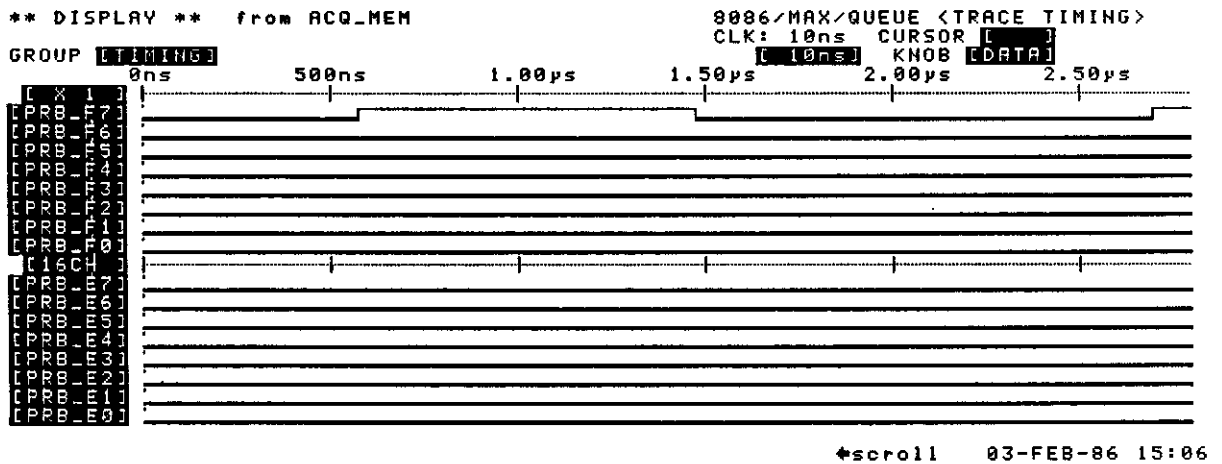


Figure 3-1 Timing Analysis Measurement Example (sampling clock: 10 ns)

Input signal changes will appear on the screen display. The sampling clock is changed by pressing  after the input prompt is moved to the menu item of the sampling clock by pressing  (try to set the sampling timing to 100 ns by pressing  three times).

Next, press  and the data will be displayed (as shown in Figure 3-2) in ten times the detail than what is shown in Figure 3-1.

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3.2 SIMPLE EXAMPLES OF TIMING ANALYSIS

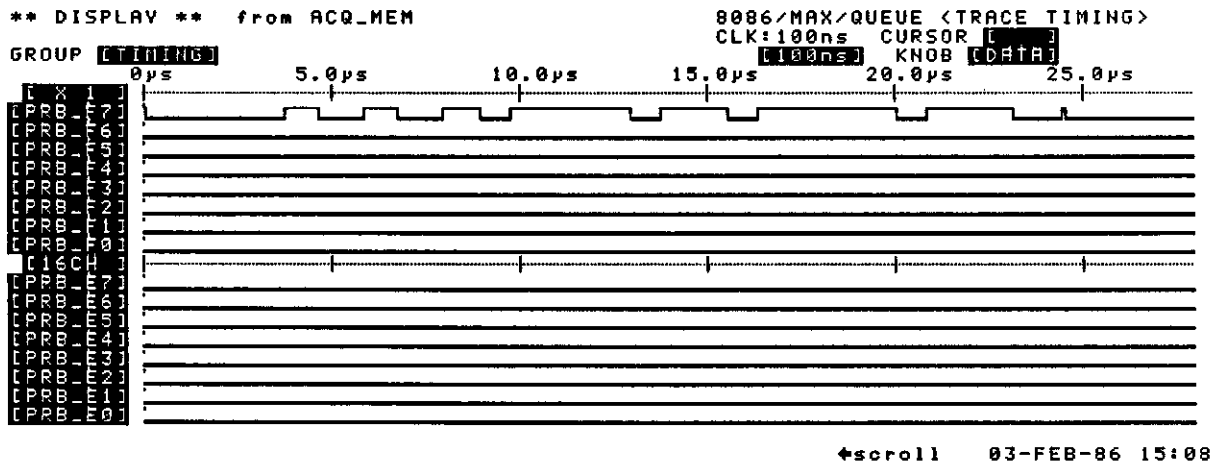


Figure 3-2 Timing Analysis Measurement Example (sampling clock: 100 ns)

What portion of the input signal starts to display is unpredictable no

matter how many times  is pressed(?).

Turn the scroll knob clockwise to move the data on the screen to the left; and vice versa. Turn the scroll knob fast and the data moves fast; slow

turning will also slow down the data changes. Next, press  to move the input prompt to the menu item of [ x 1 ] (time axis multiplier). The time

axis multiplier can be changed by pressing either  or . x n expands the time axis; x 1/n contracts the time axis. All of the data contained in the memory (16 ch. x 2048 samples) attained at x 1/10 ratio is specified.


Next, press  to move the input prompt to the menu item of [ PRB\_F7]. Enter "DATA" by using the character key of the ENTRY key group (refer to Figure 3-3).

Pay attention to the use of the shift key (the green key). When  is pressed following the previous procedures, the label name [ PRB\_F7] is changed and displayed as [DATA] as shown in Figure. This function ensures that the data analysis can be performed with great ease.



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3.2 SIMPLE EXAMPLES OF TIMING ANALYSIS

Refer to Section 4.2.3 for the screen that will appear next when  <sup>CONFIG</sup> is pressed. Then, press  <sup>TRACE</sup> and   to move the input prompt to TRIG\_T. Next, press  <sup>1</sup> to set "1" to the equivalent position of "DATA" as shown in Figure 3-5. When  <sup>RM</sup> is pressed, the screen as shown in Figure 3-6 will appear. After this, no matter how many times  <sup>RM</sup> is pressed, the initial display remains at H level. This means that action is triggered (the trigger point indicates the initial data). (On the time axis, 0 ns is displayed).

Press  <sup>TRACE</sup> again, and then press  <sup>RM</sup> after setting 0 to "ENBL\_T" and -0001 to "DELAY" as shown in Figure 3-7. At this point, the trigger point becomes clearer than before.

```

** TRACE SPECIFICATION **                               8086/MAX/QUEUE <TRACE TIMING>
[TRACE TIMING]-----QuickVIEW [OFF]
      LABEL          ENBL_T  TRIG_T
DATA   (PRB_F7)
PRB_F6 (PRB_F6)
PRB_F5 (PRB_F5)
PRB_F4 (PRB_F4)-----
PRB_F3 (PRB_F3)
PRB_F2 (PRB_F2)
PRB_F1 (PRB_F1)
PRB_F0 (PRB_F0)-----
PRB_E7 (PRB_E7)
PRB_E6 (PRB_E6)
PRB_E5 (PRB_E5)
PRB_E4 (PRB_E4)-----
PRB_E3 (PRB_E3)
PRB_E2 (PRB_E2)
PRB_E1 (PRB_E1)
PRB_E0 (PRB_E0)-----
                                CLOCK RATE [100ns]
                                DELAY = +0000 (0ps)

```

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Figure 3-5 Trigger Pattern (TRIG\_T) Setting Example

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3.2 SIMPLE EXAMPLES OF TIMING ANALYSIS

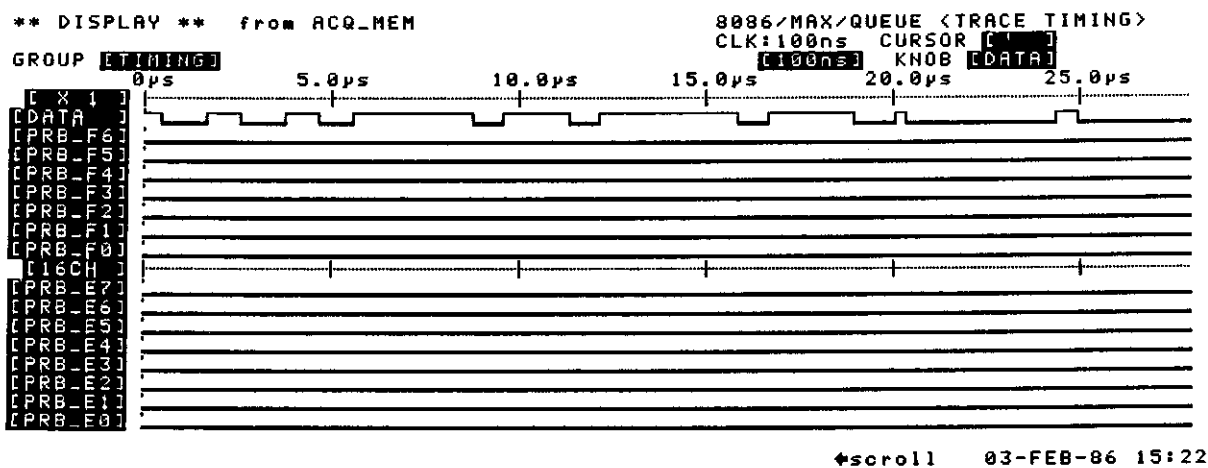


Figure 3-6 Measuring Example with Trigger Pattern Setting

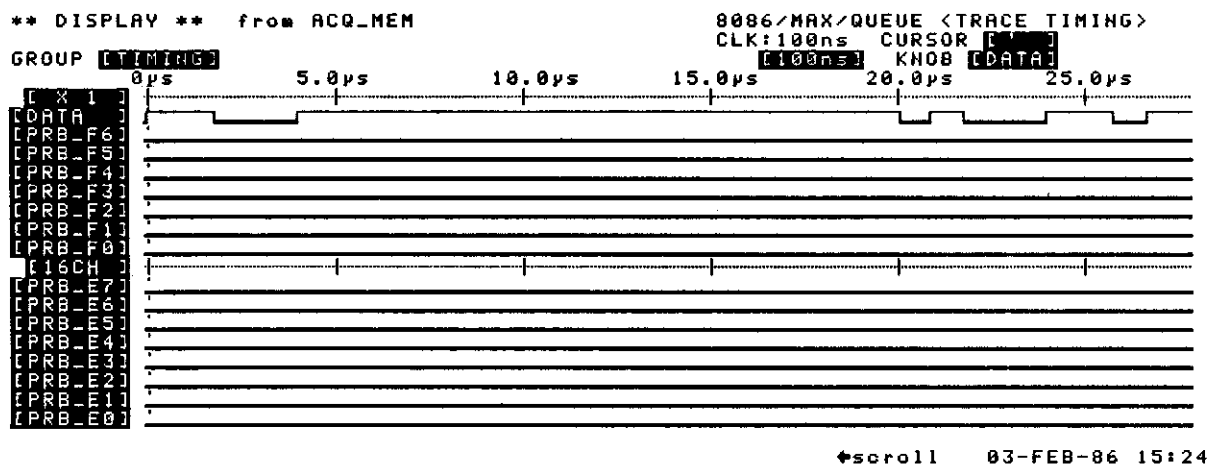


Figure 3-7 Delay Usage Example

Refer to Section 4.4.3 for the screen which appears when TRACE is pressed. When the above procedures are executed, the basic operation of the timing analysis outline can be grasped.

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PERSONALITY KIT  
INSTRUCTION MANUAL

3.3 SIMPLE EXAMPLES OF STATE ANALYSIS

3.3 SIMPLE EXAMPLES OF STATE ANALYSIS

Connect the microprocessor probe to the main unit (refer to Section 2.3.1) and load the system software (refer to Section 2.5). Choose the desired processor when \*\* CONFIGURATION \*\* is displayed on the CRT. Next, press

(immediately after POWER ON, the measuring mode turns into the TRACE STATE).

Then press  and the measured data as shown in Figure 3-8 appears (the data differs according to the system measured).

```

** DISPLAY **      from ACQ_MEM (86,Q)                8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS] [DATA] [STATUS] [HEX] [HEX] [HEX] [HEX] [HEX]
RADIX [HEX] [HEX] [HEX] [HEX] [HEX] [HEX] [HEX] [HEX]
[ ] +-----+-----+-----+-----+-----+-----+-----+
0000 FFFF0 EA 4
0001 FFFF1 83 4
0002 FFFF2 0D 4
0003 FFFF3 00 4
0004 FFFF4 FE 4
0005 FED83 B8 4
0006 FED84 00 4
0007 FED85 A0 4
0008 FED86 9E 4
0009 FED87 D8 4
0010 FED88 C6 4
0011 FED89 06 4
0012 FED8A 14 4
0013 FED8B 00 4
0014 FED8C 00 4
0015 A0014 xx00 6
0016 FED8D C6 4

```

↑scroll 03-FEB-86 16:50

Figure 3-8 State Analysis Measuring Example

The input prompt is moved to the menu item of [ADRS] on the first line on the left. Check if the contents of GROUP is changed when  is pressed. ([ADRS] → [DATA] → [STATUS] → [ ] → [ADRS])

Then, press  to move the input prompt to the menu item [HEX] and check if the contents of RADIX is changed by pressing . Next, press  to move the input prompt to the RADIX selection menu item of [DATA] (currently in [HEX]). [DATA] is displayed in 8086/88 mnemonic and [MNEM] with [S-by-S] is displayed on the when  is pressed. Then press  to display the program.

Then, try to turn the scroll knob. Turn the scroll knob clockwise to scroll the data upwards, and turn the knob counterclockwise to scroll the data downwards. Next, press the PAGE   keys. What the scroll knob can move by a line can be moved by these keys ten lines, vertically.

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INSTRUCTION MANUAL

3.3 SIMPLE EXAMPLES OF STATE ANALYSIS

Familiarize yourself with these operations and their effects on the DISPLAY screen by trying out all the key functions. Refer to Section 4.6.2 of the main unit instruction manual for the display formats and their meanings and the meaning of the menu items, and Section 4.6.3 for the use of the reference memory.

Next, press  <sup>TRACE</sup> and press  five times to move the input prompt to the menu item [ADRS] which is one element of TRIG1.

Input here the pattern of one data in [ADRS] as shown in Figure 3-8.

Then, press  <sup>MIN</sup> and the data with the pattern (called trigger) is moved to the upper most line of the measured data (refer to Figure 3-9). The same pattern remains unchanged on the upper most line no matter how many

times  <sup>MIN</sup> is pressed. Refer to Section 4.4.2 of the main unit

instruction manual for the screen which appears when  <sup>TRACE</sup> is pressed.

```

** DISPLAY **   from ACQ_MEM (86,Q)                               8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS] [DATA] [STATUS] [HEX] [HEX] [HEX] [HEX]
RADIX [HEX] [MHEM] [HEX] [HEX] [HEX] [HEX]
[LN] +-----+-----+-----+-----+-----+-----+-----+
0000 09078      0000/mem_rd                                     5
0001 09078      0001/mem_wr                                     6
0002 FC41C      STI                                           4
0003 FC41D      RET_S                                         4
0004 0884E      0991/mem_rd                                     5
0005 08850      FC00/mem_rd                                     5
0006 FC991      XOR      AX,AX                                   4
0007 FC992      ..                                           4
0008 FC993      MOV      BX,107A                                4
0009 FC994      ..                                           4
0010 FC995      ..                                           4
0011 FC996      ..                                           4
0012 0907A      1088/mem_rd                                     5
0013 FC997      ADD      04[BX],#0005                           4
0014 FC998      ..                                           4
0015 FC999      ..                                           4
0016 0908C      15C1/mem_rd                                     5

```

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Figure 3-9 Measuring Example by Trigger Pattern Setting (State Analysis)

The measured data can be displayed not just by numeric values but also names. (For instance: the function name used for program creation). Therefore, it is necessary to define names (SYMBOL and CODE names). The

display which appears by pressing  <sup>SYM DEF</sup> is used for definition. For details, refer to Sections 4.3.2 and 4.3.3 of the main unit instruction manual.

When all of the above operations are executed, the outline of the basic operation of the state analysis can be understood.



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---

3.4 SIMPLE EXAMPLES OF S & T ANALYSIS

3.4 SIMPLE EXAMPLES OF S & T ANALYSIS

Connect the microprocessor probe and probe E/F to the main unit and execute loading of the system software.

Next, press  <sup>TRACE</sup> to set the measuring mode to TRACE S&T (S→T) in which the state analysis and timing analysis sections operate simultaneously.

Execution starts when  <sup>RM</sup> is pressed. For the relations with the measured data, refer to Section 4.4.4 of the main unit instruction manual.

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3.5 FLOPPY DISK APPLICATIONS

3.5 FLOPPY DISK APPLICATIONS

When the main unit POWER switch is turned OFF, all of the measured data and data set in the menu item displayed on the screen described respectively in Sections 3.2 to 3.4 are deleted. For re-use of these data, it is very convenient to store them on the floppy disk. The operations of the disk file of the TR4725 differ from those of the general-purpose type computers such as personal computers, and are rather simple.

Refer to Section 4.2.4 of the main unit instruction manual for file

processing on the screen with  <sup>CONFIG</sup>, Section 4.3.4 for file processing on

the screen with  <sup>SYM DEF</sup>, section 4.4.5 for file processing on the screen with

<sup>TRACE</sup>, and Sections 4.6.4 and 4.7.5 for file processing on the screen with

<sup>DISPLAY</sup>.

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3.6 USE OF QuickVIEW

---

3.6 USE OF QuickVIEW

The TR4725 has a new facility called QuickVIEW provided with the functions and ease of use of the oscilloscope for timing analysis.

The oscilloscope observes and measures the transitional condition of signals to be measured by setting the condition for attaining the desired screen and data by repeatedly operating the knobs of the trigger level or the key switches of time axis or input gain.

Though not exactly the same as the oscilloscope since the nature of the signals handled are different, QuickVIEW uses the scroll knob and provides the same ease of operation as the oscilloscope.

The operation procedures are simple. Press  to move the input prompt to the menu item of QuickVIEW and set [ON] with . Next, press  to enter into QuickVIEW mode. The sampling clock is changed by simply turning the scroll knob and then the real time data can be observed. Refer to Section 4.8 of the main unit instruction manual for details of the QuickVIEW facility.

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3.7 EXAMPLES OF USING THE PROGRAMS

3.7 EXAMPLES OF USING THE PROGRAMS

After the operations described in the previous sections are learned, it is easy to create the program of measurement procedures by simple programming.

Programming starts immediately when  is pressed.

Programs can be created by simply pressing , , or . The

command that can be selected by  or  has been made as similar as possible to the key operation. For instance, [TRACE] function is

equivalent to pressing . The created program is immediately

executable when  is consecutively pressed twice. Pressing

interrupts execution. For the operating procedures of the editor, refer to Section 6.2.1 of the main unit instruction Manual, and Section 6.2.2 for the type of commands that can be selected and their functions.

The created program is stored as a file (named as command file) and can be applied. For the application method, refer to Section 6.4 of the main unit instruction manual. Refer to Section 6.3 for the execution procedures of the command file.

The followings are explanations of some program examples. Try to create the same program for practice.

Figure 3-10 shows the program which executes the measurement by repetition (repeat function). The repeat function is a fixed function of conventional models of the logic analyzer. With the TR4725, all kinds of varieties can be developed. Figure 3-11 shows one example. The program as shown can display the acquired data within at five seconds most.

Run command is not necessarily required in the program. Figure 3-12 shows the program that only sets measuring conditions, which is convenient for setting measuring conditions to be used as a routine. Figure 3-13 shows the program that saves all kinds of measuring results in the system saved file after three measurements, by changing only the TRACE data.

Figure 3-14 shows the program that repeats the measurement ten times under the same measuring conditions.

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3.7 EXAMPLES OF USING THE PROGRAMS

```
** PROGRAM **                                8086/MAX/QUEUE <TRACE TIMING>
LN  _  COMMAND  _  -----  COMMENT  _  -----
00 [RUN]
01 [GOTO] LN[00]
02 END
```

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Figure 3-10 Repeat Function Program 1

```
** PROGRAM **                                8086/MAX/QUEUE <TRACE TIMING>
LN  _  COMMAND  _  -----  COMMENT  _  -----
00 [RUN]
01 [WAIT] 005 sec
02 [GOTO] LN[00]
03 END
```

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Figure 3-11 Repeat Function Program 2

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3.7 EXAMPLES OF USING THE PROGRAM

```
** PROGRAM **                                8086/MAX/QUEUE <TRACE TIMING>
LN_  _COMMAND-----COMMENT-----
00  [CONFIG]
01  [GET] [F0:] TEST1.CNF  GET
02  [TRACE]
03  [GET] [F0:] TEST1.TRC  GET
04  [SYMDEF]
05  [GET] [F0:] TEST1.SYM  GET
06  END
```

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Figure 3-12 Program That Only Sets Measuring Conditions

```
** PROGRAM **                                8086/MAX/QUEUE <TRACE S&T(S+T)>
LN_  _COMMAND-----COMMENT-----
00  [CONFIG]
01  [GET] [F0:] TEST1.CNF  GET
02  [TRACE]
03  [GET] [F0:] TEST1.TRC  GET
04  [RUN]
05  [SAVE] [QUICK] [F0:] SAVE
06  [TRACE]
07  [GET] [F0:] TEST2.TRC  GET
08  [RUN]
09  [SAVE] [QUICK] [F0:] SAVE
10  [TRACE]
11  [GET] [F0:] TEST3.TRC  GET
12  [RUN]
13  [SAVE] [QUICK] [F0:] SAVE
14  END
```

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Figure 3-13 Program Example -1

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3.7 EXAMPLES OF USING THE PROGRAM

```
** PROGRAM **                                8086/MAX/QUEUE <TRACE S&T(S+T)>
LN  COMMAND-----COMMENT-----
00 [DEFINE] [I=] 00
01 [CONFIG]
02 [GET] [F0:] TEST1.CNF GET
03 [TRACE]
04 [GET] [F0:] TEST1.TRC GET
05 [RUN]
06 [SAVE] [QUICK] [F0:] SAVE
07 [COUNT+1] [I]
08 [IF] [I+] 10 THEN GOTO LN[05]
09 END
```

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Figure 3-14 Program Example -2

*MEMO*



A large, empty rectangular area with rounded corners, enclosed by a dashed border, intended for writing the memo's content.



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4.1 INTRODUCTION

---

4. PERSONALITY KIT PERFORMANCE CHARACTERISTICS

4.1 INTRODUCTION

The basic measurement operations are described in Chapter 4 of the main unit instruction manual. This chapter focuses on the performance characteristics of the Personality Kit. Refer to the related sections of the main unit instruction manual when reading this chapter. (For convenient reference, the section titles are identical.)

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4.2 INPUT CHANNEL CONFIGURATION (CONFIG)

4.2 INPUT CHANNEL CONFIGURATION (CONFIG)

4.2.1 CONFIG Menu Screen for 8086/88

State analysis measurement using the TR47251 is designed especially for 8086 or 8088 microprocessors. The menu screens of the state analysis section are shown in Figures 4-1 and 4-2, corresponding to the 8086 and 8088 microprocessors, respectively.

The Personality Kit allows eight operation selections for the selection of 8086/88, the selection of QUEUE sample mode/BUS sample mode, and the selection of MIN/MAX. Both the selections of 8086/8088 and MIN/MAX are determined by the SUT circuit. The selection of the sample mode can be freely chosen by the user. The QUEUE sample mode captures data in synchronizing with the 8086/88 internal instruction queue. This feature is especially suitable for software trace since the screen does not display the data which is not executed during the pre-fetched instruction execution. A performance characteristic of the BUS sample mode is that it captures the data output on the bus of 8086/88 without any modification, and the pre-fetched instruction is displayed even without execution so this is suitable for learning about relationships with peripherals. Six types of GROUP can be defined. Among these, three groups of ADRS, DATA and STATUS are previously defined and cannot be changed by the user. However, the user can still define the remaining three types. Names such as A19 displayed on the CRT stand for the signal pin names of the 8086/88 microprocessor. The signal name with a ♦ mark indicates that the signal pin is selected. POL means the polarity of signal capturing. An alphanumeric character of no more than six characters long can be adopted as a GROUP name.

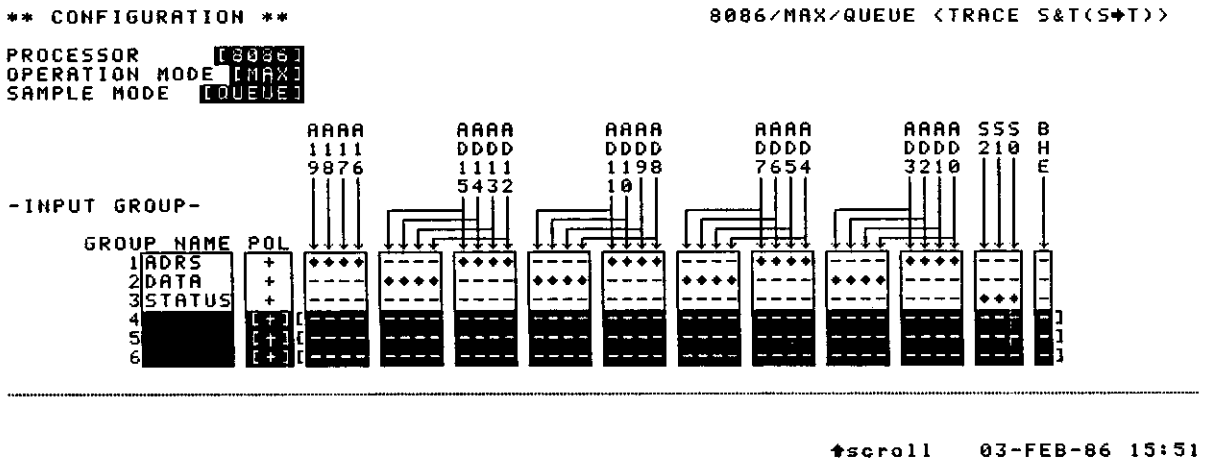


Figure 4-1 CONFIG Menu Screen (8086)



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4.3 SYMBOL AND CODE DEFINITIONS (SYMDEF)

4.3 SYMBOL AND CODE DEFINITIONS (SYMDEF)

4.3.1 CODE Table for 8086/88

The TR47251 provides a CODE table defined for GROUP "STATUS" to be used for TRACE condition setting (refer to Section 4.4.2 of the main unit instruction manual) and captured data display (refer to Section 4.6.2 of the main unit instruction manual). The table is shown in Figure 4-3. Refer to Section 4.3.3 of the main unit instruction manual when displaying the table.

```
** SYMBOL DEFINITION **                                8088/MAX/QUEUE <TRACE S&T(S+T)>
GROUP [STATUS]    TYPE [CODE ]
RADIX [HEX ]

LN  NAME      VALUE USE
-----
000 INTA      0    [+ ]
001 IO_RD     1    [+ ]
002 IO_WR     2    [+ ]
003 HALT      3    [+ ]
004 OP        4    [+ ]
005 MEM_RD    5    [+ ]
006 MEM_WR    6    [+ ]
007 ILLEGAL   7    [+ ]

pre-defined for 8086/88 microprocessor
unchangeable
```

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Figure 4-3 Defined CODE Table (8086/88 status)

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4.4 DISPLAY OF CAPTURED DATA IN STATE ANALYZER (DISPLAY)

4.4 DISPLAY OF CAPTURED DATA IN STATE ANALYZER (DISPLAY)

Figure 4-4 shows the measured data captured by the TR47251. For display format and menu screen setting, refer to Section 4.6.2 of the main unit instruction manual.

```

** DISPLAY **      from ACQ_MEM (86,Q)                8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS ] [DATA ] [STATUS] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
RADIX [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ] [HEX ]
[LN]  +-----+-----+-----+-----+-----+-----+-----+-----+
0000  0885A  F212  6
0001  08858  FC00  6
0002  08856  0B40  6
0003  FC98C   9A   4
0004  FC98D   02   4
0005  FC98E   04   4
0006  FC98F   00   4
0007  FC990   FC   4
0008  08854  FC00  6
0009  08852  0991  6
0010  FC402   55   4
0011  08850  4000  6
0012  FC403   8B   4
0013  FC404   EC   4
0014  FC405   56   4
0015  0884E  0426  6
0016  FC406   1E   4

```

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Figure 4-4 Measured Data Display Example

4.4.1 QUEUE Sample Mode Display

The examples displayed in mnemonic of the data captured by the QUEUE sample mode are shown in Figure 4-5. The data shown in Figures 4-4 and 4-5 are identical.

The 8086 DATA which is equivalent to the instruction code is set to 1 byte so that the QUEUE sample mode and the 8086/88 microprocessor internal instruction queue can synchronously capture instruction codes in 1 byte units.

The part of ".." in the DATA displayed in mnemonic is a part of the instruction code which means that it is included in the mnemonic (and operand) immediately before.

Since the instruction fetch (to be accurate, the microprocessor internal instruction fetch) in the QUEUE sample mode and its execution are displayed in such a way that they can be executed consecutively, thus is ideal for software debugging.

There are two QUEUE sample display modes: S-by-S (State-by-State) display mode and PACKED display mode. S-by-S (State-by-State) display mode and PACKED display mode. S-by-S display mode faithfully displays the captured condition of the logic analyzer system, and the PACKED display mode is a higher density display excluding all the ".." marks which are not required for analysis. Two display modes are shown in Figures 4-5 and 4-6 (Figure 4-6 is the PACKED display with the same data as Figure 4-5).

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4.4 DISPLAY OF CAPTURED DATA IN STATE ANALYZER (DISPLAY)

```

** DISPLAY ** from ACQ_MEM (86,Q)                                8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS ] [DATA ] [STATUS] [HEX ] [HEX ]
RADIX [HEX ] [MNMN ] with [S-by-S] [HEX ] [HEX ]
[LN]-----+-----+-----+-----+-----+-----+-----+-----+
0000 0885A F212/mem_wr F212 MEM_WR
0001 08858 FC00/mem_wr FC00 MEM_WR
0002 08856 0B40/mem_wr 0B40 MEM_WR
0003 FC98C CALL_S FC402 9A OP
0004 FC98D .. 02 OP
0005 FC98E .. 04 OP
0006 FC98F .. 00 OP
0007 FC990 .. FC OP
0008 08854 FC00/mem_wr FC00 MEM_WR
0009 08852 0991/mem_wr 0991 MEM_WR
0010 FC402 PUSH BP 55 OP
-----+-----+-----+-----+-----+-----+-----+-----+
0011 08850 4000/mem_wr 4000 MEM_WR
0012 FC403 MOV BP,SP 8B OP
0013 FC404 .. EC OP
0014 FC405 PUSH SI 56 OP
0015 0884E 0426/mem_wr 0426 MEM_WR
0016 FC406 PUSH DS 1E OP

```

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Figure 4-5 S-by-S Display Example in QUEUE Sample Mode

```

** DISPLAY ** from ACQ_MEM (86,Q)                                8086/MAX/QUEUE <TRACE STATE>
GROUP [ADRS ] [DATA ] [STATUS] [HEX ] [HEX ]
RADIX [HEX ] [MNMN ] with [PACKED] [HEX ] [HEX ]
[LN]-----+-----+-----+-----+-----+-----+-----+
0000 0885A F212/mem_wr F212 MEM_WR
0001 08858 FC00/mem_wr FC00 MEM_WR
0002 08856 0B40/mem_wr 0B40 MEM_WR
0003 FC98C CALL_S FC402 9A OP
0008 08854 FC00/mem_wr FC00 MEM_WR
0009 08852 0991/mem_wr 0991 MEM_WR
0010 FC402 PUSH BP 55 OP
-----+-----+-----+-----+-----+-----+-----+
0011 08850 4000/mem_wr 4000 MEM_WR
0012 FC403 MOV BP,SP 8B OP
0014 FC405 PUSH SI 56 OP
0015 0884E 0426/mem_wr 0426 MEM_WR
0016 FC406 PUSH DS 1E OP
0017 0884C 0800/mem_wr 0800 MEM_WR
0018 FC407 PUSH 04[BP] FF OP
0021 08854 FC00/mem_rd FC00 MEM_RD
0022 0884A FC00/mem_wr FC00 MEM_WR
0023 FC40A PUSH 02[BP] FF OP

```

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Figure 4-6 PACKED Display Example in QUEUE Sample Mode

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4.4 DISPLAY OF CAPTURED DATA IN STATE ANALYZER (DISPLAY)

4.4.2 BUS Sample Mode Display

The example of the data captured in BUS sample mode in mnemonic is shown in Figure 4-7. This is the data measured under the same trace conditions as for Figures 4-4, 4-5 and 4-6. (Only the CONFIG setting is different.)

The 8086/88 microprocessor captures data which is accessed to the bus as in BUS sample mode. When the bus is found empty, 8086/88 microprocessor immediately executes instruction pre-fetch. Therefore, no consecutive operation of the bus along with the instruction code on the bus and its execution can occur. The part of ".." in the mnemonic displayed DATA is a part of the instruction code which indicates that is is a portion of the mnemonic (and operand) immediately before. "." indicates one digit of the hexadecimal.

The line with a blank line number indicates that two types of the instruction codes are included in the DATA of the line before. So, the address of the line with a blank line number should be the address of the line before plus one (+1).

```

** DISPLAY **      from ACQ_MEM (86,B)                8086/MAX/BUS <TRACE STATE>
GROUP [ADRS ] [DATA ]
RADIX [HEX ] [MNEM ]
[CLN] +-----+ [DATA ] [STATUS] [HEX ] [HEX ]
[HEX ] [CODE ] [HEX ] [HEX ]
-----+-----+-----+-----+
0000 00084 098C/mem_rd 098C MEM_RD
0001 00086 FC00/mem_rd FC00 MEM_RD
0002 08860 F246/mem_wr F246 MEM_WR
0003 0885E FC00/mem_wr FC00 MEM_WR
0004 FC98C 029A/op 029A OP
0005 0885C 0687/mem_wr 0687 MEM_WR
0006 FC98E 0004/op 0004 OP
0007 FC990 33FC/op 33FC OP
0008 FC992 8BC0/op 8BC0 OP
0009 0885A FC00/mem_wr FC00 MEM_WR
0010 FC402 PUSH BP
MOV BP,SP
0011 08858 0991/mem_wr 0991 MEM_WR
0012 FC404 .. 56EC OP
PUSH SI
0013 08856 0856/mem_wr 0856 MEM_WR
0014 FC406 PUSH DS FF1E OP

```

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Figure 4-7 Display Example in BUS Sample Mode

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4.4 DISPLAY OF CAPTURED DATA IN STATE ANALYZER (DISPLAY)

4.4.3 8086/88 Disassembling Format

- (1) The mnemonic of the ope code uses the i AP x 86/88 standard assembling format from the INTEL CO..  
(Data: i AP x 86 micro assembling language programming manual)
- (2) The operand data (1 byte or 2 bytes) are all displayed in hexadecimal. Thus, the numeric base indicating symbol is not used. Also, a "#" sign is attached to the immediate data.
- (3) "\_\_B" is attached to the ope code in the byte-operating instructions.
- (4) The following symbols are attached to the mnemonic of the CALL, JMP, and RET instructions according to the instruction type:
  - Directly in the segment: none
  - Indirectly in the segment: "\_\_I" is attached.
  - Directly between segments: "\_\_S" is attached.
  - Indirectly between segments: "\_\_SI" is attached.
- (5) Direct jump and call instructions in the segment are changed to the absolute address of the branches for display.
- (6) The prefix of REP and LOCK is displayed as an independent instruction. However, when the next instruction has a memory operand, the segment override prefix is included in the operand.
- (7) When ADRS is displayed in SYMBOL, the addresses as operands are displayed in SYMBOL as much as possible.
- (8) When a not-used instruction is found, it is displayed as "/illegal".



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5.1 MICROPROCESSOR PROBE TEST

5. OPERATION CHECK

5.1 MICROPROCESSOR PROBE TEST

Since the Personality Kit uses connectors with many pins and cables for measurement, trouble such as imperfect contact occurs due to incorrect operation. A simple test is therefore designed to check the signal system operation. Perform the following procedures to check operation:

- (1) Mount the supplemented 8086/88 probe test adapter on the PROBE TEST connector in the TR4725 rear panel.
- (2) When a DIP plug cable is used, directly connect the microprocessor probe to the probe test adapter via a 40-pin DIP IC package. (Refer to Figure 5-1.)

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5.1 MICROPROCESSOR PROBE TEST

TR4725 rear panel connector

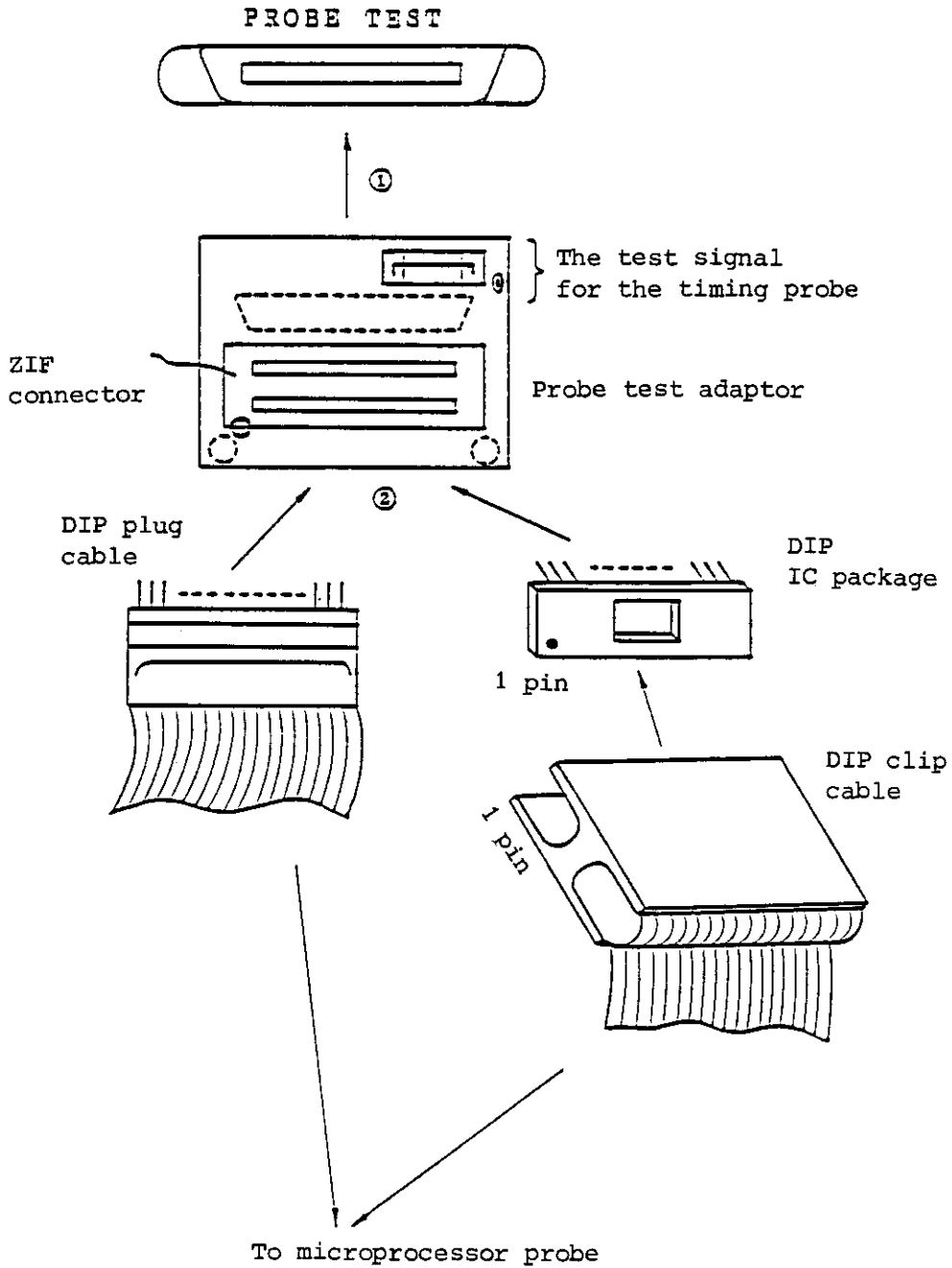


Figure 5-1 Probe Test Connection

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5.1 MICROPROCESSOR PROBE TEST

- (3) Set the measuring mode to TRACE STATE on the TRACE menu screen. Next, press  <sup>DEFAULT</sup>.
- (4) Press  <sup>DEFAULT</sup> on the CONFIG menu screen and then set the SAMPLE MODE menu item to [BUS].
- (5) Press  to start checking.
- (6) Check if the display is the same as Figure 5-2; if it is, the operation is normal.

```

** DISPLAY **      from ACQ_MEM (86,B)                8086/MAX/BUS   <TRACE STATE>
GROUP [ADRS] [DATA] [STATUS] [HEX] [HEX] [HEX] [HEX] [HEX]
RADIX [HEX] [HEX] [HEX] [HEX] [HEX] [HEX] [HEX] [HEX]
-----+-----+-----+-----+-----+-----+-----+-----
[LN] 0000 00000 0000 0
0001 11111 11xx 1
0002 22222 2222 2
0003 33333 3333 3
0004 44444 4444 4
0005 55555 55xx 5
0006 66666 7777 6
0007 88888 8888 0
0008 99999 xxxx 1
0009 AAAAAA xxAA 2
0010 BBBBBB BBBB 3
0011 CCCCCC xxCC 4
0012 DDDDD  xxx  5
0013 EEEEE  xxFF  6
0014 00000 0000 0
0015 11111 11xx 1
0016 22222 2222 2

```

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Figure 5-2 Microprocessor Probe Test Result

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5.2 DATA ACQUISITION PROBE E/F TEST

5.2 DATA ACQUISITION PROBE E/F TEST

The signal (500 kHz, TTL level pulse) testing the probe E/F outputs on the probe test adapter as shown in Figure 5-1. Perform the following procedures for testing:

- (1) Connect the probe test adapter to the PROBE TEST connector on the TR4725 rear panel.
- (2) Connect all the parts of the probe E/F input channel that needs to be tested to the test signal terminal via probe hooks.
- (3) Set the measuring mode to TRACE TIMING on the TRACE menu screen and then set the clock rate to 100 ns after pressing  <sup>DEFAULT</sup>.
- (4) Press  to start testing.
- (5) Check if the operation is normal by confirming that the display is the same as Figure 5-3. When error occurs with the measured data, contact your nearest ADVANTEST representative.

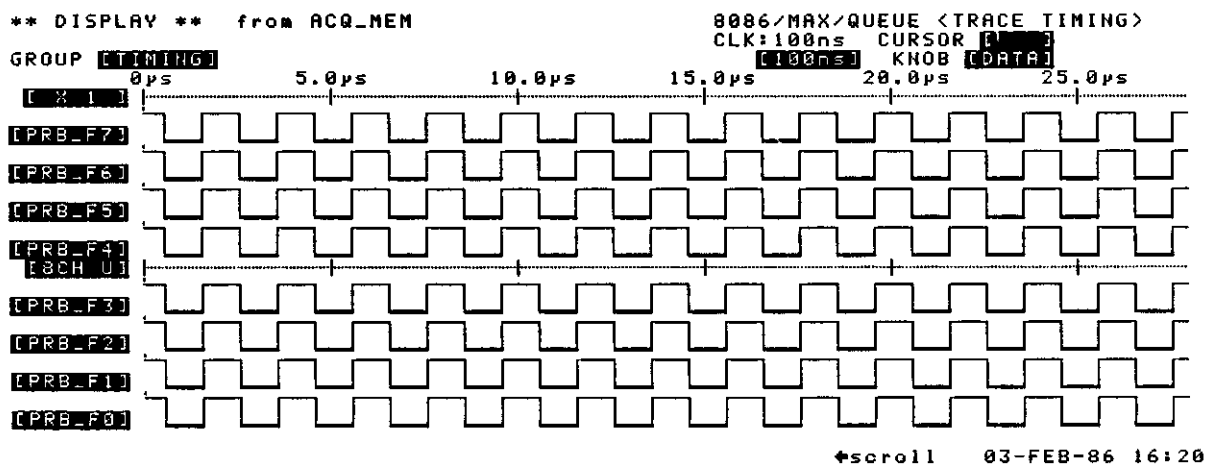


Figure 5-3 Probe E/F Test Result

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6.1 STORAGE

6. EQUIPMENT STORAGE AND TRANSPORTATION PRECAUTIONS

6.1 STORAGE

The storage environment condition for the TR47251 Personality Kit is  $-10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ . When the probe is not used for a long time, place the kit in the Personality Kit storage case and keep in a dry place away from direct sunlight in particular, keep the board in the supplied conductive case). Be sure to store the floppy disk in an environment conditions of  $+10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  (it is recommended to store the floppy disk separately from the Personality Kit storage case).

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6.2 TRANSPORTATION

6.2 TRANSPORTATION

Use the packaging materials of first shipping when transporting the equipment. However, when the original packaging materials cannot be found, pack the equipment as follows:

- (1) Wrap the equipment with vinyl covers.
- (2) Wrap the equipment with 50 mm thick cushioning material and then place the wrapped equipment into a carton more than 5 mm thick.
- (3) After the equipment is wrapped with the cushioning material, put in the accessories, and then more cushioning material. Close the carton box and tie the box with packing ropes.

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INSTRUCTION MANUAL

7.1 TR47251 SPECIFICATIONS

7. SPECIFICATIONS

7.1 TR47251 SPECIFICATIONS

Input Specifications

Applicable Microprocessor: 8086 (5 MHz), 8086-2 (8 MHz), 8086-1 (10 MHz),  
8088 (5 MHz), 8088-2 (8 MHz) of INTEL Co., or  
their equivalents.

Microprocessor clock frequency

: Depends on the system to be measured.

Input current

: -200  $\mu$ A max. (low level)  
20  $\mu$ A max. (high level)

Microprocessor status display

: The LED on the microprocessor probe displays  
the status of CLK, RESET, READY, NMI, INTR, and  
RQ/HOLD.

Microprocessor operation mode

1. MIN mode  
Measurement is executed by inserting the  
microprocessor which has a better or  
equivalent function as the microprocessor of  
the system to be measured into the reference  
processor socket of the probe pod.
2. MAX mode  
Measurement can be performed without  
inserting the microprocessor into the  
reference socket.

Personality Kit operation mode

1. BUS sample mode  
Captures data on 8086/88 bus without  
modification.
2. QUEUE sample mode  
Captures data on the bus in synchronous  
timing with the 8086/88 internal instruction  
queue.

Logical polarity

: + or -

Input group

: Defined by the data input channel groups

Input group name

: An alphanumeric no more than 6 characters long

Input group number

: 6 max. among which 3 are already defined (ADRS,  
DATA, and STATUS)

Display Specifications

Display data source

: Acquisition memory, reference memory, and file

Display items

: 8 items max.

Input group display order: Capable of display by selecting the input group  
name in random order, repeated display of the  
same input group, and deletion of the specific  
input group display.

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7.1 TR47251 SPECIFICATIONS

- Display format : Bus sample mode, S-by-S and PACKED displays in queue sample mode. State can be displayed in binary, octal, decimal, hexadecimal, symbol, codem ASCII code, 8086/88 mnemonic (data only).
- Transmission between memories : The displayed data is transmitted to the reference memory. Data in reference memory and acquisition memory are displayed.
- Data scroll : Vertical scrolling by scroll knob. Page scroll key enables vertical scrolling in page units.
- Specific display : Trigger display for triggers. A memory boundary is displayed between trace windows.

Personality Kit configuration:

Item name	Model name	Q'ty	Remarks
Personality board		1	
Microprocessor probe	TR14725-10	1	
40-pin DIP clip cable	A04725-11	1	
40-pin DIP plug cable	A04725-12	1	
Probe test adapter		1	
40-pin DIP IC package		1	
System software package	P47251-001FJ	2	
Blank disk	MF-2DD	2	
Disk storage case		1	
Miscellaneous container		1	
Personality key storage case		1	
Instruction manual	J47251	1	



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LIST OF FIGURES

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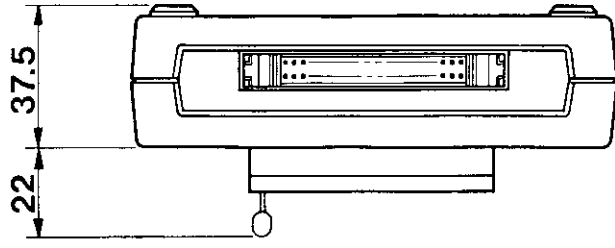
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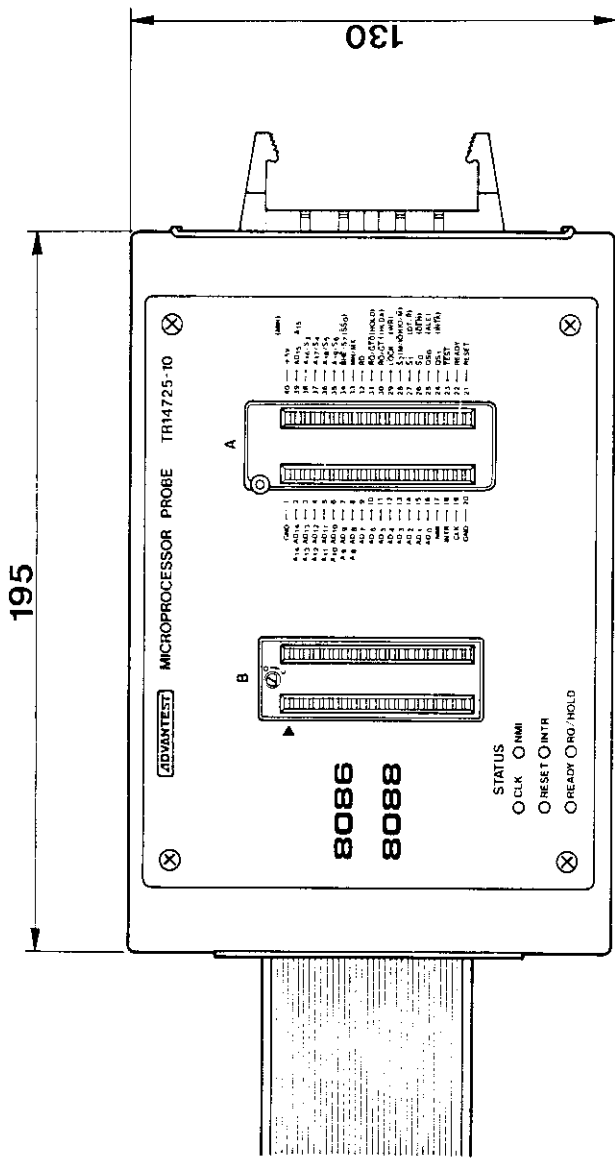
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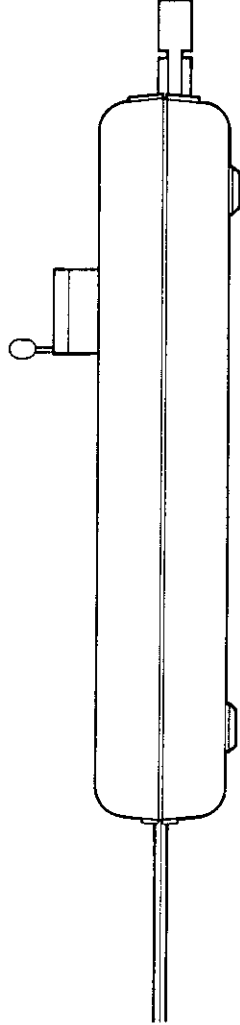




FRONT VIEW



TOP VIEW

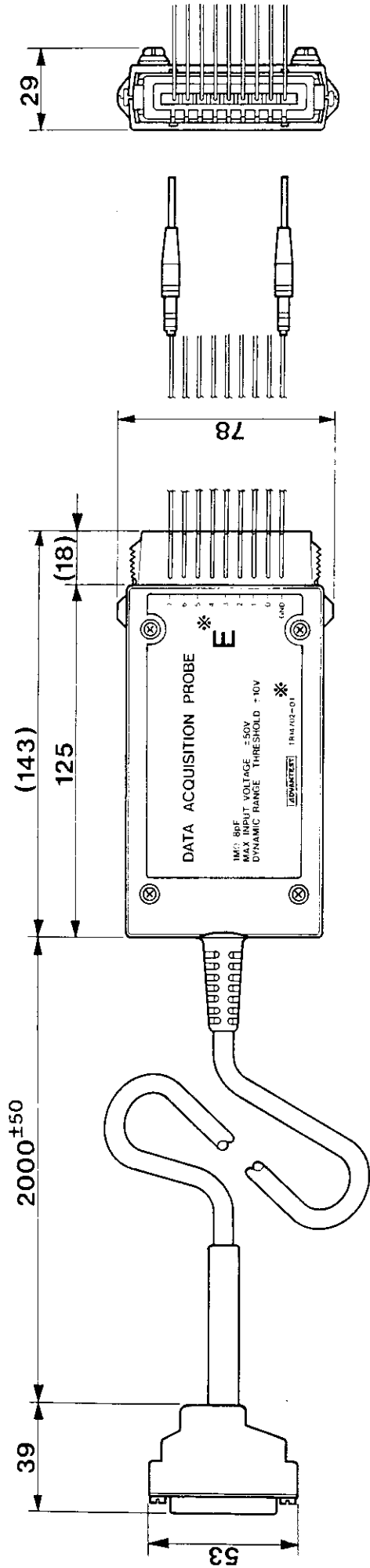


SIDE VIEW

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EXTERNAL VIEW

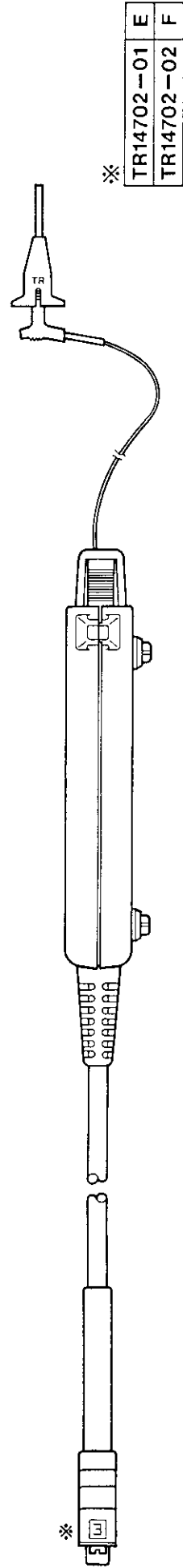






TOP VIEW

FRONT VIEW



SIDE VIEW

TR14702  
EXTERNAL VIEW

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