ADVANTEST®

ADVANTEST CORPORATION

INSTRUCTION MANUAL

TR47242

Personality Kit

MANUAL NUMBER 47242 OEA 606

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Printed in Japan

PREFACE

This manual applies to the system disk P47242-001FJ V2.0.

RECORD OF REVISIONS

Rev. No.	Date	Remarks
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LIST OF RELATED MANUALS

Manual No.	Manual Name	Remarks
TR4725	Logic Analyzer	
TR47250	Personality Kit	
TR47251	Personality Kit	
TR47252	Personality Kit	
TR47241	Personality Kit	
TR47242	Personality Kit	
TR47243	Personality Kit	

TABLE OF CONTENTS

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.).

1.2 TR47242 GENERAL DESCRIPTIONS

The TR47242 8085 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) State analysis has been expedited since 8085 mnemonic is also available, along with numeric values, for analysis of the captured data.

(2) Data capturing is assigned to special hardware, thus high accuracy analysis can be performed with a smaller probe.

(3) State analysis efficiency has been upgraded since symbols and codes are defined and provided for setting measuring conditions or analyzing measured data.

(4) Complicated applications are enabled by more than one trace window condition and memory fragmentation for setting trace conditions.

(5) 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.

(6) 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.

1.3 UNPACKING AND INSPECTION

1.3.1 Appearance Check and Component Confirmation

Upon receiving the TR47242 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	TR14724-20	1
40-pin DIP clip cable	A04724-21	1
40-pin DIP plug cable	A04724-22	1
Probe test adapter		1
40-pin DIP IC package		1
System software package	P47242-001FJ	2
Blank disk	MF-2DD	2
Disk storage case		1
Miscellaneous container		1
Personality kit storage case		1
Instruction manual	E47242	1

* The blank disk can be purchased separately.
  Model name: A09502 (one set contains ten disks.)

MEMO

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.

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.

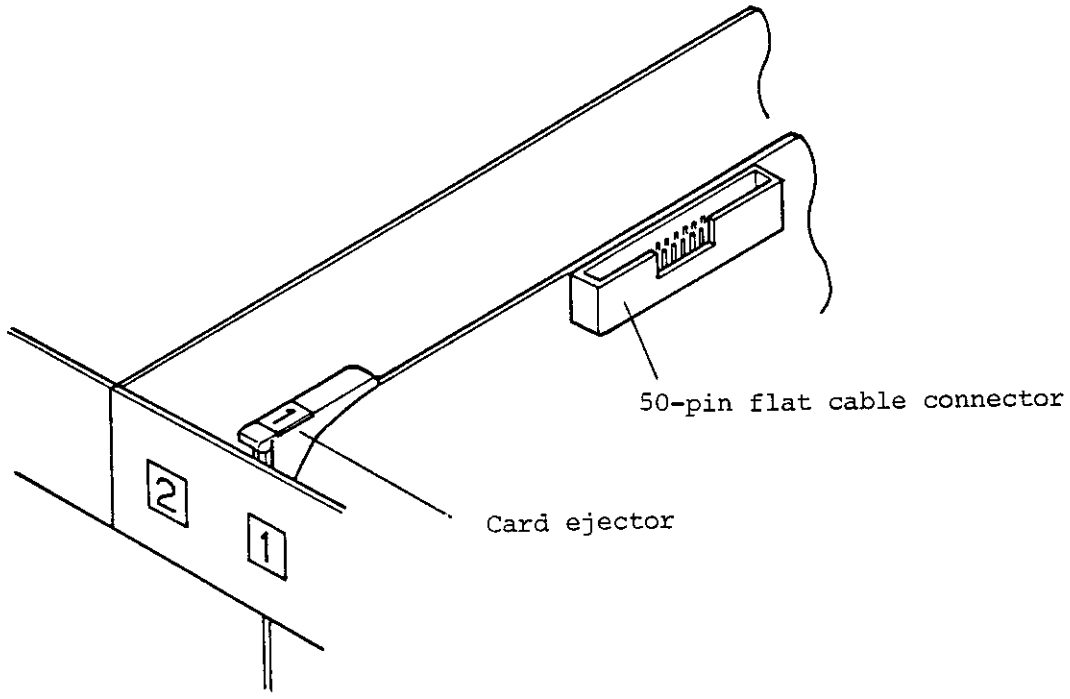


Figure 2-1 Personality Board Installation Method

2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

Perform the following procedures to connect probe to the system to be measured using 8085:

2.3.1 Connecting Microprocessor Probe

This personality kit contains a microprocessor probe (TR14724-20) for connecting a system under test (termed SUT hereafter) in which a microprocessor 8085 is used. This section describes the actual connecting method of the probe. For how to handle the data captured by the probe, see Section 4.2.1.

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 (TR14724-20). Insert respectively the two connectors to the probe slots in the main unit rear panel. The connectors can be locked by screws.

CAUTION

Before connecting microprocessor probe, make sure to turn OFF the power of the main unit.

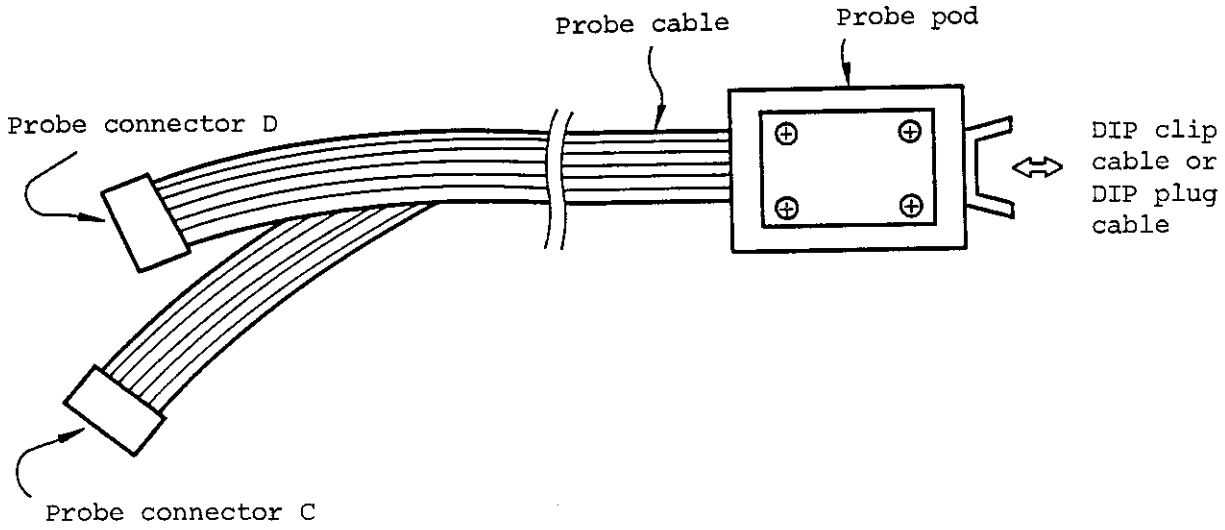


Figure 2-2 Microprocessor Probe Shape and Parts Names

(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.

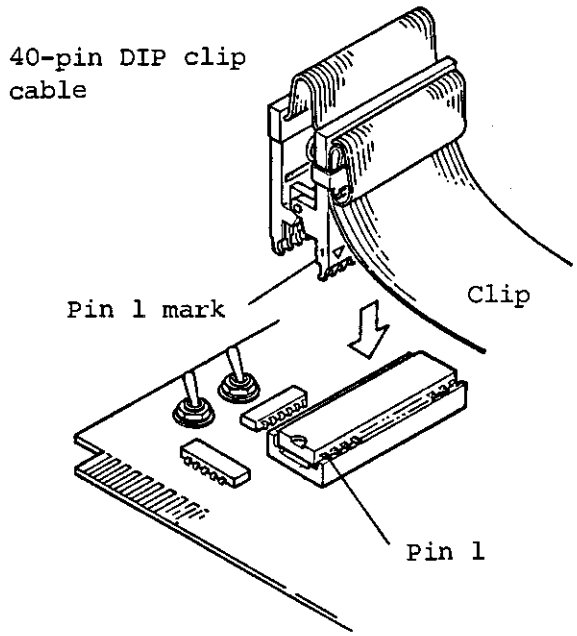


Figure 2-3 The Use of DIP Clip Cable

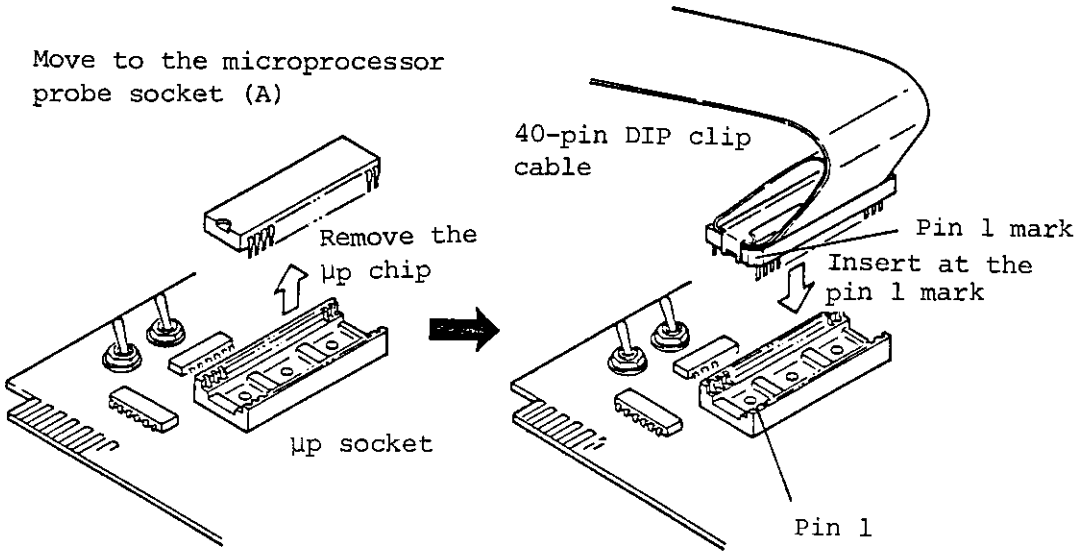


Figure 2-4 The Use of DIP Plug Cable

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.

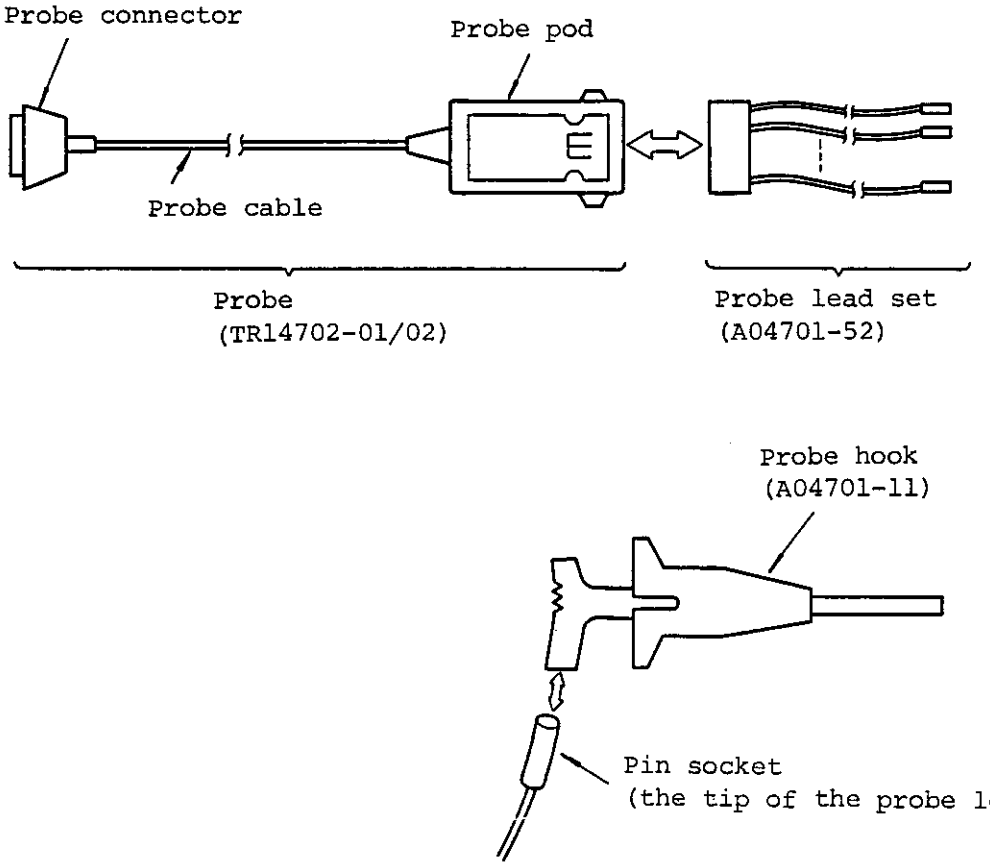


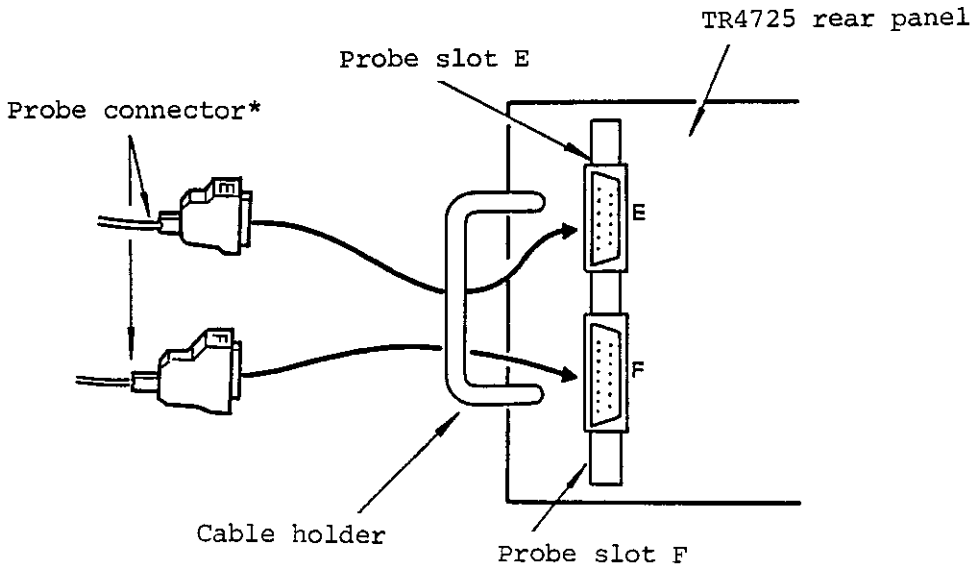
Figure 2-5 Probe E/F Shape and Parts Names (standard configuration)

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

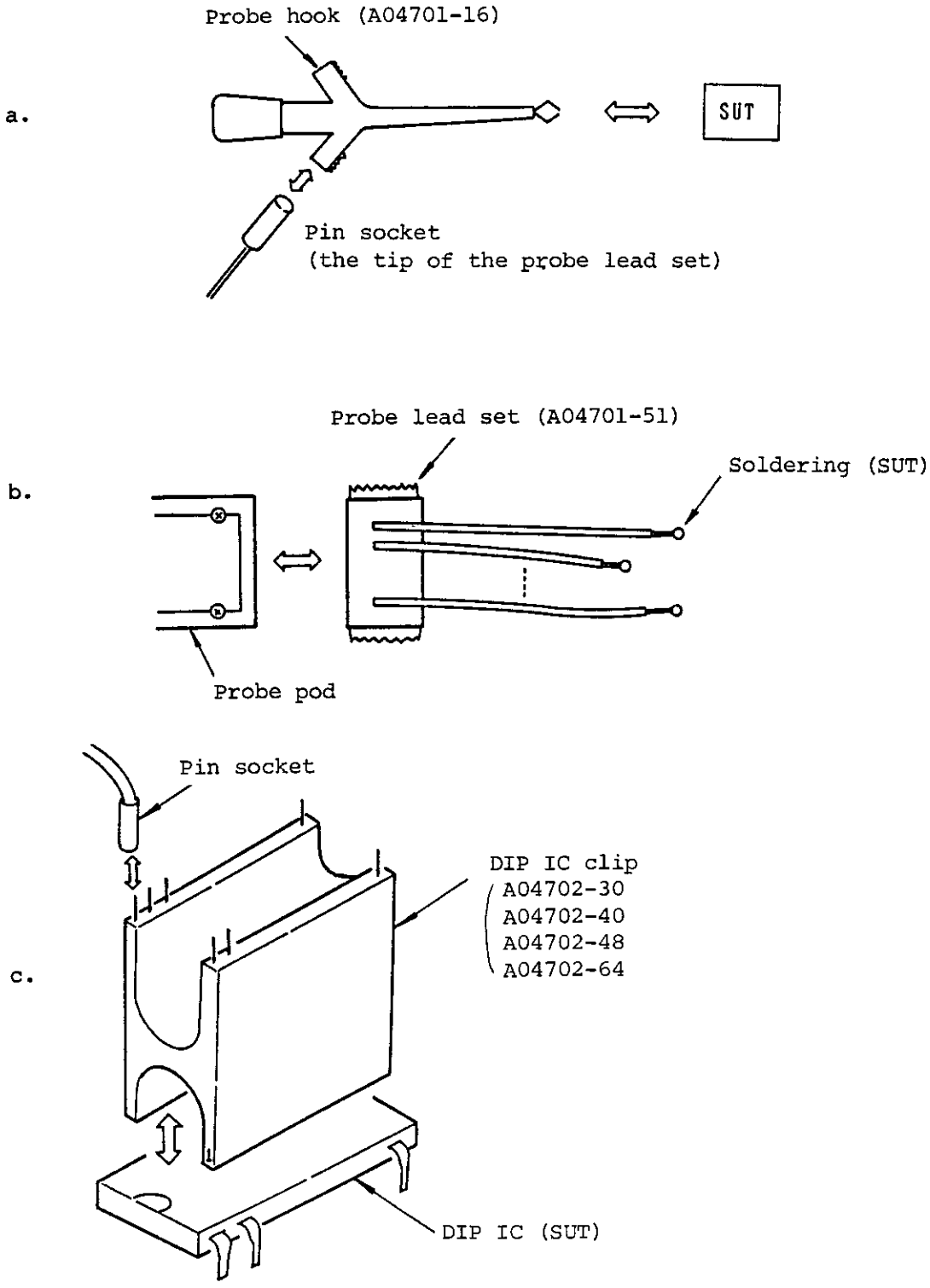
Next, connect probe to SUT. As a standard procedure, use the probe lead set (A04701-52) with pin socket to connect probe to SUT via probe hook (A04701-11; single hook). When the pin which is suitable for pin socket is found in SUT, direct connection with the pin socket is possible. The stock No. and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

Manufacturer	Stock No.	Suitable size
AUGAT KK-JAPAN	LSG-2BG2-1	0.51mmø ~ 0.76mmø

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).)



*: Match at pin 1 and then clip.

Figure 2-7 Connecting SUT with Optional Accessories

2.4 USE OF THE MICROPROCESSOR PROBE

(1) Use of the microprocessor probe socket

Insert the removed target microprocessor into socket on the probe and lower the lever when connecting probe and the SUT with the DIP plug cable.

(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:
(Refer to the TR14724-20 External View at the end of this manual.)

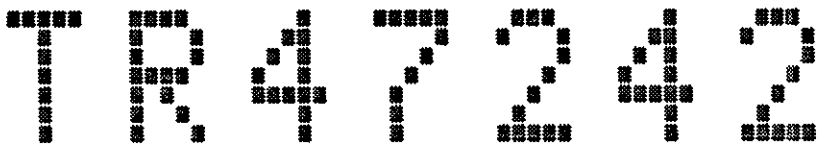
- CLK : Lights when clock signal is applied.
- RESET : Lights when reset signal is applied.
- READY : Lights when ready signal is applied.
- TRAP : Lights when TRAP signal is applied.
- RST/INTR: Lights when RST7.5, RST6.5, RST5.5, or INTR signal is applied.
- HOLD : Lights when BUSRQ or HALT signal is applied.

2.5 LOADING THE SYSTEM SOFTWARE

The software (system software) which controls the operation of the personality kit is loaded from the system disk (P47242-001FJ) 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:



```
8085 PK

System software loading in progress

Self-test ended

OS4725 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 operation-enabled state as shown in Figure 2-9.

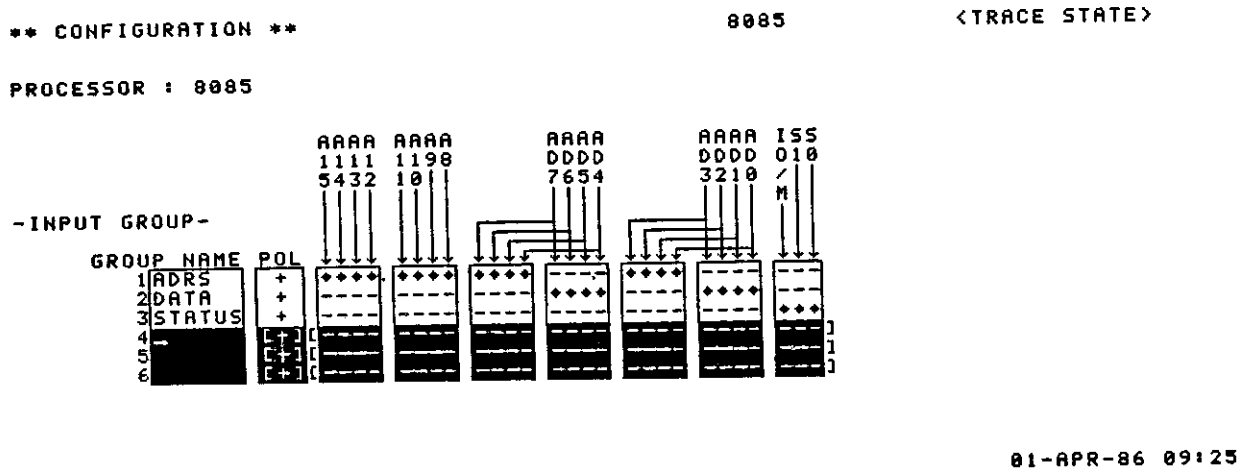


Figure 2-9 Screen Display at the End of Loading (CONFIG menu screen)

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.

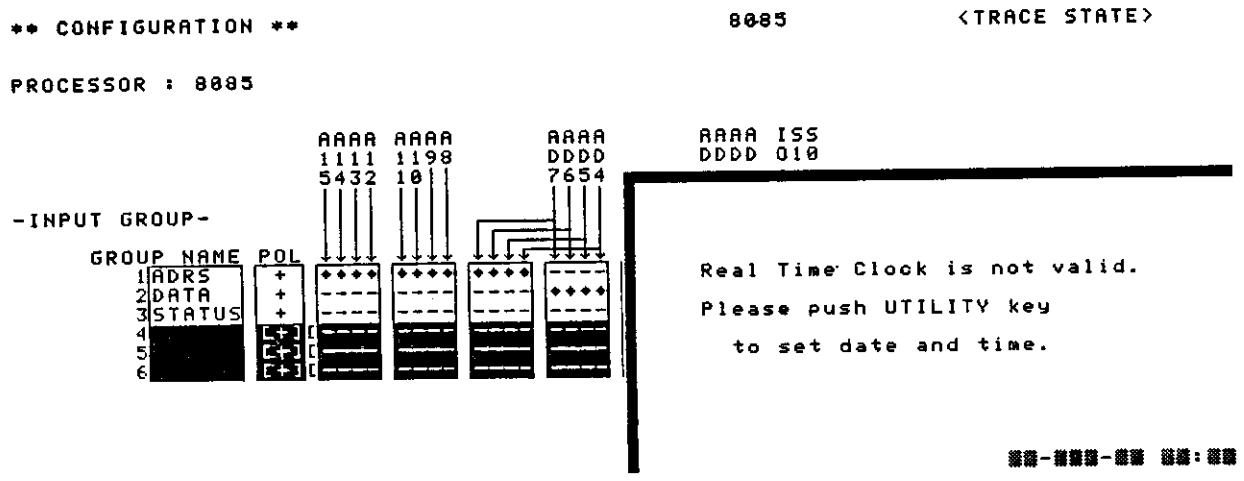


Figure 2-10 Screen Display Requesting Built-in Clock Setting

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.

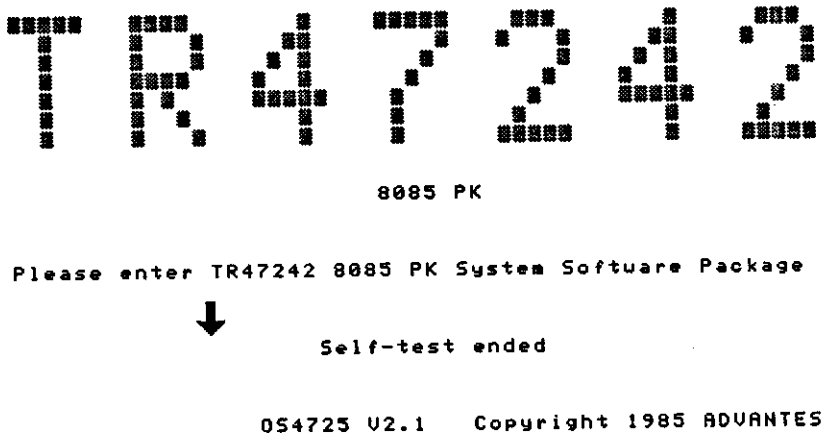


Figure 2-11 Screen Display Requesting System Disk Insertion

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 [CONFIG] 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 [TRACE] and the display as shown in Figure 2-12 will appear. The setting of the trace condition is enabled on the TRACE menu screen.

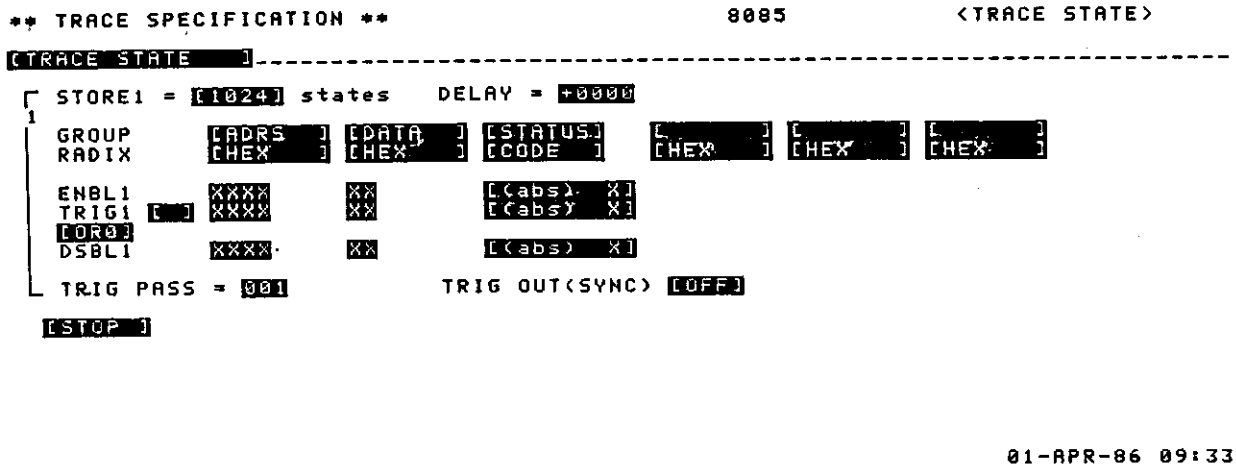


Figure 2-12 TRACE Menu Screen (TRACE SPECIFICATION)

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

```
** DISPLAY **                               8085             <TRACE STATE>

GROUP [ADRS    ] [DATA    ] [STATUS] [        ] [        ] [        ] [        ] [        ]
RADIX [HEX     ] [HEX     ] [HEX   ] [HEX     ] [HEX     ] [HEX     ] [HEX     ] [HEX     ]
[LN]-+---------+---------+---------+---------+---------+---------+---------+----------










                                                                    01-APR-86 09:34
```

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 [GET] 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             8085             <TRACE STATE>

GROUP [ADRS    ] [DATA    ] [STATUS] [        ] [        ] [        ] [        ] [        ]
RADIX [HEX     ] [HEX     ] [HEX   ] [HEX     ] [HEX     ] [HEX     ] [HEX     ] [HEX     ]
[LN]-+---------+---------+---------+---------+---------+---------+---------+----------
0000  0000      F3        3
0001  0001      31        3
0002  0002      00        2
0003  0003      11        2
0004  0004      FB        3
0005  0005      C3        3
0006  0006      40        2
0007  0007      00        2
0008  0040      FE        7
0009  0040      FE        7
0010  0040      00        3
0011  0041      01        3
0012  0042      80        2
0013  0043      10        2
0014  0044      02        3
0015  1080      12        1
0016  0045      03        3
                  F0:DISP.REG, gotten                ↑scroll   01-APR-86 09:35
```

Figure 2-14 Sample Data for Explanation

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).

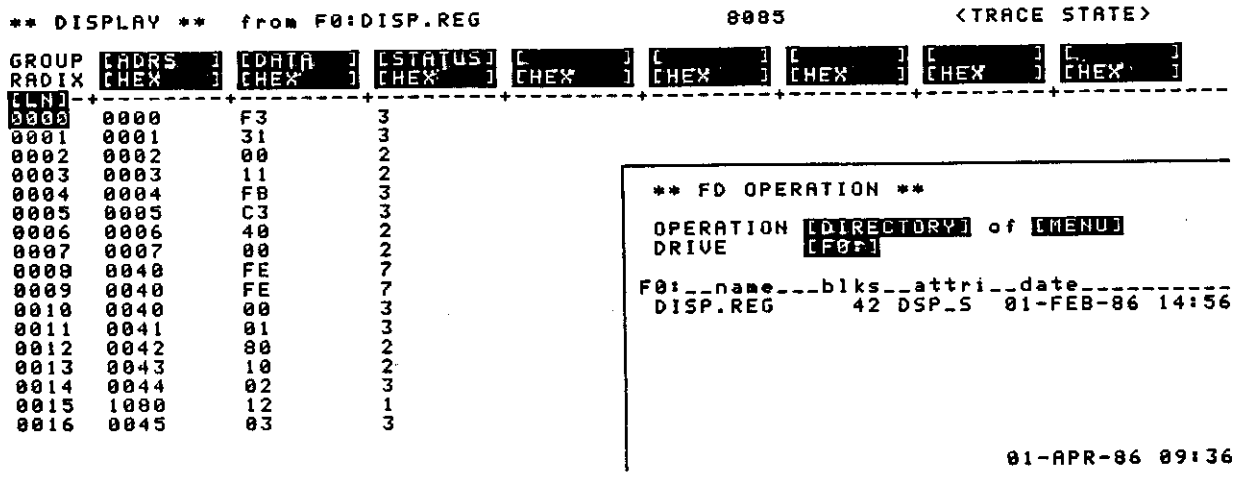


Figure 2-15 FD Menu Screen

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

[STOP]). 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:

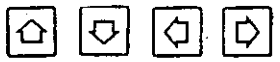
- The menu item for data inputting is displayed inversely.
- The menu item (input prompt) for inputting data (currently permitted) by pressing the ENTRY key is displayed by inverse blink display.
- Input prompt can be moved by [↑] [↓] [←] [→] or [TABLE] .
- The menu item enclosed in brackets can be selected by the SELECT key.

(1) The menu item enclosed in brackets:

For the menu item enclosed in brackets, data is input by pressing SELECT ([NEXT] , [PREV]) key to select from the chain data group.

The data group is selected in due order with [NEXT] key; in inverse order with [PREV] 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 [HELP] (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 [NEXT] .

(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.

2.8 USE OF HELP KEY

[HELP] 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 [NEXT] / [PREV] 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 [HELP] 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.

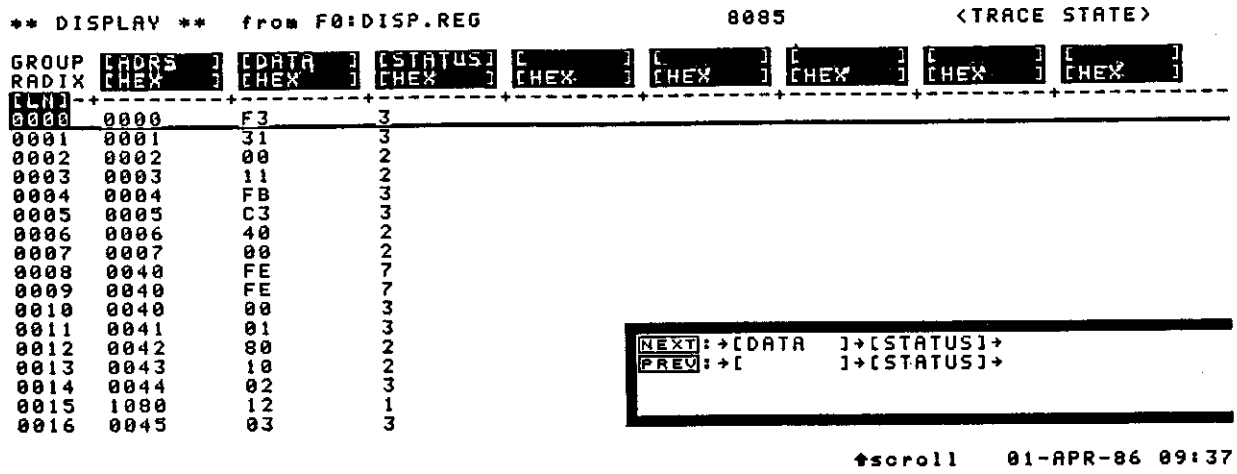


Figure 2-16 HELP (menu item) Function Display Example (1)

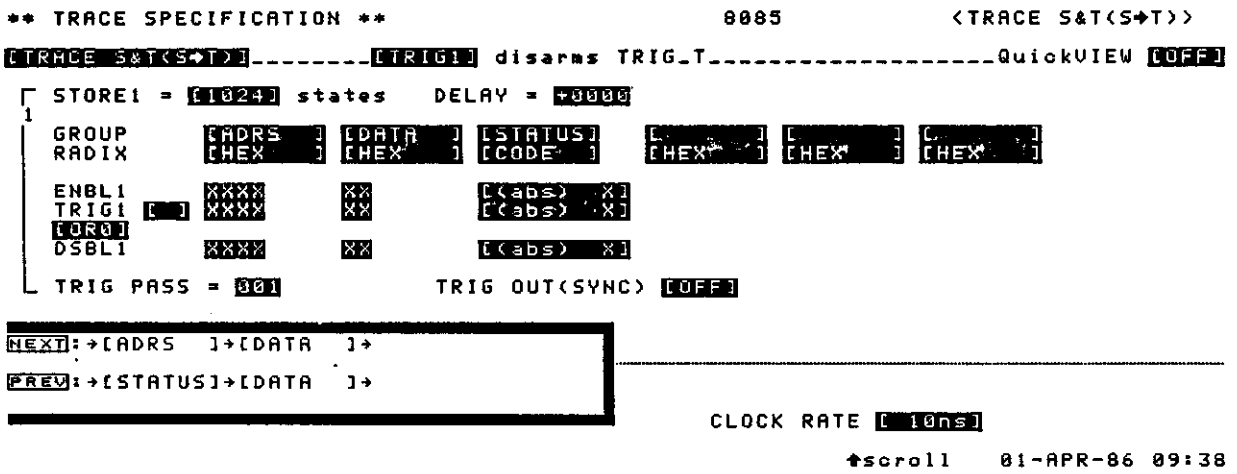


Figure 2-17 HELP (menu item) Function Display Example (2)

(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.

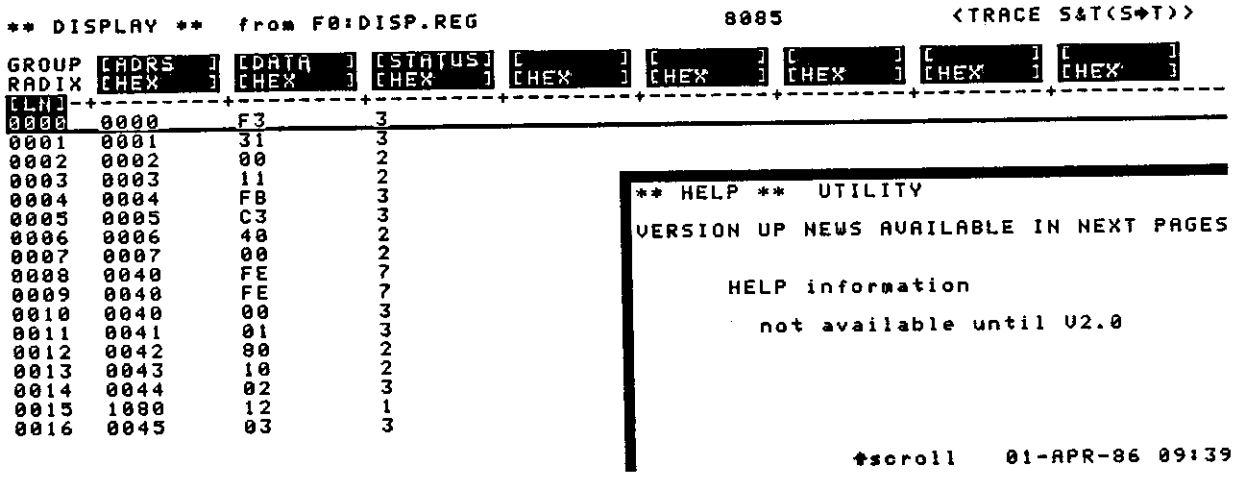


Figure 2-18 HELP (key) Function Display Example (1)

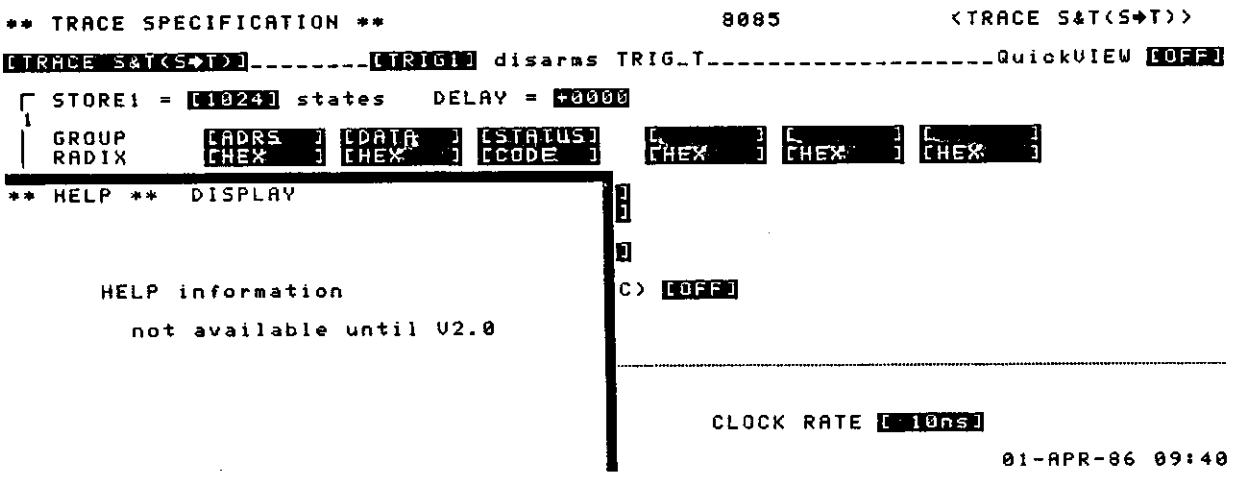


Figure 2-19 HELP (key) Function Display Example (2)

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 [⌂][0] 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.

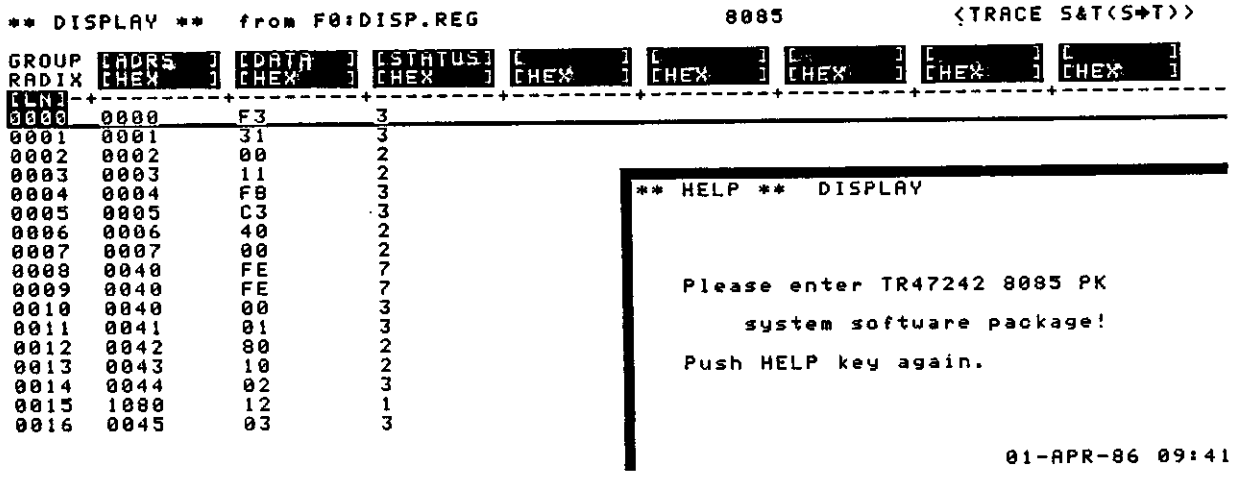


Figure 2-20 Screen Requesting System Disk Insertion by the HELP (key) Function

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

menu screen can be deleted completely by pressing [STOP] .

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 [f0] and then [NEXT] four times, and the screen as shown in Figure 2-21 will appear.

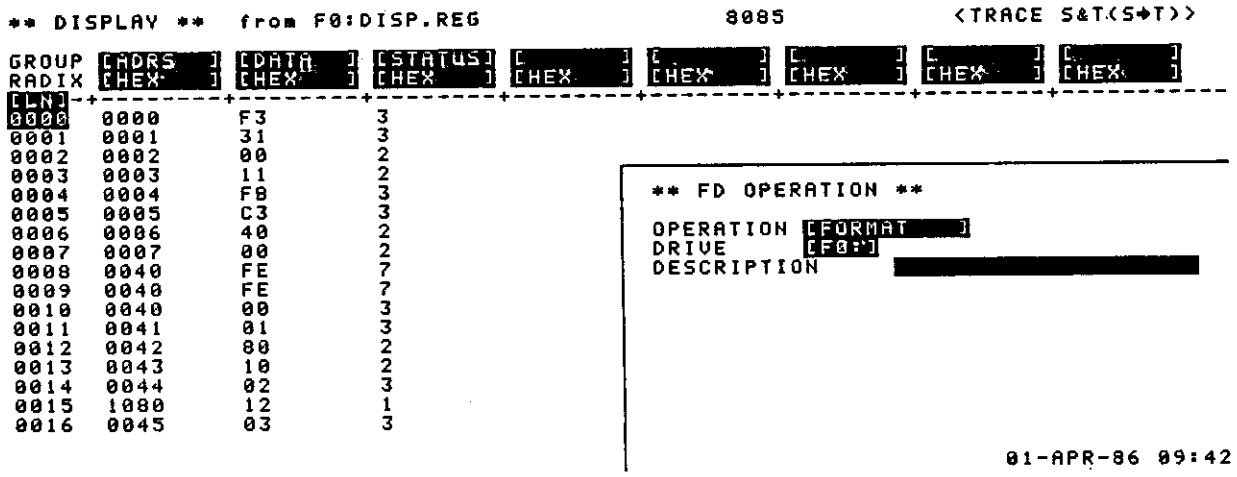


Figure 2-21 Disk Format

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 [f0]. The screen will ask "FORMAT?". Press the green key on the bottom right corner of the front panel and then [2] 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.)

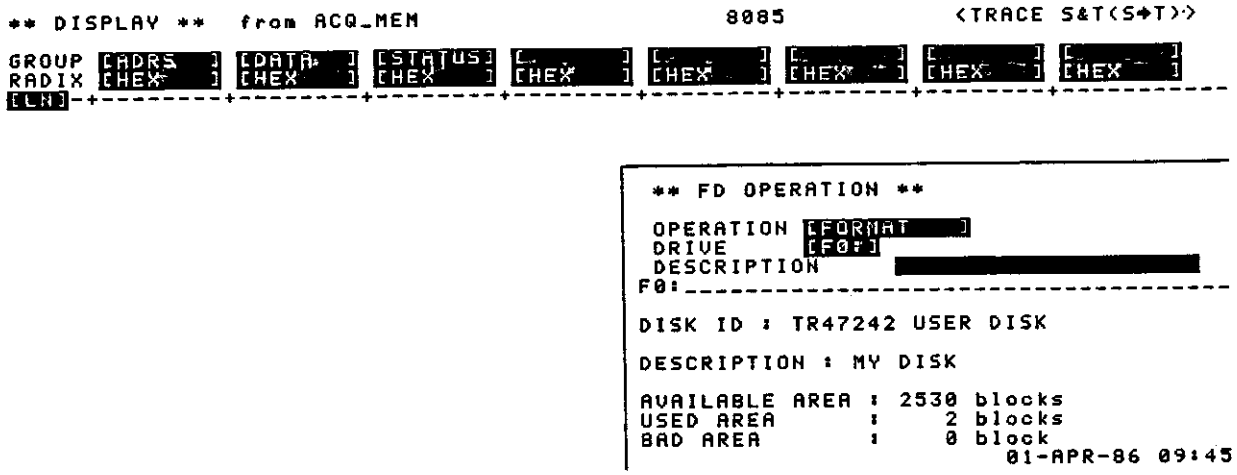


Figure 2-22 Display at the End of Disk Formatting

Press [DISPLAY] and then press [SAVE] twice, and the data that is currently displayed on the screen is written into the disk. When [I/O] 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 [GET] and turn the scroll knob clockwise, and the file bearing the DISP.S1 will appear in the file name menu item. Next, again press [GET] 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 [I/O] and then press [NEXT] 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 [I/O] to start the execution of PURGE to delete the file. Any blank disk which is 3.5 inches, 80 tracks and dual-sided 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).

MEMO

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.

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 [TRACE] 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, if [RUN] is pressed. The sampling clock at this moment is 10 ns (100 MHz).

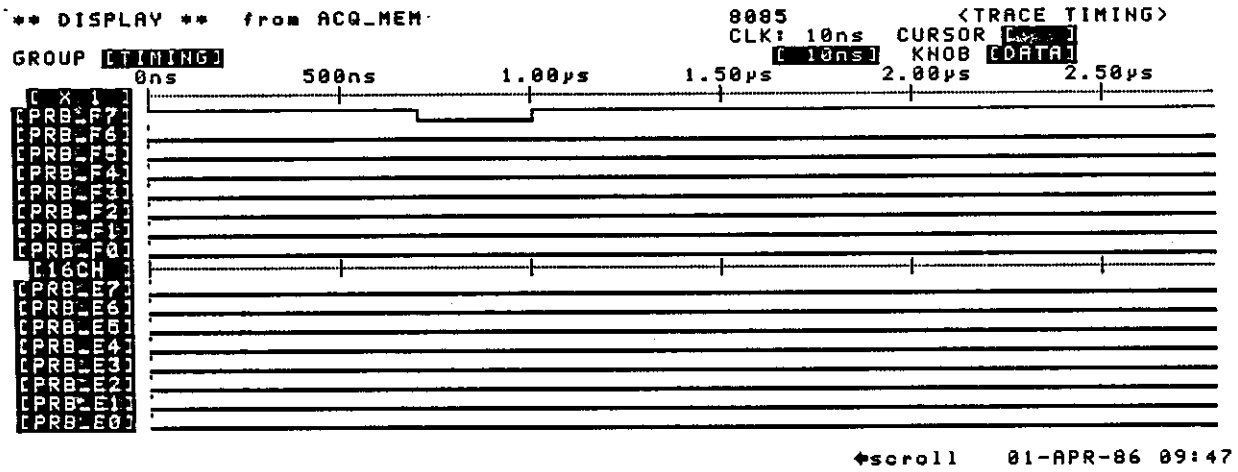


Figure 3-1 Timing Analysis Measurement Example (sampling clock: 10 ns)

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 [NEXT] (try to set the sampling timing to 100 ns by pressing [NEXT] three times).

Next, press [RUN] 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.

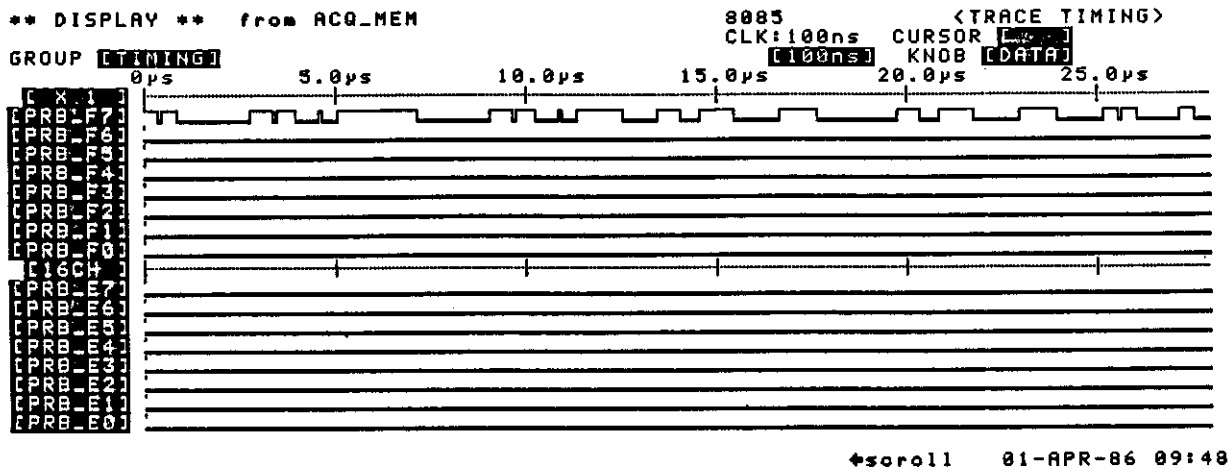


Figure 3-2 Timing Analysis Measurement Example (sampling clock: 100 ns)

What portion of the input signal starts to display is unpredictable no matter how many times [RUN] 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 [NEXT] or [PREV]. 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 [CONFIG] 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 [DISPLAY] 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.

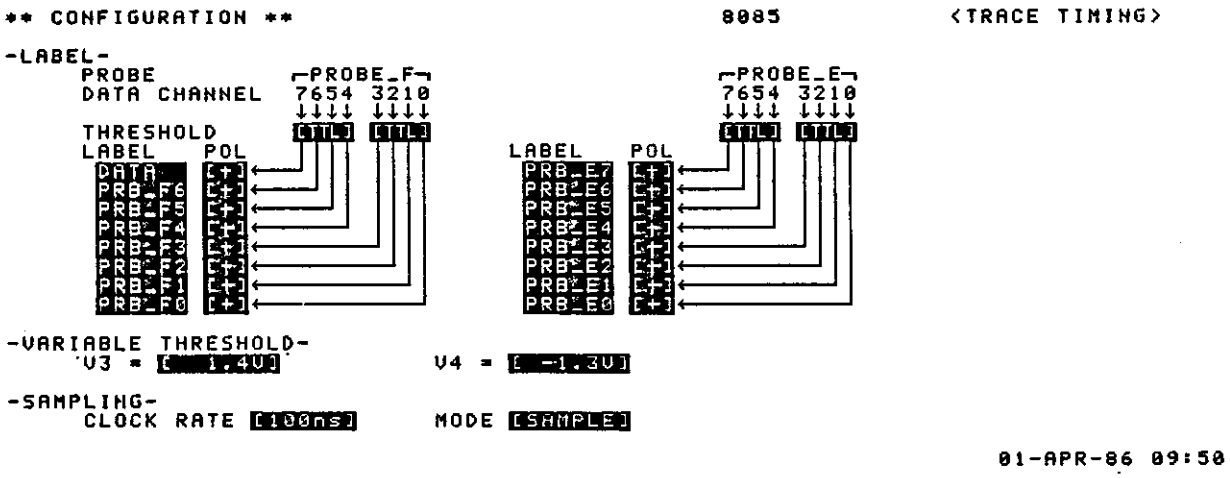


Figure 3-3 Label Name Definition Example

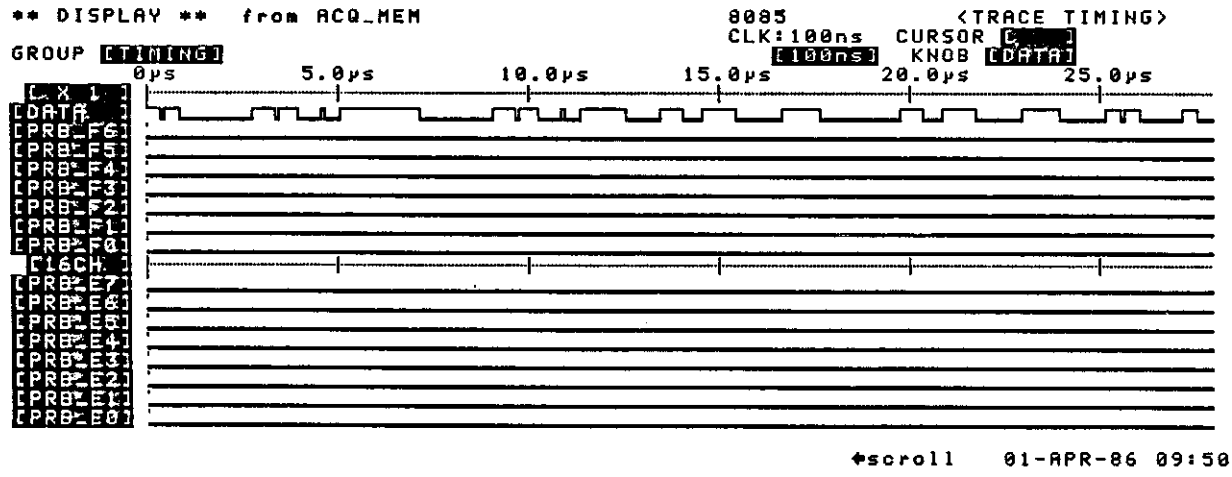


Figure 3-4 Label Name Usage Example

It is important to familiarize oneself with the operations and results on the DISPLAY screen by trying out all function keys related to the screen.

All of the operations on the DISPLAY screen are controlled by   , NEXT and PREV . Refer to the related portion of the main unit instruction manual, Section 4.7.1 for the display formats and their meanings and the meaning of the menu item, Section 4.7.2 for the data scroll, Section 4.7.3 for cursor operation (two cursors of A and B can be used together), Section 4.7.4 for the time axis multiply and contraction, and Section 4.7.5 for the relations between the displayed data and the acquisition memory.

Refer to Section 4.2.3 for the screen that will appear next when [COMMAND] is pressed. Then, press [TRACE] and [⇨] to move the input prompt to TRIG_T. Next, press [1] to set "1" to the equivalent position of "DATA" as shown in Figure 3-5. When [RUN] is pressed, the screen as shown in Figure 3-6 will appear. After this, no matter how many times [RUN] 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 [TRACE] again, and then press [RUN] 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.

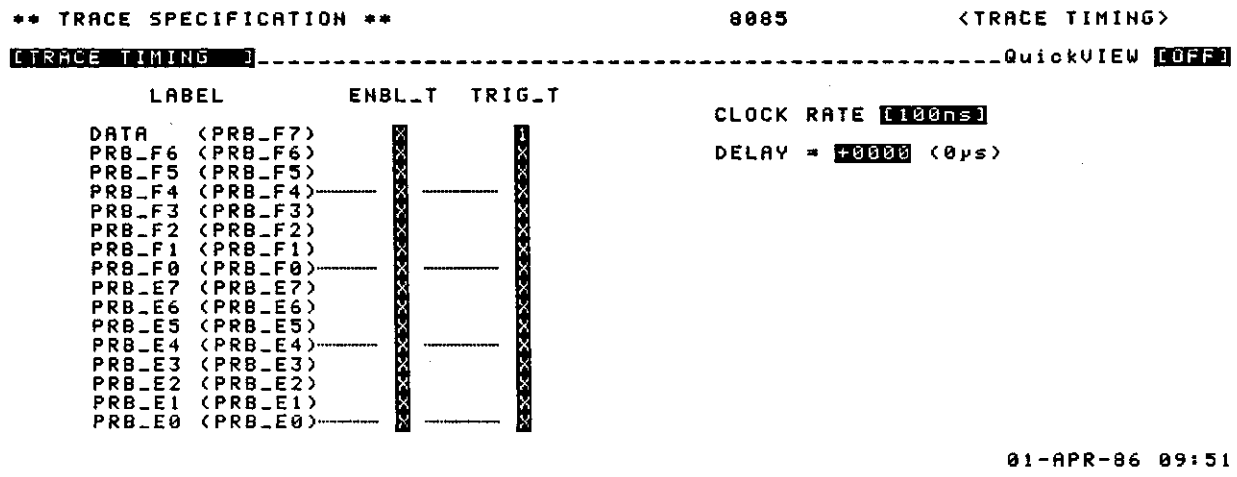


Figure 3-5 Trigger Pattern (TRIG_T) Setting Example

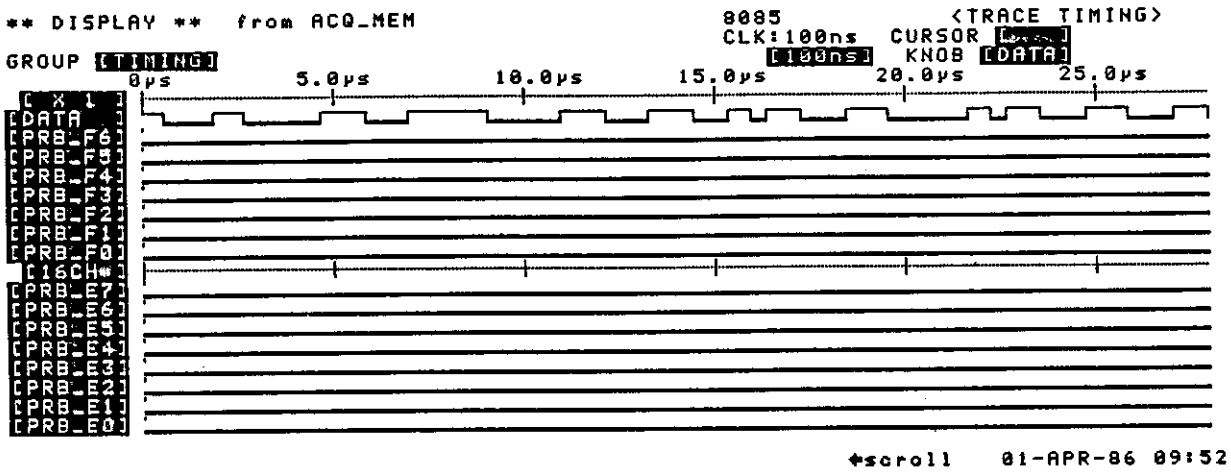


Figure 3-6 Measuring Example with Trigger Pattern Setting

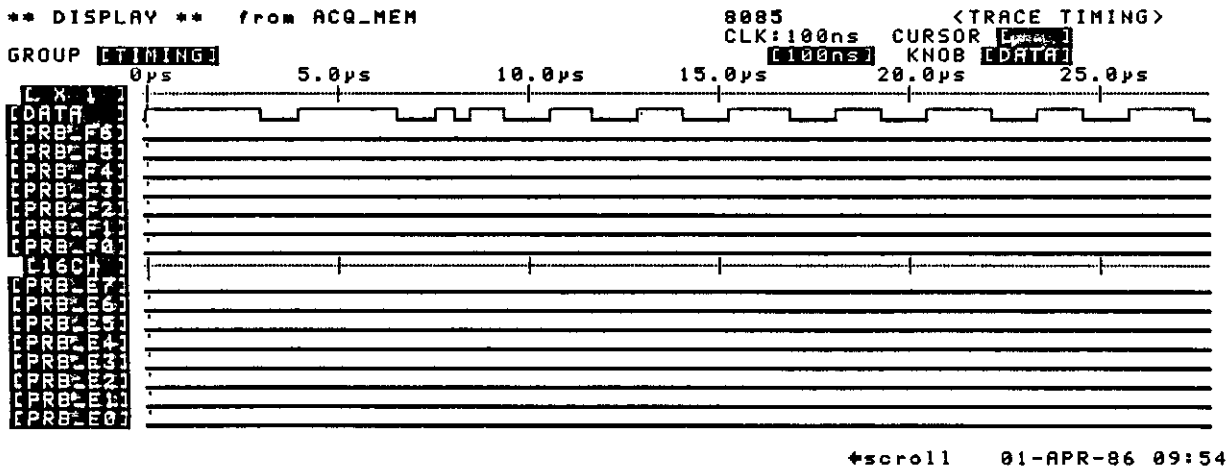


Figure 3-7 Delay Usage Example

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.

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

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

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

```
** DISPLAY **   from ACQ_MEM                    8085          <TRACE STATE>

GROUP [ADRS    ] [DATA    ] [STATUS] [        ] [        ] [        ] [        ] [        ]
RADIX [HEX     ] [HEX     ] [HEX   ] [HEX     ] [HEX     ] [HEX     ] [HEX     ] [HEX     ]
[LN]--+--------+--------+--------+--------+--------+--------+--------+----------
0000   1012      12        1
0001   0084      36        3
0002   0085      12        2
0003   1012      12        1
0004   0086      37        3
0005   0087      39        3
0006   0088      3A        3
0007   0089      80        2
0008   008A      10        2
0009   1080      F1        2
0010   008B      3B        3
0011   008C      3C        3
0012   008D      3D        3
0013   008E      3E        3
0014   008F      12        2
0015   0090      3F        3
0016   0091      40        3

                                                  *scroll   01-APR-86 09:58
```

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 NEXT 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. Next, press ⇩ to move the input prompt to the RADIX selection menu item of [DATA] (currently in [HEX]). [DATA] is displayed in 8085 mnemonic and [MNEM] with [S-by-S] is displayed on the when NEXT is pressed. Then press RUN 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.

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 [TRACE] 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 [RUN] 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 [RUN] is pressed. Refer to Section 4.4.2 of the main unit instruction manual for the screen which appears when [TRACE] is pressed.

```
** DISPLAY **   from ACQ_MEM                       8085          <TRACE STATE>

GROUP [ADRS   ] [DATA    ]        [STATUS] [       ] [       ] [       ] [       ]
RADIX [HEX    ] [MNEM    ]with[S-by-S] [HEX   ] [HEX    ] [HEX    ] [HEX    ] [HEX    ]
[LN]-+---------+-------------------+--------+---------+---------+---------+--------
0000  0088      LDA   1080          3
0001  0089         ..               2
0002  008A         ..               2
0003  1080       F1/mem_rd          2
0004  008B      DCX   SP            3
0005  008C      INR   A             3
0006  008D      DCR   A             3
0007  008E      MVI   A,12          3
0008  008F         ..               2
0009  0090      CMC                 3
0010  0091      MOV   B,B           3
0011  0092      MOV   B,C           3
0012  0093      MOV   B,D           3
0013  0094      MOV   B,E           3
0014  0095      MOV   B,H           3
0015  0096      MOV   B,L           3
0016  0097      MOV   B,M           3

                                                  ↕scroll   01-APR-86 10:03
```

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 [SYM DEF] 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.

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 [TRACE] 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 [RUN] is pressed. For the relations with the measured data, refer to Section 4.4.4 of the main unit instruction manual.

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 [CONFIG], Section 4.3.4 for file processing on the screen with [SYM DEF], Section 4.4.5 for file processing on the screen with [TRACE], and Sections 4.6.4 and 4.7.5 for file processing on the screen with [DISPLAY].

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 [TRACE] to move the input prompt to the menu item of QuickVIEW and set [ON] with [NEXT]. Next, press [RUN] 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.

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 [PROGRAM] is pressed.

Programs can be created by simply pressing [NEXT], [PREV], or [↓]. The command that can be selected by [NEXT] or [PREV] has been made as similar as possible to the key operation. For instance, [TRACE] function is equivalent to pressing [TRACE]. The created program is immediately executable when [AUTO] is consecutively pressed twice. Pressing [STOP] 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.

```
** PROGRAM **                                    8085          <TRACE TIMING>

LN___COMMAND_____________________________________________COMMENT____________
00 [RUN]
01 [GOTO] LN[00]                                          ;
02  END


                                                                01-APR-86 10:04
```

Figure 3-10 Repeat Function Program 1

```
** PROGRAM **                                    8085          <TRACE TIMING>

LN___COMMAND_____________________________________________COMMENT____________
00 [RUN]
01 [WAIT] 005 sec                                         ;
02 [GOTO] LN[00]
03  END


                                                                01-APR-86 10:05
```

Figure 3-11 Repeat Function Program 2

```
** PROGRAM **                                        8085          <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


                                                                  01-APR-86 10:08
```

Figure 3-12 Program That Only Sets Measuring Conditions

```
** PROGRAM **                                        8085          <TRACE TIMING>

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


                                                                  01-APR-86 10:12
```

Figure 3-13 Program Example -1

```
** PROGRAM **                                    8085          <TRACE TIMING>

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


                                                                01-APR-86 10:15
```

Figure 3-14 Program Example -2

MEMO

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.)

4.2 INPUT CHANNEL CONFIGURATION (CONFIG)

4.2.1 CONFIG Menu Screen for 8085 Microprocessor

The CONFIG function determines how to configure the TR4725 input block on which the personality kit is installed. Section 2.3.1 describes the physical connection between the probe and SUT. This section describes the CONFIG function that determines how the analyzer performs level conversion of the electric signal input from the probes for sampling operation, and how it converts that signal into easy-to-handle logical data.

The CONFIG menu screen is divided into three types by measurement mode. (The measurement mode is set at the TRACE menu screen. For details, see Section 4.2.1 of the main unit instruction manual.

The timing analysis menu screen is independent of the personality kit. For how to handle the timing analyzer, refer to Section 4.2.3 of the main unit instruction manual.

The state analysis menu screen is presented in Figure 4-1. The codes marked with the arrow sign stand for the name of the signal pins in 8085.

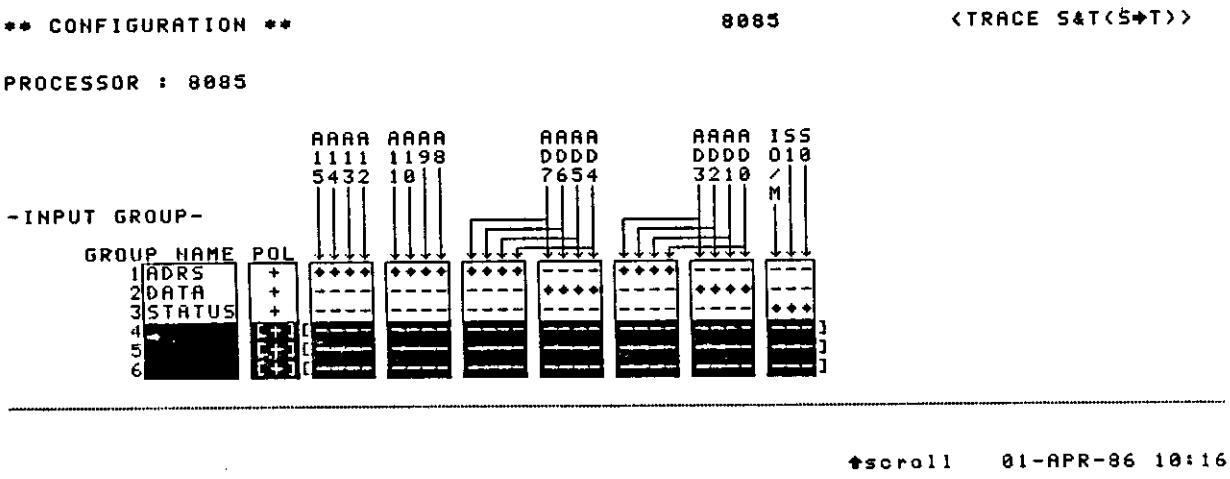


Figure 4-1 CONFIG Menu Screen

The following item can be set at this menu screen:

- PROCESSOR: Indicates that this personality kit corresponds to the 8085 microprocessor. (fixed)

- POL : Specifies the polarization for signal capturing with + (positive) or - (negative).

- GROUP : Defines the unit in which several input channels are handled, as the input GROUP (termed GROUP hereafter). To define GROUP, specify the GROUP name having a maximum of six alphanumeric characters. Next, specify the input channel which belongs to the GROUP by entering the ◆ mark. Up to six GROUPs can generally be defined. However, three of them, [ADRS], [DATA] and [STATUS] have already been defined in the personality kit, and therefore, the user cannot change the names of those groups. The remaining three groups can be defined by the user. The input channel which has already been used may also be overlapped. The number (called a GROUP number, for instance, 1 for the GROUP number of GROUP [ADRS]) in the left side of the GROUP name is used to specify the GROUP name to be compared during program execution of the command [DEFINE] or [COMPARE_RANGE]. (See Section 4.1.2 in the main unit instruction manual.)

The PROCESSOR name is always displayed in the center of the 1st line on the other menu screens. The defined GROUP may be used in the TRACE and DISPLAY menu screens.

4.3 SYMBOL AND CODE DEFINITIONS (SYMDEF)

This personality kit uses not only numeric values but also SYMBOL and CODE to set the trace condition (TRACE function) and to display and analyze the measured data (DISPLAY function). These are defined by the SYMDEF function.

SYMBOL is applicable to a GROUP having any number of channels. SYMBOL gives one SYMBOL name to numeric strings in a certain range. When used in accordance with the label or function name for program development, this SYMBOL improves the debugging efficiency.

CODE is applicable to a GROUP having 8 or fewer channels. It gives one CODE name to one numeric value, and therefore, the user can easily create the code tables.

For details ot the SYMBOL and CODE definitions, see Section 4.3 in the main unit instruction manual.

4.3.1 CODE Table for 8085

This personality kit has already been defined in the CODE tables for the GROUP [STATUS] (see Figure 4-2).

```
** SYMBOL DEFINITION **                          8085          <TRACE S&T(S→T)>

GROUP [STATUS]    TYPE [CODE   ]
RADIX [HEX    ]

LN___NAME____VALUE_USE----------------------------------------------------------
000 MEM_WR       1    [◆]
001 MEM_RD       2    [◆]
002 OP           3    [◆]
003 IO_WR        5    [◆]
004 IO_RD        6    [◆]
005 INTA         7    [◆]

     pre-defined for 8085 microprocessor
     unchangeable


                                                              01-APR-86 10:17
```

Figure 4-2 Defined CODE Table (8085 status)

4.4 DISPLAY OF CAPTURED DATA IN STATE ANALYZER (DISPLAY)

Figure 4-3 shows the measured data captured by the TR47242. For display format and menu screen setting, refer to Section 4.6.2 of the main unit instruction manual.

```
** DISPLAY **   from ACQ_MEM                    8085          <TRACE STATE>

GROUP [ADRS    ] [DATA    ] [STATUS  ] [        ] [        ] [        ] [        ] [        ]
RADIX [HEX     ] [HEX     ] [HEX     ] [HEX     ] [HEX     ] [HEX     ] [HEX     ] [HEX     ]
[LN]--+--------+--------+--------+--------+--------+--------+--------+-----------
0000    0003      11         2
0001    0004      FB         3
0002    0005      C3         3
0003    0006      40         2
0004    0007      00         2
0005    0040      00         3
0006    0041      01         3
0007    0042      80         2
0008    0043      10         2
0009    0044      02         3
0010    1080      08         1
0011    0045      03         3
0012    0046      04         3
0013    0047      05         3
0014    0048      06         3
0015    0049      12         2
0016    004A      07         3

                                                  ↑scroll   01-APR-86 10:19
```

Figure 4-3 Measured Data Display Example

4.4.1 Measured Data Display

Figure 4-4 shows an example in which the data captured with the QUEUE sample mode is displayed in mnenonic. This data is the same data as given in Figure 4-3.

The part of ".." in the DATA displayed in mnemonic is defined as a part of the instruction code. In this case, the data for the ".." section is contained in the mnemomic (or operand) which is immediately above that ".." section. "." represents one haxadecimal digit data.

```
** DISPLAY **   from ACQ_MEM                    8085          <TRACE STATE>

GROUP [ADRS    ] [DATA    ]                    [STATUS] [      ] [      ] [      ] [      ]
RADIX [HEX     ] [MNEM    ]with[S-by-S]        [CODE  ] [HEX   ] [HEX   ] [HEX   ] [HEX   ]
[LN]--+--------+------------------------+-------+--------+--------+--------+--------
0000    0003       11/mem_rd              MEM_RD
0001    0004     EI                       OP
0002    0005     JMP   0040               OP
0003    0006        ..                    MEM_RD
0004    0007        ..                    MEM_RD
0005    0040     NOP                      OP
0006    0041     LXI   B,1080             OP
0007    0042        ..                    MEM_RD
0008    0043        ..                    MEM_RD
0009    0044     STAX  B                  OP
0010    1080       08/mem_wr              MEM_WR
0011    0045     INX   B                  OP
0012    0046     INR   B                  OP
0013    0047     DCR   B                  OP
0014    0048     MVI   B,12               OP
0015    0049        ..                    MEM_RD
0016    004A     RLC                      OP

                                                    ↑scroll   01-APR-86 10:20
```

Figure 4-4 S-by-S Display Example for Measured Data

The method for properly displaying the data which is captured by the analyzer is called the S-by-S (State-by-State) display mode. A mode excluding useless ".." sections in analysis operation from the above mode is called the PACKED display mode. Figure 4-4 shows the former display example, and Figure 4-5 shows the PACKED display by using the same data to be used in Figure 4-4.

```
** DISPLAY **   from ACQ_MEM                    8085          <TRACE STATE>

GROUP [ADRS    ] [DATA    ]                    [STATUS] [      ] [      ] [      ] [      ]
RADIX [HEX     ] [MNEM    ]with[PACKED]        [CODE  ] [HEX   ] [HEX   ] [HEX   ] [HEX   ]
[LN]--+--------+------------------------+-------+--------+--------+--------+--------
0000    0003       11/mem_rd              MEM_RD
0001    0004     EI                       OP
0002    0005     JMP   0040               OP
0005    0040     NOP                      OP
0006    0041     LXI   B,1080             OP
0009    0044     STAX  B                  OP
0010    1080       08/mem_wr              MEM_WR
0011    0045     INX   B                  OP
0012    0046     INR   B                  OP
0013    0047     DCR   B                  OP
0014    0048     MVI   B,12               OP
0016    004A     RLC                      OP
0017    004B     DAD   B                  OP
0018    004C     LDAX  B                  OP
0019    1281       10/mem_rd              MEM_RD
0020    004D     DCX   B                  OP
0021    004E     INR   C                  OP

                                                    ↑scroll   01-APR-86 10:21
```

Figure 4-5 PACKED Display Example for Measured Data

4.4.2 8085 Disassembling Format

(1) The mnemonic for the opcodes using Intel's 8085 standard assembly formats.

(2) All the numerics used in operands are displayed in hexadecimal numbers. Accordingly, no codes for indicating the numeric base are used.

(3) When GROUP [ADRS] is displayed by SYMBOL, its address as an operand is displayed by SYMBOL as much as possible.
The display formats are:
SYMBOL name + hhhh (h stands for one hexadecimal digit)
SYMBOL name - hhhh

(4) "/illegal" is displayed when any illegal or noninstallation instruction is detected.

MEMO

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 8085 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.)

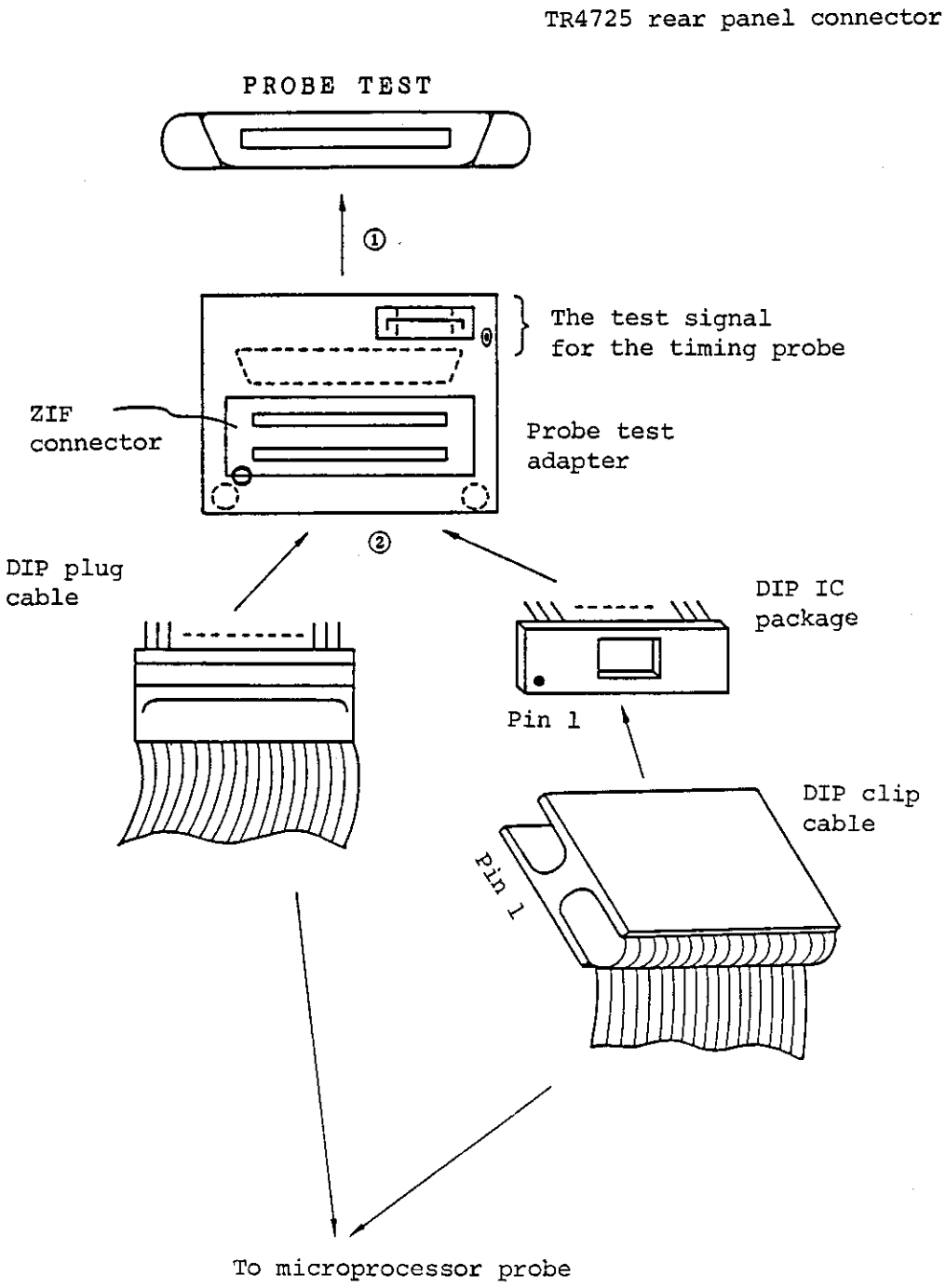


Figure 5-1 Probe Test Connection

(3) Set to the TRACE menu screen. Next, press DEFAULT

(4) Press RUN to start checking.

(5) Check if the display is the same as Figure 5-2; if it is, the operation is normal.

```
** DISPLAY **  from ACQ_MEM                  8085          <TRACE STATE>

GROUP [ADRS  ] [DATA  ] [STATUS] [      ] [      ] [      ] [      ] [      ]
RADIX [HEX   ] [HEX   ] [HEX   ] [HEX   ] [HEX   ] [HEX   ] [HEX   ] [HEX   ]
[LN]-+--------+--------+--------+--------+--------+--------+--------+----------
0000  0000     00       2
0001  1111     11       2
0002  2222     22       2
0003  3333     33       2
0004  4444     44       1
0005  5555     55       1
0006  6666     66       1
0007  7777     77       1
0008  8888     88       6
0009  9999     99       6
0010  AAAA     AA       6
0011  BBBB     BB       6
0012  CCCC     CC       5
0013  DDDD     DD       5
0014  EEEE     EE       5
0015  FFFF     FF       5
0016  0000     00       2

                                                 ↕scroll   10-SEP-85 15:15
```

Figure 5-2 Microprocessor Probe Test Result

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 DEFAULT.

(4) Press RUN 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.

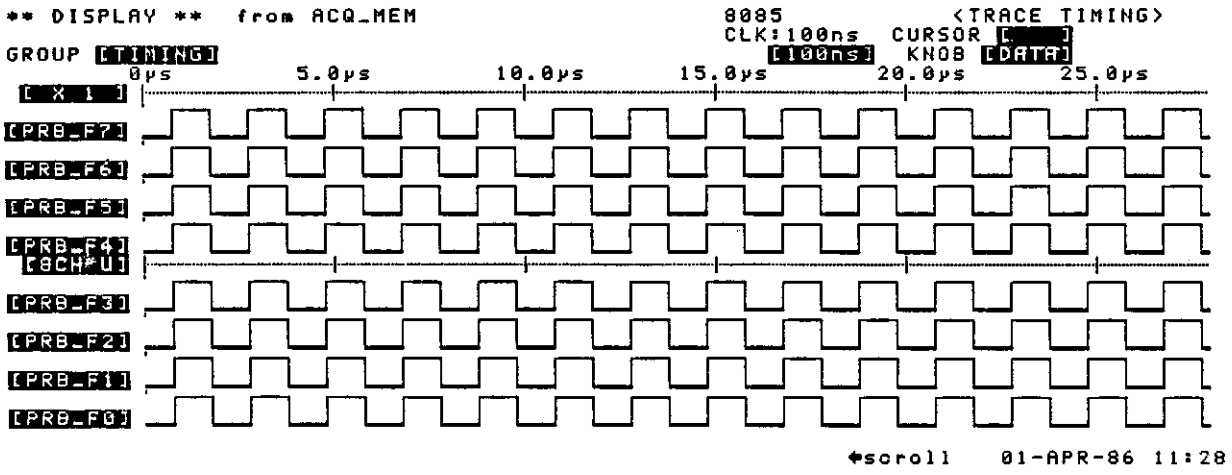


Figure 5-3 Probe E/F Test Result

6. EQUIPMENT STORAGE AND TRANSPORTATION PRECAUTIONS

6.1 STORAGE

The storage environment condition for the TR47242 Personality Kit is $-10^{o}C$ to $+60^{o}C$. 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 $+10^{o}C$ to $+60^{o}C$ (it is recommended to store the floppy disk separately from the Personality Kit storage case).

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.

7. SPECIFICATIONS

7.1 TR47242 SPECIFICATIONS

Input Specifications

Applicable Microprocessor	: 8085A, 8085AH (3 MHz), 8085A-2, 8085AH-2 (3 MHz), 8085AH-1 (6 MHz) of INTEL Co., or their equivalents.
Microprocessor clock frequency	: Depends on the system to be measured.
Input current	: -200 µA max. (low level) 20 µA max. (high level)
Microprocessor status display	: The LED on the microprocessor probe displays the status of CLK, RESET, READY, TRAP, RST/INTR, and HOLD.
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 ovf the same input group, and deletion of the specific input group display.
Display format	: State can be displayed in binary, octal, decimal, hexadecimal, symbol, code, ASCII code, 8085 mnemonic (data only). S-by-S or PACKED display in mnemonic notation.

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	TR14724-20	1	
40-pin DIP clip cable	A04724-21	1	
40-pin DIP plug cable	A04724-22	1	
Probe test adapter		1	
40-pin DIP IC package		1	
System software package	P47254-001FJ	2	
Blank disk	MF-2DD	2	
Disk storage case		1	
Miscellaneous container		1	
Personality key storage case		1	
Instruction manual	E47242	1	

* The blank disk can be purchased separately.
Model name: A09502 (one set contains ten disks.)

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LIST OF FIGURES

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(No table numbers are assigned in this manual.)

LIST OF EXAMPLES

Example No.	Title	Page

(No example numbers are assigned in this manual.)

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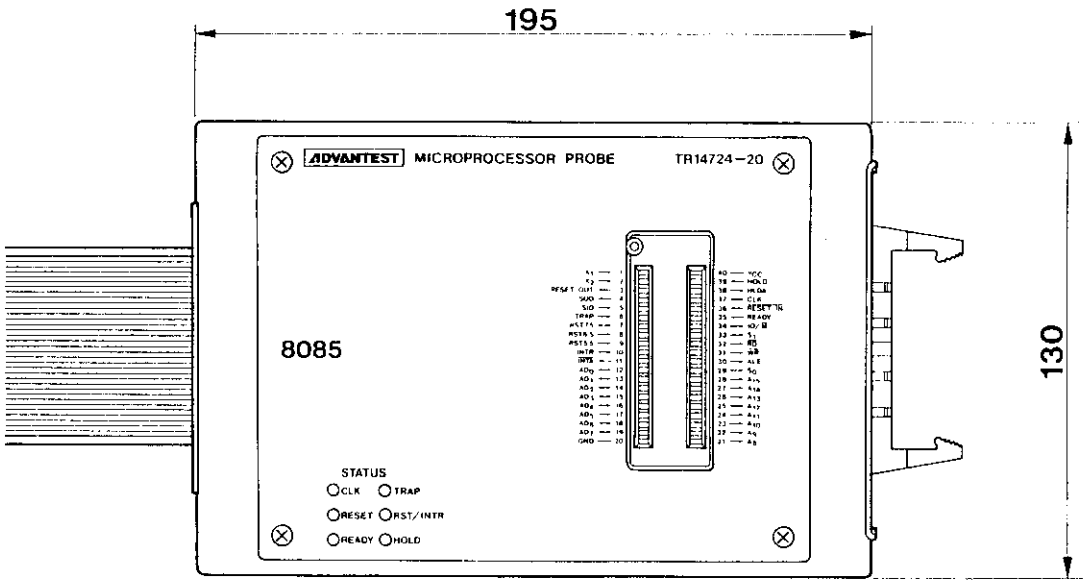
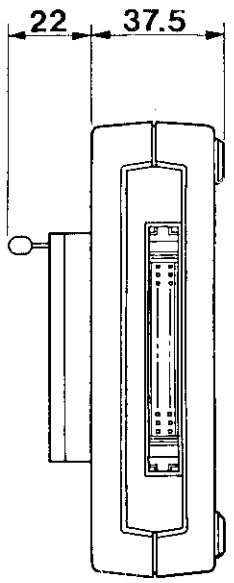
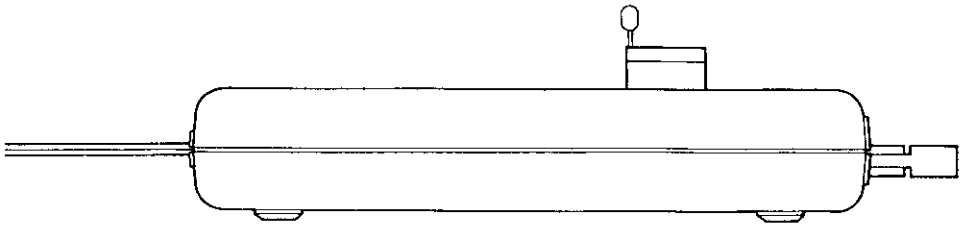


TOP VIEW



FRONT VIEW



SIDE VIEW

TR14724-20
EXTERNAL VIEW

14724-20 EXTI-509-A

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