ADVANTEST®
ADVANTEST CORPORATION

# INSTRUCTION MANUAL

## TR47250
## Personality Kit

MANUAL NUMBER 47250 OEA 606

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Printed in Japan

# PREFACE

This manual applies to the system disk P47250-001FJ 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 | |

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# 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 TR47250 GENERAL DESCRIPTIONS

The TR47250 General-purpose Personality Kit is the plug-in probe for state analysis used by installing in the TR4725 Logic Analyzer main unit. This personality kit, with flexible, general-purpose capabilities, can be applied to any state machines such as micro computer systems and mini-computer systems.
The major features of this personality kit are as follows:

(1) There are 64 input channels in total: 48 data input channels and 16 clock input channels. A wide range of applications are possible since a high input impedance of 1 MΩ is provided.

(2) The flexible sampling clock generation by combining 4 clock input channels and 12 clock qualifier input channels is possible. A clock of a maximum of 50 MHz can be acquired by the clock input channel and sampling clock of a maximum of 20 MHz can be generated.

(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 TR47250 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 | Remarks |
|---|---|---|---|
| Personality board | | 2 | |
| Data acquisition probe A | TR14701-01 | 1 | |
| Data acquisition probe B | TR14701-02 | 1 | |
| Data acquisition probe C | TR14701-03 | 1 | |
| Clock/qualifier probe D | TR14701-04 | 1 | |
| Probe hook | A04701-01 | 8 | one set of ten hooks |
| Probe test adapter | | 1 | |
| System software package | P47250-001FJ | 2 | |
| Blank disk | MF-2DD | 2 | |
| Disk storage case | | 1 | |
| Miscellaneous container | | 1 | |
| Personality kit storage case | | 1 | |
| Instruction manual | E47250 | 1 | |

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".

(5) Install the personality board with marker "2" on the board ejector into the slot "2". Then, connect the 50-pin flat cable to the connector in the center of the board.

(6) Mount the four machine screws to re-set the upper cover.

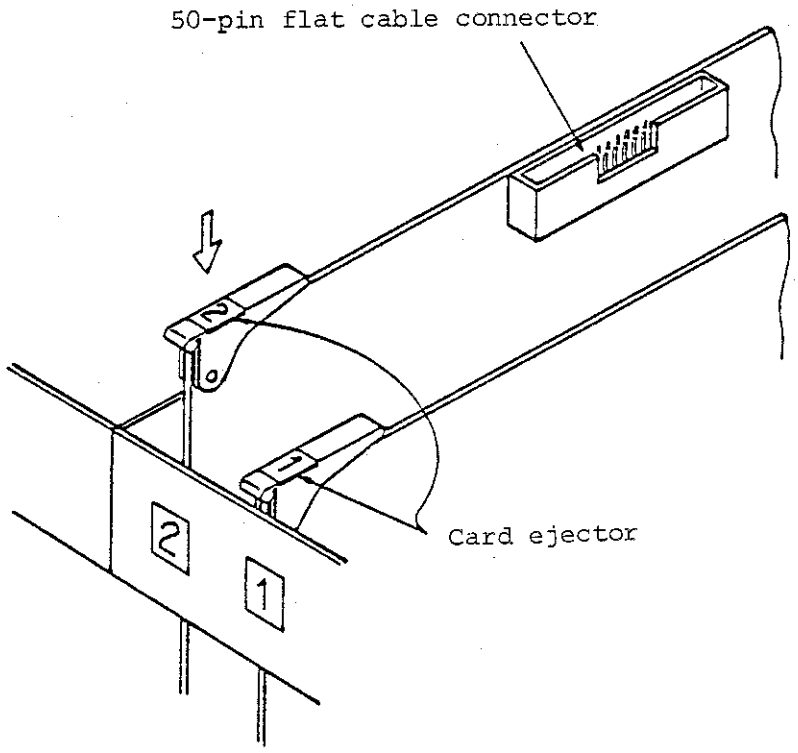



Figure 2-1 Personality Board Installation Method

# 2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

## 2.3.1 Connecting Probes A/B/C/D

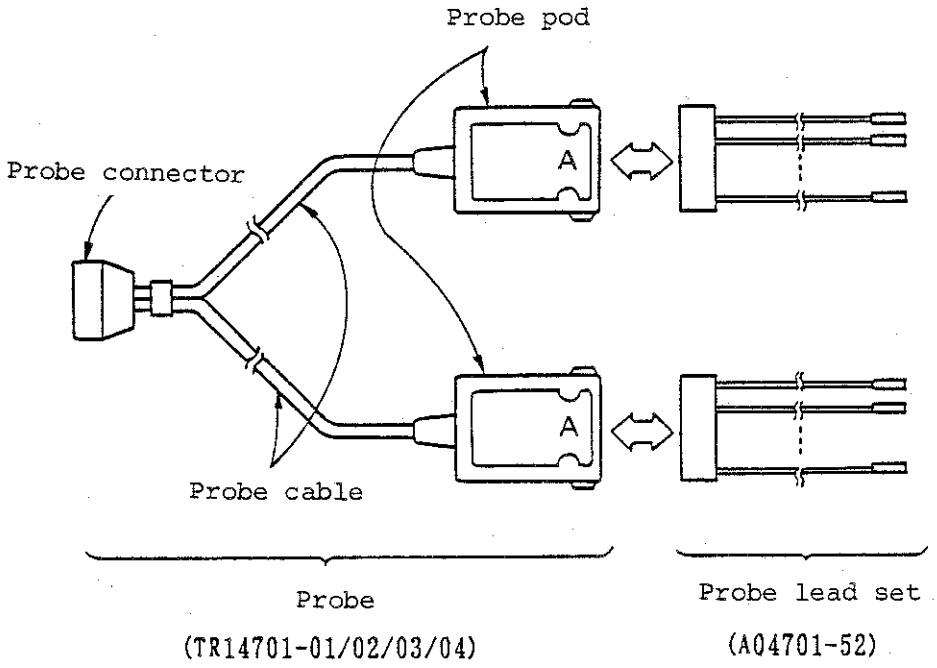
There are four probes provided on the personality kit for connecting with the system under test (hereafter called SUT).

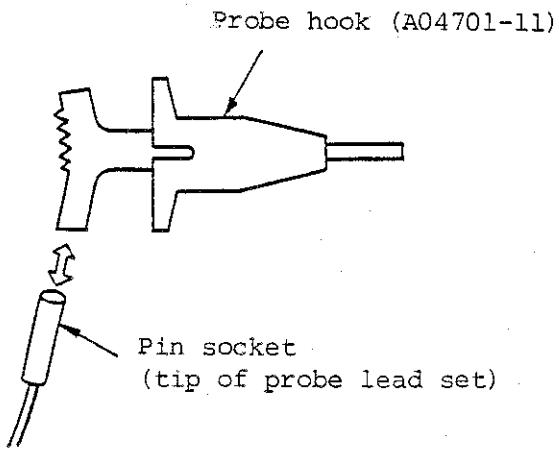
Three probes for capturing the SUT data signals: data acquisition probe A (TR14701-01; hereafter called data probe A or simply probe A), data acquisition probe B (TR14701-02), and data acquisition probe C (TR14701-03). Each probe can capture data from 16 channels.

The probe for acquiring SUT clock signal is clock/qualifier probe D (TR14701-04; hereafter called clock probe D or simply probe D). Probe D can acquire clock signals from 4 channels and clock qualifier signals from 12 channels.

The data signal captured by each probe and the clock signal operations are described in Section 4.2.1. The physical connections of probes are explained here.

The configuration and part names of probes A/B/C/D are shown in Figure 2-2.
A probe lead set with pin sockets and probe hooks are provided as standard accessories to the personality kit.




⇔ indicates that the part is detachable.

Figure 2-2 Configuration and Part Names of Probes A/B/C/D (standard configuration)

## 2.3 CONNECTING PROBE AND THE SYSTEM UNDER TEST

(1) Connecting probes A/B/C/D to the main unit

There is a mark indicating the upper side on the probe connectors for probes A/B/C/D as shown in Figure 2-3. Insert the probes into the corresponding probe slots (for instance, probe A into probe slot A) with the mark facing upwards on the rear panel of the TR4725 main unit. The connector can be locked by screws.

**Caution**

Connect probes A/B/C/D only when the power to the main unit is switched OFF.

(2) Connecting probes A/B/C/D to the SUT

Use the attached probe hook to connect probes to the SUT circuit. Before making connection, insert the probe hook into the pin socket at the tip of the probe lead set. When the SUT has pins adaptable to the pin socket, it is also possible to connect to the pin socket directly. The following is a list of model names and sizes of pin sockets.

| Manufacturer's name | Model name | Adaptable size |
|---|---|---|
| AUGAT KK-JAPAN | LSG-2BG2-1 | 0.51 mmϕ to 0.76 mmϕ |

Other optional accessories include a probe lead set which permits soldering and a probe lead set which can connect 8 channels or 16 channels at a time through the connector.

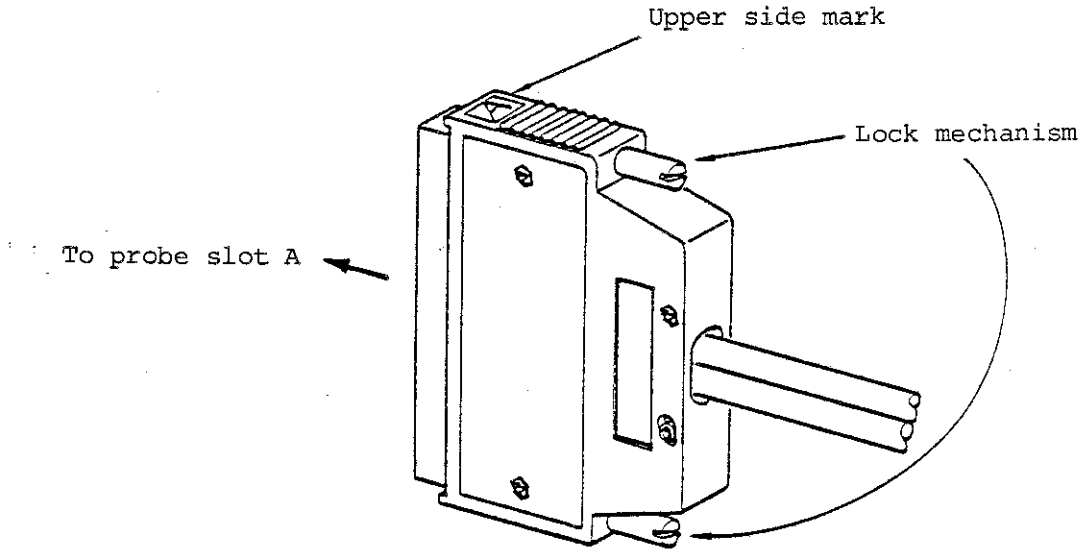
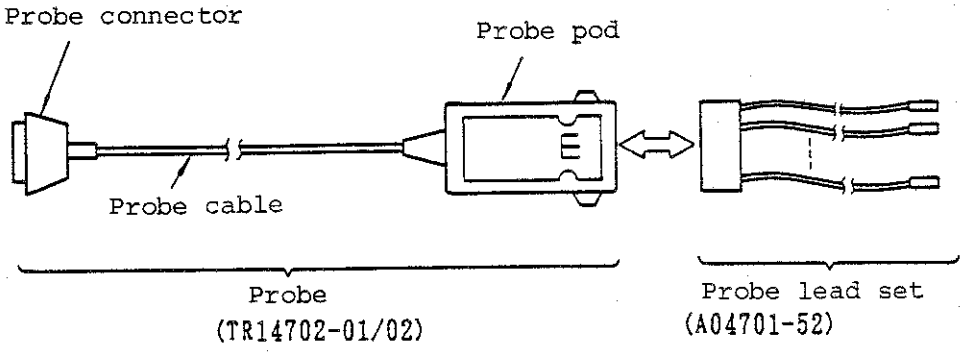



Figure 2-3 Connecting the Probe Connector
(For probe A - same for other probes)

### 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 2-4.



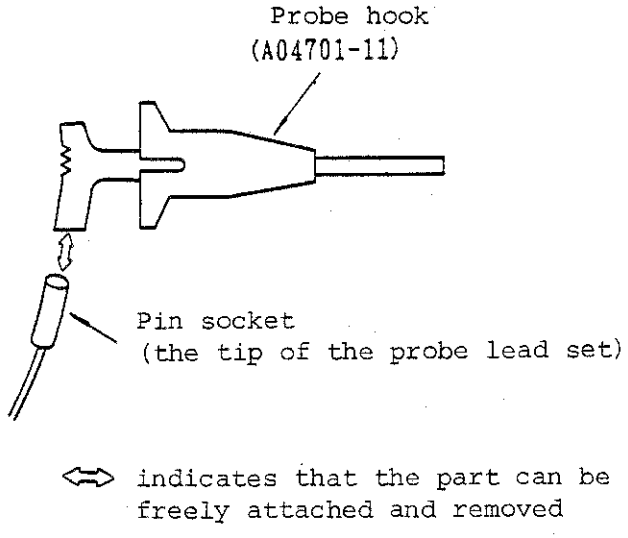
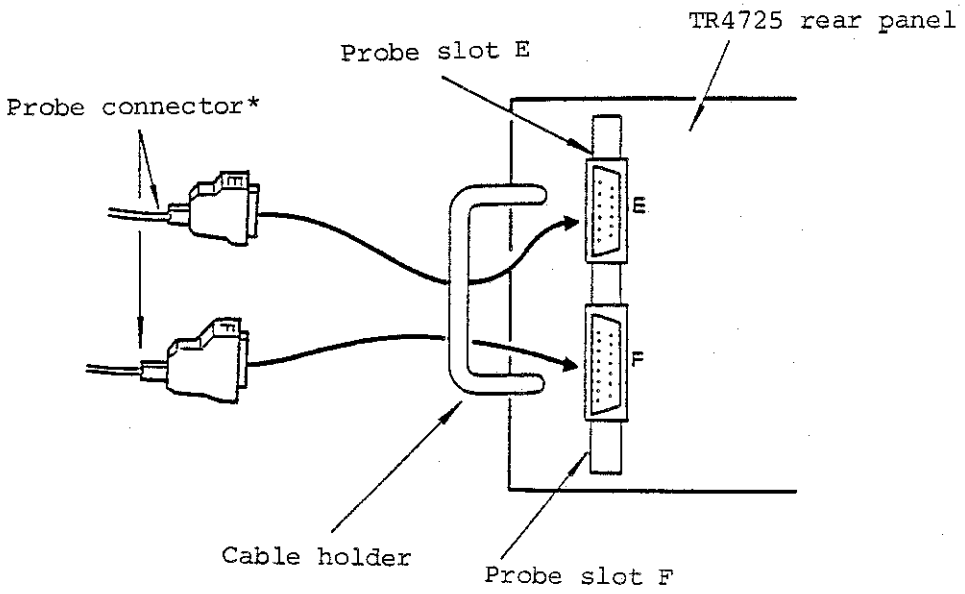




Figure 2-4 Probe E/F Shape and Parts Names (standard configuration)

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 2-5.

**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 2-5 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:

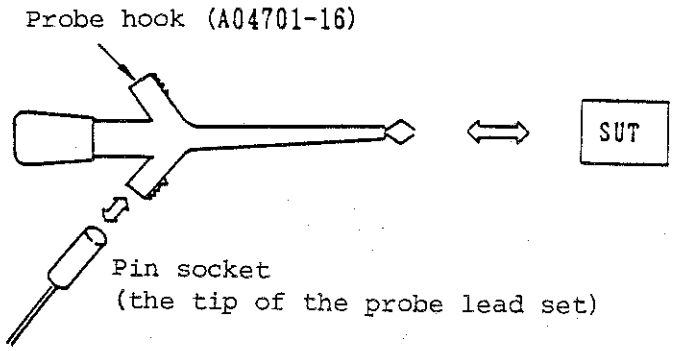
| Manufacturer | Stock No. | Suitable size |
|---|---|---|
| AUGAT KK-JAPAN | LSG-2BG2-1 | 0.51mmø ∿ 0.76mmø |

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 2-6 (a).)

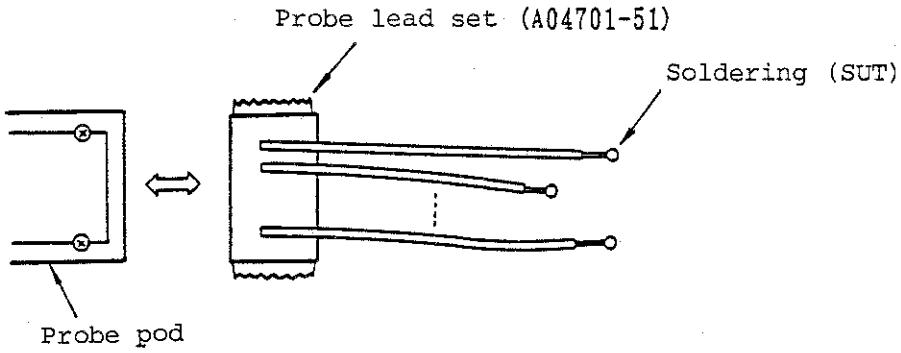
Use the probe lead set (A04701-51) when soldering is used instead of probe hook or pin socket for connection. In this case, the connection of eight channels can be performed in one procedure. (Refer to Figure 2-6 (b).)

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 2-6 (c).)

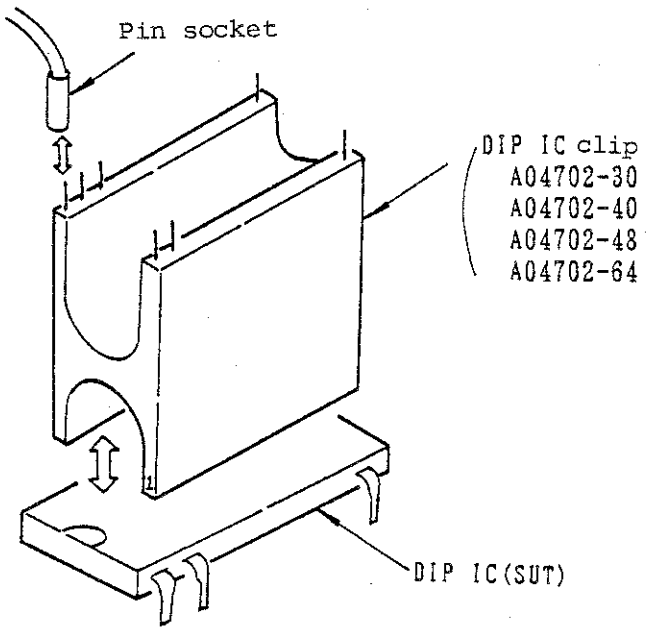
a.




b.




c.




*: Match at pin 1 and then clip.

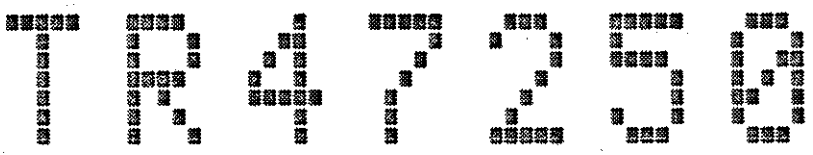
Figure 2-6 Connecting SUT with Optional Accessories

## 2.4 LOADING THE SYSTEM SOFTWARE

The software (system software) which controls the operation of the personality kit is loaded from the system disk (P47250-001FJ) 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 2-7, the following messages are displayed for loading:




```
GENERAL PK

System software loading in progress

Self-test ended

OS4725 V2.1   Copyright 1985 ADVANTEST CORPORATION
```

Figure 2-7 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 2-8.

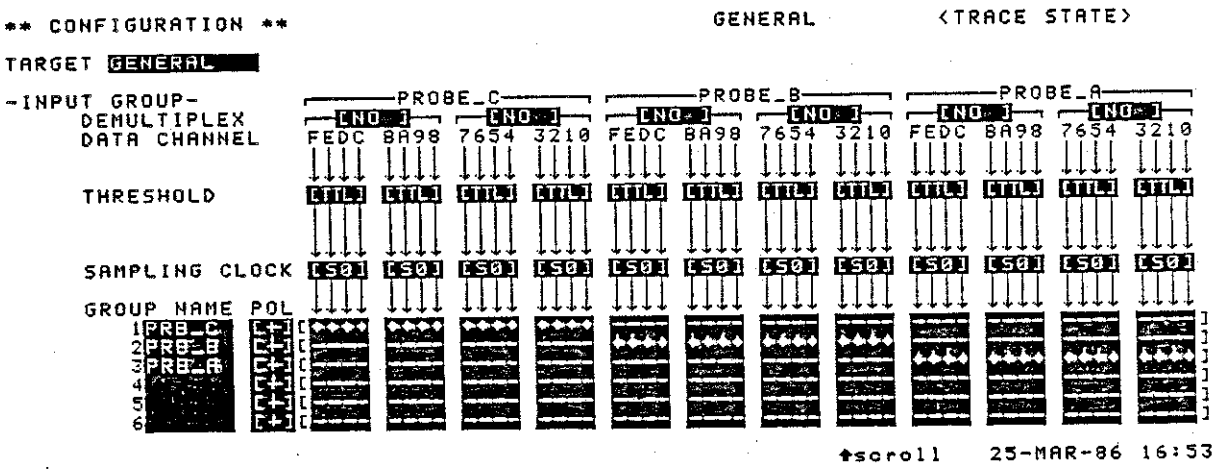



Figure 2-8 Screen Display at the End of Loading (CONFIG Menu Screen)

When the screen as shown in Figure 2-9 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.

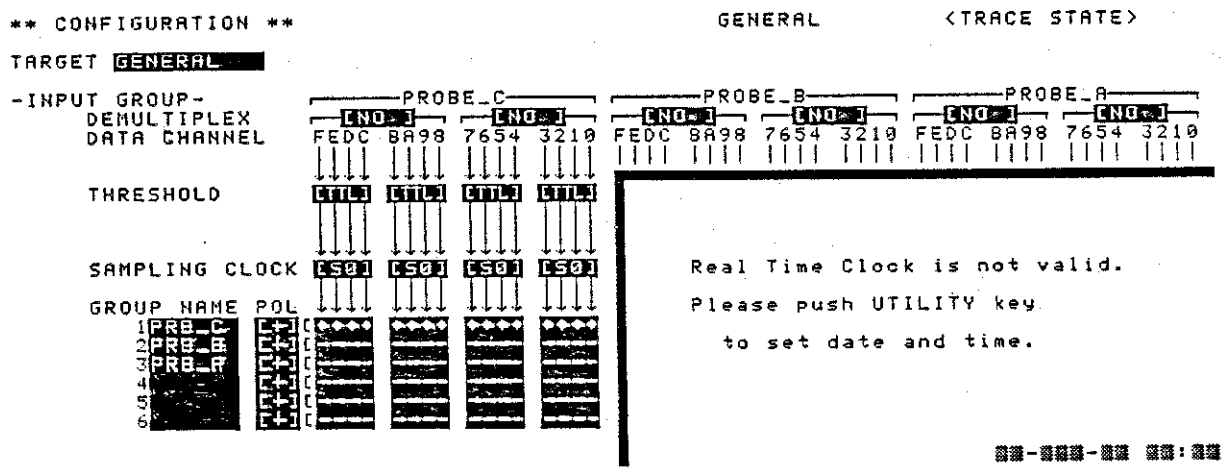



Figure 2-9 Screen Display Requesting Built-in Clock Setting

The display as shown in Figure 2-10 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 2-7, the display of either Figure 2-8 or Figure 2-9 appears and the system enters into operation-enabled state.

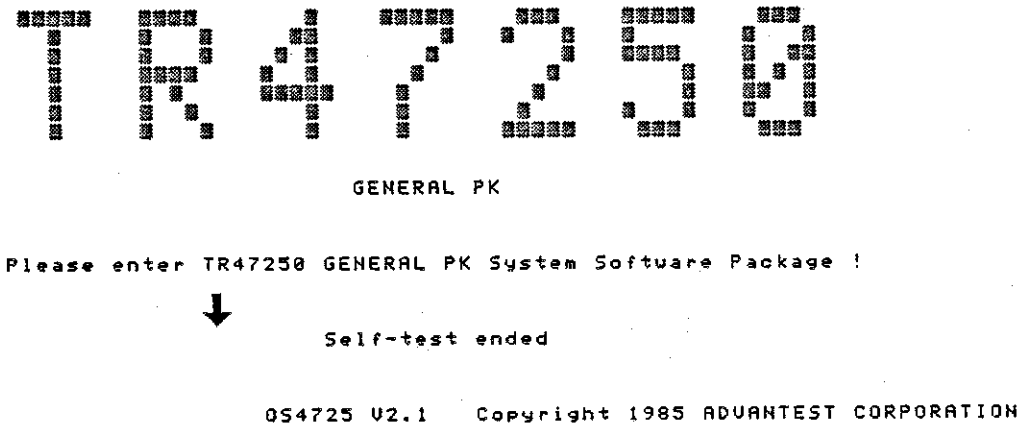



Figure 2-10 Screen Display Requesting System Disk Insertion

## 2.5 CRT DISPLAY FORMATS AND THEIR MEANINGS

One sample data file is stored in the system disk for the explanation from Sections 2.5 to 2.8. 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 2-8 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 2-11 will appear. The setting of the trace condition is enabled on the TRACE menu screen.

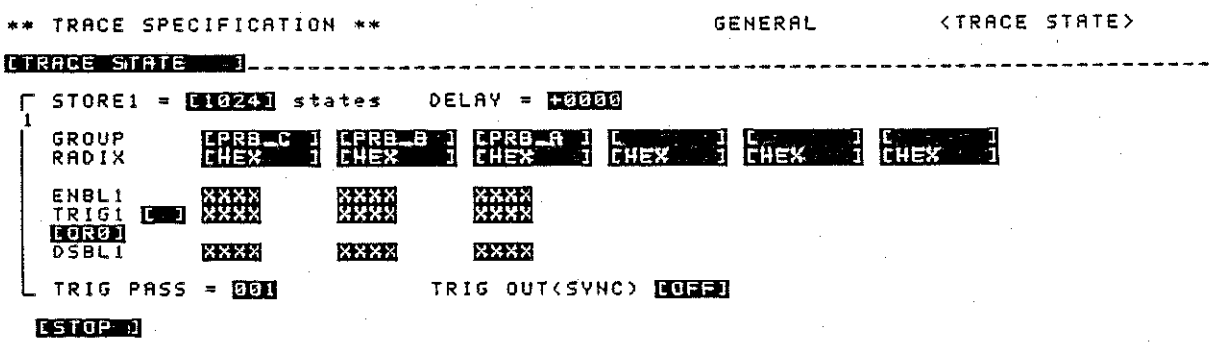



Figure 2-11 TRACE Menu Screen (TRACE SPECIFICATION)

Press DISPLAY and the display as shown in Figure 2-12 will appear. Analysis of the captured data is enabled on the DISPLAY menu screen.

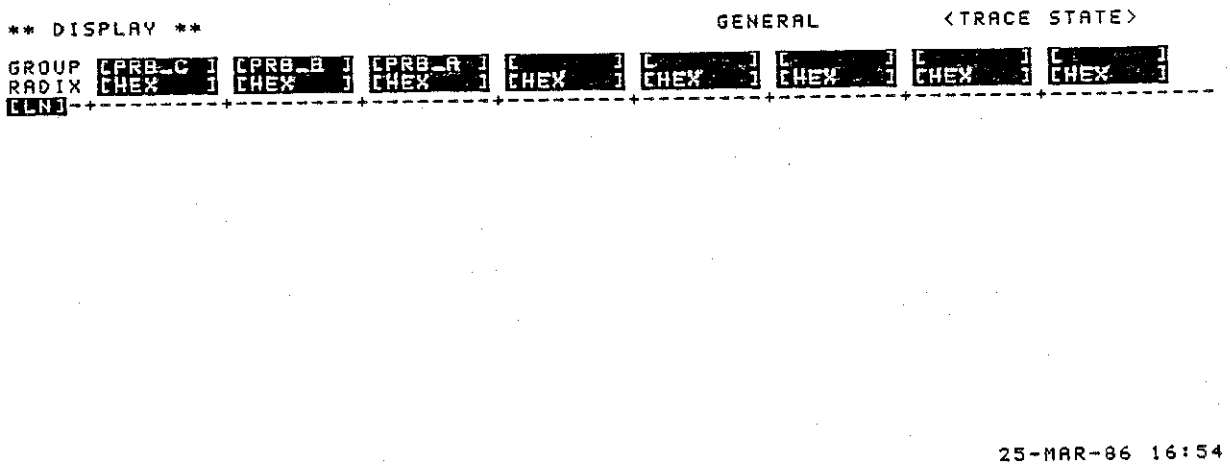



Figure 2-12 DISPLAY Menu Screen

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 2-13).

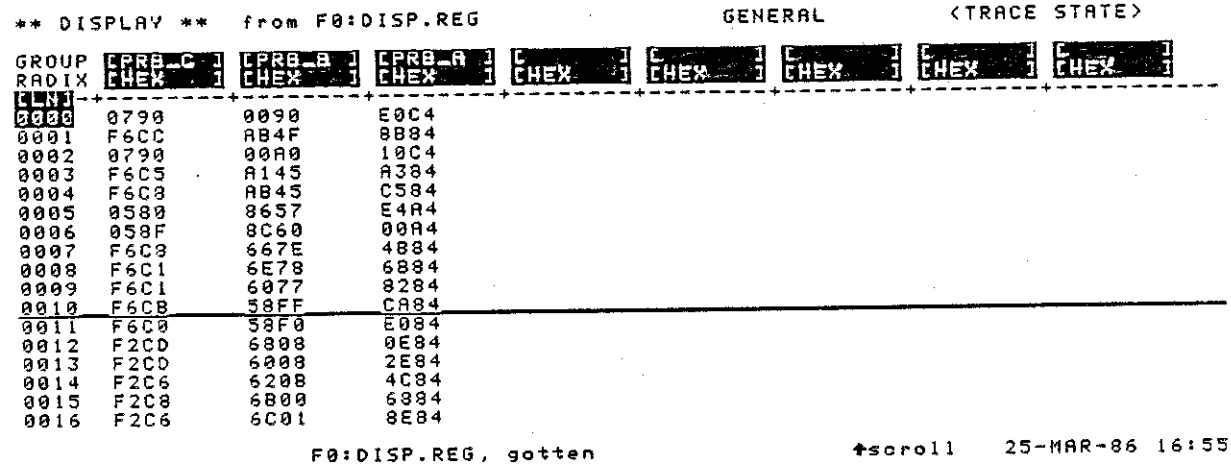



Figure 2-13 Sample Data for Explanation

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 2-13, 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 [f0] on the lower center of the front panel twice, and the display as shown in Figure 2-14 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 2-14).

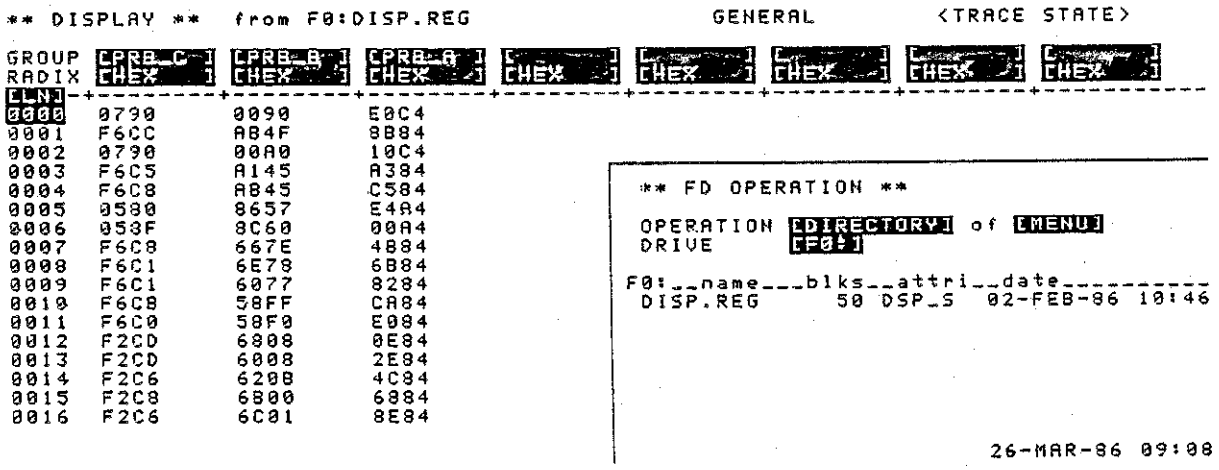



Figure 2-14 FD Menu Screen

## 2.6 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 [NIBBLE].
- 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 2.5). 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.

## 2.7 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 2-15 and 2-16. 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.

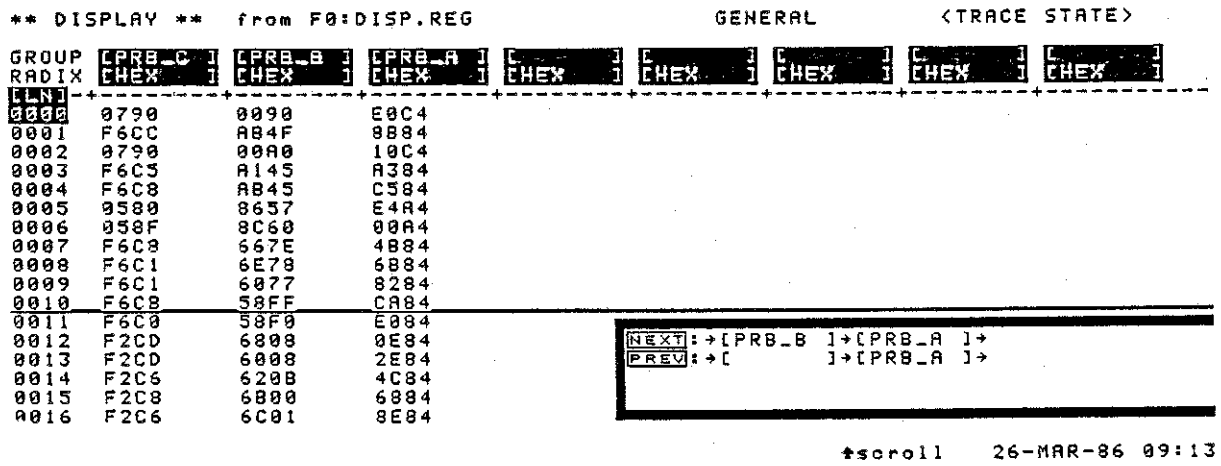



Figure 2-15 HELP (menu item) Function Display Example (1)

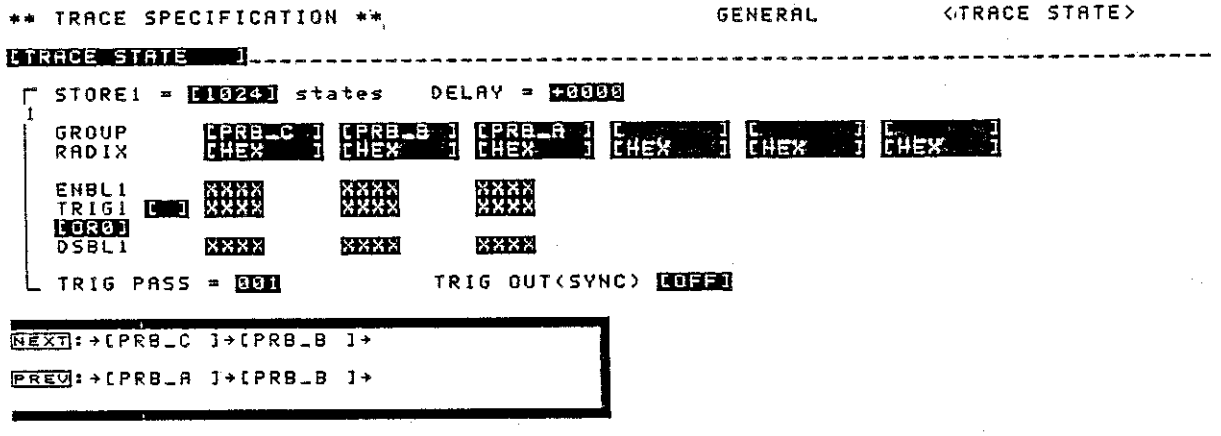



Figure 2-16 HELP (menu item) Function Display Example (2)

(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 2-17 and 2-18.

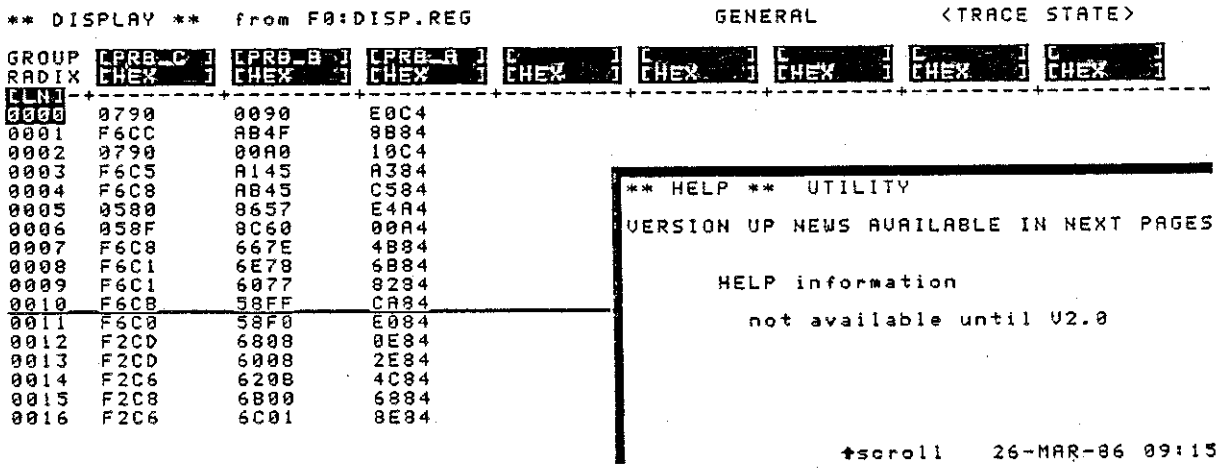



Figure 2-17 HELP (key) Function Display Example (1)

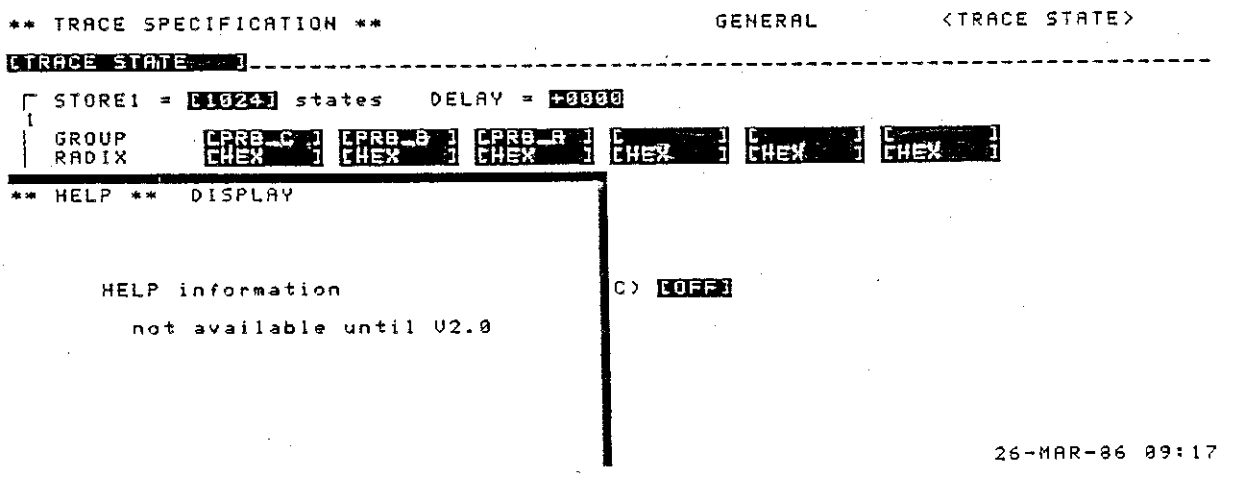



Figure 2-18 HELP (key) Function Display Example (2)

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 ▲ ▼ 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 2-19 is displayed. Test this function.

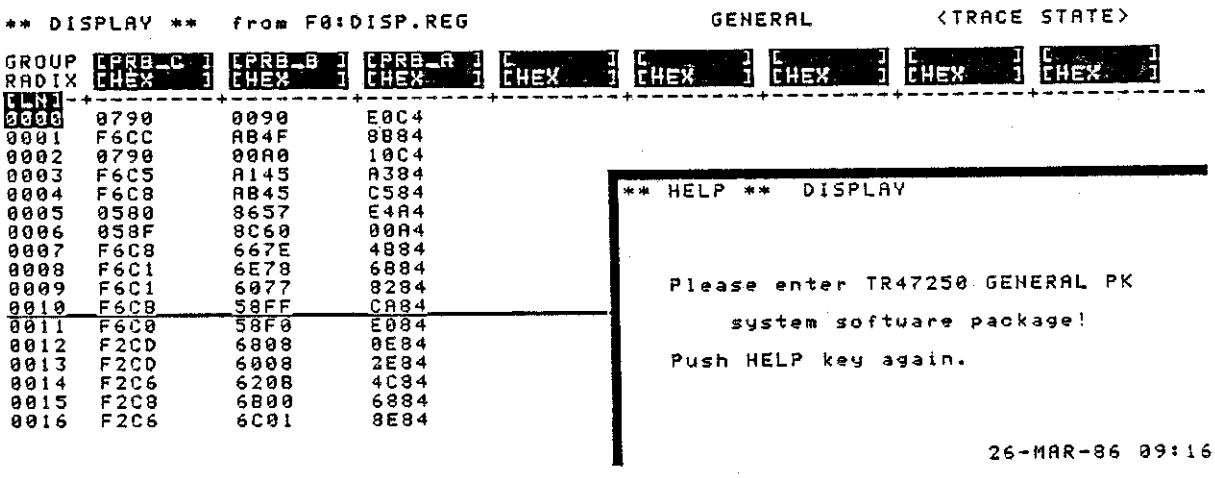



Figure 2-19 Screen Requesting System Disk Insertion by the HELP (key) Function

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 .

## 2.8 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 [10] and then [NEXT] four times, and the screen as shown in Figure 2-20 will appear.

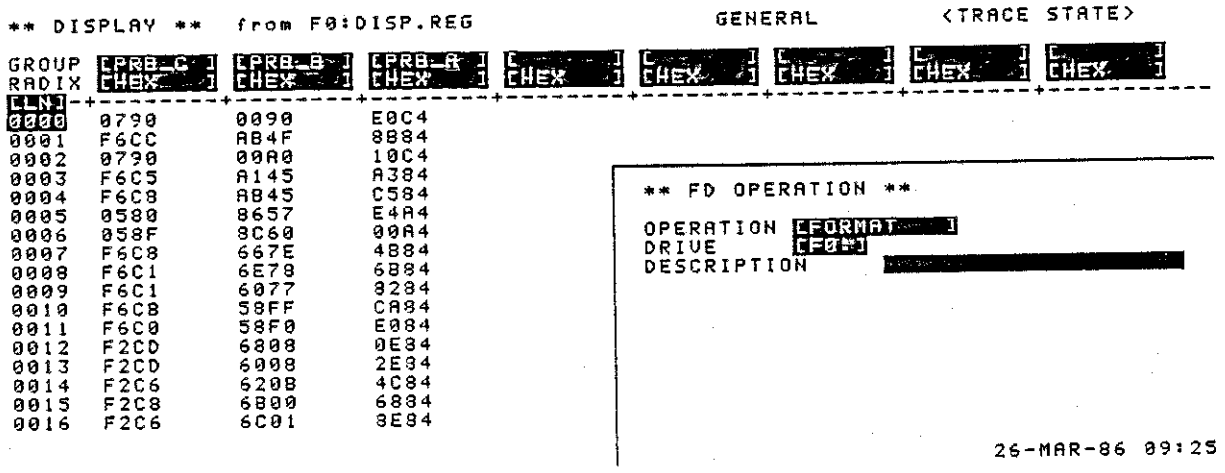



Figure 2-20 Disk Format

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 [10]. 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 2-21 appears, it indicates the end of formatting. (The green key is the shift key, and "Y" is entered by the operations described above.)

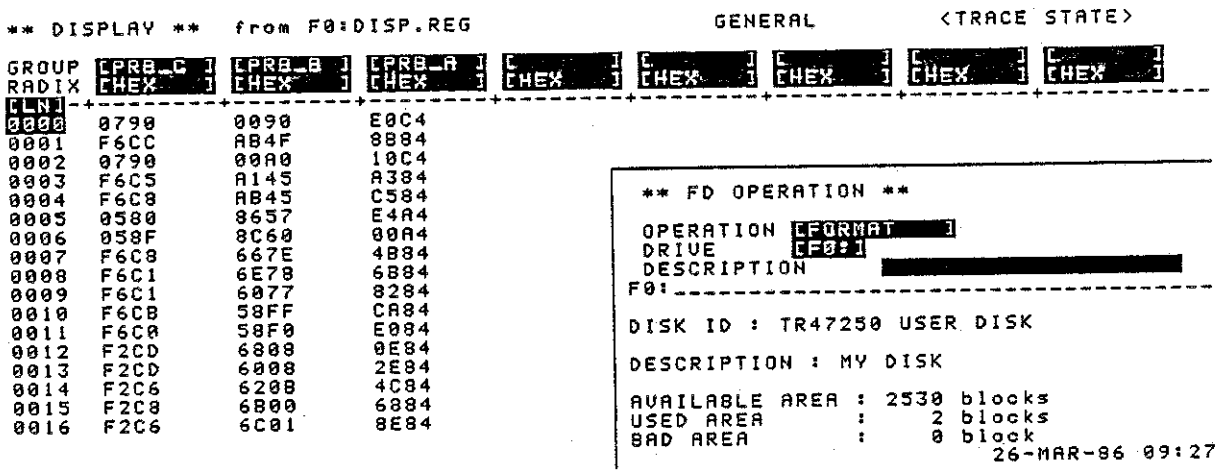



Figure 2-21 Display at the end of Disk Formatting

Press [DISPLAY] and then press [SAVE] twice, and the data that is currently displayed on the screen is written into the disk. When [ID] 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 [ID] 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 [ID] 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.

The state-only analyzer cannot perform that described in Sections 3.2, 3.4, and 3.6.

## 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 2.4).

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. The sampling clock at this moment is 10 ns (100 MHz).

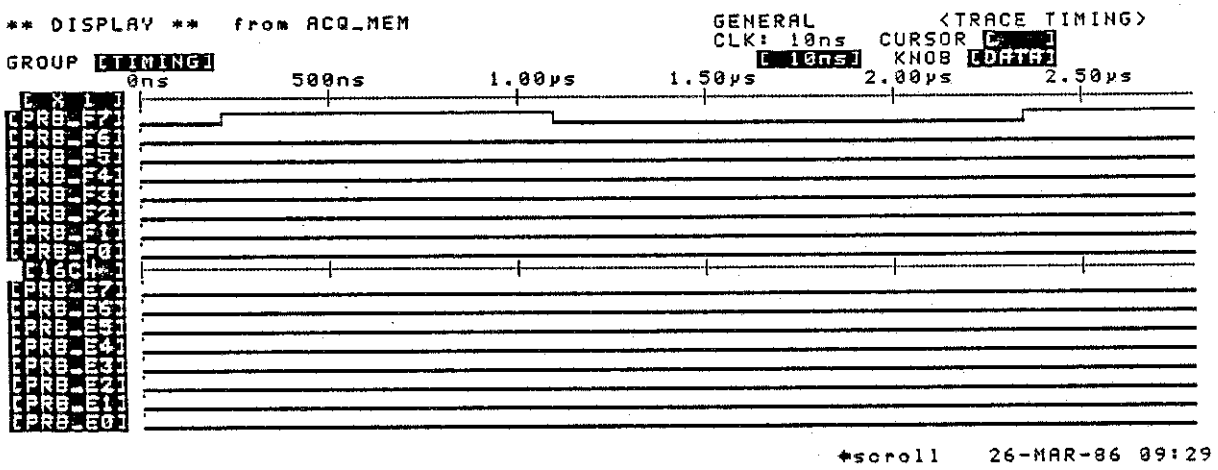



Figure 3-1 Timing Analysis Measurement Example (sampling clock: 10 ns)

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.

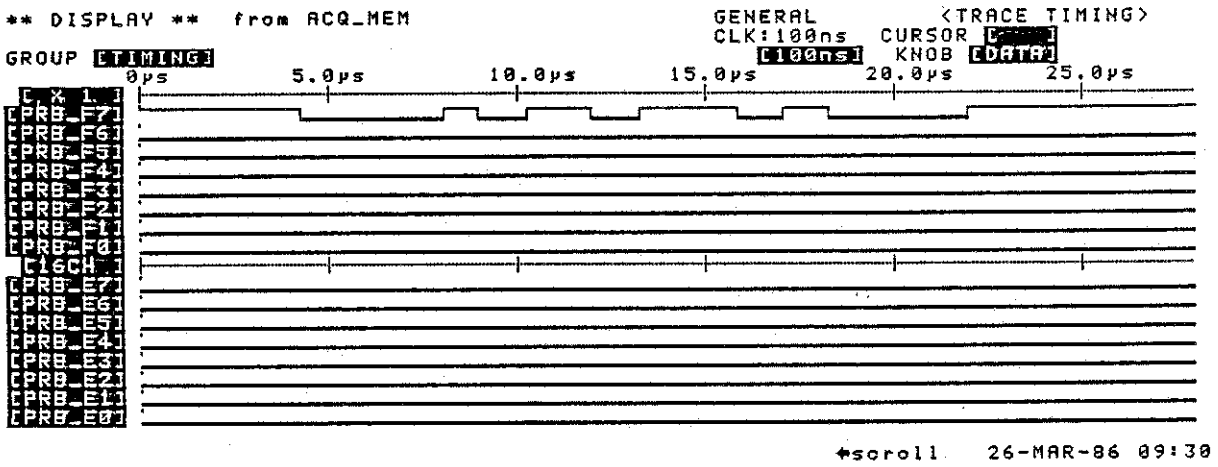



Figure 3-2 Timing Analysis Measurement Example (sampling clock: 100 ns)

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 [COMMAND] 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.

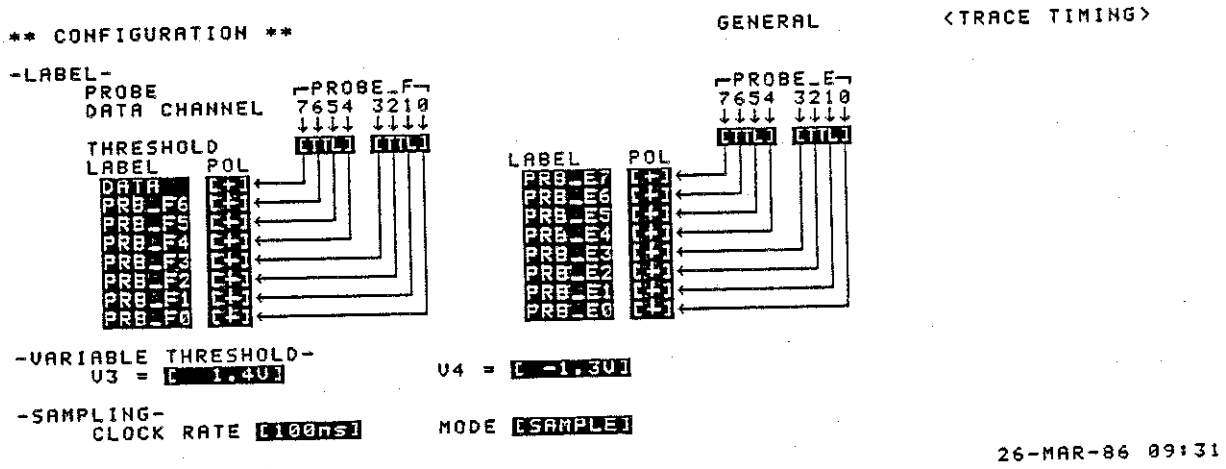



Figure 3-3 Label Name Definition Example

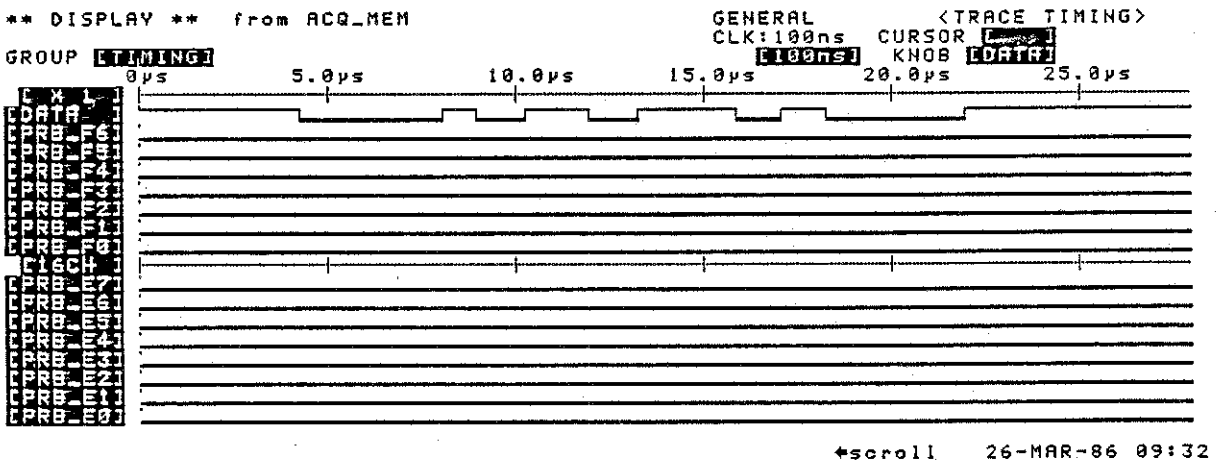



Figure 3-4 Label Name Usage Example

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  ,  ,  and  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.

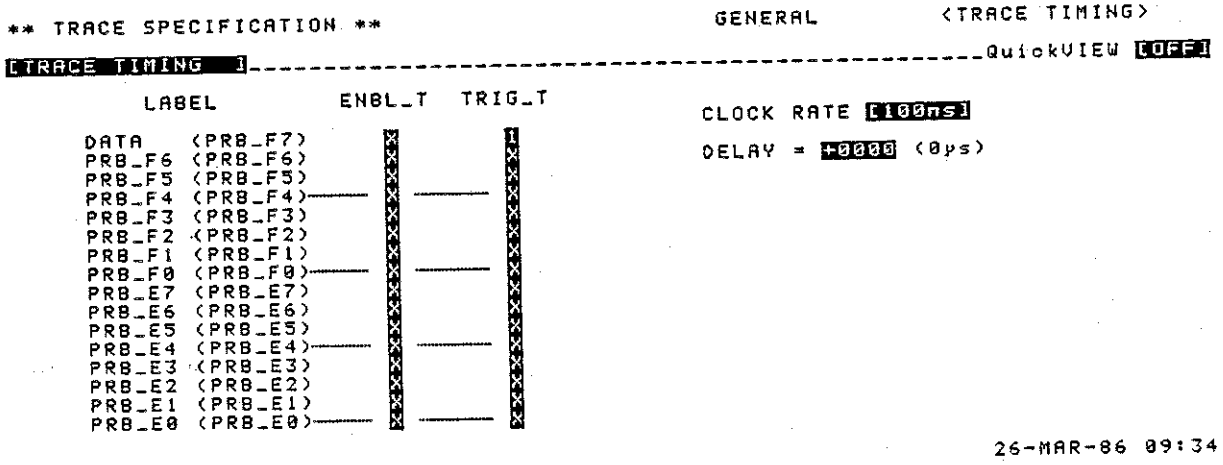



Figure 3-5 Trigger Pattern (TRIG__T) Setting Example

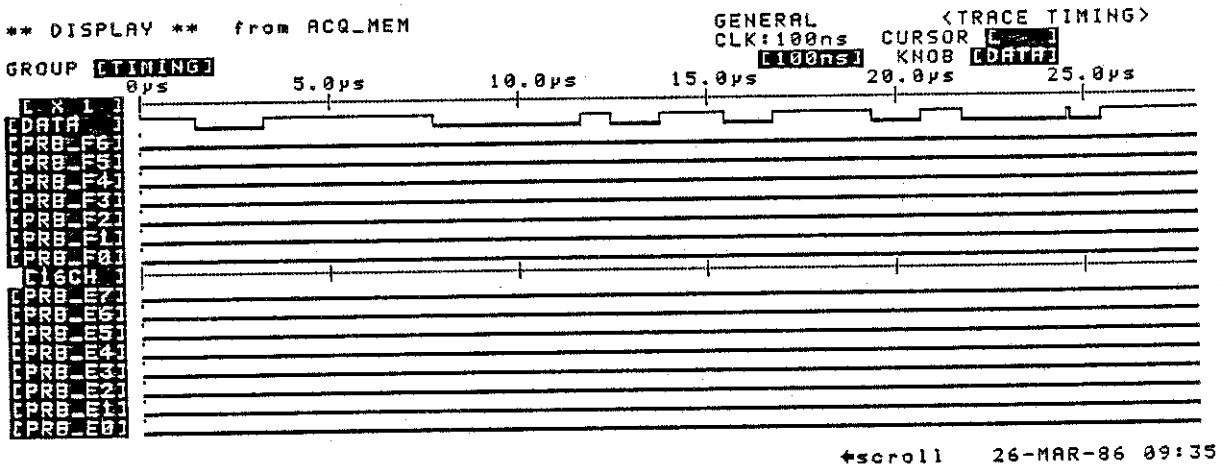



Figure 3-6 Measuring Example with Trigger Pattern Setting

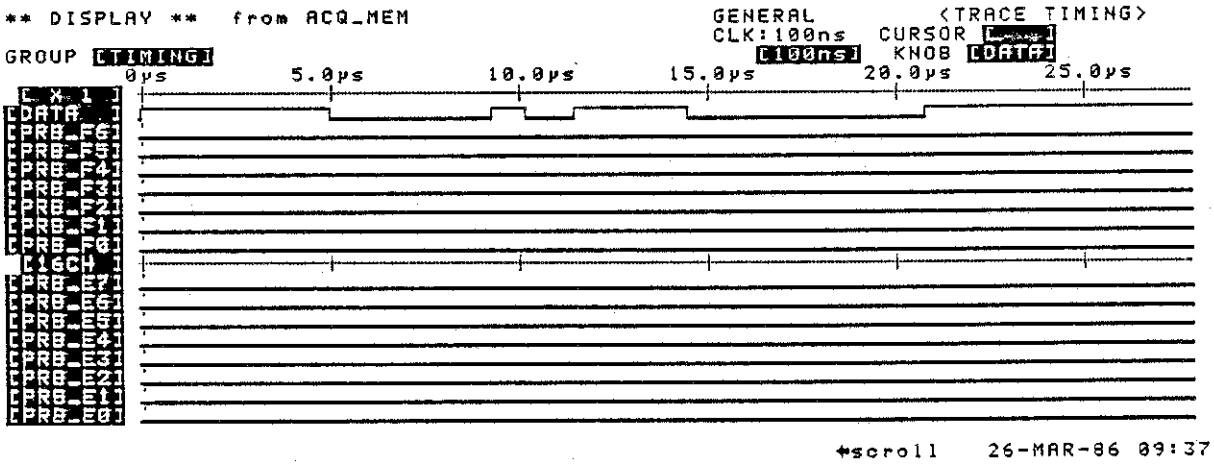



Figure 3-7 Delay Usage Example

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 probes C and D to the main unit (see Section 2.3.1) and load the system software (see Section 2.4). The display shown in Figure 3-8 (a) will appear on the CRT. Turning the knob clockwise or pressing the PAGE [O] key will give the screen shown in Figure 3-8 (b). The input conditions for data capturing can be set on these screens.

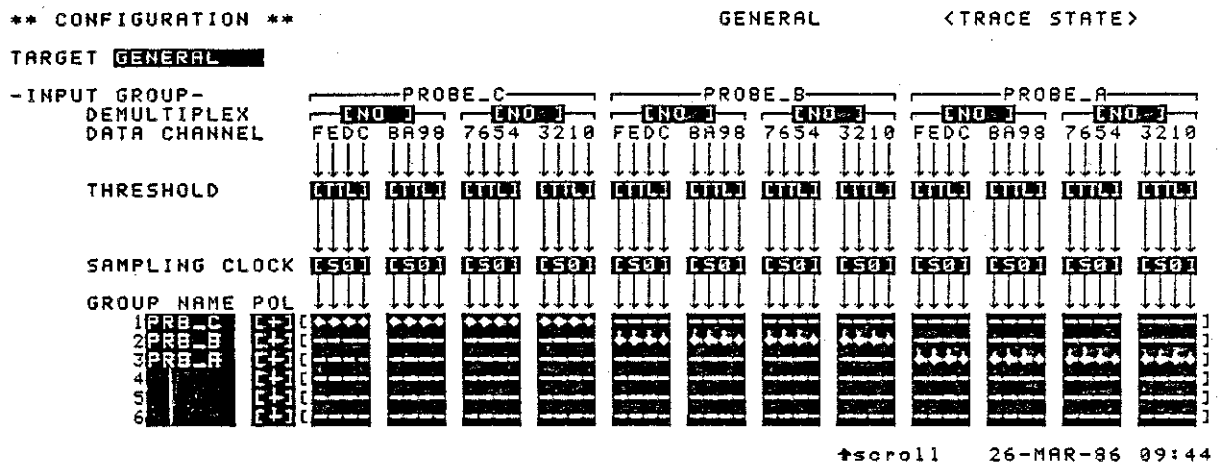



Figure 3-8 (a) CONFIG Menu Screen (data input channel)

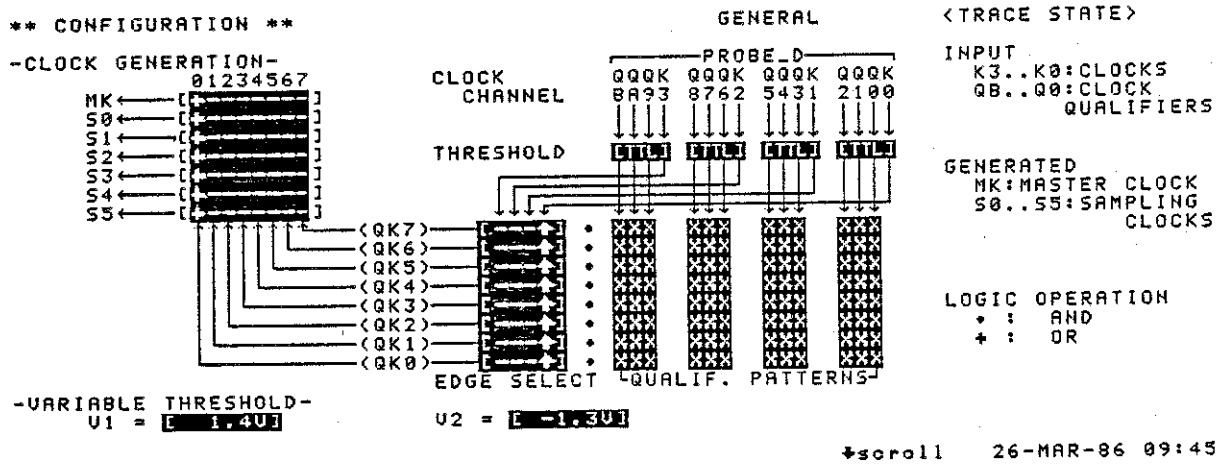



Figure 3-8 (b) CONFIG Menu Screen (clock input channel)

Next, prepare the SUT circuit to be measured. Connect probe channel No. F of probe C and channel No. K0 of probe D to any clock signal terminal (preferably at TTL level) via the probe hook. (The same signal is regarded as the data input signal at probe C and the clock input signal at probe D.)

Then press [RUN] for data capturing and the screen shown in Figure 3-9 will appear. Only the signals of the channel on the far left of the [PRB_C] group are actually captured. In the figure, the channels with no input along with the channels that probes are not connected (the menu items of [PRB_B] and [PRB_A] mean the data from probe B and probe A, respectively) are displayed as if they contain "0" data.

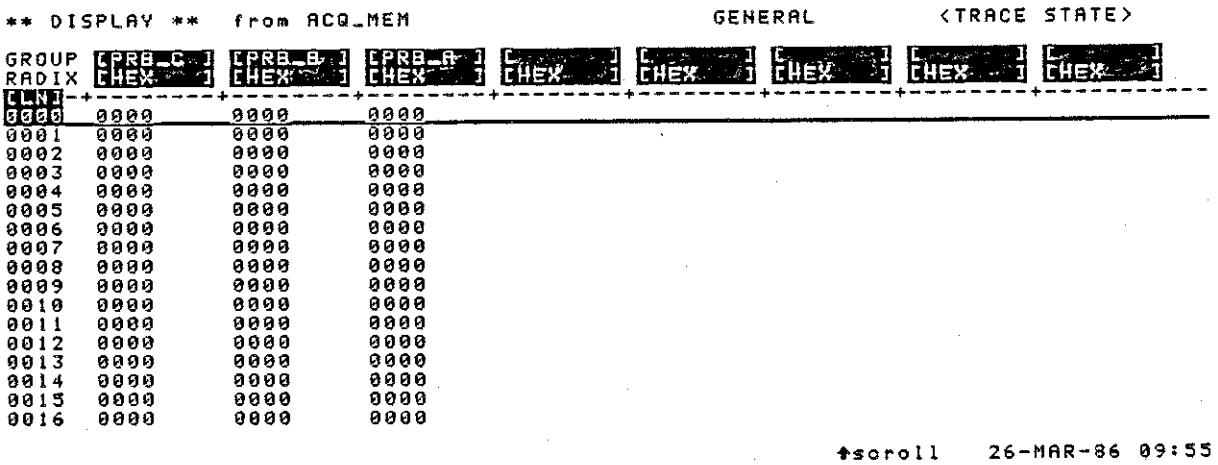



Figure 3-9 State Analysis Measurement Example (1)

Next, turn the scroll knob. Turning clockwise moves the data upwards; counterclockwise brings the data downwards.

Press [NEXT] and [PREV] (and also use [↑], [↓], [←], [→] keys) to check how data has changed along with selecting GROUP and RADIX.

Then, press [CONFIG] to set the condition shown in Figure 3-10 (a) and (b). This condition, with the data/clock in the so-called 1-channel condition, is the same as the one shown in Figure 3-8 (a) and (b).

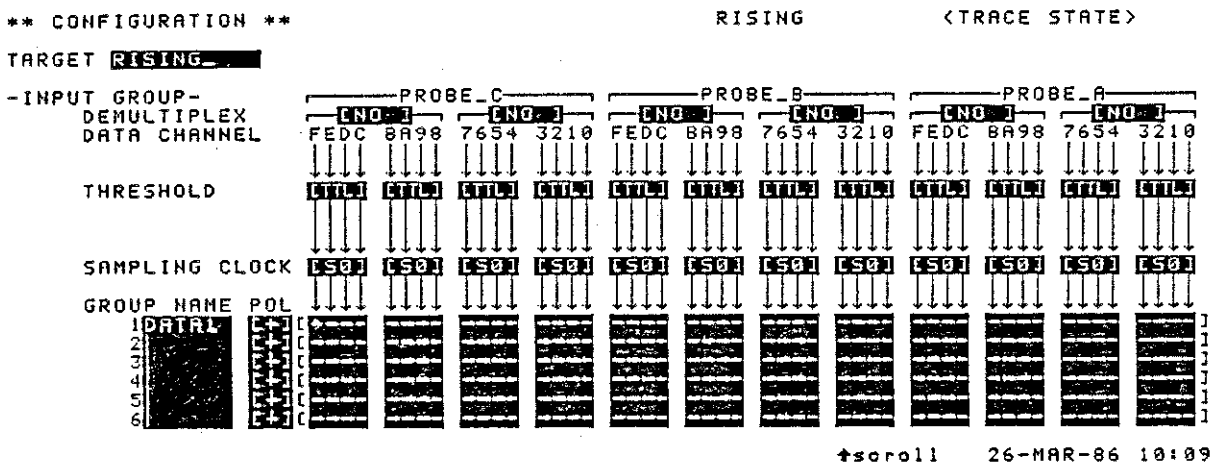



Figure 3-10 (a) GROUP Name Definition Example

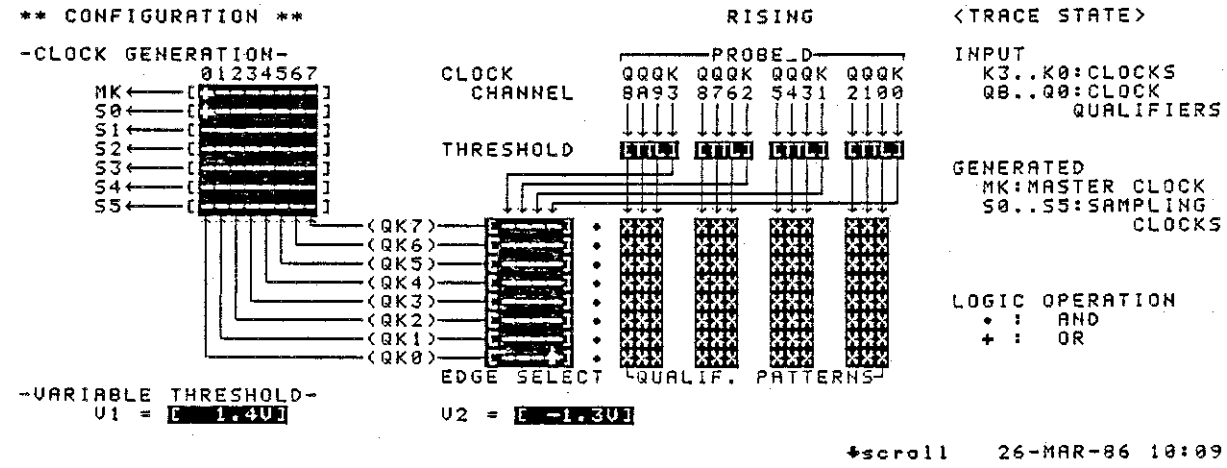



Figure 3-10 (b) Sampling Clock Setting Example (leading edge)

When [RUN] is pressed, the screen shown in Figure 3-11 appears. In this screen, only the data of the GROUP name of "DATA 1" defined in Figure 3-10 (a) is displayed.

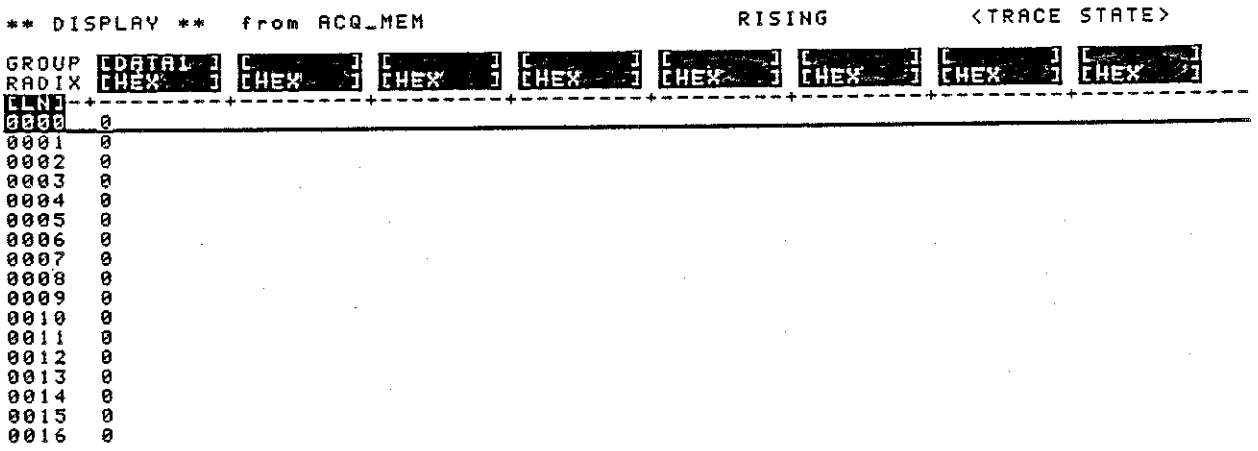



Figure 3-11 State Analysis Measurement Example (2)

Then press [COMMAND] and the leading edge of the clock signal input from channel No. K0 which has been used as the sampling edge (displayed by ↑ on the screen) is now set to be used as the trailing edge of the clock signal as shown in Figure 3-12 (displayed by ↓ on the screen).

Press [RUN] to start data capturing as shown in Figure 3-13.

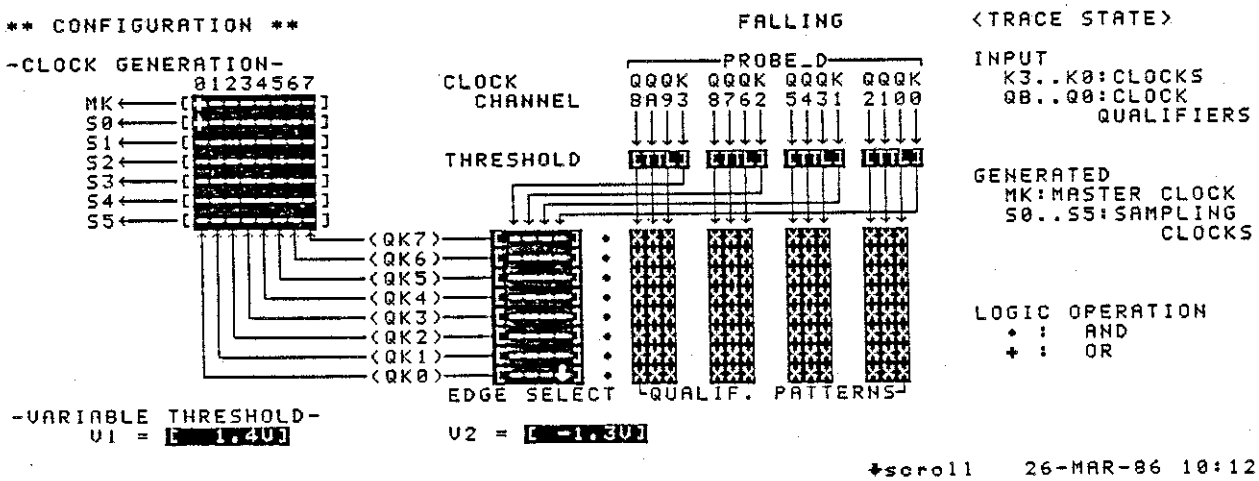



Figure 3-12 Sampling Clock Setting Example (trailing edge)

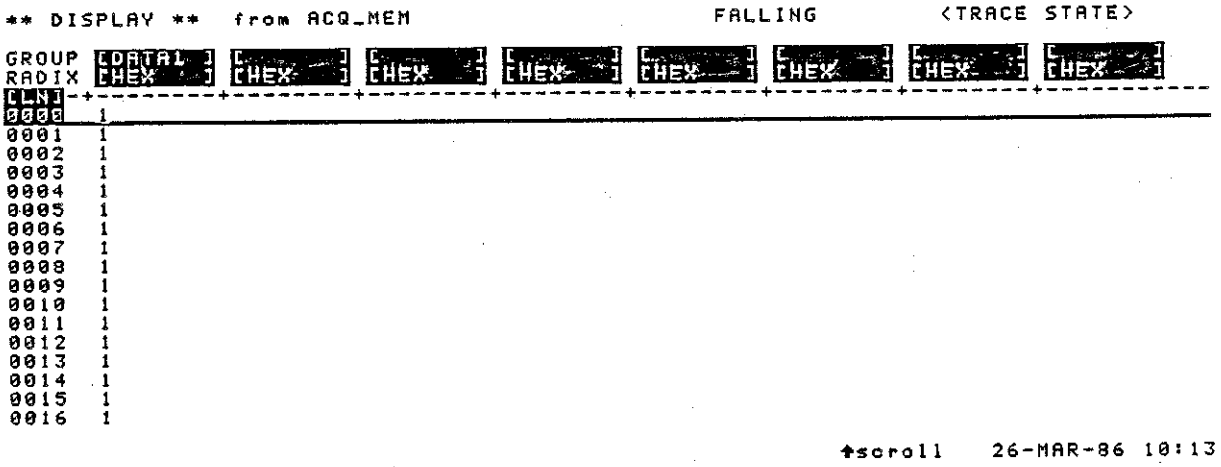



Figure 3-13 State Analysis Measurement Example (3)

Then press [CONFIG] to set the conditions as shown in Figure 3-14. This setting sets both the leading and trailing edges of the clock signal as the sampling edge (the flowchart from starting K0 clock until the master clock MK and the sampling clock appears is shown in the figure).

Press [RUN] and the data is captured as shown in Figure 3-15. This means that the data in Figures 3-11 and 3-13 is captured alternately.

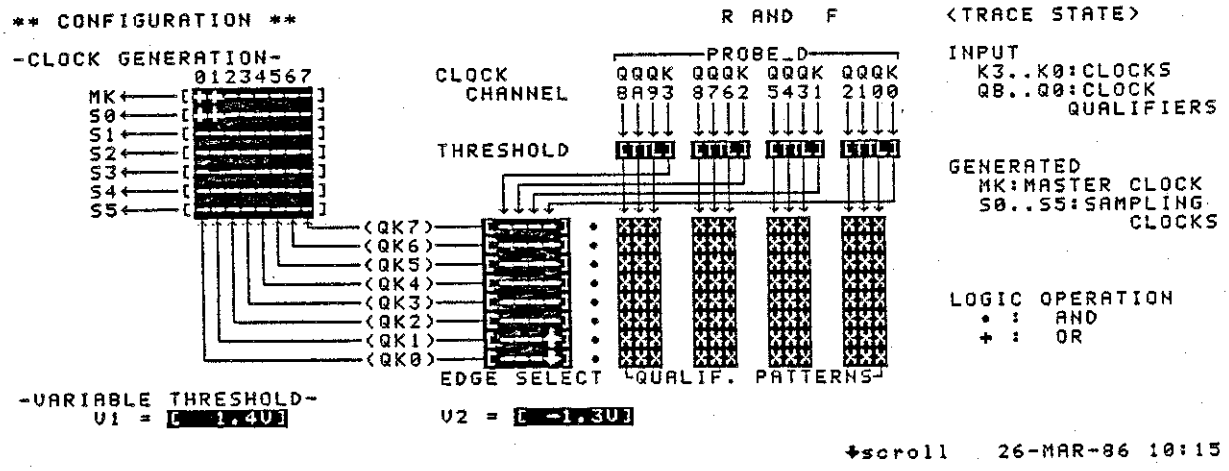



Figure 3-14 Sampling Clock Setting Example (leading and trailing edges)

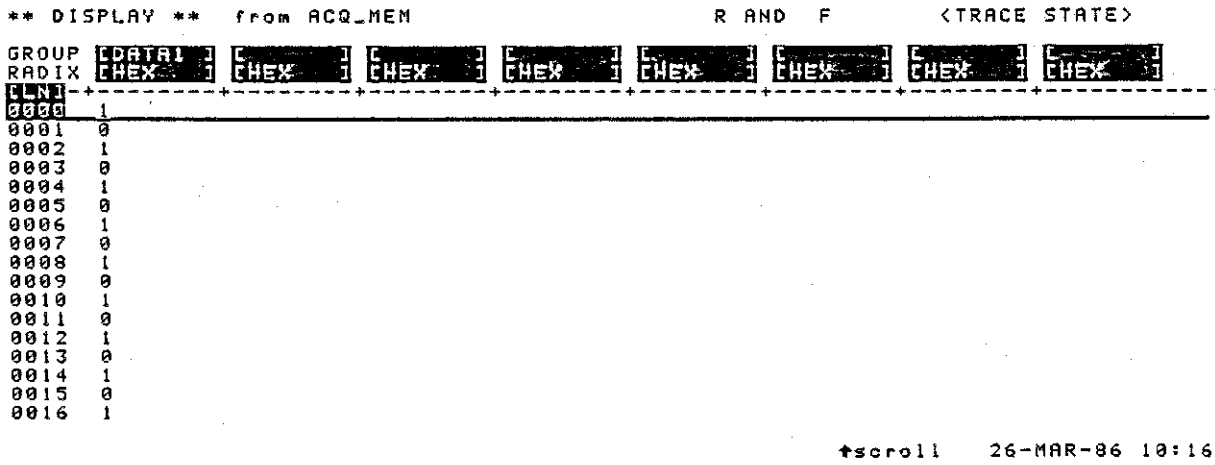



Figure 3-15 State Analysis Measurement Example (4)

It is impossible to predict from which part of the input signal that the display will start no matter how many times [RUN] is pressed.

Then press [TRACE] to set the trigger as shown in Figure 3-16. Press [RUN] and the first line will always include data with the value set in Fibure 3-16. This means that the trigger is accessed and the trigger point is the initial data.

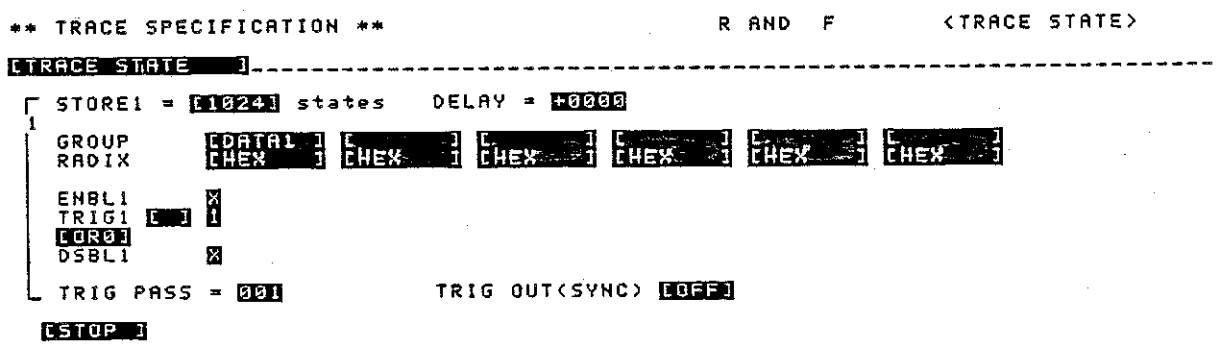



Figure 3-16 Trigger Pattern Setting

The screen which appears by pressing the CONFIG key can be difficult to read and yet logic actually used is rather easy. See Section 4.2.1 to master reading the screen.

For the CONFIG menu screen including the timing analysis, refer to Section 4.2.1 in the main unit instruction manual. Refer to Section 4.4.1 for measurement mode selection and the TRACE menu screen, and Section 4.4.2 for the trace condition setting of the state analysis. Refer to Sections 4.6.1 and 4.6.2 of the main unit instruction manual for the display of the captured data.

Non-numerical values of symbols and codes are provided to display GROUP which is defined in the CONFIG menu screen. For definitions, refer to Sections 4.3.1, 4.3.2, and 4.3.3 of the main unit instruction manual.

## 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 [COMM'G], 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], [ENTRY], or [↓]. The command that can be selected by [NEXT] or [ENTRY] 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 3-17 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 3-18 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 3-19 shows the program that only sets measuring conditions, which is convenient for setting measuring conditions to be used as a routine. Figure 3-20 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 3-21 shows the program that repeats the measurement ten times under the same measuring conditions.

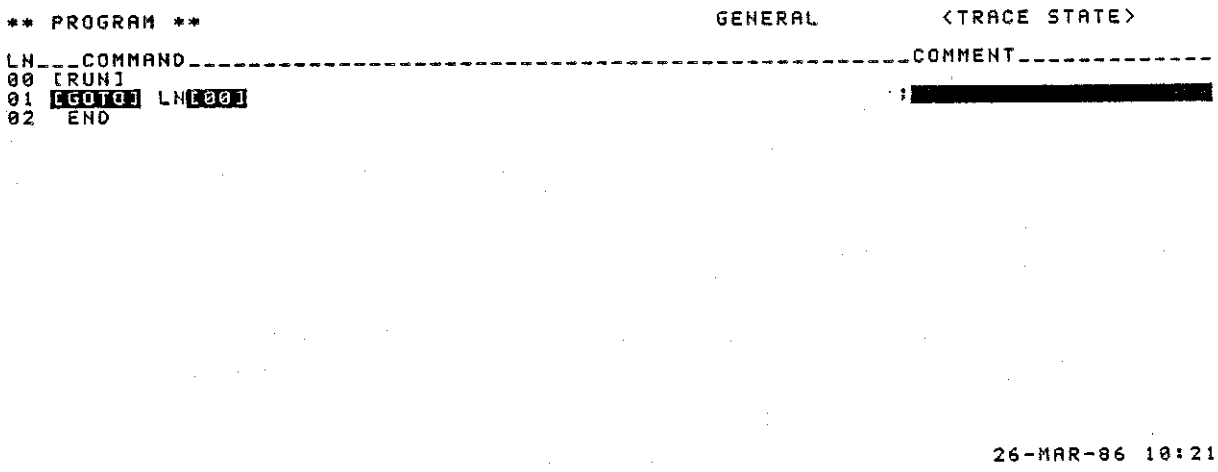



Figure 3-17 Repeat Function Program 1

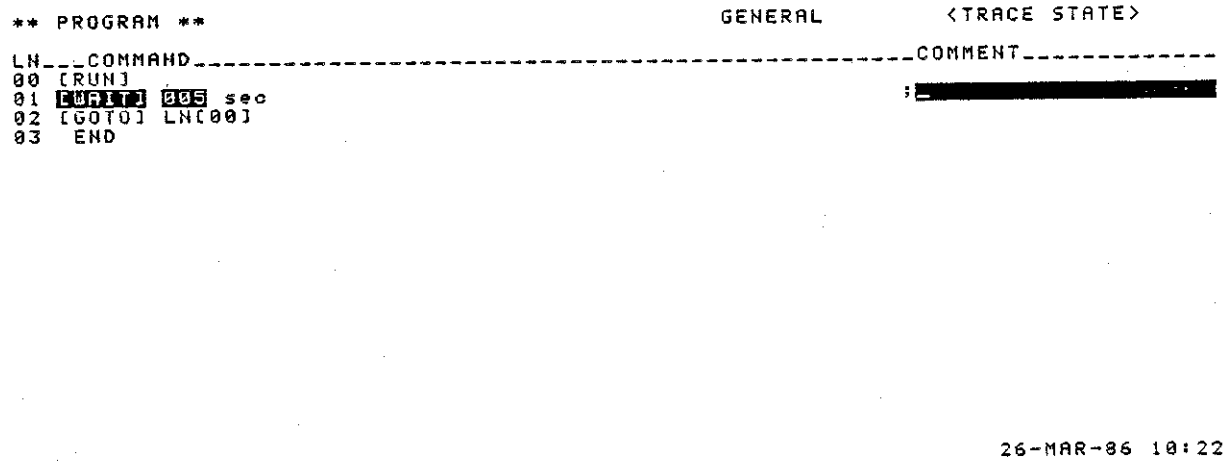



Figure 3-18 Repeat Function Program 2

```
** PROGRAM **                                    GENERAL        <TRACE STATE>

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


                                                          26-MAR-86 10:24
```

Figure 3-19 Program That Only Sets Measuring Conditions

```
** PROGRAM **                                    GENERAL        <TRACE STATE>

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


                                                          26-MAR-86 10:27
```

Figure 3-20 Program Example -1

```
** PROGRAM **                                    GENERAL        <TRACE STATE>

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


                                                        26-MAR-86 10:30
```

Figure 3-21  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 General-purpose CONFIG Menu Screen

The system to be measured by the TR47250 state analysis is not particularly confined. Any digital system, as long as the specifications are satisfied, is applicable.

CONFIG is the function which determines the configuration of the input block of TR4725 installed on the personality kit.
The physical connection of probes and the SUT was described in Section 2.3. Here, the level conversion and sampling of the electric signals input from these probes and the CONFIG function which determines the conversion process to logical data output for the operation are described.

There are three types of CONFIG menu screen depending on the measurement mode. (The measurement mode is set in the TRACE menu screen; for details, refer to Section 4.2.1 in the main unit instruction manual. The menu screen of the timing analysis is not dependent on the personality kit. For its operating procedures, refer to Section 4.2.3 of the main unit instruction manual.

The state analysis menu screen related to the TR47250 personality kit is composed of the screen that defines data inputs of no more than 48 channels as several segmented groups (the data input channel configuration), and the screen defines the sampling clock by using the external clock inputs of no more than 16 channels for sampling only the required data (clock input channel configuration).

(1) Data input channel configuration

The initial menu screen for constructing the data input channel is shown in Figure 4-1. In the figure, the data signals input from data probes A/B/C are converted to the level by the specified threshold voltage, are sampled by the specified sampling clock, and are displayed as data of the specified group. In other words, the electric signals in 48 channels with the physical names of PRB_CF to PRB_C0, PRB_BF to PRB_B0, and PRB_AF to PRB_A0 are converted into data with logical names (GROUP name).

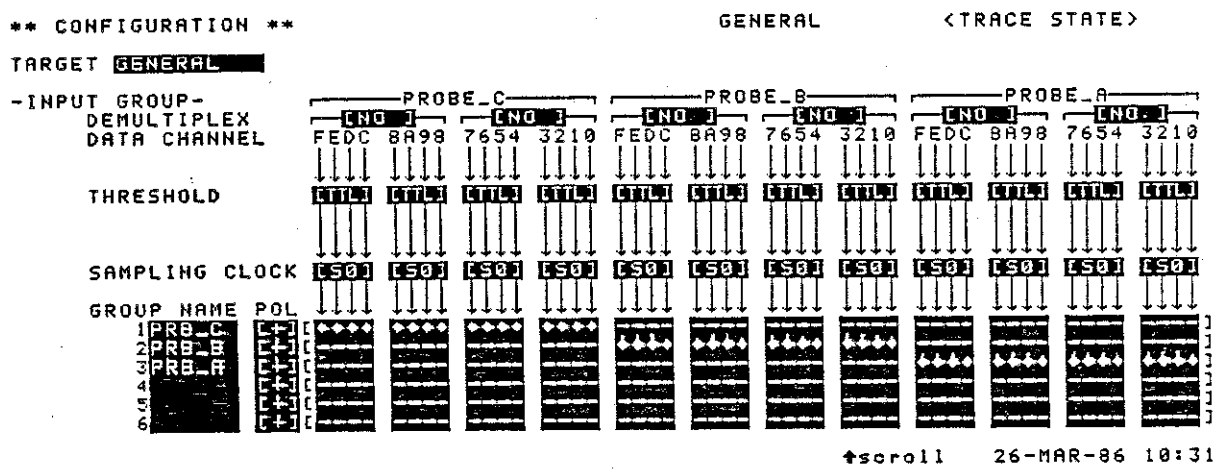



Figure 4-1 Initial Menu Screen of the Data Input Channel Configuration

The contents that can be set are as below:

- TARGET: This menu item is related to the entire input channel configuration. What the current setting is doing on the SUT is described in less than 10 alphanumeric characters. The description is always displayed on the uppermost line of the center to the right.
  "GENERAL" in the initial data indicates the GENERAL-PURPOSE PERSONALITY KIT.

- DEMULTIPLEX: When YES is specified with the data input signals used in the clock sharing multiplex method, the data is divided on the personality kit. Demultiplex is specified for each probe pod and data from eight channels is acquired from the four low-order channels. One example is shown in Figure 4-2. The 16-bit input signals from probes B/C are divided by two sampling clocks S0 and S1 and are converted into data with GROUP names ADDRESS and DATA, repectively.

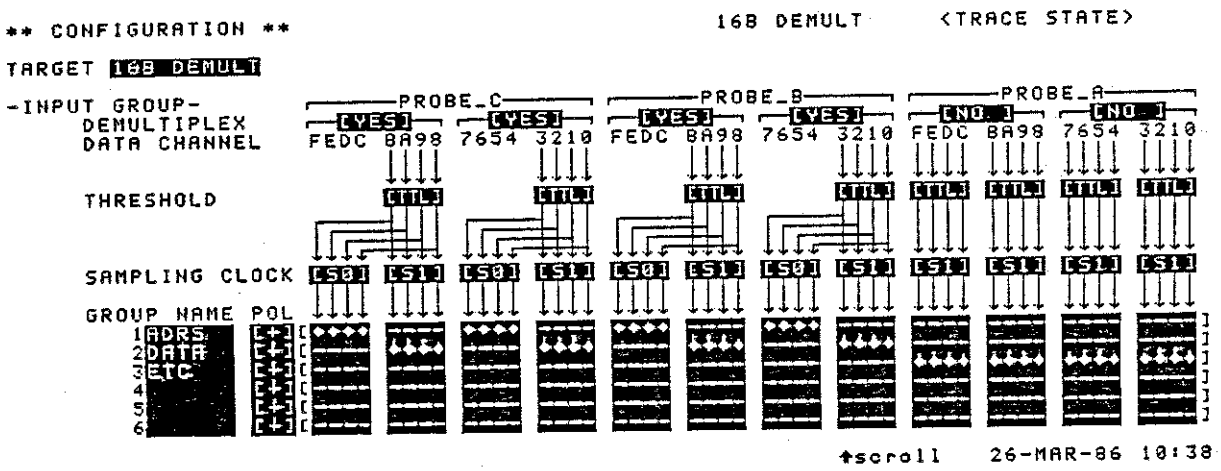



Figure 4-2 Multiplex Setting Example

- THRESHOLD: The threshold voltage can be selected from among TTL (approx. 1.4 V), ECL (approx. -1.3 V), V1, and V2. V1 and V2 can be set randomly in the range from -12.7 to +12.7 V in 100-mV steps (on the menu screen of the clock input channel configuration). The threshold voltage can be set for every four channels of data input.

- SAMPLING CLOCK: Can be selected from the maximum of six sampling clocks S0 to S5 which are generated in the menu screen of the clock input channel configuration. Invalid clocks cannot be selected.

- POL: Specifies + or - as the polarity of the data to be captured.

- GROUP: Defines the GROUP unit for handling several data input channels together. First define the GROUP name by using no more than six alphanumeric characters.
  Then specify the data input channels belonging to the GROUP by inputting them with a ♦ mark. There can be a maximum of six GROUPs. As the initial setting, PRB_C, PRB_B, and PRB_A are defined as the respective GROUP names corresponding to the data input channels of data probes C, B and A.
  The GROUP defined here can also be used in other menu screens (refer to Section 4.1.2 in the main unit instruction manual).

(2) Clock input channel configuration

The initial menu screen for clock input channel configuration is shown in Figure 4-3. A maximum of six sampling clocks (S0 to S5) and the master clock (MK) can be generated from four channels of clock input (K3 to K0) and 12 channels of clock qualifier input (QB to Q0).

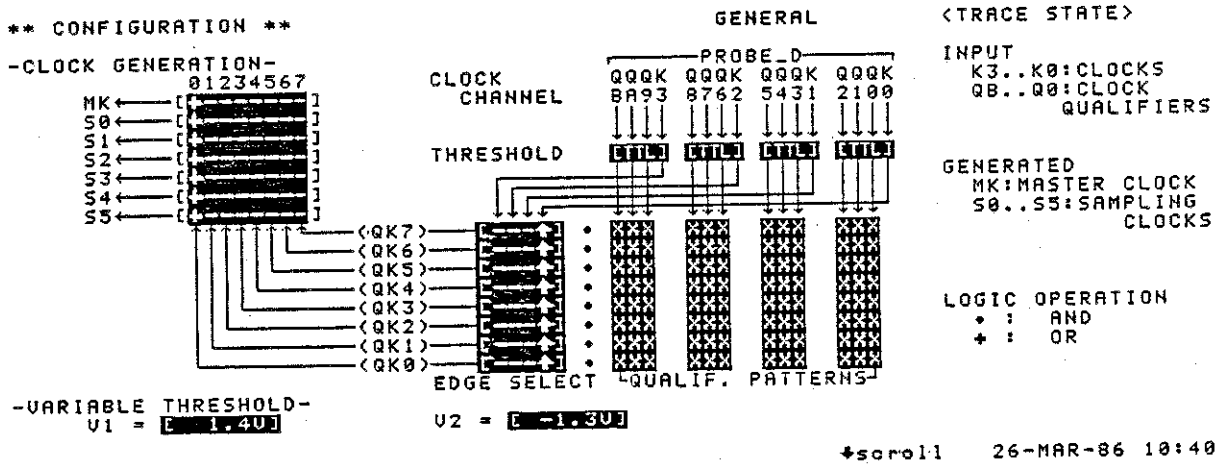



Figure 4-3 Initial Menu Screen for Clock Input Channel Configuration

The contents that can be set are as below:

- THRESHOLD: The threshold voltage can be selected from among TTL (approx. 1.4 V), ECL (approx. -1.3 V), V1, and V2. V1 and V2 can be set randomly in the range from -12.7 to +12.7 V in 100-mV steps. The threshold voltage can be set with one channel of the clock input and three channels of the clock qualifier input as a group.

- EDGE SELECT: Specifies the leading edge or the trailing edge of one of the clock input from K3 to K0 as the selected edge.

  ↑ indicates the leading edge; ↓ indicates the trailing edge.

- QUALIF. PATTERNS: Creates 12 bit patterns for specifying the validity of the selected edge mentioned above by using 12 channels of the clock qualifier inputs of QB to Q0. The element of each pattern is set to x (don't care), 1, or 0. x indicates the validity of the qualifier input; 1 and 0 specify the validity of the selected edge with positive logic and negative logic, respectively.

- CLOCK GENERATION: Sampling clocks S0 to S5 are generated by logically ORing the qualified clocks QK7 to QK0 which are generated by the clock input and clock qualifier input. Input as many + marks ranging from 1 to 8 into positions equivalent to the qualified clocks and the coupling is executed. The master clock (MK) can be generated using the same procedures.
  This master clock outputs the data sampled by the sampling clock to the internal data bus altogether. It should be set to be later than or equal to the time of the sampling clock.

- VARIABLE THRESHOLD: Variable thresholds V1 and V2 can be set in the range from -12.7 to +12.7 V in 100-mV steps.

The clock generation process, with the combinations of menu items mentioned above, should be summarized as below:

(1) A maximum of eight types of qualified clocks (QK0 to QK7) are generated by ANDing a maximum of eight types of qualifier patterns (QP0 to QP7) created by the clock qualifier inputs (Q0 to QB) with the clock inputs (K0 to K3).

$QK0 = K\ell \uparrow\downarrow QP0$

$\vdots$

$QK7 = Km \uparrow\downarrow QP7$ ($\ell$, m .... = 0 to 3)

and $\uparrow\downarrow$ indicate the clock edge selection and · indicate ANDing.

(2) From the above eight types of qualified clocks, six types of sampling clock (S0 to S5) can be obtained by ORing them.

$S0 = QKa + QKb + .... + QKc$

$\vdots$

$S5 = QKd + QKe + .... + QKf$

(a, b, c, d, e, f, .... = 0 to 7)

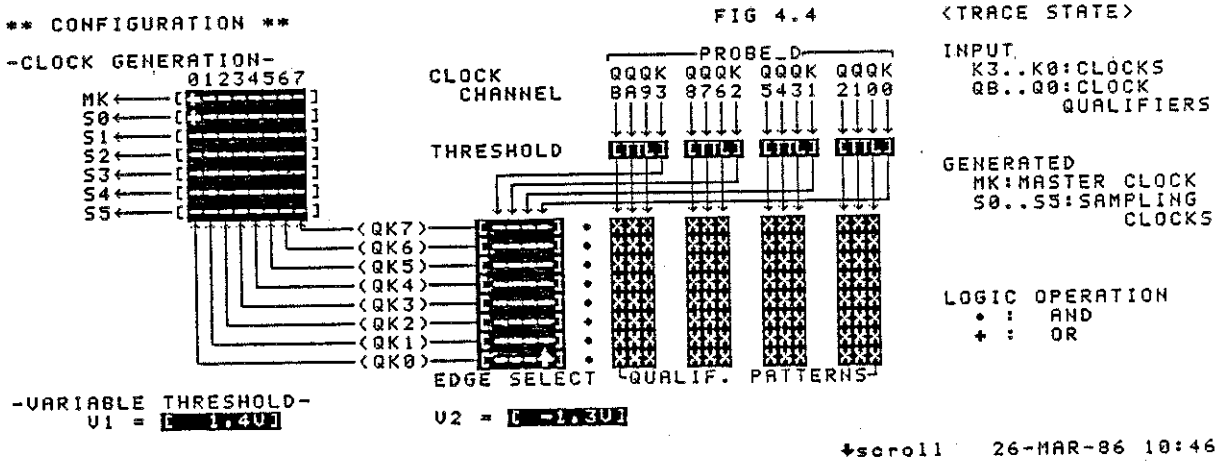
+ indicates ORing.

(3) The master clock (MK) can be obtained using the same procedures.

$MK = QKx + QKy + .... QKz$

(x, y, z, .... = 0 to 7)

Clock generation examples are shown in Figure 4-4 to 4-8.



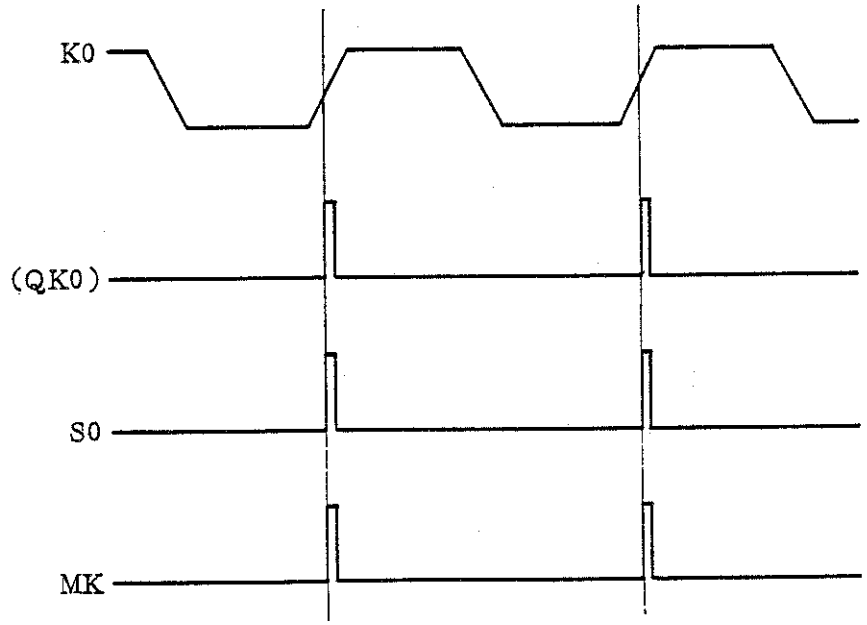
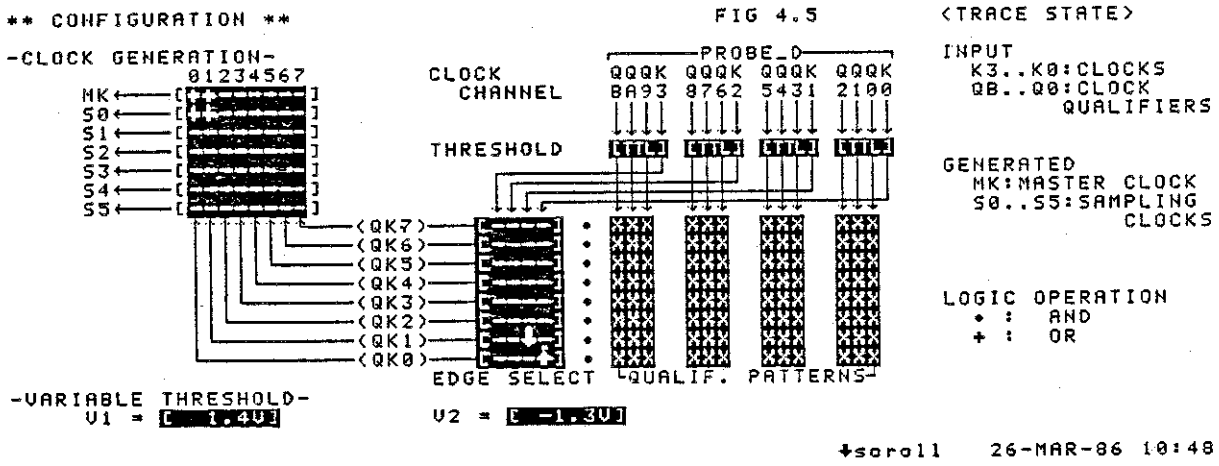




Figure 4-4 Example of Sampling Data Using All Leading Edges of One Clock (input from K0)



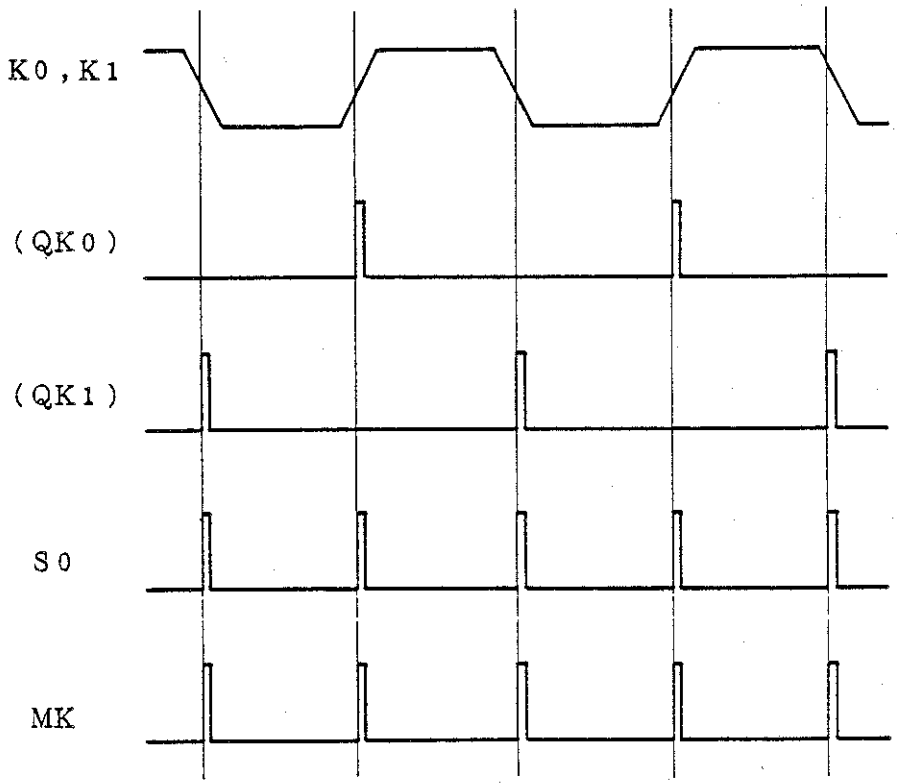
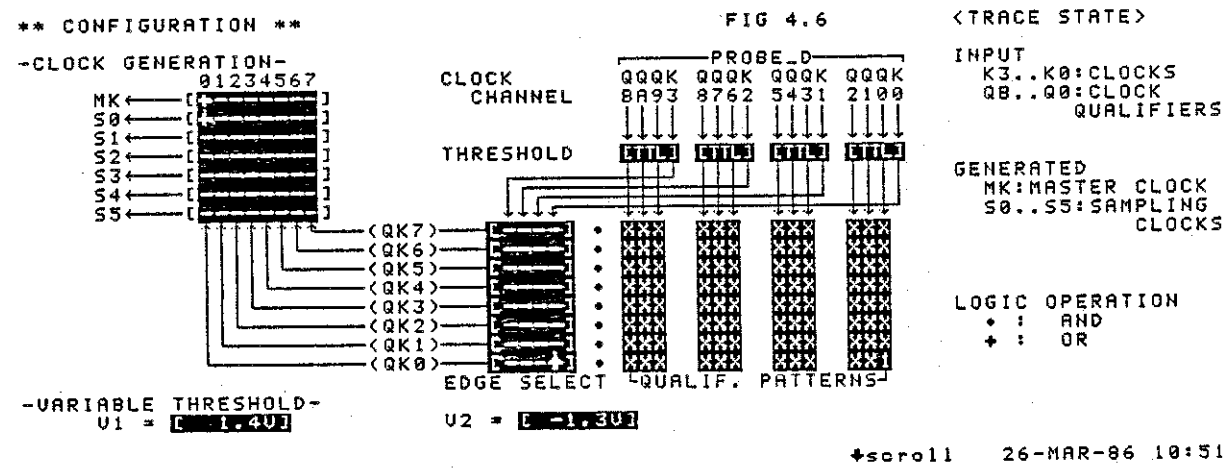




Figure 4-5 Example of Sampling Data Input Using All the Leading and Trailing Edges of One Clock (input the same clock from K0 and K1)



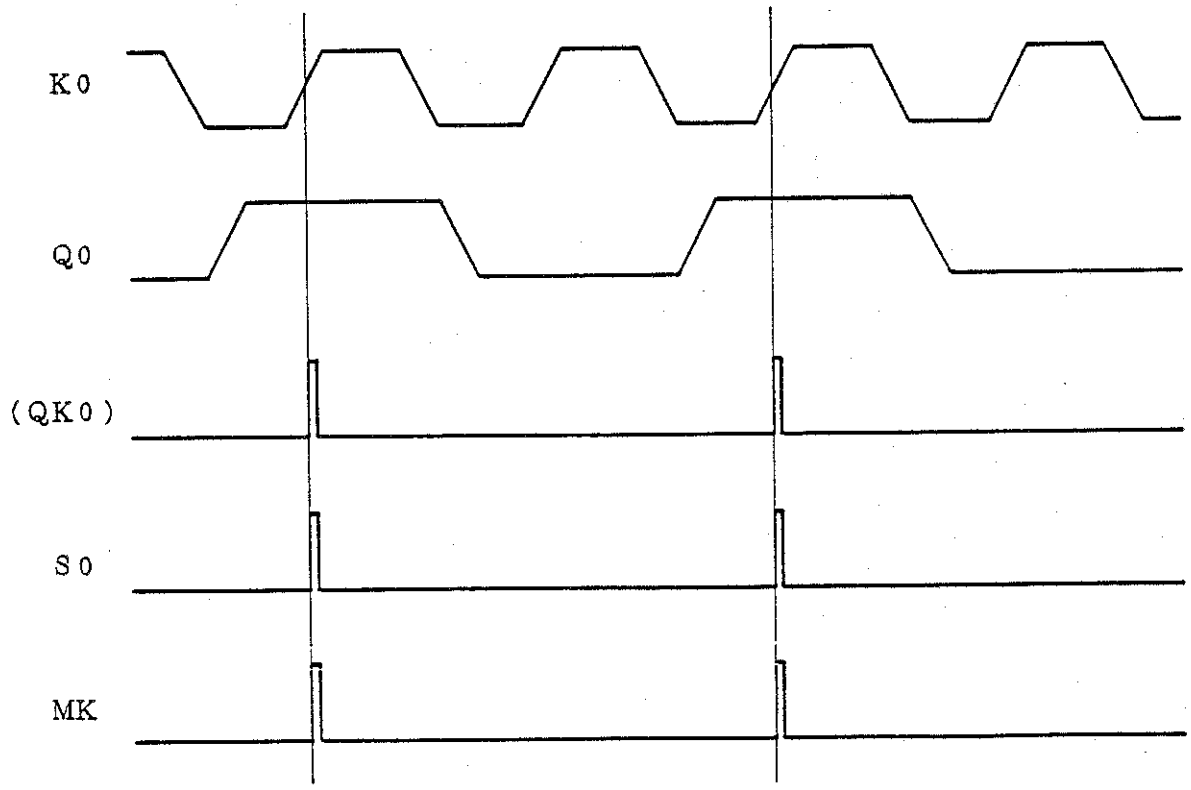
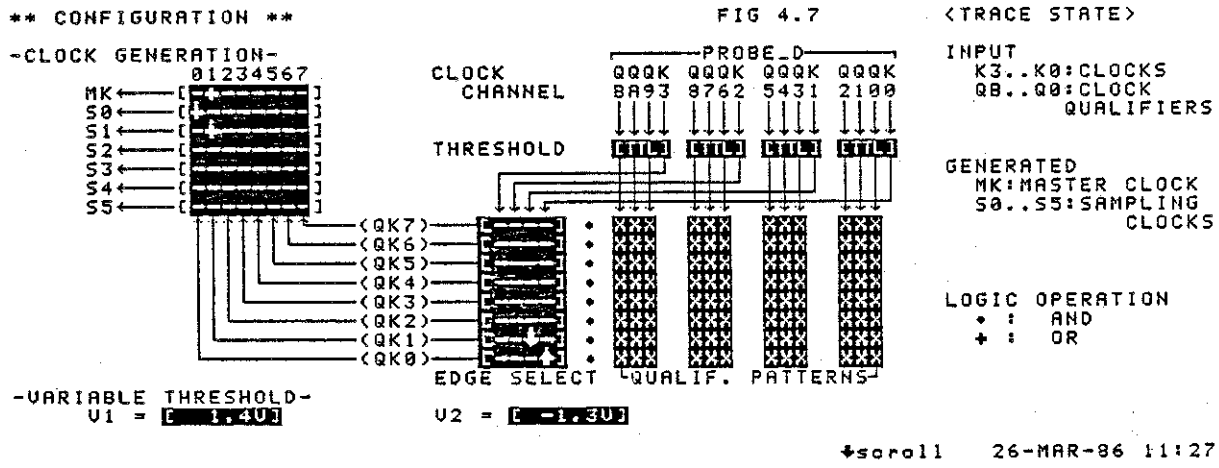




Figure 4-6 Example of Sampling Data Input Using the Edge Qualified by the Clock Qualifier (input from Q0; positive logic) from the Leading Edges of One Clock (input from K0)



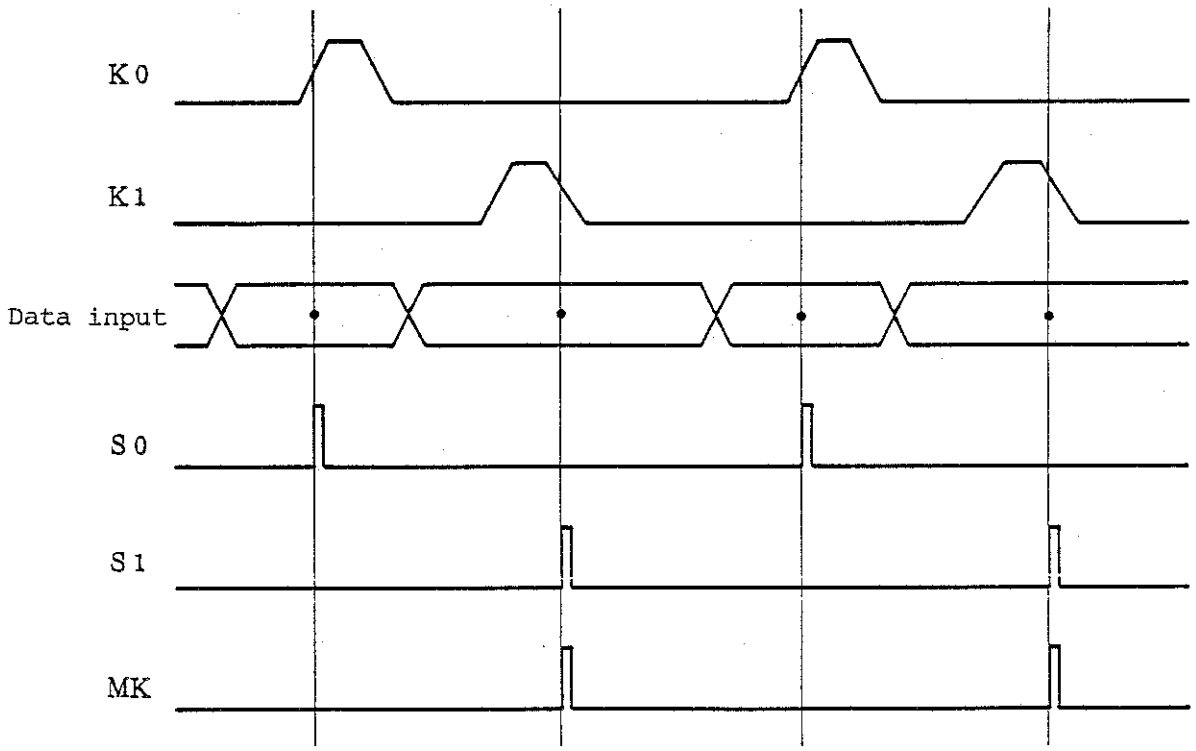
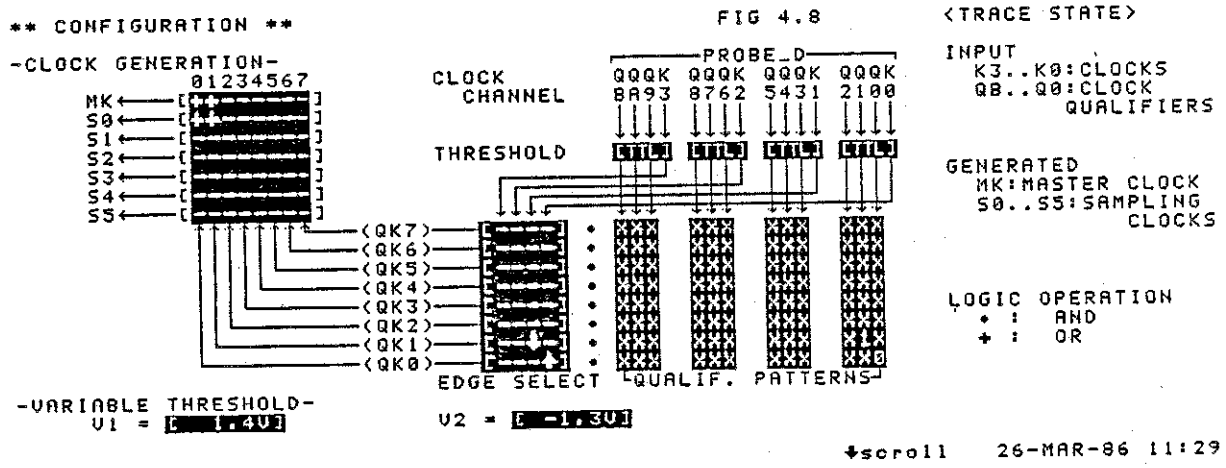




Figure 4-7 Example of Sampling Data which Uses Clock Sharing Multiplexing Using Two Clocks (input from K0 and K1) (demultiplexing; see Figure 4-2)



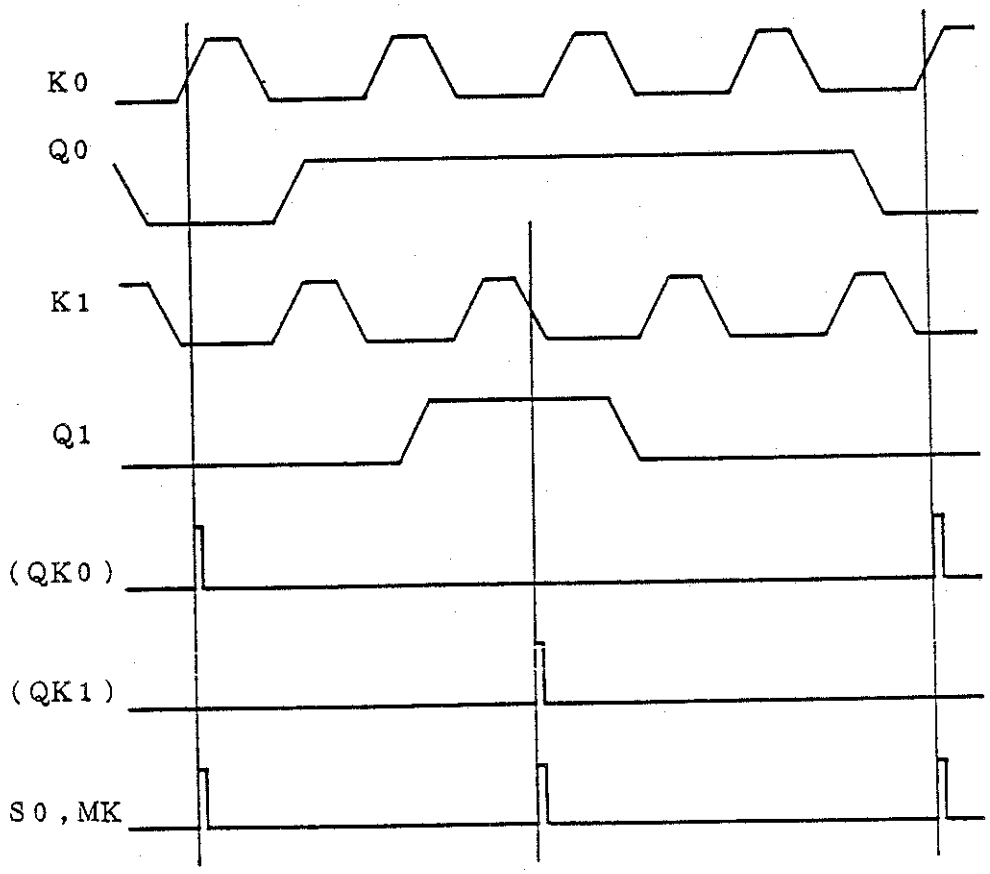




Figure 4-8 Example of Sampling Data Input Using Two Qualified Clocks which are Separately Qualified

MEMO

# 5. OPERATION CHECK

## 5.1 TESTING PROBES A/B/C/D

Input signals are captured by probes in the personality kit. Because there are many input channels belonging to these probes, problems such as faulty connections may occur as a result of operating procedures. To prevent this, a built-in function for checking probe operation is provided. Perform the following procedure to test the probes when the data captured seems unusual:

(1) Turn OFF the POWER, before removing the probes A/B/C/D.

(2) Load the system software (see Section 2.4).

(3) Press [UTILITY] and [MENU] to select [PROBE TEST]. Then press [RUN] to load the [PROBE TEST] program from the system disk. The screen shown in Figure 5-1 is displayed.

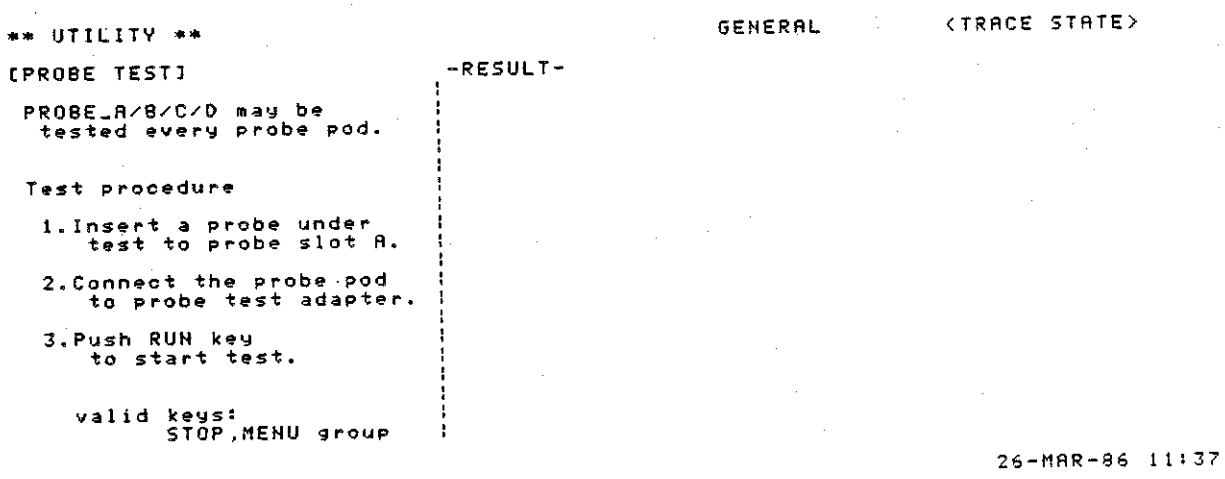



Figure 5-1 [PROBE TEST] Selection

(4) Mount the attached probe test adapter in the PROBE TEST connector on the TR4725 rear panel.

(5) Connect the probe to be tested, as shown in Figure 5-2, to PROBE SLOT A on the rear panel. Each probes A/B/C/D consist of two eight-channel-unit probe pods. Connect the probe lead set from the probe test adapter to either pod.

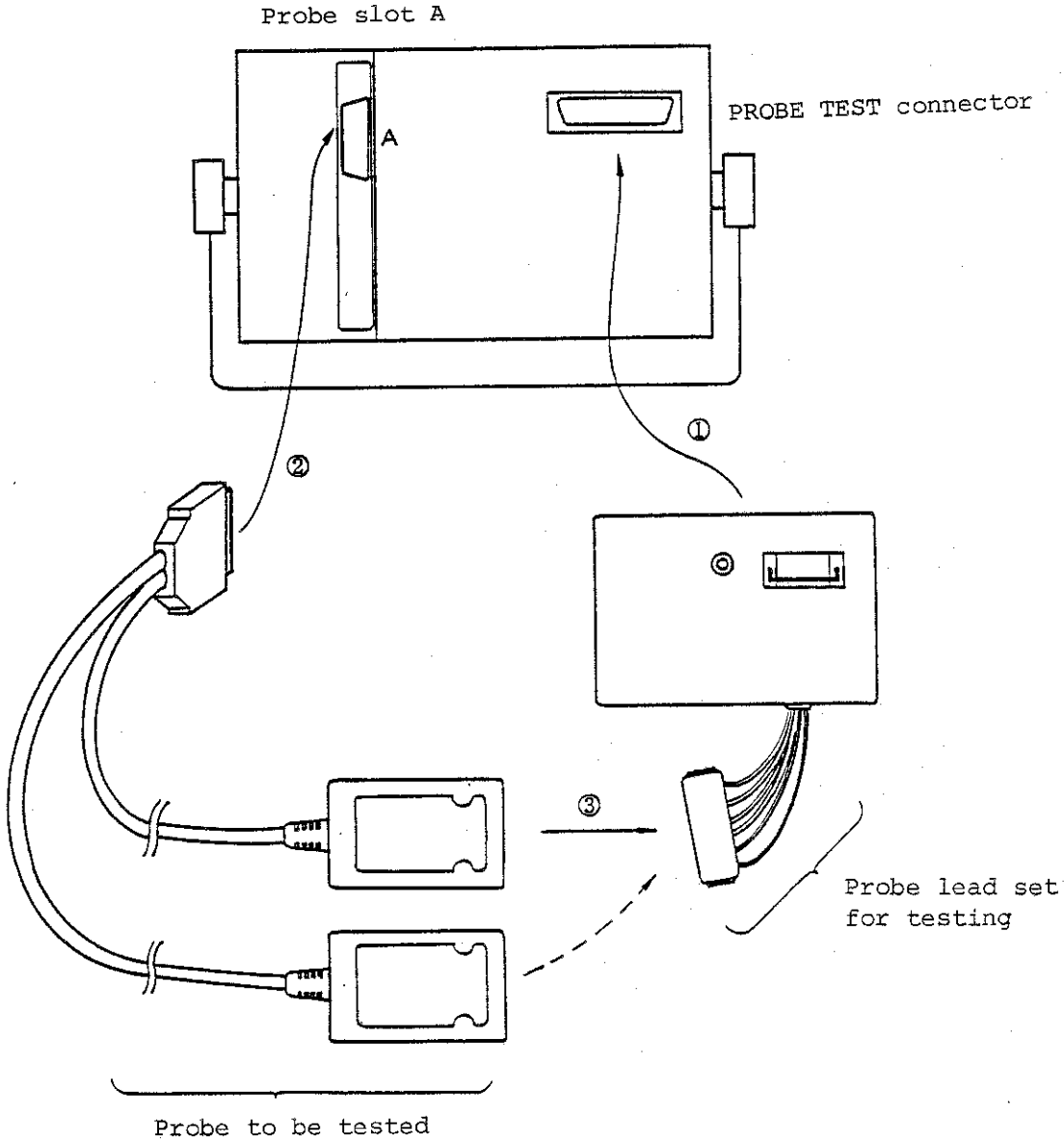



Figure 5-2 Connections for Probe Test

(6) Press [RUN] to start the test. The test result is dispalyed in each of the eight channels (see Figure 5-3).
Here, "PASS" means that the corresponding channel is functioning normally; "FAIL" indicates an error. The channel name display corresponds to the probe name plate.
The same probe pod can be tested as many times as desired by pressing [RUN].

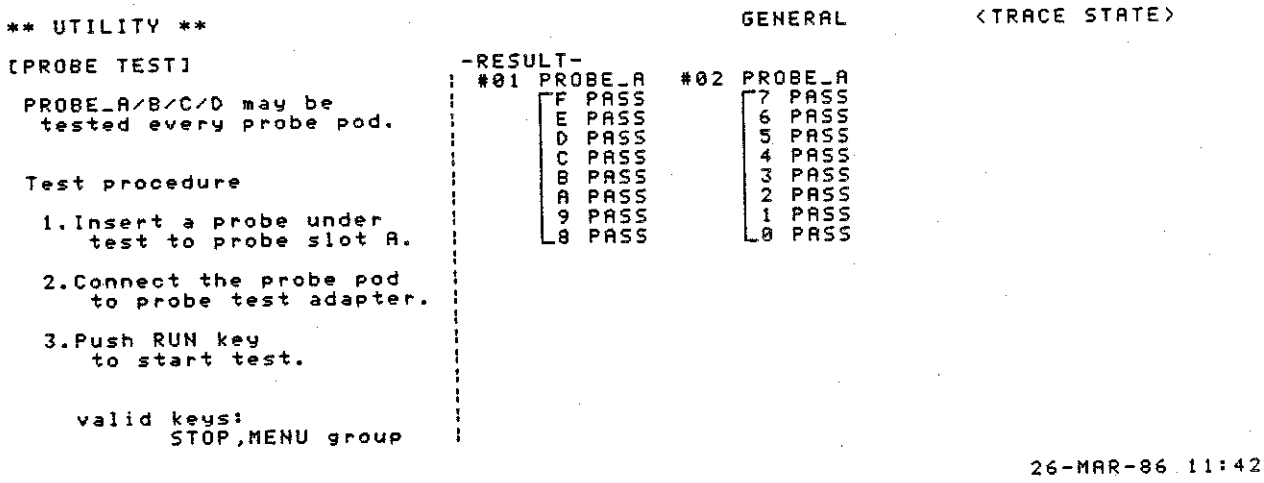



Figure 5-3 Probe Test Result

(7) When testing the other probe pod, connect the probe lead set and press [RUN].

(8) When testing another probe, start from procedure (1).

## 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 5-2. 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 5-4. When error occurs with the measured data, contact your nearest ADVANTEST representative.

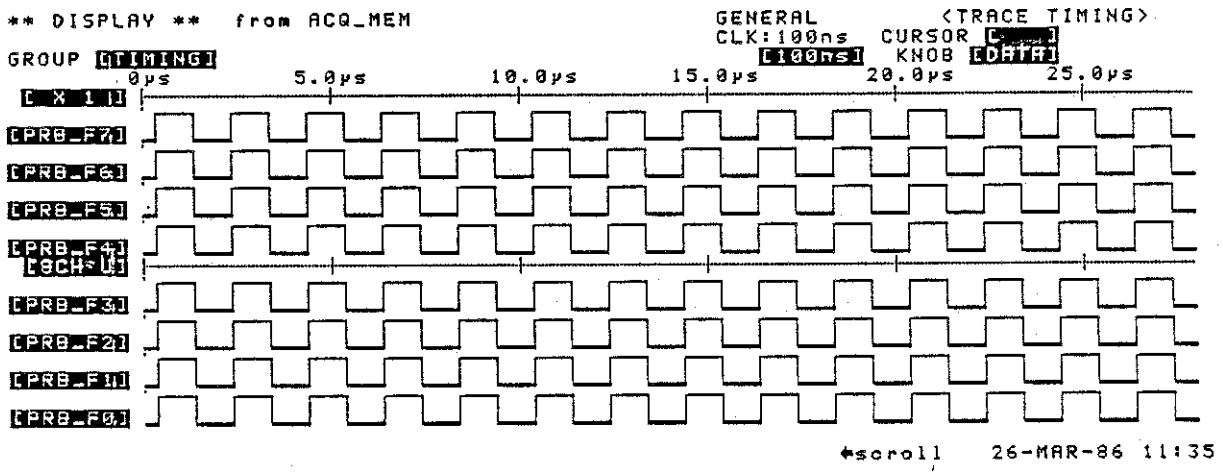



Figure 5-4 Probe E/F Test Result

# 6. EQUIPMENT STORAGE AND TRANSPORTATION PRECAUTIONS

## 6.1 STORAGE

The storage environment condition for the TR47250 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 TR47250 SPECIFICATIONS

### Input Specifications

Number of input channels: 64 channels (data input - 48 channels; clock input - 4 channels, clock qualifier input - 12 channels)

Input impedance: Approx. 1 MΩ // under 8 pF
Input sensitivity: Less than 200 mVp-p
Threshold voltage: TTL (approx. 1.4 V), ECL (approx. -1.3 V), V1 or V2 (-12.7 V to +12.7 V, 100 mV steps)
Shared threshold voltage: One threshold voltage is shared by four data input channels. (One threshold voltage is shared by one clock input channel and three clock qualifier input channels.)
Operation input voltage range: ±10 V of the center of the threshold voltage
Breakdown voltage range: ±50 V
Data input channel set-up time: 15 ns min.
Data input channel holding time: 0 ns min.
Clock input frequency: 50 MHz max.
Sampling clock: 6 types (S0 to S5)
Sampling clock frequency: 20 MHz max.
Sampling clock generation method:

(1) Up to eight types of qualified clocks (QK0 to QK7) can be generated by ANDing the up to eight types of qualifier patterns (QP0 to QP7) which are created by clock qualifier inputs (Q0 to QB) with the clock inputs.

QK0 = Kℓ↕·QP0
⋮
QK7 = Km↕·QP7 (ℓ, m = 0 to 3)
(↕ indictes clock edge selection; · indictes AND.)

(2) Up to six types of sampling clocks can be acquired by ORing the up to eight types of qualified clocks mentioned above.

S0 = QKa + QKb + .... QKc
⋮
S5 = QKd + QKe + .... QKf (a, b to f .... = 0 to 7)
(+ indicates OR.)

(3) The master clock (MK) can be acquired using the same method.

Demultiplexing: Sampling is possible using the different sampling clock for the four low-order channels of the data acquisition probe pod.

Logic polarity: + or -
Input group: Use the data input channel collection to define this.
Input group name: No more than six alphanumeric characters
Input group numbers: 6 max.
Connecting probes and the SUT:

(1) Use a probe hook to connect to any point (in each channel).
(2) Use a pin socket to connect to pins with a maximum diameter of 0.76 mm (in each channel).
(3) Use a 34-pin header socket to connect several channels together (8 channels).

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. |
| Display format | : State can be displayed in binary, octal, decimal, hexadecimal, symbol, code, ASCII code. |
| 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 | | 2 | |
| Data acquisition probe A | TR14701-1 | 1 | |
| Data acquisition probe B | TR14701-2 | 1 | |
| Data acquisition probe C | TR14701-3 | 1 | |
| Clock/qualifier probe D | TR14701-4 | 1 | |
| Probe hook | A04701-11 | 8 | One set of ten hooks |
| Probe test adapter | | 1 | |
| System software package | P47250-001FJ | 2 | |
| Blank disk | MF-2DD | 2 | |
| Disk storage case | | 1 | |
| Miscellaneous container | | 1 | |
| Personality key storage case | | 1 | |
| Instruction manual | E47250 | 1 | |

MEMO

# LIST OF FIGURES

## LIST OF FIGURES

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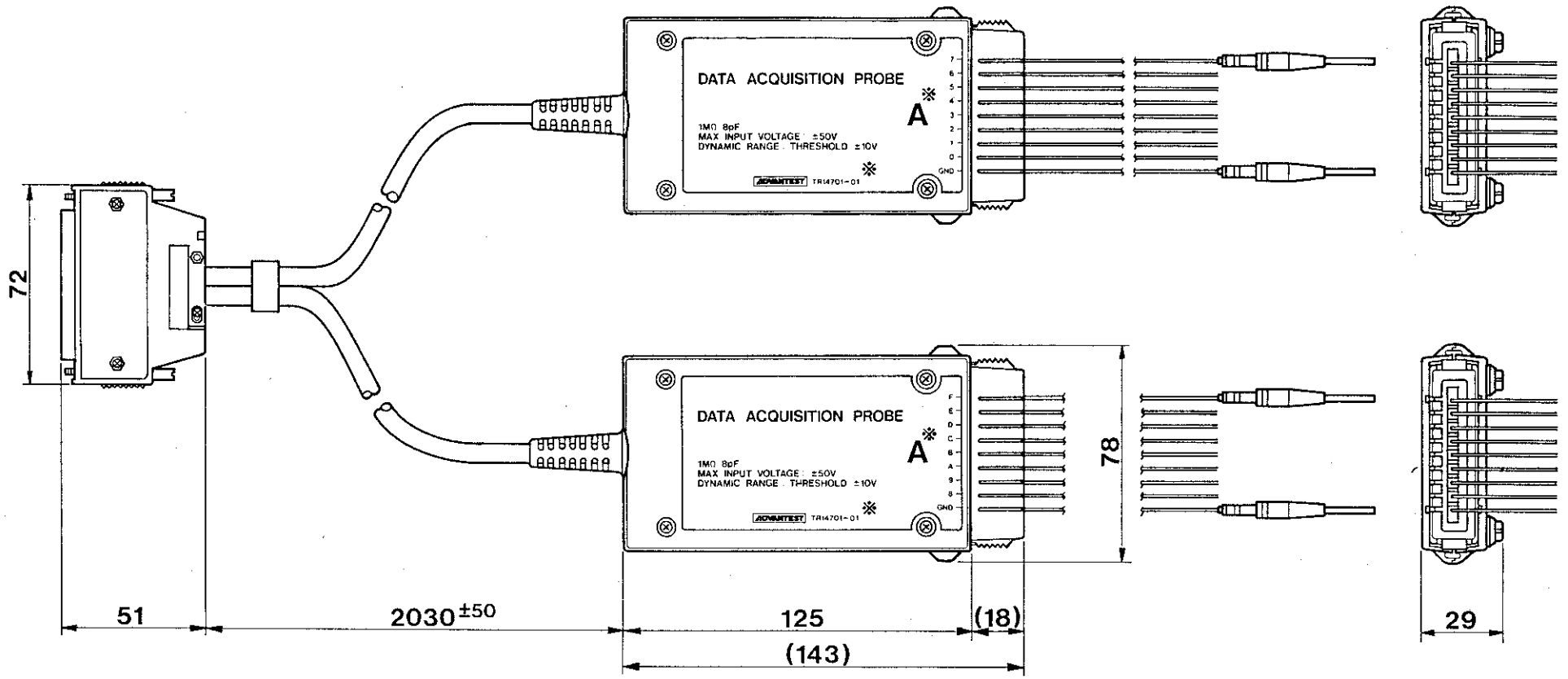
(No table numbers are assigned in this manual.)

# LIST OF EXAMPLES

| Example No. | Title | Page |
|---|---|---|

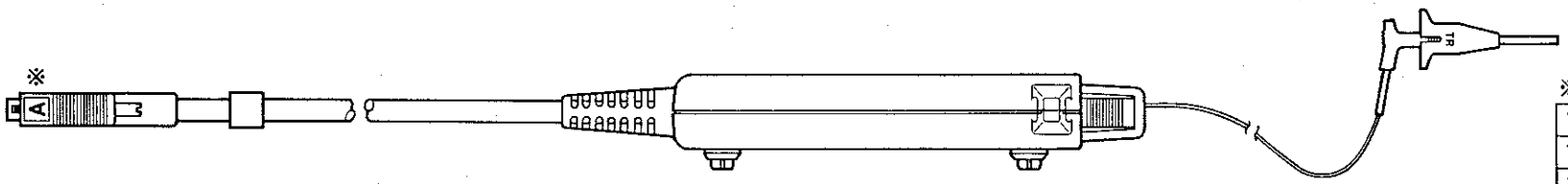
(No example numbers are assigned in this manual.)

# ALPHABETICAL INDEX




TOP VIEW

FRONT VIEW



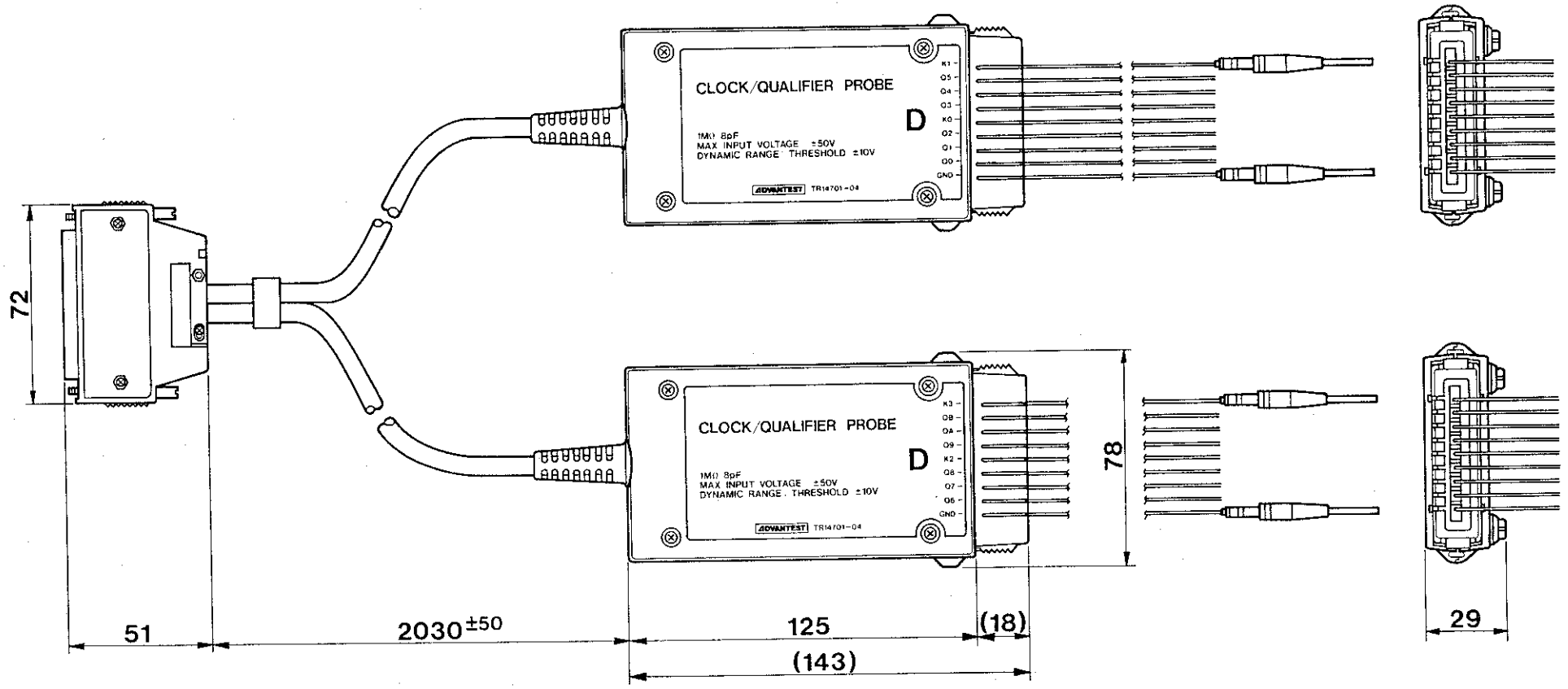

SIDE VIEW

※

| | |
|---|---|
| TR14701-01 | A |
| TR14701-02 | B |
| TR14701-03 | C |

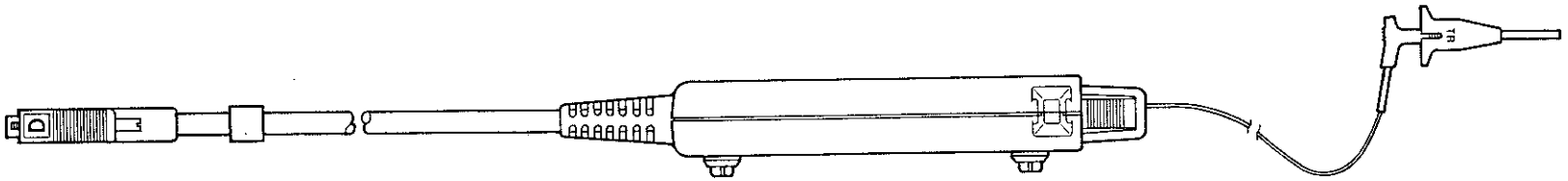
**TR14701**
**EXTERNAL VIEW**

14701-01/2/3 EXT1-412-B




TOP VIEW

FRONT VIEW



SIDE VIEW

TR14701
EXTERNAL VIEW

14701-04 EXT1-412-C

# IMPORTANT INFORMATION FOR ADVANTEST SOFTWARE

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(3) You may not reverse engineer, de-compile, or disassemble, all or any part of, the SOFTWARE.

## Liability

Advantest shall have no liability (1) for any PRODUCT failures, which may arise out of any misuse (misuse is deemed to be use of the SOFTWARE for purposes other than it's intended use) of the SOFTWARE. (2) For any dispute between you and any third party for any reason whatsoever including, but not limited to, infringement of intellectual property rights.

# LIMITED WARRANTY

1. Unless otherwise specifically agreed by Seller and Purchaser in writing, Advantest will warrant to the Purchaser that during the Warranty Period this Product (other than consumables included in the Product) will be free from defects in material and workmanship and shall conform to the specifications set forth in this Operation Manual.

2. The warranty period for the Product (the "Warranty Period") will be a period of one year commencing on the delivery date of the Product.

3. If the Product is found to be defective during the Warranty Period, Advantest will, at its option and in its sole and absolute discretion, either (a) repair the defective Product or part or component thereof or (b) replace the defective Product or part or component thereof, in either case at Advantest's sole cost and expense.

4. This limited warranty will not apply to defects or damage to the Product or any part or component thereof resulting from any of the following:

   (a) any modifications, maintenance or repairs other than modifications, maintenance or repairs (i) performed by Advantest or (ii) specifically recommended or authorized by Advantest and performed in accordance with Advantest 's instructions;

   (b) any improper or inadequate handling, carriage or storage of the Product by the Purchaser or any third party (other than Advantest or its agents);

   (c) use of the Product under operating conditions or environments different than those specified in the Operation Manual or recommended by Advantest, including, without limitation, (i) instances where the Product has been subjected to physical stress or electrical voltage exceeding the permissible range and (ii) instances where the corrosion of electrical circuits or other deterioration was accelerated by exposure to corrosive gases or dusty environments;

   (d) use of the Product in connection with software, interfaces, products or parts other than software, interfaces, products or parts supplied or recommended by Advantest;

   (e) incorporation in the Product of any parts or components (i) provided by Purchaser or (ii) provided by a third party at the request or direction of Purchaser or due to specifications or designs supplied by Purchaser (including, without limitation, any degradation in performance of such parts or components);

   (f) Advantest's incorporation or use of any specifications or designs supplied by Purchaser;

   (g) the occurrence of an event of force majeure, including, without limitation, fire, explosion, geological change, storm, flood, earthquake, tidal wave, lightning or act of war; or

   (h) any negligent act or omission of the Purchaser or any third party other than Advantest.

5. **EXCEPT TO THE EXTENT EXPRESSLY PROVIDED HEREIN, ADVANTEST HEREBY EXPRESSLY DISCLAIMS, AND THE PURCHASER HEREBY WAIVES, ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, (A) ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND (B) ANY WARRANTY OR REPRESENTATION AS TO THE VALIDITY, SCOPE, EFFECTIVENESS OR USEFULNESS OF ANY TECHNOLOGY OR ANY INVENTION.**

6. **THE REMEDY SET FORTH HEREIN SHALL BE THE SOLE AND EXCLUSIVE REMEDY OF THE PURCHASER FOR BREACH OF WARRANTY WITH RESPECT TO THE PRODUCT.**

7. **ADVANTEST WILL NOT HAVE ANY LIABILITY TO THE PURCHASER FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR REVENUES, IN ANY AND ALL CIRCUMSTANCES, EVEN IF ADVANTEST HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND WHETHER ARISING OUT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE. TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE.**

8. **OTHER THAN THE REMEDY FOR THE BREACH OF WARRANTY SET FORTH HEREIN, ADVANTEST SHALL NOT BE LIABLE FOR, AND HEREBY DISCLAIMS TO THE FULLEST EXTENT PERMITTED BY LAW ANY LIABILITY FOR, DAMAGES FOR PRODUCT FAILURE OR DEFECT, WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING, WITHOUT LIMITATION, NEGLEGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE.**

# CUSTOMER SERVICE DESCRIPTION

In order to maintain safe and trouble-free operation of the Product and to prevent the incurrence of unnecessary costs and expenses, Advantest recommends a regular preventive maintenance program under its maintenance agreement.

Advantest's maintenance agreement provides the Purchaser on-site and off-site maintenance, parts, maintenance machinery, regular inspections, and telephone support and will last a maximum of ten years from the date the delivery of the Product. For specific details of the services provided under the maintenance agreement, please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest 's sales representatives.

Some of the components and parts of this Product have a limited operating life (such as, electrical and mechanical parts, fan motors, unit power supply, etc.). Accordingly, these components and parts will have to be replaced on a periodic basis. If the operating life of a component or part has expired and such component or part has not been replaced, there is a possibility that the Product will not perform properly. Additionally, if the operating life of a component or part has expired and continued use of such component or part damages the Product, the Product may not be repairable. Please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest's sales representatives to determine the operating life of a specific component or part, as the operating life may vary depending on various factors such as operating condition and usage environment.

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