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Using the HP 70004A Display

The HP 70004A display serves as the *front panel* for instruments in the HP 71600B Series Systems, and as your window for viewing current system configuration and measurement results. The HP 70004A display has fourteen **softkeys**, (seven on each side of the screen) and a number of [FIXED LABEL] keys above and below the screen.

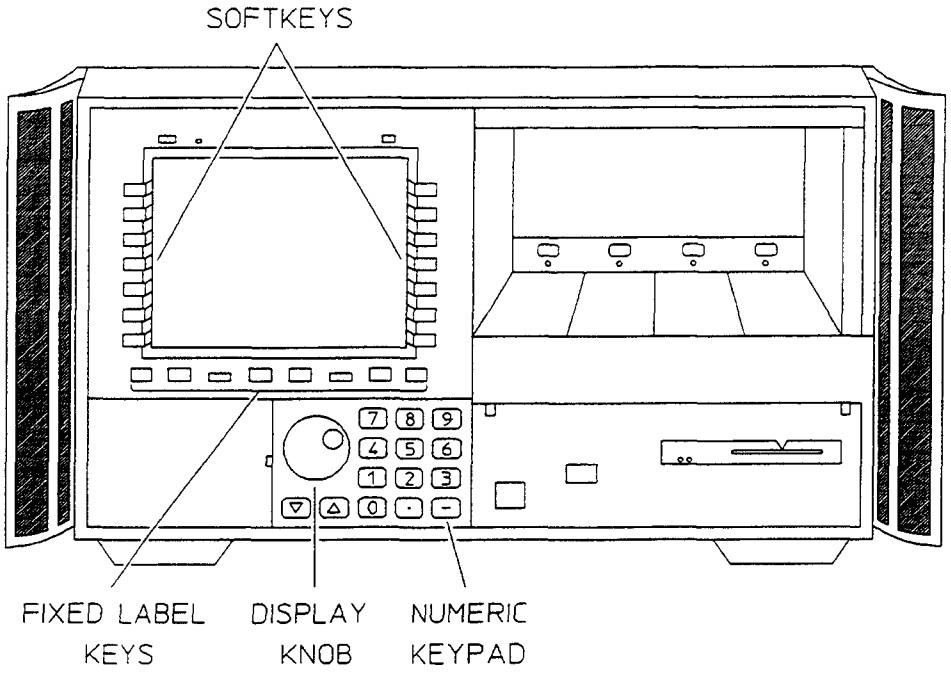


Figure 2-1. HP 70004A Display

Key Notation

Throughout this manual **softkey** indicates softkey labels and [FIXED LABEL] indicates fixed label keys.

Instrument Softkeys

The following description refers to instrument (pattern generator and error detector module) softkeys, refer to the HP 70004A Display Operating Manual for an explanation of display softkeys.

The fourteen softkeys are split into two columns of seven keys referred to as the left-menu and the right-menu. The keys in the left-menu are the *top level* keys and are used to select major functions or groups of functions. When a left-menu key is selected it is underlined. The right-menu keys are subordinate to the currently selected (underlined) left-menu key, and are used to select functions or parameters relevant to the left-menu selection. For example, if the left-menu **select pattern** softkey is selected, the right- menu softkeys enable the user to select from a choice of PRBS or user defined patterns.

Multi-State Functions

Some softkeys switch between two states, such as `LOGGING OFF ON` and `SYNC AUTO/MAN`. An underline on the key labels indicates which keys and conditions are selected.

Fixed Label Keys

Fixed Label keys select major system functions such as PRINT, PLOT, INSTR PRESET, DISPLAY or MENU. The two most important keys (DISPLAY) and (MENU), are explained in the following paragraphs. Refer to the HP 70004A display Operation Manual for detailed information on Fixed Label Keys.

Display Knob

Use the knob to change parameters and select other operating values.

Numeric Keypad

Use the numeric keypad to enter numeric values.

To Set Up the Display

To configure the system correctly it is important to first set up the display, and then configure the display to show instrument or module status. System functions are therefore split into two groups as follows:

- Display Functions
- Instrument Functions

These functions are explained in the following paragraphs.

Display Functions

Display functions are accessed using the (DISPLAY) fixed label key. Pressing the (DISPLAY) key provides the softkeys on the left and right of the display as shown below, enabling display functions to be set up. Refer to the HP 70004A display Operation Manual for detailed information on display operation softkeys.

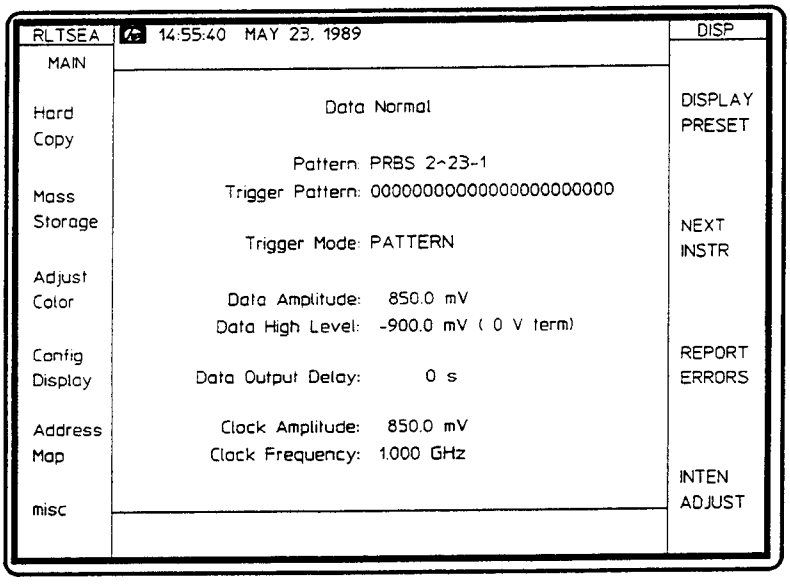


Figure 2-2. Display Softkeys

Instrument Functions

Instrument functions are accessed via the MENU fixed label key. Pressing the MENU key enables softkeys which give access to all instrument or module functions, as shown in the following figure for the error detector module selection.

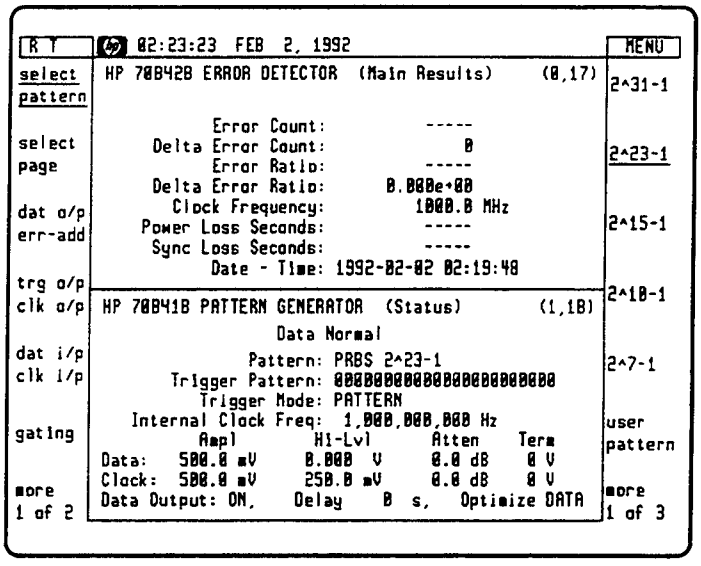


Figure 2-3. Instrument Softkeys for Master/Slave Operation

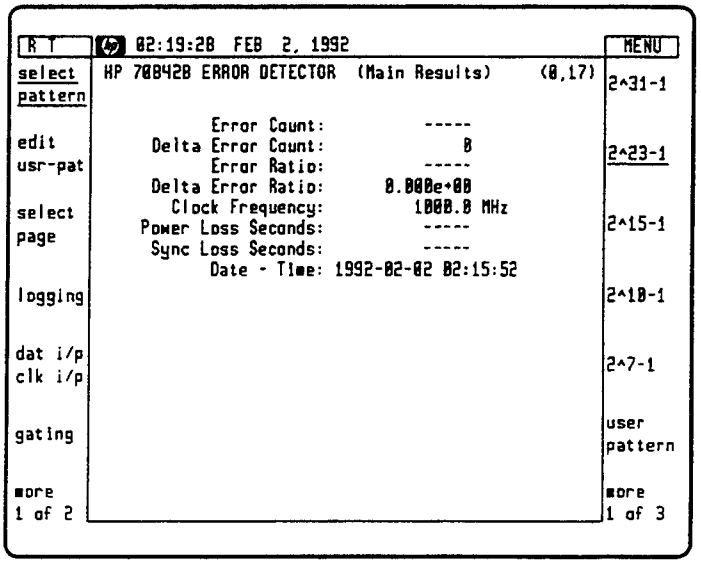


Figure 2-4. Instrument Softkeys for Master/Master Operation

Making Your First Measurement

Introduction

The following procedure is designed to give you confidence in using the Display (Fixed Label) keys and **Softkeys** by performing a simple error measurement. It shows you how to cable the system and set up the pattern generator and error detector modules to perform a simple back-to-back error measurement. The procedure also introduces you to many of the instrument operating features.

Note

It is assumed that the system is configured for master/slave operation. If your system is configured for master/master operation refer to the master/master procedure on page 2-14.

Procedure

Ensure that 50 ohm cables are used to connect the module IN/OUT ports. All the cables, adapters and terminations you need are contained in the HP 15680A RF Accessory Kit.

1. Connect the HP 70311A or HP 70312A clock source CLOCK OUT port to the pattern generator CLOCK IN port. Refer to the HP 70311A and HP 70312A Clock Sources Operating and Calibrating manual for advice on setting clock frequency. If you are not using an HP 70311A/HP 70312A clock source, connect a suitable external clock source to the CLOCK IN port.
2. Connect the pattern generator DATA OUT and CLOCK OUT ports to the error detector DATA IN and CLOCK IN ports respectively. Terminate any unused ports with 50 ohm terminations (HP part number 1250-2153). See figure 2-5. Ensure the HP 70001A mainframe and HP 70004A display rear-panel HP-MSIB ports are connected. Information on HP-MSIB cabling is given in the HP 71600B Series Installation and Verification manual.

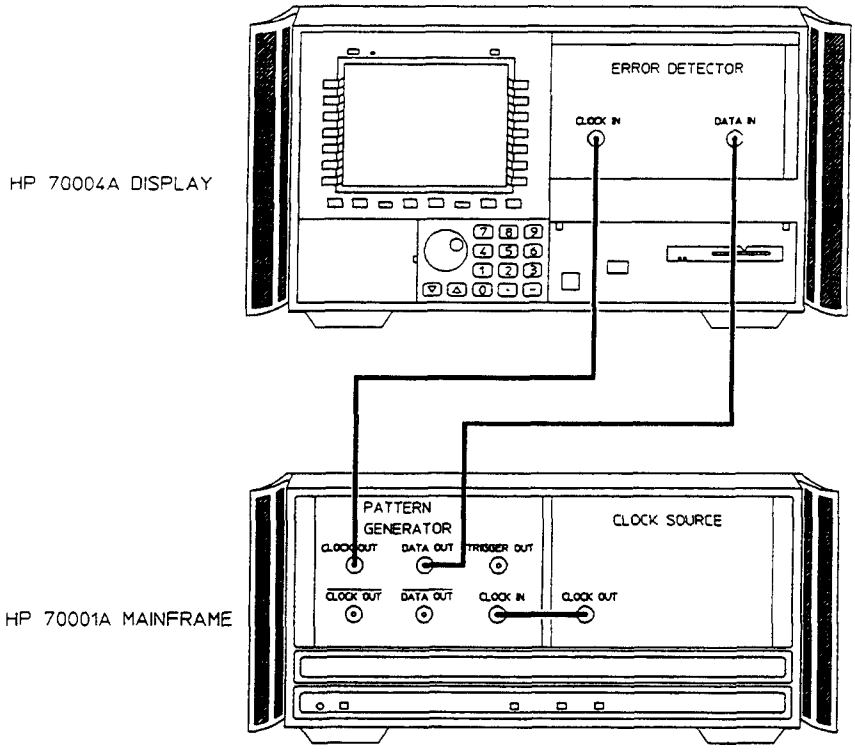


Figure 2-5. System Back-to-Back Connection

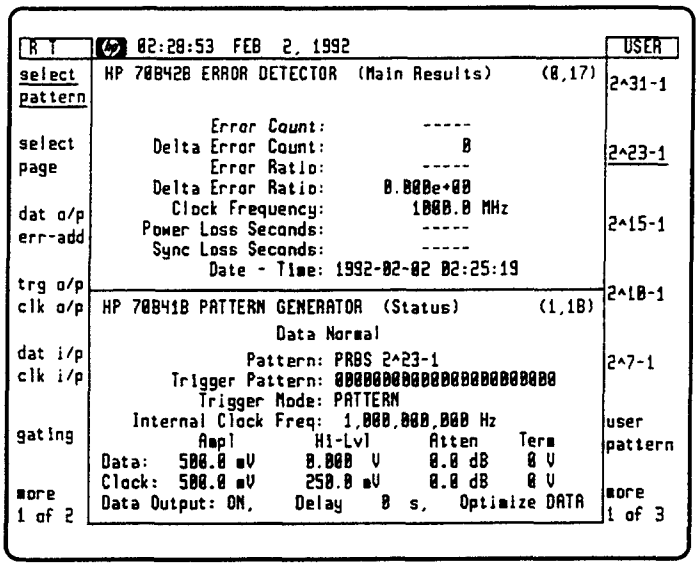
Initial Switch-On

3 Switch on power to the HP 70001A mainframe and the HP 70004A display. The mainframe I/O led and all display LEDS will illuminate and then extinguish after a few seconds. The display will cycle through a range of colors, give a display indicating *HP 70004A DISPLAY* and a message stating *For instrument display press DISPLAY then NEXT INSTR*, and finally display the status of the module selected before the last power down. The ACT LED on the module selected will be illuminated. Wait until the display settles to indicate module status before continuing with this procedure. If module status is not displayed press DISPLAY then **NEXT INSTR**.

Note Softkeys that are selected are displayed in inverse video or are underlined.

Setting the system to a known (default) state

4. Press the (MENU) key, then the green (INSTR PRESET) key. This sets the pattern generator and error detector modules to their default values. A list of default settings is given in Appendix A. The display should be as follows:



Automatic Clock-to-Data Alignment

This feature aligns the clock and data inputs such that the error detector samples in the middle of the *eye* (in the time axis). See page 5-23 for a more detailed explanation of clock-to-data alignment.

5. Press the left-menu `dat i/p clk i/p` softkey.

6. Press the right-menu `CLK-DAT ALIGN` softkeys. If clock-to-data alignment is successful a message *Clk-Data Aligned, Eye Width=***ps* is displayed at the bottom of the display.

To Select a Measurement Gating Period

7. Press the left-menu `gating` softkey. The gating mode currently selected is MANUAL (see right-menu), try selecting a 10 second SINGLE gating period.

8. Press `SINGLE` then `GATING PERIOD`, use the numeric keypad and `SECONDS` softkey to select a 10 second gating period. Proceed to step 9, or read the following note for alternative gating choices.

Note

The instrument is currently set to gate by time; two other gating period choices are also provided, they are: *gate by errors* and *gate by bits*. To select either of these gating choices select the following softkeys in the order given.

- Select the `more 2 of 2` right-menu, and select `GATE BY ERRS` or `GATE BY BITS`.
- Select the `more 1 of 2` right-menu and press `GATING PERIOD`.

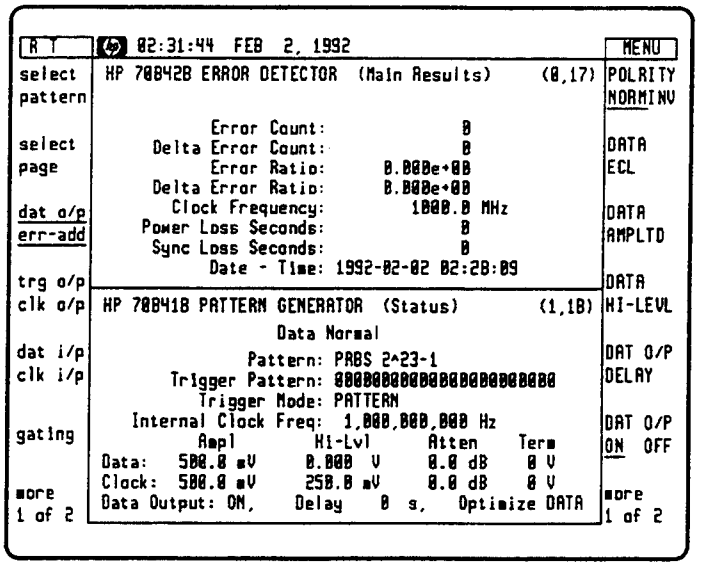
■ Select the appropriate **ERRORS** or **BITS** softkey and press **EXIT**.

To Start a Measurement

9. Press the right-menu **RUN GATING** softkey. Note the illuminated *Gating* LED on the error detector module front panel and the *Gating* flag at the top left of the screen.

Viewing Results and Introducing Errors into the System.

10. Since there were no errors introduced into the system there are no errors measured. To introduce errors into the system and obtain a meaningful result proceed as follows:
11. Select the **dat o/p, err-add** left-menu softkey, the right-menu softkeys will change to the following:



12. Select the **more 2 of 2** right-menu, then press the **error add** softkey. Note that a new right-menu providing error add softkeys is displayed.

To Add Single Errors to the Data

13. Press the **ERR-ADD SINGLE** softkey.

To Select a Fixed Error Rate

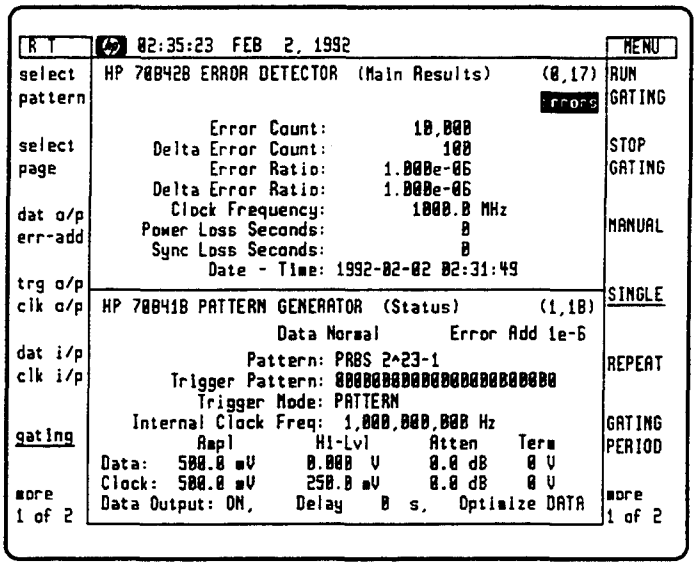
14. Select **ERR-ADD FIXED**, then **fixed rate** from the right-menu.
15. Select a fixed error rate from the menu displayed using the appropriate softkey. Press **EXIT**, then **EXIT** again to return to the main menu. The error rate selected will be displayed at the top right of the pattern generator display, and the error detector will have an Errors flag at the top right of the display.

To Add External Errors

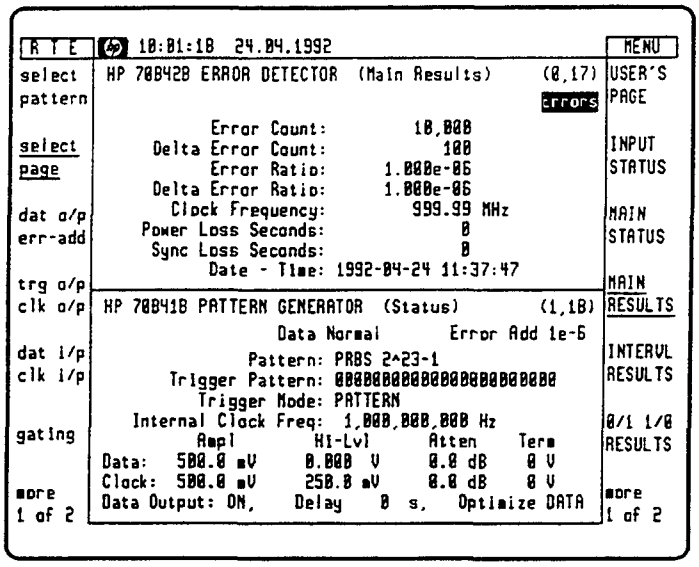
16. Connect an external error signal source to the pattern generator rear panel ERROR INJECT input. A single error is added to the data output for each rising edge at the input.

To Begin a New Measurement

17. Select the left-menu **gating** softkey, then press the right-menu **RUN GATING** softkey. Check the error detector (Main Results) at the end of the gating period. A typical results display is given in the following figure.



18. The error detector (Main Results) are displayed; this is only one of seven pages you may select to view error detector status or configuration. Press **select page**; note that the menu on the right of the display changes to the following:



19. Try selecting each of the right-menu softkeys and view the error detector display for each page.

This concludes your first measurement using an HP 71600B Series System.

Master/Master Configuration

Introduction

In certain applications it is desirable to configure the HP 71600B Series error detector and pattern generator as independent modules (HP-MSIB masters). For example where you wish to setup different patterns in the pattern generator and error detector.

Note

Full instructions on how to configure a module for master or master/slave operation is given in the HP 71600B Series Installation and Verification Manual.

Master/Master Softkeys

Only softkeys relevant to the module status currently shown are displayed.

The right-hand menus corresponding to a left-hand menu selection are unchanged from those in master/slave operation, except that in the error detector the alternate word pattern is not available from within the `select pattern` softkey.

Refer to Chapter 4 for a detailed description of pattern generator and error detector softkeys.