I/O Function Guide

Interface Modules for
HP 54600-Series Instruments

Introduction

These modules provide the means for remote communication with HP 54600-series instruments. For programming specifics, refer to the Programmer's Guide or Programmer's Reference shipped with your oscilloscope or logic analyzer. The hardcopy process does not interrupt front-panel operation of the instrument. While any of the interfaces are connected to the rear panel of the instrument, the instruments trace memories become nonvolatile and are saved when the power is removed from the instrument.

HP 54650A HP-IB Interface Module

* Full programmability
* Hardcopy output

HP 54651A RS-232-C Interface Module

* Full programmability
* Hardcopy output

HP 54652A Parallel Interface Module

* Hardcopy output

HP 54652B Parallel/RS-232-C Interface Module

* Full programmability
* Hardcopy output
* Connection to both an RS-232-C controller and a parallel printer at the same time.

HP 54655A Test Automation Module (HP-IB) and HP 54656A Test Automation Module (RS-232-C)

* Full programmability.
* Hardcopy output.
* 100 nonvolatile sequence steps.
* 40 nonvolatile mask templates.

- 2 nonvolatile trace memories.
- Built-in automatic mask generation and mask editing capabilities.
- Protection of test sequence and mask template setup through software.

The HP 54656A has the following additional features:

- External input lines for Next, Previous and Reset control.
- 5 user-definable output lines.
- Recessed protection switch.

**HP 54657A Measurement/Storage Module (HP-IB),
HP 54658A Measurement/Storage Module (RS-232-C), and
HP 54659B Measurement/Storage Module (RS-232-C/Parallel)**

- Full programmability.
- Hardcopy output.
- Three additional automatic voltage measurements (amplitude, preshoot, and overshoot).
- Two additional automatic time measurements (delay and phase angle).
- User defined measurement thresholds of 10%/90%, 20%/80%, or selected voltage values.
- Two additional cursor measurements (voltage in percent and time in degrees).
- Two additional cursor measurement sources (math function 1 and 2).
- Waveform math functions (addition, subtraction, multiplication, differentiation, integration, and FFT).
- Time and date tagging of hardcopy and nonvolatile memories.
- Three nonvolatile trace memories.
- Additional 64K of nonvolatile trace memory (with data compression).

The HP 54659B has an additional parallel output connector which allows the module to be connected to both an RS-232-C controller and a parallel printer at the same time.

Interface I/O functions

Interface module	Interface connection	I/O Function
HP 54650A	HP-IB	HP-IB controller or HP-IB output to printer/plotter
HP 54651A	RS-232-C	RS-232-C controller or RS-232-C output to printer/plotter
HP 54652A	Parallel	Parallel output to printer
HP 54652B[2]	RS-232-C and parallel	RS-232-C controller and parallel output to printer, or RS-232-C output to printer/plotter
HP 54655A[1,3]	HP-IB	HP-IB controller or HP-IB output to printer/plotter
HP 54656A[1,3]	RS-232C	RS-232-C controller or RS-232-C output to printer/plotter
HP 54657A[1]	HP-IB	HP-IB controller or HP-IB output to printer/plotter
HP 54658A[1]	RS-232-C	RS-232-C controller or RS-232-C output to printer/plotter
HP 54659B[1,2]	RS-232-C and parallel	RS-232-C controller and parallel output to printer, or RS-232-C output to printer/plotter

[1] The enhanced features of the HP 54655A/56A/57A/58A/59B are not available to the HP 54620A/C Logic Analyzer. These modules supply enhanced oscilloscope programming functions. The I/O functions of these modules will function when used with the HP 54620A/C Logic Analyzer.
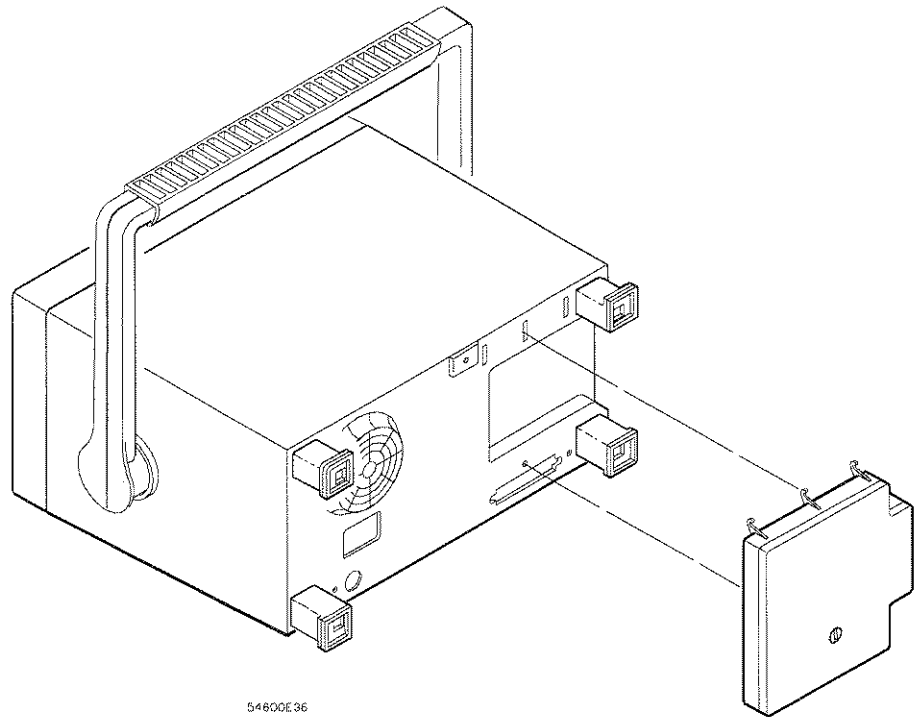
[2] The 54652B and HP 54659B are not compatible with the HP 54600A, HP 54601A, HP 54602A, and HP 54610A.

[3] The 54655A and HP 54656A are not compatible with the HP 54615B and HP 54616B.

To install the interface module

1 Turn off the instrument.
2 Install the module as shown below.

The instrument is reset after installation. The installed interface module
is shown in the message displayed when your turn on the instrument.
The I/O functions (controller and hardcopy) are available by pressing the
instrument front-panel 〔 **Print/Utility** 〕 key.

54600E36

Installation of interface to HP 54600-Series instrument

Interface Cables

Interface module	Cable function (Instrument to ..)	Module connector	Printer/plotter/ controller connector	HP part number	Cable Length
HP 54650A, HP 54655A[1,3]**, HP 54657A**[1] **(HP-IB)**	Printer/plotter/ controller	HP-IB	HP-IB	HP 10833A HP 10833B HP 10833C HP 10833D	1 m (3.3 ft) 2 m (6.6 ft) 4 m (13.2 ft) 0.5 m (1.6 ft)
HP 54651A, HP 54656A[1,3]**, HP 54658A**[1] **(RS-232-C)**	Printer/plotter/ controller	25-pin F	25-pin F	HP 13242G HP 17255M	5 m (16.7 ft) 1.5 m (4.9 ft)
	Controller	25-pin F	25-pin M	HP 92219J HP 17255D	5 m (16.7 ft) 1.5 m (4.9 ft)
	Controller	25-pin F	9-pin M	HP 24542G	3 m (9.9 ft)
HP 54652A (parallel output only)	Parallel printer	parallel	parallel	C2950A C2951A	2 m (6.6 ft) 3 m (9.9 ft)
HP 54652B[2]**, HP 54659B**[1,2] **(RS-232-C and parallel output)**	RS-232 controller	9-pin M	25-pin M	HP 34398A	2.5 m (8.2 ft)
	RS-232 controller	9-pin M	9-pin M	HP 34398A	2.5 m (8.2 ft)
	RS-232 printer/ plotter/controller	9-pin M	25-pin F	HP 34398A + HP 34399A adapter kit	2.5 m (8.2 ft)
	Parallel printer	parallel	parallel	C2950A C2951A	2 m (6.6 ft) 3 m (9.9 ft)

[1] The enhanced features of the HP 54655A/56A/57A/58A/59B are not available to the HP 54620A/C Logic Analyzer. These modules supply
enhanced oscilloscope programming functions. The I/O functions of these modules will function when used with the HP 54620A/C Logic Analyzer.

[2] The 54652B and HP 54659B are not compatible with the HP 54600A, HP 54601A, HP 54602A, and HP 54610A.
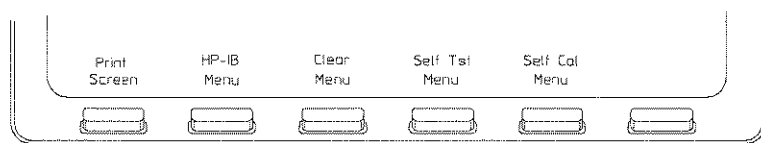
[3] The 54655A and HP 54656A are not compatible with the HP 54615B and HP 54616B.
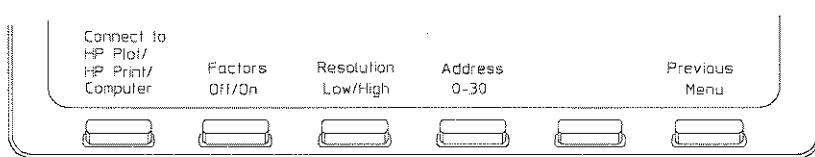
Print/Utility Menu

The Print/Utility menu of the instrument is different for each of the interfaces after installation. The following figures show how to select I/O functions in the Print/Utility menu.

HP 54650A (HP-IB)

- Press ⌐ Print/Utility ⌐ , then press the **HP-IB Menu** softkey.

54652E06

- Press the **Connect to HP Plot**, **HP Print**, or **Computer** softkey and assign the HP-IB **Address**.
- This menu also allows you to set **Factors** (see page 16) and print **Resolution** (see page 14).

54652E02

- Press the **Previous Menu** softkey. If HP Plot or HP Print was selected, pressing the **Print Screen** softkey sends the screen image to the printer/plotter.
- For controller operation, refer to the instrument Programmer's Guide.

HP 54651A (RS-232-C)

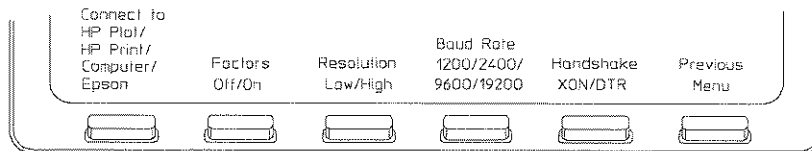- Press ⌐ Print/Utility ⌐ , then press the **RS-232 Menu** softkey.

Print
Utility

Print Screen	RS-232 Menu	Clear Menu	Self Tst Menu	Self Cal Menu	

54652E05

- Press the **Connect to HP Plot, HP Print, Computer , or Epson** softkey and assign the **Baud Rate** and **Handshake** protocol.
- This menu also allows you to set **Factors** (see page 16) and print **Resolution** (see page 14).

RS-232
Menu

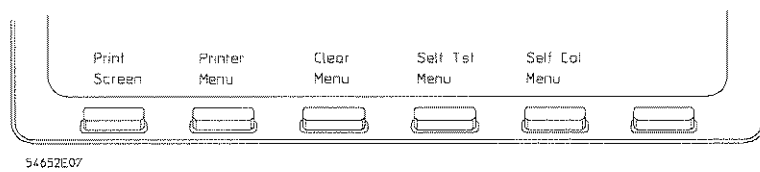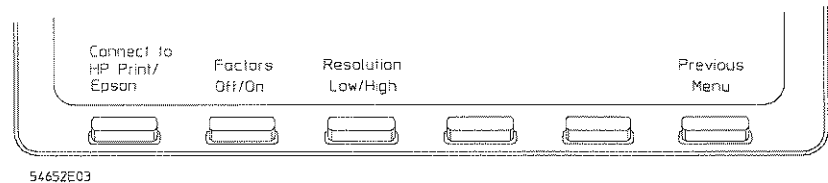| Connect to HP Plot/ HP Print/ Computer/ Epson	Factors Off/On	Resolution Low/High	Baud Rate 1200/2400/ 9600/19200	Handshake XON/DTR	Previous Menu

54652E01

- Press the **Previous Menu** softkey. If HP Plot, HP Print, or Epson was selected, pressing the **Print Screen** softkey sends the screen image to the printer/plotter.
- For controller operation, refer to the instrument Programmer's Guide.

HP 54652A (parallel output)

- Press ⌈ Print/Utility ⌉ , then press the **Printer Menu** softkey.

Print
Utility

| Print Screen | Printer Menu | Clear Menu | Self Tst Menu | Self Cal Menu | |

54652E07

- Press the **Connect to HP Print** or **Epson** printer softkey.
- This menu also allows you to set **Factors** (see page 16) and print **Resolution** (see page 14).
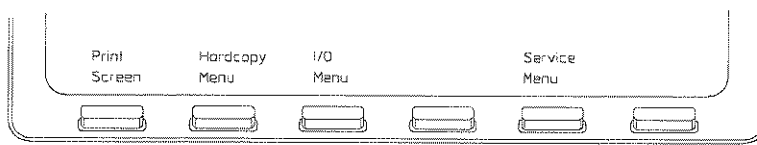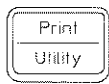
Printer Menu

| Connect to HP Print/ Epson | Factors Off/On | Resolution Low/High | | | Previous Menu |

54652E03

- Press the **Previous Menu** softkey. Pressing the **Print Screen** softkey sends the screen image to the hardcopy device.

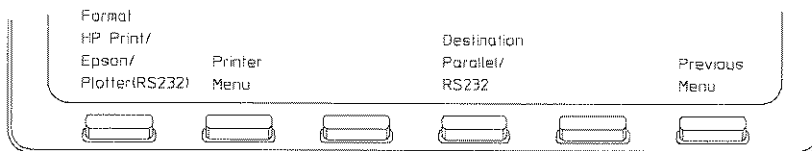# HP 54652B and HP 54659B
(RS-232-C and parallel output)

- Press ⌐ Print/Utility ⌐ , then press the **Hardcopy Menu** softkey.

Print
Utility

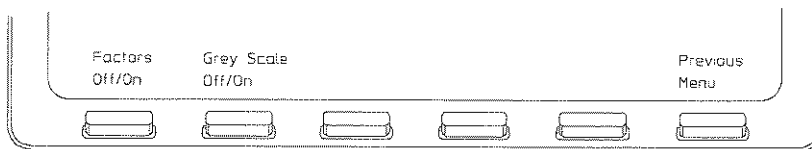| Print | Hardcopy | I/O | | Service | |
| Screen | Menu | Menu | | Menu | |

54652E04

- Press the **Destination Parallel** or **RS232** softkey. Parallel or RS232 can be used for hardcopy output.

- Press the **Format HP Print**, **Epson** printer, or **Plotter** (RS-232 only) softkey.

Hardcopy
Menu

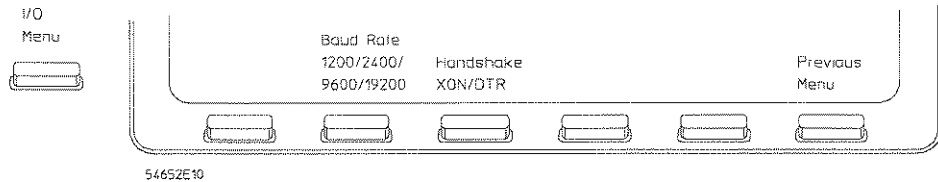| Format | | | Destination | | |
HP Print/					
Epson/	Printer		Parallel/		Previous
Plotter(RS232)	Menu		RS232		Menu

54652E08

- Press the **Printer Menu** softkey. This menu allows you to set **Factors** (see page 16) and **Grey Scale** (see page 15).

Printer
Menu

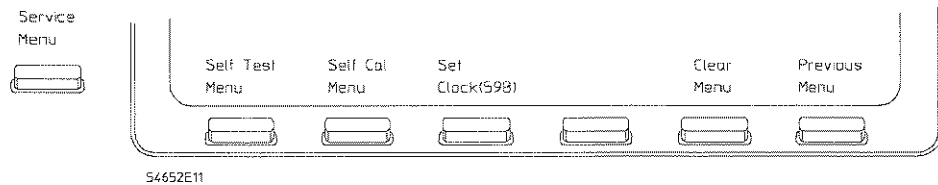| Factors | Grey Scale | | | Previous | |
| Off/On | Off/On | | | Menu | |

54652E09

- Press the **Previous Menu** softkey, then press the **I/O Menu** softkey to assign the **Baud Rate** and and **Handshake** protocol.

I/O
Menu

Baud Rate
1200/2400/   Handshake   Previous
9600/19200   XON/DTR   Menu

54652E10

- Press the **Previous Menu** softkey. If HP Plot, HP Print, or Epson was selected, pressing the **Print Screen** softkey sends the screen image to the printer/plotter.

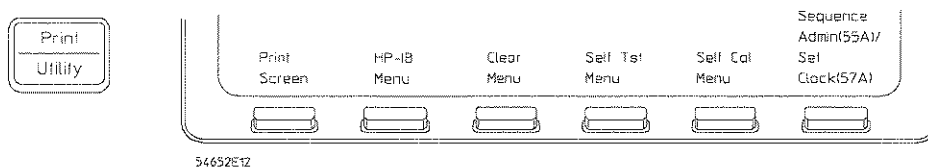- The Service Menu is discussed in the instrument User and Service Guide.

Service
Menu

Self Test   Self Cal   Set   Clear   Previous
Menu   Menu   Clock(S98)   Menu   Menu

54652E11

- For controller operation, refer to the instrument Programmer's Guide and module User's Guide if using the HP 54659B.

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HP 54655A and HP 54657A (HP-IB)
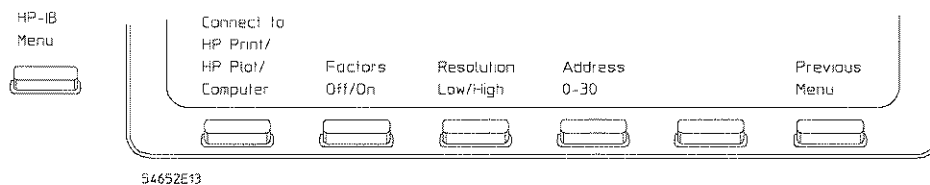
- Press [Print/Utility] , then press the **HP-IB Menu** softkey.

Print
Utility

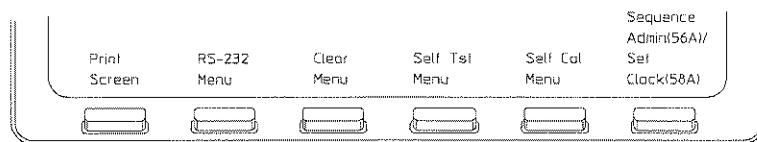|					Sequence Admin(55A)/
Print Screen	HP-IB Menu	Clear Menu	Self Tst Menu	Self Cal Menu	Set Clock(57A)

54652E12

- Press the **Connect to HP Plot**, **HP Print**, or **Computer** softkey and assign the HP-IB **Address**.

- This menu also allows you to set **Factors** (see page 16) and print **Resolution** (see page 14).

HP-IB
Menu

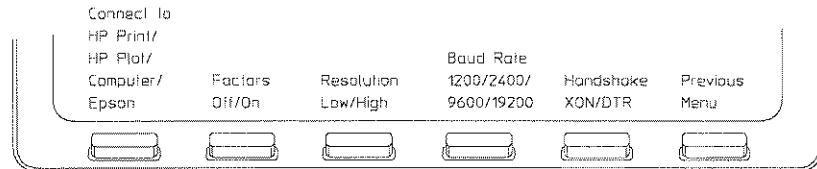| Connect to HP Print/ HP Plot/ Computer	Factors Off/On	Resolution Low/High	Address 0-30		Previous Menu

54652E13

- Press the **Previous Menu** softkey. If HP Plot or HP Print was selected, pressing the **Print Screen** softkey sends the screen image to the printer/plotter.

- For controller operation, refer to the instrument Programmer's Guide and module User's Guide.

HP 54656A and 54658A (RS-232-C)

- Press [Print/Utility] , then press the **RS-232 Menu** softkey.

54652E14

- Press the **Connect to HP Plot, HP Print, Computer , or Epson** softkey and assign the **Baud Rate** and **Handshake** protocol.
- This menu also allows you to set **Factors** (see page 16) and print **Resolution** (see page 14).

54652E15

- Press the **Previous Menu** softkey. If HP Plot, HP Print, or Epson was selected, pressing the **Print Screen** softkey sends the screen image to the printer/plotter.
- For controller operation, refer to the instrument Programmer's Guide and module User's Guide.
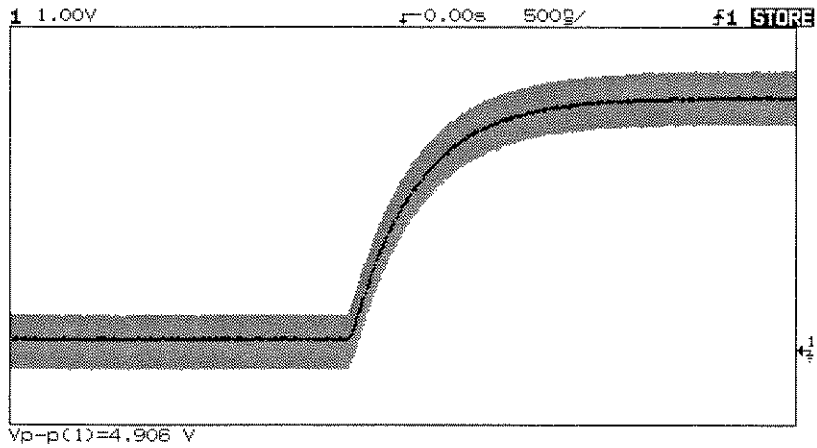
Print Resolution
(HP 54650A/51A/52A/55A/56A/57A/58A only)

High or low hardcopy resolution can be selected in the print menu.

High resolution printing requires an HP-PCL printer capable of 300 dpi (dots-per-inch), such as an HP LaserJet II Series printer.

When high resolution is selected, the full-bright and half-bright traces on the instrument screen are printed or plotted on the hardcopy.

High resolution plot uses two pens for the hardcopy. Half-bright traces are plotted with plotter pen 1 and full-bright traces are plotted with plotter pen 2.

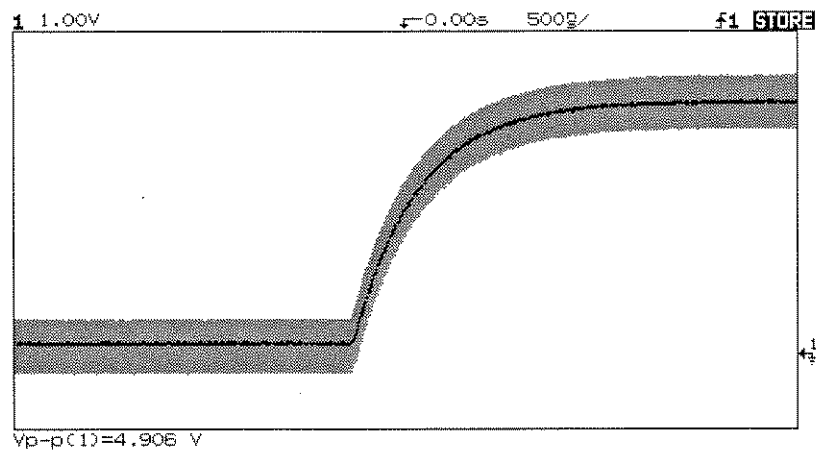**High Resolution Print**

Grey scale (HP 54652B and HP 54659B)

Grey Scale On or Off can be selected in the print menu.

Grey scale printing requires an HP-PCL printer capable of 300 dpi (dots-per-inch), such as an HP LaserJet II Series printer.

When Grey Scale is selected, the full-bright and half-bright traces on the instrument screen are printed or plotted on the hardcopy.

Grey scale plot uses two pens for the hardcopy. Half-bright traces are plotted with plotter pen 1 and full-bright traces are plotted with plotter pen 2.
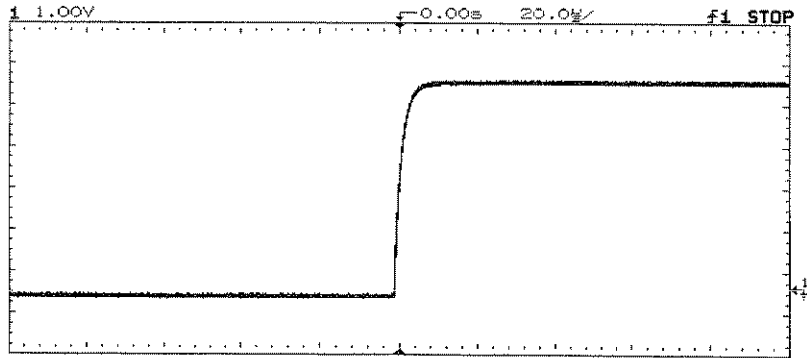
Grey Scale Print

Print Factors

Instrument factors may be turned on or off for hardcopy prints and plots. All factors are printed on the hardcopy when on is selected. When factors is selected for a hardcopy plot, the plot is in portrait mode. When factors is not selected for hardcopy plot, the plot is in landscape mode.

```
1  1.00V                          -0.00s   20.0%/        f1 STOP
```



```
            State    Volts/Div    Position     Couplg  BW Lim  Invert   Probe
Chan 1   On       1.000 V     -2.366 V     DC      Off     Off      1:1
Chan 2   Off      100.0mV      0.000 V     DC      Off     Off      1:1
Chan 3   Off      100.0mV      0.000 V     DC      ---     ---      1:1
Chan 4   Off      100.0mV      0.000 V     DC      ---     ---      1:1

                         Main         Main          Time   Delayed     Delayed
                 Mode    Time/Div     Delay         Ref    Time/Div    Delay
Horizontal   Normal    20.00us/     0.000 s       Cntr   --------    -----

Trigger Mode       Source   Level     Holdoff   Slope   Couplg  Reject  NoiseRej
        AutoLvl   Ch 1    2.366 V   200.0ns   Pos     DC      Off     Off

Display Mode: Normal
```
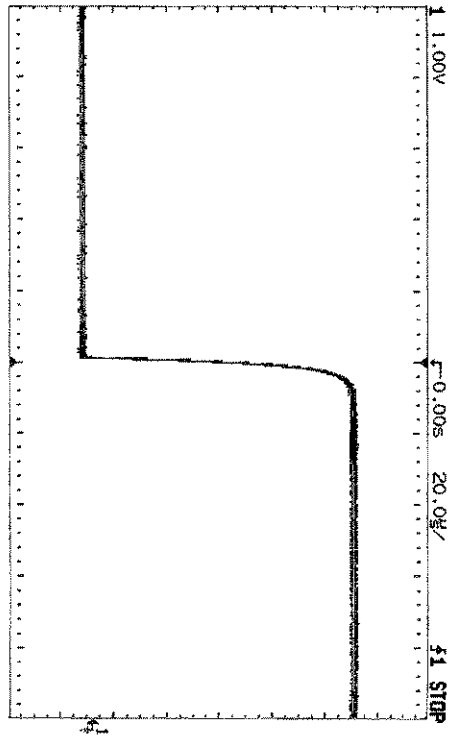
Print or Plot with Factors On

Plot with Factors Off (landscape mode)

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