

HP 3587S/E3238S Hardware Installation Note

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Introduction

This note describes the installation and configuration of measurement hardware for the HP 3587S Realtime Signal Analyzer and the E3238S Signals Development System. These systems are composed of the following components:

- VXI Mainframe with option 918 (backplane shield kit)
- E1498A (V743/100) VXI embedded controller
- E3249B VXI system disk[†]
- E1430A or E1437A VXI ADC
- E1485C VXI DSP
- E1562E/F VXI Throughput Disk *
- E1472A VXI RF Multiplexer module*
- HP 89431A tuner (2-2650 MHz)*
- WJ 9119 VXI tuner (0.5-32 MHz, 4 MHz IF BW)*
- WJ 9119-1 VXI tuner (0.5-32 MHz, 8 MHz IF BW)*
- HP E6500 VXI tuner (2 MHz-1.0/3.0 GHz)*
- CS-5040 VXI tuner (0.5-18 GHz)*
(requires all 3 E6500 modules; see pages 4 and 15)

Standard components for both the HP 3587S and E3238S systems:
E1498A(V743), E3249B[†], E1430A or E1437A, and E1485C.

Optional components for the HP 3587S:

HP 89431A, WJ 9119/WJ 9119-1, E6500, CS-5040 tuners, E1562E/F modules.

Optional components for the E3238S:

E1472A, HP 89431A, WJ-9119/WJ-9119-1, E6500, and CS-5040 tuners.

Most of the HP 3587S and E3238S systems are integrated at the factory by Hewlett-Packard. This note describes the recommended system configurations.

To setup, the only installation steps you should have to perform are to connect the cables to the peripherals (display, disk drive, keyboard, mouse) and the tuner, if your system includes one.

You should review the entire note and perform the required steps. This installation note should be retained for future reference.

[†]System disks other than the E3249B may be used.

*Optional hardware

System Configuration

The following illustrations show module and cable placement. The configuration of each module is described in detail, later in this document.

Figure 1.
HP 3587S System
Hardware Configuration
(standard)

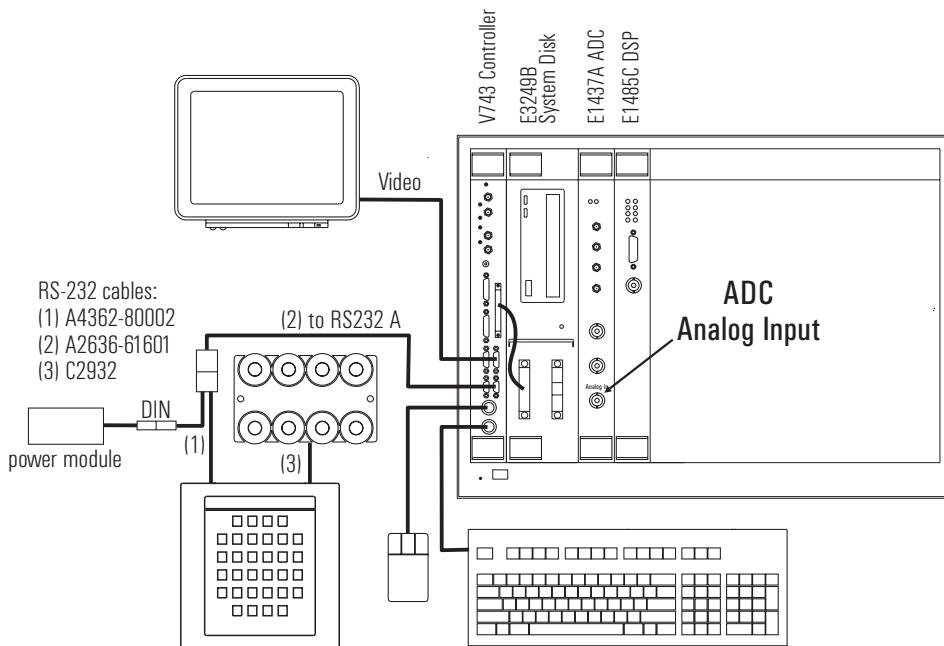
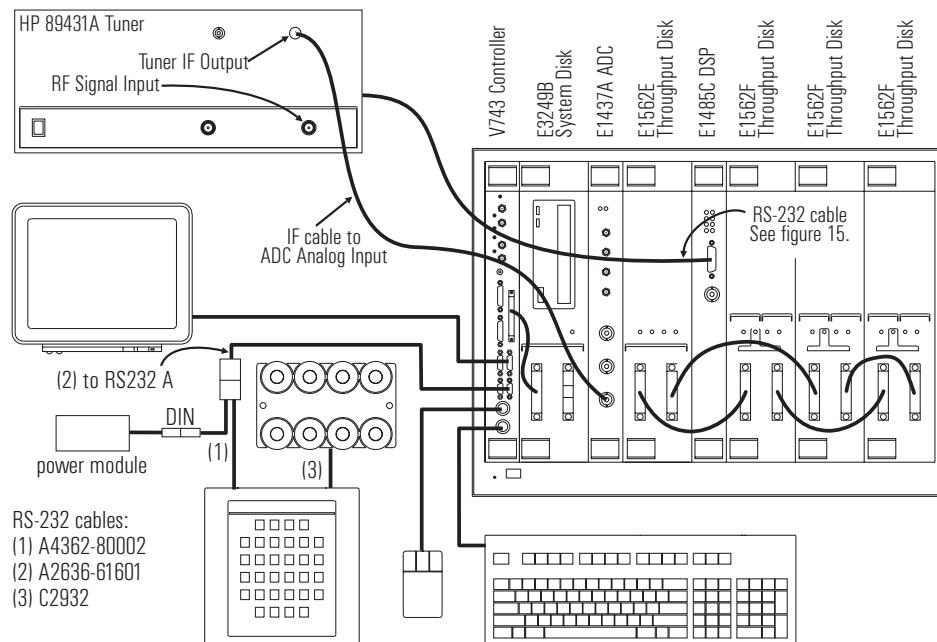
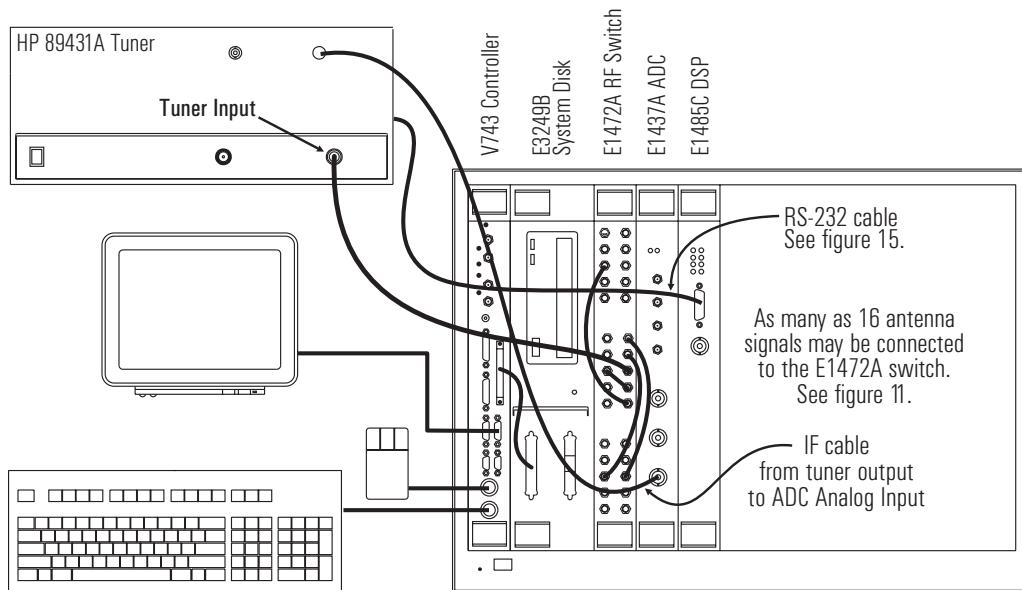


Figure 2.
HP 3587S System
Hardware Configuration
with a 2.65 GHz tuner &
option ATR with 4 E1562
throughput disk modules



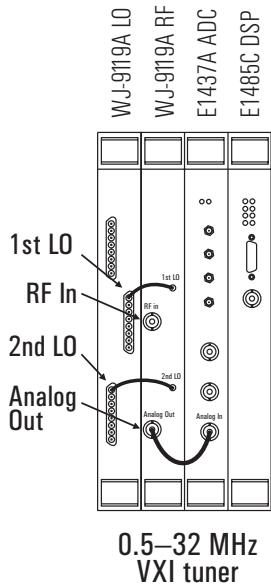
- To use a VXI tuner with the ATR option shown, use a second mainframe chassis to power the E1562F disk modules.
- To configure a LAN printer, see page 16.

Figure 3.
HP E3238S System
Hardware Configuration
incl. optional 2.65 GHz
tuner and RF switch



- See page 8 for antenna connections to the RF switch.
- If no RF switch is installed, connect the antenna signal to the tuner input.
- To install the HP 89431A tuner, see page 11 .

Figure 4.
WJ-9119 VXI tuner



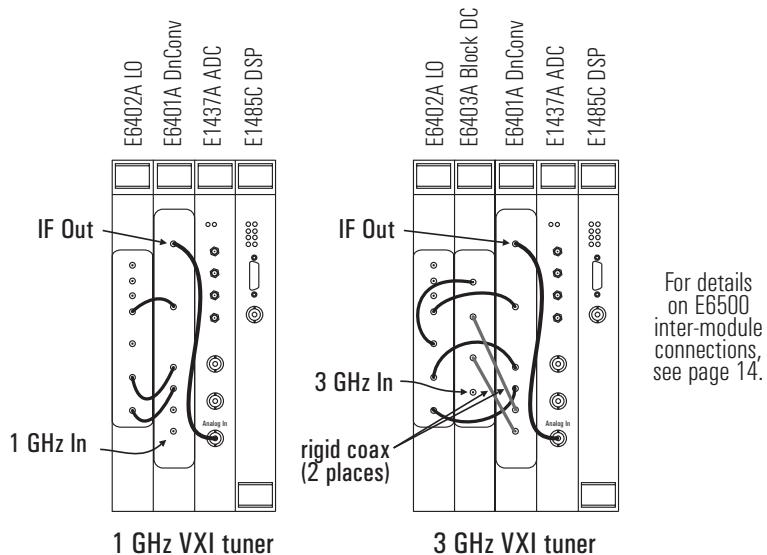
WJ-9119 tuner configuration information is on page 13.

Notes

The purpose of the figure above is to illustrate cabling. The slots in which the *tuner* modules are installed or order of placement is not critical.

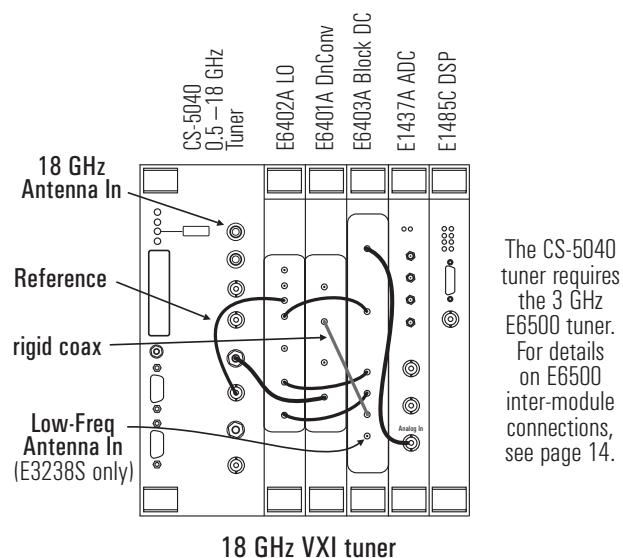
The ADC and DSP modules *must* be installed in adjacent slots with the ADC on the left and the DSP on the right, as shown in these figures. Option ATR for the HP 3587S is the only exception to this; it has the E1562E between the ADC and DSP modules as shown in figure 2.

Figure 5.
E6500-Series tuners.



E6500 tuner configuration and detailed cabling information appears on page 14.

Figure 6.
CS-5040 tuner.



The low-frequency antenna input configuration shown in figure 6 may be used with the HP 3587S but the user must change the downconverter type to use the input. CS-5040 tuner configuration information appears on page 15.

Notes

The E6500-Series tuners allow measurements as low as 2 MHz but performance below 20 MHz may be degraded.

The purpose of the figures above is to illustrate cabling. The slots in which the tuner modules are installed or order of placement is not critical.

The ADC and DSP modules *must* be installed in adjacent slots with the ADC on the left and the DSP on the right, as shown in these figures.

Installing the VXI Controller and System Disk

E1498A V743 VXI Controller

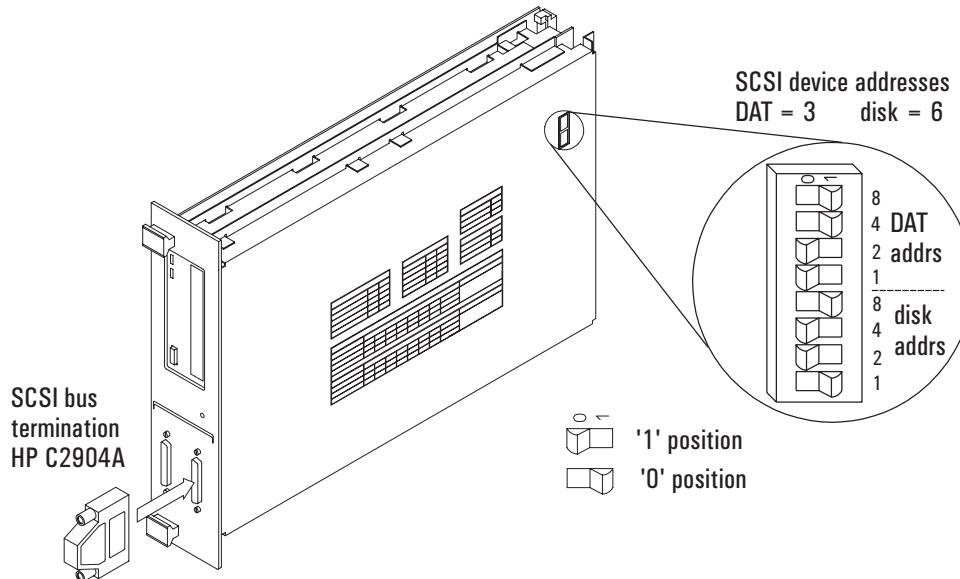
Refer to "Installation Guide Model V743 VXI Controller" (HP P/N E1497-90010) for instructions on installing and configuring the V743 controller in the VXI mainframe. This guide covers the procedures for proper installation of the keyboard, mouse, display, disk and other external peripherals. Once these devices are installed, refer to the *V743/100 Owner's Guide* for information on how to:

- Configure the controller's path to the HP-UX operating system.
- Boot the HP-UX operating system.
- Learn how to use the HP-UX operating system and HP Vue.
- Optionally learn how to use the HP Standard Instrument Control Library (SICL) to do instrument interfacing.

E3249B VXI System Disk

The E3249B module should be installed next to the V743 module and the SCSI cable connected between the two as shown in figures 1 and 2. This module has no VXI address settings. The DAT and disk each have a SCSI address which should be set to 3 for the DAT and 6 for the disk as shown in figure 7. Also, a SCSI terminator (C2904A) should be connected to either SCSI connector.

Figure 7.
E3249B settings



Installing the Main VXI Components

This section covers configuration of the following VXI modules.

- E1430A or E1437A ADC
- E1485C DSP
- E1472A RF Multiplexer
- E1562E/F Throughput Disk

Notes

If this system has been integrated at the HP factory, this procedure can be skipped entirely.

The system uses only one ADC module; either the E1430A or the E1437A.

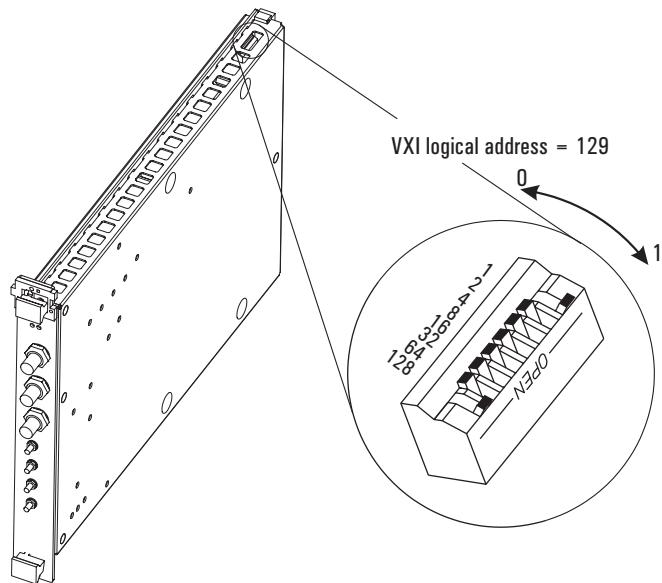
Verify that the ADC and E1485C modules are installed in the VXI mainframe in adjacent slots with the ADC to the left of the E1485C. Option ATR for the HP 3587S adds an E1562E between the ADC and E1485C.

1. Before installing the VXI modules, turn off the power to the VXI mainframe and disconnect the power cord. This prevents damage to the modules during installation.
2. Set the DIP switches on the VXI modules as described on the following pages.
3. Firmly seat the modules in the VXI Mainframe with the ADC in the slot immediately to the left of the E1485C with the following exception:
For the HP 3587S with option ATR (from left to right), the order should be:
 - a. ADC (either the E1430A or E1437A)
 - b. E1562E disk module
 - c. E1485C DSP module
 - d. E1562F disk modules, if any. See figure 2.
4. Secure the modules by tightening the captive screws that hold each module into the mainframe. This must be done to insure that performance specifications are met.

E1430A VXI ADC

The E1430A VXI ADC module must be installed in a VXI slot left of the E1485C module and should have a logical address of 129. In a 3587S system with option ATR, the E1562E module should be between the E1430A and the E1485C.

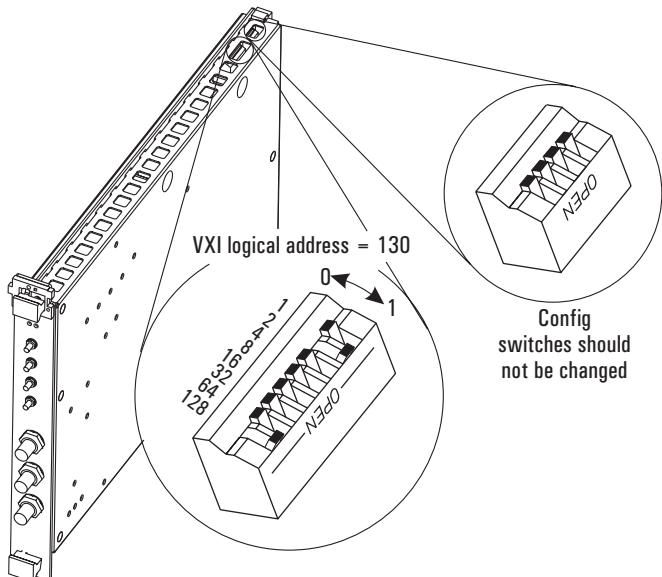
Figure 8.
E1430A Logical
Address Setting



E1437A VXI ADC

The E1437A VXI ADC module must be installed in a VXI slot left of the E1485C module and should have a logical address of 130. In a 3587S system with option ATR, the E1562E module should be between the E1437A and the E1485C.

Figure 9.
E1437A Logical
Address Setting

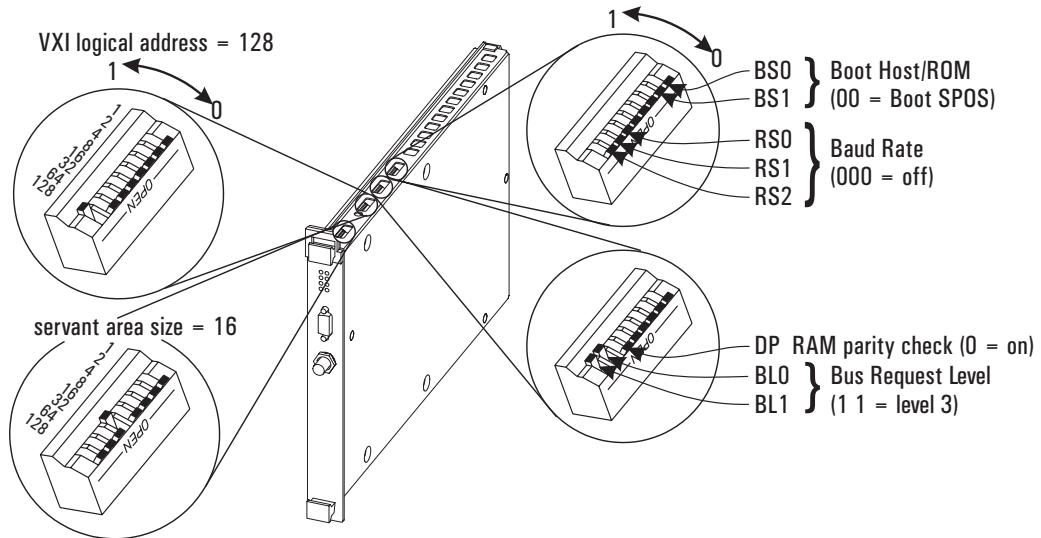


E1485C VXI DSP

The E1485C VXI DSP module should be configured as follows:

- It should contain 1 to 4 Motorola 96000 DSP daughter boards (option 1FL)
- Set the VXI logical address (LA) to 128
- Set the servant area switch setting (SASS) to 16
(Servant Area = LA through LA+SASS = 128 through 144)
- Set the other switches as shown in figure 10.

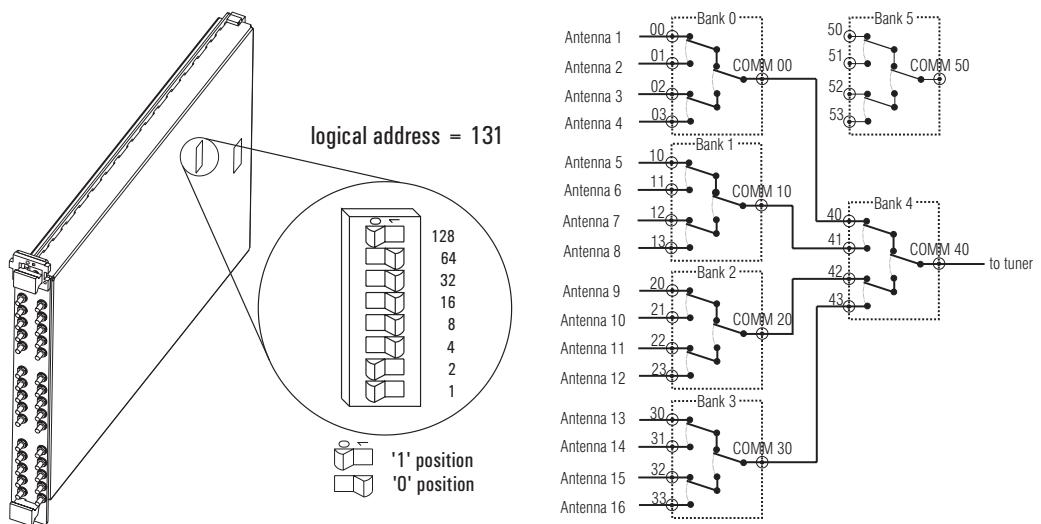
Figure 10.
E1485C Settings



E1472A VXI RF Multiplexer (optional)

The E1472A VXI RF Multiplexer module should be installed as shown in figure 3. The E1472A logical address should be set to 131.

Figure 11.
E1472A settings



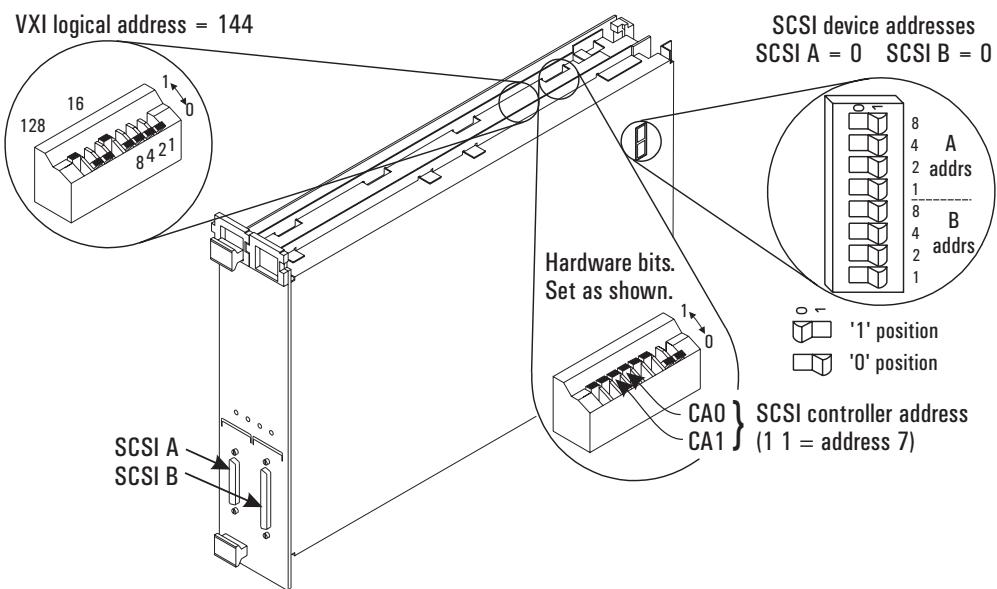
E1562E VXI SCSI Interface/Throughput Disk Module (HP 35687B option ATR)

Note

If your system does not include option ATR, this procedure is not applicable.

The E1562 disks are part of option ATR for the HP 3587S system. The E1562E should be installed between the ADC module and E1485C as shown in figure 2. Set the other switches as shown in figure 12.

Figure 12.
E1562E settings



E1562F Throughput Disk Module (part of HP 35687B option ATR)

The E1562F(s) should be installed right of the E1485C as shown in figure 2.

Figure 13.
E1562F settings

Note
Captured data is striped across all installed disk modules. If any disk modules or SCSI cables are removed, they must be reinstalled and cabled exactly as they were when data was taken to be able to read the data correctly.

SCSI bus
termination
HP C2905A
(see table)

The E1562F can be configured two ways:

1. **Thru** (default) is the standard SCSI daisy-chain with both disks and both connectors on the same bus. (No internal termination.)
2. **Terminated** means each connector provides one end-of-bus termination as well as access to one internal disk drive.

LEDs on the front panel indicate configuration settings. The configuration is changed by moving internal cables. See the E1562 User's Guide for more information.

SCSI device addresses
(see table)

Legend:
○ - '1' position
□ - '0' position

SCSI Addresses

The E1562E contains two 4 GB disk drives and two fast wide differential SCSI controllers. The E1562F module contains two 4 GB disk drives.

In a multi-module system, the E1562E splits the data and sends it out the two SCSI connectors on the front panel. Each bus has 15 device addresses, one of which is taken by the SCSI controller in the E1562E (default = 7).

SCSI Terminations

Each end of a SCSI bus must be terminated. The default configuration of the E1562F modules is thru; i.e. both disks are connected to the bus and the second SCSI connector is used to extend the bus to another module. The alternate configuration uses each connector to access one disk drive and provides termination for each of the two busses. LEDs on the front panel indicate configuration settings. The configuration is changed by moving internal cables as described in the E1562 User's Guide.

The configuration of the last E1562F(s) on the bus depends on the number of disk modules in the system. See the following table. A *terminated* E1562F is required at the end of a system with an even number of disk modules. For systems with an odd number of E1562 disk modules, external terminations are used (HP C2905A).

1-module system		6-module system (for more than 4 modules, another mainframe is required)					
E1562E/F	E	E1562E/F	E	F	F	F	F
A addrs	0	A addrs	0	1	1	3	3
B addrs	0	B addrs	0	2	2	4	4
config	n/a	config	n/a	thru	thru	thru	thru
cabling	SCSI A (no external SCSI B term required)	cabling	SCSI A	-----A B-----	-----A B-----A	-----A B-----A	-----A B-----B
2-module system		5-module system					
E1562E/F	E	E1562E/F	E	F	F	F	F
A addrs	0	A addrs	0	1	1	3	3
B addrs	0	B addrs	0	2	2	4	4
config	n/a	config	n/a	thru	thru	thru	thru
cabling	SCSI A-----A	cabling	SCSI A-----A B-----A B-----term*				
	SCSI B-----B		SCSI B-----A B-----A B-----term*				
3-module system		4-module system (this configuration shown in figure 2)					
E1562E/F	E	E1562E/F	E	F	F	F	F
A addrs	0	A addrs	0	1	1	3	3
B addrs	0	B addrs	0	2	2	2	3
config	n/a	config	n/a	thru	thru	term	
cabling	SCSI A-----A B-----term*	cabling	SCSI A-----A B-----A				
	SCSI B-----A B-----term*		SCSI B-----A B-----B				

term* is the HP C2905A (external) termination shown in figure 13.

The table above shows configurations for systems with from 1 to 6 disk modules to illustrate the connections and terminations used to expand the number of disk modules. More than 6 disk modules may be installed. The number of disk modules used is limited by the number of SCSI addresses.

Installing Optional Tuners

This section cover the installation of the following components:

- HP 89431A tuner (2.65 GHz)
- Watkins-Johnson WJ9119 VXI tuner (0.5–32 MHz)
- HP 6402A local oscillator
 - HP 6401A 1 GHz downconverter
 - HP 6403A 3 GHz block downconverter
- Communications Solutions CS-5040 VXI tuner (18 GHz, 40 GHz, 60 GHz)

HP 89431A Tuner

Note

If your system does not include a 89431A tuner, this procedure is not applicable.

The installation of the 89431A RF tuner requires the AFU cable kit. This kit contains the RS-232 cable that connects the tuner to the E1485C and a 50Ω BNC IF signal cable that connects the tuner to the E1430A. (See figure 2.)

1. Turn power off.

Turn the power to the RF tuner off and disconnect the power cord before installing or configuring the 89431A to avoid damage.

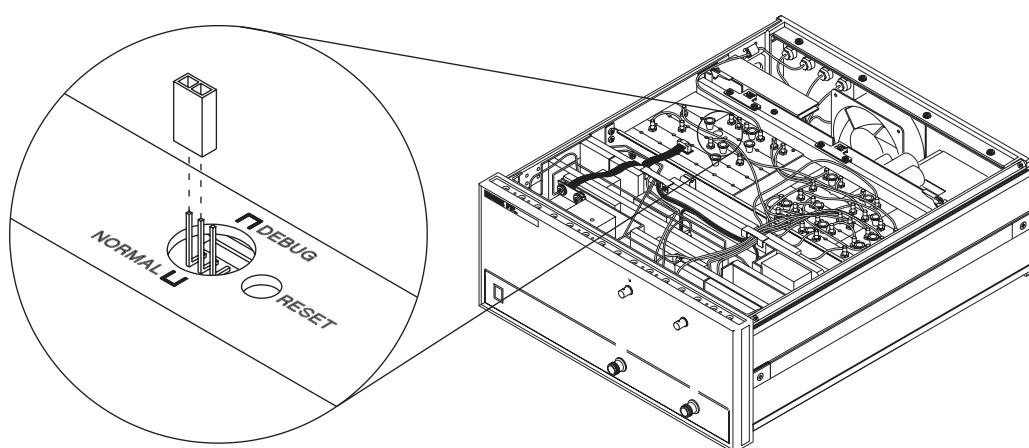
2. Set the baud rate jumper.

If this system has been integrated at the HP factory, skip this step and proceed to step 3.

Before the 89431A RF tuner can be used in the 3587S or E3238S system, an internal jumper must be set to the proper position.

To access this jumper, remove the top cover from the tuner and set the jumper in the DEBUG position as shown in figure 14.

Figure 14.
Move jumper to the
DEBUG position



When the jumper is in the correct position, replace the top cover and securely tighten the retaining screw.

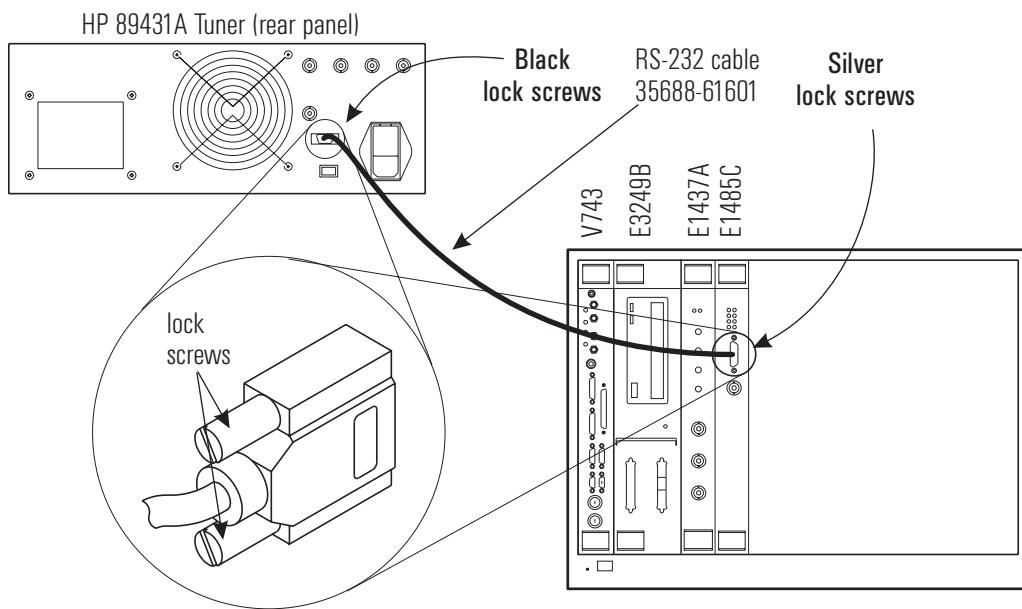
3. Connect the RS-232 cable.

The 89431 RF tuner is connected to the E1485C DSP VXI module by the 35688-61601 RS-232 cable included in the AFU kit. See figure 15.

Caution

The 35688-61601 RS-232 cable must be installed properly to avoid damaging the E1485C or the tuner. It has lock screws with English threads on one end of the cable and screws with metric threads on the other end.

Figure 15.
Connecting the
RS-232 cable



- Attach the cable end with the black (dark-colored) lock screws to the "SERIAL 2" port on the rear panel of the 89431A RF section.
- Attach the cable end with the silver (light-colored) lock screws to the "RS-232" port on the front panel of the E1485C DSP VXI module.
- Tighten all lock screws firmly. Do not over-tighten.

4. Connect the IF signal cable.

The 89431A RF tuner is connected to the ADC module by a 50Ω BNC cable included in the AFU kit. (See figure 2.)

- First, attach one end of the BNC cable to the front panel connection on the 89431A RF tuner labeled "OUT (to channel 1)".
- Second, attach the other end of the BNC cable to the front panel connection on the ADC module labeled "Analog In".

5. Reconnect the power cable.

This concludes the hardware installation procedure for either an HP 3587S or E3238S system. Refer to the respective software installation notes (35687B or 35688B) for information on software installation.

Watkins-Johnson WJ9119 or WJ9119-1 VXI HF tuners

Note

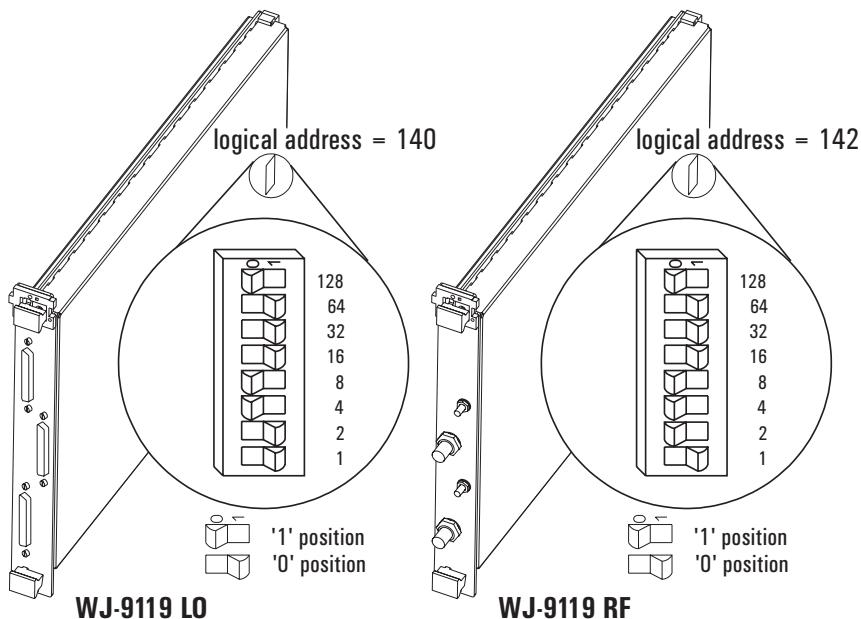
If your system does not include either a WJ9119 or a WJ9119-1 tuner, this procedure is not applicable to your installation.

The Watkins-Johnson VXI HF tuner is supported in both the HP 3587S and the E3238S systems. Configure the modules as described in figure 16 and then install them in the VXI mainframe as described in figure 4.

- Set the logical address of the LO module to 140.
- Set the logical address of the RF module to 142.

See the following illustration.

Figure 16.
Configuring the
WJ-9119 tuner.



HP E6500VXI RF Tuner

Note

If your system does not include an HP E6500-Series tuner, this procedure is not applicable to your installation.

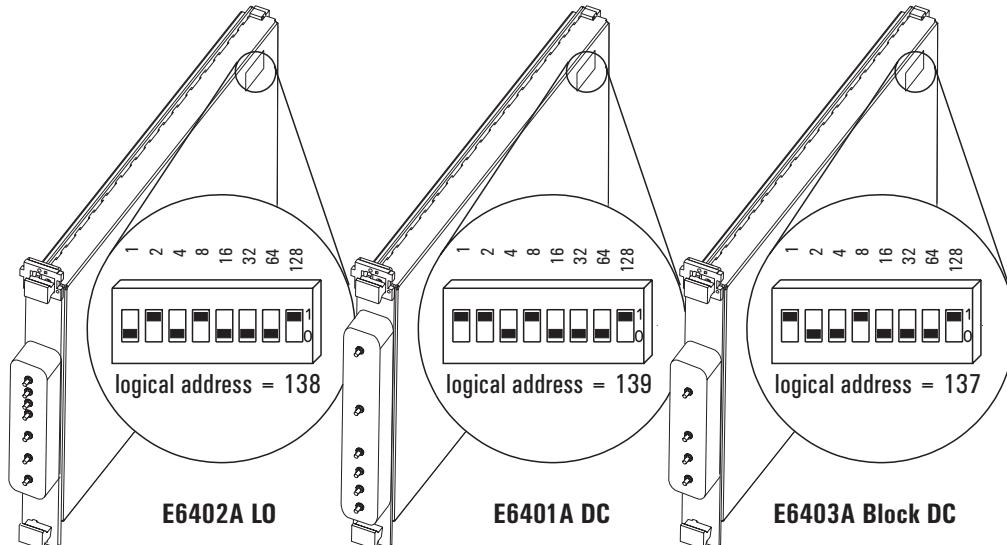
The E6401A must have option 001 installed to work properly with the E3238S. This is the baseband IF output option.

The HP E6500-Series VXI RF tuner is supported in both the HP 3587S and the E3238S systems. The E6500-Series tuners allow measurements as low as 2 MHz but performance below 20 MHz may be degraded.

Configure the modules as described below and then install the modules in the VXI mainframe as shown in figure 5.

- Set the logical address of the E6402A LO module to 138.
- Set the logical address of the E6401A 20-1000 MHz Downconverter to 139.
- If your system includes the E6403A Block Downconverter module, set its logical address to 137.

Figure 17.
Configuring the
HP 6500-Series
tuner modules.



Inter-module connections (See illustration on page 4 for cable drawing.)

1 GHz configuration		3 GHz configuration	
E6401A	Connected to:	E6401A	Connected to:
IF Output	System ADC Analog In	IF Output	System ADC Analog In
3rd LO Input	E6402A 3rd LO Out	3rd LO Input	E6402A 3rd LO Out
2nd LO Input	E6402A 2nd LO Out	2nd LO Input	E6402A 2nd LO Out
1st LO Input	E6402A 1st LO Out	1st LO Input	E6402A 1st LO Out
20-1000 MHz	RF Signal Input	Block DC	E6403A Block DC Output (rigid coax)
		20-1000MHz	E6403A 20-1000 MHz Out (rigid coax)
E6403A	Connected to:	E6403A	Connected to:
		BD LO Input	E6402A BD LO Out
		20-3000 MHz	RF Signal Input

Communication Solutions CS-5040 Microwave Tuner

Note

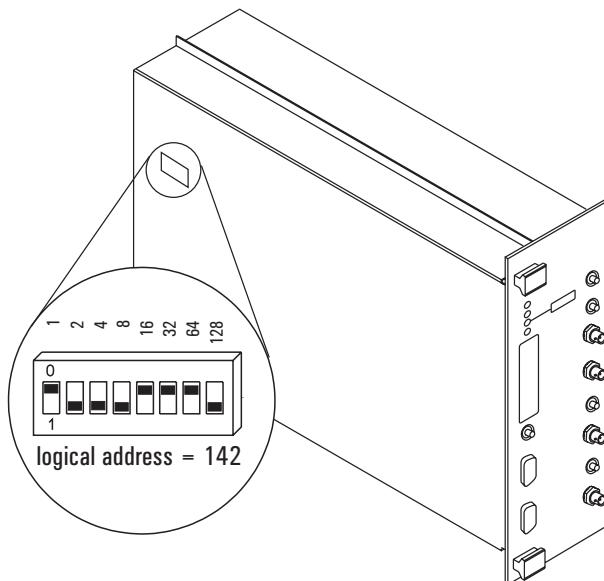
If your system does not include a CS-5040 tuner, this procedure is not applicable to your installation.

This downconverter module relies on the E6500-Series 3 GHz tuner as shown in figure 6. See the previous discussion for E6500 installation instructions.

The CS-5040 tuner is supported in both the HP 3587S and E3238S systems. The 40 GHz and 60 GHz versions have external components cabled to the 18 GHz downconverter module. See block diagram below.

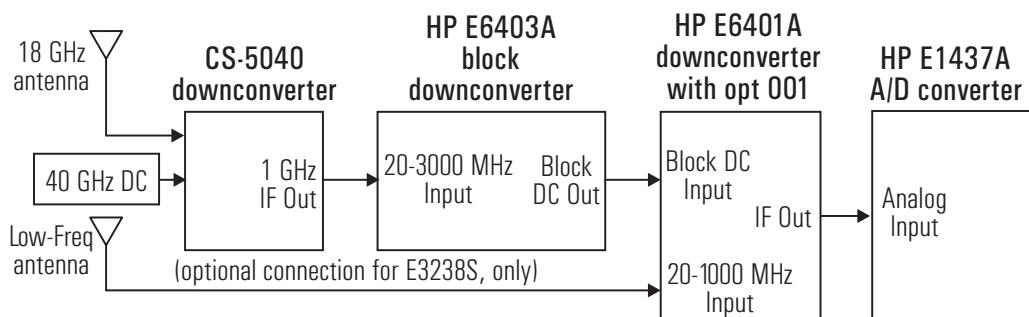
Configure the module's logical address as shown below and install it in the VXI mainframe. See the application configuration documentation for instructions concerning changes to the configuration files.

Figure 18.
Configuring the
CS-5040 tuner.



As shown in figure 19, a second “low-frequency” input may be connected to the E6401A in a E3238S system. This allows signal sweeps as low as 2 MHz. The transition from one input to the other occurs at a transition frequency between 500 MHz and 1 GHz as specified in the `e3238s.cfg` file. See also figure 6.

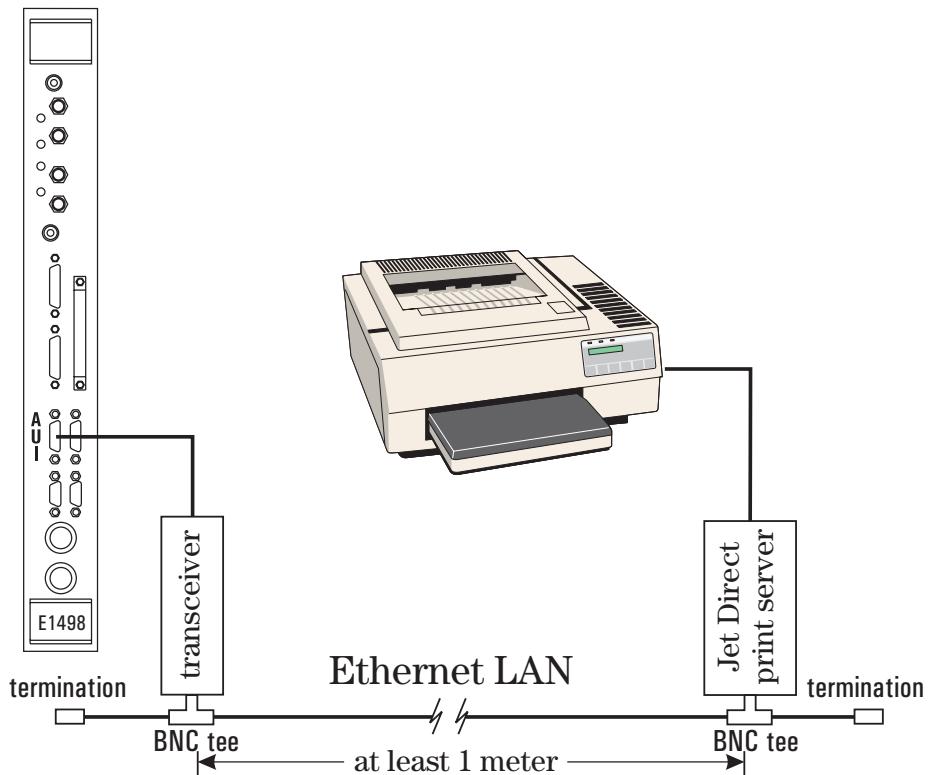
Figure 19.
Tuner block diagram.



Printer Configuration

The printer configuration with the best performance and flexibility is the ethernet LAN configuration shown in figure 20. The VXI module shown is the slot-0 controller. The rest of the VXI chassis and other VXI modules are not shown for clarity.

Figure 20.
LAN printer configuration.



If you are not connecting to an existing LAN cable, you can use a coaxial cable with BNC connectors as shown in the figure above. The 50Ω terminations may be connected directly to the BNC tee connectors on the LAN interface modules. Make sure there is no coax between the BNC tees and their associated interface module.

Connect the LAN transceiver to the AUI connector on the E1498 V743 controller. The BNC connector can be inserted in the run of ethernet coaxial cable at any convenient junction as long as it is at least 1 meter from any other tee connection. The printer's ethernet interface should be connected to the ethernet coax in the same manner.

See the HP-UX System Administration documentation for information about the `sam` utility. This utility can be used to perform printer configuration.