HP 3587S/E3238S Hardware Installation Note

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*
- E1369A VXI Microwave Switch*
- SCMVX008 VXI TIM-40 Carrier Board*
- bc350/357VXI-C Time and Frequency Processor (IRIG)*
- 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 18)

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 E1369A,bc350VXI, bc357VXI, SCMVX008, HP 89431A, E6500, WJ-9119/WJ-9119-1, 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.**

†System disks other than the E3249B may be used.
*Optional hardware

Part Number 35687-90036

HEWLETT® PACKARD

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● US 1-800-265-5001 ● Canada (905) 206-4725 ● Europe (41-22) 780 8111 ● Japan (81 426) 56 7832 ● Latin America (305) 267-4245/4220
● Australia 1 800 629 485 ● New Zealand 0 800 738 378 ● Asia Pacific (852) 2599-7777

System Configuration

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

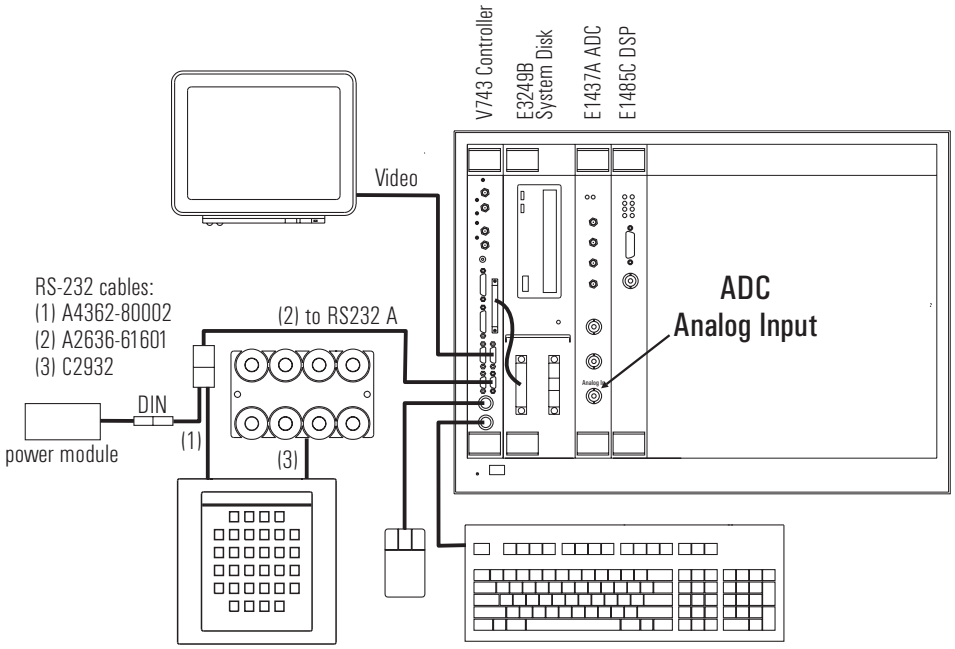


Figure 1.
HP 3587S System Hardware Configuration (standard)

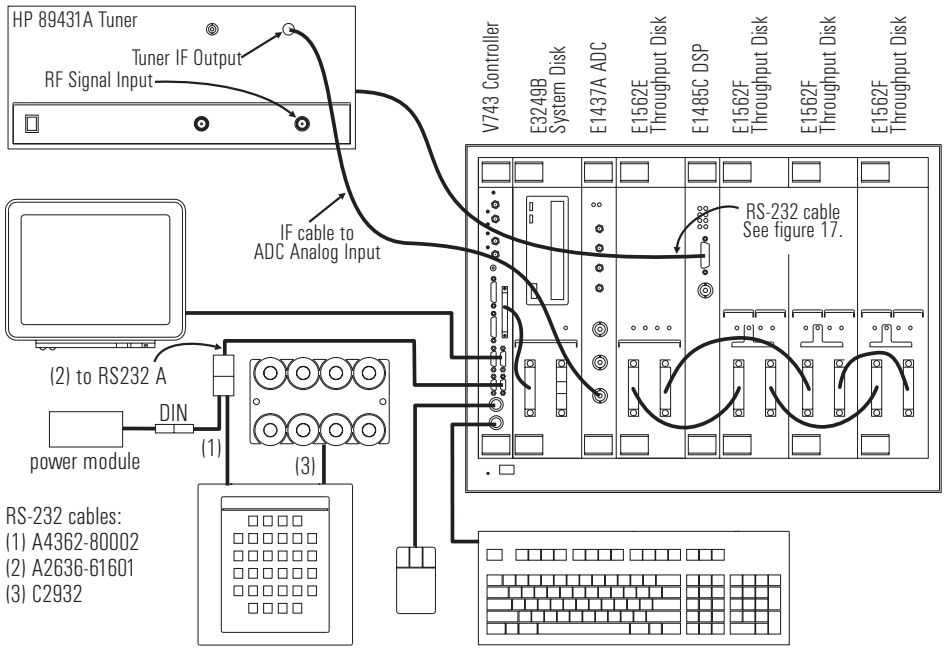


Figure 2.
HP 3587S System Hardware Configuration with a 2.65 GHz tuner & option ATR with 4 E1562 throughput disk modules

- To use a VXI tuner with the ATR option shown, use a second mainframe chassis to power the E1562F disk modules.
- To configure the E1562 disk modules, see page 10.
- To configure a LAN printer, see page 19.

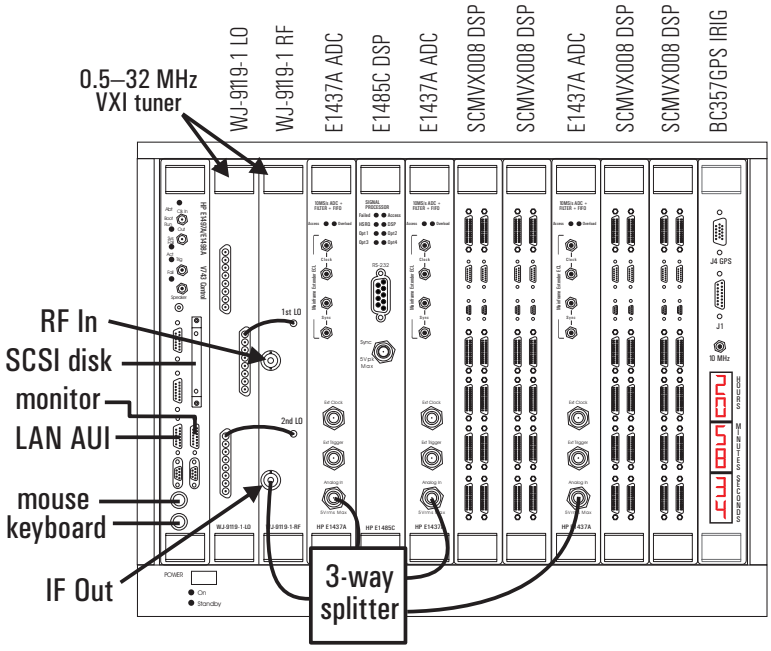


Figure 3.
HP E3238S System Hardware Configuration incl. optional HF tuner, SCMVX008 TIM-40 carrier boards and a GPS/IRIG timing module.

The SCMVX008 modules provide narrow-band signal processing. Signal data is provided by an additional E1437A ADC. Two such groups are shown in figure 3. SCMVX008 modules are installed adjacent to the ADC as shown. See also, page 12.

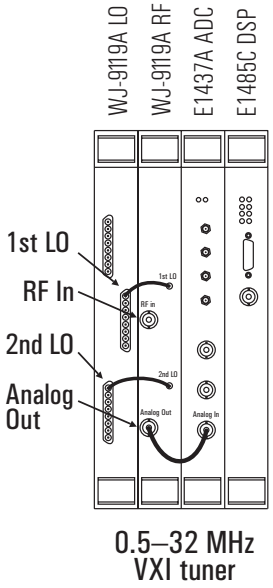


Figure 4.
WJ-9119 VXI tuner

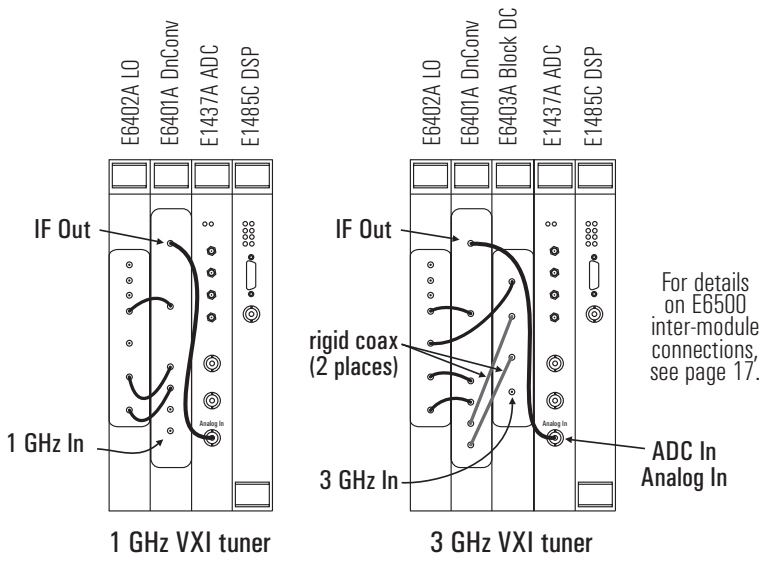
WJ-9119 tuner configuration information is on page 16.

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.

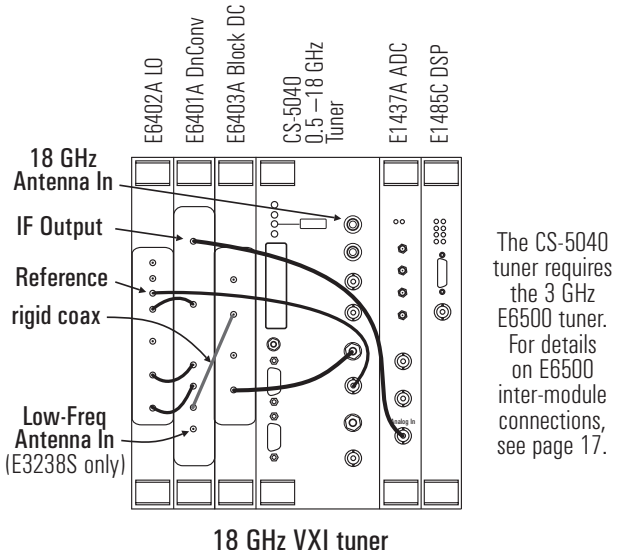
However, the ADC and DSP modules *must* be installed in adjacent slots with the ADC on the left and the DSP on the right, as shown in these figures. Option ATR for the HP 3587S is the only exception to this; it has the E1562E between the ADC and DSP modules as shown in figure 2.

Figure 5.
E6500-Series tuners.



E6500 tuner configuration and detailed cabling information appears on page 17.

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 18.

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

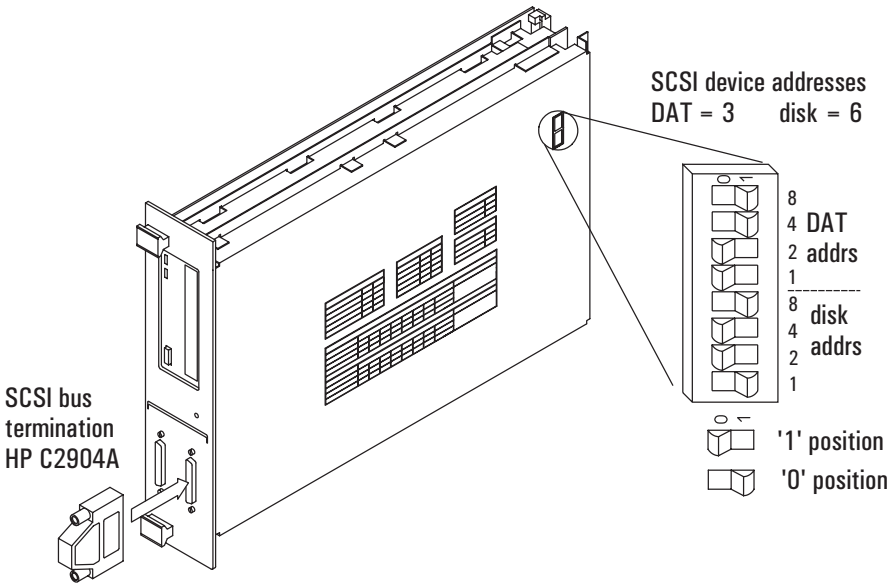
Refer to “Installation Guide Model V743 VXI Controller” (HP P/N E1497-90010) for instructions on installing and configuring the V743 controller in the VXI mainframe. This guide covers the procedures for proper installation of the keyboard, mouse, display, disk and other external peripherals. Once these 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 CDE.
- 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:

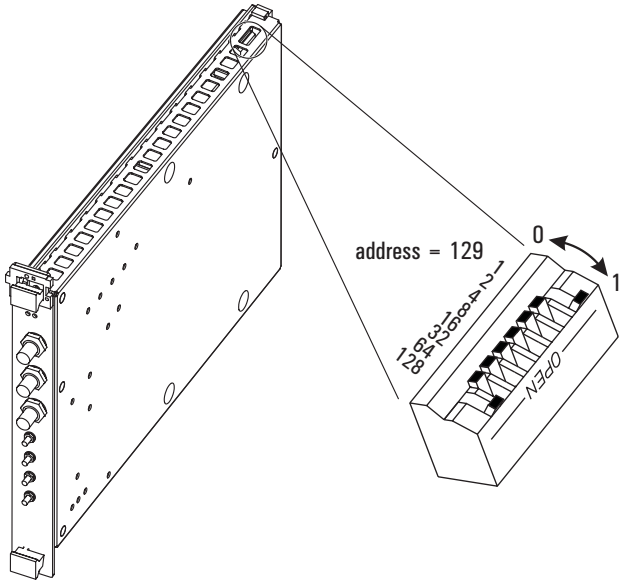
   For the HP 3587S with option ATR (from left to right), the order should be:

   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.

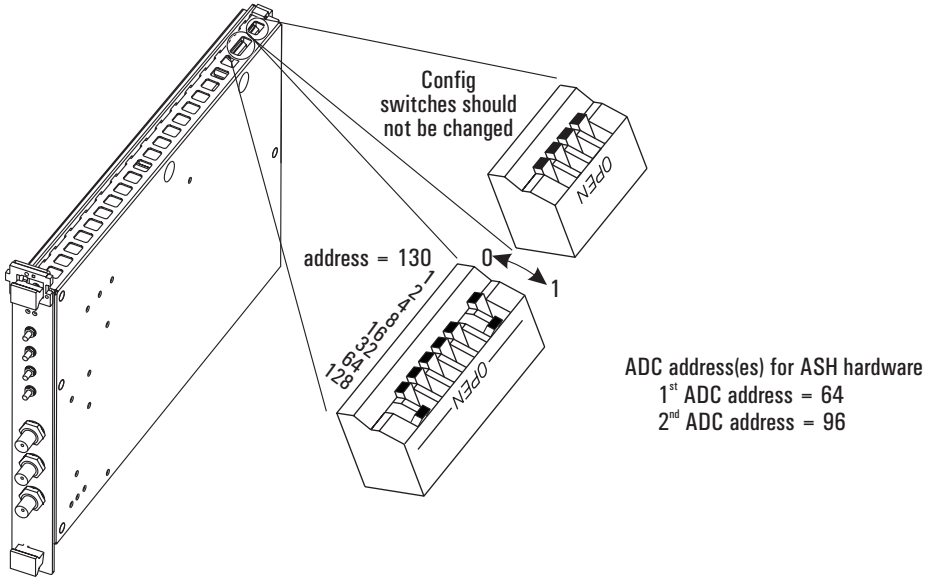
Figure 8.
E1430A Logical Address Setting



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

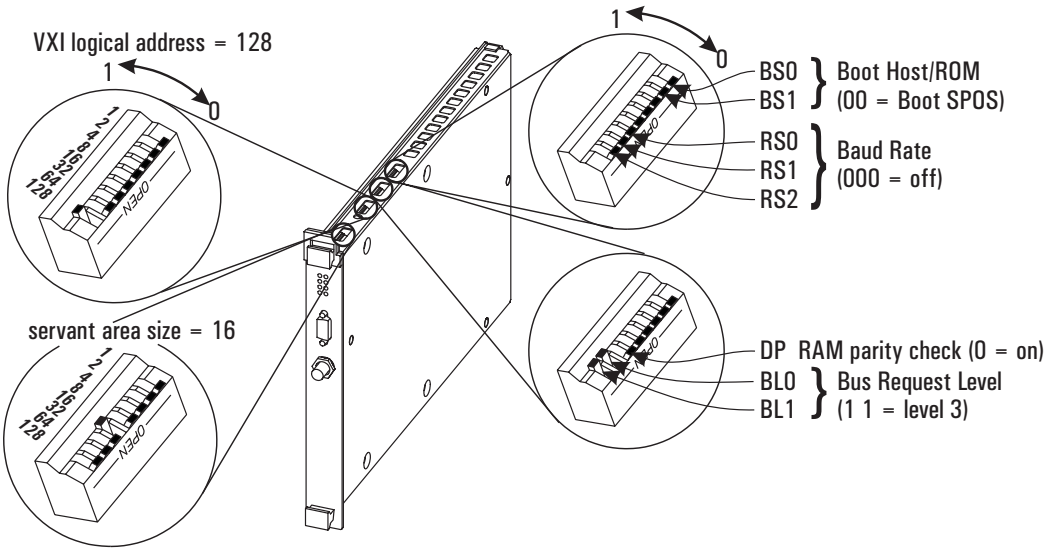


E1485C VXI DSP

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.

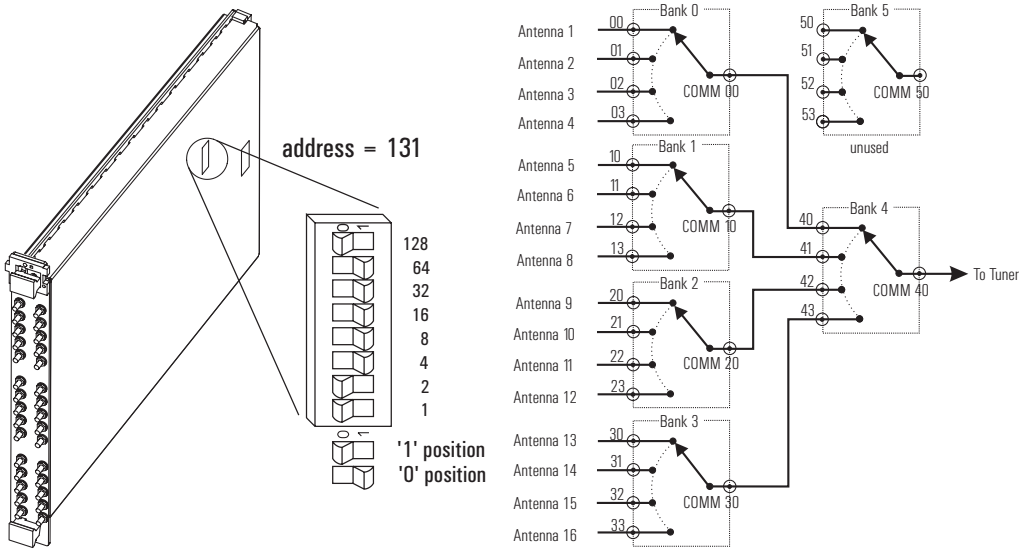
Figure 10.
E1485C Settings



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

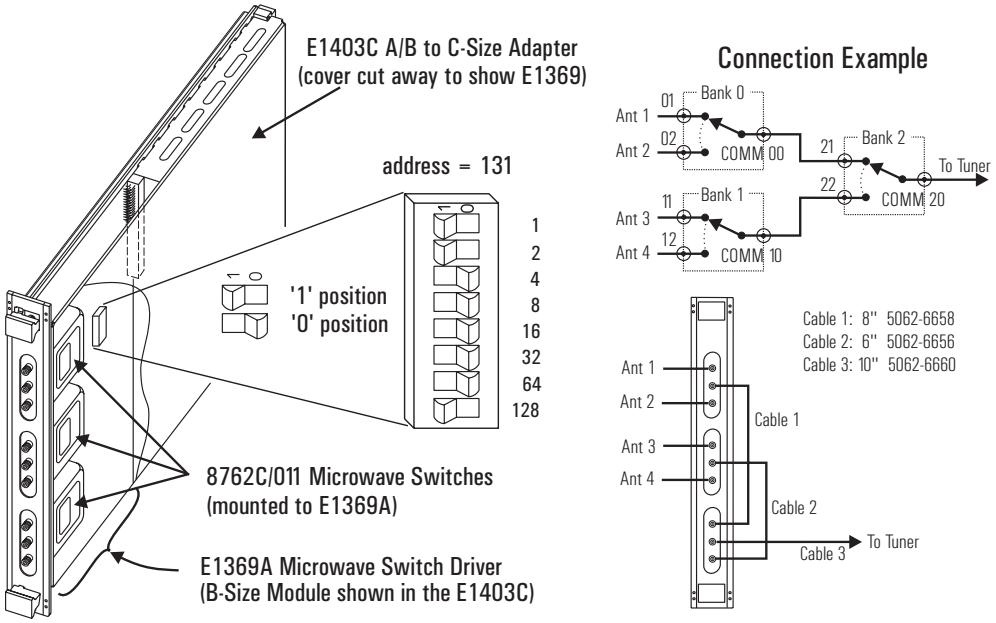


Note: only one switch module may installed in a system.

E1369A VXI Microwave Switch (optional)

This VXI module supports switching signals for the microwave tuners. It can be installed in any chassis slot. Set the address to 131.

Figure 12.
E1369A Settings

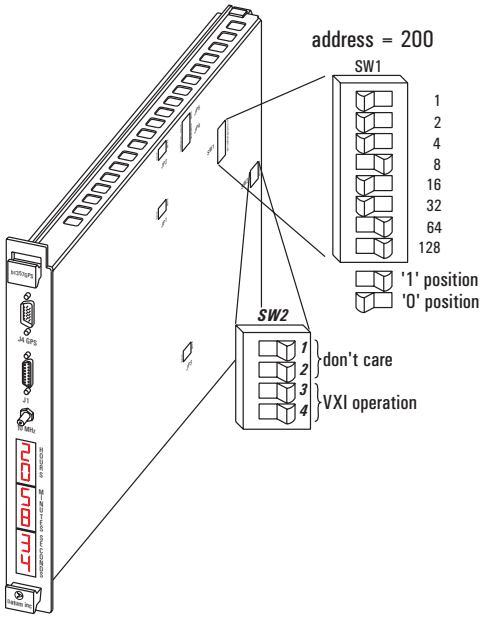


The configuration shown above consists of the switch driver board, the switches, and an extender module. It may be ordered as special option 404-E3238B.

bc350/357VXI-C Time and Frequency Processor (IRIG Time Reference)

This VXI module provides accurate time stamp information. The model bc357VXI also has a GPS satellite receiver for a source. This module may be installed in any chassis slot. Set the address to 200.

Figure 13.
bc350VXI Settings



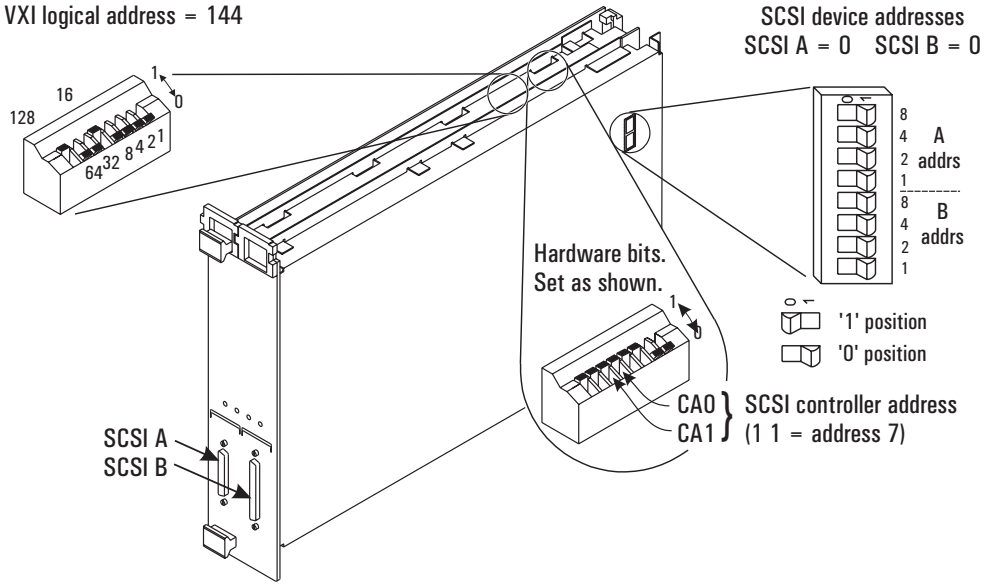
Jumpers	
JP1 time code	1-2: DC levelshift
	3-4: modulated
JP2 GPS mode	1-2: single-ended 1pps
	3-4: differential 1pps
JP3 GPS sensor	1-2: ACUTIME Smart Antenna or SV-6
	3-4: TANS
JP4 RS422 mode	3-4: 5-6: have an aux. RS422 output port
	3-4: RS422 ports are daisy-chained 5-6: such that IRIG signal is passed on
JP5 RS422 load	1-2: puts 100Ω load between diff input lines
	3-4: no load added

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 14.

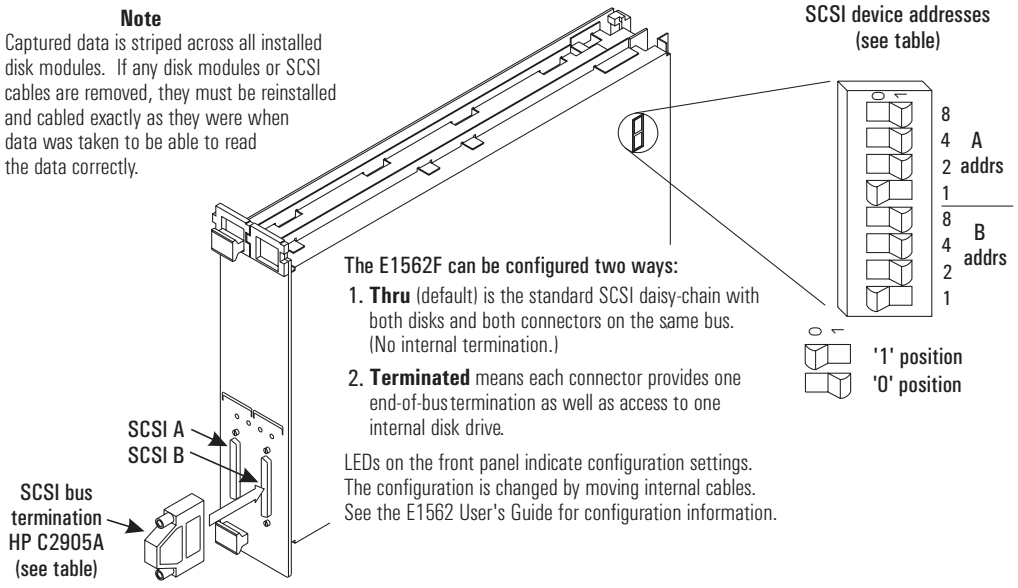
Figure 14.
E1562E settings



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 15.
E1562F settings



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		
E1562E/F	E	
A addrs	0	
B addrs	0	
config	n/a	
cabling	SCSI A (no external	
	SCSI B term required)	

6-module system (for more than 4 modules, another mainframe is required)						
E1562E/F	E	F	F	F	F	F
A addrs	0	1	1	3	3	5
B addrs	0	2	2	4	4	5
config	n/a	thru	thru	thru	thru	term
cabling	SCSI A——————A B——————————A B——————————A					
	SCSI B——————————A B——————————A B——————B					

2-module system		
E1562E/F	E	F
A addrs	0	1
B addrs	0	1
config	n/a	term
cabling	SCSI A——————A	
	SCSI B——————B	

5-module system					
E1562E/F	E	F	F	F	F
A addrs	0	1	1	3	3
B addrs	0	2	2	4	4
config	n/a	thru	thru	thru	thru
cabling	SCSI A——————A B——————————A B—term*				
	SCSI B——————————A B——————————A B—term*				

3-module system			
E1562E/F	E	F	F
A addrs	0	1	1
B addrs	0	2	2
config	n/a	thru	thru
cabling	SCSI A——————A B—term*		
	SCSI B——————————A B—term*		

4-module system (this configuration shown in figure 2)				
E1562E/F	E	F	F	F
A addrs	0	1	1	3
B addrs	0	2	2	3
config	n/a	thru	thru	term
cabling	SCSI A——————A B——————————A			
	SCSI B——————————A B——————B			

term* is the HP C2905A (external) termination shown in figure 15.

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.

SCMVX008 VXI TIM-40 Carrier Board

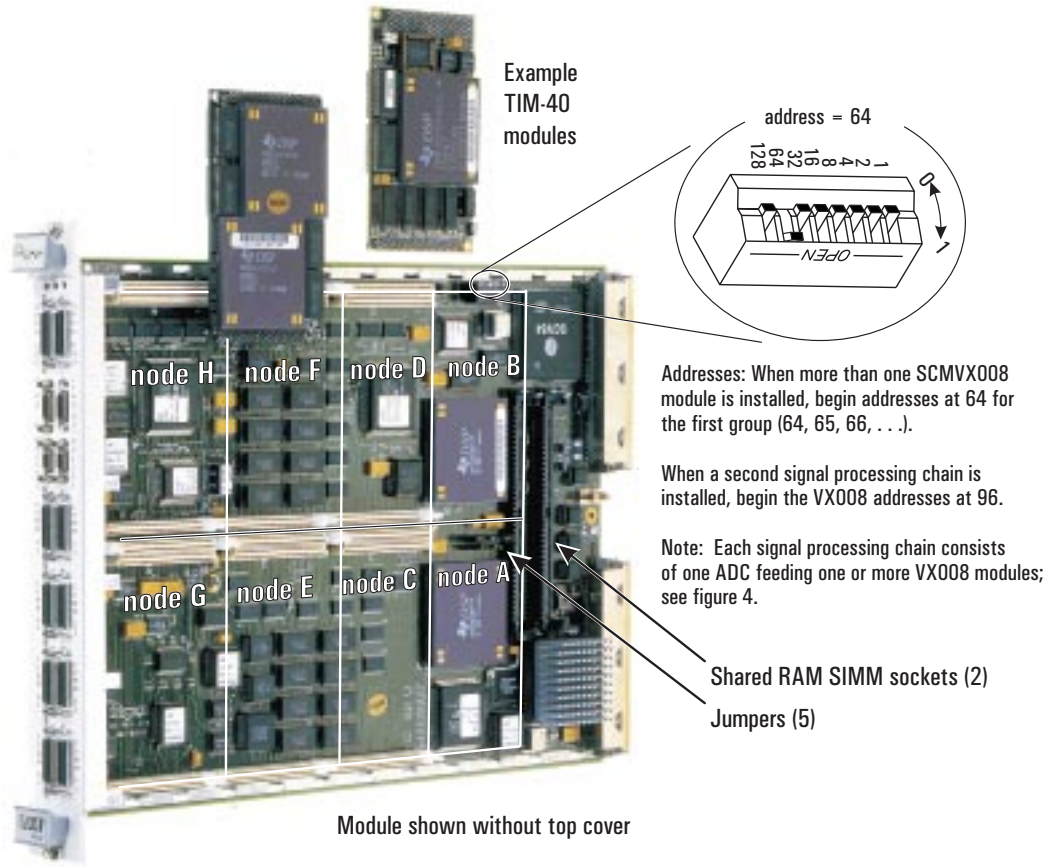
This module supports narrow-band signal processing using C40 DSP modules. They are normally fully configured as provided from HP. Installation details are described in the Spectrum document *LeMans VX8 Carrier Board Installation Guide*

The VX8 board contains 2 C40 DSPs (in nodes A and B). You may load as many as 6 TIM-40 modules that provide digital downconversion (DDC) and more digital signal processing. Two such configurations are discussed on the next page.

VXI Logical Addresses

Set the VXI logical address as described in the following figure.

Figure 16. Setting up the SCMVX008.



Installing Shared RAM SIMMs

There are 2 SIMM slots that take either 4 MB (1M×32 or 1M×36) or 32 MB (8M×32 or 8M×36) 60ns DRAM SIMMs. Jumpers JP3, JP4, and JP5 must be set appropriately.

- If only one memory module is installed, it must be in slot 1 (at rear).
- If 2 modules are installed, they must be of the same size (either 4 MB or 32 MB).
- Jumpers JP3, JP4, JP5: for 4 MB SIMMs set to 1M; for 32 MB SIMMs set to 8M

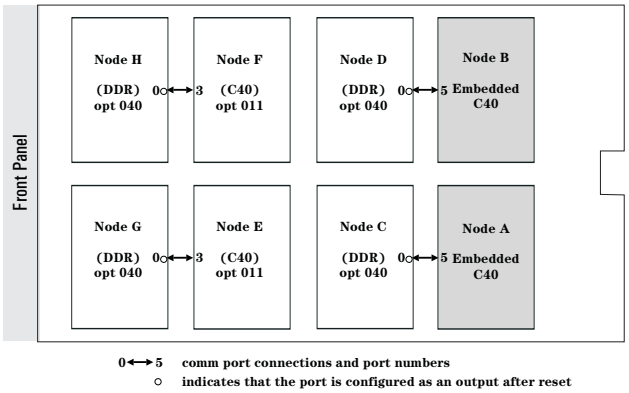
Other Jumpers

- JP1, JP2: on pins 2-3
- JP6, JP7: open

TIM-40 Configuration

This section describes the TIM-40 boards installed and their jumper settings.

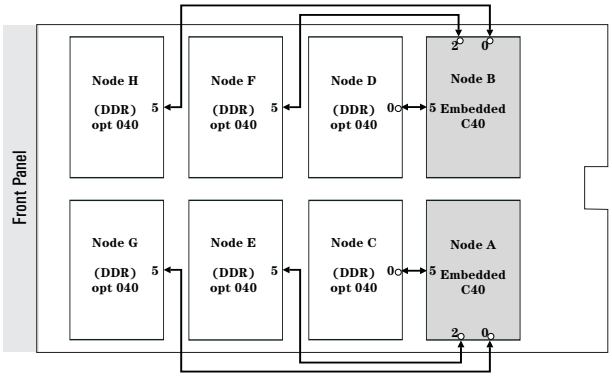
4-channel/DSP Topology



0 ↔ 5 comm port connections and port numbers
○ indicates that the port is configured as an output after reset

Node	TIM-40 Module Type	Jumpers						Comm Port Connections		
		040 DDR			011 C40			040 DDR	C4x DSP	
		CP4	CP5	CLK	JP1	JP2	JP3	Comm Port	Node	Comm Port
C	040 DDR	out	out	out				0	A	5
D	040 DDR	out	out	out				0	B	5
E	011 C40				out	1-2	in			
F	011 C40				out	1-2	in			
G	040 DDR	out	out	out				0	E	3
H	040 DDR	out	out	out				0	F	3

12-channe/DSPl Topology



0 ↔ 5 comm port connections and port numbers
○ indicates that the port is configured as an output after reset

Node	TIM-40 Module Type	Jumpers			Comm Port Connections		
		040 DDR			040 DDR	C4x DSP	
		CP4	CP5	CLK	Comm Port	Node	Comm Port
C	040 DDR	out	out	out	0	A	5
D	040 DDR	out	out	out	0	B	5
E	040 DDR	out	in	out	5	A	2
F	040 DDR	out	in	out	5	B	2
G	040 DDR	out	in	out	5	A	0
H	040 DDR	out	in	out	5	B	0

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.)

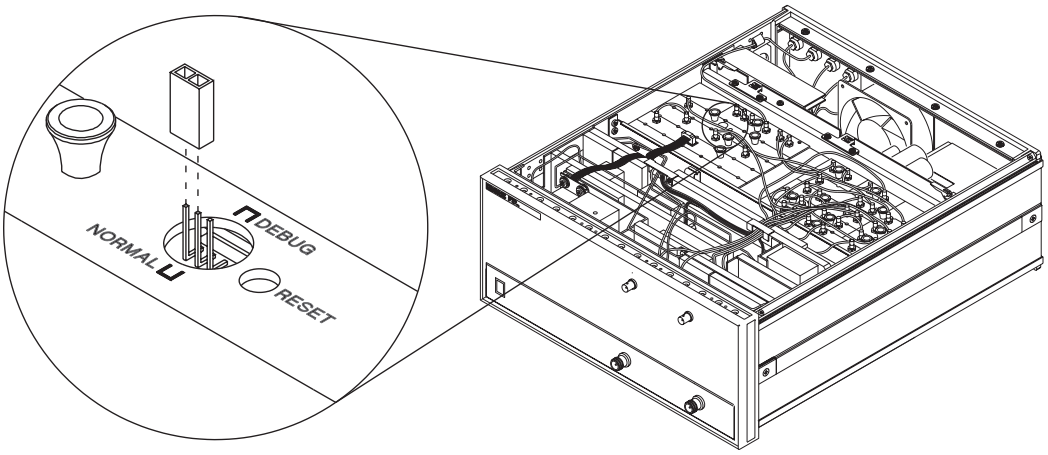
1. **Turn power off.**
   Turn the power to the RF tuner off and disconnect the power cord before installing or configuring the 89431A to avoid damage.

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 16.

Figure 16. Move jumper to the DEBUG position



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

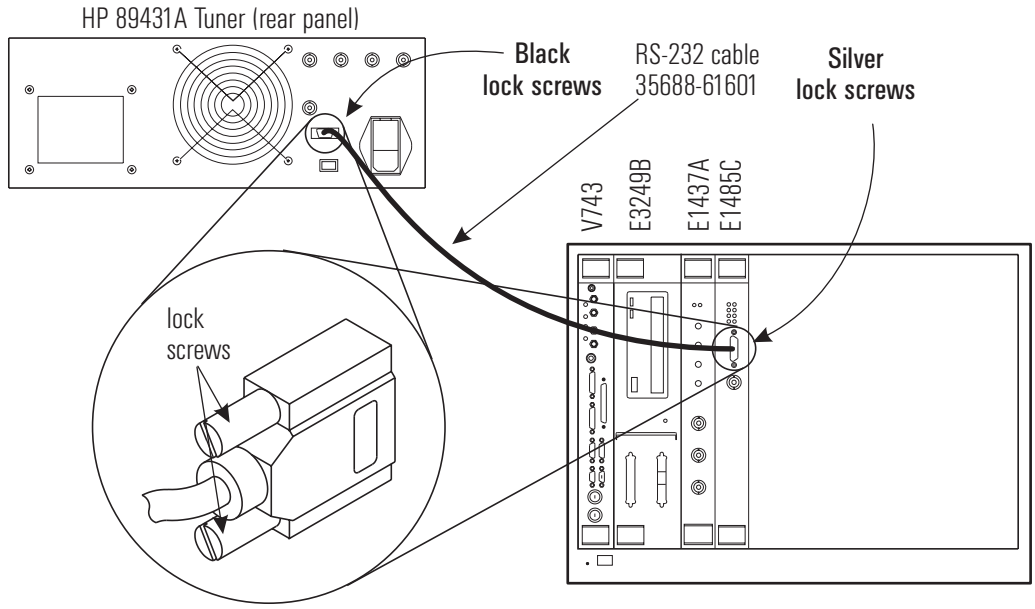
3. Connect the RS-232 cable.

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 17.

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 17. Connecting the RS-232 cable



a. 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.
b. 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.
c. 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.)

a. First, attach one end of the BNC cable to the front panel connection on the 89431A RF tuner labeled "OUT (to channel 1)".
b. 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 18 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.

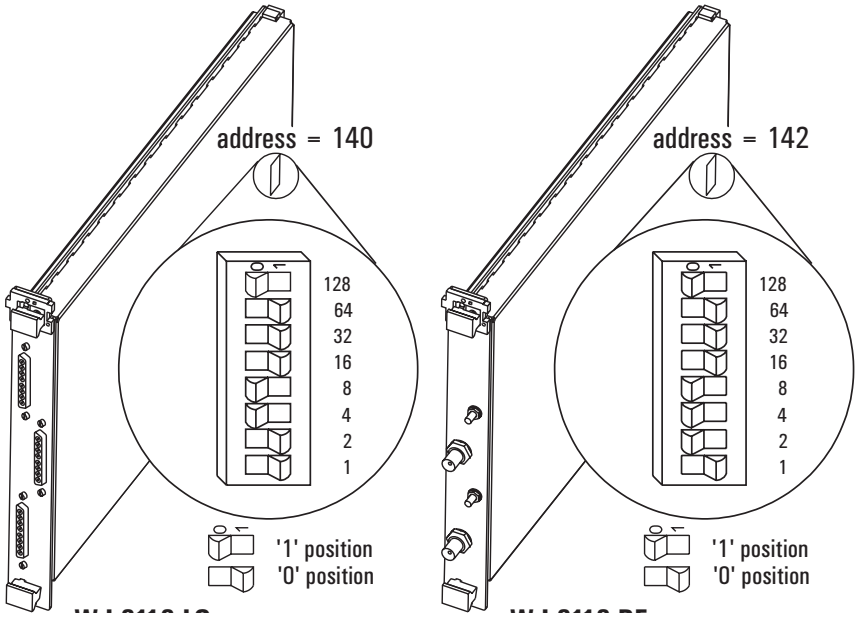


Figure 18. Configuring the WJ-9119 tuner.

HP E6500VXI RF Tuner

Notes

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.

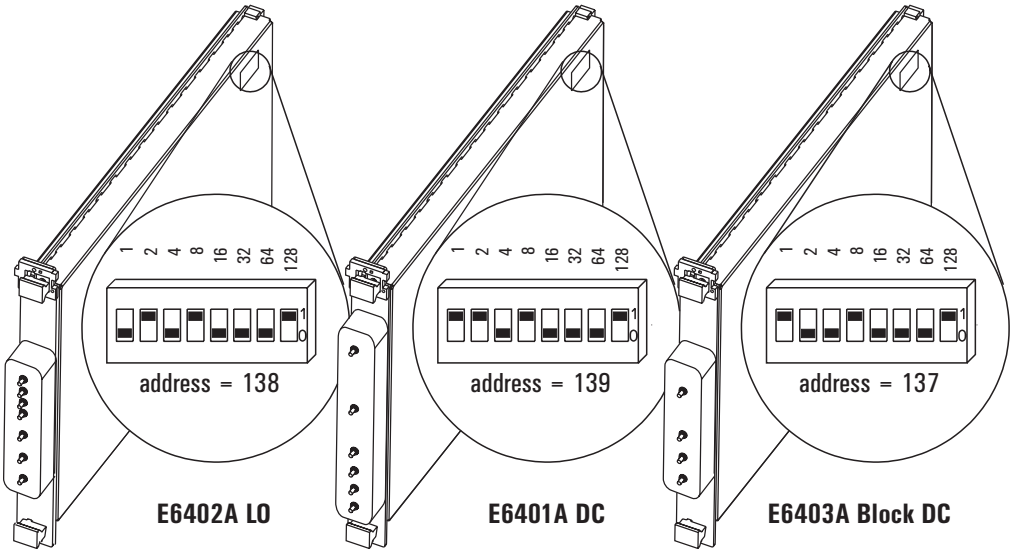


Figure 19. Configuring the HP 6500-Series tuner modules.

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:**
		BD LO Input	E6402A BD LO Out
		20-3000 MHz	RF Signal Input

Communication Solutions CS-5040 Microwave Tuner

Note

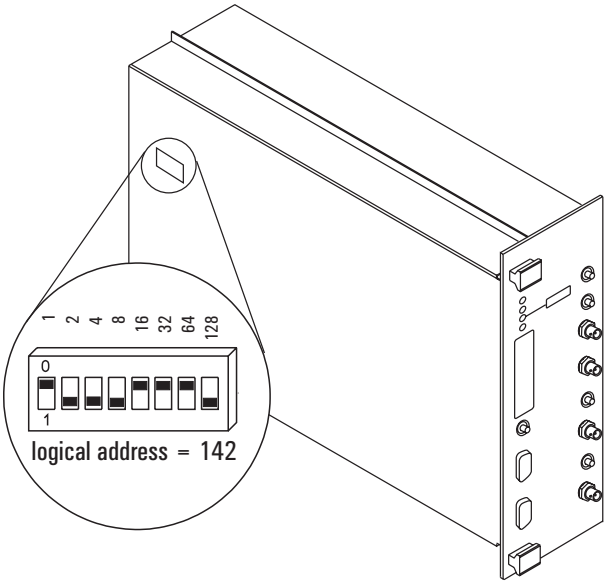
If your system does not include a CS-5040 tuner, this procedure is not applicable to your installation.

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.

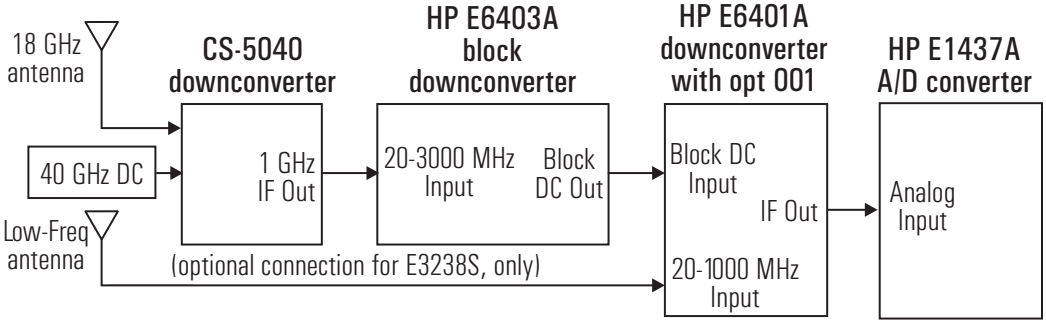
Configure the module's logical address as shown below and install it in the VXI mainframe. See the application configuration documentation for instructions concerning changes to the configuration files.

Figure 20.
Configuring the CS-5040 tuner.



As shown in figure 21, 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.

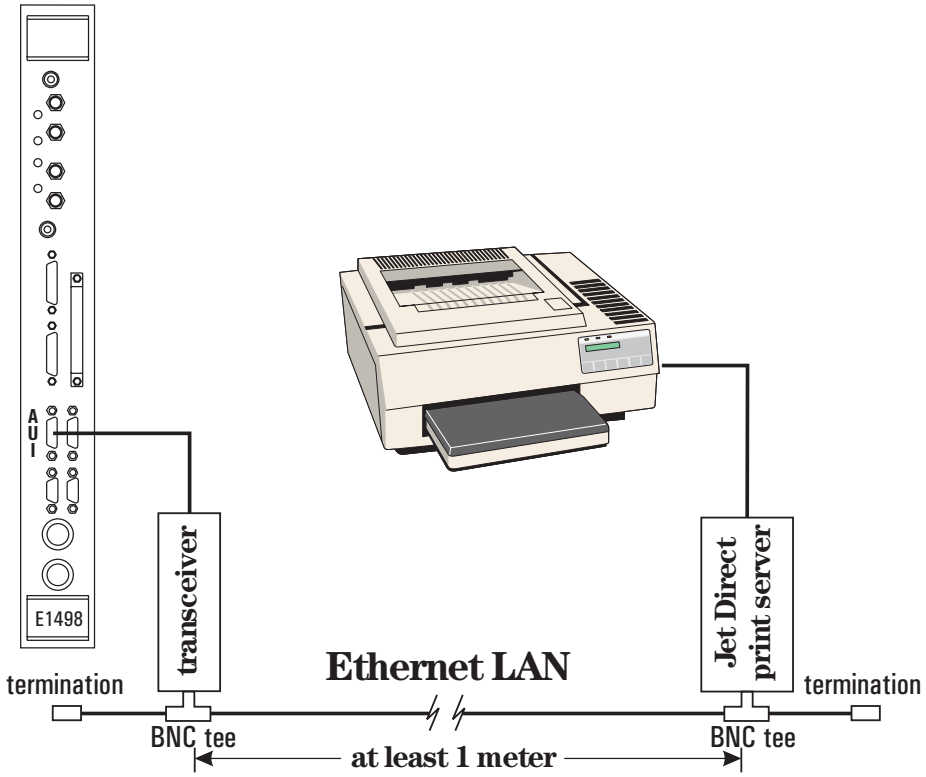
Figure 21.
Tuner block diagram.



Printer Configuration

The printer configuration with the best performance and flexibility is the ethernet LAN configuration shown in figure 22. 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 22.
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.