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Agilent E6501A, E6502A, E6503A VXI Receivers

Configuration Guide



Agilent E6501A, E6502A, E6503A
VXI Receiver Configurations

- **E6501A 1 GHz VXI receiver**
- **E6501A Option 003 3 GHz VXI receiver**
- **E6502A 1 GHz dual channel VXI receiver (two independent LOs) in Option 006 six-slot mainframe**
- **E6503A Option 003 3 GHz dual channel VXI receiver (with shared LO) in the Option 013 thirteen slot mainframe**

Slot zero MXI interface must be ordered separately.

Agilent Technologies
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This guide directs you through steps that help determine the correct model number and options for your application needs using Agilent Technologies' E6501A, E6502A, and E6503A VXI receivers.

The E6501A, E6502A, and E6503A comprise a modular family of VXI receivers for monitoring signals in the 20 MHz to 1 GHz frequency range using the standard configurations, or extended to 3 GHz using the Option 003 configuration. Agilent supplies this high-performance receiver hardware and VXI plug-and-play software drivers to provide systems integrators with excellent building blocks for developing their system solutions.

The following pages describe seven steps used to choose model numbers and options for your applications.

Step 1

Select the optimum base receiver configuration to meet your needs. Choose one of the following 20 MHz to 1000 MHz VXI receivers:

- E6501A VXI receiver (single channel)
- E6502A dual channel VXI receiver (independent LOs) for independent simultaneous operation
- E6503A dual channel VXI receiver (shared LO) for phase coherent applications

(Please refer to the diagrams on page 5 and the table on page 6.)

Each of the three receivers covers the 20 MHz to 1000 MHz frequency range. See Step 2 for frequency extension to 3 GHz.

The diagrams on page 5 illustrate the standard receiver configurations. The E6501A[1] is a single channel VXI receiver consisting of the E6401A 1 GHz downconverter module, the E6402A LO module, and the E6404A IF processor module.[2]

The E6502A dual channel VXI receiver consists of two E6401A 1 GHz downconverter modules, two E6402A LO modules, and one E6404A IF processor module with Options 031 and 040. The E6503A dual channel VXI receiver includes two E6401A 1 GHz downconverter modules, one E6402A LO module with Option 002, and one E6404A IF processor with Options 022 and 040.

Note the simplified block diagrams of the different configurations of the IF processors comprising the three standard receivers (see page 5). The E6501A includes a single IF channel and a single mezzanine. (A mezzanine is a printed circuit board that attaches to the main assembly.) The E6502A is a dual channel receiver with two IF channels and two mezzanines in the IF processor allowing two simultaneous operations such as signal searches and signal demodulation.[3] The E6503A is a dual channel receiver used by systems integrators requiring a phase coherent front-end for applications like direction finding.[4] It includes an IF processor with two IF channels and a single mezzanine with two DDCs. (DDCs are integrated circuit components that provide digital downconversion and digital filtering.)

1. The E6501A receiver is based on the E6500A VXI tuner. For applications requiring the tuner, refer to the E6500A Product Overview, literature number 5965-5769E.
2. The IF processor module can be ordered separately for upgrading existing E6500A tuners to a complete receiver configuration or for system integration applications requiring multiple channels, but the module itself is not specified. Its performance is specified only when used as part of one of the E65XX receivers. The E6404A is compatible with the standard E6500A tuner having a 21.4 MHz IF output. It is not compatible with the E6500A Option 001 baseband output configuration. The E6404A IF processor module option configurations are annotated next to each diagram in the illustrations on pages 5 and 6 as a useful reference when ordering the IF processor separately for tuner-to-receiver upgrades. Knowledge of the module options is not a requirement for ordering complete receivers. The options required for the receivers are shown in the table on page 6.
3. Plug-and-play software drivers and a virtual front panel demonstration software tool are provided. Turnkey software for automatic signal search and signal demodulation (automatic handoff) must be provided by the systems integrator.
4. Phase coherence is not specified. Calibration is required by the systems integrator in their overall direction finding system.

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Step 2

Select Option 003 to extend frequency coverage to 3 GHz, if desired.

Option 003 adds one E6403A 3 GHz block downconverter module to the E6501A receiver and two of these modules to both the E6502A and E6503A receivers.

Step 3

Select a VXI mainframe, if desired.

Order Option 006 for a six slot mainframe or Option 013 for a thirteen slot mainframe. Note that the specifications for the E6501A, E6502A, and E6503A are guaranteed only in VXI mainframes manufactured by Agilent.[5]

Step 4

Select the desired options for mezzanine #1 in the IF processor VXI module.

The options with 02 prefixes apply to mezzanine #1. For example, the E6501A Option 025 provides an additional 4 DDC (digital downconverter) chips to the resident single DDC for a total of five DDCs on mezzanine #1. (A total of 5 DDCs on each of the two mezzanines are allowed, permitting a total of 10 DDCs per IF processor module. Note that there are three DDC configuration choices: one, two, or five DDCs per mezzanine for a total of two, four, or 10 DDCs per IF processor.) Option 026 adds 4 MBytes of static RAM to mezzanine #1. (Refer to page 6 for available options for each receiver configuration. The diagrams at the top of each column illustrate which IF processor module configuration is included as a standard part of each receiver.)

Step 5

Select the desired options for mezzanine #2 in the IF processor VXI module.

The options with 03 prefixes apply to mezzanine #2. For example, the E6501A Option 031 adds the second mezzanine card which includes one resident DDC and one DSP (digital signal processor). Option 036 should be ordered instead of Option 031 if 4 MBytes of static RAM are desired on mezzanine #2.

5. At the time of printing, the only Agilent VXI mainframes tested with the E65XX receivers are the E1401B (thirteen slot) and E1421B (six slot).

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Step 6

Refer to the footnotes on page 6 to ensure that no conflicting options are chosen.

For example, Option 022 or 025 can be ordered, but not both. Likewise, Option 031 or 036 can be ordered, but not both.

Step 7

Order accessory hardware separately.

In addition to a mainframe, the VXI receivers require a VXIbus slot zero module and computer to operate. Neither is included with the receivers, so they must be ordered separately. A MXI card is the recommended slot zero controller due to bus width (32 bits) and speed considerations. The E650X series receivers include a VXI plug-and-play driver written for Windows NT. The recommended MXI interface kit for Windows NT® is the National Instruments VXI-PCI8015 (part number 777119-02). The kit includes a PCI-MXI-2 board (to be installed inside a PC), a VXI-MXI-2 board (to be installed in slot zero in the VXI mainframe), NI-VXI/VISA software, a flexible MXI-2 cable (2 meters), and documentation. To order the kit and for more information, contact National Instruments directly.[6]

For systems integrators using other operating systems (e.g., UNIX), the driver source code is provided and can be recompiled into the new platform.

For HP-UX on the HP 9000 series 700 computers with EISA backplanes, the E1428B VXIbus extender (VXIbus-to-MXIbus) C-size VXI card (to be installed in slot zero in the VXI mainframe) and the E1489C EISA/ISA-to-MXIbus interface card (to be installed in the series 700 computer) are recommended. To obtain a MXI cable, be sure to order the correct option on the E1489C. Finally, note that the E1406A VXI command module cannot be used for slot zero control due to bus width constraints. The E650X series receivers provide 32 bit wide data, whereas the command module operates at 16 bits. Therefore, GPIB and RS-232 control cannot be used to control the E650X series VXI receivers.

To listen to demodulated analog audio from the receivers requires additional hardware that is not included with the VXI receivers. To obtain an external audio cable that connects the receiver audio output to a special audio breakout box to which headphones can be connected, order the Agilent E3245A audio breakout box kit. Only one E3245A is required for the ten analog audio signals from the E650XA receivers (provided they include Options 025 and 035). To rack mount the E3245A, order E3245A Option AXM.

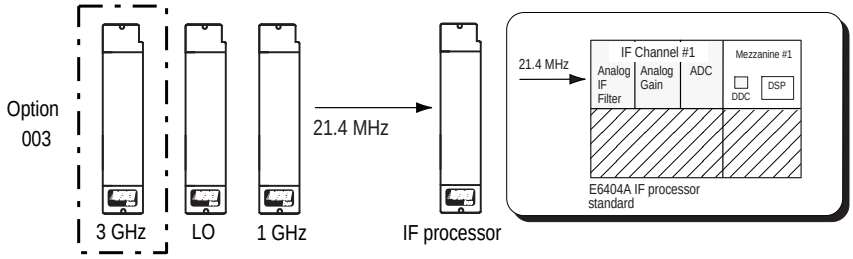
6. National Instruments, 6504 Bridge Point Parkway, Austin, TX 78730-5039 (Telephone: 512-794-0100)

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Agilent E6501A, E6502A, E6503A standard receiver configurations

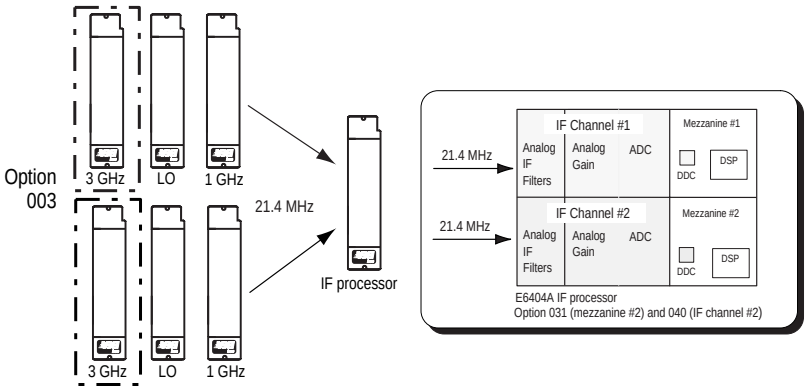
To assist you in steps 1, 2, 4, and 5 of the ordering process, refer to the diagrams below. The E6404A IF processor diagrams are shown here and repeated on page 6 as a useful cross reference when ordering mezzanine options. The standard IF processor configuration varies depending on the receiver in which it resides. For example, the E6501A is a single channel receiver employing a single channel IF processor with one mezzanine. A standard mezzanine includes a single DDC and a single DSP. An IF channel includes analog filtering (30 kHz, 700 kHz, and 8 MHz bandwidths), autoranging analog gain, and a high-speed analog-to-digital converter. Page 6 lists options for adding another mezzanine or IF channel and for additional DDCs and static RAM.

E6501A Receiver



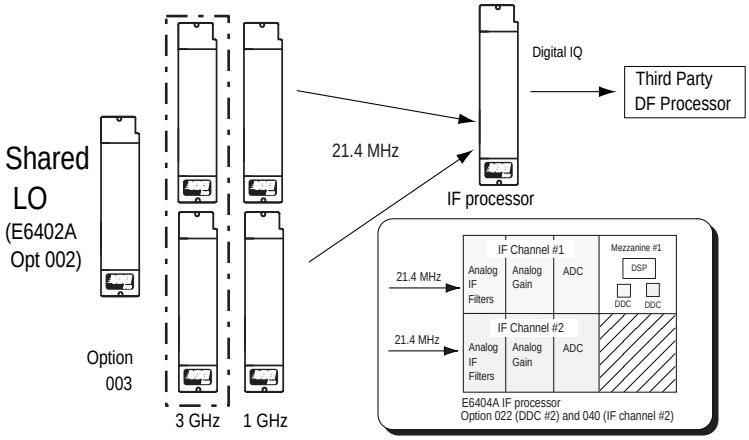
E6502A Dual Channel Receiver

(independent LOs)



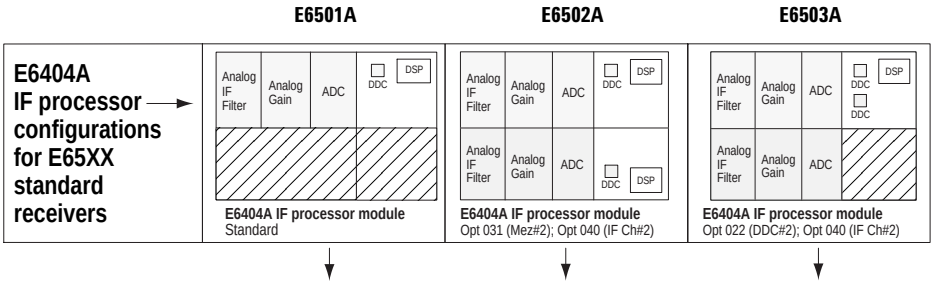
E6503A Dual Channel Receiver

(with shared LOs)



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Agilent E6501A, E6502A, E6503A receiver options



Option	Description	E6501A[11]	E6502A[12]	E6503A[13, 14]
003	Increases frequency coverage to 3 GHz	x	x[1]	x[1]
006	Add a 6 slot E1421B VXI mainframe[2]	x	x	x
013	Add a 13 slot E1401B VXI mainframe[2]	x	x	x
022	Add 1 DDC[3,4] to mezzanine #1	x	x	
025	Add 4 DDCs[3,4] to mezzanine #1	x	x	x[5]
026	Add 4 MBytes RAM[6] to mezzanine #1	x	x	x
031	Add a second mezzanine[7,8] to the IF processor	x		x
032	Add 1 DDC[9] to mezzanine #2	x	x	x
035	Add 4 DDCs[9] to mezzanine #2	x	x	x
036	Add a second mezzanine and 4 MBytes RAM[10]	x	x	x
0B1	Add extra user manual	x	x	x
0B3	Service manual and service software	x	x	x

For steps 3, 4, 5, and 6, refer to the table above. Please note that the E6404A IF processor configurations for each of the three receivers are shown in the corresponding column in the table. The IF channel, mezzanine, and DDC configurations serve as the basis of each standard receiver. The rows in the table show the options that can be ordered that add functionality to the base configurations.

1. Adds two E6403A 3 GHz block downconverter VXI modules to the receiver.
2. VXI mainframes are required to meet guaranteed receiver specifications. Mainframes may be ordered separately.
3. Digital downconverters are used for digital filtering and for channelization of multiple signals for demodulation by the DSP.
4. Options 022 and 025 may not be ordered together. Choose one or the other. A maximum quantity of ONE of these options is allowed.
5. E6503A Option 025 adds three DDCs to mezzanine #1 (not four), since two reside on the standard configuration.
6. 4 MBytes of static RAM useful for delay memory applications. May be ordered with Option 022 or 025 (choose one), if desired.
7. Second mezzanine includes one DDC and one DSP. E6502A includes the second mezzanine in its standard configuration.
8. Options 031 and 036 may not be ordered together. Choose only one.
9. Options 032 and 035 MUST be ordered with either Option 031 or 036 (choose one). Option 031 or 036 is necessary to provide the second mezzanine on which the Option 032 or 035 DDCs must reside. Options 032 and 035 may not be ordered together. Choose one or the other. A maximum quantity of ONE of these options (032 or 035) is allowed.
10. 4 MBytes of static RAM useful for delay memory applications. Option 036 may not be ordered with the E6501A Option 031 or E6503A Option 031. Choose only one. Since the E6502A includes a second mezzanine, the E6502A Option 036 simply adds 4 MBytes of RAM.
11. E6501A allows a second mezzanine to be added (Option 031) but not a second IF channel since only one tuner front-end is included.
12. Includes E6404A IF processor with module Options 031 (second mezzanine) and 040 (second IF channel).
13. Includes E6404A IF processor with module Options 022 (second DDC) and 040 (second IF channel).
14. To configure more than two RF channels, call your Agilent sales representative for available custom configurations.

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Related literature	Pub. number
E6501A, E6502A, E6503A VXI Receiver Product Overview	5966-0165E
E6501A, E6502A, E6503A Data Sheet	5966-3344E
E6500A VXI Tuner Product Overview	5965-5769E

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