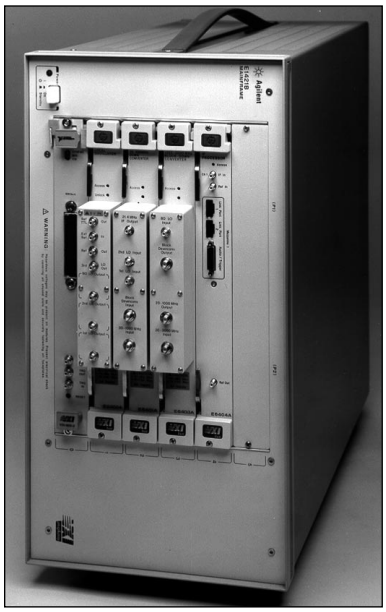
Agilent E6501A, E6502A, and E6503A VXI Receivers

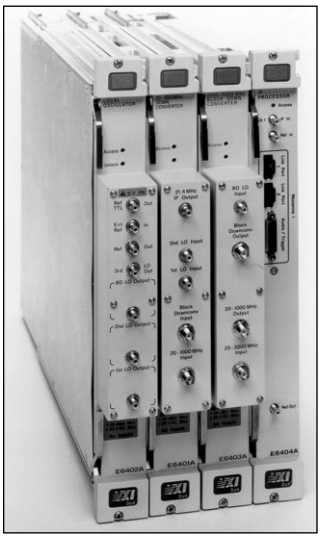
Product Overview

Agilent E6501A Option 003 receiver in optional six slot VXI mainframe with customer-supplied MXI interface, PC, and monitor

High-performance VHF/UHF receiver subsystems for systems integrators



Agilent E6501A Option 003 receiver in optional six slot VXI mainframe with customer-supplied MXI interface



Agilent E6501A Option 003 2 MHz to 3 GHz VXI receiver

Agilent Technologies

Innovating the HP Way

Surveillance and monitoring applications

Surveillance and monitoring of off-the-air signals places extremely high demands on RF receiver subsystems. The Agilent Technologies E6501A, E6502A, and E6503A VXI receivers meet the needs of systems integrators requiring the highest RF performance, modular flexibility, and multifunction and multichannel capability. Figure 1 illustrates the types of solutions that systems integrators must deliver to end-users in the spectrum monitoring and surveillance marketplaces. Applications typically cover three main scenarios: search, collection, and direction finding (DF). Search typically requires a dedicated scanning receiver. Collection, or monitoring, requires multiple handoff receivers to demodulate the signals of interest found by the search receiver. Direction finding subsystems utilize multiple antennas and multiple receiver front-ends each fed by a common local oscillator (LO). In summary, surveillance and monitoring systems require multiple receivers to measure multiple channels. Traditional systems have often utilized dedicated receivers for each of these three separate functions. While this offers ultimate flexibility and simultaneous operation, it does result in very large and expensive systems. An alternative to using dedicated hardware for each function, the E650X series receivers provide high performance, multifunction, multichannel receiver hardware along with VXI plug-and-play software drivers to systems integrators at a lower cost and requiring less rack space. This capability is described below.

The Agilent E650X family of receivers is shown in Figure 2. The E6501A 2 MHz to 1 GHz receiver consists of three VXI C-size modules. The E6501A Option 003 adds a block downconverter module to extend the frequency range to 3 GHz. The E6502A dual channel receiver provides two independent 1 GHz channels that allow simultaneous search and collection. Finally, the E6503A dual channel receiver with a shared LO provides systems integrators with the basis of a DF subsystem.

Note: Each receiver configuration is tunable down to 2 MHz. However, the specifications apply only to the 20 MHz to 3 GHz frequency range.

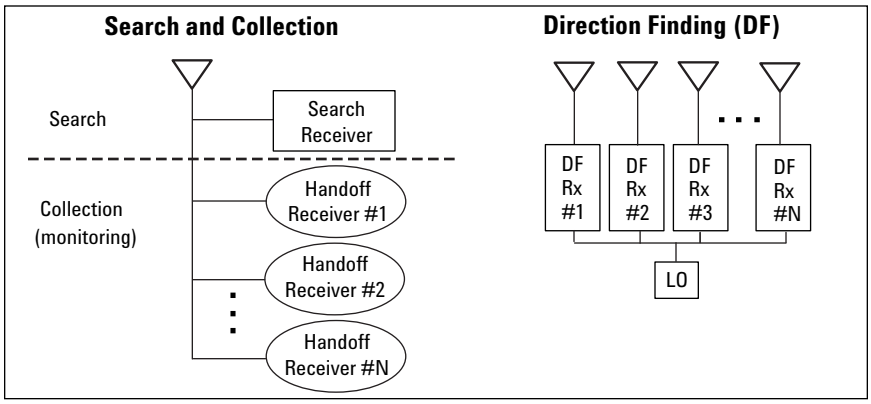


Figure 1. Surveillance and monitoring applications require high performance, multifunction, multichannel receivers such as the Agilent E650X series receivers.

Figure 2. The Agilent E650X series VXI receiver family includes many configurations such as the ones shown here: (left to right) the E6501A 1 GHz receiver, the E6501A Option 003 3 GHz receiver, the E6502A dual channel receiver with independent LOs in the optional six-slot VXI mainframe and customer-supplied MXI slot-zero interface, and the E6503A Option 003 dual channel receiver with a shared LO in the optional thirteen-slot mainframe and customer-supplied MXI slot-zero interface.

Agilent E6501A receiver

The E6501A, E6502A, and E6503A VXI receivers are different configurations based on a common set of VXI module hardware. Each receiver covers the 2 MHz to 1 GHz frequency range, extendable to 3 GHz with Option 003. (Specifications apply only to the 20 MHz to 3 GHz range.) The three receiver configurations will each be described individually, beginning with the E6501A. Refer to Figures 3 and 4.

Figure 3. The E6501A receiver covers the 2 MHz to 1 GHz frequency range.

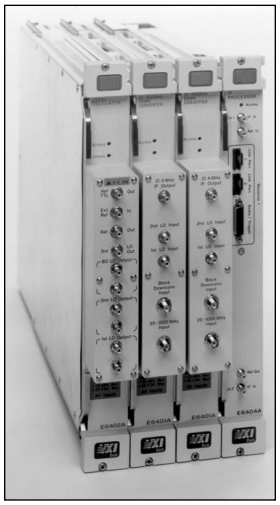


Figure 4. The E6501A Option 003 receiver covers the 2 MHz to 3 GHz frequency range.

The Agilent E6501A provides:

- Single RF input
- RF preselection
- 8 MHz bandwidth digitization
- DSP-based demodulation of up to 10 signals simultaneously (optional)
- Digital IF filters and digital I/Q outputs
- Reconfigurable and expandable to more channels
- VXI plug-and-play software drivers

The block diagram of the E6501A is shown in Figure 5. The 1 GHz base version consists of the E6401A 1 GHz downconverter module, the E6402A LO module, and the E6404A IF processor module. Option 003 adds the E6403A block downconverter module to extend the frequency range to 3 GHz. (The E6401A, E6402A, and E6403A modules are also used in the E6500A VXI tuner. Refer to the E6500A product overview, literature number 5965-5769E, for more information on the E6500A tuner.)

Note the configuration of the E6404A IF processor module. It processes the 21.4 MHz IF output from the E6401A downconverter module. The IF processor includes anti-alias filtering, gain control, a digitizer, one digital downconverter (DDC) extendable to a total of ten, and one digital signal processor (DSP) extendable to a total of two.

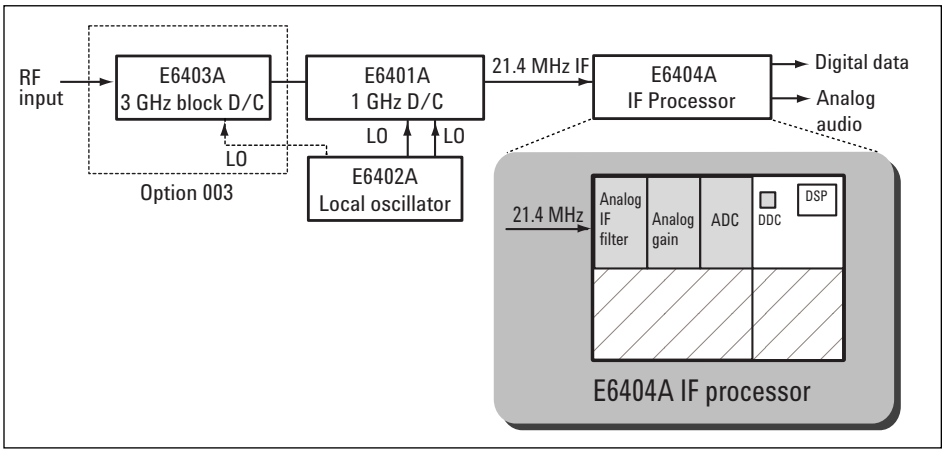


Figure 5. The E6501A receiver block diagram includes the 1 GHz downconverter module, local oscillator module, and IF processor module. Option 003 adds the 3 GHz block downconverter module to extend the frequency range to 3 GHz. The inset shows a simplified block diagram of the E6404A IF processor module.

Agilent E6501A, continued

E6404A IF processor

The Agilent E6404A IF processor VXI module block diagram is shown in Figure 6. It consists of two main PC-board assemblies: the host board and the mezzanine. The host board includes a bandpass filter section with three filter bandwidth selections, each centered at the 21.4 MHz IF. The 8 MHz filter provides anti-alias protection for the 28.533 Msample/sec analog-to-digital converter (ADC). Additionally, a 700 kHz and 30 kHz analog filter are included to provide enhanced adjacent channel rejection.

An amplifier with high-speed, adjustable –12 to +48 dB gain and accompanying correction RAM provide fast autoranging to maximize signal level to the ADC while minimizing the possibility of ADC overload. The mezzanine is a smaller PC board assembly that attaches to the host board. It includes a single DDC, a single DSP (Analog Devices Sharc), and 5 digital-to-analog converters (DAC). An additional four DDCs can be added to the mezzanine optionally. The DDCs provide several functions: digital filtering (36 choices from 247 Hz to 462 kHz), signal channelization and tuning in an 8 MHz range for digital drop receiver (DDR) capability, and digital I/Q signals to external devices.

The standard E6404A IF processor VXI module included in the E6501A receiver includes a single IF channel on the host board and one mezzanine with a single DDC (see Figure 6). Optional configurations of the IF processor provide a second IF channel on the host board and a second mezzanine (see Figure 7). Additionally, both mezzanines may include up to five DDCs each, providing a total of ten within the IF processor module. This dual channel IF processor configuration requires two front-end tuners, each providing a 21.4 MHz IF signal (refer to the E6502A configuration, Figure 17).

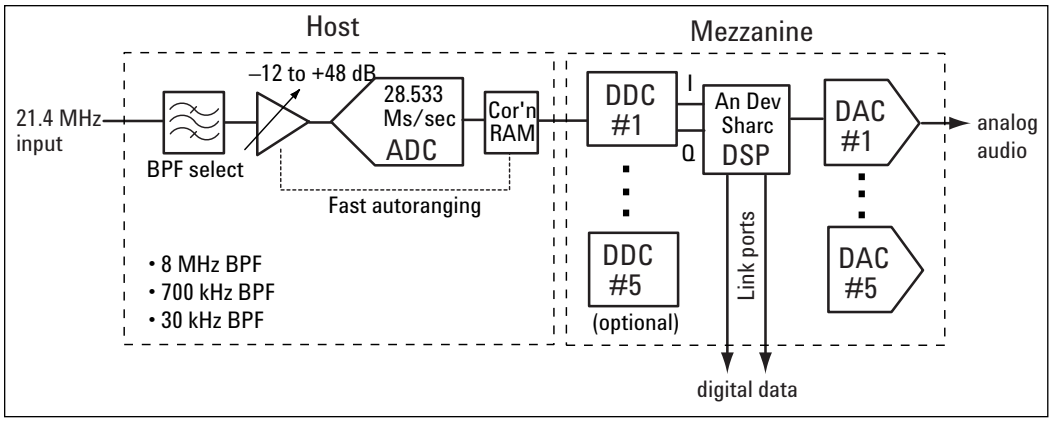


Figure 6. The E6404A IF processor VXI module block diagram illustrates digitization, digital filtering, and DSP functions. Both analog and digital outputs are available for further processing.

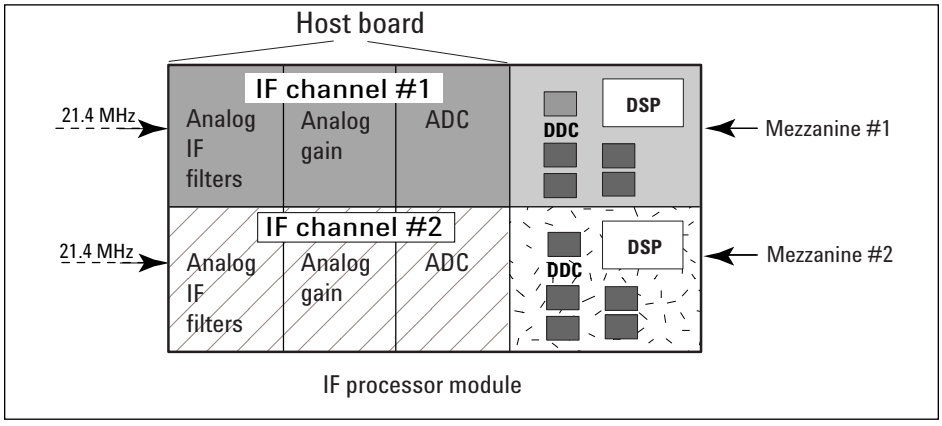


Figure 7. The E6404A IF processor module with optional second IF channel and second mezzanine board. The standard version of the module includes one IF channel and one mezzanine (with one DDC, one DSP, and five DACs). The second DSP, the additional nine DDCs, and the additional five DACs (not shown) are also optional.

Autoranging and dynamic range optimization

Surveillance and monitoring applications present challenging dynamic signal levels to surveillance receivers. Signal levels can vary over a large amplitude range, making it difficult for the receiver to respond with the right amount of gain to guarantee both the measurement of low-level signals and a response fast enough to protect the detector or digitizer from overload by high-level signals. Agilent E650X series digital receivers include sophisticated autoranging hardware and dynamic range optimization in the DSP to optimize the measurement of signals in a varying signal level environment. The variable gain amplifier, correction RAM, and DSP provide a feed-forward autoranging that is somewhat analogous to an analog receiver's automatic gain control (AGC). However, since the E650X series receivers are DSP-based digital receivers, the methodology is very different. In addition, the DDCs (digital downconverters) provide digital processing gain to enable the measurement of low-level signals. Dithering at the ADC input further reduces digitizer spurious to extend the dynamic range of the receiver. The spectrum display shown in Figure 8 illustrates how the autoranging automatically adjusts the gain depending on the signal levels measured in each 8 MHz band. Note how the noise floor decreases for adjacent bands, since the signal levels are lower and consequently the autorange gain can be set higher. This allows the receiver to accommodate large signals in one band without sacrificing sensitivity across the rest of the band. Refer to the E650X technical specifications (literature number 5966-3344E) for more information.

Signal collection (demodulation)

Traditionally, the signal collection process requires at least one handoff receiver to provide audio demodulation of the signal of interest. Traditional handoff receivers can only demodulate one signal at a time. Once the signal is demodulated or disappears, the receiver can be tuned to another frequency. If multiple signals are present, then multiple receivers are required, thus adding cost and size to the collection subsystem. Refer to Figure 9.

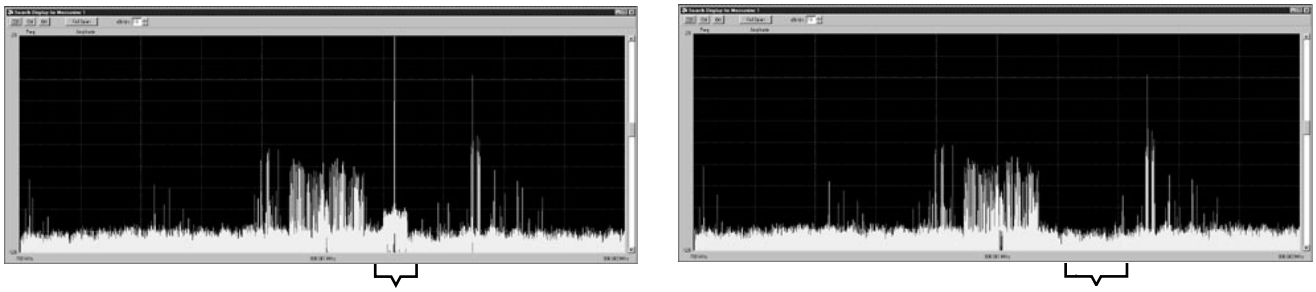


Figure 8. The E6501A receiver's autoranging automatically reduces the gain to prevent overload of the ADC converter in the bracketed 8 MHz band containing the high-level signal (see the display on the left). The gain is independently adjusted in adjacent bands, allowing higher gains and a corresponding lower noise floor, thus allowing low-level signals to be detected. The display on the right shows the same off-the-air spectrum without the high-level signal.

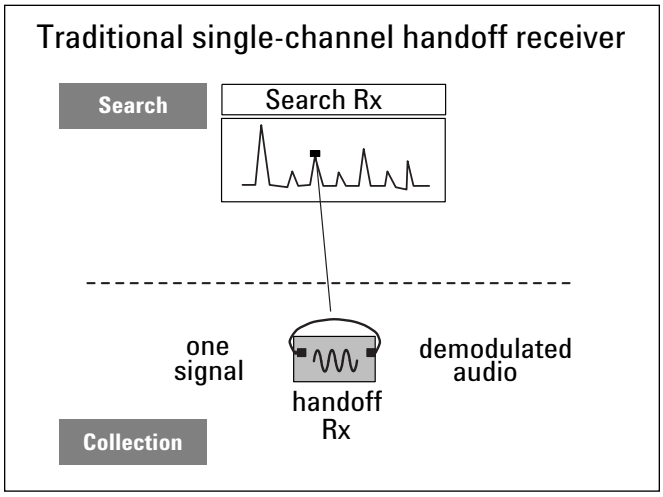


Figure 9. Traditional receivers can demodulate one signal at a time.

Agilent E6501A, continued

DDRs for signal collection

Agilent E650X series digital receivers provide a solution to the multiple handoff receiver problem. With the option of including up to ten DDCs, the E650X series receivers are capable of demodulating up to ten separate signals in an 8 MHz band (refer to Figure 10). The five DDCs on each mezzanine each tune to a separate signal for a total of ten signals. The DDCs not only provide this channelization, they also provide the digital IF filtering necessary to resolve the signals. The DSP on each mezzanine demodulates the signals using its internal AM, FM, PM, SSB, and CW algorithms. Thus, the DDCs combined with the DSP provide a unique and powerful DDR capability that saves cost and space over the alternative traditional solutions which require ten separate handoff receivers. This demodulation capability of ten signals simultaneously is valid for signals having bandwidths of approximately 30 kHz or less. (Wider bandwidth signals can be demodulated, but the total number of signals simultaneously demodulated will be less than ten.) Since the ten signals must be located in the same 8 MHz band (i.e., the tuning range of the DDCs), this DDR capability is often referred to as "band handoff." This is in contrast to the "channel handoff" of traditional receivers. Band handoff is also referred to as "stare," since the receiver LO is fix-tuned to an 8 MHz band, providing a higher probability of intercept (POI). The software driver included with the E650X receivers also provides traditional receiver functions such as automatic frequency control (AFC) and squelch.

Signal search

In addition to providing multiple simultaneous demodulation capability, the E650X series receivers can alternatively function as search receivers. For example, one E6501A receiver can provide high-speed search while the second E6501A provides "band handoff" demodulation of up to 10 signals simultaneously (refer to Figure 10). Note that the E650X does not include turn-key software to perform signal searches. Rather, the receivers include a VXI plug-and-play software driver for systems integrators to accomplish this function. By stepping the LO in 8 MHz steps and using the driver to provide the DSP-based FFT, a systems integrator can accomplish signal searches on the order of 2.8 GHz/second in a 10.4 kHz FFT bandwidth.

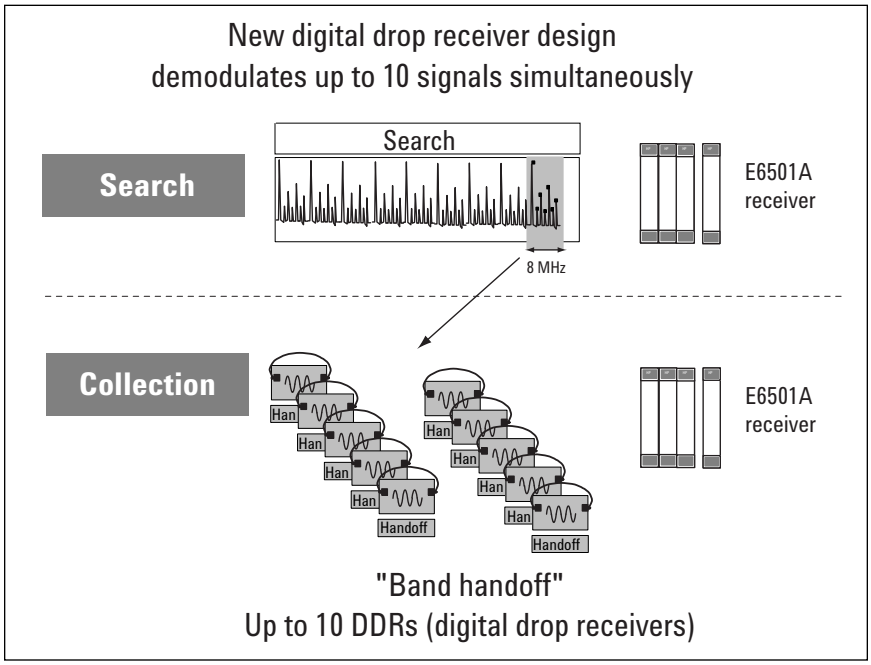


Figure 10. E650X series receivers are capable of demodulating up to ten signals simultaneously in an 8 MHz band. This saves rack space and cost when compared to alternative receivers which can only demodulate one signal at a time.

Analog and digital outputs

There are several ways to output analog and digital signals from the Agilent E650X series receivers. Refer to Figure 11. Demodulated analog audio is output from a special multi-pin connector on the E6404A IF processor module for connection to amplified speakers, headphones, and analog audio recorders. Alternatively, the audio can be digitized by external ADCs to create digital audio.

High-speed Sharc link ports on the IF processor can provide full-rate wide bandwidth digitized data from the analog-to-digital converter or digital I/Q data from the digital downconverters to external DSP devices or digital recorders.

Note that the internal DSP in the IF processor is dedicated to internal firmware functions like receiver tuning control, analog demodulation functions, and fast-fourier transforms (FFTs). The Sharc link ports can be used to output digital data to an external DSP for other applications such as additional demodulation algorithms. The external hardware and DSP algorithms must be supplied by the customer.

The E650X receivers are generally controlled by an external computer interfaced to a VXI slot-zero MXI module. To control the receiver and to display spectral FFT data on the PC, the slot zero MXI interface to the PC is used.

The E6404A IF processor module provides both the analog and digital outputs to customer-supplied devices for further processing and recording. The front panel of the standard IF processor includes two Sharc link ports and one multi-pin analog audio connector. The optional dual-channel IF processor shown in Figure 12 includes two sets of link port and audio connectors, since it includes two mezzanines.

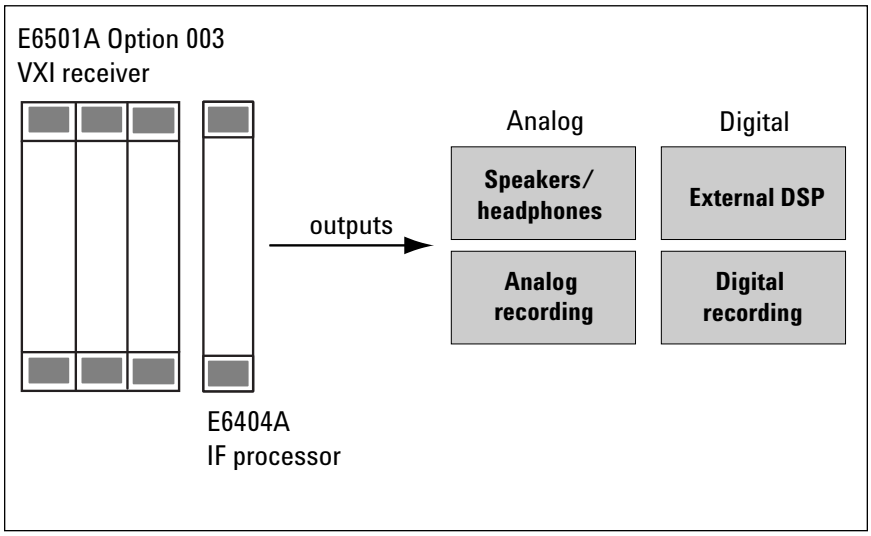


Figure 11. Analog and digital outputs are available from E650X receivers. Demodulated analog audio, digital I/Q data, and full-rate wide bandwidth ADC data can be output to customer-supplied devices.

Figure 12. The E6404A dual channel IF processor VXI module (shown with Options 031 and 040) includes two Sharc link digital output connectors and one multi-pin analog audio output connector per mezzanine. The standard model includes only one mezzanine.

Analog and digital outputs, continued

To accommodate ten analog audio channels, a separate external cable and audio breakout box kit is available (Agilent E3245A). Figure 13 illustrates that the kit provides ten mini-phone jack audio connectors to interface to ten sets of headphones or ten amplified speakers.

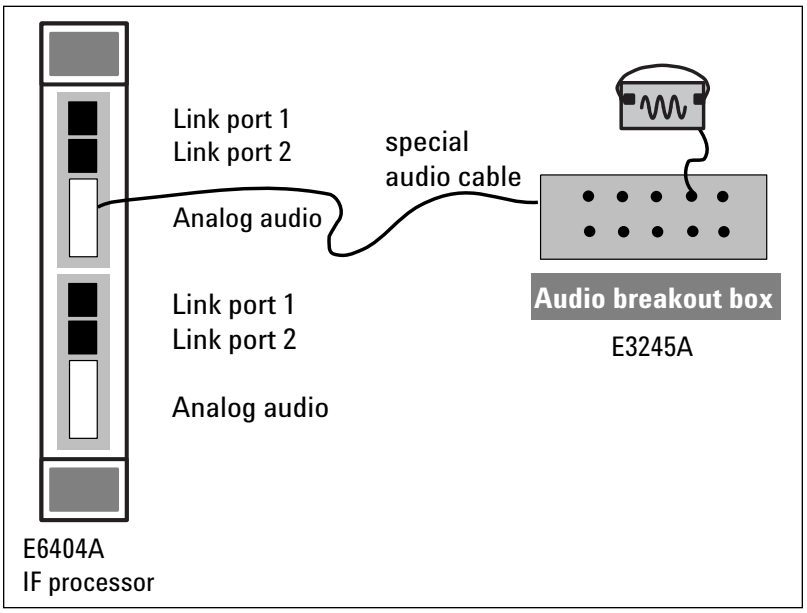


Figure 13. An external audio breakout box accessory (E3245A) can be used to distribute up to ten analog audio channels to headphones or amplified speakers. (E6404A shown with optional second mezzanine.)

The table in Figure 14 illustrates the wide range of analog and digital output selections available from the Agilent E650X series receivers. If the option to include ten DDCs is ordered, each receiver can provide up to ten simultaneous analog audio channels or up to ten digital I and Q channels. The actual number of signals simultaneously demodulated depends on the IF bandwidth selected.

Analog	**Parameters**
audio	247 Hz to 462 kHz DDC BW (15 kHz maximum audio BW; up to 10 signals)
Digital (Link ports)	**Parameters**
full rate data	28.533 Msamples/sec (16 bit samples) (using 2 Sharc link ports)
digital I/Q data	247 Hz to 462 kHz DDC BW (up to 10 signals)

Figure 14. E650X receivers provide analog audio outputs and two formats for digital outputs. Note that the total number of simultaneous demodulations depends on the IF bandwidth selected.

Agilent E6502A dual channel receiver

The E6502A dual channel receiver provides two independent receiver channels, each with its own LO. Refer to Figures 15 and 16.

The Agilent E6502A provides:

- Two independent receivers for simultaneous search and collection
- RF preselection
- 8 MHz bandwidth digitization
- DSP-based demodulation of up to 10 signals simultaneously (optional)
- Digital IF filters and digital I/Q outputs
- VXI plug-and-play software drivers

Figure 17 illustrates that a dual channel IF processor module can accommodate two RF tuner channels, thus saving cost and space. The module includes two IF channel paths and two separate mezzanines.

Since the E6502A is a dual channel receiver with independent LOs, it can be used in two different modes (refer to Figure 18). The first mode uses the first channel to perform search while the second provides band handoff with five DDRs over an 8 MHz "stare" band. The second mode suspends the search and allocates both receivers to band handoff with ten DDRs over a 16 MHz "stare" band.

The two receivers may be tuned to side-by-side 8 MHz bands or independently tuned to two 8 MHz bands anywhere in the 1 GHz tuning range (or 3 GHz with Option 003). Wider stare ranges can be achieved with the E650X flexible VXI architecture by adding more channels.

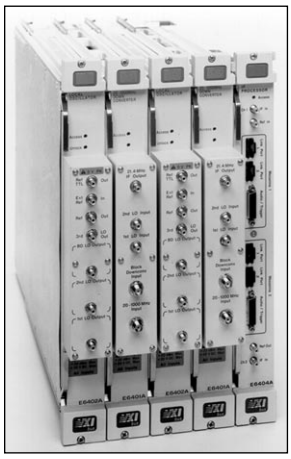


Figure 15. The E6502A dual channel receiver (independent LOs) covers the 2 MHz to 1 GHz frequency range.

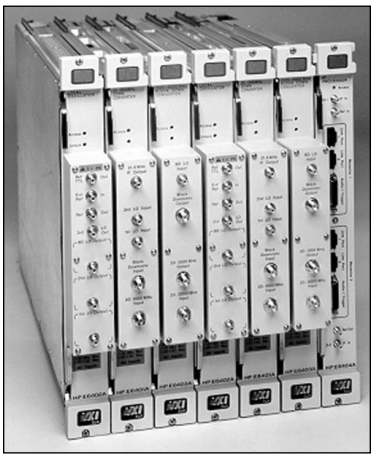


Figure 16. The E6502A Option 003 dual channel receiver (independent LOs) covers the 2 MHz to 3 GHz frequency range.

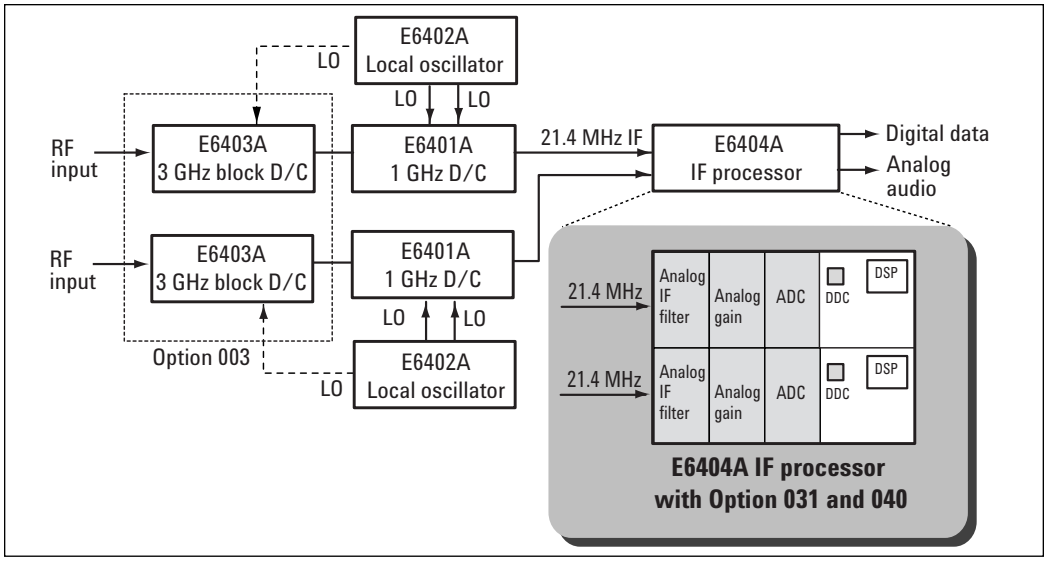


Figure 17. The E6502A VXI receiver includes two independent tuner channels and a dual-channel IF processor module.

Agilent E6502A dual channel receiver, continued

The E6502A receiver provides two independent 2 to 1000 MHz channels and fits into a compact six-slot VXI mainframe. Using an MXI slot-zero interface to a PC, the E6502A provides the basis of a compact search and collection receiver subsystem. (The PC and MXI interface cards must be ordered separately.) To assist systems integrators in building their own turnkey systems, a VXI plug-and-play software driver and Windows NT® demo virtual front panel are provided at no extra charge with the receiver.

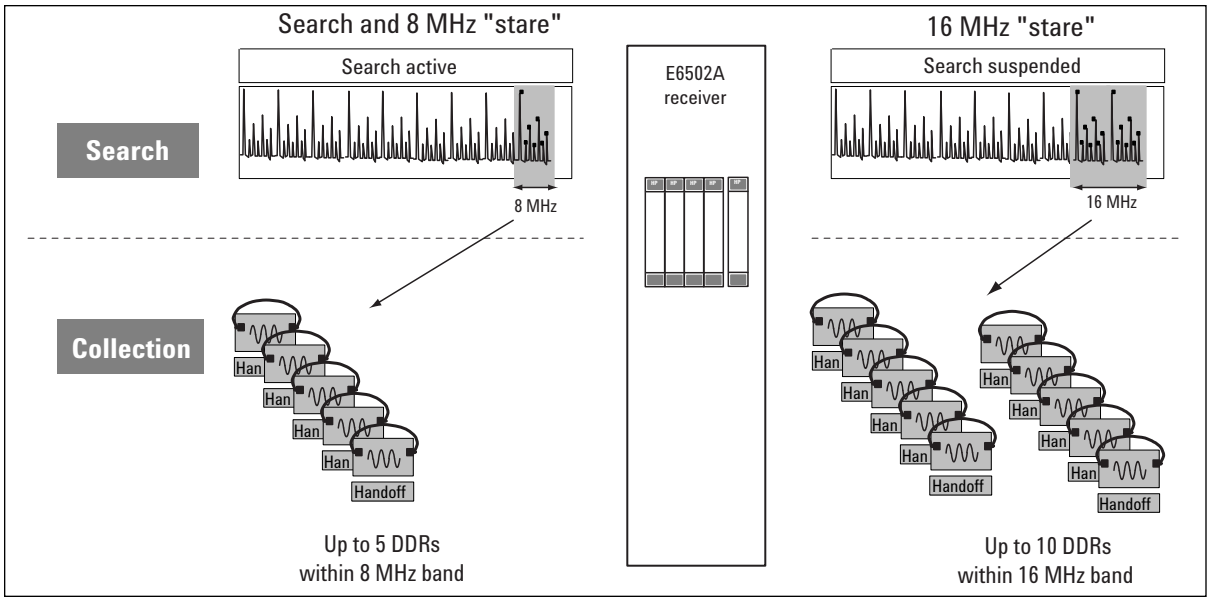


Figure 18. Search and collection (stare or band handoff) modes can be switched quickly to accommodate changing signal environments. Search and stare with five DDRs for demodulation can be performed simultaneously using the two independent channels on the E6502A. Alternatively, both channels can be dedicated to stare to allow demodulation of up to 10 signals simultaneously.

Figure 19. Operating the receiver requires additional accessory equipment such as a PC, an MXI interface card set (VXI and PCI cards), and customer-written software. VXI plug-and-play software drivers for the E650X receiver are provided at no charge to assist the systems integrator. (The E6501A Option 003 receiver is shown here.)

Agilent E6503A dual channel receiver

The E6503A is a dual channel receiver with a single common LO. The primary purpose of this configuration is to provide a two channel receiver for DF applications. Refer to Figures 20 and 21.

The Agilent E6503A provides:

- Two channel subsystem for DF applications
- RF preselection
- Synchronized DDC channels between IF processor modules
- 8 MHz bandwidth digitization
- DSP-based demodulation of up to 10 signals simultaneously (optional)
- Digital IF filters and digital I/Q outputs
- VXI plug-and-play software drivers

For DF applications the two channels must be tuned to the same frequency, so each channel is driven by the same LO. Each RF input is connected to a separate antenna or spatially diverse elements of the same antenna. The E6404A IF processor module includes two DDCs, each tuned to the same frequency. This provides digital I and Q data or wideband full-rate ADC data to third party (systems integrator) DF processors, which can compare the phase and amplitude of the two channels and provide a line of bearing. Refer to Figure 22.

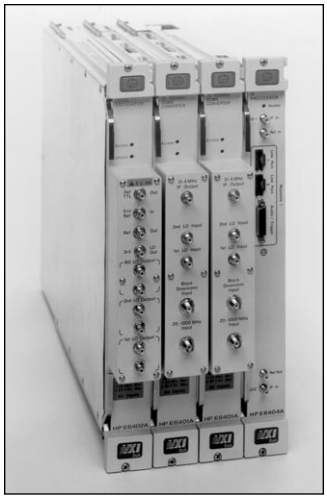


Figure 20. The E6503A dual channel receiver (shared LO) for DF applications covers the 2 MHz to 1 GHz frequency range.

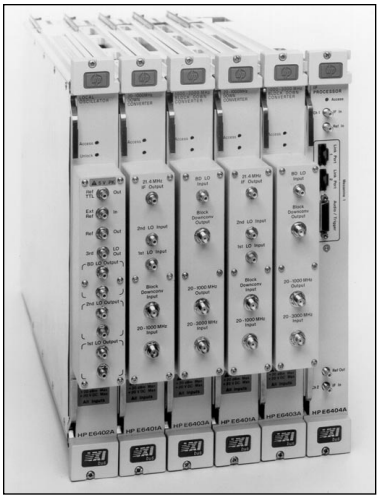


Figure 21. The E6503A Option 003 dual channel receiver (shared LO) for DF applications covers the 2 MHz to 3 GHz frequency range.

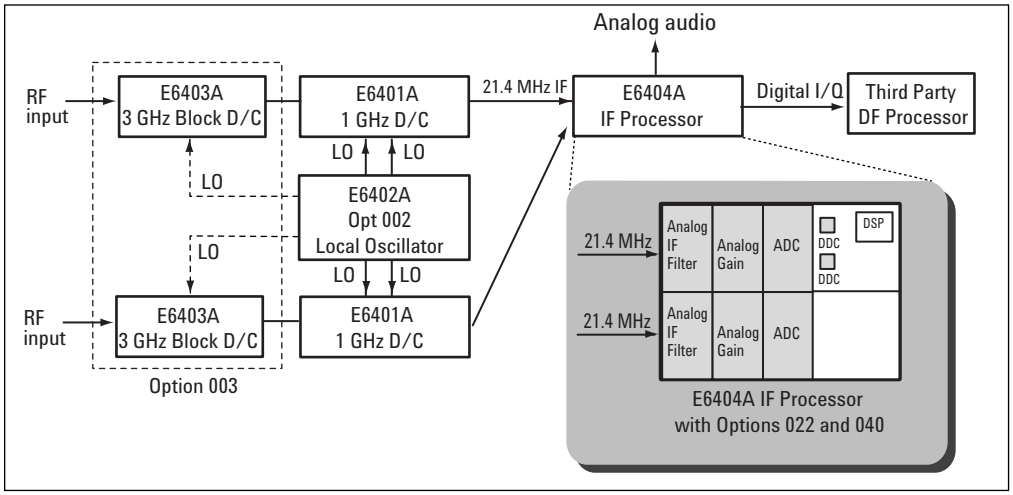


Figure 22. The E6503A dual channel receiver provides systems integrators with a subsystem for DF applications. The systems integrator must provide the DF processor, antennas, and software.

Agilent E6503A dual channel receiver, continued

Although the E6503A is a two channel receiver, its modular VXI architecture provides a flexible growth path for systems integrators requiring more channels. Figure 23 shows an example of a custom-engineered six channel 1 GHz configuration. The six downconverters feed three dual-channel IF processors to provide digital I and Q outputs. A custom LO distribution amplifier VXI module is required to distribute the LO signals from the single LO module to each of the six downconverters. (It has the capability to distribute to a maximum of ten channels.) Consult your Agilent sales representative for more information on custom capabilities such as systems having greater than ten channels.

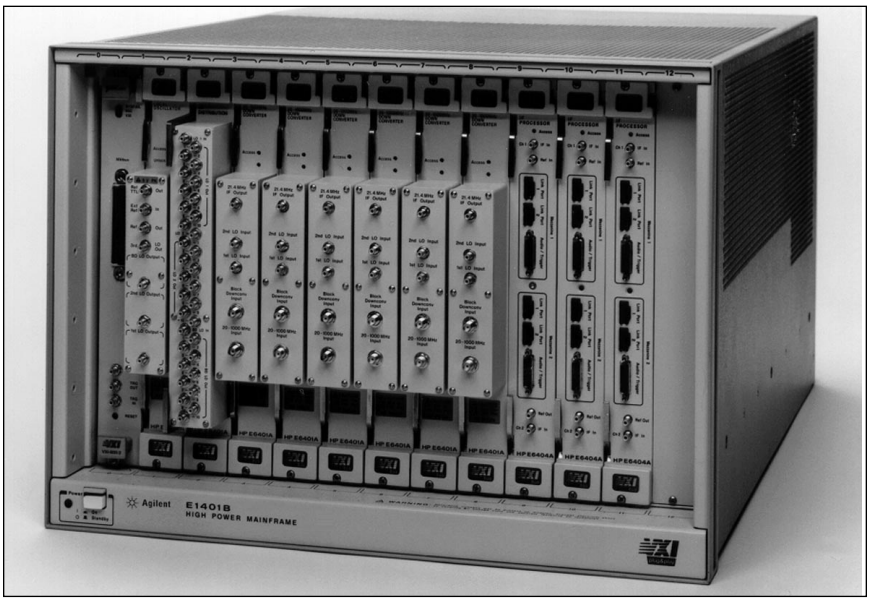


Figure 23. A six channel receiver subsystem employing a shared LO module, a custom LO distribution module, six 1 GHz downconverter modules, and three dual channel IF processor modules. An MXI card, PC, DF processor, DF software, and antennas are customer-provided.

VXI plug-and-play drivers

The E650X series VXI receivers include industry-standard VXI plug-and-play drivers for systems integrators to use in developing turn-key signal search, collection, and DF systems. As Figure 24 illustrates, the instrument driver is the main component of the plug-and-play architecture. In addition, the E650X receiver DSP commands and virtual front panel (VFP) provide interfaces to the driver. Industry-standard VISA I/O interface libraries are also provided. The driver runs on a Windows NT operating system. To allow the driver to be recompiled on other operating systems such as UNIX, source code for the driver only is provided to the systems integrator at no charge. (Note: the E650X receivers include plug-and-play drivers. The E6500A tuner does not).

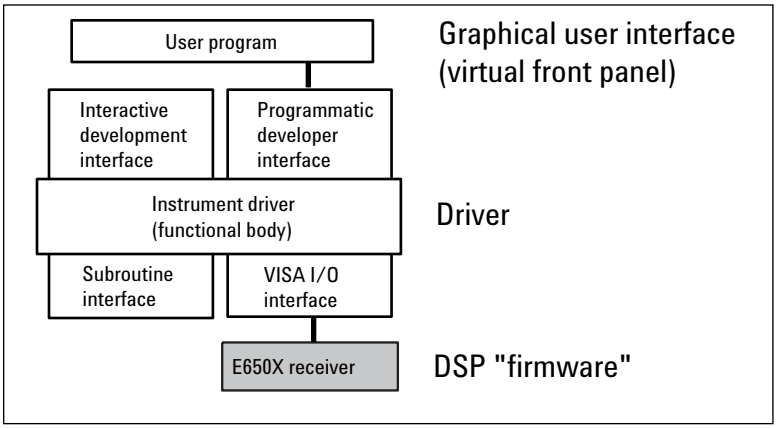


Figure 24. A VXI plug-and-play driver provides systems integrators with a powerful software tool to write their own application software and GUI to control the E650X receivers.

Virtual front panel demonstration software

A graphical user interface (GUI) for the E650X receivers must be provided by the systems integrator to meet the specific needs of the end-user. An example VFP written by Agilent is included with each receiver to provide the integrator with a means of demonstrating the capabilities of the receiver (refer to Figure 25). It is demonstration software, has limited functionality, and is not intended for field use. The source code is not provided for this demonstration software.

The signal search window displays a 2 MHz to 1 GHz frequency scan using consecutive 8 MHz FFTs generated in the internal DSP. The middle display is a zoom window that provides an expanded view of an 8 MHz band selected by a cursor in the search window. The lower three displays provide a narrowband "IF pan" window with a span set by the DDC bandwidth, centered around the three largest signals. A control panel (not shown) sets the frequency, digital IF bandwidth, demodulation type, and DDC tuning.

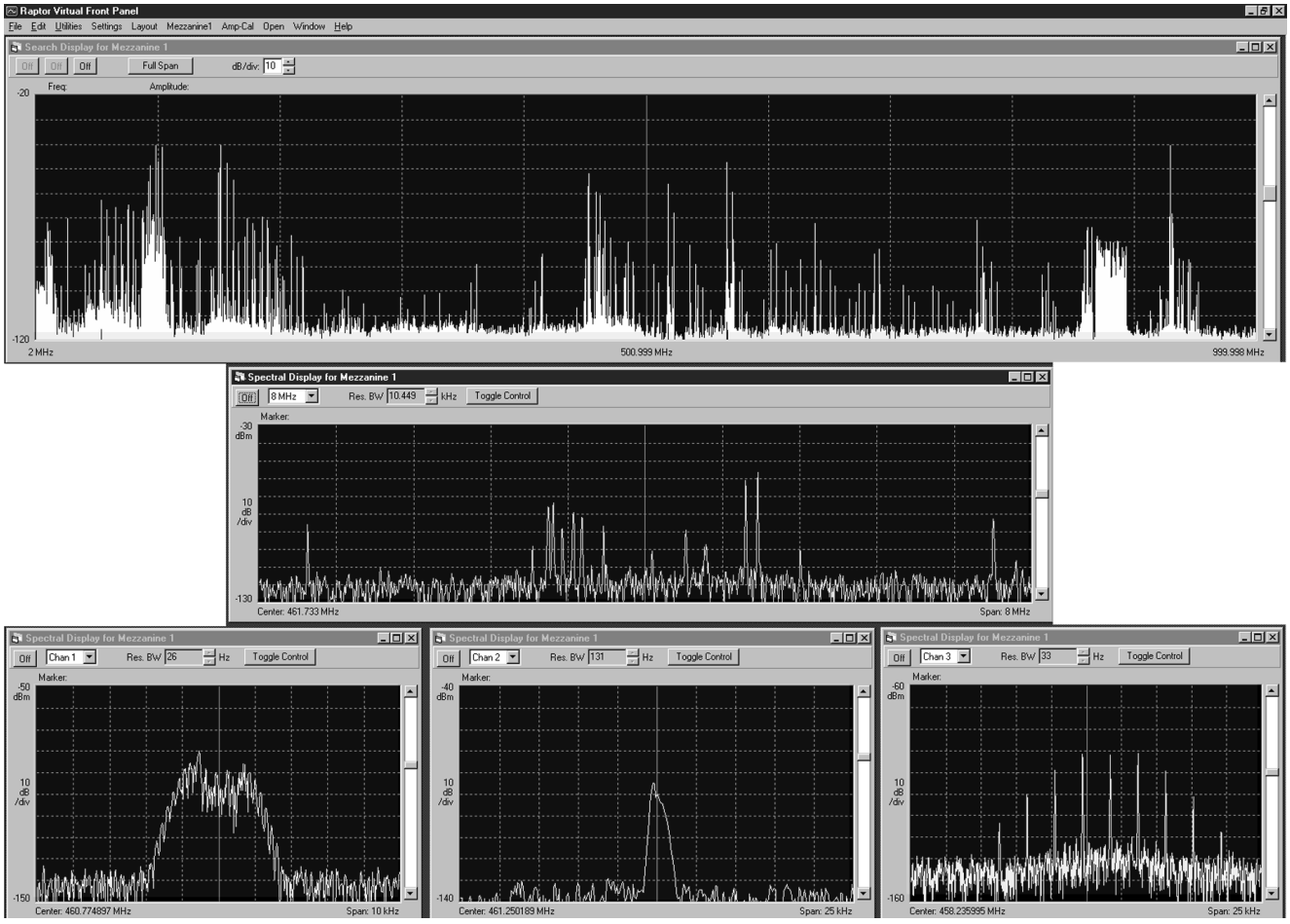


Figure 25. E650X receiver demonstration software (virtual front panel) provides an example of how systems integrators might use the plug-and-play software drivers to design their own GUI.

Multifunction/multichannel capability for systems integrators

The Agilent E650X series VXI receivers provide exceptional hardware performance and VXI plug-and-play software capabilities to make systems integrators successful in delivering solutions to their surveillance and monitoring customers. Current solutions often include dedicated receivers for each measurement function—search, collection, and direction finding. While this approach allows measurement functions to occur simultaneously, the hardware costs and space requirements can exceed desired budgets.

The E650X receivers can also be used for separate functions, while providing outstanding RF performance in a smaller size and often at a lower price. Alternatively, for those mission requirements that cannot afford nor require simultaneous measurements because cost and size are critical, the E650X receivers provide excellent value.

Figure 26 illustrates the two-channel E6502A in a compact six-slot VXI mainframe. When attached to a PC with system integrator software added, this platform offers four key measurement functions: search and collection (8 MHz stare with five digital drop receivers); collection only (16 MHz stare with ten digital drop receivers); two channel phase-locked downconversion to digital I and Q for direction finding; or simultaneous search over two separate bands. Since the receivers are DSP-based, mode switching from one function to the next is fast and seamless.

(Note that the E6502A provides phase-locked downconversion for DF. For coherent downconversion, refer to the E6503A dual channel receiver which uses a common LO.)

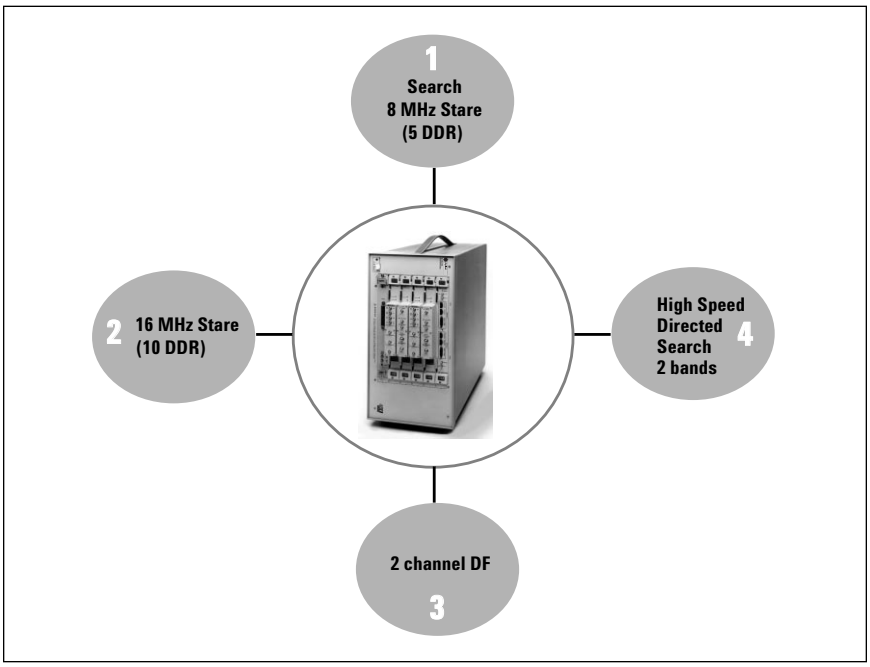


Figure 26. E650X receivers provide multifunction and multichannel capability which is easy to reconfigure (often just by software mode switching) to quickly meet changing mission requirements. Application modes on which systems integrators can build include search, collection (stare or band handoff), and DF.

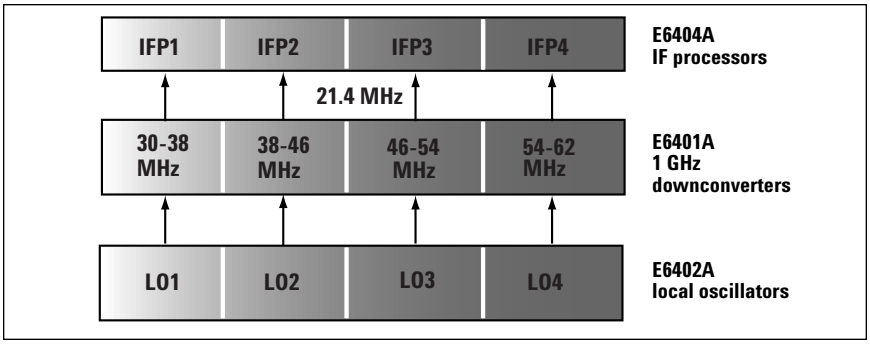


Figure 27. Adding more channels is easy with a modular VXI platform. This example illustrates a four-channel system, which provides 40 DDCs over a 32 MHz stare range to allow demodulation of 40 signals simultaneously. Each channel is 8 MHz wide and can be positioned anywhere in the 2 MHz to 1 GHz frequency range using this configuration. Coverage to 3 GHz requires the 3 GHz downconverter module for each channel.

To see this multifunction and multichannel receiver capability even more clearly, consider the application where the highest probability of intercept (POI) over a 32 MHz frequency band is desired (refer to Figure 27). Since each receiver can "stare" at 8 MHz, four E6501A receivers can cover the 32 MHz range and provide up to 40 DDRs (for simultaneous signal demodulations). Other more traditional approaches would require 40 single channel receivers, which are much more costly and occupy significantly more space.

With the four-channel receiver just described, the simultaneous measurement function combinations increase significantly when compared to the two channel case. Figure 28 illustrates the flexibility of the E650X series receivers in meeting the needs of end-users as measurement needs dynamically change from one moment to the next. The thirteen-slot VXI mainframe provides a very compact platform for the four channel receiver described in Figure 27—twelve slots for the receivers and one for the MXI module.

Note that for DF applications using this multi-LO configuration, the 10 MHz references of the LOs must be phase-locked together and calibrations performed each time the receiver is tuned. For improved performance, the hardware can be easily reconfigured with a single LO module driving all four downconverters to provide coherent downconversion with calibration required on a periodic basis only. A custom LO distribution module is also required for configurations having more than two channels.

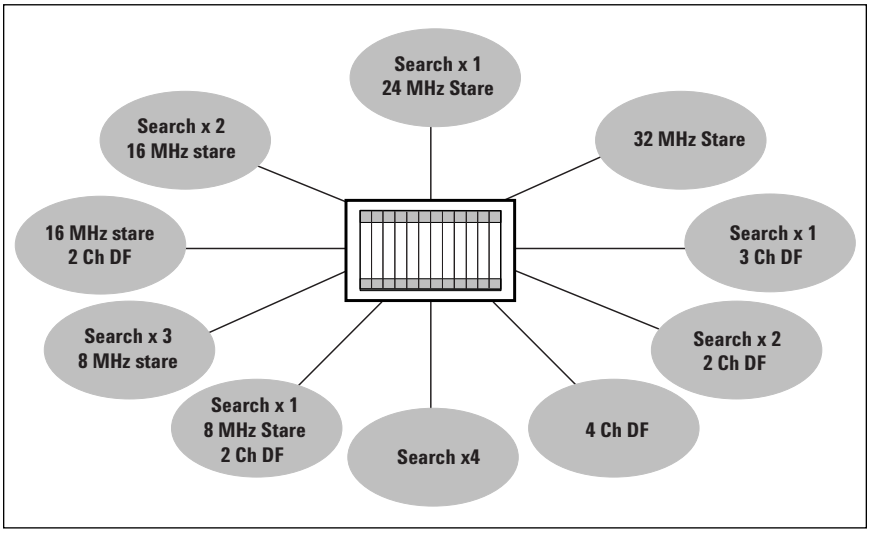


Figure 28. Increasing the number of channels significantly increases the possible functional configurations that can be employed in fast-changing mission requirements. This is a four-channel subsystem that fits into a compact thirteen-slot VXI mainframe. Simultaneous 32 MHz stare, search and 24 MHz stare, or 4 channel phase-locked DF are just a few examples of the modes available.

Compatibility with the E3238

The Agilent E650X series tuner and receivers are used in two primary scenarios. One use is as system building blocks by systems integrators for developing their own turn-key systems. The other is as an integrated part of the Agilent E3238 signals development system. The E6500A VXI tuner with Options 001 and 003 provide a preselected downconversion front-end for the E3238 system (refer to Figure 29). Additionally, the E6501A VXI receiver can be used as a "band handoff" receiver for the E3238 for demodulation of up to ten signals simultaneously. Be sure to order the proper options on the E6501A for this capability. Refer to the configuration guide (literature number 5966-2974E).

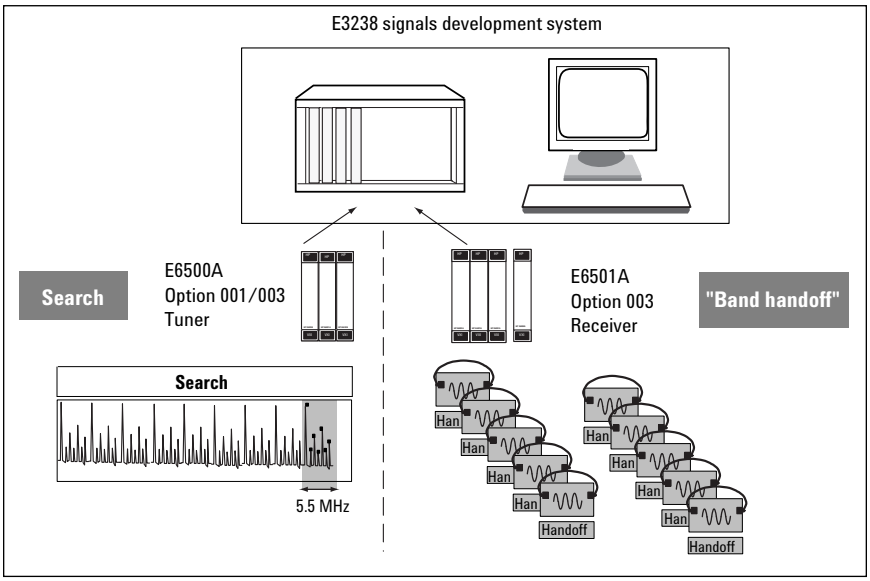


Figure 29. The E650X tuner and receivers can be included in the E3238 signals development system.

For further information

The Agilent E650X receivers provide systems integrators with multi-function, multichannel building block hardware accompanied with software drivers to integrate flexible, reconfigurable monitoring and surveillance systems. Contact your Agilent sales representative for more information on the E6501A, E6502A, and E6503A VXI receivers.

Related literature	Pub. number
Agilent E6501A, E6502A, E6503A VXI Receivers Data Sheet	5966-3344E
Agilent E6501A, E6502A, E6503A VXI Receivers Configuration Guide	5966-2974E
Agilent E6500A VXI Tuner Product Overview	5965-5769E

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