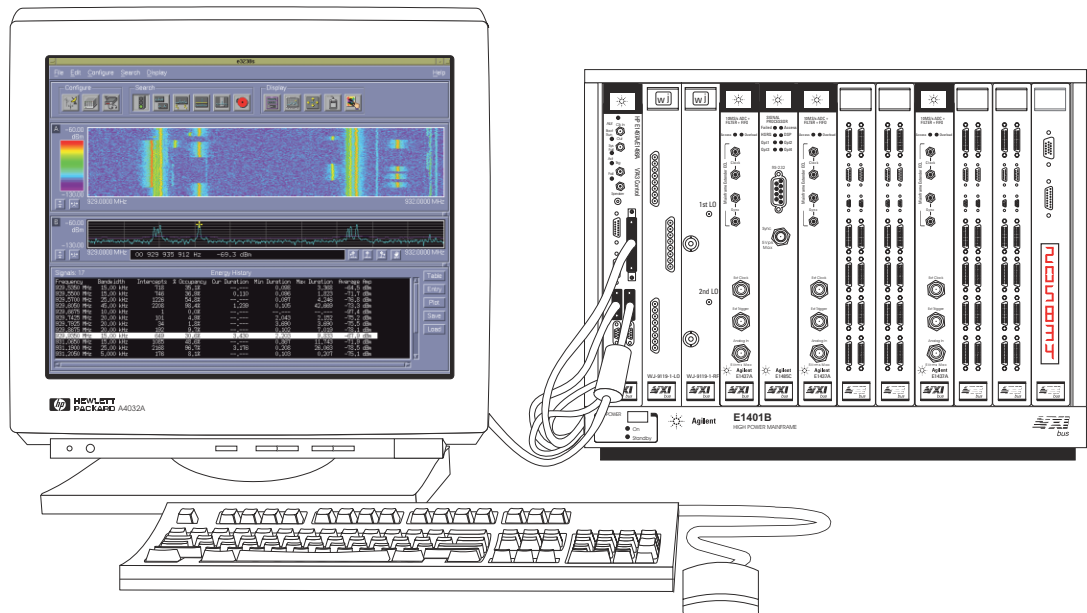
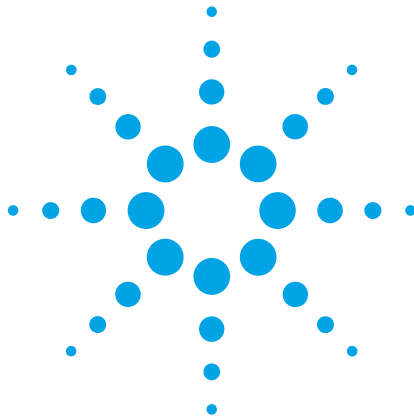


Agilent E3238 Signals Development System

Option ASH User Signal Processing

Product Overview



Expand the capabilities of your Agilent E3238 signals development system by adding the user signal processing Option ASH. This option helps you tightly integrate your custom signal detection identification algorithms into the E3238 software.



Agilent Technologies
Innovating the HP Way

More ADC and DSP power

Add one or two sets of “channelizer” hardware (see figure 1) to the E3238 platform to support your user signal processing algorithms. Each set of hardware includes an ADC module and a set of DSP modules. A delay memory module can be added as well.

The dedicated ADC in the channelizer gives your signal processing routines an independently controllable wideband resource for digitizing suspect signals. Your algorithms get the data they need no matter what the search

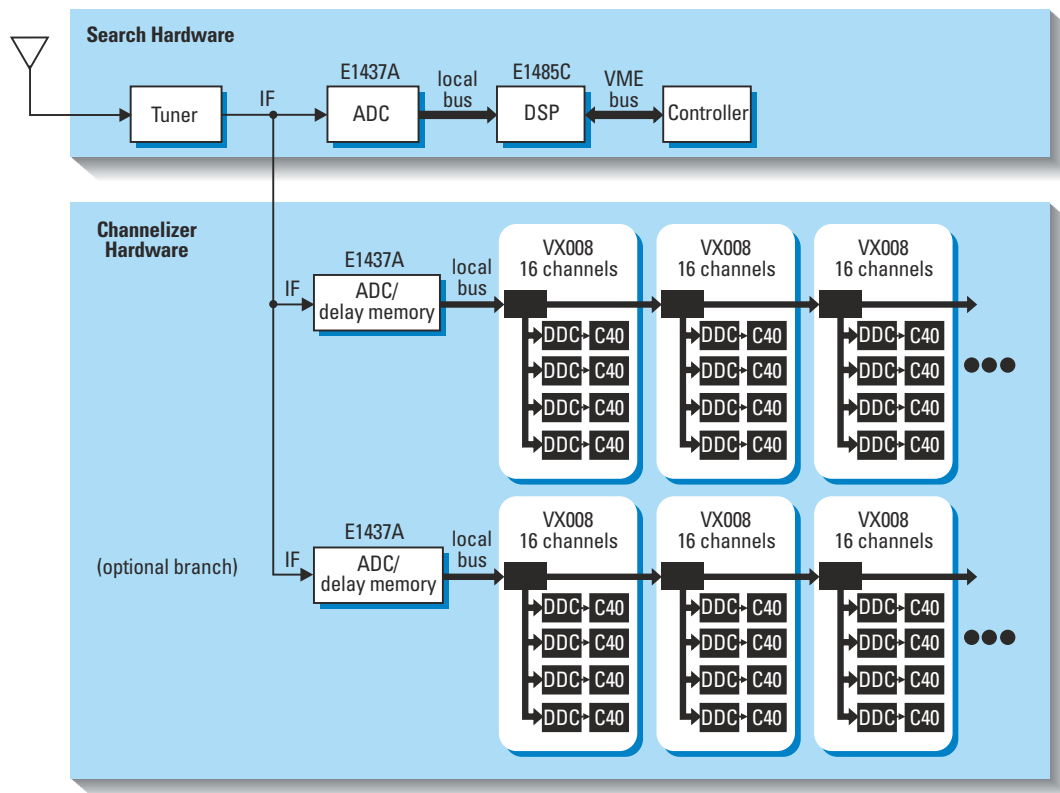
ADC is programmed to do. This helps speed signal processing and reduce software complexity.

Configure the DSP hardware to meet your signal processing needs. The standard SCMVX008 DSP module includes two 60 MHz TI TMS320C40 digital signal processors, and six TIM¹ slots for adding more processing. Use these slots for additional general purpose C40s or add digital downconversion. Option 040 for the SCMVX008 is a four-channel programmable digital downconverter (DDC) on a TIM card.

Each channel is independently programmable in frequency, and group programmable in bandwidth, so you can isolate four signals with a single Option 040 DDC. The SCMVX008 supports Agilent Local Bus for real-time transfer of wideband data from the ADC.

When first-syllable or first-bit capture is key, delay memory is a must. Option ASH user signal processing supports digital delay memory implementation. For short delays use the FIFO RAM memory in the ADCs. For longer delays use one, or many, 2 GB deep E9830 VXI delay memory modules.

Figure 1:
Option ASH
channelizer
example block
diagram.



¹ The Texas Instrument Module (TIM-40) form factor for the C40 is a widely accepted mezzanine card standard created by Texas Instruments.

Software libraries make the job easier

Option ASH provides host and target libraries to speed the integration of your signal identification code into the E3238.

The host code includes a shared library link² that simplifies control of your channelizer hardware. All you have to do is write a shared library giving the configuration and addresses of the hardware. The link provides a Motif menu and hardware commands to control and display the status of the ADC, DSP and delay memory hardware.

Option ASH provides a second shared library link for monitoring activity in the DSP modules as your signal identification routines execute. The libraries include a predefined Motif window and example code to help speed the generation of your own DSP activity monitor. You decide what appears in the window: implement an eye-diagram, or constellation diagram, or practically any display that best serves your monitoring needs. Display ASCII text or ones and zeros if required. Follow the Agilent example code to add a pending frequency list and a DDC channel assignments list.

Figure 2: Option ASH channelizer hardware control menu.

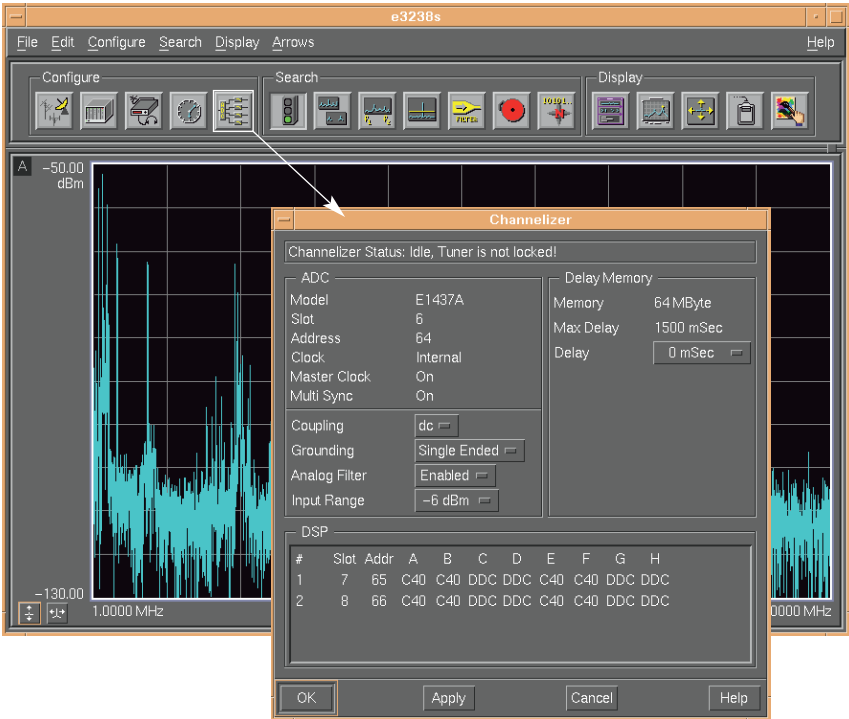
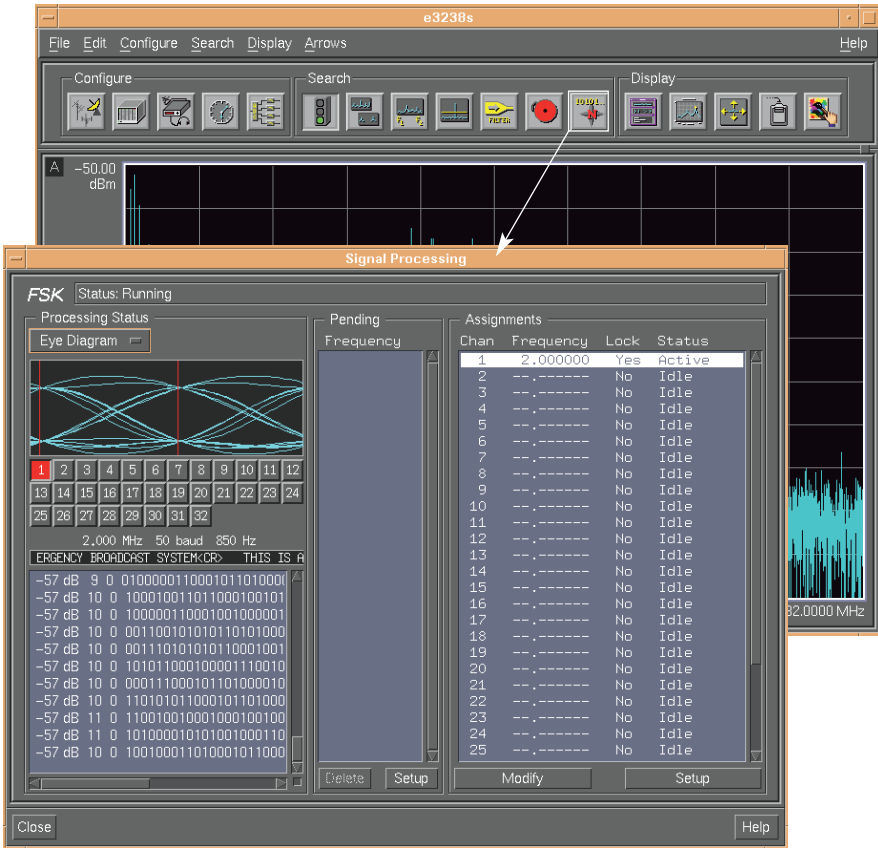


Figure 3: Option ASH example program signal processing menu.



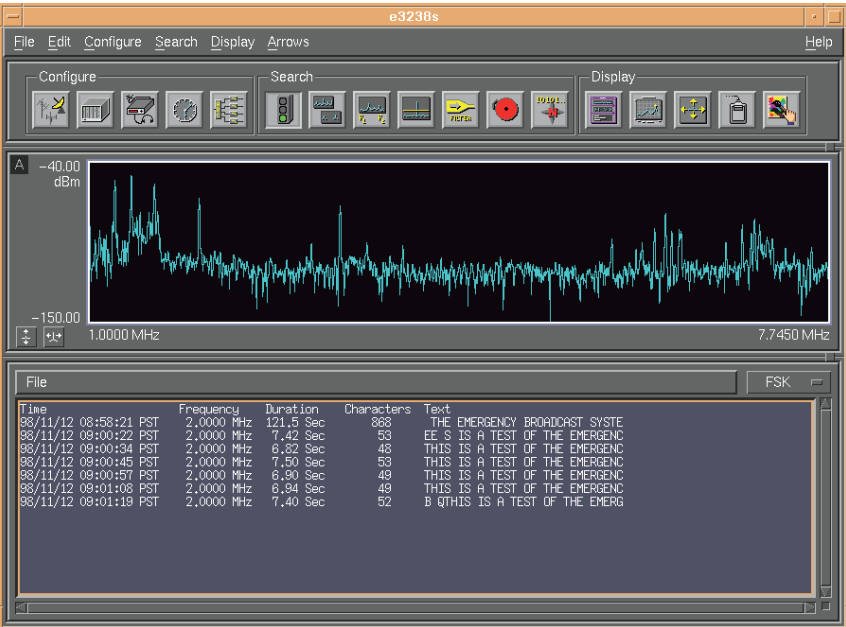
² A shared library contains position-independent code that is linked to a pre-defined point in the main program at run time.

Generating routines to run in the DSP modules is simplified by the C40 target libraries supplied with Option ASH. Signal processor target libraries provide tools for host-to-target and target-to-host communication, data flow management and results retrieval. These libraries handle the details of data movement between ADC and DSP and from DSP to host for you. Just use the Option ASH library function calls in your code.

Option ASH also offers host-resident database tools for gathering the results of your user signal identification processing. Build the database structure that best fits your signals of interest. Start with the Agilent example database where each record includes date/time, frequency and duration of the signal along with the number of characters in the message and the text of the message. Modify this any way you choose. Add SNR, signal type, confidence level, baud, shift, azimuth, and more. Create signal specific forms or reports to display signal information the way you want it.

Take action on the data you store in your signal database. The E3238 alarm function can access this database to search for particular signals of interest and can be programmed to assign receiver and DF assets to those signals. All of the standard alarm functions and tasks are available for your mission.

Figure 4: Option ASH example program signals database.



Developing user software for Option ASH

Option ASH is not a development environment but it does provide a number of examples and complete instructions for writing software to work with all of its features. To help speed program development, example code is documented in the user manual and shipped as part of the ASH code. All file and data formats are documented in the manual as well.

Option ASH capabilities are compatible with ANSI C code only. To develop programs compatible with this option you will need to purchase ANSI C development software and have knowledge of:

- Basic HP-UX operation and system administration
- C programming language
- The X11 Windows CDE environment
- X11 Windows and Motif programming (for GUI development)
- A text editor such as vi
- Software development tools (i.e. make, cc, ld, xdb)

Agilent provides training courses for some of these topics. Contact your local representative for more information.

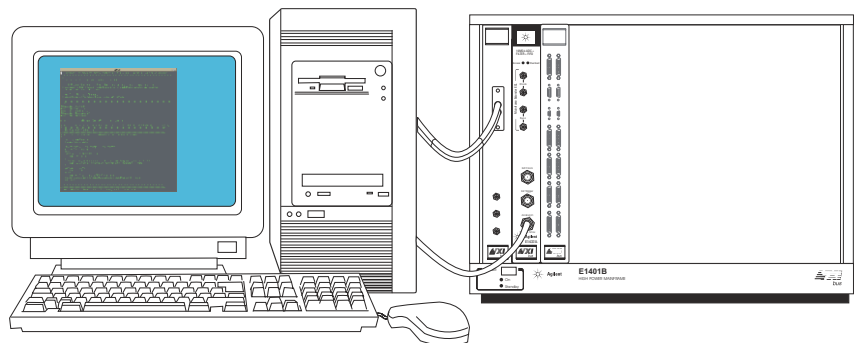
Generating software to integrate with the E3238 and Option ASH can be divided into three areas: host program, target program, and signal database.

Developing the host-based shared libraries requires a fully operational E3238 system. These libraries send commands to the target to configure the channelizer hardware and perform the appropriate processing. The resulting data is returned to the host for further processing and entry in the signal database.

Developing the signals database requires only an HP-UX workstation running the E3238 code in its “nohardware” (no VXI modules) mode. This code may also be developed on a fully operational E3238.

Developing C40 DSP target programs requires a Windows NT[®] PC workstation and C40 code development software. We also recommend using the E2748A VXI Vector Waveform Generator connected to the PC with a MXI 2 interface. The E2748A hardware can simulate signals for the target code to identify or demodulate.

Figure 5:
Windows/NT
PC workstation.



Windows NT is a U.S. registered trademark of Microsoft Corporation.

The Agilent E3238 Signals Development System

The E3238 is a commercial-off-the-shelf, VXI-based, modular wideband signals development system capable of sweep rates in excess of 2.6 GHz/s. It has many features to complement and leverage this speed.

Select from two search modes.

Use General Search for wide spectrum monitoring or as part of an environment characterization. Use the DIRECTED SEARCH mode to sequentially scan 100 individual spectrum segments without wasting time on the spaces in between. Each segment is user programmable for start and stop frequency, RBW, averaging and antenna used. Use the TUNER LOCK search mode to stare continuously at a section of spectrum. Section size depends on the tuner and ADC you select for your system and ranges from 2.0 MHz to 7.0 MHz

Use the mouse-controlled manual signal isolation tools in the E3238 directly on the signal trace. You don't have to take your eyes from an elusive signal to tune to it. Just drag a box around it with the mouse and the system will zoom the display to that signal. Place the cursor on the signal and press a mouse button to activate the frequency and amplitude marker. Assign a hand-off receiver to the signal with a simple drag-and-drop operation.

A selection of signal energy thresholds automatically isolates potential signal energy from noise energy. The LEVEL threshold is best for the VHF/UHF environment where the noise floor is flat. The adaptive AUTO threshold will automatically follow the contoured and ever changing noise floor in the HF spectrum. The ENVIRONMENT threshold subtracts the signal and noise environment from the display to enhance new signal searches.

Use the automatic alarm features for automatic energy-of-interest isolation. Program this option to identify energies-of-interest based on their frequency, amplitude, bandwidth and duration characteristics. Once isolated have the system assign a hand-off receiver to the energy, digitally record the energy, sound an audible alarm, even save the trace showing the energy.

Automatically gather parameters on all energy events that exceed the selected threshold level in the E3238 energy history database. Capture energy frequency, amplitude, bandwidth, duration, and more. Download this to any comma-separated-value-compatible spreadsheet for analysis.

Use the automatically generated action files to document mission activity. These logs include a new energy log, a hand-off receiver log and an alarm log.

You can operate the E3238 via Ethernet LAN, accessing all features, displays and menus from any X-compatible server anywhere in your network.

When speed with selectivity is key, when the assigned spectrum is crowded and advanced tools are necessary to isolate signals of interest, the E3238 scanning signal analysis system delivers.

Configuration

The user signal processing software option can be ordered as part of a new system or as an upgrade to an existing E3238S or E3238B system.

To order as part of a new system please include Option ASH in the system configuration.

The model number to upgrade an existing system's software is 35688C. Be sure to specify Option ASH user signal processing.

Depending on the age of your system you may also have to upgrade your application software and HP-UX operating system. Contact your Agilent representative for details.

Warranty

The hardware in the E3238 system is covered by a three-year return to Agilent Technologies parts and labor warranty. The software is warranted for 90 days. Additional coverage may be purchased from Agilent. Contact you local Agilent representative.

Ordering information

Agilent E3238	E3238 signals development system software
Agilent 35688C	E3238 signals development system software upgrade
Option 100	Standard E3238 software
Option AS9	User programming
Option ASH	User signal processing
Option ORU	Software update installation planning

Export of the product identified in this literature is subject to U.S. Export control laws. Export licenses are approved on a case-by-case basis and sale of any of these products is dependent on approval of the United States Government.

Related Agilent Literature

*3587 Signals Analysis System
Brochure*
literature number 5968-2076E

*Agilent Communications
Intelligence Solutions Overview*
literature number 5988-0633EN

*E3238 Signals Development System
Configuration Guide*
literature number 5988-0562EN

*E3238 Signals Development System
Product Overview*
literature number 5968-2075E

*E3238 Signals Development System
Technical Specifications*
literature number 5963-6609E

*Test Systems and VXI Products
Catalog*
literature number 5980-0307E

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Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

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