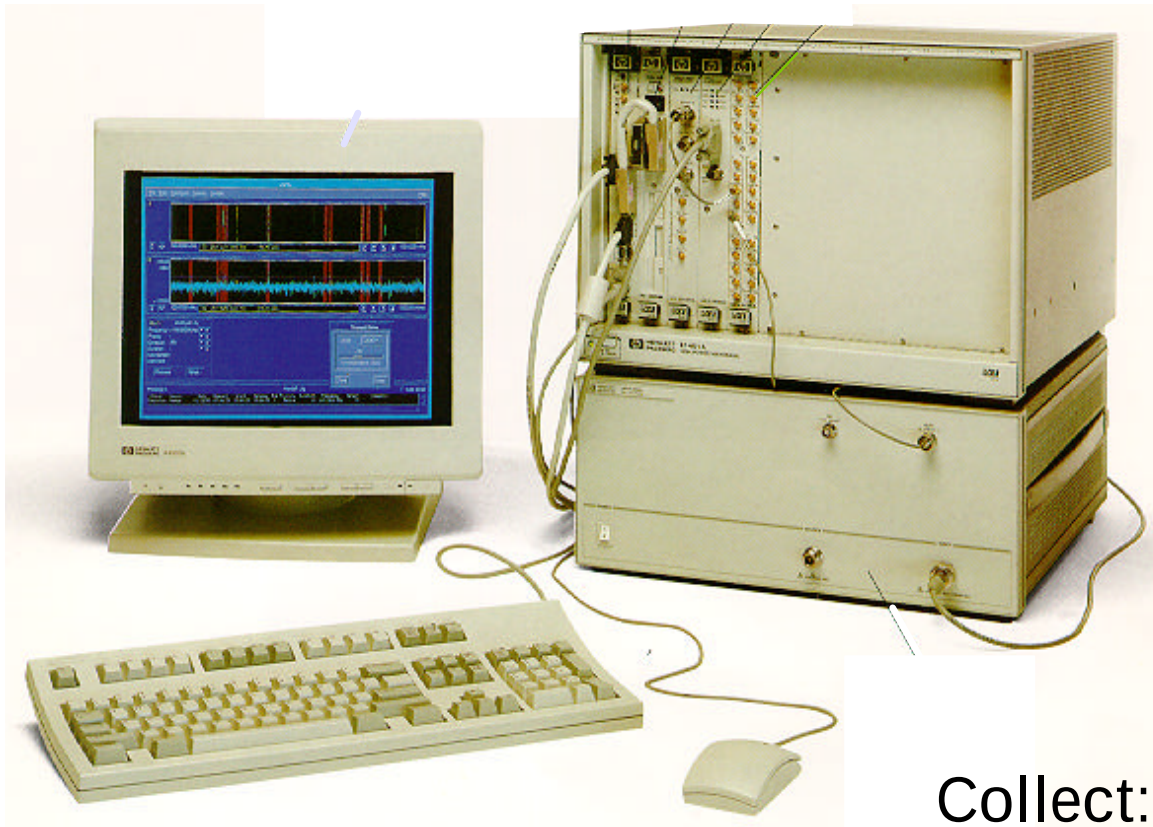


E3238S Scanning Signal Analysis System



Search: *General
& Advanced Directed*

Isolate: *Manual & Auto
(thresholds, alarms,
metrics, responses)*

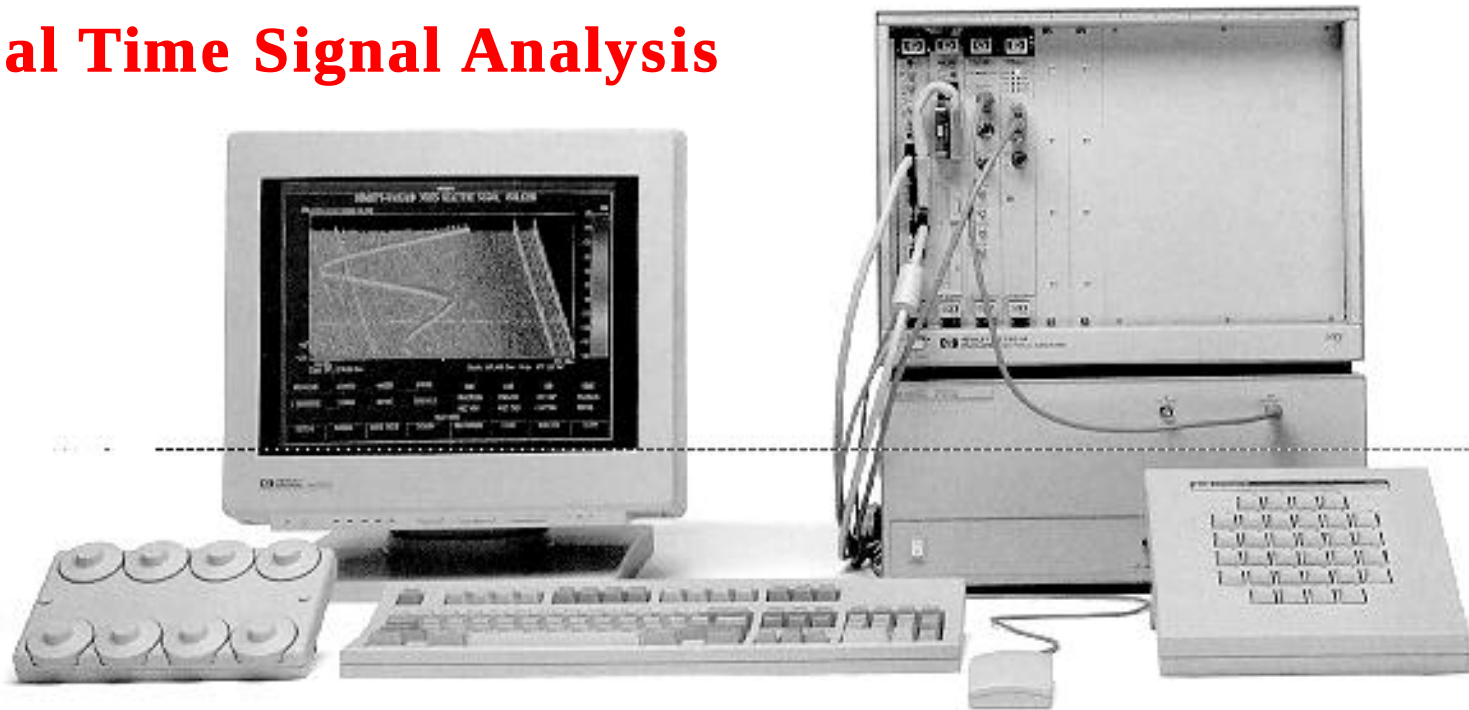
Collect: *Control multiple
drop receivers directly*

Sweep rate: *1.1 GHz/sec
with 7.5kHz RBW*

Integrate: *LAN, programmability*

HP 3587S Signal Analysis System

Real Time Signal Analysis



- ▶ 1 MHz Real Time Bandwidth
- ▶ Up to 110 dBFS SFDR
- ▶ Very high speed displays (*falling raster, map, spectrum, strip chart*)
- ▶ Frequency, Time, & Amplitude domain analysis
- ▶ IEEE 1155 (VXI)
- ▶ Flexible markers
- ▶ Add algorithms

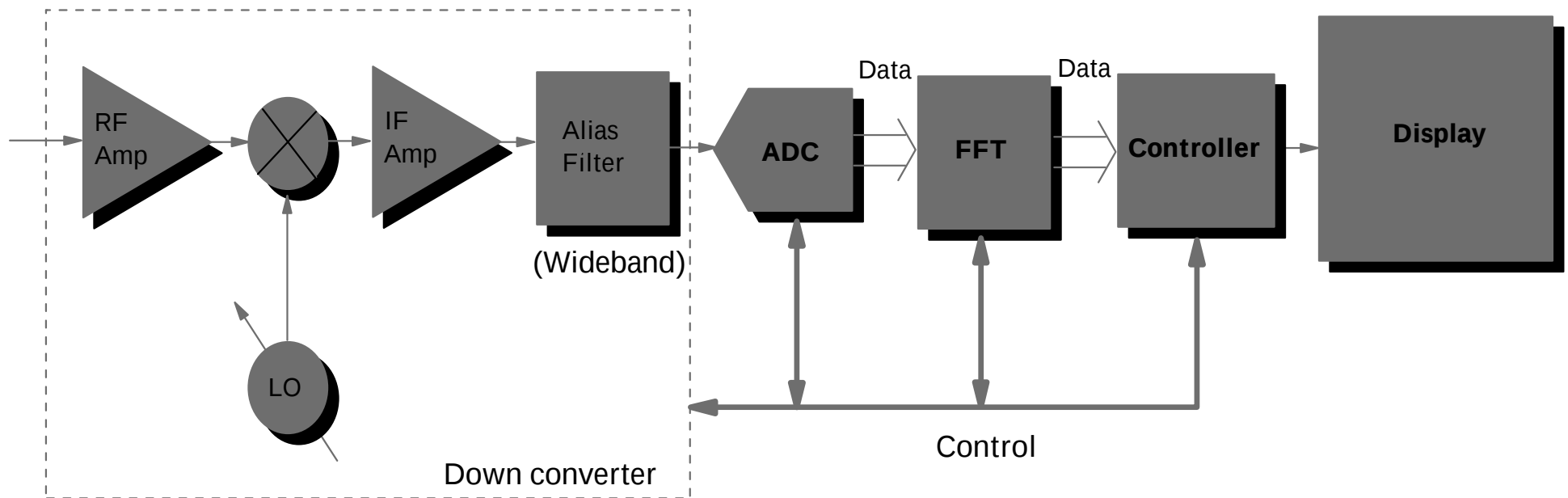
E3238S Speed and Selectivity

Wideband downconversion

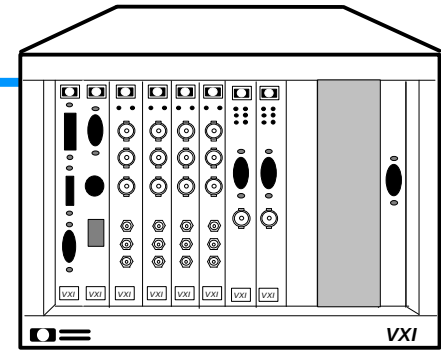
- ▶ Speed (1 GHz/sec)

FFT based IF processing

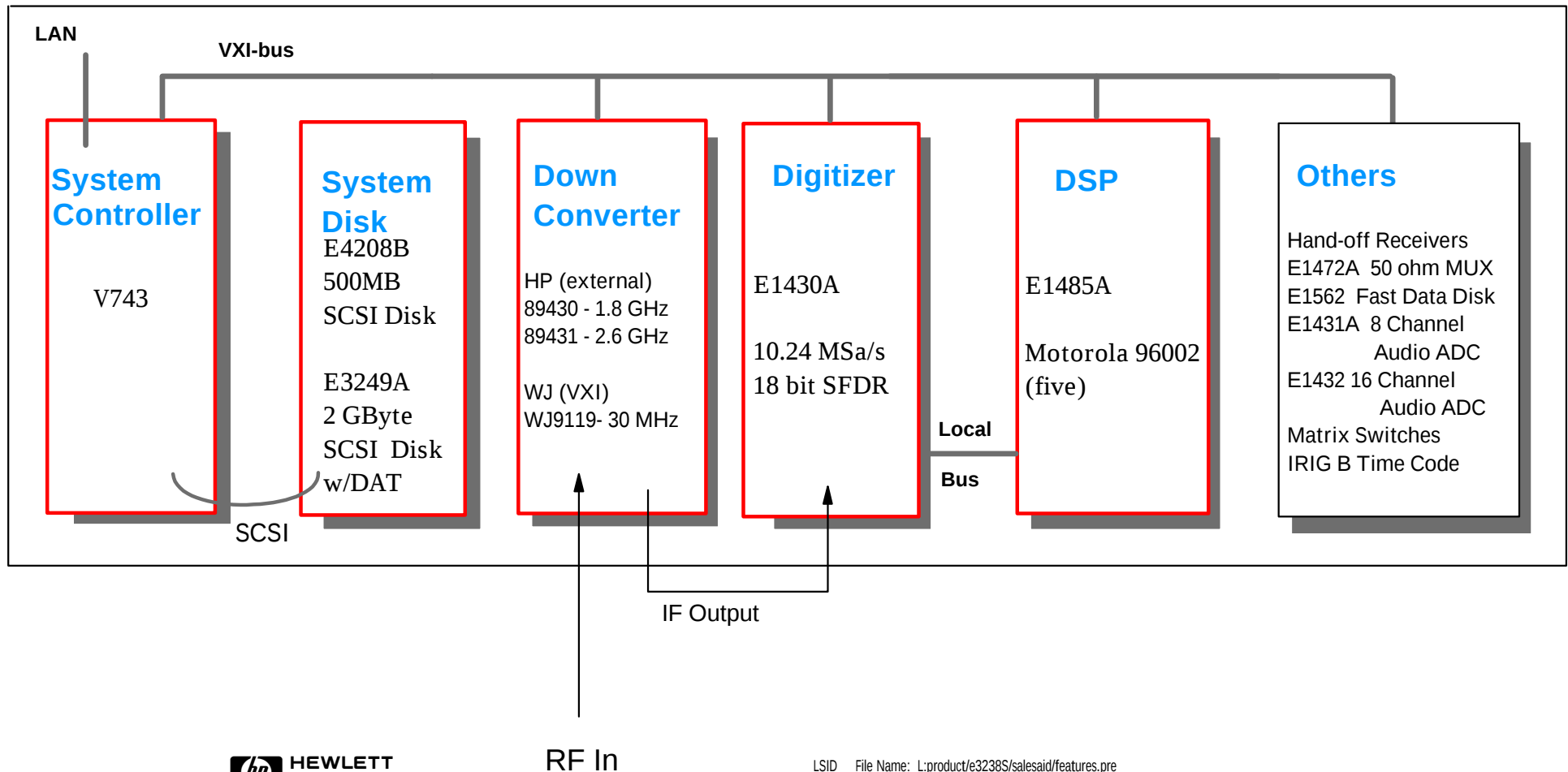
- ▶ Selectivity (60 Hz - 120 kHz)



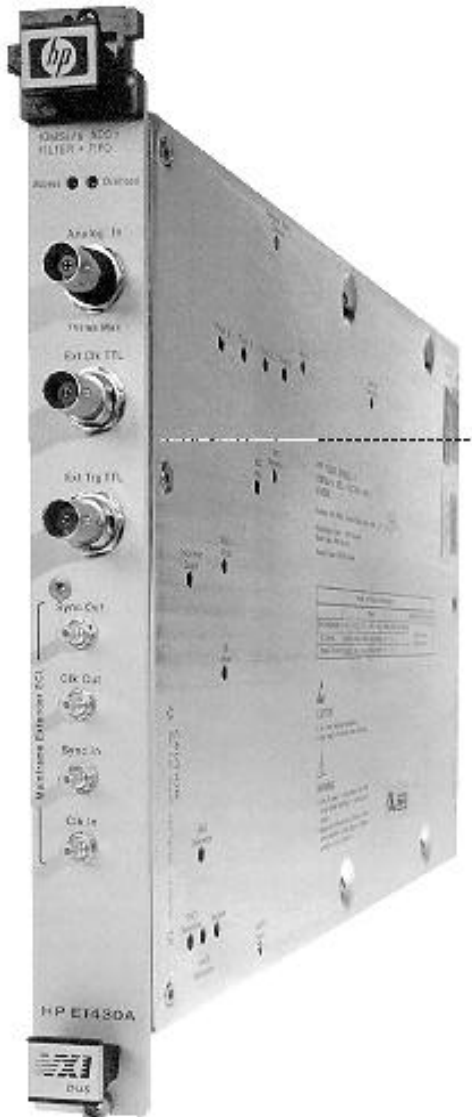
E3238S System VXI COTS



VME Extensions for Instrumentation (VXI)



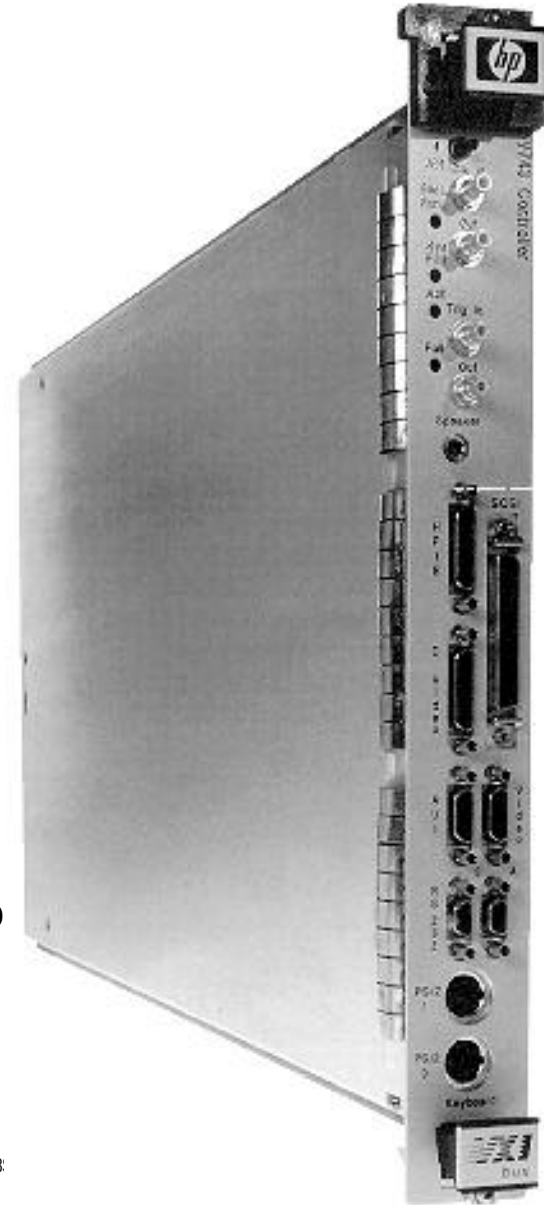
E1430A 10 MSa/sec ADC *with DSP*



- Sample Rate: 10 MSa/sec
- Input Bandwidth: 4 MHz, alias protected
- Raw resolution: 23 bits
- SFDR: 18 bits (110 dB)
- Noise figure: 15 dB
- Input ranges: +26 to -32 dBm
- Digital filters: 1 Hz to 2 MHz, octave steps
- Digital LO: 10 uHz tuning resolution
- FIFO memory: 8 MBytes
- Data Transfer Rate: 25 MByte/sec, Local Bus
- Programming: Register
- Software: C library, SICL driver, VEE driver

E1497 and E1498 Product Description

- C-Size VXI, Single slot module
- HP PA RISC architecture - 7100LC
- 64MHz system CPU clock, 16-128 RAM
- 100MHz system CPU clock, 32-128 RAM
- HP-UX 9.05 Operating System
- VXI Slot 0 and Commander functionality
- Measurement Clock -10 MHz
- Measurement Trigger - Programmable
- System status indicator lights
- Audio output - beeper
- SCSI 2 - Single Ended, 2-4.5 MB/sec.
- HP-IB equivalent to the E2071B EISA card
- Video out - 1024x768 (default), 1280x1024 Co
- LAN AUI - IEEE 802.3
- Dual RS-232 for terminals or device I/O
- PS-2 connectors for keyboard & mouse



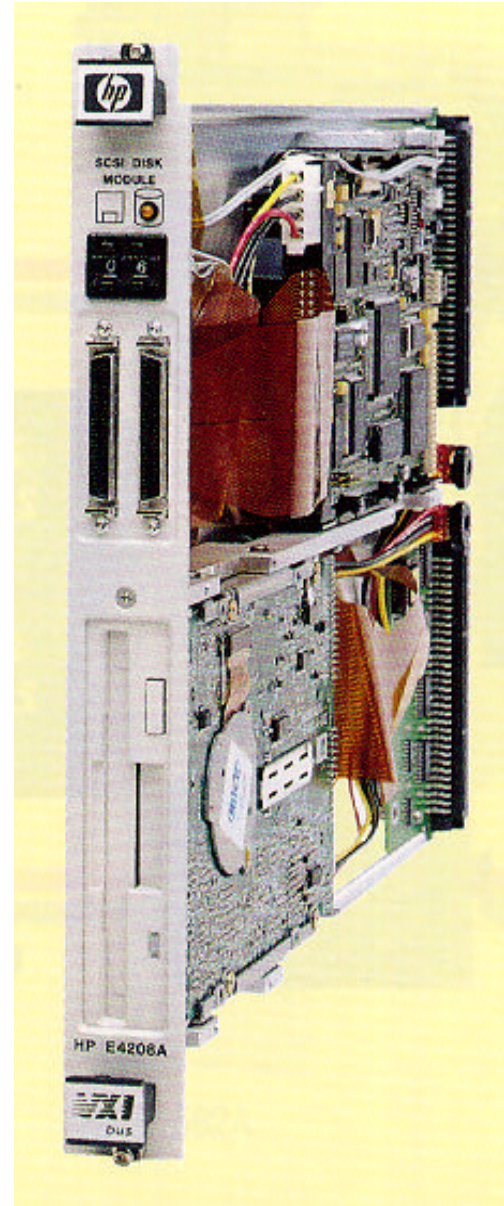
VXI System disks

E4208B System disk

- ▶ 1 GBtye
- ▶ Floppy / floptical
- ▶ SCSI interface (single ended)
- ▶ C size, 1 slot

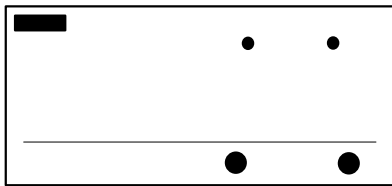
E3249A

- ▶ 2 Gbtye
- ▶ DAT drive (8 GBtye)
- ▶ SCSI interface (single ended)
- ▶ C size, 2 slot



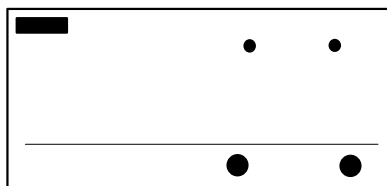
E3238S Downconverters

A selection of frequency ranges



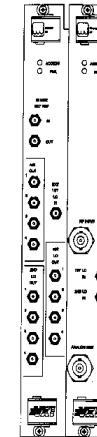
HP 89430A

- ▶ 2 - 1800 MHz
- ▶ 1.0 GHz/sec
- ▶ SFDR: 70 dBfs
- ▶ Sens: -142 dBm/Hz
- ▶ NF: <32 dB



HP 89431A

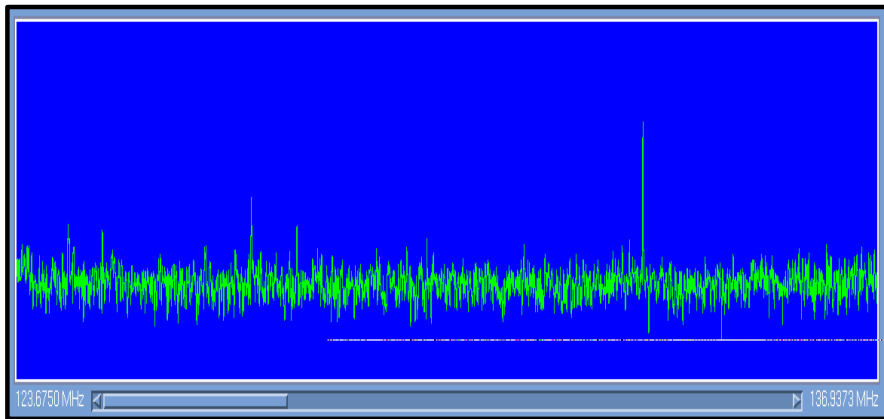
- ▶ 2 - 2650 MHz
- ▶ 1.1 GHz/sec
- ▶ SFDR: 70 dBfs
- ▶ Sens: -159 dBm/Hz
- ▶ NF: <15 dB



WJ-9119

- ▶ 0.5 - 32 MHz
- ▶ 1.0 GHz/sec (approx)
- ▶ SFDR: 95 dBfs, min
- ▶ Sens: -159 dBm/Hz
- ▶ NF: 15dB (typical)
- ▶ 2 slot, C-size

E3238S General Search



Characterize the environment

Single F_1 - F_2

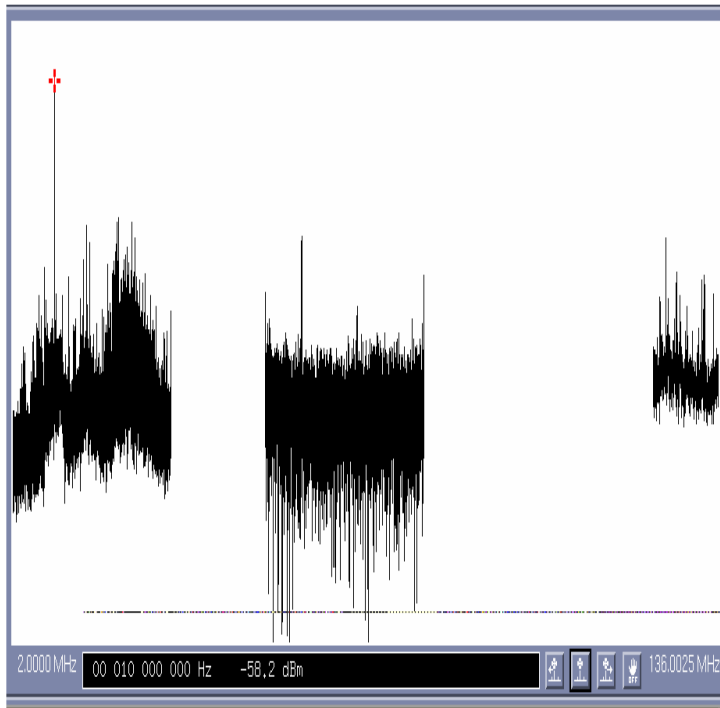
Multi RBW

Multi filter shape factor

Mult antenna inputs

Averaging

E3238S Directed Search (opt AS7)



- ▶ Concentrate on "hot spots"
100 F_1 - F_2 segments
- ▶ Match receiver to each segment
RBW, shape factor, averaging, tuner attenuation
- ▶ Match antenna to segment
Signal routing (16 antennas)
- ▶ Match revisit time to each segment
Sweep ratio (sweep 1/X)
- ▶ CSV segment database
Read/write common spreadsheets (Lotus, etc)

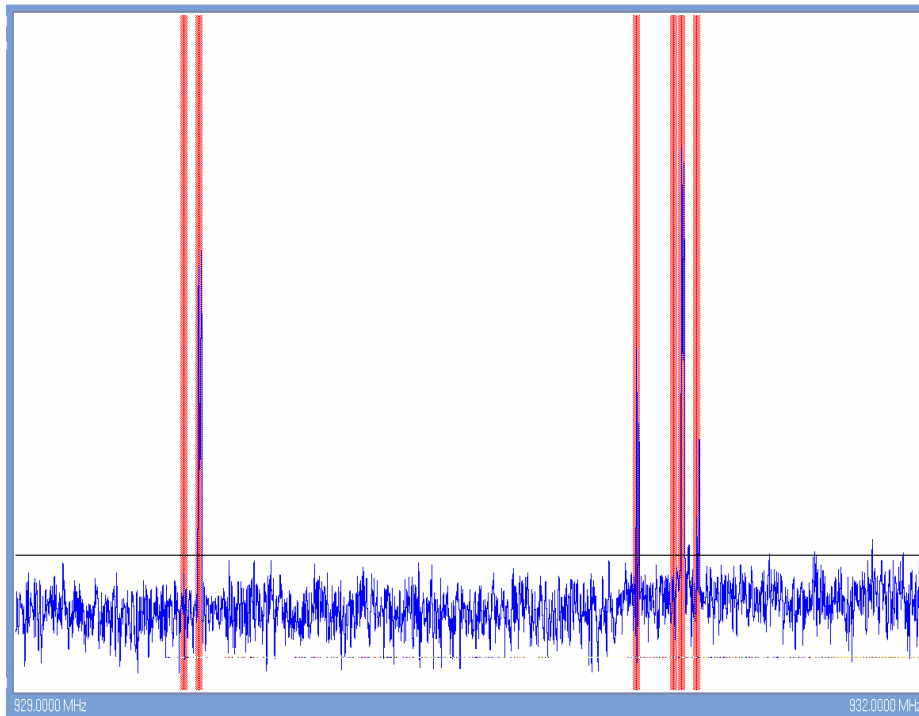
E3238S Signal Isolation Tools: Manual

Mouse control (not menu)

- Keep eyes on trace
- Easy to use
- Easy to learn
- Rubber band box
 - Display zoom & receiver tune*
- Mouse click
 - Markers*
- Drag-and-drop
 - Handoff*



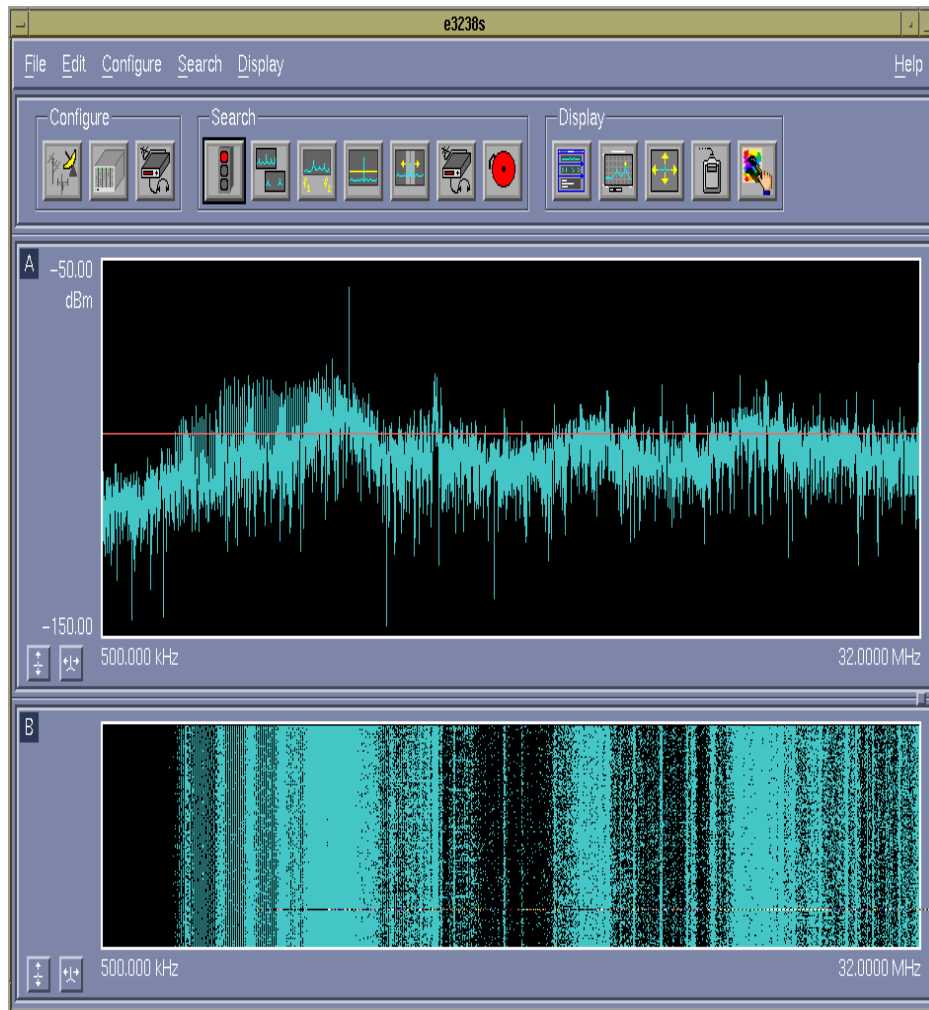
E3238S Signal Isolation Tools: Automatic



For remote operation and/or
reducing operator workload

- ▶ Selection of energy thresholds
- ▶ User programmable alarms
- ▶ User selectable alarm responses

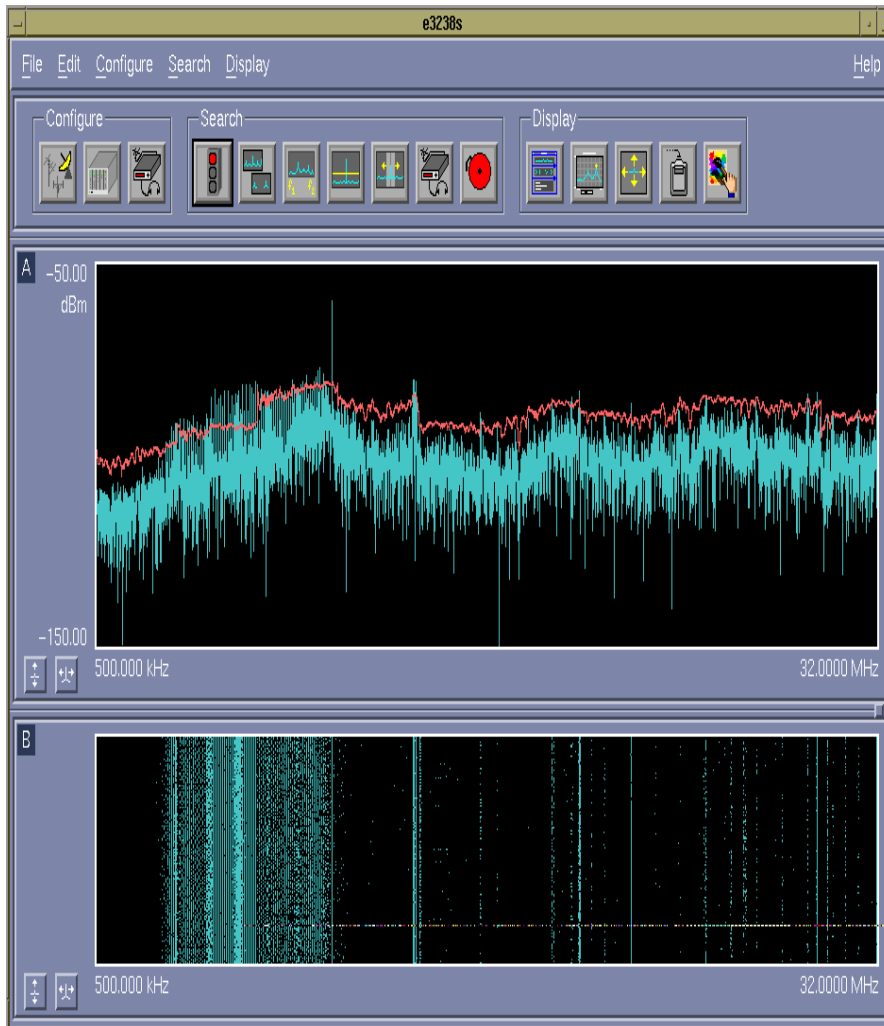
E3238S option AS8



Level threshold (std)

- ▶ Single horizontal line
- ▶ Best in VHF, UHF

E3238S Signal Isolation Tools



Auto threshold

- ▶ Hugs noise floor
- ▶ Calculated on every sweep

Find weak signals with fewer false alarms

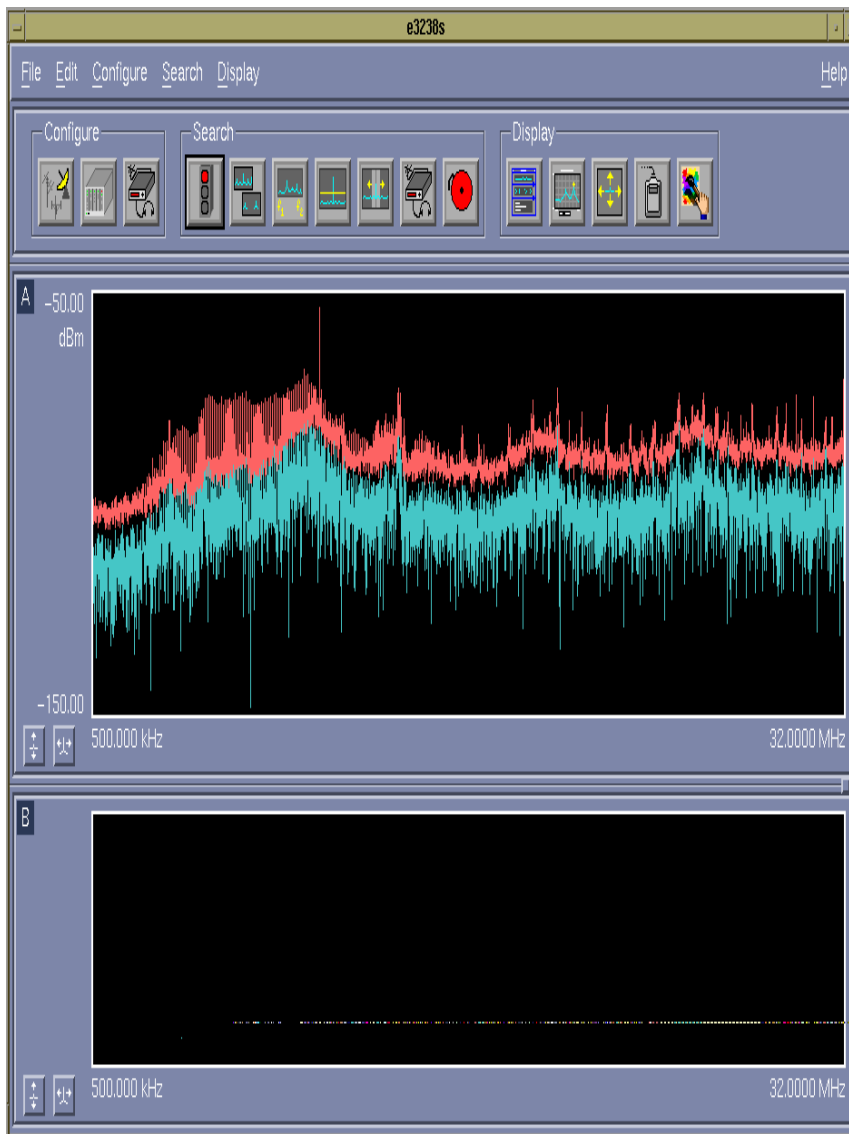
- ▶ Even when floor wanders

HF

- ▶ Even when floor jumps

Lightening, ignition noise

E3238S Signal Isolation Tools



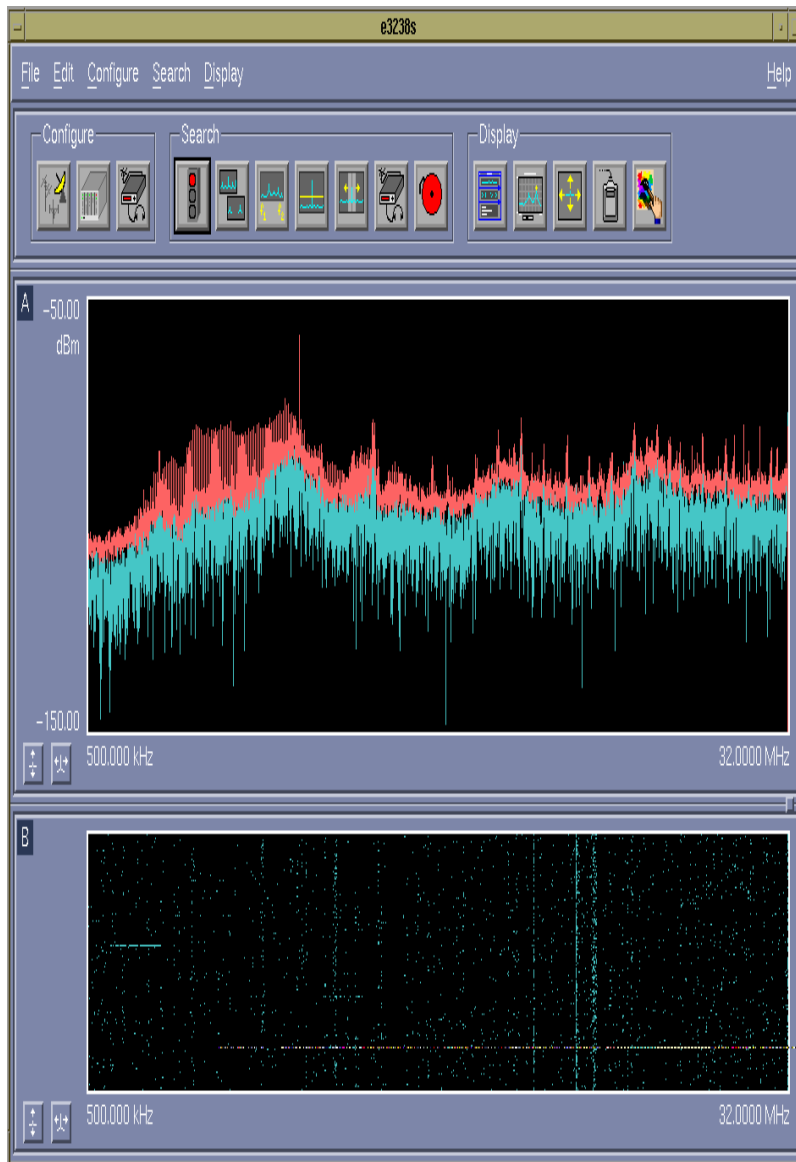
Environment Threshold

- ▶ Stores signal & noise profile
- ▶ Subtracts from display

Find new signals in dense, stable environment

- ▶ Burst
- ▶ Frequency hoppers
- ▶ Spread spectrum

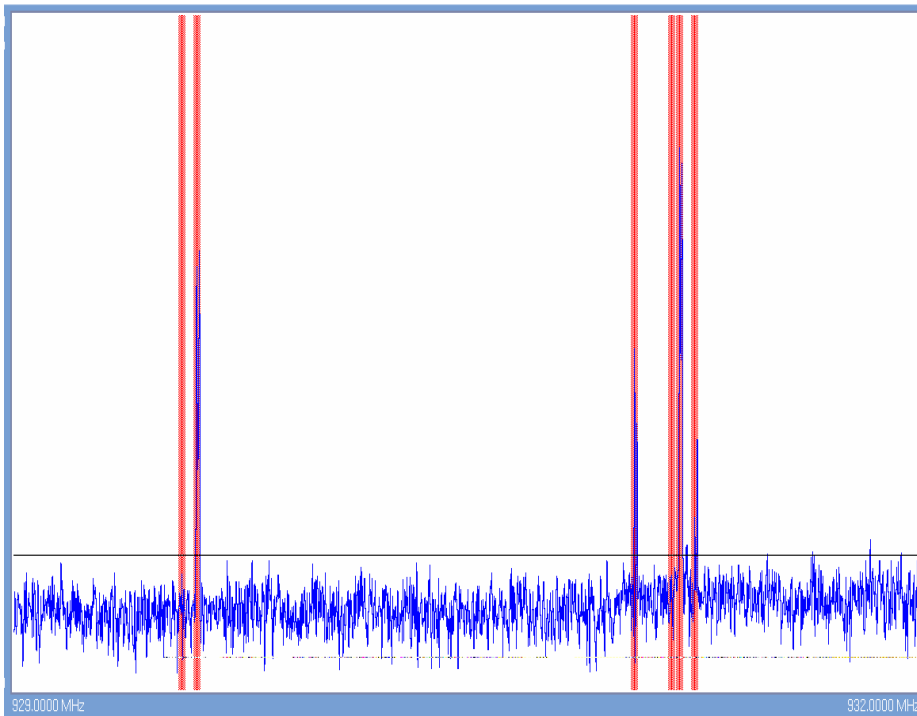
E3238S Signal Isolation Tools



File

- ▶ Store/recall useful thresholds
- ▶ Recall custom built threshold

E3238S Signal Isolation Tools: Automatic



Peak criterion

- Reduces false alarms on noise

Bandwidth criterion

- Reduces false alarms on modulation

E3238S Signal Isolation Tools

Alarm Setup

Description: Malaga Alarm

Alarm Control

Status: Active Priority: Medium Trigger: New Energy

Alarm Scheduling

Schedule: Hourly Start: :18 Duration: :39:04

Alarm Events Setup

Event 1 And Event 2 Or Event 3 Xor Event 4

Event 1 Features

Signal: Not Present

Frequency: Greater Than 108.0000 MHz

Bandwidth: In Band 5.000000 KHz to 25.000000 KHz

Amplitude: Greater Than -60.00 dBm

Duration: Greater Than 10 Sweeps

Tasks to Perform on Alarm

☐ Save Snapshot Setup ... ☐ Visual Alarm Setup ...

☐ Handoff to Rx Setup ... ☐ Audible Alarm Setup ...

☐ Record Setup ... ☐ Log to File

OK Cancel Help

Automated Alarms

User customizes via

- ▶ control
- ▶ scheduling
- ▶ events setup
- ▶ signal features
- ▶ tasks (responses)

E3238S Signal Isolation Tools

Signal features

- ▶ Signal *appears* and has the following characteristics

	Signal is Greater than X	Signal is Less than X	Signal is In band X	Signal is Out of band X	Don't care
Frequency	X	X	X	X	default
Bandwidth	X	X	X	X	default
Amplitude	X	X	X	X	default
Duration	X	X	X	X	default

Note: X is user settable

- ▶ Signal with these characteristics *disappears*

E3238S Signal Isolation Tools

Scheduling

- ▶ Continuous
- ▶ Band (start, stop)
- ▶ Hourly (start, duration)
- ▶ Daily (start, duration)

Events Setup

- ▶ Four events (defined by signal feature sets)
- ▶ Logical combinations (AND, OR, XOR. off)

Control

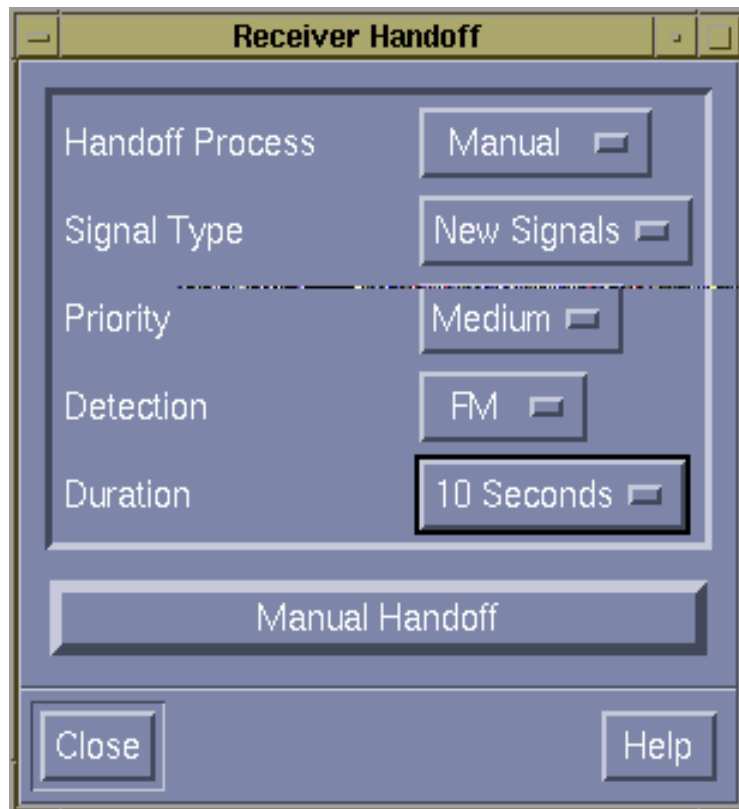
- ▶ Status (active, inactive)
- ▶ Priority (low, medium, high, critical)
- ▶ Trigger (new energy, all energy, once)

E3238S Signal Isolation Tools

Tasks User selected responses to alarm

- ▶ Save snapshot *records one sweep to disk*
- ▶ Handoff to Rx *assigns hand-off Rx to signal*
- ▶ Record *record multiple sweeps to disk*
- ▶ Visual alarm *displays alarm icon on monitor*
- ▶ Audible alarm *sounds an alarm using V743*
- ▶ Log to file *updates signals list*

E3238S Signal Collection



Links to handoff receiver

- [VXI, RS232, HPIB](#)
- [Software driver](#)
WJ-8618, WJ-8615
- [Control: 0 - 4](#)

Handoff control

- [Drag-and-drop](#)
- [Marker button](#)
- [Mouse button](#)
- [Handoff setup menu](#)

Automatic signal log

E3238S Remote Operation

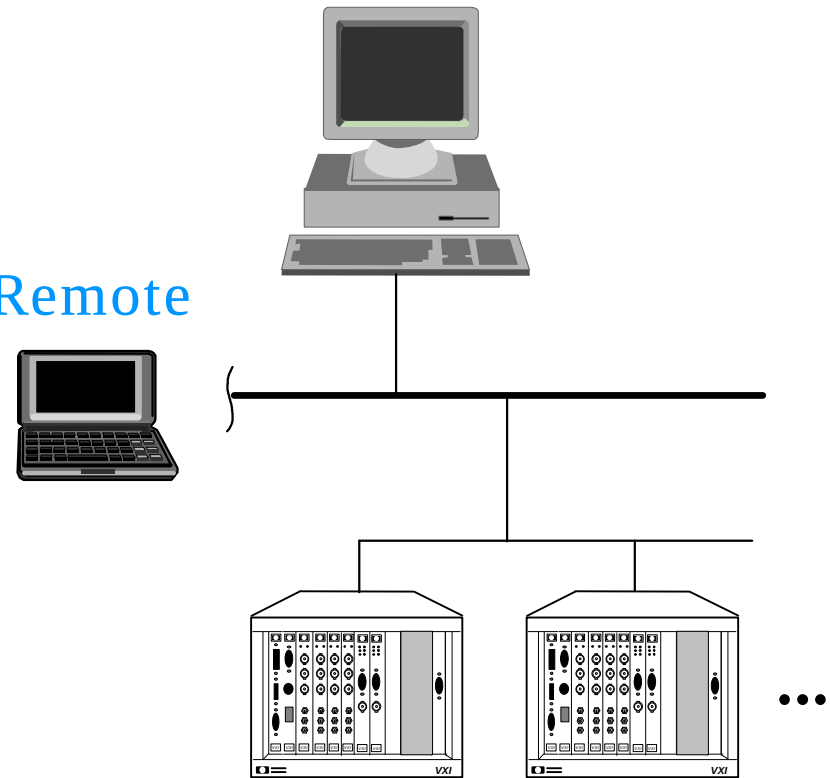
Open Architecture

Fully X11 compliant

- *Local LAN operation*
- *Remote LAN operation*

Motif

Remote



For advanced users

Custom Layouts

Match interface layout to task

- 8 display panes
- Spectrum / spectrogram
- Preset signal detection criterion
- Preset search segments
- Optimize receiver parameters
- Configure handoff receivers
- Locate menus
- Lockout menus (password)

Command line programming

