

Graphic User Interface for High and Low Channel Count DATAQ and Recorder Systems

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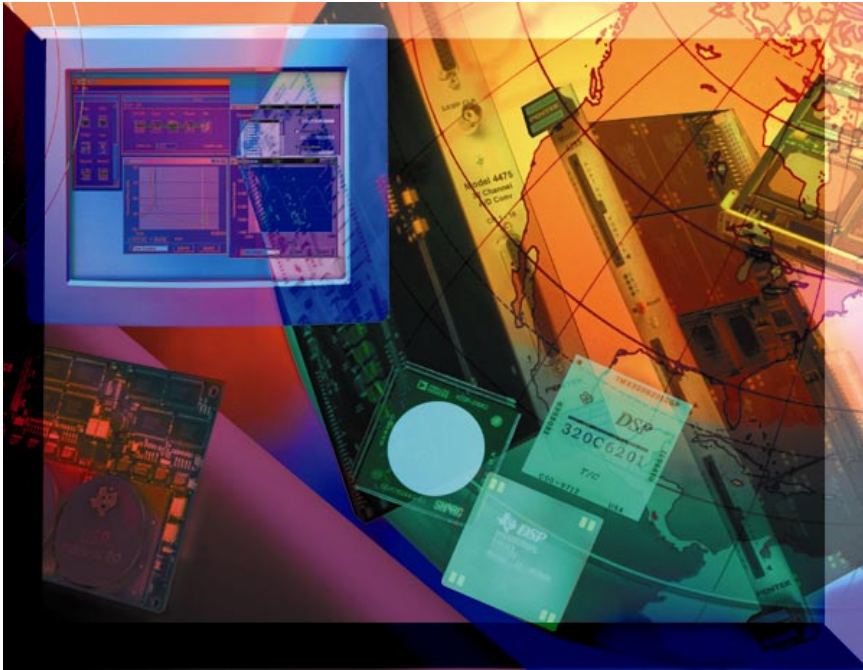
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THIC Meeting at Hotel Villa

San Mateo CA 94403-4537

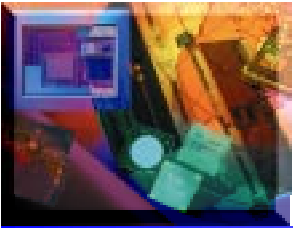
July 22, 1998



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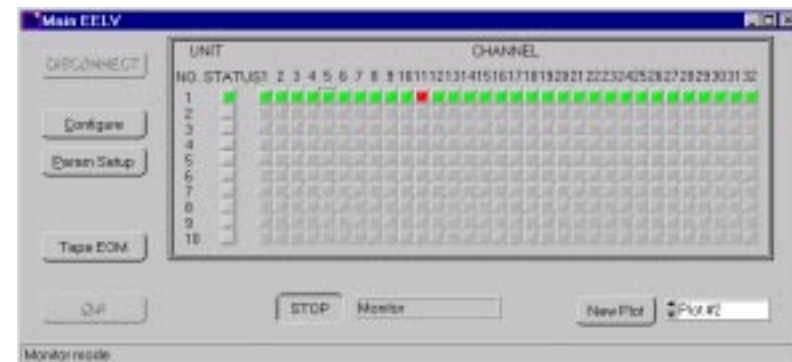
Graphic User Interfaces for High and Low Channel Count DATAQ and Recorder Systems





The Tasks at Hand:

- GUI or HMI?
 - ◆ Human Machine Interface
- Control without complexity
- Acquisition of valid data
- Monitoring without confusion
 - ◆ Real-time vs. Visual Real-time
- Expansion without constraints
- Cost & Development Time vs. COTS

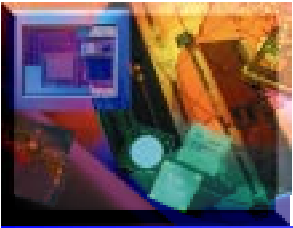




Four HMI/GUI Examples

- Multi-purpose ruggedized recorder
 - ◆ No GUI, LCD remote control
- Serial (PCM) sonar recorder
 - ◆ Simple GUI to match past
- Windtunnel DATAQ
 - ◆ 320 channels - simple functionality
- Vibration monitoring, processing and acquisition system
 - ◆ 32 channels - complex functionality





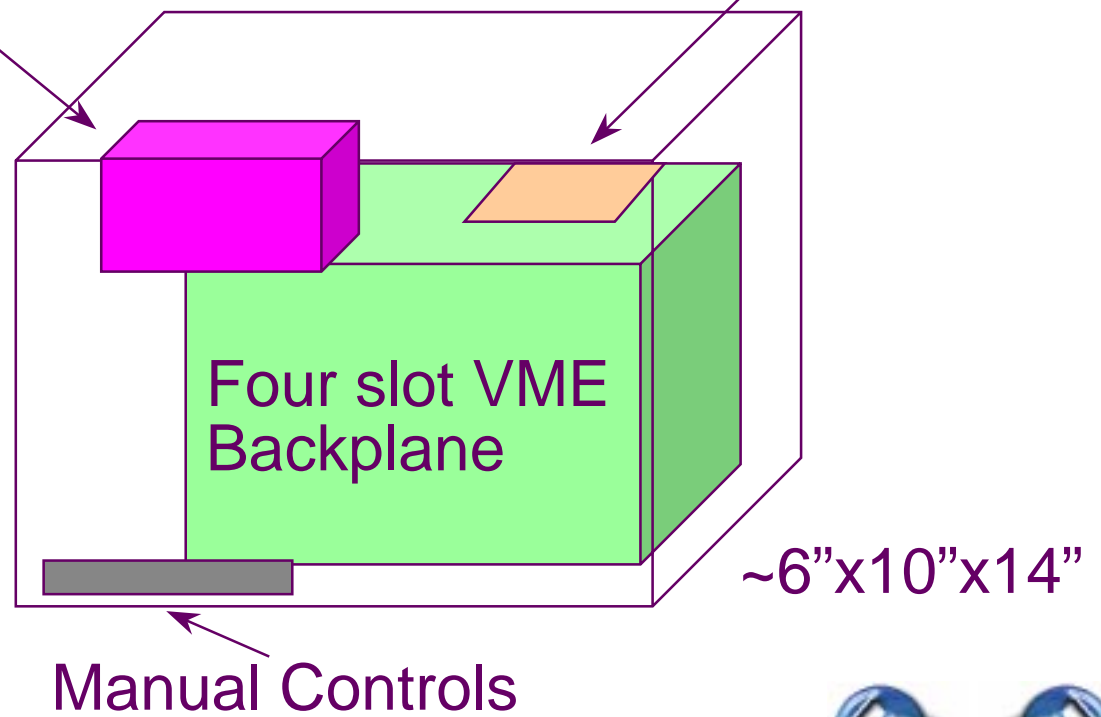
PE DCMR-24 Digital Recorder

24 Mbit/s with 25 GByte uncompressed capacity
uses SONY's AIT tape, 28 VDC supply
16-32 Ch. Analog, 2 Ch. Video, Serial and/or 1553



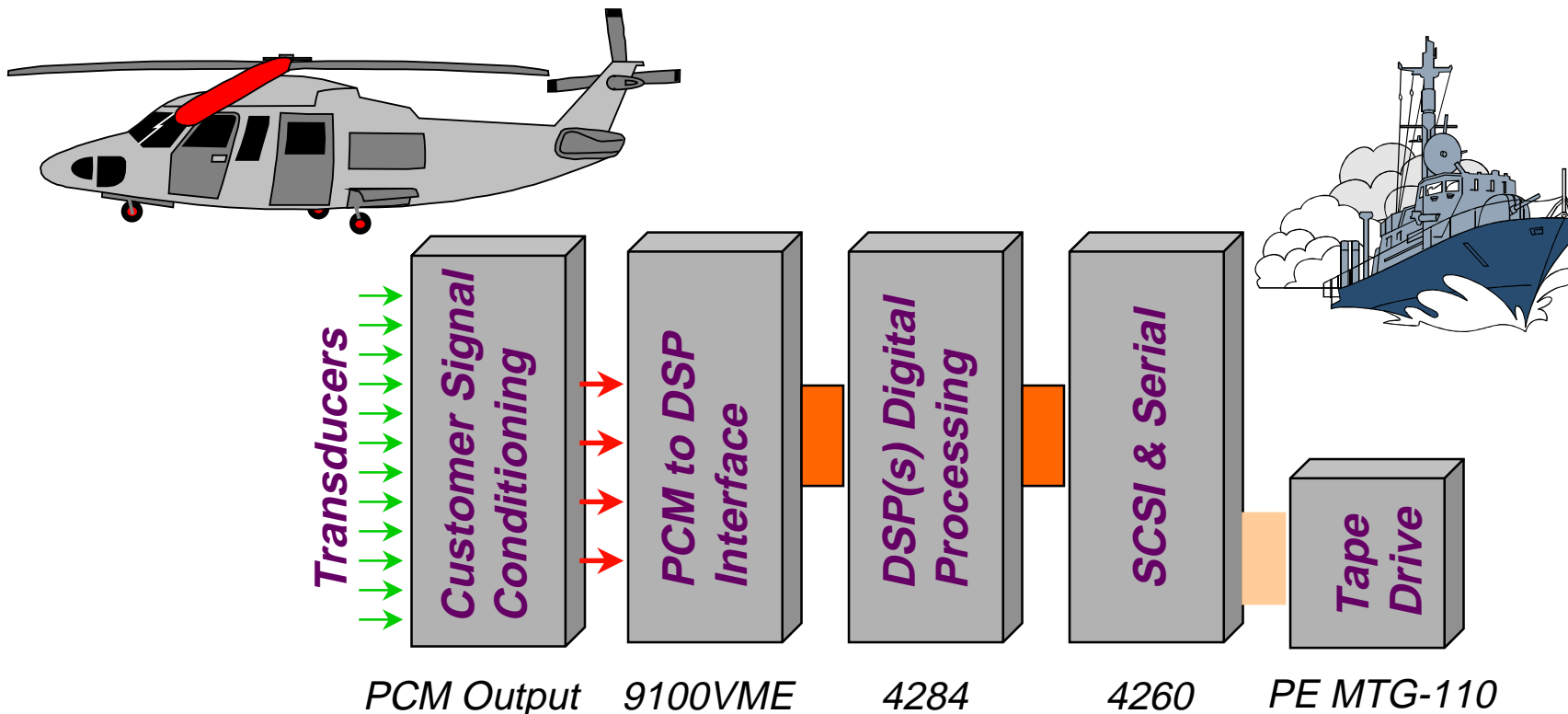
SONY SDX 3.5" drive

Serial Controller





Ocean Floor SONAR Mapper





Ocean Floor SONAR Mapper GUI

UT-ARL Data Recorder: /node2/t84b/0 (@fred)

RECORDING 13:22:21
18 FEB 1998

Tape Usage [%] 7.941790 0.00 50.00 100.00
Tape Position [%] 7.941790 0.00 50.00 100.00

signal found

18 Feb 1998	13:17:56	RECORDING START
18 Feb 1998	13:18:06	signal search
18 Feb 1998	13:19:35	signal found
18 Feb 1998	13:20:27	signal noise, high frequency spike
18 Feb 1998	13:21:00	signal strength regained
18 Feb 1998	13:21:28	signal noise
18 Feb 1998	13:21:34	signal lost
18 Feb 1998	13:22:02	establishing signal search
18 Feb 1998	13:22:12	signal found

System configuration completed

Search/Skip Mode

Search by time stamp
18 Feb 13:19:35

Skip events
1

Search Controls

Markers

Tape Position and Usage

Message

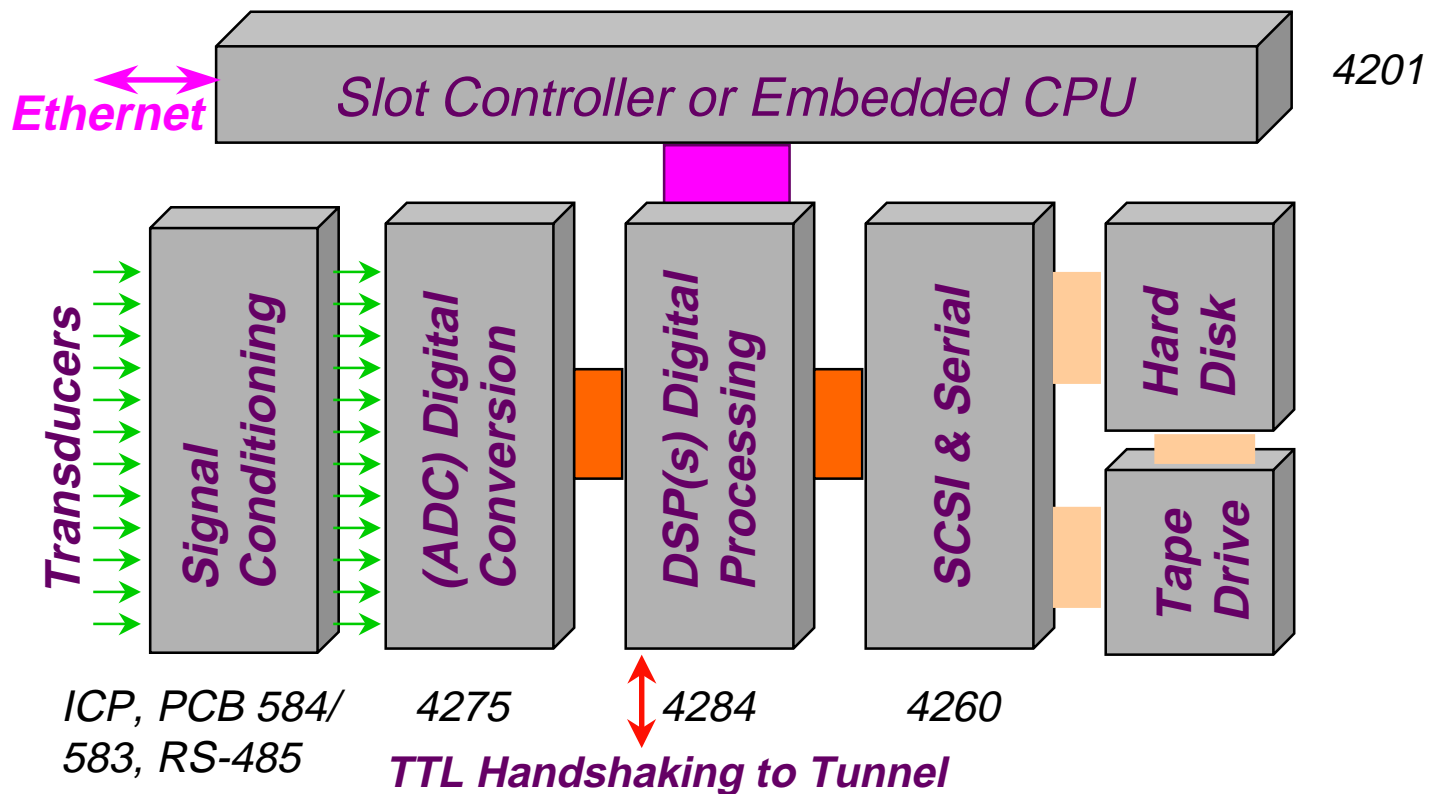
System Status

Directory of events, markers and messages



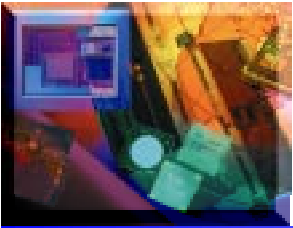


Windtunnel 320 Chan. System



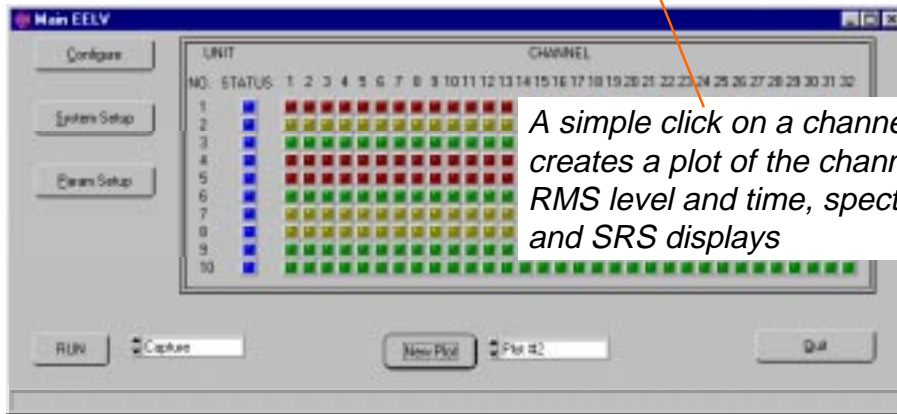
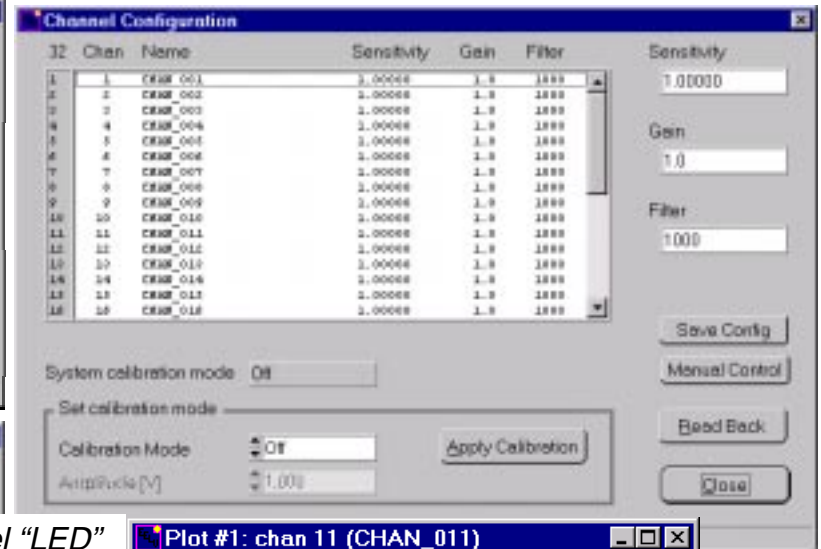
10 Modules for 320 Channels



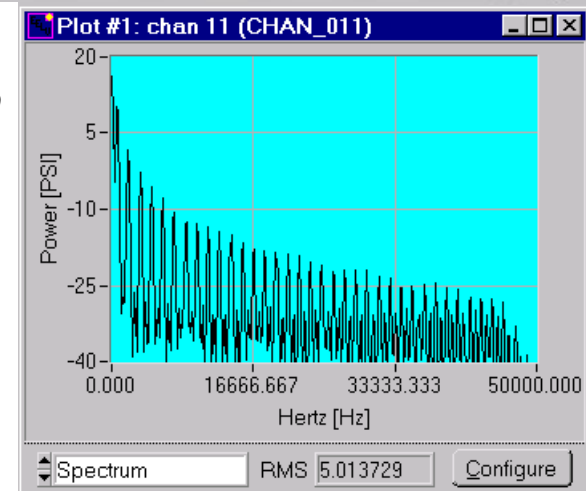


Windtunnel System - Part 2

A unique human interface was used to control, monitor and keep track of the 320 active channels:



A simple click on a channel "LED" creates a plot of the channel with RMS level and time, spectra, PSD and SRS displays



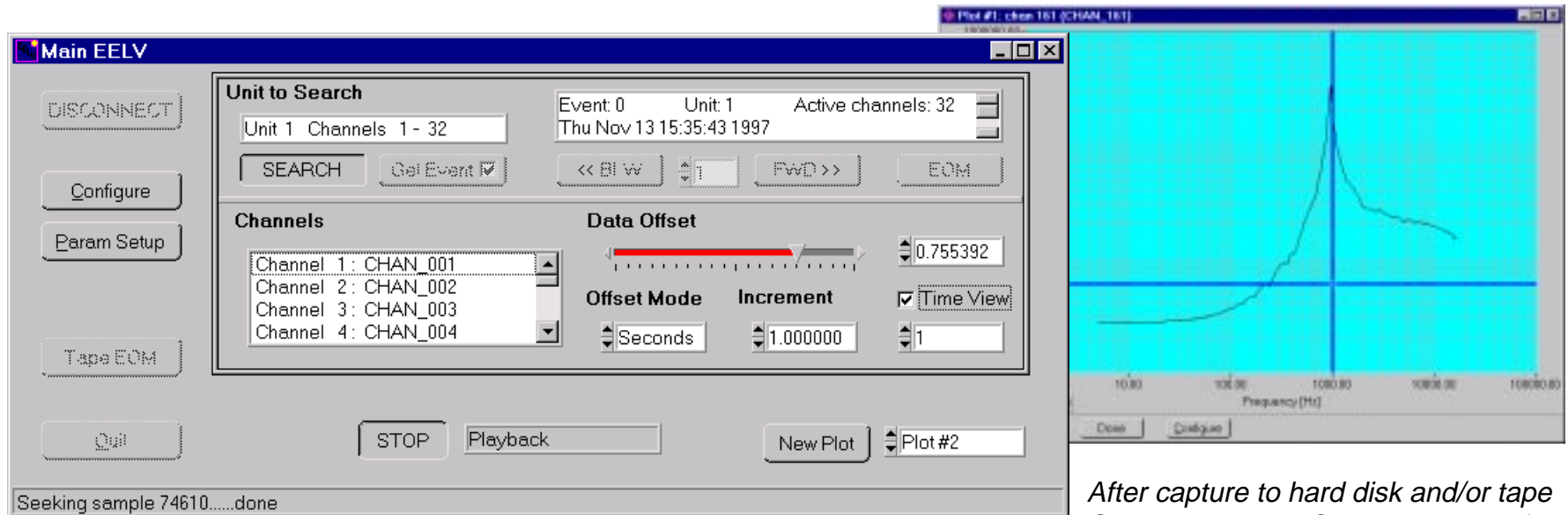
Data captured to buffer (hard disk), loading to tape in progress alerts can be latched onto or used to stop loading.



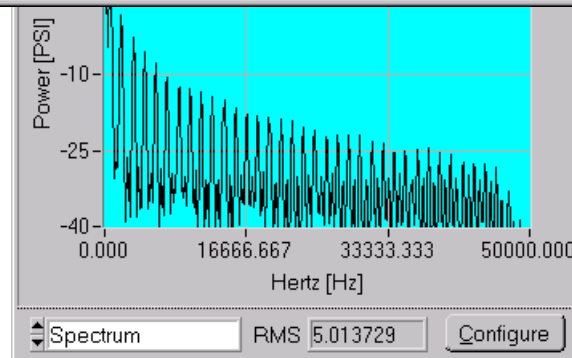


System Evolution - Part 3

After use in the tunnel - new missions required two @160 channel shock measurement and analysis systems

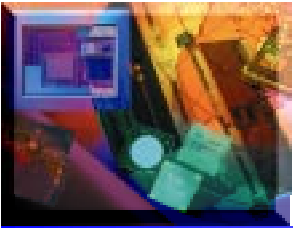


Frequency and time plots available during playback



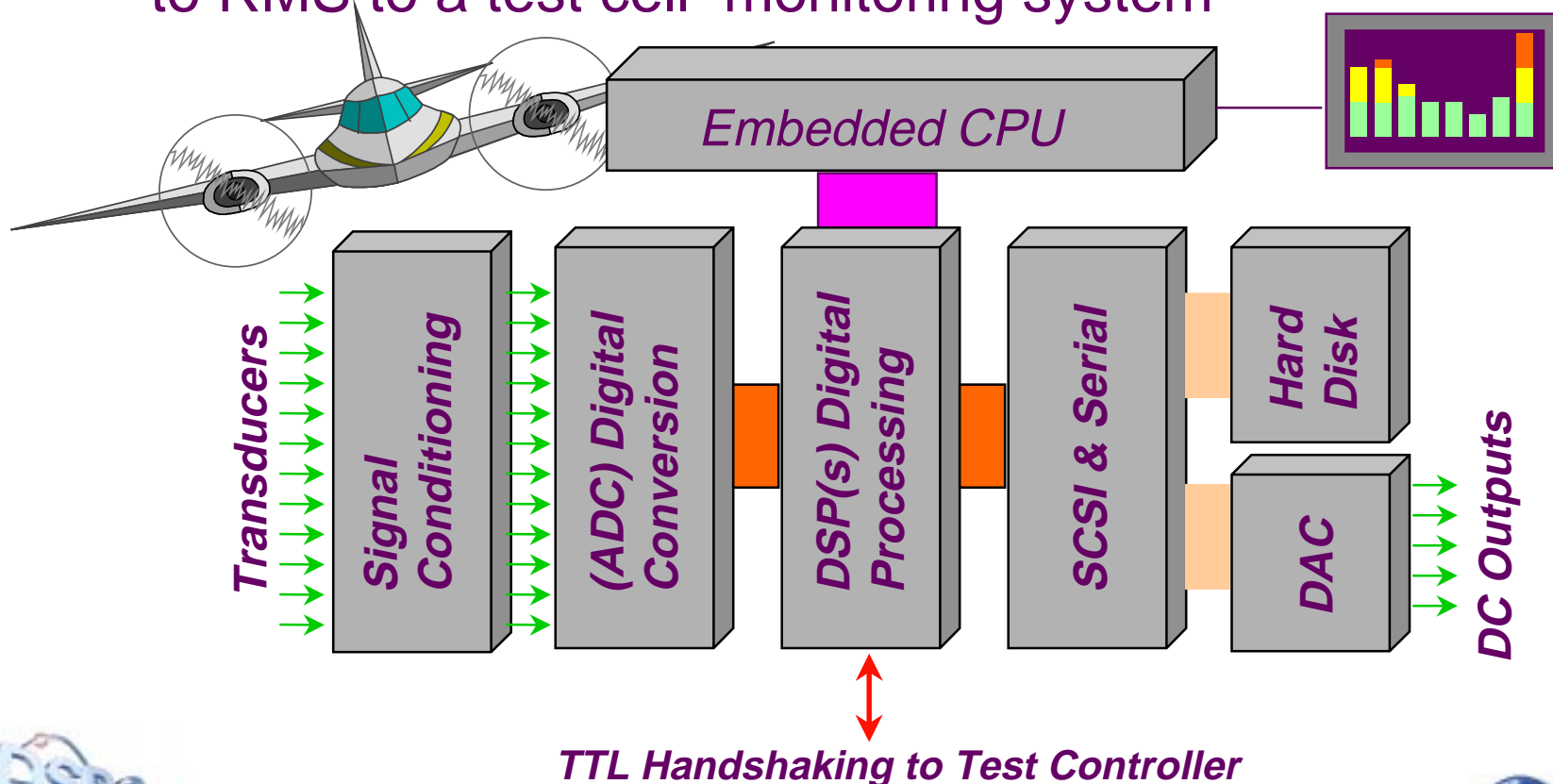
After capture to hard disk and/or tape Shock Response Spectrum plots of a channel for a specific search point can be made with RMS level and time, spectra, PSD and SRS displays

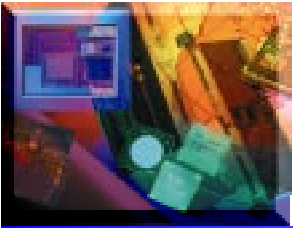




Engine/Gearbox Vibration DATAQ

Receives vibration data from RS-232 controlled transducer conditioners and passes DC proportional to RMS to a test cell monitoring system





VibMon - System Configuration

Configuration Setup

Excel Setup

Analog Input

Channel I.D. Filter Low Pass

A/D Channel Tracking B. Width

Name Tracking Channel

Eng. Units Tracking Mult.

Active Warning Level

Gain Warning Enable

Sensitivity Alarm Level

Differentiation Alarm Enable

Intergration

Analog Output

D/A Channel Multiplier

Source I.D. Output Offset

System Setup

Node Name Sample Rate

Board Name Record Time

Port Number Pretrig Time

4260 StackPos PSD Factor

4252 StackPos	A/D Unit	Mix Stack Pos
<input type="text" value="0.1"/>	Unit 0 0	
	Unit 1 1	

SCSI Address	SCSI Disk	SCSI Address
<input type="text" value="0.1"/>	Disk 0 0	
	Disk 1 1	

Buttons: Save, Quit, Change Password

Import control

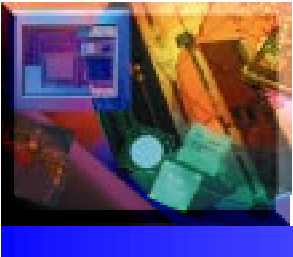
System control

Imported setup

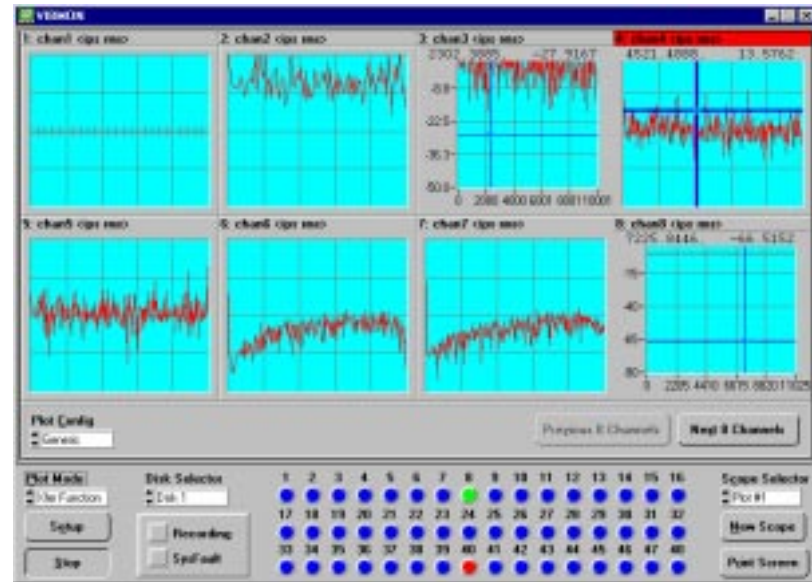
Setup: Default48 (48)

Id	Name	A/D	D/A	Units	Gain	Sens	Cond.	Filter	O-gain	O-offset	Warning	Alarm
1	chan1	01	16	ips	0.0	1.00e+000	None	Low 1000.0	1.00e+000	0.00e+000	4.00	4.50
2	chan2	02	15	ips	0.0	1.00e+000	None	Low 2000.0	1.00e+000	0.00e+000	4.00	4.50
3	chan3	03	14	ips	0.0	1.00e+000	None	Low 3000.0	1.00e+000	0.00e+000	4.00	4.50
4	chan4	04	13	ips	0.0	1.00e+000	None	Low 4000.0	1.00e+000	0.00e+000	4.00	4.50
5	chan5	05	12	ips	0.0	1.00e+000	None	Low 5000.0	1.00e+000	0.00e+000	4.00	4.50
6	chan6	06	11	ips	0.0	1.00e+000	None	Low 6000.0	1.00e+000	0.00e+000	4.00	4.50
7	chan7	07	10	ips	0.0	1.00e+000	None	Low 7000.0	1.00e+000	0.00e+000	4.00	4.50

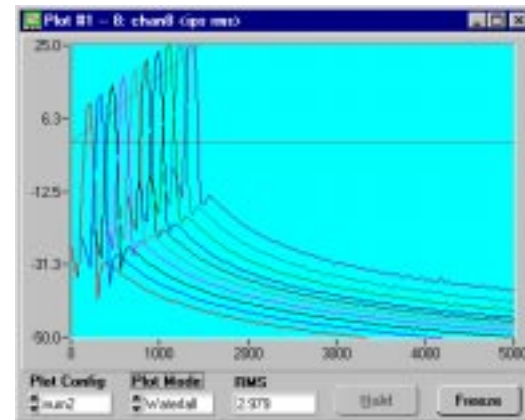




VibMon - GUI/HMI for DATAQ



File Name	Date	Time	Size	Permissions
DATA	31 Mar 98	13:53	45551	Default40 1 0
DATA	31 Mar 98	15:22	21378	Default40 3 0
DATA	02 Apr 98	14:34	298	Default40 6 0
DATA	02 Apr 98	13:29	65533	Default40 7 0
DATA	02 Apr 98	14:26	697	Default40 8 0
DATA	02 Apr 98	14:26	84	Default40 9 0
DATA	02 Apr 98	14:26	128	Default40 10 0
DATA	02 Apr 98	14:28	6251	Default40 11 0
DATA	02 Apr 98	14:34	154	Default40 12 0
DATA	02 Apr 98	14:35	65534	Default40 13 0
SNAP	31 Mar 98	13:41	268	Default40 0 1
SNAP	03 Apr 98	10:34	216	Default40 13 1





VibMon - Plot Configuration

Generic

Name:

Time Domain

Min Scale: Max Scale: Time Base:

Frequency Domain

Min Scale: Max Scale: Min Freq: Max Freq:

Nth Octave

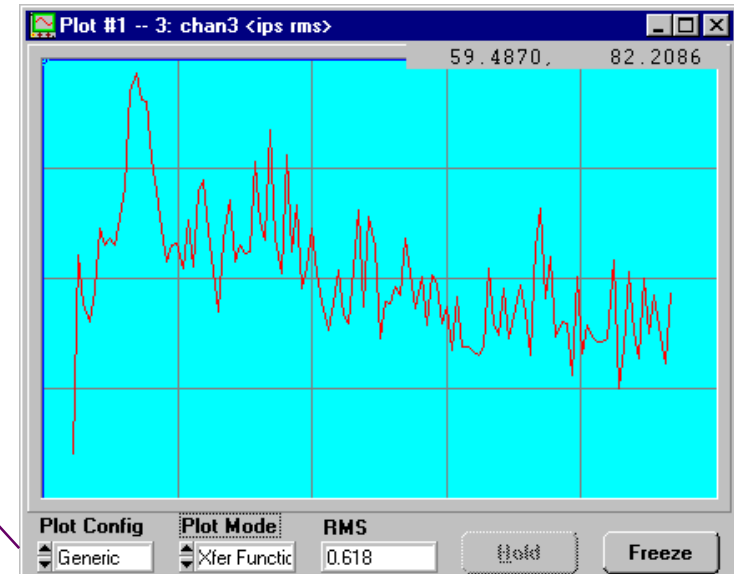
Start Frequency: Number of Octave: Div. per Octave:

Transfer Function

Reference Channel:

Water Fall

View Angle: View Raise: Trace Separation: Number of Traces: Update Period:



Plot type





Summary

- GUI has evolved into HMI
- Elaborate systems with simple operation are possible
- GUI/HMI “strawmen” are invaluable for development and evaluation
- Consistent HMI’s can cover a wide variety of hardware and data types

