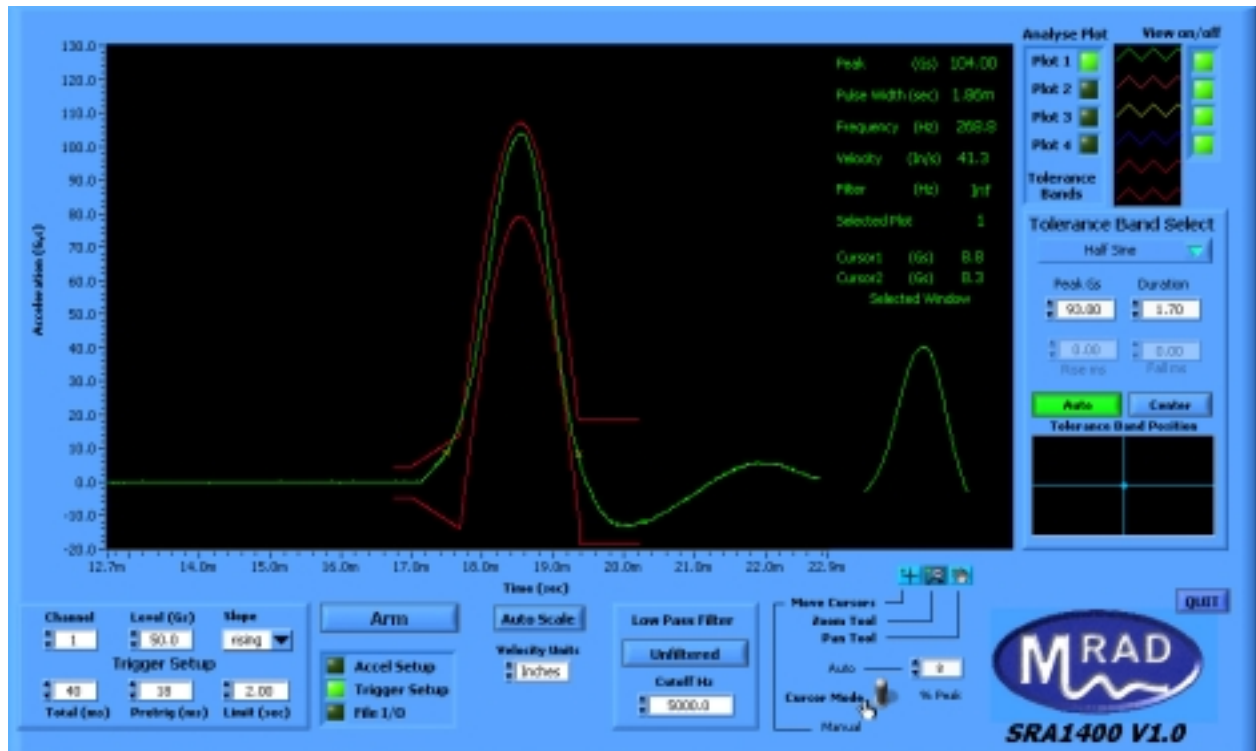


Chapter 4

SRA-1400-4 V1.0 SHOCK INSTRUMENT



M/RAD Model SRA-1400-4, Four Channel Digital Shock Pulse Instrumentation System to capture, display and analyze half-sine, sawtooth and square wave pulses:

Integrated System for Shock Pulse Capture, Display and Analysis

The system includes 4 main building blocks. These blocks are the Signal Conditioning, Digitizer, Computer and Special Analysis Software. These building blocks are described below.

Signal Conditioning:

The Signal Conditioning for this system is comprised of transducer buffer and scaling. These circuits represent the waveform recorder with a normalized full-scale input regardless of transducer sensitivity.

Digitizer:

The Digitizer is an SRA-1400-4 data acquisition board which is a complete four channel waveform recorder. This recorder is a PCI board which resides inside the computer enclosure. The shock pulse is used

to self-trigger the recording and the system will automatically back record to provide a pulse record which starts before the shock pulse begins.

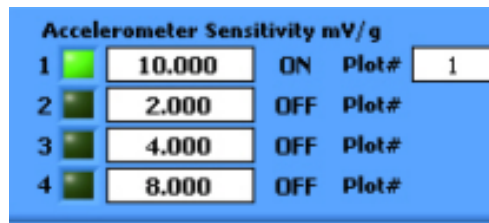
Computer minimum requirements:

1. 400 MHz CPU
2. 64 Meg's Ram
3. 1 open PCI slot (PCMCIA slot for a laptop)
4. 10 Mb of hard drive space
5. Screen resolution 1024 x 768 min
6. Color printer (optional)

Analysis Software:

The special analysis software provides easy-to-use operator interface. All of the functions mentioned below are activated by the mouse.

The Trigger & and Accelerometer setup

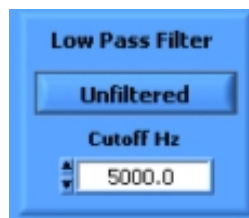


Accelerometer Sensitivity mV/g			
1	<input type="text" value="10.000"/>	ON	Plot# <input type="text" value="1"/>
2	<input type="text" value="2.000"/>	OFF	Plot#
3	<input type="text" value="4.000"/>	OFF	Plot#
4	<input type="text" value="8.000"/>	OFF	Plot#

To set which channel the SRA will use to **trigger**; Click mouse on green button to the left of the sensitivity input box.

To set **sensitivity**; refer to your accelerometer calibration sheet to determine the sensitivity of the accelerometer in mV/g and enter the value in the corresponding box for the channel that this accelerometer will be used.

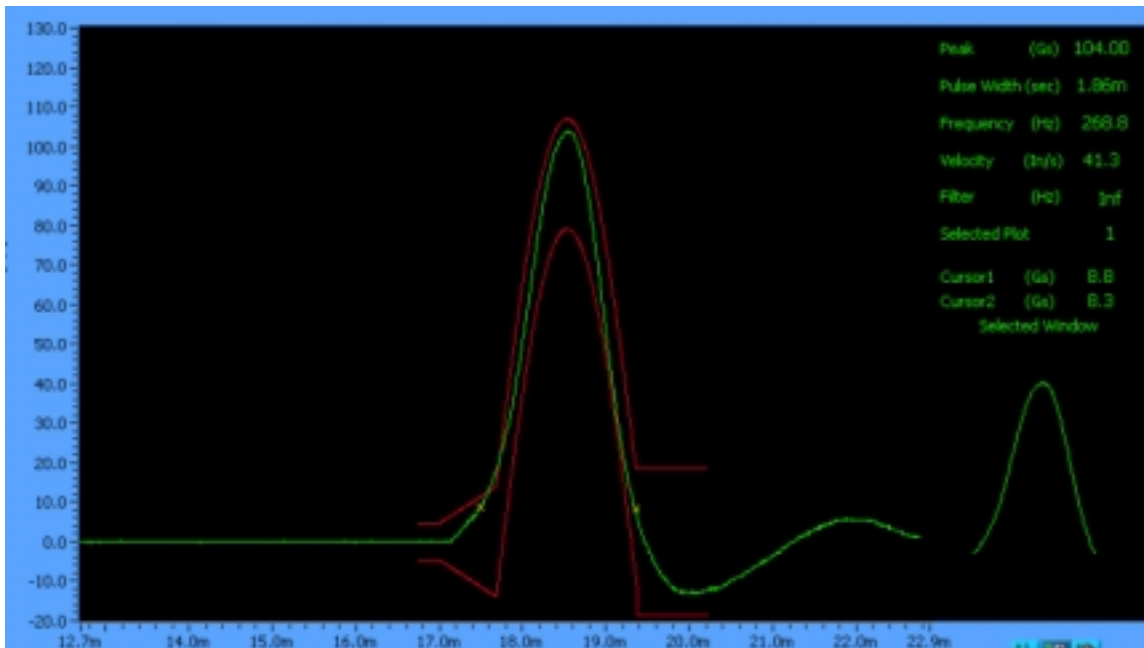
Filter



Low Pass Filter	
<input type="button" value="Unfiltered"/>	
Cutoff Hz	<input type="text" value="5000.0"/>

There is a user adjustable low pass fourth order Butterworth filter that can post process the data.

Graphic Window



Channel	Level (Gs)	Slope
1	50.0	rising
Trigger Setup		
40	18	2.00
Total (ms)	Pretrig (ms)	Limit (sec)

2.0m	22.9m
Move Cursors	<input type="checkbox"/>
Zoom Tool	<input type="checkbox"/>
Pan Tool	<input type="checkbox"/>
Auto	0
Cursor Mode	% Peak
Manual	<input type="checkbox"/>

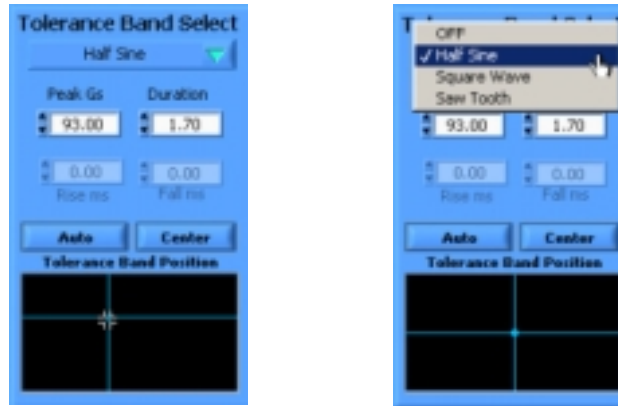
This software allows users to view shock pulse waveforms on a large graphic window. This window illustrates the recorded waveform and includes two cursors that are controlled via either the mouse or may be pre-set to automatic location based upon the pulse amplitude. The cursors have “live” position readouts in time and scaled data. Additionally, the operator can analyze waveform segments for pulse width, velocity and peak G levels which instantaneously appear after the pulse is displayed. The screen shows the results properly scaled with engineering units.

Auto Scale
Velocity Units
Inches

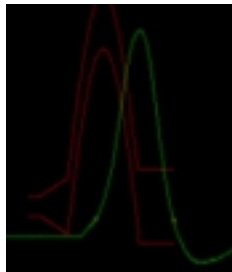
Auto scale automatically adjusts display screen scale.

Velocity values can be in English or metric units

Shock Pulse Conformity

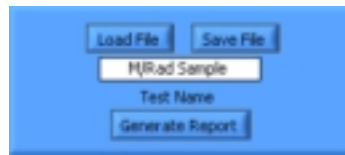


A special function that identifies shock pulse conformity to MIL-SPEC tolerances is available for half-sine, sawtooth and square wave waveforms.



If **Auto** is enabled, this function automatically centers the tolerance bands to the pulse to inspect for conformity. **Center enables** your mouse to move the cross hairs in the window to allow the user to adjust the position of the tolerance bands to inspect conformity of the pulse.

Data Storage



Displayed waveforms can emanate from disk storage as well as the waveform recorder. Recorded waveforms can be saved to the disk or the hard drive and reports generated. All files are saved unfiltered, in as-taken condition and can be adjusted once the plot is recovered from a file

Waveform reports



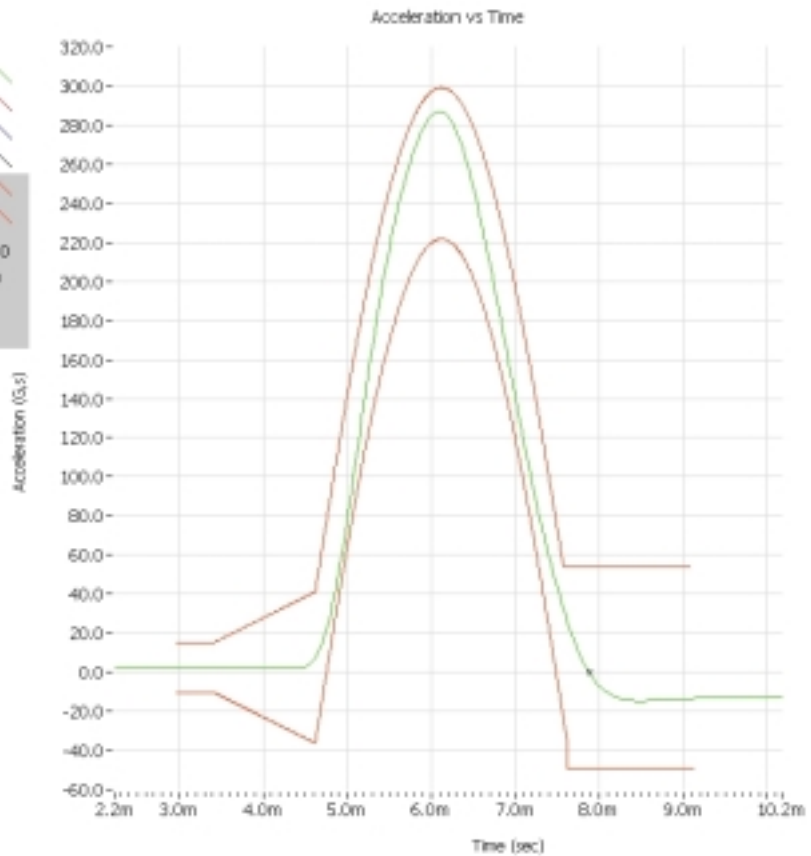
MRAD SRA1400 Data Acquisition
 File
 Test1
 05/26/01 01:20:20 PM
 Sample rate(Hz): 40000
 Channels
 1 2
 Accelerometer sensitivities (mV/g)
 5000.00 1.000 1.000 1.000
 Data (Volts)

Plot Color	1	2	3	4
Tolerance				
Band				
Settings				
Peak (G)	258.0			
Duration (sec)	3.0			

Notes
 Current Time 35:57:51
 01/09/2002

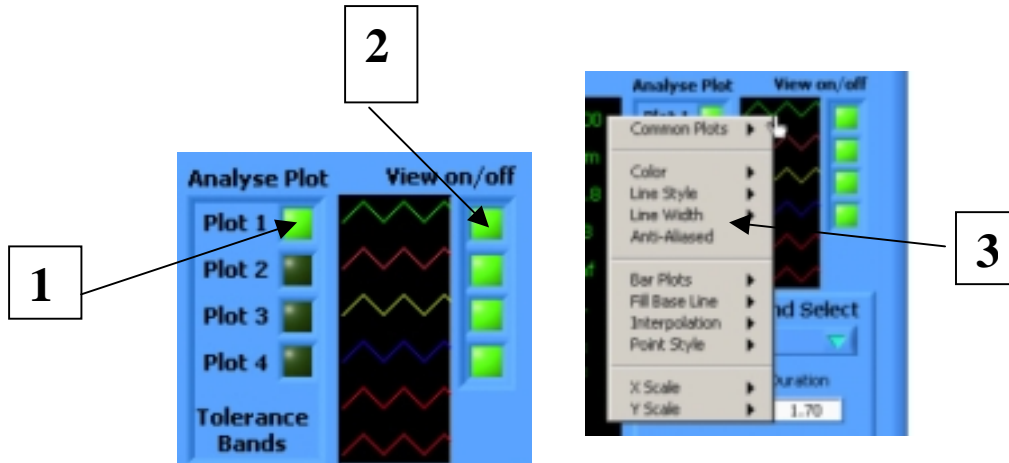
MRAD Sample Report

Selected Plot 1
 Peak (G's) 287.0
 Duration (sec) 7.9m
 Velocity (In/s) 198.3
 Frequency (Hz) 63.5
 Low Pass Filter(Hz) 1.3k



Waveform reports may be printed or saved as an image file. There is a notes window provided for the user to store information about the test. The scale, line color and style of this plot are user adjustable.

Plot Options



Plot options are as follows

- 1) User may choose the channel to analyze
- 2) User may choose witch channel to view or view all channels.
- 3) User may edit the appearance of the plot lines.

Accessories:

1. Accelerometer (0-500g)
2. Accelerometer (50-2,500g)
3. Accelerometer (2,501-30,000g)
4. 10, 25 & 50 foot cables are available.