Mean Time Between Failure

DTS believes that the reliability of its TDAS PRO product is its most important feature. Our 20 years of automotive crash test experience gives us a personal understanding of the term "critical data collection application." Test set-up and vehicle costs are often very high and customers must be able to rely on their data acquisition system to work the first time, every time, in this industry.

DTS's TDAS products have been used in test labs around the world in thousands of crash and impact tests. To our knowledge, no TDAS unit has ever lost data due to equipment failure.

TDAS PRO Shock Reliability

Standard TDAS physical tests performed on each module include a nominal 110 G, 12 msec shock applied three times from each direction in the three primary axes. The module is mounted to the shock test device (Figure 1) and subjected to the acceleration profile shown in Figure 2. During each test, data is recorded from 350 ohm full-bridge plugs connected to seven of the data channels. An accelerometer mounted directly to the module is connected to the remaining channel to measure the acceleration in the primary force axis. The data for each channel from all tests is analyzed to verify that the system performs as expected and that the impact does not affect the recorded data.

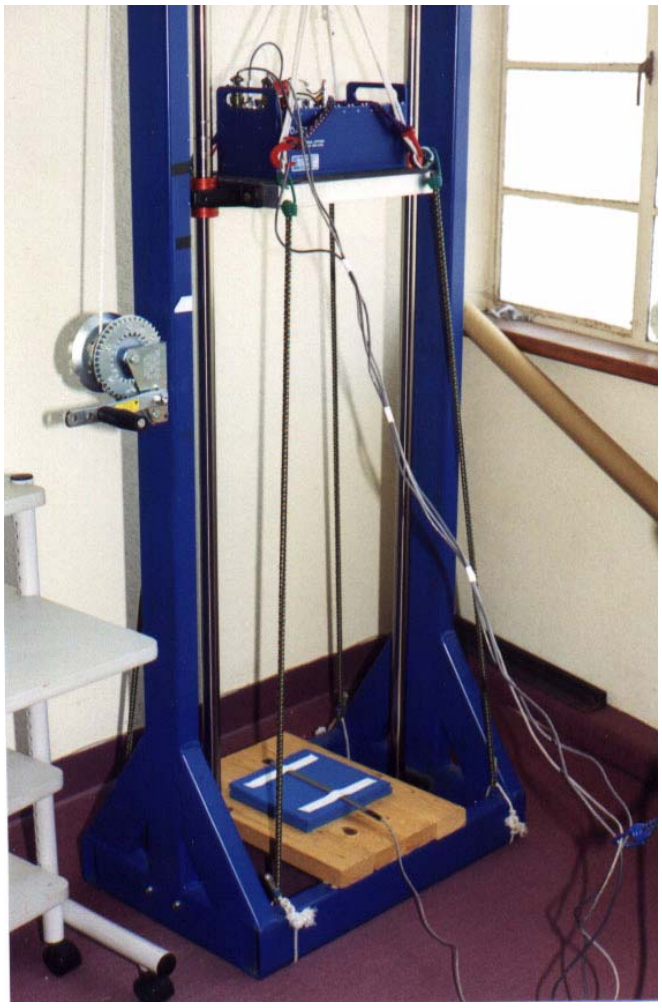

Figure 1: DTS shock pulse fixture.

TDAS data recorders are rugged and inherently durable. TDAS modules and TDAS software have been operating in the field since 1995 in high volume impact testing environments with no known mechanical or software failures. The development process for the current production TDAS included durability testing on a single, representative module to determine how the data recorder design would withstand repeated 50 G, 20-25 millisecond shock pulses.

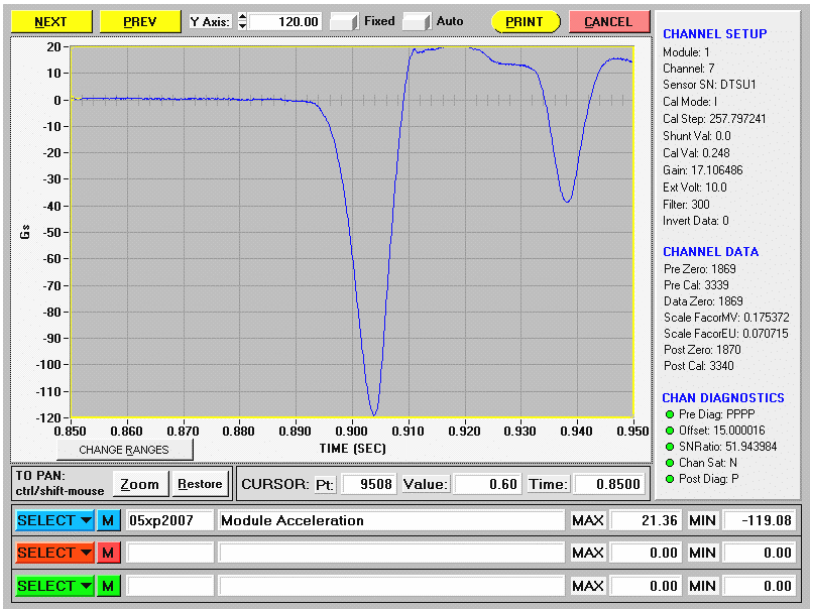

Figure 2: Standard production test acceleration pulse.

Beginning with the standard TDAS shock test procedure described above, the acceleration pulse was modified to be wider and less severe than the standard production test of 100 G, 11-15 msec. The sample module was again configured with the channel plugs and accelerometer as in the standard shock test. Next, the worst-case impact directions were selected in two of the most likely axes to be under repeated load based on the possible mounting orientations of the TDAS rack system. Finally, the module was subjected to 125 shock pulses in each of the two axes between 50 G and 60 G magnitude as shown in Figure 3. Data were collected and analyzed after each 50 shock pulses to look for performance degradation. There was none—the unit

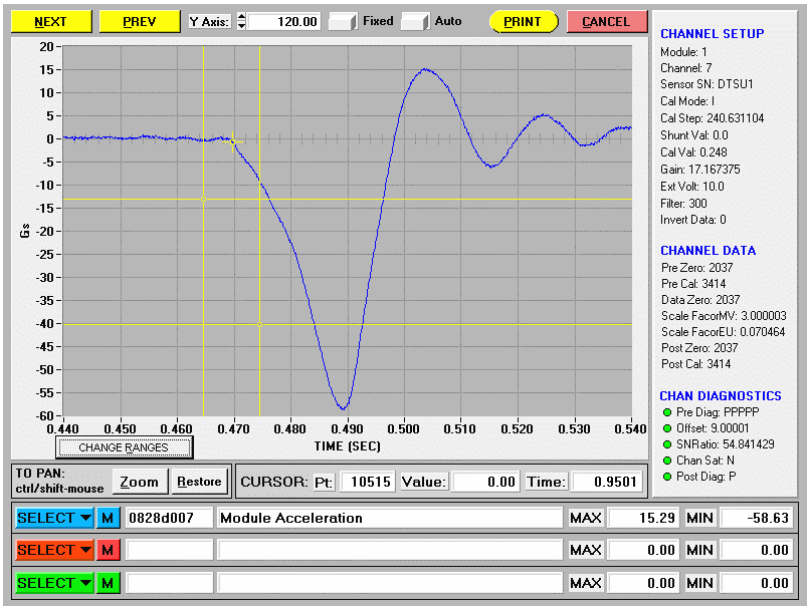

Figure 3: Durability test acceleration pulse.

performed flawlessly. The exterior and interior of the module were then inspected for indications of wear or weakness. Again, there was none. A complete recalibration of the module was also performed and no change between the pre-test and post-test calibration factors was found.