

# Portfolio

<b>CLIENT</b>	DEFENCE
<b>PROJECT</b>	Military Test Equipment
<b>PRODUCT</b>	Missile Firing Integrated Recording System
	<ul style="list-style-type: none"><li>ENGINEERING</li><li>DESIGN</li><li>DEVELOPMENT</li><li>CONSULTANCY</li><li>MANUFACTURE</li></ul>



## MISSILE FIRING INTEGRATED RECORDING SYSTEM *Real Time Image Capture & Storage*

Designed and manufactured by PJB this system is used for recording missile firing trials for later review and analysis. It uses an industrial computer platform with a high performance motherboard supported with plug-in peripheral devices, adapted specifically for this application.

### Introduction

The previous system used old technology and comprised of a large number of discrete equipment pieces, resulting in a system which was inconvenient to transport and susceptible to damage and loss.

### Computer System

The system is based on an industrial computer platform. This consists of a high performance motherboard of 'PC' architecture, supported with plug-in peripheral devices, customized for this application. The microprocessor used is a Dual Core device with an internal clock speed of around 3 GHz.

A proprietary Matrox video capture card using MIL software provides a maximum of four video signal inputs through standard BNC connectors. This allows the reading and storing of the images to take place whilst ensuring there is no possibility of missed frames.

A digital signal interface accepts the events sources from the trial. The video capture interface card provides a number of auxiliary TTL level undedicated I/O ports. A custom made level conversion interface module is used to translate volt free contact closures into TTL logic levels suitable for the card. The application software monitors the ports and responds accordingly.

Serial data from a radar oscilloscope is continuously received during the trial. The video interface card includes a serial port which may be assigned a COM port number by the computer. This serial port has a differential RS485 architecture, and will not directly connect to the oscilloscope output. Therefore, a custom made RS232 to RS485 converter module is used to provide the correct interfacing.

### Data Storage

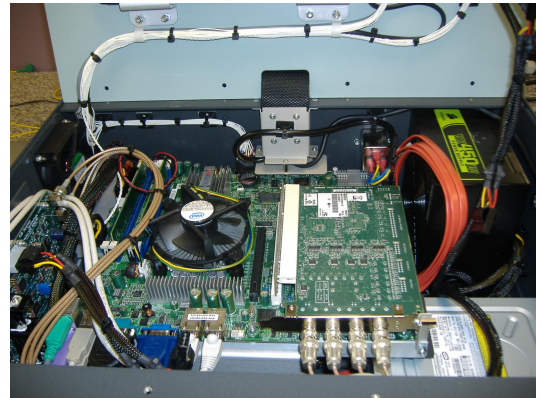
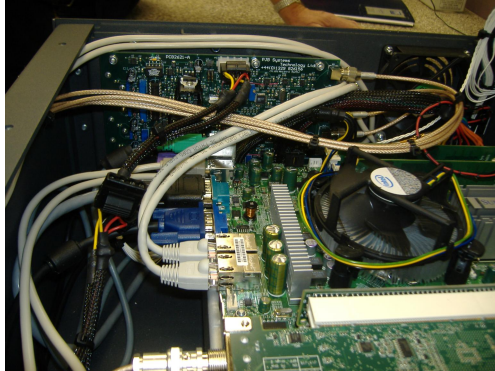
All data is stored during the trial on system hard drives. Critical factors in the selection of the drives were the sustained write speed and the need to store uncompressed images to avoid loss of vital picture content. Therefore, a multiple hard drive system is employed to accommodate the large amount of image data.

### Monitor and keyboard

A 17 inch TFT monitor is built in to each unit to show the live video images as they are being captured and recorded. Options allow setting the display format, from four video images in a tiled reduced resolution pattern to a selected image at full screen. A standard keyboard and trackball are provided for operator use.



# Portfolio



## Video Inputs Galvanic Isolation

To provide complete protection of the video signal interfaces against possible damage due to transient voltages, signal channels from the cameras are galvanically isolated to a withstand voltage of greater than 1500. Dedicated isolated power supplies are used to energize the outboard sides to maintain the withstand voltages. Each video channel is optically isolated using a high performance analogue opto-coupler.

## Loss of Signal Compensation (LOSC)

To overcome the possibility of signal loss, the system has a special compensation method whereby, if a loss of a video input occurs, a substitute synchronisation signal pattern will be switched into operation. Each video channel is provided with a dedicated compensator, constantly measuring and recording the characteristics of the associated video signal and able to detect to presence or otherwise of a valid video signal. In the event of a loss of signal, then the compensator will switch into the video line a sync pattern having characteristics (times) identical to those of the last detected valid signal. This method is more complex than switching to a standard fixed format substitute signal, but, due to the matching of the signal characteristics, will avoid discontinuities or gross changes in the sync times which may be detected as signal errors by the capture card. There is no effect on the remaining recording channels if the inputs to one or more channels are lost.

## Software

The video writer provides the user with an option to create image overlays that are superimposed on each acquired frame. Prior to the trial, pertinent information is written on each video channel screen and the software automatically inserts the time and date and a frame counter. The counter is preset to zero and can be set to run from the keyboard or from the ship interface. Finally, a field is provided to show the status of the digital interface to the ship system. A separate software application allows the image frames from the trial to be replayed.

## Enclosure

The equipment is housed in a single industrial custom made enclosure designed to maximize portability and durability. The base of the enclosure houses the main computer and the digital and serial interface module. The keyboard and trackball are ergonomically mounted on the top panel and the monitor is permanently mounted in the hinged lid.

