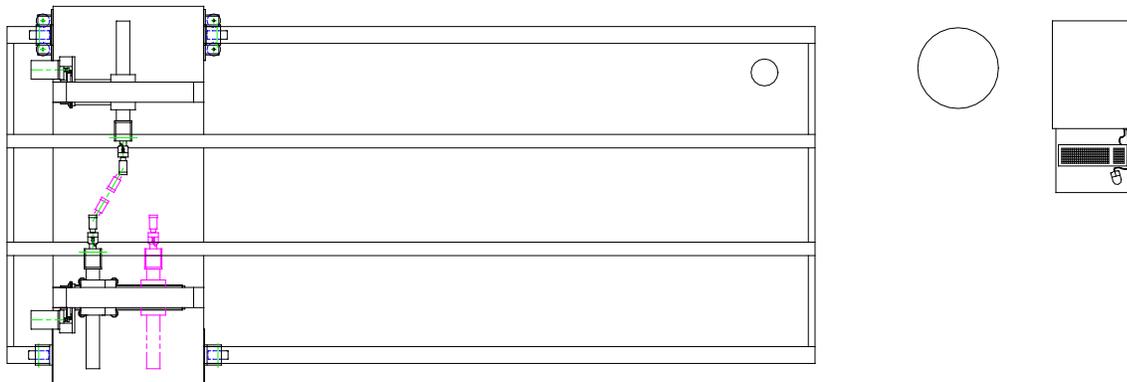
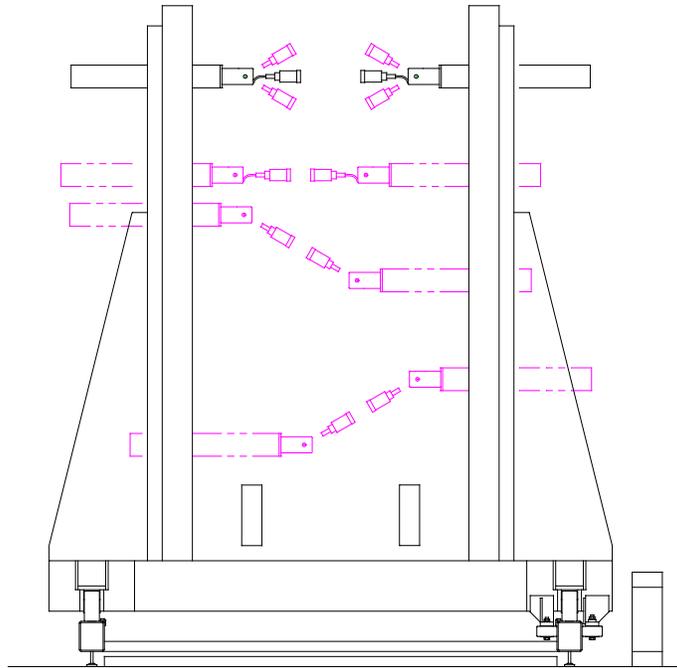




**SDI-5720 Vertical Frame Through Transmission  
Ultrasonic System**





## 1 INTRODUCTION

The SDI-5720 is a low cost high performance UT system designed for incorporation into airframe Lean Manufacturing environments. It incorporates the features of a large scale fixed gantry system such as the SDI-5410, into a compact floor standing unit. The flexible design allows the system to be supplied configured for the inspection of flat panels, and field upgraded, when required, to perform complex 3D scans.

In full 3D scanning configuration, the system is designed to inspect a limited range of part geometries, such as aircraft control surfaces, wings, doors etc that are too highly contoured to be regarded as flat, but not so contoured as to require a full gantry system. Accordingly, it is possible to reduce size, complexity, cost and installation requirements, while maintaining performance. In addition, the inherent rigidity of the structure when compared to all but the largest gantry systems allows higher speed scanning with more precise transducer positioning. Advances in computing and motion control technology mean that the air-conditioned mobile control consoles provided with the unit out perform many of the permanent control room installations associated with larger gantry systems.

The system is based on modules widely used in SDI's product range, which can be viewed on our web site at [www.sdindt.com](http://www.sdindt.com). All components/modules used in the system are designed and manufactured in-house by S.D.I. in their Newbury Park, CA facility.

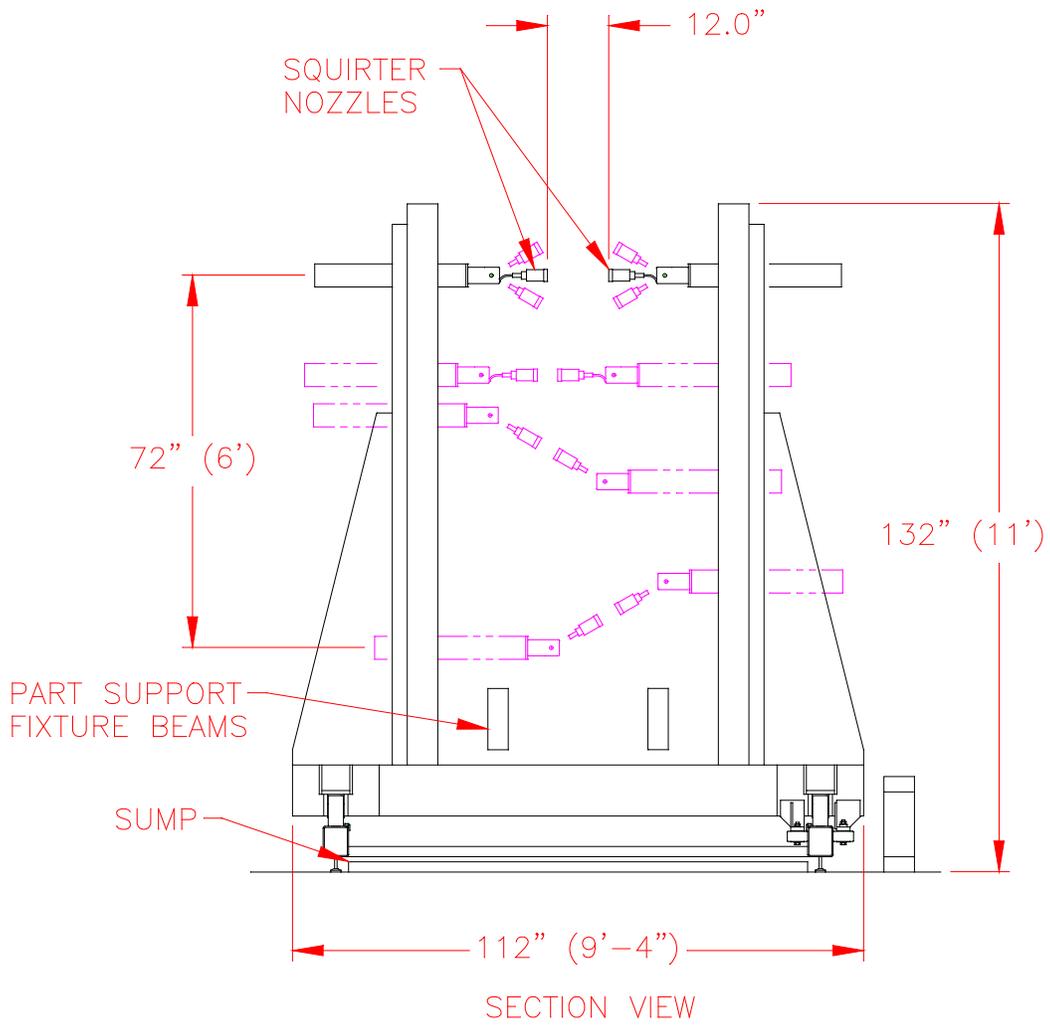
## 2 MECHANICAL CONFIGURATION

The system is turnkey, stand alone and fully self contained. The mechanical configuration is outlined in the attached concept drawing. All support frame members are welded box section. The frame is mounted on a rigid platform fitted with water containment and recirculation components. The system is movable. When in position it is possible to anchor the system to the ground for additional rigidity. The axes of motion provided on the system are shown in the table below:

Axis	Description	Range	Speed	Resolution	Accuracy
X	Primary axis along the frame. 3 phase brushless d.c. servo drives with resolver.	144in.	20 in/sec	.001	.004in/ft
Z1, Z2	Vertical column rack and pinion drives. 3 phase brushless d.c. servo drives with resolver.	60in.	8in/sec	.001	.004/ft
Y1, Y2 (Motorized on 3D version only)	Lateral arms. Rack and pinion drive with brushless d.c. motors and resolvers in oil filled waterproof	12in.	12in/sec	.001	.004/ft



	housing. Column spacing and Y axis reach accommodate a part with overall thickness/chord of 12 in.				
Delta X (Option for complex curves)	Mounted on a single Z axis column.	18in.	12in/sec	.001	.004/ft
A1, A2 (Motorized on 3D version only)	Gimbal in X, Y plane	+/- 90 deg	30 deg/sec	.01deg	0.01deg
B1, B2 (Motorized on 3D version only)	Gimbal in Y, Z plane	+/- 90 deg	30 deg/sec	.01deg	0.01deg





**Linear Drives.** For all linear ways, heavy duty rack and pinion drive provides precise positioning and encoder feedback. The frame is an inverted bridge design with both towers mounted onto the same bridge frame. This has the advantage of maintaining precise alignment in the X direction. The inverted bridge also simplifies maintenance and repair as the drive components for all axes are accessible from ground level. The linear ways for Z, Y and delta-X axes are precision stainless steel, heavy duty, V rails. These are also fitted with precision rack and pinion drives. The Z axis carriages are counter balanced. All drives are closed loop d.c. with encoders/resolvers.

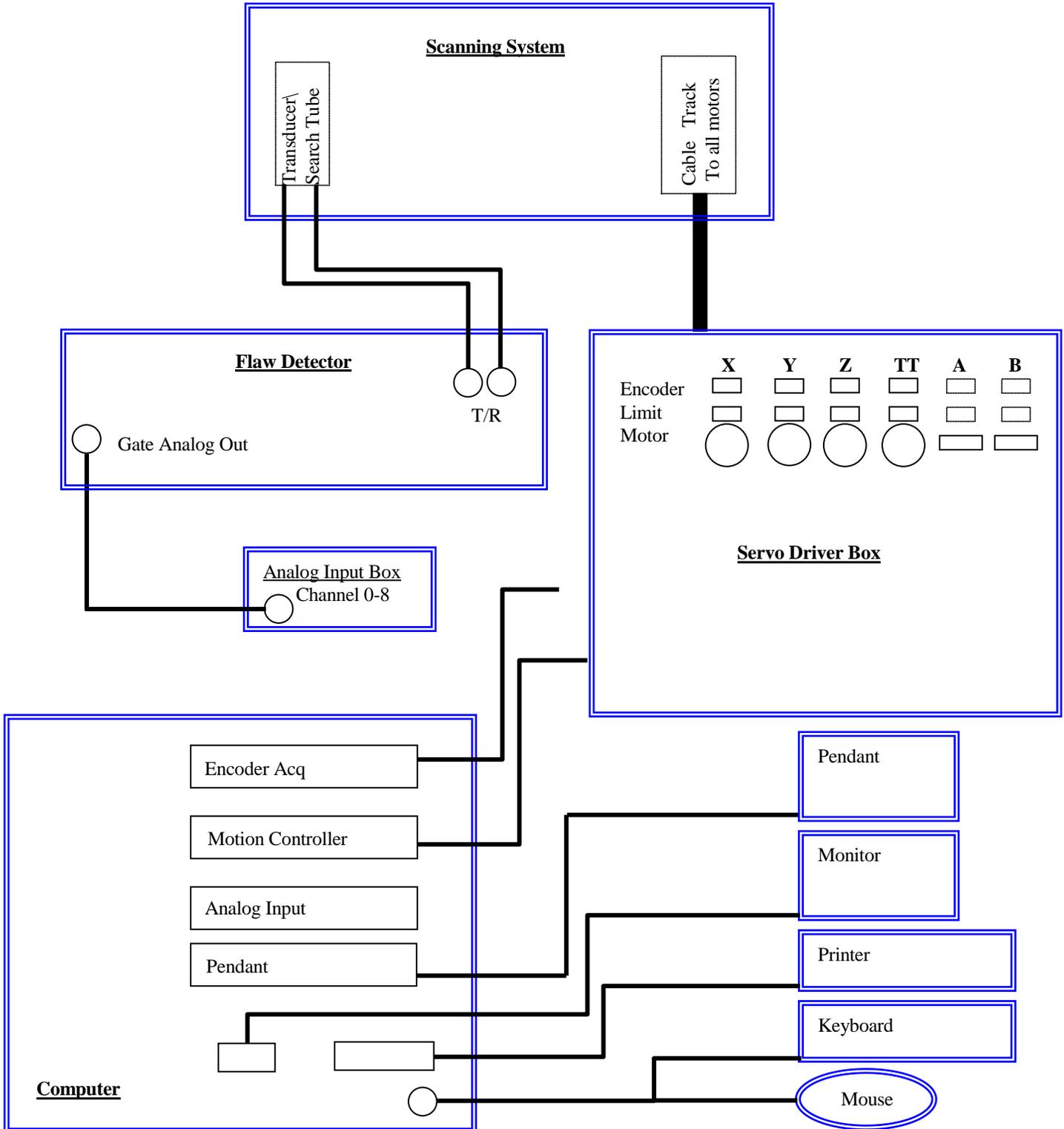
**Gimbal Drives(Optional).** The gimbals are direct drive three phase brushless servos with integral high precision resolvers. The units are housed in oil filled stainless steel enclosures. The squirter is attached to the gimbals by a magnetic mount.

**Control Console.** The mobile control console can be positioned anywhere within reasonable distance from the system. Current SDI systems have similar remote consoles up to 80 ft. from the scanner. It is fitted with two 19 inch monitors linked in the Windows operating environment to allow windows to be dragged from one screen to the next, or expanded over two screen. The console requires a single 110V 60 Amp single phase supply. SDI will install the necessary transformers to achieve this from the customer's supply. The console houses all the computing, drive and instrumentation components required to operate the system. The enclosure includes a filtration and refrigeration unit.

### **3 ELECTRICAL CONFIGURATION**

The electrical configuration describes the components and interconnections for the motion control, drive, instrumentation and data acquisition sub systems. The majority of the components are housed in the system console. All system components meet applicable US and International safety codes. Apart from the very low current ultrasonic signals, no voltages greater than 70 volts are present anywhere on the system outside the control console.

The electrical layout is shown below





## **4 INSTRUMENTATION**

The system is supplied with the SDI 2460-4, two channel systems instrument. This is a modular, multi-channel flaw detector comprising pulser, receiver, flaw gate and thickness modules. The unit will be configured to be able to provide simultaneous pulse echo from each side together with two through transmission tests. A range of auxiliary instrumentation can be provided to aid in the inspection of the more complex highly attenuative lay-ups. This includes log amplifiers, pre-amplifiers, and tone burst pulsers. Details of the SDI 2460 are as follows:-

### **General:**

High resolution, two channel, fully programmable "Tank Top" flaw detector for use with industrial immersion facilities.

Features switchable pulser voltage, frequency, gain and calibrated attenuation.

Flaw and thickness gates with initial pulse or interface triggering.

8 segment DAC module. Range 37dB

Rectified video and r.f. outputs are provided together with external/int sync and sync out.

### **Pulser:-**

Selectable voltage and damping

High Power 100-1000V

High Resolution 50-300V

Rep Rate 0.5-5kHz. Per channel

Ext/Int sync.

### **Receiver:-**

Selectable Pulse-echo/Through transmission.

Switched Frequency 1, 2.25, 5, 10 and broad band. 1-25Mhz

Gain:- 97 dB. dynamic range

Attenuation 1-127dB in 1dB steps

### **Gates:-**

Flaw Amplitude and Thickness

Main Pulse/Interface sync

### **Outputs:-**

Rectified video.

Stepless gated r.f.

Flaw alarm logic.

Thickness High-Low

Proportional analog 0-10V.

### **A-scan display module:-**

Provides real time A-scan display

A scan printout



## **5 MOTION CONTROL**

Motion control is provided by the widely used SDI-MasterScan program. A technical specification is attached.

## **6 ACQUISITION/ANALYSIS**

The acquisition/analysis software used is the SDI-WinScan package. This software is described in the attached specification.

## **7 INSTALLATION**

The system will be fully assembled and made operational at the SDI facility in Newbury Park for customer buy off. The Acceptance Test Procedure (ATP) will be carried out using the test samples supplied by the customer. SDI will address any items requiring rectification prior to authorization for shipment by the customer representative. Upon receiving approval, SDI will dismantle, crate and ship the system. SDI will carry out site preparation prior to the arrival of the system. The system will then be assembled and made operational on site. The ATP will then be repeated.

## **8 TRAINING**

SDI provide a comprehensive training program including 5 days training of personnel in the operation and routine maintenance of this equipment. This training will take place at the customer site after installation.

## **9 CUSTOMER SUPPORT**

### **9.1 Customer Support Department**

SDI can offer 24-hour response to all product support requirements to ensure minimal equipment downtime.

### **9.2 Field Service Organization**

SDI has a domestic field service organization to provide post installation service and maintenance on installed systems in the United States. Overseas installations are covered through our trained representative network.



### **9.3 Spare Parts**

A recommended spare parts list will be provided with the system. Replacement of these recommended spares will be covered in the maintenance training given with the system.

### **9.4 Technical Support**

Technical support and engineering staff at the SDI facility are available for telephone support as required. All customers are offered free consultation via phone or fax.