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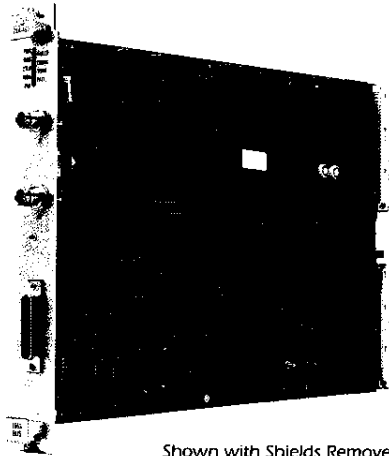
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## 73A-453 ONE-CHANNEL MIL-STD-1553A/B BUS SIMULATOR MODULE

- Emulates a 1553 Bus Controller (BC), single or multiple Remote Terminals (RT), or acts as a 1553 bus monitor
- Programmable message rate, response time, and transition time
- Extensive error insertion and error detection, under program control, on any word or message
- Programmable output level and input threshold
- GSA item



Shown with Shields Removed

### ORDERING INFORMATION

**73A-453** - One-Channel MIL-STD-1553A/B Bus Simulator Module

**VX1782P** - Hooded Connector

The 73A-453 Module allows the system controller to communicate with, and test devices built in compliance with, the MIL-STD-1553A/B data bus being used in many military aircraft and communications systems. The 73A-453 may be utilized in three ways:

- As a 1553 Bus Controller (BC) Simulator.
- As a 1553 single or multiple Remote Terminal (RT) Simulator.
- As a 1553 Bus Monitor.

The 73A-453 is programmed by sending ASCII characters, or ASCII characters combined with binary data, from the system controller. Data is returned to the system controller as ASCII characters or binary data.

The 73A-453 output can be either the normal 1553 waveform, or the sinusoidal waveform used by MCAIR. It operates from either an internal or an external clock for additional flexibility.

In the Bus Controller Simulator mode, the 73A-453 can test any of the 32 remote terminals (31 plus broadcast mode) specified by 1553. The system controller loads the Module with a message sequence list plus data lists for each RT to be addressed, which are in turn transmitted to the proper RT(s). Response data received from the RT is stored in on-card memory.

In the RT Simulator mode, the 73A-453 Module can simultaneously emulate as many as 31 different RTs plus broadcast mode. The system controller preloads the 73A-453 with the appropriate response data and status words for each simulated RT. Data received from the 1553 bus by the 73A-453 is stored in on-card memory for later evaluation.

In the Bus Monitor mode, the 73A-453 Module simply observes and stores all bus traffic. Up to 30,000 command, data, or status words can be stored for later evaluation.

The 73A-453 can introduce errors into its transmitted data stream, including parity, Manchester encoding, zero crossing errors, dropped data bits, interword data gaps, incorrect or invalid sync patterns, incorrect RT response times, incorrect number of bits per word and words per message, invalid signal levels, and Gaussian or common-mode noise. On received data, it can distinguish among the following error types: incorrect transition time, Manchester, dropped data-bit, bit count, parity, incorrect sync, terminal/controller response time, interword data-gap, and word count, as well as message format errors such as incorrect RT address, missing RT response, invalid status words, and invalid mode code or broadcast mode usage.

### BITE

The 73A-453 Module provides extensive memory and internal self test. In addition, a series of LEDs provide status information concerning the Module's operation, including address status, module power, failures, and programming errors. LEDs also indicate 1553 bus communications, current mode of operation, and pattern recognition.

### Specifications

Configurable as (programmable):  
MIL-STD-1553 Bus Controller Simulator, single or multiple RT Simulator, or Bus Monitor.

#### Operating Modes:

Bus Controller Simulator, programmable for up to 32 separate data lists.  
RT Simulator, programmable for data and response collection and response from up to 32 RTs.  
Bus Monitor, collects bus data in single buffer, receive-only mode.

#### Buffer Capability:

30,000 22-bit words (16 bits data, 6 bits error/sync code) may be user allocated.

#### 1553 Bus Coupling:

Direct Coupling, 1:1 turns ratio, 55 Ohm isolation resistor each leg.  
Transformer Stub Coupling, 1:0.707 turns ratio.

## 1553 Analog Output:

Level-programmable to 250 different levels.  
Range, depends on the bus loading. Differential voltage level output range for the following bus loads is:

Direct Coupled,

35 Ohms	0.20V to 8.20V PTP
70 Ohms	0.30V to 13.75V PTP
1,000 Ohms	0.75V to 34.40V PTP

Transformer Coupled, 70 Ohms, 0.60V to 24.2V PTP.  
Two 70 Ohm Terminators, either direct-coupled direct connection or transformer-coupled, 0.20V to 8.20V PTP.

**Note: The above levels are with MCAIR switch in OFF position; in the ON position, peak-to-peak levels approx. 10% higher.**

Accuracy,  $\pm 0.2V$  PTP, 25 and 70 Ohm loads.

Noise Content, 50 mV PTP.  
Current Drive,

260 mA RMS max, direct-coupled output. 380 mA RMS max, transformer-coupled.  
Short-circuit Protection, direct-coupled output may be shorted for several minutes without degradation. Transformer-coupled output should not be shorted.

## 1553 Analog Input:

Max Input, 40V PTP differential.  
Threshold, programmable to approximately 250 levels from 0.50V to 9.00V PTP; direct-coupled input (0.35V to 6.36V PTP; transformer-coupled input).

## Transition Time Error Detection:

To within 62.5 nsec of 0.5, 1.0, 1.5 or 2.0 msec nominal.

## Word Format:

Manchester bi-phase, self-clocking, 1 MHz, 20-bit word with sync, data, and parity bits.

## Message Format:

Programmable command or status word plus user-defined number of data words per message.

## Message Capability:

Any number of messages may be transmitted or received up to available buffer memory.

## Message Rate:

Bus Controller Simulator Mode (time from end of one message to start of next), programmable from 14  $\mu$ sec to 65,535  $\mu$ sec on an individual message basis.  
RT Simulator Mode (RT response time), programmable from 4.25  $\mu$ sec to 65,535.25  $\mu$ sec on an individual message basis.  
Bus Monitor Mode, message rate is defined by active devices on bus.

## Message Synchronization:

An operation may be programmed to start on a user-specified pattern word.

## Induced Transmitter Errors:

Programmable on an individual word basis, incorrect parity, Manchester, dropped bit, sync pattern, incorrect bit count ( $\pm 1$ -bit).  
Programmable on an individual word basis,  $\pm 150$  nsec bit transition time,  $\pm 150$  nsec sync transition time, dropped parity bit, 1-bit interword gap.  
Programmable on an individual message basis, incorrect RT response time, word count, or status word RT address.  
Bit position programmable, Manchester, dropped bit, and transition time errors.

## Receiver Error Checking:

Individual Word Basis, bit transition time, parity, dropped bit, sync pattern, and receiver response time (response-time error value programmable from 4 to 31  $\mu$ sec).  
Individual Message Basis, interword data gap, word count, no RT response, incorrect RT address.

Format Errors, improper mode code operation, improper broadcast mode operation, and improper use of status word bits.

## Time Base:

16 MHz crystal oscillator.

## Interrupt Capability:

Programmable to interrupt system controller on completion of a bus communications sequence.

## Programmed By:

ASCII Characters. Data uses either hexadecimal or binary notation.

## Auxiliary Outputs (TTL levels):

Reconstructed Received Data and Clock.  
Transmitted Data and Clock.  
Pattern Recognition Output.  
Status Error Output.  
Data Word Received Output.  
Data Bus Input Active Output.  
Position Identification Output.

## Auxiliary Inputs (Analog):

Common-mode voltage.  
Gaussian noise.

## VXI Specifications:

Device Type, VXI message based instrument, Rev. 1.2\*.  
Protocol, Word Serial.  
Module Size, "C" size, one slot wide.

## Front Panel Signal Connectors:

One DB-25P connector.  
Two MIL-STD-1553 triaxial connectors.

## Recommended Cable:

VX1782P, Hooded Connector.

\*The VXI Specification strongly recommends that controllers and slot 0 modules support 1.2, 1.3, and 1.4 modules. However, some vendors have ignored this and force customers to replace their 1.2 instruments. Please consider this when selecting your controller and slot 0 vendor.



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