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# AVM1553SM-X

## Multiple Channel Dual Redundant MIL-STD-1553B Protocol Tester and Simulation Module for VMEbus



### General Features:

The AVM1553SM-x family of configurable VME modules provides for the protocol testing, simulation, and monitoring of up to two independent dual redundant MIL-STD-1553B data busses on a single 6U module. The module can act as Bus Controller (BC), Multiple Remote Terminal (MRT, up to 31 plus the broadcast RT), and a Bus Monitor (BM) all concurrently for each dual redundant MIL-STD-1553B stream. Full error injection and detection is programmable in all modes of operation. The module can be configured with up to four 16 MIPS micro-coded controllers and 1 Mbytes of RAM. Each channel can be optionally equipped with a Chronological Bus Monitor/Analyzer capability with data filter functions and accurate time tagging of all MIL-STD-1553B messages, RT response times, and intermessage gaps.

## Functional Characteristics

### Bus Controller Simulation

The AVM1553SM-x module provides autonomous BC operation including a programmable retry mechanism and sequencing of Minor Frames within Major Frames with no need for host interaction. BC operation can be triggered by external events.

### Multiple RT Simulation

The AVM1553SM-x module can simulate up to 31 Remote Terminals with all subaddresses individually programmable. Each RT has a programmable response time. In addition, RTs can be programmed as a Mailbox Monitor (Monitor Terminal) for non-simulated RTs.

### Error Injection Capabilities

For BC and MRT simulation, the AVM1553SM-x provides full protocol error injection capabilities:

- SYNC pattern programmable on a half-bit basis;
- Manchester Error (low or high) in any word or bit position;
- Bit Count High and Low errors;
- Word Count High and Low Errors;
- Data Contiguity errors;
- Parity errors;
- Wrong Bus errors.

The position (word and bit) for the error injection can be specified precisely for each message.

### Chronological Bus Monitor Operation

The AVM1553SM-x module can be optionally configured with a powerful Chronological Bus Monitor/Analyzer with Data Filter capability. Each daughter board has 256 Kbytes of memory and a dedicated 16 MIPS micro-coded controller.

The Chronological Bus Monitor provides 26 bit time tagging of all BC commands with 1 microsecond resolution and measures RT response times and intermessage gaps with a separate 9 bit counter with 250 ns resolution. The Time Tag Counter can be reset via the VME bus or through a separate RS-422 input.

#### Key Features of BC Mode include:

- BC Intermessage Gaps programmable down to 4 microseconds
- External BC triggering or Minor Frame Time Synchronization
- Multi-buffering mechanism for data consistency and message multiplexing
- Full error injection down to Word and Bit levels

#### Key Features of MRT Mode include:

- Fast programmable response time for each simulated RT down to 5 microseconds
- Multi-buffering for each simulated RT and subaddress
- Full error injection down to Word and Bit levels
- No Response Counter to simulate BC retries

#### Key Features of Chronological Monitor Mode include:

Two level Complex Trigger on:

- Elapsed Time
- Any MIL-STD-1553B error
- Any MIL-STD-1553B word
- Data word value including range checking

Capture Filter in Standard or Message Modes:

- 2048 MIL-STD-1553B message filters

- Range checking
- Corrupt transfer capture

## MIL-STD-1553B Bus Connection

The interface of the AVM1553SM-x module to the MIL-STD-1553B bus is configurable for transformer coupling or direct coupling via jumpers. Trompeter BJ77 connectors are provided on the front plate of the VME card for the bus connections.

## Driver Software Support

The AVM1553SM-x family of modules is offered with a comprehensive software driver package implemented in C language.

### Support for Industry Standard Operating Systems is available:

- Generic Driver Software for 680X0 Processors or Embedded PC/AT (DOS)
- VxWorks 5.2 and Tornado
- pSOS+
- ADA

Other operating system drivers can be made available upon request. Contact [Technical Support](#) for the latest on supported operating systems.

## Technical Data

### Subsystem Interface:

- VME slave
- Data Transfer options D8, D16, D32, BLT
- Address options A32 or A24 and A16
- Programmable 16 bit timer
- One VME interrupt line

### Processors:

- AVM1553S-1:** One 16 MIPS micro-coded processor
- AVM1553SM-1** and **AVM1553S-2:** Two 16 MIPS micro-coded processors
- AVM1553SM-2:** Four 16 MIPS micro-coded processor

### Memory:

- AVM1553S-1:** 256 Kbytes RAM
- AVM1553SM-1:** 512 KBytes RAM
- AVM1553S-2:** 512 KBytes RAM
- AVM1553SM-2:** 1024 KBytes RAM

### Time Tagging:

**Global Time Tag:** 26 bits wide, 1 microsecond resolution, can be reset from the VME bus or from an external RS-422 input

**Response Time and Intermessage Gap Timer:** 9 bits wide with 250 ns resolution

### MIL-STD-1553B Frontend:

- Two industry standard MIL-STD-1553B transceivers per Bus Interface Unit
- Configurable for Transformer or Direct Coupling to bus

### Connectors:

- VME 96 Pin backplane connectors;
- Two or Four Trompeter BJ77 frontplate connectors for bus signals;
- 14 Pin T&B series 609 connector for Time Tag Sync, BC Frame Sync, Monitor Trigger Input, Monitor Trigger Output

### Dimensions:

- Standard 6U (B-Size) VME module
- 160mm by 233mm by 20mm

### Power Consumption (typical):

11 Watts @ +5V

**Decoder:**

For each Bus Interface Unit, one Manchester Decoder with Parity Checker and Error Detection

**Temperature Range:**

0° to +45° C ambient (standard)  
-15° to +60° C ambient (extended)

**Encoder:**

For each Bus Interface Unit, one Manchester Encoder with Parity Generator and full Error Injection capabilities

**Relative Humidity:**

5% to 95% non-condensing

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