



MIL-STD-1553B

RT Validation Report



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1. Test Information's

All tests are conducted according to test plan from MIL-HDBK-1553A (1 November 1988). This validation plan defines the test requirements for verifying that the design of remote terminals meet the requirements of MIL-STD-1553B "Digital Time Division Command/Response Multiplex Data Bus"

1.1 Customer Information

The purpose of the test was to verify the 1553 VHDL IP core by Ofer Hofman (Sital). Test was conducted on the LRU provided by Ofer Hofman (Sital). The 1553 IP core, as a part of the FPGA device, interface the 1553 net via on board transceiver and transformer.

1.2 Unit Under Test Identification

Module Part number: Ofer Hofman
Module Serial number:

Number of channels: 1
Type of channels (BC, RT BM): RT

1.3 Summary of Test Results

Channel	ACEBUS1	ACEBUS2
Test		
Electrical:	Pass	Pass
RT Protocol:	Pass	Pass
Noise Rejection:	Pass	Pass



1.4 Test personnel

Dragan Prnjatovich – Elbit Systems
Ofer Hofman -Sital

1.5 Equipment list

- Oscilloscope Tektronix 2465
- Wavetek – 11MHz Function Generator model 21
- 4192A LF Impedance Analyzer HP
- 3400A RMS Voltmeter HP



2. Test Report

2.1 Electrical Tests Results

2.1.1 Channel 1

2.1.1.1 Channel A1

5.1.1.1 Amplitude Pass

V_{pp} value [V] - Expected: 18.0-27.0
- Measured: 18

5.1.1.2 Risetime/falltime Pass

Sync waveform - Tr value [nsec] - Expected: 100-300
- Measured: 150

- Tf value [nsec] - Expected: 100-300
- Measured: 150

Data bit waveform - Tr value [nsec] - Expected: 100-300
- Measured: 150

- Tf value [nsec] - Expected: 100-300
- Measured: 150

5.1.1.3 Zero crossing stability Pass

500 nsec - Tzcp value [nsec] - Expected: 475-525
- Measured: 508

- Tzcn value [nsec] - Expected: 475-525
- Measured: 502

1000 nsec - Tzcp value [nsec] - Expected: 975-1025
- Measured: 1012

- Tzcn value [nsec] - Expected: 975-1025
- Measured: 988

1500 nsec - Tzcp value [nsec] - Expected: 1475-1525
- Measured: 1515

- Tzcn value [nsec] - Expected: 1475-1525
- Measured: 1480

2000 nsec - Tzcp value [nsec] - Expected: 1975-2025
- Measured: 2015

- Tzcn value [nsec] - Expected: 1975-2025



- Measured: 2005

5.1.1.4 Distortion, overshoot and ringing Pass

Absolute Vd value [mV] - Expected: 0-900
- Measured: 100

5.1.1.5 Output symmetry Pass

Absolute Vr value [mV] - Data 8000H - Expected: 0-250
- Measured: 0
- Data 7FFFH - Expected: 0-250
- Measured: 0
- Data 0000H - Expected: 0-250
- Measured: 0
- Data FFFFH - Expected: 0-250
- Measured: 0
- Data 5555H - Expected: 0-250
- Measured: 0
- Data AAAAH - Expected: 0-250
- Measured: 0

5.1.1.6 Output noise Pass

Vrms value [mV] - OFF state - Expected: 0-14.0
- Measured: 0
- ON state - Expected: 0-14.0
- Measured: 0

5.1.1.7 Output isolation Pass

Absolute value [dB] - Expected : >45
- Calculated: 51.1

5.1.1.9 Terminal response time Pass

Response Time [usec] - TX command - Expected: 4.0-12.0
- Measured: 9.2
- RX command - Expected: 4.0-12.0
- Measured: 9.2
- RT_RT command - Expected: 4.0-12.0



- Measured: 9.2
- MODE command - Expected: 4.0-12.0
- Measured: 9.2

5.1.2.1.1 Zero crossing distortion Pass

- Global Response within 150 [nsec] - Expected: CS
- Measured: CS
- Positive Data Sync - value for first NR [ns] - Expected: >150
- Measured: 205
- Negative Data Sync - value for first NR [ns] - Expected: >150
- Measured: 250
- Positive Data Middle - value for first NR [ns] - Expected: >150
- Measured: 215
- Negative Data Middle - value for first NR [ns] - Expected: >150
- Measured: 246
- Positive Data Parity - value for first NR [ns] - Expected: >150
- Measured: 175
- Negative Data Parity - value for first NR [ns] - Expected: >150
- Measured: 250

5.1.2.1.2 Amplitude variations Pass

- V_{pp} at which response \leftrightarrow CS [V] - Expected: <0.86
- Measured: 0.79
- V_{pp} at which NR first occurred [V] - Expected: >0.2
- Measured: 0.79
- Response for V_{pp} = 0.20 V - Expected: NR
- Measured: NR

5.1.2.1.3.1 Trapezoidal Pass

- Response - Expected: CS for each message
- Measured: CS for each message

5.1.2.1.3.2 Sinusoidal Pass

- Response - Expected: CS for each message
- Measured: CS for each message

5.1.2.2 Common mode rejection Pass



- Response while applied +10.0 VDC - Expected: CS for each message
- Measured: CS for each message
- Response while applied -10.0 VDC - Expected: CS for each message
- Measured: CS for each message
- Response while applied ± 10 Vp sinus - Expected: CS for each message
- Measured: CS for each message

2.2 Protocol Tests Results

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Protocol Tests Results FEB-23-2005 15:8
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Bus A	Bus B	Test
Pass	Pass	5.2.1.1.1 RT response to command words
Pass	Pass	5.2.1.1.2 RT-RT response to command words
Pass	Pass	5.2.1.2.1 Minimum time
Pass	Pass	5.2.1.2.2 Transmission rate
Pass	Pass	5.2.1.3.1.1 Transmit command word
Pass	Pass	5.2.1.3.1.2 Receive command word
Pass	Pass	5.2.1.3.1.3 Receive data words
Pass	Pass	5.2.1.3.2.1 Transmit command word
Pass	Pass	5.2.1.3.2.2 Receive command word
Pass	Pass	5.2.1.3.2.3 Receive data words
Pass	Pass	5.2.1.3.3.1 Transmit command word
Pass	Pass	5.2.1.3.3.2 Receive command word
Pass	Pass	5.2.1.3.3.3 Receive data words
Pass	Pass	5.2.1.3.4.1 Transmit command word
Pass	Pass	5.2.1.3.4.2 Receive command word
Pass	Pass	5.2.1.3.4.3 Data word
Pass	Pass	5.2.1.3.5.1 Transmit command
Pass	Pass	5.2.1.3.5.2 Receive command
Pass	Pass	5.2.1.3.5.3 Mode command word count error
Pass	Pass	5.2.1.3.5.4 RT to RT word count error
Pass	Pass	5.2.1.3.6 Contiguous data
Pass	Pass	5.2.1.4 Superseding commands
Pass	Pass	5.2.1.4.1 RT to RT superseding command



Pass	Pass	5.2.1.5.1	Transmit status
Pass	Pass	5.2.1.5.2	Transmitter shutdown and override
Pass	Pass	5.2.1.5.3	Reset remote terminal
Pass	Pass	5.2.1.6	Data wrap-around
Pass	Pass	5.2.1.7.1	RT to RT timeout
Pass	Pass	5.2.1.7.2	RT to RT message format errors
Pass	Pass	5.2.1.7.3	Transmitting RT errors
Pass	Pass	5.2.1.8	Bus switching
Pass	Pass	5.2.2.1.1	Dynamic bus control
Pass	Pass	5.2.2.1.2.1	Synchronize without data word
Pass	Pass	5.2.2.1.2.2	Synchronize with data word
Pass	Pass	5.2.2.1.3	Initiate self-test
Pass	Pass	5.2.2.1.4	Transmit BIT word
Pass	Pass	5.2.2.1.6	Terminal flag bit inhibit and override
Pass	Pass	5.2.2.1.7	Transmit vector word
Pass	Pass	5.2.2.1.8	Transmit last command
Pass	Pass	5.2.2.2.1	Service request
Pass	Pass	5.2.2.2.2	Broadcast command received
Pass	Pass	5.2.2.2.3	Busy
Pass	Pass	5.2.2.2.4	Subsystem flag
Pass	Pass	5.2.2.2.5	Terminal flag
Pass	Pass	5.2.2.4.1	Bcst synchronize without data word
Pass	Pass	5.2.2.4.2	Bcst synchronize with data word
Pass	Pass	5.2.2.4.3	Bcst initiate self-test
Pass	Pass	5.2.2.4.4	Bcst transmitter shutdown and override
Pass	Pass	5.2.2.4.6	Bcst terminal flag bit inhibit and override
Pass	Pass	5.2.2.4.7	Bcst reset remote terminal
Pass	Pass	5.2.2.4.8	Bcst dynamic bus control
Pass	Pass	5.2.2.5.1.1	Command word error
Pass	Pass	5.2.2.5.1.2	Data word error
Pass	Pass	5.2.2.5.2	Message length, BC to RT broadcast

Total number of running: 1



2.3 Noise Rejection Tests Results

2.3.1 Channel A1

5.3 Noise rejection test Pass

Result - Expected: See table III - criteria for noise rejection tests
- Measured: After 0:21:59 - 44,000,220 Words - 0 Errors

2.3.2 Channel B1

5.3 Noise rejection test Pass

Result - Expected: See table III - criteria for noise rejection tests
- Measured: After 0:21:59 - 44,000,220 Words - 0 Errors