MASTER/REMOTE TELEMETRY UNIT (MRTU)

REMOTE TELEMETRY UNIT

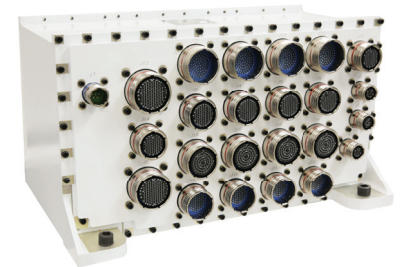|	
Analog Sensor (Type A/B/C/D) Inputs	
Channel Count	220 type A; 32 type B; 4 type C; 24 type D
Input Range	- 5.25 V to + 10.0 V (span + offset)
Spans	58 programmable spans; high: 500 mV to 5000 mV; medium: 75 mV to 1000 mV; low: 10 mV to 100 mV
Offset	High span: -5.25 V to +5.00 V in 10 mV steps; medium span: - 530 mV to + 250 mV in 2 mV steps; low span: -55 mV to +25 mV in 200 uV steps
Accuracy	± 1.0% + ½ LSB
Type	Differential or single-ended (programmable); no external jumper required
Resolution	8, 10, 12 bits
Analog Prefilter	Type A: 50 Hz RC; type B: 100 Hz 6 pole Butterworth; type C: 1000 Hz 6 pole Butterworth; type D: 2000 Hz 6 pole Butterworth
Max Sample Rate	Type A and B: 800 sps; type C: 3200 sps; type D: 6400 sps
Input Impedance	> 9 Meg Ω; > 30 kΩ powered off
RTD Inputs	
Channel Count	100 channels
Input Range	0 to 9065 ohms
Spans	59 programmable spans: 25 to 5000 ohms
Excitation Source	1.0 or 5.0 mA constant current, span dependent
Offset	0 to 9065 ohms
Accuracy	± 1.0% to ½ LSB
Type	2-wire or 3-wire, programmable; no external jumper required
Resolution	8, 10, 12 bits
Max Sample Rate	100 sps per input
Serial Data Inputs	
Format	NRZ-L, TIA/EIA-422-B compliant
Bandwidth	1 Mbps maximum
Buffering/Ping Pong	8192 eight bit data words, eight bit word size
Output Format	Interleaves serial data; PCM output per format
Command Handling	
Receives commands from the bus controller; format switch, strain gauge auto zero or program enable/disable	
MIL-STD-1553B Interface	
Redundant transformer coupled stubs as specified in MIL-STD-1553B	
The item's RT address selectable via external jumper	
Receives data (16 bits per data word) from the bus controller and other remote terminals and interleaves this data into the output PCM bit stream. Outputs may subaddress location in any sequence.	

L3Harris' Master/Remote Telemetry Unit (MRTU) is a fully programmable data acquisition line replaceable unit. This unit provides a variety of sensor input signal conditioning and sensor excitations for use in extreme environment launch vehicle booster and upper stage applications.

Multiple MRTUs throughout the vehicle create a telemetry system scalable for up to seven total units with one master, three first-tier remotes, and three second-tier remotes.

The MRTU features over 500 telemetry and sensor inputs per unit across fifteen separate sensor and telemetry input types, individually defined by analog filtering, sampling speed and voltage range.

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Constant voltage (28 V, 10 V, 5 V) and RTD constant current outputs total 221 output channels. All analog input channels offer programmable gains and offsets using the maximum resolution of the analog to digital converter. External software generates and uploads user-defined sample schedules to the MRTU.

The MRTU supports four different telemetry table formats, loaded by serial GSE port connected to only the master and distributed to remotes. Formats are switched via 1553 command, providing the capability to change sensor sample schedules based on mission scenario or bandwidth limitations.

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Excitation Outputs	28 VDC	10 VDC	5 VDC
Output Voltage	28.0 ± 4.0 VDC	10.0 ± 0.020 VDC	10.0 ± 0.020 VDC
Load Current	30 mA per output	30 mA per output	30 mA per output
Overload Protection	Active current limit circuit per output	Active current limit circuit per output	Active current limit circuit per output
Max Ripple	30 mVrms	15 mVrms	15 mVrms
Bi-Level Inputs			
Voltage Input	Logic 1: +3 < Vin < +35 VDC; logic 0: -10 < Vin < +1 VDC; open circuit logic zero		
Type	Single ended, ref. to signal return		
Input Impedance	> 200 kΩ		
Pulsed MPU Input Signals	**Type 1: encoded from 0 to 255 counts**	**Type II: waveform: unconditioned magnetic pickup ref.**	**Type III: waveform: unconditioned magnetic pickup ref.**
Voltage Range	0.5 < Vin < 25 Vp-p	0.0 ≤ Vin ≤ ± 25 Vp-p differential. floating	
Type	Differential, floating		
Accuracy	1 count in 100,000 (0.001%)	1 count in 100,000 (0.001%)	1 count in 100,000 (0.001%)
Waveform	Unconditioned magnetic pickup		
Frequency	30 Hz < f < 7.0 kHz	80 Hz < f < 3.5 kHz	1.5 kHz < f < 3.5kHz
Strain Gage Inputs			
Selectable config.	Full, 1/2, or 1/4 bridge, external jumper, 350 ± 3.5 Ω		
Input	-50 mV - 1/2 span ≤ Vin ≤ 50 mV + 1/2 span, single pole RC, 100 Hz		
Programmable spans	5 to 50 m VDC in 200 µ VDC steps		
Programmable offsets	15 options (0% to 100% of full measurable span)		
Accuracy	± 10%		
Resolution	8, 10, or 12 bits programmable		
Auto-zero	via MIL-STD-1553B bus		
Pulse Code Modulation (PCM) Outputs			
Data: Differential, transmitted in non-return-to-zero ILevel (NRZ-L) compliant with TIA/EIA-422-B			
Clock: Differential PCM clock output synchronous with the PCM data output			
CDAS Bus Interface			
Each MRTU to MRTU interface uses 100 Base-TX Ethernet			
Each MRTU allows for up to three MRTU-to-MRTU interfaces (bus A, bus B, and bus C) for interfacing with downstream remotes arranged in daisy-chain configuration			
The master MRTU is capable of addressing and receiving responses from any remote MRTU interface using 100 Base-TX Ethernet			

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