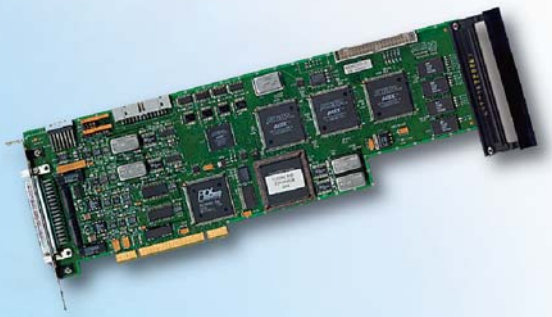
Telemetry West

Multifunction PCI Telemetry Module

MFT733A-PCI



L-3's best-selling Multifunction PCI Telemetry Module (MFT733A-PCI) brings a new level of integration to the system designer. The functions of multiple previous boards are now combined into a single PCI slot, accommodating more telemetry applications in a standard PC workstation or server. It provides a complete PCM telemetry system for 1 or 2 data streams, ideally suited for quick-look applications, flight-line checkout systems, and portable configurations. A rich, robust, and proven set of embedded functions typically offloads the host processor and can be applied to a wide variety of data communications solutions at rates up to 30 Mbps.

The Multifunction PCI Telemetry Module includes the functions of two decommutators, two simulators, two bit synchronizers, and a full-function IRIG time code decoder/generator/translator.

Embedded software configuration options include:

- 2 bit syncs, 2 decom/simulators, internal time clock
- 1 bit sync, 2 decom/simulators, 1 IRIG time code input, internal time clock
- 2 decom/simulators, 1 IRIG time code input and output, internal time clock
- 1 bit sync, 1 decom/simulator, 1 IRIG time code input, internal time clock

Digital synthesizers provide high-resolution frequency programming and low jitter output for two independent PCM outputs at rates up to 20 Mbps for simulation and commanding applications.

Proprietary embedded digital processing optimally acquires and tracks PCM and IRIG time signals and rejects noise. IRIG time functions are closely coupled with decommutation, providing high accuracy time-tagging of input data with 1 microsecond resolution for both real-time or tape playback applications.

In well over 1,000 installations fielded to date, the Multifunction PCI Telemetry Module provides turnkey PC-based single-board telemetry solutions in conjunction with L-3's Visual Test System (VTS) or Vista Software. Alternatively, the robust and powerful API allows integrators to program the board directly for use in a wide range of embedded telemetry applications.

KEY FEATURES

- Dual decom design saves PCI slots
- Bus-mastering DMA channels can support both input and output channels
- Extract clock and data from noisy PCM data streams at rates to 15 Mbps
- Supports NRZ-L or randomized NRZ-L PCM inputs to 30 Mbps for a single decom or to 20 Mbps for dual decoms
- Decode, translate, or generate IRIG-A, -B, or -G time
- Time tag PCM input frames with 1 microsecond resolution optionally synchronized to an external source
- Status tag PCM input frames, including sync state, bit slip, CRC error detection
- Extract two asynchronous embedded frames, or fully decommutate a primary and an embedded stream
- Simulate arbitrary telemetry data and formats to 20 Mbps
- Send real-time strip chart data directly to ADP716-PC Analog & Digital Ports with VTS, bypassing host processor

Excellence You Can Measure

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Multifunction PCI Telemetry Module

MFT733A-PCI SPECIFICATIONS

Bit Synchronizers

Signal Range	.50 mV to 10 V peak-peak
Codes	.NRZ-L, NRZ-M, NRZ-S, BiΦ-L, BiΦ-M, BiΦ-S, randomized NRZ-L (11, 15, 17, 20, V35, Intelsat) DM-M, DM-S, RZ
Method	.Second order, phase-locked-loop
Bit rate	.NRZ codes: 100 bps to 15 Mbps Other codes: 100 bps to 5 Mbps
Tuning resolution	.0.1% (percent of bit rate)
Loop bandwidth	.0.1%, 0.2%, 0.4%, 0.8%, 1.6% (percent of transition rate)
Outputs	.Tape, clock/data, phase, polarity, TTL/RS-422, frame search toggle

Input Channels (Decommutators)

Inputs	
Data rates	.0 to 30 Mbps for single stream; 0 to 20 Mbps for dual stream; 0 to 40 Mbps max aggregate at 8 bits per word
Input code	.NRZ-L or randomized NRZ-L
Data polarity	.Normal/Inverted/Auto
Data alignment	.MSB/LSB first per stream
Input levels	.TTL (data/clock) or RS-422 (data/clock)
Clock input phase	.0° or 180°
Clock duty cycle	.50 ± 5%
Data Buffer	
PCI data pass qualifier	.Frame and subframe not-search and per-word programmable in sorted or tag/data modes
Data buffers	.Two independent 32- or 64-kword double buffers
Format	.Telemetry, status, and time words sorted per application setup, tag-data, or pass-through
Buffer access method	.Bus-mastering DMA controllers or slave reads and interrupts
Other Outputs	
Data pass qualifier	.Frame and subframe not-search and per word
Embedded data streams	.2 max.
Status to host	.Frame sync state, subframe sync state, frame search detector, subframe search detector, bit slip detector, CRC error detector, interrupt state, interrupt overrun, active buffer size, bit rate
I/O connector	.Real-time, parallel address; data compatible with L-3's Analog & Digital Ports board (ADP716-PC)
Frame and Subframe Characteristics (Sorted Mode or Tag-Data)	
Sync pattern	.64 bits max.
Subframe sync method	.SFID, unique sync code, URC, FCC, or none
Search-to-lock	.1 to 4 valid sync words
Lock-to-search	.1 to 4 valid sync words
Error threshold	.0 to 3 bits
Sync aperture	.±0 or ±1 bit
Frame size	.2 to 32,768 telemetry words with simulator; 65,536 without simulator
CRC error checking	.Programmable polynomial and word location to 16th order
Time-Tagging (Sorted Mode)	
Time source	.Internal time clock optionally synchronized to external IRIG
Format	.BCD — microseconds to hundreds of days
Trigger source	.End of minor frames
Resolution	.One microsecond
Status Tagging (Sorted Mode)	
Trigger source	.End of minor frames

Output Channels (Simulators)

Modes of Operation	
Repetitive	.On-board current value buffer for simulation data
Command	.Send one command sequence at a time, including sync, data, and fill bits under host control
Streaming encoder	.Alternate between double buffers using DMA or slave writes and interrupts; continuous or burst modes supported
Data Buffer	
Current value buffer	.1 to 65,532 telemetry words
Outputs	
Data rates	.PCM NRZ codes: 0 to 20 Mbps aggregate max. in combination with decoms @ 8 bpw Other PCM codes: 0 to 10 Mbps
Data rate resolution	.1 bps
Data rate accuracy	.Stratum 3 (±4.6 ppm) with internal reference
PCM data codes	.NRZ-L, NRZ-M, NRZ-S, BiΦ-L, BiΦ-M, BiΦ-S, randomized NRZ-L (11, 15, 17, 20, V35, Intelsat) DM-M, DM-S, RZ
Output levels	.TTL (data/clock) or RS-422 (data/clock)
Output drive	.TTL high-level: -32 mA max.; RS-422: -20 mA max. TTL low-level: 64 mA max.; RS-422: 20 mA max.
Clock output phase	.0° or 180°
Clock source	.Internal/external

Time Code Reader/Generator/Translator

Inputs (applies to Reader Mode only)	
Format	.Analog: IRIG-A, -B, or -G forward
Playback rates	.1/16, 1/8, 1/4, 1/2, 1, 2, 4, 8, or 16 times real time
Carrier frequency range	.±5% of nominal in a wide loop bandwidth mode
Mark amplitude	.200 mV to 10V (auto-range)
Impedance	.1 MΩ or 75 Ω programmable
Modulation ratio	.2:1 to 6:1
Error detection	.Error frame bypass option
Phase-locked-loop	.Tracks IRIG input time and generates time on signal loss; wide or narrow loop bandwidth (prog)
Internal Time Clock	
Modes of operation	.Translate or generate forward
Resolution	.One microsecond
Stability in Generate Mode	.±4.6 ppm
Interface	.Host can read or set time to 1 µsec
Outputs	
Format	.Analog: IRIG-A, -B, or -G encode of internal time clock
Carrier frequency range	.100 KHz maximum
Modulation ratio	.3:1 nominal

Connectors

Rear panel	.DB-50 (female)
Parallel I/O	.40-pin 0.1" center header
Auxiliary	.26-pin 0.1" center header
TTL external cable assembly (order separately)	.DB-50 to 12 coax cables
RS-422 differential external cable assembly (order separately)	.DB-50 to 8 triax and 4 coax cables

Power

+5V supply	.1.6 A typical ± 5%
+12V supply	.400 mA typical ± 5%
-12V supply	.100 mA typical ± 5%
VIO	.140 mA max. (either 5V or 3.3V)

Compatibility

VTS Softwre (verstion 6.4.2 for 15/30 Mbps operation; previous versions 10/20)
Vista Software (version 4.3.0 for 15/30 Mbps operation; previous versions 10/20)
L-3 stand-alone Bit Synchronizer Software
Direct programming via API command window

Ordering Information

MFT733A-PCI	.PCI Multifunction Telem Module, Dual Stream, BNC/TTL
MFT733A-PCI-T	.PCI Multifunction Telem Module, Dual Stream, Triax Connectors (Differential)/RS422
MFT733A-PCI-OEM	.PCI Multifunction Telem Module, Dual Stream, OEM (Board & Driver Only)
MFT733A-PCI-H	.PCI Multifunction Telem Module, Dual Stream, Hardened Version
MFT733A-PCI-S	.PCI Multifunction Telem Module, Single Stream, BNC/TTL
MFT733A-PCI-S-OEM	.PCI Multifunction Telem Module, Single Stream, OEM (Board & Driver Only)
MFT-CBL-DIF	.Cable for MFT733-PCI (All Versions), Triax/ Differential, RS422
MFT-CBL-TTL	.Cable for MFT733-PCI (All Versions), BNC/TTL

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