GDP SPACE SYSTEMS

ACROAMATICS
TELEMETRY SYSTEMS

Compact Telemetry System
Model 4000

Hardware Features:

- Compact Form Factor
- Network Enabled
- Bit Synchronizer
- IRIG 106 PCM Decommutator
- IRIG A, B, & G Time Code Translator
- PCM Simulator
- Supports IRIG Chapter 4 & 8 PCM Formats

Software Features:

- Project Organization Utilizing Explorer Like Navigation
- Real Time Data Display Processing, and Export
- Fully Compliant Chapter 10 Data Recording and Playback
- TMATS and Custom Import/Export
- Software Decommutator Processes IRIG 105 Chapter 10 data files (PCM, Mil-STD-1553, ARINC 429, Audio and Video)
- Multi-feature Math Machine

General Description

Combining proven hardware and software from Acroamatics and EMC, the Model 4000 Compact Telemetry system is capable of processing telemetry data streams with data rates up to 32 Mbps. The Model 4000 is based on Acroamatics' Model 1626P Frame Synchronizer and Model 472M Bit Synchronizer plus ILIAD Lite Telemetry Software from EMC Corporation. The Model 4000 enables the user to process PCM data using advanced software decommutation features and robust math-machine functions. Data is recorded in IRIG chapter 10 format and a utility is provided for the import/export of telemetry format information in TMATS, CSV and other file formats. An explorer-style interface guides the user through system setup effectively and data can be displayed in a variety of formats including a tabular "Tech View" and the advanced graphical "SL View".

The Model 4000 is comprised of two components, a hardware front-end and software application. The hardware functions, including bit synchronization, decommutation IRIG time translation and PCM simulation, are performed in the Model 4000 chassis which contains the Acroamatics Telemetry Processor hardware Suite capable of decommutating one IRIG 106 Chapter 4 or Chapter 8 telemetry stream. The ILIAD Lite Telemetry Software performs functions such as set up and control of the hardware, data display, data processing and data recording. The Model 4000 chassis is connected to the PC utilizing standard Ethernet protocol and connectivity. Several PC's and Model 4000 units may be connected on the same network, thereby allowing independent work stations a selection of data sources as well as access for multiple hardware front ends.

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Bit Synchronizer

Signal Inputs

Source	1 single ended
Isolation	Greater than 60dB at 20MHz
Impedance	Program selectable: Hi-Z/Lo-Z, Single Ended: 4kΩ/75Ω
Signal Level	0.2 to 30V p-p
DC Offset	20V max Hi-Z
PCM Codes	Program selectable: NRZ-L/M/S, Biø-L/M/S, DBiø-M/S, DM-M/S, MDM-M/S, RZ
Derandomizer	Program selectable: RNRZ 9/11/15/17/23, forward/reverse

Synchronization

Bit Rate Range	8bps-32Mbps NRZ codes, 8bps-16Mbps all others
Capture Range	3 times the programmed loopwidth, typical
Loop Bandwidth	0.1% to 3.2%, program selectable in 0.1% increments
Sync Threshold	0dB for NRZ-L and Biø-L codes
Sync Maintenance	(LW=0.1%) —2dB NRZ-L and Biø-L codes
Sync Acquisition	(LW=1.6%, SNR > 12dB) Typically less than 32 bit periods
Sync Retention	(LW=0.1%, SNR >3dB) Retains sync through >128 consecutive dropouts
Bit Error Rate	(LW=0.1%) to within 1dB of ideal bit error rate performance curves

Frame Synchronizer

General

Bit Rate	Up to 64Megabits per second
Polarity	Programmable, with automatic polarity correction
Format Types	IRIG 106 Chapter 4, IRIG 106 Chapter 8, Embedded Format
Minor Frame Length	Programmable, 4 to 65536 words
Major Frame Length	Up to 256 Minor Frames, Starting Frame Number 0 or 1

Synchronization

Mainframe Sync	Provides for programmable sync pattern. Pattern length up to 64 bits.
Automatic Polarity Inversion	Input polarity is inverted when two consecutive sync patterns are found.
Sync Modes	Fixed, Adaptive and Burst
Sync Strategy	SEARCH, VERIFY and LOCK
Sync Error Tolerance	0 to 15 errors, programmable
Sync Slip Window	0, ±1, ±2 bits, programmable
Clock Rate Monitor	A delay counter returns the synchronizer to SEARCH if the clock input is lost.

PCM Word Decommutation

Word Attributes	Bits in this word (from 4 to 32); the orientation of the input data, MSB or LSB first; Embedded Asynchronous word location.

Output

Output Buffer Size	Double buffered 65,536 32-bit words, for each channel. Data may be read directly from the PCI bus or via the DMA channels.

IRIG Time Code Translator/Generator

Functional

Amplitude	0.5 to 20 Vpp, Single-ended
Impedance	12K Ohms minimum
Input Codes	Translates IRIG G, A and B
Input Frequency	125 Hz to 400,000 Hz
Modulation Index	2:1 through 5:1.
Polarity	Program selectable, Invert or Normal polarity
Internal Time Base	40MHz crystal oscillator

Operational

Generate Mode	Time is generated from the onboard crystal oscillator and is pre settable from the Host.
Translate Mode	Time is read from an external source.
Translate Carrier Mode	The internal timing is based on the input carrier. This mode enables the system to translate time as the input carrier rate varies during playback of an analog recording.
Translate Failsafe Mode	The internal timing is phase-locked to the input carrier. In the event of time dropout, the translator continues generating time without interrupt.
Frame Bypass	Automatic frame bypass compares previous time frame with current one, and Tim Accumulator updated when they agree.

Specifications subject to change without notice.

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PCM Simulator

Function Description

Bit Rate	Follows Bit sync Setup, 8bps-20Mbps NRZ codes, 8bps-16Mbps all others.
Programming	Automatically copies word and frame attributes from programmed Decom setup or for more sophisticated simulator setups. Text file programming is provided.
Data Sources	1024 Static Registers, Two User-Defined 16 bit Dynamic Data Memories, Two 16-bit Module Up/Down Counters, 16-bit Pseudo-Random Generator, 16-bit Program Counter
Word Lengths	Programmable for each data source. Static data words range from 1 to 32 bits All other data sources range from 1 to 16 bits
Word Orientation	Programmable MSB/LSB for each data word
Dynamic Data Memory	2K x 16 bit RAM, Pre-settable to ramp, sine, triangle or square wave functions
Frame Length	Maximum of 4096 words

Output

Internal	Internally connects to Bit Synchronizer or Frame synchronizer via program control
Clock and Data	Zero degree Clock, NRZ-L data, TTL
PCM Code Type	Sixteen selectable output codes: NRZ-L/M/S, Biø-L/M/S, DBiø-M/S, DM/M/s, MDM-M/S, RNRZ 11, 15, 17 and 23

Data Displays

General

Display Types	Bus View, DCM View, Quad View, Quick View, Tech View, Video, SL View
Limit Check	Dynamic Limit check, Alarms, Record, Report
Quick Look	Parameter Set, Job Request, Status

Data Recording

General

Recording Format	IRIG 106 Chapter 10 format
Playback Format	IRIG 106 Chapter 10 format (PCM, 1553, ARINC 429, Serial, Analog, Video) MARS II (PCM, 1553) Teletronics (PCM)
Playback Attributes	Auto position, variable speed, search, time window
Control	VCR type controls

Data Processing

Data

Data Types	Unsigned, Signed (2s Comp), Offset Binary, Binary Coded Decimal, 1s Complement, IEEE-754 Floating Pt, 1750 Floating Pt, Sign Magnitude, CVSD, IBM Floating Point, TMS320C3, DEC Float, CAPS Float, ADCII, Text

Real Time

Conversion Methods	Polynomial, Interpolation, Discrete Translation, Bit Weight
Bit Manipulation	Bi Mask, Concatenation

Derived Algorithm

Arithmetic Operations	+, -, *, /, POWER, SQRT, ()
Trigonometric Operations	SIN, ASIN, SIND, ASIND, COS, ACOS, COSD, ASOCD, TAN, ATAN2, TAND, ATAN2D, ATAN, ATAND
Logarithmic Operations	LOG, LOG10, EXP
Logical Operations	OR, AND XOR, EQUAL TO, SHLEFT, SHRIGHT, LESS THAN, GREATER THAN, GREATER THAN OR EQUAL TO, LESS THAN OR EQUAL TO, NOT EQUAL TO
Special Operations	CONCAT, IF-THEN-ELSE, CASE, HIGH VALUE, LOW VALUE, LAST VALUE, HOLD, ABS, MOD

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Other Features

General

Software Decommutation	IRIG 106 Chapter 4, 8 & 10 (PCM, 1553, Video, UART, ARINC 429, Analog) & MARS II format
Import/Export	Import: TMATS, JTDMS, Custom & M204 format Export: TMATS, AIMS & IMUX format
Network Features	Network Data Distribution and Point to Point Remote Control
Tools and Utilities	MARS II Dubbing Utility, Chapter 10 Dubbing Utility, Chapter 10 Ingest, Validate Chapter 10 Streams, Chapter 10 Packet Viewer, Validate Bus Stream, Sample View, Bus Message Report, Measure and Ops Report, Project Backup, Project Restore

Chassis

Physical

Dimensions	11.70” W x 9.20” D x 2.25” H
Weight	Approx. 6 lbs.
Material	18 Gage Mild Steel
Finish	Powder Coat, Blue
Power	120W External 12V/120V power supply

Environmental

Humidity	Operating 20-90% Storage 20-95%
Temperature	Operating 0° to 60° C (32° to 140° F) Storage -40° to 85° C (-40° to 185° F)
Processor	Intel® Pentium M or Intel®**Core™2 Duo (1.2 to 2.0 GHz)**
Memory	**1 x SODIMM up to 2.0 GB**
Operating System	**Microsoft XP**
Interfaces	**2 x Ethernet (10/100/1000 Base-T), Keyboard & Mouse (PS/2), Video (VGA), 1 x RS232**

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