Tarsus3 PCIe or cPCI/PXI

40 Mbps PCM Processor - Single or Dual Versions

Single or Dual Bit Sync / Frame Sync / Decommutator /IRIG Time Code Reader / PCM Simulator in PCIe or cPCI/PXI 3U Form Factor

ULYSSIX

TECHNOLOGIES, INC.

Where Technology Soars
A Woman-Owned Small Business
www.ulyssix.com

Tarsus3

Ulyssix's 3rd generation PCM processor, the Tarsus3, advances Ulyssix's PCM processing capability by utilizing the PCIe or cPCI/PXI 3U form factor to integrate a single or dual PCM bit sync/frame sync/decommutator/simulator/IRIG time code reader in the same housing with other test and measurement instrumentation (i.e. function generators, scopes, signal conditioning, spectrum analyzers, etc). The Tarsus3 can be setup and controlled using the Ulyssix ALTAIR software, DEWESoft software , IADS software, or custom software easily written using Ulyssix supplied drivers.

ULYSSIX ALTAIR Software Suite

Including:
Tarsus3 setup,
Real-Time Data Acquisition
with Graphical Monitoring
Extensive Math Capability
Fully designed and supported at
Ulyssix in USA

Optional:
IRIG CH10 Recorder/Playback
UDP Frame and Parameter-
Broadcasting
UART PCM Output
TMoIP Interface
IADS Interface
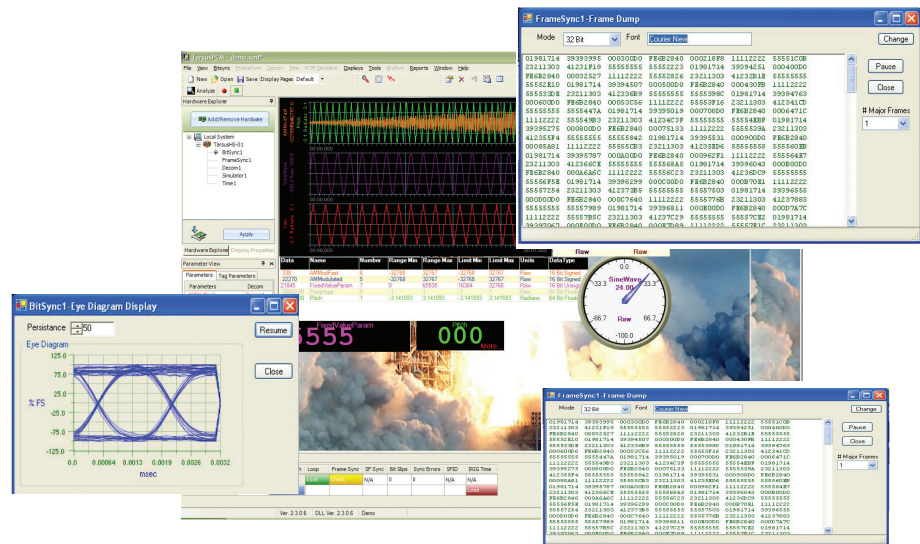
Bit Synchronizer

Designed using all DSP filter algorithms in FPGA technology for maximum performance capability

Accepts all IRIG 106-17 PCM code types

Bit Sync programmable input rates from 1 bps to 40 Mbps

Less than 1 dB to theoretical bit sync BER performance

All IRIG 106-17 codetypes are selectable for PCM output

Frame Synchronizer

Supports PCM streams from 1 bps up to 50 Mbps

Supports up to 1024 minor frames per major frame and 16Mb per minor frame

Frame Sync Archive capability

Advanced algorithm to allow for varying frame sizes

Storage & Diagnostics

Optional 32 GB Flash Memory on card storage available for archival of PCM data in 32 bit packed mode Frame Sync Archive playback capability (The flash hardware can be fully disabled for customer non-volatile requirements)

Diagnostic feature used to aid Ulyssix in troubleshooting FPGA firmware internal control register configuration from user setup configuration

Retrieval popup form in ALTAIR & DEWESoft software suites outputs diagnostic file for transfer to Ulyssix for quick system analysis for card configuration errors, setup errors or actual hardware failures

Where Technology Soars

Tarsus3

The Tarsus3 PCM Processor board is powered by the latest Intel/Altera Arria V GZ and Cyclone FPGA's with the firmware being user reconfigurable using Ulyssix supplied FlashBurn software with user upgrade capability under maintenance contract. The Tarsus3 is the mothercard to mount the optional Bald Eagle RF daughter card which includes dual receiver with diversity combiner capability, with optional transmitter/frequency converter capability allowing the user to have a complete RF to bits with real-time and post analysis PCM decommutator system in a single board set.
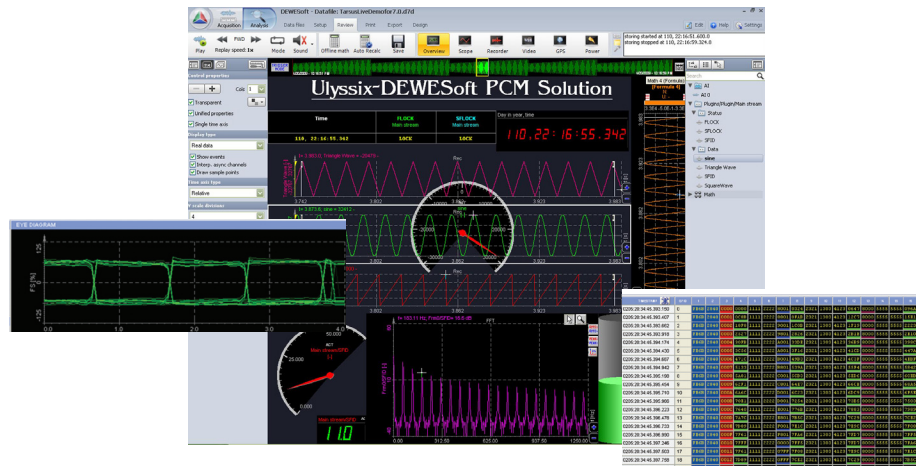
DEWESoft Software Suite

Including:
Tarsus3 Setup
Real-Time Data Acquisition
Post-Playback Analysis
Extensive Math Capability

Optional:
IRIG CH10 Recorder/Playback
Networking Between Clients
Ethernet Stripchart Interface
UART PCM Output

IRIG Time Code Reader

Separate analog path onto card

Supports IRIG A, B, G & NASA-36

Used for both IRIG time display and/or minor frame time tag header information

PCM Simulator

Programmable PCM streams from 1 bps up to 40 Mbps

Ulyssix .tdd frame sync file and Chapter 10 Archive playback capability

Fixed major frame simulator utilizing defined waveform & tabular data to output

Forward Error Corrected output capable

Selectable output code type

TTL and RS422 output capability

Decommutator

Supports all IRIG Class II decommutator features with variable word length from 3 - 64 bits, format switching, parameter concatenation and asynchronous embedded formats

High speed data transfer of user word selected channels to the PCI bus for disk storage and playback

Two on card DACs for word analog output

Full parameter math processing

Available with two different user friendly Windows GUI based software suites for full setup of format frame, word selection, channel display capability and optional client/server capability

Tarsus3
Specifications

Bit Synchronizer Input Specifications

Input Data Rate	Bit Sync programmable input tunable rates from 1 bps to 40 Mbps for NRZ-L/M/S, RNRZ-L and 1 bps to 20 Mbps for Bi-Φ L/M/S
Input Source	2 independent inputs (1 single ended BNC, 1 differential Twinax)
Input Impedance	Hi-Z/75Ω/50Ω, single ended input, software selectable
Maximum Safe Input	± 35 VDC
Input Signal Level	30 mVp-p to 5 Vp-p
DC Input Level	+/- 5 VDC
Input PCM Codetypes Modes	NRZ-L/M/S, RNRZ-L, RZ, Bi-Φ L/M/S, program selectable (consult factory for other codetypes)
Derandomizer Input	RNRZ-11/15, forward/reverse, program selectable
Input Polarity	Normal, inverted or auto selectable using frame sync correlator

Bit Synchronizer Data Specifications

Loop Bandwidth	0.01% to 3.0%, to the programmed bit rate
Capture Range	+/-3 times of the programmed loop bandwidth
Data Tracking Range	+/-5 times of the programmed loop bandwidth
Sync Acquisition	less than 200 bits, typically 100 bits max
Bit Error Probability	Less than 1 dB to theoretical bit sync BER performance for bit rates up to 25 Mbps, less than 2 dB to theoretical from 25 Mbps to 33 Mbps, less than 2.7 dB to theoretical to 40 Mbps
PCM Encoder Output	TTL and RS422 Level driven
PCM Encoder Code Types	NRZ-L/M/S, RNRZ-L, RZ, Bi-Φ L/M/S or RNRZ 11/15, program selectable
Clock Output	0°, 90°, 180°, 270°

Frame Sync/Decommutator Specifications

Input Data Rate	Up to 50 Mbps
Input Signals	TTL Level single ended, RS-422 differential or direct from Bit Sync section of the PCM Processor, NRZ-L and clock
Word Lengths	3 to 64 bits variable from channel to channel
Minor Frame Length	3 to 16,777,216 bits
Major Frame Length	1 to 1024 minor frames per major frame
PCM bit word order	MSB or LSB, word by word basis, program selectable
Frame Sync Pattern	16 to 64 bits
Frame Sync Location	Leading the minor frame
Frame Sync Strategy	Search-Check-Lock, programmable counts per step
Subframe Sync	FCC or SFID
Sync Error Tolerance	0 to 8 bits, program selectable
Bit Slip Window	0 to 9999 bits, program selectable
Data Polarity	Normal or inverted on a channel by channel basis
Asynchronously Embedded Formats	Supports up 8 asynchronous embedded formats based on computer CPU capability
Bit Concatenation/Fragmented-Words	Software decommutator can combine individual bits from separate PCM words

PCM Simulator Specifications

Output Data Rate	1 bps to 40 Mbps for NRZ-x, RNRZ-L, or 20 Mbps for all others
Output PCM Codetypes	NRZ-L/M/S, RNRZ-L 11/15, RZ, Bi-Φ L/M/S, RNRZ 11/15/, forward/reverse, program selectable
Output Signal Levels	Data and Clock, TTL, and RS422 level driven
Word Lengths	3 to 64 bits, variable length
Frame Length	Same as decommutator specs
Data Words	Fixed or math functions (sine wave, triangle, square wave, sawtooth, counter) with programmable sample rate

DAC Output Specification

Number of Channels	2
Output Level	1 Vpp to 5 Vpp, selectable in 0.1 Vpp steps, ± 2.5V offset in 0.1 VDC steps

Time Code Reader Specifications

IRIG Codetypes	IRIG A, B, G & NASA-36

On Card Data Storage

Storage Amount	Up to 32 GB archived data stored in 32-bit packed format
Data Retrieval	Through supplied software suite or user generated software using Ulyssix data software driver

Tarsus3 Diagnostics

Version Control	All current software, firmware and driver version numbers stored for easy retrieval
Latest Setup	Current card setup configuration is stored for verification of proper setup
Diagnostic Download	Direct download to file for transfer to Ulyssix for evaluation and recommendations

Physical Specifications

Dimensions	cPCI 3U form factor, 100mm 160mm PCIe short card configuration
Interface Connectors	MDM-51 connector to individual BNC breakout cables (other configurations, consult factory)
Manufacturing	The design utilizes Surface Mount Technology (SMT), manufactured with robotic assembly techniques to IPC-610B Class 2 manufacturing standards
Temperature Range	Operating: 0°C to 70°C Storage: -20°C to 85°C
Power Consumption:	Less than 25 Watts total, for all supplies +3.3V 3.5 Amps +12V 0.8 Amps

Ordering Options

Tarsus3-cPCI-01 Tarsus3-PCIe-01	PCM Processor Card 40 Mbps Bit Sync, Frame Sync, Decom, IRIG Time Code Reader and PCM Simulator with Tarsus PCM Software Application
Tarsus3-cPCI-DEWE-PROF-01 Tarsus3-PCIe-DEWE-PROF-01	PCM Processor Card 40 Mbps Bit Sync, Frame Sync, Decom, IRIG Time Code Reader and PCM Simulator with DEWESoft X3 Software Application with PCM Extension
Tarsus3-cPCI-02Dual Tarsus3-PCIe-02Dual (DEWESoft version also available)	40 Mbps Dual Bit Sync, Dual Frame Sync, Dual Decommutator, IRIG Time Code Reader and PCM Simulator with ALTAIR PCM Software Application
Bald Eagle RF	Dual Receiver with Diversity Combiner C/S/Upper-L/Lower-L/P-Band daughter card mounted to the Tarsus3 card. (see Bald Eagle RF for details)
Bald Eagle RF-TX	Dual Receiver with Diversity Combiner C/S/Upper-L/Lower-L/P-Band with All Band RF transmitter/RF modulator/frequency converter daughter card mounted to the Tarsus3 card. (see Bald Eagle RF brochure for details)
ULX-OPT-UART	Upgrade to add 4 UART channel output
ULX-OPT-CH10	Chapter 10 recording and reproducer for both Chapter 10 disk files and UDP-CH10-Ethernet packets
ULX-OPT-LQTESTER	BERT Tester Option for Time Latency Measurements and Bit Error Tester of PCM Data Stream
ULX-OPT-UDP PARAM/FRAME BROADCAST	UDP Frame and/or decom parameter mulitcast or unicast broadcast for external Altair software networking or external data transfer

Specifications are subject to change without notice.
Revised: June 23, 2020