# Model 2430D
## 40 MBPS PCM BIT SYNCHRONIZER

**DELTA TELEMETRY SYSTEMS**

ACROAMATICS TELEMETRY SYSTEMS

## KEY FEATURES

- Compact and rugged
  - 2u single/dual stream design
- 8 bps to 44 Mbps Data Rate RangeNRZ and Bi-Phase Codes
- Best in Class Performance
  - within 0.50 db of theory in all modes
- Fast Sync Acquisition
  - within 50 bit transitions, typical
- Best in Class Sync Retention
  - to 1024 bits without transition
  - Bit Sync Status Monitors
  - Front Panel lED Lock/Search/Loss
  - On screen Performance Monitor
    - Input Amplitude, Offset, Rate Deviation and Lock Status
- Data Quality and Signal Test:
  - BERT/PRN BER Link Test Mode
  - Frame Sync PCM BER Monitor
  - Frame Lock/Loss Monitor
  - Eb/No Signal Quality Analog Out
  - Viterbi Error Monitor/Stats
- Data Simulator/Generator
  - Programmable rate/PRN Code/ PCM Format and Code - to 40 Mbps
- Processes all IRIG Codes
  - NRZ-L/M/S, DBio-M/S, DM-M/S, MDM-M/S, RZ
  - Randomizer/Derandomizer
- Descrambler
  - CCITT V.35, INTELSAT, G2 Invert

## GENERAL DESCRIPTION

The new Model 2430D is a "drop in" replacement for all previous 2430 family 2u rackmount single and dual stream PCM bit synchronizer units. It provides a new signal I/O interface which allows a wide variety of standard unit input and output configurations to be offered at the time of order, making any rear panel connector assignable as to type, signal function and termination. The new Model 2430D is based on an entirely new "best in class" advanced 3rd generation digital bit sync design, yet remains a "drop in" compatible replacement for previous generation Acroamatics. In fact, the 2430D is literally a "drop in" upgrade for any standard 2u rackmount bit sync - while delivering state-of-the-art 40 Mbps rate capabilities, and significant BER, acquisition and signal retention performance improvements. The 2430D is configured with either one or two channels. For higher count bit sync applications the Model 2950P 4u system supports configurations of up to sixteen (16) channels with the same rock solid performance as the Model 2430D

Standard options include Viterbi convolutional encode/decode, Frame Sync Pattern Lock/Bit error Rate Test, dual and quad stream live data best source select/ambiguity resolution. Equipped with a 4.9 inch high brightness color LCD display, the Model 2430D delivers simple and precise menu driven front panel operator set-up control, system and signal quality status feedback. Remote monitoring and programming is supported via provided Ethernet and serial RS-232 interface. Set-up storage and recall is provided at the users option, either locally, via remote networked host, or both.

Windows Remote Bit Synchronizer GUI Operating Software is provided with each Model 2430D to remotely program and operate up to 64 individual bit sync channels over a network. The same software also supports operation of all present and legacy model Acroamatics bit sync products - whether in multi-stream units, standalone PCI card installations, or bit syncs installed with decoms in remote Telemetry Data Processing (TDP) Systems.
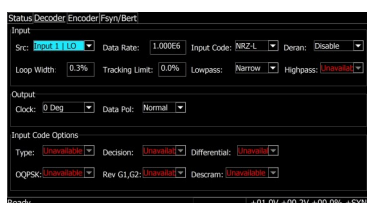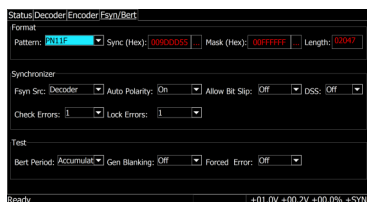
*Network compatible. Includes Windows 7 & 10 local and remote software.*
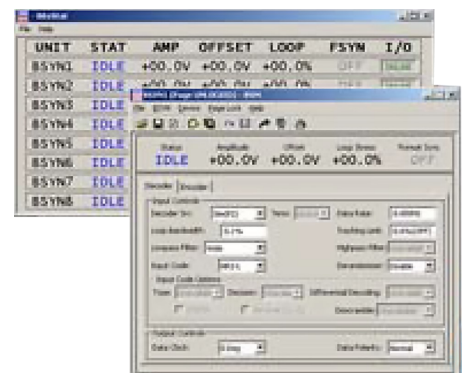
# Model 2430D
## 40 MBPS PCM BIT SYNCHRONIZER

## TECHNICAL SPECIFICATIONS

### Signal Inputs (Per Bit Sync)

| | |
|---|---|
| Source | Four (4) Program selectable inputs provided. Choice of input configuration (i.e. three BNC single-ended/one Triax RS-422) at time of order. |
| Isolation | Greater than 60 dB at 40MHz |
| Impedance | Program selectable: Hi-Z/Lo-Z, Single Ended: 4 kΩ / 75Ω , Differential: 10 kΩ /150 Ω |
| Signal Level | Single Ended: 0.2 to 20V p-p, Differential: 0.2 to 10V p-p |
| DC Offset | 20V max Single-Ended, Hi-Z |
| Baseline | Variation Tracks sinusoidal offsets to 100% p-p signal amplitude at 0.1% bit rate |
| 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 | 8 bps to 40 Mbps (all IRIG Codes - includes bi-phase). Each channel individually assignable. |
| Tuning Resolution | 0.1% of bit rate |
| Capture Range | 3 times the programmed loopwidth, typical |
| Tracking Range | ±12% typical, with programmable limiter |
| 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 50 bit pixels |
| Sync Retention | (LW=0.1%, SNR > 3dB) Retains sync through > 1024 consecutive dropouts |
| Bit Error Rate | (LW=0.1%) within 0.50 of ideal bit error rate performance curves, in all modes of operation and data rates. |

### Data/Clock Outputs, NRZ-L (Per Bit Synchronizer)

| | |
|---|---|
| NRZ-L Data | One each 8 bps to 40 Mbps NRZ-L, TTL - BNC/75Ω. Optional RS-422 available on request. |
| Data Clock | One each: 0°, 90°, 180°, 270°, operator program selectable (per Data Output line). |
| Data Polarity | Program selectable: normal / inverted |
| Signal Type | BNC Single-ended TTL or Triax RS-422 Differential, specified at time of order per NRZ-L bit sync clk/data output pair |
| RS-422 | Differential driven Bit Sync NRZ-L and CODED Outputs are also each provided via rear panel DB-35 connector, standard. |

### Data/Clock Outputs, Code (Per Bit Synchronizer, via Bit Sync Internal dual PCM Encoder)

| | |
|---|---|
| Data Source | Program selectable: Recovered Data (Bit Sync NRZ-L Data/Clk - DEFAULT) or External data/clock (Program Selectable) |
| Output | Three each: One each TTL data/clk (0° & 180°, selectable) Code (selectable) PCM and Clk, One each TTL data RNRZL, One each TAPE (code selectable) TTL or ±2Volts balanced output, 50mA drive current |
| Randomizer | Program selectable: RNRZ 9/11/15/17/23, forward, reverse |
| PCM Codes | Program selectable: NRZ-L/M/S, Biø-L/M/S, DBiø-M/S, DM-M/S, MDM-M/S, RZ |

### External Data/Clock PCM Encoder Input (Per Bit Synchronizer)

| | |
|---|---|
| Signal Type | Jumper selectable: RS-422 or TTL |
| Impedance | 120Ω RS-422, 75Ω TTL |
| Data Code | Program selectable: NRZ-L/M/S, Biø-L/M/S, DBiø-M/S, DM-M/S, MDM-M/S, RZ |
| Data Clock | Program selectable: Normal/Inverted, 1x or 2x |

### Convolution Encoder/Decoder (Optional, Per Bit Synchronizer)

| | |
|---|---|
| Viterbi Decoder | Rate 1/2, k=7: Includes differential decoding, V.35 descrambling, and G2 invert |
| Symbol Formats | Serial, parallel, and staggered parallel |
| Convolutional Encoder | Rate 1/2, k=7: Includes differential encoder, V.35 scrambler, and G2 inverter |
| Symbol Formats | Serial, parallel, and staggered parallel |

### Format Generators/Synchronizer (Optional, Per Bit Synchronizer)

| | |
|---|---|
| Format Generator | Programmable frame length, sync pattern and mask, and rate |
| Synchronizer Source | Recovered data, external data, or test generator (to 64 Mbps in rate) |
| Synchronizer Strategy | Pattern match in "search", programmable error limits for "check" and "lock" states |
| Other Features | Bit slip enable, auto polarity enable, data source/ambiguity resolution |

### Bit Error Rate Tester (Optional, Per Bit Synchronizer)

| | |
|---|---|
| Transmitter Pattern | PRN sequence: 211-1, 27-1, 29-1, 215-1 (forward/reverse) |
| Pattern Clock Source | Program selectable: Bit Rate Clock or External Clock |
| Blanking | Program selectable: 32, 64, 128 bits |
| BER Sample Period | Program selectable: 103 to 109 bit periods, or continuous accumulate |
| Other Features | Automatic pattern synchronization, forced error ON/OFF |

### Physical/Remote Interface

| | |
|---|---|
| Remote | RS-232 & 10/100/1000BT Ethernet. Windows 11 64-bit Remote Bit Sync Software provided at no additional charge. |
| Power | 115/230 VAC 60-50 Hz 3A max |
| Dimensions | 3.48" (8.84cm) H x 19.0" (48.26cm) W x 20.19" (51.28cm) D |
| Temperature | Operating: 0° to +40° C, Non-Operating: -40° to +86° C |
| Relative | Humidity Up to 90% non-condensing |
| Shock | Operating 6G, Non-operating 50G |
| Vibration | Operating 0.5G, 5 to 2000 Hz, Non-Operating 1.2G, 5 to 500 Hz |

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