

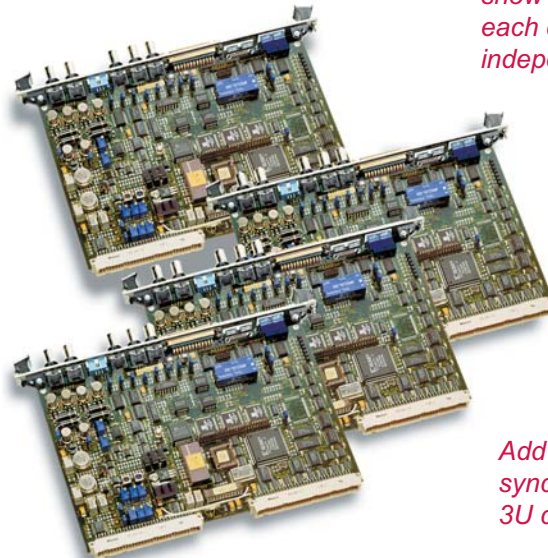
Ground Systems

PCM Bit Synchronizer 30 Mbps

EMR832



LED indicators show lock/status for each channel independently



Add up to 4 bit synchronizers per 3U chassis.

- Self-contained 3U rack-mount chassis
- NRZ codes to 30 Mbps, other codes to 15 Mbps
- Single chassis houses 1 to 4 bit synchronizers
- Easy-to-use menu-based setup from front panel
- Large 8mm characters for viewing status from across the room
- Stores multiple setups in non-volatile memory
- Randomizing and derandomizing
- RS-232 interface
- Viterbi decoding option (rate ½)
- Remote setup over RS-232 compatible with the EMR 8320

The EMR832 PCM Bit Synchronizer is a seventh generation PCM bit synchronizer. It's one of a series of PCM products we've designed that provides high-speed bit and format synchronization with flexible data processing, distribution, and display.

Our EMR832 performs input signal conditioning, bit synchronization, data reconstruction, code conversion, clock generation, and output conditioning to provide clean, synchronous serial data and clock signals. It comes as a self-contained RETMA rack-mount chassis that houses one to four bit synchronizers. Each synchronizer can be set up from either the front panel using the keypad and a large LCD display panel, or remotely over an RS-232 interface in a format compatible with the EMR8320.

The EMR832 provides a tunable bit rate capability over its full operating range of 60 bps to 30 Mbps, with data in any standard IRIG code format as input. Outputs of clean serial NRZ-L data and synchronous clocks are provided at the rear panel of each bit synchronizer. The power and remote control connectors are at the rear of the chassis.



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EMR832 Bit Synchronizer Specifications

Inputs

Sources	Programmable, any one of 4 sources
Configuration	AC coupled; single-ended
Level	0.1 to 10V peak-to-peak
Bit rate	Programmable, 60 bps to 30 Mbps for NRZ codes; 60 bps to 15 Mbps for all other input PCM input codes
Input codes	Programmable to any of the following: NRZ-L/M/S, B ϕ -L/M/S, DM-M/S, MDM-M/S
Termination	Individually programmable to 10K Ω (HIGH) or 75 Ω (LOW)
Polarity	Programmable, Normal/Inverted
Direction	Programmable, Forward/Reverse

Input Perturbations

DC common mode rejection	± 10 V
AC common mode rejection	Rejects without degradation a sine wave common mode signal with peak-to-peak amplitude up to the input signal level at a rate of 0.025% of the bit rate
Baseline shift	Rejects without degradation a signal with baseline shifts of up to 100% of the peak-to-peak signal amplitude
Baseline variation	Rejects without degradation a superimposed sinusoidal waveform whose amplitude is equal to the peak-to-peak amplitude of the PCM input signal and whose frequency is up to 0.03% of the bit rate
Jitter	Degradation of BER performance is less than 0.5 dB for bit rate jitter of $\pm 0.5\%$ at a jitter frequency of 10 Hz and Eb/No of 12 dB

Bit Synchronizer Parameters

Bit synchronizer type	Second order, Type II Phase Locked Loop (PLL)
Loop bandwidths (LBW)	0.1, 0.2, 0.4, 0.8, 1.6, 3.2 in percent of bit rate
Acquisition	Acquires synchronization on input signals with Eb/No down to 0 dB with 50% transition density and narrowest loop bandwidth
Acquisition range	Acquires synchronization on signals within $\pm 5\%$ of the selected bit rate at Eb/No of 15 dB and widest loop bandwidth
Acquisition time	Acquires synchronization within 100 bit periods (average) at Eb/No of 12 dB; Adaptive mode selection acquires synchronization within 20 bit periods (average) at Eb/No of 12 dB
Tracking	Bit rate variations up to $\pm 10\%$ of selected bit rate after acquisition has occurred at frequencies up to 7.5 Mbps; bit rate variations up to $\pm 5\%$ at frequencies 7.5 Mbps to 30 Mbps
Phase ambiguity resolution	Resolves phase on B ϕ codes within 32 random bit periods assuming 50% transition density and maintains phase for up to 2,000 sequential logic 1's or sequential 0's for Eb/No of 15 dB
Retention	Retains synchronization on input signals with Eb/No down to 0 dB at narrowest loop bandwidth and retains synchronization with bursts of up to 128 bits without transitions for Eb/No down to 3 dB

Bit Error Rate Performance

For Eb/No of 0 dB to 12 dB (square-edged data and additive white Gaussian noise) and input bit rates up to 30 Mbps, unit will reconstruct data to within 1 dB of the ideal bit error probability code curves as shown in IRIG Standard 106-96 Appendix C, Figure C-3.

For Eb/No of 0 dB to 12 dB (filtered data and band-limited additive white Gaussian noise per IRIG Standard 106-96 Appendix C, paragraph 1.2 and Figure C-1) and input bit rates up to 30 Mbps, unit will reconstruct data to within 1 dB of the bit error probability curve depicted in Figure C-1.

Processing Outputs

Two outputs	1. NRZ-L and Clock (on separate coaxial connectors); Clock phase: programmable; 0°, 90°, 180°, and 270° 2. NRZ-L and Clock (on ribbon cable connector)
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Derandomizer

Direction	Forward/Reverse
Lengths	11-, 15-, 20-, or 23-bit shift register

Tape Recorder Output

PCM codes	Programmable to any of the following: NRZ-L/M/S, B ϕ -L/M/S, DM-M/S, MDM-M/S
Output randomizer	Same as derandomizer
Level	TTL
Drive capability	.50 Ω to ground
Source impedance	On-card jumper selectable

Viterbi Decoding Option

Rate	R = 1/2, K = 7
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EMR832 Chassis Specifications

Front Panel Control:

Display	4 lines of 40 8mm characters
Keys	.20 keys, prompted from page display

Remote Control:

RS-232C	Serial communications port for setup
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Setup Formats:

Storage	Non-volatile memory
Quantity	.6 per bit sync

Operating Environment

Temperature	.32–113°F (0–45°C)
Relative humidity (non-condensing)	0–95 $\pm 5\%$ @ 50–86°F (10–30°C) 0–75 $\pm 5\%$ @ 86–104°F (30–40°C) 0–45 $\pm 5\%$ @ 104–113°F (40–45°C)

Physical Characteristics

Voltage	.110–240 VAC, auto-detect reselection
Frequency	.50–60 Hz
Power consumption	.100 watts
Rack-mount option	.RETMA rack slides (length 22")
Height	.5.25" (13.37 cm), 3U
Width	.19" (48.4 cm)
Depth	.20.125" (51.1 cm)
Weight	.22 lb

Ordering Information

EMR832-C	.Chassis for 30 Mbps Bit Synchronizer
EMR832-S	.30 Mbps Bit Synchronizer Module, Single Ended
EMR832-D	.30 Mbps Bit Synchronizer Module, Differential
EMR832-SV	.30 Mbps Bit Synchronizer Module with Viterbi Decoding, Single Ended
EMR832-DV	.30 Mbps Bit Synchronizer Module with Viterbi Decoding, Differential
EMR832-X	.Module Extender Card for EMR832
EMR832-BP	.Breakout Panel with Cable for EMR832
EMR832-R	.Rack Mount Kit for EMR832, Spare
PS-BIT-S	.Power Supply for EMR832 or MBS720 External Bit Synchronizer, Spare
SC-BIT-S	.System Controller for EMR832 or MBS720 External Bit Synchronizer, Spare

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