

DBS-200 Bit Synchronizer Specifications

Features

- **Multiple Internal Bit Sync Modules**
- **Selectable IRIG Codes, In and Out**
- **Tunable Bit Rates Up to 40 Mbps**
- **Multiple External Input Sources**
- **Selectable Loop Bandwidths**
- **Convolutional Decoding/Encoding**
- **Local Control via Multifunction Keypad**
- **Remote Control via RS-232, Ethernet, or IEEE-488**
- **BER Performance (Within 1 dB of Theoretical Curves)**



Introduction

The stand-alone PCM bit synchronizer, Model DBS-200, is a multifeatured, digitally-controlled bit synchronizer that provides state-of-the-art BER performance. The DBS-200 excels in harsh noise conditions with a signal-to-noise ratio level superior to every other unit in its class.

The DBS-200 represents a breakthrough in high-speed digital bit synchronizers. Its patented loop width and tracking features enable the DBS-200 to attain the performance levels of bit synchronizers costing two or three times as much with equal performance.

Integrated into a 19-inch rack-mounted assembly, the stand-alone DBS-200 provides front-end flexibility to the system integrator. Programmability includes input sources and impedance, input code types and polarity, tunable bit rates, loop and tracking bandwidths, output codes and clock phases, and an optional convolutional decoder/encoder feature for high reliability transmission as required in space-based applications. The DBS-200 is controlled and programmed via an internal CPU with a numeric/function keypad and interactive display. Remote control may be supported via RS-232, Ethernet, or IEEE-488 options. Optional support for the simultaneous operation of two internal bit synchronizer modules is available.

The DBS-200 is used with PCM applications where noise-reliable solutions are required for noise perturbation problems. The DBS-200 design, which has received a U.S. patent, uses the most-advanced, low-power, high-reliability components available on the market today.

For CCSDS space applications, the DBS-200 offers an optional Viterbi decoding function using a QUALCOMM device. The constraint length of 7 and the 1/2 rate decoding scheme, as adopted by NASA and the European Space Agency (ESA), are supported by the DBS-200.

Occupying only 3-1/2 inches of rack space, the DBS-200 with hundreds of units in the field is the most cost-effective, high-performance bit synchronizer available today.

INPUTS

Functions	Codes	NRZ-L/M/S, BIØ-L/M/S, DM-M/S Differential BIØ-M/S, RZ, programmable
	Derandomization	Lengths 9, 11, 15 (forward and reverse), programmable
	Bit Rate Range (NRZ-L/M/S)	100 bps - 20 Mbps, programmable Options to 40 Mbps and extended low range
	Bit Rate Range (Other PCM Codes)	100 bps - 10 Mbps, programmable Options to 20 Mbps and extended low range
	Resolution	Less than 0.1%
	Viterbi Codes	Rate 1/2, length 7, symbols G1=171, G2=133 Alternate G1symbol inversion (ASI) supported NRZ-L and BIØ-L PCM formats; differential and nondifferential
	Sources	One of four BNC inputs, programmable
	Impedance	75 ohms and 10k ohms (optional 50 ohms), programmable
	Configuration	Single-ended; optional differential input
	Phase Lock Loop	Internal VCO; optional external clock input
	Polarity	Normal or inverted, programmable
	Loop Bandwidths	0.1 %, 0.5%, 1.0%, and 1.6% (other additional options), programmable
	Bit Detection	Matched filter and sample
Dynamics (Typical)	Amplitude	500 mV peak-to-peak to 10V peak-to-peak; input monitored on front panel
	DC Baseline Offset	100% of peak-to-peak input voltage
	Baseline Variation	Maximum of .1% of input bit rate at 100% of the peak-to- peak signal input, BIØ codes
	Acquisition Range	Within $\pm 5\%$ of selected bit rate, $E_b/N_o = 15$ dB
	Acquisition Time	Within 50 bits, average, random data within 0.5% deviation from the programmed data rate, $E_b/N_o = 15$ dB
	Tracking Range	Up to $\pm 20\%$ variation from selected bit rate
	BER Performance	Within 1 dB of theoretical curve, up to maximum data rate
	Noise Curve	Within 1 dB of the theoretical curve, $E_b/N_o = -3$ dB to 12 dB
Sync Maintenance	Down to $E_b/N_o = 3$ dB having transition gaps up to 128 bit periods occurring once every 1024 bits	

Note: Specifications do not apply to all possible combinations of bit sync settings and signal perturbations.

OUTPUTS

- Standard outputs are included with each single-channel sync DBS-200 unit
- Optional Line Driver: DBS-200-LDR-001
- All TTL outputs capable of driving 50 ohms

CONVOLUTIONAL ENCODER:

- Rate 1/2, Length 7, Symbol G0=171, G1=133
- Selectable ASI and Differential, NRZ-L Format
- Uncoded NRZ-L Data and 0° Clock Required

CODE	STANDARD (SINGLE CHANNEL)	OPTIONAL LINE DRIVER
NRZ-L	TTL	TTL/RS-422
Clock 1	TTL Programmable Ø	TTL/RS-422 Selectable Ø
Clock 2	-	TTL/RS-422 Selectable Ø
Clock 3	-	TTL/RS-422 180°
Clock 4	-	TTL/RS-422 270°
BIØ -L	-	TTL/RS-422 Bipolar
Selectable PCM NRZ-L,M,S BIØ -L,M,S DM-M,S +/- RNRZ-L 9, 11, 15 Seq	-	TTL/RS-422 Bipolar
Soft-bit Decision	-	TTL/RS-422

CONTROL & DISPLAY

Local

Control	Numeric/parameter/function keypad with interactive display
Format Storage	Nonvolatile memory, retains current setup in addition to ten stored parameter setups
Display	2 x 20 character LCD display

Sync, Search, and Loss Front-panel Indicators

Remote Control (Optional)

RS-232 serial remote interface, 10/100-Base-T Ethernet, or IEEE-488 GPIB Interface (contact factory.)

Status Information: All parameter and status information is available over remote port

SIZE & WEIGHT

H, W, D	3 ½-inches (8.9 CM), 19" (48.2 CM), 18-inches (45.7 CM)
Weight	20 lbs (9 Kg)

POWER

Voltage	85 – 264 VAC
Frequency	47 to 63 Hz
Consumption	175W maximum

ENVIRONMENT**Temperatures**

Operating	32 °F – 122 °F (0 °C – 50 °C)
Storage	0 °F – 200 °F (-20 °C to 80 °C)

Humidity

Operating/Storage	20 to 95% noncondensing
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Altitude

Operating/Storage	10, 000 feet (3,048M)
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ORDERING INFORMATION

DBS-220-105	Bit Synchronizer, 20 Mbps, One Channel
DBS-240-105	Bit Synchronizer, 40 Mbps, One Channel
DBS-220-205	PCM Bit Sync, 20 Mbps Base Unit, Two Channels
DBS-240-205	PCM Bit Sync, 40 Mbps Base Unit, Two Channels
DBS-200-LDR-001	Line Driver Interface
DBS-200/V-002	Viterbi Decoder (requires DBS-200-LDR-001)
DBS-200/VQPSK-001	QPSK Decoder (includes Viterbi decoding and line driver)
DBS-200-232-001	RS-232 Remote Control
DBS-200-488-002	IEEE-488 Remote Control (contact factory)
DBS-200-LDR-101	Multiport RS-422 Line Driver Interface
DBS-200-ENET-001	Ethernet Control, 10/100 (Requires DBS-200-232-001)

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