SDM-2020D Digital Video Demodulator
High-Speed Data Demodulator

FEATURES

- Digital Video Broadcast (DVB)
- Transparent Data Transmission
- Programmable 1.5 to 100 Mbit/s
- QPSK
- 8PSK and 16QAM (Optional)
- L-Band input 1 (Standard), 2 or 4 Optional
- 70/140 MHz Input (Optional), 1 input

APPLICATIONS

The SDM-2020 video demodulator is a high-performance unit designed for high-speed satellite transmission. This unit is ideal for:

- Digital Video Broadcast
- Digital Satellite News Gathering (DSNG)
- Primary and backhaul transmission for:
  - Contribution
  - Distribution
  - ATSC (HDTV)
  - Direct To Home (DTH)

The SDM-2020 also excels in:

- High-speed data distribution
- Fiber and cable restoration
- Internet

DIGITAL VIDEO BROADCAST (DVB)

The SDM-2020 demodulator supports satellite channel adaptation for DVB applications. It translates the incoming RF satellite channel into an MPEG-2 data stream as defined by EN 300 421(QPSK) and EN 301 210 (8PSK and 16QAM):

DVB Digital Video Broadcasting

- De-randomization for energy dispersal (descrambling)
- Outer coding, Reed-Solomon EIA (204, 188, T=8)
- Convolutional interleaving (depth I=12)
- Inner coding QPSK, 1/2, 2/3, 3/4, 5/6, and 7/8 rates
- Inner coding 8PSK, 2/3, 5/6, 8/9
- Inner coding 16QAM, 3/4 and 7/8
- Baseband filtering and demodulation

DATA RATE FLEXIBILITY

The SDM-2020 demodulator is a data rate programmable unit. The user can easily program the desired data rate or symbol rate.

INTERFACES

Field-changeable interfaces for the SDM-2020 include:

- EIA-422/530 Serial/Parallel Data Interface
- LVDS Serial/Parallel Data Interface
- ASI / LVDS
- ECL-HSSI Serial Data Interface
- G.703
- SMPTE 310M (SSI-DVB) Serial Data Interface

MAXIMUM DATA THROUGHPUT

8PSK and 16QAM increase the data rate through a satellite transponder compared to QPSK. The examples below are for a 36 MHz transponder:

- 8PSK 5/6: 1 carrier at 68 Mbit/s (1 modem)
- 16QAM 7/8: 2 carriers at 34.36 Mbit/s (2 modems)

Similar results are available using transponders with different bandwidths. The advanced higher order modulation of the SDM-2020 optimizes video or data applications.

POWERFUL CONCATENATED CODING

The powerful industry standard concatenated coding used by the SDM-2020 product family reduces the E_b/N_0 needed to produce low bit error rates (BER). This combination of inner coding (Viterbi/trellis) combined with outer Reed-Solomon coding yields unparalleled performance.

CONFIGURATION RETENTION

The SDM-2020 demodulator maintains the unit configuration in non-volatile memory. When power is restored, the unit returns to the configuration in place before power was removed.

MODEMS

SDM-2020D

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SYSTEM

Digital Data Rate	1.5 to 100 Mbit/s, in 1 bit/s steps depending on symbol rate, data interface and frame type
Symbol Rate	37.5 Msys/s maximum
DVB Compliant Modulation	QPSK at 1/2, 2/3, 5/6, 3/4, and 7/8 rate 8PSK at 2/3, 5/6 and 8/9 (optional) 16QAM at 3/4 and 7/8 (optional)
EN 300 421 / EN 301 210 Compatibility/Compliance	Inner Coding (Viterbi, K=7, Pragmatic Trellis), Reed-Solomon, Data Scrambling, Interleaving, Sync Word, QPSK, 8PSK
Frame Types Supported	188 and 204 byte MPEG2 TS, None

ENVIRONMENTAL AND PHYSICAL

Prime Power, AC	100 to 240 VAC, 50 to 60 Hz, 60 W typical, 100 W maximum
Size	19W x 16D x 1.75H inch (1 RU) (48.2 cm x 40.6 cm x 4.44 cm)
Weight	< 15 lbs. (6.8 kg)
Temperature:	
Operating	0 to 50°C (32 to 122°F)
Storage	-40° to +70°C (-40° to +158°F)
Humidity: Operational	< 95%, non-condensing
IF Output Connector	Type F, female

DEMODULATOR

	L-Band (Standard (4-Input)	70/140 MHz (Opt) (1 Input)
Operating Frequency Range	950 to 1750 MHz	50 to 90 MHz 100 to 180 MHz
Step size	2.5 kHz	2.5 kHz
Desired Input Carrier C(dBm) =	-65 +10 Log (Msym/s)	-57 +_10 Log (Msym/s
AGC Range	40 dB minimum	30 dB minimum
Acquisition Range (Programmable)	Up to ± 500 kHz	Up to ± 60 kHz
Input Impedance	75Ω	75Ω (50Ω opt)
Return Loss	10 dB typical	18 dB typical
LNB DC Voltage Output (500 mA maximum)	13 and 17 per DisEq 4.2 and 20 to 24 VDC	Not Applicable

Min Data Rate, Mbit/s	1/2	2/3	3/4	5/6	7/8	8/9
QPSK (188 Frame)	1.38	1.84	2.07	2.30	2.42	
8PSK (188 Frame)		2.76		3.45		3.69
16QAM (188 Frame)			4.14		4.84	

Max Data Rate, Mbit/s	1/2	2/3	3/4	5/6	7/8	8/9
QPSK (188 Frame)	34.56	45.0	45.0	57.60	45.0	
8PSK (188 Frame)		69.12		86.39		92.15
16QAM (188 Frame)			92.15		92.15	

E_b/N_0 for BER = 10^{-10}	1/2	2/3	3/4	5/6	7/8	8/9
QPSK (All Rates)	4.3	4.9	5.6	6.2	6.7	
8PSK ≤ 30 Msym/s		6.9		8.8		9.4
8PSK ≥ 30 Msym/s		6.9		8.8		9.8
16QAM (188 Frame)			8.9		10.6	

DATA INTERFACE

ECL_HSSI	Serial: Bit Clock (TT), Data (SD), Send Timing (ST), DCE
Serial to 70 Mbit/s	Ready (DM), CA and TA
EIA-422	
Serial / Parallel	Parallel: Same as LVDS
Serial to 18 Mbit/s	Serial: Bit Clock (TT), Data (SD), Send Timing (ST), DCE Ready (DM)
LVDS	
Serial / Parallel	Parallel: Byte Clock, 8 bits data, Sync, Data Valid
Serial to 32 Mbit/s	Serial: Bit Clock (TT), Data (SD), Send Timing (ST)
ASI / LVDS	Asynchronous Serial Interface LVDS Parallel: Byte Clock, 8 bits data, Sync, Data Valid
G.703 Includes 2 - 32 ms Rx Buffer	1.544, 2.048, 6.312, 8.448, 32.064, 34.368, 44.736, or 51.84 Mbit/s (per Bellcore SONET STS-1)
SMPTE 310M	19.392 658 Mbit/s, ATSC 8VSB

MONITOR AND CONTROL

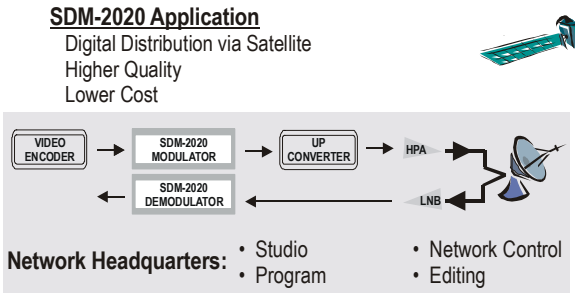
Local User Keypad Interface	6 button	
LCD Display	2 lines, 16 characters per line	
Status LEDs	Power On	Sync
	LNB Power	Test Mode
	Rx Fault	Stored Mode
	Rx Alarm	
Remote User Interface:		
Async Serial Interface	EIA-485 (2-/4-wire) or EIA-232	
Baud Rate, programmable	300, 600, 1200, 2400, 4800, 9600, or 19200 bit/s	
Serial Format	ASCII	
Data Bits	7 bit with parity, or 8 bit with no parity	
Stop Bits	2	
Parity	Odd, Even, or None	
Addressing	Configurable address from 1 to 255; Address 0 is reserved for global addressing	
Status Relays	Common equipment fault alarm	
Status/Control	Data Rate Select, Code Rate Select, Modulation Type, Rx Frequency, Rx Power Level, LNB Power On/Off, E_b/N_0 , BER, E_b/N_0 Alarm	

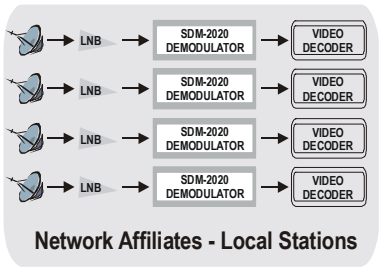
OPTIONS

8PSK	DVB Modulation per EN 301 210
8PSK and 16QAM	DVB Modulation per EN 301 210
2 or 4 L-Band Inputs	Customer-select
70/140 MHz Input	75Ω or 50Ω (opt) (Single Input)
Prime Power	DC: 42 to 56 VDC, 60 W typical, 100 W maximum

SDM-2020 Application

Digital Distribution via Satellite
Higher Quality
Lower Cost





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