



Second Generation DSP Data Receiver



Features

- QPSK / BPSK / PSK demodulation up to 2.7 MSPS
- QPSK / BPSK performance within 1dB of theoretical, 0.5 dB typical
- Built in Viterbi decoding for next generation downlinks
- Direct 70 MHz IF conversion at 50 MSPS and 10 bit resolution
- Selectable RF inputs & IF bandwidths for multimode flexibility
- -90 dBm to -50 dBm input range
- RS-422 and 50 ohm TTL clock and NRZ data outputs
- Flexible 5 1/4" Drivebay format fits easily in most PC and Workstation enclosures
- RS-232 and TTL level serial control for setup, tuning, mode selection and status
- 2 line 16 character Vacuum Fluorescent display for status and signal level readout

Description

The MetCom DSP SG Drivebay Series Receiver is a versatile digital receiver for all current, and many future weather satellite formats. The 5 1/4" drivebay format provides easy installation in most PC and workstation enclosures. The MetCom DSP can also be mounted in a standard external enclosure designed to support a CDROM or hard disk.

The MetCom DSP SG converts the incoming RF signal to a bandwidth limited and AGCed 70 MHz IF which is then directly digitized at 50 million samples per second with 10 bit resolution. Digital Signal Processing techniques are used to implement tuning, AGC, carrier tracking and symbol recovery. The demodulated data is then processed in a gate array to convert the varied signal formats to NRZ data and clock. Hardware Viterbi decoding is implemented when required. BER performance is within 1 dB of theoretical. DSP advantages include repeatable performance and long term operation without component

drift and flexible multimode operation.

The Metcom DSP SG currently supports MSG HRIT, MSG LRIT, MTSAT HiRID, MTSAT LRIT, GOES GVAR, GOES LRIT, GMS S-VISSR, Meteosat PDUS, NOAA HRPT, DOD DMSP, Fengyun 1 CHRPT, and Fengyun 2 S-VISSR reception..

The MetCom DSP is controlled by a PC compatible RS-232 connection. The user can setup downconverter offsets, tune frequencies, select demodulator modes (which may internally select IF SAW filters), select RF inputs, supply power to downconverters, control clock and data polarities and read signal levels, lock status and other receiver status by means of this serial link.

Multiple demodulator modes can be supported by the MetCom DSP SG. Data and clock outputs include RS-422 LVDS and 50 ohm TTL on IDC and SMA connectors to facilitate connection to decryption units and frame formatters.



Specifications *(subject to change without notice)*

RF Specifications

Input Frequency.....	126 to 154 MHz
Input Dynamic Range.....	-90 to -50 dBm nominal
Image Rejection	>60 dB
Input Impedance.....	50 ohms
Input Return Loss	>15 dB selected input >10 dB unselected input
Input To Input Isolation	>60 dB
IF Frequency	70 MHz
IF Band width	0.5 to 5.0 MHz, 0.5 MHz increments SAW filter(s) depends on mode(s)
IF Filters	1 standard, 2nd optional
LO Frequency	196 to 224 MHz in 25 KHz steps
Signal Strength (RSSI) Output.....	0 to 4 VDC, 30 mV/dB nominal -50 dBm = 2.50 volts

Demodulator (DSP)

Demodulator Modes.....	QPSK, BPSK, PSK
Demodulator Implementation Loss....	< 1 dB at 10E-6 BER (Q{SK / BPSK) 0.5 dB typical
Demodulator Type.....	Digital Costas Loop
Base Band Filters.....	Root Raised Cosine (RCC) typical $\alpha = 0.4$

Data

Supported Data Encoding.....	NRZ-L, NRZ-S, NRZ-M, Biphase-L
Supported Symbol Rates	0.1 to 2.7 MS/PS
Convolutional Decoding.....	Viterbi rate $\frac{1}{2}K=7, G1=171 G2=133$ V.35 CCITT and IESS descrambling 5.2 dB coding gain at 10 ⁻⁵ BER

Electrical / Mechanical

Supply Voltage	5 V @ 0.75 A, 12 V @ 0.65 A, 1.65 A max if powering 2 downconverters
Downconverter Power Output	2 x 12V at 500 ma (thermal fuse)
Power Connector	4 pin PC power connector
RF Input Connectors	SMA female
Signal Strength Output Connector	BNC female
Size.....	$\frac{1}{2}$ high, 5 $\frac{1}{4}$ " drivebay 5.85" W x 8.5" D x 1.7"H (14.7cm W x 21.6cm D x 4.32cm H)
Weight.....	3.1 lbs (1.41 Kg)
Operating Temperature	32 to 122 °F (0 to 50 °C), non-condensing

Interface

Control Interface	RS-232 and TTL serial at 9600 baud
Control Interface Connector	RS-232 - 10 pin IDC
Data / Clock Interface	RS-422, LDVS, TTL and 50 ohm TTL
Data / Clock Interface Connector	RS-422, LDVS and TTL - 16 pin IDC 50 ohm TTL - SMA female 93 ohm TTL available by special order

Supported Modes

- **GOES GVAR** (USA)
2.11 MBPS, BPSK, NRZ-S
- **GOES LRIT** (USA)
64 and 128 KBPS, BPSK, NRZ
with viterbi
- **GMS S-VISSR** (Japan)
Fengyun 2 S-VISSR (China)
MTSAT HiRID (Japan)
660 KBPS, BPSK, NRZ-M
- **MTSAT LRIT** (Japan)
75 KBPS, BPSK, NRZ, Viterbi
- **Meteosat PDUS** (Europe)
166.66 KBPS, PSK, Biphase-L
- **MSG HRIT** (Europe)
1.148 MBPS, QBSK, NRZ
with Viterbi
- **MSG LRIT** (Europe)
146.942 KBPS, BPSK, NRZ
with viterbi
- **NOAA HRPT** (USA)
665.4 KBPS, PSK, Biphase-L
- **DOD DMSP RTD** (USA)
1.024 MBPS, BPSK, NRZ
- **Fengyun 1 CHRPT** (China)
1.3308 MBPS, PSK, Biphase-L