MAG_200/TGS-M

MAGALI MOBILE TELEMETRY GROUND STATION

DESCRIPTION

MAG_200/TGS-M is a mobile telemetry ground station. It is a light and compact with battery power option.
It performs signal reception, bit and frame synchronisation, storage and real time data processing. It can also house the receiver card.

MAG_200/TGS-M includes Magali Telemetry software with PCM decommutation module IRIG 106 Class II for a **processing of up to 50 000 parameters.**

CCSDS, CE83 or Daniel decommutation are also available to replace or complete IRIG 106 Class II.

The solution is upgradable to include other data format as digital buses (MIL-STD-1553, ARINC-429…) Video, Chapter 10 or Ethernet data acquisition: IENA, iNet, Zodiac Data System RTR, raw telemetry packets ...

KEY FEATURES

- **Highly mobile platform** for field and room applications
- **From 1 to 2 PCM inputs** (option 4 inputs with other controller)
- PCM Data Rates up to **20 Mbps** for NRZ-L
- **Bit Synchronizer, PCM Decom**, PCM Simulator, time code reader/ generator - Receiver option
- **Up to 50 000 parameters processed**
- **Magali** telemetry software included
- Options : MIL-STD-1553, ARINC 429, Video ...
- **Network architecture** option for remote control or distribution

SPECIFICATIONS

RECEIVER (OPTION)

Tuner Features

Input frequency-S-band	2200 - 2400 MHz
Input frequency-E-band	2185 - 2485 MHz
Input frequency-U-band	1710 - 1850 MHz
Input frequency-L-band	1435 - 1540 MHz
Input frequency-P-band	215 - 320
IF Bandwidths	12 or 4 among 0.5, 1, 1.5, 2.5, 3.5, 4, 6, 8, 10, 12, 16, 20 MHz
Tuner resolution	50 kHz
Frequency accuracy	0.002%
Noise figure	8 dB (maximum) ; 6 dB (typical)
Operating Input Level	-10 to threshold
Maximum input level	+ 18 dBm without damage

Demodulator Features

Demodulation type	AM and FM
Post detection BW	12 or 4 software Selectable Video Filters. Unless otherwise specified : 50% of the IF Bandwidths.
Data Output Level	BI-polar (with software controlled output level to +/- 3.5Vpp) with 75 Ohm output impedance

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Demodulator (more)	Features
AGC Output	0-4 V into 1KΩ, 0 V is -100 dBm, +4V is 0 dBm
AGC time Constant	4 selectable time constants 1, 10, 100, 1000 ms
AGC Linearity	+/- 2 dB into best fit straight line -15 dBm to threshold +5 dB
AM Output	4 Vp-p into 10 KΩ; 2.5 Vp-p into 75Ω
AM frequency response	Selectable AM Low Pass Filter for 50, 500, 5K and 50 KHz

Additional Inputs/Outputs

AGC Controlled	-15 +/- 5 dBm signal
70 MHz IF	into 50 Ohms
Linear 70 MHz IF	35 dB Gain (typ) into 50 Ohms. Max output of +5 dBm

Bus Outputs

Signal Strength and Peak deviation
AM modulation Depth
AM Frequency

BIT SYNCHRONIZER

PCM Codes	PCM Codes
Codes	NRZ-L, NRZ-M, NRZ-S, RZ, BIO-L, BIO-M, BIO-S, DM-M, DM-S, M²-M, M²-S
Randomized codes	RNRZ-L, RNRZ-M, RNRZ-S
Randomized sequences	2^{11}-1, 2^{15}-1, 2^{17}-1, 2^{23}-1

Input and Signal features

Input signals	Single-ended or differential
Impedance	75 W (default), 50Ω, 1KΩ (Jumper Select)
Polarity	Auto-detect (normal or inverted)
Signal Amplitude	0.4 V pp to 10 V pp (nominal)
Maximum Voltage Input	5V RMS for 50Ω and 75Ω Inputs; 25V RMS for 1KΩ Impedance
Maximum DC Offset	± 5V for 50Ω and 75Ω Inputs; ± 25 V for 1KΩ Impedance
Dynamic AC baseline variation	100 % of the input signal with a frequency of up to 0.1% of the signal frequency for sinewave or sawtooth signals (100 Hz maximum).

Performances

Bit rate	100 bps to 20 Mbps for NRZ codes - 100 bps to 10 Mbps other codes
Loop-Bandwidth	Programmable from 0.01% to 2 % depending on the Bit Rate of the input
Acquisition Range	0.04 % to 8 % depending on the Loop-Bandwidth selected

Bit Error Rate Performance

The Bit Synchronizer performance relative to theoretical is indicated below when the applied signal has an S/N ratio within 1 dB of the specified synchronization threshold with a Gaussian white noise bandwidth up to three times the bit rate, and has no jitter or base line variations on the input signal.

Code	Bit Rate	Degradation from Theoretical
NRZ	<10 Mbps	<1 dB maximum (0.5 dB typical)
NRZ	10 to 20 Mbps	<1.5 dB maximum (1dB typical)
BIO, RZ	<5 Mbps	<1 dB maximum (0.5 dB typical)
BIO, RZ	5 to 10 Mbps	<1.5 dB maximum (1 dB typical)
DM, M²	up to 10 Mbps	<2 dB maximum (1 dB typical)

Synchronization Hold

The Bit Synchronizer is capable to maintain synchronization during periods of a signal loss or during continuous periods of 1s or 0s lasting up to 245 bits in every 1024 bits for NRZ coded signals up to 5 Mbps or BIO coded signals up to 2.5 Mbps, providing :

- S/N ratio is greater than 12 Db
- PLL Bandwidth is equal to .01%
- 50% Transition Density when the signal is present
- Signal has no jitter or base line variations on the input signal
- Signal has a constant amplitude

Acquisition Time

The average acquisition time is a function of the Loop Bandwidth and will be less than 100 bits with a Loop Bandwidth of 1 % and less than 150 bits with a Loop Bandwitdth of 0.1 % for NRZ coded signals up to 5 Mbps or BIO coded signals up to 2.5 Mbps, providing:

- Gaussian white noise in a band up to three times the bit rate
- Transition Density less than 2 % of the bit rate
- Signal has no jitter or baseline variations on the input signal

Output Signals

Data	TTL and RS-422
Zero Degree Clock	TTL and RS-422
Tape outputs	1 V pp into 50 Ω (code programmable) TTL and RS-422
Lock Status	In status register
ES/No > 5 dB Status	In status register
Input Signal Level Status	In status register
Built-in-test	In status register

Frame Synchronizer

Inputs	NRZ-L
Input Levels	TTL or RS 422
Input Data Rate	10.0 bps to 20.0 Mbps
Word Length	3 to 16 bits (32 bits with software)
Minor Frame Length	2 to 16383 words per minor frame
Major Frame Length	1 to 1024 minor frames per major frame
Bit Order	MSB/SB (word-by-word basis)
Frame Sync Pattern	Up to 64 bits
Frame Sync Location	Leading or trailing the frame
Frame Sync Strategy	Adaptive mode (search-lock-verify) & burst mode (search-lock)
Sync Error Tolerance	0 to 16 bits
Sync Slip Window	1 to 3 bits wide
Data Polarity	Normal, inverted or automatic (detection)
Sub-Frame Sync	FCC, SFID or URC (option)

IRIG Time Code/Generator

Inputs	IRIG A, B or G
Input levels	250 Hz or 20 KHz, 1 V (peak to peak nominal)
Latency	2 µs maximum

SIMULATOR

Outputs Data	0° & 90° clocks
Output Levels	TTL or RS 422
Output Data Rate	1.0 Bps to 20.0 Mbps (NRZ codes)
PCM codes	NRZ-L/M/S, BIO-L/M/S, DM-M/S, M2, RNRZ-L-11/15
Word Length	3 to 16 bits
Minor/Major Frame Length	2 to 16383 words
Major Frame Length	1 to 1024 minor frames
Bit Order	MSB/LSB-first on a word-by-word basis
Sync	Up to 64 bits
Sub Frame Sync	FCC, SFID & URC

SOFTWARE

IRIG 106	Class II Full compatible
Frame output	Chapter 10 and Raw format
Export	ASCII, MATLAB, CSV, Google Earth…
Import	ASCII, BINARY, CSV...
Main functions	Data acquisition/replay, real time, visualization, post processing, analysis, test report
Network	Distributed Architecture
Tools	Kalliste synoptic editor, SDK...

CONTROLLER

Model	Aluminum Chassis with 17" Wide Screen
Resolution 1920*1080	Keyboard with integrated Touchpad
Package	Caddy Trolley
I./O	1xPS2, 6xCOM (4 onboard), 1xVGA, 2xLAN, 6xUSB2.0, Audio
RAM	4 GB DDR3 (max. 32 GB)
System Hard Drive	1 x 500 GB SATA, 7200 rpm in removable rack, 2,5"
Data Hard Drive	1 x 500 GB SATA, 7200 rpm in removable rack, 2,5"
VGA	Intel HD Graphics 2000
DVD R/W	Yes
Operation System	Windows 7 32-bit or 64-bit
Size / Weight	433 x 347 x 229 mm

ORDERING INFORMATION

MAG-200/TGS-M/1/XXX[1]	1 telemetry stream ground station
MAG-200/TGS-M/2/XXX[2]	2 telemetry stream ground station
MAG-200/IENA	IENA Ethernet module
MAG-200/iNet	iNet Interface
MAG-200/A_1553 [2]	1553 interface
MAG-200/A_A429/8 [2]	8 Arinc429 channels interface
MAG-200/Ch10	IRIG 106 Chapter 10 format interface
MAG-200/3D_VIRTUAL	3D Visualization - With standard 3D mobile and 3D terrain

[1] Decommutation module : IRIG, CE83, DANIEL, CCSDS
[2] 6 PCI Slot controller. Not compatible with battery powered option

Specifications are subject to change. Please, verify the latest specifications prior order.

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