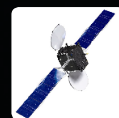


## CLEBER MS2 DVB-S/S2 Multistream Modulator



CLEBER-MS2 R12K15

### DESCRIPTION

Cleber offers a powerful, flexible and modular hardware and software platform for broadcast operators, where customers can install up to six boards with no limitations in terms of position. Based on a Linux embedded OS, Cleber detects the presence of the boards and shows the related control interface to the user, either through web GUI and Touchscreen TFT display. Both AC and DC power supplies option are provided, as well as redundant configurations.

MS2 is a satellite modulator board to be installed in the Cleber platform; compliant with DVB-S and DVB-S2 standard, it also manages roll-off down to 0.05 (DVB-S2X).

Basic board accepts 2 input streams over ASI: in multi-stream configuration, the streams can be associated to different Input Stream Identifier (ISI) as per standard. The basic board can also two more streams from the internal bus, coming from local encoders, satellite receiver, ASI or IP bridge boards (optional plug-in modules for CLEBER), achieving a maximum of 8 input streams.

Two output connectors are available: the main one covers the L-Band between 950 and 2150 MHz, the second offers an additional IF output (70-140 MHz synthesizable), besides a L-band monitor signal. By software, it is possible to enable 10 MHz reference for external BUC across the L-band output, optionally with high-stability OCXO.

Maximum Symbol Rate is 49.5 MBaud and all modcodes are available as per standard; output power is configurable over an extended range, -40 up to +8 dBm, with excellent MER.

### FEATURES

- Self-contained compact solution (1U Rack 19")
- Six plug-in slots available for any combination of boards
- DVB-S/S2 Modulator
- Single and Multistream
- L- band and IF output
- 10 MHz reference for BUC
- Optional high stability OCXO
- TFT front panel control
- Embedded Linux OS
- Redundant power supply (AC and/or DC)
- WEB interface, SNMP v2 and GPIO

## SPECIFICATIONS

### Modulation:

**Standard:** ETSI EN 300 421 (DVB-S)  
ETSI EN 302 307 (DVB-S2)

#### DVB-S

- Outer FEC: Reed Solomon
- Inner FEC: Viterbi
- MODCODS:
  - QPSK: 1/2, 2/3, 3/4, 5/6, 7/8
  - 8PSK: 2/3, 5/6, 8/9

#### DVB-S2:

- Outer FEC: BCH
- Inner FEC: LDPC
- MODCODS:
  - QPSK: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
  - 8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10
  - 16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
  - 32APSK: 3/4, 4/5, 5/6, 8/9, 9/10

**Symbol Rate Range:**

**Frame length:**

- DVB-S/DSNG: 188 bytes
- DVB-S2: Short Frames 16200 bits  
Normal Frames 64800 bits  
0,05-0,10-0,15-0,20-0,25-0,30-0,35

**Roll-off factor:**

### Input Interface:

Back panel: 2 ASI inputs on BNC (F) - 75 ohms  
Internal Bus: 2 balanced ASI lines (*option, AB01 board required*)  
Extension: 4 balanced ASI lines from extension board (*option, MS2E board required*)  
ASI Format: 188 and/or 204 byte mode  
ASI Multistream interface:

- Up to 8 ISI
- Rate adapter

### Output Interface:

#### L-band output:

Connector: F (F), 50 ohms or SMA (F). 50 ohms  
Return loss: > 14 dB  
Level: -40/+8 dBm (+/- 2 dB)  
Frequency: 950 - 2150 MHz (10 Hz steps)  
Spurious: Better than -65 dBc/4 kHz @ +5dBm  
Phase Noise with Internal Reference (typical dBc/Hz@950-2150):

10 Hz	100Hz	1kHz	10kHz	100kHz	1MHz
-60	-78	-103	-110	-112	-133

#### IF-band:

Connector: BNC (F) - 75 ohms  
Return loss: > 20 dB  
Level: -40/+10 dBm (± 3 dB)  
Frequency: 50 - 180 MHz (10 Hz steps)  
Spurious: Better than -65 dBc/4 kHz @ +5dBm  
Phase Noise with Internal Reference (typical dBc/Hz@50-140):

10 Hz	100Hz	1kHz	10kHz	100kHz	1MHz
-65	-80	-105	-114	-120	-133

#### L-band monitoring output:

Connector: SMA (F), 50 ohms  
Return loss: > 14 dB  
Level: -45 dBm  
Frequency: identical to L-band output.

### 10 MHz reference input / output interface:

#### Input:

Connector: BNC (F) - 50 ohms  
Level: -8dbm ÷ +5dBm

### Autosensing function

#### Output (*option, MS2E board required*):

Connector: BNC (F) - 50 ohms  
Level: 0 dbm ±1 dB

#### BUC reference:

Frequency: 10MHz

#### Internal Reference frequency:

High Stability  
Stability: ± 1 ppm over -20°C to 70°C  
Ageing: ± 1 ppm/year  
Very High Stability (*optional*)  
Stability: ± 5 ppb over 0°C to 65°C  
Ageing: ± 1 ppb/day  
± 500 ppb/10 year

### Control:

Front panel (TFT touchscreen display)

Web browser (embedded http server, no additional software required)

SNMP v2

### Electrical:

#### Supply:

AC: 100-240 V~ 50/60 Hz IEC 320  
DC: 22 ÷ 65 V (2 pins plug)  
10 ÷ 36 V (2 pins plug)

#### Configuration:

Single AC or DC  
Single AC and DC  
Dual Redundant Hot swappable AC  
Dual Redundant Hot swappable DC  
Dual Redundant Hot swappable AC+DC

#### Power consumption:

Base chassis: 4.5W  
MS2 consumption: 30 W

### Mechanical:

Chassis: 1U Rack 19"  
Dimensions:  
Width: 482.5 mm  
Height: 43.65 mm  
Depth: 357.80 mm  
Weight:  
Base chassis: 2.5 Kg  
Maximum: up to 7 Kg (depending on number and type of slots)

### Environmental:

Operative temperature range: -10 ÷ 55°C  
Relative Humidity: 0 - 95% non-condensing

\* Elber reserves the right to make changes to specifications of products described in this datasheet at any time without notice and without obligation to notify any person of such changes.



ELBER Srl. Via Pontevicchio, 42W - 16042 Carasco (GE) Italy  
Phone +39.0185.351333 fax +39.0185.351300  
www.elber.com - elber@elber.it