M/M2 Series Frequency Converters

Our M Series converters, for voice, data, and digital/analog video transmissions, offer the key features you expect to find in world class products at a competitive price. The single rack-mount unit brings together such features as extended bandwidth, reduced size, high reliability and superior performance to meet your system requirements.

The converters meet INTELSAT, Eutelsat, Regional and DOMSAT performance specifications, while their extended bandwidth enables you to access most commercial Ku-Band satellites worldwide.

Featuring excellent phase noise performance, which accommodates both the Quadrature Phase Shift Keying (QPSK) and more stringent Eight Phase Shift Keying (8PSK) modulation schemes. These units faithfully transmit the wide spectrum of data rates required for digital video applications.

With options such as a 1 KHz synthesized "D6" converter, for fine step sizes, and integrated group delay/amplitude equalizers, you know that this converter has the flexibility to meet your system needs. When you factor in its support of SCPC and HDTV, as well as its low bit error rate, there simply is no other converter that can offer as much for the price.

M series converters, along with their related components, are also designed to support redundant configurations for both 1:1 and 1:N system requirements. The design goal is to meet the broadest range of satellite telecommunications needs. They are also backed up by 24/7 service and support capabilities, as well as Satellite Networks' commitment to excellence.

L3 communications
Satellite Networks

Front Panel Control And Monitor Functions

- Frequency
- Gain
- Summary Alarm
- Detailed Alarm
- Self Test
- Store/Recall Frequencies
- Unit Address
- Mute
- Subassembly Diagnostics
- Key Lock
- Ref Frequency Monitor & Adjust
- Power On/Off Indicator
- Local/Remote
- 10 MHz Crystal Reference Monitor Port
- RS422/485 Remote Control (Rear Panel)

Power

INPUT: 115/230 VAC +/-10% 47 - 63 Hz
Consumption: 100W (max.)

Environment

Operating Temp: 0 to 50˚C
Non-Operating Temp: -30 to +70˚C
Humidity: Up to 95%
(Non-Condensing)

Mechanical

Dimensions: 1.75" x 22" x 19"
Weight: 9 Kg (20lbs.) nominal
Shock & Vibration: Normal handling by commercial carriers

M2 Series Specifications (C & KU-Band)

UC6M2-D5 & UC14M2-D5
Low Phase Noise Upconverter

Type.....Dual Conversion
Frequency.....Positive (No Inversion)
Frequency Selection.....Synthesizer tuned
(Local or Remote.....125 KHz steps
Frequency Stability.....± 1 x 10 (-8) / MO
incl 10 to 40˚ C.....temp. change
First IF Frequency.....Above 1 GHz
Reference Frequency.....Front Panel Adjust and Monitor

Input

Frequency..... 70 ± 20 MHz
(Option: 140 ± 36 MHz)
Impedance..... 75 Ohms
Return Loss.....23 dB (nom.) Note 1
Connector.....BNC

Output (UC6M2-D5), C-Band

Frequency..... 5.845-6.725 GHz (Std.)
Impedance.....50 Ohms
Return Loss.....19 dB (nom.)
Connector.....Type "N"
Level (1 dB compr.).....+9 dBm (min.)*
Higher Val. Opt.
Muting.....80 dB (min.)

Output (UC14M2-D5), Ku-Band

Frequency.....13.75-14.5 GHz (Std.)
Impedance.....50 Ohms
Return Loss.....15 dB (nom.)
Connector.....SMA
Level (1 dB compr.).....+6 dBm (min.)*
Higher Val. Opt.
Muting.....80 dB (min.)

Transfer Characteristics

Gain.....32 dB (nom.) 30 dB (min.)
Bandwidth and Ripple.....36 MHz, ± 0.25 dB (max.)
Gain Slope.....± 0.05 dB/MHz (max.)
Gain Stability.....± 0.25 dB/day (max.)
Group Delay (± 18 MHz) Note 1.....Linear ± 0.05 ns/MHz (max.)
Parabolic 0.008 ns/MHz (max.)
Ripple 1.0 ns, p-p (max.)
Phase Noise.....3 dB better than IESS
308/309 (UC14M2-D5)
5 dB better than IESS
308/309 (UC6M2-D5)
AM to PM Conversion.....0.1˚/dB (max.) for –10
dBm output
Gain Adjust.....30 dB in 0.5 dB steps
Front Panel Control
Remote Control.....RS422/485 (Std.)
Slope Adjustment.....± 1 dB Front Panel

OPTIONS (* Optional Levels Available)

- +15 dBm Output Power @ 1 dB compression point (U/C)
- Remote Control: RS-232 or IEEE -488
- IF/RF Monitor Ports (Front Panel)
- LO Monitor Ports (Front Panel)
- 10 MHz External References
- -48V DC Power
- Higher Frequency Stability
- 5 or 10 MHz External Reference Auto or Manual Select

DC4M2-D5 & DC11M2-D5
Low Phase Downconverter

Type.....Dual Conversion
Frequency.....Positive (No Inversion)
Frequency Selection.....Synthesizer tuned, 125 KHz steps
(Local or Remote)
Frequency Stability.....± 1x 10 (-8) / MO, incl.
10 to 40˚ C temp. change
First IF Frequency.....Above 1 GHz
Reference Frequency.....Front Panel Adjust and Monitor

Input (DC4M2-D5), C-Band

Frequency.....3.4-4.2 GHz (Std.)
Impedance.....50 Ohms
Return Loss.....19 dB (nom.)
Connector.....Type "N"
Noise Figure.....13 dB (max.)

Input (DC11M2-D5), Ku-Band

Frequency.....10.95-12.75 GHz (Std.)
Impedance.....50 Ohms
Return Loss.....15 dB (nom.)
Connector.....SMA
Noise Figure.....15 dB (max.)

Output

Frequency.....70 ± 20 MHz
(Option: 140 ± 36 MHz)
Impedance.....75 Ohms
Return Loss.....23 dB (nom.) Note 1
Connector.....SMA
Level (1 dB compr.).....+15 dBm (min.)
Muting.....80 dB (min.)

Transfer Characteristics

Gain.....52 dB (nom.) 50 dB (min.)
Bandwidth and Ripple.....36 MHz, ± 0.25 dB (max.)
Gain Slope.....± 0.05 dB / MHz (max.)
Gain Stability.....± 0.25 dB /day (max.)
Group Delay(± 18 MHz) Note 1.....Linear ± 0.05ns/MHz (max)
Parabolic 0.008
ns/MHz (2) (max.)
Ripple 1.0 ns,p-p (max.)
Phase Noise.....5 dB better than IESS
308/309 (DC4M2-D5)
3 dB better than IESS
308/309 (DC11M2-D5)
In-band LO Leakage.....-70 dBm (max.) at input
AM to PM Conversion.....0.1˚ /dB (max.) for 0
dBm output
Intermodulation (Third Order).....-50 dBc, for two carriers
at 0 dBm output
Gain Adjust.....30 dB in 0.5 dB steps
Front Panel Control
Remote Control.....RS422/485 (Std.)
Slope Adjustment.....± 1 dB Front Panel

Note 1: 140 MHz IF (Up and Downconverters)

Bandwidth.....72 MHz (min.)
Ripple.....± 0.4 dB
IF Return Loss.....23 dB (nom.)
Group Delay.....Linear ± 0.03
Parabolic 0.003
Ripple 1.0

M Series Specifications (C, X, KU & KA-BAND)

UC6M-D5 & UC14M-D5
UC17M-D5 & UC (27-31) –D5*
Low Phase Noise Upconverter

Type	Dual Conversion
Frequency Sense	Positive (No Inversion)
Frequency Selection	Synthesizer tuned -D5 (125 KHz steps) (-D6 1KHz steps optional)
Frequency Stability	± 300 Hz/mo (X-Band) ± 200 Hz/mo (C-Band) ± 500 Hz/mo (Ku-Band) incl. 10˚C to 40˚C temp. change
First IF Frequency	Above 1 GHz

Input

Frequency	70 ± 20 MHz (Optional: 140 ± 36 MHz)
Impedance	75 Ohms
Return Loss	26 dB (typ.),23 dB (min.)
Connector	BNC
Noise Figure	10 dB

Output

Frequency	7.9-8.4 GHz (Std. X-Band) 5.850-6.425 GHz (Std. C-Band) 14.0-14.5 GHz (Std. Ku-Band) 27.5-31.5 GHz (Std. Ka-Band)**
Impedance	50 Ohms
Return Loss	22 dB (typ.), 20 dB (min.)
Connector	SMA (Type "N" for C-Band)
Level (1 dB compr.)	-6 dBm min.* (X, Ka & Ku-Band) -5 dBm min.* (C-Band)

Transfer Characteristics

Gain	17 dB (nom.) 15 dB (min.)*
Bandwidth and Ripple	36 MHz, ± 0.25 dB
Gain Slope	± 0.05 dB / MHz (max.)
Gain Stability	± 0.25 dB / day (max.)
Group Delay (± 18 MHz)	Linear 0.05 ns/MHz (max.) Parabolic 0.005 ns/MHz (2) (max.) Ripple 1.0 ns, p-p (max.)
In-band LO Leakage	-80 dBm (max.) at output
AM to PM Conversion	0.1˚/dB (max.) for output levels up to –22 dBm
Gain Adjust	± 20 dB (nom.) continuous
Phase Noise	5 dB better than IESS 308/309

140 MHz IF Option

Bandwidth	80 MHz (X & Ka-Band) 72 MHz (C & Ku-Band)
Ripple	± 0.25 dB
IF Return Loss	21 dB
Ripple	1.0 dB p-p
Group Delay	Linear: 0.025 ns/MHz Parabolic: 0.03 ns/MHz Ripple: 1 ns p-p

Specifications subject to change without notice
* Optional Levels Available
** Consult L-3 Satellite Networks for Available Bandwidth

DC4M-D5, DC11M-D5
DC7M-D5, DC(17-21) M-D5*
Low Phase Noise Downconverter

Type	Dual Conversion
Frequency Sense	Positive (No Inversion)
Frequency Selection	Synthesizer tuned, -D5 (125 KHz steps) -D6 (1 KHz steps) KHz steps (1 KHz steps Optional)
Frequency Stability	± 300 Hz/mo (X-Band) ± 200 Hz/mo (C-Band) ± 500 Hz/mo (Ku-Band) 10˚C to 40˚C temp. change
First IF Frequency	Above 1 GHz

Input

Frequency	7.25-7.75 GHz (X-Band) 3.625-4.2 GHz (C-Band) 10.95-12.75 GHz (Ku-Band) 17.7-21.2 GHz (Ka-Band)**
Impedance	50 Ohms
Return Loss	23 dB (typ.), 20 dB (min.)
Connector	SMA (Type "N" for C-Band)
Noise Figure	14 dB (typ.), 16 dB (max.) (X & Ku-Band) 12 dB (typ.), 14 dB (max.) (C-Band)

Output

Frequency	70 ± 20 MHz (Optional: 140 ± 36 MHz)
Impedance	75 Ohms
Return Loss	23 dB (min.)
Connector	BNC
Level (1 dB compr.)	+20 dBm (typ.), * +15 dBm (min.)

Transfer Characteristics

Gain	40 dB (nom.) 35 dB (min.)*
Bandwidth and Ripple	36 MHz, ± 0.25 dB (max.)
Gain Slope	± 0.05 dB/MHz (max.)
Gain Stability	± 0.25 dB/day (max.)
Group Delay (± 18 MHz)	Linear 0.05 ns/MHz (max.) Parabolic 0.005 ns/MHz (2) (max.) Ripple 1.0 ns, p-p (max.)
In-band LO Leakage	-75 dBm (max.) at input
In-band Image Rejection	80 dB min. (X & Ku-Band) 90 dB min. (C-Band)
AM to PM Conversion	0.05˚/dB (max.) for input Levels up to –40 dBm
Intermodulaton (Third Order)	-50 dBc for two carriers at 0 dBm output
Gain Adjust	20 dB (nom.) continuous
Phase Noise	5 dB better than IESS 308/309

OPTIONS

- +13 dBm @ 1 dB compression (U/C)
- 55 dB or 60 dB Gain (D/C)
- Remote Control (RS422/485), IEEE-488 or Form C Contact Closure
- IF/RF Signal Monitor Ports
- IF/RF LO Monitor Ports
- External Reference (5 or 10 MHz)
- -48V DC Prime Power
- Front Panel Gain Adjust in 1.0, or 0.25 dB Steps
- Ultra Low Phase Noise
- 80 MHz Bandwidth @ 70 MHz IFt

Other Converter Offerings:

V2200 - 1:1 Redundant Up/Down Converters in a Single Rack Unit

V2245 - Redundant Up/Down Converter - Chassis Configurable up to 1:8

communications
Satellite Networks

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