

The MA4040D is a fully agile commercial quality IF upconverter for data over cable and Digital Video-on-Demand applications. Advanced design allows a single MA4040D card to cover a frequency band from 53 to 858 MHz and still maintain a phase noise specification which exceeds the DOCSIS requirements for 64/256 QAM. Remarkably low out of band noise performance and low spurious are achieved through high level mixing, a microwave frequency IF and multiple levels of filtering.

The MA4040D is a modular circuit card designed for use with the VCom MA4000 Series.



Each MA4002D card chassis with common MA4011D/MA4012D power supply can contain up to 10 MA4040D independent frequency agile upconverters in a 4U rack mount configuration. The redundancy features of this product make it suitable for the most demanding applications. Built in IF & RF power detectors allow for easy input and output level configuration. The remote control interface allows full control and monitoring of all frequencies and levels.

This advanced, cost effective upconverter offers high performance, flexibility and space efficiency.

## Card Features:

- High level output; +61 dBmV 53 to 858 MHz
- Front panel selectable output frequency in 12.5 kHz step size
- Digital slope compensation to achieve <math>\pm 0.3</math> dB slope over any channel
- A range of custom IF input frequencies are available
- Auto IF AGC automatically corrects for input level changes (non-bursty)
- Out of band noise performance <math>< -12</math> dBmV/ <math>-30</math>dBmV/6 MHz
- Excellent in-band noise performance
- User defined soft alarms for IF and RF levels can be enabled via remote control
- RF output mutes when changing output configuration
- High reliability, state-of-the-art design using microstrip MMIC and surface mount technology
- Conservative component derating and 100% burn in help ensure reliable operation
- Low power consumption
- All local oscillators are frequency synthesized and locked to a common internal high stability reference

## System Features:

- Local control via LCD and 4 soft touch push buttons
- Remote control via RS232/RS485/Terminal or optional SNMP
- FLASH memory for easy software updates
- Front panel displays IF and RF power levels
- International internal switching power supply (100 to 240 VAC) (Optional -48 VDC power supply)
- Internal high reliability fans ensure cool operation for long product life
- 1-to-1 Redundancy



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# SPECIFICATIONS — VCom MA4040D

## FREQUENCY AGILE 64/256 QAM UPCONVERTER

### IF INPUT

IF Frequency (center of the band)	44.00 MHz (optional 36.125 MHz or 43.75 MHz)
Bandwidth	Passband 6 MHz (optional 8 MHz)
Input Level	+25 to +35 dBmV (total power)
Impedance	75 ohm
Return Loss	20 dB
Connector	F type (female)
IF Detector Accuracy	1 dB
IF attenuator Step Size	0.05 dB typical
IF AGC (for carrier/digital input)	enable/disable

### RF OUTPUT

Frequency Range	53 to 858 MHz (band center)
Frequency Step Size	12.5 kHz
Frequency Accuracy	2 ppm
Frequency Response (any 5 MHz band)	±0.3 dB
Frequency Response (any 7 MHz band)	±0.4 dB (for wide band options)
Group Delay (any 5 MHz band)	15 nsec p-p max (8 nsec typ)
Output Level	+61 dBmV max.
Output Level Step Size	0.05 dB typical
RF Detector Accuracy	±1.0 dB typical
Gain Control Range	+45 to +61 dBmV
Impedance	75 ohm
Return Loss (inband)	16 dB
Connector	F type
RF Monitor Point (calibrated)	20 dBc ± 0.5 dB
Spurious (50 MHz to 950 MHz)	-60 dBc (-70 dBc typ)
Phase Noise	
1 to 10 kHz (double side band noise power)	-37 dBc (-40 dBc typ)
10 to 50 kHz (double side band noise power)	-54 dBc (-57 dBc typ)
50 kHz to 3 MHz (double side band noise power)	-53 dBc (-55 dBc typ)
10 kHz Offset (SSB)	-95 dBc/Hz @ 10 kHz (-99 dBc/Hz typical)
Broadband Noise (average noise all Channels outside ± 18 MHz)	-12 dBmV/6 MHz (-15 dBmV/6 MHz typ) -11 dBmV/8 MHz (8 MHz option) -30 dBmV/6 MHz at twice RF frequency
Modulated Adjacent Noise (6 MHz channel Passband)	
± 3 to 3.75 MHz	-58 dBc min (<-60 dBc typical)
± 3.75 to 9 MHz	-62 dBc min (<-64 dBc typical)
± 9 to 15 MHz	-65 dBc min
Modulated Adjacent Noise (8 MHz channel Passband option)	
±4 to 5 MHz	-58 dBc min
± 5 to 12 MHz	-61 dBc min
± 12 to 20 MHz	-64 dBc min
Carrier Mute	Automatic upon frequency change
Redundancy switching speed (1 to 1)	50 ms max.

### GENERAL

Remote Control Serial Interface	RS232, RS485, or Terminal (software selectable) (Optional SNMP over IEEE802.3 10-Base-T Ethernet)
Connector	Dual RJ45
Power Requirement	100 to 240 VAC, 50 to 60 Hz (MA4011D) Optional -48 VDC (MA4012D)
Power Consumption	400 VA maximum
Operating Temp	0 to 50°C (32 to 122°F)
Mounting	Standard 19" (48.3 cm), 4U (7") rack space
Dimensions (MA4002D Chassis)	19" (w) x 14.25" (d) x 7" (h) (48.3 x 36.2 x 13.2cm)
Shipping Weight	
MA4002D Chassis with MA4011D P/C Module	18 lbs. (8.2 kg)
MA4040D Upconverter card (each)	1.2 lb. (0.6 kg)
F Connectors	ANSI SP 406-1998

### OPTIONS

1P1 - Input-Digital 44.000 MHz with 8 MHz Passband
1P2 - Input-Digital 36.125 MHz with 8 MHz Passband
1P4 - 43.75 MHz IF with 8 MHz Passband
2S1 - SNMP Proxy Agent & Interface

### ACCESSORIES

AC4000 - MA4000 Communications Kit
AC4001 - Cisco UBR Options Kit

