

UC4040D 256 QAM UPCONVERTER

INSTALLATION AND OPERATION GUIDE



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Approved: **B.G.**

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SAFETY PRECAUTIONS

1. Before installing and operating this equipment, read all Safety, Installation and Operating sections. Retain this manual for future reference.
2. Follow all instructions — Failure to do so may result in damage to the unit or severe personal injury.
3. Servicing should not be attempted by the user. There are no user serviceable parts inside. Refer all servicing to factory qualified personnel.
4. Shock Hazard — An electrical shock hazard exists when the chassis cover is removed as is required to set internal controls. Always disconnect power from the unit before removing the cover.
5. Cleaning — Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
6. **“CAUTION: The Vecima Networks UC4040D with the –48 V dc supply option is intended for use only in rack mounted or cabinet installations where the dc supply wiring is protected from access by user personnel and from the outside environment.”**

Warning: Do not work on the system or connect or disconnect cables during periods of lightning activity.

LES PRÉCAUTIONS DE SÉCURITÉ

1. Avant d'installer ou d'opérer cet équipement, lisez, toutes les sections de sécurités, d'installations et d'opérations. Gardez ce manuel comme source de référence.
2. Suivez toutes instructions - si non, vous risquez d'endommager la machine ou de vous blesser sérieusement.
3. N'essayez, pas de réparer cet équipement vous même. Référez toutes revisions nécessaire au personnel qualifié de la manufacture.
4. Risque de choc - Il y a un risque de décharge électrique qui existe quand la couverture du châssis est enlevée, comme est nécessaire pour ajuster les contrôles internes. Il faut toujours couper l'électricité avant d'enlever le couvercle pour faire aucun ajustage.
5. Le nettoyage - n'utilisez pas de nettoyeurs aérosols ou liquides. Utilisez un tissu humide pour nettoyer.
6. **"ATTENTION": Le Vecima Networks UC4040D qui peut approvisionner le courant continu -48 V, doit être employé seulement dans une étagère montée ou installée dans un cabinet où les fils électriques sont protégés contre les éléments et ne sont pas accessibles aux personnes non-qualifiées.**

Attention Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage du foudre.



Important Installation Instructions



The UC4040D is a CLASS 1 Laser Product.



When Option 6S2 is installed, a switch or equivalent disconnect device must be provided by the installer.

DECLARATION OF CONFORMITY

CE Marking

UC4040x Frequency Agile 256 QAM Upconverter

Manufactured by:

Vecima Networks Inc.
150 Cardinal Place
Saskatoon, SK Canada
S7L 6H7

We, Vecima Networks Inc., declare under our sole responsibility as manufacturer of the products to which this declaration relates, that the products stated herein are in compliance with the following standards:

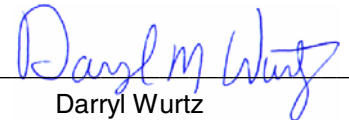
Product Safety Standards:

1. IEC 950 (1991) 2nd Edition, Amendment No. 1 (1992), Amendment No. 2 (1993), Amendment No. 3 (1995), and Amendment No. 4 (1996) with National Deviations for AT, BE, CH, CZ, DE, DK, FI, FR, GB, GR, HU, IT, NL, NO, PL, SE, YU, and Group Differences

EMI/EMC Standards:

1. EN 50022 Class A
2. EN 50082-1 :1992

The products are CE marked – 99

Signed: 
Darryl Wurtz

Date: 19 July 2004

Position: Quality Assurance Manager

Place of issue: 150 Cardinal Place
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S7L 6H7

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1.0 GENERAL INFORMATION

1.1 System Overview

Built in 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.

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.

1.2 Functional Overview

The **UC4040D** is a fully agile commercial quality IF upconverter for data over cable and cable modem applications. Advanced design allows the UC4040D to cover a frequency band from 53 to 857 MHz and still maintain a phase noise specification which exceeds the requirements of 256 QAM. The UC4040D is fully DOCSIS compliant and optimized for 256 QAM cable modem traffic.

1.3 Features

- High level output; +61 dBmV 53 to 857 MHz
- Front panel selectable output frequency in 12.5 kHz step size
- Digital slope compensation to achieve $< \pm 0.3$ dB slope over any channel
- A range of custom IF input frequencies are available
- Auto IF AGC automatically corrects for input level changes
- Out of band noise performance < -12 dBmV/-30dBmV/6 MHz
- Excellent in-band noise performance
- User defined soft alarms for IF and RF levels can be enabled from 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
- Local control via LCD and 4 soft touch push buttons
- Remote control via RS232/RS485 or optional SNMP
- FLASH memory for easy software updates
- All local oscillators are frequency synthesized and locked to a common internal high stability reference
- Front panel output power display detects IF and RF power levels
- International internal switching power supply (100 to 240 VAC)
- Internal high reliability fan ensures cool operation for long product life

1.4 Specifications

IF INPUT

IF Frequency (center of the band)	44.00 MHz
Bandwidth	Passband 6 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

RF OUTPUT

Frequency Range	53 to 857 MHz (band center)
Frequency Step Size	12.5 kHz
Frequency Accuracy	1ppm (internal TCXO)
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)	25 nsec p-p max
Output Level	+61 dBmV max.
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
Spurious (50 MHz to 950 MHz)	-60 dBc
Phase Noise	
1 to 10 KHz	-37 dBc (double side band noise power)
10 to 50 KHz	-54 dBc (double side band noise power)
50 KHz to 3 MHz	-53 dBc (double side band noise power)
10 KHz Offset (SSB)	-95 dBc/Hz @ 10 kHz
Broadband Noise	
(average noise all Channels outside ± 18 MHz)	-12 dBmV/6 MHz
	-11 dBmV/8 MHz (8 MHz option)
	-30 dBmV/6 MHz at twice RF frequency
Modulated Adjacent Noise (6 MHz channel)	
+/- 3 to 3.75 MHz	-58 dBc min
+/- 3.75 to 9 MHz	-62 dBc min
+/- 9 to 15 MHz	-65 dBc min
Modulated Adjacent Noise (8 MHz channel 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

GENERAL

Weight	2.4 lbs. (1.2 kg)
Power	100 to 240VAC, IEC connector
	-48 VDC (Option 6S2)
Power Consumption	25 W
Operating Temperature	0 to 50°C (32 to 122°F)

OPTIONS

1P1	-	Input-Digital 44.00 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
6S2	-	Internal -48 VDC Power Supply

Specifications subject to change without notice

2.0 INSTALLATION

2.1 Unpacking the Unit

Carefully remove the equipment from its packing material and set it on a solid surface, such as a table or desk. If it appears damaged in any way, notify the carrier, and keep all packing materials for inspection by the carrier's agent.

2.2 Operating Environment

The UC4040D is designed to operate at temperatures ranging from 0 to 50°C (32 to 122°F). As with all electrical equipment, operation at excessive temperatures accelerates the deterioration of components. For this reason, measures should be taken to prevent the build up of excessive heat in the rack.

2.3 Power Requirements

The UC4040D has an internal international auto-ranging power supply which allows it to be powered from any 100 to 240 VAC; 50 to 60 Hz source. When option 6S2 is installed at the factory, a -48 VDC power source may be used. The power source should be capable of delivering a minimum of 25 watts per unit.

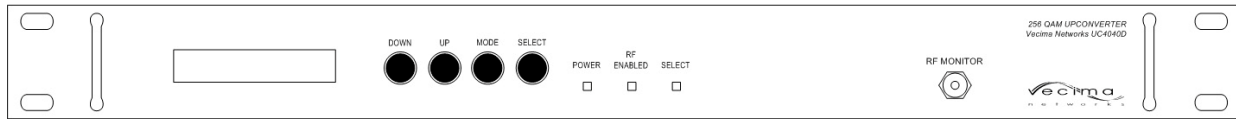
Check the total current power consumption of all equipment on the same line before applying power to the UC4040D. Avoid sharing an AC source that feeds heavy motors or other equipment which require large current drains.

2.4 Rack Mounting

The UC4040D requires 1U (1.75") of vertical rack space. It should be installed in a rack allowing access to the back of the unit. The UC4040D upconverter should be isolated from strong RF radiation emanating from local equipment on the rack. Power line transients that may cause damage to the unit should be avoided.

3.0 OPERATION

DIAGRAM 3.0A: FRONT PANEL



3.1 Front Panel Description

DISPLAY

The first line on the display is the Mode Information Line. It shows the settings for the currently selected mode. The possible operating modes depend upon the currently selected module. (See Section 3.2, UC4040D Upconverter Modes for a detailed description of the available modes).

The second line on the display is the Status Information Line. The Status Line is divided as follows:

The two leftmost characters are “mX” where X is replaced by the currently selected module address. The module addresses are assigned with module A being the upconverter card and module K being the Power Supply.

The next two characters are “sXX” where “XX” indicate the status code for the currently selected module. Refer to Section 5.0, Status Codes for a list of current status codes.

The next two characters are “eXX” where “XX” indicates the error code for the currently selected module. (This code is only displayed when it is non-zero). Refer to Section 6.0, Error Codes for the list of current error codes.

The final three or four characters of the second line can display the following information:

- When under Remote Control and local control is disabled, it will read “RMT”
- When under Local Control and a UC4040x card is selected, it will display the current firmware revision of the UC4040x card (ex “r118”)
- When under Local Control and a module other than a UC4040x is selected, this area will be blank

POWER ON LED

When the green POWER ON indicator is illuminated, the module has been correctly installed and powered on.

RF ENABLED LED

When the green RF ENABLED indicator is illuminated, the internal output circuitry is enabled to provide an RF output. The RF ENABLED indicator does not necessarily indicate the presence of an output, it only reflects that the module is capable of an RF output if an IF input is applied and the levels configured.

ALARM LED

The red ALARM indicator has two modes. A flashing Alarm LED indicates a non-critical alarm condition (i.e. soft alarm). A constant Alarm LED indicates a critical alarm condition (i.e. hard alarm). Detailed alarm information is available by selecting the corresponding module from the front panel and observing the status and error codes on the LCD display.

MODULE SELECT BUTTON

The MODULE SELECT button allows the user to select Module A (Upconverter Module), or Module K (Control/Communications Module) to display or control the unit. The LCD Display will indicate the module selected in the Status Line (Module A = mA, Module K = mK).

MODE BUTTON

The MODE button allows the user to cycle through each of the various modes for the selected module.

UP/DOWN BUTTONS

The UP/DOWN arrow buttons adjust the settings for the currently selected mode.

RF MONITOR CONNECTOR

The RF Monitor F connector provides a means of checking the RF output without disconnecting it from service. The RF Monitor will provide an output 20 dB down from the RF output. The test cable length (and return loss) should be kept to a minimum to maintain the 20 dB coupling accuracy.

3.2 UC4040D Upconverter Modes

FREQUENCY

When this mode is selected, the display will read: **Frq XXX.XXXX MHz**

The displayed frequency is the current configured Output Frequency. To adjust the output frequency, use the UP/DOWN arrow buttons. Single stepping will allow 12.5 kHz adjustment, while holding the buttons depressed will change the frequency more quickly.



The displayed frequency represents the center of the band.



During frequency change, the output is muted and the RF ENABLED indicator is turned off for 5 seconds to avoid undesirable interference.

AUTO IF

When this mode is selected, the display will read:

IF AGC Enabled

or

IF AGC Disabled

Pressing the Up or Down buttons will toggle the display between Enabled and Disabled. When enabled, the UC4040D will automatically optimize the IF level and ensure it is within a pre-set threshold range (default ± 0.5 dB). When disabled, the IF level can be manually adjusted as described in the next section.



At time of shipping, the Auto IF is enabled.



The Auto IF mode should only be used for continuous IF inputs (non-bursty).



If the IF level is not within ± 4.0 dBmV of the optimum level during Auto IF mode, the output will be muted to avoid undesirable interference, and the Alarm LED will be on.



Because the IF AGC has been optimized for digital QAM signals, it is recommended that AUTO IF is disabled for analog signals.

IF LEVEL ADJUST

When this mode is selected, the display will read:

IFPwr $\pm XX.X$ dB

The display indicates the approximate IF power level measured at the internal IF power detector. To adjust the IF level, use the UP/DOWN arrow buttons. To configure the UC4040D Upconverter for optimum performance, the IF level should be adjusted to read approximately 0.0 dB (-0.5 to +0.5). An IF level less than 0 dB will degrade noise performance and a level above 0 dB will promote intermodulation products.



The IF level can only be adjusted if the Auto IF mode is disabled.

RF OUTPUT LEVEL ADJUST

When this mode is selected, the display will read: **RFPwr XX.X dBmV**

The display indicates the approximate RF output power level measured by the internal RF power detector. To adjust the RF level, use the UP/DOWN arrow buttons. The RF output level may be set within the range of 45 dBmV to 61 dBmV.



Ensure that the IF level is correctly set before adjusting the RF level.

OUTPUT ENABLE/DISABLE

When this mode is selected, the display will read: **Output Enabled**
or
Output Disabled

Pressing the Up or Down buttons will toggle the display between Enabled and Disabled. When enabled, the RF output from the UC4040D Upconverter is enabled. When disabled, the RF output from the UC4040D is disabled.



An RF output is only present when there is a valid IF input configured as described in the previous sections. This means that at the time of shipping, the output is disabled, until a valid input is applied.

IF AND RF ALARM THRESHOLD SETTING

The IF and RF alarm threshold can be configured by the user via remote control.

Default settings at time of shipping are as follows: **IF +4, -4 dB, alarm function enabled**
RF +62, +48 dBmV, alarm function enabled

The IF and RF alarms can be independently enabled or disabled via remote control. Refer to Section 8.0, Remote Control for instructions on how to adjust these settings.

DEFAULT SETTINGS

At the time of shipping, factory defaults are applied. They are:

Auto IF enabled
IF and RF Threshold enabled
Output is disabled (until a valid input is supplied)

The default status code at time of shipping is s0E. Once a valid input is applied, this status code will change.

ADDRESS

When this mode is selected, the display will read: **Address XXX**



The displayed address is the currently selected UC4040D Address. A different address can be selected by pressing the Up or Down buttons. The UC4040D has an address from 001 - 999. The address is only used for remote control and monitoring purposes. The factory default address is 999.



Module K (mK) must be selected in order for this mode to be selected.

RS232/RS485/TERMINAL/SNMPext SELECT

When this mode is selected, the display will show the current format selected:

RS-232 Selected
Comm Disabled
SNMPext Selected
Terminl Selected
RS-485 Selected

Pressing the Up or Down buttons will toggle the display between the available selections.

-  The Remote Interface Connector Pinout will change depending upon the Interface Type selected. Please refer to the Remote Interface Connector description for details.
-  Module K (mK) must be selected in order for this mode to be selected.
-  When the SNMP option is installed, the user can also select the SNMP Interface in this mode.

S/W REVISION

When this mode is selected, the display will read: S/W Rev: XXX.XX

This displays the revision of the software installed on the controller.

BUTTON GUARD

Button Guard is used to prevent accidental changes in the unit's settings and can be turned on or off. When Button Guard is turned on, the unit can be configured until the backlight dims. To exit from Button Guard mode press the Down button followed by the Mode button as displayed on the controller. If the incorrect buttons are pressed, the unit will stay in Button Guard mode until the correct sequence is entered.

-  When SNMPext or SNMP is selected, the controller will go into "Local Lock On" or "StandBy" mode. This indicates that the controller is set to communicate through SNMP. To break out of SNMP modes, press and hold the Module Select button for 7 or more seconds. For more information, refer to the SNMP Manual.

3.3 Remote Control Using Terminal Mode

This mode allows the UC4040D to be controlled using a standard terminal (or terminal emulation) program. In order to use this mode, the following information is required:

- Terminal Mode must be selected from the front panel of the unit. 1) Press the Module Select button until **Module K** is selected. 2) Press the mode button until the Remote Interface type is selected (RS232, RS485). 3) Press UP or DOWN until **TerminI Selected** is displayed on the screen.
- The UC4040D does not provide a prompt and will only send a response when a command has been received.
- Local Echo should be enabled for the terminal (the communications/control module will not echo the characters).
NOTE: If Windows 98 is being used, the local echo feature in Hyperterminal may not work. This issue is documented in the Microsoft Knowledgebase. For more information send an e-mail to <mailto:mshelp@microsoft.com> with Q192456 in the subject line.
- The terminal type can be TTY or YT100 or similar.
- CR -> CR/LF mapping should be disabled for both inbound and outbound traffic.
- The only special characters that are implemented are character return (0x0D, ^M), linefeed (0x0A, ^J), and destructive backspace (0x08, ^H). All other characters are processed as part of the message.

The command syntax is as shown in Section 8.0, Remote Control Section, with the following modifications:

- Commands should not have an initial asterisk
- The CRC is ignored
- The maximum length is 49 characters
- All commands are parsed from left to right. Only the first command on a line is processed, any additional characters are ignored.

3.4 Remote Control Using Terminal Mode over a Standard Phone Modem

It is possible to use the terminal mode to remote control the UC4040D over a modem connection. The information in Section 3.3, Remote Control Using Terminal Mode still applies to this configuration; however, there are two additional requirements:

- 1) The modem that is connected to the UC4040D **MUST** be configured so that its serial port (DTE) is locked at 9600 baud. Additional settings are hardware flow control (RTS/CTS), 8N1 data, auto-answer, no dial-out.
- 2) There are no special requirements for the modem that is connected to the PC used for remote control.

NOTE: This was tested with a USRobotics Sportster 33.6 external fax modem. Other modems in the USRobotics Courier or Sportster lines will also work. A set of general configuration instructions for a USRobotics Courier or Sportster modem can be found at <http://www.usr.com/modem/documents/10563.htm>

Modems other than those mentioned may not support this configuration. If in doubt, consult with your modem vendor.

3.5 Remote Control Via SNMP

When the SNMP option is installed, the RS232/RS485 mode will vary slightly.

RS232/RS485//TERMINAL/SNMP/SNMPext SELECT

When this mode is selected, the display will show the current format selected:

RS-232 Selected
Comm Disabled
SNMP Selected
SNMPext Selected
Terminl Selected
RS-485 Selected

Pressing the Up or Down button will toggle the display between the available selections.

Refer to the SNMP Manual for more information regarding SNMP Operation.

3.6 Resetting the LCD Display

If the LCD display information goes blank or displays meaningless characters during normal operation of the UC4040D, the display may be reset as follows:

1. Press and hold the front panel "MODULE SELECT" button
2. While holding the "MODULE SELECT" button, press the "UP" button, then release both buttons.
3. The UC4040D is now in programming mode.
4. Wait a few seconds, then repeat steps 1 and 2. The LCD display information is now restored and the UC4040D is back in normal operation.

3.7 FLASH Upgrade

The Flash Utility for upgrading the firmware on the Power Supply/Controller and the Upconverter Module is included in the Demonstration Software. For more information, refer to Appendix B – Remote Access Software Installation & Utility Instructions.

3.8 Demonstration Software

Vecima Networks has written a demonstration program for use with Vecima Networks products. This software is not required to operate the unit; however, it is designed to make remote control easier for the user.

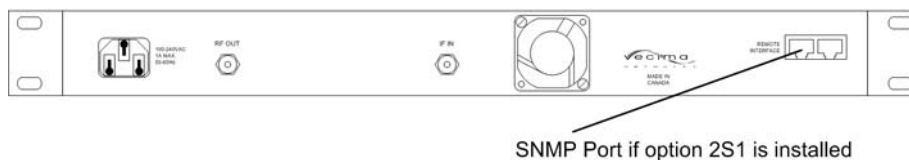
The Demonstration software is available as an option when ordering the product (Option SW4000), or it can be downloaded free of charge from the Vecima Networks Inc. technical support page at www.vecimanetworks.com.

The software contains commands and controls for the Upconverters, Power Supply/Control Module, and the QAM Modulators. The Flash Utility for upgrading the Upconverters, QAM Modulators and the Power Supply/Control Module is also included in the Demonstration Software.

Refer to Appendix B – Remote Access Software Installation & Utility Software for more detailed instructions on installing and using the Demonstration Software.

4.0 REAR PANEL INTERFACES

DIAGRAM 4.0a: REAR PANEL



RF OUT

The RF OUT F Connector provides the RF output signal from 53 to 858 MHz with a level of 45 to 61dBmV. The impedance is 75 ohm.

IF IN

The IF IN F Connector accepts an input signal at 44 MHz with up to a 6 MHz bandwidth from a 75 ohm source. The level should be from 25 to 35 dBmV.



Other options available (see OPTIONS, page 9)



An IF level of +33dBmV is recommended for use with a Vecima Networks MA4050 QAM modulator

REMOTE INTERFACE

The Remote Interface connector is a dual RJ45. Both sockets in the connector are identical and are connected in parallel. The remote cable plug may be used in either socket. For RS-485 operation, the unused socket may be used to daisy-chain the next RS-485 device on the same bus. The pin-out for the matching RJ45 plug is shown in the following table and diagram:

DIAGRAM 4.0b : RJ45 PLUG CONNECTIONS

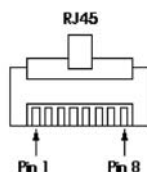


TABLE 4.0a : RS232 PIN-OUT

Terminal				UC4040D
RJ45 Pin	Signal	Direction	Signal	RJ45 Pin
1	CTS	←	CTS	1
2	DSR	←	DSR	2
3	RXD	←	TXD	3
4	RXD/GND	—	RXD/GND	4
5	TXD/GND	—	TXD/GND	5
6	TXD	→	RXD	6
7	DTR	→	DTR	7
8	RTS	→	RTS	8



Note: The above pin-out allows a straight through RJ45 cable to be used for connection between the terminal and the chassis. An RJ45 - DB25 adapter can also be used to connect to a PC or similar RS232 standard serial port.

TABLE 4.0B: RS485 PIN-OUT

Terminal				UC4040D
RJ45 Pin	Signal	Direction	Signal	RJ45 Pin
1	NC		NC	1
2	NC		NC	2
3	A	↔	A	3
4	GND	—	GND	4
5	GND	—	GND	5
6	B	↔	B	6
7	NC		NC	7
8	NC		NC	8



Note: The above pin-out allows connection to an RS485 communications bus. If desired, an RS485 - RS232 converter and an RJ45 - DB25 adapter can be used to connect to a PC or similar RS232 serial port.

ETHERNET LINK LED

This LED is only present when SNMP (option 2S1) is installed at factory.

When the Ethernet Link LED is lit, the unit has been successfully connected to an Ethernet Hub (10 baseT only). When the LED is not lit, there is no connection between the unit and an Ethernet Hub.



For more information, refer to the SNMP manual.

5.0 STATUS CODES

The status code is displayed on line 2 of the LCD display. It consists of an 's' character followed by a 2 digit hexadecimal number. The following tables can be used to interpret the meaning of the digits.

TABLE 5.0A: MOST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description	Digit	Description
0	None	8	Reserved
1	Backup Relay Enabled	9	Reserved
2	Reserved	A	Reserved
3	Reserved	B	Reserved
4	Reserved	C	Reserved
5	Reserved	D	Reserved
6	Reserved	E	Reserved
7	Reserved	F	Reserved

TABLE 5.0B: LEAST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description
0	None
1	Output is disabled
2	IF AGC is enabled
3	IF AGC is enabled, Output is disabled
4	IF Threshold Detection is enabled
5	IF Threshold Detection is enabled, Output is disabled
6	IF Threshold Detection is enabled, IF AGC is enabled
7	IF Threshold Detection is enabled, IF AGC is enabled, Output is disabled
8	RF Threshold Detection is enabled
9	RF Threshold Detection is enabled, Output is disabled
A	RF Threshold Detection is enabled, IF AGC is enabled
B	RF Threshold Detection is enabled, IF AGC is enabled, Output is disabled
C	RF Threshold Detection is enabled, IF Threshold Detection is enabled
D	RF Threshold Detection is enabled, IF Threshold Detection is enabled, Output is disabled
E	RF Threshold Detection is enabled, IF Threshold Detection is enabled, IF AGC is enabled
F	RF Threshold Detection is enabled, IF Threshold Detection is enabled, IF AGC is enabled, Output is disabled

5.1 Controller Module Status Codes

The status code is displayed on line 2 of the LCD display. It consists of an 's' character followed by a 2 digit hexadecimal number. The following tables can be used to interpret the meaning of the digits.

TABLE 5.1A MOST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description	Digit	Description
0	None	8	Reserved
1	Reserved	9	Reserved
2	Reserved	A	Reserved
3	Reserved	B	Reserved
4	Reserved	C	Reserved
5	Reserved	D	Reserved
6	Reserved	E	Reserved
7	Reserved	F	Reserved

TABLE 5.1B LEAST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description	Digit	Description
0	None	8	Reserved
1	Local Control Locked Out	9	Reserved
2	Reserved	A	Reserved
3	Reserved	B	Reserved
4	Reserved	C	Reserved
5	Reserved	D	Reserved
6	Reserved	E	Reserved
7	Reserved	F	Reserved

6.0 ERROR CODES

When the error code is non-zero, it is displayed on line 2 of the LCD display. It consists of an 'e' character followed by a 2 digit hexadecimal number. The following table can be used to interpret the meaning of the digits.

TABLE 6.0A: MOST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description
0	None
1	Fixed LO Error
2	IF AGC Error
3	IF AGC Error, Fixed LO Error
4	IF Threshold Error
5	IF Threshold Error, Fixed LO Error
6	IF Threshold Error, IF AGC Error
7	IF Threshold Error, Fixed LO Error
8	RF Threshold Error
9	RF Threshold Error, Fixed LO Error
A	RF Threshold Error, IF AGC Error
B	RF Threshold Error, IF AGC Error, Fixed LO Error
C	RF Threshold Error, IF Threshold Error
D	RF Threshold Error, IF Threshold Error, Fixed LO Error
E	RF Threshold Error, IF Threshold Error, IF AGC Error
F	RF Threshold Error, IF Threshold Error, IF AGC Error, Fixed LO Error

TABLE 6.0B: LEAST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description
0	None
1	Output is Muted
2	Hard Alarm condition
3	Hard Alarm condition, Output is Muted
4	Soft Alarm condition
5	Soft Alarm condition, Output is Muted
6	Soft Alarm condition, Hard Alarm condition
7	Soft Alarm condition, Hard Alarm condition, Output is Muted
8	Variable LO Error
9	Variable LO Error, Output is Muted
A	Variable LO Error, Hard Alarm condition
B	Variable LO error, Hard Alarm condition, Output is Muted
C	Variable LO Error, Soft Alarm condition
D	Variable LO Error, Soft Alarm condition, Output is Muted
E	Variable LO Error, Soft Alarm condition, Hard Alarm condition
F	Variable LO Error, Soft Alarm condition, Hard Alarm condition, Output is Muted

6.1 Controller Module Error Codes

When the error code is non-zero, it is displayed on line 2 of the LCD display. It consists of an 'e' character followed by a 2 digit hexadecimal number. The following table can be used to interpret the meaning of the digits.

TABLE 6.1A MOST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description	Digit	Description
0	None	8	Reserved
1	Reserved	9	Reserved
2	Reserved	A	Reserved
3	Reserved	B	Reserved
4	Reserved	C	Reserved
5	Reserved	D	Reserved
6	Reserved	E	Reserved
7	Reserved	F	Reserved

TABLE 6.0B: LEAST SIGNIFICANT DIGIT DESCRIPTION

Digit	Description
0	None
1	Hard Alarm Condition
2	Reserved
3	Reserved
4	Reserved
5	Right Side Power Supply Failure, Hard Alarm
6	Reserved
7	Reserved
8	Reserved
9	Left Side Power Supply Failure, Hard Alarm
A	Reserved
B	Reserved
C	Reserved
D	Right Side Power Supply Failure, Left Side Power Supply Failure, Hard Alarm
E	Reserved
F	Reserved

7.0 UC4040D CHASSIS FAN CHANGE PROCEDURE



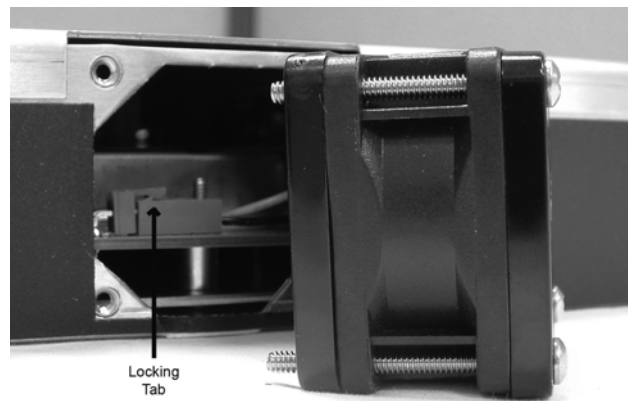
DANGER! Hazardous voltages present! Disconnect power supplies before servicing.

7.1 UC4040D Chassis Fan

The rear chassis fan cannot be changed while the chassis is powered up. To change the rear chassis fan perform the following steps:

- 1) Remove the 120 VAC line cord or the -48 VDC power wires from the rear of the chassis.
- 2) Remove and keep the three screws holding the fan in place. Separate the fan from the chassis. See Figure 7.1.

FIGURE 7.1. FAN REMOVAL



- 3) Reach through the hole revealed when the fan was removed, and pull on the connector to unplug it from the circuit board. Discard the failed fan.
- 4) Plug the connector of the new fan assembly (Vecima Networks part number FA210106-01) into the connector on the circuit board, ensuring that the locking tab on the fan wire connector is oriented up.
- 5) Position the fan assembly against the chassis while ensuring that the fan wires do not become crushed between the chassis and the fan body. The new fan assembly should be oriented, so that when looking at the rear of the chassis, the wires are in the top right hand corner.
- 6) Re-install the three fan mounting screws. The screws should have Loctite 425 applied to the first 0.25" of the threads. Remove any excess Loctite that may drip from the screw. Tighten the screws evenly, in rotation, to secure the fan assembly to the chassis. **Uneven tightening may distort or crack the fan housing.**

8.0 DETAILED REMOTE CONTROL

8.1 Operation

The UC4040D system may be controlled via the RS232/RS485 Remote Interface connector. (See Section 4.0, Rear Panel Interfaces for the connector pin-out).

The input data rate can be 9600, 14400, or 28800 baud. The UC4040D controller will automatically determine which data rate is in use and adjust accordingly. There are no user settings relating to baud rate selection.

8.2 Message Format

All messages to the UC4040D controller consist of a sequence of ASCII characters. Messages must meet the following guidelines in order to be correctly interpreted by the UC4040D controller.

- There can be no more than 75 ms between consecutive message bytes.
- After receiving the entire message, the UC4040D controller will require approximately 200 ms to process and respond to the message.
- Only one message can be processed at a time, consequently the user must wait for a reply before sending a new message.
- Commands sent to an invalid chassis address will be discarded without a response.

8.3 Command Structure

The command structure consists of a sequence of ASCII characters terminated by a carriage return. All ASCII characters are case-insensitive unless otherwise indicated. Commands are to be in one of the following two general formats:

<start>ADD<sp>MOD<sp>CC<sp>CRC<cr>

or

<start>ADD<sp>MOD<sp>CC<sp>PARM<sp>CRC<cr>

<start> ASCII Asterisk character

<sp> ASCII Space character

<cr> ASCII Carriage Return character

ADD = Address (3 ASCII characters)

Addresses are 3 digit numbers. Three digits (including leading zeros) are required to correctly define an address.

Note: The unit is shipped from the factory with a default address of 999. See Section "3.2 Address" for instructions on how to change this address.

MOD = Module (1 ASCII character)

A = Upconverter Card

K = Power Supply

CC = Command Code (2 or 3 ASCII characters)

Valid Command Codes:

FL = Load Frequency

IAE = Enable IF AGC Threshold

RTE = Enable RF Threshold

AI = Set IF Attenuation

IAD = Disable IF AGC Threshold

RTD = Disable RF Threshold

AR = Set RF Attenuation

ITS = Set IF Threshold

SU = Unit Status Request

OE = Enable Output

ITE = Enable IF Threshold

SC = Configuration Status Request

OD = Disable Output

ITD = Disable IF Threshold

LE = Enable Local Control

IAS = Set IF AGC Threshold

RTS = Set RF Threshold

LD = Disable Local Control

CRC = CRC-16 checksum (3 characters)

The checksum is preferred, but not required. If the checksum is used, the first character is an ASCII "V" followed by the low and high bytes respectively of the computed CRC 16 checksum (the checksum characters are not necessarily ASCII). The checksum is to be computed on all characters after the initial <start> character up to, and including, the first "V" character in the CRC section. If the checksum is not used, the 3 characters should be ASCII "NNN" (they must be uppercase).

PARM is one or more characters, and is command specific.



The command syntax for **Terminl Mode** is the same as above with the following modifications:

- 1) Commands should not have an initial asterisk
- 2) The CRC is ignored
- 3) The maximum length is 49 characters
- 4) All commands are parsed from left to right. Only the first command on a line is processed, any additional characters are ignored.

8.4 Response Structure

The response structure will consist of a sequence of ASCII characters, terminated by a carriage return. Responses will be in one of the two following general formats:

<start>ADD<sp>R<sp>RC<sp>CRC<cr>

or

<start>ADD<sp>R<sp>RC<sp>PARM<sp>CRC<cr>

<start> ASCII Asterisk character

<sp> ASCII Space character

<cr> ASCII Carriage Return character

There will be one response returned for all commands.

ADD = Address (3 characters)

The address of the unit that is responding to the command.

R = ASCII "R" character (1 character)

Indicates that this is a response to a previous message.

RC = Response Code (3 characters)

OK = Command Accepted

MOD = Command Denied because the addressed module is invalid

ERR = Command Denied because of Syntax Error

CRC = Command Denied because of CRC-16 error

CRC = CRC-16 checksum (3 characters)

The response checksum is always valid. The first character will be an ASCII "V" followed by the low and high bytes respectively of the computed CRC 16 checksum (the checksum characters are not necessarily ASCII). The checksum will be computed on all characters after the initial <start> character up to, and including, the first "V" character in the CRC section.

PARM is one or more characters, and is command specific.

8.5 Detailed Command Descriptions and System Responses

This section defines each of the command codes and the associated parameters.

FL - Load Frequency

Description: Loads the frequency for the specified module.

Parameters: Desired frequency in MHz, in the form XXX.XXXX. Leading zeros are optional, but not required. The decimal point and four trailing characters are required. Valid input frequencies are between 53.0000 MHz and 857.0000 MHz. Valid trailing characters are multiples of 0.0125 MHz, all others will be denied.

Example: *999<sp>A<sp>FL<sp>800.0625<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

AI - Set IF Attenuation

Description: Sets the IF attenuation for the specified module.

Parameters: Desired IF attenuation in dB, in the form XX.XX. Leading zeros are optional, but not required. The decimal point and two trailing characters are required. Valid attenuation values are between 0 dB and 31.75 dB in 0.25 dB steps. Valid trailing characters are 00, 25, 50 or 75.

Example: *999<sp>A<sp>AI<sp>10.50<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

AR - Set RF Attenuation

Description: Sets the RF attenuation for the specified module.

Parameters: Desired RF output attenuation in dB, in the form XX.XX. Leading zeros are optional, but not required. The decimal point and two trailing characters are required. Valid attenuation values are between 0 dB and 31.75 dB in 0.25 dB steps. Valid trailing characters are 00, 25, 50 or 75.

Example: *999<sp>A<sp>AR<sp>4.25<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

ITS - Set IF Threshold

Description: Sets the IF thresholds for the specified module.

Parameters: Desired IF thresholds in dB, in the form X.X<sp>-X.X. Leading zeros are optional, but not required. The decimal point and trailing character is required. The first parameter is the positive threshold and can range between 4.0 and 0.0 dB. The second parameter is the negative threshold and can range between 0.0 and -4.0 dB. The trailing character can range between 0.0 and 0.9.

Example: *999<sp>A<sp>ITS<sp>1.5<sp>-1.5<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

ITE - Enable IF Threshold

Description: Enables IF Threshold detection for the specified module.

Parameters: None

Example: *999<sp>A<sp>ITE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

ITD - Disable IF Threshold

Description: Disables IF Threshold detection for the specified module.

Parameters: None

Example: *999<sp>A<sp>ITD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

IAS - Set Auto IF Threshold

Description: Sets the Auto IF Thresholds for the specified module.

Parameters: Desired IF thresholds in dB, in the form X.X<sp>-X.X. Leading zeros are optional, but not required. The decimal point and trailing character is required. The first parameter is the positive threshold and can range between 4.0 and 0.0 dB. The second parameter is the negative threshold and can range between 0.0 and -4.0 dB. The trailing character can range between 0.0 and 0.9.

Example: *999<sp>A<sp>IAS<sp>1.5<sp>-1.5<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

IAE - Enable Auto IF

Description: Enables Auto IF Mode for the specified module.

Parameters: None

Example: *999<sp>A<sp>IAE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

IAD - Disable Auto IF

Description: Disables Auto IF Mode for the specified module.

Parameters: None

Example: *999<sp>A<sp>IAD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

RTS - Set RF Threshold

Description: Sets the RF Thresholds for the specified module.

Parameters: Desired RF thresholds in dBmV, in the form XX.X<sp>XX.X. Leading zeros are optional, but not required. The decimal point and trailing character is required. The first parameter indicates the high threshold and can range between +45 and +63 dBmV. The second indicates the low threshold and can range between +45 and +63 dBmV. The trailing character can range between 0.0 and 0.9.

Example: *999<sp>A<sp>RTS<sp>60.0<sp>50.0<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

RTE - Enable RF Threshold

Description: Enables RF Threshold detection for the specified module.

Parameters: None

Example: *999<sp>A<sp>RTE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

RTD - Disable RF Threshold

Description: Disables RF Threshold detection for the specified module.

Parameters: None

Example: *999<sp>A<sp>RTD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

OE - Enable Output

Description: Turns on the Output from the specified module.

Parameters: None

Example: *999<sp>A<sp>OE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

OD - Disable Output

Description: Turns off the Output from the specified module.

Parameters: None

Example: *999<sp>A<sp>OD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

LE - Enable Local Control

Description: Enables local control of the UC4040D. The module address must indicate a valid module even though the command does not change any module settings.

Parameters: None

Example: *999<sp>A<sp>LE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

LD - Disable Local Control

Description: Disables local control of the UC4040D. The module address must indicate a valid module even though the command does not change any module settings.

Parameters: None

Example: *999<sp>A<sp>LD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

SU - Status Unit Request

Description: The Status Unit Request command returns the factory model and revision history for the specified module.

Parameters: None

Example: *999<sp>A<sp>SU<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

If the response is OK, then the following parameters will also be returned in the order shown in Table 8.5A. (Note: X may be replaced by any valid character. All other characters will be as shown).

TABLE 8.5A : RESPONSE PARAMETERS FOR STATUS UNITS REQUEST

Parameter (Units)	Format	Example
Model	XXXXXXXXXXXX	Upconverter
Module SN	XXXXXXXX	0123456
Hardware Revision	XXX	010 (i.e. Rev 1.0)
Microcontroller Revision	XXX	010 (i.e. Rev 1.0)
PLD Revision	XXX	010 (i.e. Rev 1.0)
Miscellaneous	16 chars	

SC - Status Configuration Request

Description: The Status Configuration Request command returns the active configuration, including error codes and alarm status for the addressed module. It also returns the current status of the power supply module.

Parameters: None

Example: *999<sp>A<sp>SC<sp>CRC<cr>

Response: OK or ERR or CRC or MOD

If the response is OK, then the following parameters will also be returned in space delimited format in the order shown in Table 8.5B. (Note: X may be replaced by any valid character. All other characters will be as shown). Error codes are the last two digits reported on the status code line. Refer to Section 6.0, Error Codes for more details.

TABLE 8.5B : RESPONSE PARAMETERS FOR STATUS CONFIGURATION REQUEST

Parameter (Units)	Format	Example
UC4040D Status Code	XXXX	0101
UC4040D Input Freq. (MHz)	XXX.XXXX	110.0000
Reserved for future use	XXX	XXX
UC4040D IF Attenuation (dB)	XX.XX	10.25
UC4040D RF Attenuation (dB)	XX.XX	15.50
UC4040D IF Power (relative dB)	XXX.X	< -4.0
UC4040D RF Power (dBmV)	XX.X	57.0
Power/Control Module Status Code & Error Code	XXXX	0000

8.6 CRC Calculation

The CRC calculations are performed using a table driven approach. The polynomial used is $X^{16}+X^{15}+X^2+1$.

Only the basic algorithm and lookup table will be described here. Sample code is available on request. For further information, this approach is described in detail in the following paper:

Perez, Aram; Byte-wise CRC Calculations, IEEE Micro, June 1983, pp. 40 - 50

The algorithm for the CRC calculation is as follows:

Exclusive-OR the input byte with the low-order byte of the CRC register to get X.

Shift the CRC register 8 bits to the right.

Exclusive-OR the CRC register with the contents of the table, using X as an index.

Repeat steps 1 - 3 for all message bytes.



Note: The CRC register is 16 bits long, and should be cleared to 0 before beginning the calculations.

For the transmit message: After all the message bytes have been processed, the CRC is tagged on to the end of the message with the least significant byte first.

For the received message: After all the received message bytes have been processed, the resulting CRC should be zero. If it is not zero, at least one bit error has occurred. If it is zero, it is assumed that no errors have occurred.

9.0 WARRANTY AND SERVICE POLICIES

9.1 Warranty Statement

Vecima Networks warrants its products to be free from defects in workmanship or materials for a period of two years.

The warranty begins on the date of the original shipment from Vecima Networks to its customer. No claim may be allowed for expenses incurred in installation or use. No other expressed or implied warranties shall apply to the goods sold. Vecima Networks is not responsible for delayed shipments, other loss beyond Vecima Networks' control, or consequential damages of any kind arising in connection with the use of its products. This warranty is a return-to-factory warranty only. During the warranty period Vecima Networks will at its option, replace, repair or refund the price paid for any item which is returned for service. This warranty does not apply to units that have been physically or environmentally abused.

9.2 Service Policies: How to Return an Item for Service:

Before returning any item for service, an R.M.A. (Returned Material Authorization) number must be assigned by Vecima Networks. A unique R.M.A. number will be assigned for each item being returned. When requesting an R.M.A. number, please be prepared to provide the model, Vecima Networks serial number, original invoice number, your purchase order number and an adequate fault description. The serial number of a unit can be found on a barcode label similar to the one pictured below. R.M.A. service is available Monday to Friday from 8:30 a.m. to 4:30 p.m. CST (statutory holidays excepted).



To obtain an R.M.A. number you may:

Call: (306) 955-7075, press '0' for

Dept.

Fax: (306) 384-0086 — Attention: R.M.A. Request

Email: support@vecimanetworks.com

Operator, or '3' for Service

Once an R.M.A. number has been assigned, please refer to it in all correspondence and make certain that all applicable R.M.A. numbers are clearly marked on the outside of each package being returned. You must also ensure that each product is shipped to Vecima Networks in its original shipping container (or equivalent) via Prepaid carrier, with appropriate insurance and customs documentation (where required). Vecima Networks will not accept collect shipments, damaged shipments or shipments unaccompanied by an R.M.A. number.

For items still under Warranty – Items will be returned from Vecima Networks Inc. to its customer via prepaid ground carrier. The customer is responsible for any additional costs incurred, including custom clearance and duties. Any alternate means of shipment must be requested by the customer and will be subject to additional charges.

For items no longer under Warranty – Items will be returned from Vecima Networks Inc. to its customer via prepaid ground carrier at the customer's expense. The customer is responsible for any additional costs incurred, including custom clearance and duties. Any alternate means of shipment must be requested by the customer and will be subject to additional charges.

Shipping Instructions will be provided by the repair center when the RMA number is sent to the customer.

9.3 Repair Charges and Warranty Exemptions

Items returned beyond the warranty period or items that do not qualify for warranty service are subject to additional out-of-warranty repair charges. Descriptions of these charges and warranty exemptions are below:

- 1) Repair turnaround time is typically 5-14 business days after receipt of the item at Vecima Networks. A Flat Rate Repair Charge will apply to all out-of-warranty items. Flat Rate Repair Charges are subject to change without notice.
- 2) Any faults due to customer error (i.e. - incorrect set-up or configuration settings) are subject to the current Test Fee and will be exempt from warranty.
- 3) Items returned with inadequate fault descriptions are subject to the current Test Fee and are exempt from warranty.
- 4) In the event that no fault is found, the item is subject to the current Test Fee and will be exempt from warranty.
- 5) Any product exhibiting external damage (either from shipping, improper handling or use) will be subject to inspection. If said damages are determined to be the cause of failure, the item will be exempt from warranty.
All repairs to correct the external damage are subject to Time & Materials Charges (parts and labor at current rates).
- 6) Items with damage caused by unauthorized repairs or by external devices are subject to current out-of-warranty Flat Rate Repair Charges and are exempt from warranty.
- 7) All products returned for Factory Optioning are subject to the applicable current Option Charge plus Test Fee. Factory-optioned products carry the balance of the original warranty or a 90 day warranty, whichever is greater.

All out-of-warranty repairs must be approved by the customer in writing. No repairs will be made until the customer's Purchase Order or Out-Of-Warranty Repair Authorization is received.

APPENDIX A - CRC - 16 CALCULATIONS TABLE

All values in the table are in Hex format.

X TERM	ENTRY	X TERM	ENTRY	X TERM	ENTRY
0	0	33	1540	66	2A80
1	C0C1	34	D701	67	EA41
2	C181	35	17C0	68	EE01
3	140	36	1680	69	2EC0
4	C301	37	D641	6A	2F80
5	3C0	38	D201	6B	EF41
6	280	39	12C0	6C	2D00
7	C241	3A	1380	6D	EDC1
8	C601	3B	D341	6E	EC81
9	6C0	3C	1100	6F	2C40
A	780	3D	D1C1	70	E401
B	C741	3E	D081	71	24C0
C	500	3F	1040	72	2580
D	C5C1	40	F001	73	E541
E	C481	41	30C0	74	2700
F	440	42	3180	75	E7C1
10	CC01	43	F141	76	E681
11	CC0	44	3300	77	2640
12	D80	45	F3C1	78	2200
13	CD41	46	F281	79	E2C1
14	F00	47	3240	7A	E381
15	CFC1	48	3600	7B	2340
16	CE81	49	F6C1	7C	E101
17	E40	4A	F781	7D	21C0
18	A00	4B	3740	7E	2080
19	CAC1	4C	F501	7F	E041
1A	CB81	4D	35C0	80	A001
1B	B40	4E	3480	81	60C0
1C	C901	4F	F4441	82	6180
1D	9C0	50	3C00	83	A141
1E	880	51	FCC1	84	6300
1F	C841	52	FD81	85	A3C1
20	D801	53	3D40	86	A281
21	18C0	54	FF01	87	6240
22	1980	55	3FC0	88	6600
23	D941	56	3E80	89	A6C1
24	1B00	57	FE41	8A	A781
25	DBC1	58	FA01	8B	6740
26	DA81	59	3AC0	8C	A501
27	1A40	5A	3B80	8D	65C0
28	1E00	5B	FB41	8E	6480
29	DEC1	5C	3900	8F	A441
2A	DF81	5D	F9C1	90	6C00
2B	1F40	5E	F881	91	ACC1
2C	DD01	5F	3840	92	AD81
2D	1DC0	60	2800	93	6D40
2E	1C80	61	E8C1	94	AF01
2F	DC41	62	E981	95	6FC0
30	1400	63	2940	96	6E80
31	D4C1	64	EB01	97	AE41
32	D581	65	2BC0	98	AA01
n					

X TERM	ENTRY
99	6AC0
9A	6B80
9B	AB41
9C	6900
9D	A9C1
9E	A881
9F	6840
A0	7800
A1	B8C1
A2	B981
A3	7940
A4	BB01
A5	7BC0
A6	7A80
A7	BA41
A8	BE01
A9	7EC0
AA	7F80
AB	BF41
AC	7D00
AD	BDC1
AE	BC81
AF	7C40
B0	B401
B1	74C0
B2	7580
B3	B541
B4	7700
B5	B7C1
B6	B681
B7	7640
B8	7200
B9	B2C1
BA	B381
BB	7340
BC	B101
BD	71C0
BE	7080
BF	B041
C0	5000
C1	90C1
C2	9181
C3	5140
C4	9301
C5	53C0
C6	5280
C7	9241
C8	9601
C9	56C0
CA	5780
CB	9741
CC	5500
CD	95C1
CE	9481
CF	5440

X TERM	ENTRY
D0	9C01
D1	5CC0
D2	5D80
D3	9D41
D4	5F00
D5	9FC1
D6	9E81
D7	5E40
D8	5A00
D9	9AC1
DA	9B81
DB	5B40
DC	9901
DD	59C0
DE	5880
DF	9841
E0	8801
E1	48C0
E2	4980
E3	8941
E4	4B00
E5	8BC1
E6	8A81
E7	4A40
E8	4E00
E9	8EC1
EA	8F81
EB	4F40
EC	8D01
ED	4DC0
EE	4C80
EF	8C41
F0	4400
F1	84C1
F2	8581
F3	4540
F4	8701
F5	47C0
F6	4680
F7	8641
F8	8201
F9	42C0
FA	4380
FB	8341
FC	4100
FD	81C1
FE	8081
FF	4040

APPENDIX B - REMOTE ACCESS SOFTWARE INSTALLATION & UTILITY INSTRUCTIONS

B1.0 Multi Agile Remote Access Software Installation

B1.0.1 Installation from CD:

Procedure:

- (1) Copy all the files from the CD to a common directory on your PC. (e.g. C:\Temp)
- (2) Run the program “setup.exe” to install the Demo Software. Installation will create a folder called “Vecima Networks” on your Windows95 or Windows98 START Menu.

B1.0.2 Installation from emailed or downloaded files

The Demo Software can be sent to you via email, or downloaded from Vecima Networks’ website (www.vecimanetworks.com/support.html) as a single ZIP file: SW4000_dd_mmm_yyyy.zip (where dd = day, mmm = month, yyyy = year).

The current version will be the only one available on the website.

Procedure:

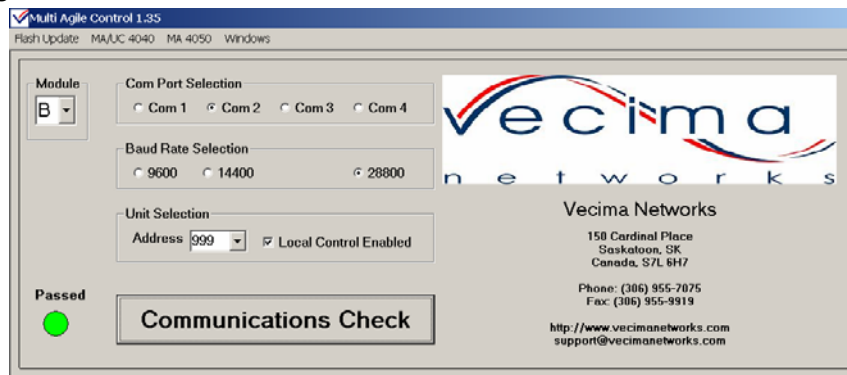
- (1) Extract the contents of the ZIP file to a common directory on your PC using an Unzip utility. The following files will be created in your directory: **MADemo_r1v31.cab**, **setup.exe**, **SETUP.lst**

r1v31 is the demo software revision. This may change if the demo software is updated. Please check the Support link on the Vecima Networks website (www.vecimanetworks.com) for newer versions.

- (2) Run the program “setup.exe” to install the Demo Software. Installation will create a “Vecima Networks” folder on your Windows95 or Windows98 START Menu.

B2.0 Multi Agile Remote Access Software Overview

B2.0.1 Multi Agile Remote Access Software Main Window



The Demo Remote Access Software is intended for use with Vecima Networks' MA4000 Series, UC4040x, and DUAL4040x products.

Please refer to the Remote Control sections for details on physical connection.

The Menu Selection Bar at the top of the window has the following choices:

- | | |
|---------------------|--|
| Flash Update | Flash Update utility for the MA401xx, UC4040x, or DUAL4040x Display/Controller
Flash update utility for the UC4040D or MA4040D Upconverter card
Flash Update utility for the MA4050C QAM Modulator card. |
| MA/UC 4040 | Vecima Networks MA4040x, UC4040x, or DUAL4040x Upconverter control utility |
| MA 4050 | Vecima Networks MA4050 QAM Modulator control utility |
| Windows | Allows switching between the windows currently opened. |

B2.0.2 Communications Configuration

Procedure:

- (1) Select the COM Port and Baud Rate that you are using on your PC.
 - (2) Type in the Address** number that matches the unit that you are connected to. Please refer to the appropriate User Manual to set the unit's Address.
- ** Address 999 is the default address used when shipped from the factory. When daisy chaining several units on an RS485 bus, you must assign a unique Address to each unit to allow access/control of a specific unit on the bus.



When the **Local Control Enabled** box is CHECKED, you may control the unit using the software or the front panel (Default Setting).

When the **Local Control Enabled** box is NOT CHECKED, you may control the unit using the software only. This is indicated on the second line of the Controller display by 'RMT'

- (3) Confirm communications settings are functional

Just to the left of the **Communications Check** button, you will see a Yellow dot with "Unknown" typed above it. Click on the button with the mouse to check the status of your communication connection.

If all your settings are correct, then the dot will turn Green and state "Passed" above it. Remote control of the unit is now possible.

If your settings are NOT correct, then the dot will turn Red and state "Failed" above it. Remote control of the unit is NOT possible. Please check your settings and cable connection before you try again.

B3.0 Multi Agile Remote Access Software Utilities

B3.0.1 Flash Update – Controller / Display

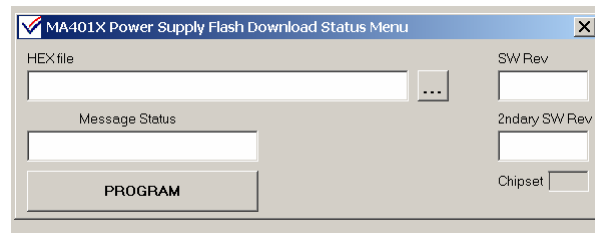
- ☛ Do not power cycle the unit or use the Front Panel Buttons to configure the unit while it is programming.
- ☛ The operation of the Upconverter or QAM Modulator should not be affected during programming
- ☛ The unit's Controller stores operating code in Flash Memory in order to make it possible to update using the RS232 interface.

Procedure:

- (1) Make sure that the unit is in program mode:

To place the unit in program mode first press the “Module Select” button to ensure the display is active (backlight is on), press and hold the “Module Select” button and then press the “Up” button. The display on the LCD should indicate that the unit is in program mode. To exit from program mode, simply repeat the key sequence.

- (2) Run the Multi Agile Remote Access Software and ensure that the COM Port settings are correctly chosen for your PC.
- (3) Select Flash Update from the menu then 4011 Flash. The Flash Update Utility will open another window displaying:



- (4) During the Demo Software installation, the latest Flash File revision is copied to the same directory as the Multi Agile executable file. If the Multi Agile program was not installed in the default directory, use the browse buttons to locate the directory for the Controller Flash files.
- (5) Click on the PROGRAM button to update the Flash memory. This button will first program the FLASH memory with the new code, and then verify the FLASH memory to confirm that programming was successful.

(NB: Occasionally during this process, a message box indicating an Unknown Error will be displayed. You may close this box by pressing OK. If this error occurs repeatedly, please exit and restart the Multi Agile software and choose a slower baud rate before retrying the programming operation.)

B3.0.2 Flash Update – x4040D Upconverter module

The 4040 FLASH utility is intended for Upconverter modules and the 4050 FLASH utility is intended for QAM Modulator modules.

You can identify which module you have from the label on the front of the card or unit. If you are unsure as to whether or not your particular module can be flashed, contact Vecima Networks Technical Support by phone or email support@vecimanetworks.com with the model number and serial number.

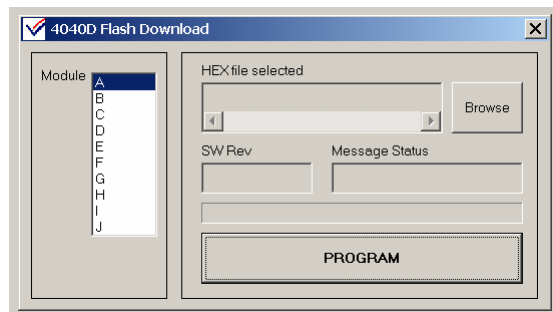


Do not power cycle the unit or use the front panel buttons to configure the unit while it is programming.



The operation of the module should not be affected during programming.

- (1) Run the Multi Agile Remote Access Software and ensure that the COM Port settings are correctly chosen for your PC.
- (2) Select Flash Update from the menu, then 4040 Flash. The Flash Update Utility will open another window displaying:



- (3) When using this software, you will need to select the appropriate Module location for the module you wish to update. Looking at the FRONT of the MA4000 Chassis, the Modules are labeled A through J from left to right. The DUAL4040x you must choose Module A or Module B, and with the UCM4540x, the Upconverter is in Module position A.

When using this software to control the UC4040x, you MUST select slot position A.

- (4) The **Flash file for your Upconverter is automatically selected** from the same directory as the Multi Agile executable file. If the Multi Agile program was not installed to the default directory use the browse buttons to locate the directory for the Multi Agile files.
- (5) Click on the PROGRAM button to update the Flash memory. This button will first program the FLASH memory with the new code, and then verify the FLASH memory to confirm that programming was successful.

B3.1 MA/UC 4040

From the Menu Selection Bar, click on MA/UC 4040 and select Demo. The following window will open:

B3.1.1 MA/UC 4040 Utility Description

Module Selection

When using this software, you will need to select the appropriate Module location for the Upconverter you wish to control. Looking at the FRONT of the MA4000 Chassis, the Modules are labeled A through J from left to right. The DUAL4040x you must choose Module A or Module B, and with the UCM4540x, the Upconverter is in Module position A.



When using this software to control the UC4040x, you MUST select Module A.

The information that is displayed for the module selected reflects the current condition of the Upconverter at the time that the module is selected. To update this information you must click on the Update Unit Status button or double click the desired module.

Frequency

Frequency (MHz) displays the Band Center of the current RF output frequency. The RF output frequency may be adjusted from 53 to 858 MHz in 12.5 kHz step sizes. Click on the Update Frequency button to send the new center RF frequency setting to the Upconverter. *Entering an invalid frequency value will generate a Syntax Error response.*

IF Power

IF Power (dB) displays the current IF power sensed at the input port. The IF power may be attenuated by 0 to 39.75 dB in 0.05 dB step sizes. Click on the Update IF Attenuation button to send the new attenuation setting to the Upconverter. *Entering an invalid attenuation value will generate a Error response.*

IF Threshold Set

Clicking the **IF Threshold Set** button prompts for high and low IF threshold limits to be entered. The high IF threshold limit may be 0.0 to 4.0 dB. The low IF threshold limit may be -4.0 to 0.0 dB. *Initially, the low IF threshold level is set to -4.0 dB and the high RF threshold is set to +4.0 dB.*

IF AGC

IF AGC is current condition will be displayed in a box next to the IF AGC Enable button. This will show Enabled when IF AGC is Enabled or Disabled if the IF AGC is currently disabled. To change the current state of the IF AGC simply click on the IF AGC Enable button or the IF AGC Disable button. The use of IF AGC for digital signals is recommended.

IF Threshold

IF Threshold current condition will be displayed in a box next to the IF Threshold Enable button. This will show Enabled when IF Threshold is Enabled or Disabled if the IF Threshold is currently disabled. To change the current state of the IF Threshold sensing simply click on the IF Threshold Enable button or the IF Threshold Disable button

When **IF Threshold is enabled**, and the IF power is outside the IF Threshold limits, a non-critical alarm will be triggered.

Redundant Operation

There are two indication boxes used for redundant mode. The first box will indicate Alarm/Lock if the module selected failed while it was the active module in redundant mode. The second box will indicate whether or not the selected module is currently in redundant mode. The **Backup Enable** and **Backup Disable** buttons are used to enable or disable redundant mode for the selected module.

RF Threshold

RF Threshold current condition will be displayed in a box next to the **RF Threshold Enable** button. This will show Enabled when RF Threshold is Enabled or Disabled if the RF Threshold is currently disabled. To change the current state of the IF Threshold sensing simply click on the **RF Threshold Enable** button or the **RF Threshold Disable** button.

RF Threshold Set

Clicking the **RF Threshold Set** button prompts for high and low RF threshold limits to be entered. The high RF threshold limit may be set as high as +63 dBmV. *Initially, the low RF threshold level is set to +45 dBmV and the high RF threshold is set to +63 dBmV.*

When **RF Threshold is enabled**, and the RF power is outside the RF Threshold limits, a non-critical alarm will be triggered.

RF Output

RF Output current condition will be displayed in a box next to the **Output Enable** button. This will show Enabled when RF Output is Enabled or Disabled if the RF Output is currently disabled. To change the current state of the RF Output simply click on the **Output Enable** button or the **Output Disable** button.

RF Output Level Section

RF Output Level (dBmV) displays the current RF output level sensed at the output port. The RF output level may be attenuated by 0 to 39.75 dB in 0.05 dB step sizes. Click on the **Update RF Attenuation** button to send the new attenuation setting to the Upconverter. *Entering an invalid attenuation value will generate a Syntax Error response.*

B3.2 MA4050

On the Menu Selection Bar, there is a section on MA4050. This section is not required, unless you are using an MA4050 QAM Modulator.

Please refer to the MA4050 QAM Modulator User's Manual for instructions on using the MA4050 Controls in the Demonstration Software.



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