



MA4367 AGILE MMDS TRANSMITTER SYSTEM

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. The user should not attempt servicing. 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.

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 contrôls 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.

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

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1.0 GENERAL INFORMATION

1.1 System Overview

The **MA4367** is a frequency-agile commercial quality transmitter for MMDS applications. Advanced design permits full frequency agility over the 2505 to 2681 MHz frequency band while still maintaining a phase noise specification which exceeds the requirement for 64 and 256QAM. The MA4367 is a Vecima 4000 series system which includes an upconverter, power amplifier and power supply/control module housed in a single chassis. The **MA4061B** is a frequency agile MMDS upconverter in a modular circuit card designed for use with the Vecima MA4000 Series. The **MA4070C** is a solid state, fixed gain power amplifier for MMDS applications. Each MA4000 card chassis with common MA4011B or MA4012B power supply can contain 1 MA4061B and 1 MA4070C Power Amplifier in a 4U rack mount configuration. This advanced, cost-effective transmitter offers high performance, flexibility and space efficiency.

1.2 MA4061B Module Features

- Front panel selectable output frequency from 2505 to 2681 MHz in 62.5 kHz steps
- RF output muted when changing output configuration or phase lock alarm
- 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
- Input IF AGC ensures very stable output level, even if input varies

1.3 MA4070C Module Features

- 4 W linear transmit power for 64 or 256QAM modulation
- May be operated with video
- 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

1.4 System Features

- Local control via LCD and 4 soft touch push buttons
- Remote frequency and level agile via RS232/RS485 or optional SNMP
- Fully phase locked synthesized oscillators referenced to a TCXO for exceptional frequency stability
- Durable design is reflected in the stainless steel chassis and lexan labels
- International internal switching power supply (100 to 240 VAC) or DC supply (-36 to -60 VDC)
- Front panel displays IF/RF power

1.5 Specifications

IF INPUT

IF Center Frequency	44.00 MHz
Input Bandwidth	6.0 MHz
IF Input Level	25 to 35 dBmV
Input Connector	F female connector, 75 ohm
IF AGC	Selectable enable/disable

RF OUTPUT

Output Frequency Band	2505 to 2681 MHz
Linear Output Power [64/256 QAM]	+36 dBm for MER >= 38 dB
Output level adjustment	0 to -15 dB
Spectrum	Inverted relative to IF input
Output Connector	N female connector, 50 ohm
Frequency Step Size	62.5 kHz steps, 2505 to 2681 MHz
Output Bandwidth	6.0 MHz
Frequency Stability (10 to 40°C)	±3 kHz (MA4011B/MA4012B TCXO 1 ppm)
Gain Flatness	±0.8 dB over 6 MHz
Gain Stability	±0.7 dB (10 to 40°C)
Mute Level	-60 dBc
Phase Noise	-94 dBc/Hz at 10 kHz offset

POWER CONSUMPTION

AC Option	120 VAC nominal (100 to 240 VAC), 50/60 Hz, 175 W max.
DC Option	-48 VDC nominal (-36 to -60 VDC), 175 W max.

MISCELLANEOUS

Remote Control Interface	RS232/RS485 (SNMP or alarm contact closure optional)
Remote Control Connector	RJ45 (in and out)
Operating Temperature	10 to 40°C (50 to 104°F)
Relative Humidity	95% max.
Configuration	Standard 19" rack mount, 4U height, front panel control/display
Dimensions	17.5" (w) x 13.7" (d) x 7" (h) (44.4 x 34.8 x 17.8 cm)

COMPONENTS

MA4003 MMDS Chassis
MA4011B (AC) or MA4012B (DC) power/control modules
MA4061B MMDS Upconverter
MA4070C MMDS Power Amplifier

Specifications subject to change without notice.

1.6 Available MA4367 System Configurations

The MA4367 is available in the following configurations:

<u>System</u>	<u>Description</u>
MA4367AC	2.5GHz TX/UC System,100-240VAC
MA4367AC/SNMP	2.5GHz TX/UC System,100-240VAC,SNMP
MA4367AC/SNMP/EA	2.5GHz TX/UC System,100-240VAC,SNMP,ExternalAlarm
MA4367DC	2.5GHz TX/UC System,-48VDC
MA4367DC/SNMP	2.5GHz TX/UC System,-48VDC,SNMP
MA4367DC/SNMP/EA	2.5GHz TX/UC System,-48VDC,SNMP,ExternalAlarm

2.0 INSTALLATION

CAUTION: This device must be professionally installed.

1 mW/CM² is the maximum permissible exposure for radio transmitters between 1.5 to 100 GHz for uncontrolled environments. The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF fields in excess of the FCC recommended limits.

For more information, refer to the Federal Communications Commission guidelines on radio frequency safety, accessible through their Web site: www.fcc.gov.

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 MA4367 system includes an active cooling fan tray which forces cooling air from the bottom through to the top of the chassis. For adequate ventilation, a space of 1U (1.75") should be left in the rack, directly above the MA4367 chassis for warm air exhaust. It is designed to operate at temperatures ranging from 10 to 40°C (50 to 104°F). As with all electrical equipment, operation at excessive temperature accelerates the deterioration of components. For this reason, measures should be taken to prevent the build up of excessive heat in the rack.

Antenna Requirements

The MA4367 is operated with a user-supplied antenna. Please consult table 2.2A for further information. Mount the antenna according to the manufacturer's instructions.

TABLE 2.2A: ANTENNA LIST

Transmitter Power		Antenna Type	Antenna Gain	Safe Distance
(Watts)	(dBm)		(dBi)	(meters)
4	36.0	Omni	10	0.59
4	36.0	180° Sectoral	9.5	0.56
4	36.0	180° Sectoral	12.5	0.79
4	36.0	120° Sectoral	11	0.66
4	36.0	120° Sectoral	14	0.93
4	36.0	90° Sectoral	13	0.83
4	36.0	90° Sectoral	16	1.18



Caution: The antenna(s) used for MA4367 Agile MMDS Transmitter system is to be installed in an outdoor fixed environment. The antenna is to be mounted on an outdoor permanent structure with a minimum separation distance of 1.5 meters between the antenna elements and nearby persons.

RF exposure compliance is addressed at the time of licensing.



The maximum recommended antenna gain is 18 dBi.

2.3 Power Requirements

The equipment is supplied with either an AC international auto-ranging internal power supply which allows it to be powered from any 100 to 240 VAC; 50 to 60 Hz source, or a DC supply capable of operating from –36 to –60 VDC.

Check the total current consumption of all equipment on the same line before applying power to the MA4367 system. Avoid sharing a power source that feeds heavy motors or other equipment, which require large current drains.

2.4 Rack Mounting

The MA4367 system is designed for standard rack mounting in a 19" equipment rack. It requires 4U (7.00") of vertical rack space. It should be installed in a rack allowing access to the back of the unit. The upconverter should be isolated from strong RF radiation emanating from local equipment in the rack. Power line transients that may cause damage to the unit should be avoided. For adequate ventilation, a space of 1U (1.75") should be left in the rack, directly above the MA4367 chassis for warm air exhaust.

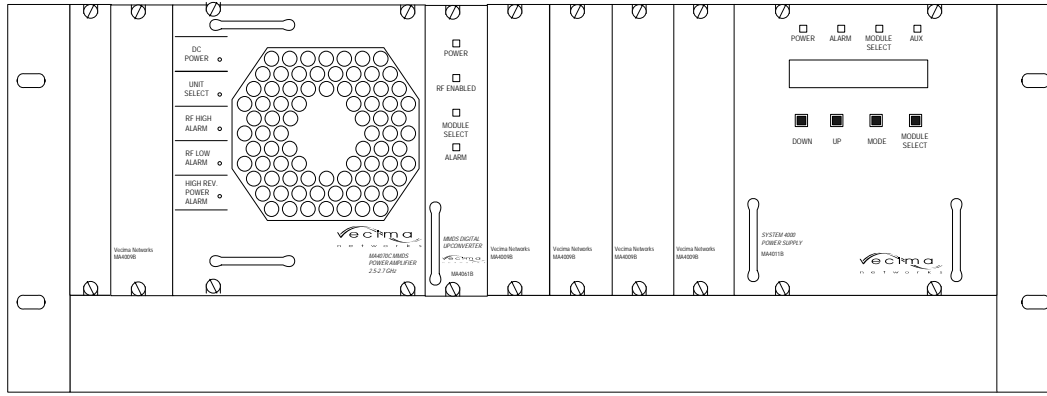
2.5 Module Installation/Replacement

1. Power off the chassis using the rear panel power switch
2. Disconnect the RF cables from the rear of the corresponding module
3. Using a screwdriver, loosen the corresponding front panel captive screws until the module is free to pull forward
4. Insert the replacement module and retighten the front panel captive screws
5. Turn on the power switch
6. Configure the output frequency and IF/RF levels. Note that after power cycle, the frequency of the MA4061B needs to be re-entered in order for the power detectors on the MA4070C to lock on properly.
7. Reconnect the rear panel RF cables

3.0 OPERATION

3.1 Front Panel Description

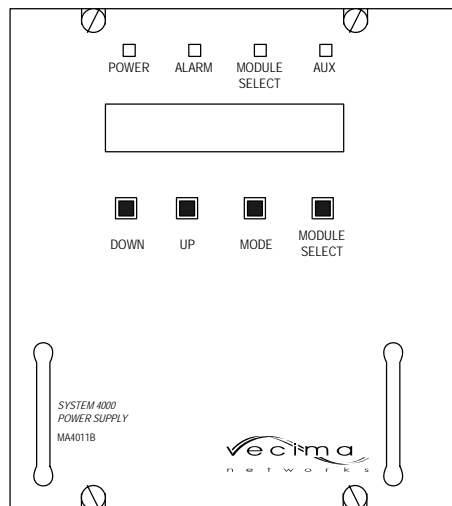
DIAGRAM 3.1A : FRONT PANEL – MA4367 SYSTEM



As shown in Diagram 3.1A, the power/control module front panel has an LCD display, four soft touch push buttons, and 4 indicator LEDs. All other modules have 4 indicator LEDs. Modules are configured using push buttons on the power supply module, or via the remote interface. If no configuration adjustments are being made via the front panel controls, the display back light will shut off after a five minute interval. Pressing any of the front panel buttons will re-enable the back light.

3.1.1 MA4011B/MA4012B Power/Control Modules

DIAGRAM 3.1B : FRONT PANEL – MA4367




DISPLAY

The first line on the display is the Mode Information Line. It shows the settings for the currently selected module. The possible operating modes depend upon the currently selected module (See Section 3.2, Front Panel Operating 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. When used with the MA4070C Power Amp Module or the MA4070C Power Amp Module, they can be installed as shown in Diagram 3.1A.

 Each MA4003 chassis can accommodate one MA4061B Upconverter Module and one MA4070C Power Amplifier Module.

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 characters indicate if local front panel control of the MA4003 chassis is enabled. Local/Remote control is indicated by “L/R” while remote-only control is indicated by “R”. With remote-only control, the local control via the front panel is locked out.

MODULE SELECT BUTTON

The MODULE SELECT button allows the user to select the module to display and/or control (the MODULE SELECT LED will be lit on the selected module, and the LCD display will indicate the module address in the status line).

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 buttons adjust the settings for the currently selected mode of the selected module.

POWER ON LED

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

ALARM LED

A constant Alarm LED on the MA4011B/MA4012B indicates a critical alarm condition. Detailed alarm information is available by selecting the module from the front panel and observing the status and error codes on the LCD display.

MODULE SELECT LED

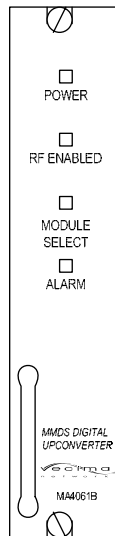
When the green MODULE SELECT indicator is illuminated, it indicates that the corresponding module has been selected from the front panel or via the remote control interface.

AUX LED

This LED is reserved for future use.

3.1.2 MA4061B – Upconverter Card

DIAGRAM 3.1c : FRONT PANEL – MA4367



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.

MODULE SELECT LED

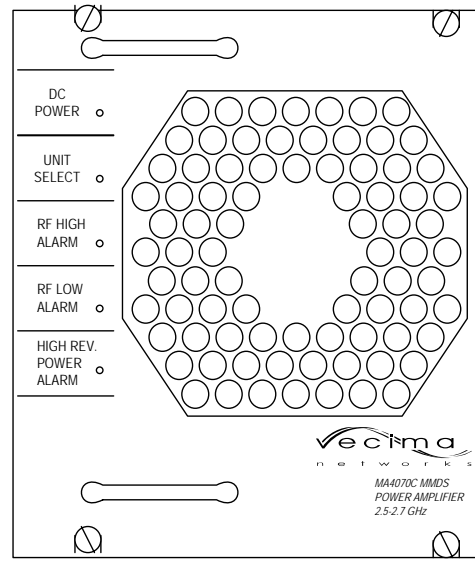
When the green MODULE SELECT indicator is illuminated, it indicates that the corresponding module has been selected from the front panel or via the remote control interface.

ALARM LED

The red MA4061B 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.

3.1.3 MA4070C – Power Amplifier

DIAGRAM 3.1D : FRONT PANEL – MA4367



DC POWER LED

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

UNIT SELECT LED

When the green UNIT SELECT indicator is illuminated, the corresponding module has been selected from the front panel or via the remote control interface.

RF HIGH ALARM LED

When the RF HIGH ALARM LED is illuminated, detected power levels have exceeded acceptable limits. Limits will depend on whether default or custom thresholds are set.

RF LOW ALARM LED

When the RF LOW ALARM LED is illuminated, detected power levels have fallen below acceptable limits. Limits will depend on whether default or custom thresholds are set.

HIGH REV POWER ALARM LED

When the HIGH REV POWER ALARM LED is illuminated, detected power levels have exceeded acceptable limits. Limits will depend on whether default or custom thresholds are set.

3.2 Front Panel Operating Modes

3.2.1 MA4061B Upconverter Modes

FREQUENCY

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

The displayed frequency is the current configured Output Frequency. To adjust the output frequency, use the UP/DOWN buttons. Single stepping will allow 62.5 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 MA4061B 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.

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

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

☛ At the time of shipping, the AUTO IF is enabled.

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 buttons. To configure the MA4061B 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 $\pm XX.X$ dBm**

The display indicates the approximate RF output power level measured by the internal RF power detector at the output of the MA4061B upconverter. To adjust the RF level, use the UP/DOWN buttons. The RF output level may be set within the range of -15 dBm to +3 dBm.

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

☛ Adjustments of the MA4061B output level will also directly affect the output level of the MA4070C power amplifier.

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 MA4061B Upconverter is enabled. When disabled, the RF output from the MA4061B Upconverter 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 are as follows: **IF +4, -4 dB, alarm function enabled**

RF -15, +4 dBm, alarm function enabled

The IF and RF alarms can be independently enabled or disabled via remote control. Refer to Section 6.5, Detailed Command Descriptions and System Responses for instructions on how to adjust these settings.

DEFAULT SETTINGS

At the time of shipping from factory, the default settings of the MA4061B are:

AUTO IF AGC enabled

IF & RF Thresholds enabled

Output is disabled (until a valid input is supplied)

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

3.2.2 MA4070C Power Amplifier Modes

FORWARD POWER

When this mode is selected, the display will read: **Fwd Pwr XX.X dB**

The display indicates the approximate RF power at the output of the MA4070C power amplifier. To adjust the RF level, use the UP/DOWN buttons. Note that since the MA4070C is a fixed gain device, the MA4367 transmitter actually adjusts the RF output power of the MA4061B upconverter. Therefore any changes made to the MA4070C output level will also be reflected in the MA4061B output level. The RF level is measured by the internal RF power detector at the output of the MA4367 power amplifier. The detector measures from +20 dBm to +40 dBm. It is recommended to use a calibrated external power meter for accurate setting of the power level.



If operating by remote control, adjustments of the forward power level cannot be made directly. The power must be adjusted by altering the MA4061B output level.

REVERSE POWER

When this mode is selected, the display will read: **Rev Pwr XX.X dBm**

The display indicates the approximate RF power level returned to the card from mismatched connections, etc. The detector measures from +20dBm to +40dBm

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 MA4070C Power Amplifier is enabled. When disabled, the RF output from the MA4070C Power Amplifier is disabled.

TEMP

When this mode is selected, the screen indicates the internal temperature of the amplifier.

FORWARD AND REVERSE ALARM THRESHOLD SETTING

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

Default settings are as follows:

ForwardHigh	+41 dB, alarm function disabled
ForwardLow	+20 dB, alarm function disabled
ReverseHigh	+40 dBm, alarm function disabled

The alarms can be independently enabled or disabled via remote control. Refer to Section 6.5, Detailed Command Descriptions and System Responses for instructions on how to adjust these settings.

3.2.3 MA4011B/MA4012B Power/Control Module Modes

ADDRESS

When this mode is selected, the display will read:

Address XXX



The displayed address is the currently selected MA4003 chassis Address. A different address can be selected by pressing the Up or Down buttons. The MA4003 chassis has an address from 001 - 999. The address is only used for remote control and monitoring purposes. The factory default address is 999.

INTERFACE SELECT

When this mode is selected, the display will read:

RS232 Selected
or
Comm Disabled
or
SNMP Selected
or
SNMPext Selected
or
Terminl Selected
or
RS485 Selected

Pressing the Up or Down buttons will toggle the display between the above modes.



The Remote Interface Connector Pinout will change depending upon the Interface Type selected. Please refer to Section 4.1, Power/Control Module Rear Panel Connection for details.

RS232 SELECTED

In this mode, the external interface is RS232. The interface connector is the lower RJ-45 socket on the rear panel of the power supply. The display will indicate R/L in the lower right-hand corner. See Section 4.1 for electrical interface details and section 6 for remote control details.

COMM DISABLED

In this mode, remote communications is disabled. The display will still indicate R/L in the corner.

SNMP SELECTED

In this mode, the SNMP communications is enabled. Choosing this mode will set the unit to remote control only, as indicated by "R" in the corner of the display. In this mode, local control of the unit via the front panel buttons is disabled. See below for instructions on exiting this mode from the front panel to re-enable local control.

SNMPEXT SELECTED

In this mode, the SNMP communications is enabled using an external SNMP module. This mode is not used unless an external SNMP module is delivered with the unit. Choosing this mode will set the unit to remote control only, as indicated by "R" in the corner of the display. In this mode, local control of the unit via the front panel buttons is disabled. See below for instructions on exiting this mode from the front panel to re-enable local control.

SNMP Breakout Feature

This SNMP breakout feature has been added in order to provide the function of exiting from the SNMP control via the front panel. When the MA4012B power supply indicates SNMP SELECTED or SNMPext SELECTED, the modules in the chassis will be periodically polled and "R" is displayed in the corner of the display to indicate only remote control is allowed.

SNMP Breakout Procedure

To break out of SNMP control:

1. Press and hold the Module Select button for approximately 10 seconds.
2. Upon release of the Module Select button, all communication to the controller, including SNMP, is disabled and COMM DISABLED is displayed on the front panel.

Re- enabling SNMP

When the SNMP Controller is in the COMM DISABLED state:

1. Select SNMP ENABLED or "SNMPext ENABLED from the communication type menu.
2. After 5 seconds, the front panel will automatically be locked out.

NOTE: The SNMP module will begin or continue polling if SNMP has been previously enabled through the MIB browser. There may be some delay, as long as 6 1/2 minutes, before a full chassis scan is performed.

TERMINAL SELECTED

In this mode, the RS232 interface is enabled, with operation suitable for connection to a terminal or terminal emulator. The remote protocol is similar to the normal RS232 operation, except the timing restrictions are eliminated, permitting regular typing speed for the commands. The display will indicate R/L in the lower right-hand corner.

RS485 SELECTED

In this mode, the external interface is RS485. The interface connector is the lower RJ-45 socket on the rear panel of the power supply. The display will indicate R/L in the lower right-hand corner. See section 4.1 for electrical interface details and section 6 for remote control details.

SOFTWARE REVISION

When this mode is selected, the revision number of the software is displayed.

BUTTON GUARD

This mode may be selected to guard against accidental contact of the front panel buttons that may change the settings of the MA4367. When button guard is set to ON, the buttons will be disabled after the display backlight is extinguished. To re-enable the buttons, follow the instructions on the display: press the down button and then the mode button. The button guard feature will still be active and the buttons will again be disabled when the backlight is extinguished.

3.3 Remote Control Operating Instructions

The MA4000 system may be controlled via the RS232/RS485 Remote Interface connector. (Refer to Section 4.1, Power/Control Module Rear Panel Connections for the connector pin-out).

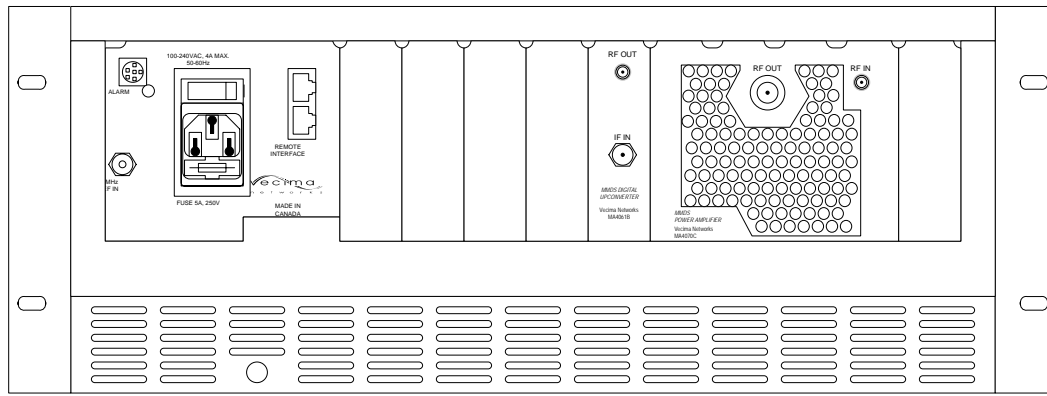
The input data rate can be 9600, 14400, or 28800 baud. The MA4000 System Controller will automatically determine which data rate is in use and adjust accordingly. There are no user settings relating to baud rate selection.

For additional information refer to Section 6.0, Detailed Remote Control.

4.0 REAR PANEL CONNECTIONS

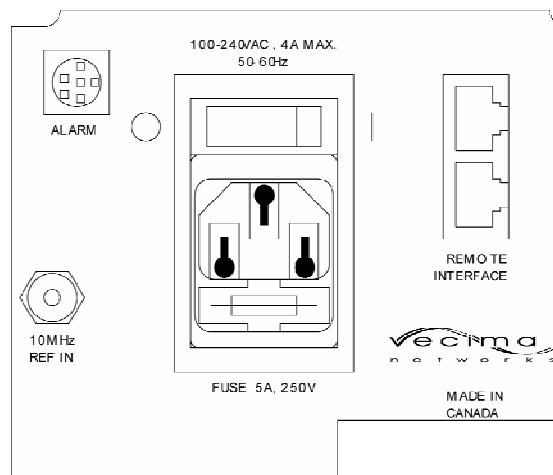
The MA4367 can use either an AC or DC power/control module. The diagram below shows a rear panel with an AC power/control module.

DIAGRAM 4.0A: REAR PANEL – MA4367 SYSTEM



4.1 MA4011B – AC Power/Control Module

DIAGRAM 4.1A : REAR PANEL – MA4367

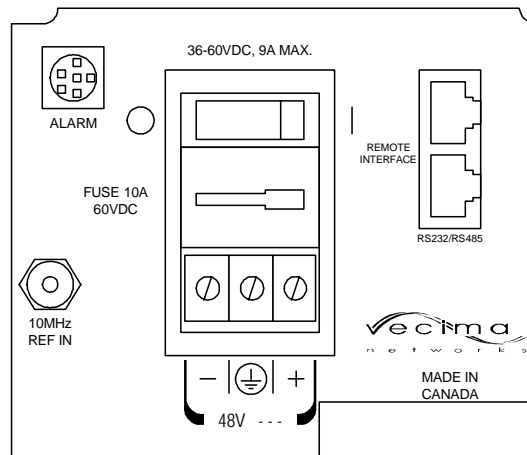


AC POWER ENTRY MODULE

The AC input accepts input from 100 – 240 VAC. The fuse is internal to the IEC holder. If the fuse requires replacement, ensure the voltage and current rating is correct. Turn off the AC power switch and then remove the AC cord to power off the chassis.

4.1 MA4012B – DC Power/Control Module

DIAGRAM 4.1B : REAR PANEL – MA4367



DC INPUT

The DC input accepts input voltages from 36 to 60 VDC. An indicating fuse is included which exposes a marker if the fuse is blown. If the fuse requires replacement, ensure the voltage and current rating is correct. The fuse type is a 10 Amp, 125VDC indicating telecom-style fuse. Suggested part numbers are Bussman GMT-10 or Littlefuse 0481010. The fuse mounts with the indicator to the right. The DC power switch may be used for turning the power on and off to the entire chassis.

ALARM

This connector is used for an external alarm monitor. It is an 8-pin miniature circular connector. The indicated pins are connected to a dry-contact relay that is active when an alarm is present in the chassis. See Table 4.1A and Diagram 4.1B for the connector pin descriptions.

DIAGRAM 4.1B : ALARM SOCKET CONNECTIONS

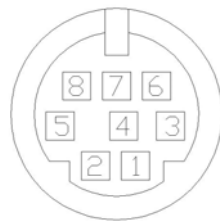


TABLE 4.1A : ALARM SOCKET PINOUT

Pin Number	Function
5	Common
6	Normally closed
7	Normally open
1, 2, 3, 4, 8	Not connected

REMOTE INTERFACE

The Remote Interface connector is a dual RJ45. The upper socket is used for the Ethernet interface with the lower socket used for RS232 or RS485. The pin-out for the matching RJ45 plug is shown in the following table and diagram:

DIAGRAM 4.1C : RJ45 PLUG CONNECTIONS

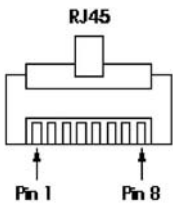


TABLE 4.1B : RS232 PIN-OUT

Terminal				Upconverter
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 MA4003 chassis. It is also possible to use an RJ45 - DB25 adapter to connect to a PC or similar RS232 standard serial port.

TABLE 4.1C: RS485 PIN-OUT

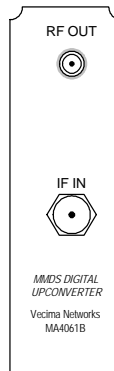
Terminal				Upconverter
RJ45 Pin	Signal	Direction	Signal	RJ45 Pin
1	NC		NC	1
2	NC		NC	2
3	A	↔	A	3
4	GND	—	GND	4
5	GND	—	GND	5
6	B	↔	B	6
7	NC		NC	7
8	NC		NC	8



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.

4.2 MA4061B - MMDS Upconverter Card

DIAGRAM 4.2A : REAR PANEL – MA4367



RF OUT

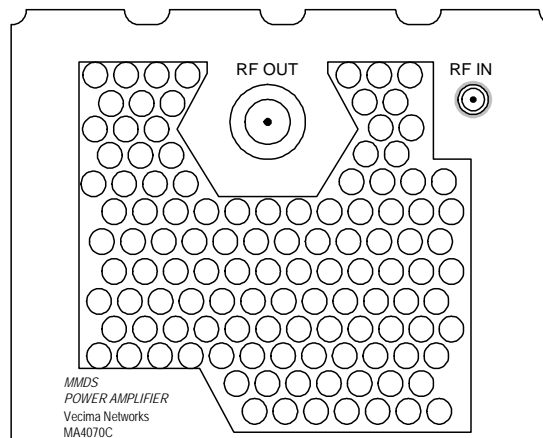
The RF out SMA connector provides the RF output signal from 2505 to 2681 MHz with a level of -15 to 3 dBm. The impedance is 50 ohm.

IF IN

The IF Input 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.

4.3 MA4070C - Power Amplifier

DIAGRAM 4.3A: REAR PANEL – MA4367



RF OUT

The RF output N connector provides the RF output signal from 2505 to 2681 MHz. The impedance is 50 ohm

RF IN

The RF Input SMA connector accepts an input signal at 2505 to 2681 MHz with up to a 6 MHz bandwidth from a 50 ohm source.

5.0 STATUS AND ERROR CODES

5.1 MA4061B Status and Error Codes

The status and error codes are displayed on line 2 of the LCD display. They consist of an 's' or 'e' character followed by a 2 digit hexadecimal number. The following tables can be used to interpret the meaning of the digits. For example, a display of s02 e40 indicates that IF AGC is enabled and there is an IF Threshold error. If there are no errors, the error code will not be displayed, and only the status will be visible.

Status Code Left Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	.															Backup relay enabled
		Unused

Status Code Right Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	Output is disabled
		IF AGC is enabled
				IF threshold detection is enabled
							RF threshold detection is enabled

Error Code Left Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	Fixed LO error
		IF AGC error
				IF threshold error
							RF threshold error

Error Code Right Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	Output is muted
		Hard alarm condition
				Soft alarm condition
							Variable LO error

5.2 MA4070C Status and error Codes

The status and error codes are displayed on line 2 of the LCD display. They consist of an 's' or 'e' character followed by a 2 digit hexadecimal number. The following tables can be used to interpret the meaning of the digits. If there are no errors, the error code will not be displayed, and only the status will be visible.

Status Code Left Digit																	Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
	Unused	

Status Code Right Digit																	Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
	Output is disabled	
		Forward power high threshold detection is enabled	
				Forward power low threshold detection is enabled	
								RF threshold detection is enabled	

Error Code Left Digit																	Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
	.															Reverse power threshold error	
		Unused	

Error Code Right Digit																	Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
	Hard alarm condition	
		Soft alarm condition	
				Forward power high threshold error	
								Forward power low threshold error	

5.3 MA4011B Power/Control Module Status and Error Codes

The status and error codes are displayed on line 2 of the LCD display. They consist of an 's' or 'e' character followed by a 2 digit hexadecimal number. The following tables can be used to interpret the meaning of the digits. If there are no errors, the error code will not be displayed, and only the status will be visible.

Status Code Left Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	Unused

Status Code Right Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	.															Local control locked out
		Unused

Error Code Left Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	.															5 Volt supply under voltage
		Unused

Error Code Right Digit																Status
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	Hard alarm condition
		Unused
				24 Volt supply under voltage
							10 Volt supply under voltage

6.0 DETAILED REMOTE CONTROL

6.1 Operation

The MA4367 system may be controlled via the RS232/RS485 Remote Interface connector. (See Section 4.1, Power/Control Module Rear Panel Connections for the connector pin-out).

The input data rate can be 9600, 14400, or 28800 baud. The MA4000 System Controller will automatically determine which data rate is in use and adjust accordingly. There are no user settings relating to baud rate selection.

6.2 Message Format

All messages to the MA4000 system controller consist of a sequence of ASCII characters. Messages must meet the following guidelines in order to be correctly interpreted by the controller.

- There can be no more than 75 ms between consecutive message bytes.
- After receiving the entire message, the MA4000 System 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.

6.3 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.

MOD = Module (1 ASCII character)

A = Module A (Leftmost module)

B = Module B

.

.

J = Module J (Next to Power Control Module)

CC = Command Code (2 or 3 ASCII characters)

MA4061B Command Codes

FL = Load Frequency	IAS = Set IF AGC Threshold
AI = Set IF Attenuation	IAE = Enable IF AGC Threshold
AR = Set RF Attenuation	IAD = Disable IF AGC Threshold
OE = Enable Output	RTS = Set RF Threshold
OD = Disable Output	RTD = Disable RF Threshold
ITS = Set IF Threshold	RTE = Enable RF Threshold
ITD = Disable IF Threshold	SU = Unit Status Request
ITE = Enable IF Threshold	LE = Enable Local Control
	LD = Disable Local Control

MA4070C Command Codes

OE = Enable Output	FPHS = Forward Power High Set
OD = Disable Output	FPHE = Forward Power Hi Enable
SU = Unit Status Request	FPHD = Forward Power High Disable
SC = Configuration Status Request	FPLS = Forward Power Low Set
LE = Enable Local Control	FPLE = Forward Power Low Enable
LD = Disable Local Control	FPLD = Forward Power Low Disable
	RPS = Reverse Power Threshold Set
	RPE = Reverse Power Threshold Enable
	RPE = Reverse Power Threshold Disable

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.

6.4 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>

There will be one response returned for all commands.

<start> ASCII Asterisk character

<sp> ASCII Space character

<cr> ASCII Carriage Return character

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.

6.5 Detailed Command Descriptions and System Responses

6.5.1 MA4061B Upconverter Detailed Command Descriptions and System Responses

This section defines each of the command codes and the associated parameters for the MA4061B Upconverter module.

FL - Load Frequency

Description: Loads the frequency for the specified module.

Parameters: Desired frequency in MHz, in the form XXXX.XXXX. Leading zeros are optional, but not required. The decimal point and four trailing characters are required. Valid input frequencies are between 2505.0000 MHz and 2681.0000 MHz. Valid trailing characters are multiples of 0.0625 MHz, all others will be denied.

Example: *999<sp>A<sp>FL<sp>2500.0625<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 25 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 39.75 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 dBm, 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 the second indicates the low threshold. 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 MA4367 system. 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 MA4367 system. 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. The detailed contents of the reply are shown in the response section.

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 below. (Note: X may be replaced by any valid character. All other characters will be as shown).

TABLE 6.5.1A : RESPONSE PARAMETERS FOR STATUS UNIT REQUEST

Parameter (Units)	Format	Example
Model	XXXXXXXXXX	Upconverter
Module SN	XXXXXXX	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	
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6.5.2 MA4070C Power Amplifier Detailed Command Descriptions and System Responses

This section defines each of the command codes and the associated parameters for the MA4070C Power Amplifier module.

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 MA4367 system. 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 MA4367 system. 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. The detailed contents of the reply are shown in the response section.

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 below. (Note: X may be replaced by any valid character. All other characters will be as shown).

TABLE 6.5.2A : RESPONSE PARAMETERS FOR STATUS UNITS REQUEST

Parameter (Units)	Format	Example
Model	XXXXXXXXXX	MA4070C
Module SN	XXXXXXX	0123456
Hardware Revision	XXX	010 (i.e. Rev 1.0)
Microcontroller 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. The detailed contents of the reply are shown in the response section.

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 below. (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 6.5.2B : RESPONSE PARAMETERS FOR STATUS CONFIGURATION REQUEST

Parameter (Units)	Format	Example
MA4070C Status Code	XXXX	0101
MA4070C RF Power (dBm)	XXX.X	31.5
MA4070C RF Reverse Power (dBm)	XX.X	< 20

FPHS – Forward Power High Set

Description: Sets the Forward Power High for the specified module. When the Forward Power High is enabled, and the RF Power is above the threshold limit, a non-critical alarm will be triggered.

Parameters: Desired RF Thresholds in dBm, in the form XX.X. The decimal point and trailing characters are required. The trailing character can range between 0.0 and 0.9

Example: *999<sp>B<sp>FPHS<sp>38.0<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

FPHE – Enable Forward Power High

Description: Enables the Forward Power High for the specified module. When the Forward Power High is enabled, and the RF Power is above the threshold limit, a non-critical alarm will be triggered.

Parameters: None

Example: *999<sp>B<sp>FPHE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

FPHD – Disable Forward Power High

Description: Disables the Forward Power High for the specified module.

Parameters: None

Example: *999<sp>B<sp>FPHD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

FPLS – Set Forward Power Low

Description: Sets the Forward Power Low for the specified module. When the Forward Power Low is enabled, and the RF Power is below the threshold limit, a non-critical alarm will be triggered.

Parameters: Desired RF Thresholds in dBm, in the form XX.X. The decimal point and trailing characters are required. The trailing character can range between 0.0 and 0.9

Example: *999<sp>B<sp>FPLS<sp>34.0<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

FPLE – Enable Forward Power Low

Description: Enables the Forward Power Low for the specified module. When the Forward Power Low is enabled, and the RF Power is below the threshold limit, a non-critical alarm will be triggered.

Parameters: None

Example: *999<sp>B<sp>FPLE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

FPLD – Disable Forward Power Low

Description: Disables the Forward Power Low for the specified module.

Parameters: None

Example: *999<sp>B<sp>FPLD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

RPS – Set Reverse Power Threshold

Description: Sets the Reverse Power Threshold for the specified module. When the Reverse Power Threshold is enabled, and the RF Power is above the threshold limit, a non-critical alarm will be triggered.

Parameters: Desired RF Thresholds in dBm, in the form XX.X. The decimal point and trailing characters are required. The trailing character can range between 0.0 and 0.9

Example: *999<sp>B<sp>RPS<sp>25.0<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

RPE – Enable Reverse Power Threshold

Description: Sets the Reverse Power Threshold for the specified module. When the Reverse Power Threshold is enabled, and the RF Power is above the threshold limit, a non-critical alarm will be triggered.

Parameters: None

Example: *999<sp>B<sp>RPE<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

RPD – Disable Reverse Power Threshold

Description: Disables the Reverse Power Threshold for the specified module.

Parameters: None

Example: *999<sp>B<sp>RPD<sp>CRC<cr>

Response: OK or MOD or ERR or CRC

6.6 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.

7.0 WARRANTY AND SERVICE POLICIES

7.1 Warranty Statement

Vecima 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 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 is not responsible for delayed shipments, other loss beyond Vecima's 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 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.

7.2 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. 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 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 Operator, or '3' for Service Dept.

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

Email: support@vecimanetworks.com

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 in its original shipping container (or equivalent) via Prepaid carrier, with appropriate insurance and customs documentation (where required). Vecima 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 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 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.

7.3 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.
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 (ie - 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.
- 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 and test fees 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	X TERM	ENTRY	X TERM	ENTRY
0	0	33	1540	66	2A80	99	6AC0	CC	5500
1	C0C1	34	D701	67	EA41	9A	6B80	CD	95C1
2	C181	35	17C0	68	EE01	9B	AB41	CE	9481
3	140	36	1680	69	2EC0	9C	6900	CF	5440
4	C301	37	D641	6A	2F80	9D	A9C1	D0	9C01
5	3C0	38	D201	6B	EF41	9E	A881	D1	5CC0
6	280	39	12C0	6C	2D00	9F	6840	D2	5D80
7	C241	3A	1380	6D	EDC1	A0	7800	D3	9D41
8	C601	3B	D341	6E	EC81	A1	B8C1	D4	5F00
9	6C0	3C	1100	6F	2C40	A2	B981	D5	9FC1
A	780	3D	D1C1	70	E401	A3	7940	D6	9E81
B	C741	3E	D081	71	24C0	A4	BB01	D7	5E40
C	500	3F	1040	72	2580	A5	7BC0	D8	5A00
D	C5C1	40	F001	73	E541	A6	7A80	D9	9AC1
E	C481	41	30C0	74	2700	A7	BA41	DA	9B81
F	440	42	3180	75	E7C1	A8	BE01	DB	5B40
10	CC01	43	F141	76	E681	A9	7EC0	DC	9901
11	CC0	44	3300	77	2640	AA	7F80	DD	59C0
12	D80	45	F3C1	78	2200	AB	BF41	DE	5880
13	CD41	46	F281	79	E2C1	AC	7D00	DF	9841
14	F00	47	3240	7A	E381	AD	BDC1	E0	8801
15	CFC1	48	3600	7B	2340	AE	BC81	E1	48C0
16	CE81	49	F6C1	7C	E101	AF	7C40	E2	4980
17	E40	4A	F781	7D	21C0	B0	B401	E3	8941
18	A00	4B	3740	7E	2080	B1	74C0	E4	4B00
19	CAC1	4C	F501	7F	E041	B2	7580	E5	8BC1
1A	CB81	4D	35C0	80	A001	B3	B541	E6	8A81
1B	B40	4E	3480	81	60C0	B4	7700	E7	4A40
1C	C901	4F	F4441	82	6180	B5	B7C1	E8	4E00
1D	9C0	50	3C00	83	A141	B6	B681	E9	8EC1
1E	880	51	FCC1	84	6300	B7	7640	EA	8F81
1F	C841	52	FD81	85	A3C1	B8	7200	EB	4F40
20	D801	53	3D40	86	A281	B9	B2C1	EC	8D01
21	18C0	54	FF01	87	6240	BA	B381	ED	4DC0
22	1980	55	3FC0	88	6600	BB	7340	EE	4C80
23	D941	56	3E80	89	A6C1	BC	B101	EF	8C41
24	1B00	57	FE41	8A	A781	BD	71C0	F0	4400
25	DBC1	58	FA01	8B	6740	BE	7080	F1	84C1
26	DA81	59	3AC0	8C	A501	BF	B041	F2	8581
27	1A40	5A	3B80	8D	65C0	C0	5000	F3	4540
28	1E00	5B	FB41	8E	6480	C1	90C1	F4	8701
29	Dec-01	5C	3900	8F	A441	C2	9181	F5	47C0
2A	DF81	5D	F9C1	90	6C00	C3	5140	F6	4680
2B	1F40	5E	F881	91	ACC1	C4	9301	F7	8641
2C	DD01	5F	3840	92	AD81	C5	53C0	F8	8201
2D	1DC0	60	2800	93	6D40	C6	5280	F9	42C0
2E	1C80	61	E8C1	94	AF01	C7	9241	FA	4380
2F	DC41	62	E981	95	6FC0	C8	9601	FB	8341
30	1400	63	2940	96	6.00E+80	C9	56C0	FC	4100
31	D4C1	64	EB01	97	AE41	CA	5780	FD	81C1
32	D581	65	2BC0	98	AA01	CB	9741	FE	8081
								FF	4040

APPENDIX B – MA4367 SNMP AGENT CONFIGURATION PROCEDURE

The MA4367 SNMP agent is an optional feature that must be factory installed at time of order

a) Once PC on same 10.10.10.0 network is connected to the unit with a cross-over Ethernet cable try pinging the unit. This can be done from the DOS prompt.

```
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
```

```
C:\>ping 10.10.10.11
```

```
Pinging 10.10.10.11 with 32 bytes of data:
```

```
Reply from 10.10.10.11: bytes=32 time=1ms TTL=64
Reply from 10.10.10.11: bytes=32 time=1ms TTL=64
Reply from 10.10.10.11: bytes=32 time=1ms TTL=64
Reply from 10.10.10.11: bytes=32 time=2ms TTL=64
```

```
Ping statistics for 10.10.10.11:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

b) In order to be sure that you are indeed connected to the right unit check the arp cache. The MAC/physical address listed for 10.10.10.11 should be the same address listed on the back label of the unit.

```
C:\>arp -a
```

```
Interface: 10.10.10.2 --- 0x10004
 Internet Address   Physical Address   Type
 10.10.10.11       00-20-4a-72-1b-5c  dynamic
```

c) In order to access the SNMP Agent configuration menus telnet to 10.10.10.11 9999.

```
C:\>telnet 10.10.10.11 9999
```

```
*** Wavecom SNMP Proxy Agent
Serial Number 7207004 MAC address 00:20:4A:72:1B:5C
Software version V5.20
Press Enter to go into Setup Mode
```

d) Press Enter at the point to load the Setup Mode; the Current Settings will then be displayed.

Current settings:

Hardware: Ethernet Autodetect AUI
IP addr: 010.010.010.011
No gateway set
Netmask: 255.255.255.000--- not set ---

Baudrate: 09600
I/F Mode: 4C
Flow: 00
Chassis addr: 999
SNMPEnable: No

SNMP community name for read:
SNMP community name for write:

Change Setup

0 Basics
1 Connection
2 Community strings
8 Exit
9 Save and exit

Select:

e) As you can see there are 03 main submenus:

0) Basic = SNMP Agent IP Address, subnet mask, IP for SNMP Manager/Traps, password set

Select: 0

IP Address: (010) .(010) .(010) .(011)
Set Gateway IP Address (N) N

Netmask: Number of Bits for Host Part (0=default) (08)
IP Address for SNMP Traps: (000) .(000) .(000) .(000)
Change telnet config password (N) N

1) Connection = Baudrate, I/F Mode, Chassis address, SNMP Enable

Select: 1

Baudrate (09600)
I/F Mode (4C) ?
Flow (00) ?
Chassis address (999) ← **Note: must be same as Chassis Address set on MA4012B**
SNMPEnable (N) N

2) SNMP Community Strings = read and write SNMP Community strings

Select: 2 SNMP community name for read (): public

SNMP community name for write (): private

f) Once all of your required changes have been made select option 9 to Save and Exit. This will reset the SNMP Agent and the new settings will be effective as soon as it reloads.



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