ONE-THIRD RACK FREQUENCY CONVERTERS AND TRANSLATORS WITH REMOTE CONTROL

SECTION 1

INTRODUCTION

1.1 GENERAL DESCRIPTION

1.1.1 PHYSICAL

Figure 1-1. Front Panel

Figure 1-2 Rear Panel
1.1.2 FUNCTIONAL

This document provides a description of the monitor and control functions provided with the MITEQ Rack-Mounted One-Third Rack Frequency Converters and Translators with Remote Control. There is a wide variety of unit configurations that this document pertains to. Many of these units are single-band block frequency converters which require no frequency control however the frequency band of operation is always available to the user. A second form is a multiple-band block frequency converter. These use band switching commands to monitor and control the operational frequency band of the unit. Also included in the scope of this document are synthesized frequency converters which can be tuned to discrete frequencies in a given band of operation. All of the units described in the scope of this document feature a digitally controlled attenuator. The units are equipped with 32 memory locations where setups can be stored and recalled easily. Also, an event log is continuously updated with time stamped records of significant events. The internal frequency reference can be adjusted via software so there is no need to open the converter. Each unit is provided with two remote ports for monitor and control. An Ethernet interface and an RS485/RS422 serial port are integrated into each unit. Both ports support a robust set of monitor and control functions. When the unit is in local control mode only monitoring functions are permitted at the remote ports.
### 1.2.2 CONNECTOR WIRING INFORMATION

#### One-Third Rack Frequency Converter Redundancy Connector  J7
9-pin D-subminiature Plug

<table>
<thead>
<tr>
<th>Signal</th>
<th>Pins</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground</td>
<td>1</td>
<td>Ground</td>
</tr>
<tr>
<td>Redundancy Control Bus Data-</td>
<td>3</td>
<td>RS485 Data– for connection to 1/3 Rack 1:1 RSU</td>
</tr>
<tr>
<td>Redundancy Control Bus Data+</td>
<td>7</td>
<td>RS485 Data+ for connection to 1/3 Rack 1:1 RSU</td>
</tr>
<tr>
<td>DC ON Input</td>
<td>5</td>
<td>Connect to Ground (Pin 1) to turn on 12V DC at Pins 8&amp;9</td>
</tr>
<tr>
<td>+12 Volts DC Output for RSU</td>
<td>8</td>
<td>12 Volt DC supply for 1/3 Rack 1:1 RSU</td>
</tr>
<tr>
<td>+12 Volt DC Return for RSU</td>
<td>9</td>
<td>12 Volt DC return for 1/3 Rack RSU 1:1 RSU</td>
</tr>
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</table>

#### Form-C Status Contacts

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<thead>
<tr>
<th>PINS</th>
<th>Normal</th>
<th>Fault</th>
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</thead>
<tbody>
<tr>
<td>4,2</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>2,6</td>
<td>Closed</td>
<td>Open</td>
</tr>
</tbody>
</table>

#### One-Third Rack Frequency Converter Monitor & Control Connector  J6
9-pin D-subminiature Socket

<table>
<thead>
<tr>
<th>Signal</th>
<th>Pins</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Ground</td>
<td>1</td>
<td>Ground</td>
</tr>
<tr>
<td>Data Out-</td>
<td>3</td>
<td>RS485/RS422 Data Out– for Monitor &amp; Control</td>
</tr>
<tr>
<td>Data In-</td>
<td>5</td>
<td>RS485/RS422 Data In– for Monitor &amp; Control</td>
</tr>
<tr>
<td>Data Out+</td>
<td>7</td>
<td>RS485/RS422 Data Out+ for Monitor &amp; Control</td>
</tr>
<tr>
<td>Data In+</td>
<td>9</td>
<td>RS485/RS422 Data In+ for Monitor &amp; Control</td>
</tr>
<tr>
<td>External Fault/Mute Input</td>
<td>8</td>
<td>Connect to Pin 1 or Disconnect from Pin 1 (User Defined) to cause fault and mute converter</td>
</tr>
</tbody>
</table>

#### Form-C Status Contacts

<table>
<thead>
<tr>
<th>PINS</th>
<th>Normal</th>
<th>Fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,2</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>2,6</td>
<td>Closed</td>
<td>Open</td>
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</table>

#### Ethernet Interface Connector (J10)
RJ45

<table>
<thead>
<tr>
<th>RJ-45 PIN#</th>
<th>WIRE COLOR</th>
<th>10BaseT SIGNAL NAME</th>
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<tbody>
<tr>
<td>1</td>
<td>White/Orange</td>
<td>Transmit+</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>Transmit-</td>
</tr>
<tr>
<td>3</td>
<td>White/Green</td>
<td>Receive+</td>
</tr>
<tr>
<td>4</td>
<td>Green</td>
<td>Un-used</td>
</tr>
<tr>
<td>5</td>
<td>Blue</td>
<td>Un-used</td>
</tr>
<tr>
<td>6</td>
<td>White/Blue</td>
<td>Receive-</td>
</tr>
<tr>
<td>7</td>
<td>White/Brown</td>
<td>Un-used</td>
</tr>
</tbody>
</table>
SECTION 2
LOCAL OPERATION

2.1 CONTROLS

2.1.1 EXTERNAL CONTROLS

AC Power
Apply AC power to the unit by connecting the line cord supplied to the unit and then to an approved AC power source. Upon Power-up a one-second-beep sounds and the LCD backlight will be lit when power is on.

Fuse
The fuse is accessible from the rear panel of the unit, in the corner adjacent to the AC line cord input. The fuse value is T1.25A.

2.2 FRONT PANEL OPERATIONS

A Liquid Crystal Display (LCD) and Light Emitting Diode (LED) indicator buttons have been organized such that important information is available at a glance. The keypad has been arranged to allow an operator easy access to any parameter from the front panel. See Figure 1-1 for the physical layout of the front panel.

2.2.1 INDICATOR BUTTONS

The “STATUS” indicator button LED will light red to indicate an active fault in the Frequency Converter. The indicator button LED will light amber when there are no active faults but fault events have been stored in the log and the log has not been cleared since. Pressing the “STATUS” button will provide instant access to the Status screen. Pressing the “STATUS” button repeatedly will toggle the context of the display between the Fault Status screen and the Main screen.

The green “REMOTE” indicator button LED is lit green when the unit is in remote control mode. The “REMOTE” indicator button is not lit while the unit is in local control mode. Operating parameters can be monitored from the front panel and from the remote port at all times. When the unit is in remote control mode operating parameters can be changed from the remote ports only. When the unit is under local control operational parameters can be changed from the front panel only. The unit will always power up in remote control mode. Also, after thirty minutes of inactivity at the front panel, while in local control mode, the unit will revert to remote control mode.

The “RF ON” indicator button LED will light green when the unit is carrying communications traffic. The “RF ON” indicator button LED is not lit when the output is mute, interrupting communications traffic. While in local mode the operator can press the “RF ON” indicator button to toggle the output between Mute and “RF ON” provided there are no active faults. When a fault is active the output is forced to mute. After the fault extinguishes and is no longer active the user-programmed state will be restored.
2.2.2 SCREEN NAVIGATION AND DATA ENTRY

The keypad includes four directional arrow keys for navigation and data entry. An “ENT” key is used for confirming data entries. A beeper will sound to acknowledge each key press. An error tone will sound for illegal entries.

While in Remote mode, local data entry is prohibited. However, all system parameters can be examined.

The cursor will appear as either two vertical arrows, an up arrow “↑” on the top line and down arrow, “↓” on the bottom line, or as a single right arrow “→”. This indicates the direction of navigation. While the cursor appears as two vertical arrows use the up and down arrow keys to navigate between screens. Press the left or right arrow key and the cursor will appear as a right arrow “→”. When the cursor is a right arrow “→” the data field to the right of the cursor is selected and the up and down arrow keys are used to change the data in the selected field. Use the left and right arrow keys to navigate between fields within a screen. Pressing the “STATUS” indicator button will exit the data entry mode and resume the screen navigation mode with the cursor returning to the two vertical (“↑” and “↓”) arrows at the left of the screen and repeated presses of the “STATUS” indicator button will toggle the display between the Fault Status screen and the Main screen. When the “↑” and “↓” arrows appear at the left of the screen use the up and down arrow keys to scroll through the screens listed below. This provides visibility of all pertinent data in both Local and Remote modes.

- Main (Frequency Attenuation)
- Frequency Reference / Slope
- Fault Status / Event Log
- Date/Time
- M&C Remote RS485/RS422 Communications
- Redundant Remote RS485 Communications
- Ethernet IP Address
- Ethernet Subnet Mask
- Ethernet Gateway
- Ethernet Password
- Screen Contrast / External Fault Configuration

Data is entered by using the up and down arrow buttons to scroll until the desired setting is displayed and then pressing the “ENT” key. When changing attenuation or slope, the “ENT” key need not be pressed, these parameters are updated dynamically with the scrolling of the displayed data. Any other data entry not terminated by pressing the “ENT” key will expire after ten seconds, an error tone will sound, and the display will be restored to its prior setting. Invalid entries will be ignored and cause an error tone to sound.
2.2.3 MAIN SCREEN

The Main screen is the default context of the display. These settings appear at power-up. After one minute of idle time the display will default to the Main screen. Repeated presses of the “STATUS” button will toggle the display between the Status screen and the Main screen.

RF Frequency
Some converters, such as single-band block converters, do not have tunable RF Frequency. For those converters the Translation Frequency is displayed.
To re-tune the RF Frequency of a converter from the Main screen:
• Press the left or right arrow key to select the RF Frequency field on the display.
• Press “ENT” to enter frequency edit mode.
• Use the left and right arrow keys to select a digit to change.
• Use the up and down arrow keys to change the digit.
• Press “ENT” to tune the converter to the displayed RF Frequency.

IF Frequency
• The IF Frequency is displayed for informational purposes only on synthesized frequency converters. Block converters do not display this field.

Internal / External Reference Detect
An “X” or an “I” will appear in the upper right corner of the Main screen. An “X” indicates that an external frequency is connected to the converter. An “I” indicates that the internal frequency reference is being used. This is displayed for informational purposes only and cannot be changed.

Attenuation
To change the attenuation setting of the converter:
• From the Main screen, press the left or right arrow key to select the attenuation field on the display.
• Use the up and down arrow keys to increment or decrement the attenuation dynamically.
Memory Registers
To view the contents of the memory registers:
- From any screen press the “RECALL” button. This will change the display to the main screen and activate the memory location field.
- Use the up and down arrow keys to view the memory registers. This will not change the converter settings.
- Press “ENT” to retune the converter and assert the settings stored in the memory register.

To store the converter settings into a memory location:
- From any screen press the “RECALL” button. This will change the display to the main screen and activate the memory location field.
- Press the right arrow key to highlight the memory register field.
- Use the up and down arrow keys to select the memory register to store the current settings into.
- Press “ENT” to store the Frequency and attenuation settings into the selected memory register.

2.2.4 FREQUENCY/SLOPE REFERENCE ADJUST SCREEN

Frequency Reference
To electronically fine-tune the internal frequency reference:
- From the Frequency Reference / Slope screen, press the left or right arrow key to select the Reference field on the display.
- Use the up and arrow keys to fine-tune the internal frequency reference from 0 to 1023.

Slope
Some models are equipped with adjustable slope. To adjust the slope:
- From the Frequency Reference / Slope screen, press the left or right arrow key to select the Slope field on the display.
- Use the up and arrow keys to adjust the slope dynamically.
2.2.5 STATUS SCREEN

The Status screen presents details about any faults as well as the event log. This screen will display the number of active faults as well as the number of events stored in the log. The event log can be cleared from this screen as well. Repeated presses of the “STATUS” button will toggle the display between the Status screen and the Main screen.

Active Faults

The number of active faults is reported in the Status Screen. To view the active faults:

- Press the left or right arrow key to activate the Active Faults field on the display.
- Use the up and down arrow keys to scroll through all of the active faults.
- Press the “STATUS” key to return to the Status Screen.

The active faults that can be reported are:

- Power Supply Fault
- LO Fault
- External Fault
- User-programmed Test Fault
Event Log
To view the event log:
- From the Status Screen press the left or right arrow key to highlight the Events field on the display.
- Use the up and down arrow keys to scroll through all of the events stored in the Event Log. Events are displayed in reverse chronological order; most recent (highest numbered) first.
- Press the “STATUS” key to return to the Status Screen.

The events that can be reported are:
- Log Cleared
- Unit Startup
- Power Supply fault / recovery
- LO Lock fault / recovery
- RF Frequency Change
- Attenuation Change
- User Muted/Unmuted
- Test fault / recovery
- Unit Name Change
- Slope Change
- External fault / recovery
To clear the event log:

- From the Fault Status screen press the left or right arrow key to highlight the CLEAR field on the display.
- Press “ENT” and the screen above will appear.
- Press “ENT” again to clear the Event Log or press “STATUS” to return to the Fault Status screen.

2.2.6 DATE TIME SCREEN

**Date and Time**

In order to adjust the date and time:

- Press the up or down arrow key until the Date and Time are displayed.
- Press the left or right arrow key to select each of the fields: month, day, year, hour, minute, second.
- If the selected field is correct then press the left or right arrow key to advance to the next field.
- If the selected field needs adjustment use the up or down arrow keys to adjust the new display.
- Continue to press the left or right arrow key adjusting the necessary fields until all of the fields are correct.
- Press “ENT” at any time to set the date and time to those displayed.
2.2.7 SERIAL PORT REMOTE OPERATION SCREEN

The serial port remote operation screen allows the operator to configure the remote control parameters listed below.

- RS485 (2-wire) or RS422 (4-wire) Bus
- RS485/RS422 Remote Address
- RS485/RS422 Baud Rate
- RS485/RS422 Parity

Serial Port Bus
Units are equipped with an RS485/RS422 interface. To operate in a 2-wire configuration RS485 should be selected. To operate in a 4-wire configuration RS422 should be selected.

To switch between RS485 and RS422:
- If not already displayed, use the Up and down arrow keys to access the Serial Port Remote Operation screen.
- Press the left or right arrow key to select the bus field on the display.
- Use the up and down arrow keys to toggle between RS485 and RS422 operation.
- Press “ENT” to save the selection.

Serial Port Address
Units can occupy a remote address from 64 to 95 decimal. To select the remote address:
- If not already displayed, use the Up and down arrow keys to access the Serial Port Remote Operation screen.
- Press the left or right arrow key to select the address field “ADD” on the display.
- Use the up and down arrow keys to increment or decrement the displayed address respectively.
- Press “ENT” to save the address.

Serial Port Baud Rate
To select the baud rate of the serial port:
- If not already displayed, use the Up and down arrow keys to access the Serial Port Remote Operation screen.
- Press the left or right arrow key to select the baud rate field “BAUD” on the display.
- Use the up and down arrow keys to scroll through the available options until the desired setting is displayed. The baud rates available are 2400, 4800, 9600, and 19200.
- Press “ENT” to save the selection.
Serial Port Parity
To select the parity for the Serial Port:
• If not already displayed, use the Up and down arrow keys to access the Serial Port Remote Operation screen.
• Press the left or right arrow key to select the parity field on the display.
• Use the up and down arrow keys to scroll through the available options until the desired setting is displayed. The parity can be set to “ODD”, “EVEN” or “NONE”.
• Press “ENT” to set the parity selection.

2.2.8 REDUNDANT SERIAL PORT REMOTE OPERATION SCREEN

The redundant serial port is always configured for RS485 (2-wire) operation.

Redundant Serial Port Address
Units can occupy a remote address from 64 to 95 decimal. To select the remote address for the redundant serial port:
• If not already displayed, use the Up and down arrow keys to access the Redundant Serial Port Remote Operation screen.
• Press the left or right arrow key to select the address field “ADD” on the display.
• Use the up and down arrow keys to increment or decrement the displayed address respectively.
• Press “ENT” to save the address.

Redundant Serial Port Baud Rate
To select the baud rate of the redundant serial port:
• If not already displayed, use the Up and down arrow keys to access the Redundant Serial Port Remote Operation screen.
• Press the left or right arrow key to select the baud rate field “BAUD” on the display.
• Use the up and down arrow keys to scroll through the available options until the desired setting is displayed. The baud rates available are 2400, 4800, 9600, and 19200.
• Press “ENT” to save the selection.
Redundant Serial Port Parity
To select the parity for the redundant serial port:
- If not already displayed, use the Up and down arrow keys to access the Redundant Serial Port Remote Operation screen.
- Press the left or right arrow key to select the parity field on the display.
- Use the up and down arrow keys to scroll through the available options until the desired setting is displayed. The parity can be set to “ODD”, “EVEN” or “NONE”.
- Press “ENT” to set the parity selection.

2.2.9 ETHERNET PORT REMOTE OPERATION SCREENS

If not already displayed, use the Up and down arrow keys to access the Ethernet Port remote operation screens. The Ethernet port remote operation screens allow the operator to configure the Ethernet settings listed below. These are presented in four consecutive screens.

- IP Address
- Subnet Mask
- Gateway
- Password

NOTE: With the exception of Ethernet Password, the entry of all Ethernet Parameters requires a system reset in order to invoke the changes. The screen above will appear after any change to IP Address, Subnet Mask or Gateway. This screen gives the operator the option to defer the reset until all Ethernet parameters have been updated. Select “YES” and Press “ENT” to re-start the CONVERTER. Select “NO” and press “ENT” to dismiss the screen and enter other Ethernet parameters.
IP Address
To change the IP Address:
• Press the up or down arrow key until the IP Address is displayed.
• Press the right or left arrow key to select an octet of the IP Address.
• Use the up and down arrow keys to scroll the numeric value of the octet.
• Press the right or left arrow key to select the next octet.
• Press “ENT” to save the IP Address.

Subnet Mask
To change the Subnet Mask:
• Press the up or down arrow key until the Subnet Mask is displayed.
• Press the right or left arrow key to select an octet of the Subnet Mask.
• Use the up and down arrow keys to scroll the numeric value of the octet.
• Press the right or left arrow key to select the next octet.
• Press “ENT” to save the Subnet Mask.
Gateway
To change the Gateway:
- Press the up or down arrow key until the Gateway is displayed.
- Press the right or left arrow key to select an octet of the Gateway.
- Use the up and down arrow keys to scroll the numeric value of the octet.
- Press the right or left arrow key to select the next octet.
- Press “ENT” to save the Gateway.

Password
To change the Password:
- Press the up or down arrow key until the Password is displayed.
- Press the right or left arrow key to select the first or last character of the Password.
- Use the up and down arrow keys to scroll through the available characters.
- Press the right or left arrow key to select the next character.
- Press “ENT” to save the Password.
2.2.10 LCD CONTRAST/EXTERNAL FAULT SCREEN

If not already displayed, use the Up and Down arrow keys to access the LCD Contrast/External Fault Screen.

**LCD Contrast**

In order to adjust the LCD contrast:
- From the LCD Contrast/External Fault Screen, press the left or right arrow key to locate the cursor in the LCD contrast field.
- Use the up or down arrow keys to adjust the contrast of the display.
- An Error tone will sound if the end of the adjustment range is reached.

**NOTE:** If the display is too light or too dark to read use the following sequence to quickly access contrast.
1) Press the “STATUS” indicator button.
2) Press the “ENT” button.
3) Use the up arrow to darken the display or the down arrow to lighten the display.

**External Fault Configuration**

- From the LCD Contrast/External Fault Screen, press the left or right arrow key to locate the cursor in the EXT FLT field.
- Use the up and down arrow keys to scroll through the available options until the desired setting is displayed. The selections are N/A for not available, NO for normally open and NC for normally closed.
- Press “ENT” to set the selection.
SECTION 3
SERIAL PORT OPERATION

3.1 SERIAL PORT DESCRIPTION

The unit is supplied with an RS485/422 remote interface port. Status is always available at the RS485/RS422 remote port regardless of control mode. Selection of Remote or Local control mode is available at the front panel only. The unit defaults to remote control upon power-up. If the unit is inadvertently left in local control mode, after thirty-minutes of inactivity at the local port, Remote control will be automatically restored.

The RS485/RS422 serial port can be set to RS485 for two-wire operation or to RS422 for four-wire operation from the front panel local interface. This port supports a multi-drop bus arrangement. The RS485/RS422 interface parameters such as address, baud rate and parity are can be set from the front panel. All transmissions on the RS485/RS422 port are multi-byte sequences beginning with a header byte and ending with a trailer byte followed by a checksum byte. The transmitted bytes are all ASCII printable characters in the range of 20H to 7EH. The RS485/RS422 monitor and control protocols are described in detail later in this section of the document.

All messages addressed to the RS485/RS422 port are acknowledged with a response message. The unit continually monitors the RS485/RS422 port and will accept commands, addressed to it, even in Local mode. When in Local mode, receipt of any SET commands (commands beginning with “$”) at the RS485/RS422 remote port will be ignored and the unit will respond with an error code.

3.2 REMOTE MESSAGE PROTOCOL (RS485/RS422)

The data format is a 10-bit sequence for each character. If odd or even parity is selected the ten bits are 1 Start bit, 7 Data bits, 1 Parity bit, and 1 Stop bit. If the parity is set to none, the bits are 1 Start bit, 8 Data bits, and 1 Stop bit. The remote Address, Baud Rate, and Parity are programmable from the local control port.

If any character in a command message contains an error in parity, framing, overrun, or the checksum is incorrect, the command is ignored and no response is made. When odd or even parity is selected, all characters, including the checksum character, are checked for parity. The response time from command to acknowledge is 100 ms. maximum.

3.2.1 RS485/RS422 SERIAL PORT MESSAGE FORMAT

The RS485/RS422 serial port message format is as follows:
HEADER - ADDRESS - COMMAND/ERROR CODE - PARAMETERS - TRAILER - CHECKSUM

Header
The Header byte is 123 decimal (7BH, ASCII character ".")

Address
The address may take on the values from 64 to 95 decimal (40H to 5FH, ASCII characters “@” to “_”).
Commands and Error Codes
Commands are three ASCII characters preceded by an ASCII “?” or “$.” Commands preceded by “?” are QUERY commands and those preceded by “$” are SET commands. Query commands are used to examine system parameters while SET commands are intended to modify system parameters. An Error Code may be returned as a reply to an unacceptable Command.

Parameters
Parameters are all ASCII printable characters in the range of 20H to 7EH. Numeric parameters are sent MSD first, LSD last. Values which do not adhere to the command format, or are beyond the allowable range, will be rejected and cause the unit to respond with an error code.

Trailer
The Trailer byte is 125 decimal (7DH, ASCII character "}").

Checksum
The checksum byte is the sum modulo 95 of all message characters beginning with the header byte up to and including the trailer byte. The value 32 is subtracted from each character value before taking the modulo 95 sum. The value 32 is added to the final sum to obtain the checksum value. All values are in decimal.

Checksum = MOD [(character value - 32), 95] + 32

Below is a program, written in the ‘C’ programming language that illustrates the checksum calculation.

```c
/*
   return the checksum character for the message in array
   subtract 32 from each character before taking modulo 95 sum
   add 32 to the final sum
   mes_len = message length
*/
char check_sum(char *array, char mes_len)
{
    char i,sum;

    for (i = 0, sum = 0; i < mes_len; i++) {
        sum += *array++ - 32;
        sum %= 95;
    }
    return(sum + 32);
}
```
<table>
<thead>
<tr>
<th>ASCII Character String</th>
<th>Function</th>
<th>ASCII Character String</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALR</td>
<td>System Fault Status</td>
<td>ATN</td>
<td>Unit Attenuation change without storing in event log</td>
</tr>
<tr>
<td>ATT</td>
<td>Unit Attenuation</td>
<td>BND</td>
<td>Frequency Band (Block Converters)</td>
</tr>
<tr>
<td>ATN</td>
<td>Unit Attenuation change without storing in event log</td>
<td>BNM</td>
<td>Number of Bands (Block Converters)</td>
</tr>
<tr>
<td>CLK</td>
<td>Internal Calendar / Clock</td>
<td>COM</td>
<td>Combination Frequency/Band and Attenuation Command</td>
</tr>
<tr>
<td>EAC</td>
<td>External Fault Configuration</td>
<td>EAD</td>
<td>Ethernet Parameters</td>
</tr>
<tr>
<td>EAD</td>
<td>Ethernet Parameters</td>
<td>FRQ</td>
<td>RF Frequency</td>
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<td>Frequency Reference Source</td>
<td>IFS</td>
<td>IF Frequency</td>
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<td>LOG</td>
<td>Event Log</td>
<td>MEM</td>
<td>Memory Recall / Store</td>
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<td>MUT</td>
<td>Mute</td>
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<td>Unit title</td>
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<tr>
<td>NAM</td>
<td>Unit title</td>
<td>REF</td>
<td>Frequency Reference Adjust</td>
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<tr>
<td>REF</td>
<td>Frequency Reference Adjust</td>
<td>SET</td>
<td>Memory Recall / Store and Set</td>
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<td>System Status</td>
<td>TMP</td>
<td>Internal Temperature</td>
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<td>Firmware Version</td>
<td>VLT</td>
<td>System Voltages</td>
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</table>

<table>
<thead>
<tr>
<th>Error Code ASCII Character</th>
<th>Reason for Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Command not recognized</td>
</tr>
<tr>
<td>b</td>
<td>Illegal parameter or parameter out of range</td>
</tr>
<tr>
<td>c</td>
<td>Unit in Local mode</td>
</tr>
<tr>
<td>d</td>
<td>Busy</td>
</tr>
</tbody>
</table>
3.3 COMMAND CODE DESCRIPTION

The following paragraphs describe each of the command codes. For clarity the header, address, trailer and checksum characters are not shown. Upper case letters are the actual command or response characters. Lower case letters represent parameter character strings.

Commands preceded by “?” are QUERY commands and those commands preceded by “$” are SET commands. Query commands are used to examine system parameters while SET commands are intended to modify system parameters.

For units not equipped with a variable attenuator, all attenuation queries will be returned a value of zero and all attenuation parameters in SET commands must contain a value of zero.

Below is a detailed description of the protocol required for each of the commands and replies.

3.3.1 SYSTEM FAULT STATUS = ALR

The SET command requires nine parameters. All but the first parameter are ignored. The first parameter is used to set or clear a user generated test fault.

Remote Command Sequence:  $ALRabcdefghijklmnopqrstuvwxyz
Unit Response:  $ALR

The QUERY command requires no parameters.

Remote Command Sequence:  ?ALR
Unit Response:  ?ALRabcdefghijklmnopqrstuvwxyz

?:  Component Fault Status indicator
a-i:  "0" or "1" ASCII numeric character
  0 = No fault
  1 = Fault

a-i indicates the status of the component faults described below.

a  User-programmed Test Fault
b  Logged Fault
c  LO Fault
d  Power Supply Fault
e  Reserved for future use
f  Reserved for future use
g  External Fault
h  Reserved for future use
i  Reserved for future use
3.3.2 UNIT ATTENUATION = ATT

The SET command requires a three-digit parameter representing the attenuation in dB. The three-character string “INC” or “DEC” can be used in place of the attenuation parameter to increment or decrement the attenuator by 0.2 dB. This event is logged in unit event log.

Remote Command Sequence: $ATTttt or $ATTINC or $ATTDEC

Unit Response: $ATT

The QUERY command requires no parameters.

Remote Command Sequence: ?ATT
Unit Response: ?ATTttt

ATT: Attenuation indicator
ttt: Three-digit parameter indicating attenuation in tenths of a dB.
INC: Used in place of “ttt” in the SET command to increment the attenuator 0.2 dB
DEC: Used in place of “ttt” in the SET command to decrement the attenuator 0.2 dB

3.3.3 UNIT ATTENUATION WITHOUT LOG = ATN

The SET command requires a three-digit parameter representing the attenuation in dB. The three-character string “INC” or “DEC” can be used in place of the attenuation parameter to increment or decrement the attenuator by 0.2 dB. This event is not logged in unit event log.

Remote Command Sequence: $ATNttt or $ATNINC or $ATNDEC

Unit Response: $ATN

The QUERY command requires no parameters.

Remote Command Sequence: ?ATN
Unit Response: ?ATNttt

ATN: Attenuation indicator
ttt: Three-digit parameter indicating attenuation in tenths of a dB.
INC: Used in place of “ttt” in the SET command to increment the attenuator 0.2 dB
DEC: Used in place of “ttt” in the SET command to decrement the attenuator 0.2 dB
3.3.4 FREQUENCY BAND INFORMATION = BND (Block Converters Only)

The SET command requires one parameter which is one digit in length representing the desired frequency band. If no faults exist, this command also unmutes the output.

Remote Command Sequence:  $BND\textbackslash b
Unit Response:  $BND

The QUERY command requires no parameters, however an optional parameter may be included. With no parameters the current band and associated frequency information will be returned. If a band number parameter is included the frequency information for that particular band will be indicated in the reply message.

Remote Command Sequence:  ?BND\textbackslash b
Unit Response:  ?BND\textbackslash bLffffffffff-fffff0ffffff-fffff

BND: Band indicator
b: single-digit ASCII numeric character representing Band number
L: LO frequency indicator
fffff: Five-digit ASCII numeric characters indicating frequency in MHz
I: Input frequency indicator
ffff-ffff: Input Frequency Range
O: Output Frequency indicator
ffff-ffff: Output Frequency Range

3.3.5 FREQUENCY BAND NUMBER INFORMATION = BNM
(Block Converters Only)

There is no SET command.

The QUERY command requires no parameters.

Remote Command Sequence:  ?BNM
Unit Response:  ?BNM\textbackslash b

BNM: Band number indicator
b: single-digit ASCII numeric character representing number of Bands
3.3.6 INTERNAL CALENDAR AND CLOCK = CLK

The SET command requires a twenty-character parameter that sets the date and time of the internal calendar/clock.

Remote Command Sequence: $CLKYyyyyMmmDddHhhNnnSss
Unit Response: $CLK

The QUERY command requires no parameters.

Remote Command Sequence: ?CLK
Unit Response: ?CLKYyyyyMmmDddHhhNnnSss

Y: Year indicator
yyyy: Year, 4-digit ASCII numeric characters.

M: Month indicator
mm: Month, 2-digit ASCII numeric characters

D: Day indicator
dd: Day, 2-digit ASCII numeric characters

H: Hour indicator
hh: Hour, 2-digit ASCII numeric characters

N: Minute indicator
nn: Minute, 2-digit ASCII numeric characters

S: Second indicator
ss: Second, 2-digit ASCII numeric characters
### 3.3.7 UNIT COMBINATION COMMAND = COM

The SET command requires two parameters; a band or frequency parameter and an attenuation parameter.

- Block Converter Remote Command Sequence: `$COMBbTttt`
- Synthesized Remote Command Sequence: `$COMFfffffffffffTttt(Ii)`
- Unit Response: `$COM`

The QUERY command requires no parameters.

- Remote Command Sequence: `?COM`
- Block Unit Response: `?COMBbTttt`
- Synthesized Unit Response: `?COMFfffffffffffTtttIi`

- **BND**: Band indicator (Block converters)
- **b**: single-digit ASCII numeric character representing Band number

- **F**: Frequency indicator. (Synthesized converters)
  - **fffffffffff**: Twelve digit ASCII numeric characters indicating the tuned frequency in Hz.

- **T**: Attenuation indicator.
  - **ttt**: Three digit ASCII numeric characters indicating the attenuation in tenths of a dB.

- **I**: IF indicator. (optional on Synthesized SET command)
  - **i**: "0" or "1" ASCII numeric character (optional on SET command)
    - 0 = 70 MHz
    - 1 = 140 MHz.
    - 2 = LBand

### 3.3.8 EXTERNAL FAULT CONFIGURATION = EAC

The SET command requires one parameter.

- Remote Command Sequence: `$EACn`
- Unit Response: `$EAC`

The QUERY command requires no parameters.

- Remote Command Sequence: `?EAC`
- Unit Response: `?EACn`

- **EAC**: External Fault Configuration indicator.
  - **n**: ASCII numeric character
    - 0 = Ignore External Fault
    - 1 = Normally Open, A closure will cause a fault indication.
    - 2 = Normally Closed, An open will cause a fault indication.
3.3.9 ETHERNET PARAMETERS = EAD

The SET command requires three 12-digit parameters indicating the Ethernet IP address, Ethernet Subnet Mask, Ethernet Gateway Address. Each parameter should be entered as four groups of three digits

Remote Command Sequence: $EADiiiiiiiiiiiiGgggggggggggSssssssssssss
Unit Response: $EAD

The QUERY command requires no parameters.

Remote Command Sequence: ?EAD
Unit Response: ?EADiiiiiiiiiiiiGgggggggggggSssssssssssss

NOTE: The unit will automatically reset after receipt of the SET command to invoke the settings.

3.3.10 UNIT FREQUENCY = FRQ

The SET command requires one parameter which is twelve digits in length representing the transmit (up converter), receive (down converter) or translation (block converter) frequency in Hz. Leading zeros must be used with frequencies below 10 GHz.

Remote Command Sequence: $FRQffffffffffff
Unit Response: $FRQ

The QUERY command requires no parameters. The reply will consist of twelve digits indicating transmit(up converter), receive(down converter) or translation (block converter) frequency in Hz. Leading zeros will be used for frequencies less than 10 GHz.

Remote Command Sequence: ?FRQ
Unit Response: ?FRQffffffffffff

FRQ: Frequency indicator
ffffffffffff: Twelve-digit ASCII numeric characters, indicating frequency in Hz.

3.3.11 FREQUENCY REFERENCE SOURCE = FRS

There is no SET command.

The QUERY command requires no parameters.

Remote Command Sequence: ?FRS
Unit Response: ?FRSs

s: "X" or "I" ASCII character
   X = External Frequency Reference
   I = Internal Frequency Reference
3.3.12 IF SELECTION = IFS

There is no SET command.

The QUERY command requires no parameters.

Remote Command Sequence:  ?IFS
Unit Response:  ?IFSi

IFS: IF indicator.
i: “0” or “1” ASCII numeric character
   Synthesized Converters: 0 = 70 MHz, 1 = 140 MHz, 2 = LBand
   Block Converters: 0

3.3.13 UNIT EVENT LOG = LOG

The only SET command clears the unit log of its contents.

Remote Command Sequence:  $LOG00
Unit Response:  $LOG

The QUERY command requires a two-digit parameter indicating the log entry to be examined. If entry 00 is selected, the unit returns the number of log entries currently in the log, otherwise the unit responds with the date, time and a code indicating the event which has occurred.

Remote Command Sequence:  ?LOGnn
Unit Response:  ?LOGnnCyyyyymmddhhnnssEee

nn: Two digit ASCII numeric characters indicating the log entry queried.

C: Calendar/Clock indicator

yyyy: Year, four-digit ASCII numeric characters
mm: Month, two-digit ASCII numeric characters
dd: Day, two-digit ASCII numeric characters
hh: Hour, two-digit ASCII numeric characters
nn: Minute, 2 digit ASCII numeric characters
ss: Second, two-digit ASCII numeric characters

E: Event indicator.

c: Event Code 00 to 99 represent the following:
00: Event Log Cleared
01: Processor Startup
02: Power Supply Fault
03: Power Supply Fault Recovery
04: Oscillator Lock Fault
05: Oscillator Lock Fault Recovery
06: Synthesizer Lock Fault
07: Synthesizer Lock Fault Recovery
08: Frequency Change
09: Attenuation Change  
10: Unit Mute By Operator  
11: Unit Unmute By Operator  
12: Test Fault Activated By Operator  
13: Test Fault Deactivated By Operator  
14: Unit Name Change  
15: Slope Change  
16: External Fault  
17: External Fault Recovery  

3.3.14 UNIT MEMORY REGISTER STORE/RECALL = MEM

The SET command stores band or frequency and attenuation into a selected memory register. Thus three parameters are required; memory register, band or frequency and attenuation parameters. A fourth parameter for IF frequency is added for Synthesized Converters. This command does not affect unit operation.

Block Converter Remote Command Sequence: $MEMnnBbTttt  
Synthesized Converter Remote Command Sequence: MEMnnFffffffffffffffTtttli  
Unit Response: $MEM

The QUERY command requires one parameter indicating the memory register to recall and returns the contents of that register. This command does not affect unit operation.

Remote Command Sequence: ?MEMnn  
Block Converter Response: ?MEMnnBbTttt  
Synthesized Converter Response: ?MEMnnFffffffffffffffTtttli

nn: Two digit ASCII numeric characters indicating the memory register accessed.

B: Frequency Band indicator.  
b: 1 = Band 1, 2 = Band 2, etc.

F: Frequency indicator  
ffffffffffff: Twelve-digit ASCII numeric characters indicating frequency in Hz.

T: Attenuation indicator  
ttt: Three-digit parameter indicating attenuation in tenths of a dB.

I: IF indicator. (Synthesized Converter only)  
i: "0" or "1" ASCII numeric character  
  0 = 70 MHz  
  1 = 140 MHz.  
  2 = LBand
3.3.15  UNIT MUTE COMMAND = MUT

The SET command requires a one-digit parameter indicating mute or unmute.

Remote Command Sequence:  $MUTm
Unit Response:  $MUT

The QUERY command requires no parameters.

Remote Command Sequence:  ?MUT
Unit Response:  ?MUTm

MUT:  Mute indicator.

m:  "0" or "1" ASCII numeric character
    0 = not mute
    1 = mute

3.3.16  UNIT NAME = NAM

The SET command requires an ASCII string from one to twenty digits in length indicating the name of the unit. Allowable characters are in the range of 20H to 7AH.

Remote Command Sequence:  $NAMnnnnnnnnnnnnnnnnnnnn
Unit Response:  $NAM

The QUERY command requires no parameters.

Remote Command Sequence:  ?NAM
Unit Response:  ?NAMnnnnnnnnnnnnnnnnnnnn

nnnnnnnnnnnnnnnnnnnn:  Twenty character unit name.

3.3.17  INTERNAL REFERENCE FREQUENCY ADJUSTMENT = REF

The SET command requires a four-digit parameter indicating the ten-bit reference frequency adjustment from 0 to 1023.

Remote Command Sequence:  $REFaaaa
Unit Response:  $REF

The QUERY command requires no parameters.

Remote Command Sequence:  ?REF
Unit Response:  ?REFaaaa

aaaa:  Reference frequency adjustment (0000 to 1023) in ASCII numeric characters.
3.3.18 UNIT MEMORY REGISTER STORE/RECALL AND SET = SET

The SET command stores band or frequency and attenuation into a selected memory register. Thus three parameters are required; memory register, band or frequency and attenuation parameters. A fourth parameter for IF frequency is added for Synthesized Converters. The unit is set to the parameters included in the command.

Block Converter Remote Command Sequence: $SETnnBbTttt
Synthesized Converter Remote Command Sequence: $SETnnFFFFFFFFFTttti
Unit Response: $SET

The QUERY command requires one parameter indicating the memory register to recall and returns the contents of that register. The unit is set to the parameters included in the reply.

Remote Command Sequence: ?SETnn
Block Converter Unit Response: ?SETnnBbTttt
Synthesized Converter Response: ?SETnnFFFFFFFFFTttti

nn: Two digit ASCII numeric characters indicating the memory register accessed.

B: Frequency Band indicator.
b: 1 = Band 1, 2 = Band 2, etc.

F: Frequency indicator
fffffffffff: Twelve-digit ASCII numeric characters indicating frequency in Hz.

ATT: Attenuation indicator
ttt: Three-digit parameter indicating attenuation in tenths of a dB.

I: IF indicator. (Synthesized Converter only)
i: "0" or "1" ASCII numeric character
  0 = 70 MHz
  1 = 140 MHz.
  2 = LBand
3.3.19 UNIT STATUS = STA

There is no SET command.

The QUERY command requires no parameters.

Remote Command Sequence: \(?STA\)
Block Converter Response: \(?STABbTtttLIMmRr?abcdefghi\)
Synthesized Converter Response: \(?STAFffffffffftttLIlMmRr?abcdefghi\)

**B:** Frequency Band indicator.
\(b\): 1 = Band1, 2 = Band2, etc.

**F:** Frequency indicator.
\(ffffffffff\): Twelve-digit ASCII numeric characters indicating frequency in Hz.

**T:** Attenuation indicator.
\(ttt\): Three-digit ASCII numeric characters, indicating the attenuation in tenths of a dB.

**L:** Local / Remote mode indicator.
\(l\): "0" or "1" ASCII numeric character
0 = Local control
1 = Remote control

**I:** IF indicator. (Synthesized Converter only)
\(i\): "0" or "1" ASCII numeric character
0 = 70 MHz
1 = 140 MHz.
2 = LBand

**M:** Mute status indicator.
\(m\): "0" or "1" ASCII numeric character
0 = not mute
1 = mute.

**R:** Frequency Reference Source indicator.
\(r\): "0" or "1" ASCII numeric character
0 = internal
1 = external.

**?:** Component Fault Status indicator
\(a-i\): "0" or "1" ASCII numeric character
0 = No fault
1 = Fault

\(a-i\) indicates the status of the component faults described in the ALR command.
3.3.20 INTERNAL TEMPERATURE READING = TMP

There is no SET command.

The QUERY command requires no parameters.

   Remote Command Sequence:  ?TMP
   Unit Response:  ?TMPsttt

   s:  “+” or “-“ indicating sign.
   ttt:  Temperature in degrees Celsius, 3 digit ASCII numeric characters

3.3.21 FIRMWARE VERSION = VER

There is no SET command.

The QUERY command requires no parameters.

   Remote Command Sequence:  ?VER
   Unit Response:  ?VER firmware version

The length of this reply will vary depending on the applicable firmware

3.3.22 SYSTEM VOLTAGES = VLT

There is no SET command.

The QUERY command requires a no parameters.

   Remote Command Sequence:  ?VLT
   Unit Response:  ?VLTsv.vv

   s:  “+” or “-“ indicating sign.
   vv.vv:  Four-digit ASCII numeric characters indicating
           the measured supply voltage in Volts (nominally +12.30 Volts DC).
SECTION 4
ETHERNET PORT OPERATION

4.1 ETHERNET INTERFACE INSTALLATION AND OPERATION

4.1.1 FUNCTIONAL DESCRIPTION

The MITEQ 1/3 Rack-mount Converter is equipped with an Ethernet Interface feature permitting control and monitoring via a 10 or 100 Mbps Ethernet connection. Available interface protocols are HTTP (web access), SNMP (Simple Network Management Protocol), and Telnet. In addition, the capability to remotely upgrade the system firmware is provided.

The use of standard protocols makes it possible to provide (password-protected) access to the Converter from any location in the world where an internet connection is available

4.1.2 INSTALLATION

Connection
The Converter must be connected to the facility Local Area Network (LAN) network via an industry-standard 10baseT RJ45 cable. The cable should be a “direct” cable, not a “crossover” cable. The Converter may also be connected directly to a PC without a LAN. (See Appendix A for details)

Setup
Setup of the Ethernet Interface should be attempted only after the Converter is fully installed and functioning, in accordance with the Converter Operation and Maintenance (O&M) Manual. Once operating, the Ethernet Interface may be configured.

Configuring Internet Protocol (IP) Operating Parameters
An Internet Protocol (IP) address and associated parameters must be configured in the unit so the controlling device can address it. Normally, the individual or organization managing the facility’s LAN assigns this address. (See Appendix A for information on connecting directly to a PC without a Local Area Network). Three parameters will be required:

<table>
<thead>
<tr>
<th>IP Address</th>
<th>(Factory Default Setting 192.168.1.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subnet Mask</td>
<td>(Factory Default Setting 255.255.255.0)</td>
</tr>
<tr>
<td>Gateway</td>
<td>(Factory Default Setting 0.0.0.0)</td>
</tr>
</tbody>
</table>

Note: Factory setting IP address is assigned at time of final testing of the RSU. Unique MAC addresses are assigned and recorded on the basis of serial number at MITEQ.

The Ethernet IP address may be configured via the local interface.

Verifying Proper Connection and Configuration
The connection and configuration may be verified from a PC attached to the LAN using the network “ping” command. From a command prompt, enter

```
ping <assigned IP address>
```

The response will either indicate whether a connection was established.

4.1.3 ACCESSING THE SYSTEM
Access via the Web Interface
All system settings may be queried or modified via the Web Interface. The web page designs have been optimized for the use with the Microsoft Internet Explorer (MSIE) Version 5.0 web browser, or higher. Use of Cookies must be enabled (see the TOOLS|INTERNET OPTIONS|PRIVACY setting).

Web access may function properly, or with somewhat degraded performance, using other browsers of the same vintage. Browsers of earlier vintage are not recommended.

To connect to the Converter, launch the web browser on any PC connected to the same LAN, and enter the address

http://<assigned IP address>

A sign-on page requesting the password should be displayed. (See Appendix B for information on configuring for access to the Converter by name instead of IP address). The default password is “11111”.

The operator may navigate between the available pages by clicking on the button images about 1/3 of the way down from the top of the screen.

To set an operating parameter, make the appropriate changes, change the (screen locked) pull-down to UNLOCKED, and press the Submit or other applicable button.

The following table lists the functions available on each page:

<table>
<thead>
<tr>
<th>Function Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(All Pages)</strong></td>
<td></td>
</tr>
<tr>
<td>Band (Block Converters)</td>
<td>Show the currently selected band</td>
</tr>
<tr>
<td>RF Frequency (Synthesized Converters)</td>
<td>Show the currently RF frequency</td>
</tr>
<tr>
<td>Attn</td>
<td>Show the current attenuation setting</td>
</tr>
<tr>
<td><strong>Home Page</strong></td>
<td></td>
</tr>
<tr>
<td>Band Table</td>
<td>Show the available bands</td>
</tr>
<tr>
<td>Band Select</td>
<td>Set the desired band</td>
</tr>
<tr>
<td>Attenuation Set</td>
<td>Enter the desired attenuation value</td>
</tr>
<tr>
<td>Mute Select</td>
<td>Mute or unmute the Converter</td>
</tr>
<tr>
<td><strong>Memory Page</strong></td>
<td></td>
</tr>
<tr>
<td>Memory Number</td>
<td>Select or view the memory location number</td>
</tr>
<tr>
<td>Setup Name</td>
<td>Select or view the memory setup name</td>
</tr>
<tr>
<td>Band Number</td>
<td>Select or view the memory band number</td>
</tr>
<tr>
<td>Attenuation</td>
<td>Select or view the memory attenuation setting</td>
</tr>
<tr>
<td>View Memory</td>
<td>Recall the specified memory number and show its values without changing the Converter settings.</td>
</tr>
<tr>
<td>Set from Memory</td>
<td>Recall the specified memory number and load its values to the Converter.</td>
</tr>
<tr>
<td>Save Memory</td>
<td>Save the specified settings at the specified memory number without changing the Converter settings.</td>
</tr>
<tr>
<td>Save and Set</td>
<td>Save the specified settings at the specified number and load its values to the Converter.</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Communications Page</strong></td>
<td></td>
</tr>
<tr>
<td>IP Address</td>
<td>View or set the system IP address (changing this value will reset the system)</td>
</tr>
<tr>
<td>IP Subnet Mask</td>
<td>View or set the system IP Subnet Mask (changing this value will reset the system)</td>
</tr>
<tr>
<td>IP Gateway</td>
<td>View or set the system IP Gateway (changing this value will reset the system)</td>
</tr>
<tr>
<td>System Contact</td>
<td>View or set the SNMP System Contact parameter</td>
</tr>
<tr>
<td>System Name</td>
<td>View or set the SNMP System Name parameter</td>
</tr>
<tr>
<td>System Location</td>
<td>View or set the SNMP System Location parameter</td>
</tr>
<tr>
<td>Read Community</td>
<td>View or set the SNMP Read Community parameter (enter a long arbitrary string to make SNMP inaccessible)</td>
</tr>
<tr>
<td>Write Community</td>
<td>View or set the SNMP System Contact parameter parameter (enter a long arbitrary string to make SNMP inaccessible)</td>
</tr>
<tr>
<td>Trap Destination</td>
<td>View or set the SNMP Trap destination address</td>
</tr>
<tr>
<td>Send a Test Trap</td>
<td>Check this box and press Submit to send a single SNMP test trap</td>
</tr>
<tr>
<td><strong>Time Page</strong></td>
<td></td>
</tr>
<tr>
<td>Set Clock</td>
<td>View or set the system real-time clock</td>
</tr>
<tr>
<td><strong>Miscellaneous Page</strong></td>
<td></td>
</tr>
<tr>
<td>Second Between Fault Updates</td>
<td>View or set how frequently the fault indications will be refreshed on the Logs page</td>
</tr>
<tr>
<td>Web Timeout</td>
<td>View or set the time before a web user is logged off due to inactivity.</td>
</tr>
<tr>
<td>Minutes Between SNMP traps</td>
<td>View or set the frequency with which SNMP traps are resent. A value of 0 will cause traps to be sent only when a fault initially occurs.</td>
</tr>
<tr>
<td>Converter Name</td>
<td>View or set the assigned converter name</td>
</tr>
<tr>
<td>Enable Firmware Upgrade</td>
<td>Permit or prevent remote upgrade of the converter firmware.</td>
</tr>
<tr>
<td>Enable Telnet</td>
<td>Permit or prevent Telnet access</td>
</tr>
<tr>
<td>Enable Test Fault</td>
<td>Force a false fault for test purposes</td>
</tr>
<tr>
<td>Old Password</td>
<td></td>
</tr>
<tr>
<td>New Password</td>
<td>Update the system password (1-5 digits). All three values must be entered. If the old password does not match the existing password, or the two new password entries are different, the update will not occur.</td>
</tr>
</tbody>
</table>
### Event Log Page

<table>
<thead>
<tr>
<th>Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault Indicators</td>
<td>View any pending system faults</td>
</tr>
<tr>
<td>Log Listing</td>
<td>View a listing of all system log entries</td>
</tr>
<tr>
<td>Clear Log</td>
<td>Clear the system log</td>
</tr>
<tr>
<td>Logout Page</td>
<td>The user is logged off the system</td>
</tr>
</tbody>
</table>

### Access via SNMP

The 1/3 Rack Converter may be accessed and monitored via the Simple Network Management Protocol (SNMP). SNMP is designed for control of network elements from a central management point.

The SNMP Management Information Base (MIB) file for the system, available from MITEQ defines the specifics of the interface. This file is read by the chosen SNMP management tool to provide an “understanding” of the interface. The MIB file is in a format that can be ready with any text editor. Do NOT modify this file.

SNMP operating parameters may be set on the COMMS web page. If SNMP operation is not desired, this feature may be rendered inaccessible by inserting a long arbitrary string in the Read Community and Write Community fields.

### Access via Telnet

The Converter may be accessed via Telnet. There is no special protocol on the Telnet channel; the Converter will expect the same commands, and offer the same replies, as via the RS485/RS422 serial port.

Telnet access must first be enabled on the COMMS web page. If not being used, it is recommended that it be left disabled for security reasons. When a Telnet connection is established, the Converter will request the password, which should be sent in the standard MITEQ wrapper ('{'<address byte(ignored)><password>'}'<checksum byte(ignored)>). The connection will be refused if a user is already logged in via the web interface.

Once the connection is established, standard serial commands may be sent and responses will be received. Logout is automatic when the Telnet connection is broken.

### 4.1.4 Firmware Upgrade

Instructions on how to use the firmware update program:

1. Install AutoUpdate and copy the s19 file to your computer. Make a note of where you save the file.
2. Start AutoUpdate.exe.
3. Find the Converter. Click the "Find..." button, it will show a list of Ethernet-based Converters that are available for reprogramming. Highlight the converter you wish to reprogram and click "OK".
4. Select the s19 file for uploading to the converter. Click "Browse..." and select the file DB163995_APP.s19. It is the other file that was extracted from the zip file.
5. Check the box that reads "Reboot When Complete."
6. Start the update process. Click "Update." There will be a message box that reports if it successfully completed or not. Successful programming takes approximately 30 seconds, unsuccessful programming can take 2 minutes to time out.

After the upgrade, it will be necessary to log in again. The new firmware version will be visible on the login page.

4.1.5 DHCP (DYNAMIC HOST CONFIGURATION PROTOCOL)

IP settings can be statically set by the administrator, or they can be dynamically handled by a DHCP server.

Set the IP address to 0.0.0.0 in order to configure the device for DHCP. (See Section 5.4.2 for changing the IP address)

In order for DHCP mode to work properly, the converter must be connected to a DHCP server at power-up and when first set to DHCP mode. If the server is unavailable for 60 seconds, the converter will time out and the IP address will be set to 0.0.0.0.
APPENDIX 1 – CONNECTING WITHOUT A NETWORK

For testing, familiarization, or configuration, the Converter may be connected to a PC without a LAN. This may be done two ways:

1 - Connect via an Ethernet hub, using standard cables
2 - Connect directly using a single, reversing cable

In this configuration, the PC must be configured with a Static IP address. The procedure for this varies between OS types and versions. Consult the operating manual or help files available with the computer to be used to determine the proper procedure.

The computer must be configured with the same Subnet Mask, but a different IP address, to connect properly. For connecting with the converter as shipped from the factory, the following settings are recommended:

IP Address: 192.168.1.2
Subnet Mask: 255.255.255.0
Gateway: 0.0.0.0

Note: Factory setting IP address is assigned at time of final testing of the converter. The default IP is recorded on the Final Test Data Sheet for the unit. Unique IP addresses are provided and recorded on the basis of serial number at MITEQ.

Both standard and reversing cables are widely available. The following chart is provided for assembling cables if desired, or for identifying a specific cable type:

<table>
<thead>
<tr>
<th>Direct Cable Wiring</th>
<th>Crossover Cable Wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 wh/or 1</td>
<td>1 wh/or 3</td>
</tr>
<tr>
<td>2 or 2</td>
<td>2 or 6</td>
</tr>
<tr>
<td>3 wh/gn 3</td>
<td>3 wh/gn 1</td>
</tr>
<tr>
<td>4 bl 4</td>
<td>4 bl 4</td>
</tr>
<tr>
<td>5 wh/bl 5</td>
<td>5 wh/bl 5</td>
</tr>
<tr>
<td>6 gn 6</td>
<td>6 gn 2</td>
</tr>
<tr>
<td>7 wh/br 7</td>
<td>7 wh/br 7</td>
</tr>
<tr>
<td>8 br 8</td>
<td>8 br 8</td>
</tr>
</tbody>
</table>

APPENDIX B – REACHING THE CONVERTER BY NAME INSTEAD OF IP ADDRESS

If the Converter is connected to a LAN equipped with a Domain Name Server, the network manager may be able to configure the server to associate a particular text name with an IP address. If this is not the case and addressing by name is desired, machines equipped with Microsoft Windows may be configured for this capability.

Locate the “hosts” file on the PC to be configured. Some common locations for the host’s file are:

Windows XP: C:\WINDOWS\SYSTEM32\DRIVERS\ETC
Windows 2K: C:\WINNT\SYSTEM32\DRIVERS\ETC
Win 98\ME: C:\WINDOWS

The hosts file is a plain-text file of the form:
Add the desired address/name pair(s) to the list. Generally, it is a good idea to back up any system file before modification. An example host file is provided here:

```
216.239.39.99 google.com
127.0.0.1 localhost
192.168.1.1 miteqConv_1
192.168.1.2 miteqConv_2
```

In some cases, it may be necessary to reboot the PC before changes to the host file take effect.

Other Operating Systems may use a different mechanism. Consult the appropriate documentation to change host settings.

**GLOSSARY**

10-baseT Controlled-impedance cable used for Ethernet wiring

Crossover Cable An Ethernet cable wired with the signal pairs reversed, to permit connection of two computer devices.

Direct Cable An Ethernet cable wired with the signal pairs directly connected, to permit connection between a computer and hub or router

FTP File Transfer Protocol, a protocol for moving files between computers via a TCP/IP connection

Gateway An IP setting parameter that indicates how a device may connect to other devices that are not a member of the immediate subnetwork

HTTP Hypertext Transport Protocol. The standard protocol for moving web pages between servers (e.g. the Converter) and clients (e.g. the web browser)

Hub A component used to connect several Ethernet-equipped devices together.

IP Address Internet Protocol address. A unique address used to identify and connect to a device.

LAN Local Area Network. A means (usually, but not always Ethernet) for connecting multiple computing devices together for high-speed communications.

IP Internet Protocol. Specifies an organization of data packets sent between computers for network communications.

MSIE Microsoft Internet Explorer, the web browser integrated with most versions of Microsoft Windows. The Converter interface design was optimized for operation with MSIE 5.0 or higher

RJ45 The standard telephone-style connector used for terminating twisted-pair Ethernet cables.

SNMP Simple Network Management Protocol, a system of communication between managed network elements (e.g. the Converter), and a network control program, e.g. HP Openview.

Subnet Mask A numeric mask defining the size of a subnetwork. Bits cleared in the mask define IP addresses that may
communicate on the subnetwork.

**TCP**
Transmission Control Protocol. Specifies a mechanism for establishing a virtual connection between network elements, usually via IP.

**Telnet**
A simple mechanism for communicating between two devices via TCP. A connection is opened between the devices, and bytes may then pass freely between them, as with a serial connection.