CHAPTER 7: Event Logging

Overview

During normal operation, the EmulationEngine processes and can log various types of events. When an event is logged, a record of the event is stored for future analysis. The event record includes a timestamp, an indicator of the type of event that occurred, and a limited amount of data to describe the event.

Event logging is controlled on three levels:

1) master enable (controlled by set evlog enable/disable)

2) verbosity level (controlled by set evlog level <level>)

3) module enable (controlled by set evlog module <module name> enable/disable)

1) The master enable controls whether event logging occurs at all. The master control is independent of other filters. If "set evlog disable" is used, enabling event logging for a particular module has no effect.

2) The verbosity level sets an “importance” threshold for events: at lower verbosity, only more “important” events are logged; at higher verbosity, less important events may also be logged.

3) Each event is processed by a given module or process within the EmulationEngine. The various processes of the system can be individually enabled for event logging.

The event logging function stores event records into a buffer area in memory. The log buffer is a circular buffer that can hold 512 event records. The "get evlog buffer" command can be used to display the contents of the buffer at any time.

Event data can also be written to a log file in Flash. When writing to a file is enabled by the "set evlog file enable" command, the log buffer is flushed to a file every 30 seconds or every time it wraps at the 512-record limit (which ever comes first). There are two log files, A and B. The EmulationEngine will alternate between the two files so that at least one full file is available at any given time. Each log file can store up to 4,000 event records. You can display the records stored in either file using the "get evlog file A" and "get evlog file B" CLI commands.

Event Record Format

Event records are printed in the following format:

```
[header]: [message] [optional parameters]
```

Example:

```
12/27/2002,9:59:57,2296.320226,11396: RX: ok pDesc 0x9326c0
hwStatus 01cd803c:0be20203 numRxDesc 9643712
```

where:

[header] is a standard header consisting of a timestamp, microsecond clock reference and sequence number (e.g.: 12/27/2002,9:59:57,2296.320226,11396)

timestamp = 12/27/2002,9:59:57 (time the event occurred, taken from the system clock)

microsecond clock reference = 2296.320226 (in seconds, resolution to 1 microsecond, not sync'ed to timestamp)

sequence number = a sequential number assigned to each record (e.g., 11396; next event would be 11397, 11398, etc.)

[message] is very brief text string (typically < 15-20 characters) indicating the type of event that occurred (e.g.: RX: ok indicates a valid 802.11 frame received without error).

[optional parameters] describe the specific circumstances of this particular occurrence of the event. It can be up to four 32-bit parameters. Example: pDesc 0x9326c0 hwStatus 01cd803c:0be20203 numRxDesc 9643712.

CLI Commands

The following CLI commands control event logging:

set evlog enable/disable: This is the master control to enable or disable event logging (i.e., to the event log buffer in RAM). The default is enabled.

set evlog level <level>: This command sets the verbosity level (0/critical, 1/low, 2/medium, or 3/high) for event logging. The default is critical.

set evlog module <module> enable/disable: This command enables or disables logging events from the specified module or process: EmulationEngine control events, virtual station control events, WLAN transmit and receive events, and User Interface events. By default, the following processes are enabled for event logging: EmulationEngine control events and virtual station control events. The following processes are disabled for event logging: WLAN transmit and receive events and User Interface events.

set evlog console enable/disable: This command enables or disables logging directly to the console. The default is disabled.

set evlog file enable/disable: This command enables or disables recording logged events to file. The default is disabled.

get evlog settings: This command shows the current event log control settings.

get evlog buffer [n] – This command prints the last n events logged to the log buffer in memory. If [n] is omitted or zero, all events currently in the log buffer will be displayed.

get evlog file A/B <startRec#> <count>: This command prints event records in log file A or B. If no starting record number <startRec#> is given, records are displayed starting with the first record in the file. If no count of records is given, all records are displayed. You can also use "?" to display the number of records in the file.

clear evlog file A/B: This command clears all event records from log file A or B

clear evlog buffer: This command clears all event records from the log buffer.

save evlog: This command flushes all records from the log buffer to the log file, even if log to file is not enabled.

NOTE: Event log control settings are not permanent. They are not saved with other configuration controls. They must be entered following startup as desired to change event log operation from the default settings indicated above.

The Web-Based User Interface

You can configure and display the event log by selecting the Logging tab in the web-based user interface side bar. See the "Event Log Side Bar" in Chapter 5 for details.

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CHAPTER 8: Statistics Counters

The statistics counters defined in this chapter can be:

1) Selected when creating a new monitor in the Monitoring/New Monitor dialog.

2) Displayed as legends or table headings in a monitor or reports page.

3) Displayed using CLI commands.

Individual Virtual Station Counters

If statistics for individual virtual stations are selected, one or more of the following values may be shown.

Individual Virtual Station 802.11 Management Counters

Counter	Description
Authentications	Number of times the virtual station has Authenticated with the System Under Test
Deauthentications	Number of times the virtual station has Deauthenticated from the System Under Test
Associations	Number of times the virtual station has Associated with the System Under Test
Disassociations	Number of times the virtual station has Disassociated from the System Under Test

Individual Virtual Station Signal Quality Indication

Counter	Description
Rcv Signal Strength	Signal strength indication for the most recently received frame
Ack Signal Strength	Received signal strength indication (RSSI) in the most recently received ACK frame
Rcv Rate	Data rate for the most recently received frame
Tx SF Rate	Data rate for the most recently transmitted short frame
Tx LF Rate	Data rate for the most recently transmitted long frame

Individual Virtual Station Frame Counts

Counter	Description
Rcv MSDUs	Total frames received by the virtual station, all frame types
Rcv Data	Data frames received by the virtual station
Rcv Mcast	Multicast frames received by the virtual station
Rcv Mgmt	Management frames received by the virtual station
Rcv Ctrl	Control frames received by the virtual station
Tx MSDUs	Total frames transmitted by the virtual station, all frame types
Tx Data	Data frames transmitted by the virtual station

Counter	Description
Tx Mcast	Multicast frames transmitted by the virtual station
Tx Mgmt	Management frames transmitted by the virtual station
Tx Ctrl	Control frames transmitted by the virtual station

Individual Virtual Station Ping Statistics

These counters are only shown if the virtual station was configured for internal mode:

Counter	Description
Transmit Count	Number of Pings the virtual station is configured to send
Transmit Data Size	Size of the data payload in the ICMP Echo message
Packets Transmitted	Number of ICMP Echo packets that have been transmitted
Bytes Transmitted	Number of data bytes that have been transmitted in ICMP Echo packets
Transmit ENOBUFS	Number of times a buffer was not available for transmission
Packets Received	Number of ICMP Echo Response packets that have been received
Bytes Received	Number of data bytes that have been received in ICMP Echo Response packets
Round-trip Min	Time difference between transmitted ICMP Echo and received ICMP Echo Response, minimum observed
Round-trip Max	Time difference between transmitted ICMP Echo and received ICMP Echo Response, maximum observed
Round-trip Avg	Average time difference between transmitted ICMP Echo and received ICMP Echo Response, in microseconds
Round-trip Stddev	Standard deviation in time difference between transmitted ICMP Echo and received ICMP Echo Response

Individual Virtual Station Error Statistics

Counter	Description
Rcv Errors	Total receive errors
Rcv PHY Errors	Receive errors at the PHY level
Rcv CRC Errors	CRC errors in received frames
Rcv Duplicates	Duplicate frames received
Rcv Discarded	Received frames discarded
Ack Rcv Fails	ACK receipt failures
Tx Errors	Total transmit errors
Excess Retries	Transmit retry attempts exceeded
Total Retries	Total transmission retries

Counter	Description
Tx Filtered	Transmit frames filtered
Tx Discarded	Transmit frames discarded
RTS Fails	RTS-CTS failures
Authentication Type	Virtual station authentication type (open-system or shared-key)
Encryption	Virtual station encryption mode (on/off)
Rcv Decrypt Errs	Received frame decryption CRC errors
FCS_Fails	Frame checksum errors in received frames
WEP_Excluded	Received frames that were rejected because of incorrect encryption

Summary Statistics

Summary statistics provide a summary report taken over a set of virtual stations. The virtual station set can be a defined group or all virtual stations currently in the system. In contrast, the individual virtual station statistics report provides a list of statistics and counters for an individual virtual station. The summary report provides a summary of the statistics and counters taken over the indicated set of virtual stations. The summary gives, for each counter, the minimum and maximum values for that counter found in the set of virtual stations examined, the average value, and where applicable the total (sum) over the set of virtual stations. If summary statistics are selected, one or more of the following values may be shown.

Summary Signal Counters

Counter	Description
RxSigMin	Minimum signal strength indication for received frames
RxSigMax	Maximum signal strength indication for received frames
RxSigAvg	Average signal strength indication for received frames
AckSigMin	Minimum received signal strength indication (RSSI) in received ACK frames
AckSigMax	Maximum received signal strength indication (RSSI) in received ACK frames
AckSigAvg	Average received signal strength indication (RSSI) in received ACK frames
RxRateMin	Minimum data rate for received frames
RxRateMax	Maximum data rate for received frames
RxRateAvg	Average data rate for received frames
TxRateSfMin	Minimum data rate for transmitted short frames
TxRateSfMax	Maximum data rate for transmitted short frames
TxRateSfAvg	Average data rate for transmitted short frames

Counter	Description
TxRateLfMin	Minimum data rate for transmitted long frames
TxRateLfMax	Maximum data rate for transmitted long frames
TxRateLfAvg	Average data rate for transmitted long frames

Summary Transmit Statistics

Counter	Description
TxMsduMin	Minimum frames transmitted per virtual station, all frame types
TxMsduMax	Maximum frames transmitted per virtual station, all frame types
TxMsduAvg	Average frames transmitted per virtual station, all frame types
TxMSDUs	Total frames transmitted by all virtual stations, all frame types
TxDataMin	Minimum data frames transmitted per virtual station
TxDataMax	Maximum data frames transmitted per virtual station
TxDataAvg	Average data frames transmitted per virtual station
TxDataFrames	Total data frames transmitted by all virtual station
TxMcastMin	Minimum Multicast frames transmitted per virtual station
TxMcastMax	Maximum Multicast frames transmitted per virtual station
TxMcastAvg	Average Multicast frames transmitted per virtual station
TxMcastFrames	Total Multicast Frames transmitted by all virtual stations
TxMgmtMin	Minimum Management Frames transmitted per virtual station
TxMgmtMax	Maximum Management Frames transmitted per virtual station
TxMgmtAvg	Average Management Frames transmitted per virtual station
TxMgmtFrames	Total Management Frames transmitted by all virtual stations
TxCtrlMin	Minimum Control Frames transmitted per virtual station
TxCtrlMax	Maximum Control Frames transmitted per virtual station
TxCtrlAvg	Average Control Frames transmitted per virtual station
TxCtrlFrames	Total Control Frames transmitted by all virtual stations
TxRetryMin	Minimum transmission retries per virtual station
TxRetryMax	Maximum transmission retries per virtual station
TxRetryAvg	Average transmission retries per virtual station
TxTotalRetries	Total transmission retries by all virtual stations
TxErrMin	Minimum transmission errors per virtual station
TxErrMax	Maximum transmission errors per virtual station
TxErrAvg	Average transmission errors per virtual station
TxErrors	Total transmission errors by all virtual stations

Summary Receive Statistics

Counter	Description

Counter	Description
RxMsduMin	Minimum frames received per virtual station, all frame types
RxMsduMax	Maximum frames received per virtual station, all frame types
RxMsduAvg	Average frames received per virtual station, all frame types
RxMSDUs	Total frames received by all virtual stations, all frame types
RxDataMin	Minimum data frames received per virtual station
RxDataMax	Maximum data frames received per virtual station
RxDataAvg	Average data frames received per virtual station
RxDataFrames	Total data frames received by all virtual stations
RxMcastMin	Minimum Multicast frames received per virtual station
RxMcastMax	Maximum Multicast frames received per virtual station
RxMcastAvg	Average Multicast frames received per virtual station
RxMcastFrames	Total Multicast Frames received by all virtual stations
RxMgmtMin	Minimum Management Frames received per virtual station
RxMgmtMax	Maximum Management Frames received per virtual station
RxMgmtAvg	Average Management Frames received per virtual station
RxMgmtFrames	Total Management Frames received by all virtual stations
RxCtrlMin	Minimum Control Frames received per virtual station
RxCtrlMax	Maximum Control Frames received per virtual station
RxCtrlAvg	Average Control Frames received per virtual station
RxCtrlFrames	Total Control Frames received by all virtual stations
RxErrMin	Minimum receive errors per virtual station
RxErrMax	Maximum receive errors per virtual station
RxErrAvg	Average receive errors per virtual station
RxErrors	Total receive errors by all virtual stations

Summary Error Statistics

Counter	Description
Rcv_PHY_Errors	Receive errors at the PHY level
Rcv_CRC_Errors	CRC errors in received frames
Rcv_Discarded	Total received frames discarded
Rcv_Duplicates	Duplicate frames received
Ack_Rcv_Fails	ACK receipt failures
FCS_Fails	Frame checksum errors in received frames
Tx_Discarded	Total transmit frames discarded
Tx_Excess_Retries	Transmit retry attempts exceeded
Rcv_Decrypt_Errors	Received frame decryption CRC errors
WEP_Excluded	Received frames rejected because of incorrect encryption

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CHAPTER 9: Troubleshooting

Login Name and/or Password Recovery

If configuration records for your EmulationEngine are lost and you do not remember its user name or password, it may not be possible to log in to the device. If this should happen, a special login sequence will direct the EmulationEngine to reset the login name and password to their factory defaults.

- Open a telnet connection to the device
- At the login prompt, type RESET in response to the EE login prompt and FACTORY in response to the Password prompt. These are both case sensitive. Example:

```
EE login: RESET

Password: *******
```

In response to this sequence, the EmulationEngine will reset both the login username and the login password to their factory defaults (User Name: Admin, Password: EE). A new configuration file with the reset login and password will be written to the Flash file system, and the EmulationEngine will issue a new login prompt. No other configuration parameters are affected by this operation.

You may now log in using the factory default login name (Admin) and password (EE). Following successful login, you may use the "set login" or "set password" CLI commands to set these parameters as desired. Be sure to record the new settings for future reference.

Using a Third-Party Load Generator

Symptom: Telnet or the Web Client becomes unresponsive during a test or cannot connect at the conclusion of a test.

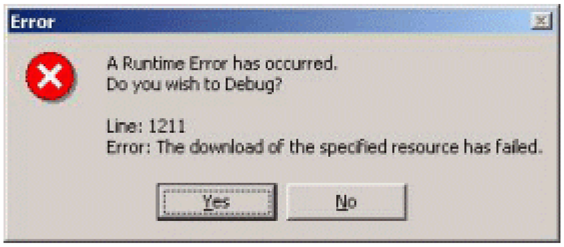
Possible Problems:

- If your Load Generator exceeds the maximum 802.3 rate specified in the EmulationEngine Specifications during a test: 1) Telnet and/or the Web Client may not be able to establish a new connection. 2) If connected, Telnet and/or the Web Client may lose connectivity to the EmulationEngine.
- If Telnet or the Web Client become unresponsive during a test or cannot connect at the conclusion of a test, make sure your Load Generator is not responding to ARP requests that are targeted to the EmulationEngine address. If this occurs, the ARP request transmitted from the PC Client (running telnet) or the Web Client for the purpose of obtaining the MAC address of an IP address, will respond with the Load Generator's MAC address instead of the EmulationEngine's MAC address. All data sourced from the PC

client would incorrectly be destined to the Load Generator instead of the EmulationEngine.

Web-Based User Interface Login Error

If you are running a personal firewall product (e.g., ZoneAlarm, McAfee's software firewall, etc.) on the command PC, the following error dialog may be displayed by your browser immediately following successful log-in to the EmulationEngine web server:



A Runtime Error has occurred.
Do you wish to Debug?

Line: 1211
Error: The download of the specified resource has failed.

If this error dialog is displayed, just click the No button to continue. This error has not impact on the operation of the web-based user interface or the EmulationEngine.

Hardware Installation/LEDs

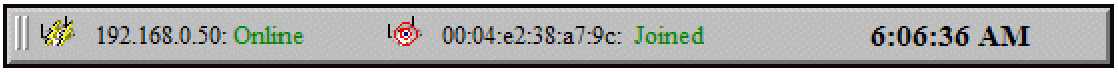
Power LED: When you apply power to the EmulationEngine, the power LED (the left-most LED facing the front of the unit) should flash momentarily and then light ON (solid). If this does not occur, check the power cable connection and/or the power outlet where the power supply is installed. If power is being supplied to the unit and the Power LED remains off, it may indicate that the EmulationEngine's software image file (EE22.SYS) cannot be loaded into flash (i.e., corrupted or does not exist).

Ethernet LED: When you attach the Ethernet cable between the command PC and the EmulationEngine, the Ethernet link LED (the middle LED) should flash momentarily and then light ON (solid). This should occur if you are attaching directly to the EmulationEngine using a cross-over cable or through a hub/switch using a straight cable. If the LED remains OFF, check the cable connections. If the LED remains OFF, one or more of the following problems may exist:

- Incorrect or defective cable
- Defective hub/switch
- Using the wrong port on a hub/switch (i.e., uplink port instead of 10/100 port)

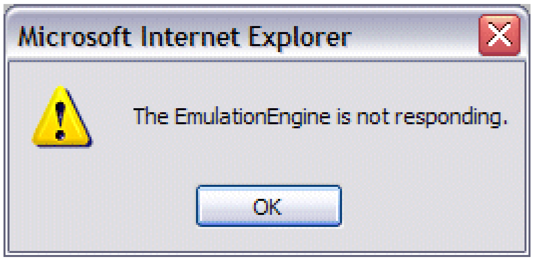
EmulationEngine Busy or Not Responding

The status bar in the top-right corner of the web-based user interface main page shows the status of the EmulationEngine with the System Under Test.



192.168.0.50: Online 00:04:e2:38:a7:9c: Joined 6:06:36 AM

The status (e.g., Online) next to the EmulationEngine IP address indicates the current status of EmulationEngine with with the web-based user interface. This status may intermittently display “Busy”. If the Busy condition lasts longer than the Polling Timeout specified in the Configure EmulationEngine dialog, the status will change to Not Responding and the following dialog will be displayed:



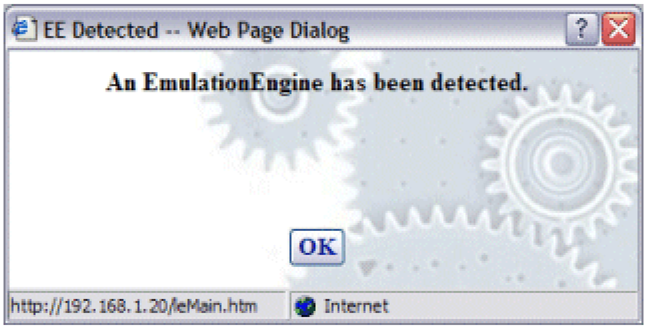
Microsoft Internet Explorer

The EmulationEngine is not responding.

When this dialog is displayed, the user interface will disable all actions until the EmulationEngine starts responding again. When you click “OK” to dismiss this dialog, the EmulationEngine/System connection status in the status bar will display “Offline”.

- If Busy is frequently shown in the status bar, increase the value of the Polling Interval in the Configure EmulationEngine dialog (see EE->Configure EE).
- If the “EmulationEngine Not Responding” dialog is displayed frequently, increase the value of the EE Polling Timeout in the Configure EmulationEngine dialog (see EE->Configure EE).
- If the “EmulationEngine Not Responding” dialog continues to be displayed, check the cable connections between the command PC and the EmulationEngine.
- You may also establish a telnet connection to access and log in to the CLI to verify that the EmulationEngine is or is not responding.

When Not Responding status is cleared and the web-based user interface receives a response from the EmulationEngine, the following dialog will be displayed:

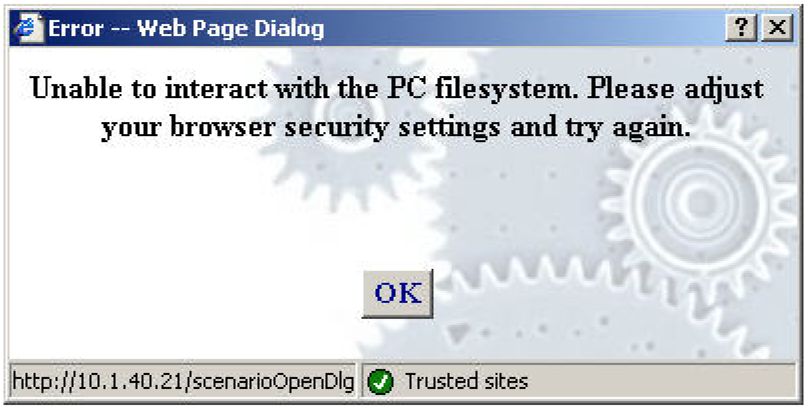


EE Detected -- Web Page Dialog

An EmulationEngine has been detected.

Loading Files from the Command PC

If you attempt to load a scenario file from the command PC using the web-based user interface, the browser may display the following warning dialog:



Error -- Web Page Dialog

Unable to interact with the PC filesystem. Please adjust your browser security settings and try again.

Click "OK" to continue.

Missing Key File

The EmulationEngine is offered in four configurations:

- EmulationEngine 11a: Supports IEEE 802.11a only.
- EmulationEngine 11b: Supports IEEE 802.11b only.
- EmulationEngine 11a/11b: Supports IEEE 802.11a and 802.11b.
- EmulationEngine 11a/b/g: Supports IEEE 802.11a, 802.11b, and 802.11g.

Each configuration is shipped with a unique feature key that is stored in the EmulationEngine's flash file system. If the keyfile does not exist or is corrupted or you have requested a feature upgrade, the CLI will prompt you to enter your authorization code in order to create the keyfile. There are only two conditions where the authorization code must be entered.

1) Feature Upgrades

2) Corrupted or non-existent keyfile

NOTE: The web-based user interface does not provide any indication of a missing keyfile. When the keyfile is missing, the EmulationEngine's web server will not respond to the browser.

If the keyfile has been corrupted or does not exist or you have requested a feature upgrade, you will be prompted to enter your unique key/authorization code when you establish a telnet or serial connection and log in to the CLI.

Example:

```
telnet 192.168.0.50
EE login: Admin
Password: **
```

```
Communication Machinery Corporation
EmulationEngine(tm) 11a/b/g Rev 2.0.0

System date & time is THU JAN 01 00:00:44 1970
Use the "set date" or "set time" command to adjust

EmulationEngine 11a/b/g software version 2.0.0
WLAN mode ................... 802.11a
WLAN MAC address ............ 00:0b:cd:59:23:57
WLAN address mask ........... ff:ff:ff:ff:00:00
LAN MAC address ............. 00:0b:16:00:00:07
BSSID of System Under Test.... 00:60:1d:f0:de:97
The EmulationEngine is not joined with the SUT.
0 vSTAs currently in the system.
*** This EmulationEngine has not been Node Locked
*** Please enter "admin" to continue
```

Enter the “admin” command and enter “cmc” at the password prompt:

```
CMC_EE -> admin
Password: ***
Ok
```

When administrative mode is activated with this command, the CLI will prompt for the authorization code:

```
Please Enter EE Authorization Codes for MAC:
00:0b:16:00:00:07
CMC_EE ->
```

Enter your authorization code at the CMC_EE-> prompt. This authorization code is provided on a separate sheet in your shipping container with the EmulationEngine. If you have lost your authorization code, please contact CMC Technical Support (www.cmc.com).

After you enter the correct authorization code, the CLI will display the following message.

```
Thank you...Authorization Codes Accepted
```

When this message is displayed, the keyfile is created in flash and this procedure will no longer be required.

Configuration Records

Print this page and use the following form to keep a record of EmulationEngine configuration parameters:

Parameter	**Default**	**CLI Command**	**Configured Value**
IP address	192.168.0.50	set ipaddr	
Subnet mask	255.255.255.0	set ipmask	
Gateway	192.168.1.254	set gateway	
Username	Admin	set login	
Password	EE	set password	
WLAN Base MAC Address		set eemac	
WLAN MAC Mask	ff:ff:ff:ff:00:00	set eemask	

APPENDIX A: Specifications

Hardware

Standards: IEEE 802.11a, IEEE 802.3 and IEEE 802.3u, IEEE 802.1d, IEEE 802.11a, IEEE 802.11b, IEEE 802.11g

Ports:

- (1) 10/100Base-T Ethernet, RJ-45(UTP)
- (1) RS-232 (DB9)
- (1) Power - 5V DC, 2.5A

Frequency Range: 802.11a: 5GHz Unlicensed National Information Infrastructure (UNII) band, 802.11b/g: 2.4 GHz band.

Modulation Technology: Orthogonal Division Frequency Multiplexing (OFDM) and Complementary Code Keying (CCK)

Modulation Techniques:

Receiver Sensitivity:

- 54, 48, 36, 24, 18, 9, 6 Mbps OFDM
- 11, 5.5 Mbps CCK
- 2 Mbps QPSK (Quadrature Phase Shift Keying)
- 1 Mbps BPSK (Binary Phase Shift Keying)

Media Access Control: CSMA/CA

Wireless Frequency Range:

- 2.4 to 2.4825 MHz
- 5.150 to 5.850 GHz

LEDs:

- Power
- Ethernet Link/Activity
- Wireless Activity

Antenna Type: Tri-mode dual 5dBi dipole antennas with diversity, Power software configurable.

Physical Dimensions:

- L = 9.25 inches
- W= 6.38 inches
- H = 1.63 inches

Temperature

- Operating: 0°C to 55°C (32°F to 131°F)
- Storing: -20°C to 65°C (-4°F to 149°F)

Humidity: 5%-95%, non-condensing

Safety and Emissions: FCC

Software

EmulationEngine Core:

- IEEE 802.11a, 802.11b, 802.11g
- Maximum number of virtual stations: 64

Performance: See the EmulationEngine Specifications sheet for detailed performance figures.

Network Management: Web-Based browser with JavaScript and Command Line Interface (CLI)

Web-Based User Interface:

- Maximum number of groups per Scenario: 10
- Maximum monitors per Scenario: 4

Encryption:

- Cipher Encryption Mode: Shared WEP key on per virtual station basis
- Authentication: Open-system and shared keys on per virtual station basis
- Shared keys: up to 4 keys
- Shared WEP encryption keys: 64-, 128-, 152-bit

RTS/CTS: Support for RTS/CTS

Fragmentation: Fragment Threshold support

Rates: 802.11a: 6, 9, 12, 18, 24, 26, 48, 54 Mbps. 802.11b: 1, 2, 5.5, 11 Mbps. 802.11g: 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, 54.

Circular Event Log: up to 8000 records

Telnet Sessions: up to 4

Maximum 802.3 packet size: 1518 bytes

802.11 Emulation: Fully emulates 802.11 station states in terms of: authentication, association, disassociation, de-authentication

Operational Mode: Constant Awake Mode (CAM)

External mode: IP traffic only

Channels supported in GHz: 802.11a: 36(5.180), 40(5.200), 44(5.220), 48(5.240), 52(5.260), 56(5.280), 60(5.300), 64 (5.320), 149 (5.745), 153 (5.765), 157 (5.785), 161 (5.805), 165 (5.825). 802.11b/g: 1 (2.412), 2 (2.417), 3 (2.422), 4 (2.427), 5 (2.432), 6 (2.437), 7 (2.442), 8 (2.447), 9 (2.452), 10 (2.457), 11 (2.462).

Internal Log-In: user name and password

Flash size: 3.0 MBytes Total/1.2 MBytes Available for storing scenarios, event logs and statistics

APPENDIX B: Software Upgrades

Complete the following steps to load a new software file into the EmulationEngine’s flash file system:

1) If you are already logged in to the CLI, type reboot to return the EmulationEngine to a known state:

```
reboot
```

2) Use Telnet to log back in to the CLI:

```
telnet 192.168.0.50
EE login: Admin
Password: EE
EmulationEngine Rev x.x
CMC_EE ->
```

This step uses the EmulationEngine’s default IP address (192.168.0.50). If you have changed the IP address, use the address you previously configured in the EmulationEngine.

3) Use the "ls" command to verify that there is enough space in the flash file system for the new software.

```
CMC_EE -> ls
```

4) Compare the bytes free count to the size of the software file you want to download. If there is not enough space, use the "rm" command to remove one or more files from flash. **DO NOT** remove the keyfile.

```
CMC_EE -> rm <file_name>
```

5) You must have an FTP server running in order to complete this step. In the CLI, enter the "ftp" command and the command PC’s IP address. Example:

```
CMC_EE -> ftp 192.168.0.2
```

6) Enter your FTP server user name and password. Just press <Return> in response to either prompt if there is no user name or password.

```
Username: <your_user_name>
Password: <your_password>
```

7) At the prompt for a remote file, give the pathname to the latest EE22.SYS file on your PC (e.g., c:\EE22.SYS). For the local file use EE22NEW.SYS. Enter “down” at the “dowload or upload” prompt.

```
Remote File: c:\EE22.SYS
Local File: EE22NEW.SYS
download or upload: down
Getting @192.168.0.2:c:\EE22.SYS -> EE22NEW.SYS
###########################################################
###########################################################
###########################################################
###########################################################
###########################################################
```

```
###########################################################
###########################################################
###########################################################
###########################################################
###########################################################
###########################################################
###########################################################
###########################################################
###########################################################
#
done
1007441 bytes
CMC_EE ->
```

8) When the transfer is complete, use the "ls" command to verify that the size of the file in Flash is the same number of bytes as the file on the FTP server/command PC.

```
CMC_EE -> ls
```

9) At the CMC_EE-> prompt, type the following command to move the file and use the correct boot name.

```
CMC_EE -> mv EE22NEW.SYS EE22.SYS
```

10) When the move is complete, use the "ls" command to verify the file has been moved with the correct name.

```
CMC_EE -> ls
```

11) Use the "reboot" command to reboot the EmulationEngine and to activate the new software.

```
CMC_EE -> reboot
```

After reboot, you must reestablish the telnet session in order to log back in to the CLI. If the CLI displays the message “This EmulationEngine has not been Node Locked” after you enter the EE login name and password, see “Missing Key File” in Chapter 9. Troubleshooting.

APPENDIX C: Cable Pin Assignments

Standard Ethernet Cable

A straight cable can be used to connect the Command PC to a hub and the hub to the EmulationEngine For a straight cable; the wires match one for one. This cable is not provided.

Pin 1: Rx+

Pin 2: Rx-

Pin 3 : Tx+

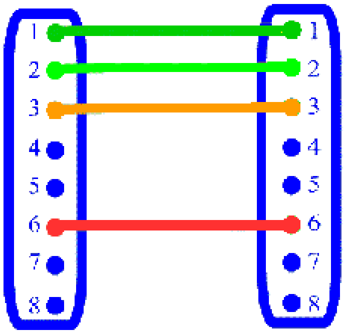
Pin 4 : Not Used

Pin 5 : Not Used

Pin 6 : Tx-

Pin 7 : Not Used

Pin 8: Not Used



Ethernet
Straight Cable

Ethernet Cross-Over Cable

A cross-over cable must be used to connect the Command PC directly to the EmulationEngine. This cable is provided.

Pin 1: Rx+

Pin 2: Rx-

Pin 3 : Tx+

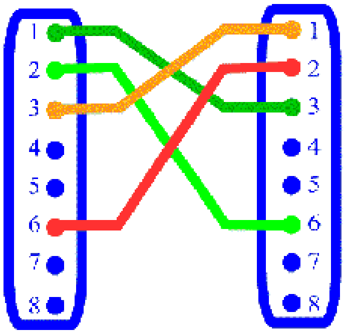
Pin 4 : Not Used

Pin 5 : Not Used

Pin 6 : Tx-

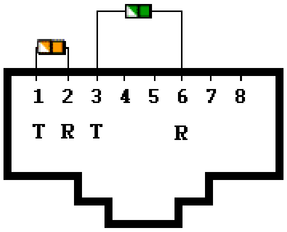
Pin 7 : Not Used

Pin 8: Not Used



Ethernet
Cross-Over Cable

RJ-45 Connector



10/100Base-T

Serial Cable

The following table shows the connector pin assignments for the DB9 connector. The provided serial cable is a straight cable with female and male connectors. In this table, DTE refers to the local/EmulationEngine side of the connection and DCE is the remote side.

DB-9	SIGNAL DIRECTION	SIGNAL NAME
1	x	Protective Ground
3	DTE-to-DCE	Transmitted Data
2	DCE-to-DTE	Received Data
7	DTE-to-DCE	Request To Send
8	DCE-to-DTE	Clear To Send
6	DCE-to-DTE	Data Set Ready
5	x	Signal Ground
1	DCE-to-DTE	Received Line Signal Detector (Carrier Detect)
4	DTE-to-DCE	Data Terminal Ready
9	DCE-to-DTE	Ring Indicator

APPENDIX D: Error and Status Messages

The EmulationEngine may display the following error and status messages in response to incorrect or unexpected user actions or WLAN activity.

EmulationEngine or Virtual Station Control Messages

Message	Description
EE Lost SUT (no beacons)	The EmulationEngine was joined with the System Under Test but has stopped receiving beacons from it.
EE Not joined with System Under Test	A requested operation could not be performed because the EmulationEngine is not joined with a System Under Test.
Internal system error	A requested operation resulted in an unspecified internal error.
Invalid message identifier	Internal error: the vSTA control task received a Command message with an invalid message identifier.
Invalid object identifier	The vSTA control task received a GET or SET Command message with an invalid Object identifier.
Invalid object value	The vSTA control task received a SET Command message with an invalid object value.
Invalid operation	Internal error: the vSTA control task received a Command message with an invalid operation code.
Invalid vSTA identifier	The vSTA control task received a Command message with an invalid vSTA identifier.
Invalid vSTA state for operation	A requested operation could not be performed because the specified vSTA is not in the appropriate state.
vSTA idle	A requested operation could not be performed because the specified vSTA is in the Idle state.
vSTA not configured	A requested operation could not be performed because the specified vSTA has not been Configured.
vSTA not idle	A requested operation could not be performed because the specified vSTA is not in the Idle state.
vSTA not initialized	A requested operation could not be performed because the specified vSTA has not been Initialized.
vStaControl() Err writing NOTIFY into UI's queue	The vSTA control task cannot post a message because the UI task’s queue is full. This may occur if a web user logs out while the EmulationEngine is running and so may be ignored.
vStaControl() Task for NOTIFY no longer exists	The vSTA control task cannot post a message because the UI task is no longer present. This may occur if a telnet user logs out while the EmulationEngine is running and so may be ignored.

MAC Layer Management Messages

Message	Description
Invalid parameter	Internal error: an MLME function has been invoked with an invalid parameter.
MLME Already in BSS	Internal error: a requested MLME function was rejected because the EmulationEngine is already a member of a BSS.
MLME Driver error	Internal error: an MLME function has encountered an unspecified error in the device driver.
MLME Op not supported	Internal error: an MLME function has been invoked which is not supported in the current configuration.
MLME Op refused	Internal error: a requested MLME function was rejected due to other current system activity.
MLME Op timed out	An invoked MLME function (e.g., Authentication or Association) has not completed within programmed timing parameters.
MLME Too many requests	Internal error: an MLME function has been invoked repeatedly without adequate completion.

Standard 802.11 WLAN Reason Codes

Message	Description
Authentication expired	The previous authentication of a station is no longer valid.
Class 2 frame received STA not AUTH	A class 2 frame was received from a nonauthenticated station.
Class 3 frame received STA not ASSOC	A class 3 frame was received from a nonassociated station.
Inactivity	A station was disassociated due to inactivity.
Leaving	Station deauthentication or disassociation because the station is leaving a BSS.
Not authenticated	The station requesting association is not authenticated.
Too many associations	The System Under Test is unable to handle all currently associated stations.
Unspecified	Unspecified reason.

Standard 802.11 WLAN Status Codes

Message
Association denied - Reason outside scope of standard
Association denied - STA does not support all data rates
Association denied - too many stations
Authentication frame with unexpected sequence
Authentication rejected - challenge failure

Message
Authentication rejected - next frame timed out
Can't support all requested capabilities
Reassociation denied - Can't confirm association exists
Specified algorithm not supported
Unspecified failure

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