



CTM-1m.DT

CTM-1m.1U



CYCLONE TIMING MODULE USER GUIDE

Getting Started

Plug in your CTM using either the primary or secondary power supply port. Connect your PC to the “network” port on the front of the unit via a standard CAT5 cable and your computers NIC card. Once you have established an Ethernet connection, you can access the web interface at the default IP address (**169.254.1.1**).

Using the CTM Control Panel, you can now navigate the various configuration and status pages within the CTM user interface.

CTM Main Page

The first page displays the current CTM network settings and readings from the GPS receiver on board.

Basic Information

Site name: When set, this field will display the name or location entered under the general system setup page.

Date: Displays the current date when CTM is connected to the GPS antenna, and has proper GPS lock.

Time: Displays corrected time when CTM is connected to the GPS antenna, and has proper GPS lock. Time correction can be adjusted to display current time in any time zone from General System Setup page.

Alert: Displays current state of alarm for quick reference.

MAC Address: Displays MAC address of CTM. Address is permanent, and can not be altered or changed by the user.

Flash Memory: Upon startup, the CTM will perform a checksum of the primary memory location containing the user interface and operating files. In the event that memory location “A” is corrupt, the CTM will boot up using location “B” and display a failed checksum for location “A”. If both memory banks have been corrupted, the CTM will boot up in Flash Loader mode. In the event of a simultaneous failure of both memory banks contact Last Mile Gear Technical Support at +1(360) 414-5990 or support@last-milegear.com.

Password Set: Displays current state of password security. Password system OFF is default, with no password set. Password security can be enabled by entering the desired code in the Change Password page. Once set, this field will display CTM Password lock is ON.

Interface Version: Shows current version of web interface operating software.

Control CPU: Shows current version of CPU software load.

Flash Loader Version: Shows current version of firmware upload software.

Hardware Version: Shows current version of CTM circuit board.

Radio Power Status: This window will display the current status of all 8 radio ports

Status: Here you will find the current state of power for each port. The ON condition will be displayed in green, and shows that this port is currently being powered. The OFF condition shows that this port is currently not powered and is shown in black. When this field displays the red TRIP status, the radio port has shorted out causing the CTM to automatically turn off power to this port. Power can be restored in the CTM Radio Setup page.

Sync: Displays current state of sync for each port. The ON condition shows that the sync pulse is being fed to the radio connected to the corresponding port. The OFF condition shows that the sync pulse is disabled and an uninterrupted 24VDC is being fed to the corresponding radio. Sync can be turned off and on for each port on the Radio Setup page.

Radio Power: This column will display the current power draw in Watts from each port.

Radio Name: This column will display the user defined name for each port. The user can edit these fields in the CTM Radio Setup page.

Network & Email Setup

IP Address: Displays the current IP address assigned to the CTM. The user can change the IP in the Network Setup page. Default IP setting is 169.254.1.1.

Subnet Mask: Displays the current subnet mask set in the CTM. The user can change this parameter in the Network Setup page. Default setting is 255.255.255.0.

Gateway: Displays the current gateway IP address set in the CTM. The user can change this address in the Network Setup page. Default gateway IP setting is 169.254.0.0.

DNS1: Displays the current primary DNS address set in the CTM. The user can change the address in the Network Setup page. Default DNS setting is 0.0.0.0.

DNS2: Displays the current secondary DNS address set in the CTM. The user can change the address in the Network Setup page. Default DNS setting is 0.0.0.0.

SNMP Target: Displays the current SNMP target address and port number set in the CTM. The user can change the address in the Network Setup page. Default setting is 0.0.0.0:162.

SNMP Community Str: Displays the current SNMP community string set in the CTM. The user can change this setting in the Network Setup page. Default community string is public.

SMTP Port: Displays the current SMTP port set in the CTM. The user can change the port number in the Network Setup page. Default port number is 25.

From Email: The current email address in which CTM alerts will be sent from.

Send To 1: Primary email address for email alert recipient. All alarms and settings changes will have an email generated and sent to this Email address. The user can change this setting in the Network Setup page.

Send To 2: Secondary email address for email alert recipient. All alarms and settings changes will have an email generated and sent to this Email address when entered. Changes for this setting can be made in the Network Setup page.

GPS Receiver Status & Environment

Timing: Here the status of the GPS timing pulse will be displayed. If the antenna is tracking more than 3 satellites, the CTM will display FIX. When the GPS receiver can see WAAS enabled satellites, the CTM will display WAAS LOCK in this location. If no satellites can be seen by the receiver, NO-FIX will be displayed.

Antenna Power: Displays the status of the antenna. The antenna must be connected prior to the CTM being powered up. Otherwise the CTM will not recognize the antenna.

SATS: Displays the number of satellites the GPS receiver can currently see. At least 6 satellites must be visible to the CTM for proper GPS timing.

Sig S/N (dB): This field displays the current GPS signal to noise level in dB. Antenna S/N noise floor needs to be about 35db in order to locate satellites. The number you see displayed on the web page is an averaged for different 4 satellites that the GPS is using for mathematical calculations. Ideally you want is to see 6 to 8 satellites being tracked. The S/N number will drop off dramatically, suddenly, when the cable gets too long, but is more an indicator of spectrum noise around the antenna. You should see the S/N in the 45 to 50db range, about 55 is max. If you have low S/N and a reasonable-length cable (and a working antenna) then the problem is either a bad cable joint or too much noise in the GPS spectrum (around 1.5GHz). You may also experience some rain fade issues but this is generally limited to instances of the most extreme precipitation. Water in the antenna cable will rapidly kill the GPS signal also. As you also found out, the antenna has to have a clear view of the sky, as much as possible.

Latitude: Displays current latitude position of CTM gathered from the GPS receiver. You must have visibility of at least 4 satellites before this field will show actual coordinates.

GPS Receiver Status & Environment - Continued

Longitude: Displays current latitude position of CTM gathered from the GPS receiver. You must have visibility of at least 4 satellites before this field will show actual coordinates.

Altitude: Displays current altitude of CTM. You will need more than 3 satellites before this field will show the actual elevation. Units of measurement can be changed from the default Metric units to standard in the General System Settings page.

Time Zone: Displays current time zone in relation to GMT. User can change offset in General System Settings page.

CTM Slave: Displays number of slave CTM's connected to the CTM-1M. By default this field will show CTM Slave Units Not Enabled.

Temperature: Displays current temperature inside the CTM case. Normal operating temperatures may vary depending on environment and installation. Temperature display units are adjustable from Celsius (default), to Fahrenheit in the General System Settings page.

Primary Volts: Displays current voltage on primary power port. Normal operating voltage is approximately 24VDC. In the event that the port has been shorted out, this field will display an OVER CURRENT alarm. The CTM will automatically switch to the secondary power port until the short has been removed.

Secondary Volts: Displays current voltage on secondary power port. Normal operating voltage is approximately 24VDC. In the event that the port has been shorted out, this field will display an OVER CURRENT alarm.

Logic Volts: Displays current voltage powering memory and processor circuits within the CTM, and should read approximately 5VDC.

CTM Radio Setup

CTM Master/Slave Buttons: When enabled this page will display a button to switch between the Master and Slave radio pages. The same information will be recorded and displayed for slave when connected via the Slave port.

CTM Power & Temperature: Here you will find the current voltage readings for both the primary and secondary power supplies as well as the logic power for the onboard electronics.

Primary Volts: Displays current voltage on primary power port. Normal operating voltage is approximately 24VDC. In the event that the port has been shorted out, this field will display an OVER CURRENT alarm. The CTM will automatically switch to the secondary power port until the short has been removed.

Secondary Volts: Displays current voltage on secondary power port. Normal operating voltage is approximately 24VDC. In the event that the port has been shorted out, this field will display an OVER CURRENT alarm.

Logic Volts: Displays current voltage powering memory and processor circuits within the CTM, and should read approximately 5VDC

Temperature: Displays current temperature inside the CTM case. Normal operating temperatures may vary depending on environment and installation. User can change temperature display units from Celsius (default), to Fahrenheit in the General System Settings page.

CTM Radio Setup/Status: Here you will make all of the radio port settings and can enter the radio name for each port.
Pwr (W): This column will display the current power draw in Watts from each radio port.

Reset: A green check in this box will cycle the power on the corresponding port. Power will be interrupted for 3 seconds before it is restored automatically. To reset any port simply check the box and press the Apply Radio Settings button.

Port ON: A green check in this box will send 24VDC to pins 4, 5, 7 and 8 to the corresponding port number. Only the top RJ45 port will be powered, with the lower port carrying Ethernet from a switch or router. To change the power status of each port, check or uncheck the box next to the port number you wish to change. When finished making changes, press the Apply Radio Settings button at the bottom of the window to save changes. The port will change the power status only after you have saved your changes.

Sync ON: A green check in this box will send a 1 pulse per second sync signal to the radio plugged into the corresponding port. This extremely fast interruption in power is picked up by the radios as the sync over power signal.

Radio Name: Here you can enter a name that will be associated to each port. When finished making changes, press the Apply Radio Settings button at the bottom of the window to save changes.

General System Setup

Site Name: Enter the name you wish to associate with this CTM module. This name will be given when alerts are sent via email. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

GMT Offset Hours: You can correct the time displayed on the status screen and the time stamp on alerts which are sent via email. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

Enable WAAS/EGNOS correction for GPS receiver: Here you can enable/disable the WAAS/EGNOS satellite correction feature. Users outside WAAS/EGNOS coverage should disable this feature to ensure proper GPS satellite tracking.

Enable Metric Units Display: Here you can change the measurement units from Metric(default) to standard. This affects both temperature and elevation readings on the status page. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

Apply Time Zone correction to NTP Server Function: A green check in this box will apply the GMT offset value set in the GMT Offset Hours window to the NTP server function for the CTM. When set, radios receiving NTP time from the CTM will have corrected time displayed on their status screen as well as their event logs.

Network Setup

IP Address: Set the IP address for the CTM Network port. The default setting for this field is 169.254.1.1. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

Subnet Mask: Set the subnet mask for the CTM Network port. The default setting for this field is 255.255.255.0. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

Gateway: Set the gateway IP address for the CTM Network port. The default setting for this field is 169.254.0.0. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

DNS 1: Set the primary DNS IP address for the CTM Network port. The default setting for this field is 0.0.0.0. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

Network Setup - continued

DNS 2: Set the secondary DNS IP address for the CTM Network port. The default setting for this field is 0.0.0.0. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

SNMP Target: Set the SNMP Target address and port number for the CTM Network port. The default setting for this field is 0.0.0.0:162. When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

SNMP Community STR: Set the SNMP community string for the CTM Network port. The default setting for this field is "public". When finished making changes, press the Update Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

Requested Connection Speed: Here you can set the Ethernet negotiation speed for the Network port on the CTM.

Email Setup

SMTP Name: Enter the SMTP name for you mail server. The name set in this field will enable your CTM to send alerts via email. When finished making changes, press the Update Email Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

Email Set-up - continued

Port Number: This field defaults to Port 25. Unless otherwise specified by your Network Administrator this can remain unchanged. When finished making changes, press the Update Email Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

To 1 Address: Enter the primary email address that you wish alerts to be sent to. When finished making changes, press the Update Email Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

To 2 Address: Enter the secondary email address that you wish alerts to be sent to. When finished making changes, press the Update Email Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button.

From Address: Enter the email address you wish to have alert Email messages sent from. This email address will appear as the sender address in the recipient's Inbox. When finished making changes, press the Update Email Setup button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button. Send Test Email.

Send Test Email

Once you have finished configuring the Email Setup page you can use the Send Test Email feature to test your configuration. This button will send a blank email to both the primary and secondary Email Addresses saved in the E-Mail Setup page.

Change Password

Enter any password, caps sensitive, that you wish to use to restrict access to the CTM web interface. After a user initiates a session by entering the correct password, there is a 5 minute time out. When there has been no activity on the web interface for 5 minutes you will be asked to re-enter the password. Only one session can be initiated at a time without being asked to re-enter the password when changing pages. When finished making changes, press the Submit button at the bottom of the window to save changes. You can reset the fields that have unsaved changes by pressing the Reset button. To turn off password protection, type "No Password" (*This is Case Sensitive*) as the password. This will effectively remove any previously saved password.

View Log

Here you can view the log entries by Date/Time stamp. The newest entries are now at the top of the page to make it easier to find recent activity. You can also send the log file via email to the primary and secondary addresses listed on the E-mail Setup page.

Error Codes: Generally speaking, numbers below 6 are bad, numbers higher than 6 are error condition resets (fault has been cleared). Error class 0 on a Master CTM is an Ethernet connection failure, in the context of a slave error class 0 means there is a local network cable problem. So in general, error class 0 refers to a communications problem between the Master and Slave.

Three digit error codes indicate a Slave error, thus errors 100 thru 199 are slave errors. For example, error code 05 and 105 would indicate a Circuit Breaker Trip on the Master and Slave respectively. Otherwise the error codes are the same for all units.

Master Error Codes:	
0 - Network Connection Lost	9 - Test Message
1 - Primary Power Lost	10 - Primary Power Restored
2 - Secondary Power Lost	20 - Secondary Power Restored
3 - GPS Trouble	30 - GPS Time Lock Restored
4 - Over Temperature Error	40 - Temperature Back Into Limits
5 - Circuit Breaker Trip	50 - Circuit Breaker Cleared
6 - Login Failure	60 - Login OK
7 - Settings Change	80 - Reset Complete
8 - Reset	99 - Ethernet Communications Restored

Note: For previous versions of CTM software, error code 100 was "Ethernet Restored". This has been changed to Error code 99. This is the only change for Master error codes.

Master Error Codes:
100 - Local Network Lost
101 - Primary Power Lost
102 - Secondary Power Lost
104 - Over Temperature Error
105 - Circuit Breaker Trip
110 - Primary Power Restored
120 - Secondary Power Restored
140 - Temperature Back Into Limits
150 - Circuit Breaker Cleared

NOTE: Status conditions for a disconnected slave will be retained as the last known reading before the slave comms were lost.

Update Firmware

The Update Firmware button is used to change active firmware memory locations or load new firmware to the CTM.

Change Active Firmware: Use this button to change the active CTM firmware package. Radio operation will be unaffected as long as the CPU versions between the two packages remain the same. Press the Upload Firmware File button to bring up the Flash Loader page which will display the current firmware versions in each memory location. Once in the Flash Loader page you can go back to the main page by selecting the memory bank you wish to boot to, then press the Go to Selected CTM Main Web Page button.

Upload Firmware File: When pressed, the CTM will reboot the network port and bring up the Flash Loader page. Here you can load the latest revision of the CTM firmware. Depending on your browser settings, you may need to refresh the page to display the Flash Loader page.

To Update your CTM's Firmware:

1. Use the browse button to locate the ".hex" file.
2. Click on the Update button to begin the upgrade. The flash loader will automatically update the inactive memory bank. The active memory bank is indicated by the green dot next to bank A or B at the bottom of the page.
3. Do not interrupt the upgrade process once the file transfer has begun! DO NOT hit your browser's back STOP or BACK button during file upload!
4. Upon reboot, the CTM will boot to the memory bank that was just upgraded if successful. REFRESH the flash loader page at the currently set IP address to display the main page. In case the process was NOT successful, the CTM will reboot using software in the OTHER memory bank, if possible. As a last resort, the CTM will reboot back to the flash loader page.

Because the Flash Loader software is unable to do anything except, load the flash memory, the front panel lamps will not be operational while the CTM is in flash loader mode. They will be in whatever state they were in when the system rebooted into flash loader mode. Likewise for the GPS and Control CPU status.

There's no logging, no status updates, no monitoring of the GPS timing to handle backup timing, etc. The power supply & circuit breaker system will still work, as these operate on their own, but these events will not be logged. The Timing pulse, power supply system, and the backup oscillator system will still work, but may drift quite a bit if the GPS goes down while in flash loader mode.

It is still best to do flash loader operations during non-peak traffic load times in case something goes wrong. Users should ONLY use the flash loader when absolutely necessary. Its also not a good idea to enter flash-loader mode and leave it there for long periods of time in case the GPS goes down while in flash loader mode. Radio operation will not be affected as long as the new firmware has the same CPU version as the current firmware revision.

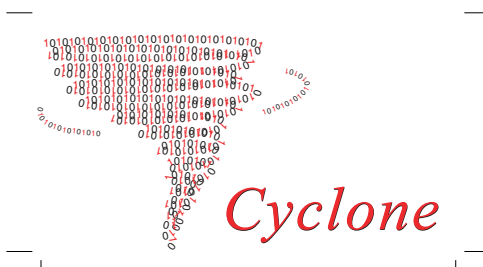
Cyclone Timing Module Specifications

CTM Unit		GPS RECEIVER	
Primary Power Input Voltage Range <i>(Operation)</i>	22 ~ 31 VDC	Position Deviation <i>(Typical per Local conditions)</i>	< 3 ft.
Maximum Voltage Applied to Either Power Port	±180 VDC / 120	Timing Deviation <i>(Typical per Local conditions)</i>	< 200 nSec
Power Inputs Polarity Protected	Yes	Antenna Drive Voltage	5 VDC
Power Inputs Surge Protected	Yes	Time to First Fix <i>(Typical Cold Start)</i>	< 1 Minute
Grounding System	Negative Only	Time to First Fix <i>(Typical Warm Start)</i>	< 10 Seconds
Quiescent Current @ 24V Input Voltage	220 mAmp	WAAS/EGNOS Capability <i>(Increase Accuracy)</i>	Yes
Quiescent CTM Power	5.2 Watts	CTM-1m Desktop Mechanical	
Maximum Operating Temperature	140° F	Dimensions	9" x 7.25" x 2"
Minimum Operating Temperature	-40° F	Weight	2.5 lbs. <i>(Without Power Supplies)</i>
Radio Port Surge Supression Nominal	5,000 Amp Gas Tube PoE, 1,500W TVS Ethernet	CTM-1m 1U Mechanical	
PoE Surge Supress Voltage Nominal <i>(Gas Tube)</i>	90 Volts	Dimensions	19" x 11" x 2"
Surge Peak Power Dissapation <i>(.1uSec)</i>	20 kWatt	Weight	7 lbs. <i>(With 2 Power Supplies)</i>
Surge Peak Power Dissapation <i>(1mSec)</i>	2 kWatt	CTM-1m Power Supply Mechanical	
Sync Pulse Drift <i>(Backup)</i>	1 - 10 ppm <i>(Depending on rate of temperature change)</i>	Dimensions	5.75" x 2.75" x 1.5"
		Weight	1.5 lbs.

NOTE: If the unit ~powers up~ in flash loader mode the radio ports will be “on” until the Web server system comes on line and turns off any radio ports that were turned off before. If the unit ~powers up~ into normal web server mode then the radio ports will be on briefly with sync pulses (a few seconds, long before the radios wake up), then the sync pulses will STOP until a solid time-lock is obtained from the GPS (and the backup oscillator has a chance to phase-lock to GPS time), then the sync pulses come on and stay on after that. This is the normal operation.

Also note that the Ethernet connection has to be available for the Zilog chip to initialize and start managing the rest of the CTM, this feature makes it work with a slower Cisco router.

1. When doing a “Blowout Reset” on the CTM, hold the button in to 10 seconds to just reset the IP address, hold in 30 sec to reset everything. IF THE ETHERNET cable is connected, you’ll see the Ethernet connection light wink off when the button is released. You can still do the reset button thing without a cable connected, but you won’t see a light flash. The system isn’t able to flash any other lights during a reset-button hold-in procedure.
2. Log entry times are captured at the time the log entry is made, which can be up to three seconds later than when the event really occurred. The reason is when trouble strikes, the system re-reads the information 2 or 3 times to make sure it wasn’t a freak event, then makes the log entry. The CTM does a status check on most of the sub-systems about once per second.
3. If you briefly disconnect the Ethernet cable then plug it back in, you can get a “Ethernet Connection Restored” entry without a corresponding “Connection Lost” signal. This is by design, and it shows brief disconnects of 1 to 2.5 seconds. A “Connection Lost” log entry is entered if the connection was lost for more than 2.5 seconds. If the connection is lost for less than 1 second then the CTM should handle this without flagging an error, so if the router is doing housekeeping you won’t get repeated error flags.
4. Due to the time delay for processing GPS messages and handling web page requests, the displayed time on the web page may be up to 2 seconds late.
5. You can’t start the CTM without having the Ethernet cable connected. In order to handle slow Cisco routers, the CTM will wait until it has a solid connection from the router, up to 50 seconds, before starting its initializer routine. If a connection is not made within that time, it will reset itself and start looking for a connection again. The reason for this is so that when the Web Interface stack initializes, it has a stable Ethernet connection to get all its marbles lined up just right for the connection type.
6. All radio ports will be on while the Zilog Web interface stack is initializing, and any radio ports that need to be turned off won’t be off until the Web Interface is done initializing.
7. It takes about 20 seconds of stable-time lock for the Zilog Web interface to release a “Reset Complete” log entry on reset.
8. On Reset, the Zilog system will force a warm-start reset of the GPS soft ware, and this will cause a momentary loss of time lock. You’ll see a GPS Sig Loss, then a GPS OK log entry in a row in the logs, this is normal. The sync pulses to the radios are unaffected, though.



**Technical Support for your Cyclone Timing Module is available on the web at www.lastmilegear.com.
You can also contact us via Email at support@lastmilegear.com or by telephone at 1(866) 230-9174.**