

ADI



OcelotTM

User's Manual

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1 Welcome to the Ocelot™

Congratulations on your purchase of the Ocelot™ Home Automation Controller. Whether you are a beginner, or a seasoned veteran, the Ocelot™ will help you tackle almost any automation project. This manual will help you get the most out of your new controller.

Kick back, grab a cup of coffee, and let's get started.

1.1 Ocelot™ Description and Features

The Ocelot™ is a highly evolved Programmable Logic Controller (PLC). It can be programmed for stand-alone operation, or controlled by many of the popular third party Home Automation Software programs. The Ocelot™ has been designed to accommodate most automation requirements. External ports are provided for RS-232 communications, RS-485 communications, X-10 communications, and infrared (IR) control. These ports allow the Ocelot™ to interface with a variety of external devices.

Controller: The Ocelot™ controller can handle up to 2048 lines of user code. The code is stored in a non-volatile memory that will retain it's contents even if the power is lost. A battery backed real-time clock allows the controller to execute instructions based on the time and date.

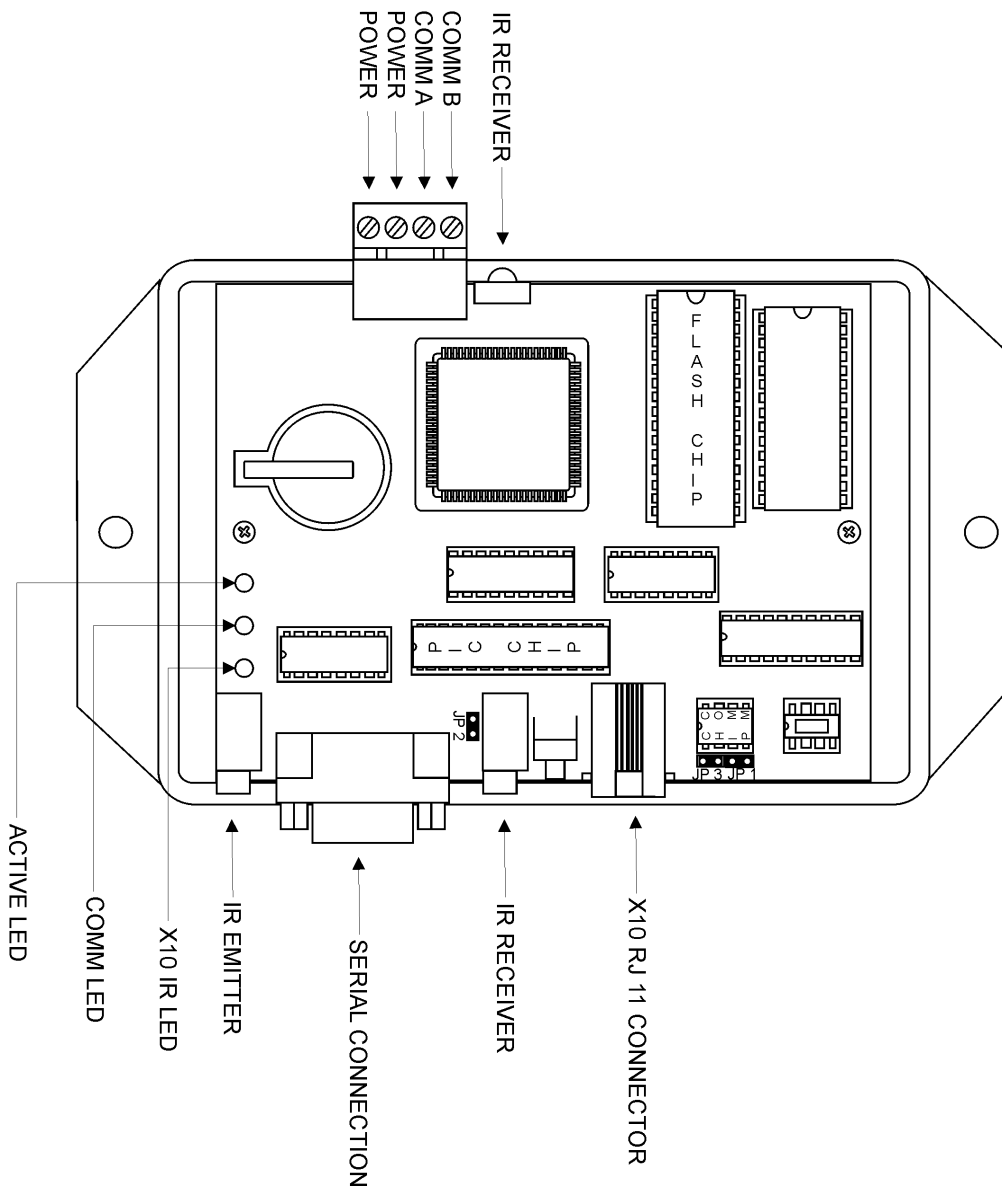
RS-232 Port: The Ocelot™ provides a RS-232 port for communications with an external computer. This port is used to initially load the user program. It can also be used for communications with a third party software program. Additionally, this port can be used for communications with an ADICON modem, or for controlling external RS-232 equipment with ASCII commands.

RS-485 Port: The Ocelot™ provides a RS-485 port for communications with other ADI modules. ADI provides modules for relay outputs, analog inputs, temperature monitoring, humidity monitoring, zoned IR outputs, audio messages, switch inputs, etc.

X-10: The Ocelot™ provides a port for connecting an X-10 interface such as the TW-523. This interface allows the Ocelot™ to control external lighting and appliance modules. The Ocelot™ can also monitor/control RCS X-10 thermostats with this port.

IR Input: The Ocelot™ has an integral learning IR input that can store up to 1024 unique IR commands. The Ocelot™ has the ability to recognize previously learned IR commands. This is one of the most exciting features of the Ocelot™, as you can initiate macros based on a single button press of a remote control.

IR output: The Ocelot™ provides a stereo jack for outputting IR commands. This is typically used for connecting an IR mini-emitter. This output cannot directly drive an IR blaster.



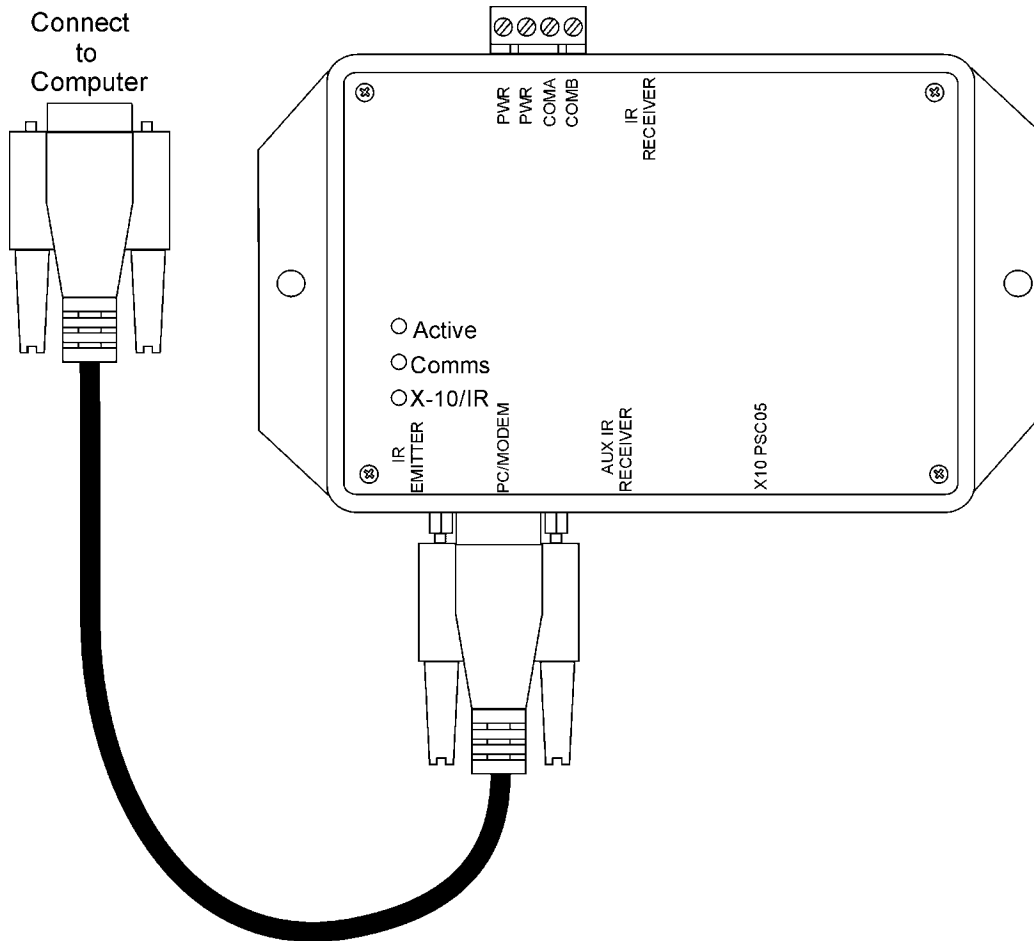
2 What do I need to get started?

This section describes how to connect your computer, power supply, and accessories to the Ocelot™.

2.1 Connecting the Ocelot™ to your Computer

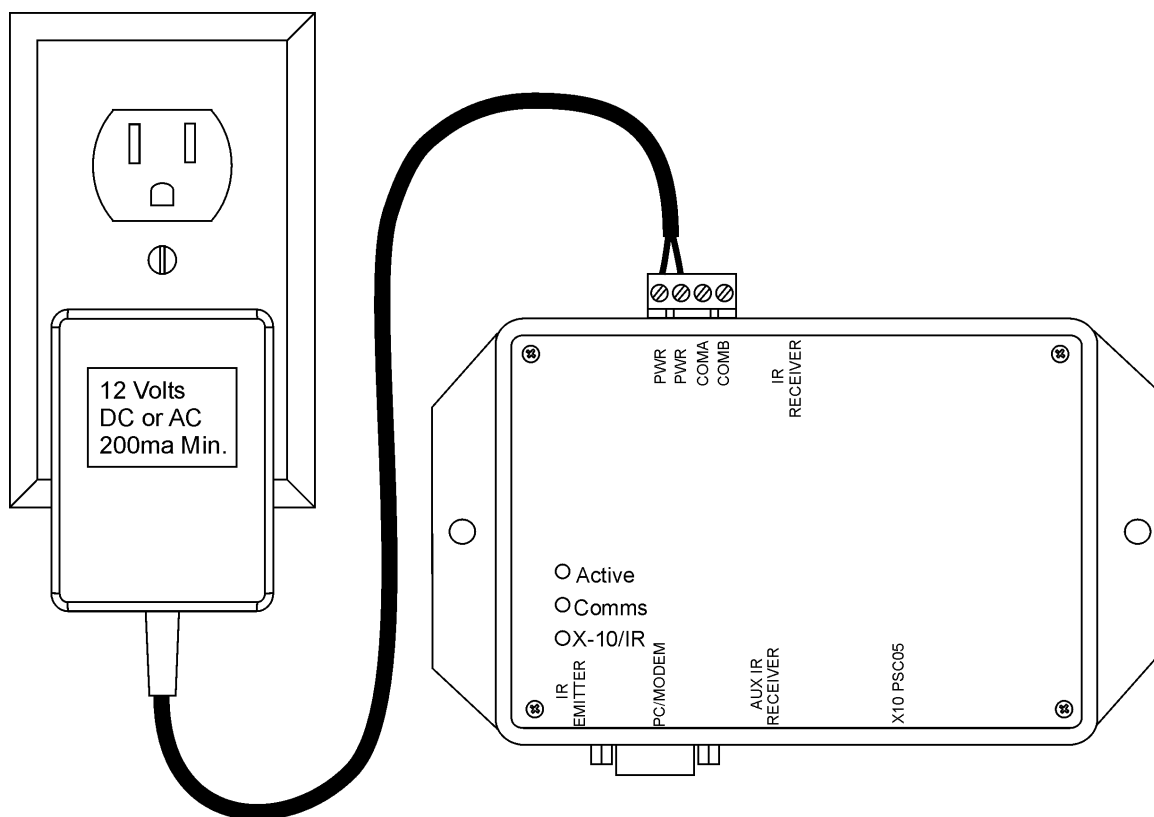
The Ocelot™ is programmed with your instructions via a serial connection to your computer. A standard RS-232 serial cable has been provided with your Ocelot™ for this connection. Connect the female DB-9 end of the cable to the DB-9 connector on the Ocelot™. Connect the male DB-9 end of the cable to an unused DB-9 serial adapter on your computer. Later, we will need to tell the computer which serial port is hosting the Ocelot™ connection, so take note if you have more than one serial port.

Note: Some computers may provide USB connectors instead of RS-232 connectors. If this is the case, you will need to purchase an external USB RS-232 adaptor. These adaptors are available at most retail computer outlets.



2.2 Connecting Power to the Ocelot™

The Ocelot™ requires a low voltage power source for operation. The Ocelot™ can accept any voltage source from 9V to 12V AC or DC. The power source needs to provide at least 200 mA (milli-amps) of current. Your Ocelot™ has been provided with a wall-mounted supply for this purpose. The supplied power supply is attached to a four-position plug that mates with the socket on the Ocelot™. If you are using the provided supply, plug the four-position jack into the socket on the Ocelot™. If you choose not to use the provided supply, make sure that your power source provides the proper low voltage output 9V – 12V AC or DC.



Warning: The Ocelot™ requires a 9V – 12V AC or DC power source. Do not connect the Ocelot™ to AC line voltage (110 VAC or 220 VAC) The Ocelot™ and attached computer will be seriously damaged.

Warning: Connecting the power source to the COMA or COMB pins will cause damage to the Ocelot™. Refer to the power supply drawing before powering the Ocelot™.

Plug the AC source into the line voltage. As the Ocelot™ goes through the power-up cycle, the Ocelot™ LED's will blink different patterns. The flash patterns indicate the status of the Ocelot™ and the attached devices. These flash patterns are explained in detail later in the manual.

If you do not see any LED flash patterns, confirm that the power supply is correctly attached to the Ocelot™.

2.3 Configuring the Ocelot™ to Receive Infrared Commands

The Ocelot™ is factory configured to receive Infrared (IR) commands. The Ocelot™ provides a built-in IR receiver. IR commands are issued by most audio/visual remote controls. To test this feature, point any IR remote control at the IR receiver on the Ocelot™.

Pressing any button on the remote should cause the Ocelot™ IR/X-10 LED to turn Red for a few seconds.

Note: The Ocelot™ will constantly be scanning for IR commands. The IR/X-10 LED may turn Red, even if you have not pressed a button on the remote control. This is normal operation. The Ocelot™ may be detecting IR activity from ambient light sources. This should not interfere with normal Ocelot™ operation.

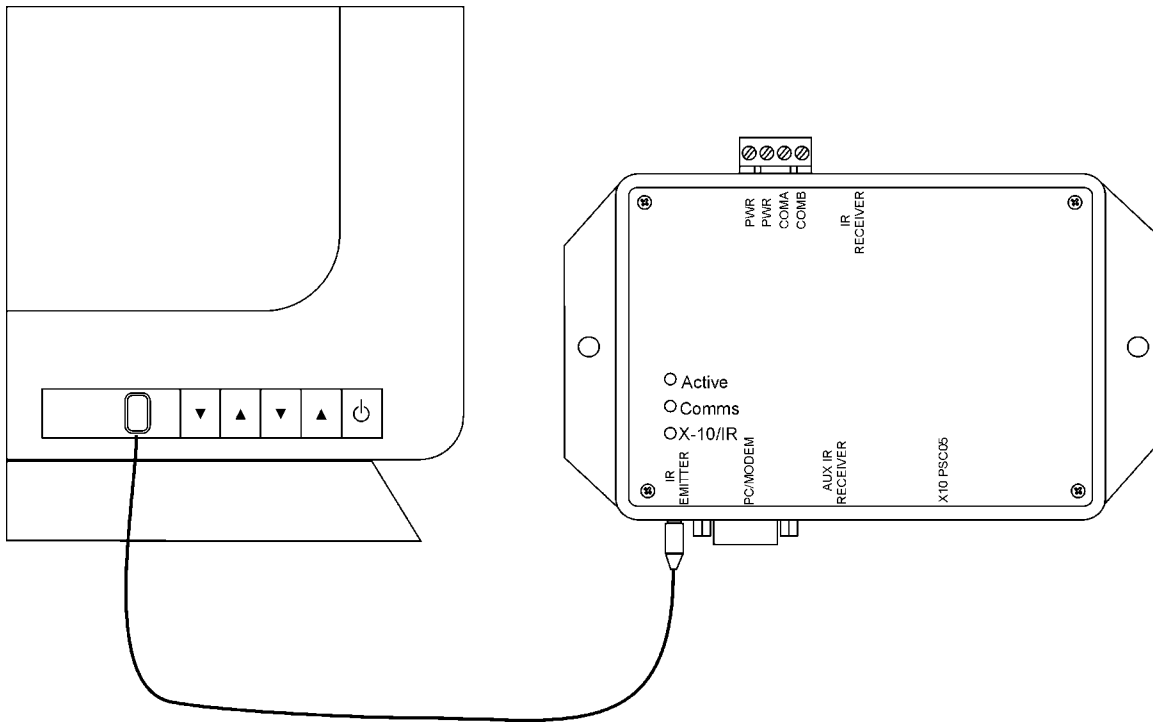
An IR input jack is provided for attaching the optional ADI external IR receiver. This cable is not provided with the Ocelot™. Most installations do not require this option. If you have selected this option, make sure that you disconnect the power supply prior to connecting this cable.

Warning: Connecting, or disconnecting, the optional external IR receiver cable, while the Ocelot™ is powered, will permanently damage the optional IR receiver cable. Remove power from the Ocelot™ before installing the optional IR receiver cable.

2.4 Connecting an external Infrared Transmitter

The Ocelot™ has the ability to control IR based audio/visual equipment. The Ocelot™ issues these commands via an optional IR mini-emitter plugged into the IR Emitter jack. The Ocelot™ supports single and dual mini emitters from Xantech™ and Buffalo. The Ocelot™ does not support blaster style emitters. Contact your Ocelot™ distributor to order the correct emitter for your application.

Refer to the SECU-16IR data sheet and application notes for additional information on controlling IR based equipment.



2.5 Connecting an X-10 Line Interface

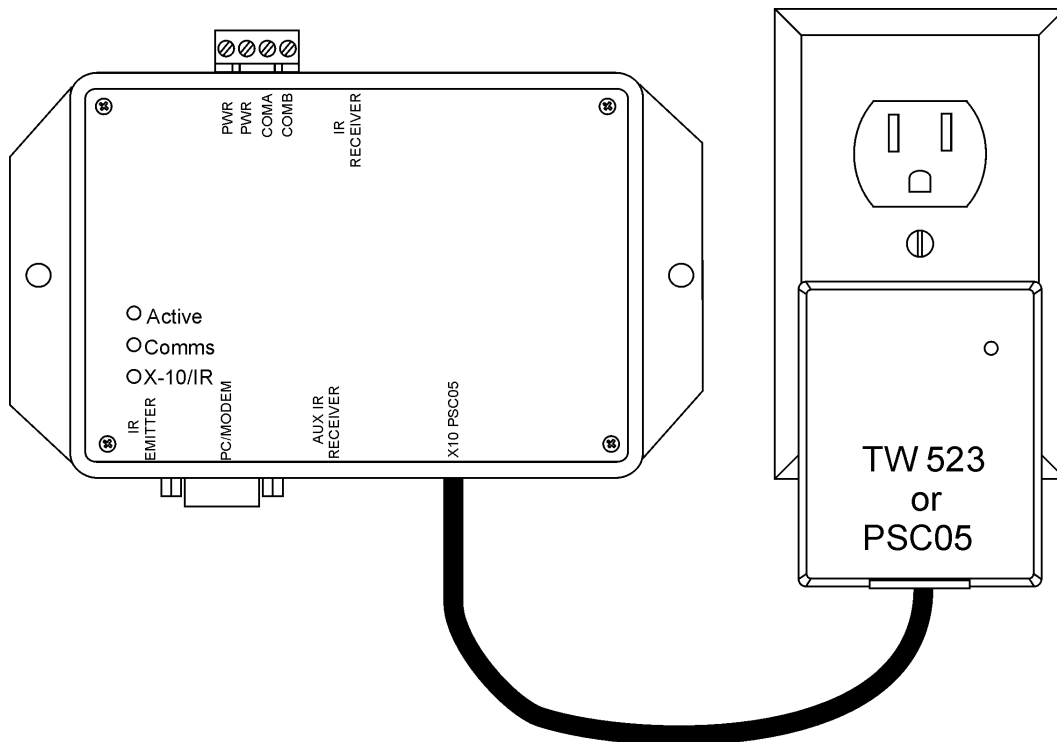
The Ocelot™ has the ability to interface with X-10 style modules to control household lighting. An optional X-10 line interface is required for these functions. Popular models include the TW-523 and the PSC-05.

The Ocelot™ transmits standard X-10, extended X-10, preset commands, and Leviton® style commands. The Ocelot™ cannot receive extended or Leviton® style commands.

Your Ocelot™ was provided with a RJ-11 cable for connection to the X-10 line interface. The Ocelot™ must use this cable. Do not use a phone cable or a cable from another HA controller.

Plug one end of the RJ-11 cable into the jack on the Ocelot™. Plug the other end of the cable into the jack on the line interface. Plug the line interface into an available wall outlet. The Ocelot™'s™ X-10/IR LED will turn green to indicate that the Ocelot™ detects the presence of the line interface.

Note: Do not plug the line interface module into a UPS as X-10 communications will be disabled.



3 OK, I'm Connected, What Next?

At this point, the Ocelot™ is powered up and connected to the computer. You are ready to load your software and communicate to the Ocelot™.

3.1 Controlling the Ocelot™ with Third Party Software

The Ocelot™ can be controlled with many of the popular HA software programs. Refer to the third party software manual for information on configuring the Ocelot™ for operation with the third party software.

3.2 No, I want to do my own thing

This is the really cool thing about the Ocelot™. You can utilize the free C-Max™ software to program the Ocelot™ to perform just about any automation task. Before proceeding, make sure that your computer meets the minimum requirements for running the C-Max™ software.

Computer Requirements:

1 available RS232 port with DB9 connector

MS-Windows® 95/98/NT/ME

1.6 Mbytes Available Hard Disk Space

1.6 Mbytes RAM

4 Roll up your Sleeves, lets get started!

This section describes how to load the C-Max™ software into your computer. We will also explain how to set the internal clock and configure the Ocelot™ for your geographical location.

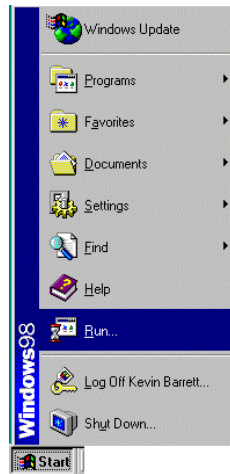
4.1 Loading the C-Max™ Software

Your Ocelot™ was provided with a diskette or CD that contains the C-Max™ software. This software is also available from the ADI Website www.appdig.com. The following instructions assume that the software is being installed from the floppy drive. If you are installing from the CD or downloaded file, change the source directory to match your method of installation.

4.1.1 Installing the C-Max™ Software

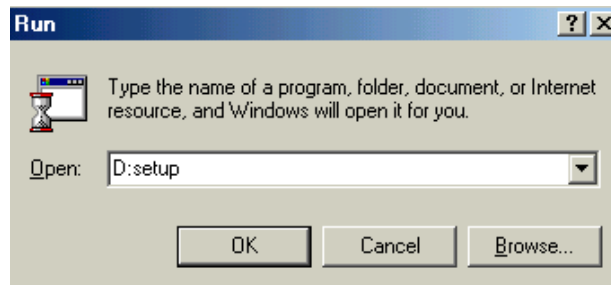
- 1) Place the C-Max™ CD in your computer's CD-Rom drive. The program should automatically launch. Follow the directions on screen. If the program does not launch, go to step 2.

2) Click Start with your left mouse button. A window will appear.



3) Click Run with your left mouse button. The Run window will appear.

4) Type the following in the window to the right of Open: X:Setup (where X is the drive letter of your CD Rom Drive)

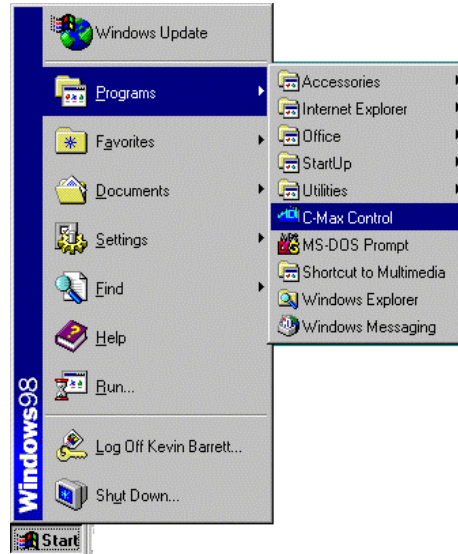


5) Click OK and follow the directions on screen.

4.1.2 Setting up Communications

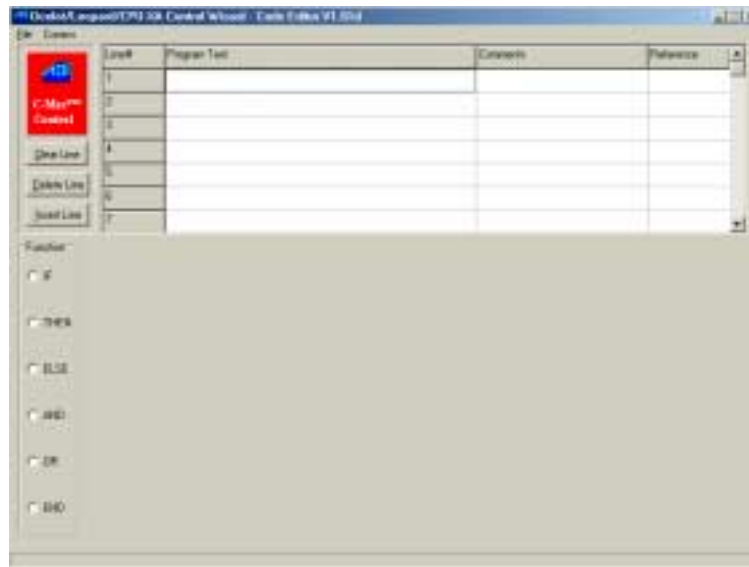
1) Click Start with your left mouse button. A Window will appear.

2) Move the cursor up to Programs. A second window will appear.



3) Move the mouse over to the second window and then move the cursor down until the C-Max™ Control icon is highlighted. Click the C-Max™ Control icon with your left mouse button.

The following screen will appear:



4) Click Comms with your left mouse button. A window will appear.

5) Click Comms Setup with your left mouse button. The following screen will appear:

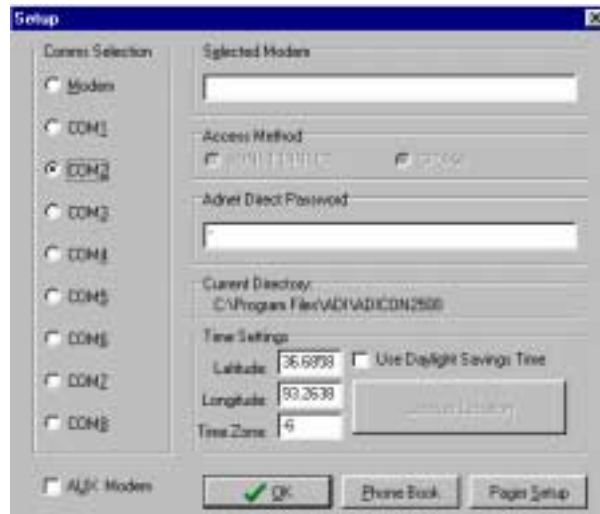


6) Click the COM port you are utilizing with your left mouse button. A black dot will appear next to the Com port you have selected. If you do not know which Com port you are utilizing, contact your computer's manufacturer.

7) Click OK with your left mouse button.

4.1.3 Entering Latitude and Longitude, Sunrise and Sunset

If you are going to base events on Sunrise and Sunset, you must enter the latitude and longitude for your location. Click Comms, then Comms Setups from the Code editor. The following screen will appear:



The latitude and longitude must be entered in decimal format. The time zone must be entered. Greenwich England is time zone 0. Time zones west are minus numbers. Eastern Time Zone is -5, Central Time Zone -6, etc. The default value entered when C-Max™ is installed is for Branson, Missouri, which is in the Central Time Zone.

Go to the following link on the Internet to get your latitude and longitude:

<http://www.zipinfo.com/>

4.1.4 Daylight Savings Time

The Ocelot™ can be set up to automatically account for Daylight Savings time. Daylight Savings time begins on the first Sunday in April (the clock is set 1 hour ahead) and ends on the last Sunday in October (the clock is moved back 1 hour).

4.1.4.1 Setting up for Daylight Savings Time.

From the C-Max™ Code editor screen, Click Comms with your left mouse button.

Click Comms Setup with your left mouse button.



Click the box to the left of User Daylight Savings Time with your left mouse button. A black check mark will appear in the box.

If your state or country does not use daylight savings time, do not click this box.

4.1.4.2 Forcing Daylight Savings Time

If you receive the Ocelot™ during daylight savings time and want to make sure that daylight savings time is turned on, do the following:

- 1) In the C-Max™ software, Click Comms Setup, Attach to CPUXA with your left mouse button. The CPUXA Access screen will appear.
- 2) Click CPUXA Utility then Retrieve CPUXA Parameters with your left mouse button.

The following window will appear:

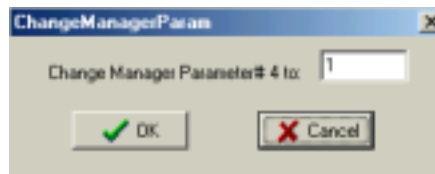


The screenshot shows a window titled "CPUSSA" with a table of parameters. The table has two columns: "P#" and "Data". The "Data" column is currently selected. The table contains 20 rows of data.

P#	Data
0	504
1	0
2	0
3	20
4	0
5	1
6	0
7	0
8	15
9	15
10	2
11	4
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	150.15

3) Click the Window to the right of 4 below Data with your left mouse button. The Change Manager Param window will appear.

4) Enter a 1 and click OK with your left mouse button.



5) Click the Window to the right of 5 below Data with your left mouse button. The Change Manager Param window will appear.

6) Enter a 1 and click OK with your left mouse button.

4.1.5 Setting the Clock on the Ocelot™

- 1) Double-click the clock on the lower right corner of your monitor and set the PC clock to the correct date and time.
- 2) Click CPUXA™ Utility with your left mouse button. A Window will appear.
- 3) Click Set CPUXA™ Clock to PC Clock with your left mouse button. The window to the left will read Setting CPUXA™ RTC. The clock on the Ocelot™ is set.

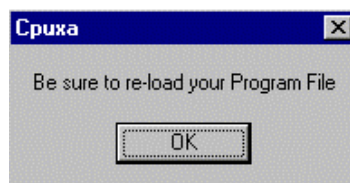
4.1.6 Retrieving the time from the Ocelot™

- 1) Click CPUXA™ Utility with your left mouse button. A Window will appear.
- 2) Click Get CPUXA™ Clock your left mouse button. The window to the left will display the Date and Time stored in the Ocelot™.

4.1.7 Reload CPUXA™ Executive

When you install a new version of C-Max™ Control Wizard software, you will need to load the FLASH512.BIN file into the Ocelot™. The FLASH512.BIN file is the software inside the Ocelot™. As features are added to the C-Max™ Control Wizard Software, the updated FLASH512.BIN file needs to be loaded in the Ocelot™ to support the new features.

- 1) Click CPUXA Utility with your left mouse button. A Window will appear.
- 2) Click Reload CPUXA Executive with your left mouse button. The new FLASH512.BIN file will be loaded into the Ocelot™. Once the program is loaded, the following message will appear:

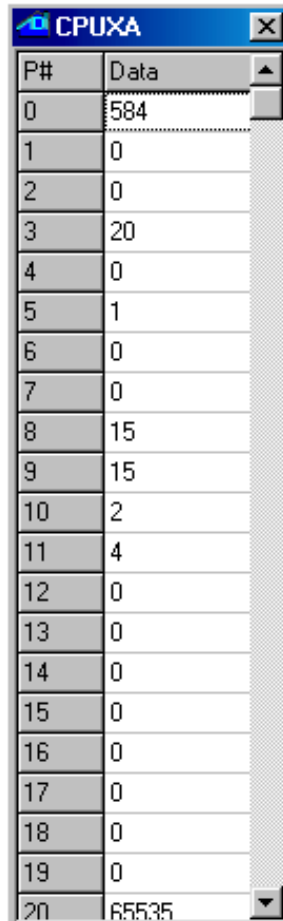


- 3) Click OK with your left mouse button. If you have a program in your Code Editor, you must reload it into the Ocelot™ (refer to section 4.2.3)

4.1.8 Ocelot™ Configuration Parameters

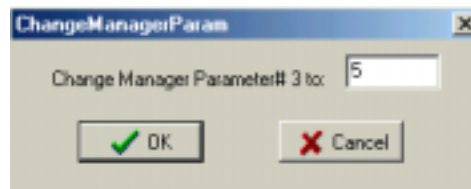
These parameters define the Ocelot™ operating modes. To access these parameters click Retrieve CPUXA Parameters in the CPUXA Utilities with your left mouse button. Refer to Table 1 for a description of each parameter.

The following window will appear:



P#	Data
0	584
1	0
2	0
3	20
4	0
5	1
6	0
7	0
8	15
9	15
10	2
11	4
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	65535

To change a parameter, click in the window to the right of the parameter you want to change. The following window will appear:



ChangeManagerParams

Change Manager Parameter# 3 to:

Enter the value you want to change the selected parameter to, then click OK with your left mouse button. The new value will be reflected in the CPUXA parameter window.

Below is a list of the Parameters and their explanations:

Table 1 - Ocelot™ Parameters

Param Number	Description of Parameter	Values / Usage
1	Bobcat parameter display	<ul style="list-style-type: none"> 0 = Off 15 = Bobcat address at 5 and data will display in variable 20, Bobcat address at 6 and data will display in variable 21, etc.
2	Power Mode	<ul style="list-style-type: none"> 1 = low power mode 0 = normal mode
3	Max Module address	<ul style="list-style-type: none"> Highest module # to scan for. This is automatically set after auto addressing modules.
4	Daylight Saving Time Status	<ul style="list-style-type: none"> 1 = DST in force 0 = DST not in force
5	Daylight Saving Time Enabled	<ul style="list-style-type: none"> 1 = Check for DST 0 = Do not check for DST
6	Reserved	<ul style="list-style-type: none"> Must be 0
7	Rescan Time	<ul style="list-style-type: none"> Auto rescan in minutes (0 = OFF)
8	Net Timeout	<ul style="list-style-type: none"> Time in 1/10ths of sec to wait for module to respond
9	Retry Counter	<ul style="list-style-type: none"> Give up trying to talk to module after this many retries
10	Reserved	<ul style="list-style-type: none">
11	Reserved	<ul style="list-style-type: none">
12	Reserved	<ul style="list-style-type: none">
13	Not Used	<ul style="list-style-type: none">
14	Ocelot™ Master or Slave Address	<ul style="list-style-type: none"> 0 = Master 1 or higher = Slave address (Note: All slaves must have an address unique from the other slaves or modules)

Table 1 (Continued) Ocelot™ Parameters

15	Auto X-10	<ul style="list-style-type: none"> • 0 = Off • 1 = On <p>Send X-10 0xFE (RX),hc,kc when X-10 is received. 0xFB (TX),hc,kc when X-10 is transmitted. (hc = house code, kc = key code or unit code)</p>
16	Auto I/O	<ul style="list-style-type: none"> • 0 = Off • 1 = On <p>Send 0xFF if the remote I/O status has changed.</p>
17	Auto IR	<ul style="list-style-type: none"> • 0 = Off • 1 = On <p>Send IR number when a comparison match exists, 0xFD (RX) or 0xFC (TX),IR_ number</p>
18	Send ASCII IR	<ul style="list-style-type: none"> • 0 = Off • 1 = Send ASCII string on IR recognize + T000xxx xxx = IR number recognized.
19	Controller Type	<ul style="list-style-type: none"> • Must be 0
20	Max IR received	<ul style="list-style-type: none"> • Default = 80 <p>The higher the number the longer the time required to check for an IR match</p>
21	RCS X-10 Thermostat Display	<ul style="list-style-type: none"> • 0 = Off • 1 = On <p>RCS X-10 Thermostat temperature is displayed in variables 64-79 for House codes A-P</p>
22	Reset Variables on Power Up	<ul style="list-style-type: none"> • 0 = All variables reset • 1 or higher = Variable not to be reset on power up <p>Example: 40 = 40-127 not reset on power up</p>
23	Internal Use	<ul style="list-style-type: none"> • Always leave at Zero (subject to change)

4.1.9 CPU Memory Dump

Reserved for factory use and should not be utilized.

4.1.10 Auto Address Modules

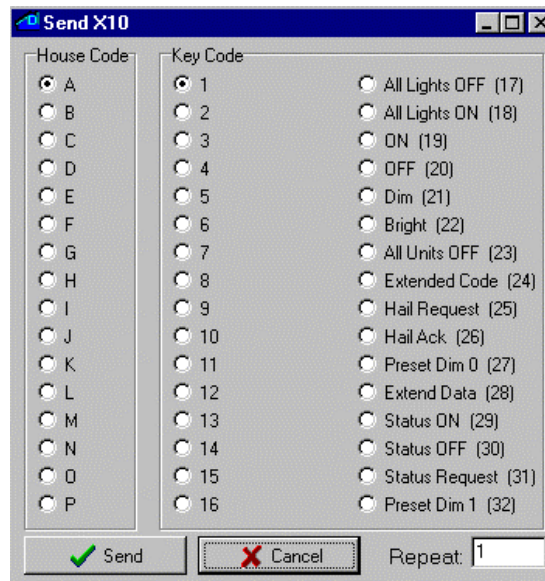
Auto addressing is discussed in the Module manuals.

4.2 Sending an X-10 Command from C-Max™

The Ocelot™ can send and receive X-10 signals. The Ocelot™ must be connected to a TW523 or compatible product to transmit and receive X-10 signals on your AC power lines. Connect the TW523 to the Ocelot's™ RJ-11 modular port using the RJ-11 modular cable provided with the Ocelot™.

4.2.1 Send X-10

- 3) Click X-10 with your left mouse button. A window will appear.
- 2) Send X-10 with your left mouse button. The following screen will appear:



Each X-10 module has a House code and Key Code (also called a Unit Code).

3) Click the House Code then the Key Code (1-16) for the controlled module. Click Send with the Left Mouse button.

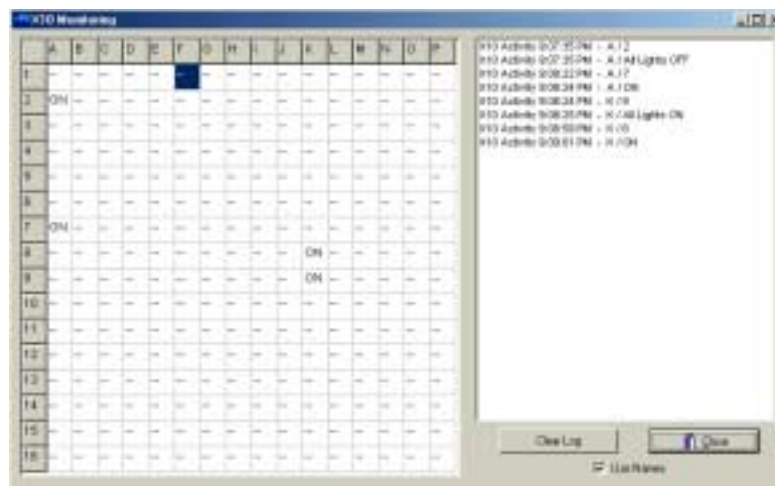
4) Then Click the Key Code designating what you want the unit to do (the list of commands to the right). The device should respond.

For example, if you want to turn on a light whose light module is set to House code C3, you will select House Code C and Key Code 3 with your left mouse button. Click Send with the left mouse button. Then select ON (19) with your left mouse button then click Send again with your left mouse button.

4.3 Monitoring X-10 Commands from C-Max™

This option allows you to monitor X-10 Activity.

- 1) Click Comms with your left mouse button. A window will appear.
- 2) Move your mouse down to Attach to CPUXA with your left mouse button. The CPUXA Access screen will appear.
- 3) Click X-10 with your left mouse button. A window will appear.
- 4) Click Monitor X-10 with your left mouse button. The following window will appear: Any X-10 activity will be displayed on this window. Click Close with your left mouse button to close the window.



4.4 Learning IR Commands

Note: If you are using more than one Ocelot™, each unit must learn the Infrared commands that you want that unit to transmit or receive. Train each unit with different IR commands if you desire. If you have a TV where the master is and a VCR where a slave is, the slave can be programmed for the VCR codes and the Master can be programmed with the TV codes.

- 1) Click Infrared with your left mouse button. A window will appear.
- 2) Click Learn Infrared Command with your left mouse button. The following window will appear:



- 3) Type in the IR number for this IR command.

Make sure that the number you save is a unique number. If you save the IR command as the same number that has been previously saved, the previously saved IR command will be lost. It is a good idea to write down what IR number corresponds to what remote signal.

Note: You cannot recognize IR #0. This is used by the factory. Store your IR commands in IR #1 – IR # 1023. Parameter 20 sets the highest IR # that the Ocelot™ compares against incoming IR commands, while looking for a match. The factory default is 80.

Note2: Do not save the same IR in two locations (I.E. store the same infrared command in IR # 3 and IR # 9).

- 4) Click Learn IR with your left mouse button. The following window will appear:



- 5) Point your Infrared device at the IR receiver and press the button you want to learn. The learning IR window will disappear.

6) To test the IR command, make sure you have an IR emitter connected to the IR Emitter jack on the Ocelot™ and pointed to the IR Receiver on your Device (VCR, TV, etc.) and click Transmit IR with your left mouse button. The device should respond to the learned command.

Repeat steps 2-6 until all IR commands have been learned. Remember you can store up to 1024 unique IR commands in the Ocelot™.

7) Click Close when all IR Commands have been learned.

A window will appear asking you if you want to save the learned IR to disk. If you do, click Yes and select a file name. If not, click No.

4.5 Transmitting IR Commands

1) Click Infrared with your left mouse button. A window will appear.

2) Click Transmit Infrared with your left mouse button. The following screen will appear:



3) Enter the Learned IR number you want to transmit.

4) Make sure you have an IR emitter connected to the IR Emitter jack on the Ocelot™ and pointed at, or mounted on, the IR Receiver on your Device (VCR, TV, etc) and click Transmit IR with your left mouse button. The device should respond to the learned command.

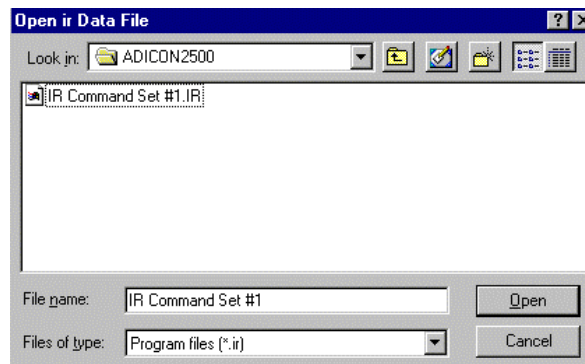
5) Click Close with your left mouse button to close the IR window.

4.5.1 Download Infrared File to Ocelot™

If you have saved a series of IR commands to disk you can load them into the Ocelot™ from your computer.

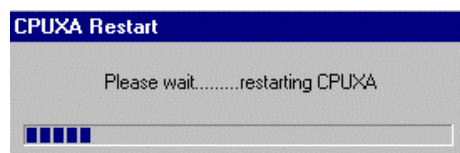
Note: Downloading a saved IR file to the Ocelot™ will overwrite all previously saved IR commands in the Ocelot™.

- 1) Click Infrared with your left mouse button. A window will appear.
- 2) Click Download Infrared file to CPUXA™ with your left mouse button. The following window will appear:



- 3) Highlight the saved IR file. The file name should appear in the window to the right of File name. Press OK with your left mouse button.

The window to the left will read Sending 256 bytes to various addresses starting at C000. When the file has been sent, the following window will be displayed:

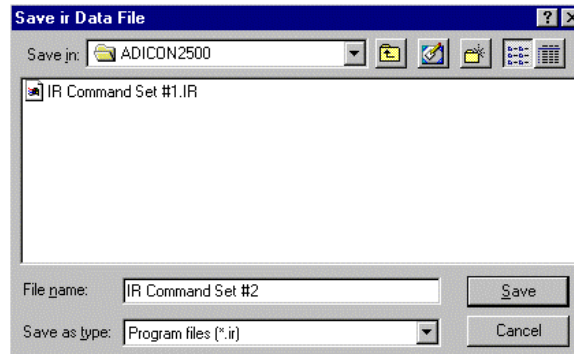


When the Status Bar is done scrolling across the CPUXA™ Restart window, the window will disappear and the Ocelot™ is ready to transmit IR.

4.5.2 Upload Infrared File from the Ocelot™

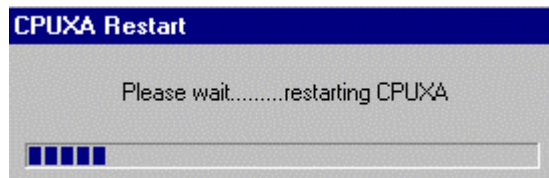
If you have saved a series of IR commands in the Ocelot™, you can load them from the Ocelot™ and save them to your computer.

- 1) Click Infrared with your left mouse button. A window will appear
- 2) Click Upload Infrared file from CPUXA™ with the left mouse button. The following window will appear:



- 3) Type in the file name in the window to the right of File name, then click Save with your left mouse button.

Stopping Ocelot™ will appear in the window to the left in the Ocelot™ Access screen. Wait until the following window appears:



When the Status Bar is done scrolling across the CPUXA™ Restart, the window will disappear and the Ocelot™ is ready to transmit IR.

4.6 OK, Now Impress Me

So far we have been using C-Max™ to manually control external lighting and IR equipment. But who really wants to sit at their computer and issue commands to start the VCR. The next section describes how to program your Ocelot™ to automatically issue IR and lighting commands.

5 The Really Cool Stuff

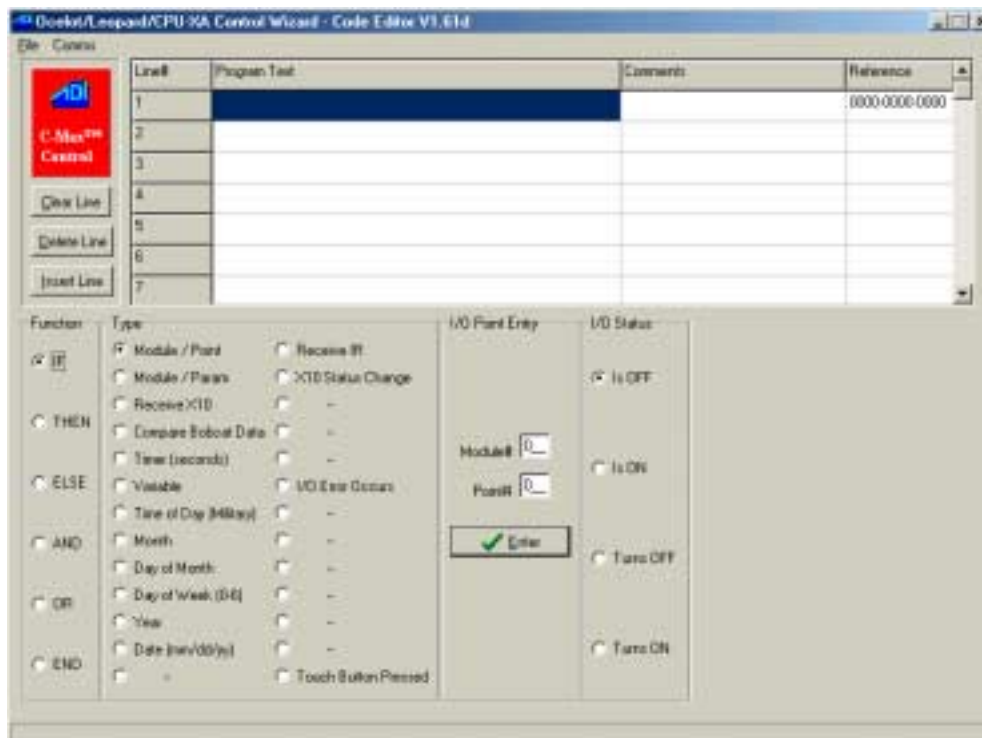
In this section we will discuss how to make your Ocelot™ issue commands based on inputs or events. Specifically we will focus on X-10 and IR events and commands. Other events and commands will be explored in later chapters.

5.1 Programming the Ocelot™ with IF-THEN-ELSE Instructions

The Ocelot™ is programmed with simple IF-THEN-ELSE instructions. The C-Max™ Control Wizard software allows you to create your program without knowing anything about the internal workings of microprocessors. You create your program with the help of the C-Max™ Control Wizard, then download your program to the Ocelot™.

5.1.1 Overview of the IF-THEN-ELSE Instruction set.

IF-THEN-ELSE is a very basic way of telling the Ocelot™ what you want to accomplish.



The IF function allows the Ocelot™ to scan for incoming commands and events.
The THEN function tells the Ocelot™ to issue a command.

You can create a simple, yet powerful program with these two commands.

IF this happens
 THEN do that

Additional functions allow you to get more creative.

The ELSE function allows the Ocelot™ to issue a command if something did not happen.

IF this happens
 THEN do that
 ELSE do something different

The AND function allows you to issue a command based on multiple incoming commands.

IF this happens
 AND this other thing also happens
 THEN do that

The OR function allows you to issue a command based on one of several incoming commands.

IF this happens
 OR this other thing happens
 THEN do that

The END function tells the Ocelot™ that this is the last instruction in your program. This function should only be included once, as the very last instruction.

```

IF this happens
    THEN do that
IF this other thing happens
    THEN do that other thing
IF this third thing happens
    THEN do that third thing
END

```

5.2 Programming Examples

5.2.1 Send an IR Command based on Receiving an IR Command

In this example, we have previously learned six IR commands. We will tell the Ocelot™ to watch for the remote control ON command, then send out the VCR ON command.

This simple program segment requires two lines of code.

For the first line: Click IF, Click Receive IR, and then select IR #2 from the list. Click Enter.

Your first line of code should look like the example below.

For the second line of code: Move your curser to the second line, Click on the Program Text block next to Line #2. The program block will be outlined to indicate that this is the active program line.

Click IF, Click Transmit Local IR, type in 6 under Constant Entry, Click Enter.

Your program should match the example shown below.

Notice that comments have been added to remind us that IR #2 is the ON button, and that IR #6 is the VCR ON button. You can add your own notes by clicking on the Comments block next to each line of code. C-Max™ will prompt you with a text box for entering the notes.

Line#	Program Text	Comments
1	If Receive Infra-Red# 2	If power ON is pressed
2	Then Transmit Infra-Red# 6	Turn on VCR

5.2.2 Send an X-10 Command based on Receiving an X-10 Command

In this example, we will show how to issue an X-10 command based on the reception of an X-10 command. A common application is to turn on the lights if a motion detector sends out a detection command.

In this example, the motion detectors are at address A/1 and the lights are at address B/2.

This program requires two lines of code.

For the first line:

Move your cursor to the program block next to line#1. Click to outline this program line. Click IF, Click Receive X-10, Click House Code A, Click Key Code 1. Move the cursor to Program Text Line #2 and Click to save the previous line.

For the second line:

Click THEN, Click X-10 Quick ON, Click House Code B, Click Key Code 2. You can add your notes to the Comments block as described in the previous example.

Line#	Program Text	Comments
1	If X10 A/1 is received	If Motion Sensor turns on
2	Then turn X10 B/2 ON	Turn on lights

5.2.3 Send an X-10 Command based on Receiving an IR Command

Let's mix it up a little. In this example we will use our TV remote control to turn on the outside lights. We have previously learned the remote control STOP button into IR #8. The outside lights are addressed at A1.

Using the IF function, we tell the Ocelot™ to look for IR #8.

Using the THEN function, we tell the Ocelot™ to issue the X-10 A1/ON command.

We learned how to do these program lines in the previous examples.

Line#	Program Text	Comments
1	If Receive Infra-Red# 8	If Stop is pressed on remote
2	Then turnX10 A/1 ON	Turn on lights

5.2.4 Sending out Multiple Commands based on Receiving a Single Command (Building a Macro)

There are many instances where you want to issue several commands based on receiving a single command. One IF command followed by several THEN commands. These types of program segments are commonly called macros. As long as you have available program lines, there is no limitation on the size of the macro.

In this example, we will build a macro that allows us to press the remote control STOP button and cause several things to happen. We will issue an X-10 command to turn on the living room lights at X-10 address A/1. Then we will issue an X-10 command to brighten the hallway lights at X-10 address A/2. Finally, we will issue an IR command to stop the VCR.

The only twist in this example is brightening the hallway lights. This example would also work for dimming lights.

To issue a bright command:

Click THEN, Click Transmit X-10, Click House Code A, Click Key Code 2.

Move your curser to the next line.

Click THEN, Click Transmit X-10, Click House Code A, Click Bright, type in the brightness level, Click ENTER.

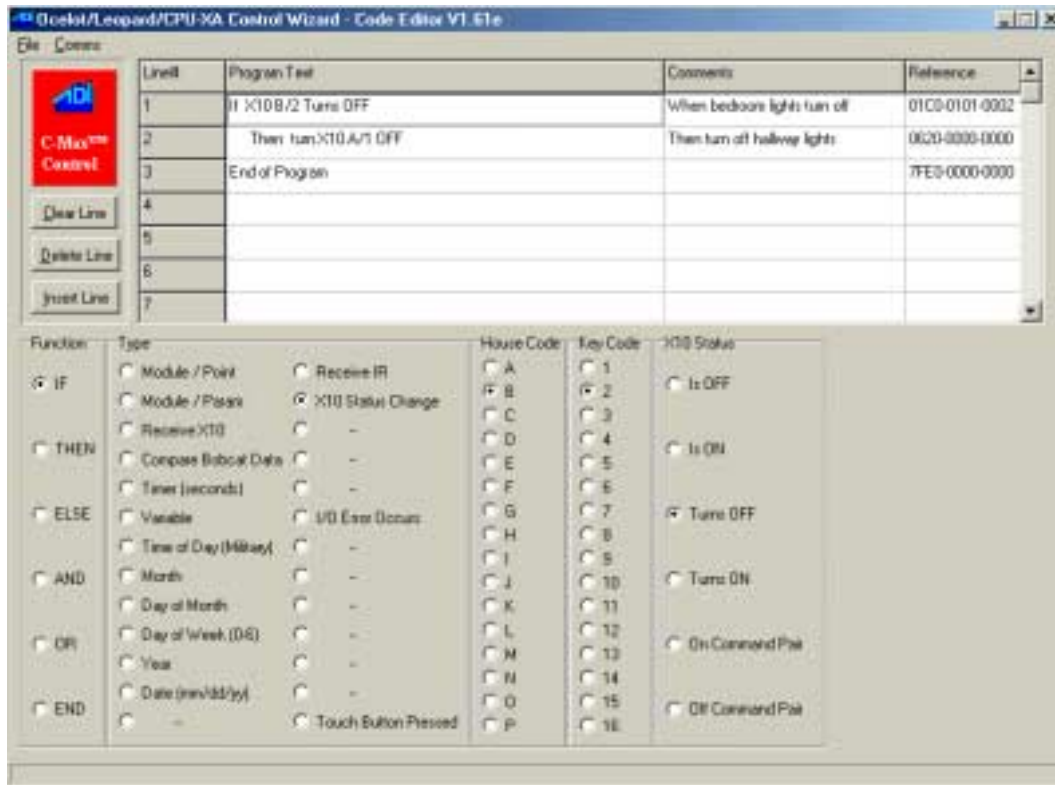
Line#	Program Text	Comments
1	If Receive Infra-Red# 8	If Stop is pressed on remote
2	Then turn X10 A/1 ON	Turn on living room lights
3	Then Transmit X10 A/2	Brighten lights
4	Then Transmit X10 A/22, 10 time(s)	in Hallway
5	Then Transmit Infra-Red# 3	Stop VCR

5.2.5 Tracking X-10 Status

The Ocelot™ tracks the status of all 256 X-10 addresses. This status can be viewed from the C-Max™ Monitor X-10 window. On power-up, the Ocelot™ will see all X-10 addresses as OFF. The Ocelot™ can issue commands based on the current state, or a change in state of any X-10 address.

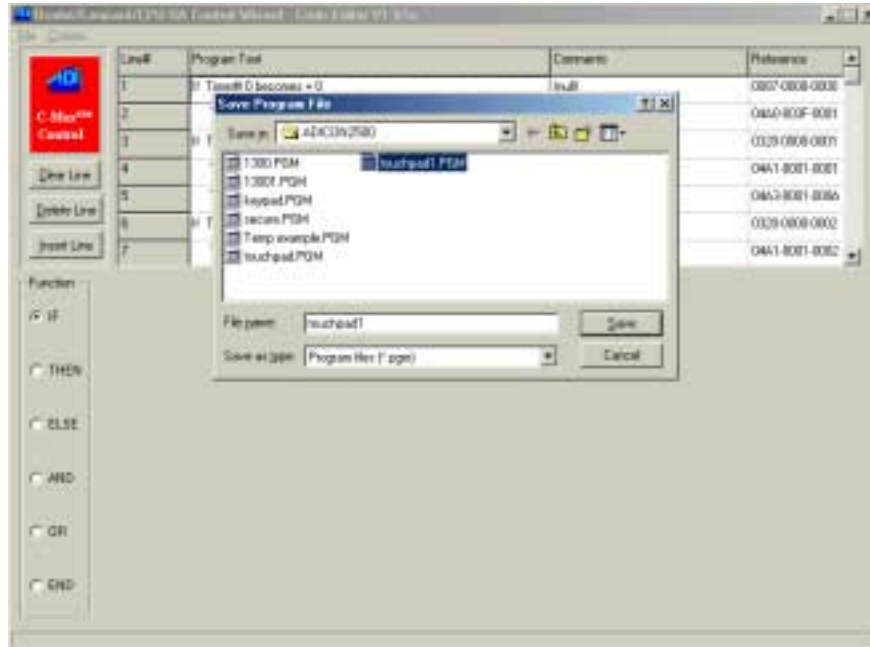
5.2.5.1 Sending an X-10 Command based on a Status Change

In this example we will turn off the hallway lights when the bedroom lights are switched off. The hallway lights are at X-10 address A/1 and the bedroom lights are at address B/2.



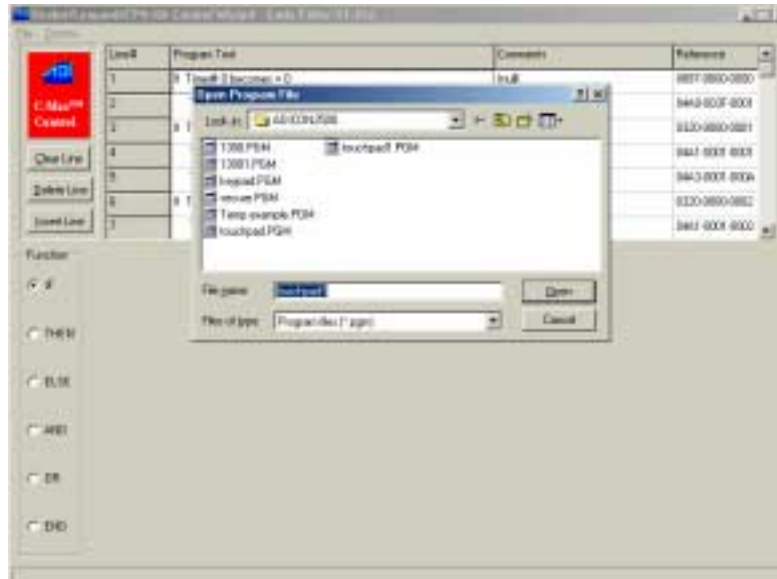
5.2.6 Saving your Program

After completing your program, C-Max™ allows you to save the program. Click File, Select Save Program As, and then type in your file name. The program will be saved in a *.pgm format.



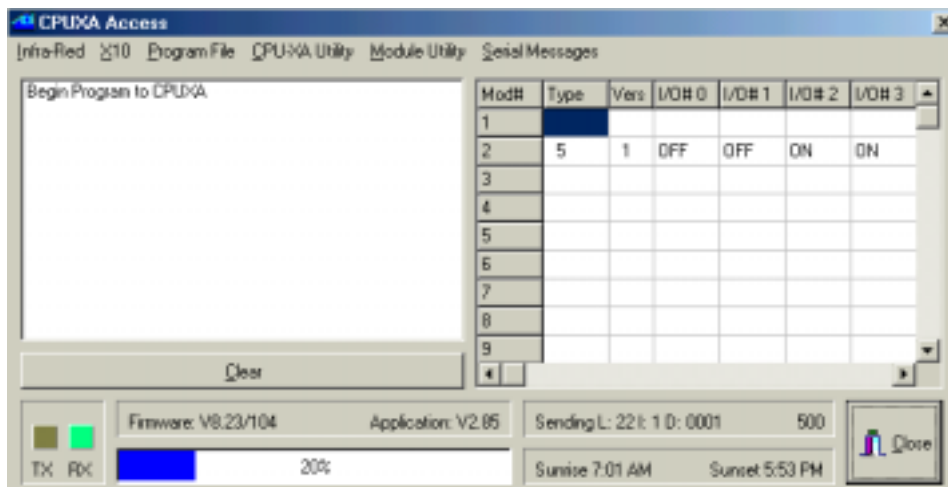
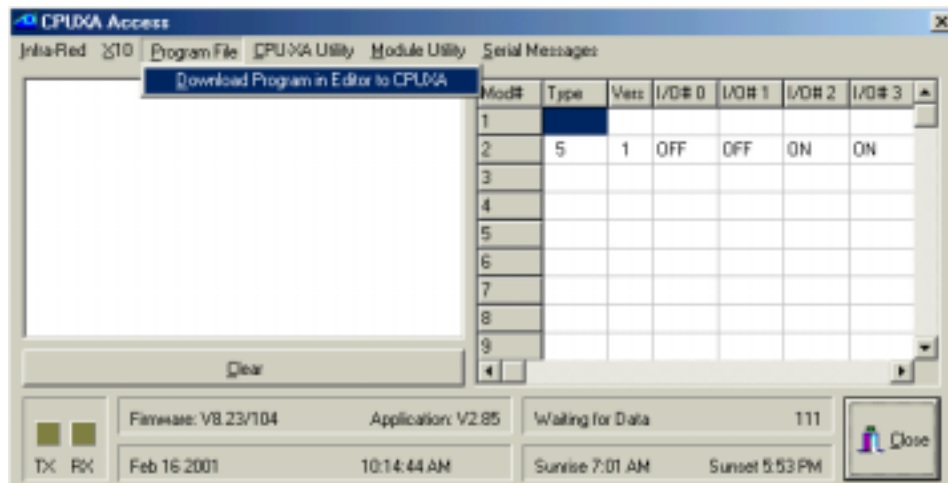
5.2.7 Loading a Previously Created Program File into the Code Editor

You can load previously created files into the code editor by clicking on File, then selecting Open Program.



5.2.8 Downloading your Program File into the Ocelot™

This command will load the Ocelot™ with the program file in the Code Editor. Select Comms, then Attach to CPU-XA. Click on Program File, then select Download File.



5.2.9 Is My Program Running?

The Ocelot™ Active LED indicates the status of the Ocelot™. Four quick flashes indicate an operational program. A single flash indicates that the Ocelot™ is loading a new program, or that the Ocelot™ has lost its executive program. Three flashes indicate that no user program is loaded in the Ocelot™.

5.2.10 Debugging and Monitoring your Program

C-Max™ provides tools to assist you in monitoring your program. The X-10 Monitor is one useful tool. The other tools will be outlined in the future chapters.

6 The Plot Thickens (Using other Ocelot™ Features)

So far we have issued commands based on incoming X-10 and IR. Now we will discuss issuing commands based on the internal Real time Clock (RTC). We will also outline how to use the internal timers and variables.

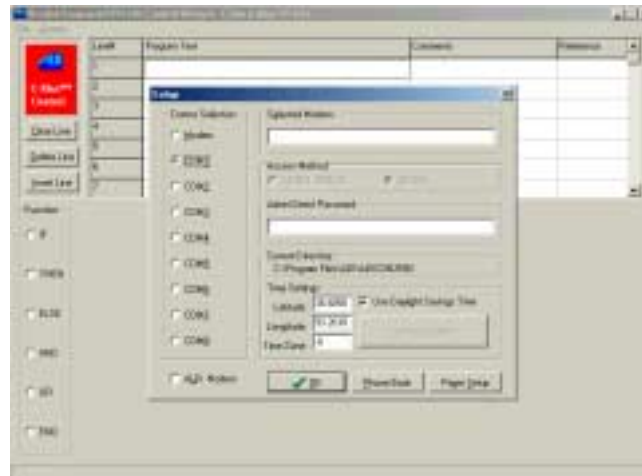
6.1 Issuing Commands based on the RTC

The Ocelot™ incorporates a Real Time Clock (RTC). Earlier we discussed how to initialize the RTC, now we will look at how to use the RTC in our programs.

The Ocelot™ can react to any of the following events:

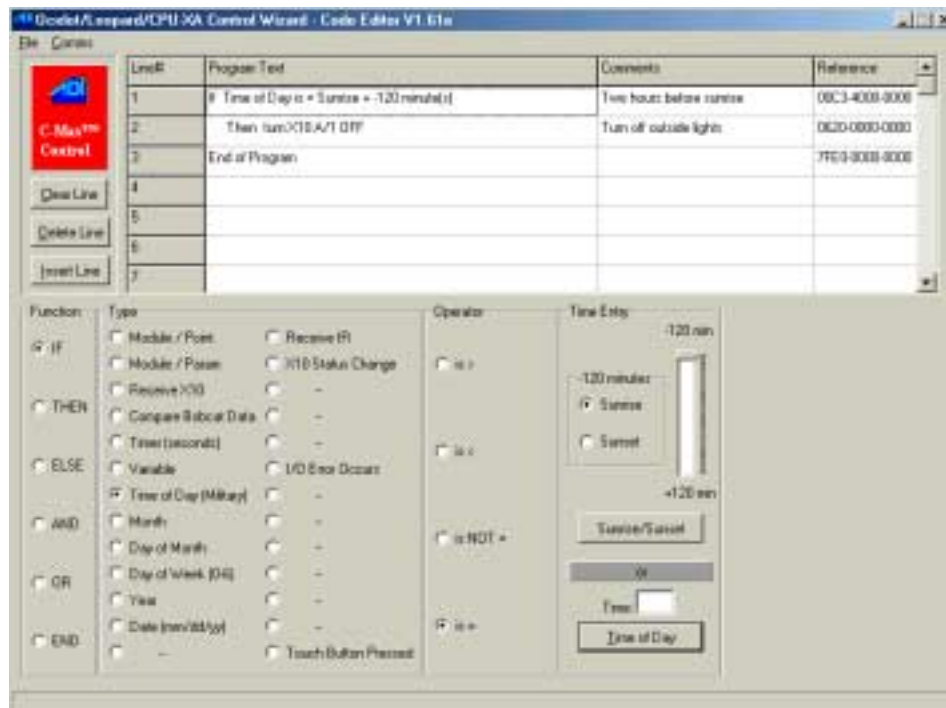
Time of Day:	Presented in Military Format 00:00 – 23:59
Month:	1 (January) – 12 (December)
Day of Month:	1 (1 st) – 31 (31 st)
Day of Week:	0 (Sunday) – 6 (Saturday)
Year:	2001 – whenever
Date:	mm/dd/yy (Feb 16,2001 would be 02/16/01)

Additionally, the Ocelot™ tracks Sunrise and Sunset for your geographical location. Commands can be issued up two hours before/after Sunrise/Sunset.



6.1.1 Issuing an X-10 Command based on the time

In this example, we will issue an X-10 command to turn off the outside lights two hours before sunrise every morning.

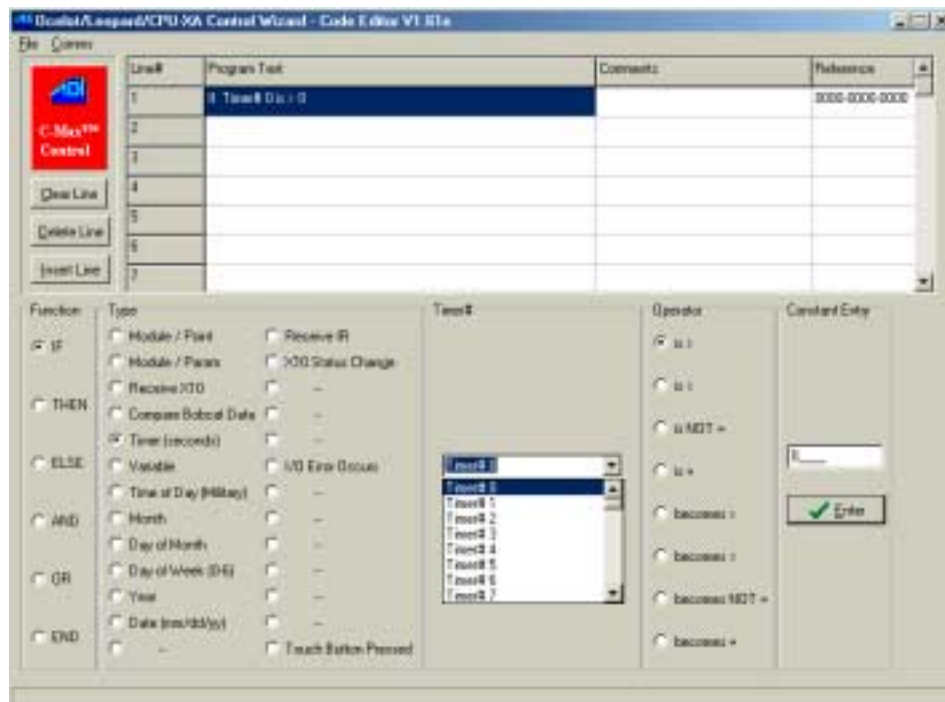


6.2 Using Timers and Variables

The Ocelot™ provides sixty-four timers and one hundred twenty-eight variables for use in your program.

Timers count seconds. The default (power-up) value for all timers is zero. A timer set to zero is OFF. To activate a timer, set it to one. The timer will begin counting UP.

To turn OFF the timer, set the value back to zero.



Variables have several functions.

Variables 0 – 59 are general-purpose memory locations that can be used to count events or to initiate quasi-subroutines.

Variable 60 indicates the last received IR. (65535 indicates a non-recognized IR)

Variable 61 is not used in the Ocelot™.

Variable 62 is for factory use only.

Variable 63 is not used on the Ocelot™.

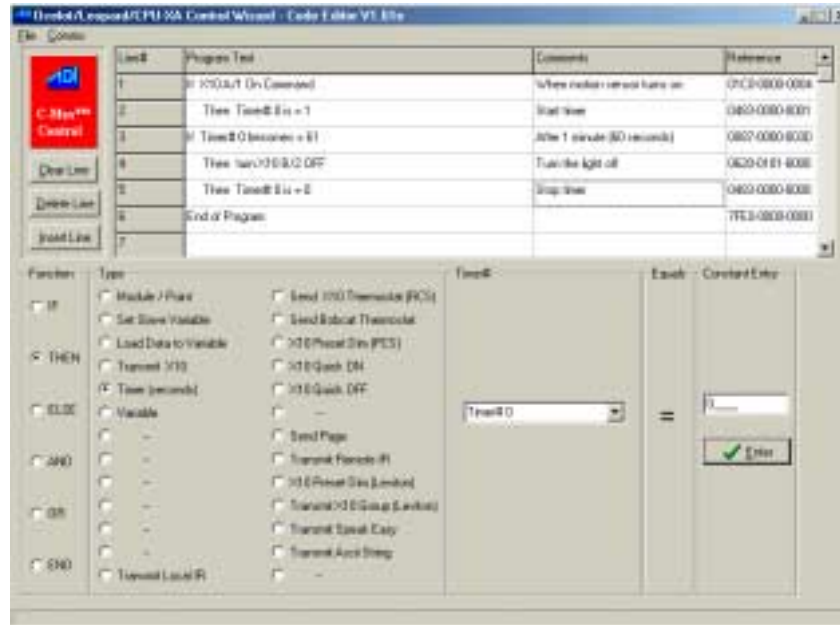
Variables 64 – 79 indicate the X-10 temperature received from an RCS Thermostat.

Note: All variables are reset to 0 on power-up. Parameter 22 allows you to select the minimum variable number that will retain it's value upon loss of power. All higher variable number's values will also be retained on power-up. For example: if parameter 22 = 70, then all variables above 70 (including variable 70) will retain their values at the time of power loss. All variables below 70 will be reset to 0.



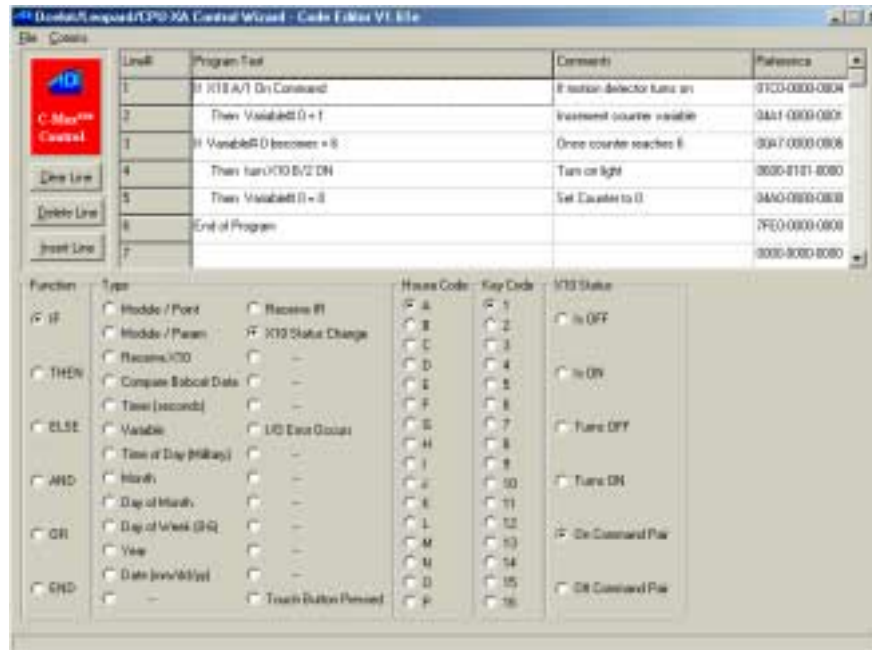
6.2.1 Programming with Timers

In this example, we will receive an X-10 A/1 ON command, then set a timer to fire out an X-10 B2/OFF command sixty seconds later. We will then turn off the timer. In this example, the incoming X-10 command was from a motion detector and the outgoing command turns on the outside lights for one minute.



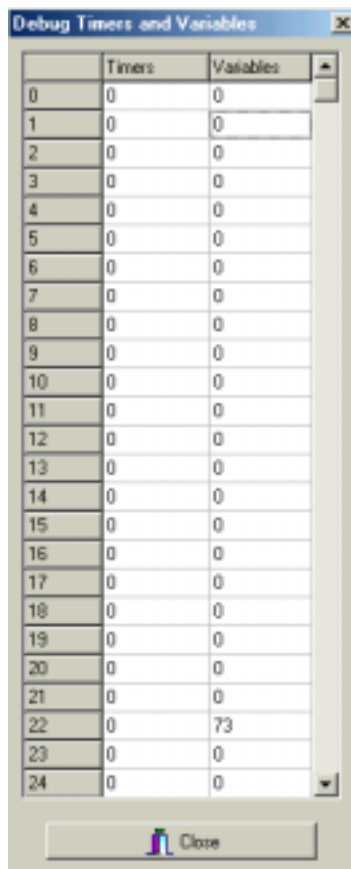
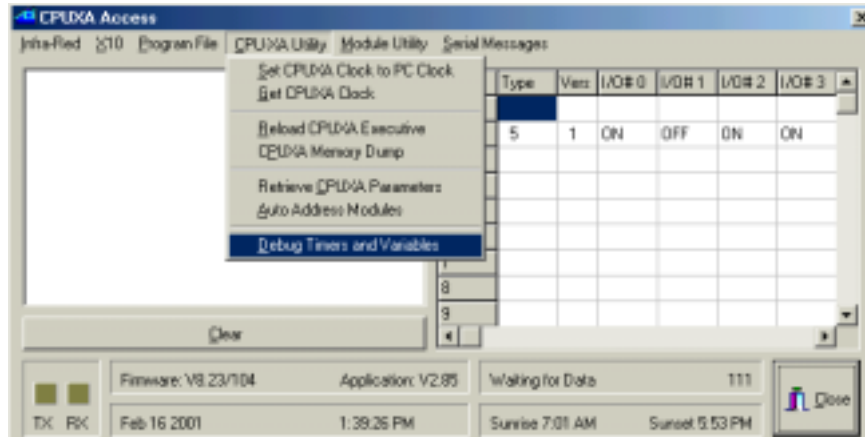
6.2.2 Programming with Variables

In this example, we will increment a variable every time we receive an X-10 signal from the motion detector at address A/1. After the variable reaches six, we will execute a quasi-subroutine to turn on the outside lights at X-10 address B/2.



6.3 A little Help here! (Using Debug)

Once you download your program, you can monitor the timers and variables from C-Max™. Click on C-Max™ Utilities and select Debug Timers and Variables. A list of the timers and variables will be displayed. You can also set a timer or variable to force a portion of your program to execute.



7 Sending ASCII Messages (Controlling other Equipment via RS-232)

The Ocelot™ can control other RS-232 based equipment by issuing ASCII data commands.

The Ocelot™ can also issue messages to alphanumeric pagers with the optional ADNET modem.

The Ocelot™ can store up to one hundred and twenty-eight ASCII strings, with a maximum string length of thirty-two characters in each string. The RS-232 communication parameters are fixed at 9600, 8,1, no parity, no handshaking.

The ASCII strings cannot be retrieved from the Ocelot™, once they are written to the Ocelot™.

Non-printable characters are entered in a four digit format: ^XXX, where ^ indicates that the next three numbers are the binary value for the ASCII character.

Example: To issue a LF (linefeed) you enter ^013.

Refer to an ASCII table for a complete list of the binary values for non-printable characters.

7.1 Entering your ASCII Strings

Click on Serial Messages, select Pager Messages to create alphanumeric pager messages, or select Serial Messages to create ASCII messages. Create ALL of your messages before selecting SEND, as the created messages cannot be recovered after they have been sent to the Ocelot™. If you want to add a new message, you will have to re-enter the entire list.

Ascii Messages

Message #0	For hidden characters type ^002^013
Message #1	Send Message two here ^013
Message #2	Send Message three here ^013
Message #3	
Message #4	
Message #5	
Message #6	
Message #7	
Message #8	
Message #9	
Message #10	
Message #11	

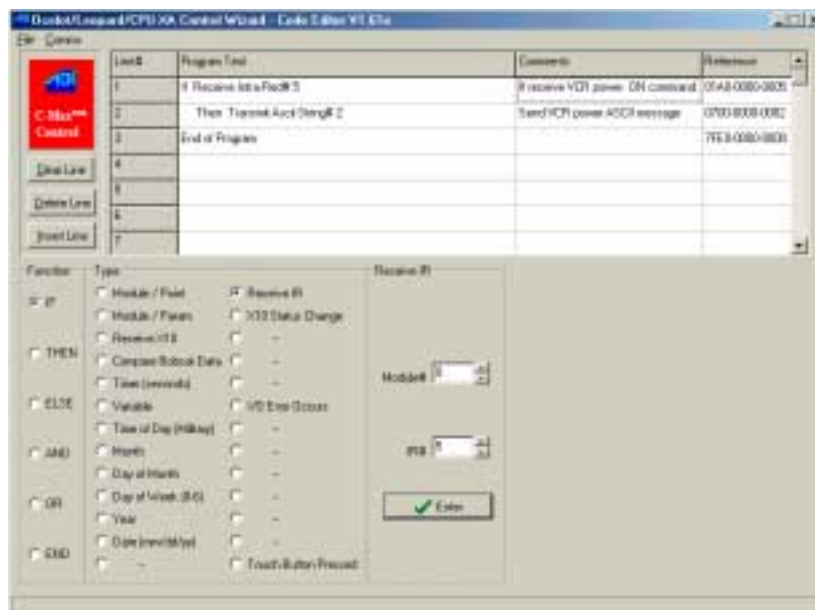
Enter text exactly as you wish it to be sent. To send non-printable characters enter the decimal value of the character preceded by a caret (^). For example, to send a carriage return, enter ^013. Note that 3 numbers must always follow a ^.

Send Close

7.2 Sending an ASCII string

Note: Sending an ASCII message while connected to the C-Max™ software is not advised. C-Max™ communications will be disrupted by the unexpected response from the Ocelot™. Utilize HyperTerminal, or another communications program to monitor the ASCII data issued from the Ocelot™.

In this example, we will use an IR remote control to cause the Ocelot™ to issue an ASCII command to turn on an RS-232 controlled VCR. The ASCII ON command for this VCR has previously been created and stored in ASCII location 2. The remote control ON button has been learned into IR #5.



8 Controlling Leviton® Style X-10 Switches

8.1 Leviton® Group Commands

Leviton® modules series 16xxx support group commands. These modules can be set to learn a group command. Every module in that group will brighten or dim to a preset level when a command is issued. Every module in the group must have the same house code. If you want each module in a group to be at different light levels, then each module must have a unique key code.

Send Leviton X10 Commands

Leviton Extended Commands

House Code	Key Code
<input checked="" type="radio"/> A	<input type="radio"/> 1
<input type="radio"/> B	<input type="radio"/> 2
<input type="radio"/> C	<input type="radio"/> 3
<input type="radio"/> D	<input type="radio"/> 4
<input type="radio"/> E	<input type="radio"/> 5
<input type="radio"/> F	<input type="radio"/> 6
<input type="radio"/> G	<input type="radio"/> 7
<input type="radio"/> H	<input type="radio"/> 8
<input type="radio"/> I	<input type="radio"/> 9
<input type="radio"/> J	<input type="radio"/> 10
<input type="radio"/> K	<input type="radio"/> 11
<input type="radio"/> L	<input type="radio"/> 12
<input type="radio"/> M	<input type="radio"/> 13
<input type="radio"/> N	<input type="radio"/> 14
<input type="radio"/> O	<input type="radio"/> 15
<input type="radio"/> P	<input type="radio"/> 16

Include in Group at Current Level

Remove from Group

Entire Group to Learned Level

Entire Group OFF

Group Number: 0

Note: While you can set a group number from 0 to 63, a single module can only belong to 4 groups. Group commands only apply to 16xxx series modules.

Brightness Level 0%

Set Light Level

Close

Sixty-four unique groups can be created. Each module can belong to 4 different groups. For example one light module can be in groups M1, M3, M7, and M9, while another module can be in groups M1, M25, M33, and M60. When a group M1 command is issued, both modules will respond. When an M3, M7 or M9 group command is issued, only the first module will respond. When a group command M25, M33 or M60 is issued, only the second module will respond.

To learn a group command,

- 1) Click the circle to the left of the House Code you want to train with your left mouse button. A black dot will appear in the circle.
- 2) Click the circle to the left of Key Code to select the Leviton® module you want to add to the group. A black dot will appear on the circle.

- 3) Select the Group Number by either typing in the group number to the right of Group Number or click the Up and Down arrows to the right of the white box until the desired group number is displayed.
- 4) Move the scroll bar on the lower right corner until the desired light is displayed. You can either click the arrows to the Left (Dim) or Right (Bright) with your left mouse button or place you mouse over the square between the arrows, press and hold your left mouse button then slide the bar left (Dim) or right (Bright) until the desired brightness level is displayed. Release the left mouse button once the desired brightness level is displayed.
- 5) Click Set Light Level with your left mouse button. The Leviton® module will respond to that light level.
- 6) Click Include in Group at Current Level with your left mouse button. The Leviton® module is now part of that learned group.

Repeat steps 1-6 until each Leviton® module has learned their groups.

8.2 Setting a Group to Their Learned Levels

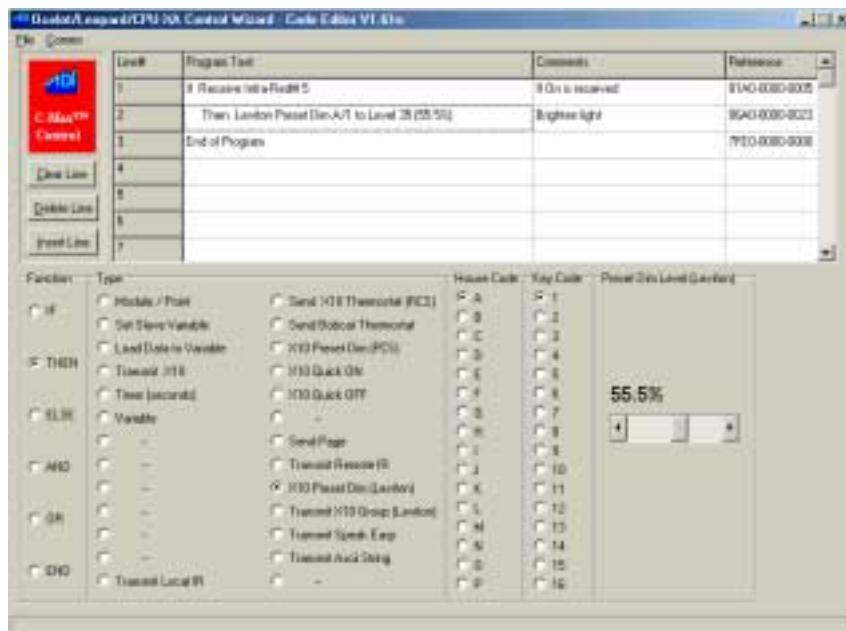
- 1) Click the circle to the left of the House Code you want to train with your left mouse button. A black dot will appear in the circle.
- 2) Select the Group Number by either typing in the group number to the right of Group Number or click the Up and Down arrows to the right of the white box until the desired group number is displayed.
- 3) Click Entire Group to Learned Level with your left mouse button. Every light in that learned group will respond to their learned levels.

8.3 Turning Off an Entire Group

- 1) Click the circle to the left of the House Code you want to train with your left mouse button. A black dot will appear in the circle.
- 2) Select the Group Number by either typing in the group number to the right of Group Number or click the Up and Down arrows to the right of the white box until the desired group number is displayed.
- 3) Click Entire Group OFF with your left mouse button. Every Leviton® module in the selected groups will turn off.

8.4 Removing a Leviton® Module From a Group

- 1) Click the circle to the left of the House Code you want to train with your left mouse button. A black dot will appear in the circle.
- 2) Click the circle to the left of Key Code to select the Leviton® module you want to remove from the group. A black dot will appear on the circle.
- 3) Select the Group Number by either typing in the group number to the right of Group Number or click the Up and Down arrows to the right of the white box until the desired group number is displayed.
- 4) Click Remove from group with your left mouse button. That module will no longer respond to that group command, but can be set to another group if desired.



9 Controlling PCS™ Style Switches

Some X-10 lighting switches will accept preset dim commands. PCS™ is one common provider for these switches. These switches allow the Ocelot™ to issue a single command to set the light to a specific brightness level. Conventional X-10 switches require the Ocelot™ to issue a series of dim/bright commands to set the light to a specific brightness.

9.1 Sending an X-10 Preset Dim Command

In this example we issue a Preset Dim to the outside lights twenty minutes before sunset.



10 Expanding your HA Setup

As you become more acquainted with the Ocelot™ and start to build your application, you may find that you would like to expand the scope of your installation. No problem, the Ocelot™ was designed for expandability. The Ocelot™ is just one component in the growing ADICON family. Expansion modules are available for controlling and monitoring just about anything. Refer to the ADICON modules on the included CD, or go to the ADI Website www.appdig.com for information on the latest modules.

11 Diagnostics

11.1 Communication Problems

Problem:

Ocelot™ Active LED is flashing only once.

Solutions:

Confirm that power is connected correctly.

Reload the executive from C-Max™.

Problem:

Ocelot™ cannot communicate with C-Max™ and the Active LED is flashing three times.

Solutions:

Configure C-Max™ to use the correct RS-232 serial port.

Replace the serial cable.

Problem:

C-Max™ is reporting communication errors and the Active LED is flashing four times.

Solution:

The user program may be sending ASCII commands. C-Max™ will be disrupted if your program attempts to send ASCII commands.

11.2 X-10 Problems

Problem:

The Ocelot™ X-10/IR LED does not light to indicate the presence of the AC line interface module.

Solution:

Verify that the LED is lit on the AC interface line module. No light = no good.

Verify that your interface cable is the one provided with the Ocelot™.

Verify that the interface cable is plugged into the RJ jacks on the Ocelot™ and interface.

Problem:

X-10 command is issued, but the controlled device does not respond.

Solution:

Verify the address on the controlled device.

Verify that the X-10/IR LED blinks off for less than a second when the command is issued.

AC line interference at the controlled module. Try moving the module.

Problem:

X-10/IR LED turns OFF for several seconds and the controlled device does not respond.

Solution:

AC line interference at the AC line interface module. Try moving the AC interface module to a different AC outlet.

Problem:

My program is issuing the X-10 command constantly.

Solution:

Check your code carefully. You may be issuing constant X-10 commands while an event is active. For example IF Variable 0 = 0 THEN SEND X-10 will constantly send X-10 commands.

11.3 IR Problems

Problem:

Cannot learn and replay ANY IR command.

Solution:

Verify that the remote control batteries are good. Try another remote control.

Problem:

Can learn IR commands but cannot control the A/V equipment.

Solution:

Confirm that a min-emitter is plugged into the IR EMITTER input on the Ocelot™.

Confirm that the emitter is placed exactly over the A/V equipment IR input.

Confirm that you are not using a blaster IR emitter.

Problem:

Can control SOME IR A/V equipment, but NOT ALL equipment.

Solution:

The Ocelot™ cannot learn IR commands from some remote controls. If your remote control uses very high frequencies, the Ocelot™ will be unable to learn these commands.

Problem:

The Ocelot™ learns and replays the IR command correctly. BUT the Ocelot™ program does not recognize the incoming IR command.

Solution:

The Ocelot™ has trouble recognizing remote control commands from some vendors. Specifically, RCA® remote control commands can be learned and replayed, but they cannot be recognized by the Ocelot™. Utilize another manufacturer's remote control to trigger sending RCA® commands.

Problem:

My program is continually sending Infrared commands.

Solution:

Check your code carefully. You may be issuing constant IR commands while an event is active. For example IF Variable 0 = 0 THEN Transmit Infrared will constantly send IR commands.

12 Frequently Asked Questions (FAQ)

Frequently asked questions are being maintained as a separate document on the ADI Website www.appdig.com Refer to the website for the latest list of FAQ's. If you received this manual on CD, refer to the FAQ link on the opening menu.