

ADI



LEOPARDTM

User Manual

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Leopard™ manual Rev 1

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1 Welcome to the Leopard™

Congratulations on your purchase of the Leopard™ Home Automation Controller. Whether you are a beginner, or a seasoned veteran, the Leopard™ 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 Leopard™ Description and Features

The Leopard™ combines the power of the Ocelot with the convenience of a touch screen. It can be programmed for stand-alone operation, or controlled by many of the popular third party Home Automation Software programs. The Leopard™ 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 Leopard™ to interface with a variety of external devices.

Controller: The Leopard™ 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.

Touch Screen: The Leopard touch screen is a QVGA LCD display with 320 x 240 resolution. The backlight is a Cold Cathode Fluorescent Lamp (CCFL).

Beeper: The Leopard provides a piezo beeper that can be set to sound on button presses, or under user program control.

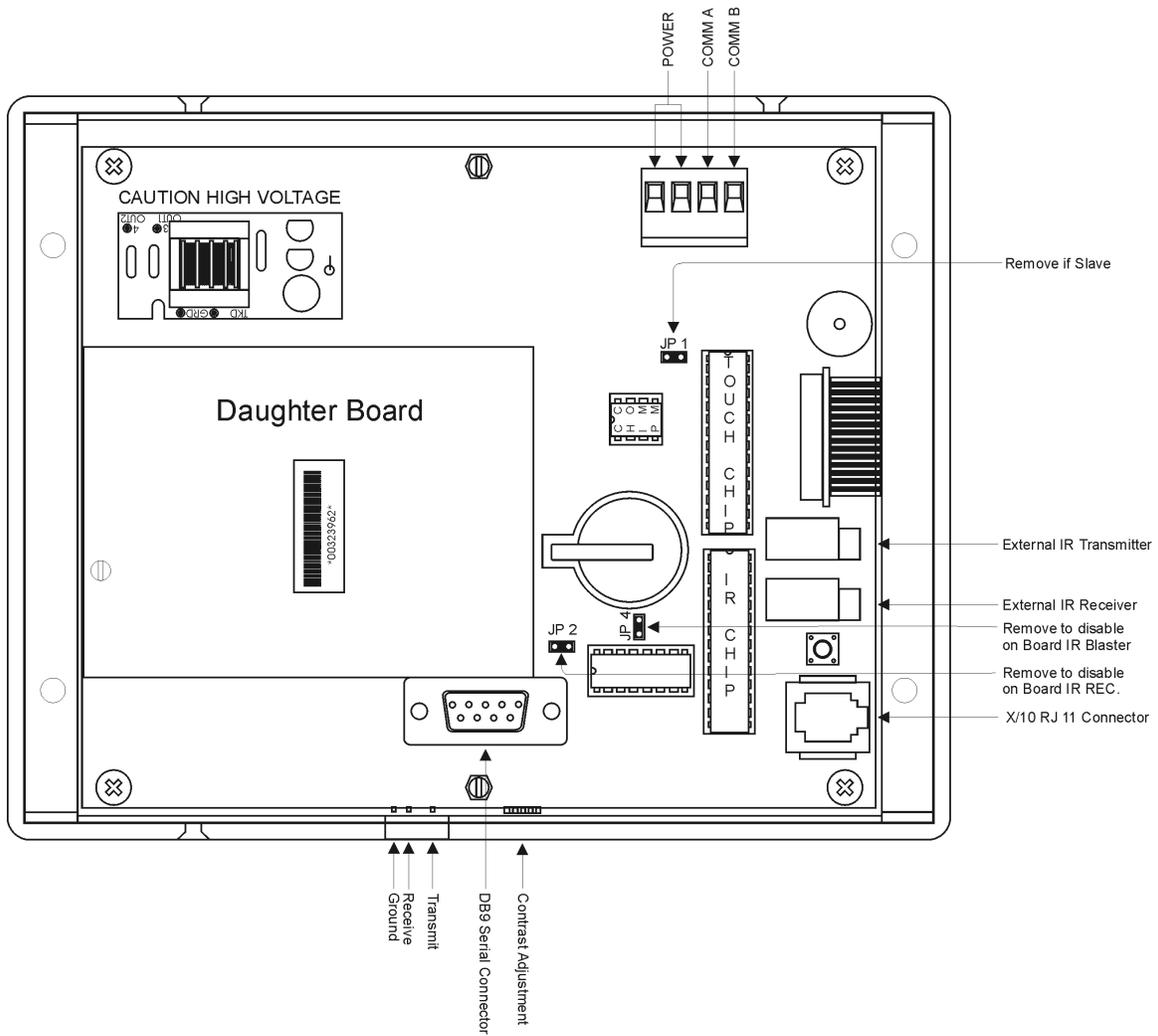
RS-232 Port: The Leopard™ provides a RS-232 port for communications with an external computer. This port is used to initially load the user program. It can also be used for communications with a third party software program. Additionally, this port can be used for communications with an ADICON modem,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

RS-485 Port: The Leopard™ 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 Leopard™ provides a port for connecting an X-10 interface such as the TW-523. This interface allows the Leopard™ to control external lighting and appliance modules. The Leopard™ can also monitor/control RCS X-10 thermostats with this port.

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

IR output: The Leopard™ provides an IR blaster on the front face of the unit. A stereo jack is provided for attaching an optional IR emitter.



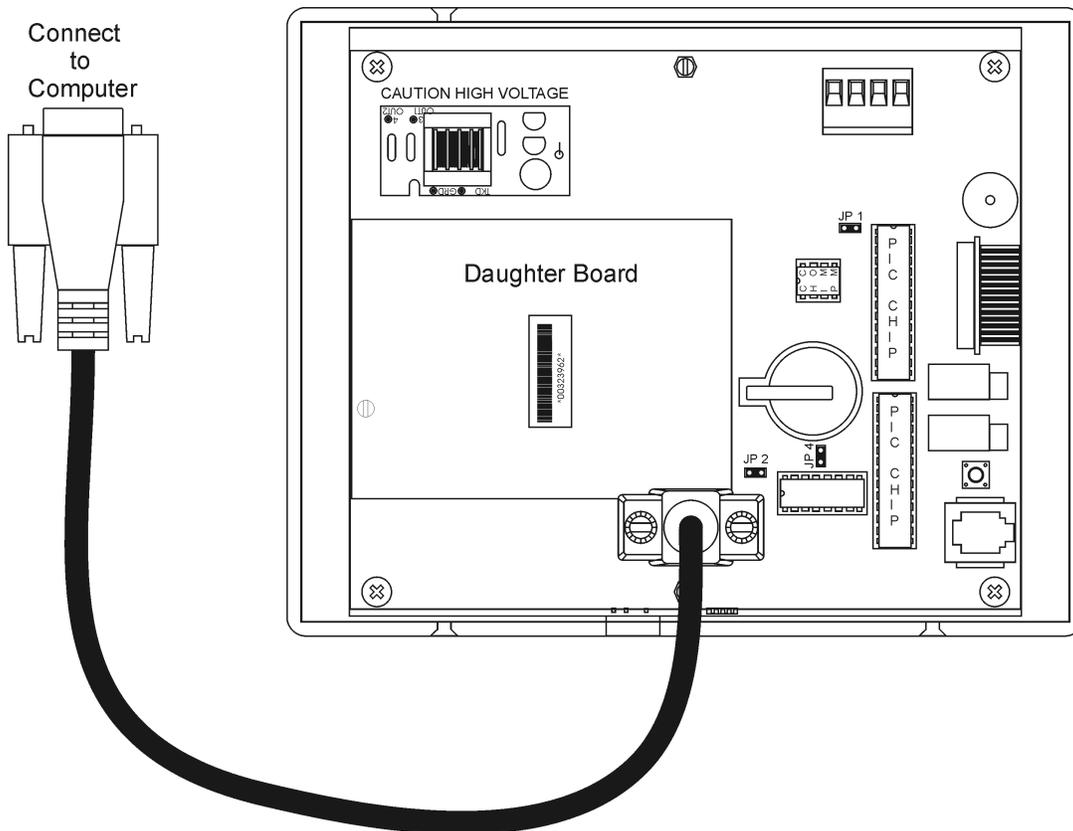
2 What do I need to get started?

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

2.1 Connecting the Leopard™ to your Computer

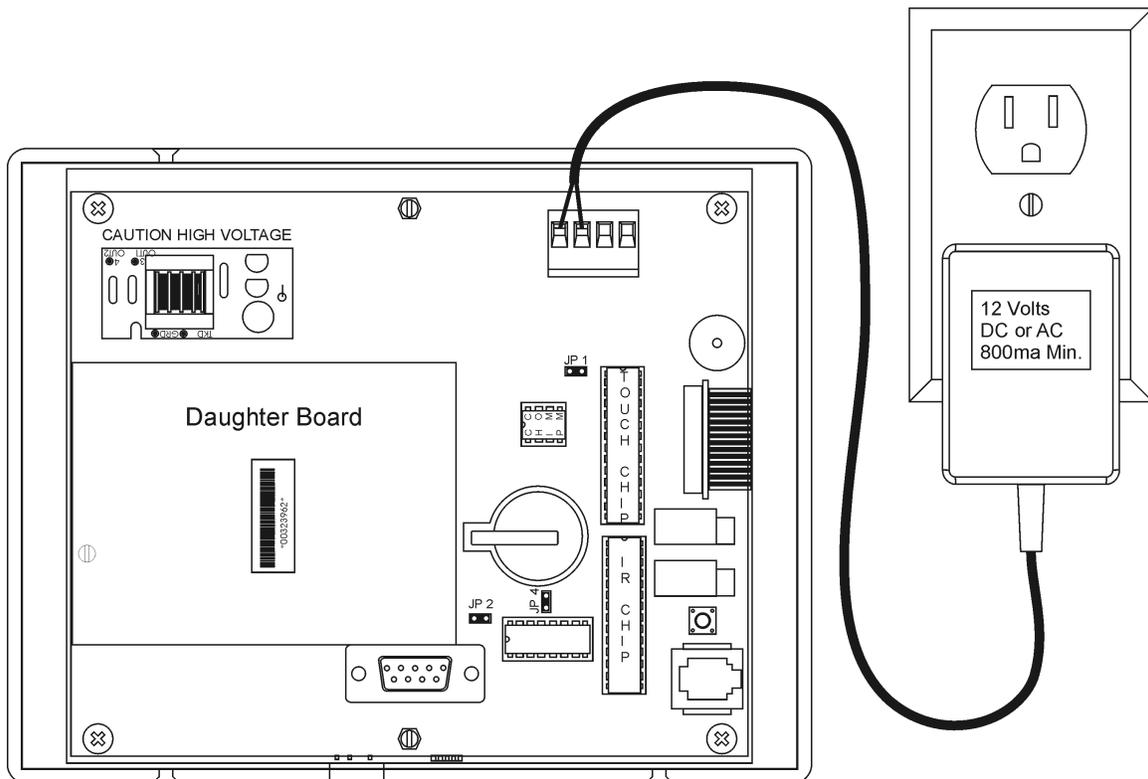
The Leopard™ is programmed with your instructions via a serial connection to your computer. A standard RS-232 serial cable has been provided with your Leopard™ for this connection. Connect the female DB-9 end of the cable to the DB-9 connector on the Leopard™. Connect the male DB-9 end of the cable to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

The Leopard™ requires a low voltage power source for operation. The Leopard™ can accept any voltage source from 9V to 12V AC or DC. The power source needs to provide at least 800 mA (milli-amps) of current. Your Leopard™ 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 Leopard™. If you are using the provided supply, plug the four-position jack into the socket on the Leopard™. 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 Leopard™ requires a 9V – 12V AC or DC power source. Do not connect the Leopard™ to AC line voltage (110 VAC or 220 VAC) The Leopard™ and attached computer will be seriously damaged.

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

Plug the AC source into the line voltage. As the Leopard™ goes through the power-up cycle, the Leopard™ LED's will blink different patterns. The flash patterns indicate the status of the Leopard™ 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 Leopard™.

2.3 Configuring the Leopard™ to Receive Infrared Commands

The Leopard™ is factory configured to receive Infrared (IR) commands. The Leopard™ 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 Leopard™.

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

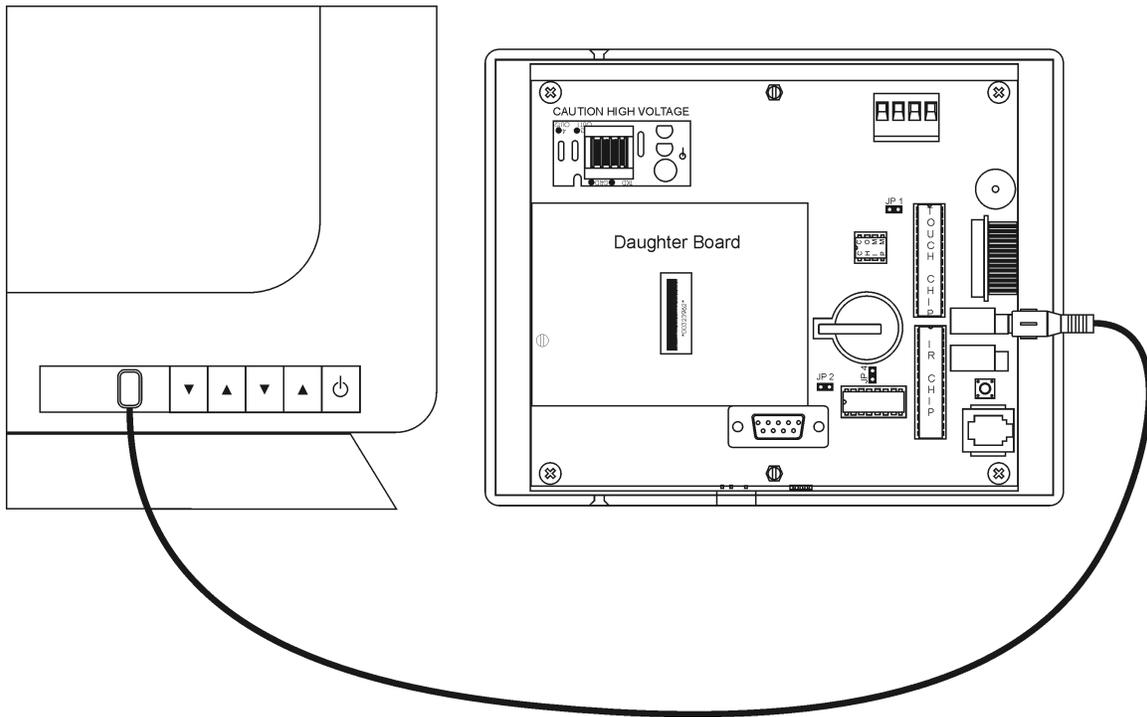
Note: The Leopard™ will constantly be scanning for IR commands. The IR/X-10 LED may turn Red, even if you have not pressed a button on the remote control. This is normal operation. The Leopard™ may be detecting IR activity from ambient light sources. This should not interfere with normal Leopard™ operation.

An IR input jack is provided for attaching the optional ADI external IR receiver. This cable is not provided with the Leopard™. 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 Leopard™ is powered, will permanently damage the optional IR receiver cable. Remove power from the Leopard™ before installing the optional IR receiver cable.

2.4 Connecting an external Infrared Transmitter

The Leopard™ has the ability to control IR based audio/visual equipment. The Leopard™ issues these commands via the IR blaster mounted in the face of the Leopard. You can also mount an external IR min-emitter in the IR-OUT jack on the rear of the Leopard.



2.5 Connecting an X-10 Line Interface

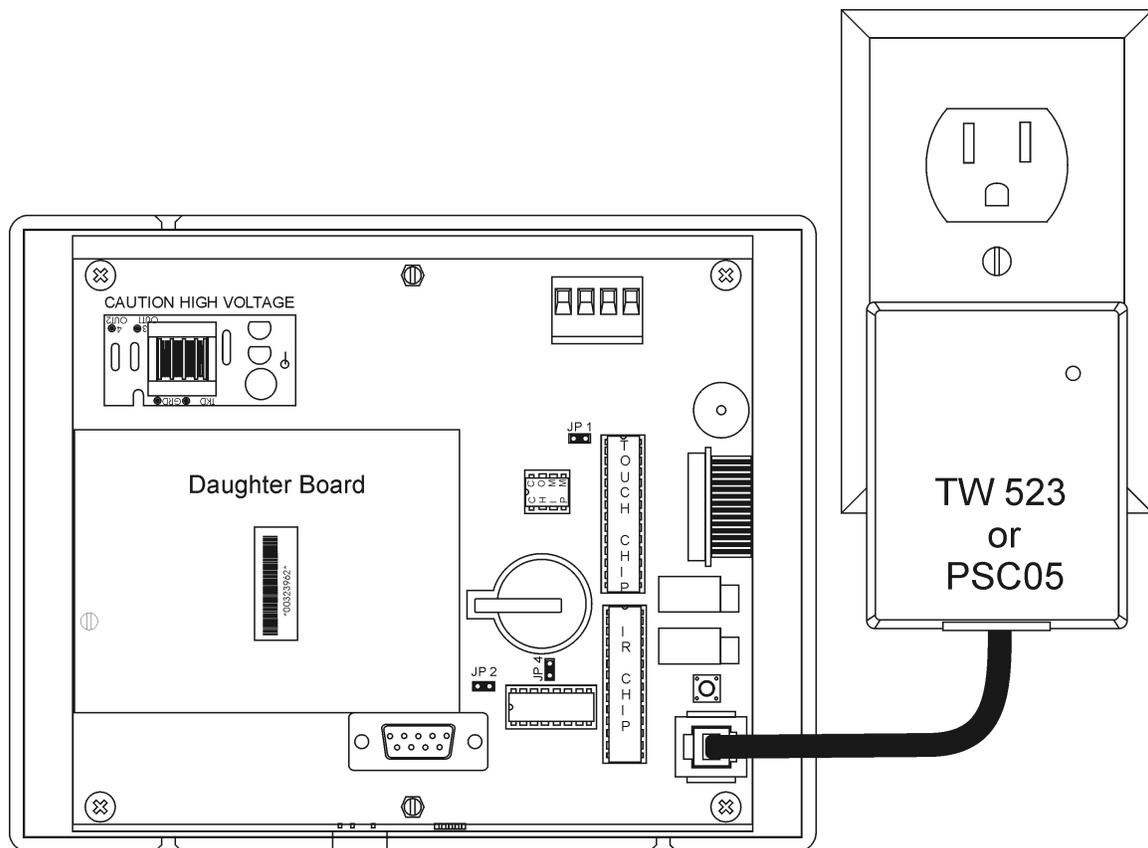
The Leopard™ has the ability to interface with X-10 style modules to control household lighting. An optional X-10 line interface is required for these functions. Popular models include the TW-523 and the PSC-05.

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

Your Leopard™ was provided with a RJ-11 cable for connection to the X-10 line interface. The Leopard™ 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 Leopard™. Plug the other end of the cable into the jack on the line interface. Plug the line interface into an available wall outlet. The Leopard's™ X-10/IR LED will turn green to indicate that the Leopard™ 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.

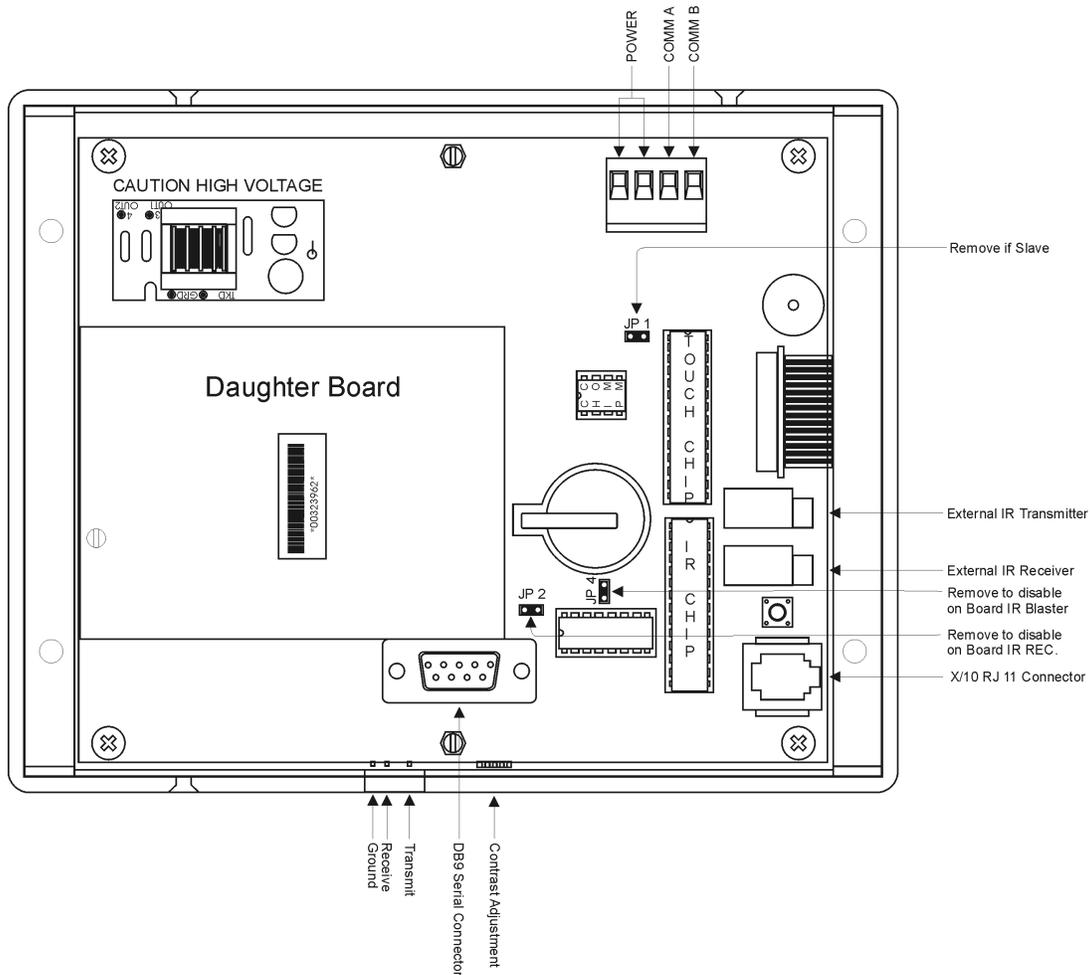


3 OK, I'm Connected, What Next?

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

3.1 Setting the LCD Display Contrast

The Leopard display contrast can be adjusted to provide the optimum display. The contrast control is accessible with a small Philips screwdriver. Refer to the following drawing for the location of the contrast control.



3.2 Controlling the Leopard™ with Third Party Software

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

3.3 No, I want to do my own thing

This is the really cool thing about the Leopard™. You can utilize the free C-Max™ software to program the Leopard™ 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 Leopard™ for your geographical location.

4.1 Loading the C-Max™ Software

Your Leopard™ 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 CD drive. If you are installing from a downloaded file off of our Website, 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.

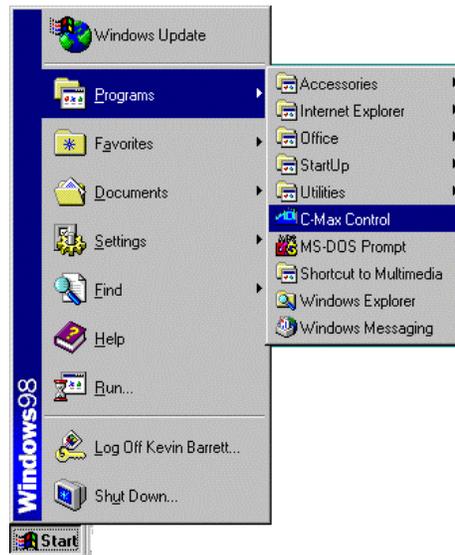
4) Type the following in the window to the right of Open: X:Setup (where X is the drive letter of your CD Rom Drive)



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:

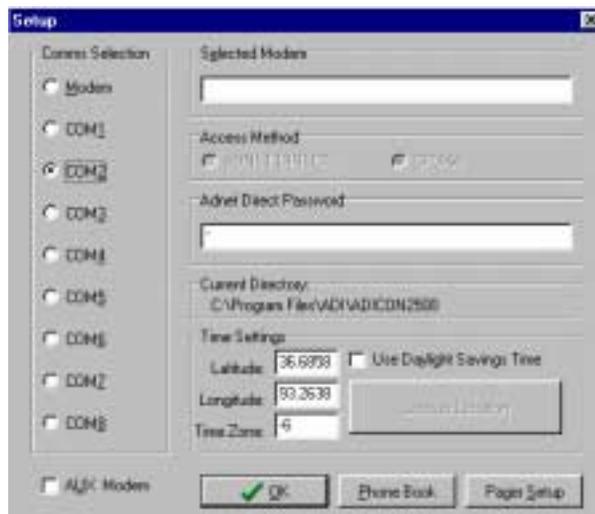


6) Click the COM port you are utilizing with your left mouse button. A black dot will appear next to the Com port you have selected. If you do not know which Com port you are utilizing, contact your computer's manufacturer.

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 of the prime meridian are negative 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/>

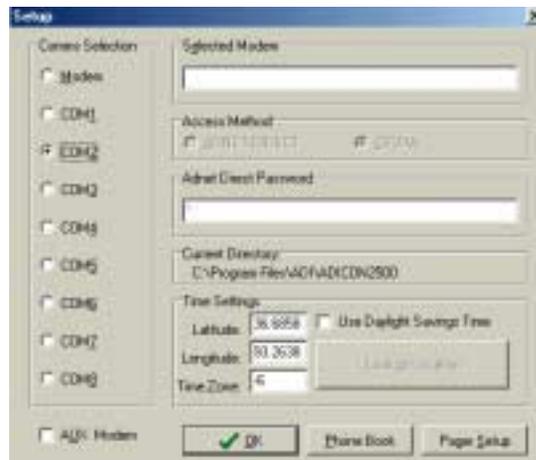
4.1.4 Daylight Savings Time

The Leopard™ 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 Leopard™ 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:



Pr#	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	FFFF

- 3) Click the Window to the right of the number 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 Leopard™

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 Leopard™ is set.

4.1.6 Retrieving the time from the Leopard™

1) Click CPUXA™ Utility with your left mouse button. A Window will appear.

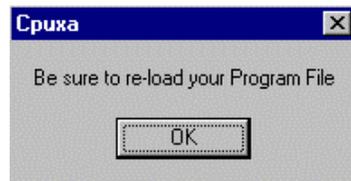
2) Click Get CPUXA™ Clock your left mouse button. The window to the left will display the Date and Time stored in the Leopard™.

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 Leopard™. The FLASH512.BIN file is the software inside the Leopard™. As features are added to the C-Max™ Control Wizard Software, the updated FLASH512.BIN file needs to be loaded in the Leopard™ 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 Leopard™. 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 Leopard™ (refer to section 4.2.3)

4.1.8 Leopard™ Configuration Parameters

These parameters define the Leopard™ 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.

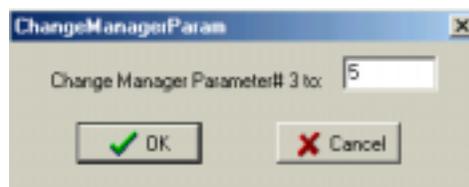
The following window will appear:



The screenshot shows a window titled "CPUXA" with a table of parameters. The table has two columns: "P#" and "Data". The data values are as follows:

P#	Data
0	538
1	0
2	0
3	5
4	0
5	1
6	3
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	1
20	80

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



The screenshot shows a dialog box titled "ChangeManagerParam". It contains a text input field with the label "Change Manager Parameter# 3 to:" and the value "5". Below the input field are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

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 - Leopard™ 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	Leopard™ 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) Leopard™ 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 1
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

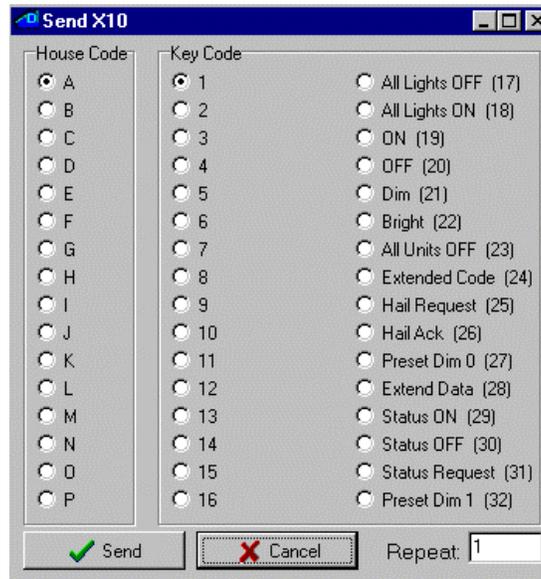
Auto addressing is discussed in the Module manuals.

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

The Leopard™ can send and receive X-10 signals. The Leopard™ 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 Leopard's™ RJ-11 modular port using the RJ-11 modular cable provided with the Leopard™.

4.2.1 Send X-10

- 1) 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).

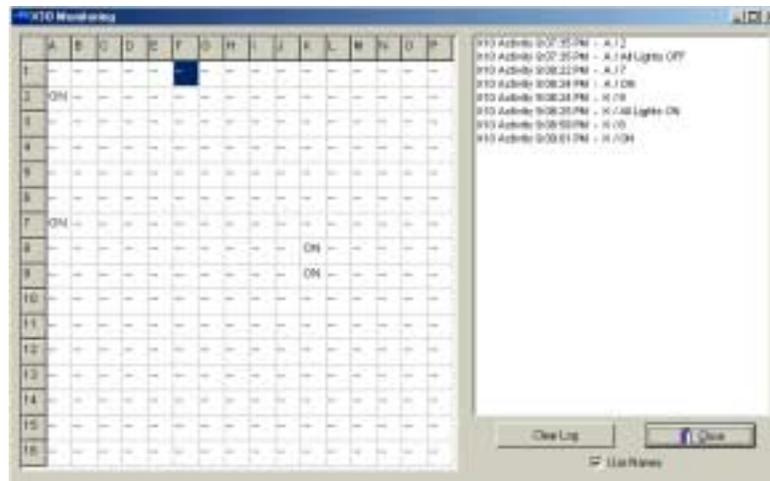
- 3) Click the House Code then the Key Code (1-16) for the controlled module. Click Send with the Left Mouse button.
- 4) Then Click the Key Code designating what you want the unit to do (the list of commands to the right). The device should respond.

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 Leopard™, 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 Leopard™ 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 Leopard™ 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 the IR blaster on the Leopard™ 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 Leopard™.

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 the Leopard™ IR Blaster pointed at 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.

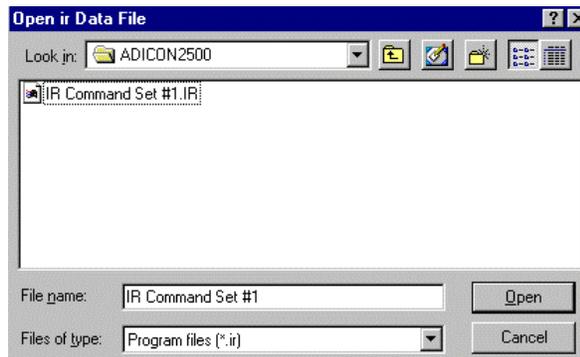
4.5.1 Download Infrared File to Leopard™

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

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

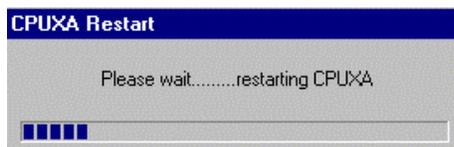
1) Click Infrared with your left mouse button. A window will appear.

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:

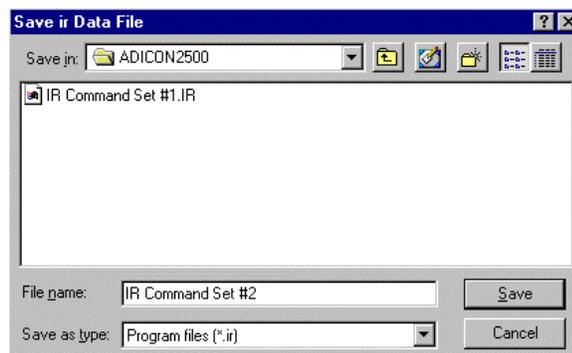


When the Status Bar is done scrolling across the CPUXA™ Restart window, the window will disappear and the Leopard™ is ready to transmit IR.

4.5.2 Upload Infrared File from the Leopard™

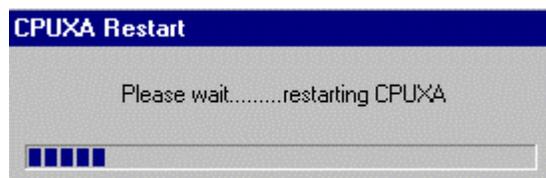
If you have saved a series of IR commands in the Leopard™, you can load them from the Leopard™ and save them to your computer.

- 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 Leopard™ will appear in the window to the left in the Leopard™ 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 Leopard™ 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 Leopard™ to automatically issue IR and lighting commands.

5 The Really Cool Stuff

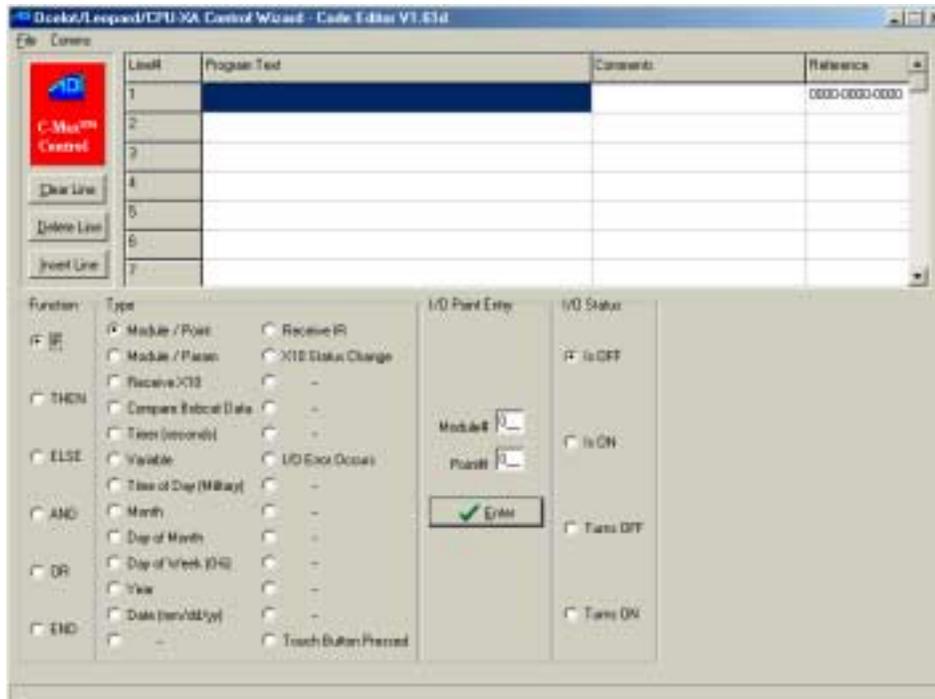
In this section we will discuss how to make your Leopard™ issue commands based on inputs or events. Specifically we will focus on X-10 and IR events and commands. In later chapters, we will use these same procedures to add the touch screen button press control.

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

The Leopard™ 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 Leopard™.

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

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



The IF function allows the Leopard™ to scan for incoming commands and events.

The THEN function tells the Leopard™ 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 Leopard™ 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 Leopard™ 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 Leopard™ 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 cursor 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 Leopard™ to look for IR #8.

Using the THEN function, we tell the Leopard™ 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 turn X10 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 cursor to the next line.

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

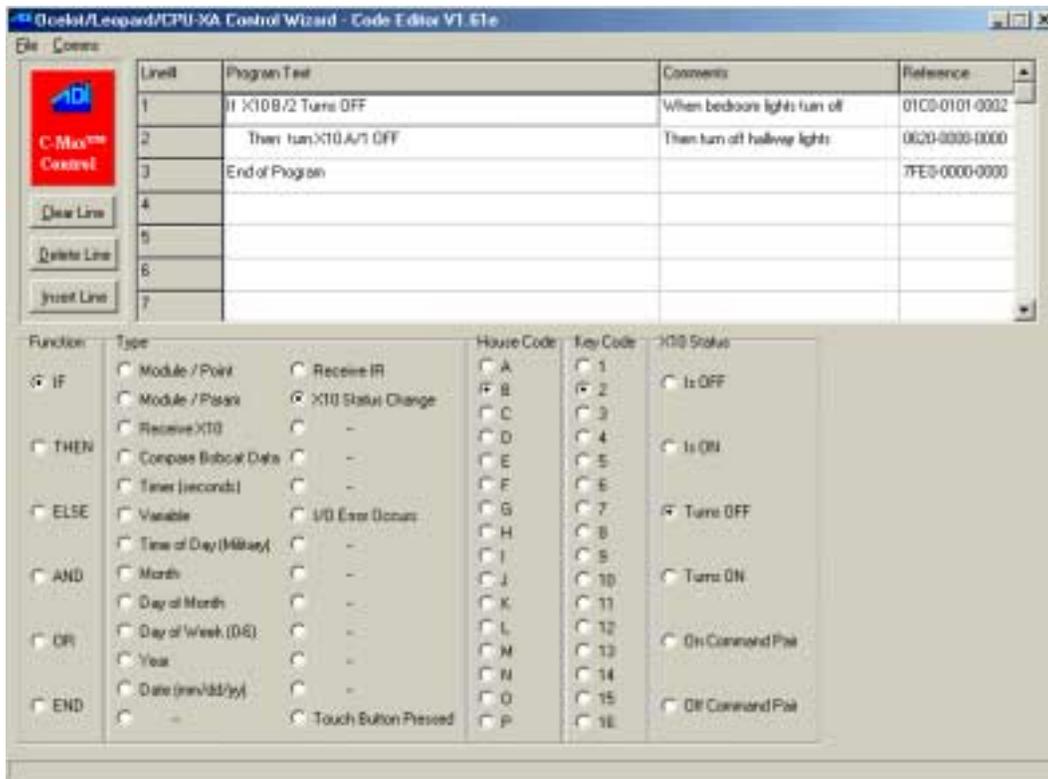
Line#	Program Text	Comments
1	If Receive Infra-Red# 8	If Stop is pressed on remote
2	Then turn X10 A/1 ON	Turn on living room lights
3	Then Transmit X10 A/2	Brighten lights
4	Then Transmit X10 A/22, 10 time(s)	in Hallway
5	Then Transmit Infra-Red# 3	Stop VCR

5.2.5 Tracking X-10 Status

The Leopard™ 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 Leopard™ will see all X-10 addresses as OFF. The Leopard™ can issue commands based on the current state, or a change in state of any X-10 address.

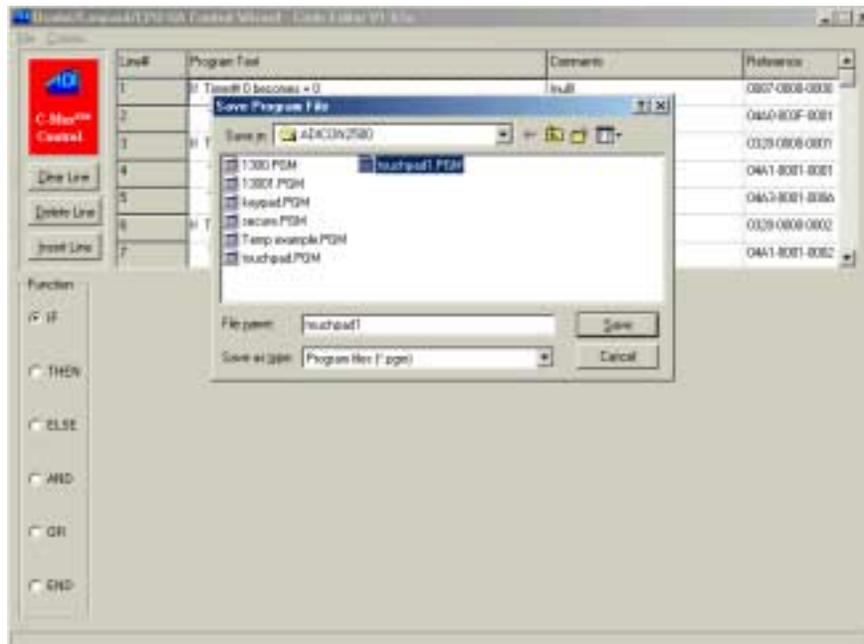
5.2.5.1 Sending an X-10 Command based on a Status Change

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.



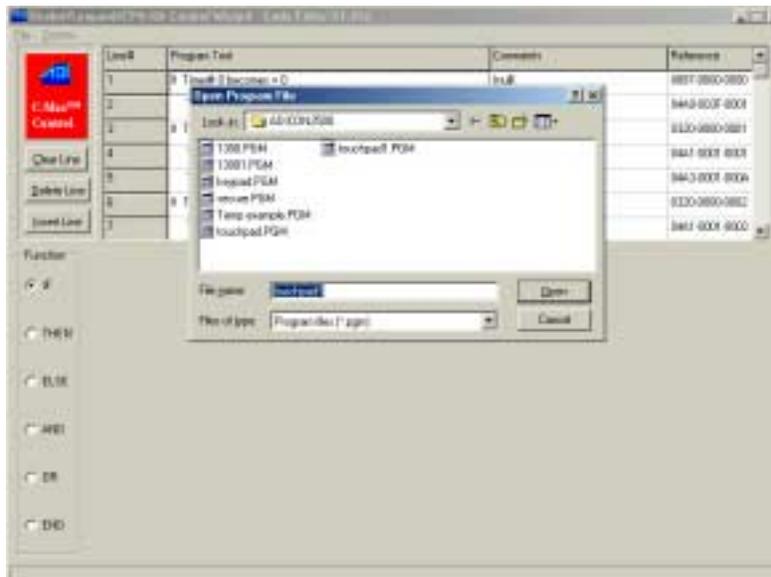
5.2.6 Saving your Program

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

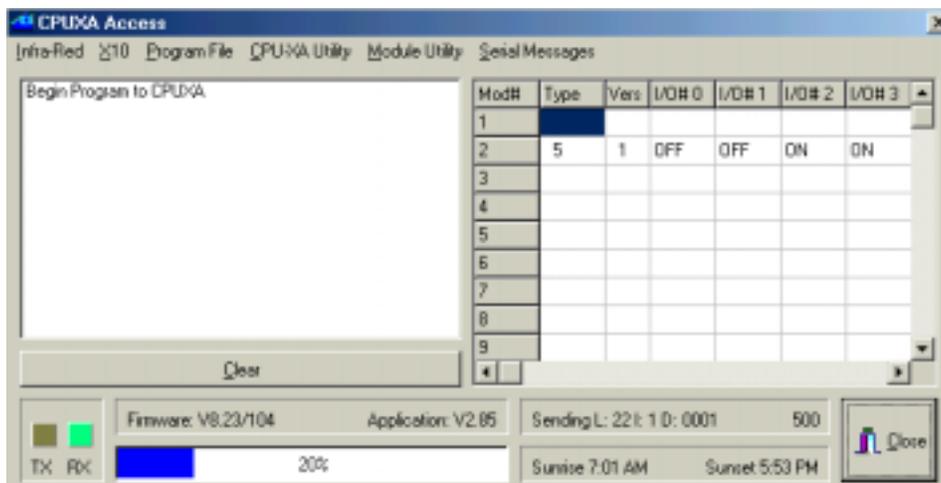
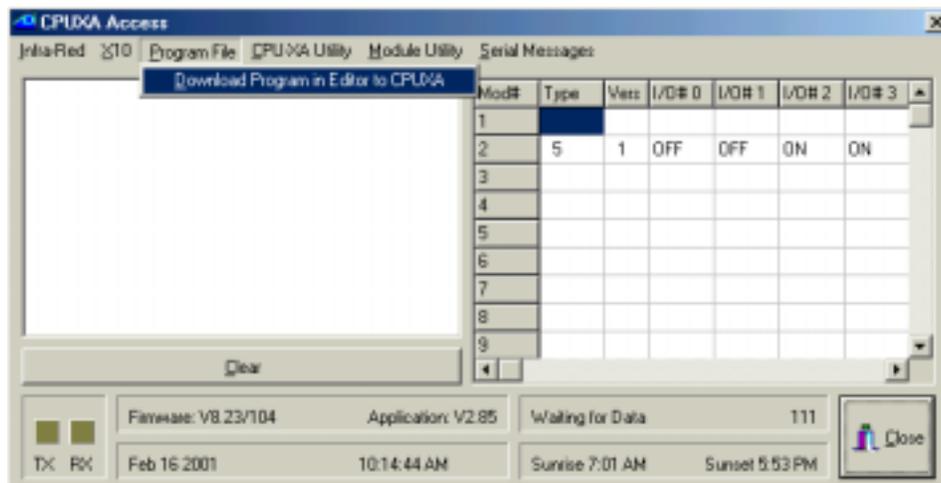
You can load previously created files into the code editor by clicking on File, then selecting Open Program.



5.2.8 Downloading your Program File into the Leopard™

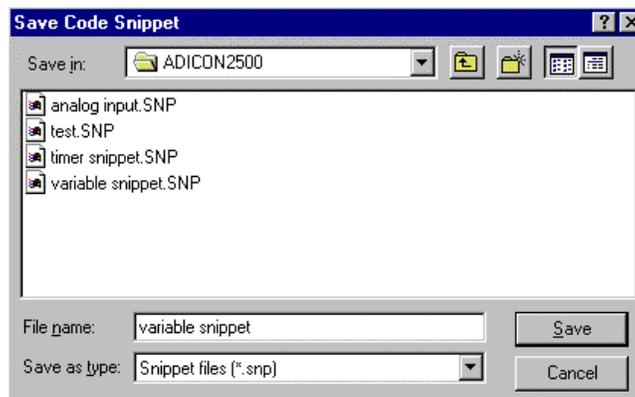
This command will load the Leopard™ with the program file in the Code Editor.

Select Comms, then Attach to CPU-XA. Click on Program File, then select Download File.



5.2.8.1 Saving a Code Snippet

- 1) Place your mouse over the first line of code you want to save.
- 2) Press and hold your left mouse button.
- 3) Holding your left mouse button down, drag the mouse up or down until all the code you want to save is highlighted. Release your left mouse button.
- 4) Press and release your right mouse button. A Window will appear

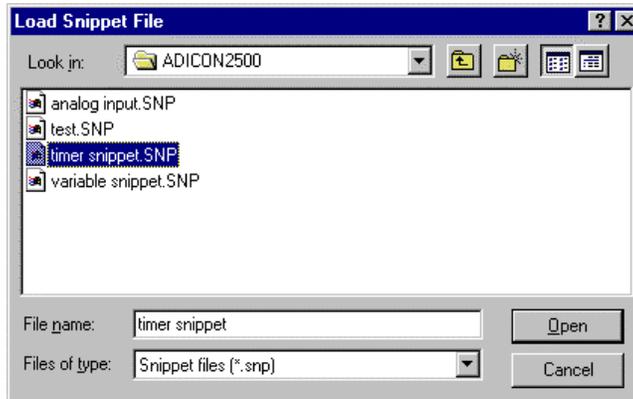


- 5) Move your mouse over and down until Save Code Snippet to Disk is highlighted. Press and release your left mouse button. The following window will appear:
- 6) Type in the name your want the snippet to be saved as. Click Save with your left mouse button. The code snippet is now saved.

5.2.8.2 Loading a Saved Code Snippet

- 1) Place your mouse over the line that you want to place Code Snippet. Click your left mouse button to highlight that line.
- 2) Press and release your right mouse button. A window will appear to the right.

3) Move your mouse over and down until Load Code Snippet from Disk is highlighted. Press and release your left mouse button. The following window will appear:



4) Double click the Code Snippet file you want to load (or single click the Code Snippet file to highlight it then click OK) with your left mouse button.

The Code Snippet will be placed in the line you highlighted in Step 1. Any code below that line will be pushed down to the end of the pasted code.

5.2.9 Is My Program Running?

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

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 Touch Screen Programming

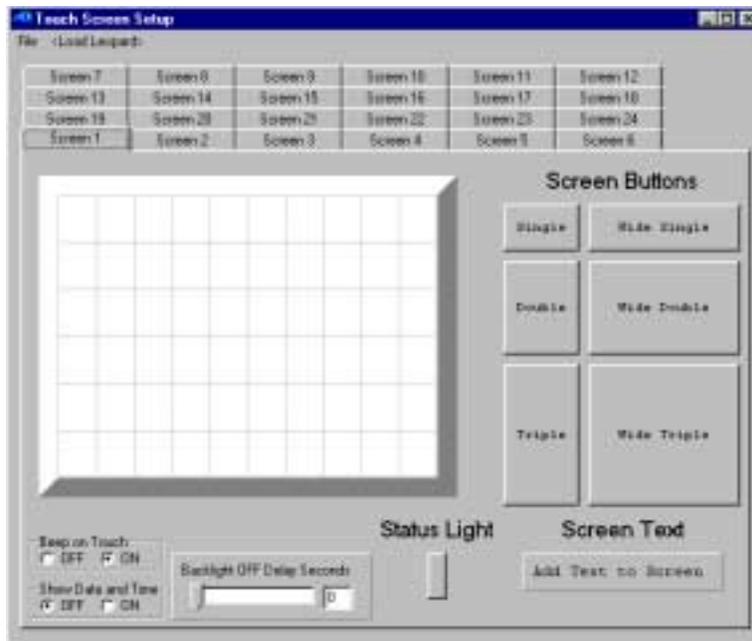
This section explains how to create the buttons for your program. We will also outline adding text and creating your own bitmap.

The Leopard supports 255 unique buttons or text strings. These can be placed on any of the 24 user screens. The 25th screen (screen 0) is reserved for your bitmap.

6.1 Setting up the Leopard™ Touch Screens.

From the C-Max™ Code editor, click Comms with your left mouse button. A window will appear. Click Touch Screen Setup with your left mouse button.

The following screen will appear:



6.2 Description of the Touch Screen Setup Window

The upper left of the screen provides 2 options: File and <Load Leopard>.

File – The following options are available:

New – Clears all objects on every screen.

Open Touch Screen File – Opens a saved touch screen file.

Save Touch Screen File As – Saves the current touch screen to disk.

Open Bitmap File – Opens a bit map file and displays it on screen.

Load Bitmap to Leopard™ – Loads the bitmap file into the Leopard.

<Load Leopard> - Loads your current screens into the Leopard™ touch screen controller.

Screens – There are 25 screens available: 0-24. Screen 0 is reserved to load a bitmap file on power up. On power up, the bitmap stored in screen 0 will be displayed. To load this, Variable 63 must be set to 0.

Objects – Every button, text or status light is an object. Every object has a number associated with it (Object 1, 2 3 etc.). When you move your mouse over the object, the tag will appear revealing the number of that object.

Buttons – **There are six sizes of buttons: Single, Double, Triple, Wide Single, Wide Double, and Wide Triple. These can be labeled and placed anywhere on the touch screen.**

Screen Text – Allows you to add text to a screen.

Status Light – Can be attached to an X10 device or ADICON Module I/O point to reflect the status of a device.

Backlight Off delay Seconds – Allows you select the delay time between touch screen activity and when the backlight will turn off. If this value is set to 60, the backlight will turn OFF 60 seconds after a button press. Selecting 0 seconds will keep the backlight on continually. Either slide the bar to the right or type the time in seconds on the window to the right.

Beep on Touch – If On, the Leopard™ will beep each time the screen is touched. If OFF, the Leopard™ will not beep each time the screen is touched.

Show Date and Time – If ON, will show the date and time on each screen. If OFF, the Leopard™ will not display the date and time.

6.3 Configuring the Screens

6.3.1 Selecting the Screen

Place your mouse over the Screen Number Tab and click it with your left mouse button. That screen will appear to the forefront.

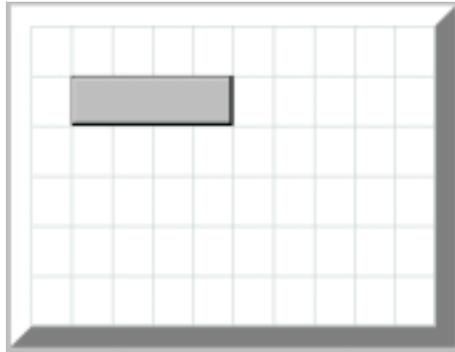
6.3.2 Placing and Editing Buttons

6.3.2.1 Placing Buttons

- 1) Select the button you want to add by clicking it with your left mouse button. The button will appear on the upper left corner of the touch screen.

2) Using your left mouse button, move the button to the desired location.

Note: The touch screen is divided into 60 sections or points. For best results, place the button so that it covers an entire section as shown below:

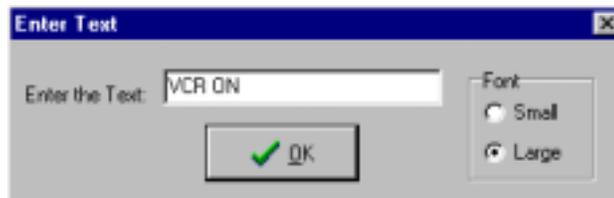


6.3.2.2 Naming Buttons

1) Place your mouse over the desired button and click your right mouse button. A window will appear as follows:

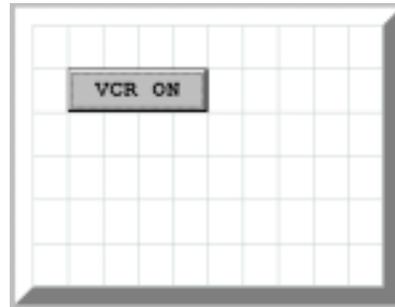


2) Move the mouse down until Enter Caption is highlighted and press your left mouse button. The following window will appear:



- 3) Type in the title of the button.
- 4) Select font size of the text by clicking the circle to the left of Small or Large on the right side of the Enter Text window.
- 5) Click OK with your left mouse button.

The button will reflect the text you typed in as shown.



6.3.2.3 Deleting Buttons

Click the button you want to delete with your right mouse button. A window will appear. Click Delete Button with your left mouse button. The button will be deleted.

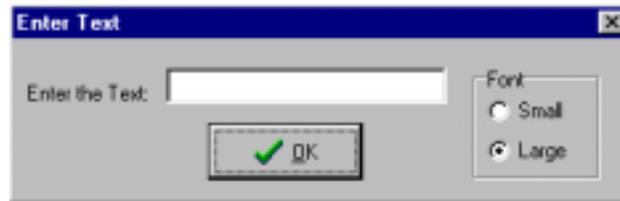
Note: If you delete an object whose number is between two existing objects, the next object added will take the deleted objects number designation. For example: if you currently have objects 1,2 and 3 and you delete object 2, the next button you add will be designated object 2.

6.3.3 Adding Text to Screen

Click the Add Text to Screen button with your left mouse button. The word Text will appear on the upper left corner of the touch screen. Using your mouse to click and drag the text to where you want it positioned on the touch screen.

6.3.3.1 Editing Text

1) Place your mouse over the text and click your right mouse button. A window will appear. Move your mouse down until Enter Text is highlighted and click it with your left mouse button. The following window will appear:



- 2) Type in the text you want to add to the screen.
- 3) Select font size of the text by clicking the circle to the left of Small or Large on the right side of the Enter Text window.
- 4) Click OK with your left mouse button. The text you typed in will be displayed on the touch screen.

6.3.3.2 Deleting Text

Place your mouse over the text you want to delete and press your right mouse button. A window will appear. Move the mouse down until Delete Text is highlighted and click your left mouse button. The selected text will be deleted.

Note: Text on the touch screen is an object. If you delete an object whose number is between two existing objects, the next object added will take the deleted objects number designation. For example: you currently have objects 1,2 and 3 and you delete object 2, the next button you add will be designated object 2.

6.3.4 Adding a Status Light

The status light will show the status of either an X10 device or I/O point of a given ADICON™ 2500 module.

- 1) Click Status Light with your left mouse button. A Status light will appear on the upper left corner of the display.
- 2) Place your mouse over the status light and click and drag it to where you want it located.
- 3) Release the mouse button when it is placed.

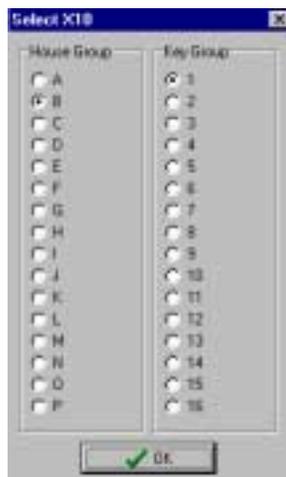
6.3.4.1 Deleting a Status Light

Place your mouse over the Status light you want to delete and press and release your right mouse button. A window will appear. Move the mouse down until Delete Light is highlighted. Press and release Delete light with your left mouse button. The Status light will be deleted.

Note: A Status light on the touch screen is an object. If you delete an object whose number is between two existing objects, the next object added will take the deleted objects number designation. For example: you currently have objects 1,2 and 3 and you delete object 2, the next button you add will be designated object 2.

6.3.4.2 Assigning an X10 device to a Status Light

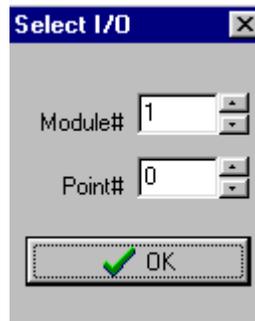
Place your mouse over the Status light you want to delete and press and release your right mouse button. A window will appear. Move the mouse down until Attach X10 Status is highlighted. Press and release Attach X10 Status with your left mouse button. The following window will appear:



Select the House group and Key group you want the Status light to reflect. Click OK with your left mouse button.

6.3.4.3 Assigning an I/O Status to a Status Light

Place your mouse over the Status light you want to delete and press and release your right mouse button. A window will appear. Move the mouse down until Attach I/O Status is highlighted. Press and release Attach I/O Status with your left mouse button. The following window will appear:



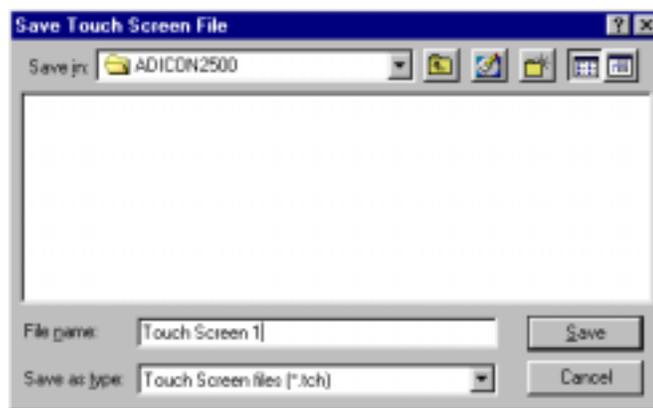
Enter the Module Number (the address of the Module) and the I/O point to want the Status light to reflect. Click OK with your left mouse button.

6.4 Loading the Screens into the Leopard

Once your screens are setup, you must load them into the Leopard™ Touch Screen Controller. Click <Load Leopard> with your left mouse button. This will load the screens into the Leopard.

6.5 Saving your Screens to Disk

Click file with your left mouse button. A window will appear. Move your mouse down until Save Touch Screen File As is highlighted and click your left mouse button. The following window will appear:



Type in the name of your touch screen file and click Save with your left mouse button.

6.6 Opening a Saved Touch Screen File

Click file with your left mouse button. A window will appear. Move your mouse down until Open Touch Screen File is highlighted and click with your left mouse button. The following screen will appear:



Double click the file you want to open with your left mouse button (or highlight the file you want to open then click Open with your left mouse button). The saved touch screen will be displayed on your screen.

6.7 Loading a Bitmap file into the Leopard

A black and white bitmap file can be loaded into the touch screen.

You can use Windows Paint, or any third party graphics program to create your bitmap program. The bitmap image must be black and white (NOT gray scale) and be 320x240 in resolution. The top 17 lines must be left blank, as they are reserved for displaying the time and date on the display.

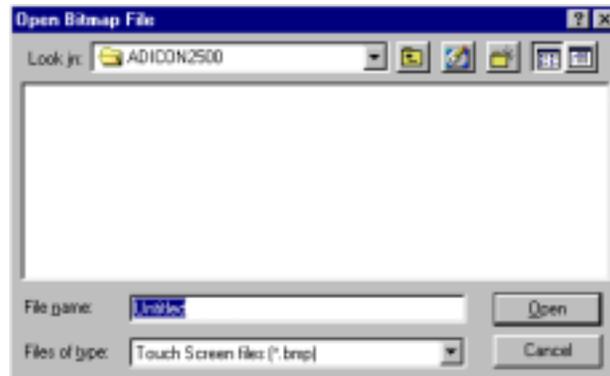
To load the bitmap file into the Leopard, three steps must be accomplished:

- 1) Open the bitmap file
- 2) Load the bitmap file into the Leopard
- 3) Set variable 63 to 0 to make the bitmap appear on the display once power is applied to the Leopard.

After power-up, the Leopard will display the Leopard logo followed by your bitmap. If no bitmap is loaded, the Leopard will display a blank screen.

6.7.1 Opening the Bitmap File

1) Click file with your left mouse button. A window will appear. Move your mouse down until Open Bitmap File is highlighted on the display. The following window will appear:



2) Click the down arrow to the right of Look in and find your bitmap file (for convenience purposes, when you create your bitmap file, save the file in the Program Files\ADI\ADIC2500 directory on your computer. The Open Bitmap window will then point directly to your bitmap file).

3) Once you find your bitmap file, double click it with your left mouse button (or highlight the filename with your left mouse button then click Open).

The bitmap file will appear on Screen 1 along with whatever objects you have set up on Screen 1 on your computer's display.

Note: Even though the bitmap file appears on Screen 1, when you load the bitmap file into the Leopard, it will not be displayed on screen 1 on the Leopard™ on your screen.

6.7.2 Loading the Bitmap File

Click File with your left mouse button. A window will appear. Move your mouse down until Load Bitmap to Leopard™ is highlighted and click your left mouse button. The bitmap file will then be loaded into the Leopard.

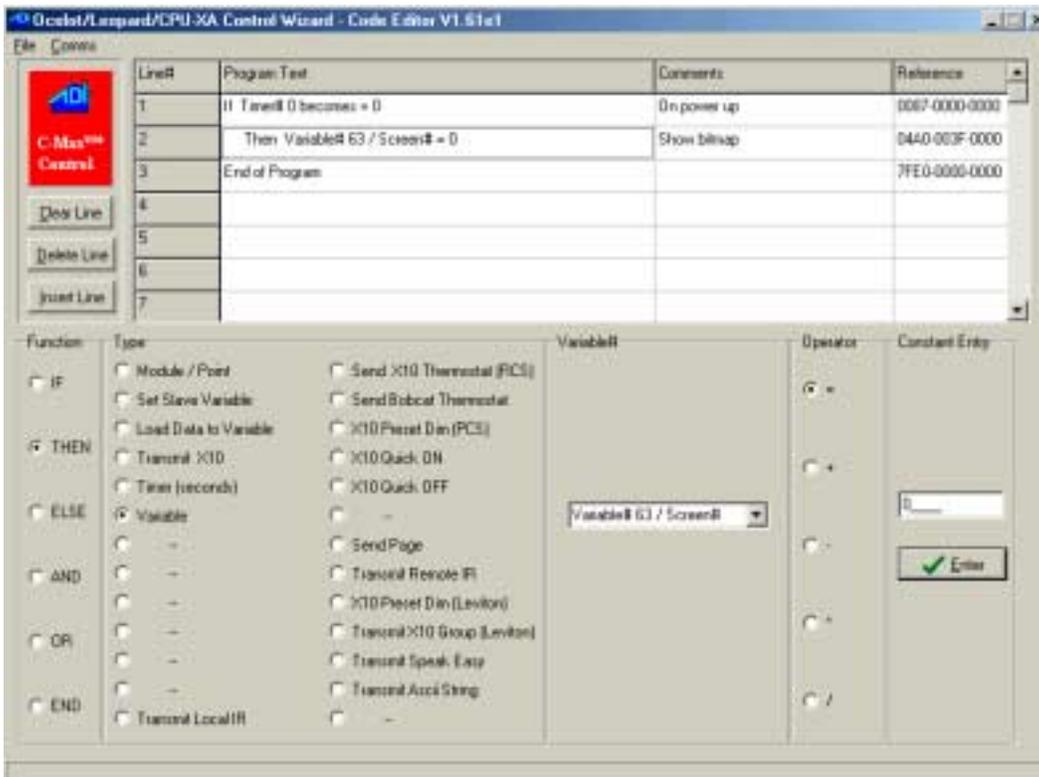
7 Programming with Buttons

This section outlines how to use the buttons within your program flow. We will also discuss changing screens based on button presses and variables.

7.1 Changing Screens on Power-up.

Variable 63 controls the displayed screen. To display a specific screen on power-up, you will need to set this variable to the desired screen number.

In the following example, we want to display our bitmap on power-up. To accomplish this, we set variable 63 to 0. Note that we use IF BECOMES EQUAL as the test. This case will only be true once on power-up. Had we used IF IS EQUAL as the test, the screen would constantly go back to the bitmap.



7.2 Changing Screens from the Bitmap

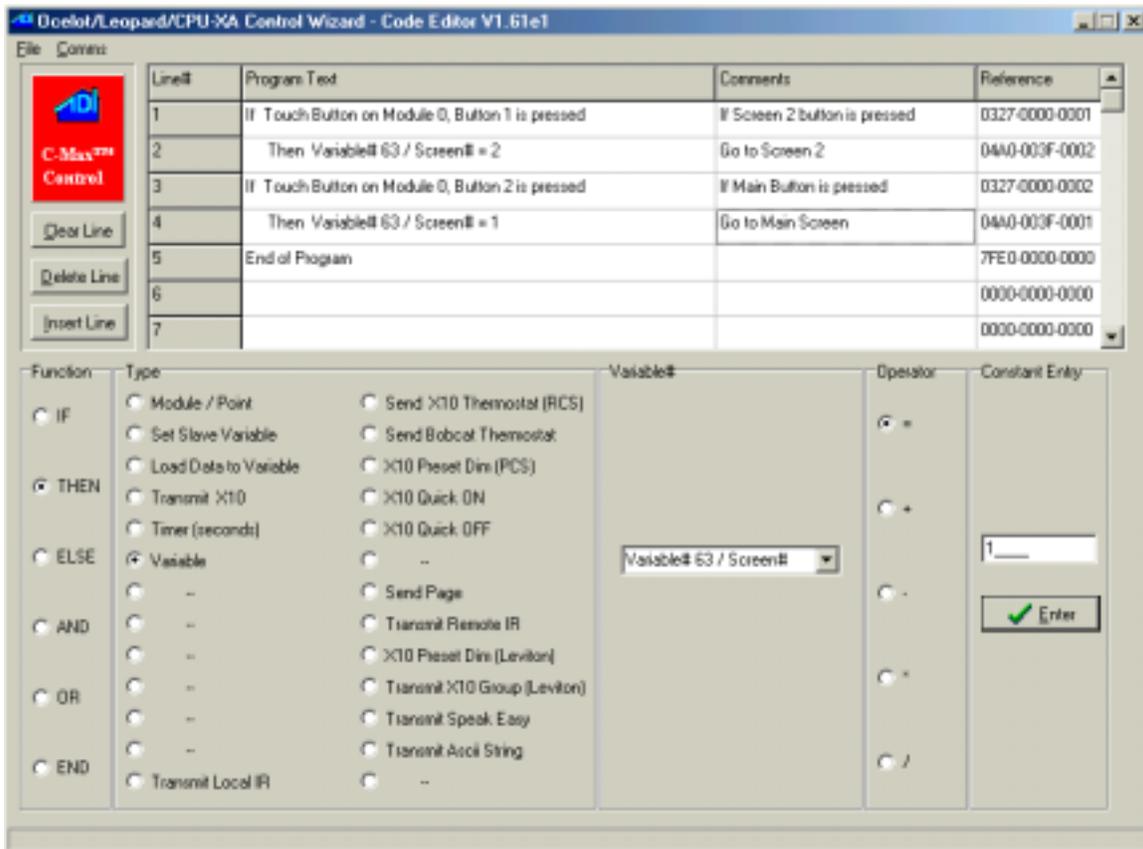
The bitmap (screen 0) has no visible buttons. Pressing anywhere on the screen will load a value of 255 into the button variable. We use this feature to select another screen from the bitmap.

In the following example, we will change to screen #1, based on a button press on the bitmap screen.

Line#	Program Text	Comments	Reference
1	If Timer# 0 becomes = 0	On power up	0007-0000-0000
2	Then Variable# 63 / Screen# = 0	Show bitmap	0440-003F-0000
3	If Variable# 63 / Screen# = 0	If on Bitmap Screen	06A3-003F-0000
4	And Touch Button on Module 0, Button 255 is pressed	And the screen is touched anywhere	0F20-0000-00FF
5	Then Variable# 63 / Screen# = 1	Go to Main Screen	0440-003F-0001
6	End of Program		7FE0-0000-0000
7			

7.3 Changing Screens based on a Button Press

We can use button presses to switch screens. In the following example, we have two screens. Each screen has a single button. Screen #1 has a single button assigned object #1. Screen #2 has a single button assigned object #2. This example will switch between the two screens based on pressing the single button on each screen.



7.4 Sending an X-10 Command based on a Button Press

A common application is to use a button press to issue an X-10 command.

In the following example we have a single button, assigned object #1, on screen #1.

When we press this button, we will issue an A1/ON command.

Line#	Program Text	Comments	Reference
1	If Touch Button on Module 0, Button 1 is pressed	If light button is pressed	0327-0000-0001
2	Then Turn X10 A1 ON	Turn on Light	0600-0000-0000
3	End of Program		7FE0-0000-0000
4			0000-0000-0000
5			0000-0000-0000
6			0000-0000-0000
7			0000-0000-0000

Function Type

IF

THEN

ELSE

AND

OR

END

Type

Module / Point

Module / Param

Receive X10

Compare Bobcat Data

Timer (seconds)

Variable

Time of Day (Military)

Month

Day of Month

Day of Week (0-6)

Year

Date (mm/dd/yy)

..

Receive IR

X10 Status Change

..

..

I/O Error Occurs

..

..

..

..

..

Touch Button Pressed

Touch Button Pressed

Module# 0

Button# 1

Enter

7.5 Sending an IR Command based on a Button Press

Another common application is to use the button press to issue an IR command.

In the following example we have a single button, assigned object #1, on screen #1.

When we press the button, we will issue IR #1 which we have previously saved as the TV ON command.

The screenshot shows the 'Code Editor V1.61e1' window for the 'C-Max Control Wizard'. It features a table for program testing and a panel for selecting functions.

Line#	Program Test	Comments	Reference
1	If Touch Button on Module 0, Button 1 is pressed	If light button is pressed	0327-0000-0001
2	Then Transmit Infra Red# 1	Turn on TV	0580-0000-0001
3	End of Program		7FE0-0000-0000
4			0000-0000-0000
5			0000-0000-0000
6			0000-0000-0000
7			0000-0000-0000

Below the table is a function selection panel with the following options:

- Function: IF, THEN (selected), ELSE, AND, OR, END
- Type: Module / Point, Set Slave Variable, Load Data to Variable, Transmit X10, Timer (seconds), Variable, --, Transmit Local IR (selected)
- Constant Entry: Send X10 Thermostat (PCS), Send Bobcat Thermostat, X10 Preset Dim (PCS), X10 Quick ON, X10 Quick OFF, --, Send Page, Transmit Remote IR, X10 Preset Dim (Leviton), Transmit X10 Group (Leviton), Transmit Speak Easy, Transmit ASCII String, --

8 The Plot Thickens (Using other Leopard™ 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.

8.1 Issuing Commands based on the RTC

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

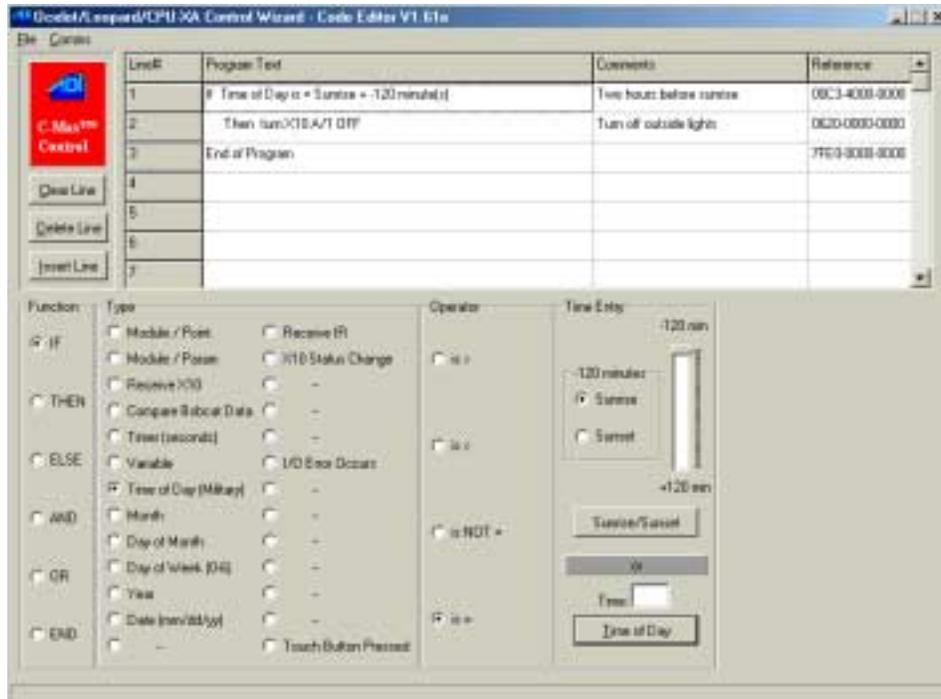
Time of Day:	Presented in Military Format 00:00 – 23:59
Month:	1 (January) – 12 (December)
Day of Month:	1 (1 st) – 31 (31 st)
Day of Week:	0 (Sunday) – 6 (Saturday)
Year:	2001 – whenever
Date:	mm/dd/yy (Feb 16,2001 would be 02/16/01)

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



8.1.1 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.

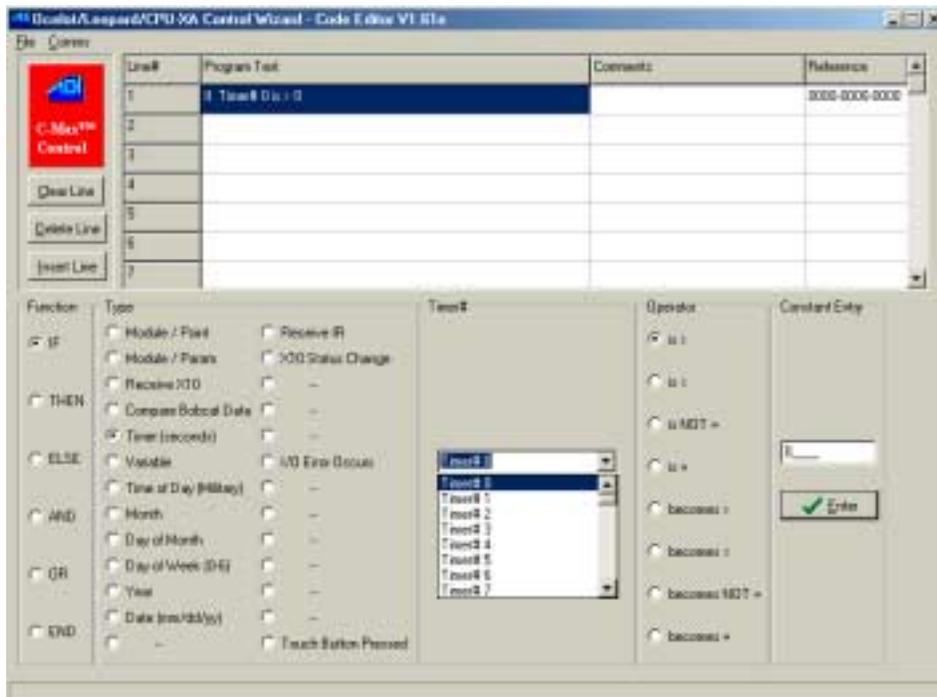


8.2 Using Timers and Variables

The Leopard™ 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 Leopard™.

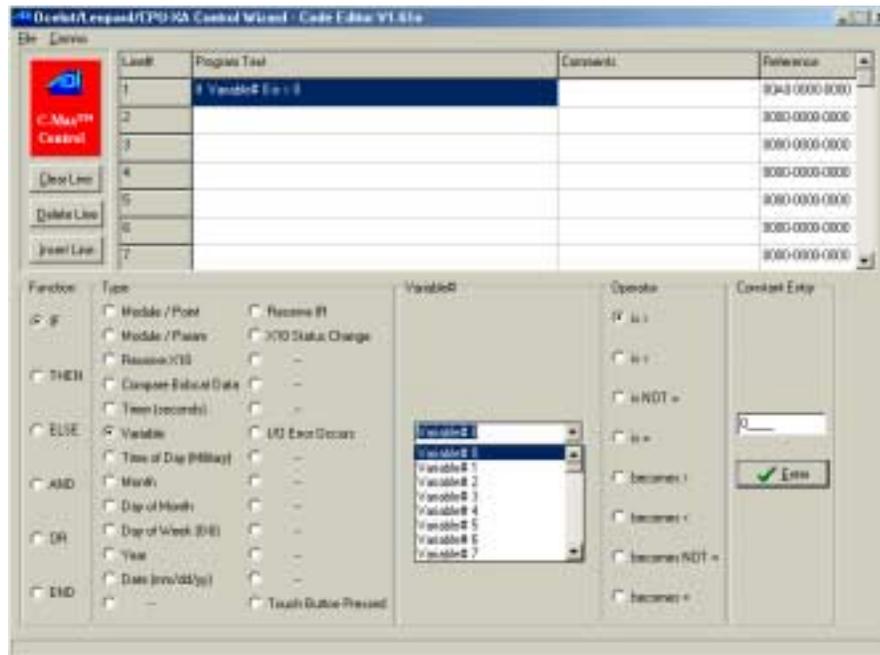
Variable 62 is the beep function. The Leopard will beep for the amount of seconds you set variable 62 to.

Variable 63 selects the displayed screen.

Variables 64 – 79 indicate the X-10 temperature received from an RCS® Thermostat. If you are not using an RCS® Thermostat (parameter 21 = 0), variables 64-79 can be used for general-purposes.

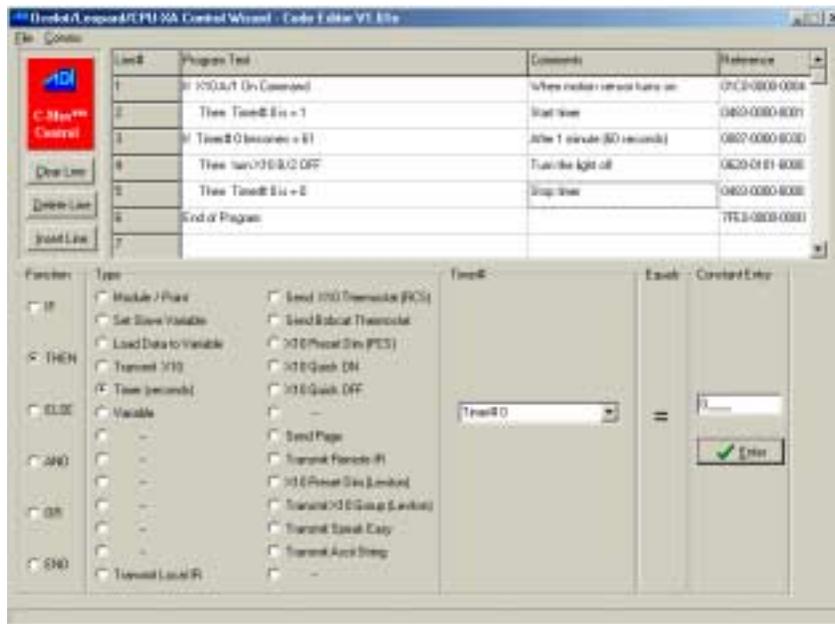
Variables 80-127 are general-purpose memory locations.

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.



8.2.1 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.



8.2.2 Changing Screens with Timers

In this example we will return to the main menu (screen #1) 30 seconds after pressing button #2 on screen #2.

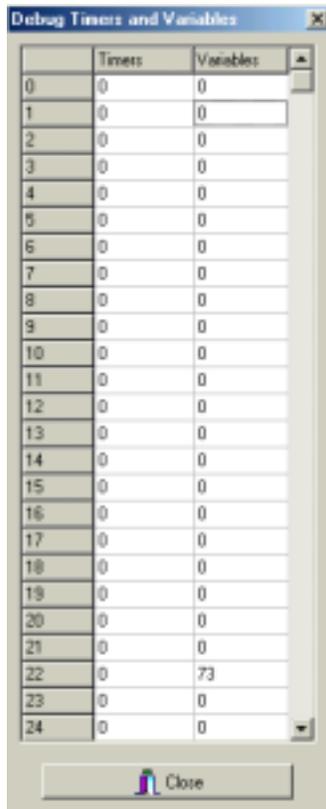
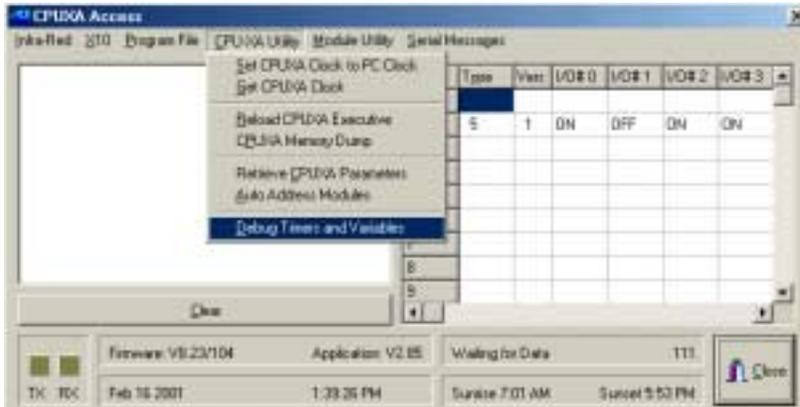
The screenshot shows the 'Control Wizard - Code Editor V1.61e1' window. The main area displays a ladder logic program with the following steps:

Line#	Program Text	Comments	Reference
1	If Touch Button on Module 0, Button 2 is pressed	Once Screen 2 button is pushed	0320-0000-0002
2	Then turn X10 A/1 ON	Turn on light	0600-0000-0000
3	Then Timer# 1 is = 1	Start timer	0483-0001-0001
4	If Timer# 1 becomes = 31	After 30 seconds	0087-0001-001F
5	Then Variable# 63 / Screen# = 1	Go to screen 1	04A0-003F-0001
6	Then Timer# 1 is = 0	Reset timer	0483-0001-0000
7	End of Program		7FE0-0000-0000

Below the program table is a configuration panel for the 'Timer# 1' function. The 'THEN' function is selected, and the 'Timer (seconds)' type is chosen. The configuration shows 'Timer# 1' set equal to the constant value '0'. An 'Enter' button is visible at the bottom right of the configuration area.

8.3 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. You can change variable 63 to the desired screen number to view your loaded screens.

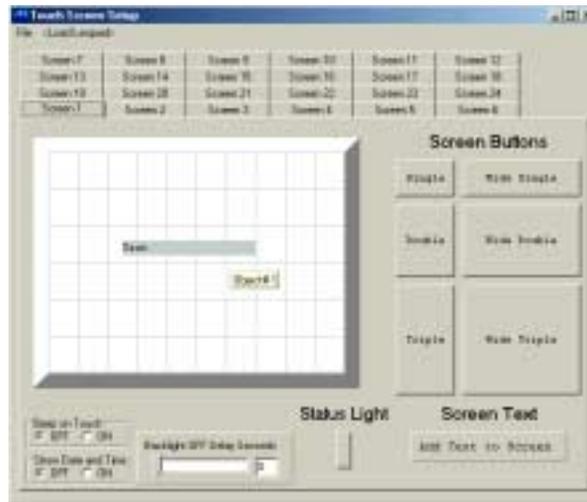


9 Displaying Variables on the Touch Screen

The Leopard can display variable information. Typically, this feature is used in conjunction with ADI Bobcat environmental sensors. The Bobcats provide real-time readings for the temperature and humidity. The Leopard will place these readings in variables for program action and display. Refer to the Bobcat data sheets for more information regarding the exact parameter locations for each Bobcat.

In the following example, we have configured the Leopard to place the reading from the Temperature Bobcat in variable 15. We will provide three digit locations (set the dimension to 3). We will display the result on screen #1.

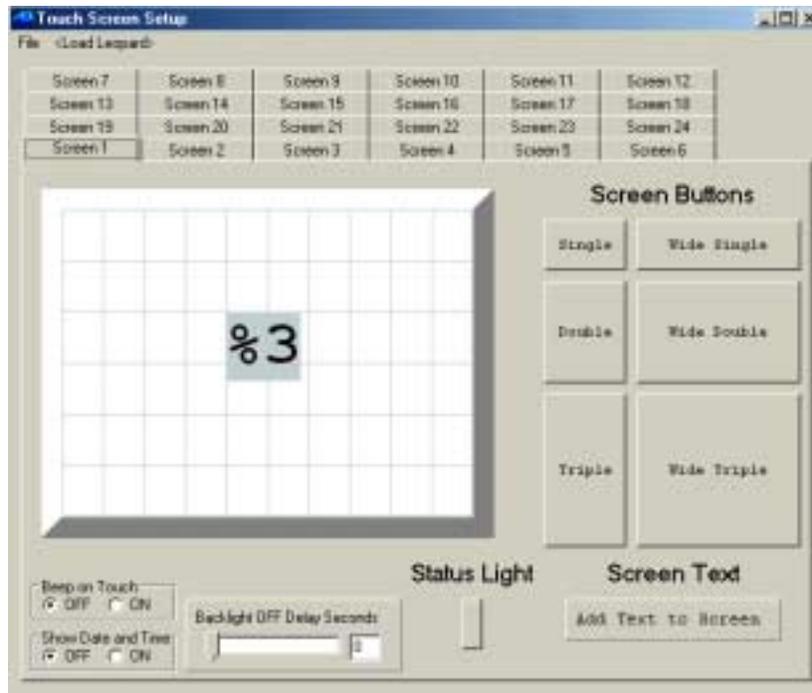
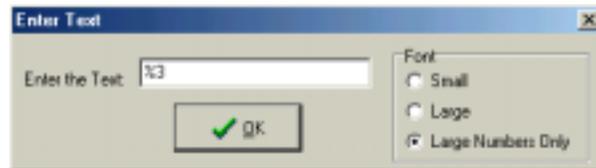
- 1) From the C-Max™ Code editor, click Comms then Touchscreen setup with your left mouse button.
- 2) Select the screen that you want to display the temperature or humidity level.
- 3) Click Add Text to screen with your left mouse button. Move the text to the desired location.



- 4) Right click over the text and select Enter Text with your lefty mouse button. The Enter Text window will appear.

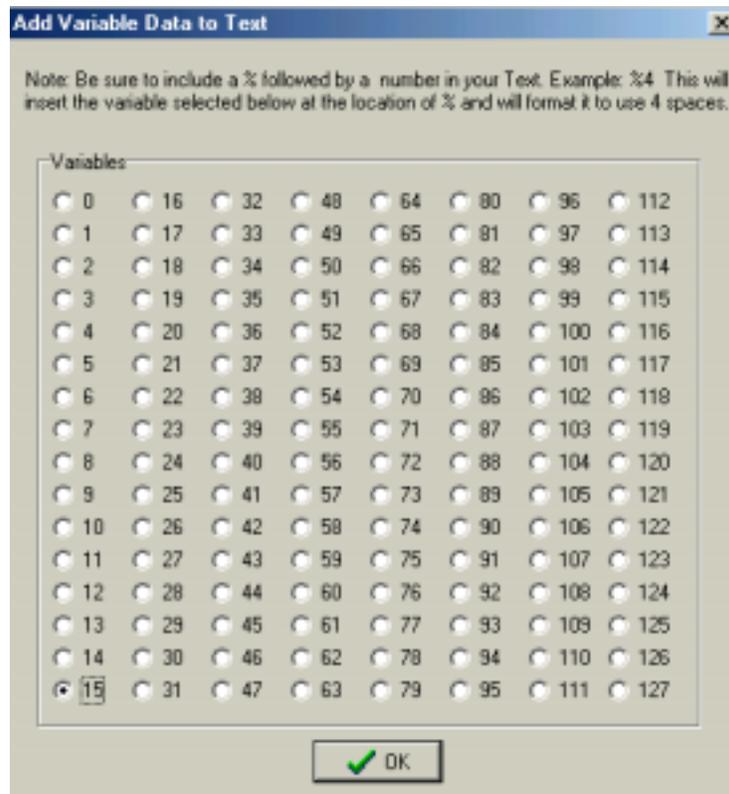
Type the percent symbol (%) followed by the number of digits you want to display. If you want to display on 2 digits, enter %2. If you want to display 3 digits, enter %3.

5) Select the size of numbers you want the numbers to be displayed by clicking the size under font to the right of the Enter Text window.



6) Click OK.

7) Right click over the text you entered, and Select Variable Data in Text with your left mouse button. The Add Variable Data in Text window will appear.



8) Select the variable that you set up in Step 1. Click OK.

The temperature or humidity level will now be displayed on the Leopard™ screen. As the temperature or humidity level changes, the Leopard™ will display those changes in levels.

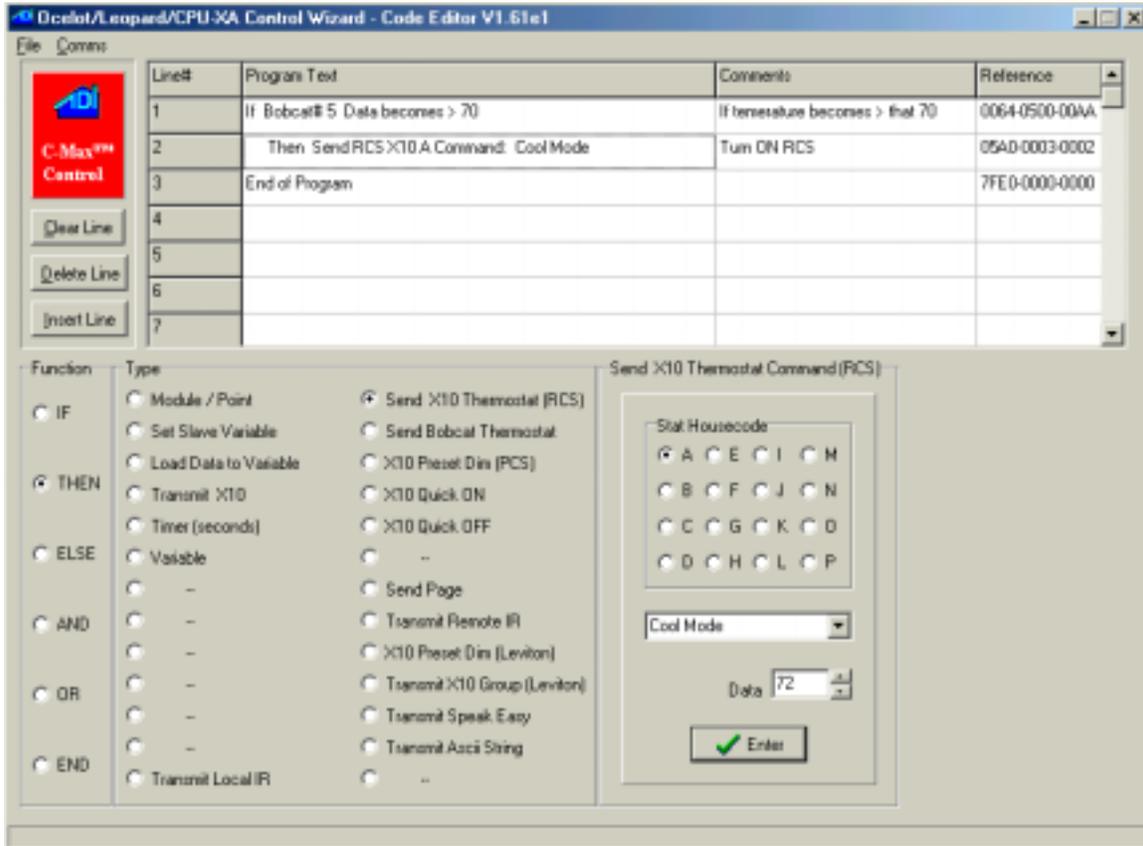
10 RCS Communicating Thermostats

The Leopard provides support for communications with the RCS communicating thermostats. The Leopard can issue commands, and receive responses via X-10 preset commands.

The thermostat reading can be displayed, and acted upon in the program flow.

To activate the RCS features, set parameter 21 to 1, the factory default is 0.

C-Max provides dedicated commands for setting the thermostat. These are available from the SEND X10 Thermostat (RCS) command box shown below. For complete information on each command, refer to the RCS owner's manual for your thermostat.



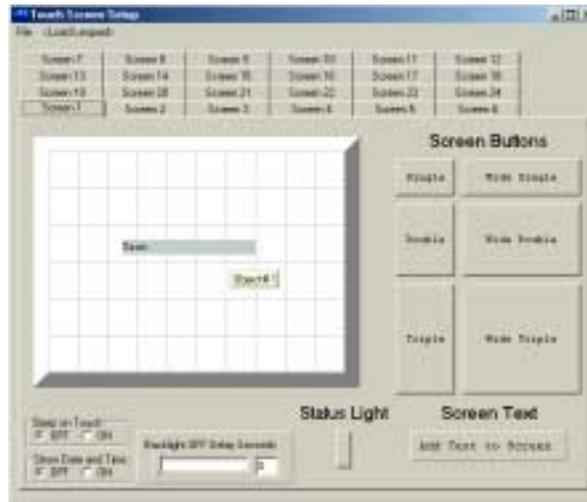
The received X-10 commands from the thermostat will be stored in variables 64-79, where variable 64 corresponds to house code A, and variable 79 corresponds to house code P.

These received temperatures can be displayed on your screens, in the same manner as the Bobcat information discussed in a previous chapter.

If your thermostat is set to house code A, then the temperature will reside in variable 64.

In the following example, we will set-up our touch screen to display the temperature from house code A on screen #1.

- 1) From the C-Max™ Code editor, click Comms then Touchscreen setup with your left mouse button.
- 2) Select the screen that you want to display the temperature or humidity level.
- 3) Click Add Text to screen with your left mouse button. Move the text to the desired location.

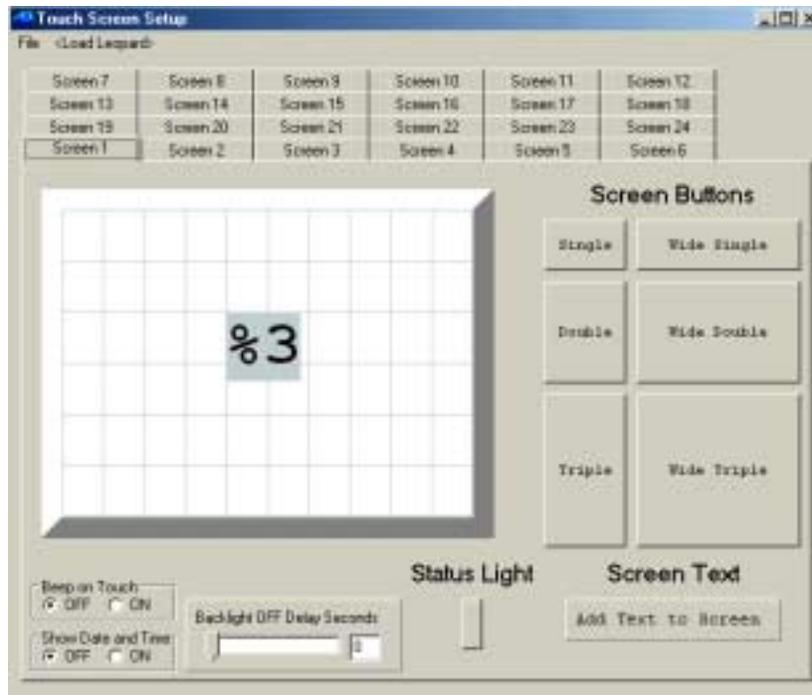


- 4) Right click over the text and select Enter Text with your left mouse button. The Enter Text window will appear.

Type the percent symbol (%) followed by the number of digits you want to display. If you want to display on 2 digits, enter %2. If you want to display 3 digits, enter %3.

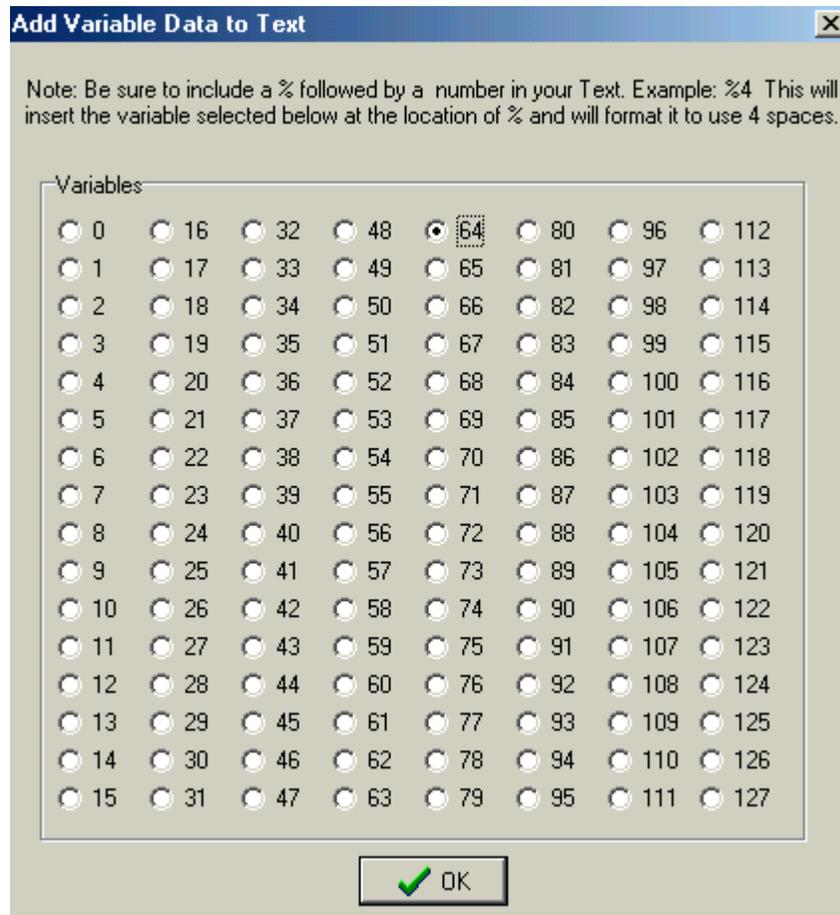
- 5) Select the size of numbers you want the numbers to be displayed by clicking the size under font to the right of the Enter Text window.





6) Click OK.

7) Right click over the text you entered, and Select Variable Data in Text with your left mouse button. The Add Variable Data in Text window will appear.



8) Select Variable 64 for House Code A.

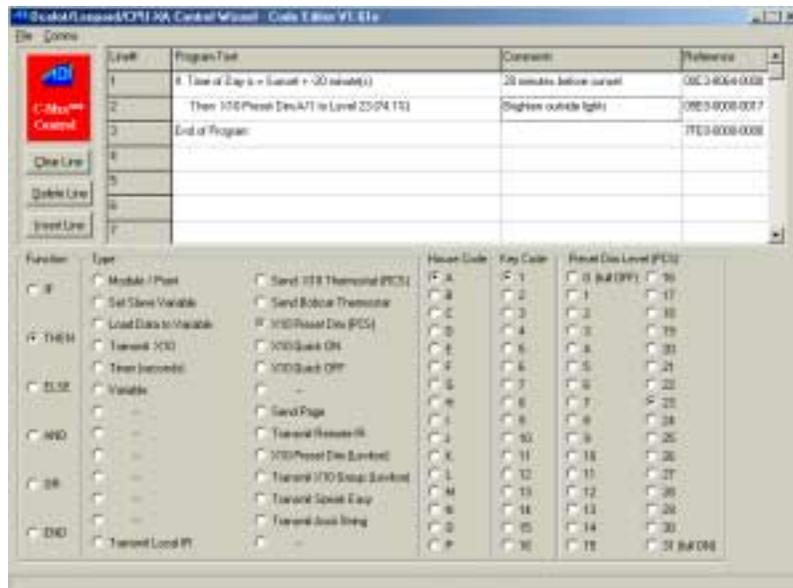
The temperature Reported by the RCS thermostat will now be displayed on the Leopard™ screen. The temperature displayed on the Leopard™ will change as the temperature changes.

11 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 Leopard™ to issue a single command to set the light to a specific brightness level. Conventional X-10 switches require the Leopard™ to issue a series of dim/bright commands to set the light to a specific brightness.

11.1 Sending an X-10 Preset Dim Command

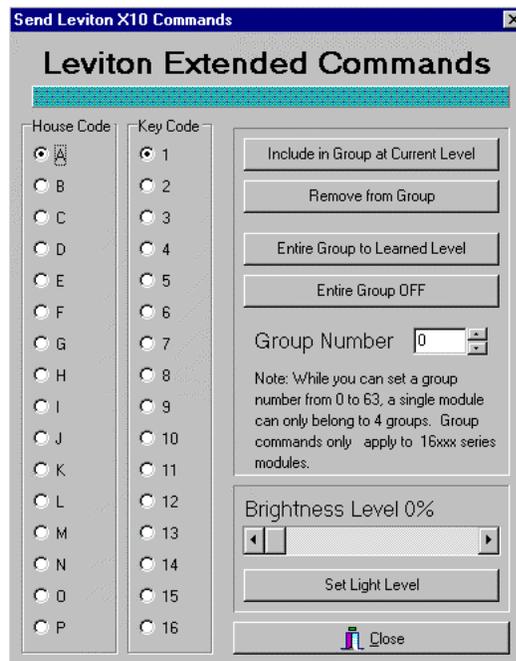
In this example we issue a Preset Dim to the outside lights twenty minutes before sunset.



12 Controlling Leviton® Style X-10 Switches

12.1 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.



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 in 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 level is displayed. You can either click the arrows to the Left (Dim) or Right (Bright) with your left mouse button or place your 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.

12.2 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.

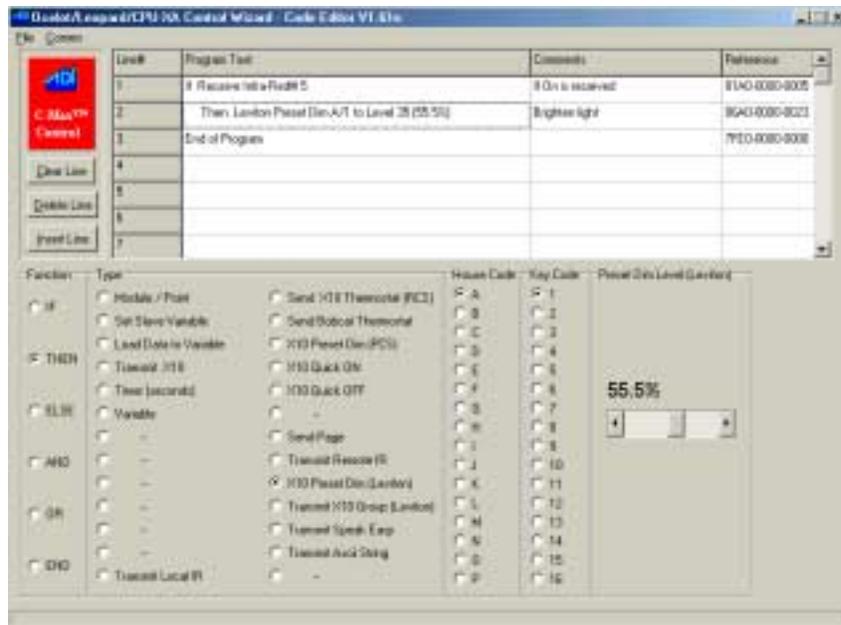
12.3 Turning Off an Entire Group

- 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.

12.4 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.



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

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

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

The Leopard™ 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 Leopard™, once they are written to the Leopard™.

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.

13.1 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 Leopard™. If you want to add a new message, you will have to re-enter the entire list.

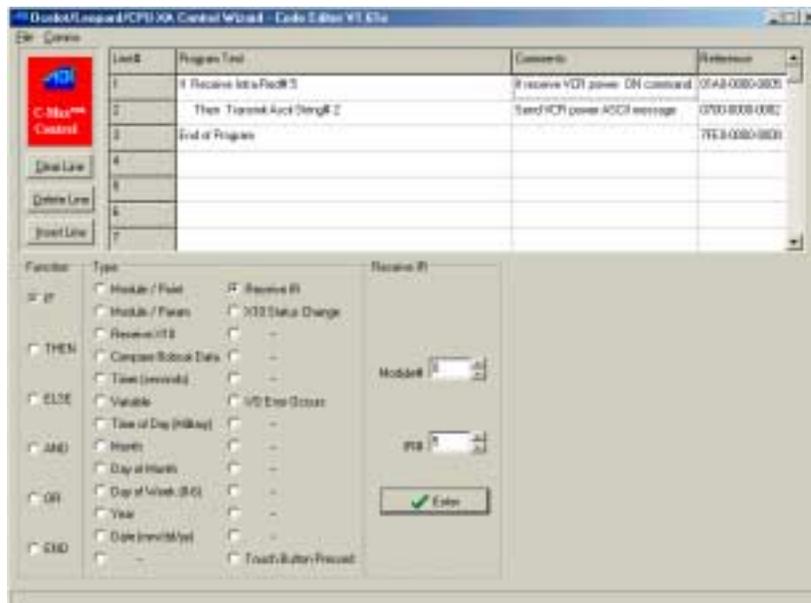
Message #	Text
Message #0	For hidden characters type ^002 ^013
Message #1	Send Message two here ^013
Message #2	Send Message three here ^013
Message #3	
Message #4	
Message #5	
Message #6	
Message #7	
Message #8	
Message #9	
Message #10	
Message #11	

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 ^.

13.2 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 Leopard™. Utilize HyperTerminal, or another communications program to monitor the ASCII data issued from the Leopard™.

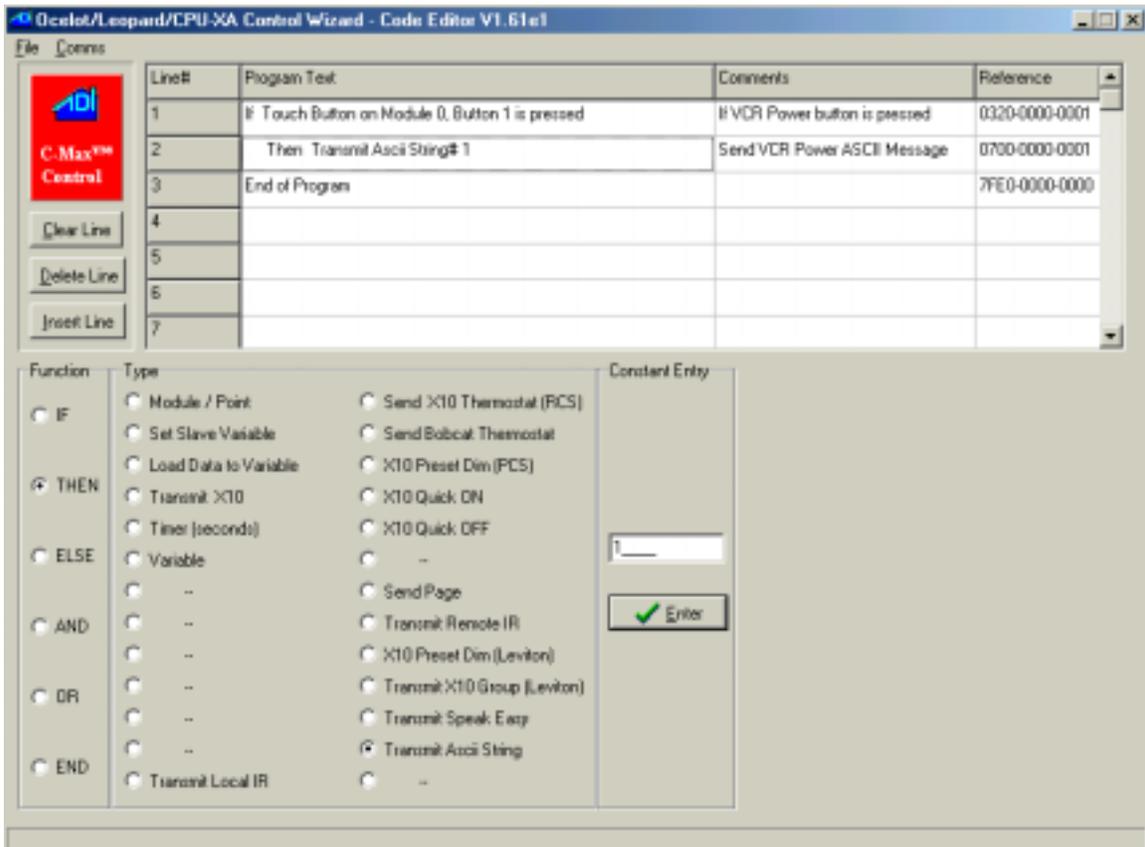
In this example, we will use an IR remote control to cause the Leopard™ to issue an ASCII command to turn on an RS-232 controlled VCR. The ASCII ON command for this VCR has previously been created and stored in ASCII location 2. The remote control ON button has been learned into IR #5.



13.3 Sending an ASCII string with a Button Press

In this example, we will use a button press to send the same command to the VCR.

We have placed a single button, assigned object #1, on screen #1.



14 Mounting the Leopard™

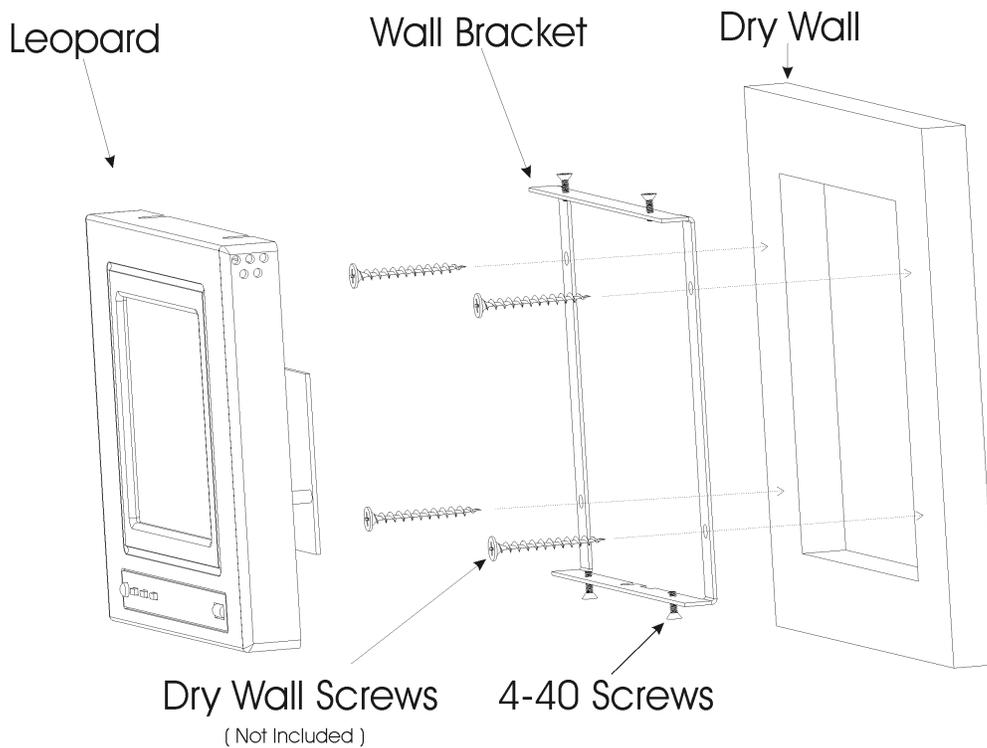
14.1 Mounting the Leopard™ on a Wall

To mount the Leopard on the Wall, Do the following:

- 1) Loosen the screws on the top and bottom of the Leopard™.
- 2) Slide the metal bracket from the Leopard™.
- 3) Using drywall screws mount the bracket to the wall. Make sure the bracket is square.

Note: You may need to use small strips of wood on the back inside of the wall to add support for the drywall screws.

- 4) Cut a hole in the wall using the mounting bracket as a guide. Make sure the hole is large enough to fit the Leopard™ circuit board through.
- 5) Slide the Leopard over the mounting bracket.
- 6) Tighten the screws on the top and bottom of the Leopard™.



14.2 Mounting the Leopard™ to an Acrylic Stand (Optional)

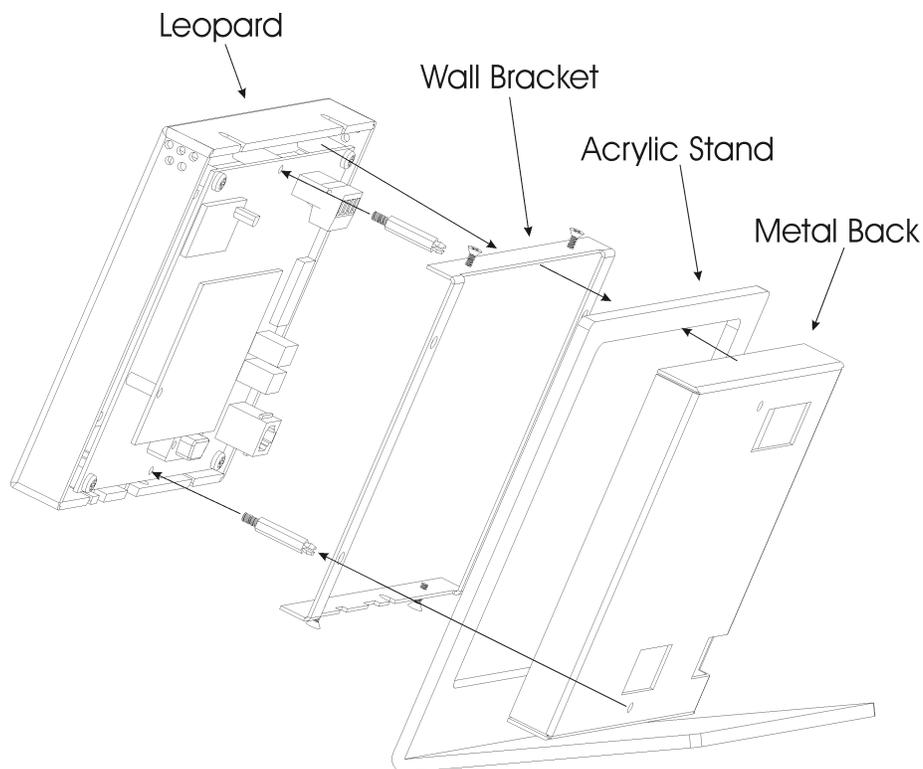
To use the Leopard™ on a desk or table, you can attach it to our optional Acrylic Stand.

To mount the Leopard™ to the Acrylic Stand, do the following:

- 1) Loosen the four screws on the top and bottom of the Leopard™.
- 2) Remove the Wall Bracket from the Leopard™.

Note: There should be a metal bracket already attached to the Acrylic Stand. If the Wall Bracket is not attached to the stand, use double-sided tape to attach the bracket that you removed from the Leopard™ in Step 2 to the Acrylic Stand so that it fits evenly around the hole.

- 3) Remove the two center Phillips screws from the back of the Leopard™.
- 4) Screw the nylon standoffs that were provided with the Acrylic Stand in the same holes that the screws were removed from in Step 1.
- 5) Slide the Leopard™ over the Wall Bracket on the Acrylic Stand.
- 6) Place the metal back over the back of the Leopard™ and snap it onto the nylon standoffs.
- 7) Attach all wires to the Leopard™.



15 Diagnostics

15.1 Communication Problems

Problem:

Leopard™ Active LED is flashing only once.

Solutions:

Confirm that power is connected correctly.

Reload the executive from C-Max™.

Problem:

Leopard™ 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.

15.2 X-10 Problems

Problem:

The Leopard™ 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 Leopard™.

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

15.3 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:

The IR blaster is located on the face of the Leopard. Make sure that there is a clear path between the blaster and the controlled equipment. You may need to utilize a mini-emitter.

Problem:

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

Solution:

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

Problem:

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

Solution:

The Leopard™ 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 Leopard™. 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.

15.4 Display Problems

Problem:

The screen will not display anything other than the bitmap.

Solution:

Verify that your program does not constantly change variable 63 back to 0.

You can monitor variable 63 with the debug screen in C-Max.

Problem:

The backlight will not turn OFF.

Solution:

In the touch screen set-up, set the backlight time to a value other than 0.

Problem:

Button presses do not always seem to work.

Solution:

Make sure that the buttons are exactly over the grid. If a button occupies less than 50% of a cell, the Leopard will reject a button press on that part of the button.

16 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.