

1. Design. Connect. Realize with EZ Web Lynx.

EZ Web Lynx is a simple embedded Ethernet integration device to get your products online fast!

This tiny unit can easily be added to any existing electronic design to gain Ethernet capability, reducing development and engineering time. Its dynamic web pages are easily programmed in HTML with no other technical knowledge or programming languages needed!

There are 3.3V and 5V versions available to fit your design requirements. Start out with one of our development kits to see how EZ Web Lynx can work for you. See Section 4 of this manual on the Development Kits for more details.

1.1 General Use

EZ Web Lynx was designed to offer a quick and easy way to get an existing or a new product online. Its versatility allows quick adaptation into limitless applications and be monitored from remote locations. The following are some general examples of how EZ Web Lynx could be used:

1.1.1 Industrial Environment

Incorporate EZ Web Lynx into any industrial device to allow for local or remote monitoring of equipment status. You can observe what functions are on, which are off, if your machine is on schedule, or has the correct settings.

1.1.2 Laboratory Equipment

Adding EZ Web Lynx to your lab equipment allows you to audit the results from various devices faster and monitor many at the same time. In addition, EZ Web Lynx can notify you via e-mail when a test is done.

1.1.3 Consumer Products

EZ Web Lynx will give you a competitive edge with your products, allowing you to provide customers with a cutting-edge product that can communicate over the Internet. This could be useful in appliances like an oven or refrigerator. This would allow you to start pre-heating your oven from work, or make sure you did not forget to turn it off after leaving for a trip. With EZ Web Lynx e-mail functions, you can receive a notification e-mail if you forgot to close the refrigerator door, or if the temperature is too warm in the freezer. For detailed directions on how to set up a similar example, please see Section _____ "Example Application".

1.1.4 Hobbyists

EZ Web Lynx is a cost effective module that can be incorporated into even the smallest projects. It is ideal for someone who wants to develop their own device at home to monitor from any computer connected to the Internet. For example, if you wanted to set up a home weather station, EZ Web Lynx can be embedded into your weather monitoring system. You can view the results and current conditions from your PC.

2. EZ Web Lynx

2.1 Command Interfaces

EZ Web Lynx users can communicate with the equipment through three interfaces: Serial AT, UDP Server, and HTTP CGI. These allow for configuration and control of the device. See the **Command Set** section for information on the specific commands and their functions.

2.1.1 Serial AT Command Interface

The serial AT interface allows the user or other processors to configure and operate the device without the need for a network connection. The default serial settings are 8N1, 9600 baud, and no flow control. All commands are preceded with "AT*". In order to write (execute) a command, use the following format:

AT*KEY=VALUE<CR><LF>

To quickly repeat the last command, press the ! key (Shift +1). If the KEY and VALUE are valid, the command interface will return an OK message. If either is invalid, the interface will return an ERROR message along with an error code. See **Table T2.1.1** for descriptions of each of the error codes. This table should also be referenced for any errors in the UDP Server Interface, and errors not returned from GET or POST HTTP.

T2.1.1 **Error Messages**

Code	Description
1	Bad command or invalid key.
2	Pin number out of the valid range.
3	Pin is locked. Cannot change setting.
4	Invalid register issued to REG or NVREG command.
5	Invalid number of bytes issued to REG or NVREG command.
6	Attempt to read a write-only command.
7	Attempt to write a read-only command.
8	Value out of range.
9	Pin does not have analog capability (PIN_ANALOG command).
10	System is locked—cannot change settings
11	Bad password issued to UNLOCK command.

To read a command from the AT interface, use the following format:
AT*KEY?<CR><LF>

If the KEY is valid and readable, the interface will return the following message: KEY=VALUE<CR><LF>

2.1.2 UDP Server Interface

The EZ Web Lynx also includes a UDP server for accepting AT commands. The EZ Web Lynx IDE uses this feature to configure the device. For a more specialized use, a custom application could be developed to communicate with the EZ Web Lynx. The interface for the UDP AT commands is the same as for the serial AT interface. The default UDP port for commands is port 6666. This port can be changed using the IDE or any of the AT command interfaces (serial, UDP HTTP).

2.1.3 HTTP (Web) CGI Interface

Commands can be issued to the EZ Web Lynx using HTTP CGI GET and POST commands. GET commands can be issued from any web browser or from a custom application, and are appended to the end of the URL. The following is an example of a GET command:

```
http://www.website.com/filename.htm?KEY1=VALUE1&KEY2=VALU  
E2&KEY3=VALUE3...
```

The total number of characters in the filename and the KEY/VALUE pairs must be less than 256. Sets of commands that contain 256 characters or more must be split into multiple GET requests.

HTML POST requests are similar to GET requests but are embedded within HTML pages. POST requests usually take the form of HTML forms similar to the following:

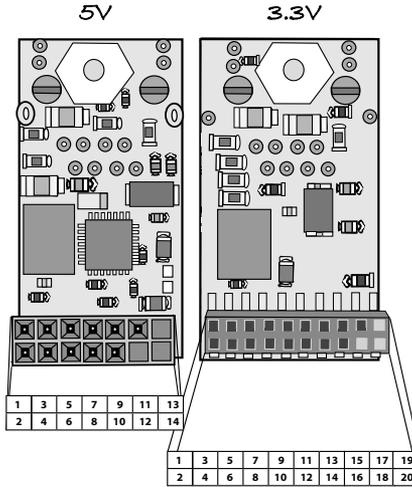
```
<form name="thisform" action="" method="post">  
  <input type="radio" name="DHCP" value="1"/> DHCP  
  <input type="radio" name="DHCP" value="0"/> NO DHCP  
</form>
```

In POST requests, the name field represents the KEY and the value field represents the VALUE for the command to be executed.

See **Section 2.8** for additional Command Set information.

See **Table T2.1.1** for a description of the error codes.

2.2 Connections



T2.2a

5V EZ Web Lynx

Pin Number	Description
1	Analog Input 1/Digital I/O
2	Analog Input 2/Digital I/O
3	Analog Input 3/Digital I/O
4	Analog Input 4/Digital I/O
5	Analog Input 5/Digital I/O
6	Digital I/O
7	Digital I/O
8	TX - Serial Data Transmit (from EZ Web Lynx to PC or other serial device)/Digital I/O
9	RCV - Serial Data Receive (from PC to EZ Web Lynx)/Digital I/O
10	Dallas DS1621 or DS1631 I ² C Temp Sensor SCL (clock) line/Digital I/O
11	Dallas DS1621 or DS1631 I ² C Temp Sensor SDA (data) line/Digital I/O
12	RST (Active-low Reset)
13	Vdd (5V)
14	GND

T2.2b**3.3V EZ Web Lynx**

<i>Pin Number</i>	<i>Description</i>
1	Analog Input 1/Digital I/O
2	Analog Input 2/Digital I/O
3	Analog Input 3/Digital I/O
4	Analog Input 4/Digital I/O
5	Analog Input 5/Digital I/O
6	Analog Input 6/Digital I/O
7	Digital I/O
8	TX - Serial Data Transmit (from EZ Web Lynx to PC or other serial Device)/Digital I/O
9	RCV - Serial Data Receive (from PC to EZ Web Lynx)/Digital I/O
10	Dallas DS1621 or DS1631 I ² C Temp Sensor SCL (clock) line/Digital I/O
11	Dallas DS1621 or DS1631 I ² C Temp Sensor SDA (data) line/Digital I/O
12	Digital I/O
13	Digital I/O
14	Digital I/O
15	Digital I/O
16	Digital I/O
17	Digital I/O
18	RST (Active-low Reset)
19	Vdd (3.3V)
20	GND

To install the EZ Web Lynx, connect Vdd to a voltage source (5V or 3.3V) and GND to circuit ground. RST should be left floating when not in use. To reset the EZ Web Lynx, pull this pin to ground. A common connection would be to a switch or pushbutton between RST and ground. Connect the Ethernet jack to any 10Mbps network switch or hub. Then connect the input/output pins as desired. The following sections describe in greater detail how these I/O pins can be used.

2.3 Digital Input

Any of the I/O pins (pins 1-11 on EZ Web Lynx 5V or pins 1-17 on EZ Web Lynx 3.3V) can be used as digital inputs. When configured as a digital input, any of the other features of the pin (Serial, I²C, Analog) are unavailable.

2.4 Digital Output

Any of the I/O pins referenced for digital inputs can be used for digital output. When configured as a digital output, any of the other features of the pin are unavailable.

2.5 Analog Input

Pins 1-5 on the 5V module or 1-6 on the 3.3V module can be used as analog inputs. These inputs have the range GND-V_{dd} and a resolution of .02V for the 5V module and .01V for 3.3V module. The analog input should be used consecutively, starting from Pin 1. For example, if one analog input is needed, use Pin 1; if 2 are needed, use Pin 1 and Pin 2; if 3 are needed, use Pin 1, Pin 2, and Pin 3; etc. The use of analog pins out of order may produce undesirable results.

2.6 I²C Temperature Sensor

EZ Web Lynx can be connected directly to an I²C temperature sensor such as the Dallas DS1621 or DS1631. Connect Pin 10 to the SCL pin on the sensor and Pin 11 to the SDA pin on the sensor. Pull up resistors must be used on both the SDA and SCL lines (4.7k Ω recommended). For additional information, see **Section 2.9.3**. These connections are already present if using the EZ Web Lynx Development Kit.

2.7 Serial Communication

To use the serial port on the EZ Web Lynx, Pin 8 is the TX line (from the EZ Web Lynx to the PC or other device) and Pin 9 is the RCV line. The EZ Web Lynx transmits and receives using TTL levels (GND-V_{dd}) so if connecting to a PC or other RS232 serial device, an RS232 level converter chip must be used. The default serial settings are 8N1, 9600 baud, and no flow control. The serial baud rate may be changed using the EZ Web Lynx command set.

2.8 Command Set

The EZ Web Lynx can be configured and operated via a set of commands issued to the device. The commands can be issued using one of the four interfaces: serial, UDP, HTTP, and the EZ Web Lynx IDE. The specifics of operating each of these interfaces is discussed in Sections 2.1-2.1.3. The command set works on a KEY=VALUE system. Each command has a unique key and range or set of values associated with it. Most commands can be read or executed (write). Reading a key generally displays a value that is associated with that key. Writing a key usually changes that value. The majority of keys can be written or read, however, there are a few that can only do one or the other.

The following table lists the valid keys, acceptable values, and the results of reading and writing each key.

T2.8

Key	Read	Write	Values
PIN_OUTPUTxx	xx is the pin number reading this command will return the current setting (0=set low, 1=set high, 2=direction is input).	Make the pin a digital output.	0=output low 1=output high
PIN_INPUTxx	xx is the pin number. Samples the current state of the pin and returns the value (1=high, 0=low).	N/A	N/A
PIN_ANALOGxx	xx is the pin number. Reads the analog voltage on the specified pin and returns it in the form XX.X. Specifying a pin that does not have analog capability will return an error.	Sets the specified pin to be an analog input.	Value is ignored.
PIN_LOCKxx	xx is the pin number. Returns whether the specified pin is currently locked (1=locked, 0=unlocked).	Lock or unlock the specified pin so its state (Analog/Digital, Input/Output, High/Low) cannot be changed.	1=lock pin 0=unlock pin
REGxx	xx is the register number (0-255). Returns the value of the specified register.	Write the value to the specified register.	Value=y,z yyy= value to write decimal or hexadecimal z=number of bytes to write: 1 (default), 2, or 4

(T2.8 cont'd)

Key	Read	Write	Values
NVREGxx	xx is the non-volatile register number (0-255). Returns the value of the specified register.	Write the value to the specified register.	Value=y,z yyy=value to write decimal or hexadecimal z=number of bytes to write: 1 (default),2, or 4
SERIAL_ BAUD	N/A	Changes the serial baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
SERIAL_ ECHO	N/A	Turn on/off echoing of all characters received on the serial port.	1=echo on 0=echo off
SERIAL_ START	Returns the serial capture buffer start value as a list of hexadecimal values.	Change the serial capture buffer start value.	Accepts a comma-separated list of hexadecimal digits. The digits can, but need not be, preceded by "0x". For example, the value "0x41,42,0x43" will be interpreted as "ABC." (no "" needed)

(T2.8 cont'd)

Key	Read	Write	Values
SERIAL_ END	Returns the serial capture buffer end value as a list of hexadecimal values.	Change the serial capture buffer end value.	Accepts a comma-separated list of hexadecimal digits. The digits can, but need not be, preceded by "0x". For example, the value "0x41,42,0x43" will be interpreted as "ABC." (no "" needed)
SERIAL_ KBHIT	Returns how many characters are contained in the last serial capture buffer.	Write a 0 to mark this frame as received. This command will then return 0 until another frame is received.	0
SERIAL_ GET	Returns the last received serial capture buffer as text.	N/A	N/A
SERIAL_ SEND	N/A	Send characters out the serial port.	Accepts a comma separated list of hexadecimal digits. The digits can, but need not be, preceded by "0x". For example, the value "0x41,42,0x43" will be interpreted as "ABC." (no "" needed)
LCD_SEND	N/A	Write a string to the LCD screen.	Accepts a string of characters. Several special characters are allowed: <ul style="list-style-type: none">• /f-Clear LCD• return cursor to 1• 1 /n-Put cursor at beginning of next line /r-put cursor at 1• 1 without clearing screen

(T2.8 cont'd)

Key	Read	Write	Values
LCD SEND	N/A	Write a string to the LCD screen.	Accepts a string of characters. Several special characters are allowed: <ul style="list-style-type: none"> • /f-Clear LCD, return cursor to 1 • 1 /n-Put cursor at beginning of next line /r-put cursor at 1 • 1 without clearing screen /s-move cursor one space right without alteringng contents /b-backspace
LCD GOTÖ	N/A	Change the cursor position on the LCD screen.	value is in form x,y. x-horizontal position (1-16) y-vertical position (1-2)
DHCP	Return whether DHCP is enabled or disabled	Enable or disable DHCP ¹	1=Enable 0=Disable
BOUND	Return 0 if DHCP is disabled or not bound to an IP address, return 1 if bound.	N/A	N/A
AIP	Return the value of the IP address that will take effect after the device is reset.	Change the value of the IP addresss that will take effect after the device is reset. ¹	Must be in dotted-quad form (192.168.100.210, for example)
IP	Return the current IP address	N/A	N/A
AGW	Return the value of the gateway address that will take effect after the device is reset.	Change the value of the netmask that will take effect after the device is reset. ¹	Must be in dotted-quad form (192.168.100.210, for example)

¹ Changes to networking configurations are stored internally and do not take effect until the EZ Web Lynx is reset.

(T2.8 cont'd)

Key	Read	Write	Values
GW	Return the current gateway address	N/A	N/A
ANMASK	Return the value of the netmask that will take effect after the device is reset.	Change the value of the netmask that will take effect after the device is reset. ¹	Must be in dotted-quad form (255.255.255.0, for example)
NMASK	Return the current netmask	N/A	N/A
HTTP	Returns the TCP port used for HTTP.	Change the TCP port used for HTTP. ¹	0-65535 0 will disable HTTP service 80 is default
TFTP	Returns the UDP port used for TFTP file transfers.	Change the UDP port for TFTP. ¹	0-65535 0 will disable 69 is default
UDP	Returns the UDP command port.	Change the UDP command port. ¹	0-65535 0 will disable 6666 is default
DNS	Returns the current DNS server.	Change the DNS server.	Must be in dotted-quad form (192.168.100.1, for example)
RESET	N/A	Reset the device (for IP configuration changes to take effect).	1=reset device
ANNOUNCE_PORT	Read the port that announce messages will be broadcast on.	Change the port that announce messages will be broadcast on. Also changes the port that listens for announce message requests. (CAUTION)	0-65535 7123 is default (always listens on announce_port + 1 for announce requests).

¹ Changes to networking configurations are stored internally and do not take effect until the EZ Web Lynx is reset.

(T2.8 cont'd)

Key	Read	Write	Values
ANNOUNCE_NOW	N/A	Causes the EZ Web Lynx to broadcast a number of announce messages over the network.	Value is the number of announce messages to broadcast (1-255) 0 will stop any broadcast currently enqueued
TEMPyxx	Reads the current temperature from an attached Dallas DS1621/1631 I ² C temperature sensor. y is F or C (Fahrenheit or Celsius). xx is the I ² C address of the temperature sensor (0-7).	N/A	N/A
ID	Returns the ID string programmed into the device.	Changes the ID string of the device.	Any string up to 25 characters.
SSN	Returns the serial number of the device.	N/A	N/A
VER	Returns the current firmware revision of the EZ Web Lynx.	N/A	N/A
LOCK	Returns 1 if locked, 0 if unlocked.	Prevents ANY changes (web pages or configuration) until unlocked.	VALUE contains the new password to use.
UNLOCK	N/A	Unlocks the device after being locked	VALUE must contain the password specified when LOCK was executed.
EMAIL_TO	Read the TO field of any future emails	Edit the TO field of any future emails	
EMAIL_FROM	Read to FROM field of any future emails.	Edit the FROM field of any future emails.	

(T2.8 cont'd)

Key	Read	Write	Values
EMAIL_SUBJECT	Read the subject line of any future emails.	Edit the subject line of any future emails.	
EMAIL_NOW	N/A	Send a status email immediately.	1=Send email All other values ignored
EMAIL_DAILY	Return the status (on or off) of the daily status email.	Enable or disable the daily status email.	1=Send email 0=Disable
EMAIL_TEMP_yxx	The value of y (F or C) specify a temperature in Fahrenheit or Celsius. xx is the I ² C address of the temperature sensor (0-7). Reading this command will return the trigger value (in xx.x format) if active or 0 if not active.	Enable or disable temperature-activated email.	VALUE is the form xx.x and specifies the trigger temperature. 0 (no decimal point) disables this feature.
EMAIL_DIGITAL_{xx}	xx is the pin number to check for the input-activated email. Returns whether the even-driven email is active on the specified pin.	Enable or disable digital input-activated email.	1=Enable 0=Disable
EMAIL_ANALOG_Hxx	xx is an analog pin. Returns the analog trigger value (x.xx format) or 0 if not active.	Specifies the trigger value (in volts) at which to cause an email to be sent. Email will be sent when the value becomes greater than the trigger value.	VALUE is in the format x.xx and specifies the trigger voltage. 0 (no decimal point) disables this feature

(T2.8 cont'd)

Key	Read	Write	Values
EMAIL_ANALOG_Lxx	xx is an analog pin. Returns the analog trigger value (x.xx format) or 0 if not active.	Specifies the trigger value (in volts) at which to cause an email to be sent. Email will be sent when the value falls below the trigger value.	VALUE is in the format x.xx and specifies the trigger voltage. 0 (no decimal point) disables this feature
EMAIL_SERIAL	Returns the triggering sequence if active or 0 if not active.	Enables or disables the serial-triggered email feature.	VALUE contains the triggering condition as a comma-separated list of hexadecimal characters. Writing a 0 will disable this feature.
EMAIL_HOST	Returns the current SMTP server used for sending email.	This command changes the SMTP server that the EZ Web Lynx will communicate with to send email.	The value can be either the domain name (i.e.: ezweblynx.com) or the IP address of the SMTP server.

2.9 Features

There are many unique features of the EZ Web Lynx that can be incorporated into your project. The following section describes in more detail how some of these special features work.

2.9.1 Device Lock

The EZ Web Lynx can be password-protected to prevent any other users from changing the configurations of the device. To lock the device, use the LOCK command as described in the Command Set section and specify a password. When locked, the device will not allow changes to the IP configuration, serial configuration, email configuration, or device ID. To unlock the device, call the UNLOCK command with the correct password.

2.9.2 Pin Lock

The I/O pins on the EZ Web Lynx can be individually locked in their current state by using the PIN_LOCK command. When locked, a pin's current I/O direction (input/output), latch (high or low when configured as output), and analog/digital/I²C/serial mode configurations cannot be modified. The PIN_LOCK command is also used to unlock a pin.

2.9.3 I²C Temperature Sensor

Pins 10 and 11 have a secondary purpose for communication with a Dallas DS1621 or DS1631 I²C temperature sensor. To use either of these sensors, connect pin 10 to the SCL pin on the sensor and PIN11 to the SDA line. Both of these lines need to be pulled up with 4.7kΩ resistors. Connect the Vdd and GND lines between the EZ Web Lynx and the sensor. The A0, A1, and A2 lines can be connected to either Vdd or GND to create the I²C address for the particular device. The temperature sensor can then be monitored in either Fahrenheit or Celsius using the TEMP commands in the preceding **Table 2.8**.

2.9.4 Data Registers

The EZ Web Lynx has the ability to store values for use by the programmer. There are two sets of data registers available, volatile and non-volatile — each consisting of 256 8-bit locations.

The volatile register loses its values each time the EZ Web Lynx is reset. Upon reset, the values in the volatile register are reset to zero. The volatile register is useful for storing temporary values that need to be accessed very quickly.

The non-volatile register retains its values on reset. Non-volatile registers are best used for values that do not change very often. To change a value in the registers, send either the REG (volatile) or NVREG (non-volatile) commands to the EZ Web Lynx. Both sets of registers follow the same syntax:

AT*REGxxx=y,z -or- AT*NVREGxxx=y,z

The value xxx is replaced with the register number that you wish to access (0-255); y is the value that you wish to store; z is the number of locations (bytes) that the value will take. The value for z can be 1 (8-bit number, maximum value of 255), 2 (16-bit number, 65535 max), or 4 (32-bit number, 4294967295 max); the default if left blank is 1. Multi-byte values are stored little-endian (least-significant byte is stored in the lower numbered register).

2.9.5 Serial Capture Buffer

The EZ Web Lynx includes a feature that allows the device to automatically capture a specific frame of serial data based on user-specified start and stop conditions. This feature is extremely useful if using the EZ Web Lynx in a serial device where information needs to be processed frequently, or that sends out a specific serial error code that must be captured.

To enable the serial capture buffer, a start and stop sequence must be specified to the device. This is done by sending the commands:

- AT*SERIAL_START=A,B,C...
- AT*SERIAL_END=D,E,F...

The values of each of these commands is a single hexadecimal character or comma-separated list of characters. The start and end buffers may each be up to 20 characters long. When the EZ Web Lynx detects the specified start sequence on the serial port, it begins internally buffering the characters. The device stops buffering characters when it detects the complete sequence of end characters. The EZ Web Lynx will buffer up to 125 serial characters, including the start and stop characters.

To check the status of the serial buffer and access the buffered stream, two commands are used:

- AT*SERIAL_KBHIT
- AT*SERIAL_GET

SERIAL_KBHIT is used to check how many characters are buffered in the last complete (start and stop sequence detected by the EZ Web Lynx) frame that was received. This value includes the start and stop characters. If the command returns 0, no characters have been buffered yet. This value may be cleared by executing this command with a value of 0. The serial buffer will still be available to the user after having been cleared.

SERIAL_GET returns the received serial stream. This stream will include both the start and stop sequences.

Additionally, the EZ Web Lynx includes a custom HTML tag for viewing serial data. The `<!--(SERIAL_DATA x y)-->` tag will print all received serial characters from index x to index y where the first character is index 0.

The following is an example of how this can be used when writing a web page.

```
...
<!--(IF READ SERIAL_KBHIT>0)-->
  Serial Data:<!--(SERIAL_DATA 3 15)-->
<!--(ELSE)-->
  NO SERIAL DATA!
<!--(ENDIF)-->
...
```

This will display any serial data from the third character to the 15th character. Otherwise, it will display “NO SERIAL DATA” on the web page.

See **Section 3.14** HTML Instruction Set for details.

2.9.6 Email

The EZ Web Lynx has the ability to send event-driven email alerts as well as a daily status email. Only one event-triggered email may be configured. Event-driven emails can be triggered by any of the following conditions:

- a user-specified digital input becomes active
- a user-specified analog input is higher than a certain voltage
- a user-specified analog input is lower than a certain voltage
- temperature reaches a specified level
- a specified string of characters is read on the serial port

If enabled, the EZ Web Lynx will also send a daily status email. The internal clock of the EZ Web Lynx does not keep track of time when the power is off; thus, the user will not be able to specify when the email will be sent. The device keeps an internal counter and will trigger an email when the timer completes an entire day (86400 seconds). The timer is saved to internal memory frequently, but will only continue to count while the EZ Web Lynx is supplied power.

The user is also be able to request a status email be sent immediately.

The user is be able to configure the email options using the AT interface (serial, UDP or HTTP). The email will contain the state (input or output, analog or digital, high/low/analog voltage) of each of the inputs. If the EZ Web Lynx is configured to read a temperature sensor, the current temperature will be sent in the email, as well.

2.9.7 LCD

The EZ Web Lynx is programmed to operate a 2x16 character LCD. The LCD can be used to assist in configuring the EZ Web Lynx before installing in an end-product. The LCD uses pins 1-8 of the EZ Web Lynx. Therefore, when the LCD is being used, those pins will be locked. In addition, because pin 8 is used, the serial interface cannot be used when the LCD is being used.

An LCD may also be incorporated into a product that uses the EZ Web Lynx. Using the same commands, the LCD can be controlled by the EZ Web Lynx device. To accomplish this, connect the LCD to the EZ Web Lynx in the following manner:

LCD Pin	5V EZ Web Lynx Pin
Vss (Power Supply)	5v supply ¹
Vdd (Ground)	GND
Vo (Contrast Adjust)	See Note*
RS (Register Select)	Pin 8
R/~W (Read/Write)	Pin 7
E (Enable)	Pin 6
D0	N/C
D1	N/C
D2	N/C
D3	N/C
D4	Pin 1
D5	Pin 2
D6	Pin 3
D7	Pin 4

* The Vo pin needs a voltage between 0.0-0.5V to adjust the LCD contrast. The most common way is to connect a potentiometer between Vdd and Vss, and use the potentiometer's output voltage to adjust the contrast.

¹ Most LCD modules require a 5V supply to power the LCD. A separate 5V source may be needed when using the 3.3V EZ Web Lynx. See the specifications on the datasheet for your particular LCD.

2.9.8 Device ID

To make identification of a particular device in an environment with multiple EZ Web Lynx devices, the user may assign a custom device ID to each module. This is accomplished using the ID command. This ID string may contain up to 25 characters.

2.9.9 IP Discovery Announcements

If DHCP is enabled on an EZ Web Lynx module and no serial interface is available to determine the IP address of the device, a special UDP packet will be broadcast over the network to allow a user to determine the IP address of the device. This packet will be broadcast to the UDP announce port (default is 7123) specified in the ANNOUNCE_PORT command. The packet will contain the IP and MAC address of the device (in the packet's header), the device ID, and the UDP command port to be used for the UDP command interface. Using network monitoring software, these announce messages can be listened for and an unknown IP address of a device determined.

This packet will be broadcast at a rate of 3 seconds per announcement. The broadcast is triggered in one of two ways. First, the announcements are made 5 times each time the device is reset. Second, announcements can be requested using the ANNOUNCE_NOW command.

The EZ Web Lynx always accepts requests for announcements (using the ANNOUNCE_NOW command) on the UDP announce port + 1 (default is 7124). This way, all that needs to be known is the UDP announce port to allow anyone to find the IP address of an EZ Web Lynx. The device allows the user to modify the UDP announce port. However, extreme caution must be taken to remember this port, or it may be very difficult to find a device with an unknown IP address.

2.10 IP Configuration

The EZ Web Lynx allows for full modification of its networking settings to allow it to be used in any network environment. Changes can be made using any of the command interfaces (serial, UDP, or HTTP). Any changes made to the network configurations will not take effect until the device is reset.

The following is a description of each of the network settings:

DHCP: DHCP is a networking protocol that allows for a unique IP address to be assigned dynamically to each device on a particular network. In order for DHCP to work, there must be a DHCP server enabled on the network. The default setting is DHCP disabled.

DNS: Changes the primary DNS server used to resolve domain names to IP addresses. This is used only for the email functionality of the EZ Web Lynx.

IP Address: All devices on a network must have a unique IP address. The default IP address for the EZ Web Lynx is 192.168.100.210. IP addresses in the range 192.168.0.0 through 192.168.255.255 are reserved for private networks and, therefore, will likely be used for the EZ Web Lynx.

Netmask: The netmask is used when translating an IP address from a local network to a different network over the Internet. The default value is 255.255.255.0. If the device is only being accessed from the local network, then the default value generally does not need to be changed.

Gateway: This is the IP address of the node in the network that acts as an interface from the network to the Internet. The default gateway is 192.168.100.1. If the device is only being accessed from the local network, then the default value generally does not need to be changed.

For several of the IP configurations, two sets of commands exist. The first is a read-only command that displays the current active setting for that command. These commands include IP, GW, and NMASK. The second set of commands are readable and writable, and deal with the setting that will take place after a restart. These commands include AIP, AGW, and ANMASK. Writing to these commands will change the particular setting only after the device is reset. Reading these commands will return the value that will be active after the device is reset. Changes to the IP configurations will only take effect after the device is reset.

3. IDE Overview

The EZ Web Lynx IDE is an integrated development environment (IDE) designed to assist developers in creating a web application using an EZ Web Lynx device. The IDE provides a visual interface for creating a HTML document and also allows for editing the document as raw HTML. The IDE can be used for configuration of an EZ Web Lynx device settings and to upload an HTML image to the device.

3.1 Steps to Create and Publish an EZ Web Lynx Application

Create a new basic web application by following these easy steps:

1. Execute the EZ Web Lynx IDE program.
2. Create a new project by selecting "New Project" from the file ribbon. Name and save this project file.
3. Create the main file by selecting "New" on the file ribbon.
4. Begin editing this file:
 - a. Place the cursor in the editor and enter the text "Salutations World".
 2. On a new line type "My status is:"
 3. Select the HTML Ribbon.
 4. Select the edit ribbon and Highlight "Salutations World" In the top pull down under font select H1.
 5. On the ribbon bar select the pull down in the EZ Web Lynx toolbar. Select "PIN X ltag/hTag"
 6. Click "Insert" The Insert Tag dialog will open.
 7. In the value field for ltag enter "sleeping" enter "working hard" htag.
5. Click save to save this file.
6. Click the Internet Explore tab to simulate what the EZ Web Lynx will output. You should get the following:
 1. The simulated output should say Salutations world. My status is sleeping.
 2. Move the mouse over the simulate tab on the side of the screen. When the simulate window appears set pin 1 to high.
 3. Click refresh and the text changes to "Salutations world my status is working hard"
7. Under the target menu select create image and save the image file.
8. Make sure EZ Web Lynx device is connected to the network select "select device" from the target ribbon.
9. When the select device dialog appear select the device from the list and press select.

10. Select change settings. The network settings, ID, other device settings are displayed for the device. Verify these settings and make any changes. If changes were made press “update device” to save these changes to the device. Press finished.
11. Select Upload project from the target ribbon and provide the file name of the project image that was saved in step 5. The project image file will upload to the device.
12. The device should now be able to display the web page previously created.

3.2 File Formats

When working with the IDE several files may be created or used. The following are some of the files that may be encountered. All files must be in 8.3 format.

- **.CDS** - A CCS Data Stream file. This contains an image of the web application that may be uploaded to a device. These files are created by opening a project and selecting “Create Image” from the target menu.
- **.PJT** - A project file. The project file contains a list of the files that are included when creating an image that will be uploaded to the device.
- **.HTM** - A web page document. An HTML document is a plain text file with special tags indicating the formatting. An HTML document may consist of text, images, tables and hyperlinks to other sites. HTML is a standard format for web pages and is known for its ability to allow users to view information and follow hyperlinks to other locations of interest. For more information on HTML documents visit www.w3.org
- **.JPG or .GIF or .PNG** - An Image file. Image files may be included in the project so that HTML documents may reference them. A web browser may then display an image on a web page.
- **.CSS** - A file containing a Cascading Style Sheet. These files contain information about how an HTML document should be presented by the web browser.

3.3 Using the Editor

The IDE provides an HTML editor with several ways of viewing an open document. Select from one of tabs at the top of the editor window for the various ways to view and work on the document. Developers may find it useful to switch between modes. The following modes are available:

- **Visual** - Working in visual mode allows for quick editing of the document with minimal knowledge of HTML and provides real-time editing. Specific options such as changing fonts, inserting custom tags, and inserting tables are only available in this mode. Other views require tags to be manually typed in.
- **Internet Explorer** - At some point a developer will want to know what the document will look like in a web browser. This may be different than in the visual view because of dynamic content. The 'Internet Explorer' mode gives the developer a powerful tool to simulate what the document will look like when the EZ Web Lynx processes the dynamic content. A developer can also change values in the simulate slide out menu to view how the device responds in different settings. The editor is 'read only' in this mode.
- **Body** - In an HTML document, the body section defines the content of the document. If the developer finds it easier to edit the HTML directly then this mode will allow editing HTML content without having to work with items such as the style sheet or tags that may be found in the HEAD section.
- **HTML** - This mode shows the full raw HTML document in plain text. This allows the developer the greatest flexibility when editing an HTML document.
- **Style sheet** - This view gives the developer an ability to edit or add to the style sheet for the document. A Cascading Style Sheet describes the presentation of a document. The style sheet displayed here is found in the head section of the HTML document.
- **Meta-Tags** - Allows for viewing the Meta-Tags for the open document. This view is read only.

3.4 File Ribbon Menu

Developing a web application consists of creating one or more HTML files. Also in order to place your application on the EZ Web Lynx device each file must be part of the project. This ribbon allows for creating new projects and adding HTML files. Support for printing is also provided.

Open Project	Opens a saved project into the IDE
New Project	Creates a new project
Save Project	Saves the project settings
Save Project As	Prompts the user for a project name to save the currently open project
New	Creates a new blank HTML file and adds it to the current project
Save	Saves the HTML file that is open (use 8.3 format for file name)
Save As	Prompts for the file name to save the file currently open
Open	Opens an HTML file to edit
Close	Closes the project
Print	Prints the file displayed in the print tab
Printer Setup	Select the printer and printer options
Print Preview	Preview the printer document
Exit	Exit the software

3.5 Edit Tab

To provide the developer with an easy way to edit documents, an option-rich editor has been included. Depending on editing mode and where the cursor is, some options may not be available.

Undo	Undo the last edit to the program
Redo	Redo the last undo
Cut	Move the selected text to the clipboard
Copy	Copy the selected text to the clipboard
Paste	Move text from the clipboard to the editor
Import Text with line breaks	Load text from a file into the editor keeping the line breaks
Import Text without line breaks	Load text from a file without the line breaks
Decrease list indent	Un-indent a list item by one level
Increase list indent	Increases the indent of a list item by one level
Remove innermost span	Removes the innermost span. To set formatting options HTML documents use a span tag for example <code> text </code> This option removes the innermost span at the cursor location.

Edit table	Allows the insertion/deletion of the selected table rows or columns
Font settings tool bar	The font settings tool bar allows the user to change the font style for the selected text

3.6 HTML Tab

Working with HTML documents consists of adding tags to control how images are inserted, text is formatted, and text hyperlinks are formed. If the editor is in visual mode, this tab is available to help the developer format the document.

3.6.1 Image

Insert Picture	Brings up the insert picture dialog giving the following options
Pictures Source	The location of the image to insert. A copy of the image will be placed in the project directory if the image location is not in the project directory (use 8.3 format for file name)
Alternate Text	This is the text to display if the web browser can not display images
Layout	Align an image left, right, or center
Size	Select the height and width of an image. If the Aspect ratio box is checked then the image will scale proportionally as the height or width are changed
Make Link	Makes the selected image into a hyperlink. If the image is a hyperlink, the user can click on it and be taken to a location providing more information. For example a company logo could be made to link to the company web site.
Delete Link	Remove the hyperlink attribute from the selected image
Restore Original Size	If an image has been resized, the developer can use the option to return the image back to its default original size
Align left, center, right	This allows an image to be aligned on the left, in the center, or on the right side of the page

3.6.2 Table/Lists

HTML items such as tables, lists and cell option commands can be inserted into the document.

Unordered List	Inserts an unordered list at the cursor position (ie. Bullet points)
Ordered List	Inserts an ordered list at the cursor position (ie. 1,2,3...)
Insert Table	Brings up the insert table dialog to insert a tab
Table Settings	Select the number of columns, number of rows, the width in pixels, and the table class and table style. Table class and table style are taken from the style sheet.
Cell Options	The user can change the cell spacing and cell padding in this dialog. The user can also change the cell class and the cell style in this dialog. Cell class and Cell styles can be defined in the style sheet.

3.6.3 Commands

To assist the developer in using dynamic content for the EZ Web Lynx Server, some options have been provided.

Select an EZ Web Lynx command from the pull down menu in the tab and press insert for the command to be placed at the current cursor position. A dialog box appears and the user is allowed to enter any parameters for the command. Please see the list of commands in the EZ Web Lynx documentation for a better understanding of what the parameters are and how the commands effect the display.

After inserting a command, the developer may click on a command and select 'Edit device CMD' to edit the parameters for a command in the HTML document. A dialog box opens, allowing the user to change the parameters for the command easily without having to worry about the syntax for the command.

3.6.4 Hyperlink

Make Hyperlink	Creates a hyperlink out of the selected text using the link in the 'link edit' box. The selected text may now be clicked on to take the user to a location providing more information about the text.
Remove Hyperlink	Removes the hyperlink at the current cursor locations
Anchor	Adds an anchor at the current cursor position. An anchor creates a link within current document

3.7 Tools Tab

The EZ Web Lynx IDE is a functional editor and some common editor functions have been provided to assist the developer.

3.7.1 Document

Spell Check	Spell checks the open HTML document
Word Count	Displays the number of words in the HTML document
Spell Check Options	Displays settings for spell checking
Graphics List	Shows a list of graphic files used by the HTML document

3.7.2 View

Show Tags	Box checked - the tags are displayed in the HTML editor view
Insert	Box checked - the insert slide out menu becomes visible
Project Manager	Box checked - the project manager becomes visible. The Project Manager allows all pages and images of the current project to be viewed.
Simulate Settings	Box checked - the settings for how the document will be simulated
Simulate Errors	Box checked - a list of errors that occurred the last time the project was simulated will be visible. (See Section 3.9)

3.8 Target

The IDE allows for transferring a project to the device as well as viewing and changing device settings.

- **Create Image:** After loading a project, use this option to create an image of the current project and save it to a disk. The image file format does not support sub-directories. This means that any links to images or files in the project must be to the same directory. Once the an image is created, it may be uploaded it to one or more EZ Web Lynx devices.
- **Select Device:** Press 'Select Device' to choose which device to communicate with.

The select device dialog box on the left will list all the devices found on the local network. The refresh button refreshes this list.

If the IP address and port of the device is know, it can be entered manually or be selected from the device list. Press select to choose the device

- **Upload Image:** After a device is selected, the project can be uploaded to the device. Clicking upload image prompts the user for an image file and uploads that file to the device selected.
- **Change Settings:** The network settings for the EZ Web Lynx device may need to be viewed or changed at times. The settings that can be changed include IP Address, Gateway, DHCP, Netmask, ID, UDP Port, HTTP Port, and TFTP Port. A device must be selected to use this option.

If the IDE is behind a firewall and has problems communication with the device, then the firewall settings may need to be changed. By default the IDE uses UDP ports 7124 and 7123 to detect the device. The firewall may also need to be set to allow for UDP, TFTP, and HTTP traffic to and from the device. Note that the ports used can be set differently for each device. Contact your system administrator for assistance.

3.11 Slide-out Windows

Along the left side of the IDE window is a series of slide-out windows for the user to quickly include files, insert document tools or simulate the web view.

- **Project Manager:** Contains a list of files in the current project. Checking a file will include the file in the project image that can be uploaded to the device. The device does not support sub-directories.

It is recommended that all files in the project be kept in the same directory, as the file will always be placed in the root directory on the device.

To add an add existing file to the project select add. To remove a file from the current project highlight the project in the list and select remove.

All files must be in short (8.3) format.

- **Insert Tab:** This window allows for easy insertion of images, lists, and other HTML objects as well as EZ Web Lynx commands.

Position the cursor in the editor and click the command to insert. This option is available only when the editor is in the visual mode.

- **Simulate:** A visualization of the dynamic content output. Choose the Internet Explorer mode in the editor.

This mode will simulate any of the EZ Web Lynx commands. Any of the network settings, ID, serial number, Pin status, and key values may be entered or changed. Press the refresh button to update the display using the current settings.

- **Simulate Errors:** This window displays potential problems that were detected the last time the IDE simulated dynamic content. Some problems that are detected are, missing Endif tags and key values with incorrect parameters.

3.10 Using Command-line Parameters

Some users may find it useful to create a project outside of the IDE or the user may want to automate the process of uploading a project to a device. To support this some functions of the IDE can be invoked from the command line as follows.

<code> P Project_file Image_file</code>	Creates an image from the project file and saves it as Image_file
<code> D source_dir Image_file</code>	Creates an image using all files in source_dir and saves it as Image_file. This allows an image to be created without the project file created by the IDE.
<code> U IPAddress:port Image_file</code>	Uploads the Image file to the device at IP Address:port. Note that port is the UDP command port for the device.

3.11 Help File

3.12 Custom Web Pages

One of the features of the EZ Web Lynx is the ability to create and upload custom web pages to the device. Using a set of custom HTML tags (see **Section 3.13** HTML Instruction Set), the web pages interact with the EZ Web Lynx device to view the conditions of the I/O ports, change the device settings, view incoming data, and more. The EZ Web Lynx IDE has the ability to create, simulate, compile, and upload web pages from a PC to any EZ Web Lynx device. (See **Section 3.8** for creating and uploading web pages to an EZ Web Lynx device.) Some key information regarding the custom web pages:

- The EZ Web Lynx 5V device has 927kB of Flash memory available for storing web pages. The EZ Web Lynx 3.3V device has 896kB available.
- There are three pages that the device may look for and therefore should be part of the pages loaded onto the device:
 - index.htm will be loaded when the IP address accessed by a web browser and no file is specified in the URL
 - error404.htm will be loaded when the requested file cannot be found. If not provided, a simple 404 page will be generated.

- File types supported:
 - HTML (.htm extension)
 - XML (.xml)
 - Text (.txt)
 - GIF (.gif)
 - JPEG (.jpg)
 - PNG (.png)
 - Icons (.ico)
 - Cascading Style Sheets (.css)
 - All other file extensions will be read as plain text
- Files should be in 8.3 character format
- Custom HTML tags will be processed in any type of file, as they are read, except for within images of supported types.

3.13 HTML Instruction Set

The EZ Web Lynx allows customized, dynamic web content, created by using a set of custom HTML tags. These tags interact with the EZ Web Lynx when a web page is loaded; allowing the web pages to change based on the current state of the EZ Web Lynx.

Tag	Values	Description
<!--(PIN x)-->	x is a pin number	The element is replaced with 0 if the pin is low and 1 if it is high. The PIN will be set to input mode.
<!--(PIN x ltag/htag)-->	x is a pin number ltag is the text if the pin is low htag is the text if the pin is high	The element is replaced with ltag if the pin is low and htag if it is high. The PIN will be set to input mode.
<!--(PIN x ANALOG)-->	x is a pin number	The element is replaced with a number of the form x.xx representing the pin voltage. This pin will be set to analog mode and direction set to input.

Tag	Values	Description
<!--(PIN x ANALOG*a/b+c-d,p)-->	x is a pin number a is a number to multiply the analog voltage by (*a is optional) b is a number to divide the analog voltage by (/b is optional) c is a number to add to the analog voltage (+c is optional) d is a number to subtract from the analog voltage (-d is optional) p is the number of decimal places	The element is replaced with a number representing the calculation result. This pin will be set to analog mode and direction set to input. The operators (*/+/-) must be used in this order.
<!--(SERIAL DATA x y)-->	x and y are the beginning and ending index of the last serial frame captured	The element is replaced with the last serial frame of data from character index x to y. If you want to read the full serial frame, use the READ HTML extension documented below. See the chapter titled Serial Buffering.
<!--(IF PIN x = n)-->	x is a pin number n is 0 or 1	If the statement is false text is removed up to the ELSE or ENDIF.
<!--(IF PIN x < a)-->	x is a pin number	If the statement is false text is removed up to the ELSE or ENDIF.
<!--(IF PIN x > a)-->	a is a number in the range (0.00-5.00) (5 V version) or (0.00-3.30) (3.3 V version)	If the statement is false text is removed up to the ELSE or ENDIF.
<!--(IF KEY = n)--> <!--(IF KEY != n)--> <!--(IF KEY < n)--> <!--(IF KEY <= n)--> <!--(IF KEY > n)--> <!--(IF KEY >= n)-->	KEY is a valid key (see chapter titled Command Set) n can be an integer or float depending on which key is used	If the command's VALUE does not follow this conditional check, text is removed up to the ELSE or ENDIF.

Tag	Values	Description
<code><!--(ELSE)--></code>		Used for the IF directive
<code><!--(ENDIF)--></code>		Used for the IF/ELSE directive
<code><!--(EXEC KEY=VALUE)--></code>		Executes a command from the command set.
<code><!--(READ KEY)--></code>		Reads a command from the command set.

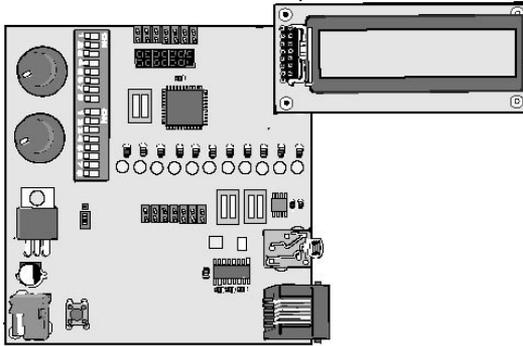
4. EZ Web Lynx Development Kit

(picture inserted here)

4.1 The EZ Web Lynx Development Kit includes everything you need to get your project started. Included in the development kit is:

- Two EZ Web Lynx Devices
- Docking Station for programming and testing
- Host Ribbon Cable
- Network cable
- 9V Power Supply

4.2 Docking Station



The docking station includes the following features for programming and testing EZ Web Lynx operations:

- 1 - Integrated connector for the EZ Web Lynx
5V device connector - 2x7 M .1"
3.3V device connector - 2x10 M 2mm
- 2 - Red/Green bi-color LEDs to indicate the high/low state of each pin
- 3 - User terminal block to allow access to each of the I/O pins on the EZ Web Lynx
- 4 - RS-232 level converter and serial connector for Personal Computer to EZ Web Lynx serial communications with a DIP switch to isolate RS-232 chip from device
- 5 - Connector for 2x16 LCD module (LCD module not included)
- 6 - Dallas DS1631 Temperature sensor with isolating DIP switch
- 7 - In-Circuit Debugger/Programmer connector for advanced programming

5. Additional Information

5.1 General Specifications

<i>Specification</i>	5V	3.3V
Physical Dimensions	Length: 1.625" Width: 0.7" Height: 1.0"	Length: 1.5" Width: 0.75" Height: 0.875"
I/O Pins	11 Digital I/O pins – 9 w/ add'l features: -5 Analog -2 Serial Communication -2 I ² C (DS1621/1631 temperature sensors)	17 Digital I/O pins – 10 w/ add'l features: -6 Analog -2 Serial Communication -2 I ² C (DS1621/1631 temperature sensors)
Programming Method	HTML for custom web content	
Supported Network Protocols	HTTP – View HTML pages/send CGI UDP – Command interface, IP broadcasts SMTP – Email TFTP – Uploading/download HTML pages ICMP – (Ping) DHCP	
Ethernet Port	10Mbps Half Duplex (IEEE 802.3)	
Memory for HTML pages	927kB	896kB

5.2 Electrical Specifications

<i>Specification</i>	5V		3.3V	
	<i>Minimum</i>	<i>Maximum</i>	<i>Minimum</i>	<i>Maximum</i>
Supply Voltage (Vdd)	4.5V	5.5V	3.1V	3.6V
Supply Current¹	175 mA @5V	N/A	150mA @3.3V	N/A

¹Minimum supply current needed for EZ WEB LYNX with no peripherals (LEDs, temperature sensor, etc)

Specification	5V		3.3V	
	Minimum	Maximum	Minimum	Maximum
Input Low Voltage (Digital) Pin 1-7, 10, 11 Pin 8, 9 Reset ² Pin 1-6, 8, 9, Reset ² Pin 7, 10-17	GND GND GND	0.8 V 0.2*Vdd 0.2 V	GND GND	0.2*Vdd 0.8 V
Input High Voltage (Digital) Pin 1-7, 10, 11 Pin 8, 9 Pin 1-6, 8, 9 Pin 7, 10-17	2.0 V 0.8* Vdd	Vdd Vdd	1.7 V 0.8*Vdd	Vdd Vdd
Output Low Voltage (Digital)	GND	0.6 V	GND	0.4 V
Output High Voltage (Digital)	Vdd-0.7 V	Vdd	2.4 V	Vdd
Pin Current Source (Output) Pin 1-7 Pin 8-11		25 mA		2 mA 25 mA
Pin Current Sink (Input) Pin 1-7 Pin 8-11		25 mA		2 mA 25 mA

² Voltage level to force the device to reset

5.3 Application Ideas

Industrial Refrigeration

In commercial food preparation facilities, temperature control is critical to safe and successful operations. The EZ Web Lynx is perfect for incorporating into an industrial refrigeration or freezing system to monitor the temperature. Install a DS1631 temperature sensor to monitor the refrigerator temperature. Connect the temperature sensor to an EZ Web Lynx. Configure the EZ Web Lynx to email the maintenance staff when the temperature rises above the desired temperature. The DS1631 temperature sensor has a resolution of 0.5°C, so the EZ Web Lynx can easily monitor the temperature at a very accurate level.

Additionally, a web page can be written using the EZ Web Lynx IDE that allows the supervisor or maintenance personnel to monitor the temperature from anywhere. The HTML code might look something like this:

```
<html>
<body>
<title>Temperature of <!--(READ ID)--></title>
<h1>Temperature of <!--(READ ID)--></h1>
<p>
  <!--(IF TEMPFO < 36.0)-->
    <font color="#0000FF">
  <!--(ELSE)-->
    <!--(IF TEMPFO < 38.5)-->
      <font color="#FFFF00">
    <!--(ELSE)-->
      <font color="#FF0000">
    <!--(ENDIF)-->
  <!--(ENDIF)-->
  <!--(READ TEMPFO)-->
</p>
</body>
</html>
```

5.4 Test Equipment

Laboratory test equipment often has a serial interface limiting its usefulness, and thus, requiring a person to monitor it. Using the EZ Web Lynx's serial buffering capability, the test equipment can be monitored via a web page that will display the last information outputted by the test equipment. The test equipment will respond with STATUS_CONTINUE. if the test is still running; STATUS_PASS. if the test passed; or STATUS_FAIL. if the test fails. The web page could be written as follows:

```
<html>
<title>Lab Test Equipment Status</title>
<body>
  <!--(EXEC SERIAL_START=53,54,41,54,55,53)-->
  <!--(EXEC SERIAL_END=2E)-->
  <!--(EXEC SERIAL_SEND=53,54,41,54,55,53,3F)-->
  </p>
      Results:<!--(READ SERIAL_GET)-->
  </p>
</body>
</html>
```

In this HTML example, the first two commands set up the EZ Web Lynx to buffer any data from when it sees the word "STATUS" until it sees a period. The last HTML command reads the results that the lab equipment sent to the EZ Web Lynx. Now, the results of the testing can be seen over the Internet using any web browser.

5.5 Technical Support & Warranty Information

5.6 Distribution & Large Sales

CCS, Inc. offers a large quantity discount for orders over 100 units. Please contact Sales for a quote at sales@ezweblynx.com or by calling 262-522-6500 x45.

If you are interested in becoming a distributor, please contact CCS, Inc. at 262-522-6500 x45

To locate an already existing distributor, visit our website at www.ezweblynx.com