BOLTEK CORPORATION

Lightning Detection

ERL-10-S Programmable Output Relay Kit-1/Kit-2

User Manual

SEE DISCLAIMER ON REVERSE

BOLTEK LIGHTNING DETECTION

ERL-10 Output Relay Module

Disclaimer

ERL-10 lightning data is only approximate and should not be used for safety applications. Strike and storm locations indicated, and alarm statuses may be erroneous and should not be used to safeguard personnel, equipment or data.

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THIS EQUIPMENT IS NOT TO BE USED FOR SAFETY PURPOSES

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FCC Compliance Statement
For United States Users

This equipment is tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. It is the responsibility of the user to use a shielded interface cable with this device. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

For Canadian Users

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la class B respecte toutes les exigences du Règlement sur le materiel brouilleur du Canada.

WARNING: LIGHTNING AND ELECTRIC FIELD DATA IS ONLY APPROXIMATE AND SHOULD NOT BE USED FOR SAFETY APPLICATIONS. ELECTRIC FIELD READINGS, STRIKE DISTANCES AND ALARM STATUSES MAY BE ERRONEOUS AND SHOULD NOT BE USED AS A PRIMARY MEANS TO SAFEGUARD PERSONS, EQUIPMENT OR DATA.

Table of Contents

Chapter 1

Introduction

The ERL-10 Programmable Output Relay Module puts a live lightning status alarm on your laptop or desktop computer, along with relay connections to activate lighting or audible devices. The ERL-10 is suitable for use with a computer or as a stand-alone relay module for fixed installations.

Quick Start Instructions

1) Install EFM-100 (and ANT-2 if purchased). Please refer to user manuals of each detector for installation details.

2) Connect EFM-100 Cat6 cable to ERL-10 EFM connector.

3) Connect ANT-2 Cat6 cable to LD-250 Lightning Sensor connector if purchased.

4) Connect the USB cable from your computer USB port to the USB connector of your ERL-10.

5) Plug in the AC power adapter into the lead of the ERL-10 and into an AC outlet. The ERL-10 will power up. All of the LEDs will illuminate the indicator lights for 2 seconds then the EFM Data LED will start blinking rapidly, LD-250 data LED will blink once per second if connected. If the fault LED stays on, check EFM-100 power and connection or refer to Fault Code chart listed in Appendix A

6) After the ERL-10 is powered up, the USB driver install program can be found on the Boltek USB Flash Drive in the folder:**\USB_DRIVER**. If the driver does not install, check for latest drivers on our website here: https://boltek.com/downloads/erl-10

7) Run the ERL-10 program executable on the USB Flash Drive to install the Configuration, Monitor, and Data Viewer applications.

8) After installation has completed, run the Config application to set alarm parameters and click "Write config to ERL-10" to save settings to the ERL-10

9) If viewing alarm status on a PC or Laptop, run the Status Monitor software to view active alarms/all clear status.

Unless changed, once the ERL-10 is powered up, it goes into Survey Mode for a default time of 20 minutes. If no lightning activity is detected, then the All Clear status light will illuminate and normal operation of the device will begin.

Chapter 2

Software

ERL-10 display software installation

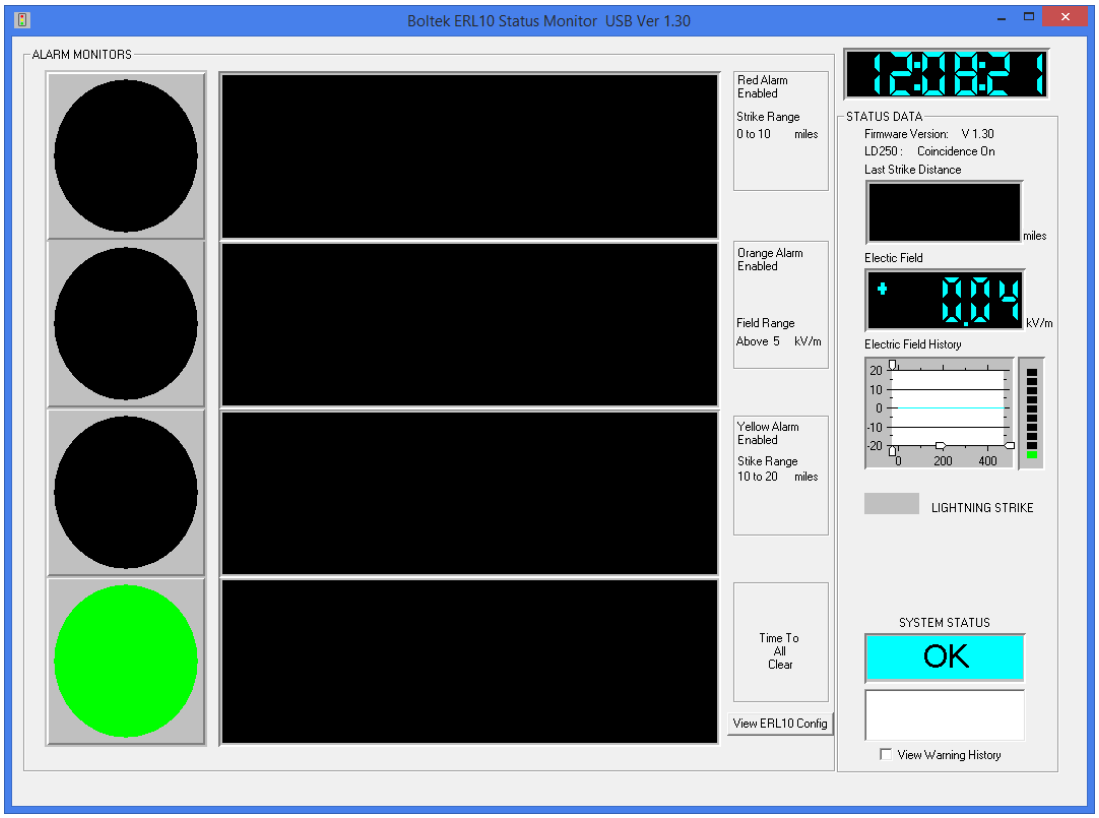


Figure 1: ERL-10 Status Monitor Display – All Clear state

Insert the provided Boltek USB Flash Drive into an available USB port. If the setup program does not run automatically, you can start it from the Windows **Run** command window and browse the USB drive for the **ERL10_V134_Install.exe** file (may vary if version number is different) and click open to start installation.

The software installation package installs three programs that work specifically with the ERL-10:

- **ERL10 Config** – Configures all of the alarm parameters along with enabling/disabling Coincidence mode, and relay switch states.
- **ERL10 Status Monitor** – Displays field reading, last strike distance, alarm status and configuration. A USB and RS485 connection version are both installed for convenience.
- **Event Viewer** – Opens archived daily data files created automatically from the Status Monitor software to view and analyze historical alarm and lightning activity.

ERL-10 USB driver installation

1) Plug the square end of the USB cable into the EFA-20, and the other end of the cable into an available USB port on a Laptop or PC.
2) Windows should automatically install the driver if there is an internet connection.

If the "Found New Hardware Wizard" appeared in step 1 or there is no active internet connection:

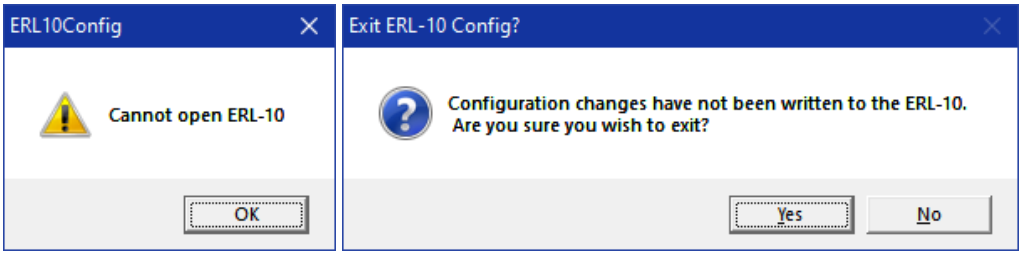
a) Click Cancel if Found New Hardware Wizard window pops up.
b) Insert EFM-100 Software USB Flash Drive and Open Computer (or My Computer) and go into USB Flash Drive. Open ***USB_DRIVER*** folder and run ***ERL10_USB_Driver_Install.exe***
c) Click Yes (or Continue) if Allow Changes to computer message pops up.
d) When Driver Setup window appears, click Next
e) Browse for a different installation folder or leave default folder then click Install
f) Setup will extract some files then click Next when USB Driver Installer window appears.
g) Read End User Agreement then select "I accept this EULA" and click Next
h) After the two drivers (BOLTEK CDM Driver Package & FTDI CDM Driver Package) have been successfully installed, click Finish

Click Close on Driver setup window, and installation is complete.

ERL-10 Alarm Configuration

After the hardware, drivers and software are setup and installed, the ERL-10 alarm parameters can be configured with the ERL10 Config software. The ERL-10 needs to be connected to the PC/Laptop with the USB cable in order to modify the alarm configuration.

If you see these message windows pop up when starting the Configuration Utility, click the OK button then click the Yes button.



Check the top of the ERL-10 relay module and verify that the power LED is on and the USB cable is properly connected.

To verify connectivity, confirm the correct firmware version (**1**), data scrolling in the USB Live Com Update Window (**2**) and if there are any faults (**3**). See figure below for example.

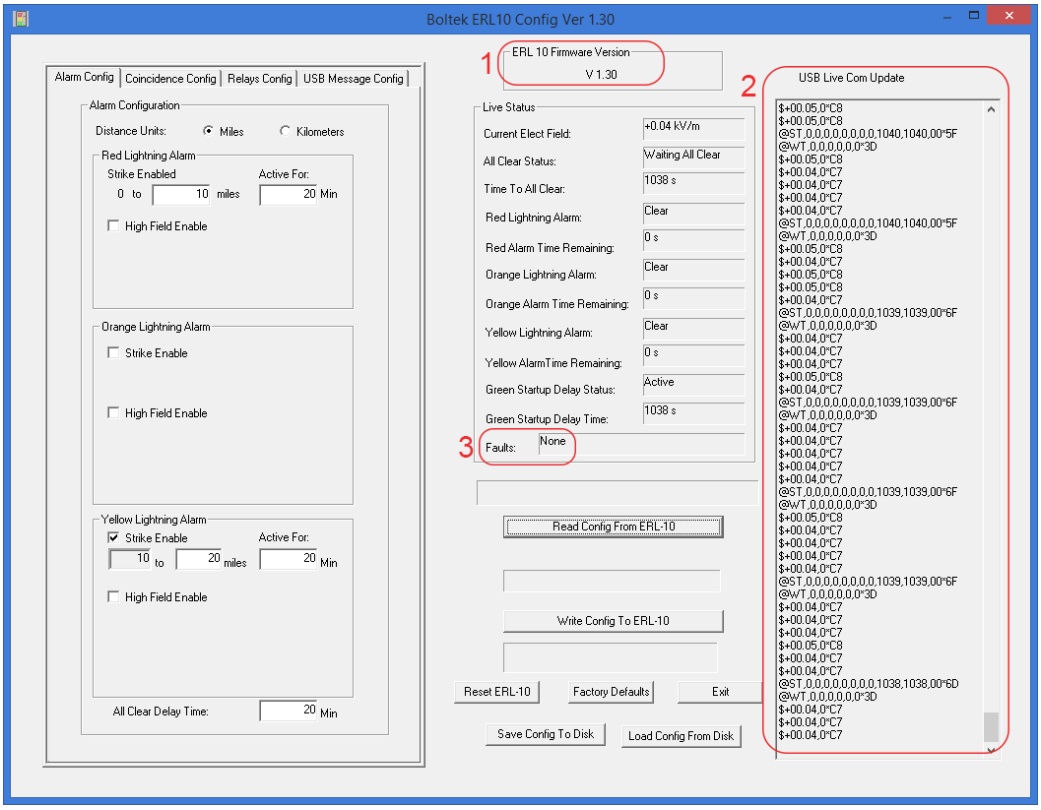


Figure 2: ERL10 Config Utility Window

Alarm Config tab settings

Distance Units

- Select Miles or Kilometers by clicking on the corresponding radio button

Red Lightning Alarm

- The Red strike alarm is always active and cannot be disabled.
- The ***Strike Enable*** distance box cannot be set to the same or exceed an Orange or Yellow enabled strike alarm distance. The set distance cannot exceed 20 miles/32km using just the EFM-100 sensor or 40 miles/64km with coincidence mode enabled.
- The ***Active For*** box sets the duration that the Red alarm will remain active when a strike is detected within the set distance range. This value can be set between 1 and 60 minutes.
- The ***High Field Enable*** box enables/disables a Red High Field alarm.
    - The ***Above*** box is used to set the desired magnitude of the electrical field to activate the alarm and represents the same positive and negative field levels. This value cannot be the same or less than an active orange or yellow high field alarm.
    - The ***Delay On*** time is the length of time the set electric field magnitude must remain above before the alarm is activated. If the electric field magnitude drops below the set point before the delay expires, the delay timer will be reset. This value can be set between 1 and 600 seconds.
    - The ***Active For*** box sets the duration that the Red alarm will remain active when this high field alarm is activated. This value can be set between 1 and 60 minutes.

Orange Lightning Alarm

- The Orange strike alarm can be enabled or disabled.
- The ***Strike Enable*** distance box cannot be set to the same or lower distance than the Red strike alarm. The set distance cannot exceed 20 miles/32km using just the EFM-100 sensor or 40 miles/64km with coincidence mode enabled.
- The ***Active For*** box sets the duration that the Orange alarm will remain active when a strike is detected within the set distance range. This value can be set between 1 and 60 minutes.
- The ***High Field Enable*** box enables/disables an Orange High Field alarm.
    - The ***Above*** box is used to set the desired magnitude of the electrical field to activate the alarm and represents the same positive and negative field levels. This value cannot be the same or lower than the active Yellow high field alarm level. It also cannot be set to the same level or higher than the Red high field alarm if enabled.
    - The ***Delay On*** time is the length of time the set electric field magnitude must remain above before the alarm is activated. If the electric field magnitude drops below the set point before the delay expires, the delay timer will be reset. This value can be set between 1 and 600 seconds.
    - The ***Active For*** box sets the duration that the Red alarm will remain active when this high field alarm is activated. This value can be set between 1 and 60 minutes.

Yellow Lightning Alarm

- The Yellow strike alarm can be enabled or disabled.
- The ***Strike Enable*** distance box cannot be set to the same or lower distance than the Red (or Orange if enabled) strike alarm. The set distance cannot exceed 40 miles or 64km.
- The ***Active For*** box sets the duration that the Yellow alarm will remain active when a strike is detected within the set distance range. The set distance cannot exceed 20 miles/32km using just the EFM-100 sensor or 40 miles/64km with coincidence mode enabled.
- The ***High Field Enable*** box enables/disables a Yellow High Field alarm.
    - The ***Above*** box is used to set the desired magnitude of the electrical field to activate the alarm and represents the same positive and negative field levels. This value cannot be higher than an active Red or Orange high field alarm level.
    - The ***Delay On*** time is the length of time the set electric field magnitude must remain above before the alarm is activated. If the electric field magnitude drops below the set point before the delay expires, the delay timer will be reset. This value can be set between 1 and 600 seconds.
    - The ***Active For*** box sets the duration that the Yellow alarm will remain active when this high field alarm is activated. This value can be set between 1 and 60 minutes.

All Clear Delay Time

- This timer represents the length of time to wait for no alarm activity until the Green All Clear status is enabled. If a strike or high field alarm triggers before this expires, the timer will reset. This value can be set between 1 and 60 minutes.

Coincidence Config Tab

This tab allows the user to enable or disable the coincidence mode feature of the ERL-10 when using both EFM-100 and LD-250 sensors.

Select ***LD250 Enable*** if the LD-250 lightning detector is connected to the ERL-10's RS232 connector. De-select (default) if no LD-250 is connected to the ERL-10. The Fault LED will illuminate if this option is enabled and the LD-250 lightning detector unit is powered off or not connected.

Relays Config Tab

This tab allows the user to program the normal state of the output relay switches for the Red Alarm Relay, Orange Alarm Relay, Yellow Alarm Relay, and Green All Clear Relay. The default setting is Normally Open for all relays. The switch states can be configured based on how the user hardware connected to the terminal block operates.

USB Message Config Tab

This tab displays what messages are transmitted from the ERL-10, these settings can't be modified

Configuration Buttons

The configuration buttons allow the user to send and read configurations to and from the ERL-10

Read Config From ERL-10
Displays last saved configuration parameters of the ERL-10. A message will appear above this button if any configuration changes have been made.

Write Config To ERL-10
Uploads and saves the parameters that are displayed in the configuration software to the ERL-10.

Reset ERL-10
Clicking this button will clear any active alarms and reset the power on the ERL-10.

Factory Defaults
This button will reconfigure the ERL-10 to its default parameters. If there are any active alarms, they will remain on after clicking this button.

Save Config To Disk
This button saves the current configuration parameters to a data file on the PC or Laptop. This is useful when running multiple sites. Once saved, the file can then be emailed or saved on a flash drive or disk to be loaded on another ERL-10. You can also save multiple files when testing for different parameters.

Load Config From Disk
This is used for loading previously saved configuration files. There are eight pre-configured files that come with the ERL-10 software package for convenience:

- 2AlarmStrikeAndFieldWithCoincidence.cfg
- 2AlarmStrikeAndFieldWithNoCoincidence.cfg
- 2AlarmStrikeWithCoincidence.cfg
- 2AlarmStrikeWithNoCoincidence.cfg
- 3AlarmStrikeAndFieldWithCoincidence.cfg
- 3AlarmStrikeAndFieldWithNoCoincidence.cfg
- 3AlarmStrikeWithCoincidence.cfg
- 3AlarmStrikeWithNoCoincidence.cfg

Exit
Closes the ERL-10 Config program.

ERL-10 Status Monitor

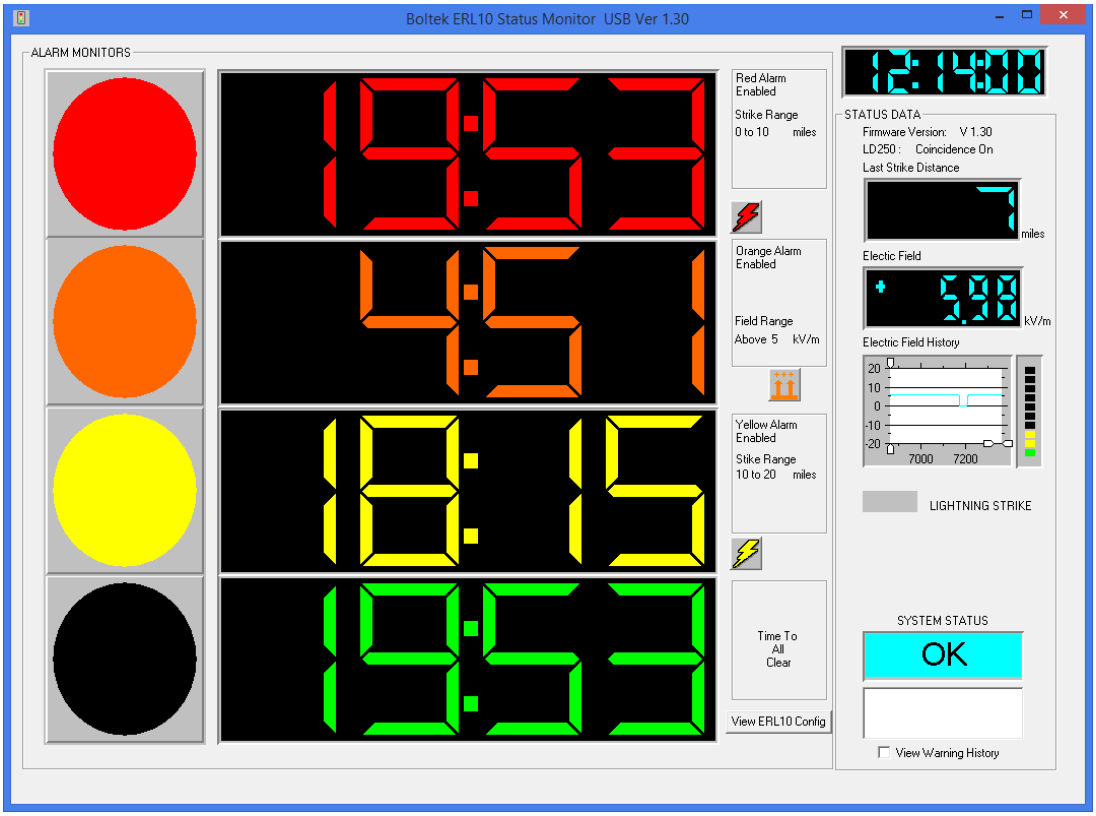


Figure 3: ERL-10 Status Monitor Display - Active Alarms State

Alarm Monitors

Displays the alarms that are enabled on the ERL-10 as well as any active countdown timers and their respective parameters.

View ERL10 Config

Displays all of the current configuration status of the ERL-10. This display is read only and parameters cannot be changed in this window.

Status Data

Displays ERL-10 firmware version of the ERL-10, coincidence mode on or off along with the last strike distance detected and current electric field levels. There are slider bars on the Electric Field History window that can be used to zoom in and out of the graph. The Lightning Strike box will flash the corresponding alarm color when a strike is detected within each set distance parameters. System Status box will display OK if everything is running properly, or it will display Fault if there is a communications error or other fault with the ERL-10.

View Warning History

Displays a timestamped historical display of the current day's relay activity. Activity is only recorded while the Status Monitor software is running.

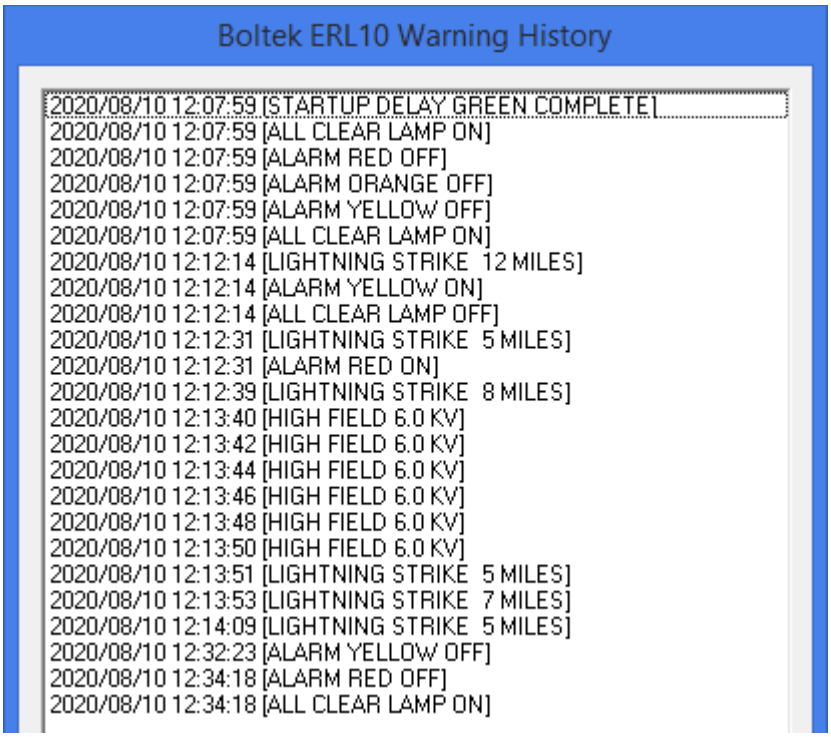


Figure 4: Warning History Log

Configure SMS & Email Alerts

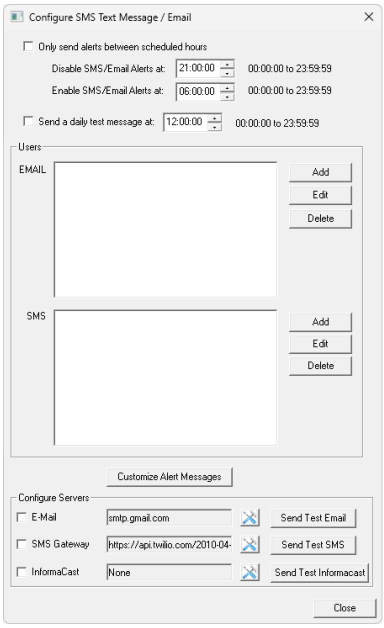


Figure 5: Email & SMS Alerts

Alarm Checkbox

Select the messages you wish to receive. ***Active*** will send messages when an alarm or fault is first triggered, ***Clear*** will send messages after the selected alarm(s) are cleared based on the settings input for the **High**, **Very High**, and **Lightning** alarm settings.

Scheduled Daily Status

Enable this option and set a time for the software to send a daily message to confirm proper operation of the EFM-100 and software without having to do a manual check. Disable this option if you do not wish to receive a daily notification.

E-mail Recipients

Click the **Add** button to enter a new email recipient for receiving the activated alert messages. To change or remove an existing recipient, first select the email address to highlight, then click **Edit** to change, or **Delete** to remove email address.
Up to 50 E-mail recipients can be added to the list.

SMS Recipients

Click the **Add** button to enter a new cell phone number for receiving the activated alert messages. To change or remove an existing contact, first select the phone number to highlight, then click **Edit** to change, or **Delete** to remove it from the list.
Up to 50 SMS recipients can be added to the list.

Email Configuration

Select the E-Mail checkbox to enable email alerts. Click on the settings icon 
to configure the outgoing email server. After details are input, click Accept to save settings.

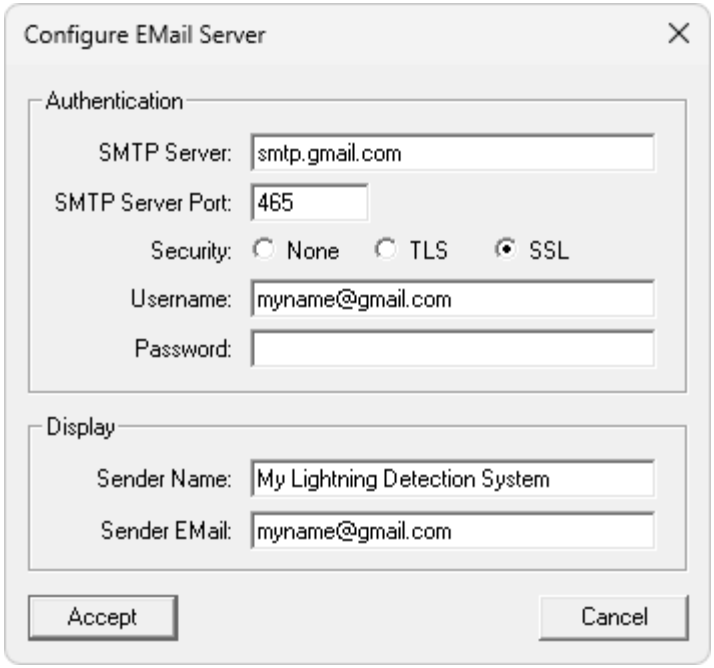


Figure 6: Outgoing email server settings

Authentication: Refer to your internet provider or network administrator for this information.
Display: Enter the name and email address to be shown on the email alerts, they can be valid or fake names and are for display purposes only.
After details are input, click Accept to save settings.

SMS by Gateway
Note!: An account with Twilio needs to be setup in order to use the SMS Alerts

Select the SMS by Gateway checkbox to enable alerts to be sent through a Click-A-Tell account. Click on the settings icon to enter Account SID, Authorization Token, and Twilio phone number.

Figure 7: SMS Gateway Settings

Click **Accept** button to save the current settings or **Cancel** to close Configure without saving the settings.
To verify that the Alert settings are properly setup, click on the test button for that mode.

After all the alarm and alert settings have been setup, click the Accept button to save the current configuration of the ERL-10 Options

ERL-10 Event Viewer

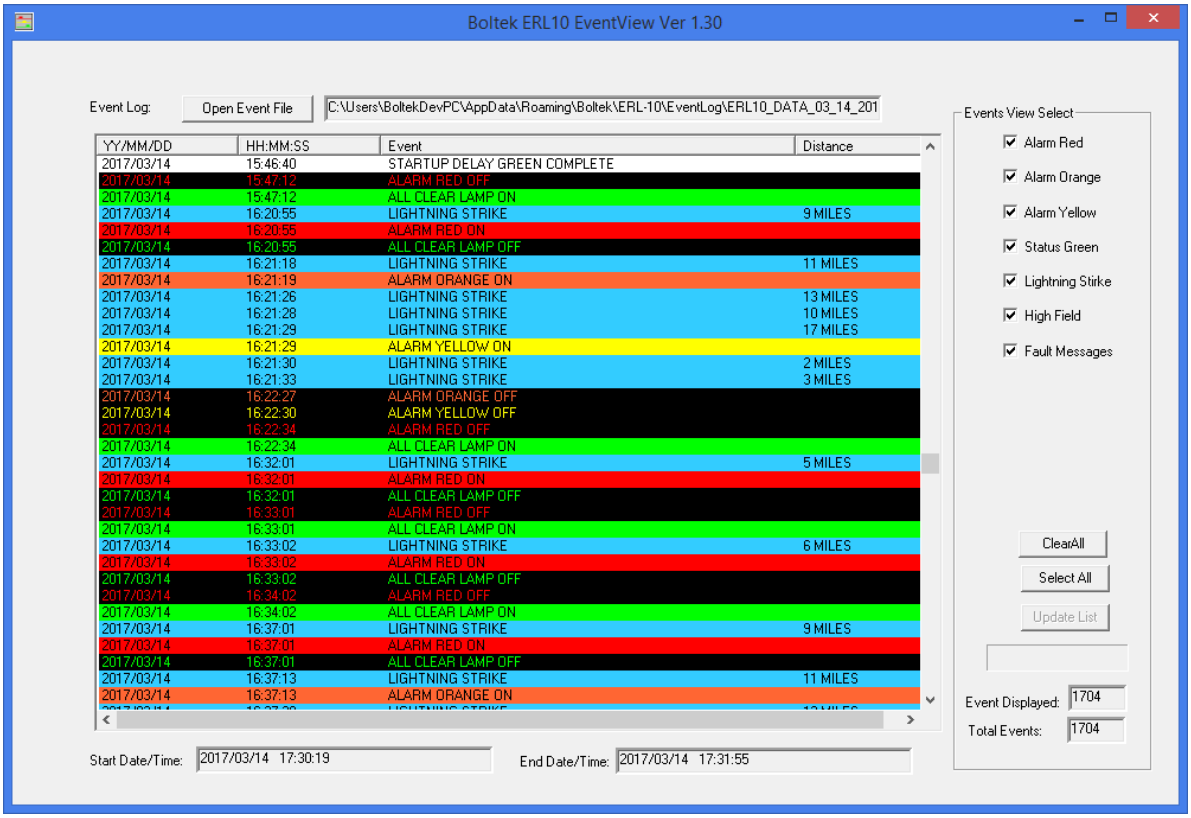


Figure 8: Historical Event Viewer

The event viewer is used to display historical alarm and lightning strike activity. A daily data file is automatically created and updated by the ERL10 Status Monitor program while it is running. The ERL-10 Output Relay Module does not store data and historical activity cannot be retrieved if the software is not running.

Open Event File

Click this button to open an historical data file. Select the preferred file to view activity for that day. A window with a graph will pop up

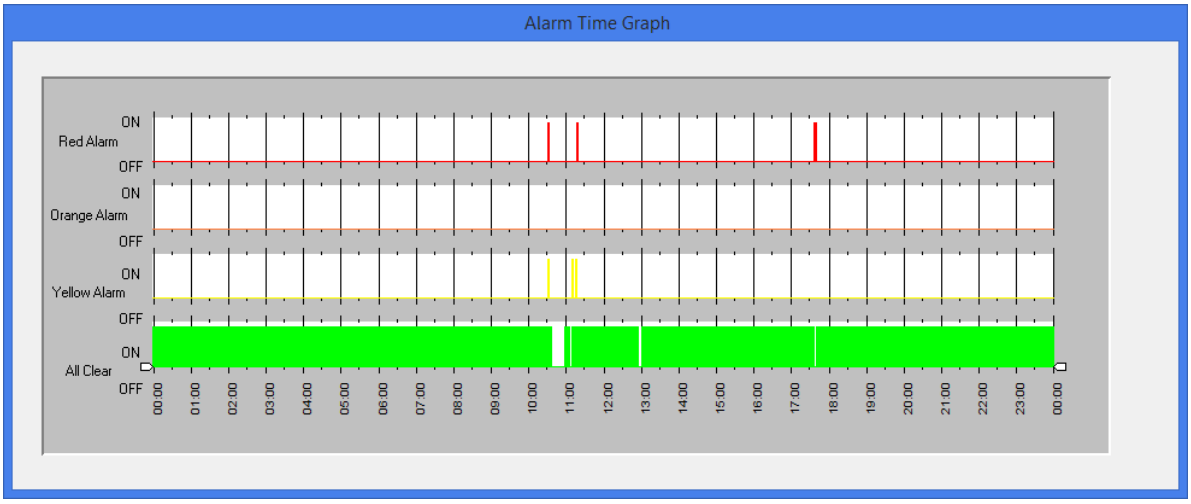


Figure 9: Alarm Time Graph

Zoom handles are located at the bottom of the graph to expand a time frame of interest for an easier view when looking at the relay state changes.

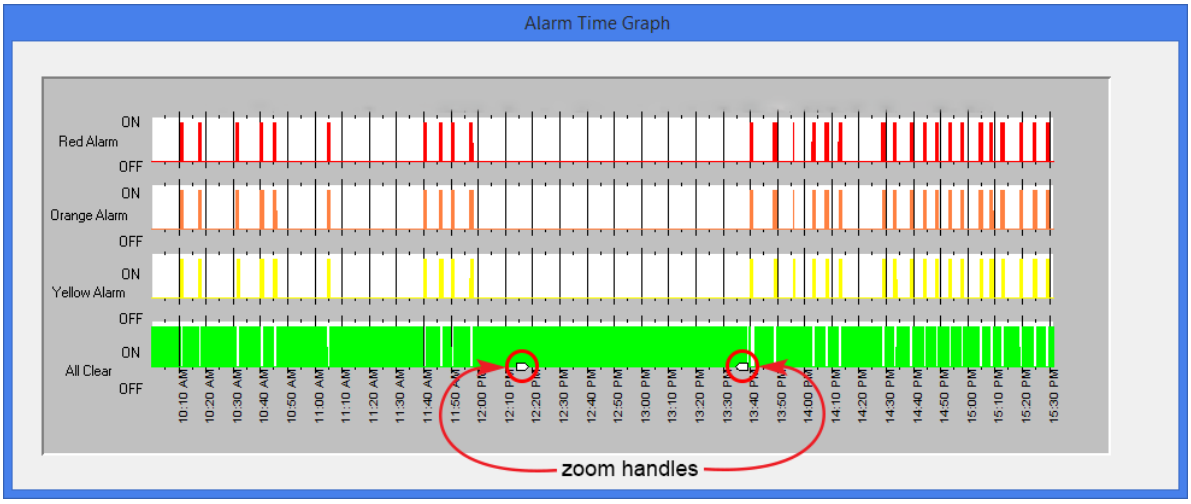


Figure 10: Alarm Time Graph Zoomed In

Chapter 3

Operation

Operation Modes

The ERL-10 can be configured to activate up to three alarm levels, with either a single sensor (EFM-100) or two sensors (EFM-100 & LD-250). It can also be used as a stand-alone device, with external devices connected to the relay contacts, or connected to a PC/Laptop. Alarm status is always shown with the LED's on the top of the ERL-10 and can also been seen with the ERL-10 status monitor software when connected to a PC/Laptop through USB or RS485 connection.

Coincidence Mode
This mode will receive data from both the EFM-100 and LD-250 to virtually eliminate any false strikes that may occur with precipitation noise or objects that could interfere with the normal operation of the EFM-100. Coincidence mode is only applicable within the EFM-100 detection range (0-20 miles/0-32km). Lightning strike detection can be extended further than the EFM-100 range in this mode, in which case would only be detected by the LD-250 and could be subject to false strikes. High electrical field alarms can also be set which are measured by the incoming EFM-100 data.

Single Sensor Mode (Non Coincidence)
This mode will receive data from only the EFM-100 and will activate high field alarms or lightning strike alarms set up to 20 miles (32km) away. Single sensor mode is also liable to display false strikes from heavy precipitation or other objects that could interfere with the normal operation of the detector.

Input Power Setting

12V/24V Input

The ERL-10 can be configured for 12VDC or 24VDC power input. This is pre-configured with jumpers on the ERL-10 circuit board during assembly. Voltage input is labeled on the top of the ERL-10 case.

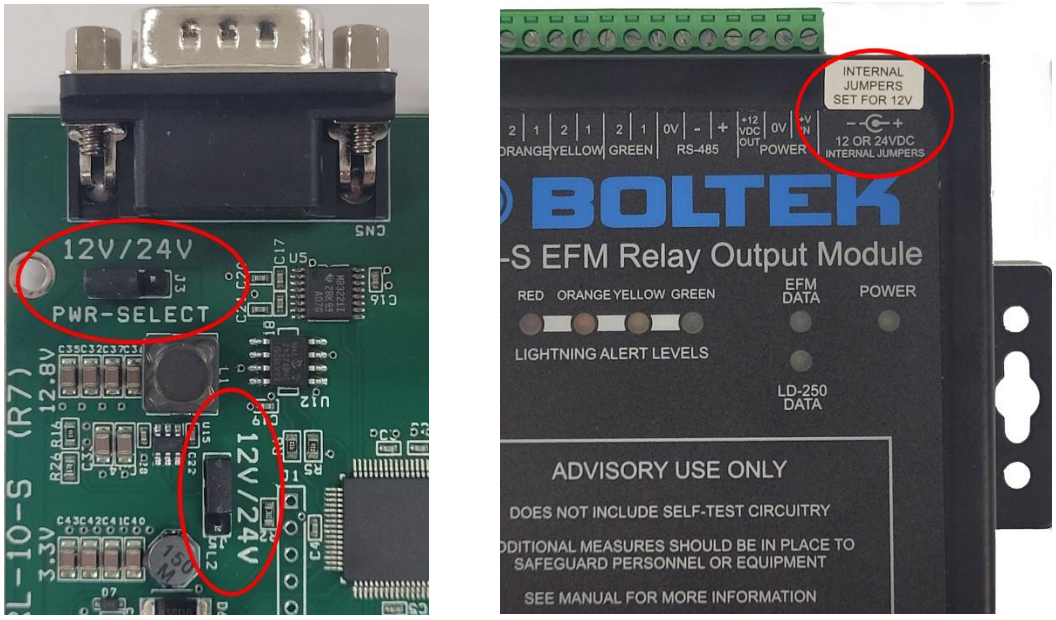


Figure 11: 12V/24V Input Jumper Settings

Overview of the ERL-10 Kit-2 dual sensor lightning detection system

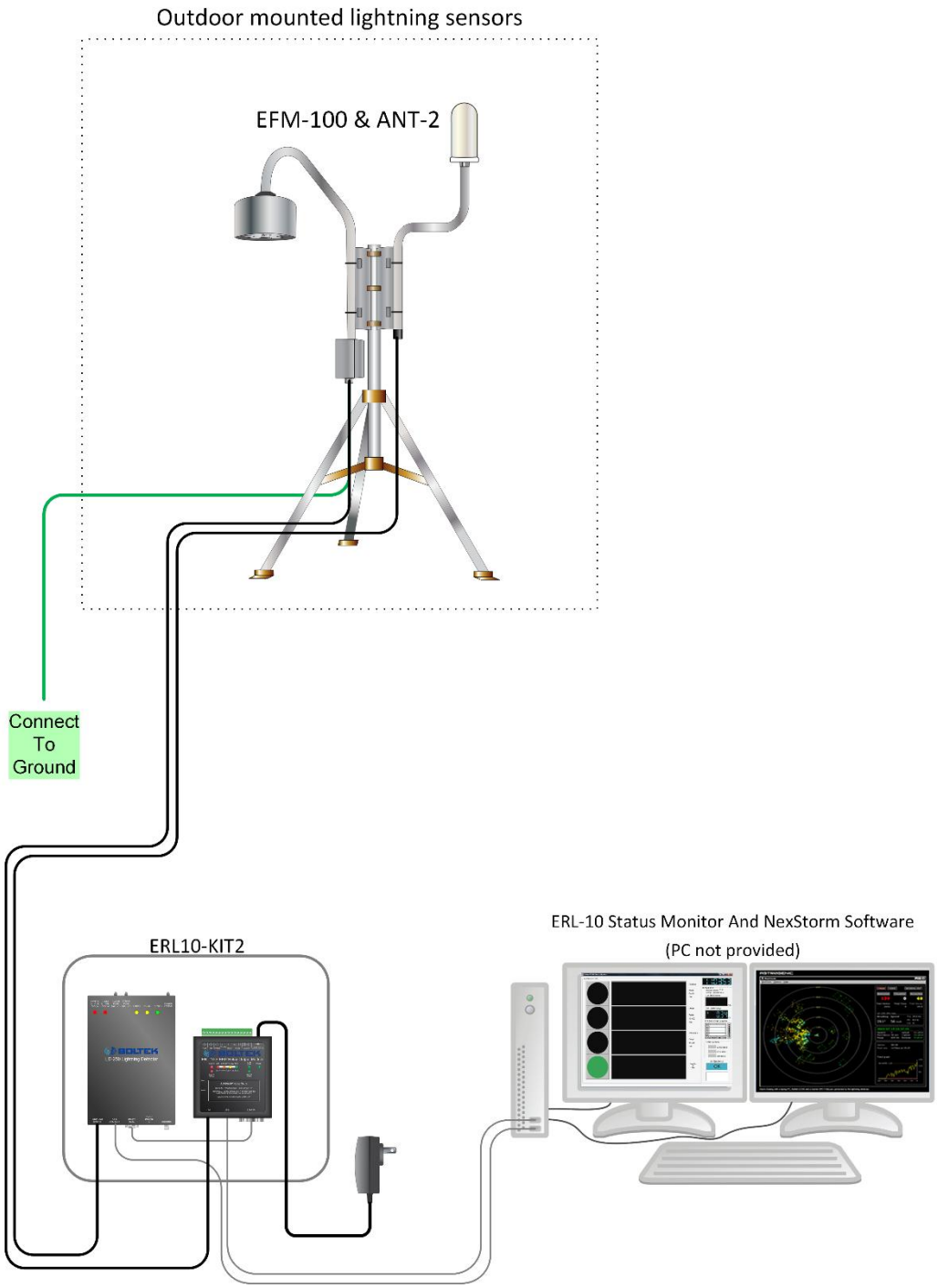


Figure 12: ERL-10 Kit-2 with USB Connection.

Overview of the ERL-10 Kit-1 single sensor lightning detection system

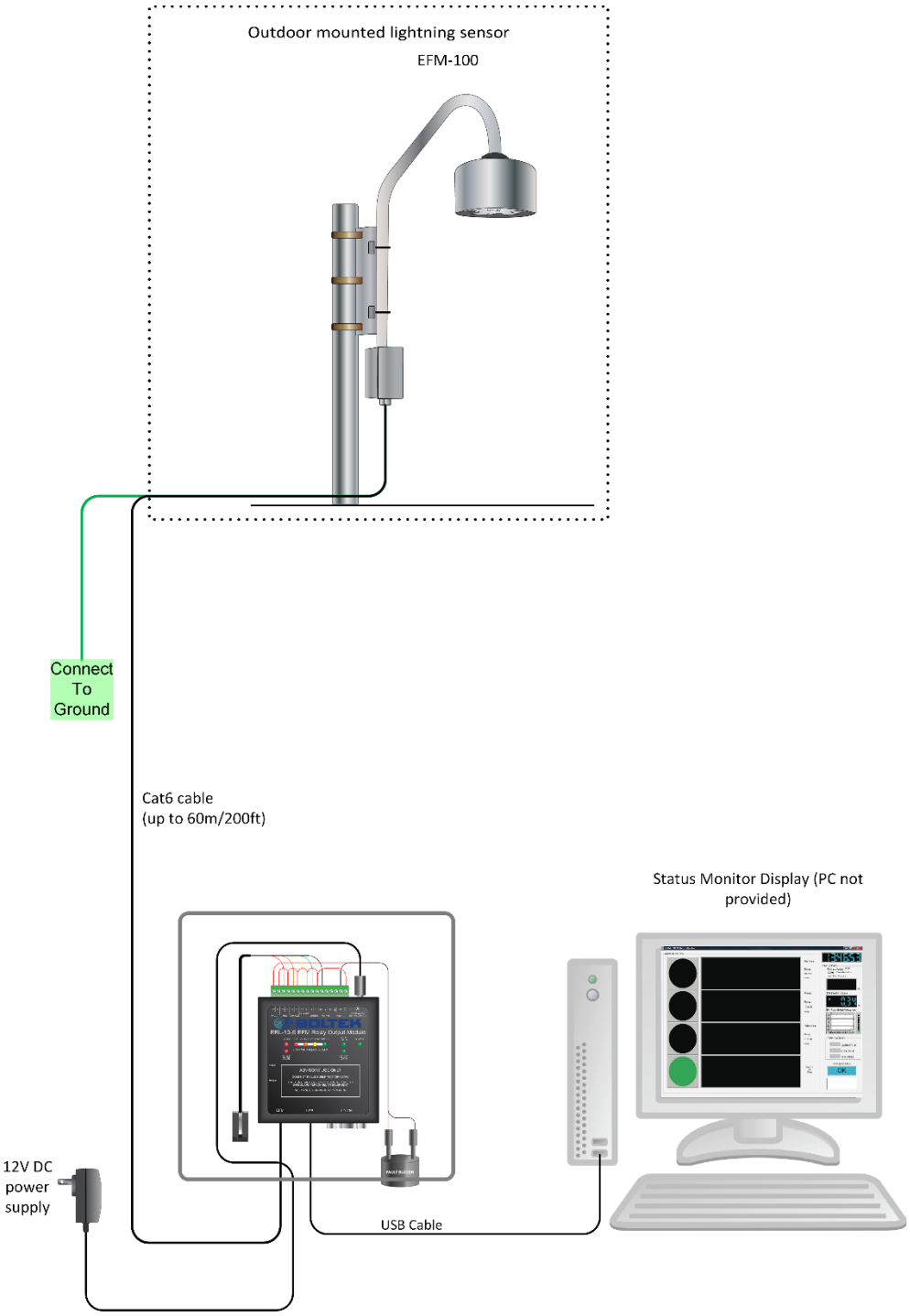


Figure 13: ERL-10 Kit-1 with USB.

Connectors

EFM
Connect the Cat6 Cable from the EFM-100C sensor into the EFM RJ45 connector

USB
Connect the provided USB cable here and attach other end to an available USB port on a Laptop or PC. This connection is needed to display lightning strikes and alarm status on the ERL-10 software.

LD-250
Connect the DB9 cable from the LD-250 RS232 port to the ERL-10 RS232 port. This is needed when coincidence mode is enabled.

Power
Connect supplied 12V or 24V DC power supply to this connector

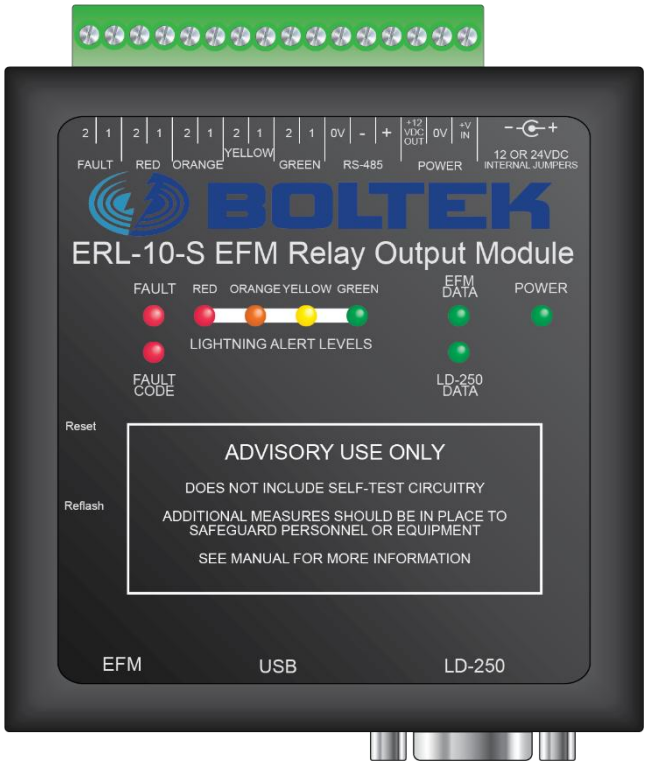


Figure 14: ERL-10-S Top View

Front Panel LEDs

POWER LED
The power LED illuminates when the 12V power is present on the ERL-10. If the LED does not light when the unit is plugged into a power source check your 12V power supply or outlet.

EFM DATA LED
The EFM DATA LED flashes when data is transmitting from the EFM-100 to the ERL-10 either through the fiber optic cable, or the RS485 connection (if using the EFM-100-RS485 model).

LD-250 DATA LED
The LD-250 DATA LED will flash as data transmits through the RS232 serial port when the optional LD-250 is connected and coincidence mode is enabled in the configuration software.

GREEN LED
The GREEN LED will stay illuminated when there is no lightning or high electrical field activity detected. The GREEN LED will turn off as soon as an active alarm is triggered in any of the ranges.

YELLOW LED
The YELLOW LED will illuminate when a strike or high field alarm is detected based on the settings entered in the configuration software until no further activity is detected within the set active time.

ORANGE LED
The ORANGE LED will illuminate when a strike or high field alarm is detected based on the settings entered in the configuration software until no further activity is detected within the set active time.

RED LED
The RED LED will illuminate when a strike or high field alarm is detected based on settings entered in the configuration software until no further activity is detected within the set active time. The Red lightning alarm is always on for strike activity and cannon be disabled, however the Red high field alarm can be enabled or disabled in the configuration software.

FAULT LED
The FAULT LED will illuminate and stay on when a problem with the ERL-10 is detected.

FAULT CODE LED
The FAULT CODE LED will flash a number of times then pause and repeat if there is a failure. Refer to fault code table below for description.

Fault Description	# of blinks
EFM-100 NO DATA	1
LD-250 NO DATA	2
EFM-100 ROTOR FAULT	3
EFM-100 SELF TEST ERROR	4
EFM-100 SYNTAX ERROR	5
EFM-100 CHECKSUM ERROR	6
EFM-100 UNKNOWN ERROR	7
ERL-10 RESET FAULT	8
ERL-10 CONFIGURATION ERROR	9
LD-250 SYNTAX ERROR	10
LD-250 CHECKSUM ERROR	11
LD-250 UNKNOWN ERROR	12

Table 1: Fault Codes

Appendix A

USB/RS485 Messages

Electric Field Sentence
Transmitted by the EFM-100 twenty times per second over fiber optic or RS485 (as configured by the jumpers in the ERL-10)

$<p><ee.ee>,<f>*<cs><cr><lf>

<p> - polarity of electric field + or -
<ee.ee> - electric field level 00.00 to 20.00
<f> - fault 0: Normal, 1: Rotor Fault
<cs> - checksum in hex 00 to FF
<cr> - carriage return
<lf> - line feed

Example:
$+00.33,0*C9 Represents 0.33kV/m with no faults.

High Field Sentence
Transmitted when an active high field alarm level is detected longer than set delay time.

@HF, <p><ee.ee>*<cs><cr><lf>

<p> - polarity of electric field + or -
<ee.ee> - electric field level 00.00 to 20.00
<cs> - checksum in hex 00 to FF
<cr> - carriage return
<lf> - line feed

Example:
@HF,-05.00*C9 Represents a high field alarm was triggered at -5kV/m.

Strike Sentence
Transmitted when a strike is detected within a set distance range.
@LI,<ddd>,<uuu>*<cs><cr><lf>

<ddd> - strike distance 0-300 miles
<uuu> - unit of distance (Km, Miles)
<cs> - checksum in hex
<cr> - carriage return
<lf> - line feed

Example:
@LI,06,Miles*B7 Represents a strike that was detected 6 miles away.

Status Sentence

@ST,<r>,<o>,<y>,<g>,<ac>,<tr>,<to>,<ty>,<tg>,<tac>,<fc>*<cs><cr><lf>

<r> - red alarm status (0: not active, 1: active)
<o> - orange alarm status (0: not active, 1: active)
<y> - yellow alarm status (0: not active, 1: active)
<g> - startup green delay status (0: not active, 1: active)
<ac> - all clear green status (0: not active, 1: active)
<tr> - red alarm timer count 0-3600 seconds
<to> - orange alarm timer count 0-3600 seconds
<ty> - yellow alarm timer count 0-3600 seconds
<tg> - startup green delay timer count 0-3600 seconds
<tac> - all clear green timer count 0-3600 seconds
<fc> - fault code (see fault code data output table for description)
<cs> - checksum in hex
<cr> - carriage return
<lf> - line feed

Example:
@ST,1,0,1,0,0,86,0,87,81,87,00*2C
Represents an active red and yellow alarm status with red alarm to clear in 86 seconds, yellow alarm to clear in 87 seconds, green status startup delay of 81 seconds remaining, 87 seconds remaining until all clear status, and no fault codes present.

Timer Warn Sentence

@WT,<trs>,<tos>,<tys>,<trf>,<tof>,<tyf>*<cs><cr><lf>

<trs> - red strike alarm timer count 0-3600 seconds
<tos> - orange strike alarm timer count 0-3600 seconds
<tys> - yellow strike alarm timer count 0-3600 seconds
<trf> - red electric field alarm timer count 0-3600 seconds
<tof> - orange electric field alarm timer count 0-3600 seconds
<tyf> - yellow electric field alarm timer count 0-3600 seconds
<cs> - checksum in hex
<cr> - carriage return
<lf> - line feed

Note: If there is more than one fault, the sum of the codes will be transmitted

Fault Description	Output String Code (HEX)
EFM-100 NO DATA	01
LD-250 NO DATA	02
EFM-100 ROTOR FAULT	04
EFM-100 SELF TEST ERROR	08
EFM-100 SYNTAX ERROR	10
EFM-100 CHECKSUM ERROR	20
EFM-100 UNKNOWN ERROR	40
ERL-10 RESET FAULT	80
ERL-10 CONFIGURATION ERROR	100
LD-250 SYNTAX ERROR	200
LD-250 CHECKSUM ERROR	400
LD-250 UNKNOWN ERROR	800

Table 2: Fault Code Data Output.

Appendix B

Specifications

ERL-10 Hardware Specifications

Power Supply Voltage:	11.8-18 VDC, 0.8 Amp
AC Adapter:	120V AC, 60Hz or 220V AC, 50 HZ (International)
USB Port:	1.0/2.0 Compatibility
RS485 Input Data Format:	ASCII, NMEA style data sentences 9600 baud, 8N1
RS485 Output Data Format:	ASCII, NMEA style data sentences 115200 baud, 8N1
ERL-10 Dimensions / Weight:	5.0" x 6.5" x 1.5" (127 x 165 x 38 mm) 0.8 lbs (375 gm)
Shipping Dimensions / Weight for ERL-10 module:	9.0" x 6.5" x 2.75" (229 x 165 x 70 mm) 3 lbs (1.4kg)
Shipping Dimensions / Weight for ERL-10 Kit-1:	30" x 24" x 11" (762 x 610 x 280 mm) 25 lbs (11 kg)
Shipping Dimensions / Weight for ERL-10 Kit-2:	30" x 24" x 11" (762 x 610 x 280 mm) 30 lbs (13.6kg)

Software Specifications

Operating Systems:	Windows 11, 10,8, 7 (32/64 bit)
Alarm Distance Ranges (non Coincidence mode):	0 to 20 mi (0 to 32 km)
Alarm Distance Ranges (Coincidence mode):	0 to 40 mi (0 to 64 km)
High Field Alarm Ranges:	0 to 20 kV/m