Front Matter

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“International Tower Lighting, LLC”, “ITL, LLC”, MON-800, MON-805, MON-830, MON-920-LAN, MON-930, MON-940, ITL-920-LAN, ITL-0930, ITL-0940, ITL-0950, ADP OnSite, ADP Lite, ADP Standard, and ADP Enterprise, and the ITL logo are all trademarks of ITL, LLC. All other trademarks and brand names are the property of their respective proprietors.

Limited Warranty and Disclaimer

ITL, LLC guarantees that every MON-950 monitoring system is free from physical defects of material and workmanship under normal use for one (1) year from the date of purchase. If the product proves defective during this warranty period, please contact ITL, LLC in order to obtain a Return Authorization Number, RMA.

In no event shall ITL, LLC’s liability exceed the price paid for the product from direct, indirect, special, incidental, or consequential damages resulting from the use of the product, its accompanying software, or its documentation. ITL, LLC makes no warranty or representation, expressed, implied, or statutory, with respect to its products or the contents or use of this documentation and all accompanying software, and specifically disclaims its quality, performance, merchantability, or fitness for any particular purpose unless otherwise stated.

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Please send any comments regarding the manual to support_doc@itl-llc.com.

Safety Warning
This equipment uses lethal voltages which can cause serious injury and/or death. Do not attempt to service this equipment with line power applied.

Never rely on just one switch to power down a high voltage supply. Measure for voltages using a voltmeter to ensure that power is off and has been completely removed.

Do not wear any jewelry when servicing this equipment. Gold and silver are excellent conductors of electricity.

**Battery Warning and Disposal**

There is danger of explosion if the included sealed lead-acid battery is replaced incorrectly. Only replace the battery with the same or equivalent type recommended by the battery manufacturer. Dispose of used batteries according to the battery manufacturer’s instructions.

Do not incinerate, disassemble, or puncture the battery.

For questions or details please contact The Battery Council International at (312) 664-6610, or your local waste agency.
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Introduction

Congratulations, and thank you for choosing an ITL monitoring system.

We trust that ITL's reputation for technical excellence, experience in product development, commitment to our customers and testing will ensure your complete satisfaction.

You have chosen one of the most technologically innovative monitoring systems for monitoring tower lighting systems available on the market today. This product is the result of many years of engineering with extensive input from field service personnel.

This manual covers both, the MON-0950-000 hardwired Ethernet based system and the MON-0950-DIGI wireless monitoring system.

Please take the time to read and familiarize yourself with this manual. It contains the information necessary to install, test and troubleshoot the MON-950 monitoring system.
Product Description

ITL’s MON-950 systems are designed to provide complete monitoring solutions for all types of tower lighting systems. The monitoring system’s rich set of features is directly applicable to monitoring any type of strobe lighting system and red light controller system.

All MON-950 controllers are SNMP enabled and support SNMP v1 and SNMP v2c capabilities to allow for M2M communication. Additionally, the system has built-in web pages to provide a more intuitive human interface and is supported by most web browsers. The web pages include pre-defined templates for the most common tower lighting configurations for quick and reliable installation.

The MON-950 systems have ten dry-contact inputs for monitoring tower lighting system’s alarm and status relays as well as door switches, generators and other equipment suitable for dry-contact monitoring. The tower lighting system’s photocell is monitored and may be over-ridden remotely when needed. Both resistive and 120VAC powered photocells are supported. The MON-950 systems are pre-cabled for up to five dry-contact inputs and battery backup is included as a standard feature.

Both, hardwired Ethernet connection and wireless modem communication are supported.

Typical wireless applications include the use of a secure software tunnel provided by a third party for communication between the MON-950 (Agent) equipment and network management system (NMS) or SNMP manager.
Specifications

Environment

Temperature
-40ºC to +55ºC

Humidity
less than 95% relative humidity (non-condensing)

Mechanical

Enclosure

Dimension
- Height: 15.32” (389mm)
- Width: 13.30” (338mm)
- Depth: 7.00” (178mm)

Weight
14 lbs (6.4Kg) max

Electrical

Model: MON-950-000

Input Power
120/240VAC at 60Hz, 12VA (max.)

Suppression
- 45 Joule, 275V, Input Power, Photocell
- 45 Joule, 275V, Input Power, Photocell
- 23 Joule, 275V, Dry Contact Inputs

Relay Outputs
120/230 VAC, 1 Amp, Form-C

Model: MON-950-24V (Option Available Upon Request)

Input Power
24VDC

Suppression
- 23 Joule, 275V, Dry Contact Inputs

Relay Outputs
120/230 VAC, 1 Amp, Form-C

Communication Module

Digi Connect WAN
Digi WR21
Installation

The following section describes how to install the MON-950 series monitoring system. Based on the type of system you are going to install please refer to the appropriate wiring diagram in section *Wiring Diagrams*.

Unpacking your Monitoring System

Please examine the shipping containers and their content thoroughly upon receipt and report any potential shipping damage to the carrier.

Tools for Installation

The following tools are suggested for mounting of the ITL monitoring system and satellite.

- Digital multi-meter capable of reading 600VAC/DC (Fluke 177 or 179)
- Nut Drivers and Sockets
- #2 Phillips Screwdriver
- 5/16 Flat Head screwdriver
- Crimp Tool
- Needle Nose Pliers
Quick Installation Guide

The quick start guide shows how to install the MON-950 series monitoring systems. The guide provides only basic instructions to personnel familiar with these type of installations. For more details, refer to this document.

- Remove packaging material
- Determine make of existing tower lighting controller and select appropriate installation diagram from this manual
- Connect MON-950 to tower lighting controller to be monitored using supplied harness
- Apply power to unit
- All input LEDs should be on solid or blinking
- Determine unit’s IP number from either the LCD display
- Use web browser to configure basic network settings
Mounting Enclosure Panel

The MON-950 should be mounted to a properly grounded H-frame or a structure which provides a direct low impedance connection to earth ground.

The mounting cannot obstruct access to the monitoring system’s internal components for the purpose of installing and maintaining the equipment. The following diagrams detail the mounting dimensions and clearance for proper access.

Mounting Details for the Enclosure Panel

![Diagram showing mounting details and dimensions of Enclosure Panel]

*Figure 1: Mounting Details and Dimensions of Enclosure Panel*
Circuit Board

The following sections detail the MON-950 internal circuit board assembly.

1. ITL-0950 Circuit Board Assembly

Figure 2: ITL-0950 Circuit Board
A. Ethernet connection

Figure 3: ITL-0950 Ethernet Connection

B. Battery connection

Observe polarity when connecting and disconnecting the battery. Note all battery warnings in the Safety Warning section.

Figure 4: ITL-0950 Battery Connection
C. Digi Modem Connection

Observe polarity when connecting and disconnecting the modem’s power cord to the circuit board.

Figure 5: ITL-0950 Wireless Modem Connection
2. LED Indicators

A. Communication and Mode

The Day/Nite LEDs will indicate the actual operating mode of the MON-950. Under normal conditions the board will follow the state of the PEC and/or Photocell inputs.

For diagnostics purposes the normal operating mode can be changed manually with the on-board Manual Mode Switch. The board will follow the Manual Mode Switch if it is not in Auto mode and blink the corresponding LEDs, indicating that it is no longer following the PEC / Photocell inputs. The Manual Mode Switch will automatically time out after 8 hours, the LEDs will stop blinking, and the board will revert to following the PEC and/or Photocell inputs.

The MON-950’s operating mode can also be overridden remotely in which case the LEDs will also blink. This special mode will not time out since it can be changed remotely.

Both special modes will through an exception, i.e. send SNMP traps if enabled, and/or report alarms to ADP if available.

Figure 6: ITL-0950 Communication Status LEDs
B. Inputs and Output Relays

![Image of circuit board with labeled components]

**Figure 7: ITL-0950 Dry Contact Input LEDs, Output Relays & LEDs**

C. Indicator Function

<table>
<thead>
<tr>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUTS 1-10</td>
<td>Flashing – Alarm&lt;br&gt;Steady – Status Input Active / Enabled&lt;br&gt;Off – No Alarm / Status Input Not Active / Disabled</td>
</tr>
<tr>
<td>OUTPUTS 1 &amp; 2</td>
<td>On when output relay energized</td>
</tr>
<tr>
<td>DAY MODE</td>
<td>Steady – Day mode operation via photoelectric cell&lt;br&gt;Flashing – Day mode operation via remote over-ride or manual mode switch</td>
</tr>
<tr>
<td>NITE MODE</td>
<td>Steady – Night mode operation via photoelectric cell&lt;br&gt;Flashing – Night mode operation via remote over-ride or manual mode switch</td>
</tr>
<tr>
<td>TXD</td>
<td>On when the MON-950 transmits data</td>
</tr>
<tr>
<td>RXD</td>
<td>On when the MON-950 receives data</td>
</tr>
<tr>
<td>DCD</td>
<td>Status of Data Carrier Detect</td>
</tr>
<tr>
<td>CON</td>
<td>On when the MON-950 establishes a communication connection</td>
</tr>
</tbody>
</table>

**Figure 8: ITL-0950 Indicator Lights Description**
Input Connections

Figure 9: ITL-0950 Connections
Web Pages

The MON-950 has a built-in web pages for a more intuitive human interface. The web pages can be accessed with most web browsers by directly typing in the device’s IP address into the browser’s address bar. The IP address is indicated on the MON-950’s on-board the LCD display. An example on how to access the product via a web browser is shown below:

![Figure 10: Web Browser Address Bar](image-url)

---

*Figure 10: Web Browser Address Bar*
Alarm Page

The alarm page contains status of all input alarms, along with power, battery, remote override and PEC/Photocell status. Each entry will either indicate 'none' if no alarm exists or a timestamp when the alarm occurred. Additionally, an either Open or Closed state is indicated where applicable.

Alarms can be reset from this page.

The Alarm descriptions match the selections from the Input Configuration page. Table entries which are grayed indicate disabled inputs.

Figure 11: Alarms Page
PEC / Photocell

The PEC/Photocell page displays the system’s operating mode along with PEC, Photocell, Manual Mode Switch and Remote Override Status. The system’s mode can be changed remotely through this page if needed for test purposes or in case of a PEC/Photocell failure.

The page also indicates the last time the system switched from Day to Night Mode, Night to Day Mode and the last time power has been restored to the controller.
Input Configuration

The Input Configuration page provides access to the MON-950’s built-in templates for selecting different manufactures’ lighting systems to match this manual’s included installation diagrams. Once a template has been selected those inputs cannot be further changed with the exception of the Input Delay. All remaining unused inputs can be disabled or assigned to monitor additional devices’ dry contacts.

Custom Input Strings that have been saved will be listed in the top ten spots of the Menus on each input.

Copper Theft alarm will take over the contact for Output 2 giving connections for user supplied external sirens and/or lights.

This page will require a password to access. The default factory login/password is admin / itl

Figure 13: Input Configuration Page
Custom String Configuration

The Custom String Configuration page provides access to the MON-950’s ten optional user defined alarm strings. If a Custom input is needed the user can name and set the severity of the input choice. Once a name and severity have been added the user must save and this will allow them to select it on the dropdown menu from the Input Configuration page.

This page will require a password to access. The default factory login/password is admin / itl

Figure 14: Input Configuration Page
Output / Modem Control

This page provides access to the MON-950’s two Form-C output relays which can be utilized as needed for custom applications. For convenience a custom description can be added to further detail the function of each relay.

The page also controls how long the modem (if connected) should remain on after a primary power loss. By default, the MON-950 will shut the modem down 10 minutes after a power loss in order to extend the time the unit can operate without draining the battery. As long as primary input power is not present, the unit will remain in shutdown but awake every 12 hours to re-report alarms.
The Auto Modem Reset option controls the interval at which the MON-950 will perform an automatic internal modem reset after it last communicated with a remote NMS manager. This will assure that the modem will typically reset at least once every 24 hours.

This page will require a password to access. The default factory login/password is *admin / itl*
Network / System Configuration

This page provides access to the basic network settings. The *Host Name / Site ID* and *Site Name* are both included for reporting verbose SNMP traps.

**Default Settings Are:**
- DHCP = Disabled
- IP Address = 192.168.1.191
- Gateway = 192.168.1.1
- Subnet Mask = 255.255.255.0
This page will require a password to access. The default factory login/password is admin / itl
SNMP Configuration

This page allows for setting SNMP destination IP addresses for sending SNMP traps. The enable option must be checked for traps to be sent.

Enable Verbose Traps will send SNMP traps in human readable format rather than numeric. Verbose Traps follow the format

SiteID : SiteName : AlarmDescription : Severity

An example is shown in Figure 18 below.
Figure 18: SNMP Verbose Trap

This page will require a password to access. The default factory login/password is **admin/itl**
SNMP

Besides the MON-950’s intuitive web interface the system can also act as a SNMP agent for administrators to query configuration and status of the unit.

The SNMP enabled MON-950 supports both, SNMP v1 (RFC 1157) and community based SNMP v2c (RFC 3416) application layer protocols over User Datagram Protocol (UDP) transport layer, in order exchange information between the MON-950 (agent) and a central SNMP manager or Network Management System (NMS).

The agent uses UDP Port 161 to respond (listen) to the SNMP manager and UDP Port 162 to send traps and notifications to the SNMP manager. Get, Get_Bulk, Get_Next, Set and Trap Protocol Data Units (PDUs) are supported.

MIB

File 950-ANS1.MIB contains the MON-950 reference MIB with information relating to the MON-950 in Abstract Syntax Notation Version 1 (ASN.1) format. The file is not part of the agent and can be obtain separately from ITL, LLC’s technical support group via email.

Figure 19 below details the 950-ANS1.MIB tree
Figure 19: MON-950 MIB
1. Object Identifiers (OIDs) and Names

With the exception of system Object Identifiers (OIDs), all MON-950 OIDs will start with the ITL enterprise specific group number, IEEE Organizationally Unique Identifier (OUI), 43.6.1.4.1.35367 and branch from there as indicated below. The following objects are provided.

**System OIDs**

The following OIDs are read only and follow the

OID Branch: iso(1).org(3).dod(6).internet(1).mgmt(2).system(1)

<table>
<thead>
<tr>
<th>OID</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.6.1.2.1.1.1</td>
<td>sysDescr</td>
<td>Description</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.2</td>
<td>sysObjectID</td>
<td>Object ID</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.3</td>
<td>sysUpTime</td>
<td>Up Time</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.4</td>
<td>sysContact</td>
<td>Contact</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.5</td>
<td>sysName</td>
<td>Name</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.6</td>
<td>sysLocation</td>
<td>Location</td>
</tr>
<tr>
<td>1.3.6.1.2.1.1.7</td>
<td>sysServices</td>
<td>Services</td>
</tr>
</tbody>
</table>

*Figure 20: System OIDs*

**Product OIDs**

The following OIDs are read only.


<table>
<thead>
<tr>
<th>OID</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.6.1.4.1.35367.1.1</td>
<td>prodName</td>
<td>Site ID</td>
</tr>
<tr>
<td>1.3.6.1.4.1.35367.1.2</td>
<td>prodVersion</td>
<td>Firmware Version</td>
</tr>
<tr>
<td>1.3.6.1.4.1.35367.1.3</td>
<td>prodDate</td>
<td>Firmware Date</td>
</tr>
</tbody>
</table>

*Figure 21: Product OIDs*
Trap Setup OIDs

The MON-950 supports sending traps to up to two destination IP addresses. Traps can be enabled and configured through a SNMP manager or the MON-950’s build-in web pages. If enabled, traps are sent for any change-of-state of MON-950 parameters which have been configured through the web pages.

Traps are automatically retransmitted until they have been acknowledged (see Alarm OIDs). The MON-950 will retransmit traps in the following time interval until acknowledged: 1 minute, 5 minutes, 15 minutes, 30 minutes, 1 hour, 1 hour … for a total of 24 hours. After 24 hours the timer will be reset and the sequence will repeat in the same order as long as the event causing the trap is still present or active.

The following OIDs are read / write with the exception of the trap index which is read only.


<table>
<thead>
<tr>
<th>OID</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.6.1.4.1.35367.2.1.1.1</td>
<td>trapReceiverNumber</td>
<td>Trap Index, 0..1</td>
</tr>
<tr>
<td>1.3.6.1.4.1.35367.2.1.1.2</td>
<td>trapEnabled</td>
<td>Trap Enable, 0..1</td>
</tr>
<tr>
<td>1.3.6.1.4.1.35367.2.1.1.3</td>
<td>trapReceiverIPAddress</td>
<td>Trap Destination IP, 0..1</td>
</tr>
</tbody>
</table>

*Figure 22: Trap Setup OIDs*
**Alarm OIDs**

Only the acknowledge OID is read/write, all other OIDs are read only.


<table>
<thead>
<tr>
<th>OID</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.6.1.4.1.35367.4.1.1.1</td>
<td>alarmIDNumber</td>
<td>Alarm Index, 1..14</td>
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<td>1.3.6.1.4.1.35367.4.1.1.2</td>
<td>alarmState</td>
<td>Alarm Active, 1..14 (0=inactive, 1=active)</td>
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<td>1.3.6.1.4.1.35367.4.1.1.3</td>
<td>alarmAcknowledged</td>
<td>Alarm Acknowledge, 1..14 (0=not acknowledged, 1=acknowledged)</td>
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<tr>
<td>1.3.6.1.4.1.35367.4.1.1.4</td>
<td>alarmDescription</td>
<td>Alarm Description, ASCII string</td>
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<tr>
<td>1.3.6.1.4.1.35367.4.2</td>
<td>heartBeat</td>
<td>12 hour alive-trap</td>
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*Figure 23: Alarm OIDs*

Alarms are acknowledged by issuing a SNMP Set to the corresponding OID. This will prevent the alarm from being resent unless the alarm re-occurs.
Installation Diagrams

The following section details various installation diagrams for connecting the MON-950 to a wide variety of existing lighting systems. Please refer to the diagram which matches your lighting system at the tower site.

ILS-3400 Wiring Diagram

![ILS-3400 Wiring Diagram]

*Figure 24: ILS-3400 Wiring Diagram*
ILS-3400 Triple Beacon Wiring Diagram

Figure 25: ILS-3400 Triple Beacon Wiring Diagram
ILS-2400 Wiring Diagram

Figure 26: ILS-2400 Wiring Diagram
ILS-2400 Triple Beacon Wiring Diagram

Figure 27: ILS-2400 Triple Beacon Wiring Diagram
ILS-1700-CAT Triple Beacon Wiring Diagram

Figure 28: ILS-1700-CAT Triple Beacon Wiring Diagram
Figure 29: ILS-1700-CAT Five Beacon Wiring Diagram
ILS-D1RW Wiring Diagram

Figure 30: ILS-D1RW Wiring Diagram
ILS-D1RW Triple Beacon Wiring Diagram

Figure 31: ILS-D1RW Triple Beacon Wiring Diagram
Figure 32: FTB-324/312/311/310 Wiring Diagram
Figure 33: FTB-324/312/311 Triple Beacon Wiring Diagram

Figure 34: FG-3000/3000B/2000/2000B Wiring Diagram
FG-3000B/3000 Triple Beacon Wiring Diagram

Figure 35: FG-3000B/3000 Triple Beacon Wiring Diagram
FG-2000B/2000 Triple Beacon Wiring Diagram

Figure 36: FG-2000B/2000 Triple Beacon Wiring Diagram
E-1DB Wiring Diagram

Figure 37: E1DB Wiring Diagram
E-1DB2 Wiring Diagram

Figure 38: E1DB2 Wiring Diagram
E-1DBSL Wiring Diagram

Figure 39: E1DBSL Wiring Diagram
D-1LVS Wiring Diagram

Figure 40: D-1LVS Wiring Diagram
D-2/3LVS Wiring Diagram

Figure 41: D-2/3LVS Wiring Diagram
Figure 42: E-2/3DB Wiring Diagram
E-2/3DBSL Wiring Diagram

Figure 43: E-2/3DBSL Wiring Diagram
AA0M-TSS Wiring Diagram

Figure 44: AA0M-TSS Wiring Diagram
AA1-M Wiring Diagram

Figure 45: AA1-M Wiring Diagram
RLC-200 Wiring Diagram

Figure 46: RLC-200 Wiring Diagram
Technical Support and Contact Info

Contact Info

For information on the ITL lighting systems’ basic functions, refer to this manual and the accompanying drawings. For additional help with the installation or operation of any ITL products, please contact ITL, LLC at one of the following below.

Web and Internet Sites

Corporate home page:  http://www.itl-llc.com


Customer Support Technicians

8:00 AM - 5:00 PM Central Time

US and Canada call:  +1-615-256-6030
Toll Free:  +1-866-624-8309
Email:  support@itl-llc.com

RMA

Please contact ITL, LLC before returning equipment for repair and obtain a Return Material Authorization (RMA) number.

<table>
<thead>
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<th>Description of Change</th>
<th>Date</th>
<th>Preparer / Approval</th>
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<tr>
<td>5</td>
<td>Updated cover sheet.</td>
<td>7/09/2012</td>
<td>Prepared By: Elke Hinson</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Approved By: Andy Rudolph</td>
</tr>
<tr>
<td></td>
<td>Removed device discoverer software information, updated system configuration.</td>
<td></td>
<td>Approved By: Andy Rudolph</td>
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