Installation Instructions
Sapphire™
Touch Screen

Cat. No. TS007

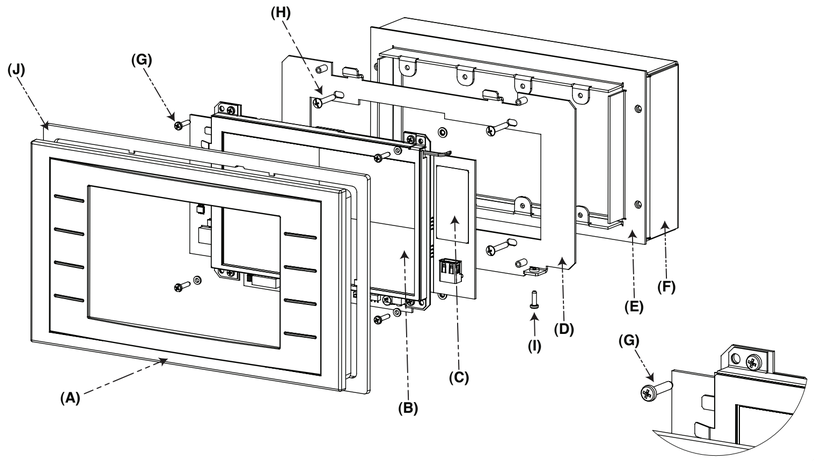
DI-001-TS007-00B

Warnings and Cautions:
- To be installed per all appropriate codes per your jurisdiction.
- If you are not sure about any part of these instructions, consult Leviton Tech Support at 800.959.6004, or, LESTechSupport@Leviton.com.
- For indoor use only.
- Item **D** (grounded mounting plate) is required for proper EMI shielding.

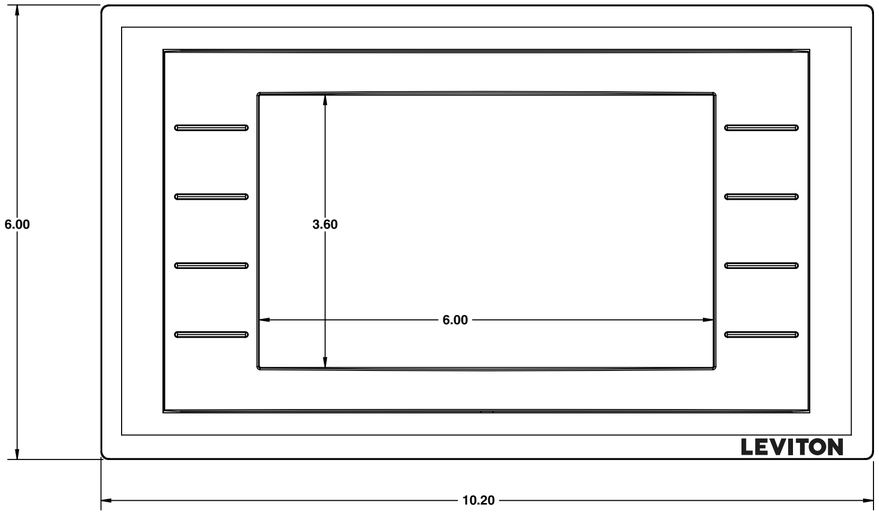
Assembly

Figure 1

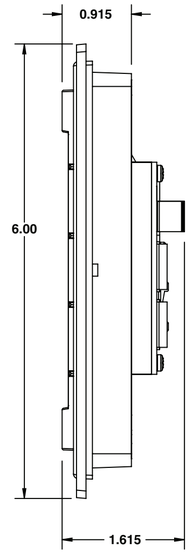
Components
(**A**) Sapphire™ Touch Screen Face Plate*
(**B**) Sapphire™ Touch Screen
(**C**) Expansion Module / USB Memory Stick Location
(**D**) Sapphire™ Touch Screen Grounded Mounting Plate
(**E**) 4-Gang Raised Device Plate**
(**F**) 4-Gang Box**
(**G**) Touch Screen to Mounting plate Screws. 4-40 x 7/16" Pan Head Phillips. Typical of **(4)**
(**H**) Mounting Plate Screws 6-32 x 13/16" Triple Head. Typical of **(4)**
(**I**) Face Plate to Mounting Plate Screws 4-40 x 7/16" Pan Head Phillips. Typical of **(2)**
(**J**) Decorative Clear Frame
* Faceplate and clear frame are sold separately. Reference data sheet for part numbers.
** Customer Supplied



Dimensions



Front



Side

Installation

Installation Pre-requisites:

1. Determine how the device will be powered using Leviton factory drawings. If a decision has not been made, use the power input terminals. Three options exist:
   - Power over LumaCAN™ cable.
   - Auxiliary Power Input Terminals, +12-24VDC.

   Note: In North America listed/certified class 2 power supply required. Outside North America, a power supply compliant with IEC 60950-1 SELV/LPS is required.
2. Procure appropriate back-box.
   - 4-Gang box is required with 4-Gang raised device cover (Leviton catalog numbers BBG04-000 + WPG04-00R), however the device will also install with 4-Gang device box. 4-Gang masonry style boxes also are supported.

   Note: Metal box must be used for proper RF shielding.
   Note: Back box must be grounded.
   Note: Surface mount boxes are not supported.
3. Determine the network type the device will communicate on by referring to factory drawings.
   The Sapphire™ wall mounted Touch Screen is compatible with the following network types:
   - LumaCAN™
   - Ethernet (10/100Base T connection)
   - RS-485 (BACnet/MSTP)
   - Expansion modules,
     - WIFI Ethernet (Leviton catalog number TSA00-WFI required).
     - LevnetRF (Leviton catalog number TSA00-LRF required).
4. Review all diagrams in this guide for device features, termination, and installation guidelines.
5. Back box location template
   - Use the provided mounting template to locate your back box on the wall.

Installation:

Note: The components referenced by letters below are shown in Figure 1.
Note: Torque rating for all front panel screws is 4in-lb.
Over-tightening screws will void the warranty.

1. Locate and install back-box **(F)** and device plate **(E)** on wall using provided mounting template. Face of device plate **(E)** must not extend into the room beyond finished wall surface and should be flush or slightly behind finished wall.

   Note: Leviton recommends installation at +60"AFF for viewing and interaction with the screen by most adults. If wall box height lighting controls are desired, Leviton recommends the installation of any Sapphire™ button station or any switch capable of providing momentary or maintained contact closures.
2. Pull and prepare all network and data wiring into back box **(F)**.

   Note: See termination diagrams on page two.
3. Install Touch Screen mounting plate **(D)** to device plate **(E)** using **(4)** provided screws **(H)**.
4. Using the included termination diagrams as a guide, make all terminations at rear of Touch Screen.
5. Install Touch Screen **(B)** to mounting plate **(D)** using **(4)** provided screws **(G)**.

   Note: The Touch Screen ships with the screws pre-installed to the mounting plate, they have to be removed before attaching the Touch Screen to the mounting plate.
6. Install the faceplate **(A)**, with pre-installed decorative clear frame **(J)**. These components are purchased and packaged separately from the touch-screen itself. The faceplate has a protective cover on it which should not be removed until owner occupancy.
7. Install faceplate **(A)** on Touch Screen mounting plate **(D)** by hooking faceplate on top tabs, then rotating into place.
8. To secure faceplate, back out face plate screws **(I)** until screw head **(I)** snugs into Touch Screen faceplate **(A)**. **DO NOT** over tighten.
9. Apply power.
   When power is applied the following will happen:
   - Leviton Logo Boot Screen will be displayed. While the device is booting, the screen may blink out several times. The complete boot process can take between 1 and 15 minutes depending on the size of your network.
   - The default screen will be displayed depending on your system configuration, the behavior of the On/Off buttons may differ. These buttons will turn on/off all lights in the area to which the touchscreen is assigned, or if unassigned, the entire network.
   - Settings: In the bottom right hand corner of your screen is a settings icon. This icon is used to set basic configuration parameters for this device. Initial parameters will be set by Leviton Field Service at time of system commissioning.

Installation Continued:

A description of the configuration options are listed below.

Time/Date: Should be set to the current date/time.
Network: Network information and settings
1. LumaCAN™ Node ID – must be unique across all devices on this subnet. Valid values are 1-250.
2. LumaCAN™ subnet – all devices on this subnet should be set to the same subnet. Valid values are 1-254.
3. IP information – If you have an Ethernet connection, this information must be set. Set to DHCP if you have a DHCP server, if not, set to a unique static IP address. Subnet and gateway information should be as determined by your IP staff.

Information:
1. **Load Configuration** – allows you to load a configuration file from a USB thumb drive (C). The file must be in the root of the drive.
2. **Export Error Log** – saves error log to a USB thumb drive, inserted into (C).
3. **Edit** – allows editing of a scene.
   Press the Edit menu command. Any editable component will be flashing at you. Select any editable component by pressing it with your finger. You will be presented with a screen that allows you to change the level of any assigned channel or group and add channels or groups. Make changes as needed. Press the Save button to save your changes and exit Edit mode. Cancel will close the editing screen without saving changes.

Sign-In: Enables access to configuration functions. The default username/password are as follows:
Username: administrator
Password: 1234

Note: If your system has already been partially configured, the default user name and password may have changed.

10. Full System Configuration will be performed by a Leviton Field Commissioning Agent. For assistance with scheduling commissioning, please contact your Project Manager or LESFieldService@Leviton.com.

Specifications

SPECIFICATIONS	
Cat. No. TS007	
Power Input Voltage	+12-24VDC, Class 2 SELV
Power Input Current	950mA-600mA (950mA at 12V, 600mA at 24V)
Max Peripheral Output	100mA, voltage follows input voltage, Class 2 SELV
Display	7" Diagonal, TFT Active Matrix 18 bit Color, 800x480px, LED Backlight
Required Mounting	4-Gang box with a 4-Gang raised device cover preferred, 4-Gang Device Back box, 4-Gang masonry style box
LumaCAN Network	Daisy Chain, Home-Run when repeaters are used, Category 6 or better required, TIA-568B termination preferred, 1,600' max run Length unless repeaters are used. (Leviton Cat. No. WIR06-01K or equivalent).
Ethernet Network	Star, Category 5 or 6 wiring, TIA-568B termination preferred
RS-485 Network	Belden 1502R, Belden 9829, or equivalent, Daisy Chain length depends on baud rate, use Leviton Cat. No. WIRLN-500 or equivalent.
Input/Output	Class 2 SELV

FCC COMPLIANCE STATEMENT:

The enclosed device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(i.) This device may not cause harmful interference
(ii.) This device must accept any interference received, including interference that may cause undesired operation.

Warranty

LEVITON LIGHTING & ENERGY SOLUTIONS of Leviton Manufacturing Co Inc warrants its Dimmer Systems and Controls to be free of material and workmanship defects for a period of two years after system acceptance or 26 months after shipment, whichever comes first. This Warranty is limited to repair of replacement of defective equipment returned Freight Pre-Paid to **Leviton Lighting & Energy Solutions at 20497 Teton Ave., Tualatin, Oregon 97062, USA. User shall call 1-800-959-6004** and request a return authorization number to mark on the outside of the returning carton, to assure that the returned material will be properly received at Leviton. All equipment shipped back to Leviton must be carefully and properly packed to avoid shipping damage. Replacements or repaired equipment will be returned to sender freight prepaid, F.O.B. factory. Leviton is not responsible for removing or replacing equipment on the job site, and will not honor charges for such work. Leviton will not be responsible for any loss of use time or subsequent damages should any of the equipment fail during the warranty period, but agrees only to repair or replace defective equipment returned to its plant in Tualatin, Oregon. This Warranty is void on any product that has been improperly installed, overloaded, short circuited, abused, or altered in any manner. **Neither the seller nor Leviton shall be liable for any injury, loss or damage, direct or consequential arising out of the use of or inability to use the equipment.** This Warranty does not cover lamps, ballasts, and other equipment which is supplied or warranted directly to the user by their manufacturer. Leviton makes no warranty as to the Fitness for Purpose or other implied Warranties.

1 LumaCAN™ Network Termination Diagram

Background:

LumaCAN™ is Leviton's proprietary communication protocol for control systems. Topology for LumaCAN™ is daisy-chain and can only support home-run configurations when Leviton's LumaCAN™ repeater (NPRPT-006) is used. LumaCAN™ wiring requires Category 6 or better cable and your Touch Screen can be powered from this network. LumaCAN™ requires termination at each end of the LumaCAN™ network. If the touch screen is at the end of the run, you can terminate the network by setting the termination switch to the TERM position. The termination switch is located on the front of the device, behind the faceplate, under the screen **(Figure 2)**.

Your system may or may not require LumaCAN™, please reference your Leviton Factory drawings for details. These documents will be provided as part of the construction document submittal package.

Installation:

1. Terminate end of network cables to RJ-45 QuickPort receptacles **(Figure 3)**, use short Cat 6 patch cords for connection between RJ-45 QuickPort and Sapphire™ device.
2. Plug patch cords in to the LumaCAN™ ports on the back of the unit.
3. Move termination switch to the TERM position if the Touch Screen is at either the beginning or end of the LumaCAN™ Network (**Figure 2**).

Notes:
- Signal termination required at each end-of-line device. **DO NOT** terminate midpoint devices.
- LumaCAN™ networks require a daisy chain topology.
- If using a LumaCAN™ repeater, a home-run topology may be used.
- Category 6 wire required, Leviton Cat. No. WIR06-1K or equivalent.

LumaCAN™ Topology

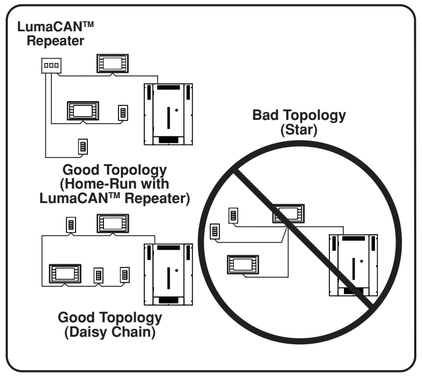
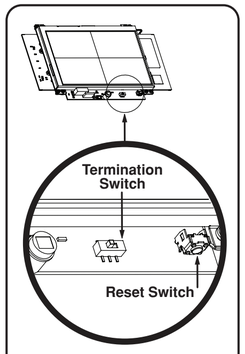
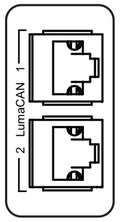


Figure 2



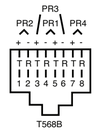
LumaCAN™ Ports



RJ-45 Receptacle Pinout

There are two major standards for the pinout of RJ-45 connectors. These two standards are often referenced as TIA-568A and TIA-568B. Although either is acceptable so long as it is consistent throughout a project, Leviton requires the use of only the TIA-568B standard. The only difference between the standards is what color wires terminate to each of the (8) RJ-45 pins. Per the TIA-568B standard, the pinout for an RJ-45 receptacle is as follows. **When terminating a male RJ-45 plug to the network cable hold the plug with the clip down and looking at it from the back to match the figure below.**

Figure 3



TIA-568B Wiring Standard Chart		
Pin	**Pair #**	**Color**
1	2	Orange/White
2		Orange
3	3	Green/White
4	1	Blue
5		Blue/White
6	3	Green
7	4	Brown/White
8		Brown

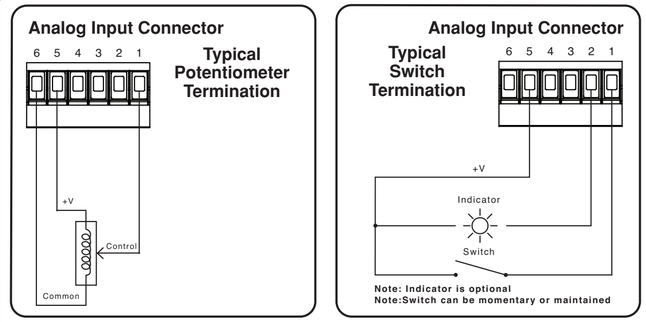
2 Analog Input Termination Diagrams

Background:
Two analog inputs are provided for connection to peripherals like switches, potentiometers, occupancy sensors, and photocells.

Installation:
1. Determine the device to be connected.
2. Connect as shown in **(Figure 4)**.

Notes:
- Power supply output current for peripherals is max 100mA.
- Out terminal can sink a maximum of 100mA.
- Inputs can detect any analog voltage 0-10Vdc and any switching voltage up to +24Vdc.
- When configured as a switch, the switch can be momentary or maintained.
- Analog output voltage follows input voltage.

Figure 4



Terminals:
Pin 1 - In 1 - Input signal to Sapphire™ from the Peripheral
Pin 2 - Out 1 - Output signal from Sapphire™, usually used for LED configuration. Output is floating in the "Inactive" state and is tied to DC common in the "Active" state.
Pin 3 - In 2 - Input signal to Sapphire™ from the Peripheral
Pin 4 - Out 2 - Output signal from Sapphire™, usually used for LED configuration. Output is floating in the "Inactive" state and is tied to DC common in the "Active" state.
Pin 5 - +V output - Power supply output voltage (voltage follows input voltage)
Pin 6 - DC Common

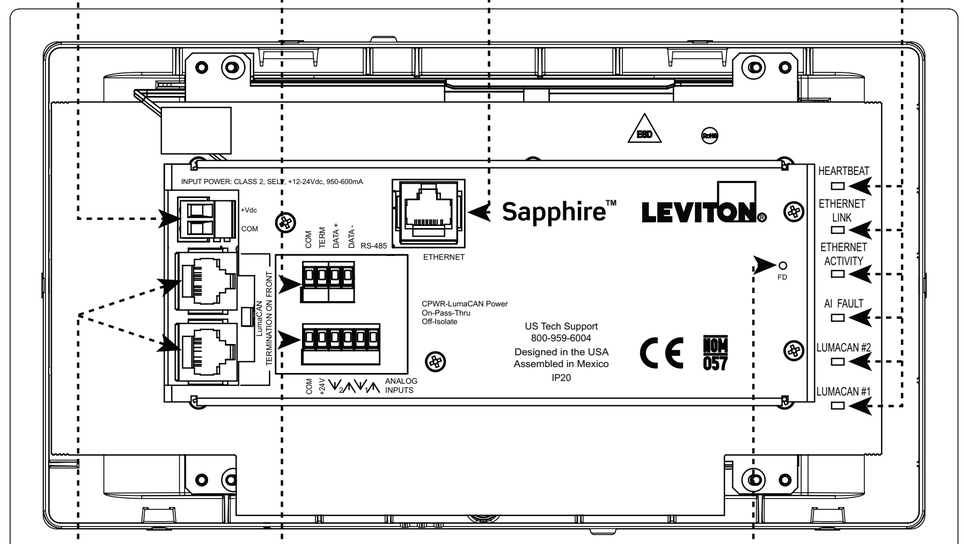
NOTE: Consult Factory Drawings for Required Terminations

7 Auxiliary Power Input

6 RS-485

3 10/100 Base T Ethernet

4 LED's



1 LumaCAN™ Ports

2 Analog Input Connector

5 Factory Default Switch

3 10/100 Base T Ethernet Network Termination Diagram

Background:
Many systems will require connection to Ethernet networks. The Sapphire™ Touch Screen supports many different protocols on this network which are system dependent. Your system may or may not require an Ethernet connection, please reference your Leviton Factory drawings for details. These documents will be provided as part of the construction document submittal package.

Installation:
1. Terminate end of network cable to an RJ-45 QuickPort receptacle **(Figure 5)**; use a short Cat 5 or better patch cord for connection between RJ-45 QuickPort and Sapphire™ device.
2. Plug the patch cord in to the 10/100 Base T Ethernet port on the back of the unit.

Notes:
- All Ethernet connections must be home-run to an Ethernet switch.
- TIA-568B termination required.
- Category 5e (Leviton Cat. No. WIR5E-1K or WIR06-1K) or better wire required.

4 LED's

Heartbeat
Normal: Blinks once per second
Processor Failure: Continuous Off

Ethernet Link
Normal: Solid when Ethernet Connected
Off when no connection

Ethernet Activity
Normal: Blinks on Transmit
Off otherwise

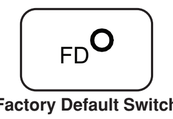
AI Fault
Normal: Off
Solid: AI port short

LumaCAN #1
Normal: Blink on transmit or receive

LumaCAN #2
LED not populated

5 Factory Default Switch

Push and hold for five seconds, then release, to reset to factory defaults.



Factory Default Switch

RJ-45 Receptacle Pinout

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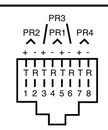
Figure 5



TIA-568B Wiring Standard Chart		
Pin	**Pair #**	**Color**
1	2	Orange/White
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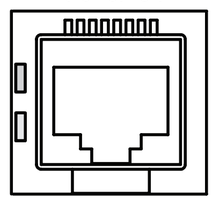
4	1	Blue
5		Blue/White
6	3	Green
7	4	Brown/White
8		Brown

Ethernet Port



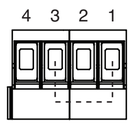
6 RS-485 Network Termination Diagram

Background:
The RS-485 network is most commonly used for connection to BACnet/MSTP networks. Pin-out of this connector is shown in **(Figure 6)**.

Installation:
1. Connect as shown in **(Figure 6)**.

Notes:
- RS-485 compatible wire is required. Leviton recommends Leviton Cat. No. WIRLN-500, Belden No. 1502R, or Belden No. 9829.
- Shield & drain wires on the RS-485 network should be tied together at every device connection, and connected to ground only at one point.
- Termination of Network can be achieved by connection a jumper wire between **TERM** (Pin 3) and **DATA** - (Pin 1). This places a 110 Ohm resistor across said pins. **TERM** is often required at each end of the network.

Figure 6



RS-485 Connector

Pin 4 - COM
Pin 3 - TERM
Pin 2 - DATA +
Pin 1 - DATA -

7 Auxiliary Power Input Termination Diagram

Background:
The auxiliary power input is one of three options for powering the Sapphire™ Touch Screen. The other choices for powering the Touch Screen are LumaCAN™.

Installation:
1. Connect as shown in **(Figure 7)**.

Notes:
- Appropriate North American listed/certified class 2 power supply required. Outside North America, a power supply compliant with IEC 60950-1 SELV/LPS is required.
- Minimum #18AWG wire required.
- If a line voltage to low voltage power supply is installed in the back-box to which touch-screen installed, the line voltage input wires must be sleeved with 5mm heat shrink tube.

Figure 7