



## Network Wiring

*Tech Works Light-Call™* products are distributed microprocessor systems operating on two twisted pair wiring. The first pair is 12 VDC power in a parallel connection plan. The second pair is RS485 terminated bus topology, operating at 39K baud in a parallel connection plan. Because this is a distributed processor system, each intelligent device contains a micro controller, so there is "NO Central Processor". Each device is totally self-contained and can be used as a stand alone or in combination with any other intelligent device.

Four (4) screw terminals are provided on each intelligent device for connection to the network. The screws are labeled "+" and "-" for DC Power and "T" and "R" for Transmit/Receive Data connections. On each station in the middle of the system there should be two wires attached to each screw and on the end only one wire to each screw. If there are more than two or none at all, the system will not operate properly.

Note: Be sure to securely tighten screws so that wires will not come loose.  
U.L. Torque Spec: 3.5 lb. - in.

The system is designed to operate on unshielded twisted pair cable from 24 to 18 AWG. The twist of the cable is critical to the proper communication of data on the network to avoid noise interference. Any standard voice grade twist should provide adequate noise cancellation under normal operating conditions. However, if you are installing a system in a high electro magnetic radiation environment you should consider data grade twist for all cables.

All wiring is NEC Class 2.

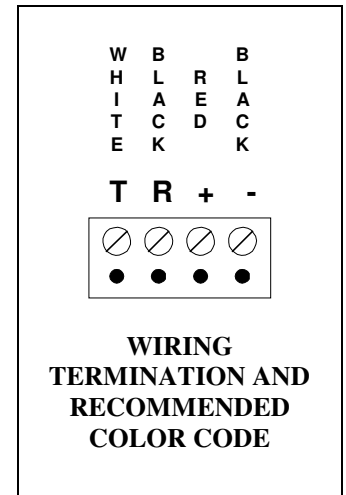
*Due to the implementation of innovative data noise canceling circuits in all Tech Works RS485 microprocessor products, the data and power can now be run in any direction upto a total wire length of 3000 feet.*

*The last station on each end of all wire runs must employ a terminating resistor to make the network operate correctly. The terminator is built into each station and selected by turning "ON" the "T" dipswitch. If a terminator is placed in the middle, data will not flow to all devices in the system causing irregular operation.*

As with any RS485 communication system grounding is critical to the proper operation and life expectancy of the system. All *Tech Works* power supplies employ a floating ground designed to isolate the data communication from interference and destructive electro static discharges. The use of multiple power supplies on the same network will cause different floating ground references (ground loops) which may cause noise and destruction of the intelligent devices.

**Connect the power supply as near the middle of the network loop as possible to assure the best possible power distribution.**

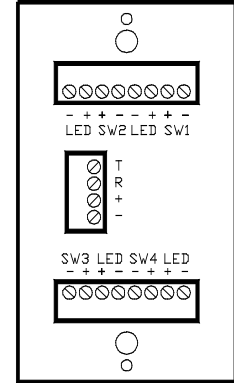
*The last station on each end of each wire run must employ a terminating resistor to make the network operate correctly.*



## Passive Device Wiring

Some Intelligent Substations have screw terminals for connection of passive devices. The terminals labeled SW are a contact closure input. The terminals labeled LED (+ -) provide 12 VDC current limited output to power external LED's (lights). The (-) terminal is a pull to ground (Common) control capable of providing 125 mA of on / off switching for external devices or control. Some passive stations are critical on switch polarity. If stations do not function, check polarity of wiring.

Corridor Lights are typically the largest current users. In systems with a large number of Corridor Lights it may be desirable to use multiple power supplies. The 5234 is opto-isolated for use with multiple power supplies. Whenever using more than one power supply on a system, be certain to follow proper grounding and **never connect power supply outputs together.** **WARNING - THE EQUIPMENT THAT IS CONNECTED TO THIS INTERFACE IS NOT CONSIDERED TO BE PART OF THE SYSTEM CONFIGURATION UNLESS THE EQUIPMENT IN QUESTION COMPLIES WITH THE STANDARD FOR HOSPITAL SIGNALING AND NURSE CALL EQUIPMENT UL1069.**



## Substation Switch Settings

Each Substation is equipped with two sets of four position dipswitches. These are the only installer programming required for installation. The first set of switches selects the Master or group of Masters on which this Substation will be displayed. The second set of dipswitches selects the column of lights on the Master to represent this Substation. Any two Substations with the same address will be totally interactive. This means the push of a button on one sub will light its light, as well as the light on the other sub with the same address.

On the first or Master dipswitch, the left most switch labeled "T" is a built-in terminating resistor. This is provided to tell the network where the first and last devices in the system are located. On the first and last station in a system the "T" switch must be set to the up or on position for proper network communication. All other "T" switches in the system must be set to the down or off position. The last switch to the right is labeled "1". This represents Master number 1 or 0. If the switch is down or off the switch represents a 0. If the switch is up or on the switch represents a 1. The third switch is labeled "2". This represents a 0 in the down position or a 2 in the up position. The second switch from the left is labeled "4". This represents a 0 in the down position and a 4 in the up position. By adding the value of the switches in the up or on position the address of the Master is selected. For example; all switches down are Master 0; switches 1, 2, and 4 all up are Master 7; switch 1 and 4 up is Master 5; etc.

The second set of dipswitches selects the column of lights on a Master or Annunciator to represent this Substation. As with the Master selection the number values are additive. The first column to the left on a Master is column 0 and is addressed by all switches in the down or off position. The last or right most columns of lights on a Master is column 7 and is addressed by all dipswitches being in the up position. Column six would be addressed by switch 4 and 2 being in the up position. The left most switch in the column group is labeled "S" for software. The standard Substations are shipped with two software variations installed. The "S" down position provides the default operation which is the first push of each button lights a *steady* lamp and is accompanied by a single annunciation tone at the Master and the second push of a button changes the lamp to *flashing* and is accompanied by a repeating tone at the Master. The "S" up position provides the second software which is normally the top most button lights a *flashing* lamp and is accompanied by a repeating tone at the Master upon first push of the button. All other buttons remain first push *steady* lamp second push *flashing*. This software option may change to meet special applications. If a job shop or special software has been ordered, documentation will be included with the product indicating the second function of the "S" switch.

