

**AUTOMATION REMOTE**  
**STATUS SYSTEM**

Installation Manual

## Manual Contents

<b>For information about:</b>	<b>Turn to page:</b>
Supplies needed for the system.....	3
Explanation of system components and a description of drawings for wiring the system..... (found in the back of the manual)	4 - 5
Guide to component installation.....	6
Cat-5 wiring information.....	7
Status system test and configuration.....	8 - 9 - 10
Factory assistance information.....	11
Cat-5 to RJ-45 connection drawing.....	12
Cat-5 interface board schematic & jumper settings.....	13
Wiring of 28 point PLC to console.....	14
Wiring of 14 point PLC to console.....	15
Wiring of 14 point PLC in wall status box.....	16

## **BIG SKY STATUS SYSTEM** **INSTALLATION AND CONFIGURATION**

### **SUPPLIES NEEDED FOR SYSTEM.**

1 - 28 POINT - PLC TO FUNCTION AS THE MASTER CONTROLLER IN THE SYSTEM.

1 - 14 POINT - PLC FOR EACH CONSOLE BEING MONITORED AS WELL AS ONE 14 POINT PLC FOR EACH STAND ALONE STATUS PANEL IN THE SYSTEM. (The 28 point PLC will count as one of the monitoring 14 point PLC s in the system.)

1 - Piece of DIN RAIL for each PLC to mount the PLC s in the automation or wall box.

1 - INPUT CONVERTER MODULE FOR EACH PLC IN THE SYSTEM. (Converter module is already mounted and wired to the PLC s when a full system is shipped from the factory.)

1 - Piece 10 conductor 22 gage wire for each status panel in the system. This wire is used for both control and power feed in the status panels being controlled by the consoles and just control for the stand alone panels. A 30 foot piece is provided by Big Sky but any length may be provided on request.

1 - CAT-5 INTERFACE BOARD FOR EACH PLC IN THE SYSTEM.

Category 5 cable run daisy chained between all PLC s. There should be 2" end s of cable at each PLC except the end units, where there should only be one piece at each. Same as used for Ethernet

RJ-45" (8 conductor) connectors for each end of each piece of CAT-5" cable. Same as used for Ethernet

1 - RJ-45 connector crimp tool.

## **EXPLANATION OF SYSTEM COMPONENTS**

### **THE 28 POINT PLC.**

The 28 point PLC will function as the master controller of the system. The present 28 point unit will be mounted in a console and will operate as one of the nodes. The 28 point PLC **MUST** be located at one of the ends of the network but **CANNOT** be used as a node for a stand alone status panel or as a controller for a booth status panel. Select one of the consoles located at the end of the network that will not have a status panel in which to mount this PLC. The present version 28 point PLC must be powered by a 120vac source. Future versions of this controller are being developed that will have high speed outputs such as in the 14 point controllers.

Note: it sometimes may be necessary to provide some amplification or signal conditioning due to very long runs or noisy environments. If it is found to be necessary to add a repeater, the master 28 point PLC should be placed in the center of the system. The output of the master will be wired into the input of the repeater and two pieces of cat-5 cable will be connected to the output of the repeater and will branch off to the rest of the PLC s.

### **THE 14 POINT PLC.**

The 14 point PLC s are considered slaves in the system. Due to the high speed outputs, these units can monitor the status of a local console, and can also be used as controllers for status panels. If the 14 point PLC s are mounted in a console, they are mounted inside the automation back box and are powered locally by the automation power supply. Status panels mounted on the wall of the booth can be controlled by the PLC in the console closest to that status panel. The panel controlled by the console PLC is also powered by the automation power supply in that console through the status panel interface cable. If the PLC s are used for status only, a 12/24vdc power source must be provided. This source should be a regulated supply with a 2-amp minimum rating. The status panel mounted on the wall as a stand alone status panel such as status panels down stairs will be controlled by a PLC mounted in that wall box.

### **THE INPUT CONVERTER MODULE.**

The input converter boards convert the 12vdc that comes from the remote indicator outputs of the automation to the 24vdc needed to control the inputs of the PLC.

### **THE CAT-5 INTERFACE BOARD.**

The CAT-5 interface board provides connection between standard CAT-5" cable and the communications port on the PLC. This board is plugged into the DB-15 plug on the PLC and provides for the connection of 2" CAT-5 cables to each PLC port.

## **THE OPTIONAL REPEATER**

Under some circumstances it may be necessary to add a repeater to the system. The repeater will help overcome instability problems that may occur do to excessive noise or distance. If a repeater is needed, the master will be placed somewhere in the center of the system and the output COMM port of the master PLC will be connected to the HOST port on the repeater through the use of a CAT-5" board configured for the repeater input. A second CAT-5" board is plugged into the PLC port on the output of the repeater and the 2 CAT-5 cables that were run for the PLC at that location are plugged into a CAT-5 board configured for use on the output of the repeater.

## **DRAWINGS FOR WIRING OF THE SYSTEM**

AC5IM-A.SCH = Schematic of the CAT-5 interface board as well as the jumper settings for the board when used in different parts of the system.

MASTER TO SLAVE CAT5 CABLE.SCH = Schematic showing the wiring of the RJ-45 connectors when wired and plugged into the CAT-5 board. The colors are shown as viewed from the top of the board with the connectors positioned as indicated.

28 POINT PLC IN CONSOLE.SCH = Schematic of the 28 point PLC to a Big Sky console with a SERIES-1 automation. (The power input of the PLC is wired to the 120vac feed to the automation.)

14 POINT PLC IN CONSOLE.SCH = Schematic of the 14 point PLC to a Big Sky console with a SERIES-1 automation. (The PLC is powered by the 12vdc output from the automation on the CTERM board on the non operating side of the console, through the same cable as the connection to the remote indicator outputs of the automation.) The status panel cable is shown but is only present when the local PLC is controlling a status panel. (A 30 foot cable is provided with the DB-15" side prewired. If the status panel is located on the wall or in the sound rack, use the full length. If the status panel is to be located in the console with the PLC, cut the cable accordingly to prevent excessive cable around RF generating devices such as igniters or dimmers.

14 POINT PLC IN WALL STAT BOX.SCH = Schematic of the 14 point PLC when mounted in a stand alone wall mounted status panel. All of the interface wiring is provided by the factory with the exception of the CAT-5 wiring which must be added in the field. 120vac must be provided for the 12vdc 3.4amp power supply.

## SYSTEM COMPONENT INSTALLATION

The PLC s will be received with all the hardware for mounting. This will consist of the CAT-5 interface board and a piece of din rail and all the hardware for mounting the PLC inside the automation back box or on a panel near the automation. The PLC should be mounted where there will be access to the automation remote indicator outputs as well as the 12vdc output from the automation power supply.

When mounted inside the automation back box, the 14 point PLC will be mounted vertically using the left hand holes that were originally provided for mounting accessory boards in the back box. These holes should be approximately in the center of the box when looking into the box from the front with the panel down. Mount the din rail using the hardware provided and then snap the PLC onto the rail. Orientation of the PLC should be with the COMMPORT door on the top.

The 28 point PLC will be mounted in the automation back box also using the piece of din rail provided. The rail should be mounted horizontally across the 2 bottom holes from the same set of holes as the 14 point. Mount the PLC oriented with the COMMPORT to the left.

In both cases, the PLC s are already wired with a cable to connect to the CTERM automation interface board on the non operating side of the console.

The wall mount box should be mounted with the studs more toward the bottom of the box. The din rail that holds the PLC/POWER SUPPLY assembly should be mounted on the third row of studs up from the bottom. The panel is then mounted all the way to the top of the box. The second piece of din rail with the terminals blocks on it should be mounted vertical to the right of the assembly. This is where the 120vac is wired. BLACK = HOT, WHITE = NEUTRAL, GREEN = GROUND.

In the case of a stand alone wall mount status box, all the wiring for local operation is provided. All that is needed is the 120vac feed for the power supply and the connection of the CAT-5 cable. For wall mount boxes mounted in the projection booth, it may be necessary to provide a louder annunciator. Please let us know how many wall mount status panels will be in the projection booth so that these annunciators may be included.

For wiring of the 14 point PLC when in the console see drawing 14 point plcint in console.sch  
For wiring of the 28 point PLC when in the console see drawing 28 point plcint in console.sch  
For wiring of the 14 point PLC when mounted in a stand alone status box on the wall, see drawing plc in wall stat box.sch.

**NOTE:** THE 10 CONDUCTOR 22 GAGE CABLE SHOWN IN THE DRAWINGS IS ONLY PRESENT WHEN THE LOCAL PLC IS CONNECTED TO A STATUS PANEL! WE HAVE PROVIDED A 30 FOOT LONG PREWIRED CABLE FOR CONNECTION TO A WALL OR SOUND RACK MOUNT STATUS PANEL. IF THE STATUS PANEL IS TO BE MOUNTED IN THE CONSOLE, CUT THE CABLE TO LENGTH TO ALLOW WIRING TO THE STATUS PANEL. ALLOW FOR PROPER CABLE WROUGHTING WITH A SERVICE LOOP BUT DO NOT LEAVE EXCESSIVE CABLE TO PREVENT NOISE PROBLEMS.

### **CAT-5 WIRING INFORMATION**

As mentioned in the previous pages, the CAT-5 cable should be daisy chained from one console to another. As with any data cable, the CAT-5 cable should be run in the ceiling away from high power or lighting feed or load wires, as well as any ceiling mounted fluorescent fixtures. Preferably in data cable hangers with only similar DATA type cables.

When running the cable through the console up to the automation box, care should be taken to make sure the cables do not come in close proximity to XENON DC cables or close to the POWER SUPPLY TRANSFORMERS as any of these devices can be a potential for unstable data transmission.

**NOTE: PLEASE USE PROPER TYPE AND INSTALLATION OF CAT-5 CABLE TO SATISFY LOCAL BUILDING CODES.**

The CAT-5 cable is stripped outer jacket only about ½ back on one end and terminated into a standard RJ-45 insulation displacement type connector as is used to network computers. The conductors must be manipulated into the proper position, and then pushed into the connector. The whole connector is then pushed into a special crimp tool that when operated the contact surfaces of the connector are pushed into position, complete the connection to the wires.

SEE DRAWING MASTER TO SLAVE CAT5 CABLE.SCH FOR PROPER POSITION OF WIRES IN RJ-45 CONNECTOR.

**NOTE:** WHEN FINISHED TERMINATING THE CAT-5 CABLE, **DO NOT** PLUG THE CABLES INTO THE CAT-5 INTERFACE BOARDS THAT WILL BE PLUGGED INTO THE PLC S. THIS WILL BE DONE LATER DURING THE SYSTEM CONFIGURATION.

## **STATUS SYSTEM TEST AND CONFIGURATION**

After all the PLC s have been mounted and all the wires are terminated to the associated consoles, it is time to test and configure the system.

The first test that needs to be made is to make sure that the PLC s that are reading console status are receiving the signals properly from the remote status indicator outputs of the automations. Please follow this procedure for this test.

**NOTE: AT THIS POINT POWER ONLY THE 14 POINT PLC S. LEAVE THE 28 POINT UNTIL LATER IN THE CONFIGURATION.**

1- power up each automation, when the PLC powers, it will go through a short diagnostic period during which the OK LED will flash. When diagnostics are finished, the OK LED will turn on continuously and the RUN LED will turn on.

2 - Check the inputs on the PLC. With the automation in the stop mode, input #1 on the PLC should be ON. The proper inputs according to automation mode are as follows:

Automation = Stopped    Input #1 on the PLC.  
Automation = Started    Input #2 on the PLC.  
Automation = Alarm    Inputs #1 and #3 on the PLC.

If any of the inputs do not operate correctly with respect to the designated automation mode, check that the cable is properly terminated. If the cable is correct check that the signal is present at the proper terminal on the CTERM board on the console. The terminals should provide 12VDC out according to mode with respect to common. If the signal is not present, check that all connectors are properly seated both on the CTERM side and back at the automation side. If all is correct, there may be a problem with the main automation board. Please contact Big Sky for repair or replacement.

3 - If all the signals are correct, power up the 28 point master PLC. When the diagnostics are complete, the #12 output on the PLC will begin pulsing. This indicates that the PLC is in configuration mode.

**Configuration mode is enabled by the jumper that is present on input #16 on the PLC. The jumper is in place when shipped so that the 28 point PLC will start configuring when powered the first time. When configuration is finished this jumper will be removed for normal operation.**

**NOTE: THE OUTPUT ON THE PLC WILL PULSE FOR 2 TO 3 MINUTES AND THEN STOP AUTOMATICALLY. AS LONG AS THE JUMPER HAS NOT BEEN REMOVED, THE PLC IS STILL IN CONFIGURATION MODE. THE JUMPER MUST BE REMOVED BEFORE THE PLC WILL RETURN TO RUN MODE.**

**The 28 point PLC should be at the end of the network. The only time this is not the case, is if a repeater is necessary. In this case the 28 point PLC will be in the center of the network and two branches would come from output of the repeater in both directions.**

**At this point we want to connect to the 28 point PLC and work toward the nearest status panel. We will use this status panel to monitor the communications of all of the PLC s in the system.**

4 - Plug the CAT-5 interface board into the COMMPORT of the 28 point PLC. Plug the CAT-5 cable into the interface board. Connect the other end of the same CAT-5 cable to PLC at that end. If that PLC does not have a status panel, continue on until the first panel is reached.

5 - When the first panel is reached, connect the CAT-5. After a few seconds, press the local alarm reset button on the front of the panel. After a while the panel should beep several times. This indicates that communication has been established with the master and that the master knows that there is a status panel at that location. If there were PLC s between the master and the PLC with the status panel the status of these units may begin to be displayed as well as the status of the master.

6 - Once the setup of the status panel has been completed, start connecting the houses in sequence.

**Always connect additional houses one at a time in the proper sequence. This allows both checking the communications of the PLC being connected as well as the checking of the individual piece of CAT-5 cable that came from a known working PLC to the one being checked presently.**

7 - As the connection is made to PLC s with status panels, the status panel may be enabled at that point.

Follow this sequence until all the PLC s and status panels have been configured. If the master was able to complete a full sweep of the possible addresses on the buss, and all of the cables and PLC s are functioning correctly, the status panels should show the status of all the machines in the system.

**NOTE: IT IS NORMAL TO SEE LONG DELAYS IN THE UPDATE OR INITIALIZATION TIMES OF NEW NODES ADDED TO THE NETWORK. WHEN THE SYSTEM IS IN CONFIGURATION MODE, THE MASTER WILL RUN THROUGH ALL 36 POSSIBLE ADDRESSES FOR NODES IN THE SYSTEM. WHEN THE MASTER IS TAKEN OUT OF CONFIGURATION MODE, THE MASTER MAKES NOTE OF THE PLC S THAT ARE PRESENT AND ONLY COMMUNICATES WITH THOSE UNITS.**

On the 28 point PLC, outputs 8, 9, 10 and 11 are used to show the number of status panels configured on the network. This total includes both the panels connected to PLC s in consoles and stand alone wall mount panels located outside the projection booth. The indication is in binary format and is displayed as follows:

- Output #8 = least significant bit or 1.
- Output #9 = 2
- Output #10 = 4
- Output #11 = 8

Examples ----

	OUTPUTS				
	11	10	9	8	
LED S	0	0	0	1	= 1 status panel
	0	0	1	0	= 2 status panels
	0	0	1	1	= 3 status panels
	0	1	0	0	= 4 status panels
	0	1	0	1	= 5 status panels

As many as 15 status panels total may be configured on PLC s in the system. This total includes up to 6 stand alone wall mount status panels.

8 - After verifying that the count on the 28 point master matches the number of status panels, and that all the console status is being properly displayed, remove the jumper from input #16. This will return the PLC to the run mode.

**NOTE: REMOVE ONLY THE SIDE OF THE JUMPER THAT IS CONNECTED DIRECTLY TO #16 AND BEND IT BACK AWAY FROM THE TERMINAL. THIS JUMPER MAY BE NEEDED TO RUN CONFIGURATION AGAIN IN THE EVENT OF A CHANGE IN THE SYSTEM.**

**Factory assistance and information:**

If you have checked the troubleshooting guide on the previous page and are still have problems with operation, contact your theatre equipment dealer. If you are unable to resolve your problem quickly or easily, contact BIG SKY Industries Engineering Department at:

BIG SKY Industries, Inc.  
259 Center St.  
Phillipsburg, NJ 08865  
[www.bigskyindustries.net](http://www.bigskyindustries.net)

Tel. (908)454-6344  
Fax (908)454-6373

Hours: Monday-Friday  
8:30a.m.-5:00p.m. (EST)

Additional product information is also available by calling or faxing these numbers.











