SYSTEM GALAXY

635 & 600 HARDWARE

INSTALLATION & CONFIGURATION

GALAXY CONTROL SYSTEMS

SG v 11.7.0

Flash 11.0.7

Jan 2021

System Galaxy

635-600 Series Hardware Manual

Revised JAN 2021

635-600 Series Hardware Manual Rev. 11.7.0

System Galaxy 635-600 Series Hardware Manual

COVERING:

600 & 635 CPU
600 & 635 DPI/DRM Rev. E/F
DIO - Rev. C / D
DSI - Rev. B/C
Relay Board – all revisions

Information in this document is subject to change without notice.
Therefore, no claims are made as to the accuracy or completeness of this document.

Integrated applications and 3rd Party Technologies my have additional requirements.

At the time this manual is published, all 600-series Hardware is compatible with System Galaxy 11 software. See the board compatibility section in this guide to determine older-model board pairing requirements and upgrade path. Check the Galaxy Tech support website for the latest updates and flash compatibility information. Visit us at www.galaxysys.com

11th Edition

Revision C

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1 Overview, Safeguards, Specifications, and Requirements

This chapter covers general safeguards and hardware requirements.

Requirements are organized by topic (listed below) so that technicians, installers, planners, administrators and can easily find the pertinent information.

1.1 What's in this Manual (you are here)

CHAPTER-1 OUTLINE

CHAPTER-2 COVERS

Step-by-step installation instructions for installing the hardware and field devices are in Chapter-2.

CHAPTER-3 COVERS

The Event Server and GCS Services are covered briefly in Chapter-3

CHAPTER-4 COVERS

Hardware Trouble-shooting information is found in Chapter-4

Appendixes as follows

Appendix A ~ Hardware programming templates / tables that help installer and system owner record facts about the hardware configuration that will be used when setting up the software correctly.
Appendix B ~ How to … connect to HyperTerminal
Appendix C ~ How to … read the panel settings shown through the embedded web page
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Appendix O ~ Relay Board Help: dipswitch settings, board ID / relay # chart

Additional Supporting Documentation

This hardware manual provides software programming tips to aid installer in walk testing the hardware during the installation process. The following documents provide extensive instructions on the System and Software Installations.

Table 1: RELATED DOCUMENTS

MANUAL NAME	DESCRIPTION
System Galaxy Software Installation	installing/upgrading the software/database.
Also in HTML which can be started from the GalSuite Install splash screen (IE 6 or later).	
SG Software Requirements Manual	for PC's / Servers that run software/services.
System Galaxy Software Manual	features, programming and use.

1.2 IMPORTANT: Product Safety and Precautions

These notes apply to 635-model & 600-model Controllers (and their boards). Please read and follow.

WARNING - Failure to obey safety warnings could result in serious bodily injury, death, and/or damage to equipment, and/or loss of data, and/or undesirable equipment/system operation.

1. **Installation and Maintenance:** Installation and maintenance of System Galaxy hardware and software must be performed by an authorized/certified dealer. Always use best practices when installing and operating Galaxy equipment and peripheral hardware devices.
2. **Controller Power Supply:** The 635/600-Series Controller uses a power transformer 110 volts alternating current (110 VAC), however the circuit boards are low-voltage 12 VDC from the internal power supply. ALWAYS use the power transformer provided with the controller cabinet and the specified power source.
3. **Multiple power supplies:** Door Locks should have a separate power supply. If wiring more than 4 proximity readers on a single controller, technician should install a second power supply to avoid undesirable operation.
4. **Controller Power Source:** controller must be connected to a non-switchable power circuit.
5. **Power Hazards:** this equipment should be installed and operated only with the type of power source indicated in the instructions (or labels). **Serious bodily injury or equipment damage could result.**
6. **Power Cord Protection: route power cords and other wires/cables wisely.** Avoid trampling, straining, pinching or chafing. Electrical shock or equipment damage could occur.
7. **Overloading Hazards:** Do not overload the power supplies or equipment.
8. **5-V Reader Voltage Regulation:** Do not connect 5v Reader directly to a 635-DRM. You must install voltage regulator at reader end. (With 600-DRM/DPIs, install onboard voltage-jumpers in 5-volt position.)
9. **Grounding: Do not ground the controller to cold water ground/earth ground.**
10. **Moisture & Water Hazards:** This equipment is non-condensable and **must be mounted in a dry and protected area.** Do not install or use this equipment in or near sources of moisture such as exposure to weather, rain, pools, car washes, air conditioners, or moisture. **Serious bodily injury, death, or equipment damage could occur.**
11. **Object & Liquid Penetration Hazards:** Do not insert (or use) objects in the equipment that are not approved, as they could touch voltage points or short out parts. Never spill, pour or apply any liquid substance on the equipment. **Failure to heed could result in electrical shock or equipment damage.**
12. **Cleaning:** Do not clean equipment with water or liquid. Electrical shock or equipment damage could occur.
13. **Heat Hazards:** this equipment has **-10º C to +60º C (14 º F to 140 º F)** temperature specs. Avoid mounting close to heat sources or uncontrolled climates. Equipment failure could result.
14. **Static Electricity:** Take standard precautions to avoid static shock if handling the circuit boards.
15. **Mounting Safety:** This equipment is designed to be wall mounted. Never place or install this equipment in a location or manner that is unstable to avoid personal injury or equipment damage.
16. **Burden:** do not place or rest any heavy object on this unit – the unit could fall or become detached from its mounting and result in personal injury or equipment damage.

1.3 Hardware Certifications & Compliances

The 600-Series & 635-Series Access Control Panel (ACP) is listed as follows:

REGULATORY STANDARDS

- UL 294, Fifth Edition, Access Control System Units
- UL 1076, Fifth Edition, Proprietary Burglar Alarm Units and Systems
- CSA C22.2, No. 205-M1983, First Edition, Signal Equipment
- CE EN-50133
- RoHS Compliant

Installation and Service for Galaxy Hardware:

Installation and service of Galaxy hardware / components must be performed by a ***Galaxy-certified Technician***.

Power Source for Galaxy Access Control Panel (ACP):

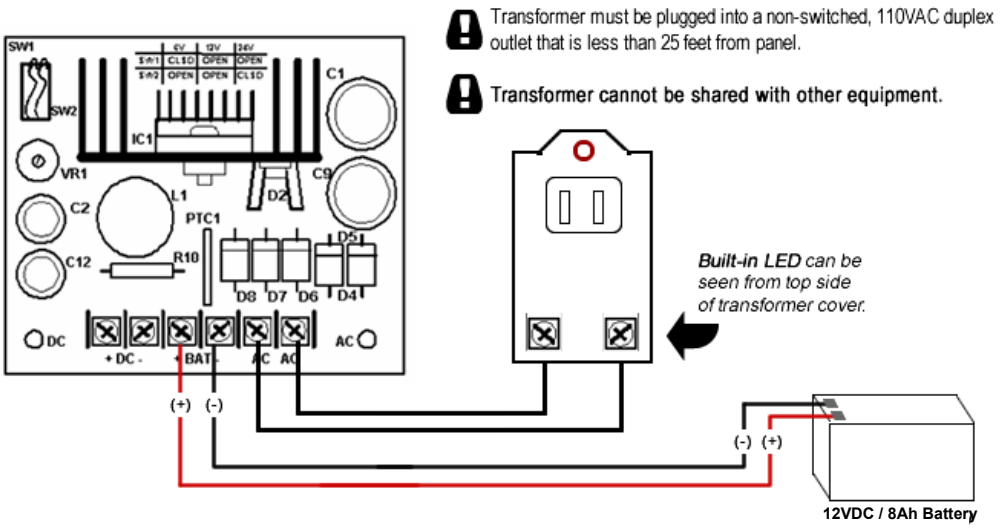
The Galaxy Controller requires a continuous power source from a 110VAC ***non-switched outlet*** that is less than 25 feet from the control panel. (Do not connect the power adapter to an outlet that is controlled by a switch.)

AC Power Transformer, Class-2, Plug-in Type (shown with Altronix Power Supply):

The AC Power Transformer, used by Galaxy controllers, must meet following requirements:

- Must be a Class-2 Plug-in Transformer with fused secondary.
- AC Transformer must be plugged into the 110VAC non-switched, duplex outlet.
- Transformer must not be shared by any other equipment.
- Requires 1 pair of 18 AWG wire (minimum).
- Input-rated at 120 VAC / 48 VA at 60 Hz,
- Output-rated 16.5 VAC / 40VA at 60 Hz.
- Must be UL-Listed and CSA-Certified.

Galaxy access control panels that require AC transformers are only intended for use with a UL Listed, Class-2 transformers, like the one manufactured by ***Universal Power Group No. UB1640WR***.



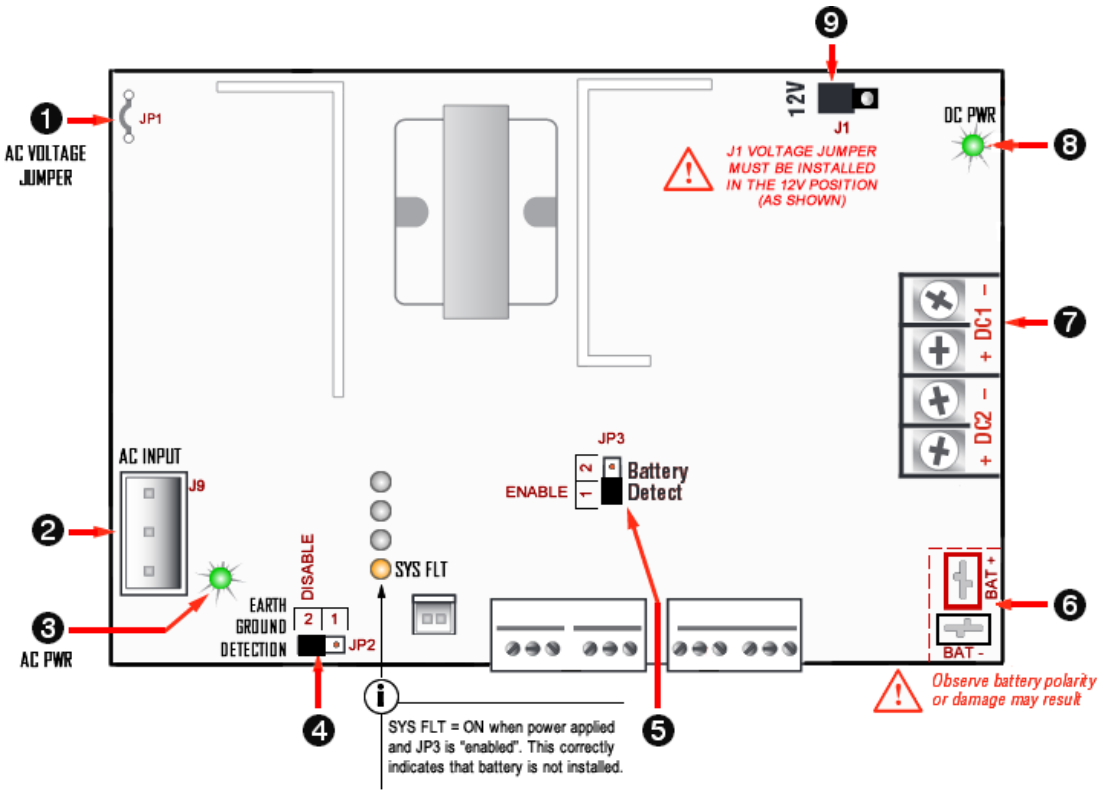
- - - See NEXT PAGE for LifeSafety Power Supply - - -

Power Supply (LifeSafety FPO75) for Controller (no transformer needed / for US or International):

The LifeSafety FPO75 (75 Watt) Power Supply does not use a plug-in transformer. LifeSafety Power Supply is compatible for international installations.

CAUTION: **Power Input Jumper (JP1) is set 120 VAC/ 60 HZ** (Factory Default; i.e. JP1 is closed/not cut). You must correctly configure the power input JP1 jumper wire – see FlexPower install manual that is shipped with the power supply. Failure to correctly configure JP1 will cause equipment damage or hazard.

- For 120 VAC / 60 Hz input power = JP1 CLOSED (Factory Default) ▸ Do not cut JP1 Jumper Wire.
- For 230 VAC / 50 Hz input power = JP1 OPEN ▸ Cut the JP1 Jumper Wire (at red dot).
- Only use 12VDC Output switch position SW1. Galaxy Controllers do not support 24VDC.



1) **JP1 - AC Input Voltage Jumper** (120/230VAC):
   - For 120VAC = JP1 is UNCUT (Factory Default)
   - For 230 VAC = JP1 Wire must be CUT
2) **J9** - AC Input Connector (3-prong)
3) **LED** - AC Power LED (ON/OFF)
4) **JP2** - Earth-Ground Jumper (enable/disable) = **DISABLED (position 2)**
5) **JP3** - Battery Jumper (enable/disable) = **ENABLED (position 1)**
6) **J2/J3** - Battery Connections for back up battery (+/-)
7) **TB1** - Terminal Block for DC Voltage Output Lugs (DC1)
8) **LED** - DC Power LED (ON/OFF)
9) **J1 (or SW1) - DC Output Voltage Jumper** = **must be set to the 12V position!**

Also: ⓘ SYSTEM FLT LED - Can indicate a missing battery when JP3 is "enabled" and AC power is applied/on.

1.4 Hardware Replacement Parts

The 600-series and 635-series Access Control Panels use the following replacement parts:

1.4.1 ORDERING POWER TRANSFORMER & BATTERIES

- **+3V Lithium Battery – Panasonic CR2354**
  - **Galaxy PN 53-2035-00**
  - Installs on-board, for the 600-CPU, 635-CPU. Observe polarity when installing.

- **12V / 8Ah (or equivalent) Sealed, Lead-Acid battery – Universal Power Group UB1280**
  - **Galaxy PN 90-0714-53**
  - Installs inside the 600- or 635-series controller cabinet.
  - Replacement every 3-5 years.
  - Do not short-circuit; observing polarity when installing.
  - Avoid total discharging (deep discharging).
  - **WARNING: risk of fire, explosion, or burns. Do not open, disassemble, incinerate or heat above 65°C.**

- **16.5 / 40VA AC Transformer; Class-2 Plug-in - Universal Power Group UB1640RW**
  - **Galaxy PN 90-0714-52**
  - Input rated 120 VAC / 48 VA at 60 Hz
  - Output rated 16.5 VAC / 40VA at 60 Hz
  - Must be plugged into a 110VAC, non-switched outlet. Install at distance less than 25 feet from panel.
  - DO NOT connect controller power adapter to an outlet that is controlled by a switch.
  - Transformer cannot be shared with any other equipment.

1.4.2 ORDERING REPLACEMENT BOARDS

Table 2: REPLACEMENT BOARDS AND PARTS

635 BOARDS		600 BOARDS		OTHER PARTS
635 CPU: **20-0635-30**		600 CPU: **20-0600-60**		**+3V Lithium Battery: 53-2035-00**
635 DPI/DRM: **20-0235-10**		600 DPI: **20-0268-40**		**12V / 8Ah Sealed, Lead-Acid Battery: 90-0714-53**
				16.5 / 40VA AC Transformer: 90-0714-52 (***Class-2 Plug-in***)

1.5 Hardware Capability: Panel-Level (CPU)

1.5.1 Controller Capability of the 600/635 Model Access Control Panel:

- **TCP/IP (CPU on-board) Ethernet Network Communication:**
  - **635 MODEL CPU = 10/100 MB / Full Duplex Auto-sensing Ethernet Network capable** (600 Model CPU = 10MB Full Duplex Ethernet Network capable)
  - 600/635 models auto-detect/auto-connect to the System Galaxy **GCS Event Service** after the CPU is correctly configured for the field settings (provided the Communication Server is installed/online).
  - **CPUs and daughter boards must be configured*** with correct field settings by the installer.

    * 635 CPUs have embedded Web Configuration page which is auto-detected when the browser and CPU are on the **same network segment** and **port 80 is open**. All CPUs and daughter boards can be configured with the Web Configuration Tool or with a terminal emulator such as HyperTerminal. Some daughter boards use dipswitch and jumpers to set certain features. See *Chapter-2*.

- **50,000 card/user capacity/per cluster: expands to unlimited cards** if 'Card Lookup' feature enabled.
  - Supports all card technologies: Prox 125KHz, Barcode, Magnetic Stripe; HID® iClass®; MIFARE®, MIFARE DESFire™, MIFARE DESFire™ EVI;
  - Supports Government-compliant Readers/card data: HSPD-12 & FIPS 201; PIV, PIV2, FASC-N 200bit, 75bit CHUID; TWIC; CAC-Legacy, Transition, Endpoint; PKI challenge to Personal Certificate(PAK)
  - Supports Biometric Identification/Authentication Readers: Sagem 2/300, Sagem 100/110, Sagem520; L-1 Identity (Bioscrypt) 4G-Series Readers; Morpho MA SIGMA (Legacy mode), MA SIGMA 5G Mode*

    * SIGMA 5G mode is supported on systems where System Galaxy 10.4.8 (or higher) is integrated with the MorphoManager/BioBridge software for enrollment of biometric credentials. The SIGMA reader must be added to the MorphoManager software and the system supports Biometric (finger only – 1:many) and Prox+Biometric (card+finger – 1:1) . See *SG SIGMA with MorphoManager Guide*.

    Note: SIGMA Legacy mode is supported on SG with the traditional biometric enrollment and does not depend on MorphoManager or BioBridge module.

- **254 user-definable Time Schedules per cluster:** plus 2 fixed schedules ("Always" and "Never")
- **256 user-definable I/O Groups per cluster**
- **256/Unlimited Access Control Groups:** 254 user-definable access groups, plus 2 fixed ("Always"/"Never") and **expands to unlimited** with the *Personal Doors* feature enabled.
- **10,000-event memory buffer/per CPU** (i.e. *controller*)**:**
- **NON-DEGRADED OPERATION** - Galaxy Panels remain fully operational even when the system or database server is "offline". Full functionality is maintained because all users, cards, access rules, schedules and hardware operational settings are stored in the CPU memory. If the Communication (Event) Server or Database servers are offline, the panel stores its log events in memory until the CPU is able to reconnect. Upon reconnection, the CPU returns to live event logging and transmits all offline events to the database. The "offline" events are available via system reports. Any programming changes made at the software will be stored in the database until the panel comes back online and the data is loaded via the DataLoader service or GCS Load Utility.

1.6 Hardware Capability: Board-Level

1.6.1 List of Boards and Component Descriptions:

This is the list of CPU & Daughter Boards as of System Galaxy v10 Software.

1. **CPU Board (600 model & 635 model)** - Central Processing Unit
   - Supports up to 64 Devices (readers, inputs, etc.) per CPU board/panel
   - Factory installed 3V lithium backup battery.
   - Pre-loaded (factory-default) s28 Flash – may require field update to match site system version
   - 9-pin D-Shell, RS232 Serial Port – for configuring CPU with a serial programming cable via Laptop/PC

Table 3: CPU COMPONENTS (635 vs 600)

635 MODEL CPU	600 MODEL CPU
coldstart jack ("park" to warm-reset)	reset switch (1 sec. warm reset/10 sec. cold reset)
RJ-45 Ethernet jack	HFJ-11 Ethernet Jack (Auto-sensing 10/100MB)
Configure the IP Address using the RS232 Serial Port and programming cable	Configure the IP Address using the embedded web tool (option: or use the serial programming port/cable)

2. **DPI/DRM Board (600/635)** - Dual Port Reader Interface / Dual Reader Module
   - Supports 2 readers per board
   - 2 surge suppression diodes (to suppress lock surge)
   - 2 supervision resistor/sockets (and 4.7K resistors factory default)
   - 4 Form C SPDT Relays (2 relays each section/port)
   - SW1 reset switch

Table 4: DRM COMPONENTS (635 vs 600)

635 MODEL DRM	600 MODEL DPI/DRI
(not applicable) install a voltage regulator if using 5V readers	12v/5v reader port voltage jumpers
Board ID is set using the SW2 dipswitch	**Board ID is set using CPU RS232 Serial Port** (directly connecting a PC using a programming cable and running HyperTerminal® or similar emulator.
1 RS-485 Communication Port	(not applicable)
Enable/Disable section-2 via SW2 Dipswitch Option-B; only used for the RS485 Comm. Port if remotely installing the DRM on an RS485 Multidrop	(not applicable)`
Power Input terminal for "wet lock relay operation" 4 Form C SPDT Relays (2 relays each section/port)	(not applicable)
"Wet-Lock-Relay" Jumpers to enable/disable the option (for relay-1 on each section)	(not applicable)

3. **600 DIO Board** - Digital Input / Output Board–

   - Supports maximum **8 inputs per board**
   - Supports maximum **4 outputs per board**
   - SW1 Reset Switch

4. **DSI Board** - Dual Serial Port Interface –

   - 2 RS485 Communication Ports per board (Section-1/Section-2)
   - SW1 Reset Switch
   - **120 K ohm termination resistors** *included with board* (**only install** resistor near the RS485 connector if the board is at the end-of-line for the 485 Section (channel) you are wiring. Treat each section independently; one section could be at EOL when the other section is not.

5. 600/635-model Relay Board - for General Output or Elevator Control

   - Supports 8 outputs per board
   - Uses Form-A SPST Relays.
   - RS485 Communication Port (3-pin A/B/GND)
   - Board ID is addressed via dipswitch

6. **635-model Input Board**

   - Supports 16 Inputs per board (normally open/normally closed must be set in the software screen)
   - RS485 Communication Port (3-pin A/B/GND)
   - Termination Jumper (2-pin black) – installer must install jumper only if the board is at the end-of-line.
   - Voltage / Tamper input terminal provided
   - Board ID is addressed via dipswitch

1.7 Hardware & System Descriptions

1.7.1 Description of Galaxy Access Control Panel:

ENCLOSURE DIMENSIONS:

- **18 GAUGE ELECTRICAL CABINET, HINGED**
- **8-DOOR/MEDIUM = 18 x 13.75 x 6.25 in.**

ADDITIONAL PANEL SIZES OFFERED:

- **2-DOOR/SMALL = 12 x 12 x 4 in.**
- **16-DOOR/LARGE = 32 x 13.75 x 6.25 in.**
- **8-DOOR/RACK MOUNT = 7 x 19 x 18.75 in.** (18 x 49 x 48 c1m) (Std. 4 Rack Units)

COMPONENTS IN THE DOMESTIC 8-DOOR CONTROLLER :

- **Factory-installed Power wiring harness for board power** (pre-stripped wire tips are covered with shrink-tubing to prevent shorts)
- **Factory-installed power supply (1) for powering CPU and daughter boards** (prewired to harness, with jumpers preset to factory default (see manufacturer's specifications for your power needs) - Additional power supplies may be needed for readers and field devices.

  See Power Requirements Section of this guide as well as installation instructions – and the original manufacturer's instructions for the reader or device)
- **Factory-installed tamper switch** (prewired to wiring harness)
- **1 ribbon cable for IC2 Data Bus** (with board connectors crimped in place)
- **1 power transformer 110VAC / 60Hz and AC Cable**
- **1 battery for back up power** (12VDC / 8 A-hr – individually wrapped/boxed)
- **1 pair of battery wires** (pre-installed on the power supply)
- **1 set of keys for the door lock on the enclosure**
- **1 *Serial Programming Cable*** that connects the CPU to a PC Com port for 600 model. Note: 635 CPU and Daughter Boards* are configurable via web interface using port 80.

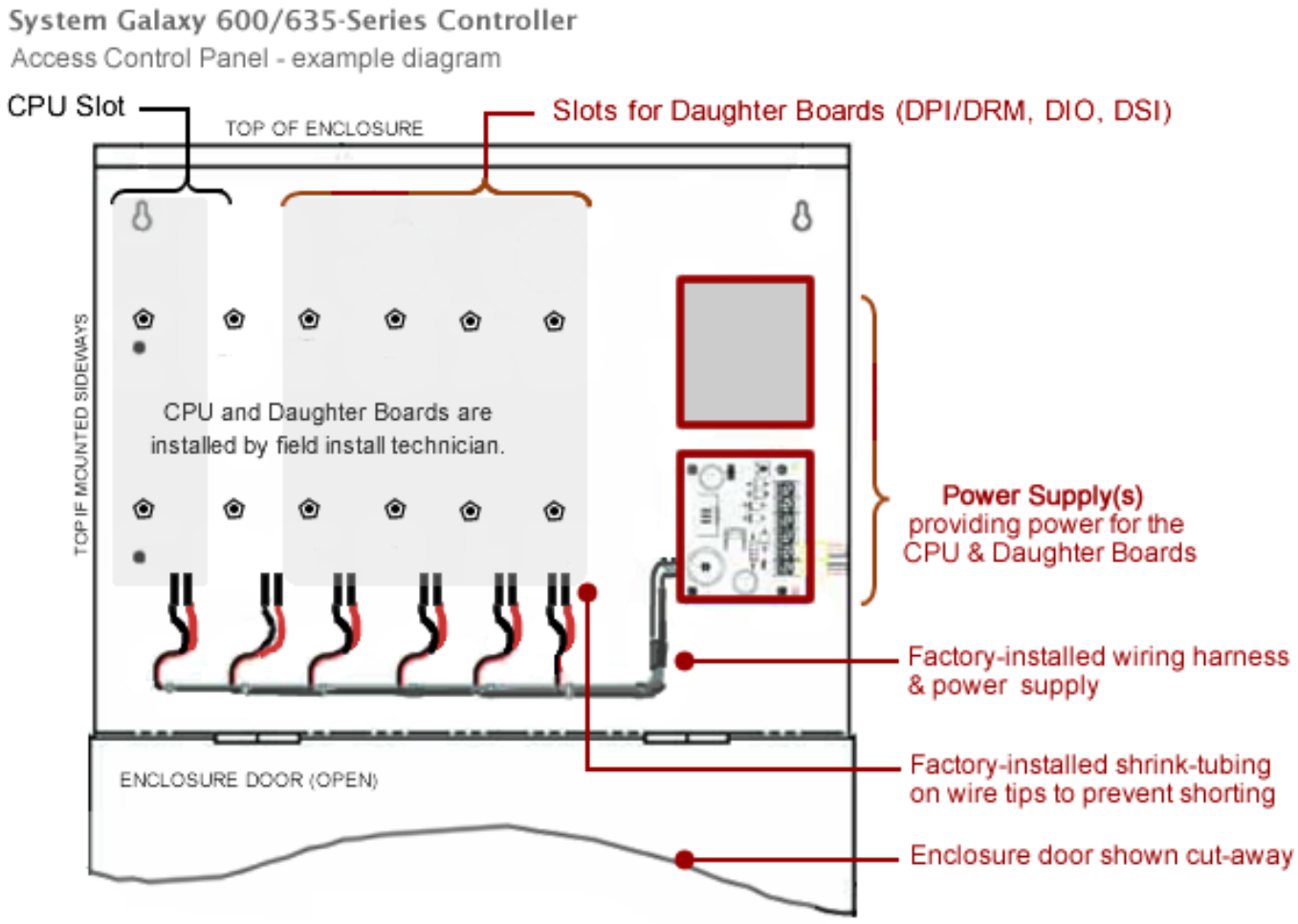
  * Some Daughter Boards require setting the Board ID and other options using the SW2 dipswitch BEFORE mounting boards inside the enclosure.

  Also any on-board jumpers (all models) must be set BEFORE mounting boards.
- **CPU & Daughter boards are shipped individually per the Dealer's purchase order.**

NOTE: This list represents a standard, domestic 8-Door Panel. Components may vary for other domestic and international panels and other sizes

See diagram on next page for example of controller cabinet.

Figure 1 – 600/635 Model Controller (Access Control Panel) Basic



1.7.2 635/600-series CPU Description:

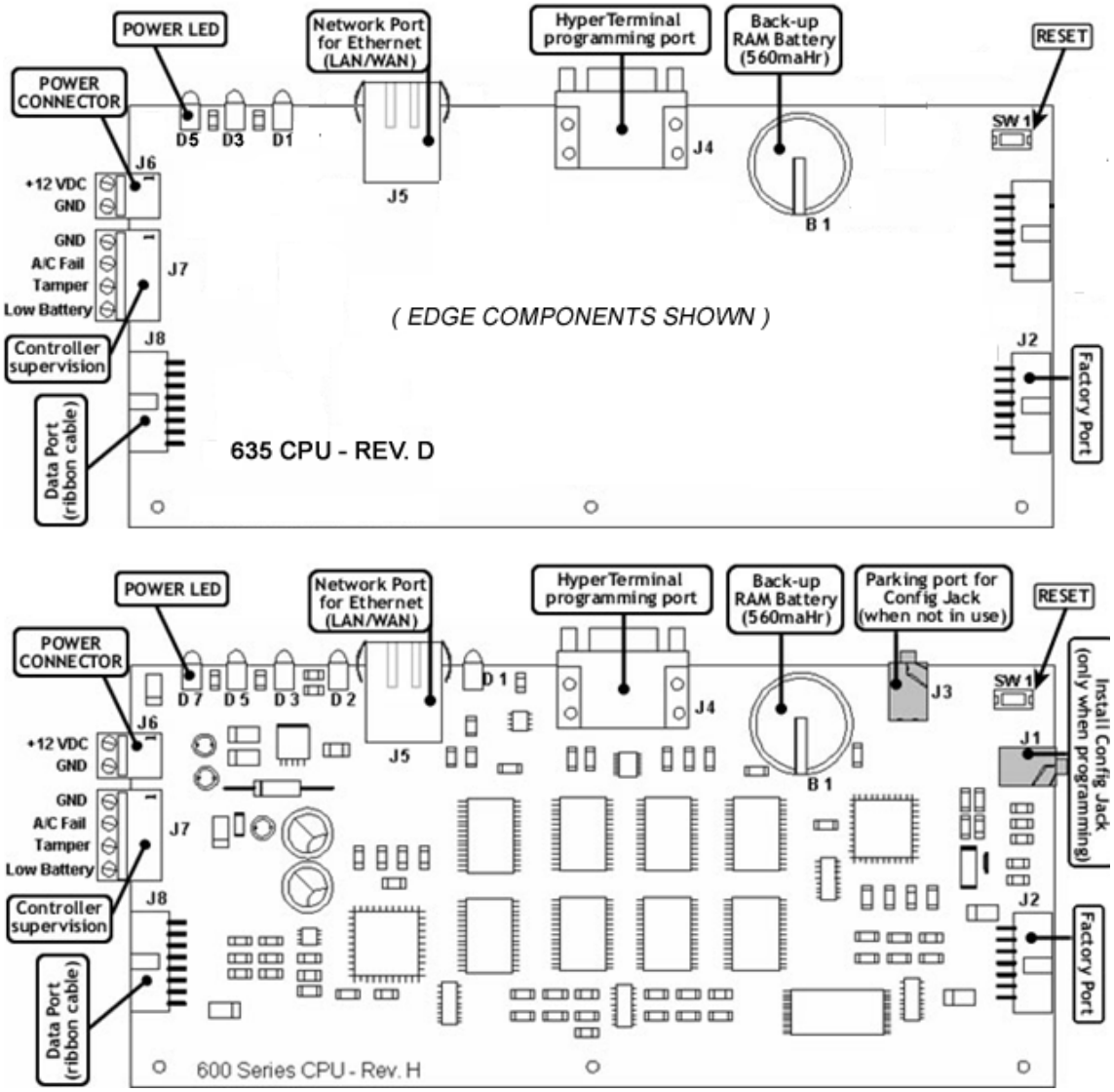
See Appendix M for complete list of CPU components

The CPU Board is the brains of the controller and holds the S28 Flash Code in its memory.

635 CPUs are compatible with all 635 and 600 series daughter boards.

- CPU must run the correct version S28 that matches the software (see instructions in chapter 2)
- CPU provides on-board Ethernet (TCP/IP 100 MB full duplex) ; LEDs indicate connection / transmission
- 635 & 600 CPUs provide board programming options via the on board connections via TCP/IP using the *Galaxy Configuration Tool (635) or* (RS-232 at J4 (600 only) using *HyperTerminal* or *Putty Tool*
- The 635 & 600 CPUs CPU initiate the IP connection to the System Galaxy Event Server.
- 10,000 event buffer per CPU . During operation, the CPU Board processes events locally (at the panel).

Figure 2 – CPU BOARD EDGE COMPONENTS: 635 CPU (Upper) & 600 CPU (Lower)



1.7.3 635/600 DRM (DPI) Description:

See Appendix M for complete component list of 600 DPI

The DRM (DPI) Board controls the readers, door contacts, request to exit, door lock, and offers an additional output relay for both reader/door ports. 600 and 635 DPI's are interchangeably compatible with either a 635 or 600-series CPU.

635-DRM WARNING – Do not connect a 5v Reader directly to a 635-DRM. You must install a 5-VDC voltage regulator in line – preferably at the reader end.

635-DRM NOTICE – See Appendix-Q of this guide for installation instructions including wiring Lock Relays for wet relay operation.

- **Controls two (2) Reader ports (sections) per board**, including contacts for Door Contacts, REX devices.
- **Controls two (2) Lock Relays per board** (one relay per reader port/section); Form C SPDT DRY RELAY.
  - » 600/635 Lock Relays support either Fail-safe or Fail-secure wiring; Dry relay Fail-safe or Fail-secure wiring is shown in Chapter 2 (see 600 DPI board layout in Appendix M;). All 635 Wet Relay wiring is shown in Appendix Q).
  - » 600/635 Lock Relays a support Dry Relay operation by default,
  - » 635 only supports wet relay operation for Lock Relays; wet/dry operation is independent per section. See Appendix Q for 635 instructions.
- **Controls two (2) Output Relays per board** (one relay per port/section); Form C SPDT DRY RELAY. Relay-2 supports either Normally Open or Normally Closed device wiring.
- LEDs are provided on the edge of board to indicate when a Relay is activated (LED = solid on) or deactivated (LED = off).

1.7.4 600 DIO Detailed Description:

See Appendix M for complete component list of 600 DIO

The DIO Board controls eight (8) input devices and four (4) output devices per board. The board comes with built-in supervision and Hypervision capability that is turned on from the System Galaxy software after end-of-line supervision resistors have been installed. The Output Relays are Dry Form-C SPDT relays that can be wired Normally Open or Normally Closed based on they type of device being used (see diagram of DIO in Appendix M).

1.7.5 600 DSI Description:

See Appendix M for complete component list of 600 DSI

The DSI Board controls two (2) RS-485 serial ports per board for the following devices:

PERIPHERALS

- Cypress Clock (Time Clock model 1201)
- Galaxy LCD custom message display (displays time and custom messages upon card swipes)

OUTPUT RELAYS

- Galaxy Output Relay Board (Elevator Control or General Output Relay control)

WIRELESS READERS

- IR Schlage RS-485 PIM for Wireless Readers (Legacy)
- Schlage AD300 Hard-wired Readers
- Schlage AD400 Wireless Readers
- Assa Abloy Aperio Wireless Readers
- Salto Salis Wireless Readers
- Other wireless readers – see www.galaxysys.com

1.7.6 600 RELAY BOARD Description:

See Appendix M for complete component list of 600 RELAY BOARD

The Relay Board controls eight (8) Form-A SPST relays per board. The board supports General Output control or Elevator Relay Control. The Relay Board is daisy-chained to the RS-485 port of the DSI board – rules apply (see Chapter-2 for details; and diagram in Appendix M).

In General Mode, output relays can be triggered by DIO inputs or by certain alarm events (reader & controller) using I/O Groups (mapped in the software). General relays can also be directly controlled from a software (i.e. hardware tree, device status, or graphic screen).

Elevator Control mode is also set up in the software after the Relay board have been installed. See Chapter 2 for hardware installation instructions.

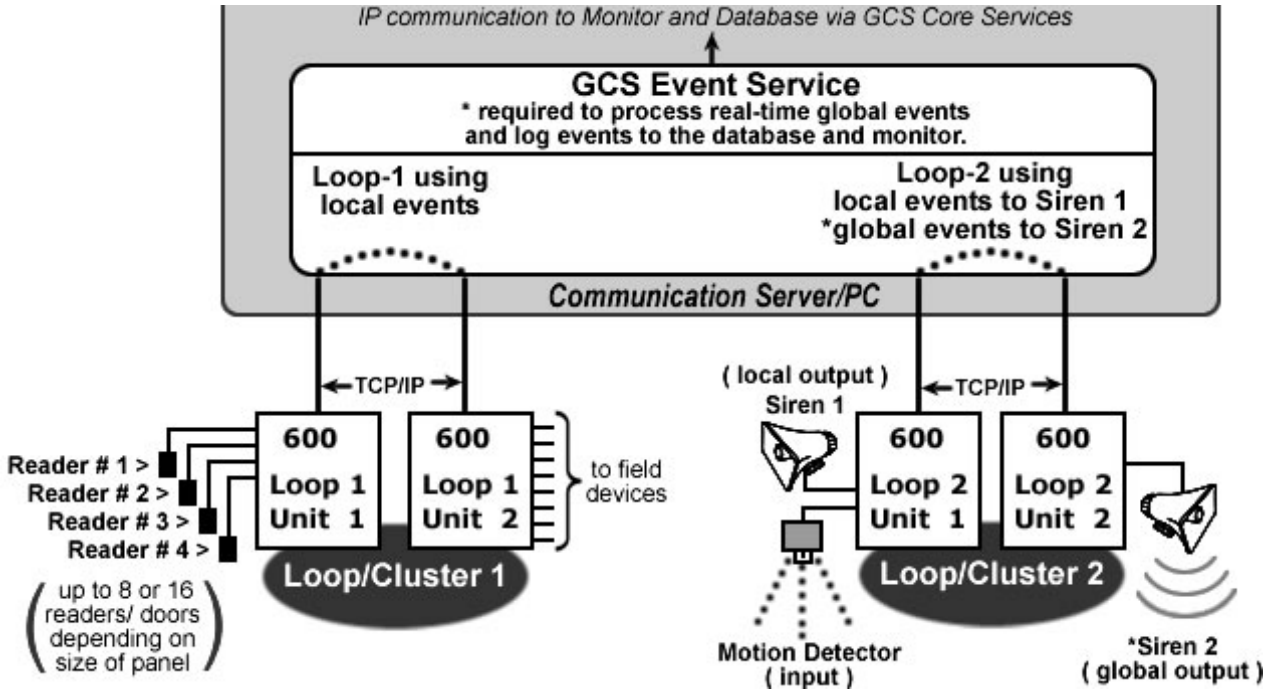
1.7.7 The System Described:

The **hardware side of the system** includes controllers (panels) and all field hardware (readers, locks, REXs, etc.) that make up the access control system. The panels interoperate with the *System Galaxy Software* by sending event messages over a LAN/WAN network to the Event Server (i.e. Communication Server/PC). *GCS Services are involved – see figure-2.*

The **event messages** are handled by the *GCS Event Service* (running on the Event Server) and are logged to the SG database and SG monitoring software. *Core GCS Services are involved in routing the messages properly - see figure-2. Also see diagram of core services in Chapter 3 Figure 26). The GCS Event Service is described in Chapter 3 of this manual. GCS Services are explained in-depth Chapter 11 of SG Software Manual.*

600-series **controllers initiate the connection** to the Event Server. The panels are grouped into (assigned to) *Clusters,* which are equivalent to a *Loop* in the software, but there is no primary panel in a cluster. Each panel initiates its own connection to the Event Server. NOTE: A cluster can be thought of as a TCP/IP loop (or virtual loop); not a hard-wired 422 loop. A panel can send *global events* to other panels in the same loop/cluster. **The GCS Event Service must be running to support *global events* within the cluster (see Figure 1 below for example of global events).**

Figure 3 - Concept Diagram showing how *Global Events* use the GCS Event Service

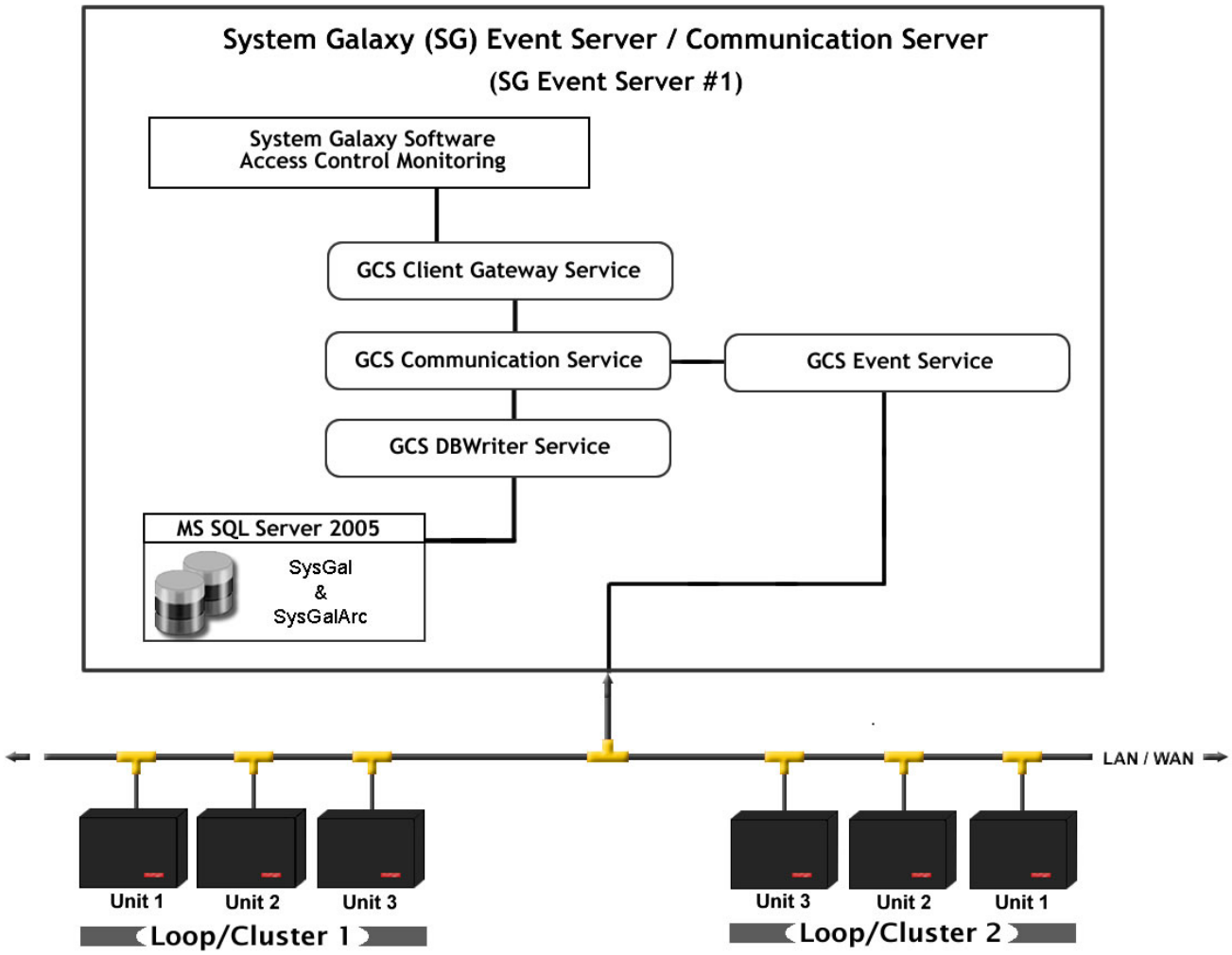


1.7.8 SG System Diagram – Communication/Event Server:

In the diagram (below) you can see how the *GCS Services* are connected and transmit messages to the *System Galaxy Database* and to the *System Galaxy Software/Monitoring screen*. Likewise, messages go from the software to the panels via the GCS Services.

Figure 4 - System Diagram of *600-series Loop/Clusters* connecting to Event Server

This diagram shows a stand-alone installation (all Software and Services on one server).



1.7.9 SG System Planning Notes:

While the installer can begin installing the Galaxy Hardware before the software and database are installed, keep in mind that the SG Database & Communication Server (software/database &GCS services) must be installed before the panels can connect to the system and be walk-tested.

1. **Basic hardware tests** can be performed using the **Web Configuration Tool / Embedded Web Page** of the CPU before the system walk-through is performed.
2. **A full walk-test** can be performed after all hardware has been installed, configured and is programmed into the SG Software/Database, and panels are connected to the GCS Event Service (system is online).

Tips on Planning an Installation:

1. **Obtain and use site plans, blueprints and drawings (as needed).**
2. **Use the *Programming Templates*** (from **Appendix A** of this Guide) **to record information about the exact hardware configuration**. This information is valuable in the following ways:
   - Helps installer keep track of the hardware during the hardware installation & configuration process
   - Helps installer correctly identify all hardware during basic hardware tests, troubleshooting & walk-tests
   - Helps installer correctly configure the hardware into the SG Software/Database
   - Helps the customer's IT Administrator understand how to support the Hardware on the LAN/Network
3. **Determine how many panels and boards you will need to install.** .
4. **Determine the types and quantity of field devices you will need** (readers, locks, contacts, input and output devices, clocks, separate power supplies, wiring and other field equipment).
5. **Determining the Location of controller(s) and field devices.** Remember to follow Safety, Mounting, Wiring and Distance Specifications (see other sections in Chapter 1 for these specifications).
6. **Use the correct type of wiring for field devices.** Be sure to consider the type of ceiling (plenum vs. non-plenum). **(Reference Chapter 1 Wiring Specifications)**
7. **Contact the Network Administrator to get network access on the LAN/WAN network.**
   - **Chapter 1 – Network Requirements** covers LAN network requirements for Galaxy hardware.
   - **Chapter 1 later sections that** cover software & system requirements for connecting to Galaxy GCS Services. This is necessary for logging data to the database and event screen. *This information is also helpful for troubleshooting connections.*

1.8 CPU & Board Flash Requirements for 600/635-Series Hardware

1.8.1 About Factory Flash and Field-Flashing the CPU:

CPU boards come with a pre-installed, factory flash code. ***Factory flash*** allows a technician to install the boards and configure the *network parameters* and other board settings even before they have been *field-flashed* to the current field version. This lets the installer configure. **The boards must still be *field-flashed* to the correct flash version if the factory flash doesn't match the System Galaxy software, in order to operate correctly**.

- **IMPORTANT:** All CPUs and daughter boards must be running the correct ***S28 version*** of flash (i.e. field flash code) that is compatible with the System Galaxy software operating at the field install site. You may need to upgrade or downgrade your boards in order to match the system version in a repair scenario.
- **IMPORTANT:** ***Field-flashing*** a controller CPU can be done using the GCS Loader Utility, after configuring the CPU board settings and IP/network parameters, AND Event Server IP Address.
- **NOTE:** If the ***factory flash*** already matches the ***field flash version***, the installer does not need to flash the board.

NOTICE: When downgrading a factory CPU to older site flash code v5.0 (or older), it is advisable to keep the **I2C Ribbon Cable** disconnected from the CPU to prevent daughter boards from prematurely updating to the factory-flash. Reconnect the CPU to the I2C Bus after the CPU flash has been correctly updated (including validate & burned). See Chapter-2.

IMPORTANT UPGRADE INFORMATION FOR ALL SYSTEMS

A. For systems upgrading from 5.00 Flash or lower - panels must be upgraded in a three-step process:

- **If panels are running v5.00 /4.77 Flash (or lower), you cannot go straight up to 10.4.x** (or current flash) – the flash process will not complete, although it will not damage the board. Drop back and run the "stepstone" file and then run the "release" file.
- Remember: CPU flash version must match the SG Software Version. Reference *Flash Version Table* in Chapter 1 or 2 to confirm which flash versions are needed.

1. **First the CPU must be upgraded to the current "stepstone" file version.**
2. **Then the CPU must be upgraded to the flash "release" file version.**
3. **Finally, all daughter boards must be updated to the flash "release" version.**

B. For systems upgrading from 5.04 Flash or higher – follow the information below:

- **If site is at 5.04 you must disconnect all 635-DSI boards. This does not affect 600 DSI boards.**
- **This does not affect later versions after 5.04.**
- **To find out if you have any 635-DSI Boards,** send a [Get Board Info] from the Controller Programming screen in the System Galaxy software (or look up Panel Summary via the CPU's *embedded web page*).

1. **First disconnect the 635 DSI's from the Data ribbon cable.**
2. **Upgrade the CPU flash . Then upgrade the other daughter boards as normal.**
3. **Finally upgrade each 635-DSI Board individually.**

   To do this, connect one DSI board to the ribbon cable and upgrade it before connecting and upgrading the next one. To trigger a flash update, click **[Allow Board Flash Update]** button in GCS Loader or webpage.

CPU's and daughter boards can be flashed using the GCS Loader Utility from the System Galaxy software: Launch the GCS Loader Utility from the software by right-clicking on a *loop/cluster name* in the Hardware Tree. Use the *_stepstone.s28 and the *_release.s28.

CPU's and daughter boards can be flashed using the embedded webpage (browser): Launch the panel's embedded webpage by using the 635 Config Tool or by entering the panel's IP Address into the browser url. Use the *_stepstone.bin and the *_release.bin. Browser/PC must be on the same network segment as panel.

SUPPORT: Consult Galaxy Technical Support if you any questions.

1.8.2 About Updating the Flash for Daughter Boards:

Daughter boards (DPI, DRM, DIO, DSI) come with a pre-installed factory flash, which allows boards to boot-up before flashing. The boards may still need to be field-flashed to synchronize the board with the correct field flash version.

- GENERAL OPERATION NOTICE (DPI, DRM, DIO, DSI): **All daughter boards must operate using the correct flash version.** The correct version is the version that comes with the *SG Software*. Open the **Help ▸ About screen** from the SG menu to see which version of flash your site's daughter boards should be running.
- END-VERSION NOTICE FOR 600 PANELS & CLUSTERS: **The end-version for 600-panels is v10.5.6 Flash.** This means 600-Panels on an SG-11 System must run v10.5.6. All panels on a 600-Cluster or on a mixed Cluster must run v10.5.6 If any 635-Panels are mixed-in with 600-Panels, must run v10.5.6. 635-Clusters should be running the correct release version of flash.
- 635-CPU FLASH DOWNGRADE NOTICE: **Downgrading a 635-CPU to v10.X (or lower) resets the Cluster and Unit ID to '255'.** If you are replacing a CPU on an older system (SG 10.X or lower), you can pre-flash the CPU to the target version by using the CPU's Factory IP Address (192.168.0.150) and [Update Firmware] link in the Panel Status webpage or use the Factory Test Station.
- DAUGHTER BOARD – CURRENT 'MANUAL-FLASH' NOTICE (v5.04 S28 to Current): **Currently you will manually start flashing boards by using the [Update Boards] button/link.** [Update Boards] button is located in the *EZ80 Screen* of the GCS_Loader Utility or in the CPU's Panel Status webpage.
- DAUGHTER BOARD – BYPASSING THE 'AUTO-FLASH' DELAY TIMER (v5.0 S28): **With old S28 Flash v5.0 (or lower), you can bypass the built-in 10-minute Flash Delay Timer by sending a 'clear auto' command from a Terminal Emulator.** Otherwise the daughter boards will begin flashing 10 minutes after the CPU has finished flashing.
- **With flash v 5.04 or higher,** the CPU does not use the ***10-Minute Flash Timer*** after v5.04 flash. Now the installer must manually initiate the flashing of the daughter boards using the Update Boards button or link.

WARNING: DO NOT INTERRUPT POWER TO THE PANEL OR ANY BOARDS WHILE FLASH IS UPDATING.
Interrupting power during flash update can damage the board memory.

1.8.1 Flash Version Compatibility Chart for SG-11:

Table 5: FLASH VERSION CHART for SG 10 through SG-11 (current)

SG SOFTWARE	FLASH VERSION	635-Clusters CANNOT HAVE 600 CPUs	600-Clusters Can have 600 mixed with 635 CPUs
(new) SG 11.7.0.1	**Flash v 11.0.7 →**	**11.0.7 (1)**	**10.5.6** (600/635 mixed) * (1)
SG 11.6.0	Flash v 11.0.6 →	11.0.6 (1)	10.5.6 (600/635 mixed) * (1)
SG 11.3.0.1	Flash v 11.0.5 →	11.0.5 (1)	10.5.6 (600/635 mixed) * (1)
SG 11.2.0.1	Flash v 11.0.3 →	11.0.3 (1)	10.5.6 (600/635 mixed) * (1)
SG 11.1.0.2	Flash v 11.0.3 →	11.0.3 (1)	10.5.6 (600/635 mixed) * (1)
SG 10.5.6	Flash v 10.5.6 →	10.5.6 (1)	10.5.6 (600/635 mixed) * (1)
SG 10.5.1	Flash v 10.5.3 →	10.5.3 (all boards/all panels) * (1)	
SG 10.4.9	Flash v 10.4.15 →	10.4.15 (all boards/all panels) * (1)	
SG 10.4.8	Flash v 10.4.8 →	10.4.8 (all boards/all panels) * (1) (2)	
SG 10.4.1	Flash v 10.4.1 →	10.4.1 (all boards/all panels) * (1) (2)	
SG 10.4	Flash v 10.4 →	10.4.0 (all boards/all panels) * (1) (2)	
SG 10.3.x	Flash v 5.04 →	5.04 (all boards/all panels) * (1) (2)	
SG 10.2.0	Flash v 5.00 →	5.0 (all boards)	◂ Daughter Boards auto-update after 10-min delay timer expires. To bypass the delay timer, you can send a 'clear auto' command from a *terminal emulator* while you are connected to the CPU.
SG 10.1.x	Flash v 4.77 →	4.77 (all boards)	
SG 10.0.0	Flash v 4.60 →	4.60 (all boards)	

* - The new **RS485 Input Module** or **RS485 Door Module** are not compatible the 600-CPU.

(1) **You must manually start the flash updates to daughter boards**. You can start [Update Boards] from EZ80 tab in the GCS_Loader Utility (or the CPU Panel Webpage).

(2) **635-DSI BOARDS NOTICE:** To upgrade from 5.04 Intermediate Flash to 10.4 (or higher), you must disconnect all 635-DSI Boards from the I2C Data Bus – then connect one 635-DSI and complete its flash update before connecting the next 635-DSI. **This does not affect 600-DSI. This does not affect SG 11.**

See the next page for the Compatibility Charts for SG 11 releases

Table 6: BOARD COMPATIBILITY CHART for SG-10 / SG-11 (see Tables 7 & 8 for SG-9 or lower)

WHEN IS UPGRADING YOUR SG SOFTWARE REQUIRED ?

The table below shows the *minimum required version* needed to support certain features. You only need to upgrade the *SG Software* if your **existing system version** is below the **minimum required version** that is indicated beside the board-feature.

WHEN IS UPGRADING HARDWARE REQUIRED ?...

- If installing **635-Input Module** – upgrade the affected panel to 635 CPU and 635-DSI
- If installing **Wireless Readers or IP Readers** – upgrade the affected panel to 635 CPU and 635-DSI
- If installing a **Galaxy 485 Remote Door Module** – You must upgrade to 635-CPU, 635-DRM, and 635-DSI.
- If installing newer **destination-driven elevator systems**, then you must install all 635-series hardware.

NOTES

- **600-model boards can interoperate with 635-model boards in the same system and within the same control panel.**
- **You can replace older 600-model boards with new 635-model boards whenever needed. In some cases you may need to upgrade the CPU to support the 635-board**

635-SERIES CONTROLLER	
635 CPU Board - Processor • Operates in same loop /system with 600 CPUs • Supports all 635 & 600 daughter boards • Supports all 635-series *RS485* Modules • Supports 600-series *RS485* Devices – restrictions apply • Supports *Destination-driven Elevator Systems (Otis, Schindler, etc.)* • Supports Card Tour Board	
635 DAUGHTER BOARDS	**600 DAUGHTER BOARDS**
600 DIO Board (compat.)	**600 DIO Board**
635 DRM Reader Board	**600 DPI Reader Board**
635 DSI Serial Board	**600 DSI Serial Board**
• 600 Output Module (general output or elevator control) • LCD Clock unit • Schlage PIM 485 ODT (legacy)	• 600 Output Module (general output or elevator control) • LCD Clock unit • Schlage legacy PIM 485 ODT
• Assa Abloy Aperio (SG 10.1*)	• Assa Abloy Aperio (SG 10.1*)
• Salto Salis Wireless (SG 10.2*) • Schlage AD-300 (SG 10.2*) • Schlage AD-400 Wifi (10.2*) • or Mix AD-300/AD-400 (10.2*)	• Salto Salis Wireless (SG 10.2*) • Schlage AD-300 (SG 10.2*) • Schlage AD-400 Wifi (10.2*) • or Mixed AD-300/AD-400 (10.2*)
• Assa IP Readers (SG 10.4*)	• Assa IP Readers (SG 10.4*)
• 635 Input Module (SG 10.4*)	← Not supported on 600-DSI
• Remote 485 Door DRM (10.4*)	← Not supported on 600-DSI
COMPATIBLE MODULES (RS-485 multi-drop)	
600 Elevator/Output Module (using DSI)	
635 Door Module (using 635 CPU & DSI, SG 10.3*) **635 Input Module (using 635 CPU & DSI, SG 10.4*)**	

600-SERIES CONTROLLER	
600 CPU Board – Processor • Operates in same loop /system with 635 CPUs • Compatible/Supports all 600 daughter boards • Supports 635 DRM (Reader board) • Supports 600 Output/Elevator Modules on 600 DSI • *Destination-driven elevator systems and Card Tour are not supported.*	
635 DAUGHTER BOARDS	**600 DAUGHTER BOARDS**
600 DIO Board (compat.)	**600 DIO Board**
635 DRM Reader Board	**600 DPI Reader Board**
635 DSI Serial Board	**600 DSI Serial Board**
• 600 Output Module (general output or elevator control) • LCD Clock unit • Schlage legacy PIM 485 ODT	• 600 Output Module (general output or elevator control) • LCD Clock unit • Schlage legacy PIM 485 ODT
← Wireless and IP readers are NOT supported on 600-CPU	
← 635-Input Board is NOT supported on 600-CPU	
← Remote 485 Door Module NOT supported on 600-CPU/DSI	
COMPATIBLE MODULES (RS-485 multi-drop)	
600 Elevator/Output Module (using DSI)	
← 635 RS-485 Door Module not supported on 600 CPU ← 635 Input Module not supported on 600 CPU	

* Asterisk means this indicated version (or higher) supports the feature listed. If your existing system is below the minimum required version, you must upgrade your system to the latest version of SG Software.

1.8.2 Older Version Compatibility Charts (SG-9 / SG-8):

Table 7: FLASH VERSION CHART for SG-9 (and older)

FLASH VERSION	CPU	DPI	DIO	DSI	SOFTWARE VERSION
V4.57 Flash →	4.57	4.57	4.57	4.57	**SG 9.0.5**
V4.51 Flash →	4.51	4.51	4.51	4.51	**SG 9.0.4**
V4.50 Flash →	4.50	4.50	4.50	4.50	**SG 9.0.0**
V2.30e Flash →	2.30e	1.71d	1.61b	2.31f	**SG 8.3.0**
v1.74d Flash →	1.74d	1.60h	1.40b	2.12a	**SG 8.2.3**
v1.60 Flash →	1.61j	1.60e	1.40b	2.2b	**SG 8.2.2**
v1.60 Flash →	1.60n	1.60e	1.40b	2.2b	**SG 8.2.0**
v1.40 Flash →	1.40d	1.40c	1.40c	*not used*	**SG 8.1.1**

IMPORTANT: you may need to step up the flash to interim versions to make the upgrade all the way to a recent version of SG 10 or 11. Contact Technical Support for assistance.

Table 8: SG 9/8 Software Compatibility for 600-series Board Revisions

Software Compatibility		Hardware Compatibility	
SG Software	**S28 Flash**	**Board Models**	**Factory Revisions** (A, B, C … E, F, etc.)
SG 9.X **SG 8.X**	*See Table above for correct Flash Version*(1)	**600 CPU Board** - Processor Board	All CPU revisions are compatible with all daughter-board revisions.
		600 DIO Board - Input/Output Board	All daughter-board revisions are compatible with all CPU revisions.
		600 DPI Board - Reader Interface Board	
		600 DSI Board - RS-485 Serial Board	

(1) All CPUs and daughter boards should be running the *correct flash code* that was released with the SG Software that is installed on the jobsite. Find the correct flash version by opening the software help window or by opening the Loader Utility. If you replace a board you must flash it to the correct version issued with the installed SG version. If you upgrade the SG Software system, then you must reflash all your panels and daughterboards to the version of flash that is issued with the new SG Software. The flash running in the panel/boards must be in sync with the SG Software version installed. Obey any stepped upgrade flashing instructions mentioned in the prior section. Always contact Tech Support to ensure you have the complete information for upgrading flash.

1.9 Controller Mounting Requirements

1. The controller enclosure **must** be wall mounted using tear-drop shaped mounting holes.
2. Panel can be mounted horizontally (typical) or vertically

- Non-condensable: do not mount in or near water, liquid, moisture or rain/weather
- Clean, reasonably dust-free environment.
- Temperature should be between -10° C and +60° C.
- Location should have limited access for security purposes.
- Do not mount to metal studs or brackets.
- Do not connect Chassis to Cold Water Ground.
- Avoid power transformers and high voltage and high frequency devices.

Figure 5 – 6XX-Series Controller Mounting Requirements:

Applies to both 635- and 600- model controllers. Medium controller shown.

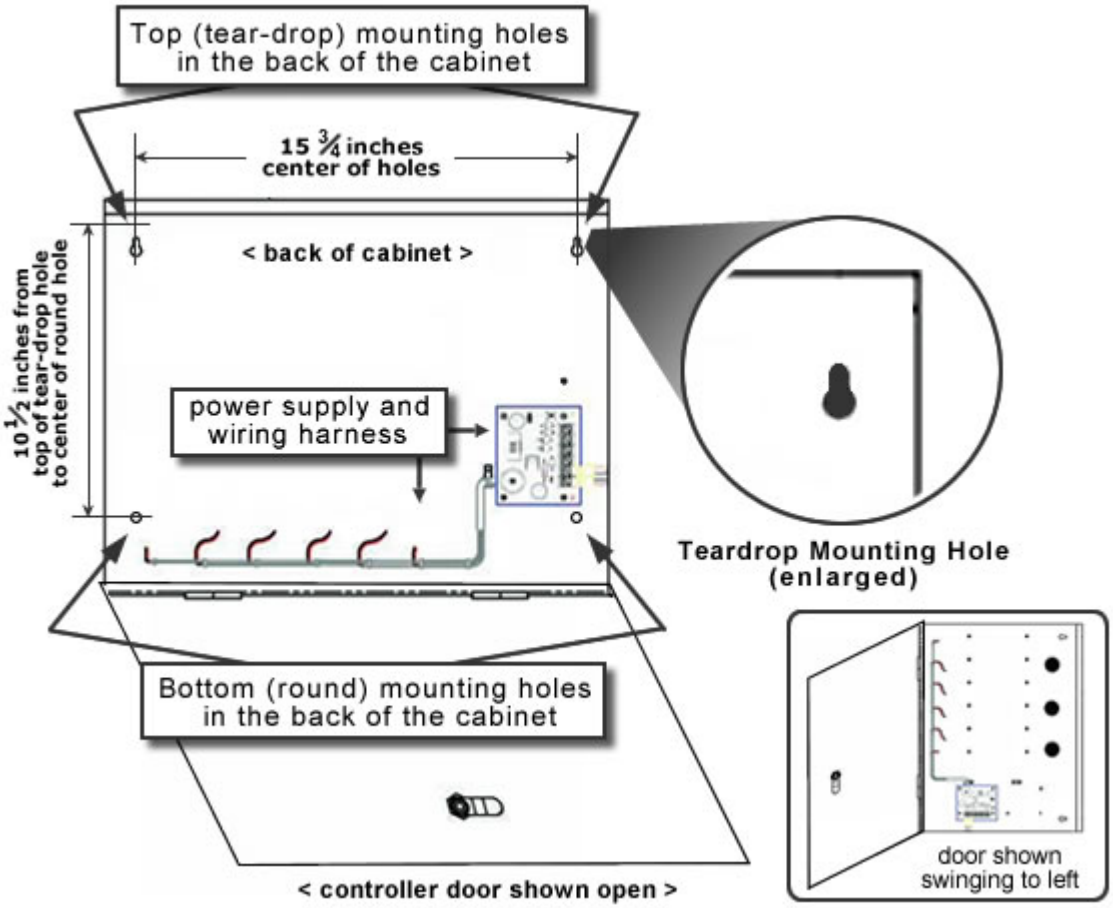
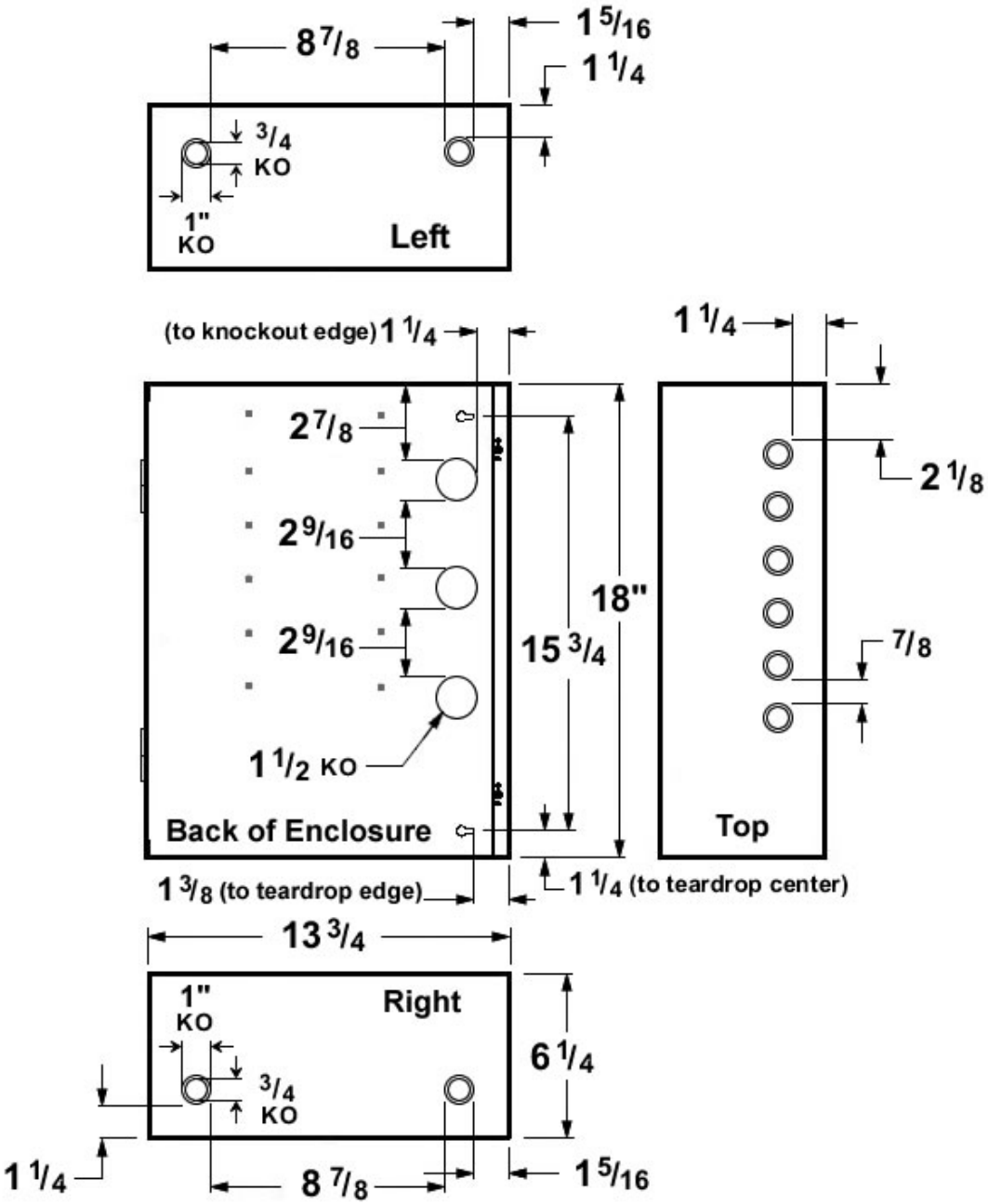


Figure 6 – 6xx-series Medium Controller Dimensions & Knockout Diagram:

This diagram shows a facing (inside) view of the back and inside views of sides for a medium controller enclosure.

Drawing is shown rotated 90 degrees to fit on page.

Dimensions shown in inches.



1.10 Power Requirements

1. **A Power Transformer** 16VAC @ 40 VA (transformer included if purchased with panels).
   - **Power transformer must be plugged into a 110VAC/60Hz outlet that is less than 25 feet from the controller.**
   - **The 110VAC outlet cannot be controlled by a switch.**
   - **Transformer cannot be shared with other equipment.**

2. **The controller comes with a 12VDC 2.5 amps Power Supply for powering CPU and daughter boards** (power supply included as purchased with panel).

   The 12 VDC Power Supply must be connected to the controller's wiring harness inside the panel by the installation technician.

3. **Do not power relay boards on the same power supply as CPU, DPI or DSI.** If 635/600 Model Output or Elevator Relay Boards are in the same panel with a CPU and DSI, they will need a separate power supply; Output Rated at 12 VDC 2.5 amps.

4. **When using more than four proximity readers on one controller, it is necessary to use an additional power supply to power the additional readers.** You must common the grounds between the power supplies in the panel (readers only).

5. **When using biometric readers:** biometric readers must be powered separately. Do not power Biometric readers from the DRM board or from the controller power supply.

6. **Powering door locks: An additional DC Power Supply is required**. Do not power door locks from the DRM board or from the controller power supply.

7. **IMPORTANT: Do NOT use the same power supply for Locks and Readers.** Use a separate power supply for locks.

8. **IMPORTANT: additional power supplies must be purchased for any field devices or equipment that will require it** (e.g. Sagem Readers, Cypress Clocks, input or output devices, etc.). Follow the *device manufacturer's guidelines* for type of power supply to use.

9. **IMPORTANT: DO NOT Common the Ground of the Lock Power to the controller power supply or to the reader power supplies.**

10. **Surge Suppression Diodes** should be installed *parallel to lock* to suppress kickback surge. Diodes should be **located at the lock** and as far away from the controller as possible.

1.11 Relay Ratings and Current Draw

The following tables show Relay Ratings and the Current Draw with and without relays energized.

Table 9: Ratings for Relays for Galaxy Hardware

Board	Relay Type	Port Output =
635 DRM Reader Board	**Form-C SPDT Relays** **supprots "dry" or "wet" contact relay operation.** **See Appendix Q for details.**	24 VDC @ 1.5 amps maximum per relay.
600 DPI Reader Board	**DRY Form-C SPDT Relays** *Supports dry contact only.*	24 VDC @ 1.5 amps maximum per relay.
600 DIO Board	**DRY Form-C SPDT Relays**	24 VDC @ 1.5 amps maximum per relay.
600 Output Relay Board *Elevator Control or General Output Control*	DRY Form-A SPST (NO)	24 VDC @ 1.5 amps maximum per relay. Requires a separate power supply.
635 Output Relay Board *Elevator & General Output Control*	DRY Form-C SPDT Support NO and NC wiring.	24 VDC @ 1.5 amps maximum per relay. Requires a separate power supply.

Table 10: Board Current Draw for Galaxy Hardware

Current draw for a single board	Current draw with relays energized
CPU = **0.07** amps (70 mA)	**n/a**
DPI / DRM= **0.03** amps (30 mA)	**0.25** amps (250 mA) with 2 *HID ProxPro readers* and all 4 relays energized.
DIO = **0.05** amps (50 mA)	**0.15** amps (150 mA) with all 4 relays energized
Relay Board = **0.02** amps (20 mA)	**0.60** amps (600 mA) with all 8 relays energized.
DSI = **0.02** amps (20 mA)	**n/a**
Ex: one Controller with 1 CPU, 1 DPI, 2 Prox Readers and all 4 relays energized will draw 0.350 amps.	

1.12 Hardware Wiring Specifications

1.12.1 Controller Ethernet Communications:

- **635 CPU** = **Auto-sensing 10/100 Mb /Full Duplex at the port side**.
- **600 CPU** = 10 Mb Ethernet/Full Duplex at the port side.

1.12.2 Hardware Wiring Specifications (Type, Gauge, Distance):

Table 11: DEVICE WIRING SPECIFICATIONS

Connection Type	Max Distance	Wire Gauge & Specifications
Reader Hardware	500 ft. from controller	22 AWG, 10-conductor, stranded / shielded
SIGMA Reader	500 ft. from controller	20-24 AWG, single-conductor, non-stranded / shielded
Lock Hardware	500 ft. from controller	18 AWG 2-conductor minimum, stranded
Composite Cable	500 ft. from controller	18 AWG & 22 AWG Card Access 4-Element
RS-485 NODE/PIM/DRM	4,000 ft to last node*	22 AWG, shielded, twisted pair
635 Input Relay Board	4,000 ft to last node*	22 AWG, shielded, twisted pair
* total line distance from a DSI Board to the **last** device/node (e.g. PIM, DRM.) on the multi-drop = 4,000 ft max		
WARNING! Observe Fire and Electrical Codes for wire insulation jackets (i.e. PVC-rated vs. Plenum-rated). Use Plenum-rated cable when appropriate		

Table 12: ETHERNET WIRING SPECIFICATIONS

Connection Type	Max Distance	Wire Specifications
Controller to IP Switch: (TCP/IP)	100 meters (328 ft.) *port to port on local LAN side*	**Cat 5e** Unshielded, twisted-pair (UTP)

SUPPORT: Consult Galaxy Technical Support if you any questions.

IMPORTANT: Use the correct Cat5e unshielded twisted-pair cable. Always use best industry practices.

IMPORTANT: All maximum distance limits are estimates based on clear/unimpaired communication. If interference exists, wiring should be rerouted to get clear communication. **Failure to correct installation issues will result in undesired hardware/system operation.**

IMPORTANT: Use overall shielded wiring for all device wiring.

Failure to use overall shielded wiring may result in equipment operating poorly or incorrectly. **If a site has not used proper wiring techniques, you may need to install new wiring.**

IMPORTANT: Properly ground the DRAIN WIRE of the shielded cable:

Connect the drain wire to the *negative on the board (GND)* or to the *negative DC Terminal of the power supply*. NEVER ground the drain wire at a Reader (or device-end of the wire-run. Failure to properly ground the drain wire will result in undesired equipment operation

1.13 Board Programming Requirements

1. **635- model boards can be configured using the Galaxy 635 Web Configuration Tool.**

   The 635 Web Tool opens in a standard Web Browser. The Tool automatically finds all Galaxy CPUs by their MAC address, provided the panels are online/on the same network segment as the Web Tool – and provided the controller cabinet door is open (tamper switch open).

   OPTIONALLY: If the installer cannot access the network/segment and connect to the 635-model boards via the Web Tool, the installer can connect directly to the boards via the RS-232 Programming Port using a Standard Serial Programming Cable. In this method, the installer uses a Terminal Emulator (i.e. Putty, HyperTerminal® , etc.) to connect to the panel CPU - and program the 635-CPU Network IP Settings, Cluster ID, Controller Unit ID, and GCS Event Server IP Address, as well as other CPU options. Be aware all 635-Model Daughter Boards have a dipswitch to configure the Board ID and other options. [600-model CPUs and Daughter Boards can also be programmed via the Terminal Emulator].

   The RS-232 Programming Serial Cable comes with controller enclosure:

   - **Cable Pin-out must be:** Pin 2 to Pin 2, Pin 3 to Pin 3, Pin 5 to Pin 5.
   - The cable must have a DB9 female connector on one end and a DB9 male connector on the other end
   - Connect the programming serial cable to the **J4** serial port on the CPU Board and the standard 9-pin serial port on the PC or laptop that is running a Terminal Emulator.

   Putty / Terminal Emulator Session parameters:

   BAUD Bits per Second = 57,600 K BPS
   Parity = None
   Data Bits = 8
   Stop Bits = 1
   Flow Control = None

   
   See the Web Configuration Tool Guide for information on how to use the tool to configure and test the controller, boards and communication ports.

2. **Each Controller must have a unique Unit ID number within the Loop/Cluster** (see Figure 6).
3. **The CPU Board ID** is "0" by default – this value cannot be changed.
4. **The CPU Number should be set to "1".** *If a second (dual) CPU board is installed, its CPU number should be set to "2".*
5. **All daughter boards (DPI, DIO, DSI, etc.) must have a unique Board ID** within their Unit (controller/panel). Board numbers 1 through 16 are valid for each controller.

   The 635 DPI must be addressed to a unique binary value on the controller bus using the on-board dip switch located on the back edge of the board. The 635 DPI is compatible with either 635 or 600 CPU and can coexist with 600 DPIs, DIO, DSI.

6. **Unique/Valid IP Addresses must be used for 6xx-series controllers. The CPU can have a static IP Address or non-routable IP Address.** 6xx-series also supports DHCP Addressing; however, it is not recommended for the stability of the Access Control System. Note: a static IP Address cannot be blank or zeros. You must program a private IP address even if using the DHCP.
7. **The controllers communicate with the Event Server on port 3001.** Port 3001 must be open and unblocked at firewalls, routers and switches, etc. for communications to occur.

NOTICE: The 6xx-series board settings must match the software programming for proper operation (see Figure 6). Hardware is usually installed and configured before the software. If the software is already programmed, you must use the Loop, Unit, and Board ID's set in the software – these settings are found in the Loop and Controller Properties

screens. **TIP**: **Use Hardware Programming Templates from Appendix A** (*which can be copied as needed*) to record panel settings and locations for use when the software is being programmed.

Figure 7 – 600/635-Model Controller Configuration Example:

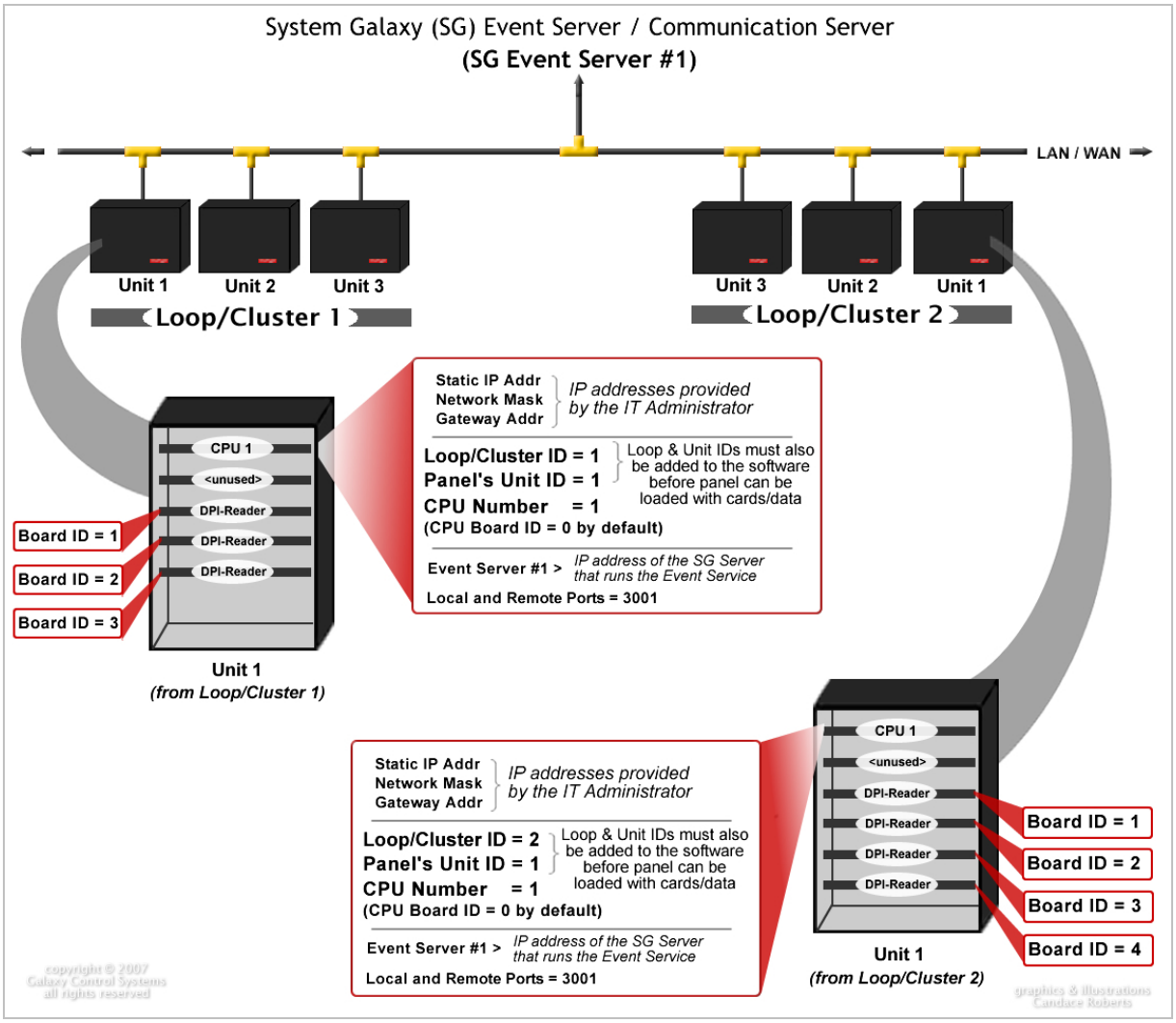
This **example** shows of how the Controllers/CPUs are grouped into *Loop*/*Clusters* and configured connect to the *System Galaxy Event Service* using the TCP/IP Ethernet network (LAN/WAN).

- Every *600/635-Model Controller (CPU)* is assigned a unique/valid **Loop/Cluster ID** (i.e. 1, 2, 3 …).
- Each *Control Panel CPU* is assigned a unique/valid **Unit ID** (1, 2, 3 …) within its loop/cluster.
- Each Daughter Board (DPI/DRM, DIO, DSI) is given a unique/valid **Board ID** (1, 2, 3 …) within its panel.

NOTE: *Software programming must match exactly to the configuration of the hardware (see Appendix for Templates to record your actual CPU and Board configuration as you install. This helps you keep track when programming software.*

NOTE: See Chapter-2 for step-by-step instructions for the CPU and Board configuration.

NOTICE: The panels behave as if they are on the same loop/cluster based on the assigned Loop/Cluster ID. Each controller/panel connects to the SG Communication/Event Server using the TCP/IP Ethernet network. The SG Software will identify and treat the panels as being on the same Loop/Cluster when logging events, issuing loop-level commands, and loading/managing system configuration, (i.e. adding/deleting cards, managing access privileges, schedules, etc.).



1.14 Network & IT Requirements for Galaxy Hardware

This section lists requirements that pertain to System Environment, Networking and IT Requirements.

Galaxy Hardware is designed to communicate over TCP/IP connections/networks with the following stipulations.

1. **Unique, static or non-routable IP Addresses must be given to each Galaxy Panel (CPU)** and the computers that host the GCS Communication and Event Services.

   If private IP Addresses are not available, a non-routable IP Address should be used.

   NOTICE: If DHCP addressing is used, and the DHCP server goes offline or changes the addresses, then connectivity between the server and loops will be adversely affected!

2. **635 Controller: TCP/IP over LAN/WAN 10/100 Mb Ethernet/Full Duplex at port side.**

3. **Specific port numbers must be available and not blocked by firewalls, switches, or routers.** System Galaxy uses port numbers **1433, 5010, 3001, 4000, 4001, 4002,** and **4003**.

4. **Windows OS** need to set PC firewall at the Communication Server to accept the File and Print Sharing, sqlservr.exe and sqlbrowser.exe.

5. **ONLINE VS. OFFLINE OPERATION: An access control system should have a stable network environment**.

   a. **OFFLINE OPERATION:** Controllers are designed to operate independently (offline) in a non-degraded mode of operation when the software/database/services are offline. All "offline events" are buffered in the panel memory if the server connection is interrupted. Offline events in the buffer are retransmitted when connections to the Services and Database are restored.

   b. **REAL-TIME EVENT MONITORING**: If your customer is providing real-time event monitoring, the panels will need reliable/uninterrupted network connection to the SG Server/services, SG software & database. The following GCS Services must be running/online for real-time events. GCS Client Gateway, GCS Communication Service, GCS Event Service, GCS DBWriter Service typically are hosted on the main Communication Server. A copy of the GCS Client Gateway must also be running on every additional monitoring station. The MSSQL Service typically runs on the Database server (where the database is installed. This can be on the same machine (standalone install) that serves as a communication server for small systems. On larger systems the Database server is often a separate machine from the Communication server.

   c. **Avoid running the Galaxy Hardware and Software on a network that is unstable, subject to frequent downtime or heavy network resource demands.** Networks that provide email or public internet use can become bogged down with traffic. Consider a dedicated network (such as one with non-routable addressing), especially if you are using real-time event monitoring, alarm event monitoring, time & attendance, or input/output logic that requires **global events** (panel to panel).

   d. **Add all System Galaxy programs and services to any firewall, network scanning, or port blocking software.** Logging of events, and real-time monitoring can be adversely affected.

6. **LOCATION OF SERVICES AND PANELS:**

   - **LOCATION OF SERVICES**: Typically, the GCS Event and GCS Communication services are running on the same computer in the same time-zone as the panels.
   - **MULTIPLE EVENT SERVERS**: The system can support multiple copies of the GCS Event service but they must run on separate computers. You cannot have multiple copies of the Event service on the same computer or vm.
   - **REMOTE PANELS AND MULTIPLE TIME-ZONES**: In cases where the system is large or panels are distributed across a wide area – (e.g. a campus setting, or remote buildings), any panels that are in a different time-zone will require a separate copy of the Event Service running on a separate computer that is configured to use the time-zone of the remote panels. The separate computer can be physically located in the remote time-zone, but better practice may be to have the computer in the local time-zone. The computer serving the remote panels must be configured to the same time-zone as the remote panels. This allows the remote events to maintain their original time-stamp.

1.15 Communication Requirements for System Galaxy Servers

This section covers info about System Galaxy services, which affect logging events from the hardware.

EVENT HANDLING (MONITORING VS. LOGGING EVENTS)

1. When the SG Software is installed, typically the ***core GCS Services*** are installed on the same machine (GCS Client Gateway Service, GCS Communication Service, GCS Event Service, GCS DB Writer Service).

Name of Services	NEEDED TO MONITOR ?	NEEDED TO LOG EVENTS ?	MAIN PURPOSE OF THE SERVICE
GCS Client Gateway Service	YES	**NO**	Converts binary data to man-readable messages.
GCS Communication Service	YES	YES	Sends binary data to Gateway and DBWriter. Initiates connection to the Event Service.
GCS Event Service	YES	YES	635/600-series panels initiate their connection to the Event service based on the IP Address.
GCS DB Writer Service	YES	YES	Logs binary data to SQL Server / SG Database.

2. **LOGGING AND MONITORING REQUIREMENTS:**

   The 635/600-series hardware is designed to continue functioning in a non-degraded operation, for panel-level operations and access decisions, without the System Galaxy client software or database being online.

   Off-line Events are buffered in the controller's memory and retransmitted to the Database and Monitoring workstation when connectivity is restored. **NOTE:** The core GCS Services must be running and able to establish ODBC and IP connections in order for events to be logged to the Database and the Client Monitoring workstation.

   A *Local Event* is defined as an event that happens at a panel (such as an input) and triggers an output at the same panel in the same loop/cluster. Local events are not interrupted if Event Service/Server is down.

   A *Global Event* is defined as an event that happens at one panel (such as an input) and triggers an output at a different panel in the same loop/cluster (i.e. panel-to-panel). Global events are interrupted if the Event Service/Server is down. By design the Event Service can continue operating if the database or the software is off-line – as long as the host PC is running/online.

RUNNING MULTIPLE EVENT SERVERS (INCLUDING TIME-ZONE OPERATION)

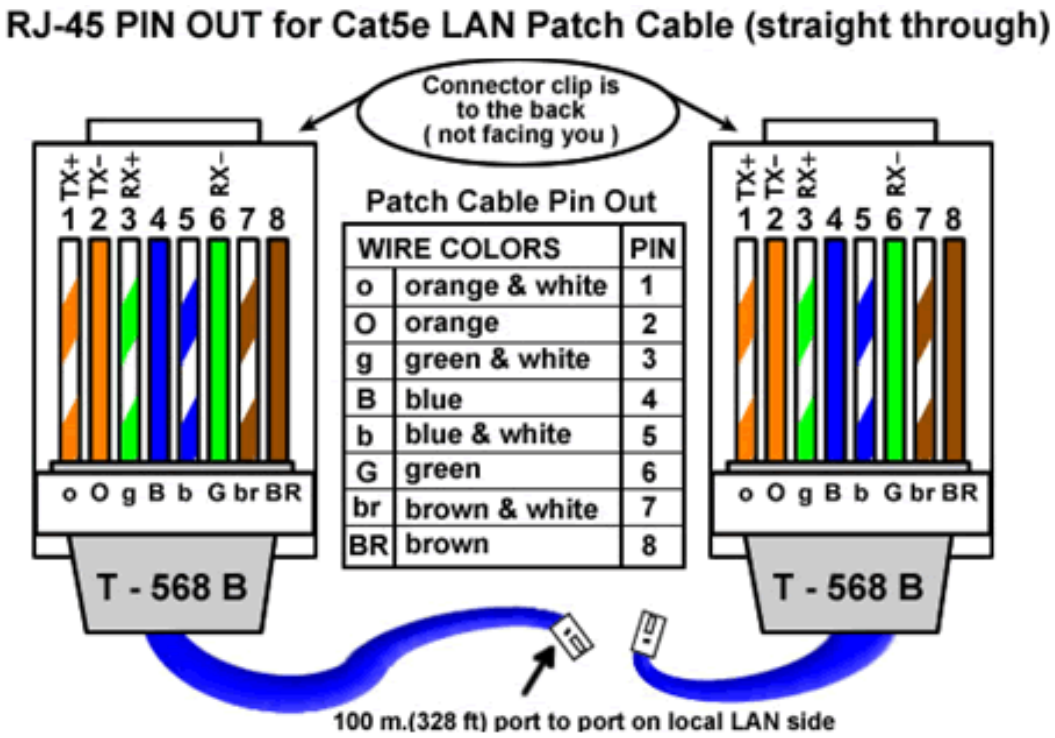
3. **You can run multiple GCS Services as long as they are on separate PCs/Servers. You cannot run multiple copies of the GCS Service on the same machine (PC, Server, Virtual Machine).** The same is true for the GCS Communication Service.
   a. **If you are running multiple Event Servers, you CANNOT split a loop/cluster. All the 635/600-series controllers that are in the same loop must be assigned to the same GCS Event Server**. Multiple loops/clusters can be assigned to the same cluster.
   b. **You cannot split the controllers in a loop/cluster between multiple servers.**
   c. **All panels in the same loop must be assigned to the same IP Address where the GCS Service is running.**
4. **If you have remote panels that are installed in a different time-zone than your central system, you must run multiple Event Services on a separate PCs or VMs to serve the local & remote panels.**
   a. **The "Local" GCS Event Service** (serving the local panels) will run on a PC/VM that is physically located in your local time-zone. This PC must have its clock set to your local time-zone.
   b. **The "Remote" Event Service** (serving the remote panels) must be running on a separate PC/VM. This PC can be physically located in the local time-zone, but it must have its clock set to run the same remote time-zone that the remote panels are in. This allows the events from the remote panel to be logged with the correct time stamp.

1.16 Requirements for Logins and User Privileges (SG Software)

1. You must have Administrator Rights In order to install System Galaxy Software.
2. Operator/User must log in as a' power user' in order to program hardware in the System Galaxy software.
3. The System Galaxy software must be able to connect to the database in order for the operator to log in and start the SG software. This means the core GCS services must be running and connected to the database.
4. **SG Operator Login Privileges** can affect the ability to see events in the monitoring screens or use certain features and commands in the System Galaxy software.
5. **System Galaxy software has a 14-day Registration grace period** for the System and the Workstation. This grace period starts from the date the software is installed. If the grace period lapses before the software is properly registered, features and monitoring are affected. Contact your Dealer/Tech Support for assistance with Registration.

1.17 Pinout for Ethernet Cable (Cat-5e)

THIS DIAGRAM SHOWS HOW TO MAKE A NETWORK ETHERNET CABLE (CAT-5e)



1.18 General FAQs about Features of Galaxy Hardware

- **System Galaxy 10 software allows both 508i Loops and 635/600 Loops at the same site; however the 508i and 600 panels cannot be mixed into the same loop**.
- **The 635/600-series Controller does not communicate with 508i controllers or 508i loops.**
- **The 635/600-series Controller communicates with other 635/600-series Controllers that are in the same loop/cluster provided the Event Service is online.** This is known as *global event traffic* (or panel-to-panel communication) - supports functionality like pass-back, door interlock, Inputs & Outputs (I/O), etc.
- **635/600-series Controllers cannot pass events to panels that are in a different Loop/cluster.**
- **600-series Panels communicate using TCP/IP with 10 MB/Full Duplex.**
- **635-series Panels communicate using TCP/IP with 100 MB/Full Duplex.**
- **The 600 DPI-Reader board interfaces with current reader technologies** supported by System Galaxy. Each board supports 2 readers; a lock relay and 2nd relay for both readers (4 relays total).
- **635 DPIs are cross-compatible with all other boards. 635 DPIs additionally offer wet-lock relay operation – see the Appendix for 635 Wiring to see this.**
- **The 600 DIO board has 8 max inputs and 4 max outputs.**
- **The 600 DIO board supports Supervised inputs** (e.g. series (in-line), parallel (end of line), or series-parallel resisters). Once the resisters are installed the feature is programmed in the Inputs Properties screen, which offers the common industry standard resistor values.
- **The 600 DIO board supports HYPERVISION,** which is an added layer of supervision to prohibit supervised circuits from being defeated. Hypervision is enabled via the software programming screen.
- **The 600 DSI board supports Cypress clock on RS-485 channel.**
- **The 600 DSI board supports Schlage Wireless™ Access PIM-485 on the RS-485 channel.**
- **The 600 DSI board supports the 600 Relay board on the RS-485 port.** The relay boards can be daisy-chained and limits apply based on whether they are used for general output or elevators.
- **The 600 Relay boards support General Output and Elevator Control.**

2. Hardware Installation Instructions

IMPORTANT: Each STEP of the install instructions should be performed in sequence. Skipping steps or doing steps out of sequence could result in an improper installation and undesirable operation.

IMPORTANT: The main instructions have been updated for the 635-model Boards. Some of the information for specific 600-model boards is found in an older guide or in the appendices of this guide.

IMPORTANT: 600-model boards are compatible with 635-model boards. See Step-1 for board capability. **Starting with SG-11, all 600-series Clusters *end-version is v10.5.6 flash*.** As of SG-11, any 635-CPUs on same cluster with 600-CPUs must be flashed with the same version as 600-Clusters. 600-Clusters **remain compatible with SG 11, but may not support new features introduced after 10.X.**

About walk-testing hardware: *Some software set up is required to walk-test hardware.* Brief software set up instructions are found in this manual to help you test.

HARDWARE INSTALL STEPS ~ Quick List:

LIST OF TABLES IN THIS CHAPTER

LIST OF FIGURES FOUND IN THIS CHAPTER

STEP 1. Hardware Install ~ Site Preparation

Site Preparation varies for every customer, and the installation chapter is concerned with providing requirements and standards for planning and installing the hardware.

1.1 Site Survey, Certifications and Power Source Requirements

Conduct a site survey to ensure you know exactly how much hardware and which pieces of hardware you need to install. Also see STEP-2 in this chapter for important information about installing the panels to ensure these requirements are met.

You must know the network settings of the PC/Event Server-1 (i.e. IP Address, Subnet Mask, Gateway). **The Event Server must use a static IP Address. Also, you must know the network settings for each Controller CPU in order to program the panels.** (See System Galaxy Installation Worksheet for a quick list of things you must obtain for the hardware installation.)

Overall System Architecture:

Since the ***System Galaxy Access Control System*** is controlled and monitored by the software and services, you must consider where servers and clients will be installed during your site survey. The Software and Services are explained in Chapter 1 and 3. But the installation of software and services are not covered in Chapter 2.

See related sections in **Chapter 1 of this guide** that pertain to ***system architecture*** and other info you must consider during planning phases. Also see the **SG System Specification Guide** for requirements and specifications for the system, PC/Server, Database, OS, IT, and clients.

Technical Certification:

Survey, installation, upgrades, and maintenance/repair of System Galaxy Hardware, software and peripheral hardware components must be performed by a ***Galaxy-certified Dealer & Technician***.

See Chapter 1 of this guide for more information on ***Compliances and Certifications***, which includes ***Regulatory Standards*** met by System Galaxy hardware.

Controller Power Supply and Power Sources:

Controller Power Source:

System Galaxy Controller requires a continuous power source from a 110VAC ***non-switchable outlet**** that is less than 25 feet from the control panel. (Do not connect the power adapter to an outlet that is controlled by a switch.)

The power supply comes already installed inside the cabinet. See your Galaxy Parts Order Catalog for specific types of controller power supplies offered.

UL-Listed controllers come with a UL Listed Power Supply and use a is a Class-2, plug-in type transformer with fused secondary. ***See next section for details***.

Controller Class-2, Plug-in AC Transformer:

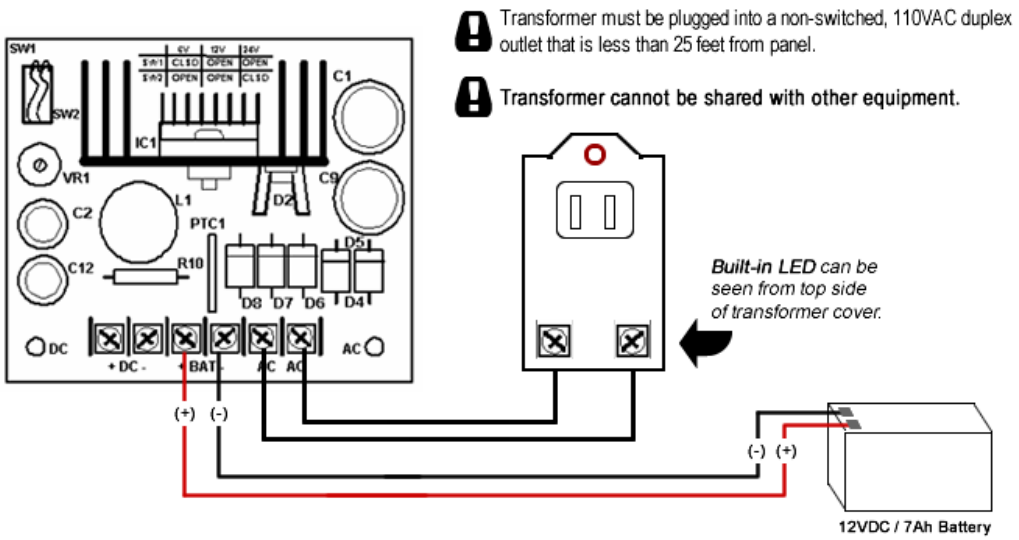
The AC transformer, used in Galaxy's UL-listed controller, is a Class-2, plug-in type transformer with fused secondary. The transformer is UL-listed and CSA Certified and can be plugged into a duplex plug. The transformer should be Input-rated 120 VAC/49 VA at 60 Hz; Output rated 16.5 VAC/40VA at 60 Hz.

The transformer requires 1 pair of 18 AWG wire (minimum).

The transformer must be plugged into the 110VAC non-switched, duplex outlet and must **not** be shared by any other equipment. Galaxy access control panels that require AC transformers are only intended for use with a UL Listed, Class-2 transformer, like the one manufactured by ***Universal Power Group No. UB1640WR***.

Figure 8 – Illustration of UL-Listed Power Supply and Transformer

This diagram refers to the 6xx-series UL-listed Controller. Other controllers use other power supplies.



IMPORTANT: Be sure to follow installation guidelines for using additional power supplies, proper gauge and types of wiring and any fire code or electrical codes that apply to your job site location.

1.2 General Requirements and Safeguards

You must follow all safeguards and requirements when installing Galaxy hardware.

SAFEGUARDS:

These notes apply to 635-model & 600-model Controllers (and their boards). Please read and follow.

WARNING - Failure to obey safety warnings could result in serious bodily injury, death, and/or damage to equipment, and/or loss of data, and/or undesirable equipment/system operation.

1. **Installation and Maintenance:** Installation and maintenance of System Galaxy hardware and software must be performed by an authorized/certified dealer. Always use best practices when installing and operating Galaxy equipment and peripheral hardware devices.
2. **Controller Power Supply:** The 635/600-Series Controller uses a power transformer 110 volts alternating current (110 VAC), however the circuit boards are low-voltage 12 VDC from the internal power supply. ALWAYS use the power transformer provided with the controller cabinet and the specified power source.
3. **Multiple power supplies:** Door Locks should have a separate power supply. If wiring more than 4 proximity readers on a single controller, technician should install a second power supply to avoid undesirable operation.
4. **Controller Power Source:** controller must be connected to a non-switchable power circuit.
5. **5-V Reader Voltage Regulation:** Do not connect 5v Reader directly to a 635-DRM. You must install voltage regulator at reader end. (With 600-DRM/DPIs, install onboard voltage-jumpers in 5-volt position.)
6. **Grounding: Do not ground the controller to cold water ground/earth ground.**
7. **Overloading Hazards:** Do not overload the power supplies or equipment.
8. **Power Hazards:** this equipment should be installed and operated only with the type of power source indicated in the instructions (or labels). **Serious bodily injury or equipment damage could result.**
9. **Power Cord Protection: route power cords and other wires/cables wisely.** Avoid trampling, straining, pinching or chafing. Electrical shock or equipment damage could occur.
10. **Moisture & Water Hazards:** This equipment is non-condensable and must be mounted in a dry, protected area. Do not install or use equipment in/near sources of moisture or exposure to rain, pools, car washes, air conditioners, sprinklers, or any kind of moisture. Serious injury, death, or equipment damage could occur.
11. **Object & Liquid Penetration Hazards:** Do not insert (or use) objects in the equipment that are not approved, as they could touch voltage points or short out parts. Never spill, pour or apply any liquid substance on the equipment. **Failure to heed could result in electrical shock or equipment damage.**
12. **Cleaning:** Do not clean equipment with water or liquid. Electrical shock or equipment damage could occur.
13. **Heat Hazards:** this equipment has **-10º C to +60º C (14 º F to 140 º F)** temperature specs. Avoid mounting close to heat sources or uncontrolled climates. Equipment failure could result.
14. **Static Electricity:** Take standard precautions to avoid static shock if handling the circuit boards.
15. **Mounting Safety:** This equipment is designed to be wall mounted. Never place or install this equipment in a location or manner that is unstable to avoid personal injury or equipment damage.
16. **Burden:** do not place or rest any heavy object on this unit – the unit could fall or become detached from its mounting and result in personal injury or equipment damage.

REQUIREMENTS:

These notes apply to 635-model & 600-model Controllers (and their boards). Please read and follow.

1. **Controller Power Source:** System Galaxy Controller requires a continuous power source from a 110VAC non-switchable outlet*
2. **CPU COMMUNICATIONS**
   a. **635 CPU** = **Auto-sensing 10/100 Mb /Full Duplex at the port side**.
   b. **600 CPU** = 10 Mb Ethernet/Full Duplex at the port side.
3. **635-model BOARD IDs**
   a) CPU number is 1 – factory default.
   b) Daughter boards must have a valid ID on the CPU data buss (1-16, no duplicates**). DRM, DIO, DSI.** (635-model boards use a dipswitch to set board IDs and MUST be set before you install the board.) (600-model boards use a terminal emulator to set the board IDs.)
   c) All RS-485 devices must have a valid ID on the 485-Channel/Section (1-16; no duplicates).
   d) Wireless readers such as Salto Sallis, Assa Aperio, Schlage AD400 and legacy readers must be within the WiFi signal range of their host PIM and also must have a valid ID within the RS-485 section (1-16, no duplicates, no out-of-sequencing or overlapping IDs across PIMs. You can skip an ID number, but you cannot use it in a different PIM. The skipped ID can only be used on the same PIM where it was skipped, and only if the reader is within the signal range of that PIM.

   *** Exception for IDs in the case of 600 Output Relay Boards …**
   - 600 General Output Relays valid IDs = 1-3 (limit 3 boards per 485-section)
   - 600 Elevator Control Relays valid IDs = 1-15 (limit 15 boards per 485-section) (Note: standard elevator control uses output relay boards, at least 1 DSI board, and 1 DRM (elevator reader). Destination-based elevator systems (Otis, etc.) do not use relay boards.)
4. **WIRING SPECIFICATIONS: Chapter-1 also has complete information about wiring.**

Table 13: WIRING SPECIFICATIONS

Connection Type	Max Distance	Wire Gauge & Specifications
Controller to IP Switch	100 meters (328 ft.)	**Cat 5e** Unshielded, twisted-pair (UTP)
Reader Hardware	500 ft. from controller	22 AWG, 10-conductor, stranded / shielded
SIGMA Reader	500 ft. from controller	20-24 AWG, single-conductor, non-stranded / shielded
Lock Hardware	500 ft. from controller	18 AWG 2-conductor minimum, stranded
Composite Cable	500 ft. from controller	18 AWG & 22 AWG Card Access 4-Element
RS-485 Multi-drop (PIM, 635-DRM or Input or Output Relay Module)	4,000 ft to last node*	22 AWG, shielded, twisted pair
	120-ohm resistors must be installed at both extreme ends as close to the node as possible for signal termination.	
Wireless Readers	within signal range	n/a – this can vary based on the topography of the site.
635 Input Relay Board	4,000 ft to last node*	22 AWG, shielded, twisted pair
* **total line distance** to the **last** device/node (e.g. PIM, DRM…) on the RS-485 multi-drop is max. 4,000 ft		
WARNING! Observe Local Fire and Electrical Codes for wire insulation jackets (i.e. PVC-rated vs. Plenum-rated). Use Plenum-rated cable when appropriate.		

IMPORTANT: **Properly ground the DRAIN WIRE on only one end**. Connect the drain wire to the *GND on the board (Reader Port).* NEVER ground a drain wire at a Reader (or device-end of the wire-run). Failure to properly ground the drain wire can result in undesirable equipment operation.

1.3 About Upgrading Hardware / Expanding Systems

If you are installing new hardware on an existing system, these are considerations you must make.

WHEN IS UPGRADING THE HARDWARE REQUIRED?

- Installing Wireless Readers, IP Readers? – you must upgrade to 635 CPU and 635-DSI
- Installing 635-Input Module? – you must upgrade to 635-CPU and 635-DSI
- Installing a Galaxy 485 Remote Door Module? – You must upgrade to 635-CPU, 635-DRM, and 635-DSI.
- Installing newer *destination-driven* elevator systems? - then you must install all 635-model hardware.
- 600-model boards can interoperate with 635-model boards in the same system and within the same control panel.
- You can replace older 600-model boards with new 635-model boards as needed.
- The older 600-model boards do not support the newer hardware interfaces and features supported by the 635.

WHEN IS UPGRADING THE SG SOFTWARE REQUIRED?

This section explains when to upgrade the SG Software based on hardware features.

For example, most newer types of Wireless Readers require SG-10.2 or higher, but Assa IP Readers require SG-10.4 or higher.

See the ***Board Compatibility Table*** *which is useful for new systems and for existing systems that want to know whether their system supports a feature or product. If your existing system does not support a feature, then the system should upgrade to the newest version* **…**

a) if an ***SG software version*** is noted, then that is the minimum version of SG that is required to support that feature.

b) if the ***no version*** is noted, then any version of SG supports the feature.

See the ***Flash Version Chart*** to determine which version of flash is compatible with your version of SG Software.

a) Also, you can look in the SG Software **Help > About** menu to see which flash versions are matched to your software..

1.4 Board Compatibility and Capability (635 vs. 600 models)

The table below shows the compatibility of Galaxy boards and features when using SG 11.X software.

NOTES ABOUT REPAIR / MAINTENANCE / UPGRADE OF BOARDS

1. TO REPLACE AN EXISTING BOARD: you should NOT need to change software programming. Do the following …
   a) **KEEP THE SAME CPU IP-ADDRESS and Network Settings (CPU):** A new CPU can seamlessly replace an existing CPU.
   b) **KEEP THE SAME BOARD-ID:** BEFORE you install a 635-Board, you must preset the Board ID on the new 635-Board dipswitch to match the ID of the board you are replacing. This way the new board will seamlessly replace the existing board. You can use Panel Webpage to locate the board by its serial number and Board ID.
2. FLASHING 635-CLUSTERS: all 635-CPUs must be flashed to the version of flash that is married to the SG Software.
3. 635-CPU (PANEL) CAN OPERATE IN A 600-CLUSTER:
   a) **All panels in a 600-Cluster must run the same flash and cannot be flashed higher than v10.5.6**
   b) Use ***Loop Diagnostics*** [Get Controller Info] to discover whether you have any 635-CPU's in a 600-Cluster.
   c) The ***SG-11 GCS_Loader*** automatically flashes any 635-CPUs to v10.5.6 if they are in a 600-Cluster.
   d) Be aware the ***flash version-ceiling*** for a 600-Cluster (600-CPU) is **S28 v10.5.6**. However, all 635-Clusters must be running the supported Flash version that matches the SG Software – (see the ***Flash Version Chart*** for more info.)

Table 14: BOARD COMPATIBILITY CHART for SG-11

635-SERIES CONTROLLER (635-CPU)		600-SERIES CONTROLLER (600-CPU)★	
635 CPU Board - Processor • Operates in same loop /system with other 600 Panels (CPUs) • Supports all 635 & 600 daughter boards • Supports all 635-series *RS485* Modules • Supports all 600-series *RS485* Modules – restrictions apply • Supports Destination-driven elevator systems • Supports Card Tour Board		**600 CPU Board – Processor** ★ **SG Flash v10.5.6 is the highest version for 600-CPUs** • Operates in same loop /system with 635 Panels (CPUs), but all panels will be limited to running v10.5.6 flash. This limits your readers. • Compatible/Supports all 600 daughter boards • Supports 635 DRM (Reader board) • Supports 600 Output/Elevator Modules on 600 DSI • *Destination-driven elevators and Card Tour are not supported.*	
635-MODEL BOARDS			**600-MODEL BOARDS**
600 DIO Board	**600 DIO Board**	**600 DIO Board**	**600 DIO Board**
635 DRM Reader Board	**600 DPI Reader Board**	**635 DRM Reader Board**	**600 DPI Reader Board**
635 DSI Serial Board	**600 DSI Serial Board**	**635 DSI Serial Board**	**600 DSI Serial Board**
• 600 Output Module (general output or elevator control)	• 600 Output Module (general output or elevator control)	• 600 Output Module (general output or elevator control)	• 600 Output Module (general output or elevator control)
• LCD Clock unit	• LCD Clock unit	• LCD Clock unit	• LCD Clock unit
• Schlage PIM 485 ODT (legacy)	• Schlage PIM 485 ODT (legacy)	• Schlage PIM 485 ODT (legacy)	• Schlage PIM 485 ODT (legacy)
• Assa Abloy Aperio (SG 10.1)	• Assa Abloy Aperio (SG 10.1)	Assa Not supported on 600-CPU	
• Salto Salis Wireless (SG 10.2)	• Salto Salis Wireless (SG 10.2)	Salto Not supported on 600-CPU	
• Schlage AD-300 (SG 10.2)	• Schlage AD-300 (SG 10.2)	Schlage AD-series not supported on 600-CPU (NOTE IN THIS SCENARIO, a 635-DSI IS LIMITED BY THE 600-CPU)	
• Schlage AD-400 Wifi (10.2)	• Schlage AD-400 Wifi (10.2)		
• Mixed AD-300/AD-400 (10.2)	• Mixed AD-300/AD-400 (10.2)		
• Assa IP Readers (SG 10.4)	• Assa IP Readers (SG 10.4)	ASSA IP not supported 600-CPU	
• 635 Input Module (SG 10.4)	<< Not supported on 600-DSI		
• 635 Remote Door DRM (10.4)	<< Not supported on 600-DSI		
COMPATIBLE MODULES (RS-485 multi-drop)		**COMPATIBLE MODULES (RS-485 multi-drop)**	
635 Output (or Elevator) Relay Module (using 635 DSI)		600-Model Relay Board using either DSI on 600-CPU	
635 Door Module (using 635 CPU & 635 DSI, SG 10.3)		<< 635 Door Module not supported on 600 CPU	
635 Input Module (using 635 CPU & 635 DSI, SG 10.4)		<< 635 Input Module not supported on 600 CPU	

STEP 2. Mount the Controller Enclosure/Cabinet

2.1 Choose a good location for the Controller

1. **Choose a proper location for the controller:** Obey wiring distances, preplan the locations for your controllers and all hardware devices (readers, inputs, etc.).
2. ***See Chapter 1, power, current draw and wiring requirements.***

EXPOSURE

1. CLEAN & DRY: Choose a clean, dry, reasonably dust-free location
2. TEMPERATURE: Temperature should be between -10º C and +60º F

WARNING: This equipment cannot get wet. DO NOT install outside or near sources of moisture (i.e. rain, car washes, air conditioning, etc.) Exposure to moisture can cause electrical shock, injury, or damage to equipment, or system failure.

MOUNTING REQUIREMENTS

1. WALL MOUNTED: Controller is designed to be mounted on a wall.
2. SECURE AREA: Locate controller in a secured area.
3. HI-VOLTAGE/ HI-FREQUENCY: Avoid installing the panel near power transformers and high frequency/voltage areas. Don't mount controllers near anything that causes interference. Don't route wiring near other hi-voltage or power lines.
4. FIELD WIRING DISTANCE: From Controller to Field Device (reader) is 500 feet. If noise or interference exists, you should reroute field wiring or use line drivers to boost the signal. RS-485-line distance is up to 4,000 feet.
5. LAN WIRING DISTANCE: From Controller to the LAN Switch is 100 meters from port to port (approx. 328 feet). This can be extended with the use of repeaters.

2.2 Running Field Wiring

1. **Typically, most of the field wiring is run before the controller/hardware is installed.**
   - **a)** Route wiring in a neat and secure manner.
   - **b)** Do NOT run data wires near high power/high frequency devices or wiring.
   - **c)** Leave a ***service loop*** inside the controller for future maintenance.

2. **Obey all local, state and federal codes when choosing the field wiring.**

3. **Galaxy recommends overall shielded for all wiring.**

4. **Ground drain shields at one end only.** In the case of daisy-chained RS-485 devices (readers, input boards, output relay boards, …) you must ground the drain wire at one end for each segment between the devices.

5. **Install surge protectors at the device-end where locks are concerned.**

6. **Install 120-ohm terminal resistors at both extreme ends of an RS-485 network run.**

   - **The 635-DSI Board** has a terminal jumper on the board (one for each section). You must leave the jumper open unless the board is at one 'extreme end' of a wire run. Treat the DSI sections independently: Channel-1 could be at the extreme end while channel-2 is not.
   - **The 635-Input Board** has a terminal jumper on the board. You will leave the jumper open on every board except the one(s) that are at the extreme end of the run.

IMPORTANT: Use the correct/approved types and gauges of wiring. Overall shielded wiring is always recommended for all wiring (see *Chapter-1).*

IMPORTANT: Observe Wiring Distances for all hardware. Failure to obey wiring distances can cause equipment or system failure, or improper operation (see *Chapter-1).*

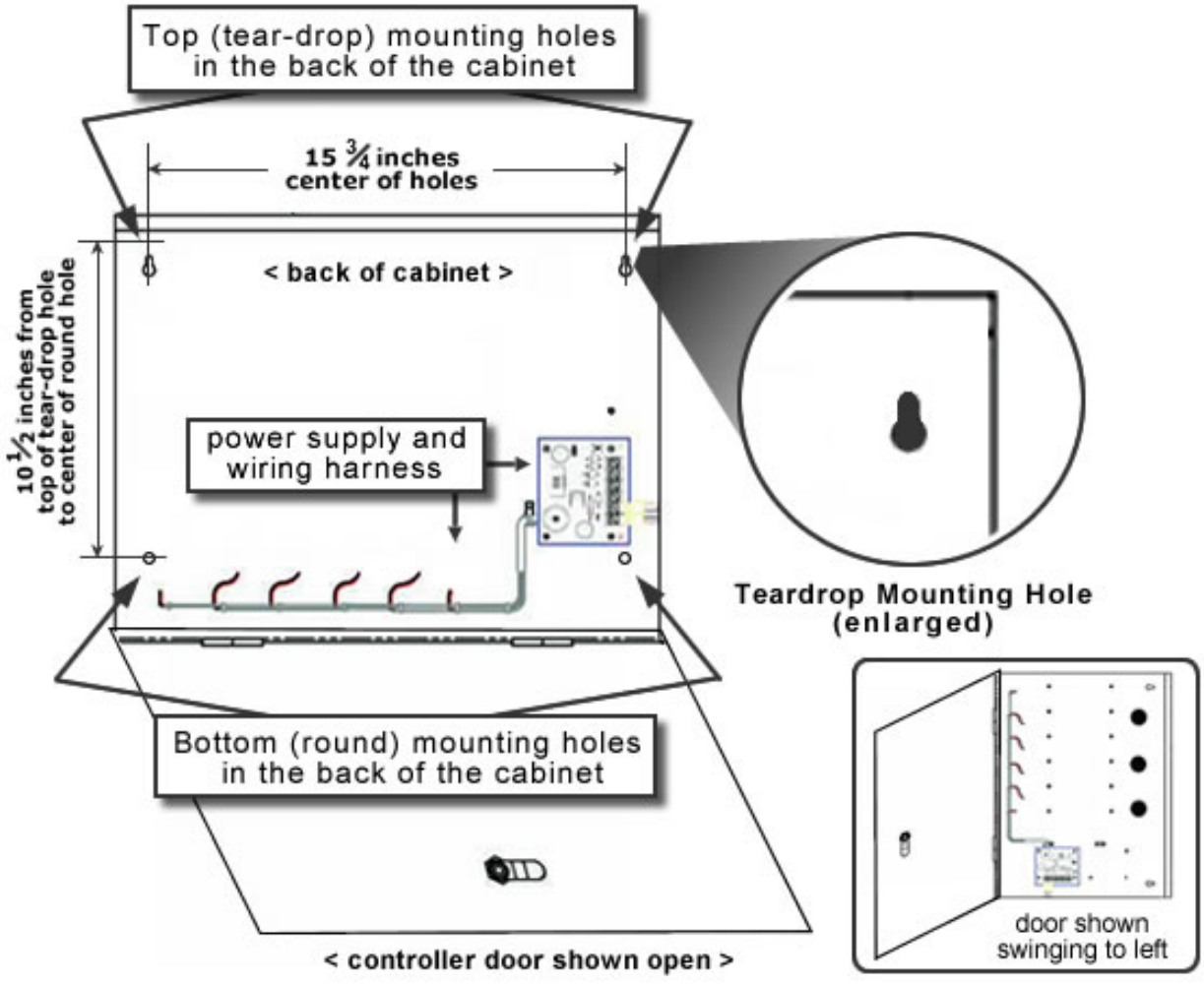
2.3 Mount the Controller Cabinet

1. **Mount the 6xx-series cabinet with the door swinging down.**
   (Cabinet can optionally be mounted with door swinging to the left.)
   - The overall size of the medium controller cabinet is 18" W x 13 ¾" H x 6 ¼" D.
   - Cabinet should be mounted on a wall in a safe and secure manner.
   - Use proper mounting hardware and methods for the controller and wall surface.
   - **DO NOT mount cabinet to metal studs.**

Also see the knockout diagram and more Controller Dimensions (Chapter 1)

Figure 9 – 6xx-series Controller Mounting Diagram

Note: controller is 18" W x 13 ¾" H x 6 ¼" D (as shown). Pertains to both 600 and 635 models



STEP 3. Install Power Connectors inside Controller

Step-3 is about wiring the ***two-piece orange connectors*** to the wiring harness inside the panel.

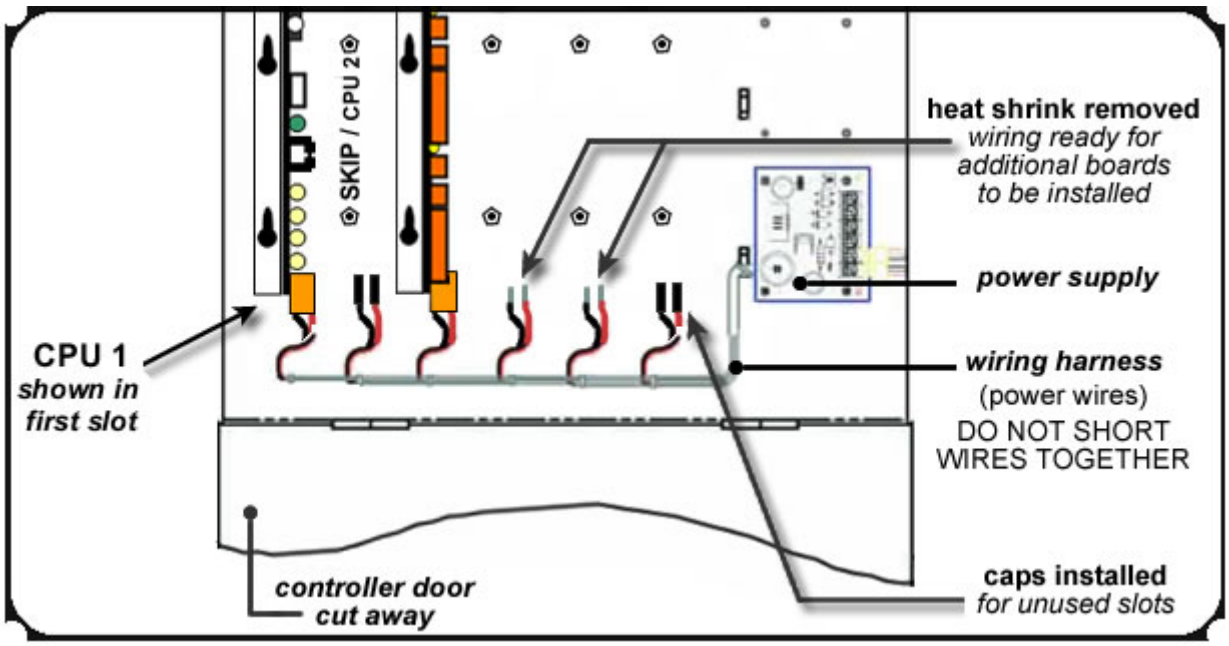
WARNING: DO NOT short the power wires together. Failure to properly insulate wires could result in damage to the equipment or electrical shocks.

3.1 Remove Heat Shrink (only from wires to be used)

1. **Remove the heat shrink ONLY from the wires for the slots you will use.** The wiring harness inside the controller is designed to be modular and flexible. Installer can use some or all of the available slots.
2. **Leave the heat/shrink on the unused wire-tips where no board is installed** or place the proper end-caps according to your local codes. DO NOT SHORT POWER WIRES.

Figure 10 – Controller Wiring Harness:

This diagram shows the wiring harness inside the Controller prepped for installing boards.



3.2 Wire the CPU Power Connector and Tamper Switch

CAUTION: UNPLUG CONTROLLER FROM POWER OUTLET. Do not attempt to wire connectors while the power supply is "hot". Wiring a connector while it is "hot" can cause electrical shock, injury, damage to equipment, or system failure.

OBSERVE POLARITY! Failure to obey polarity can cause electrical shock, injury, death, equipment damage.

1. **CPU Power connection:** Use the 2-pin orange connector supplied with CPU.
   a) The CPU connectors will always install in the topmost slot – *you will notice the Tamper switch is spliced into the ground wire of the power harness where the CPU will be installed*.
   b) Connect the Black (GND) wire from the Controller Power Harness to pin-2 of the power connector. Connect the RED (+12 VDC) wire from the Controller Power Harness to pin-1 of the power connector. .
2. **Wire the CPU Tamper connection:** Use the 4-pin orange connector supplied with the CPU board
   a) Wire the Tamper switch to Pin-3 of the Tamper Connector.
   b) NOTICE that the Tamper Switch is already spliced into the Ground (BLACK) Wire from the Controller Power Harness.

Figure 11 – Diagram of CPU Power and Tamper Connectors:

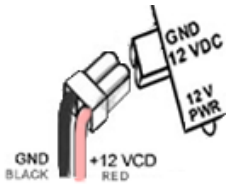
CPU BOARD	TOP VIEW (Terminal Screws Up)	WHEN FLIPPED OVER (as it is plugged into the Board)
Power Connector OBSERVE POLARITY		 You will actually plug in after the board is installed in a following step
Sense Connector CPU		

Table 15: 635-CPU PINOUT

CPU Power & Tamper pin-outs
[J6] Power Connector: CPU power, **CPU Board draws 0.05 amps** ▸ Pin 1 = **+12 VDC** ▸ Pin 2 = **GND** (ground) **[J7] Sense Connector: Tamper, A/C Fail, Low Battery** ▸ Pin 1 = GND (ground) ▸ Pin 2 = AC Fail ▸ **Pin 3 = Tamper** (pre-wired into controller harness from factory) ▸ Pin 4 = Low Battery

3.3 Wire the "A/C Fail" and "Low Battery" to Sense Connector

CAUTION: UNPLUG CONTROLLER FROM POWER OUTLET. Do not attempt to wire connectors while the power supply is "hot". Wiring a connector while it is "hot" can cause electrical shock, injury, damage to equipment, or system failure.

OBSERVE POLARITY! Failure to obey polarity can cause electrical shock, injury, equipment damage.

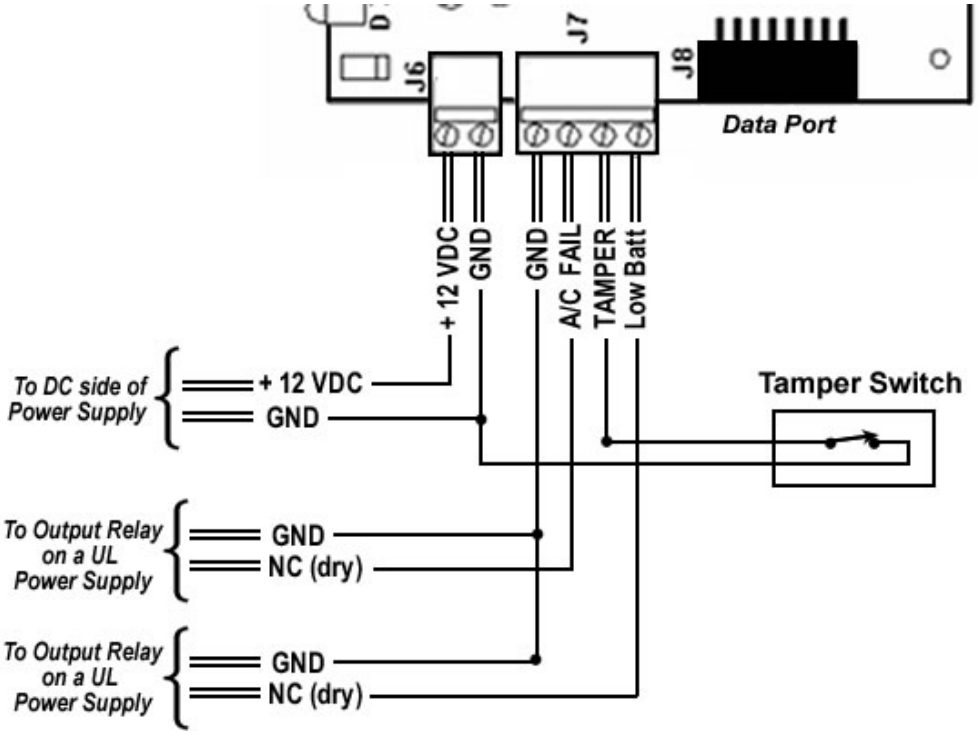
1. **Wire the "A/C Fail" warning circuit:** from the CPU board to an output Relay on the Power supply. Land the stranded, 22-gauge wiring according to the silk screen on the back of board. If you are not using this option, then you should jumper-out the option (A/C Fail to GND).

2. **Wire the "Low Battery" warning circuit:** from the CPU board to an output Relay on the Power supply. Land the stranded, 22-gauge wiring according to the silk screen on the back of board. If you are not using this option, then you should jumper-out the option (Low Batt to GND).

Figure 12 – 635 CPU Warning Circuits: "A/C Fail", "Low Battery", and "Tamper"

This diagram shows how to wire the A/C Fail and Low Battery warning circuits (635/600 CPUs).

VIEW FROM TOP SURFACE OF BOARD



3.4 Wire the Power Connectors for the Boards (DRM, DIO, or DSI)

CAUTION: UNPLUG CONTROLLER FROM POWER OUTLET. Do not attempt to wire connectors while the power supply is "hot". Wiring a connector while it is "hot" can cause electrical shock, injury, equipment damage, or system failure.

OBSERVE POLARITY! Failure to obey polarity can cause electrical shock, injury, equipment damage.

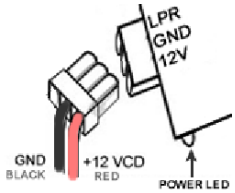
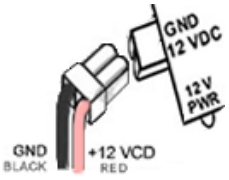
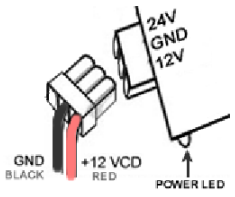
You should wire the power connectors for daughter boards while you have room to work (before you install the boards). Installing the boards is the following step.

1. **Remove the 2-pin (or 3-pin) Power Connectors from board packaging** (DPI, DIO, DSI).
2. **Connect the Black (GND) wire** from the Controller Power Harness to pin-2 of the power connector.
3. **Connect the RED (+12 VDC) wire** from the Controller Power Harness to pin-1 of the power connector.

See **Step-11 *Wiring Field Devices*** for wiring all readers, locks, and relays; as well as DSI RS-485 Channels.

Figure 13 – Wiring Power Connector on 635 DRM (views of correct wiring):

Diagram shows *TOP VIEW as you are wiring the connector*; and the *FLIPPED-OVER VIEW as it plugs into the board*. Some people prefer to plug the unwired connector into the board and then insert the wires and tighten screws from the bottom. Either way you must carefully observe polarity to prevent equipment damage or shock.

TYPE OF BOARD	Showing TOP VIEW ↓ (Terminal Screws Up; viewed as the plug wires to harness)	Showing FLIPPED-OVER ↓ (Terminal screws are down; shown as it is plugged into the Board)
635 DRM Board Dual Reader Module	 * PIN-3 = LPR (RESERVED)	
635 DIO Board Digital Input/Output		
635-DSI Board Dual Serial Interface (RS-485 Channels)	 * PIN-3 = 24 VDC (RESERVED)	

Pin-3 Reserved - DRM/DSI: DRM Pin-3 is reserved for Lock Power Relay ~ requires a separate power supply (only used for "Wet Lock Relay" operation). DSI Pin-3 is reserved for a separate +24 VDC Auxiliary Power Supply. **Never wire the controller's power supply to Pin-3 on either board.**

See Appendix for ***635-DRM Wet Contact Operation*** on how to properly wire the LPR input and set the jumpers.

STEP 4. Install the CPU and Interface Boards (daughter boards)

IMPORTANT: DO NOT CONNECT CONTROLLER TO POWER DURING BOARD INSTALLATION STEPS.
IF YOU ARE REPLACING A BOARD ON EXISTING SYSTEM, KEEP IT DISCONNECTED FROM THE POWER HARNESS WHILE YOU ARE HANDLING THE BOARD OR WIRING/CONNECTING OTHER DEVICES.

4.1 Install the 635-CPU Board inside Controller

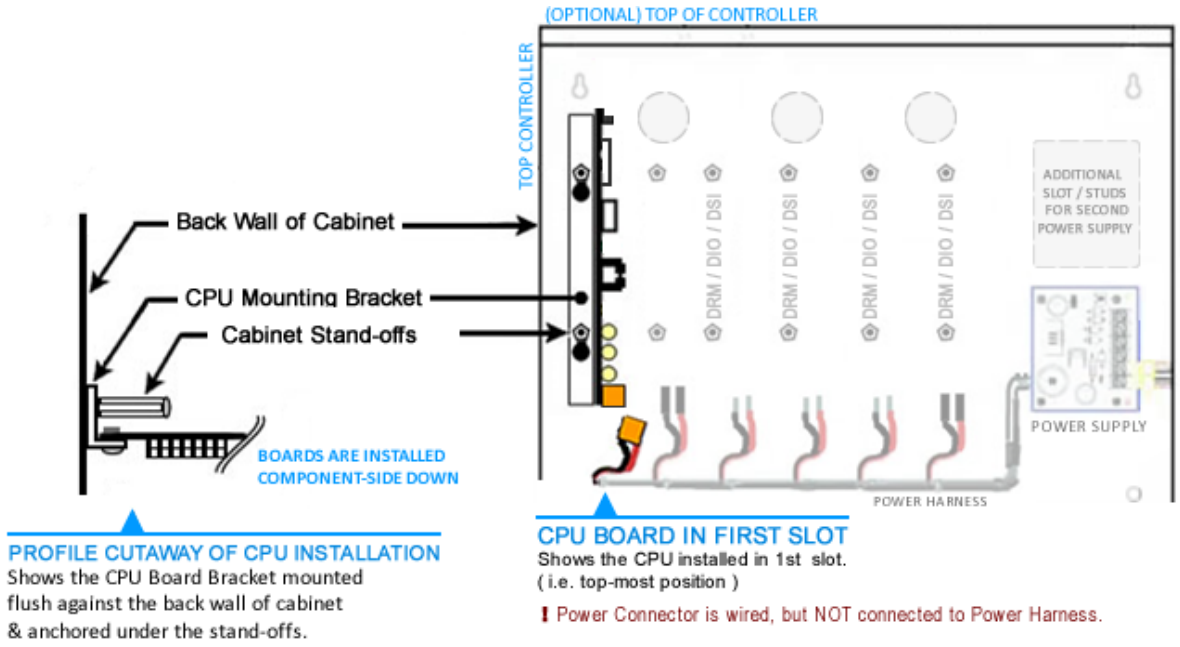
NOTE: if you have a pre-install process that allows you to preconfigure the CPU settings, you may do that before installing. However, this requires you to know in advance what the field settings must be. This is helpful if you are repairing/replacing an existing board. If you do not have a preconfigure process, you will program the board at a later step.

1. **Loosen the stand-offs and mount the Board (bracket) flush against the back wall of cabinet, in first slot.**
   DO NOT mount bracket on end of stand-off – See diagram below.
   NOTE: Board installs with components facing down (or toward power supply).
2. **Tighten stand-offs on top of the bracket**, to anchor the board firmly in position (see diagram cutaway below).
3. **Connect the Ribbon Cable** to the Data port (J8).
4. **Connect the Sense (Tamper) Connector to** (J7)**. DO NOT CONNECT POWER HARNESS YET.**
5. **Remove the paper strip* from the 3V lithium battery.**

* **FYI - The paper strip shows the embedded *flash version* installed on the CPU from the factory.** If the field system is running newer or older flash version, you must update the CPU to the field version. Updating CPU Flash is performed in a future step (before loading data to the board).

Figure 14 – Installing CPU (with bracket against back of cabinet)

Diagram shows controller cabinet hanging in horizontal option. Cabinet may be installed vertically.



DRAWINGS ARE APPROXIMATE / NOT TO SCALE

4.2 Installing a 635-DRM Board (Dual Reader Module)

If you are not installing a DRM board, skip this section.
If you are installing the 635-DRM for Remote Door operation, go to the section on 635-DSI Remote Door installation.

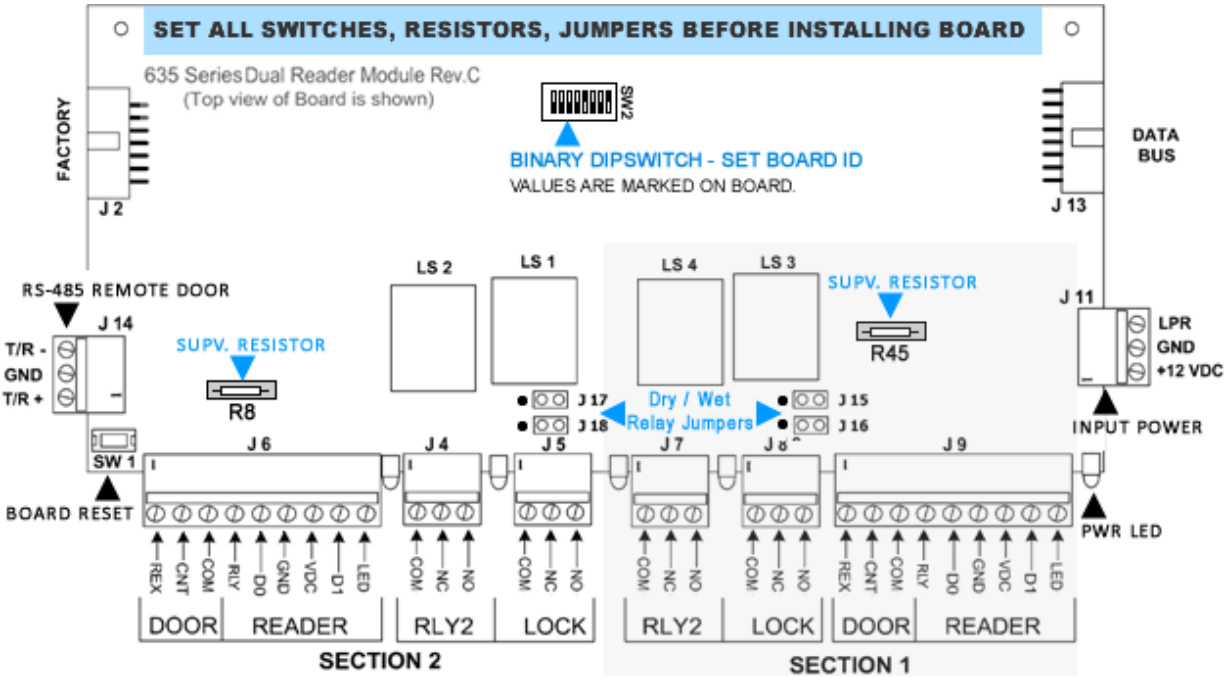
635-DRM - BOARD FEATURES

For reference, this section describes the components and features of the 635-DRM. See Appendix for 600-model hardware.

- **Board Reset Switch (SW1):** used to reset board operation, and to reset board to initialize Jumpers and Dipswitch settings.
- **Binary dipswitch (SW2):** for assigning the Board ID (before installing), as well as Remote Door Option-B.
- **Reader Supervision (R45/R8) SIP sockets:** allow installer to change the supervision resistor value as desired (factory default = 4.7k ohm Resistors). Matching values must be set in the SG software Reader Properties screen.)
- **Supports Dry Relay contacts** (normal operation default) **vs. Wet Relay contacts** (wet relay operation) Pwr Input (J11-LPR) & Jumpers (J15/J16/J17/J18) for configuring wet relay operation. (Dry Relay is the factory default)
- **Power Input (J11)** for connection to controller power harness.
- **Power LED (D12)** indicates board is connected to the power harness and the power is on (solid/on).
- **I2C Data Input (J13)** for ribbon cable connection to the CPU Board I2C Data Buss.
- **Remote Door RS-485 Input (J14)** used with the 635-DSI 485 Channel (see 635-DSI Section for wiring and topology).
- **Reader, REX, Door Connectors (J6/J9):** for wiring Readers, REX, and Door hardware.
- **Relay-1 & Relay-2 Connectors (J8/J7; J5/J4):** for wiring Locks (Relay-1) & addit. hardware (Relay-2) (4 SPDT Form-C Relays provide 1.5 A max. output). Supports wiring all relays as Normally Open and Normally Closed(NC)
- **LEDs for Lock Relay-1 and Relay-2 (D7/D6; D2/D1)** indicate when the relay is engaged (solid/on) or disengaged (off).

Figure 15 – 635 DRM Board Features:

Diagram shows board component-side up. Board installs component-side down with power input on the same side as harness.



DRAWING IS APPROXIMATE - NOT TO SCALE

635-DRM - INSTALL REQUIREMENTS

1. **CAUTION:** do not reset power to a DRM during the flashing process. This can damage the factory flash.
2. **WARNING:** Do Not Connect A 5V Reader Directly to the 635 DRM – you must install a voltage regulator for 5V readers or configure the reader for 12V. The 635 DRM supports 12 volt readers directly connected.
3. **You must set a valid board ID on the 635 DRM.** Use the binary switch before powering up/connecting the board. The factory default is '16' (1-16 are supported).
   - If you are replacing a board you will use the ID of the board you are replacing so you don't have to reprogram the software. If adding a new board, you will choose a board ID that is not used.
   - You can use either the Galaxy software or the Web Configuration Tool – or browser with the CPU IP Address, if you need to determine the existing board ID in case you are replacing an existing board.
   - You will need access to the System Galaxy software (server) to add the board to the database if you are adding a new board / new doors.
4. **The following requirements apply to lock wiring and operation.**
   - The 635 supports Fail Safe and Fail Secure
   - You must use install surge protection diodes at the device-end of line (at the lock).
   - **You must use a separate +12/+24 VDC power supply to power door Locks**.
   - Lock relays ("relay 1") can be used in wet or dry operation (see next item)
5. **RELAY-1 (LOCK RELAYS) are Form-C SPDT DRY Contact Output; with Max. 24 VDC @ 1.5 amps.**

   a) **Dry Contact Relay Operation -** recommended if you are replacing a 600 DPI for service repair.
   - Fail-safe and Fail-secure are supported under dry-contact relay operation
   - Remove all ***Relay-1 Jumpers*** (factory default) [J15 & J16 → Sect 1/Rly-1 (LS3)] [J17 & J18 → Sect 2/Rly-1 (LS1)]
   - Do not land lock power on the board – important to see diagram and install steps.

   b) **Wet Contact Relay Operation** - is available (not mandatory) if you are adding a new board and wish to use *wet relay operation.*
   - Fail-safe and Fail-secure are supported under wet-contact relay operation
   - Install lock jumpers before you install the board. [J15 & J16 → S-1/Rly-1 (LS3)] [J17 & J18 → S-2/Rly-1 (LS1)]
   - You must correctly land Wet-Contact Relay Power Input on the LPR contact (+12/+24 VDC). This must be a separate power supply.
   - You must correctly land lock wiring (Relay-1)– **see diagrams for fail-safe / fail-secure lock wiring**.

   WARNING: Failure to properly land lock wiring (using wet relay operation) can short lock power supply.
6. **Relay-2 always uses FORM-C SPDT DRY OUTPUT;** Max. 24 VDC @ 1.5 amps. NO/NC supported.
7. **Door Contact Supervision is supported.** You can change to a different value than the factory default.
   - Factory Default 4.7 kΩ resistors are installed in the resistor sockets.
   - **EOL resistors must match the value of the socketed on-board resistor**. EOL resistors should be place at the device end
   - EOL configurations supported are **series**, **parallel**, and **series-parallel**. The configuration must be set in the Software Reader Properties screen to match the physical installation.

635-DRM – BOARD INSTALLATION (STANDARD OPERATION)

If you are installing the 635-DRM for Remote Door operation, see the section for 635-DSI Remote Door installation.

This section covers installing the DRM board as a standard daughter board on the I2C Buss (i.e. not as a Remote Door Module on the RS-485 Channel).

IMPORTANT: DO NOT CONNECT CONTROLLER TO POWER DURING BOARD INSTALLATION STEPS.
IF YOU ARE REPLACING A BOARD, KEEP IT DISCONNECTED FROM THE POWER HARNESS WHILE YOU ARE HANDLING THE BOARD OR WIRING/CONNECTING OTHER DEVICES.

READER VOLTAGE: if you are using 5V Readers, you must install a 5V Voltage Regulator.

PART 4.2.1 PRE-CONFIGURING THE SUPERVISION RESISTORS

if you are not using/providing door supervision– skip this part. …

For convenience, Factory-default Supervision Resistors are already installed in SIP Sockets. And matching EOL (end of line) resistors are supplied with the board in a Ziploc bag tied to the board.

- (Section 1) **R45** SIP Socket is for door contact supervision at Door-1 = **4.7K ohm** factory default
- (Section 2) **R8** SIP Socket is for door contact supervision at Door-2 = **4.7K ohm** factory default

1) SETTING UP DOOR SUPERVISION RESISTORS (R45/R8):

A. Using the factory default 4.7k-ohm Resistors:

1) KEEP the 4.7k-ohm Resistors that are already installed on the DRM board (R45 & R8).
2) INSTALL the matching 4.7k-ohm EOL Resistors at device end (i.e. in series, or parallel, or series-parallel)
3) ENABLE supervision in the SG Software by setting the correct value in Reader's Properties Screen that matches how you installed the EOL Resistors (i.e. series, parallel, or series-parallel).

B. (optional) **Using Supervision with a custom Resistor value, do the following:**

1) INSTALL the new Custom-value Resistors in the SIP Resistor Sockets R45 & R8.
2) INSTALL the matching value EOL Resistors at the device-end (i.e. series, or parallel, or series-parallel).
3) ENABLE supervision in the SG Software by setting the correct value in Reader's Properties Screen that matches how you installed the EOL Resistors (i.e. series, parallel, or series-parallel).

NOTICE: if you decide to use door supervision after the board is installed, you can use Option-A the factory default and avoid uninstalling the DRM boards. Option-B Custom Supv Resistors will require you to uninstall every DRM that is affected.

PART 4.2.2 SETTING THE LOCK RELAY JUMPERS

If you are using Dry-Contact Relay Operation (factory default) then the black jumpers are removed (not installed).

2) ABOUT SETTING THE RELAY JUMPERS:

- Relay-1: The ***contact jumpers*** affect only the Lock Relay (R1)
- Relay-2: is <u>always</u> a dry contact relay (no jumpers).

A. DRY CONTACT RELAY OPERATION = <u>black jumpers removed</u> (FACTORY DEFAULT)**.**

- Provide power to locks with a separate power supply.

  DO NOT POWER LOCKS FROM THE DRM BOARD OR FROM THE PANEL POWER SUPPLY.

Table 16: DRY-CONTACT RELAY OPERATION = (NORMAL OPERATION)

Board Section	Relays	Jumpers	DRY Contact Jumper Position
Section-1	**Relay-1 (controls Lock for Door 1)**	**J15 & J16**	**Removed / Not Installed**
	Relay-2 (controls an addit. output for door 1)	n/a	
Section-2	**Relay-1 (controls Lock for Door 2)**	**J17 & J18**	**Removed / Not Installed**
	Relay-2 (controls an addit. output for door 2)	n/a	

See Appendix for ***<u>635-DRM Dry Contact Operation</u>*** *for a diagram of lock power input and the fail-safe and fail-secure Lock wiring.*

B. (OPTIONAL) **WET CONTACT RELAY OPERATION: <u>both black jumpers installed</u>** on the Section you want to use "wet contact operation".

- Provide power to locks with a separate power supply.

  DO NOT POWER LOCKS FROM THE DRM BOARD OR FROM THE PANEL POWER SUPPLY.

- Provide power for the "wet contact" from a **separate power supply** to the "LPR" contact (Pin-3) of the Power Input Connector (J11) on the DRM board.

Table 17: WET-CONTACT RELAY OPERATION = JUMPERS INSTALLED

Board Section	Relays	Jumpers	DRY Contact Jumper Position
Section-1	**Relay-1 (controls Lock for Door 1)**	**J15 & J16**	**INSTALLED**
	Relay-2 (controls an addit. output for door 1)	n/a	
Section-2	**Relay-1 (controls Lock for Door 2)**	**J17 & J18**	**INSTALLED**
	Relay-2 (controls an addit. output for door 2)	n/a	

See Appendix for ***<u>635-DRM Wet Contact Operation</u>*** *for a diagram of lock power input, the LPR power input, and the fail-safe and fail-secure Lock wiring.*

PART 4.2.3 (REQUIRED) PRE-CONFIGURE DRM BOARD ID

3) SETTING THE DRM BOARD ID (SW2):

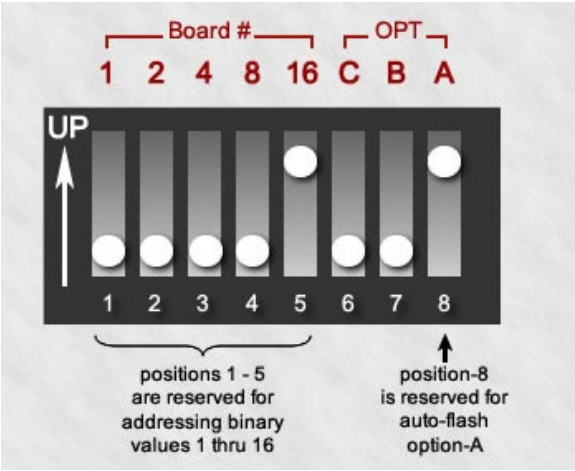
a) The Binary Dipswitch [SW2] is located on the center-back edge of the DRM board.

- Each board ID must be unique (no duplicates) and valid (1 thru 16).
- If you are replacing an existing board – you must use the same ID as the old board to maintain the system programming of the readers/doors, etc.
- If you are installing a new board, the ID must be unique on the I2C Data Buss.

b) only Turn "ON" the switches needed to achieve the desired ID.

- **Positions 1 thru 5:** for binary addressing. Find the desired value in *Board ID column* of table (below).
- **Positions 6 and 7:** are unused and should remain OFF.
- **Position 8: should remain ON (factory default).** This option enables flash auto-update.

Figure 16 – BINARY DIPSWITCH for DRM Board ID



CAUTION: DO NOT INTERRUPT BOARD POWER OR RESET THE BOARD WHEN IT IS FLASHING. Resetting the board or power during a flash update can damage the factory flash. **Be sure the DRM is <u>not</u> in the flashing process**.

Table 18: BINARY ADDRESS TABLE FOR 635-DRM

Binary Address Table								
Binary Value >	(1)	(2)	(4)	(8)	(16)	unused		Auto update
Dipswitch Position >	1	2	3	4	5	6	7	8
Board ID						OFF		ON
1	ON					< position 6 and 7 = currently unused >		< default ON – auto update flash enabled >
2		ON						
3	ON	ON						
4			ON					
5	ON		ON					
6		ON	ON					
7	ON	ON	ON					
8				ON				
9	ON			ON				
10		ON		ON				
11	ON	ON		ON				
12			ON	ON				
13	ON		ON	ON				
14		ON	ON	ON				
15	ON	ON	ON	ON				
16					ON			
Binary Value >	(1)	(2)	(4)	(8)	(16)	unused		Auto update
POSITIONS are OFF unless shown as ON								

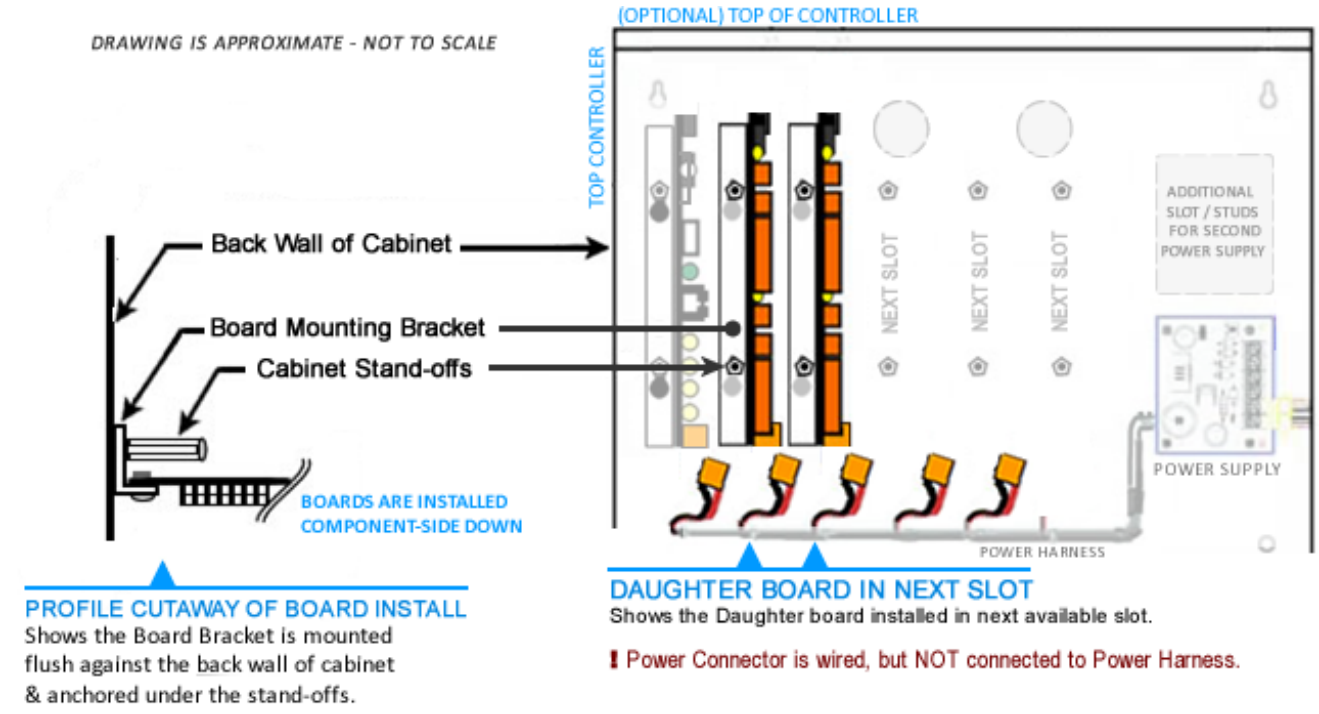
PART 4.2.4 (REQUIRED) INSTALLING THE 635 DRM BOARD INTO THE CONTROLLER

If you are not installing a DRM on the I2C Buss, skip this section. If you are installing a DRM as a "Remote Door Module" on the RS-485 Channel of a DSI, then see the instructions for ***635-DSI Remote Door Installation***.

4) **Loosen the stand-offs and mount Board (bracket) flush against the back wall of cabinet,** in next available slot**.**
   DO NOT mount bracket on end of stand-off – See diagram below
   NOTE: Board installs with components facing down (or toward power supply).
5) **Tighten stand-offs on the bracket**, to anchor the board firmly in position.
6) **Connect the Ribbon Cable** to the Data port (J2).
7) ***Repeat instructions for each DRM Board*** starting from Part 4.2.1**.**
8) **DO NOT CONNECT BOARD TO THE POWER HARNESS UNTIL YOU HAVE FINISHED INSTALLING ALL BOARDS.**

Figure 17 – Installing a DRM Board with bracket against back of cabinet:

This diagram shows the installation of an interface board in the next available slot.



Drawing is approximate – not to scale.

4.3 Install the DIO Board in the Controller

If you are not installing a DIO board, skip this section.

The DIO board is a 600-model board (*there is not a 635 version of this board*).

NOTE: **The 600-DIO board does not have a dipswitch to set the board ID**. *You must program the Board ID **after** you install the board into the controller and have applied power and connected to the CPU with the data ribbon cable.* The DIO board ID must be set using a ***config. jack*** to set the board to "33" for initial programming.

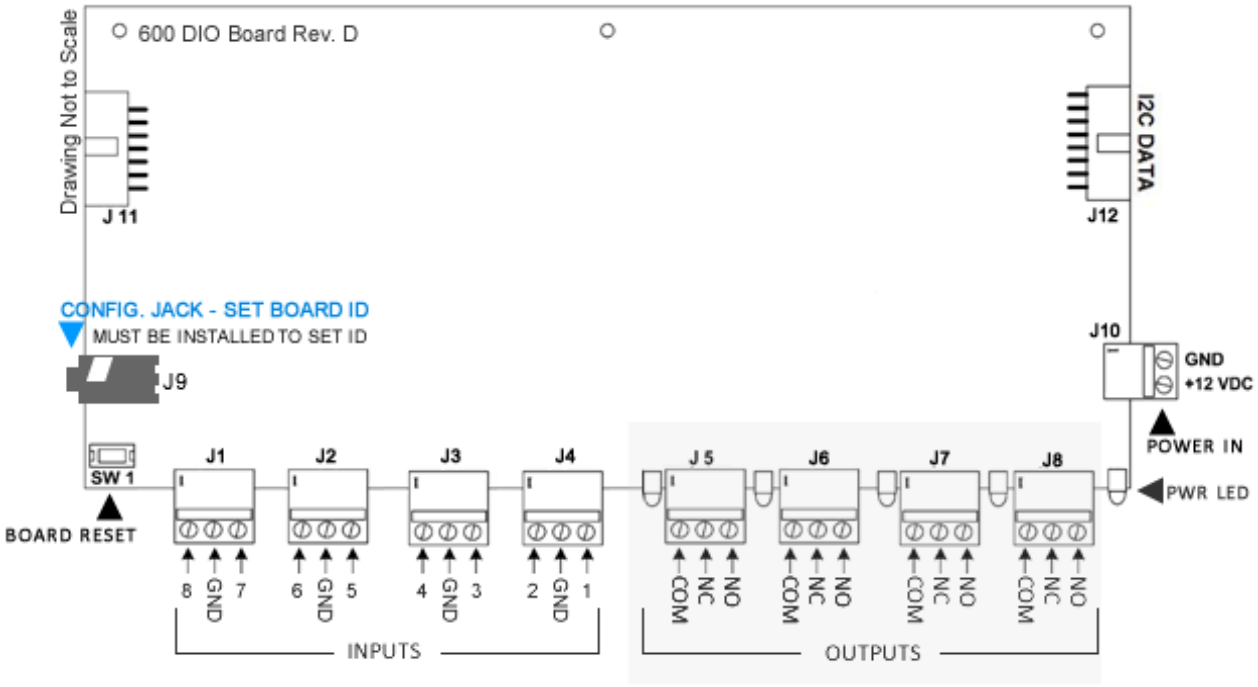
- **If the CPU is a 600-model:** you can configure the ID using a terminal emulator (with *config jack*) and use the "config" command to find/select the board by its *reference number.* Assign a valid, unused board ID (1-16 is valid).
- **If the CPU is a 635-model:** you can configure the ID using the embedded web page/Web Config Tool (with config jack). You will select the board from the appropriate screen and edit the ID. Assign a valid, unused board ID (1-16 is valid).

600-DIO - BOARD FEATURES

- **Board Reset Switch (SW1):** for resetting the board to initialize the Jumpers and Dipswitch settings, or reset operation.
- **Configuration Jack (J9):** must be installed when configuring the Board ID – can configure after installing the board.
- **Power Input (J10)** for connection to controller power harness.
- **Power LED (D5)** indicates board is connected to the power harness and the power is on (solid/on).
- **I2C Data Input (J12)** for ribbon cable connection to the CPU Board I2C Data Buss.
- **Input Connectors (J1, J2, J3, J4)** for connecting inputs 1 thru 8 (8 Input points provided).
- **Output Connectors (J5, J6, J7, J8)):** for connecting outputs 1 thru 4 (4 Output Relays are provided; Form-C 1.5 A max.).
- **LEDs for Output Relays (D1, D2, D3, D4)** indicate when the relay is engaged (solid/on) or disengaged (off).

Figure 18 – 600 DIO Board Features:

Diagram shows board component-side up. The board installs component-side down. Power input should be on the same side as the power harness when the board is installed in the controller.



DRAWING IS NOT TO SCALE

600-DIO – BOARD INSTALLATION

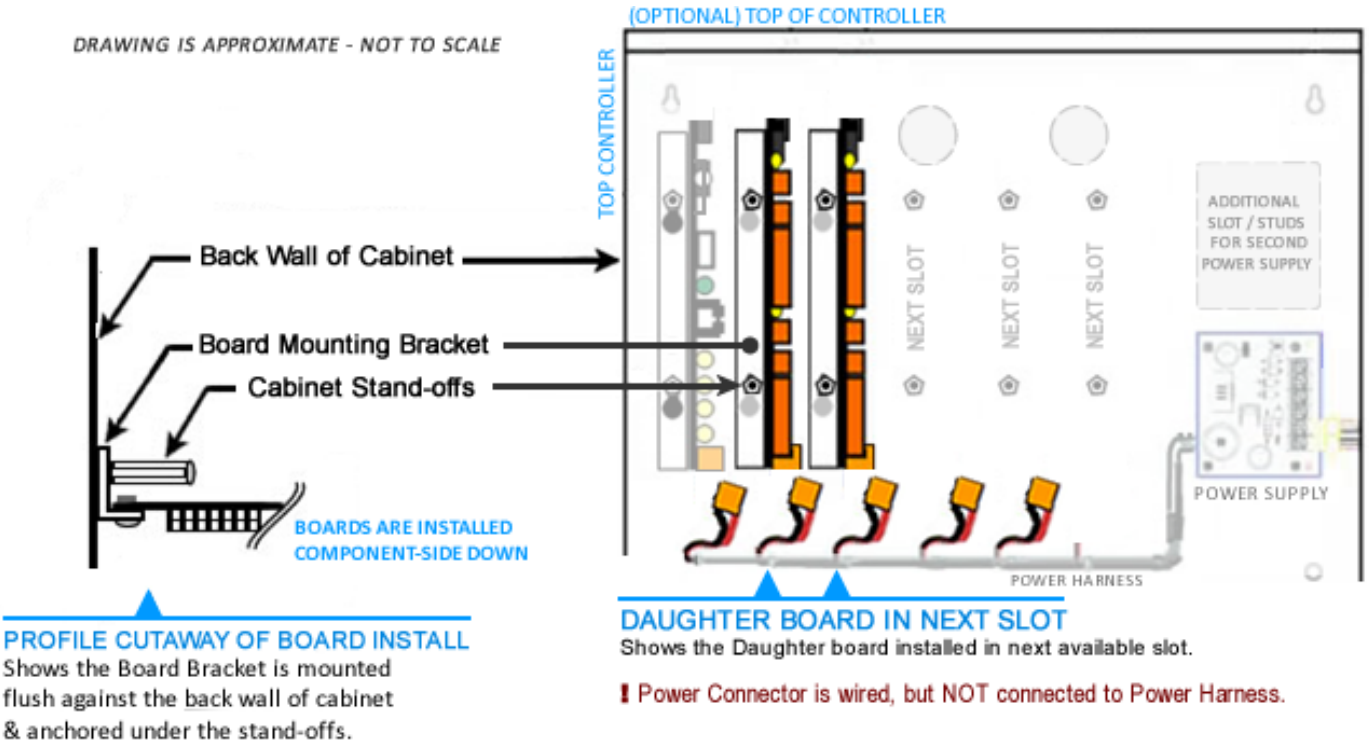
If you are not installing a DIO board, then skip this section.

The DIO board is a 600-model board (there is not a 635 version of this board).

1. **Loosen the stand-offs and mount Board (bracket) flush against the back wall of cabinet,** in next available slot**.**
   DO NOT mount bracket on end of stand-off – See diagram below
   NOTE: Board installs with components facing down (or toward power supply).
2. **Tighten stand-offs on the bracket**, to anchor the board firmly in position.
3. **Connect the Ribbon Cable** to the Data port (J12).
4. **Repeat instructions (beginning at 1) for each DIO Board you will be installing.**
5. **DO NOT CONNECT BOARD TO THE POWER HARNESS UNTIL YOU HAVE FINISHED INSTALLING ALL BOARDS.**

Figure 19 – Installing a DIO Board with bracket against back of cabinet:

This diagram shows the installation of an interface board in the next available slot.



4.4 Installing a 635 DSI Board (Dual Serial Interface)

If you are not installing a 635-DSI board, skip this section.

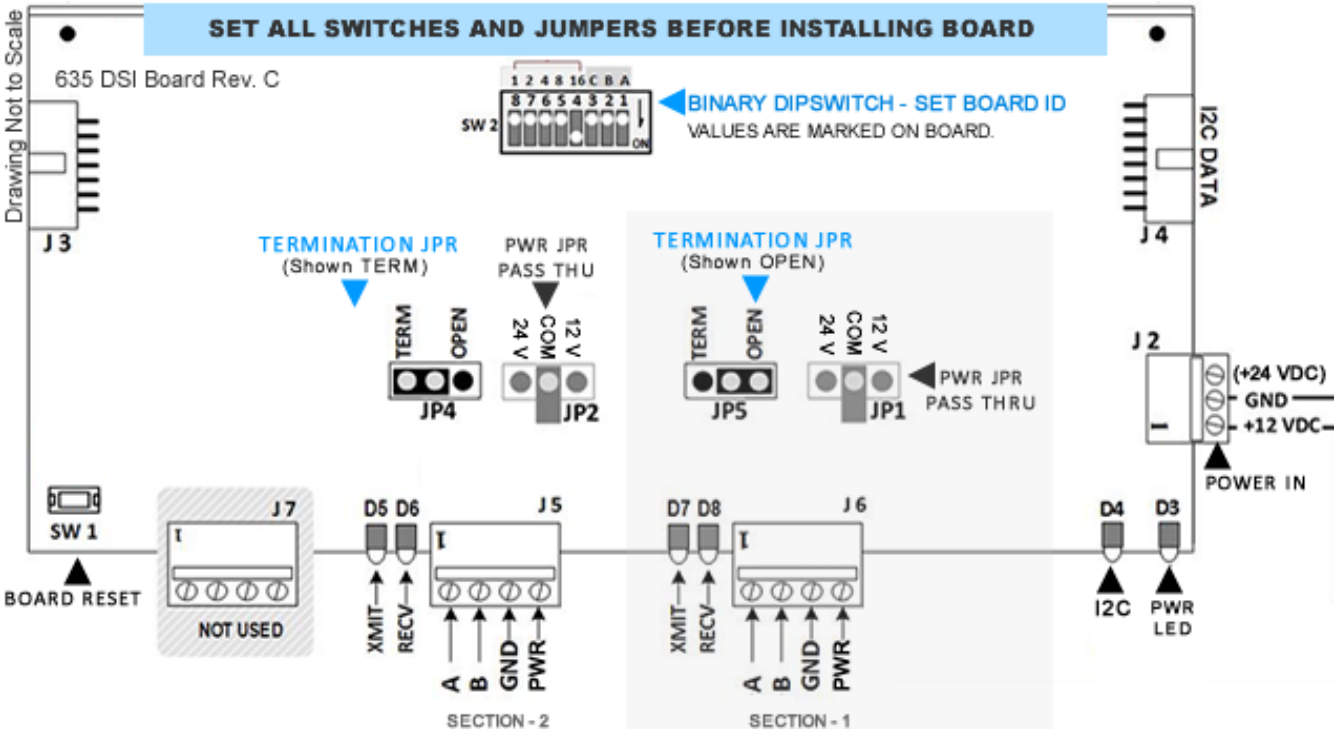
635-DSI - BOARD FEATURES

This section covers the 635-model DSI Board. *See the Appendix for the 600-model DSI Features.*

- **Board Reset Switch (SW1):** for resetting the board to initialize the Jumpers and Dipswitch settings, or reset operation.
- **Binary Dipswitch (SW2):** for assigning the Board ID (before installing), as well as Option-B.
- **Termination (JP4/JP5) 2-Pin Jumpers:** allows installer to set the Termination if the board is at EOL (independent sections) (factory default = OPEN). Matching 120 Ω Termination Resistor must be installed at the extreme end of line.)
- (OPTIONAL) **Passthru Power Output (JP1/JP2) 2-Pin Jumpers:** ability to configure the pass-thru voltage from the power input **(J2).** (factory def = UNSET) 12V pos. passes power from J2 Pin-1; 24V pos. passes pwr from J2 Pin-3 via separate 24v P.S.
- **Power Input (J2)** for 12V on PIN-1 from controller DC Power Supply; 24V on PIN-3 from separate DC Power Supply.
- **Power LED (D3)** indicates board is connected to the power harness and the power is on (solid/on).
- **I2C Data Input (J4)** for ribbon cable connection to the CPU Board I2C Data Buss.
- **RS-485 Connectors (J5/J6)** used for RS-485 Communication with various multi-drop devices (see Section for wiring).
- **LEDs for XMIT/RECV (D5/D6, D7/D8):** blinking or flickering indicates RS485 Communication is detected.

Figure 20 – 635 DSI Board Features:

Diagram shows board component-side up. The board installs component-side down. Power input should be on the same side as the power harness when the board is installed in the controller.



635-DSI - BOARD SPECIFICATIONS

- **The 635 DSI Board has two (2) RS-485 Serial ports (sections J6/J5).**
  1. **Each RS-485 Section supports a max 16 devices in most cases** (i.e. DRM readers, WiFi readers(PIMS), clocks, LCDs, ...). In the case of Output or Elevator Relays the limits are different. **See Table-2 for Max Devices**.
  2. **Each reader/device must have a unique/valid ID** on the Section (1 thru 16 = valid; zero not valid).
  3. **NOTICE: The 635-CPU has a "max device count" of 64 devices.** Sometimes each device/reader counts as 1, but sometimes the whole section counts as 1 device. When you plan your system, and how many DSI Boards you can support in the panel, you must consider all the devices on all other boards, as well as the DSI Boards – this is especially important when you are installing readers. **Table-2 Max Devices & Device Count**.
- **Both DSI Sections function independently from each other:** The installer must assign the ***Section Use*** in the software (the DSI Programming screen) before walk-testing the hardware. For example, you can install Readers on one section and Relay Control on the other section. **See Table-4 for Mapping the "Section Use". Also topology diagrams are available in the later sections.**
- **Each DSI Section is dedicated:** Each section must be ***dedicated to the same type or brand of technology***. For example, you cannot mix LCDs and Cypress clocks on the same section. You cannot mix inputs and outputs on the same section. You cannot mix different reader types (except for AD-Series). You cannot mix Wireless Wiegand readers and Wireless ABA formats on the same section (this does cover the **See Table 2 for Independent Function and Table 3 Dedicating Section Use.**

THE 635-DSI SUPPORTED TECHNOLOGIES

1. **Remote Door Module (635-DRM)** – The 635 DSI supports **up to 16 readers per RS-485 Channel** (max 64 devices per CPU). You can choose to use one or both reader ports on each DRM by setting Option-B (dipswitch) on the DRM. This ultimately affects how many DRMs will be on the 485-channel.

   The SG software extrapolates and assigns a Reader ID based upon the DRM Board ID and the setting of Option-B switch (on/off). If DRM #1 has Option-B ON, the system will treat it as Reader-1 and Reader-2. NOTE: You can have a mix of single and dual reader DRMs – or – you can have all single or all dual. In any case, the maximum number of readers supported on a DSI Section is always 16 Readers/Doors.
2. **Wireless Readers:**
   Schlage AD400 (Wireless), AD300 (Hard-wired)*, ASSA Aperio*, Salto Salis*, Schlage ODT Legacy, etc.

   * SEE the appropriate hardware mini-guide for the specific 3rd Party Brand of Reader you are installing (i.e. the separate Galaxy guides for Schlage AD400/AD300, Assa Aperio, Schlage ODT Legacy Guide, etc.
3. **635 Input Module** *max. of 16 modules per section - for large-quantity input monitoring.*
4. **600 Output Relay Board** *for large-quantity output control*:
   a. **as General Output Relays** - *max. of three (3) Output Relay Boards per channel.* ***(See more Appendix)***
   b. **as Elevator Control Relays** - *max. of 15 Output Relay Boards per channel (Standard Elevator systems). (Note: "destination-based systems" by Otis and Schindler do not use 600 Output Relay Boards)*
5. **Cypress Clock model 1201** *max. of 16 clocks per section - for Time and Attendance.*
6. **Galaxy LCD Display Module** *max. of 16 per section* 4x20 (4 lines x 20 chars per line) configurable for text display or as a time clock display.

635-DSI MAX NO. OF DEVICES & DEVICE COUNT (per Section)

Table 19: DSI Max. Number of Devices and Device Count for each Section

Use of section	Hardware	Max Devices* per Section	Valid IDs	Device Count
Remote Readers ** with a 635 DRM Board (Wiegand and ABA can be mixed on the section)	635-CPU 635-DSI (1) 635-DRMs**(1)	**Max. 16 Readers** (requires from 8 to 16 DRMs, based on whether you enable one or both reader ports on the DRM via the DRM dipswitch Option-B).	**1 thru 16 –** **This is calculated by the SG software based on DRM board address** – see Step-11 for board addressing.	Each **READER** counts as 1 device.
Wireless Readers using an RS-485 PIM or Node. (Schlage, Assa, Salto, etc.)	635-CPU 635-DSI (1) *3rd party PIMs*(1)	**Max. 16 Readers** (using from 1 to 16 PIMs based on **signal strength** & **physical topography** of the building).	**1 thru 16 –** 3rd Party software is used to set reader ID. (PIM must have valid ID also)	Each **READER counts as 1 device.**
AD300 Hardwired (NO PIMs)	635-CPU 635-DSI	**Max. 16 Readers**	**1 thru 16 –** 3rd Party software is used to set reader ID.	Each **READER counts as 1 device.**
AD300/AD400 MIXED	635-CPU 635-DSI (1) *3rd party PIMs* (1)	**Max. 16 Readers** **AD400s require PIMs**	**1 thru 16 –** PIMs need valid ID	Each **READER counts as 1 device.**
Clocks or LCD Units (you cannot mix clocks & LCDs same section)	635-CPU 635-DSI (1) *Clock/LCD* (1)	**Max. 16 CLOCKS** **Max. 16 UNITS**	**1 thru 16 –** This is a physical setting configured manually within the CLOCK or LCD.	Each **DSI SECTION counts as 1 device.** (IN THIS CASE YOU DO NOT COUNT THE CLOCK OR LCDs)
635-Input Modules (you cannot mix inputs and outputs on same section)	635-CPU 635-DSI (1) 635-Input Mod. (1)	**Max. 16 Input Modules** -with max 16 inputs per Input Module.	**1 thru 16 –** This is a binary dipswitch address on the input board.	One **INPUT MODULE counts as 1 device.** DO NOT COUNT EVERY INPUT.
600-Output Relay Brd (you cannot mix inputs and outputs on same section)	635-CPU 635-DSI (1) 600-Output Brd (1)	**Max. 3 Output Boards** (General Outputs) - **max 8 Relays per board**. - max 24 Relays per DSI Section **Max. 15 Output Boards** (Elevator Control Relays) - **max 8 Relays per board**. - max 120 Relays per DSI Sectior	**1 thru 3 –** Set via binary dipswitch address on the input board. **1 thru 15 –** Set via binary dipswitch address on output board.	One **Output Board counts as 1 device.** DO NOT COUNT EVERY RELAY

*At the actual job site, the "max devices per section" can be less than what the system supports, due to physical factors such as signal strength, physical topography of the building, or total line distance (4,000 feet).

** **Remote readers** can be up to 500 feet from the DRM board. You can have any mix of reader types or card format. The DRM Boards must be within the 4,000 ft max line distance for the DSI Board.

(1) **Install Terminal Resistors** (or onboard Termination Jumpers) **at the extreme end of the RS-485 wire run**. When installing resistors at the device, get as close to the device as possible. DSI board and Input Board have onboard jumpers - leave them open unless the board is truly at the extreme end of the line.

635-DSI Examples of How DSI Sections Function Independently

This table clarifies how the sections can work independently. You don't have to put the same hardware on one section as you do on the other section. **However, you do have to stay under the 64-device max CPU count.**

Table 20: Examples of DSI Sections Functioning Independently

Functions	635-DSI SECTION-1	635-DSI SECTION-2	
DSI EXAMPLE 1	635-DRM Remote Doors	635-DRM Remote Doors	Both sections = same use
DSI EXAMPLE 2	635-DRM Remote Doors	clocks	Each section = different use
Note: only in the case of Remote DRMs, the reader technology and card format can be mixed			

Wireless Function	635-DSI SECTION-1	635-DSI SECTION-2	
DSI EXAMPLE 1	**Schlage AD400 – Wgn dedicated**	**Schlage AD300 – Wgn dedicated**	**Dedicated card format**
DSI EXAMPLE 2	**Schlage AD400 & AD300 (MIXED)**	**Schlage AD300 – dedicated**	**Section-1 mixed AD300/400**
DSI EXAMPLE 3	**Assa Aperio**	**Salto Salis**	**Each section = different use**
NOTICE: AD300 & AD400 are the only readers that can mix on the same section (provided they are all the same Card Format (i.e. ABA vs Wiegand)). You cannot mix ABA and Wiegand on the same section with any wireless readers.			

Inputs/Outputs	635-DSI SECTION-1	635-DSI SECTION-2	
DSI EXAMPLE 1	635 INPUT MODULES	635 INPUT MODULES	Both sections = same use
DSI EXAMPLE 2	635 INPUT MODULES	600 OUTPUT MODULES	Each section = different use
DSI EXAMPLE 3	600 OUTPUT MODULES	600 OUTPUT MODULES	Both sections = same use

Table 21: Mapping the DSI "Section Use" in the SG Software

Section Use is set in the System Galaxy in the DSI Programming screen before you Walk-Test the system. Most are self-explanatory. You must configure each DSI Section with the appropriate setting.

Purpose	Boards Needed	"SECTION USE" in System Galaxy
Not in use	n/a	UNUSED
Aperio Wireless Readers	635 DSI	ASSA ABLOY Aperio
Salto Salis Wireless Readers	635 DSI	Salto Salis RF
Schlage (ABA) AD300 hardwired Schlage(ABA) AD400 Wireless	635 DSI	PIM ABA Readers
Schlage (Wgn) AD300 hardwired Schlage (Wgn) AD400 Wireless	635 DSI	PIM Wiegand Readers
Veridt CAC Readers	635 DSI	Veridt CAC Readers
Remote Door /Readers	635 DSI & 635-DRM (Dual Reader Mod)	RS-485 Door Modules
Inputs	635 DSI & 635- Input Modules	RS-485 Input Modules
Outputs (general purpose)	635 DSI & 600- Output Relay Boards	Output Relay
Elevator Control	635 DSI & 600- Output Relay Boards	Elevator Control Relay
Cypress Clock	635 DSI	
LCD Display	635 DSI	LCD 4x20 Display

GO TO Step 10- Wiring Field Devices to find wiring diagrams for the 635 DSI.

635-DSI – BOARD INSTALLATION

If you are not installing a DSI board, then skip this section.

This section covers the 635-model board. The 600 version of this board is covered in an older manual, but as far as mounting the board into the cabinet, the steps are the same.

PART 4.4.1 (OPTIONAL) PRE-CONFIGURE THE EOL TERMINATION JUMPERS (635-DSI)

For convenience, 120 ohm Termination Jumpers are provided on the DSI Board (factory default = OPEN).

- OPEN = no termination resistance at the DSI BOARD.
- TERM = 120 ohm resistance is applied at the DSI Board end.

NOTICE:

- You must install Termination at both extreme ends of the RS-485 wire run (especially in the case of Wireless Readers, Input Boards, clocks and LCDs).
- Each 485 Section must be configured for termination, independently. It is possible to have a wire run where one Section is not at the EOL (JP = OPEN POSITION), while the other Section is at the EOL (JP = TERM POSITION).

Table 22: SET THE DSI TERMINATION JUMPERS FOR EACH SECTION

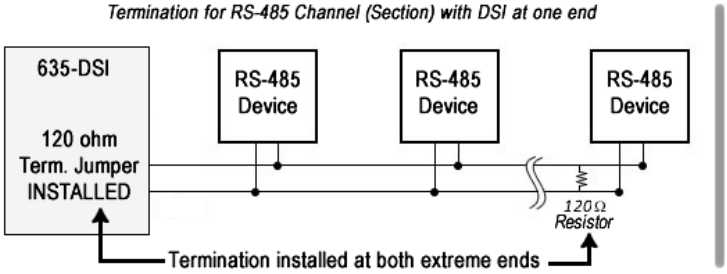
SECTION	JUMPER	Setting if Section is at EOL	*Setting if Section is not EOL*
Section-1	JP5	"TERM" (A)	OPEN (factory default) (B)
Section-2	JP4	"TERM" (A)	OPEN (factory default) (B)

(A) Example A: If the DSI Board is at one extreme end of the wire run, you must install a matching 120-ohm Termination Resistor at the ***other extreme end*** of 485 run.

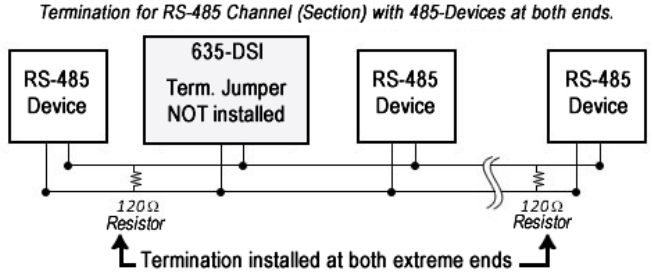
(B) Example B: IF the DSI Section is set to OPEN, then you must install a 120-ohm Resistor at ***both extreme ends*** as near to the end device as possible (120-ohm resistors are supplied with the board in a Ziploc).

Figure 21 – Examples using Termination Resistance with the 635 DSI Board:

Example A – (JPx = TERM) the DSI Section is at ***one extreme end***, with a 120-ohm Termination Resistor installed at ***other extreme end***.



Example B – (JPx = OPEN) the DSI Section is not at either extreme end. Therefore, a 120-ohm Termination Resistor installed at ***both extreme ends***.



PART 4.4.2 SETTING THE DSI PASS-THRU VOLTAGE JUMPERS

If you are not using pass-thru voltage and the jumpers (JP1/JP2) are already in the UNSET, then skip this part.
For convenience, the 635 DSI supports Pass-thru voltage from the power input.

The voltage (12v/24v) is passed thru Pin-4 (Pwr Out) of the RS-485 Connectors (J6/J5).

NOTICE:

- Leave the Jumpers open (factory default) if you are not using pass-thru voltage.
- Install the Jumpers in the correct position if you are using pass-thru voltage.
- Each 485 Section must be configured for pass-thru, independently. It is possible to use pass-thru on one Section and not on the other Section. Or it is possible to pass 12V on one Section and 24V on the other section.

Table 23: SET THE DSI PASS-THRU JUMPERS FOR EACH SECTION

SECTION	JUMPER	Pwr Input(J2) Pin-1	Pwr Input(J2) Pin-3	*NO PASS THRU VOLTAGE*
Section-1	JP1	Set to "12V" (A)	Set to "24V" (B)	UNSET (factory default) (C)
Section-2	JP2	Set to "12V" (A)	Set to "24V" (B)	UNSET (factory default) (C)

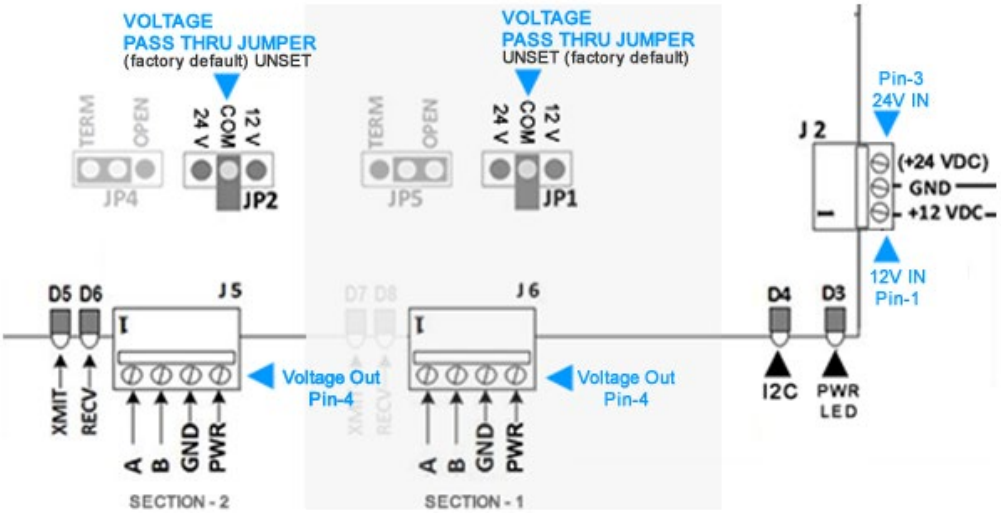
(A) 12V pass-thru from the controller 12V power supply (PIN-1 of Power Input(J2)) to PIN-4 of the RS485 Connectors.

(B) 24V pass-thru from an auxiliary power supply (PIN-3 of Power Input(J2)) to PIN-4 of the RS485 Connectors.

(C) UNSET means no voltage is passed thru to PIN-4 of the RS485 Connectors.

Figure 22 – Using Pass-thru Jumpers on the 635 DSI Board:

This diagram shows the pass-thru jumpers in the UNSET position.



PART 4.4.3 (REQUIRED) PRE-CONFIGURE DSI BOARD ID

1. SETTING THE DSI BOARD ID (SW2):

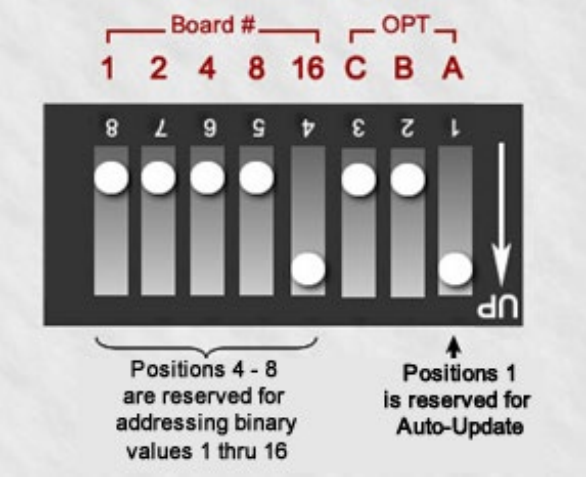
a) The Binary Dipswitch [SW2] is located on the center of the DSI board.

- Each board ID must be unique (no duplicates) and valid (1 thru 16).
- If you are replacing an existing board – you must use the same ID as the old board to maintain the system programming of the readers/doors, inputs, outputs – whatever is supported.
- If you are installing a new board, the ID must be unique on the I2C Data Buss.

b) Turn "ON" only the switches needed to achieve the desired ID.

- **Positions 4 thru 8:** for binary addressing. Find the desired value in *Board ID column* of table (below).
- **Positions 2 and 3:** are unused and should remain OFF.
- **Position 1: should remain ON (factory default).** This option enables flash auto-update.

Figure 23 – BINARY DIPSWITCH for DSI Board ID



CAUTION: DO NOT INTERRUPT BOARD POWER OR RESET THE BOARD WHEN IT IS FLASHING.
Resetting the board or power during a flash update can damage the factory flash. **Be sure the DSI is not in the flashing process**.

Table 24: BINARY ADDRESS TABLE FOR 635-DRM

Binary Address Table								
Binary Value >	(1)	(2)	(4)	(8)	(16)	unused		Auto update
Dipswitch Position >	8	7	6	5	4	3	2	1
Board ID						OFF		ON
1	ON					< position 6 and 7 = currently unused >		< default ON – auto update flash enabled >
2		ON						
3	ON	ON						
4			ON					
5	ON		ON					
6		ON	ON					
7	ON	ON	ON					
8				ON				
9	ON			ON				
10		ON		ON				
11	ON	ON		ON				
12			ON	ON				
13	ON		ON	ON				
14		ON	ON	ON				
15	ON	ON	ON	ON				
16					ON			
Binary Value >	(1)	(2)	(4)	(8)	(16)	unused		Auto update
POSITIONS are OFF unless shown as ON								

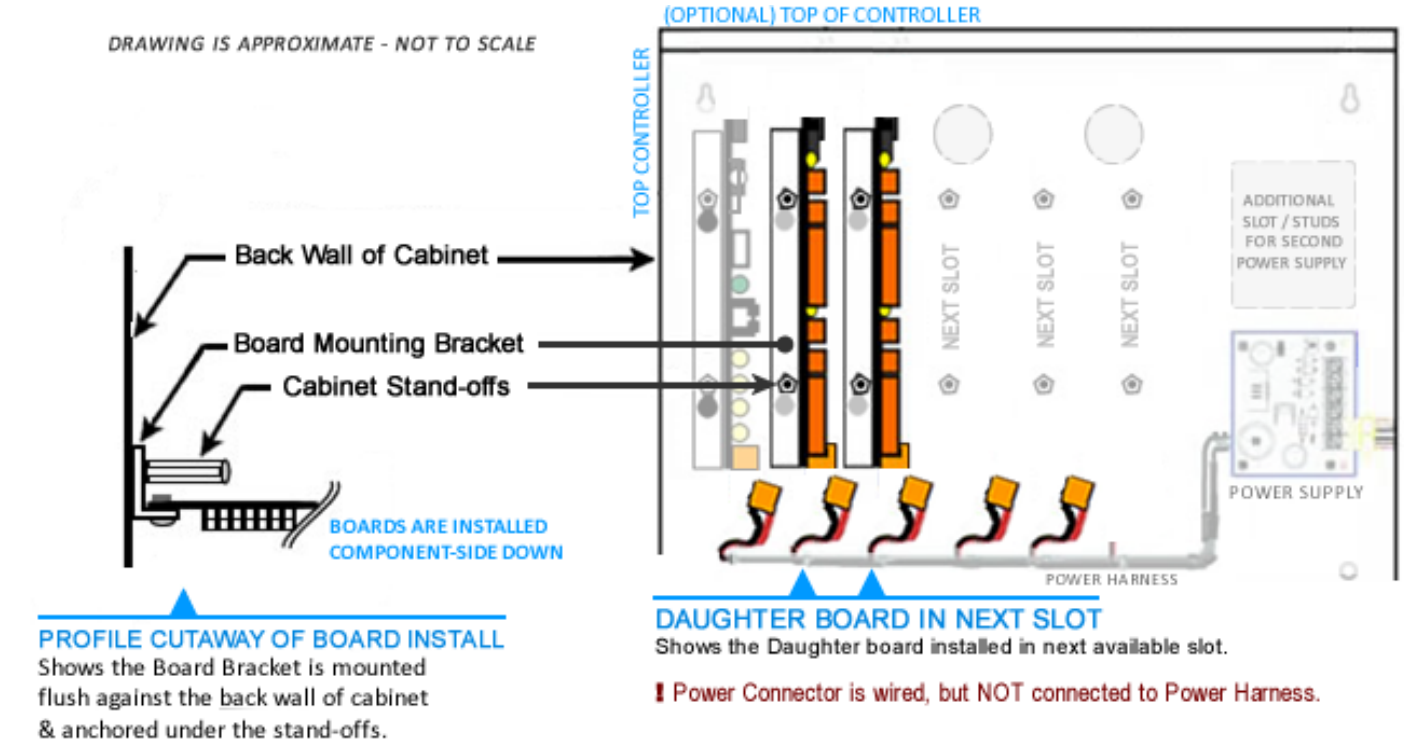
PART 4.2 4 (REQUIRED) INSTALLING THE 635 DSI BOARD IN THE CONTROLLER

IF You are not installing a DSI, skip this section

1. **Loosen the stand-offs and mount Board (bracket) flush against the back wall of cabinet,** in next available slot.
   DO NOT mount bracket on end of stand-off – See diagram below
   NOTE: Board installs with components facing toward power supply.
2. **Tighten stand-offs on the bracket**, to anchor the board firmly in position.
3. **Connect the Ribbon Cable** to the Data port (J4).
4. **Repeat instructions (beginning at 1) for each DSI Board you will be installing.**
5. **DO NOT CONNECT BOARD TO THE POWER HARNESS UNTIL YOU HAVE FINISHED INSTALLING ALL BOARDS.**

Figure 24 – Installing a DSI Board with bracket against back of cabinet:

This diagram shows the installation of an interface board in the next available slot.



4.5 Installing a 635-Model Output Relay Board

If you are not installing a Relay Board, skip this section.

Notice: if you are upgrading a 500-model ORM, this is the solution you will use.

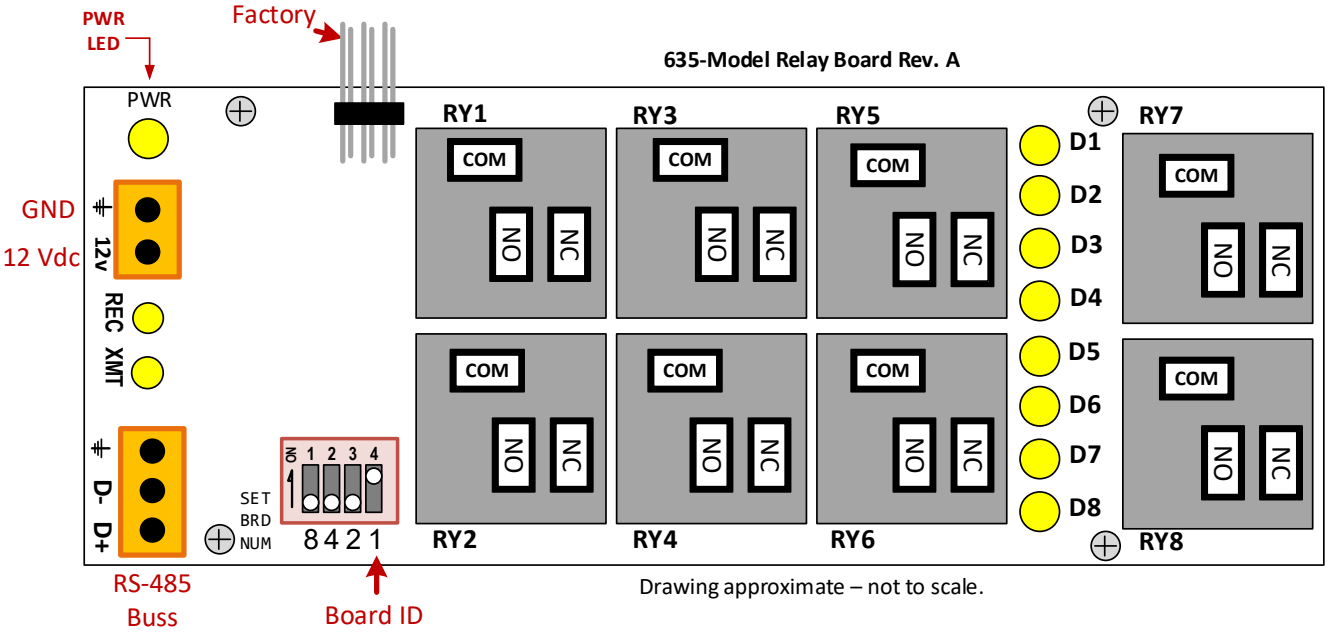
NOTICE: The Relay Board can install in a single layer in the cabinet, or you can use a stacking kit which is available from the Galaxy Product Catalog. One stacking kit allows you to stack 2 Boards onto 4 panel studs..

635-OUTPUT RELAY BOARD - FEATURES

- **Binary Dipswitch (SW1):** is a 4-position switch for assigning the Board ID (set ID before installing).
- **Power Input (J1)** +12V on PIN-1 from Dedicated Power Supply; use separate Power Supply (not the one powering the DSI).
- **PWR LED** indicates board is connected to the power harness and the power is on (solid/on).
- **RS-485 Connection (J2)** for RS-485 3-Wire (D+, D-, GND) PIN-1 = D+; PIN-2 = D-; PIN-3 = GND.
- **REC LED** indicates board is receiving data over the RS-485 network connection (flicker/blinking = data receiving).
- **XMT LED** indicates board is transmitting data over the RS-485 network connection (flicker/blinking = data transmitting).
- **RELAYS (RY-1, 2, 3, 4, 5, 6, 7, 8)** there are eight Form-C SPDT Dry Relays, (Rated max. 24v, 1.5 Amps). These relays can be wired Normally Closed (NC) or Normally Open (NO) to an output device.
- **OUTPUT LEDs (D1, 2, 3, 4, 5, 6, 7, 8)** indicates when a relay is active/engaged (regardless of how it is wired (NO/NC)).

Figure 25 – 635 Output Board Features:

Diagram shows board's component-side up. The boards are install flat and component-side-up, which uses 4 studs (or 2 slots). Installer will wire the Power Input to a separate 2nd power supply (i.e. not the P.S. used by the CPU/DSI).



Note – the 600-Model Board uses the same wiring pinout as the 635-model.

635-RELAY BOARD – INSTALLATION OF BOARD IN CONTROLLER

If you are not installing a Relay Board, then skip this section.

PART 4.5.1 PREP STEPS - BEFORE INSTALLING THE RELAY BOARDS

You must know how many boards will be on each DSI 485 Channel (Section). The use (i.e. general output or elevator control) will determine how many boards you can support on a DSI Section. The last Output Board on the RS485-Section must be within the 4,000 ft. max line length.

A. General Purpose Outputs:

- MAIN PANEL: must have a **CPU board** and a **DSI board**; can have Relay Boards on 2nd power supply.
- SECOND PANEL: second or additional panels will have only Relay Boards, wired back to DSI in main panel.

General Output (GPO/ORM)	Max Number of Relay Boards	Total Number of Relays
Per RS485 Section (port):	Up to **3 Boards**	Up to **24 Relays** per Section
Per DSI Board:	Up to **6 Boards**	Up to **48 Relays** per DSI Board

B. Elevator Control:

- MAIN PANEL: must have a **CPU board**, **DRM Board** and a **DSI Board**; & Relay Boards (based on cabinet size).
- SECOND PANEL: second or additional panels will have only Relay boards, wired back to DSI in main panel.

Elevator Control	Number of Relay Boards	Total Number of Relays
Per RS485 Section (port):	Up to **15 Boards**	Up to **120 Relays** per Section
Per DSI Board:	Up to **30 Boards**	Up to **240 Relays** per DSI Board

Elevator relay boards might install only on one section of the DSI if each cab's floors are accessed independently.

Relay Boards must be installed in a Multidrop configuration (daisy-chained) on the DSI RS485 Section (not a star).
See ***Appendix N*** for additional panel diagrams of the first and second panels.

Figure 26 – Example of Relay Boards in Main Panel for General Purpose Output Relay (ORM)

Diagram shows **medium** Main Panel for GPO/ORM holds 2 relay boards (or 4 with stacker kits). See next diagram for 2ND Panel.

NOTICE: Relay Boards must use a separate power supply when they are in the main panel.

NOTICE: ERM **Elevator control Main Panel must include a DRM board. T**hus, it will hold only 1 relay board (or 2 with a stacker kit)

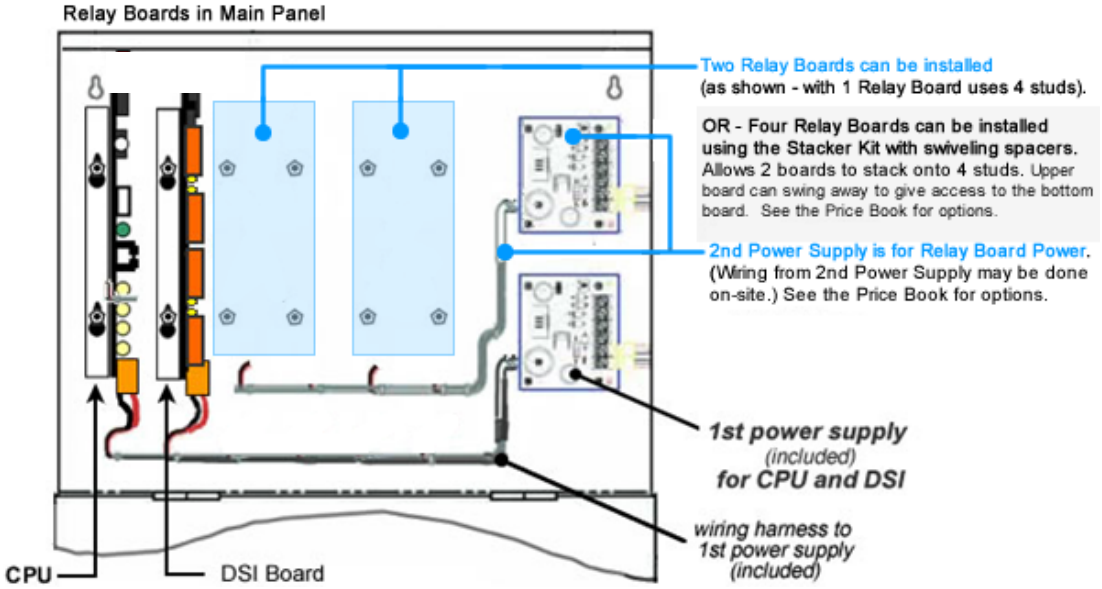
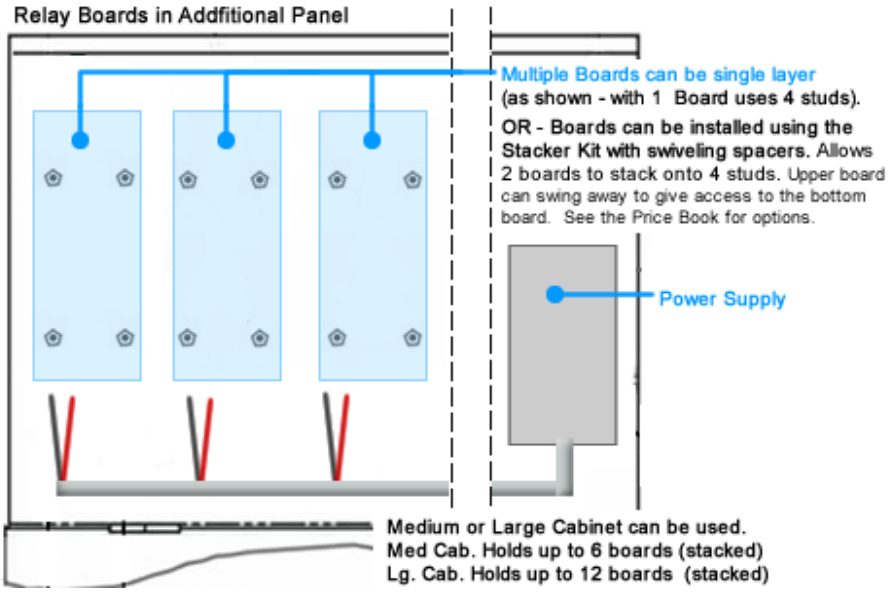


Figure 27 – Example of Relay Boards Installed in a Separate Panel

This diagram shows the Relay Boards installed in a second (auxiliary) panel. All control boards must be in the Main Panel. The additional panels will hold . **SEE PART 4.5.3 FOR CORRECT INSTALL INSTRUCTIONS.**



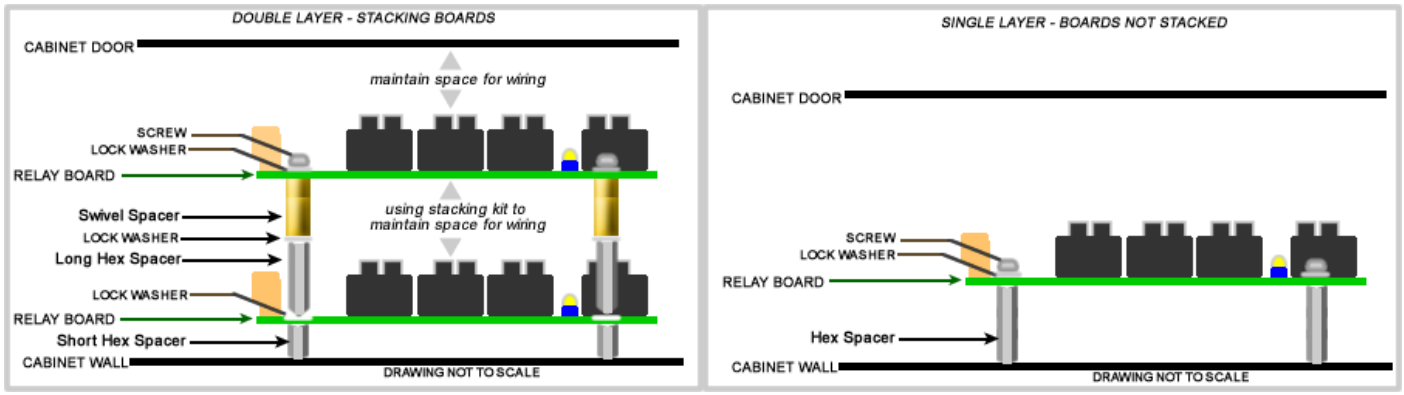
1. **You must decide how the boards will be installed in the electrical cabinets.**

   a. **SINGLE LAYER INSTALL:** Relay boards are mounted onto existing standoffs – be sure you have enough clearance when the door is closed for the wiring to the Relays**. YOU CANNOT MOUNT THE BOARD FLUSH TO THE CABINET WALL – YOU MUST USE A SPACER (STANDOFF).** **SEE PART 4.5.3 FOR CORRECT INSTALL INSTRUCTIONS.**

   b. **DOUBLE LAYER (STACKER KIT):** Relay boards are mounted using the Stacker Kit that provides 12 Lock Washers spacers (standoffs) – be sure you have enough clearance between boards and when the door is closed for the wiring to the Relays. **One kit of 12 spacers mounts 2 Relay Boards in a stacked configuration**. **YOU CANNOT MOUNT THE BOARD FLUSH TO THE CABINET WALL – YOU MUST USE A SPACER (STANDOFF).**

Figure 28 – Example of Single Layer vs. Stacked Install (SEE PART 4.5.3 FOR EXACT INSTRUCTIONS)

Diagram shows board's component-side up. The boards are install flat and component-side-up, which uses 4 studs (or 2 slots). Installer will wire the Power Input to a separate 2nd power supply (i.e. not the P.S. used by the CPU/DSI).



PART 4.5.2 CONFIGURE THE RELAY BOARD IDs (REQUIRED)

- You can do this as you install each board – but do not forget to do it.
- If you are stacking the boards, you must address the lower boards before you install the upper board.

2. You must set the Board ID before installing the boards.

- **(Switch positions 1 thru 4).** ID 1 thru 16 are valid; each Board ID must be unique on the RS-485 bus.

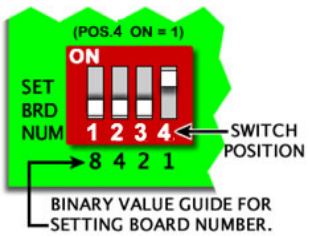
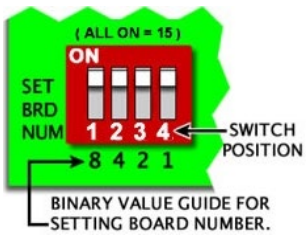
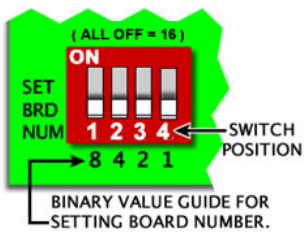
RELAY BOARD # 1	BOARD # 15	BOARD # 16
		

Table 25: BINARY ADDRESS TABLE FOR OUTPUT RELAY BOARD

ID	Actual DIP-Switch Position
1	4 = ON
2	3 = ON
3	3, 4 = ON
4	2 = ON
5	2, 4 = ON
6	2, 3 = ON
7	2, 3, 4 = ON
8	1 = ON

ID	Actual DIP-Switch Position
9	1, 4 = ON
10	1, 3 = ON
11	1, 3, 4 = ON
12	1, 2 = ON
13	1, 2, 4 = ON
14	1, 2, 3, = ON
15	ALL ON = 15
16	ALL OFF = 16

PART 4.5.3 INSTALLING THE BOARDS IN THE PANELS (REQUIRED)

3. INSTALLING BOARDS IN A SINGLE LAYER ONLY: << SKIP THIS STEP IF YOU ARE STACKING >>

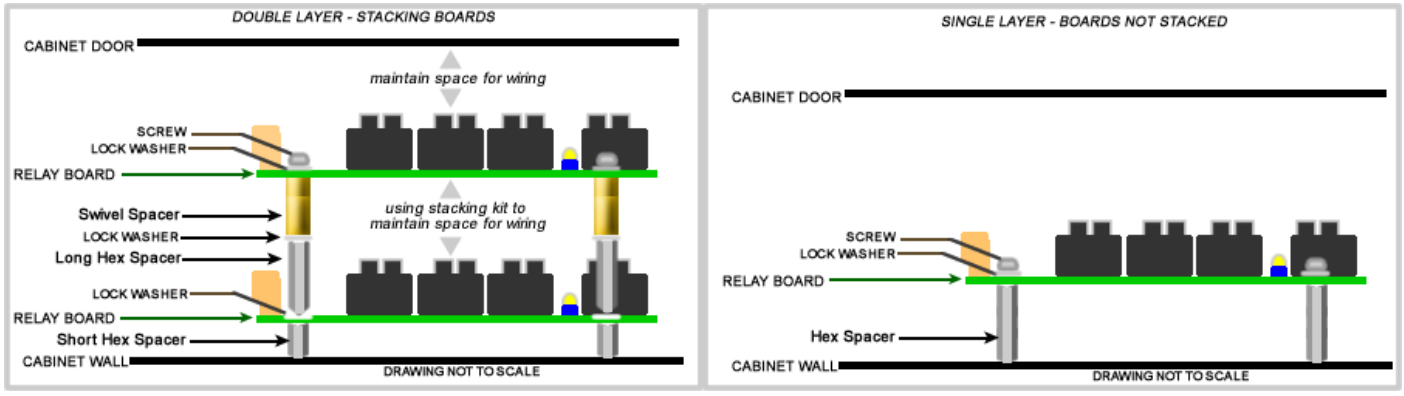
- **a.** Make sure you have set the Board Numbers to the appropriate, unique IDs (via binary dipswitch).
- **b.** You may be able to use the existing standoffs (hexagonal spacers) that are in the Galaxy cabinet. You must maintain enough space between the boards and cabinet door for the wiring going to the Relays.
- **c.** Place board flat (component-side-up) on top of 4 spacers – NEVER MOUNT BOARD AGAINST PANEL WALL!
- **d.** Install a lock washer on each mounting hole of the board. Install the 4 screws to anchor the board. (go to next step to wire relays and power input)

4. INSTALLING BOARDS IN STACKED: << SKIP THIS STEP IF DOING A SINGLE-LAYER INSTALL >>

- **a.** Make sure you set Board IDs to the appropriate, unique IDs before installing (via binary dipswitch).
- **b.** **Remove existing spacers from cabinet and Install the shortest hex spacers from your Stacking Kit** onto the **bare studs** in the cabinet. (4 hex spacers for a board) – NEVER MOUNT BOARD AGAINST PANEL WALL!
- **c.** **Place the lower Relay Board onto the spacers** (you can pop ahead to next page for instructions on wiring).
- **d.** **Place 4 lock washers** on mounting holes of the board and secure by **installing 4 long hex spacers** on each mounting hole of the board.
  - **At this point you may want to go ahead and wire up relays and inputs of lower board(s)**
- **e.** **Place 4 more lock washers on top of each hex spacer that you installed in the prior step.**
- **f.** **Install 4 swivel spacers** so that the short arm of the swivel spacer is toward the upper board. The swivel spacers allow the upper relay board to swing out of the way to allow access to the lower board. *You may want to test the swing-away clearance to ensure you have installed the swivel spacers as needed.*
- **g.** **Align the upper Relay Board) onto the swivel spacers**.
- **h.** **Install the last 4 washers** and secure the board with the **4 screws from the stacker kit**. You can complete the wiring as needed for the relays and orange connectors.

Figure 29 – Relay Board Installation Options (Single Layer vs. Stacked)

Diagram shows board's component-side up. The boards are install flat and component-side-up, which uses 4 studs (or 2 slots). Installer will wire the Power Input to a separate 2nd power supply (i.e. not the P.S. used by the CPU/DSI).



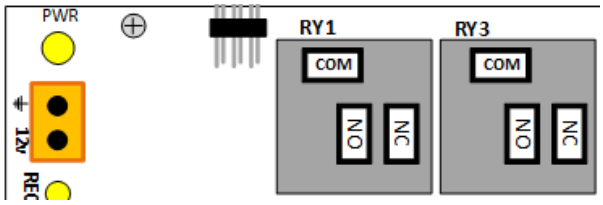
5. WIRING THE RELAYS (NO vs. NC):

a. The relays are Dry Form-C SPDT Rated at 24v 1.5 Amps.

b. You can wire the relays Normally Open (NO) or Normally Closed (NC), as needed.

Figure 30 – 635-Relay Board: Wiring the Relay Terminals

Diagram shows where to land wires for Relay Terminals.



6. WIRING THE POWER INPUT CONNECTOR:

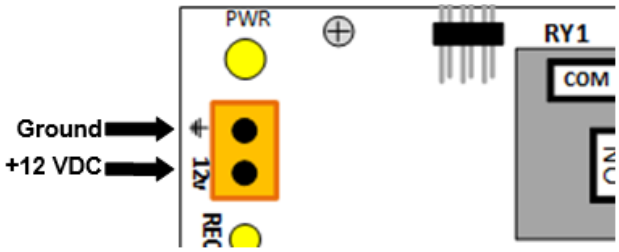
a. You must wire the power inputs to the appropriate size power supply.

b. Remove the *Orange 2-Piece Connector* and wire it as follows:

- Connect the Ground wire to the side marked with the ground symbol
- Connect power to the side marked 12v

Figure 31 – 635-Relay Board: Wiring the Power Input

Diagram shows where to land wires for the Power Input.



7. DO NOT CONNECT/APPLY POWER TO THE BOARD YET.

- **Also See Appendix N for additional diagrams of Output Relay panels as needed.**

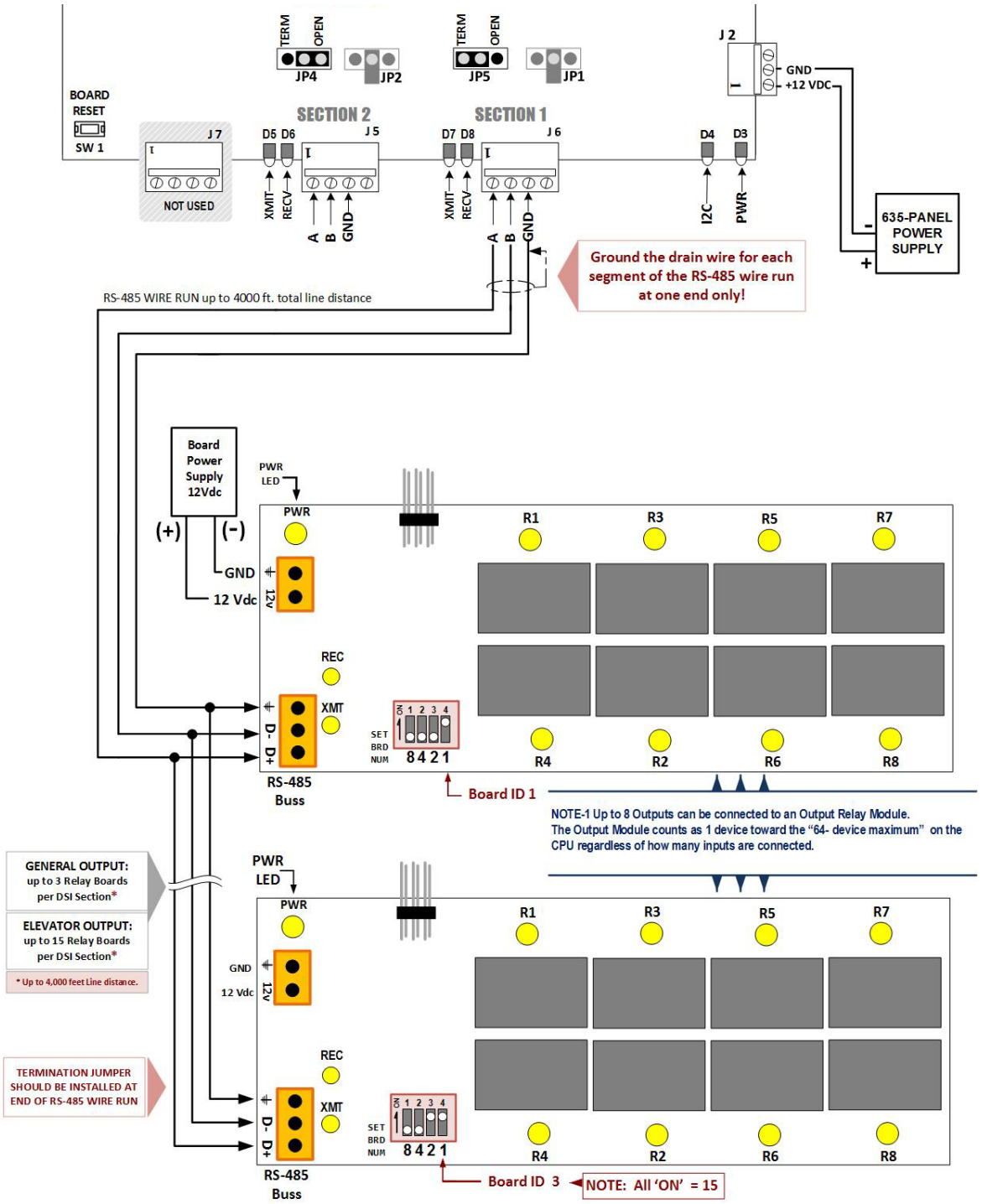
8. WIRING RELAY BOARD TO RS-485 MULTI-DROP:

Diagram shows Boards installed on the DSI Board Section-1 in a multidrop (daisy chain) configuration.

DO NOT USE A STAR CONFIGURATION ON THE 485 SECTION.

SEE NEXT PAGE FOR RS485 PINOUT GUIDE

Figure 32 – Relay Board Installation (on the 635-DSI Board's RS-485 Multidrop)



Drawing is not to scale.

STEP-8 PINOUT GUIDE FOR RS-485 MULTIDROP

- Relay Boards must be installed in a multidrop (daisy chain) configuration.
- **DO NOT USE A "STAR" CONFIGURATION ON THE RS485 SECTION.**

Table 26: WIRING PINOUT FROM 635-DSI TO FIRST RELAY BOARD

DSI BOARD RS-485 (J5 / J6)	FIRST RELAY BOARD RS-485 ON MULTIDROP
A (pin 1)	**to D+**
B (pin 2)	**to D-**
GND (pin 3)	**GND** ← Ground Drain wire at DSI END ONLY for this line segment
UNUSED (pin 4)	- -

Use this pinout guide for the first Relay board on the multidrop.

Never wire more than one board to a DSI Section.

WIRING PINOUT RELAY BOARD

Table 27: WIRING PINOUT FROM ONE RELAY BOARD TO NEXT RELAY BOARD

RELAY BOARD RS-485	TO NEXT RELAY BOARD ON MULTIDROP
D+	to **D+**
D-	to **D-**
GND	**GND** ← Ground Drain wire on shielding to one board (do not ground both ends of the drain wire).

Use this pinout guide for each Relay board on the multidrop.

Only one (1) Relay Board can be wired to a Relay Board.

Never wire more than one board to another board.

4.6 Installing 635-Model Input Module

If you are not installing a 635 Input Board, skip this section.

NOTICE: If you are upgrading older 500-series Controllers with 500 AMMs, this is the solution you will use.

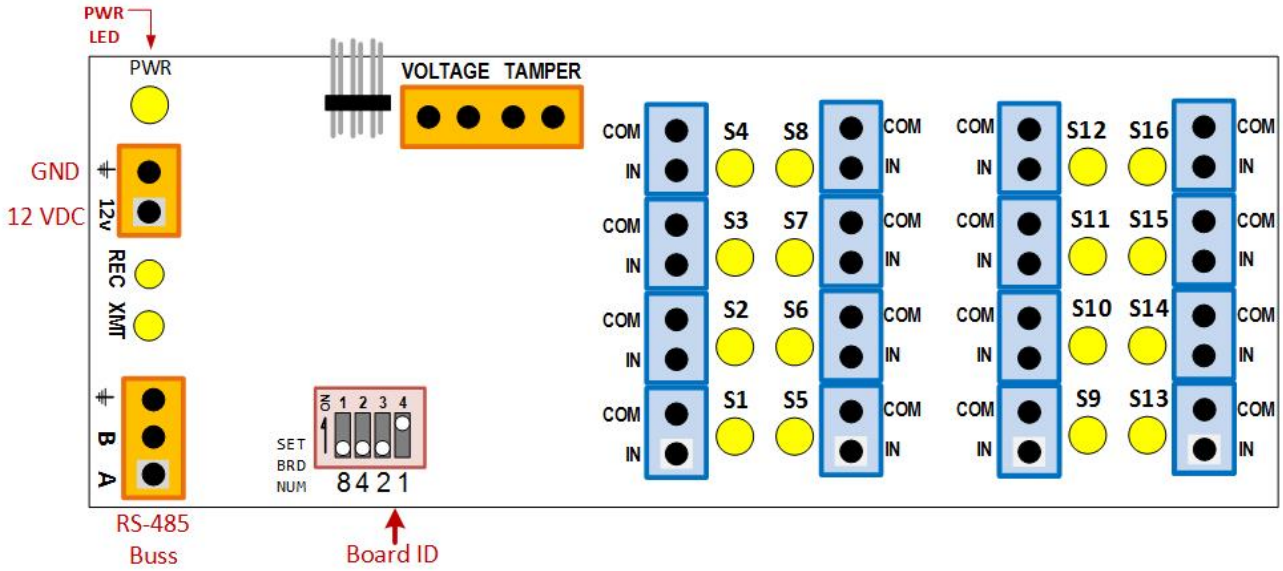
NOTICE: The Input Boards can be installed in a single layer (1 Input Board on 4 studs), or you can use a stacking kit - available from the Galaxy Product Catalog. One stacking kit allows you to stack 2 Boards onto 4 panel studs.

635-INPUT MODULE - FEATURES

- **Binary Dipswitch (SW1):** is a 4-position switch for assigning the Board ID (set ID before installing).
- **Power Input (J1)** +12V on PIN-1 from Dedicated Power Supply; use separate Power Supply (not the one powering the DSI).
- **PWR LED** indicates board is connected to the power harness and the power is on (solid/on).
- **RS-485 Connection (J2)** for RS-485 3-Wire (A, B, GND) PIN-1 = A; PIN-2 = B; PIN-3 = GND.
- **REC LED** indicates board is receiving data over the RS-485 network connection (flicker/blinking = data receiving).
- **XMT LED** indicates board is transmitting data over the RS-485 network connection (flicker/blinking = data transmitting).
- **INPUT LEDs (S1 thru S16)** indicate when an input is active.
- **PLUGGABLE, 2-WAY PCB INPUT CONNECTORS: Sixteen (16) connectors support 16 inputs per board. (J5, J6, J7, J8)**
  There are Four (4) banks of pluggable, 2-Pin Connectors used for wiring the inputs. *Each bank (J5/J6/J7/J8) of 2-pin connectors is mounted in a row so that it looks a single 8-pin connector, but each 2-pin connector can be unplugged from the board for easy of wiring.* The connectors are 2-way connectors, which offer retention screw contacts for landing stranded wires, or push-in contacts for single conductor wires.

Figure 33 – 635-Input Module Features

Diagram shows board's component-side up. The boards are install flat and component-side-up, which uses 4 studs (or 2 slots). Installer will wire the Power Input to a separate 2nd power supply (i.e. not the P.S. used by the CPU/DSI).



635-INPUT MODULE – INSTALLATION OF BOARDS IN CONTROLLER PANELS

If you are not installing an Input Board, then skip this section.

PART 4.6.1 PREP STEPS - BEFORE INSTALLING THE INPUT BOARDS

1. **You must know how many boards will be on each DSI 485 Channel (Section).**
   The last Input Board on the RS485-Section must be within the 4,000 ft. max line length.

A. INPUT BOARD:

- MAIN PANEL: must have a **CPU board** and a **DSI board**; and Relay Boards on separate power supply.
- SECOND PANEL: second or additional panels may have only the Relay Boards.

General Input (AMM)	Number of Relay Boards	Total Number of Relays
Per RS485 Section (port):	Up to **16 Boards**	Up to **256 Inputs** per Section
Per DSI Board:	Up to **32 Boards**	Up to **512 Inputs** per DSI Board

NOTICE: Each Input Board counts as 1 DEVICE toward the CPU's 64-Device maximum – regardless of how many inputs are connected to the board. This makes a max of 64 Input Boards per CPU.

However, you may have those 64 boards scattered across multiple DSI boards depending on the topology of your building. The more DSI boards you put in the main panel, the less room for input boards.

Input Boards must be installed in a Multidrop configuration (daisy-chained) on the DSI RS485 Section.

Figure 34 – Basic Example of Input Boards Installed in the Main Panel

Diagram shows **medium** Main Panel for Inputs will hold 2 boards (or 4 with stacker kits). See next diagram for 2ND Panel.
NOTICE: Input Boards can use a separate power supply when they are in the main panel.

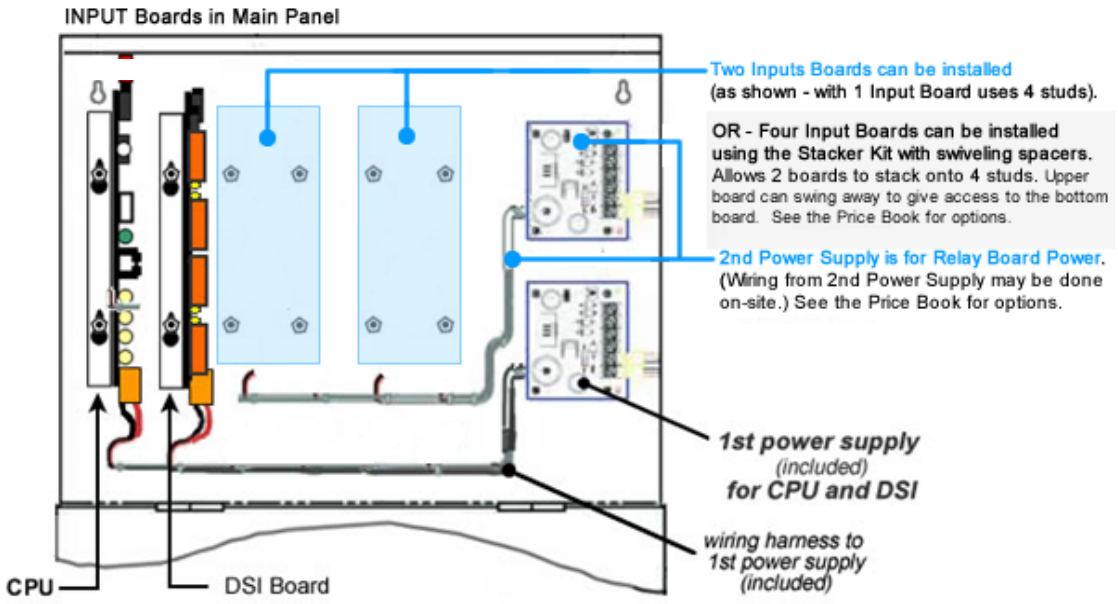
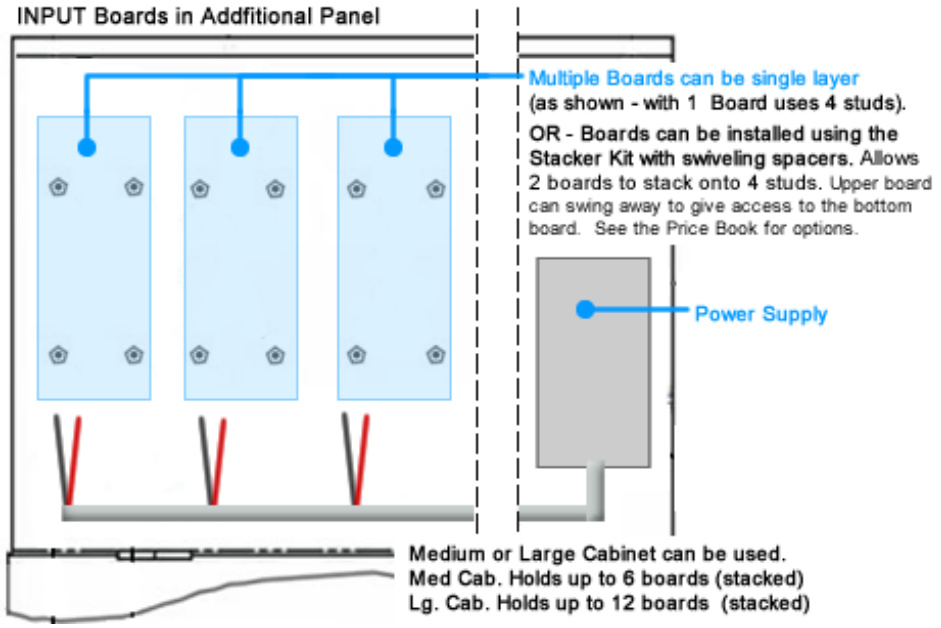


Figure 35 – Basic Example of Input Boards Installed in a Separate Panel

This diagram shows the Input Boards installed in the second (auxiliary) panel. The CPU, DSI are in the Main Panel.



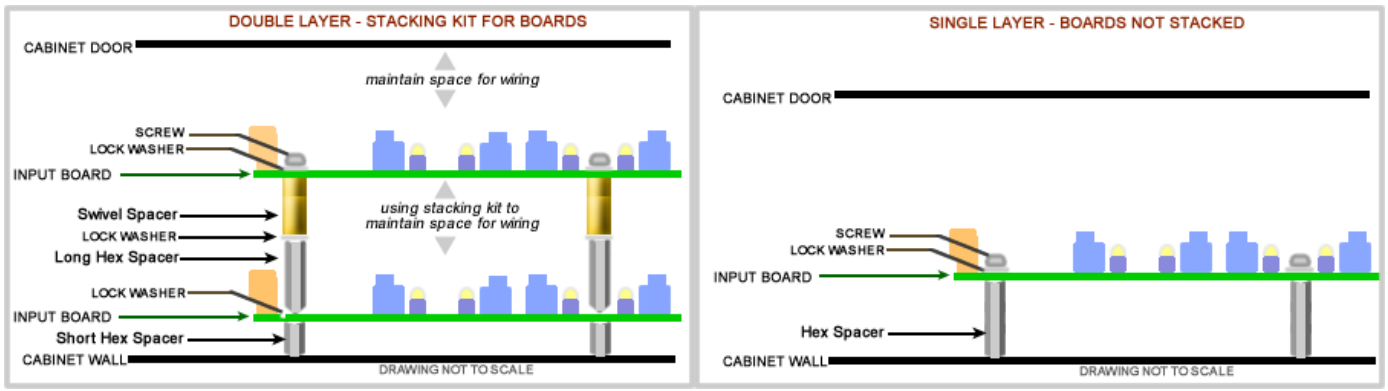
2. You must decide how the boards will be installed in the electrical cabinets.

a. **SINGLE LAYER INSTALL:** Relay boards are mounted onto existing standoffs – be sure you have enough clearance when the door is closed for the wiring to the Relays**. YOU CANNOT MOUNT THE BOARD FLUSH TO THE CABINET WALL – YOU MUST USE A SPACER (STANDOFF). (SEE PART 4.6.3 FOR EXACT INSTRUCTIONS)**

b. **DOUBLE LAYER (STACKER KIT):** Relay boards are mounted using the Stacker Kit that provides 12 Lock Washers spacers (standoffs) – be sure you have enough clearance between boards and when the door is closed for the wiring to the Relays. One kit of 12 spacers mounts 2 Relay Boards in a stacked configuration. **YOU CANNOT MOUNT THE BOARD FLUSH TO THE CABINET WALL – YOU MUST USE A SPACER (STANDOFF).**

Figure 36 – Example of Single Layer vs. Stacked Install (SEE PART 4.6.3 FOR EXACT INSTRUCTIONS)

Diagram shows board's component-side up. The boards are install flat and component-side-up, which uses 4 studs (or 2 slots). Installer will wire the Power Input to a separate 2nd power supply (i.e. not the P.S. used by the CPU/DSI).



PART 4.6.2 CONFIGURE THE BOARD IDs (REQUIRED)

- You can do this as you install each board – but do not forget to do it.
- If you are stacking the boards, you must address the lower boards before you install the upper board.

3. You must set the Board ID before installing the boards.

- **(Switch positions 1 thru 4).** ID 1 thru 16 are valid; each Board ID must be unique on the RS-485 bus.

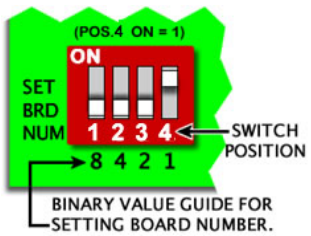
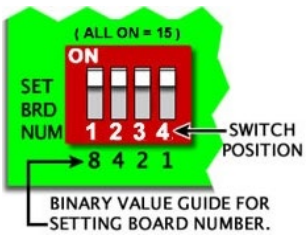
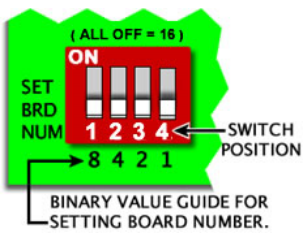
INPUT BOARD # 1	BOARD # 15	BOARD # 16
		

Table 28: BINARY DIPSWITCH SETTINGS FOR INPUT BOARD

ID	Actual DIP-Switch Position	ID	Actual DIP-Switch Position
1	4 = ON	9	1, 4 = ON
2	3 = ON	10	1, 3 = ON
3	3, 4 = ON	11	1, 3, 4 = ON
4	2 = ON	12	1, 2 = ON
5	2, 4 = ON	13	1, 2, 4 = ON
6	2, 3 = ON	14	1, 2, 3, = ON
7	2, 3, 4 = ON	15	ALL ON = 15
8	1 = ON	16	ALL OFF = 16

PART 4.6.3 INSTALLING THE BOARDS IN THE PANELS (REQUIRED)

4. INSTALLING BOARDS IN A SINGLE LAYER ONLY: << SKIP THIS STEP IF YOU ARE STACKING >>

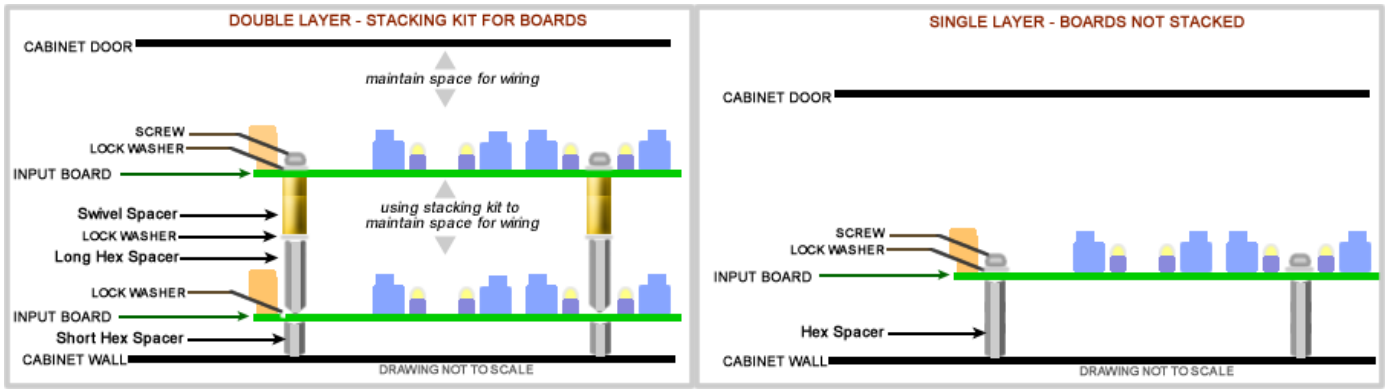
- **a.** Make sure you have set the Board Numbers to the appropriate IDs.
- **b.** You may be able to use the existing standoffs in the Galaxy cabinet if you can maintain enough space for the wiring to the input connectors.
- **c.** Place a lock washer on each of the 4 mounting holes of board.
- **d.** Install 4 screws to anchor the board(s) onto the standoffs (spacers).
- **e.** GO TO THE STEP ON WIRING THE INPUTS AND OTHER CONNECTORS.

5. INSTALLING BOARDS IN STACKED: << SKIP THIS STEP IF DOING A SINGLE-LAYER INSTALL >>

- **a.** Make sure you set Board IDs to the appropriate, unique IDs before installing (via binary dipswitch).
- **a.** **Remove existing spacers from cabinet and Install the shortest hex spacers from your Stacking Kit** onto the **bare studs** in the cabinet. (4 hex spacers for a board) – NEVER MOUNT BOARD AGAINST PANEL WALL!
- **b.** **Place the lower Input Board onto the spacers.**
- **c.** **Place 4 lock washers on the boards 4 mounting holes** and **install 4 long hex spacers** to anchor the board.
  - At this point you may want to go ahead and wire up relays and inputs of lower board(s)
- **d.** **Place 4 more lock washers on top of each hex spacer that you installed in the prior step**
- **e.** **Install the 4 swivel spacers so that the short arm of the swivel spacer is toward the upper board**. The swivel spacers allow the upper relay board to swing out of the way to allow access to the lower board. *You may want to test the swing-away clearance to ensure you have installed the swivel spacers as needed*.
- **f.** **Align the upper Relay Board onto the swivel spacers**.
- **g.** **Install the last 4 washers** and secure the board with the **4 screws from the stacker kit**. You can complete the wiring as needed for the relays and orange connectors.

Figure 37 – Input Board Installation Options (Single Layer vs. Stacked)

Diagram shows board's component-side up. The boards are install flat and component-side-up, which uses 4 studs (or 2 slots). Installer will wire the Power Input to a separate 2nd power supply (i.e. not the P.S. used by the CPU/DSI).



6. WIRING THE INPUTS:

Wire the inputs to the ***pluggable/ interlocking, 2-way 2-pin TB Connectors***.

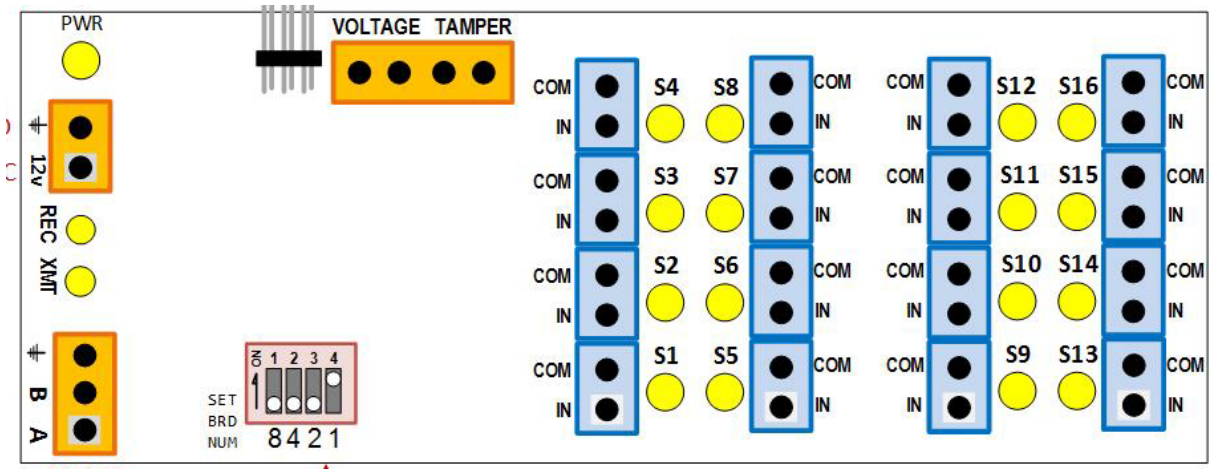
The pluggable/interlocking 2-pin connectors are arranged into four banks of connectors. You can unplug each one from the board for ease of wiring (but be careful to observe the polarity of your wiring.

NOTICE: These are *2-way TBC connectors*, which means ….

- **If you are using stranded wire**, anchor stranded wiring using the screw contacts that come in from the side.
- **If you are using single-conductor wire,** use "push-in" contacts that allow you to push the solid wire in from the top-side of the connector.

Figure 38 – Input Board Component Designations and Connector Pinouts

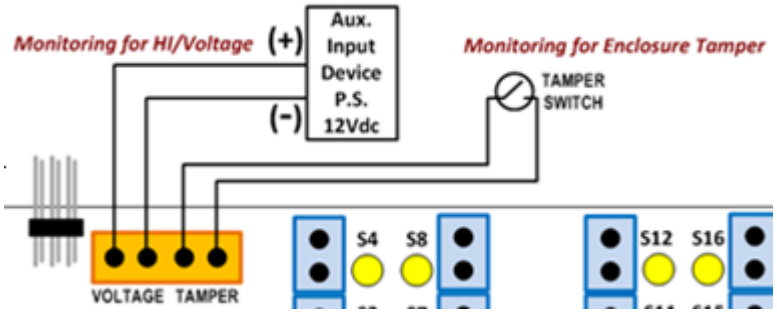
Diagram shows board's component-side up - with Component designations & Connector pinout markings.



7. WIRING THE "TAMPER" & "VOLTAGE ALARM" INPUTS (4-PIN Connector):

Figure 39 – Input Board: Voltage-monitoring and Tamper-switch Wiring

Wiring diagram for tamper switch and voltage monitoring.



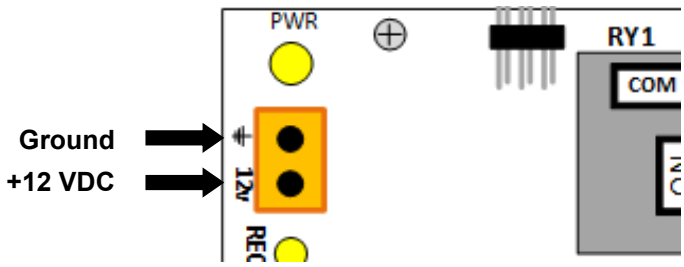
8. WIRING THE POWER INPUT CONNECTOR:

Remove the Orange 2-Piece Connector and wire it as follows:

- Connect the Ground wire to the side marked with the ground symbol
- Connect power to the side marked 12v

Figure 40 – Input Board: Power Input Wiring

Wiring diagram for board power input connector.



9. DO NOT CONNECT/APPLY POWER TO THE BOARD YET.

Also See Appendix N for additional diagrams of Output Relay panels as needed.

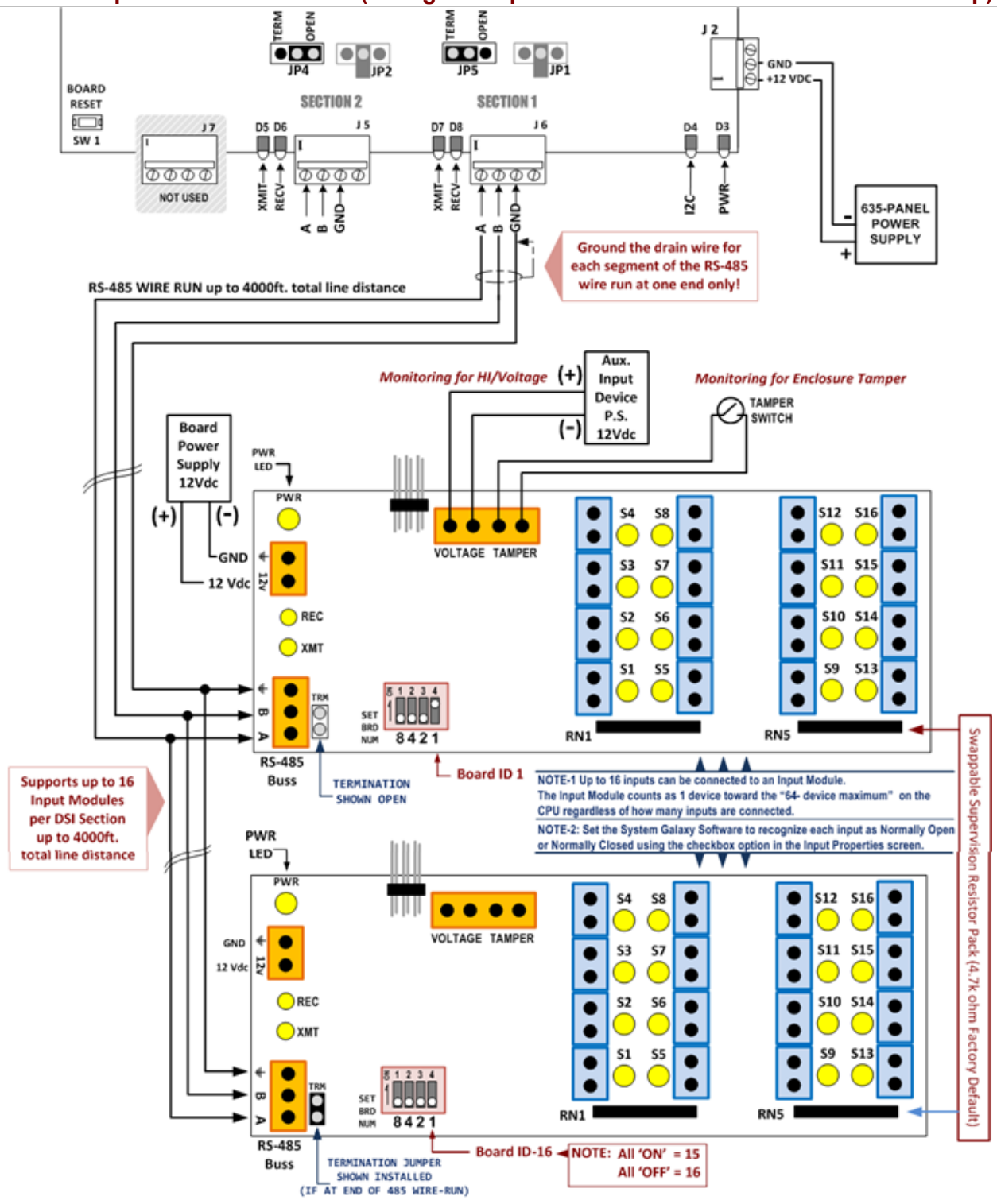
10. WIRING INPUT BOARD TO THE RS-485 MULTI-DROP:

Diagram shows Boards installed on 635-DSI Board Section-1 in a multidrop (daisy chain) configuration.

DO NOT USE A STAR CONFIGURATION ON THE 485 SECTION.

SEE NEXT PAGE FOR RS485 PINOUT GUIDE

Figure 41 – Input Board Installation (wiring 635 Input Boards to the 635-DSI RS485-Multidrop)



STEP-10 PINOUT GUIDE FOR RS-485 MULTIDROP

- Boards must be installed in a multidrop (daisy chain) configuration.
- **DO NOT USE A "STAR" CONFIGURATION ON THE RS-485 SECTION.**

Table 29: WIRING PINOUT FROM THE 635-DSI TO FIRST INPUT BOARD

DSI BOARD RS-485 (J5 / J6)	FIRST INPUT BOARD RS-485 ON MULTIDROP
A (pin 1)	**to A**
B (pin 2)	**to B**
GND (pin 3)	**GND**
GND (pin 3)	← Ground Drain wire at DSI END ONLY for this line segment
UNUSED (pin 4)	- -

Use this pinout guide for the first Input board on the multidrop.

Never wire more than one board to a DSI Section.

Table 30: WIRING PINOUT FROM ONE INPUT BOARD TO NEXT INPUT BOARD

INPUT BOARD RS-485	TO NEXT INPUT BOARD ON MULTIDROP
A	to **A**
B	to **B**
GND	**GND** ← Ground Drain wire to only one board (do not ground both ends of the drain wire).

Use this pinout guide for each individual Input board on the multidrop.

Only one (1) Input Board can be wired to a Input Board.

Never wire more than one board to another board.

STEP 5. Applying Power to the Controller

5.1 Pull all field wiring into the controller

1. **Pull all the field wiring into the controller cabinet, using conduit and the supplied knock-outs** taking care to not pinch or strain wiring.
2. **Leave enough extra wire to make a service loop**.
3. **Also, pull the LAN cable into the cabinet for the CPU connection.**

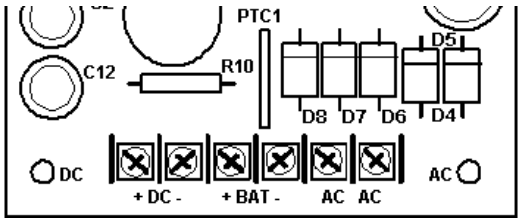
IMPORTANT: Do not run low-voltage wiring in the same bundle or conduit with high-voltage wires. Running data (Reader Data and LAN) wires near high frequency wires can cause severe communication interference and results in equipment or system failure.

5.2 Connecting Back-up Battery and Power Transformer to the Power Supply

CAUTION: OBSERVE POLARITY WHEN CONNECTING THE BATTERY.

CAUTION: Risk of Electric Shock, Electrical Arcs, Fire or Burns if battery is not properly wired. Reversing polarity can cause electrical shock and result in serious bodily injury.

1. **Attach the backup battery** (12 V / 8 A-hr or equivalent) **to the power supply** at the terminals marked **" + BAT – "**. The battery sits inside the cabinet in front of the power supply.
2. **Wire the power transformer to the controller power supply (min. 18 gauge) at the terminals marked "AC"**



Example: Altronix 12 VDC Power Supply. Observe Terminal Markings & polarity of the Power Supply you purchased.

3. **Plug the power transformer into the 115 AC 50 Hz wall outlet (power source).**
4. **Check DC volts output of the power supply inside the controller (should see 13.8 VDC).**
5. **CONNECT THE CPU POWER CONNECTOR TO THE CPU BOARD – POWER LED = SOLID/ON.**

5.3 About adding an Auxiliary Power Supply inside the Controller

The controller has room and mounting studs for a second power supply, if needed to support proximity readers, Relay Boards, Input Boards, etc.

For the standard 8-door controller, if there are more than four (4) proximity readers attached to the controller, you may need two SMP3 Power Supplies. The first 4 prox readers (on first 2 DRMs) can be supported on the first Power Supply. The second 2 DRMs will support the next 4 prox readers and should be wired to the second SMP3 power supply.

IMPORTANT: When installing a two power supplies for DRMs inside the controller, you should common the grounds between the power supplies. (This may already be done if ordered from factory) but if you are doing it yourself, you must common the grounds during installation).

5.4 About External Power Supplies outside the Controller

Peripheral hardware must be powered from an external power supply that is separate from the controller.

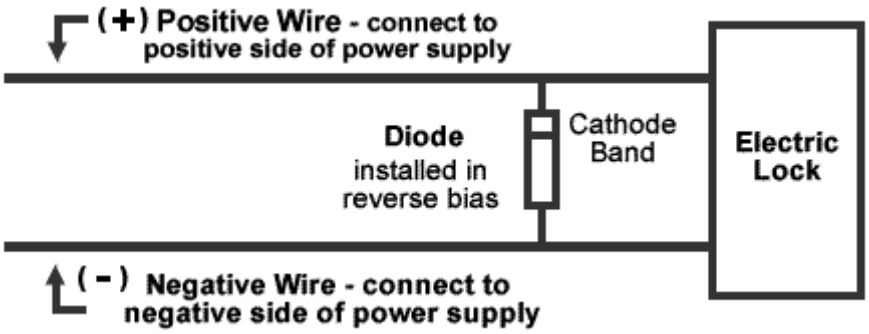
IMPORTANT: ALL LOCKS MUST BE POWERED FROM A SEPARATE POWER SUPPLY AT THE LOCK (OUTSIDE OF THE CONTROLLER). DO NOT COMMON THE LOCK POWER TO THE CONTROLLER POWER.

IMPORTANT: Biometric, Wireless, CAC, and IP readers require separate external power supply that is not mounted inside the Galaxy controller . DO NOT COMMON THE EXTERNAL POWER TO THE CONTROLLER POWER.

5.5 Installing Suppression Diodes at the Door Locks

Surge suppression diodes should be installed in reverse bias and parallel to the lock to absorb kickback. **Install diodes as far away from the controller as possible.**

Figure 42 – Installing a Surge Suppression Diode for Door Lock



STEP 6. Programing the 635 CPU Board

The **635-CPU** can be programmed using a *Terminal Emulator (RS232)* or using the *Web Configuration Tool (Cat5e).*

Gather Network Settings for the 635-Controllers (TCP/IP):

There are additional fields in the CPU programming, but this lists the basic fields required to get a panel CPU configured.

	Controller 1	Controller 2	Controller 3	Controller 4
IP Address	. . .	. . .	. . .	. . .
Subnet	. . .	. . .	. . .	. . .
Gateway	. . .	. . .	. . .	. . .
Cluster ID				
Panel Unit ID[1]				
CPU Number				
Event Svr-1 IP	. . .	. . .	. . .	. . .
Loc/Rmt Port	3001/3001	3001/3001	3001/3001	3001/3001
Physical Locale				

(1) Controllers (Panel Units) can be on the same cluster or on separate clusters. The CPU must have a unique Unit ID if they are in the same Cluster.

6.1 Configuring a CPU Board using a Terminal Emulator

The 635-model CPU Board can be configured using a *terminal emulator (TeraTerm)* …

Equipment Needed:

- **Galaxy Installation USB drive** (which stores the programming tools, drivers, utilities, etc.)
- **TeraTerm Emulator** (USB X:\\Auxiliary\System Galaxy\FTS635\Factory Test\Teraterm\teraterm-4.87.exe)
- **Serial Programming cable** (RS-232 Serial Cable)
- **USB Serial Converter** if needed - *Note the USB Driver must be installed*. (GALAXY PN 81-1015-00)

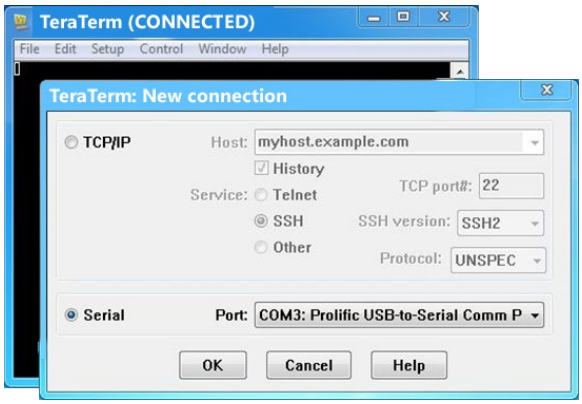
✱ **FYI** - *If you need to make a serial cable, see Chapter 1 CPU Programming Requirements.*

6.1.1 Programming a CPU Board via Terminal Emulator

1. **Apply power to the CPU board** by plugging in the orange power connector from the wiring harness to J6 / J7.
2. **Connect the serial programming cable** from the *PC com port* to the 635 CPU serial port (J4).
3. You must install the terminal emulator program on your Laptop/PC.

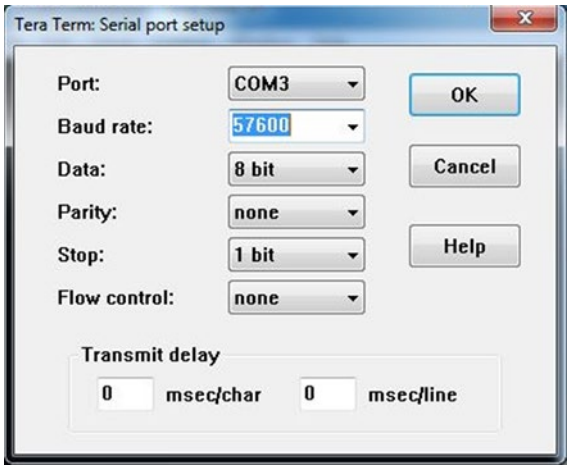
4. Start-up the **TeraTerm emulator** and configure it as follows:

   a) Set the tool for Serial connect and select Com Port.



   b) from the TeraTerm menu, select *Setup* and *Serial Port.*

   c) Configure the serial settings …



      Baud Rate: **57600 K**

      Data Bits: **8 bits**

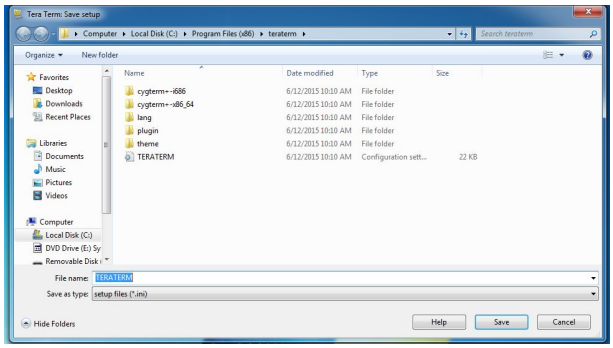
      Parity: **None**

      Stop Bits: **1 Bit**

      Flow Control: **None**

   d) Click OK.

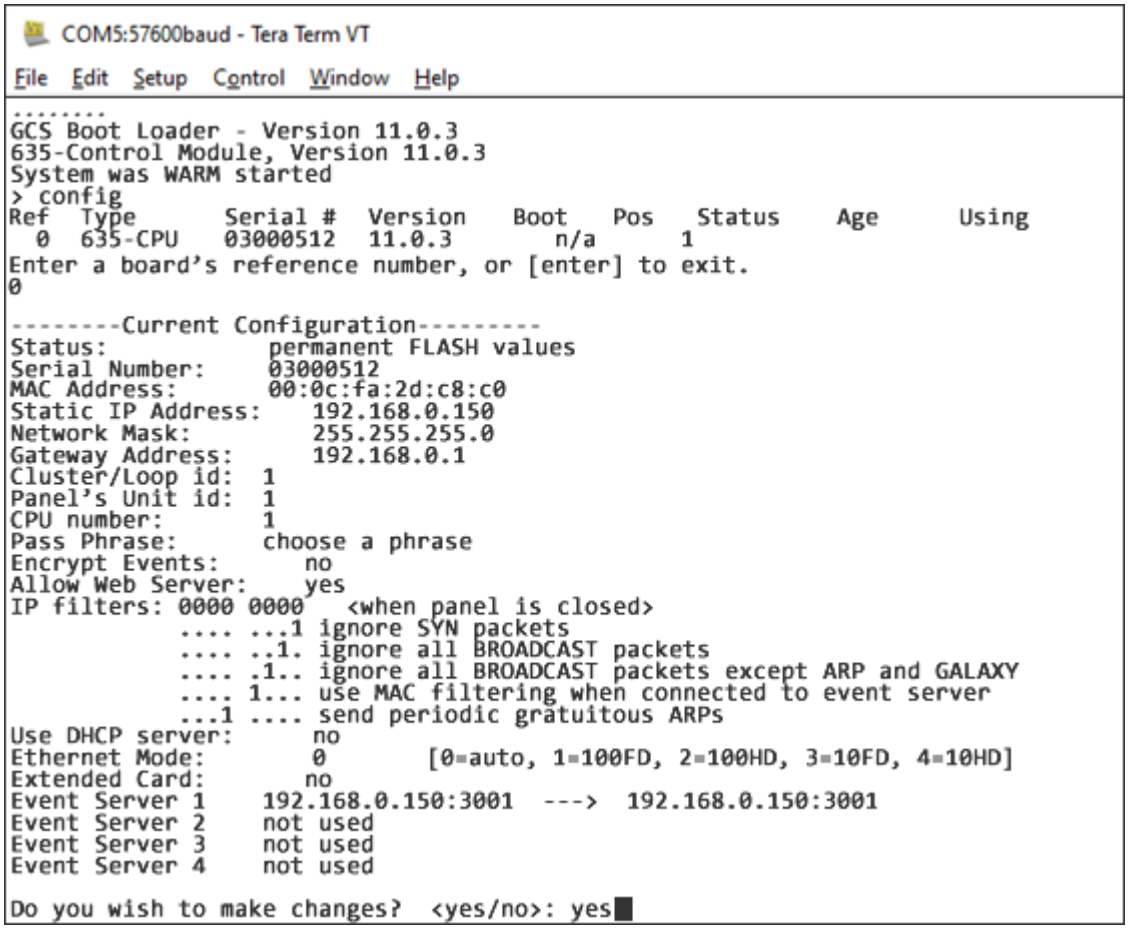
   e) From the menu, select *Setup* and *Save Setup* option and save setup file in the default location.



Continue on next page …

5. On 635 model you will **press the keyboard ENTER KEY** to begin the command session**.**
   On older 600-models/flash, type "install" at the login prompt to begin programming session.
   a) Type "**config**" then press **ENTER KEY**,
   b) then type "**0**" (zero) and press **ENTER KEY** to begin programing the CPU.
6. Enter (type) the CPU's **unique/static IP Address**, and press the **ENTER KEY**.
7. Enter (type) the CPU's **Subnet Mask**, followed by the **Gateway Address**.
   Press the **ENTER KEY** each time to advance your cursor position to the next field.
8. Enter (type) the Cluster ID, Controller Unit ID, CPU Number, and any other settings.
   Press the **ENTER KEY** each time to advance your cursor position to the next field.
9. Also, you can just press **ENTER KEY** to skip fields without changing the setting.
10. Near the end, type **'yes'** to configure the IP Address for Event Server 1.
    You will enter the IP Address at the prompt.
11. Accept port 3001 for both the local and remote ports.
12. Press the **ENTER KEY** to skip redundant servers *unless you are using them*.
13. **At the final Save Prompt, you must type 'yes' to permanently save your work!** If you skip the save prompt, you must re-access the CPUs settings and use the **ENTER KEY** to cycle back down to the final save prompt.

IMPORTANT: If you fail to save your programming, the board will lose its settings the next time it is power failed.



6.2 Programming a 635-Model CPU Board (via Web Config Tool /or embedded webpage)

This section provides quick steps for programming the CPU from the embedded web page. The Web Config Tool finds the CPUs by its MAC address provided the panel door is open (a security feature to ensure a tech is really changing the panel programming). The CPU comes from the factory with a default IP Address '***192.168.0.150***'. *You can identify each CPU board by its serial number sticker,* which is affixed to the board.

PREREQUISITES:

See Chapter-1 for a full list of it requirements as needed. These are related to this step.

- **OPEN PORT NUMBERS:** port numbers must be open and not blocked by firewalls, switches, or routers. System Galaxy uses port numbers 1433, 5010, 3001, 4000, 4001, 4002, and 4003.
- **OPEN PC/OS FIREWALL EXCEPTIONS -** the Communication Server, Firewall Exceptions must be configured to accept the File Sharing and Print Sharing, sqlservr.exe and sqlbrowser.exe.
- **635 Controller: TCP/IP over LAN/WAN 10/100 Mb Ethernet/Full Duplex at port side.**
- **A unique static IP Address must be given to each Galaxy Panel (CPU)** as well as the Event Server (aka Communication Server) that hosts the GCS Communication and Event Services.

  If private IP Addresses are not available, then a non-routable IP Address should be used.

  CAUTION: If a DHCP address is used, and the DHCP server goes offline or changes the panel IP address, then connectivity between the SG Event Server and the Panel/CPU will be lost! The IT professional must assign dedicated, non-routable DHCP addresses to prevent this from happening.

1. ***Install the 635 Web Configuration Tool*** as needed on a PC that is connected to the same broadcast domain as the 635 panel(s) that you want to program or test.
2. ***Click desktop icon*** to start the Web Config Tool (your default browser will open).

3. If dual NIC cards are used, select the correct NIC card in the droplist.

Figure 43 – Example of 635 Web Config Tool Screen

4. **The Config Tool automatically detects all 635 CPU's by MAC address if the following is true:**
   - The CPU and PC must be on the same network segment.
   - The cabinet door must be open (tamper switch).
   - The CPU's **Web Enable** option must be ON (factory default). You must use TeraTerm or other emulator if the Web-Enable option is off.

   a) **Clicking the Panel Serial Number** will open the *Network Configuration screen* where you can configure the CPU'S network/IP settings. See step-5 on the next page.

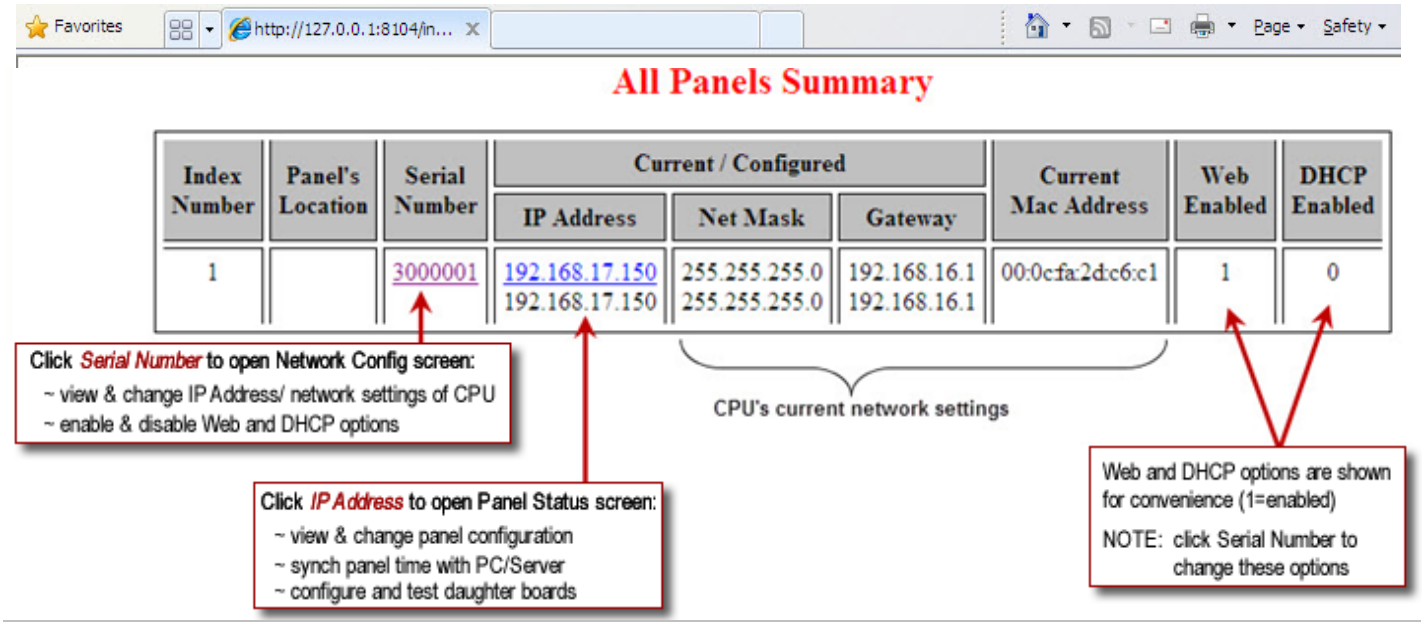
   b) **Clicking the panel IP Address** opens the *Panel Status screen* (see step-6 on a following page) and configure daughter boards.
   - View current programming, set Panel's Date/Time, see list of daughter boards.
   - Click the ***Configure Panel link*** to configure the Panel's Cluster and Unit IDs and program the Event Server connection settings.

   1. Click the ***board's Serial#*** *to* configure or test the daughter boards.

Figure 44 – Example of 'All Panel Summary' screen – LIST OF DETECTED PANELS

The All Panel Summary (home) page opens in your default browser.

635 Panels must be powered up, connected to the same broadcast domain, and the **CABINET DOOR on the Panel MUST BE OPEN (TAMPER SWITCH ACTIVE)**.

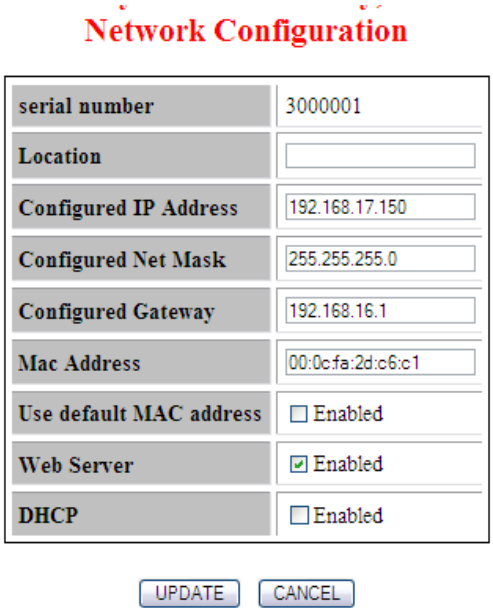


5. From ***All Panels Summary*** page, clicking the ***CPU Serial Number*** opens *Network Configuration* screen.

   This screen allows you to see and change the panel's network settings and to give the 635 Panel a descriptive name (location) and configure the network settings.

   - **UPDATE–** saves your changes by sending your changes to the panel (CPU).
   - **CANCEL–** clears changes for any fields that have not been saved/update. It resets fields to the values in the panel. Cancel will not undue changes you already updated/saved.

Figure 45 – Network Configuration Screen – Entering CPU Network Settings



FIELD DEFINITIONS

- The **Serial Number** of the board cannot be changed (this is a factory setting).
- **Location field:** enter a descriptive name for the location of the panel (e.g. Lobby, Front Door, 1st Floor, etc.).
- **IP Address:** displays current IP Address in the board. Type an IP Address that is valid for your network.
- **Network Mask:** displays current Mask. Type a network mask that is valid on your network.
- **Gateway:** displays current Gateway. Type a gateway address that is valid on your network..
- **Mac Address:** It is not recommended to change this. The first 3 octets are fixed. The last 3 octets can be changed.
- **Use default MAC Address:** when checked, this option returns the panel to its default MAC address.
- **DHCP:** when enabled (checked), the CPU will obtain its IP Address dynamically – DHCP Server must be online.
- **Web Server:** when checked (ON), the technician can access all configuration and diagnostic screens. This option must be ON in order to configure the CPU's Cluster, Unit and Event Server settings, as well as configure and test the daughter boards. When unchecked, the browser will return a ***'404 Page cannot be displayed'*** for all screens except the Summary and Network Configuration screen shown here.

6. From the ***All Panels Summary*** page, clicking the ***CPU IP Address*** opens the *Panel Status* screen – see below.

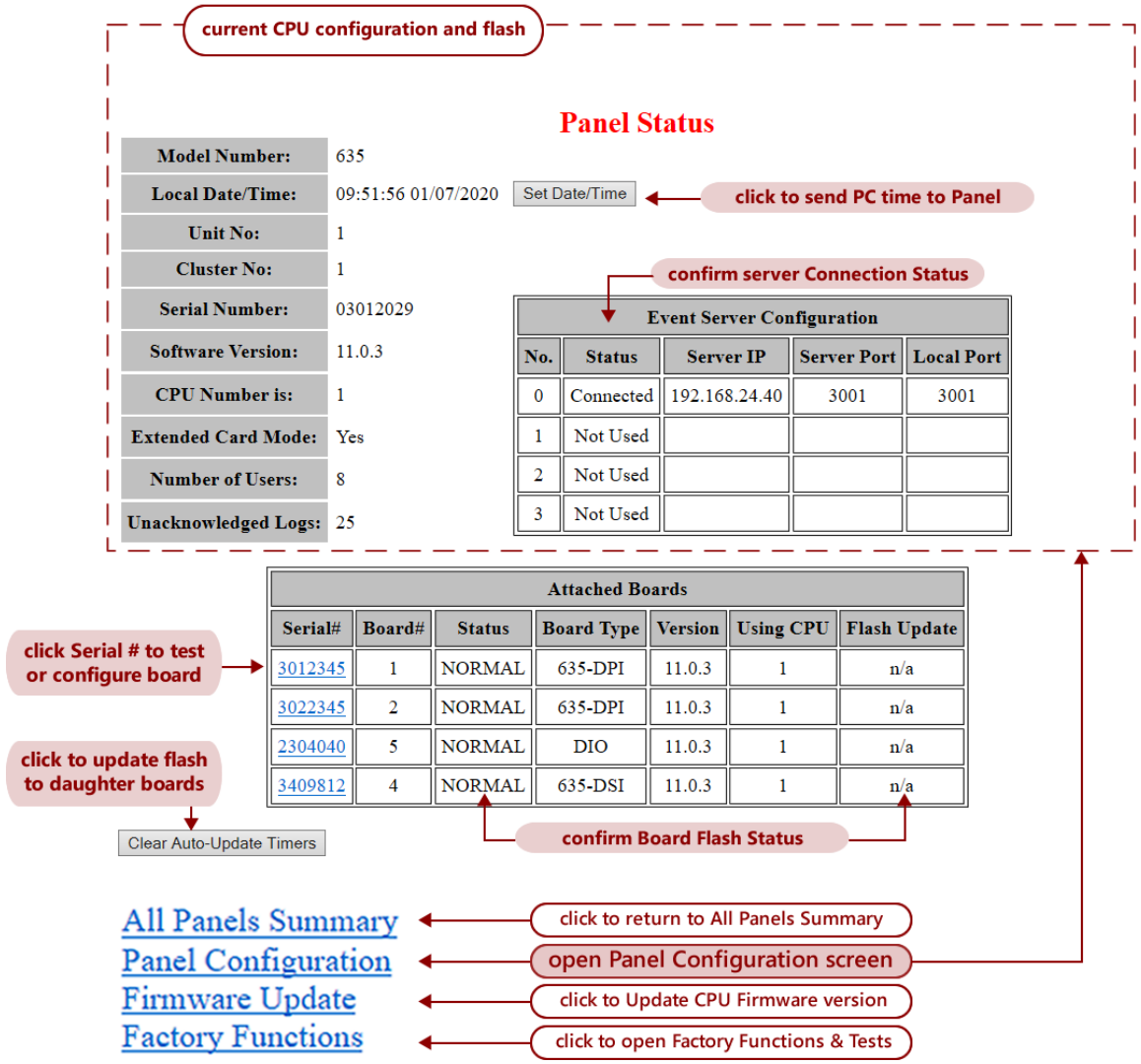
   a) Clicking the ***Panel Configuration*** link (at the bottom of the screen) opens the Panel Configuration screen, where you can configure the Cluster ID, Panel Unit ID, and set options like Extended Card Mode, etc.

   b) Clicking the ***Daughter Board's Serial Number*** will open the board test and configuration page. *Note that 635-boards use dipswitches to preset the unique board ID (1-16 is valid). 600-board IDs must be configured via the web page by clicking the board serial number.*

✱ **FYI –** at this point you could also type the IP Address of the CPU into a browser to open the Panel Status page without the Web Config Tool, provided the Network Parameters have already been programmed in the CPU. The panel door must be open /ajar.

Figure 46 – Example of 'Panel Status' screen – (CPU STATUS / CURRENT SETTINGS)

This screen displays the CPU's current settings and connection status to Event Server, boards, flash version, number of users (cards), panel date/time (real-time), and board flashing status.



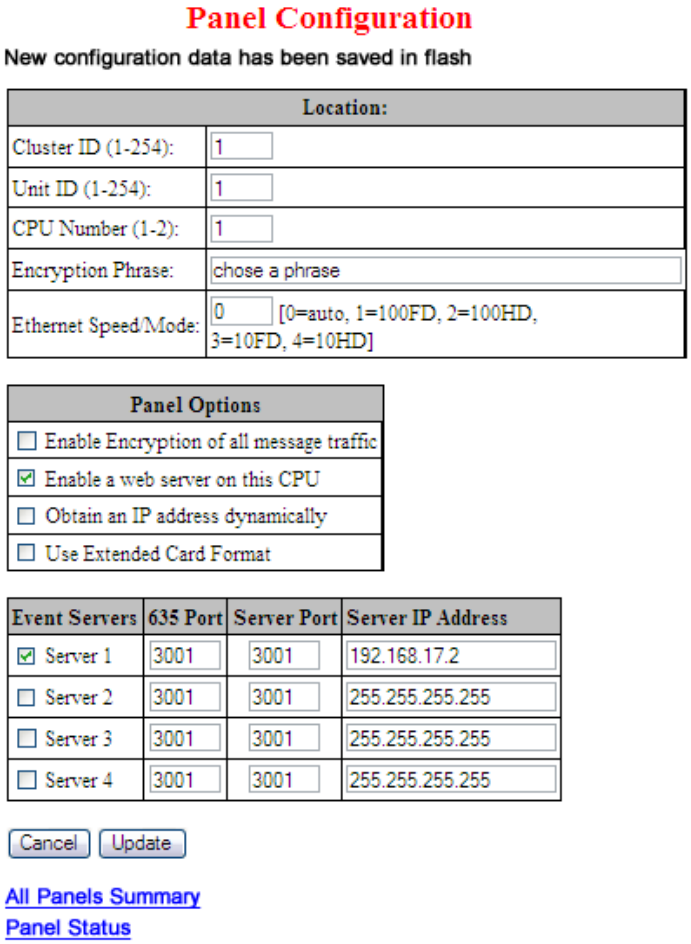
IMPORTANT: DO NOT INTERRUPT POWER DURING THE ACTIVE FLASHING CYCLE. The Panel Status screen will show the flashing status. Pressing F5 on your keyboard will refresh the screen. .

7. From the ***Panel Status screen***, click on the ***Panel Configuration link*** (at the bottom of the screen) to open the *Panel Configuration* screen.

   - **UPDATE button –** sends (posts) your changes to the panel (CPU).
   - **CANCEL button –** clears changes to fields before update; Cancel will not undue changes you already updated.

Figure 47 – Example of 'Panel Configuration' screen – (CPU PROGRAMMING)

This screen allows the technician to change the Panel's current configuration and connection parameters to the Event Server.



Panel Configuration

New configuration data has been saved in flash

Location:	
Cluster ID (1-254):	1
Unit ID (1-254):	1
CPU Number (1-2):	1
Encryption Phrase:	chose a phrase
Ethernet Speed/Mode:	0 [0=auto, 1=100FD, 2=100HD, 3=10FD, 4=10HD]

Panel Options	
☐	Enable Encryption of all message traffic
☑	Enable a web server on this CPU
☐	Obtain an IP address dynamically
☐	Use Extended Card Format

Event Servers	635 Port	Server Port	Server IP Address
☑ Server 1	3001	3001	192.168.17.2
☐ Server 2	3001	3001	255.255.255.255
☐ Server 3	3001	3001	255.255.255.255
☐ Server 4	3001	3001	255.255.255.255

Cancel Update

All Panels Summary

Panel Status

NOTES

- The panel **Cluster ID** and **Unit ID** must match the ID's in the System Galaxy database. The Unit ID must be unique within the cluster. CPU Number should be 1.
- **Encryption Phrase** (if used) must match the phrase programmed at the Event Server. Also, the same phrase must be used at all panels that are on the same Event Server.
- The Event Server IP Address **must be a static or non-routable** IP address.
- **Event Server IP address: Typically you will configure one Event Server IP address. Port 3001 is the default port and must be unblocked at the Event Server and any ports or switches in line.** Additional Event Servers provide redundancy in case the first event server goes down. The panels will auto-switch to the next available server. (Again, if you are using encryption, then all the event servers must use the same encryption phrase that you are using in the panels.)

STEP 7. Set the Interface Board ID's (DPI/DIO/DSI)

This step covers powering up, connecting to the data buss and setting the board ID for the daughter Boards (i.e. DPI, DIO, DSI, etc.)

IMPORTANT: BEST PRACTICE is to bring one board on at a time.

7.1 Apply power to the "Daughter" Boards (DPI/DIO/DSI)

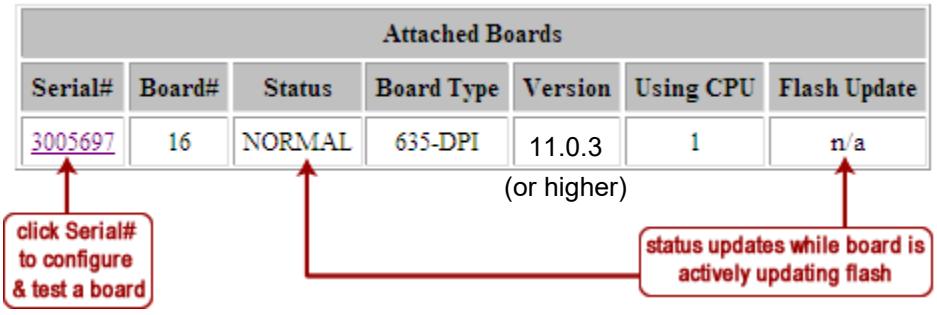
635 NOTICE – 635 uses a binary dipswitch to set the Board ID and auto-update feature.

1. **Apply power to the Interface board** by plugging-in the orange connector from the wiring harness to the board's power connector. MAKE SURE THE POWER LED IS ON. It is located on the front edge of board next to the power connector.
2. **Connect the Ribbon Cable** from the CPU data port to the daughter board data port. The data port is on the same side of the board as the power connector.
3. **Press the RESET Switch (SW1) on this board** (not the CPU). *The reset switch is located next on the front corner of the board – opposite corner from the power harness.*
4. **Wait 10 seconds for the board to boot up.**

7.2 Verify Board ID is Correct for Daughter Board(s) (DRM/DIO/DSI)

5. **From the Web Config Tool (Browser), press F5** to refresh the Panel Status page and you should see the daughter board come online. **VERIFY THE BOARD # is unique and set correctly, as expected**. It can take up to 45-secs for a board to come online.

Figure 48 – Example of Bringing Daughter Boards online - Panel Status screen

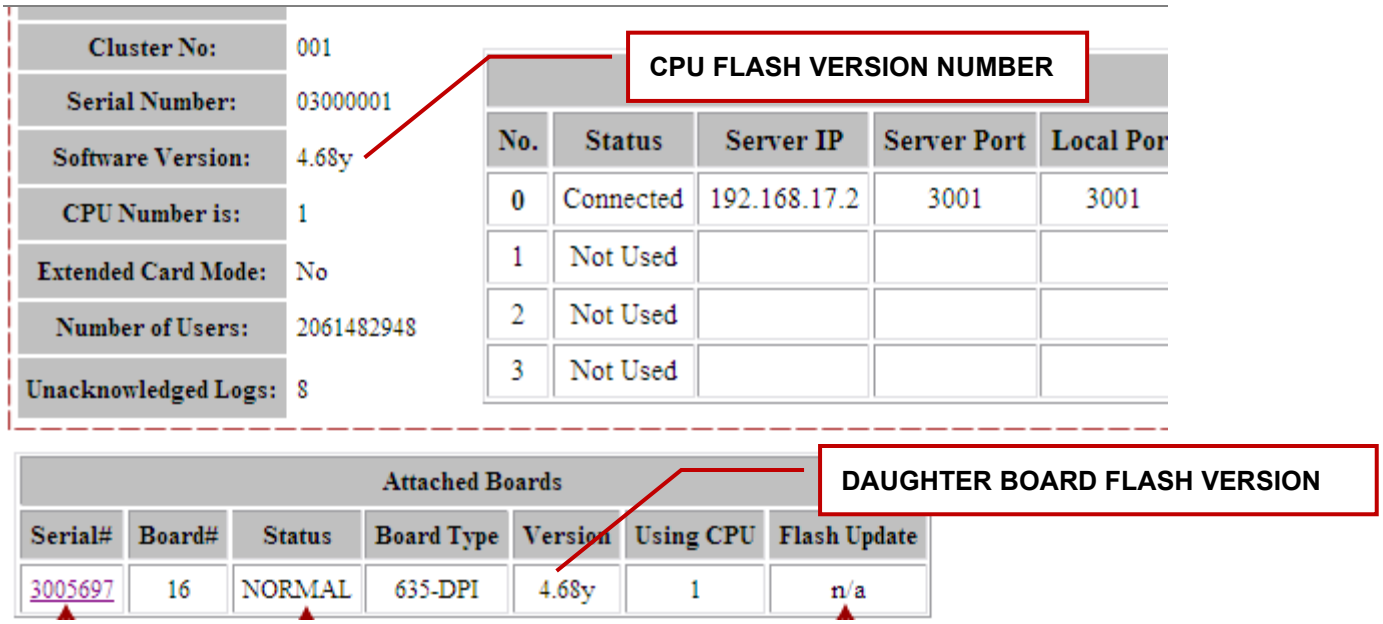


NOTICE: It can take up to 45-secs for a board to come online.

7.3 Verify Flash Version is Correct for Daughter Board(s) (DRM/DIO/DSI)

The daughter board Flash version number must match the CPU Flash version.

6. **Allow the flash to update without interruption.** After the flash update field shows "completed", you can click on the ***board serial number*** to test the relays or LEDs as needed.



SEE THE FOLLOWING TABLE TO DETERMINE THE CORRECT FLASH TO BE RUNNING.

7.4 Flash Version Chart

1. **If a cluster has any 600-series Panels, then all panels must be flashed to v10.5.6**. To find out if your cluster has any 600 CPUs, open *Loop Diagnostics screen* in SG Software to send a [Get Controller Info] to each cluster.
2. The CPU and all Daughter Boards flash version must be the correct version for System Galaxy software - see chart below.
3. **CAUTION: If downgrading a CPU to Flash v5.00 or older, disconnect daughter boards before flashing CPU.**

SG SOFTWARE	FLASH VERSION	635-Clusters CANNOT HAVE 600 CPUs	600-Clusters Can have 600 mixed with 635 CPUs
(new) SG 11.7.0.1	**Flash v 11.0.7 →**	**11.0.7 (1)**	**10.5.6** (600/635 mixed) * (1)
SG 11.6.0	Flash v 11.0.6 →	11.0.6 (1)	10.5.6 (600/635 mixed) * (1)
SG 11.3.0.1	Flash v 11.0.5 →	11.0.5 (1)	10.5.6 (600/635 mixed) * (1)
SG 11.2.0.1	Flash v 11.0.3 →	11.0.3 (1)	10.5.6 (600/635 mixed) * (1)
SG 11.1.0.2	Flash v 11.0.3 →	11.0.3 (1)	10.5.6 (600/635 mixed) * (1)
SG 10.5.6	Flash v 10.5.6 →	10.5.6 (1)	10.5.6 (600/635 mixed) * (1)
SG 10.5.1	Flash v 10.5.3 →	10.5.3 (all boards/all panels) * (1)	
SG 10.4.9	Flash v 10.4.15 →	10.4.15 (all boards/all panels) * (1)	
SG 10.4.8	Flash v 10.4.8 →	10.4.8 (all boards/all panels) * (1) (2)	
SG 10.4.1	Flash v 10.4.1 →	10.4.1 (all boards/all panels) * (1) (2)	
SG 10.4	Flash v 10.4 →	10.4.0 (all boards/all panels) * (1) (2)	
SG 10.3.x	Flash v 5.04 →	5.04 (all boards/all panels) * (1) (2)	
SG 10.2.0	Flash v 5.00 →	5.0 (all boards)	◂ Daughter Boards auto-update after 10-min delay timer expires. To bypass the delay timer, you can send a 'clear auto' command from a *terminal emulator* while you are connected to the CPU.
SG 10.1.x	Flash v 4.77 →	4.77 (all boards)	
SG 10.0.0	Flash v 4.60 →	4.60 (all boards)	

* - The new **RS485 Input Module** or **RS485 Door Module** are not compatible the 600-CPU.

(1) **You must manually start the flash updates to daughter boards**. You can start [Update Boards] from EZ80 tab in the GCS_Loader Utility (or the CPU Panel Webpage).

(2) **635-DSI BOARDS NOTICE:** To upgrade from 5.04 Intermediate Flash to 10.4 (or higher), you must disconnect all 635-DSI Boards from the I2C Data Bus – then connect one 635-DSI and complete its flash update before connecting the next 635-DSI. **This does not affect 600-DSI. This does not affect SG 11.**

IMPORTANT UPGRADE INFORMATION FOR ALL SYSTEMS

◆ **For systems starting at/below 5.00 Flash - the panels must be upgraded in a three-step process:**

- **If panels are running v5.00 /4.77 Flash (or lower), you cannot go straight up to 10.4.1** (or current flash) – the flash process will not finish, though it will not damage the board. First run the **"stepstone" file** and then run the **"release" file**.

1. First upgrade the CPU to the current "stepstone" file version.
2. Then upgrade the CPU to the "release" file version.
3. Finally, all daughter boards must be updated to the "release" version.

◆ **For systems starting from 5.04 Flash (or higher) - 635-DSI's may need to be disconnected before flashing CPU:**

- **600 DSI boards can remain connected during flashing.**
- **Sites upgrading from v10.5.6 should be okay to leave the DSI's connected.**
- **To discover if you have any 635-DSI Boards,** send a [Get Board Info] from the *Controller Programming screen* in the System Galaxy software (or get Panel Summary via CPU's *embedded web page*). Do this for every controller as needed.

1. **Disconnect 635 DSI's from the ribbon cable (Data Bus) ONLY IF you are** flashing to a version below v10.5.6.
2. **Then upgrade the CPU flash and other daughter boards as normal*.**
3. **Finally upgrade each 635-DSI Board individually.** To do this, connect one DSI board to the ribbon cable and upgrade it before connecting and connecting the next one. Click **[Allow Board Flash Update]** button in GCS Loader (or Panel webpage).

* ABOUT UPDATING FLASH: CPU's and Daughter Boards can be flashed using several methods, depending on whether the CPU is on the network or is programmed into the SG software.

- **If using Serial RS-232 or USB Serial cable (direct-connect): use a Terminal Emulator (TerraTerm, etc.) from PC/Laptop.**
- **If using Web Config Tool and Cat5e: click [Update Boards] on the Panel Status page after the board appears in the list.** Browser/PC must be on the same network segment as panel. Also use the Factory Test port to flash via *Factory Functions page* in CPU webpage.
- **If the controller and boards are added into the software and connected to the Services, use click [Update Boards] button in the *GCS Loader Utility*:** Launch *GCS Loader Utility* from the software by right-clicking on a *loop/cluster name* in the SG Hardware Tree.

Contact Technical Support for assistance if you have any questions.

STEP 8. Connect the Controller CPU to the Network

PC to Controller Communications:

600 CPU uses **TCP/IP 10 Mb Ethernet/Full Duplex** at the port side.
635 CPU uses **TCP/IP 100 Mb Ethernet/Full Duplex** at the port side.

DISTANCE from the Controller to the switch: conform to TCP/IP specifications (max 300 ft from Controller to switch; max 900 ft on the local LAN side).

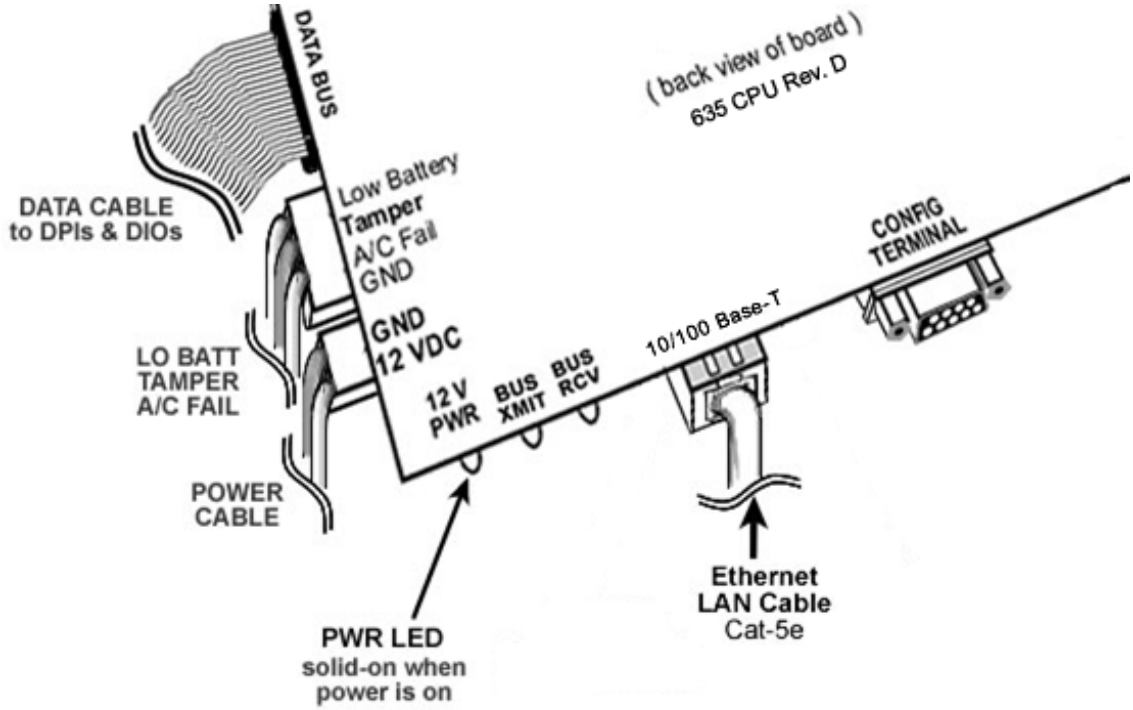
IMPORTANT: All maximum distance limits are estimates based on clear communication. If interference exists, distances must be reduced to maintain communication.

8.1 Connect the CPU to the Ethernet LAN

1. **Connect the Cat-5e cable to the CPU board Ethernet Connector (10/100 Base-T).**

Figure 49 – 635 CPU: Power, Ethernet, Tamper and Data connections

Diagram shows how to land wiring on connectors.



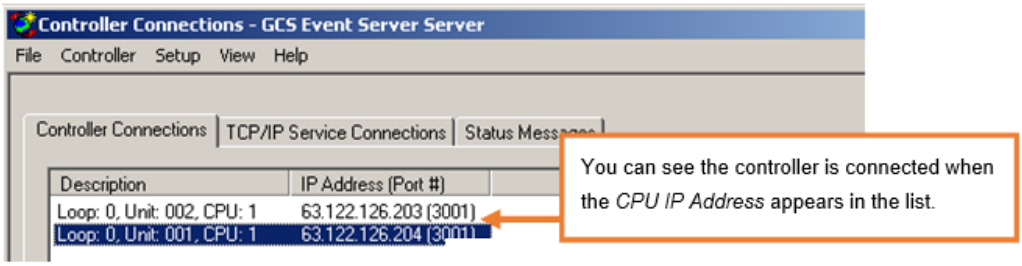
- **The Link and LAN LEDs are on the Ethernet Connector and** will flicker as data is detected on the Network.
- **The XMIT and RCV LEDs** will flicker as communication occurs.

8.2 Verify Connection to the Event Server

1. **Verify the controller is connected to the Event Server by opening the *GCS Event Service* and finding the controller IP Address in the list of Controller Connections tab.** You should see the controller's IP Address showing *connected* status.

   - **The Controller CPU must be powered on, correctly programmed, and properly connected to the Ethernet LAN.** *See previous step in Chapter 2- for instructions.*
   - The controller IP Address should be static or non-routable.
   - The IP Address of the PC/Server hosting the Event Service **must be static**.
   - **The controller must also be added to the SG Software** – see Programming chapter of SG User Guide for instructions.
   - **The *GCS Event Service* must be running.** The 600/635-series controllers should initiate a connection to the Event Server within a minute or two.
   - The ***GCS DBwriter Service*** and ***GCS Communication Service*** must also be running for panels to maintain their connection to the Event Service. If these services are not running the panel will drop its connection and go into buffering mode (which is fully operational / not degraded functionality – but events will store until connection can be resumed.)
   - **Port 3001 cannot be blocked.** You must add port 3001 to Server Firewalls, network routers/switches, and any blocking software as appropriate.

2. **To open the Event Service, right-click the Event Service Icon**  on the server *system tray* and select 'Open' (depending upon your operating system). You can also run *GCS Event Service* by starting it from the GCS\System Galaxy directory.



- **If the controller does not automatically connect after a few minutes, turn to the Quick Troubleshooting Guide in this manual for help.** The panel may have a programming mistake (in the panel or in the software), such as cluster or panel IDs, Panel IP/Network settings; or there may be ports blocked somewhere.

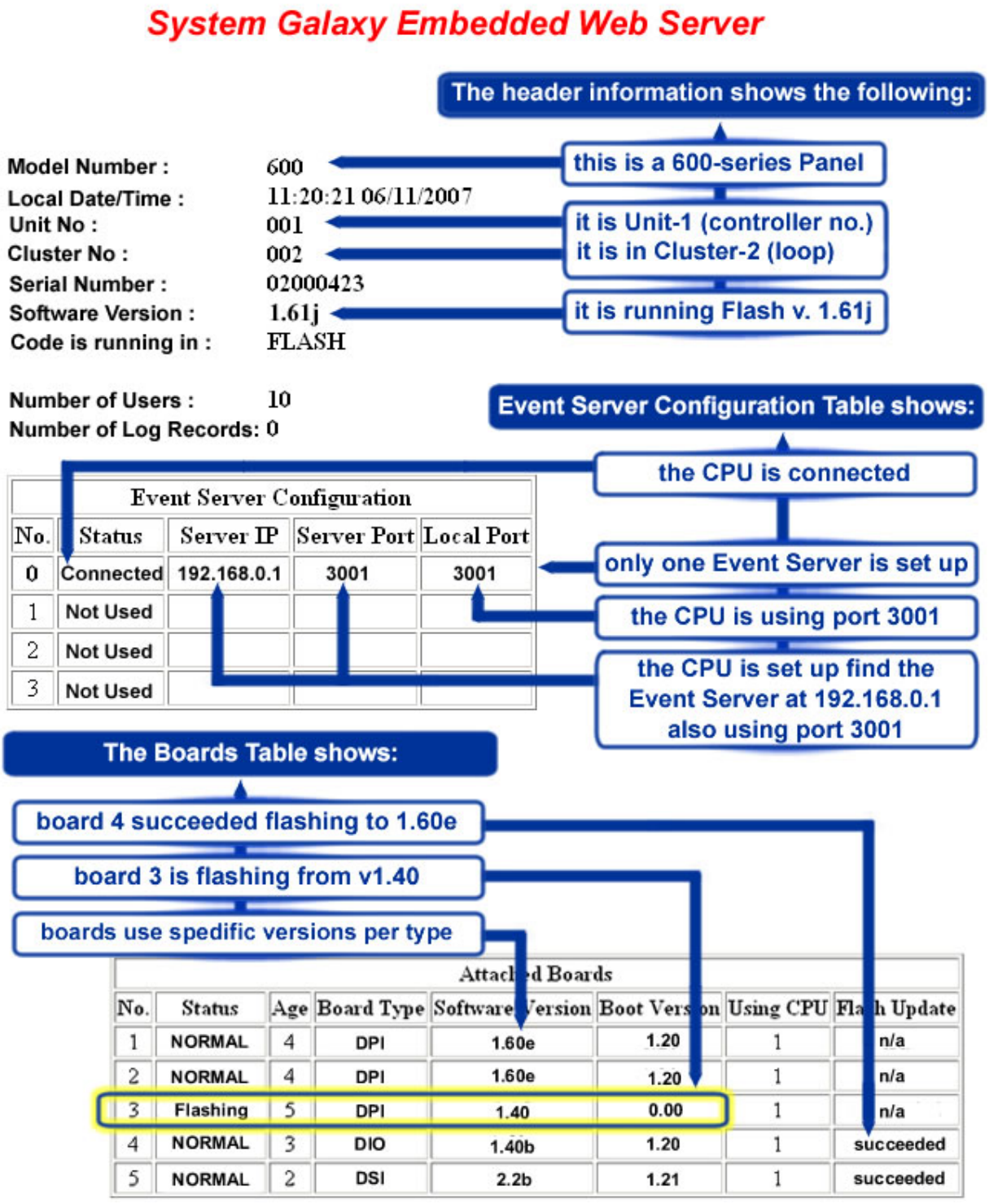
TIP: you can see/connect to the panel's embedded web page from a PC browser and see/change the panel settings from its embedded web page. **The 'Allow Web Server' option must be ON (yes) in the controller – and you *must be on a PC that is in the same network segment as the panel.*** Type the controller's static IP Address into the browser's URL address field (for example: http:// 192.168.0.1). See more on the SG Embedded Web Server on the next page.

TIP: to verify the IP Address of your Event Server, you can run an *ipconfig* command from the PC hosting the Event Server (via the DOS/shell command line). *See Appendix I for help on using the ipconfig command.*

Verify that the Panel's (Embedded Web Page) *Event Server Configuration table* shows the correct IP Address for the Event Server you are trying to reach. Also, the port numbers need to match (3001). **IMPORTANT: The Event server IP Address must be unique & static.** *See the Quick Troubleshooting Guide in this manual for additional help.*

Figure 50 – Example of Controller's Embedded Web Report:

The embedded web page also will show which server IP the panel is connected to. You can determine where the panel is configured to connect to rule out configuration mismatches. Type the panel's static address in the browser address field (ex: http://198.168.0.1). You must be on the same network segment to be able to get the panel's Embedded Web Page.



STEP 9. Test the Controller (recommended)

Galaxy recommends that you test the Galaxy hardware before landing field wiring: Testing the hardware proves the panels are installed and configured correctly. *If it is not feasible to do at this time, proceed to the next step for wiring field devices.*

Refer to your hardware templates to set up software according to the hardware.

9.1 SOFTWARE PROGRAMMING QUICK NOTES:

1. **The Software, database and GCS Services should be installed and running** on the main Communication/Event Server. *See the System Galaxy Installation Instructions and Software Manual for in-depth instructions.*
2. **The controller(s) must display as connected in the GCS Event Service** (635/600-series hardware initiates this connection). *See Step 9.2 for example.*
3. **The Cluster/Loop must be programmed in the *600 Loop Properties* screen:**
   - **Loop ID** should match the Loop ID you set in the CPU board configuration (If you find that there is a mismatch bit is possible to change the LOOP ID to one that is unused in the software OR you can change the CPU to match the software – whichever is appropriate).
   - **Controller Type** must be "600" and the **Connection Type** must be TCP/IP.
   - **Remote Port** should be "4003".
   - **Event Server Address** must beset to the IP Address of the computer running that is running the GCS Event Service. Typically this is the same computer that runs the Comm Service.
   - **Communication Server Address** must be set to the IP Address or Name of the computer that is running the GCS Communication Service.
4. **Controllers & Boards must be programmed in the 635/600 Controller Properties screen.**
   - **Controller ID** must match the Unit ID you set in the CPU
   - **Board ID Numbers** and **Types** must match the board ID's and types installed.

   TIP: the [Get Board Info] button will pull back the board IDs it finds (if the panels are powered up and connected to the Event service – all core GCS services must be running).

9.2 TESTING PANELS with WEB PAGE OR SOFTWARE COMMANDS:

1. **You can test the boards with the Web Page options.**
2. **Use the Hardware Tree to send pulse, lock and unlock commands to each port to verify the ports are working.**

   NOTE: The "at rest state" of the Form-C relay is de-energized with the LED off.

   - **An UNLOCK command will energize LOCK Relay** for the chosen DPI port/section and cause the LED to light up (ON/SOLID).
   - **A LOCK command will de-energize LOCK Relay** for the chosen DPI port/section and cause the LED to turn OFF.

STEP 10. Wiring Field Devices to all Interface Boards

This section covers field wiring (readers, locks, rex, outputs, etc.) to the interface boards (DIO, DRM, DSI, etc).

- Always **leave a "service loop"** or slack in the panel when wiring the field devices. This ensures there is enough extra length in the wiring inside the panel for future repairs or changes.
- Always **use overall shielded cable** for reader wiring.
- Always **properly ground the shielding drain wire** *on one end only* to the negative on the board (GND) or the negative DC terminal on the power supply. NEVER ground the drain at the reader or device end.

Table 32: WIRING DISTANCES FOR HARDWARE

Connection	Max Distance	Wire
Reader Hardware	500 ft. to panel/DRM	22 AWG, 10-conductor, stranded/shielded
Lock Hardware	500 ft. to panel/DRM	18 AWG 2-conductor minimum, stranded
Composite Cable	500 ft. to panel/DRM	18 AWG & 22 AWG Card Access 4-Element
600/635 Relay Board	4,000 ft [1] [2]	22 AWG, shielded, twisted pair
Total line distance 4,000 ft max. measures from the DSI Board to the **last Relay Board** on the 485-multidrop; or the full length of the 485 wire-run.		
635 Input Board	4,000 ft [1] [2]	22 AWG, shielded, twisted pair
Total line distance 4,000 ft max. measures from the DSI Board to the **last Input Board** on the 485-multidrop; i.e. the full length of the 485 wire-run.		
Wireless PIM, Hub, Gateway	4,000 ft [1] [2]	22 AWG, shielded, twisted pair
Total line distance 4,000 ft max. measures from DSI Board to the **last PIM/Hub/GW** on the 485-multidrop; i.e. the full length of the 485 wire-run.		
RS-485 Wired Readers (AD-300, Veridt)	4,000 ft [1] [2]	22 AWG, shielded, twisted pair
Total line distance 4,000 ft max. measures from DSI Board to the **last wired reader** on the 485-multidrop; i.e. the full length of the 485 wire-run. Note: you ***can*** mix AD-400 PIMs and AD-300 Readers on the same DSI Section only if you configure unique IDs (no duplicate/overlapping IDs).		
RS-485 Device (LCD, Clock, etc.)	4,000 ft [1] [2]	22 AWG, shielded, twisted pair
Total line distance 4,000 ft max. measures from DSI Board to the **last device** on the 485-multidrop; i.e. the full length of the 485 wire-run.		
RS-485 DRM (as Remote Door Modules)	RS-485 = 4,000 ft [1] [2]	22 AWG, shielded, twisted pair
(DRM to Reader wiring is separate)	(DRM to Reader = 500 ft)	22 AWG, 10-conductor, stranded/shielded
Total line distance 4,000 ft max. measures from DSI Board to the **last DRM** on the 485-multidrop; i.e. the full length of the 485 wire-run.		
1) Always install termination (resistors/jumper) **on both extreme ends of the 485-run**. Termination resistors are included with the board and must be installed on both extreme ends. Note if the DSI Board/Section is one extreme-end, then you may use the TERM Jumper on that section instead of a resistor. However, be aware that the DSI sections operate independently. This means it is possible to have the TERM jumper installed on one section but not installed on the other section if the other section is not technically on the extreme-end of its 485-wire-run. If a DSI board section is not on one extreme end, then place the jumper in the OPEN position. **2) IMPORTANT: as a rule, you cannot mix Manufacturer's products on the same DSI-Section,** unless the product Install Guide/Addendum indicates you can mix (for example AD300/AD400; or LE/NDE). DSI-Sections operate independently; therefore, you can support different products using different Sections – Example: if Assa Hubs are installed on Section-1, then other products can go on Section-2.		
WARNING! Observe Fire and Electrical Codes for wiring insulation jackets for PVC-rated cable or plenum-rated cable. Use plenum-rated cable when appropriate.		

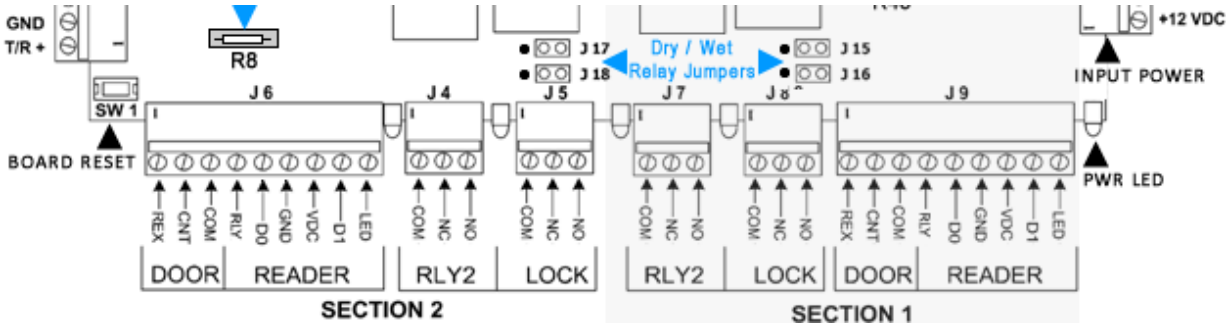
10.1 Field Wiring Standard Readers to the 635 DRM Board

NOTE: Always follow the silk-screened marks on the back of the board you are wiring !

NOTICE: If you are installing MORE than FOUR (4) Proximity Readers, you should use an additional power supply for the additional readers. Common the power supplies together at the negative DC wires on both power supplies using an 18-gauge wire).

- **IMPORTANT: 635-DRM does not use voltage jumpers, so you must install a 5v voltage regulator before you connect a bar code or mag stripe reader.**
- **IMPORTANT:** YOU MAY WANT TO REMOVE POWER TO THE BOARD WHILE WIRING DEVICES. YOU CAN UNPLUG THE BOARD IF DESIRED.

Figure 51 – 635-DRM Reader Board Edge Connectors (component-side up)



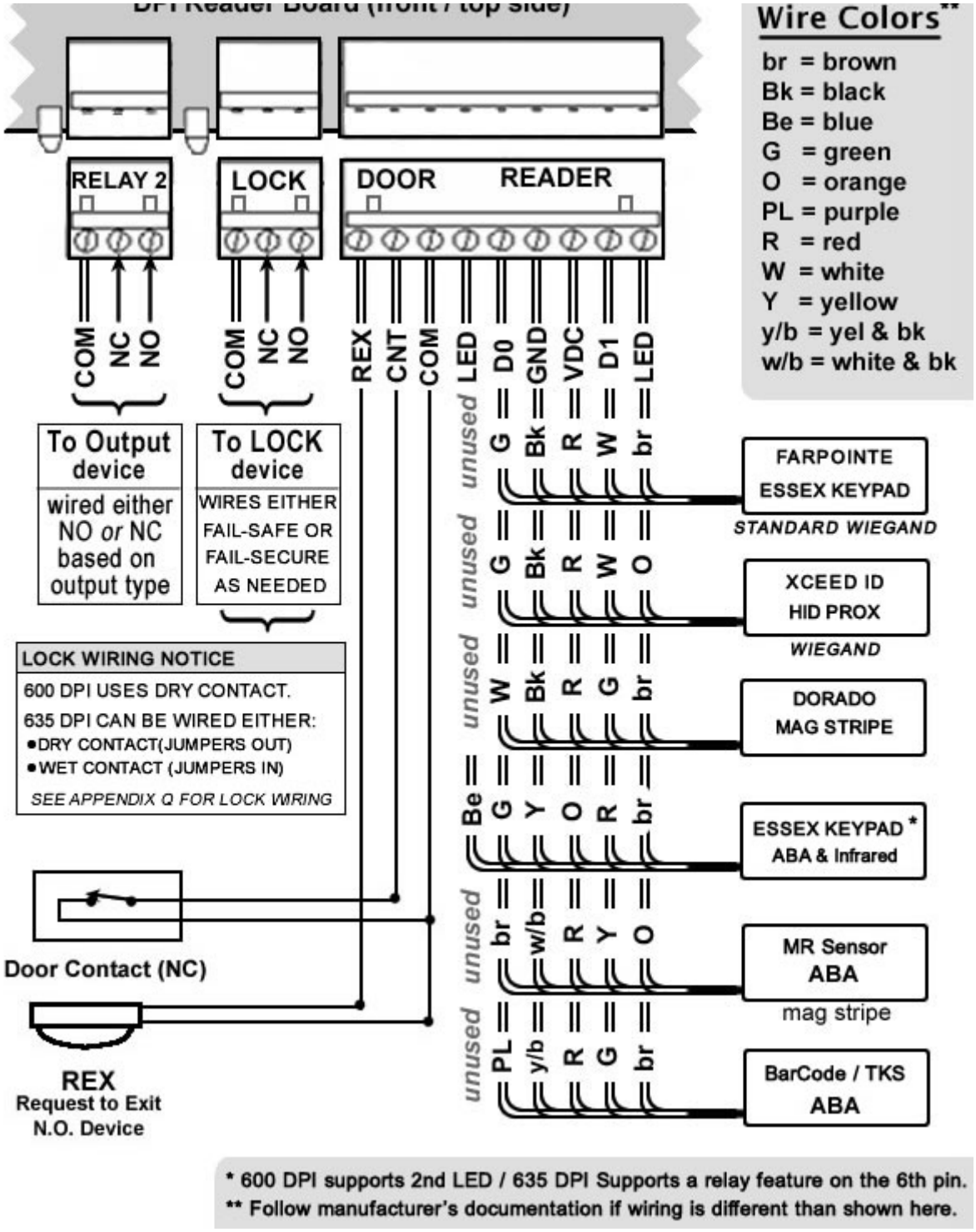
1. **Remove the 2-piece orange connectors to begin wiring.**

2. **Use the appropriate DRM Wiring Templates to help you land wiring** for Reader, REX, Door Contact and Lock to the front-side (terminal screws) on the two-piece connectors.
   a. **Typical Readers** are in Figure 34
   b. **Sagem Readers** are in Figure 35
   c. **Anti Passback wiring** is in Figure 36

- **Relay 1 is used for the LOCK** and can be wired as normally open (NO) or normally closed (NC) as needed.
- **Relay 2 is used as needed for an extra output.** Note: Software programming affects how Relay 2 reacts when Relay 1 is energized.

Figure 52 – DRM BOARD: Reader Wiring Template – for typical reader technologies.

Diagram shows how wiring looks from the front (terminal screw) side of the connectors.

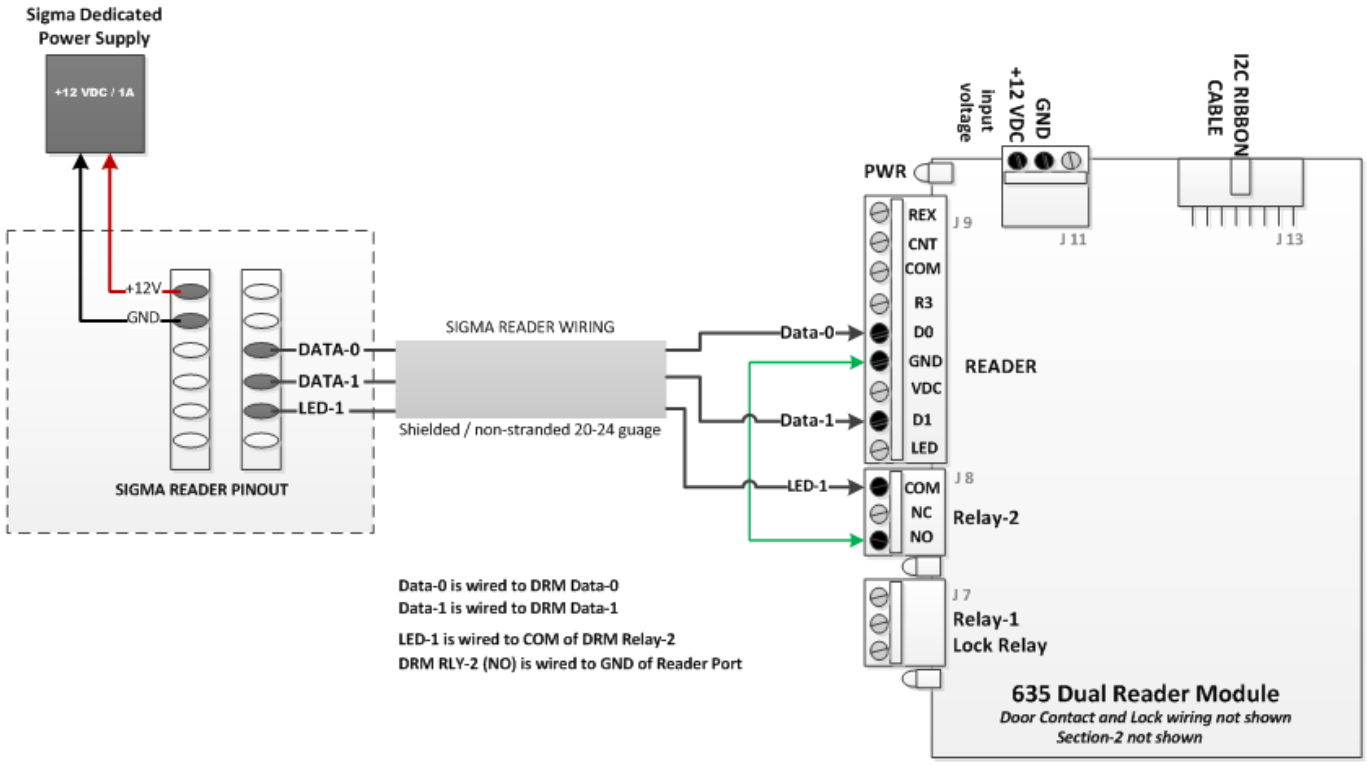


10.2 Field Wiring the SIGMA Morpho to the 635 DRM

3. IF you are installing a Morpho SIGMA Reader – use the following diagram.

Figure 53 – DRM board: Reader Wiring Template for the SIGMA Reader.

Diagram shows how wiring looks from the front (terminal screw) side of the connectors.



IMPORTANT: This wiring of Relay 2 requires specific configuration in the Reader Properties screen of the System Galaxy software – see the Galaxy Guide for integrating the SIGMA Reader in 5G Mode and Morpho Manager. Extensive software configuration of the MorphoManager Client Server software is required.

10.3 Field Wiring the 635 DRM for ANTI PASSBACK

4. **IF you are wiring readers for Anti-Passback**, **use the following steps and diagram.** You can use Sections 1 and 2 on the same DPI board or you can use two Sections on separate boards, but they should be in the same controller enclosure.

On DPI Section-1:

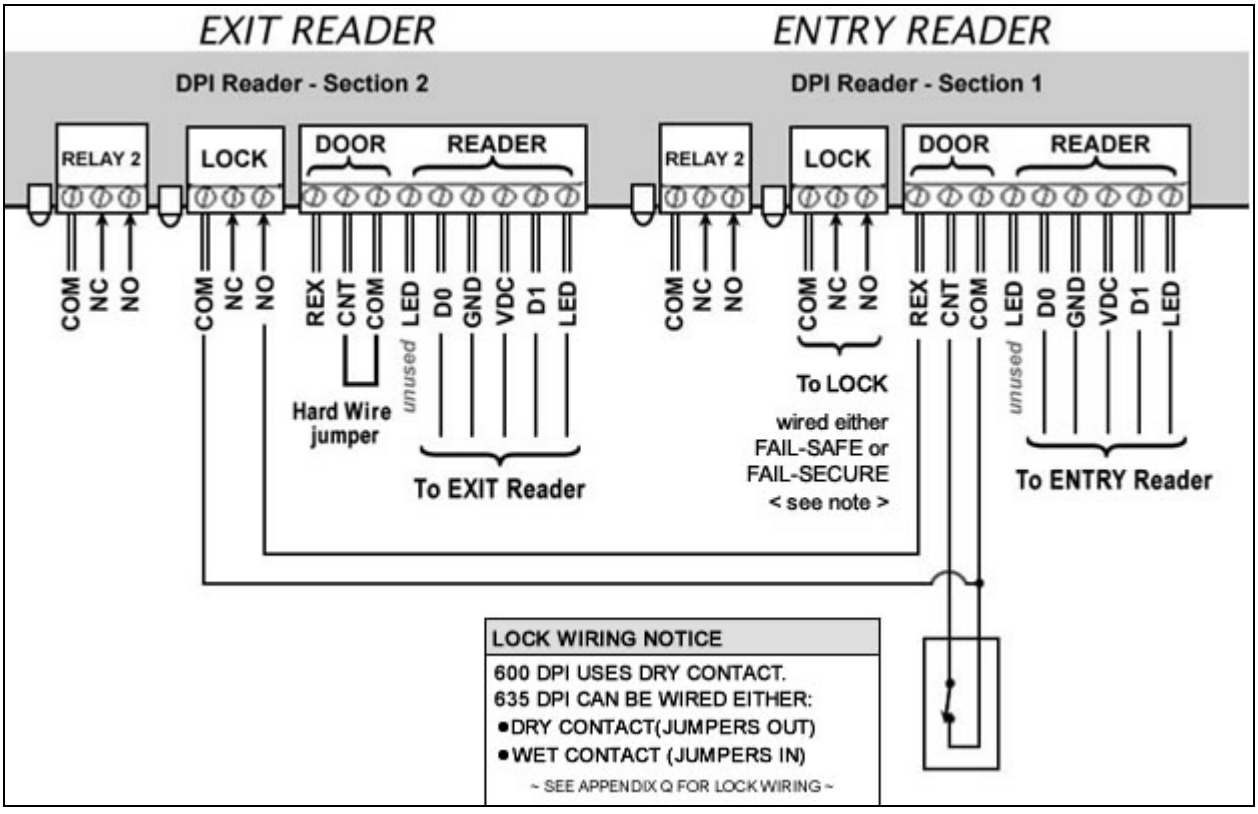
1. **Wire the Entry Reader** to one section of the DPI and hang it on the entry side of door.
2. **Wire the Door Contact** to the same section as the Entry Reader – to CNT and COM.
3. **Wire the LOCK device** to the same section on the DPI as the entry reader. You will either wire the lock normally open (NO) or normally closed (NC), depending on the type of lock you are installing. REMEMBER to install surge suppression diodes at the lock and power the lock on a separate power supply.

On DPI Section-2:

4. **Wire the Exit Reader** to the second section of the DPI and hang it on the exit side of the door.
5. **Hard Wire (jumper) the CNT contact to COM** (common) on section-2 of the DPI board.
6. **Wire Relay 1** (lock relay) from the normally open (NO) contact on section-2 to the REX contact on section-1.

Figure 54 – DPI board: Reader Wiring Template for Anti-Passback.

Diagram shows how wiring looks from the front (terminal screw) side of the connectors.



10.4 Field Wiring the DIO - Digital Input/Output board

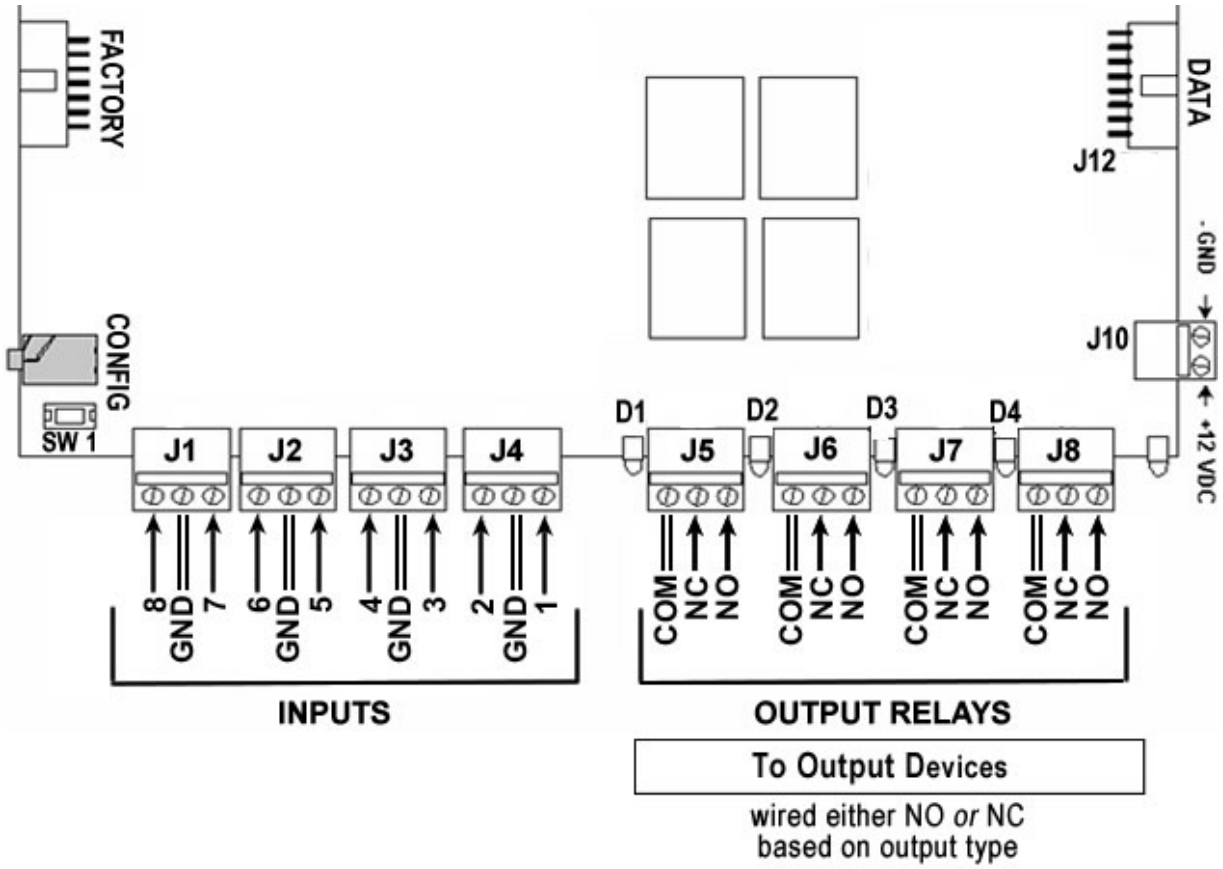
This STEP covers DIO Rev C and D.

1. **Remove the 2-piece orange connectors and land wiring as indicated in the diagram.**

   - **J1, J2, J3 and J4 are used for wiring up to eight (8) possible inputs**. Pin 2 on all terminals (J1 through J4) is designated as the ground.
   - **J5, J6, J7 and J8 are used for wiring up to four (4) possible outputs**.

Figure 55 – 600-DIO Board: Component Designation and Connector wiring pinout

This diagram shows how to land wiring for inputs and outputs to the 600-DIO Board.
Note: there is not a 635-model DIO board



10.5 About setting up Supervision & Hypervision of Inputs

Supervision & Hypervision modes are programmable Built-in features of the DIO Board and are enabled at the software in the Input Programming Screen **after supervision resisters have been installed at the device.**

SUPERVISION OF INPUTS:

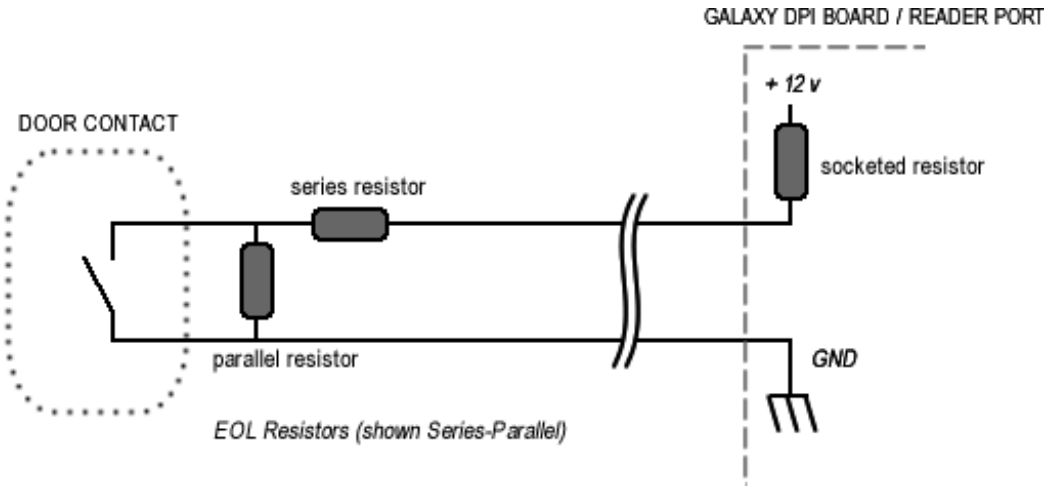
Supervision provides the input circuit with a different voltage depending on the resistor values used. The DIO board monitors the alternating voltages and compares them with the appropriate thresholds to determine the current state of the input.

When the DIO board detects that either (a) *the actual voltage transitions for any of the thresholds*, or (b) *the two alternating states do not match*, the DIO board will report the appropriate event (alarm, trouble) to the software Event and Alarm Screens.

IMPORTANT: Alarm programming must be properly configured for alarm-events to report in the software. This includes configuring the input properties to be acknowledged as well as correctly configuring Alarm Options in the SG System Settings screen. Note that *alarm priorities* apply and can affect whether the incoming alarm is superseded by other alarms/devices with a higher alarm priority.

CAUTION: The thresholds are set to the *default values* that correspond with *supervision resistor values.* Thresholds should be adjusted only when it is necessary to compensate for line resistance. It is possible render an input *non-operational* by setting the values too high or too low.

Figure 56 – Diagram of the end of line resistors for input supervision:



HYPERVISION OF INPUTS:

Hypervision is a DIO feature that provides an added layer of security that protects supervised inputs from being defeated. Hypervision uses alternating voltages and additional thresholds for the supervised input.

PREREQUISITE:

- Supervision resistors must be installed and setup before Hypervision can be enabled.
- You may want to validate your supervision and thresholds before you add the Hypervision.

The DIO board applies two different, alternating source voltages to the input circuit. The board monitors the voltage level at the input terminal for each source voltage applied. (This results in an alternating voltage level at the input terminal). The actual voltage read with each source voltage is then compared to the appropriate thresholds to determine the current state of the input.

When the board detects either (a) *that the actual voltage transitions over any of the thresholds*, or (b) *if the two alternating states do not match*, the board will report the appropriate event (alarm, trouble) to the software event and alarm screen.

IMPORTANT: Alarm programming must be properly configured for alarm-events to report in the software. This includes configuring the input properties to be acknowledged as well as correctly configuring Alarm Options in the SG System Settings screen. Note that *alarm priorities* apply and can affect whether the incoming alarm is superseded by other alarms/devices with a higher alarm priority.

CAUTION: The thresholds are set to the *default values* that correspond with *supervision resistor values*. Thresholds should be adjusted only when it is necessary to compensate for line resistance. It is possible render an input *non-operational* by setting the values too high or too low.

10.6 Field Wiring the 635-Input Modules to the 635-DSI Board

Figure 57 – Wiring the 635-Input Board to a 635-DSI Board:

The DSI BOARD is shown *component-side up* (typically it installs component-side down) – keep this in mind when you are landing wires. When board is facing down, Terminal "A" is next to the LED. Section-1 is closest to the power wiring harness in the controller. Input Boards are install component side up – See Step-4 of this Chapter-2.

DSI to Relay Board (3-wire):

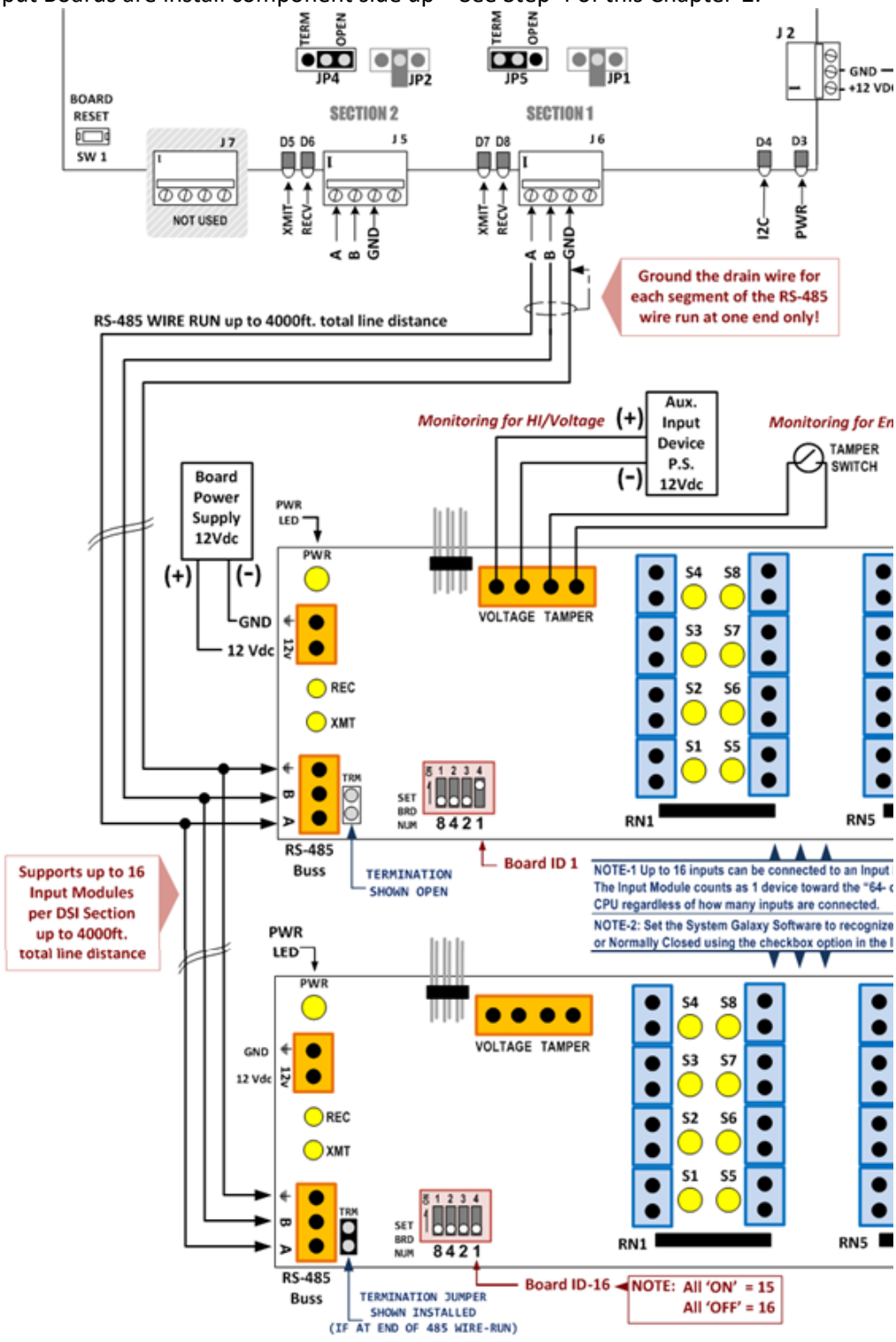
635-DSI	Input Brd
A	A
B	B
GND	GND
Ground the shield at one end of segment	

Daisy-chain Relay Boards:

Relay Brd	Relay Brd
A	A
B	B
GND	GND
Ground the shield at one end of segment	

Standard Input Points:
Supports up to **16 Input boards** per DSI Section
(up to 256 inputs per section)

See Step-4 for help with setting dipswitches (board ID) and how inputs are wired.



10.7 Field Wiring Output Relay Boards to the 635-DSI Board

Figure 58 – Wiring a 600-Relay Board to a 635-DSI Board:

The DSI BOARD is shown *component-side up* (typically it installs component-side down) – keep this in mind when you are landing wires. When board is facing down, Terminal "A" is next to the LED. Section-1 is closest to the power wiring harness in the controller. Relay Boards are install component side up – See Step-4 of this Chapter-2.

DSI to Relay Board (3-wire):

635-DSI	Relay Brd
A	D +
B	D -
GND	GND
Ground the shield at one end of segment	

Daisy-chain Relay Boards:

Relay Brd	Relay Brd
D +	D +
D -	D -
GND	GND
Ground the shield at one end of segment	

General Output Relays:

Supports up to **3 Relay boards** per DSI Section

(up to 24 outputs per section)

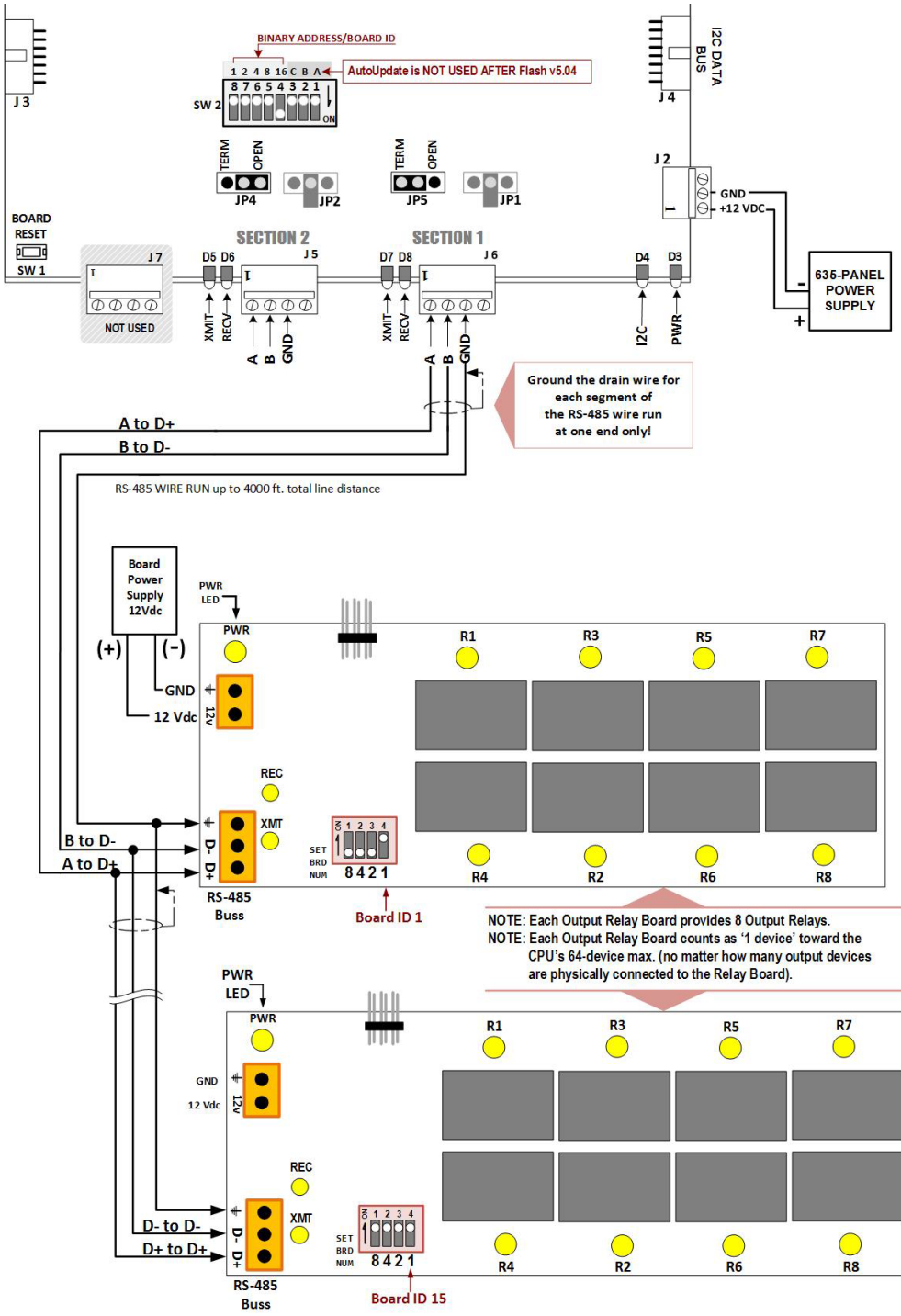
Standard Elevator Relays:

Supports up to **15 Relay boards** per DSI Section

(up to 120 floors per section)

See Step-4 for help with setting dipswitches (board ID)

See Appendix O for how relays are assigned.



10.7 Field Wiring Schlage AD PIMs to the 635-DSI Board

Figure 59 – Wiring a Schlage AD PIM to a 635-DSI Board:

The DSI BOARD is shown *component-side up* (typically it installs component-side down) – keep this in mind when you are landing wires. When board is facing down, Terminal "A" is next to the LED. Section-1 is closest to the power wiring harness in the controller.

DSI to Relay Board (3-wire):

635-DSI	Relay Brd
A	TDA-
B	TDB+
GND	GND
Ground the shield at one end of segment	

Daisy-chain Relay Boards:

Relay Brd	Relay Brd
TDA-	TDA-
TDB+	TDB+
GND	GND
Ground the shield at one end of segment	

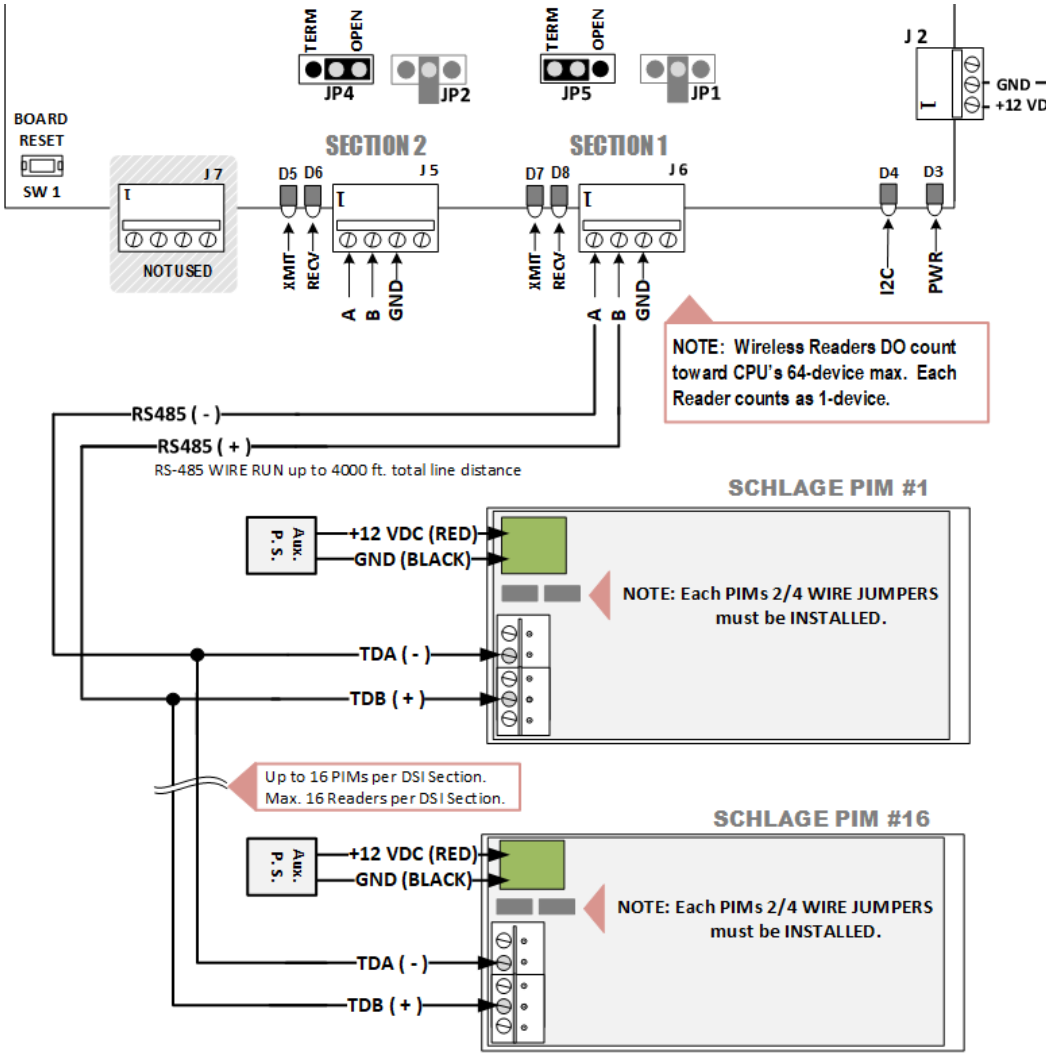
General Output Relays:

Supports up to **16 Devices (AD400-PIMs/Readers or AD300 Readers** per DSI Section

(up to 32 readers per board)

You can mix AD400 PIMs and AD300 Readers on same section provided they are the same format (ABA/Wiegand) and you unit numbers are unique (no duplicates/no overlapping).

DO NOT EXCEED CPU's 64-device on the controller. This includes other boards and devices (DIO, DRM, or other DSIs)



- Install 2/4 Wire Jumpers on PIMs
- Install Term Jumper on DSI only if DSI is at end of chain
- 120-ohm Termination must be installed on both extreme ends – resistors are provided. The DSI Term Jpr can replace on of the resisters IF the board is on one extreme end.

See Step-4 in this guide for help with setting dipswitches (DSI board ID).

See AD400 Addendum for greater details, for device limit chart, and software configuration.

10.8 Field Wiring 635-DRM Remote Door Module to the 635 DSI Multidrop

Figure 60 – Wiring a 635-DRM (for Remote Door Modules) to a 635-DSI Board:

The DSI BOARD is shown *component-side up* (typically, it installs component-side down) – keep this in mind when you are landing wires. When board is facing down, Terminal "A" is next to the LED. Section-1 is closest to the power wiring harness in the controller. See Step-4 of this Chapter-2.

DSI to Relay Board (3-wire):

635-DSI	Relay Brd
A	TR +
B	TR -
GND	GND
Ground the shield at one end of segment	

Daisy-chain Relay Boards:

Relay Brd	Relay Brd
TR +	TR +
TR -	TR -
GND	GND
Ground the shield at one end of segment	

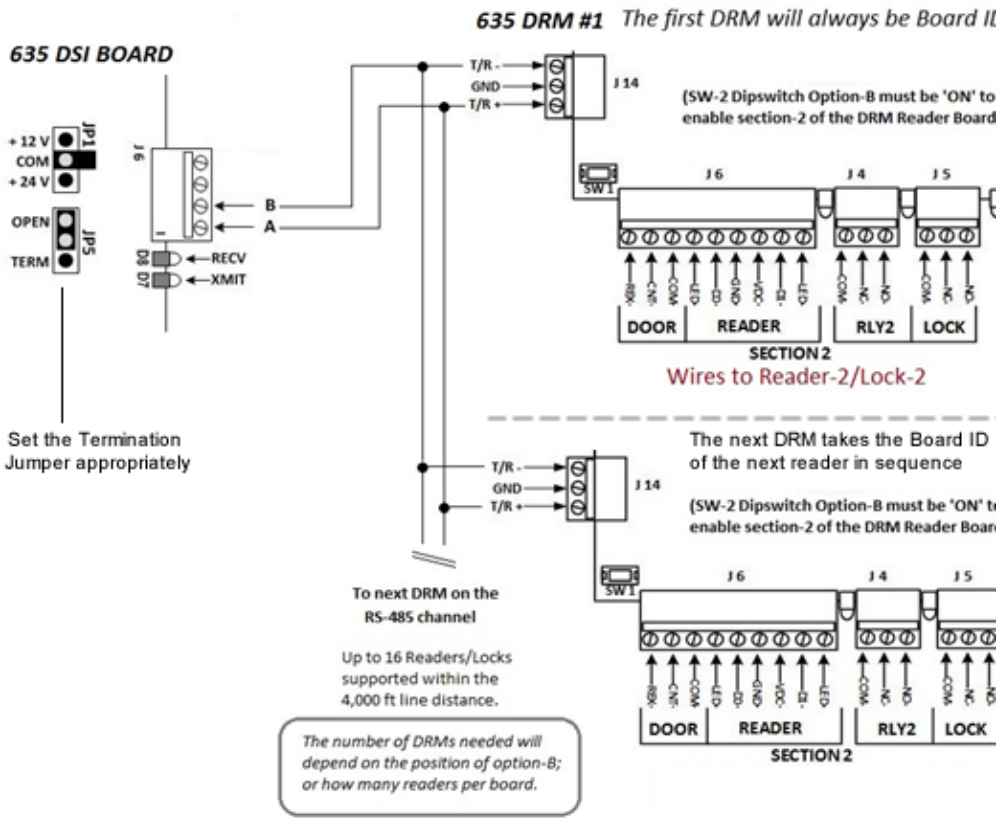
MAX DOORS VS. BOARDS:

Supports up to **16 DRM boards** per DSI Section

(up to 16 DOORS per section)

Note you can have 1 or 2 doors attached to a DRM so this will affect the number of DRMs you need.

See instructions that come with the Remote Door Module.



See Step-4 for help with setting dipswitches (board ID) and Appendix O for how relays are assigned.

10.9 Field Wiring Cypress Clock to 635-DSI Board

1. **Remove the 2-piece orange connectors and land wiring as indicated in the diagram.**
   - **There are 2 RS-485 Sections(ports) – each section is independent (for example you can have doors on Section-1 and Clocks on Section-2**.
   - Terminal Pin-outs are silk-screened on the back of board. But the diagram below shows the DSI *component-side up* – so be aware Terminal "A" is next to the LED. Section-1 is closest to the power input connector (wiring harness).

Figure 61 – Wiring a Cypress Clock (1201) to a 635-DSI Board:

DSI to Clocks (2-wire):

635-DSI	CLOCK
A	YELLOW
B	GREEN
Ground the shield at one end of segment	

Daisy-chain Clocks:

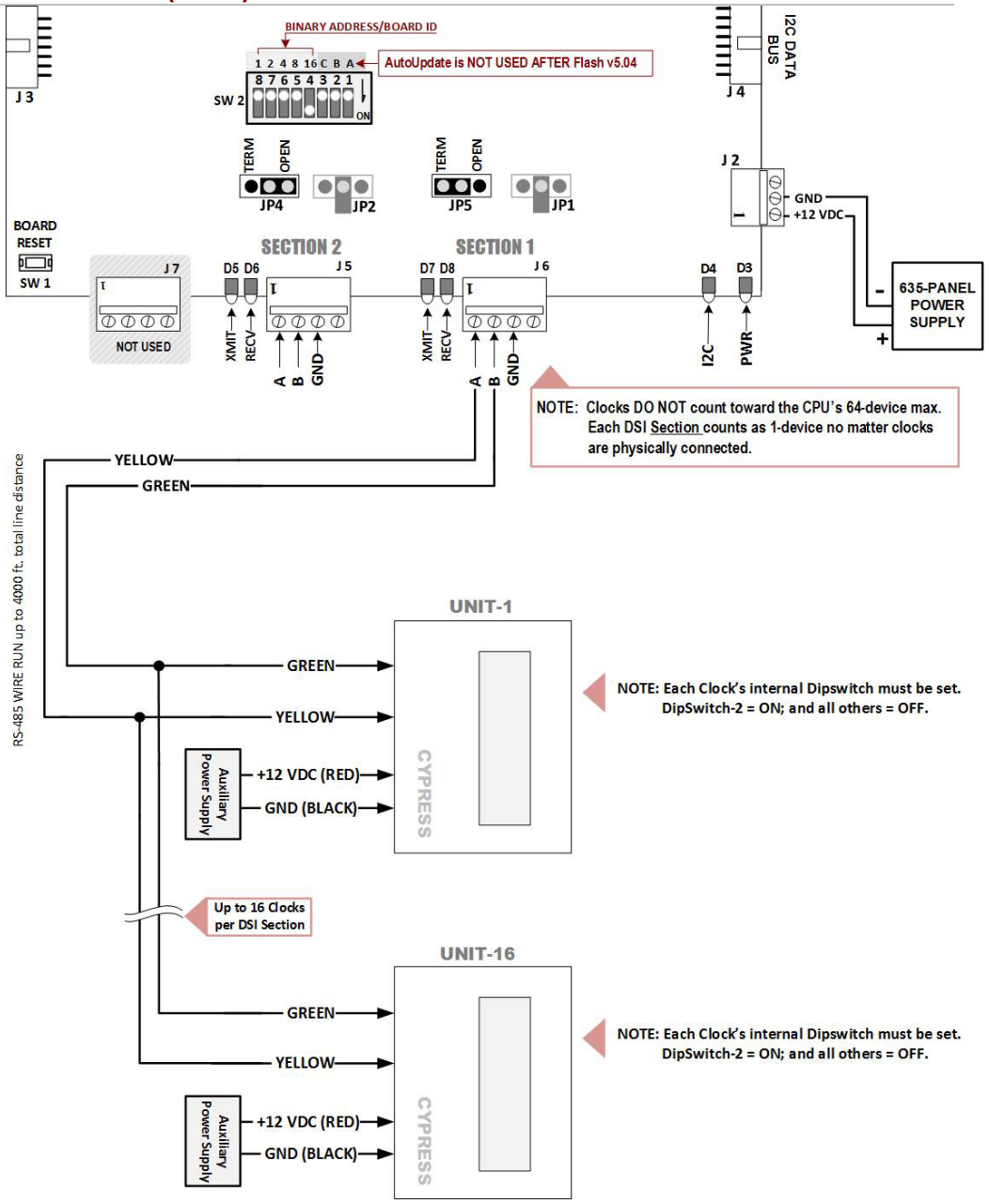
CLOCK	CLOCK
YELLOW	YELLOW
GREEN	GREEN
Ground the shield at one end of segment	

CYPRESS CLOCKS:

Supports up to **16 Clocks** per DSI 485 Section (Port)

UNIT NUMBERING:

Unit numbering is not done.



10.10 Field Wiring LCD Display Unit to 635-DSI Board -

SET UNIT IDs: YOU MUST USE THE Galaxy Configuration Programming Tool to configure the Display UNIT IDs (1 thru 16 are valid). The DSI supports 16 max. units per 485 Section.

1. Remove the back cover of the Display Module and insert the wiring through the opening provided in the back cover.
2. Install the 2-pin jumpers on J1 (9600 BAUD) and J2 (forces 12 VDC operation)
3. Remove the 2-piece orange connectors at the DSI and land wires as shown in the diagram.

Figure 62 – Wiring a Galaxy LCD Display Unit to a 635-DSI Board:

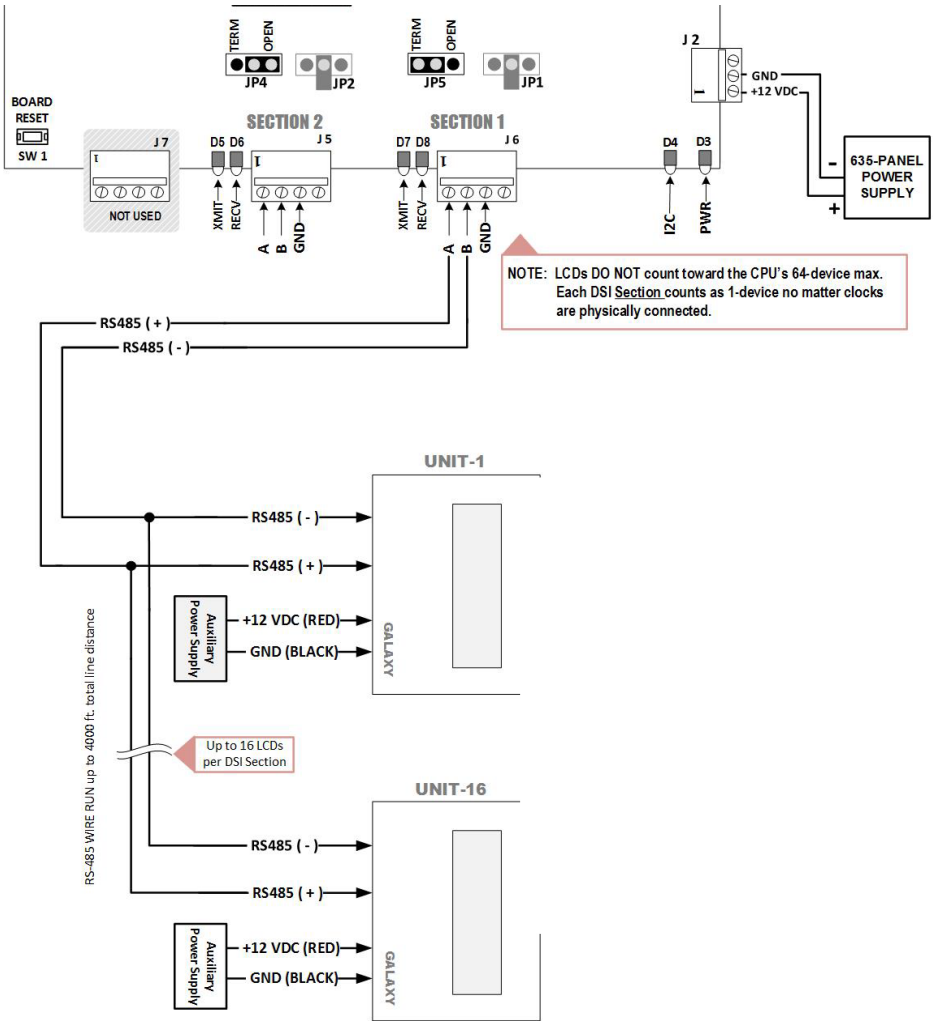
Diagram shows wiring for Galaxy LCD Display on the DSI Board (component-side up).

DSI to LCD (2-wire):

635-DSI	LCD
A	485 (+)
B	485 (-)
Ground the shield at one end of segment	

Daisy-chain LCDs:

LCD	LCD
485 (+)	485 (+)
485 (-)	485 (-)
Ground the shield at one end of segment	



LCD UNIT:

Supports up to **16 LCDs** per DSI 485 Section (Port)

UNIT NUMBERING:

Each LCD must have a valid unit ID on the DSI section.
Program via Web Config Tool

See Step-4 for info on DSI dipswitch settings for board ID.

See Appendix P for help with setting unit IDs.

STEP 11. Walk-Test the System (recommended)

If you have not set up the minimal software programming required to walk-test the system, you can turn to Step 9 and reference the Software Setup Quick Notes.

11.1 Quick Steps to Software Setup

More in-depth programming information is found the main SG Software Manual.

Table 33: Software Setup - Process for 635/600 Clusters are as follows

Step	Action
1	**Add the Cluster (Loop) in System Galaxy** in the Loop Properties screen or Loop Wizard
2	**Add the Controller(s) in System Galaxy** in the Controller Properties screen or Wizard: At this point the controller should automatically come online provided the core GCS Services are running (i.e. Client Gateway, Communication Service, Event Service and DBWriter Service).
3	**Add the DPI boards in System Galaxy** in the Controller Properties screen:
4	**Program the Door/Reader as needed in System Galaxy.** The Reader Properties are primarily the same for the 600-series as for the 508i-series, thus refer to the main SG Software Manual for details if needed.
5	**Program any Cards, Schedules, Access Rules, Schedules, etc.** This functionality and programming is described in the Software Manual.
6	**Add the DIO boards in System Galaxy** in the Controller Properties screen:
7	**Add the DSI board(s) in SG in the controller properties screen. Also, you must configure the DSI Channels in the Hardware Programming screen to the appropriate output type (i.e. Cypress Clock mode, General Output mode, or Elevator Output mode)**
8	**Add the Inputs In System Galaxy** In The Input Properties Screen: Inputs Are Programmed As Normal (See SG Software Manual) with the exception of Supervision and Hypervision.
9	**Program any I/O Groups and Outputs in System Galaxy:** Refer to the main System Galaxy Software Manual for the details on programming these features.
10	**Verify Services are running and that the 635/600 Controller is connected to the Event Service – this section includes basic instructions.** More detailed instructions about the Event Service are found in Chapter 5 of this manual. Also, instructions about core GCS Services are found in Chapter 11 of the main System Galaxy Software Manual.
11	**Verify / Load Flash and then Data to Controllers:** This is done through the GCS Loader. The loader can be started from the SG Hardware Tree by right clicking a loop.
12	**Walk-Test the System:** walk test the loops with a test card (see Step 12.2). Likewise alarm cards and other inputs can be tested in the same fashion. If you find any input, output, reader or other device not functioning correctly, then verify your device programming, schedules and access rules are correctly configured, applied/loaded.

11.2 Quick Steps to creating a Test Card

Once you have completed the Loading of a loop, it is a good idea to create a "test card". Create test cards in the Cardholder Programming Screen. It is recommended you test access.

When creating the test cards do the following:

1. **Present an unused card to a reader to generate a "Not in System" message**
2. **From the System Galaxy Event Screen, right click the "Not in System" message and pick the 'Add Card' option on the menu.** (This opens the Cardholder Programming screen and pre-fills the card code and card data).
3. **ALSO click the OK button on the 'click apply to save' notification** (this message simply alerts user that changes are saved when [apply] is clicked).
4. **Enter "TEST ACCESS CARD" in the Last Name field.**
5. **Select the *Card/Badge Settings tab***
    a. Set the *Card Role* droplist to "Access Control"
6. **Add loop privileges to the card from the *Loop Privileges tab* as follows:**
    a. Select the [Edit Loop/Cluster] button.
    b. Move all loops to "authorized" column by selecting the names and clicking the [>>] move button.
    c. Once the loops are in the authorized column, click [OK].
7. **Add access privileges to card from the *Loop Privileges tab* as follows:**
    a. In the [Authorized Loops] droplist, you must choose a loop/cluster name.
    b. In the [Access Group] droplist. choose "UNLIMITED ACCESS" (or the appropriate access group that will give the card access to all doors for the duration of the test.
    c. *REPEAT steps 7a and 7b for EVERY LOOP in the Authorized Loops droplist. You must configure them one at a time.*
8. **Click [Apply] button on the *Cardholder Programming screen* to save test card in the database. Now you are ready to walktest the readers.**
9. **When you walk-test the cluster/loop, ALSO verify the following …**
    a. **that the System Galaxy Event Message (door name) matches the location of the reader.**
    b. **the door functionality** (i.e. door contacts, request to exit devices, motion sensors, locking/unlocking, elevator relays (floor lights), gate operator, etc.)
    c. **if video cameras are assigned to the readers,** you should invoke the conditions that are configured to cause the video to pop-up (related programming must be complete). This can be done in a separate test run if you have not yet set up the surveillance system.
10. **Also you should arm the system and walk-test your inputs and outputs …**
    a. Verify that the audible alarms sound if any are installed or the appropriate action occurs.
    b. Verify that the *alarm event message* comes into the System Galaxy software screens as appropriate.
    c. Verify any assigned cameras pop-up video as appropriate (related programming must be complete). This can be done in a separate test run if you have not yet set up the surveillance system.

3 Communication /Event Server Overview

This chapter covers the Galaxy Communication and Event Server and its role in the Hardware system. Use this chapter for troubleshooting or to understand how the Event Server works.

3.1 Description of the Communication Server

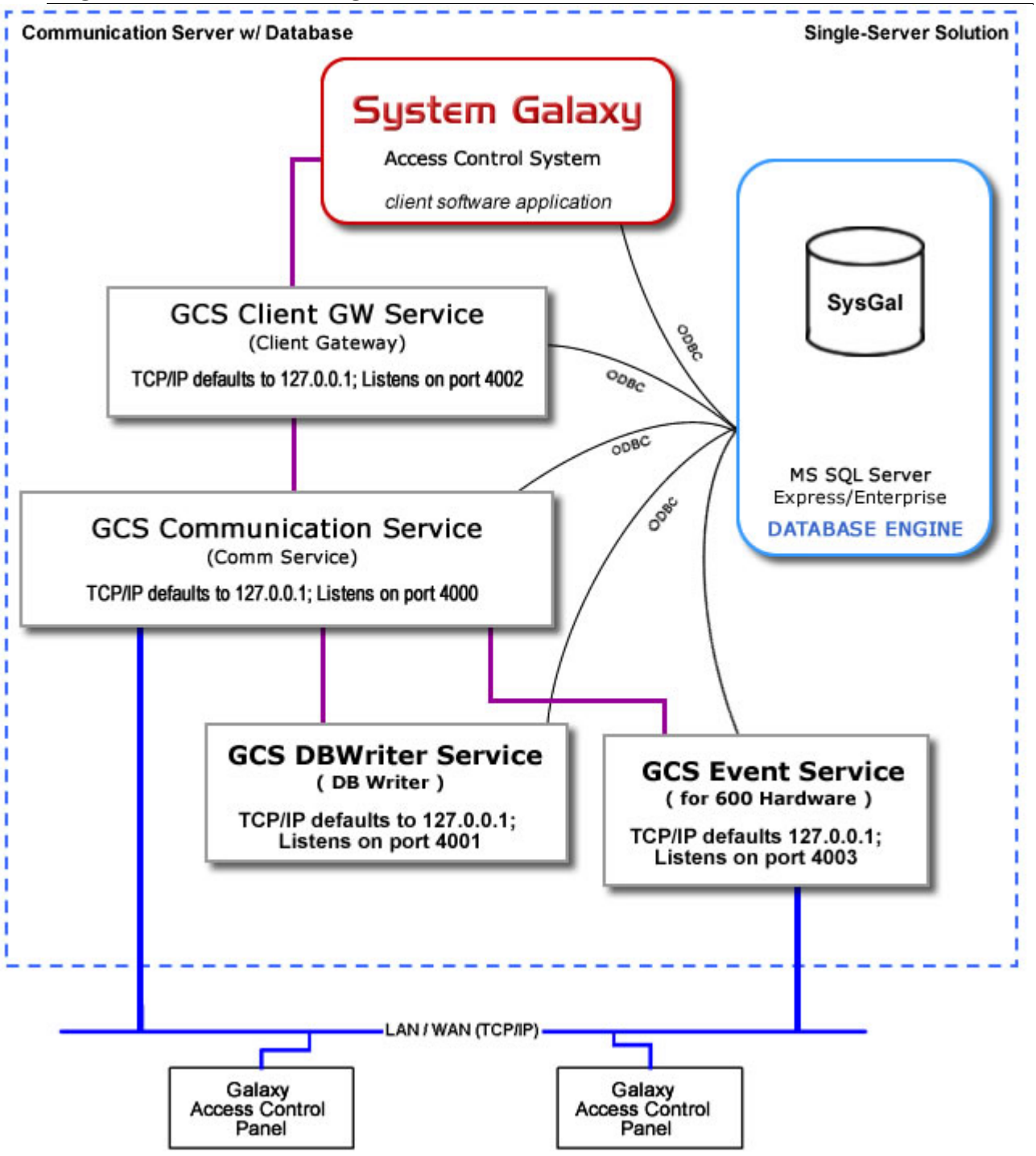
Core GCS Services and usually the System Galaxy software run on the Communication Server.

- **GCS Communication Service [port 4000]** *(aka Comm service) is the hub of the GCS Services*
  - Handles transmission of events to and from the Database (via DBWriter), SG Monitoring Software (via Gateway) and the access control panels (via Event service).
- **GCS DBWriter Service [port 4001]**
  - logs the events to the Database from the Communication Service.
  - If the DBWriter looses connection with the SQL Server, it will induce a shutdown. Any DBWriter shutdown (whether induced by manual or automated means) will spawn a shutdown of the Comm Service. This protects against lost / dropped events and ensures that the access control panel will retain the events in its buffer until IP connectivity is restored.
  - Note that Galaxy hardware does not operate in degraded mode if IP connections are interrupted; this is known as Off-line event buffering. The panel continues to be fully functional and buffers up to 10,000 events at the CPU. Events are re-transmitted to the database once IP connections are restored. Off-line events become available in system reports after being retransmitted / logged.
- **GCS Client Gateway Service [port 4002]**
  - Retrieves the SysID for the System Galaxy software running on Clients and Servers
  - Handles sending SG operator commands, converts incoming events into man-readable messages;
  - In SG 10 it also buffers incoming SG Alarms, which was done at the software level in SG 9.
- **GCS Event Service [port 4003]**
  - The 600 controller initiates the connection to the Event service
  - Transmits events to the Communication Service.
  - This service must run local to the time-zone of the panel; more than one instance of the Event service can run if needed.
  - Cross-panel communications rely on the Event server to be running for real-time execution.

IMPORTANT: Galaxy Event Servers must use a static IP Address in order for the controllers to make connections to the GCS Event Service.

3.2 IP Connections between Services

Figure 29 - Block Diagram of core GCS Services:



3.3 Opening the GCS Event Service window:

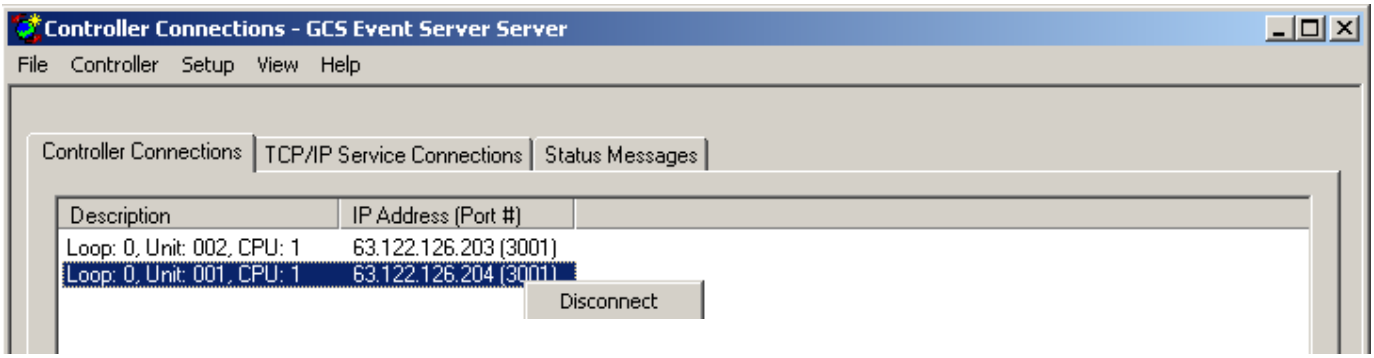
- **right-click the**  **icon** found on the system tray and select 'Open'

3.4 Managing the 600 Controller Connections:

The 600 *Controller Connections tab* displays the names and status of each 600-series controller that is connected to the Event Service.

600-series controllers initiate the IP Connection to the Event Service/Server once they are properly programmed. Chapter 2, Step-6 of this manual describes how to program the 600 CPU.

Figure 30 - Event Service *Controller Connections* screen:



If you force a disconnect from this screen, the 600 panel should come back online momentarily.

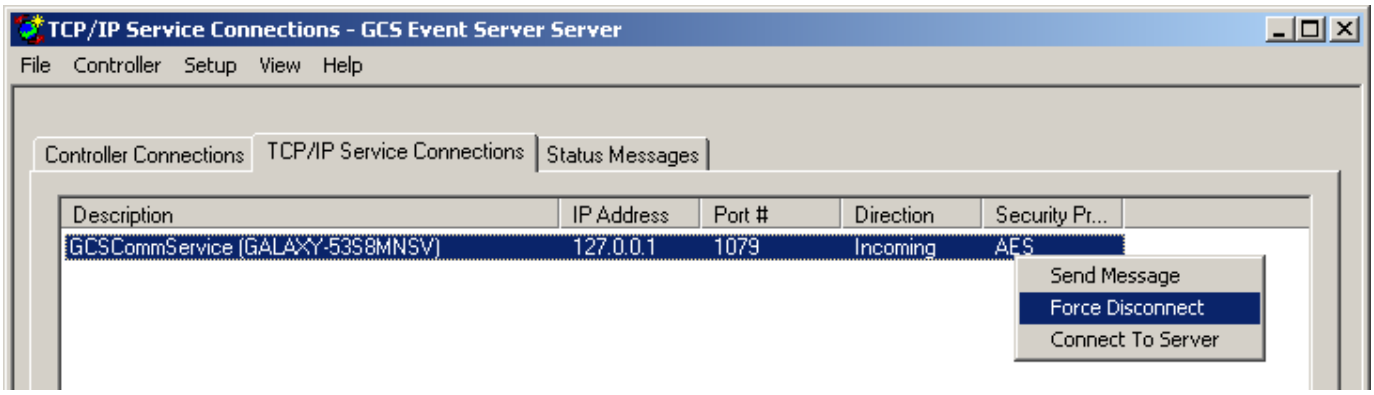
3.5 Managing the TCP/IP Service Connections:

The *TCP/IP Service Connections tab* displays the name of the incoming connection from the GCS Comm Service including the DNS name of the PC the *Comm Service* is running on. Also this screen shows the IP Address and Security Protocol of the incoming connection.

User is able to ***force disconnect*** from this window by right-clicking the service connection. The services are designed to reconnect automatically to servers every 30 to 60 seconds.

The **Connect to Server** option is not used in the Event Service since it does not have a client relationship to another service. *Event Server does not connect to the DBWriter Service.*

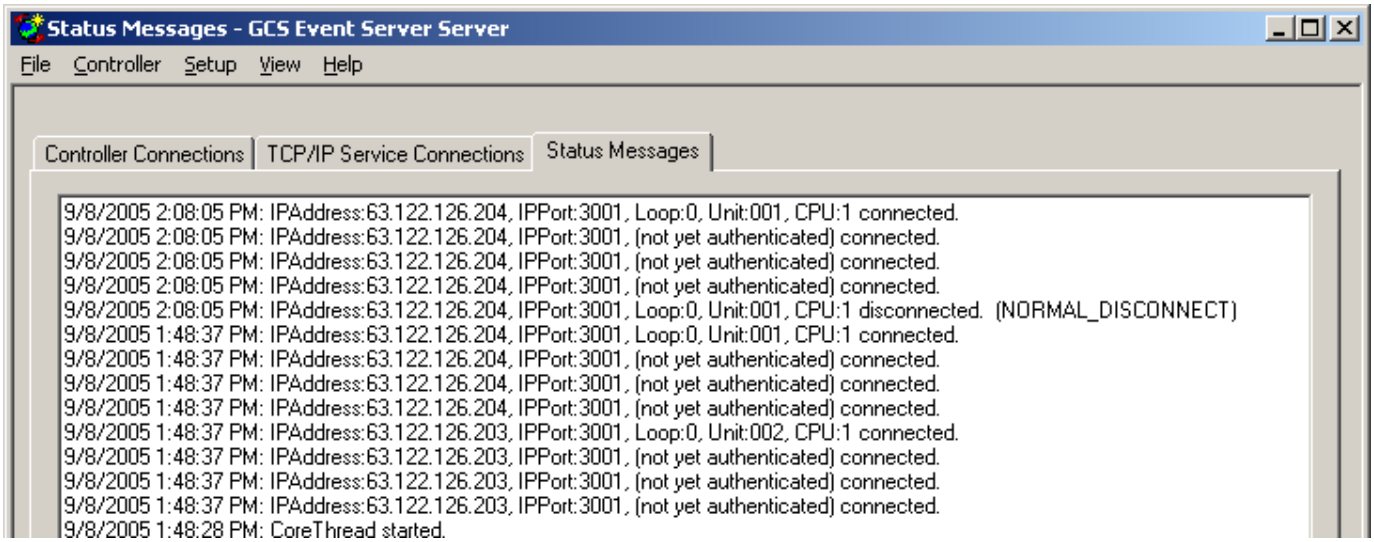
Figure 31 - Event Service *TCP/IP Service Connections* screen:



3.6 About the Status of Connections:

The *Status Messages tab* displays a buffer of status messages for the 600 Panels attempting to connect to the Event Server/Service. In this example, two 600-series panels have successfully connected to the Event Server. The 600-series panels are designed to initiate their connection to the Event Server. If the panel does not connect with a reasonable time, consider verifying programming at the panel matches the programming in the database or perform a power reset to the CPU.

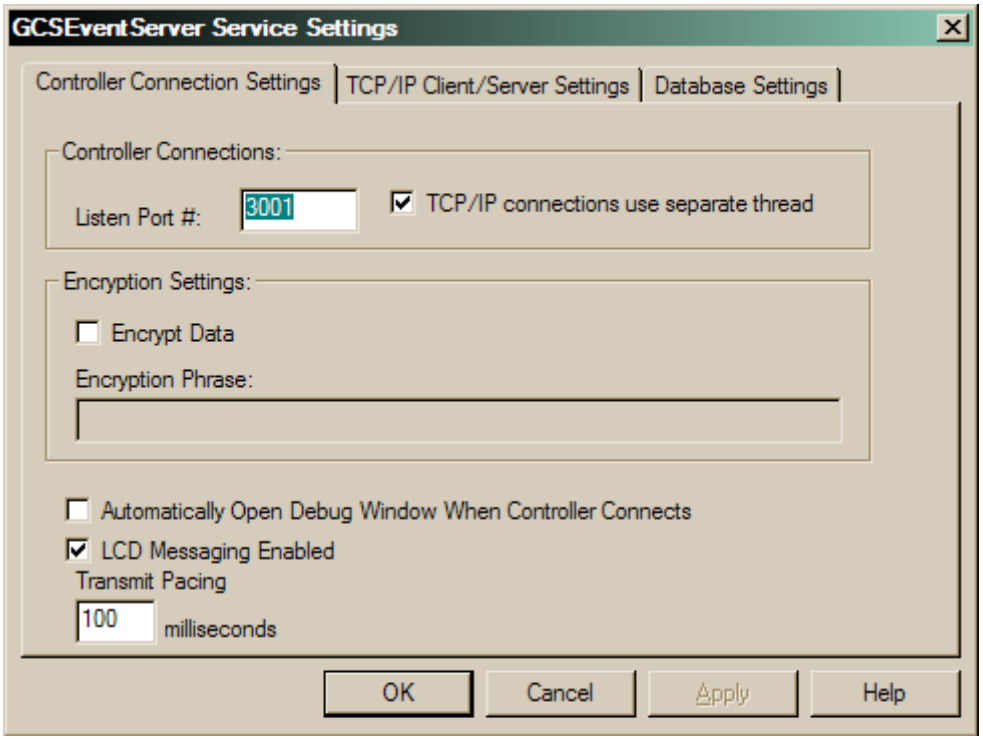
Figure 32 - Event Service *Status Messages* screen:



3.7 Configuring the Controller Connection Settings:

- Open this window by selecting ***Setup*** then ***Configure***, from the menu bar.
- The controller connection port should be set to **'3001'** and click **APPLY** to save.

Figure 33 - Event Service Settings > *Controller Connection Settings* screen:



Controller Connection Settings tab

- **Listen Port #** - this field defaults to **3001**. If the service is running on Windows® XP or other OS using a firewall, then port 3001 must be unblocked/open.
- **TCP/IP connections use separate thread** - Enabling this option creates an additional TCP/IP socket thread or each controller connection.

Encryption Settings

- **Encrypt Data option** – when *checked*, this option turns on encryption between the Event Service and the 600 panels. All controllers connecting to this service must match this setting (i.e. checked means "yes"; unchecked means "no").
- **Encryption Phrase** – If the *Encrypt Data* option is *checked*, then the Encryption Phrase field must be programmed. All controllers will use the same pass phrase as the Event Service.

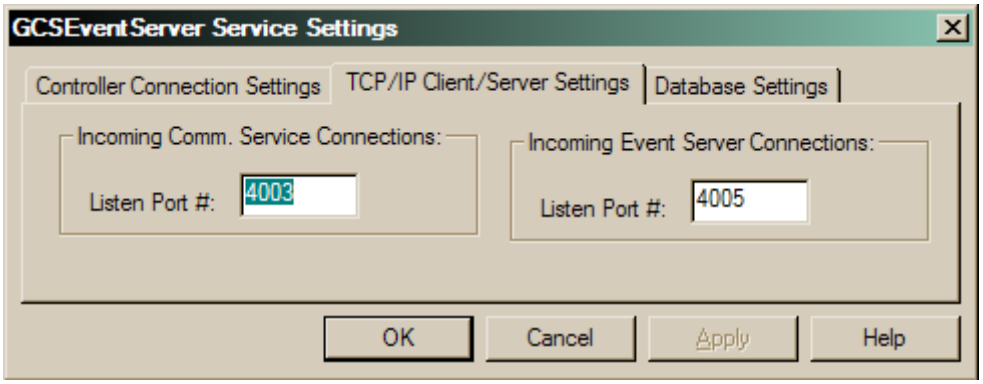
Other Options

- **LCD Messaging option** – when *checked*, this option enables the system to support message transmission from the LCD Display Module. The default transmit pacing speed is 100 ms.

3.8 Configuring the TCP/IP Client Server Settings:

- The Incoming Connections Port should be set to **'4003'** and press **APPLY** to save (see Appendix D for Software Loop properties screen)

Figure 34 - Event Service Settings > *TCP/IP Client Server Settings* screen:



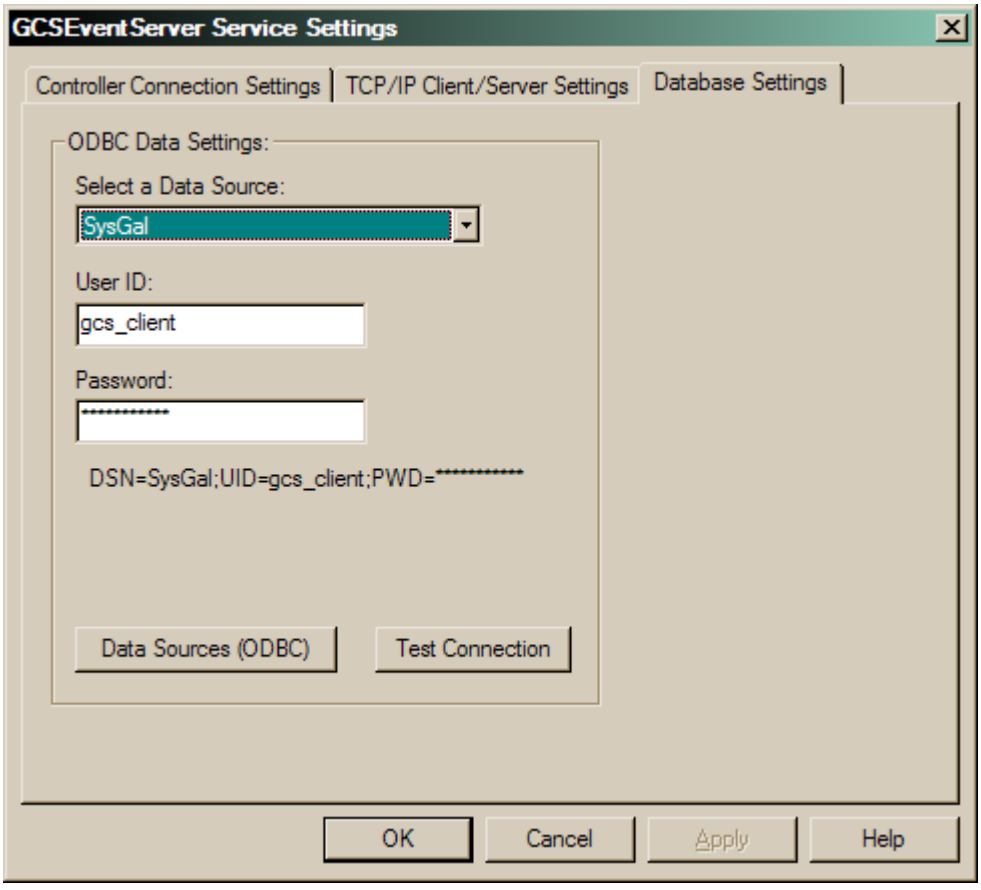
Incoming Connections - The GCS Comm Server makes an incoming connection to the Event Server. Only the *Communication Server* that is assigned to the Event Service will connect. The Comm Server is responsible for passing messages between the Event Service and the Client Gateway Service and the DBWriter Service.

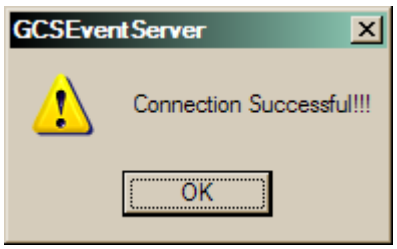
- **Incoming Comm Server Listen Port** - **The default port is 4003.** This field identifies the port the Event Service will use to listen for GCS Comm Server connection attempts. **This port must be open and unblocked at the firewall and any port blocking software.**
- **(SG-9) Incoming Event Server Listen Port** - **The default port is 4005.** This field identifies the port the Event Service will use to listen for incoming Event Server connection connections. **This port must be open and unblocked at the firewall and any port blocking software.**
- **(SG 8.X) Allow Client to Specify option –** when checked this option allows the upstream *client* service to specify the security protocol if the *server* protocol is different**.**
- **(SG 8.X) Protocol –** this droplist allows user to choose a security protocol.

3.9 Configuring the ODBC Settings:

- Beginning in SG-9 the Event Service maintains an ODBC connection to SysGal database.
- Click the TEST CONNECTION button to verify that your Event Service can connect to the database successfully.
- Click the DATA SOURCES (ODBC) button to configure your ODBC settings if you are unable to connect. See Appendix P for instructions on setting your ODBC connection.

Figure 35 - Event Service Settings > *Database Settings* screen:





4 Hardware Troubleshooting

This chapter covers troubleshooting information for System Galaxy. The following sections are included:

HARDWARE TROUBLESHOOTING SECTIONS:

4.1 Troubleshooting Connectivity and Red-X on Loops

This part covers troubleshooting Controller Connectivity and Red-X on Loops.

- **The Software and Services initiate connections in a "daisy-chain" fashion to each other.** Part 3.2 of this chapter contains troubleshooting tips for services; also see the diagram provided in this chapter, section 3.3. Chapter 4 covers the Event Service in detail. *The main GCS Services are covered in the main SG Software Manual in chapter 11.*

- **The GCS Services know where the Event Service is located for the Controllers based on *Loop Programming* in the Software Loop Properties screen.** Chapter 3 Step-10 and Step-11 have tips on software programming. The in-depth software programming instructions are found in the Main SG Software Manual.

- **The Controllers initiate their connections to the Event Server/Service.** The controller knows the Event Server IP Address (which must be static) to connect with based on the programming done in Chapter 3 Step-6.

    a. **The software should generate a *'panel not connected' event* provided the panel is programmed correctly at the software.** Chapter 4 covers the Event Service in detail. Section 3.3 provides troubleshooting tips for configuring the CPU and Chapter 2 Covers instructions for configuring the CPU in detail.

SG 8 or higher supports the *600 Controller* using the *GCS Event Service* in tandem with the *GCS Communication Server* *(and other core services)* for logging events to the SG Database and SG Event Monitoring Screens. See the key points in the following notes:

4.2 Verifying connections between Services

It is possible to have a red-X on the hardware tree if the IP connections between SG and/or any of services are not established or panel programming does not match the system programming:

NOTE: a diagram showing the connectivity between the Software, Services and Panels is shown in Section 3.3. The diagram shows a simple (single-server) install with two 600-loops.

TIP: IF any of the controllers are not connected to the Event Server, turn to Chapter 2 Step-9 to verify the controller is on the LAN.

TIP: Chapter 2, Step-6 covers the HyperTerminal *config* command. You can use that section to retrace/verify you programming is correct at the panel.

IMPORTANT: Programming in the 600-series Controller (CPU) MUST MATCH the values programmed into the software screens. Chapter 2 Step-10 covers testing the Controller and has Software Setup Quick Steps.

1. **Check the *Communication Control screen* to see if Red-X shows up:**

   A red-X indicates that an IP connection is lost between the services (Start troubleshooting at the top of the list and work down) Open the Services Windows from the system task tray check the following:

2. **Ensure that an outgoing TCP/IP Connection is shown to the next downstream service in question** (you can force a *connect to server* from the TCP/IP Connection tab from this service by right-clicking to get the command menu – you must provide the correct port and IP address to the next downstream service).

3. **Ensure that an incoming TCP/IP Connection is shown from the upstream service for the service in question:** (you can force a *connect to server* from the TCP/IP Connection tab of the upstream service by right-clicking to get the command menu – you must provide the correct port and IP address to the downstream service).

⇨ **System Galaxy application:**

a) Has an outgoing connection to the Gateway service. If the Red-X is on the Communication Control Window between SG and the Gateway, user can force a connect with the button at the bottom of the Communication Control Window. User can check that the connection parameters are correct in the Configuration>>Options>>Client Gateway settings. The port should be 4002 and the IP address can be the external IP address of the computer running the gateway.

⇨ **Gateway Service can have:**

a) one incoming from each (SG software) client workstation it serves
b) one incoming from CCTV (if used)
c) one incoming from LogDistributor (if Email Notification or Event Output is used)
d) one outgoing to the Alarm Panel (if used)
e) one outgoing to the main LCS Comm Service; plus one outgoing to each secondary LCS's Comm Service if multiple comm. Servers are used.

⇨ **Comm Service can have:**

a) one incoming from Client Gateway
b) one outgoing to DBWriter
c) one outgoing to the Event Service it serves; note only one Event Server can run on a PC, but Comm Service can connect to multiple pc's/event servers if the site is that complex/large)

Note that the Comm Service will also show any controller connections 508i panels if you installed any at this site and they are connecting via LAN) and it will show a connection to the Event Service in this same screen also.

⇨ **DBWriter Service can have:**

a) one incoming from Comm Service
b) one incoming to Alarm Panel Service (if used)
c) one outgoing to MSDE (or MS-SQL Server)

⇨ **Event Service can have:**

a) one incoming from Comm Service
b) one connection to each 600-series controller that is setup to use it.

NOTICE: See the following page for more notes and tips.

- **Verify that port blocking/firewall software is setup to accept the following ports 3001, 4003, 4002, 4001, 4000, 5010 as appropriate at each computer running System Galaxy services**. Chapter 1 Sections 1.8 through 1.10 have consolidated requirements for Networks.

- **Verify that any 600-panel encryption appropriately configured (set/not set) to match the actual 600 panel** – if encryption key is not used at the 600-panel then it should be off at the Event Service. If encryption key is used at the panel then the encryption password and the key must both match the programming at the Event Server for the loop in question. This is an all or nothing setting – all panels must have the same setup or no panels can have encryption.

Remember that *encryption settings* can interfere with connections between services. These settings can be *resynchronized* from the GCS Service Manager Utility.

IMPORTANT: IF you are NOT using encryption between the 600-panel and the Event Service, this must be disabled in the controller and in the Event Service Configuration screen. If encryption is used between the panel and the Event Server, then the pass phrases must match (see Chapter 2 Step-6).

NOTE: Sometimes the computer name cannot be resolved at the Communication Server field. Inserting the raw IP Address into the Loop Properties screen will resolve this.

NOTE: That if the Database Server or the Database Service or the DB Writer Service loose their connections, the GCS Comm Service will detach itself from the GCS Event Service and downline Cluster's /Loops. This is intended behavior. Restore Database Server connections to resume event logging and the software will be able to connect to Loops again.

4.3 Verifying settings in SG Properties Screens

It is possible to have a Red-X on the hardware tree because the Loop and/or Controller Properties screen are not correct. **Also see Figure 32** for an picture of how the software programming must match the programming at the panel.

NOTE: a diagram showing the connectivity between the Software, Services and Panels is shown in Section 3.3. The diagram shows a simple (single-server) install with two 600-loops.

1. **Verify the Loop Programming is correct in SG as follows:**
    a. **600 Cluster/Loop ID is correct for EVERY panel on the loop in question.** Loop number in SG database must match the Loop ID in every 600 panel of the loop/cluster in question. (The Loop/Cluster ID must be unique within the System and match the panel(s)).
    b. **System type = "600"**
    c. **600 connection type is set to "TCP/IP"**
    d. **600 Event Server IP Address is correct for the loop in question** - must be set to the IP Address of the computer running the Event Service for the Loop in Question
    e. **600 Loop Listening Port is correct for the loop in question** – default value should be 4003. This should only be changed if the customer IT department has dictated it.
    f. **600 Loop Communication Server's DNS Name/IP Address is correct for the loop in question** – it should be set to the Name or IP Address of the computer running the Communication Service for the Loop in Question. Re-click the [This Computer] button and/or supply the Name or IP ADDRESS of the Communication Server. Remember that if the DHCP server has been reconfigured or the computer moved, it can cause inability to connect. IP Address is the safest bet if this is suspected. Also can try setting the Communication Server to a static unused address if all other options have failed or as rule-out.
    g. **Only one copy of any/each applicable Service is running on the PC/Server in question** – multiple instances of a service on the same machine is invalid operation. There can be more than one Event Server in a System, but only one instance of the Event Service running on a given machine. There can be more than one Comm Server in a System, but only one instance of the Communication Service running on a given machine. All other services are restricted to one instance system-wide.
2. **Verify the Controller Programming is correct in SG as follows:**
    a. **600 Unit ID is correct for EVERY panel on the loop in question.** Unit number in SG database must match the Unit ID in each 600 panel of the loop/cluster in question. (the unit number must be unique within the loop in question and match the panel)
    b. **Controller Serial number is 020***** for a 600 panel.**

4.4 Verifying settings at the Controller (CPU)

It is the responsibility of the Panel to initiate the connection to the Event Server/Service.

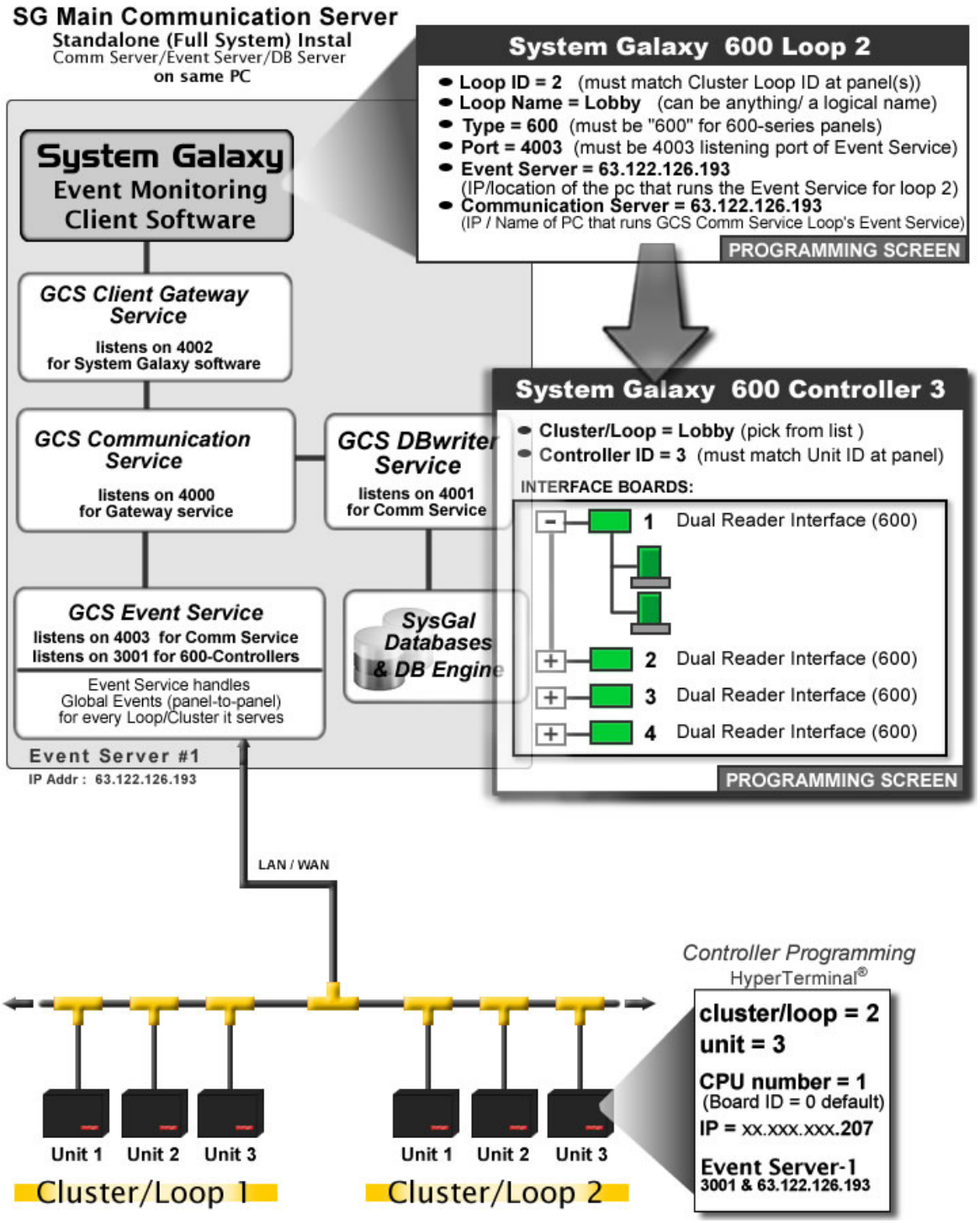
NOTE: a diagram showing the connectivity between the Software, Services and Panels is shown in Section 3.3. The diagram shows a simple (single-server) install with two 600-loops.

Chapter 2 (Step 6) provides the details for configuring the board via HyperTerminal

1. **Verify the Controller Configuration is correct at the Panel using HyperTerminal.**
    a. **600 Cluster/Loop ID is correct for EVERY panel on the loop in question.** This must match the Cluster ID in the database (600 Loop Properties screen).
    b. **600 Unit ID is correct for EVERY panel on the loop in question.** This must match the Controller ID in the database and must be unique within the Loop/cluster in question – 600 Controller Properties screen
    c. **600 CPU Board ID is set to 1** (if dual (2) CPU's are in use, you will set the second one to CPU "2") - This is set at the CPU (see Step-6 in Chapter 2).
    d. **600 IP Address (static) is a valid/unique IP Address on the customer's LAN** - set at the CPU (see Step-6 in Chapter 2).
    e. **Encryption setting (yes/no) and the Encryption Pass phrase: Set at the CPU and at the Event Service. All panels on the same event service must use the same pass phrase** (see Step-6 in Chapter 2 and also Chapter 4).
    f. **IF DYNAMIC ADDRESSING IS USED: verify that the DHCP server is up** (the 'net' command in HyperTerminal is useful in determining which address was supplied to the panel – connect HyperTerminal to the panel in question and verify that the IP Address is valid).
    g. **The Network Mask and Gateway Address must conform to the scheme used.**
    h. **600 Panel's LOCAL PORT = 3001**
    i. **600 Panel's REMOTE PORT = 3001**
    j. **Event Server IP Address is valid.** The Event Server is the PC running the Event Service that serves the loop in question. The *ipconfig* command in DOS on the Event Server will return the pc's correct address. The Event Server must have a static IP Address – DHCP is not recommended for this server.
    k. **Make sure all firewalls and ports are configured to have port 3001 open/unblocked.**

WARNING: If the technician by-passed the *save config prompt* in HyperTerminal when programming the CPU, the panel will stop working (loose its configuration) when the next reset occurs at the panel. Make sure you save your settings at the panel.

Figure 36 - Programming at the Software must match the Controller:



A – Appendix : Programming Templates

Use templates to ensure hardware settings are unique and can be programmed to match the software.

A.1 DPI - Reader port programming

Sample: in the example there are 3 DPI boards with Section 2 on DPI 2 is unused

Cluster ID (Loop)	Unit ID	CPU #	DPI ID	Section 1 Port # / Use	Section 2 Port # / Use
1	2		1	P-1 BAR CODE	P-2 Far Pointe
			2	Thin Line	NOT USED
			3	Mini Prox	XeedID

Template can be copied as needed.

Cluster ID (Loop)	Unit ID	CPU #	DPI ID	Section 1 Port # / Use	Section 2 Port # / Use

Appendix A - Programming Templates

A.2 DIO port programming

Template can be copied as needed.

Cluster ID	Unit ID	CPU #	DIO ID	INPUT Port # / Use	OUTPUT Port # / Use
1	*1*	*1*	*1*	*1, 2, 3, 4 / MD*	*1 = SIREN*
			1	*5 / TIMER*	*2 = LIGHT CONTROL*
Cluster ID	**Unit ID**	**CPU #**	**DIO ID**	**INPUT Port # / Use**	**OUTPUT Port # / Use**

A.3 DSI port programming

Template can be copied as needed.

Cluster ID (Loop)	Unit ID	CPU #	DSI ID	Section 1 232 OR 485 Port / Use	Section 2 232 OR 485 Port / Use

B – Appendix: Resetting ODBC Connections

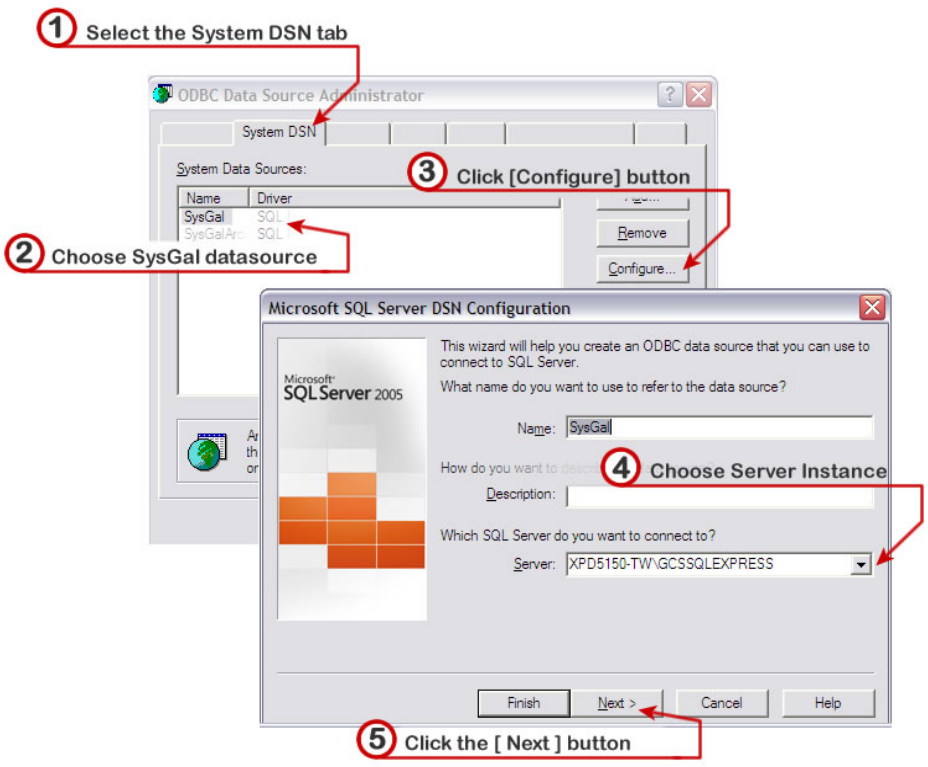
The Core GCS services must maintain ODBC connections to the System Galaxy database to support live man-readable messaging and other features.

B.1 : Configure your SG Data Sources

Open the ODBC Data Source Administrator in the GCS Service you need to configure (you can open the Service from the System Tray)

- Double-click the GCS Service ICON on the Windows system tray
- From the menu choose Setup > Configure > Database Settings tab
- Click the DATA SOURCES button to open the ODBC DATASOURCE ADMINISTRATOR window

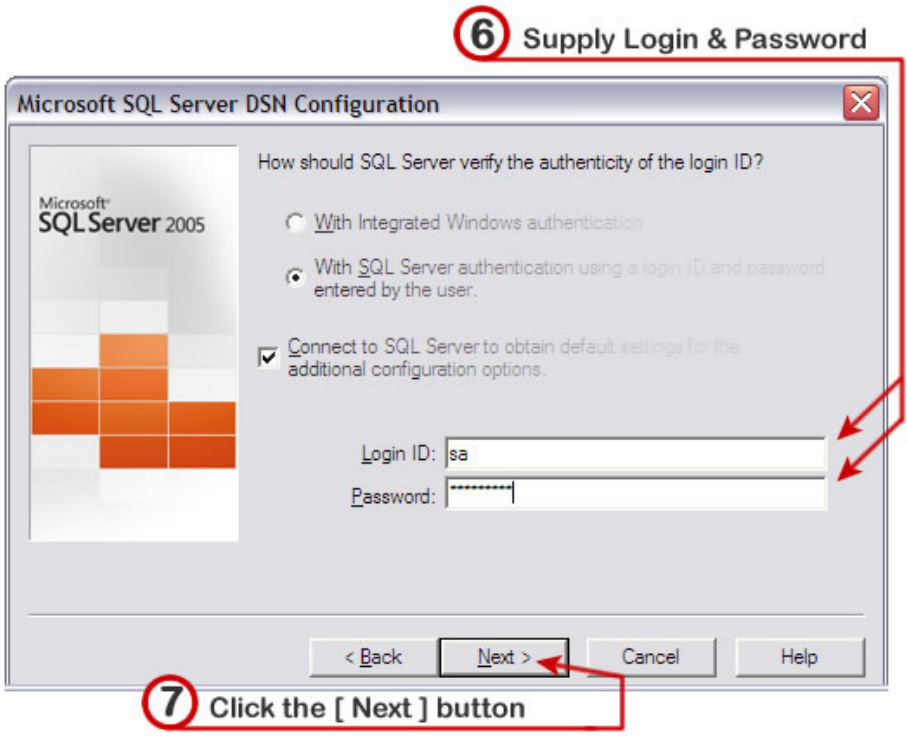
1. Select System DSN tab
2. Select SysGal datasource
3. Click [Configure] button
4. Choose the instance
5. Click [NEXT]



NOTE: SysGal is the default data source name. However, this name can be customized by the system owner during or after the SG Database server is installed. Ensure you see/select the correct data source name for in the listbox.

Configure your Data Sources (continued)

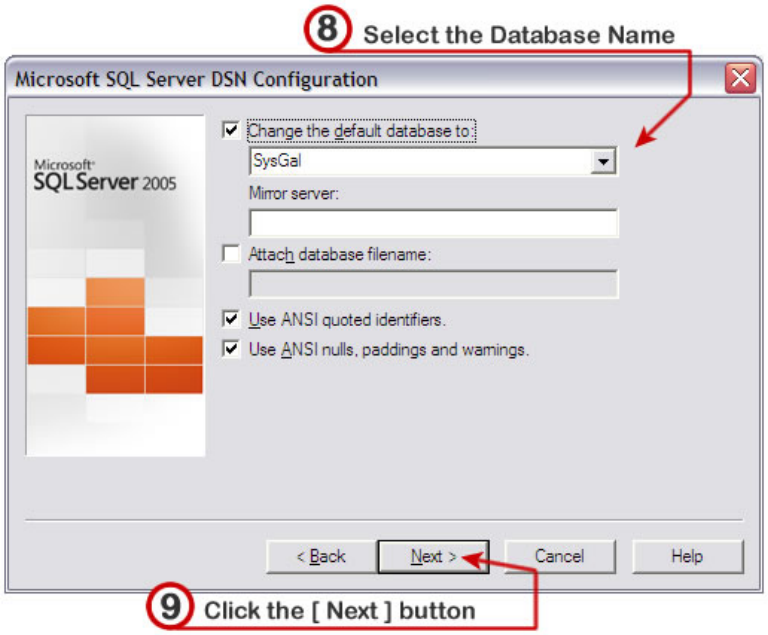
6. Supply the login & password to your database
7. Click [NEXT] to continue



NOTE: the options to ***use SQL Server Authentication*** and to ***Connect to SQL Server…*** should be used unless the system owner has chosen to use Integrated Windows Login.

Configure your Data Sources (continued)

8. Select the Database Name
9. Click [Next] to continue



NOTE: SysGal is the default database name. However, this name can be customized by the system owner during or after the SG Database server is installed. Ensure you see/select the correct database name for in this field.

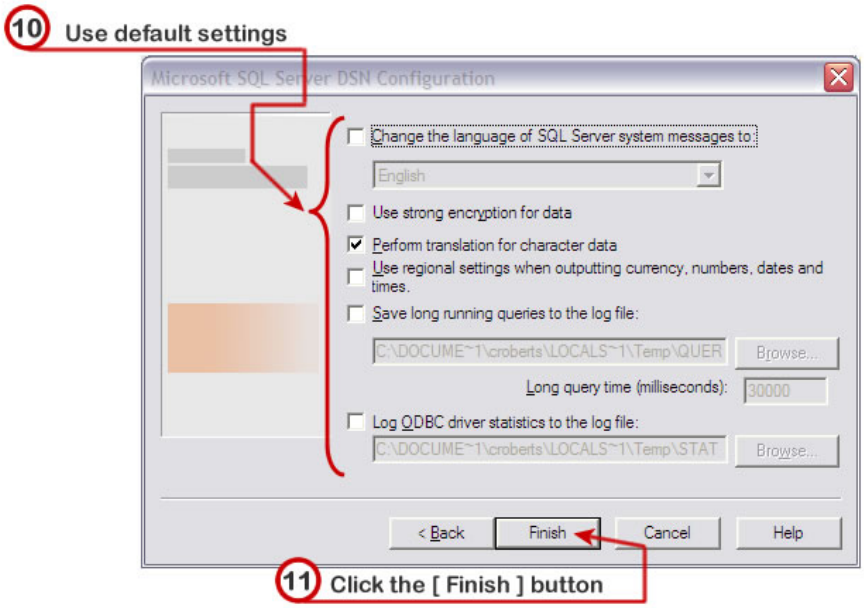
SUPPORT: If you do not know the database name, contact the owner or IT / DB Administrator to determine which database name should be used and resolve any issues with permissions. If you cannot see the expected database name in the list, contact the IT Administrator to resolve network issues (i.e. ports, firewalls, etc.).

Appendix B - Connecting to the ODBC Data Source

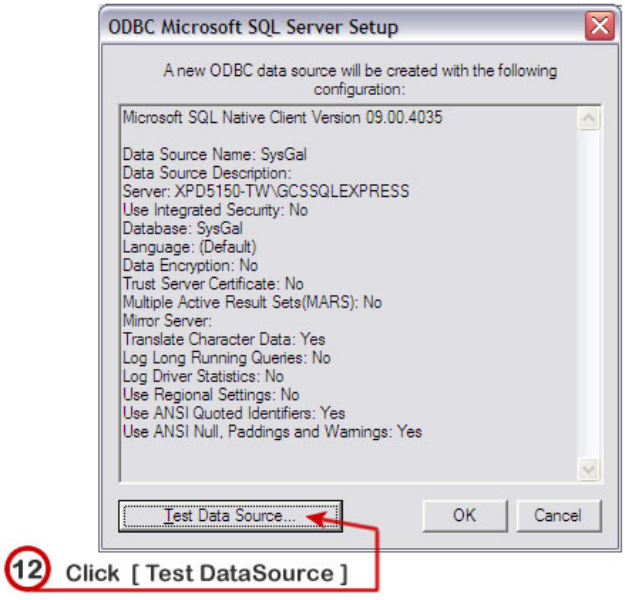
Configure your Data Sources (continued)

10. use default settings

11. Click the FINISH button to continue



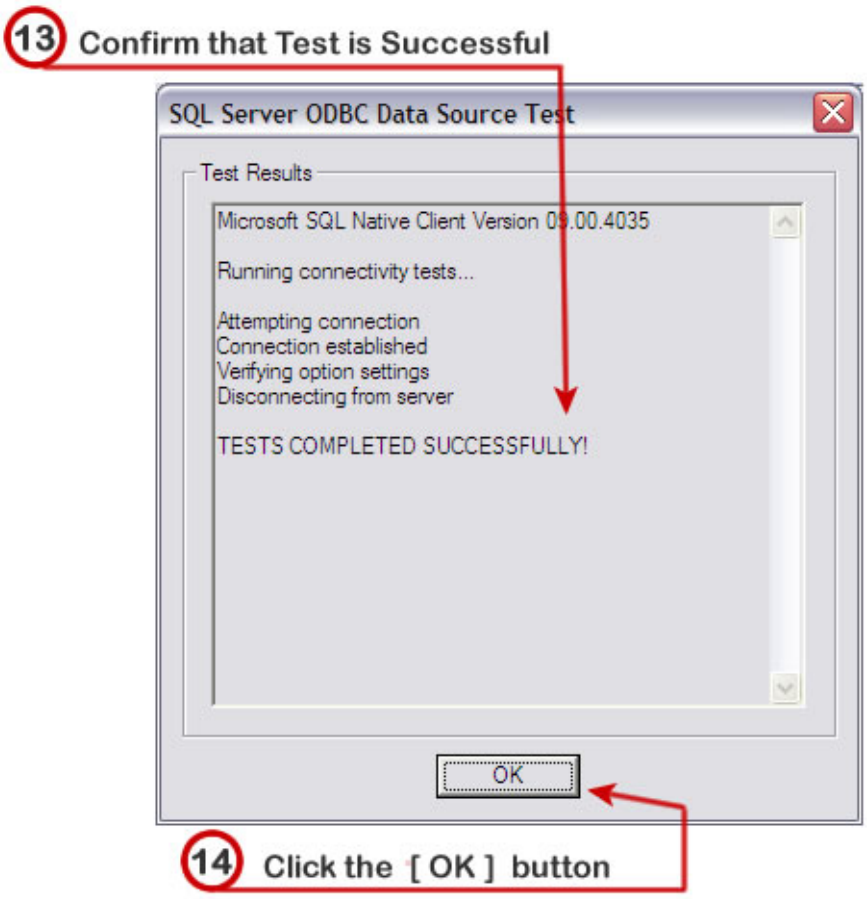
12. Click the TEST DATA SOURCE button to verify ODBC connectivity



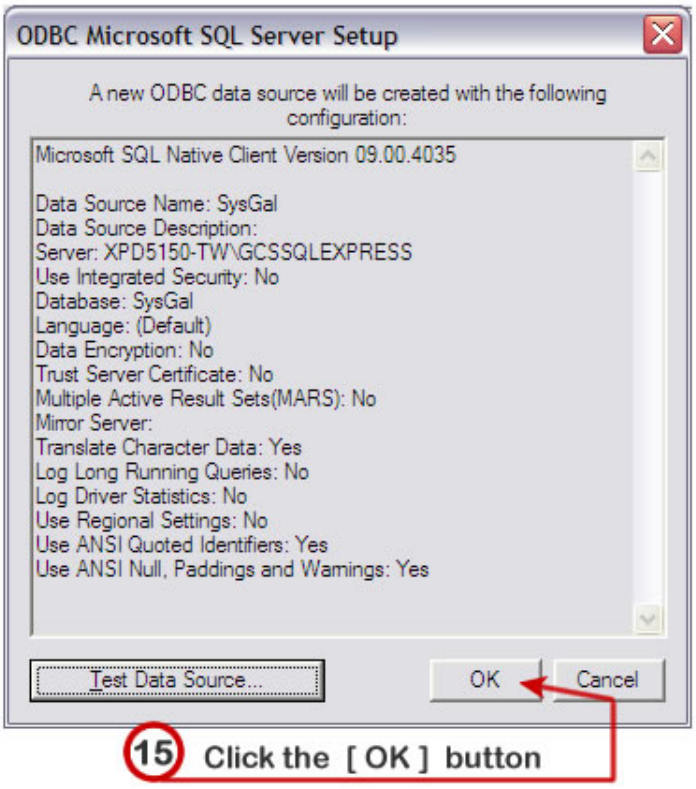
Configure your Data Sources (continued)

13. Confirm that the test is SUCCESSFUL

14. Click the OK button to continue

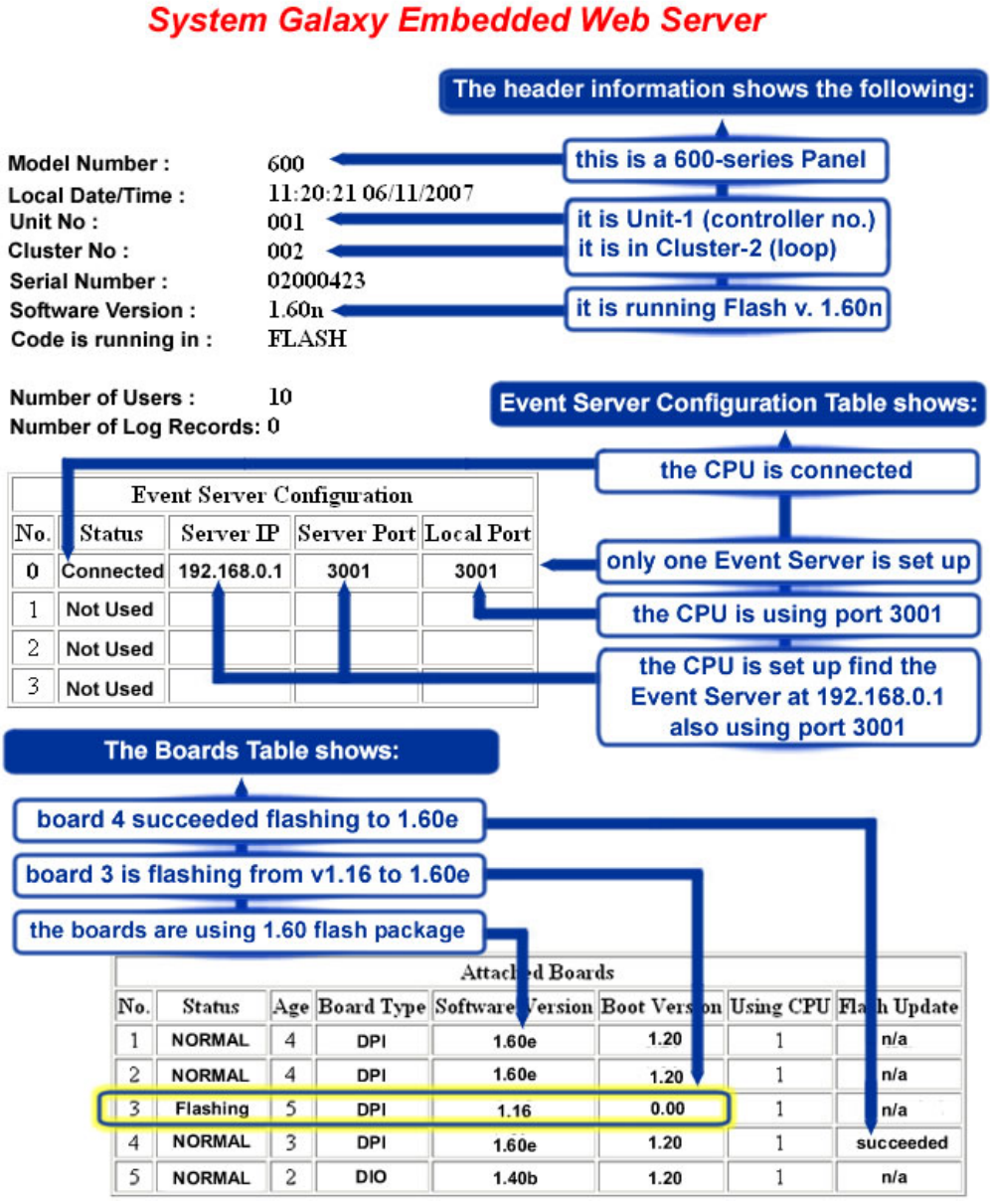


15. Click the OK button to complete the DSN configuration



C – Appendix : View panel settings in Web Browser

- To view the panel settings from a Web Browser, open a Web Browser from the server.
- In the Browser's address field, type the IP Address of the controller you want to see.
- The following screen should display (provided the panel is set to Allow Web Browser). *Note: you cannot change settings at the panel from the browser. You can see if the settings are correct and prove that the controller is online.*



D – Appendix : Checking Loop Programming

To verify the Loop/Cluster is correctly programmed into the SG Software, you must look in the Loop Properties screen in the System Galaxy software.

- **Go the Communication Server and start the SG Software** by double-clicking the SG Icon on the desktop.
- **Log in to the software with a master operator** (or user that has rights to view and edit).
- **Click the following path on the menu bar 'Configure>Hardware>Loops** or click on the Loop Toolbar button. You could also right-click on the Loop's icon in the Hardware tree. *The Loop Properties screen will open.*

- In the Loop Properties screen, **select the name of the Loop/Cluster** in question.

- **Verify that the Loop/Cluster ID matches the Cluster ID at the Controller in question.** Use the Web Browser to see this or use HyperTerminal to get into the controller and fix the Cluster ID to match the software.

- **Verify that the Loop Type is set to 600-series.** If you had this field incorrectly set to 500 type you **must** delete all controllers and then delete this loop. Then you can reprogram the loop using the correct 600-series in the type field. You cannot simply switch this field.

- **Verify that the connection Type is TCP/IP.** Set this to TCP/IP if it is not already set.

- **Verify that the Event Server IP Address field is correctly set to** the IP Address of the computer running the GCS Event Service (you can find this using the *ipconfig* at the Event Server to find this address – see Appendix-I.

- **Verify that the Remote Port is set to 4003** (not 3001). The Comm Service uses this to connect to the Event Service.

- **Verify that the Communication Server IP Address is correctly set** to the name or IP Address of the computer that is running the Comm Service.

> **Note:** sometimes the name server sets a name that cannot be resolved. To ensure this is not a problem, use the IP Address of the Comm Server. (you can find this using the *ipconfig* at the Comm Server to find this address – see Appendix-I)

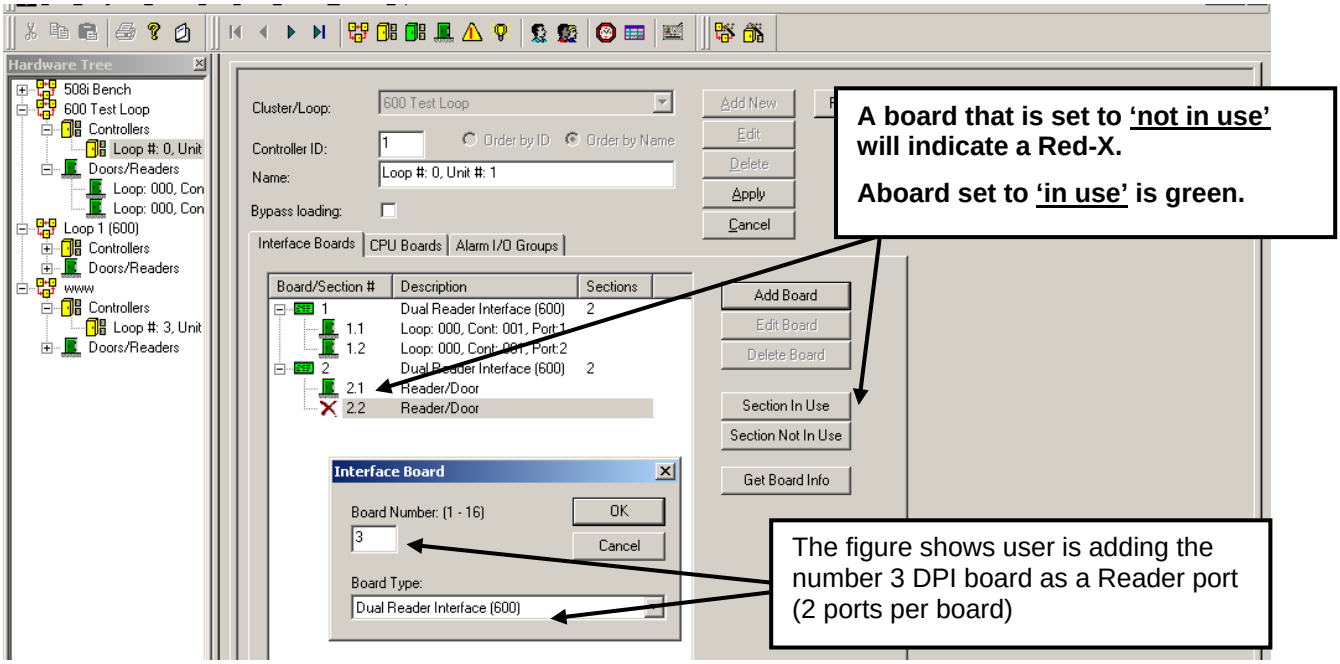
- **Save any changes by pressing the [apply] button.**

E – Appendix : Checking Controller Programming

To verify the Controller is correctly programmed into the SG Software, you must look in the Controller Properties screen in the System Galaxy software.

Note: to edit fields in the software you must click the EDIT button. You need rights to edit.

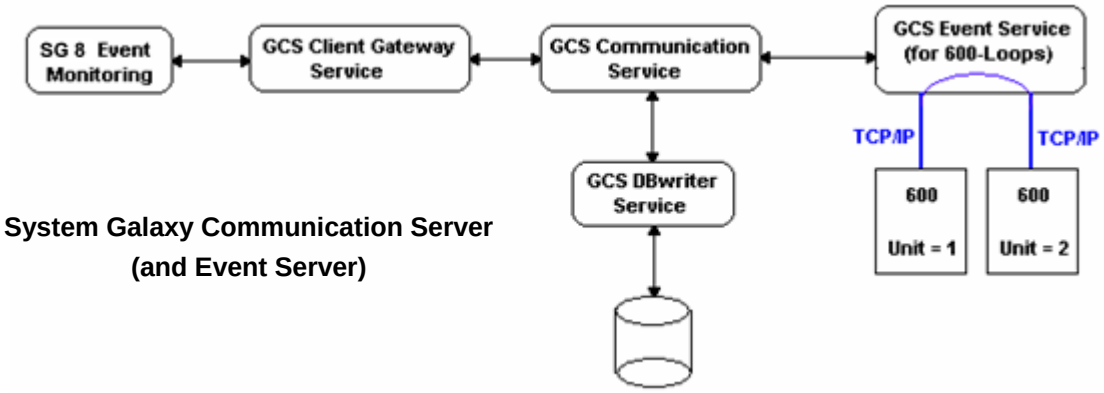
- **Go the Communication Server and start the SG Software** by double-clicking the SG Icon on the desktop.
- **Log in to the software with a master operator** (or user that has rights to view and edit).
- **Click the following path on the menu bar 'Configure>Hardware>600 Controllers** or click on the 600 Controller Toolbar button. You could also right-click on the Controller's icon in the Hardware tree. *The Controller Properties screen will open.*
- In the Controller Properties screen, **select the name of the Controller** in question.
- **Verify that the Controller ID matches the Unit ID at the Controller in question.** Use the Web Browser to see this, or use HyperTerminal to get into the controller and fix the Unit ID to match the software.
- **Verify that the model is set to 8-door or 16-door as needed.**
- **Verify that the Bypass Loading field is unchecked (as desired).** If checked, the operator cannot load the controller.
- **Verify that the correct boards are added to the controller (DIO, DPI, DSI, ETC) AND that their board ID's are correct for the controller in question.**
- **Save any changes by pressing the [apply] button.**



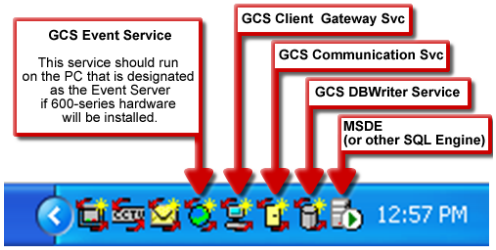
F – Appendix : Starting & Stopping GCS Services

The core GCS Services must be running and have their listening ports correctly set to log events to the SG Software and Database. Ports must be unblocked at firewalls and devices.

Core Service Name	Listening Ports	Other Ports
GCS Client Gateway Service	4002	5010 for SysID
GCS Communication Service	4000	3001 for 508i controllers (if used)
GCS DBWriter Service	4001	
GCS Event Service	4003	3001 for 600 controllers



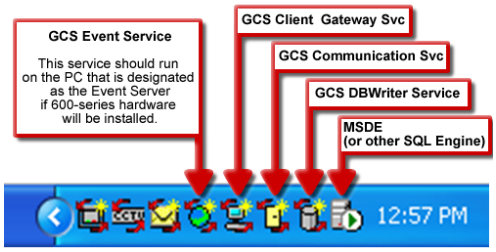
Core GCS Services are installed on the main Communication Server. They appear on the System Tray (hover your mouse over the icons to make sure Windows is refreshed). *They should run automatically when the pc/server is started.*



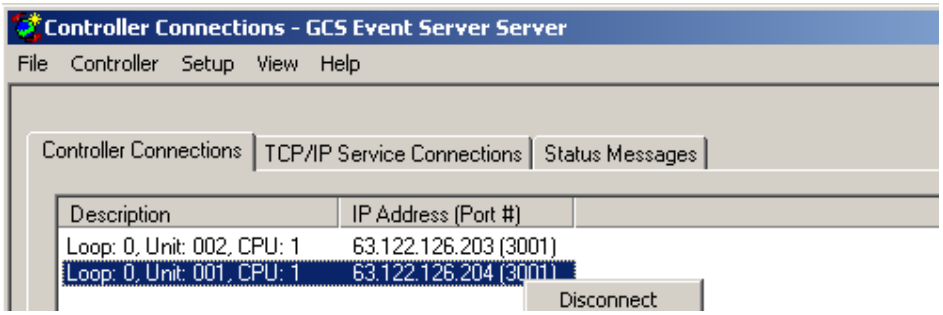
- **To start a service** that is not running you must go to the Window's Start button and choose Settings>Control Panel>Administrative Tools>Services.
    - Scroll down until you find the GCS Service you need to start then right-click its name and pick 'Start' from the menu.
- **To Stop a service** you can use the same method above only pick 'Stop' on the menu.
- To make a Service to run automatic, right click the name of the Service and pick 'Properties' on the menu and set the startup to be automatic.

G – Appendix : Opening the Event Service

The GCS Event Service will display every controller that is programmed to connect to it. The controller will initiate the connection to the Event Service. The Event Service should be set to run automatically when the Event Server/PC is started.



- **To open the Event Service, you must right-click its ICON on the system tray and pick 'Open'. You will be able to see the 600 controllers that are connected.**



- To close the Event Service but leave it running, close the Connections window and choose the button [Hide GUI, Keep Service Running].

- **If you accidentally stop the service refer to Appendix F to start the service again**.

H – Appendix : Putty/HyperTerminal Commands

A. Connecting to a Terminal Emulator

1. Connect the programming serial cable to the **J4** serial port of the CPU Board (Rev H or later) and the standard 9-pin serial (com) port on the PC or laptop that will run Terminal Emulator.

   A programming cable comes with the controller enclosure:

   - The cable must have a DB9 female connector on one end and a DB9 male connector on the other end.
   - **Cable Pin-out must be:** Pin 2 to Pin 2, Pin 3 to Pin 3, Pin 5 to Pin 5.

   - Note: you can purchase a reliable USB-Serial Converter from Galaxy if you need one. ***Be sure to install the driver!*** Connect the PC-end of the Serial Cable to the USB Converter and connect that to the Laptop/PC USB Port.

2. On the PC/Laptop, click the TeraTerm startup icon (or suitable terminal emulator). TeraTerm can be installed royalty-free, by copying it from the Galaxy GalSuite Installer USB Drive. It is found in the Auxiliary\System Galaxy\FTS\TeraTerm folder path.

3. In TeraTerm, ***Configure Setup*** *option* you must enter the parameters below, and then select the ***Save Setup*** menu option to save your connection parameters.

   635-CPU Terminal Session parameters are:

   Bits per Second = 57,600K
   Parity = None
   Data Bits = 8
   Stop Bits = 1
   Flow Control = None

See table of Terminal Commands on next page

Appendix H - HyperTerminal Commands

4. When you have the Terminal Session established, you will use the following commands to perform your work.

Commands	Description / Use
All commands are typed in lowercase.	
install	(600 CPUs only) Default login /password to the panel (set at factory) **Note 635-CPUs do not require a login password** to begin programming with direct connect.
boards	This command allows you to list all the boards that the controller sees are connected and operating. *600-series boards*: ▸ NOTE that board 34 is not valid operating ID and will not work until it is set up. ▸ NOTE that board 33 is a interface board that is in config mode (jack installed) and will not work until it is set up with a valid ID. ▸ NOTE that valid IDS are 1 through 16 for interface boards and there cannot be duplicates. If you have a board that does not show up, you can disconnect all other boards and run the boards command again to see if you can find it's ID. Bring one board back on at a time to confirm all ID's are unique/not duplicated. ▸ NOTE that the CPU is not returned in this command. *635-Series boards* ▸ Set a unique and valid board ID using the onboard dipswitch. (1-16 is valid; and each board must be unique on the I2C Data Bus)
config	This is the command to configure the CPU board and set board IDs for DPI, DIO, DSI, etc. The config jack must also be installed in the board for the board to allow configuration. You must save your changes, or they will be lost on the next power failure or board reset. NOTE that the CPU is always 0.
net	This is useful to return the IP Address being used by a controller CPU if it is set up to use DHCP Addressing.
version	This command lets you see the version of flash running on all the boards that are connected to the CPU on the data bus.

IMPORTANT: you must save your board configuration by typing "yes" when prompted or the configuration will be temporary and subsequently will be lost when a power failure happens to the panel – such as with a storm, brownout, or power outage.

If you skip or mistype a setting, you can cycle back around by simply reissuing the config command and the board number. Remember to type "yes" when prompted to save.

Appendix H - HyperTerminal Commands

B. Programming the CPU Board

(Reference Chapter 1 for a consolidated list of IT Requirements).

IMPORTANT: See the Network Administrator to obtain network parameters. You must use unique and valid ID's when programming a CPU.

Logging into Board's Config Mode:

IMPORTANT: You MUST type the all entries in lowercase.

1) **Press the <Enter> key to get the login prompt if it is not displaying**.

2) **(635-CPU) just press the <Enter> key.**
(600-CPU only) At the login, type "install" press the <Enter> key.

```
login: install

600-Control Module, Version 1.60n
System was WARM started
>
```

3) **At the ">" prompt, type "config" and press the <Enter> key**.

A list of boards is displayed (only "known" boards that are physically connected to the IC2 Bus will display). If this is a new install and you have not connected any other boards, they will display after they are connected to Data Cable in a later step.

The CPU shows up as board "0" (zero)

Type number "0" to choose the CPU.

```
config

Select a board to configure
Board  0: type=CPU, version=1.60n
Board  1: type=DPI, version=1.60e, using=1
Board  2: type=DPI, version=1.60e, using=1
Board  3: type=DPI, version=1.60e, using=1
Board  4: type=DPI, version=1.60e, using=1
Board  5: type=DIO, version=1.40b, using=1
Enter a board number, or [enter] to exit.
0
```

In this example, you see the controller had 5 additional boards. If you are doing a new install you will not see any boards that are not connected to the ribbon cable, powered-up, and given board ID's.

Appendix H - HyperTerminal Commands

Selecting the CPU Board to Edit:

1. **When prompted to enter a board number, you will type "0" and press <Enter> key.** The current configuration will display, with the prompt "*Do you wish to make changes? (yes/no)*"

NOTICE: if this is a new board from the factory, you will see factory test settings in it. **You must change the ID's and network settings to so the board can work on your site.**

```
--------Current Configuration---------
Status:            permanent FLASH values
Serial Number:     02000423
MAC Address:       00:0c:fa:1e:86:27
Static IP Addr:    192.168.0.202
Network Mask:      255.255.255.0
Gateway Address:   63.122.126.1
Cluster/Loop id:   3
Panel's Unit id:   2
CPU number:        1
Password:          install
Pass Phrase:       chose a phrase
Encrypt Events:    no
Allow Telnet:      yes
Allow Web Server:  yes
Use DHCP server:   yes
Event Server 1     192.168.0.202:3001  -->  192.168.0.1:3001
Event Server 2     not used
Event Server 3     not used
Event Server 4     not used

Do you wish to make changes? (yes/no):
```

2. **Type "yes" and press <Enter> to advance:** This brings you to the first *edit field* where the Static IP Address is entered.

Appendix H - HyperTerminal Commands

Setting the IP Address and Network Parameters:

NOTICE: Addressing must be set correctly or the board will not work.

See Network Administrator to get a valid IP Address, Network Mask and Gateway Address.

3. **Set the IP Address and press <Enter> key:** (the following points are noted)

If a "static" address is used: This is usually obtained from a Network Administrator. You must use a unique and conform to the Network guidelines

If DHCP addressing will be used: You can press <Enter> to skip this field as long as it is already set to a non-zero address.

NOTICE: The 'DHCP Allowed' field must also be set to 'Y' in a following step.

After the CPU programming is saved and proper LAN connection is made, the CPU will broadcast a request to obtain the DHCP address. The amount of time it takes to receive the DHCP address is based on timing set in the DHCP server.

4. **Set Network Mask and press <Enter> to advance:**

- **If a "static" address is used** this must be set to a valid Network Mask.
- **If DHCP addressing used,** you can skip this field, it is automatically assigned.

5. **Set Gateway and press <Enter> to advance:**

- **If a "static" address is used** this must be a valid Gateway if needed.
- **If DHCP addressing used,** you can skip this field, it is automatically assigned.

Appendix H - HyperTerminal Commands

Setting the Loop and Controller ID's:

Use templates found in Appendix -A to record hardware configurations. Copy as needed,

6. **Set Cluster/Loop ID: this value must be "1" (one) or greater.**

   - **All CPU's in the same cluster/ loop will have the same Loop ID**.
   - **The Loop ID here must match the Loop ID set in the software/database.**

     NOTE: if the Loop has already been programmed into the software/database you should set this field to match the software. You can find this information in the System Galaxy Loop Properties screen.

7. **Set the Unit ID: this value must be "1" (one) or greater.**

   - **The Unit ID must be unique for all panels within the same loop.**
   - **The Unit ID must match the Unit ID used in the software/database.**

     NOTE: if Controller has already been programmed into the software/database you should set this field to match the software. You can find this information in the System Galaxy Controller Properties screen.

8. **Set the CPU Number: this value should be "1".**

   Note: If you are setting up a second (dual) CPU, then you will set this value to "2" (two) for the second CPU in the controller.

Appendix H - HyperTerminal Commands

Setting Passwords and Encryption fields (optional):

TIP: If you want to keep the factory default settings, you can press the <Enter> key to skip *through these fields* – *options are explained below.*

9. **Setting a PASSWORD: (optional)** used only for telnet; this is not needed for panel to communicate.

   IMPORTANT: Also 'Allow Telnet' field must be set to "y" to enable telnet.

   The default password is "install".

   To keep/skip it - Press <Enter> and advance to next field.

   To change it – type a new password (4 to 8 characters) and press <Enter> key.

   To erase it – press the <space bar> then <Enter> to advance.

10. **Setting a PASS PHRASE: (optional) -** used for Event Encryption (next option); this not needed for panels to communicate). This is blank by default. Events will be encrypted between the controller and Event Service if you set this up.

    To keep or skip it - Press <Enter> and advance to next field.

    To change it - type a new password (between 16 to 39 characters long**).**

    IMPORTANT: The 'ENCRYPT EVENTS' field must be set to "y" to enable feature.

    IMPORTANT: This value must match exactly to the *pass phrase* set in the Event Service.

11. **Setting the ENCRYPT EVENTS (y/n):** (optional – must have a pass phrase set (previous option) - this not needed for panels to communicate). This is 'n' (off) by default.

    - Type "y" or "n" to indicate yes (on) or no (off). **This must match the setting in the Event Server (in the Event Server - yes = checked; no = unchecked).**

12. **ALLOW TELNET:** this option will block telnet capability if set to NO.

    IMPORTANT: The 'PASSWORD' field must also be set up (previous step).

Appendix H - HyperTerminal Commands

13. **Allow Web Server:** this allows technician to view the configuration from a Web Browser. Note: You cannot change the panel configuration from the web browser.

14. **Use DHCP Server:** this option determines if the CPU board will obtain an IP Address dynamically. Once a dynamic address is obtained, the board will stop using the static address. The HyperTerminal 'net' command can be used to see the IP Address if a DHCP is used.

Setting the Event Server connection parameters:

15. **Setting Parameters for Event Server 1:** this is the prompt for the next four options.

    a) **Active y/n?: type "y" (yes) and press <Enter> key to advance.**

    b) **IP Address: enter the static IP Address of the Event Server; press <Enter> key.** (i.e. the address of the PC where the GCS Event Service is running must be static).

    c) **Remote Port (3001): type "3001" and press <Enter> key to advance.** This is the default port number for the Event Server. This must match the local port (next field).

    d) **Local Port (3001): type "3001" and press <Enter> key to advance.** This is the default port number of the 600 panel. An IT Administrator must provide a good port number if 3001 is unavailable. This must match remote port (next field).

> **NOTE:** this field displays the static address even if DHCP option is "YES". After these settings are saved, use the "net" command In HyperTerminal to find the dynamic address.
>
> It may take several minutes for the DHCP Server to assign an address. This time is dependent on the speed of the DHCP server.

16. **Setting Parameters for Event Server (2 through 4):** this option is not typically used unless redundant servers are planned.

    a) Active y/n?: this option should typically be set to "n" (no) for servers 2 thru 4.

    If redundant servers will be used, type 'y' (yes) and enter the IP Address of the redundant server and set both the ports to 3001.

> **CAUTION: DO NOT SKIP THE PROMPT TO *SAVE* SETTINGS.** If you do pass the *save* prompt, you must re-issue the *config* command and skip all the way down to the *Save* prompt again. **NOTICE: Unsaved settings will be lost on the next power interruption.**

17. **The 'Save Confirmation':** when you leave the last programming field, HyperTerminal will re-display your new configuration and will show the prompt "save new settings yes or no?" at the bottom of the screen.

    b) **Type "yes" to save the changes.**

    c) If you see something you need to change, you will simply reissue the 'config' command to fix it. Use <Enter> key to skip to the desired field.

> **WARNING: Unsaved settings will be lost on the next power fail or board reset.**
>
> If you skipped the *save* prompt, then re-issue the *config* command in HyperTerminal & use the <Enter> key to advance down to the *save* prompt again.
>
> *You shouldn't need to reprogram if board was not power-failed.*

18. **Keep the HyperTerminal connected to the CPU.**

19. **Cold Reset the CPU while J1 jack is still installed in the CPU's CONFIG port. Press the RESET button (SW1) on the CPU board.**

> **IMPORTANT: This reset starts a 10 minute delay timer. This 10 minute delay gives you time to set remaining board ID's for interface boards.**
>
> After the delay has elapsed, the CPU will detect the flash versions of daughter boards and update them if needed.
>
> **The 'clear auto' command will bypass the 10 minute delay.**

20. **REMOVE THE J1 Config jack-plug from the CPU Board and insert into the config port on the next board you will install.**

Keep the HyperTerminal connected to the CPU. You need it to set the ID's in remaining boards.

Appendix H - HyperTerminal Commands

C. (600-series) Configuring the Board ID for Daughter Boards (DPI/DIO/DSI)

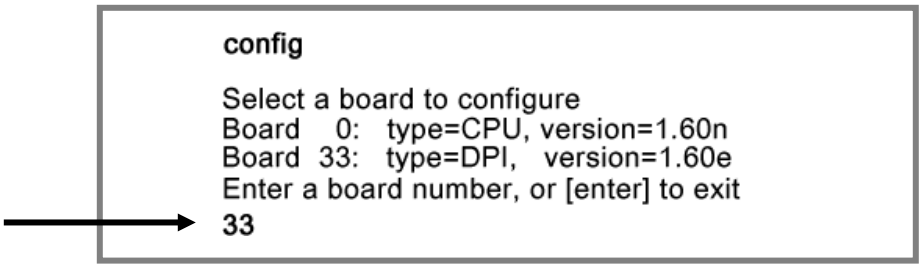
635 NOTICE – 635 uses a binary dipswitch to set the Board ID and auto-update feature. See Appendix-Q for instructions.

1. **At the HyperTerminal '>' prompt, type "config" and press the <Enter> key.**

   A list of boards is displayed: The board you are currently programming should be listed Board 33.

   - If you see 34, you don't have the config jack installed or you did not press reset
   - If you have multiple boards showing 33, you should unplug them from the ribbon cable. **If it has been less than 90 seconds** since the last board was brought online it may still show as 33 until the CPU picks it up.

2. **Choose board 33 by typing "33" and press the <Enter> key.**



3. **Type "yes" and press the <Enter> key to get into edit mode.**
4. **Type an unused Board ID (1 through 16 is valid) and press the <Enter> key.**

   NOTICE: If you have already added the board in the Galaxy Software, you must match that ID. *You can find the Board numbers in the Controller Properties screen*.

5. **Auto Update FLASH: this option should be set to yes to allow the Interface Board to receive updates from the CPU. Press the <Enter> key** to SKIP to next field.

6. **Type "yes" when prompted to SAVE the settings, and press the <Enter> key**.

   WARNING: Unsaved settings will be lost on the next power reset.

   If you accidentally skipped the *save* prompt, simply re-issue the *config* command in HyperTerminal and use <Enter> to get back to the *save* prompt again.

   You shouldn't need to reprogram if board was not power-failed or reset.

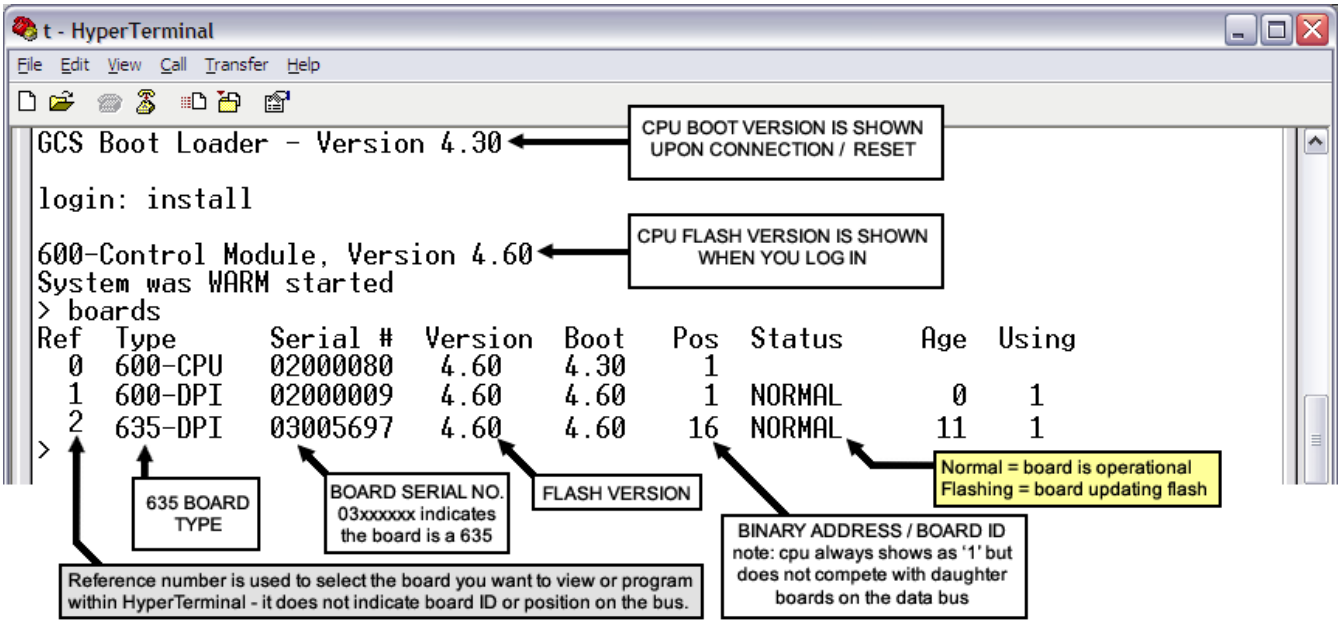
7. **REMOVE THE CONFIG JACK from the config port now or you will loose your changes.**
8. **Repeat the instructions starting from Step 7.1 for every additional Interface board.**

Appendix H - HyperTerminal Commands

VERIFY BOARD IDS (applies to all 635/600-series models)

9. **From HyperTerminal – issue a *boards* command.**

   Note: as firmware advances, the current flash code version will change. The data layout may also be different from one version to another. The image below is using v4.60 s28.



10. **Remove all config jacks from any 600 daughter boards.** (635 boards do not have config jacks)

11. **IF all boards show up as *normal* and match the CPU Flash Package (see chart above), then press the reset switch on each daughter board.**

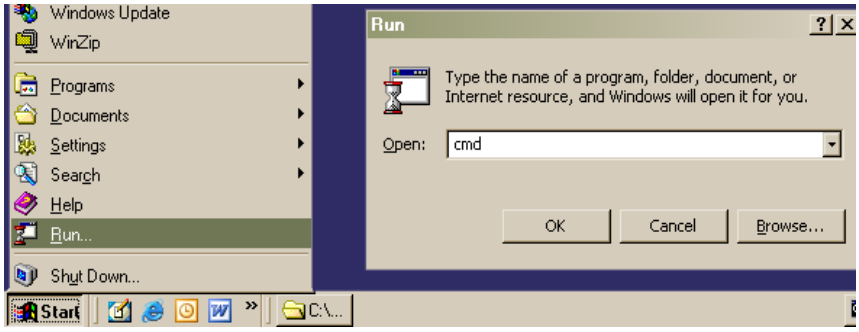
12. **After all the boards are up again, reissue the *boards* command in HyperTerminal.**
    - Verify that all Board ID's are correct.
    - If any ID's are not correct you must return to Step 7 to program and save the board ID correctly. BE SURE TO ALLOW ALL BOARDS TO COMPLETE FLASH UPDATES BEFORE POWER FAILING or pressing the RESET switch.

I – Appendix : Finding IP Address of Event Server

- Go to the computer that runs the GCS Event Service. Open a DOS Command Window and execute the *ipconfig* command at the prompt:

To open a DOS shell:

1. **Click [Start] button** on the Windows® Task Bar
2. **Select 'Run'** option
3. **Type "cmd"** in the field provided.



4. **Click [OK]** button (the DOS shell window will open).
5. Once the DOS Shell opens, **type the *ipconfig*** command in lower case. **The screen will display the IP Address of the Event Server.**

- The Event Server IP Address must be set in the controller's *Event Server address field* (Chapter 2 Step-6 covers controller programming).
- This Event Server IP Address must also be set in the SG Software Loop Properties screen>Event Server address field (Appendix D).
- The Event Server listening port for TCP/IP Connection must use 4003
  a. this is set in the Event Service (Chapter 3 Figure 35)
  b. and also in the SG Software Loop Properties screen (Appendix D).
- The Event Service Controller Communication port must use 3001
  a. this is set in the Service (Chapter 3 Figure 34)
  b. and in the controller's Event Server settings for local and remote ports (Ch 2 Step-6).

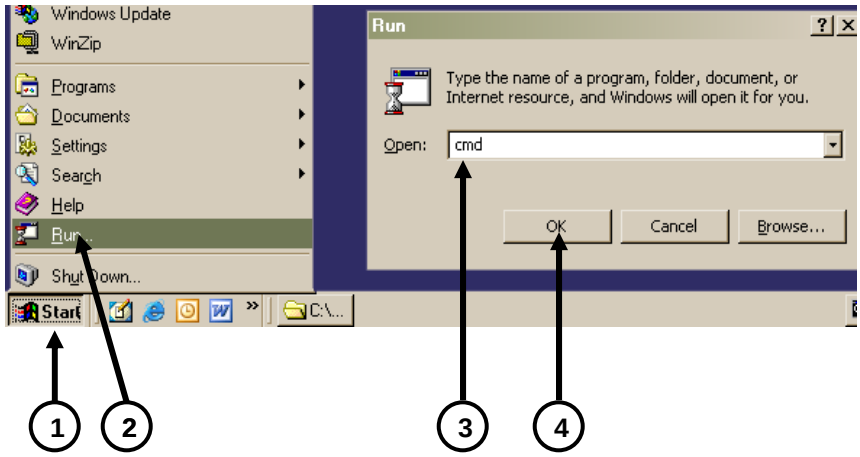
- You can use HyperTerminal to verify and change the Event Server parameters as needed - Chapter 2 Step-6 covers how to connect with HyperTerminal and program the panel.
- You may be able to run a Web Browser to search for the panel by putting the Controller IP Address into the browser Address field. You can view the Event Server settings (you cannot make changes to the panel via the web browser). *Note: the Allow Web Server must be on at the panel.*
- If you cannot find the panel from a web browser, you can *ping* the panel from the Event Server. (Appendix J covers pinging the controller from the Event Server.)

J – Appendix : Ping Controller from Event Server

- **To ping a controller from the Event Server,** open a DOS command prompt as shown:

To open a DOS shell:

1. **Click [Start] button on the Windows® Task Bar.**
2. **Select the 'Run' option.**
3. **Type "cmd" in the field provided.**
4. **Click [OK] button.**



- Once a DOS Shell opens (see below), you will type the *ping* command with the *IP Address* of your panel. Syntax is important, so use l*ower case* and put *a space* between *ping* and the IP Address.

Example 1 – Ping with Reply – you have successfully reached the panel if you get a reply

```
C:\WINNT\Profiles\croberts>ping 61.111.140.130

Pinging 61.111.140.130 with 32 bytes of data:

Reply from 61.111.140.130: bytes=32 time=10ms TTL=128
Reply from 61.111.140.130: bytes=32 time<10ms TTL=128
Reply from 61.111.140.130: bytes=32 time<10ms TTL=128
Reply from 61.111.140.130: bytes=32 time<10ms TTL=128
```

- **If you get a reply from your IP Address but panel does not connect to Event Server**:
  1. Verify you programmed the correct Event Server address into the panel. This can be done by running the *ipconfig* command at the Event Server and comparing it to what you programmed into the panel. Use HyperTerminal (Appendix or a Web Browser to check the panel –see Figure 16 in Chapter 2).
  2. Verify that port 3001 is set for local and remote ports in the controller (see Ch 2 Step 6).
  3. Verify that the Event Server Service is set to use 3001 (see Chapter 3 Figure 34).
  4. Verify that the firewall and any other port blocking software is set to allow 3001 (Ch 1 section 1.8 lists the ports that must be open).

- **If your ping request timed out, consider the following:**
  1. Verify you are not making a syntax error when typing your ping command.
  2. Verify you are pinging the correct address and that you correctly typed the address observing *address format* used at your site.
  3. Verify that all firewalls, routers or switches have port 3001 unblocked.
  4. Verify the controller programming is correct (refer to Chapter 2 Step-6).

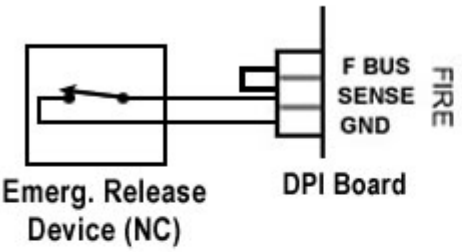
K – Appendix : Wiring DPI Emergency Release

The DPI boards can be wired to use and Emergency Release Device to unlock doors. This feature is only available to the "local" boards within the same controller. **You cannot trigger lock releases on DPI boards in separate cans.**

- ❖ DPI Boards are shipped with the jumper between SENSE and GND (ground).
- ❖ You must move the jumper to be installed between SENSE and FBUS on each/all boards that will respond to the emergency release device.
- ❖ Then wire the emergency release device between SENSE and GND on the first DPI.

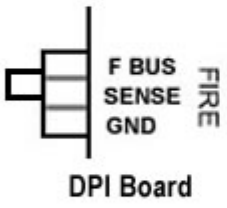
In the diagram below you can see that board 1 is the DPI that is wired to the Emergency Release device (relay or switch). When the Emergency Release Device is activated it will cause all the DPI cards to energize their lock relays provided they are properly wired.

DPI (board 1) is shown:
jumper is installed between SENSE and F BUS
wired to the Emergency Release Device (NC) at SENSE and GND



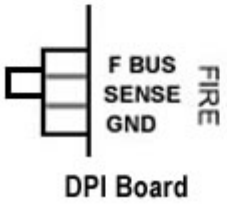
When the Emergency Release Device is activated, this DPI (board 1) will energize the Lock Relays on both sections/doors.

DPI (board 2) is shown: jumper is installed between SENSE and F BUS



When the Emergency Release Device is activated, this DPI (board 2) will energize the Lock Relays on both sections/doors.

DPI (board 3) is shown: jumper is installed between SENSE and F BUS



When the Emergency Release Device is activated, this DPI (board 3) will energize the Lock Relays on both sections/doors.

IMPORTANT: All these DPI boards are in the same Controller.

L – Appendix : List of Terms

600-series	600-series is the model name for the Galaxy hardware equipment (controller, circuit boards, etc.). 600-series boards are not interchangeable with other Galaxy models. 600 hardware is supported in SG 8.1 or later. Depending on the software version you may or may not have 508i hardware co-exist on the same jobsite but cannot be mixed in the same loop with 600 hardware.
Board ID	600-series boards must be assigned a valid *Board ID* that matches the Board ID at the software. All boards in the same unit/controller should have **unique** board IDs. Duplicate Board ID's will cause equipment operation problems.
Client Gateway	GCS_Client Gateway service - *see GCS_Client Gateway Service*.
Cluster	A virtual loop - a group of 600-series controllers that communicate with each other using the Event Server Service. There can be more that one cluster assigned to an Event Server, but a cluster cannot be split between two Event Servers.
Cluster ID	600-series controller CPU boards must be assigned a valid Cluster ID that matches the Cluster ID at the software. This cluster ID is important to establishing maintaining connectivity on the network (LAN/WAN). All controllers in the same cluster should have the same Cluster ID.
Communication Service	(Comm Service)GCS_Communication service - see GCS_Communication Service.
CPU - Central Processing Unit.	There is a minimum of one CPU in every 600-series controller. The CPU sends and receives communications with daughter boards (i.e. DPI, DIO, DSI, etc.)
Daughter boards	Daughter boards refers to the *subordinate* boards to the CPU. Daughter boards are the DPI, DIO, DSI, Relay board, etc.
Database engine	System Galaxy 8 uses MS-SQL 2005 Express by default. SG also interfaces with MSDE 2000 and SQL 2000 Enterprise.
DBWriter Service	Common term for the GCS_DBWriter service - see GCS_DBWriter Service.
DIO - Digital Input/Output board.	The DIO is a *daughter* board in the 600-series controller. It connects to input and output devices and uses relay logic to activate outputs.
DPI - Dual Port Interface Reader board.	The DPI is a *daughter* board in the 600-series controller. It connects to readers, locks, request to exit devices, etc.
DSI - Dual Serial Interface board.	The DSI is a *daughter* board in the 600-series controller. It connects to clocks or other devices that use RS-232 or RS-485 connection types.
Event message(s)	Event messages are the incoming events from the field devices that are wired to the controllers, such as valid access or invalid access from a card reader.
Event Server	The computer that runs the GCS Event Service, this is typically the same computer as the Communication Server but the Event Server can be a separate computer if needed.
Event Service	See GCS Event Service

Appendix L - List of Terms

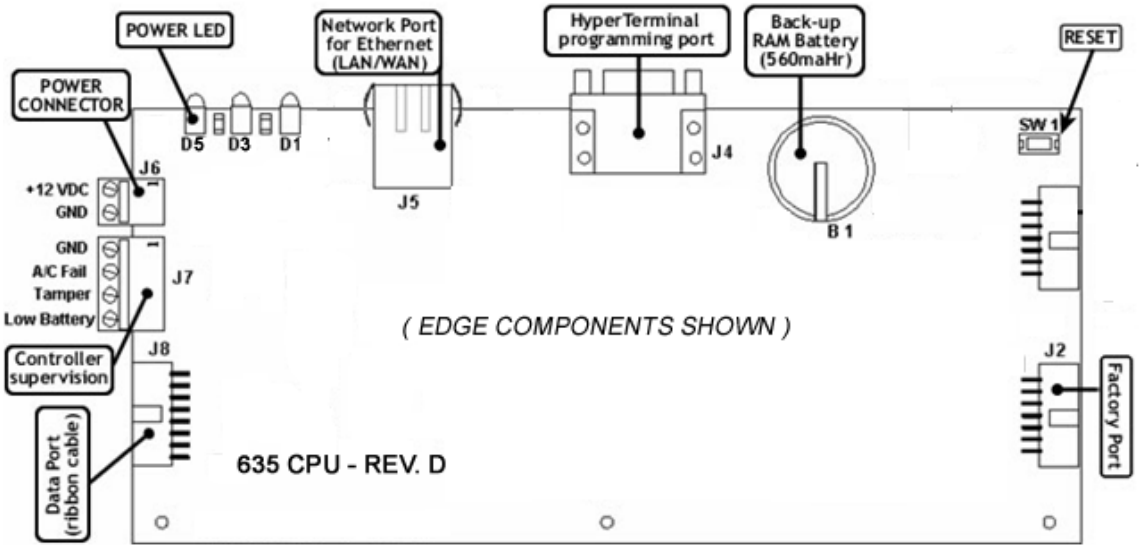
Firewall	A software application that blocks or allows certain ports according to how it is programmed or set up. System Galaxy uses 5010, 4000, 4001, 4002, 4003, 1433
Flash	The act of loading flash code to the controller CPU; **or** the code itself.
GCS Client Gateway service	GCS Client Gateway Service is a System Galaxy background service that handles communications between the Client (software) application and the GCS Communication Service. The Client Gateway is responsible for converting binary communications into human-readable messages, which are displayed in the Event screen. This service is also responsible for verifying the client initial connection at start up to the database. *This service maintains an IP connection to the Client software and the Communication Service and an ODBC connection to the database.* **If this panel goes offline the software monitoring screen will not display live events but the events will be available from reports/the database, provide the other services are online.**
GCS Communication service	GCS Communication Service is a System Galaxy background service that handles communications between the GCS Client Gateway, GCS DBWriter Service, and GCS Event Service (for 600 hardware). *The Comm Service is responsible for making and maintaining an IP connection to the GCS Event. (note: Comm Service also makes and maintains connections to the 508i-series primary controller (if present)). This service maintains an ODBC connection to the database.* **IF this service looses connectivity to the DBWriter, it may drop its connection to the Event Service and 508i-panels.** This allows the panels to buffer events in memory until the database connection is restored. Panels function locally, independently while offline from the database. stored events are re-transmitted when connection to the database is restored. These events may display in the event screen if the software is up when connectivity is restored.
GCS DBWriter service	GCS DBWriter Service is a System Galaxy background service that handles communications between the GCS Comm Service and the Database Engine Service. The DBWriter Gateway is responsible for logging events to the database and confirming the event transmission is logged. This service maintains an IP connection to the Communication Service and the Database engine service and an ODBC connection to the SG database.
GCS Event service	GCS Event Service is a System Galaxy background service that handles communications between the GCS Comm Service and the 600-series Controllers. *The Comm Service is responsible for making and maintaining an IP connection to the GCS Event Service. Note: the 600-series Controllers are responsible for connecting to the Event Server Service.* **IF this service goes offline, panel to panel communications (global events) will not occur.** Events will buffer at the panel until the Event Server/Service is online.
GCS Loader	the System Galaxy software module that is used to load flash code and data/settings from the System Galaxy database into the controller/panel.
GCS SysID	GCS SysID is the system ID that is needed for System Galaxy Client software to connect to the database. In System Galaxy 8, the SysID is part of the GCS Client Gateway service. Therefore GCS Client Gateway must be running for the software to startup and operator be able to log in.

Appendix L - List of Terms

HyperTerminal®	A Microsoft® communication program that can be used to change the configuration or to troubleshoot the 600-series controller boards.
IE®	Microsoft® Internet Explorer® web browser, which can be used to view and verify the controller configuration over IP connection. You cannot change configuration settings from the web browser.
Loop/cluster	A group of controllers that have the same Loop/Cluster ID.
Offline events	Events that are buffered at the controller the controller is not connected to the services and database. These offline events are retransmitted when the services and database are restored.
Relay Board	The relay board has 8 form-A SPST relays per board. This board uses/connects to the RS-485 channel on a DSI (dual serial interface) board. Relay board supports either General Output or Elevator control. The operation mode (general or elevator) is driven by software settings. Relay boards must have unique board numbers on the channel and can be daisy-chained. Limits and stipulations apply – see chapter 2
RS-485 Channel	The DSI board has 2 sections, both of which have an RS-485 communication port/channel. This channel currently supports technology such as Cypress Time clock (1201) and the Galaxy Relay board (general output and elevator control).
S28 flash	This is the flash code file stored on the SG communication server that can be downloaded to the controller's CPU. The CPU then updates the DPI boards.
Serial Channel	This is a term used to refer to the DSI Serial port. The RS-485 port on either section of the DSI board is also known as the serial channel or 485 channel. The Galaxy software requires you to set the serial channel to the desired mode of operation (i.e. general output or elevator control modes). Other programming applies.
Server	In the case of the System Galaxy, the server is the computer that runs the GCS Services (i.e. the Communication/Event server) and the GCS_Event Service.
Unit ID	600-series controller CPU boards must be assigned a valid Unit ID that matches the Unit ID at the software. This Unit ID is important to establishing maintaining connectivity on the network (LAN/WAN). All controllers in the same loop/cluster should have **unique** UNIT IDs. You cannot duplicate a Unit ID in the same loop/cluster.

M– Appendix: 635 & 600 Series Boards

M.1 635 CPU Board – Central Process Unit



Component List

[SW 1] Power Reset Switch - power reset /warmstart (press and hold full 10 seconds to coldstart)
[J4] DB9 Serial Port: used for programming the board via *HyperTerminal* session
[J5] Ethernet Jack: for TCP/IP **100Mb**/Full Duplex
[J6] Power Connector: CPU power, **CPU Board draws 0.05 amps**

- Pin 1 = +12VDC
- Pin 2 = GND(ground)

[J7] Sense Connector: Tamper, A/C Fail, Low Battery

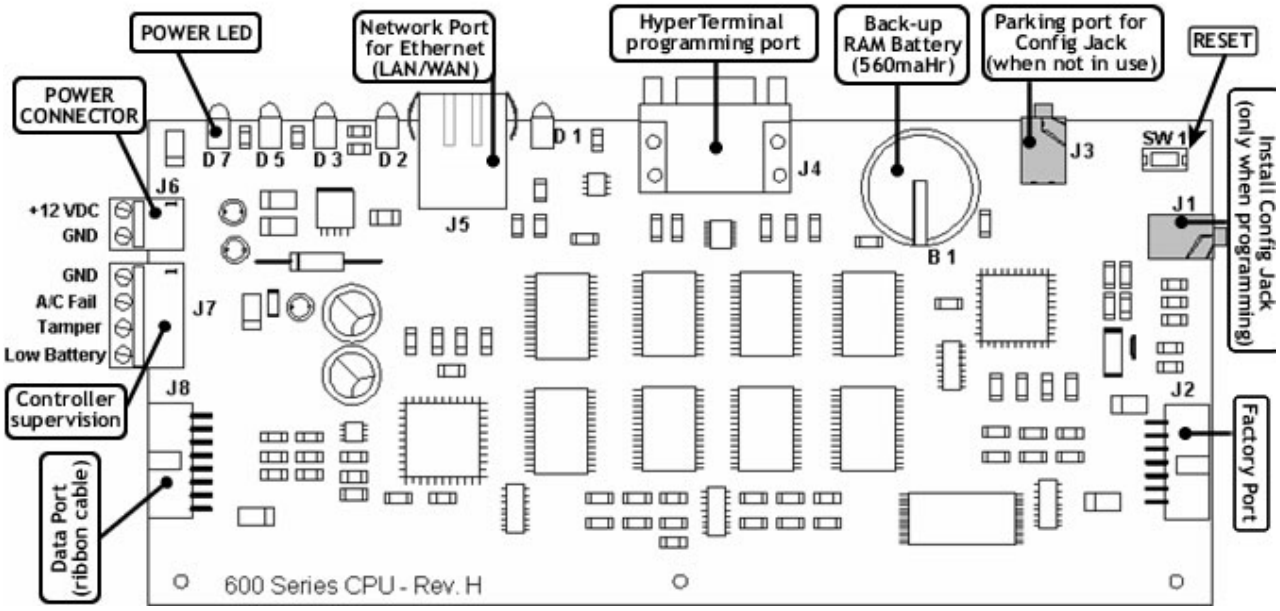
- Pin 1 = GND (ground)
- Pin 2 = AC Fail
- Pin 3 = Tamper
- Pin 4 = Low Battery

[D1] Receive LED: indicates data being received
[D3] Transmit LED: indicates data being received
[D5] POWER LED: indicates that 3.3VDC of power is present for CPU memory
[B1] 3v Lithium battery: provides temporary power for the CPU's RAM

NOTE: The 635 CPU can be Flash loaded from the *EZ80 Flash tab* in the GCS Loader screen as needed.

Appendix M - 635-600 Series Boards

M.2 600 CPU Board – Central Process Unit



Component List

[J1] Config Jack (if jack plug is installed at the time of power reset, board is coldstarted)
[J3] Spare Jack (use this to park the jack plug after coldstart is performed)
[SW 1] Power Reset Switch - power reset depends on position of J1 jack-plug
[J2] ***Factory Programming Port*** *- not used in field*
[J4] DB9 Serial Port: used for programming the board via *HyperTerminal* session
[J5] Ethernet Jack: for TCP/IP 10Mb/Full Duplex
[J6] Power Connector: CPU power, **CPU Board draws 0.05 amps**

- Pin 1 = +12VDC
- Pin 2 = GND(ground)

[J7] Sense Connector: Tamper, A/C Fail, Low Battery

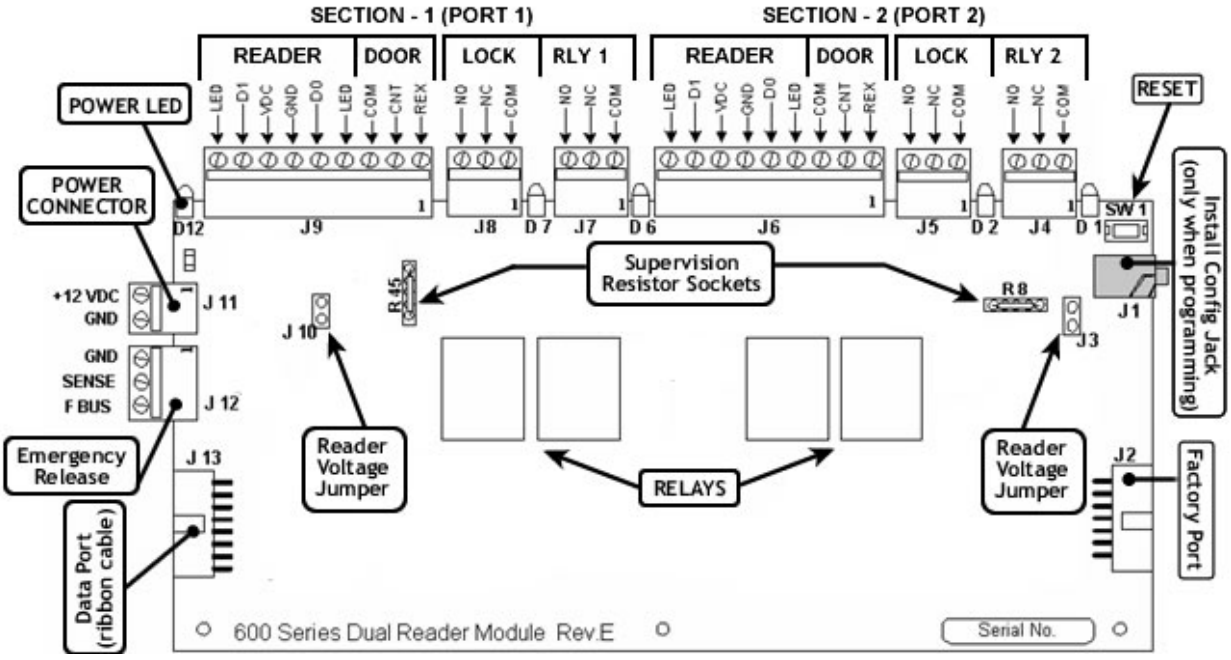
- Pin 1 = GND (ground)
- Pin 2 = AC Fail
- Pin 3 = Tamper
- Pin 4 = Low Battery

[J8] Data Connector: data interconnect to the DPI and DIO Boards
[D1] LINK LED: indicates valid Ethernet connection
[D2] LAN LED: indicates data detected
[D3] Receive LED: indicates data being received
[D5] Transmit LED: indicates data being transmitted
[D7] POWER LED: indicates that 3.3VDC of power is present for CPU memory
[B1] 3v Lithium battery: provides temporary power for the CPU's RAM

NOTE: The 600 CPU can be Flash loaded from the *EZ80 Flash tab* in the GCS Loader screen if needed.

Appendix M - 635-600 Series Boards

M.3 600 DPI Reader Board - Dual Port Interface Board



[J1] Config Jack (when jack plug is installed at the time of power reset, board is in Config mode)
[SW 1] Power Reset Switch - power reset

Port 2/Section 2

[J3] Reader Voltage Jumper (Port 2/Section 2): used to set +5 volts or +12 volts for the reader
[J4] Relay 2 (Port 2/Section 2): wiring contacts for auxiliary Relay 2
[D1] Relay 2 LED (Port 2/Section 2): is lit/ON when the Relay 2 is energized
[J5] Lock Relay 1 (Port 2/Section 2): wiring contacts for Lock Relay 1
[D2] Lock LED (Port 2/Section 2): is lit/ON when the Relay 1 is energized
[J6] Reader/Door (Port 2/Section 2): wiring contacts for reader, door contact and REX
[R8] Socketed Resister (Port 2/Section 2): for door supervision (default 4.7K ohms installed)

Port 1/Section 1

[J7] Relay 2 (Port 1/Section 1): wiring contacts for auxiliary Relay 2
[D6] Relay 2 LED (Port 1/Section 1): is lit/ON when the Relay 2 is energized
[J8] Lock Relay 1 (Port 1/Section 1): wiring contacts for Lock Relay 1
[D7] Lock LED (Port 1/Section 1): is lit/ON when the Relay 1 is energized
[J9] Reader/Door (Port 1/Section 1): wiring contacts for reader, door contact and REX
[J10] Reader Voltage Jumper (Port 1/Section 1): used to set +5 volts or +12 volts
[R45] Socketed Resister (Port 1/Section 1): for door supervision (default 4.7K ohms installed)

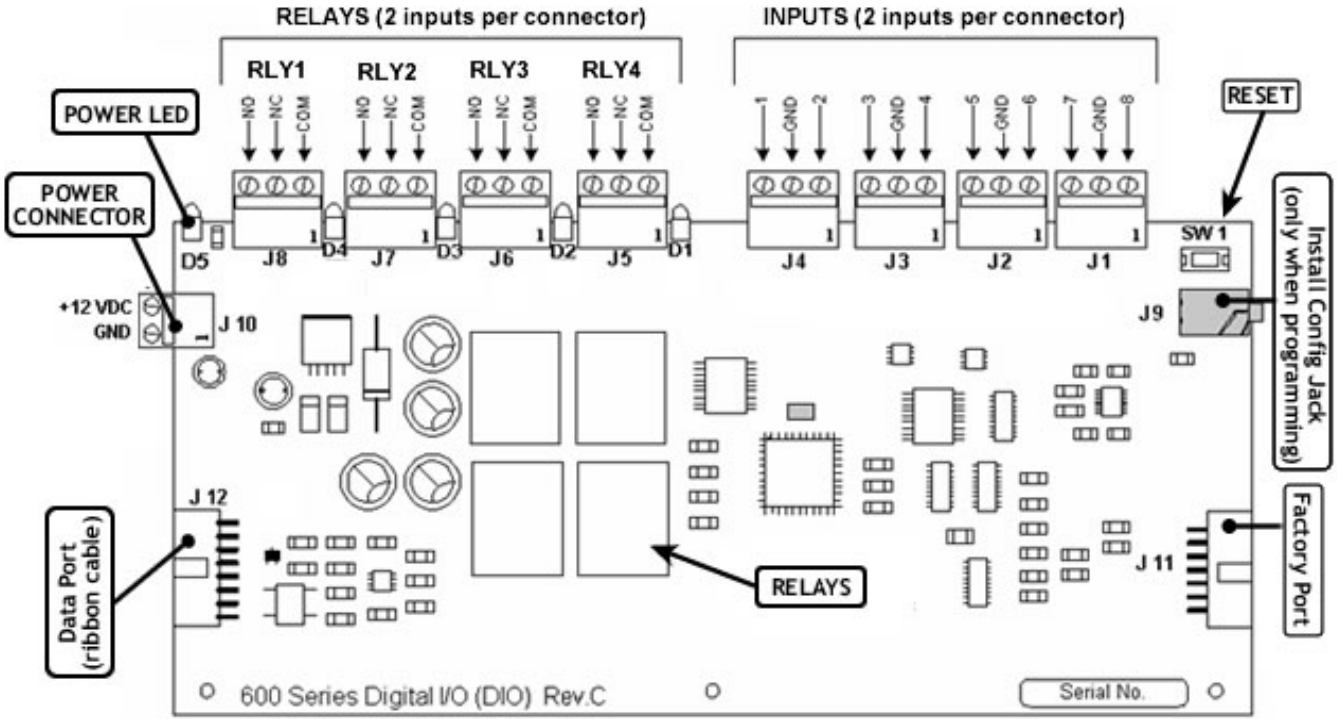
[J11] Power connector: +12 VDC board power connects from the wiring harness
[J12] Emergency Release Input (closed circuit to ground – pin 1) see Appendix K
[J13] I2C Data Buss: port to connect to the data *ribbon* cable.
[D12] Power LED: indicates power is applied to the DPI board.

Note that the Supervised DPI mode is enabled at the software in the Reader Properties screen

See Appendix Q for diagram and instructions for the 635 DPI

Appendix M - 635-600 Series Boards

M.4 DIO Board – Digital Input/Output Board



Component List

[J1 - J4] Inputs 1 through 8: terminal connectors for wiring eight (8) maximum inputs to the DIO board

[D1 - D4] Input Relay LED's: indicate (ON/lit) when relays energize.

[J5 - J8] Output Relays (4) terminal connectors for wiring outputs to the DIO board (uses form C relays); relays can be wired as normally open or normally closed.

[J9] Config Jack: used for setting the board ID (field configuration)

[J10] Power connector: +12 VDC board power connects from the wiring harness

[J11] Factory Port: factory use

[J12] I2C Data Bus: used to connect data *ribbon* cable; the ribbon cable connects all boards to the CPU.

[D5] Power LED: indicates power is applied to the DPI board.

Port Output: Dry Form-C SPDT contacts; 24 VDC @ 1.5 amps maximum per relay. Each DIO provides four (4) output ports with one (1) relay per output port.

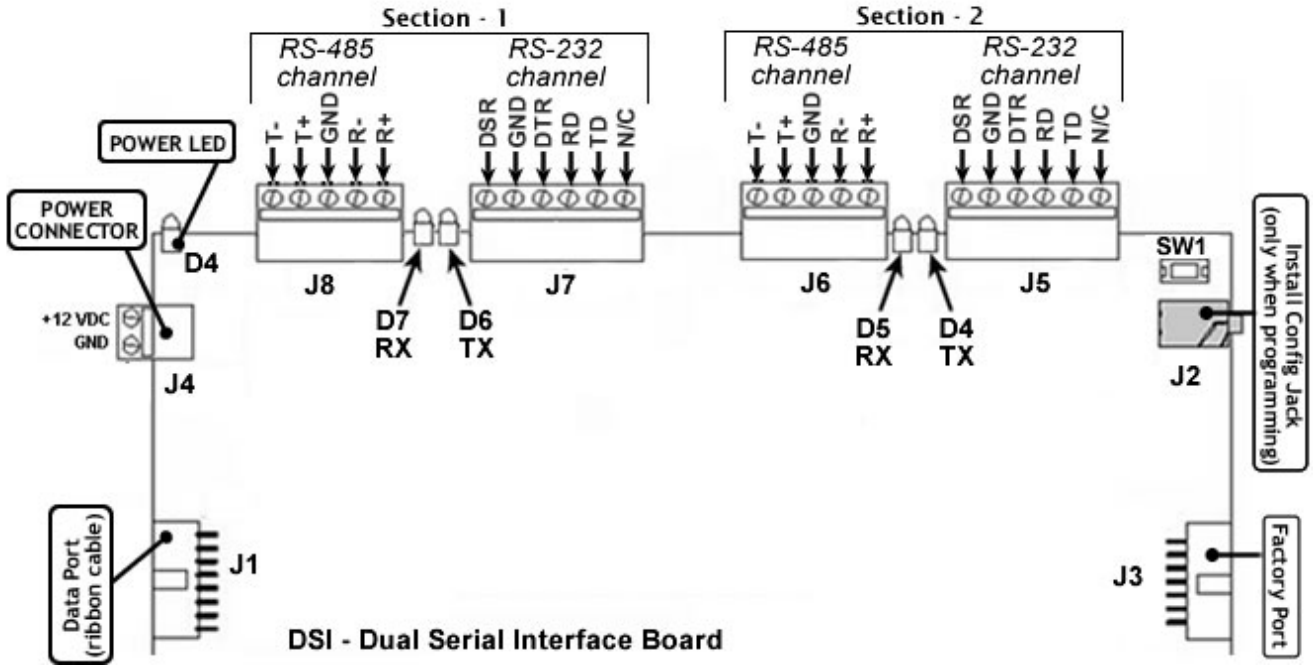
IMPORTANT: Supervision resistors should be place at the device end, not at the panel.

The 600 Digital I/O board provides Supervision of inputs and includes a new feature called Hypervision. See Chapter-2 Step-11.3 for information on Supervision and Hypervision.

IMPORTANT: Supervision and Hypervision features are input point specific. This means that each input must be individually set up for Supervision and Hypervision. Not all input points have to be supervised.

Appendix M - 635-600 Series Boards

M.5 DSI Board– Dual Serial Interface board



Component List:

[J1] I2C Data Buss: port to connect to the data *ribbon* cable.
[SW 1] Power Reset Switch - power reset
[J2] Config Jack: (when jack plug is installed at the time of power reset, board is in Config mode)
[J3] Factory Port: factory use
[J4] Power connector: +12 VDC board power connects from the wiring harness

[J5] RS-232 port for Section 2: wiring contacts for an RS-232 channel (future release)
[J6] RS-485 port for Section 2: wiring contacts for an RS-485 channel
[D4] TX LED for Section 2: may flicker when data is transmitted
[D5] RX LED for Section 2: may flicker when data is transmitted

[J7] RS-232 port for Section 1: wiring contacts for an RS-232 channel (future release)
[J8] RS-485 port for Section 1: wiring contacts for an RS-485 channel
[D4] TX LED for Section 1: may flicker when data is transmitted
[D5] RX LED for Section 1: may flicker when data is transmitted

[D4] Power LED: indicates power is applied to the DPI board.

IMPORTANT: . You cannot use both com channels on the same section at the same time. You must choose to use either the 485 or the 232 channel on a section. You can use Section-1 as 485 and section-2 as 232.

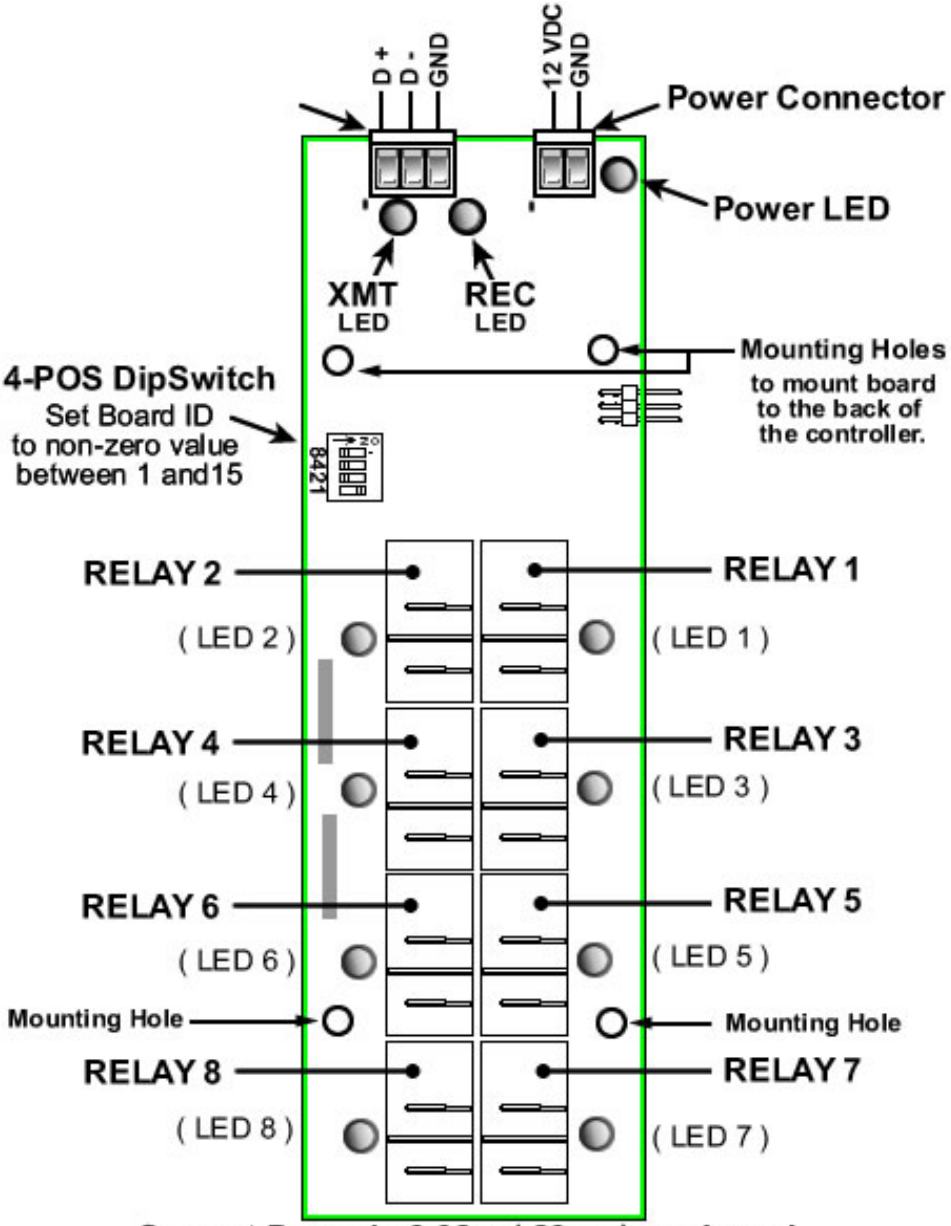
Appendix M - 635-600 Series Boards

M.6 Relay board (General Output or Elevator Control)

Each Relay Board has eight (8) Form-A SPST output relays.

The Relay board should be powered separate from CPU & DSI.

Relay boards are used in *General Output panels* or *Elevator Control panels*. See the following section on the type of panel you are installing for configuration specs and wiring.



Current Draw: is 0.02 *a* (20 *ma*) per board.

Note: If ALL 8 relays are energized at once a board draws 0.4 *a* (400 *ma*) of current.

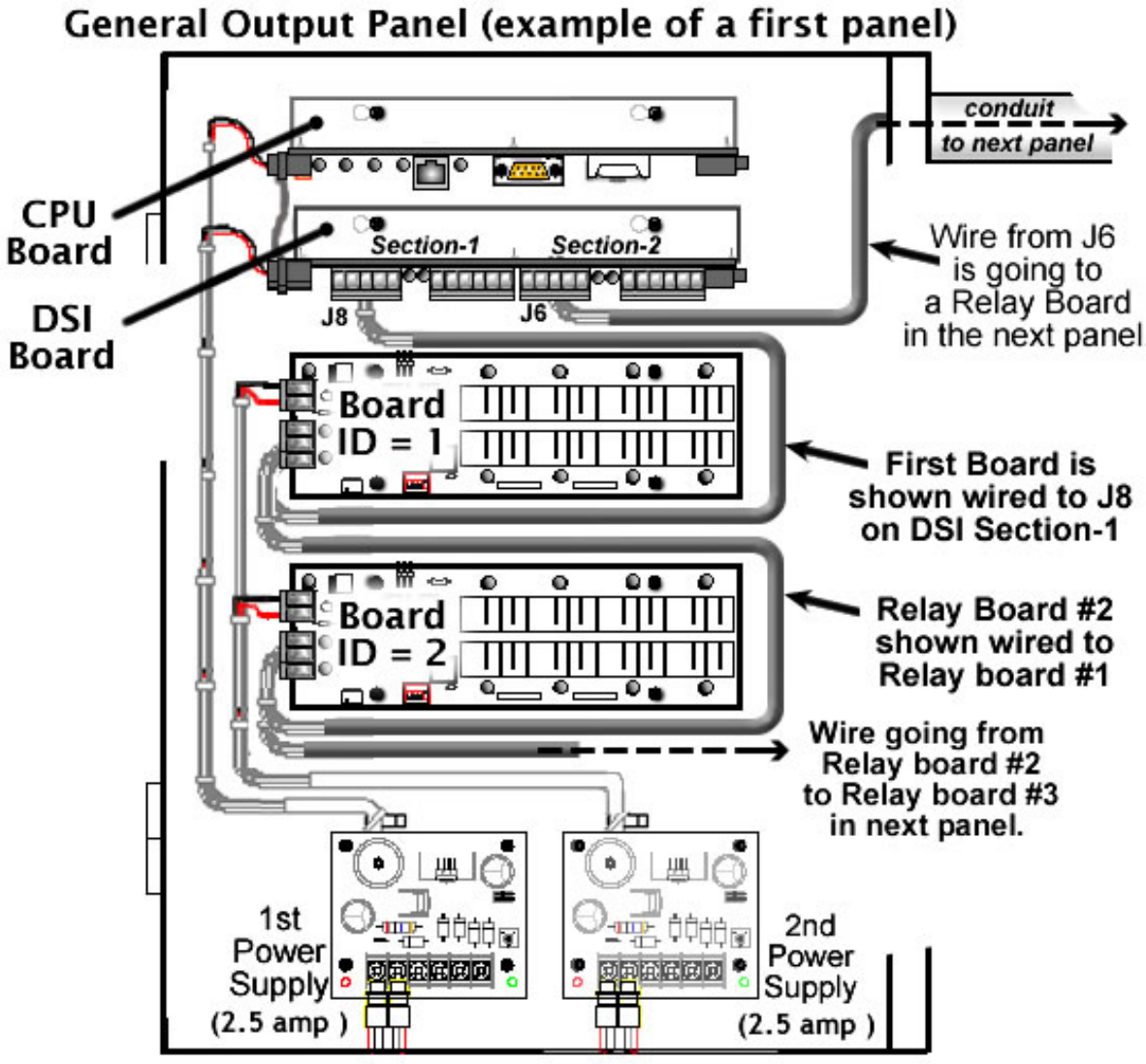
N – Appendix : 600 Relay Panels

N.1 General Output Relay Panel (First Panel)

The first panel will need a CPU and DSI-Serial board. The unused studs can be used to mount a relay board (4 studs per relay board, which takes up 2 slots in the panel).

Relay boards in 1st panel require separate 2.5 amp power.

The short panel (below) shows 2 Relay boards installed in the first panel. A long panel will hold 5 relay boards after the CPU and DSI.

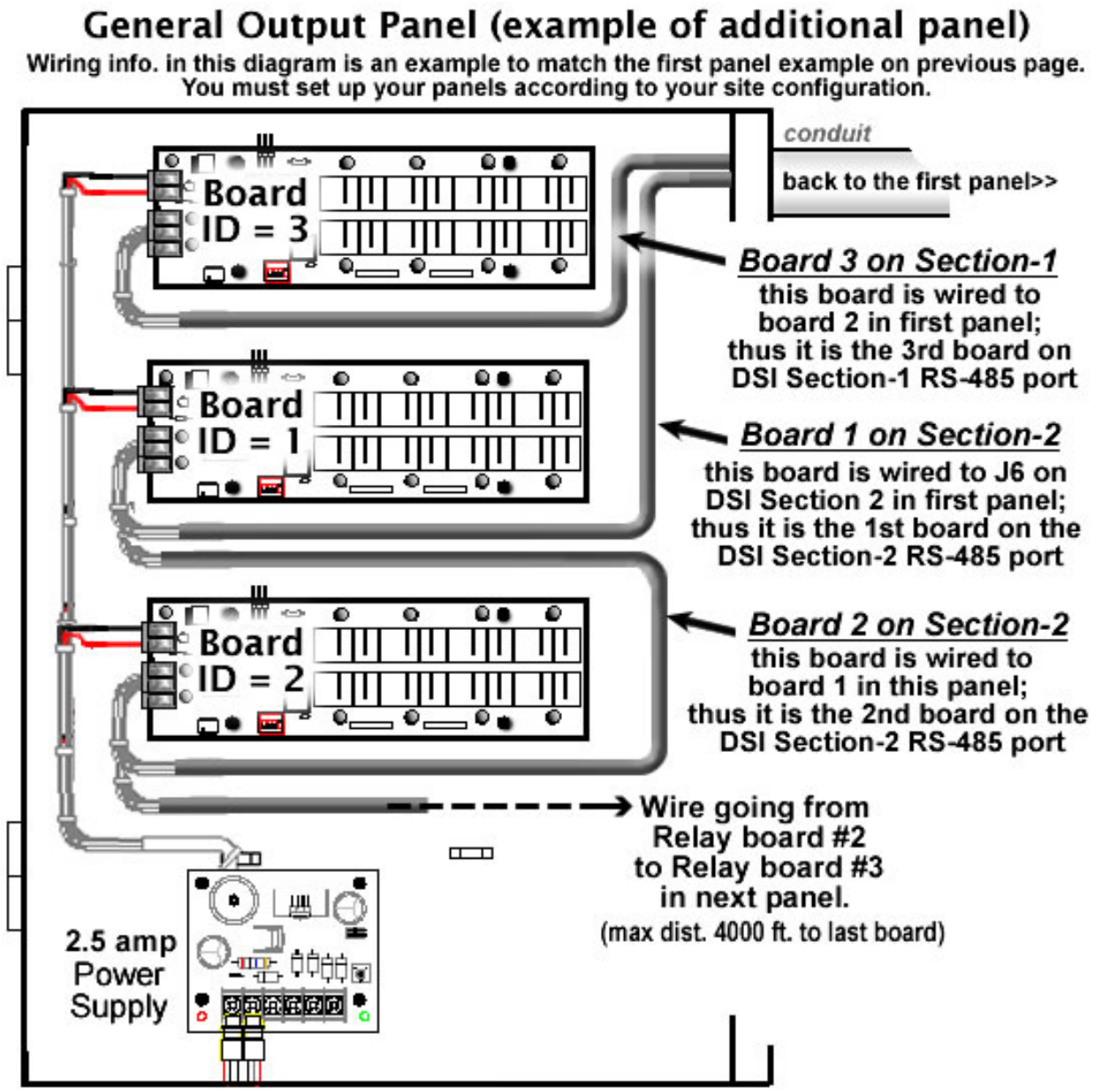


N.2 General Output Relay Panel (Second Panel)

The additional panels only house relay boards. Three (3) boards max. in a short cabinet; six (6) boards max. in a long cabinet.

The relay boards in this panel are wired back to the first panel.

NOTE: If the relay board in a second/additional panel is daisy-chained to a relay board, it will use the next sequential board ID in that chain (i.e. 1, 2, 3, etc.).



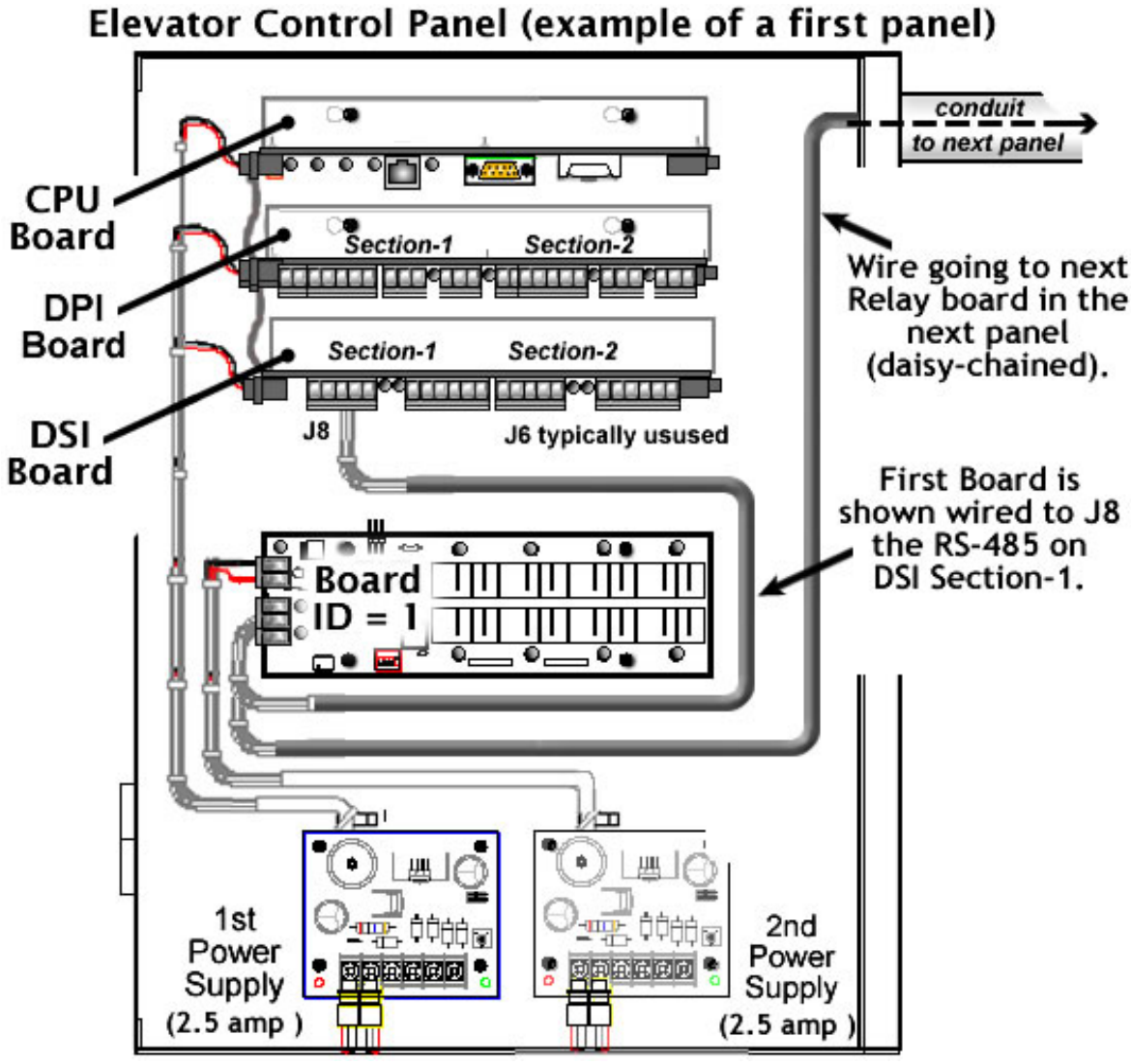
N.3 Elevator Control Panel (First Panel)

The first panel will need a CPU, DPI-Reader board & DSI-Serial board. The unused studs can be used to mount a relay board (4 studs per relay board, which takes up 2 slots in the panel).

Relay boards in 1st panel require separate 2.5 amp power.

The short panel (below) shows 1 relay board installed in the first panel. A long panel could fit 4 relay boards after the CPU, DPI, DSI boards are installed.

Note: Reader wiring is not depicted in diagram below.

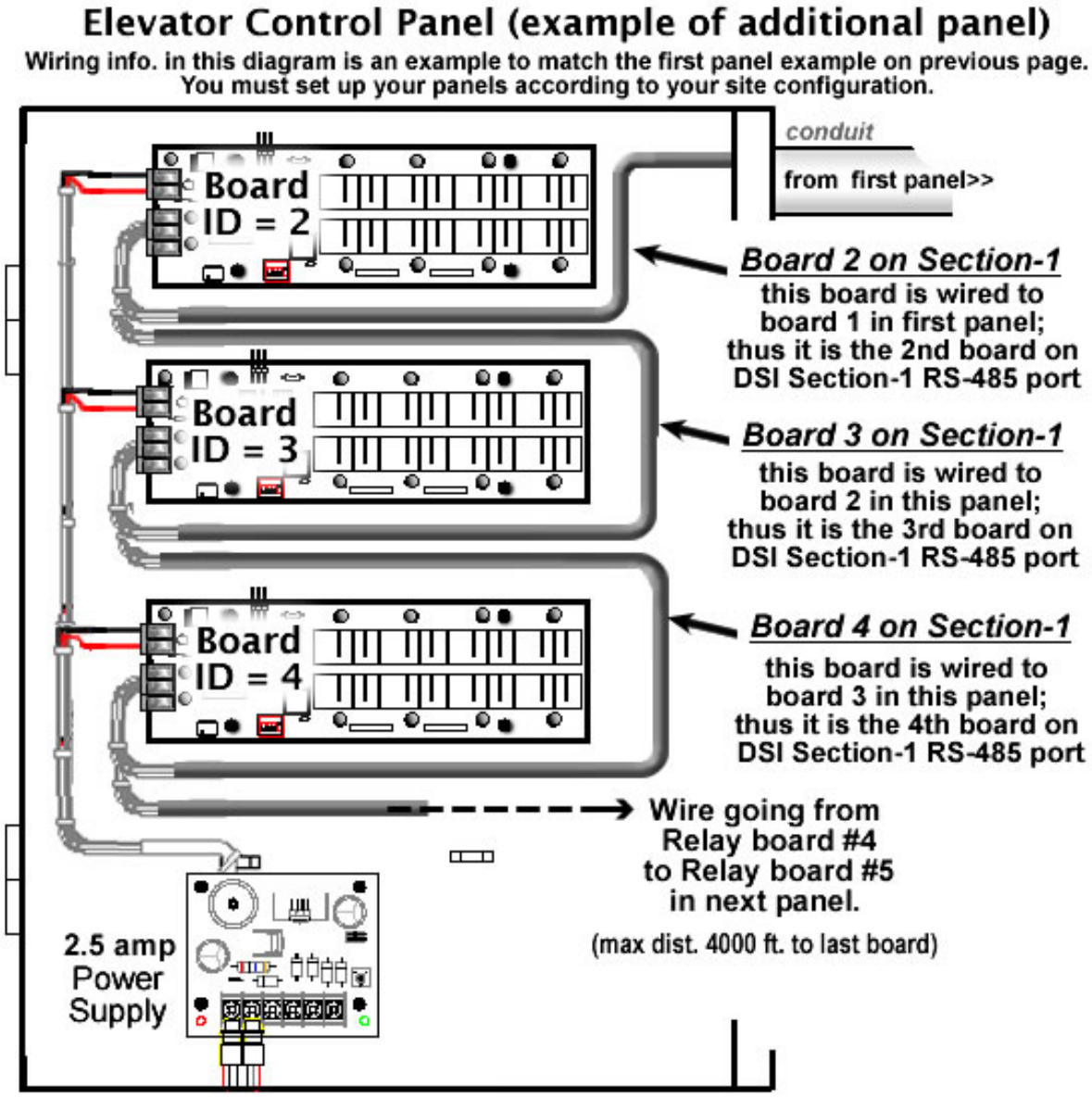


N.4 Elevator Control Panel (Second / Additional Panel)

The additional panels only house relay boards. Three (3) boards max. in a short can. Six (6) boards max. in a long can.

The relay boards in this panel are wired back to the first panel.

NOTE: If the relay board in a second/additional panel is daisy-chained to a relay board, it will use the next sequential Board ID in that chain (i.e. 1, 2, 3, etc.).



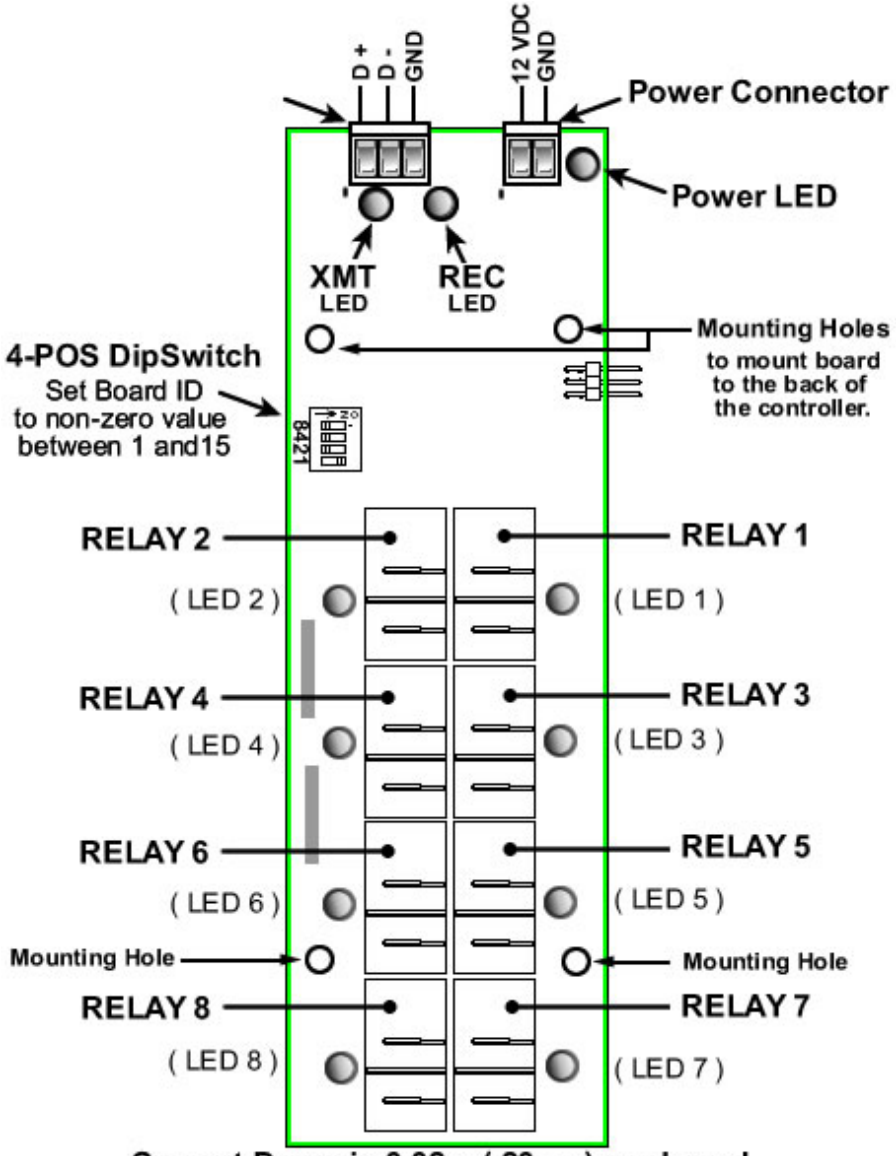
O – Appendix : Output Relay Board Help

O.1 Relay board (General Output or Elevator Control)

Each Relay Board has eight (8) Form-A SPST output relays.

The Relay board should be powered separate from CPU & DSI.

Relay boards are used in General *Output panels* or *Elevator Control panels*. See the following section on the type of panel you are installing for configuration specs and wiring.



Current Draw: is 0.02 *a* (20 *ma*) per board.

Note: If ALL 8 relays are energized at once a board draws 0.6 *a* (600 *ma*) of current.

Appendix O - Output Relay Board Help

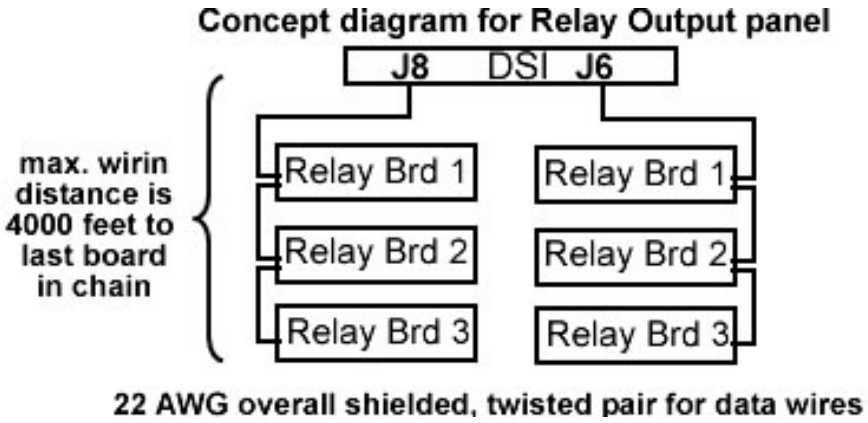
O.2 Relay Board Power and Data Wiring

NOTE: one board draws 0.02 a (20 mA); and if all 8 relays energized at the same time, the board draws a max of 0.6 a (600 ma).

POWER WIRING in the 1st panel: Relay boards are NOT wired to the same power supply as the CPU, DPI and DSI boards. *Visual examples of panels are found on following pages (i.e. the General Output FIRST Panel or the Elevator FIRST Panel).*

POWER WIRING in 2nd/additional panel: Relay boards are wired to the existing power supply and harness. *Visual examples of panels found on following pages (i.e. General Output 2ND Panel or Elevator 2ND Panel).*

DATA WIRING in all panels: Relay boards are connected in a "daisy-chain" from the RS-485 port (J6 or J8).



Appendix O - Output Relay Board Help

O.3 Relay Board Dipswitch Settings for board numbers

The switch allows you to set a binary value depending on switch position (i.e. UP = 1; DOWN - 0).

Switch position		1	2	3	4
SILK SCREEN>		*8*	*4*	*2*	*1*
Board Numbers	**1**	DN	DN	DN	**UP**
	2	DN	DN	**UP**	DN
	3	DN	DN	**UP**	**UP**
	4	DN	**UP**	DN	DN
	5	DN	**UP**	DN	**UP**
	6	DN	**UP**	**UP**	DN
	7	DN	**UP**	**UP**	**UP**
	8	**UP**	DN	DN	DN
	9	**UP**	DN	DN	**UP**
	10	**UP**	DN	**UP**	DN
	11	**UP**	DN	**UP**	**UP**
	12	**UP**	**UP**	DN	DN
	13	**UP**	**UP**	DN	**UP**
	14	**UP**	**UP**	**UP**	DN
	15	**UP**	**UP**	**UP**	**UP**

O.4 Relay Number Chart

Board numbers must be unique in the daisy-chain off of an RS-485 port/channel in order to operate relays independently. The relays (1-8) on each daisy-chained board gets assigned logical numbers based on the board number (see chart below).

The software operates the relays based on the board number:

- on **board # 1** relays 1 thru 8 will operate as relays 1 thru 8
- on **board # 2** relays 1 thru 8 will operate as relays 9 thru 16
- on **board # 3** relays 1 thru 8 will operate as relays 17 thru 24

Relay No. chart - per Relay Board ID

Brd ID	Relay No's		
1	1	thru	8
2	9	thru	16
3	17	thru	24*
4	25	thru	32
5	33	thru	40
6	41	thru	48
7	49	thru	56
8	57	thru	64

Brd ID	Relay No's		
9	65	thru	72
10	73	thru	80
11	81	thru	88
12	89	thru	96
13	97	thru	104
14	105	thru	112
15	113	thru	120*

See next page for Software setup information.

O.5 Software Setup of the Output Relay board

Note for the SG Software Setup:

- After the controllers and the DSI board has been properly added in the software, then you open the *Serial Channels property* screen (go to Configuration >> Hardware menu).
- Set the DSI 's RS-485 channel (port) to operate in 'General Output or 'Elevator Control' mode (as desired) **and** set the *total number of relays* for that channel (*general output can have max 24 relays and *elevators can have max 120 relays).
- If using general mode, you will set up inputs and outputs as normal. If installing elevators, set the Elevator Reader's property to be "checked" for Elevator Reader and pick the appropriate DSI channel in the droplist on the General tab of the Reader Property screen.
- When you save this, your relays will appear on the Elevator schedules tab of the Reader Properties screen.

P – Appendix: Configuring LCD Unit ID

YOU MUST USE THE V 1.77 Galaxy Configuration Programming Tool to configure the LCD Display UNIT IDs.

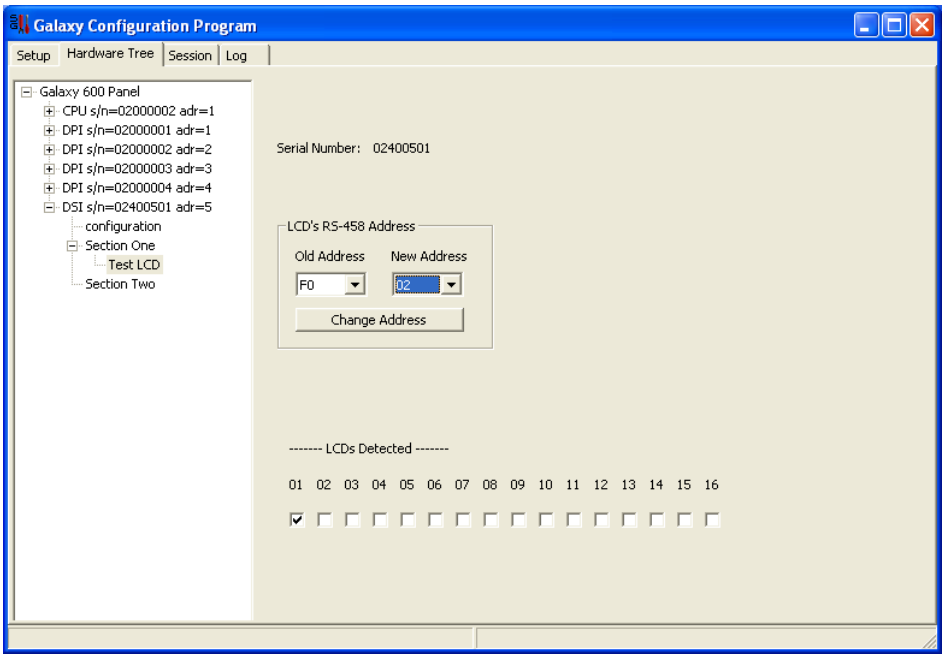
- Valid Unit IDs are 1 through 16
- the DSI supports 16 max. units per 485 port

See the Config Tool Manual for full operating instructions.

P.1 : Configure the LCD Unit ID

IMPORTANT: YOU MUST CONFIGURE ONE UNIT AT A TIME

1. Choose the **Configuration** option under the DSI board
2. Set the Configuration to LCD **4X20 Display Module**
3. Select **Test LCD** option and allow the unit time to respond
4. Choose the existing address in the **Old Address** droplist
5. Choose the address you wish to set in the **New Address** droplist
6. Click **CHANGE ADDRESS** button to set the LCD Unit ID

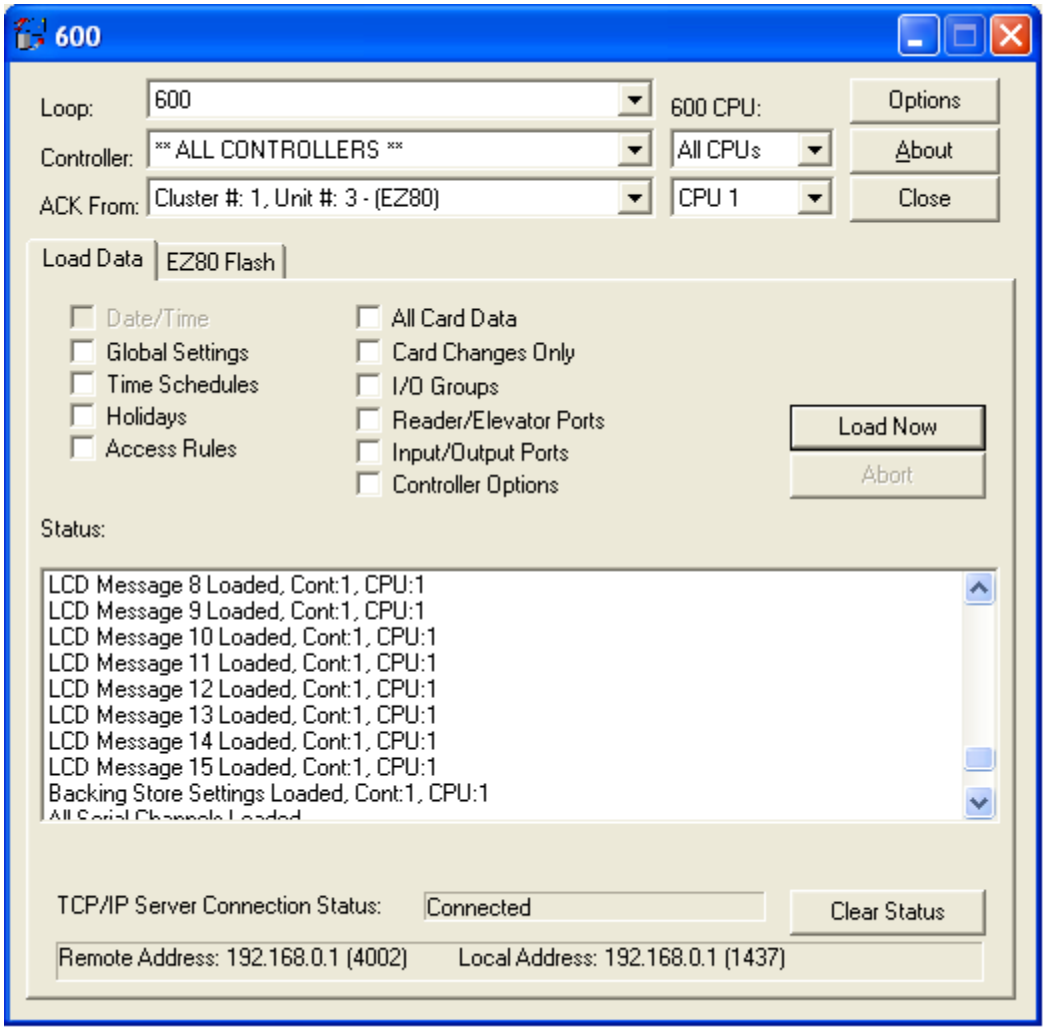


Appendix P - Setting LCD Unit IDs

P.2 : Load the LCD Unit ID from the SG Software

To load the LCD from the System Galaxy software you must log onto the System with a valid ID and select the desire LOOP from the Hardware Tree

1. Right click the LOOP icon on the Hardware Tree branch
2. Select the LOAD option
3. Load Data to the desired Controller
4. LCD message packets are included in the Load Status display



P.3 : Configure the LCD Unit ID from the SG Software

To configure the LCD from the System Galaxy software you must log onto the System with a valid ID and OPEN the Serial Channel programming screen.

- Open the 600 **Serial Channel Property screen** …

  from the SG menu bar selections **Configure > Hardware > Serial Channel**
- Select the **Cluster Name**
- Select the **Controller Name**
- Select the appropriate **DSI Board number** and **section number** (e.g. Board 1; Sect 1)
- Click **Edit** button
- Select a **Channel Mode**:
  - o **4X20 LCD Display**
- Select the **LCD FORMAT**: to determine how the LCD will display data
  - **8 characters by 4 lines** (includes space on the right side of the display unit to see the number of card uses remaining on the access control card when it is presented to the reader. This format allows for 3 digit count (up to 999 swipes)) This format is good for parking decks and other areas where visitor counts are limited by the number of uses programmed in the Cardholder screen.
  - **12 character by 4 lines** (includes space on the right side of the display unit to see the number of card uses remaining on the access control card when it is presented to the reader. This format allows for 2 digit count (up to 99 swipes)) This format is good for parking decks and other areas where visitor counts are limited by the number of uses programmed in the Cardholder screen.
  - **Clock Large Digits** displays the time formatted as HH:MM ss (AM/PM)
  - **Normal Multi-Line Display** this display format allows for 20 characters by 4 lines (number of uses is not displayed in this format)
- Enter the data you wish to display when a card is presented.
- Click **Apply** to save changes.
- Changes should automatically load momentarily and can also be loaded using the GCS Loader (see P.2)

Q – Appendix: Replacing a 600 DPI with 635 DRM

This appendix covers replacing older 600-model DPI Reader Boards with the newer 635-model DRM Boards.

Q.1 Specifications for the 635 DPI Board

A. SUPPORTING EXISTING SITE CAPABILITIES: You will not lose any 600-model functionality in your controller. The 635 DRM is fully compatible with 600-series hardware **using v4.60 flash** (or later) on the 600 CPU.

1. **ABOUT UPDATING EXISTING HARDWARE FLASH:** The 635-DRM requires the Flash v4.60 (or higher). You must update the flash in all of your existing controllers if they are below v4.60 flash. All controllers must be running the same Flash version system-wide (CPU and all daughter boards).
2. **EXISTING SG SOFTWARE (COMPATIBLE VS. UPDATING):** the SG software must be in synch with the flash. (you cannot run newer flash on older software). If the system is already running SG 10 you will not need to upgrade your software.

SUPPORT: Consult Galaxy Technical Support for assistance in determining the best upgrade version for your system. 1-800-445-5560 / 301-845-6600.
NOTICE: Older versions may need to perform a Step-Flash upgrade.
When upgrading software, you must backup all your assets and databases.
This is a process that must be done with careful consideration.

3. **ABOUT SETTING THE BOARD ID ON A 635-DRM:** You must set the Board ID before you install the DRM. The 635-DRM uses a binary dipswitch to set the board ID. You cannot reach it after the board is installed.
   - **Expand/Add Doors in a 600-model controller: You must assign a unique (unused) Board ID** to the DRM.
   - **Repair/Replace an existing 600-DPI:** You **must assign the same ID** of the old 600-DPI board to the 635-DRM. This way all the system programming is maintained. If you put a different ID in the replacement board, then all the reader programming will have to be done over from scratch. This will adversely affect other programming also, such as access groups and door groups – etc.
4. **ABOUT BACK-FLASHING THE 635-DRM TO MATCH FIELD FLASH:** The DRM comes with factory flash, which is usually a different version that the field Flash. After you have upgraded your hardware (and software) you will probably need to backlash the DRM to match the correct field Flash version.
5. **IMPORTANT NOTICE FOR 5-VOLT READERS: You must install a Voltage Regulator if you will be attaching 5V readers to the 635-DRM.** The DRM supports 12V readers by default. 5V Readers, such as Bar Code or Magnetic Swipe readers require an in-line voltage regulator.

B. TAKING ADVANTAGE OF THE 635-DRM'S NEW CAPABILITIES:

1. **RS-485 Remote Door Feature:** you must use the **635-CPU**, **635-DSI**, and the **correct version of Flash** (5.04 or higher) and upgrade to the **correct version of SG software** (SG10.3 or higher) that supports the Remote Door feature.
2. **"Wet Lock-Relay Operation":** this is purely a hardware feature. The minimum requirement to support the 635-DRM Board is required (i.e. Flash v4.60 or higher and the SG Software that supports that flash).

Appendix Q - 635 DPI Installation

INSTALL REQUIREMENTS

1. **WARNING:** Do Not Connect A 5v Reader Directly To The 635 DPI – you must install a voltage regulator for 5v readers or configure the reader for 12v. The 635 DPI supports 12 volt readers directly connected.
2. **WARNING:** Failure to properly land lock wiring (using wet relay operation) can short lock power supply.
3. **CAUTION:** do not reset power to a DPI during the flashing process. This can damage the factory flash.
4. **You must flash the 600 CPU to v4.60** (or higher) **BEFORE you connect a 635 DPI**.
   - System Galaxy software SG 9.0.5 (or later) or SG 10.0 (or later) supports v4.60 flash.
5. **You must set a valid board ID on the 635 DPI.** Use the binary switch before powering up/connecting the board. The factory default is '16' (1-16 are supported).
   - If you are replacing a board you will use the ID of the board you are replacing so you don't have to reprogram the software. If adding a new board you will choose a board ID that is not used.
   - You can use either the Galaxy software or HyperTerminal if you need to determine the existing board ID in case you are replacing an existing board.
   - You will need access to the System Galaxy software (server) to add the board to the database if you are adding a new board / new doors.
6. **The following requirements apply to lock wiring and operation.**
   - **The 635 supports Fail Safe and Fail Secure**
   - **You must use install surge protection diodes** at the device-end of line (at the lock).
   - **You must use a separate +12/+24 VDC power supply to power door Locks**.
   - **Lock relays ("relay 1") can be used in wet or dry operation (see next item)**
7. **By default, all Relays are FORM-C SPDT DRY OUTPUT with Max. 24 VDC @ 1.5 amps.**

   a) Dry Contact Relay Operation - recommended if you are replacing a 600 DPI for service repair
   - Fail-safe and Fail-secure are supported under dry relay operation.
   - Remove lock jumpers. (J15 &16 sect 1; J17 & 18 sect 2)
   - Do not land lock power on the board – important to see diagram and install steps.

   b) Wet Contact Relay Operation - is available (not mandatory) if you are adding a new board and wish to use *wet relay operation.*
   - You must install lock jumpers before you install the board. (J15 &16 sect 1; J17 & 18 sect 2)
   - You must correctly land lock power on the LPR contact (+12/+24 VDC).
   - You must correctly land lock wiring – **must see diagrams for fail-safe / fail-secure lock wiring**.
   - **WARNING**: failure to follow proper lock wiring for wet relay operation can short the lock power supply.
8. Relay-2 always uses FORM-C SPDT DRY OUTPUT; Max. 24 VDC @ 1.5 amps. NO/NC supported.
9. Door Contact Supervision is supported. You can change to a different value than the factory default.
   - Factory Default 4.7k ohm resistors are installed in the resistor sockets.
   - EOL resistors must match the value of the socketed on-board resistor.
   - EOL resistors should be place at the device end
   - EOL configurations supported are series, parallel, and series-parallel.
   - *instructions for installing supervision resistors in Chapter 2 - 600 Hardware Guide*

Appendix Q - 635 DPI Installation

WIRE DISTANCES AND GAUGES:

Connection	Max Distance	Wire
Reader Hardware	500 ft	22 AWG, 10-conductor, stranded/shielded; land drain wire on one end only to negative on the board.
Composite Cable	500 ft	18 AWG & 22 AWG Card Access 4-Element
Lock Hardware	500 ft	18 AWG 2-conductor minimum, stranded
WARNING! Observe Fire and Electrical Codes for wiring insulation jackets for PVC-rated cable or plenum-rated cable. Use plenum-rated cable when appropriate.		

Ratings for LOCK RELAYS on 635 DPI Boards:

1. There are a total of 4 relays on the 635 DPI; two relays per section.
2. Each section/port has a **lock relay** (a.k.a. relay 1) and a **general output relay** (a.k.a. relay 2).
3. All (4) relays are **DRY* Form-C SPDT Max. 24 VDC @ 1.5 amps**.
   - The output relays (relay-2) are always DRY operation;
   - The lock relays (relay-1) can support either dry contact relay operation (*jumpers removed) or wet contact relay operation (jumpers installed).

WARNING: carefully follow the diagrams and instructions in the ***Install Steps*** to ensure proper wiring and relay operation. Locks must use separate power supply.

Appendix Q - 635 DPI Installation

Q.2 QUICK STEPS for installing a 635 DPI

This addendum assumes you are properly following requirements and install instructions for the controller cabinet, CPU, daughter boards, etc., as described in the Chapter 2 of the Hardware Guide.

CAUTION! Do NOT interrupt power while a DPI is in the flashing process. Interrupting power during a flash update can damage the memory. Factory restoration is required to recover the board operation.
CAUTION! Do NOT connect a 5volt reader directly to the 635 DPI; 12volt readers are supported as is.
IMPORTANT! Use a separate power supply for Locks. Install *surge protection diodes* at the lock end.

635 DPI QUICK STEP TABLE (detailed instructions for each step are found on the following pages)

635 DPI - BOARD PREP	
1. Verify / Flash CPU *(from SG software/Loader)*	Use System Galaxy software to verify CPU flash version. **Flash as needed - CPU 1 must use 4.60 flash (or higher)**. This may mean a software upgrade. Contact Galaxy Tech Support for Assistance.
2. Obtain a valid DPI Board ID	Factory Default Board ID = 16 • If you are replacing an existing board, set the DRM to use same ID as old board. • If adding a new board to an existing panel, you can keep factory default (16) if not already in use, otherwise set the ID to a unique value with the panel (**see the System Galaxy Controller Properties screen to discover what ID is unused.**)
3. Set the Board ID (dipswitch)	using the binary dipswitch (**see diagram & Binary Address Table**)
4. Reader Voltage NOTICE	**IMPORTANT:** 5V Readers require voltage regulators to be installed.
5. Install Supervision Resistors (optional)	Factory default = 4.7k Ω swappable resistor SIP socket; EOL resistors must match value of socketed resistor. You must enable at the software.
6. Set Relay-1 Jumpers	Standard Dry Relay operation = OUT; New Wet Relay operation = IN (**see diagram**)
635 DPI - BOARD INSTALL	
7. Install Board in card slot	Place mounting bracket under standoffs (**see diagram Chap. 2 of 600 Hardware Guide**)
635 DPI - WIRING (wire, but do not connect 2-Piece connectors to the board yet)	
8. Wire Lock Relay 1	**Follow diagrams carefully** for the type of install (wet or dry relay operation).
a. Wire reader, REX, contact	Land wires correctly / ground shielding (**see diagram in Chap. 2 section 11**)
b. Wire Relay 2 (if used)	Normally Open and Normally Closed devices are supported (
9. Wire DPI power connector	Observe polarity; swap over to the 3-pin power plug. ***CAUTION: SEE Diagrams in following sections for wiring lock power supply.***
635 DPI - BRING BOARD ONLINE (**also see Chap. 2 for details on these steps**)	
10. Connect DPI power	Connect the DPI board power (**D12 LED** should light up solid)
11. Connect data/ribbon	Connect the 635 DPI to the data ribbon cable. Allow all daughter boards to update flash without power interruption. **Caution:** default *10-minute update delay* occurs; issuing a CLEAR AUTO command will bypass the delay (board does not auto-flash if it matches the CPU version). Always allow flashing to complete without interruption.
12. DPI Flash/Load Data	Allow DPI to flash without power interrupt (Galaxy Config Tool / HyperTerm / Web). Use SG Controller Loader to load data if adding new doors **after** all flashing completes.
13. Connect field devices	Connect each field device (support 12V readers; 12/24V Locks)
14. Load data to the panel	Configure field devices into the software. Use SG Loader to load panel.
15. Walk-Test your devices	Test the field devices to ensure operation. (**see diagram in Chap. 2**)

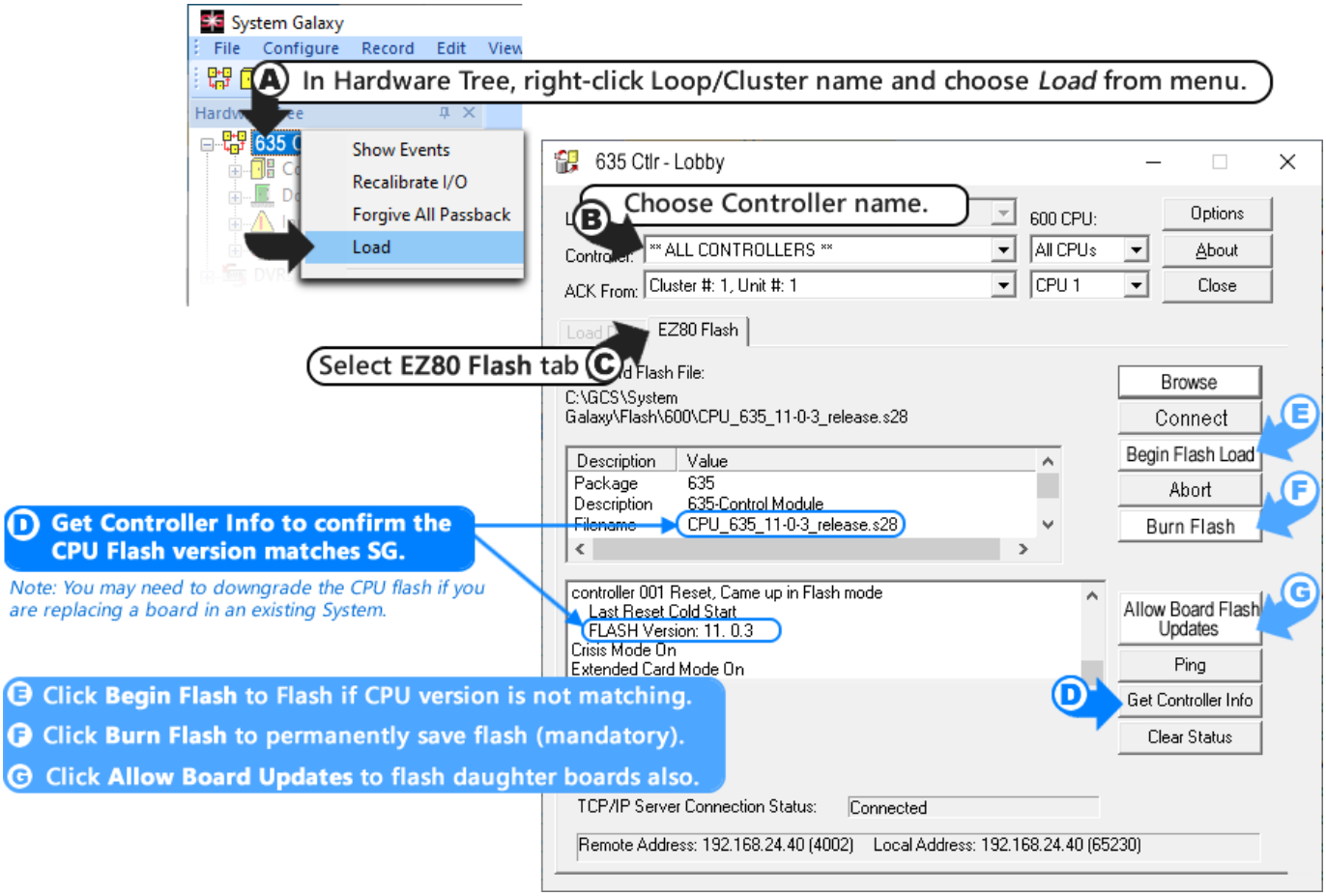
Appendix Q - 635 DPI Installation

[STEP 1] FLASH / LOAD THE CPU

NOTE: If this is a new installation of the entire panel you can perform this step as a part of Step 12.

The 635 DPI requires 4.60 s28 flash (or higher). This ensures the DPI can come online when you are finished installing.

1. CPU must be online and connected to the Event Server in order to flash/load the hardware.
2. Open System Galaxy software and login.
   a) In SG Hardware Tree, right-click the LOOP icon that the controller belongs to; and Select LOAD option.
   b) Choose the specific Controller as needed.
   c) Select the EZ-80 Flash tab in the Loader window
   d) Get Controller Info (button) and verify CPU flash version matches the SG flash version AND is a minimum of v4.60 or higher *(required to support the DRM with wet-lock capability.)*
   e) If you need to flash the CPU, click Begin Flash Load button.
   f) You must Burn Flash into CPU after the loading is completed. Choose VALIDATE & BURN flash.
   g) Now you can click Allow Board Flash Updates button to update daughter boards. The later flash versions will not auto_update daughter boards.
3. Once the controller is finished flashing the CPU and all daughter boards, you can switch to the Load Data tab and load any programming changes to the controller for new or different hardware.



Appendix Q - 635 DPI Installation

[STEP 2] FIND A VALID BOARD ID (via the software programming)

IMPORTANT! Failure to set a valid Board ID will cause door hardware to operate in an undesired fashion. An invalid board number interferes with ability to communicate or flash (IDs 1 – 16 are supported).

Do the following to determine which number you should use.

1) **IF you are installing a new controller and no boards have been previously installed**:
   - DPI must be set to a unique (unused) value between 1 and 16. Factory default is 16. You can keep 16 if it is unused. Otherwise you must find a number that is unused within the panel – see the SG Controller Properties screen.

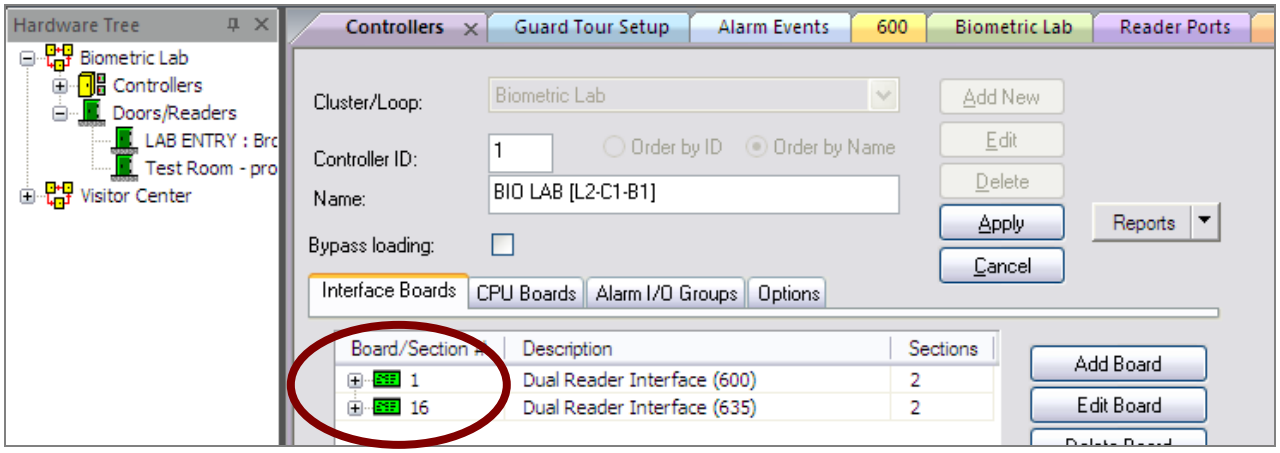
     TIP: After you finish setting IDs and installing the hardware, you will come back to this software screen and add the board to the controller using the [Get Board Info] button to pull back the list of boards. (the CPU must be connected to the Event service in order to pull the boards; you can manually add boards if needed)

     TIP: the [Get Board ID] button also show the flash each DPI is running. The CPU and all DPIs should upgrade to 4.60 (SG 10).

2) **IF you are replacing a DPI for service/maintenance reasons:**
   - **a)** Sign-in to System Galaxy and **open the *Controller Properties screen*** for the panel you are servicing.
   - **b)** find the ID of the board being replaced on the *Interface Boards tab,*
   - **c)** In Step-2 you will assign that same ID to the new 635 board so it will pick up communicating for the board that is programmed in the software. You should not need to change anything in the software programming.

3) **IF you are adding a new board (adding doors) to an existing controller:**
   - **a)** Sign-in to System Galaxy and **open the *Controller Properties screen*** for the panel you are servicing.
   - **b)** Find out which IDs are already in use and choose an **unused** ID that is within the valid range (1 - 16) (for example: if existing controller has already assigned boards 1 and 16, then 2 thru 15 are available).

from the menu, choose **Configure > 'Controllers-600'** to open the Properties screen:



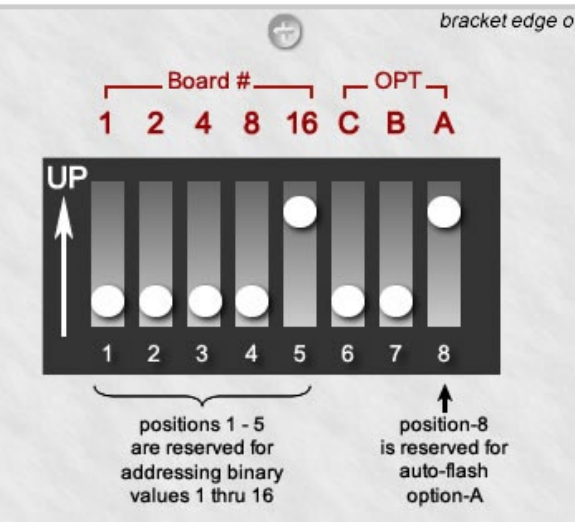
Appendix Q - 635 DPI Installation

[STEP 3] SET THE DPI DIPSWITCH (Board ID Addressing)

The ***8-position binary dipswitch*** [SW2] is on the center-back edge of the DPI board.

4. Set to ON only the positions needed to achieve the desired ID.
   - **Positions 1 thru 5:** used for binary addressing. Find the desired value in the *Board ID column* of the table (below).
   - **Positions 6 and 7:** are unused and should remain OFF.
   - **Position 8:** should remain ON (factory default (recommended)). This option enables auto-update. When auto-update is ON, the board will automatically update its flash version whenever future upgrades to the CPU flash are performed.

FIGURE Q-2: BINARY DIPSWITCH & ADDRESS



ORIGINAL BOARD ID ADDRESSING: since you are setting the board ID before connecting power, the ID will initialize when power is applied.

CAUTION: use caution when resetting board power. **Be sure the DPI is <u>not</u> in the flashing process**. Resetting power during a flash update can damage the factory flash.

Binary Address Table

Binary Value >	(1)	(2)	(4)	(8)	(16)	unused		Auto update
Dipswitch Position >	1	2	3	4	5	6	7	8
Board ID	*Factory default = 16*					OFF		ON
1	ON					< position 6 and 7 are currently unused >		< default ON – auto update flash enabled > OFF (disabling auto-update is not recommended)
2		ON						
3	ON	ON						
4			ON					
5	ON		ON					
6		ON	ON					
7	ON	ON	ON					
8				ON				
9	ON			ON				
10		ON		ON				
11	ON	ON		ON				
12			ON	ON				
13	ON		ON	ON				
14		ON	ON	ON				
15	ON	ON	ON	ON				
16					ON			

POSITIONS = OFF unless shown as ON

Appendix Q - 635 DPI Installation

[STEP 4] 635-DPI PREP: READER VOLTAGE

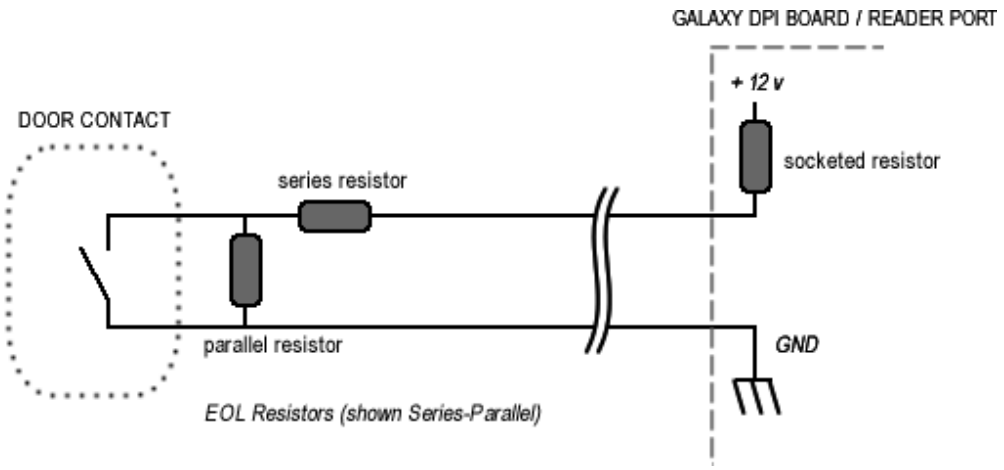
CAUTION! Do NOT connect a 5V Reader directly to a 635-DPI board. Install the voltage regulator before connection 5V readers to a 635 board.

[STEP 5] 635-DPI PREP: DOOR SUPERVISION (resistors & settings)

NOTES:

- If you are **not** using door contact supervision, you can skip this step
- Enable door contact supervision in the System Galaxy *Reader Properties screen*. You must choose the setting you are actually using (i.e. series, parallel, or series-parallel).

1. **Install EOL resistors as follows:**
   - The factory default value on the board is 4.7k ohms. You can keep this or change it if you desire since the supervision resistor is mounted in a resistor socket.
   - The EOL resistor(s) must be the same value as the on-board socketed resistor.
   - The EOL resistors must be physically installed at the device. You may install the resistor(s) in series, parallel, or series-parallel configuration.



[STEP 6] 635 DPI PREP: SETTING JUMPERS FOR LOCK RELAYS

NOTES:

- 600 DPI only supported dry relay operation
- 635 DPI supports both **dry** relay and **wet** relay operation
- Do not land lock power supply on the LPR terminal if using dry relays

REMOVE JUMPERS for DRY RELAY OPERATION

Board Section	Jumpers	DRY Operation
Section-1 / Door 1	15 & 16	**removed**
Section-2 / Door 2	17 & 18	**removed**
LOCK POWER: DO NOT use the LPR contact. Provide power at the lock. ▪ See the section on **Wiring Lock Power for Dry Relays**		

INSTALL JUMPERS for WET RELAY OPERATION

Board Section	Jumpers	Wet Operation
Section-1 / Door 1	15 & 16	**installed**
Section-2 / Door 2	17 & 18	**installed**
LOCK POWER: connect (separate) power supply to the LPR contact. ▪ See the section on **Wiring Lock Power for Wet Relays**.		

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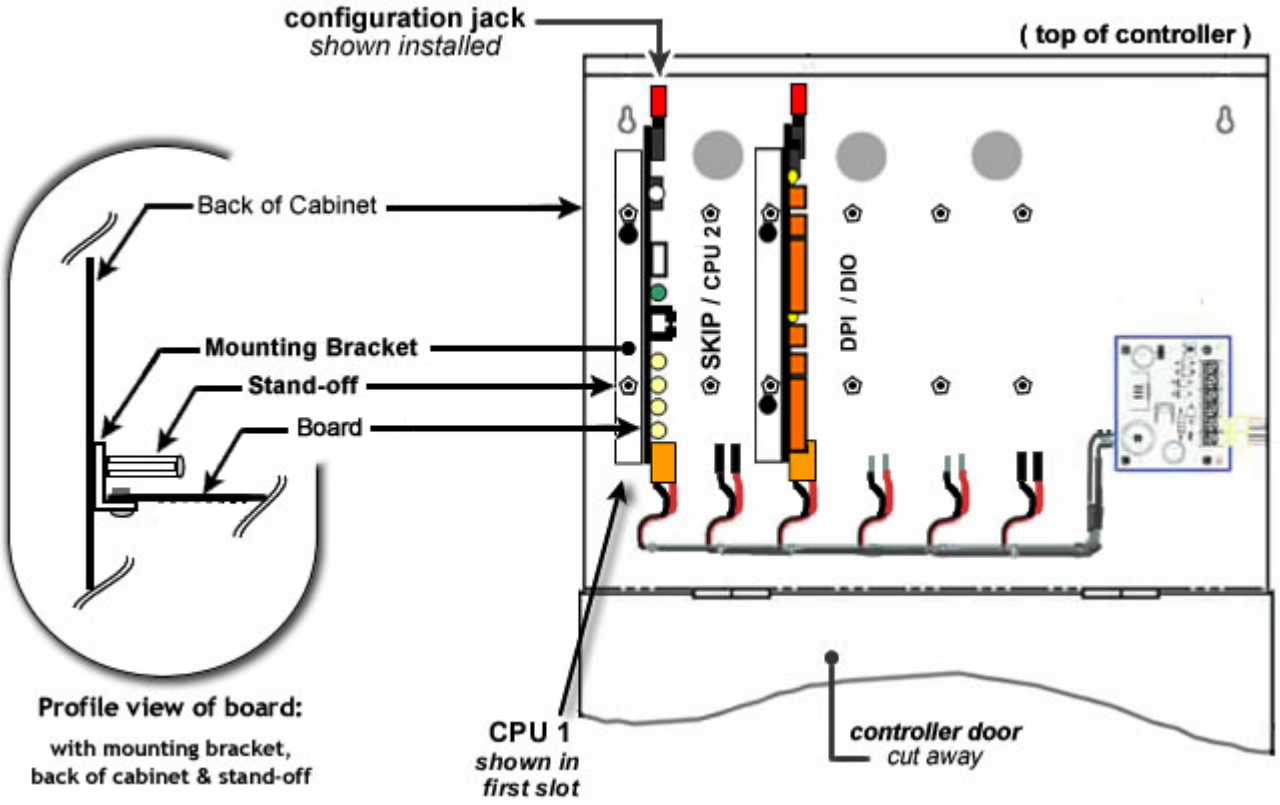
[STEP 7] MOUNT THE 635 DPI BOARD IN THE CONTROLLER CARD SLOT

CAUTION! Remove power from the controller BEFORE you install or uninstall any boards. Galaxy recommends the installer unplug controller unit from the wall outlet to prevent a shock or electrical short.

Physically install the *635 DPI BOARD* into the controller panel using the mounting brackets as shown.

FIGURE Q-2: INSTALLING DPI BOARD IN CARD SLOT

This diagram shows the installation of an interface board in the 3rd slot.



Appendix Q - 635 DPI Installation

[STEP 8] WIRING TO EXISTING FIELD DEVICES

NOTICE – The power connector for a 635 board is a 3-pin connector – you should refer to STEP 7 for wiring the power connector.

- **READER/REX/DOOR CONTACT WIRING:** the 635 uses the same 9-pin connector as previous 600 boards. Therefore, you can connect the existing reader/door wiring to the 635 board without changing any wires. See Reader Wiring diagrams in Step 11 of Chapter-2 of this Hardware Guide.

  Note that the 6th pin is no longer used for a second LED; it is now used for a RLY option. This would only take affect if you are wiring LED2 (E.G. ESSEX Keypad set for IR).

- **READER VOLTAGE JUMPERS:** the 635 DPI does not use reader voltage jumpers. The board provides 12 VDC to the reader ports.
- **RELAY 2:** The Secondary Relay (2) uses the same 3-pin connector as previous 600 boards. See Reader Wiring diagrams in Step 11 of Chapter-2 of this Hardware Guide.
- **RELAY 1:** The Lock Relay (1) uses the same 3-pin connector as previous 600 boards.
  - If you are replacing an existing 600 DPI that is already wired to use dry contact relay operation, you can connect the existing wiring.

Dry Contact Relay (1) **Both Jumpers = UNINSTALLED**	**Wet Contact Relay (1)** **Both Jumpers = INSTALLED**
Sect. 1 [J15], [J16] = removed **Sect. 2 [J17], [J18] = removed**	**Sect. 1 [J15], [J16] = installed** **Sect. 2 [J17], [J18] = installed**
Use 'DRY CONTACT' when… ▪ you are replacing an existing 600 DPI ▪ OR you are simply using dry relay for lock control as typically performed	***Use 'WET CONTACT' only when…*** ▪ you are providing your lock power to the DPI board at the designated LPR contact. (see the following diagrams in this section).
IMPORTANT! ALWAYS POWER LOCKS FROM A SEPARATE POWER SUPPLY REGARDLESS OF WHETHER YOU ARE USING ***WET*** or ***DRY CONTACT WIRING*** FOR LOCK RELAY.	

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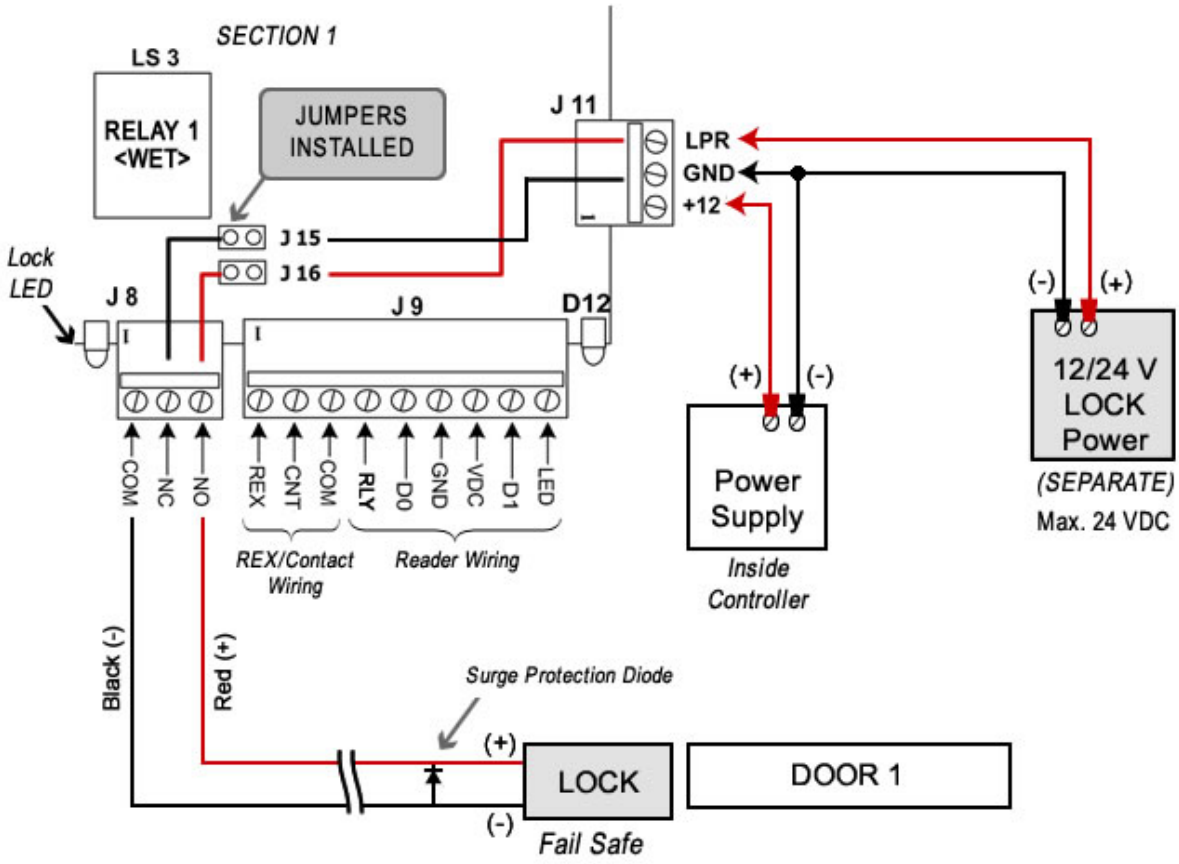
LOCK WIRING for FAIL-SAFE using WET CONTACT RELAY OPERATION

- Jumpers (J15/J16) are installed
- the Power Supply for the Lock lands on the LPR & GND contacts of J11

635 LOCK WIRING: FAIL SAFE using Wet Relay Operation



WARNING: FAILURE TO FOLLOW CORRECT LOCK WIRING FOR WET RELAY OPERATION WILL SHORT THE LOCK POWER SUPPLY. LAND WIRING AS SHOWN FOR PROPER OPERATION.

IMPORTANT: LOCK JUMPERS MUST BE INSTALLED FOR WET RELAY OPERATION.

IMPORTANT: SURGE PROTECTION DIODE MUST BE INSTALLED AT THE LOCK.

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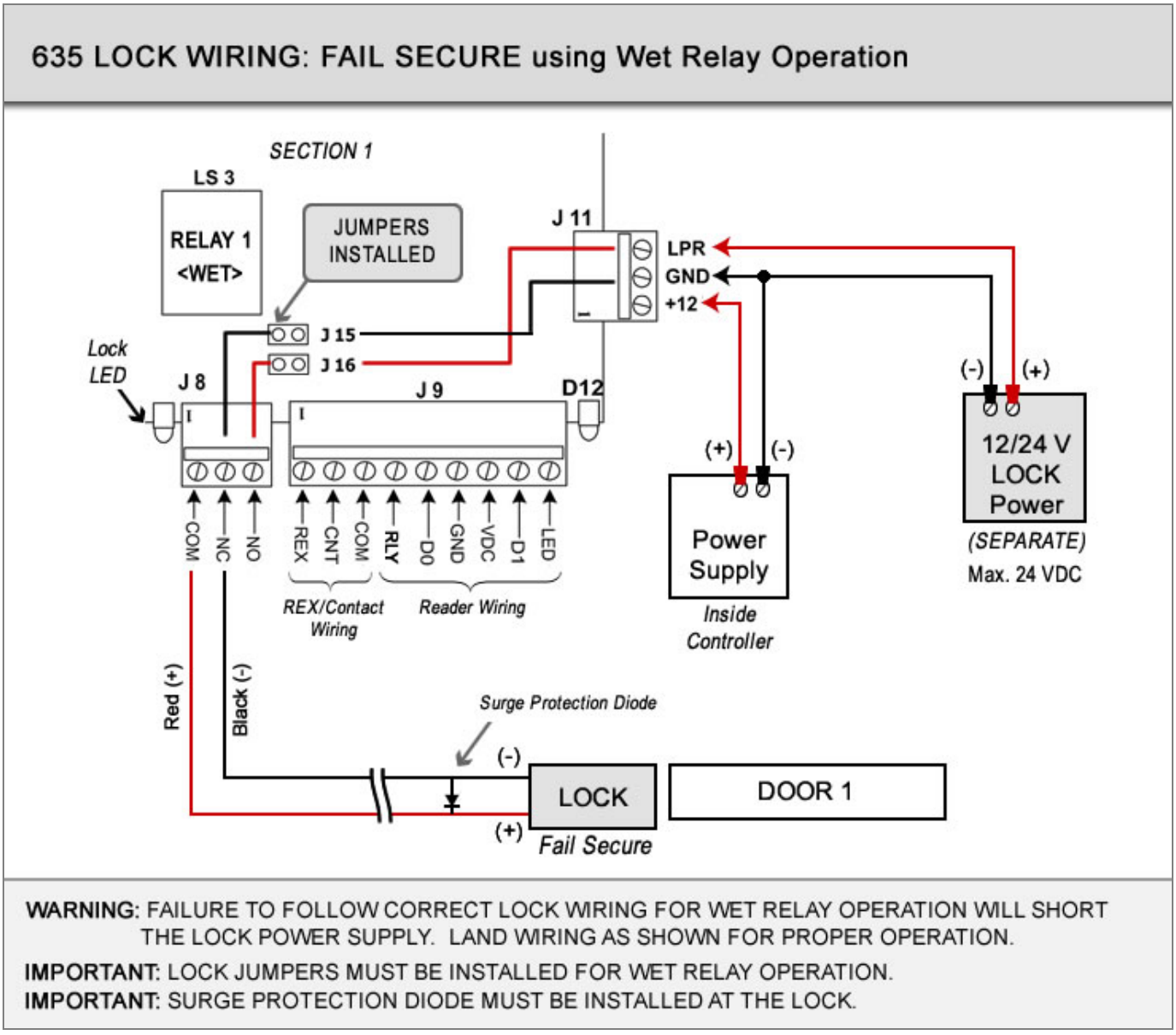
LOCK WIRING for FAIL-SECURE using WET CONTACT RELAY OPERATION

- Jumpers (J15/J16) are installed
- the Power Supply for the Lock lands on the LPR & GND contacts of J11



WARNING: FAILURE TO FOLLOW CORRECT LOCK WIRING FOR WET RELAY OPERATION WILL SHORT THE LOCK POWER SUPPLY. LAND WIRING AS SHOWN FOR PROPER OPERATION.

IMPORTANT: LOCK JUMPERS MUST BE INSTALLED FOR WET RELAY OPERATION.

IMPORTANT: SURGE PROTECTION DIODE MUST BE INSTALLED AT THE LOCK.

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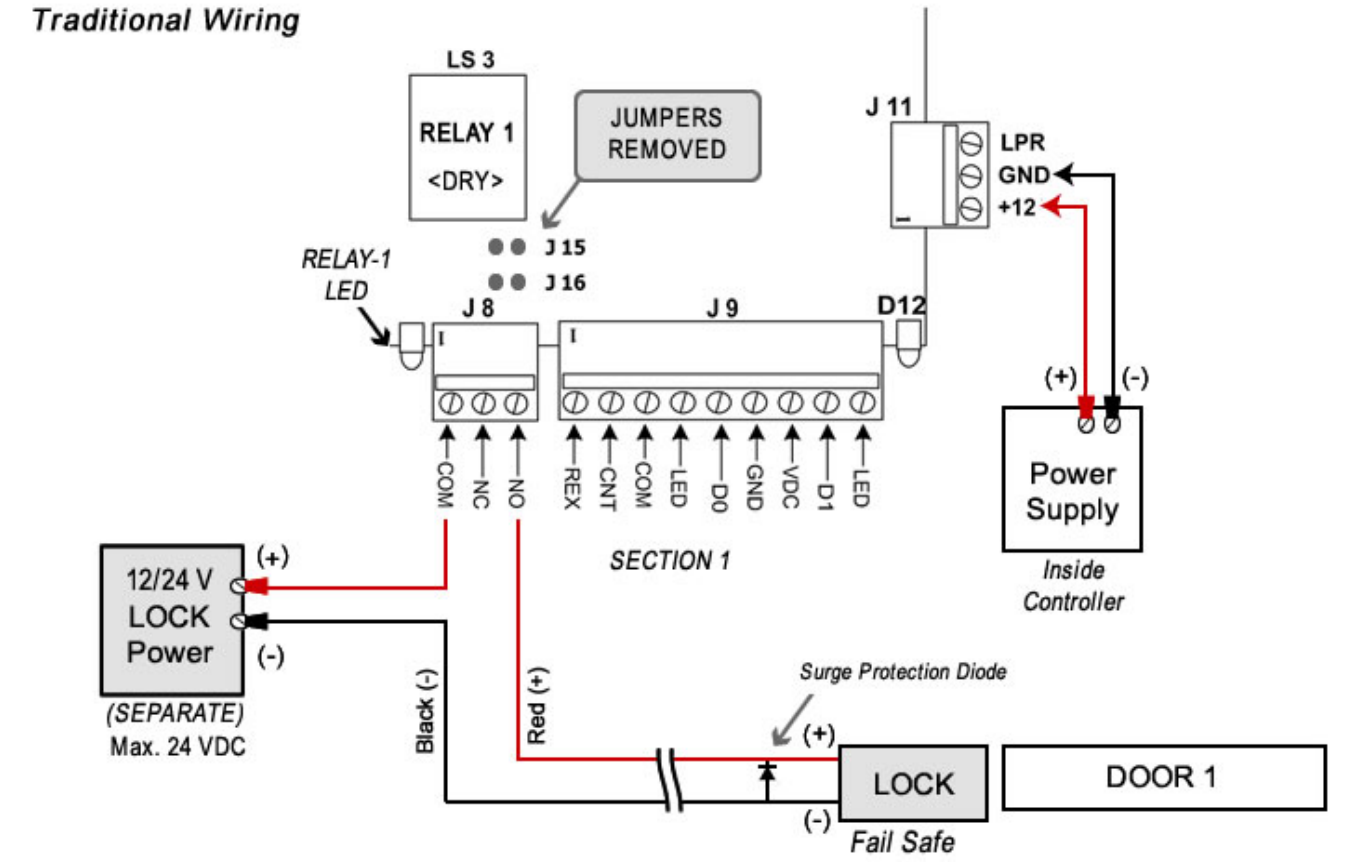
LOCK WIRING for FAIL-SAFE using DRY CONTACT RELAY OPERATION

- Jumpers (J15/J16) are REMOVED (NOT Installed)
- Lock must use separate Power Supply (DO NOT land lock power on LPR contact)

635 DPI LOCK WIRING: FAIL SAFE using Dry Contact Relay Operation



CAUTION: FAILURE TO FOLLOW CORRECT LOCK WIRING CAN CAUSE EQUIPMENT DAMAGE. THE LOCK POWER SUPPLY SHOULD NOT EXCEED 24VDC. LAND WIRING AS SHOWN FOR PROPER OPERATION.

IMPORTANT: LOCK JUMPERS MUST BE REMOVED FOR DRY RELAY OPERATION.

IMPORTANT: SURGE PROTECTION DIODE MUST BE INSTALLED AT THE LOCK.

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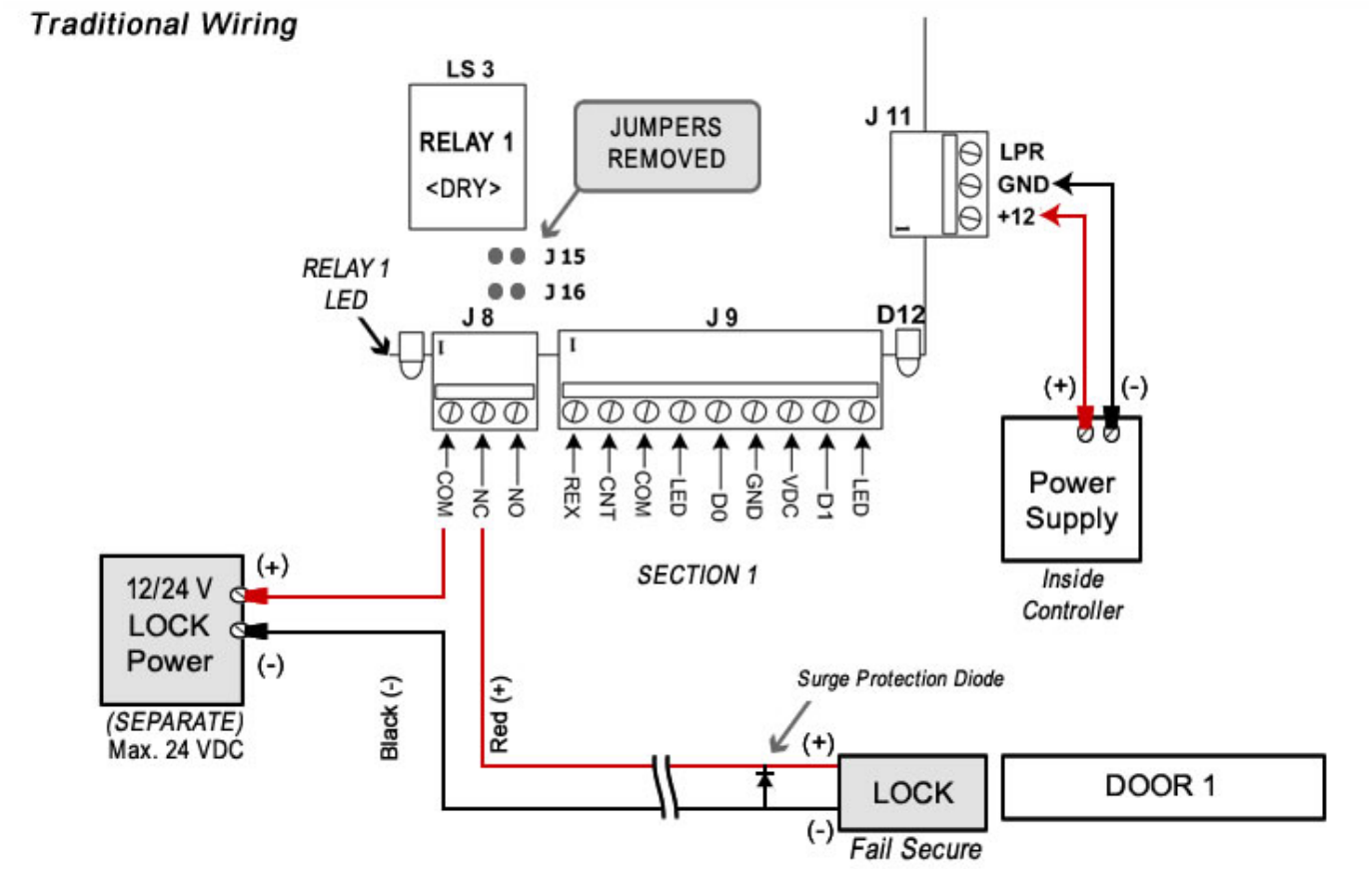
LOCK WIRING for FAIL-SECURE using DRY CONTACT RELAY OPERATION

- Jumpers (J15/J16) are REMOVED (NOT Installed)
- Lock must use separate Power Supply (DO NOT land lock power on LPR contact)

635 LOCK WIRING: FAIL SECURE using Dry Contact Relay Operation



CAUTION: FAILURE TO FOLLOW CORRECT LOCK WIRING CAN CAUSE EQUIPMENT DAMAGE. THE LOCK POWER SUPPLY SHOULD NOT EXCEED 24VDC. LAND WIRING AS SHOWN FOR PROPER OPERATION.

IMPORTANT: LOCK JUMPERS MUST BE REMOVED FOR DRY RELAY OPERATION.

IMPORTANT: SURGE PROTECTION DIODE MUST BE INSTALLED AT THE LOCK.

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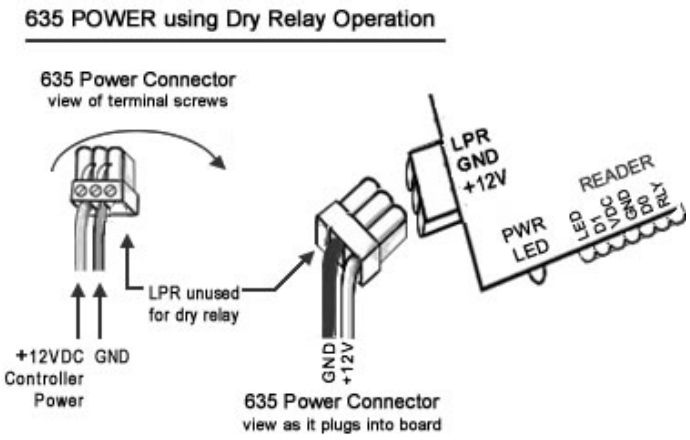
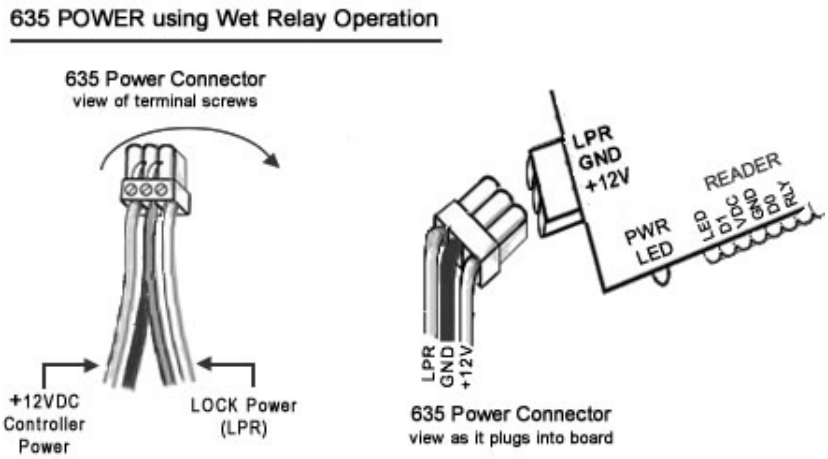
[STEP 9] LAND WIRING for POWER

1. **635 DPI using DRY CONTACT RELAY OPERATION -** If you are replacing an existing DPI, your power connector should already be wired as you will need it. 600 DPI only supports dry contact operation. SEE ADDITIONAL RELAY DIAGRAMS.

> **CAUTION:** Use the 3-pin connector provided with the board so that you correctly align the connector. Be careful to correctly land power and ground. Misaligning the power connector could cause human electrical hazard or damage to equipment connector.



2. **635 DPI using WET CONTACT RELAY OPERATION - Carefully wire the lock power to the LPR terminal. Common the negative to the GND terminal.**



[STEP 10] CONNECT DPI POWER

1. Plug in the DPI power connector. Take care to align the pins correctly.

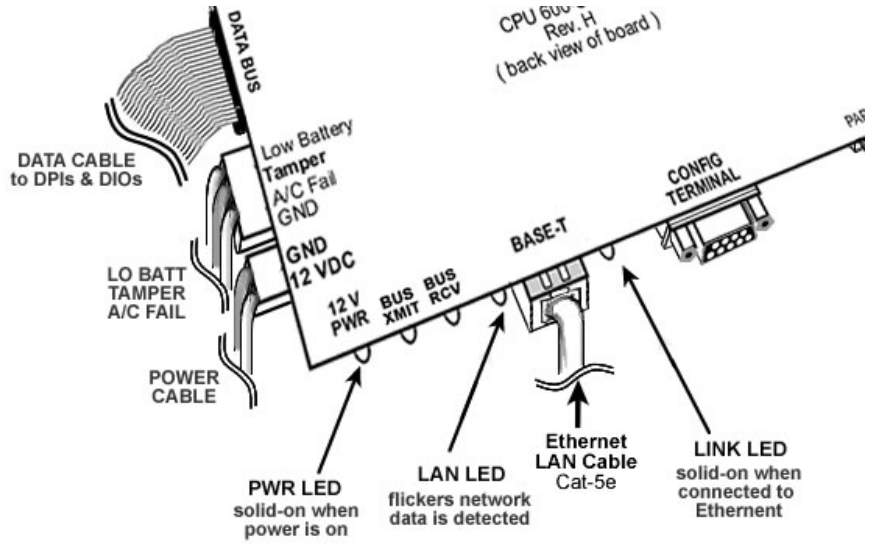
Appendix Q - 635 DPI Installation

[STEP 11] CONNECT DPI RIBBON CABLE

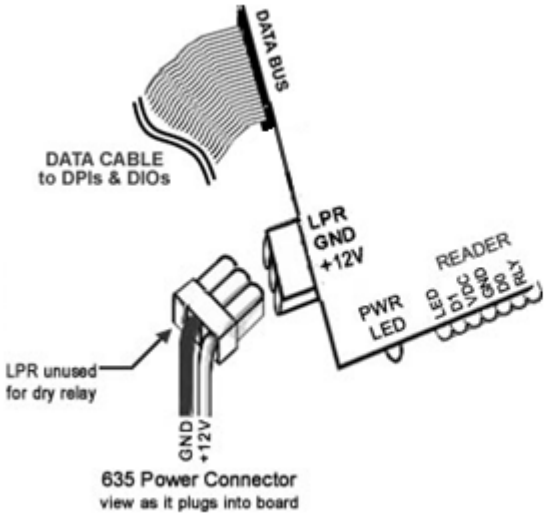
1. Plug in the ribbon cable to the DPI board

2. Make sure the ribbon cable is properly seated and connected to the CPU as well.

CPU POWER AND DATA RIBBON CABLE



DPI POWER AND DATA RIBBON CABLE



Appendix Q - 635 DPI Installation

[STEP 12] DPI FLASHING AND LOADING DATA

NOTES:

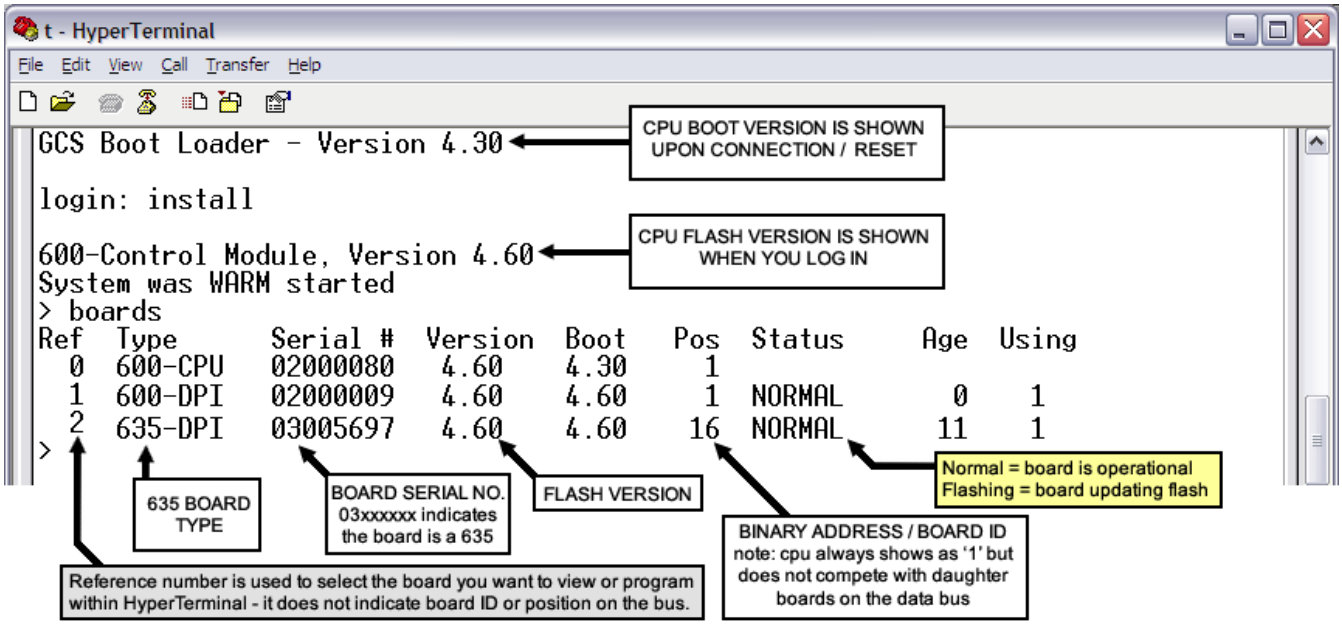
- The CPU must be powered up and data ribbon cable connected in order for the CPU to flash the DPI.
- A new 635 DPI will come from the factory with the current flash version being released for new installs. Software and CPU flash must be brought up to a compatible version.
- Daughter boards auto-update* flash when added to the data bus, if the CPU flash is different. CPU requires 4.60 s28 (min)
- Daughter boards flash one at a time. Boards start flashing within 10 minutes after the CPU Flash is finished. Once flashing starts it only takes 90 seconds to update.

1. Verify the DPI flashes to the correct Sign into HyperTerminal and issue a **boards** command (XP) or use a Web browser to call the IP address of the CPU (any OS).

2. To bypass the 10-min flash, you can issue a ***clear auto*** command delay From HyperTerminal (XP or older) or the Galaxy Config Tool (Vista/Win-7), and induce flashing to any daughter boards.

HyperTerminal View of the 'boards' Command

In this example the technician would physically connect a programming cable between the CPU 9-PIN serial port and a laptop or PC Com port; start HyperTerminal and type the 'install' command and then the 'boards' command to see the boards that are attached to the controller.



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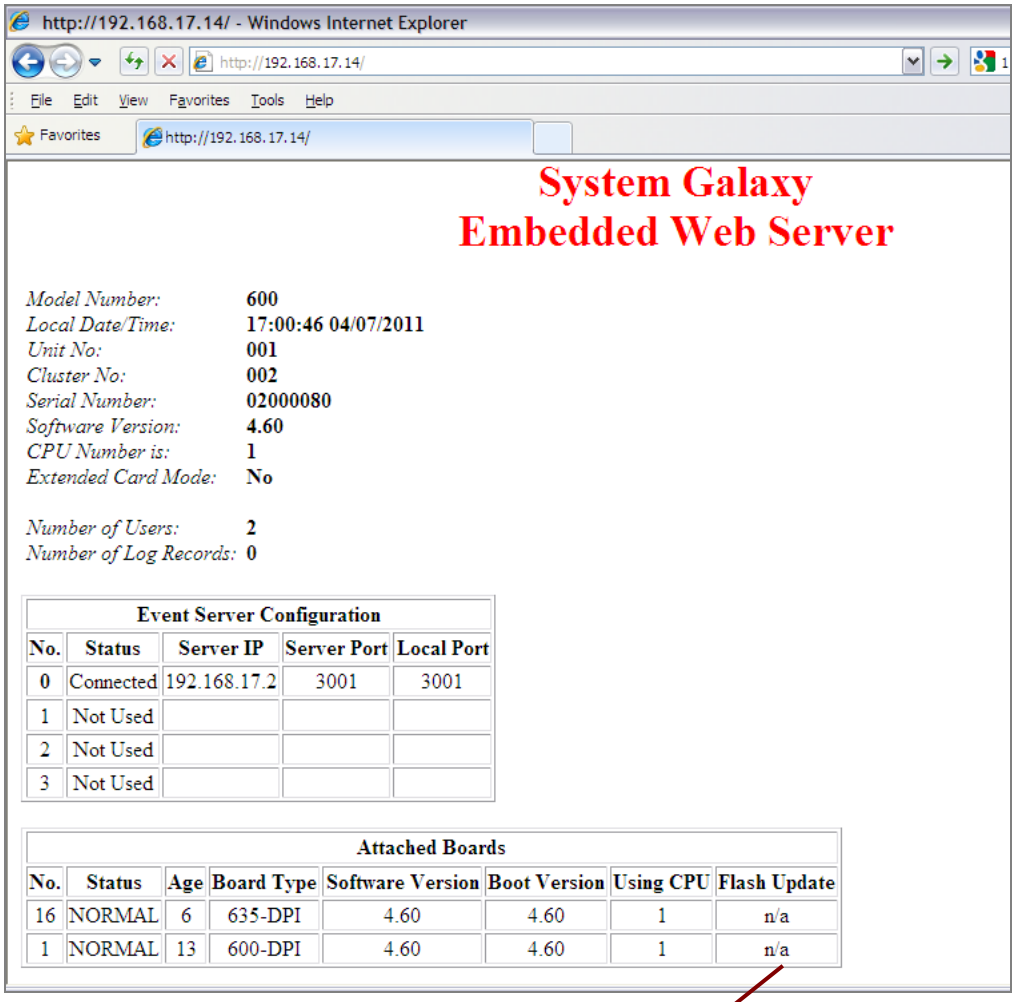
Web Browser View of the Controller and Boards

In this example the technician would type the IP address of the CPU into the browser address field and press the ENTER key to find the controller.



Show N/A if no if no flash has been done.
Shows FLASHING if in the process of updating flash

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[STEP 13] CONNECT FIELD DEVICES

- Connect your field devices if you have not already done so.

[STEP 14] LOAD DATA TO THE PANEL

- Use System Galaxy Loader to load all the data to the panel. See Chapter 2 of this manual or use the Software User Guide to find details on how to use the GCS Loader.

[STEP 15] WALK TEST YOUR DEVICES

- Use the instructions in Chapter 2 of this manual to assist you with walk-testing your newly installed board and its devices.