System Galaxy
Hardware Manual

Version 2.4
June 19, 2004

Revision History

1.0	First Release 06/22/2000
1.1	08/18/2000 – updated diagrams
1.2	09/06/2000 – updated diagrams, added CCTV string chart to Appendix
1.3	11/22/2000 – added Lantronix Configuration section
2	6/19/2002 -- updated for SG version 4.5
2.1	11/26/2002 -- reformatted, added AMM Aux, new PRM, Cypress clock, GCS_LantronixConfig
2.2	12/30/2002 -- revised network bridge section
2.3	05/01/2003 -- revised Lantronix programming (Access Dynamic), added Troubleshooting
2.4	06/19/2004 -- added 508i documentation from addendum, added Sagem readers

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System Overview

Introduction

System Galaxy is an enterprise-class integrated access control and security management system. Designed for use in a wide variety of security applications, the **System Galaxy** system allows users to monitor and control many facility and security functions.

The **System Galaxy** system was designed with software and hardware components that combine Access Control, Alarm Monitoring, CCTV, Photo Imaging/Badging, Photo Verification, Elevator Control, HVAC and Lighting within a facility or multiple facilities.

System Components

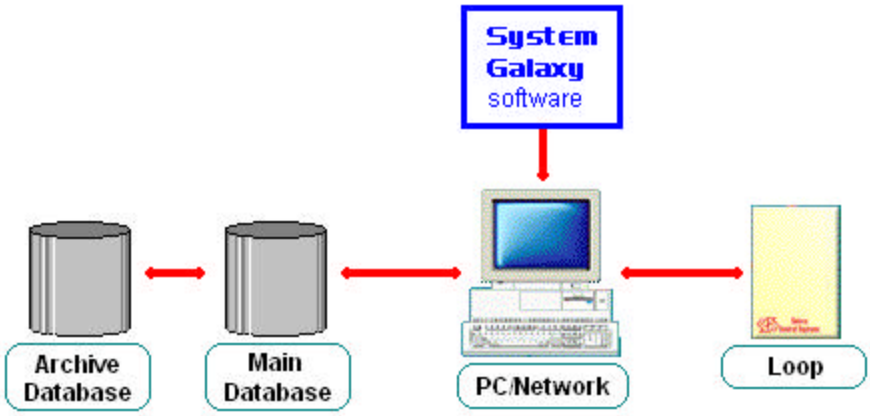
System Galaxy consists of both electronic hardware and software components that work together to control and monitor a facility. The software components are used to configure and monitor the operation of the hardware, while the hardware components implement the actual security and control functions.

The **System Galaxy** hardware consists of five major components: the **System Galaxy** controller units, credential readers, alarm monitoring modules (AMMs), the output relay modules (ORMs), and personal computers (stand-alone or networked).

The **System Galaxy** software is based on a central database that contains all the information necessary for the functioning of the hardware. The database also records all events generated by the hardware. The **System Galaxy** software provides easy access to system monitoring, hardware control, report generation, and CCTV and badging functions.

System Galaxy software can be set up before or after the **System Galaxy** hardware is installed. However, the hardware configuration must be available to provide information such as unit and serial numbers. Installation and Configuration of the **System Galaxy** software is explained in detail in the Software Guide.

The following diagram represents the basic interaction between all the elements of **System Galaxy**.



Site Plan

The first step to a successful installation is to make a site plan. This is a drawing indicating the location of each component of the access system. It should include the controllers, power supplies, PC(s), card readers and/or keypads, door contacts, door strike sensors, all alarm points and all wiring lengths. Have the customer provide blueprints of the building or buildings to assist you with this task. It is very helpful to have access to the electrical drawings as well. **Always remember to have your site plans approved by the local regulatory agency to assure that your installation will conform to all safety codes.** When drawing any site plan, keep the following recommendations in mind:

1. Keep all wire (power, network, strike, door sensor, alarm and reader) well away from high frequency and high power lines. If the crossing of these lines is unavoidable, do so at a 90-degree angle. This minimizes the electrical interference, which could disrupt the system's normal operation.

2. Use 22 AWG (Beldon #9946 - PVC rated) shielded wire for readers, Alarm Monitoring Modules, and Output Relay modules; 22 AWG shielded twisted pair for network wiring (Beldon #8723 - PVC rated); and 18 AWG shielded wire for door release connections. The shields should be grounded at the controller end only. Dedicated conduit is highly recommended for the wiring. Be aware of any special requirements for plenum-rated cable.

3. The controller should be centrally located in reference to the doors and/or alarm points that it controls. This will prevent many long wire runs. It should also be located in a secure area to prevent tampering.

4. If the distance between network controllers exceeds 1000 feet (at 9600 baud), line drivers or short haul modems are required. If the distance between controllers includes electrical interference, fiber connections may be required for clean operation.

PC Requirements

The computer system requirements vary if you are configuring a Stand-Alone PC, Network Database Server, or Network Client. Please refer to the appropriate section for the minimum requirements for your system.

Minimum Requirements for a Stand-Alone Configuration

- IBM Compatible PC with an Intel® Celeron ® 500 MHz processor (or higher)
- 128 Mb of RAM
- Windows NT ® Workstation 4.0 with Service Pack 5, or Windows 2000, or Windows XP
- Microsoft® Internet Explorer version 4.0 or higher (cannot be replaced by Netscape® Navigator)
- 2 GB of free hard drive space to install System Galaxy; more space needed depending on size of database.
- Standard graphics card capable of 24-bit color at 1024 x 768 resolution
- 17" monitor (or larger)
- Standard Parallel Port
- COM (serial) ports as required:
  - One COM port per direct-connection loop
  - An additional COM port if using an RS-232 programming reader
  - One COM port if using a serial Port UPS
- One serial Port UPS (recommended)
- Any Windows® compatible printer for report printing

Minimum Requirements for a Network Configuration

A Network Configuration requires setting up both a **Network Database Server** and a **Network Client**, each of which has different system requirements. Please refer to the appropriate section when setting up the system.

Network Database Server

Note: the recommended size of the Database Server depends on the amount of traffic that the system will generate. If you will be using **System Galaxy** for a large system (multiple loops, or a constant stream of events), **consider upgrading the database server to improve your performance**

- IBM Compatible PC with an Intel® Pentium II ® 300 MHz processor (or higher)

- 128 Mb of RAM (at least)
- Windows NT® Server 4.0 with Service Pack 5, or Windows 2000, or Windows XP
- Hard drive space according to size of database.
- Standard graphics card capable of 24-bit color at 1024 x 768 resolution
- 15” monitor (or larger)
- One serial (COM) port
- One serial port UPS
- One NIC (network card)

Network Client

- IBM Compatible PC with an Intel® Pentium II ® 300 MHz processor (or higher)
- 128 Mb of RAM
- Windows NT® Workstation 4.0 with Service Pack 5
- Microsoft® Internet Explorer version 4.0 or higher (cannot be replaced by Netscape® Navigator)
- 2 GB of free hard drive space to install System Galaxy
- Standard graphics card capable of 24-bit color at 1024 x 768 resolution
- 17” monitor (or larger)
- Standard Parallel Port
- COM ports as required:
- One COM port per direct-connection loop
- An additional COM port if using an RS-232 programming reader
- One NIC (network card)
- Any Windows® compatible printer for report printing

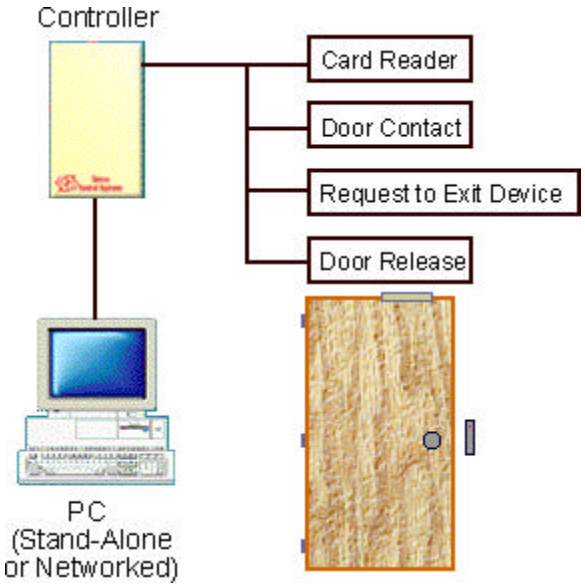
The above specifications are minimum requirements only and are subject to change with the addition of software modules. Please contact Galaxy to ensure these are the latest specifications.

NOTE: ANY deviation from these minimum requirements can cause **System Galaxy** to not function, or to operate with degraded performance.

Simple System Configuration

The simplest system configuration would be one controller with one Dual Port Interface card, connected to one card reader and the associated door controls. The card reader and door controls would be located at the point of entry.

Cabling between the card reader and the controller allows data to be sent to the controller and status information to be sent back to the reader indicator lights. Additional cabling allows for the control of a door release and a sensor signal to be sent to the controller when the door is opened.



The Dual Port Interface card provides the surge protection necessary to protect the controller's CPU in the event that the controller receives a surge. The controller also provides the capability of monitoring and controlling alarm points. In addition to access control, alarm devices can be monitored and outputs can be activated, by simply configuring an **Input/Output Port** or adding an **Alarm Monitoring Module,** and/or **an Output Relay Module.**

Most small installations will consist of two to eight entry points connected to a single controller. For systems with more than eight points of entry, multiple controllers are connected in a network ("loop") with one controller acting as the primary unit and the others as secondary units. Only the primary controller is connected to a PC, either by an RS-232 connection, a modem connection, or a TCP/IP connection.

Only one personal computer is required to program and monitor the system regardless of the number of controllers in a system. However, multiple computers can be used in a **System Galaxy** System.

500 Series Controller - Description

Introduction

The 500 Series controller is the central connection and control point for all the hardware. All system functions, such as cards being granted access and alarm devices monitoring the system, are controlled by this unit. In addition, all system events, such as card reads and alarm events, are recorded by the 500 Series control units for eventual transfer to the PC. Up to 10,340 events are recorded in the controller buffer before the oldest event is replaced by the most recent event.

The 500 Series of controllers includes the 508 model, 502 model, and 508i model.

The 508 and 502 model controllers are the original controller design, and feature a processor board that is mounted on the interior of the controller door.

The 508i controller is a new version of the System Galaxy 500 series controller. The main feature of this controller is the "native IP", which allows a **10Mb** Ethernet connection via cat-5 cable connected directly to the CPU of the controller. The controller CPU is also new, and now connects to the backplane directly, without the use of ribbon cables.

The 508i controller requires at least the **version 6 maintenance release** of the System Galaxy software in order to function; it requires the latest version of the Loader and Zlink that are included in that package. Please install the 508i upgrade patch before upgrading the hardware.

The 508i controller can be used in a loop with other 500 series controllers (508 and 502 models), as long as the software is the correct version and all the controllers are running the same version of Flash.

508/502/508i Specifications

Controller Enclosure Dimensions: 21.00” x 14.00” x 6.25”: The controller enclosure is designed to be wall mounted.

Input Power: 12 VDC @ 2 amps; minimum: 11.5 V, maximum: 14.0 V. This powers all boards, readers, AMMs, and ORMs. **Lock Power and ORM relay power must be provided separately**. When using more than four proximity readers on one controller, it is necessary to use an additional power supply to power the additional readers. Simply power the additional readers off of the second power supply instead of off the back plane. Most biometric readers must also be separately powered. Be sure to common the grounds between the power supplies.

Port Output: Form-C SPDT contacts; 24 VDC @ 1.5 amps maximum. Each port circuit provides relay contacts for controlling external devices.

PC to Controller Communications: Serial Asynchronous RS-232. Interfaces at 9600 baud.

Connections: Straight lead barrier strips. All cable should be shielded and connected to the Power Supply Ground (the YELLOW pin of each port). **DO NOT USE THE CONTROLLER CHASSIS FOR GROUND!**

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

Connection	Distance	Wire	Beldon #
PC to 500 controller (RS-232):	50 ft.	22 AWG 4 conductor twisted pair	8723
500 controller to Modem (RS-232):	50 ft.	22 AWG 4 conductor twisted pair	8723
500 controller to 500 at 9600 baud:	1000 ft.*	22 AWG 4 conductor twisted pair	8723

*Galaxy-provided line drivers can be used to go longer distances between controllers. If electrical interference is present between controllers, fiber connections are recommended for clean operation.

All Galaxy readers:	2500 ft.	22 AWG 10 conductor	9946
All other readers:	500 ft.	22 AWG 10 conductor	9946
500 to AMM:	500 ft.	22 AWG 10 conductor	9946
500 to ORM:	100 ft.	22 AWG 10 conductor	9946*
Lock Hardware: ----		18 AWG 2 conductor minimum	

***Please note that these Beldon numbers refer to PVC-rated cable, not plenum-rated cable.**

508/502 Central Processing Unit

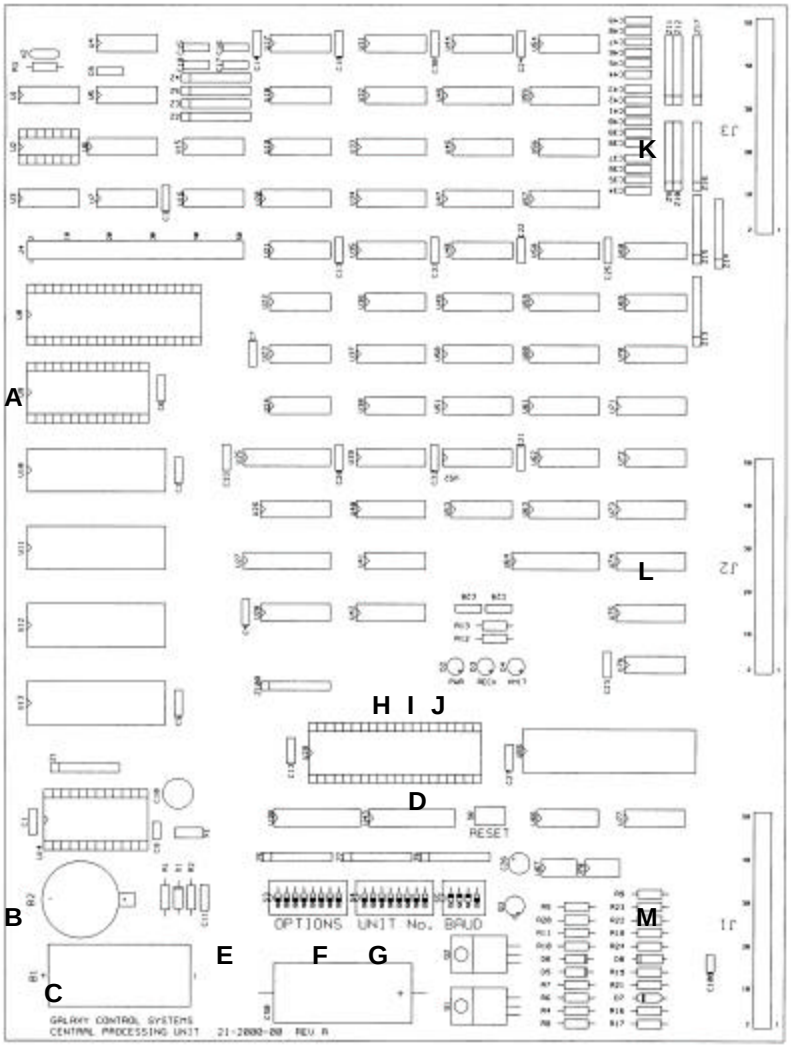
The Central Processing Unit (CPU) is the intelligence of the Galaxy controller. It is responsible for all decisions made by the system. It processes data consisting of card/PIN codes, door sensors, manual egresses, alarm conditions, network messages and PC data. The CPU generates signals for the door releases, reader LEDs, output relays, and controls network and PC communications.

The CPU board has a smoked Plexiglas cover protecting it, which must be removed to gain access to the system dip switches and batteries. This cover should be reinstalled to protect the CPU from damage. The illustration on the following page is of a Galaxy 500 Series CPU.

The CPU includes Option Switches, Unit Number Switches, Baud Switches, a Reset Switch, LEDs, and Batteries. Each of these elements is discussed in the following sections.

Controller CPU Components

A = EPROM chip
B = Clock battery
C = Memory battery
D = Reset button
E = Option switches
F = Unit # switches
G = Baud rate switches
H = Power LED
I = Receive LED
J = Transmit LED
K, L, M = Connectors for ribbon cables from backplane



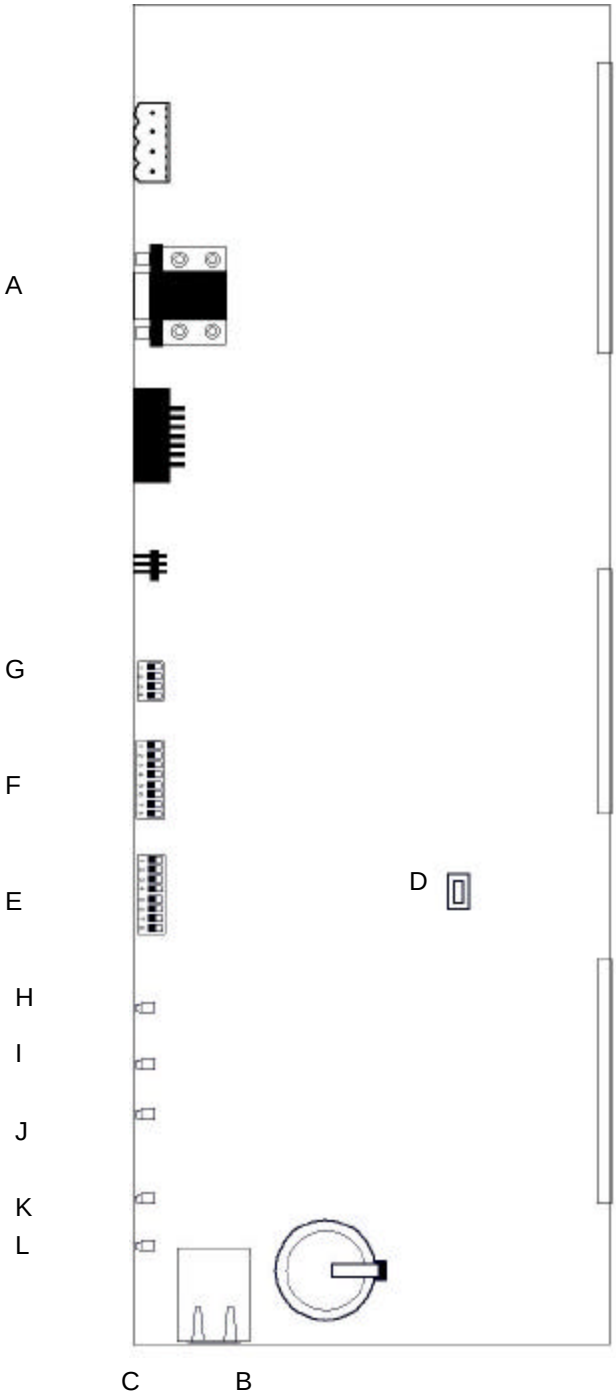
508i Central Processing Unit

The Central Processing Unit (CPU) is the intelligence of the Galaxy controller. It is responsible for all decisions made by the system. It processes data consisting of card/PIN codes, door sensors, manual egresses, alarm conditions, network messages and PC data. The CPU generates signals for the door releases, reader LEDs, output relays, and controls network and PC communications.

The CPU includes Serial Ports, a Cat-5 Ethernet jack, Option Switches, Unit Number Switches, Baud Switches, a Reset Switch, LEDs, and a Battery. Each of these elements is discussed in the following sections.

Controller CPU Components

A = DB9 Serial Port (J5)
B = Clock, Memory battery
C = Ethernet Jack
D = Reset button
E = Option switches
F = Unit # switches
G = Baud rate switches
H = Power LED
I = Receive LED
J = Transmit LED
K = LAN LED
L = LINK LED



508/502 Option Switches (S3)

The OPTION (S3) switch bank is located near the bottom of the CPU board. This bank of switches enables certain unique functions for the panel. Below is a description of these switch functions.

Switch 1 – Reset Mode

In the up position, this switch deletes, or "COLD STARTS", the controller data memory when the controller reset button is pushed. The controller programming data will have be reloaded from the system database. FLASH programming is not affected.

The controller is shipped with this switch in the up position so that it has a clean start when it is initially powered on at the site. Switch 1 should be placed in the down position upon power-up of the controller.

With Switch 1 OFF (down), the system will reset with a "WARM START." A warm start does not wipe out the controller memory.

A system reset can occur for any of these reasons:

1. The reset button is depressed.
2. The CPU system voltage drops below 11.5 volts
3. The CPU automatically resets itself based on a built-in watchdog timer.
4. A Power surge occurs.

In the down position (switch 1 off), and with a fresh Lithium memory-backup battery installed, a warm reset will occur when any of these conditions occur.

A reset command can also be issued by the software from the PC. The type of reset (warm or cold) is determined by the software.

Switch 2 – Processor Mode

In the up position, Switch 2 forces the controller to always boot in EPROM Mode. This is a very basic mode in which communication can be established to the controller, but no data or functionality may be loaded to the controller.

In the down position, Switch 2 forces the controller to always boot in FLASH mode. The controller must be in Flash mode to function properly.

Switches 3 and 4 - Communication Method

Combinations of settings for switches 3 and 4 set the method of communication between the controller and the PC to which it is connecting.

Switch 3 **down**	and	Switch 4 **down**	= Direct cable connection
Switch 3 **up**	and	Switch 4 **down**	= Modem connection
Switch 3 **down**	and	Switch 4 **up**	= Ethernet/network connection

Switch 3 up and Switch 4 up = invalid setting.

If you are setting up a modem connection, make sure the controller has a “direct” phone number. It cannot use an extension or other type of phone connection that is interrupted by a switching system that would require dialing more numbers or being connected by a receptionist.

If you are setting up an Ethernet/network connection, you must use a Lantronix MSS-100 device that converts an RS 232 signal into an Ethernet signal (10-100 Mb). The network must also use a TCP/IP format.

If you are attaching a Cypress Clock to a secondary controller using the com port of that controller, Switches 3 and 4 of that controller must be UP. See the section "Cypress Clock" for more information.

Switches 5 and 6 – Network Bridge

If a network bridge is being established between two loops, the **Extending Secondary** should have **Switch 5 in the up position**.

The **Remote Primary** should have **Switch 6 in the up position**, which forces it to be a primary controller.

If the controller is not part of a network bridge, Switches 5 and 6 should be left in the down position.

See the section "Connecting Controllers using a Network Bridge" for more information.

Switches 7 and 8 - are unused at this time.

508i Option Switches (S3)

The OPTION (S3) switch bank is located along the side of the CPU board. This bank of switches enables certain unique functions for the panel. Below is a description of these switch functions.

Switch 1 – Reset Mode

In the up position, this switch deletes, or “COLD STARTS”, the controller data memory when the controller reset button is pushed. The controller programming data will have be reloaded from the system database. FLASH programming is not affected.

The controller is shipped with this switch in the up position so that it has a clean start when it is initially powered on at the site. Switch 1 should be placed in the down position upon power-up of the controller.

With Switch 1 OFF (down), the system will reset with a “WARM START.” A warm start does not wipe out the controller memory.

A system reset can occur for any of these reasons:

5. The reset button is depressed.
6. The CPU system voltage drops below 11.5 volts
7. The CPU automatically resets itself based on a built-in watchdog timer.
8. A Power surge occurs.

In the down position (switch 1 off), and with a fresh Lithium memory-backup battery installed, a warm reset will occur when any of these conditions occur.

A reset command can also be issued by the software from the PC. The type of reset (warm or cold) is determined by the software.

Switch 2 – is unused at this time

With the 508i controller, option switch 2 is unused. It does not set "EPROM mode", as it did in the original 500 series controllers.

Switches 3 and 4 - Communication Method

Combinations of settings for switches 3 and 4 set the method of communication between the controller and the PC to which it is connecting.

Switch 3 **down**	and	Switch 4 **down**	= Direct cable connection
Switch 3 **up**	and	Switch 4 **down**	= Modem connection
Switch 3 **down**	and	Switch 4 **up**	= Ethernet/network connection

Switch 3 up and Switch 4 up = setting for Cypress clock unit (see below)..

If you are setting up a modem connection, make sure the controller has a “direct” phone number. It cannot use an extension or other type of phone connection that is interrupted by a switching system that would require dialing more numbers or being connected by a receptionist.

If you are setting up an Ethernet/network connection, you must use a Lantronix MSS-100 device that converts an RS 232 signal into an Ethernet signal (10-100 Mb). The network must also use a TCP/IP format.

If you are attaching a Cypress Clock to a secondary controller using the com port of that controller, Switches 3 and 4 of that controller must be UP. See the section "Cypress Clock" for more information.

Switches 5 and 6 – Network Bridge

If a network bridge is being established between two loops, the **Extending Secondary** should have **Switch 5 in the up position**.

The **Remote Primary** should have **Switch 6 in the up position**, which forces it to be a primary controller.

If the controller is not part of a network bridge, Switches 5 and 6 should be left in the down position.

See the section "Connecting Controllers using a Network Bridge" for more information.

Switch 7 is unused at this time.

Switch 7 is currently unused.

Switch 8 is unused at this time

Switch 8 is reserved for Galaxy Control Systems technical development team. When option switch 8 is up, the controller allows writing to the boot sector of the CPU.

508/502/508i Unit Number Switches (S4)

To the immediate right of the eight OPTION switches is a bank of switches labeled UNIT NO. The combination of switch positions on this bank determines the Unit Identification number of the controller.

The primary controller of each loop is the controller that connects to the PC. This primary controller must always be assigned Unit Number 000. If there are additional controllers in the loop, each one **MUST** have a unique ID number. Other controller numbers can range from numbers 001 through 254, allowing for systems of up to 255 controllers. There cannot be two controllers on the same loop with the same Unit Number. Controllers on different loops will duplicate unit numbers

It is recommended that secondary units be assigned unit numbers in ascending order starting with Unit '001'. The table below lists the different switch settings for Unit Numbers 000-05. The Appendix lists the switch settings for unit numbers 0 through 99.

0 = Switch Down
1 = Switch Up

Switch #	1	2	3	4	5	6	7	8
Unit #								
00	0	0	0	0	0	0	0	0
01	1	0	0	0	0	0	0	0
02	0	1	0	0	0	0	0	0
03	1	1	0	0	0	0	0	0
04	0	0	1	0	0	0	0	0
05	1	0	1	0	0	0	0	0

You can also use the Calculator tool in Windows to determine the unit number. Choose the Scientific View. With "Dec" selected, type in a number (for example, "5" for unit number 5). Change the format to "Bin" (binary). The equivalent binary number will appear, where the number 1 represents the switch up, and the number 0 represents the switch down, starting with the switch on the left.

508/502/508i Baud Switches (S5)

To the right of the UNIT NO. switches, there is a bank of four switches labeled BAUD. These are used to select communication parameters and must match those selected on your PC or modem. Following is a list of the possible switch combinations and the settings associated with each of them.

9600: All switches in the ON (up) position. (Factory Default)

4800: Switches 1 and 3 in the ON (up) position, Switches 2 and 4 in the OFF (down) position.

2400: All switches in the OFF (down) position.

These switches should be left in the factory default position for 9600 baud unless a change is recommended by Galaxy Technical Support.

508/502/508i Reset Switch (S6)

Near the center of the 508/502 CPU and in the lower half of the 508i CPU is a push-button labeled RESET. This button is most commonly used to reset the controller in the event of a lock-up.

The reset button is also used if a switch setting change is necessary. When the controller is first powered up, the CPU reads the UNIT No. and OPTIONS switches. If any of the OPTION or UNIT NO. switches are

changed, a reset must be performed. Simply press the button and release. The new parameters will then take effect.

ALWAYS MAKE SURE OPTION SWITCH ONE IS IN THE DESIRED POSITION (WARM OR COLD RESET) BEFORE PRESSING THE RESET BUTTON. (See the section on "Switch 1 - Reset Mode" for more information).

50/502 LEDs

There are three indication LEDs on the CPU that provide some basic information about the system. Each is labeled by its function. During normal operation, all three should be lit, however, the RECV and XMIT LEDs will be slightly dimmer than the PWR LED.

- **PWR** should be brightly lit, indicating the system is receiving +12 VDC. However, the PWR LED will light with less than 12 VDC. Always check DC voltage between J9 pins 8 and 9 to verify that the controller is receiving approximately +13.8 VDC.
- **RECV** indicates that data is being received through the network input path.
- **XMIT** indicates that data is being transmitted by the CPU.

508i LEDs

There are five indication LEDs along the edge of the CPU that provide some basic information about the system (the original 500 series had three). Each is labeled by its function.

The first three are labeled PWR (Power), RECV (Receive), and XMIT (Transmit). During normal operation, all three should be lit, however, the RECV and XMIT LEDs will flicker.

- **PWR** should be brightly lit, indicating the system is receiving +12 VDC. However, the PWR LED will light with less than 12 VDC. Always check DC voltage between J9 pins 8 and 9 to verify that the controller is receiving approximately +13.8 VDC.
- **RECV** indicates that data is being received through the loop input path.
- **XMIT** indicates that data is being transmitted by the CPU to the loop.

The LAN and LINK LEDs are new with the 508i CPU. The LEDs will respond to any detected Ethernet traffic. They are only valid when a TCP/IP Ethernet connection is being used between the controller and the host PC.

- **LINK will be lit when a valid Ethernet connection is detected.**

- **LAN will blink as data is detected on the Ethernet connection.**

508/502 Batteries (B1 and B2)

The CPU memory and clock components are under battery backup protection in the event of power loss. The batteries may be removed from their respective sockets to save battery life before the unit is installed.

The memory battery is a standard BR 2/3 A, 3V lithium battery and can retain the system memory for a total of 90 days of down time. Galaxy recommends changing this battery semiannually as routine maintenance. Note that battery is shipped in place with a strip of paper blocking the connection. The strip of paper must be removed in order for the battery to function.

The clock battery is a coin type rated for ten years. Both batteries are socketed for easy replacement.

508i Battery (B1)

The CPU memory and clock components are under battery backup protection in the event of power loss. In the 508i CPU, there is one battery to support both these functions.

The battery is a standard CR2354, 3V lithium battery. Galaxy recommends changing this battery semiannually as routine maintenance. Note that battery is shipped in place with a strip of paper blocking the connection. The strip of paper must be removed in order for the battery to function.

508i Jumpers

The Jumpers are used to select the power that is sent to the DPI's. These jumper settings SHOULD NOT BE CHANGED.

508i Unused Connectors (J7, J8)

The J7 and J8 connectors are for development use only

508/502 Ribbon Cables

The Central Processing Unit (CPU) makes all decisions based on inputs received from external devices such as readers, door sensors, alarm inputs etc. All of these devices are attached to the Back Plane. There are three 50-conductor ribbon cables that carry all the signals which are exchanged between the Back Plane and the CPU. J17, J18 and J19 are the connection points for these cables. The controller is supplied with these three cables pre-mounted to the box with one end connecting to the back plane and the other to the Central Processing Unit.

508/502/508i Back Plane

The Back Plane is the connection point for all system wiring, including readers, devices, and network connections.

All system device wiring (readers, inputs, outputs) is connected to the Back Plane via straight lead barrier strips (single 18 AWG maximum). Each strip is called a Port.

The controllers are available in 2 models: a 508 model with an 8-port backplane, and a 502 model with a 2-port backplane. The differences between the two models are discussed in the next sections.

Each port on a controller can be used as one of the following: a reader port, an Alarm Monitoring Module port, an Output Relay Module port, an Input/Output Port, or an Elevator Port.

The port type specified in the software must match the device wired to the port. Consult the **System Galaxy** Software Guide for instructions on how to program the software.

A port will not function unless a Dual Port Interface card (DPI) is plugged into the correct connection on the back plane for each pair of ports. The DPI completes the connection between the port device and the Central Processing Unit. It is recommended that the Dual Port Interface cards not be installed until the port wiring has been completed.

If this is an older Galaxy system that is being upgraded, please contact Galaxy's technical support staff to determine whether or not the existing DPIs will function with all port types.

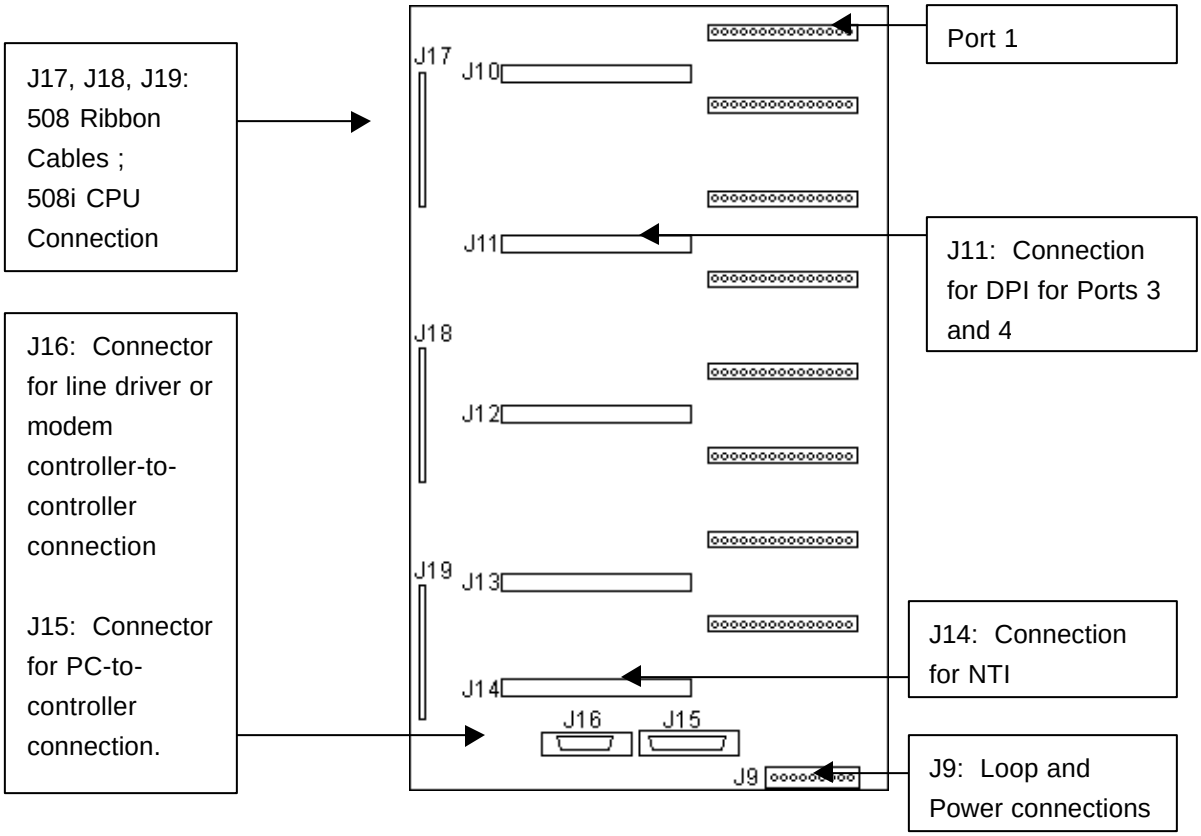
508/508i Model Back Plane

On the right side of the 508 backplane are 8 straight lead barrier strips, known as ports. These are the connection points for devices in the system (readers, AMMs, ORMs, etc.)

On the lower right corner of a 508 model back plane there is a 9 pin terminal strip connector (J9). This is where additional controllers are attached, and system power is applied.

Located at the bottom of the board are two female DB-style connectors. The larger of the two (J15) is where a PC or modem is attached to connect a primary controller back to a PC. The second connector (J16) is provided for those installations that may require line drivers or modems to be used for network communications rather than the normal hard wire connections.

Located along the left-hand edge of the back plane, there are three 50 pin connectors labeled J17, J18, and J19. Ribbon cables are attached here, which carry signals between the Back Plane and Central Processing Unit.



Finally, in the center of the board are four 64-pin female connectors labeled J10-J13. A Dual Port Interface board can be inserted into each of these connectors. A Network/Terminal Interface card must be installed into J14, the last 64-pin connector. All Dual Port Interfaces and Terminal Network Interfaces can be inserted and removed without powering down the system.

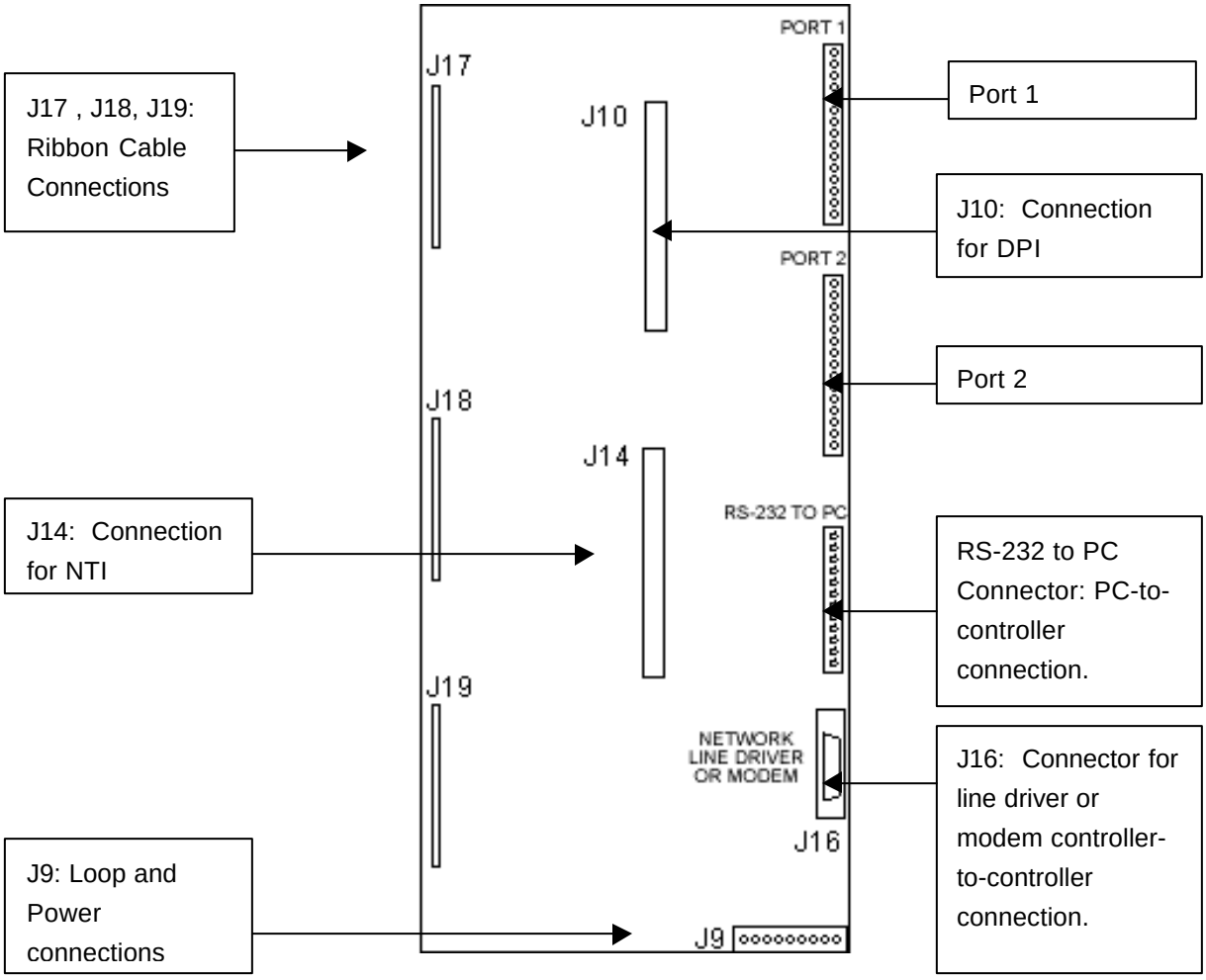
502 Back Plane

On the lower right corner of the 502 model backplane there is a 9 pin terminal strip connector labeled J9. This is where additional controllers are attached, and system power is applied.

There is a terminal strip located along the right edge of the backplane, labeled "RS-232 to PC". This connector is used to connect the Primary Controller of the loop back to the PC.

Below the terminal strip is a DB-style connector, labeled J16, for those installations that may require modems or line drivers to be used for network communications.

Located along the left-hand edge of the Back Plane, there are three 50 pin connectors, labeled J17, J18, and J19. Ribbon cables are attached here which carry signals between the Back Plane and Central Processing Unit.



Finally, in the center of the board are two 64 pin female connectors labeled J10 and J14. A Dual Port Interface board can be inserted into J10 while a Network/Terminal Interface is installed into J14. The Dual Port Interface connector is shared by the two ports. The Dual Port Interface and Network/Terminal Interface can be inserted and removed without powering down the system.

Dual Port Interface (DPI)

The Dual Port Interface is a board that inserts into the Back Plane. All signals from the port connections are routed through a DPI, before passing to the CPU. The DPI contains surge protection necessary to absorb electrical spikes and prevent damage to the CPU and other devices.

Each Dual Port Interface board supports two ports. Four DPIs can attach to the 508 Back Plane using connectors J10 - J13. These connectors are evenly spaced along the center of the Back Plane. One DPI connects to the 502 Backplane using connector J10. Each DPI connector is keyed to prevent backward insertion. The Back Plane is labeled, designating which ports are supported by each Dual Port Interface board. On a 508 controller, it is not necessary to have all four Dual Port Interfaces installed. If only ports 1 and 2 are to be used, for example, only the DPI that connects to J10 is required.

All wiring should be done prior to installing the Dual Port Interface boards. The system can also be programmed without these boards installed. **The DPIs may be removed and replaced without removing system power.**

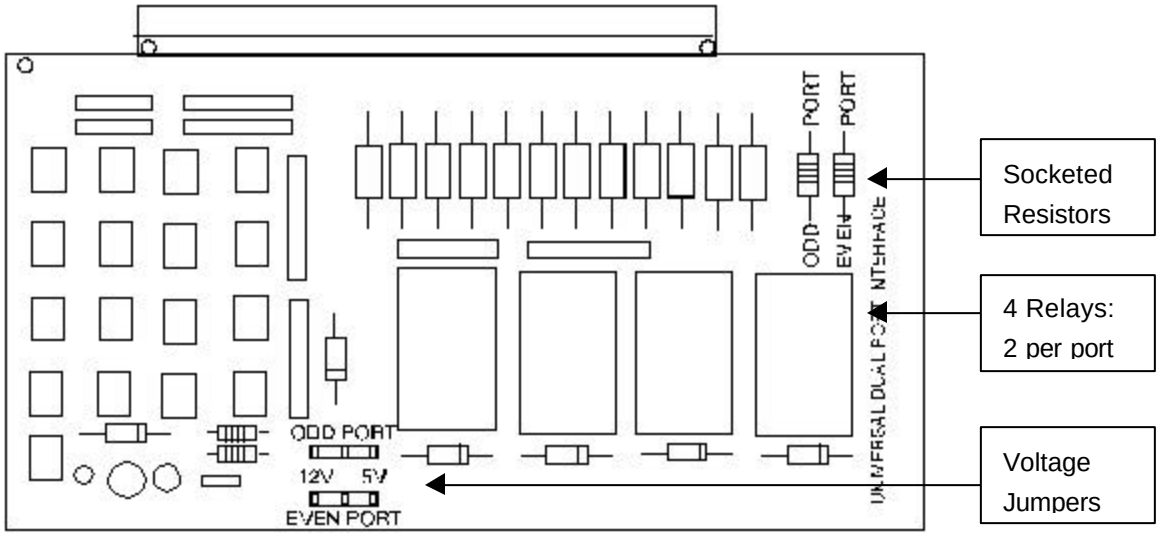
There are two versions of the DPI - an older version that does not support door contact supervision, and a more recent version that does support door contact supervision. Each is discussed below.

DPI - Unsupervised Door Version

The DPIs that do not support door contact supervision are easily identified because they do not have any LEDs or dip switches.

These older version boards each have an odd port voltage jumper (Ports 1, 3, 5, and 7) and an even port voltage jumper (Ports 2, 4, 6 or 8). These jumpers route either 5 volts or 12 volts to each port. **Wiegand, Barcode and most magnetic stripe readers require 5 volts** while Infrared readers, most proximity readers and Alarm, Output, Elevator and I/O ports require 12 volts. **Make sure this jumper is set correctly prior to installing the boards.**

On the older version boards, there is a socketed resistor for each port. This resistor protects the board in the event of a short circuit condition, and can be replaced if possibly damaged by a surge.



DPI - Supervised Door Version

The DPIs that support door contact supervision can be identified by the eight LEDs and three banks of dip switches on the board. These DPIs only work with System Galaxy software version 5 or higher, with Flash version 1.50 and higher.

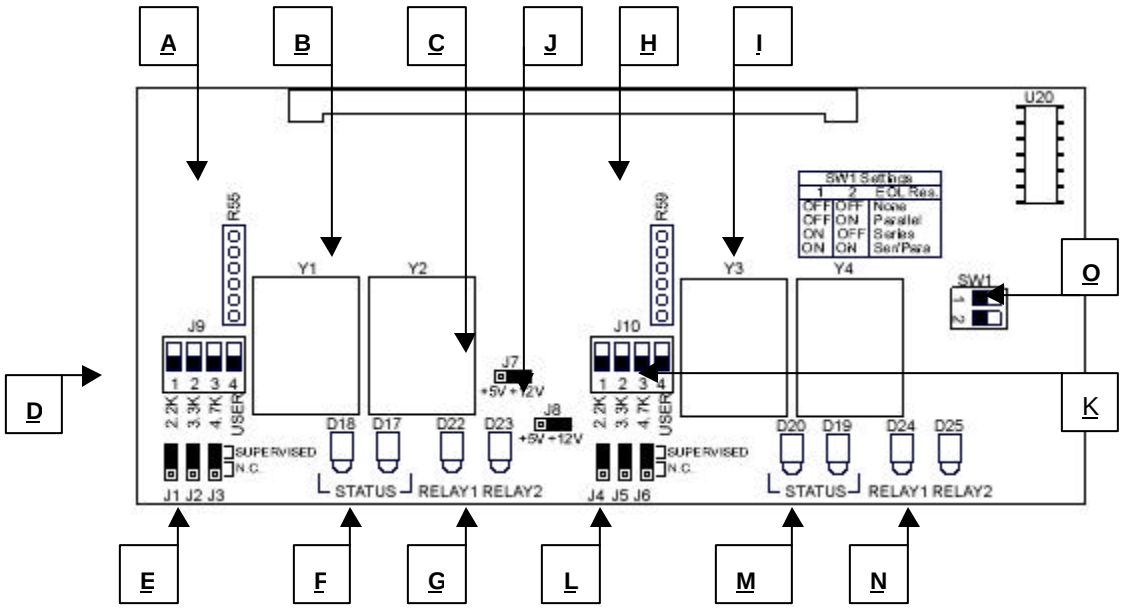
Components - Odd Port Functions

A R55 - Socket for User Supplied Resistor (if not using 2.2K, 3.3K, or 4.7K resistor)
B Y1, Y2 - Relays 1 and 2
C J7 - Jumper, select +5 or +12 Volts
D J9 - Dip Switches, select Door Contact Supervision Resistance (if USER, provi de resistor in R55)
E J1, J2, J3 - Jumpers, select Supervised or Normally Closed (all three must use same position)
F D18, D17 - Green and Red LEDs, Door Contact/REX status
G D22, D23 - Yellow LEDs, Relay 1 & Relay 2 status

Components - Even Port Functions

H R59 - Socket for User Supplied Resistor (if not using 2.2K, 3.3K, or 4.7K resistor)
I Y3, Y4 - Relays 1 and 2
J J8 - Jumper, select +5 or +12 Volts
K J10 - Dip Switches, select Door Contact Supervision Resistance (if USER, provide resistor in R59)
L J4, J5, J6 - Jumpers, select Supervised or Normally Closed (all three must use same position)
M D20, D19 - Green and Red LEDs, Door Contact/REX status
N D24, D25 - Yellow LEDs, Relay 1 & Relay 2 status

O SW1 - Dip Switches, select End Of Line Resistance Configuration for BOTH PORTS.



Setting Voltage for Port

Each port must have the voltage set to either +5V or +12V, depending on the device to be attached to the port. Wiegand, Barcode and most magnetic stripe readers require 5 volts while Infrared readers, most proximity readers and AMM, ORM, Elevator and I/O ports require 12 volts.

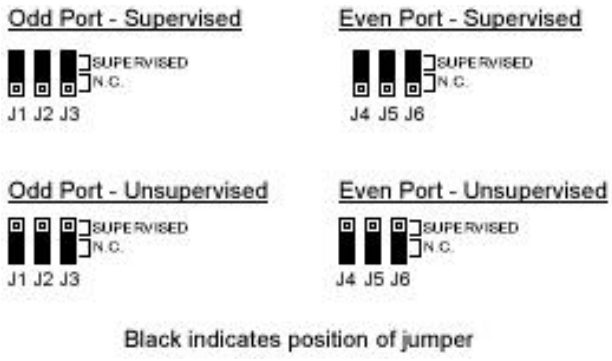
The J7 jumper sets the voltage for the odd port, and the J8 jumper sets the voltage for the even port. The +5V position is to the left, and the +12V position is to the right. Be sure to set the correct voltage before installing the board.

Setting Supervision On/Off for Port

Note: Supervision must also be turned on in the System Galaxy software to function correctly. See the Software Guide for more information.

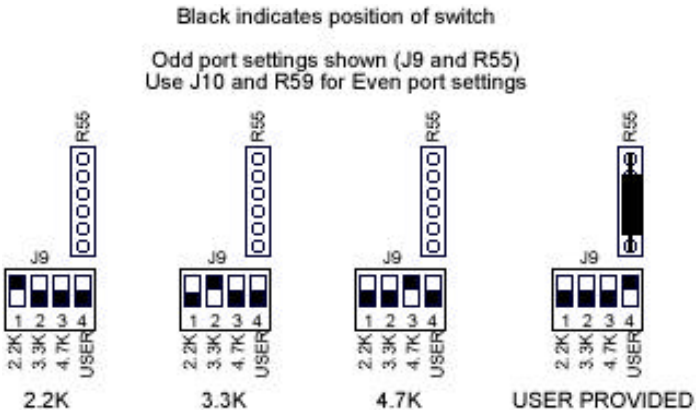
To set a port to the supervised mode, follow these steps:

- Place the **three supervision jumpers** (**J1, J2, and J3** for odd port; **J4, J5, and J6** for even port) in the "supervised" position (the upper two pins). All three jumpers must be in the same position. If the port is not being supervised, put all three jumpers in the N.C. (Normally Closed) position.

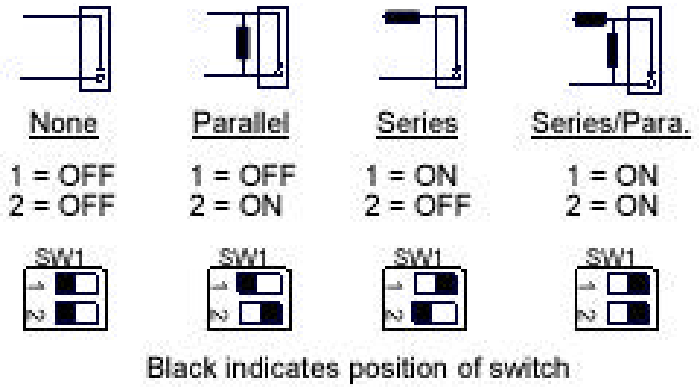


Black indicates position of jumper

- Use the **resistance dip switches** (**J9** for odd port, **J10** for even port) to select the resistance value that matches the end-of-line resistance values used at the door contact - 2.2K, 3.3K, or 4.7K. If the resistance value does not match any of these three, select **USER** and place a resistor in the socket (**R55** for odd port, **R59** for even port) that matches the resistance value being used. Put the dip switch in the UP position to select a value. Only one value can be selected.



- Use the **dip switches at SW1** to select the End of Line Resistance configuration. This will apply to both the odd and even port. **Both ports must use the same configuration.** The "ON" position is to the right.



Status LEDs

The status LEDs are D18 and D17 for the odd port, and D20 and D19 for the even port.

For unsupervised doors, the behavior of these LEDs indicate the condition of the REX device. For supervised doors, and LEDs indicate the condition of both the REX and the door contact.

The status of a supervised door contact can be determined by the combination of the Red and Green LEDs. **If the door is not supervised, the LEDs will not accurately represent the door contact status.**

Green (D18 odd, D20 even)	Red (D17 odd, D19 even)	Supervised Door Contact Status
OFF	OFF	Door Open
OFF	ON	Trouble Open
ON	OFF	Normal
ON	ON	Door Shorted

The status of the REX device is represented by blinking of the LEDs. **The status of the REX device is accurate whether or not the door is supervised.**

Green LED blinking (D18 odd, D20 even) = REX is INACTIVE
Red LED blinking (D17 odd, D19 even) = REX is ACTIVE

Relay 1, Relay 2 LEDs

The LEDs labeled Relay 1 and Relay 2 (D22, D23 for odd port; D24, D25 for even port) represent the status of the relays. **The status of the relay LEDs is accurate whether or not the door is supervised.** When the relay is active, the LED is ON. When the relay is inactive, the LED is OFF.

Network/Terminal Interface

The Network/Terminal Interface plugs into the 508 or 502 Back Plane through connector J14. This is the bottom-most slot on the Back Plane.

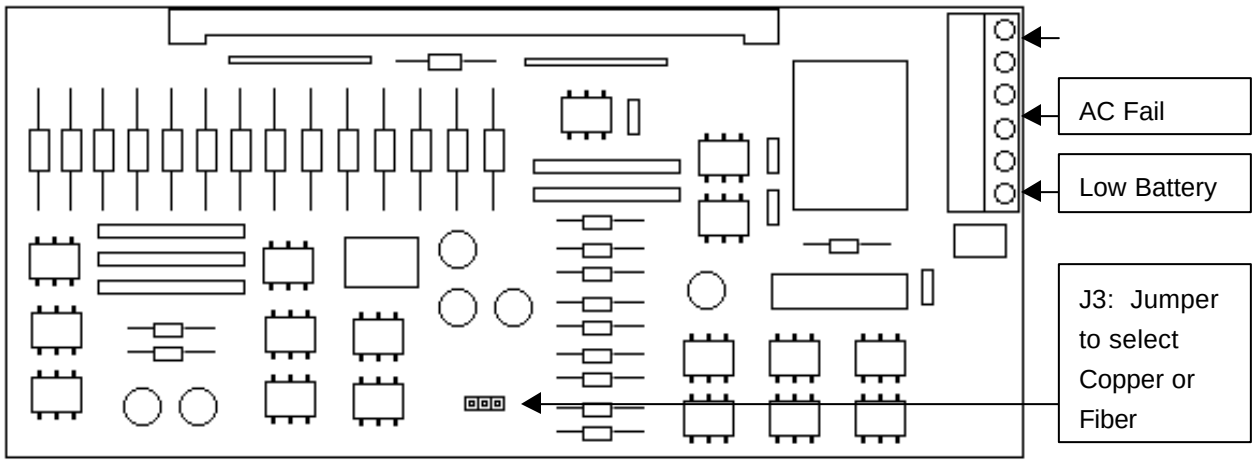
All of the PC and network communication drivers/receivers are found on the Network/Terminal Interface board. The Network/Terminal Interface board is also responsible for the surge protection between controllers and between the PC and primary controller. This protection is designed to prevent potential CPU damage due to electrical surges on the network and communication lines.

The Network/Terminal Interface is a vital communication link in the system. If it is not installed, there will not be any communication between the personal computer and primary controller, nor between the primary and the secondary controllers.

The AC Failure and Low Battery connections on the Network Terminal Interface allow the unit's power status to be monitored by **System Galaxy**'s software. If using the UL version of the panel, these connections should be wired to a UL rated Power supply. The Tamper connection can connect to an optional enclosure Tamper switch.

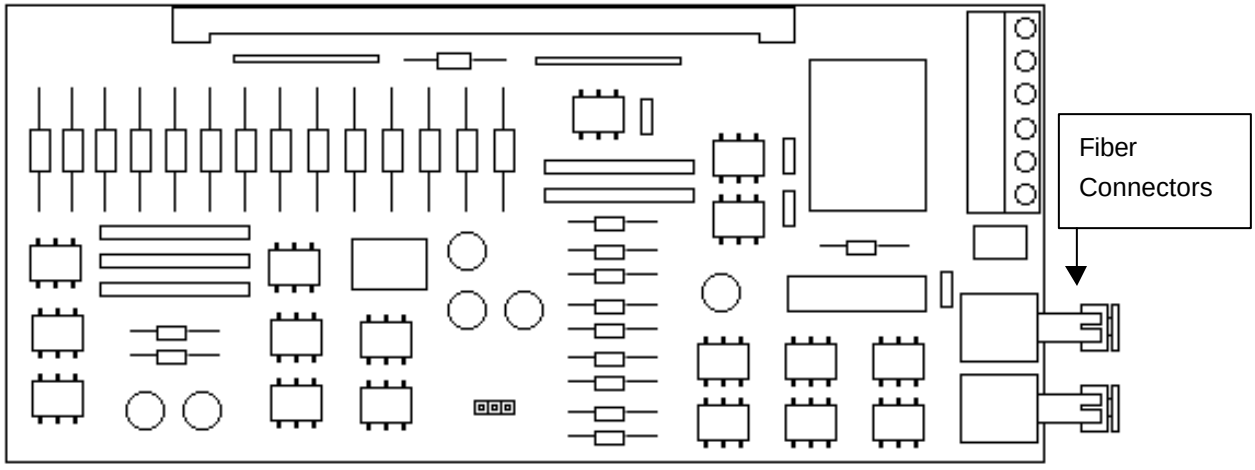
The Low Battery, AC Fail, and Tamper must all be Normally Closed dry inputs to report safe conditions. These inputs are shipped with jumpers in place; the jumpers should be left in place if the input is to be unused.

Tamper



Fiber Option

The Network/Terminal Board is also available to support fiber optic connections between controllers (see below). A fiber-ready board has two additional connections on the board for attaching the fiber. The jumper (J3) must be set to "fiber" if the board is receiving from fiber. See the section "Using Fiber Between Controllers" (pg. 37) for more information on installing fiber between controllers.



500 Series Controller - Installation

508/502 Main Installation Checklist

Step:	Refer to:
1. Mount chassis.	pg. 34
2. Wire to other controllers (J9).	pg. 35
3. Wire power supply (J9). This allows the battery to begin charging.	pg. 44
4. Set Option Switches 3 and 4 for the correct Connection type.	pg. 18
5. Set Option Switches 5 and 6 if controller is part of network bridge.	pg. 18
6. Set Unit Number Switches.	pg. 20
7. Install all necessary Dual Port Interfaces.	pg. 26
8. Install the Terminal/Network Interface.	pg. 31
9. Connect the personal computer to the Primary Controller.	pg. 42
10. Connect AC Power and make sure the three LEDs are illuminated.	LEDs - pg. 22
11. Push the Reset Button.	pg. 21
12. Put Option Switch 1 in the down position.	pg. 17

508i Main Installation Checklist

Step:	Refer to:
1. Mount chassis.	pg. 34 (same as 508/502)
2. Wire to other controllers (J9).	pg. 35 (same as 508/502)
3. Wire power supply (J9). This allows the battery to begin charging.	pg. 44 (same as 508/502)
4. Set Option Switches 3 and 4 for the correct Connection type.	pg. 18 (same as 508/502)
5. Set Option Switches 5 and 6 if controller is part of network bridge.	pg. 18 (same as 508/502)
6. Set Unit Number Switches.	pg. 20 (same as 508/502)

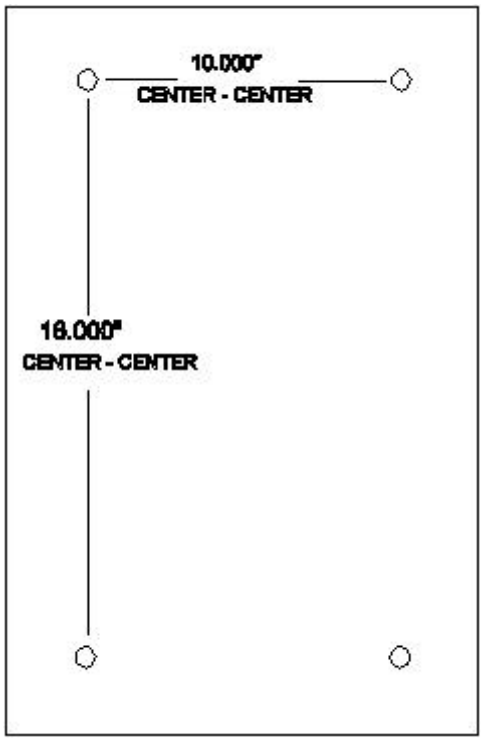
7. Install all necessary Dual Port Interfaces.	pg. 26 (same as 508/502)
8. Install the Terminal/Network Interface.	pg. 31 (same as 508/502)
9. **Connect the personal computer to the Primary Controller.**	**pg. 42**
10. Connect AC Power	LEDs - pg. 22 (same as 508/502)
11. Push the Reset Button.	pg. 21 (same as 508/502)
12. Put Option Switch 1 in the down position.	pg. 17 (same as 508/502)
13. **Program IP address (Ethernet connection only)**	**pg. 45**
14. **Load Flash to Controller**	**pg. 46**

Mounting the Controller - 508/502/508i

The controller enclosure is designed to be wall mounted. Its specifications are 21.00" x 14.00" x 6.25". Four tear-dropped shaped mounting holes are available as shown below. It is not necessary to remove the back plane board to hang the unit. Typically, 1/4" wood screws or anchors with sheet metal screws would be used.

When selecting a mounting location, keep the following points in mind:

- 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. Do not connect Chassis to Cold Water Ground.
- Avoid power transformers and high frequency devices.



Controller to Controller Connections - 508/502/508i

J9 is a 9-position screw terminal connector located on the lower right corner of the Back Plane. This is where networked controllers are attached, the modem relay connections are made and controller power is applied.

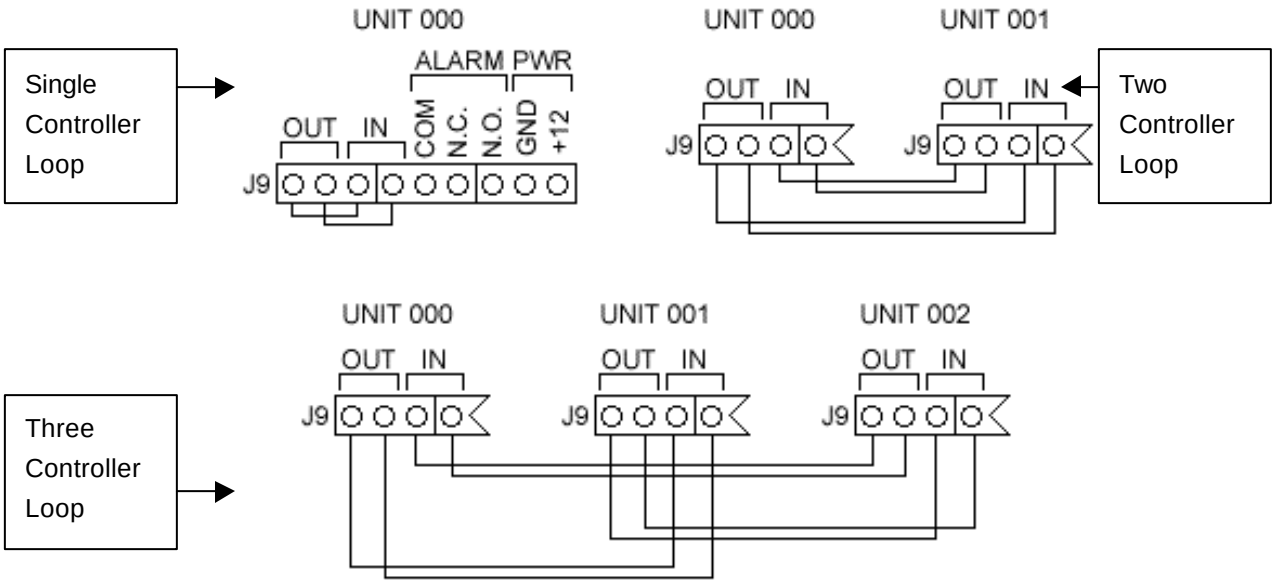
In a multi-controller system, the controllers form a daisy-chain loop around which the controller data travels for all units to utilize as necessary. The main controller is designated as the primary controller, while the rest are called secondaries. The maximum possible number of controllers in one network is 255.

Pins 1 through 4 of J9 are labeled NETWORK . Pins 1 and 2 are OUT and pins 3 and 4 are IN. All controllers transmit network information through Pins 1 and 2 to the next controller. The next unit receives the data on Pins 3 and 4, then retransmits it out on Pins 1 and 2. The data travels completely around the network loop in this manner and is eventually received in by the primary unit's pins 3 and 4. Each Back Plane comes with two jumper wires between Pins 1 and 3 and Pins 2 and 4. These jumpers are required for a stand alone primary so that the controller network is complete. **THESE JUMPERS MUST BE REMOVED WHEN MORE THAN ONE CONTROLLER IS ON THE NETWORK.**

Standard Copper Wiring of Controller Loop

When using standard copper wiring between controllers, the connections for wiring the controllers into a loop are made at the first 4 pins of the J9 connector on the backplane. It is necessary to observe polarity when wiring the network.

The figure below illustrates network wiring for 1, 2 and 3 controller systems.



For multiple-controller loops, the first OUT (pin 1) of the first controller is wired to the first IN (pin 3) of the next controller, and the second OUT (pin 3) of the first controller is wired to the second IN (pin 4) of the next controller. This pattern is repeated until the last controller in the loop. The first OUT (pin 1) of the last controller is wired to the first IN (pin 3) of the first controller, and the second OUT (pin 4) of the last controller is wired to the second IN pin of the first controller.

Two Controller Loop:

	FROM ⟶		**TO**
Unit #	Pin #	Unit #	Pin #
000	OUT (pin 1)	001	IN (pin 3)
000	OUT (pin 2)	001	IN (pin 4)
001	OUT (pin 1)	000	IN (pin 3)
001	OUT (pin 2)	000	IN (pin 4)

For a single-controller loop, place two jumpers in the J9 connections: from OUT (pin 1) to IN (pin 3), and from OUT (pin 2) to IN (pin 4).

Single Controller Loop:

FROM		TO	
Unit #	Pin #	Unit #	Pin #
000	OUT (pin 1)	000	IN (pin 3)
000	OUT (pin 2)	000	IN (pin 4)

When wiring the network, use 4 conductor, 22 AWG (Beldon #8723) shielded, twisted pair cable (unless plenum-rated cable is required). The shield should be attached to ground at one end only, for each segment of the loop. Keep the cable as far away as reasonably possible from all high power and/or high frequency lines. If there are any questions or doubts concerning the running of wires, please contact Galaxy before proceeding. The maximum distance between controllers is 1000 feet at 9600 Baud with no interference.

Using Fiber between Controllers

An optional Network/Terminal Interface is available that supports fiber connections between controllers.

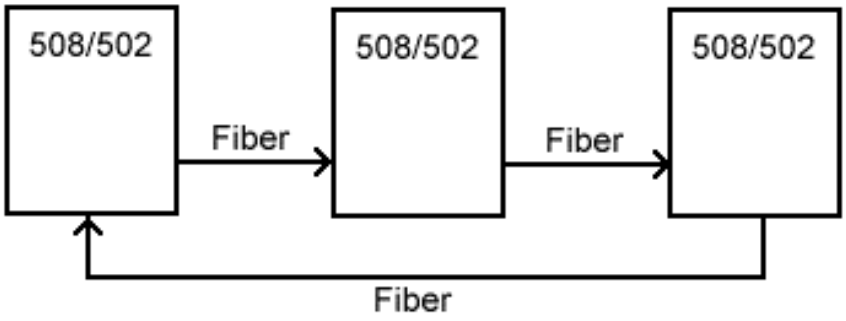
See the section "Network/Terminal Interface: Fiber Option" 32 for more information on the available fiber-enabled network/terminal interface.

When the fiber-enabled Network/Terminal Interface is used, the jumper (J3) must be set to match the receiving connection. Also note that the transmit side is constantly transmitting.

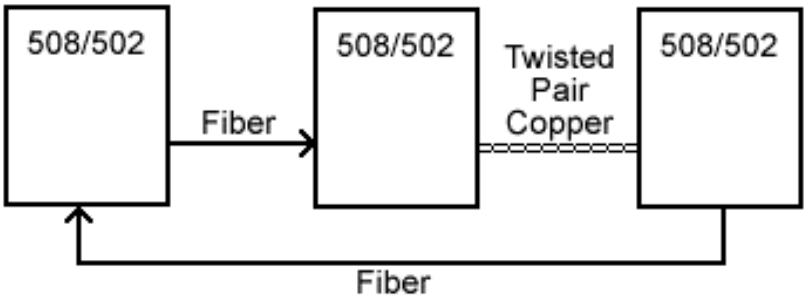
Be sure to remove the jumpers from the OUT/IN connections on J9 of the controller backplane for each controller using a fiber connection.

The diagrams below show the configuration of all-fiber and mixed copper-fiber connections.

All Fiber Connection:



Mixed Fiber/Copper Connection:



Specifications for Fiber Connections

Data Rate: 2400-19,200 baud
Wavelength: 820 nm
Fibers: 2 Multi-mode
Connectors: ST

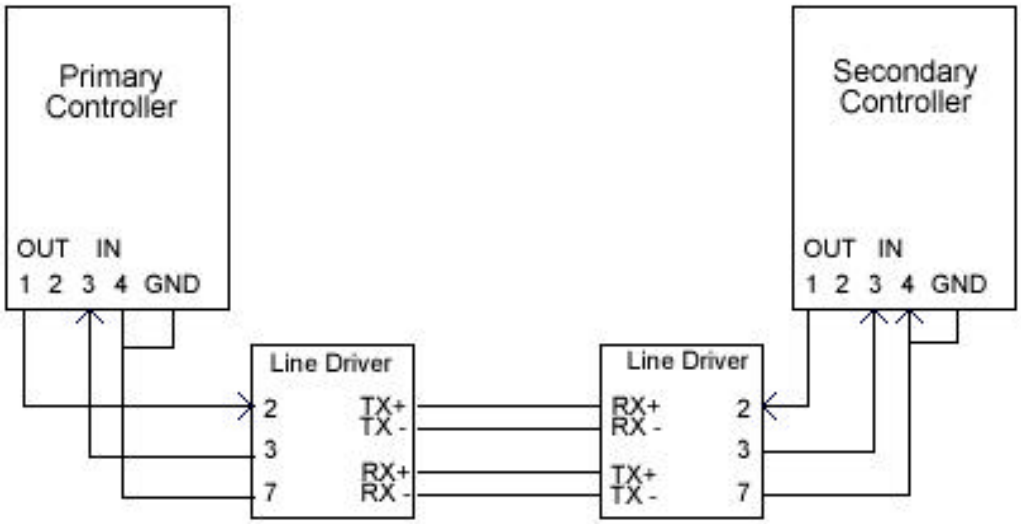
Optical Power Budget

Fiber	Wavelength	Power Budget	Max Distance
62.5/125	850nm	13db	12,000ft
62.5/125	850nm	12db	8 miles

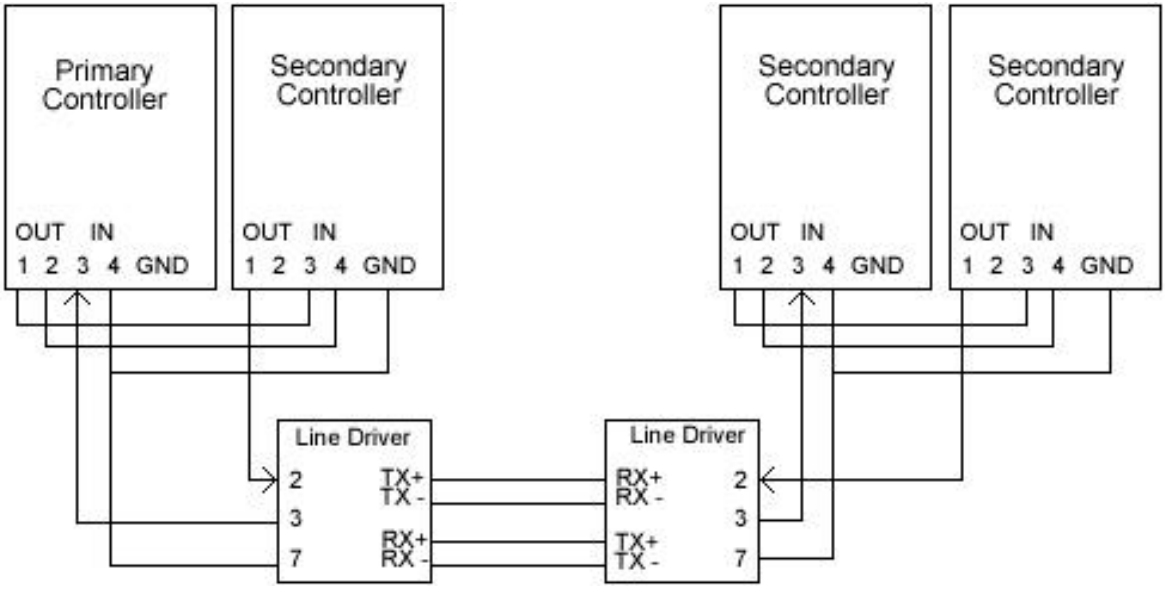
Using Line Drivers Between Controllers

Galaxy strongly recommends that Line Drivers be used when the network distance between any two controllers is greater than 1000 feet, but less than 1.5 miles. Line Drivers are easy to install and require no hardware changes to the controllers. Galaxy can supply Black Box's SHMB-2 Short Haul Modems. Other communication technologies such as fiber optics, laser and radio frequency devices can also be used, however, Galaxy's Engineering Staff should be consulted prior to installing these types of devices.

This diagram shows how the line drivers are connected in a one controller to one controller setup. The data comes "OUT" of the primary controller, passes through the line drivers and "IN" to the secondary controller. The data then completes the loop by passing "OUT" of the secondary controller, back through the line drivers and then "IN" to the primary.



The second diagram shows the wiring configuration that would be used in a two controller to two controller setup. In this diagram, the data passes “OUT” of the primary and “IN” to the local secondary (second from the left). The data then travels “OUT” of the local or first secondary and through the line drivers to the remote site. At the remote site, the data is received “IN” by the second controller from the right. It then transmits the data “OUT” to the farthest right controller. That controller then transmits the data through the line drivers and “IN” to the primary controller. These examples should provide enough reference information when designing the wiring for different numbers of controllers at each location.

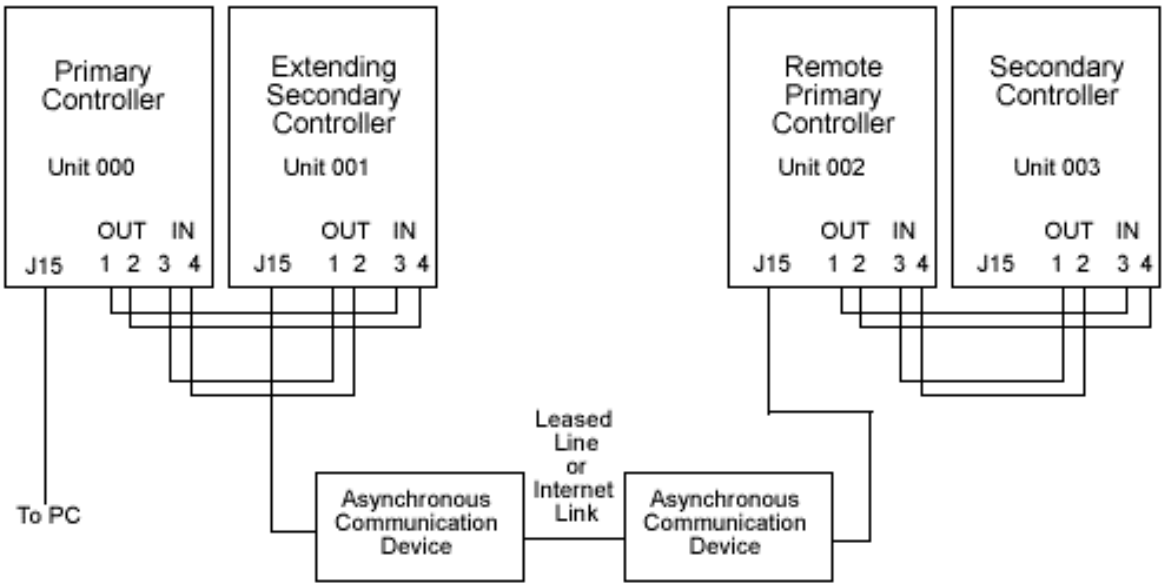


Connecting Loops using a Network Bridge - 508/502

System Galaxy is able to monitor multiple loops on a single PC at the same time, by any of the three methods of communication (direct wire, modem, TCP/IP). Therefore, the use of network bridges to connect and monitor two

loops simultaneously has declined significantly. However, network bridges are still used between loops when an input on one loop must trigger an output on another loop.

A Network Bridge forms a continuous connection between two loops that makes the loops behave as one loop. The system cannot tell the two loops apart. All programming is still done from the local computer. In the diagram, notice that each controller loop is independent and the only connection between the two loops is a standard RS-232 modem cable between them.



There are several different kinds of devices that can be used as a Network bridge between controllers. Each type of device has advantages and disadvantages. Please contact Galaxy's Engineering staff to determine which would be best for your system.

There are also options switch settings required to make the network bridge function. See pg. 18 for more information.

Lantronix MSS-100

The Lantronix MSS-100 is an Internet communication device that enables RS-232 format data to travel between points on a TCP/IP computer network. Because computer network traffic can greatly affect how the controllers communicate, it is necessary to consult Galaxy's Engineering Support before specifying or installing these devices.

See the section "Lantronix Configuration" for instructions on configuring the device.

Motorola UDS v.3225

Digital leased lines can also be used to create a Network Bridge between controllers. Below is a description of how the Motorola UDS v.3225 needs to be configured.

EXTENDING SECONDARY	REMOTE PRIMARY
Modem Options	
DCE rate is 9600 Trellis	same
Normal Originate	Forced Answer
4 Wire	same
Tx level --15 dBm	same
Dial Line jack is RJ-45	same
DTE Options	
Async Data	same
Make DTE Rate same on both modems	
8 Bit char size	same
No Parity	same
Ignores DTR	same
DCD is normal	same
CTS follows RTS	same
RTS-CTS delay is 0ms	same
DTE Fallback-disabled	same

Connecting Loops using a Network Bridge - 508i

The 508i controller can be used to establish a TCP/IP connection for a network bridge to another loop, without the use of a Lantronix MSS-100.

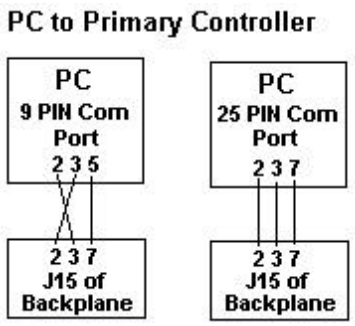
If a network bridge is to be configured using the native IP of the 508i, both ends of the bridge (the Extending Secondary and Remote Primary) both must 508i controllers using the native IP. You cannot use a 508i controller on one end of the bridge and a 500-series controller using a Lantronix device on the other end.

If using an RS-232 connection, the Extending Secondary and Remote Primary can be 508i or the original 500 series controllers.

PC to Controller Connections - 508/502/508i

Direct Connection - 508/502/508i

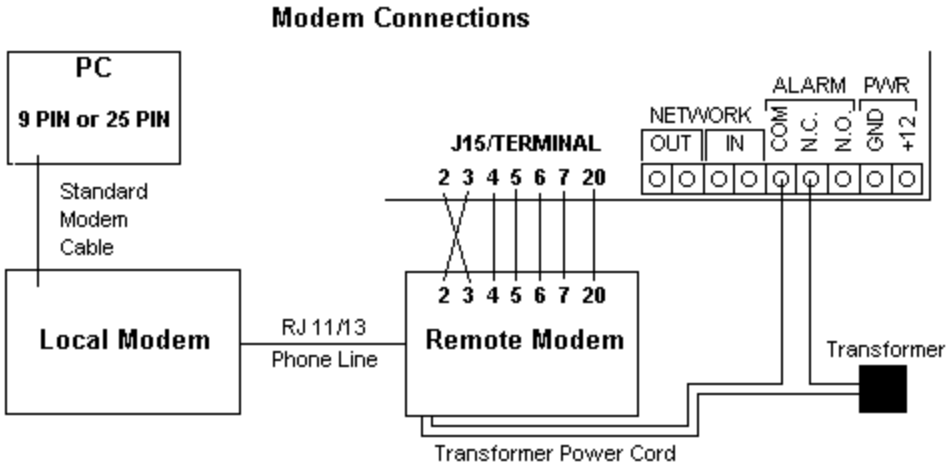
In order to communicate to the controllers in a loop, a PC must be used. The PC connects to the primary controller using the 25-pin female DB connector (J15) on the Back Plane. The connection uses the standard RS-232 interface and is used to configure and observe the system. Most of the time the connection is made through a direct connection as shown here.



If the distance between the PC and controller is greater than 50 feet but less than 1.5 miles, line drivers, short haul modems, or fiber transceivers can be used. Galaxy can provide Black Box's SHMB-2 Short Haul Modem.

Dial-up Connection - 508/502/508i

If the distance is too great or cable cannot be pulled between the location of the PC and the Primary Controller of a loop, then modems can be used to connect the primary controller to the PC. The Primary can then be dialed and connected. This is the wiring configuration for a dial-up scenario.



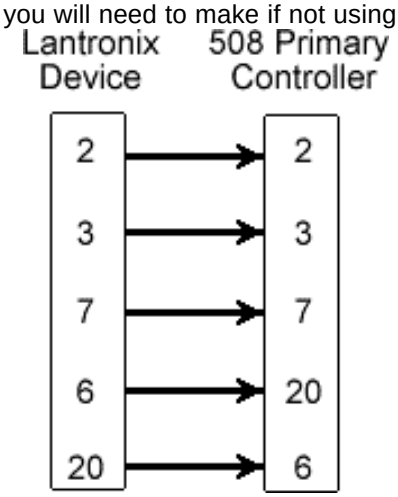
While at the controller location, be sure to record the Primary unit's serial number for the software configuration.

A US Robotics Sportster modem is the recommended modem for use at the primary controller. Each modem of this type must have switches 3, 5, and 8 in the ON position and all other switches must be OFF. Place Option switch 3 on the 500 Series CPU board in the up position to enable dial-up.

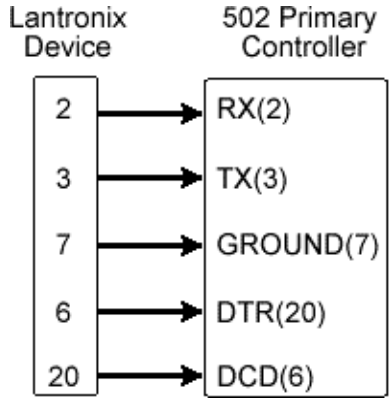
TCP/IP Connection - 508/502

When connecting to the PC from a 508 or 502 Primary Controller using TCP/IP, a Lantronix Micro-Serial Server (MSS) is used. The device connects the primary controller to a TCP/IP network.

For a 508 Primary Controller, the Lantronix device is attached to the TCP/IP network (LAN/WAN), then to the controller's J15 terminal strip. The cable labeled "PC" and "Primary Controller" (included with Lantronix devices purchased through Galaxy Control Systems) will provide the correct connections. The following diagram shows the Lantronix-to-controller connections you will need to make if not using the provided cable.



For a 502 Primary Controller, the Lantronix device is attached to the TCP/IP network (LAN/WAN), then attached to the backplane via the "RS-232 to PC" terminal strip. No cable is provided. The pins of the "RS-232 to PC" terminal strip are labeled with numbers that match the connection diagram below.



See the Section “Lantronix Configuration” for configuring the device.

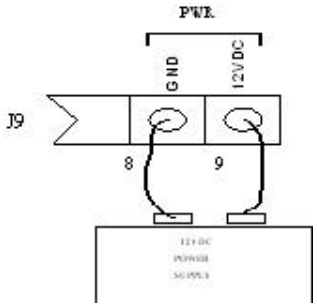
TCP/IP Connection - 508i

With the 508i controller, no Lantronix Micro-Serial Server (MSS) is used for TCP/IP connections between the PC and Primary Controller.

Simply connect the Ethernet cable to the Cat-5 connector at the bottom edge of the CPU. The IP address and other network settings will be programmed after Flash is loaded to the controller.

NOTE: The Ethernet connection MUST be a 10Mb connection, NOT a 100Mb connection.

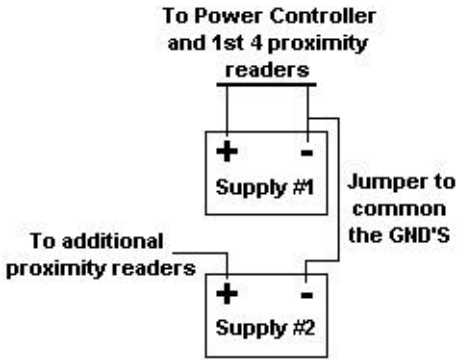
Controller Power Connections - 508/502/508i



The controller requires a +12 volt battery-backed DC power supply with a minimum 2 ampere continuous output. These power supplies come with the 502 and 508 units and should actually put out 13.8 VDC under load. The supply's output must be filtered and electronically regulated. It should also have a built-in battery charger and should automatically switch to the battery when an power failure occurs.

System Power is applied between Pins 8 and 9 of J9. The Back Plane is silk-screened with GND and +12 respectively. If power supplies from Galaxy are not used, it is recommended that one with a battery backup be used. This will allow the system to continue to operate for some time even after AC power is lost. The power supply should also have a voltage ripple less than 2 millivolts.

The controller power supply provides power for the control unit, readers, AMMs, ORMs, and Input/Output ports only. When using more than four proximity readers on one controller, or when using a 24 volt DC reader, it is necessary to power these readers with an additional supply. When using a second supply, remove the power jumper on the Dual Port Interface Board and common the grounds between the controller power supply and the power supply for those additional readers.



A separate power supply must be used to power the door strikes, magnetic locks and ORM relays.

Program IP Address - 508i

To program the IP address of the controller (necessary only for TCP/IP connections), a cable with the following connections must be used: **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. Connect the cable to the J5 serial port (the debugging port) of the CPU and the standard 9-pin serial port on the PC or laptop that will run HyperTerminal.

Start a HyperTerminal connection with the following settings: 56,000K baud rate, N, 8, 1, No Hardware Flow Control.

Once the connection is established, hit the Enter key. The controller will return "unrecognized command", then provide a ">" prompt.

Type "config" at the prompt. A list of current settings will appear.

To change the settings, type "yes" (lowercase). Hit the enter key to bypass changing a particular setting as it is displayed. To bypass the Password setting without changing it, hit the space bar, then hit the enter key.

Once you have changed the necessary settings, type "yes" (lowercase) to save the changes

The settings are described below.

Serial #	The serial number of the CPU board (also labeled on the board)
MAC Address	The MAC address assigned to the CPU board by Galaxy Control Systems.
Package #	The package number represents the type of controller (2 = 508i).
IP	The IP address assigned to the controller must be static, in the standard "dotted" format (nnn.nnn.nnn.nnn). The IP address must be assigned by the network administrator. The default IP address assigned to every board by Galaxy Control Systems is 63.122.126.203.
Subnet Mask	The Subnet Mask must be assigned by the network administrator.
Gateway Address	The Gateway address must be assigned by the network administrator.
Partner IP	If a "partner IP" address is specified, the controller will only accept an incoming connection from the designated address. If the controller will be used as an Extending Secondary in a network bridge, this setting MUST be set to the IP address of the Remote Primary. This setting is optional for Primary and

	Remote Primary controllers. For a Primary Controller, the IP address of the PC host must be used; you cannot use the NAME of the PC host. Do not use this feature with dynamic IP addresses (DHCP).
Partner Port	This is an optional setting. For Primary and Remote Primary controllers, this setting specifies the port used for listening for connections. For Secondary controllers, this setting specifies the destination port and the local outbound port. If left unset, the controller defaults to port 3001.
Password	This is required setting for Extending Secondaries; it is an optional setting for Primary and Remote Primary controllers. If set, this password replaces the controller serial number in the security algorithm that controls the connection between the controller and a PC. If set for a Primary Controller, the password must also be typed into the Serial Number field in the System Galaxy software. Galaxy recommends that the same password be used for all 508i controllers in each installation. To skip the Password setting without changing it, hit the space bar, then hit the enter key.

Load Flash - 508i

The CPU board will arrive pre-loaded with a version of Flash code. However, it may not be the latest version of Flash. To ensure that the latest Flash version is being used, or to ensure that all controllers are using the same version of Flash, it is necessary to load the Flash code to the CPU.

Flash can be loaded to the controller by either of two methods: either by using HyperTerminal, or by using the new version of the Load program in the version 6 software Maintenance Release.

Load Flash Using HyperTerminal

To load Flash using HyperTerminal, a cable with the following connections must be used: **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. Connect the cable to the J5 serial port (the debugging port) of the CPU and the standard 9-pin serial port on the PC or laptop that will run HyperTerminal.

Start a HyperTerminal connection with the following settings: 56,000K baud rate, N, 8, 1, No Hardware Flow Control.

Once the connection is established, hit the Enter key. The controller will return "unrecognized command", then provide a ">" prompt.

To put the CPU into the mode for loading Flash through the serial port, hold the "g" key on the keyboard while hitting the reset button on the CPU.

Note: Be prepared to act quickly with the following steps. If you wait too long to begin the file transfer after selecting option 2, the transfer will fail. If the transfer fails, hold the "g" key on the keyboard while hitting the reset button on the CPU. This is return the controller to the necessary mode.

A menu will appear with the option for Normal mode (1 - pass control to the application in Flash) or Flash Loading (2 - download a file and burn into Flash using 1k Xmodem). Type "2" and hit the enter key.

As characters begin to go across the screen, quickly select the Transfer menu from HyperTerminal, then select the option "Send File". Browse to the folder "C:/Program Files/System Galaxy/Flash". In the Flash folder, select "508i.s28" as the file name and click OK. Set 1K Xmodem as the Protocol, then click the Send button. Sending the file will take 3 - 5 minutes.

When the file transfer is complete, the screen will display messages as the Flash is burned. When complete, the menu will return with options 1 and 2. Type "1 " and hit the enter key to return to Normal operation.

Load Flash Using Loader (v.6 Maintenance Release)

To load Flash using the Load command within System Galaxy, the Version 6 Maintenance Release must be installed first. Once the installation is complete, follow the remaining steps.

Open the Loader as usual (right click on loop and select Load). There is a new tab labeled EZ80 in the loader window. This window does not list the Flash code in banks.

You can select "All controllers" to load, but the ACK controller must be a 508i controller.

1. Click the Browse button and select the "508i.s28" file.
2. Click the Connect button.
3. Click the Begin Flash Load button. This may take 5 -15 minutes.
4. When Load is complete, click the Check Flash button
5. Select "Validate and Burn Permanently into Flash", and click OK.
6. Zlink will disconnect, then reconnect (if System Galaxy is running).

Note: On the EZ80 tab, the Ping and Get Controller Info buttons return status messages that appear on the 500 series tab.

Card Readers & Keypads

Description

Galaxy's **System Galaxy** system supports most of the industry's major card readers and technologies. The supported technologies and readers include but are not limited to:

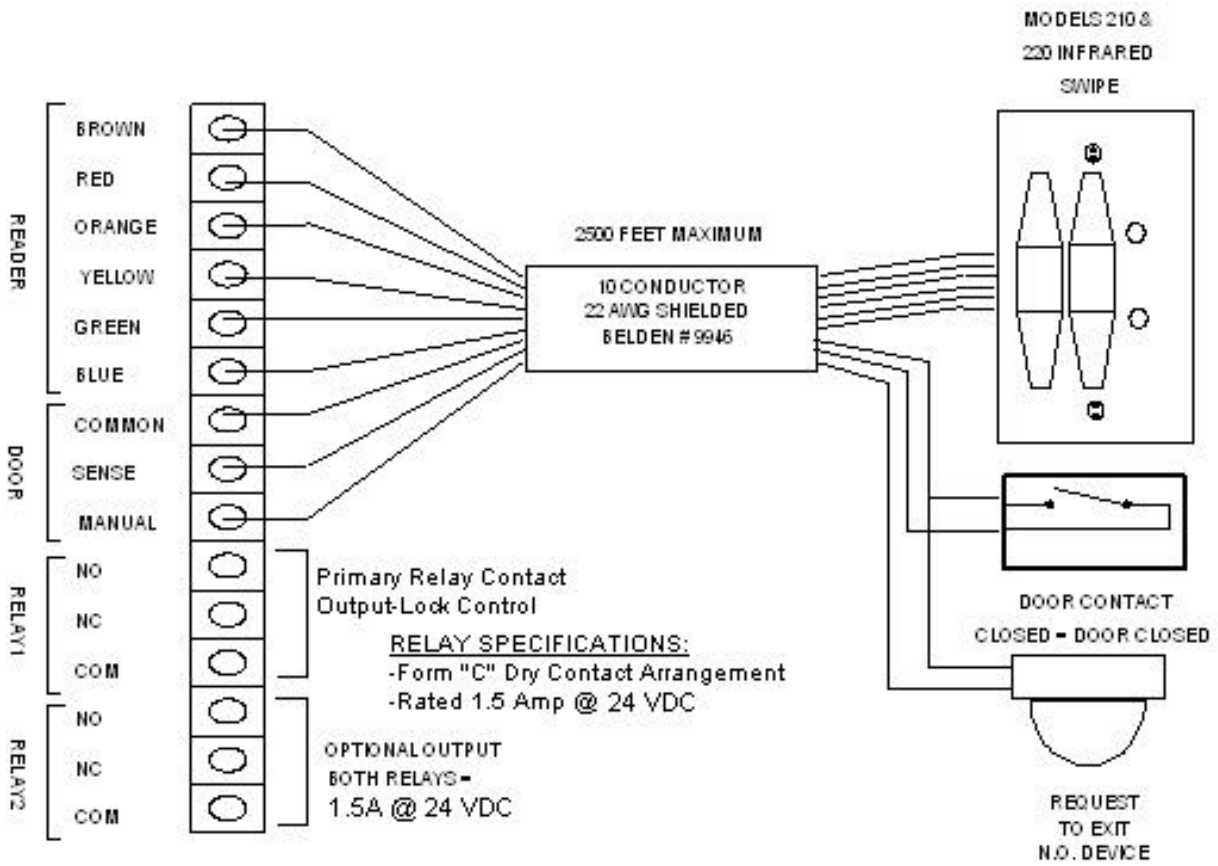
- Galaxy's infrared swipe readers, keypads, and card reader keypad combinations.
- Wiegand format readers including Proximity, Wiegand swipe, Wiegand key, keypads, and most biometric technologies.
- ABA format readers including magnetic stripe readers, barcode readers and keypads.

Galaxy is continually expanding its range of supported readers. If you have a particular installation requirement, please contact Galaxy for assistance.

Installation

The basic wiring for a reader to the controller port can consist of the 5 or 6 reader wires, a door contact, a request to exit device, a lock of some sort and a sounder or CCTV camera. The silk screened color codes indicate which color wire goes into each pin for Galaxy's Infrared Reader. A diagram of each type of reader, indicating its specific wiring, can be found in this manual.

The following diagram shows the how a typical reader port is wired.



The shield of the cable should be connected to the pin labeled "Yellow". This is the ground for the reader.

Brown: This is the green LED for Galaxy's Infrared readers and the LED line for all others.

Red: This is Data 1 for the reader.

Orange: This is the positive voltage that is output by the DPI. Depending upon how the DPI is set, the voltage here will either be +5 VDC or +12 VDC. Check the reader specifications before setting the voltage jumper.

Yellow: This is the reader ground. Also connect the cable shield here.

Green: This is Data 0 for the reader.

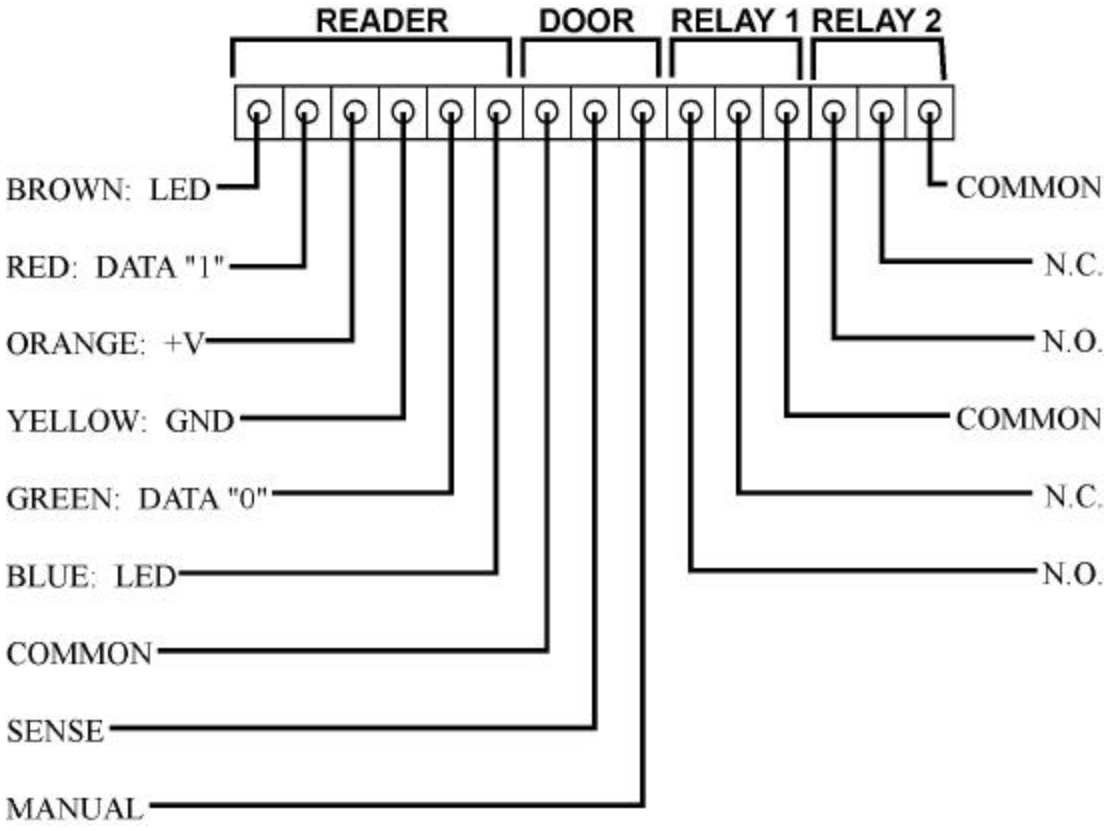
Blue: This is the red LED for Galaxy's Infrared format readers. Because most other readers support only one LED this is unused for all other readers.

Common: This pin is used for the Door Contact and the Request to Exit Device.

Sense: The Door contact should wire between this pin and Common under the DOOR silkscreen. When the door is closed, the panel must see a contact closure between these pins. If contacts are not being used, a wire jumper must be placed between Common and Sense for the Port to accept any inputs.

Manual: A Request to Exit Device can be wired between this Pin and Common under the DOOR silkscreen. This Device is normally open. When the panel sees a closure, it can be programmed to shunt the door contact and trigger Relay One or just shunt the door contact.

IMPORTANT: If you do not use door contacts, place a jumper between the Common and Sense pins. Otherwise, the system will detect the door status as "open" and will disable the reader as a result.

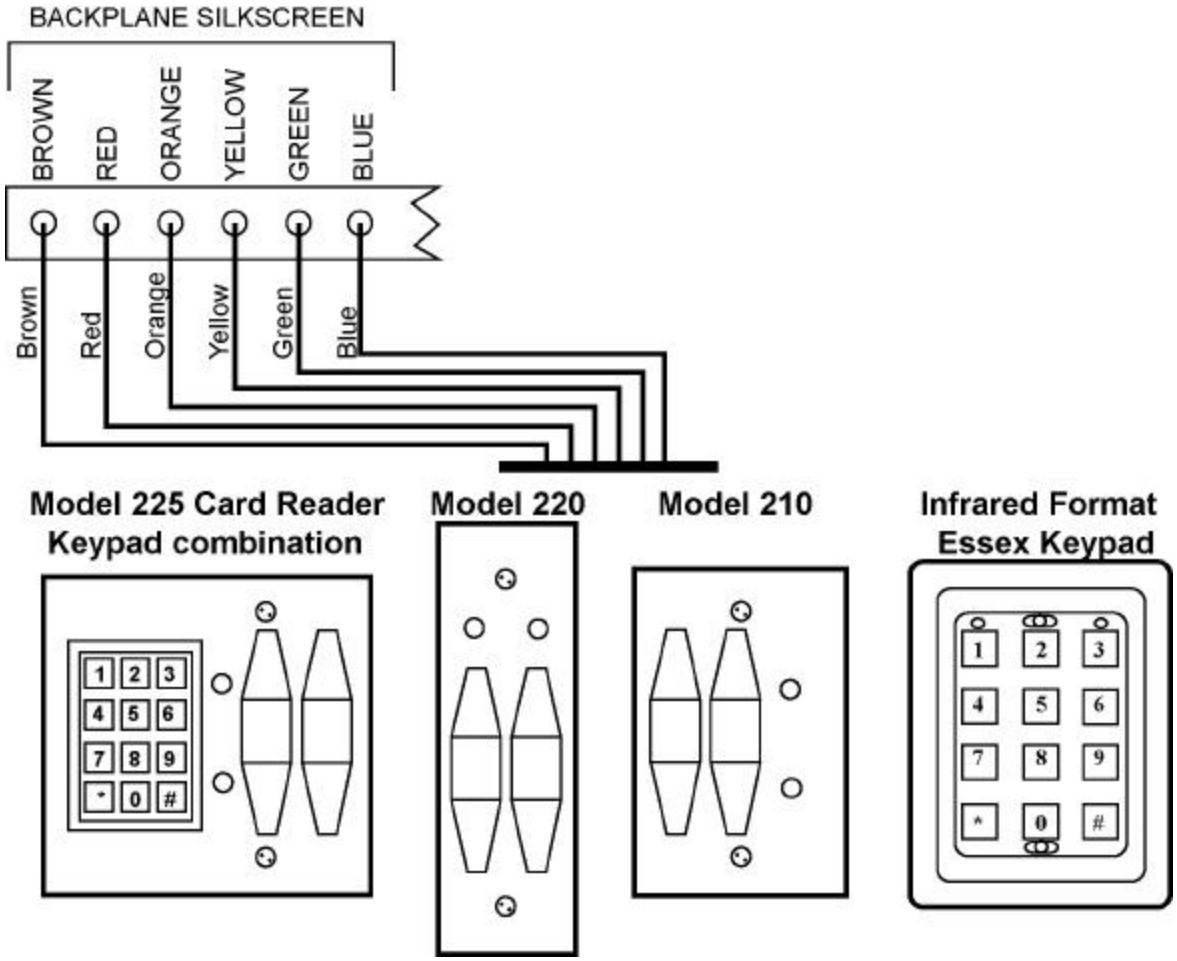


Infrared Swipe Readers and Keypads

The text silk screened on the Back Plane describes each pin's function for a Galaxy reader port. Pin 1 is on the left and is labeled "Brown." Notice that Pins 1 through 6 are all labeled with colors. These are directly compatible with the color codes on the Galaxy keypads, infrared card swipe readers and Parallel Reader Modules.

Galaxy recommends using 10 conductor, 22 AWG (Beldon # 9946), shielded cable for the reader (6), door sense (2), and manual egress wiring (2). Maximum distance is 2500 feet. All cables should be run inside a grounded conduit with only the controller end of the cable shield grounded. Do not run cables in conduit that already has wire in it. The reader, door sensor and egress device wires should be kept in a separate cable from the relay output, because door releases generally draw more power than the other devices and may cause interference and voltage spikes if both are in the same jacket.

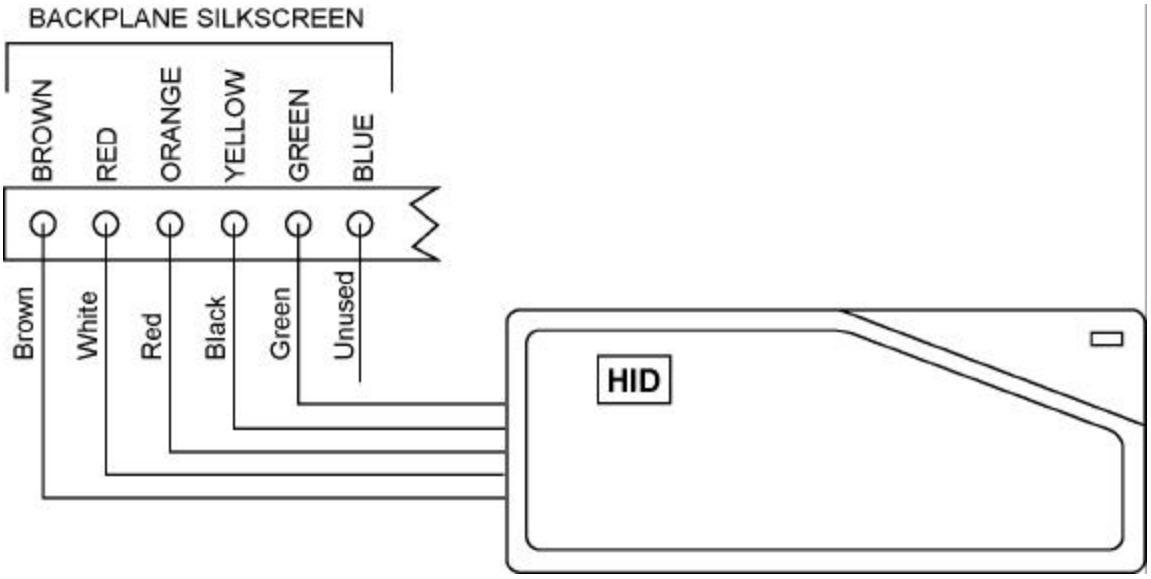
This diagram illustrates that each color from the Galaxy Infrared format reader wires to the same color silk screened on the Back Plane.



Wiegand Swipe Reader

Galaxy's 500 Series controller can use Wiegand readers to identify industry standard Wiegand cards. The Wiegand reader provided by Galaxy (Part # 90-0724-00) uses the "26 bit" Wiegand format.

When using Wiegand Swipe readers, the card can be swiped in only one direction. If cards are swiped in the wrong direction, the controller will not acknowledge the activity. For this reason, the Duress feature cannot be used with Wiegand Swipe readers. Additionally, these readers cannot be used with alarm cards to Arm and Disarm the systems I/O Groups. Only Galaxy's Infrared format readers and keypads can be used for Duress or to Arm and Disarm alarms.



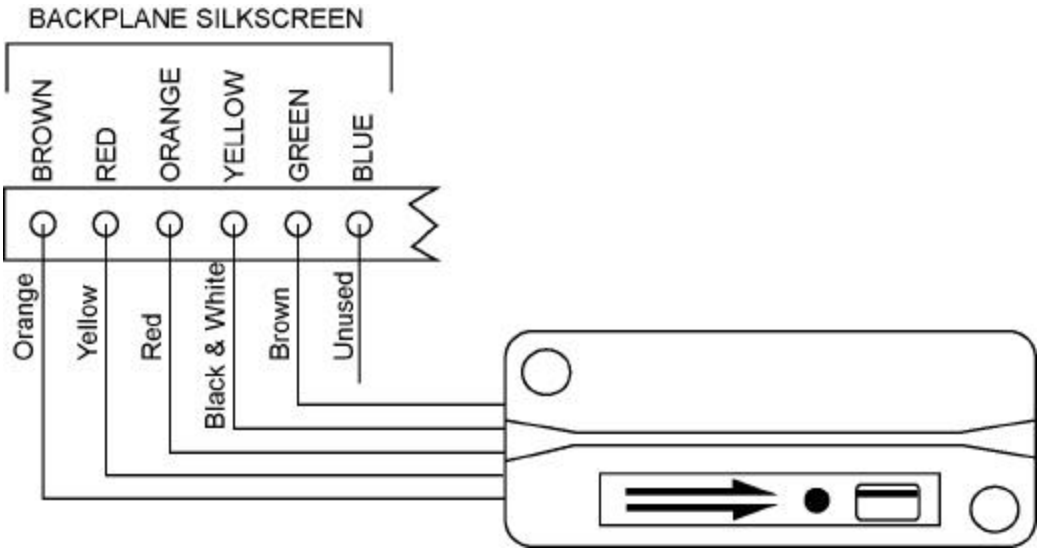
The remaining connections for door contacts, request to exit devices and output relays can be found in the "Door Contact/Rex" and "Lock Wiring" sections. The maximum controller to reader distance using 22 AWG shielded cable is 500 feet. **The Dual Port Interface voltage jumper must be set to 5 volts for this reader.**

Magnetic Stripe Reader

Galaxy's **500 Series Controller** can use Magnetic Stripe readers to identify most industry standard Mag Stripe formats. The Track II Mag Stripe reader provided by Galaxy (Part #'s: Black: 90-0010-00 & Chrome: 90-0011-00) uses the "ABA" format.

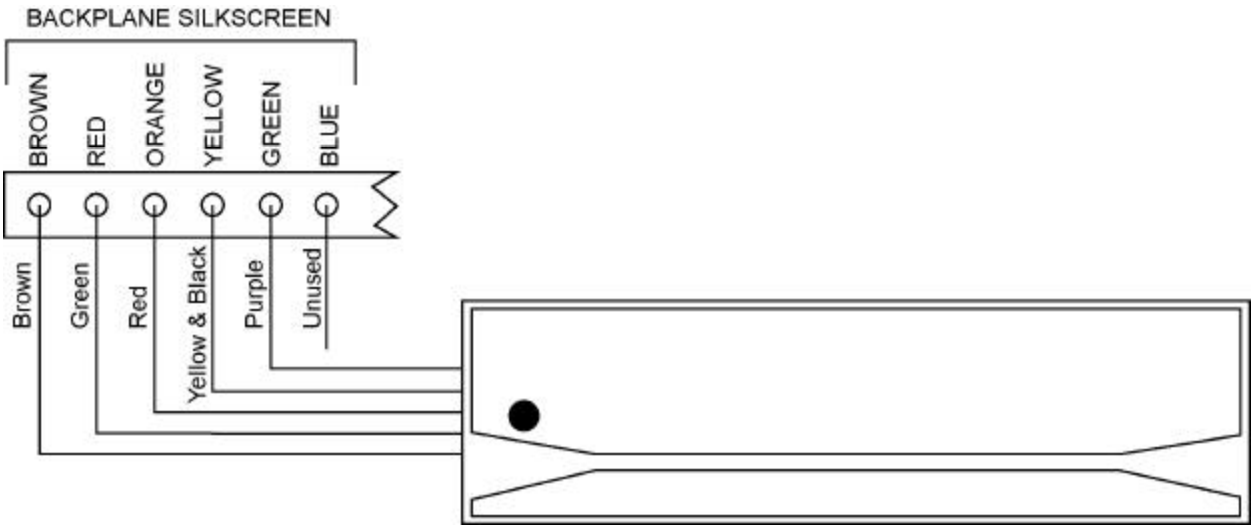
When using MR Sensor's magnetic stripe reader, the card can be swiped in only one direction. If cards are swiped in the wrong direction, the controller will not acknowledge the activity. For this reason, the Duress feature cannot be used with magnetic stripe readers. Additionally, these readers cannot be used with alarm cards to Arm and Disarm the systems I/O Groups. Only Galaxy's Infrared format readers and keypads can be used for Duress or to Arm and Disarm alarms.

The remaining connections for door contacts, request to exit devices and output relays can be found in the "Door Contact/Rex" and "Lock Wiring" sections. The maximum controller to reader distance using 22 AWG shielded cable is 500 feet. **The Universal Dual Port voltage jumper must be set to 5 volts for this reader.**



Barcode Readers

Galaxy's **500 Series Controller** can use a barcode reader to identify most industry standard barcode formats. The Barcode reader provided by Galaxy (Part # 90-0840-00) uses the "ABA" (Magnetic Stripe) format.



When using a standard barcode reader, the card does not provide a "direction". For this reason, the Duress feature cannot be used with barcode readers. Additionally, these readers cannot be used as alarm cards to Arm and Disarm the systems I/O Groups. Only Galaxy's Infrared format readers and keypads can be used for Duress or to Arm and Disarm alarms.

The remaining connections for door contacts, request to exit devices and output relays can be found in the "Door Contact/Rex" and "Lock Wiring" sections. The maximum controller to reader distance using 22 AWG shielded cable is 500 feet. **The Universal Dual Port voltage jumper must be set to 5 volts for this reader.**

Essex keypads

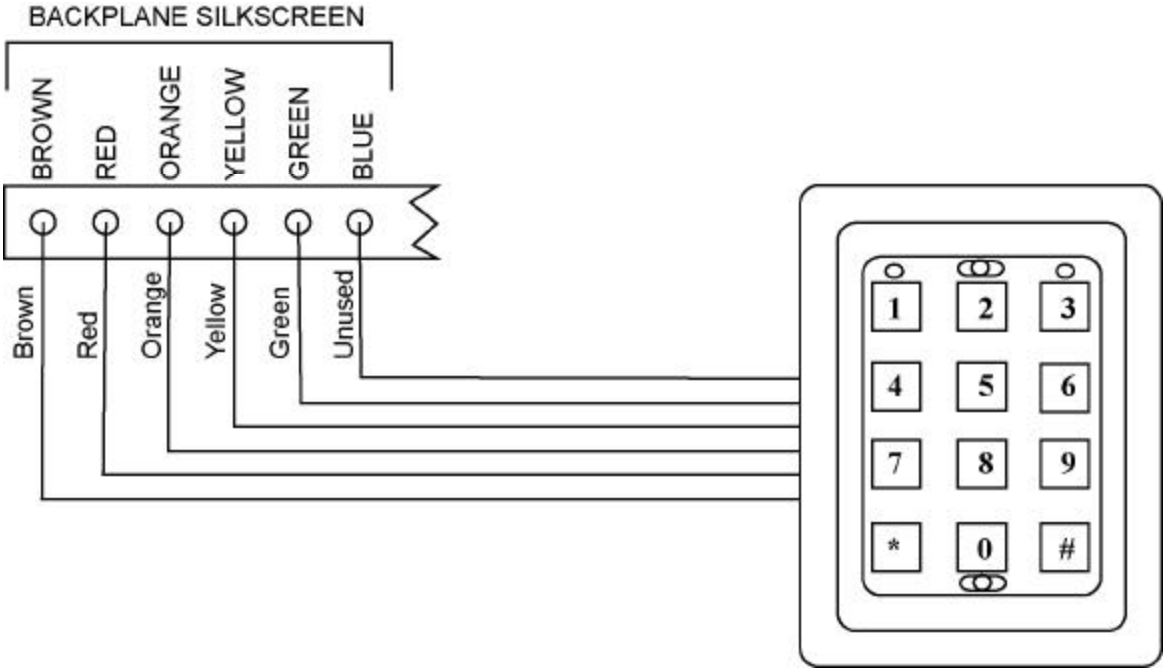
Galaxy offers three formats of the Essex keypad: Infrared, ABA, and Wiegand. These formats are available so that Pin Required can be used with Infrared, Magnetic Stripe and Wiegand format stand alone readers. Below are the wiring diagrams for the ABA and Wiegand formats. The Infrared format diagram can be found in the "Infrared Swipe Reader and Keypads" section. Please contact Galaxy's Technical Support to find out which format of Essex keypad is best for your application.

ABA Format

The "ABA" version of the Essex keypad (Part # 90-0050-00) provides "ABA Track II" format data to the controller. When using this diagram make sure the label on the back of the keypad identifies it as the "ABA Track II" format.

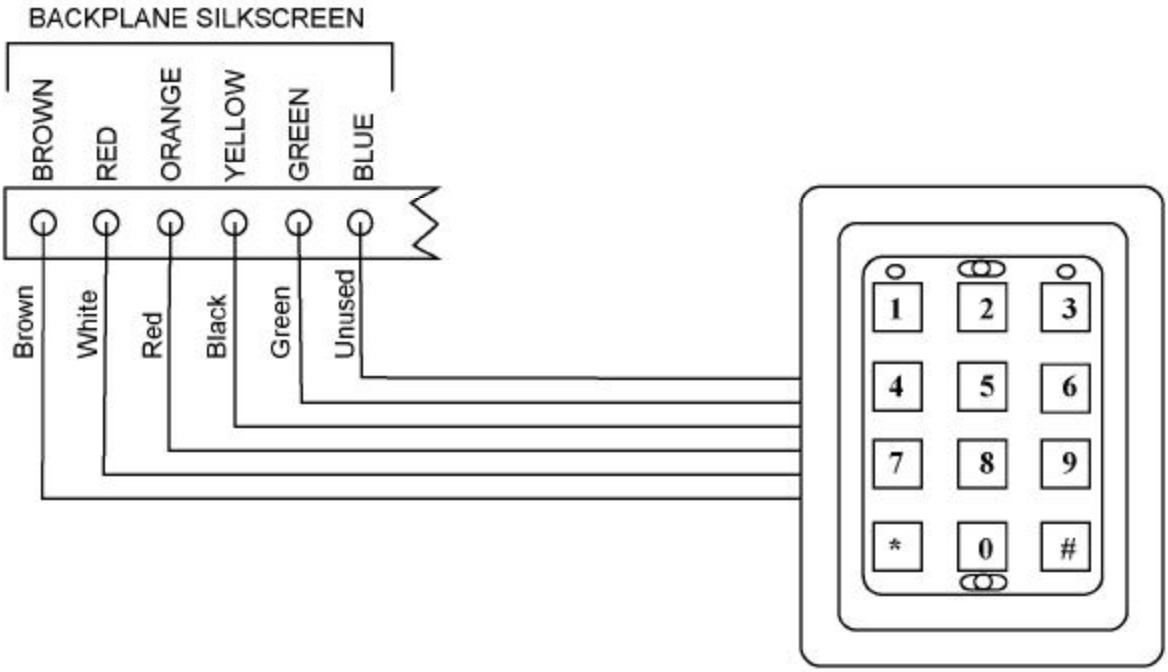
Alarms cannot be Armed or Disarmed and the Duress feature cannot be used with Non-Infrared format keypads. Only Galaxy's Infrared format readers and keypads can be used for Duress or to Arm and Disarm alarms.

The remaining connections for door contacts, request to exit devices and output relays can be found in the "Door Contact/Rex" and "Lock Wiring" sections. The maximum reader-to-controller distance is 500 feet when using 22 AWG shielded cable. **This reader requires the Universal Dual Port Interface be set to 12 Volts.**



Wiegand Format

The “26 bit Wiegand” version of the Essex keypad (Part #90-0060-00) provides 26 Bit Wiegand data to the controller. When using this diagram make sure the label on the back of the keypad identifies it as the “Wiegand” format.



Alarms cannot be Armed or Disarmed and the Duress feature cannot be used with Non-Infrared format Keypads. Only Galaxy’s Infrared format readers and keypads can be used for Duress or to Arm and Disarm

The remaining connections for door contacts, request to exit devices and output relays can be found in the “Door Contact/Rex” and “Lock Wiring” sections. The maximum reader-to-controller distance is 500 feet when using 22 AWG shielded cable. **This reader requires the Universal Dual Port Interface be set to 12 Volts.**

Proximity Readers

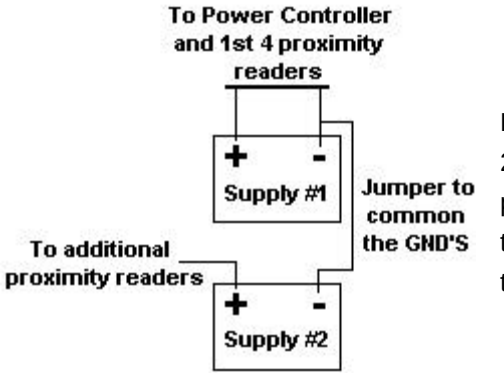
Galaxy’s **500 Series Controller** supports HID as well as most other Proximity devices which are Wiegand outputs. There are also portal and road loop readers available; however, these models are not discussed in this manual. For information on these systems, contact Galaxy’s Technical Support Staff. The Proximity readers provided by Galaxy use the “26 Bit Wiegand” format.

Alarms cannot be Armed or Disarmed and the Duress feature cannot be used with Non-Infrared format readers. Only Galaxy’s Infrared format readers and keypads can be used for Duress or to Arm and Disarm alarms.

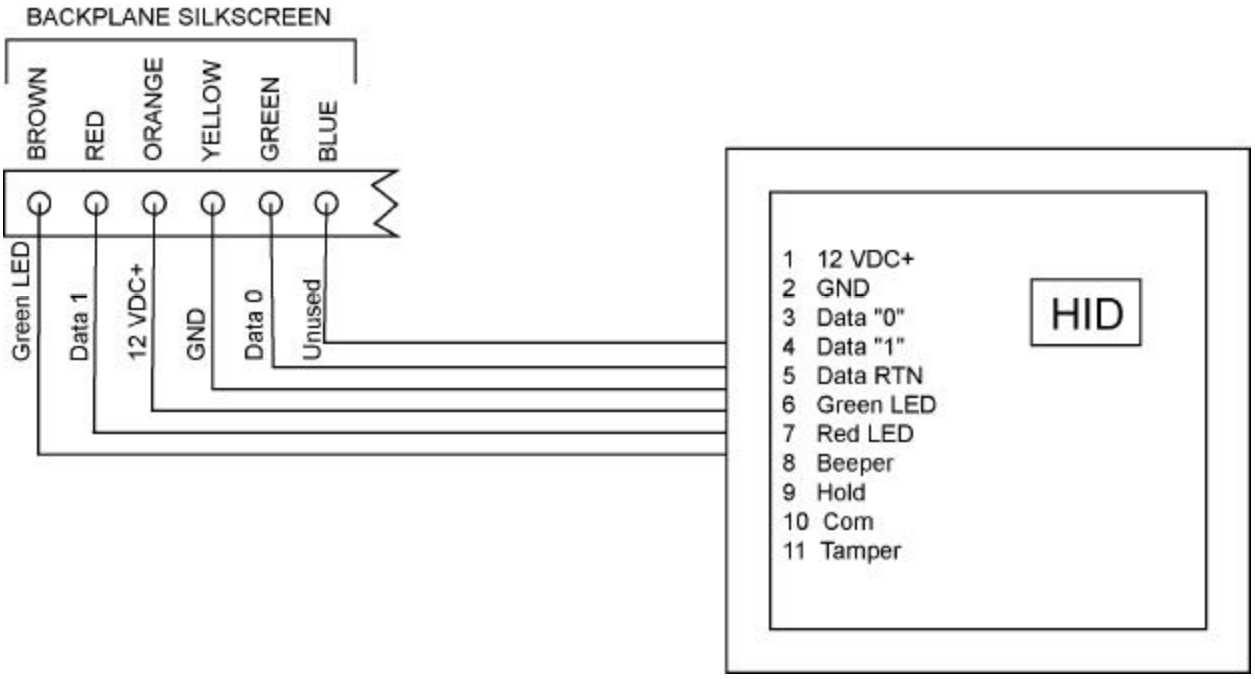
Do Not install the read head/antenna in close proximity to devices that could emit radio frequency interference such as computer monitors, cordless telephones, and radio transmitters. Any device that emits RF interference

in the area of the read head/antenna will reduce the overall read range. Some large computer monitors can emit RF for up to 40 feet. In addition, do not install the read head/antenna on metallic surfaces of any kind. The metal will greatly reduce the read range. Most window glass in today's buildings contain some percentage of metallic silver used to reflect ultraviolet rays. These metallic qualities will reduce the maximum read range that can be achieved. Proper grounding is crucial for optimum read ranges to be achieved.

IMPORTANT: when using more than four proximity readers on one controller, it is necessary to power the additional readers with a second power supply. Also, Maxi-Prox extended range models require an additional 24 to 28 VDC power supply. For both of these scenarios, remove the jumper on the Dual Port Interface Board. Then power only these readers off a separate power supply and common or connect the grounds between the controller power supply and the power supply for those additional readers.



When wiring the device, the shield and ground (Black) wires from the reader **CANNOT** be connected together, otherwise a ground loop condition may occur. This will cause the maximum read range to be reduced.



The remaining connections for door contacts, request to exit devices and output relays can be found in the "Door Contact/Request to exit" and "Lock Wiring" sections. The maximum controller to reader distance using 22 AWG cable is 500 feet. For HID and most other proximity readers the Universal Dual Port Interface jumper setting is 12 volts. Please check the documentation that accompanies the reader or contact Galaxy's Technical Support for assistance.

HID Prox Pro with Keypad

In order to adjust the Facility Code for the Prox Pro with Keypad a set of configuration/reset cards are required. Contact Galaxy to obtain these. Follow these instructions to reset the keypad

1. Once the Prox Pro with keypad is wired and the keypad is connected, power on the device.

2. After the initialization beeping for the reader has stopped, pass the Reset card over the reader. The reader should beep again.

3. After the beeping stops again, pass the configuration card over the reader and type the desired facility code followed by #.

To test the keypad, go into the Cardholders window and add a 26-bit Wiegand format card (see user guide for adding a card). If the number you have programmed appears as the Facility code and 1234 comes in as the card code then the procedure worked properly. Please contact Galaxy if you have any questions about this procedure.

Sagem Readers

Sagem readers are biometric (fingerprint) readers that store fingerprint templates at the reader, and can scan and recognize user fingerprints without the use of a card or credential. System Galaxy can interface with the MA200 and MA300 readers.

Interfacing Sagem Readers and System Galaxy

Before System Galaxy can be programmed to interface with the Sagem reader(s), the readers must be installed (see above), the enrollment reader must be installed (see note below), and the Sagem software must be installed (see Sagem documentation).

IMPORTANT: SAGEM READERS REQUIRE A SEPARATE POWER SUPPLY. (see power/ground section)

The Sagem readers and Sagem software should be installed according to the manufacturer's instructions. The following steps are critical to allow the Sagem readers to work with System Galaxy:

- Ethernet connection to the reader.
- Power/Ground connections for the reader.
- LED and Data connections back to the controller port.
- Weigand or Clock/Data Jumper settings on the reader.
- Programming the reader configuration.

- Installing the Sagem software
- Reader programming in the System Galaxy software (see SG Software Guide).
- Add users to Sagem reader and System Galaxy (see SG Software Guide).

Each of these steps is explained in detail in the following sections.

Note: When a Sagem reader scans a finger and does not recognize the finger, no message is sent to the controller, and no "Not In System" or "Invalid Access Attempt" will display in System Galaxy.

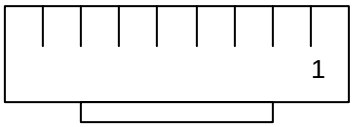
Note: When a user is deleted from the reader through System Galaxy, the finger data is deleted from the Sagem reader. However, in the MA200 model of reader, the space used for that finger data is not released for reuse. A "Garbage Collection" function must be performed in the Sagem stand-alone data management application to release the space for a new user's finger file (refer to Sagem documentation for more information).

Ethernet Connection to Reader

The Ethernet connector runs through the middle of the internal reader board. Four wires are required to make the connection. You can remove the connector from the end of a standard Cat-5 cable, or you can make your own cable.

When using cable that conforms to the EIA/TIA T56B color standards, the following color codes apply:

Pin 1 - White/Orange: TX+
Pin 2 - Orange: TX-
Pin 3 - White/Green: RX+
Pin 6 - Green: RX-



Cat-5 cable connector

The wiring for other cable standards is documented in the Sagem installation instructions. Follow those instructions to connect the reader to the Ethernet network if using wire that does not follow the EIA/TIA T56B Color Standards.

Power/Ground Connection to Reader

The Power and Ground connection to the reader requires 2 wires, which connect to the connectors labeled +12V and GND.

IMPORTANT: The standard 12V, 2 amp controller power supply does not provide adequate current for a Sagem reader, which uses between .5 and .75 amps. Use a separate power supply of at least 2 amps.

Data and LED Connection to Controller Port

The connection between the reader and the controller port requires 4 wires: 2 for the LEDs, and 2 for the data signals.

The connector is labeled "Wiegand Out", although it also supports Clock/Data signals (recommended for System Galaxy).

"Wiegand Out" Connector Pin	to	Galaxy Controller Port Pin
D0	to	Green
D1	to	Red
LED	to	Brown
GND	to	Yellow

Set Jumpers for Wiegand or Clock Data

The set of eight (8) jumpers at the top of the reader are used to set the data format transmitted from the reader. The jumpers are counted from left to right, with 1 at the left. See the Sagem documentation for more information.

If you are using Clock/Data format (recommended for Galaxy systems), install jumpers 1, 2, 4, and 8.

If you are using Wiegand format, install jumpers 4 and 7.

When you have set the jumpers, you may close the reader cover and install the reader on the wall.

Program reader configuration

To program the Sagem reader, you will use the blue buttons at the top of the reader button panel. The buttons will line up under options displayed on the screen above them. In these instructions, the buttons will be referenced by the option name.

Login to Programming Mode

1. To enter the programming mode, press the # (pound) key, the * (star) key, then the # (pound) key again.
2. When prompted for the PIN, enter 1, 2, 3, 4, 5 (the default). If this PIN has been changed, you will need to know the correct PIN.
3. Push the blue button under the OK option.

Enter the System Programming Menu

1. Push the blue button under the System option.
2. Push the blue button under the ASYSTE option.

3. At the System Menu, you will be prompted to enter the password. Enter 1, 2, 3, 4, 5 (the default). If this password has been changed, you will need to know the correct password.
4. Push the blue button under the OK option.

Navigate the Configuration Files - IP Address, Subnet, Gateway

1. Push the blue button under the Config option.
2. Use the blue buttons under the Next and Prev options to move through the list of files to find "/cfg/net".
3. Push the blue button under the Edit option.
4. Use the blue buttons under the Next and Prev options to move through the list of sections to find "IP".
5. Push the blue button under the Edit option.
6. Use the blue buttons under the Next and Prev options to move through the list of options to find "Address".
7. Push the blue button under the Edit option.
8. To erase the current IP address, use the blue button under the Right option to move to the end of the address, then push the # (pound) button repeatedly to erase all the characters.
9. Type the address using the number pad keys. Use the * (star) button for periods.
10. Push the blue button under the OK option.
11. Use the blue buttons under the Next and Prev options to move through the list of options to find "Subnet".
12. Push the blue button under the Edit option.
13. To erase the current subnet number, use the blue button under the Right option to move to the end of the number, then push the # (pound) button repeatedly to erase all the characters.
14. Type the subnet address using the number pad keys. Use the * (star) button for periods.
15. Push the blue button under the OK option.
16. Use the blue buttons under the Next and Prev options to move through the list of options to find "Gateway".
17. Push the blue button under the Edit option.
18. To erase the current gateway number, use the blue button under the Right option to move to the end of the number, then push the # (pound) button repeatedly to erase all the characters.
19. Type the gateway address using the number pad keys. Use the * (star) button for periods.
20. Push the blue button under the OK option.
21. Push the blue button under the EXIT option.

Change to Ethernet Mode (only necessary if default has been changed)

1. Use the blue buttons under the Next and Prev options to move through the list of files to find "/cfg/Maccess".
2. Push the blue button under the Edit option.
3. Use the blue buttons under the Next and Prev options to move through the list of sections to find "Admin".
4. Push the blue button under the Edit option.

5. The HostCom value should be set to "3". To erase the number, use the blue button under the Right option to move to the end of the number, then push the # (pound) button repeatedly to erase all the characters.
6. Use the number pad to enter "3".
7. Push the blue button under the OK option.
8. Push the blue button under the EXIT option.

Program Site/Facility Code (ONLY if using Wiegand output - skip this section for Clock/Data Output)

1. Use the blue buttons under the Next and Prev options to move through the list of files to find "/cfg/Maccess".
2. Push the blue button under the Edit option.
3. Use the blue buttons under the Next and Prev options to move through the list of sections to find "Wiegand/Datacl".
4. Push the blue button under the Edit option.
5. The Facility Code defaults to "7". To erase the number, use the blue button under the Right option to move to the end of the number, then push the # (pound) button repeatedly to erase all the characters.
6. Use the number pad to enter the new facility code.
7. Push the blue button under the OK option.
8. Push the blue button under the EXIT option to return to the Section level.

Return Reader to Normal Operation

1. Push the blue button under the EXIT option to return to the File Level.
2. Push the blue button under the EXIT option to return to the System Menu.
3. Push the blue button under the MORE option twice.
4. Push the blue button under the EXIT option to return to the Select App prompt.
5. Push the blue button under the MACCESS option.
6. The reader should now be in normal operating mode, with the prompt "Place finger for identification please" displayed.

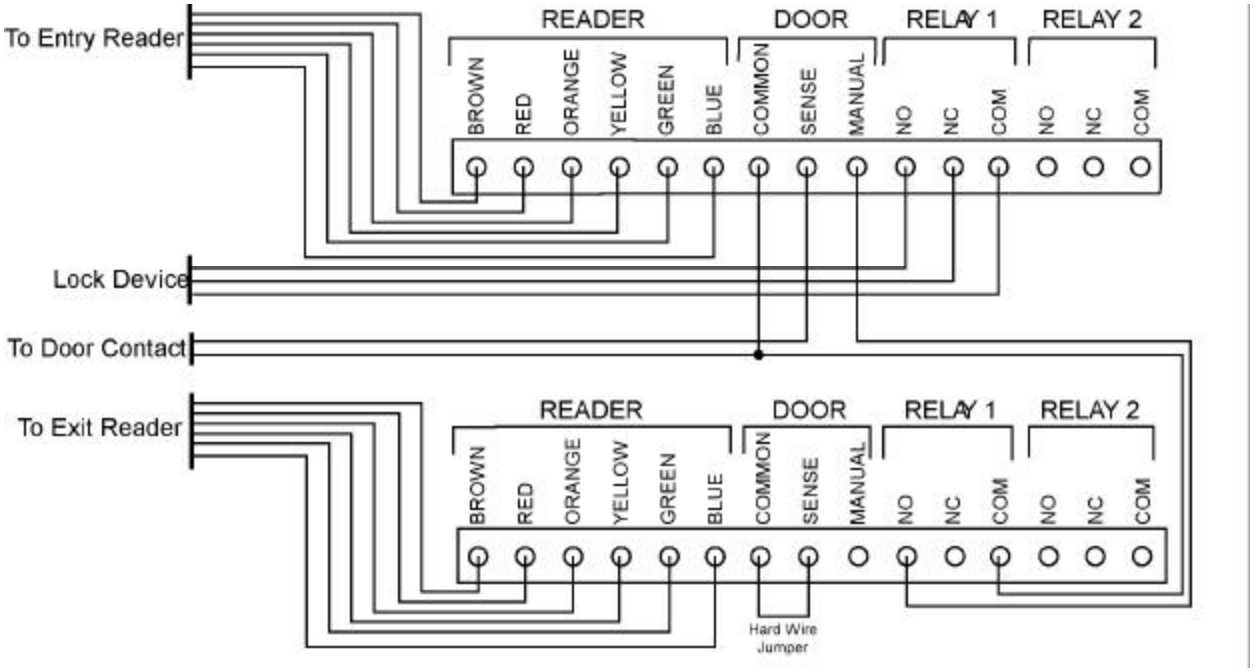
Install Sagem Software

The Sagem Software installation is documented in a separate ReadMe file, located on the System Galaxy cd. Please refer to that file for more information.

Wiring Readers for Anti-Passback

When anti-passback is being used on both sides of a specific door, it is important that the following wiring be implemented so that the door hardware operates as efficiently as possible.

The door's contact is monitored by the entry port while the exit port has its door contact monitoring point's jumpered out. Relay 1 of the Exit port wires into the Request to exit on the Entry Port. In the Programming, the user must check "Unlock on Rex" for the Entry Port so that when Relay 1, on the Exit Port, changes state and trips the other port's REX, it will automatically activate Relay 1 and the lock will unlock.



Parallel Reader Module

Description

In certain cases, it is desirable to attach more than one reader to a single port. The Parallel Reader Module allows a pair of readers to be connected to the same controller port. This allows both entry and exit door control through the use of a single port. Passback monitoring is not possible with a Parallel Reader module.

The Parallel Reader Module is contained in a small (approx. 3" x 2") molded plastic and metal box. The box is not weatherproof and should never be installed outdoors.

Inside the box is a board with three jumpers. The jumpers are used to set voltage (+12 V or + 5 V) for each reader, and to select the reader format (Infrared or All Others). Both readers used in the module must put out the same format. For example, an Infrared reader would not work with a proximity reader through a parallel reader interface, but a proximity reader will work with a Wiegand format Essex keypad.

Four sets of 6 inch wires extend from the metal face of the box. The sets of wires are labeled "READER 1", "READER 2", "CONTROLLER", and "J4 IN/OUT". The two readers are attached to Reader 1 and Reader 2. The module is connected back to the Controller with the Controller wires. The J4 IN/OUT wires are currently unused.

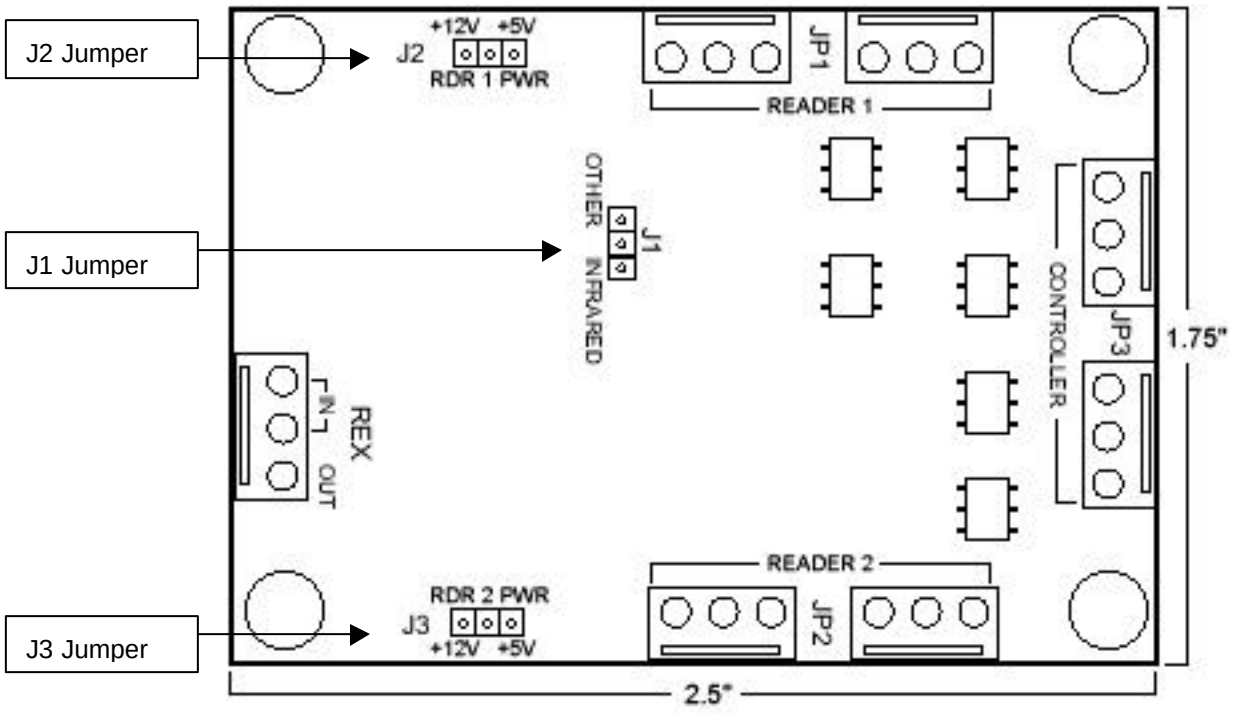
The module can be used in PIN-required situations. System Galaxy can be programmed to require both a card and PIN code for entry. This can be accomplished with either a combination reader/keypad (for example, Galaxy's Model 225 Card Reader/Keypad Combination reader) or by using a separate card reader and keypad connected together with a Parallel Reader Module. This option can be exercised with Infrared readers, Wiegand output devices, Magnetic Stripe, and Barcode readers.

Installation

To install the Parallel Reader Module, you must set the jumpers, connect the readers, connect the module to the controller, and set the DPI at the controller to 12 V. Each step is explained below:

Set the Jumpers

1. Unscrew and remove the four screws from the metal face of the Parallel Reader Module.
2. Open the Parallel Reader Module.
3. Locate the J1 jumper, labeled "INFRARED" and "OTHER". (see diagram below)
4. Set the jumper to the position that matches the type of readers attached to the module. If holding the module as shown below, the center and top pins are for "Other", the center and bottom pins are for "Infrared". Both readers must be the same type.
5. Locate the J2 jumper, labeled "RDR 1 PWR" and "+12 V + 5 V". (see diagram below)
6. Set the jumper to the position that matches the voltage needed by Reader 1. Left and center pins are +12 V, right and center pins are +5 V.
7. Locate the J3 jumper, labeled "RDR 2 PWR" and "+12 V + 5 V". (see diagram below)
8. Set the jumper to the position that matches the voltage needed by Reader 2. Left and center pins are +12 V, right and center pins are +5 V.
9. Close the Parallel Reader Module (replace wires into correct holes).
10. Replace and retighten the four screws.



Connect the Readers

Install the Parallel Reader Module as close to the readers as possible. Use the 6" connection wires labeled "READER 1" and "READER 2" (on the module box) to connect to the reader wiring. The Parallel Reader Module wire colors match the color scheme of Galaxy infrared readers.

Connect the Module to the Controller

When connecting the module to the controller, use 18 AWG wire rather than 22 AWG. This is required to provide sufficient current to the readers. Use the 6" connection wires labeled "CONTROLLER" to connect the module to the controller. The wiring from the Parallel Reader Module to the controller port is the same as for any Galaxy infrared reader.

Tape off the J4 IN/OUT wires

The connection wires labeled "J4 IN/OUT" are currently unused. They should be taped off to prevent shorting in the module.

Set the DPI to 12 V

ALWAYS set the Dual Port Interface board voltage to +12 V when using the Parallel Reader Module. The Reader Voltage jumpers on the Parallel Reader Module will be used to regulate the voltage to the desired voltage.

Special Notes for Essex Keypads

1. When using the PIN-required option, always choose the correct version of Essex Keypad.
2. With Magstripe, barcode and any other ABA reader USE THE ABA VERSION OF THE ESSEX KEYPAD.
3. With Proximity, Wiegand Swipe, Wiegand Key, and any other 26 bit Wiegand format USE THE 26 BIT WIEGAND VERSION OF THE ESSEX KEYPAD.
4. With any Galaxy Infrared format reader USE THE INFRARED FORMAT OF THE ESSEX KEYPAD

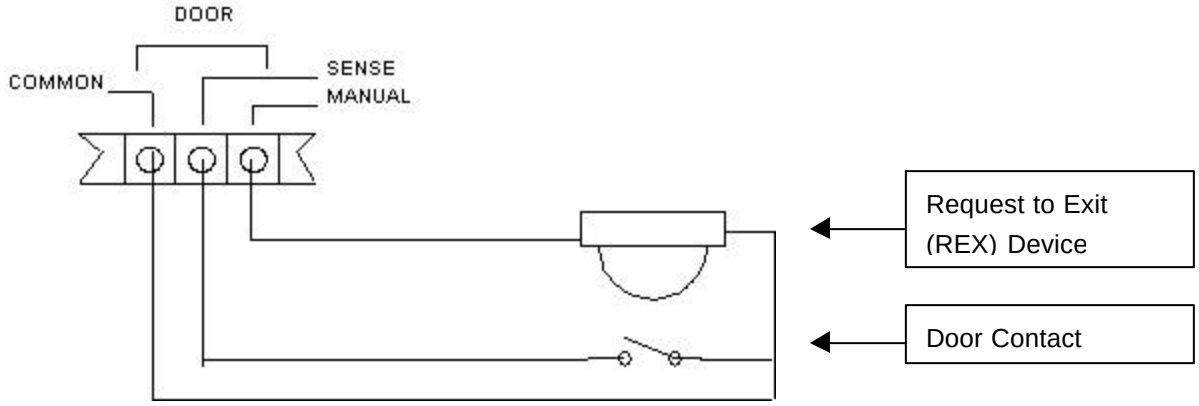
Door Contact/Request to Exit

Description

On each port, pins 7 through 9 on the Back Plane are labeled COMMON, SENSE, and MANUAL respectively. These are the door contact/sensor and manual egress inputs with Pin 7 being common to both. To use the door sense capability, a sensor, which generates a closed circuit when the door is closed, is required. Usually a magnetic switch with *Normally Open* (NO) contacts is used (when the door is closed the contact should be closed). The manual egress "Request to Exit" input allows the lock control relay (Relay 1) and door contact to be activated by means other than a card.

Installation

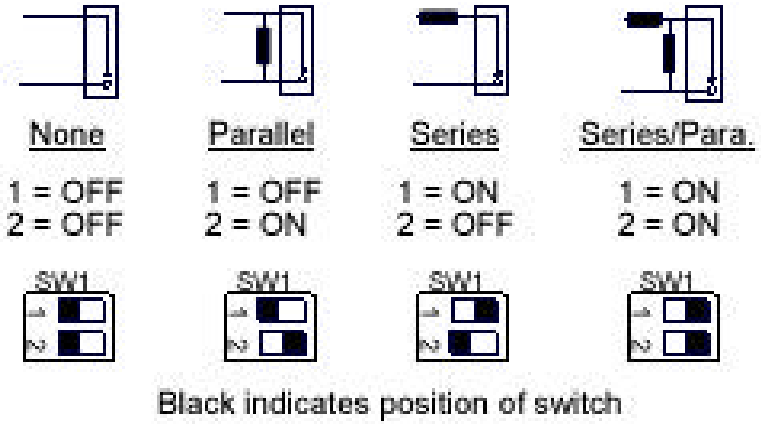
The door sensing device should be wired between Pins 7 and 8. **If door open sensors/contacts are not being installed, Pins 7 and 8 (Common and Sense) must be shorted together with a jumper wire so that the system thinks that the door is always closed.** If this is not done, once the readers are powered up, both reader LED's will come on, then both LED's will turn off, as the system believes the door has been left open. Default time is 15 seconds before both LED's turn off.



The manual egress device can be anything which produces a momentary contact closure between Pins 7 and 9. Two examples of manual egress devices are a push button switch and a motion detector with contacts.

If the door contact will be supervised, the DPI for the port to which the contact is wired must be able to support supervised door contacts. See pg. 28 for more information on DPIs.

If supervised, the End-Of-Line resistance must be set on the DPI, using the SW1 switches. The setting must match the wiring of the resistance, and must be the same for both ports using the DPI.



There are other settings that must be made on the DPI when using supervised door contacts. See the section on DPIs for more information.

Supervision of the door contacts must also be enabled in the software. See the Software Guide for more information.

Lock Wiring

Description

The port pins labeled Relay 1 and Relay 2 are outputs which are used to control a door release and/or other devices. Pins 10 through 12 are labeled Relay 1, while Pins 13 through 15 are labeled Relay 2. Each relay consists of a Normally Open (NO), a Normally Closed (NC) and a common contact. Typically, Relay 1 is used for strike/lock control. Relay 2 can be used for anything that can be controlled by a contact closure or opening, such as an alarm shunt, a sounder or CCTV control. Upon access being granted, Relay 1 will energize. Relay 1 will remain active for the time specified in the System Software or until the Door Sensor indicates that the door has opened. Relay 2, if used, is independently timed and can be configured to activate for all of its door alarm events as well as its own valid unlock.

Installation

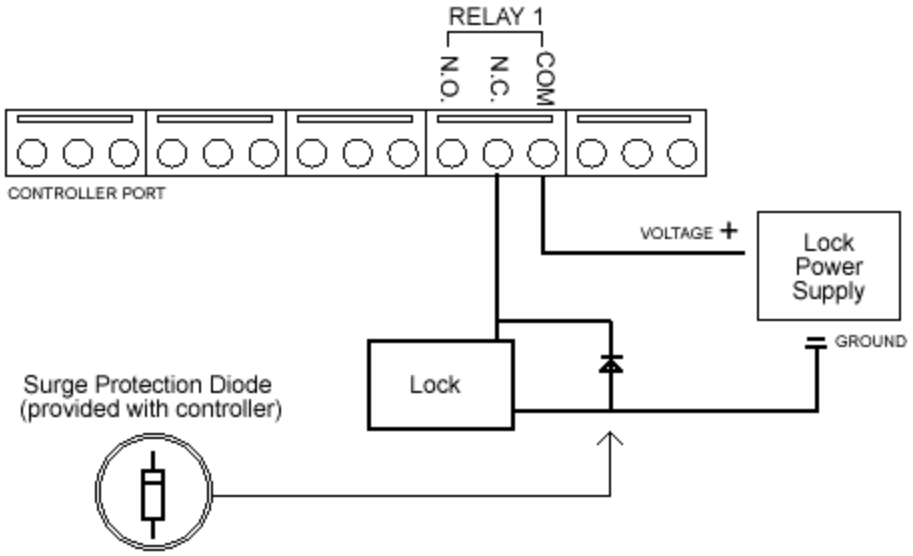
When wiring door releases, the output contacts should act like a switch between the strike lock and its power supply. For devices which need power applied to lock and release only when power is removed (fail-safe), the Common and Normally Closed outputs are used. If the strike requires power to unlock (fail-secure), the Common and Normally Open pins would be used. The maximum power through the contacts should not exceed 24 VDC @ 1.5 amps.

Do not use the controller power supply for the strikes.

See the following sections for diagrams on fail-safe and fail-secure wiring.

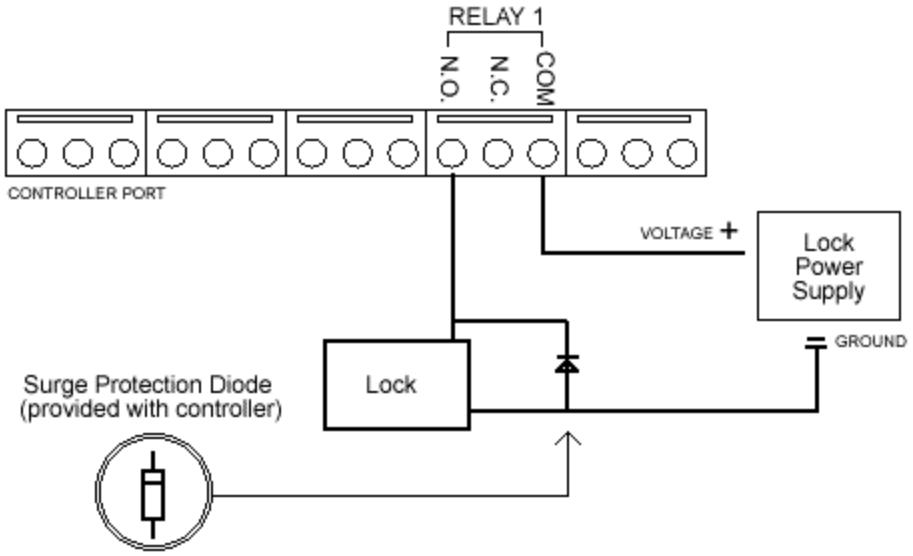
Fail Safe Wiring

Follow this diagram for devices that are typically wired in "fail safe" configuration, such as Magnetic Locks, so that when power is removed from the lock, the lock will unlock.



Fail Secure Wiring

Follow this diagram for devices that are typically wired in "fail secure" configuration, such as Electric Strikes, so that when power is removed from the lock, the lock will stay locked.



Programming Reader

Description

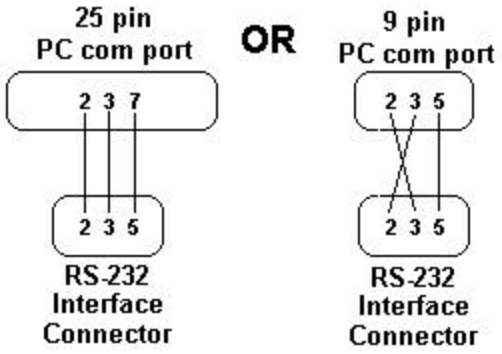
Cards can be "swiped" or learned into the **System Galaxy** system using a Galaxy provided RS-232 Programming Reader/Interface. This interface plugs into a communication port on the back of the PC, allowing cards can be swiped at the user's desk, rather than at a reader attached to a controller.

The Programming Reader Interface can be purchased from Galaxy with any of our provided readers attached. The Programming Reader works well for systems where taking cards to a controller-connected reader would be difficult.

Installation

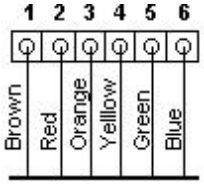
Connecting Reader to PC

The Programming Reader Interface connects to a communication port on any **System Galaxy** PC using the configuration shown.



Programming Reader Configuration

There are two connectors for readers to be attached on the RS-232 interface. One is labeled **INT** (internal) and the other is labeled **EXT** (external). The internal connection is usually already wired from the factory. The External connection can be used for any Galaxy supported reader type. Both connectors are labeled 1-6 with the pins having the properties shown in the diagram. These



color codes correspond to the values on the 508 backplane. An infrared reader would wire as shown, but a Wiegand reader would wire, Brown to pin 1, White to 2, Red to 3, Black to 4, and Green to 5, just as a regular Wiegand reader would. Additional reader wiring can be found in the individual reader's section of the Installation manual.

Voltage jumper

There is a voltage jumper on the RS-232 Reader Interface. The jumper must be set to 5 volts for all 5 volt readers or the readers and the Interface will be damaged.

INT/EXT Switch

This switch is used to tell the interface which connector, internal or external, it should be receiving data through. Be sure to flip the INT/EXT switch accordingly when changing from using the internal reader to the external reader or visa versa.

Dip Switches

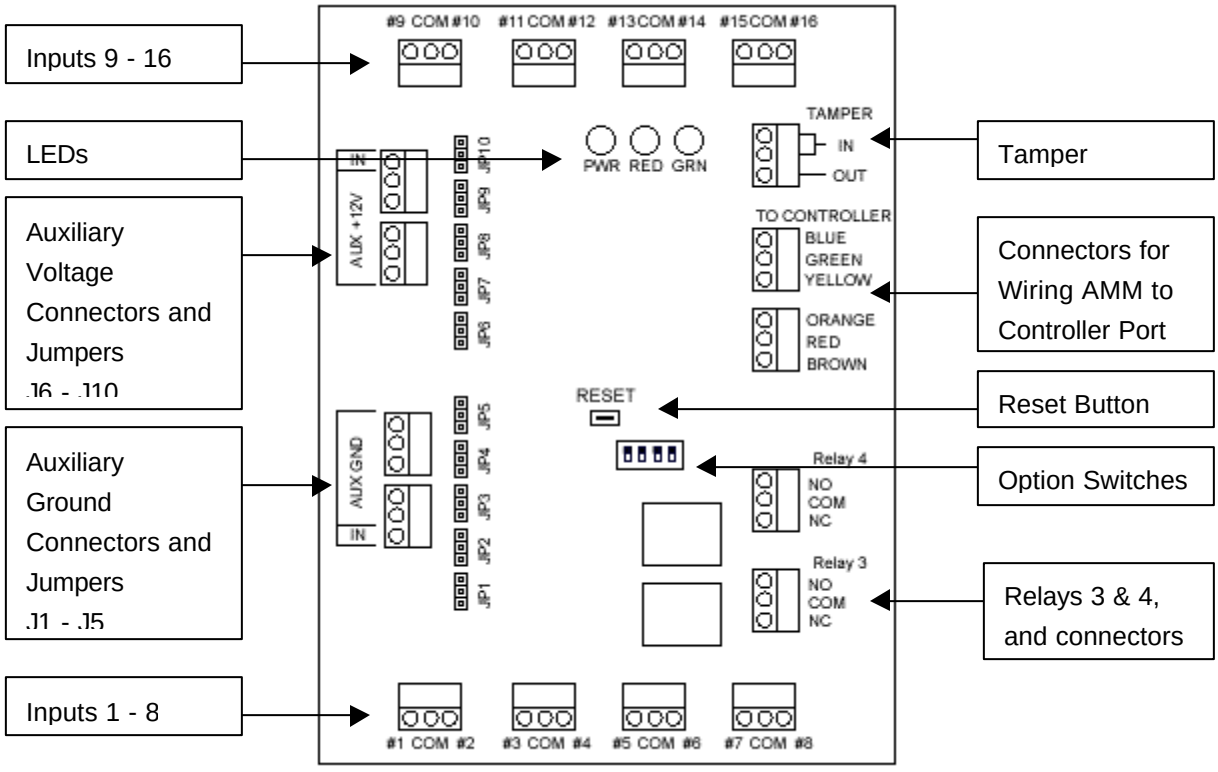
The bank of dip switches is used to tell the RS-232 interface what type of data, Infrared, Wiegand, or ABA, it should be receiving from the reader and transmitting to the computer. This is how the switches need to be set for the three different data formats.

Infrared: All OFF
Wiegand: #1 ON, all others OFF
ABA: #2 ON, all others OFF

Alarm Monitoring Module (AMM)

Description

The Alarm Monitoring Module (AMM) facilitates monitoring of alarm and general purpose input devices by the **500 Series controller**. Each AMM can monitor up to 16 devices in addition to tamper, communication failure, and auxiliary 12 VDC low voltage conditions. The AMM also is responsible for controlling its four associated relays. Relays 1 and 2 are located on the associated DPI and Relays 3 and 4 are located on the AMM itself. These relays have all the functionality of the ORM outputs.



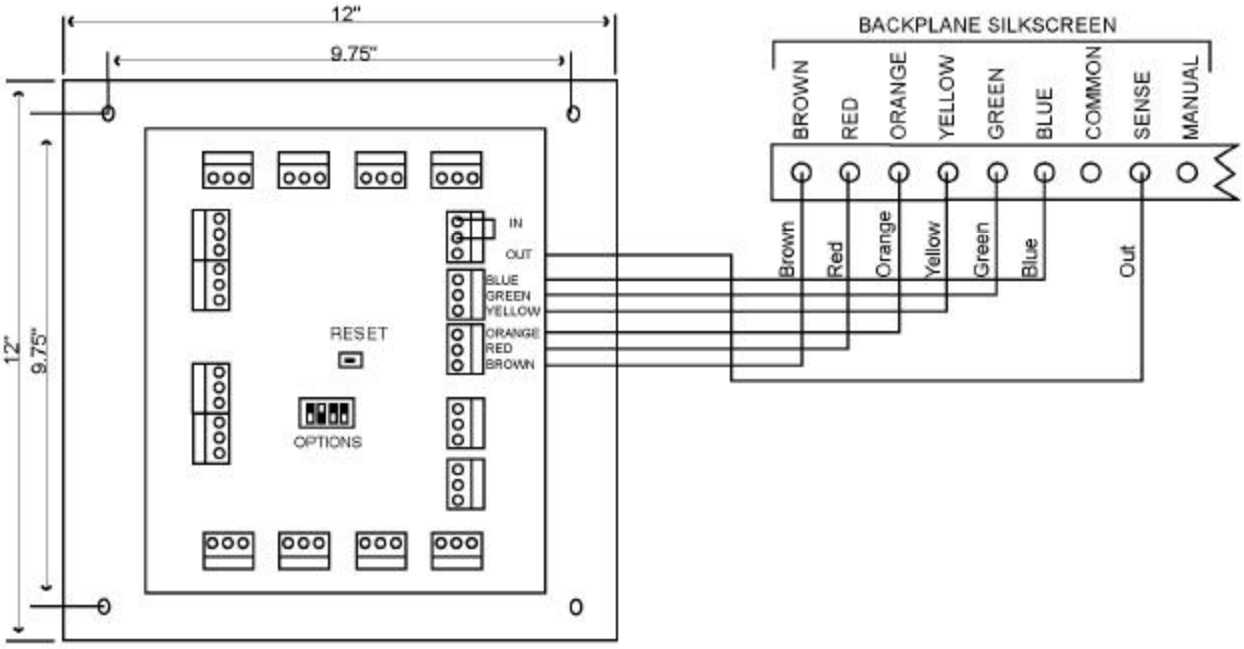
The AMM communicates bi-directionally with the controller. It is responsible for monitoring the condition of all devices wired to it, and informs the controller when any of those devices change condition. Through the system software, each device can be given a descriptive name and priority level as well as assigned to I/O GROUPS. Through I/O GROUPS, input devices can control output relays for annunciation

purposes. Other device specific data can also be configured via the software. Devices that can be monitored by an AMM are not limited strictly to alarm devices. General-purpose devices such as temperature sensors, flow meters, pressure sensors, etc. can be monitored as well.

Installation

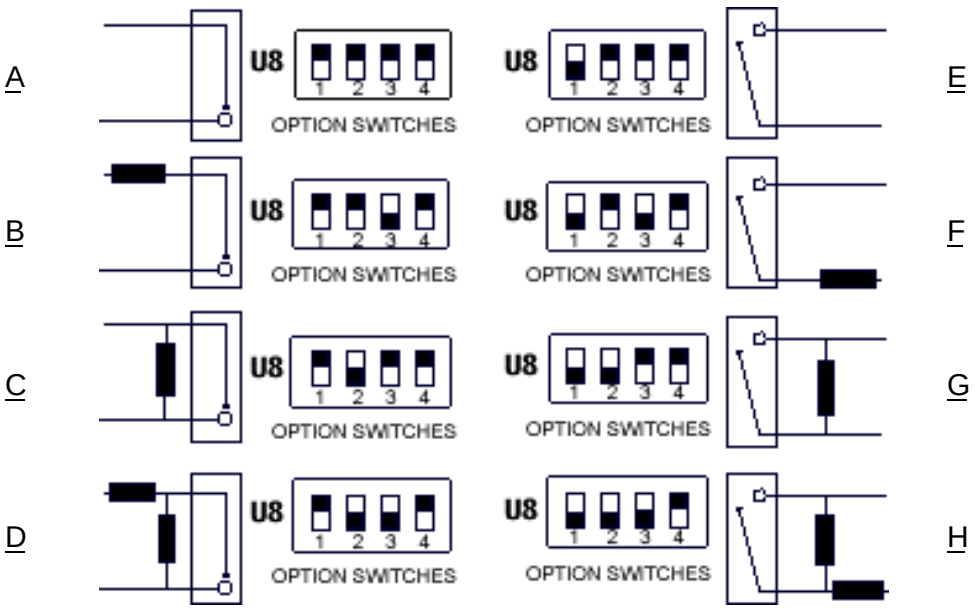
AMM to Controller Wiring

The AMM uses one port on the 500 Series controller. The maximum wiring distance between the AMM and the controller is 500 feet when using eight conductor, 22 AWG, (Beldon #9946) shielded cable. An overall shield is critical to prevent external electrical interference from effecting the correct operation of the AMM and controller.



AMM to Device wiring

The maximum wiring distance between each device and the AMM is 1000 feet when using two conductor, 22 AWG shielded cable, however shorter distances are encouraged to minimize the effects of external electrical interference. The wiring arrangement at the device varies, based on the AMM option switches. Diagrams are shown below for each of the possible switch configurations. **Black indicates the position of the switch.**



A = Normally Closed (NC)
B = Normally Closed (NC) Series Resistor 4700 OHM
C = Normally Closed (NC) Parallel Resistor (End of Line) 4700 OHM
D = Normally Closed (NC) Series and Parallel Resistor (End of Line) 4700 OHM
E = Normally Open (NO)
F = Normally Open (NO) Series Resistor 4700 OHM
G = Normally Open (NO) Parallel Resistor (End of Line) 4700 OHM
H = Normally Open (NO) Series and Parallel Resistor (End of Line) 4700 OHM

If supervision resistors are used, it is critical that they be installed as close to the device being monitored as possible. This provides for maximum security and reliability. All unused inputs MUST be wired in the safe condition to eliminate extraneous messages from being reported to the system software.

AMM Relay Wiring

There are four Form C relay outputs that are available with the Alarm Monitoring Module. The first two, Relays 1 and 2, are the DPI relays of the port. Relays 3 and 4 are located on the AMM itself. These relays can be tripped by local events as well as events that occur on other ports or controllers.

AMM Monitored Auxiliary Power Wiring

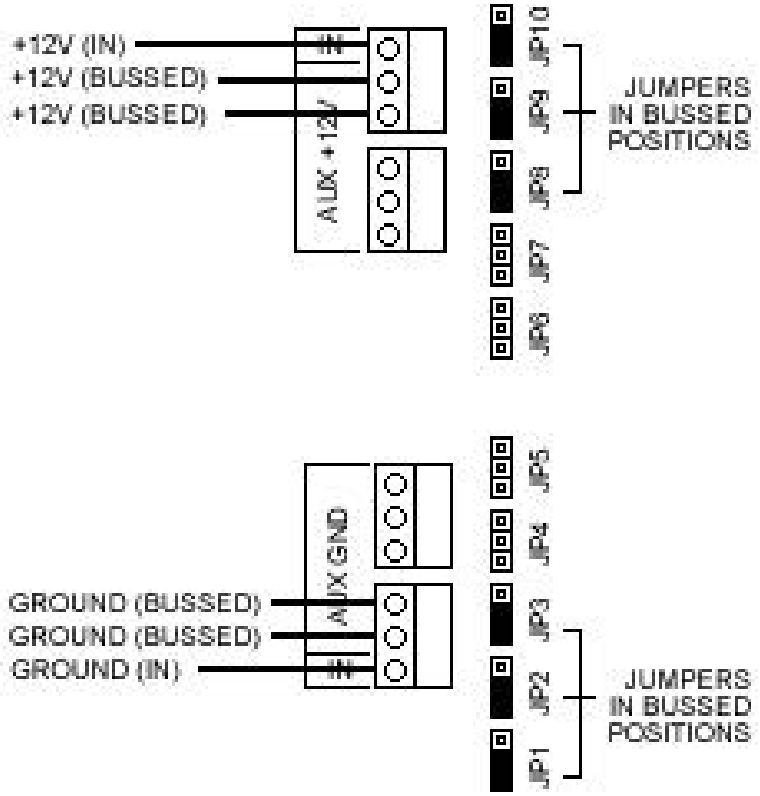
Power for inputs monitored by an AMM, such as glass break sensors and motion detectors, can be wired through the AMM board and monitored by the System Galaxy software. The power supply must be battery backed-up, providing standard 13.8 volts under load.

Switch 4 of the AMM option switches must be in the DOWN position to monitor auxiliary power.

The Auxiliary power connectors are found on the left of the board. To monitor a power source, connect the +12V of the source to the connector labeled "IN" above the "AUX +12V" label. Connect the ground of the source to the connector labeled "IN" below the "AUX GND" label.

To connect that power source to devices, place the jumpers J1 - J5 and J6 - J10 in the bussed position (connecting the middle and bottom pins of each jumper). Connect the devices to one of the five remaining connectors labeled "AUX +12V". Connect the ground for those devices to one of the five remaining connectors labeled "AUX GND".

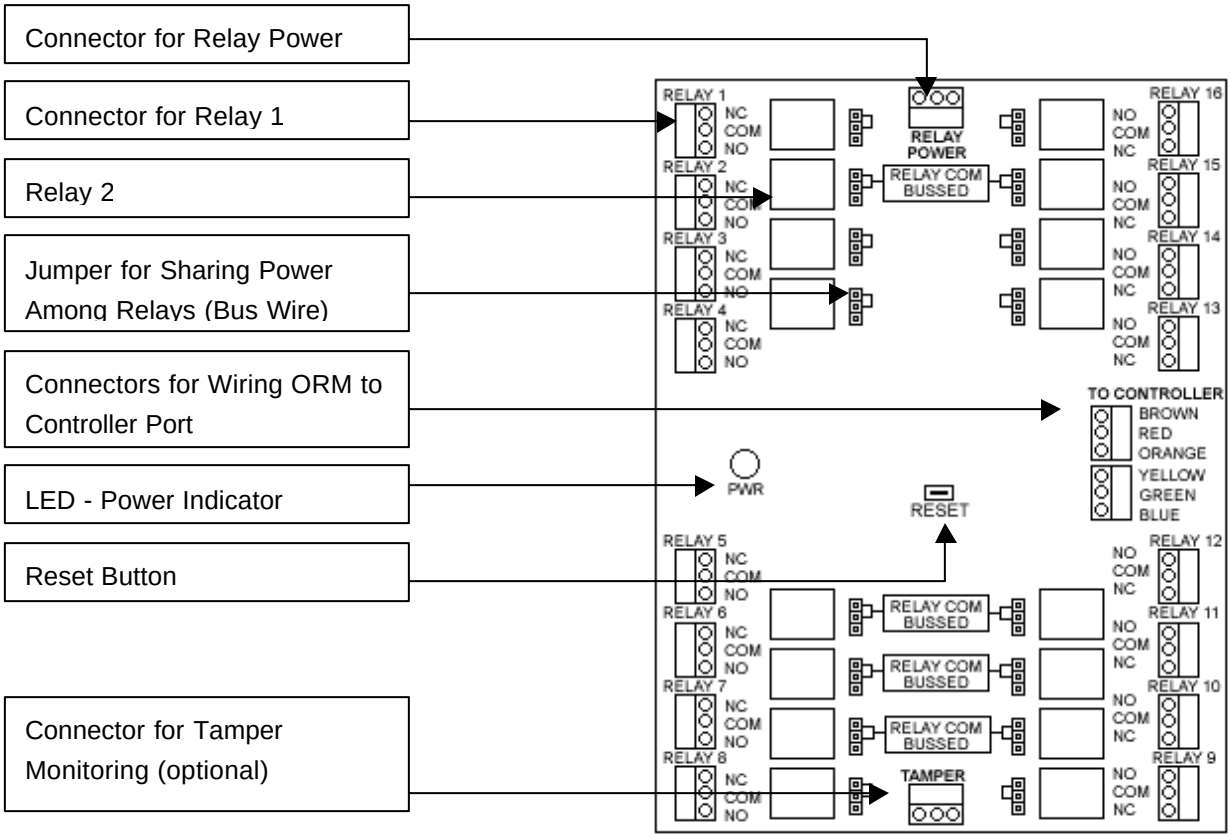
The diagram below shows auxiliary monitored power being shared to two devices.



Output Relay Module (ORM)

Description

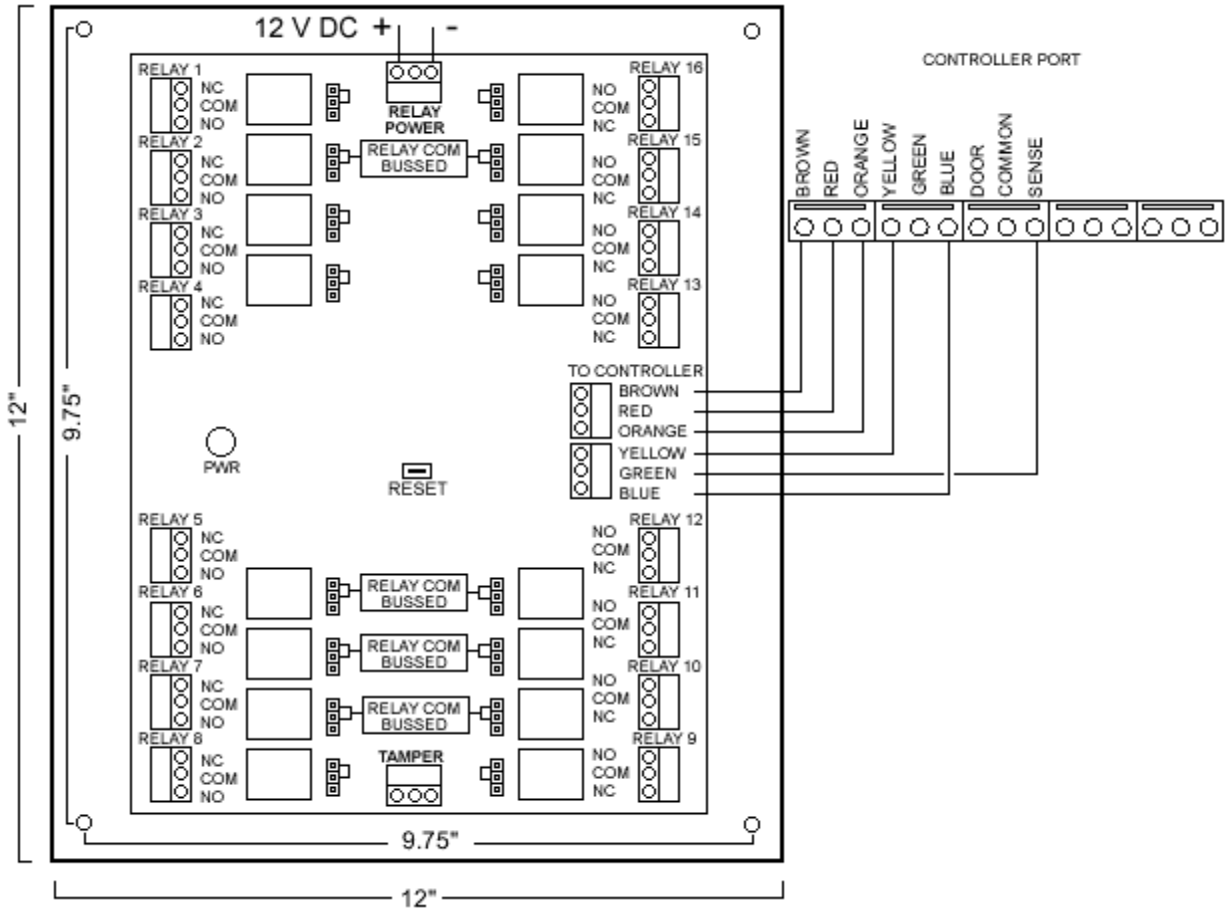
The Output Relay Module (ORM) facilitates control of external devices by the **500 Series controller.** Each ORM provides 16 Form-C SPDT dry contact outputs besides monitoring an enclosure tamper switch, communication failure, and the Relay 12 VDC Power supply for low relay voltage conditions. The ORM outputs can be used to control ANY device that can be switch controlled by relays rated at 1.5 amps, 24 VDC. Examples include LEDs, bells, piezo sounders, digital communicators/dialers, etc. for alarm or status annunciation. They can be used to turn lighting equipment on and off, unlock doors, and control elevators and HVAC equipment.



Installation

In the center along the right edge of the Output Relay Module (ORM) is a 6 position connector where the **500 Series** Controller is attached. See the wiring diagram below for the connections.

Six conductor, 22 AWG shielded cable (Beldon #9946) is required to wire the ORM to the **500 Series** controller. The maximum wiring distance is 100 feet. Shielded cable will minimize the effects of external electrical interference on the ORM and controller operation.



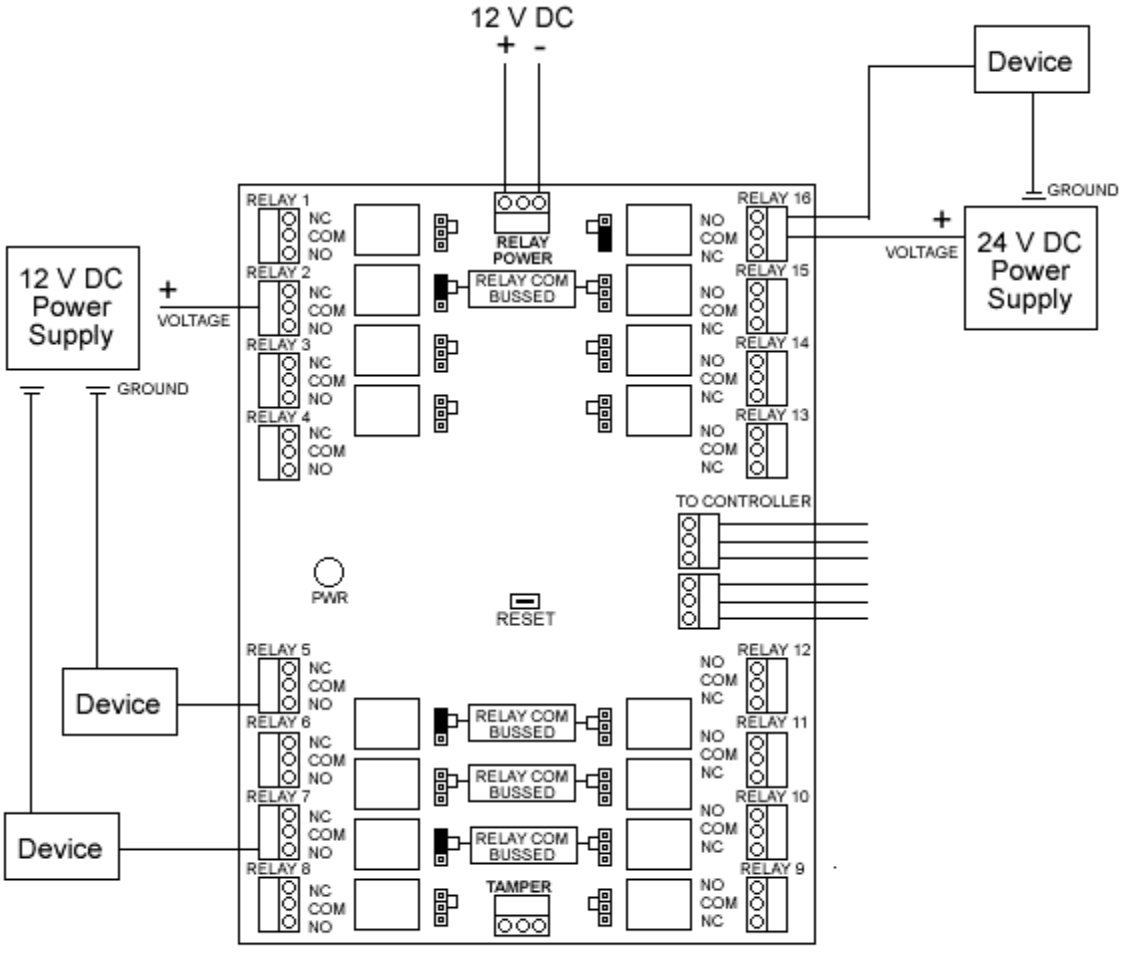
Relay Power

The ORM contains 16 Form C relays. These relays can be programmed through the software to be triggered by any door alarm or AMM event on the same loop as the ORM. All connectors are removable for easy installation and maintenance. On the left and right edges of the circuit board are three position connectors, one for each relay. Relays 1 through 8 are located along the left edge while Relays 9 through 16 are located along the right edge.

In the top-center is a 3 position connector labeled Relay Power. **Connect a separate battery backed-up +12 VDC 2 Amp power supply to this connector to power the Relays.** The ORM monitors this for low voltage and reports the status to the software. **Connect only a +12 VDC DC Power Supply to the Relay Power connector. Any other voltage supply will result in damage to the ORM.**

Optional Relay Bussing

Next to each relay, there are three (3) jumper pins labeled JP1 - JP16. These are provided to allow the COMMON contacts of the relays to be connected or "Bussed" together. This is useful if the devices being controlled must have power switched to them. By wiring power to one relay's COMMON contact, that power can be picked up by other relays' COMMON contact by simply inserting the provided jumper in the proper position. This "Bus" eliminates the need for external jumper wires.



In the above diagram, the jumpers for relays 2, 5, and 7 are in the "Bus" position, allowing those relays to share a common power source. The jumper for relay 16 is in the non-bussed position, isolating that relay's power source from the rest of the relays.

Tamper Connection

The Tamper connector at the bottom of the ORM is used for monitoring a tamper sensor inside the ORM box. The tamper sensor is provided in the UL version ORM; it is not provided in the standard ORM.

Elevator/HVAC Control

Description

The Elevator/HVAC Control Reader allows valid card swipes and time schedules to activate relays for the purposes of allowing access to certain floors or certain zones of an HVAC system.

Installation

The Elevator/HVAC control module uses both ports of the Universal Dual Port Interface on the 500 Series controller to carry out its functions. **Both ports must be connected to the same DPI.**

Odd DPI Port Configuration

The first port on the DPI (The odd port: 1, 3, 5, or 7) is used by the card reader. The reader is normally mounted in the Elevator cab or in a location easily accessible to the HVAC system. Any reader type that is compatible with the 500 Series controller can be used. The wiring diagrams for the various readers supported can be found in the "Reader Port" section of this manual. The door contact and Request to Exit points are not monitored for the Elevator/HVAC reader port, but a jumper must still be placed between the common and sense pins on the port. Also, Elevator readers cannot be in a Passback Area, or Door Group.

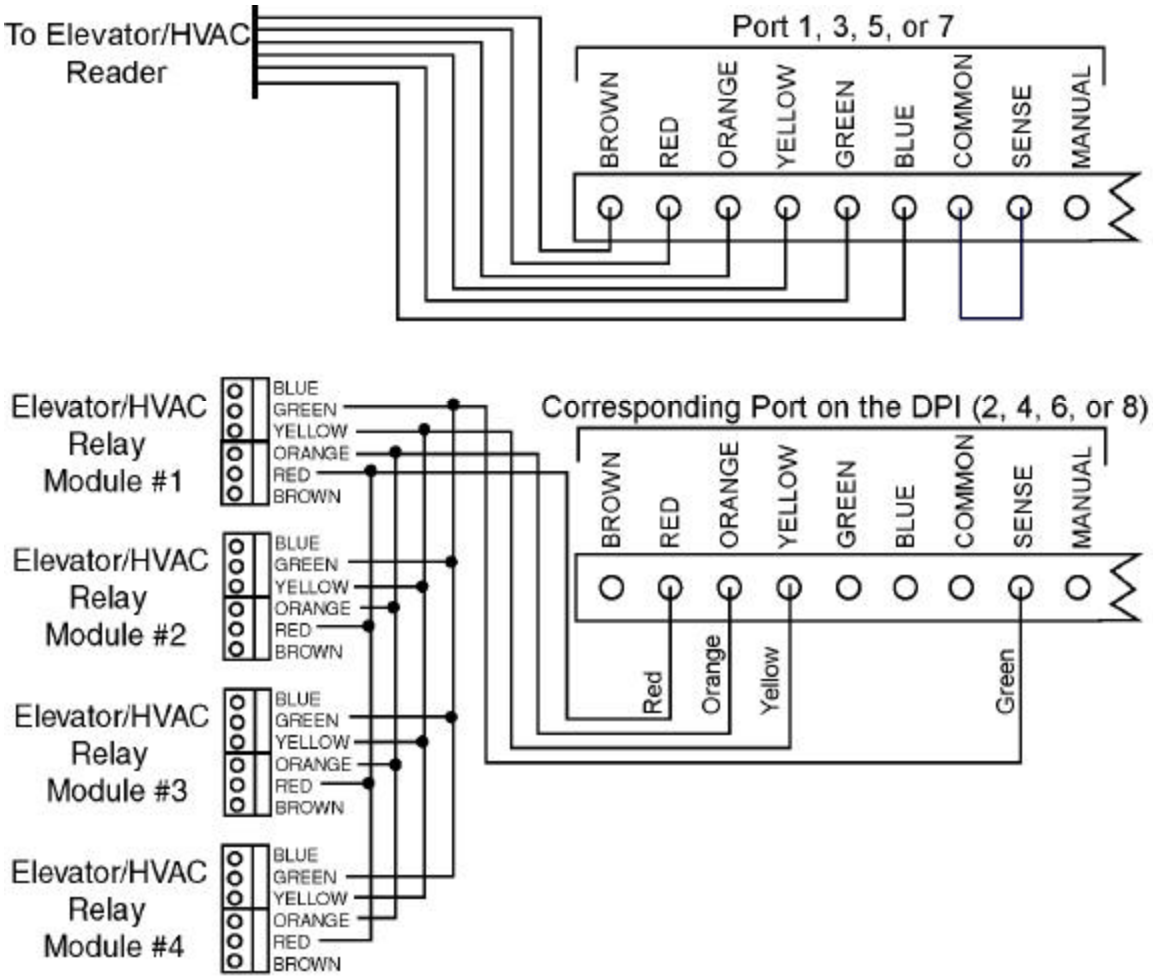
Even DPI Port Configuration

The second port of that same DPI (The even port: 2, 4, 6, or 8) is used for the Relay Module or Modules that will be used to control access to the elevator floors or the HVAC system operation. The relay modules used are Galaxy's Output Relay Modules with the elevator EPROM. When using ORMs with the Elevator Reader, make certain that the EPROM is an elevator EPROM.

Relay Module #	Relays Controlled by
1	1-16
2	17-32
3	33-48
4	49-64

Each relay module can control up to 16 floors and up to four relay modules can be connected to an Elevator Control Module Relay Port. The EPROM # or Module # tells the Module what relays programmed in the software it will control. Only one relay module per Elevator Control Port should have a specific number. If two Module #1's were installed instead of a Module #1 and Module #2, then the programming for relay's 17 through 32 would be ignored. In the scenario where there are two #1 modules, both would follow the programming for Relay's 1 through 16.

Wiring Diagram for Odd and Even Port:



General Purpose Input/Output Port

Description

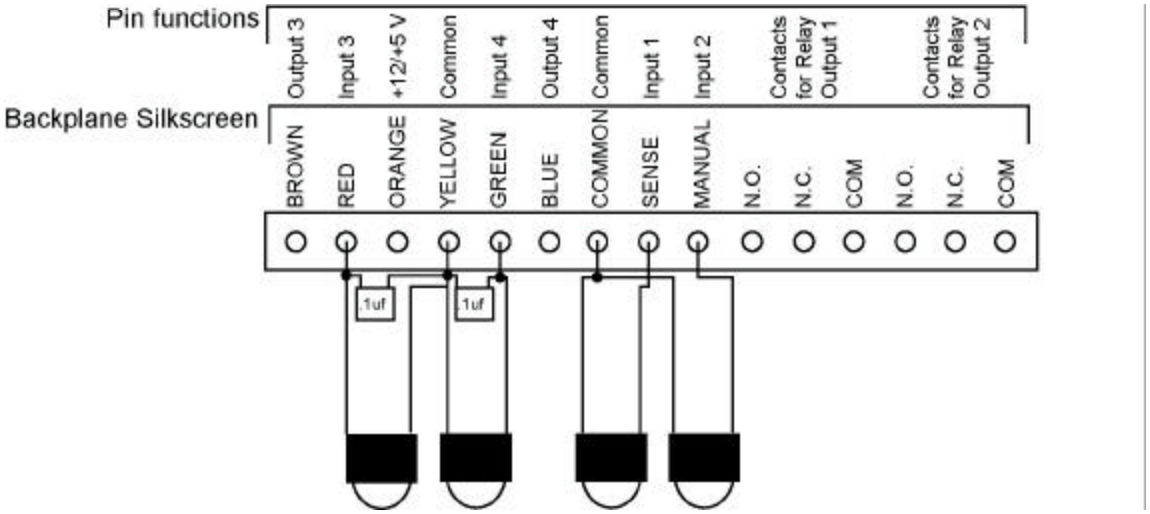
This type of port allows up to four alarm devices to be monitored and provides two form C relay outputs and 2 open collector outputs. The Inputs are programmed and function just as an AMM input except for the fact that they are all unsupervised Normally Closed. The outputs have the same functionality as the ORM outputs. The open-collector outputs are suitable for driving low-current circuits such as LEDs or low-current relay coils. The output is pulled low by the controller when the output is on (current flowing). External components must complete the circuit by providing an electrical pull-up to positive voltage. See the Input/Output section for more detail.

In addition to the ways that a port can be used, that have already been discussed, each port can also monitor and annunciate alarms. When a port is configured as an Input/Output Port in the **System Galaxy** software, the wiring connections take on the functions shown in the following diagram. Each Input/Output Port can accept up to four inputs and can produce two relay outputs (DPI Relays 1 and 2) and two Open Collector Outputs (Brown and Blue pins).

Installation

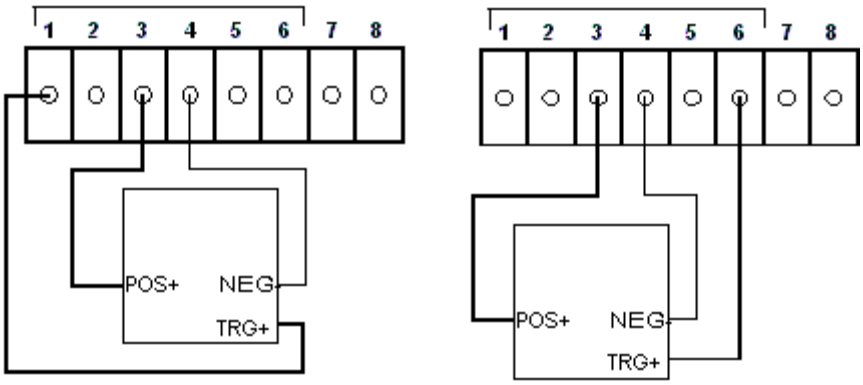
Connecting Inputs

The Inputs for the Input/Output port are as follows: Red is Input 3, Green is Input 4, Sense is Input 1 and Manual is Input 2. All inputs are normally closed. Inputs 3 and 4 share the "Yellow" Common pin while Inputs 1 and 2 share the "Door" Common pin. Galaxy's technical support department recommends that a .1 microfarad capacitor be installed on Inputs 3 and 4. This will prevent multiple alarms that may result from the contact bouncing and generating multiple alarms. The capacitor is not necessary for Inputs 1 and 2. The debounce circuitry is built in to these lines. In the software, these inputs can be programmed to trip any local or global outputs.

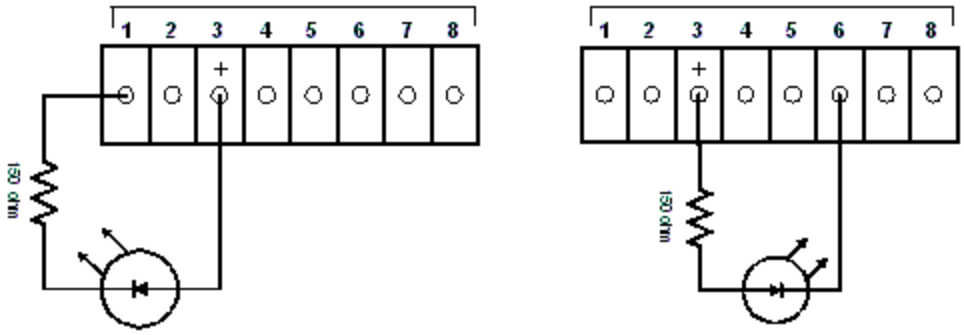


Connecting Outputs

Outputs 1 and 2 are Form C relays 1 and 2 on the Dual Port Interface. Output 3 is the Brown wire, Output 4 is the Blue wire and both are Open Collector Outputs. The open collector outputs are suitable for driving low-current circuits such as LEDs or low-current relay coils. The output is pulled low by the controller when the output is on (current flowing). External components must complete the circuit by providing an electrical pull-up to positive voltage, as shown in the following diagrams. These outputs can be tripped by any I/O Group.



The above diagram represents wiring the I/O ports for relays. The type of relay shown in the above diagram is comparable to the Altronix RBSN-TTL. The relay selected must support a positive trigger (as shown in the diagram).



The above diagram represents wiring the I/O port for LEDs. When wiring an LED from the I/O port, a 150 ohm resistor is the typical (minimum) resistance. A higher resistance will result in a dimmer LED.

When wiring either relays or LEDs, do not attempt to connect a separate power source.

Cypress Clock

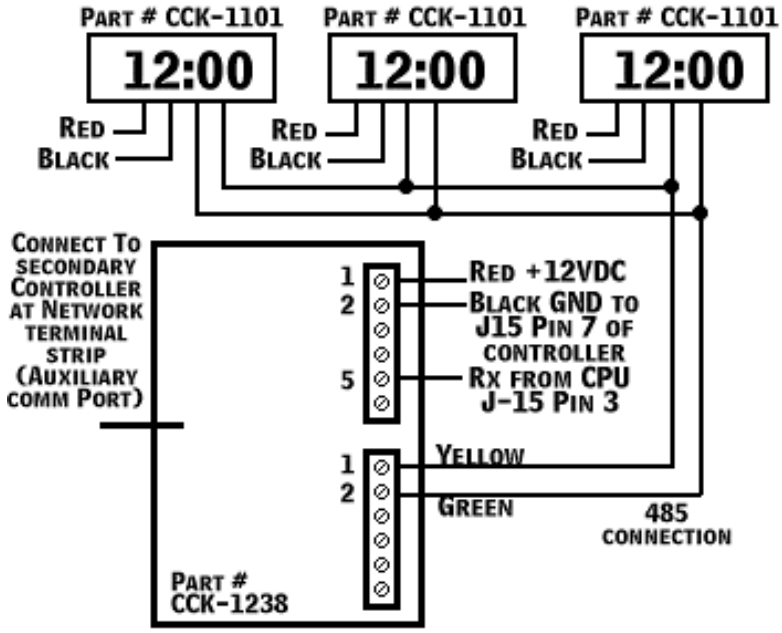
Description

A Cypress clock system is a time-display system that can connect to a secondary System Galaxy 508 or 502 controller. The clock system will display the current time stamp of the controller.

Installation

A Cypress clock interface unit (CCK-1238) can be connected to any SECONDARY 508 or 502 controller in a loop. The interface is connected to the auxiliary COM port of a secondary controller, which is the J15 connector used in primary controllers to connect with the PC. Up to 32 clocks can be connected to one interface unit.

The 508/502 controllers must be running at least Flash version 1.11, and option switches 3 and 4 must be in the UP position. In the software, the controller must have the Auxiliary Com Port set to the Cypress Clock mode, and Broadcast must NOT be enabled. See the diagram below for more details.



The Cypress clock interface unit (CCK-1238) can be connected to ANY 508i controller in a loop, PRIMARY OR SECONDARY. The interface is connected to the J6 COM port on the CPU of the controller.

The controllers must be running at least Flash version 508i (508I_1Old.s28). No option switch settings are necessary. In the software, the controller must have the Auxiliary Com Port set to the Cypress Clock mode, and Broadcast must NOT be enabled. See the diagram below for more details.

Lantronix Configuration

Description

The **Lantronix device** (micro-serial server) is an Internet communication device that converts Ethernet format data to RS-232 format data. This allows Galaxy controllers to be connected to their supporting PC via an Ethernet connection (such as a LAN/WAN), or to connect to each other over a Network Bridge created by two Lantronix devices (one at the Extending Secondary and one at the Remote Primary).

The Lantronix device is available in three models: **MSS100**, **MSS1** and **MSS1T2**.

MSS100 supports up to 100Mb network connections; **MSS1/ MSS1T2** supports up to 10Mb network connections (T2 version has coax adapter)

Installation

Setup for any model is best accomplished using the **GCS Lantronix Utility**. The GCS Lantronix Utility is available as a file on the GCS Software Suite CD or from the Galaxy website.

To copy the utility from the GCS Software Suite interface, click the "Browse CD" button. Open the "Utils" folder, then the "LantronixConfiguration" folder. Copy the file "GCS_LantronixConfiguration.exe". Paste the file to a location on the PC's hard drive or to a floppy.

If you do not have the GCS Lantronix Configuration utility, you may use Hyperterminal to program the Lantronix device. Those instructions are in the section following the utility instructions.

Setup Using GCS Lantronix Utility (Recommended)

1. Connect the MSS100 to the Serial port of the configuring PC using the special cable included with the device. The cable provides the following connections:

MSS100 DB-25	PC Serial Port	
	9 Pin	25 Pin
2	2	3
3	3	2
7	5	7

2. Open the GCS_Lantronix utility by double-clicking on the file GCS_LantronixConfiguration.exe.

3. Select the **Configuration Type** from the drop-down list.

   Primary Controller: MSS100 will be used to connect from PC to Primary Controller of loop.
   Primary Controller with Auto-Connect: same as above, but controller will have TCP/IP dial-back enabled in the software programming. Please contact Galaxy Technical Support if you are planning on using this feature.
   Extending Secondary: MSS100 will be connected to the Extending Secondary of a Network Bridge
   Remote Primary: MSS100 will be connected to the Remote Primary of a Network Bridge.

4. Under "Local PC Comm. Port Settings", select the COM port to which the MSS100 is connected and set the baud rate to 9600.

5. Click the Connect button.

6. In the IP Settings section, enter the IP Address, Subnet Mask, and Gateway to be assigned to the MSS-100. You will need to contact IT administration for this information.

7. If the Dedicated IP Address is applicable, the field will be enabled. For a Primary Controller with Auto-Connect, enter the IP address of the PC to which the controller can initiate a dial-back connection. For an Extending Secondary, enter the IP address of the MSS-100 that will be connected to the Remote Primary.

8. Reset the MSS-100 :

   - Unplug the device from the power source.
   - Press and hold the reset button (usually requires an unbent paper clip).
   - Still holding the reset button, plug in the device to the power source.
   - **Continue to hold the reset button until text appears.**
   - When the line "%%Lantronix MSS-100%%" appears, press the Enter key.
   - The Local prompt is displayed.

9. Click the Send Command button. The listed commands will be sent to the device and at the end it will reboot itself.

10. When the reboot is complete, you can disconnect the MSS-100 from the COM port and move it to its permanent location.

Setup Using Hyperterminal

Part One - Assigning the IP Address

1. Connect the MSS100 to the Serial port of the configuring PC using the special cable included with the device. The cable provides the following connections:

MSS100 DB-25	PC Serial Port	
	9 Pin	25 Pin
2	2	3
3	3	2
7	5	7

2. Start Hyperterminal. It is usually found at **Start button >> Programs >> Accessories >> Hyperterminal**.

   If it is not available, you can add it using Add/Remove Programs in the Control Panel.

3. Once Hyperterminal opens, enter any **name for your connection** and select any **icon**.

4. In the Connect To window, select the **COM port** to which the cable is connected.

5. Click **OK.**

6. In the **COM Port Properties**, use the following settings:

Bits per second	**9600**
Data bits	**8**
Parity	**None**
Stop bits	**1**
Flow Control	**None**

7. Click **OK**.

8. Cold reset the device:

   - Unplug the device from the power source.
   - Press and hold the reset button (usually requires an unbent paper clip).
   - Still holding the reset button, plug in the device to the power source.
   - **Continue to hold the reset button until text appears.**

- After the line "%%Lantronix MSS-100%%" appears, press the Enter key.
- The Local prompt is displayed.

9. Type in **SET PRIV** and press the enter key.
   This sets the privilege level so configuration commands can be issued.

10. Type in **SYSTEM** as the password and press the enter key.

11. The IP configuration will now be set.
    Type **CHANGE IPADDRESS ###.###.###.###** (###.###.###.### = the IP address) and press the enter key..

    The IP address must be assigned by the facility's network administrator to fit into the facility's address scheme. Otherwise the communication will not work.

Part Two - Programming the Device

1. Type **CHANGE FLOW CONTROL NONE** to disable all flow control, and press the enter key.

2. Type **CHANGE GATEWAY nnn.nnn.nnn.nnn** (nnn.nnn.nnn.nnn = the gateway), and press the enter key.

   This allow access from the Internet or from a different sub-net to which the device is connected. The facility's valid Gateway must be used. Contact the Facility's Manager of Information Systems to obtain this information.

3. Type the following commands, and press the enter key after each line:

   CHANGE BOOTP DISABLED
   CHANGE RARP DISABLED
   CHANGE SUBNET MASK mmm.mmm.mmm.mmm (mmm.mmm.mmm.mmm = the subnet mask); Contact the MIS department to obtain this information.

4. Follow the instructions below that are appropriate for how you are going to use the device.

   <u>For a Network Connection from PC to Controller (IP Dial-back not enabled):</u>
   - To set the baud rate of the device, type **CHANGE SPEED ####** (### equals either 9600, 4800, or 2400 and must match the baud rate setting of the CPU) and press the Enter key.
   - Type **CHANGE SIGNAL CHECK ENABLED** and press the enter key.
   - Type **CHANGE DTRWAIT ENABLED** and press the enter key.
   - Type **CHANGE DSRLOGOUT ENABLED** and press the enter key.
   - Type **CHANGE ACCESS REMOTE** and press the enter key. If you need to set up the device to support the controller dial-back via TCP/IP, contact Galaxy tech support.

- Verify that Option switch 4 on the controller is in the UP position.

For an Extending Secondary (Network Bridge):

- Type **CHANGE DEDICATED TCP nnn.nnn.nnn.nnn:3001T**. (nnn.nnn.nnn.nnn = IP address of the remote primary) and press the enter key.
- Type **CHANGE AUTOSTART ENABLED** and press the enter key.
- Set **Option switch 5** on the controller in the **up** position**.**
- To change the baud rate of the device, type **CHANGE SPEED ####** (#### equals either 9600, 4800, or 2400 - this baud rate must match the setting of the 500 CPU) and press the enter key.

For a Remote Primary (Network Bridge):

- Type **CHANGE ACCESS REMOTE** and press the enter key. This disables the local port for configuration after this connection is terminated.
- Set **Option switch 6** on the controller in the **up** position.
- To change the baud rate of the device, type **CHANGE SPEED ####** (#### equals either 9600, 4800, or 2400 - this baud rate must match the setting of the 500 CPU) and press the enter key.

5. End the PC connection and remove the special cable (if still connected).

6. Connect the Lantronix to the 508 controller using the included cable, which provides the following special connection:

J15 Connector	Lantronix DB-25
2	2
3	3
7	7
6	20
20	6

For a 502 Controller, create a cable with the following connection:

RS-232 TO PC Connector	Lantronix DB-25
DTR (20)	6
RX (2)	2
TX (3)	3
DCD (6)	20
GROUND (7)	7

7. You must test the connection after the controllers have been added to the database.

8. Contact Galaxy's Technical support department with any questions.

Troubleshooting

Helpful Commands

When dealing with a Lantronix device issue, such as unexpected disconnects, there are several commands that are useful for troubleshooting purposes. Those commands are described in the section below.

INIT DELAY 0 (Reboots Device)

The INIT DELAY 0 command issues a reboot command to the Lantronix device. The INIT DELAY 0 command can be issued to a Lantronix device via a Telnet session or via the included cable using the "Send Now" button (see "Helpful Buttons" section that follows).

INIT DELAY 0 is useful for rebooting the Lantronix device if the port has been locked up (often due to the "Access Dynamic" setting used for enabling TCP/IP Dial-back).

SHOW PORT (Displays Port Settings)

The SHOW PORT command can be issued to a Lantronix device via a Telnet session or via the included cable using the "Send Now" button (see "Helpful Buttons" section that follows).

The SHOW PORT command returns the following information (the settings may not be identical).

Port 1: Username: Port_1		Physical Port 1 (Idle)	
Char Size/Stop Bits:	8/1	Baud Rate:	9600
Flow Ctrl:	None	Session Limit:	4
Parity:	None	Modem Control:	None
Access:	Remote	Break Ctrl:	Local
Local Switch:	None	Start Character:	None
Forward:	None	Backward:	None
Port name:	Port_1	Terminal Type:	None
Preferred Service:			
Characteristics: DSR Logout Verify Telnet Pad Dtrwait Signal Check			
Sessions:	0	Current Session:	None
Input/Output Flow Ctrl:	N/N	DSR/DTR/CTS/RTS/CD:	Y/N/N/Y/N

Seconds Since Zeroed:	3886253	Framing Errors:	0
Accesses Local/Rem:	0/14	Parity Errors:	0
Flow Control Violations:	0	Overrun Errors:	0
Bytes Input:	82765	Bytes Output:	488582
Input Flow On/Off:	0/ 0	Output Flow On/Off:	0/ 0

Items to note are the setting of the Physical Port 1 (should be "idle" or "job service", not "local"), and the setting for Access (should be "remote" for a standard primary controller, should be "dynamic" only if the controller is using the DialBack via TCP/IP feature).

SHOW SERVER (Displays Device Settings)

The SHOW SERVER command can be issued to a Lantronix device via a Telnet session or via the included cable using the "Send Now" button (see "Helpful Buttons" section that follows).

The SHOW SERVER command returns the following information (the settings may not be identical).

MSS100 Version V3.5/9(990603) Uptime: 44 Days 23:41
Hardware Addr: 00-80-a3-21-17-0c Name/Nodenum: MSS_21170C/ 0
Ident String: MSS100

Inactive Timer (min):	30	Serial Delay (msec):	30
Password Limit:	3	Session Limit:	4
Queue Limit:	32	Node/Host Limits:	32
LAT Circuit Timer (msec):	80	Keepalive Timer (sec):	20
Multicast Timer (sec):	30	Retrans Limit:	10
TCP/IP Address:	63.122.126.201	Subnet Mask:	255.255.255.0
Nameserver:	(undefined)	Backup Nameserver:	(undefined)
TCP/IP Gateway:	63.122.126.1	Backup Gateway:	63.122.126.253
Domain Name:	(undefined)	IP Time:	None
		TCP Keepalives:	Enabled
DHCP Server:	None	Lease Time:	0:00
Load Address:	00-00-00-00-00-00	Prompt:	Local_%n%P>

Characteristics:
Incoming Logins: Telnet (No Passwords Required)
LAT Groups: 0

Items to note are the IP address, Subnet Mask, TCP/IP Gateway, and Backup Gateway. These should all be set as defined by the network's administrator. The DHCP Server should also be set to "None", which sets the IP address as a static IP address.

Helpful Utility Buttons

There are several buttons in the GCS Lantronix Utility that are available for troubleshooting purposes. Those buttons are described in the following sections.

Send Now button

The Send Now button is located at the bottom of the GCS Lantronix Utility screen. This button allows you to send commands to the Lantronix device when it is connected to the PC via the included cable.

1. Open the GCS Lantronix Utility (GCS_LantronixConfig.exe)
2. Type a command into the Command text box.
3. Click "Send Now" button.
4. The results will return in the text window above the button.

If you are sending a command that requires "privilege", you must first send the command "SET PRIV", followed by the command "SYSTEM". This will allow you to issue privileged commands.

Telnet button

The Telnet button is located at the bottom of the GCS Lantronix Utility screen. The Telnet button creates a Telnet session to a Lantronix device that you have placed on the network.

1. Open the GCS Lantronix Utility (GCS_LantronixConfig.exe)
2. Click "Telnet" button.
3. Enter the IP address of the Lantronix device into the dialog box.
4. Click "OK".
5. A Telnet session will open.
6. Login at the user name prompt as "system"
7. You can issue commands (like Show Port and Show Server) from the Local prompt.
8. Type "logout" to exit.

If you are issuing a command that requires "privilege", you must first issue the command "SET PRIV", followed by the password "SYSTEM". This will allow you to issue privileged commands.

Ping button

The Ping button is located at the bottom of the GCS Lantronix Utility screen. The Ping button sends a "ping" signal to a Lantronix device that you have placed on the network. This allows you to determine if a device that you connected to the network is really present on the network by sending a signal and receiving an acknowledgement.

1. Open the GCS Lantronix Utility (GCS_LantronixConfig.exe)
2. Click "Ping" button.
3. Enter the IP address of the Lantronix device into the dialog box.
4. Click "OK".
5. A black window will open.
6. Several messages will appear. If successful, a time in seconds will appear listed after each ping reply If unsuccessful, the message "Request Timed Out" will appear.
7. The black window will close automatically.

Tip: If you cannot connect to the controller, try Pinging with the Lantronix powered off. If you get a response, someone else is using the same IP address.

Appendix

Index of 508i Commands

When connected to the 508i CPU either through HyperTerminal or a Telnet session (available once the IP address is correctly installed and configured), several commands are available for programming and diagnostic functions. This list of commands is also available by typing "help" at the command prompt.

In a Telnet connection, after signing in, type the "crlf" command to format the screen to be readable. Type "echo" if you wish to see the commands you are typing.

switches

This command returns the current settings of all three banks of dip switches (Unit Number, Options, and Baud), and the meaning of those settings.

config

This command allows you to set up the IP address and subnet mask for this controller, as well as other settings. It also gives a list of the current settings. To modify these settings, type "yes" (lowercase).

Serial #	The serial number of the CPU board (also labeled on the board)
MAC Address	The MAC address assigned to the CPU board by Galaxy Control Systems.
Package #	The package number represents the type of controller (2 = 508i).
IP	The IP address assigned to the controller must be static, in the standard "dotted" format (nnn.nnn.nnn.nnn). The IP address must be assigned by the network administrator. The default IP address assigned to every board is 63.122.126.203.
Subnet Mask	The Subnet Mask must be assigned by the network administrator.
Gateway Address	The Gateway address must be assigned by the network administrator.
Partner IP	If a "partner IP" address is specified, the controller will only accept an incoming connection from the designated address. If the controller will be used as an Extending Secondary in a

	network bridge, this setting MUST be set to the IP address of the Remote Primary. This setting is optional for Primary and Remote Primary controllers. For a Primary Controller, the IP address of the PC host must be used; you cannot use the NAME of the PC host. Do not use this feature with dynamic IP addresses (DHCP).
Partner Port	This is an optional setting. For Primary and Remote Primary controllers, this setting specifies the port used for listening for connections. For Secondary controllers, this setting specifies the destination port and the local outbound port. If left unset, the controller defaults to port 3001.
Password	This is required setting for Extending Secondaries; it is an optional setting for Primary and Remote Primary controllers. If set, this password replaces the controller serial number in the security algorithm that controls the connection between the controller and a PC. If set for a Primary Controller, the password must also be typed into the Serial Number field in the System Galaxy software. Galaxy recommends that the same password be used for all 508i controllers in each installation. To skip the Password setting without changing it, hit the space bar, then hit the enter key.

net

This command returns the statistics of the Ethernet port.

port n (where n equals a port number)

This command returns troubleshooting information for the specified port

Unit Number Table

0 = Switch Down
1 = Switch Up

Switch #	1	2	3	4	5	6	7	8
Unit #								
00	0	0	0	0	0	0	0	0
01	1	0	0	0	0	0	0	0
02	0	1	0	0	0	0	0	0
03	1	1	0	0	0	0	0	0
04	0	0	1	0	0	0	0	0
05	1	0	1	0	0	0	0	0
06	0	1	1	0	0	0	0	0
07	1	1	1	0	0	0	0	0
08	0	0	0	1	0	0	0	0
09	1	0	0	1	0	0	0	0
10	0	1	0	1	0	0	0	0
11	1	1	0	1	0	0	0	0
12	0	0	1	1	0	0	0	0
13	1	0	1	1	0	0	0	0
14	0	1	1	1	0	0	0	0
15	1	1	1	1	0	0	0	0
16	0	0	0	0	1	0	0	0
17	1	0	0	0	1	0	0	0
18	0	1	0	0	1	0	0	0
19	1	1	0	0	1	0	0	0
20	0	0	1	0	1	0	0	0
21	1	0	1	0	1	0	0	0
22	0	1	1	0	1	0	0	0
23	1	1	1	0	1	0	0	0
24	0	0	0	1	1	0	0	0
25	1	0	0	1	1	0	0	0
26	0	1	0	1	1	0	0	0
27	1	1	0	1	1	0	0	0
28	0	0	1	1	1	0	0	0
29	1	0	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
31	1	1	1	1	1	0	0	0
32	0	0	0	0	0	1	0	0
33	1	0	0	0	0	1	0	0
34	0	1	0	0	0	1	0	0
35	1	1	0	0	0	1	0	0
36	0	0	1	0	0	1	0	0

Switch #	1	2	3	4	5	6	7	8
Unit #								
37	1	0	1	0	0	1	0	0
38	0	1	1	0	0	1	0	0
39	1	1	1	0	0	1	0	0
40	0	0	0	1	0	1	0	0
41	1	0	0	1	0	1	0	0
42	0	1	0	1	0	1	0	0
43	1	1	0	1	0	1	0	0
44	0	0	1	1	0	1	0	0
45	1	0	1	1	0	1	0	0
46	0	1	1	1	0	1	0	0
47	1	1	1	1	0	1	0	0
48	0	0	0	0	1	1	1	0
49	1	0	0	0	1	1	0	0
50	0	1	0	0	1	1	0	0
51	1	1	0	0	1	1	0	0
52	0	0	1	0	1	1	0	0
53	1	0	1	0	1	1	0	0
54	0	1	1	0	1	1	0	0
55	1	1	1	0	1	1	0	0
56	0	0	0	1	1	1	0	0
57	1	0	0	1	1	1	0	0
58	0	1	0	1	1	1	0	0
59	1	1	0	1	1	1	0	0
60	0	0	1	1	1	1	0	0
61	1	0	1	1	1	1	0	0
62	0	1	1	1	1	1	0	0
63	1	1	1	1	1	1	0	0
64	0	0	0	0	0	0	1	0
65	1	0	0	0	0	0	1	0
66	0	1	0	0	0	0	1	0
67	1	1	0	0	0	0	1	0
68	0	0	1	0	0	0	1	0
69	1	0	1	0	0	0	1	0
70	0	1	1	0	0	0	1	0
71	1	1	1	0	0	0	1	0
72	0	0	0	1	0	0	1	0
73	1	0	0	1	0	0	1	0
74	0	1	0	1	0	0	1	0
75	1	1	0	1	0	0	1	0
76	0	0	1	1	0	0	1	0
77	1	0	1	1	0	0	1	0
78	0	1	1	1	0	0	1	0
79	1	1	1	1	0	0	1	0
80	0	0	0	0	1	0	1	0
81	1	0	0	0	1	0	1	0
82	0	1	0	0	1	0	0	0

Switch #	1	2	3	4	5	6	7	8
Unit #								
83	1	1	0	0	1	0	1	0
84	0	0	1	0	1	0	1	0
85	1	0	1	0	1	0	1	0
86	0	1	1	0	1	0	1	0
87	1	1	1	0	1	0	1	0
88	0	0	0	1	1	0	1	0
89	1	0	0	1	1	0	1	0
90	0	1	0	1	1	0	1	0
91	1	1	0	1	1	0	1	0
92	0	0	1	1	1	0	1	0
93	1	0	1	1	1	0	1	0
94	0	1	1	1	1	0	1	0
95	1	1	1	1	1	0	1	0
96	0	0	0	0	0	1	1	0
97	1	0	0	0	0	1	1	0
98	0	1	0	0	0	1	1	0
99	1	1	0	0	0	1	1	0

ASCII STRINGS FOR CCTV

All strings listed are as viewed using Hyperterminal connected to the COM port to which the CCTV Switcher would normally be connected.

Unless noted, the following codes apply:

nn or **nnnn is the** 2 or 4 digit Alarm number, as programmed in the database
mmmm is the 4 digit Monitor number, as programmed in the database
cc or **cccc is the** 2 or 4 digit Camera number, as programmed in the database
pp or **pppp** is the 2 or 4 digit Position number, as programmed in the database

Brand/Model	ALARM number	String Sent for Alarm	String Sent for Restore	Camera/Monitor/Position Sent for Alarm or Restore	Notes
AMERICAN DYNAMICS/ PELCO CM9750-DT	nnnn	nnnnEa	nnnnTa	mmmmMacccc#apppp\a	
BURLE ALLEGIANT	nnnn	+ALARMnnnn	-ALARMnnnn	R/C cccc12ppppd	d is the single digit camera number
KALATEL	nnnn	00[nnnn~	00\nnnn~	mmmm#cccc~ppppEcccc~	Both camera and monitor number will be reduced by 1 when sent. Example : Programmed monitor 8,camera 9 and position 7 would send 07#008~07E008.
VICON	nnnn	?unnnnS	?unnnnR	?Gpp cc	
PANASONIC MUX	hh	?OAI:hh?	?OAL:hh?	Will not send Camera/Monitor/Positions	hh is the Hex value for the Decimal value of the Alarm # programmed in the database.
PANASONIC WJ-SX550A	ALARM # hh	?CMD:HA(hh) ??CMD:HA()?	?CMD:HA()	Will not send Camera/Monitor/Positions	hh is the Hex value for the Decimal value of the Alarm # programmed in the database.