SIEMENS

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INSTRUCTION & INSTALLATION

SOLID-STATE CROSSING CONTROLLER IIIA (SSCC IIIA) A91160 & A91165

SEPTEMBER 2007, REVISED FEBRUARY 2014

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VERSION E.1

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CUSTOMER SERVICE: (800) 626-2710
TECHNICAL SUPPORT: (800) 793-7233
FAX: (270) 918-7830

FCC RULES COMPLIANCE

The equipment covered in this manual has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

ADDENDUM
POWER & LAMP CONNECTOR INSPECTION

1 GENERAL

This addendum applies to all Safetran® SSCC III, SSCC IIIA, SSCC III Plus, and SSCC IV Solid-State Crossing Controllers and concerns the green screw-down style connectors used for **power and lighting circuits.**

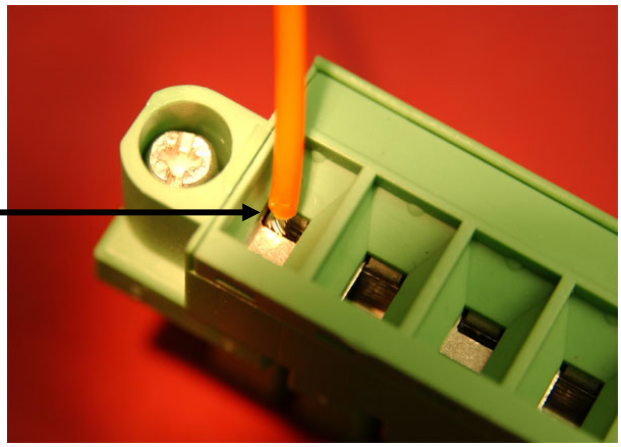
During initial installation of the crossing warning system and during periodic inspections, the power and lighting circuit connections on screw-down style connectors should be inspected as described in paragraph 2.

2 RECOMMENDED INSPECTION PROCESS

a. Visually inspect each connection for signs of heat damage such as charring or discoloration.

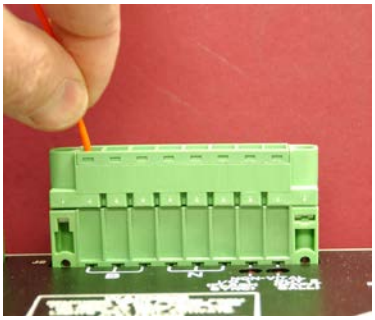
b. Verify that the stripped end of each wire has been inserted into a connector wire receptor just short of the insulation jacket.

Portion of wire exposed between insulation jacket and top of wire receptor.



c. Verify that the screw for each wire receptor has been tightened to a torque of 4.5 inch-pounds (approximately the same tightness as required when tightening a signal terminal nut)

d. Grasp each wire just above the connector surface between your thumb and index finger and pull on it to verify that it does not move within the connector. Pull with about the same amount of force as when tightening boot laces (not starting a chain saw).



e. If the wires do not move, go to step “g”. If a wire is suspected of moving, remove the wire and then mechanically sweep the wire receptor through the full range of motion by tightening and loosening the associated screw. Verify that there are no issues that prevent the receptor from fully opening or closing.

f. Once it is verified that the connector wire receptor is mechanically able to be properly tightened, either repeat the process for that wire starting at step “b” above or replace the screw-down style connector with a cage-clamp style connector (Safetran p/n Z715-09163-0008).

g. Perform all required operational tests.

3 SSCC REVISIONS WITH CAGE-CLAMP CONNECTORS

Effective with the following SSCC revisions, Safetran began supplying cage-clamp style connectors in place of the screw-down style connectors for all SSCC shipments:

- SSCC IIIA, 91160/91165, Rev D5
- SSCC III Plus, 91190/91195, Rev B4
- SSCC IV, 91210/91215, Rev B3

NOTE

The SSCC battery and light circuit connectors are provided with multiple wire receptors for the B, N, L1, and L2 connections. Where multiple wires are used, it is recommended that each wire be attached to a separate wire receptor on the connector to ensure the best possible electrical connection and to reduce overall voltage drop and heat buildup.

NOTICE
PRODUCT UPGRADE

Effective immediately, Safetran Solid State Crossing Controllers are shipped from the factory with cage-clamp style connectors in place of the screw-down style connectors normally installed in connector positions J1, J2 and J6. The cage-clamp connectors provide a positive and permanent connection via consistent spring tension pressure rather than requiring proper torque as with the previous screw-down type design.

These connectors may also be substituted for the screw-down connectors on SSCC IIIA, SSCC III Plus and SSCC IV Crossing Controllers currently in service. The cage-clamp style connectors are a direct replacement and require no modification of the crossing controller for installation.

To order the cage-clamp style connectors contact Safetran Customer Service at 800-793-7233 and specify part number Z715-09163-0008

Specifications:

Wire Size Range	#24 – #8 AWG (use wire size recommended in SSCC manual)
Wire Stripping Length	0.59” (15 mm)

It is recommended that a stripping tool be used which allows the strip length to be set accurately. The addition of ferrules is not required.

Wire Insertion:
The stripped end of a wire should be inserted into the wire receptor after levering the cage clamp open. This is accomplished by pressing straight down with the recommended type of screwdriver in the rectangular slot in the connector next to the wire receptor. Care should be taken to ensure that the wire receptor is fully open before wire insertion.

The recommended screwdriver type is flat bladed with a blade size of 0.10” wide, 0.020” thick (2.5mm x 0.5mm). These screwdrivers are supplied with the crossing controllers.

CAUTION

USE THE CORRECT WIRE INSERTION TOOL TO PREVENT DAMAGE TO THE CONNECTOR.

After the stripped end of a wire is inserted into the wire receptor, hold the wire in place while removing the screwdriver to allow the wire receptor to close on the stripped end of the wire, securing it in place. All the wires are to be prepared in this fashion.

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DOCUMENT HISTORY

Version	Release Date	Nature of Change(s)
1.0		Preliminary review copy
2.0		2nd preliminary review copy
2.1		revised 2nd preliminary review copy
A		Initial release
Change		Revised figures 10-1, 10-2, 10-3 to add missing Flash Sync LED and correct silk screen for S1, S2, and the two non-vital LEDs at J2 on crossing controller illustration.
A1		Revised per results of Inspection number CR-F75.
B		Release version B in accordance with approval of A1 changes.
C		Revision to reflect elimination of common gate return units and addition of DETECT LAMP NEUTRAL WIRE function to CONFIGURE menu.
D	10-13-2005	Revision of wiring diagrams in section 10 to show new S-40 relay panel for isolated gate applications and improve legibility of all diagrams. Minor edits throughout. Paragraph numbering style changes throughout. Page 1-11, Table 1-2 for connector J2, pin 7 Added text in bold below: **This output is referenced to negative battery.** Page 1-12, paragraph 1.3.2.1 Removed reference to running DT software on Pocket PC (not currently supported). Page 1-13, paragraph 1.3.2.1 Added WARNING at top of page. Page 1-18, paragraph 1.4.1.5 Downgraded WARNING to CAUTION. Page 1-21, paragraph 1.4.1.8 Added following bullet to Non-vital I/O 1 – (Flash Sync) specification: • This I/O is referenced to controller's negative battery Page 2-11, **2.2.4 SSCC IIIA DC Power Connections** • Changed WARNING to the following CAUTION **CAUTION** DO NOT CONNECT POWER TO THE SSCC UNTIL AFTER COMPLYING WITH PARAGRAPH 2.3. FAILURE TO INITIALLY "POWER UP" IN THE PROPER SEQUENCE MAY PREVENT SHORT-CIRCUIT

		PROTECTION FROM DETECTING WIRING ERRORS AND DAMAGE THE UNIT Page 2-12, 2-13 • Made WARNING from last sentence of last paragraph in 2.2.4. • Inserted paragraph 2.2.5 (**Non-Vital I/O 1 (Flash Sync) Connection**), figure 2-7 and associated notes. Page 2-15, **2.2.6.1 Rules For Using Echelon® LAN** • Downgraded WARNING to CAUTION. Page 2-15, **2.3 POWER UP AND INITIALIZATION** • Removed two WARNINGS and a CAUTION, inserted the following WARNING: **WARNING** **OBSERVE CORRECT POLARITY WHEN CONNECTING BATTERY TO THE SSCC IIIA B AND N CONTACTS ON FRONT-PANEL CONNECTOR J2. REVERSED POLARITY WILL RESULT IN CONTROLLER DAMAGE** • Revised first sentence and added five steps for a startup procedure. • Added text to end of final NOTE ("The warning devices will remain activated until the proper inputs are energized.") Page 2-17, **2.3.1 Failure During Power Up and Initialization** • Added "**PEDESTRIANS,**" to second paragraph of WARNING. Page 3-1, **3.1 GENERAL** • Added to FIRST paragraph: "An LED indicator is associated with each input. When the input is activated the LED is illuminated, and when the input is deactivated the LED is dark." Page 4-2, **4.2.1 PROGRAM Menu** • Added WARNING Page 4-12, **4.2.2.4 Configure Aux. I/O** • Added paragraph below figure 4-2. Page 6-2, **6.4 LAMP VOLTAGE ADJUSTMENT PROCEDURE** • Reworded WARNING • Page 6-10, 6.6.1 SSCC IIIA Crossing Operational Check List & Tests • Added/modified Check / Test steps. Page 7-2, Figure 7-1 • Added note to flow diagram. Page 9-1, **9.2 SOFTWARE UPGRADE** • Added WARNING Page A-1, Appendix A • Reworded WARNING.

D.1	2-8-2006	Page B-1, Appendix B • Minor wording change to WARNING. • Changed footers to reflect 'Rev D.1' changes Page 4-9, Figure 4-3 • Added note next to Default YES…, "…Set to NO…" Page 4-9, paragraph 4.2.2.5 • Added note below paragraph title "…Disable DETECT LAMP NEUTRAL WIRE…" Page 6-2, paragraph 6.3 • Added sentence to first subparagraph, "…Safetran's FLX-4000 LED…" Page 6-2, paragraph 6.3 • Added wording to second subparagraph, "…on volt meters…", "…measurement…" Page 6-2, paragraph 6.3 • Added third subparagraph to read, "This distorted AC waveform condition…"
E	9-10-2007	Page 7-1, paragraph 7.2 Added note, "…The power supplies in many LED signals…" Changed footers to reflect 'Rev E' changes Page 6-2, paragraph 6.4 • Inserted new Paragraph 6.4, titled "Meter Reading Conversion Examples" Page 7-1, paragraph 7.1 • Changed sentence to end of second paragraph to read "Return the unserviceable unit to Safetran under the Return Material Authorization process, if applicable." Page 7-2 • Inserted blank page stating "This page intentionally left blank" to correct pagination issues Page 7-3, Figure 7-14 • Replaced with new Troubleshooting Diagram dated 09-06-07 • Changed page size to 11 X 17 to make it easier to read the troubleshooting diagram Page 7-4 • Inserted blank page stating "This page intentionally left blank" to correct pagination issues Page 7-5, paragraph 7-3 • Changed the first paragraph to read: "The SSCC is continuously self-checking its hardware and software for faults. Fault conditions may be

		severe or informational. When a severe fault is detected, the LCD displays a **SHUTDOWN #xxx** message where **xxx** is the Error Code. The fault is entered into the summary log. If a fault occurs repeatedly, the unit must be replaced and returned to Safetran under the Return Material Authorization process." • Changed the second paragraph to read: "Some faults are informational faults and will not cause a SHUTDOWN; however, they are still entered into the summary log. Some faults may be correctable by user action. Table 7-1 lists those faults and the action to take." Page 7-5, Table 7-1 • Replaced all occurences of "If error persists, unit requires servicing" with "If error persists, replace unit and return it to Safetran under the Return Material Authorization process." • Added Shutdown Error Code 394 that states "1E2 03/08/07 16:27:47.2 Processor communication error, Unable to communicate with slave processor" in the Sample Summary Log Messages Column, "394" in the Shutdown Error Code Column, and "Replace unit and return it to Safetran under the Return Material Authorization process" in the Corrective Action Column Page 7-6, paragraph 7.4 • Changed paragraph number 7.2 to 7.4 Page 7-6, paragraph 7.5 **Inserted new paragraph 7.5 that states: 'Troubleshooting Maintenance Call (MC) Light Problems** **Several operations in the SSCC system will turn-off the MAINT CALL (MC) light. This procedure assumes:** • The warning devices are not activated and SSCC unit is healthy. • No track is out-of-service (A track OOS turns off the MC light) • MC operation is being placed in service for the first time and wiring must be checked. Page 7-7, paragraph 7.5.1 **Inserted paragraph 7.5.1 that states: "Troubleshooting Procedures for Maintenance Call (MC) Light Problems.** **The following procedure checks the most common items first. If the MAINT CALL light does not turn on after a step, proceed to the next step.** 1. Observe MAINT CALL LED on Connector J2 • If LED 1 is on, go to step 2. • If LED 1 is off, go to step 3. 2. Determine that the MC light functions by testing the lamp circuit as follows: a. Measure DC voltage between **B** (+ meter lead) and **MAINT CALL** (MC) out (- meter lead) on the green connector J2. ♦ If voltage is within 0.5 volts of B, then the lamp or lamp circuit is open and must be repaired. ♦ If voltage is less than 1.0 volts, go to next step. b. Measure between **N** (- meter lead) and **MC** (+ meter lead) on the green connector. ♦ If voltage is within 0.5 volts of B, then the lamp circuit is okay, but the MC output is off. ✧ If LED 1 is on, replace SSCC

		✧ If LED 1 is off, go to the next step 3. If the SSCC health light is flashing rapidly or off, determine cause or replace SSCC. 4. Battery voltage may be low: • If **Low Battery** is set to **Enabled** in Configuration Menu**,** verify that the voltage on the battery connector is more than the **Low Battery Level** shown. **If, after following the steps above, the MC lamp stays off, call Safetran Technical Support for further assistance at (800) 793-7233."** Page 8-1, paragraph 8-2, Note • Changed Note to read "SSCC MEF software revision 9V546.A06.H or above requires SEAR II MEF software revision 9V645.A01.G or above to establish communications." Page A-1, Appendix A • Deleted the former Appendix A, titled "Using a Conventional Meter." The former Appendix B, titled "SSCC IIIA MCF Release History" is renumbered to Appendix A History Card, Sheet 2 of 2 • Changed title of History Card to reflect new usage, renaming the title to "SSCC Generic History Card" • Deleted former table "Multimeter Reading Variance From Actual Lamp Voltage" and inserted new table from the updated Paragraph 6.4 continuing with the same table title
E.1	January 2014	Change company branding to Siemens, change font to Arial.

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NOTES, CAUTIONS, AND WARNINGS

Throughout this manual, notes, cautions, and warnings are frequently used to direct the reader's attention to specific information. Use of the three terms is defined as follows:

WARNING

INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY. WARNINGS ALWAYS TAKE PRECEDENCE OVER NOTES, CAUTIONS, AND ALL OTHER INFORMATION.

CAUTION

REFERS TO PROPER PROCEDURES OR PRACTICES WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN A POTENTIALLY HAZARDOUS SITUATION AND/OR POSSIBLE DAMAGE TO EQUIPMENT. CAUTIONS TAKE PRECEDENCE OVER NOTES AND ALL OTHER INFORMATION, EXCEPT WARNINGS.

NOTE

Generally used to highlight certain information relating to the topic under discussion.

If there are any questions, contact Siemens Rail Automation Corporation Application Engineering.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

Static electricity can damage electronic circuitry, particularly low voltage components such as the integrated circuits commonly used throughout the electronics industry. Therefore, procedures have been adopted industry-wide which make it possible to avoid the sometimes invisible damage caused by electrostatic discharge (ESD) during the handling, shipping, and storage of electronic modules and components. Siemens Rail Automation has instituted these practices at its manufacturing facility and encourages its customers to adopt them as well to lessen the likelihood of equipment damage in the field due to ESD. Some of the basic protective practices include the following:

- Ground yourself before touching card cages, assemblies, modules, or components.
- Remove power from card cages and assemblies before removing or installing modules.
- Remove circuit boards (modules) from card cages by the ejector lever only. If an ejector lever is not provided, grasp the edge of the circuit board but avoid touching circuit traces or components.
- Handle circuit boards by the edges only.
- Never physically touch circuit board or connector contact fingers or allow these fingers to come in contact with an insulator (e.g., plastic, rubber, etc.).
- When not in use, place circuit boards in approved static-shielding bags, contact fingers first. Remove circuit boards from static-shielding bags by grasping the ejector lever or the edge of the board only. Each bag should include a caution label on the outside indicating static-sensitive contents.
- Cover workbench surfaces used for repair of electronic equipment with static dissipative workbench matting.
- Use integrated circuit extractor/inserter tools designed to remove and install electrostatic-sensitive integrated circuit devices such as PROM's (OK Industries, Inc., Model EX-2 Extractor and Model MOS-40 Inserter (or equivalent) are highly recommended).
- Utilize only anti-static cushioning material in equipment shipping and storage containers.

For information concerning ESD material applications, please contact the Technical Support Staff at 1-800-793-7233. ESD Awareness Classes and additional ESD product information are also available through the Technical Support Staff.

GLOSSARY

Advance Preemption:	Notification of an approaching train is forwarded to the highway traffic signal controller by railroad equipment for a period of time prior to activating the railroad active warning devices.
Advance Preemption Time:	This period of time is the difference in the Maximum Preemption Time required for highway traffic signal operation and the Minimum Warning Time needed for railroad operation and is called the Advance Preemption Time. This time delay is determined by the highway agency after an engineering study of the intersection and grade crossing
ATCS:	Acronym for Advanced Train Control System
Beacon:	A highway traffic signal with one or more signal sections that operates in a flash mode. In this manual, the beacons referred to are used as supplemental emphasis to a highway-railroad grade crossing advance warning sign.
CFG:	Abbreviation for Configure.
CPU:	Central Processor Unit – A controller module (Master or Slave) for the SSCC IV unit.
CRC:	Cyclical Redundancy Check – An error check code in which a check key is calculated and appended to the data. It is used to check for corrupted data.
DCE:	Data Communications Equipment – Any device (modem, terminal, printer, etc.) that merely transports data over a transmission facility (establishes, maintains, and terminates a session) but does not originate or consume data.
DT Utility:	Acronym for Diagnostic Terminal Utility
DTE:	Data Terminal Equipment – Any device (computer, etc.) that originates or consumes data over a transmission facility (can act as data source, data sink, or both).
Echelon®:	The company that created the twisted pair LAN used by the SSCC IV. “Echelon” is also used to refer to the LAN itself.
EGOM	Exit Gate Operating Mode – A dynamic mode in which the exit gate operation is based on the presence and detection of vehicles between the stop bar or entrance gate and the exit gate.
Entrance Gate:	A gate used at the entrance to a highway-railroad grade crossing, which is designed to release and lower by gravity from the full vertical position to the horizontal position under a loss of power condition or when the control energy (GC) is removed.

GLOSSARY (continued)

Exit Gate:	A gate used at the exit from a highway-railroad grade crossing with Four Quadrant Gates to restrict wrong direction vehicular movements, which is designed to raise by gravity from the horizontal position to a vertical position great enough to allow vehicle clearing under a loss of power condition or when the control energy (GC) is removed.
FAR GATE:	On the same surge panel, the 'Far Gate' is the flashing light signal or gate with the largest voltage drop in the cable circuit. In general, if both signals have the same number and type of lamps and the same size cable conductors, the 'Far Gate' is the location with the longest cable run. The 'Far Gate' circuit on the surge panel does not have an adjustable resistor in series with L1 and L2 to provide voltage adjustment.
Flash Memory:	A type of non-volatile memory that can be reprogrammed in-circuit via software.
FLS:	Acronym for Flashing Light Signal
FPM:	Acronym for Flashes Per Minute
Gate Delay Period:	The programmable time period from when the lights begin to flash until the gates begin to descend.
GC:	Gate Control – Output(s) from the SSCC IV unit for controlling the crossing gates. These outputs are isolated from battery.
GD:	Gate Down – An input to the SSCC IV unit to indicate when the crossing gates are in the “down” position.
GCP:	Grade Crossing Predictor – A train detection device used as part of a highway-railroad grade crossing warning system to provide a relatively uniform warning time.
GP:	Gate Position – An input to the SSCC IV unit to indicate when the crossing gates are in the “up” position (83 to 90 degrees).
Highway-Railroad Grade Crossing Advance Warning Sign:	A traffic control sign (round yellow sign with RR and a black X) placed by the highway agency in advance of many highway-railroad grade crossings
Interconnection:	The electrical connection between the railroad active warning system and the traffic signal controller for the purpose of preemption.
LAN:	Local Area Network – A limited local network where the data transfer medium is generally wires or cable. For the SSCC IV, it refers to the individual twisted pair Echelon LAN connection to other equipment such as an external event recorder, etc.

GLOSSARY (continued)

LCD:	Acronym for Liquid Crystal Display
LED:	Light-Emitting-Diode – A solid-state indicator.
LOS:	Acronym for Loss-Of-Shunt
MBT:	Abbreviation for Master Boot file
MCF:	Module Configuration File – The train detection program (also referred to as "application program") that defines what the SSCC does. Some models of a crossing controller have several application programs pre-loaded inside them. The application program is in the form of a file that has to be downloaded into the controller or comes pre-loaded inside the controller. The term "MCF" refers to the actual file that is loaded into the controller and also is used to refer to the application logic.
MEF:	Master Executable File – Executive software running in the SSCC IV unit for the primary (master) processor. The master processor is responsible for overall operation of the SSCC IV and internal communication with the slave processors.
Megger:	A piece of high voltage test equipment used for verifying the integrity of cable insulation.
MS:	Motion Sensor – A system for detecting train movement on a track.
NEAR GATE:	On the same surge panel, the 'Near Gate' is the flashing light signal or gate with the lowest voltage drop in the cable circuit. In general, if both signals have the same number and type of lamps and the same size cable conductors, the 'Near Gate' is the location with the shortest cable run. The 'Near Gate' circuit on the surge panel has an adjustable resistor in series with L1 and L2 that provides additional voltage adjustment.
Neutral Wire:	The wire in a three wire flashing light signal circuit that shunts current from the 'off' lamp. In SSCC applications, the neutral wire is the N wire to the FLS.
Node:	The transceiver interface of a piece of equipment connected to the Echelon® LAN.
OS:	Abbreviation for Out-of-Service.
Pocket PC:	A small, handheld computer running a Microsoft® Personal Digital Assistant operating system.
Preemption:	Transfer of normal operation of traffic signals to a special control mode.

GLOSSARY (continued)

PRG:	Abbreviation for Program.
PSO-III:	Phase Shift Overlay III – A Safetran track circuit (transmitter at one location and receiver at another location) that supplies track occupancy information for crossing warning devices and other train or vehicle detection systems.
RMS:	Root Mean Square – The square root of the average of the squares of all the values. RMS is always the same or just a little larger than the average of the unsigned values, and is sometimes referred to as the amount of DC required to produce an equivalent amount of heat in the same load.
RS-232:	EIA interface between DTE and DCE, employing unbalanced serial binary data interchange at up to 20 Kbps/50 ft. Uses DB-25 connector (or optional DB-9 connector). Can interface with ITU specifications V.24, V.28, or V.10. Distance from DTE to DCE is generally less than 60 meters.
SBT:	Abbreviation for Slave Boot file.
SEF:	Slave Executable File – Executive software running in the SSCC IV unit for the secondary (slave) processors. The slave processors (two for 20-Amp units, or four for 40-Amp units) are responsible for the SSCC IV outputs.
Simultaneous Preemption:	Notification of an approaching train is forwarded to the highway traffic signal controller unit or assembly and railroad active warning devices at the same time.
TC:	Abbreviation for Test Configure.
TMR:	Abbreviation for Timer.
True rms AC + DC:	A test equipment setting that allows the measurement of rms voltage for non-sinusoidal wave shapes by measuring the AC + DC components.
Wrap Around:	A track circuit, or combination of track circuits, that extend to, or beyond, the limits of a GCP approach, which provides train detection. When used in relay equivalent logic, the wrap around relay contact, WAR, is in parallel with the GCP relay contact in the XR circuit.
XR:	Designation for railroad crossing relay, or equivalent crossing activation circuit.

SECTION 1
INTRODUCTION

1.1 GENERAL

This is the instruction and installation manual for the Safetran® Solid-State Crossing Controller IIIA (SSCC IIIA). The following controller units are available:

- 40-ampere unit (part number A91160)
- 20-ampere unit (part number A91165)

The 20-ampere units (Single Model) provide one set of Lamp, Gate Control and Bell outputs while the 40-ampere units (Dual Model) provide two sets.

1.2 EQUIPMENT OVERVIEW

The SSCC IIIA is designed to operate in conjunction with a train detection device such as a grade crossing predictor (GCP), motion sensor (MS), PSO-III or other equipment supplying an XR relay drive. The SSCC IIIA receives vital crossing control and gate position inputs and provides total control of the lamps, bells, and gates at a grade crossing. It incorporates microprocessor controlled solid-state switching and safety monitoring technology into a fully integrated package.

The SSCC IIIA is an enhanced version of the SSCC III, which has been discontinued. New features in the SSCC IIIA version include:

- Echelon® connection for communicating recorder and diagnostic information
- Multiple SSCC IIIA units can be synchronized to flash in unison
- Loss of Shunt Timers for each input
- Enhanced TEST functions, such as Timed Lamp Tests

The following paragraphs provide descriptions of the SSCC IIIA assemblies and the associated lighting/surge panels. Figures 1-1 and 1-2 present illustrations of the SSCC IIIA units, and figures 1-3 through 1-6 present illustrations of the lighting/surge panels.

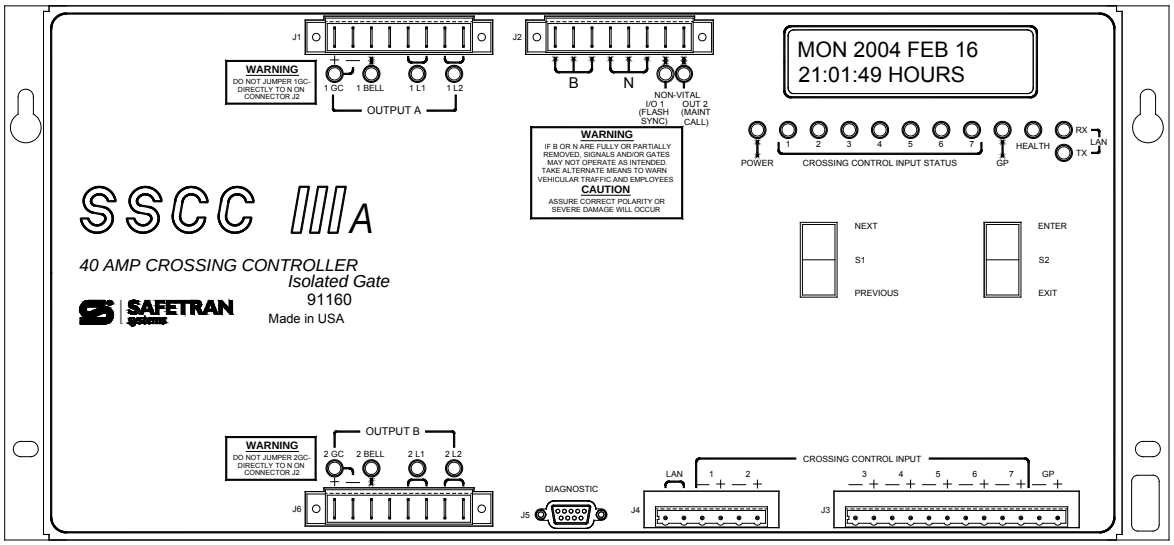
1.2.1 Solid State Crossing Controller IIIA (SSCC IIIA)

The SSCC IIIA is housed in an aluminum case with a black epoxy powder-coat finish. The unit can be wall or backboard mounted as well as rack-mounted (19-inch rack, or 23-inch rack with optional base – see Ordering Information). Front panel connectors accommodate all external connections and interconnecting wiring to the lighting/surge panel(s).

1.2.1.1 SSCC IIIA Features

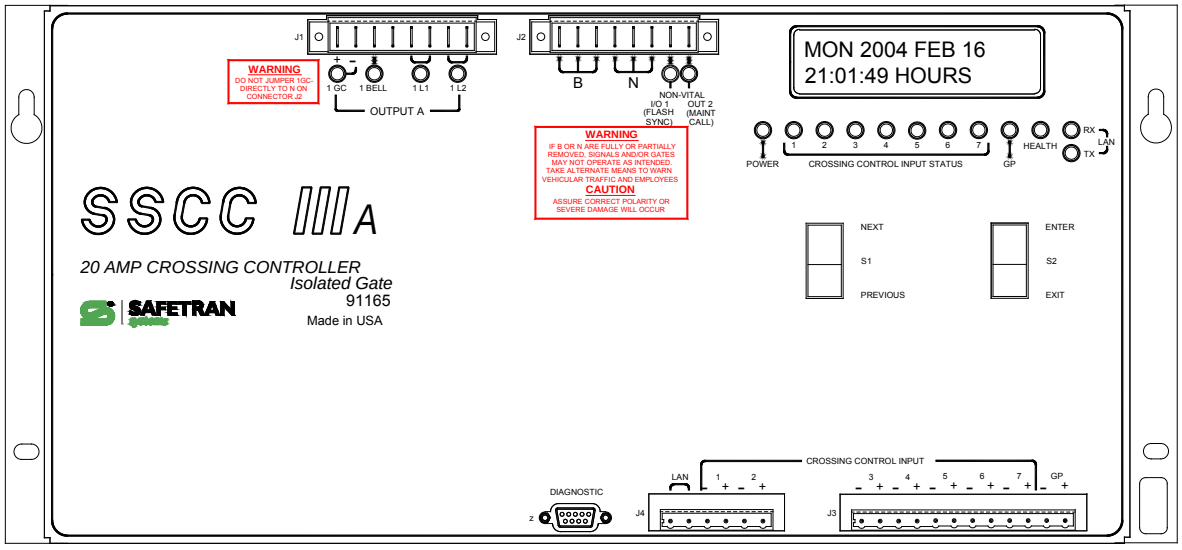
The SSCC IIIA exhibits the following features:

- 40-ampere units support 4 gates with lamps and bells, or 2 gates with lamps and bells and cantilever with lamps.
- 20-ampere units support 2 gates with lamps and bells
- Isolated gate control
- Voltage regulated adjustable lamp outputs
- Programmable vital control inputs (up to 8 including one input for GP)
- Non-volatile real-time clock with optional daylight savings
- On-board event memory
- Programmable lamp flash rate
- Optional synchronized lamp flashing of multiple units
- Programmable gate control delay
- Optional “bell off” condition while gate is rising
- Enhanced crossing and lamp test modes
- Configurable test timers
- Optional Loss-Of-Shunt selection with configurable timers
- A/B outputs enabled (40-Amp units only)
- Password protection (can be enabled/disabled)
- Programmable low battery indication threshold
- Echelon® connectivity to other Safetran products, such as the SEAR II event analyzer.
- Maintenance Call output



SSCC3ISO40A.DWG
03-04-04 (Rev 1-20-14)

Figure 1-1. SSCC IIIA 40-Ampere Unit, A91160



SSCC3ISO20A.DWG
03-04-04 (Rev 1-20-14)

Figure 1-2. SSCC IIIA 20-Ampere Unit, A91165

An additional feature of the SSCC IIIA is its small size and light weight. Relays and wiring normally required for conventional highway grade crossing installations (including the XR, slow release gate control, and flasher relays) are replaced by heavy-duty solid-state switches. Gate delay and GP flashing lamp control are also part of the microprocessor solid-state vital logic circuit.

The SSCC IIIA provides a user-programmable, highly efficient regulated lamp voltage to minimize the chances of the lamp voltage dropping below acceptable limits when the AC power is off or when the battery charger has failed. This feature also eliminates seasonal adjustment of lamp voltages when using temperature compensated battery chargers. The regulated lamp drive is a pulse-width modulated voltage with an AC component and a DC component. A "TRUE RMS AC+DC" meter is required to accurately read the pulse-modulated lamp voltage (such as a Fluke 187 or 189 digital multimeter).

⚠ WARNING

WARNING

TO CORRECTLY MEASURE LAMP VOLTAGE, THE VOLTMETER MUST HAVE A SETTING FOR "TRUE RMS AC + DC".

Conventional multimeters may be used; however, the voltage reading will vary from "true rms AC + DC". The variance is not a set percentage and is dependent on battery voltage. A conversion chart cross-referencing several conventional meters is provided in Appendix A.

Independent lamp voltage adjustment resistors are provided for the "near" set of flasher lamps (shortest cable) to compensate for unequal voltage drops between the two cables. To aid in aiming lamps and adjusting lamp voltage, a TEST menu provides for lamps to be lit continuously. However, if a train arrives while in this mode, the crossing warning devices will operate as intended.

During normal operation, system health is monitored by the CPU, and a MAINT CALL contact is supplied on a connector on the front panel to control a maintenance call (MAINT CALL) lamp or crossing monitor device. If a problem occurs, the MAINT CALL output is turned off.

1.2.2 Lighting Surge Panels

⚠ CAUTION

CAUTION

THE SSCC IIIA SYSTEM REQUIRES EXTERNAL INPUT AND OUTPUT PRIMARY SURGE PROTECTION.

Interface between the SSCC IIIA unit and external crossing gates, bells, and lamp circuit wiring can be provided by Lighting/Surge Panels. There are two basic types of Lighting/Surge Panels for the 20-amp and 40-amp crossing controller units: common return and isolated gate control.

Lighting Surge Panel part numbers are as follows:

- A91170-1 Common return gate control (used with 20-Amp & 40-Amp units, A91160, A91165).
- A91170-2 Common return gate control (used with 40-Amp unit, A91160).
- A91181-1 Isolated gate control (used with 20-Amp & 40-Amp units, A91160, A91165).
- A91181-2 Isolated gate control (used with 40-Amp unit, A91160).

For isolated gate control, a single A91181-1 panel (figure 1-3) is used with the 20-ampere unit (A91165), and both an A91181-1 and an A91181-2 panel (figure 1-4) are generally used with the 40-ampere unit (A91160). Refer to figure 1-7 for typical isolated gate control wiring.

For common return gate control, a single A91170-1 panel (figure 1-5) is used with the 20-ampere unit (A91165), and both an A91170-1 and an A91170-2 panels (figure 1-6) are generally used with the 40-ampere unit (A91160). Refer to figure 1-8 for typical common return gate control wiring.

The panels contain arresters and equalizers for surge protection with standard AREMA binding posts provided for underground cable connections to the flashing lights, gates, and bells. Battery circuit protectors for the lighting/surge panel are included on the A91170-1 and A91181-1 surge panels. The A91170-2 and A91181-2 panels are similar to their dash-one versions, but do not include the battery circuit surge protection as their purpose is to extend the dash-one panels for the dual output crossing controllers.

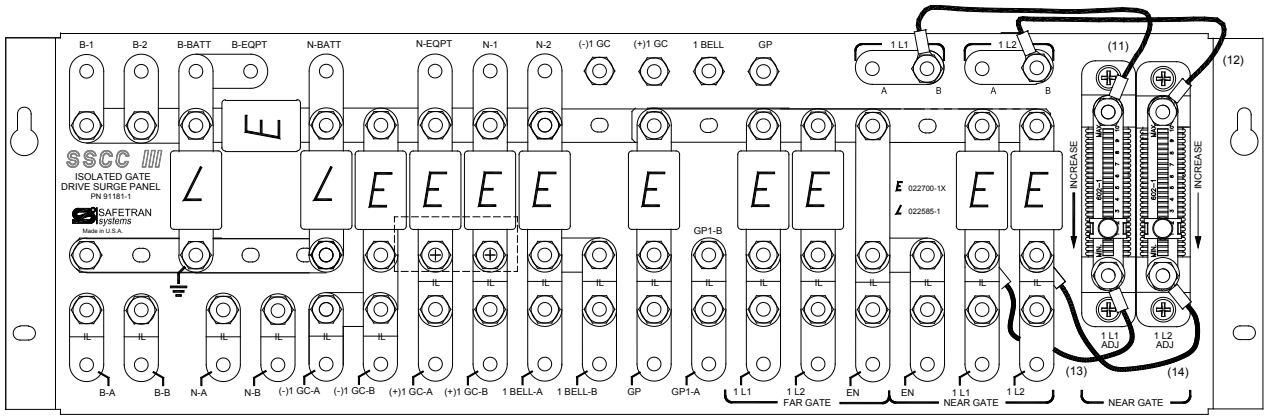
All the lighting surge panels provide insulated links in all underground cable connections to allow quick circuit isolation for testing and making measurements without requiring removal of site cabling.

All the lighting surge panels provide adjustable resistors in the NEAR GATE Lamp 1 and Lamp 2 circuits to compensate for different lengths of cabling to the crossing flashing lamps.

The lighting surge panels also provide steering diodes for the Gate Control output from the SSCC IIIA to provide isolation between the two crossing gate controls.

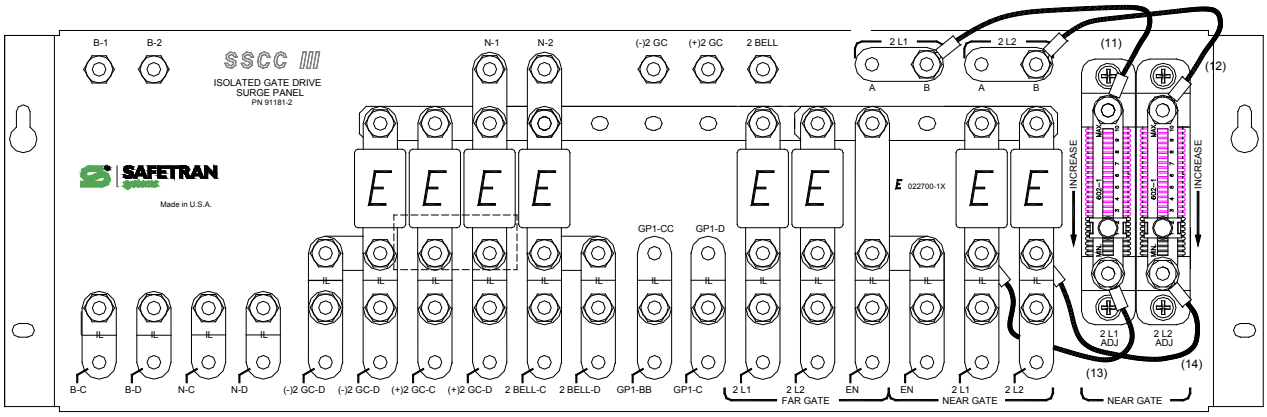
The lighting surge panels can be wall- or backboard-mounted, and rack-mounted (23-inch rack).

Underground wiring for the gates and flashers is routed into the wayside enclosure and connected to the lighting/surge panel(s). Interconnect wiring is then run from the lighting/surge panel(s) directly to the crossing controller.



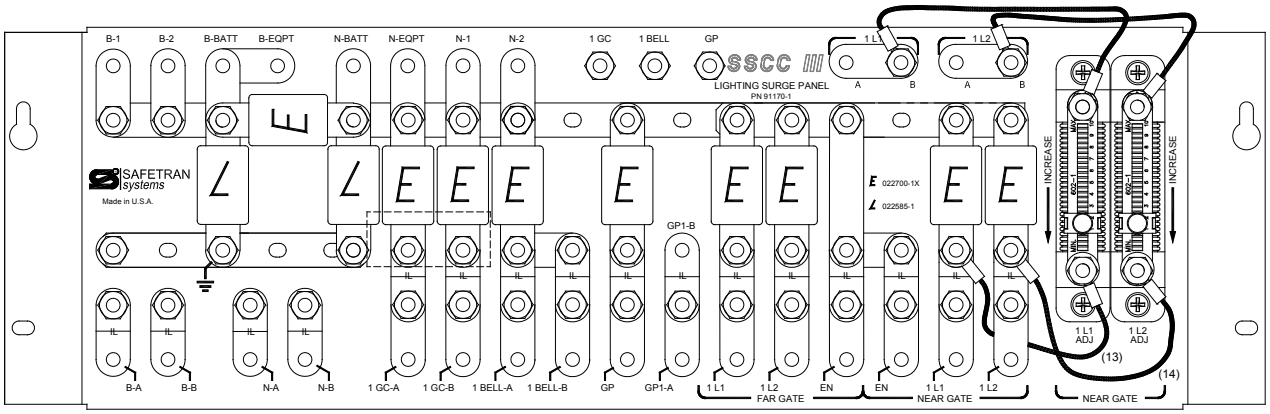
ISGDSP2.DWG
03-05-04

Figure 1-3. Isolated Gate Control Lighting Surge Panel, A91181-1 (for 20-Amp or 40-Amp unit)



91181-2SG.DWG
03-12-04 (Rev 1-20-14)

Figure 1-4. Isolated Gate Control Lighting Surge Panel, A91181-2 (for 40-Amp unit only)



SURGPNL2.DWG
02-25-02

Figure 1-5. Common Return Lighting Surge Panel, A91170-1 (for 20-Amp or 40-Amp unit)

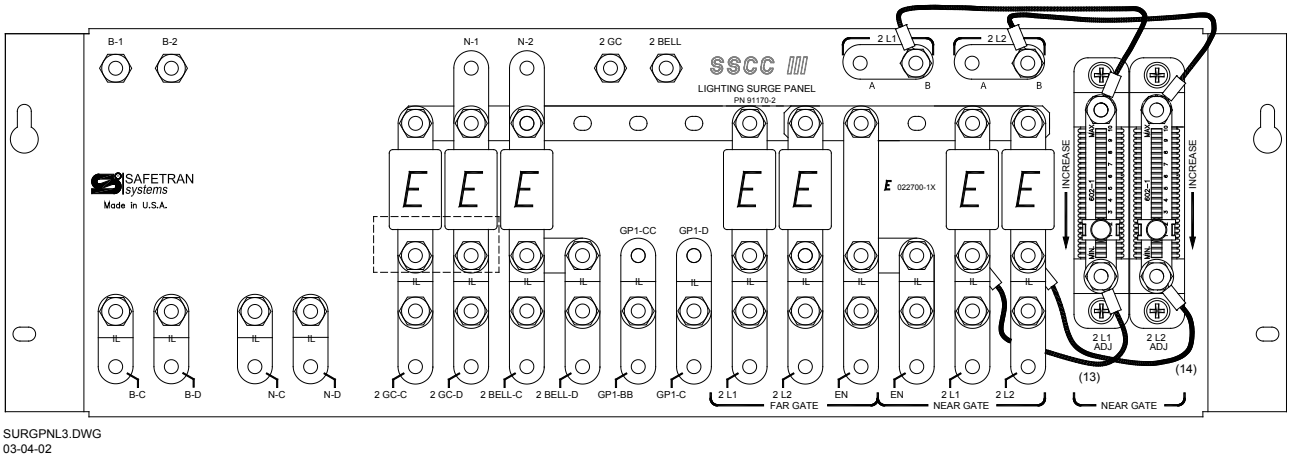


Figure 1-6. Common Return Lighting Surge Panel, A91170-2 (for 40-Amp unit only)

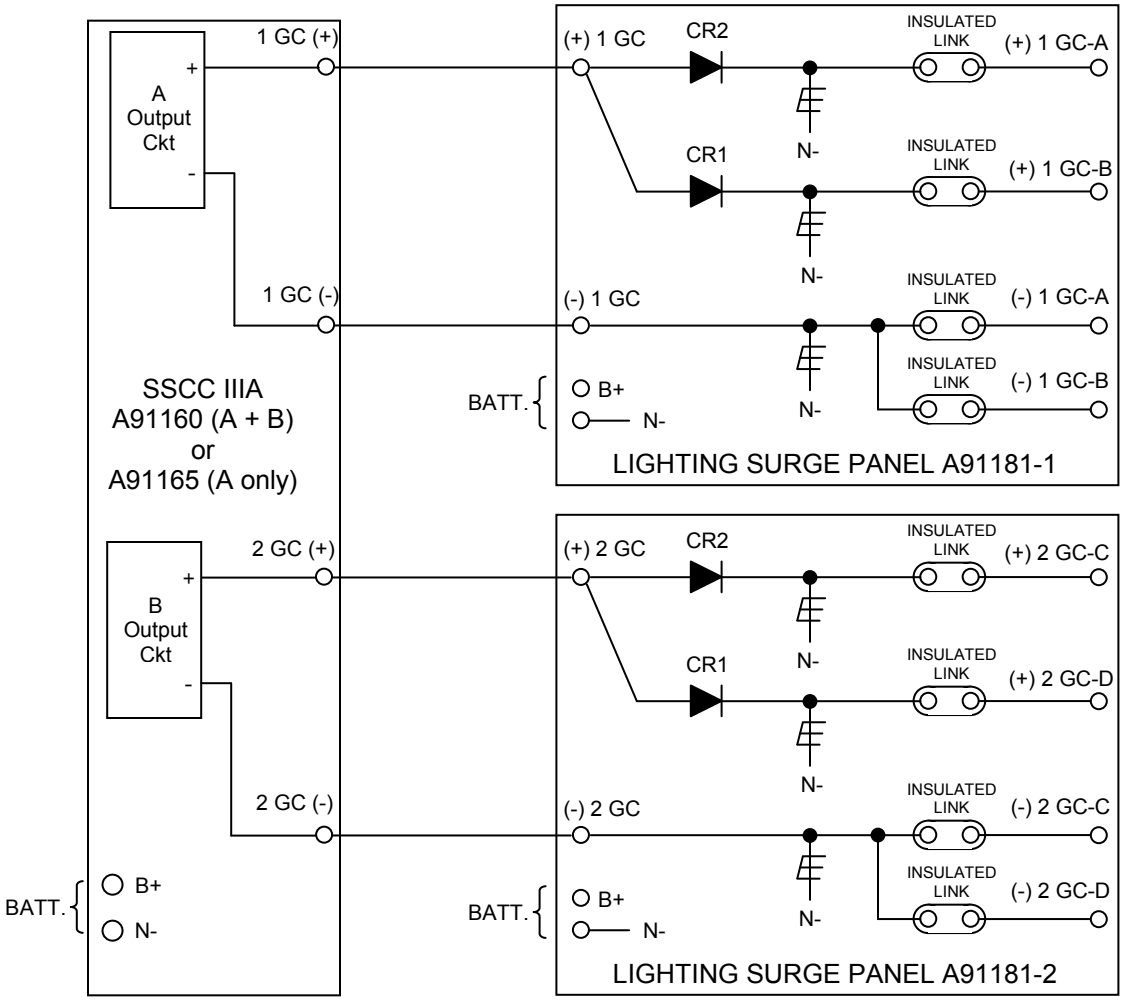
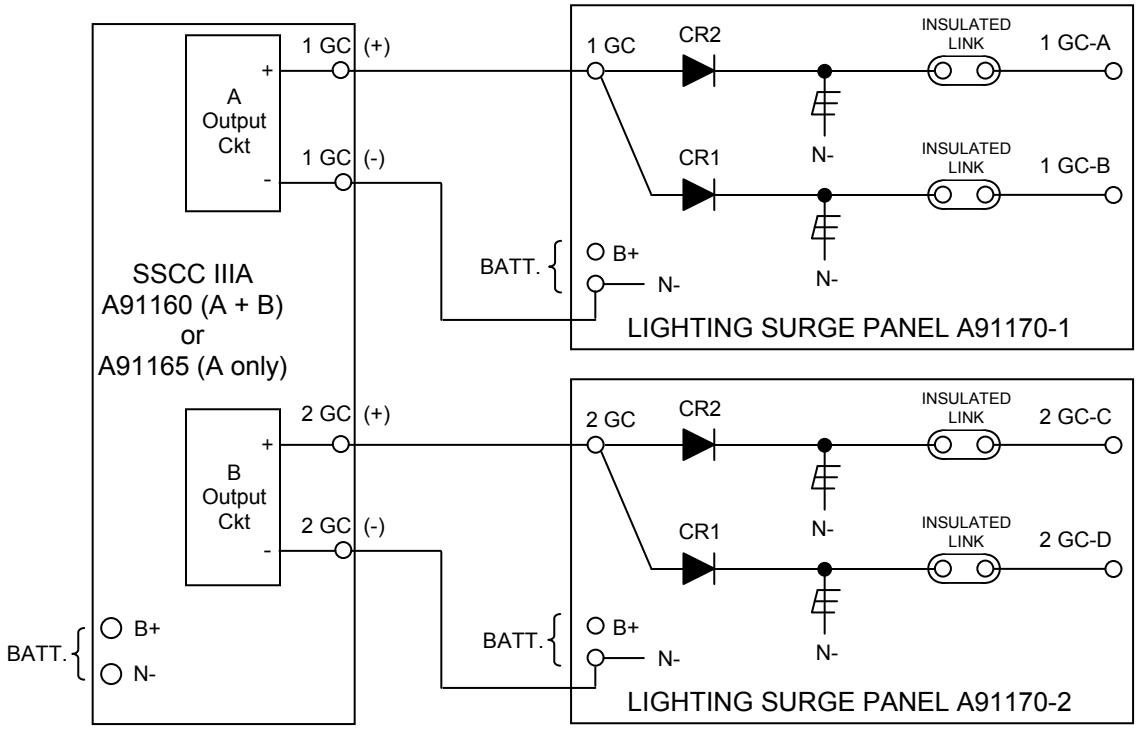


Figure 1-7. Typical Isolated Gate Control



WARNING

DO NOT JUMPER 1 GC (-) OR 2 GC (-) DIRECTLY TO "N" ON SSCC CONNECTOR J2.

Figure 1-8. Typical Common Return Gate Control

1.3 SYSTEM FUNCTIONAL DESCRIPTION

The 20-ampere SSCC IIIA units (A91165) are designed to supply a maximum of 20 amperes of lamp current. This normally accommodates two sets of flashers (with front and back lights) and two crossing gates for a total of eight 25-watt lamps lit at any given time. The 40-ampere SSCC IIIA units (A91160) are designed to supply a maximum of 40 amperes of lamp current. This normally accommodates four sets of flashers (with front and back lights) and four gates for a total of 16 25-watt lamps lit at any given time (using both A Output and B Output).

The basic architecture of the SSCC is shown in figure 1-9. Each 20-Amp Controller contains one master and two slave processors, and each 40-Amp Controller contains one master and four slave processors. Each processor has its own software and purpose. All processors are constantly communicating with each other and running individual self-tests. Each slave processor provides a distinct flashing lamp output such as 1L1, 1L2, etc. while the Master CPU controls all other functions. A 12-volt output from the 1 GC or the 2 GC requires both corresponding slave CPUs and the Master CPU to be in agreement in an internal Vital AND Gate.

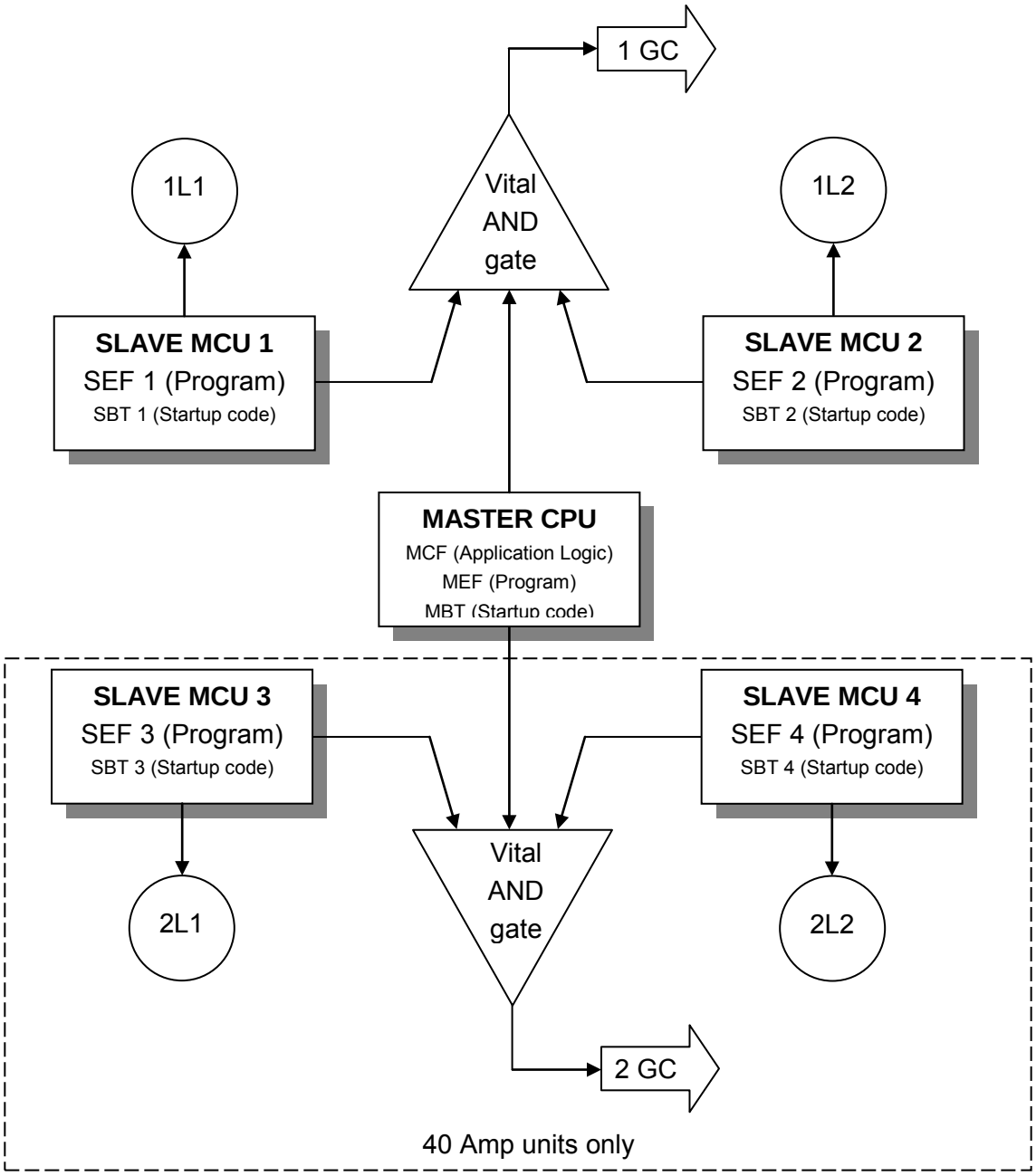


Figure 1-9. Crossing Controller Basic Architecture

1.3.1 SSCC IIIA Controls and Indicators

The SSCC IIIA front panel contains a liquid crystal display, two rocker panel switches, and a number of LED indicators. Table 1-1 lists the controls and indicators and gives a brief description of each.

Table 1-1. SSCC IIIA Controls and Indicators

Indicator/Control	Type	Description
(main display)	Liquid Crystal Display	32-character (in 2 rows) LCD with microprocessor-controlled heater
POWER	LED	Directly monitors B input (Battery). Lit to indicate presence of battery voltage.
1 thru **8** (programmable status LEDs)	LED	Eight status LEDs independently CPU-enabled. Crossing activation inputs are inputs 1 through 7. Input 8 is used for the GP input, when required (gate position – lit when gate arms are in the vertical position).
HEALTH	LED	Driven by CPU, flashes at a slow rate (≈1 Hz) when system is fully operational, and at a fast rate (≈8 Hz) when faulted.
LAN RX (red)	LED	Driven by CPU, flashes to indicate LAN RX activity.
LAN TX (green)	LED	Driven by CPU, flashes to indicate LAN TX activity.
1GC (**Output A**)	LED	Lit when gate relays are energized and off when Output Bank A gates are commanded to drop.
1 BELL (**Output A**)	LED	Lit when Output Bank A bells are commanded to ring.
1L1 (**Output A**)	LED	Lit when Output Bank A L1 lamps are commanded to light.
1L2 (**Output A**)	LED	Lit when Output Bank A L2 lamps are commanded to light.
2GC (**Output B**)	LED	Lit when gate relays are energized and off when Output Bank B gates are commanded to drop.
2 BELL (**Output B**)	LED	Lit when Output Bank B bells are commanded to ring.
2L1 (**Output B**)	LED	Lit when Output Bank B L1 lamps are commanded to light.
2L2 (**Output B**)	LED	Lit when Output Bank B L2 lamps are commanded to light.
NON-VITAL I/O 1 (FLASH SYNC)	LED	Lit to indicate that J2, pin 7 is active. This I/O is programmed as a non-vital output (default), flash sync in (slave unit), or flash sync out (master unit) for synchronizing lamp flashing of multiple SSCC crossing controllers.
NON-VITAL OUT 2 (MAINT CALL)	LED	Lit steady when maintenance call output (J2, pin 8) is active. Off to indicate a failure.
NEXT/PREVIOUS	Switch	Input command to main CPU to move forward or backward through the menu or increase/decrease values.
ENTER/EXIT	Switch	Input command to main CPU to execute a function or to exit from a submenu.

1.3.2 I/O Interface

The SSCC IIIA front panel provides connectors for the external interfaces (see table 1-2). Refer to *Specifications*, paragraph 1.4, for the interface specifications.

Table 1-2. SSCC IIIA I/O Interface

Ref. Des.	Pin	I/O	Description
J1	1	1GC+ (Output A)	Gate 1 Output positive (Output Bank A - A91160, A91165 units)
	2	1GC- (Output A)	Gate 1 Output negative (Output Bank A - A91160, A91165 units)
	3	1 BELL (Output A)	Bell Output for Output Bank A
	4	(n/a)	(not used)
	5	1 L1	Lamp Output 1 for Output Bank A (all units)
	6		
	7	1 L2	Lamp Output 2 for Output Bank A (all units)
	8		
J2	1	B	Positive Battery input
	2		
	3		
	4	N	Negative Battery input or return
	5		
	6		
	7	NON-VITAL I/O 1 (FLASH SYNC)	Flash Sync I/O is designated as a non-vital output (default), sync in (slave unit), or sync out (master unit) for synchronizing lamp flashing of multiple SSCC crossing controllers. This output is referenced to negative battery.
	8	NON-VITAL OUTPUT 2 (MAINT CALL)	Provides an output indication when an SSCC IIIA failure occurs. Output is normally a sink to N- and becomes a high impedance when a failure occurs.
J3	1	Input 3-	Crossing Controller input 3 negative
	2	Input 3+	Crossing Controller input 3 positive
	3	Input 4-	Crossing Controller input 4 negative
	4	Input 4+	Crossing Controller input 4 positive
	5	Input 5-	Crossing Controller input 5 negative
	6	Input 5+	Crossing Controller input 5 positive
	7	Input 6-	Crossing Controller input 6 negative
	8	Input 6+	Crossing Controller input 6 positive
	9	Input 7-	Crossing Controller input 7 negative
	10	Input 7+	Crossing Controller input 7 positive
	11	Input 8-	Crossing Controller input 8 negative - Generally GP negative
	12	Input 8+	Crossing Controller input 8 positive - Generally GP positive
J4	1	LAN	Echelon® LAN input 1 (polarity arbitrary)
	2	LAN	Echelon® LAN input 2 (polarity arbitrary)
	3	Input 1-	Crossing Controller input 1 negative
	4	Input 1+	Crossing Controller input 1 positive
	5	Input 2-	Crossing Controller input 2 negative
	6	Input 2+	Crossing Controller input 2 positive

Continued on next page

Table 1-2 Concluded

Ref. Des.	Pin	I/O	Description
J5	1	DCD	RS-232 serial interface- Carrier Detect **not** used
	2	TXD	RS-232 serial interface- Transmit Data
	3	RXD	RS-232 serial interface- Receive Data
	4	DTR	RS-232 serial interface- Data Terminal Ready[2]
	5	GND	RS-232 serial interface- Signal Ground
	6	DSR	RS-232 serial interface- Data Set Ready[2]
	7	RTS	RS-232 serial interface- Request To Send **not** used
	8	CTS	RS-232 serial interface- Clear To Send[2]
	9	RI	RS-232 serial interface- Ring Indicator **not** used
J6[1]	1	2GC+ (Output B)	Gate 2 Output positive (Output Bank B - A91160 unit only)
	2	2GC- (Output B)	Gate 2 Output negative (Output Bank B - A91160 unit only)
	3	2 BELL (Output B)	Bell Output for Output Bank B
	4	(n/a)	(not used)
	5	2 L1	Lamp Output 1 for Output Bank B (A91160 units only)
	6		
	7	2 L2	Lamp Output 2 for Output Bank B (A91160 units only)
	8		

[1] Output B LEDs and Output connector J6 are not present on 20-ampere units.
[2] 2-wire plus ground RS-232 configuration only (no handshaking). DTR, DSR, and CTS internally jumpered for use by DTE (if required).

1.3.2.1 RS-232 Diagnostic Port J5

The RS-232 Diagnostic port is configured as DCE, to communicate with a diagnostic terminal or other DTE such as a PC.

The serial port can be used for the following functions:

- Updating software using the DT (Diagnostic Terminal) utility
- SSCC IIIA configuration and diagnostics using the DT utility
- Obtaining the internal log
- Viewing log data in real time

The DT utility is available on CD-ROM from Siemens Customer Service, along with the DT user manual. The DT utility allows the user to perform the following:

Updating Software (see WARNING below)
To update SSCC IIIA software, connect J5 to a laptop PC running DT utility. Refer to Section IX, *Software Verification & Upgrade* for information.

SSCC IIIA Configuration and Diagnostics (see WARNING below)
To change SSCC IIIA configuration or perform diagnostics, connect J5 to a laptop PC running DT utility. The functionality of the SSCC IIIA front panel is also provided in the DT utility.

WARNING

WHILE UPDATING SOFTWARE OR CHANGING THE CONFIGURATION, THE CROSSING GATES ARE DOWN WITH LAMPS FLASHING AND BELLS RINGING (REGARDLESS OF THE STATE OF THE VITAL CROSSING CONTROL INPUTS). TAKE ADEQUATE PRECAUTIONS TO WARN PERSONNEL, PEDESTRIANS, TRAINS AND OTHER VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION HAS BEEN VERIFIED.

Obtaining the internal log

The SSCC IIIA contains memory for recording events. Designed as a diagnostic tool, the memory space is large enough to record the last 8 train moves. These last 8 train moves can be downloaded by connecting a laptop PC running the DT utility to the J5 serial port. This data can be stored as a file. Connect J5 to a laptop PC and use the DT utility to download the log (refer to Section VIII, paragraph 8.2.1 for log data format).

Viewing log data in real time

To view the events in real time with oldest events being replaced by the newest, connect a laptop PC running a terminal emulation application to the J5 serial port. The DT utility can also be used to examine event data (refer to Section VIII, paragraph 8.2.1 for log data format).

1.3.2.2 LAN

The SSCC IIIA is capable of communicating via non-vital messages with external equipment using the Echelon® LAN interface. One such application is to use the SEAR II, part number A80273, to log messages from the SSCC IIIA. By connecting via the LAN, all events can be recorded on the SEAR II. This allows a user to record significantly more information than can be stored in the internal log of the SSCC IIIA.

Refer to Section 8, *External Communication*, for information on external communications using the LAN.

1.3.3 Standard Sequence of Operation

When a train is detected, the input to the SSCC IIIA drops and the following basic controller sequence is initiated:

1. The crossing control input LED on the front panel of the SSCC IIIA is extinguished.

2. The crossing signals begin to flash and the L1 and L2 lamps on the front panel of the SSCC IIIA begin to flash.

3. Concurrent with the flashers operating, the crossing bell(s) begin to ring and the 1 BELL LED (also the 2 BELL LED for the 40-Amp unit) on the front panel of the SSCC IIIA is lit.

4. A nominal 12 volts to the crossing gate relays is removed after the programmed gate delay has run its time causing the gates to descend. The 1GC LED (also the 2GC LED for the 40-Amp unit) is extinguished to indicate gate operation.

5. As the gates begin to descend, the GP input drops to zero and the LED on the front panel associated with the GP input (generally input #8) is extinguished.

When the activation input to the controller is restored (nominal 12 volts), the following sequence occurs:

1. The crossing control input LED lights.

2. The crossing gates begin to rise and the flashers continue to flash. The LEDs 1 L1 and 1 L2 (also 2 L1 and 2 L2 for the 40-Amp unit) continue to flash until the crossing gates are returned to the vertical position.

3. The bell(s) may or may not be ringing as the gates rise, depending upon the SSCC IIIA programming.

4. The GP input is restored, the GP LED lights, and the flashers stop flashing.

1.3.4 Crossing Operation in the Event of an SSCC IIIA Failure

Each SSCC IIIA flashing lamp output (1L1 and 1L2 in both 20 and 40-ampere units plus 2L1 and 2L2 in 40-ampere units) is controlled by an individual processor and these processors are in turn synchronized by a master processor. In addition, each processor is constantly running self-diagnostic tests which results in complete on-line testing of the SSCC IIIA operation. These tests include testing of lamp driver circuitry, lamp sense circuitry, bell output circuitry, gate output circuitry, flash memory, and RAM.

If a critical failure is detected, appropriate action is taken to immediately flash the lamps and bring down the gates. As an example, if a lamp driver failure is detected in one of the flashing lamp outputs of a 20-ampere SSCC IIIA (1L1 for this example), then one lamp of a flashing pair would be in the failure state (either on steady or off steady) while the other lamp (controlled by 1L2) would continue to flash. Extending this same example to a 40-ampere SSCC IIIA unit, the 1L1 lamp would be in the failure state while the lamps controlled by 1L2, 2L1 and 2L2 would continue to flash.

WARNING

IF B OR N ARE FULLY OR PARTIALLY REMOVED, SIGNALS AND/OR GATES MAY NOT OPERATE AS INTENDED. TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC AND EMPLOYEES.

WARNING

REMOVING INPUT POWER FROM THE SSCC IIIA UNIT WILL CAUSE THE GATE(S) TO DROP BUT THE LAMPS AND BELLS WILL NOT BE ACTIVATED.

1.3.5 Open Lamp Neutral Wire Detection

To detect if all neutral wires to the lamps driven by an output have become open (a rare occurrence), the SSCC IIIA performs an open neutral wire test at the beginning of each activation phase. If all neutral wires to the lamps driven by Output A or Output B are detected as open (which causes the lamps to be connected in series), the SSCC IIIA reacts as follows:

1. The duty cycles of the affected enabled lamp outputs (1L1 and 1L2 for Output A, 2L1 and 2L2 for Output B) are reduced from 50% to 25%, which causes both lamps to flash in unison.
2. The pulse-width modulation of the output is increased to 90%, which raises the true rms AC + DC voltage to 1.5 volts below the battery voltage. The result is the lamps flash in unison at a voltage greater than one half of the normal voltage.
3. The SSCC IIIA turns off the output to the MAINT CALL lamp.
4. The HEALTH LED on the controller unit flashes at 8 Hz and the display periodically displays “LAMP NEUTRAL WIRE OPEN”.

When the lamp neutral wire connection is corrected, the system reverts to normal operation, but the MAINT CALL lamp remains out until manually reset, or until the next crossing activation. Reset from the TEST menu by selecting TST ACTIVATE XNG **(WARNING: THE CROSSING WILL ACTIVATE)**.

1.3.6 Use of Independent Pairs of Lamp Outputs

AREMA C&S Manual Part 3.1.25 recommends the use of two or more independent pairs of lamp outputs to increase the probability that at least 50% of the lamps are functioning as intended in the unlikely event of a failure of a pair of lamp driver outputs. The SSCC IIIA 40-Amp unit exceeds this criteria by providing two independent outputs in each pair.

1.3.7 Cross Wiring Lamp Output Pairs

AREMA C&S Manual Part 3.1.25 has an option about cross-wiring the outputs of two independent pairs. The SSCC IIIA does not need to be cross-wired. Cross wiring is not recommended because the Open Lamp Neutral Wire Detection would not be effective.

1.3.8 Use of Multiple Controllers

When interconnecting multiple crossing controllers, the following connections must be made:

- If separate batteries are used to supply power to the controllers, the negative sides of the batteries must be connected together to complete the external flash-sync circuit.
- The GP input from a gate mechanism must be connected to the controller that controls the lamps on that gate mast.

At locations where the signals controlled by separate controllers are not separated by a median, the GP inputs from all gates should be connected to all controllers. This arrangement will cause all lights to flash in the event all gates are not vertical.

At locations where the signals controlled by separate controllers are separated by a median, the GP inputs from all gates on the same side of the median should be connected to the controller(s) activating lights on that side of the median. This arrangement will cause all lights on the same side of the median to flash in the event that all gates on that side of the median are not vertical.

1.4 SPECIFICATIONS

1.4.1 SSCC IIIA Specifications

1.4.1.1 SSCC IIIA Mechanical Specifications

Packaging:	Black powder-coat metal enclosure
Mounting:	Wall, shelf or backboard mount, 19-inch or 23-inch rack mount panel options
Weight:	20-ampere = 9.6 lb (4.32 kg) (approx.), including mating connectors 40-ampere = 11.4 lb (5.13 kg) (approx.), including mating connectors
Depth:	4.125 in (10.48 cm) 4.75 in (12.07 cm) with mating connectors installed
Height:	8.72 in (22.15 cm)
Width:	17.6 in (44.70 cm) (front panel only), 19.0 in (48.26 cm) overall on 19-inch rack mount base 23.0 in (58.42 cm) overall on 23-inch rack mount base

1.4.1.2 SSCC IIIA Environmental Specifications

Temperature:	-40 °F to +160 °F (-40 °C to +70 °C)
Humidity:	95% non-condensing

1.4.1.3 SSCC IIIA Site Power Requirements

Input Power:	Customer supplied battery, 6 or 7 cells of lead, 9, 10, or 11 cells of nickel-cadmium. Customer supplied battery charger must be a constant voltage charger capable of 20-Amps continuous for a 20-Amp SSCC IIIA, and 40-Amps continuous for a 40-Amp SSCC IIIA.
Ripple Voltage:	1.0V peak-to-peak (maximum)

1.4.1.4 SSCC IIIA Power Requirements

Operating Voltage:	The SSCC IIIA requires an operating voltage of at least 1.5 volts above the desired lamp output. The SSCC IIIA operates normally between 9 and 16.5 VDC (B and N connections) When the operating voltage drops below 9VDC, the lamps will begin to flash and gates will descend.	
Maximum Voltage to Crossing Control Inputs:	Nominal 12 VDC, maximum 20.0 VDC	
Operating Current (not including Maint. Call lamp):	20 ampere unit =	750 ma maximum (crossing not activated)
	40 ampere unit =	850 ma maximum (crossing not activated)
Maximum Lamp Current Capability:	20 amperes per lamp output bank, A or B (This will normally accommodate two sets of flashers with front and back lights, and two crossing gates for a total of eight 25-watt lamps lit at any given time.)	
Isolation:	2000 VAC isolation built-in	

Short Circuit Lamp, Gate & Bell Output Protection:	Built-in
Surge Protection:	Secondary surge protection built-in for all external I/O, external primary surge protection required
Power Indication:	LED illuminated when power is applied

1.4.1.5 Echelon® LAN Interface

Data Transfer Rate:	1.25 Mbps
Node Wiring:	For normal installations within the same signal case or bungalow, use stranded twisted pair, conductor size #22 AWG (0.3 mm^2) to #16 AWG (1.3 mm^2).
Node Topology:	Bus (direct daisychain), no stubs or drops.
Number of Nodes:	No more than 8 in any 16 meter (53 feet) length of transmission cable (contact Siemens California technical support if more are required).
Message Format:	ATCS compatible, vital and non-vital messages

⚠ CAUTION

CAUTION

BECAUSE THE ECHELON® INTERFACE IS NOT SURGE PROTECTED, THE NETWORK CONNECTIONS MUST BE RESTRICTED TO EQUIPMENT CONTAINED INSIDE A PROTECTED SIGNAL CASE OR BUNGALOW.

1.4.1.6 SSCC IIIA Operating Specifications

System Reaction Time:	Nominal 700 ms
Real-Time Clock:	Drift = 1.752 minutes per month maximum Clock operating period with loss of power = 3 days minimum, 4 days maximum
Internal Event Recorder:	Diagnostic tool with capacity for last 8 train moves. Event memory is retained for at least 2 days after power is lost.

Power-Up Time:	Nominal 20 seconds from system power-up to fully operational (Warning devices are activated during power up).
Flashing Lamps:	3-wire circuit (L1, N, L2) with continuous energy across L1/L2 for gate tip lamps.
Flash Rate:	Programmable 30 to 70 FPM (default = 50) in increments of 5 FPM.
Duty Cycle:	Nominal 50% each flashed lamp
Crossing Control/GP Inputs:	XR Inputs (1 through 7) selectively enabled/disabled GP (input 8) reserved for Gate Position input
Lamp Voltage Adjustment:	Far gate lamps programmable, with regulated set points from 9.0 to 15.0 volts in 0.1 increments (actual output voltage limited to 1.5 volts less than battery voltage). Adjustment resistors provided for voltage drop compensation on "Near Gate" output of lighting/surge panel(s).
Crossing Control Input Impedance:	1k ohm nominal
Crossing Control Input States:	Energized = 7.5 to 20 VDC Deenergized = 0 to 2.5 VDC
Gate Control Drive Current:	The vital gate output is rated at 10 amperes DC for 10 seconds and for 6 amperes DC continuous at 12 volts.
Gate Control Drive Voltage:	Nominal 12 VDC
Programmable Gate Delay Period:	Programmable 3 through 20 seconds in 1-second increments (Output A independent of Output B)
Bell Output:	Continuous upon activation Optional bell off during gate rising
Bell Output Voltage and Current:	Nominal 12 VDC, 2 amperes per output

Test Modes:	Static lamp test - selected lamps lit steady	1 L1, 1 L2 (all units)
	Static lamp test - all lamps flashing	2 L1, 2 L2 (40-A units only)
	Activate crossing	
	Timed lamp test - automatically delayed start & timed to go off.	
	Repeated lamp test – timed lamp test repeated after twice the initial delay.	

1.4.1.7 SSCC IIIA Test, Setup and Program Modes

User Display:	Liquid crystal display, two rows of 16 characters each, temperature sensor and microprocessor-controlled heater
Idle Screen:	Date and time display (after boot-up or menu timeout)
Menu Timeout:	After 90 seconds of push button inactivity, returns to idle screen while in all menu modes (except when in active test or while setting up lamp voltages)
Key Entry:	NEXT/PREVIOUS, ENTER/EXIT momentary switches
Security:	Password protection enable/disable in Program mode
Configuration:	Can be changed by the user from the front panel or via DT utility
Real-time Clock:	Date and time settable from front panel in Program mode, or via the DT utility. Daylight savings time can be enabled or disabled.

1.4.1.8 SSCC IIIA Interfaces

Battery Input: Three pins for B terminal and three pins for N terminal

⚠ WARNING

WARNING

WHEN WIRING BATTERY-POWER TO AN SSCC IIIA CONNECTOR J2 B AND N TERMINALS, THE FOLLOWING IS REQUIRED:

- **TWO (2) 'B' WIRES AND TWO (2) 'N' WIRES TO A 20-AMP UNIT.**
- **THREE (3) 'B' WIRES AND THREE (3) 'N' WIRES TO A 40-AMP UNIT.**

INCORRECT POLARITY WILL RESULT IN SEVERE DAMAGE TO THE CONTROLLER UNIT.

Vital Control Inputs:	Seven pairs (+ and –) for crossing control, eighth input for GP (Gate Position input + and –)
Non-vital I/O 1 – (Flash Sync):	One pin configured as non-vital output, or as Flash Sync input/output (default = non-vital output). ▪ Sourced output rated for 2 amperes DC at 12 volts. ▪ Input voltage range = 5V to 16.5V, 50 ma. maximum. ▪ This I/O is referenced to controller's negative battery
Non-vital Output 2 – (Maintenance Call):	One pin to provide a negative return for a MAINT CALL lamp circuit, rated for 4 amperes DC at 12 volts (48 watts total, or two 18-watt lamps)
Outputs:	Output A lamp outputs (1 L1 and 1 L2 - all units) Output B lamp outputs (2 L1 and 2 L2 - 40-ampere units only) Gate output 1GC+/1GC- (and 2GC+/2GC- for 40-ampere units) Bell output 1 BELL (2 BELL for 40-ampere units)
Echelon® LAN:	Two pins (polarity is arbitrary)

1.4.2 Lighting Surge Panel (A91170-1, A91170-2, A91181-1, A91181-2) Specifications

1.4.2.1 Lighting Surge Panel Mechanical Specifications

Packaging:	Black powder-coat metal panel
Mounting:	Wall or backboard mount, 23-inch rack mount only (not available in 19-inch rack mount)
Weight:	A91170-1, A91181-1 are 10.0 lb (4.5 kg) (approx.) A91170-2, A91181-2 are 9 lb - 2 oz (4.1kg) (approx.)
Depth:	3.56 in (9.04 cm) including AREMA binding posts
Height:	6.97 in (17.70 cm)
Width:	23.0 in (58.42 cm) overall including mounting tabs

1.4.2.2 Lighting Surge Panel I/O Interface

I/O Interface Type: Standard AREMA binding posts

Near/Far Gate
Cable Compensation: Adjustable resistors for Near Gate L1 and L2
Test/Measurement: Special insulated links with gold-plated nuts on all connections to the crossing for quick circuit isolation

Surge Protection on:
- L1 (lamp 1 output for A and B)
- L2 (lamp 2 output for A and B)
- En (lamp common for A and B)

} Near and Far Gates

- GP (gate position input – A91170-1, A91181-1 panels only)
- 1 BELL, 2 BELL (bell outputs for A, B, C and D)
- 1GC, 2GC (gate controls for A, B, C and D)
- B (battery + input)
- N (battery return)

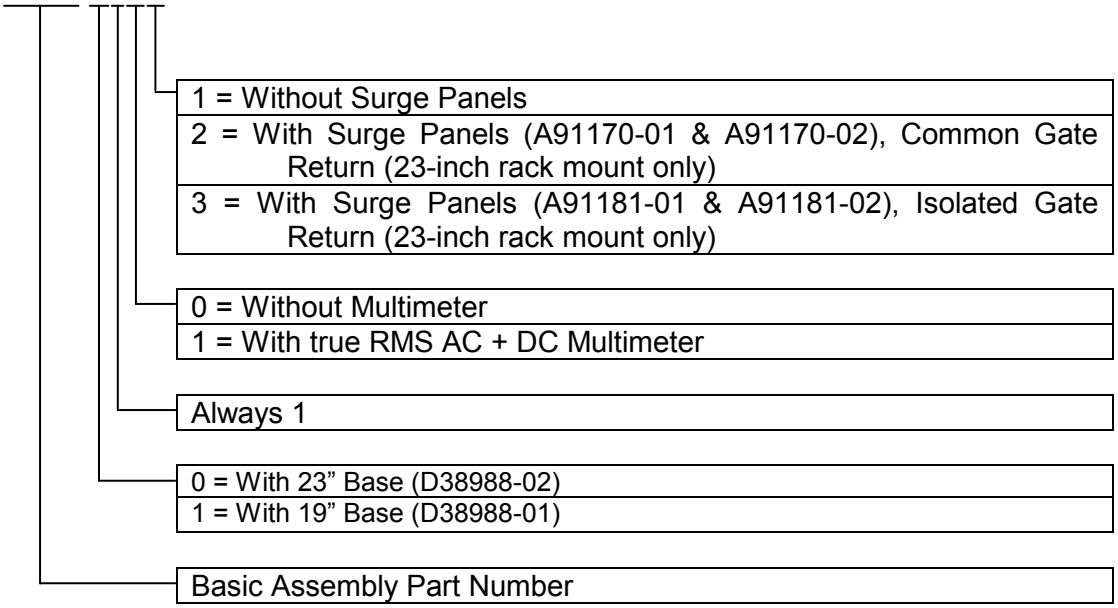
} A91170-1, A91181-1 only

1.5 ORDERING INFORMATION

1.5.1 SSCC IIIA 40-Ampere Unit, A91160

The part number breakdown for the SSCC IIIA 40-ampere unit is:

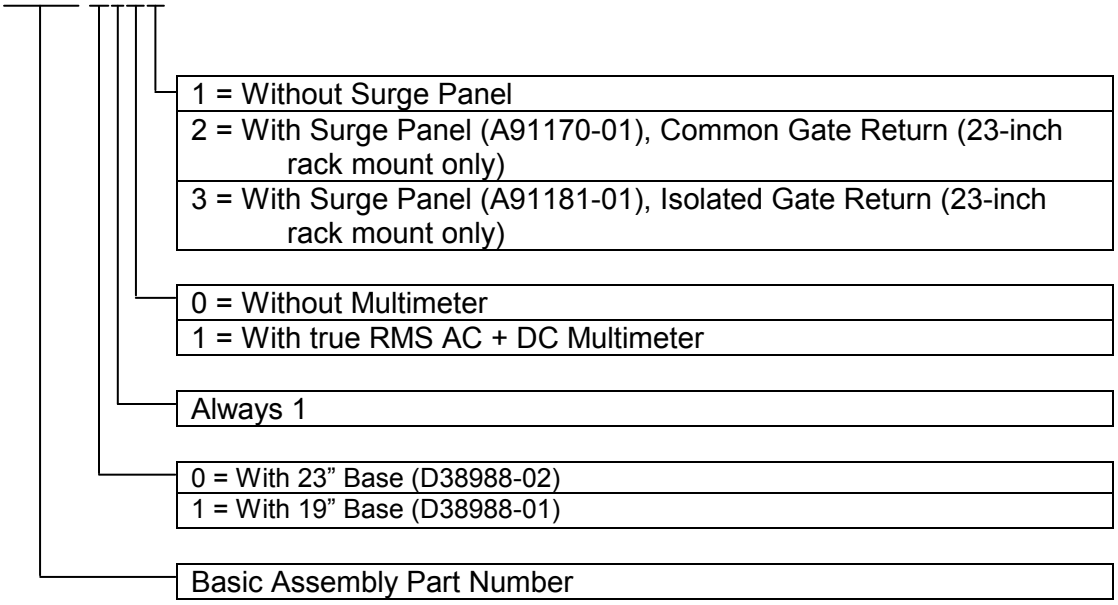
9000-91160-X1XX



1.5.2 SSCC IIIA 20-Ampere Unit, A91165

The part number breakdown for the SSCC IIIA 20-ampere unit is:

9000-91165-X1XX



1.5.3 Lighting Surge Panels

Lighting Surge Panels can be ordered with the crossing controller unit, or they can be ordered separately.

To order Lighting Surge Panels separately, refer to the table below:

Part Number	Gate Control	Description
9000-91170-1	Common Return	Output A Lighting Surge Panel with battery surge protection (used with A91160 and A91165 units)
9000-91170-2		Output B Lighting Surge Panel (used with A91160 unit only)
9000-91181-1	Isolated Gate	Output A Lighting Surge Panel with battery surge protection (used with A91160 and A91165 units)
9000-91181-2		Output B Lighting Surge Panel (used with A91160 unit only)

1.5.4 Mating Connectors

Mating I/O connectors are shipped with each SSCC IIIA unit, but can also be ordered separately. The mating serial interface connector and cable is customer-supplied (DB-9 male). To order mating I/O connectors, specify the following part numbers:

Part Number	Connector Position On SSCC IIIA Front Panel Where Used	Contact type
Z715-09151-0000	J1, J2 and J6	Screw-down
Z715-09027-0006	J4	Cage Clamp
Z715-09027-0012	J3	Cage Clamp

SECTION 2
INSTALLATION

2.1 GENERAL

The guidelines discussed in the following paragraphs should be observed during the installation of an SSCC IIIA system and related equipment.

2.2 PHYSICAL INSTALLATION

The physical installation for the SSCC IIIA system consists of securely mounting the unit and lighting surge panels, plus installing the interface connections. Following installation, refer to Section 5 for application programming, and refer to Section 6 for lamp voltage adjustment, testing, flashing light signal alignment, and system verification.

2.2.1 Mounting The SSCC IIIA System

The SSCC IIIA is designed to be mounted on a backboard or other flat surface. The crossing controller units are also available in widths for mounting in 19-inch or 23-inch racks (refer to figures 2-1 and 2-2 for mounting dimensions). The interconnections, the maintainers/installers interface, and the LED indicators are accessible from the front of the system. Make certain that the SSCC IIIA case is grounded (through mounting hardware or other means).

⚠ CAUTION

CAUTION

ENSURE THAT THE SSCC IIIA CASE IS ADEQUATELY GROUNDED BEFORE APPLYING POWER TO THE SYSTEM. REFER TO FIGURES 10-1 THROUGH 10-6 FOR TYPICAL GROUNDING.

The Lighting Surge Panels can be mounted directly in a 23-inch rack (not available in 19-inch rack mount), or on a backboard or other flat surface. Refer to figure 2-3 for mounting dimensions.

⚠ CAUTION

CAUTION

SURGE PROTECTION FOR THE SSCC IIIA AND ITS INPUT AND OUTPUT LINES IS PROVIDED BY LIGHTING SURGE PANELS, PART NUMBER A91170 OR A91181, BY THE SURGE PANELS INCLUDED IN A FARADAY SHIELDED BUNGALOW, OR BY EQUIVALENT SURGE PROTECTION AS SHOWN IN FIGURES 10-1 THROUGH 10-6.

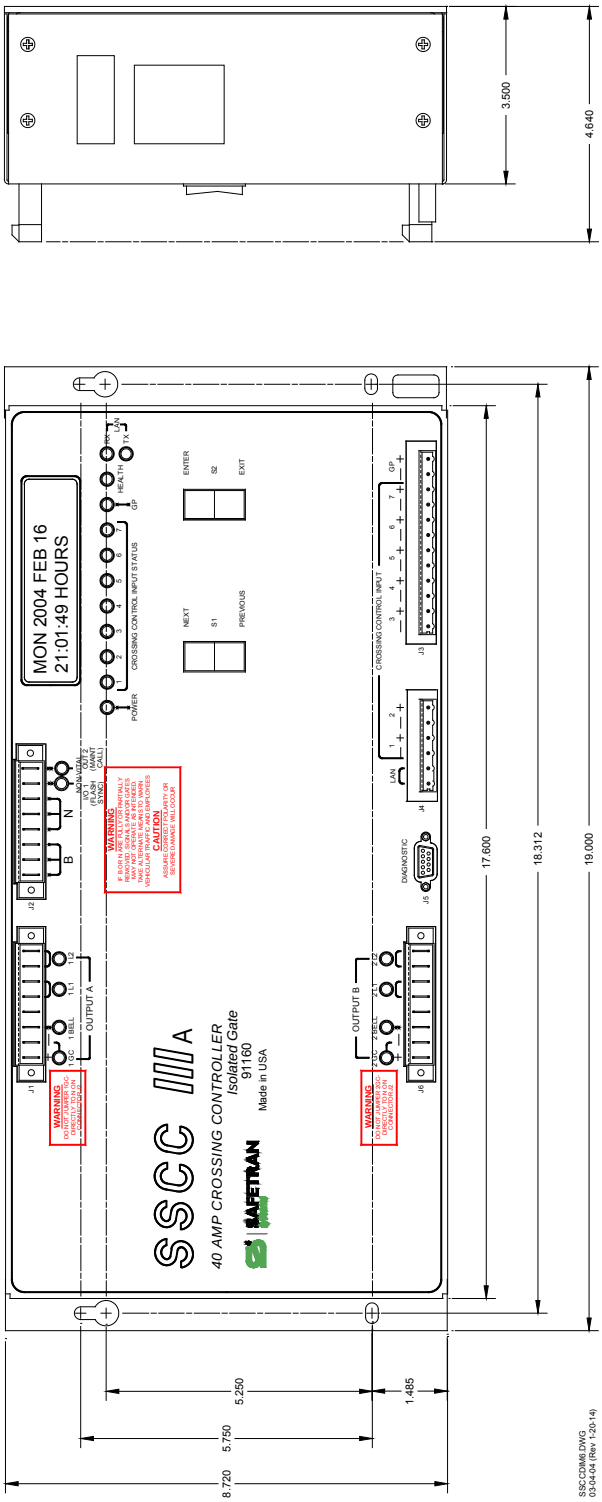


Figure 2-1. SSCC IIIA Mounting Dimensions For 19-Inch Rack

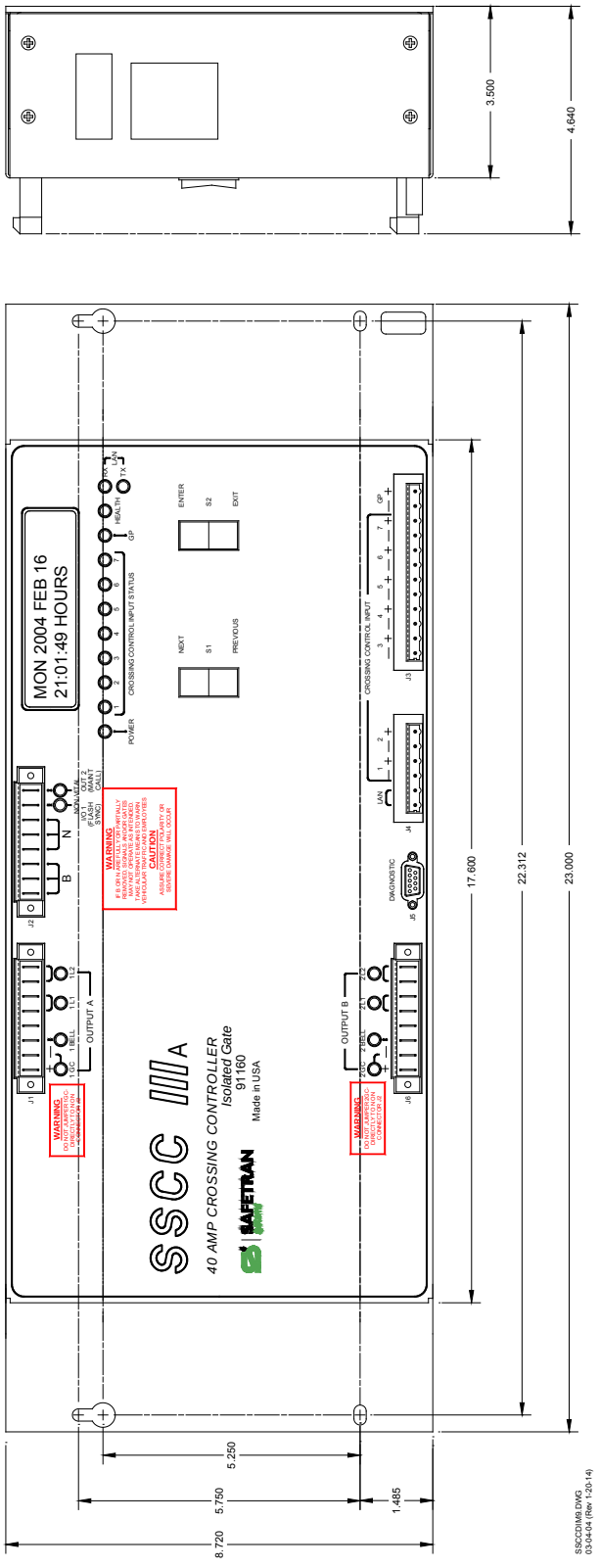


Figure 2-2. SSCC IIIA Mounting Dimensions For 23-Inch Rack

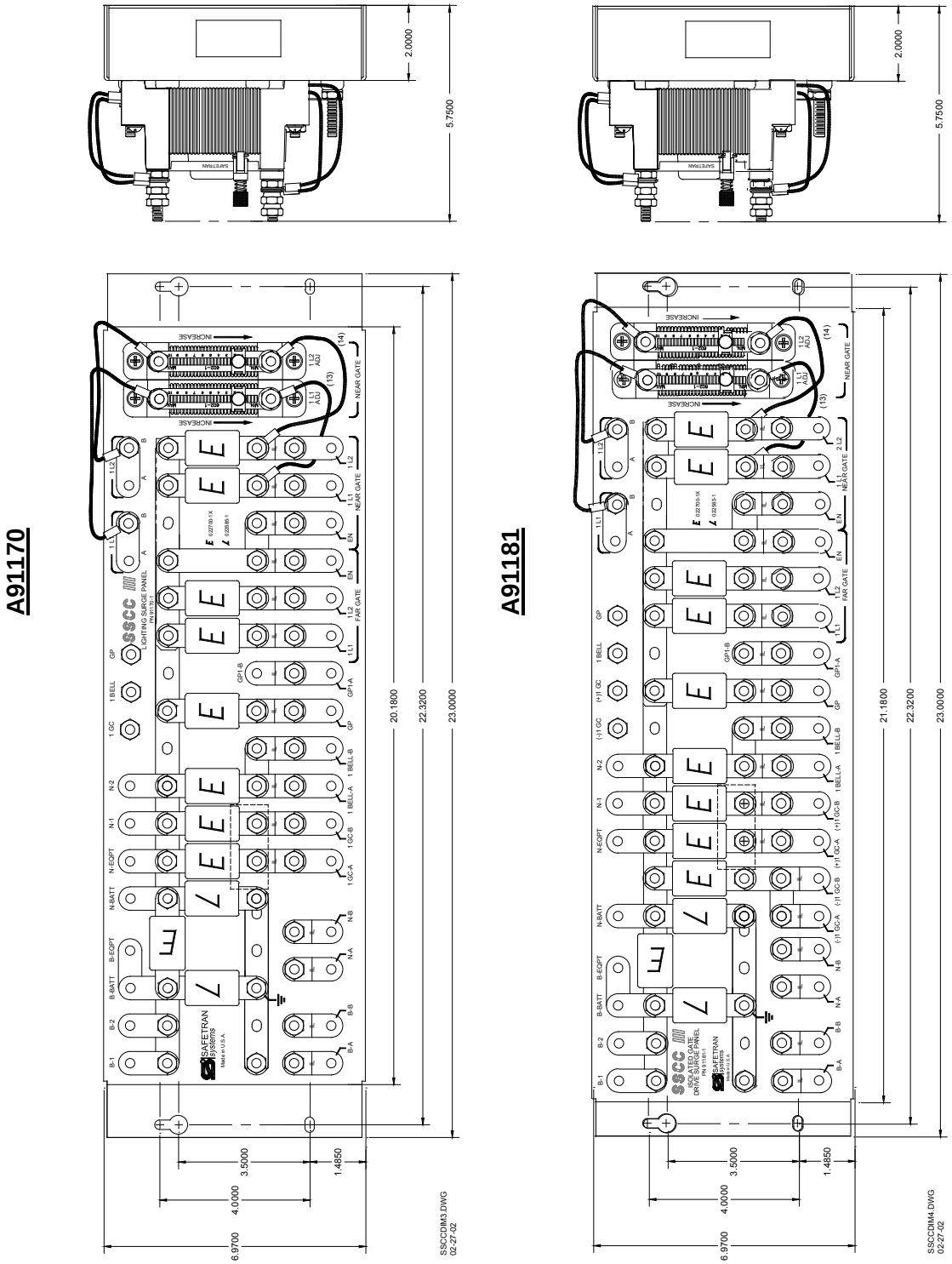


Figure 2-3. SSCC IIIA Surge Panel Mounting Dimensions (Typical for -1 And -2 Versions)

2.2.2 Wiring Harness

The wiring harness for the SSCC IIIA includes connections to the power source and to all I/O. The SSCC IIIA front panel connectors accommodate all external connections and interconnecting wiring to the lighting/surge panel(s), which in turn provide connections to the crossing. Wiring is in accordance with railroad schematics. Wiring harnesses are not provided by Siemens.

NOTE

NOTE

For a crossing without gates, disable the GP input to the SSCC IIIA by connecting the GP+ input to the battery B terminal, and connecting the GP – input to the battery N terminal.

2.2.2.1 Mating Connectors

The SSCC IIIA unit is shipped with the necessary mating connectors for the I/O connections as determined by the configuration specified.

⚠ WARNING

WARNING

ENSURE THAT ALL SSCC IIIA FRONT PANEL MATING CONNECTORS ARE IN THE PROPER POSITION, WELL-SEATED AND SECURELY FASTENED DOWN.

2.2.2.2 Wire Size And Type

Recommended wire sizes for an SSCC IIIA system are as indicated in table 2-1. Maintain wire runs as short as possible.

Table 2-1. Recommended SSCC IIIA Wire Sizes

SSCC IIIA System Wiring	Recommended Wire Size And Quantity
Power to B input (SSCC IIIA unit)	Two 10AWG (20-ampere unit) Three 10AWG (40-ampere unit)
Power to N input (SSCC IIIA unit)	Two 10AWG (20-ampere unit) Three 10AWG (40-ampere unit)
Battery wiring to Lighting/Surge Panel(s) B and N	6AWG
Lamp outputs, gate outputs, and bell outputs (to lighting surge panels)	10AWG for each output
Underground wires from Lighting/Surge Panel(s) to lamps, bells, and gate motors	6AWG
Vital Inputs (crossing control, GP)	12AWG to 18AWG
Maintenance Call output	10AWG to 18AWG
Echelon® LAN	16AWG to 22AWG

⚠ WARNING

WARNING

WHEN WIRING BATTERY-POWER TO AN SSCC IIIA, THE FOLLOWING IS REQUIRED:

- **TWO (2) 'B' WIRES AND TWO (2) 'N' WIRES TO A 20-AMP UNIT.**
- **THREE (3) 'B' WIRES AND THREE (3) 'N' WIRES TO A 40-AMP UNIT.**

INCORRECT POLARITY WILL RESULT IN SEVERE DAMAGE TO THE CONTROLLER UNIT.

⚠ WARNING

WARNING

IF B OR N ARE FULLY OR PARTIALLY REMOVED, SIGNALS AND/OR GATES MAY NOT OPERATE AS INTENDED. TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC AND EMPLOYEES.

⚠ WARNING

WARNING

BELL(S) MUST BE DRIVEN FROM SSCC IIIA BELL OUTPUT(S) (1 BELL, 2 BELL) ONLY.

DO NOT USE LAMP OUTPUTS TO DRIVE BELLS!

Mating connectors are cage clamp type for signal connections, and screw-down type for heavy current-carrying connections. Stranded wire should be used for all type connectors.

2.2.2.3 Wire Preparation

Strip insulation from the end of the wire as indicated in the table below.

Mating Connector for:	Type of Connection	Strip Length
J1, J2, and J6	Screw-down	0.28" (7 mm)
J3 and J4	Cage clamp	0.32" – 0.35" (8 – 9 mm)

It is recommended that a stripping tool be used which allows the strip length to be set accurately. The addition of ferrules is not required.

2.2.2.4 Wire Insertion

For screw-down type connectors, the stripped end of a wire should be inserted into the wire receptor of the connector until it stops, then the screw-down should be tightened (using the screwdriver provided) to a torque of 4.5 inch pounds (0.5 – 0.6 Nm).

For cage clamp type connectors, the stripped end of a wire should be inserted into the wire receptor after levering the cage clamp open. This is accomplished by pressing straight down with the recommended type of screwdriver in the rectangular slot in the connector next to the wire receptor (some connectors also have optional slots on the side). Care should be taken to ensure that the wire receptor is fully open before wire insertion.

The recommended screwdriver type is provided with each unit (flat bladed with a blade size of 0.10” wide, 0.020” thick (2.5mm x 0.5mm)).

⚠ CAUTION

CAUTION

USE THE CORRECT WIRE INSERTION TOOL TO PREVENT DAMAGE TO THE CONNECTOR.

After the stripped end of a wire is inserted into the wire receptor, hold the wire in place while removing the screwdriver to allow the wire receptor to close on the stripped end of the wire, securing it in place. All the wires are to be prepared in this fashion.

2.2.2.5 Strain Relief

Sufficient slack should be allowed in the bundles feeding the SSCC IIIA connectors to allow for easy disengagement. This facilitates removal and replacement of the SSCC IIIA unit, if necessary.

2.2.2.6 Maximum Lamp Cable Lengths

When installing the crossing controller system, the maximum allowable length for any single cable run (either single or double wire) used to connect the crossing lamps to lighting/surge panel(s) is determined by the total system current requirement, type of battery driving the lamps, and the wire gauge. If wire resistance is too high due to excessive length, the crossing lamps will not receive their full rated voltage. This condition will trigger errors of “Open Lamp Neutral Wire” detection.

The effective resistance of the wire can be reduced and the maximum wire length increased by using two wires of the same gauge in parallel (doubling) to the crossing lamps. Figure 2-4 illustrates a typical crossing profile and table 2-2 lists the maximum recommended cable lengths (for the longest cable or cable pair) based upon load current and battery available.

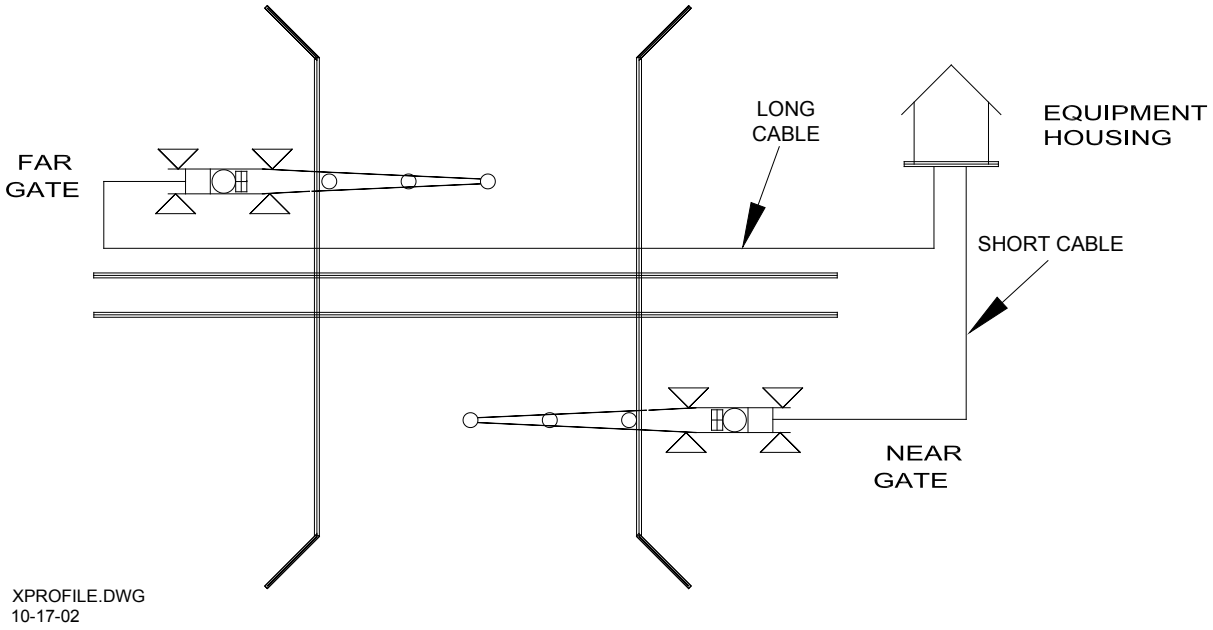


Figure 2-4. Typical Crossing Profile

Table 2-2. Maximum Recommended Lengths For Crossing Lamp Cables[1]

Cable Size	LOAD CURRENT									
	5.0 Amp		7.5 Amp				10.0 Amp			
	Battery/Cells[2]		Battery/Cells[2]				Battery/Cells[2]			
	L-6	N-9	L-6	L-7	N-10	N-11	L-6	L-7	N-10	N-11
#9AWG	225	175	117	260	200	260	88	213	150	213
#9AWG Double Leads N, L1, L2	450	350	234	520	400	520	176	426	300	426
#6AWG	450	350	234	500	400	500	175	375	300	375
#6AWG Double Leads N, L1, L2	900	700	469	1000	800	1000	350	750	600	750

[1] Cable lengths are given in feet.
[2] L = lead-acid, N = Nickel-cadmium. The number after the letter represents the number of cells.

Figure 2-5 illustrates a simplified diagram of typical cable wiring for driving crossing lamps.

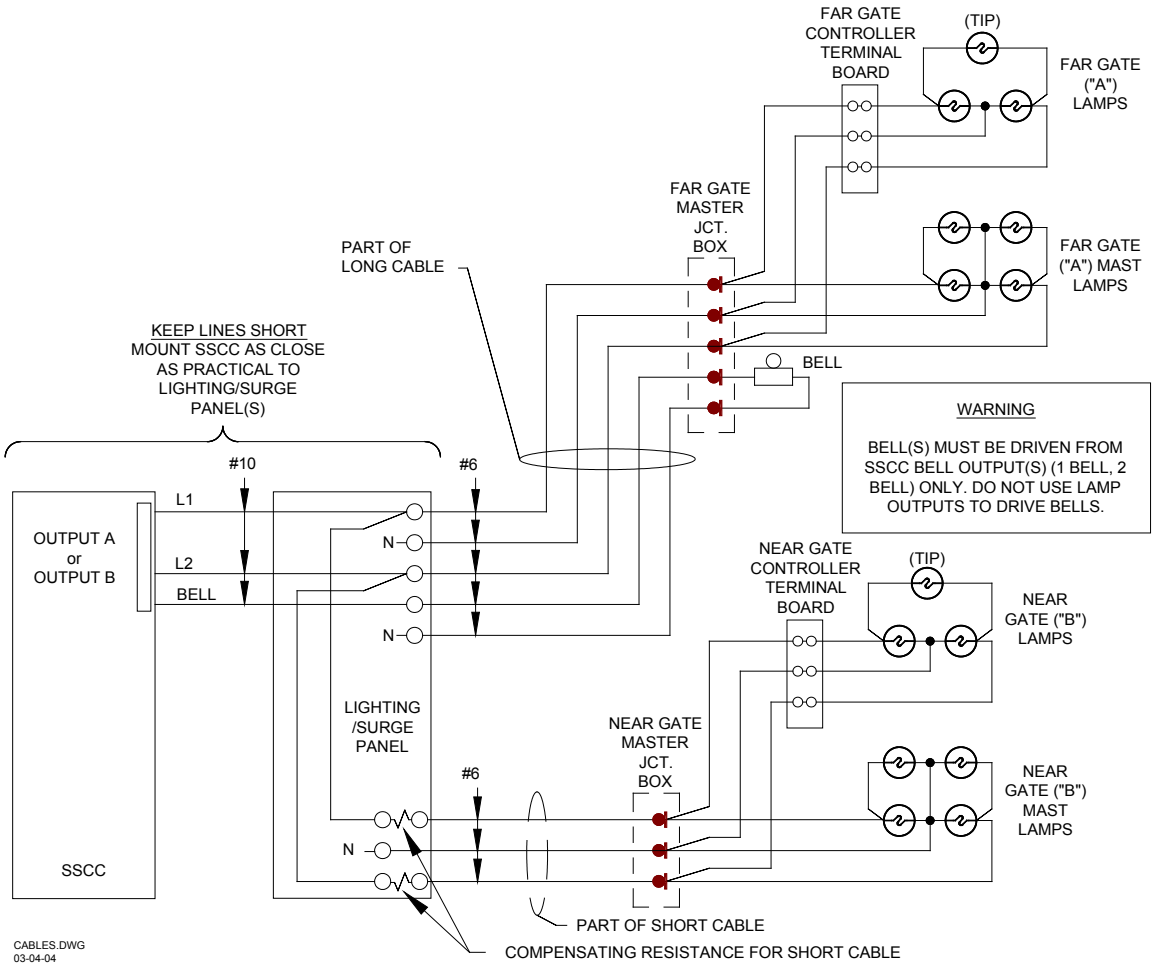


Figure 2-5. Typical Lamp And Bell Cables

Load current for systems requiring 5.0, 7.5, and 10 amperes per cable is based upon 9.5 volts supplied to the lamps. Systems requiring 5 amperes normally consist of flashers only. Systems requiring 7.5 amperes normally consist of eight 18-watt lamps (4 on at a time) while systems requiring 10 amperes consist of eight 25-watt (4 on at a time) or ten 18-watt lamps (5 on at a time).

Batteries are lead-acid types with 6 or 7 cells or nickel-cadmium with 9, 10, or 11 cells. Recommended cable sizes are for number 6 AWG.

2.2.2.7 Connecting Underground Wiring To Lighting/Surge Panels

Conventional AREMA binding post mounting hardware is normally used for connecting underground wiring to the lighting/surge panel and from the lighting/surge panel to the crossing controller.

To provide for easy Megger checking of the underground wiring via the AREMA binding posts on the lighting/surge panel, insulated testing links and gold nuts are installed instead of the standard link hardware. The insulated testing link contains an integral insulating washer. The gold nut has a recess for the insulator, and provides for excellent conductivity from the terminal

to the surface of the link. This special hardware makes it possible to open the link for testing simply by backing off the jam nut and the gold nut a few turns until contact with the link is lost. When the gold nut and jam nut are tightened, the link functions in the normal manner. To ensure that the gold nut does not loosen, tighten a jam nut (not gold) on top of the gold nut (refer to figure 2-6).

When connecting underground wiring to terminals equipped with insulated links, the hardware should be installed as illustrated in figure 2-6 to ensure that the links remain parallel with the front panel surface and do not bind or become distorted when tightened.

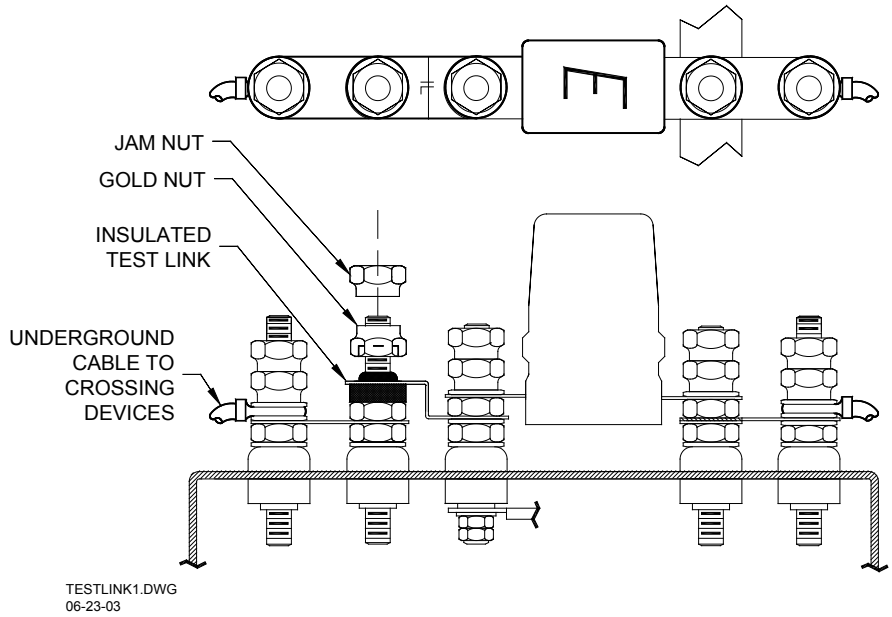


Figure 2-6. Insulated Testing Link (shown in open position)

2.2.3 Lighting/Surge Panels

Surge protection for the SSCC IIIA system is provided by the lighting/surge panels. The surge panels contain the correct configuration of arresters and equalizers for the specific applications (refer to table 2-3 for a list of part numbers for surge panels).

Table 2-3. Lighting Surge Panels

Part Number	Gate Control	Description
A91170-1	Common Return	For Output A (used with A91160 and A91165 units)
A91170-2		For Output B (used with A91160 unit only)
A91181-1	Isolated Gate	For Output A (used with A91160 and A91165 units)
A91181-2		For Output B (used with A91160 unit only)

Surge protection for the battery circuits and the GP circuit as well as for the common interfaces to the crossing equipment is provided on the dash-one versions (refer back to table 2-3). The A91181-1 panel is used with the 20-amp SSCC IIIA unit (A91165), while an A91181-1 and an A91181-2 panel are generally required with the 40-amp unit (A91160). The A91170-1 panel is used with the 20-amp SSCC IIIA unit (A91165), while an A91170-1 and an A91170-2 panel are required with the 40-amp unit (A91160) when common gate return is required.

The panel assemblies are designed for installation on the wayside enclosure accessory mounting board. The panels provide the interface between the external crossing gates, bells, and lamp circuit wiring and the crossing controller. Each panel is equipped with standard AREMA binding posts which accommodate connections to the battery lightning arresters and the battery, bells, gate, and lamp circuit equalizers.

Also included are two lamp-adjusting resistor units, which are used as voltage adjustment for the "NEAR GATE" outputs. These resistors are used in combination with the microprocessor-controlled lamp outputs to compensate for any difference in voltage drops between the "NEAR GATE" and "FAR GATE" outputs due to different cable lengths.

2.2.4 SSCC IIIA DC Power Connections

CAUTION

DO NOT CONNECT POWER TO THE SSCC UNTIL AFTER COMPLYING WITH PARAGRAPH 2.3. FAILURE TO INITIALLY "POWER UP" IN THE PROPER SEQUENCE MAY PREVENT SHORT-CIRCUIT PROTECTION FROM DETECTING WIRING ERRORS AND DAMAGE THE UNIT.

The SSCC IIIA is designed to operate directly from the signal operating battery. Typically, these batteries have voltages ranging between 12 volts and 16.5 volts. The SSCC IIIA can maintain constant lamp output voltage, provided the battery voltage remains 1.5 volts higher than the programmed lamp output.

The battery circuit supplying the SSCC IIIA should have primary surge protection, arresters, and equalizers, located as close as possible to the battery (refer to Section 10, figures 10-1 through 10-6). The SSCC IIIA system power is also protected by internal secondary protection. The arresters and equalizers provided on the surge panels (part numbers A91170-1 and A91181-1), protect against surges coming into the signal house from the warning device cables.

WARNING

OBSERVE CORRECT POLARITY WHEN CONNECTING BATTERY TO THE SSCC IIIA B AND N CONTACTS ON FRONT-PANEL CONNECTOR J2. INCORRECT POLARITY WILL RESULT IN SEVERE DAMAGE TO THE CONTROLLER UNIT.

Battery positive and negative are connected to the B and N screw-down fasteners on the J2 connector. Refer to Section 1, table 1-2, for connector pin assignments. Insulated 10 AWG stranded wire is recommended for power circuits. It is recommended that three (3) 'B' wires and three (3) 'N' wires be connected to the J2 connector on 40-Amp units. It is recommended that two (2) 'B' wires and two (2) 'N' wires be connected to the J2 connector on 20-Amp units. For typical system wiring, refer to the application drawing in Section 10.

When a common return gate control circuit is used, the negative wire connected to GC- must be connected directly to the negative gate circuit on the surge panel as shown in figure 1-8.

WARNING

DO NOT CONNECT THE WIRES FROM 1GC- OR 2GC- DIRECTLY TO THE N TERMINAL ON THE J2 CONNECTOR. DOING SO MAY RESULT IN THE GATES NOT OPERATING AS INTENDED IN THE EVENT NEGATIVE POWER IS REMOVED FROM THE WIRES LEADING TO THE J2 CONNECTOR.

2.2.5 Non-Vital I/O 1 (Flash Sync) Connection

Pin 7 of J2 is a non-vital Input/Output commonly used as a Lamp Flash Sync Connection. To synchronize lamp outputs on multiple controllers so that the left and right lamps flash in unison, connect pin 7 on J2 of each controller together. If separate batteries are used to supply power to the controllers, the negative sides of the batteries must also be connected to complete the external flash sync circuits (refer to figure 2-7). If total battery isolation is required, a fast acting non-vital relay controlled by the master controller can be used to synchronize the slave controller by keying the slave controller's positive battery through its contact to pin 7.

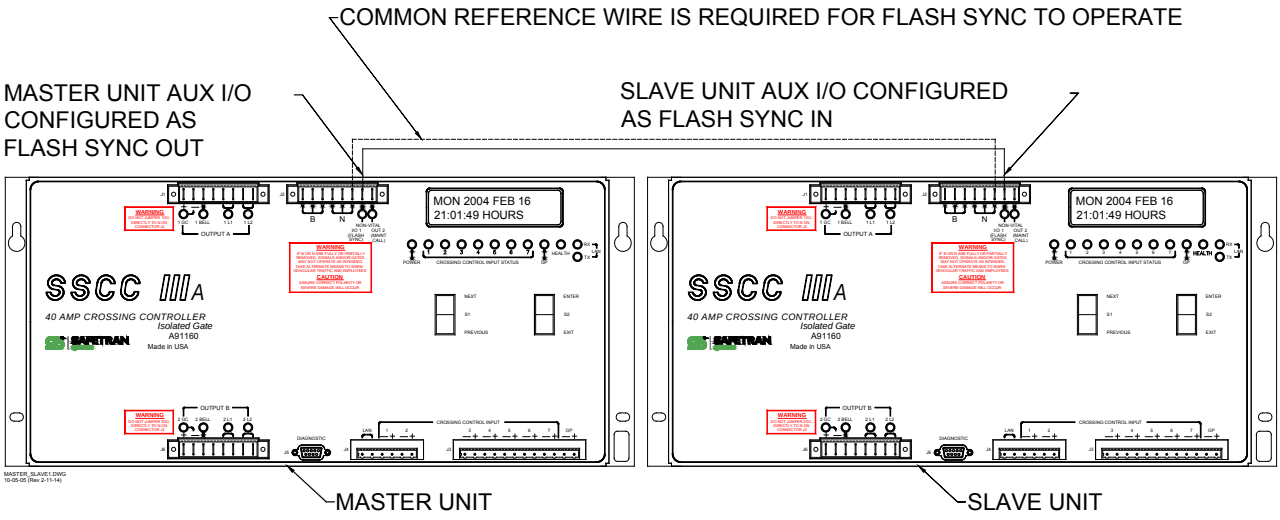


Figure 2-7. Flash Sync Control And Reference

NOTE

NOTE

GCP4000 Chassis have Isolated Flash Sync connections. Observe polarity when connecting GCP4000 Flash Sync connections to SSCC IIIA controllers.

NOTE

NOTE

One controller must be configured for Flash Sync Out, with the other controller(s) configured for Flash Sync In. Refer to section 4.2.2.5 for configuring Aux I/O.

NOTE

NOTE

All controllers must be programmed with the same flash rate in order for Flash Sync to operate properly. Refer to section 5.2.1.2 for programming controllers.

2.2.6 Non-vital ATCS Communication Connections

SSCC IIIA units can communicate with other equipment via a twisted pair Echelon® LAN interface. Data on the LAN is transferred by using non-vital ATCS messages. The interface operates at a data rate of 1.25 Mbps and messages are sent in data packet format.

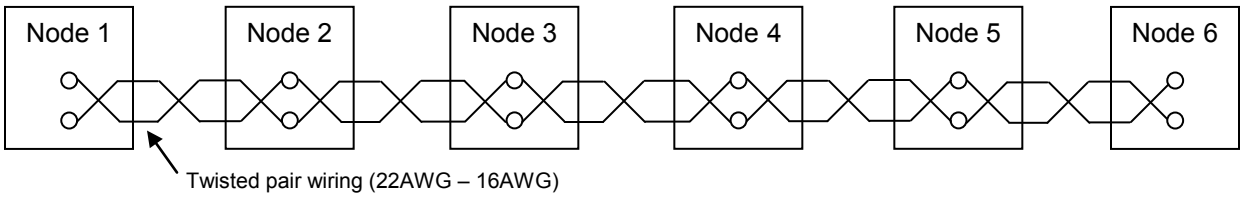
Table 2-4 lists and describes the pinouts for the J4 connector, which includes the Echelon® LAN interface.

Table 2-4. Echelon® & Input Connector Pinouts (J4)

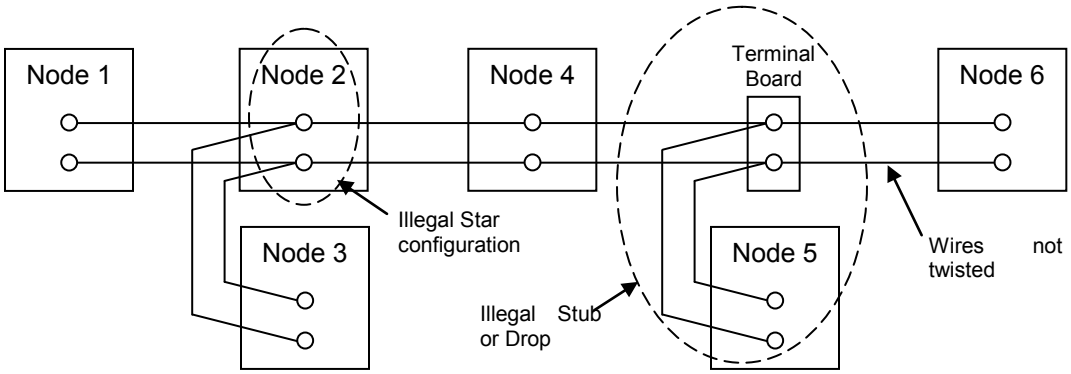
Pin #	Signal Name	Description
1	ECH 0	Echelon® twisted pair LAN conductor (polarity is arbitrary)
2	ECH 1	Echelon® twisted pair LAN conductor (polarity is arbitrary)
3	Input 1 -	Crossing Control Input 1 negative lead
4	Input 1 +	Crossing Control Input 1 positive lead
5	Input 2 -	Crossing Control Input 2 negative lead
6	Input 2 +	Crossing Control Input 2 positive lead

2.2.6.1 Rules For Using Echelon® LAN

- Wire size is from #22AWG to #16AWG, stranded twisted pair.
- Each connection (node) must be wired in a daisy-chained bus configuration, no drops allowed (see figure 2-8).
- Maximum wiring length of LAN bus wiring is 53 feet (16m) within a signal case or bungalow, but wiring should be kept as short as practical.
- A maximum of 8 connection (nodes) is recommended. If additional connections are required, contact Siemens California Technical Support for assistance.



CORRECT BUS WIRING



EXAMPLES OF INCORRECT WIRING

Figure 2-8. LAN Bus Wiring

CAUTION

BECAUSE THE ECHELON® INTERFACE IS NOT SURGE PROTECTED, NETWORK CONNECTIONS MUST BE RESTRICTED TO THE EQUIPMENT CONTAINED INSIDE A SIGNAL CASE OR BUNGALOW.

NOTE

For additional information concerning the Echelon® LAN, contact Siemens Rail Automation Technical Support.

2.3 POWER UP AND INITIALIZATION

The SSCC IIIA is equipped with active short circuit protection on its gate control, bell, and lamp outputs. To prevent initial wiring errors from damaging the controller the following sequence should be followed:

1. After the SSCC IIIA is installed and all external wiring is completed, remove all plug connectors.

WARNING

OBSERVE CORRECT POLARITY WHEN CONNECTING BATTERY TO THE SSCC IIIA B AND N CONTACTS ON FRONT-PANEL CONNECTOR J2. REVERSED POLARITY WILL RESULT IN CONTROLLER DAMAGE.

2. After verifying the battery polarity on the J2 plug, apply power to the unit by inserting the plug into the J2 connector.

When power is initially applied to the SSCC, the Power Up process begins. The Power Up and Initialization process takes approximately 20 seconds to complete. During this process, Vital Hardware and Software checks are performed to assure proper internal operation.

During the Power Up and initialization process, three display message screens appear in sequence. The first message to appear momentarily is the Power Up screen similar to figure 2-9.

Figure 2-9. Power Up Screen

The second message to appear momentarily on the display is the Software Version, similar to figure 2-10.

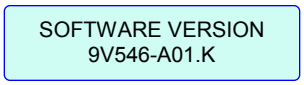


Figure 2-10. Software Version Message

Following the Software Version screen, the Initialization screen momentarily appears, similar to the one in figure 2-11.

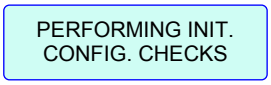


Figure 2-11. Initialization Screen

After completing the Power Up and Initialization process, the SSCC should become fully operational and display the idle screen (current time and date alternating with the unit's MCF and time), similar to that shown in figure 2-12. This is the normal screen that is generally displayed whenever the front panel programming switches (S1 and S2) have not been used in the last 90 seconds.

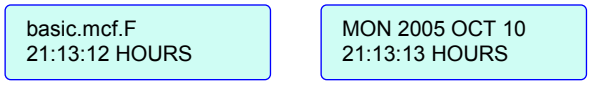


Figure 2-12. Typical Idle Screen

The unit always returns to this display after 90 seconds of inactivity on the push buttons, except when in the "Setup Lamp Voltages" mode or when a test mode is selected.

3. After initial turn on, connect the J1 plug into the **OUTPUT A** J1 connector (and the J6 plug into the **OUTPUT B** J6 connector on 40 amp models). The warning devices should be activated.

4. Connect J3 plug into the **INPUT** J3 connector and connect J4 plug into the **INPUT** J4 connector.

5. After installation and turn on, proceed to Section 5 for programming and configuration of the SSCC IIIA unit.

NOTE

NOTE

Refer to Section 4 for general information on the programming and configuration menu displays. The warning devices will remain activated until the proper inputs are energized.

2.3.1 Failure During Power Up and Initialization

If the Power Up and Initialization process fails due to a failed vital check, the unit will stay in the Power Up and Initialization process (gates remain down with lights flashing). This is indicated by the Power Up and Initialization screens re-appearing and the Idle screen not appearing. The unit must be replaced to correct the problem (refer to Section VII for troubleshooting).

WARNING

WHILE THE SSCC IIIA IS REBOOTING, THE CROSSING GATES ARE DOWN WITH LAMPS FLASHING AND BELLS RINGING (REGARDLESS OF THE STATE OF THE VITAL CROSSING CONTROL INPUTS). TAKE ADEQUATE PRECAUTIONS TO WARN PERSONNEL, PEDESTRIANS, TRAINS AND OTHER VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION HAS BEEN VERIFIED.

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SECTION 3
SSCC IIIA MODULE CONFIGURATION FILE (MCF)

3.1 GENERAL

The SSCC IIIA operates a crossing based on the configuration software (MCF) that is installed during manufacturing. This software determines the crossing operation based on its 8 VPI inputs (#1 through #7 are crossing activation inputs and #8 is the gate position input). These inputs can be used for, but are not limited to, track circuits, MS/GCP circuits, Island circuits, XR networks, and test switches. An LED indicator is associated with each input. When the input is activated the LED is illuminated, and when the input is deactivated the LED is dark.

Currently, the BASIC MCF (filename: basic.mcf) is used as the configuration software for the SSCC IIIA crossing controller, which is an application providing 7 inputs logically "ANDed" together to allow for use of multiple MS/GCP units. This MCF permits the SSCC IIIA to be an exact field replacement for a SSCC III unit.

3.2 OPERATION

The crossing activates when any of the enabled SSCC IIIA inputs 1 through 7 are de-energized. Thus, the XR is driven by inputs 1 through 7 in an "AND" array as shown in figure 3-1. Inputs 2 through 7 can be enabled or disabled in the Program menu (input #1 is always enabled). In this way, unused inputs can be disabled (refer to figure 3-1 for a typical application) without the need to apply battery voltage (+ and -) to unused inputs. If a test switch is not required, input 4 can be disabled in the Program menu (program enabled inputs 1 thru 3).

The BASIC MCF file has a maximum of 7 activation inputs that can be programmed for use. As a minimum, one input (input #1) must be used. For example, if only one input is used to control the SSCC IIIA unit, then use input number 1 and set the ENABLED INPUTS to **1 THRU 1**. If two inputs are used, then use input numbers 1 and 2 and set the ENABLED INPUTS to **1 THRU 2** (the default = **1 THRU 7**).

NOTE

NOTE

The concept of XR as used here is a function of logic internal to the SSCC IIIA, rather than a physical relay.

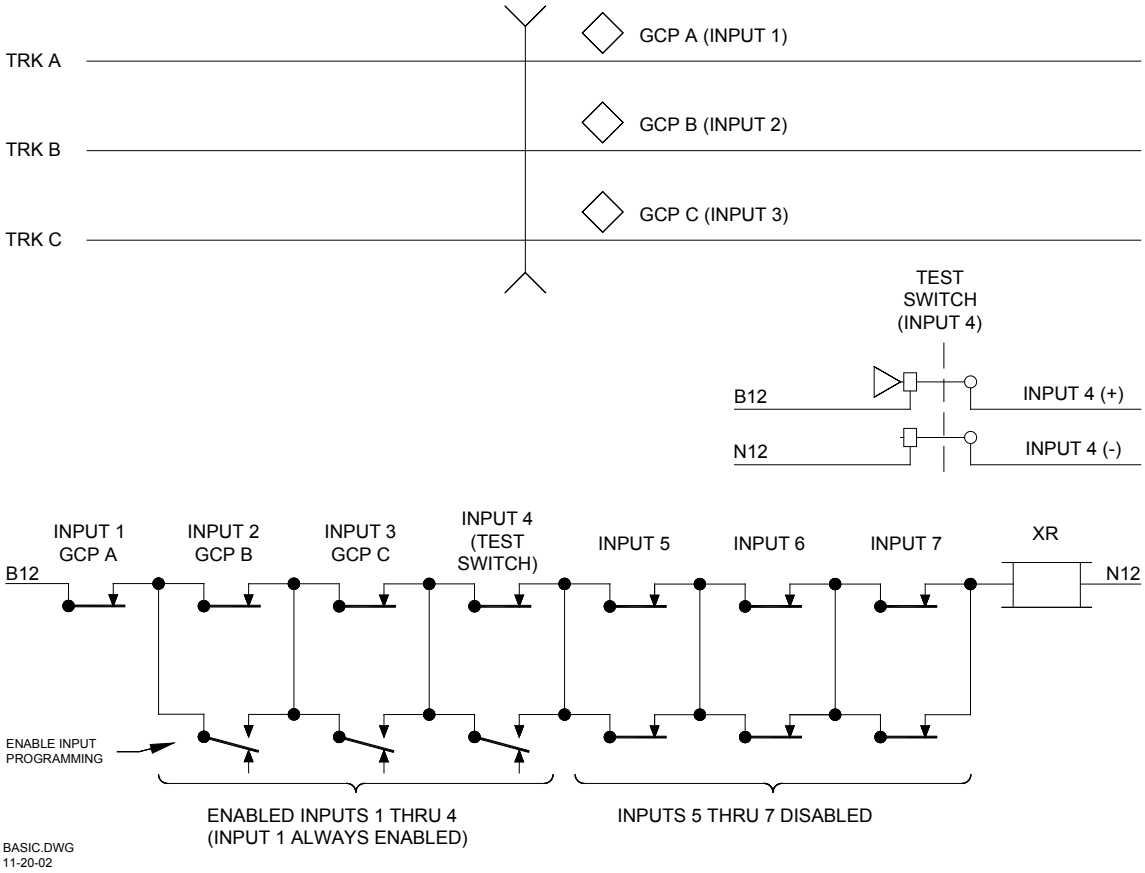

Figure 3-1. Typical XR Inputs for BASIC MCF

3.3 PHYSICAL INPUTS

The inputs available on the BASIC MCF configuration are listed in table 3-1.

Table 3-1. BASIC MCF Inputs

Input #	Input Function	Optional LOS[1]	Notes
1	(not defined)[2]	Yes	Required (cannot be disabled)
2	(not defined)[2]	Yes	Disable in Program menu if not used
3	(not defined)[2]	Yes	Disable in Program menu if not used
4	(not defined)[2]	Yes	Disable in Program menu if not used
5	(not defined)[2]	Yes	Disable in Program menu if not used
6	(not defined)[2]	Yes	Disable in Program menu if not used
7	(not defined)[2]	Yes	Disable in Program menu if not used
8	GP – (Gate Position)[3]	No	Required (cannot be disabled)

[1] LOS = Loss-Of-Shunt timer.
[2] Although inputs 1 through 7 are “not defined” in this table, the most common application would be to connect to an MS/GCP crossing relay output. Inputs 1 through 7 are “ANDed” together, thus de-energizing of any of these inputs will cause the crossing to activate.
[3] Input 8 is intended to be used as the Gate Position (GP) input. Gate wiring should be such that Input #8 is active when all the gates are in the “up” position. When any gate is not detected as “up”, this input becomes deenergized which causes the lamps to flash.

3.4 OPTIONAL LOSS-OF-SHUNT TIMER

The BASIC MCF is equipped with an optional Loss-Of-Shunt timer for each of the seven configured XR inputs. The Loss-Of-Shunt time is the delay from the time the input energizes to when the logic considers the input valid. The LOS timer is settable using the CONFIGURE menu of the crossing controller, or using the DT utility. The range is 0 to 20 seconds (default = 0 second), and each enabled input will have an LOS timer in the CONFIGURE menu. If no LOS time is required, set the LOS time to zero (0).

NOTE

NOTE

Refer to Section 5, paragraph 5.2.1.2, *Using the CONFIGURE Menu*, for configuring Loss-Of-Shunt timer.

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SECTION 4
DISPLAYS & MENU DESCRIPTIONS

4.1 GENERAL

This section defines the function of each menu display. The menu descriptions in this section are provided for general information only. The procedures for using the Program, Configure and Test Configure menus are provided in Section 5, the procedures for using the Setup Lamp Voltages and Test menus are provided in Section 6, and the procedure for using the Query menu is provided in Section 9.

4.2 MAIN MENU

The main menu is the top level of the menu system. The default position in the main menu is the Idle Screen (see figure 4-1), which is automatically accessed shortly after bootup.

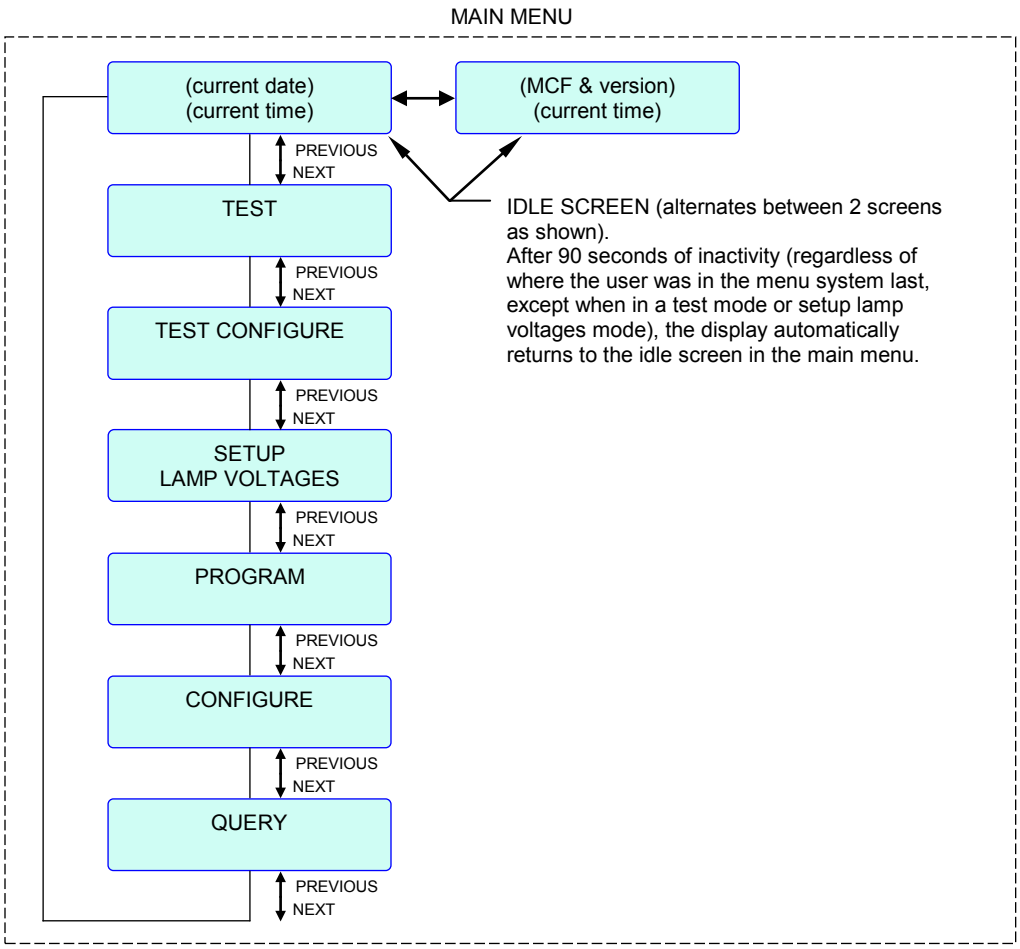


Figure 4-1. SSCC IIIA Main Menu

Each submenu of the main menu has an EXIT function to return to the main menu, or after 90 seconds of inactivity the display automatically returns to the idle screen in the main menu.

NOTE

If the 90 second inactivity timeout is allowed to occur while in an edit mode, the system reverts to the idle screen and any changes that were made without saving will be lost.

NOTE

When in edit mode of any of the menus, the values or options in the edit field wrap around at the value or option limits.

4.2.1 PROGRAM Menu

The PROGRAM menu (figure 4-2) is the primary programming tool for system applications.

When any changes are made (in Program edit mode), changes are saved when the user presses <Enter>, and a “saving changes” message is displayed.

SAVING
CHANGES…

NOTE

Whenever the password function is enabled and there is no rocker switch activity for 90 seconds, the user will be prompted to enter the correct password before Program parameters can be changed.

WARNING

ALL PROGRAM AND CONFIGURE PARAMETERS MUST BE SET TO APPROVED RAILROAD DESIGN AND APPLICABLE GOVERNMENT REGULATIONS.

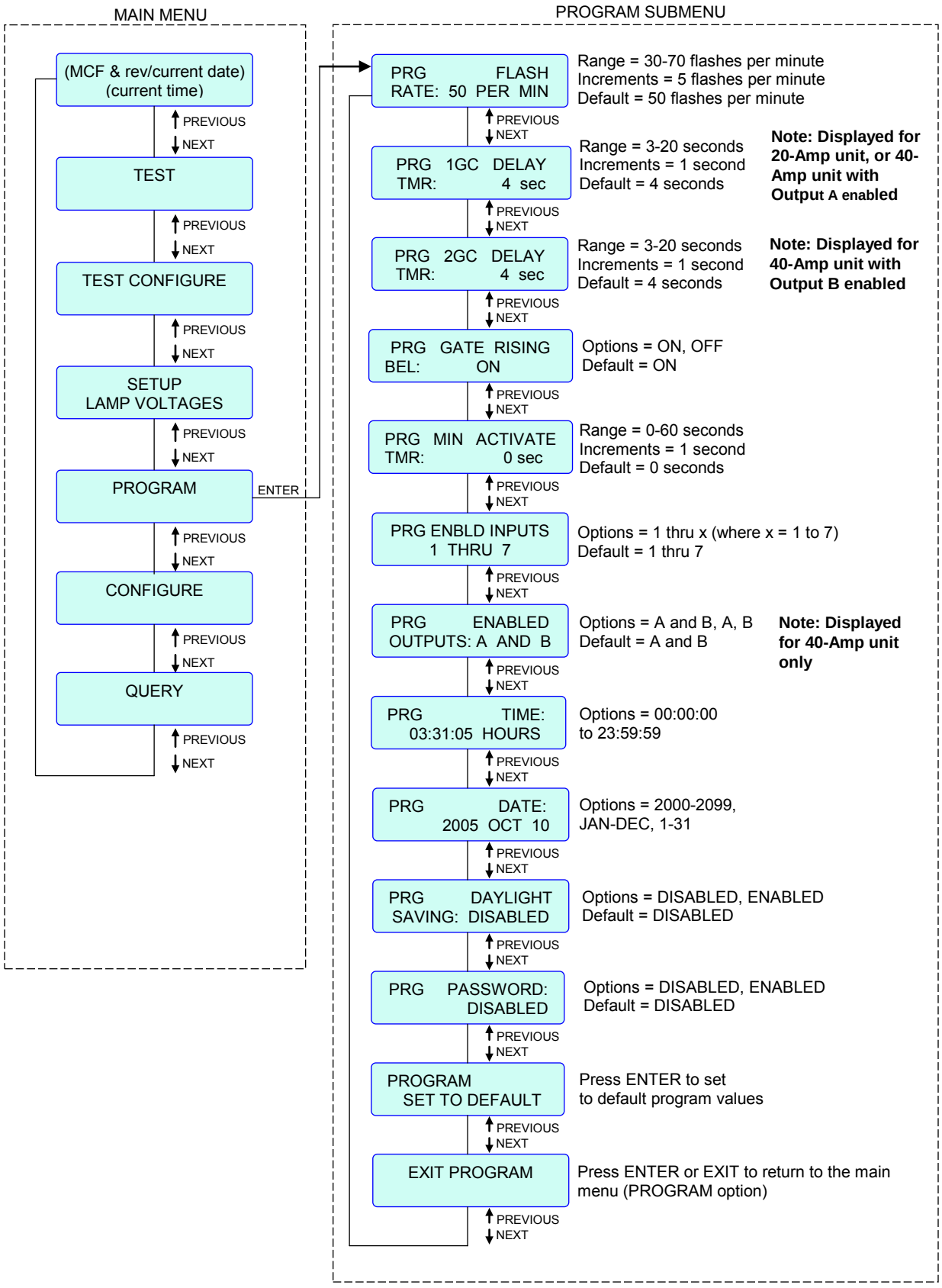
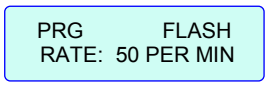


Figure 4-2. Program Menu Flow Diagram

4.2.1.1 Program Lamp Flash Rate

The rate at which the crossing lamps flash can be set by using the **PRG FLASH RATE** menu. The range is 30 flashes per minute to 70 flashes per minute (default = 50 flashes per minute).



4.2.1.2 Program Gate Delay Timers

Normally, when a crossing controller is activated, the lights begin to flash before the gates begin to descend. Gate delay 1 timer is a function in both the 20-amp and 40-amp units to provide this gate delay for the "A" output. This timer is settable by using the **PRG 1GC DELAY TMR** menu. The range is 3 seconds through 20 seconds (default = 4 seconds).

Gate delay 2 timer is a function only in the 40-Amp unit to provide this gate delay for the "B" output. This timer is settable by using the **PRG 2GC DELAY TMR** menu. The range is 3 seconds through 20 seconds (default = 4 seconds).

NOTE

NOTE

PRG 2CG DELAY menu is only applicable for the 40-Amp crossing controller unit with Output B enabled.

4.2.1.3 Program Gate Rising Bell Off

The bell(s) at a crossing can be configured to ring (set to ON) as the gates are rising, or not ring (set to OFF) by using the **PRG GATE RISING BEL** menu. The default setting is ON.

4.2.1.4 Program Minimum Activation Time

The "Minimum activation time" function provides an automatic minimum time the flashers and gates will operate once the flashers have been activated. This timer may be used to allow gates to have sufficient time to completely lower.

The Minimum activation time can be set using the **PRG MIN ACTIVATE TMR** menu. The range is 0 to 60 seconds in 1-second increments, and the default is 0 seconds.

A typical example of a menu display for MIN ACTIVATION TIME is shown below:

```
PRG MIN ACTIVATE
TMR:          0 sec
```

4.2.1.5 Program Enabled Inputs

⚠ WARNING

WARNING

AN INPUT CANNOT BE USED TO ACTIVATE A CROSSING IF IT IS NOT ENABLED.

The SSCC IIIA has a total of 8 vital inputs: seven activation inputs (#1 through #7) and a Gate Position (GP) input (#8). The activation inputs are enabled or disabled for the SSCC IIIA by using the **PRG ENBLD INPUTS** menu. For example, if only one input is used to control the SSCC IIIA, then use input number 1 and set the ENABLED INPUTS to **1 THRU 1**. If two inputs are used, then use input numbers 1 and 2 and set the ENABLED INPUTS to **1 THRU 2** (the default = **1 THRU 7**).

```
PRG ENBLD INPUTS
1 THRU 7
```

NOTE

NOTE

Activation inputs (#2 through #7) may be enabled/disabled, but input #1 is always enabled. Vital input number 8 is the GP input (Gate Position).

NOTE

NOTE

At initial cutover, the crossing will generally be constantly activated until the proper SSCC IIIA inputs have been enabled and the control to the inputs is high.

4.2.1.6 Program Enabled Outputs (40-Amp Unit Only)

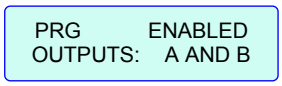
⚠ WARNING

WARNING

WHEN AN OUTPUT (A OR B) IS NOT ENABLED, IT CANNOT BE USED TO CONTROL THE CROSSING LAMPS, GATES OR BELLS.

A 40-amp SSCC IIIA unit has two sets of lamp outputs, **Output A** and **Output B**. Output A includes a gate control output, bell output, and lamp outputs 1 L1 and 1 L2. Output B includes a gate control output, bell output, and lamp outputs 2 L1 and 2 L2. Each lamp output is capable of supplying 20 amps.

A 40-Amp controller unit can be programmed to operate from Output A only (20 amps lamp drive maximum), Output B output only (20 amps lamp drive maximum), or both Output A and Output B (40 amps total lamp drive).



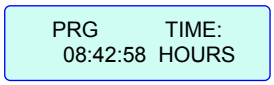
NOTE

NOTE

The available options for this menu item are output **A**, output **B** or outputs **A AND B** (default). This menu item does not appear on the display of 20-Amp units.

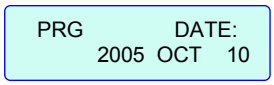
4.2.1.7 Program Time

Time is in 24-hour format. To set the current time, the user must enter the hours (00 – 23), minutes 00 – 59) and seconds (00 – 59).

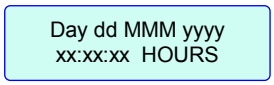


4.2.1.8 Program Date

To set the current date, the user must enter the year (2000 – 2099), month (JAN – DEC) and day (01 – 31) in the format: yyyy MMM dd.



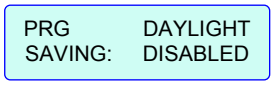
After time and date have been set, they are displayed on the idle screen in the following format:



The “Day” of the week (**SUN** through **SAT**) as displayed above is automatically determined by the system based on the values entered.

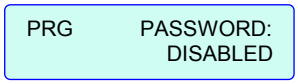
4.2.1.9 Program Daylight Saving

When the SSCC IIIA unit is programmed to compensate for daylight savings time, the real time clock automatically adjusts for daylight saving. The options are ENABLED or DISABLED, with the default = DISABLED.



4.2.1.10 Program Password

To safeguard system settings, the SSCC IIIA is provided with password protection which can be armed (ENABLED) or disarmed (DISABLED). The unit is shipped with password protection disabled.



NOTE

NOTE

Password protection applies to the PROGRAM and CONFIGURE menus only.

If a password is established, the password can be either armed (ENABLED), or disarmed (DISABLED) until later. When password protection is enabled, the user is prompted to enter the current password whenever attempting to modify parameters from the front panel rocker switches. Password remains valid, allowing unrestricted access and editing, until menu timeout.

The password must consist of four digits (**0000** through **9999**). It is recommended that the password be recorded for future reference.

NOTE

NOTE

When entering a password, to discard changes and start over before password is saved, press <EXIT>.

NOTE

NOTE

To facilitate setup, it is generally recommended that the password not be armed until all programming and configuration operations have been performed, and lamp voltages have been set up.

When password protection is disabled, the user has full modification access to the entire system.

4.2.1.11 Program Set to Default

The software establishes default settings for all program options. All programmed values and options can be simultaneously returned to their defaults in one simple operation, except for Date, Time and Password.

NOTE

NOTE

Skip this menu item unless all default program parameters are to be restored. When default settings are restored, all default program parameters must again be setup (refer to the unit History Card for previous settings). Restoring default parameters does not affect the password settings.

When the SSCC IIIA is set to default program values, program parameters are set as follows:

Parameter	Default Value/Option
Program Flash Rate:	50 flashes per minute
Program Gate Delay 1 Timer:	4 seconds
Program Gate Delay 2 Timer:	4 seconds
Program Gate Rising Bell:	On
Program Min Activate Timer:	0 seconds
Program Enabled Inputs:	1 through 7
Program Enabled Outputs:	A and B (40-amp unit only – this parameter does not apply for the 20-amp unit, which only has output A)
Program Time:	(not changed when set to default)
Program Date:	(not changed when set to default)
Program Daylight Saving:	Disabled
Program Password:	(n/a - see note below)

NOTE

NOTE

Restoring default parameters does not affect the current password or the time and date settings. Password Enabled/Disabled and the 4-digit password remain as set up previously.

4.2.1.12 Exit Program Mode

The “EXIT PROGRAM” menu selection allows the user to exit the Program option and return to the main menu.

EXIT
PROGRAM

NOTE

NOTE

Pressing the <EXIT> button at any time also exits the selected option and returns to the next higher level in the menu system.

4.2.2 CONFIGURE Menu

The Configure menu (see figure 4-3) is used for establishing certain system configuration parameters such as timers, I/O options, thresholds, etc.

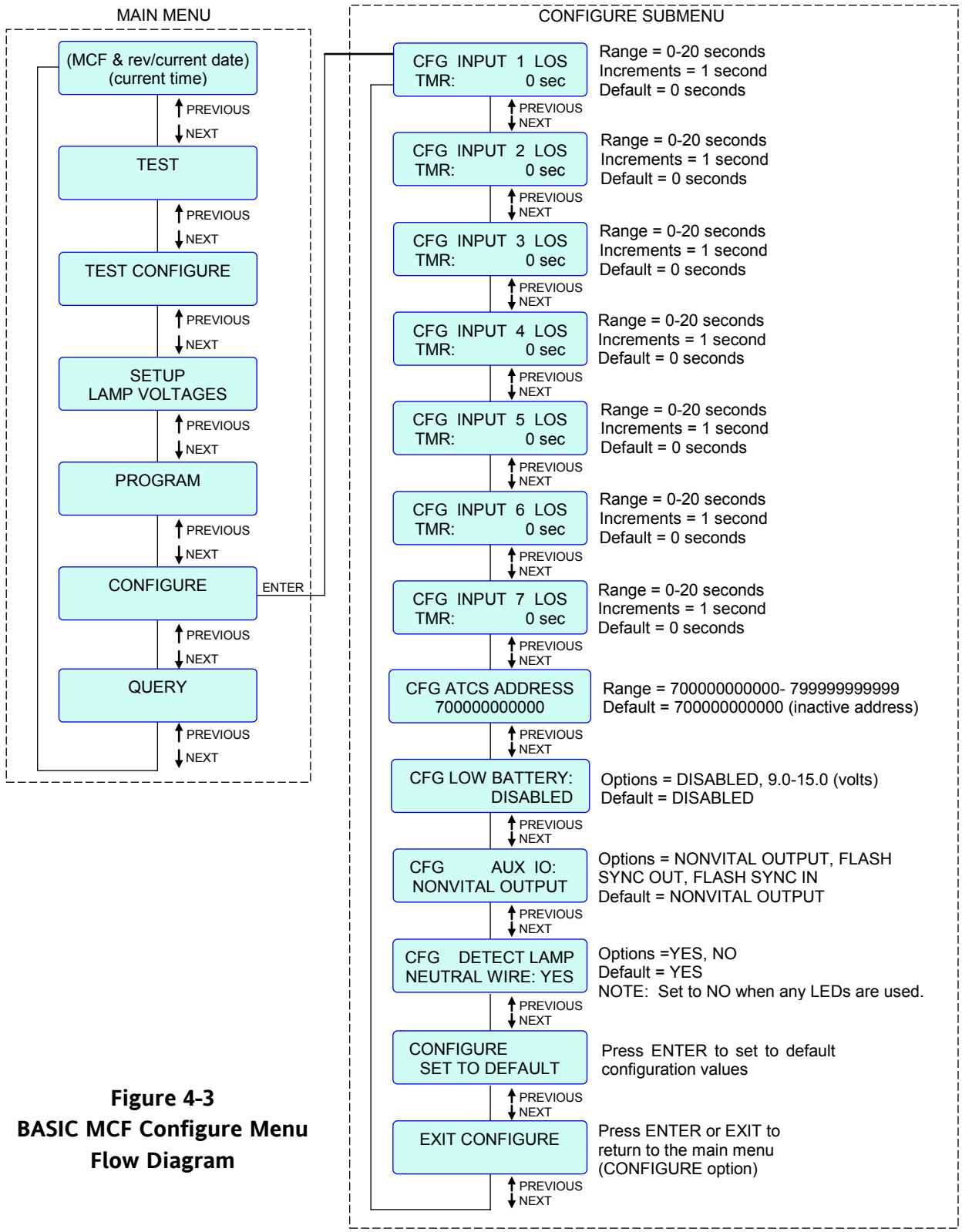


Figure 4-3
BASIC MCF Configure Menu Flow Diagram

NOTE

NOTE

Whenever the password function is enabled and a valid password has not been recently entered, the user will be prompted to enter the correct password before configuration parameters can be changed.

When any changes are made (in Configure edit mode), changes are saved when the user presses <Enter>, and a “saving changes” message is displayed.

```
SAVING
CHANGES…
```

4.2.2.1 Configure Loss-Of-Shunt Timers For Each Input

In special applications, the crossing activation inputs to the SSCC IIIA can be programmed for Loss-Of-Shunt (LOS) pickup delay.

```
CFG  INPUT  1  LOS
TMR:           2 sec
```

For example, LOS pickup delay might be useful to add some additional pickup delay time for island circuit pickup or when track circuits are used as inputs to the SSCC IIIA. The LOS time is the delay from the time the input energizes to when the logic considers the input valid.

A separate time delay can be provided for each crossing control activation input (#1 through #7) that has been enabled in Program menu. The range is 0 to 20 seconds, and the default setting for Loss-Of-Shunt is 0 (no timeout value).

NOTE

NOTE

Only crossing control activation inputs #1 through #7 can be configured for a Loss-Of-Shunt timer. Crossing control input #8 (GP) can never be configured for a Loss-Of-Shunt timer.

4.2.2.2 Configure ATCS Address

An ATCS address (site identification number) can be programmed into the system to allow for a non-vital communication link when external communication is required (refer to Section 8).

```
CFG  ATCS ADDRESS
700000000000
```

The range is 700000000000 through 799999999999, and the default ATCS address is 700000000000 (inactive address).

NOTE

NOTE

The default address is intentionally an inactive ATCS address. The ATCS address must be set to 700000000003, or greater, to communicate inside the signal house.

There is a railroad industry standard that establishes the proper method for determining the address if the communications is being transmitted outside the signal house.

The ATCS address is formatted as follows: **7.RRR.LLL.GGG.SS**

Where:
7 is the designation for ATCS wayside type addressing,
RRR is the Railroad number,
LLL is the Line number,
GGG is the Group number,
SS is the Subnode number.

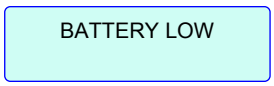
NOTE

NOTE

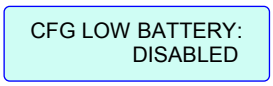
To establish LAN communications, the Subnode number must be 03 or greater.

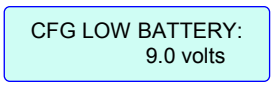
4.2.2.3 Configure Low Battery

The SSCC IIIA unit monitors the system battery voltage, and can be programmed to signal when battery voltage has dropped below a set value (flashes a message on the SSCC IIIA unit display and deactivates the MAINT CALL output). This can indicate when a battery or a battery charger has failed, or if there has been a prolonged power failure.



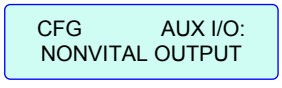
The low battery voltage adjustment varies from 9.0 to 15.0 volts in 0.1 volt steps, or can be disabled.





4.2.2.4 Configure Aux. I/O

Interface connector J2, pin 7 may have one of three functions which can be selected by using the Program menu option CFG AUX I/O.



The default option is **NONVITAL OUTPUT** which functions as a non-vital output as established in the system MCF (see NOTE). This I/O can also be programmed as a **FLASH SYNC OUT** which provides a master sync output to synchronize the flashing of one or more slave crossing controllers, or as a **FLASH SYNC IN** to synchronize the unit's lamp flashing of a slave unit to a master crossing controller. Refer to figure 4-4 for a typical Master/Slave application.

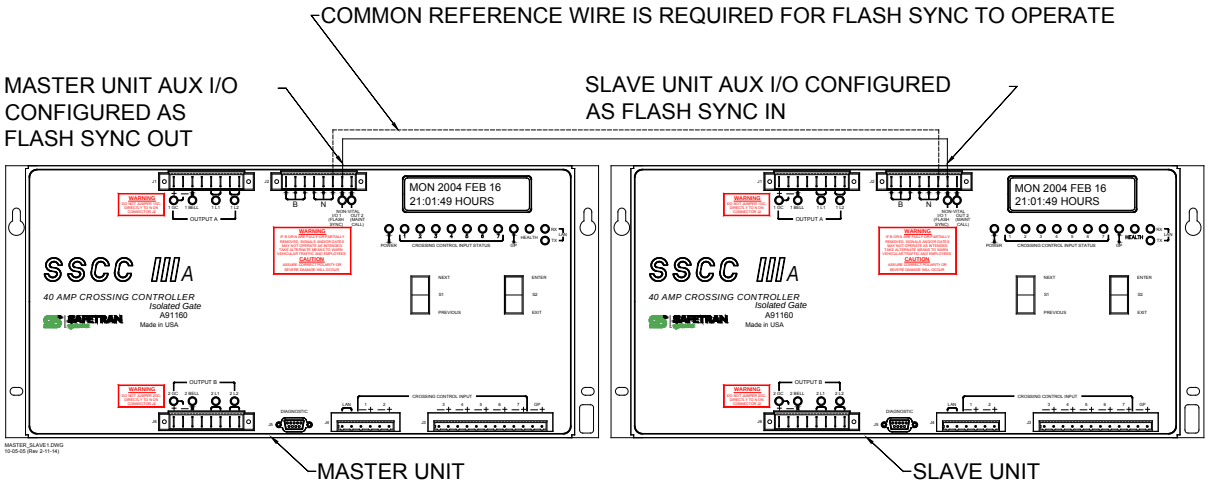


Figure 4-4. Typical Master/Slave Application

In figure 4-4, the common reference wire is required only if the crossing controllers are powered by separate batteries that are isolated from each other. If the battery isolation must be maintained, a fast acting non-vital relay controlled by the master flash sync may be used to key B of the slave unit into the slave flash sync input.

4.2.2.5 Configure Detect Lamp Neutral Wire

When this function is enabled, the SSCC IIIA will detect when there is an open in the lamp neutral wire.

NOTE

NOTE

The power supplies in many LED signals adversely affect the Open Lamp Neutral circuitry. Disable (set to NO) DETECT LAMP NEUTRAL WIRE when LEDs are used on any lamp output.

CFG DETECT LAMP
NEUTRAL WIRE: YES

To enable detection of an open lamp neutral wire, select YES. To disable the function select NO. The default = YES.

4.2.2.6 Configure Set To Default

The software establishes default settings for all configure options. All configure values and options can be simultaneously returned to their defaults in one simple operation.

CONFIGURE
SET TO DEFAULT

NOTE

NOTE

Skip this menu item unless all default configure parameters are to be restored. When default settings are restored, some configuration parameters may need to be setup again (refer to the unit History Card for previous settings).

When the SSCC IIIA is set to default configuration values, the configuration parameters are set as follows:

Parameter	Default Value/Option
Configure INPUT x LOS	0
Configure ATCS Address	700000000000 (inactive address)
Configure Low Battery	DISABLED
Configure Aux. I/O	NONVITAL OUTPUT
Configure Detect Lamp Neutral Wire	YES

4.2.2.7 Exit Configure Mode

The “EXIT CONFIGURE” menu selection allows the user to exit the Configure option and return to the main menu by pressing <ENTER> or <EXIT> when “EXIT CONFIGURE” is displayed.

EXIT CONFIGURE

NOTE

NOTE

Pressing the <EXIT> button at any time also exits the selected option and returns to the next higher level in the menu system.

4.2.3 SETUP LAMP VOLTAGES Menu

The Setup Lamp Voltages menu (figure 4-5) is used for setting the flashing lamps for the proper illumination at the crossing, taking into consideration factors such as voltages drops in cables due to different lengths of cable.

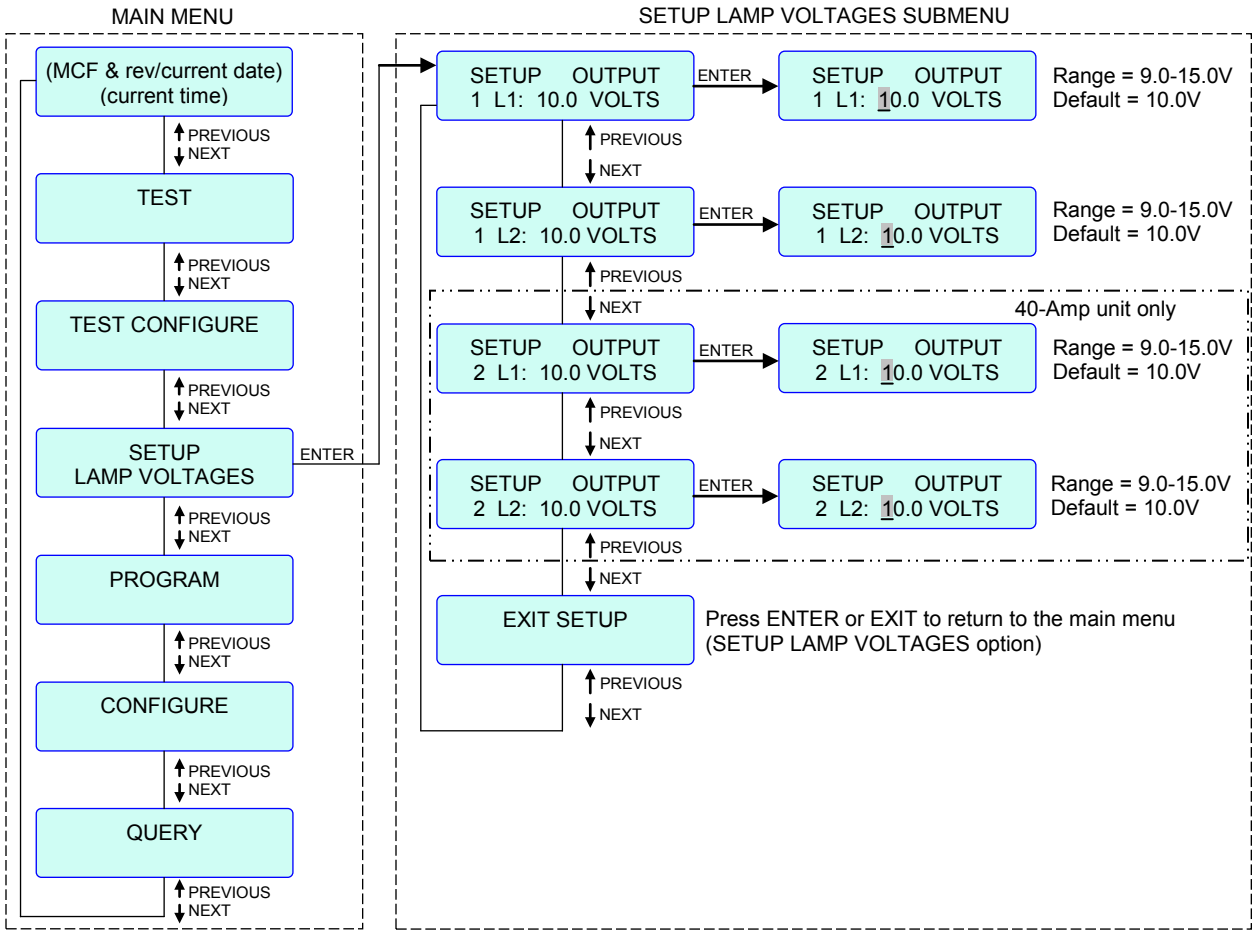


Figure 4-5. Typical Setup Lamp Voltages Menu Flow Diagram

When any changes are made (in Setup Lamp Voltages edit mode), changes are saved when the user presses <Enter>, and a “saving changes” message is displayed as follows:

SAVING
CHANGES…

The factory default setting for SSCC IIIA lamp voltage outputs is 10.0 volts (at the SSCC IIIA output terminals). This voltage can be adjusted in the field within the range of 9.0 to 15.0 volts, however the true rms AC + DC voltage will always be no more than 1.5 volts under the supplied battery voltage.

The SSCC IIIA provides a user-programmable, highly efficient regulated lamp voltage to minimize the chances of the lamp voltage dropping below acceptable limits when the AC power is off or when the battery charger has failed. This feature also eliminates seasonal adjustment of lamp voltages when using temperature compensated battery chargers. The regulated lamp drive is a pulse-width modulated voltage with an AC component and a DC component. A “TRUE RMS AC+DC” meter is required to accurately read the pulse-modulated lamp voltage (such as a Fluke 187 or 189 digital multimeter).

NOTE

NOTE

If attempting to set the L1 or L2 output voltage higher than battery voltage minus 1.5 volts, a message will continuously flash on the display as follows:

LAMP VOLTS LIMI-
TED BY BATTERY.

NOTE

NOTE

Only the FAR gate (longest cable lengths) lamp voltages are set by using the Setup Output (1L1, 1L2, 2L1, 2L2) menu options. The NEAR gate (shortest cable lengths) lamp voltages are set by adjusting slide resistors on the Lighting Surge Panels.

4.2.3.1 Selecting the Proper Voltmeter for Setting Lamp Voltage

To accurately read the crossing lamp voltages, a “true rms AC + DC” multimeter (e.g., Fluke 187 or 189 digital multimeter) must be used. Conventional multimeters may be used, however, the voltage read on the meter will vary from “true rms AC + DC”. The variance is not a set percentage and is dependent on battery voltage. A conversion table cross-referencing several conventional meters is provided in Section 6 and in the SSCC Generic History Card at the bottom of Side 2 of 2.

4.2.3.2 Setup Output 1 L1 (Output A)

This step lights steady one of the flasher pairs of lamps and permits the SSCC IIIA output voltage to be adjusted until the far gate lamp voltage is correct. The factory default setting for SSCC IIIA lamp voltage outputs is 10.0 volts, however this voltage can be adjusted in the field within the range of 9.0 to 15.0 volts. Since the crossing controller unit drops 1.5 volts internally, the lamp voltage setting must be at least 1.5 volts less than the supplied battery voltage.

NOTE

NOTE

Both 20-Amp and 40-Amp SSCC IIIA units have Output A.

4.2.3.3 Setup Output 1 L2 (Output A)

This step lights steady the other flasher pair of lamps and permits the SSCC IIIA output voltage to be adjusted until the other far gate lamp voltage is correct. The factory default setting for SSCC IIIA lamp voltage outputs is 10.0 volts, however, this voltage can be adjusted in the field within the range of 9.0 to 15.0 volts. Since the crossing controller unit drops 1.5 volts internally, the lamp voltage setting must be at least 1.5 volts less than the supplied battery voltage.

4.2.3.4 Setup Output 2 L1 (Output B, 40-Amp Units Only)

This step lights steady one of the flasher pairs of lamps and permits the SSCC IIIA output voltage to be adjusted until the far gate lamp voltage is correct. The factory default setting for SSCC IIIA lamp voltage outputs is 10.0 volts, however this voltage can be adjusted in the field within the range of 9.0 to 15.0 volts. Since the crossing controller unit drops 1.5 volts internally, the lamp voltage setting must be at least 1.5 volts less than the supplied battery voltage.

4.2.3.5 Setup Output 2 L2 (Output B, 40-Amp Units Only)

This step lights steady the other flasher pair of lamps and permits the SSCC IIIA output voltage to be adjusted until the far gate lamp voltage is correct. The factory default setting for SSCC IIIA lamp voltage outputs is 10.0 volts, however this voltage can be adjusted in the field within the range of 9.0 to 15.0 volts. Since the crossing controller unit drops 1.5 volts internally, the lamp voltage setting must be at least 1.5 volts less than the supplied battery voltage.

4.2.3.6 Exit Setup Mode

This menu selection allows the user to exit the Setup Lamp Voltages option and return to the main menu by pressing <ENTER> or <EXIT> when “EXIT SETUP” is displayed.

4.2.4 TEST CONFIGURE Menu

The Test Configure menu (figure 4-6) allows the user to set up (configure) timers used in the TEST menu.

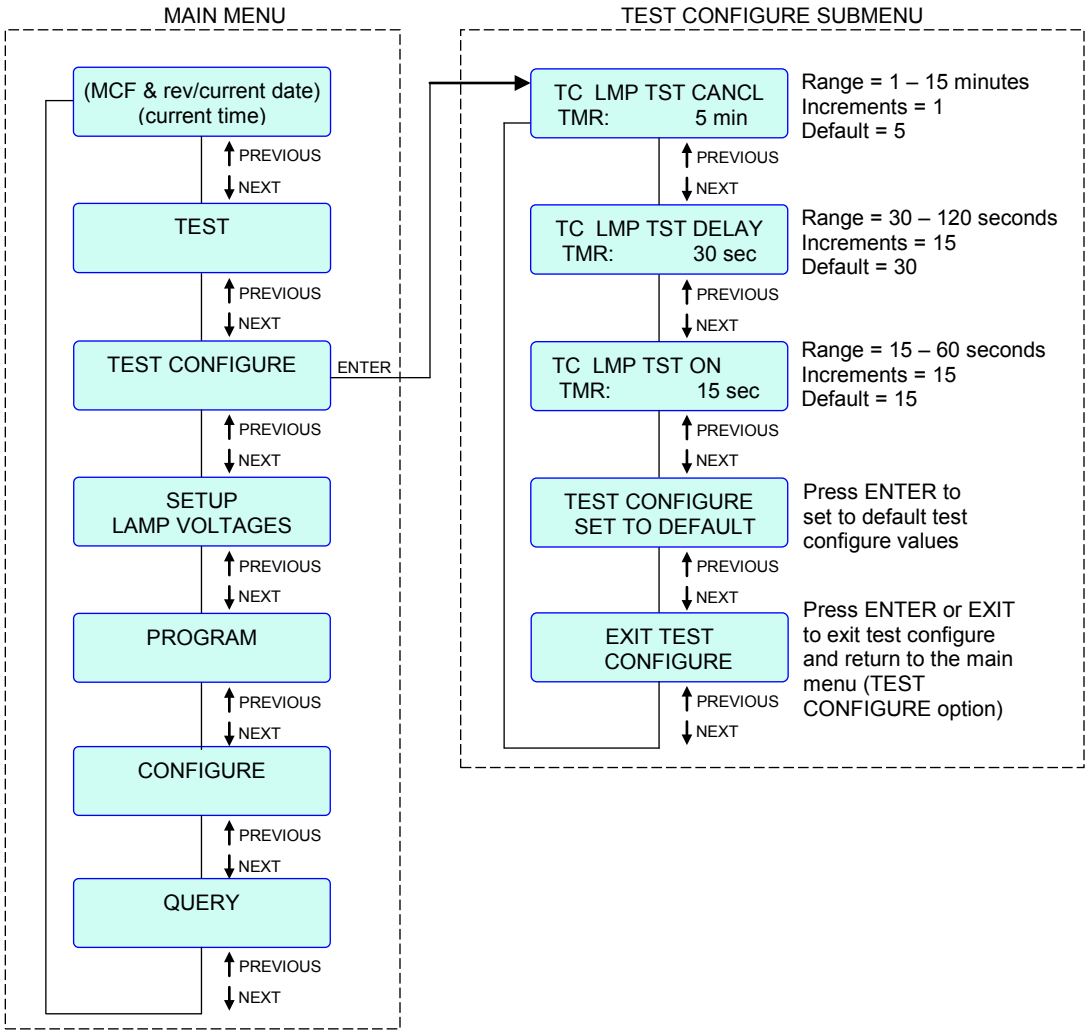
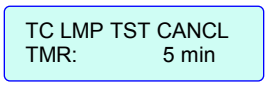


Figure 4-6. Typical Test Configure Menu Flow Diagram

4.2.4.1 Test Configure Lamp Test Cancel Timer

The lamp test cancel timer is used to automatically cancel the “test lamps steady” and “test flash lamps” tests in the TEST menu, in the event the test runs too long. Normally these tests are manually terminated.



NOTE

NOTE

The “test timed lamps” and the “test timed lamps repeat” in the TEST menu do not use the lamp test cancel timer.

This timer (default = 5 minutes) is adjustable from 1 minute through 15 minutes to set the maximum test period for flashing lamps. If any of the above mentioned tests are not manually terminated within the set time frame, the system automatically terminates the test and returns to normal operation.

4.2.4.2 Test Configure Lamp Test Delay Timer

The **TEST TIMED LAMPS** function provides time for the Maintainer to leave the bungalow and walk to the far gate mechanism before the lights begin flashing (Lamp Test Delay time). The lights remain flashing for a programmable period of time (Lamp Test On time).

The **TEST TIMED LAMPS REPEAT** test not only gives time to arrive at the far gate to check the flashers, but provides additional time (twice the Lamp Test Delay time) to leave that location and arrive at the near gate (or an additional far gate) to check the flashers there. Both flash periods are equal to the Lamp Test On timer period.

The “lamp test delay” timer is used in conjunction with the “lamp test on” timer to provide an automatic test cycle for the **TEST TIMED LAMPS** and **TEST TIMED LAMPS REPEAT** tests in the TEST menu (refer to figure 4-7).

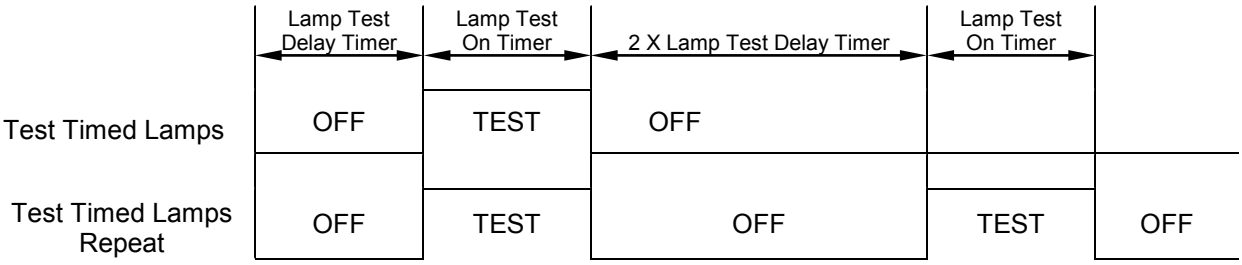


Figure 4-7. Timed and Repeat Lamp Test Cycles

Once set up, these two timers allow a Maintainer to initiate a **TEST TIMED LAMPS** or a **TEST TIMED LAMPS REPEAT** lamp test for verifying that all lamps are operational.

The Lamp Test Delay timer determines how long a delay time will occur before the lamps are turned on once the **TEST TIMED LAMPS** or the **TEST TIMED LAMPS REPEAT** tests are initiated.

TC LMP TST DELAY
TMR: 30 sec

The lamp test delay timer (default = 30 seconds) is adjustable from 30 seconds through 120 seconds (in 15 second increments) to set the delay period for timed or repeat testing of the lamps.

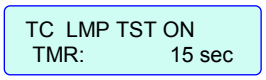
NOTE

NOTE

TEST LAMPS STEADY and **TEST FLASH LAMPS** do not use the lamp test delay timer.

4.2.4.3 Test Configure Lamp Test On Timer

The “Lamp Test On” timer is used in conjunction with the “Lamp Test Delay” timer (refer back to figure 4-7) to provide automatic test cycles for the **TEST TIMED LAMPS** and **TEST TIMED LAMPS REPEAT** test options in the TEST menu.



TEST LAMPS STEADY and **TEST FLASH LAMPS** do not use the lamp test on timer.

The “Lamp Test On” timer sets how long the lights will remain on once the “Lamp Test Delay” timer has timed out and started the “Lamp Test On” timer.

NOTE

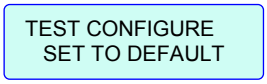
NOTE

TEST LAMPS STEADY and **TEST FLASH LAMPS** do not use the lamp test on timer.

The lamp test on timer (default = 15 seconds) is adjustable from 15 seconds through 60 seconds (in 15 second increments) to set the “on” period for test flashing lamps.

4.2.4.4 Test Configure Set To Default

The software establishes default settings for all test configure options. All test configure values and options can be simultaneously returned to their defaults in one simple operation.



NOTE

NOTE

Skip this menu item unless all default test configure parameters are to be restored. When default settings are restored, all default test configure parameters may need to be set up again (refer to the unit History Card for previous settings).

When the SSCC IIIA is set to default test configure values, the test configuration parameters are set as follows:

Parameter	Default Values
Lamp Test Cancel Timer	5 minutes
Lamp Test Delay Timer	30 seconds
Lamp Test On Timer	15 seconds

4.2.4.5 Exit Test Configure Mode

This menu selection allows the user to exit the Test Configure option and return to the main menu.

EXIT TEST
CONFIGURE

4.2.5 TEST Menu

NOTE

NOTE

While in Test Mode, if a train approaches (XR input logic deenergizes), the test is cancelled and the crossing activates normally. When the train departs, the system remains in normal operation.

NOTE

NOTE

When in test mode, after 90 seconds without activity of the front panel rocker switches, the display automatically reverts to the idle screen unless performing a test. In this case, the timeout period is determined by the Lamp Test Cancel Timer in the Test Configure option (for the Test Lamps Steady or Test Flash Lamps functions), or by the Lamp Test Delay Timer and the Lamp Test On Timer (for the Test Timed Lamps and Test Timed Lamps Repeat functions).

The Test menu (figure 4-8) provides a selection of tests for checking crossing operation.

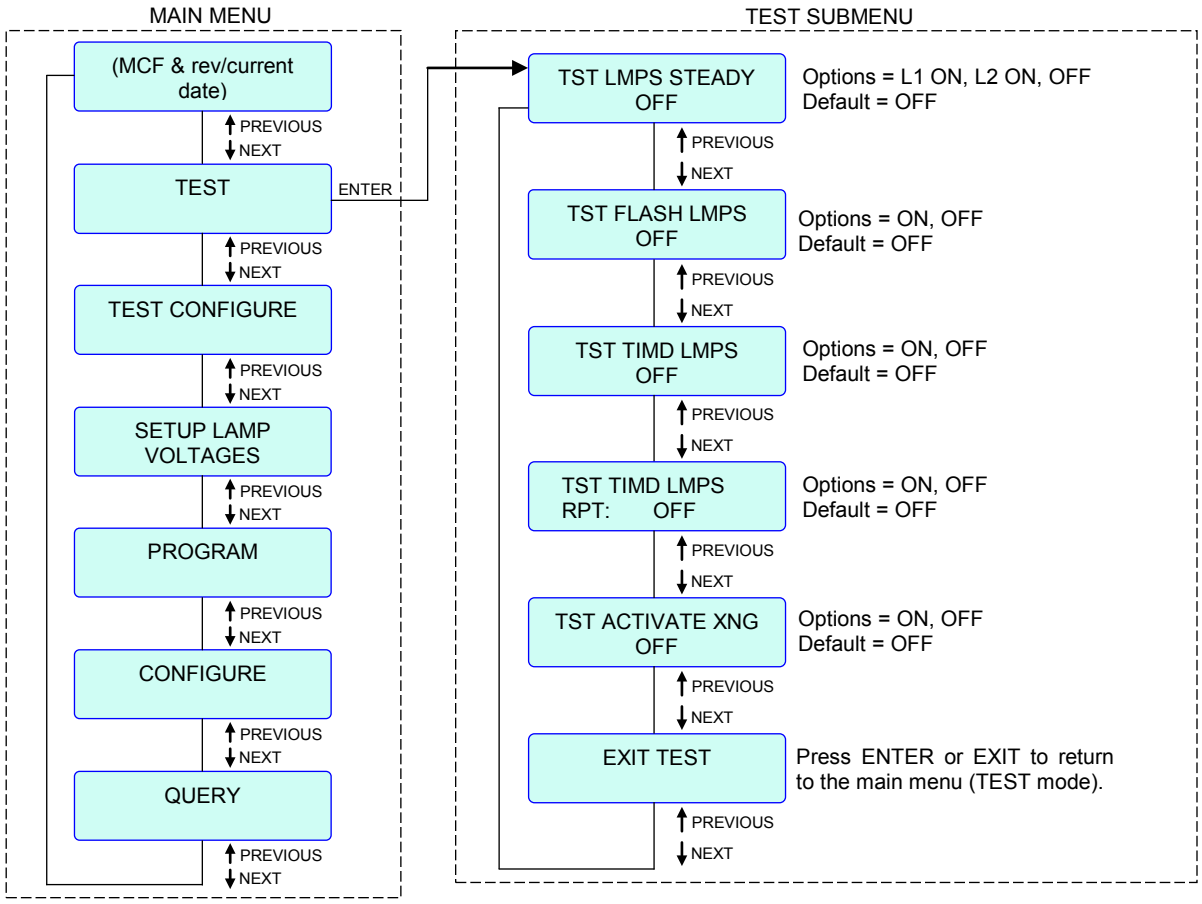


Figure 4-8. Typical Test Menu Flow Diagram

NOTE

NOTE

The default state for all test modes is **OFF**. Test modes not manually terminated are automatically terminated after a timeout period.

4.2.5.1 Test Lamps Steady

This is a manual test that turns on the lamp voltage to selected crossing lamps in a steady fashion for testing/adjusting lamps or setting lamp voltages. The options are OFF, L1 ON, or L2 ON; the default is OFF.

4.2.5.2 Test Flash Lamps

This is a manual test that turns on the lamp voltage to all crossing lamps (L1/L2) in the flashing mode for inspection or testing lamps (gates remain up). The options are OFF or ON; the default is OFF.

4.2.5.3 Test Timed Lamps

The Test Timed Lamps test mode is an automatic lamp flashing test. It is provided with configurable delays to make it easier for one person to perform testing and verification of the FAR lamps.

The **TEST TIMED LAMPS** function provides time for the Maintainer to leave the bungalow and walk to the far gate mechanism before the lights begin flashing (Lamp Test Delay time). The lights remain flashing for a programmable period of time (Lamp Test On time).

TC LMP TST ON TMR, range = 15-60 seconds, in 15 second increments. Default = 15 seconds,

The **TST TIMD LMPS** option can be toggled between ON or OFF, the default is OFF.

4.2.5.4 Test Timed Lamps Repeat

The **TEST TIMED LAMPS REPEAT** test mode is an automatic lamp flashing test. It is provided with configurable delays to make it easier for one person to perform testing and verification of two sets of FAR lamps.

TST TIMD LMPS RPT: ON means the above test (paragraph 4.2.5.3) is performed, then repeated with the second test period delayed double what is set in the Test Timed Lamps test. For example, if delay for the first test is set at 30 seconds, the second test is performed after 60 seconds.

The **TEST TIMED LAMPS REPEAT** test not only gives time to arrive at the far gate to check the flashers, but provides additional time (twice the Lamp Test Delay time) to leave that location and arrive at the near gate (or an additional far gate) to check the flashers there. Both flash periods are equal to the Lamp Test On timer period.

The **TST TIMD LMPS RPT** option can be toggled between ON or OFF, the default is OFF.

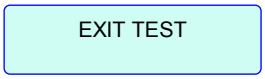
4.2.5.5 Test Activate Crossing

This is a manual test that activates the crossing by simulating a crossing control input activation. This test is useful for checking complete operation of the system including gates, lamps, bells, and timers.

The options for Test Activate Crossing are ON or OFF; default is OFF.

4.2.5.6 Exit Test Mode

This menu selection allows the user to exit the Test option and return to the main menu.



4.2.6 QUERY Menu

The Query menu provides version information for master and slave executable software, master and slave boot files, and configuration versions.

4.2.6.1 Query Software Versions

Refer to figure 4-9 for the Query Software Versions menu. The following software version information is available:

MEF: Master executable file

MBT: Master boot file

SEF1 – SEF4: Slave executable file

SBT1 – SBT4: Slave boot file

NOTE

NOTE

SEF3, SEF4, SBT3, and SBT4 are displayed only for the 40-Amp unit (they do not exist for the 20-amp unit).

NOTE

NOTE

A password is not required to view software versions.

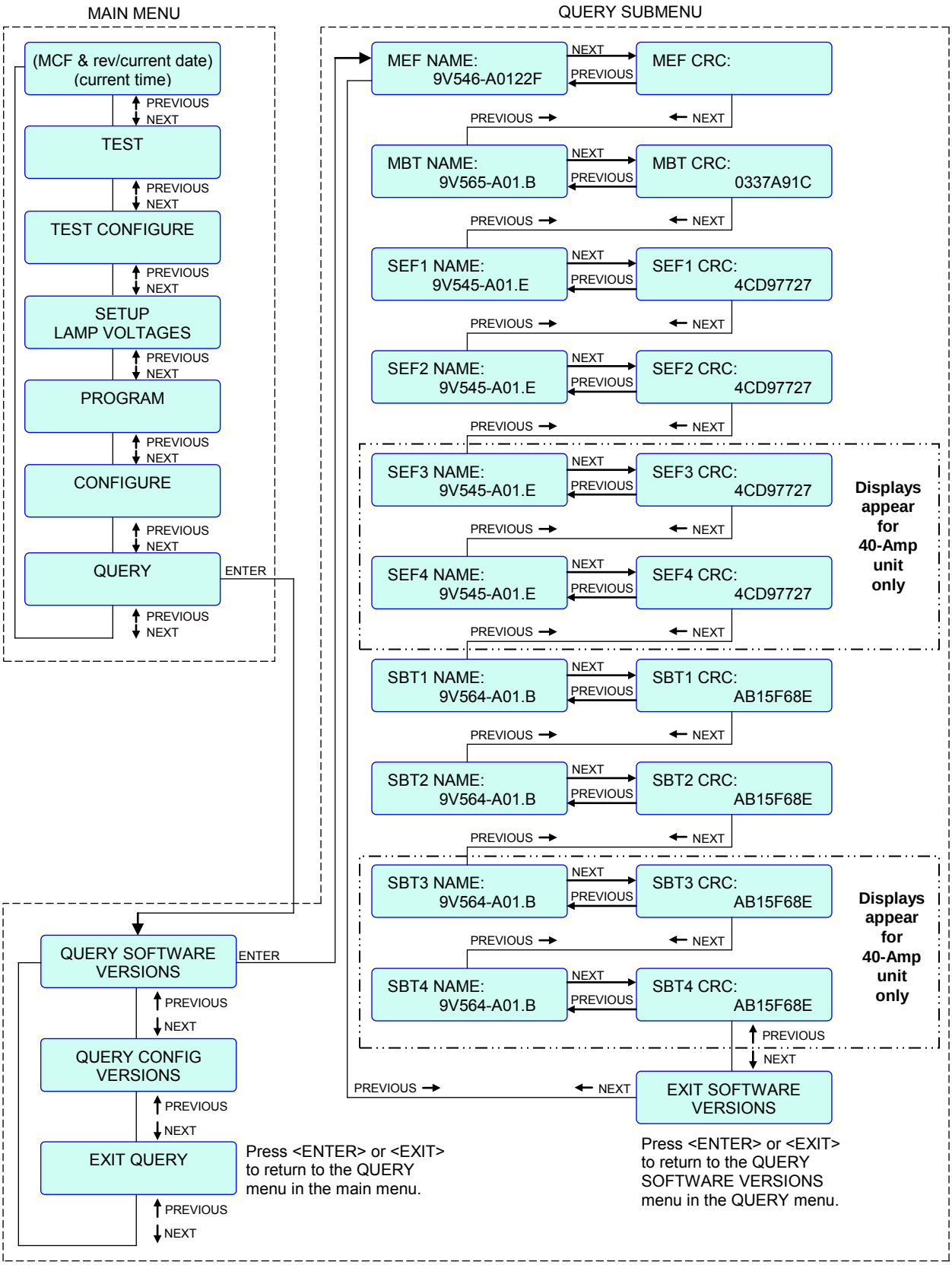


Figure 4-9. Typical Query Software Versions Menu Flow Diagram

4.2.6.2 Query Configuration Versions

Refer to figure 4-10 for the Query Configuration Versions menu. The following configuration version information is currently available:

MCF NAME: Assigned MCF filename (.mcf.version extension)

MCF CRC: 8-digit hexadecimal number calculated from the MCF

CAPABILITY NAME: Factory-assigned number

NOTE

NOTE

A password is not required to view configuration versions.

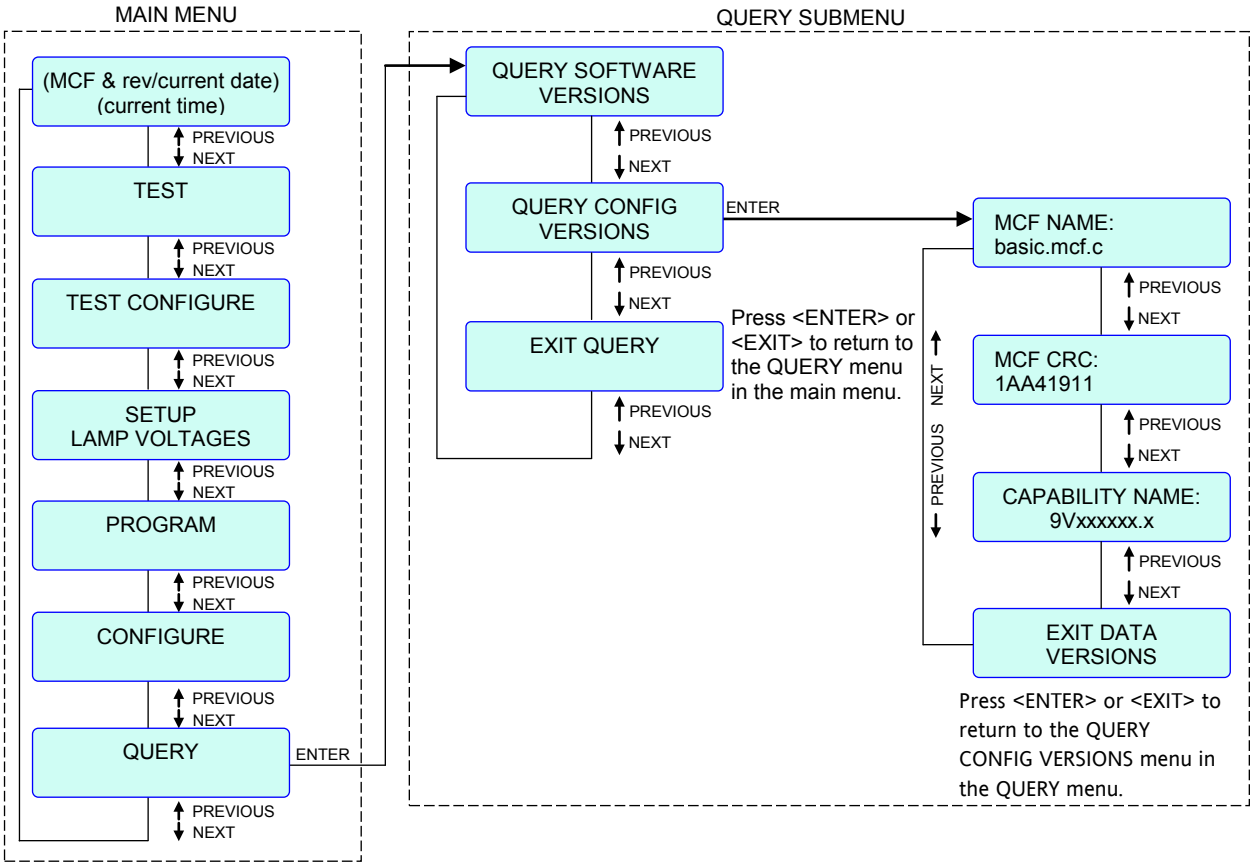


Figure 4-10. Typical Query Configuration Versions Menu Flow Diagram

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SECTION 5
APPLICATION PROGRAMMING

5.1 GENERAL

Following installation and prior to placing it in operation, the SSCC IIIA unit must be properly programmed for the specific site. This section provides step by step application programming instructions. When power is applied to the SSCC IIIA and bootup has completed, the display comes up in the Main Menu (refer to figure 5-1). Each submenu has an EXIT function to return to the main menu, or after 90 seconds of inactivity the display automatically returns to the idle screen in the main menu.

⚠ WARNING

WARNING

FOLLOWING INSTALLATION / MAINTENANCE, THE SYSTEM VERIFICATION TESTS IN SECTION 6 MUST BE PERFORMED.

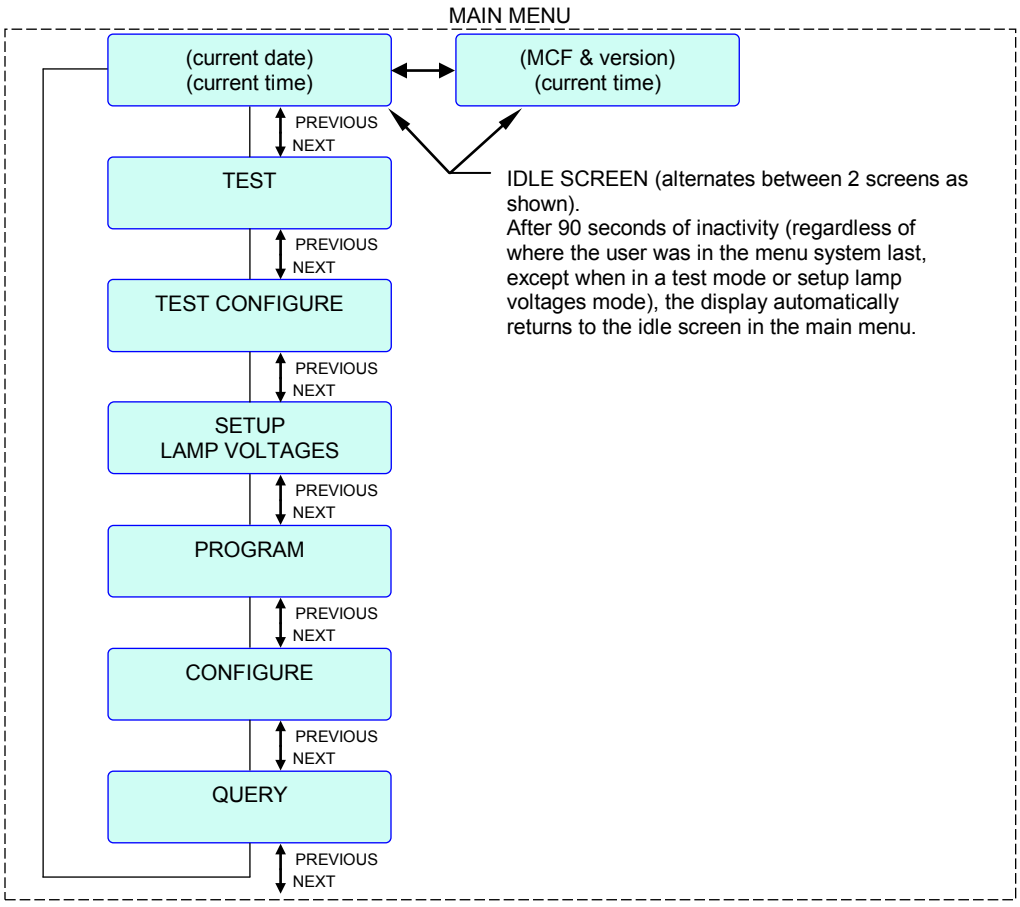


Figure 5-1. SSCC IIIA Main Menu

5.2 PROGRAMMING THE SSCC IIIA

Default settings can be changed in the field by following the built-in menu system (refer to Section 4 for general information on the menu system). All programming entries should be recorded on the History Card supplied with the unit (a master copy is located at the end of this manual).

⚠ WARNING

WARNING

ALL PROGRAM AND CONFIGURE PARAMETERS MUST BE SET TO APPROVED RAILROAD DESIGN AND APPLICABLE GOVERNMENT REGULATIONS.

NOTE

NOTE

At initial cut-over, the crossing will generally be constantly activated until the SSCC IIIA is programmed and the required inputs are present.

SSCC IIIA programming is accomplished by using the two front panel rocker switches (S1 and S2) and the liquid crystal display. The NEXT / PREVIOUS switch (S1) is used to scroll through menus and change values for selected menu items.

The ENTER function of the ENTER / EXIT switch (S2) is used to select menus and displayed menu items, to enter the editing mode for application values and save the new application values. The EXIT function of S2 is used to abandon an edit function for a selected menu item and to exit to the next higher level.

Several menu items provide two possible settings (e.g., ENABLED or DISABLED). When the edit mode is selected for one of these “toggle” items by pressing <ENTER>, the setting can be toggled to the opposite setting by using either the NEXT or PREVIOUS function.

NOTE

NOTE

If the values in a menu item are not to be changed, press <NEXT> when the menu item is displayed to proceed to the next menu item.

5.2.1 Order of Steps to Program the SSCC IIIA

All initial SSCC IIIA application programming should be performed in the following order:

1. Using the PROGRAM menu (paragraph 5.2.1.1), program all necessary menu steps per railroad design.
2. Using the CONFIGURE menu (paragraph 5.2.1.2), program all necessary menu steps per railroad design.
3. Using the TEST CONFIGURE menu (paragraph 5.2.1.3), program all desired menu steps.

NOTE

NOTE

When completed, the system will be ready for lamp voltage calibration and verification of crossing operation.

5.2.1.1 Using the PROGRAM Menu

1. Scroll through the main menu until **PROGRAM** is displayed, then press <ENTER>. A message is displayed similar to the following:

```
PRG          FLASH
RATE:  50 PER MIN
```

NOTE

NOTE

Edit mode (where the system allows changes to be made) is indicated by a flashing cursor. If a parameter is not to be changed, press <NEXT> to advance to the next parameter.

2. Press <ENTER> to edit (change flash rate), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

3. Press <NEXT>. For 20-Amp units, or 40-Amp units with Output A enabled, a message is displayed similar to the following:

```
PRG  1GC  DELAY
TMR:          4 sec
```

⚠ WARNING

WARNING

GATE DELAY TIMERS MUST BE CONFIGURED TO THE CORRECT VALUES.

4. Press <ENTER> to edit (change 1GC delay time), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

5. Press <NEXT>. For 40-Amp units only with Output B enabled, a message is displayed similar to the following:

```
PRG  2GC  DELAY
TMR:          4 sec
```

6. If the above screen is displayed, press <ENTER> to edit (change 2GC delay time), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

7. Press <NEXT>. A message is displayed similar to the following:

```
PRG GATE RISING
BEL:        ON
```

8. Press <ENTER> to edit (select gate rising bell on/off), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

9. Press <NEXT>. A message is displayed similar to the following:

```
PRG MIN ACTIVATE
TMR:          0 sec
```

10. Press <ENTER> to edit (change minimum activate timer), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

11. Press <NEXT>. A message is displayed similar to the following:

```
PRG ENBLD INPUTS
   1 THRU 7
```

⚠ WARNING

WARNING

AN INPUT CANNOT BE USED TO ACTIVATE A CROSSING IF IT IS NOT ENABLED.

12. Press <ENTER> to edit (change enabled inputs), until the desired value is displayed, then press <ENTER> again to save the new selection.

13. Press <NEXT>. For 40-Amp units only, a message is displayed similar to the following:

```
PRG          ENABLED
OUTPUTS:   A AND B
```

WARNING

WHEN AN OUTPUT (A OR B) IS NOT ENABLED, IT CANNOT BE USED TO CONTROL THE CROSSING LAMPS, GATES OR BELLS.

14. If the above screen is displayed, press <ENTER> to edit (change enabled outputs), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

15. Press <NEXT>. A message is displayed similar to the following:

```
PRG          TIME:
08:42:58  HOURS
```

16. Press <ENTER> to edit (change time):

    a. Edit the hours field by scrolling until the desired hour is displayed, then press <ENTER> to move to the minutes field.

    b. Edit the minutes field by scrolling until the desired minute is displayed, then press <ENTER> to move to the seconds field.

    c. Edit the seconds field by scrolling until the desired seconds is displayed, then press <ENTER> to save and complete the time setup.

NOTE

While in edit time mode, pressing <EXIT> from any display discards changes and returns to the **PRG TIME** display.

17. Press <NEXT>. A message is displayed similar to the following:

```
PRG          DATE:
        2005  OCT  10
```

18. Press <ENTER> to edit (change date):

    a. Edit the year field by scrolling until the desired year is displayed, then press < ENTER > to move to the month field.

    b. Edit the month field by scrolling until the desired month is displayed, then press < ENTER > to move to the day field.

c. Edit the day field by scrolling until the desired day is displayed, then press < ENTER > to save and complete the date setup.

NOTE

NOTE

While in edit date mode, pressing <EXIT> from any display discards changes and returns to the **PRG DATE** display.

19. Press <NEXT>. A message is displayed similar to the following:

PRG	DAYLIGHT
SAVING:	DISABLED

20. Press <ENTER> to edit (enable/disable daylight saving), toggle until the desired setting is displayed, then press <ENTER> again to save the setting.

NOTE

NOTE

It is recommended that arming the password be postponed until all programming and configuration have been performed, and lamp voltages have been set up (refer to Section 6 for setting up lamp voltages).

21. Press <NEXT>. If the following message is displayed:

PRG	PASSWORD:
	DISABLED

then press <ENTER> until the following message is displayed (option toggles):

PRG	PASSWORD:
	ENABLED

22. Press <ENTER> to edit (password):

NOTE

NOTE

When in password edit mode and a previous password has been assigned and enabled, the current password is prompted for as shown below.

```
ENTER
PASSWORD:    0000
```

NOTE

NOTE

If a password has not been enabled (even if assigned), the display prompts to edit or assign a new password as follows:

```
PROGRAM      NEW
PASSWORD:    0000
```

a. Edit the first digit field by scrolling until the desired number is displayed, then press <Enter> to move to the second digit field.

b. Edit the second digit field by scrolling until the desired number is displayed, then press <Enter> to move to the third digit field.

c. Edit the third digit field by scrolling until the desired number is displayed, then press <Enter> to move to the fourth digit field.

d. Edit the fourth digit field by scrolling until the desired number is displayed, then press <Enter> to save (if a *new* password) and complete the password setup.

NOTE

NOTE

If a password has been entered and saved, but it is not desired to arm it, toggle the password status to display **DISABLED** and press <ENTER>. A "saving changes" message is temporarily displayed, followed by **PRG PASSWORD DISABLED**. The next time the password is set to ENABLED and <ENTER> is pressed, the current password appears to allow the user to change the password or to enable (arm) it.

23. Set the PRG PASSWORD ENABLED/DISABLED to the desired option and press <ENTER>.

24. Press <EXIT> to exit program mode and return to the main menu.

5.2.1.2 Using the CONFIGURE Menu

NOTE

NOTE

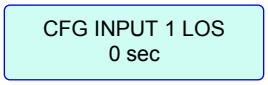
To exit the Configure menu at any time, press <EXIT> or scroll to the Configure option “Exit Configure” and press <ENTER>.

NOTE

NOTE

When the user is asked to “scroll” or “toggle” in the following procedures, the **NEXT** or **PREVIOUS** push buttons are to be pressed, as appropriate.

1. Scroll the main menu until **CONFIGURE** is displayed, then press <ENTER>. The first *configured* LOS is displayed (see example below).



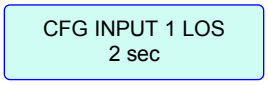
2. If the displayed LOS is not to be changed, scroll until the desired configured LOS is displayed.

NOTE

NOTE

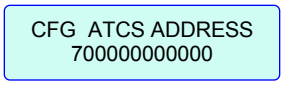
Edit mode (where the system allows changes to be made) is indicated by a flashing cursor. If a parameter is not to be changed, press <NEXT> to advance to the next parameter.

3. Press <ENTER> to edit (change LOS delay time), scroll until the desired value is displayed (see example below), then press <ENTER> to save the new selection.



4. Repeat steps 2 and 3 for all configured LOS delay times to be changed (for inputs 1 through 7).

5. Press <NEXT>. A message is displayed (may show the default ATCS address or a previous ATCS address selection) similar to the following:



6. Press <ENTER> to edit (change ATCS address), scroll each position until the desired value is displayed, then press <ENTER> to move to the next position.

The ATCS address is formatted as follows: **7.RRR.LLL.GGG.SS**

Where:

7 is the designation for ATCS wayside type addressing,
RRR is the Railroad number,
LLL is the Line number,
GGG is the Group number,
SS is the subnode number.

NOTE

NOTE

To establish LAN communications, the subnode number must be 03 or greater.

7. When all digits of the ATCS address are displayed correctly and the last digit is underscored and flashing, press <ENTER> again to save the new ATCS address.

8. Press <NEXT>. A message is displayed (may show DISABLED or a voltage) similar to the following:

```
CFG LOW BATTERY:
        DISABLED
```

9. Press <ENTER> to edit (select CFG LOW BATTERY option), scroll until the desired option is displayed, then press <ENTER> again to save the new selection.

10. Press <NEXT>. A message is displayed similar to the following:

```
CFG          AUX I/O:
NONVITAL OUTPUT
```

13. Press <ENTER> to edit (change the non-vital output selection), scroll until the desired option is displayed, then press <ENTER> again to save the new selection.

14. Press <NEXT>. A message is displayed similar to the following:

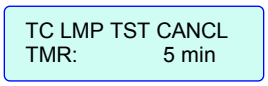
```
CFG   DETECT LAMP
NEUTRAL WIRE: YES
```

15. Press <ENTER> to edit (change CFG DETECT LAMP NEUTRAL WIRE option), scroll until the desired option is displayed, then press <ENTER> again to save the new selection.

16. Press <EXIT> to exit configure mode and return to the main menu.

5.2.1.3 Using the TEST CONFIGURE Menu

1. Scroll the main menu until **TEST CONFIGURE** is displayed, then press <ENTER>. A message is displayed similar to the following:



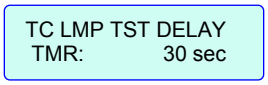
NOTE

NOTE

Edit mode (where the system allows changes to be made) is indicated by a flashing cursor. If a parameter is not to be changed, press <NEXT> to advance to the next parameter.

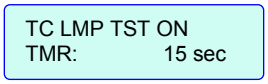
2. Press <ENTER> to edit (change lamp test cancel time), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

3. Press <NEXT>. A message is displayed similar to the following:



4. Press <ENTER> to edit (change lamp test delay time), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

5. Press <NEXT>. A message is displayed similar to the following:



6. Press <ENTER> to edit (change lamp test on time), scroll until the desired value is displayed, then press <ENTER> again to save the new selection.

7. Press <EXIT> to exit test configure mode and return to the main menu.

SECTION 6
LAMP VOLTAGE ADJUSTMENT & TESTING

6.1 GENERAL

The SSCC IIIA is shipped from the factory pre-programmed with a default setting (10.0 volts) for all lamp outputs. Field personnel can adjust these levels to match field conditions by using the front panel rocker switches and display, and following the built-in menu system (refer to Section IV for information on the menu system). This voltage can be adjusted in the field within the range of 9.0 to 15.0 volts, however the true rms "AC + DC" voltage will not be more than battery voltage minus 1.5 volts.

NOTE

NOTE

If attempting to set the L1 or L2 output voltage higher than battery voltage minus 1.5 volts, the following message will continuously flash on the display:

LAMP VOLTS LIMI-
TED BY BATTERY.

NOTE

NOTE

While in Lamp Voltage adjustment and testing mode, if a train approaches (XR input logic de-energizes), the test is cancelled and the crossing activates normally. When the train departs, the system remains in normal operation.

6.2 LAMP VOLTAGE DRIVE

The SSCC IIIA provides a highly efficient voltage-regulated lamp drive output. The lamp drive is a pulse-width modulated voltage with an AC component and a DC component. The benefits of this method of regulation are:

- Lamp voltage remains constant during AC power outages of short duration.
- Lamp voltage remains constant over wide temperature ranges when using temperature compensated battery chargers.
- The output is energy efficient and does not dissipate power as do adjustment resistors.

6.3 USE OF LED TYPE LAMPS

A number of different manufacturers currently make LED type lamps. These lamps may have different designs. For example, some LED lamps present a purely resistive load while others have a complete power supply within the lamp case to drive the LEDs. Safetran's FLX-4000 LED flashing light signals are designed to operate with the SSCC IIIA.

Other manufacturer's designs can distort the DC waveform generated by the SSCC IIIA, which drives the LED lamp. This distortion can result in a difference between what a meter reads at the LED lamp and the voltage shown on the SSCC IIIA display. When using LED lamps, use the "True RMS AC + DC" meter setting on voltmeters for the most accurate measurement of the LED lamp voltage.

This distorted DC waveform condition may trigger an "Open Lamp Neutral Wire" detection error when using LEDs; therefore, the OPEN LAMP NEUTRAL DETECT should be turned off (set to NO).

6.4 METER READING CONVERSION EXAMPLES

Following are two examples of how to measure the lamp voltages using a conventional meter. In both examples:

- Battery bank voltage is 14.7 volts
- Multimeters are set to read DC

Table 6-1:
Multimeter Reading Variance from Actual Lamp Voltages

Battery Voltage	Regulated Lamp Drive Voltage Range	Measurement Below Actual Drive Voltage	
		Using Digital Multimeter (Fluke 87 or Equivalent)	Using Analog Multimeter (TS111)
13.3	9.0 to 12.0	1.3 volts	0.6 volt
	>12.0	0.91 volt	0.42 volt
14.7	9.0 to 12.0	2.2 volts	1.1 volts
	>12.0	1.54 volts	0.77 volts
15.8	9.0 to 12.0	2.6 volts	2.0 volts
	>12.0	1.82 volts	1.4 volts

6.4.1 Lamp Voltage Measurement Example 1

When setting crossing lamp voltages to 9.5 volts, the conventional meter reading is determined by subtracting the meter variance given in Table 6-1 from the desired lamp voltage.

When using a **digital multimeter** (e.g. Fluke 87):

- Desired lamp voltage = 9.5
- Meter variance for 14.7 volt battery = -2.2
- Meter reading = **7.3**

When using an **analog multimeter** (e.g. TS111):

- Desired lamp voltage = 9.5
- Meter variance for 14.7 volt battery = -1.1
- Meter reading = **8.4**

6.4.2 Lamp Voltage Measurement Example 2

In this example, it is desired to check that lamp voltage is greater than 8.5 volts and the battery voltage is 13.3 volts.

When verifying that the lamp voltages are greater than 8.5 VDC, the conventional meter reading is determined by subtracting the meter variance given in Table 6-1 from the minimum lamp voltage threshold.

When using a **digital multimeter** (e.g. Fluke 87):

- Minimum lamp voltage threshold = 8.5
- Meter variance for 13.3 volt battery = -1.3
- Minimum meter reading = **7.2**

When using an **analog multimeter** (e.g. TS111):

- Minimum lamp voltage threshold = 8.5
- Meter variance for 13.3 volt battery = -0.6
- Minimum meter reading = **7.9**

6.5 LAMP VOLTAGE ADJUSTMENT PROCEDURE

WARNING

TO PREVENT AN OVERVOLTAGE CONDITION AT THE LAMPS, USE A VOLTMETER WITH A "TRUE RMS AC + DC" SCALE AND MAKE ALL MEASUREMENTS USING THAT SCALE.

To accurately read the crossing lamp voltages, a "true rms AC + DC" multimeter (e.g., Fluke 187 or 189 digital multimeter) must be used. Conventional multimeters may be used, however the voltage read on the meter will vary from "true rms AC + DC". The variance is not a set percentage and is dependent on battery voltage. A conversion table cross-referencing several conventional meters is provided in Appendix A.

The lamp voltage adjustment procedure can be divided into two parts for each SSCC IIIA output. The two parts actually adjust the lamp voltage by two different means or procedures.

The following is a brief explanation of the SSCC IIIA lamp adjustment procedure. Figure 6-1 shows the typical lamp wiring for one output (A or B).

Referring to figure 6-1, the first part of the procedure adjusts the far gate lamps first (because they have the longest cable length and greatest voltage drop). This is done by adjusting the SSCC IIIA L1 and then L2 output voltages in 0.1 volt steps until the two lamp voltages are set correctly at the lamps per railroad standards.

The second part of the procedure adjusts the near gate lamp voltages using slide resistors. This is accomplished by first turning on steady the L1 output and then adjusting the L1 slide resistor on the lighting surge panel until the lamp voltage is correct per railroad standards. Secondly, the L2 output is turned on steady and the L2 slide resistor on the lighting surge panel is adjusted until the lamp voltage is correct per railroad standards.

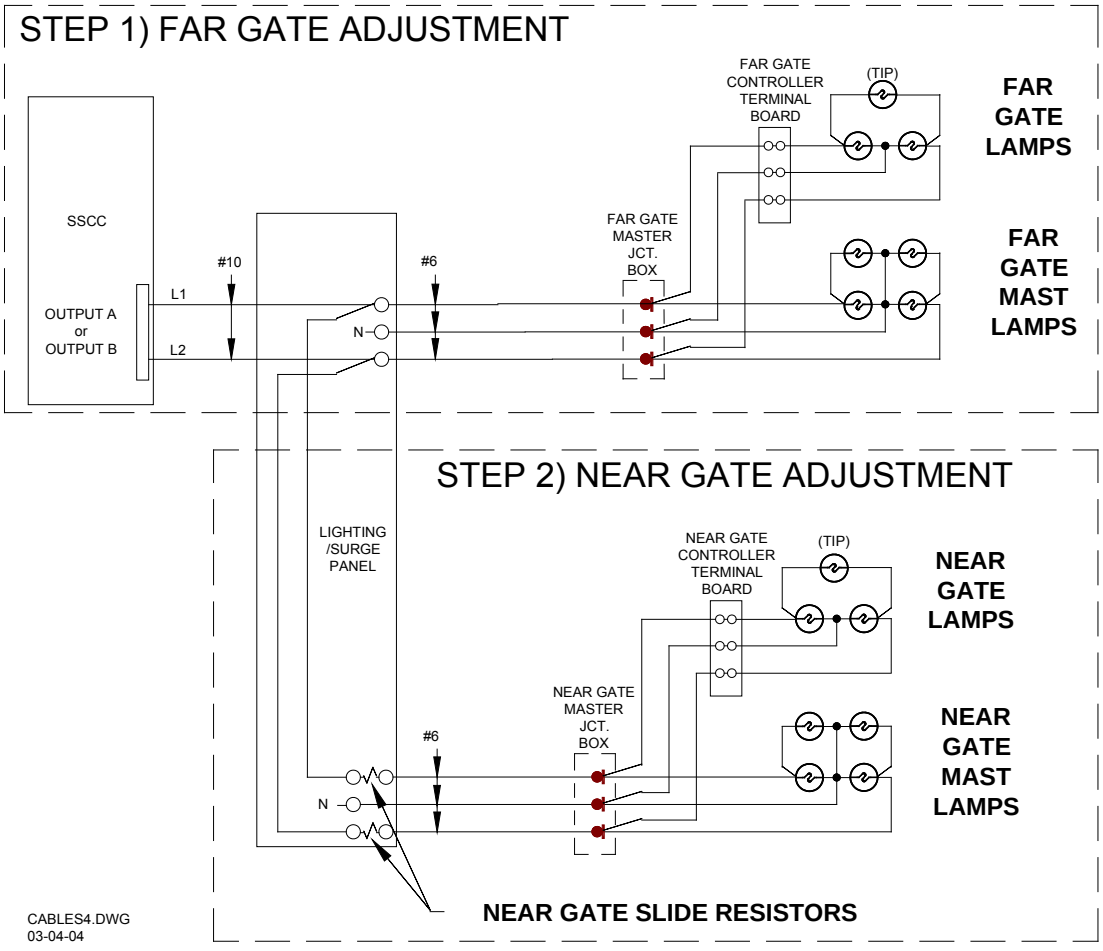


Figure 6-1. Typical Lamp Wiring

For a 20-Amp controller, only Output A is adjusted (1 L1 and 1 L2); for a 40-Amp controller, Output B (2 L1 and 2 L2) would be adjusted similarly to Output A.

The 40-Amp SSCC IIIA has two independent pairs of lamp outputs. When an output pair is connected to only one signal, the lamp output voltage can be adjusted via the SSCC IIIA front panel controls without using the slide resistors on the Lighting Surge Panels.

WARNING

FOLLOWING INSTALLATION, PROGRAMMING AND CONFIGURATION OF THE SSCC IIIA SYSTEM, AND PRIOR TO PLACING THE SYSTEM IN OPERATION, LAMP VOLTAGES MUST BE ADJUSTED AND SYSTEM OPERATION MUST BE VERIFIED.

6.5.1 Adjustment of FAR Gate Flasher Lamps (Output A)

NOTE

If a "true rms AC + DC" meter is not available, refer to Appendix A for setting lamp voltage.

NOTE

The following procedure adjusts the voltages supplied via the OUTPUT A connector (1 L1 and 1 L2) for the FAR gate (longest cable length). Both the 20-Amp and the 40-Amp units have Output A. If Output A has been disabled in the 40-Amp unit, skip to paragraph 6.4.2.

6.5.1.1 1L1 Adjustment (FAR Gate)

1. Scroll the main menu by pressing <NEXT> until **SETUP LAMP VOLTAGES** is displayed, then press <ENTER>. The following message is displayed:

   SETUP OUTPUT
   1 L1: xx.x VOLTS

2. Press <ENTER> again to enter edit mode (change 1 L1 lamp voltage). Verify that half of the lamps at the FAR gate are lit steady.

3. Connect a "true rms AC + DC" voltmeter across a lighted lamp furthest from the FAR GATE Master Junction Box at the FAR gate location.

4. Using the NEXT and PREVIOUS push buttons, increase or decrease the lamp voltage until the voltage measured at the lamp meets railroad requirements.

NOTE

It is important to be aware that the lamp voltage being measured at the crossing will be different from that displayed at the SSCC IIIA unit. The lamp voltage on the display of the SSCC IIIA is the voltage at the output of the unit's interface connector, and not at the crossing lamp filament. Voltage drops due to cable length will affect the voltage level measured at the lamps.

5. Press <ENTER> to accept changes and exit edit mode.

6. The 1 L1 lamps (OUTPUT A) have now been adjusted for the FAR gate. Enter the SSCC IIIA output voltage settings and the FAR Gate lamp voltage settings for 1 L1 on the History Card for the unit.

6.5.1.2 1L2 Adjustment (FAR Gate)

1. Press <NEXT> to display **SETUP OUTPUT 1 L2 xx.x VOLTS** (ensure that it is 1 L2).

SETUP OUTPUT 1 L2: xx.x VOLTS

2. Press <ENTER> to enter edit mode (change 1 L2 lamp voltage). Verify that the other half of the lamps at the FAR gate are lit steady.

3. Connect a “true rms AC + DC” voltmeter across a lighted lamp furthest from the FAR GATE Master Junction Box at the FAR gate location.

4. Using the NEXT and PREVIOUS push buttons, increase or decrease the lamp voltage until the voltage measured at the lamp meets railroad requirements.

5. Press <ENTER> to accept changes and exit edit mode.

6. The 1 L2 lamps (OUTPUT A) have now been adjusted for the FAR gate. Enter the SSCC IIIA output voltage settings and the FAR Gate lamp voltage settings for 1 L2 on the History Card for the unit.

NOTE

NOTE

If the SSCC IIIA is a 20-Amp unit, skip to paragraph 6.4.3.

6.5.2 Adjustment of FAR Gate Flasher Lamps (Output B, 40-Amp unit only)

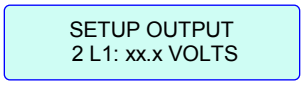
NOTE

NOTE

The following procedure adjusts the voltage supplied via the OUTPUT B connector (2 L1 and 2 L2) of the 40-Amp crossing controller unit only. For 20-Amp units, or if Output B of the 40-Amp unit is disabled, skip to paragraph 6.4.3

6.5.2.1 2L1 Adjustment (FAR Gate)

1. Press <NEXT> to display **SETUP OUTPUT 2 L1 xx.x VOLTS** (ensure that it is 2 L1).



2. Press <ENTER> to enter edit mode (change 2 L1 lamp voltage). Verify that half of the lamps at the other FAR gate are lit steady.

NOTE

NOTE

If **SETUP OUTPUT 2 L1 xx.x VOLTS** is not displayed, output B must first be enabled. Refer to Section 5, *Application Programming*, for instructions on how to enable the B outputs.

3. Connect a “true rms AC + DC” voltmeter across a lighted lamp furthest from the FAR GATE Master Junction Box at the FAR gate location.

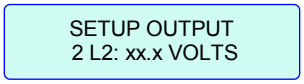
4. Using the NEXT and PREVIOUS push buttons, increase or decrease the lamp voltage until the voltage measured at the lamp meets railroad requirements.

5. Press <ENTER> to accept changes and exit edit mode.

6. The 2 L1 lamps (OUTPUT B) have now been adjusted for the FAR gate. Enter the SSCC IIIA output voltage settings and the FAR Gate lamp voltage settings for 2 L1 on the History Card for the unit.

6.5.2.2 2L2 Adjustment (FAR Gate)

1. Press <NEXT> to display **SETUP OUTPUT 2 L2 xx.x VOLTS** (ensure that it is 2 L2).



2. Press <ENTER> to enter edit mode (change 2 L2 lamp voltage). Verify that the other half of the lamps at the FAR gate are lit steady.

3. Connect a “true rms AC + DC” voltmeter across a lighted lamp furthest from the FAR GATE Master Junction Box at the FAR gate location.

4. Using the NEXT and PREVIOUS push buttons, increase or decrease the lamp voltage until the voltage measured at the lamp meets railroad requirements.

5. Press <ENTER> to accept changes and exit edit mode.

6. The 2 L2 lamps have now been adjusted for the FAR gate. Enter the SSCC IIIA output voltage settings and the FAR Gate lamp voltage settings for 2 L2 on the History Card for the unit.

6.5.3 Adjustment of NEAR Gate Flasher Lamps (Output A)

NOTE

NOTE

The following procedure adjusts the lamp voltages at the NEAR gate (shortest cable length) by adjusting the slide resistors on the lighting surge panel. If Output A for a 40-Amp unit is disabled, skip to paragraph 6.4.4.

1. Press <EXIT> to exit lamp voltage setup mode and return to the main menu.

2. Scroll the main menu using the NEXT or PREVIOUS buttons until **TEST** is displayed, then press <ENTER>. The following message is displayed:

```
TST LMPS STEADY
OFF
```

3. Press <ENTER> to enter edit mode (select test lamps steady option), scroll until **TST LMPS STEADY L1 ON** is displayed, then press <ENTER>. Verify that half of the lamps at the NEAR gates are lit steady.

```
TST LMPS STEADY
L1 ON
```

4. Connect a “true rms AC + DC” voltmeter across a lighted lamp furthest from the NEAR GATE Master Junction Box at the NEAR gate location.

5. Adjust the 1 L1 slide resistor on the lighting surge panel until the voltage measured at the lamp meets railroad requirements. Tighten the adjuster on the slide resistor, then verify that the measurement is correct.

6. Press <NEXT> to display **TST LMPS STEADY L2 ON**. Verify that the other half of the lamps at the NEAR gates are lit steady.

```
TST LMPS STEADY
L2 ON
```

7. Connect a “true rms AC + DC” voltmeter across a lighted lamp furthest from the NEAR GATE Master Junction Box at the NEAR gate location.

8. Adjust the 1 L2 slide resistor on the lighting surge panel until the voltage measured at the lamp meets railroad requirements. Tighten the adjuster on the slide resistor, then verify that the measurement is correct.

9. Press <ENTER> to turn off lamps.

10. The 1 L1 and 1 L2 lamps (OUTPUT A) have now been adjusted for the NEAR gate. Enter the NEAR Gate lamp voltage settings for 1 L1 and 1 L2 on the History Card for the unit.

6.5.4 Adjustment of NEAR Gate Flasher Lamps (Output B, 40-Amp unit only)

NOTE

NOTE

The following procedure adjusts the Output B lamp voltages (for 40-Amp units only) at the NEAR gate (shortest cable length) by adjusting the slide resistors on the lighting surge panel. For 20-Amp units, or if Output B of a 40-Amp unit is disabled, skip to paragraph 6.5.

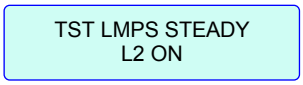
1. Press <NEXT> to display **TST LMPS STEADY OFF**.

2. Press <ENTER> to enter edit mode (select test lamps steady option), scroll until **TST LMPS STEADY L1 ON** is displayed, then press <ENTER>. Verify that half of the lamps at the NEAR gate are lit steady.

3. Connect a “true rms AC + DC” voltmeter across a lighted lamp furthest from the NEAR GATE Master Junction Box at the NEAR gate location.

4. Adjust the 2L1 slide resistor on the lighting surge panel until the voltage measured at the lamp meets railroad requirements. Tighten the adjuster on the slide resistor, then verify that the measurement is correct.

5. Press <NEXT> to display **TST LMPS STEADY L2 ON**. Verify that the other half of the lamps at the NEAR gate are lit steady.



6. Connect a “true rms AC + DC” voltmeter across a lighted lamp furthest from the NEAR GATE Master Junction Box at the NEAR gate location.

7. Adjust the 2 L2 slide resistor on the lighting surge panel until the voltage measured at the lamp meets railroad requirements. Tighten the adjuster on the slide resistor, then verify that the measurement is correct.

8. Press <EXIT> twice to return to the **TEST** menu option in the main menu.

9. The 2 L1 and 2 L2 lamps (OUTPUT B) have now been adjusted for the NEAR gate. Enter the NEAR Gate lamp voltage settings for 2 L1 and 2 L2 on the History Card for the unit.

6.6 FLASHING LIGHT SIGNAL ALIGNMENT

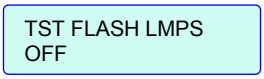
NOTE

NOTE

For the following procedure, the gates remain up. To align signal lights while gates are down and lamps are flashing, select **ACTIVATE CROSSING** instead of **TEST LAMPS FLASH**.

1. Scroll the main menu until **TEST** is displayed, then press <ENTER>.

2. Using the NEXT or PREVIOUS buttons, scroll until **TEST LAMPS FLASH OFF** is displayed, then press <ENTER> to enter edit mode (change the test flash lamps option).



3. Press <ENTER> again to toggle the option to **TST FLASH LMPS ON**.

4. Verify the lamps are flashing.

5. Align all flashing light signals in accordance with railroad standards.

6. Press <EXIT> twice to terminate test mode and return to the main menu.

7. Verify that all the lamps have returned to off.

6.7 SYSTEM VERIFICATION TESTS

After the system has been programmed, configured, and the lamp voltages have been adjusted, the system must be tested in accordance with paragraph 6.6.1 and railroad/transit company's circuit plans, procedures and instructions.

6.7.1 SSCC IIIA Crossing Operational Check List & Tests

#	Check/Test	√
1	Verify that the light/gate battery is charged.	
2	Verify that all connectors on the SSCC IIIA have been properly seated and secured.	
3	Verify that all the electrical connections in the Bell, Lamp, and Gate circuits are properly assembled, tightened and secured.	
4	Verify that all flashing lamps light and none are burned out.	
5	Verify that all lights have been aligned.	
#	Check/Test (Continued)	√
6	Verify that the gates are operational.	
7	Verify that the bell(s) are operational.	
8	Verify that all SSCC IIIA programming is correct (program and configure menus)	
9	Verify that all lamp voltages have been set.	
10	Momentarily turn on the flashers from the TEST menu and verify that the battery charger is operational (providing current to the lamps and battery).	
11	Individually open and close each wire connected to each input to the SSCC IIIA controlling the gates and lights, and verify that each input controls the crossing warning devices as determined by the programming.	
12	Verify that the gate delay time is correct (time from when flashers start until gates start to descend).	
13	Verify that the lights continue to flash while the gates are rising.	
14	If the “maintenance call” light is being used, verify that it is lit.	
15	If MAINT CALL and LOW BATTERY detection are used, temporarily increase the low battery detection level to above the battery level to verify MAINT CALL light turns off. Restore the battery detection level to the desired level and verify MAINT CALL energizes.	
16	Verify that the SSCC IIIA History Card has been updated.	
17	Verify proper crossing operation by watching train moves on all tracks, or simulate train moves with a track shunt on all crossing control track circuits.	

NOTE

NOTE

While in Test Mode, if a train approaches (XR input logic deenergizes), the test is cancelled and the crossing activates normally. When the train departs, the system remains in normal operation.

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SECTION 7
TROUBLESHOOTING

7.1 GENERAL

The SSCC IIIA is a single-board system and has no plug-in modules. All inputs, outputs, and power for the unit are completely plug-connected. Therefore, troubleshooting is made very simple.

If the SSCC IIIA fails, simply remove the mating connectors, change out the unit, verify the correct MCF is selected, reprogram parameters per the History Card and/or circuit plans, and check system calibration of the new unit. Return the unserviceable unit to Siemens under the Return Material Authorization process, if applicable.

⚠ WARNING

WARNING

IF B OR N ARE FULLY OR PARTIALLY REMOVED, SIGNALS AND/OR GATES MAY NOT OPERATE AS INTENDED. TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC AND EMPLOYEES.

⚠ WARNING

WARNING

REMOVING INPUT POWER FROM THE SSCC IIIA WILL CAUSE THE GATE(S) TO DROP BUT THE LIGHTS WILL NOT ACTIVATE.

NOTE

NOTE

When an SSCC failure lowers the gates, 2GC will always de-energize regardless of the 2GC/I7 mode.

7.2 TROUBLESHOOTING SSCC IIIA ERRORS

Generally, problems with the SSCC IIIA may be categorized as wiring related errors or SSCC IIIA related errors. Wiring related errors may occur when:

- The gates are down and lights are flashing
- The gates are up and lights are flashing
- Some lights are not operating when others are flashing

SSCC related errors may occur when:

- The SSCC IIIA reports various error codes in the text window
- Lamp neutral wire open message appears in the text window
- The Maintenance Call (Maint Call or MC) light does not function properly

The troubleshooting flow diagram of figure 7-1 is provided to help determine whether a problem is wiring-related, or SSCC IIIA-related.

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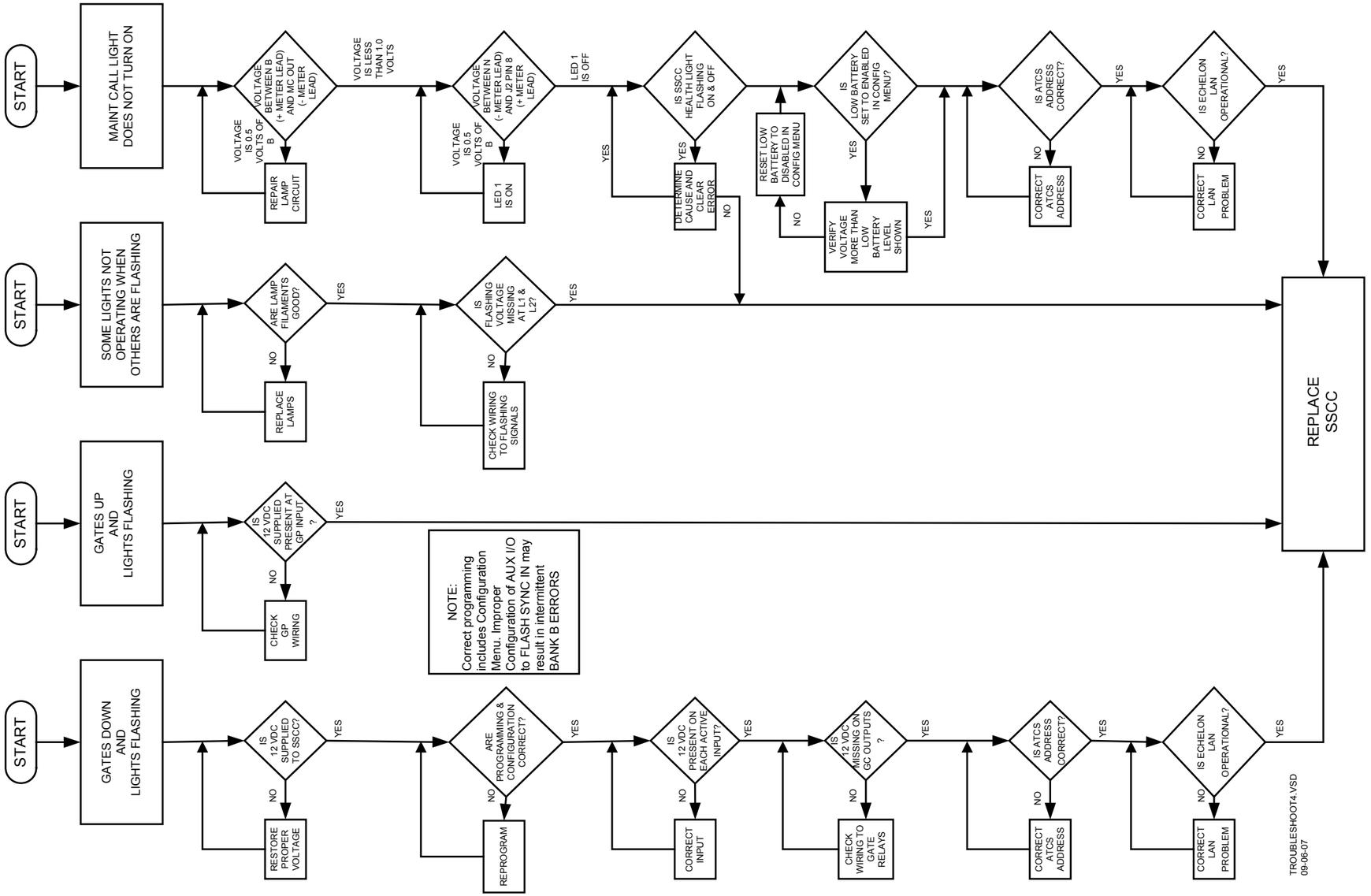

Figure 7-1: SSCC IIIA Troubleshooting Diagram

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7.3 SSCC ERROR CODES

The SSCC is continuously self-checking its hardware and software for faults. Fault conditions may be severe or informational. When a severe fault is detected, the LCD displays a **SHUTDOWN #xxx** message where **xxx** is the Error Code. The fault is entered into the summary log. If a fault occurs repeatedly, the unit must be replaced and returned to Siemens under the Return Material Authorization process.

Some faults are informational faults and will not cause a SHUTDOWN; however, they are still entered into the summary log. Some faults may be correctable by user action. Table 7-1 lists those faults and the action to take.

Other messages not included in Table 7-1 may be in the summary log depending on the verbosity level setting. A higher verbosity level will generate more messages. These messages do not require user action and can be ignored. A verbosity level of 0 (minimum) is recommended. (See DT Utility for how to set the verbosity level.)

Table 7-1: SSCC Summary Log Messages

Sample Summary Log Messages	Shut-Down Error Code	Corrective Action
1E2 03/08/07 16:27:47.2 **Config is corrupt**	**143**	Ensure the correct MCF Name and MCF ID number is selected from the CONFIGURE menu. If error persists, replace unit and return it to Siemens under the Return Material Authorization process.
1E2 03/08/07 16:27:47.2 **Startup Check Error: 0 , MCF CRC Error**	**145**	
1E2 03/08/07 16:27:47.2 **Startup Check Error: 0 , MCF ID Number Error**	**95**	
1E2 03/08/07 16:27:47.2 Unconfigured**. Fix errors and reboot, MEF CRC:** xxxxxxxx	**147**	
MCF SIN Error	**146**	Configure ATCS address
1E2 03/08/07 16:27:47.2 **System Capability inadequate to run this MCF**	**148**	The selected MCF cannot be used with this unit. Select a different MCF.
1E2 03/08/07 16:27:47.2 **Default Cfg Options Used**: Vtl User Cfg Vital	**153**	Ensure the correct MCF Name and MCF ID number is selected from the CONFIGURE menu. Ensure all menu items in the PROGRAM and CONFIGURE menus are valid. If error persists, replace unit and return it to Siemens under the Return Material Authorization process.
1E2 03/08/07 16:27:47.2 **Default Cfg Parms Used:** Vtl Usr Tim , Slot 3, Vital	**152**	
1E2 03/08/07 16:27:47.2 **Parameter Change Error:** xxx xxxx xxxxxxx		
1E2 03/08/07 16:27:47.2 **Unconfigured. Fix errors and reboot, MEF CRC:**xxxxxxxx	**95**	
1E2 03/08/07 16:27:47.2 **Lamp Flash Rate Illegal:** xxxxx	**395**	Program the Flash rate

Table 7-1 concluded

Sample Summary Log Messages	Shut-Down Error Code	Corrective Action
1E2 03/08/07 16:27:47.2 **Lamp setpoint illegal:**x.x	**360**	Set the lamp voltage
1E2 03/08/07 16:27:47.2 **POWER: LOW, POWER MODULE:** 40A, BANK SELECT: A+B		Check power source.
1E2 03/08/07 16:27:47.2 **Low Battery Detected:** xxxx mV		
1E2 03/08/07 16:27:47.2 **Startup Check Error:** xx, **HW SW Compatibility**		Replace unit and return it to Siemens under the Return Material Authorization process.
1E2 03/08/07 16:27:47.2 **Capability Record invalid, defaulting to base model**		
1E2 03/08/07 16:27:47.2 **Config is corrupt**		
1E2 03/08/07 16:27:47.2 **Data flash erase error**	**308**	
1E2 03/08/07 16:27:47.2 **Data flash write error**	**309**	
1E2 03/08/07 16:27:47.2 **VGO enable test failed**	**289**	Check power source.
1E2 03/08/07 16:27:47.2 **VGO frequency error**	**290**	
1E2 03/08/07 16:27:47.2 **Slave Error** x**: Chnl:** x , xxxxxx xxx	**302**	
1E2 03/08/07 16:27:47.2 **Reboot Occurred (RSR** xx **),** xxxx xxxxxx xxxx		If error persists, replace unit and return it to Siemens under the Return Material Authorization process.
1E2 03/08/07 16:27:47.2 **EVENT DATA CORRUPT, DATA UNAVAILABLE**		Clear the event Log
1E2 03/08/07 16:27:47.2 ATCS Rx session lost		If occurs repeatedly, check the communication link.
1E2 03/08/07 16:27:47.2 ATCS Tx session lost		
DT Queue Full	**102**	Make sure PC baud rate is correct and cable is OK
1E2 03/08/07 16:27:47.2 **LAN Shutdown**	**105**	Insure LAN wired per user manual and cabling is OK.
LAN errors	**103, 104, 105, 107**	
1E2 03/08/07 16:27:47.2 **Processor communication error, Unable to communicate with slave processor**	**394**	Replace unit and return it to Siemens under the Return Material Authorization process.

7.4 LAMP NEUTRAL WIRE OPEN

If a **LAMP NEUTRAL WIRE OPEN** message periodically appears on the LCD display and the open neutral wire connection has been corrected, the unit's **HEALTH** indication and the **MAINT CALL** output status can be restored by momentarily selecting **TST ACTIVATE XNG** from the **TEST** menu **(Warning: the crossing will activate when TST ACTIVATE XING is selected).**

NOTE

The power supplies in many LED signals adversely affect the Open Lamp Neutral circuitry. Disable (set to NO) DETECT LAMP NEUTRAL WIRE when LEDs are used on any lamp output.

7.5 TROUBLESHOOTING MAINTENANCE CALL (MC) LIGHT PROBLEMS

Several operations in the SSCC system will turn-off the MAINT CALL (MC) light. This procedure assumes:

- The warning devices are not activated and SSCC unit is healthy.
- No track is out-of-service (A track OOS turns off the MC light)
- MC operation is being placed in service for the first time and wiring must be checked.

7.5.1 Troubleshooting Procedure for Maintenance Call (MC) Light Problems

The following procedure checks the most common items first. If the MAINT CALL light does not turn on after a step, proceed to the next step.

1. Observe MAINT CALL LED on Connector J2
   - If LED 1 is on, go to step 2.
   - If LED 1 is off, go to step 3.

2. Determine that the MC light functions by testing the lamp circuit as follows:
   a. Measure DC voltage between **B** (+ meter lead) and **MAINT CALL** (MC) out (- meter lead) on the green connector J2.
      - If voltage is within 0.5 volts of B, then the lamp or lamp circuit is open and must be repaired.
      - If voltage is less than 1.0 volts, go to next step.
   b. Measure between **N** (- meter lead) and **MC** (+ meter lead) on the green connector.
      - If voltage is within 0.5 volts of B, then the lamp circuit is okay, but the MC output is off.
        - If LED 1 is on, replace SSCC
        - If LED 1 is off, go to the next step

3. If the SSCC health light is flashing rapidly or off, determine cause or replace SSCC.

4. Battery voltage may be low:
   - If **Low Battery** is set to **Enabled** in Configuration Menu**,** verify that the voltage on the battery connector is more than the **Low Battery Level** shown.

If, after following the steps above, the MC lamp stays off, call Siemens Technical Support for further assistance at (800) 793-7233.

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SECTION 8
EXTERNAL COMMUNICATON

8.1 GENERAL

The SSCC IIIA can communicate with external equipment through two means: Echelon® LAN interface, and RS-232 serial interface.

8.2 LAN

The SSCC IIIA is capable of communicating with external equipment using the Echelon® LAN interface. A typical application is to use Safetran's SEAR II, part number A80273, to record all SSCC IIIA events by connecting on the LAN.

A valid ATCS address (refer to Section 4, paragraph 4.2.2.2) must be programmed into the SSCC IIIA. The SEAR II, connected via the LAN to the SSCC IIIA, must be programmed with the ATCS address of the SSCC IIIA.

The ATCS address is formatted as follows: **7.RRR.LLL.GGG.SS**

Where: **7** is the designation for ATCS wayside type addressing,
RRR is the Railroad number,
LLL is the Line number,
GGG is the Group number,
SS is the subnode number (must be greater than 02).

Connect the SSCC IIIA LAN terminals of connector J4 (polarity is arbitrary) to the ECH terminals of connector J1 of the SEAR II (figure 8-1).

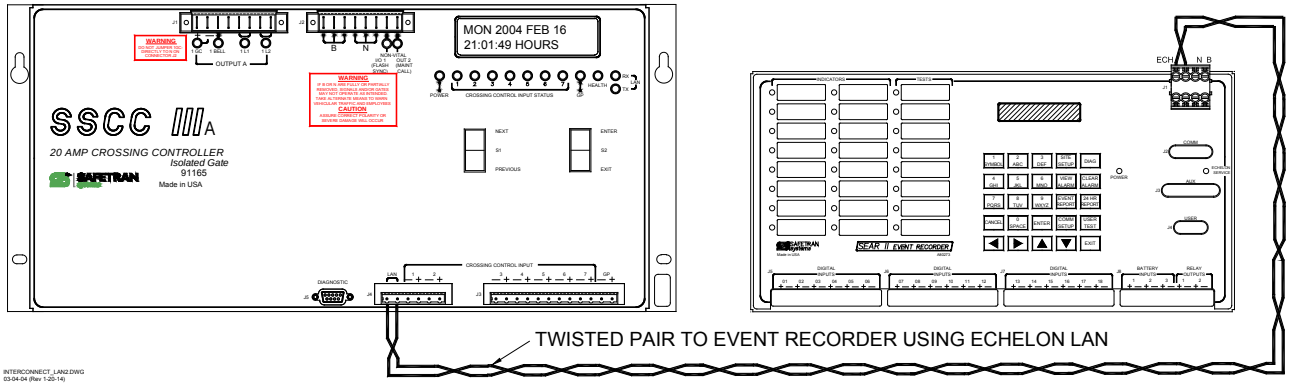


Figure 8-1. SSCC IIIA to SEAR II Using LAN

NOTE

NOTE

SSCC MEF software revision 9V546.A06.H or above requires SEAR II MEF software revision 9V645.A01.G or above to establish communications.

8.3 RS-232 DIAGNOSTIC PORT J5

The RS-232 Diagnostic port (J5) is configured as DCE, to communicate with a diagnostic terminal or other DTE such as a SEA/R. The following paragraphs give some options for using the serial port.

8.3.1 SSCC IIIA Serial Port To PC

By connecting the Diagnostic port to a laptop PC or Pocket PC running the Safetran® DT (Diagnostic Terminal) utility (refer to figure 8-2), the user is able to load software, change system parameters, review configuration data and site specific data, set date and time, monitor and troubleshoot the system, send ATCS requests and receive ATCS replies to/from local or remote equipment, and request and store event data for use with a data analyzer. Use of the DT is described in Document # SIG-00-01-13 (Pocket PC version) and Document # SIG-00-01-14 (Laptop version).

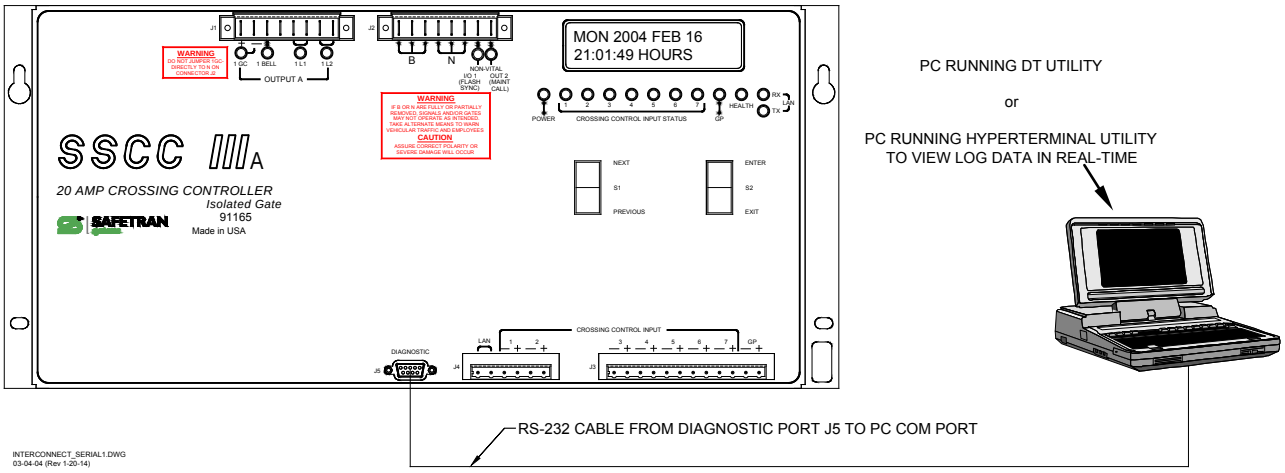


Figure 8-2. SSCC IIIA Serial Port to PC COM Port

There may be instances when data being logged needs to be transferred to a terminal or laptop computer in order to review data (such as remotely from the office). When the SSCC IIIA unit's Diagnostic port J5 (refer back to figure 8-2) is connected to a PC running terminal emulation, the events are displayed in real-time on the screen, oldest events being replaced by newest.

There are many different text capture methods available, however the following procedure is for using HyperTerminal, a Windows® based PC Terminal Emulation utility:

1. Connect the PC's COM1 port to the SSCC IIIA Diagnostic port, using an RS232 straight-through (pin to socket) cable (refer back to figure 8-2).
2. At the PC, click on the **Start** button on the taskbar, and go to **Programs\ Accessories\ Communications\ HyperTerminal**.

3. When the HyperTerminal **Connection Description** dialog box appears, type the name of the destination file for the connection configuration data (e.g., **Temp1**), select an icon for the connection, and click on **OK**.
4. In the **Connect To** dialog box, leave **Phone Number** blank, move the cursor to the **Connect Using:** box, and using the scrollbar, select **COM1**, then click on **OK**.
5. In the **Com1 Properties** dialog box, make the following selections, then click on **OK**:
    a. Bits per second: 9600
    b. Data bits: 8
    c. Parity: None
    d. Stop bits: 1
    e. Flow control: None
6. Events will be displayed in real-time.

Refer to the example log and explanation in figure 8-3.

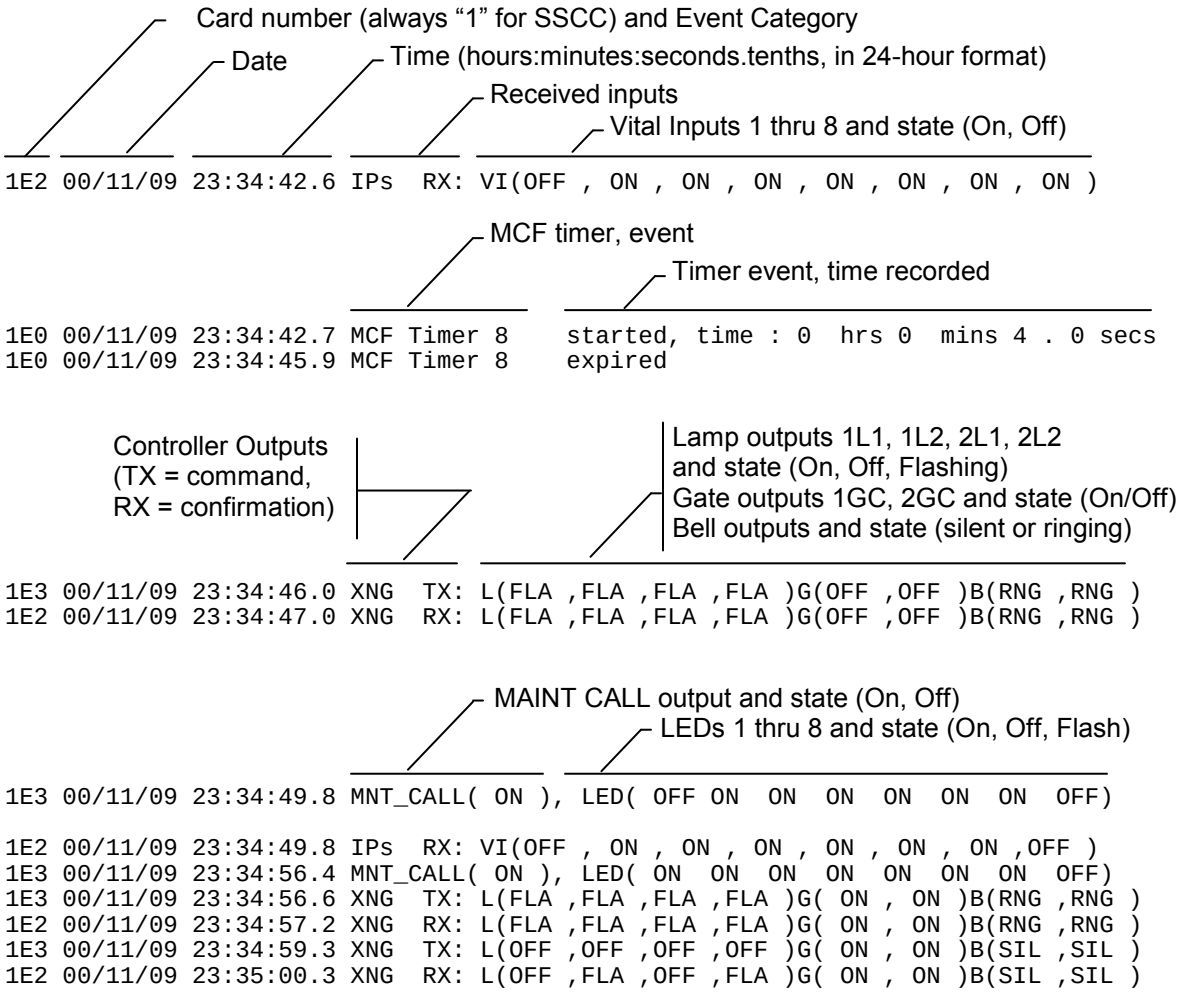


Figure 8-3. Example Log Data on a PC

8.3.2 SSCC IIIA Serial Port To SEA/R

The SSCC IIIA contains memory for recording events. Designed as a diagnostic tool, the memory space is large enough to record approximately 8 train moves. By connecting the SSCC IIIA to an Event Analyzer/Recorder such as Safetran's SEA/R, part number A80250, all events can be recorded. Connect the SSCC IIIA 9-pin Diagnostic port J5 (refer to figure 8-4) to the SEA/R 25-pin Radio/Modem port J1 or J2, using an RS232 male-to-male cable (or use a gender changer), or optionally connect the units' LAN ports. For instructions on using the SEA/R, refer to the Installation & Operation manual, Safetran Document # SIG-00-98-04, for Safetran Event Analyzer/Recorder (SEA/R) A80250.

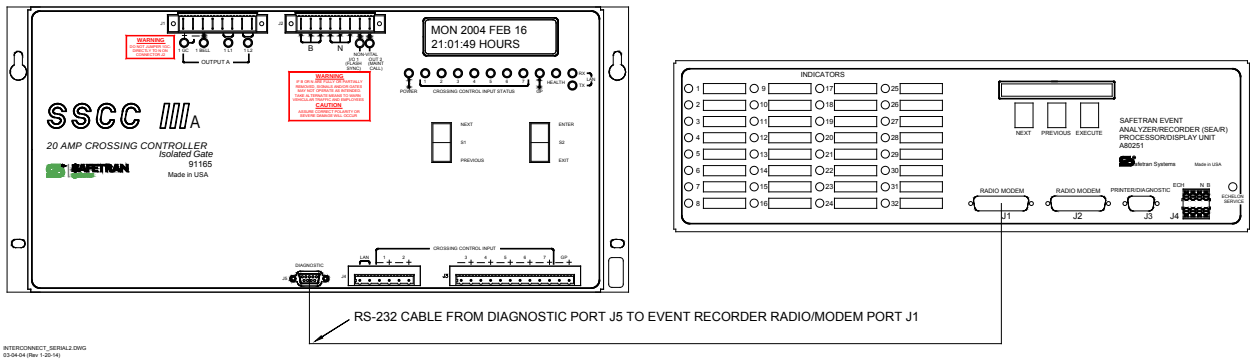


Figure 8-4. SSCC IIIA Serial Port to SEA/R

NOTE

NOTE

In order to communicate with a SEA/R (part number A80250) by LAN, the software level installed in the SEA/R must be ER30 or higher and the MIP (Microprocessor Interface Program) software must be 9V146A01.B or higher.

SECTION 9
SOFTWARE VERIFICATION & UPGRADE

9.1 GENERAL

Siemens may release enhanced application software for the Solid-State Crossing Controller IIIA (SSCC IIIA), if required.

9.2 SOFTWARE UPGRADE

WARNING

WHILE UPDATING SOFTWARE, THE CROSSING GATES ARE DOWN WITH LAMPS FLASHING AND BELLS RINGING (REGARDLESS OF THE STATE OF THE VITAL CROSSING CONTROL INPUTS). TAKE ADEQUATE PRECAUTIONS TO WARN PERSONNEL, PEDESTRIANS, TRAINS AND OTHER VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION HAS BEEN VERIFIED.

If software needs to be installed, Siemens DT (Diagnostic Terminal utility) must be available on the computer used for installing the software.

Siemens document # SIG-00-01-14 provides detailed information on using the DT software, running on a laptop or desktop PC, to install software.

9.3 SOFTWARE VERIFICATION

The MEF (Master Executable File) version resident in the SSCC IIIA is displayed on the LCD display during system boot-up. The software version is the second message displayed during the power-up cycle.

The software versions can be queried from the crossing controller front panel at any time by using the Query menu system (refer to Section 4 for the Query menu). The MEF version and the MCF name can be viewed by using the DT utility View menu, “CPU Version” option. (See Appendix A for basic.mcf revision history.)

The following paragraphs contain general instructions for verifying software versions in the SSCC IIIA.

9.3.1 Query Menu

The Query menu (refer to Section 4 for menu flow diagram) consists of the following programming items (submenus):

- Query Software Versions (paragraph 9.3.1.1)
- Query Config Versions (paragraph 9.3.1.2)
- Exit Query (paragraph 9.3.1.3)

NOTE

NOTE

Query mode does not require a password.

NOTE

NOTE

A timeout function is in effect when in query mode. If 90 seconds elapse without front panel switch activity, the display reverts to the idle screen.

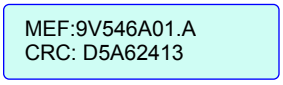
9.3.1.1 Query Software Versions

To query software versions, perform the following steps:

1. Scroll through the main menu using NEXT or PREVIOUS until **QUERY** is displayed, then press <ENTER>.

2. The default query option is displayed (**QUERY SOFTWARE VERSIONS**).

3. Press <ENTER> again. The MEF version (default option) is displayed along with its CRC (see below for a typical example).



4. Press <NEXT> to display the Master boot file (MBT).

5. Press <NEXT> or <PREVIOUS> to scroll to other software versions. Possible selections are:

MEF:	Master executable file
MBT:	Master boot file
SEF1 – SEF4:	Slave executable file
SBT1 – SBT4:	Slave boot file

NOTE

NOTE

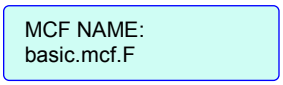
SEF3, SEF4, SBT3, and SBT4 are displayed only for the 40-Amp unit (non-existent for the 20-Amp unit).

9.3.1.2 Query Configuration Versions

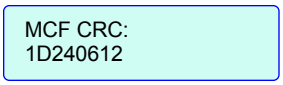
To query configuration versions, perform the following steps:

1. Scroll through the main menu using NEXT or PREVIOUS until **QUERY** is displayed, then press <ENTER>.
2. The default query option is displayed (**QUERY SOFTWARE VERSIONS**).
3. Press <NEXT>. The second option, **QUERY CONFIG VERSIONS** is displayed.

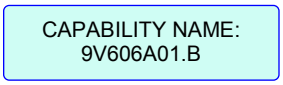
4. Press <ENTER>. **MCF NAME:** is displayed followed by the filename and revision.



5. Press <NEXT>. **MCF CRC:** is displayed followed by the 8-digit hexadecimal number.



6. Press <NEXT>. **CAPABILITY NAME:** is displayed followed by the software number and version.



7. Press <NEXT>. **EXIT DATA VERSIONS** is displayed.

8. Press <ENTER> or <EXIT> to return to the **QUERY CONFIG VERSIONS** menu in the QUERY menu, or press <NEXT> to return to **MCF NAME**.

9.3.1.3 Exit Query Mode

To exit query mode and return to the main menu (**QUERY** option), press <EXIT>, or scroll to **EXIT QUERY** and press either <EXIT> or <ENTER>.

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SECTION 10
APPLICATION DRAWINGS

10.1 GENERAL

This section contains typical application drawings for the SSCC IIIA.

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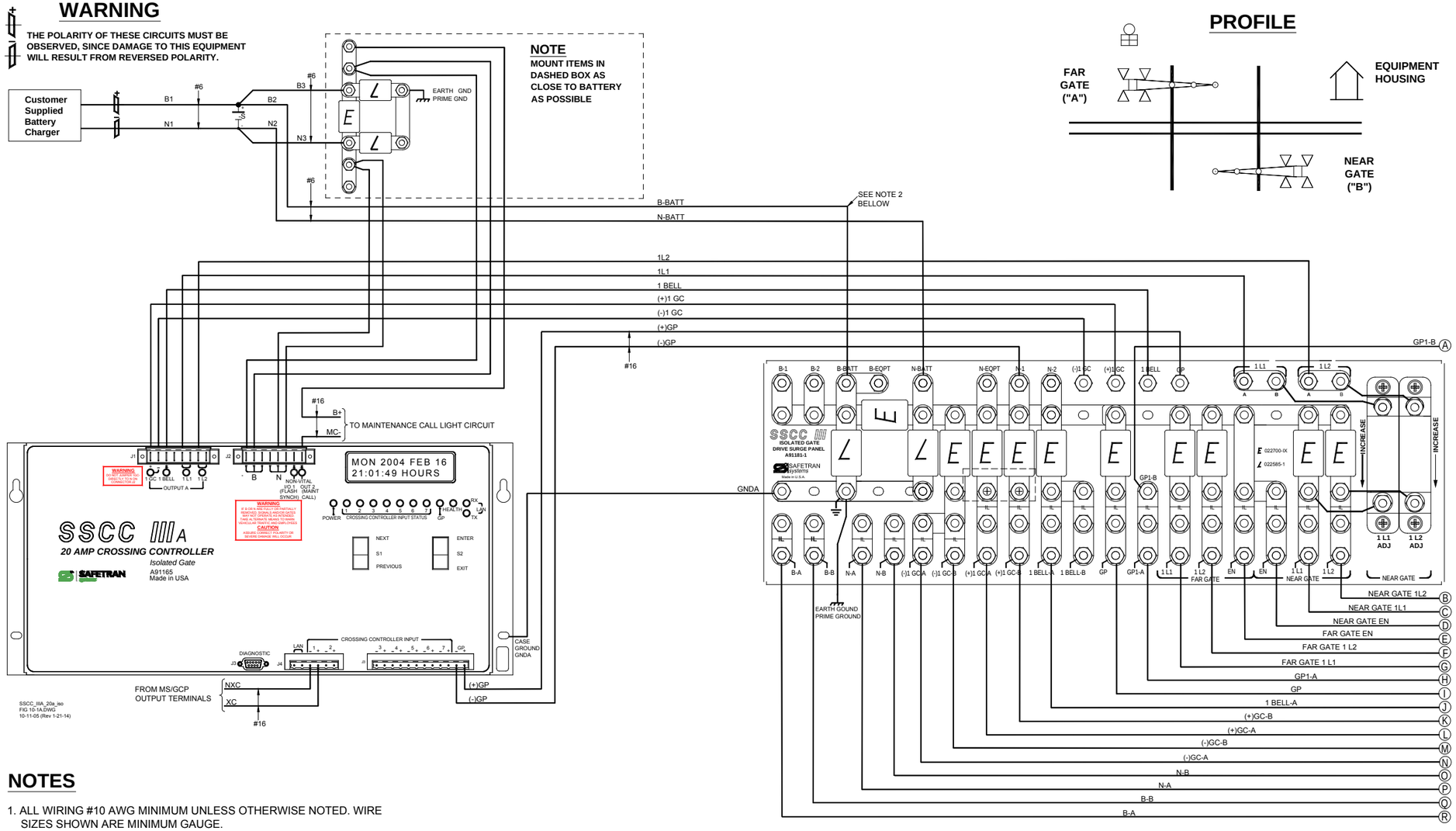


NOTES

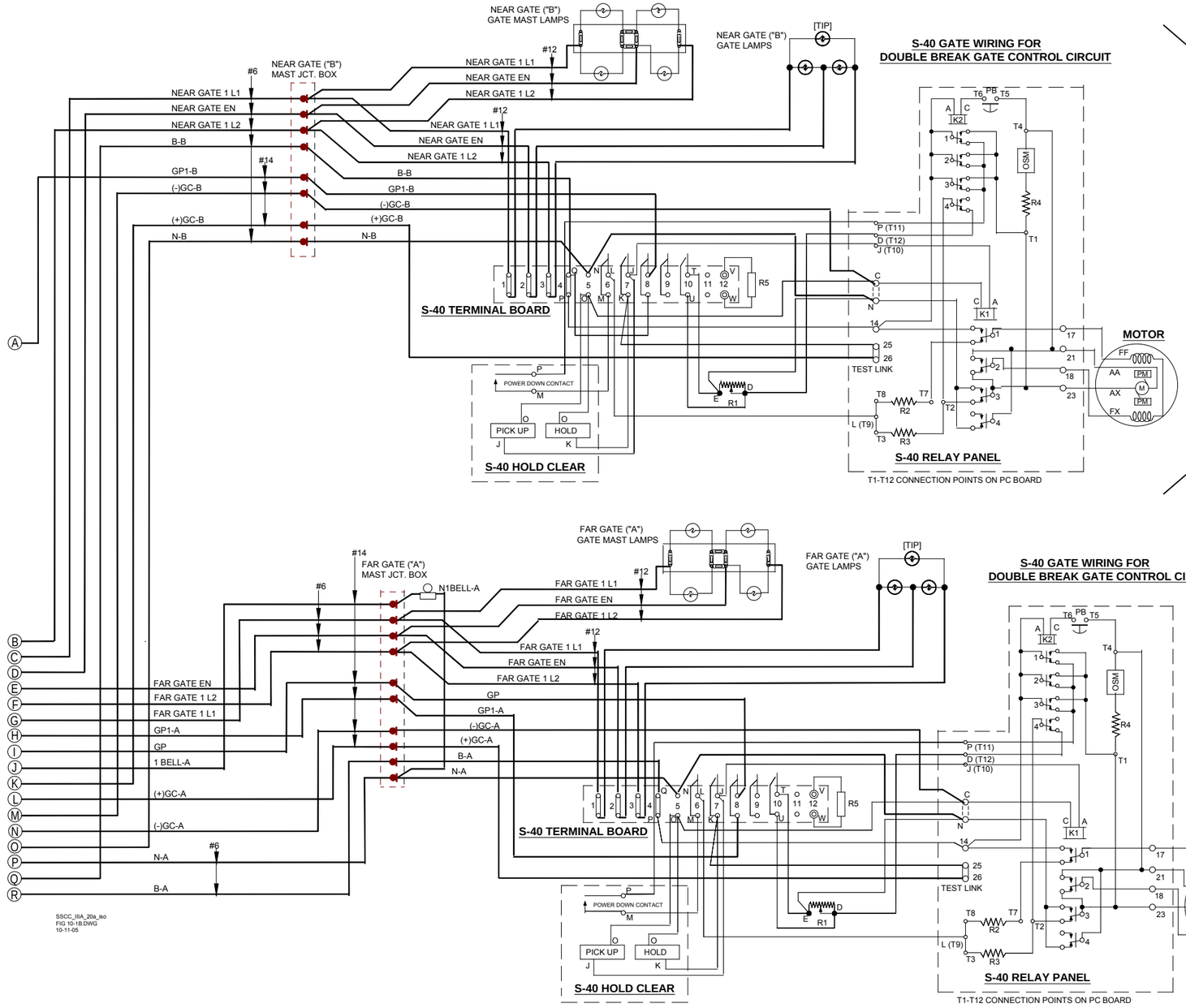
1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. THIS CONNECTION NOT REQUIRED IF GATES ARE NOT USED.
3. THE FOLLOWING SURGE PANEL SYMBOLS ARE USED:

   E = 022700-1X EQUALIZER

   ∠ = 022585-1 ARRESTER CLEARVIEW H. D.

   IL = INSULATED TESTING LINK

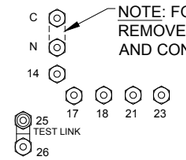
Figure 10-1: Typical Two-Gate Application (Isolated Gate Return) using 20-Ampere Crossing Controller With Lightning/Surge Panel A91181-1 (Page 1 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. ON THE SAME SURGE PANEL, THE 'FAR GATE' IS THE FLASHING LIGHT SIGNAL OR GATE WITH THE LARGEST VOLTAGE DROP IN THE CABLE CIRCUIT. IN GENERAL, IF BOTH SIGNALS HAVE THE SAME NUMBER AND TYPE OF LAMPS AND THE SAME SIZE CABLE CONDUCTORS, THE 'FAR GATE' IS THE LOCATION WITH THE LONGEST CABLE RUN. THE 'NEAR GATE' CIRCUIT ON THE SURGE PANEL HAS AN ADJUSTABLE RESISTOR IN SERIES WITH L1 AND L2 THAT PROVIDES VOLTAGE ADJUSTMENT.

RELAY PANEL TERMINAL LAYOUT



NOTE: FOR ISOLATED GATE UP CONTROL REMOVE STRAP BETWEEN TERMINALS N & C AND CONNECT (-) UP CONTROL TO TERMINAL C

CONTACTS CLOSED & FUNCTION

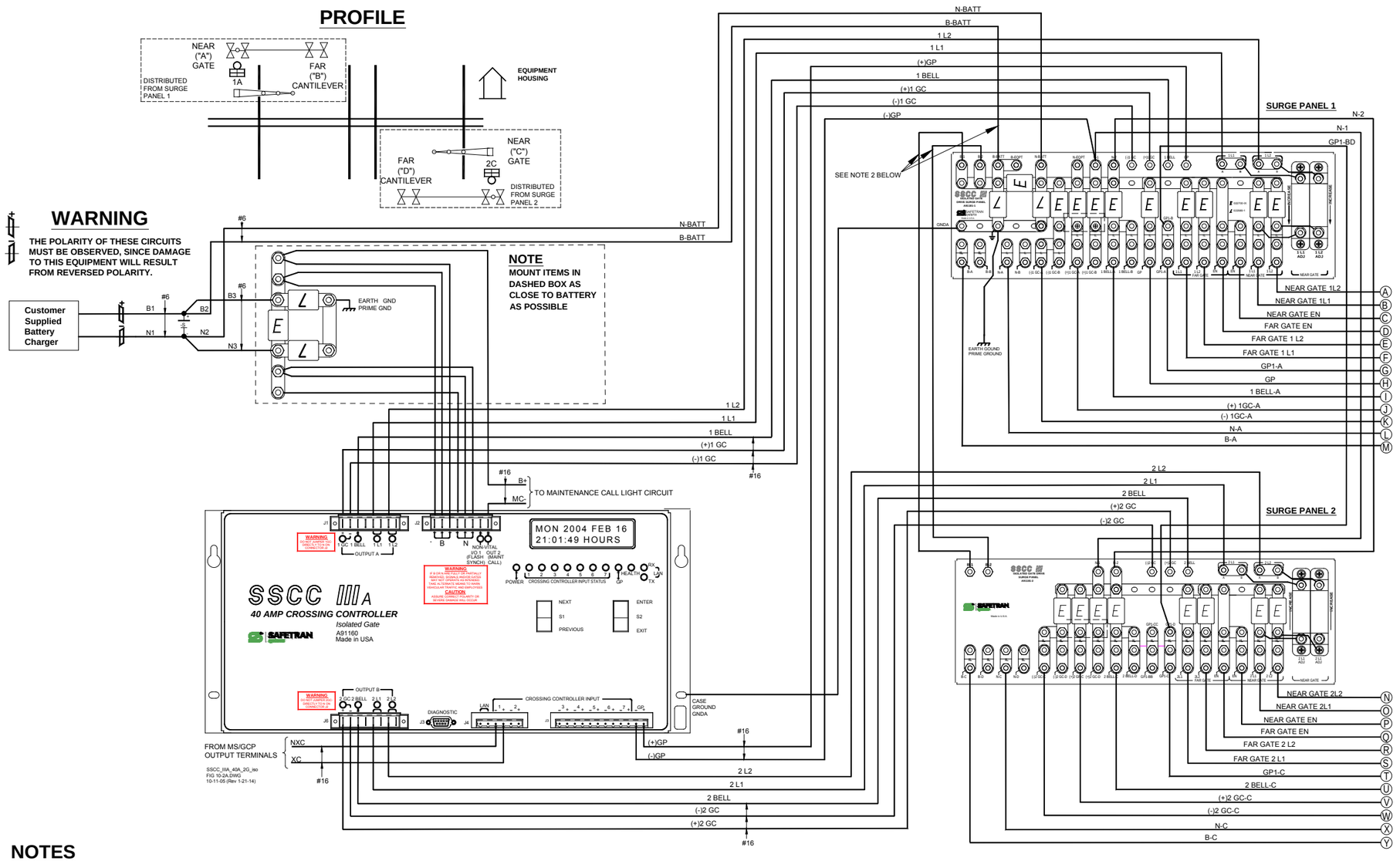
(SHOWN WITH GATE UP)

6. 45°- 90° POWER DOWN
7. 0°-89° POWER UP
8. 83°- 90° FLASHING LIGHT
9. 5°- 90° BELL
10. 0°- 5° HORIZONTAL SNUB

S-40 GATE COMPONENTS

R1 - DOWN SNUB RESISTOR, ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR
R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1 - GATE RELAY
K2 - MAINT. SWITCH RELAY
OSM - OVERSPEED MODULE

Figure 10-2: Typical Two-Gate Application (Isolated Gate Return) using20-Ampere Crossing Controller With Lightning/Surge Panel A91181-1 (Page 2 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.

2. THESE CONNECTIONS NOT REQUIRED IF GATES ARE NOT USED.

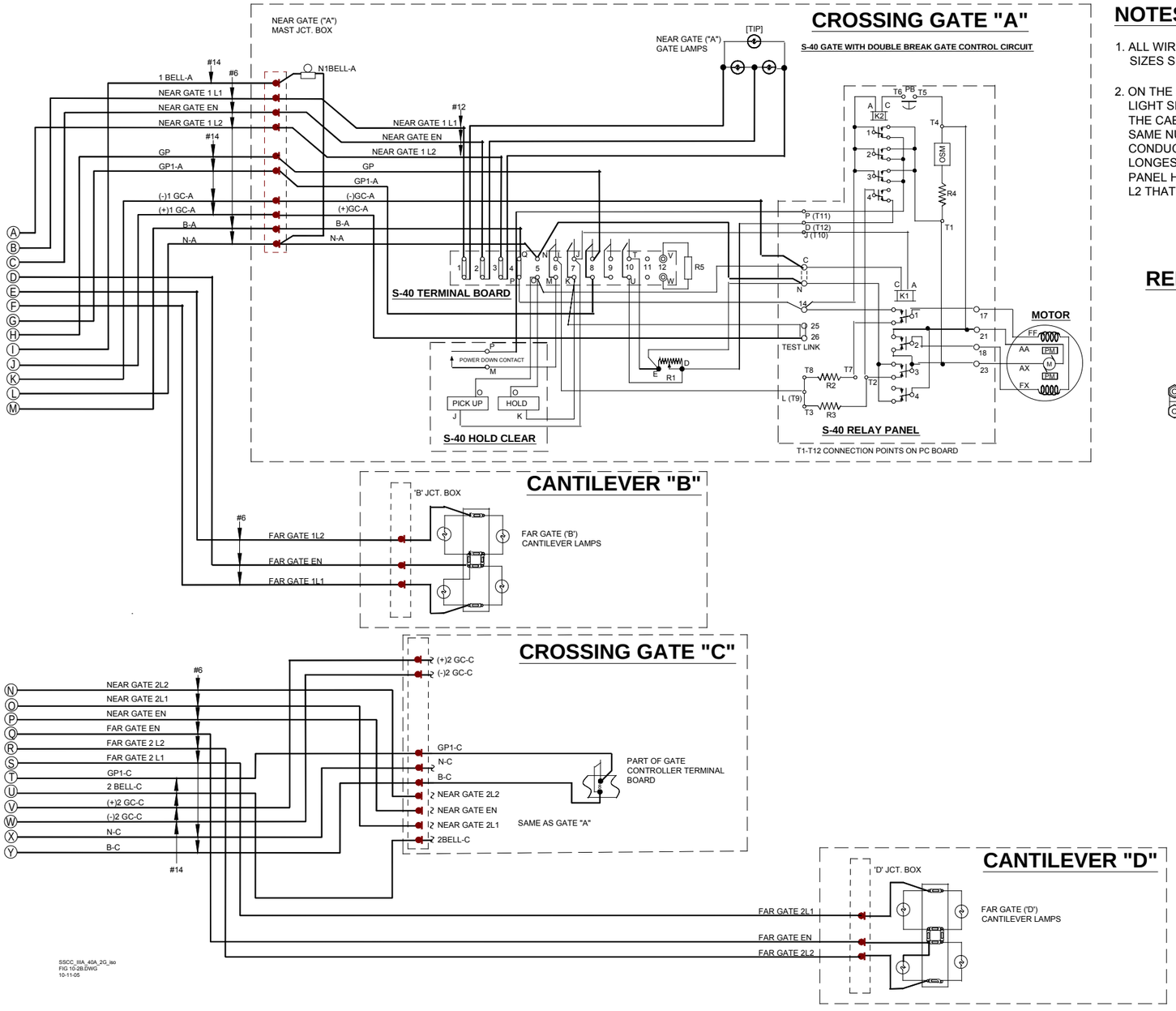
3. THE FOLLOWING SURGE PANEL SYMBOLS ARE USED:

   E = 022700-1X EQUALIZER

   ∠ = 022585-1 ARRESTER CLEARVIEW H. D.

   IL= INSULATED TESTING LINK

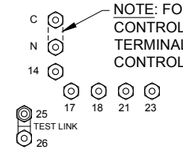
Figure 10-3: Typical Two-Gate Application (Isolated Gate Return) With Cantilever Flashers, 40-Ampere Crossing Controller With Lighting/Surge Panels A91181-1 and A91181-2 (Page 1 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. ON THE SAME SURGE PANEL, THE 'FAR GATE' IS THE FLASHING LIGHT SIGNAL OR GATE WITH THE LARGEST VOLTAGE DROP IN THE CABLE CIRCUIT. IN GENERAL, IF BOTH SIGNALS HAVE THE SAME NUMBER AND TYPE OF LAMPS AND THE SAME SIZE CABLE CONDUCTORS, THE 'FAR GATE' IS THE LOCATION WITH THE LONGEST CABLE RUN. THE 'NEAR GATE' CIRCUIT ON THE SURGE PANEL HAS AN ADJUSTABLE RESISTOR IN SERIES WITH L1 AND L2 THAT PROVIDES VOLTAGE ADJUSTMENT.

RELAY PANEL TERMINAL LAYOUT



NOTE: FOR DOUBLE BREAK GATE UP CONTROLREMOVE STRAP BETWEEN TERMINALS N & CAND CONNECT (-) UP CONTROL TO TERMINAL C

CONTACTS CLOSED & FUNCTION

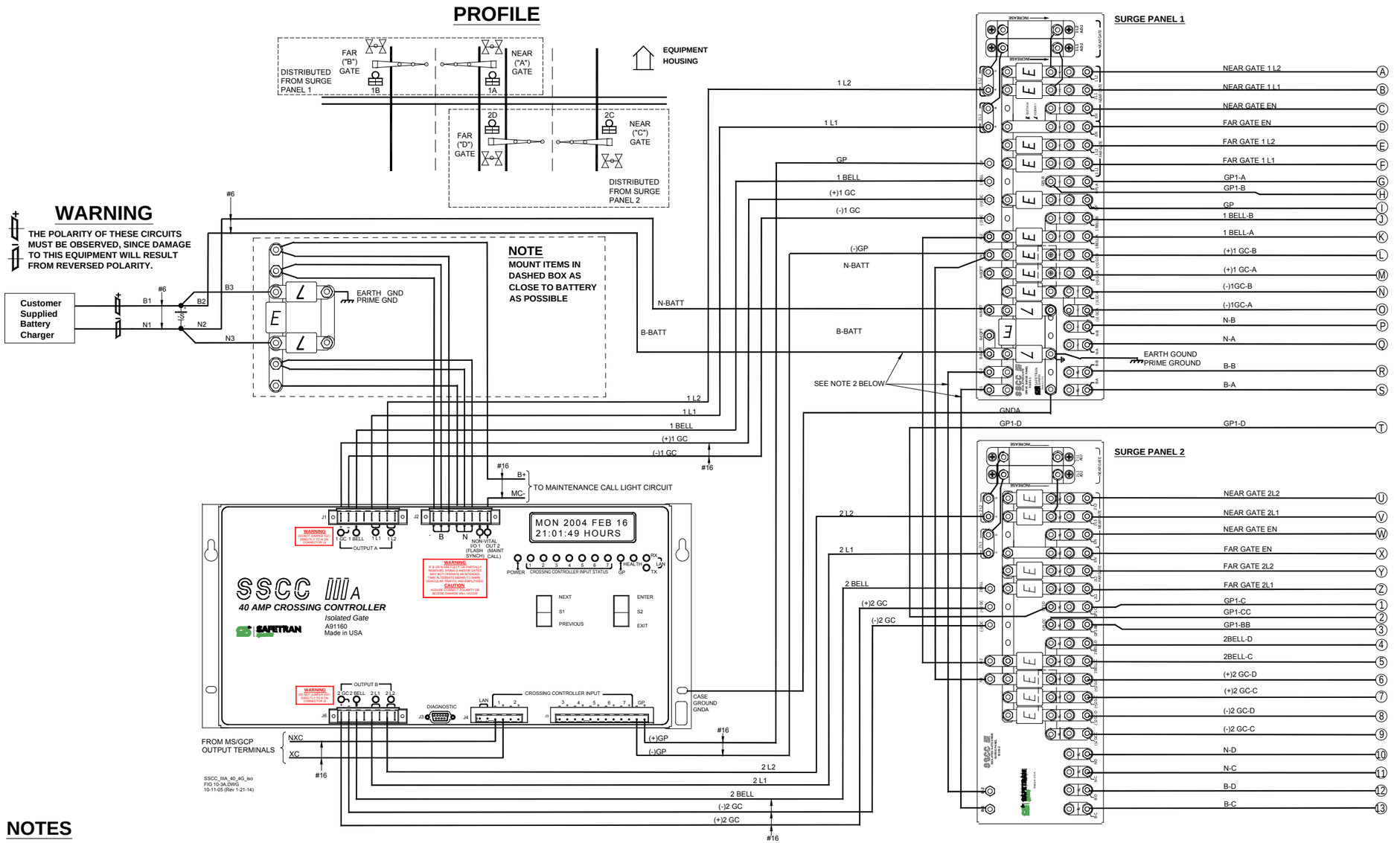
(SHOWN WITH GATE UP)

6. 45°- 90°POWER DOWN
7. 0°-89°POWER UP
8. 83°- 90°FLASHING LIGHT
9. 5°- 90°BELL
10. 0°- 5°HORIZONTAL SNUB

S-40 GATE COMPONENTS

R1 - DOWN SNUB RESISTOR, ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR
R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1 - GATE RELAY
K2 - MAINT. SWITCH RELAY
OSM - OVERSPEED MODULE

Figure 10-4: Typical Two-Gate Application (Isolated Gate Return) With Cantilever Flashers, 40-Ampere Crossing Controller With Lighting/Surge Panels A91181-1 and A91181-2 (Page 2 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.

2. THESE CONNECTIONS NOT REQUIRED IF GATES ARE NOT USED.

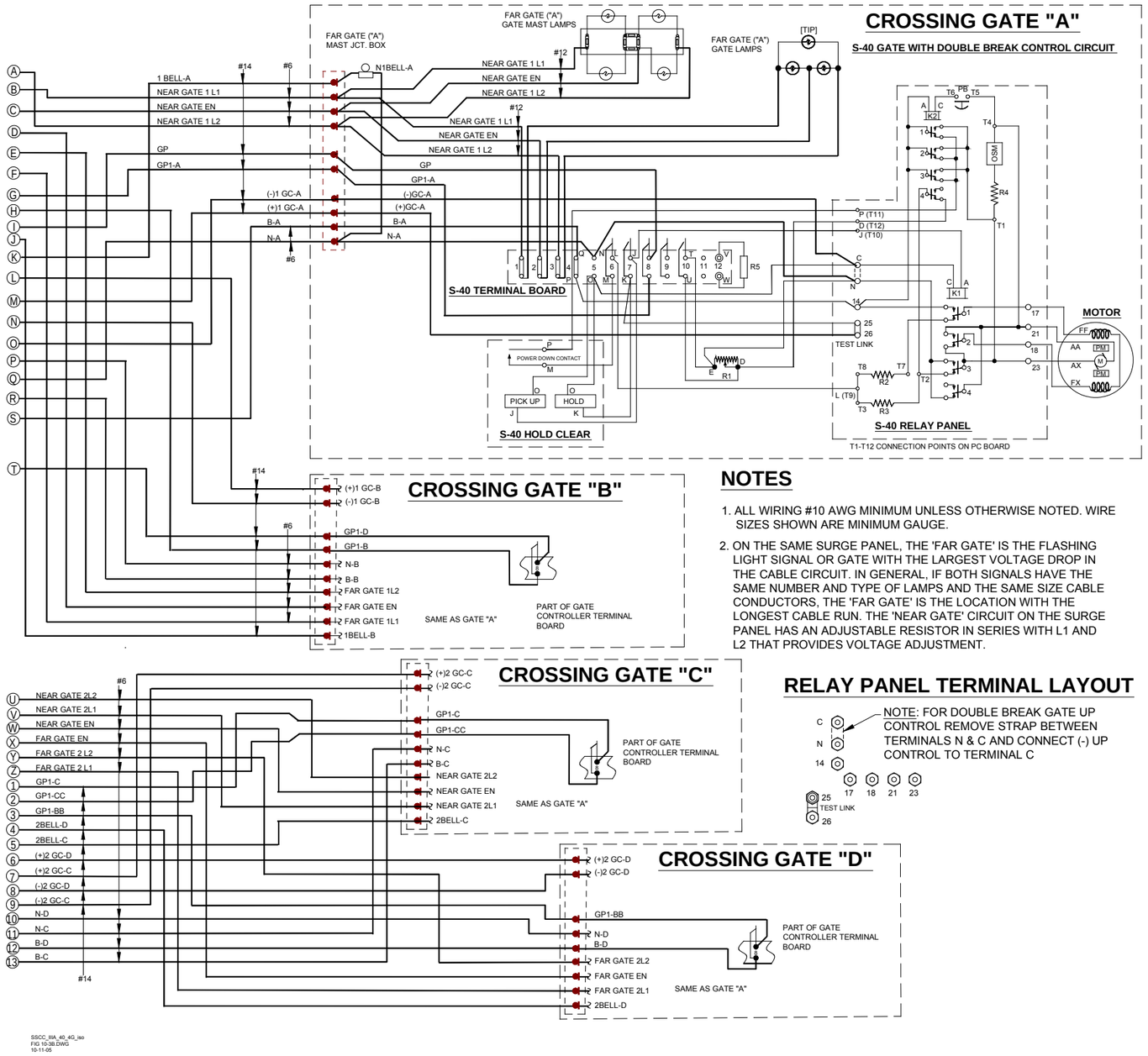
3. THE FOLLOWING SURGE PANEL SYMBOLS ARE USED:

   E = 022700-1X EQUALIZER

   ∠ = 022585-1 ARRESTER CLEARVIEW H. D.

   IL = INSULATED TESTING LINK

Figure 10-5: Typical Four-Gate Application (Isolated Gate Return) Using 40-Ampere Crossing Controller With Lighting/Surge Panels A91181-1 And A91181-2 (Page 1 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. ON THE SAME SURGE PANEL, THE 'FAR GATE' IS THE FLASHING LIGHT SIGNAL OR GATE WITH THE LARGEST VOLTAGE DROP IN THE CABLE CIRCUIT. IN GENERAL, IF BOTH SIGNALS HAVE THE SAME NUMBER AND TYPE OF LAMPS AND THE SAME SIZE CABLE CONDUCTORS, THE 'FAR GATE' IS THE LOCATION WITH THE LONGEST CABLE RUN. THE 'NEAR GATE' CIRCUIT ON THE SURGE PANEL HAS AN ADJUSTABLE RESISTOR IN SERIES WITH L1 AND L2 THAT PROVIDES VOLTAGE ADJUSTMENT.

CONTACTS CLOSED & FUNCTION

(SHOWN WITH GATE UP)
6. 45°- 90° POWER DOWN
7. 0°-89° POWER UP
8. 83°- 90° FLASHING LIGHT
9. 5°- 90° BELL
10. 0°- 5° HORIZONTAL SNUB

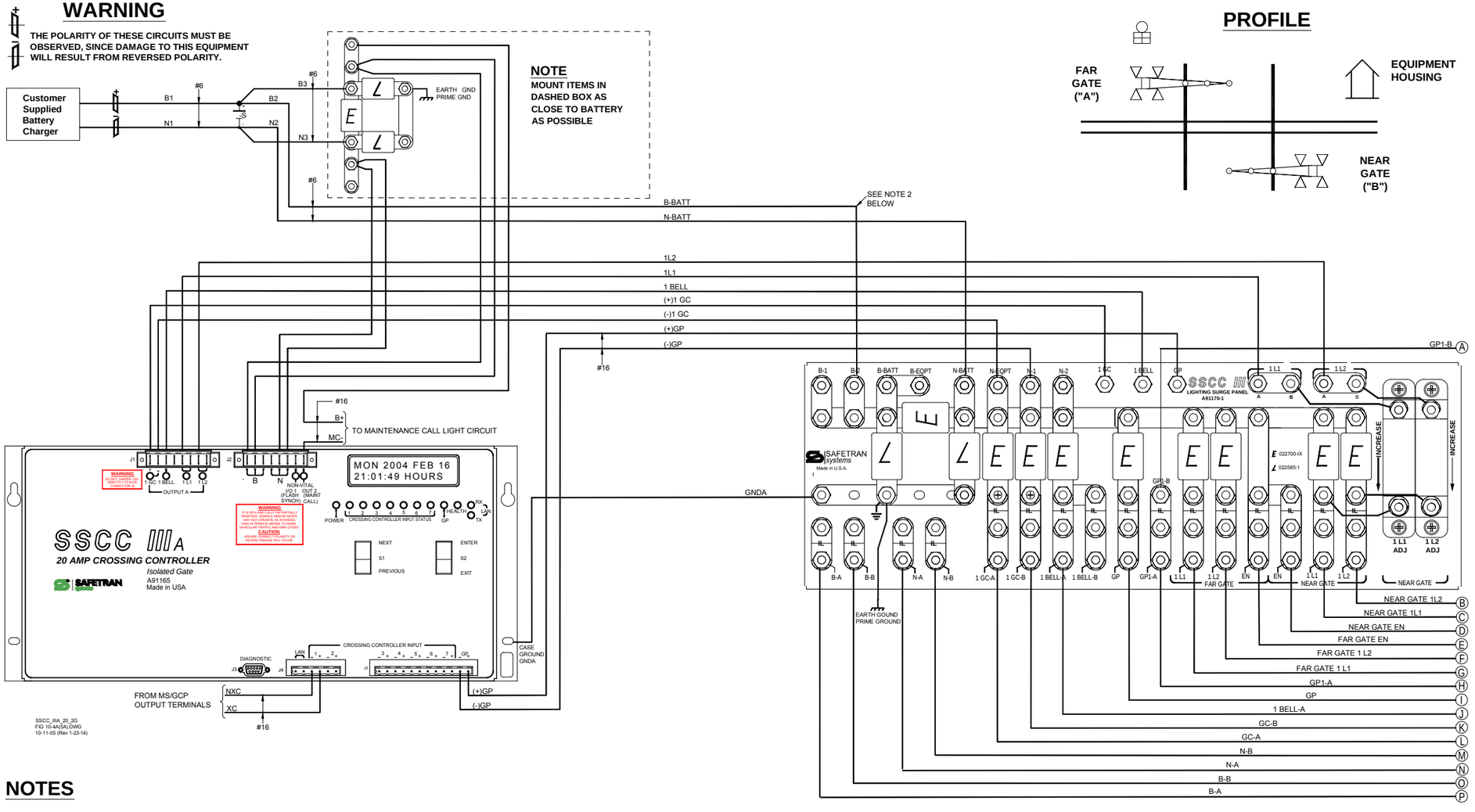
RELAY PANEL TERMINAL LAYOUT

NOTE: FOR DOUBLE BREAK GATE UP CONTROL REMOVE STRAP BETWEEN TERMINALS N & C AND CONNECT (-) UP CONTROL TO TERMINAL C

S-40 GATE COMPONENTS

R1 - DOWN SNUB RESISTOR, ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR
R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1 - GATE RELAY
K2 - MAINT. SWITCH RELAY
OSM - OVERSPEED MODULE

Figure 10-6: Typical Four-Gate Application (Isolated Gate Return) Using 40-Ampere Crossing Controller With Lighting/Surge Panels A91181-1 And A91181-2 (Page 2 of 2)



NOTES

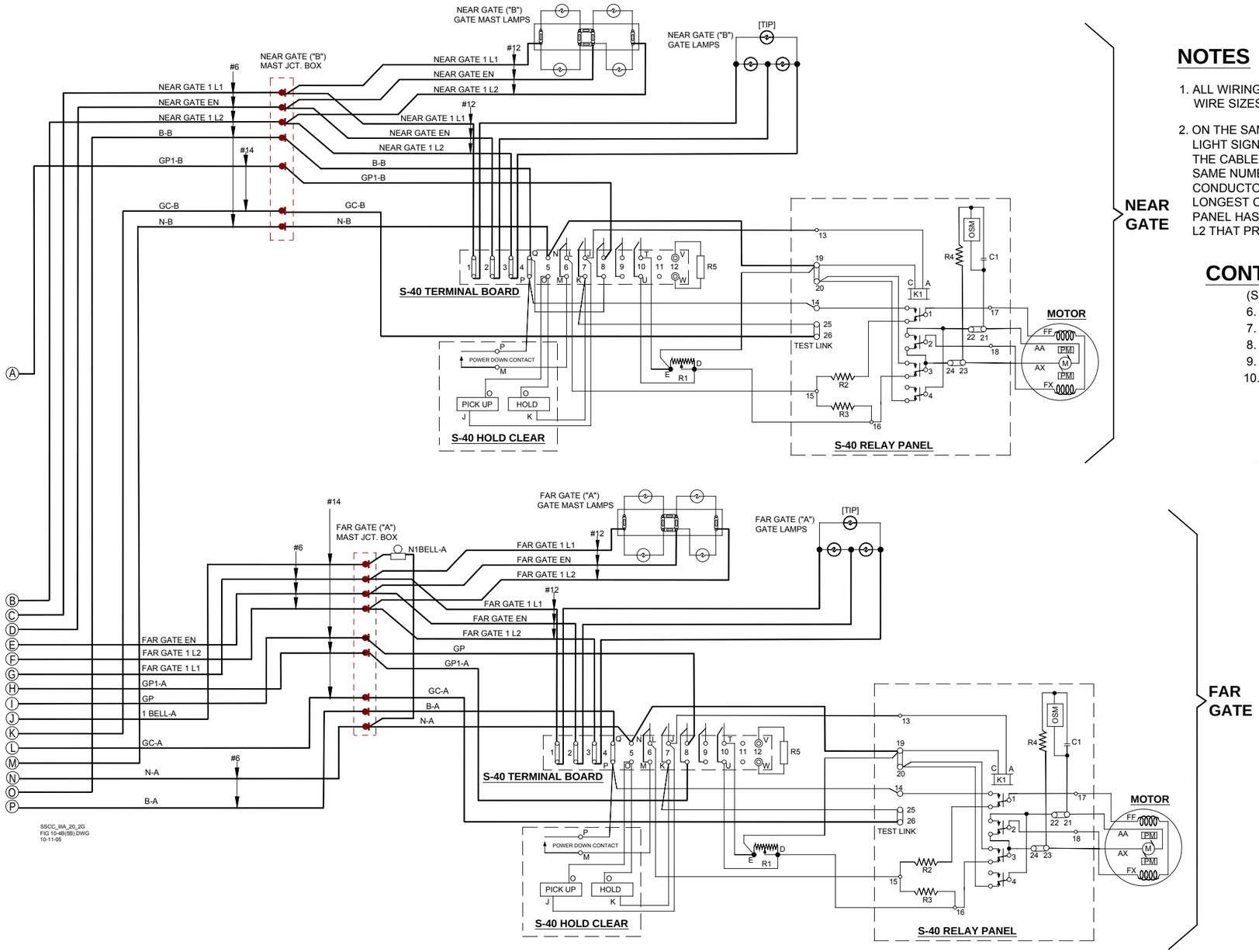
1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. THIS CONNECTION NOT REQUIRED IF GATES ARE NOT USED.
3. THE FOLLOWING SURGE PANEL SYMBOLS ARE USED:

   E = 022700-1X EQUALIZER

   ∠ = 022585-1 ARRESTER CLEARVIEW H. D.

   IL = INSULATED TESTING LINK

Figure 10-7: Typical Two-Gate Application (Common Gate Return) Using 20-Ampere Crossing Controller With Lighting/Surge Panel A91170-1 (Page 1 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. ON THE SAME SURGE PANEL, THE 'FAR GATE' IS THE FLASHING LIGHT SIGNAL OR GATE WITH THE LARGEST VOLTAGE DROP IN THE CABLE CIRCUIT. IN GENERAL, IF BOTH SIGNALS HAVE THE SAME NUMBER AND TYPE OF LAMPS AND THE SAME SIZE CABLE CONDUCTORS, THE 'FAR GATE' IS THE LOCATION WITH THE LONGEST CABLE RUN. THE 'NEAR GATE' CIRCUIT ON THE SURGE PANEL HAS AN ADJUSTABLE RESISTOR IN SERIES WITH L1 AND L2 THAT PROVIDES VOLTAGE ADJUSTMENT.

CONTACTS CLOSED & FUNCTION

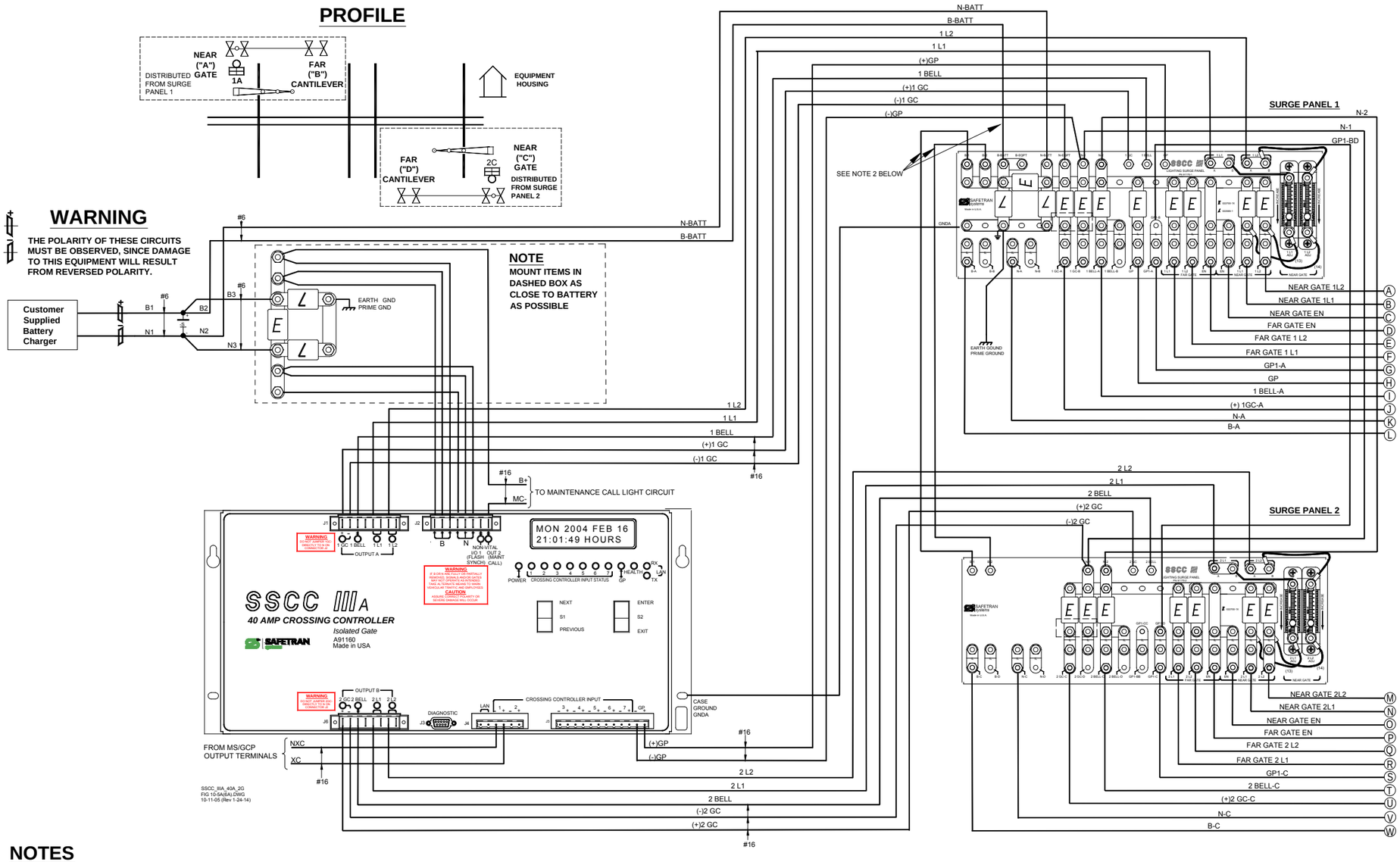
(SHOWN WITH GATE UP)

6. 45°- 90° POWER DOWN
7. 0°-89° POWER UP
8. 83°- 90° FLASHING LIGHT
9. 5°- 90° BELL
10. 0°- 5° HORIZONTAL SNUB

S-40 GATE COMPONENTS

R1 - DOWN SNUB RESISTOR, ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR
R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1 - GATE RELAY
OSM - OVERSPEED MODULE

Figure 10-8: Typical Two-Gate Application (Common Gate Return) Using 20-Ampere Crossing Controller With Lighting/Surge Panel A91170-1 (Page 2 of 2)



NOTES

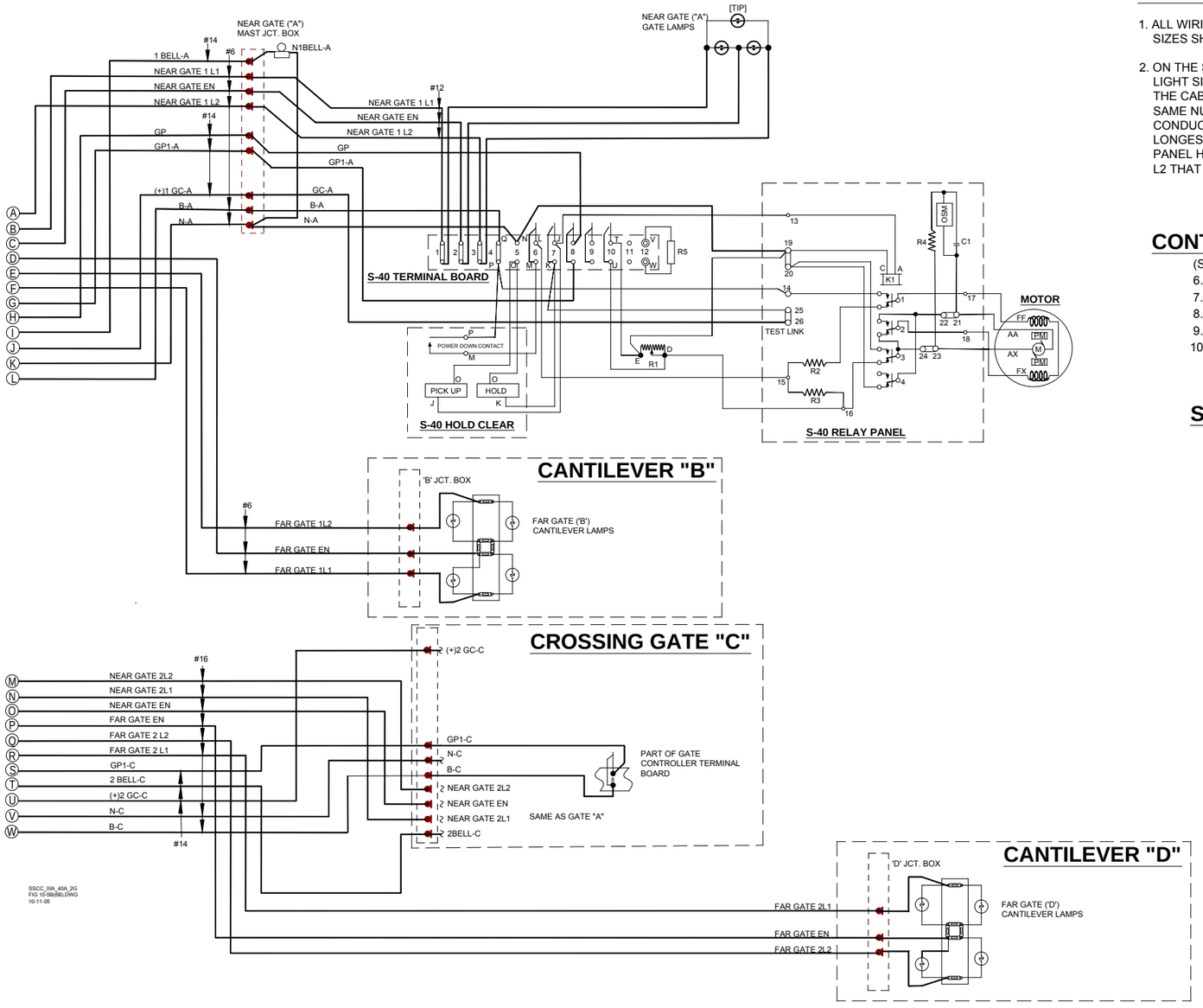
1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. THESE CONNECTIONS NOT REQUIRED IF GATES ARE NOT USED.
3. THE FOLLOWING SURGE PANEL SYMBOLS ARE USED:

   E = 022700-1X EQUALIZER

   ∠ = 022585-1 ARRESTER CLEARVIEW H. D.

   IL= INSULATED TESTING LINK

Figure 10-9: Typical Two-Gate Application (Common Gate Return) With Cantilever Flashers, 40-Ampere Crossing Controller With Lighting/Surge Panels A91170-1 and A91170-2 (Page 1 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.

2. ON THE SAME SURGE PANEL, THE 'FAR GATE' IS THE FLASHING LIGHT SIGNAL OR GATE WITH THE LARGEST VOLTAGE DROP IN THE CABLE CIRCUIT. IN GENERAL, IF BOTH SIGNALS HAVE THE SAME NUMBER AND TYPE OF LAMPS AND THE SAME SIZE CABLE CONDUCTORS, THE 'FAR GATE' IS THE LOCATION WITH THE LONGEST CABLE RUN. THE 'NEAR GATE' CIRCUIT ON THE SURGE PANEL HAS AN ADJUSTABLE RESISTOR IN SERIES WITH L1 AND L2 THAT PROVIDES VOLTAGE ADJUSTMENT.

CONTACTS CLOSED & FUNCTION

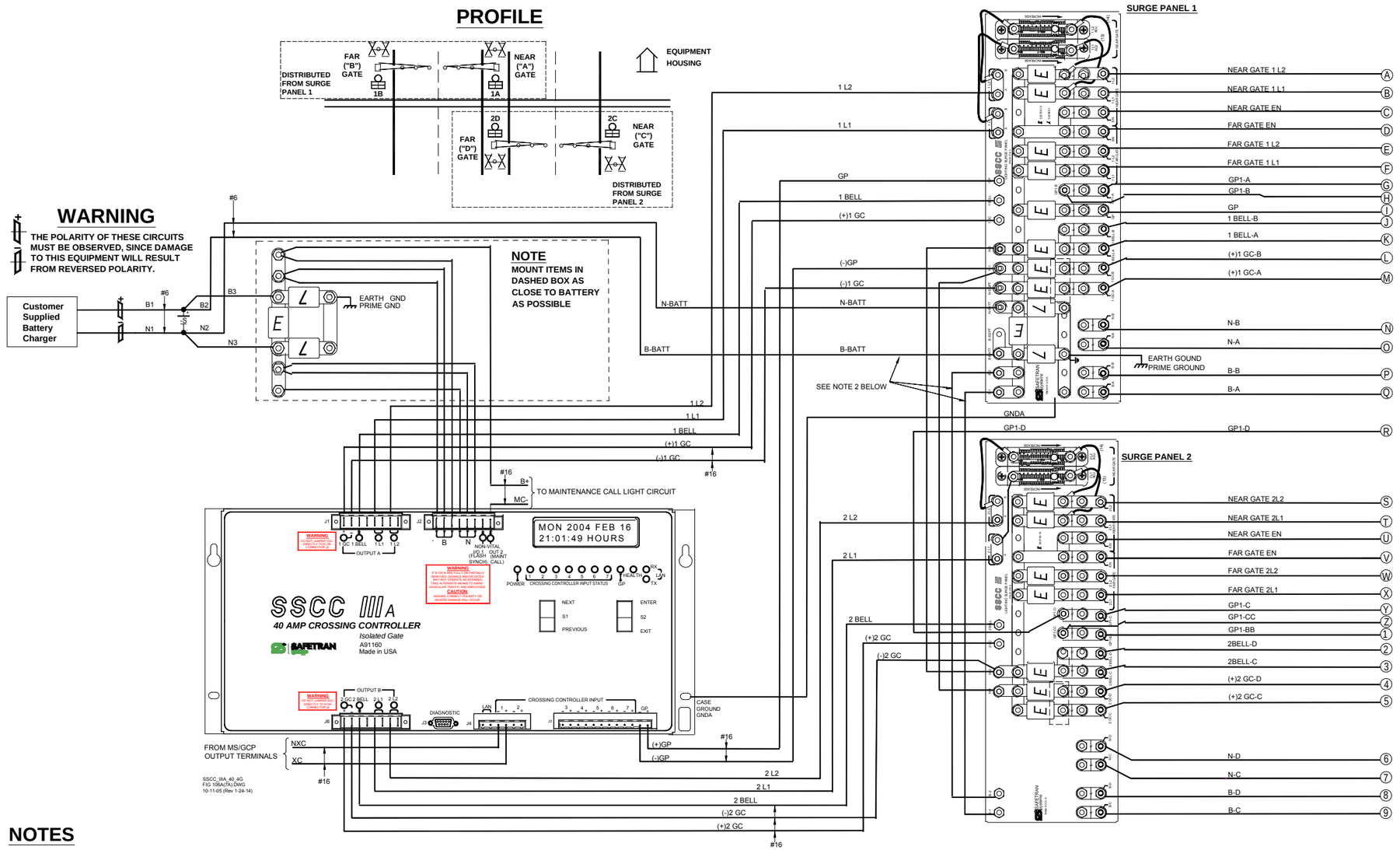
(SHOWN WITH GATE UP)

6. 45°- 90° POWER DOWN
7. 0°-89° POWER UP
8. 83°- 90° FLASHING LIGHT
9. 5°- 90° BELL
10. 0°- 5° HORIZONTAL SNUB

S-40 GATE COMPONENTS

R1 - DOWN SNUB RESISTOR, ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR
R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1 - GATE RELAY
K2 - MAINT. SWITCH RELAY
OSM - OVERSPEED MODULE

Figure 10-10: Typical Two-Gate Application (Common Gate Return) With Cantilever Flashers, 40-Ampere Crossing Controller With Lighting/Surge Panels A91170-1 and A91170-2 (Page 2 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.

2. THESE CONNECTIONS NOT REQUIRED IF GATES ARE NOT USED.

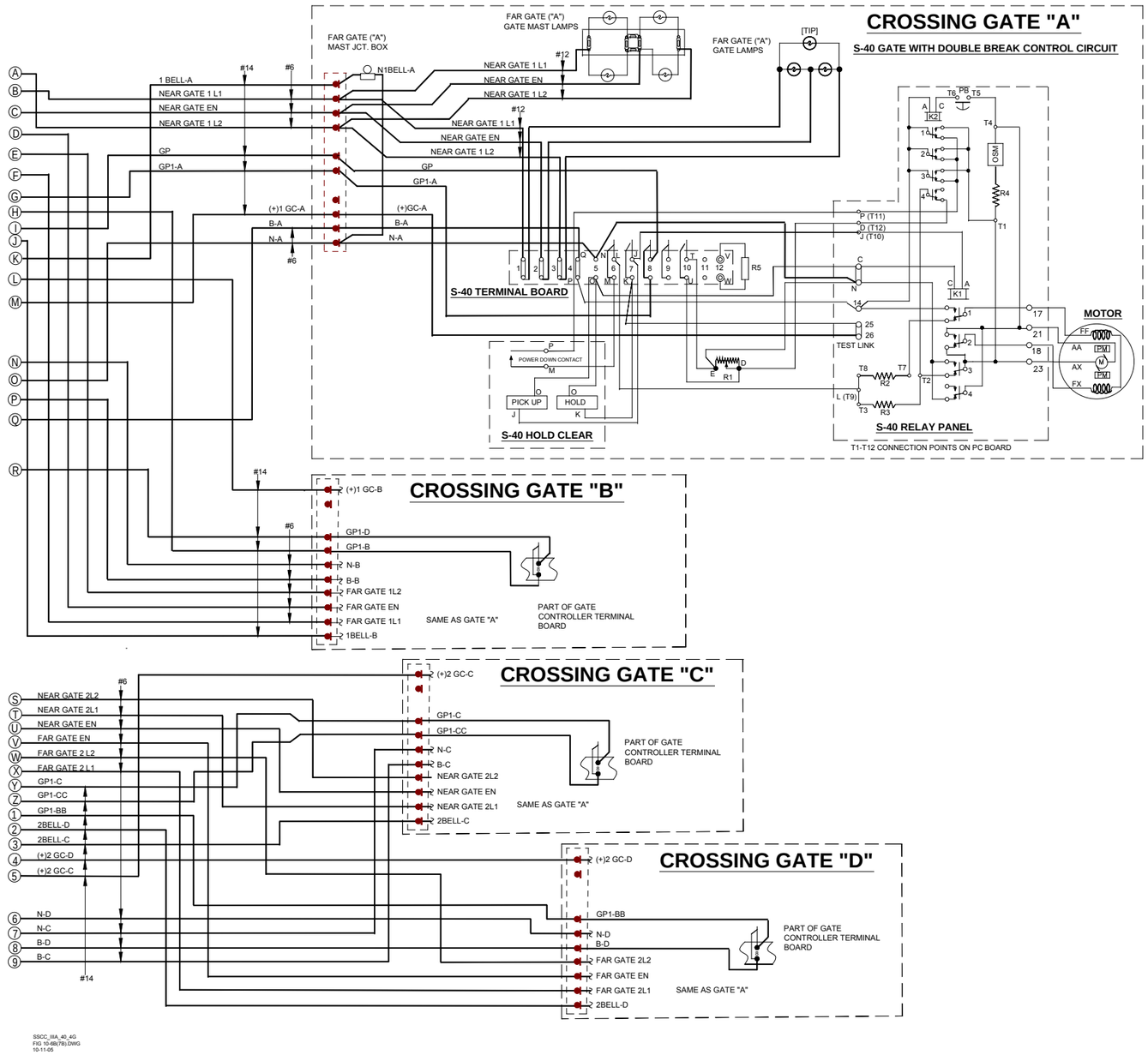
3. THE FOLLOWING SURGE PANEL SYMBOLS ARE USED:

   E = 022700-1X EQUALIZER

   ∠ = 022585-1 ARRESTER CLEARVIEW H. D.

   IL = INSULATED TESTING LINK

Figure 10-11: Typical Four-Gate Application (Common Gate Return) Using 40- Ampere Crossing Controller With Lighting/Surge Panels A91170-1 and A91170-2 (Page 1 of 2)



NOTES

1. ALL WIRING #10 AWG MINIMUM UNLESS OTHERWISE NOTED. WIRE SIZES SHOWN ARE MINIMUM GAUGE.
2. ON THE SAME SURGE PANEL, THE 'FAR GATE' IS THE FLASHING LIGHT SIGNAL OR GATE WITH THE LARGEST VOLTAGE DROP IN THE CABLE CIRCUIT. IN GENERAL, IF BOTH SIGNALS HAVE THE SAME NUMBER AND TYPE OF LAMPS AND THE SAME SIZE CABLE CONDUCTORS, THE 'FAR GATE' IS THE LOCATION WITH THE LONGEST CABLE RUN. THE 'NEAR GATE' CIRCUIT ON THE SURGE PANEL HAS AN ADJUSTABLE RESISTOR IN SERIES WITH L1 AND L2 THAT PROVIDES VOLTAGE ADJUSTMENT.

CONTACTS CLOSED & FUNCTION

(SHOWN WITH GATE UP)

6. 45°- 90° POWER DOWN
7. 0°-89° POWER UP
8. 83°- 90° FLASHING LIGHT
9. 5°- 90° BELL
10. 0°- 5° HORIZONTAL SNUB

S-40 GATE COMPONENTS

R1 - DOWN SNUB RESISTOR, ADJ.
R2 - POWER DOWN RATE RESISTOR
R3 - POWER DOWN LIMIT RESISTOR
R4 - OSM SNUB RESISTOR
R5 - DEFROSTER
K1 - GATE RELAY
K2 - MAINT. SWITCH RELAY
OSM - OVERSPEED MODULE

Figure 10-12: Typical Four-Gate Application (Common Gate Return) Using 40- Ampere Crossing Controller With Lighting/Surge Panels A91170-1 and A911z70-2 (Page 2 of 2)

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APPENDIX A
SSCC IIIA MCF RELEASE HISTORY

⚠ CAUTION

CAUTION

THE MCF LISTED BELOW IS VALID AS OF THE PUBLICATION DATE ON THIS MANUAL, BUT WILL BE UPDATED AS OPERATIONAL FEATURES ARE ENHANCED OR CHANGED. CONTACT SIEMENS CUSTOMER SERVICE FOR THE LATEST MCF REVISIONS. THE PURPOSE OF THIS NOTICE IS TO TRACK THE MCF REVISION HISTORY AND INDICATE THE MOST CURRENT VERSION.

The SSCC IIIA application configuration is contained in the Module Configuration File (MCF).

⚠ WARNING

WARNING

TO ENSURE PROPER SSCC IIIA OPERATION, VERIFY THAT THE CORRECT MCF VERSION IS INSTALLED. ALSO VERIFY THAT ALL MENU ITEMS HAVE BEEN CORRECTLY PROGRAMMED.

MCF Part Number	MCF Name	Current MCF Version	MCF CRC	Minimum Release Level
9V610-A001F	basic.mcf	F	1D240612	F

⚠ WARNING

WARNING

UNLESS DISTRIBUTED BY SIEMENS AS A GENERAL UPGRADE, AUTHORIZATION FROM SIEMENS MUST BE RECEIVED BEFORE ANY MCF NOT LISTED ABOVE CAN BE INSTALLED.

See the following table for MCF change history.

BASIC

MCF Revision/CRC	PVCS Date	Mandatory Update (Yes/No)	Change History
F/1D240612	02-11-04	No	Changes to keep gate(s) down until input is restored during boot up/reboot.
E/8F638122	04-15-03	Yes	Changes to prevent MCFs designed for 40-amp units from running on 20-amp units.
D/48CED749	02-10-03	No	Implemented MCF ID number.
C/4457951A	11-14-02	No	Changed default Flash Rate to “50 FPM” (US standard), changed default Daylignt Savings function to “OFF”.
B/1AA41911	07-19-02	No	Added Minimum Activation Timer, turn off Maintenance Call light when open neutral wire is detected.
A/90D8165F	03-11-02	No	Initial release.

SSCC IIIA HISTORY CARD

SITE SETUP DATA

Unit Serial No.: _____ Crossing No.: _____

Date Installed: _____ Installed By: _____

Crossing Controller

☐ 40-ampere unit 91160

☐ 20-ampere unit 91165

Surge Panels (Isolated Gate Control) ☐ Other_____

☐ 91181-1 (use with 40-Amp or 20-Amp units 91160 and 91165)

☐ 91181-2 (use with 40-Amp unit 91160)

Surge Panels (Common Return Gate Control) ☐ Other_____

☐ 91170-1 (use with 40-Amp or 20-Amp units 91160 and 91165)

☐ 91170-2 (use with 40-Amp unit 91160)

PROGRAM	Notes	Initial Setting By: _____ Date: _____	Setting Changed By: ___ Date: _____	Setting Changed By: ___ Date: _____
FLASH RATE:	30-70 flashes/minute Default = 50	_____ flashes/minute	_____ flashes/minute	_____ flashes/minute
GATES USED:	YES/NO Default = YES	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO
1 GC DELAY:	3-20 sec., Default = 4	_____ seconds	_____ seconds	_____ seconds
2 GC DELAY (40A):	3-20 sec., Default = 4	_____ seconds	_____ seconds	_____ seconds
GATE RISING BELL:	ON/OFF, Default = ON	☐ ON ☐ OFF	☐ ON ☐ OFF	☐ ON ☐ OFF
GC2/I7:	GC2 normal, I7 = normal GC2 inverted, I7 = normal GC2 prmt , I7 = prmt health GC2 Beacon	☐NORMAL ☐INVERTED ☐PRE-EMPT SIM ☐PRE-EMPT ADV ☐BEACON	☐NORMAL ☐INVERTED ☐PRE-EMPT SIM ☐PRE-EMPT ADV ☐BEACON	☐NORMAL ☐INVERTED ☐PRE-EMPT SIM ☐PRE-EMPT ADV ☐BEACON
MIN ACTIVATION TIME	0 – 99 sec., Default = 20	_____ seconds	_____ seconds	_____ seconds
ENABLED INPUTS:	Inputs 1 – 7 only	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
ENABLED OUTPUTS (40A):	Default = A + B	☐ A + B ☐ A ☐ B	☐ A + B ☐ A ☐ B	☐ A + B ☐ A ☐ B
TIME:	24-hour format	☐ Time Set	☐ Time Set	☐ Time Set
DATE:	-	☐ Date Set	☐ Date Set	☐ Date Set
DAYLIGHT SAVING:	Default = DISABLED	☐ Enabled ☐ Disabled	☐ Enabled ☐ Disabled	☐ Enabled ☐ Disabled
PASSWORD:	Default = DISABLED	☐ Enabled ☐ Disabled	☐ Enabled ☐ Disabled	☐ Enabled ☐Disabled

SSCC IIIA HISTORY CARD

SITE SETUP DATA (continued)

CONFIGURE				
LOS TIMERS:	0-20 seconds, Inputs 1 – 7, Default = 0	1:____ sec 5:____ sec 2:____ sec 6:____ sec 3:____ sec 7:____ sec 4:____ sec	1:____ sec 5:____ sec 2:____ sec 6:____ sec 3:____ sec 7:____ sec 4:____ sec	1:____ sec 5:____ sec 2:____ sec 6:____ sec 3:____ sec 7:____ sec 4:____ sec
ATCS Address:	Default = 700000000000			
LOW BATTERY:	9.0-15.0 volts, or Disabled Default = DISABLED	☐ Disabled ☐ Enabled _____ volts	☐ Disabled ☐ Enabled _____ volts	☐ Disabled ☐ Enabled _____volts
AUX I/O:	Default = NONVITAL OUTPUT	☐NV Out ☐ Fl Sync In ☐Flash Sync Out	☐NV Out ☐ Fl Sync In ☐Flash Sync Out	☐NV Out ☐ Fl Sync In ☐Flash Sync Out
DETECT LAMP NEUTRAL WIRE:	Default = Yes	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No

TEST CONFIGURE				
LAMP TEST CANCEL TIMER:	1-15 minutes, Default = 5	_____ minutes	_____ minutes	_____ minutes
LAMP TEST DELAY TIMER:	30-120 sec, Default = 30	_____ seconds	_____ seconds	_____ seconds
LAMP TEST ON TIMER:	15-60 sec, Default = 15	_____ seconds	_____ seconds	_____ seconds

STANDARD SETUP LAMP VOLTAGES PROCEDURE
USING TRUE RMS AC + DC METER, OR CONVERSION TABLE BELOW

SETUP LAMP VOLTAGES	Initial Setting By:_____ Date: _____ Meter: _____	Initial Setting By: _____ Date: _____ Meter: _____	Initial Setting By: _____ Date: _____ Meter: _____
FAR GATE	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts
SSCC IIIA	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts
NEAR GATE	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts	1 L1 = _____volts 1 L2 = _____volts 2 L1 = _____volts 2 L2 = _____volts

Multimeter Reading Variance From Actual Lamp Voltage

Battery Voltage	**Regulated Lamp Drive Voltage Range**	**Measurement Below Actual Drive Voltage**	
		Using Digital Multimeter (Fluke 87 or Equivalent)	**Using Analog Multimeter (TS111)**
13.3	9.0 to 12.0	1.3 volts	0.6 volt
	>12.0	0.91 volt	0.42 volt
14.7	9.0 to 12.0	2.2 volts	1.1 volts
	>12.0	1.54 volts	0.77 volts
15.8	9.0 to 12.0	2.6 volts	2.0 volts
	>12.0	1.82 volts	1.4 volts