SIEMENS

CONFIGURATION SUMMARY

SEAR II APPLICATION 9V835-A01B (CP007B) PREPARED FOR CANADIAN PACIFIC RAILWAY

OCTOBER 2007, REVISED APRIL 2014

DOCUMENT NO. SIG-00-04-15-001
VERSION B.1

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PRINTED IN U.S.A.

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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.

DOCUMENT HISTORY

Version	Release Date	Sections Changed	Details of Change
A			Initial release
B	September 2007		Manual updated to conform with the following 9V835-A01B (CP007B) software modifications: 1. Modified the CDL to use ISL2k in calculations when the MD/GCP2K input was not used. 2. Separated Track 1 and Track 2 WT recovery messages. Old code allowed good move on track 2 to clear WT alarm on track 1 and vice-versa. 3. Corrected light out and flash rate alarms, to allow each train move with the alarm to cause an alarm message to be recorded and sent. Previous logic would send the alarm for the first train affected, then not again until the alarm was reset. 4. Changed MAINTK digital input tags to BCR/MAINTK. 5. Added DTMF operation. 6. Added code to automate the Echelon configuration of the MCM, and VHF modules. 7. Added online/offline messages for configured Echelon components. 8. Added 2GCK to Gate Not Recovered calculation. Modified the code to capture valid GCK activation before calculating the alarm, and added GATE NOT UP for 30+ minutes, for cases where one of the gates is not up and GCK has not been activated. 9. Corrected Gate Not Down alarm clear messages. Clear message will not occur until a gate movement without the alarm condition exists. 10. Added test switch gate up input and monitoring. 11. Changed BELLK UP/DOWN tags to BELLK ON/OFF. 12. Added TESTSWITCH activation of 10-minute User Test Mode. 13. Changed trouble light operation to trigger on power off, or low battery only. Also added capability of flashing the trouble output relay, when configured by Site Setup menu question. 14. Changed alarm numbers to better align with other applications.

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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:

<u>WARNING</u>

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.

<u>CAUTION</u>

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.

<u>NOTE</u>

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

If there are any questions, contact Siemens Industry Inc., Rail Automation 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 Industry, Inc., 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.

1.0   DIGITAL INPUT STANDARD CONFIGURATION

(see Spare table for spare input assignments)

INPUT	USAGE	LABEL	NORMAL LOGIC STATE
1	MD/GCP 1	MD/GCP1K	1
2	**Island 1	ISL1K	1
3	XR (see note 3 below)	XK (see note 3 below)	0 or 1*
4	Gate Control 1	1GCK	1
5	Gate Up	GPK	1
6	Gate Down 1	1GDK	0 or 1*
7	Gate Down 2	2GDK	0 or 1*
8	Bell1	1BELLK	0
9	MD/GCP 2	MD/GCP2K	1
10	**Island 2	ISL2K / NISL2K	1
11	# Equipment Transfer 2	EQPT XFER2	0
12	# Equipment Transfer 1	EQPT XFER1	0
13	# Bell2 (see note 3 below)	2BELLK (see note 3 below)	0
14	Door	DOOR	0 or 1*
15	***BCR/MaintK	BCR/MAINTK	1
16	Gate Control 2	2GCK	1
17	Test Switch	TESTSWK	0 or 1*
18	# DAX1	DAX1	0 or 1*
3 or 13	TestSWGUPK (See note 3 below)	TestSWGUPK (See note 3 below)	1

  * NOTE 1:   Depending on the design of the circuit, and answers to menu questions in Site Setup.

  # NOTE 2:   These inputs are assigned as Spare inputs when not configured as designated, see Spare table.

     NOTE 3:   If XR is not used, TestSWGUPK will be assigned to INPUT3, else it will be assigned to INPUT13.   TestSWGUPK will be assigned automatically depending on answers to Site Setup questions. If TestSwGUPK is assigned to Input13, then 2BELLK will be available as an optional tag to be assigned manually. 2BELLK will keep its original LED assignment, regardless of input assignment.

  ** NOTE 4:   ISL1K, and ISL2K must only be used with tracks that are islands. Use by any other track will cause errant Warning Times, and alarms. ie. For an OS track adjacent to the island, use the AUX_TK tag from the list of manual tags, or manually assign a tag name. Be sure the new tag name does not match ISL1K, or ISL2K

* NOTE 5:   The BCR/MAINTK input is an autodetected input. If the input is High for 3 seconds after SEAR II power up, or reboot it is determined to be active.

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2.0   STANDARD LED CONFIGURATION

LED	LABEL	OFF =	ON =	FLASHING =
01	Crossing Active	MD/GCP1K & MD/GCP2K & XK & ISL1K and ISL2K all up	MD/GCP1K or MD/GCP2K or XK or ISL1K or ISL2K down	
02	Island Occupied	Island 1 & Island 2 not occupied	Island 1 & Island 2 occupied	
03	Gate Control 1	1GCK UP	1GCK DOWN	
04	Gate Control 2	2GCK UP	2GCK DOWN	
05	Gate Up	GPK UP	GPK DOWN	
06	Gate 1 Down	1GDK NOT DOWN	1GDK DOWN	
07	Gate 2 Down	2GDK NOT DOWN	2GDK DOWN	
08	Gate 3 Down	3GDK NOT DOWN	3GDK DOWN	
09	Gate 4 Down	4GDK NOT DOWN	4GDK DOWN	
10	Bell Control 1	1BELLK OFF	1BELLK ON	
11	Bell Control 2	2BELLK OFF	2BELLK ON	
12	Equipment Transfer 2	MAIN 2	STANDBY 2	
13	Equipment Transfer 1	MAIN 1	STANDBY 1	
14	Test Switch	TESTSWK OFF	TESTSWK ON	TestSWGUPK input is high
15	DAX	DAX1 UP	DAX1 DOWN	
16	Crossing Controller Fail	CONTROLLER OK	CONTROLLER FAILED	

3.0   BATTERY INPUT CONFIGURATION

INPUT	USAGE	LABEL	NORMAL RANGE
1	STANDBY BATTERY	B12	Minimum Level - 16.6 VDC
2	LIGHT BATTERY	XB12	Minimum Level - 16.6 VDC
3	AC/POR	AC/POR	Power on > 2.0 VDC

4.0   RELAY OUTPUT CONFIGURATION

OUTPUT	USAGE	LABEL	CONTACT CLOSED	CONTACT OPEN	TOGGLE
1	DTMF OUTPUT 1	DTMFOUT1	ACTIVE	INACTIVE	N/U
2	DTMF OUTPUT 2	DTMFOUT2	ACTIVE	INACTIVE	N/U
2	TROUBLE LIGHT	TRBLE LITE	OFF	ON	FLASH

NOTES :
1. DTMFOUT1 : It is configured when; ALLOW DTMF CONTROL is YES, during Site Setup.

2. DTMFOUT2 : It is configured when; ALLOW DTMF CONTROL is YES, and DTMF OUTPUT2 DELAY is not equal to 0, during Site Setup.

3. TROUBLE LIGHT : It is configured when; ALLOW DTMF CONTROL is NO, and FLASHING TROUBLE LIGHT OUTPUT is not set to UNUSED, during Site Setup. **OR** if ALLOW DTMF CONTROL is YES, and DTMF OUTPUT2 DELAY is equal to 0, and FLASHING TROUBLE LIGHT OUTPUT is not set to UNUSED, during Site Setup.

5.0   ECHELON CONFIGURATION

SLOT NUMBER (IF CONFIGURED)	USAGE	LABEL
1	WCP/CPU	MCM
2	VHF Communicator	VHF
3	ILOD	ILOD1
4	ILOD	ILOD2
5	ILOD	ILOD3
6	ILOD	ILOD4
7	GCP3000	Main gcp1
8	GCP3000	Stby gcp1
9	SSCC	SSCC1
10	SSCC	SSCC2
11	GCP3000	Main gcp2
12	GCP3000	Stby gcp2

6.0   SPARE INFORMATION

6.1   Spare Digital Input Configuration

INPUT	USAGE	LABEL	NORMAL LOGIC STATE
1 -10, 13, 15 - 17	NOT USED AS SPARE		
11	Spare 11	Specified via menu selection or manually	0 or 1*
12	Spare 12	Specified via menu selection or manually	0 or 1*
14	Spare 14	Specified via menu selection or manually	0 or 1*
18	Spare 18	Specified via menu selection or manually	0 or 1*

NOTE 1: Depending on the design of the external input circuit, and answers to menu questions in Site Setup

6.2   Spare Input To LED Assignment

LED	ASSIGNED TO INPUT #	LED ON/OFF (States are defined by the menu questions)
08	INPUT 14	
11	INPUT 13	
13	INPUT 12	
15	INPUT 18	

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6.3   Available Spare Input Names

TAG NAME	OFF NAME	ON NAME
AUX_POK	OFF	ON
*AUX_POK	ON	OFF
AUX_TK	DOWN	UP
*AUX_TK	UP	DOWN
FRK1	DOWN	UP
*FRK1	UP	DOWN
FRK2	DOWN	UP
*FRK2	UP	DOWN
DAX2	DOWN	UP
*DAX2	UP	DOWN
DAX3	DOWN	UP
*DAX3	UP	DOWN
DAX4	DOWN	UP
*DAX4	UP	DOWN
3GDK	NOT DOWN	DOWN
*3GDK	DOWN	NOT DOWN
4GDK	NOT DOWN	DOWN
*4GDK	DOWN	NOT DOWN
2BELLK	DOWN	UP
TESTSWGUPK	OFF	ON

* NOTE: The above selections are available in the Digital Configuration section of the SEAR II menu. Alternative tag names may be entered manually in the Digital Configuration section of the SEAR II menu.

7.0   MENU ITEMS (QUESTIONS DURING SITE SETUP)

NUMBER of TRACK INPUTS?	0 to 2		
NUMBER of ISLAND TRACKS?	0 to 2		
XR ACTIVE WHEN INPUT:	UNUSED	NOT ENERGIZED	ENERGIZED
NUMBER OF GATE CONTROLS?	0 to 2		

If # of Gate Controls > 0

GPK EXISTS?	YES	NO	
1GDK DOWN WHEN INPUT ..	UNUSED	NOT ENERGIZED	ENERGIZED
2GDK DOWN WHEN INPUT ..	UNUSED	NOT ENERGIZED	ENERGIZED

DOOR OPEN WHEN INPUT ..	UNUSED	NOT ENERGIZED	ENERGIZED
TSTSWITCH INPUT 17 ACTIVE WHEN..	UNUSED	NOT ENERGIZED	ENERGIZED
TSTSWITCH GATE UP INPUT...	USED	UNUSED	
1BELLK INPUT	USED	UNUSED	

If XR = UNUSED, or TSTSWITCH GATE UP = UNUSED,

2BELLK INPUT	USED	UNUSED	

DAX1 ACTIVE WHEN INPUT:	UNUSED	NOT ENERGIZED	ENERGIZED
NUMBER of EQUIPMENT TRANSFER INPUTS?	0 to 2		

NOTE

If 3GDK, or 4GDK is to be tagged to spare inputs 11 through 14, or 18, then the answer to the LED 8 question should be UNUSED, as well as the questions with reference to the actual inputs used.   i.e. if 3GDK is assigned to INP13, answer UNUSED to LED11 **AND** LED 8. 3GDK and 4GDK will always be assigned to LED's 8 & 9 regardless of the input used for these tags.

LED8 ON, IF INP14..	UNUSED	NOT ENERGIZED	ENERGIZED

If # of TRANSFER INPUTS < 2

LED12 ON, IF INP11..	UNUSED	NOT ENERGIZED	ENERGIZED

If # of TRANSFER INPUTS is 0

LED13 ON, IF INP12..	UNUSED	NOT ENERGIZED	ENERGIZED

If DAX1 is UNUSED

LED15 ON, IF INP18..	UNUSED	NOT ENERGIZED	ENERGIZED

(*Continued on next page*)

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MENU ITEMS (*continued*)

ALLOW DTMF CONTROL   NO   YES
If DTMF CONTROL = YES
      DIGIT #1:   0 to 9
      DIGIT #2:   0 to 9
      DIGIT #3:   0 to 9
      DIGIT #4:   0 to 9
      DIGIT #5:   0 to 9
      VHFC CHANNEL (1 to 8):   1 to 8
      DTMF TIME-OUT: 30 to 240
      DTMF OUTPUT 2 DELAY: 0 to 20
If DTMF CONTROL = NO, or, if DTMF CONTROL = NO and DTMF OUTPUT 2 DELAY = 0
      FLASHING TROUBLE LIGHT OUTPUT?   UNUSED   NO   YES
        (if both DTMF1 and DTMF2 outputs are used, the troublelight output cannot be used)

HOW MANY SETS OF GCP3000's?   0 to 2
    If more than 0 is selected
    DOES FIRST GCP HAVE A STANDBY?   YES   NO
    If more than 1 is selected
    DOES SECOND GCP HAVE A STANDBY? YES   NO

HOW MANY iLODS?   0 to 4
    If more than 0 ILOD's selected
    MINIMUM FLASH RATE?   35 **or** 55

HOW MANY SSCCIII UNITS?   0 to 2

BATTERY INPUT 1..   B12   NONE
BATTERY INPUT 2..   XB12   NONE
BATTERY INPUT 3..   AC/POR   B14   NONE

MINIMUM NORMAL VOLTAGE (default=10.5V)   10.5, 9.0, 9.2, 9.5, 9.7, 10.0, 10.2, 10.7, 11.0, or
                                                11.2

MINIMUM WARNING TIME (seconds)   20 to 94
DESIRED WARNING TIME (seconds)   20 to 99
IGNORE WARNING TIMES BELOW (seconds)   0 to 10
GATE NOT DOWN ALARM TIME (seconds)   8 to 30
CROSSING ACTIVE ALARM AFTER (minutes)   20 to 60

8.0   DTMF OPERATION

Activate crossing (station stop track 1)	abcde11#
De-activate crossing (station stop track 1)	abcde10#
Activate crossing (station stop track 2)	abcde21#
De-activate crossing (station stop track 2)	abcde20#
Activate crossing (maintenance)	abcde31#
De-activate crossing (maintenance)	abcde30#

NOTE

a = digit #1, b = digit #2, c = digit #3, d = digit #4, and e
= digit #5, as entered during Site Setup.

- DTMF digits a b c d e, will be determined by menu questions during Site Setup.
- VHF Communicator channel will be determined by menu questions during Site Setup.
- When a valid code is received, a beep tone will be returned via radio.
- When a digit is received, a 10 second timer will be started. The digit receive queue will be cleared when the timer expires, or when a valid code is received.
- DTMF1 Output will be assigned to Relay Output 1 onboard the SEAR II module.
- DTMF2 Output can be assigned to a Relay Output 2 onboard the SEAR II module, if used.

8.1   Activation

DTMF1 output contact will be open during the INACTIVE state. When any of the activation codes are detected, DTMF1 will be determined ACTIVE, contact closed.

If DTMF2 exists, its output contact will be open during the INACTIVE state. The DTMF2 output will become ACTIVE, contact closed, after the DTMF OUTPUT 2 DELAY time programmed by the user configuration, 0 to 20 seconds. The timer will be started by DTMF1 becoming active.

8.2   De-Activation

If the de-activate code is received while the corresponding activate code is true, both DTMF1 and DTMF2 outputs will be set to INACTIVE.

Island 1 occupancy for more than 5 seconds will cause both DTMF1 and DTMF2 to be set to INACTIVE, only if the Station Stop Track 1 code was received to cause the activation.

Island 2 occupancy for more than 5 seconds will cause both DTMF1 and DTMF2 to be set to INACTIVE, only if the Station Stop Track 2 code was received to cause the activation.

The DTMF TIME-OUT timer, which is programmed by the user configuration, (time 30 to 240 seconds) will start whenever any of the 3 activation codes are received. If the timer reaches the preset time, DTMF1 and DTMF2 will both be set to INACTIVE.

If the maintenance activation code causes the activation, then de-activation will occur at the end of the DTMF TIME-OUT timer, or upon receipt of the maintenance de-activation code. Island occupancy will not de-activate the maintenance code activation.

Other Notes:

Upon power-up, or after a reset, the SEAR II will set the DTMF1, and DTMF2 outputs to the INACTIVE state, contact open.

Event Log Messages:

"DTMF STATION TRACK 1 CONTROL RECEIVED"

"DTMF STATION TRACK 2 CONTROL RECEIVED"

"DTMF MAINTENANCE CONTROL RECEIVED"

"DTMF TIME-OUT"

"DTMF STOP CONTROL RECEIVED"

"DTMF STOP DUE TO ISLAND"

9.0   ALARM (TEST) LEDS, (IF NO ALARM, LED WILL BE GREEN)

LED	LABEL	RED	YELLOW
T1	AC POWER Note: AC power is ON if LED is steady in any color.	**Flashing** – AC currently off, more than 60 minutes. **Steady** – AC was off more than 60 minutes, but has since been restored.	**Flashing** – AC currently off, for less than 60 minutes. **Steady** – AC was off less than 60 minutes, but has since been restored.
T2	Battery	**Flashing** – One of the battery banks has been in alarm for more than 10 seconds. **Steady** – One of the battery banks has been in alarm for more than 10 seconds, but has since been restored.	**Flashing** – One of the battery banks has been in alarm for less than 10 seconds. **Steady** – One of the battery banks has been in alarm for less than 10 seconds, but has since been restored.
T3	LOD	**Flashing** – 1 or more bulbs was out during a train move **Steady** – One or more configured ILOD's are Offline, (not reporting on Echelon).	**Flashing** – The flash rate was not normal for last train move. **Steady** – Flash rate was in alarm state, but has since cleared.
T4	Warn Time	**Flashing** – Last train move had a warn time less than the Min warn time entered during Site Setup, default is 20 seconds. **Steady** – Warn time alarm had been set, but last train move had a normal warn time.	**Flashing** – Last train move had a warn time less than the Desired warn time but more than Min warn time. **Steady** – Warn time monitor had been set, but last train move had a normal warn time.
T5	Xing Active too Long	**Flashing** – Xing is active and has been for more than the User setting, default is 20 minutes. **Steady** – Xing was for more than the User setting, default is 20 minutes, and has since recovered.	
T6	Gate Remains Down	**Flashing** – GCK is UP, but one of the Gates has been down for 20+ minutes. **Steady** – Alarm was triggered, but the gate(s) have since recovered.	
T7	Gate Not Down	**Flashing** – 1 or more gates, took longer than the user defined setting to lower after GCK went down. **Steady** – Alarm was triggered, but the last gate move was ok.	
T8	Gate Not Recovered	**Flashing** – 1 or more gates, took longer than 20 seconds to raise after GCK went UP, or the GPK input is off longer than 30 minutes with GCK's up. **Steady** – Alarm was triggered, but gates have since recovered to pick the GPK.	

10.0   ALARM CONDITIONS

NOTE

All alarm LEDs can be reset to their current state by pressing the CLEAR ALARM key. If an alarm condition is still valid, the LED will continue to flash. All steady-colored LEDs will be reset to GREEN STEADY. Any LEDs not lit are defective or a problem exists with the application program.

10.1 AC Power Alarm (T1 LED)

Alarm if AC/POR input is < 0.5 VDC when a train passes the location; if no train passed the location after 60 minutes with AC/POR input < 0.5 VDC, send in "AC POWER OFF FOR 60 MINUTES"

An alarm will be sent in each time a train passes the location with AC/POR < 0.5 VDC. The time elapsed since AC/POR < 0.5 VDC will be shown in the alarm message.

Alarm clears if both inputs (if defined) are normal for a minimum of 5 minutes.

Only voltage changes of greater than 0.5 V will be logged in the Standard Event Report.

10.1.1 Alarm Text

Train passes location with POR < 0.5 VDC for less than 60 minutes.

AC POWER OFF FOR xx MINUTES (xx = number of minutes elapsed since POR < 0.5 VDC).

No train passed location with POR < 0.5 VDC for 60 minutes:

- **AC POWER OFF FOR 60 MINUTES**
- **AC POWER BACK ON**

10.1.2 T1 LED

GREEN if AC power is ON, and has not been in alarm since last Clear Alarm press.

YELLOW FLASHING if AC power is lost for less than 60 minutes.

YELLOW STEADY if power lost for less than 60 minutes and then restored.

RED FLASHING if AC power is lost for 60 minutes or more.

RED STEADY if power lost for 60+ minutes and then restored for a minimum of 5 minutes.

10.1.3 Office Alarm Management System

TBD

10.2 Battery (B12, XB12, B14) Alarm (T2 LED)

Alarm if the input is outside of the normal range of Min. (a user defined value) to 16.6 VDC for over 5 seconds. The user-defined minimum voltage will be determined after checking the failure voltage for all equipment at the location.

Alarm clears when input returns to within normal limits for 10 seconds.

Only voltage changes of greater than 0.5 V will be logged in the Standard Event Report

10.2.1 Alarm Text

(XNG)B12 LOW VOLTAGE: xx.x VDC
(XNG)B12 HIGH VOLTAGE: xx.x VDC
(XNG)B12 NORMAL VOLTAGE: xx.x VDC
(XNG)XB12 LOW VOLTAGE: xx.x VDC
(XNG)XB12 HIGH VOLTAGE: xx.x VDC
(XNG)XB12 NORMAL VOLTAGE: xx.x VDC
(XNG)B14 LOW VOLTAGE: xx.x VDC
(XNG)B14 HIGH VOLTAGE: xx.x VDC
(XNG)B14 NORMAL VOLTAGE: xx.x VDC

Note: **xx.x** = actual read voltage

10.2.2 T2 LED

GREEN upon start of application program.

YELLOW FLASHING if battery power moves out of range, but not long enough for alarm.

YELLOW STEADY if battery power moved out of range, no alarm generated and is now back in range.

RED FLASHING if battery has been out of range for over 5 seconds.

RED STEADY if power moved out of range, generated alarm and is now back in range for 10 seconds.

<u>**NOTE**</u>

The actual battery bank and alarm type (high, low) will be scrolled on the display as part of the normal messages.

10.2.3 Office Alarm Management System

TBD

10.3   Light Out Detected (T3 LED)

Alarm conditions will only be monitored when crossing has been active for more than 20 seconds.

Alarm if 2 or more burnt bulbs are detected. Record 1 burnt bulb in event log

Monitor current flow through lamp circuits and alarm if flash rate is outside of the normal range (55 - 65 FPM).

An alarm will be sent in each time a train passes the location with 2 or more burnt bulbs or abnormal flash rate.

ILOD(s) will be monitored for Echelon Online/Offline. Offline/Online messages to be sent to the office, and Offline messages to be displayed on the SEAR II display.

10.3.1 Alarm Text

(XNG)SLOW FLASH RATE: xx FPM

(XNG)FAST FLASH RATE: xx FPM

(XNG)NORMAL FLASH RATE

(XNG)TWO BULBS OUT

(XNG)MULTIPLE BULBS OUT

(XNG)NORMAL BULBS

(XNG)ILODx OFFLINE

(XNG)ILODx ONLINE

Note: **x** = ILOD Number

10.3.2 T3 LED

GREEN upon start of application program.

Flasher failure:

YELLOW FLASHING if the flash rate of any lamp is outside of the FRA-required range of 35 to 65 FPM.

YELLOW STEADY if the flash rate of any lamp is outside of the normal range of 55 to 65 FPM.

Bulb failure:

RED FLASHING if any number of burnt bulb is detected.

iLOD(s) Offline:

RED STEADY if any configured ILOD does not communicate on the Echelon.

10.3.3 Office Alarm Management System

TBD

10.4 Warning Time Track 1 Or 2 Alarm (T4 LED)

The minimum warning time (**MW**) will be specified by the user (range = 20 to 94 seconds).

The desired warning time (**DW**) will be specified by the user (range = 20 to 99 seconds).

The ignored warning time (**IW**), below which will be treated as a false alarm, will also be specified by the user (range = 0 to 10 seconds).

Warning time is calculated from **CrossingActive** to **IslandDropped**.

Alarm if warning time is less than the specified minimum warning time (MW).

Alarm clears after next train with normal warning time.

For Short Warn Alarm:

- If 2 tracks, and 1 island: are configured, island 1 will be used for both Warning Time alarms, no input for Island 2. All moves will be Track 1.

- If 1 or 2 tracks, and 2 islands are configured, the track number of a train move will be determined by the first island to be occupied.

10.4.1 Alarm Text

For Warning Time less than the user-specified minimum warning time (**MW**), but greater than **IW**, send to the office and record in event log:

> **(XNG)WARN TIME TK1 ALARM: xx**
>
> **(XNG)WARN TIME TK2 ALARM: xx**
>
> **(XNG)WARN TIME ALARM CLEAR**

Note: Warn Time Alarm Clear message sent only when Clear Alarm button is pressed on SEAR II.

For Warning Time less than the user-specified ignored warning time (**IW**), record in the event log only.

> **(XNG)WARN TIME TK1 IGNORED: xx**
>
> **(XNG)WARN TIME TK2 IGNORED: xx**

For Warning Time less than the user-specified desired warning time (**DW**), but greater than **MW,** record in the event log.

> **(XNG)WARN TIME TK1 MONITOR: xx**
>
> **(XNG)WARN TIME TK2 MONITOR: xx**

The above message will be sent to the office for the first good train move after one or more of the WT alarm message, if the warning time is less than (DW), but greater than (MW).

Each normal train move record the following message in the event log, if no other train move message is required.

> **(XNG)WARN TIME TK1 INFO: xx**
>
> **(XNG)WARN TIME TK2 INFO: xx**

The above message will be sent to the office for the first good train move after one or more of the WT alarm message, if the warning time is greater than or equal to (DW).

Note: **xx** = actual seconds of warning time

GREEN upon start of application program.

YELLOW FLASHING if last train by crossing had a warning time less than DW but greater than MW.

YELLOW STEADY if prior train had a warning time less than DW and last train had normal warning time.

RED FLASHING if last train by crossing had a warning time alarm (less than MW).

RED STEADY if prior train had alarm and last train had no alarm.

CrossingActive is calculated by monitoring the MD/GCP1K, MD/GCP2K and XK inputs to see if any have dropped. If any of these names are not assigned, they are ignored.

IslandDropped is calculated by either the ISL1K or ISL2K inputs dropping. The first to drop will be recognized. Track number for a train move will be determined by the first island to be occupied. If **CrossingActive** is not TRUE when this flag becomes TRUE, then it is also set to TRUE. If either name is not assigned, it will be ignored.

10.4.2 Office Alarm Management System

TBD

10.5 Crossing Active Too Long (T5 LED)

Alarm if **CrossingActive** TRUE for a user-specified number of minutes (default = 20 minutes)

CrossingActive means either the XR is down, either MD/GCP is down, or the Island is down.

No new T5 alarm will be generated after an "CROSSING ACTIVE FOR xx MINUTES" alarm has been generated and sent to the office.

Alarm clears when **CrossingActive** becomes FALSE.

10.5.1 Alarm Text

> **(XNG)CROSSING ACTIVE FOR xx MINUTES**
>
> Note: **xx** = user-specified number of minutes
>
> **(XNG)CROSSING ACTIVE ALARM OFF**

10.5.2 T5 LED

GREEN upon start of application program

RED FLASHING if CrossingActive is TRUE for user-specified number of minutes

RED STEADY if alarm condition occurred and is currently not in alarm

In the event of a Crossing Active Too Long alarm, the speed of the train in concern will be passed through from the GCP unit.

10.5.3 Office Alarm Management System

TBD.

10.6 Gate Remains Down Alarm (T6 LED)

Alarm if 1GCK is Up but 1GDK, 2GDK remains down for 20+ minutes, or.

Alarm if 2GCK is Up but 3GDK, 4GDK remains down for 20+ minutes.

Alarm clears when all valid inputs are up.

Note: The gate down inputs are mapped to internal flags which account for normally-energized or non-energized inputs at the crossing.

10.6.1 Alarm Text

(XNG)GATE1 STUCK DOWN 20+ MINUTES
(XNG)GATE1 STUCK ALARM CLEAR

(XNG)GATE2 STUCK DOWN 20+ MINUTES
(XNG)GATE2 STUCK ALARM CLEAR

(XNG)GATE3 STUCK DOWN 20+ MINUTES
(XNG)GATE3 STUCK ALARM CLEAR

(XNG)GATE4 STUCK DOWN 20+ MINUTES
(XNG)GATE4 STUCK ALARM CLEAR

10.6.2 T6 LED

GREEN upon start of application program.

RED FLASHING if currently in alarm.

RED STEADY if alarm occurred and is presently cleared.

10.6.3 Office Alarm Management System

TBD

10.7 Gate Not Down Alarm (T7 LED)

Alarm "GATE NOT DOWN IN TIME" if any gate down input remains FALSE for more than a user-defined number of seconds (range: 8 to 30 seconds with 8 seconds as the default) after the gate control has de-energized.

Gate Control 1 will be used as the timer start for 1GDK, and 2GDK. Gate Control 2 will be used as the timer start for 3GDK, and 4GDK.

Alarm "ISLAND OCCUPIED BUT GATE NOT DOWN" if the gate never did come down for a train. This alarm will look for the gate down input = TRUE confirmation after the gate control de-energized and before Island 1 or Island 2 dropped.

Alarm clears when gate down inputs are all TRUE in proper time.

10.7.1 Alarm Text

(XNG)GATE1 NOT DOWN IN TIME

(XNG)GATE1 NOT DOWN ALARM CLEAR

(XNG)GATE2 NOT DOWN IN TIME

(XNG)GATE2 NOT DOWN ALARM CLEAR

(XNG)GATE3 NOT DOWN IN TIME

(XNG)GATE3 NOT DOWN ALARM CLEAR

(XNG)GATE4 NOT DOWN IN TIME

(XNG)GATE4 NOT DOWN ALARM CLEAR

(XNG)ISLAND OCCUPIED BUT GATE NOT DOWN

(XNG)ISLAND AND NO GATE ALARM CLEAR

10.7.2 T7 LED

GREEN upon start of application program

RED FLASHING if currently in alarm

RED STEADY if alarm occurred and is presently cleared after proper gate operation

10.7.3 Office Alarm Management System

TBD

10.8 Gate Not Recovered Alarm (T8 LED)

Alarm if the gate up input remains low for more than 20 seconds after the gate control has energized.

Alarm if the gate up input is low for 30 minutes, with all GCK inputs UP.

Alarm clear when gate up input picks.

10.8.1 Alarm Text

(XNG)ONE OR MORE GATES NOT RECOVERED

(XNG)GATE NOT RECOVERED ALARM CLEAR

(XNG)GATE NOT UP, 30+ MIN

(XNG)GATE NOT UP ALM CLEAR

10.8.2 T8 LED

GREEN upon start of application program

RED FLASHING if currently in alarm

RED STEADY if alarm occurred and is presently cleared

10.8.3 Office Alarm Management System

TBD

11.0   ADDITIONAL ALARMS AND MESSAGES

11.1 Equipment Transfer

There are 2 possible equipment transfer inputs. A low voltage at a defined TRNSFR1, or TRNSFR2 input will determine the monitored equipment to be operating in the Main position. A high voltage will determine the monitored equipment to be operating in the Standby position. A change in input voltage will cause the equipment transfer messages to be sent to the office.

11.1.1 Alarm Text

(XNG)EQUIPMENT 1 TRANSFER TO MAIN

(XNG)EQUIPMENT 1 TRANSFER TO STANDBY

(XNG)EQUIPMENT 2 TRANSFER TO MAIN

(XNG)EQUIPMENT 2 TRANSFER TO STANDBY

11.2   SEAR II Backup Battery

The internal battery in the SEAR II unit will keep the Real Time Clock, and power the event memory when power is removed from the SEAR II. When this alarm is sent, there should be about 3 months of regular operation, before loss of time and events might be possible.

11.2.1 Alarm Text

(XNG)SEARII LOW INTERNAL BATTERY

(XNG)SEARII INTERNAL BATTERY OK

11.2.2 Special Messages

When the SEAR II comes back on-line after a power off condition, the unit will send:

SEARII POWER LOST FOR xx (Seconds, Minutes, Hours)

When the SEAR II comes back online after a power off condition, or after a reset, the unit will send in the configured times for the Minimum Warn Time, Desired Warn Time, and Ignored Warn Time as follows:

(XNG)MINIMUM WARNING TIME = xxx seconds

(XNG)DESIRED WARNING TIME = xxx seconds

(XNG)IGNORED WARNING TIME = xxx seconds

When a new application program is loaded or the unit's configuration changes, the application program is recompiled, reconfigured and restarted. An **Application Program Started** message will be generated when this occurs.

> **(XNG)SEARII Application Program Started**

11.2.3 Additional Information

11.2.3.1 Trouble Light

Relay Output2 used to drive external lamp, if DTMF output 2 is not used, and if Trouble Light is not set for "UNUSED" in Site Setup Menu.

LIGHT STATUS	CONDITION
INACTIVE STATE (Contact closed)	• AC Power OK • Batteries OK
ACTIVE STATE Selected during configuration (Contact is open, or toggling)	• AC power off for over AC OFF ALARM TIME • One or more of the Battery Banks is out of range for over 5 seconds

The Active state will restore to the Inactive state when the AC or Battery bank(s) is returned to normal operation.

11.2.3.2 Open Door

If the DOOR input is used, the open and close events will be recorded in the local SEAR II event log.

11.3 SSCC (III) / (IV) Messages

The SSCC (III)/(IV) crossing controller messages are monitored via Echelon by the SEAR II. The alarms will be for Echelon online/offline status, and monitoring of the Maint Call non-vital output of the SSCC (III)/(IV). SSCC Offline messages will also be displayed locally on the SEAR II.

11.3.1 Alarm Messages

ONLINE / OFFLINE (detected via reception of Echelon messages by SEAR II)

> **(XNG)1SSCC OFFLINE to SEAR**
>
> **(XNG)1SSCC ONLINE to SEAR**
>
> **(XNG)2SSCC OFFLINE to SEAR**
>
> **(XNG)2SSCC ONLINE to SEAR**

MAINT CALL non-vital output, (hardwired input to SEAR II)

> **(XNG)CONTROLLER FAILURE**
>
> **(XNG)CONTROLLER NORMAL**

11.4 Alarms From GCP 3000

GCP alarms / messages passed through to SEAR II and sent to the office:

ALARM TYPE	SITUATION OR ERROR CODES	ACTION
Reset	Reset Event of each GCP	Report each occurrence to Office
Error	Any error code received by the SEAR II via Echelon, from each configured GCP	Report each occurrence to Office

11.4.1 Alarm Text

> **(XNG) MAIN1 ERROR xxxx**   - xxxx is the Main1 GCP error code number
>
> **(XNG) STBY1 ERROR xxxx**   - xxxx is the Stdby1 GCP error code number
>
> **(XNG) MAIN2 ERROR xxxx**   - xxxx is the Main2 GCP error code number
>
> **(XNG) STBY2 ERROR xxxx**   - xxxx is the Stdby2 GCP error code number
>
> **(XNG) MAIN1 RESET**   - Main GCP1 reset
>
> **(XNG) STBY1 RESET**   - Standby GCP1 reset
>
> **(XNG) MAIN2 RESET**   - Main GCP2 reset
>
> **(XNG) STBY2 RESET**   - Standby GCP2 reset

11.4.2 Office Alarm Management System

TBD

11.5 GCP Online/Offline Messages

Messages are to be sent to the office when the Normal/Standby switches, or when both Normal and Standby units are offline (to the SEAR II), or when the Main GCP is offline (to the SEAR II) and there is no Standby. Offline messages will also be displayed locally on the SEAR II.

11.5.1 Alarm Text

(XNG) MAIN1=ON, STBY1=OFF

Sent when GCP1 switches from Standby to Main, or after both units were offline and the Main returned to operation.

(XNG) MAIN1=OFF, STBY1=ON

Sent when GCP1 switches from Main to Standby, or after both units were offline and the Standby returned to operation.

(XNG) MAIN2=ON, STBY2=OFF

Sent when GCP2 switches from Standby to Main, or after both units were offline and the Main returned to operation.

(XNG) MAIN2=OFF, STBY2=ON

Sent when GCP2 switches from Main to Standby, or after both units were offline and the Standby returned to operation.

(XNG) GCP1 OFFLINE

Sent when GCP1 is offline, where no standby unit exists.

(XNG) GCP1 ONLINE

Sent when GCP1 returns online, where no standby unit exists.

(XNG) GCP2 OFFLINE

Sent when GCP2 is offline, where no standby unit exists.

(XNG) GCP2 ONLINE

Sent when GCP2 returns online, where no standby unit exists.

(XNG) NML1&STBY1 OFFLINE

Sent when both GCP1 Main and Standby units are detected offline to the SEAR II for more than 60 seconds.

(XNG)NML2&STBY2 OFFLINE

Sent when both GCP1 Main and Standby units are detected offline to the SEAR II for more than 60 seconds

11.5.2 Office Alarm Management System

TBD

12.0   ALARM NUMBERS (WAMS)

The numbers assigned to alarm and alarm clear messages when sent to the Safetran WAMS office application.

ALARM TEXT	ALARM NUMBER	ALARM CLEAR
(XNG)CONTROLLER FAILURE	1	
(XNG)CONTROLLER NORMAL		101
(XNG)WARN TIME ALARM TK1: xxx sec	2	
(XNG)WARN TIME ALARM CLEAR		102
(XNG)CROSSING ACTIVE FOR xxx min	4	
(XNG)CROSSING ACTIVE ALARM OFF		104
(XNG)AC POWER OFF FOR xxx MINUTES	5	
(XNG)AC POWER BACK ON		105
(XNG)ONE OR MORE GATES NOT RECOVERED	6	
(XNG)GATE NOT RECOVERED ALARM CLEAR		106
(XNG)TWO BULBS OUT	11	
(XNG)BULBS NORMAL		111
(XNG)MULTIPLE BULBS OUT	12	
(XNG)BULBS NORMAL		112
(XNG)SLOW FLASH RATE: xxx FPM	13	
(XNG)FLASH RATE NORMAL		113
(XNG)FAST FLASH RATE: xxx FPM	14	
(XNG)FLASH RATE NORMAL		114
(XNG)B12 Low Voltage: xx.x VDC	18	
(XNG)B12 Voltage Normal: xx.x VDC		118
(XNG)XB12 Low Voltage: xx.x VDC	19	
(XNG)XB12 Voltage Normal: xx.x VDC		119
(XNG)B14 Low Voltage: xx.x VDC	20	
(XNG)B14 Voltage Normal: xx.x VDC		120
(XNG)WARN TIME ALARM TK2: xxx sec	50	
(XNG)WARN TIME ALARM CLEAR		150
(XNG)GATE1 STUCK DOWN 20+ MINUTES	60	
(XNG)GATE1 STUCK ALARM CLEAR		160
(XNG)GATE2 STUCK DOWN 20+ MINUTES	61	
(XNG)GATE2 STUCK ALARM CLEAR		161
(XNG)GATE3 STUCK DOWN 20+ MINUTES	62	
(XNG)GATE3 STUCK ALARM CLEAR		162
(XNG)GATE4 STUCK DOWN 20+ MINUTES	63	
(XNG)GATE4 STUCK ALARM CLEAR		163
(XNG)GATE1 NOT DOWN IN TIME	64	

ALARM TEXT	ALARM NUMBER	ALARM CLEAR
(XNG)GATE1 NOT DOWN ALARM CLEAR		164
(XNG)GATE2 NOT DOWN IN TIME	65	
(XNG)GATE2 NOT DOWN ALARM CLEAR		165
(XNG)GATE3 NOT DOWN IN TIME	66	
(XNG)GATE3 NOT DOWN ALARM CLEAR		166
(XNG)GATE4 NOT DOWN IN TIME	67	
(XNG)GATE4 NOT DOWN ALARM CLEAR		167
(XNG)GATE NOT UP, 30+ MIN	68	
(XNG)GATE NOT UP ALM CLEAR		168
(XNG)ISLAND OCCUPIED BUT GATE NOT DOWN	69	
(XNG)ISLAND AND NO GATE ALARM CLEAR		169
Equipment1 Transfer to Main	70	
Equipment1 Transfer to Standby	70	
Equipment2 Transfer to Main	70	
Equipment2 Transfer to Standby	70	
(XNG) MAIN1 ERROR xxxx	71	
(XNG) STBY1 ERROR xxxx	71	
(XNG) MAIN2 ERROR xxxx	71	
(XNG) STBY2 ERROR xxxx	71	
(XNG) MAIN1 RESET	71	
(XNG) STBY1 RESET	71	
(XNG) MAIN2 RESET	71	
(XNG) STBY2 RESET	71	
(XNG) GCP1 OFFLINE	72	
(XNG) GCP1 ONLINE		172
(XNG) GCP2 OFFLINE	72	
(XNG) GCP2 ONLINE		172
(XNG) NML1&STBY1 OFFLINE	72	
(XNG)NML2&STBY2 OFFLINE	72	
(XNG)ILOD1 OFFLINE	73	
(XNG)ILOD1 ONLINE		173
(XNG)ILOD2 OFFLINE	73	
(XNG)ILOD2 ONLINE		173
(XNG)ILOD3 OFFLINE	73	
(XNG)ILOD3 ONLINE		173
(XNG)ILOD4 OFFLINE	73	
(XNG)ILOD4 ONLINE		173
(XNG)1SSCC OFFLINE to SEAR	74	
(XNG)1SSCC ONLINE to SEAR		174
(XNG)2SSCC OFFLINE to SEAR	74	
(XNG)2SSCC ONLINE to SEAR		174
(XNG)VHFRADIO OFFLINE	75	

ALARM TEXT	ALARM NUMBER	ALARM CLEAR
(XNG)VHFRADIO ONLINE		175
(XNG)WCPII ECH COMM OFFLINE	76	
(XNG)WCPII ECH COMM OK		176
(XNG)B12 High Voltage: xx.x VDC	88	
(XNG)B12 Voltage Normal: xx.x VDC		188
(XNG)XB12 High Voltage: xx.x VDC	89	
(XNG)XB12 Voltage Normal: xx.x VDC		189
(XNG)B14 High Voltage: xx.x VDC	90	
(XNG)B14 Voltage Normal: xx.x VDC		190
(XNG)SEARII LOW INTERNAL BATTERY	97	
(XNG)SEARII INTERNAL BATTERY OK		197
(XNG)SEARII POWER LOST FOR: xxx MINUTES	98	
(XNG)LOCAL TEST ALARM: xx	99	
(XNG)REMOTE TEST ALARM: xx	100	

13.0   INFORMATIONAL MESSAGE NUMBERS (WAMS)

The numbers assigned to informational messages when sent to the Safetran WAMS office application.

MESSAGE TEXT	MESSAGE NUMBER
(XNG)MINIMUM WARNING TIME = xxx seconds	231
(XNG)DESIRED WARNING TIME = xxx seconds	232
(XNG)IGNORED WARNING TIME = xxx seconds	233
(XNG)WARN TIME TK1 MONITOR: xxx seconds	236
(XNG)WARN TIME TK2 MONITOR: xxx seconds	237
(XNG)WARN TIME TK1 INFO: xxx seconds	238
(XNG)WARN TIME TK2 INFO: xxx seconds	239
(XNG)SEARII APPLICATION PROGRAM STARTED	240
(XNG) MAIN1=ON, STBY1=OFF	241
(XNG) MAIN1=OFF, STBY1=ON	241
(XNG) MAIN2=ON, STBY2=OFF	241
(XNG) MAIN2=OFF, STBY2=ON	241

14.0   USER TEST MODE (SEAR II)

The operator can place the SEAR II into *User Test Mode* which will cause all alarms to be ignored. To place the unit into this mode, press the **USER TEST** key. The unit will prompt user to enter the time duration for which the unit will be placed into the *User Test Mode* (valid input = 1min, 5, 10, 15, 30, 45, 60 min, LEDTest, and LocalAlarm). Use up or down arrow keys to select the time desired, then Press ENTER. All Test LED's will flash Yellow while in *User Test Mode.* (Note that the LEDTest, and LocalAlarm selections will not cause the unit to enter User Test, read further for explanation of those features). The unit will add the following messages to the scrolling list on the LUI display, while in User Test Mode:

PRESS EXIT TO EXIT USER TEST

USER TIME REMAINING = xx MIN

27

14.1 Local Test Message

A local test alarm can be sent via the SEAR II front panel (LUI) using the following instructions:

1. Press User Test Key.
2. Press arrow keys, and scroll through the menu until LocalAlarm is displayed.
3. Press Enter, and the Local Test Alarm will be sent via the communications path, and displayed on the LUI.
4. To send another alarm, repeat steps 1 to 3.

14.2 Remote Test Message

A remote test alarm can be initiated by the office crossing monitor system, (WAMS), by sending Control Code 1. Upon receipt of the control code the SEAR II application will cause a Remote Test Alarm to be sent into the office.

The test alarm messages are:

LCL TST ALM: xx

RMT TST ALM: xx

xx will increment from 1 -25, then wrap back to 1.

14.3 Indicator Led Test

The operator can place the SEAR II into *LED Test Mode* which will cause the 16 Indicator LED's to light steady for 10 seconds. To place the unit into this mode, press the **USER TEST** key. The unit will prompt the user with user test time selections, shown in the display. Press the Up or Down Arrow keys until the "LEDTest" is displayed. Then press the Enter key. The 16 Indicator LED's will light steady for 10 seconds, then revert to the normal operating state, as defined in the application logic.

14.4 Test Switch

Activation of the Test Switch will cause the SEAR II to enter User Test Mode for the first 10 minutes. If the switch is de-activated before the 10 minutes, User Test Mode will be stopped. The Test LED's will flash Yellow while in User Test Mode.

NOTES

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