

SIEMENS

TROUBLESHOOTING HANDBOOK

HD/LINK™ VITAL I/O SYSTEM **Including 53201, 53308, & 53429**

November 1998 (Revised June 2014)

Document No: SIG-00-97-18
Version B.2

PROPRIETARY INFORMATION

Siemens Industry, Inc., Rail Automation has a proprietary interest in the information contained herein and, in some instances, has patent rights in the systems and components described. It is requested that you distribute this information only to those responsible people within your organization who have an official interest.

This document, or the information disclosed herein, shall not be reproduced or transferred to other documents or used or disclosed for manufacturing or for any other purpose except as specifically authorized in writing by Siemens Industry, Inc., Rail Automation.

Echelon® is a registered trademark of Echelon Corporation.

Siemens Industry, Inc., Rail Automation
9568 Archibald Avenue, Suite 100
Rancho Cucamonga, California 91730
1-800-793-7233

TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
PROPRIETARY INFORMATION	i
TABLE OF CONTENTS	ii
LIST OF ILLUSTRATIONS.....	ii
GLOSSARY	iii
USER MANUAL.....	1
APPLICABLE DOCUMENTS	1
RECOMMENDED TOOLS	1
OPTIONAL EQUIPMENT	1
OVERVIEW	2
FRONT PANEL INDICATORS	2
TROUBLESHOOTING FLOWCHARTS	15
APPENDIX A- INTERFACE CONNECTORS....	A-1

LIST OF ILLUSTRATIONS

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
1	Typical HD/LINK Replacement of a Pole Line Circuit.....	3
2	HD Indicators - Bootup	4
3	HD Indicators - Normal Operation	5
4	HD Indicators - Unconfigured	6
5	SSR Indicators - Bootup.....	7
6	SSR Indicators - Normal Operation	9
7	SSR Indicators - Continuously Rebooting	10
8	SID Indicators - Power Up	12
9	SID Indicators - Normal Operation.....	14
10	Destination Location Troubleshooting Flowchart	16
11	Source Location Troubleshooting Flowchart....	20

GLOSSARY

- ATCS:** Advanced Train Control System - A set of specifications compiled by the AAR for controlling aspects of train operation.
- DT:** Diagnostic Terminal - A PC (Personal Computer) with Safetran's DOS-based Diagnostic Terminal utility installed.
- ECD:** External Configuration Device - The EEPROM embedded in the HD/LINK module interface connector, used for storing the module's configuration data.
- Echelon[®]:** The company that created the LAN used by an HD/LINK system to communicate between HD/LINK modules, SSR, and SID module.
- HD/LINK Module:** A vital I/O module installed at a location to interface with the vital inputs (relay contacts) and vital outputs (relay coils) for a specific application, and which communicates over a LAN to the site SSR. HD/LINK modules are referred to in this manual as HD.
- HD/LINK System:** A Linear Network of individual wayside locations, each of which consists of one or more HD/LINK modules (configured for specific applications), SSRs, and SID Modules (optional) communicating over a twisted pair LAN.

GLOSSARY Continued

- Pole Line:** Wires strung along wayside poles for carrying signal aspect and other train control information.
- LAN:** Local Area Network - In this manual, refers to the Echelon[®] twisted pair network at each location of an HD/LINK system.
- LED:** Light Emitting Diode - A solid state indicator.
- Linear Network:** A communications network of multiple locations implemented alongside railway tracks and linked using Spread Spectrum radios.
- MCF:** Module Configuration File - The configuration data created and stored in a file for a specific HD/LINK module.
- SID:** Site IDentification module - A memory device installed at a location and attached to the LAN for the purpose of storing configuration data for the site SSR.
- SIN:** Site (Subnode) Identification Number - A twelve-digit ATCS address representing the module as a subnode on the ATCS network.

GLOSSARY Concluded

- Spread Spectrum: A method of using either frequency hopping or direct-sequence modulation to spread a radio's RF energy over the complete bandwidth of the radio.
- SSR: Spread Spectrum Radio - Refers to Safetran's S³/Link radio that uses direct-sequence modulated broadband transmissions to provide noise immunity and security.
- UCN: Unique Check Number - A configuration validation number calculated from the contents of an approved MCF and issued to be entered into an HD/LINK module for the purpose of verifying its proper configuration.
- VPI: Vital Parallel Input - A vital input to the HD/LINK module, designed primarily to read the state of a vital signaling relay.
- VRO: Vital Relay Output - A vital output from the HD/LINK module, designed primarily to drive a vital signaling relay.

USER MANUAL

This handbook is intended for use by maintenance personnel to isolate problems with an HD/LINK system, and assumes a PC (Personal Computer) is not available. For more detailed troubleshooting, refer to the HD/LINK Application Guidelines manual or the Installation manual (using a PC for diagnostics).

APPLICABLE DOCUMENTS

Document No.	Title
SIG-00-97-05	APPLICATION GUIDELINES HD/LINK™ VITAL I/O MODULE 53201
SIG-00-97-07	INSTALLATION HANDBOOK HD/LINK™ VITAL I/O MODULE 53201
COM-00-97-21 COM-00-94-04	INSTRUCTION & INSTALLATION S ³ /LINK™ SPREAD-SPECTRUM RADIO - Model 53308 Models 53301 & 53304

RECOMMENDED TOOLS

- Multimeter or DC Voltmeter
- Small flat-bladed screwdriver, blade 0.10" wide and 0.020" thick (2.5mm wide x 0.5mm thick)
- Hex socket SpinTite (7/16") or adjustable wrench
- Wire stripper and cutter

OPTIONAL EQUIPMENT

A laptop PC (with Safetran's DT utility installed) is helpful for diagnostics, and necessary if reconfiguration or SID replacement is required.

OVERVIEW

Each location in an HD/LINK system includes one or more HD/LINK modules (referred to in this manual as an HD), an S³/LINK radio (referred to in this manual as an SSR), and possibly an optional Site Identification Module (SID). The sole purpose of an HD/LINK system is to perform the same function as a cable or pole line (refer to Figure 1 for a typical pole line and its HD replacement).

The HD/LINK module at a location provides the vital I/O capability, and the radio at the location communicates with its adjacent neighbors on either side. A radio at a location may function as a repeater to transfer a signal from a source location to a destination location (refer to Location 2 in Figure 1). Location 2 could also contain an HD for external I/O, if required (for instance, if the pole line circuit had a cut section at Location 2).

Refer to Figure 1 for an illustration of how an HD/LINK system may be implemented. In the circuit of Figure 1, the following applies:

- Location 1 represents the signal source
- Location 2 represents a signal repeater
- Location 3 represents the signal destination

A failure at Locations 1, 2, or 3 in Figure 1 will affect circuit operation.

FRONT PANEL INDICATORS

Figures 2 through 9 present front panel Indicator states for the HD/Link module, SSR, and SID module for some of the possible situations. Use these indications to determine the status of the system.

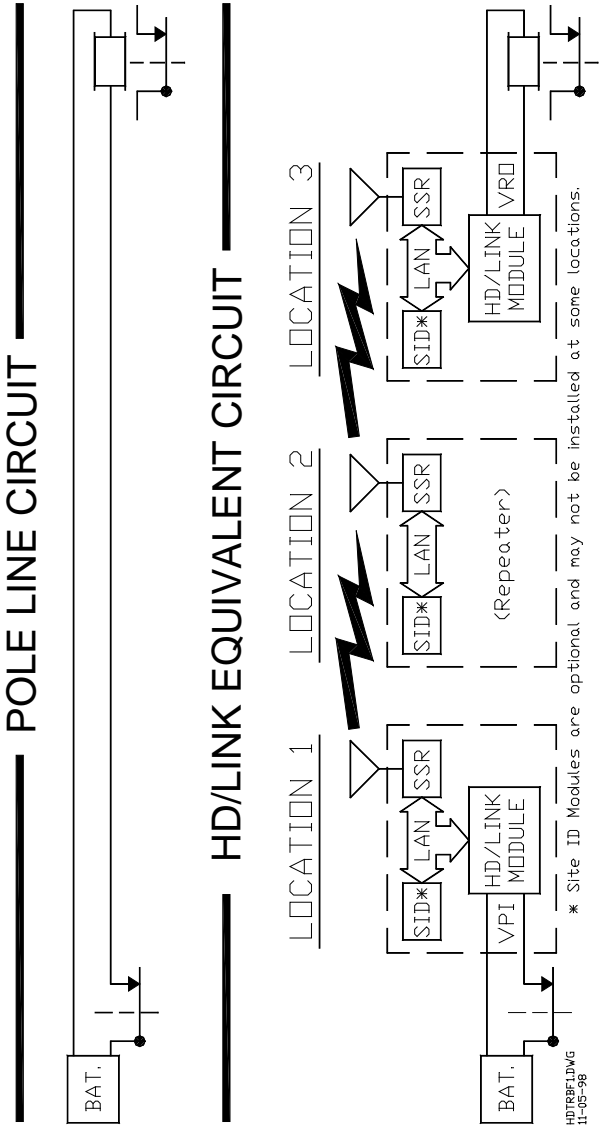


Figure 1
Typical HD/LINK Replacement of a Pole Line Circuit

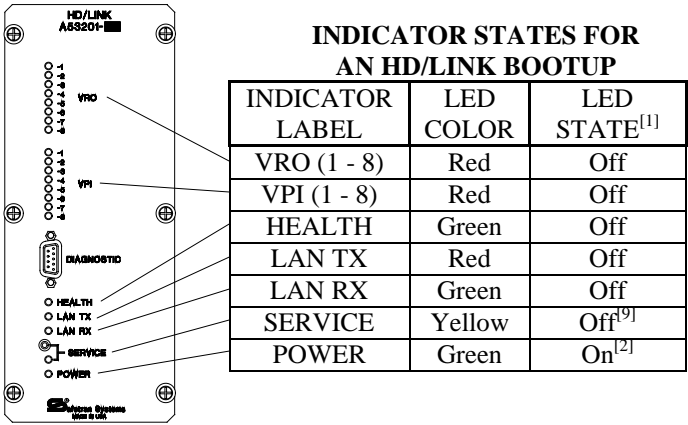


Figure 2
HD Indicators - Bootup

NOTES:

[1] HD/LINK initialization during booting up requires approximately 45 to 60 seconds, during which time all LEDs are off except POWER. After the initialization period, the module should begin normal operation (HEALTH LED should flash once approximately every two seconds to indicate the module is fully operational). If, after 45 to 60 seconds, all LEDs (except POWER) remain off, the module is probably continuously rebooting due to a fault in the system that cannot be cleared by being reset (suspect wiring problems or configuration problems).

Continuous rebooting can only be verified by connecting a DT (Diagnostic Terminal) to the Diagnostic port of the HD/LINK module and observing that the Bootstrap screen is being refreshed approximately every 20 seconds.

[2] The POWER LED should be steadily lit and never flicker or flash. If not steadily lit, check the power source for +9VDC to +16.5VDC, and check the HD/LINK module interface connector terminals 20 (B12) and 40 (N12) for proper connection (refer to Appendix A for an illustration of the interface connector). If the power source and wiring are OK, replace the HD/LINK module.

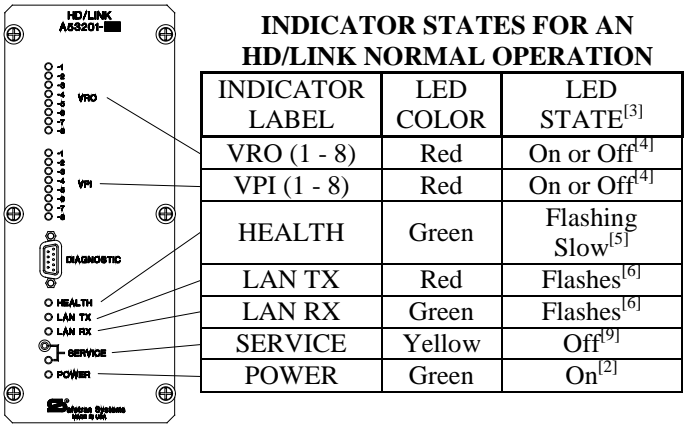


Figure 3
HD Indicators - Normal Operation

NOTES Continued:

[3] LED states during normal operation of an HD/LINK module assume that the module is configured (valid MCF, UCN, and SIN), and properly installed.

[4] The state of an I/O (VPI or VRO) depends on the voltage state of the corresponding input (refer to the railroad schematics or the MCF Contents Listing to determine if VPI and VRO states are correct).

[5] A HEALTH LED slow flash rate (once every two seconds) indicates that the module is fully operational. If the HEALTH LED flashes at a fast rate (approximately three times per second), it indicates that the module is unconfigured (refer to the Installation manual). If the HEALTH LED is steadily lighted, it indicates that the module has a hardware failure and should be replaced.

[6]. A flashing LAN TX LED (every 1 to 2 seconds), indicates that the HD is transmitting vital ATCS messages over the LAN, but it will not flash if the HD has no configured inputs. A flashing LAN RX LED (every 1 to 2 seconds) indicates that vital ATCS messages are being received over the LAN, but it will not flash if the HD has no configured outputs.

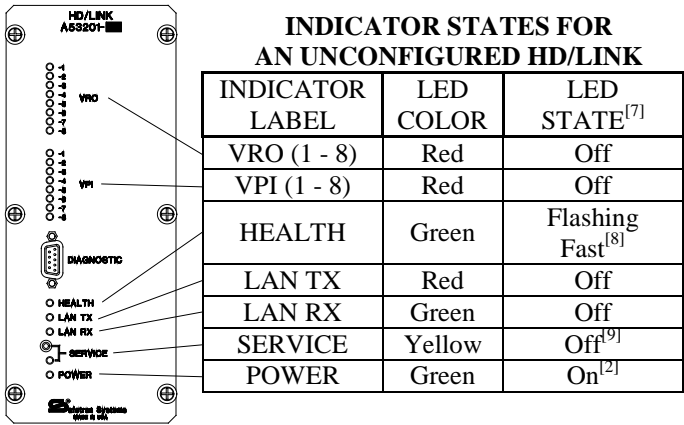


Figure 4
HD Indicators - Unconfigured

NOTES Continued:

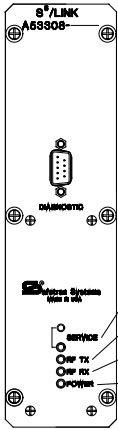
[7] If the HD/LINK module initialization process detects that the module is unconfigured, all LEDs will be off (except HEALTH which will be flashing at a fast rate and POWER which should be steadily lit).

[8] A HEALTH LED fast flash rate (approximately three times per second) indicates that the module is unconfigured. Configuration data for the HD/LINK Module is stored in the ECD (External Configuration Device) embedded in the module interface connector. Refer to the Installation manual for reloading the module configuration data (A DT is required).

An unconfigured HD/LINK module cannot be corrected by module replacement, but only by downloading the configuration data (MCF) from a DT (Diagnostic Terminal) connected to the Diagnostic port of the module.

[9] The SERVICE LED on the HD should always remain off, but if it flashes or lights steadily during boot up or normal operation, it indicates that the Echelon® LAN interface has a problem and the HD should be replaced.

The SERVICE push button (recessed) on the HD is not used in linear networking and should not be pressed.



INDICATOR STATES FOR AN SSR BOOTUP

INDICATOR LABEL	LED COLOR	LED STATE ^[10]
SERVICE	Red	Flashes 1 to 3 Times ^[12]
RF TX	Red	Off
RF RX	Green	Flashes Once ^[11]
POWER	Red	On ^[13]

Figure 5
SSR Indicators - Bootup

NOTES Continued:

[10] The SSR startup process normally takes from five to seven seconds, and during initialization the following activity (in the order listed) should be observed on the front panel indicators:

The RF RX LED flashes once

The SERVICE LED flashes from one to three times (typically flashes twice)

After initialization, the SSR should begin RF communication (the RF TX LED and the RF RX LED should begin to flash, but never at the same time). If the RF TX LED does not begin to flash within 10 seconds, check for activity on the LAN LEDs on the HD and check the LAN wiring (an SSR's ATCS address is normally obtained from the site HD over the LAN before transmission, but if the SSR is a repeater, auto-acquire should be disabled and the ATCS address hard-coded in the SSR). If the RF TX LED is flashing but the RF RX LED does not flash within 10 seconds, check the radio links to the neighboring sites.

If there is a problem with the RF link, or the LAN (or with the module being communicated with over the LAN) the SSR watchdog timer will eventually time out, causing the SSR to continuously reboot (every 10 to 20 seconds).

NOTES Continued:

[11] During SSR boot up, the RF RX LED is the first LED to flash (one time only). This signifies that hardware, software, and configuration parameters from the EEPROM have been successfully initialized.

If the RF RX LED becomes steadily lit or never lights at all, a major startup failure is indicated. Attempt to clear the fault by rebooting the SSR (power down the radio, then reapply power). If the problem persists, the SSR should be replaced.

[12] During SSR boot up the SERVICE LED is the second LED to flash (SERVICE LED will flash from one to three times; typically it flashes twice). This signifies that the Echelon[®] hardware has been initialized.

If the SERVICE LED becomes steadily lit or never lights at all, a major startup failure is indicated. Attempt to clear the fault by rebooting the SSR (power down the radio, then reapply power). If the problem persists, the SSR should be replaced.

The SERVICE push button (recessed) on the SSR is not used in linear networking and should not be pressed.

[13] The POWER LED on the SSR should light steadily and never flicker or flash. If not steadily lit, check the power source for +9VDC to +16.5VDC, and check for proper connection of the B12 and N12 connections on the SSR 8-pin Power & LAN Interface connector (refer to Appendix A for pin-outs for the SSR). If the power source and wiring are OK, replace the SSR.

The 53308 radio uses pin 1 for B12 and pin 2 for N12. The 53301 and 53304 radios use pin 1 for B12 and pin 3 for N12.

Do not replace a 53301/53304 radio with a 53308 radio, or vice versa. Radios with part number 53308 are not directly interchangeable in linear networking with radios having part numbers 53301 or 53304.

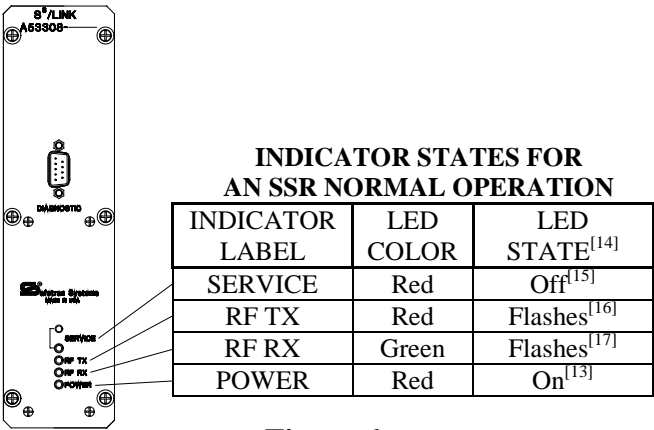


Figure 6
SSR Indicators - Normal Operation

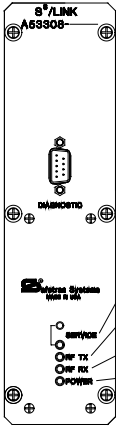
NOTES Continued:

[14] LED states during normal operation of an SSR assume that the SSR has been properly installed, and configured (manually configured, or if the radio is version 53308 or later, configuration data may also be acquired automatically over the LAN from a SID module).

[15] The SERVICE LED on the SSR should never light during normal operation. If the SERVICE LED lights at any time other than flashing at boot up, it indicates that the Echelon[®] LAN interface has a problem and the SSR should be replaced.

[16] The RF TX LED should flash periodically during normal operation (approximately two times per second).

[17] The RF RX LED should flash periodically during normal operation (approximately once per second if communicating with only one neighbor; approximately two times per second if communicating with both neighbors). If the RF RX LED stops flashing, the RF watchdog timer will time out and reboot the radio. Check the radio link. If the RF RX LED is steadily lit, a hardware failure is indicated and the SSR should be replaced.



INDICATOR STATES FOR AN SSR CONTINUOUSLY REBOOTING

INDICATOR LABEL	LED COLOR	LED STATE ^[18]
SERVICE	Red	Off or Flashes ^[19]
RF TX	Red	Off or Flashes ^[20]
RF RX	Green	Off or Flashes ^[19]
POWER	Red	On ^[13]

Figure 7
SSR Indicators - Continuously Rebooting

NOTES Continued:

[18] If an SSR experiences a catastrophic error, the SSR is automatically reset. Examples of catastrophic errors during normal operation are:

- Loss of communication on the RF link - the RF watchdog timer times out and resets the radio
- Loss of communication on the Echelon[®] LAN - the Echelon[®] LAN watchdog timer times out and resets the radio
- The radio experiences a hardware failure or the system software fails to operate normally - the hardware system watchdog timer times out and resets the radio

Examples of catastrophic errors during SSR bootup are:

- Corruption of the configuration data detected during the startup process
- A software revision mismatch detected during the startup process

NOTES Continued:

The SSR attempts to correct catastrophic errors by resetting the SSR, but in cases where doing so doesn't correct the problem, the result is that the SSR enters a loop of resetting/initializing (continuously rebooting).

[19] When the SSR is continuously rebooting due to a loss of communication over the RF link or the Echelon[®] LAN, the front panel indications are:

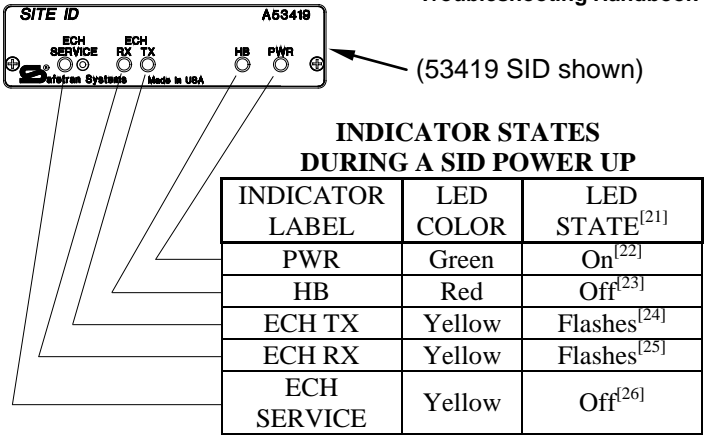
The RF RX LED flashes once followed by the SERVICE LED flashing from one to three times (typically flashes twice). This sequence is repeated continuously every 10 to 20 seconds after the first occurrence.

When the SSR is continuously rebooting due to a hardware failure, a software failure, invalid configuration data, or a software revision mismatch, there may or may not be front panel indications for the condition (rebooting in this case occurs continuously every 10 seconds or less).

If the RF RX LED remains lit, attempt to clear the fault by powering down the radio, then reapply power. If the problem persists, the SSR should be replaced.

[20] When the SSR is continuously rebooting (due to an error that cannot be corrected by resetting the SSR), the RF TX LED may remain off or may begin flashing (approximately two times per second), depending on the cause of the error, as follows:

- If the SSR is continuously rebooting and the RF TX LED does not continually flash, it indicates a problem with the LAN, or with the site HD (when the SSR is configured for ATCS address auto-acquire, only).
- If the SSR is continuously rebooting and the RF TX LED is continually flashing but the RF RX LED is not continually flashing, it indicates a radio link problem (check RF cables and connector integrity, antennas for alignment or physical damage, and status of the remote radio).



**Figure 8
SID Indicators - Power Up**

NOTES Continued:

[21] LED states during power up of the SID module assume that the module has been properly installed. Power up of the SID module normally takes less than 2 seconds, after which the module begins normal operation.

A SID module (part number 53419 or 53429) can only be used in conjunction with a version 53308 or later radio.

[22] The PWR LED on the SID module should light steadily and never flicker or flash. If not steadily lit, check the power source for +9VDC to +16.5VDC, and verify proper connection of the B and N connections (B1 and N1 on older version SIDs) on the SID 8-pin Power & LAN Interface connector (refer to Appendix A for pin-outs). If the power source and wiring are OK but the PWR LED is not steadily lit, the SID module is defective.

WARNING: A FAILED SID MODULE MUST NOT BE REPLACED UNLESS THE CAPABILITY EXISTS TO WRITE THE CONFIGURATION DATA (REQUIRES A PC).

A failed SID module should eventually be replaced, but the SID function can be effectively disabled until convenient to replace it by removing the 8-pin connector

NOTES Continued:

(Power & LAN interface) from the SID (verify that power and LAN to other units is not interrupted by doing so). The HD/LINK system should operate normally without the SID, provided the configuration data in the SSR is current.

To replace a SID module, a PC is required for placing the SSR in command mode and for writing the current configuration to the replacement SID. However, the procedure can be done remotely by maintenance personnel communicating with the office or any location in the network where a PC can be connected (a SID module can only be used with 53308 or later radios, and only 53308 or later radios can be configured remotely).

A replacement SID must be blank (contains no configuration data), unless a careful procedure is followed to transfer current configuration data from the SSR to the replacement SID and prevent corruption of the current SSR configuration data (refer to the Installation manual or the Application Guidelines manual).

[23] During SID power up, the HB LED should remain off. The HB LED (Heart Beat) should begin continually flashing (approximately 2 times per second) after power up to indicate that the SID module is operational. If the HB LED remains off after power up, or if it becomes steadily lit, an operational problem is indicated and the SID module should be replaced or disabled.

[24] During SID power up, the ECH TX LED should display a short burst of very rapid flashes (generally too fast to be counted).

[25] During SID power up, the ECH RX LED should display a short burst of very rapid flashes (generally too fast to be counted).

[26] The ECH SERVICE LED on the SID should never light during power up or normal operation. If the ECH SERVICE LED lights during normal operation, it indicates that the Echelon[®] LAN interface has a problem and the SID module should be replaced or disabled.

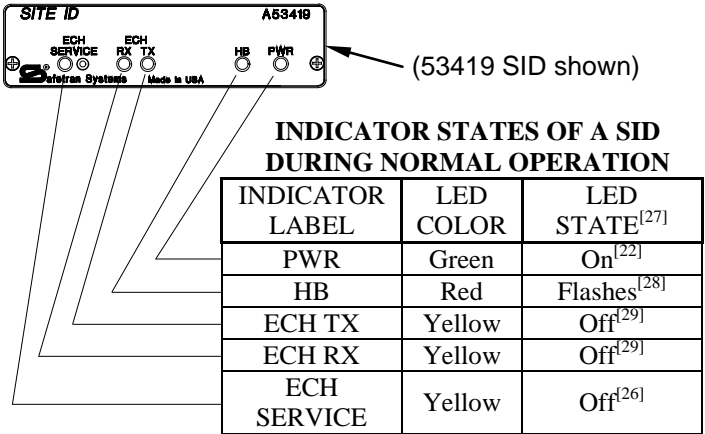


Figure 9
SID Indicators - Normal Operation

NOTES Concluded:

The SERVICE push button (recessed) on the SID is not used in linear networking and should not be pressed.

[27] LED states during normal operation of the SID module assume that the module has been properly installed and current SSR configuration data transferred to the SID. During normal operation of the HD/LINK system, the SID is idle and all SID LEDs should be off except for HB (Heart Beat) which should be continually flashing (approximately 2 times per second - see Note 28) and PWR which should be steadily lit (see Note 22).

The SID remains ready to receive a configuration update if and when it is written to the SSR. In the meantime, it maintains a copy of the current SSR configuration data in case of an SSR reset, a power failure, or an SSR replacement.

[28] The HB LED should be continually flashing (approximately 2 times per second) to indicate that the SID module is operational. If the HB LED remains off after power up, or if it becomes steadily lit, an operational

NOTES Concluded:

problem is indicated and the SID module should be replaced or disabled.

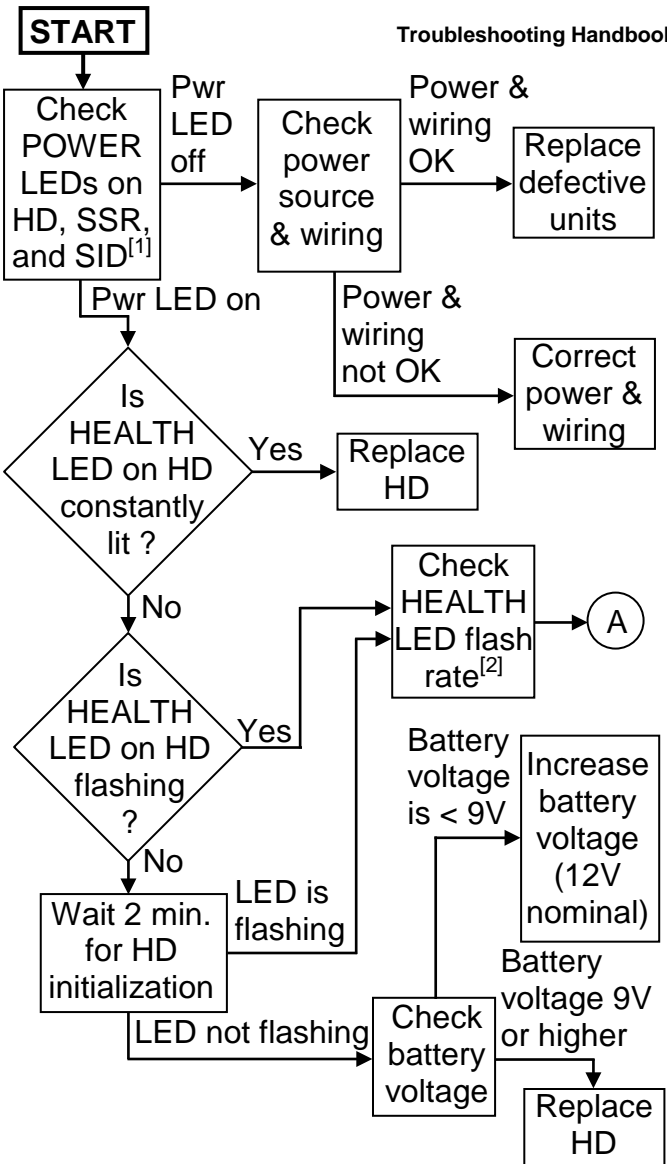
[29] The ECH TX and ECH RX LEDs should never light or flash during normal operation of the HD/LINK system. The only times the SID module ECH TX and ECH RX LEDs are active are during SID power up and when its associated SSR is booted, reset, or reconfigured (refer to the Application Guidelines manual for more information).

TROUBLESHOOTING FLOWCHARTS

Front panel indicators do not always indicate what a specific fault may be, and therefore some other troubleshooting steps may be required.

Typical troubleshooting, using the flowcharts that follow, should begin with Figure 10 (signal destination location troubleshooting) and proceed to Figure 11 (signal source location troubleshooting) if the problem appears to be coming from the source.

The flowcharts assume that the indicated fault is: the output relay does not energize when the proper input relay is energized.

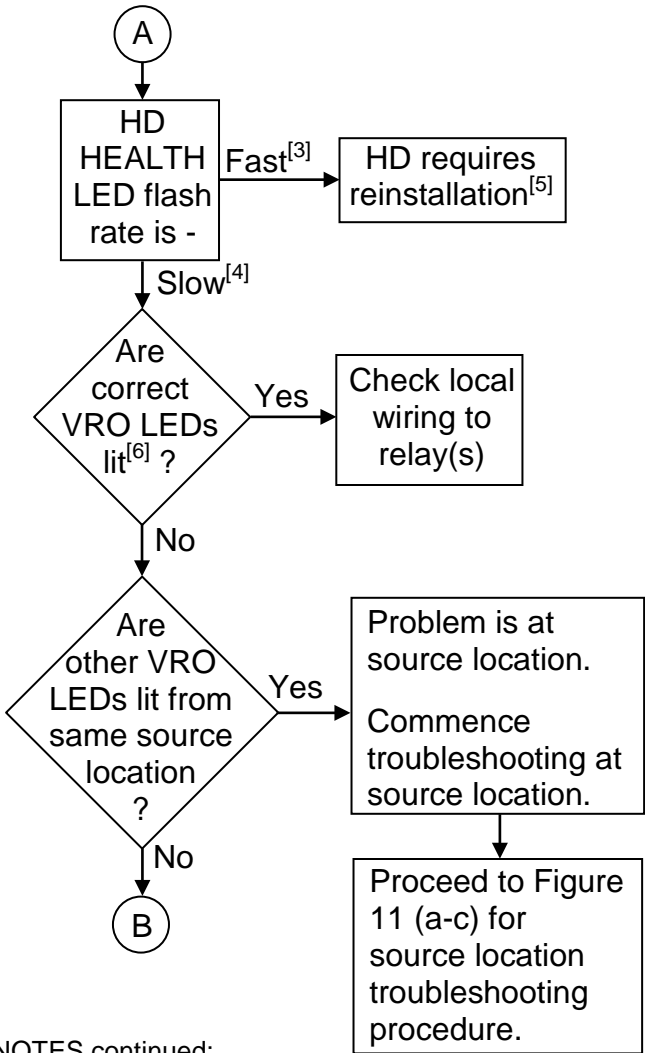


NOTES:

[1] SID is optional and may not be installed at some locations.

[2] Slow rate (once every 2 seconds) = HD is operational; Fast rate (≈ 3 times per second) = HD is unconfigured.

Figure 10a
Destination Location Troubleshooting Flowchart



NOTES continued:

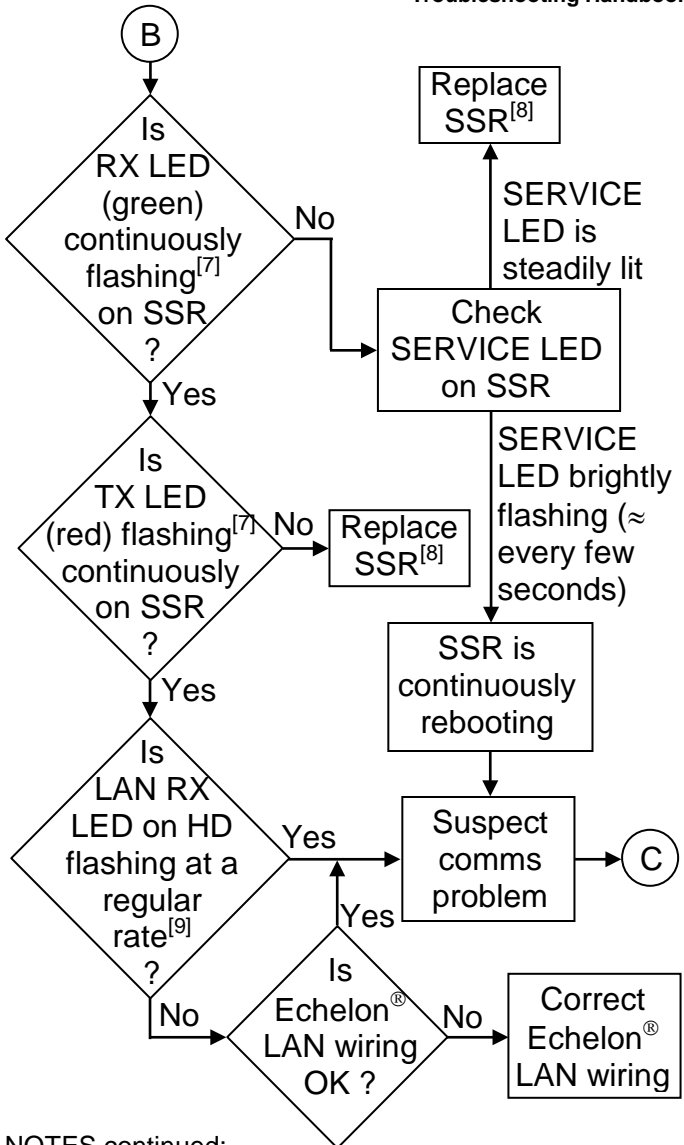
[3] Fast rate (≈ 3 times per second) = HD unconfigured.

[4] Slow rate (once every 2 seconds) = HD operational.

[5] Requires PC with Installers DT Utility. Refer to the Installation manual.

[6] Assumes an output relay is not energized that should be.

Figure 10b
Destination Location Troubleshooting Flowchart



NOTES continued:

[7] At a rate of at least once per second, non-interrupted.

[8] If SID is not installed, replacement SSR also requires configuration. Refer to radio manual.

[9] At least once every few seconds.

Figure 10c
Destination Location Troubleshooting Flowchart

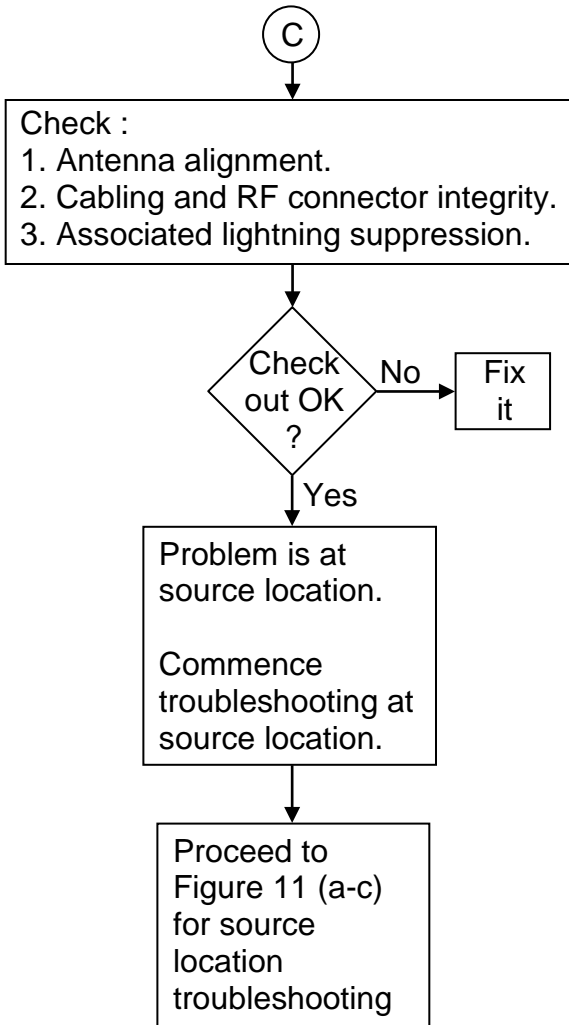
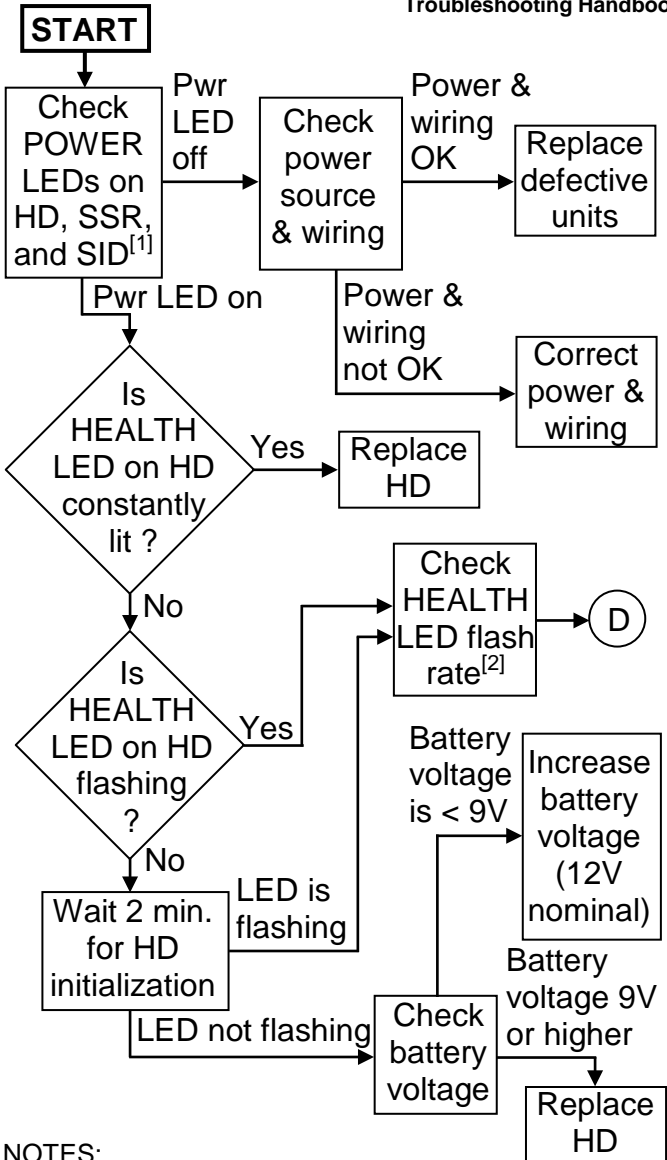


Figure 10d
Destination Location Troubleshooting Flowchart

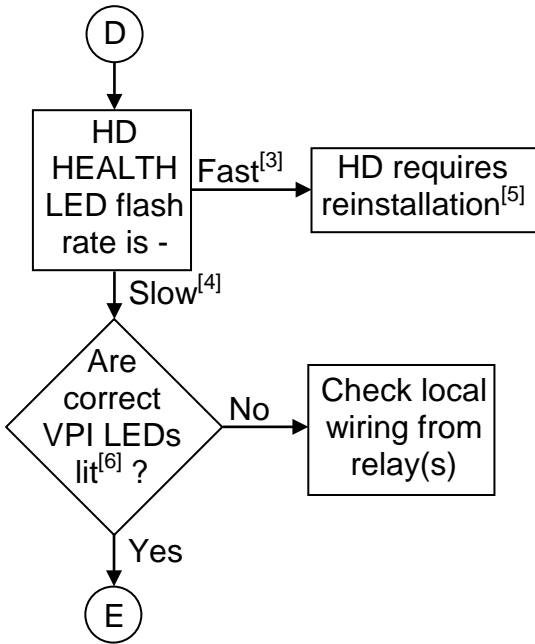


NOTES:

[1] SID is optional and may not be installed at some locations.

[2] Slow rate (once every 2 seconds) = HD is operational; Fast rate (≈ 3 times per second) = HD is unconfigured.

Figure 11a
Source Location Troubleshooting Flowchart



NOTES continued:

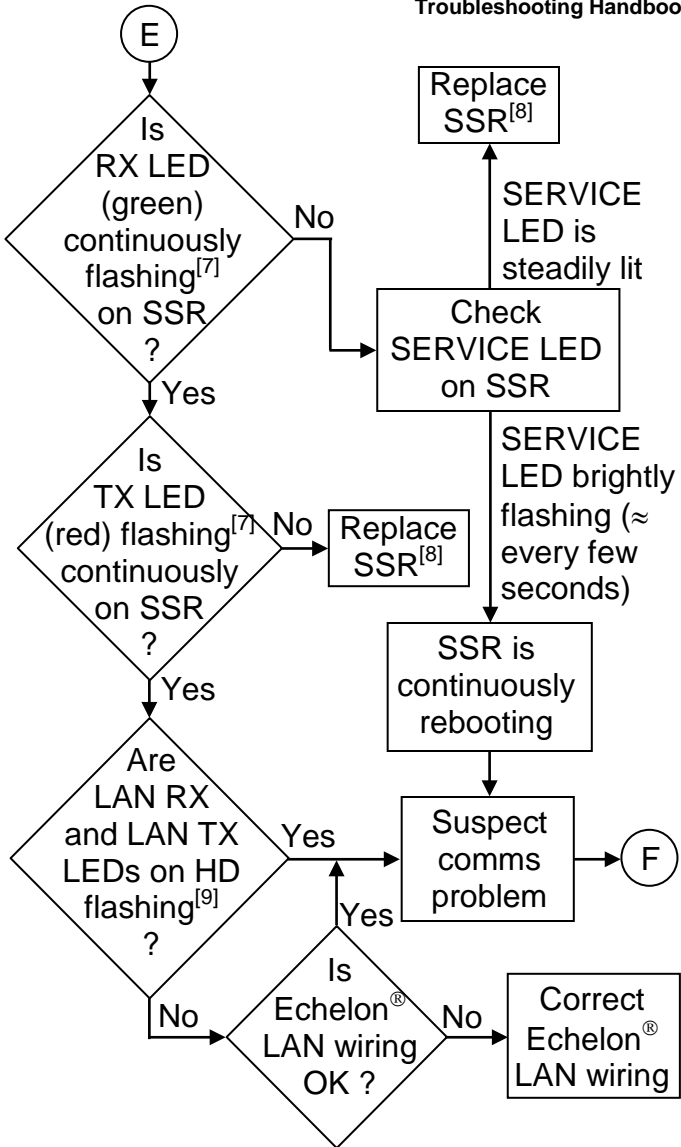
[3] Fast rate (\approx 3 times per second) = HD unconfigured.

[4] Slow rate (once every 2 seconds) = HD operational.

[5] Requires PC with Installers DT Utility. Refer to the Installation manual.

[6] Assumes the proper input relays are energized.

Figure 11b
Source Location Troubleshooting Flowchart



NOTES continued:

[7] At a rate of at least once per second, non-interrupted.

[8] If SID is not installed, replacement SSR also requires configuration. Refer to radio manual.

[9] At a regular rate of at least once every few seconds.

Figure 11c
Source Location Troubleshooting Flowchart

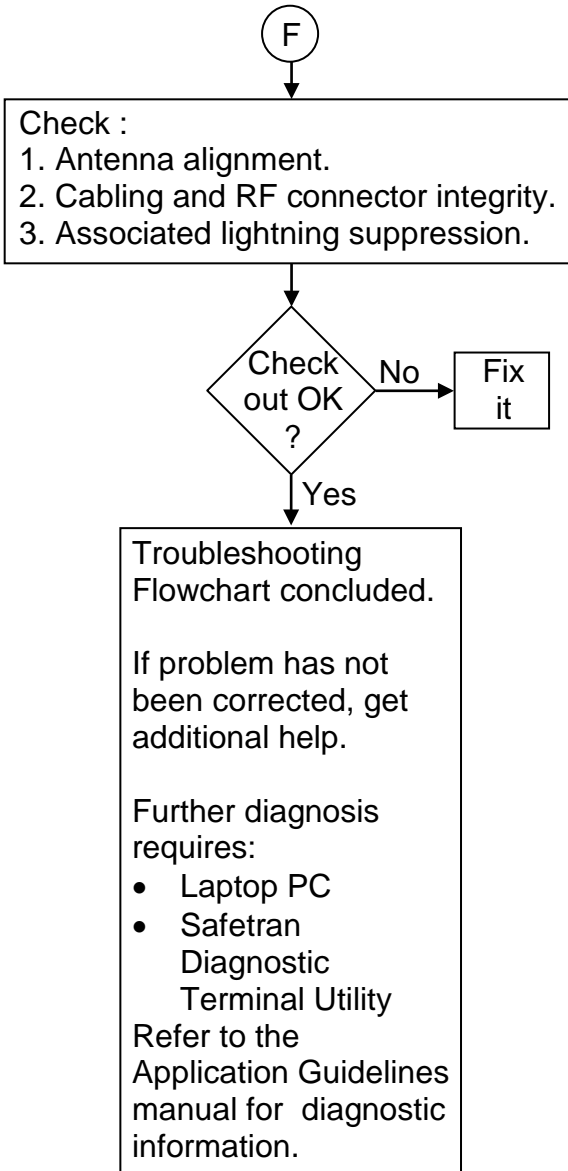
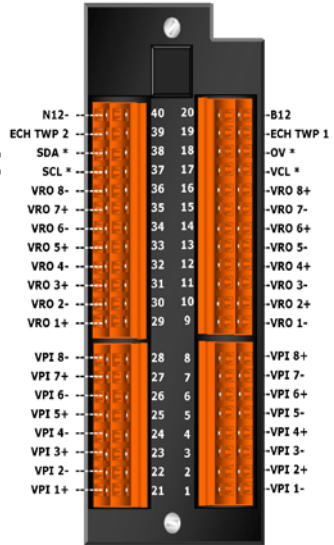
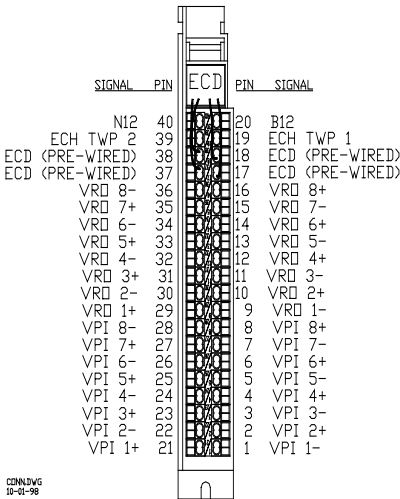


Figure 11d
Source Location Troubleshooting Flowchart

APPENDIX A INTERFACE CONNECTORS



A53013

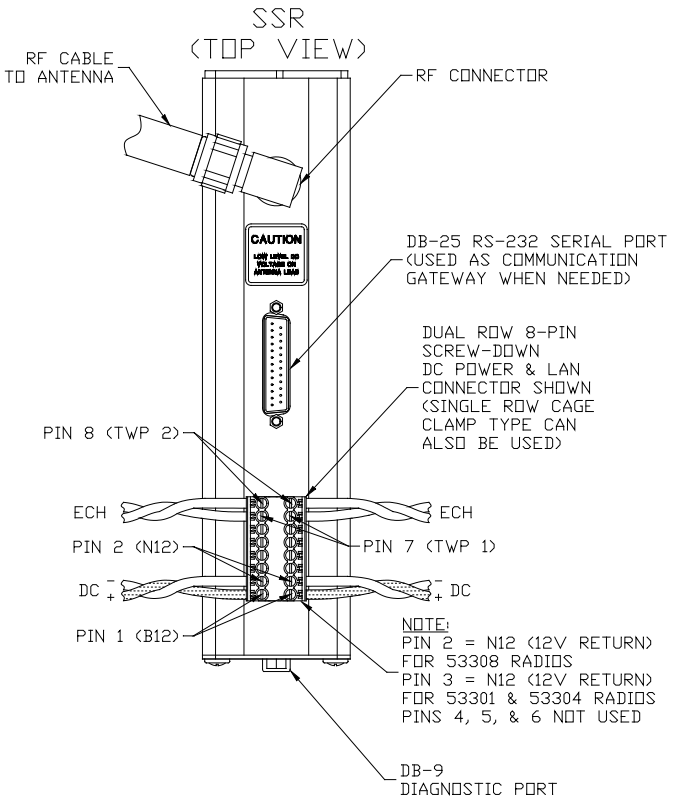
Legacy Connector

A53122

New Connector

Pin-Out Signal Symbol or Name	Signal Description
VPI	Vital Parallel Input
VRO	Vital Relay Output
+	Positive I/O connection
-	Negative I/O connection
ECD	External Configuration Device lead
ECH TWP 1	Echelon Twisted Pair LAN wire #1
ECH TWP 2	Echelon Twisted Pair LAN wire #2
B12	Battery (nominal 12VDC) positive lead
N12	Battery (nominal 12VDC) negative lead

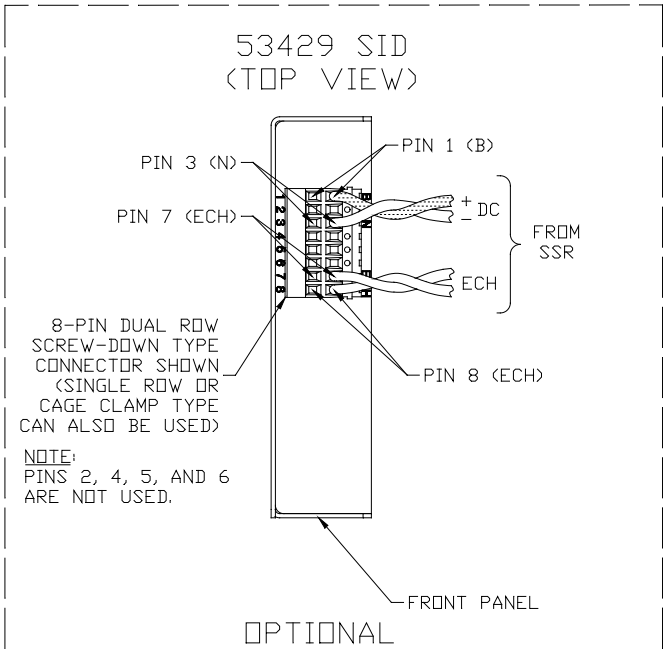
HD/LINK Module I/O Interface Connector



NOTE: 53308 RADIOS ARE NOT DIRECTLY INTERCHANGEABLE WITH 53301/53304 RADIOS IN LINEAR NETWORKING

SSR_CONN.DWG
11-12-98

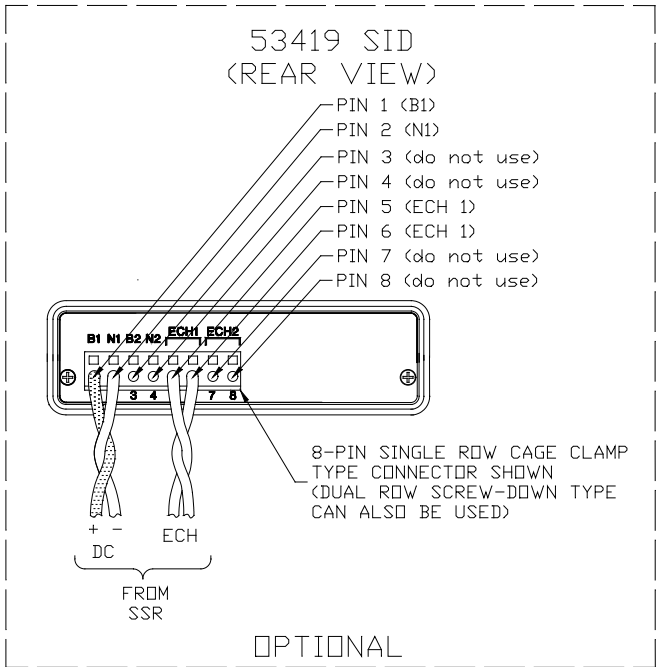
SSR Interface Connectors (53308 Radio Shown)

NOTES:

1. POLARITY OF THE ECHELON LAN (ECH) LEADS IS ARBITRARY.
2. THE SID MODULE IS OPTIONAL AND CAN ONLY BE USED WITH 53308 OR LATER RADIOS.
3. SID MODULES SHOULD NOT BE REPLACED WITHOUT THE CAPABILITY TO WRITE CONFIGURATION DATA (REQUIRES A PC).
4. SUGGESTED WIRE IS STRANDED #18AWG (RED/BLACK) FOR POWER, AND #20AWG TO #18AWG (BLACK/WHITE) FOR ECHELON LAN CONNECTIONS.
5. DC POWER AND ECHELON TERMINALS ON THE 53429 SID ARE DIFFERENT FROM THE 53419 SID, AND THE CONNECTORS ARE NOT INTERCHANGEABLE.

SID_CONN1.DWG
11-12-98

53429 SID Module DC Power & LAN Interface Connector

**NOTES:**

1. POLARITY OF THE ECHELON LAN (ECH) LEADS IS ARBITRARY.
2. DO NOT USE THE REDUNDANT POWER (B2, N2) AND ECHELON LAN (ECH2) TERMINALS (INTERNALLY JUMPED ON THE 53419 SID MODULE ONLY) TO DAISY-CHAIN CONNECTIONS, AS DISRUPTION WILL RESULT IF THE SID MODULE IS REMOVED.
3. THE SID MODULE IS OPTIONAL AND CAN ONLY BE USED WITH 53308 OR LATER RADIOS.
4. SID MODULES SHOULD NOT BE REPLACED WITHOUT THE CAPABILITY TO WRITE CONFIGURATION DATA (REQUIRES A PC).
5. USE ONLY STRANDED WIRE FOR INSERTION IN CONNECTORS WITH CAGE CLAMPS.
6. SUGGESTED WIRE IS STRANDED #18AWG (RED/BLACK) FOR POWER, AND #20AWG TO #18AWG (BLACK/WHITE) FOR ECHELON LAN CONNECTIONS.
7. DC POWER AND ECHELON TERMINALS ON THE 53419 SID ARE DIFFERENT FROM THE 53429 SID, AND THE CONNECTORS ARE NOT INTERCHANGEABLE.

SID_CONN2.DWG
11-12-98

53419 SID Module DC Power & LAN Interface Connector