

SI-544

SpiderAlert Input Output Interface Unit

SpiderAlert®

Installation Instructions

1. INTRODUCTION

1.1 General Description

SI-544 is a hard-wire input/output unit designed to operate as an interface between 4 end-of-line input devices and the SpiderBus. And has 4 output circuits that can be remotely controlled through the SpiderBus.

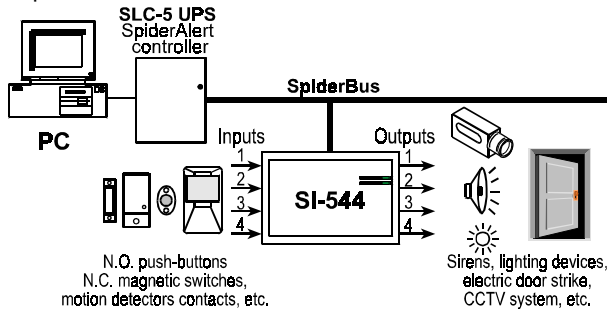


Figure 1 - Integration in SpiderAlert System

The SI-544 is identified by a factory programmed 8-bit ID code (in a 2-digit hexadecimal form).

Due to the bi-directional data communication feature of the SpiderAlert system, the SI-544 can send event codes from its inputs to the control center (SLC-5 Unit and computer) and responds to command codes received from the computer.

Just like all SpiderBus devices, the SI-544 is a supervised unit - it sends out attendance report once every 90 seconds.

The following SI-544 features can be remotely programmed by the SpiderAlert main station software:

1. SI-544 ID number
2. Outputs 1-4 pulse duration (0-255 sec, default 10 sec.)
3. Operation mode ("regular", "inactivity", "still in alarm"). The default mode is "regular".
4. Inputs 1-4 "inactivity" period (0-2550 min., default 70 min.)
5. Inputs 1-4 "still in alarm" period (0-2550 min., default 70 min.)

1.2 Input Circuits

Four End-of-Line (E.O.L.) type input circuits are available for reporting alarms or other events to the computer. Each input is identified by an ID code that forms part of the data sent to the computer. The computer software identifies the SI-544 unit that sent out an event code, the specific input of origin and the type of event (ALARM or RESTORE). Consecutively, a suitable message appears on the computer monitor, the event is registered in the control center's event log and an automatic response is initiated (if so programmed - see paragraph 1.3).

The value of the E.O.L. resistor is 10 kΩ, and deviations from this end-of-line resistance create "events" as follows:

- Once the E.O.L. loop of INPUT X is opened, the SI-544 reports that INPUT [X] is in alarm.
- Once the E.O.L. loop of INPUT X is shorted, the SI-544 reports that INPUT [X+4] is in alarm (input X+4 is a virtual input).
- The following list will surely clarify this issue:

Event	Resultant Message	Event	Resultant Message
IN1 loop is opened	Alarm at INPUT 1	IN3 loop is opened	Alarm at INPUT 3
IN1 loop is shorted	Alarm at INPUT 5*	IN3 loop is shorted	Alarm at INPUT 7*
IN2 loop is opened	Alarm at INPUT 2	IN4 loop is opened	Alarm at INPUT 4
IN2 loop is shorted	Alarm at INPUT 6*	IN4 loop is shorted	Alarm at INPUT 8*

* Inputs 5, 6, 7, 8 are virtual inputs.

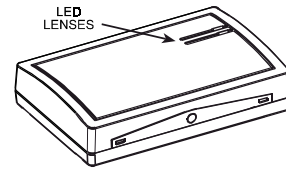


Figure 2 - External View

If several inputs change state simultaneously, the SI-544 sends out a separate message for each input.

The inputs may be connected to normally open (N.O.) pushbuttons, normally closed (N.C.) magnetic switches, motion detector contacts, etc.

1.3 Output Circuits

The SI-544 provides four output terminals (see figure 6). The output circuits, open-collector type, are under control of the computer software - they can be activated (pulled LOW), deactivated or pulsed LOW manually or by automatic computer command.

Each output may be used to sound an alarm, to control lighting devices, to open a door controlled by an electrical door strike, or for many other tasks.

Since each output cannot sink more than 100 mA, an interface relay might be required for controlling external devices, whose current consumption is higher.

The relay contacts may be wired to perform the above functions, switch wireless transmitters or CCTV on and off, etc.

1.4 Reporting Modes

The SI-544 has three different reporting modes, that may be selected by sending a command code from the computer:

A. "REGULAR" Mode

In this mode, only changes in the state of each input - alarms and restorals - are reported to the computer.

B. "STILL-IN-ALARM" Mode

In this mode, alarms and restorals are reported as in the "regular" mode, but if an input remains in a state of alarm, the alarm will be reported again after a predetermined time limit. A sustained alarm will be reported repeatedly at regular intervals, until the input is restored to normal. The reporting interval can be set up 42.5 hours.

C. "INACTIVITY" Mode

This is a special mode used for looking after sick, elderly and incapacitated people. Motion detectors are installed at strategic points within the residence under surveillance.

The person under surveillance is expected to be active from time to time, thus triggering any one of these detectors.

Lack of movement or lack of alarms within a predetermined time limit is a reason for concern. Inactivity is therefore reported to the head end computer. The time allowed to elapse until inactivity is reported can be set to 42.5 hours.

1.5 Tamper Event Reporting

A normally closed tamper switch protects the SI-544 against tampering. Once the cover is removed, the unit will automatically send its ID and a tamper alert to the computer.

2. SPECIFICATIONS

Number of Inputs: 4, E.O.L - 10 kΩ type.

Number of Outputs: 4, open collector type, 100 mA max. sinking current

Unit ID number: 8-bit code (2 hexadecimal digits)

Communication Protocol: SpiderBus communication protocol

Attendance Report Repetition Rate: once every 90 seconds.

Input Voltage: 10 -16 VDC.

Current Drain: Approximately 7 mA standby, 13 mA maximum.

Operating Temperature Range: -10°C to 49°C (14°F to 120°F)

Dimensions (H X W X D): 108 x 165 x 38 mm (4-1/4 x 6-1/2 x 1-1/2 in.)

Weight: 191 g (6.75 oz)

3. DATA AND COMMAND TRANSFER ROUTINES

3.1 Input-Initiated Message Transfer

Message transfer upon disturbing an input circuit state consists of the following stages:

- A. Once an input loop disturbance is sensed (the input deviates from the normal E.O.L. state), the SI-544 sends its ID, the input's ID and a suitable event code over the SpiderBus.
- B. The message is received and verified by the control center (SLC-5 plus associated computer) or by the bus repeater (if a bus repeater is used).
- C. If the message proves valid, the SLC-5 controller (or the repeater) acknowledges its reception. The SI-544 red LEDs illuminate while it is engaged in message transfer, until an acknowledgement is received.
- D. Once the message is acknowledged by the SLC-5 (or repeater), the red LEDs do not illuminate.

3.2 Supervision Data Transfer

The SI-544 is programmed to send out attendance messages at regular intervals. An attendance message consists of the SI-544 own ID and a special test code identifying the message as an **attendance report**. Once the SpiderAlert network is powered up, all bus devices including the SI-544 go through the first cycle of attendance reports. The control unit (SLC-5) automatically "learns" the participating units ID numbers, registers their IDs and creates a supervision list.

After the first reporting cycle, the control center will expect regular attendance reports from each bus device on its list, including the SI-544.

Attendance reports received at regular (correct) intervals are acknowledged by the control center but are not displayed by the computer. However, attendance reports received for the first time or after a break in communication between the SI-544 and the control center will be displayed on the computer screen.

Once an attendance report from a specific SI-544 fails to come in within 4 minutes from the last report, a suitable warning appears on the computer's monitor. If attendance reports from a certain unit or from a group of units stop, the reason might be discontinuity in the data bus (an "open" bus), or unit failure or sabotage.

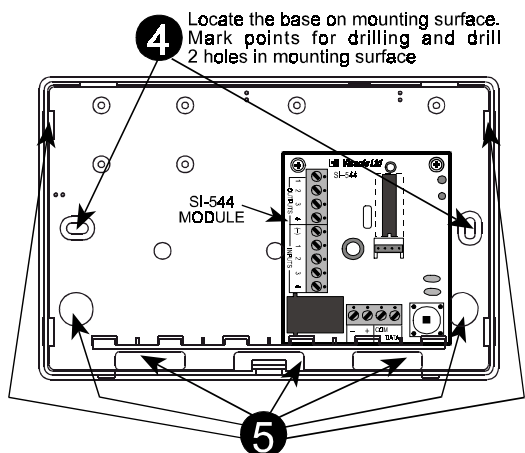
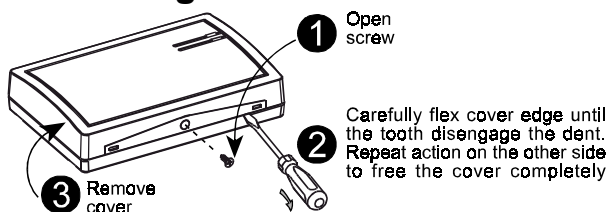
3.3 Command Transfer

Command transfer from the control center to an output circuit of the SI-544 consists of the following stages:

- A. The head end computer attendant (or the computer software, if programmed to do so) sends a digital command code over the bus. The code specifically identifies the target unit, the specific output and the desired activation mode.
- B. Upon receiving the command code, the target unit will acknowledge and the target output will be activated in the mode dictated by the code.

4. INSTALLATION

4.1 Mounting



Open the desired wiring holes. Afterwards fasten the unit to the mounting surface with 2 screws.

Figure 3 - Mounting Process

4.2 Connection to the SpiderBus

The SI-544 may be connected to the SpiderBus either by 4 terminals, or by 4-lead telephone type RJ-11 receptacle.

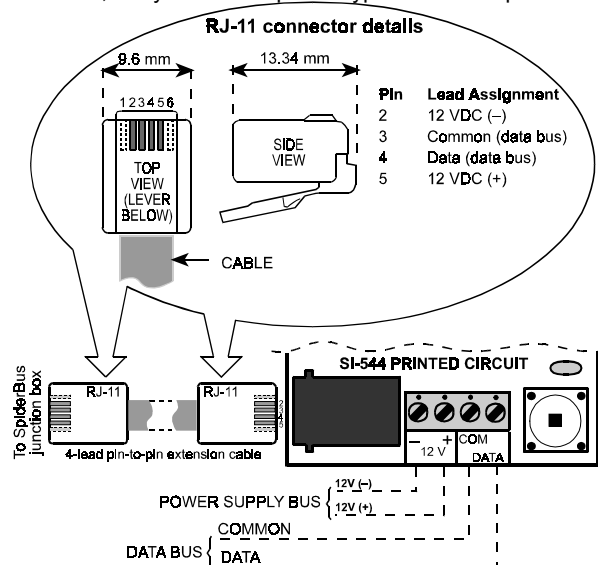


Figure 4 - SpiderBus Wiring Options

Note: The dashed line connections to the terminal block are an alternative method for connecting the SLC-5 to the data and power buses without using RJ-11 connectors.

Warning! Make sure not to reverse the COM / DATA and 12V+ / 12V- wires!

If an RJ-11 (TELCO) plug is used for connecting the SI-544 to the SpiderBus, the following items would be required:

- Proper length of 4-lead, color-coded modular cable for producing a patch cord, for connection to the bus junction box.
- Two 4-position RJ-11 plugs, to terminate both ends of the patch cord.
- A crimping tool for RJ-11 plugs.

Make sure that "one-for-one" configuration is obtained, where pin 2 is connected to pin 2, pin 3 to pin 3, etc.

CAUTION: Do not use a ready-made TELCO RJ-11 to RJ-11 patch cord, because it very rarely has the above mentioned "one for one" configuration.

4.3 Input Loop Wiring

The input circuits should be wired according to the detector type and the required distinction between intrusion event, short circuit and disconnection made by an intruder. The various detectors types, their connections and the detection features are detailed in the next table.

Table 1 - Input Configuration and possible Alarms Reporting

Sensor Type	Input Circuit Configuration	Alarms that can be Reported
N.C.		<p>A. "Event has been occurred" (open contact) or "wire was disconnected by an intruder" (**).</p> <p>B. "Short circuit was made by an intruder".</p>
N.O.		<p>A. "Event has been occurred" (closed contact) or "short circuit was made by an intruder" (**).</p> <p>B. "Wire was disconnected by an intruder".</p>

Sensor Type	Input Circuit Configuration	Alarms that can be Reported
N.C. & N.O.		<p>A. "Event has been occurred" (NC relay contact was open) or "wire was disconnected by an intruder" (**).</p> <p>B. "Event has been occurred" (NO relay contact was closed) or "short circuit was made by an intruder" (**).</p>

* Although the drawing refers to input 1, the same configuration is applicable for all the 4 input circuits.

** Without possibility to distinguish which of the 2 reasons caused the alarm.

Notes

- The end-of-line resistor (10 kΩ) must be connected at the most distant point of the loop.
- Connect both N.C. and N.O. sensors, thus taking advantage of the four physical (1-4) and four virtual (5-8) inputs. (If N.O. contact is closed, the relevant input (1-4) is triggered. If N.C. contact is open, the relevant virtual input (5-8) is triggered).

Remember: Each unused input should be bridged to the ground terminal with a 10 kΩ resistor, or else it will constantly initiate an alarm.

4.4 Output Circuit Wiring

For output circuits functional description, refer to par. 1.3.

Figure 6 provides an example of output circuit connections.

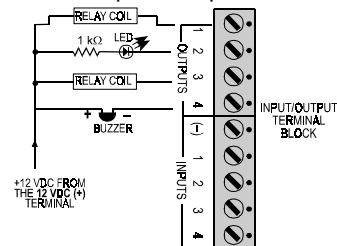


Figure 6 - Output Connections

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