

SR-500, SR-500 ER

SpiderAlert Wireless Receiver

SpiderAlert®

Installation Instructions

1. INTRODUCTION

SR-500 wireless receiver is as an interface unit between various SpiderAlert wireless transmitters and the SpiderBus.

SR-500 ER is the extended range version of the SR-500. It has the following features:

- Higher receiver sensitivity that enables longer communication range.
- Improved receiver selectivity (narrower bandwidth) that prevents reception of interfering signals from undesired transmitters (whose frequencies are near the receiving frequency).

SR-500 (ER) receives RF signals from SpiderAlert transmitters and relay the signals to the SpiderAlert Local Controller SLC-5 via the SpiderBus. All data collected by the SLC-5 is transferred to the head end computer for further processing (see fig. 1-1).

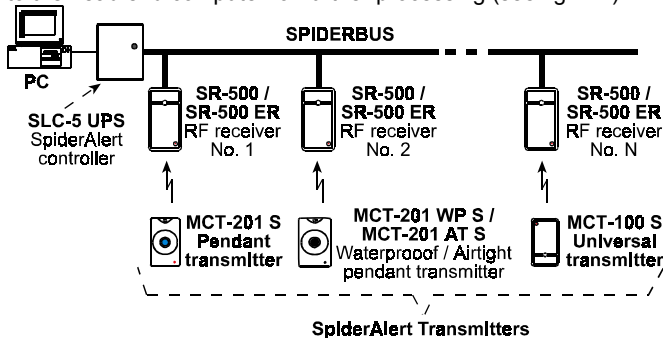


Figure 1-1. SR-500 (ER) in the SpiderAlert System

Each receiver has a factory-programmed, 8-bit ID number (in a 2-digit hexadecimal form) that is marked on top of its microprocessor IC.

2. SPECIFICATIONS

Operating Frequency (MHz): 315, 404, 418, 433.92 or other frequencies according to local requirements.

Receiver ID Code: 1 of 255 possible codes, factory programmed

Data Transfer to Bus: Serial, software controlled.

Operating Voltage Range: 10 - 16 VDC.

Number and type of Inputs: 3, Normally closed (NC)

Number of Outputs: 2

Attendance reports with the receiver ID number are sent by each receiver to the SLC-5 at regular intervals, thus permitting continuous supervision over the entire receiver network (see Para. 3-2).

SR-500 (ER) also responds to command signals sent from the computer via the SLC-5 controller and SpiderBus. Each command signal is addressed to a specific receiver, for controlling one of its two output circuits.

This allows the attendant at the head end to control remote equipment such as sirens, lights or automatic voice announcers, that can be turned on and off by direct connection to receiver's output or via a relay.

The receiver can be **remotely programmed** from the SpiderAlert main station - programming of the receiver ID number and the duration of its outputs 1 and 2 signals in "pulse" operation mode.

The receiver is protected against tampering by an on board tamper switch that is actuated upon removal of the front cover. Once tampered with, the receiver sends out its ID code plus a special tamper code to the head end computer.

A sensitivity control (marked **RANGE**, see fig. 4.3) is provided on the printed circuit board, to enable reception range adjustment.

A terminal block at the top (see fig. 4.3) provides a 4-wire connection to the SpiderAlert bus and two output terminals for controlling external devices (for details, refer to para. 3-3). A right-hand side terminal block (fig. 4.3) provides 3 input terminals for reporting local alarms (for details, refer to para. 3-4).

When a deliberate (or accidental) jamming signal is received, the receiver sends a jamming alert message.

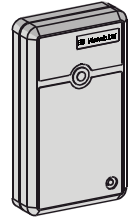


Figure 1-2. External View

Open Collector Output Current Sinking Capability: 100 mA.

Current Consumption @ 13.6 V:

SR-500: 7.2 mA (Standby), 8.8 mA (in operation)

SR-500 ER: 37 mA (standby), 39 mA (in operation)

Operating Temperature Range: 0°C to 49°C (32°F to 120°F).

Dimensions (H x W x D): 110 x 63 x 25 mm (4-5/16 x 2-1/2 x 1 in.)

Weight: SR-500 - 80g (2.8 oz.), SR-500 ER - 78g (2.75 oz.)

3. OPERATION ROUTINE

3.1 Message Handling

When a coded message is received from SpiderAlert transmitter, the receiver registers it and checks whether the bus is busy. If so, the receiver pauses to prevent collision of its message with other messages, and then tries again. If the bus is free, the receiver reports the transmitter's ID code, be it 12-bit or 24-bit, accompanied by its own 8-bit ID number.

Once the message is received by the SLC-5, an "acknowledge" signal is returned to the receiver, causing it to stop sending the data. If there is no response from SLC-5, the receiver will keep sending the data repeatedly, until SLC-5 returns an acknowledgement. The receiver will not be free to receive new coded transmissions until it gets this acknowledgement.

A special on-board LED lights upon reception of a valid RF signal. It will remain illuminated while the receiver is engaged in sending the message via the data bus or while the receiver is waiting for an acknowledge signal from SLC-5. The LED turns off 5 seconds after reception of acknowledge signal from the SLC-5.

3.2 Supervision Method

The receiver is programmed to send out periodic attendance messages. An attendance message consists of the receiver's ID number and a special test code identifying the message as an attendance report. Once the SpiderAlert network is powered up, all receivers on the bus go through the first cycle of attendance reports. The SLC-5 automatically "learns" the participating units' ID numbers, registers their IDs and creates a supervision list. After the first reporting cycle, the SLC-5 will expect regular attendance reports from each unit on its list.

Attendance reports received at regular (correct) intervals are acknowledged by the SLC-5 but not displayed by the head end computer. However, attendance reports received for the first time or after a break in communication between the receiver and the SLC-5 will be displayed on the head end computer screen.

If an attendance report from a specific receiver fails to come in within 4 minutes from the last report, a warning appears on the computer's monitor. If attendance reports from a certain receiver or from a group of receivers stop, the reason might be SpiderBus discontinuity (an "open" bus), receiver failure or sabotage.

3.3 Output Control

The SR-500 (ER) provides two output terminals (OUT1 and OUT2). These terminals, that are of the open-collector type, are under control of the head-end software - they can be activated (pulled LOW) and deactivated manually or by automatic computer command. Each output may be used to sound an alarm, to switch lights on and off, to open a door controlled by an electrical door strike, or for many other tasks. Since each open collector output can not sink more than 100 mA, an interface relay might be required for operating external devices, as shown in Figure 4-4.

4. INSTALLATION

4.1 Preliminary Survey

Taking into account that the coverage areas of individual receivers should overlap a little, to prevent creation of "dead" spots in-between neighbouring units. It is therefore recommended to conduct a survey of the installation site as follows:

- Prepare a test equipment set consisting of an SLC-5, several SR-500(ER) receivers, a power supply unit, a 4-lead cable reel and at least one type of transmitter.

Note: Make sure the sensitivity control in each receiver is set halfway between MAX. and MIN. Depress the tamper switch lever and capture it in this position with masking tape.

- Place the SLC-5 in a convenient location and temporarily deploy a few receivers at "strategic" reception points throughout the coverage area.

- Use the 4-lead cable to form a temporary bus that interconnects all receiver units and SLC-5, as shown in Fig. 4-1 (also refer to Para. 5-1, Steps A and B). The cable may be put down on the floor, following the shortest possible path.

- Power up the test equipment using the 12 VDC power supply or a 12 V battery (see Figure 4-1).

- Operate a SpiderAlert transmitter in various locations within the receiver's expected coverage area to test the reception range. Reception is verified when the LED lights steadily in response to each transmission, until the SLC-5 acknowledges the message.

IMPORTANT: Remember that different transmitter models have different power outputs. It is therefore advisable to make this test with all transmitter models likely to be used in the vicinity of the tested receiver.

- If "dead" or marginal reception areas are discovered:
 - Move the receiver to a point where reception is better.
 - Rotate the sensitivity control towards MAX to increase the receiver's sensitivity.
 - Move the neighboring receiver closer, to bridge the reception gap.
- If the receiver is picking up transmissions made in a neighboring area:
 - Move the receiver away from the neighbouring area to decrease the coverage overlap.
 - Rotate the sensitivity control towards MIN to decrease the receiver's sensitivity.
 - Coil the antenna wire (use a small screwdriver's stem for forming the coil) to reduce the reception range.
- Repeat Steps E through G above for all other receivers. Make a list of the chosen locations and indicate special requirements (sensitivity control position, coiled antenna, etc.).

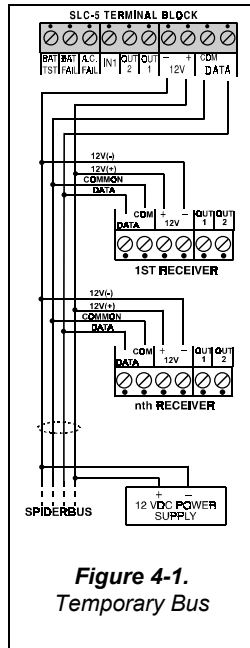


Figure 4-1. Temporary Bus

3.4 Reporting Local Alarms

The SR-500 (ER) provides 3 input terminals with a common ground return on a separate terminal block. The input circuits, which are of the normally closed type, may be connected to motion, smoke or glass break detectors in the immediate vicinity of the unit for reporting local alarms via the SLC-5 to the head-end computer. The computer software identifies the receiver that sent out the alarm signal and the specific input of origin. Consecutively, a suitable message appears on the computer's monitor and the alarm is registered in the event log.

Note: To determine the point from which an alert transmission was made with greater accuracy, dual technology (RF/IR) receivers and transmitters should be used. This especially applies to multi-story buildings.

4.2 Mechanical Mounting

Note: If it is necessary to install the receiver in a metal enclosure, let the antenna wire out through a hole or a slot in the metal enclosure, and test the reception ability very carefully.

- Open the receiver box.
- Open the two mounting knockouts in the base.
- Hold the base, against the mounting surface, with the antenna wire hanging down.

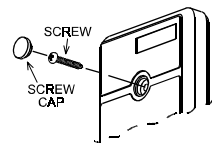


Figure 4.2 Cover Removal

- Mark points for drilling, put the unit aside and drill the mounting holes. Attach the unit to the mounting surface using two screws and wall anchors (if required). Knockouts that serve as wiring outlets are provided at the top of the base.

SR-500(ER) may be connected to the SpiderBus via 4 terminals (Fig. 4-4) or via telephone type RJ-11 connector.

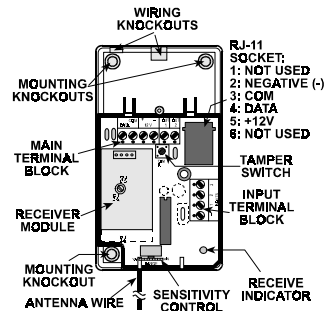


Figure 4.3 Internal View

4.3 Terminal Block Wiring

- Connect the data wires of the bus to the DATA terminals on the receiver's terminal block.

CAUTION! One of the data terminals is marked COM, indicating connection to the common (negative) lead of the data bus. The other terminal marked DATA must be connected to the second lead of the data bus. As long as the data bus is free, the data lead is kept HIGH by a pull-up resistor in the SLC-5 Local Control Unit.

- Connect the power supply bus wires to the 12 V(+) and (-) terminals.

Caution: Make sure not to reverse the bus wires!

Attention! With a large number of receivers on the bus, individual power supplies may be used for each group of receivers. Refer to Para. 4-4 in SLC-5 installation manual (D-7115-0), where several examples are given for power supply distribution along the bus.

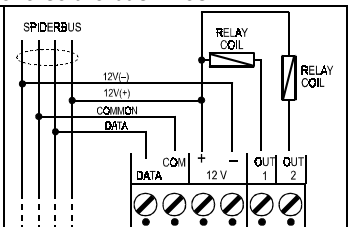


Figure 4-4. Bus, Power and Output Terminal Block Wiring

Auxiliary power supply PS-2 and bus repeater SRP-51 are available for long buses (refer to installation manuals).

- Either output terminal is suitable for operating a low-current 12VDC buzzer, an LED, or an auxiliary relay that draws less than 100 mA current. In case of a relay, connect its operating

coil across the **OUT1** and **12 V(+)** or **OUT2** and **12 V(+)** terminals (as shown in Figure 4-4).

Relays connected to OUT1 and OUT2 will pull in by manually entered or automatic command received from the head end computer. Relay contacts may be wired to open or close doors, to control lighting fixtures, to sound an alarm, to switch a wireless transmitters or CCTV on and off, etc.

- D. If you wish to report up to 3 kinds of local alarms to the head-end computer, connect normally closed (N.C.) sensor contacts across the alarm inputs and the ground (-) terminal, as shown in Fig. 4-5.

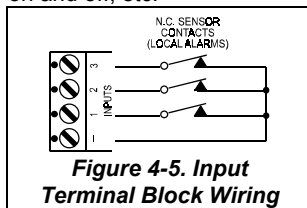


Figure 4-5. Input Terminal Block Wiring

Remember: Unused inputs should be bridged to the ground terminal with a short jumper wire, or else they will constantly initiate an alarm.

4.4 Bus Connection via RJ-11

If you prefer the quick attach/detach feature of telephone-type connectors, you can wire the SpiderAlert bus to the receiver using the on-board TELCO socket. The 4-pin mating plug required is designated RJ-11 and commonly called "TELCO plug" (see Figure 4-6). Prepare the following items:

- An appropriate length of a 4-lead color-coded modular cable, for producing a patch cord between the bus port of the SR-500(ER) and the bus junction box (see Figure 4-6).
- Two 4-position RJ-11 plugs, to terminate the above mentioned patch cord.
- A crimping tool for 4-position RJ-11 plugs.

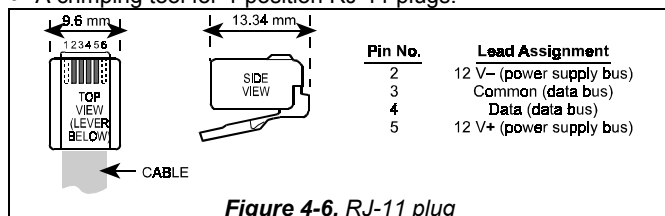


Figure 4-6. RJ-11 plug

- A. Identify the bus 4 wires and connect them to the numbered terminals within the junction box, maintaining the order required for correct patching.

5. PERIODIC INSPECTION

The supervision feature of the SpiderAlert system allows the monitoring personnel to detect a disconnected data bus or a receiver that fails to perform its data transfer duties.

This supervision, however, does not cover the RF communication part of the process. If the receiver's RF section malfunctions, the receiver will continue to send out regular attendance reports, but will not be able to receive wireless transmissions. For this reason, the system manager should make provisions for testing the system periodically without alarming the monitoring personnel, as suggested in Para. 5-1 below. Individual transmitter holders (system users) should test their transmitters periodically without involving the monitoring personnel. This can be carried out as suggested in Para. 5-2. below.

5.1 Testing by the System Manager

To ensure unflinching operation of the system, the system manager is advised to act as follows:

- Define one or several transmitters as **test units** and ask the monitoring personnel to link a test message to these transmitters' ID numbers in the computer's data base. Transmissions received from these test transmitters will be registered in the on-screen event log but will not be considered an alert.
- Use a **test transmitter** to test all receivers at least once a week by initiating a transmission in the coverage area of each receiver. Watch the receiver's LED light in response to your transmission and go off once the message is acknowledged.
- Check the monitoring station event log and verify that all test

- Prepare RJ-11-to-RJ-11 patch cord, long enough to bridge the distance between the bus junction box and SR-500(ER). Make sure a "one-for-one" configuration is obtained - pin 2 is connected to pin 2, pin 3 to pin 3, etc.

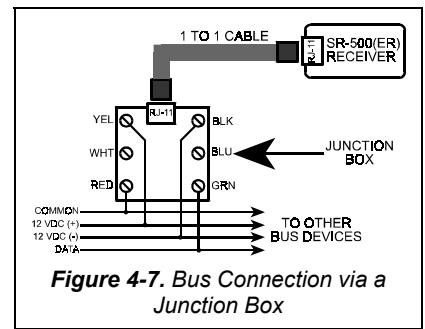


Figure 4-7. Bus Connection via a Junction Box

4.5 Final Calibration and Test

IMPORTANT! Before testing, verify that the SLC-5 Local Control unit is active. If the SLC-5 is inactive, any receiver sending a message to it will become "hung up" indefinitely, until the message is acknowledged.

Having conducted a preliminary survey as instructed in Para. 4-1, and having mounted receivers at the chosen locations, a final test is only needed to make sure that the system functions well at the outer edges of the coverage area.

- Make sure the sensitivity control in each receiver is set as determined during the preliminary survey. Also coil the antenna wire wherever necessary according to your "special requirement" list. Leave receiver covers off for the time being.
- Temporarily disconnect all receivers from the bus by disengaging the RJ-11 plugs.
- Reconnect the receivers one by one. The head-end computer should register an "attendance report" and a "tamper alert", but the receiver's LED will light only once - while sending the tamper alert.
- Operate a SpiderAlert transmitter in various locations within the receiver's coverage area to test the reception range, beginning at the outer edges of the area to be covered. Reception is verified when the LED lights steadily in response to each transmission, until the SLC-5 acknowledges the message. Readjust the sensitivity if necessary.

IMPORTANT: Do not leave the installation site before verifying reliable reception all through the expected coverage area.

- transmissions were duly registered by the system's computer.
- Call the installation company and report any receiver that failed to send a message to the computer.

5.2 Testing by Individual Users

Any SpiderAlert site may be easily equipped for transmitter tests by individual users:

- Create a special **test station**, well away from the coverage area of all other receivers.
- Define a receiver as a **test unit**, install it inside a metal box, set its sensitivity control to MIN. and coil its wire antenna tightly around the stem of a small screwdriver.
- Drill a small hole in the metal box and insert a green LED into the hole. Wire the LED with 1k½ resistor in series across the test unit's OUT1 and 12 V+ terminals. The computer can be programmed to respond to messages received from the test unit by momentary activation of output No. 1 of the test unit.
- Ask the monitoring station personnel to link a test message to the test unit's ID number in the computer's data base. Any message collected from this receiver will thereby be considered a test message.
- Inform all users of the test station, and instruct them to test their transmitters periodically at close range. Green LED momentary illumination, in response to each transmission, serves as an assurance that the test has been successful.

6. MISCELLANEOUS COMMENTS

6.1 Product Limitations

The SpiderAlert wireless system is very reliable and is tested to high standards. However, due to low transmitting power and limited range (required by FCC and other regulating authorities), there are some limitations to be considered:

- Receivers may be blocked by radio signals near their operating frequencies, regardless of digital code used.
- Receiver can only respond to one transmitted signal at a time.
- Wireless equipment should be tested regularly to determine whether there are sources of interference and to protect against faults.

6.2 Standard Compliance

- The user is cautioned that changes or modifications to the unit, not expressly approved by Visonetix Ltd., could void the user's FCC or other authority to operate the equipment.
- The 315 MHz model of this device complies with Part 15 of the FCC Rules and RSS-210 of Industry and Science Canada. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.
- 418 MHz and 433.92 MHz receiver's models comply with CE requirements for Europe and bear CE mark and certification.

Appendix A. Heated Enclosure for Cold Regions

Whenever SR-500 (ER) is installed outdoors in cold regions, it becomes necessary to protect the sensitive electronics from exposure to temperatures below 0°C (32°F). The enclosure available for this purpose is Carlon model CJ-863, in which a heater kit is installed (see Figure A-1).

Mount the SR-500(ER) within the heated enclosure as follows:

- Use some hot glue or double sided tape to attach the receiver box to the cover, as shown.
- Bend the antenna wire and fix it to the cover, using some hot glue.

Install the heated enclosure and complete the wiring as follows:

- Mount the fully equipped enclosure on the wall.
- Wire the receiver as instructed in Section 4 of this manual.
- Connect 24 VAC / 1.7A transformer to heating element terminals.

Note: When using 18 AWG wire, do not exceed 30m (100 ft) wire length between the AC transformer and the heating element. When using 12 AWG wire, do not exceed 90m (300ft) wire length.

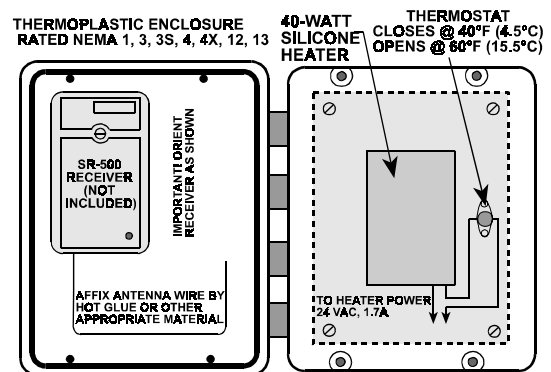


Figure A-1. Internal Construction of the Heated Enclosure

- Test the receiver according to para. 5.
- Shut the heated enclosure tight and test reception range again.

WARRANTY

Visonetix Ltd., and its affiliates, (hereinafter collectively referred to as "the Manufacturer") warrants its products (hereinafter referred to as "the Product") to be free of defects in materials and workmanship under normal operating conditions and use for a period of one year from the date of shipment by the Manufacturer. The Manufacturer's obligations shall be limited within the warranty period, at its option, to repair or to replace the defective Product or any defective component or part thereof. To exercise this warranty, the product must be returned to the manufacturer freight prepaid and insured.

This warranty does not apply to repairs or replacement caused by improper installation, Product misuse, failure to follow installation or operating instructions, alteration, abuse, accident, tampering, repair by anyone other than the Manufacturer, external causes, and failure to perform required preventive maintenance. This warranty also does not apply to any products, accessories, or attachments used in conjunction with the Product, including batteries, which shall be covered solely by their own warranties, if any. The Manufacturer shall not be liable for any damage or loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, resulting from a malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Product.

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The Manufacturer shall not, under any circumstances whatsoever, be liable for any inaccuracy, error of judgment, default, or negligence of the Manufacturer, its employees, officers, agents, or any other party, or of the purchaser or user, arising from any assistance or communication of any kind regarding the configuration, design, installation, or creation of security system involving the Product, that being the responsibility of the purchaser or user.

If the Manufacturer is unable to make such repair or replacement, the Manufacturer's entire liability shall be limited to the cost of a reasonable substitute product.

The Manufacturer shall not be responsible for any dismantling, installation, reinstallation, purchasing, shipping, insurance, or any similar charges.

The Manufacturer shall have no liability for any damages, including without limitation, any direct, indirect, incidental, special, or consequential damages, expenses, costs, profits, lost savings or earnings, or other damages arising out of the use of the Product or the removal, installation, reinstallation, repair or replacement of the Product or any related events. In the event that there is any liability against the Manufacturer, such liability shall be limited to the purchase price of the Product which amount shall be fixed as liquidated damages.

The purchaser and user understand that this Product may be compromised or circumvented by intentional acts; that the Product will not in all cases prevent death, personal injury, property damage, or other loss resulting from burglary, robbery, fire or other causes; and that the Product will not in all cases provide adequate warning or protection. The purchaser and user also understand that a properly installed and maintained alarm may reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such events will not occur or that there will be no death, personal injury, property damage, or other loss as a result of such events.

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The purchaser or user should follow the Product installation and operation instructions and test the Product and the entire system at least once each week. For various reasons, including but not limited to changes in environmental conditions, electric, electronic, or electromagnetic disruptions, and tampering, the Product may not perform as expected. The purchaser and user are advised to take all necessary precautions for the protection and safety of persons and property.

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