VERICHIP

VERICHIP

Installation Guide: Proximity Tag Reader

Contents List

Item	Quantity
Proximity Tag Reader	1
Installation Guide: Proximity Tag Reader	1

VeriChip™ systems are designed to assist staff in providing a high degree of safety for people and therefore should only be used as a component of a comprehensive security program of policies, procedures, and processes. As with every security system, **VeriChip highly recommends regular system operational checks** to verify functional integrity.

FCC Regulations

This device complies with Part 15 of the FCC Rules. 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 undesired operation.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and Receiver
- Connect the equipment into an outlet on a circuit different from that to which the Receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Modifications
Any changes or modifications not expressly approved by VeriChip Corporation for compliance could void the user's authority to operate the equipment.

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
245	■	■	■	■		■		■
246	■	■	■	■		■	■	
247	■	■	■	■		■	■	■
248	■	■	■	■	■			
249	■	■	■	■	■			■
250	■	■	■	■	■		■	
251	■	■	■	■	■		■	■
252	■	■	■	■	■	■		
253	■	■	■	■	■	■		■
254	■	■	■	■	■	■	■	
255	■	■	■	■	■	■	■	■

Document Control

Date	Rev #	Comments

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
175	■		■		■	■	■	■
176	■		■	■				
177	■		■	■				■
178	■		■	■			■	
179	■		■	■			■	■
180	■		■	■		■		
181	■		■	■		■		■
182	■		■	■		■	■	
183	■		■	■		■	■	■
184	■		■	■	■			
185	■		■	■	■			■
186	■		■	■	■		■	
187	■		■	■	■		■	■
188	■		■	■	■	■		
189	■		■	■	■	■		■
190	■		■	■	■	■	■	
191	■		■	■	■	■	■	■
192	■	■						
193	■	■						■
194	■	■					■	
195	■	■					■	■
196	■	■				■		
197	■	■				■		■
198	■	■				■	■	
199	■	■				■	■	■
200	■	■			■			
201	■	■			■			■
202	■	■			■		■	
203	■	■			■		■	■
204	■	■			■	■		
205	■	■			■	■		■
206	■	■			■	■	■	
207	■	■			■	■	■	■
208	■	■		■				
209	■	■		■				■

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
210	■	■		■			■	
211	■	■		■			■	■
212	■	■		■		■		
213	■	■		■		■		■
214	■	■		■		■	■	
215	■	■		■		■	■	■
216	■	■		■	■			
217	■	■		■	■			■
218	■	■		■	■		■	
219	■	■		■	■		■	■
220	■	■		■	■	■		
221	■	■		■	■	■		■
222	■	■		■	■	■	■	
223	■	■		■	■	■	■	■
224	■	■	■					
225	■	■	■					■
226	■	■	■				■	
227	■	■	■				■	■
228	■	■	■			■		
229	■	■	■			■		■
230	■	■	■			■	■	
231	■	■	■			■	■	■
232	■	■	■		■			
233	■	■	■		■			■
234	■	■	■		■		■	
235	■	■	■		■		■	■
236	■	■	■		■	■		
237	■	■	■		■	■		■
238	■	■	■		■	■	■	
239	■	■	■		■	■	■	■
240	■	■	■	■				
241	■	■	■	■				■
242	■	■	■	■			■	
243	■	■	■	■			■	■
244	■	■	■	■		■		

Battery

The device contains a memory-backup lithium battery.

⚠ *CAUTION — RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.*

EU Waste Electrical and Electronic Equipment

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.
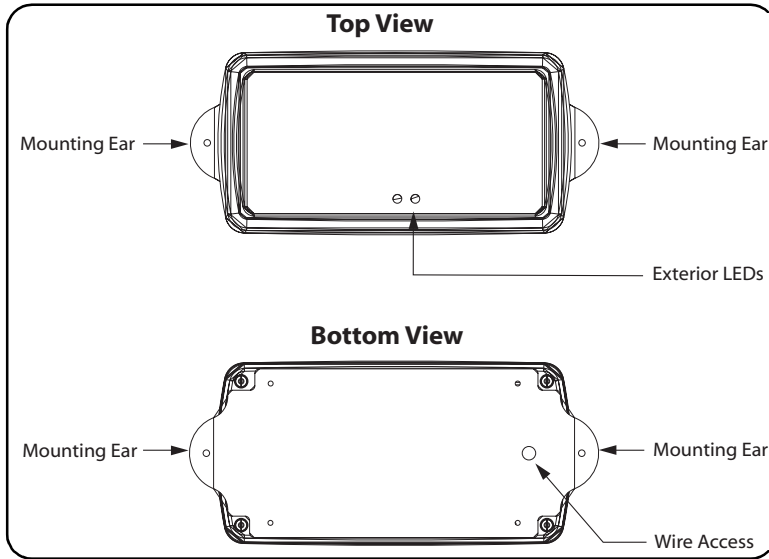
You can also contact us for more information on the environmental performances of our products.

Functional Description

The Proximity Tag Reader (PTR) is a medium range RFID tag reader. The PTR can be used to:

- ◆ Determine if a Tag is in a specific place; or,
- ◆ Record the passage of Tags through a doorway or other restricted point.

Figure 1: Proximity Tag Reader

The PTR is mounted to a flat surface using a backplate.

The PTR is housed in an attractive case that is without exterior adjustments. To make wiring connections and adjustments, you must dismount and open the case.

The only *required* wire connections are for power. An *optional* wire connection is available as a dry contact input to trigger the Low Frequency (LF) field in Standby Mode.

Preferred Practices

When installing the PTR:

- ◆ *Record the PTR serial number and location.*
- ◆ To save time, temporarily mount the PTR in its final location and then set LF field strength, address, and operating mode. After these operations are complete, permanently mount the PTR.

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
105		■	■		■			■
106		■	■		■		■	
107		■	■		■		■	■
108		■	■		■	■		
109		■	■		■	■		■
110		■	■		■	■	■	
111		■	■		■	■	■	■
112		■	■	■				
113		■	■	■				■
114		■	■	■			■	
115		■	■	■			■	■
116		■	■	■		■		
117		■	■	■		■		■
118		■	■	■		■	■	
119		■	■	■		■	■	■
120		■	■	■	■			
121		■	■	■	■			■
122		■	■	■	■		■	
123		■	■	■	■		■	■
124		■	■	■	■	■		
125		■	■	■	■	■		■
126		■	■	■	■	■	■	
127		■	■	■	■	■	■	■
128	■							
129	■							■
130	■						■	
131	■						■	■
132	■					■		
133	■					■		■
134	■					■	■	
135	■					■	■	■
136	■				■			
137	■				■			■
138	■				■		■	
139	■				■		■	■

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
140	■				■	■		
141	■				■	■		■
142	■				■	■	■	
143	■				■	■	■	■
144	■			■				
145	■			■				■
146	■			■			■	
147	■			■			■	■
148	■			■		■		
149	■			■		■		■
150	■			■		■	■	
151	■			■		■	■	■
152	■			■	■			
153	■			■	■			■
154	■			■	■		■	
155	■			■	■		■	■
156	■			■	■	■		
157	■			■	■	■		■
158	■			■	■	■	■	
159	■			■	■	■	■	■
160	■		■					
161	■		■					■
162	■		■				■	
163	■		■				■	■
164	■		■			■		
165	■		■			■		■
166	■		■			■	■	
167	■		■			■	■	■
168	■		■		■			
169	■		■		■			■
170	■		■		■		■	
171	■		■		■		■	■
172	■		■		■	■		
173	■		■		■	■		■
174	■		■		■	■	■	

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
35			■				■	■
36			■			■		
37			■			■		■
38			■			■	■	
39			■			■	■	■
40			■		■			
41			■		■			■
42			■		■		■	
43			■		■		■	■
44			■		■	■		
45			■		■	■		■
46			■		■	■	■	
47			■		■	■	■	■
48			■	■				
49			■	■				■
50			■	■			■	
51			■	■			■	■
52			■	■		■		
53			■	■		■		■
54			■	■		■	■	
55			■	■		■	■	■
56			■	■	■			
57			■	■	■			■
58			■	■	■		■	
59			■	■	■		■	■
60			■	■	■	■		
61			■	■	■	■		■
62			■	■	■	■	■	
63			■	■	■	■	■	■
64		■						
65		■						■
66		■					■	
67		■					■	■
68		■				■		
69		■				■		■

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
70		■				■	■	
71		■				■	■	■
72		■			■			
73		■			■			■
74		■			■		■	
75		■			■		■	■
76		■			■	■		
77		■			■	■		■
78		■			■	■	■	
79		■			■	■	■	■
80		■		■				
81		■		■				■
82		■		■			■	
83		■		■			■	■
84		■		■		■		
85		■		■		■		■
86		■		■		■	■	
87		■		■		■	■	■
88		■		■	■			
89		■		■	■			■
90		■		■	■		■	
91		■		■	■		■	■
92		■		■	■	■		
93		■		■	■	■		■
94		■		■	■	■	■	
95		■		■	■	■	■	■
96		■	■					
97		■	■					■
98		■	■				■	
99		■	■				■	■
100		■	■			■		
101		■	■			■		■
102		■	■			■	■	
103		■	■			■	■	■
104		■	■		■			

Proximity Tag Reader Location

Maximum Tag detection range is approximately 5 ft. (1.5 m). As a result, mount the PTR very close to the tag detection location. For example, to detect a tag worn by someone in a bed, wall mount the PTR at the head of the bed.

The PTR case was designed to make options and adjustments user-*inaccessible*. Unlike other RFID devices, the PTR is designed for mounting in locations visible to the facility occupants.

Setting LF Field Strength

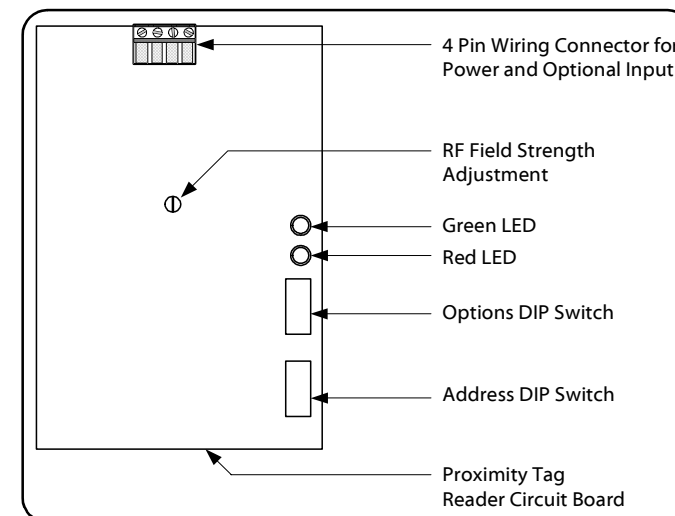Varying the LF field strength changes the size of the Tag detection zone.

Use Test Mode to set the LF Field Strength. Test Mode provides an audible beep; and, disables network messaging.

Tools: You will need a VeriChip RFID Tag and a small common screwdriver.

▶ To adjust the LF field strength:

1   Choose the PTR's final mounting location.

2   Use the backplate to mark the wall.

3   Drill mounting holes in the wall.

4   Remove the PTR cover. Identify the Options Dip Switch as shown in Figure 2.

Figure 2: PTR Circuit Board

- 4 Pin Wiring Connector for Power and Optional Input
- RF Field Strength Adjustment
- Green LED
- Red LED
- Options DIP Switch
- Address DIP Switch
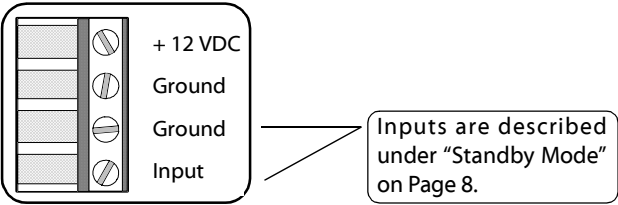- Proximity Tag Reader Circuit Board

5 Use Figure 3 to identify the 3 Mode Switches: F, G, and H. Set all 3 Mode Switches to 0 as shown in Figure 3. This sets the PTR to Test Mode.

Figure 3: Mode Switches set in Test Mode
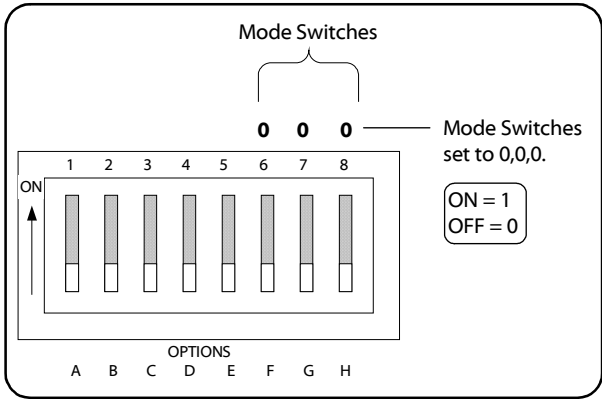
6 Temporarily mount the PTR in its final location and connect power as in Figure 4.

Figure 4: Power Wiring

7 Turn the LF field adjustment fully counter-clockwise. **Do not turn the adjustment forcefully to its limits. Do not needlessly wiggle or turn the adjustment.**

8 Walk the tag to the detection area perimeter. *Slowly* turn the field adjustment slightly clockwise. Stop turning when the red LED begins to blink.

9 Walk the Tag throughout the detection area to make sure that the LF field is consistent throughout the area. If the LF field is inconsistent, turn the field adjustment *slightly* counter-clockwise.

10 If you have increased the LF field strength, repeat Step 8 to ensure that the field does not extend beyond the detection area.

Appendix

Figure 9: Address DIP Switch (Repeated for your convenience.)
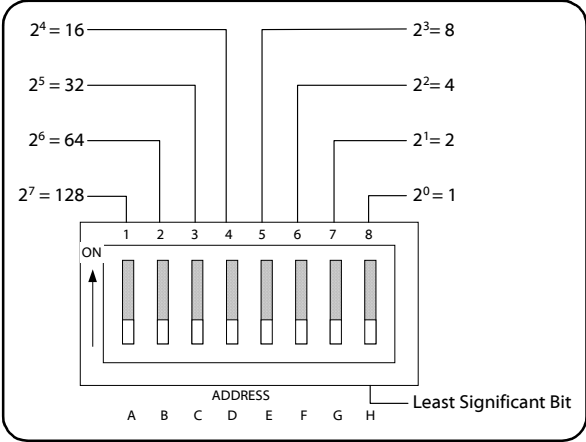
In Table 5, the left hand column contains the address. The columns, A – H, show the switch positions: A black square indicates the on position.

Table 5: Address Switch Positions

Address	A	B	C	D	E	F	G	H
0								
1								■
2							■	
3							■	■
4						■		
5						■		■
6						■	■	
7						■	■	■
8					■			
9					■			■
10					■		■	
11					■		■	■
12					■	■		
13					■	■		■
14					■	■	■	
15					■	■	■	■

Table 5: (Continued) Address Switch

Address	A	B	C	D	E	F	G	H
16				■				
17				■				■
18				■			■	
19				■			■	■
20				■		■		
21				■		■		■
22				■		■	■	
23				■		■	■	■
24				■	■			
25				■	■			■
26				■	■		■	
27				■	■		■	■
28				■	■	■		
29				■	■	■		■
30				■	■	■	■	
31				■	■	■	■	■
32			■					
33			■					■
34			■				■	

Specifications

- -

General

Input Frequency .434 MHz

Output Frequency . . . . .307 kHz

Input Voltage . . . . .12 VDC at 300 mA

Detection Zone . . . . .1 ft. to 5 ft. (0.30 m to 1.5 m)

Additional Inputs/Outputs . . . . .Dry Contact Input

Options

Operating Modes . . . . .Features 6 operating modes

Adjustable LF Field. . . . . .Allows adjustment of Tag Detection Zone to suit application

Input . . . . .Input can be configured for EOL (security), and normally open or normally closed switches

Addressable . . . . .Addressable from 0 to 255

Network

LF Link. . . . . .Uses LF link to connect to security network. Network wires NOT required.

Physical

Operating Temperature . . . . .32° F to 131° F (0° C to 55° C)

Storage Temperature . . . .-22° F to 140° F (-30° C to 60° C)

Relative Humidity. . . . . .90% non-condensing

Size

Power Supply . . . . .12 VDC regulated

Mounting. . . . . .surface mount

---

11 Turn off Test Mode by one of two methods:

- ◆ Remove power.
- ◆ Set the PTR to its usual operating mode. It is not necessary to remove power to change operating modes. See Table 1 on page 8 for a list of operating modes and switch settings.

    – — — – End of Procedure — — — – –

Setting the Address

- -

Each PTR must have an address unique within its floor or facility. Addresses are entered in binary format using the Address Dip Switch. The PTR can accept addresses ranging from 0 to 255.

The least significant bit of the binary address is on the *right hand side* of the Address DIP Switch. Figure 5 shows the binary value of every switch in the Address DIP Switch.

Table 5, appended to this guide, shows all address values and switch positions.

Figure 5: Address Dip Switch Showing Switch's Binary Values

$2^4 = 16$ $2^3 = 8$
$2^5 = 32$ $2^2 = 4$
$2^6 = 64$ $2^1 = 2$
$2^7 = 128$ $2^0 = 1$

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

ON

ADDRESS
A B C D E F G H — Least Significant Bit
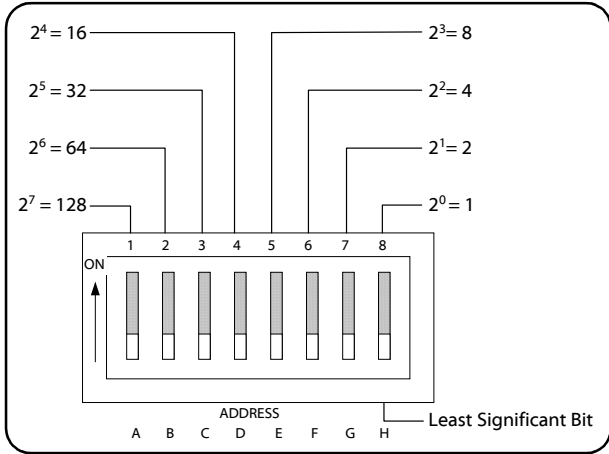
Selecting an Operating Mode

- -

Operating modes are selected using the Mode Switches on the Options DIP Switch. The location of the Options DIP Switch is shown Figure 2 on page 4.

Figure 6: Mode Switches in the Options DIP Switch
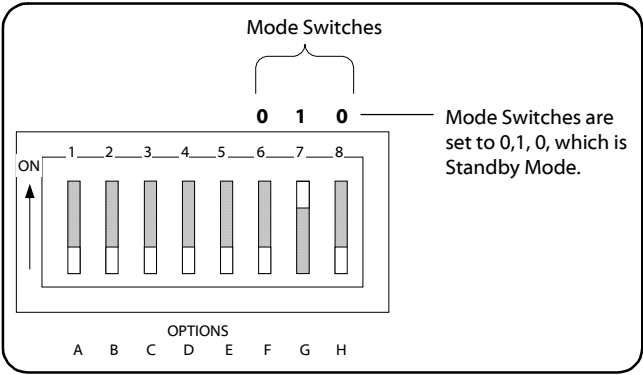
Using Mode Switches to Select Operating Mode

Figure 6 shows the Options DIP switch and the nearby circuit board. The letters, A through to H, are etched in the circuit board edge. The **Mode Switches** are labelled as F, G, and H. Operating Modes are selected by the Mode Switches.

Table 1 lists the Mode Switches (F, G, and H) and the Operating Modes.

Figure 6 shows the Mode Switches set to Standby Mode.

Table 1: Operating Modes and Mode Switch Settings

Mode Switches F G H	Operating Mode	Description
0 0 0	Test	Used for adjusting field size. Field is uninterrupted and the PTR beeps at each tag identification. Network messages are not sent.
0 0 1	Uninterrupted	Field always on. Tags are identified as they enter the field and queried once every 12 seconds. Tag identities are re-acquired every minute.
0 1 0	Standby	The PTR is active for 10 seconds when it is triggered by an opening or closing contact. See Figure 6.
0 1 1	Duty Cycle 1	The LF field cycles on for 5 seconds and off for 30 seconds automatically. The PTR identifies and reports any tags found while the field is on.
1 0 0	Duty Cycle 2	The LF field cycles on for 10 seconds and off for 5 minutes automatically. The PTR identifies and reports any tags found while the field is on.

Troubleshooting

When the PTR detects an error condition it will do all of the following:

- Transmit an error message to the network; and,
- Flash the red LED in a repeating pattern of 12 short flashes and one long flash; and,
- Sound the buzzer every 12 flashes.

The PTR may enter an error state for three reasons:

- An invalid combination of configuration switches has been set. For example, setting the Mode Switches to 1, 1, 0 or 1,1,1 will cause an error.
- The EOL input is not returning the correct measured value. This could be treated as a tamper alarm. If it is not a tamper alarm, then correct the EOL resistor value or move DIP Switch B to off.
- The main supply voltage is low. If the PTR can still function with the low supply voltage the device will continue to report tags while in the error state. If the voltage supply is so low that the PTR cannot function, it will enter the Low Power Mode which is described in the preceding text.

In each of the three error states, the PTR transmits a network message that indicates which of the three causes is responsible.

Verifying Operation

Verify the operation of the PTR by observing the two LEDs. During Test Mode, listen for the buzzer to indicate Tag detection. Table 3 and Table 4 list the LED and buzzer signals and the corresponding operations and states.

Table 3: Power and LF Field States

LED and Buzzer	Power and LF Field State
Buzzer emits short beep.	Power up.
Green LED slowly flashing.	Power on and LF field off.
Green LED on continually.	Power on and LF field on.
Red LED briefly flashes once every 1.5 seconds.	Main power has been lost. See Low Power Mode on page 9.

Table 4: Tag Identification Operations

LED and Buzzer	Operation
Red LED flashes	Tag identified, network message sent.
Red LED flashes with buzzer beep	Test Mode tag identification. A network message is *NOT* sent.
Red LED continually emitting brief flashes. Every 12 seconds, a longer red LED flash occurs and the buzzer beeps.	Error: The PTR has detected one of three error conditions. See "Troubleshooting" on page 8.

Low Power Mode

If main power fails the PTR will enter Low Power Mode.

Low power mode is indicated by the following:
 ◆ The green LED is off; and,
 ◆ The red LED is flashing approximately once every 1.5 seconds.

In low power mode the PTR does not generate a LF field. The PTR transmits a "Device in Low Power Mode" message to the network approximately once every 12 seconds.

The PTR remains in this mode until main power is restored or until reserve power is exhausted. Reserve power should last for at least 15 minutes. When main power is restored the PTR will begin normal operation.

Table 1: (Continued)Operating Modes and Mode Switch Settings

Mode Switches			Operating Mode	Description
F	G	H		
1	0	1	Duty Cycle 3	The LF field cycles on for 10 seconds and off for 30 minutes automatically. The PTR identifies and reports any tags found while the field is on.

Standby Mode

In Standby Mode the LF field is triggered on for 10 seconds when the input contacts are opened or closed. The PTR identifies and reports tags while the LF field is on. After 10 seconds the LF field shuts down until the next input trigger.

Select Standby Mode by setting the Mode Switches to 0, 1, 0 as in Figure 6.

Input Wiring

The input is an active low so that when the input terminal is grounded the input is active or on. Wire the input to one terminal of a switch. Wire the other side of the switch to either ground terminal on the PTR 4 pin wiring connector.
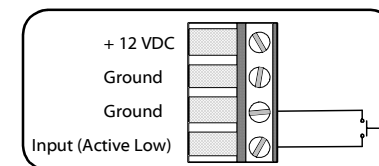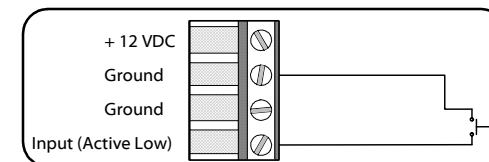
Figure 7: Input Wiring

Figure 8: Alternate Input Wiring

End Of Line Input in Standby Mode

The End-Of-Line (EOL) setting enables input fault or input tampering detection.

An EOL input provides two fixed resistance values instead of open and closed switch states. The PTR will treat the transition from one resistance value to the other as an opening, or as a closing switch. If EOL resistors are installed and the EOL input is enabled, the PTR will remember the input values resulting from the EOL resistors.

If the PTR detects an input value different from the EOL values, it will respond as for an error. Please see "Troubleshooting" on page 9.

To enable an EOL input, turn Switch A of the Options DIP switch on. See Figure 7.

Edge Select in Standby Mode

Edge section is controlled by switch B in the Options DIP Switch shown in Figure 7.

Turn Switch B on to trigger the LF field on when:
- the switch opens; or,
- when a normally closed (NC) relay opens.

Turn Switch B off to trigger the LF Field on when:
- the switch closes; or,
- when a normally open (NO) relay closes.

These conditions are summarized in Table 2.

Table 2: Setting the LF Field Trigger

Switch	Relay	LF Field	Switch B
Opens	NC opens	Turns on	On
Closes	NO closes	Turns on	Off

Figure 7: EOL and Edge Selection Switches
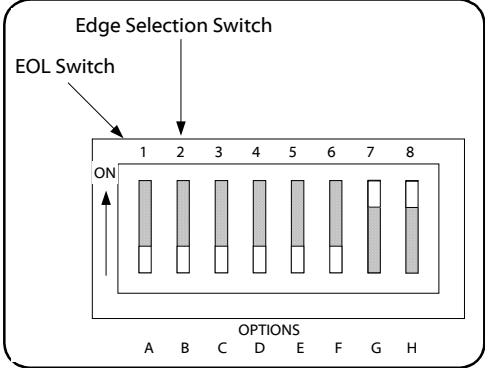
Installation

▶ To install the PTR:

1 Select a location remembering that the detection zone is limited.

2 Use the PTR backplate as a template for locating mounting holes.

3 Drill a hole in the wall for the power wire. Route the power wire inside the wall in accordance with the local wiring regulations in your district.

4 Open the PTR case.

5 Push the power wire through the PTR backplate and work it towards the wiring connector.

6 Connect the power wires as in Figure 8.

7 Optionally, connect the input wires as in Figure 8.

8 Set the PTR to Test Mode by setting the Mode Switches to 0, 0, 0. Mode Switches are part of the Options DIP Switch and are shown in Figure 6.

9 Temporarily mount the PTR in its final location. Do not close the case.

10 Adjust the LF field. See "Setting LF Field Strength" on page 4.

11 Set the PTR address, and normal operating mode. See "Selecting an Operating Mode" on page 5 and Table 1 on page 8.

12 Record the PTR address and location for later inclusion on the floor plan.

13 Close the enclosure.

14 Using the holes provided in the backplate, mount the PTR in its location. Use fasteners such as screws or wall anchors so that, if required, the device can be removed from the wall, re-configured, and replaced in the same location.

— — — End of Procedure — — — — —

Figure 8: 4 Pin Terminal Block Wiring
(Repeated for your convenience)