Field Installation Guide

P/N 411425

AI1620 SmartPass®

Intermec

A UNOVA Company

Amtech Systems Division

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WARNING TO USERS IN THE UNITED STATES

FEDERAL COMMUNICATIONS COMMISSION (FCC) RADIO FREQUENCY INTERFERENCE STATEMENT
47 CFR §15.105(a)

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency (RF) energy and may cause harmful interference to radio communications if not installed and used in accordance with the instruction manual. Operating this equipment in a residential area is likely to cause harmful interference, in which case, depending on the laws in effect, the users may be required to correct the interference at their own expense.

NO UNAUTHORIZED MODIFICATIONS
47 CFR §15.21

CAUTION: This equipment may not be modified, altered, or changed in any way without permission from Amtech Corporation. Unauthorized modification may void the equipment authorization from the FCC and will void the Amtech warranty.

USE OF SHIELDED CABLES IS REQUIRED
47 CFR §15.27(a)

Shielded cables must be used with this equipment to comply with FCC regulations.

A license issued by the FCC is required to operate this RF identification device in the United States. Contact Amtech Corporation for additional information concerning licensing requirements for specific devices.

Amtech Corporation
USA

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Installing SmartPass

This installation guide assists you with installing your AI1620 SmartPass integrated reader system (SmartPass). For additional information regarding your SmartPass, consult the AI1620 SmartPass System Guide.

Getting Started

SmartPass is intended to be installed using outdoor grade conduit in accordance with National Electric Code and local building standards. Installation by a licensed electrician and building inspection may be required.

Contents of Shipping Carton

The following items are included in the SmartPass shipping carton:

- SmartPass Reader
- Pole mount bracket assembly bubble-wrapped separately
- Accessories ordered as options may also be included

Installation Accessory Kits

Table 1-1 lists optional Amtech SmartPass installation accessory items that can be included if ordered as options:

Table 1-1 Installation Accessory Kits

Part No.	Description
54-1620-001	Wall or ceiling mount kit
58-1620-001	5-ft connector cable
58-1620-002	20-ft connector cable
20-1620-003	Connector kit only
56-1620-004	13-pair cable (1-ft lengths)
76-1620-005	110 V AC to 18 V AC Class C transformer
76-1620-006	12 V AC to 18 V AC step-up transformer

Materials Required

You need the following materials to install SmartPass:

- A 5/32-in. Allen wrench to assemble and adjust the mounting brackets

- Flat tip screwdriver
- Adjustable wrench
- Audible circuit tester (buzz box)
- Tools and supplies for the power and communications connections — these may include 1/2-in. watertight, flexible conduit and fittings, terminal strips or wire nuts, wire strippers, tape, and heat-shrinkable tubing.
- PC with 1.44 MB floppy disk drive, MS DOS, RS-232 serial port, and a communications cable with a DB9 or DB25 connector configured for 9600 baud, 8 bits, 1 stop bit, and no parity
- Two test tags of the same type to use in live operation - obtain test tags from your Amtech dealer or distributor.

If mounting the SmartPass to a round pole, you need:

- Two 1/2-in. wide, stainless-steel hose clamp straps that are 12 in. long to use with a 2-in. diameter pole or two 1/2-in. wide, stainless-steel hose clamp straps that are 24 in. long to use with a 10-in. diameter pole

If mounting the SmartPass to a wall or other flat surface, you need:

- Accessory wall or ceiling mount bracket, if additional flexibility in defining the read zone is needed - Amtech recommends the accessory bracket if SmartPass will be installed on any flat surface.
- Anchor hardware suitable for the surface on which you will mount SmartPass. Because SmartPass weighs only 4.3 kg (9 1/2 lbs), 0.6 cm. (1/4-in) bolt hardware is adequate to secure the unit to a wall or ceiling. Be sure to use high-quality corrosion-resistant anchor hardware.
- Four hex nuts and screws 3/8-16 threaded and four washers

Electrical and Communications Requirements

All construction work at the site must be completed before installing SmartPass. Electrical and communications cables should be installed according to all applicable local and federal building code requirements.

Junction Box

A watertight junction box meeting applicable local and national building codes is recommended for connecting SmartPass power and communications wiring. Amtech recommends a NEMA Type-4 junction box with a back panel. The junction box houses the terminal strip for communications and power connections.

Power and Communications Cable

The appropriate cable length for power and communications depends on the physical characteristics of the SmartPass installation site. Table 1-2 lists accessory kits available for cabling options.

Table 1-2 Connector Cabling Accessory Kits

Part Number	Description
58-1620-001	5-ft connector cable
58-1620-002	20-ft connector cable
20-1620-003	Connector kit only
56-1620-004	13-Pair cable (1-ft lengths)
76-1620-005	110 V AC to 18 V AC Class C transformer
76-1620-006	12 V AC to 18 V AC step-up transformer

Electrical Power

A dedicated electrical power supply must be present at the site and be available to SmartPass at all times. The power must be 16–28 V DC or 16–20 V AC. A step-down transformer is available (North America only) to convert a 120 V AC duplex wall outlet with ground to 18 V AC, or a step-up transformer to convert a low-voltage 12 V AC outlet to 18 V AC. Consult your local and national electrical codes for installation and safety requirements.

Note: *SmartPasses installed outside North America require a locally supplied transformer.*

If 18 V DC or 18 V AC power is available, the transformer option is not necessary.

Amtech offers a Class C transformer accessory kit (part number 76-1620-005) for sites where 110 V AC is available. It is the installer's responsibility to supply conversion equipment and wiring for other voltages. Table 1-3 contains power supply current requirements.

Table 1-3 Power Supply Current Requirements

Supply	Worst Case Maximum Current at 68°F (20°C)	Standby Operating Current at 68°F (20°C)
16 to 20 V AC	800 mA at 18 V AC	400 mA at 18 V AC
16 to 28 V DC	800 mA at 18 V DC	400 mA at 18 V DC

Power circuits are protected internally against power surges.

Power Extension

Measured voltage at SmartPass must be at least 16 V for proper operation. Use Table 1-4 to determine the correct cable size for the necessary length of cable. The table is an approximation.

Note: *If close to the maximum length, measure voltage at SmartPass to ensure it does not drop below 16 V.*

Table 1-4 Cable length from Amtech-Supplied 110 V AC to 18 V AC Transformer to AI1620 SmartPass

Cable Size (AWG)[a]	24	22	20	18	16	14	12
Maximum DCR (Ohms per foot at 68° F)[b]	0.0270	0.0175	0.0109	0.0069	0.0044	0.0027	0.0017
Maximum length (feet)	29.63	45.71	73.39	115.61	183.91	293.04	467.84
Maximum length (feet)[c]	25	39	62	98	156	249	398
When used to extend Amtech 5-ft cable (feet)	23	36	57	90	143	227	363
When used to extend Amtech 20-ft cable (feet)	14	22	35	55	88	140	224

a. Use two conductors each for 18 V and 18 V return (4 conductors total).
b. DCR information is from Belden catalog.
c. Calculated length is reduced by -15% to adjust for other variables such as connector contact resistance. Length variable factor is 85%; maximum current drawn by AI1620 is 2.5; maximum allowable voltage drop from the 18 V AC transformer secondary is 2.

Installing SmartPass on a Round Pole

When installing SmartPass on a round pole, the pole must be a minimum of 2 inches in diameter and should extend 6-8 ft above the pavement level. The pole must be installed according to local building codes.

To mount SmartPass to a pole

1. Unpack SmartPass.

   A factory-mounted bracket (Figure 1-1) is attached to the back of SmartPass, and a pole mount bracket assembly (Figure 1-2) is bubble-wrapped with SmartPass and contains a plastic bag of 4 Allen screws and washers.

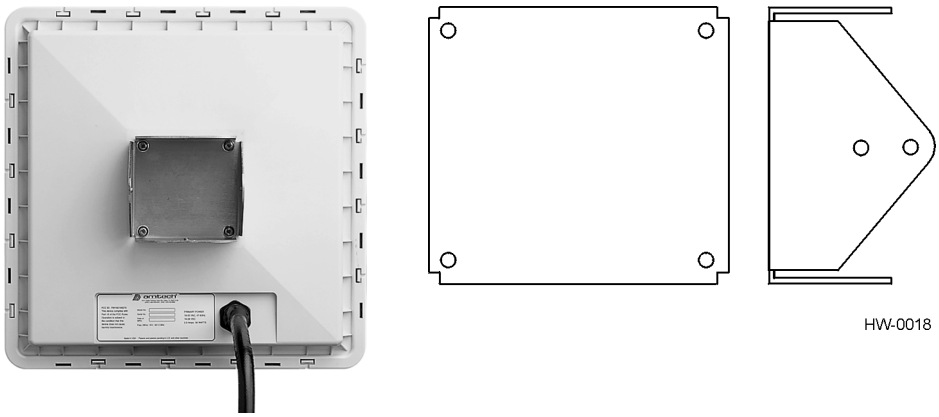

Figure 1-1 Factory-Mounted Bracket

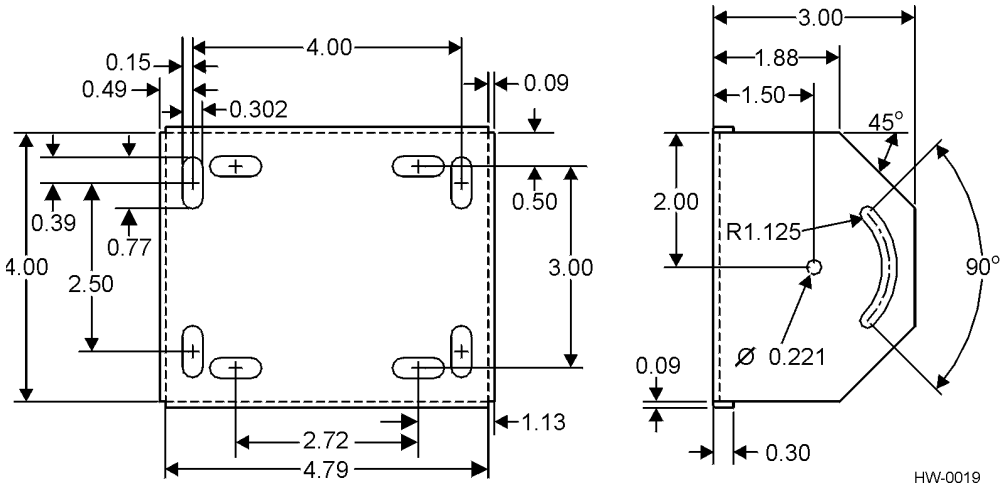

Figure 1-2 Pole Mount Bracket Assembly

2. Using the two 1.3 cm (1/2-in.) stainless steel straps, attach the pole mount bracket assembly to the pole approximately 1.8 to 2.4 m (6 to 8 ft) above the pavement surface. Tighten slightly so you can adjust SmartPass left or right, but not so slightly that the straps slide down the pole.

3. Using the four Allen screws and washers supplied with the pole mount assembly, attach SmartPass to the pole mount bracket as shown in Figure 1-3. Tighten the

screws slightly so that SmartPass can be adjusted up or down but not so slightly that the mounting assembly slips.

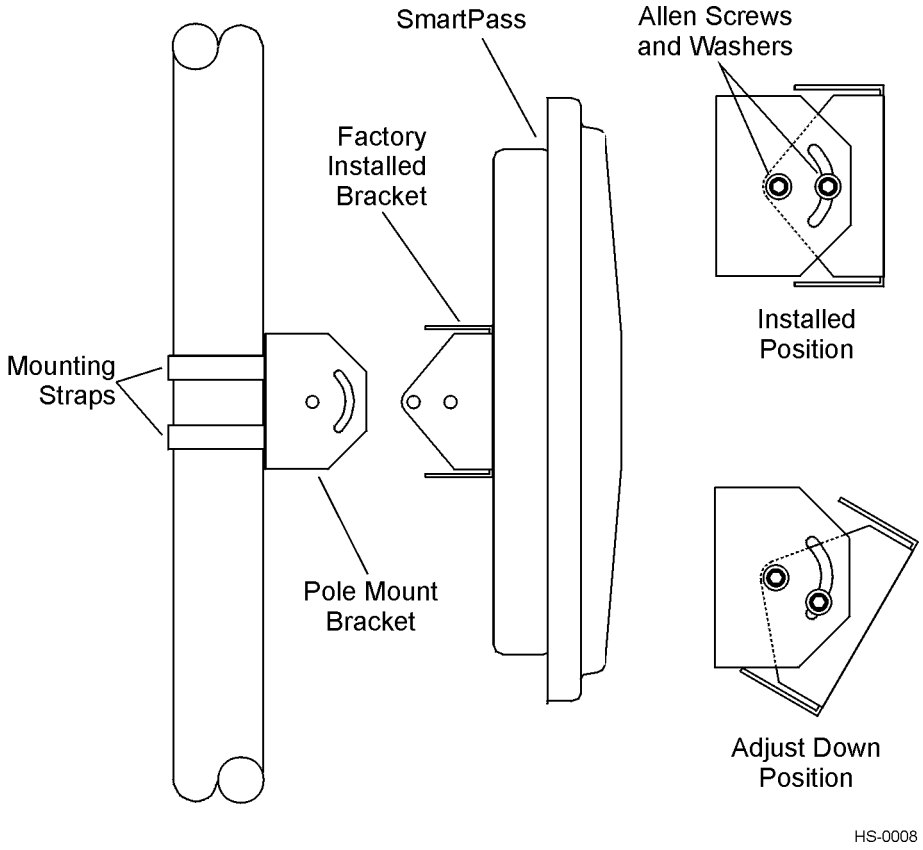

Figure 1-3 SmartPass Mounted Using Pole Mount Bracket

4. Adjust the assembly by pointing SmartPass to the middle of the area where tags will be read and tighten all screws and straps slightly.

   Figure 1-4 illustrates front and top views of a pole-mounted SmartPass. The figure shows the approximate measurements used for sites where tags would be mounted on the interior driver's side windshield.

Note: *You should determine the read zone before you tighten all screws and straps. Refer to the "Marking the Read Zone" section on page 1-31.*

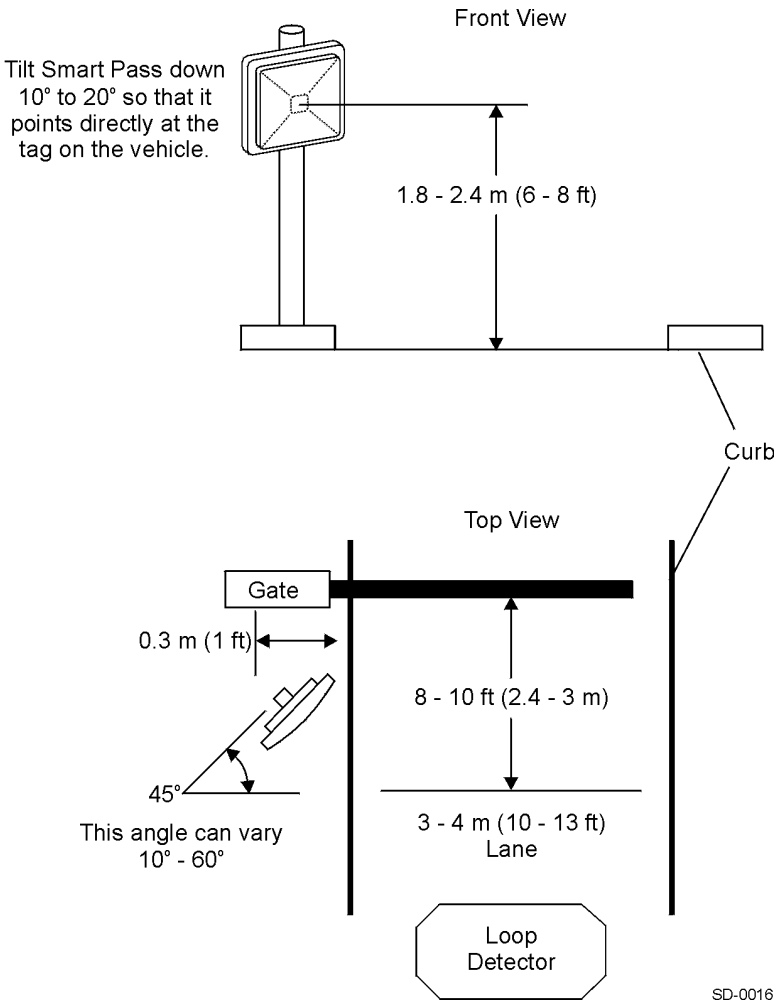

Figure 1-4 Front and Top Views of SmartPass Position

Note: *The dimensions in Figure 1-4 are for demonstration purposes only and are approximate dimensions for sites where tags will be mounted on the driver's side. Actual dimensions vary as lane geometry varies from site to site. Adjust SmartPass to match site and tag mounting positions to provide the most direct line of sight to the tags.*

Mounting SmartPass to a Wall or Ceiling

The basic SmartPass is supplied with a pole mount bracket assembly (Figure 1-2) that allows you to adjust SmartPass up and down. Amtech recommends using the wall mount bracket accessory (Figure 1-5) in addition to the pole mount bracket to provide additional horizontal aiming flexibility when attaching SmartPass to a pole with flat

sides, or to a wall or ceiling where other structures may interfere with accurately aiming SmartPass toward the tags.

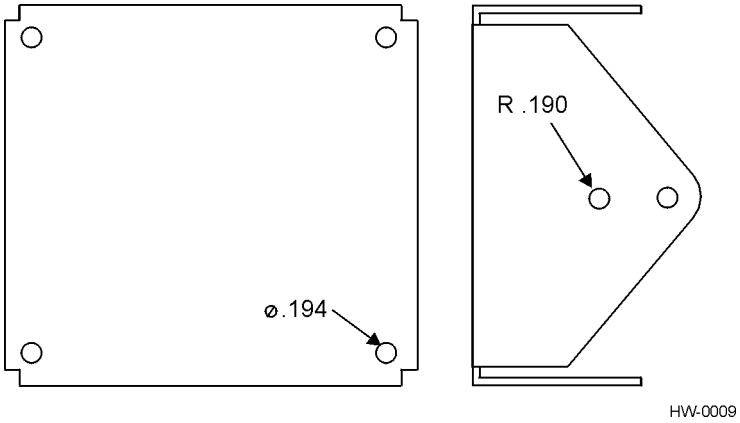

Figure 1-5 Wall Mount Bracket Accessory

To mount SmartPass to a wall or ceiling using the pole mount and wall mount bracket accessory kits

1. Unpack SmartPass. Set aside the pole mount bracket.

   Use this bracket in the following steps to provide greater adjustment for SmartPass. The pole mount bracket is wrapped separately from SmartPass and contains a plastic bag of 4 Allen screws and washers.

2. Using the 5/32-in. Allen wrench, remove the factory-mounted bracket attached to the back of SmartPass. Remove all four Allen screws and lock washers from the bracket.

3. Unpack the optional wall mount bracket accessory kit.

4. Using the Allen screws and lock washers set aside in Step 2, attach the wall mount bracket to the back of SmartPass, as shown in Figure 1-6.

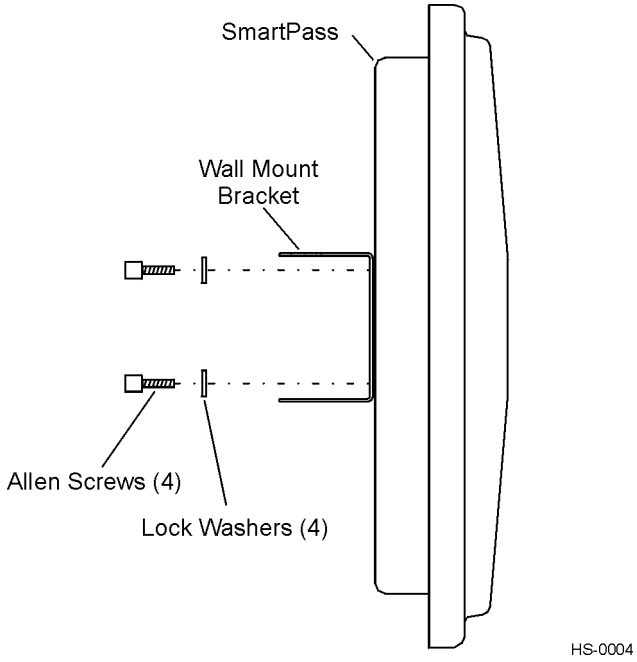

Figure 1-6 Wall Mount Bracket Attached to SmartPass

5. Tighten the screws to secure this bracket.

6. Using the four screws and washers supplied with the wall mount bracket, attach the factory mount bracket to the wall mount bracket, lining up the four outside screw holes as shown in Figure 1-7.

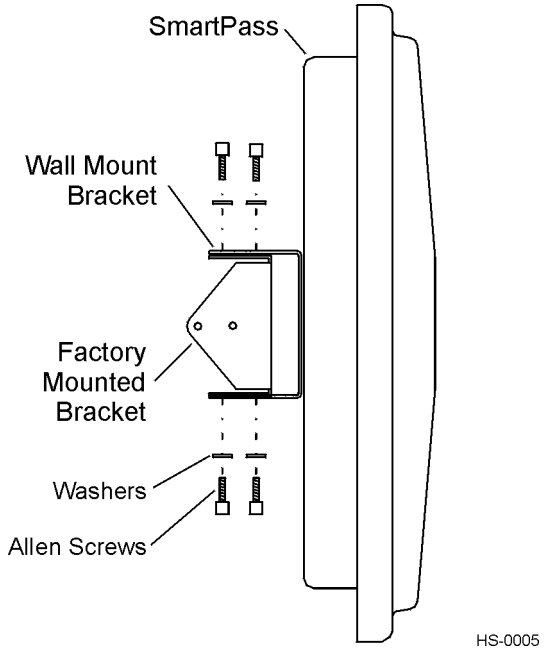

Figure 1-7 Factory Mount Bracket Attached to Wall Mount Bracket

7. Tighten lightly, since you will want to adjust the bracket later. This subassembly allows you to aim SmartPass left or right when all three brackets are assembled.
8. Mount the pole mount bracket to the wall, ceiling, or fixture using appropriate anchors as shown in Figure 1-8.

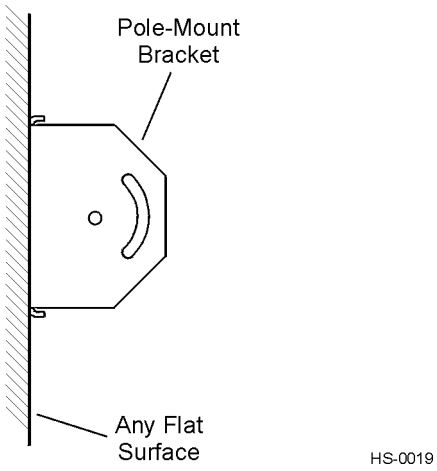

Figure 1-8 Pole Mount Bracket Attached to Wall

9. Mount SmartPass to the pole mount bracket using Allen screws and washers, as shown in Figure 1-9.

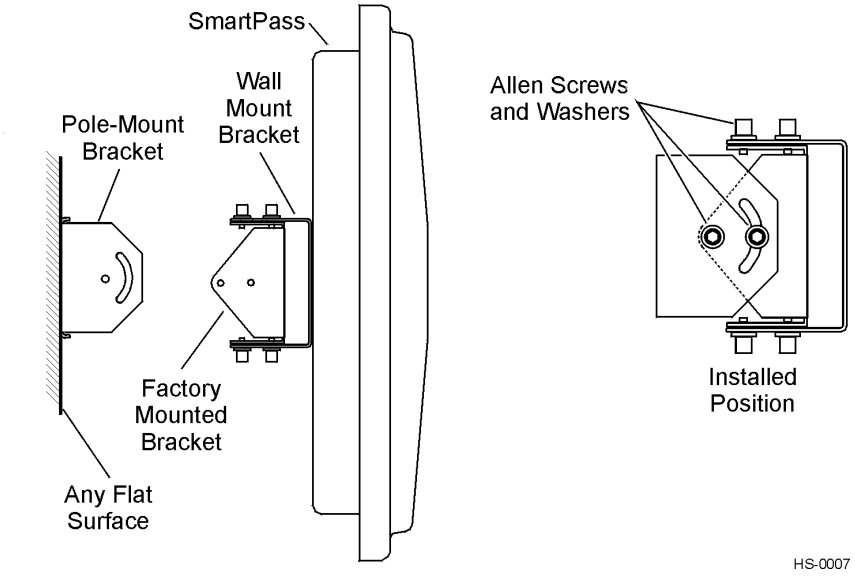

Figure 1-9 Connecting SmartPass Assembly to Pole Mount Bracket

10. Adjust and tighten screws in both axes to point SmartPass at the read zone.

Connecting and Testing Power

After mounting SmartPass, you must connect a dedicated 16-20 V AC or 16-28 V DC power supply.

Connecting the AC Power Supply

To connect SmartPass to a low-voltage AC power supply

1. Connect the SmartPass power wires from the SmartPass pigtail cable to the transformer using the cable coding as described in Table 1-5.

Table 1-5 AC Transformer Connections for Colored Pair Wire Cable

Signal From SmartPass	Colored Pair Wire Cable		Connect to Transformer Terminal Strip
	Wire Pair from SmartPass	Color Used	
Main power input	Brown/Red and Orange/Red	Brown and Orange	L1
Main power return		Red and Red	L2

2. Complete the power connections at the power supply.

Connecting the DC Power Supply

To install SmartPass using low voltage DC connections, use the connection designations shown in Table 1-6.

Table 1-6 Low Voltage DC Cable Connections for the Colored Pair Wire Cable

Signal from SmartPass	Colored Pair Wire Cable		Connection Use
	Wire Pair from SmartPass	Color Used	
Main power input	Brown/Red and Orange/Red	Brown and Orange	16 to 28 V DC + terminal
Main power return		Red and Red	16 to 28 V DC – terminal

Testing Power Connections

To test that SmartPass has power and can read a tag presented in the read zone

1. Confirm that the transformer is connected to a power outlet.
2. Connect the two leads from the audible circuit tester to the white and red wire pair (pair #8, lock/lock return) from the SmartPass cable.
3. Twist the red and green wire pair (pair #9, sense input0/sense input0 return) from the SmartPass cable to turn on a continuous RF signal.
4. Pass a tag in front of SmartPass. The audible circuit tester should sound a tone when SmartPass reads the tag.
5. Disconnect the circuit tester from SmartPass.

Note: *You will need the audible circuit tester again to determine the read zone.*

Connecting Communications

This section provides the procedures for connecting the communications to the junction box and the sense input and sense output circuits. Amtech offers reader communications through RS–232, RS–422, and Wiegand interface protocols.

Connecting SmartPass to the PC

SmartPass communications and customer interface signals are supplied from SmartPass to the host through a multiwire cable, which is a 13-pair pigtail. The connector for this cable is located on the back of SmartPass. Refer to the following sections to connect the appropriate communications wires from the cable to the terminal strip that is located inside the junction box.

The following sections contain instructions for connecting RS-232, RS-422, and Wiegand communications between SmartPass and the PC. Each section contains wiring instructions and pin assignments followed by step-by-step connection procedures. SmartPass can remain powered up while connecting PC communications.

Using an RS-232 Interface

This section contains instructions for connecting SmartPass to a PC using an RS–232 interface. RS–232 interface signals are supplied by five communications wires from the SmartPass cable. The pin assignments for the signal to the host male DB9 and DB25 connectors are shown in Figure 1-10.

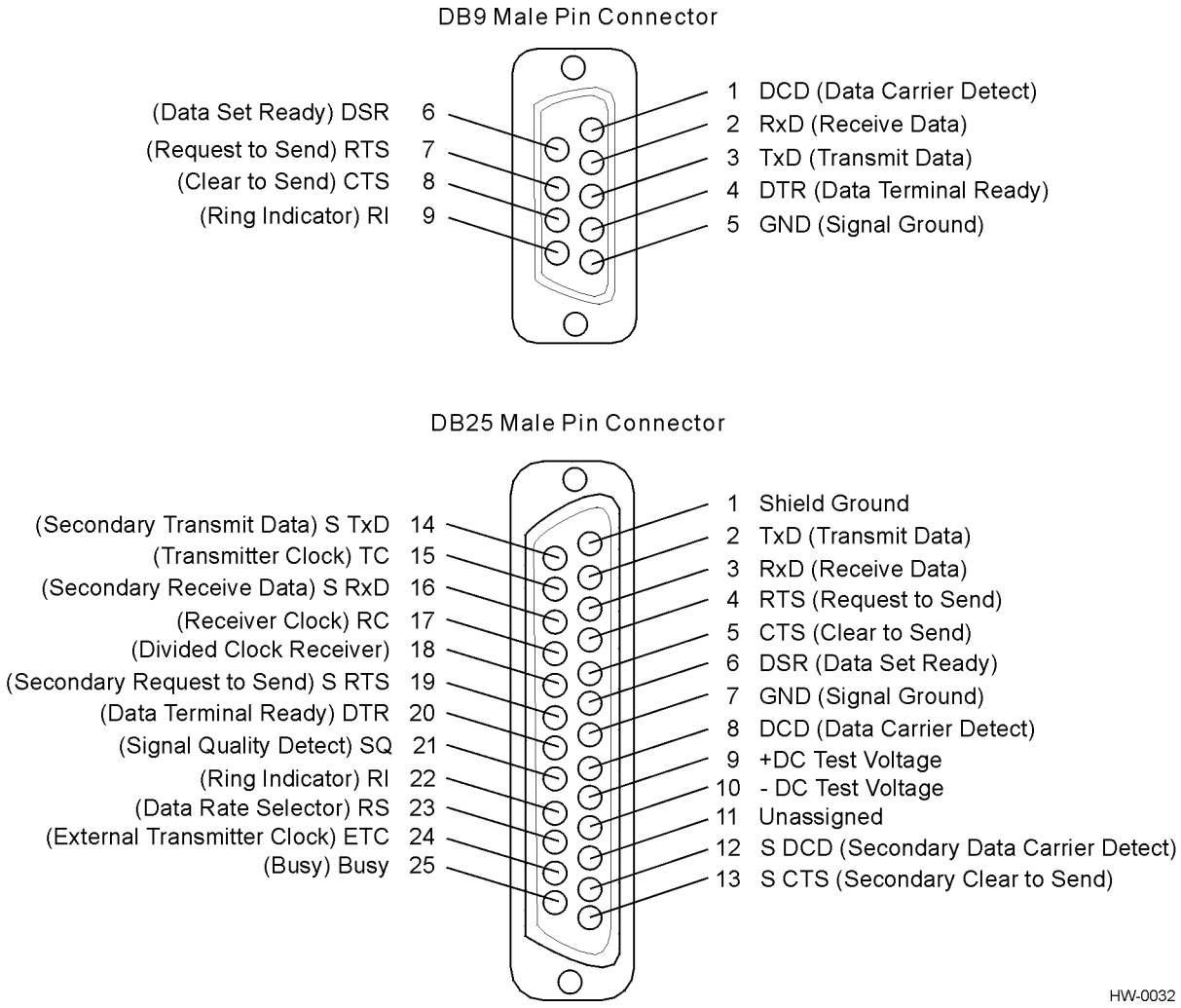

Figure 1-10 DB9 and DB25 Connector Pin Assignments for Signal to Host

Table 1-7 shows the RS-232 colored wire assignments.

Table 1-7 RS–232 Interface Signal Wiring for Colored Wire Pair Cable

Signal from SmartPass	Colored Pair Wire Cable		Connect Wire to Host DB9 Pin	Connect Wire to Host DB25 Pin
	Wire Pair from SmartPass	Color Used		
TxD — SmartPass output	Red/Black	Black	Pin 2	Pin 3
RxD — SmartPass input		Red	Pin 3	Pin 2
Signal ground	Yellow/ Black	Yellow or black	Pin 5	Pin 7
Optional for hardware handshaking				
RTS — SmartPass output	Yellow/Red	Yellow	Pin 8	Pin 5
CTS — SmartPass input		Red	Pin 7	Pin 4

To connect the RS-232 interface

1. Connect the black wire (transmit data) from the red and black SmartPass wire pair to pin 2 of the DB9 connector or pin 3 of the DB25 connector.
2. Connect the red wire (receive data) from the red and black SmartPass wire pair to pin 3 of the DB9 connector or pin 2 of the DB25 connector.
3. Connect either the yellow or black wire (signal ground) from the yellow and black SmartPass wire pair to pin 5 of the DB9 connector or pin 7 of the DB25 connector.
4. Plug the DB9 or DB25 connector into the PC.

If the host is set up for hardware handshaking, use the following procedures.

1. Connect the yellow wire (RTS) from the yellow and red SmartPass wire pair to pin 8 of the DB9 connector or pin 5 of the DB25 connector.
2. Connect the red wire (CTS) from the yellow and red SmartPass wire pair to pin 7 of the DB9 connector or pin 4 of the DB25 connector.

Using an RS-422 Interface

This section contains instructions for connecting SmartPass to a PC using an RS–422 interface. RS–422 interface signals are supplied by four wires from the SmartPass communications cable. Your host must have an RS–422 interface with either an internal or external converter.

Table 1-8 lists the RS–422 signals and their interface wires.

Table 1-8 RS–422 Interface Signal Wiring for Colored Wire Pair Cable

Signal from SmartPass	Colored Pair Wire Cable		Connect to Signal from Host
	Wire Pair from SmartPass	Color Used	
RS–422 Transmit positive	Yellow/Red	Yellow	Receive (+)
RS–422 Transmit negative		Red	Receive (–)
RS–422 Receive positive	Red/Black	Black	Transmit (+)
RS–422 Receive negative		Red	Transmit (–)

To connect the RS-422 interface

1. Connect the yellow wire (transmit +) from the yellow and red SmartPass wire pair to the host receive (+) signal.
2. Connect the red wire (transmit –) from the yellow and red SmartPass wire pair to the host receive (–) signal.
3. Connect the black wire (receive +) from the red and black SmartPass wire pair to the host transmit (+) signal.
4. Connect the red wire (receive –) from the red and black SmartPass wire pair to the host transmit (–) signal.

Using a Wiegand Interface

This section contains instructions for connecting SmartPass using a Wiegand interface. Wiegand interface signals are supplied by three wires from the SmartPass communications cable. SmartPass with RS–232 or RS–422 comes with the Wiegand option built in.

To use the Wiegand option

1. Connect SmartPass to the PC or laptop using RS–232 connections as described in the "Using an RS-232 Interface" section on page 1-16 or RS–422 connections as described in the "Using an RS-422 Interface" section on page 1-17.
2. If you are using SmartPass Host, select the **Communication** drop-down menu and click the **Wiegand Interface** option to configure SmartPass to a Wiegand interface.

   If you are using a terminal emulator, use command #451 to configure SmartPass to Wiegand interface.
3. Power down the PC.
4. Disconnect the connection between SmartPass and the PC or laptop.

5. To connect the Wiegand interface, follow the directions in the "Connecting Colored Wire Pair Cable" section later in this section.

Connecting Colored Wire Pair Cable

Table 1-9 lists the Wiegand signals and the interface wires.

Table 1-9 Wiegand Interface Signal Wiring for Colored Wire Pair Cable

Signal from SmartPass	Colored Pair Wire Cable		Connect to Signal from Host
	Wire Pair from SmartPass	Color Used	
Wiegand Zero Output	Blue/Red	Blue	Data0
Wiegand One Output		Red	Data1
Signal Ground	Yellow/Black	Yellow or black	Ground

To connect the colored wire pair cable

1. Connect the blue wire (data0) from the blue and red SmartPass wire pair to the data0 wire of your Wiegand device.
2. Connect the red wire (data1) from the blue and red SmartPass wire pair to the data1 wire of your Wiegand device.
3. Connect either the yellow or black wire from the yellow and black wire SmartPass wire pair to your Wiegand device signal ground.

Note: *The RS–232 or RS–422 interface is still included on SmartPass even when you use the Wiegand configuration. Pull the RS–232 red/black wire pairs to a convenient location and tape the ends.*

Warning

Do not cut these wires. Cutting these wires removes the option of using them in the future for testing, setting frequency, or adding additional functions.

Controlling RF Transmission

The RF transmission can be controlled by any of the following methods:

- Connecting a vehicle detector to the sense input0 circuit
- The host sending software commands to SmartPass
- Twisting together the sense input0 (red/green) wire pair, as in the test configuration discussed in the "Continuous RF Transmission" section on page 1-21.

As a factory default, SmartPass is configured to control the RF power with a vehicle detector.

Figure 1-11 illustrates the three methods of controlling RF sense output.

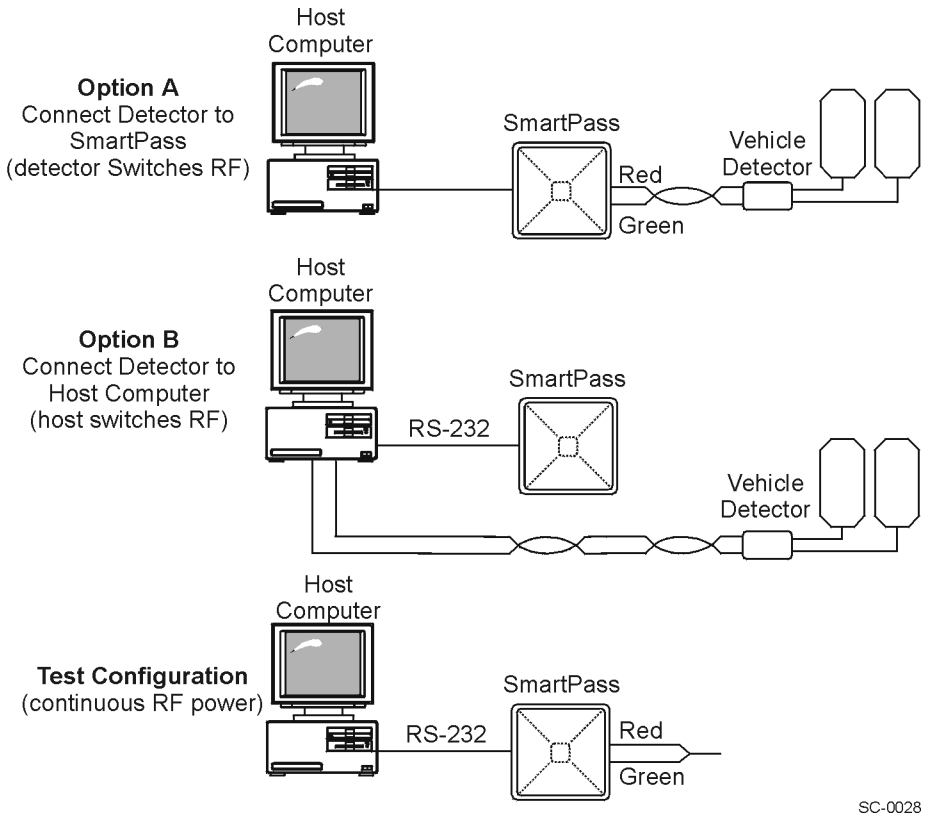

Figure 1-11 SmartPass RF Control Options

Vehicle Detector Control

The vehicle detector can be a loop detector, an infrared sensor, or an ultrasonic detector that is connected to sense input0 to turn on the SmartPass RF transmitter. In Figure 1-11, Option A shows a vehicle detector controlling the RF transmitter. This operation is preferred because then the RF transmits only when a vehicle is in the SmartPass read zone. RF-by-input control (command 641) must be enabled (factory default).

Host Control

In Figure 1-11, Option B shows the host controlling the RF transmitter.

When the vehicle detector is connected to the host computer, as shown in Option B of Figure 1-11, commands 6400 (RF transmitter off) and 6401(RF transmitter on) from the host control the SmartPass RF transmitter. Leave the software menu setting on RF-By-Sensor.

Note: *For information and instructions on executing software commands, refer to the "Software Commands" section on page 1-35.*

Continuous RF Transmission

In Figure 1-11, Option C shows the test configuration controlling the RF transmitter. The test configuration allows you to test SmartPass, by turning on the SmartPass RF transmitter continuously by twisting the red and green sense input0 wire pair together. SmartPass must be in command mode 641, which enables the RF-by-input control (factory default).

Connecting Sense Input and Sense Output Circuits

SmartPass has two sense input circuits and three sense output circuits available. The sense input circuits can be used to notify SmartPass of external events and are designed to be connected to a free-of-voltage dry contact. Sense output circuits are single-pole, double-throw relays that provide normally closed and normally open dry contacts.

The following sections provide information to connect the sense input and sense output circuits.

Connecting Sense Input Circuits

SmartPass supports two sense inputs — sense input0 and sense input1. This support requires two sense input lines for each loop sensor or a total of four sense input connections. Sense input0 is the presence detection device line and is used to control RF power. As shown in Figure 1-12, sense input0 is through the green/red wire pair on

the I/O pigtail. SmartPass expects the sense input0 circuit to close when a vehicle is present (i.e., a normally open condition). The minimum presence true period is fixed at 0 ms, which indicates that no delay occurs in closing the circuit when a vehicle is present.

Sense input1 is not used directly by SmartPass. Sense input1 is under the host computer's control.

Connecting Sense Output Circuits

SmartPass supports three sets of sense output signals. Two sets (sense output0 and sense output1) provide normally open or normally closed sense outputs. The third sense output set is dedicated for testing and setup of the reader. It is defined as the TAG_LOCK signal, which indicates when a valid tag is in the read field.

These sense outputs are dry contacts that provide normally open and normally closed sense outputs. The relay contacts are rated at 30 V_{rms} or 60 V DC at 1 A, maximum.

As illustrated in Figure 1-12, sense output0, normally closed, is located on the orange/black pair. Sense output0, normally open, is located on the brown/black pair.

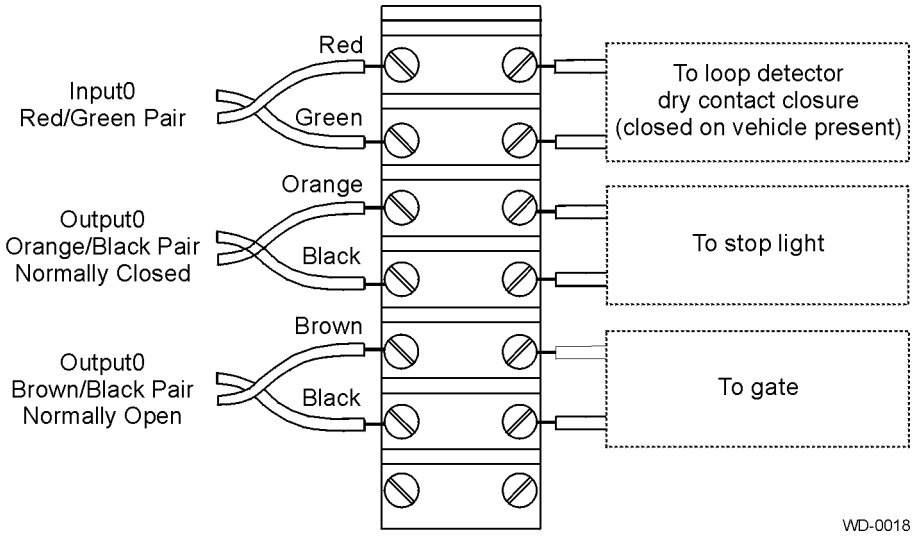

Figure 1-12 Sample Circuit Connections

In Wiegand mode operation, the sense outputs are not controlled by a predefined output mode.

Table 1-10 lists the cable descriptions and functions for the interface signals. These wire pairs can be used or terminated based on the specific project applications.

Connect the remaining wires to the appropriate terminal blocks on the terminal strip in the junction box. Use Table 1-10 as a guide to the functions of each of the wire signals.

Table 1-10 Sense Input/Output Cabling Assignments for Colored Wire Pair Cable

Pair	Pin	Color	Signal	Description	Typical Function
Blue/ Red	E	Blue	WGND0	Wiegand zero output	Parking/access control applications
	F	Red	WGND1	Wiegand one output	Parking/access control applications
White/ Red	L	White	Lock	Tag lock output, active-closed	Testing maintenance
	M	Red	Lock_RTN	Tag lock return	Testing maintenance
Green/ Red	N	Green	Sense Input0	Sense Input0 (loop)	Loop and presence detect
	P	Red	Sense Input0_RTN	Sense Input0 return; not isolated from signal ground	Loop and presence detect
Blue/ Black	R	Blue	Sense Input1	Sense Input1,	General-purpose sense input, not used to detect presence.
	S	Black	Sense Input1_RTN	Sense Input1 return; not isolated from signal ground	General-purpose sense input, not used to detect presence.
Brown/ Black	T	Black	Out0_COM	Sense Output0 (tag detect), common terminal	Switched output to control gate
	U	Brown	Out0_No	Sense Output0 normally open terminal	Switched output to control gate
Orange /Black	V	Black	Out0_COM	Sense Output0 (tag detect output), common terminal	Switched sense output for any external control (light, gate, buzzer, etc.)
	W	Orange	Out 0 Normally Closed	Sense Output0 normally closed terminal	Switched sense output for any external control (light, gate, buzzer, etc.)

Table 1-10 Sense Input/Output Cabling Assignments for Colored Wire Pair Cable (Continued)

Pair	Pin	Color	Signal	Description	Typical Function
Green/ Black	X	Black	Out1_ COM	Sense Output1, common terminal	Switched sense output
	Y	Green	Out1_NO	Sense Output1 normally open terminal	Switched sense output
White/ Black	Z	Black	Out1_ COM	Sense Output1, common	Switched sense output
	a	White	Out1_norm ally closed	Sense Output1 normally closed terminal	Switched sense output
Yellow/ Black	b	Yellow	GND	logic ground	Signal ground (used with RS232 and Wiegand
	c	Black	GND	logic ground	Signal ground (used with RS232 and Wiegand

Caution

After connecting the wires in the communications cable, ground all drain wires from the communications cable to the chassis ground in the NEMA enclosure.

Testing Procedures

To start SmartPass and test communications

1. If SmartPass's power is not already on, turn on the power.
2. Insert the SmartPass Host software diskette into the PC disk drive.
3. OPTIONAL: Open, print, and read the READ.ME file on the diskette.
4. Start SmartPass Host by performing one of the following:
   - At the DOS prompt, change the working directory to `A:\1620`, type `dl`, and press the **ENTER** key to start SmartPass Host.
   - In Windows, double-click the `DL.exe` file in the 1620 folder on the A drive.

This displays the SmartPass Host status window, shown in Figure 1-13.

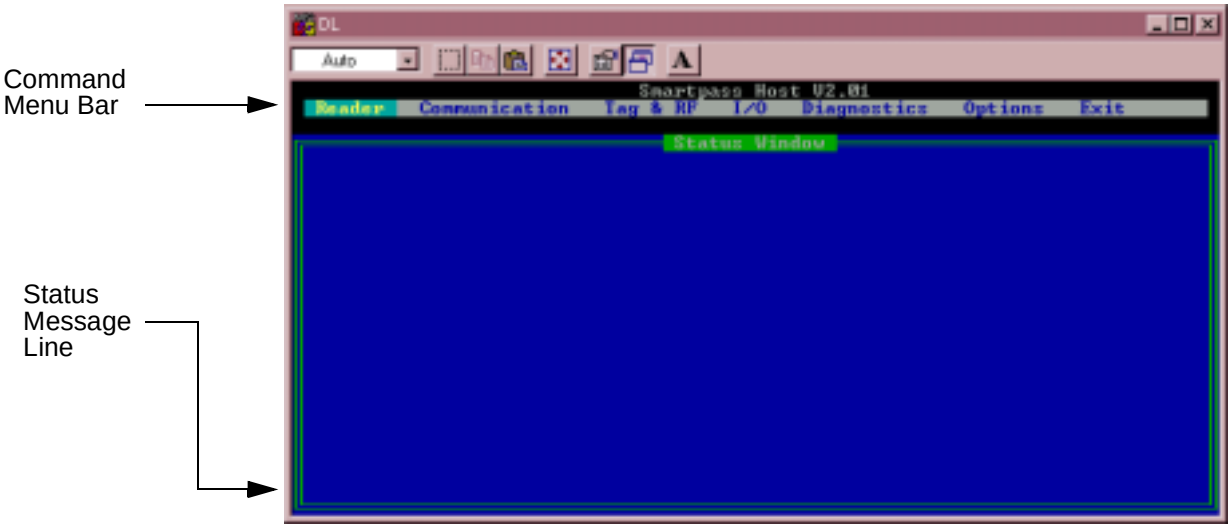

Figure 1-13 Status Window

Verifying PC-to-SmartPass Communications

Note: *When testing SmartPass using a laptop, Amtech recommends that you configure laptop communications parameters to match those of the host computer that will control SmartPass after testing and configuration are completed.*

To verify PC-to-SmartPass communications

1. Select the **Communication** drop-down menu and click the **Find Reader** option. The **Select Option** dialog box appears as shown in Figure 1-14.

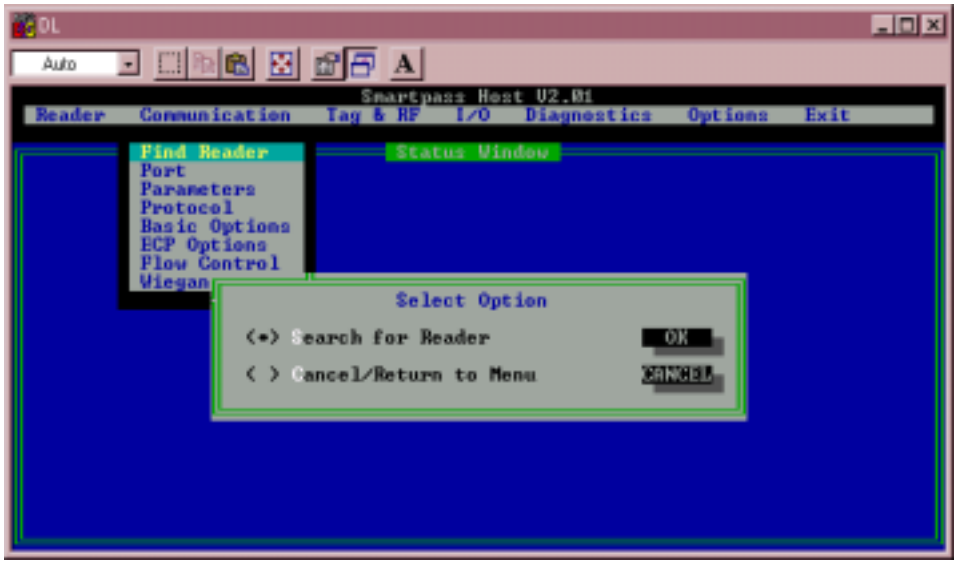

Figure 1-14 Find Reader Options

2. Select the **Search for Reader** option and click the **OK** button. SmartPass Host begins searching for the reader.

If the PC successfully locates SmartPass, SmartPass Host displays the message shown in Figure 1-15. If this message appears, the PC-to-SmartPass communications are verified.

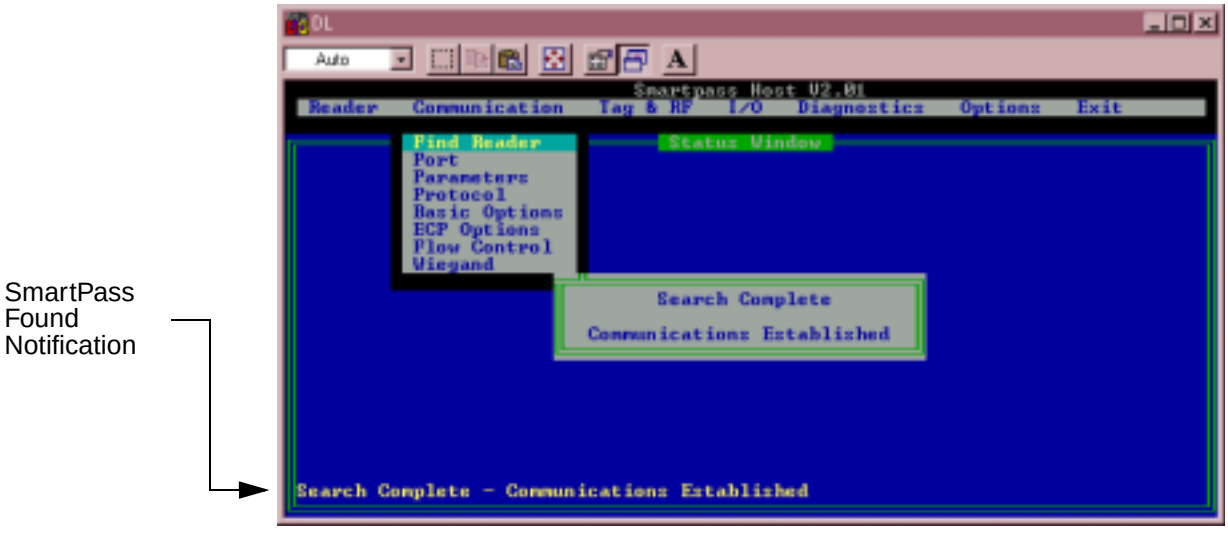

Figure 1-15 Communications Established Message

If the PC is unable to locate SmartPass, SmartPass Host displays the error message shown in Figure 1-16.

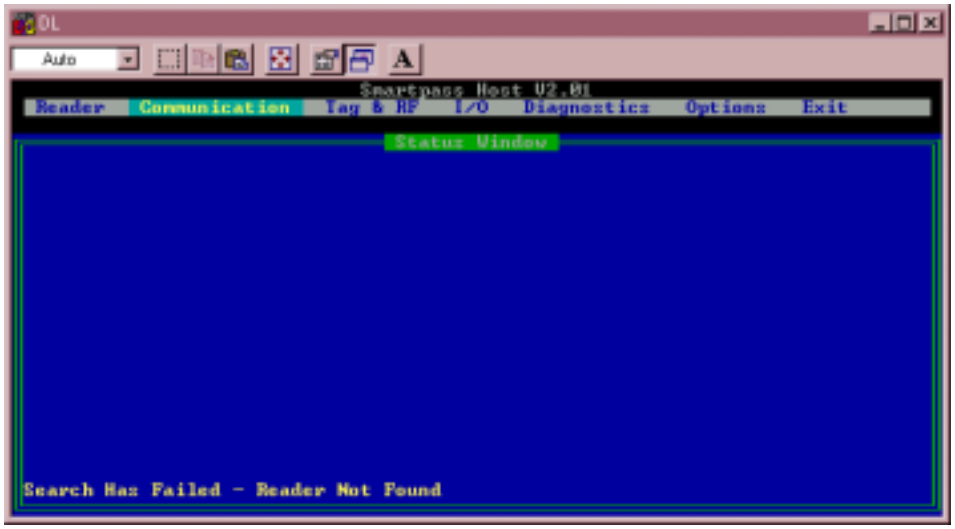

Figure 1-16 Reader Not Found Message

If the error message appears

1. Ensure that all the following communications factors are correct. Change any factors that require it.
2. Verify that SmartPass has power.
3. Verify the connections between the PC and SmartPass.
4. Verify the receive (Rx) and transmit (Tx) connections.
5. Verify the RTS and CTS connections if using handshaking.
6. Verify the COM port settings using the instructions in the “Serial Port Communications” section in Chapter 4 of the *AI1620 SmartPass System Guide.*

Repeat Steps 1 and 2 to go through the **Communication** drop-down menu items again.

If you still cannot verify the SmartPass and PC communications, contact Amtech using the information in the section "Technical Support" in Chapter 9 of the *AI1620 SmartPass System Guide.*

Verifying Tag to SmartPass Communications

After establishing communications between SmartPass and the PC, test the capability of SmartPass to read tags by performing the following steps.

To test the capability of SmartPass to read tags

1. Pass one test tag in front of the unit. If SmartPass reads the tag, SmartPass Host displays the tag information at the bottom of the status window, as shown in Figure 1-17.

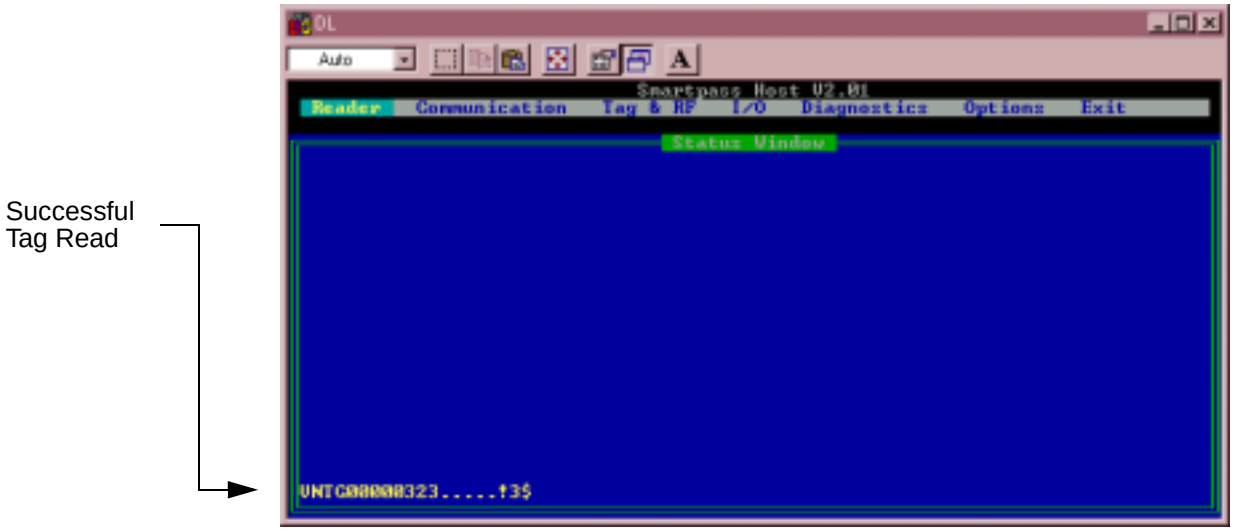

Figure 1-17 Successful Tag Read

2. If the read is unsuccessful, try the following actions:
   - Be sure the RF transmission is on continuously and/or the vehicle detector is working properly.
   - Ensure the tag you are using is compatible with the particular option of SmartPass you are working with. Some SmartPasses cannot read full-frame tags.

     To determine if the SmartPass you are working with can read full-frame tags, refer to the "General Configuration Settings" section in Chapter 4 of the *AI1620 System Guide* for information on reading the configuration label.

- Use the audible circuit tester to verify that the reader is capable of reading the tag in the read zone (see the "Testing Power Connections" section on page 1-15. If it is, the problem is probably in the communications between SmartPass and the host.

3. Pass a different test tag in front of your SmartPass.

Note: *An internal timer in SmartPass causes SmartPass to ignore a tag for 2 minutes after a good read unless it reads a different tag in the meantime.*

4. When SmartPass reads the second tag successfully, SmartPass Host displays that tag's information in the status window below the information for the first tag, as shown in Figure 1-18.

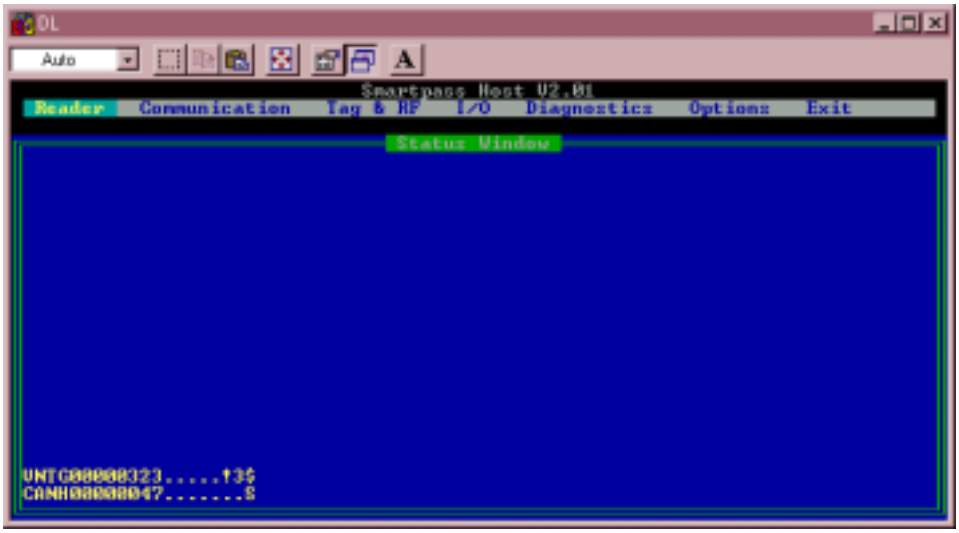

Figure 1-18 Second Successful Tag Read

If the read is unsuccessful, try the following actions:

- Be sure the RF transmission is on continuously and/or that the vehicle detector is working properly.
- Ensure the tag you are using is compatible with the particular option of SmartPass you are working with. Some SmartPasses cannot read full-frame tags.
- Use the audible circuit tester to verify that the reader is capable of reading the tag in the read zone. If it is, the problem is probably in the communications between SmartPass and the host.

Configuring SmartPass Parameters

SmartPass operating parameters can be configured as described in Chapter 4 of the *AI1620 SmartPass System Guide*.The PC must be connected to and communicating with SmartPass, and the SmartPass Host must be started, as described in the "Verifying PC-to-SmartPass Communications" section on page 1-25.

Note: *If you are using Wiegand mode, you must connect the PC or laptop to SmartPass using the RS-232 or RS-422 interface before attempting to send commands to the reader. You can leave the Wiegand interface connected during this procedure.*

Table 1-11 lists the factory default settings.

Factory Default Settings

Note: *The default configuration settings may not be the correct working configuration settings for a specific site. Changes to the configuration settings may have to be made, depending on the site plan, as described in Chapter 2 "Developing the Site Plan" of the AI1620 SmartPass System Guide.*

Table 1-11 SmartPass Default Configuration Settings

Parameter	Setting	Command
Operating mode	Data	00
Baud rate	9600	1005
Stop bits	1	1010
Parity	None	1020
End-of-line delay	0 ms	Fixed at Factory
Time and date appended	Enabled	302
Auxiliary information appended	Disabled	310
Unique ID code criteria	Separation of 1 ID	4100
Valid ID code criteria	1 acquisition	Fixed at Factory
Uniqueness timeout	2 minutes	Fixed at Factory
Wiegand mode	Disabled	450
Tag translation mode	Disabled	452
Wiegand transmit mode	1 second	4601
Dual processing mode	Reset on A, Transmit on A	4800
Reader ID number	00	6000
Communications protocol	Basic	610
Error correcting protocol (ECP) timeout	12.7 sec	612FE
Flow control	Software (XON/XOFF)	6141
Start-of-message character	# (23 hex)	Fixed at Factory
Buffer control mode	Disabled	6160
Echo mode	Enabled	6171

Table 1-11 SmartPass Default Configuration Settings (Continued)

Parameter	Setting	Command
sense output control	Predefined	621
RF-by-input control	Enabled	641
RF operating frequency	902 MHz	64200
RF operating range	Maximum	6431F
sense output pulse duration	228 ms	67C
Presence without tag reports	Disabled	6900
Minimum presence true period	0 ms	Fixed at Factory
RF-off control	Timeout or no presence	6922
RF timeout	Never true	693F
Input inversion	Disabled	6940
Serial number	SSSSSS (6 digit number)	695
Store hardware configuration	Hardware configuration not known	696
Periodic system check tag	Disabled	810
Periodic check tag interval	30 min	Fixed at Factory
Check tag location	Internal	Fixed at Factory
Input status change reports	Disabled	820

Marking the Read Zone

The antenna pattern, or read zone, of SmartPass would look roughly like a pear-shaped balloon if you were able to see it. When installing SmartPass, you first mark the unit's read zone with the RF range set at the factory default maximum. You can then adjust the read zone using the techniques discussed in the "Fine-Tuning and Verifying the Read Zone" section on page 1-33.

If two SmartPass readers are installed near each other, Amtech recommends that you fine-tune each SmartPass for the ideal read zone before connecting it to permanent sense input/sense output and communications cables.

Materials Required

To mark the read zone, you need the following items:

- SmartPass software diskette with SmartPass Host software, which is supplied to Amtech dealers and distributors, or any terminal emulation program running on a PC
- PC or laptop with 1.44 MB floppy disk drive, MS-DOS, RS–232 serial port, and a communications cable with a DB9 or DB25 connector
- Test tag, supplied by the Amtech dealer or distributor
- Communications cable to connect SmartPass to the COM1 port on your PC
- Audible circuit tester and 9 V DC battery for circuit tester power as described in the "Testing SmartPass" section in Chapter 4 of the *AI1620 SmartPass System Guide*.
- Piece of chalk or roll of tape
- Plastic or wooden yardstick
- Vinyl electrical tape or hook-and-loop material

Marking Procedures

To mark the read zone

1. Connect the red and white leads from the audible tester to the red and white pair of wires from the SmartPass cable.
2. Twist together the red and green pair of wires from the SmartPass cable to turn on continuous RF power.
3. Secure the test tag to the end of the yardstick using electrical tape or hook-and-loop material. Be sure the tag polarization matches that of the SmartPass when the yardstick is held upright.
4. Stand directly in front of and about 1.5 m (5 ft) away from SmartPass. Hold the stick so that the tag is positioned at a height and angle consistent with a tag installed on a vehicle. The test tag should cause the audible tester to sound.

Note: *If you hold the test tag in your hand, your hand will absorb the RF signal and the test results will be incorrect.*

5. Move to the left until the sound stops.
6. Mark the ground with chalk or tape at the location of the tag when the sound stopped.
7. Step backward 0.3 to 0.6 m (1 to 2 ft) and repeat Steps 5 and 6.

8. Continue moving the tag back and forth in this manner, placing marks on the ground to identify the boundary of the read zone each time the sound stops. Continue moving the tag to various locations until the read zone is fully marked.

   The marks on the ground indicate the area, called the read zone, where SmartPass reads tags at the current RF range. Figure 1-19 is a view of an ideal read zone within a controlled lane. The ***X*** marks show the outside edges of the read zone.

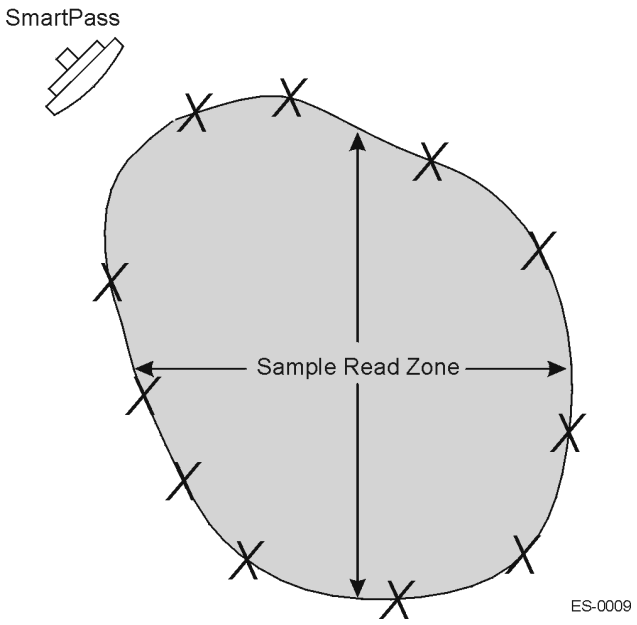

Figure 1-19 Sample Read Zone Marking Pattern

9. Stand at the farthest point of the pattern, then walk toward SmartPass and listen for a continuous sound from the audible tester. If the sound is not continuous, it could indicate a weak or “patchy” RF pattern. See the "Fine-Tuning and Verifying the Read Zone" section below to adjust the read zone.

Fine-Tuning and Verifying the Read Zone

If the read zone is too wide or too deep, it can be fine-tuned by changing the angle of SmartPass or by changing the RF range. Changing the angle of SmartPass and changing the RF range can confine the read zone to the area of the single lane where tagged vehicles are expected to pass. This prevents SmartPass from reading tagged vehicles in adjacent lanes or parked behind or next to a SmartPass unit.

You can make the read zone smaller by adjusting the RF range down from the factory default (maximum range). The range can be adjusted through a host command or using SmartPass Host.

To adjust the RF range using SmartPass Host

Note: *The SmartPass software is included on the software diskette supplied to dealers and distributors.*

1. Connect the laptop PC to SmartPass as discussed in the "Connecting SmartPass to the PC" section on page 1-15 and start the SmartPass Host as discussed in the "Testing Procedures" section on page 1-24.
2. Have another person hold the test tag at the farthest distance at which you want SmartPass to read a tag.
3. Select the **Tag & RF** drop-down menu and click on the `RF Range` command. This displays the **Range Value** dialog box, as shown in Figure 1-20.

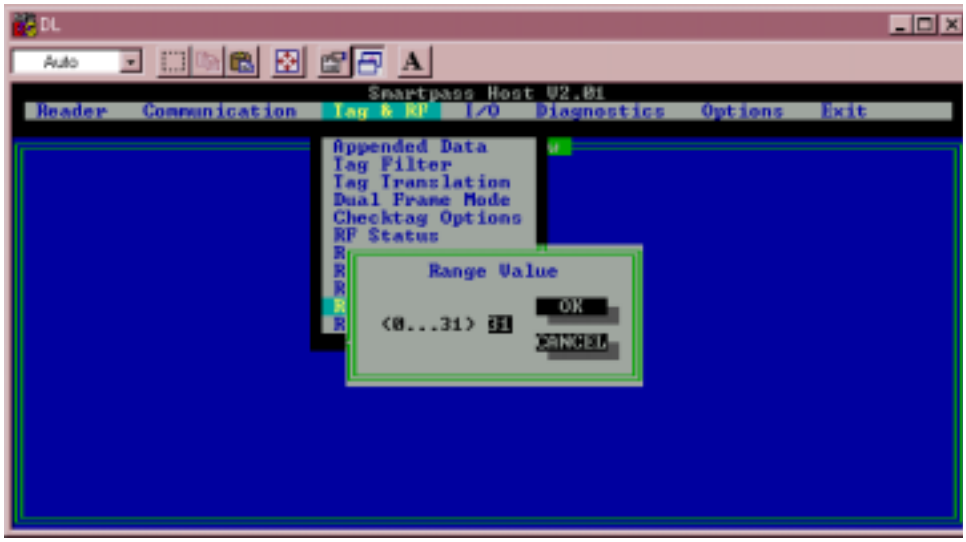

Figure 1-20 Range Value Dialog Box

4. Type in a value from 0 to 31, with 31 being the maximum (default). Smaller entries decrease the read zone size; larger entries increase the read zone size. Click on the **OK** button to make the change.
5. Follow the steps in the "Marking Procedures" section on page 1-32 to mark the new read zone on the ground with the tape or chalk.

Note: *You also need a second tag attached to a yardstick for this exercise.*

6. With SmartPass Host running, place one tag behind your back while you hold another tag in the read zone. If a good read is accomplished, the data from the tag held in the read zone displays on the PC screen.
7. Switch tags, placing the other tag behind your back and holding the first tag in the read zone. If a good read is accomplished, the data from this tag held in the read zone displays on the PC screen.

8. If both tags read successfully, you are ready to connect communications to the junction box terminal. If one or both tags did not read, follow the suggestions in the "Verifying Tag to SmartPass Communications" section on page 1-28.
9. As a last test, attach test tags to vehicles and simulate traffic going through the read zone to verify that the system performs accurately in a live environment.

Software Commands

Host transmitted commands control the operation of SmartPass. These commands may be transmitted by SmartPass Host software or manually entered using the host PC as a terminal emulator.

All SmartPass commands must be preceded with a start of message character (#) and must terminate with a carriage return by pressing the enter or return key.

Note: *Tag identification (ID) codes are not transmitted by SmartPass when in command mode. If SmartPass is left in the command mode too long, the tag buffer fills up and any additional tag IDs are lost. SmartPass must be returned to data mode as soon as possible to ensure proper transmission of acquired tag IDs.*

Sending manual commands to the reader is a three-step process:

Note: *Basic protocol (not error correcting protocol) should be used when manually entering commands. Basic protocol is the default protocol.*

1. Type #01 and press the enter or return key (# is the start of message character and 01 is the command number to switch to command mode) to put SmartPass into command mode.
2. Type # followed by the appropriate command number and press the enter or return key (no spaces).
3. Type #00 and press the enter or return key to return SmartPass to the data mode.

Caution

Be sure to return SmartPass to data mode after completion of any command operation.

To configure a Wiegand-compatible SmartPass for Wiegand output mode

1. Type #01 and press the enter or return key to switch to command mode.
2. Type #451 and press the enter or return key to enable Wiegand mode.
3. Type #00 and press the enter or return key to switch to data mode.

Command Listings

Command numbers consist of 2 to 4 hexadecimal digits. In the following tables, the letters N or S may follow a command number. The letter N indicates that a portion of the command number is variable. The letter S indicates the requirement for an alphanumeric data string that is to be included immediately following the command number. Hex digits (0-1, A-F) must be used for all command number entries. Either uppercase or lowercase characters may be used in data strings and for hex digits A-F.

Note: *The following conventions are used in Table 1-12:*

- Items in ***bold italics*** identify factory default settings.
- Only the data portion of the command number is shown.
- Only the command-related data portion of the reader message is shown.
- Refer to Chapter 7, "Communication Protocols," in the *AI1620 System Guide* for the complete syntax of commands and messages.

Table 1-12 SmartPass Commands Listed by Command Name

Command Name	Command Number	Variable	Reader Message
All IDs transmit	40		Done
Appended info status display	524		IDAP Tx Dx Xx T0 = time not appended T1 = time appended D0 = date not appended D1 = date appended X0 = aux info not appended X1 = aux info appended
Aux info append selection	31N		
Aux info append disable		***O***	***Done or Error***
Aux info append enable		1	Done or Error
Basic protocol select	***610***		***Done or Error***

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
Baud rate select	100N		
Baud rate = 110 baud set		0	Done or Error
Baud rate = 1200 baud set		2	Done or Error
Baud rate = 19.2 K baud set		6	Done or Error
Baud rate = 2400 baud set		3	Done or Error
Baud rate = 300 baud set		1	Done or Error
Baud rate = 4800 baud set		4	Done or Error
Baud rate = 9600 baud set		***5***	***Done or Error***
Boot checksum display	543		BCKS xxxx xxxx = 4-byte ASCII checksum
Boot ROM checksum verify	667		Done or Error
Buffer all IDs	43		Done
Buffer control mode disable	***6160***		***Done***
Buffer control mode enable	6161		Done
Buffer control status display	535		BCM x 0 = disabled 1 = enabled
Buffer entry transmit	06		Done, Error, or Tag Data Done = buffer empty Error = not in buffer control mode Tag Data = highest priority tag ID
Check tag select internal	***8160***		***Done***
Check tag invoke	8110		Done
Comm port parameters display	522		MAIN Bx Sx Px D0 B0 = 110 B1 = 300 B2 = 1200 B3 = 2400 B4 = 4800 B5 = 9600 B6 = 19.2 S0 = one stop bit S1 = two stop bits P0 = no parity P1 = even P2 = odd D0 = EOL delay of 0 ms

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
Comm protocol status display	525		ECPS Px Txx Xx S0 P0 = basic P1 = ECP P2 = data inquiry Txx = ECP timeout ms = 50 * xx TFF = disabled ECP timeout X0 = no flow control X1 = software flow control X2 = hardware flow control S0 = SOM character is #
Command mode switch	01		Done
Data inquiry protocol select	613		Done or Error
Data mode switch	***00***		***Done***
Date set S...S = MM/DD/YY	21MM/DD/YY	MM = 01 to 12 DD = 01 to 31 YY = 00 to 99	Done or Error
Default operating parameters load	66F		Done or Error
Destructive flash test perform	97		Done or Error
Diagnostic results display	661		DIAG Rx Ex Dx Cx R0 = boot ROM OK R1 = boot failed E0 = flash memory OK E1 = flash failed D0 = external RAM OK D1 = RAM failed C0 = RTC OK C1 = RTC failed
Diagnostics perform all Use 661 to display diagnostic results.	669		Done or Error
Download mode exit	99		Model [model] Ver [ver no.] SN [serial no.] Copyright [date] AMTECH Corp.
Download mode switch	05		Done

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
Dual-frame processing mode display	536		DUAL x 0 = reset uniqueness on A, transmit A 1 = reset uniqueness on B, transmit B 2 = reset uniqueness on A, transmit both 3 = reset uniqueness on B, transmit both
Dual-frame processing mode select	***48N***	***N = 0 to 3*** ***0 = Reset uniquenes s on A, transmit A*** ***1 = Reset uniquenes s on B, transmit B*** ***2 = Reset uniquenes s on A, transmit both*** ***3 = Reset uniquenes s on B, transmit both***	***Done***
Echo disable	6170		Done
Echo enable	***6171***		***Done or Error***
Echo status display	537		ECHO x 0 = disabled 1 = enabled
ECP protocol select	611		Done or Error ***Done or Error***

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
ECP timeout set ***ECP timeout = 12.7 sec set***	612NN	NN = 01–FE (1–255) timeout = 50 ms * NN (if NN = FF, timeout is disabled) ***FE***	Done or Error
External RAM test	660		Done or Error
Flash checksum display	540		PCKS I0000 Exxxx xxxx = 4-byte ASCII checksum
Flash checksum verify	91		Done or Error
Flash memory checksum verify	668		Done or Error
Flash memory erase	96		Done
Flow control disable	6140		Done
Flow control enable	***6141***		***Done***
Hardware configuration information display	506		S...S S...S = ASCII string (maximum length of 20 characters)
Hardware configuration string store S...S = ASCII string (maximum length of 20 characters)	***696S...S***		***Done***
Hardware flow control enable	6142		Done
I/O status display	526		IOST Cx Ox Ix Dx C0 = host controls outputs C1 = predefined output mode O0 = both outputs off O1 = output0 on O2 = output1 on O3 = both outputs on I0 = both inputs false I1 = input0 true I2 = input1 true I3 = both inputs true D0–DF = output pulse duration (4,8,12,16,20,24,32,40,48,60, 76,152, 228,300,376,752 ms)

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
Input inversion disable	***6940***		***Done***
Input inversion enable	6941		Done
Input status change display	560		SSTC Ex Mx E0 = status change reports disabled E1 = status change reports enabled M0 = no reporting M1 = report change on input0 M2 = report change on input1 M3 = report change on either input
Input0 change report	821		Done
Input1 change report	822		Done
Odd parity select	1022		Done
Output pulse duration = 228 ms set	***67C***		***Done or Error***
Output pulse duration set N = 0–F (4,8,12,16,20,24,32,40,48,60,76,152, 228,300,376,752 ms)	67N		Done or Error
Output0 turn on	6201		Done
Output1 turn on	6202		Done
Outputs turn off both	6200		Done
Outputs turn on both	6203		Done
Parity select ***Parity disable*** Parity even Parity odd	102N	 ***0*** 1 2	 ***Done*** Done Done
Periodic check tag disable	***810***		***Done***
Periodic check tag enable	8120		Done
Periodic check tag status display	550		SCTS Mx T5 M0 = periodic checktag disabled M1 = periodic checktag enabled T5 = periodic interval of 30 min
Power fail bit display	520		PWRB Px R0 P0 = no power fail has occurred P1 = power fail has occurred
Power fail bit reset	65		Done

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
Predefined output mode select	***621***		***Done***
Presence input status display	529		PRST Px D0 Ax Tx Ix P0 = disable presence without tag reports P1 = enable presence without tag reports D0 = minimum presence true period of 0 ms A0 = RF off on timeout A1 = RF off on timeout or tag A2 = RF off on timeout or no presence Tx = RF timeout period T0 = always expired T1–TE = (4,8,12,20,24,32, 48, 60,92,152,300,452,600,752 ms) TF = infinite I0 = input inversion disabled I1 = input inversion enabled
Presence without tag reports option ***Presence without tag reports disable*** Presence without tag reports enable	690N	 ***0*** 1	 ***Done*** Done
Program block load	90		Done, Checksum Error, Program Error, or Verify Error
Reader ID number display	521		RDID xx xx = 00–FF
Reader ID number set	60NN	NN = 00 to FF ***00 is factory default***	Done
Reader reset	63		Model [model] Ver [ver no.] SN [serial no.] Copyright [date] AMTECH Corp.
Real-time clock test	664		Done or Error
RF off	6400		Done
RF off on timeout	6920		Done
RF off on timeout/no presence	***6922***		***Done***
RF off on timeout/tag	6921		Done

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
RF on	6401		Done
RF on by input control	***641***		***Done***
RF operating frequency set	642		Done
RF operating range set	643NN		Done
RF status display	527		RFST Cx Ox T1 C0 = RF controlled by host C1 = RF-by-input control O0 = RF off O1 = RF on T1 = uniqueness timeout of 2 min
RF timeout = infinite set	693F		Done
RF timeout set N = 0–F (always expired, 4,8,12,20,24,32, 48,60,92,152,300,452,600,752 ms, infinite)	***693N***		***Done or Error***
RF0 filter status display	530		RF0S Ux V0 U0 = one ID separation U1 = two ID U2 = transmit all U3 = buffer all
Selected checktag option display	551		CTAG x 0 = internal 1 = external
Serial number set S...S = ASCII string (maximum length of 6 characters)	***695S...S***		***Done***
Status change report option ***Status change reports disable*** report change on input0 report change on input1 report change on input0 and input1	82N	N = 0 to 3 ***0*** 1 2 3	Done
Stop bit select ***Stop bit use one*** Stop bit use two	101N	N = 0 to 1 ***0*** 1	Done
	4100		***Done***

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
Tag ID separation select ***Tag ID separation select one*** Tag ID separation select two	410N	N = 0 to 1 ***0*** 1	Done
Tag translation mode disable	***452***		***Done***
Tag translation mode display	534		TT x 0 = disabled 1 = enabled
Tag translation mode enable	453		Done
Time and date append selection Time and date append disable ***Time and date append enable***	30N	N = 0 or 2 0 ***2***	Done or Error
Time and date display	22		HH:MM:SS.hh MM/DD/YY
Time set	20S...S	S...S = HH:MM:SS or HH:MM:SS:hh HH = 00 to 23 MM = 00 to 59 SS = 00 to 59 hh = 00 to 99	Done or Error
Version display	505		Model [model] Ver [ver no.] SN [serial no.]
Wiegand mode disable	***450***		***Done***
Wiegand mode enable	451		Done
Wiegand mode status display	532		T0F x 0 = disabled 1 = enabled
Wiegand retransmit interval display	533		WTI xx xx = 01–FF seconds

Table 1-12 SmartPass Commands Listed by Command Name (Continued)

Command Name	Command Number	Variable	Reader Message
Wiegand retransmit interval set	46NN	NN = 01–FF seconds ***01 (1 sec.) = factory default***	Done or Error

2

Troubleshooting

This chapter includes information for troubleshooting a SmartPass installation. It also includes information for obtaining support and a contact for providing feedback and suggestions to Amtech.

Symptoms and Remedies

You can use the following table for troubleshooting. Should problems continue after referring to Table 2-1, consult Amtech Technical support (see the "Technical Support" section on page 2-5) or refer to your *SmartPass Dealer's Guide* for return and replacement procedures.

Table 2-1 Symptoms and Remedies

Symptom Number*	Symptom	Remedy
1	When performing a quick test of SmartPass, the buzz box does not buzz.	Check all wiring connections, and confirm that the buzz box is functioning. The wires from SmartPass are grouped in pairs. You could find more than one red wire, more than one black wire, and so on. You must connect the correct red and white wire pair to the leads from the battery. Verify that the red/green wire pair is still twisted together as described in "Testing Power Connections" on page 1-15. Twisting the red/green wire pair turns on a continuous RF signal.
2	When testing SmartPass, all the wires are connected correctly, but the unit does not respond.	SmartPass may not have the firmware loaded inside the unit. Obtain the SmartPass software diskette from your dealer and using your PC, load the firmware into the unit. If you are using a terminal emulation program, check that the terminal emulation setting on SmartPass is VT100. Check that the SmartPass communication cable is connected to the correct COM port on the PC.
3	Strange signal responses come from SmartPass when tested with the PC.	Check the system defaults using the SmartPass Host software on the diskette that is supplied to the dealer or distributor. Your system should be set to 9600 baud, 8 bits, 1 stop bit, and no parity.
4	When a tag is moved in front of the reader, a clicking sound comes from SmartPass.	SmartPass works. You hear the relay inside SmartPass that is controlled by a lock signal. The relay is activated when a tag is in the read zone.
5	Nothing happens when the test tag is passed in front of SmartPass.	Ensure that the red/green pair of wires is twisted together to turn on the RF power continuously. Ensure that SmartPass is powered on and is in predefined output mode.
6	Unit does not appear to give Wiegand output.	Verify that the unit is reading tags. Be sure that the tags are valid Wiegand format and the unit has been set in Wiegand mode. Check Wiegand wire connections. See the "Using a Wiegand Interface" section on page 1-18.

Table 2-1 Symptoms and Remedies (Continued)

Symptom Number*	Symptom	Remedy
7	SmartPass came from another site and does not work the way the factory defaults indicate that it should.	Different commands were probably used to support the other site's specific configuration. You can restore the defaults by first disconnecting the power. Next, twist the red/black pair of wires together and power up the SmartPass for 3 or 4 seconds. The factory defaults will be restored.
8	When connected to a PC that is running terminal communications software, a just-powered up SmartPass displays one of the following messages: #Model SP-ACC Ver 2.00D SNYYYYYY #[Copyright notice]	SmartPass works! The software is now loaded. YYYYYY is the Amtech-assigned serial number for this SmartPass. However, if YYYYYY = 000000, the internal battery has failed, or a serial number has never been assigned. If the internal battery has failed, the SmartPass must be returned to the factory for replacement. If a serial number has not been assigned to SmartPass, you can assign a unique serial number by using command 695. Note that each SmartPass unit must have its own unique serial number.
9	The read zone is too small, even before the range control has been adjusted.	If another SmartPass is in the same area, be sure it operates on another frequency that is at least 6 MHz different. Check for possible interference from another nearby RF source: fluorescent lights, neon signs, high voltage power lines, nearby cellular telephone, or radio stations. Lights will need to be removed or shielded. Point SmartPass in a different direction to see if interference comes from only one direction. Try changing the frequency of the SmartPass using command 642NN. Verify that the range adjustment is set to the maximum.
10	The perimeter of the read zone has been defined, but there is a "hollow" spot in the center of the zone that does not read tags.	The angle of SmartPass may need adjustment. Slightly tilt SmartPass to a different angle to change either the length or width of the read zone. Check the range control adjustment. See the "Fine-Tuning and Verifying the Read Zone" section on page 1-33.
11	SmartPass is reading tags out of the desired read zone, or cross-lane reads are occurring.	Some interference from other RF or electrical sources may be occurring. See Chapter 2 of the *AI1620 SmartPass System Guide.*
12	How do I download the SmartPass firmware from the diskette?	To download SmartPass firmware, you will need a SmartPass software diskette with READ.ME, DL.EXE, and the firmware file. Insert the software diskette into your PC, and print the instructions in the READ.ME file.

*Use this number to reference the problem you are having with SmartPass if you call Technical Support.

Technical Support

Amtech Systems Division authorized dealers and distributors are responsible for the direct support of all customers. Authorized dealers and distributors needing support can call (972) 733-6600 and ask for the Amtech Response Center (ARC), 9:00 a.m. to 5:00 p.m. Central time, Monday through Friday. Send faxes to (972) 733-6695 ATTN: ARC. Please be prepared to answer a series of questions that are designed to direct you to the best Amtech support resource available. These questions will relate to symptoms, configuration, model, and types of tags used.

Note: *End users and facility operators calling the ARC will be referred to the dealer responsible for the system sale.*

Find Something Wrong or Want to Suggest an Improvement?

Call 1-800-755-0378, 9:00 a.m. to 5:00 p.m. Central time, Monday through Friday, and ask for the SmartPass Product Manager. Send faxes to (972) 733-6699 ATTN: SmartPass Product Manager.