

# Intelligent Library System Open Plus (ILS) 3.0

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## Installation Manual

ISO 15693



# ILS Open Plus 3.0 Installation Manual

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This manual refers to the Intelligent Library System Open Plus unit, Version 3.0.

## Document Revision Information

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|     |               |         |           |

## Document Conventions



Warning

This is a Warning icon. When it appears, the corresponding text indicates a cautionary statement which you must abide by.



Caution

This is a Caution icon. When it appears, the corresponding text indicates a cautionary statement which you must abide by.



Note:

This is a Tip icon. When it appears, the corresponding text indicates a helpful note or tip when using the feature.

The following usage conventions are used throughout the Intelligent Library System User Manual.

**Button Name** - This describes a button or selection on the screen. For example, the <DONE> button is represented in this document as **Done**.

**Key Name** - This describes a keystroke on a keyboard. For example **Ctrl** represents the control key.

## Statements

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- The device(s) may only be used for the intended purpose designed by for the manufacturer.
- Unauthorized changes and the use of spare parts and additional devices which have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.
- The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or automatically set parameters for a device or for an incorrect application of a device.
- Repairs may only be executed by the manufacturer.
- Installation, operation, and maintenance procedures should only be carried out by qualified personnel.
- Use of the device and its installation must be in accordance with national legal requirements and local electrical codes .
- When working on devices the valid safety regulations must be observed.
- Please observe that some parts of the device may heat severely.
- Before touching the device, the power supply must always be interrupted. Make sure that the device is without voltage by measuring. The fading of an operation control (LED) is not an indicator for an interrupted power supply or the device being out of voltage!
- The Antenna-Tuner and the Antenna conductor carry voltages up to 1000V.

# Important Information to our Users in North America

## FCC Regulatory Compliance Statement

Checkpoint Systems, Inc., offers Radio Frequency Identification Products that have been FCC certified or verified to 47 CFR Part 15 Subparts B/C and/or 47 CFR Part 18. Appropriately, one of the following labels will apply to the approval:

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 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 interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- OR -

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) including this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation, which may include intermittent decreases in detection and/or intermittent increases in alarm activity.

- OR -

NOTE: This equipment has been tested and found to comply with the limits for a miscellaneous type ISM device, pursuant to Part 18 of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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 communications reception, which can be determined by turning the equipment off and on, please contact Checkpoint Systems, Inc., at 1 (800) 257-5540 for further assistance.

## Equipment Safety Compliance Statement

Checkpoint Systems Radio Frequency Identification products have been designed to be safe during normal use and, where applicable, certain components of the system or accessory sub-assemblies have been certified, listed or recognized in accordance with one or more of the following Safety standards: UL 1012, UL 1037, UL 1310, UL 60950-1, CSA C22.2 No. 205, CSA C22.2 No. 220, CSA C22.2 No. 223, CSA C22.2 No. 60950-1. Additional approvals may be pending.

**WARNING:** Changes or modifications to Checkpoint's Radio Frequency Identification (RFID) equipment not expressly approved by the party responsible for assuring compliance could void the user's authority to operate the equipment in a safe or otherwise regulatory compliant manner.

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## ILS OPEN PLUS EXIT ANTENNA INSTALLATION

This chapter describes the steps required to install ILS Open Plus Exit Antennas (hereafter referred to as gates) for Intelligent Library System Open Plus 3.0.

### Requirements

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The field service technician requires:

- A laptop computer running Windows with a Serial connector.
- The typical hardware and tools to mount a gate for various floor substrates.
- The size of the mounting holes in the gate is 10 mm (.39"). The length of the anchors or bolts should be selected such that they extend at least 45 mm (1.8") and a maximum of 65 mm (2.6") from the floor.
- DB9-to-RJ45 adapter, supplied with the gates
- Service technicians will add terminators when connecting to the terminal block. The power supply connections are connected in the same manner.
- Service technicians will pull the wires, strip, add the appropriate terminators, add the toroid (supplied with the gate), and make all connections.
- The Service technician supplies all connectors.

### Overview

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The following is the installation sequence. Following this are the detailed instructions procedures for each component.

- 1 [“Safety Instructions - Read Before Beginning” on page 1-2](#)
- 2 [“Gate Features” on page 1-2](#)
- 3 [“Site Survey” on page 1-6](#)
- 4 [“Disassemble the Gates” on page 1-7](#)
- 5 [“Install the Gate Base” on page 1-10](#)
- 6 [“Connecting the Alarm Kit to the Serial-to-Ethernet Board” on page 1-12](#)
- 7 [“Install the Antenna Body” on page 1-14](#)

- 8 [“Install the Cover Plates” on page 1-16](#)
- 9 [“Antenna Configuration” on page 1-18](#)
- 10 [“Testing the Gate Antenna” on page 1-23](#)
- 11 [“Technical Data” on page 1-26](#)

## Safety Instructions - Read Before Beginning

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Caution: The Antenna-Tuner and the Antenna conductor can carry voltages up to 1000V.

- Before working with the gate, the power supply must always be unplugged. An unpowered LED is not an indicator for an unplugged power supply.

## Gate Features

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The gates are intended to be used in pairs, with one primary smart gate that contains the Reader and Multiplexer, and a secondary dumb gate without a Reader or Multiplexer. The Reader and Multiplexer are mounted inside the antenna base of the primary gate.

The primary gate controls all of the functions for all of the gates at the entrance/exit, by quickly time-multiplexing the RF field amongst them, effectively covering the entrance/exit with one large RF field.

The antennas are comprised of the electrical antenna conductor, the housing, the Antenna Tuner and the connection cable. The antennas are factory tuned to an impedance of 50 in a magnetically neutral environment at a distance of 95 cm (37"). When installed in different ambient conditions, the antenna can be retuned using the DATuningTool program. Once tuned, the antennas retain their settings as long as the ambient conditions remain unchanged.



## Physical Features

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The following is an internal view of the gate.

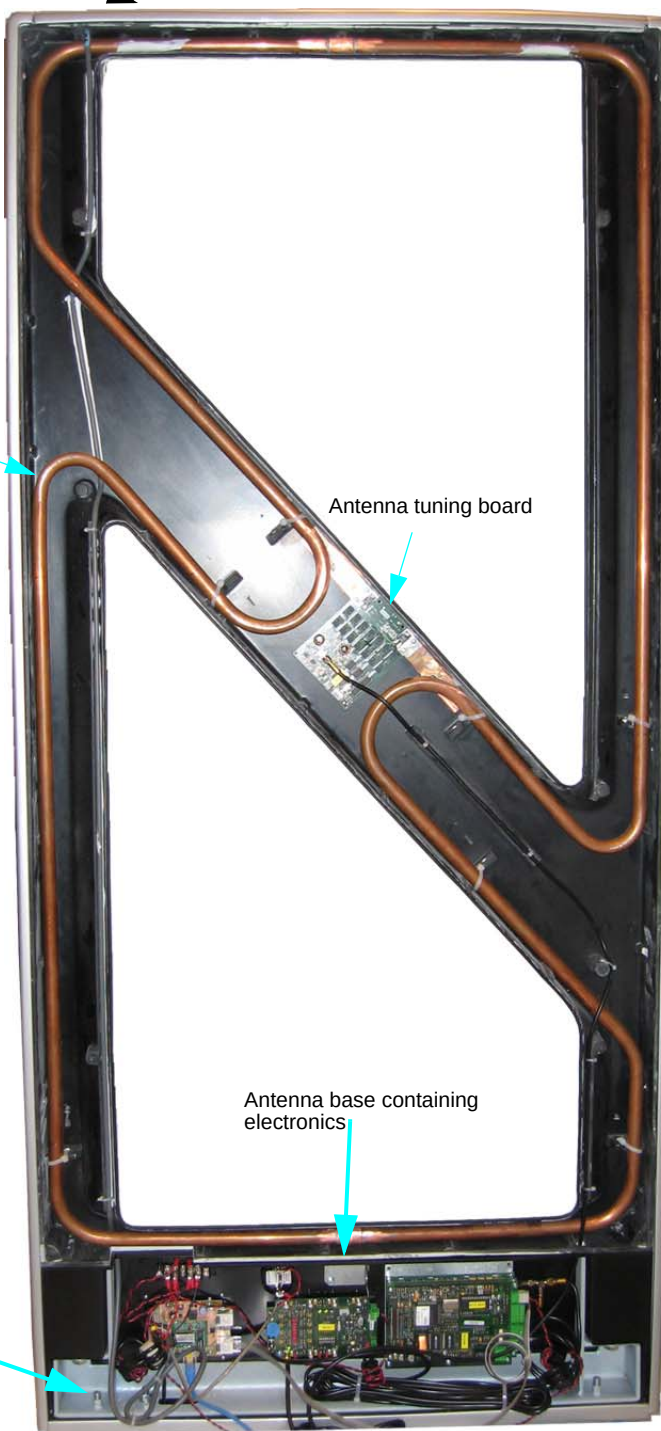
Upper frame section with  
Signal-LED

Antenna body  
with antenna  
conductor

Antenna tuning board

Antenna base containing  
electronics

Floor plate  
(hole template)

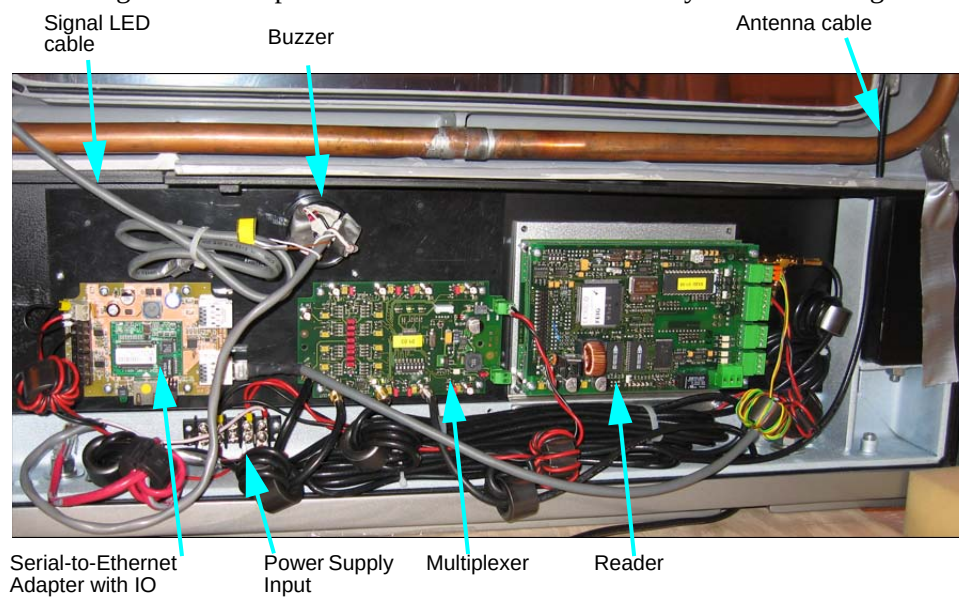


**Figure 1.1** Antenna construction without frame side pieces and cover plates

## Electronics Bay of Master Gate

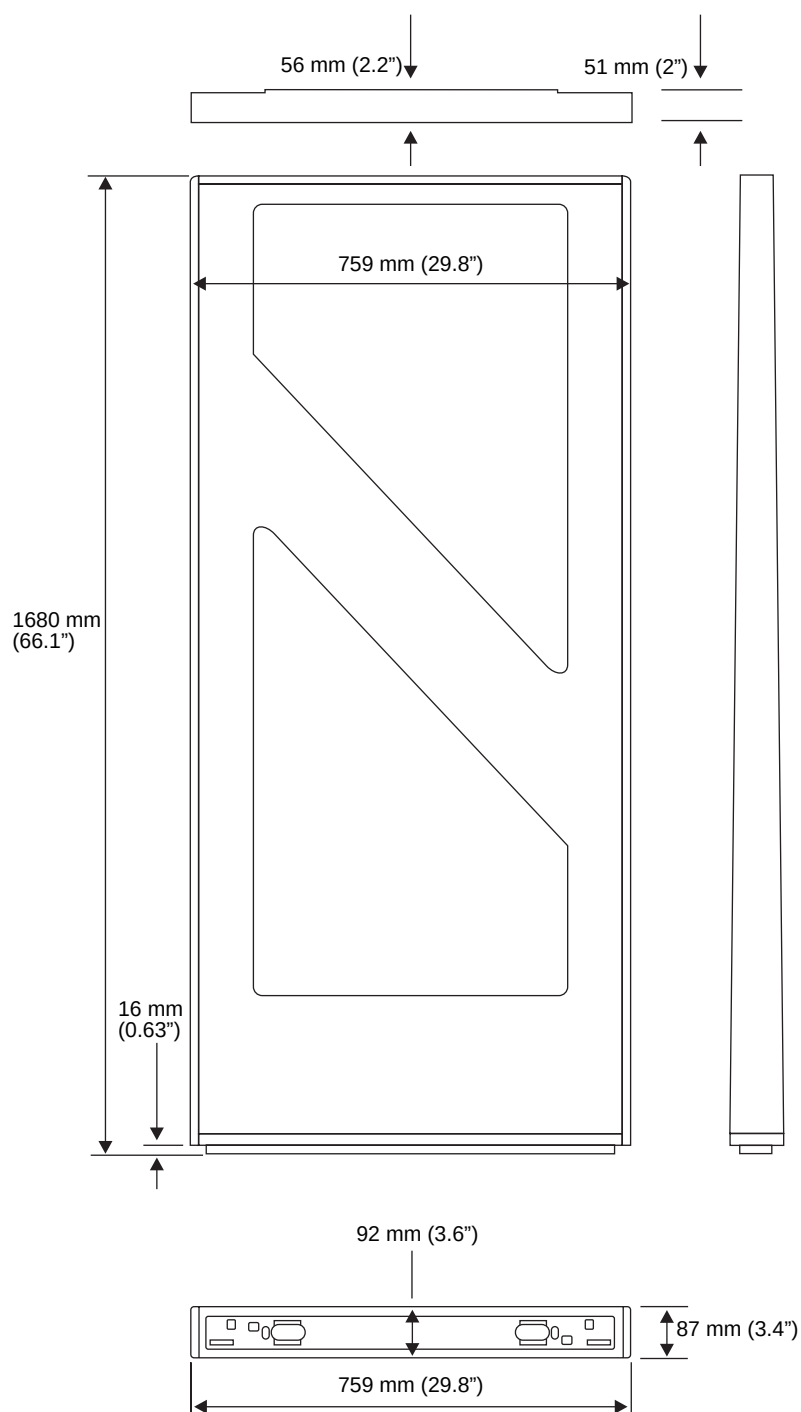
---

The following are the components found in the electronics bay of the Master gate.



## Antenna Dimensions

The outside dimensions of the antenna are shown below.



**Figure 1.2** Antenna Outside Dimensions

- Keep in mind when installing to orient the gates in the same direction to maintain a consistent look and ensuring optimum performance.

## Site Survey

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A site survey document should already have been completed for the intended installation. Refer to the site survey document for details regarding physical installation, proper grounding, proper electrical connections, etc.

### Aisle Width

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The spacing of the gates depends upon the gate configuration, but the maximum aisle width distance (centerline to centerline) is 91 cm (36”), and minimum of 81.5 cm (32”). Widths narrower than 81.5 cm (32”) does not meet ADA guidelines. The gate base should be installed first as it provides the template necessary for securing the gate to the floor. See [“Determining the Mounting Holes” on page 1-10](#) to begin.

### Gate Area Requirements

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For maximum performance, the gates should have a clearance of at least 50 cm (19.7”) between the antenna and objects that impact RF performance (such as metal). Otherwise, the Reader range will be significantly reduced. At a minimum, the gates must have at least a clearance of 20 cm (7.9”) clearance on all sides.

### Orientation

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The orientation of the gates should be determined and then maintained consistently between multiple gate antennas across the adjacent aisles. This results in the electronics bays all facing the same direction.

### Multiple Gate Scenario

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If multiple sets (one primary and up to 2 secondary) of gates are used, a minimum separation of 8 m (26.2 ft) must be kept between the antennas or gates. For shorter distances (1 m - 8 m [9.8 ft - 26.2 ft]) the Readers must be synchronized; otherwise the Reader range will be significantly reduced.

## Disassemble the Gates

---

The gates arrive already intact and one must be disassembled when performing an installation because the gate base is used as the drilling template. Use the slave gate for this procedure.

- 1 Carefully unpack the slave gate from the carton. The side moldings are especially fragile and can crack when putting significant pressure on them, such as carrying the entire gate when grabbing the sills.



**Figure 1.3** Bottom side screws removal

- 2 Remove the two screws at the bottom of each side molding.



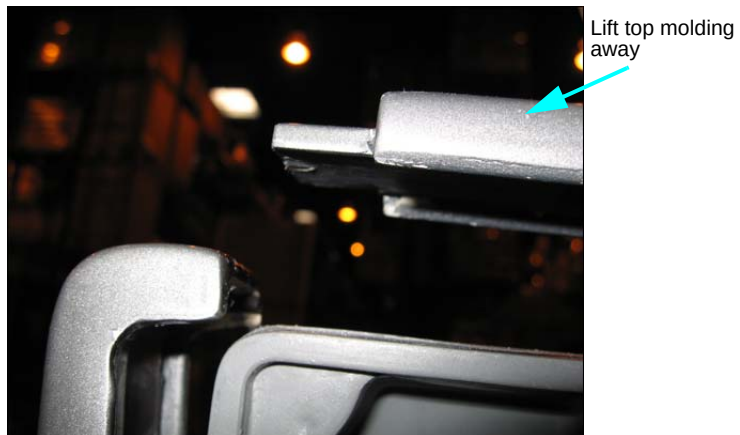
Remove these screws

**Figure 1.4** Top screws on side molding removal

- 3 Remove the two screws from the top of each side molding.
- 4 Slide each side molding upward 5 cm to 7.6 cm (2" to 3") towards the top of the gate so that the hidden fasteners (key hole slots) disengage from the molding strips and are removed from the upper antenna structure. See [“Sliding the frame side sections down” on page 1-17](#) for an illustration.

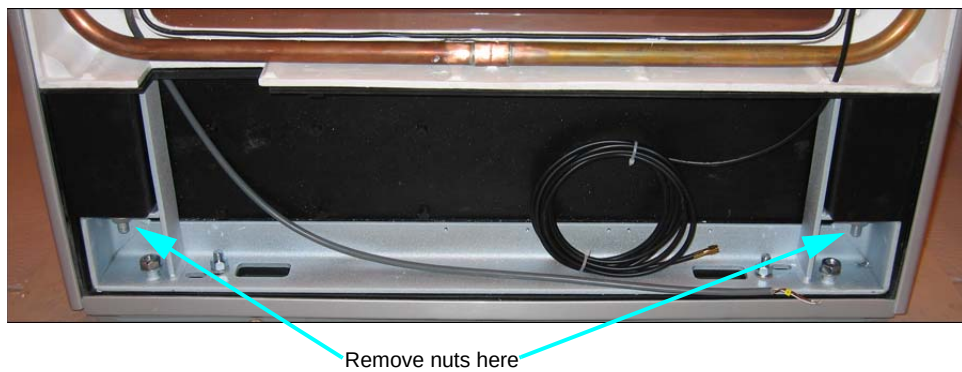


Note: Do not pry nor bend the moldings outward.



**Figure 1.5** Top molding removal

- 5** Remove the top molding only after the side moldings have been removed.
- 6** Remove the lexan cover plates from the front and back of the gate by lifting out the lip from the base.



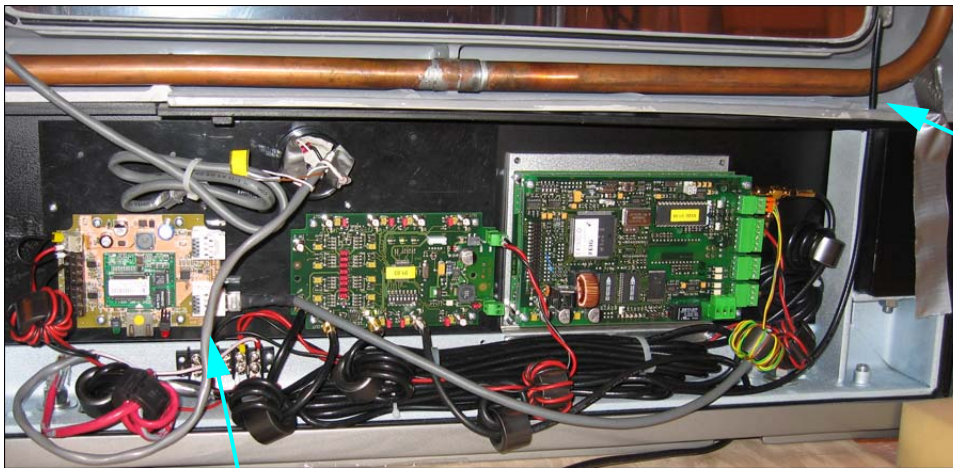
**Figure 1.6** Slave gate base

- 7** Remove the (17mm) nuts and washers at base of the upper antenna structure (inside of base).





Note: Only perform the next step if disassembling a master gate.



Antenna cable connected to multiplexer

Signal LED cable connected to serial-to-ethernet board

- If disassembling a master gate, unscrew the antenna cable from the multiplexer and signal LED cable from the serial-to-ethernet board.

Antenna partially removed from base

Nut removed from screw (not seen) here



**Figure 1.7** Antenna removed from base

- 8 Separate the base from the upper antenna structure, by sliding the two apart.
- 9 Separate the very bottom floor mounting plate from the base (electronics bay). The floor mounting plate will be used as a template for the location of the mounting holes and wire access holes. Discard any screws used for shipping.

# Install the Gate Base

The floor mounting of the slave gate is used to mark the holes for drilling.

## Determining the Mounting Holes

- 1 Use the floor mounting plate from the disassembled gate to mark the holes for all of the gates.
- 2 Ensure that the orientation of the gates is consistent, so that each gate faces the same way. Notice in the diagram below that each same mounting plate faces in the same direction.
- 3 When the position of the antennas has been marked (in conjunction with the Site Survey document), the floor plate, which is the hole template, is to be used to drill the mounting holes and the holes for the cable entry. The dimensions are shown below:

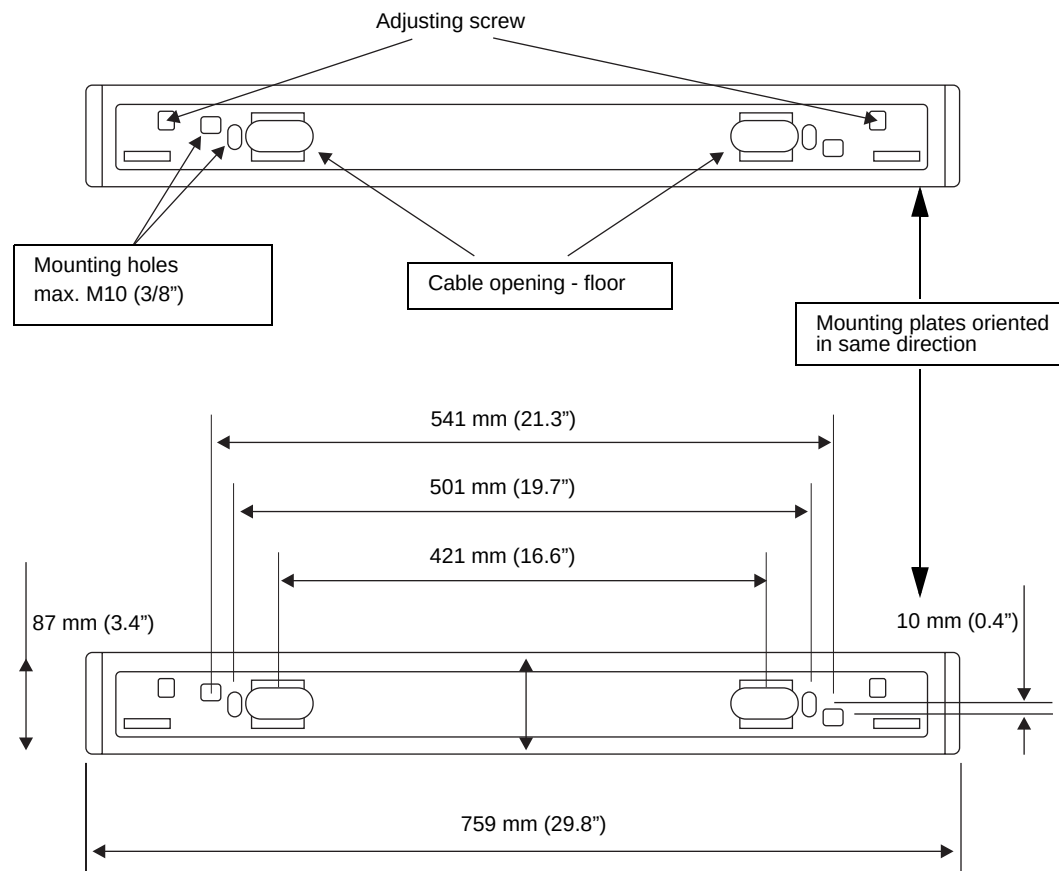


Figure 1.8 Floor Plate Dimensions

## Screw Anchor Type

The size and type of the screw anchors depends considerably on the strength of the base or floor. The anchors should be capable of withstanding a permissible load of at least 5 kN per anchor for all load directions (e.g. for concrete floor Hilti HVA anchors with HAS-(E) M8 (5/16") threaded rods or Hilti HIS-N M8 (5/16") threaded inserts). The size of the mounting holes in the antenna is 10 mm (.39"). The length of the anchors or bolts should



be selected such that they extend at least 45 mm (1.8") and a maximum of 65 mm (2.6") from the floor.

Mounting fasteners are provided by the installer, dependent upon floor type.

## Mounting Instructions

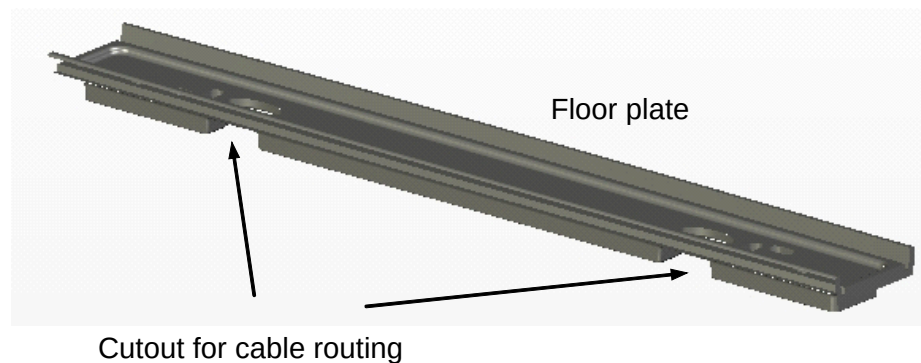
---

- ▶ Please follow the mounting instructions of the anchor manufacturer for drilling holes that match the type of flooring.

## Cable Routing

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Two cable openings are provided for the necessary connection cable. See [“Floor Plate Dimensions” on page 1-10](#). The cable openings are designed so that up to 10 cables having a diameter of 6 mm (.24") can be passed through each opening.



**Figure 1.9** Cable Routing

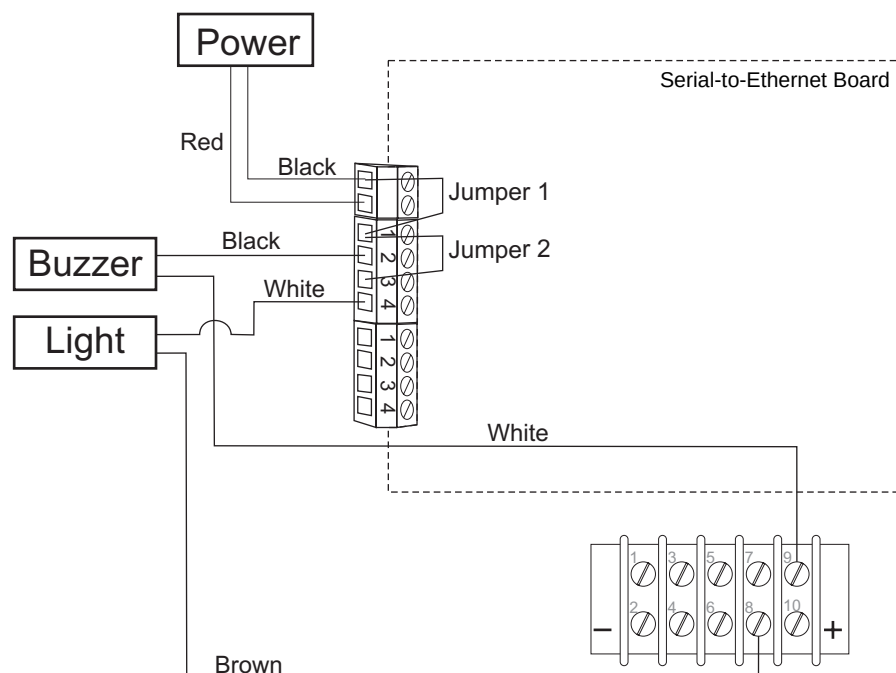
- 1 Thread the Antenna's Tuning board cable from each slave gate to the master gate.
- 2 It is recommended to route the antenna cables through the cable opening on the Multiplexer side. All other cables such as the supply voltage and multiplexing cable should be routed through the cable opening on the Reader side.

If the cable openings are not present, the cables can be routed through the cutouts provided in the antenna base. The cutouts are shown above.

## Connecting the Alarm Kit to the Serial-to-Ethernet Board

The solution provided here presumes that all alarm indicators (Signal LED and buzzer) are controlled and wired through the serial-to-ethernet board. The pulse duration can be set between 1 ms and 4000 ms by adjusting the Application Server configuration.

The alarm indicators are powered by the serial-to-ethernet board.



**Figure 1.10** Serial-to-Ethernet Board Connection

- The Alarm Kit (the lights and buzzer) should already be connected in the Master gate. If not, use the above diagram to connect the components to the serial-to-ethernet board.
- Terminals 8 and 9 refer to the terminal block located at the bottom of the housing.



Notes:

- All cables must be routed as far from the antenna conductor as possible. Never allow a cable to contact the copper tube.
- All cables should be kept as short as possible. Excess lengths should be shortened or at least tied together into small loops using cable ties (dog bone wrapped).
- The indicators should be powered in any case by a separate power supply independent of the Reader power supply. A common power supply may cause fault conditions in the Reader.
- The relay outputs are dimensioned for max. 24 V DC / 2 A. The relay outputs are intended only for switching resistive loads. If an inductive load is used, the relay contacts must be protected by an external protection circuit.
- Reversing the polarity or overloading the outputs will destroy them.

## Connect the LED Indicators

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The optical alarm indicator, the Signal LED, is integrated into the upper frame section. This means, when installing the antenna, the standard upper frame section is replaced by the one having the signal indicator and the Signal LED is connected with the connection cable.

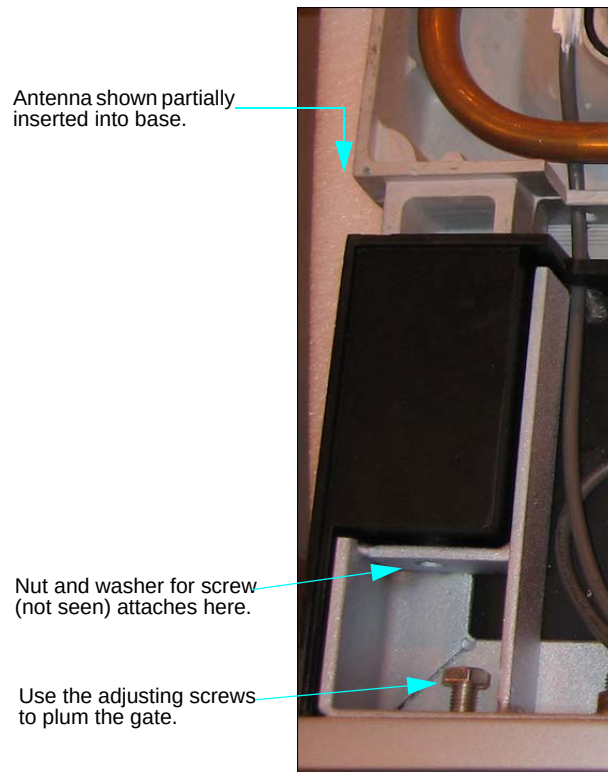


**Figure 1.11** LED Annunciator Connection

- 1 See [“Disassemble the Gates” on page 1-7](#) for instructions on how to disassemble the gate.
- 2 Once the top molding is removed, connect the pin to the LED connector. The brown connector connects to the positive (+) terminal.
- 3 Ensure that the cable is properly connected to the serial-to-ethernet board as instructed at [“Connecting the Alarm Kit to the Serial-to-Ethernet Board” on page 1-12](#).
- 4 Reassemble the gate as instructed at [“Install the Cover Plates” on page 1-16](#).

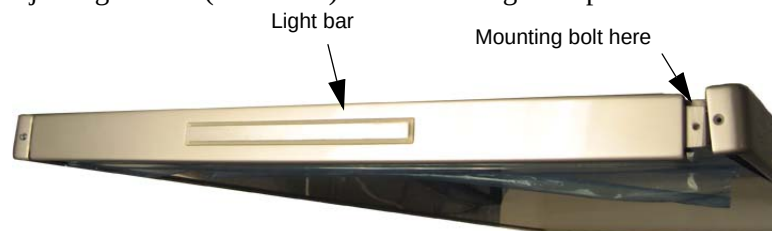
## Install the Antenna Body

Once the floor plate is bolted to the floor, you then attach the antenna base to the floor plate.



**Figure 1.12** Antenna body attachment

- 1 Insert the antenna body on to the antenna base and screw it to the antenna base using the mounting bolts as shown above.
- 2 Use the adjusting screws (see above) to ensure the gate is plum.



**Figure 1.13** Attaching the upper frame section with LED annunciator

- 3 Connect the top molding:
  - a For the master gate, place the upper molding section with the LED annunciator on the antenna body and use the mounting bolts to fasten it loosely as shown above. The annunciator connection cable for the LED is already routed in the antenna body.
  - b For the slave gate, place the upper molding section on the antenna body and use the mounting bolts to fasten it loosely as shown above.

- 4 Connect the Alarm Kit components as described in [“Connecting the Alarm Kit to the Serial-to-Ethernet Board” on page 1-12.](#)

## Cable Routing Guideline

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The cables should be routed as compactly as possible regardless of the antenna configuration. The cables should be tied into small loops at the end by binding all cables as far from the antenna conductor as possible. The cables must never be allowed to contact the copper tube. The antenna cables have a fixed length of approximately 2.10 m or 3.60 m (6.9 ft or 11.8 ft) and may not be shortened.



Cables are dogbone wrapped and routed along the bottom

**Figure 1.14** Cable Wrapping in Antenna Base

The above picture shows a correct cable routing.

## Install the Cover Plates



Note: It is recommended to install the cover plates only after a successful functional test of the complete antenna configuration has been performed.

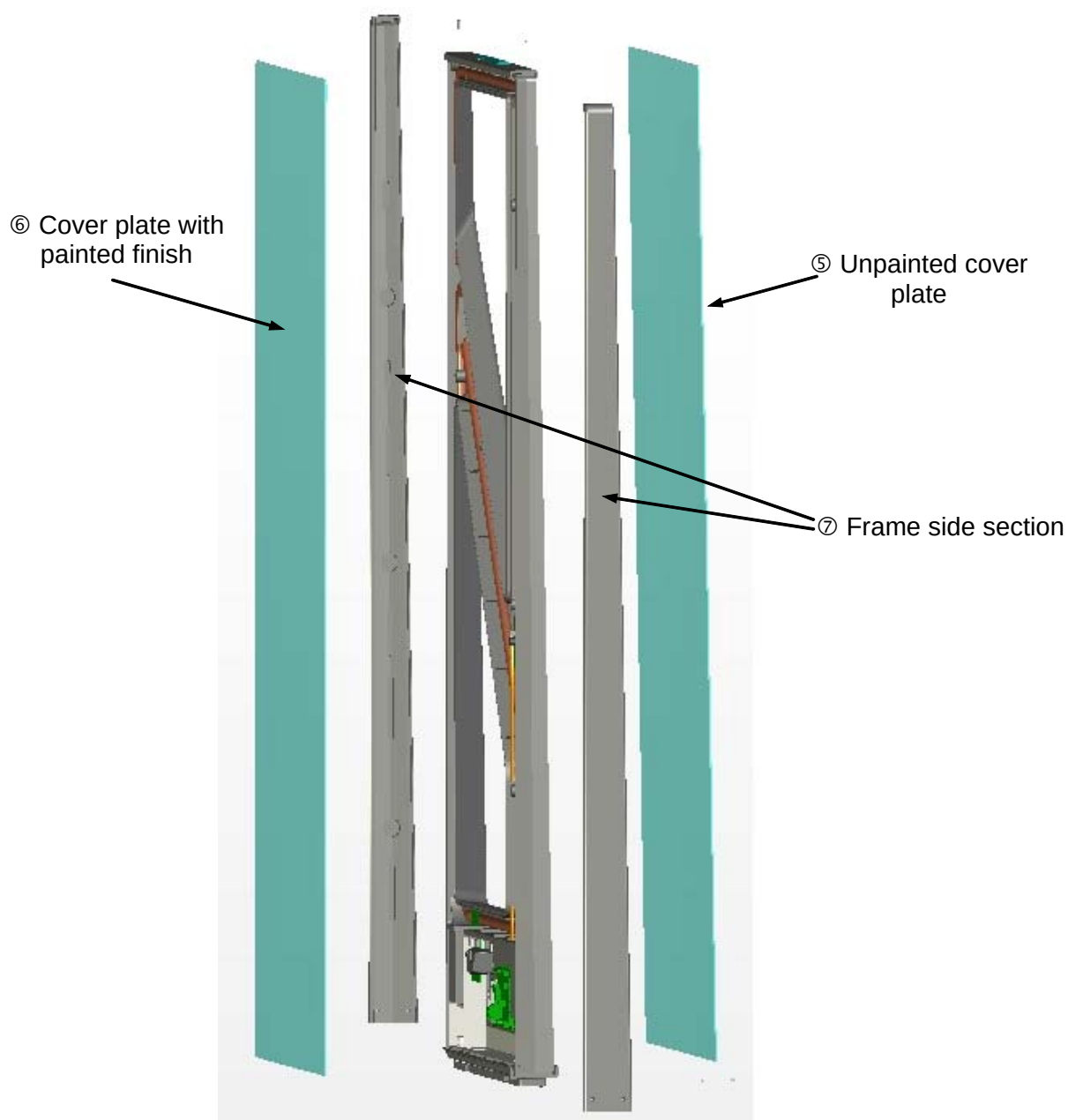
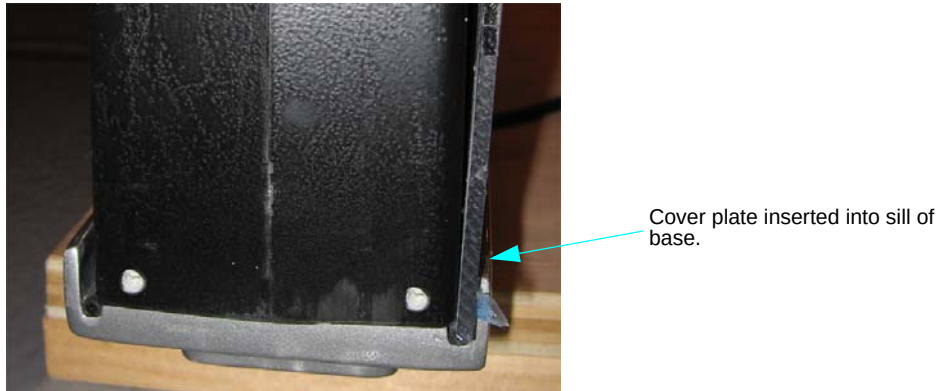


Figure 1.15 Cover Plates

- 1 The diagram above shows the cover plates (5) and (6) as well as the frame side sections (7). The upper frame section is already sitting on the antenna body as described in [“Install the Antenna Body” on page 1-14](#).



**Figure 1.16** Cover plate in antenna base

- 2 Insert cover plates in the antenna base and upper frame section as shown below. The cover plates with the painted, non-transparent section belong on the open side of the antenna body. This covers the antenna conductors and electronics.

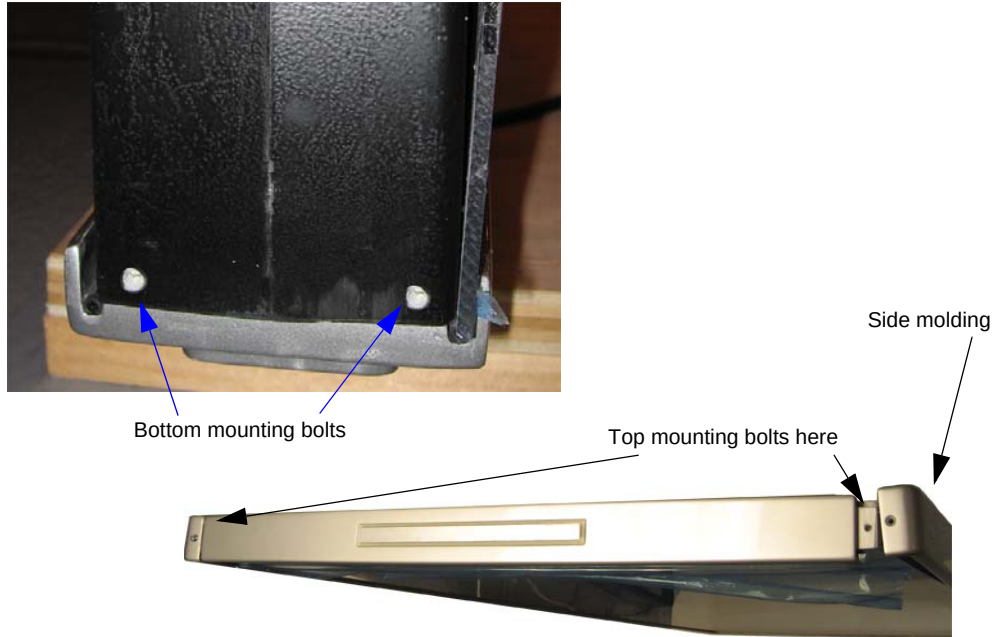


**Figure 1.17** Sliding the frame side sections down

- 3 Plug the side molding pieces in to the antenna body from the side and slide them down. Start inserting with the bottom key first, then the middle, then the top key.



- 4 Use the mounting bolts to attach the side molding pieces. The positions of the attachments are shown below.



**Figure 1.18** Mounting bolts for frame side sections

## Antenna Configuration

---

The standard configuration of a gate with three-dimensional tag orientation consists of a master gate and one or two slave gates.

The configuration ensures that if a tag moves through the gate horizontally, it can be read at least once, ensuring a high reliability of the antenna system.

## Configuration and Setup

---

### Required Components

To construct the gate you need the following components:

- Qty. 1 Master Gate (with Reader and Mutiplexer)
- Qty. 1 or 2 Slave Gates
- Power cable, interface cable and connection cable for the DC power supply (2-wire, twisted)
- Mounting materials (screws, anchors)
- RJ45-to-DB9 Serial Adapter (for connecting technician's computer to the gate)

To configure and troubleshoot the Reader you need the program:

- IDReaderConfigurator

and for tuning the antennas, the program:

- DATuningTool Version 1.00 or higher



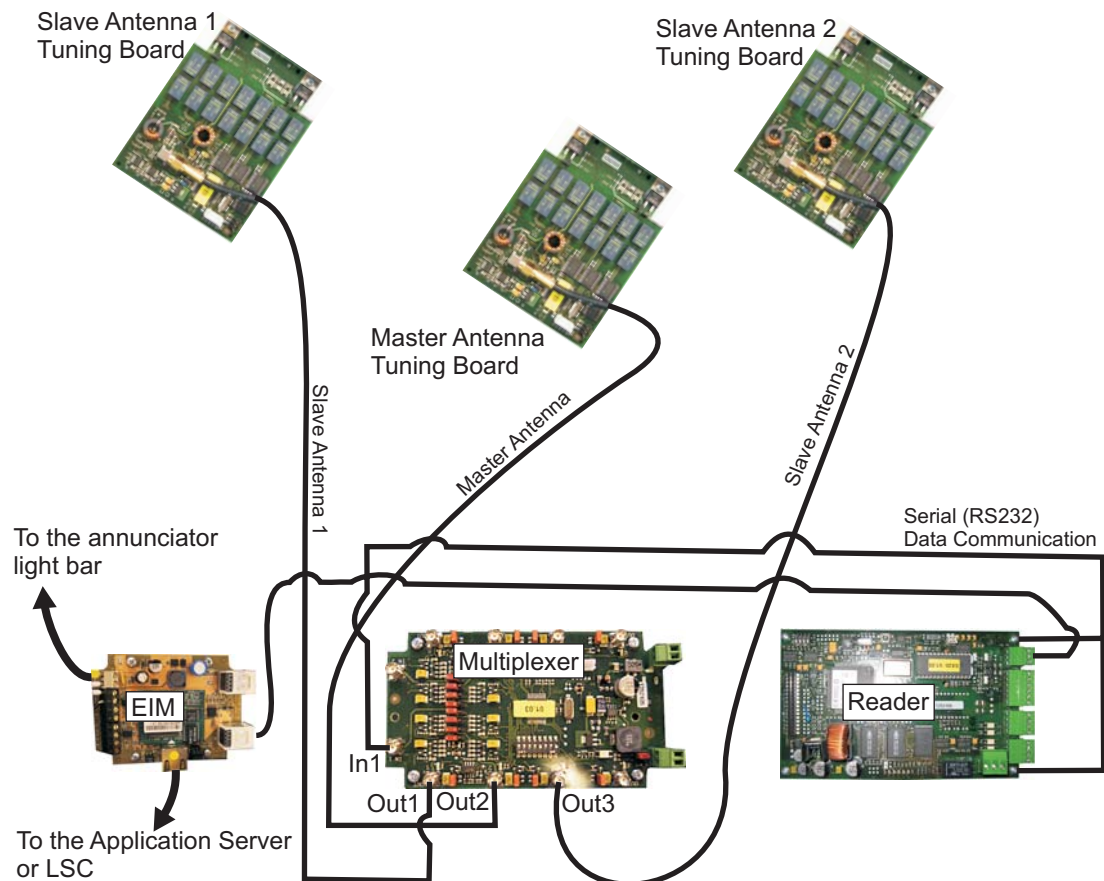
and for configuring the serial-to-ethernet board, the program:

- Network Enabler

on a personal computer running under Microsoft® Windows®. The service software is included on the OBID i-scan CD obtained from Checkpoint Systems, Inc.

## Configuration of the Gate Antenna

Connect the components as shown below. Power supplied to the terminal block in the base of the primary gate assembly will power: reader, multiplexer, Serial-to-Ethernet, and I/O for annunciators.



**Figure 1.19** Connecting components for a dual aisle (not drawn to scale)

- 1 Each antenna must be connected to the multiplexer.
  - a Single Master: Master antennas connects to Out 1.
  - b Single Aisle: Master connects to Out1, Slave to Out 2.
  - c Dual Aisle: The left Slave antenna connects to Out 1, the Master antenna connects to Out 2, and the right Slave antenna connects to Out 3.
- 2 The multiplexer outputs to the reader at In 1.

The cables have fixed lengths and may not be shortened and therefore need to be tied into small loops (dog bone wrapped). Tie all cables as far away from the antenna conductor as

possible (routed along the bottom of the board housing at the base of the gate). The cables must never be allowed to contact the copper tube.

### Setting the Multiplexer

- By configuring the S1 DIP Switch settings as shown below, all multiplexer settings are controlled by software. Jumpers are not required.

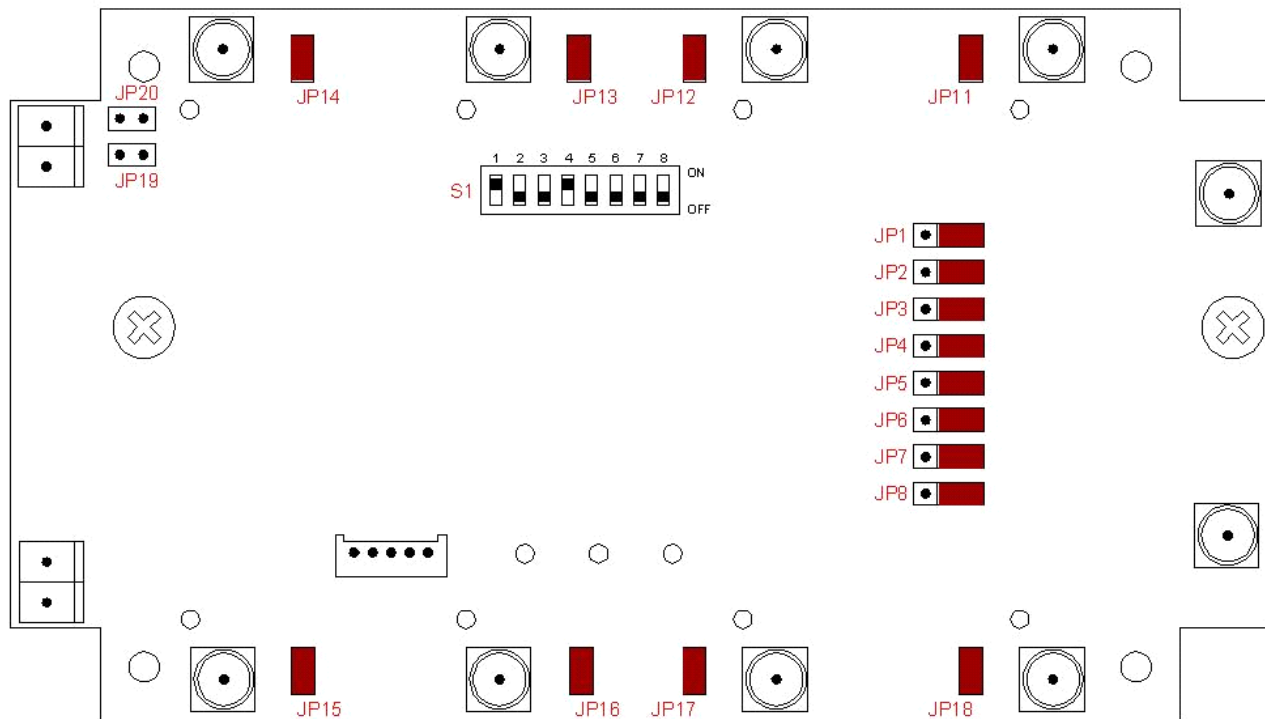


Figure 1.20 Multiplexer DIP-Switch and Jumper Positions

### DIP Switch Configuration

The DIP switch should be configured as indicated in the following table:

Table 1.1 DIP Switch S1

| 1  | 2   | 3   | 4  | 5 | 6 | 7 | 8 |
|----|-----|-----|----|---|---|---|---|
| ON | OFF | OFF | ON |   |   |   |   |

## Antenna Board Configuration

Master and Slave antennas must be set as follows (JP3 is factory set to closed and must be opened). Verify these settings:

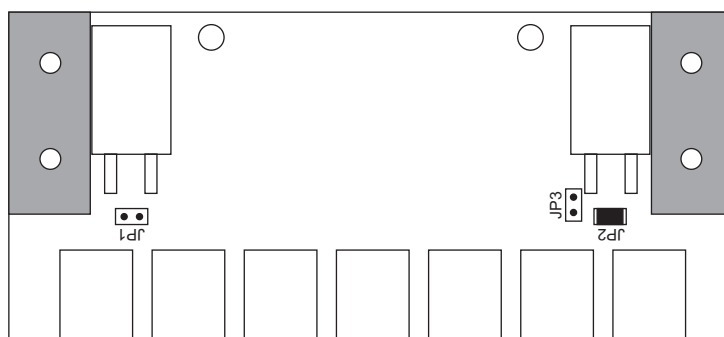


Figure 1.21 Antenna Board jumper position

Table 1.1 Antenna Board Configuration

| Function              | Jumper | Position |
|-----------------------|--------|----------|
| 1 $\Omega$ Q resistor | JP1    | open     |
| 2 $\Omega$ Q resistor | JP2    | closed   |
| Antenna switch        | JP3    | open     |

## Reader Configuration

To configure the antennas, use the IDReaderConfigurator program to perform the configuration. You also need the exit antenna configuration files on your computer so that you can upload the \*.xml settings file to the exit antenna.

- 1 Connect a laptop to the reader on the gate:
  - a Disconnect RJ45 cable between the reader and serial-to-ethernet board at the serial port.
  - b Plug the Checkpoint RJ45-to-DB9 cable adapter into the serial-to-ethernet board.
  - c Connect a serial cable from the RJ45-to-DB9 cable adapter to the laptop's serial port.
- 2 Launch **IDReaderConfigurator.exe** program from your computer.
- 3 Select **Manual Mode** and click **Next**.
- 4 Select the **COM port** your computer is using.
- 5 Verify **255** is listed in the BusAdr field.
- 6 Click **Detect** to verify your connection.
  - a If nothing appears, try changing the COM port.
  - b If that does not work, try a **0** in the BusAdr field if connecting to a Slimline reader or **9** if connecting to an exit antenna.
- 7 Once detected, click **Next**.
- 8 Click **Select Path** and browse to the exit antenna configuration files.

- 9 Select **aisle configuration** for which you are configuring and click **Next**. For example, select a dual aisle configuration file if there are three gates.
- 10 Review the summary and click **Next** to upload the configuration.
- 11 Click **Close** when finished.

## Tune the Gate Antenna

Before tuning the gate antenna, you must quit the IDReaderConfiguration software. Then the gate can be tuned as follows:

- 1 Connect a laptop to the reader on the gate:
  - a Disconnect RJ45 cable between the reader and serial-to-ethernet board at the serial port.
  - b Plug the Checkpoint RJ45-to-DB9 cable adapter into the serial-to-ethernet board.
  - c Connect a serial cable from the RJ45-to-DB9 cable adapter to the laptop's serial port.
- 2 Launch DATuningTool software.
- 3 Click **Detect Reader**.

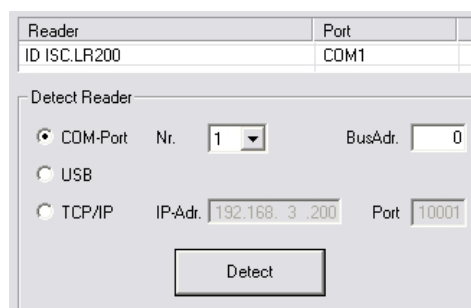
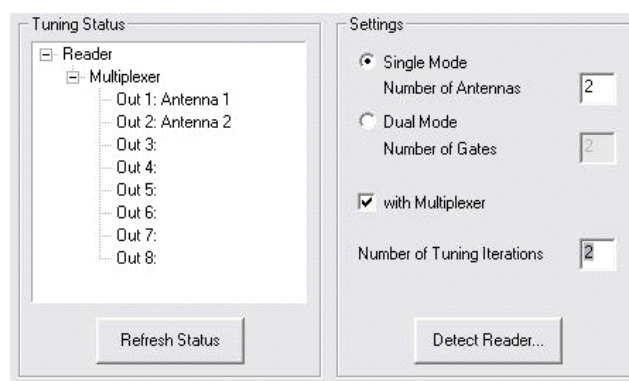


Figure 1.22 Detect Reader

- 4 Select the **COM port** your computer is using.
- 5 Verify **255** is listed in the BusAdr field.
- 6 Click **Detect**.
- 7 Use **Settings** to enter the configuration:



- select **Single Mode**
  - Number of Antennas: **1**
  - Select **with Multiplexer**
  - Number of Tuning Iterations: **3**
- 8** Click **Start Tuning** and wait until the tuning process is finished. The tuning status is displayed after each tuning pass. After successful tuning, both antennas are shown in green.
  - 9** If this does not succeed on the first try, start the process over again by clicking **Start Tuning**.
  - 10** Once finished, close the DATuningTool program.

## Testing the Gate Antenna

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After tuning the gate antenna, you can verify that it functions properly using the Reader, the ISOStart service software, and a Smart Tag. This procedure tests the noise level and performance of the gate.

### Checking the Noise Level

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- 1** With your computer still connected to the gate, launch the ISOStart program.
- 2** Click **Test and Measurement**.
- 3** Click **Noise Level** and click **Start**.
- 4** You should see these values:
  - Average: 300-750mV
  - Difference (Max-Min): < 20mV
- 5** If the values are not seen, check the following:
  - Are all cables pulled tight and do they make good contact?
  - Were the ring cores installed in the antenna cable?
  - Were the cables routed as specified?
  - Are other RFID systems installed nearby?
  - Are there large metal parts near the antenna (distance < 1.0 m)?
  - Are there devices nearby which may emit noise interference (larger machines or wireless devices)?
- 6** To determine which devices may be disturbing the gate, briefly disconnect them from the mains.

### Reading a UID Number

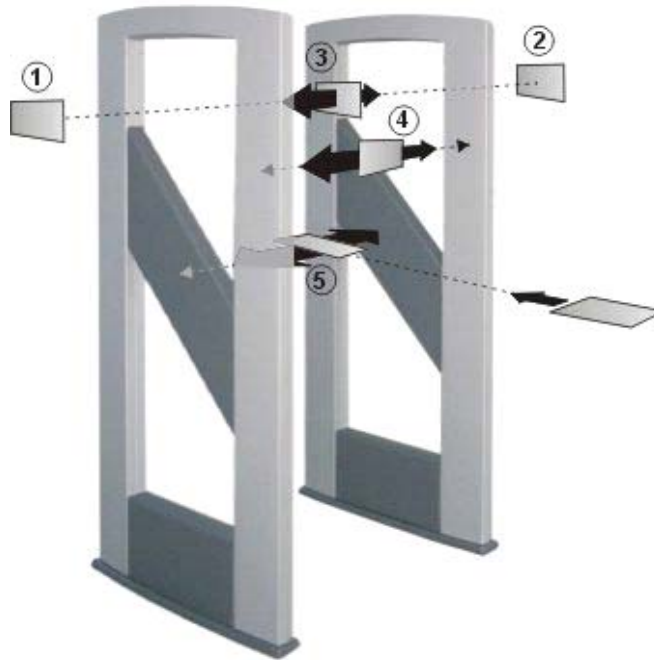
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- 1** Click **Test and Measurement**.
- 2** Click **ISO Inventory** and click **Start**.
- 3** Carry a tag through the detection zone of the gates.

- 4 Read the serial number and tag type in the display.

## Performance Testing

In this test, the capture area of the gate antenna described [“Antenna Configuration” on page 1-18](#) is verified. For other tags or other configurations the indicated ranges and read areas may differ accordingly.



**Figure 1.23** Performance Test of the Gate Antenna

- 1 The test begins by checking the read range outside the gate (see Fig. points (1) and (2)), assuming the configuration and locality permit it.
  - 2 Launch the ISOStart program and click ISO Inventory.
  - 3 If the tag is oriented parallel to the antenna towards the outside, a read range of 50 to 60 cm (19.7” to 23.6”) should be achieved.
  - 4 Check the three tag orientations inside the gate. This corresponds to the lines and orientations (3), (4), and (5).
  - 5 Slowly move the tag in the vertical and parallel direction with respect to the antenna along the line (3) from one side to the other. The tag should always be read.
  - 6 Repeat this along the line (4) in the vertical tag direction transverse to the antenna and on the line (5) in the horizontal tag orientation. Again, the tag should always be read.
- The tag should be read within the gate when moving horizontally through the gate in all 3 read orientations.

If one or more “holes” are detected, check the noise values on the Reader (see [“Checking the Noise Level” on page 1-23](#)) .

The following may result in faulty readings:

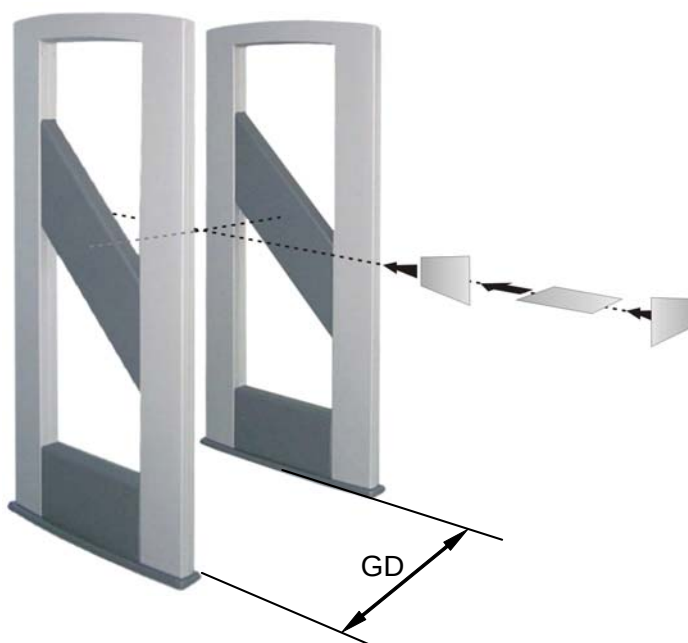
- Antenna improperly installed (orientation, antenna distance, check cabling)

- Metal near the antennas is detuning or interfering with them.
- The antennas are not properly tuned.
- Noise level too high ( $V_{\max} - V_{\min} \geq 20 \text{ mV}$ )
- Tag too insensitive, detuned or defective
- Reader improperly configured (transmitting power, transponder type, modulation, transponder parameters, etc.).
- A cable is defective or has a poor contact.
- Reader, Power Splitter or antenna defective.

## Tag Detection

The antenna configuration described allows detection of a tag moving horizontally through the capture area of the gate. The tag orientation is non-critical. The tags are detected along a horizontal axis of motion in certain regions within the antennas. The area of detection depends on the tag orientation.

The size of the three-dimensional capture area of the antennas is shown below.



**Figure 1.24** Gate Distance (GD)



**Note:** The entire capture area of the antenna is larger than the three-dimensional area shown in the drawing. This means there are tag orientations in which the tag can be detected outside the capture area. If multiple gates are arranged with short distances between each other, these will mutually interfere with each other. The Readers for the respective gates must then be synchronized.

To achieve three-dimensional capture of the tag in the capture area drawn above, the following conditions must be met:

- The gate distance (GD) depends on the antenna configuration.
- The activation field strength of the tags should be less than or equal to 80 mA/m.

- The distance from tag to tag should be greater than 10 cm (3.9"). If the tag to tag distance is reduced, the gate distance GD must be reduced correspondingly. This applies in particular to distances under 5 cm (2").
- The maximum number of tags (serial number or data) depends on the traverse speed with which the tags are brought through the capture area of the gate. The number of tags may be increased in the gate distance GD is correspondingly reduced and the maximum speed adjusted accordingly.
- The antenna should be at least 50 cm (19.7") from metal parts.
- There should be no interference of the Reader from other electrical devices in the environment. The noise level difference should be less than 20 mV.
- The ID ISC.LR200-B Reader should be set to an RF power of 8 watts.
- When using ISO 15693 transponders, the Readers should be set ["Reader Configuration" on page 1-21.](#)

## Technical Data

Antenna, Master and Slave.

**Table 1.1** Mechanical Data

| Type                                                      | Description                                                    |
|-----------------------------------------------------------|----------------------------------------------------------------|
| Housing                                                   | UV stabilized ABS                                              |
| Dimensions (W x H x D)                                    | 760 x 1700 x 80 mm $\pm$ 5mm<br>(300" x 670" x 31.5") $\pm$ 2" |
| Weight                                                    |                                                                |
| • ID ISC.ANT1400/760-C                                    | approx. 35 kg (incl. Reader)                                   |
| • ID ISC.ANT1400/760-B                                    | approx. 33 kg                                                  |
| Enclosure Rating                                          | IP 54                                                          |
| Color                                                     |                                                                |
| • Antenna Body                                            | Metallic light gray                                            |
| • Upper and lower covers                                  | Slate gray similar to RAL7015                                  |
| Mounting                                                  |                                                                |
| • No. of attaching points                                 | 4                                                              |
| • Recommended anchors                                     | $\varnothing$ 8 mm                                             |
| • Recommended minimum load capacity of the floor fastener | 5000 N / anchor                                                |
| Maximum horizontal load on the top edge of the antenna    | 250 N*                                                         |

\* Persistent deformation after load release approx. 0.5 cm (.2").

**Table 1.2** Electrical Data\*\*\*\*

| Type                                   | Description                                                         |
|----------------------------------------|---------------------------------------------------------------------|
| Supply Voltage                         | 12 - 24 V DC to the entire gate<br>7 - 12 V DC to the antenna board |
| Current Draw                           | max. 150 mA (DC)                                                    |
| Maximum transmitting power per antenna | 10 W                                                                |



**Table 1.2** Electrical Data\*\*\*\*

| Type                                                    | Description                                   |
|---------------------------------------------------------|-----------------------------------------------|
| Permissible overall transmitting power per antenna gate |                                               |
| • EU-territory (per EN 300 330)                         | 10.0 W                                        |
| • USA (per. FCC Part 15)                                | 8.0 W                                         |
| • Operating frequency                                   | 13.56 MHz                                     |
| Ranges / pass-through width in gate Type -B and -C      |                                               |
| • One tag orientation                                   | approx. 115 cm** (45")                        |
| • All tag orientations                                  | approx. 95 cm*** (37")                        |
| Antenna connection                                      | 1 x SMA plug (50 $\Omega$ )                   |
| Antennac connector cable                                | RG58, 50 $\Omega$ , approx. 2 m long (6.6 ft) |

\*\* Qty. 2 ID ISC.ANT1400/760 antennas, antenna spacing (antenna center), same flow direction, Tag 46 mm x 75 mm (1.8" x 3"), sensitivity / minimum field strength Hmin=80 mA/m rms, transmitting power 8 W, tag orientation parallel to antenna for horizontal movement through the antenna.

\*\*\* Tag 46 mm x 75 mm (1.8" x 3"), sensitivity / minimum field strength Hmin=80 mA/m rms, transmitting power 8 W, aligned in all 3 dimensions for horizontal movement through the antenna.

\*\*\*\* Electrical data refer only to the antenna with tuning circuit.

## Appendix

The following section can be used for troubleshooting to ensure the correct parameters are set.

### Reader Configuration Settings

Verify the following settings are configured for the operating power, transponder and ISO Host Mode:

- 1 Connect a laptop to the reader on the gate:
  - a Disconnect RJ45 cable between the reader and serial-to-ethernet board at the serial port.
  - b Plug the Checkpoint RJ45-to-DB9 cable adapter into the serial-to-ethernet board.
  - c Connect a serial cable from the RJ45-to-DB9 cable adapter to the laptop's serial port.
- 2 Launch ISOStart Software.
- 3 Click **Configuration**.

- 4 Click **Reader Parameters > CFG3: RF Interface** and configure the following options:

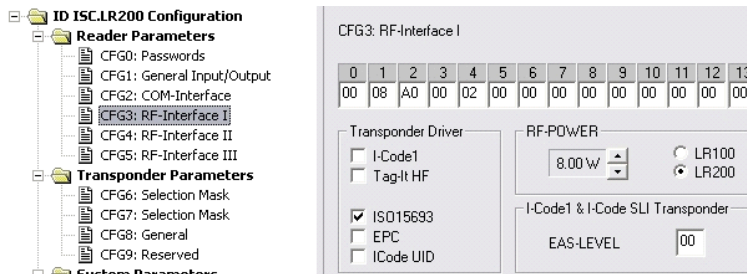


Figure 1.25 RF Interface Configuration

- In the Transponder-Drivers area, select **ISO 15693**.
- In the RF Power are, set the power to **8W**.

- 5 Click **Write** to save the configuration.

- 6 Click **Transponder Parameters > CFG8 General** and configure the following options:

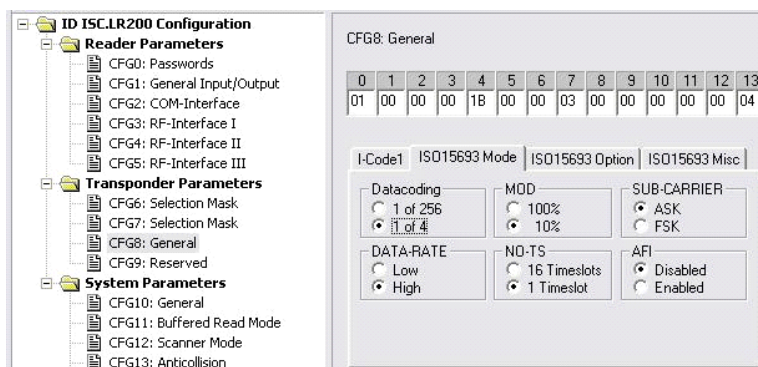


Figure 1.26 Transponder Configuration

- Datacoding - 1 of 4
- MOD - 10%
- SUB-CARRIER - ASK
- DATA-RATE - High
- NO-TS - 1 Timeslot
- AFI - Disabled



Note: National RF regulations may require different settings.

- 7 Click **Write** to save the configuration.

8 Click **System Parameters > CFG10 General** and configure the following options:

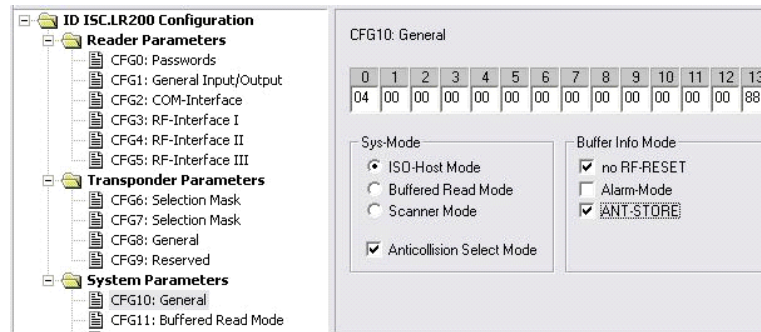


Figure 1.27 System Parameter CGF10 Configuration

- To tune, activate ISO-Host mode.

9 Click **Write** to save the configuration.

10 Click **System Parameters > CFG15 Antenna Multiplexing** and configure the following options:

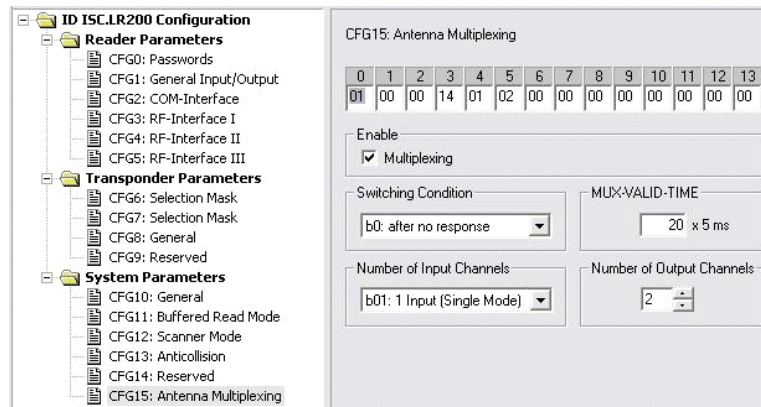


Figure 1.28 System Parameter CGF15 Configuration

11 Click to enable Multiplexing and configure the following parameters:

- Switching Condition - after no response
- Number of Input Channels - 1 Input (Single Mode)
- MUX-Valid Time - 20 x 5 ms
- Number of Output Channels => 2

12 Click **Write** to save the configuration.

## Notes