Orbit 8

Installation Guide

Johnson Controls

ShopperTrak

Contents

Introduction

This guide explains how to install the Orbit 8 traffic counting device. The following documents provide additional information:

- *Orbit 8 Field of View Chart, Reference Guide, 6200-0050-13*
- *Orbit 8 Installation, Quick Start Guide, 6200-0050-14*
- *Orbit 8 Provisioning, Setup Guide, 6200-0050-18*

For additional information, contact your regional support office.

About the Orbit 8

The Orbit 8 is a traffic counting device that monitors movement by tracking objects through an area, and identifying enter and exit paths for each shopper. The device mounts overhead with support for oblique views, and automatically connects to ShopperTrak servers for remote device management upon connecting to the public internet.

Installation requirements

This section contains information about preparing for the installation of the Orbit 8.

Note: Ensure that you have the necessary equipment and tools for the installation.

Tools and parts requirements

To install the Orbit 8, you require the following tools and parts:

- Drill
- Wire strippers
- Wire cutters
- Pliers
- Screwdrivers
- 8 foot or 2.4 meter ladder
- Tape measure
- Level
- Wire ties
- RJ45 crimp tool
- RJ45 male modular connectors
- Cable pair tester
- Power over Ethernet (PoE) tester or voltmeter

Cable specifications

To connect the Orbit 8 to the network switch, use a solid plenum rated Cat 5e or Cat 6 cable that adheres to Ethernet standards, 4 pairs, 24 AWG, 110 Ohms, CL2. The maximum cable length to a single Orbit 8 is 330 feet or 100 meters. You can extend the cable length if you use PoE repeaters.

Note: Ensure that you bring the Cat 5e or Cat 6 cable with you unless the project plan documents specify that the cable is preinstalled at the customer location. Use a Cat 5 cable only if it is pre-existing at the customer location.

Orbit 8 installation kit

The installation kit for the Orbit 8 contains the following items:

- Orbit 8 device
- Orbit 8 mounting bracket
- Calibration strip
- Three drywall anchors
- 10 feet or 3.05 meters of purple patch cable

Orbit 8 unit numbering

Each Orbit 8 has a unit number. If you are installing one Orbit 8 device at a store, its unit number is 01. If you are installing several Orbit 8 devices, the unit numbers are 01, 02, 03, and so on. Orbit 8 unit numbers are unique within each store. You can install only one Orbit 8 device with each unit number in a particular store.

Before you begin the installation, verify that the Orbit 8 unit numbers are correct for the installation site.

Installing the Orbit 8

This section outlines the following six procedures to complete when you are installing the Orbit 8:

- Procedure 1: Preparing the cables for the Orbit 8
- Procedure 2: Mounting the Orbit 8
- Procedure 3: Connecting the Orbit 8 to the ShopperTrak host
- Procedure 4: Testing the functionality of the Orbit 8
- Procedure 5: Preparing the Orbit 8 for configuration
- Procedure 6: Testing the accuracy of the Orbit 8

Procedure 1: Preparing the cables for the Orbit 8

Each Orbit 8 device requires a dedicated Cat 5e or Cat 6 cable that runs from the ShopperTrak host to the mounting locations.

Important: Do not use a Cat 5e or Cat 6 cable that is longer than 330 feet or 100 meters to connect an Orbit 8 to the ShopperTrak Host.

To prepare the cables for the Orbit 8, complete the following steps:

1. Route the cable for each Orbit 8 from the entrance or doorway to the network switch.
2. Terminate both ends of each Cat 5e or Cat 6 cable using male RJ45 modular connectors. Terminate following the T568-B standard, as **Figure 1** shows.
3. Test each network cable for proper termination and continuity.

Figure 1. T568-B cable termination

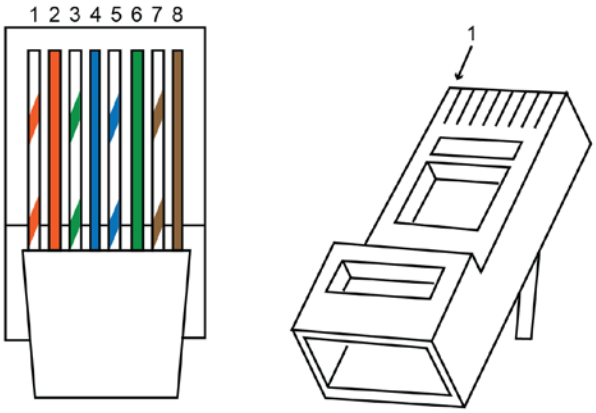

Table 1. T568-B cable termination

Pin	Color
1	White/Orange
2	Orange
3	White/Green
4	Blue
5	White/Blue
6	Green
7	White/Brown
8	Brown

Procedure 2: Mounting the Orbit 8

To mount the Orbit 8, complete the following procedures:

- Determining the appropriate Orbit 8 for the mounting location
- Positioning the Orbit 8
- Surface mounting the Orbit 8
- **Optional:** Oblique mounting the Orbit 8

Determining the appropriate Orbit 8 for the location

The type of Orbit 8 that you install in a location depends on the mounting height of the device and the entrance width. If the documents for the scope-of-work or project plan do not specify the type of Orbit 8 lens to install, use the *Orbit 8 Field of View Chart, Reference Guide, 6200-0050-13*, to determine the appropriate Orbit 8 for the entrance. If you are unsure of which Orbit 8 to install, contact your regional ShopperTrak office.

Positioning the Orbit 8

The following factors influence the placement of the Orbit 8:

- The entrance type.
- The number of Orbit 8 devices that you are installing.

To determine the appropriate position for mounting the Orbit 8, complete the following steps:

1. Identify if the entrance has no doors, doors that swing in, or doors that swing out. Referring to **Table 2**, determine how far from the door to mount the Orbit 8.

Table 2. Specifications for Orbit placement

Location	Orbit placement
No doors	0 in. to 24 in. (0 cm to 61 cm) in from the entrance
Doors that swing out	18 in. to 36 in. (46 cm to 91 cm) in from the doorjamb
Doors that swing in	18 in. to 36 in. (46 cm to 91 cm) in from the furthest in-swing of the doors

2. Measure the entrance, and determine the number of Orbit 8 devices necessary for the location. The entrance width coverage of the Orbit 8 depends on the mounting height. Refer to the *Orbit 8 Field of View Chart, Reference Guide, 6200-0050-13*, to determine the coverage capabilities.
3. To mount one Orbit 8, mark the mounting position in the center of the entrance.
4. **Optional:** To mount more than one Orbit 8, complete the following steps:
   a. Divide the width of the entrance by the number of Orbit 8 devices that you are installing at the entrance.
   b. Mark the position for each Orbit 8 so that there is an equal distance from the edges of the entrance to the device, and from the device to the center of the entrance, as **Figure 2** shows.
   c. Organize the Orbit 8 devices according to unit number, and position them so that unit number 01 is in the position furthest to the left, as you face the entrance from the inside looking out. Position unit number 02 to the right of unit number 01, and unit number 03 to the right of unit number 02. For more information on Orbit 8 unit numbers, see **Orbit 8 unit numbering**.

Figure 2. Placement and spacing of two Orbit 8 devices

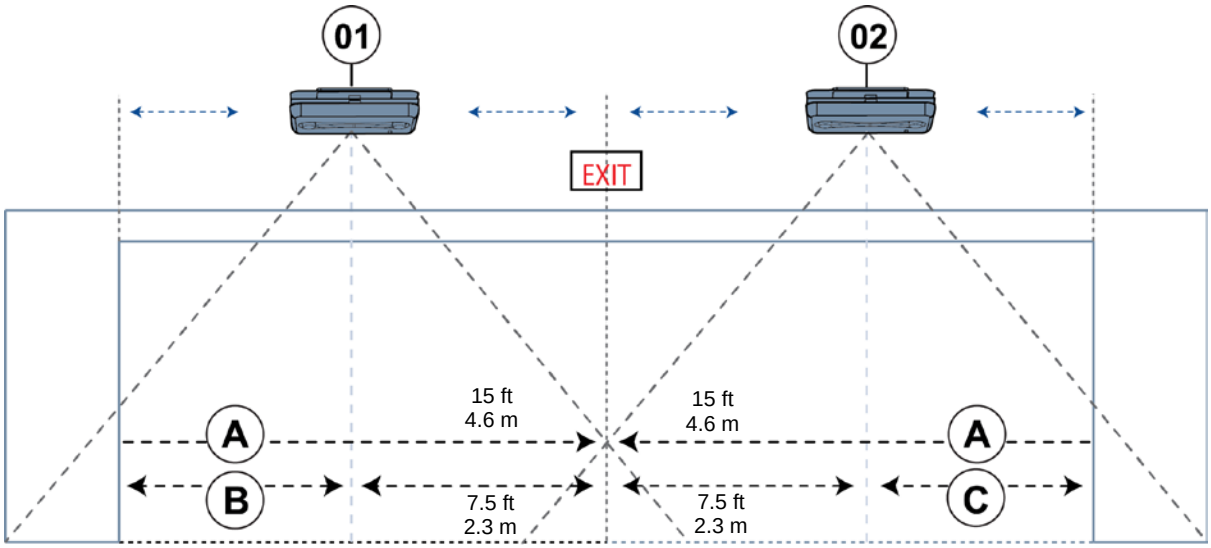

Table 3. Placement and spacing of two Orbit 8 devices

01	Orbit 8 unit number 01
02	Orbit 8 unit number 02
A	Line dividing entrance by the number of Orbit 8 devices
B	Distance from the left wall to the center of the Orbit 8
C	Distance from the right wall to the center of the Orbit 8

Figure 2 shows an example of the device placement and measurements for a 30 feet or 9.1 meter entrance that requires two Orbit 8 devices. The mounting height for the Orbit 8 devices is 14 feet or 4.3 meters.

Line A: Divides the 30-foot or 9.1-meter entrance into two areas of 15 feet or 4.6 meters.

Line B: Shows that you mount the center of Orbit unit number 01 at a distance of 7.5 feet or 2.3 meters from the left wall.

Line C: Shows that you mount the center of Orbit unit number 02 at a distance of 7.5 feet or 2.3 meters from the right wall.

There is a gap of 15 feet or 4.6 meters between the centers of Orbit unit number 01 and Orbit unit number 02. The distances from the wall to the Orbit 8 devices, and from the Orbit 8 devices to the center of the entrance, are all equal.

Surface mounting the Orbit 8

Important: If you do not have pre-provisioned Orbit 8 devices, provision the devices prior to mounting. For information on provisioning an Orbit 8, refer to *Orbit 8 Provisioning, Setup Guide, 6200-0050-18*.

To surface mount the Orbit 8 to the ceiling using the Orbit 8 mounting bracket, complete the following steps:

1. Determine the appropriate position for the Orbit 8 devices. Follow the guidelines in **Positioning the Orbit 8**.
2. Position the mounting bracket so that the hooks point into the store, as **Figure 3** shows.

Figure 3. Installing the Orbit 8 mounting bracket

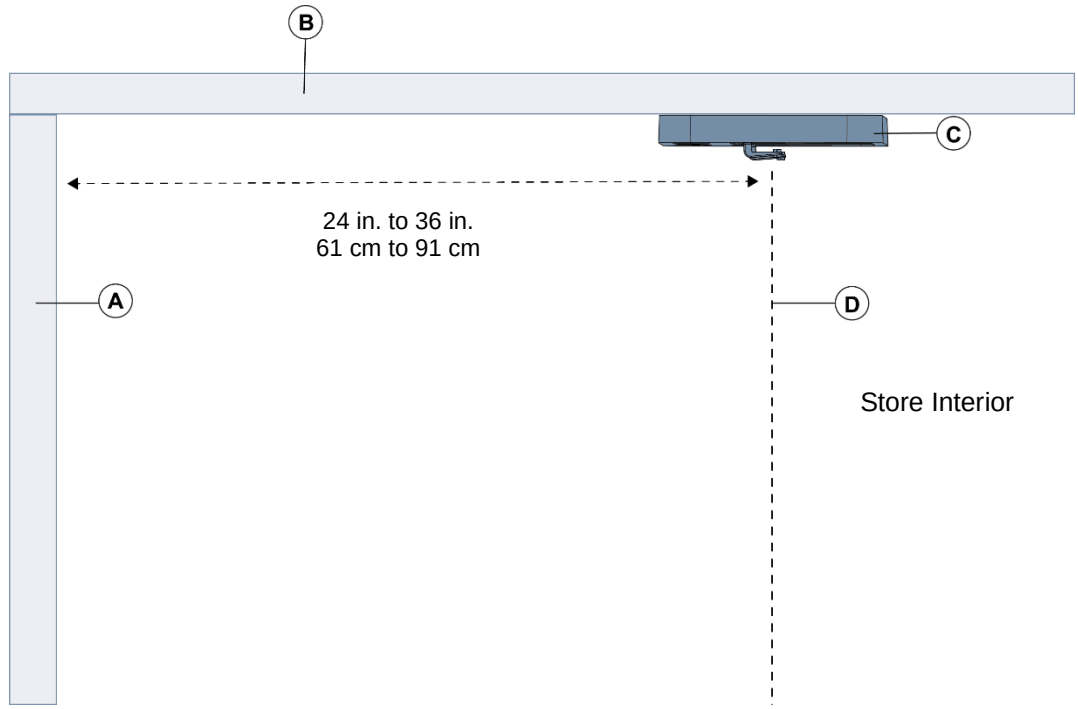

Table 4. Installing the Orbit 8 mounting bracket

A	Entrance or doorway	**B**	Ceiling
C	Orbit 8 mounting bracket	**D**	System center line

3. Use the appropriate tools and parts to secure the mounting bracket for each device to the ceiling.
4. Route the Cat 5e or Cat 6 cable through the mounting bracket, as **Figure 4** shows.
5. Connect the Cat 5e or Cat 6 cable to the Orbit 8, as **Figure 5** shows.
6. Mount each Orbit 8 onto the appropriate mounting bracket, by completing the following steps:
   a. Align the two holes in the Orbit 8 with the two hooks on the mounting bracket, as **Figure 6** shows.
   b. Slide the Orbit 8 on to the mounting bracket until the hooks click into place.
7. Ensure that each mounted Orbit 8 is stationary, and that wind, a door closing, or any other factor does not cause the Orbit 8 to move or vibrate.
8. **Important:** Ensure that you remove the lens caps from the Orbit 8 device.

Figure 4. Routing the Cat 5e or Cat 6 cable through the mounting bracket

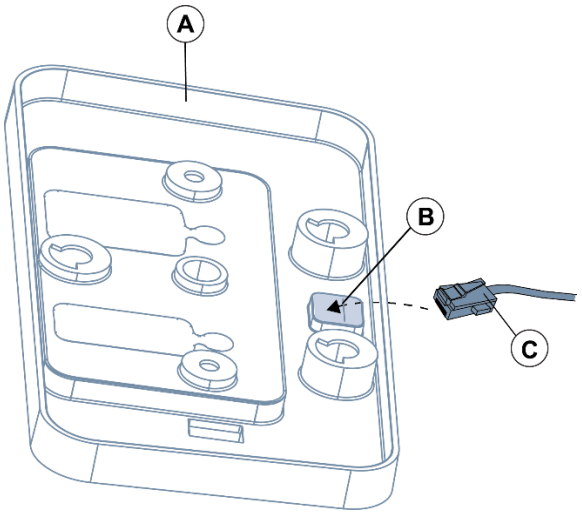

Table 5. Routing the Cat 5e or Cat 6 cable through the mounting bracket

A	Orbit 8 mounting bracket
B	Hole for routing the cable
C	Cat 5e or Cat 6 cable

Figure 5. Connecting the Cat 5e or Cat 6 cable to the Orbit 8

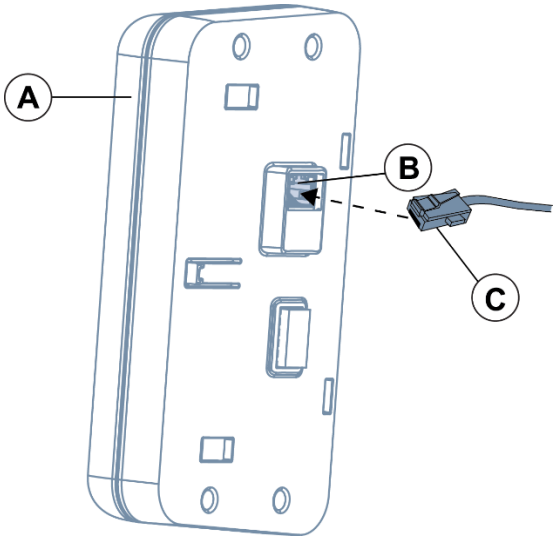

Table 6. Connecting the Cat 5e or Cat 6 cable to the Orbit 8

A	Orbit 8
B	Ethernet port
C	Cat 5e or Cat 6 cable

Figure 6. Mounting the Orbit 8 to the bracket

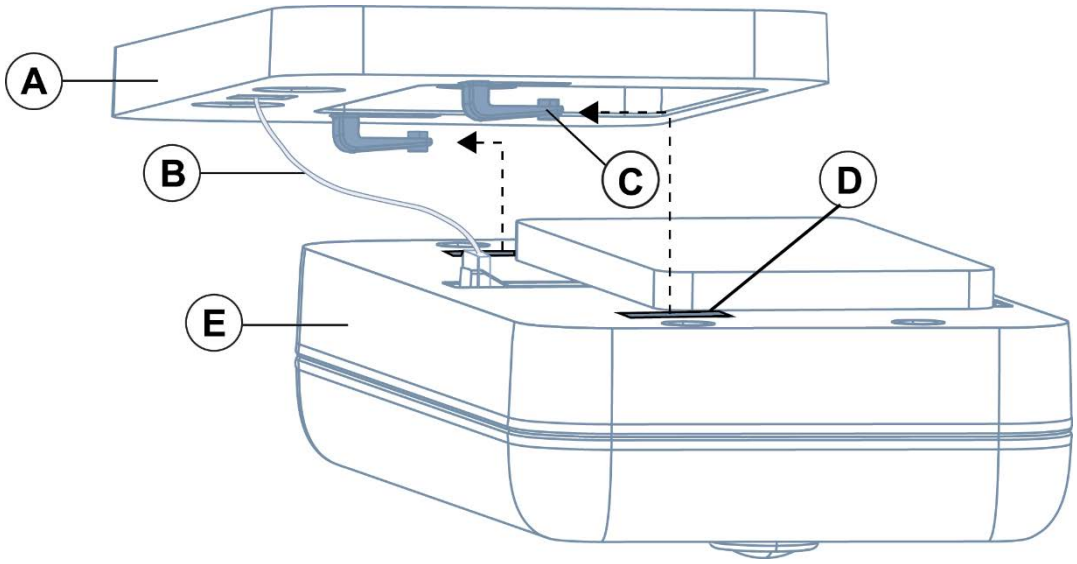

Table 7. Mounting the Orbit 8 to the bracket

A	Mounting bracket
B	Cat 5e or Cat 6 cable
C	Hook on the mounting bracket
D	Hole in the Orbit 8 device
E	Orbit 8 device

Optional: Oblique mounting the Orbit 8

Important: Oblique mount an Orbit 8 only if ShopperTrak directs you to do so. If it is necessary to oblique mount an Orbit 8, ShopperTrak provides the technician with specific instructions.

Procedure 3: Connecting the Orbit 8 to the ShopperTrak host

You can connect the Orbit 8 to the ShopperTrak host using the following options:

- A client-installed PoE switch
- A PoE switch that ShopperTrak provides
- A non-PoE switch

Connecting to a client-installed PoE switch

To connect the Orbit 8 to a client-installed PoE switch, complete the following step:

- Refer to the Installation scope of work document for port-specific information, and connect the Cat 5e or Cat 6 cable from each Orbit 8 to the designated ports on the client PoE switch.

Connecting to a PoE switch that ShopperTrak provides

To connect an Orbit 8 to a POE switch that ShopperTrak provides, complete the following steps:

1. Follow the instructions that the ShopperTrak Project Manager provides to install the ShopperTrak PoE switch.
2. Refer to the Installation scope of work document for port-specific information. Start with the lowest Orbit 8 unit number, and in ascending order, connect the Cat 5e or Cat 6 cable from each Orbit 8 to the open ports on the PoE switch.

Connecting to a non-PoE switch

To connect an Orbit 8 to a non-POE switch, complete the following steps:

1. Connect the Cat 5e or Cat 6 cable from each Orbit 8 to the PoE power injector.
2. Refer to the Installation scope of work document for port-specific information, and connect the Ethernet port of each PoE power injector to the designated port or ports on the client network switch.

Procedure 4: Testing the functionality of the Orbit 8

Green, amber, and red LED patterns indicate the status of the Orbit 8.

Green light patterns: Indicate that the device is functioning properly.
Amber light patterns: Indicate that the device is processing a task, and to wait for the task to finish.
Red light patterns: Indicate that there is a problem that requires troubleshooting.

Table 8 lists key troubleshooting terms, and their definition or acronym. **Table 9**, **Table 10**, and **Table 11** list the status indicated by each LED pattern, and the actions that the technician or the customer's IT department must take in response to that status. For further assistance, contact your regional Operational Services office.

To test the functionality of an Orbit 8, complete the following steps:

1. Identify the LED pattern on the Orbit 8.
2. Consult the appropriate LED pattern in **Table 9**, **Table 10**, or **Table 11**. Follow the action indicated for the LED status.

Table 8. Key troubleshooting terms

Term	Definition or acronym
Lead Orbit 8 device	The single Orbit 8 device at an installation site that is responsible for initiating and receiving data communications to and from the ShopperTrak network for all devices at the site.
Non-lead Orbit 8 device	Any Orbit 8 device at a given site that is not the lead device. Non-lead devices transmit traffic data to the ShopperTrak network through the lead device.
Domain name system	DNS
Dynamic host configuration protocol	DHCP
Secure sockets layer	SSL
User datagram protocol	UDP

Table 9. Green LED pattern

LED pattern	Status	Action
Slow blink	Connectivity is successful.	The installation is successful. Prepare the Orbit 8 for configuration.
Solid	All systems are functioning correctly.	No Action. The installation and configuration successfully completed.

Table 10. Amber LED sequence

LED pattern	Status	Action
Slow blink	The software is upgrading.	If this lasts longer than 1 minute, contact your regional Operational Services office.
Solid	The device is starting up.	If starting up takes longer than 1 minute, restart the device. After the second time that you restart the device, if starting up takes longer than 1 minute, contact your regional Operational Services office.

For Red LED patterns, the number of blinks of the red light indicates the specific problem. A two second solid green light separates each full sequence of an LED pattern. The LED pattern repeats until you resolve the problem.

Table 11. Red LED pattern

LED pattern	Status	Action	UDP/TCP and port
Solid	Failure to start the device.	After one attempt to restart the device, replace the Orbit 8 device.	
1 blink	Failure of the lead Orbit 8 device to obtain the IP address through DHCP.	Verify with the customer's IT department that a DHCP server is running, and that an IP address is available within the defined DHCP pool.	UDP/TCP 67 and 68
2 blinks	Failure to get the DNS of HTTP time.	Verify that DNS resolution of sitemanager.shoppertrak.com is possible through the customer's IT.	UDP/TCP 53
3 blinks	SSL certificate error.	Verify with the customer's IT department that access is available to the following sites: sitemanager.shoppertrak.com, sm1.shoppertrak.com, sm2.shoppertrak.com, de1.shoppertrak.com, de2.shoppertrak.com, ocsp.starfieldtech.com, or ocsp.godaddy.com	TCP 443 or 80
4 blinks	Failure to connect to SiteManager on port 443.	Verify with the customer's IT department that access is available to the following sites: sitemanager.shoppertrak.com, sm1.shoppertrak.com, sm2.shoppertrak.com, de1.shoppertrak.com, de2.shoppertrak.com, ocsp.godaddy.com, and ocsp.starfieldtech.com.	TCP 443
5 blinks	Failure to communicate with HTTP time.	Verify with the customer's IT department that access is available to the following sites: sitemanager.shoppertrak.com, sm1.shoppertrak.com, sm2.shoppertrak.com, de1.shoppertrak.com, de2.shoppertrak.com, ocsp.godaddy.com, and ocsp.starfieldtech.com.	TCP 80
6 blinks	Failure of a non-lead Orbit 8 device to obtain the IP address through DHCP from the lead Orbit 8 device.	Verify that the non-lead Orbit 8 devices are on the same network (VLAN) as the lead Orbit 8 device.	UDP/TCP 67 and 68
7 blinks	Failure to get DNS of the SiteManager	Verify with the customer's IT department that DNS resolution of sitemanager.shoppertrak.com, sm1.shoppertrak.com, and sm2.shoppertrak.com is possible.	UDP/TCP 53
8 blinks	Failure to get DNS for GoDaddy.	Verify with the customer's IT department that DNS resolution of ocsp.shoppertrak.com and ocsp.starfieldtech.com is possible.	UDP/TCP 53

Procedure 5: Preparing the Orbit 8 for configuration

After you verify successful connectivity for each Orbit 8, prepare the location for the remote configuration of the devices.

Important: Ensure that you removed the lens caps from the Orbit 8.

To prepare the Orbit 8 for configuration, complete the following steps:

1. Place the black and white calibration strip directly under each Orbit 8, parallel with the entryway, as **Figure 7** shows.
2. **Optional:** In locations where you are installing more than one Orbit 8, place an additional calibration strip in a vertical position at the center point between the Orbit 8 that is being configured and the Orbit 8 to the right, as **Figure 8** shows.
3. Ensure that the calibration strip is fully stretched out, and flat on the floor.
4. Contact your regional ShopperTrak office to begin the configuration of the Orbit 8 devices.

Figure 7. Placing the calibration strip

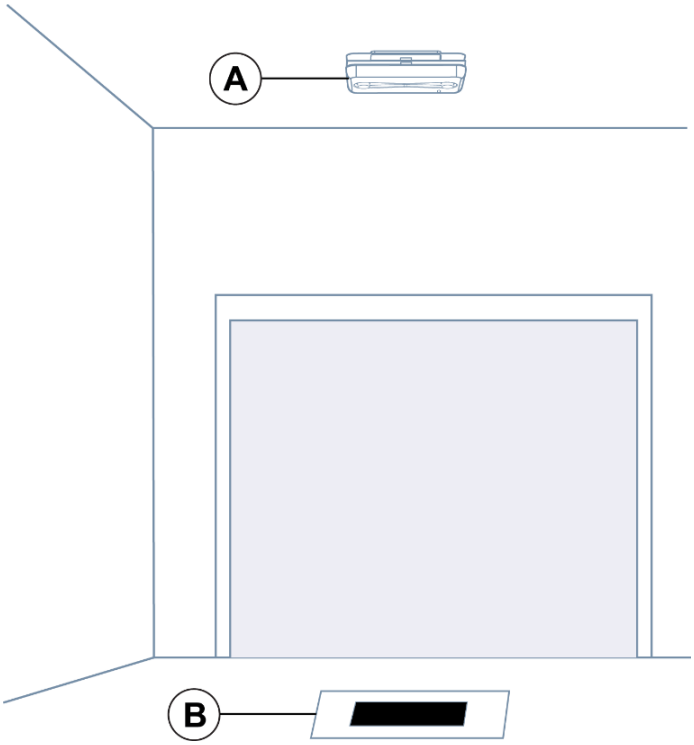

Table 12. Placing the calibration strip

A	Orbit 8	**B**	Calibration Strip

Figure 8. Placing the vertical calibration strip

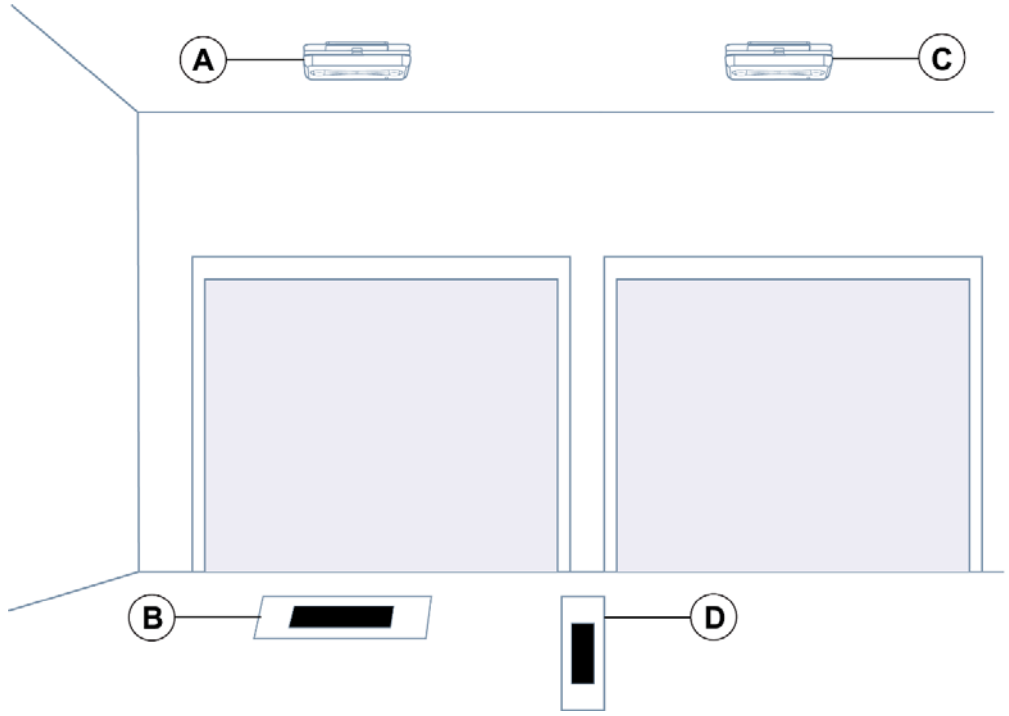

Table 13. Placing the vertical calibration strip

A	Orbit 8 unit 01	**B**	Horizontal calibration strip
C	Orbit 8 unit 02	**D**	Vertical calibration strip

Procedure 6: Testing the accuracy of the Orbit 8

After the configuration of the Orbit 8 devices, ShopperTrak conducts an accuracy test for each Orbit 8 in the location. A member of the ShopperTrak team contacts you to conduct the accuracy test.

To complete the accuracy test, you walk completely in and out of the entrance 10 to 20 times, following various patterns that you can see in **Figure 9** to **Figure 12**. When completing the accuracy test, do not always walk directly through the center of the entrance. A second person is necessary to complete some of the patterns.

Pattern 1

Walk completely in and out of the entrance.

Figure 9. Valid entrance and exit with one person

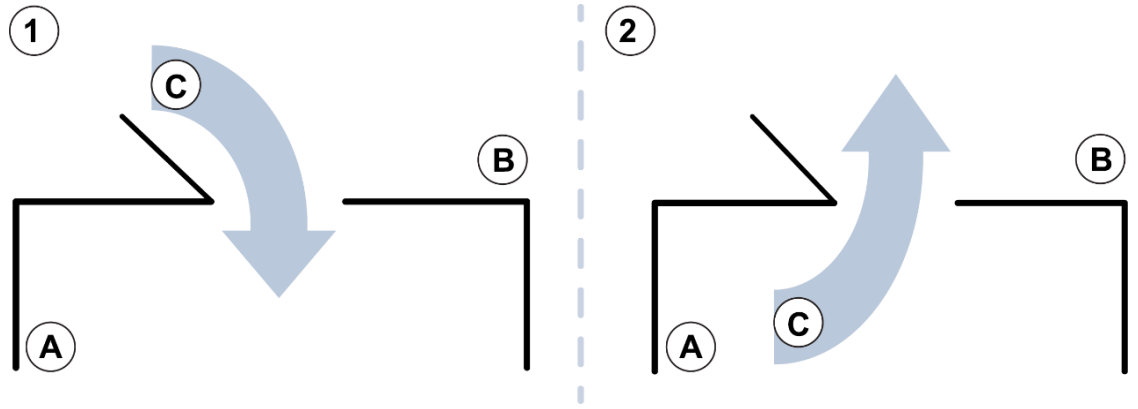

Table 14. Valid entrance and exit with one person

1	Valid entrance
2	Valid exit
A	Store interior
B	Store exterior
C	Person 1 pathway

Pattern 2

Walk to the entrance as if you are going to exit, but at the threshold turn around, and walk back in to the store.

Figure 10. Invalid exit with one person

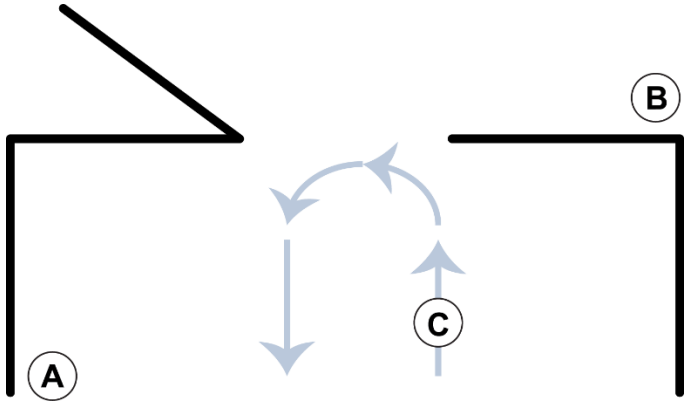

Table 15. Invalid exit with one person

A	Store interior
B	Store exterior
C	Person 1 pathway

Pattern 3

With a gap of approximately 16 inches or 41 centimeters between you and a store employee, walk side-by-side in and out of the entrance.

Figure 11. Side-by-side entrance and exit with two people

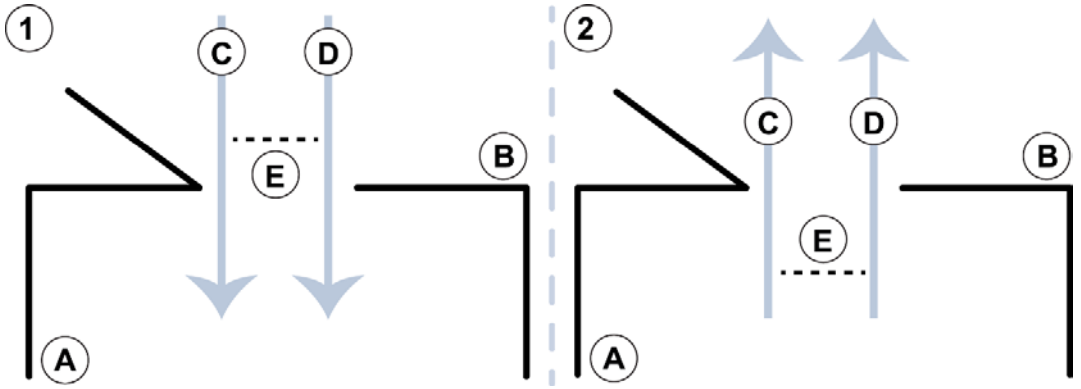

Table 16.Side-by-side entrance and exit with two people

1	Valid side-by-side entrance
2	Valid side-by-side exit
A	Store interior
B	Store exterior
C	Person 1 pathway
D	Person 2 pathway
E	16 in. or 41 cm gap

Pattern 4

With a gap of approximately 16 inches or 41 centimeters between you and a store employee, walk in single file in and out of the entrance.

Figure 12. Single file entrance and exit with two people

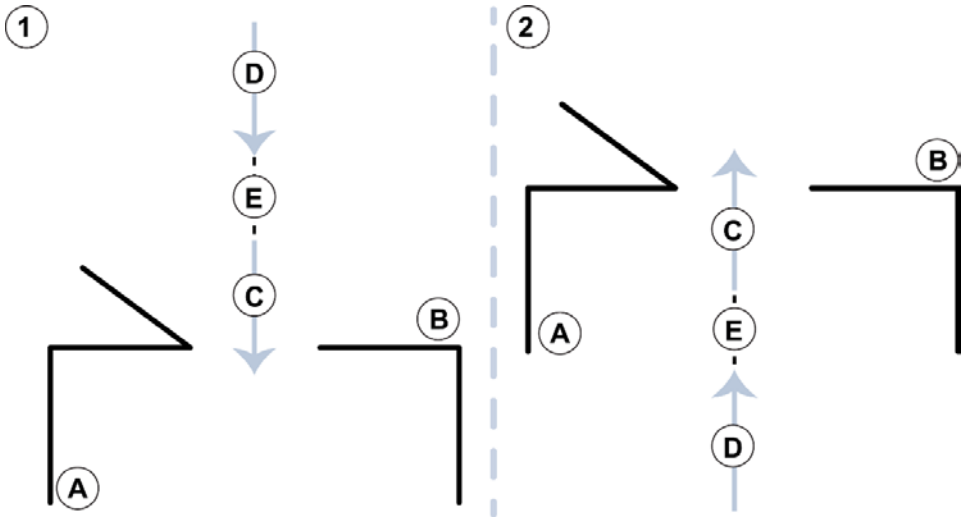

Table 17. Single file entrance and exit with two people

1	Valid single file entrance
2	Valid single file exit
A	Store interior
B	Store exterior
C	Person 1 pathway
D	Person 2 pathway
E	16 in. or 41 cm gap

Appendix A: Technical specifications

Physical

Table 18. Physical

Dimensions	3.5 in. x 6.7 in. x 2 in. (8.9 cm x 17 cm x 5 cm)
Weight	11.2 oz (318 g)
Material	High impact plastic
Color	White

Environmental

Table 19. Environmental

Relative humidity	5% to 90% non-condensing
Operating temperature	0ºC to 50ºC (32ºF to 122ºF)
Scene mean ambient lighting	100 lx to 150,000 lx

Electrical

Table 20. Communications

Cabling	PoE IEEE 802.3af
Ethernet	10/100 Base T

Table 21. Auxiliary communications

Auxiliary port	USB 2.0, for extensibility

Important: The USB 2.0 port is currently inactive on the Orbit 8 device. Do not connect, or plug any device into the USB 2.0 port.

Table 22. Cable

Cabling	Cat 5, Cat 5e, or Cat 6
Cabling length	Up to 330 ft (100 m) to a single device, extended with PoE repeaters

Table 23. Power

Power cable	48 V PoE 802.3af
Power consumption	3.75 W typical

Appendix B: Declarations

Regulatory Model: DDORB1801

Regulatory information

EMC	47 CFR, Part 15 ICES-003 EN 55032 EN 55024
Safety	UL/EN 60950-1 CSA C22.2.60950-1 EN 62368-1

FCC COMPLIANCE: This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual. Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area. This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

Canada ICES-003 (A) / NMB-003 (A)

CE

EQUIPMENT MODIFICATION CAUTION: Equipment changes or modification not expressly approved by ShopperTrak, RCT Corporation, the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

See **Introduction** on page 3.

Nondisclosure statement

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- Store personnel
- Other ShopperTrak or client vendors
- Present or future ShopperTrak competitors

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Other declarations

Installation checklist

To complete the installation, ensure that you perform each of the following steps:

Pre-installation

□ Verify that you have the necessary tools and equipment for the installation.

Installation

□ Prepare the cable for the Orbit 8.

□ Determine the appropriate Orbit 8 for the location.

□ Determine the appropriate position for each Orbit 8.

□ Surface mount the Orbit 8.

□ Remove the lens caps from the Orbit 8.

□ Connect each Orbit 8 device to the network switch.

Post-installation

□ Ensure that the LED on each Orbit 8 device displays a solid green color.

□ Place the appropriate number of calibration strips in the entrance for the number of Orbit 8 devices.

□ Perform the walk through patterns for each Orbit 8 device.