


10071753		Title: USER'S MANUAL NP10, NP20, NG10 (ALL NEO SYSTEM MODELS)					
REVISIONS				REVISIONS			
REV	DESCRIPTION	DATE	ENGINEER	REV	DESCRIPTION	DATE	APPROVED
00	CR2660AB	05/30/18	S. SINGH				
01	ECN8210	08/20/20	S. SINGH				
02	ECN8212	10/06/20	S. SINGH				
		DOC SPEC	DATES				
		DWN					
		CHK					
		ENG					
Used On		APPD		Size US Letter	10071753		
				Scale: N/A	© Checkpoint Systems, Inc. 2020 Page 1 of 28		



## Important Information to our Users in North America

### FCC Regulatory Compliance Statement

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

NOTE: This equipment has been tested and found compliant within 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 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.

**WARNING:** Changes or modifications to Checkpoint's EAS or 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.

**WARNING:** The installation location of the UHF antenna radiating structure must provide a minimum of 20cm [8in] separation between the antenna and the human body. Please note that this compliance requirement applies to select system models (specifically, any model that features RFID EPC reading). There is no such requirement for systems (Pedestals) which are not equipped with an on-board UHF RFID Reader/Antenna system.

### Industry Canada Regulatory Compliance Statement

This device complies with the Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le fonctionnement de l'appareil est soumis aux deux conditions suivantes:

- (1) Cet appareil ne doit pas perturber les communications radio, et
- (2) cet appareil doit supporter toute perturbation, y compris les perturbations qui pourraient provoquer son dysfonctionnement.

### Equipment Safety Compliance Statement

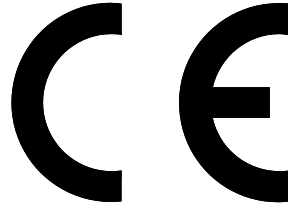
Checkpoint's Electronic Article Surveillance (EAS) products have been designed for safeness during normal use and, where applicable have been certified, listed, or recognized in accordance with one or more of the following safety standards; UL 60950-1, CSA C22.2 No. 60950-1-07. Additional approvals may be pending.

**WARNING:** Changes or modifications to Checkpoint's EAS 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.

## Important Information to our Users in Europe

### CE Regulatory Compliance Statement

Where applicable, Checkpoint Systems, Inc. offers certain Electronic Article Surveillance (EAS) products that have CE Declarations of Conformity according to R&TTE Directive 99/5/EC, EMC Directive 2004/108/EC, and Low Voltage Directive 2006/95/EC.



System Electromagnetic Compatibility (EMC) has been tested and notified through Spectrum Management Authorities if necessary, using accredited laboratories, whereby, conformity is declared by voluntarily accepted European Telecommunications Standards Institute (ETSI) standards EN 301489-3 and EN 302208 and/or EN 300330, as applicable.

NOTE: Certain Electronic Article Surveillance (EAS) equipment have been tested and found to conform to the CE emission and immunity requirement in Europe. 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. Under unusual circumstances, interference from external sources may degrade the system performance, which may include intermittent decreases in detection and/or intermittent increases in alarm activity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment experiences frequent interference from external sources or does cause harmful interference to radio communications reception, which can be determined by turning the equipment off and on, please contact a Checkpoint Systems representative for further assistance.

### RoHS Compliance Statement

The RoHS Directive stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment." A RoHS compliant product means that electrical and electronic equipment cannot contain more than maximum permitted levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE). Checkpoint is in compliance with the RoHS directive.

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The Waste Electrical and Electronic Equipment Directive (WEEE) applies to companies that manufacture, sell, distribute, or treat electrical and electronic equipment in the European Union. There are a number of obligations imposed on Checkpoint as a supplier of electrical and electronic equipment. Checkpoint's compliance approach for each of these obligations is provided below.

## WEEE Marking

All products that are subject to the WEEE Directive supplied by Checkpoint are compliant with the WEEE marking requirements. Such products are marked with the "crossed out wheelie bin" WEEE symbol shown below in accordance with European Standard EN 50419.

## Information for Users

According to the requirements of European Union member state WEEE legislation, the following user information is provided in English for all Checkpoint supplied products subject to the WEEE directive.



This symbol on the product or on its packaging indicates that the product must not be disposed of with normal waste. Instead, it is your responsibility to dispose of your waste equipment by arranging to return it to a designated collection point for the recycling of waste electrical and electronic equipment. By separating and recycling your waste equipment at the time of disposal you will help to conserve natural resources and ensure that the equipment is recycled in a manner that protects human health and the environment. For information about how to recycle your Checkpoint supplied waste equipment, please contact the Checkpoint Systems, Inc. Field Service office in your region. Customers can obtain this information from their system User Guide.

## REACH Compliance Statement

The European REACH Regulation 1907/2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH), Annex XVII entered into force in June 2009, and affects all companies producing, importing, using, or placing products on the European market. The aim of the REACH regulation is to ensure a high level of protection of human health and the environment from chemical substances.

Checkpoint Systems' substances management system follows and complies with the current revision of the REACH Regulation on the substances as identified by ECHA (European Chemical Agency).

Checkpoint Systems' products are considered articles as defined in REACH Article 3 (3).

These products/articles under normal and reasonable conditions of use do not have intended release of substances. Therefore the requirement in REACH Article 7 (1) (b) for registration of substances contained in these products/articles does not apply.

Checkpoint Systems' products/articles do not contain Substances of Very High Concern or if there are SVHC in the product/article, the content is less than the 0.1% (wt/wt) as defined by REACH Article 57, Annex XIV, Directive 67/548/EEC. Therefore the requirement in REACH Article 7 (2) to notify ECHA if a product/article contains more than 0.1% wt/wt of an SVHC and tonnage exceeding 1 tonne per importer per year is not applicable.

Checkpoint Systems' European operations do not manufacture or import chemicals, therefore Checkpoint Systems has no obligation to register substances.

## Packaging Compliance Statement

No CFCs (chlorofluorocarbons), HCFCs (hydrofluorocarbons) or other ozone depleting substances are used in packaging material. Chromium, lead, mercury, or cadmium are not intentionally added to packaging materials and are not present in a cumulative concentration greater than 100 ppm as incidental impurities. No halogenated plastics or polymers are used for packaging material. Checkpoint complies with the EU Directive 94/62/E.



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## 1.0 INTRODUCTION

The released NEO System Models include NP10, NP20 and NG10. There are various hardware options, all of which are described in this document. The part numbers of each specific model are listed following the photos.

### 1.1 System Identification



Figure 1: NP10



Figure 2: NP20



Figure 3: NG10

### 1.2 System Level Checkpoint Part Numbers (SKUs)

Checkpoint Part Number (CKP P/N) can be considered the SKU of the Finished Good. In SAP you will find these "System SKU" part numbers listed as the Material Item #. Check SAP to determine which NEO Antennas are currently stocked in your local warehouse:

Table 1-1: Base Configuration or "RF Only" Models

Model Name	System SKU	Omnify Description
NP10 2.7M	10079290	*NP10 PRI WHT
	10063949	*NP10 PRI GREY RAL 7024
NP20 2.4M	10046573	*NP20 PRI WHT
	10089329	*NP20 PRI GREY RAL 7024



Model Name	System SKU	Omnify Description
NG10 2.7M	10034928	*NG10 PSB WHT
	10034982	*NG10 PSB GRY RAL 7024
	10034929	*NG10 PSB WHT W/COLES LOGO

Table 1-2: RF/HUB Models

Model Name	System SKU	Omnify Description
NP10 2.7M with Hub Board	10144163	*NEO NP10 PSB RF/HUB WHT
	10144162	*NEO NP10 PSB RF/HUB GREY RAL7024
NP20 2.4M with Hub Board	10144110	*NEO NP20 PSB RF/HUB WHT
	10144161	*NEO NP20 PSB RF/HUB GREY RAL7024
NG10 2.7M with Hub Board	10034851	*NG10 PSB/HUB WHT
	10034983	*NG10 PSB/HUB GRY RAL 7024
	10034663	*NG10 PSB/HUB WHT W/COLES LOGO

Table 1-3: PAB/SAB Models

Model Name	System SKU	Omnify Description
NP10 PAB Models	10035203	*NP10 PAB WHT
	10035204	*NP10 PAB GREY
NP10 PAB W/HUB Models	10035205	*NP10 PAB W/HUB WHT
	10035206	*NP10 PAB W/HUB GREY
NP10 SAB Models	10035207	*NP10 SAB WHT
	10035209	*NP10 SAB GREY
NP20 PAB Models	10035210	*NP20 PAB WHT
	10035212	*NP20 PAB GREY
NP20 PAB W/HUB Models	10035213	*NP20 PAB W/HUB WHT
	10035214	*NP20 PAB W/HUB GREY
NP20 SAB Models	10035215	*NP20 SAB WHT
	10035216	*NP20 SAB GREY
NG10 PAB Models	10035217	*NG10 PAB WHT
	10035218	*NG10 PAB GREY
NG10 PAB W/HUB Models	10035219	*NG10 PAB W/HUB WHT
	10035220	*NG10 PAB W/HUB GREY
NG10 SAB Models	10035221	*NG10 SAB WHT
	10035222	*NG10 SAB GREY

Note: RFID is not an option for PAB/SAB.



Table 1-4: RFID-Enabled NEO Models

Model Name	System SKU	Omnify Description
NP10 RF/RFID with FCC Tuned Patch	10068754	*NP10 RF/RFID FCC WHT
	10034341	*NP10 RF/RFID FCC GREY
NP10 RF/RFID with ETSI Tuned Patch	10034339	*NP10 RF/RFID CE WHT
	10034340	*NP10 RF/RFID CE GREY
NP20 RF/RFID with FCC Tuned Patch	10073950	*NP20 RF/RFID FCC WHT
	10034345	*NP20 RF/RFID FCC GREY
NP20 RF/RFID with ETSI Tuned Patch	10034342	*NP20 RF/RFID CE WHT
	10034343	*NP20 RF/RFID CE GREY

### 1.2.1 Obsolete System Models

No longer manufactured Antennas are listed in Table 1-4 below. See Obsolete [O] in Omnify Description.

Table 1-5: Obsolete (Phase 1) Antennas

Model Name	System SKU	Description
NP10 2.2M	10039741	[O] *NP10 PRI 2.2M WHT
	10054864	[O] *NP10 PRI 2.2M GREY RAL 7024
NP20 2.0M	10066694	[O] *NP20 PRI 2.0M WHT
	10048562	[O] *NP20 PRI 2.0M GREY RAL 7024

## 1.3 Using this Guide

You can review NEO features and learn about the hardware which provides functionality in this document. For Product Specifications, please see Section 5.0.

This document does not provide any instructions for installation or site planning. Please refer to the other supporting documents and training materials which are available online. Section 1.3.1 below lists the Document Part Numbers (CKP P/N) and their latest revisions (at the time of this publication).

### 1.3.1 Reference Documents (See Also):

For NP10/20 "Quick Start" help, refer to CKP P/N 10051515 Rev 02 or later.

For NG10 "Quick Start" help, refer to CKP P/N 10035026 Rev 00 or later.

For long form Installation Manual help for any system, refer to CKP P/N 10078945 Rev 00 or later.

## 2.0 GENERAL DESCRIPTION

### 2.1 EAS Features

#### 2.1.1 Radio Frequency Band

##### **Detection Limited to 8.2 MHz**

- No “Application Based Detection Mode” (7.6, 9.0 detection).
- NEO is tuned to achieve detection of HF targets at 8.2MHz  $\pm$ 5% radio frequency.
- Tags tuned to other frequencies may or may not produce the alarm; expect a noticeable drop in performance for any non 8.2 tag.
- By product management and design team choice, working from voice of customer, the feature was removed intentionally. Now the only supported band is 8.2 - different from Evolve/Liberty Systems. Currently for NEO Antennas, please consider alternative tuning & dual frequency no longer supported.

#### 2.1.2 Electronic Mode of Operation

Detector mode was introduced first. PAB/SAB mode is now available. The two available Electronic Modes of Operation are described below. Both modes are considered Pulse Listen technology, but mode selection will cause TX/RX differences described in more detail below.

Any PRI model antenna should run in "Detector" mode, whereas a PAB should run in "PAB/SAB."

The NEO System Controller and EAS Sensor require minimum Software, Firmware and FPGA version to support PAB/SAB. New supported FPGA version(s) will also support the alternate mode which is Detector.

Please note a physical PAB is technically allowed to operate in "Detector" mode (and a PRI model could run in PAB/SAB), and when the result is a System running in the non-standard mode—whether the FS Technician does so intentionally or unknowingly—this does NOT cause a regulatory compliance issue, but it is expected that system performance would suffer. Therefore, always install the recommended FPGA (Software/Firmware package) and set up your pedestals in the mode which supports your hardware use case.



#### 2.1.3 Configurable alarm sound/light color

Using DMS (see [section 6.0](#)), the Field Service Technician is able to choose from a set of pre-loaded Sound Files (.mp3 format) or otherwise import a file, a replacement sound requested by the customer, then assign it as the default EAS Alarm sound. The color is also selectable from a range of visual colors and patterns.





### 3.0 QUICK CONNECT INTERFACES

All NEO Family Antennas are equipped with a technology called "Quick Base" and required Quick Connect Cables. The minimum three (3) cables are DC Power Input, General Purpose Outputs (GPO) (Relay contact pairs) and General Purpose Inputs (Digital Inputs) (GPI).

- Base configuration has 3 cables total, and the "with Hub" antennas have 4 cables.
- The number of cables needed will vary per system, per site.

Minimum connections:	Maximum connections:
<p>1. +24V DC Power</p>  <p>Figure 4: Quick Connect</p>	<p>1. +24V DC Power 2. GPO- J6 3. GPI- J8 4. Network</p> <p>Figure 5: Max. cables</p>  <p>Network is available on the "with Hub" models only. There is no way to repurpose the GPI or GPO cable to provide this feature, because other hardware is missing.</p>

- Mounting occurs immediately after securing cable connections. Critical details are below:

 <p>Figure 6: Pedestal Mounting</p>	<ul style="list-style-type: none"> <li>• One of these is required:</li> </ul>  <p>2.5mm T-Wrench or 2.5mm Allen key</p> <ul style="list-style-type: none"> <li>• Each Extension Cable gets aligned to the appropriate permanent-installation cable. Three (3) RJ-45 connectors are provided in the installation kit, for building cables.</li> <li>• Finally, the Field Service Technician / Installer will bring the antenna upright (see Figure 6), and then tighten screws.</li> </ul>
	 

## 4.0 SYSTEM HARDWARE

### 4.1 System Controller

Excluding SAB Antennas, every NEO includes one (1) EAS Sensor and antenna wiring, and one (1) System Controller and control cabling. The System Controller is one of the central devices. USB devices and the Light and Speaker board interface directly with it.

A 64-Bit Processor runs the embedded software and firmware, which work together to control all high-level and low-level operations. An example of a high-level (software) operation is reporting to the cloud; an example of a low-level (firmware) operation is controlling the hardware.

For wireless functionality, the System Controller relies on auxiliary devices (e.g. Bluetooth dongle). The USB Ports and Ethernet port are described in more detail below.

The system controller receives 5.0V / 3A regulated DC power from the Light and Speaker board covered in section 4.2.1 below.

#### 4.1.1 USB Ports on the System Controller

There are three (3) connection ports are USB Ports and one (1) is an Ethernet port (RJ-45) on one side of the System Controller. Each **USB Port** has a **designated function** (e.g. the port for Bluetooth; the port for the Data cable). When you need to swap (or install) an accessory module, be sure you are installing your device in the correct port. The Ethernet port is a wired "Service Interface," used only by MFG and/or field service.

#### 4.1.2 Spare Part Information

The complete "Upper Bay / SOM Assemblies" are different per system.

See Table 4-1 for each unique model:

Table 4-1: Upper Bay Spares

Model Name	SAP Material code	Description
"SOM" Used in NG10	10034668	^SOM,NG10
Upper Bay "SOM" in NP10	10034644	^UPPER BAY,NP10 RF & RF/HUB
Upper Bay "SOM" in NP20	10034646	^UPPER BAY,NP20 RF & RF/HUB

## 4.2 All Hardware found in Upper Bay

### 4.2.1 Light and Speaker Board

The Lights and Speaker board (CKP P/N 10077571) mates directly with the system controller. +24V DC power arrives from the lower bay. The PCB features power regulators, a real-time clock with battery backup, an Audio amplifier, and RGB Light driver.

#### 4.2.2 LED Board

The LED Board has 10 LEDs which are each comprised of 3 RGB LEDs, 3 sub-LEDs per every 1 Multi-color LED. The LED Board also has a small momentary switch, which is a push button; only Field Service is expected to use this interface.

#### 4.2.3 Speaker

NEO features an audio speaker, which is distinctly different from a piezo type "buzzer". Read more about the Speaker in section 5.6.

#### 4.2.4 USB Devices

The USB Bluetooth module (dongle), WiFi module and Cell Modem module are all similar in form-factor. WiFi and Cell Modem are mutually exclusive options (one or the other). Refer to the installation manual for more detail.



Figure 7: USB WiFi module (dongle) and USB Extension cable

Note: An extension cable is used. If you have issues with a device, you can try removing the extension cable. You can also try reseating the connector or repositioning the module.

### 4.3 EAS Sensor (TR4300 board)

The TR4300 (CKP P/N 10053101) is a TX/RX transceiver we call "EAS Sensor" or "TR4300 board."



Figure 8: EAS Sensor

The EAS Sensor gives rise to the EAS Detection System. To successfully detect real alarm events and not trigger due to "phantoms," the EAS Sensor has electronic tuning and digital signal processing. RF tuning is outside the scope of this document.

There are no jumpers on the TR4300. Like earlier "Evolve" main boards, the TR4300 has an FPGA (field programmable gate array) with processor and memory functions. Metal Shields are equipped (separate shields for Rx and Tx circuit sections). Manufacturing

ensures tightness. Connectors are also "dressed" or pre-installed at the time of manufacture.

The TR4300 board is mounted in a subassembly referred to as the "Cage" or sometimes "Board Carrier" (also "PCBA" for PCB Assembly). The entire cage is the spare. See Table 4-2 for the spare or upgrade part numbers (SAP Material code).

At the time of this publication, all actively manufactured NEO systems require TR4300 (CKP P/N 10053101) with hardware Revision 11 (or later). Refer to the NEO Installation Manual for details on how to check the Revision of your hardware.

#### 4.3.1 Spare Part information

To order a spare:

Table 4-2: Lower Bay Spares

Model Name	SAP Material code	Description
Complete Cage for any PRI Model Antenna	10058664	^LOWER BAY,ELEC NEO RF ONLY
Complete Cage for RF/HUB Model	10144164	^LOWER BAY,ELEC NEO RF/HUB

Complete replacement, rather than replacing a single failed PCB, speeds up service times. The installation manual has procedures on lower bay replacement and upgrade.

## 4.4 A1207 PAB/SAB Splitter Board

As described above, each EAS Sensor has 2 RF transmit/receive circuits. When running in PAB/SAB, the 2 transmit/receive circuits operate in a different mode, and they are physically connected to PCB hardware called the "Splitter Board" (CKP P/N 10034597) which features a 1:2 RF split and LED signal routing.

With PAB/SAB, there is a "Primary" pedestal which contains the EAS Sensor (TR4300) and a Splitter Board (A1207), and there is a "Secondary" pedestal, which contains only the Splitter Board (A1207). From the EAS Sensor, 1 transmitter controls the primary side and 1 transmitter controls the secondary side.

Every set of adjacent pedestals includes one splitter board in the Primary and one in the Secondary. Cables are ran between the devices. The terminology "PAB" and "SAB" applies because the splitter board can be used either as the "Primary Antenna Board" (PAB) (or Primary Splitter Board), and when installed at the secondary, the splitter board can be referred to as the "Secondary Antenna Board" (SAB) or Secondary Splitter Board. Unlike Evolve 2, there are no required jumper settings to reconfigure for PAB or SAB operation. The only jumper on the PCB is used only at the SAB for selecting the LED color.

There is no BUZZER I/O on the NEO Splitter board.

Note that both PAB and SAB systems also contain one "Coupler board" (impedance matching board). The diagram below shows the 8.2 MHz RF signal path (other cabling and hardware features not depicted), showing how TX1 and TX2 are used in this scenario:

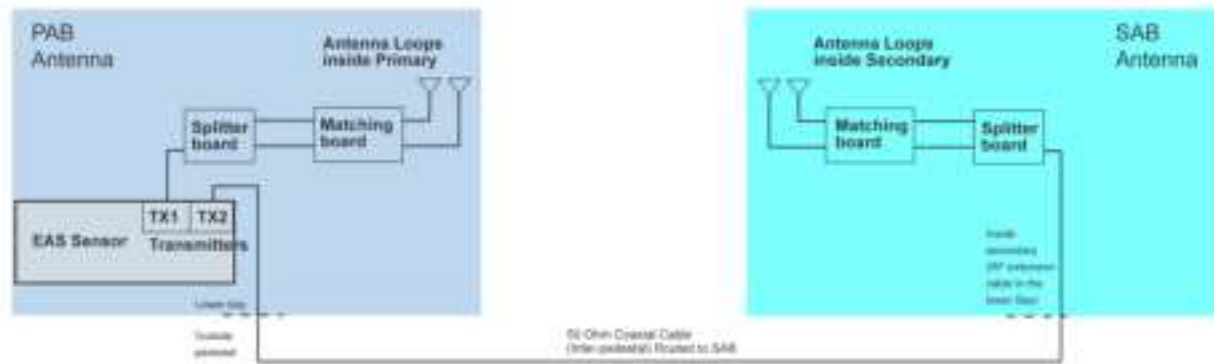


Figure 9: PAB (above left) and SAB (above right): Hardware in each pedestal, RF signal routing

## 4.5 Hub Board

The A1204 Hub Module delivers optional features, namely **Wired** connectivity, utilizing the LAN9514 USB Hub and Ethernet Controller IC.

There is 1 USB Upstream port – used for the Upper Bay data connection (USB 2.0 interface with the System Controller).

USB Downstream ports (4) are used as follows:

1. EAS Sensor connection (USB to UART).
2. External USB-to-Ethernet dongle which is only used on the Master system (which connects to the External network). The Hub Board has an 10/100 PHY Ethernet switch (unmanaged switch).
3. RFID Reader - USB data - via J19 board to board connector, 2x8 Pin Header.

The Hub Board also has load switches, allowing it to supply +12V DC to the RFID Reader. The Hub Board also has two (2) RJ-45 connectors. These are labeled OUT and IN, and have the Sync dedicated pins for Sync Out / Sync In chaining. 8-Conductor Cables (Shielded Cat 5e / Cat 6 or better) are installed between the systems next to one another, allowing all the RFID reader/antenna systems to maintain synchronization.



## 4.6 RFID Reader

The NEO "Fast Track" RFID Reader (CKP P/N 10079516) is installed in NEO RF/RFID Dual system. These are not officially released but can be considered released for beta installation (i.e. the hardware can be installed for test; beta systems are always labeled "Not for sale"). The RFID Reader is part of the Lower Bay "Cage" assembly. There is RG-316 coaxial cable pre-wiring for 2 RFID Antenna Arrays (2 Patch per array) which are part of the main sub-assembly. The hardware wiring is considered Active/Passive.

The RF/RFID system hardware includes an I/O interface board for cabling between adjacent pedestals. Each pedestal's active side must be facing the neighboring pedestal's passive side. This is the standard RFID hardware layout requiring in-floor cabling.

## 4.7 Remaining Hardware

### 4.7.1 Matching Board

An important part of the antenna in the RF Circuit is the antenna impedance matching board or "coupler board" for short. The FS Technician should never have to inspect/repair a coupler board, because they are Factory-Installed and Ready "As Manufactured." On the NEO Coupler boards, there is no tuning (no PCB Jumpers, which is different from Evolve).

### 4.7.2 GPIO Module

NEO also features a simple I/O board which two (2) of the Quick Connect Cables are pre-installed into from the factory. The Quick Start guide offers complete pin-out tables and basic software setup instructions.

The available interfaces are defined below.

#### **GPO J6**

This RJ-45 port is for triggering external devices.

There are Relay NO/NC contact pairs, which must be enabled using DMS.

2 unique relays are present (2 available in hardware/software).

#### **GPI J8**

This RJ-45 port is for accepting input signals.

There are 4 inputs which can be "mapped" to various events (advanced setup required).

#### **CPiD-RF J5**

There is also a CPiD-RF Serial Data interface available (opening the system is required); the ferrite core in the installation kit shall be used on the Cat 5e / Cat 6 or better cable, if installed, to the J5 serial port.

The NEO Installation Manual describes the hard-wired connection which is used to integrate CPiD-RF Deactivator (or deactivator chain using the CPiD Communications Module or "CAM").

### 4.7.3 Quick Connect Cables

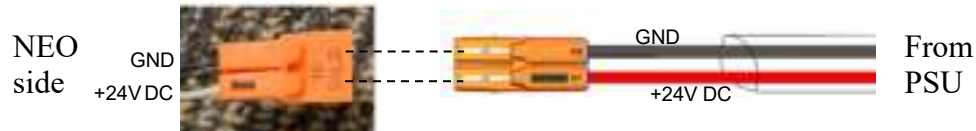
See [section 3.0](#) above (cables are identified and their functionality is described).

In the installation process, the cable interfaces and cables are joined before the mounting process.



## 24V Power Input

**Inside NEO: +24V = White Cable (this pole of the Orange Connector has the Black stripe)**



The power connection is a "tool less" connector (only wire strippers/cutters are needed to prep the wire leads, no screw driver is required).

If the provided connector fails during use, the FS Technician may install the DC power using a UL-approved wire connector junction such as 2-Position terminal block (CKP P/N 7155630) or equivalent. Insulated connectors with a locking lever are also common (approved for use so long as they meet local/national code for low voltage wiring and have UL-approval).

### 4.7.4 Power Supply

The Power Supply is part of the system. See section 7.0 for all [Power Supply Requirements](#).

## 5.0 SPECIFICATIONS

### 5.1 Overall Size

NP10:

Height: 172.78cm [68.02in]

Width: 50.75cm [19.98in]

Depth (front to back): 7.62cm [3.00in]

NP20:

Height: 172.78cm [68.02in]

Width: 34.26cm [13.49in]

Depth (front to back): 7.62cm [3.00in]

NG10:

Height: 174.7 [68.78in]

Width: 50.76cm [19.98in]

Depth (front to back): 7.72cm [3.04in]

### 5.2 EAS Sensor

Mechanical Specs:

PCB Layers: 8

PCB Materials: FR4

Dimensions: L X W: 116mm X 170mm [4.567in X 6.693in]

Electrical Specs:

DC Input / Output: +24V (other voltages are available using GPIO and connectors)

Clock Speed: 100 MHz

Clock Speed: 12.000 MHz

Connector function (Number): Connector type

Power Input / Output (2): 3-Pin 3.5mm connector, keyed

Power Output to Upper Bay (1): 3-Pin 3.5mm connector, keyed

Power Output for expansion module (1): 3-Pin 3.5mm connector, keyed

RF Antenna outputs (2): 2-Pin 3.5mm connector, keyed

USB Serial port (1): USB Type B connector, shielded  
 IO Board (GPIO module) B2B connector (1): 2 x 12 Header PCB-mount, Right Angle  
 Expansion (e.g. Hub board) B2B connector (1): 2 x 12 Header PCB-mount, Right Angle

### 5.3 PAB/SAB Splitter Board

The A1207 PAB/SAB Splitter Board (CKP P/N 10034597) is only featured on select models. For a list of PAB/SAB Models, see Table 1-3 from [Section 1.2](#).

Mechanical Specs:  
 PCB Layers: 2  
 PCB Materials: FR4  
 Dimensions: L X W: 11.91cm x 13.46cm [4.69in x 5.3in]

Electrical Specs:  
 DC Input / Output: +24V DC Input  
 Output: +24V DC Output, LED Control signal Output triggered by an input event. The event is when the FPGA decides TX2 (Secondary ped) has an alarm.  
 RF Input signal is passively split (each output is -3 dB compared to input)  
 PCB Jumper: 1 PCB jumper with 3 settings (Red, Blue, and Green). The jumper setting determines the color of the LED Alarm Light of the Secondary (SAB). Default is Red.

Connector function (Number): Connector type  
 Power Input (1): +24V DC input from EAS Sensor's parallel input/output from power supply  
 RF Antenna inputs (1): 2-Pos terminal strip  
 RF Antenna outputs (2): 2-Pin 3.5mm connector, keyed  
 GPO Connector (1): RJ-45 pass-thru, Output cable has one set of GPO relay contact pairs  
 GPI Connector (1): RJ-45 Input. GPO signal from EAS Sensor (GPIO Module) triggers the relay event which sends LED Control signal to the Secondary (SAB). The output signal illuminates the LED Light of the SAB pedestal (see below).  
 LED Connector input/output (1): 3-Pos terminal strip (used for the inter-pedestal out cable, via manufacturing installed LED Extension cable).  
 LED Connector output (1): Hirose 7-Pin port, keyed. This connector is only in use at the SAB.

Note: Some connectors are only used at the PAB. Some are used at both sides (for example, the LED input/output). For PAB/SAB one (1) splitter board is installed in both the PAB and SAB. The set of RF outputs are always used. See [Section 4.4](#) for block diagram.

## 5.4 System Controller

### Mechanical Specs:

Small PCB about the size of a credit card

### Electrical Specs:

CPU: 64-Bit Processor

Memory: 1GB 1600MHz LPDDR3 memory; 16GB

Connector function (Number): Connector type

Data Interface to/ from LnS Board (1): Header 2 x 20 PCB mounted, Female socket

Power input: DC power supplied from the Light and Speaker board (thru 2 x 20 header pins)

USB serial interface: USB Type A ports (3). Typically at least 2 USB ports are in always in use. These two uses are (1) Data from Lower Bay and (2) Bluetooth USB Dongle. The third available USB port can be used for either WiFi or Cell Modem. \*NG10 has WiFi from factory.

Audio output: Stereo output, bare leads are soldered to the PCB terminals to reduce space

Ethernet connector: Not in use (except for field service and/or MFG needs)

HDMI port: \*not in use

## 5.5 Light and Speaker Board

### Mechanical Specs:

PCB Layers: 4

PCB Materials: FR4

Dimensions: L X W: 56mm X 100mm [2.2in X 3.94in]

### Electrical Specs:

DC Power Input: 24V DC

Regulated Outputs: 5V DC

Connector function (Number): Connector type:

Power Input (1): 2-Pin Euro Plug F connector (CKP P/N 7100784) included as part of PWR cable assemblies (for lower to upper power NP10 uses 10045277; NP20 uses 10090050).

Data Interface to/ from controller (1): Header 2 x 20 pins, Male pins

Speaker 2-Pin mini jack (1): Hirose 2-Pin port, keyed

LED 7-Pin mini jack (1): Hirose 7-Pin port, keyed  
System Controller Audio Input 3-Pin mini jack (1) Hirose 3-Pin port, keyed  
USB Connector (1): USB Mini-C connector for interface to controller

## 5.6 IO Board (GPIO Module)

Mechanical Specs:  
PCB Layers: 4  
PCB Materials: FR4  
Dimensions: 32.5mm X 76.5mm [1.28in X 3.01in]

Electrical Specs:  
Inputs: 4. RJ-45 connector (2 pins per input).  
Outputs: 2. The GPO RJ-45 connector has 4 relay contact pairs in total. 2 Normally Open (N.O.) and 2 Normally Closed (N.C.). Each output drives an open and closed contact pair.  
RS-232 serial data interface (intended only for support of CPiD-RF): 1  
Connectors: 3 RJ-45, and 2 x 12 header male, pre-installed B2B with EAS Sensor.

## 5.7 Audio Speaker

Mechanical Specs:  
Dimensions: 2" diameter  
Square frame: OD of frame is approximately

Electrical Specs:  
Impedance: 4 Ohm  
Frequency response: Full range speaker (150 Hz - 20 KHz)  
Terminals: Soldered  
Wire type: 26 AWG PVC, stranded wires (Red and Black color)  
Connector, Lights and Sound Board side (speaker output terminal): Hirose DF13-2S-1.25C  
Crimp Terminals: Hirose DF13-2630SCFA(04), Qty 2.

## 5.8 LED Board

Mechanical specs:

PCB Layers: 2

PCB Materials: FR4

Dimensions: NP10 - 319.5mm X 12mm [12.58in X 0.47in]

NP20 - 156.0mm X 12mm [6.14in X 0.47in]

Features: 10 LEDs aligned in a row.

Each LED can illuminate in various colors, relying on 3 individual LEDs (Red, Green, and Blue) inside each of the 10 PCB-mounted LEDs.

Electrical specs:

Connector port (1): 7-Pin Hirose connector

NP10 / NG10 contains: ^PCB,A1179 LED NP10 (10055944).

NP20 contains: ^PCB,A1178 LED NP20 (10084027).

Required Cable (available as a FS spare): ^CABLE ASSY,LED NEO (10056250)

Power input rating: 24V / 60mA

## 5.9 Hub Board

Mechanical specs:

PCB Layers: 7

PCB Materials: FR4

Dimensions: 120mm x 123mm (approximate outside dimensions) [4.72 x 4.82in]

Electrical Specs:

DC Power Input: +24V DC

Regulated Outputs: +12V DC (for RFID Reader)

Connector Types: USB Type A (1), USB Type B (1), RJ-45 (2), Power input (see below)

Power Connector Input: 3-Pin 3.5mm connector, keyed

Required Cable (comes with system):

2-Conductor w/SHLD +24V PWR Jumper Cable (CKP P/N 10065117)

## **5.10 RFID Reader**

Mechanical specs:

PCB Layers: 8

PCB Materials: FR4

Dimensions: 225.2mm x 170mm (approximate outside dimensions) [8.87 x 6.69in]

Electrical Specs:

DC Power Input: +12V DC

Regulated Outputs: N/A

RF (UHF) Antenna Outputs: 4 SMA Female

Other Connector Types: RJ-45 (1), RS-232 Serial port for "Service".

B2B connector (1): 2 x 8 Header PCB-mount (from Hub Board)

## **5.11 Environmental**

All the internal electronics shall meet or surpass the listed environment specifications:

Operating Temperature: 0° to + 60° C

Non-Condensing Relative Humidity: 5% to 95%

## **6.0 USING DMS TO APPLY SOFTWARE SETTINGS**

Checkpoint DMS is **by-license-only** software, which will be used by field service, engineering and manufacturing to set up NEO.

Tuning can be performed using DMS. Transmit Power and other critical settings are checked/set with the help of Analog View and similar software features. DMS is also used at the time System installation to pick the LED color, pattern and the sound file (.mp3) played when the EAS Alarm Event occurs.



## 7.0 POWER SUPPLY REQUIREMENTS

### 7.1 General Details

The Power Supply Unit (PSU) is sold separately from NEO.

NEO requires +24 Volts DC supplied at J6 or J14 of the EAS Sensor.

PSU which is suitable shall be an external AC/DC converter power supply rated at 24VDC nominal, with LPS either 50W or 90W maximum. LPS stands for limited power source. Refer to Sourcing Spec (CKP P/N 10034493).

#### 7.1.1 Approved PSU Model

Use only the approved power supply. The approved PSU is GS-599ES(R) (CKP P/N 7116509). This PSU can be installed with or without the "hood kit." It is the Technician's responsibility to determine when the hood kit is required to meet national and/or local code. Plenum PSU Installation (see section 7.1.2 below) is not typical, but can be achieved as necessary to meet code.



Figure 10: 50W Power Supply

The region-specific IEC Power Cord is not included. For example, North America uses the 3-prong AC cord type shown below. The "NA POWER CORD" is CKP P/N 7209892.

Note: You must purchase 1 region-specific AC Cord per 1 PSU.



Figure 11: IEC Cord (Not Included)

### 7.1.2 Plenum PSU Installation

In the US, if the power supply is to be installed in a plenum (HVAC ventilation) area, the GlobTek GS-599MC-KIT(R) (CKP P/N 7367100) must be installed. In the event of such an installation, the power supply must be hard wired to comply with section 300.22 (C) of the NEC.

The kit includes the standard power supply (see Figure 10 above) and plenum-rated conversion kit.

## 7.2 PSU 1:1 Rule

The "Power Supply One to One Rule" for NEO Antennas is required.

PSU should be wired directly to a pedestal. Powering 2 primary pedestals from one PSU in daisy chain configuration is not allowed.

## 7.3 Other Safety Considerations

Always install using quality 18AWG, 2-Conductor cable routed directly to the NEO power input (quick connect cable).

Only use 1 power connector as the DC Power input (i.e. do not connect 2 power supplies directly to 1 reader).

On the EAS Sensor, J6 and J14 are wired in parallel, allowing the means to supply power to an accessory device (rated for +24V DC), provided that the accessory device and NEO combined do not draw more current than the PSU rating (e.g. 2.1 amps max current).

## 7.4 Ferrite Core Installation

### 7.4.1 Quick Connect cable has Ferrite Core pre-applied

Each NEO is outfitted with a power cable having the noise-suppressing ferrite core already applied (see Figure 12). This reduces installation time.

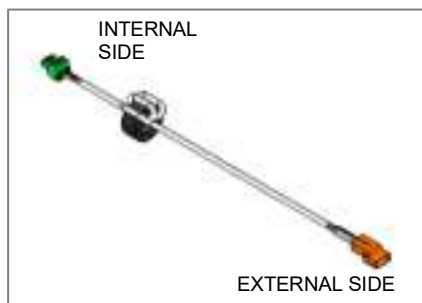


Figure 12: DC Power Extension Cable (Inside System)

The NEO Install Kit contains additional ferrite core, which can be applied to the Power Supply at the AC/DC Adapter side on the DC cable (see below). The ferrite at the power supply side is optional.

#### 7.4.2 Optional Ferrite on DC Cord near PSU AC/DC Adapter

Although not required for FCC or ETSI compliance, the ferrite core shown below is considered "optional." When the DC cord seems to be causing "noise" then applying any of these types of ferrite cores may mitigate the noise conditions.



Figure 13: Common Ferrites

1 Ferrite Core is provided in the installation kit, however this ferrite is typically not needed (see [section 4.6.2](#) describing its intended use).



Figure 14: Optional Ferrite Core Placement, Near PSU Adapter

Shown above, the "Multi-Purpose Ferrite Core" (CKP P/N 7284760) is suitable to be used here. Figure 13 shows other types which can be used. You can apply this (or any) ferrite core with 4 turns near the DC output as shown.

## **8.0 DEVICE LABELING**

### **8.1 Internal Label**

Each NEO will have a label, found in the base region, which indicates this specific unit's Model Name, part number, revision and the serial number of the unit manufactured, as well as regulatory information. For example:

Cellular:

FCC ID: DO4NEO-C

WiFi:

FCC ID: DO4NEO

Device agency label will also show country/region specific markings, indicating approval is obtained in that region.

As required by Canada IC (Industry Canada), all NEO units' internal labels shall bear text:

IC: 3356B-NEO

Cellular: IC: 6369A-MS2372H517

Wi-Fi: 10531A-80804XX

Bluetooth: 11232A-USBBT1EDR4

### **8.2 External Label**

Each NEO has a second label which shows the Model Name and serial number of the unit manufactured. There is no regulatory information on this label. The reason for this label is Field Service can check the hardware to the product packaging, and for RMA (get the S/N of the antenna without having to open up the system for viewing the internal label).