Polara

iNavigator 2 Wire System Manual

For Use with iCCU-S and iCCU-C

350-068 Rev. J

11/9/2017

Contents

1. Safety Information

 Caution! The equipment covered in this manual must be installed and operated as specified in this manual. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

 Caution! Risk of electric shock. The installer must be aware of the presence of hazardous voltage levels which may be exposed during the installation of this equipment.

For personal safety, the use of insulating gloves and safety glasses is recommended.

2. iNavigator System Description

The iNavigator Accessible Pedestrian System (APS) consists of Push Button Stations (iN2 PBS) installed on poles with existing pairs of button wires, and an Intelligent Central Control Unit installed in the traffic cabinet. There are two styles of iCCU available. The iCCU-S is compatible with all types of traffic cabinets and controllers and is normally placed on a shelf. The iCCU-C is a plug-in card that is compatible only with cabinets that currently use Type 242 Ped Isolators and have a standard C4 cable connection to the Output File. Each style communicates with the Push Button Stations (PBS) using digital data over the two low voltage button wires. The buttons are powered by the same wires. This provides a fully synchronized communication system, with many features.

Note: Hereafter in this manual, when referring to cases that apply equally to both iCCU-S and iCCU-C, iCCU-X shall be used.

2.1 iN2 Accessible Pedestrian Signal Push Button Station (PBS)

The iN2 is an Accessible Pedestrian Signal Push Button Station (PBS). These PBSs are typically used in pairs, mounted on poles at each end of a pedestrian crosswalk. Its purpose is to transmit a request for a Walk Signal to a traffic signal controller by pressing its button, then to provide audible and vibro-tactile feedback to the pedestrian, indicating the current status of the pedestrian signal. Complete system configuration via Bluetooth may be performed via any PBS in the system. Similarly, configuration may be performed via Wi-Fi when connected to the iCCU-X.

2.1.1 Technical Specification

Operating Voltage/Current: 24 VDC/0.3 A max

External Connections:

- 2 wires to interconnect board (iN2-ICB) located in the traffic cabinet
- Bluetooth Low Energy for setup and maintenance

Operating Temperature Range: -34°C to +74°C, 95% Relative Humidity

Storage Temperature Range: -40°C to + 85°C

Ingress Protection: NEMA 4X (IP65), follow installation instructions for proper protection

Push button Operating Force Range: 1 to 3 lbs.

Maximum Audio Output Level: 100 dBA @ 1 meter

Dimensions WxDxH: 5” x 2.3” 13.41” (Reference Only)

Weight: 4 lbs.

Designed for Outdoor Use, Wet Location and Overvoltage Category: NEMA 250 4X

2.2 iCCU-S Intelligent Central Control Unit for Shelf

2.2.1 Technical Specifications

Input Voltage / Current: 120VAC / 3A

PBS Output: 24 VDC / 1.4 A continuous, 3.75 A surge

Ped Walk / Don’t Walk Inputs: Optically isolated 80 – 150 Volts AC/DC, 5mA max.

Ped Outputs: Optically Isolated 36 Volts AC/DC peak, 300mA Solid State Fused Contact Closure

General Purpose Inputs: 10 – 36 Volts AC/DC peak, 10mA max, Optically Isolated

EV Inputs: Active when pulled low (< 5 V to Logic Ground)

Communication: SDLC port, Ethernet, Wi-Fi (IEEE 802.11b/g/n)

*Operating Temperature Range: -34°C to +74°C, 95% Relative Humidity

*Storage Temperature Range: -40°C to + 85°C

Mounted inside all-weather enclosure, provided by customer

Dimensions WxDxH: 3.19” x 8.82” x 6.34” (Reference Only)

Weight: 3.28 lbs.

*The LCD temperature range is limited to -20°C to +70°C operational and -30°C to +80°C storage.

2.3 iCCU-C Intelligent Central Control Unit Plug-in Card

2.3.1 Technical Specifications

Input Voltage / Current: 24VDC Nominal / 0.2A

PBS Output: Connects to existing push button wiring via card edge – replaces two Type 242 isolators

Ped Walk / Don't Walk Inputs: 24 volt logic, active low, via front panel 15 pin connector

Ped Outputs: Optically Isolated 36 Volts AC/DC peak, 300mA Solid State Fused Contact Closure

Communication: Ethernet, Wi-Fi (IEEE 802.11b/g/n)

*Operating Temperature Range: -34°C to +74°C, 95% Relative Humidity

*Storage Temperature Range: -40°C to + 85°C

Mounted inside all-weather enclosure, provided by customer

Altitude: 2000m

Dimensions WxHxD: 2.28" x 4.50" x 7.0 excluding handle (Reference Only)

Weight: 0.5 lbs.

*The LCD temperature range is limited to -20°C to +70°C operational and -30°C to +80°C storage.

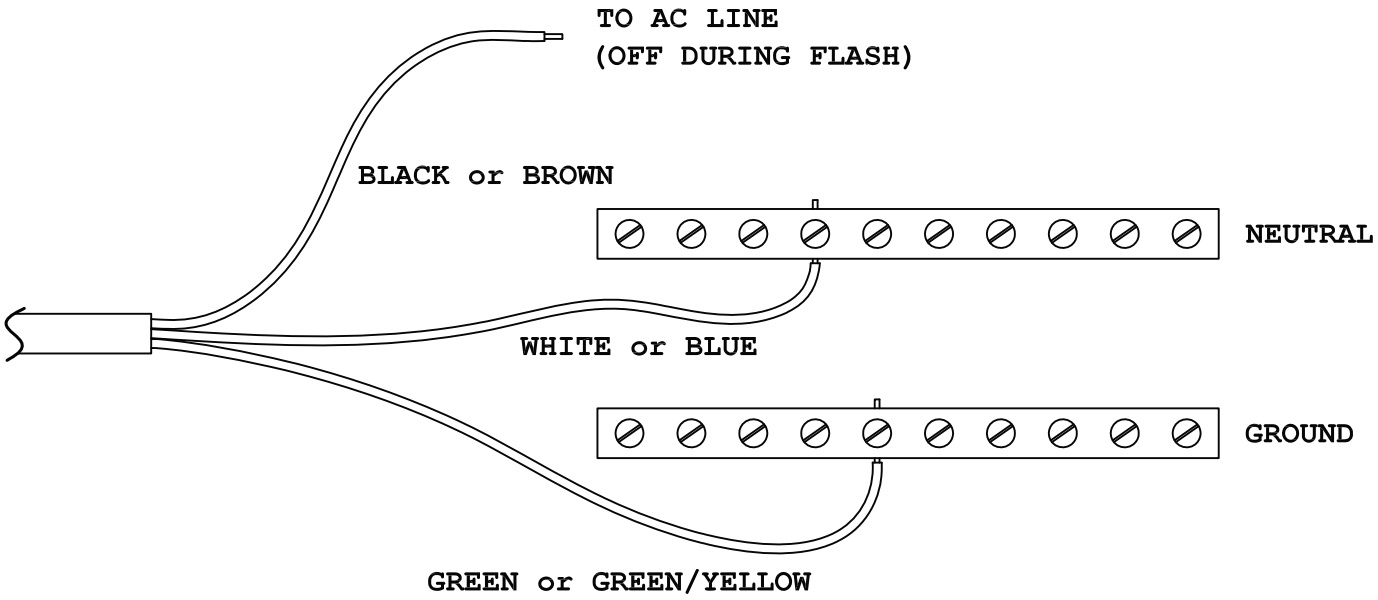
3. System Installation

Note, safety protection may be compromised if the iN2 or iCCU-X are either installed or utilized in a configuration not stated in this manual. Disconnect input power to the iN2 before field examination.

3.1 iN2 System Operation During Intersection Flash

The iN2 APS buttons are designed to cease normal function in the event of intersection flash. When pedestrian walk and don't walk signals are absent, the iCCU firmware suspends normal communication to disable the buttons**. For added safety, we recommend the AC input power for the system be connected such that power to the buttons is removed during intersection flash.** Not all cabinets have an easily accessible terminal for AC Line voltage that automatically turns off during flash. The AC Line signal feeding the load switches would normally qualify. You may need to research your cabinet drawings to determine what is possible.

3.1.1 Wiring the Power Cord



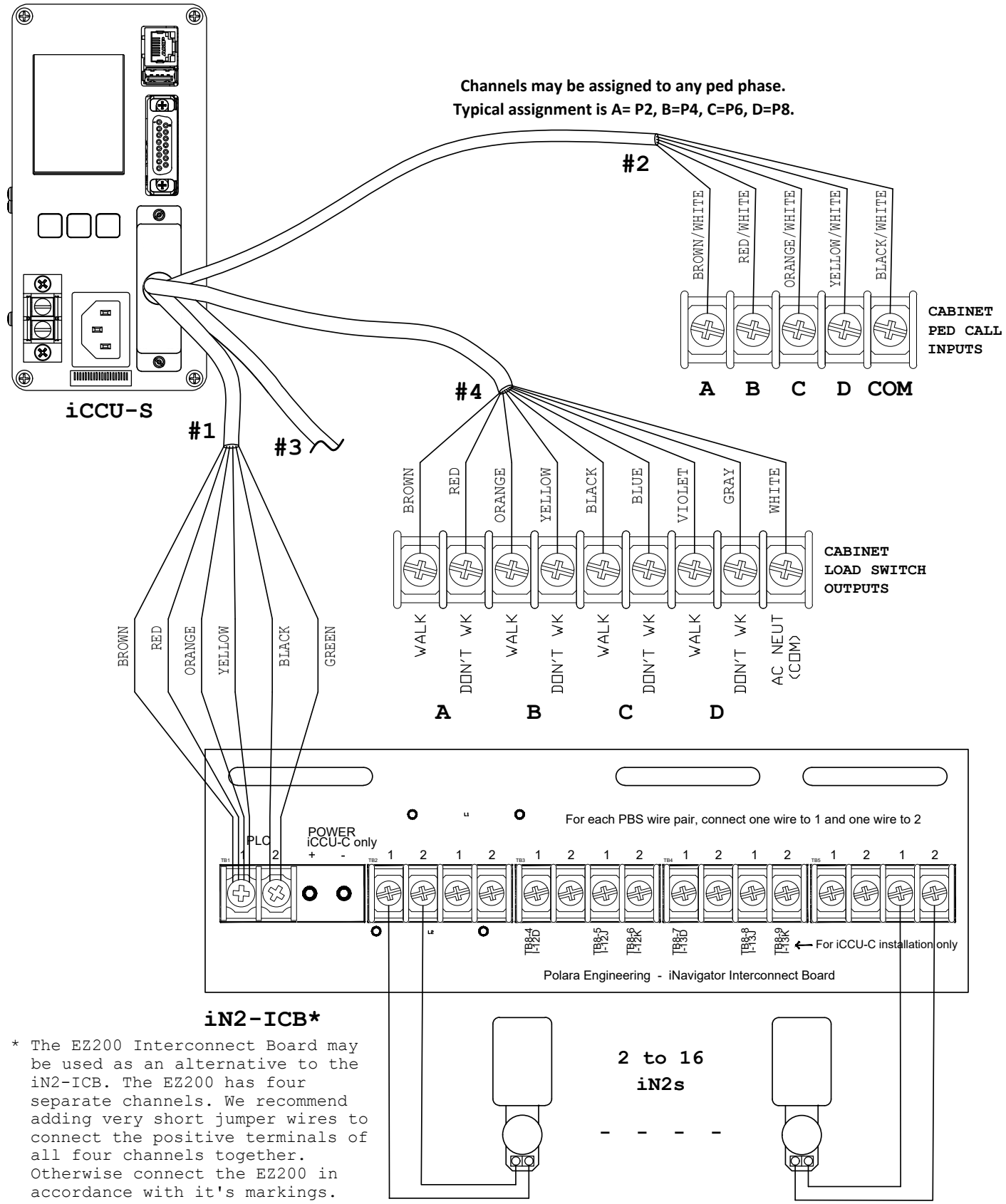
The power cord should be disconnected from the iN2 system until installation is complete.

To prevent risk of shock, place the intersection in flash to make the following connections:

- Connect the AC Line wire (black or brown) to the terminal with automatic shut-off during flash
- Connect the AC Neutral wire (white or blue) to the cabinet neutral bar
- Connect the Earth Ground wire (green or green/yellow) to the cabinet ground bar

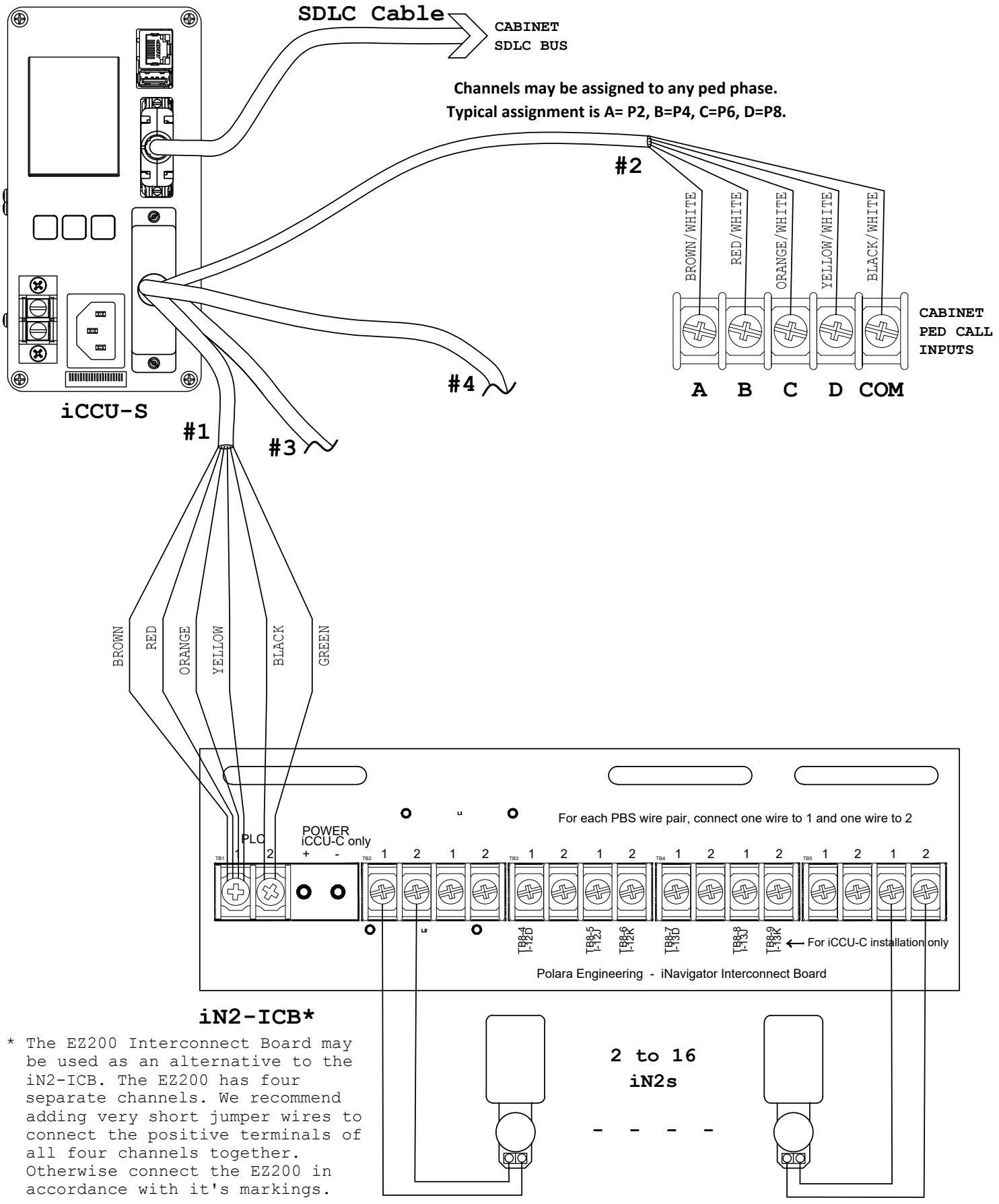
3.2 iCCU-S with iN2 PBS – Wiring Diagrams

3.2.1 Typical NEMA TS1 Cabinet Connection with Interconnect Board



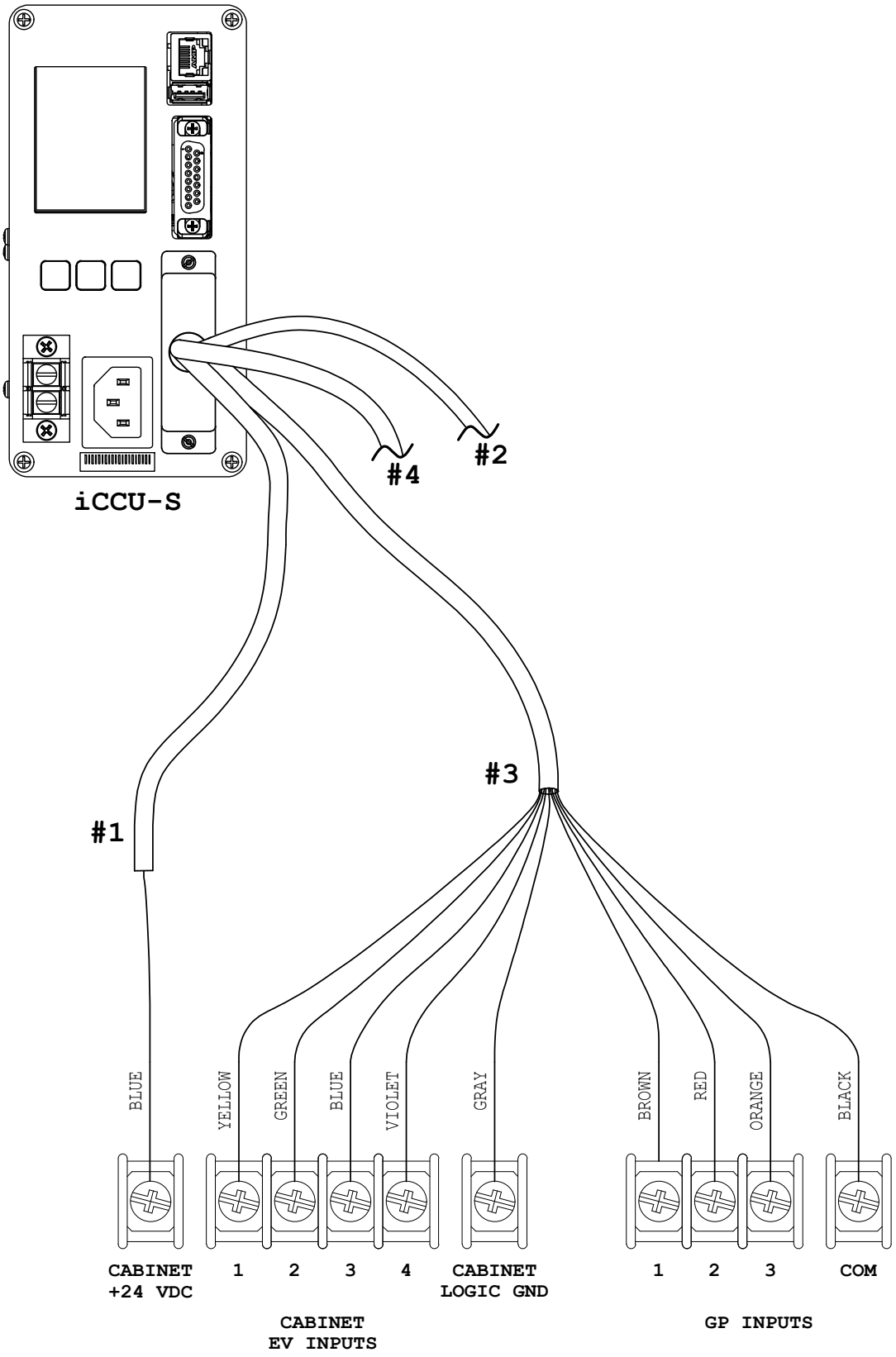
* The EZ200 Interconnect Board may be used as an alternative to the iN2-ICB. The EZ200 has four separate channels. We recommend adding very short jumper wires to connect the positive terminals of all four channels together. Otherwise connect the EZ200 in accordance with it's markings.

3.2.2 Typical NEMA TS2 Type 1 Cabinet Connection with Interconnect Board



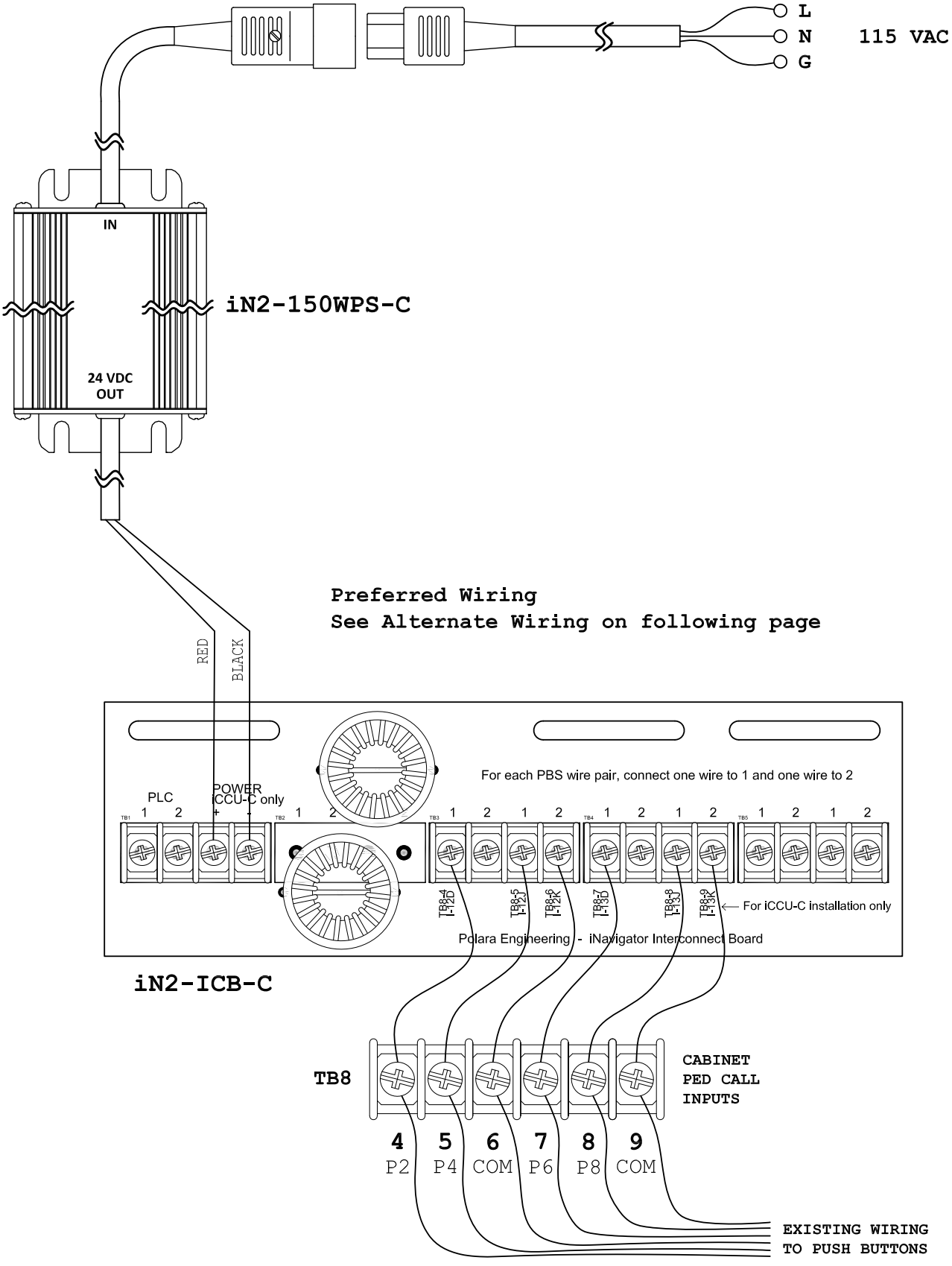
* The EZ200 Interconnect Board may be used as an alternative to the iN2-ICB. The EZ200 has four separate channels. We recommend adding very short jumper wires to connect the positive terminals of all four channels together. Otherwise connect the EZ200 in accordance with it's markings.

3.2.3 Control Unit Cabinet Wiring (Optional Wiring for Preemption and Other Special Functions)

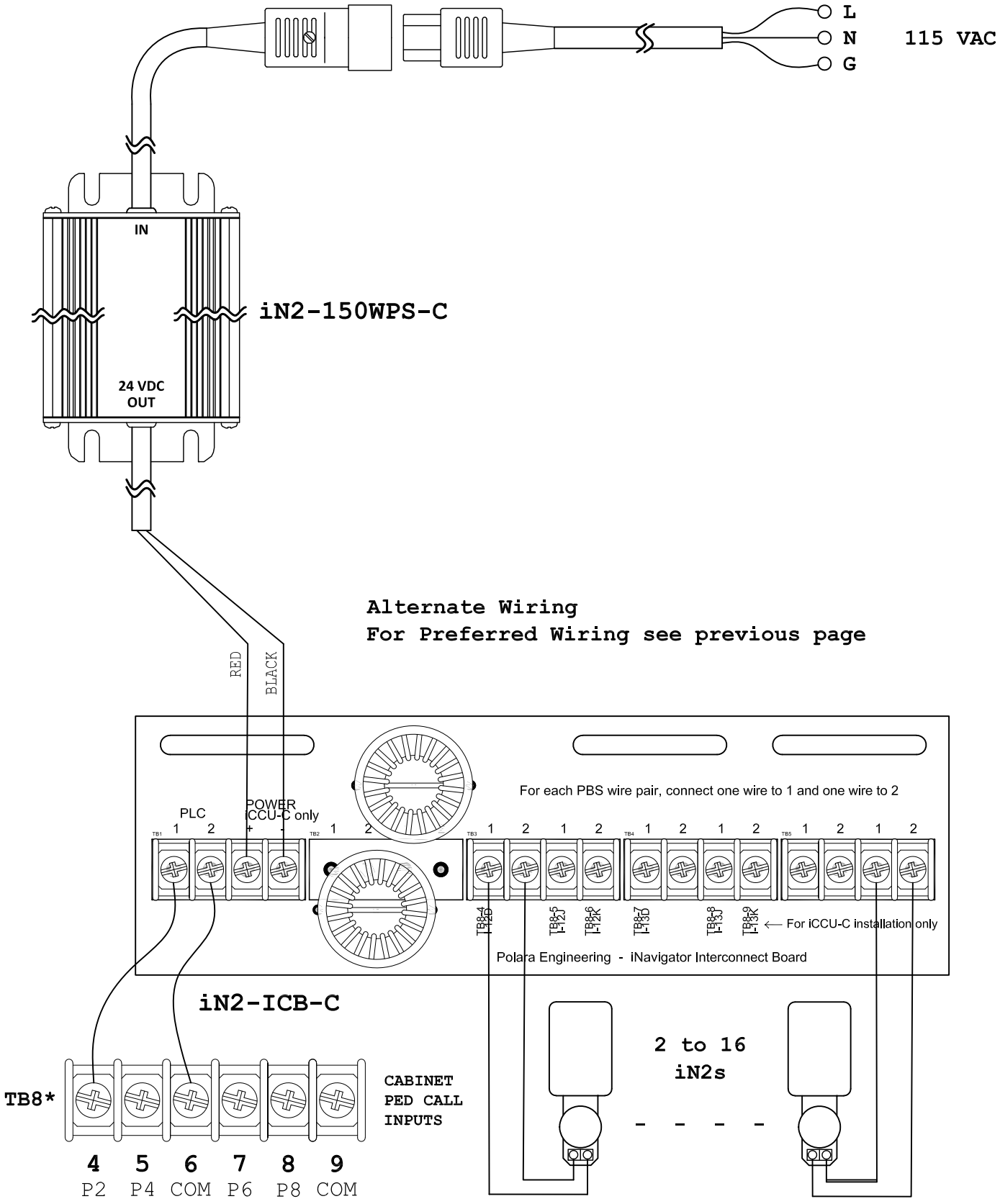


3.3 iCCU-C with iN2 PBS – Wiring Diagrams

3.3.1 Typical 332 or Similar Cabinet Connection #1 – Preferred

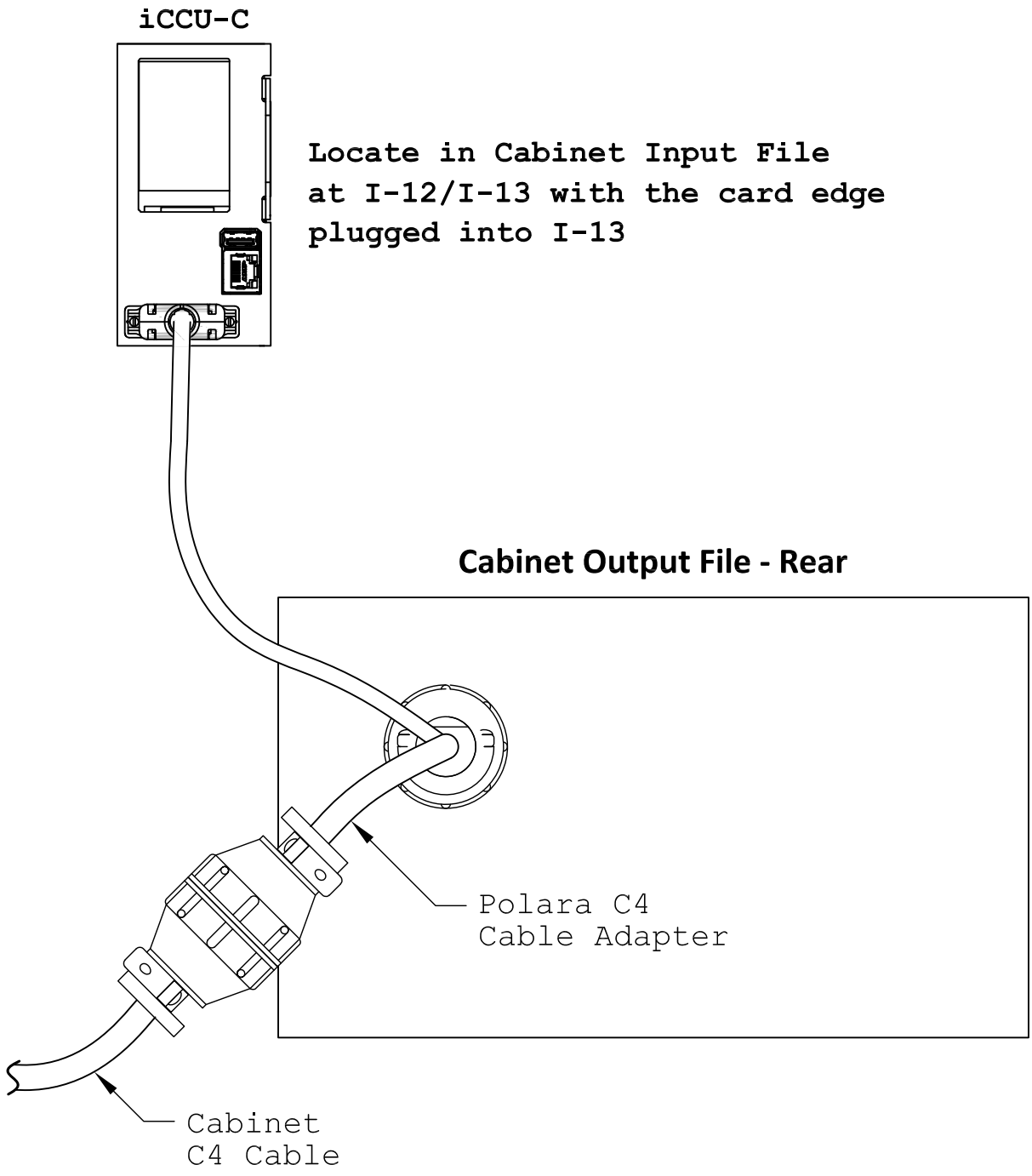


3.3.2 Typical 332 or Similar Cabinet Connection #1 – Alternate



* If TB8 is not present, connect the two PLC wires to connections D and E on the backplane for I-13 of the input file.

3.3.3 Typical 332 or Similar Cabinet Connection #2



3.4 iCCU-S Central Control Unit Installation Procedure

The iCCU-S is expected to sit on a shelf inside the traffic signal controller cabinet. The iCCU-S can function as two systems. It has the ability to work with traditional TS1 cabinet systems with wiring to ped inputs and ped outputs, or can work in a TS2 environment, utilizing SDLC to pick up the Walk/DW intervals directly from the controller. In this setup, the cabinet wiring is significantly reduced, and eliminates wiring into the high voltage ped outputs. The cables and wiring used depend on the type of cabinet installation. For a TS1 cabinet, the primary interface to the cabinet is through the 50-pin D-Sub connector. The matching cable harness assembly includes four separate cables with four separate functions. If you are replacing a prior model Polara CCU and have a cable assembly and Interconnect Board installed, they may be used with the iCCU-S with little or no modification. The following section describes the four cables. See the wiring diagrams for typical connections.

Cable #1

This cable connects the iCCU-S to the iN2 PBS units in the field via the iNavigator Interconnect Board, iN2-ICB. Cable #1 is connected to the iN2-ICB Interconnect Board's terminals labeled "PLC". Combine the brown, red, orange, and yellow wires from Cable #1 together to one terminal. Connect the black and green wires from Cable #1 together to the other terminal. Polarity does not matter.

If you have a prior model Interconnect Board, the Cable #1 connections may be left alone. The iCCU-S internally connects the four channel wires together.

Cable #2

This cable is used to place pedestrian calls to the traffic signal controller. It provides four separate contact closures for four pedestrian phases. These are identified as A (brown), B (red), C (orange), and D (yellow). Black is common. These colors are a stripe on a white background. These wires typically connect to phases 2, 4, 6, and 8 respectively, but each may be assigned to any phase during configuration, so the connections can be to any phase as desired. If the cable has been installed and was working with a prior model CCU and Interconnect Board, no change is required.

Cable #3

This cable is only used when a special function such as an emergency vehicle message is desired. There are three general purpose inputs and four emergency vehicle inputs. Each group has its own common connection. The inputs GP1, GP2, and GP3 are made active by the application of voltage in the range of 6 to 30 volts, AC or DC. The inputs EV1 through EV4 operate differently and require a slight change if you are replacing an earlier model CCU. The connections for EV1 through EV4 connect to the EV inputs of the traffic signal controller as in prior installations. The EV Com wire must connect to the cabinet Logic Ground. The blue wire in Cable #1 must connect to the cabinet +24VDC.

Cable #4

This cable is used to provide the iCCU-S with the status of the pedestrian Walk/DW signals. Like Cable #2, each Walk/DW pair is identified as A, B, C, or D. These wires connect to traffic signal cabinet terminals in parallel with wires that power the pedestrian signals, that is, ped load switch outputs. The inputs are nominally 120 VAC. Therefore, caution should be taken during installation to avoid electric shock. There is a single white wire for connection to AC neutral. During configuration, each pair must be assigned to a pedestrian phase. This would typically be A/2, B/4, C/6, and D/8, however this is not restricted in any way. Installation varies with cabinets and configurations.

If the traffic signal controller is NEMA compliant with SDLC, such as a TS2 type 1 cabinet, the iCCU-S may be connected to the SDLC bus.

If this is available, use an SDLC cable to connect the iCCU-S to the SDLC bus. If there is an unused SDLC port available in the cabinet, then the straight cable is appropriate (P/N: iN2-SDLC-CABLE). Otherwise, a "Y" cable is available (P/N: iN2-SDLC-YCABLE) to insert in between an existing connection. The configuration process will associate each pedestrian phase to a load switch number. Cable #4 is not used in this configuration.

3.5 iCCU-C Central Control Unit Installation Procedure

The iCCU-C is designed to be inserted into a standard Input File slot, replacing two Type 242 Ped Isolators. It is normally located in slots I-12 and I-13 with the card edge plugged into I-13. It operates on 24VDC from the cabinet power supply, via card edge pins A and B.

The card edge pin assignments are listed here for reference:

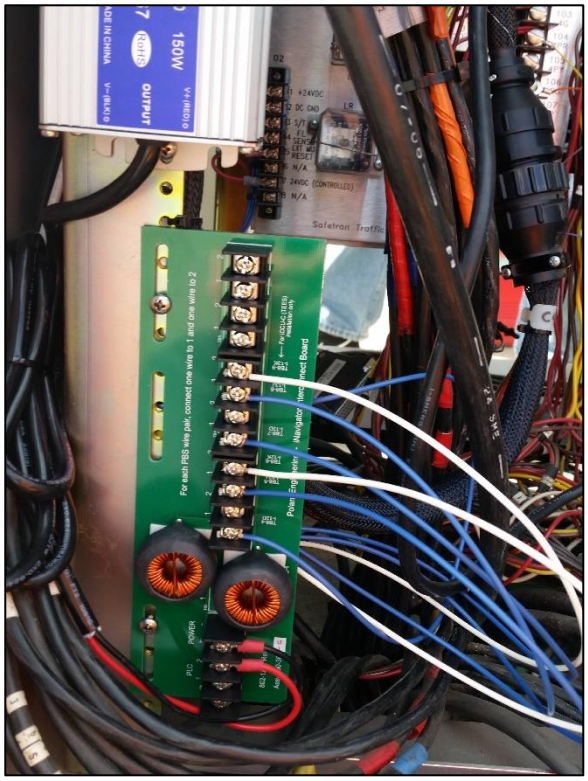
A	Logic Common
B	+24VDC
C	No Connection
D	PBS In #1+
E	PBS In #1-
F	PB Out #1+
H	PB Out #1-
J	PBS In #2+
K	PBS In #2-
L	Earth Ground
M	No Connection
N	No Connection
P	PBS In #3+
R	PBS In #3-
S	PB Out #3+
T	PB Out #3-
U	PBS In #4+
V	PBS In #4-
W	PB Out #2+
X	PB Out #2-
Y	PB Out #4+
Z	PB Out #4-

While the four PBS inputs are labeled individually, they are actually combined into a single connection pair on the iCCU card. The iCCU-C Hardware Kit includes an Interconnect Board (P/N: iN2-ICB-C) which has a dual purpose. First, it serves to wire jumper the four phases of field wiring together to act as a single pair. Second it provides a means of injecting power from a separately installed 24V power supply, which powers the iN2 PBS units in the field.

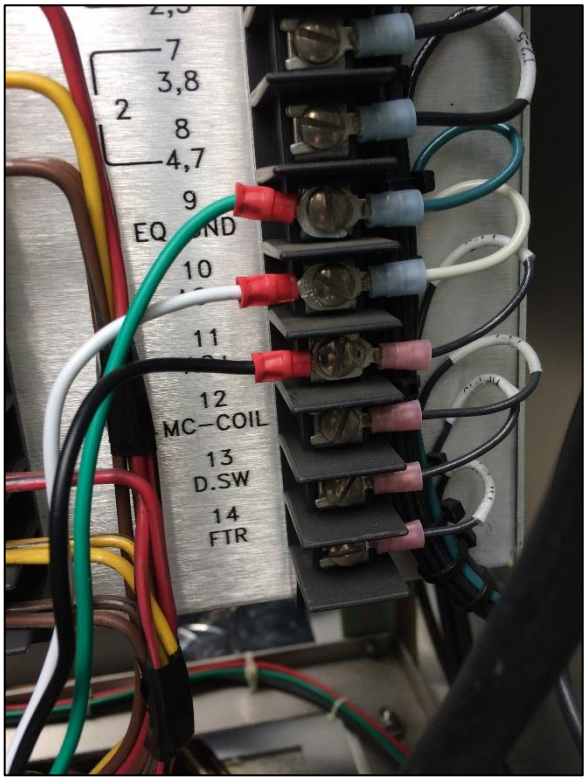
Installation should begin by setting the peds to recall. Then remove existing push buttons from the poles.

In the cabinet, the iN2-ICB-C Interconnect Board should be mounted near the terminal block for the push button field wiring. Screws are provided for attachment to the equipment rack. The free ends of the six wires should be connected to the aforementioned terminal block, referring to the labeled position identified for each wire. The 24V power supply should be mounted near the Interconnect Board. Screws are provided for attachment to the equipment rack. The output wires should be connected to the Interconnect Board terminal block labeled “Power”, with red to + and black to -. The AC input cord for the 24V power supply should be connected to a surge protected source of AC Line, AC Neutral, and Earth Ground. Do not connect the input cord to the power supply until the system installation is completed.

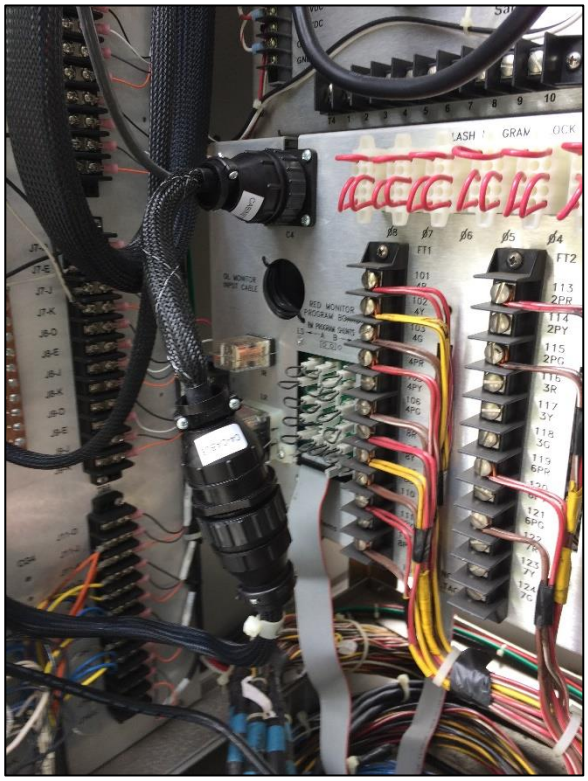
The C4 cable adapter should be installed next. This requires the intersection to be placed in FLASH. Once in FLASH, disconnect the C4 connector on the rear of the Output File panel. Connect the existing cable connecter to the mating connector of the adapter. Connect the other large adapter connector to the Output File panel. Route the smaller cable and connector to the front of the cabinet Input File. The intersection may be taken out of FLASH. Now the iCCU-C may be inserted into the Input File, replacing two Type 242 isolators in locations I-12 and I-13 (with the card edge plugged into I-13). Connect the C4 adapter cable to the iCCU-C front panel. Complete the installation with the iN2 PBS mounting and wiring per the next section. Following this, the 24V power supply may be connected.



Mounted Interconnect Board



Power Cord Connection



Installed C4 Cable Adapter

Installed iCCU-C with optional Ethernet

3.6 iN2 PBS Installation Procedure

The iN2 PBS has two mounting holes vertically spaced at 6.0 inches. The mounting is compatible with standard push button frames with 6-inch mounting holes and a wiring hole about 3.5 inches below the lower mounting hole. The suggested mounting height is 42 inches from ground level to the center of the arrow button. The maximum button height set by the MUTCD is 48". **The iN2 PBS must be mounted only in the normal upright orientation, with the connection terminals at the bottom. Any other mounted orientation will void the warranty as moisture could collect inside the unit.**

Before mounting the PBSs on their poles, the traffic signal controller should have the PED phases to set to recall. If not already done, remove existing buttons/frames from poles. Check holes for mounting fit and drill and tap ¼-20 as needed. Route the 2 ped button wires out of the wiring hole.

If Polara has recorded and pre-loaded a voice message into the PBS, the PBS will typically have a label indicating the street being crossed, for example, "Crossing Main at Broadway". Locate the unit in accordance with the label.

Remove 3 screws from the lower cover surrounding the push button, using a Torx T15 security driver bit. Lift off the lower cover. Remove all screws securing the sign and sign plate if present. Verify the arrow on the button is oriented toward the associated crosswalk. If necessary, the button / diaphragm assembly may be pulled off and rotated as needed. **Please use caution, as the diaphragm is sharp.**

With the sign and lower cover removed, position the PBS against the pole and route the wires forward through the opening at the bottom end of the module. Position the wire such that 3 or 4 inches of wire is available at the bottom of the PBS. Being careful not to pinch the button wires between the PBS wire guide channels and pole, attach the PBS to the pole using the provided ¼-20 bolts with washers, being careful not to pinch the button wires between the PBS wire guide channels and the pole.

NOTE: The use of a speed wrench or short socket is recommended. Insert the bottom bolt with washers on bolt before holding the iN2 PBS to the pole to prevent the washers from falling into the unit.

Connect the two wires from the traffic signal cabinet to the terminals of the larger black terminal block labeled BUTTON/PLC. Wire polarity is not important. Recheck tightness of all connections.

Pole-mounted iN2 PBS

Re-install the lower cover. Re-install the sign. The lower cover and sign provide ingress protection in high moisture/high salt environments. Additional corrosion protection (for signs around the screws) can be gained by adding rubber washers or grommets on the sign screws, or with the use of a silicone sealant.

The iN2 PBS is now ready to use. For programming and configuration of the iN2 PBS, please refer to the Polara Field Service App for iOS User Guide (starting on page 21 of this manual) or the Polara Field Service App for PC User Guide (starting on page 46 of this manual).

IMPORTANT: The iN2 System (iN2 PBS and iCCU-X) operate with compatible firmware sets. To ensure proper operation of the complete system and to have the latest features and security enhancements, all equipment should be upgraded upon installation with the latest released firmware. The latest firmware may be obtained through our iOS or PC Applications with an active internet connection. Please refer to Section 8 for the update procedure using the iOS App, or Section 13 for the update procedure using the PC App.

3.6.1 Connecting an External Button

The iN2 PBS supports connection of an external button such as the Polara Bulldog BDSP-014. Pressing the external button is equivalent to pressing the iN2 button, but without the associated push confirmation sound. The button wire pair should connect to the small terminal block with one wire to the GND terminal and the other wire to the PWR terminal. Polarity is not important. More than one external button is acceptable.

4. Technical Support Contact

Polara
714-521-0900 or 888-340-4872

The latest version of this manual is available in PDF format at www.polara.com.

5. Using the Polara Field Service App for iOS to Change iCCU-X Settings

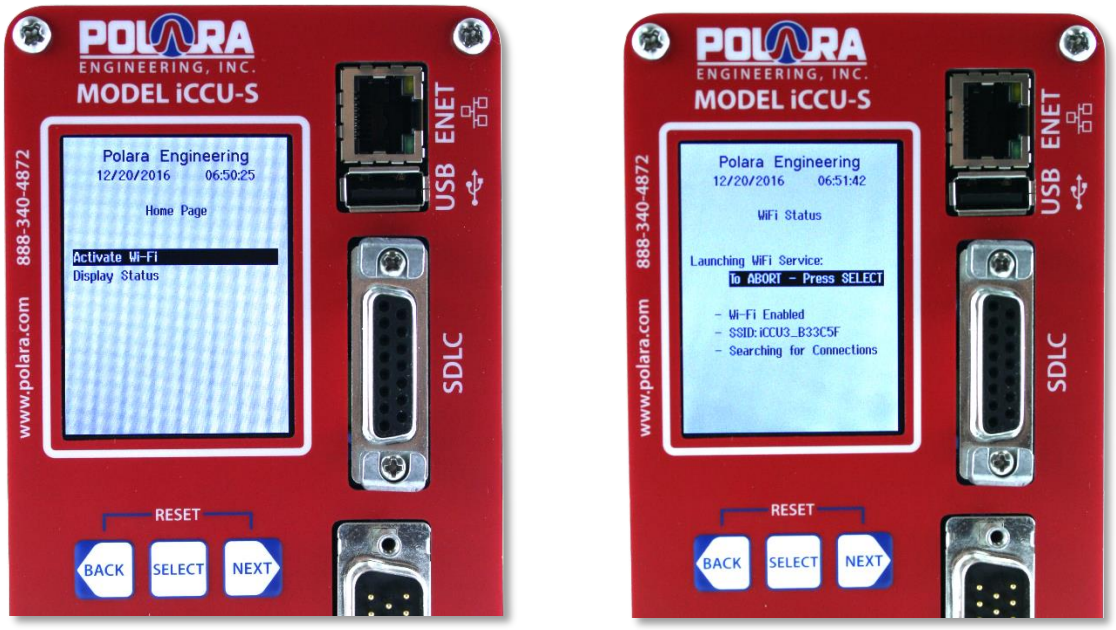
All of the available setup and maintenance procedures may be performed using a compatible iOS device. Your device must have iOS version 9.0 or higher.

The Polara Field Service App is available free in the App Store. Search for Polara and restrict the search to “iPhone Only”. Locate the app and tap the download arrow to install. For more information on installation, including how-to videos, tech briefs, and more, please visit Polara’s web site - www.polara.com.

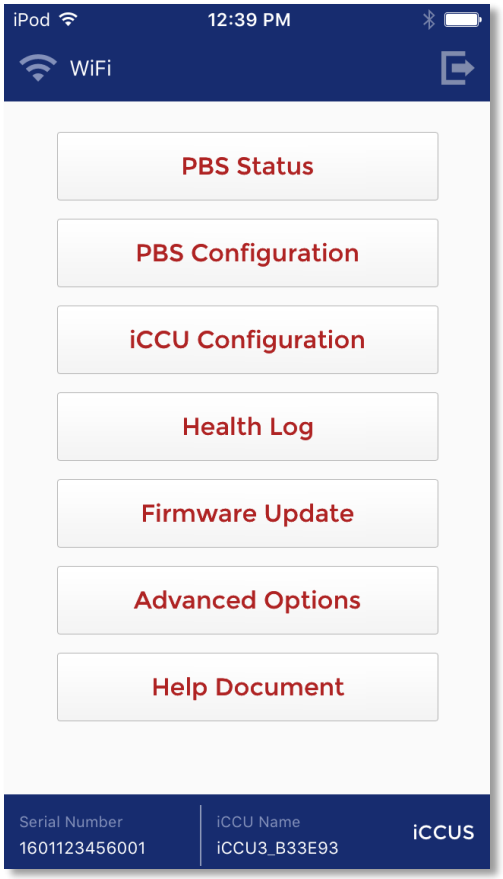
The App supports Bluetooth connection to any PBS, and Wi-Fi connection to the iCCU-X. All PBS and iCCU-X configuration options are accessible using either connection. File uploads containing firmware or audio must be performed by connecting directly to the target unit.

5.1 Wi-Fi Connection

While a Bluetooth connection will allow complete system configuration access, a Wi-Fi connection is also available. Before connection is possible, Wi-Fi must be enabled on the iCCU-X. This is done by pressing the SELECT button on the iCCU-X front panel while the main start-up screen is visible. The display should confirm that Wi-Fi is enabled.

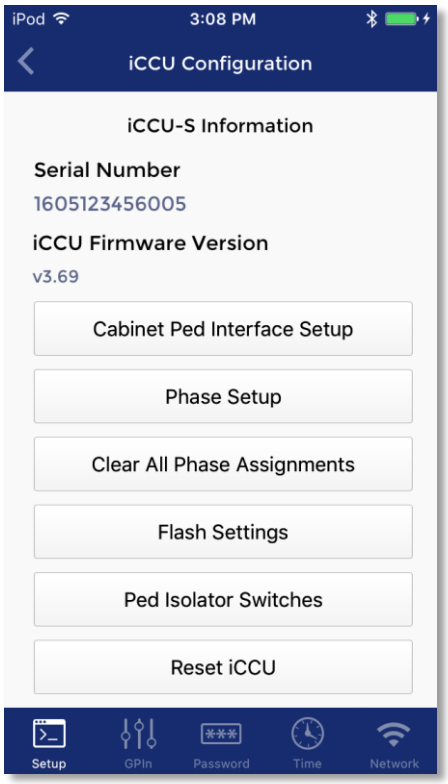


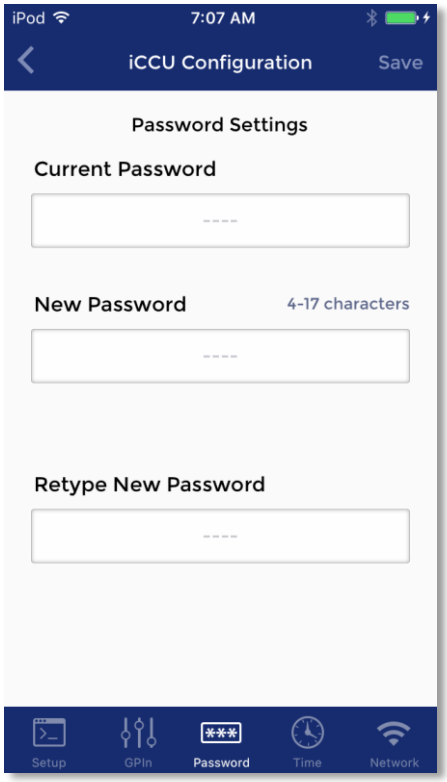
Go to Settings on your iOS device and tap Wi-Fi. Locate the Polara iCCU-X in the list of available devices. Tap the name to select (SSID indicated on LCD of iCCU-X), then enter the Wi-Fi password as requested. The Wi-Fi password is “DEFAULT1” (all caps, no quotes). After the connection is made, you may exit Settings and start the Polara Field Service (FS) App. The start page will display a list of available devices. Tap iCCU at the top of the list and enter the password (factory default is 1234), then tap “Connect”. You will then be presented with the Main Menu.



5.2 Changing the Password

To change the password, choose iCCU Configuration from the Main Menu. From the icons at the bottom of the iCCU Configuration screen, choose Password. Enter in the appropriate fields, the current password, new password, and new password repeated. Then choose Save from the upper-right area of the screen.





5.3 Advanced Communications Settings

All iN2 PBSs connected to the interconnect board communicate with the iCCU via the field wires, using one of two communication channels A or B.

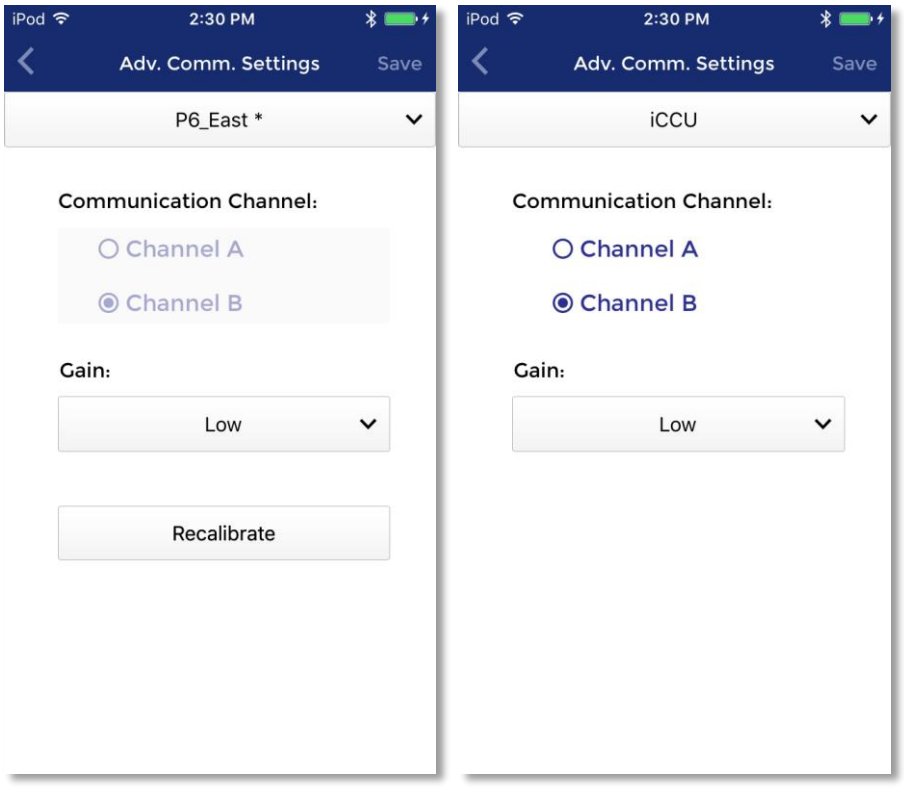
During initial startup, the iCCU will operate in Channel A by default. The first time an iN2 PBS powers up, it will auto calibrate by finding the communication channel the iCCU is operating on, and then adjust its signal until it establishes communication with the iCCU. This process typically takes 1-3 minutes. Once calibrated, each iN2 will save its communications settings in non-volatile memory and use them during any subsequent restart. Once a PBS' communications settings are calibrated and it makes a successful connection to the iCCU, it will flash its pilot light in a four flash pattern. This four flash pattern will continue until the PBS is assigned to a phase that is receiving pedestrian Walk, Don't Walk or Clearance intervals.

If a calibrated PBS loses connection to the iCCU for an extended period of time or if it cannot connect to the iCCU at start up, the PBS will restart itself and come up in an un-calibrated mode. It will search for the iCCU on both communication channels and calibrate itself once it locates the iCCU's operating channel. If no iCCU is available, the PBS will continue to search until it finds the iCCU. If one or more PBSs cannot connect to the iCCU during the calibration process (two flash pattern continues), the Communication Channel on the iCCU should be changed.

Any PBS can be manually forced to re-calibrate by using the Advanced Communication Settings. This may be necessary if the PBS is already calibrated but moved to a different location in the intersection.

If all the iN2 PBSs can connect to the iCCU, but one or more experiences timeout errors when reading remote health logs, or while trying to set PBS parameters to all PBSs, the gain on an individual iN2 PBS may need to be adjusted. Use the Advanced Communications Settings menu and try increasing the communications gain to the next highest level from what the auto calibration set it to.

To change the Communications Channel of the iCCU, connect to the iCCU and use the Advanced Communications Settings menu to select the Communications Channel B and press "Save". Before changing the Communications Channel, the iCCU will signal all connected buttons to disconnect, restart, and recalibrate so the automatic recalibration function will happen automatically.



If one or more iN2 PBSs still cannot connect to the iCCU, the communication gain can be adjusted on the iCCU using the Advanced Communications Settings menu.

Because of the various types and states of field wiring, communication may not work in all field wiring conditions, so Polara cannot guarantee an iN2 system will work on all intersections. If the above steps fail in establishing reliable communication between a PBS and iCCU, a 3-Wire system is the only option.

Polara recommends the use of a 12/2 IMSA 50-2 cable.

5.4 Channel and Phase Setup

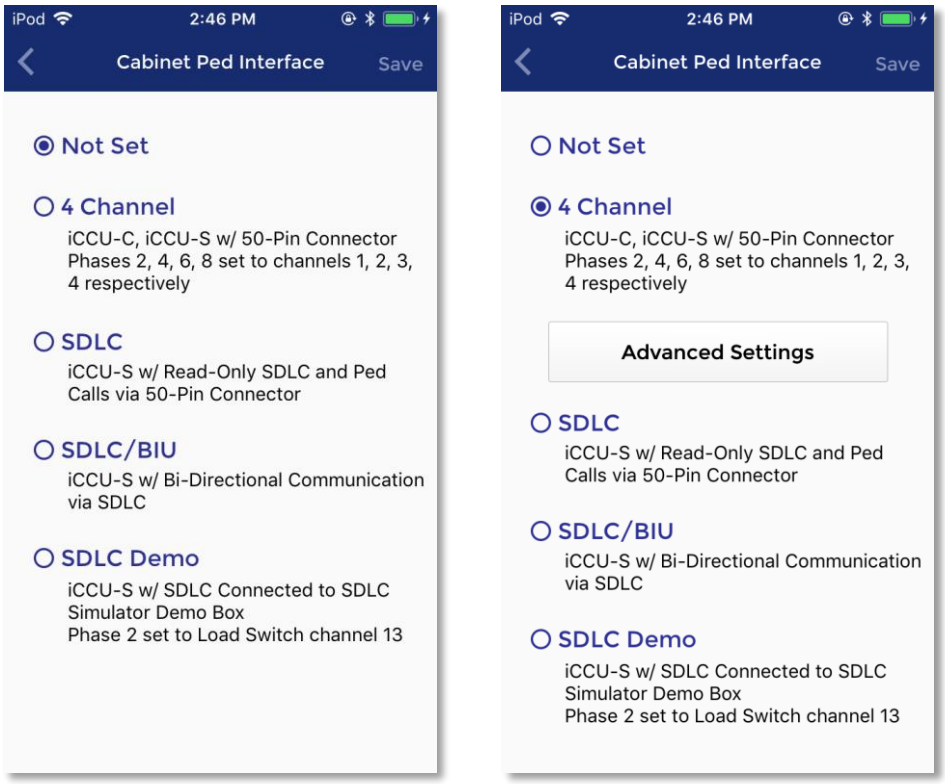
The iCCU-S can obtain Ped interval information by monitoring the outputs of the load switches (via the 50-pin harness' Cable #4) or by monitoring the SDLC bus. The iCCU-C obtains Ped interval information via the C4 cable adapter, and has automatic Source Selection. Follow the appropriate setup steps below, depending on which iCCU-X model you have installed, and how it is wired in the cabinet. Refer to sections 3.4 & 3.5. The iCCU-S supports four phases. The system identifies four channels, named A, B, C, and D. Each pedestrian phase will be associated with a channel.

5.4.1 Ped Interval Source Selection (iCCU-S only)

Begin by navigating to the Setup tab on the iCCU Configuration screen (Main Menu → iCCU Configuration). Select Cabinet Ped Interface Setup.

If Using Cable #4 of the 50-pin harness for Load Switch Monitoring:

Select the 4 Channel option. Then tap Save in the upper-right of the screen.

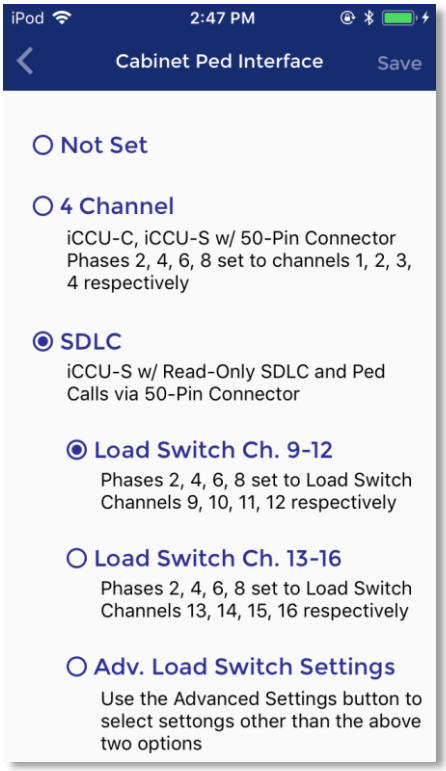


Proceed to Assigning iN2 PBSs to Phases in section 5.5.

If using an SDLC cable to monitor Ped Intervals only:

Typically the there are two options for load switch configurations in cabinets using channels 9 through 12 or channels 13 through 16 for PED load switches. Select the appropriate SDLC option based on the load switch setup in your cabinet. Tap the save button in the upper right corner to store the setting, then tap the back button to return to the previous screen and proceed to Assigning iN2 PBSs to Phases in section 5.5.

If your setup differs from one of these options, select either of the SDLC options, tap the Save button in the upper right corner of the screen, and then tap the Advanced Settings button at the bottom of the screen to modify the setup for your specific needs.



If using an SDLC cable in BIU Mode (no 50-pin harness):

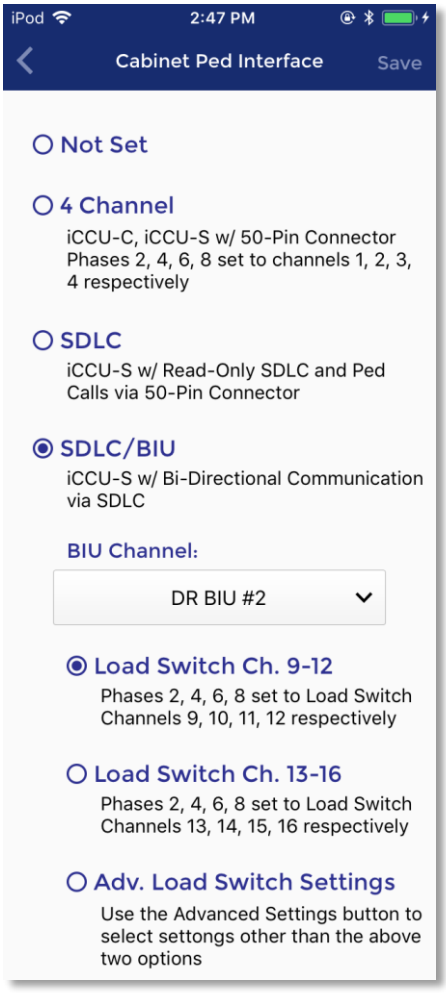
The NEMA TS 2 2003 specification defines SDLC command and response frames for 4 detector BIUs. The iCCU-S can be configured to operate as any one of these four BIUs for the purpose of placing pedestrian calls to the traffic controller. Typically, there are 4 pedestrian phases (2, 4, 6 and 8), however the iCCU-S can be configured for up to 8 pedestrian phases. By default, detector BIUs are used to places vehicle calls in the traffic controller. In order to use the iCCU-S configured as a detector BIU, the traffic controller needs to be programmed to map the vehicle call inputs to pedestrian call inputs. The process to do this varies by traffic controller. Consult your traffic controller manual or manufacturer for instructions on how to do this.

Each detector BIU communicates call status for up to 16 detector inputs. When configured as a detector BIU, the iCCU-S uses the first 8 detectors. See the table below for detector input numbers and how they need to map to pedestrian inputs.

BIU#1	BIU#2	BIU#3	BIU#4	Pedestrian Mapping
Det Input 1	Det Input 17	Det Input 33	Det Input 49	Ped Input 2
Det Input 2	Det Input 18	Det Input 34	Det Input 50	Ped Input 4
Det Input 3	Det Input 19	Det Input 35	Det Input 51	Ped Input 6
Det Input 4	Det Input 20	Det Input 36	Det Input 52	Ped Input 8
Det Input 5	Det Input 21	Det Input 37	Det Input 53	Ped Input 1
Det Input 6	Det Input 22	Det Input 38	Det Input 54	Ped Input 3
Det Input 7	Det Input 23	Det Input 39	Det Input 55	Ped Input 5
Det Input 8	Det Input 24	Det Input 40	Det Input 56	Ped Input 7

Note: A NEMA TS 2 traffic controller can only communication with a single BIU at each SDLC address. If the iCCU-S is configured to a BIU number that already has a BIU device with the same number (address), then the other BIU device with the matching number needs to be disconnected.

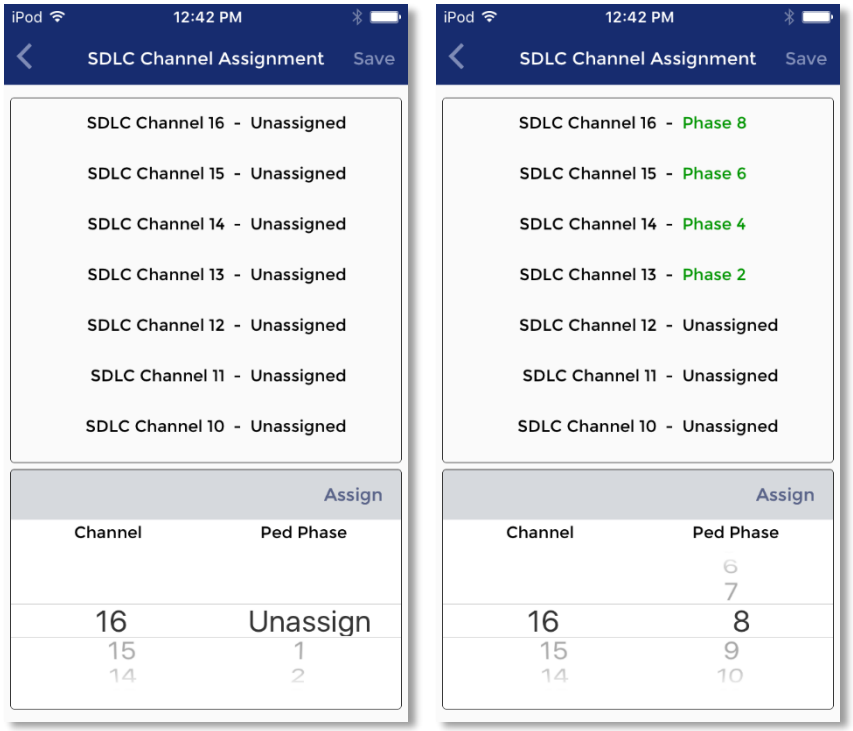
To configure the iCCU-S as a BIU, go to the “Cabinet Ped Interface” Menu and select an available detector BIU number and the proper pedestrian load switch configuration for the cabinet. If the pedestrian load



switch configuration is not listed, or more than 4 pedestrian phases are needed, select the “Adv. Load Switch Settings and assign the appropriate phases to load switch channels.

Configure the traffic controller to enable the detector BIU number selected. Program the traffic controller to remap the detector inputs to Ped inputs according to the table above. Consult your traffic controller manual or manufacturer for instruction on how to do this.

5.4.2 Advanced iCCU Settings – Channel Assignment



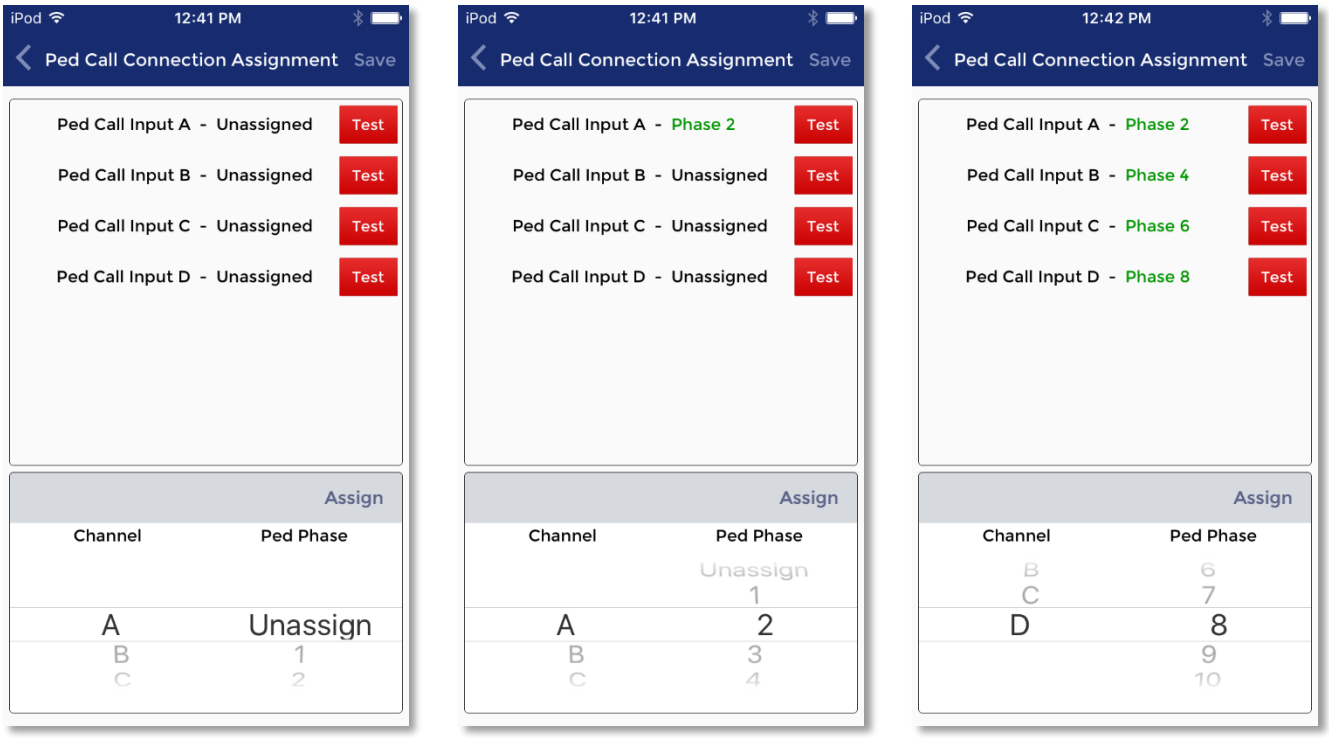
Associate phases with the SDLC PED channels that should be monitored. Refer to the traffic controller’s user manual and configuration to determine which SDLC channels correspond to which Ped phases.

To associate an SDLC PED channel with a phase, choose the channel from the selector on the bottom-left of the screen and choose a phase from the selector from the bottom-right of the screen. Then click Assign. The new phase assignments will be highlighted in green in the top area of the screen, indicating a change has been made but not saved. Continue to assign the appropriate phases to all channels in use. When finished, select Save in the upper-right area of the screen.

Proceed to Ped Call Connection Setup on the next page.

5.4.3 Advanced iCCU Settings – Ped Call Connection Setup

On Cable #2, the wire for channel A (Brown/White), needs to be wired to place a call for the same phase, in this case phase 2. Note, that test calls can be placed from this screen by pressing the Test button to the right of each channel.

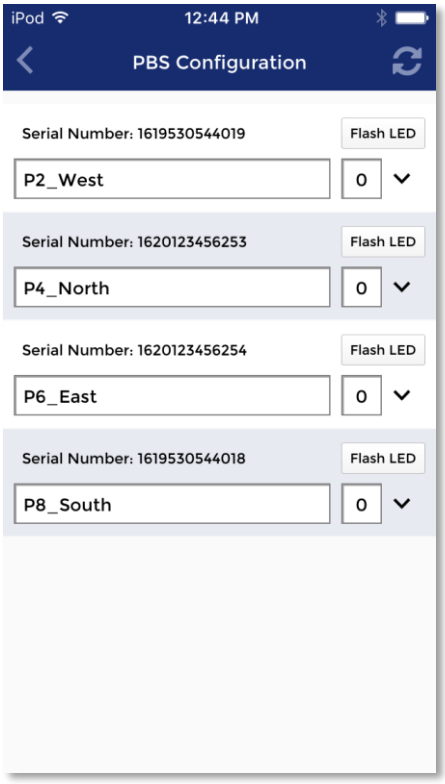


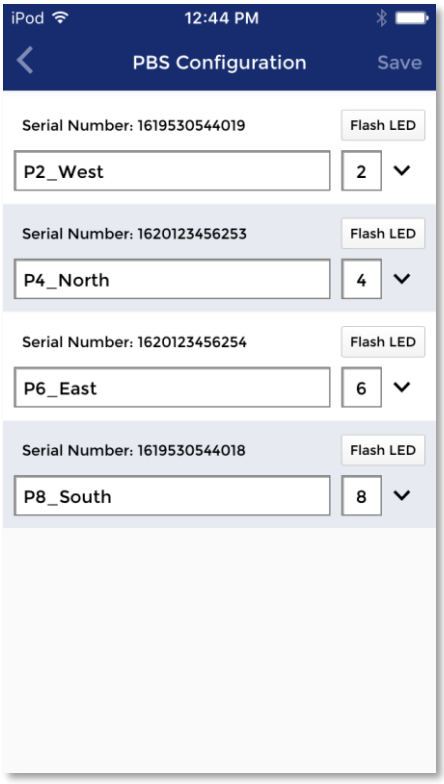
To associate a Ped Call Channel with a phase, choose the channel from the selector on the bottom-left of the screen and choose a phase from the selector from the bottom-right of the screen. Then click Assign. The new phase assignment will be highlighted in green in the top area of the screen, indicating a change has been made but not saved. Continue to assign the appropriate phases to all channels in use. When finished, select Save in the upper-right area of the screen and you will be returned to the Cabinet Ped Interface selection screen. Tap the left arrow in the upper left corner to return to the iCCU Configuration Setup menu.

With the Channel/Phase assignments configured, iN2 PBSs can now be assigned to phases.

5.5 Assigning iN2 PBSs to Phases

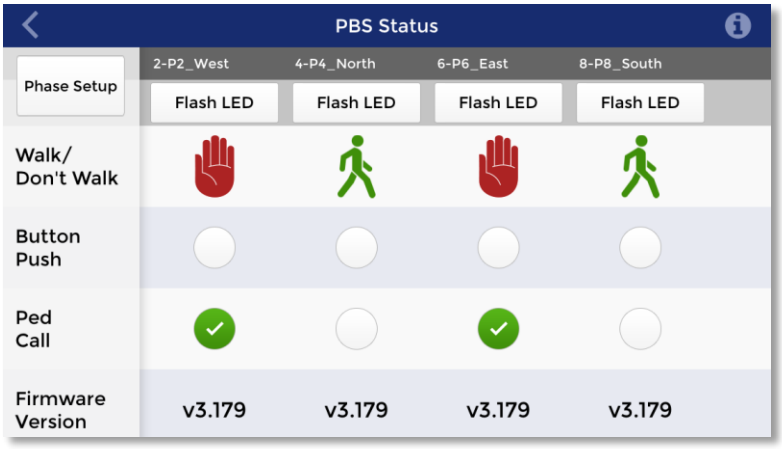
Following the Cabinet Ped Interface Setup process, each connected iN2 PBS must be named and be assigned a phase. At this point, all buttons need to have been installed and powered. From the iCCU Configuration, Setup tab screen, choose “Phase Setup”. It is suggested to name the PBS with something that identifies the installed location and the phase (must be 4 to 15 characters). If unsure of the location of a PBS, press Flash LED button to the right of the name to cause the PBS’ red LED to flash briefly. Assign the appropriate Phase by tapping the down arrow on the right and selecting the phase in which to assign the PBS. When finished naming all buttons and assigning phases, select Save on the upper-right of the screen.





After these steps, the system should be fully operational. The steps leading up to this point must have been completed without error to ensure that the PBS walk indications are matched to the correct crosswalks. Walk the intersection and verify that each PBS is linked to the correct phase.

From the main menu, tap the PBS Status button to see a screen with all iN2 units and their status.



On this PBS Status screen, the information is shown live from what is occurring in the intersection. There is a 2-5 second delay on the information.

Tapping on the Flash LED button will flash the pilot LED on the selected PBS for a few seconds.

Tapping anywhere else on a PBSs column will provide a shortcut to the PBS Configuration Settings for the selected PBS.

5.6 Setting the iCCU-X Time and Date

While viewing the home page, tap on “iCCU Configuration”. Select the Time icon at the bottom of the screen. Tap to choose a method of obtaining the time, then tap on “Save” to update the iCCU-X’s clock.

Note that this operation also sends the time to any iN2 PBSs currently connected to the network.

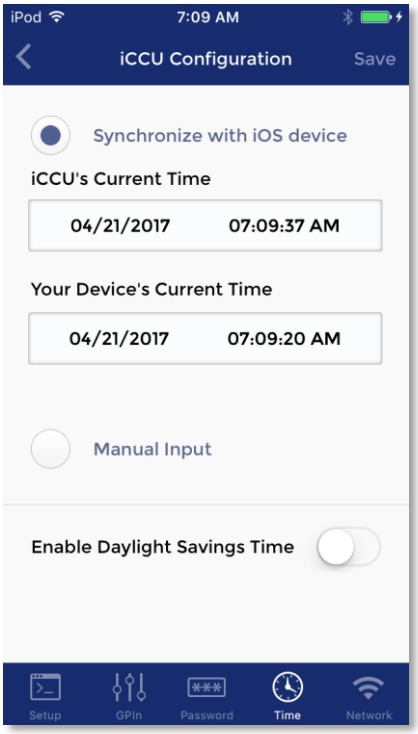
5.7 Setting Ethernet Configuration

From the iCCU Configuration screen, select the Network icon at the bottom of the screen. Enter the desired IP, Subnet Mask, Gateway, and Port. Choose Save from the upper-right of the screen.

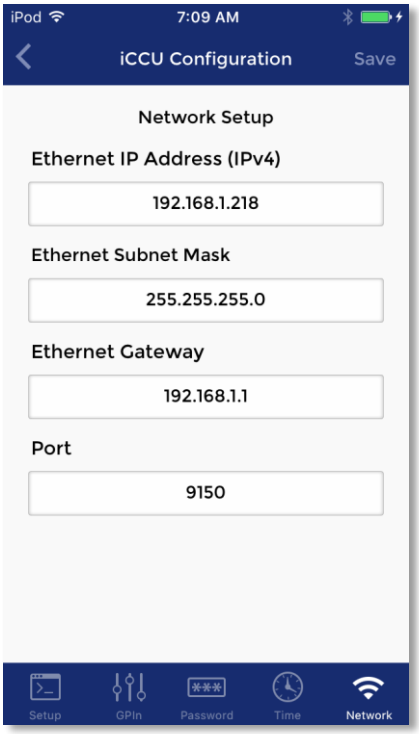
5.8 General Purpose Input and Pre-emption (iCCU-S only)

From the iCCU Configuration screen, select the GPIn icon at the bottom of the screen.

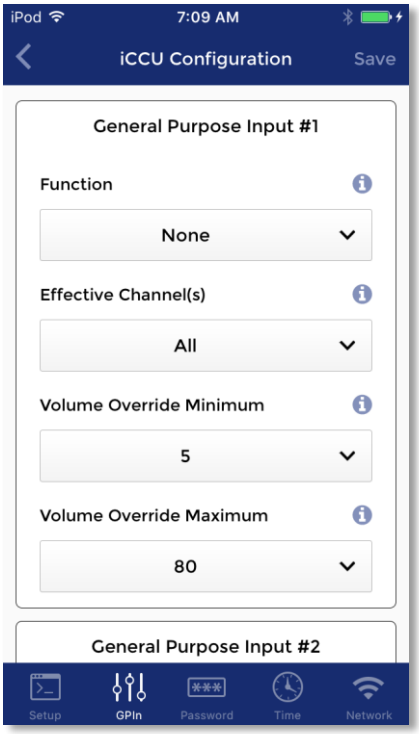
For each General Purpose Input to be used, select the desired function, the effective channels, and the desired volume. Preemption may be configured in the same way.



Set Time/Date



Ethernet Configuration

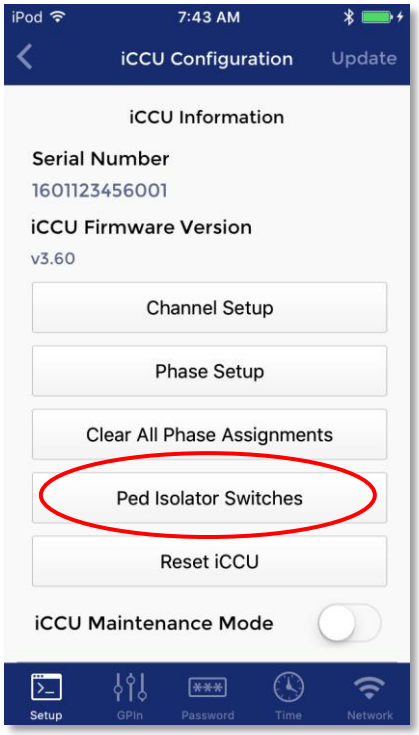


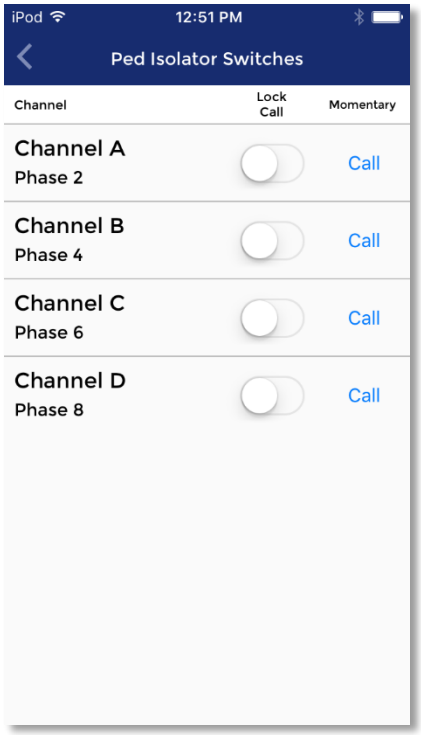
GPIn/Preemption

5.9 **Ped Isolator**

Tap on the Ped Isolator menu item under the iCCU Configuration / Setup Tab. From this screen, single calls can be placed on individual phases by tapping the Call button. Also, calls can be locked in for any phase. As long as the lock call switch is activated, the call will remain locked, even after disconnecting from the Wi-Fi connection. The iCCU will continue to lock calls until the switch is deactivated or the iCCU is power-cycled.

This screen is accessible on the PC App, iOS App and also on the front LCD panel of the iCCU.



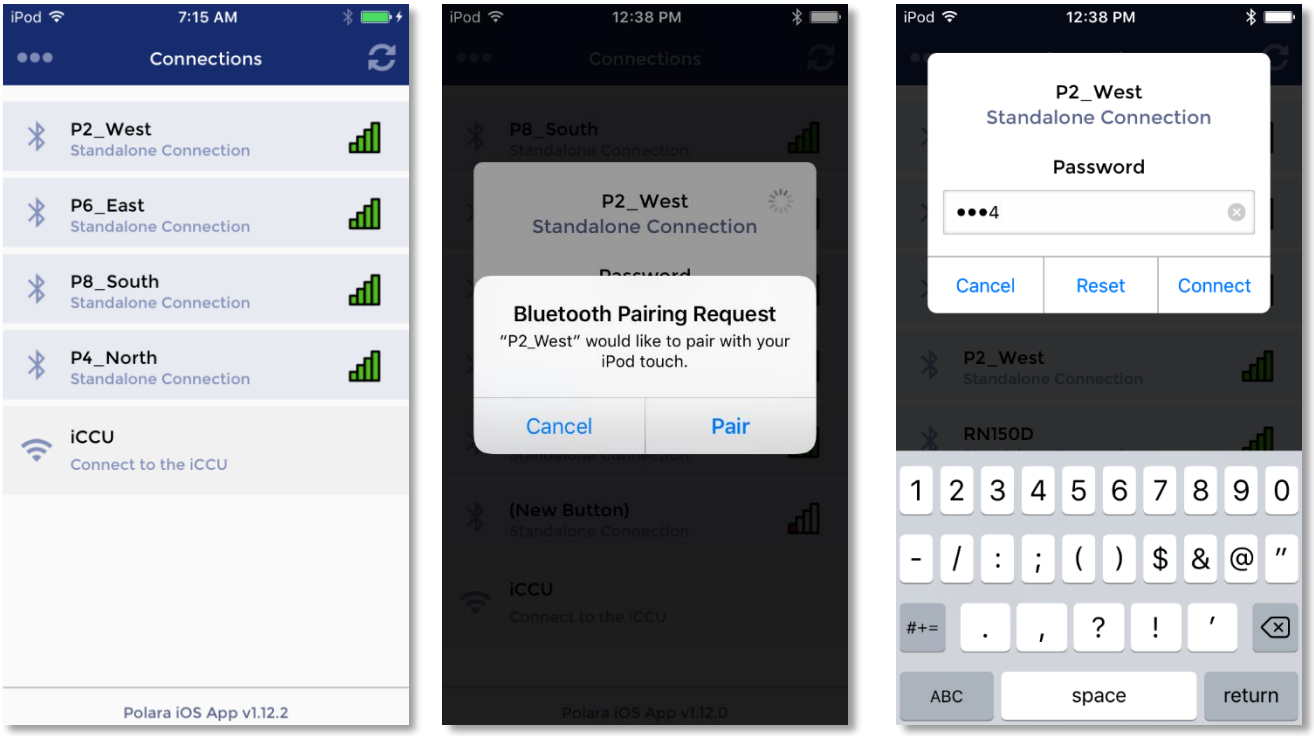


6. Using the Polara Field Service App for iOS to Change iN2 PBS Settings

6.1 Bluetooth Connection

Bluetooth LE is built into each PBS. **All configuration settings may be performed by connection to any PBS currently operating with the iCCU-X. Audio file updates and firmware file updates may only be performed by connection to the target device.**

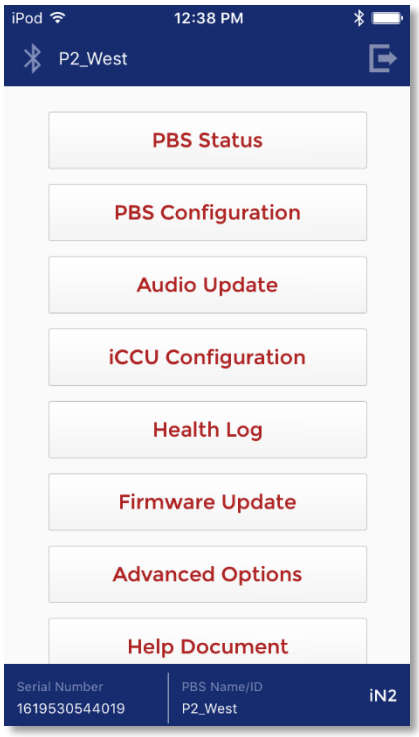
Before starting the Polara Field Service App, make sure your iOS device has Bluetooth set to ON in Settings. Then, start the app. Tap the refresh symbol at the top right. This will display a list of all available devices. The symbol to the left of each device name indicates the type of wireless connection. Each PBS offers a Bluetooth connection. Tap a name to select, enter the password (factory default is 1234), then tap “Connect”. This will display the main menu.

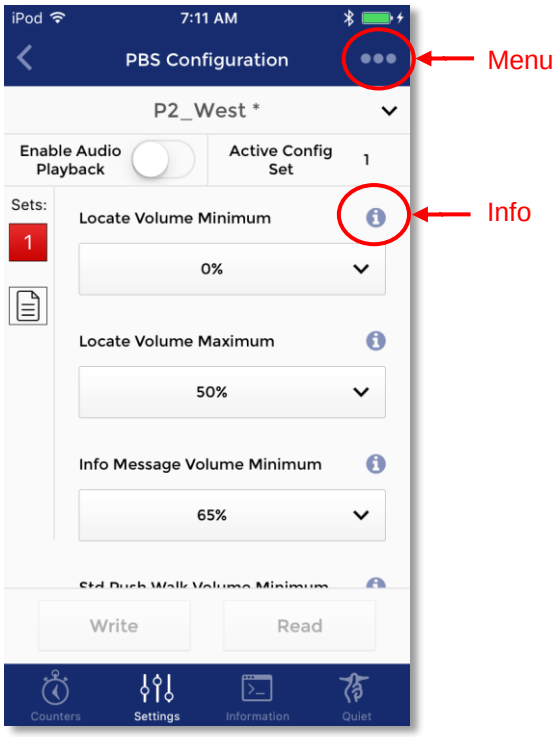


Connection and Login Screens

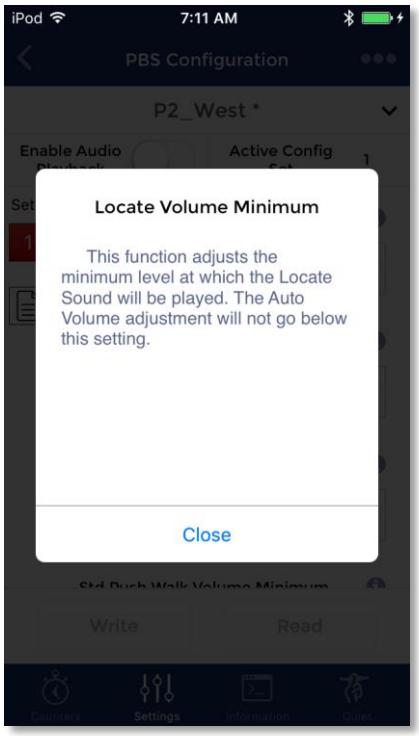
6.2 PBS Configuration Options

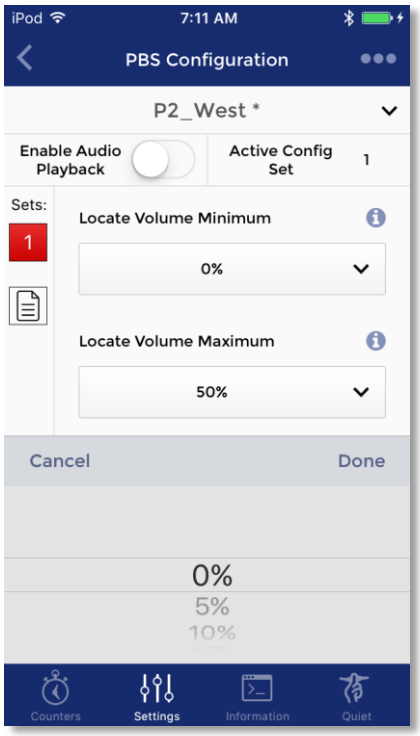
From the Polara App main menu, tap the box for “PBS Configuration”. This presents an extensive list of operational settings that may be adjusted according to desired operation. You can swipe the list up and down to find the setting to be changed. To the right of each setting title is an information button. Tap this button for a description of the setting.



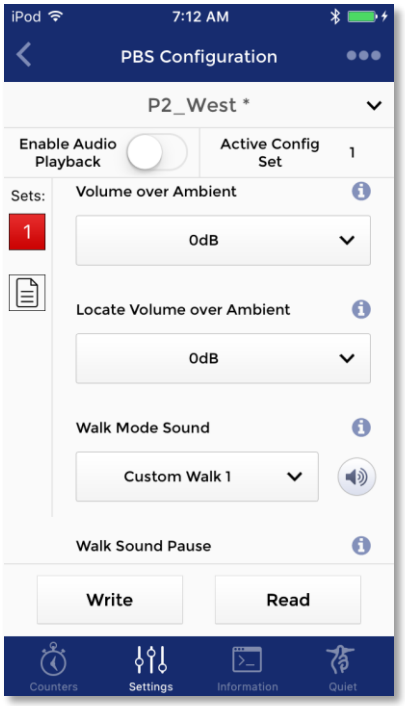


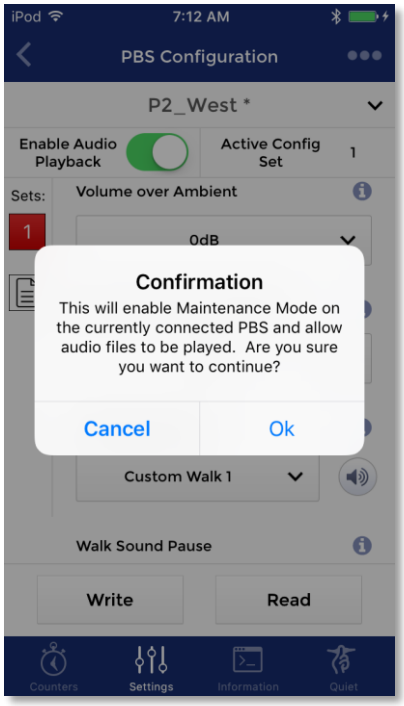
Tap in the option box to access the options for that setting. Swipe up or down to select an option. Press “Done” to select a new option or “Cancel” to proceed without any change. Tap the “**i**” (info button) for more information regarding the setting.

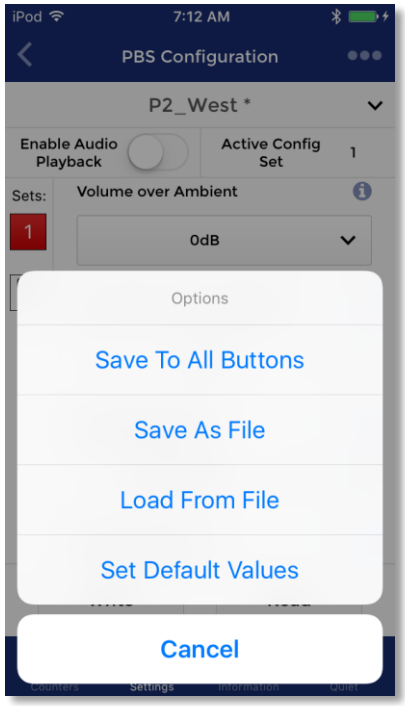




Options for selecting sounds have a button with a speaker symbol. To listen to sounds, use the slider to Enable Audio Playback. Then, tap the speaker symbol to listen to a sample of the sound. Sounds will play out of the PBS's speaker.

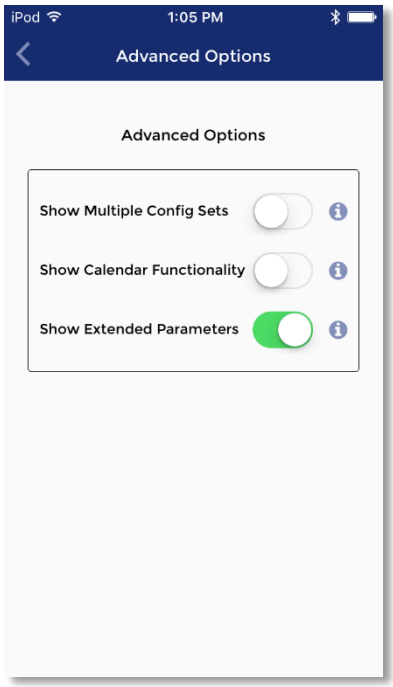


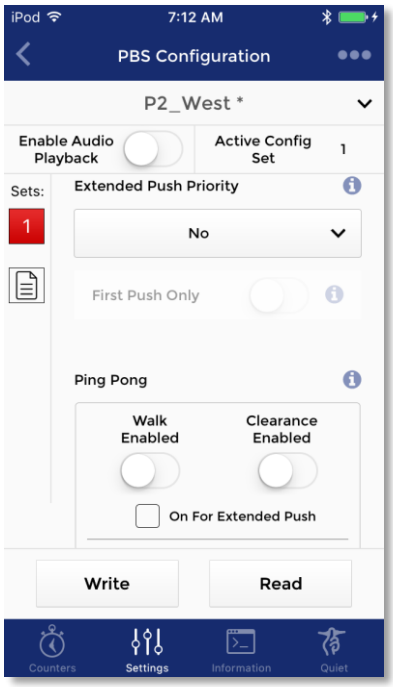




When you are finished selecting desired settings, tap the Write button to write the settings to the connected button. Alternatively, tap the menu symbol at the top right to access additional options including saving to all buttons in the intersection. After saving new settings to buttons, walk the entire intersection to test each PBS for proper operation to verify that the new settings work as intended.

There are a few additional options that must be enabled in order to view and change. From the main menu, tap the Advanced Options and then turn the switch on for Show Extended Parameters. Then return to the PBS Configuration screen. You will see a few additional options added to the bottom of the parameter list. For example, Extended Push Priority and Ping Pong options are viewable using this option.

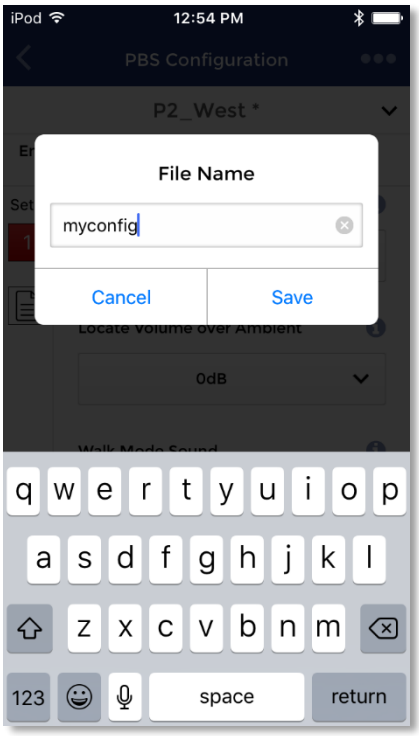




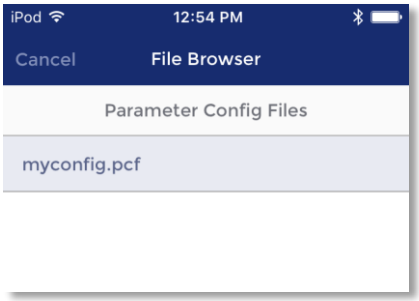
The currently displayed settings may be saved to a file and recalled for later uploading to other PBSs. Tap “Save As File” and enter a file name to create a file.

Tap “Load From File” to browse previously saved configuration files. Tap a file name and then tap “Select File” to load the settings into the iOS device’s clipboard. Tap the desired Configuration Set and then tap WRITE to save settings to the PBS.

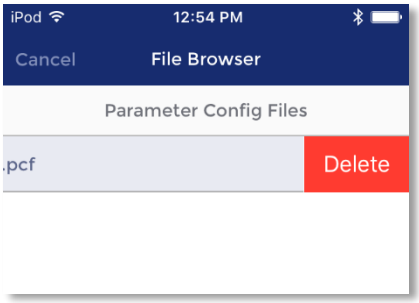
While in the File Browser, you can delete files, if necessary. To delete files, swipe from the right to the left to show the Delete button, then tap the Delete button.



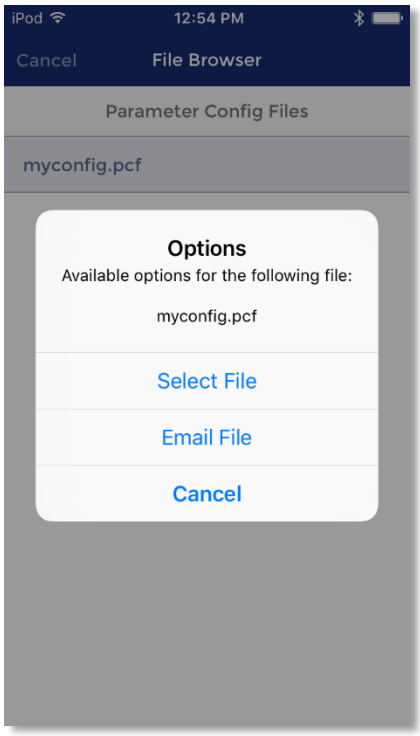
Save Dialog



Load From File



Delete File



File Options

To email a file to another device, tap “Email File”. Enter an email address and tap “Send”.

The button push force can also be adjusted from the PBS Configuration screen. Scroll down the page to find “Button Push Force”. Tap inside the setting box. Swipe to select Light, Medium, or Firm, then tap “Done”. Save the new setting as described previously.

6.3 Quiet Time

The iN2 PBS has a feature to easily allow the button to become quieter at a specified time of day. This is useful, for example, when a residential street experiences a lot of traffic during the day, but very little in the evening. In this scenario, it may be useful to have the iN2 PBS set loud enough to be heard over traffic during the day, but be nearly inaudible in the evening hours, as not to disturb residents living nearby. Quiet Time allows for a reduction in volume between a specified time interval, within a 24-hour day.

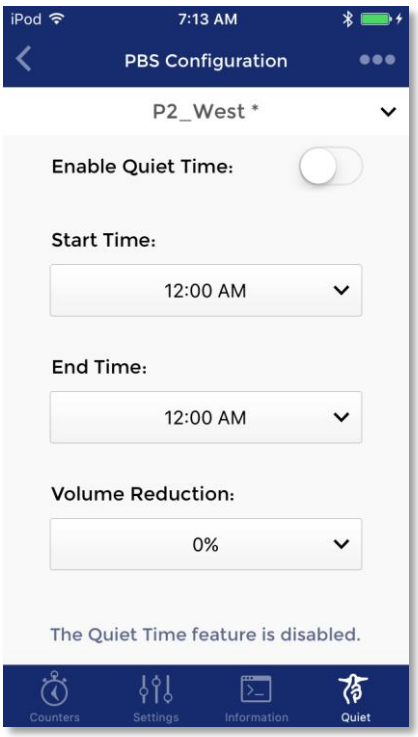
The details of the features operation is such that if the current time of day falls between the selected start and end time of the Quiet Time period, then all Minimum and Maximum volume settings will be reduced by the specified reduction amount.

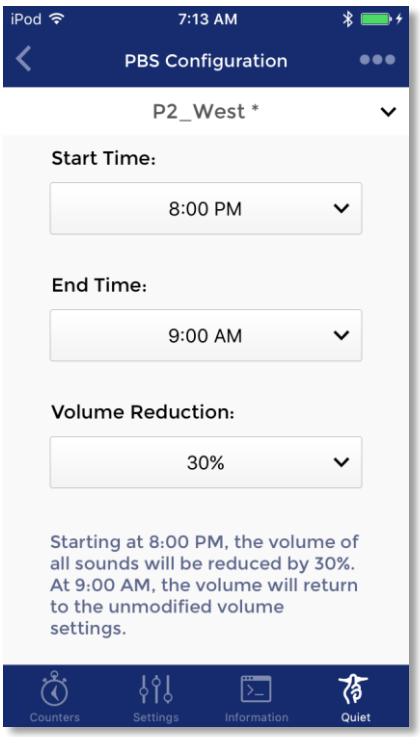
Note: The “Minimum” volume setting can be reduced down to 0%, but the “Maximum” volume setting will only be reduced down to 25%. This follows what is settable in the configuration parameters or settings screen.

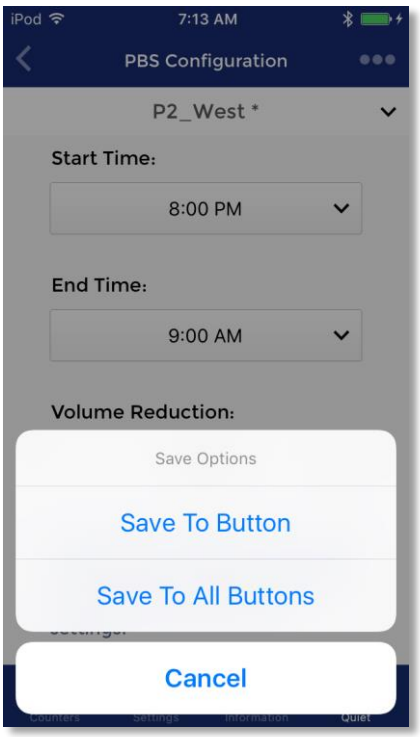
The table below shows what the effective volume settings would be with the Quiet Time set to reduce the volume by 30%. With the values set as shown in the screenshots, between the hours of 9:00am and 7:59pm, the volume will be as set configured in settings (shown in the “set value” column). At 8:00pm to 8:59am the following morning, the volumes will be reduced as shown in the “reduced value” column:

Setting Name	Set Value	Reduced Value
Locate Volume Minimum	0%	0%
Locate Volume Maximum	50%	25%
Information Message Minimum	65%	35%
Information Message Maximum	100%	70%
Std Walk Minimum	30%	0%
Std Walk Maximum	60%	30%
Ext Walk Minimum	60%	30%
Ext Walk Maximum	80%	50%

From the PBS Configuration Menu; select the Quiet Time icon at the bottom of the page. Enter the desired settings, select the 3 dots at the top right of the screen, then select the desired Save option.

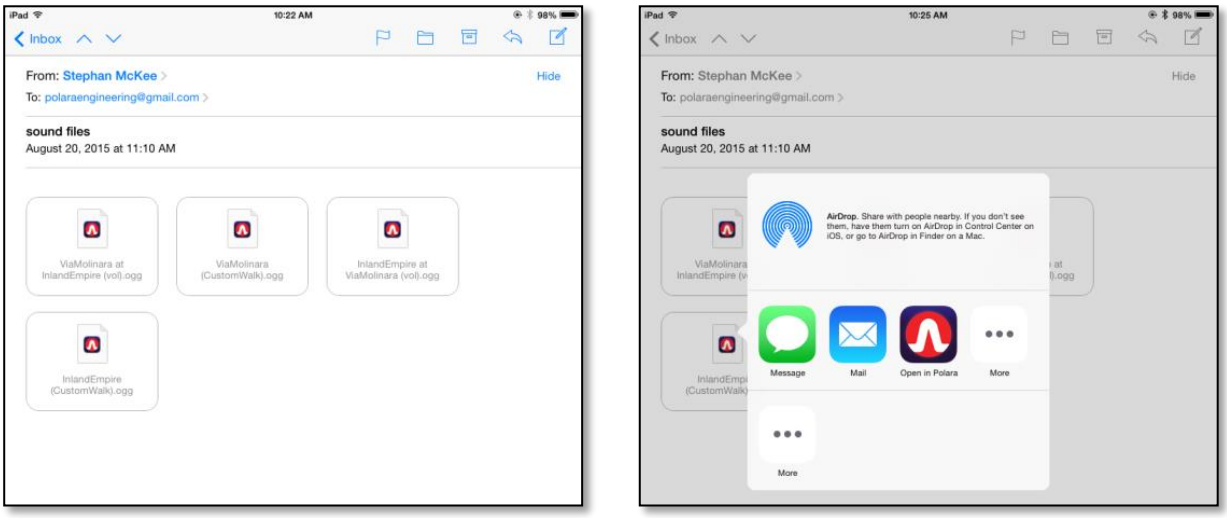






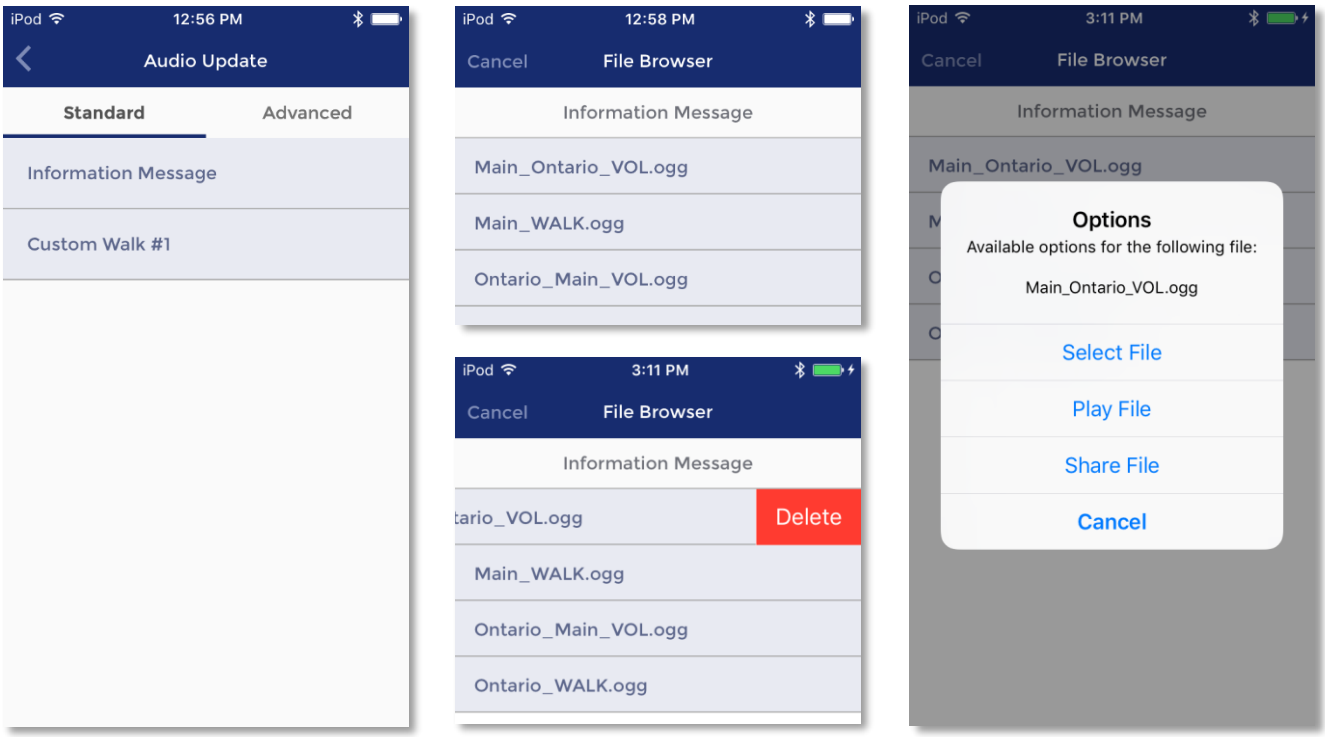
6.4 PBS Audio Update

Audio files to be uploaded must be received as an email attachment on your iOS device. With the email app open and the message displayed, tap on the attachment, then tap “Open in Polara”.



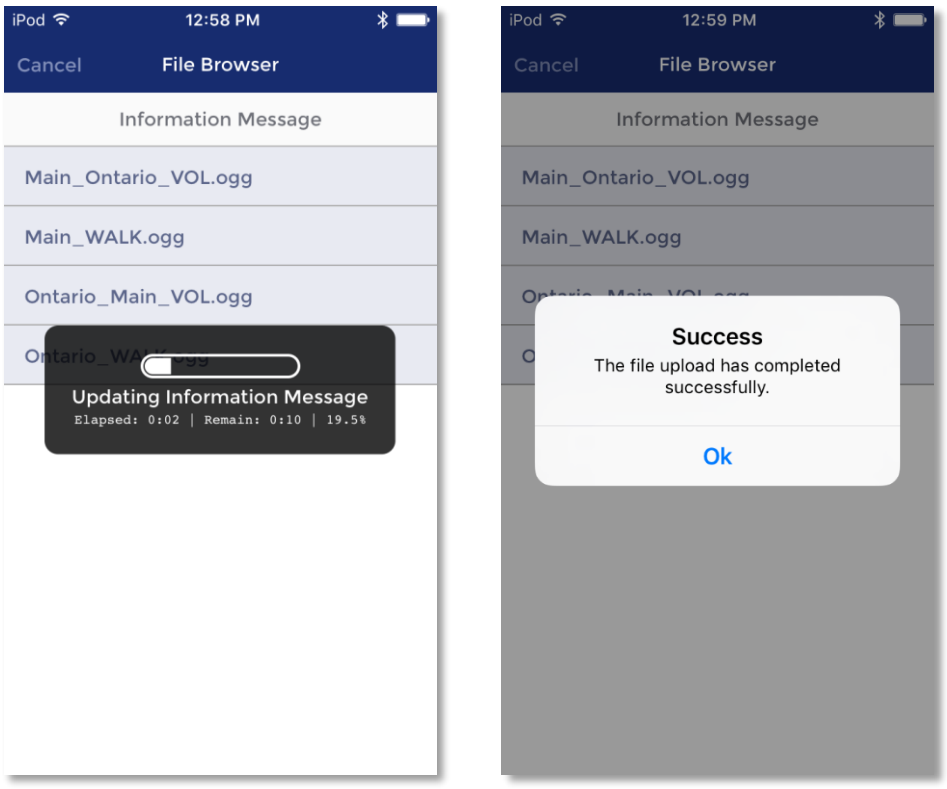
From the Polara App main menu, Tap on “Audio Update”.

To add a new Information Message file, tap on “Information Message”. This displays a list of available voice files loaded into the Polara App. Tap on the name of the file you wish to load as the Information Message sound in the PBS. Then tap the Select File button. You can also preview the file by pressing Play File or Share the file through E-Mail and other services. To delete files, swipe from the right to the left to show the delete button, then tap the Delete button.



Note: Files ending with the suffix VOL should be loaded as an Information Message and files with the suffix WALK should be loaded as Custom Walk.

As soon as the Select File button is tapped, the file will begin to upload. Once the file has completed uploading, press OK on the dialog box to return to the Audio Update screen.



Repeat this process for each file to be uploaded. Typically, a custom set will include two files, one for Information Message and one for Custom Walk #1. To enable these new custom files, go to PBS Configuration and set the Information Message option to “Custom”, and set the Walk Mode Sound option to “Custom Walk #1”.

Note: If additional audio sound customization is required beyond what is listed in the Audio Update screen, use the Intelligent Config PC Application for more audio upload options. This includes adding second language audio files.

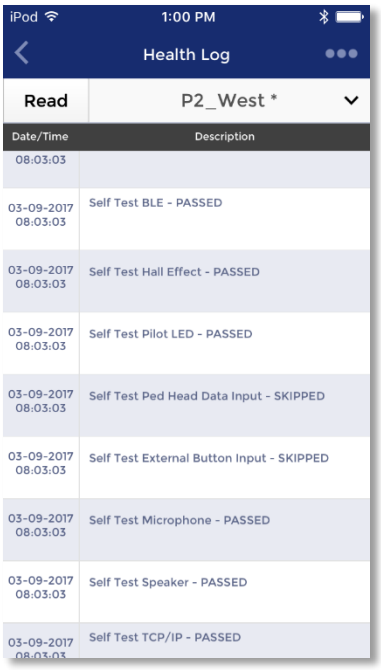
Finish by walking the intersection to confirm the system is both operating properly and playing correct messages.

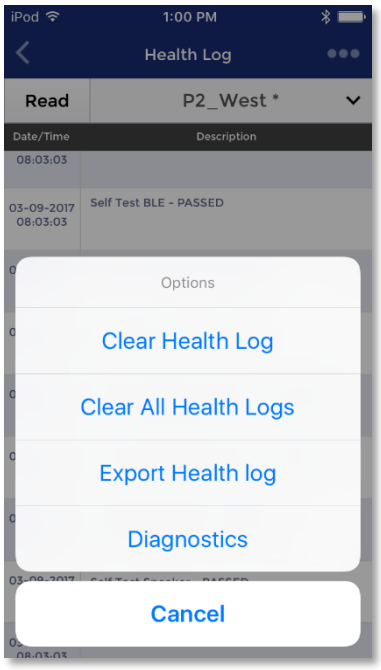
7. Using the Polara Field Service App for iOS to Access the Health Log

7.1 Accessing the Health Log

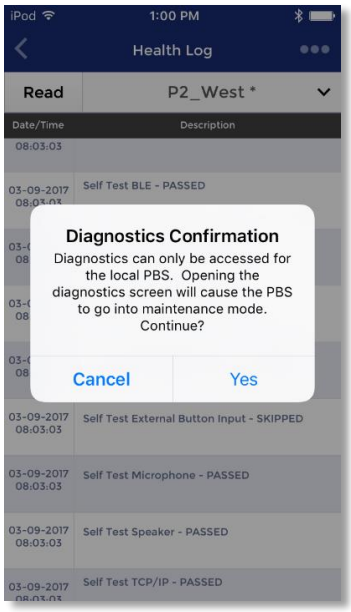
The Health Log contains a list of events, including both normal conditions and error conditions. Each PBS maintains a separate log. These can be very useful for troubleshooting.

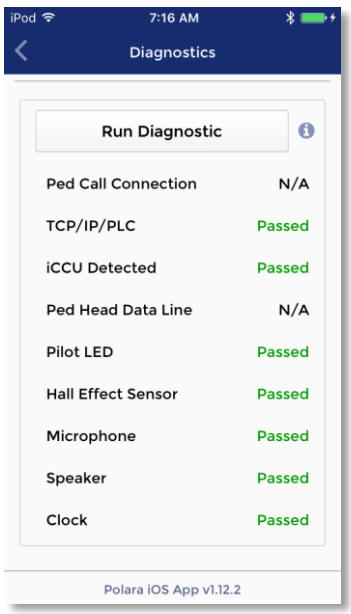
Tap the box for “Health Log” at the Polara App main menu. The Name / ID of the currently connected device is visible at the top. To read the Health Log from this device tap “Read”. The current log is downloaded and displayed. Swipe the screen to browse through the log. Tap the menu symbol at the top right to access a list of actions. The menu symbol is shown as three dots. You can choose to clear the log, export the log to an email address, or access diagnostics. For help with a particular issue, or a message of concern, email the log to support@polara.com.





Selecting “Diagnostics” will show some self-testing and maintenance options.



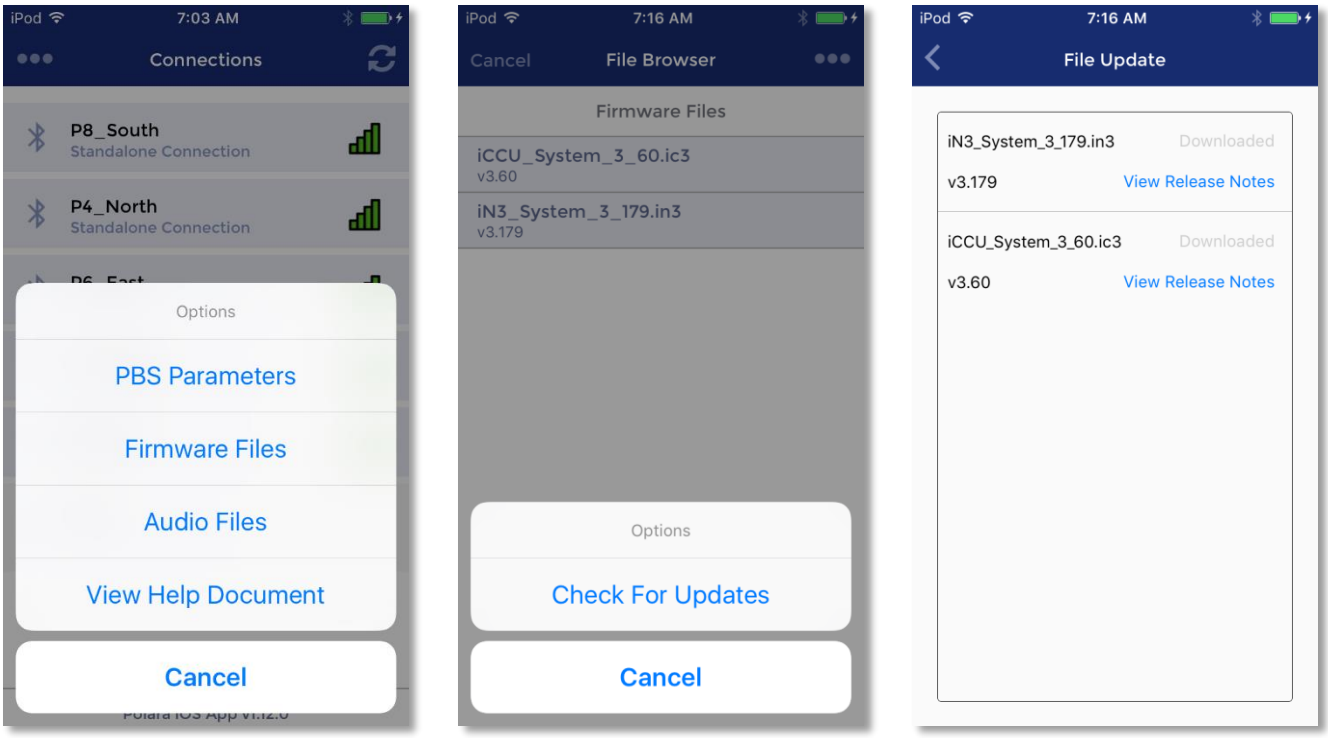


8. Using the Polara Field Service App for iOS for Firmware Updates

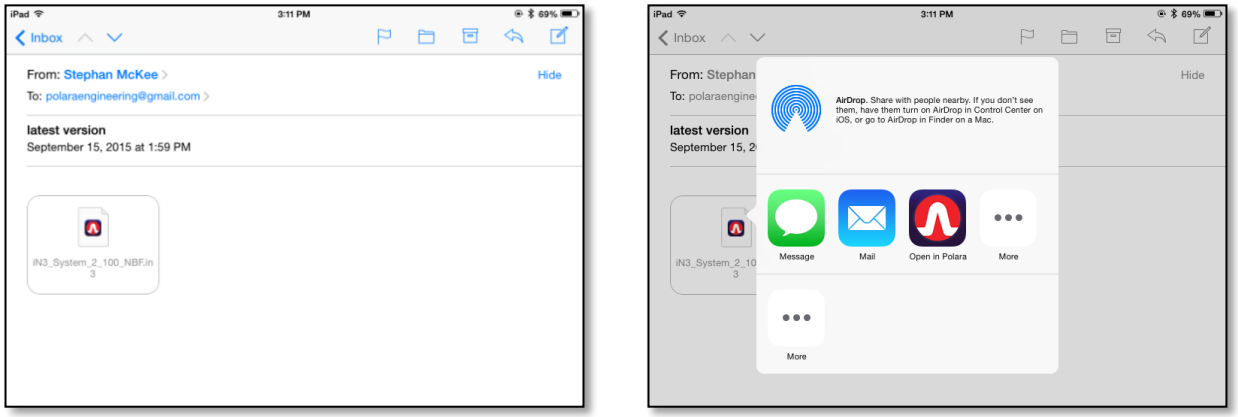
8.1 Updating Firmware

Firmware files are automatically bundled with the Polara Field Service App. The latest firmware at the time of App release is ready and pre-installed for updating.

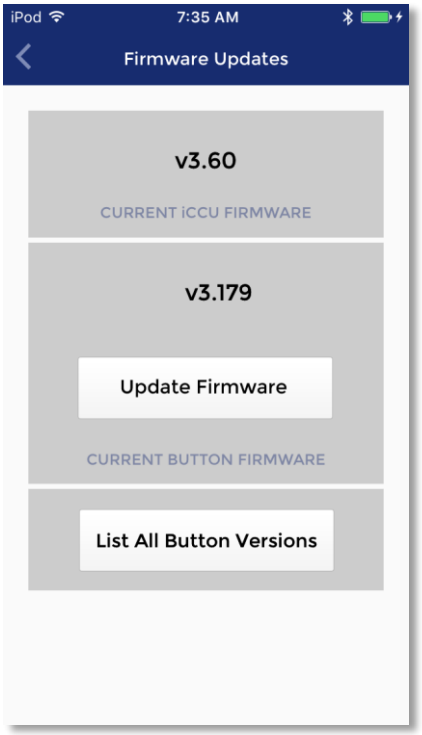
The iOS App also has the ability to connect to polara.com to check for new updates directly from within the App. Your device must be connected to the internet in order to perform the check. While disconnected from any iCCU or PBS, tap the three dots on the upper left of the connection screen. Tap on the Firmware Files option to browse all firmware files on your iOS device. Tap the three dots in the upper right corner of the File Browser screen. Tap the Check For Updates button. The device will connect to the internet and check for the latest firmware files from polara.com and provide them for download. You can tap on View Release Notes to see what the changes are from the previous version or tap the Download button to download the file to your device.

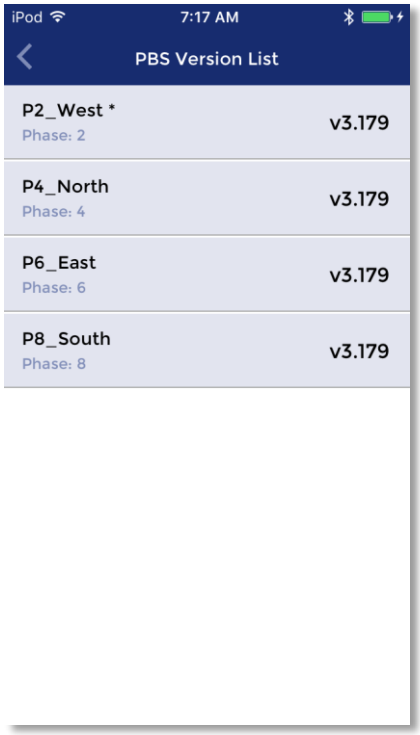


Firmware files to be uploaded can also be received as an email attachment on your iOS device. With the email app open and the message displayed, tap on the attachment, then tap “Open in Polara”.

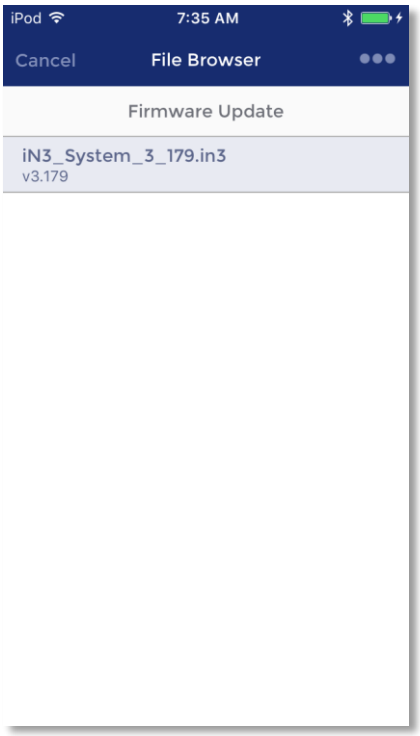


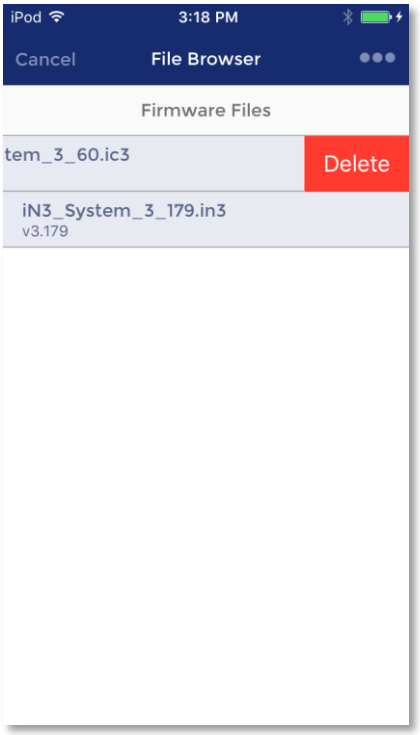
To perform a firmware update, at the Polara App main menu, tap the box for “Firmware Update”. On the firmware update page, you can view the current firmware version on the iCCU as well as the iN2 device you are connected to. By tapping on List All Button Versions, a list of all connected iN2 devices will appear with the firmware versions installed on each device. Tap the left arrow to go back to the Firmware Updates screen.

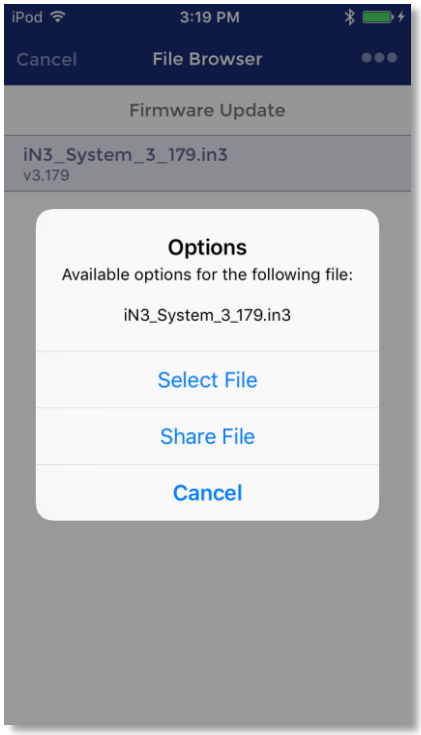


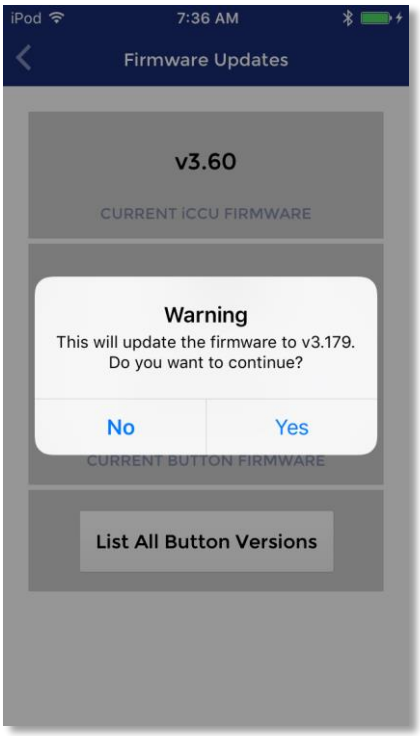


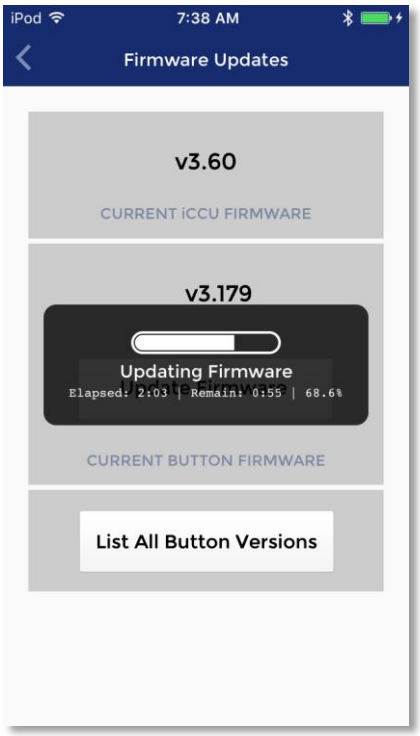
To update the firmware of the connected device, tap the Update Firmware button. The list of available firmware update files will appear. Tap the file you wish to upload and tap Select File to begin the firmware update process. When the process is complete, a message is displayed confirming the success. To delete files, swipe from the right to the left to show the delete button, then tap the Delete button.

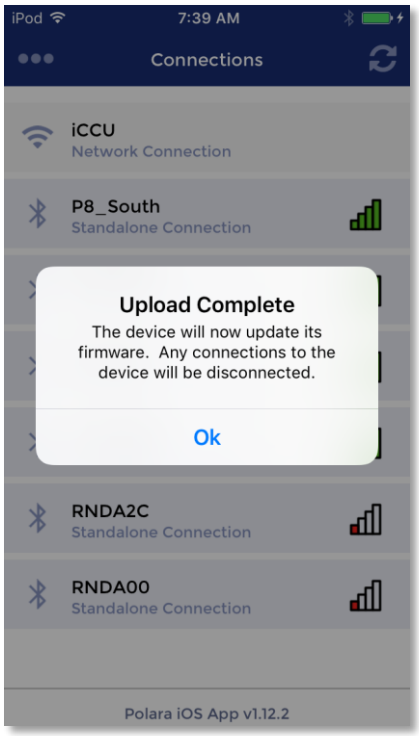












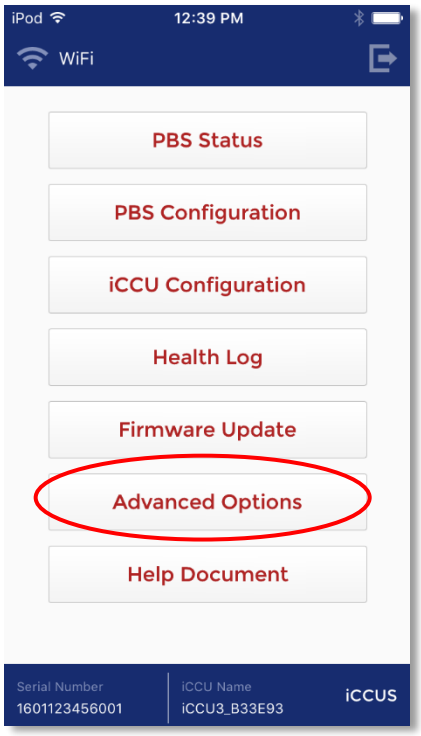
9. Using the Polara Field Service App for iOS to Program Calendar Features

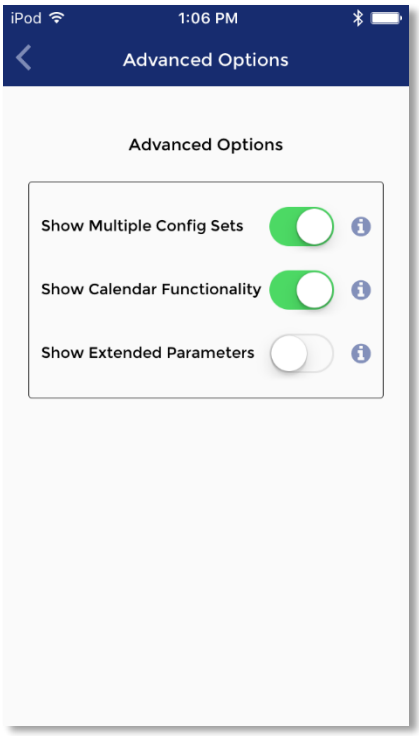
9.1 Enable the Calendar Feature

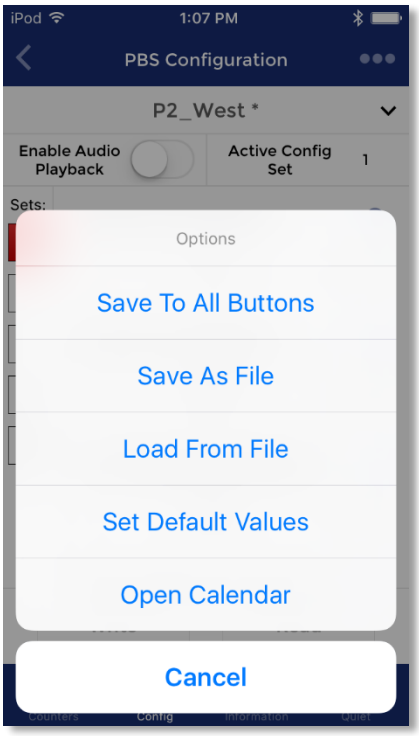
Each PBS has its own time and date clock. The Calendar Feature may be used to change the PBS options on the basis of time. Each PBS can hold four Configuration Sets. During the configuration process, one of these sets is active.

By default, the Calendar feature is disabled to simplify the settings view and to avoid confusion. In order to gain access to the Calendar feature, press on the “Advanced Options” buttons from the main menu.

Turn on the features for “Show Multiple Config Sets” and “Show Calendar Functionality”



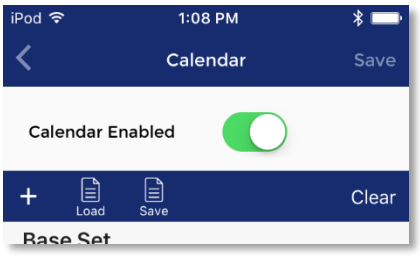




Now, go back to the main menu by pressing the < arrow in the upper left corner, then choose the PBS Configuration menu option.

Now that the Show Calendar Functionality is enabled, the Calendar feature must also be enabled. From the main menu, press PBS Configuration. Press the 3 small dots on the upper right corner and select Open Calendar. Use the slider to enable the calendar feature. Then press Save.

Press the < arrow in the upper left to return to the PBS Configuration page.

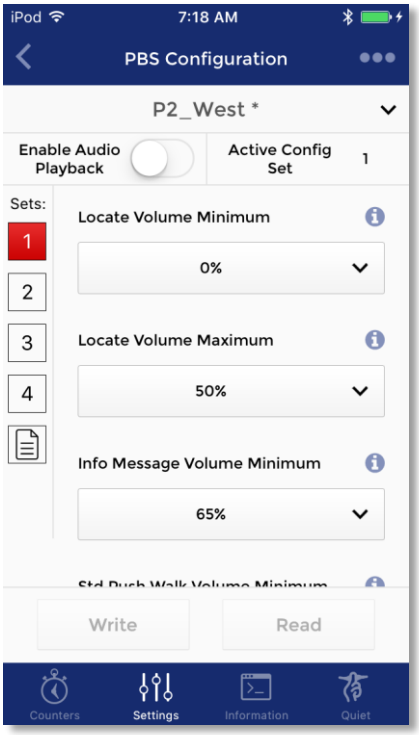


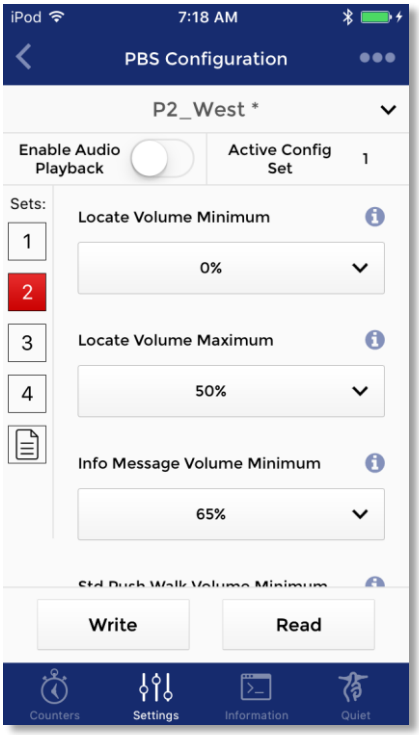
9.2 **Using the Calendar Feature**

In order to illustrate the process of creating new Calendar Events, the below instructions show how to setup a Calendar Events scheme to lower the unit's Locate Tone volume from 6pm at night to 6am in the morning every day.

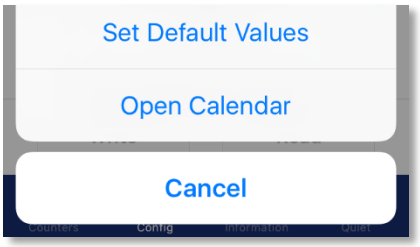
Set the volumes to a low setting then make sure the "1" red square is highlighted. Then press Write.

Set the volumes to a higher setting then press the "2" so it is highlighted red. Then press Write.





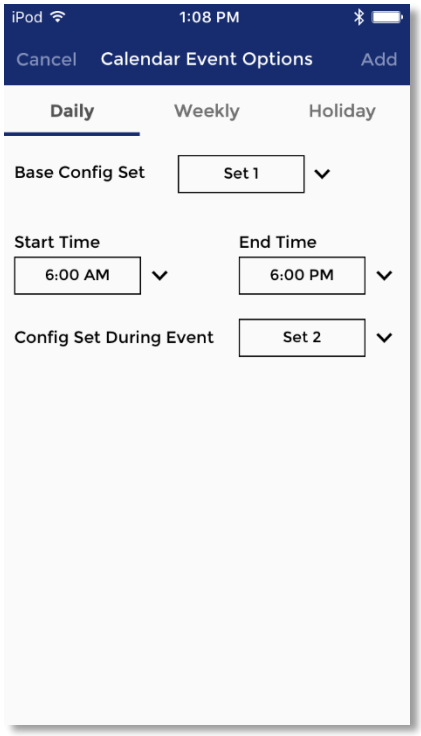
Next, press on the three small dots in the upper right corner and choose "Open Calendar"

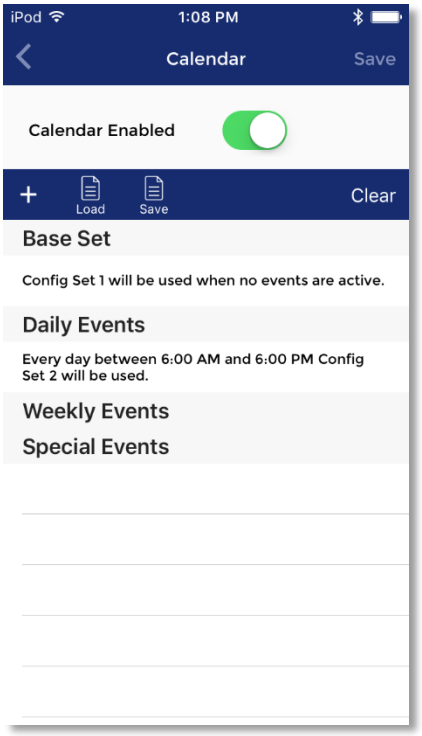


Press the plus icon (+) to add a new Calendar Event.

A new window will appear which will allow you to add a new event. Keep the Daily option selected, then choose Config Set 1 as the Base Config Set. Then select a start time of 6AM and an end time of 6PM. Then set the option for Config Set During Event to be Config Set 2.

Press Add in the upper right corner.





What this is doing is creating an event which occurs every day at 6am which changes the button's active Config Set to 2. Then, at 6pm, the active Config Set will change back to 1. Repeat this process for the Walk volumes if you want to change it during the same period.

Set "Calendar Enabled" switch to the on position if it is not already on. Tap "Save" when finished.

10. Using Polara Field Service App for PC to Change iCCU-X Settings

Most of the available setup and maintenance procedures may be performed using a PC or Laptop with Wi-Fi capability. Note: To communicate with the iN2 PBS via Bluetooth, the Polara iN-DGL (BLE Dongle) is required.

The App supports Bluetooth connection to any PBS through the iN-DGL (BLE Dongle), and Wi-Fi connection to the iCCU-X. All PBS and iCCU-X configuration options are accessible using either connection. File uploads containing firmware or audio must be performed by connecting directly to the target unit.

10.1 Download Polara Field Service App for PC (Intelligent Config) Application

The Intelligent Config application is available for download from www.polara.com.

10.2 iN-DGL (BLE Dongle)

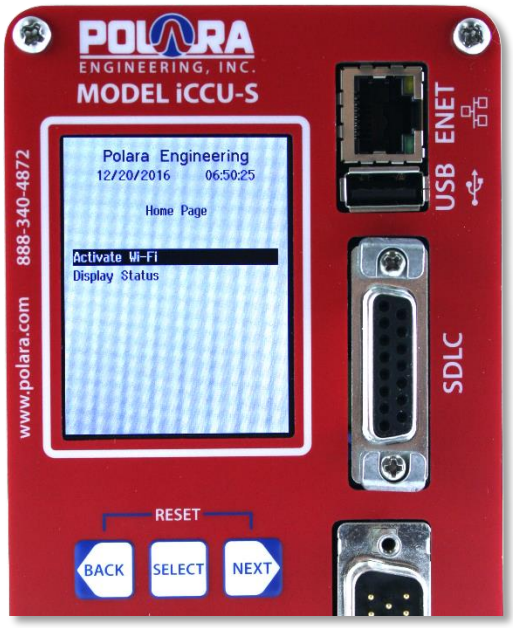
The Intelligent Config application requires the use of the Polara iN-DGL (BLE Dongle) to communicate with the Polara iN2 PBS.

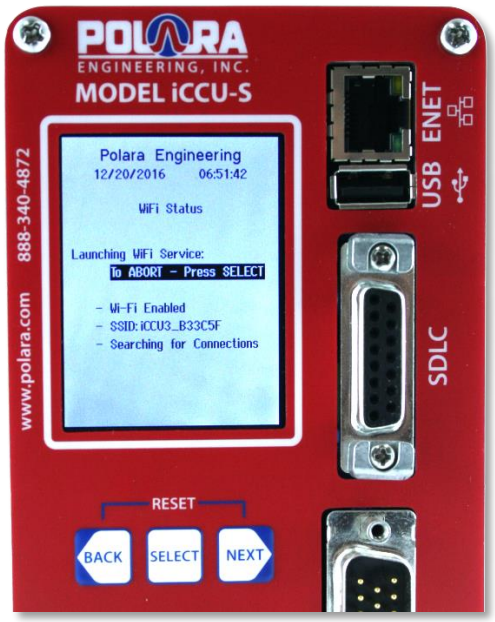
10.3 Application Installation

Your computer must be running Windows 7, 8, 8.1, or Windows 10. Also, you must have .NET Framework 4.0 or higher installed in order for the application to run. The installation process will include this step if necessary, however your computer must be connected to the internet to access those installation files. A driver program for the BLE dongle will be installed as needed. Locate the downloaded installation file, extract the IntelligentConfigSetupVxxxx.exe file, if necessary, then double-click to begin. Follow the on-screen instructions to complete the installation.

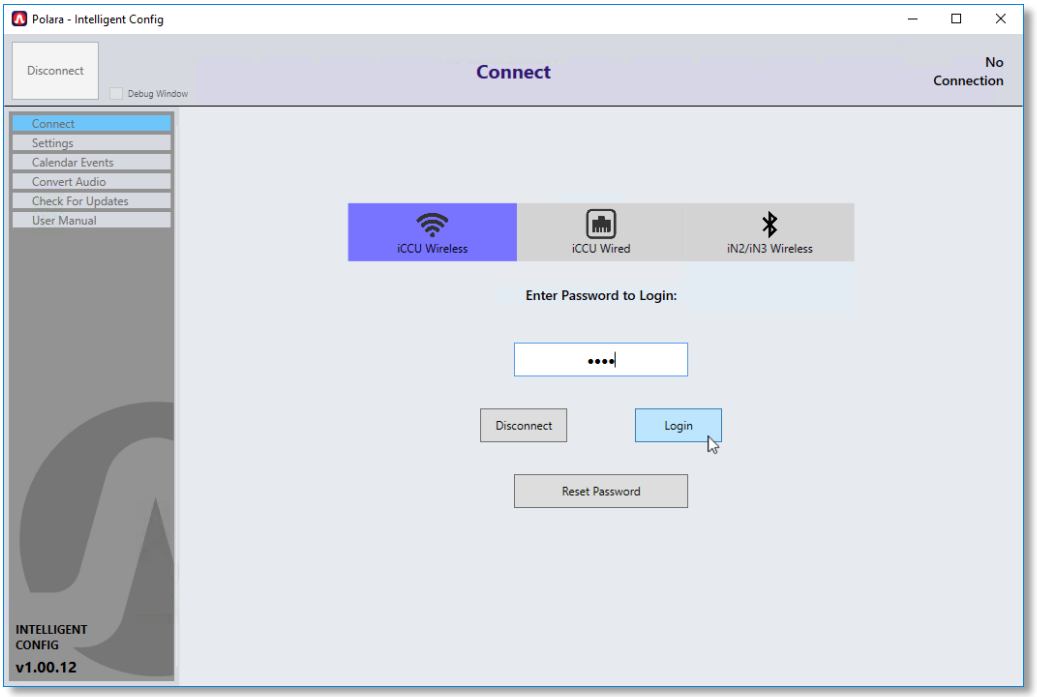
10.4 Wi-Fi Connection

While a Bluetooth connection will allow complete system configuration access, a Wi-Fi connection is also available. Before connection is possible, Wi-Fi must be enabled on the iCCU-X. This is done by pressing the SELECT button on the iCCU-X front panel while the main start-up screen is visible. The display should confirm that Wi-Fi is enabled.

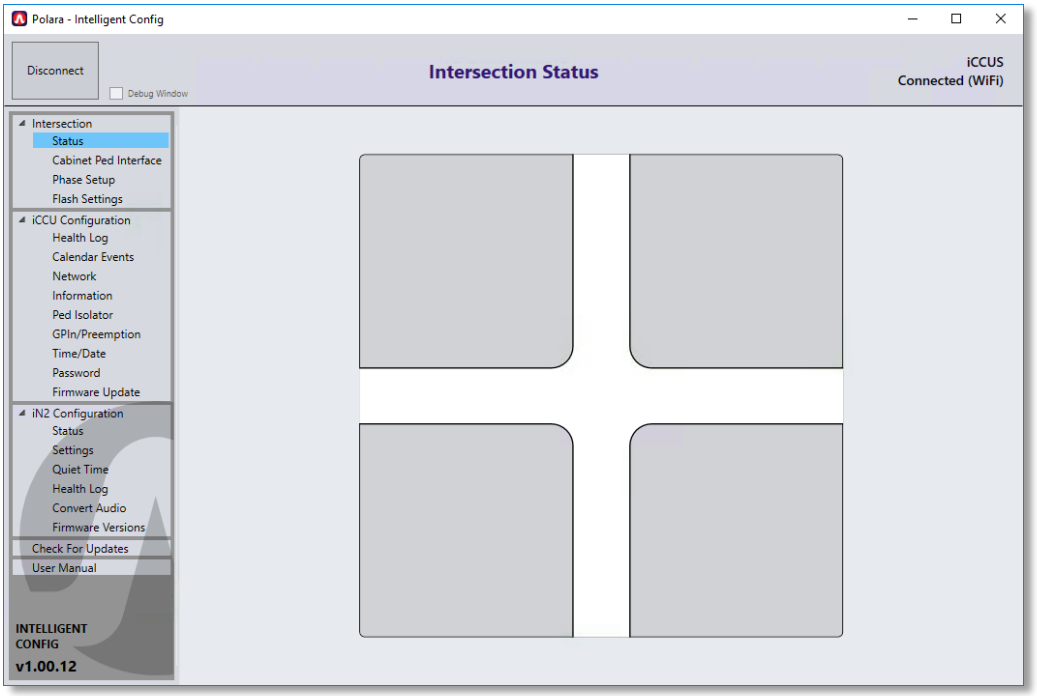




Go to the Wi-Fi connection software on your PC to search for available Wi-Fi networks within range. Locate the Polara iCCU-X in the list of available devices. Select the iCCU-X device (SSID indicated on LCD of iCCU-X), then enter the Wi-Fi password as requested. The Wi-Fi password is “DEFAULT1” (all caps, no quotes). After the connection is made, start the Polara Field Service App, also called Intelligent Config.

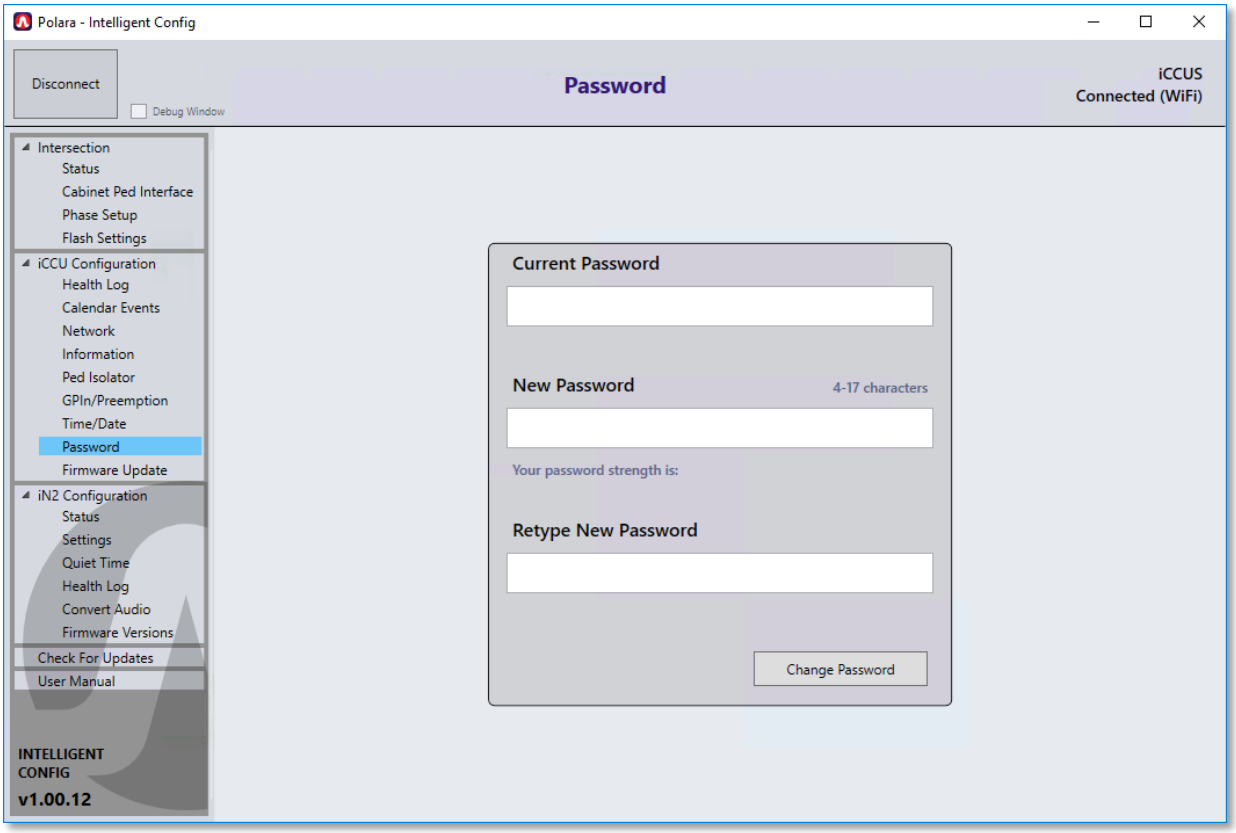


Click on the iCCU Wireless tab (if it is not already selected) and click the Connect button. Enter the password (factory default is 1234), then click Login. You will then be presented with the Intersection Status screen.



10.5 Changing the Password

To change the password, click on the Password menu item under the iCCU Configuration category. Enter in the appropriate fields; the current password, new password, and new password repeated. Then click the Change Password button.

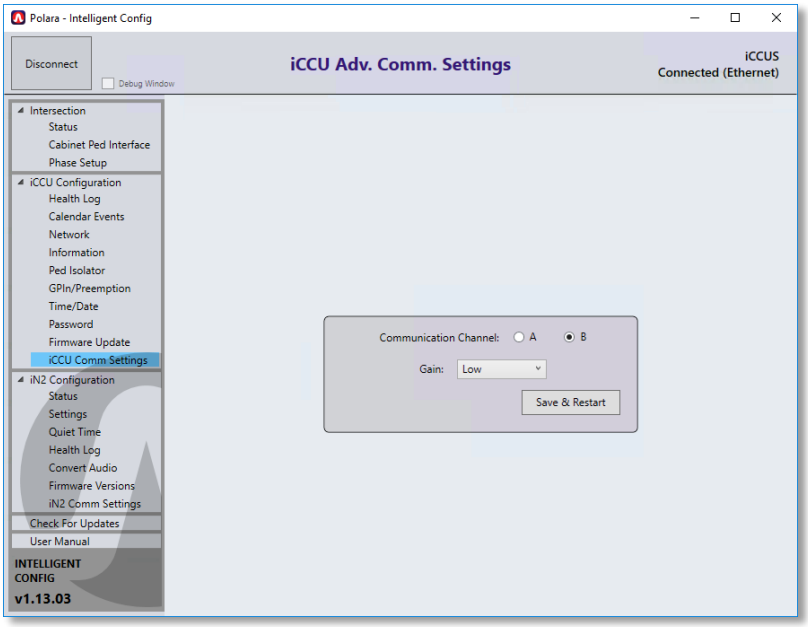


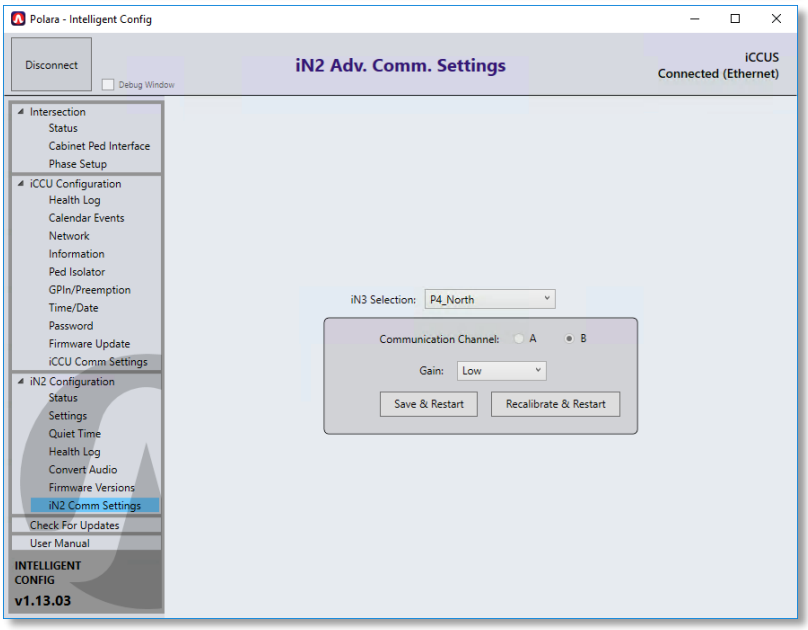
10.6 Advanced Communications Settings

All iN2 PBSs connected to the interconnect board communicate with the iCCU via the field wires, using one of two communication channels A or B.

During initial startup, the iCCU will operate in Channel A by default. The first time an iN2 PBS powers up, it will auto calibrate by finding the communication channel the iCCU is operating on, and then adjust its signal until it establishes communication with the iCCU. This process typically takes 1-3 minutes. Once calibrated, each iN2 will save its communications settings in non-volatile memory and use them during any subsequent restart. Once a PBS' communications settings are calibrated and it makes a successful connection to the iCCU, it will flash its pilot light in a four flash pattern. This four flash pattern will continue until the PBS is assigned to a phase that is receiving pedestrian Walk, Don't Walk or Clearance intervals.

If a calibrated PBS loses connection to the iCCU for an extended period of time or if it cannot connect to the iCCU at start up, the PBS will restart itself in come up in an un-calibrated mode. It will search for the iCCU on both communication channels and calibrate itself once it locates the iCCU's operating channel. If no iCCU is available, the PBS will continue to search until it finds the iCCU. If one or more PBSs cannot connect to the iCCU during the calibration process (two flash pattern continues), the communication channel on the iCCU should be changed.





Any PBS can be manually forced to re-calibrate by using the Advanced Communication Settings. This may be necessary if the PBS is already calibrated but moved to a different location in the intersection.

If all the iN2 PBSs can connect to the iCCU, but one or more experiences timeout errors when reading remote health logs, or while trying to set PBS parameters to all PBSs, the gain on an individual iN2 PBS may need to be adjusted. Use the Advanced Communication Settings menu and try increasing the communications gain to the next highest level from what the auto calibration set it to.

To change the Communications Channel of the iCCU, connect to the iCCU and use the Advanced Communications Settings menu to select the Communications Channel B and press "Save". Before changing the Communications Channel, the iCCU will signal all connected buttons to disconnect, restart, and recalibrate so the automatic recalibration function will happen automatically.

If one or more iN2 PBSs still cannot connect to the iCCU, the communication gain can be adjusted on the iCCU using the Advanced Communications Settings menu.

Because of the various types and states of field wiring, communication may not work in all field wiring conditions, so Polara cannot guarantee an iN2 system will work on all intersections. If the above steps fail in establishing reliable communication between a PBS and iCCU, a 3-Wire system is the only option.

Polara recommends the use of a 12/2 IMSA 50-2 cable.

10.7 Channel and Phase Setup

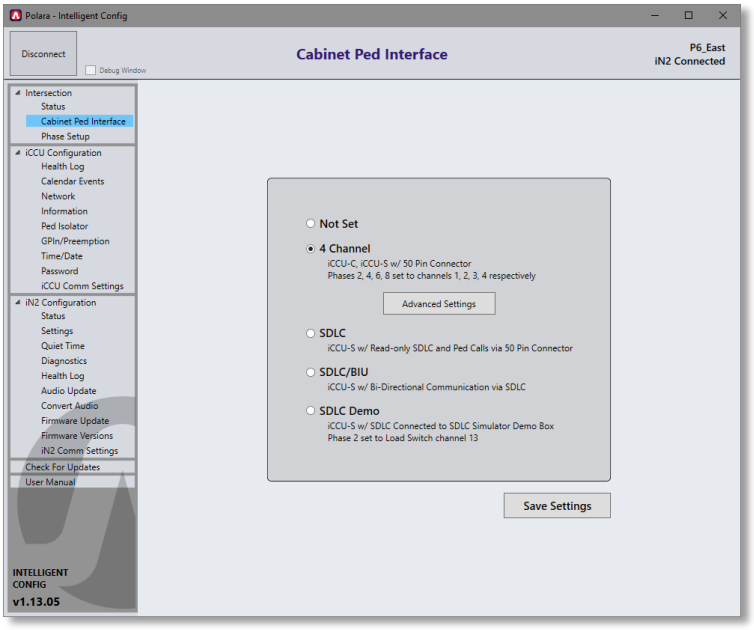
The iCCU-S can obtain Ped interval information by monitoring the outputs of the load switches (via the 50-pin harness' Cable #4) or by monitoring the SDLC bus. The iCCU-C obtains Ped interval information via the C4 cable adapter, and has automatic Source Selection. Follow the appropriate setup steps below, depending on which iCCU-X model you have installed, and how it is wired in the cabinet. Refer to section 3.3. The iCCU-S supports four phases. The system identifies four channels, named A, B, C, and D. Each pedestrian phase will be associated with a channel.

10.7.1 Ped Interval Source Selection (iCCU-S only)

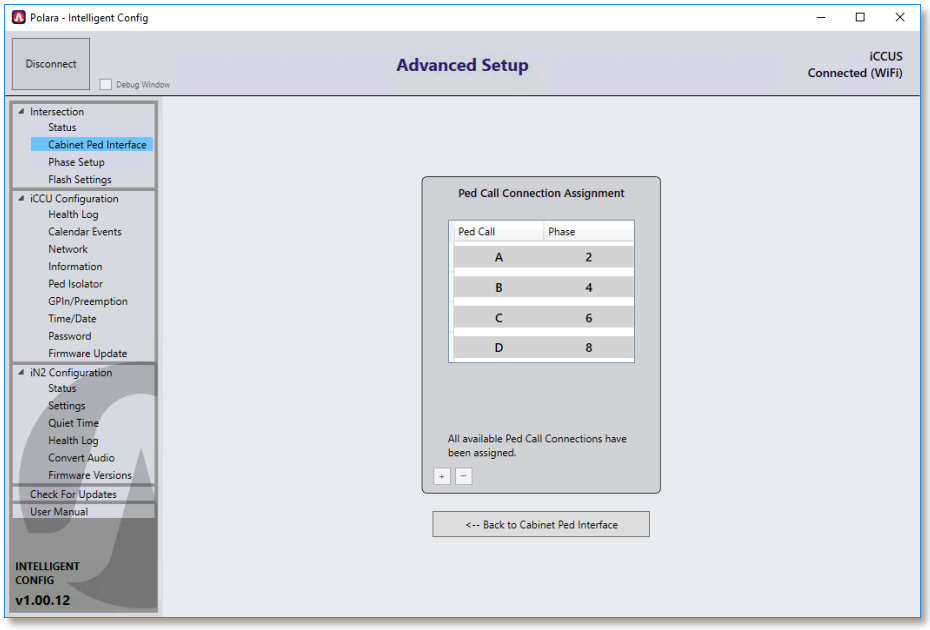
Begin by clicking on the Cabinet Ped Interface menu item under the Intersection category.

If Using Cable #4 of the 50-pin harness for Load Switch Monitoring:

Click on the 4 Channel option.



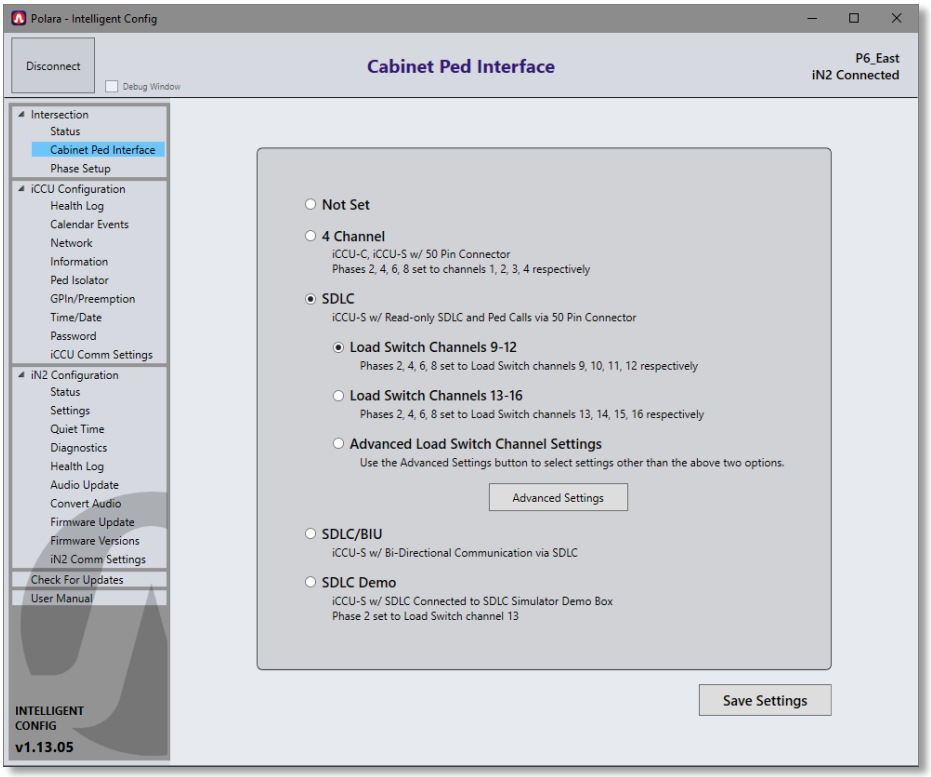
The channel assignment will be determined by the wiring of Cable #4. For example, the red and brown wires belong to channel A. With the Red wire connected to the Don't Walk output of the ped load switch associated with phase 2, and the Brown wire connected to the Walk output of the same load switch, channel A has a hard-wired association with phase 2. The most common assignment is setup by default. To customize the assignment, click on Advanced Settings and modify the assignment as necessary.



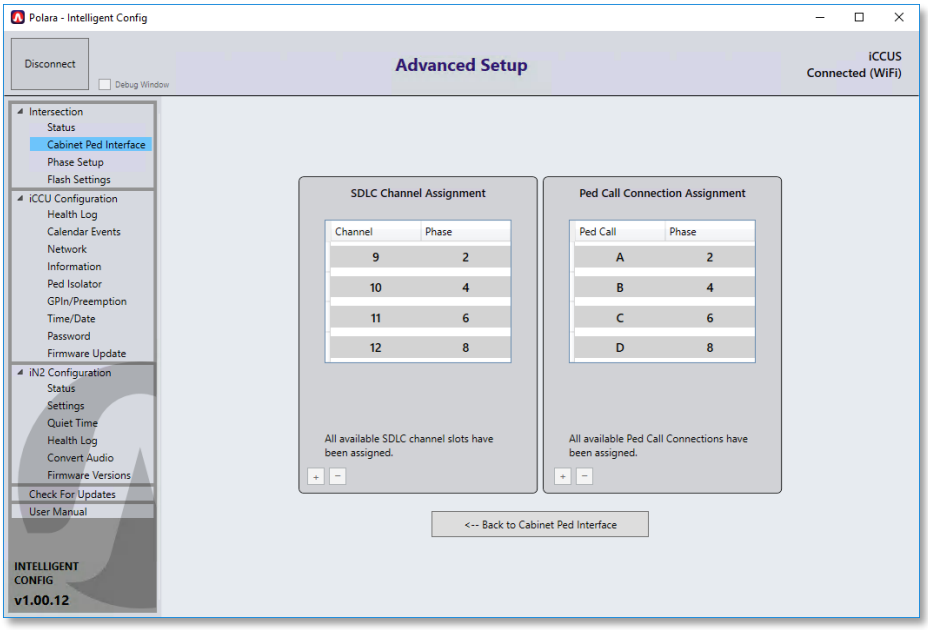
Proceed to Phase Setup in section 10.8.

If using an SDLC cable to monitor Ped Intervals only:

Typically the there are two options for load switch configurations in cabinets using channels 9 through 12 or channels 13 through 16 for PED load switches. Select the appropriate SDLC option based on the load switch setup in your cabinet. Proceed to Assigning iN2 PBSs to Phases in section 10.8.

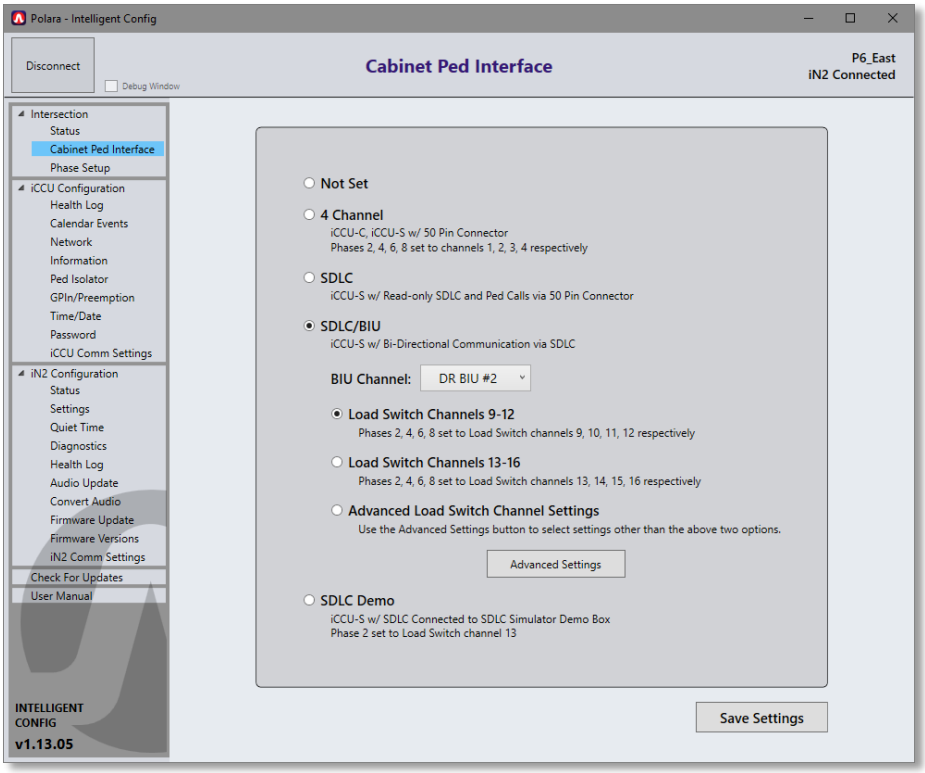


If your setup differs from one of these options, select either of the SDLC options and then click the Advanced Settings button to modify the setup for your specific needs.



If using an SDLC cable in BIU Mode (no 50-pin harness):

The NEMA TS 2 2003 specification defines SDLC command and response frames for 4 detector BIUs. The iCCU-S can be configured to operate as any one of these four BIUs for the purpose of placing pedestrian calls to the traffic controller. Typically, there are 4 pedestrian phases (2, 4, 6 and 8), however the iCCU-S can be configured for up to 8 pedestrian phases. By default, detector BIUs are used to places vehicle calls in the traffic controller. In order to use the iCCU-S configured as a detector BIU, the traffic controller needs to be programmed to map the vehicle call inputs to pedestrian call inputs. The process to do this varies by traffic controller. Consult your traffic controller manual or manufacturer for instructions on how to do this.



Each detector BIU communicates call status for up to 16 detector inputs. When configured as a detector BIU, the iCCU-S uses the first 8 detectors. See the table below for detector input numbers and how they need to map to pedestrian inputs.

BIU#1	BIU#2	BIU#3	BIU#4	Pedestrian Mapping
Det Input 1	Det Input 17	Det Input 33	Det Input 49	Ped Input 2
Det Input 2	Det Input 18	Det Input 34	Det Input 50	Ped Input 4
Det Input 3	Det Input 19	Det Input 35	Det Input 51	Ped Input 6
Det Input 4	Det Input 20	Det Input 36	Det Input 52	Ped Input 8
Det Input 5	Det Input 21	Det Input 37	Det Input 53	Ped Input 1
Det Input 6	Det Input 22	Det Input 38	Det Input 54	Ped Input 3
Det Input 7	Det Input 23	Det Input 39	Det Input 55	Ped Input 5
Det Input 8	Det Input 24	Det Input 40	Det Input 56	Ped Input 7

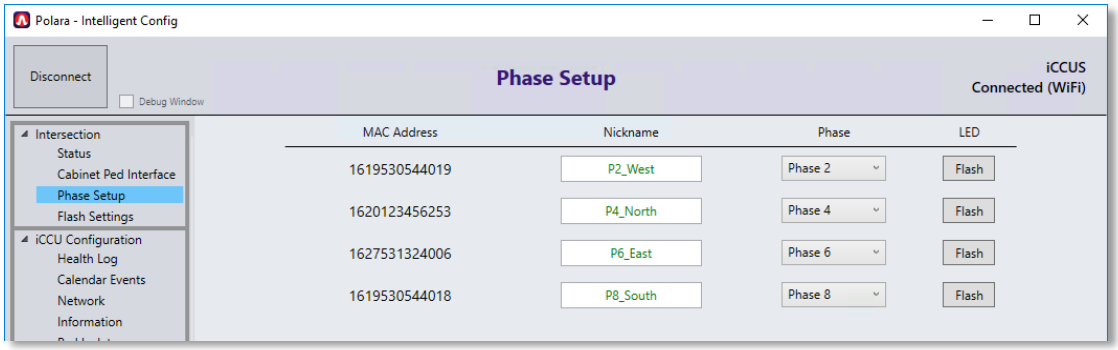
Note: A NEMA TS 2 traffic controller can only communication with a single BIU at each SDLC address. If the iCCU-S is configured to a BIU number that already has a BIU device with the same number (address), then the other BIU device with the matching number needs to be disconnected.

To configure the iCCU-S as a BIU, go to the “Cabinet Ped Interface” Menu and select an available detector BIU number and the proper pedestrian load switch configuration for the cabinet. If the pedestrian load switch configuration is not listed, or more than 4 pedestrian phases are needed, select the “Adv. Load Switch Settings and assign the appropriate phases to load switch channels.

Configure the traffic controller to enable the detector BIU number selected. Program the traffic controller to remap the detector inputs to Ped inputs according to the table above. Consult your traffic controller manual or manufacturer for instruction on how to do this.

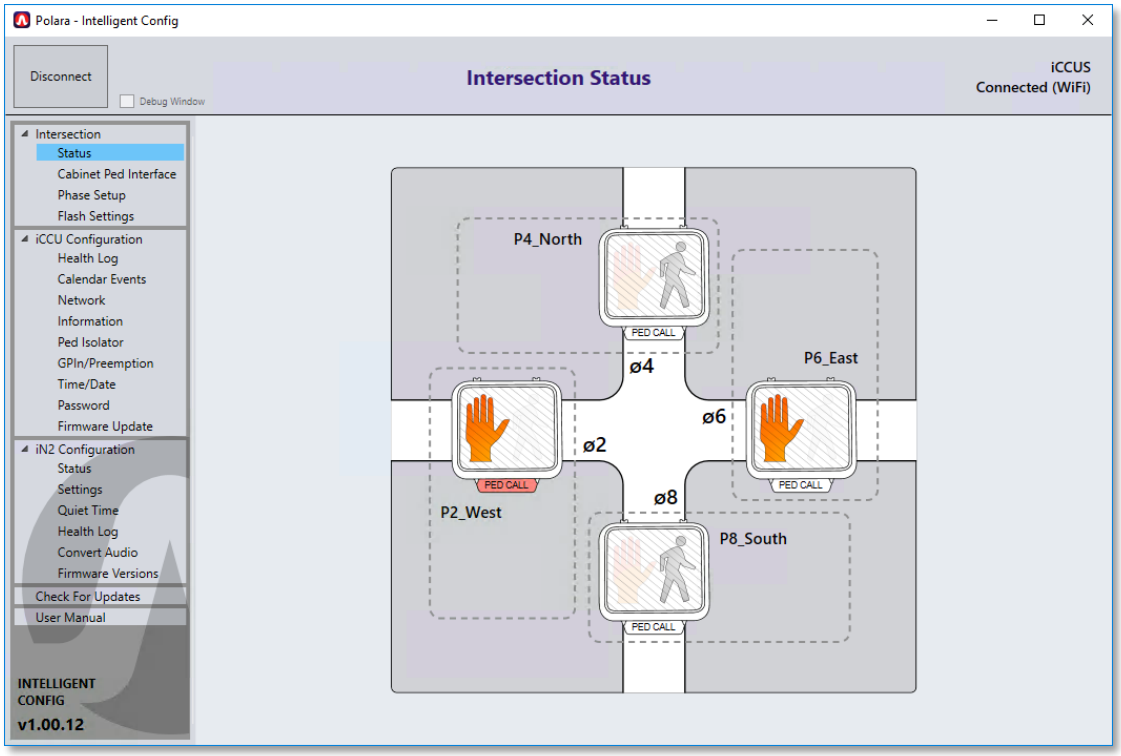
10.8 Assigning iN2 PBSs to Phases

Following the Channel Setup process, each connected iN2 PBS must be named and be assigned a phase. At this point, all buttons need to have been installed and powered. Click the Phase Setup menu item. It is suggested to name the PBS with something that identifies the installed location and the phase (must be 4 to 15 characters). If unsure of the location of a PBS, click Flash button to cause the PBS’ red LED to flash briefly. Assign the appropriate Phase by tapping the down arrow on the right and selecting the phase in which to assign the PBS. When finished naming all buttons and assigning phases, click the Save Changes button on the bottom-right of the window.



After these steps, the system should be fully operational. The steps leading up to this point must have been completed without error to ensure that the PBS walk indications are matched to the correct crosswalks. Walk the intersection and verify that each PBS is linked to the correct phase. At this point, any desired operating features may be configured.

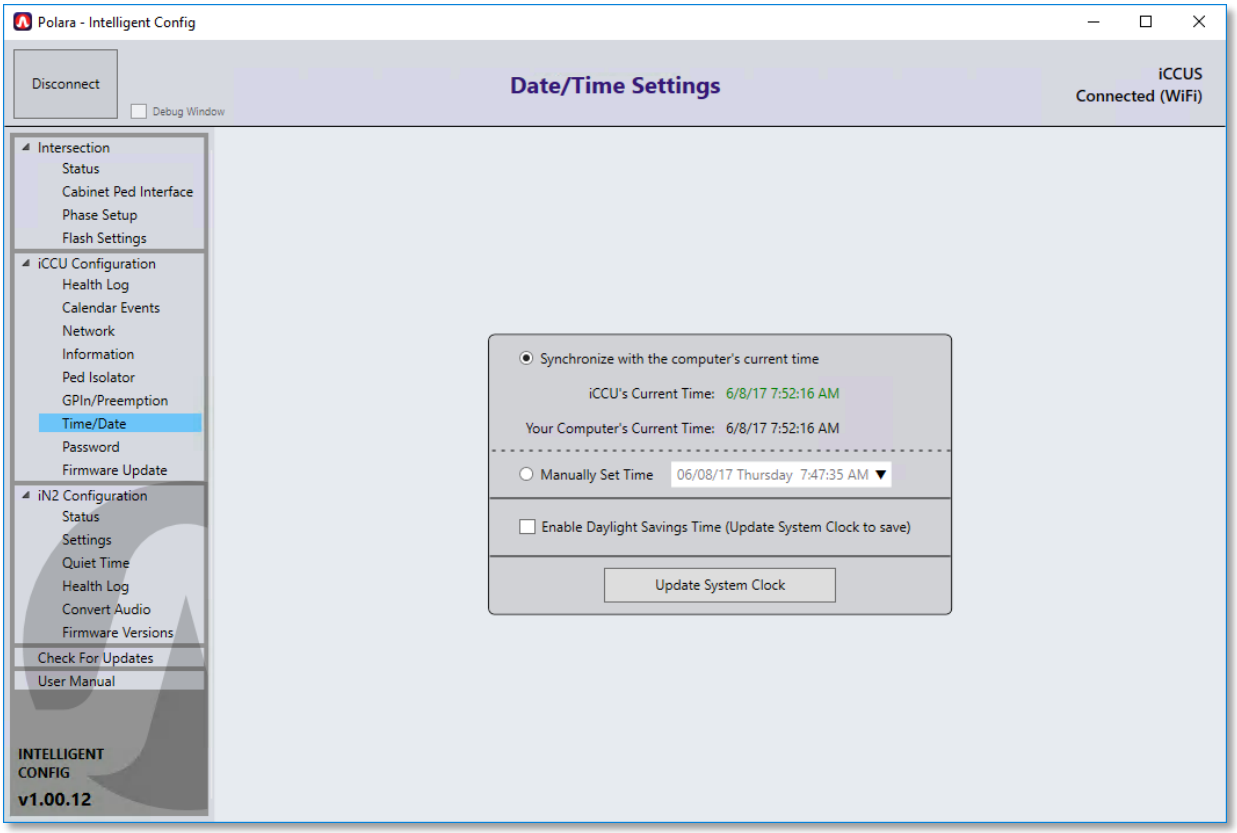
Clicking on the Status menu item will show the full intersection diagram with each phase identified and the attached buttons for each phase. The Ped Call indicator under the Ped Head becomes highlighted in red when a ped call has been latched for that phase. The Ped Head updates its images to show the current interval.



10.9 Setting the iCCU-X Time and Date

Click the Time/Date menu item under the iCCU Configuration category. Choose a method of obtaining the time, then click on “Update System Clock” to update the iCCU-X’s clock.

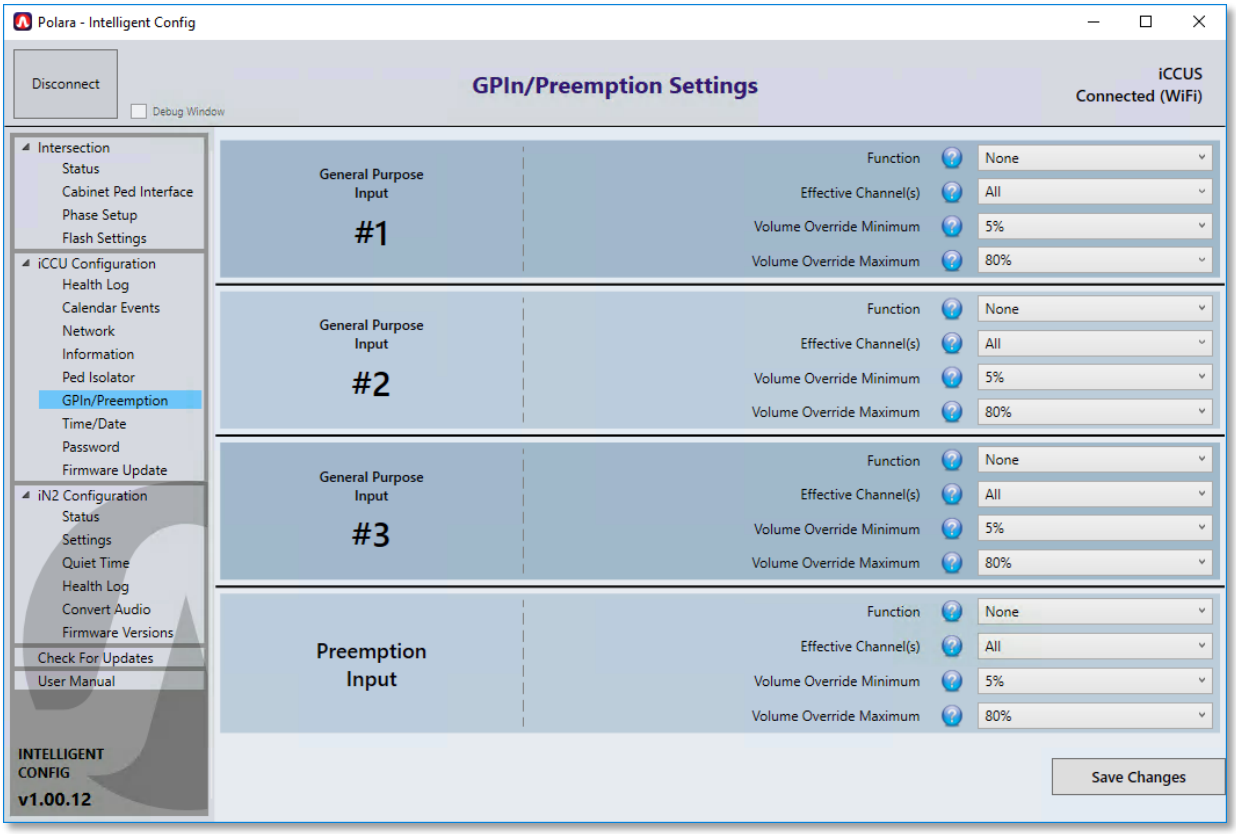
Note that this operation also sends the time to any iN2 PBSs currently connected to the network.


Polara - Intelligent Config
Disconnect
Debug Window
Date/Time Settings
iCCUS
Connected (WiFi)
Intersection
Status
Cabinet Ped Interface
Phase Setup
Flash Settings
iCCU Configuration
Health Log
Calendar Events
Network
Information
Ped Isolator
GPIn/Preemption
Time/Date
Password
Firmware Update
iN2 Configuration
Status
Settings
Quiet Time
Health Log
Convert Audio
Firmware Versions
Check For Updates
User Manual
INTELLIGENT
CONFIG
v1.00.12
Synchronize with the computer's current time
iCCU's Current Time: 6/8/17 7:52:16 AM
Your Computer's Current Time: 6/8/17 7:52:16 AM
Manually Set Time
06/08/17 Thursday 7:47:35 AM
Enable Daylight Savings Time (Update System Clock to save)
Update System Clock

10.10 General Purpose Input and Pre-emption (iCCU-S only)

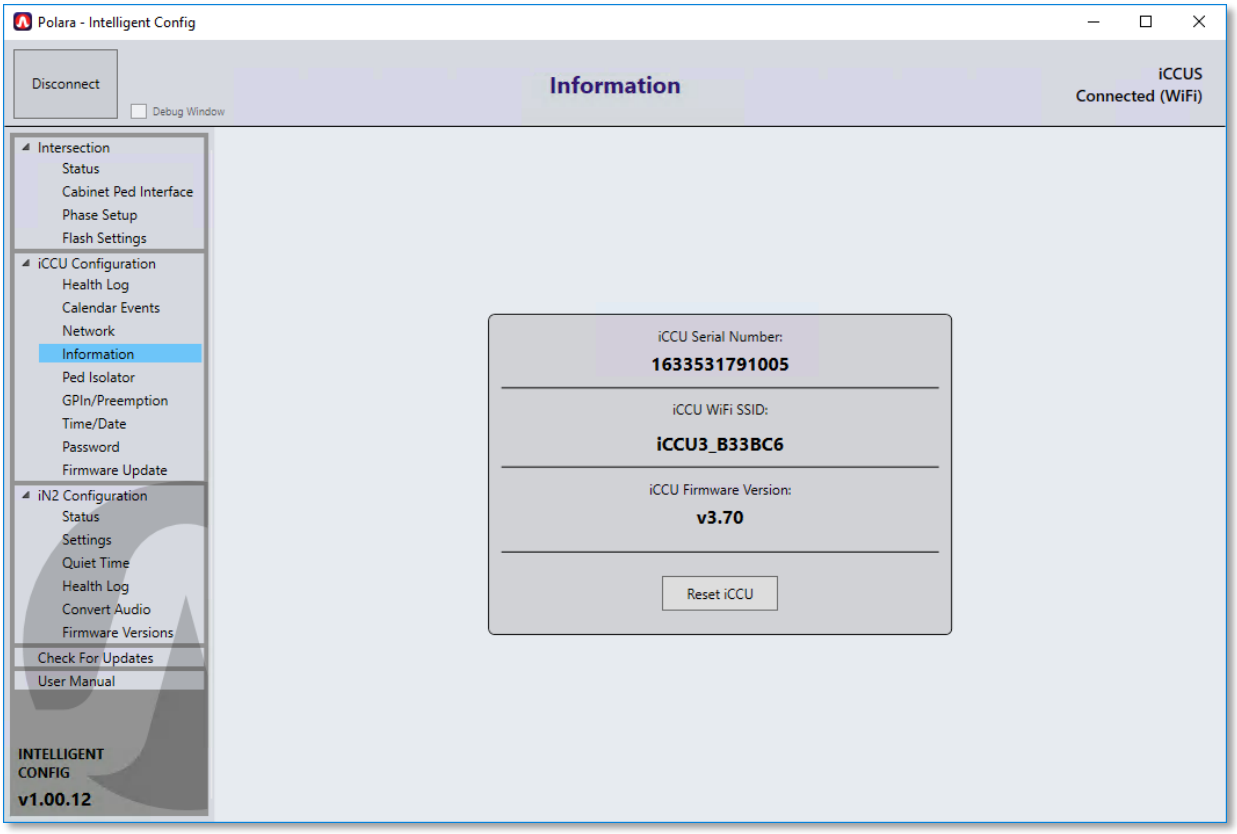
Click the GPIn/Preemption menu item from the iCCU Configuration category.

For each General Purpose Input to be used, select the desired function, the effective channels, and the desired volume. Preemption may be configured in the same way.



10.11 **Information**

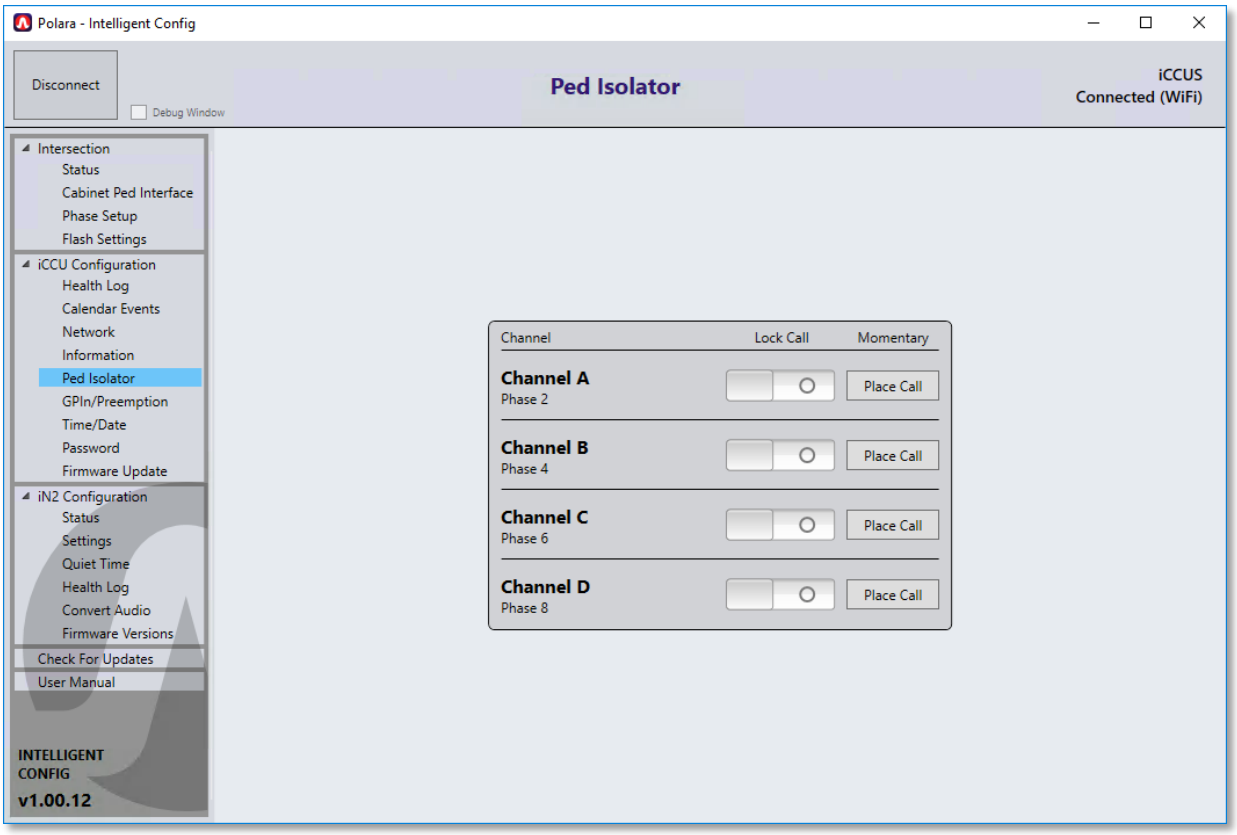
Click on the Information menu item under the iCCU Configuration category to view the iCCU's Serial Number, Wi-Fi SSID and Firmware Version. You can also click the Reset iCCU button to cause the iCCU to restart.



10.12 **Ped Isolator**

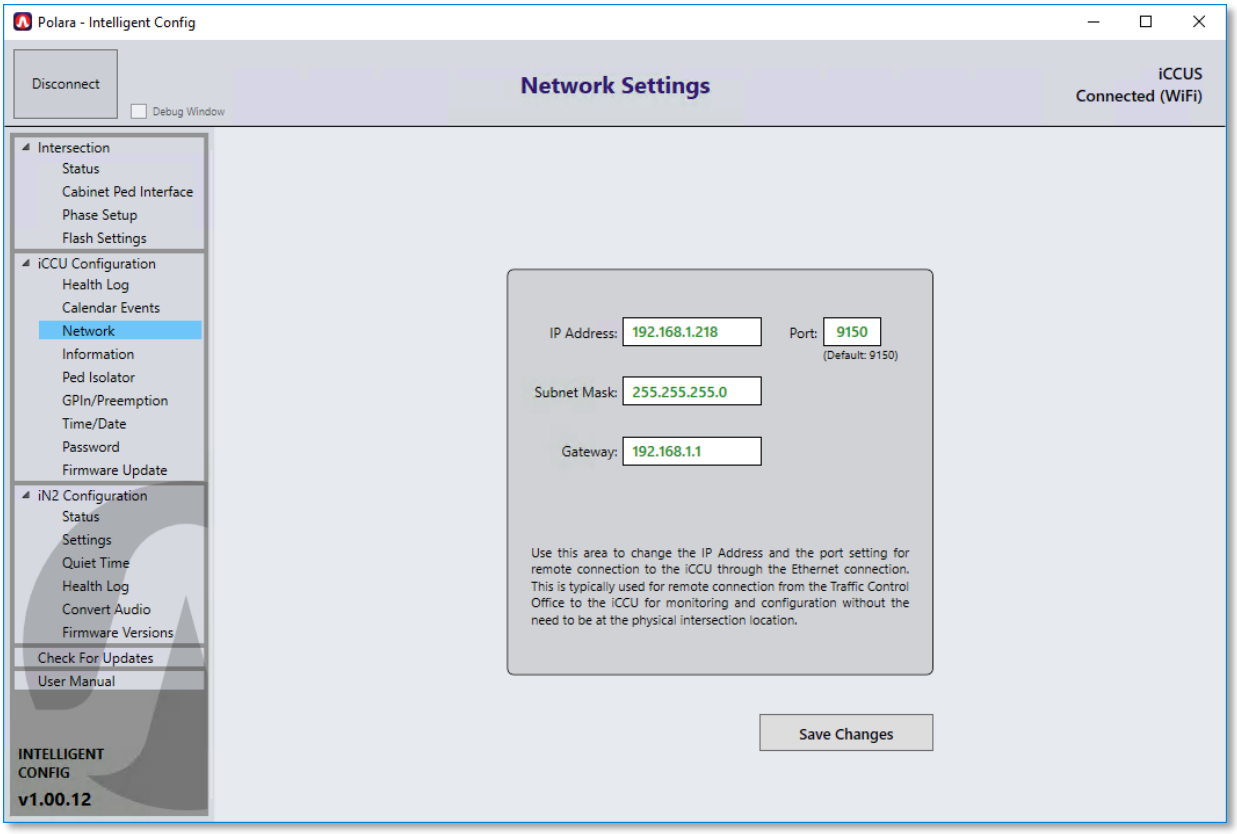
Click on the Ped Isolator menu item under the iCCU Configuration category. From this screen, single calls can be placed on individual phases by clicking the Place Call button. Also, calls can be locked in for any phase. As long as the lock call switch is activated, the call will remain locked, even after disconnecting from the Wi-Fi connection. The iCCU will continue to lock calls until the switch is deactivated or the iCCU is power-cycled.

This screen is accessible on the PC App, iOS App and also on the front LCD panel of the iCCU.



10.13 Setting Ethernet Configuration

Click the Network menu item from the iCCU Configuration category. Enter the desired IP, Port, Subnet Mask, and Gateway. Click the Save Changes button.



11. Connecting to the iCCU via Ethernet

11.1 Direct Connection from PC to iCCU

The IP address of the iCCU has been preset from the factory to 192.168.1.218. The Ethernet port on the iCCU is auto-sensing, which means that the use of a crossover-cable is not necessary, a standard Ethernet cable from your PC or Laptop directly to the iCCU can be used.

If you are connecting the iCCU to an internal network for remote access, these steps can be skipped and you can proceed directly to step 11.2 to connect and login.

In order for your computer to be able to communicate with the iCCU, you must set the TCP/IP settings on your computer to the same subnet as the settings on the iCCU. You can accomplish this by following these steps:

Click on the Start Menu icon.

Type in the search field: view network

On Windows 7, choose “View network connections”
On Windows 8 or 10, choose “View Network Status and Tasks”

You should see a list of the available connections on your computer. We want to change the settings on the connection which corresponds to the Ethernet port on the computer. This is typically named “Local Area Connection” or “Ethernet”.

Right click on the icon labeled “Local Area Connection” or “Ethernet” and choose Properties.

Click on “Internet Protocol Version 4 (TCP/IPv4)” and click the Properties button.

If “Use the following IP address” is selected, make a note of all settings so you can reset your settings when you are finished.

Click “Use the following IP address” option and enter the following:

IP address: 192.168.1.10

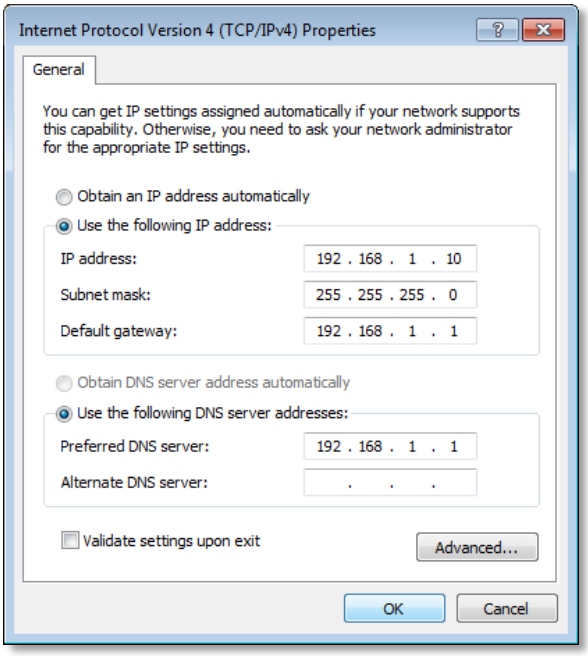
Subnet Mask: 255.255.225.0

Default Gateway: 192.168.1.1

Preferred DNS server: 192.168.1.1

Click OK on all open dialog boxes.

You should now be able to connect to the iCCU through Ethernet using the Intelligent Config App. Continue to the next section for detailed instructions.



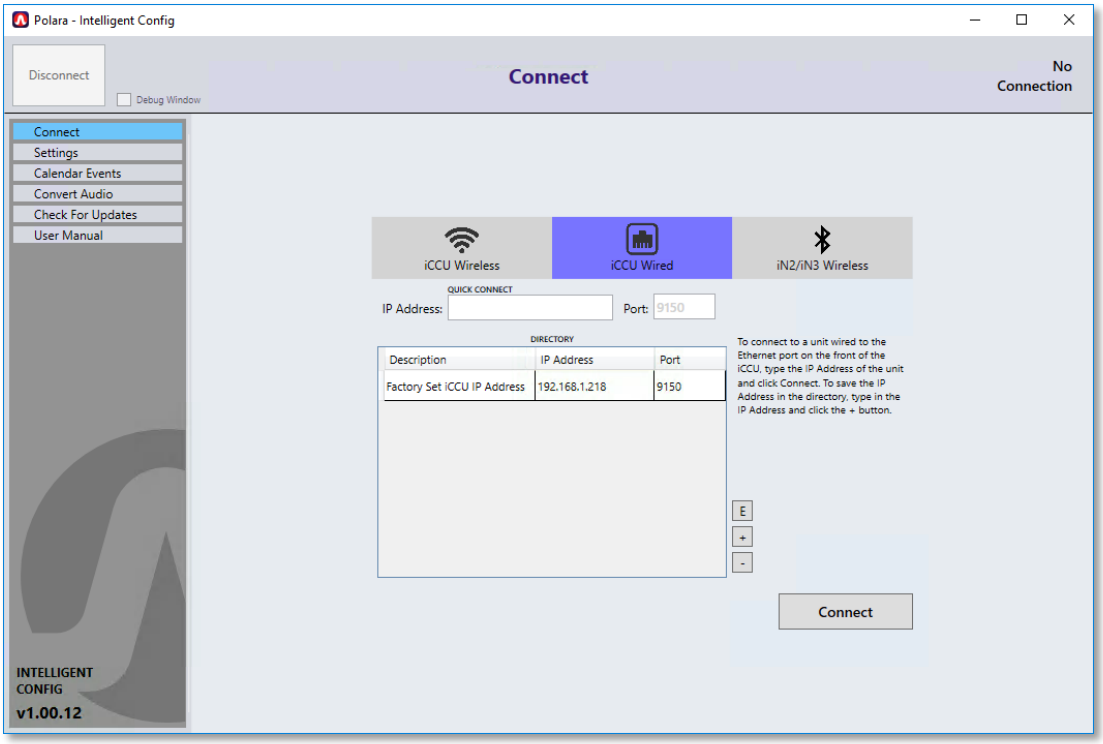
11.2 iCCU Wired Connection

The iCCU can be connected via Ethernet connection to an internal network. Any Ethernet connection to the iCCU should not be open to the internet, but should be restricted to the department's intranet. An IP address should be assigned by the IT department prior to connection so proper setup can be performed.

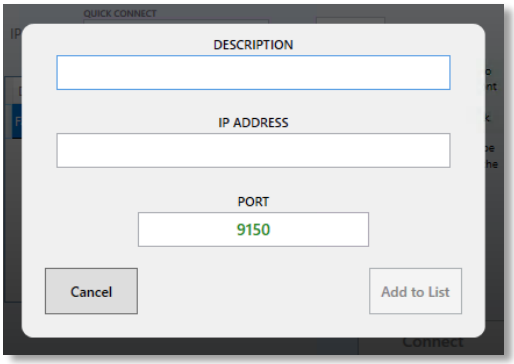
Once the Ethernet cable has been attached to the iCCU and the PC or Laptop in use is also connected either directly to the iCCU or connected through an intranet, the Intelligent Config software can be used to connect to the iCCU.

In the Intelligent Config software, click on the iCCU Wired tab on the Connect screen. If the iCCU you are connecting to has the factory default IP address, you can double-click on the Factory Set iCCU IP Address item in the list and the App will attempt to connect to the iCCU. If a connection is successful, you will see a password prompt.

If the IP Address and/or port of the iCCU is not set to factory default, you can type the IP address and port into the Quick Connect fields and click the Connect button to connect.



If you would like to save the IP address and port for one or more iCCU units, you can add new items to the Directory by clicking the [+] icon and entering the appropriate information. Likewise, you can remove an item from the directory by selecting the item and clicking the [-] icon and you can edit the item by selecting it and clicking the [E] icon.



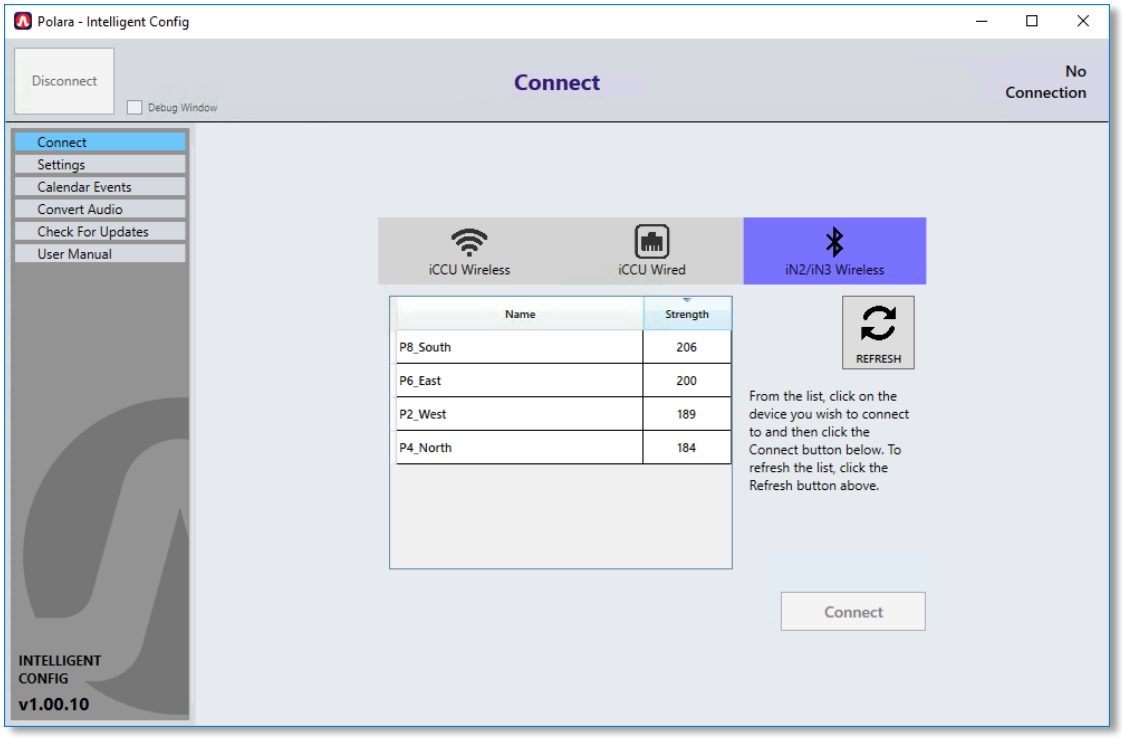
Once you are logged in, see section 10.12 for the Ethernet Settings screen to change the IP Address, Subnet Mask, Gateway and port if necessary.

12. Using Polara Field Service App for PC to Change PBS Settings

12.1 Running the Application

Make sure you have a Polara iN-DGL BLE Dongle connected to a USB port on your computer. Click on the Intelligent Config icon in the Start Menu to run the application.

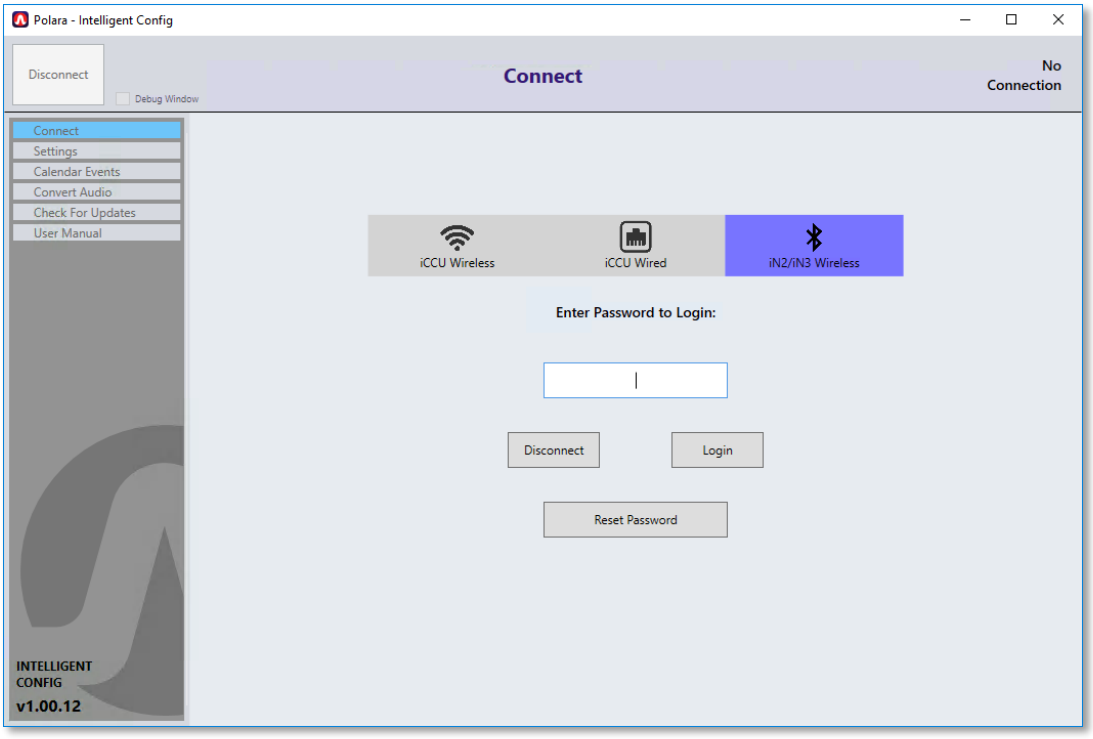
A screen similar to this should appear.



This screen shows that there are four PBS units found by the application. Click on the REFRESH button to perform a new search for available units.

12.2 Bluetooth Connection

Double-click on the name of the target unit to connect, or click to select and click the Connect button. This will take you to the login page.

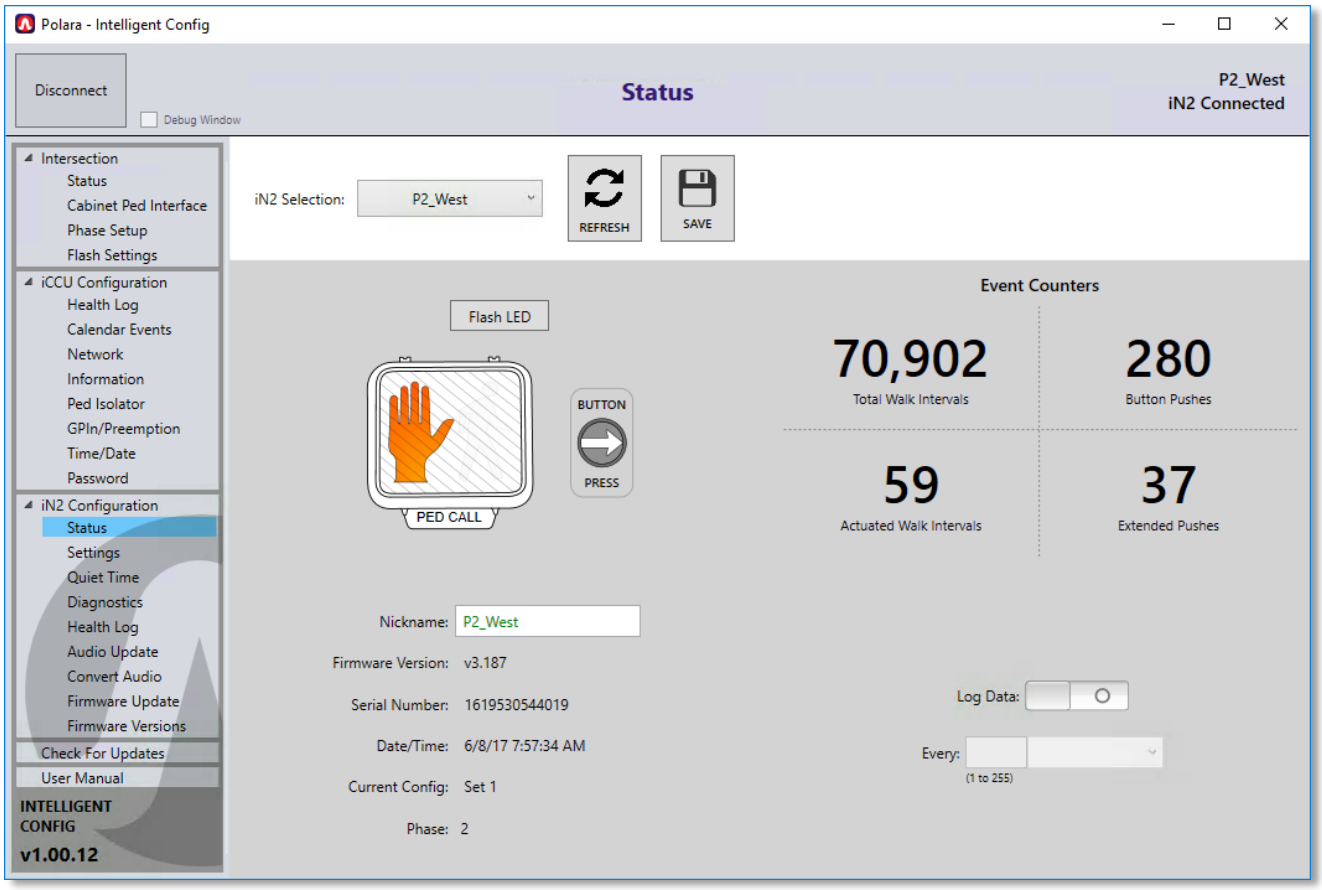


Login Page

Type in the password (Factory default is 1234), and click ‘Login’. You may click ‘Disconnect’ to cancel, or click ‘Reset Password’ if the password is unknown. You will be prompted to call Polara for assistance in resetting the password.

After login, the Status page will appear.

12.3 Status Page



The status page provides information about the connected PBS.

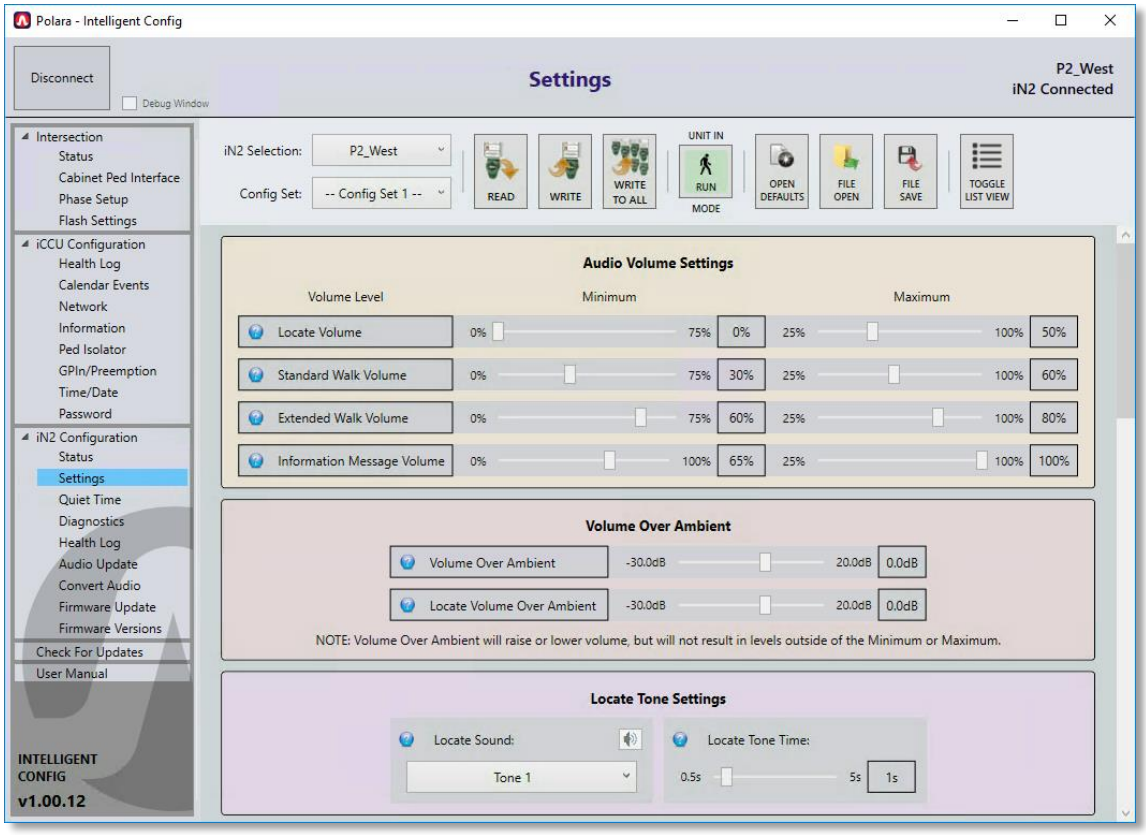
The panel on the left contains a menu of pages containing the various setup and maintenance functions. Online help is available on each page by hovering the mouse pointer over a function button.

12.3.1 Assigning a Name to a PBS

On the Status Page, enter the desired name into the Nickname field. Then click SAVE. The name of the button is immediately changed. Subsequent Bluetooth connections to the PBS will use the new name.

12.4 Settings

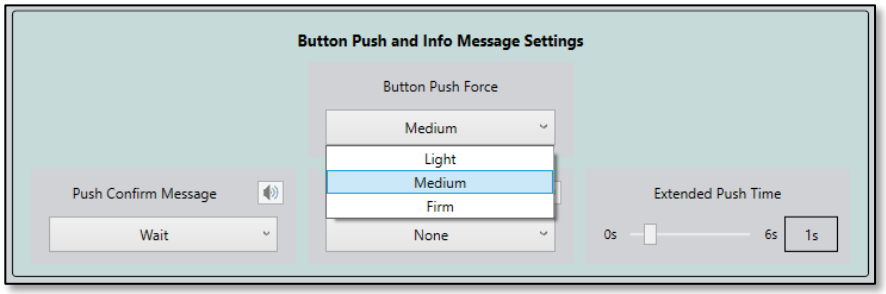
This is the main configuration page where the operating characteristics such as volume levels and sounds may be selected and uploaded. Settings may be saved to a file for later retrieval to write to multiple PBS units. When this page is opened, the settings in the PBS are not loaded automatically. Click the Read button to load the PBS' settings. Make any changes necessary and click the Write button to write the settings to the connected PBS.



In order to test play sounds on the button, the PBS must be in maintenance mode. Click the "Unit In Run Mode" button at the top of the page to switch to Maintenance mode. Then the speaker icons next to some of the settings will be enabled.

12.4.1 Adjusting Push Force

Within the Settings page, in the Button Push and Info Message Settings section, click the dropdown for Button Push Force. Select Light, Medium, or Firm. When finished, be sure to click Write to save the changes.



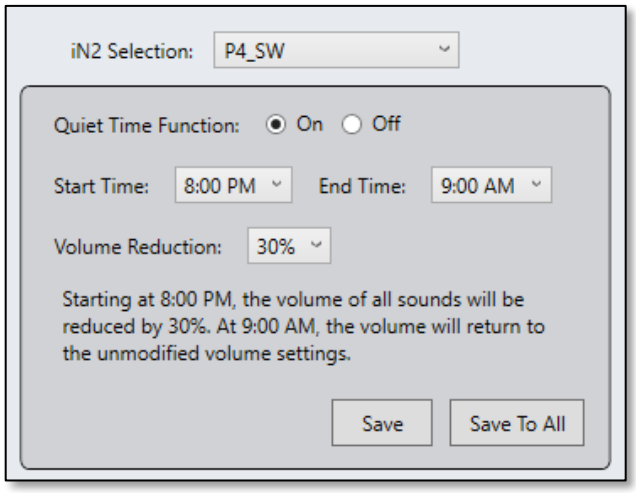
12.5 Quiet Time

The details of the features operation is such that if the current time of day falls between the selected start and end time of the Quiet Time period, then all Minimum and Maximum volume settings will be reduced by the specified reduction amount.

Note: The “Minimum” volume setting can be reduced down to 0%, but the “Maximum” volume setting will only be reduced down to 25%. This follows what is settable in the configuration parameters or settings screen.

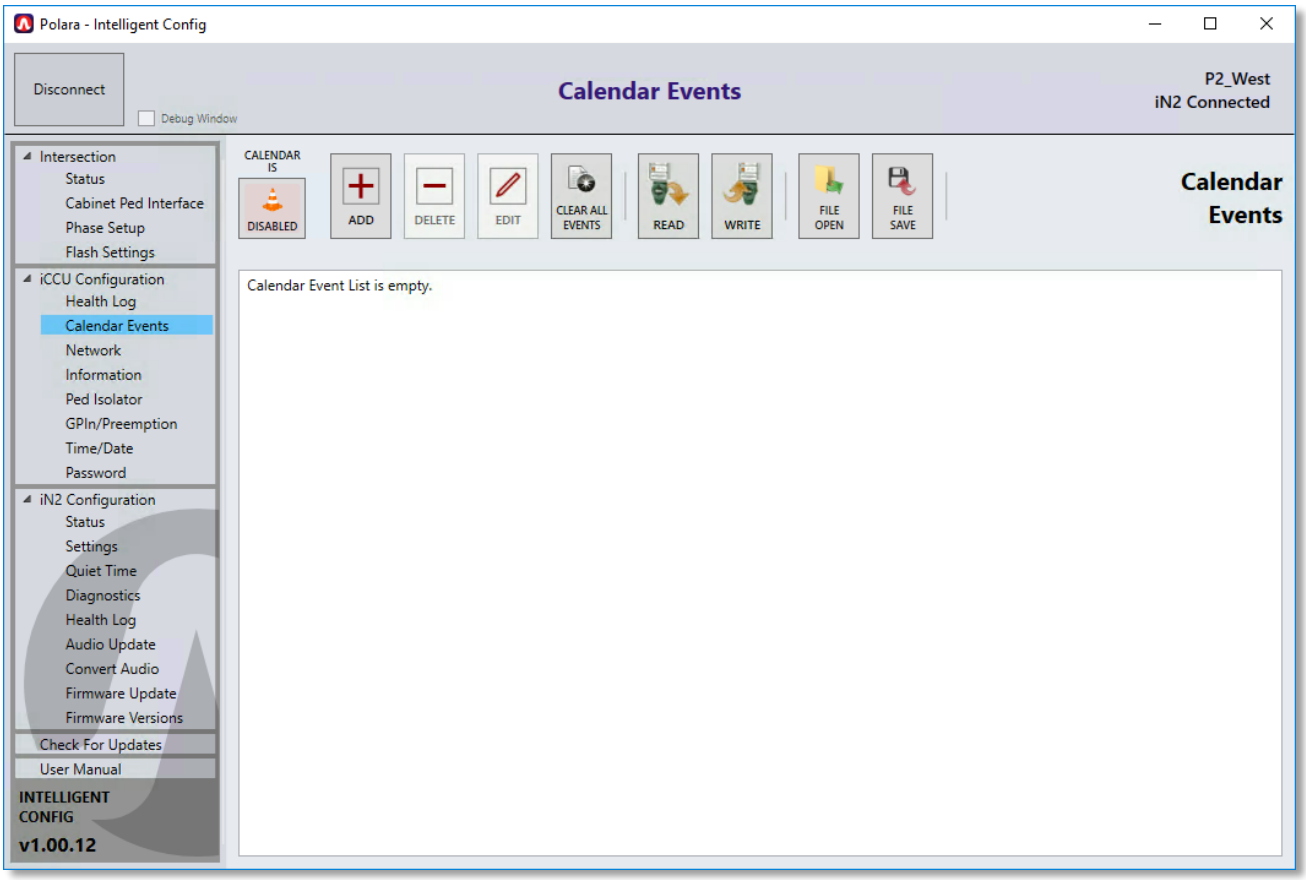
The table below shows what the effective volume settings would be with the Quiet Time set to reduce the volume by 30%. With the values set as shown in the screenshots, between the hours of 9:00am and 7:59pm, the volume will be as set configured in settings (shown in the “set value” column). At 8:00pm to 8:59am the following morning, the volumes will be reduced as shown in the “reduced value” column.

Setting Name	Set Value	Reduced Value
Locate Volume Minimum	0%	0%
Locate Volume Maximum	50%	25%
Information Message Minimum	65%	35%
Information Message Maximum	100%	70%
Std Walk Minimum	30%	0%
Std Walk Maximum	60%	30%
Ext Walk Minimum	60%	30%
Ext Walk Maximum	80%	50%



12.6 Calendar Events

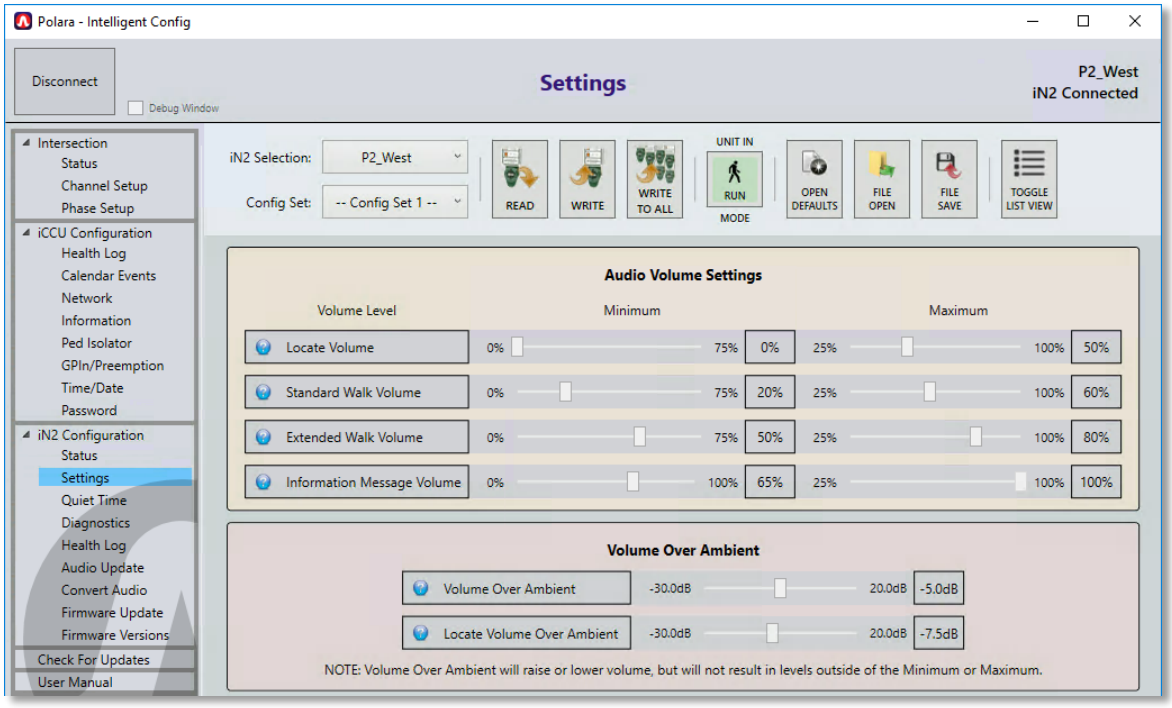
Calendar Events allow the configuration of time based changes to operating characteristics from four possible configuration sets. This feature enables changes to the settings based on the time of day, day of week, or specific day of the year. For example, you can have low volumes in the early morning and at night, while raising the volume during the day.



In order to illustrate the process of creating new Calendar Events, the below instructions show how to setup a Calendar Events scheme to lower the unit's volume from 6pm at night to 6am in the morning every day.

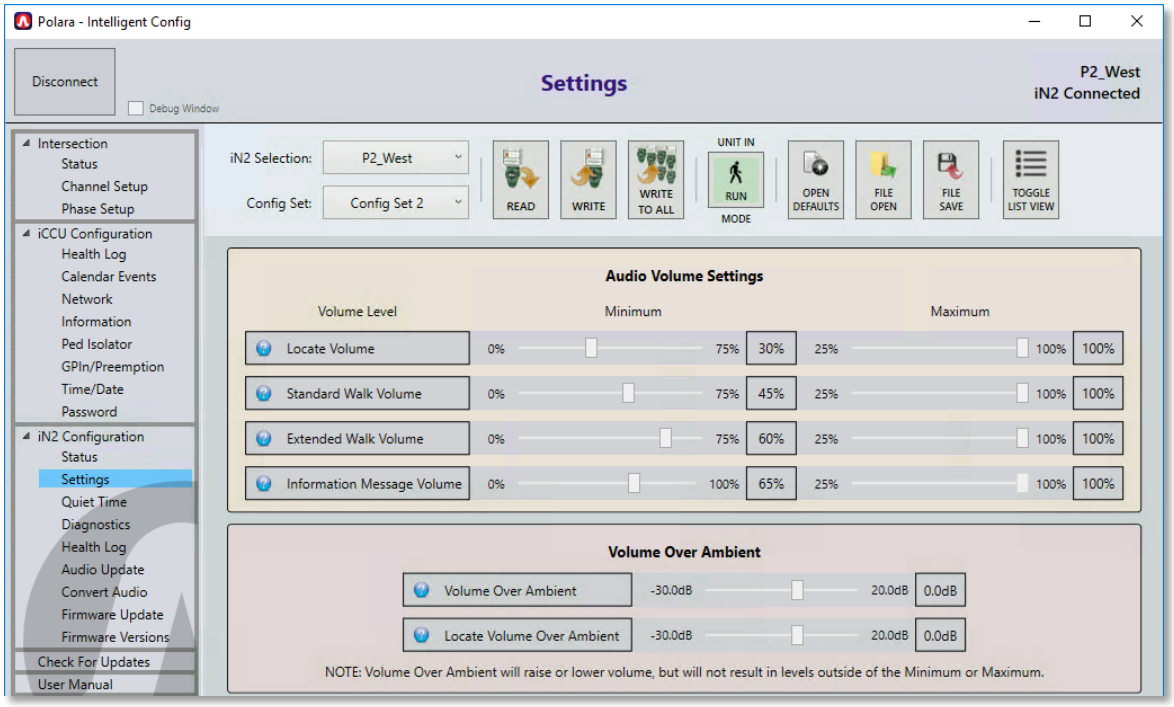
Step 1:

In the Settings page, write the low volumes in Config Set 1. Make sure the appropriate settings are set to all buttons in the intersection. The Write To All button allows you to update all buttons in the intersection with the same settings at the same time.



Step 2:

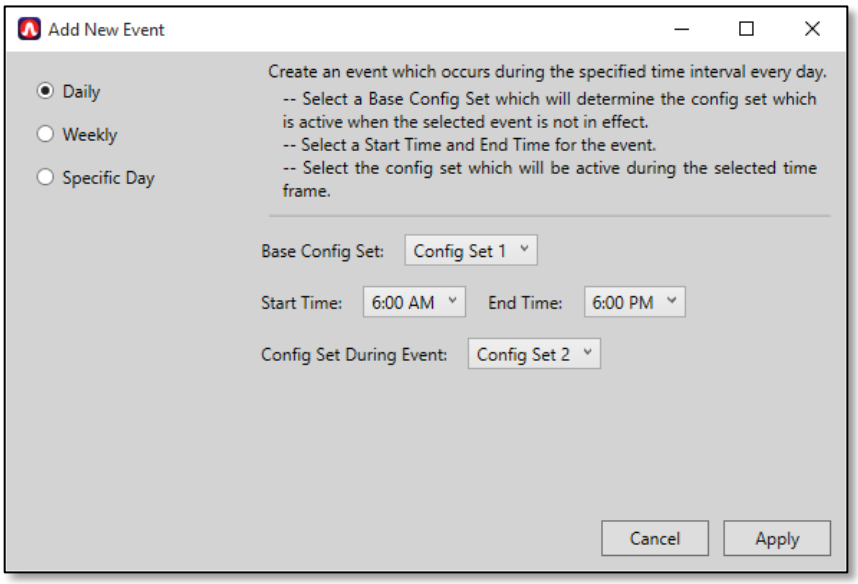
Write the higher volumes to Config Set 2.



Step 3:

In the Calendar Events page, click the Add button.

A dialog box will appear which will allow you to add a new event. Keep the Daily option selected, then choose Config Set 1 as the Base Config Set. Then select a start time of 6AM and an end time of 6PM. Then set the option for Config Set During Event to be Config Set 2.

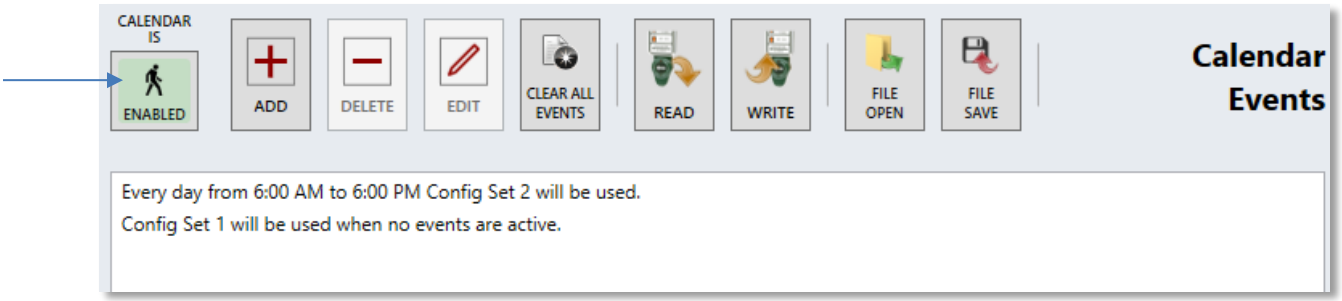


Then Click Apply.

What this is doing is creating an event which occurs every day at 6am which changes the button's active Config Set to 2. Then, at 6pm, the active Config Set will change back to 1.

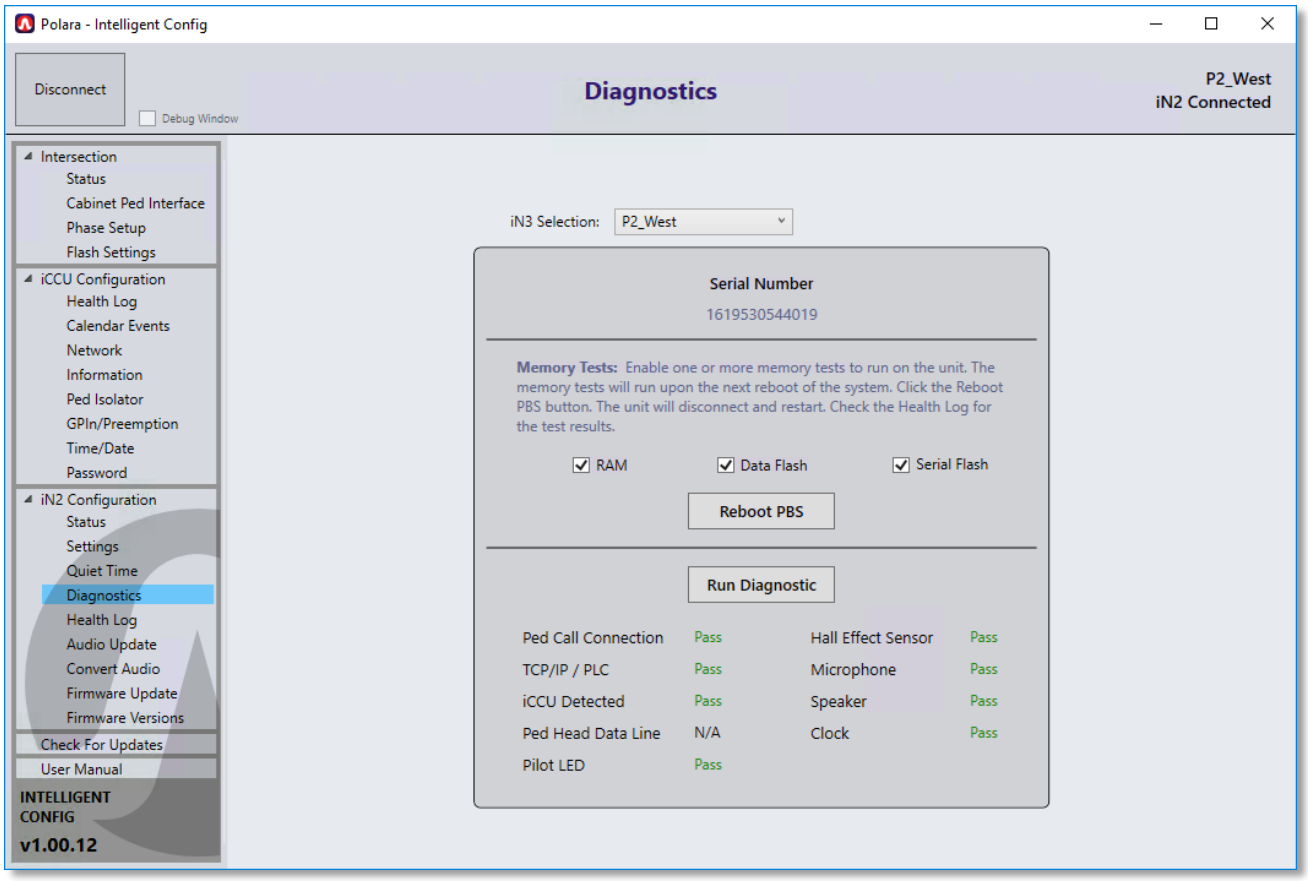
Step 4:

Click the button in the top right corner which says "Calendar is Disabled". When clicked, it will change to "Calendar is Enabled". The Calendar Events will not occur unless this option is enabled.



12.7 Diagnostics

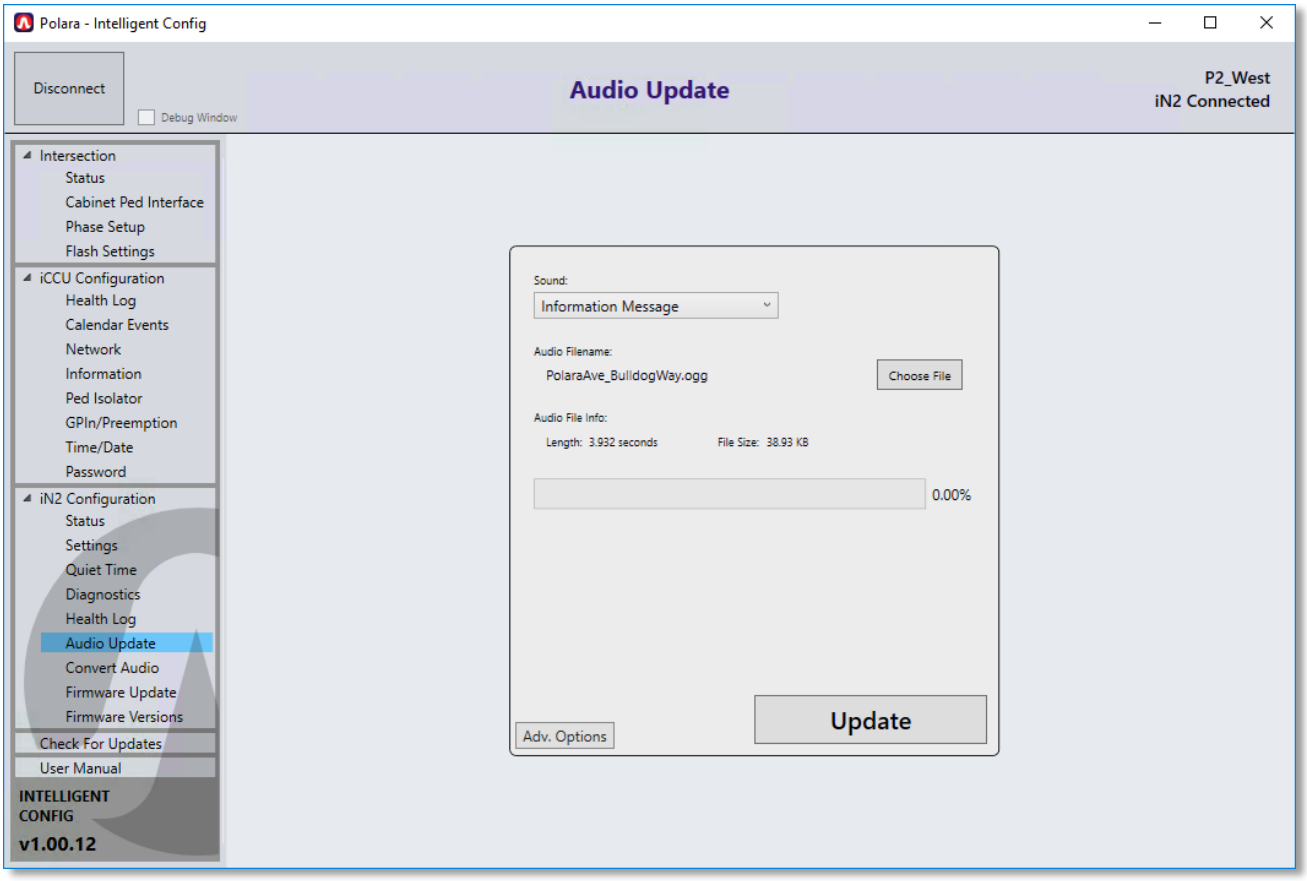
Helps to determine if there is a problem with the PBS hardware, and allows a reboot.



13. Using the Polara Field Service App for PC to Upload Audio Files

From the left menu, click Audio Update.

The Audio Update page allows you to upload audio files to provide new sounds. From the Sound dropdown, choose the sound slot to update, for example the “Information Message” slot. Then click Choose File and select the file to upload to that sound slot. Click Update to send the sound file to the PBS.



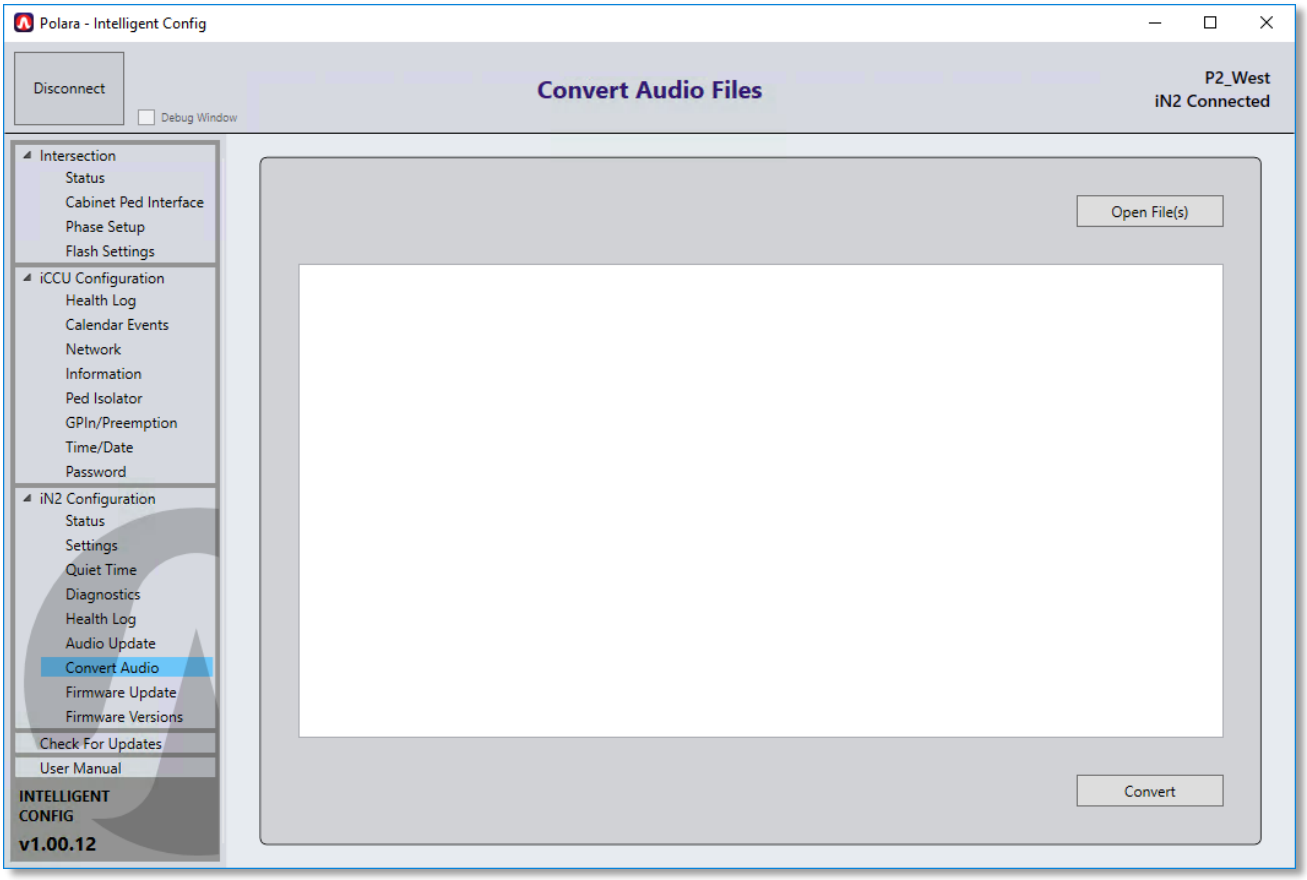
The Intelligent Config application has the ability to reprogram all standard sounds in the unit in order to reset the sounds back to factory default. To access this feature, click the Adv. Options menu and select “Reset/Verify Default Sounds”.

The Intelligent Config application also includes the ability to program sounds in Spanish for use with the Second Language option (see section 16.5.4). In the Adv. Options menu, select “Write Spanish Sounds” and a default set of walk and countdown sounds will be loaded into the unit.

To program additional sounds beyond those available in the Sound dropdown menu, select “Generate Example Audio Upload Script” in the Adv. Options menu and select a location. Then modify the script to add or remove the desired sounds to program. Then select “Upload Files Using Script…” and select the modified script to perform the update. Be sure to convert any custom-made sounds using the Convert Audio Files screen prior to uploading to the unit.

13.1 Convert Audio Files

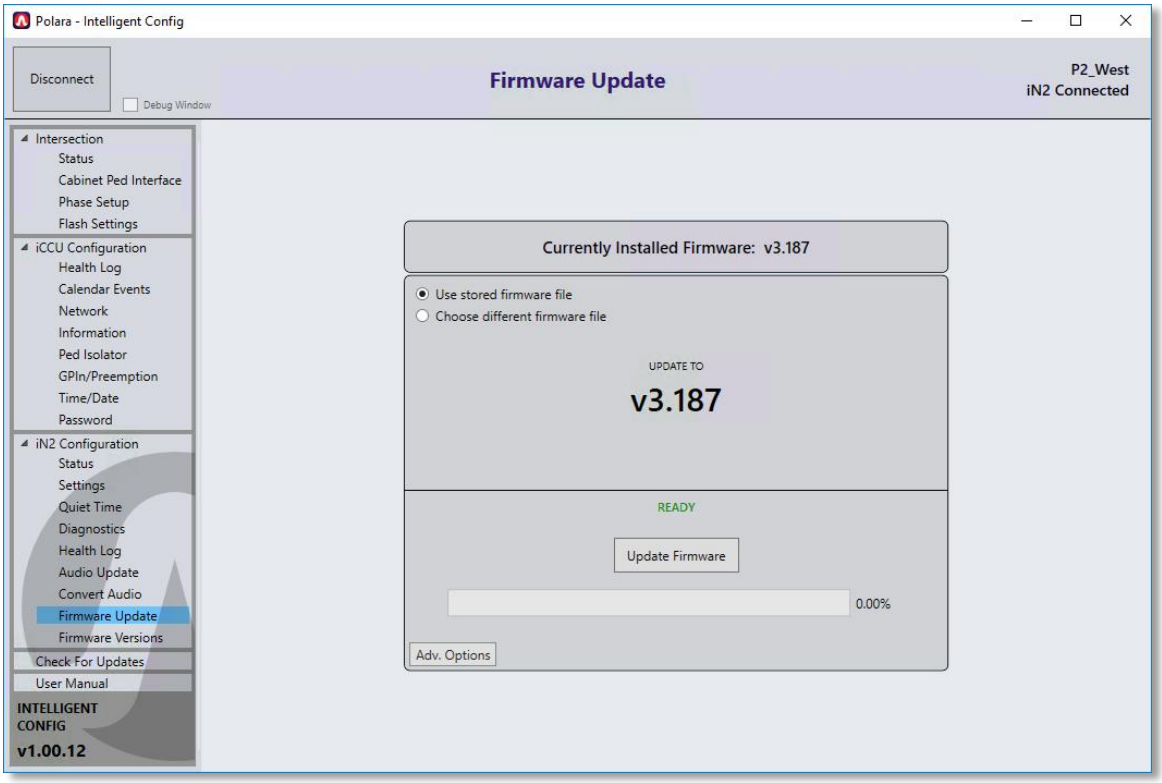
Use this feature to convert audio files to the appropriate format for the iN2 PBS. Simply click Open Files and select the files you wish to convert. Then click Convert. The converted sound files will be saved to your PC, ready to upload to the PBS, as previously described.



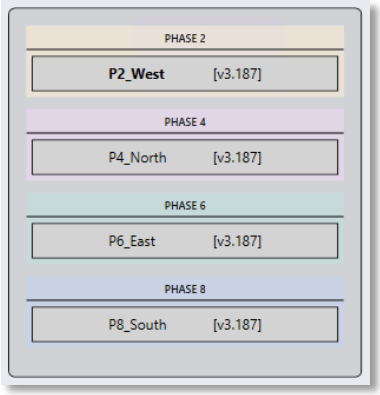
14. Firmware Update

From the left menu, click Firmware Update.

This page allows you to upload the latest firmware to the iN2 PBS. The Intelligent Config App is bundled with a firmware file that represents the most up to date version available at the time the App was released. To use this version, select “Use stored firmware file”. To use a different firmware file, select “Choose different firmware file”. Click Update Firmware to begin the update.



You can view the Firmware Version of all iN2 units in the intersection by clicking on the Firmware Versions menu item. This will give you a quick at-a-glance view of any units in the intersection which still need to be updated.

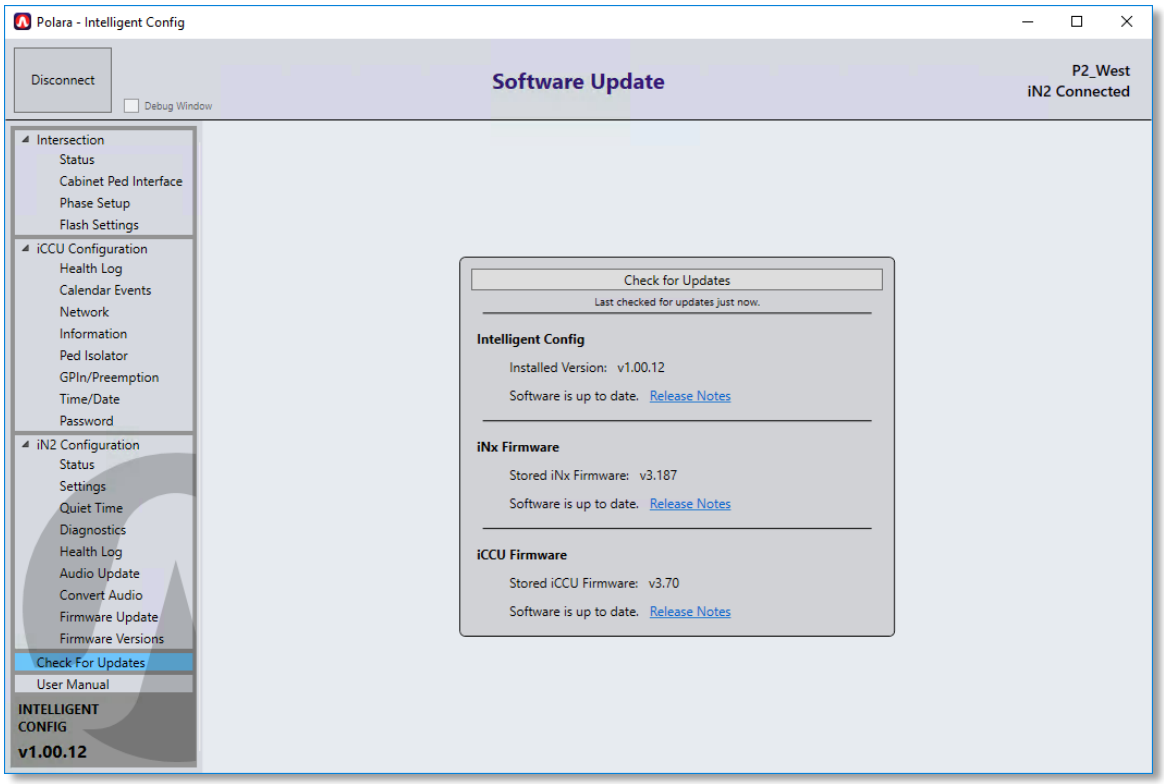


15. Keeping Up to Date

The Intelligent Config application is able to connect to the internet to check for new versions of itself and for new versions of the iN2 firmware.

Make sure your computer has internet access in order to check for updates.

After opening the application, click on the Software Update menu item and it will automatically connect to the internet and check for updates. If any updates are available, a button will appear allowing you to download and install the new update.



16. Configuration Settings Details

This section will provide details on each of the settings which can be accessed from the PBS Configuration / Settings screens on each application, PC or iOS. Most of the below information is available by tapping or clicking on the information button next to each setting in any application.

16.1 Volume Settings

The iNav PBS has an internal microphone which will detect ambient noise and will auto adjust the sound output volume to compensate for ambient noise. Each of the volume settings below have a minimum and a maximum setting. These settings control the limits at which the auto volume adjustment has control. The volume settings are entered as a percent from 0% to 100% in 5% increments. Minimum volume levels are available from 0% to 75% and maximum volume levels are available from 25% to 100%. If, for example, a minimum level is set to 20% and a maximum level is set to 60%, then the auto volume adjustment will never be lowered to below 20% of what the unit is capable of and will never be raised above 60% of what the unit is capable of.

16.1.1 Locate Volume

This function adjusts the volume level at which the Locate (16.4.1) sound will be played.

Factory Default: Minimum 0%, Maximum 50%

16.1.2 Information Message Volume

This function adjusts the volume level at which the Information Message (16.4.5), Push Confirm Message (16.4.6), and the periodic Wait Message (16.4.3) sounds will be played.

Factory Default: Minimum 65%, Maximum 100%

16.1.3 Standard Walk Volume

This function adjusts the volume level for the walk and clearance sounds when activated using a standard-length button push.

Factory Default: Minimum 30%, Maximum 60%

16.1.4 Extended Walk Volume

This function adjusts the volume level for the walk and clearance sounds when activated using an extended button push.

Factory Default: Minimum 60%, Maximum 80%

16.1.5 Volume Over Ambient

This function can increase or decrease the playback volume of all sounds except the locate sound relative to the measured ambient sound pressure, but still be within the set minimum and maximum settings. This compensation function is adjustable from -30dB to +20dB over ambient in 5dB steps.

Factory Default: 0dB

16.1.6 Locate Volume Over Ambient

This function can increase or decrease the playback volume of the locate sound relative to the measured ambient sound pressure, but still be constrained within the set minimum and maximum settings. This compensation function is adjustable from -30dB to +20dB over ambient in 2.5dB steps.

Factory Default: 0%

16.2 Walk Interval Settings

16.2.1 Walk Mode Sound

This function selects the preferred sound played during the Walk interval. The available options are: None, Cuckoo (N/S), Chirp (E/W), Standard Walk, Custom Walk 1, Custom Walk 2, Custom Walk 3, Walk Sign is On for All Crossings, Rapid Tick 1, Rapid Tick 2, Rapid Tick 3, Canadian Melody, Australian Walk, Walk Sign is On.

Note: The length of button vibration during the Walk interval matches the duration of the walk sound.

Factory Default: Standard Walk

16.2.2 Walk Sound Pause

This function selects the length of silence between walk sounds.

The available options are selected in seconds: 0, ½, 1, 1½, 2, 2½, 3, 4, 5, 6, 7, 8, 9, and 10

Factory Default: 0.5 seconds

16.2.3 Walk Sound Trigger

This function selects the condition that will play walk sounds at the next pedestrian Walk interval.

The available options are:

- Always On: Recall Mode Conditions - Plays every Walk interval.
- Any Push: Short or Extended button push.
- Extended Push: Extended push only.

Note: Do not use Extended Push on crosswalks set to Rest-in-Walk. If a blind person does not push and hold the button, and if a car never triggers the cross street, they may never get a Walk indication.

Factory Default: Any Push

16.2.4 Maximum Walk Time

This function selects the maximum time a walk message and vibrating button will activate during a Walk interval. This acts as a safety limit for the maximum possible time an intersection should ever be in Walk.

The available options are selected in seconds: 30, 35, 40, 45, 50, 55, 60, 90, 120, 150, 180, 210, 240, 300

Factory Default: 30 seconds

16.2.5 Sound/Vibrate Timer

This function selects the number of times (1, 2 or 3) or the length of the time in seconds the walk sound is played. Use this function to limit the sound timer for Rest-in-Walk situations, or to limit the walk sound time in the event of a system failure.

The Sound/Vibrate Timer setting can optionally shorten the amount of time the walk sound plays and the button vibrates during the Walk interval. There is no option that will extend the sound/vibration. Only a serious malfunction can result in an extended sound or vibration beyond the end of the Walk interval. There are settings available that can help reduce the risk to pedestrians in the event of such a malfunction.

The available options are:

- Full Walk: The selected walk sound will repeat until the Walk interval ends.
- 1 Message: The selected walk sound will play one time, or until the Walk interval ends, whichever occurs first.

- 2 Message: The selected walk sound will play two times, or until the Walk interval ends, whichever occurs first.
- 3 Messages: The selected walk sound will play three times, or until the Walk interval ends, whichever occurs first.
- Time in seconds from 4 - 50: The selected walk sound will play through the amount of time specified, or until the Walk interval ends, whichever occurs first.

For each of the above options, if Cancel on Clearance is set to Yes, any currently playing sound clip will be truncated at the time the Walk interval ends. Otherwise, the currently playing sound clip will complete. The repetition period for the walk sound will be the length of the sound clip plus the selected Walk Sound Pause time. The button vibration time is synchronized with the sound time.

Factory Default: 20 seconds

16.2.6 Sound/Vibrate Re-Trigger

This function is primarily used when the Sound/Vibrate Timer setting is not set to Full Walk and is intended for use in intersections set to Rest-in-Walk. It is also important in the following situation: If the Walk interval is able to turn on without a button push (Recall Mode) and the Walk Sound Trigger option is NOT set to Always On, the locate tone will continue into the Walk interval, just like in a Rest-in-Walk timeout. The choices below determine the response to a button push while the locate tone is playing during the Walk interval.

The available options are:

- Button Push - Typically used in Rest-in-Walk situations. After initial timeout, sound restarts immediately with button push as long as crosswalk is still in the Walk interval.
- New Walk - After timeout, a new Walk interval is required before the next walk sound is played which is also complemented with the vibrating button.

Factory Default: New Walk

16.3 Clearance Interval Settings

16.3.1 Cancel on Clearance

This function gives the choice to cancel or complete the walk sound when the intersection timing changes from the Walk interval to the Clearance interval. This function is primarily applicable where walk messages are quite long. It must be carefully examined before turning this function off since it can falsely extend the Walk interval sounds into the Clearance interval. Regulations may not allow this function, so changing the default must be carefully considered.

The available options are: No, Yes

Factory Default: Yes

16.3.2 Clearance Mode Sound

This function allows the choice of different clearance sounds.

The available options are: None, Tone 1 thru Tone 4, Countdown, Canadian Melody

If the Countdown option is selected, the Countdown numbers are automatically selected based on the previous Clearance intervals. The starting number is chosen by measuring the length of the two previous Clearance intervals and choosing the shorter of the two. Due to the measurement necessity, the Countdown will not be heard until the third Clearance interval encountered after power up.

Note: If ped recycle is activated on the traffic controller and ped recycle can interrupt the clearance cycle, it is not recommended to use countdown due to the timing changes causing the count to be incorrect.

Note: If the Second Language option is enabled, the Countdown function is tied into the language options. The Countdown language will be in the same language the pedestrian selects when performing an extended push.

Factory Default: Tone 1

16.3.3 Clearance Tone Pause

This function selects the length of silence between clearance sounds.

The available options are selected in seconds: ½, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5

Factory Default: 1 second

16.4 Don't Walk Interval Settings

16.4.1 Locate Sound

This function allows the choice of a few standard locate sounds.

The available options are: None, Tone 1 thru Tone 4

Factory Default: Tone 1

16.4.2 Locate Tone Time

This function selects the start to start repetition time of the locate sounds.

The available options are selected in seconds: ½, 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5

Factory Default: 1 second

16.4.3 Wait Message

The Wait Message is an optional feature which will switch the locate sound to a verbal "Wait" following a button push and button push confirmation sound. There are four timing options of 4, 6, 8 and 10 seconds. Also, the Wait Message can be triggered by any push or only an extended push. The Wait Message is available regardless of the Walk Sound Trigger setting.

Note: When the iCCU updates the date/time on the iN2 units, the timer between sounds resets. Therefore, the duration between these sounds may occasionally shorten.

The available options are: Off, Any Push 4s, Any Push 6s, Any Push 8s, Any Push 10s, Extended Push 4s, Extended Push 6s, Extended Push 8s, Extended Push 10s

Factory Default: Off

16.4.4 Direction Message

This function selects the spoken direction to be played when a direction message is configured as part of the Information Message setting.

The available options are: N, NE, E, SE, S, SW, W, NW

Factory Default: North

16.4.5 Information Message

This option details what notice occurs when the button is held down for the extended push time. This typically allows for a custom message that gives blind pedestrians additional information on the street they are crossing and its cross street. The options noted as 'with Pulse' give a vibrotactile pulse at the beginning of a button push and a second pulse when the button is held down for the extended push time. The options noted as 'no Pulse' only have a vibrotactile pulse at the beginning of the button push and only the sound will play at the extended push time.

The sound options are:

- Tick: A click sound is heard. This is the same sound file that is configurable as Click in the Push Confirm Message setting.
- Custom: A special-ordered or programmed information message sound. If no custom sound has been loaded, then the Custom option contains the click sound.
- Direction: "Traveling North" or whichever direction is selected for the Direction Message option will play.
- Custom + Direction: The custom sound will play followed by "Traveling North" or whichever direction is selected for the Direction Message option.
- No Sound: No sound is played.

The available options are: Tick (no Pulse), Custom (with Pulse), Direction (with Pulse), Custom + Direction (with Pulse), No Sound (with Pulse), Custom (no Pulse), Direction (no Pulse), Custom + Direction (no Pulse)

Factory Default: Tick (no Pulse)

16.4.6 Push Confirm Message

This function selects the sound played directly following a standard button push.

The available options are: Click, Wait, Custom, Custom 2

Factory Default: Wait

16.5 Other Settings

16.5.1 Button Push Force

This function adjusts the necessary force required on the button to place a call.

The available options are: Light, Medium, Firm

Factory Default: Medium

16.5.2 Cancel on Walk

This function gives the choice to immediately cancel or complete the information message when the intersection changes to the Walk interval while playing the information message.

NOTE: It must be carefully examined before changing this option to "No" since it can falsely shorten the Walk interval.

The available options are: No, Yes

Factory Default: Yes

16.5.3 Extended Push Time

This function adjusts the amount of time the button on the PBS has to be pressed and held before enabling the Extended Push functions.

The available options are selected in seconds from 0 to 6 in ½ second increments.

Factory Default: 1 second

16.5.4 Second Language

This function allows for a Second Language to be played for the information message, walk message and countdown. This language is a custom programmed option. For example, if the second language has been programmed in Spanish and enabled, the pedestrian can access the language options by pressing and holding the push button. The primary language would be stated first then the secondary language. "English", pause, "Español", pause, "English", etc. The pedestrian releases the button after they hear their language of choice. The information message is immediately played in the selected language. The walk message and countdown will also be played in the selected language. Following this, all messages will revert to the default primary language.

Note: No second language sounds are included from the factory. These must be added by recording sounds and uploading them or ordering a custom option. If this option is enabled when no second language sound are programmed, the unit may not operate as expected. See section (13) for information on uploading audio files.

The available options are: No, Yes

Factory Default: No

16.5.5 Extended Push Priority

This function, when enabled, silences the entire intersection with the exception of the crosswalk(s) that are given priority by receiving an extended push. This greatly reduces sound clutter to the blind pedestrian and allows them to concentrate on the sounds relative to their crosswalk only.

The available options are: No, Yes

Factory Default: No

Sub-Option: First Push Only

> With this option enabled, the first pedestrian to perform an extended push will take priority. Any additional extended pushes on other phases which occur prior to the upcoming walk cycle will not enable sounds for their phase.

16.5.6 Ping Pong

This function will play the walk/clearance sound first, on one PBS, then across the street, back and forth until the interval ends similar to a beaconing type of operation.

The feature can be enabled independently for walk sounds and clearance sounds. The ping pong feature can be configured to only activate upon an extended push if the “On for Extended Push” option is enabled.

Each unit must be configured to play first or play second. When there are two units per phase, then one unit should be set to play first and the other should be set to play second. If there are more than two units, then the settings should alternate for each unit in series, for example if there are three units (with one in a mid-crossing island) than the two units on the street corners should be set to play first while the island unit should be set to play second.

Note: There is no communication between units for synchronization of sounds. This feature relies on sound message length for synchronization. All units on each phase must have the same walk and clearance sounds configured to ensure proper ping pong timing.

Factory Default: Off

16.5.7 External Speaker Option

This option is only available on special ordered units with part number suffix –ES and must be specified at time of ordering.

When enabled, all walk and clearance sounds emanate from an external speaker and all other sounds emanate from the internal speaker.

Factory Default: Disabled

16.5.8 Double Walk

This setting enables a unit to automatically generate a ped call and enable sound for two Walk and Clearance intervals. A second ped call is generated after the end of the first Walk interval enabling a second Walk interval to occur. This is typically used for crossings which have an island without a pushbutton present in order to prevent the possibility of a stranded pedestrian.

The available options are: No, Yes

Factory Default: No

16.5.9 Limit Push Recall

This option is only for use when Walk Sound Trigger is set to Extended Push and Sound/Vibrate Re-Trigger is set to New Walk. This option limits the ped call re-trigger to only occur when an extended push occurs during the Walk interval. If only a standard push occurs, no ped call will occur at the end of Walk.

An automatic call placed by the PBS at the end of Walk should only happen following an Extended Push during Walk. During Walk, only an Extended Push should latch the Pilot LED. During Walk, only an external button call for Extended Push duration should latch the Pilot LED. An Extended Push which starts during Don't Walk and finishes during Walk should have the same result as an Extended Push completely within Walk.

The available options are: No, Yes

Factory Default: No

17. Regulatory Notice

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

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

18. iNav Mounting Hole Diagram