

Polara

iNS/iDS 2-Wire System Manual

Note: Model iDS2 is equivalent to iNS2 in all aspects, but includes iDetect functionality. Anywhere iNS2 is used in this manual, applies to iDS2 also.

For use with iCCU-S2 and iCCU-C2

350-077 Rev. J-26043

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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.



EARTH GND (ground) protective conductor terminal.

2. iNS2 System Description

The iNS2 Accessible Pedestrian System (APS) consists of Push Button Stations (iNS2 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-X2 available. The iCCU-S2 is compatible with all types of traffic cabinets and controllers and is normally placed on a shelf. The iCCU-C2 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-S2 and iCCU-C2, iCCU-X2 shall be used.

2.1 iNS2 Accessible Pedestrian Signal Push Button Station (PBS)

The iNS2 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 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-X2.

2.1.1 Technical Specification

Operating Voltage/Power: 24 VDC / 3W Nom

External Connections:

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

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 W x D x H: 129 x 69 x 355 (mm - Reference Only)

Weight: 4.4 lbs.

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

Note: The iNS2 can operate as an iNS3 when paired with an iPHCU3S. Refer to the iNS/iDS 3-Wire System Manual and iNS3 Quick Start/Install Guide.



2.2 iCCU-S2 Intelligent Central Control Unit for Shelf



2.2.1 Technical Specifications

Input Voltage / Current: 110-220V, 50/60Hz, 3A

PBS Output: 24 VDC / 3.17A continuous, 3.75A 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

Environmental Conditions:

- Mains supply voltage fluctuations up to ±10% of the nominal voltage
- Overvoltage Category II
- Pollution Degree 2

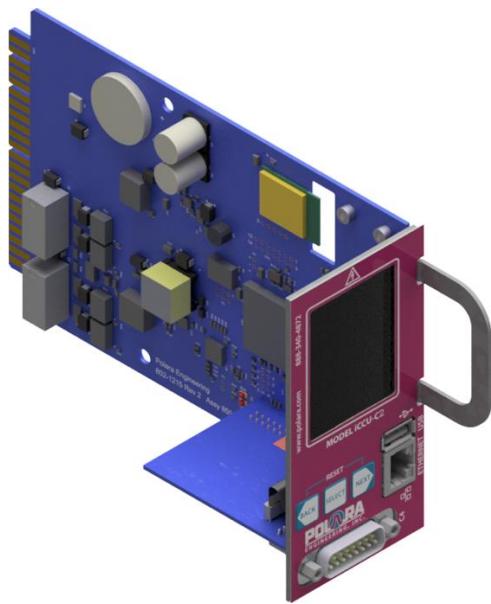
Mounted inside all-weather enclosure, provided by customer

Dimensions W x D x H: 81 x 224 x 161" (mm - 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-C2 Intelligent Central Control Unit Plug-in Card



2.3.1 Technical Specifications

Input Voltage / Current: 24VDC Nominal / 0.5A

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 W x H x D: 58 x 114 x 178 (mm - Reference Only) excluding handle

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 iNS2 or iCCU-X2 are either installed or utilized in a configuration not stated in this manual. Disconnect input power to the iNS2 before field examination.

3.1 iNS2 System Operation During Intersection Flash

The iNS2 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-X2 firmware suspends normal communication to disable the buttons. **For safety, the AC input power for the system must be connected such that power to the buttons is removed during intersection flash. This is especially important when operating in BIU mode with an iCCU-S2 or when using the iCCU-C2 in a rack. The iCCU-S2 will not be signaled via SDLC that the intersection has gone into flash. Similarly, the iCCU-C2 will not be signaled via the C4 cable that the intersection has gone into 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.

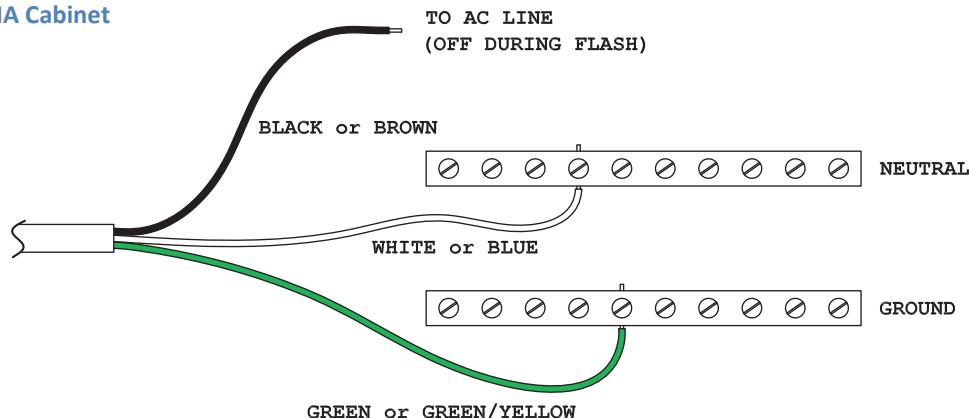
3.1.1 Wiring the Power Cord

The power cord should be disconnected from the iNS2 system until installation is complete.

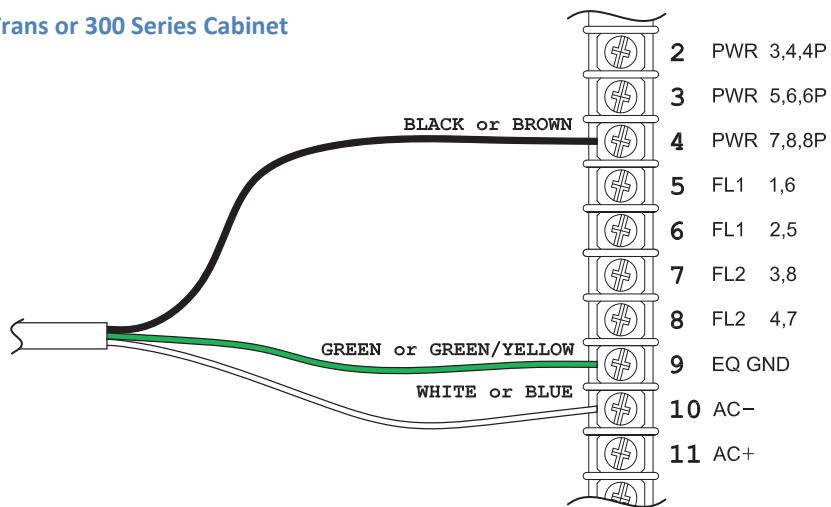
To prevent risk of shock, place the intersection in flash to make the following connections:

- 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 or AC Neutral terminal
- Connect the Earth Ground wire (green or green/yellow) to the cabinet ground bar or Earth Ground terminal

3.1.1.1 Typical NEMA Cabinet

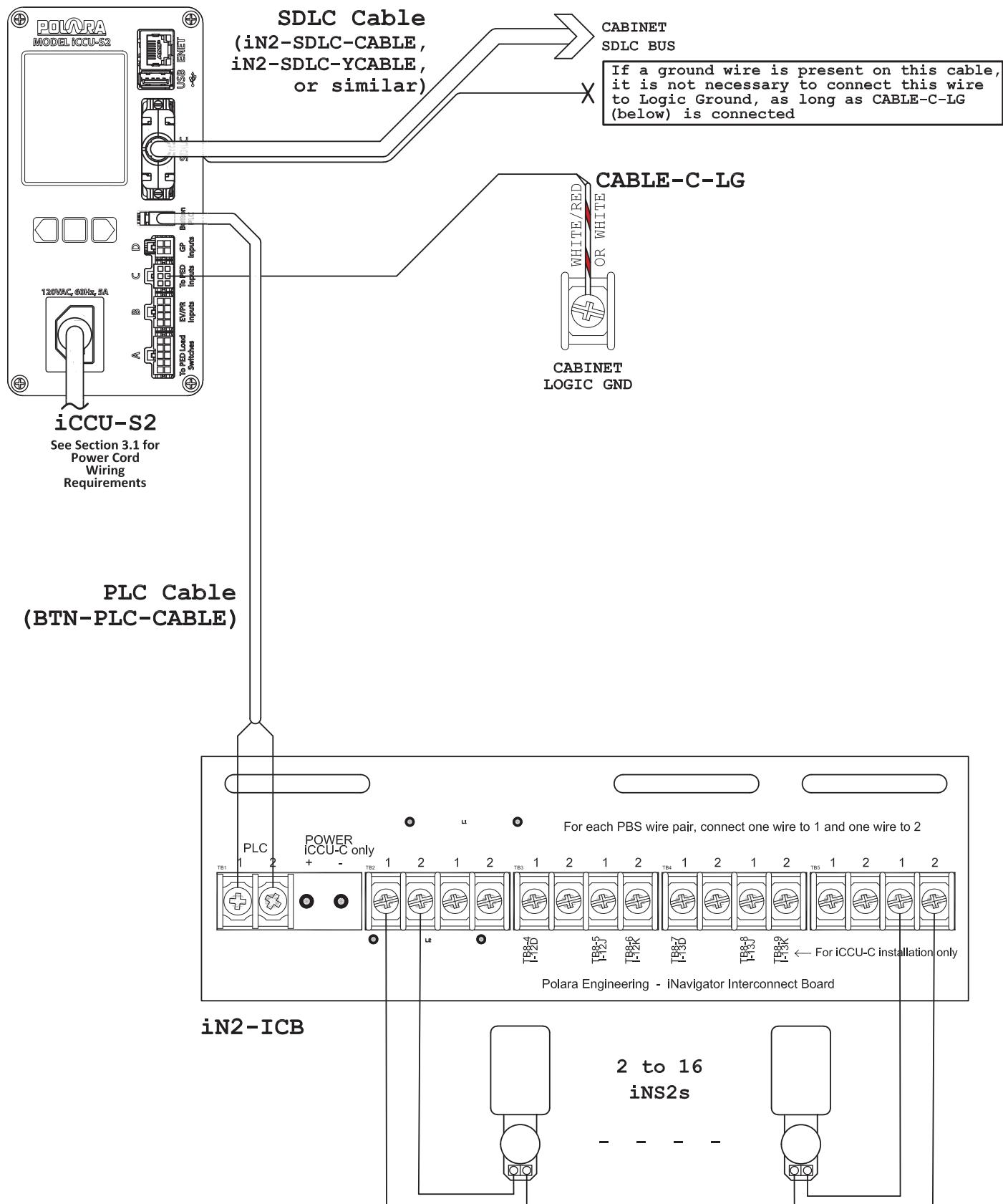


3.1.1.2 Typical CalTrans or 300 Series Cabinet

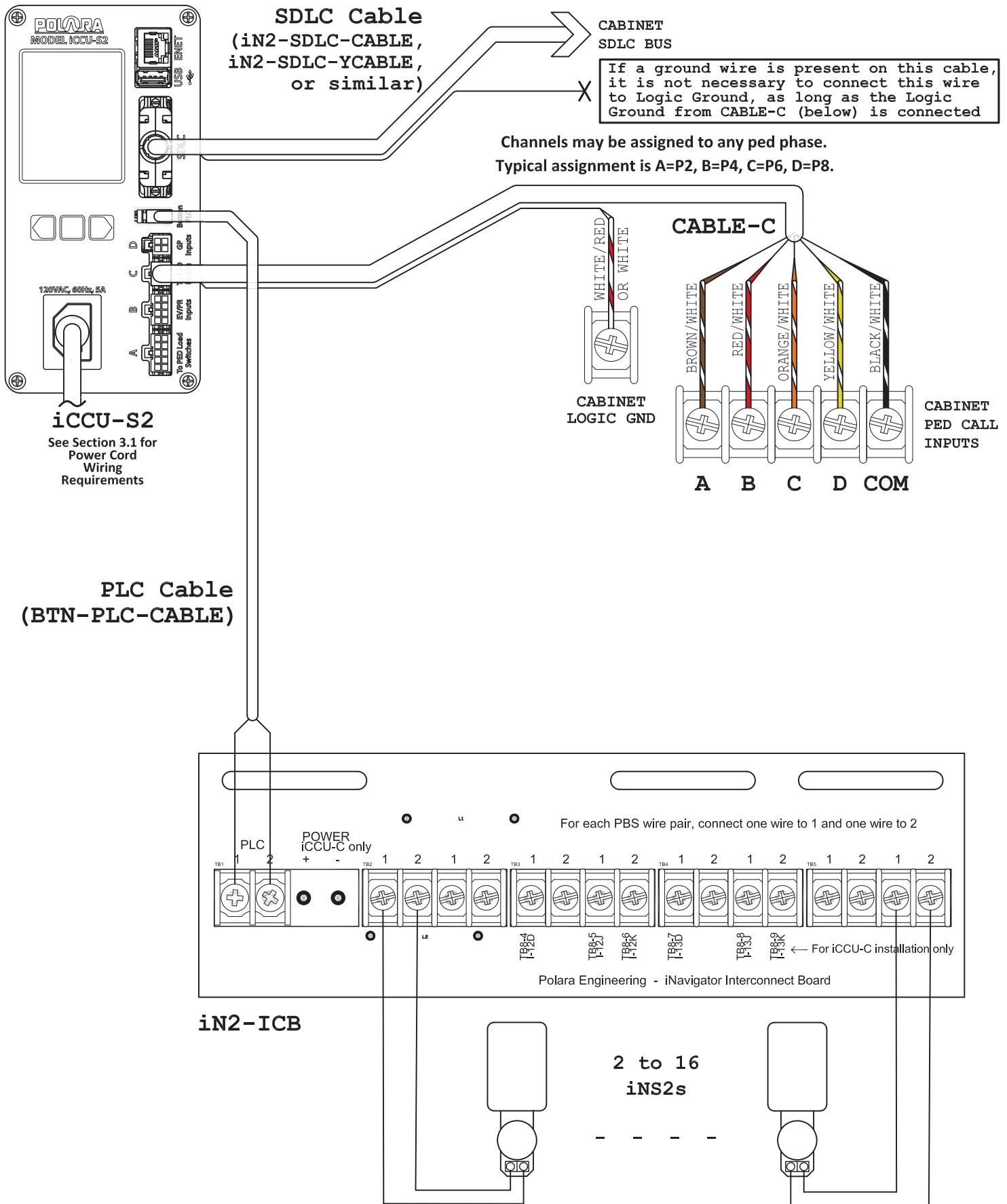


3.2 iCCU-S2 with iNS2 PBS – Wiring Diagrams

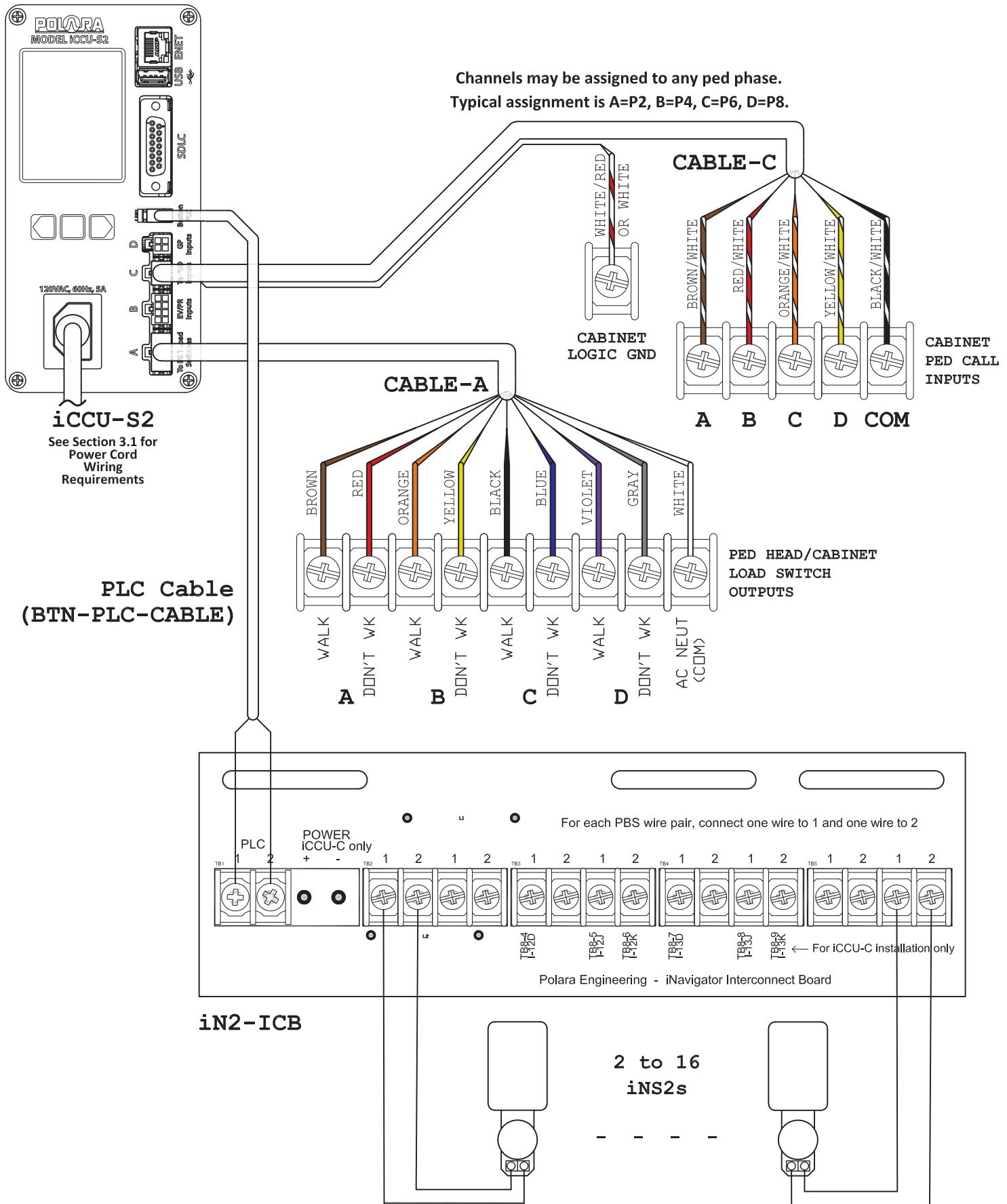
3.2.1 Typical NEMA TS2 Type 1 Cabinet Connection with Interconnect Board – BIU Mode



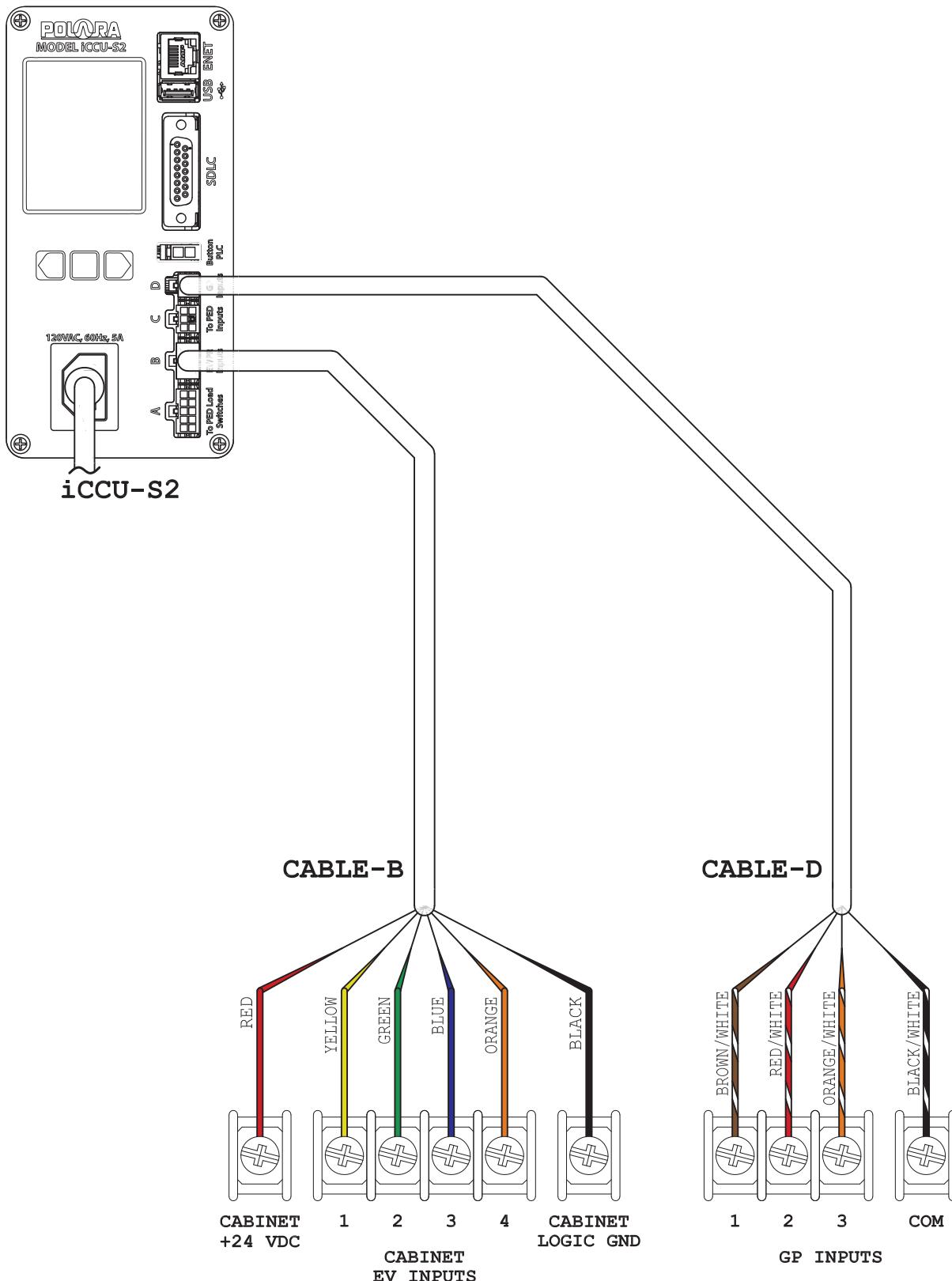
3.2.2 Typical NEMA TS2 Type 1 Cabinet Connection with Interconnect Board – SDLC Hybrid Mode



3.2.3 Typical NEMA TS1 Cabinet Connection with Interconnect Board – Hard-Wired Mode

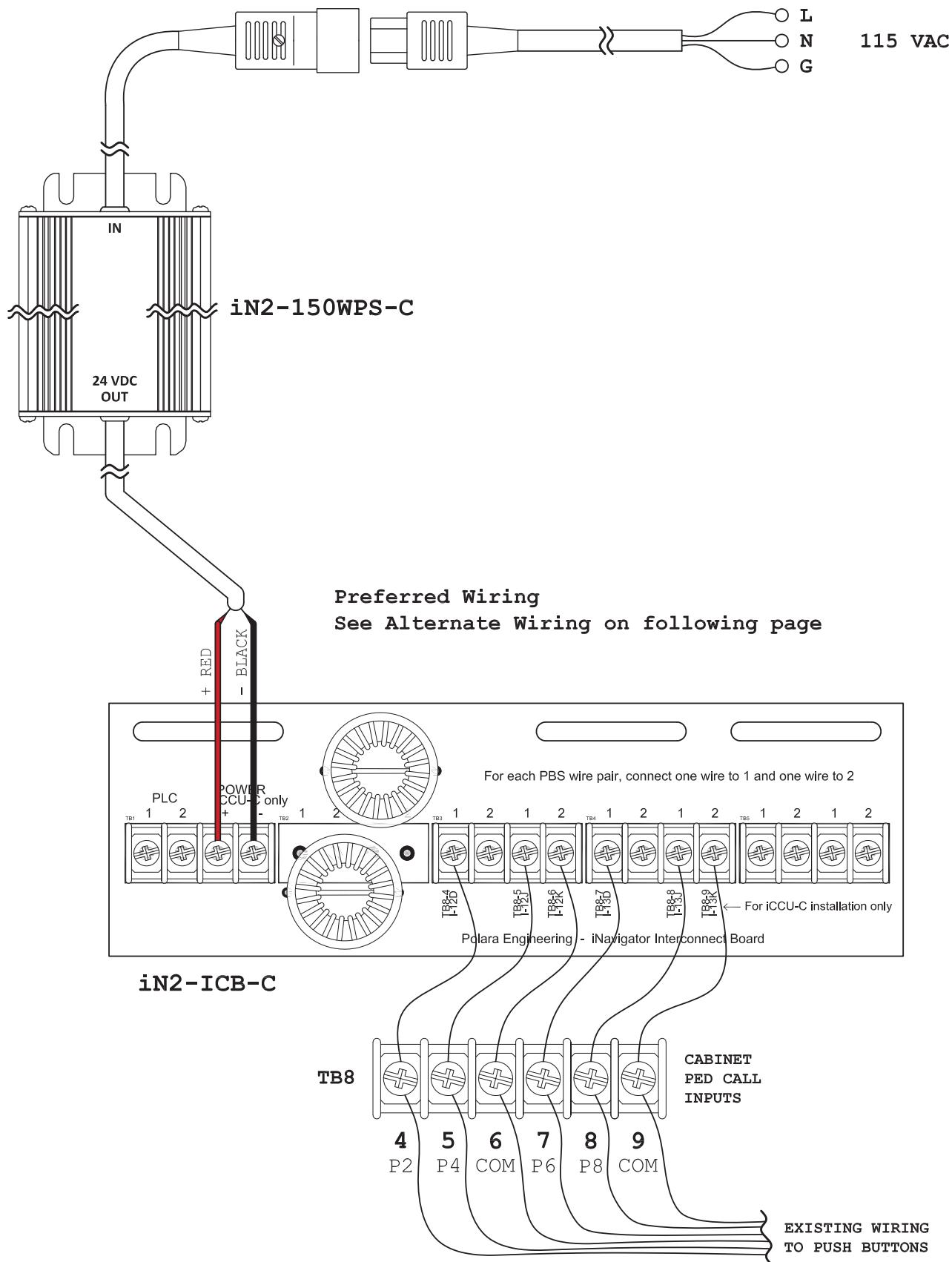


3.2.4 Control Unit Cabinet Wiring (Optional Wiring for Preemption and General Purpose Inputs)

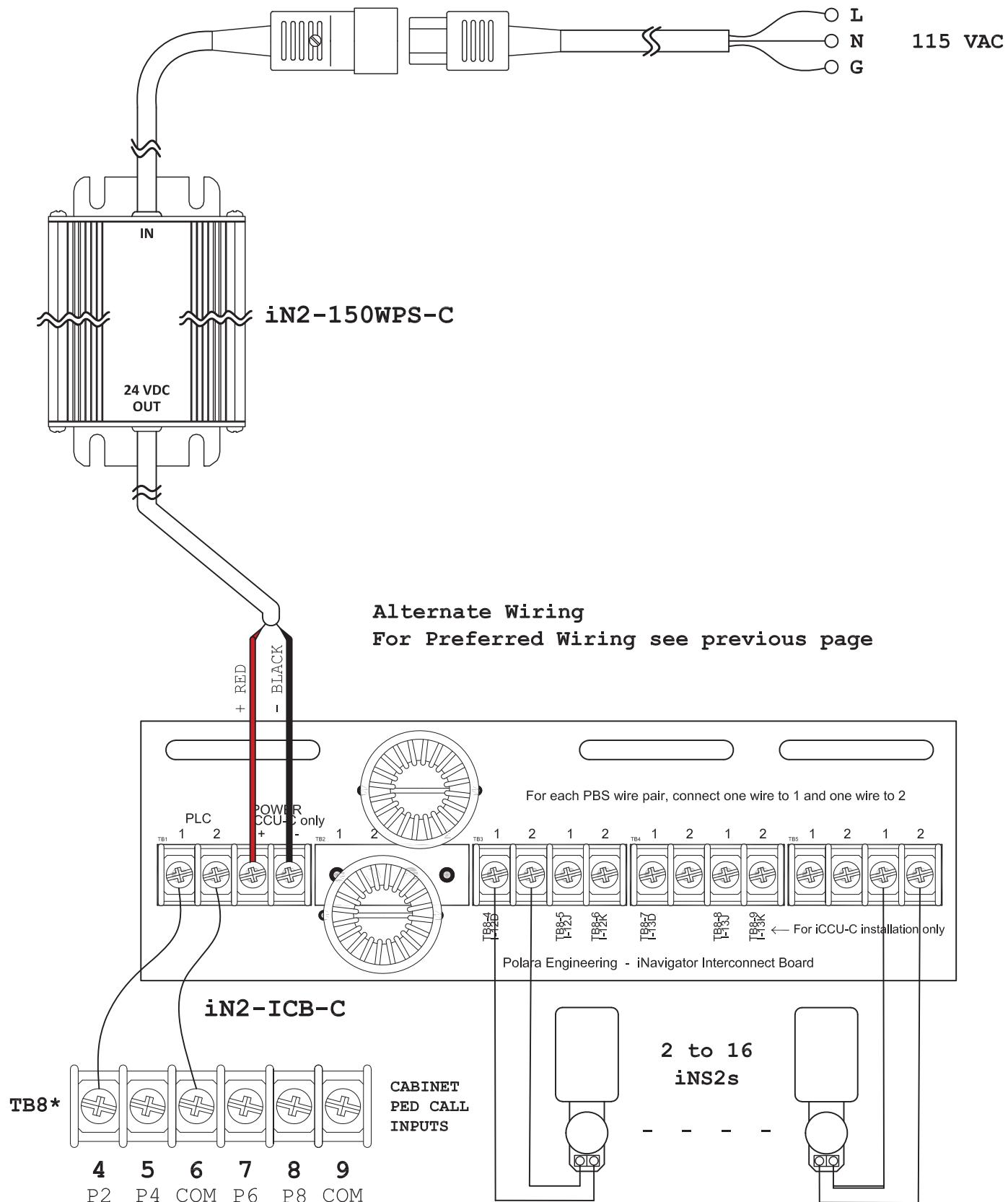


3.3 iCCU-C2 with iNS2 PBS – Wiring Diagrams

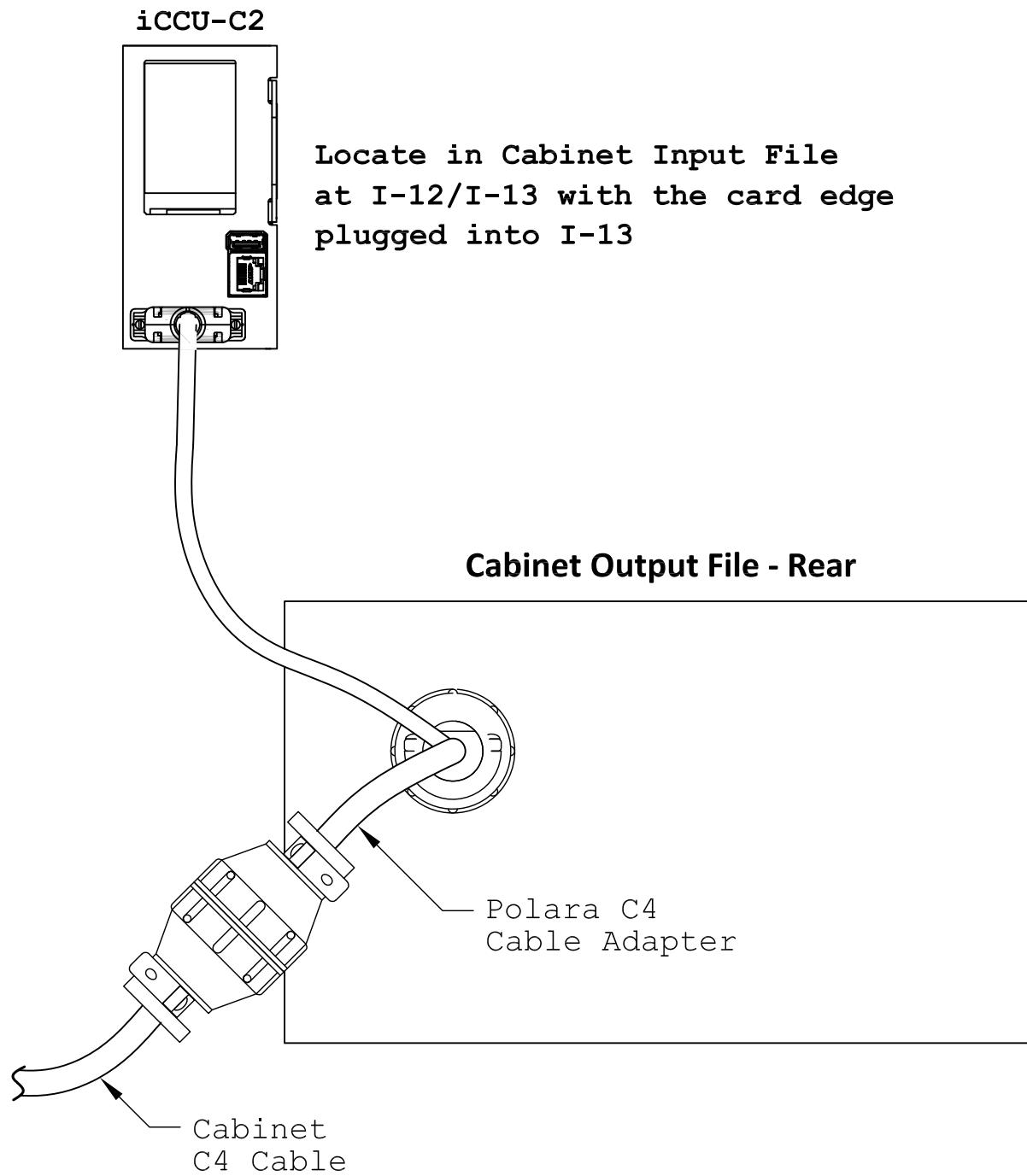
3.3.1 Typical 332 or Similar Cabinet Connection #1 – Preferred



3.3.2 Typical 332 or Similar Cabinet Connection #1 – Alternate



3.3.3 Typical 332 or Similar Cabinet Connection #2



3.4 iCCU-S2 Central Control Unit Installation Procedure

Note, all wiring must be completed before applying power to the iCCU-S2.

It is required to connect the LOGIC GROUND wire from CABLE-C-LG or CABLE-C to the cabinet's LOGIC GROUND even when SDLC will not be used. This is because at some point, if the cabinet is upgraded to use SDLC, it will already be correctly wired and will prevent a future oversite and failure of the iCCU, traffic controller or other equipment on the SDLC bus. Please note, NEMA TS2 cabinets tend to have an explicit LOGIC GROUND (NOT TO BE CONFUSED WITH PED COMMON OR OTHER GROUNDS). This would be the DC logic ground of the power supply that provides DC voltage to the traffic controller. Connection of this LOGIC GROUND should be the very first step of installation.

3.4.1 Cabinet Interface for Ped Intervals and Ped Calls

The iCCU-S2 is expected to sit on a shelf inside the Traffic Controller cabinet. The iCCU-S2 can function in one of three configurations:

1. BIU Mode
2. SDLC Hybrid Mode
3. Hard-Wired Mode

1. BIU Mode (Diagram Section 3.2.1)

The iCCU-S2 can obtain ped interval information and place ped calls via the SDLC bus. For the iCCU-S2 to work in this mode, the Traffic Controller must support NEMA TS2 compliant SDLC and be communicating with an MMU. Any standard SDLC cable can be used (such as P/N: **iN2-SDLC-CABLE**) if there is an available port to plug into. If there are no available ports, a "Y" cable is available (P/N: **iN2-SDLC-YCABLE**) to insert between an existing connection and the Traffic Controller.

When using SDLC, it is necessary to share a common logic/signal ground with the Traffic Controller and other devices on the SDLC bus. Therefore, each iCCU-S2 is shipped with CABLE-C-LG. This cable connects to the connector on the iCCU-S2 labeled "C/To Ped Inputs". This cable only has a single wire, which must be connected to the cabinet's logic/signal ground. Note, this is different from Earth or chassis ground. Please refer to your cabinet's wiring diagram to find the appropriate logic/signal ground connection point.

* Failure to establish this ground connection can result in damage to the iCCU-S2, the Traffic Controller, or other hardware on the SDLC bus.*

For proper operation and to maintain the product warranty, it must be guaranteed that the iCCU-S2's logic/signal ground is tied to the cabinet's logic/signal ground.

This mode requires configuration of the Traffic Controller to reserve a detector rack BIU address for the iCCU-S2 as well as remapping of ped inputs, typically using logic statements. Please consult the Traffic Controller's user manual for more information.

2. SDLC Hybrid Mode (Diagram Section 3.2.2)

The iCCU-S2 can obtain ped interval information from the SDLC bus while placing calls using traditional wiring to the cabinet's ped input. For the iCCU-S2 to work in this mode, the Traffic Controller must support NEMA TS2 compliant SDLC and be communicating with an MMU. Any standard SDLC cable can be used (such as P/N: **iN2-SDLC-CABLE**) if there is an available port to plug into. If there are no available ports, a "Y" cable is available (P/N: **iN2-SDLC-YCABLE**) to insert between an existing connection and the Traffic Controller.

Additionally, **CABLE-C** is required to place calls to the cabinet's ped inputs. It provides four separate contact closures for four pedestrian phases. They are identified as A (brown), B (red), C (orange), and D (yellow). Common is black. The wire

colors are solid with a white stripe. 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. This cable connects to the connector on the iCCU-S2 labeled "C/To Ped Inputs".

When using SDLC, it is necessary to share a common logic/signal ground with the Traffic Controller and other devices on the SDLC bus. Therefore, CABLE-C has an additional white/red or white wire, which should be connected to the cabinet's logic/signal ground. Note, this is different from Earth or chassis ground. Please refer to your cabinet's wiring diagram to find the appropriate logic/signal ground connection point.

* Failure to establish this ground connection can result in damage to the iCCU-S2, the Traffic Controller, or other hardware on the SDLC bus.*

3. Hard-Wired Mode (Diagram Section 3.2.3)

Note: The iCCU-S2 is not compatible with the 50-Pin D-Sub cable used by prior CCU models.

The iCCU-S2 can be directly wired to the cabinet's ped load switch outputs to obtain ped interval information, and it can be wired to the cabinet's ped inputs to place ped calls. This mode is the most versatile because it can work in any type of cabinet.

CABLE-A is used to provide the iCCU-S2 with the status of the pedestrian Walk/DW signals. 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.

CABLE-C is required to place calls to the cabinet's ped inputs. It provides four separate contact closures for four pedestrian phases. They are identified as A (brown), B (red), C (orange), and D (yellow). Common is black. The wire colors are solid with a white stripe. 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. This cable connects to the connector on the iCCU-S2 labeled "C/To Ped Inputs".

3.4.2 Preemption and General Purpose Inputs (Diagram Section 3.2.4)

Regardless of the configuration choice chosen above, the iCCU-S2 can also work with preemption devices, and also supports general purpose inputs for alternate configuration changes.

CABLE-B can be used to connect when a special function such as an emergency vehicle message is desired. There are four emergency vehicle inputs with a Com connection. The EV Com wire must connect to the cabinet Logic Ground*. The connections for EV1 through EV4 connect to the EV inputs of the traffic signal. The red wire in Cable B must connect to the cabinet +24VDC.

***Note, if using one of the two configurations that utilize SDLC, as described previously, you will have already wired one connection to the cabinet's logic/signal ground. It will still be necessary to connect the EV Com wire to the same logic/signal ground in the cabinet.**

CABLE-D is only used when additional special function is desired. There are three general purpose inputs with a 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.

3.5 iCCU-C2 Central Control Unit Installation Procedure

The iCCU-C2 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:

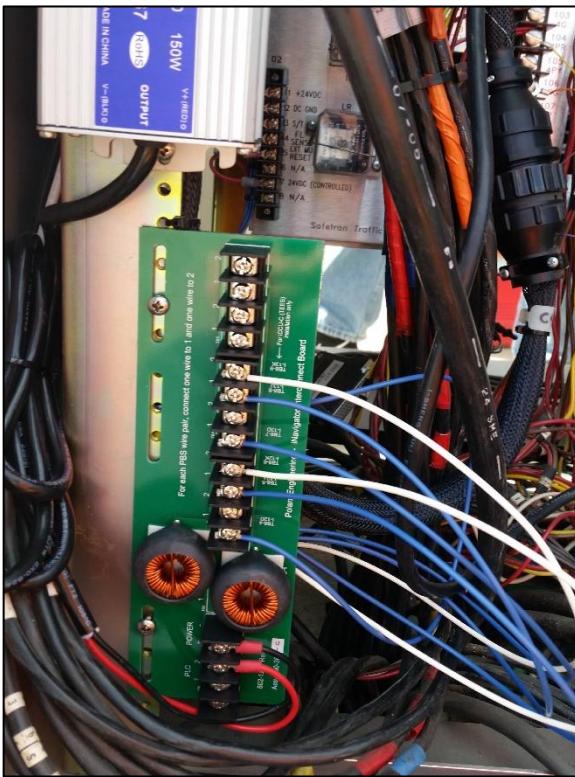
| | | | |
|----------|---------------|----------|---------------|
| A | Logic Common | N | No Connection |
| B | +24VDC | P | PBS In #3+ |
| C | No Connection | R | PBS In #3- |
| D | PBS In #1+ | S | PB Out #3+ |
| E | PBS In #1- | T | PB Out #3- |
| F | PB Out #1+ | U | PBS In #4+ |
| H | PB Out #1-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

While the four PBS inputs are labeled individually, they are actually combined into a single connection pair on the iCCU-C2 card. The iCCU-C2 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 iNS2 PBS units in the field.

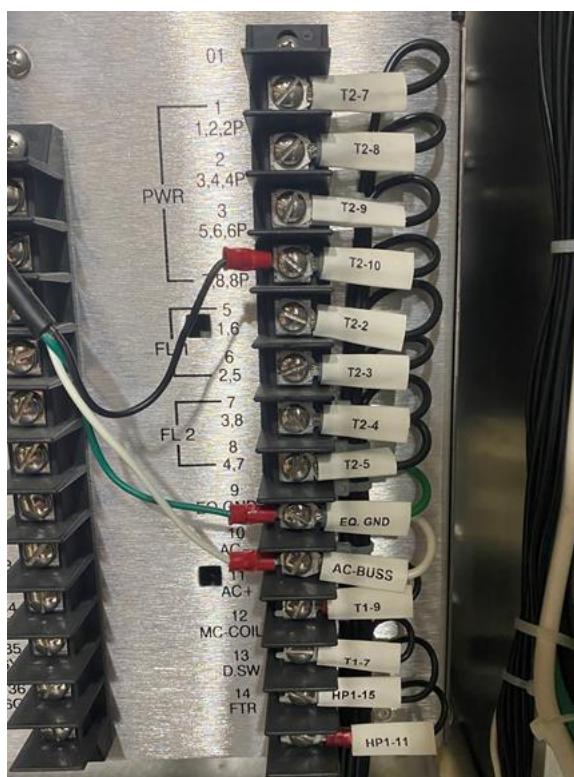
Installation should begin by setting the peds to recall. Then remove existing push buttons from the poles.

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, where the AC Line is automatically disconnected when the intersection goes into flash. Do not connect the input cord to the power supply until the system installation is completed.

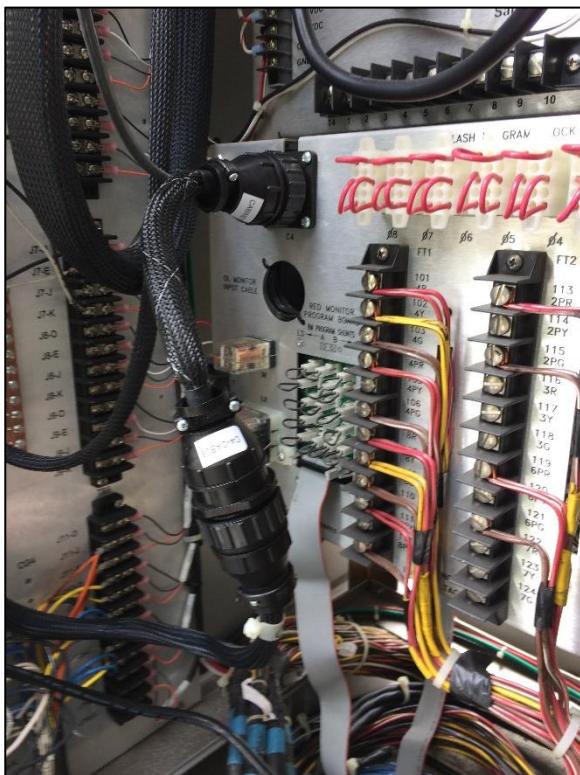
The C4 cable adapter should be installed next. This requires the intersection to be placed in FLASH. Once in FLASH, disconnect the C4 connector on the rear of the Output File panel. Connect the existing cable connector to the mating connector of the adapter. Connect the other large adapter connector 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-C2 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-C2 front panel. Complete the installation with the iNS2 PBS mounting and wiring per the next section. Following this, the 24V power supply may be connected.



Mounted Interconnect Board (iCCU-C2)



Power Cord Connection (iCCU-C2)



Installed C4 Cable Adapter (iCCU-C2)



Installed iCCU-C2 with optional Ethernet

3.6 iNS2 PBS Installation Procedure

Note: For optimum functionality Polara recommends:

- A dedicated cable with two (or three for a spare) conductors run from the Traffic Cabinet to each APS button. We recommend IMSA 50-2 cable. This cable includes a shield, but connecting the shield is not required/recommended. Twisted pair is not required, but would be acceptable. Cable similar to 50-2 without the shield and drain wire would also be acceptable.
- If the distance from the cabinet to the farthest APS button is less than 300', #14 AWG solid or stranded conductors/wire should be fine. If the distance is greater than 300', #12 AWG stranded conductors/wire should be used.
- If dedicated pairs cannot be pulled/provided to each button, at a minimum a single pair daisy chained to two buttons on a corner of an intersection typically will work. A 3-wire cable per corner with the common wire shared by two buttons on the corner will also typically work, but with either option in place of dedicated pairs, you may encounter data transmission issues.
- A common wire for 120 VAC lights must never be used as the button common.
- For further Wiring information refer to “Polara iNavigator Field Recommendations” at www.polara.com under “Installation and Operation Manuals” sections.

INSTALLATION NOTE: To complete this installation, you **MUST** install the Polara Field Service App on your iOS or Android device or the Intelligent Config PC App on a laptop (with the Polara iN-DGL Bluetooth dongle for connections to the PBS). Polara suggests downloading it at this time. If using an Android device, please refer to the “iN2 Polara FS Android Application Manual” when using the FS App.

- All of the available setup and maintenance procedures **MUST** be performed using a compatible iOS device or Android device or PC with iN-DGL. Your device must have iOS version 9.0 or higher or Android 5.0 (Lollipop) or higher.
- The Polara FS App will need to be installed on your device. It is available on the Apple App Store and the Google Play Store. The Intelligent Config PC App is available at www.polara.com.
- For more information on installation, please visit Polara’s web site - www.polara.com.

Plan PBS (push button station) locations if they have preprogrammed special messages. If special messages are not used, or will be programmed once each PBS is installed, proceed to next step.

The iNS2 PBS must be mounted only in the upright orientation with the connection terminals at the bottom, any other mounting orientation will void the warranty. If retrofitting these buttons on an intersection with existing buttons, remove existing buttons. Typical push button frames have the wire exit hole in the pole directly behind the center of the button (at least 3.5" below lower mounting hole). Because our PBS requires the wires to reach the bottom of the unit, verify 8" of wire extends beyond wire exit hole in pole. If enough wire is not available, evaluate whether a new, lower wire exit hole that would line up with the terminal block access point in the bottom of the PBS would provide adequate wire length. If yes, drill and reroute wires, the optimal position of this hole is approx. 6.5" below the lower mounting hole. If not, you need to figure out a way to achieve more wire length.

The iNS2 PBS is a modular device consisting of a backplate, electronics module, speaker module, arrow button diaphragm, button cover, sign, and optional sign backplate (for larger signs). The PBS is shipped partially assembled to secure it during transport. To prepare for mounting, remove 3 screws from the lower cover. Remove all screws securing the sign and sign backplate if present. Remove EARTH GND (ground) screw located between the two terminal blocks at the bottom of the unit. Store this screw in a safe place, it ensures the unit is grounded to the pole and must be re-installed. Verify the arrow on PBS module is oriented toward the associated crosswalk. If necessary, the button diaphragm assembly may be pulled off and rotated as needed. Secure the button diaphragm in the correct orientation by tightening the two retaining screws with a Phillips-head screwdriver. **Please use caution, as the metal button diaphragm is sharp.** Remove the electronics module and speaker module together from the backplate.

Position backplate on pole at correct height and orientation so arrow points to ending of crosswalk on the opposite side of the street. Orientation is very important because a blind person uses the arrow and face of the sign to orient themselves to the direction of travel. Mark mounting bolt locations if existing holes not correctly located. MUTCD max. height is 48". Typical recommended height is 42", but can be lower. Drill and tap 1/4-20 bolt holes and wire access hole (if necessary).

Position the backplate against the pole and route the wires forward near the bottom end of the backplate. Position the wire such that 3 or 4 inches of wire is available at the bottom of the backplate.



Attach the backplate to the pole using the provided 1/4-20 bolts with washers.

Re-install the electronics/speaker modules. Re-install the sign (and sign backplate if using), securing the PBS Module in place before wiring. Re-install EARTH GND (ground) connection screw to location between terminal blocks.

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 iNS2 PBS

Re-install the lower cover.

For programming and configuration of the iNS2 System, launch the Polara Field Service App and complete [Section 5](#) of this User Manual. **If using an Android device, please refer to the “iN2 Polara FS Android Application Manual” when using the FS App.**

The iNS2 PBS is now ready to use. If you wish to customize more available settings, please review [Section 6](#).

IMPORTANT: The iNS2 System (iNS2 PBS and iCCU-X2) 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 iNS2 PBS supports connection of an external button such as the Polara Bulldog BDSP-014. Pressing the external button is equivalent to pressing the iNS2 button, but without the associated push confirmation sound. The button wire pair should connect to the small rightmost terminal block with one wire to the GND (middle) terminal and the other wire to the PWR (right) terminal. Polarity is not important. More than one external button is acceptable. This feature is off by default and must be enabled in the Settings of the push button, see section 17.5.8 for details.

Note, to maintain corrosion protection, leave the blue dielectric grease intact while tightening the screws.

4. Technical Support Contact

Polara @ 903-366-0300 EXT 4 or 888-340-4872

Polara Enterprises, LLC
1497 CR 2178
Greenville, TX 75402

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-X2 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 Field. 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-X2. All PBS and iCCU-X2 configuration options are accessible using either connection. File uploads containing firmware or audio must be performed by connecting directly to the target unit. Skip to section 6 for instructions on connecting via Bluetooth.

Upon first run of the Polara FS app, you will be prompted with two iOS dialogs for granting access. The Polara FS app needs access to iOS Location Services in order to gain access to the WiFi network information allowing the app to detect

and connect to iCCU units. The app also needs access to Bluetooth in order to communicate with iNavigator units. Tap the appropriate action to allow the app to access these resources.

Note: Location is never tracked in the app and is never run in the background. Access to this feature is only necessary to gain the name of the connected WiFi network in order to detect iCCU units. If the location service is disallowed, the app will not be able to connect to an iCCU unit via WiFi.

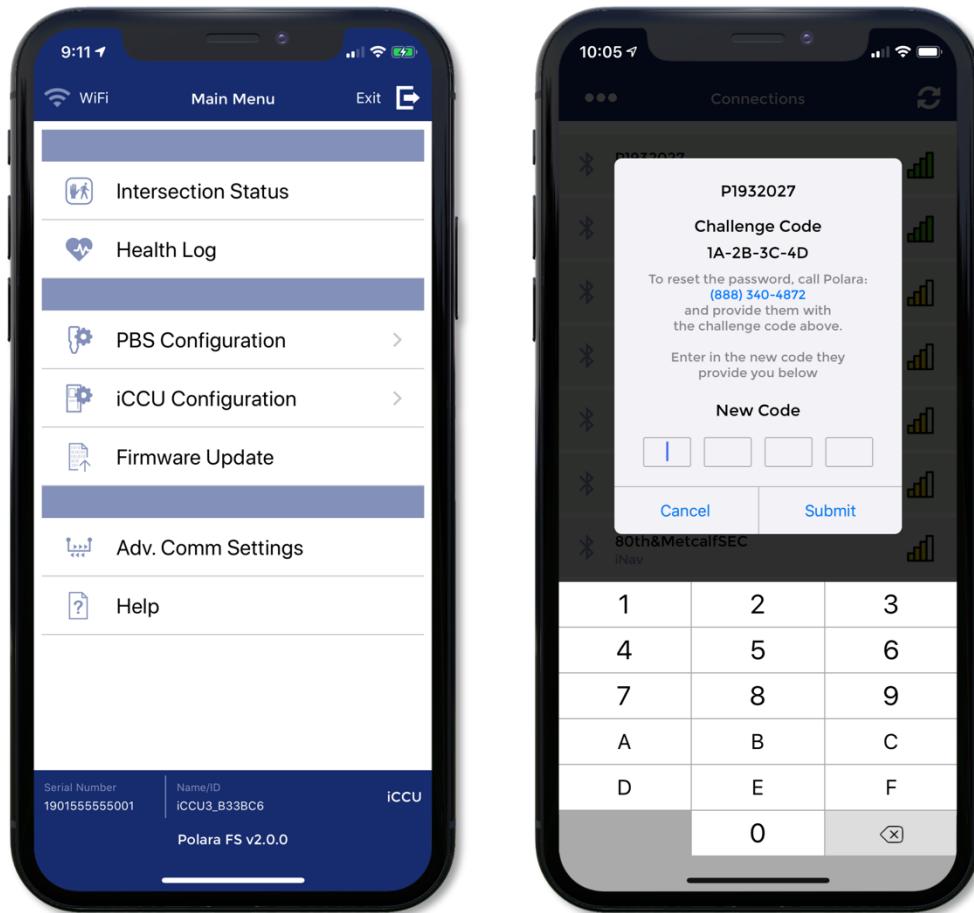
5.1 Wi-Fi Connection

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-X2. This is done by pressing the SELECT button on the iCCU-X2 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-X2 in the list of available devices. Tap the name to select (SSID indicated on LCD of iCCU-X2), 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.

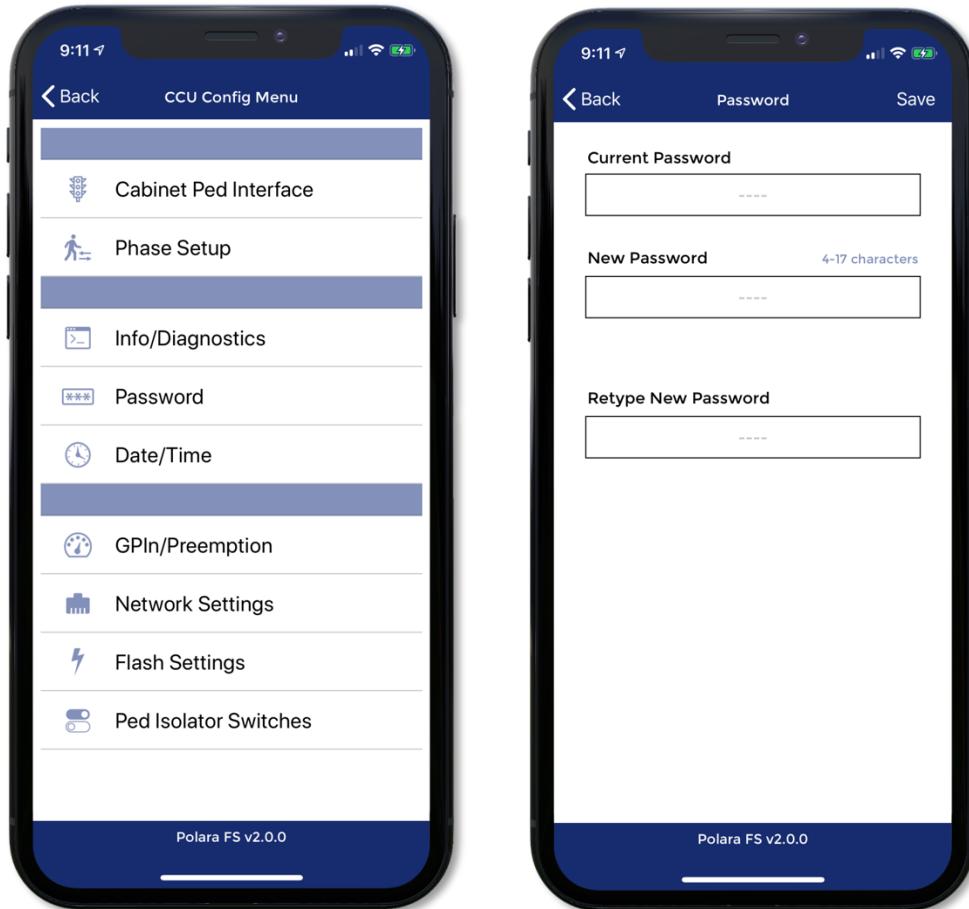


Note: If the password is unknown, the password can be reset to factory default by tapping the Reset button on the password prompt dialog. Call Polara at the number listed on the reset dialog and request a password reset verification code. Enter the new verification code into the dialog box and the password will be reset to 1234. Enter the default password at the prompt and then follow the below instructions to change the password from default and continue configuring the device.

The password will only need to be reset once (not on each individual PBS) as the password is stored in the iCCU.

5.2 Changing the Password

To change the password, choose iCCU Configuration from the Main Menu and then choose Password from the CCU Config Menu. Enter in the appropriate fields, the current password, new password, and retype new password. Then choose Save from the upper-right area of the screen. This will update the password in the iCCU-X2. Once the password has been updated, tap the back button in the upper left corner to return to the CCU Config Menu.



5.3 Advanced Communications Settings

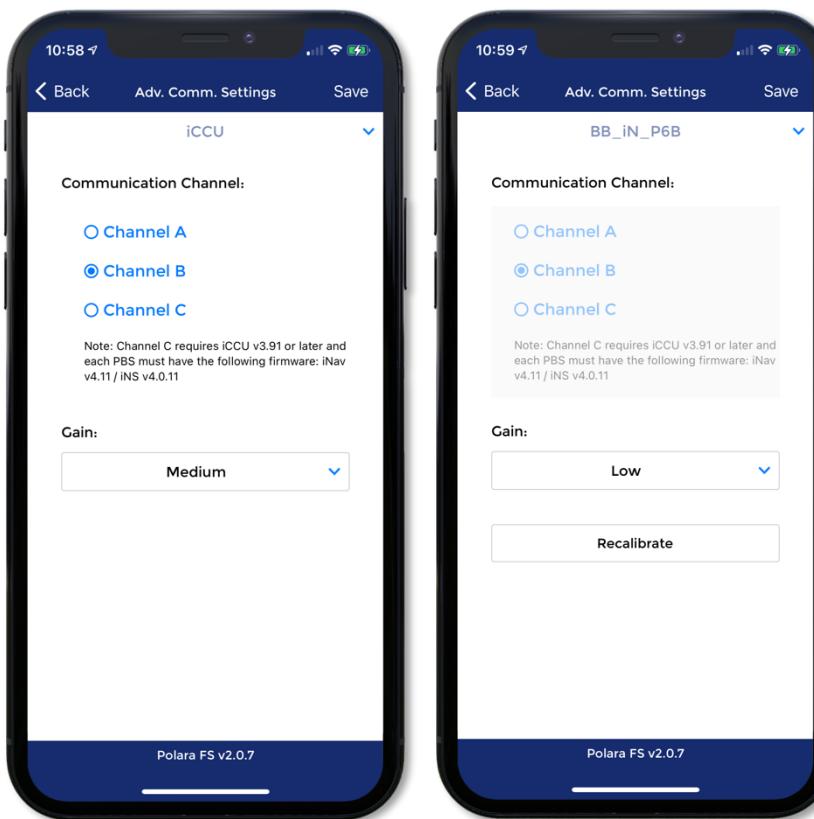
All iNS2 PBSs connected to the interconnect board communicate with the iCCU-X2 via the field wires, using one of three communication channels A, B, or C.

During initial startup, the iCCU-X2 will operate in Channel B by default. The first time an iNS2 powers up, it will auto-calibrate by finding the communication channel the iCCU-X2 is operating on, and then adjust its signal until it establishes communication with the iCCU-X2. This process typically takes 1-3 minutes. Once calibrated, each iNS2 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-X2, 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-X2 for an extended period of time or if it cannot connect to the iCCU-X2 at start up, the PBS will restart itself and come up in an un-calibrated mode. It will search for the iCCU-X2 on each of the communication channels and calibrate itself once it locates the iCCU-X2's operating channel. If no iCCU-X2 is available, the PBS will continue to search until it finds the iCCU-X2. If one or more PBSs cannot connect to the iCCU-X2 during the calibration process (two flash pattern continues), the Communication Channel on the iCCU-X2 should be changed.

To change the Communication Channel of the iCCU-X2, connect to the iCCU-X2 and choose Adv. Comm Settings from the Main Menu, then select the desired channel and press "Save". Before changing the Communication Channel, the iCCU-X2 will signal all connected buttons to disconnect, restart, and recalibrate so the automatic recalibration function will happen automatically.

Note: Channel C requires iCCU-X2 v3.91 and all iNavs must have v4.11 or later and all iNS/iDS units must have v4.0.11 or later. If any connected PBS has older firmware when the iCCU-X2 is on Channel C, the units will remain in 2-flash mode and will not establish communication with the iCCU-X2 until their firmware is updated or the channel is changed.



If after changing Communication Channels, any of the following issues are present: iNS2 PBSs (one or more) still cannot connect to the iCCU-X2; an iNS2 PBS is connected but there are communication problems when attempting to read remote health logs (or trying to set parameters to all PBSs), please contact Polara technical support for further assistance.

Because of the various types and states of field wiring, communication may not work in all field wiring conditions, so Polara cannot guarantee an iNS2 system will work on all intersections. If the above steps fail in establishing reliable communication between a PBS and iCCU-X2, a 3-Wire system is the only option.

Polara recommends the use of a 12/2 IMSA 50-2 cable for iNS2 installations.

To change an iNS2 PBS to operate as an iN3 PBS (Ped-Head Based System), please see the iN3 Quick Start Guide.

5.4 Channel and Phase Setup

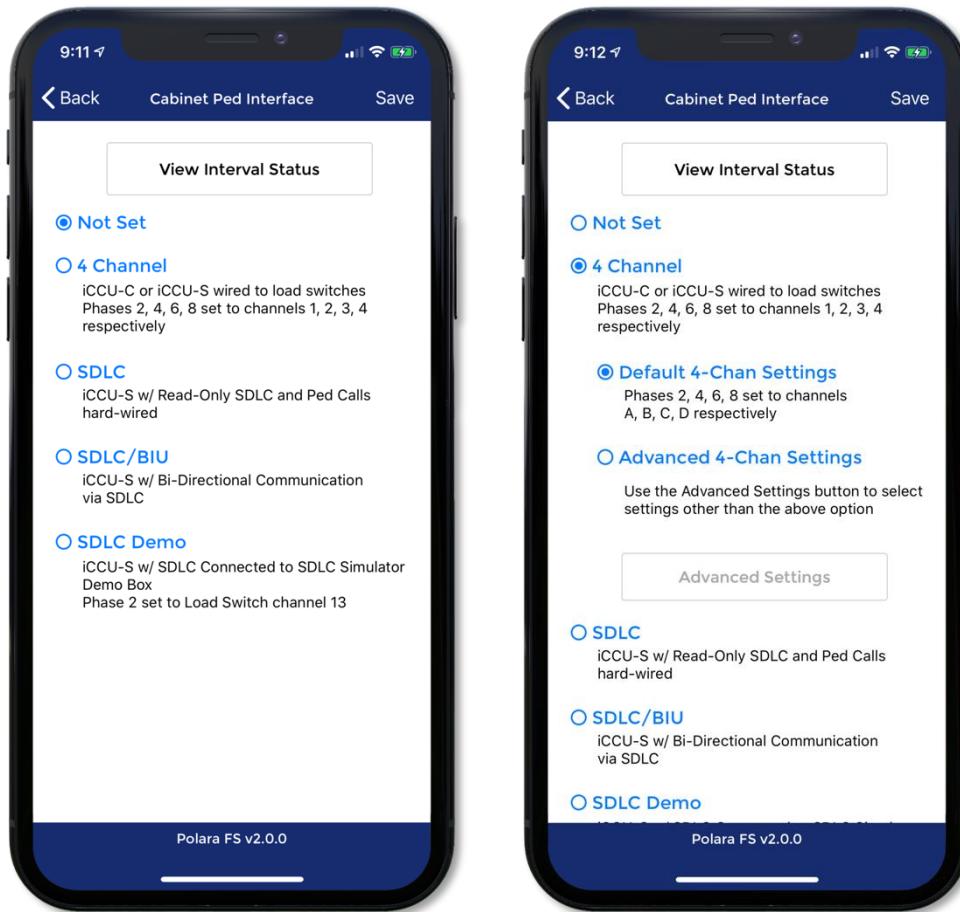
The iCCU-S2 can obtain Ped interval information by monitoring the outputs of the load switches (via the **Cable A** harness) or by monitoring the SDLC bus. The iCCU-C2 obtains Ped interval information via the C4 cable adapter and has automatic source selection. Follow the appropriate setup steps below, depending on which iCCU-X2 model you have installed, and how it is wired in the cabinet. Refer to sections 3.4 & 3.5. The iCCU-S2 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 Cabinet Ped Interface Selection

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

If Using Cable A for Load Switch Monitoring:

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



If using the iCCU-C2 and the cabinet input file is wired differently than the Cal-Trans standard such that the ped call wiring in the backplane is different than the C4 connection, select the Advanced 4-Chan Settings option and tap the Advanced Options button to change the configuration of the Load Switch and Ped Call Assignments.

Proceed to Assigning iNS2 PBSs to Phases in section 5.5.

If using an SDLC cable to monitor Ped Intervals only:

Typically, 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 iNS2 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 Cable A and no Cable C):

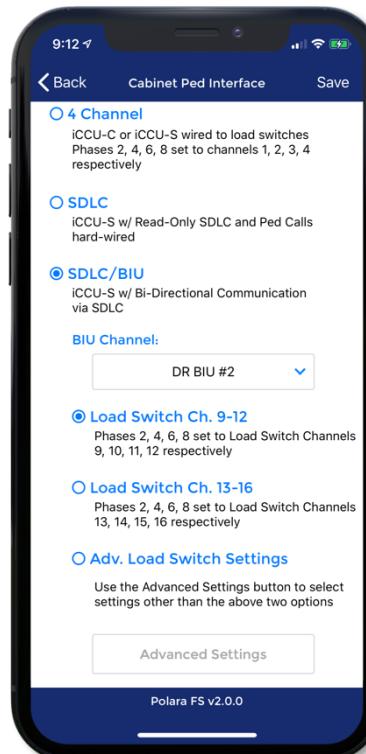
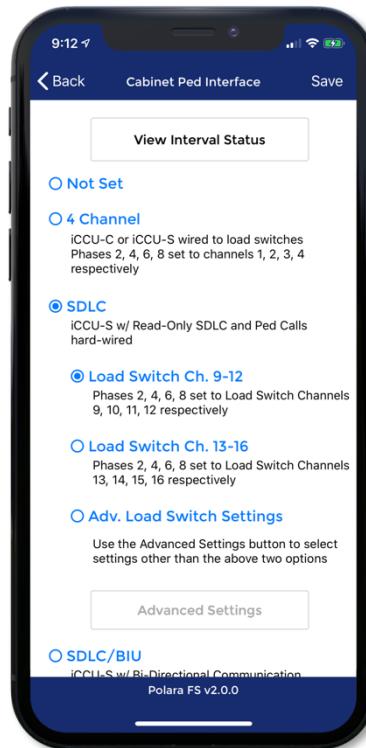
The NEMA TS 2 2003 specification defines SDLC command and response frames for 4 detector BIUs. The iCCU-S2 can be configured to operate as any one of these four BIUs for the purpose of placing pedestrian calls to the Traffic Controller. Typically, there are 4 pedestrian phases (2, 4, 6 and 8), however the iCCU-S2 can be configured for up to 8 pedestrian phases. By default, detector BIUs are used to place vehicle calls in the Traffic Controller. In order to use the iCCU-S2 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-S2 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 communicate with a single BIU at each SDLC address. If the iCCU-S2 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-S2 as a BIU, from the Cabinet Ped Interface screen, 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.

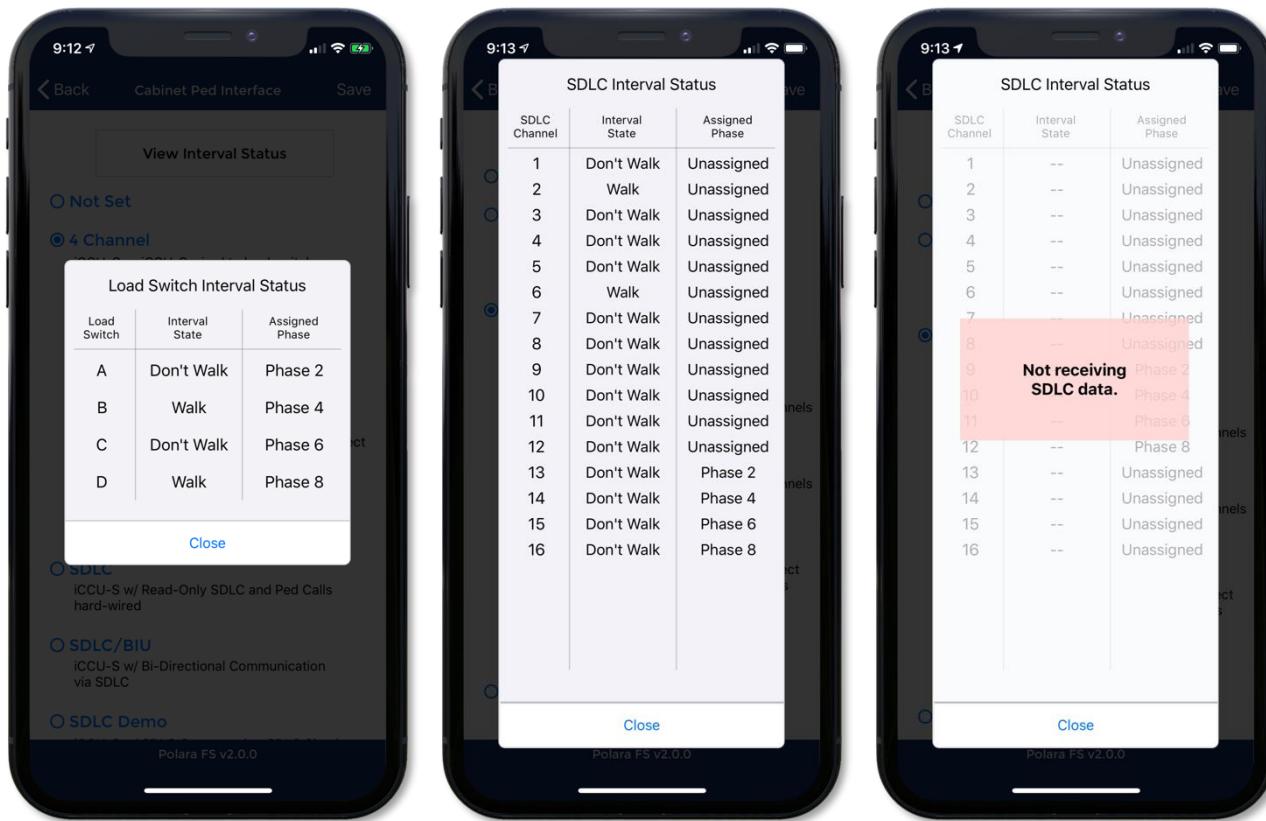
Configure the Traffic Controller to enable the detector BIU number selected. Program the Traffic Controller to remap the detector inputs to Ped inputs according to the table above. Consult your Traffic Controller manual or manufacturer for instruction on how to do this.

5.4.2 View Interval Status

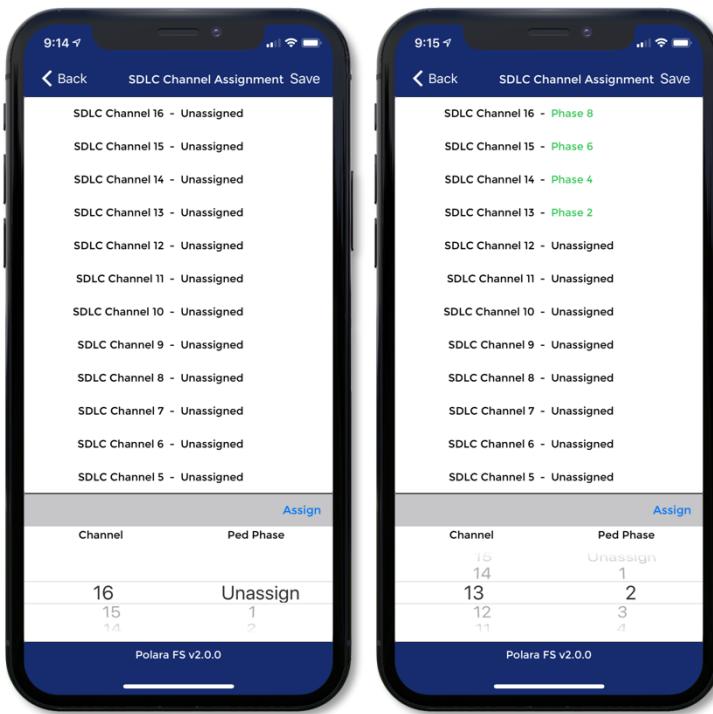
While selecting the Cabinet Ped Interface type, you can view the status of the interval information coming into the iCCU-X2 unit by tapping on the View Interval Status button. In 4-Channel mode, the interval information will be displayed for the 4 Channels wired to the load switches (or C4 connector for iCCU-C2). When in SDLC mode, all 16 SDLC channels will be displayed showing the interval information. This can be useful to determine which Load Switch setting is desired (9-12 or 13-16) or if the advanced options are necessary.

Note: In 4-Channel mode on iCCU-S2, the status displays the information received directly from the load switch. If the Walk signal is on, the status will be displayed as Walk, and in Don't Walk the status will show as Don't Walk. In the flashing Don't Walk interval, the status will toggle between Don't Walk and Off matching the Ped Head state.

If no SDLC information is being received by the iCCU-S2, the notice will be displayed with that information. Check the SDLC cable to ensure a good connection.



5.4.3 Advanced iCCU-X2 Settings – Channel Assignment



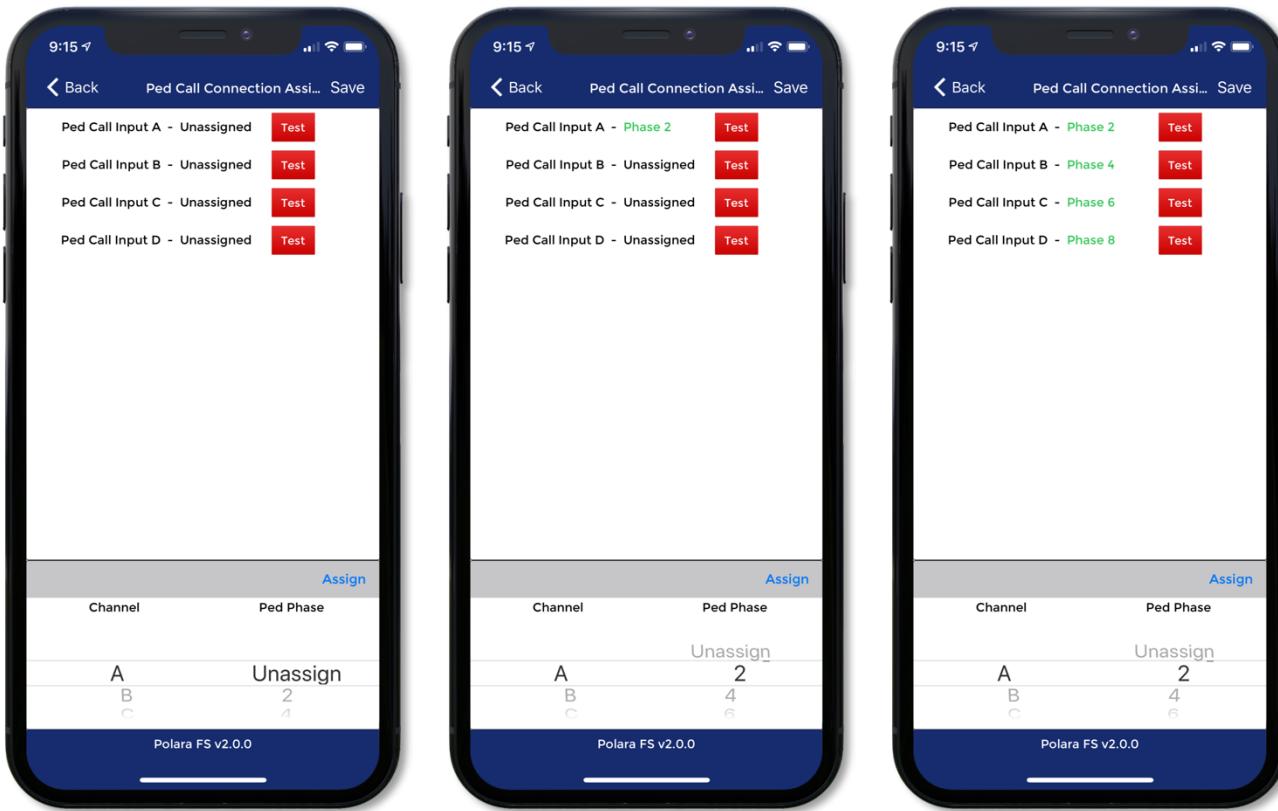
Associate phases with the SDLC PED channels that should be monitored. Refer to the Traffic Controller's user manual and configuration to determine which SDLC channels correspond to which Ped phases.

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.

5.4.4 Advanced iCCU-X2 Settings – Ped Call Connection Setup

On Cable #2C, 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.

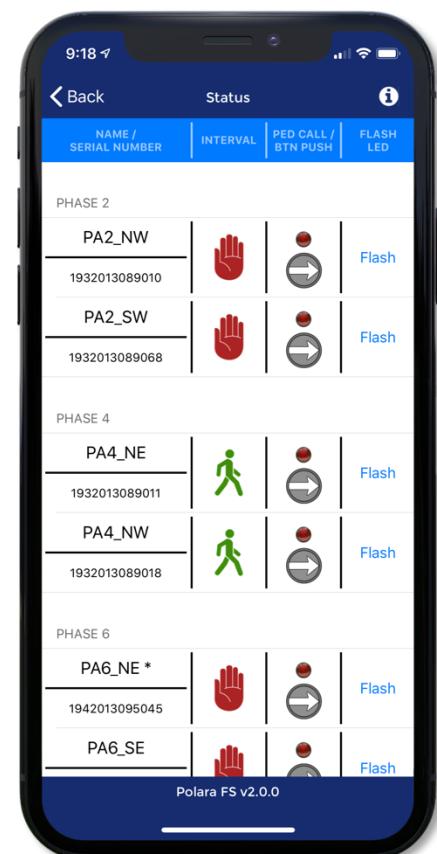
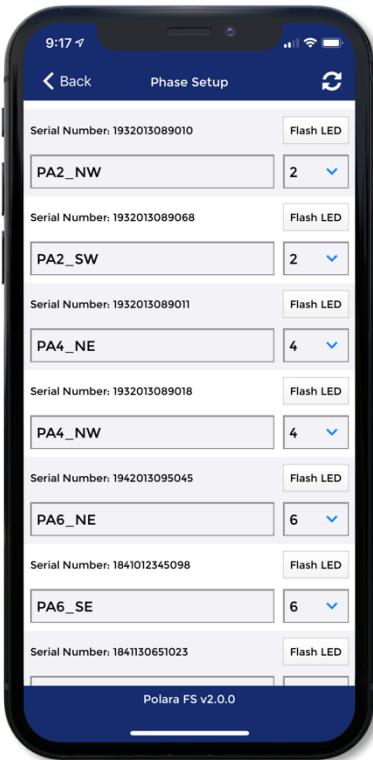
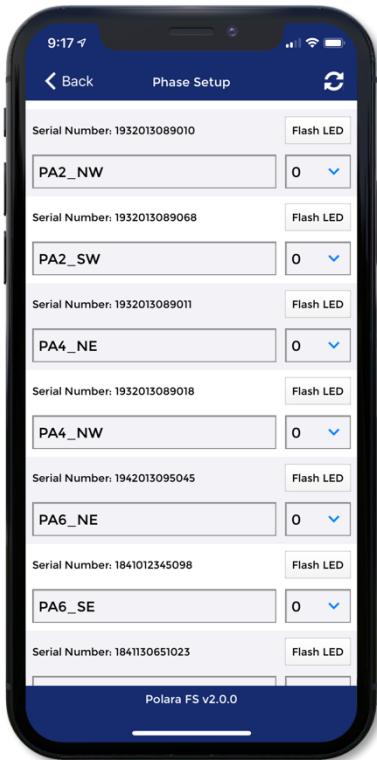


To associate a Ped Call Channel with a phase, choose the channel from the selector on the bottom-left of the screen and choose a phase from the selector from the bottom-right of the screen. Then click Assign. The new phase assignment will be highlighted in green in the top area of the screen, indicating 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 previous screen.

With the Channel/Phase assignments configured, iNS2 PBSs can now be assigned to phases.

5.5 Assigning iNS2 PBSs to Phases

Following the Cabinet Ped Interface setup process, each connected iNS2 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 menu, 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 on the right 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 Intersection Status button to see a screen with all iNS2 units and their status.

On this Status screen, the information is shown live from what is occurring in the intersection.

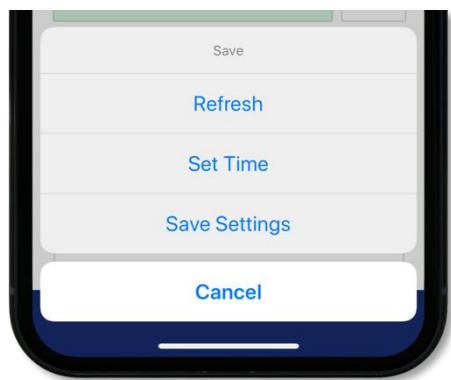
Tapping on the Flash button will flash the pilot LED on the selected PBS for a few seconds.

5.6 Setting the iCCU-X2 Time/Date, SNTP & DST Settings

While viewing the Main Menu, select iCCU Configuration, then select Date/Time. When the radio button is set to Synchronize with iOS device, the time on the iCCU-X2 will be set to the time currently detected on your iOS device. Tap the three dots on the upper right corner of the screen and select Set Time.

If you wish to specify a specific date/time that is different from your computer's time select the Manual Input option and set the desired time, then tap Done. Tap the three dots on the upper right corner of the screen, then select Set Time to apply the changes.

Note that setting the time on the iCCU-X2 also sends the updated time to any iNS2 PBSSs currently connected to the network. Also, when new iNS2 units establish a connection with the iCCU-X2, the time is synchronized with the iNS2 units automatically.

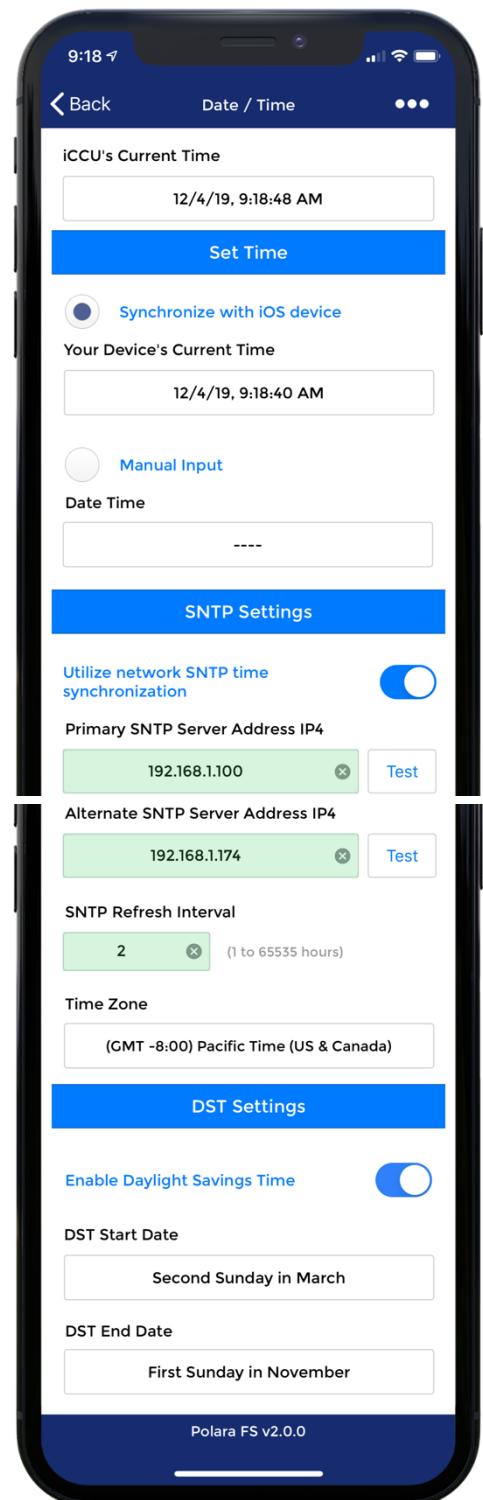


The iCCU-X2 has the ability to connect to a network time server to periodically obtain the current time. The time server cannot be a device on the open internet but must be a local server connected to the same network as the iCCU-X2. Check with your IT Administrator for the appropriate IP Addresses to use. The iCCU-X2 uses the industry standard port 123 (UDP) for SNTP. The Refresh Interval setting adjusts how often (in hours) the iCCU-X2 will ask the server for the updated time. Select the appropriate time zone for the area. If daylight savings time is used in the selected time zone, then the daylight savings time switch will automatically be set to the appropriate state.

Click the Test button next to the SNTP server to test and the server will be queried for the current time. If successful, a dialog will appear with the current time in GMT and the time converted using the selected Time Zone and DST settings.

You can manually enable and disable the daylight savings time adjustment and can also modify the date that DST starts and ends.

Tap the three dots on the upper right corner of the screen, then tap Save Settings to save the changes made to SNTP and DST settings.



5.7 Setting Ethernet Configuration

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

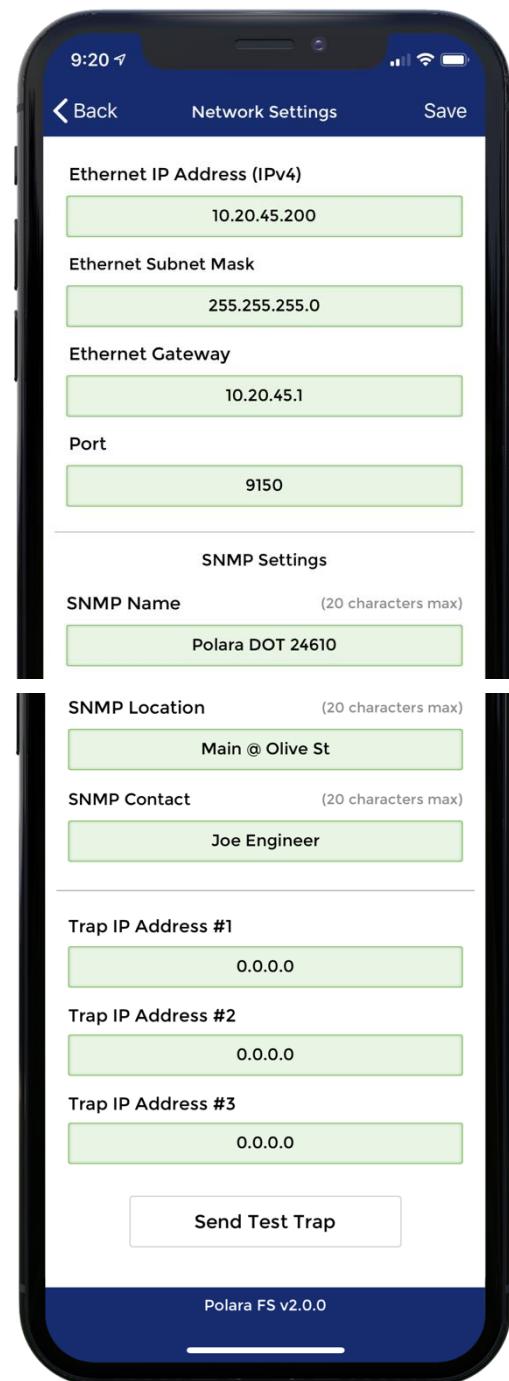
In order to apply the settings to the iCCU-X2, the unit must be restarted before the IP Address changes will take effect.

The iCCU-X2 has the ability to respond to SNMP queries for basic information and send out SNMP Trap notifications when critical actions occur within the unit.

Set appropriate information in the Name/Location/Contact fields for display in your SNTP manager to identify the unit. Enter IP Address of up to three SNTP managers to receive the SNTP traps. Tap the Save button to save the settings. After saving the settings, tap the Send Test Trap button to have the iCCU-X2 send a test trap to each IP in the list.

In order to receive and manage the reception of trap notifications you will need an SNMP network management system. Most SNMP managers have the ability to monitor for traps and there are many free dedicated trap receiver applications available for download online. Traps are sent to port 162 on your PC and this port will need to be unblocked from your firewall. Once you have your network management system installed, you can configure it to send you automatic email notifications any time a trap is received.

The SNMP MIB for the iCCU-X2 is available for download on Polara.com website under the iCCU-X2/iNS2 Installation downloads section.



5.8 General Purpose Input and Preemption (iCCU-S2 Only)

From the iCCU Configuration menu, select GPIn/Preemption.

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.

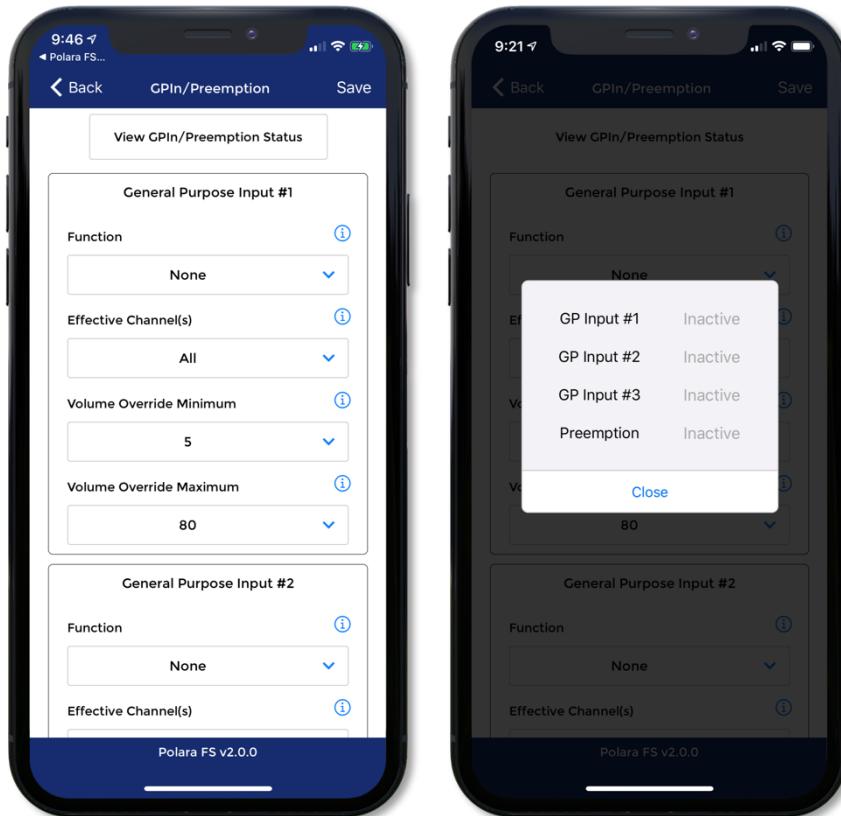
Each of the three General Purpose Inputs can be configured to a different function which will be activated by the corresponding input wire on the **Cable D** harness.

The 4 Preemption input wires on the **Cable B** harness all correspond to the Preemption Input (on the bottom of the screen).

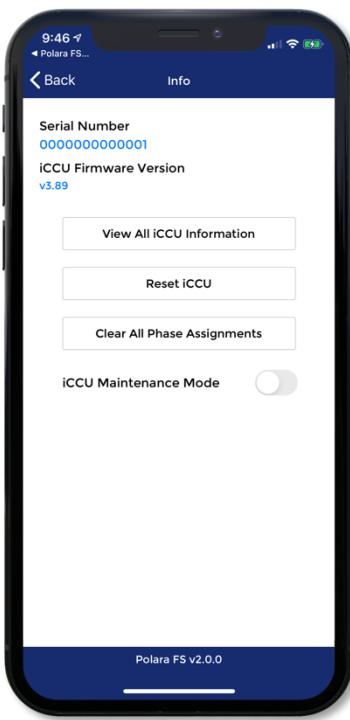
Tap the Save button to write the configuration changes to the iCCU-X2.

You can view the status of the GPIn/Preemption inputs by tapping on the VIEW GPIN/PREEMPTION STATUS button. This will provide a live-updating dialog with the status of each input. Asserting an input will change its status to Active.

See the wiring diagram on page 14 for connecting the GPIn/Preemption wires.

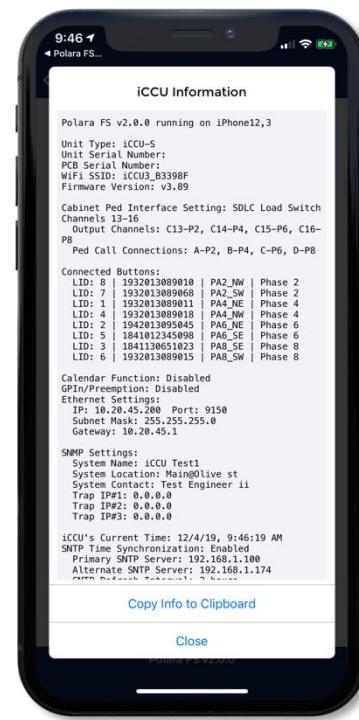


5.9 Viewing iCCU-X2 Information



From the main menu, select iCCU Configuration, then select Info/Diagnostics. The Info screen displays basic information about the iCCU-X2 including its Serial Number and Firmware Version. If you tap on the button for “View All iCCU Information” you will be presented with a dialog which displays all factory and user-settable settings. This information is also prepended to the health log when exported to file.

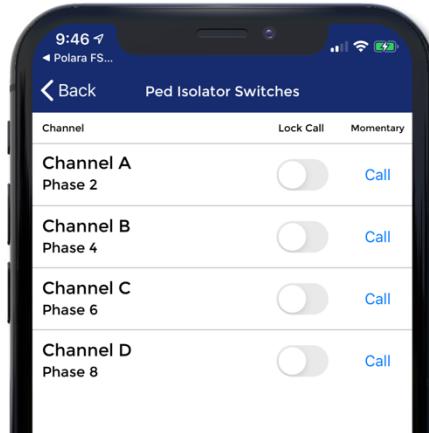
The Info screen also contains buttons which will allow remote restarting of the iCCU unit as well as the ability to clear out all phase assignments which appear in the Phase Setup screen. This is useful if the iCCU was used in a previous intersection and must be repurposed in a new intersection.



5.10 Ped Isolator

Select Ped Isolator Switches in the iCCU Configuration menu. 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-X2 will continue to lock calls until the switch is deactivated or the iCCU-X2 is power-cycled.

This screen is accessible on the PC App, iOS App and also on the front LCD panel of the iCCU-X2.

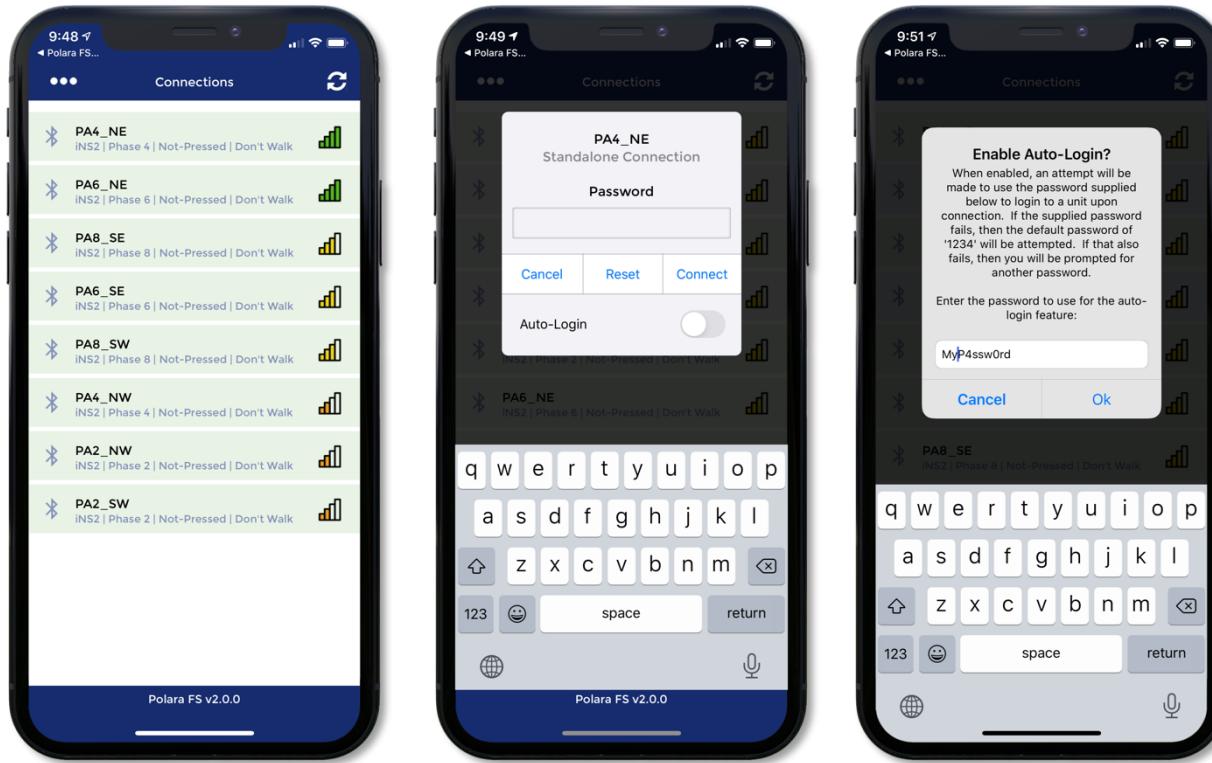


6. Using the Polara Field Service App for iOS to Change iNS2 PBS Settings

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-X2. 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.

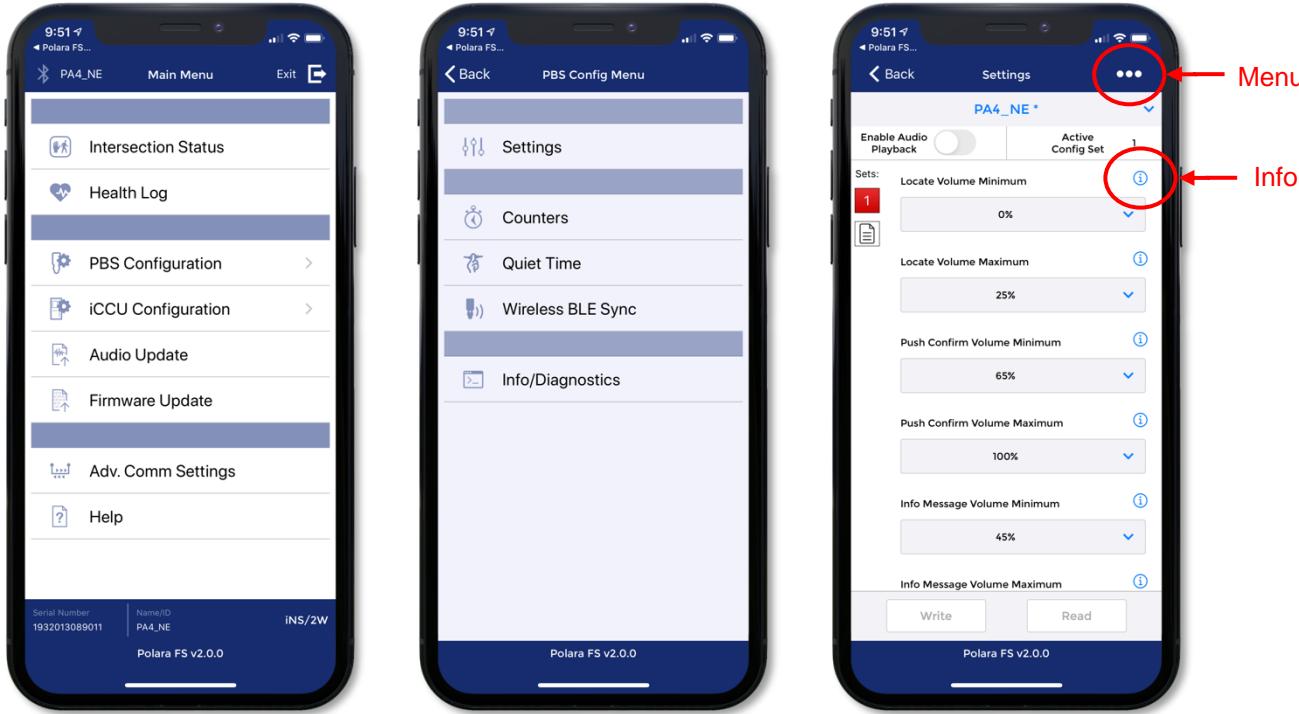


Connection and Login Screens

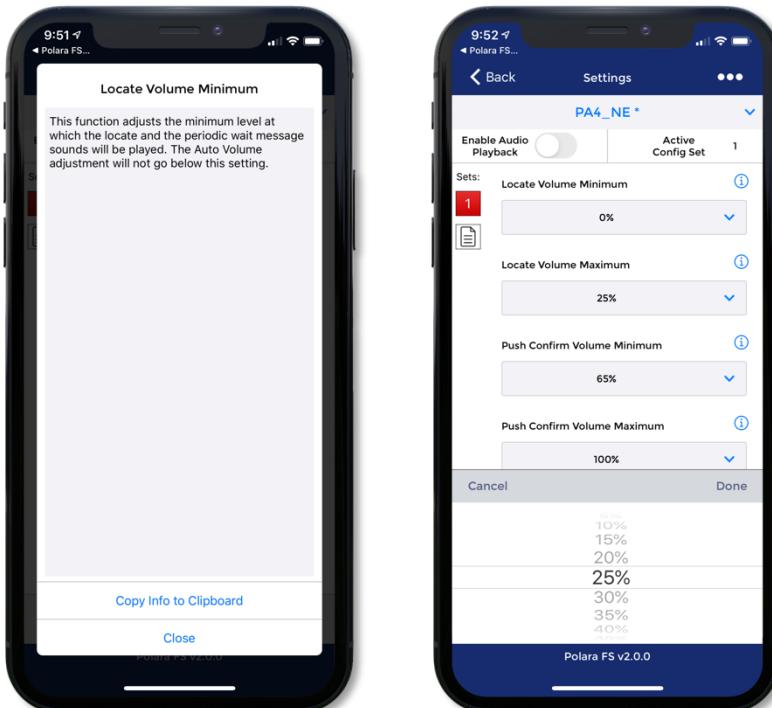
For customers where the majority or all of the intersections used within an area have the same password, a feature is available to enable logging in without having to re-enter the password. After tapping on a device in which to connect, at the password prompt, flip the switch for Auto-Login and a prompt will appear for a password that will be stored. Once this password has been stored, upon any new connections, that password will automatically be tried. If that password fails, then the default password of 1234 will be attempted. If both password attempts fail, then the standard password prompt will appear. To change a previously stored password, turn off the Auto-Login switch and then turn it back on.

6.2 PBS Configuration Options

From the Polara App main menu, select PBS Configuration, then select Settings. 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.

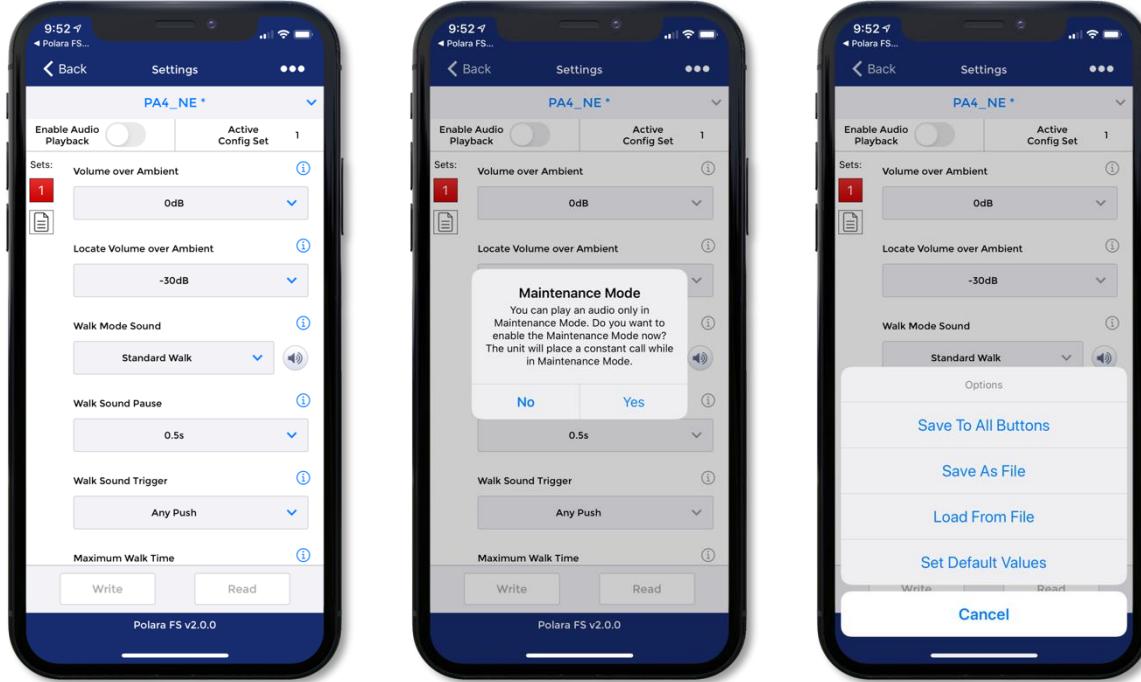


Tap in the option box to access the options for that setting. Swipe up or down to select an option. Press “Done” to select a new option or “Cancel” to proceed without any change. Tap the “i” (info button) for more information regarding the setting.



Options for selecting sounds have a button with a speaker symbol. To listen to sounds, use the slider to Enable Audio Playback or press the icon next to the sound you wish to hear. For safety, the unit will need to go into Maintenance Mode and the LED will perform a three-flash pattern. Press Yes on the confirmation dialog to enable Maintenance Mode. In this mode, the unit's main button will not operate or respond to interval changes so a pedestrian cannot use it. This will only be done on the iNS unit you are directly connected to, so a remote button cannot be made to play a walk sound and confuse a pedestrian.

Tap the speaker symbol to listen to the selected sound. Sounds will play out of the PBS's speaker. Turn off the Enable Audio Playback switch to resume the unit's normal operation.



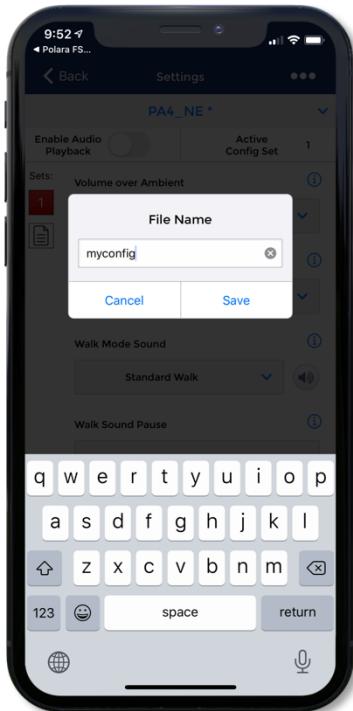
When you are finished selecting desired settings, tap the Write button to write the settings to the selected button. Alternatively, tap the menu symbol at the top right to access additional options including saving to all buttons in the intersection. After saving new settings to buttons, walk the entire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

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

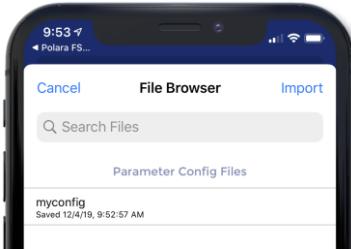
Tap “Load From File” to browse previously saved configuration files. Tap a file name and then tap “Select File” to load the settings into the iOS device’s clipboard. Tap the  to select the device configuration and then tap WRITE to save settings to the PBS.

Note: The configuration files only save the PBS Settings listed on this screen and do not apply to additional parameters on other screens such as Quiet Time or Network Settings and also do not save audio files. Audio files must be extracted and uploaded separately.

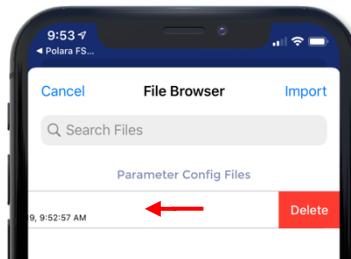
While in the File Browser, you can delete files, if necessary. To delete files, swipe from the right to the left to show the Delete button, then tap the Delete button. The configuration files are the same between all apps (iOS, Android, & PC) and can be used interchangeably.



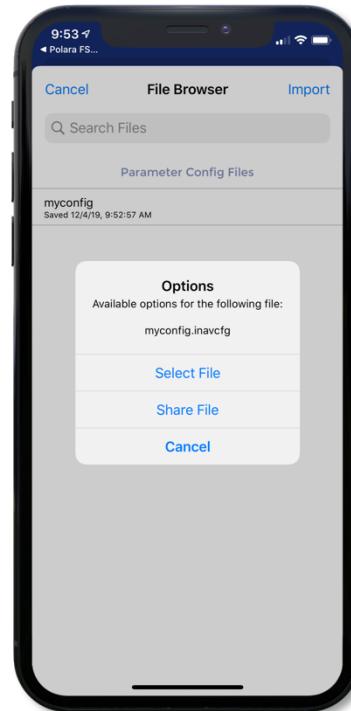
Save Dialog



Load From File



Swipe to Delete File



File Options

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

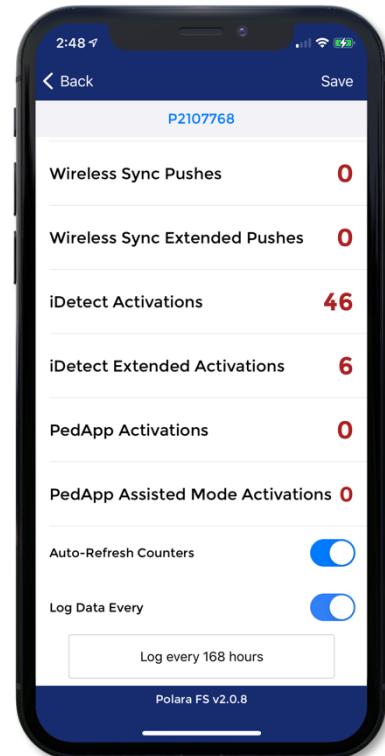
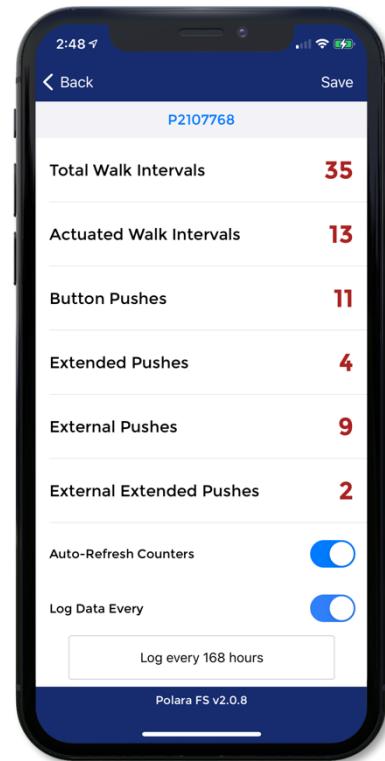
The button push force can also be adjusted from the PBS Configuration screen. Scroll down the page to find “Button Push Force”. Tap inside the setting box. Swipe to select Light, Medium, or Firm, then tap “Done”. Save the new setting as described previously.

6.3 Button Counters

From the Main Menu, select PBS Configuration, then select Counters. Each PBS keeps a count of events that have occurred in the button from the date of manufacture. These numbers act as a kind of odometer for the unit and cannot be reset. The counts are:

- Total Walk Intervals
 - The number of walk intervals the unit has received. This includes walk intervals which have been initiated by this PBS as well as walk intervals that occur while the intersection is in recall.
- Actuated Walk Intervals
 - The number of walk intervals which occurred following an internal button push. If the walk audio and button vibration occurred during a walk indication, then this counter is incremented.
- Button Pushes
 - The total number of button pushes that have been detected by the PBS's arrow button. This does not include any detected button pushes that were caused by other PBSs on the same phase.
- Extended Pushes
 - The number of extended pushes the PBS has detected on the arrow button.
- External Pushes / External Extended Pushes
 - Presses originating from another unit. Either from another unit on the same phase or from an externally connected button (see section 3.6.1). Short presses are listed as External Pushes, and long presses are listed as External Extended Pushes.
- Wireless Sync Pushes / Wireless Sync Extended Pushes
 - Short and Extended presses originating from a unit connected via the Wireless Sync feature.
- iDetect Activations / iDetect Extended Activations (iDS units only)
 - Pedestrian activations detected by the iDetect feature.
- PedApp Activations / PedApp Assisted Mode Activations
 - Pedestrian activations initiated using the PedApp.

In order to relate the above data to relative time, a logging feature is included which will add health log entries including all counters along with a timestamp at specific intervals. For example, if you want to log the data to find out how the counts change in a week, then enable Log Data Every and enter 168 hours. Tap Save in the upper right corner. Then, once a week, log entries will be added which include the counters.



6.4 Wireless Sync

Considering a scenario where a crossing on one side of the intersection does not have button wires, but does have a ped head, an iN2 unit cannot be placed on that corner, so an iN3 unit must be used. In this instance, there is no method of communicating a button press or ped call through a wired connection. The PBS has the capability to communicate via BLE from PBS to PBS to convey ped call information.

The wireless sync function provides a link between PBSs on the same PED phase such that a button press on one unit enables the Walk and Clearance sound on the other unit. Both standard and extended push status is transmitted.

Enable the wireless sync feature on the iN3 unit as well as the iN2 unit on the same phase on the opposite side of the intersection.

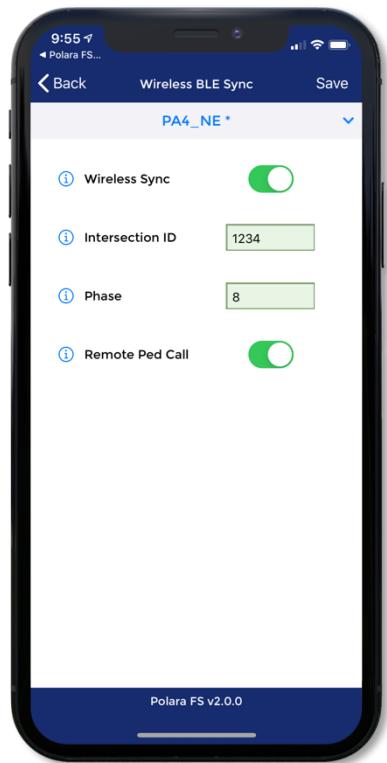
From the Main Menu, select PBS Configuration, then select Wireless Sync.

Enable this function by tapping the 'Wireless Sync' switch at the top of the screen.

The Intersection ID is used to prevent any possible interference between nearby intersections which are also using this feature. Tap the 'Intersection ID' box and enter a number (up to 9 digits) and tap 'Save'. Any number is acceptable as long as it is different from that used on any nearby intersection. In the same manner, enter the PED phase number for this PBS. Note: The Intersection ID is shared between the Wireless Sync feature and the PedApp feature. The ID can be changed in both the Wireless Sync settings page and the PedApp Intersection Info screen, but they refer to the same ID.

When the Remote Ped Call option is enabled, if that unit receives a button push indication from a Wireless Sync transmission, then it will also cause a Ped Call indication to the traffic cabinet. Enable the Remote Ped Call feature on the iN2 unit, but it does not need to be enabled on the iN3 unit if there are no button wires connected to the large terminal block.

Note: In iNavigator (iN2/iN3) units, when the Wireless Sync feature is active, the PBS will not accept Bluetooth connections via an iOS device or PC. However, 5 seconds after an Extended Push, the PBS will accept connections until the start of the next Clearance cycle. iNS units do not have this limitation.



6.5 iDetect Settings

iDetect brings touchless actuation to APS and is an added feature in all iDS APS buttons. There are many technologies that can facilitate touchless actuation, but each has strengths and weaknesses. Polara has chosen to use radar technology because of its performance, reliability, and resistance to vandalism. The intent of iDetect is to provide touchless actuation within a sensing range of 2" to 6". A basic configuration of iDetect is necessary after installation is complete (e.g., the APS is mounted to the pole properly, the button cover is installed, and the sign is installed).

Settings for the performance of iDetect functionality can be modified in the iDetect Settings screen. This screen can be found from the Main Menu by selecting PBS Configuration and then iDetect Settings.

The iDetect function can be completely disabled by turning off the Enable iDetect switch. This switch must be enabled in order for iDetect to be operational.

Make the desired setting selections based on the information below. When the desired settings have been selected, tap the three dots in the upper right corner and select Save to Button to apply the settings to the connected button, or select Save to All to apply the settings to all iDS2 buttons in the intersection.

6.5.1 Detection Profile

The Detection Profile selects sensitivity and detection schemes.

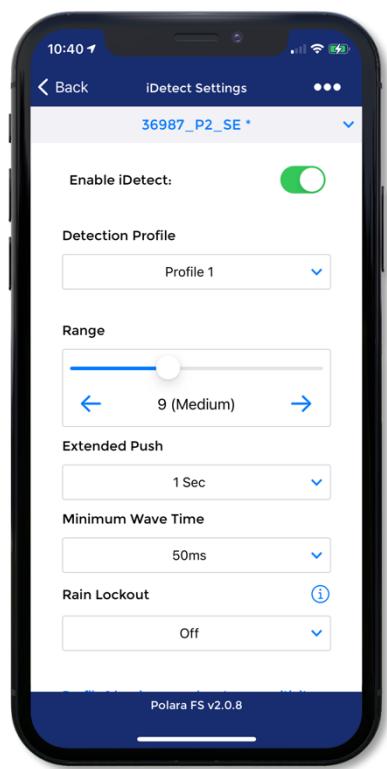
- Profile 0 (zero) uses a basic wave detection scheme. It is not recommended for use in new installations and only remains for backward compatibility. It is recommended to update the iDS unit to the latest firmware and use Profile 1 for greater sensitivity.
- Profile 1 (one) has increased system sensitivity and includes a Minimum Wave Time setting.

6.5.2 Range

The Range setting adjusts how close or far away the iDetect feature will detect movement. This setting may need to be modified based on which size sign is installed in order to optimize the detection range. A lower setting will limit the user's hand to a very close proximity (~2") to the unit before detection occurs, whereas a higher number will open detection to a slightly further distance (~6") before detection occurs. The settable range goes from a setting of 0 to 24. The factory default value is 9.

6.5.3 Extended Push

The Extended Push setting will change how Extended Pushes are handled by iDetect. The settable options include disabling the detection of Extended Pushes (Off), Override Short Push, and detection times of 1 second to 3 seconds in ½ second increments. The factory default value is 1 second. When this option is set, the user must continuously move their hand near the unit for the set time. When the user's hand first approaches the unit, the "Wait" (or configured Button Push Confirmation sound) will play. Then as they continue to move their hand (e.g., in a circular pattern near the unit), after 1 second the configured Information Message sound will play. If Override Short Push is selected, then instead of the "Wait" sound, the Information Message will be heard and the Extended Push volumes will take effect for the Walk and Clearance intervals.



6.5.4 Minimum Wave Time

Minimum Wave Time (Profile 1 only) sets the amount of time that a wave must be performed before the call is activated. The settings are in milliseconds and the available options are 0ms, 50ms, 250ms and 500ms. The factory default is 50ms. This setting can be adjusted if false activations are common. Note: The Minimum Wave Time does not increase the timing of the Extended Push, so if the Minimum Wave Time is set to 500ms (which is $\frac{1}{2}$ second), the user must wave for $\frac{1}{2}$ second to hear the "Wait" sound. Then, if the Extended Push setting is set to 1 sec, the user must continue waving for another $\frac{1}{2}$ second to hear the Extended Push sound. If the Extended push setting is set to 1.5 sec, then the user will wave for $\frac{1}{2}$ second to hear "Wait" and then continue waving for another full second to hear the Extended Push sound.

6.5.5 Rain Lockout

The Rain Lockout feature (Profile 1 only) temporarily disables iDetect for the selected duration of time if the iDetect sensor detects activations during an active walk cycle. The expectation is that pedestrians would not be attempting to activate the PBS while the walk message is playing and the button is vibrating. Therefore, if activations are detected during that time, then it is assumed that they are likely caused by rain so the Rain Lockout feature will disable additional ped calls for the set duration. The feature is disabled when the setting is set to Off. See the table below for the behavior for the remaining settings.

| Setting | If activations are detected during the walk cycle, iDetect will be disabled for the following duration: | Lockout automatically turns off if no additional activations occur during the following duration: |
|---------|---|---|
| Low | 15 minutes | 1 minute |
| Medium | 30 minutes | 2 minutes |
| High | 1 hour | 3 minutes |

6.6 PedApp Settings

The iNS can be configured to work with the Polara PedApp, which is available for iOS via the App Store and for Android via Google Play. When the buttons at an intersection are configured for use with the PedApp, they allow pedestrians to place calls for the desired crossing, without touching the buttons. Additional features to help the visually impaired include text-to-speech to speak the street names of the intersection and increased locate tones for the target button, to help find the button associated with the desired crossing.

To configure the iNS for use with the PedApp, please refer to the PedApp Configuration Guide available in the Help menu of each Field Service application and also on the Polara website.

6.7 Quiet Time

The iNS2 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 iNS2 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.

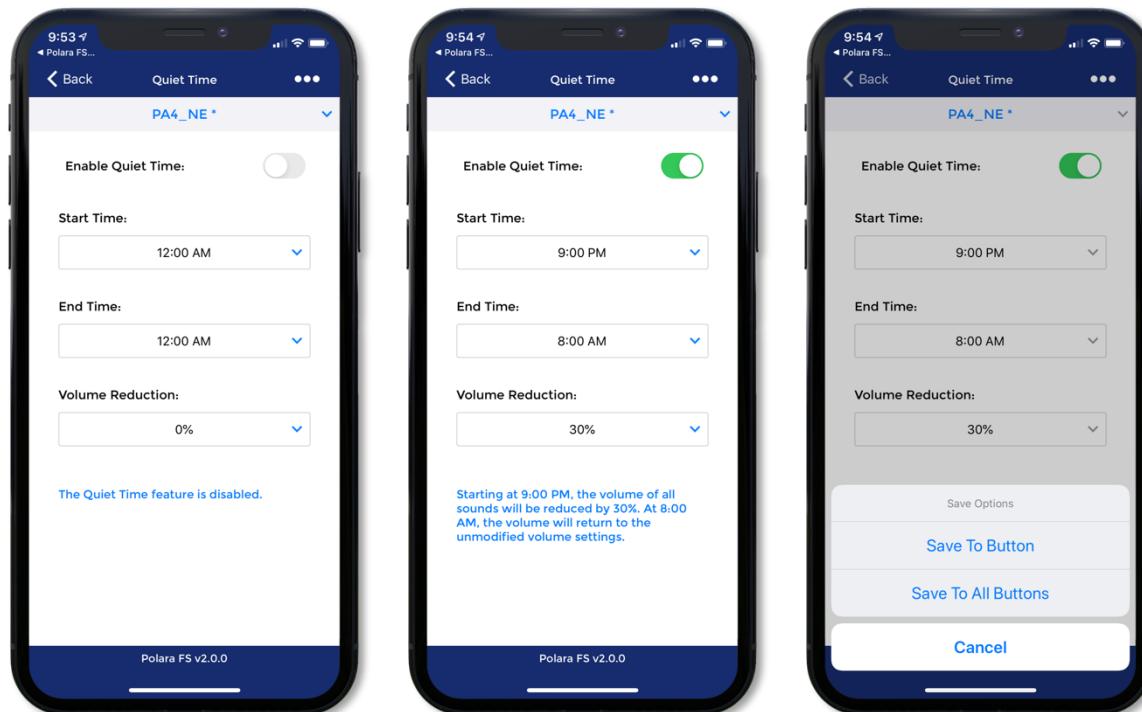
The details of the feature's operation is such that if the current time of day falls between the selected start and end time of the Quiet Time period, then all Minimum and Maximum volume settings will be reduced by the specified reduction amount.

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 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:

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

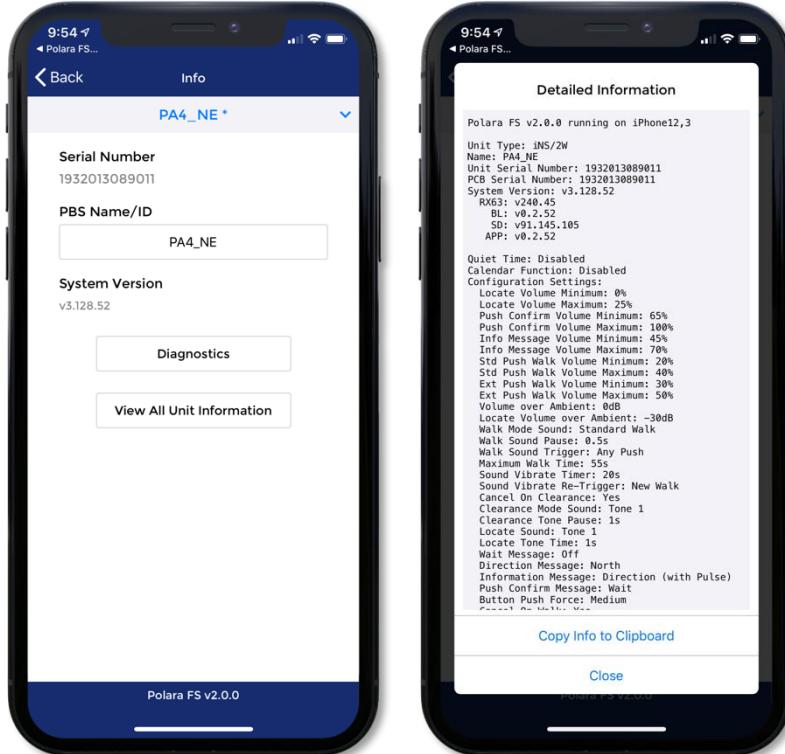
| Setting Name | Set Value | Reduced Value |
|-----------------------------|-----------|---------------|
| Locate Volume Minimum | 0% | 0% |
| Locate Volume Maximum | 50% | 25% |
| Information Message Minimum | 65% | 35% |
| Information Message Maximum | 100% | 70% |
| Std Walk Minimum | 30% | 0% |
|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



6.8 Viewing iNS2 Button Information

Tap on Info/Diagnostics when viewing the PBS Configuration menu and you will be presented with the PBS Information screen. In this screen, you can view the serial number, ID, and Firmware version of the selected iNS2 unit. You can rename the unit by tapping on the name. If you tap on the “View All Unit Information” button, you will be presented with a dialog containing all information about the factory and user-settable settings within the unit. Note: This information is also prepended to the health log when exported to file.

Tap the down arrow at the top right of the screen to select additional iNS2 units in the intersection to view their information remotely.

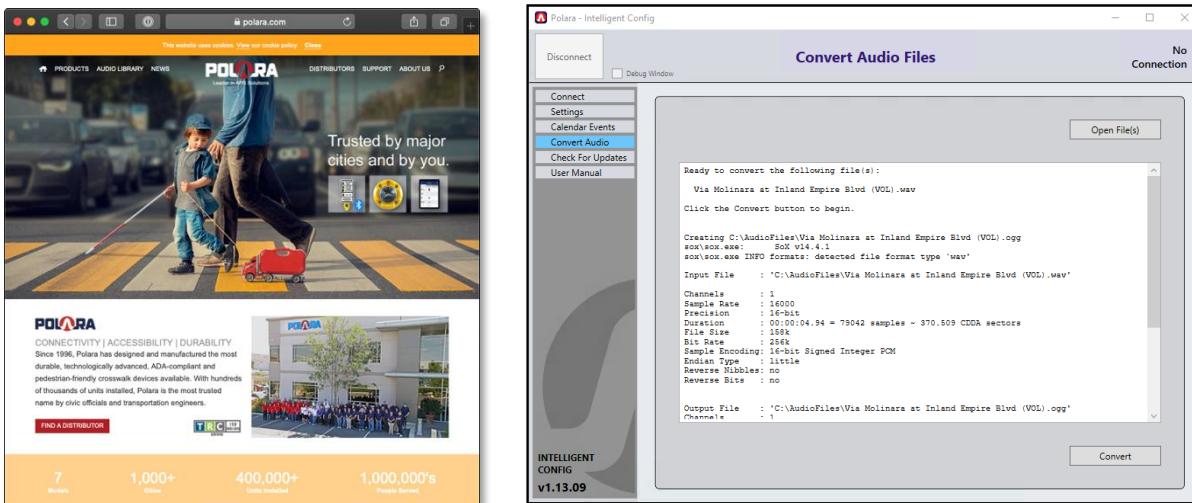


6.9 Preparing Audio Files

The audio files which are played in the iNav units are encoded using the open-source Ogg Vorbis codec. Polara provides professionally recorded custom audio files for download. You can request to have messages recorded for you by clicking on the Request Custom Message option on Polara.com under the Audio Library link. Fill out the form on the page to complete your request. You can search for audio files which have already been recorded if the streets on the desired intersection are common. The ability to search for audio files and import them into the Field Service app is also available directly within the app. See the next section for details.

If you wish to record your own messages or already have messages in another format (such as .wav or .mp3), these messages can be converted to the specific Ogg Vorbis format needed by the iNav devices by downloading the Intelligent Config application (also available on the Polara.com website) and using the Convert Audio option.

Note: Customer-recorded audio messages must use the Intelligent Config app to convert to the proper audio format. The built-in Ogg encoder in other audio programs will not use the specific compression settings needed and the audio will sound garbled when installed in an iNavigator.



Once you have your .ogg files prepared, they must be transferred onto your iOS device. Files can be transferred to the Polara FS app using a variety of methods:

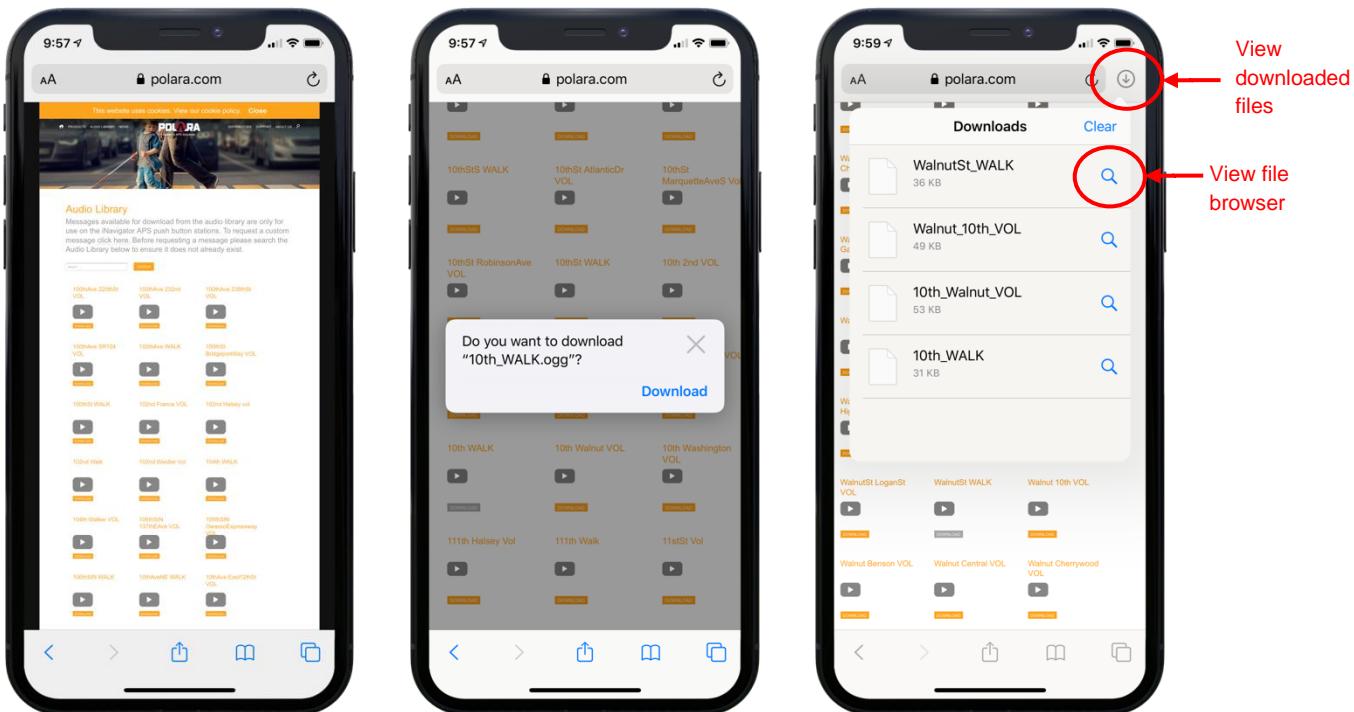
- E-mail the file to an account on your iOS device and tap the file, then choose Open in Polara FS. Note: This works best in either the built-in Mail app. Some apps like Microsoft Outlook do not offer the option to open the file in the Polara FS app. If this is the only mail application available, use one of the alternative methods to import the file.
- Store the file or files using a cloud-based storage utility such as Dropbox, iCloud Drive, Google Drive, Microsoft OneDrive, and others. Then use the iOS “Files” app to copy the files into the Polara FS audio directory or access the Share feature of the file to open the file in Polara FS. This method can be used to import large groups of messages into the Polara FS app.
- Download the ogg file from the Polara.com website into the iOS Downloads directory and then import it using iOS the Files app. This method is demonstrated in detail in the following pages.
- Within the Polara FS app while not connected to a device, tap the three dots in the upper left corner and select Audio Files, then tap the Import button in the upper right corner of the File Browser. This will open a system file browser that will allow you to select files that have been downloaded into the iOS file system and access files from cloud-based storage apps.

6.9.1 Download Audio Files from Polara.com

The following procedure is demonstrated using iOS 13. Other versions of iOS may behave differently.

Open the Safari app and browse to Polara.com, then zoom in and tap the Audio Library link on the top left of the page. Search for the audio message(s) of your chose. Then zoom in and tap the Download button. A confirmation box will appear. Tap the Download button. The file will download, and a new button will appear in the top left of the screen with file transfer status. Tap the download button for other audio messages until all the desired messages have been transferred to the Downloads folder.

Tap the icon with the circle and down arrow to access the Downloads folder and tap the magnifying glass next to one of the files.

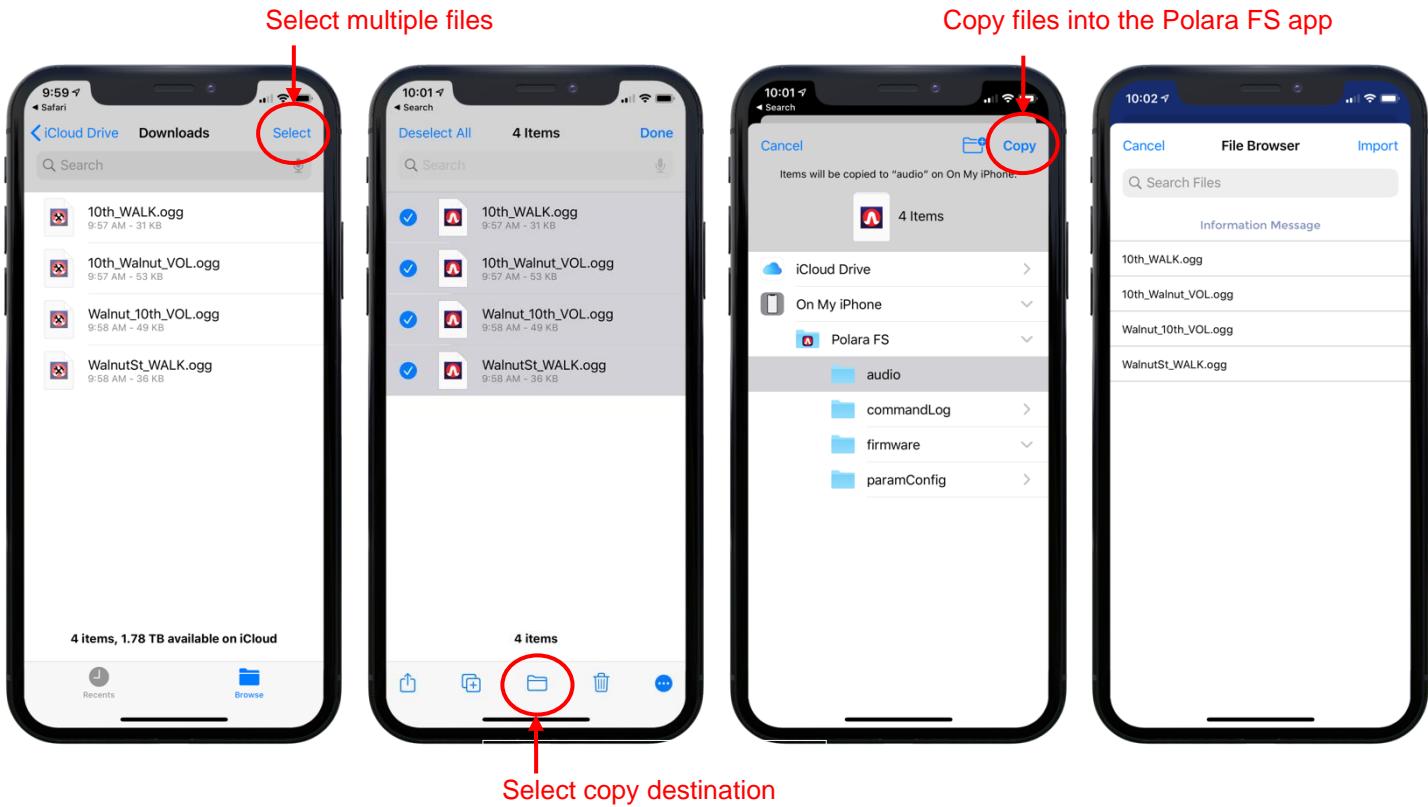


A file browser will open to the Downloads folder. Tap the Select button in the upper right corner of the screen, then tap on each file you wish to import into the Polara FS app.

Tap the folder icon at the bottom center of the screen. This will bring up another browser which allows you to select the destination folder for the files. Tap to expand the On My iPhone folder, then select Polara FS and choose the audio folder. Then tap the Copy button in the upper right corner.

This will copy all selected files into the Polara FS app.

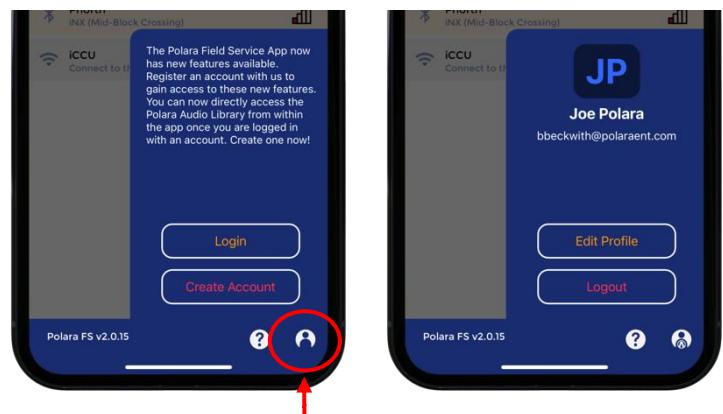
Open the Polara FS app and open the Audio Files browser and the imported files will appear.



6.9.2 Audio Library

The library of audio files that have been recorded and are available from Polara on the website is accessible directly via the Field Service App through the Audio Library screen.

Access to the Audio Library is available only after creating a user account through the app's profile interface. Tap the User Profile icon in the bottom right corner of the app to open the menu and tap Create Account. Only a name, e-mail address, and password are required to create an account. Once the account is created, a verification e-mail will be sent. Enter the code from the e-mail into the verification code field on-screen to finish account creation. Once you are logged into your account, your name and e-mail are shown in the User Profile menu.



Tap to open User Profile screen.

You can add additional information by editing your profile. This will allow you to associate an address, phone number, and company name to the user profile.

Once you are logged in, then tap on the Audio Library option in the main menu to access the search screen. Enter the name of the street to search for and tap Search. A results screen will appear with all audio files containing the search term(s). Tap on the play icon to hear the audio file. Tap on the download button to import the file into the app. Once the file is imported, the file can be uploaded to an iNav by following the instructions on the following pages.

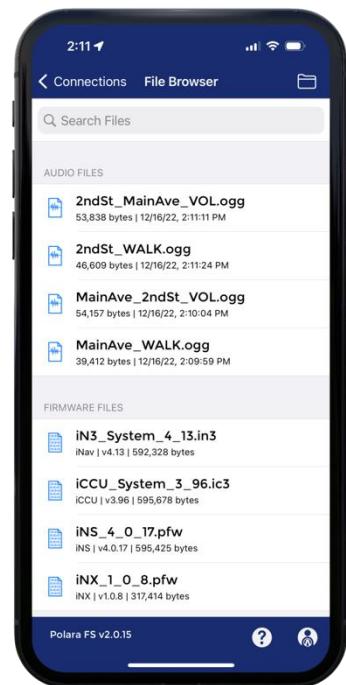
Tap to download audio message

Tap to hear audio message

Note: A connection to the internet is required to create a user account and search for audio messages.

Audio files can be managed by tapping the File Browser option in the Main Menu.

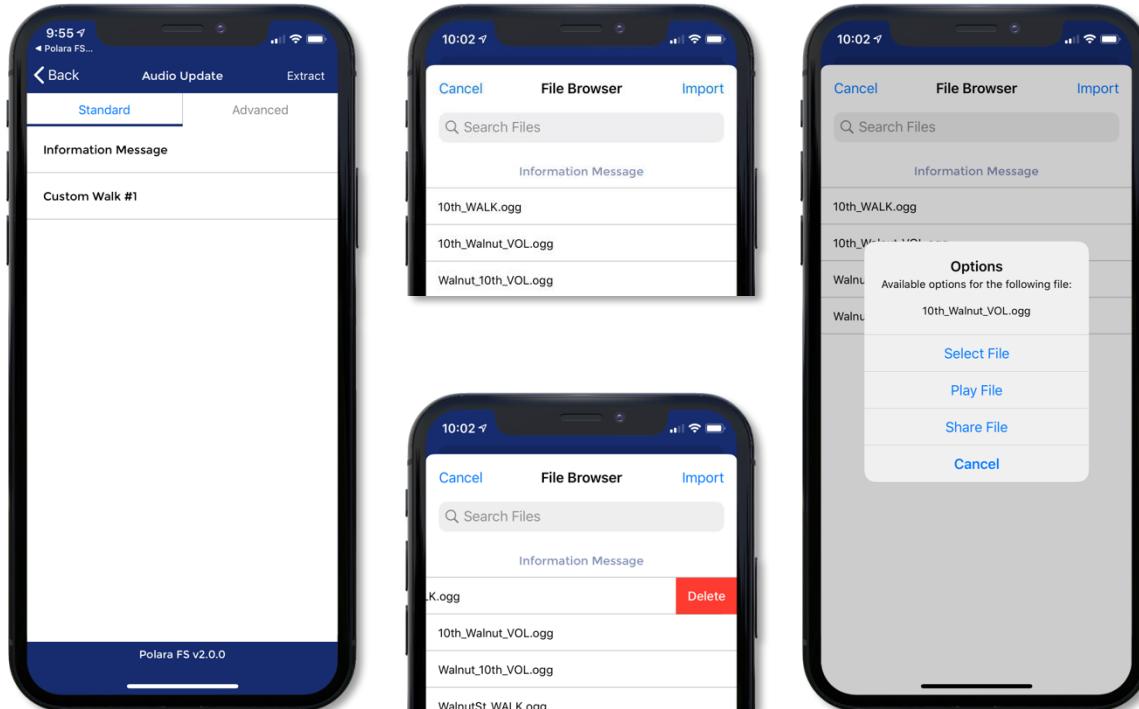
You can play, export, or delete files from the File Browser.



6.10 Sending Audio Files to iNav Device

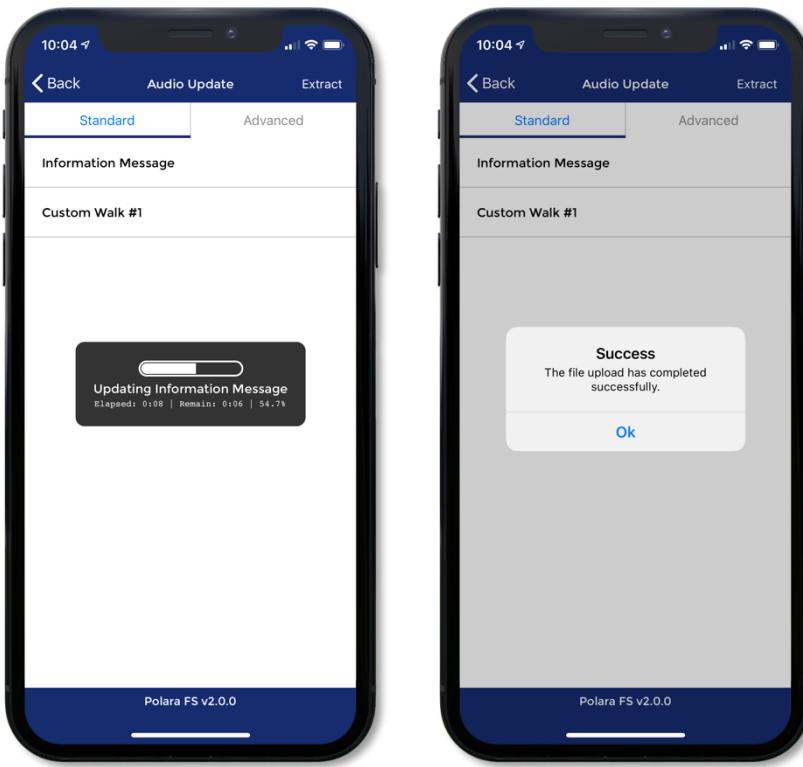
From the Polara App main menu, Tap on “Audio Update”.

To add a new Information Message file, tap on “Information Message”. This displays a list of available voice files loaded into the Polara FS 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.

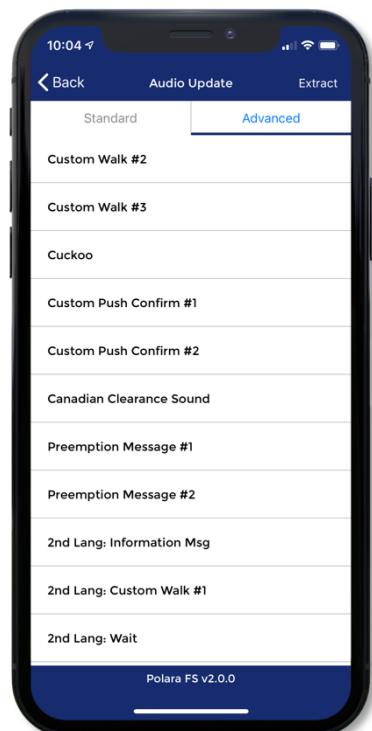


Repeat this process for each file to be uploaded. Typically, a custom set will include two files, one for Information Message and one for Custom Walk #1. To enable these new custom files, go to PBS Configuration and set the Information Message option to "Custom", and set the Walk Mode Sound option to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

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

Additional sounds can be modified for specific circumstances. The following view shows the additional sounds that can be uploaded using the iOS app by tapping the Advanced tab.

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, including adding additional second language audio files or replacing Countdown files. An iN-DGL dongle is required for connection to an iNav unit using the PC. Contact your distributor to obtain an iN-DGL if you do not already have one.



6.11 Extract Audio Files

The same messages that are available to be changed via Audio Update can be extracted from the PBS. This feature requires firmware version v3.199 or greater in the iNx unit.

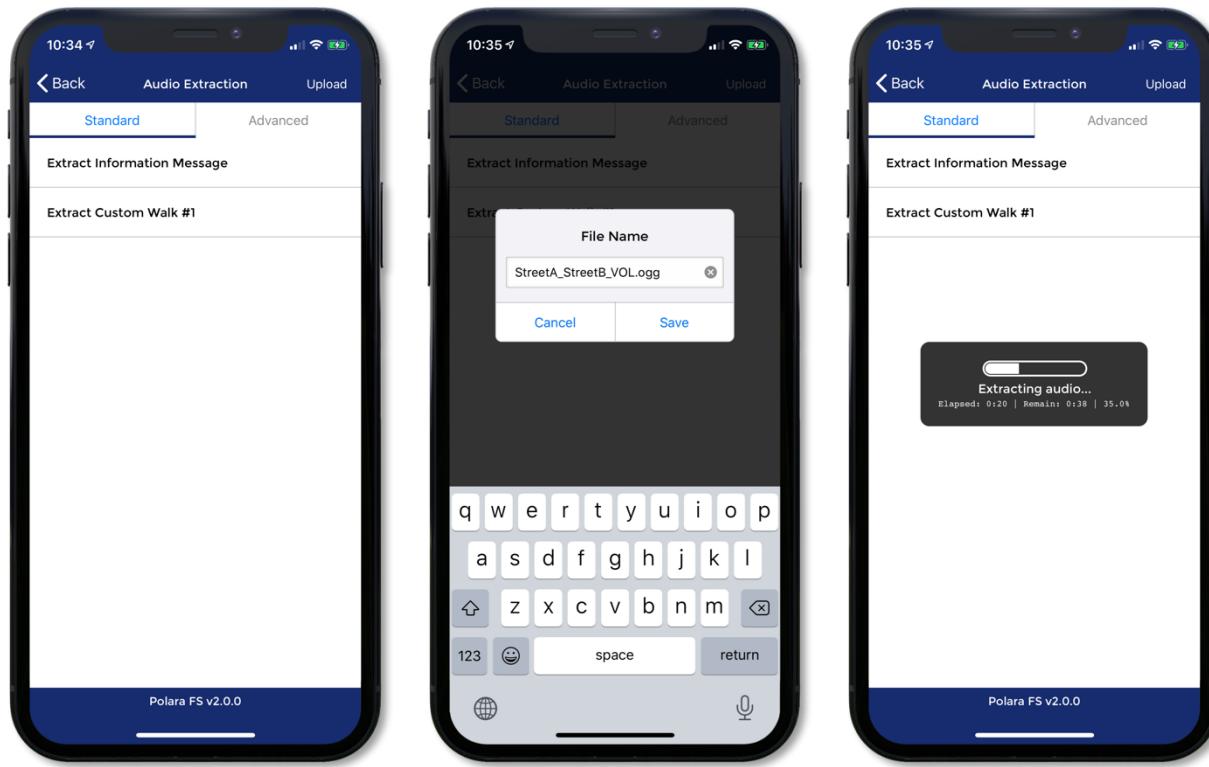
From the Polara App main menu, Tap on “Audio Update”

Tap the “Extract” button in the upper right corner of the Audio Update screen.

All options on screen should change to add the word “Extract” to the front to indicate that you will be extracting the selected message from the unit.

It is recommended that you listen to the message prior to extracting it so you know how the message should be named. Perform an extended push on the unit to hear the Information Message and then wait to hear the Walk message, or use the sound play feature in the Settings screen.

To extract the Information Message, tap the Extract Information Message option.



You will be prompted to add a filename for the extracted file. Name the file appropriately for the intersection streets. For example, the intersection of Broadway and Main would have an information message named “Broadway_Main_VOL” and the corresponding walk message would be “Broadway_WALK”.

Tap Save to begin extraction.

Once extraction is complete, you can extract additional messages from the unit or tap the Upload button to switch to upload mode.

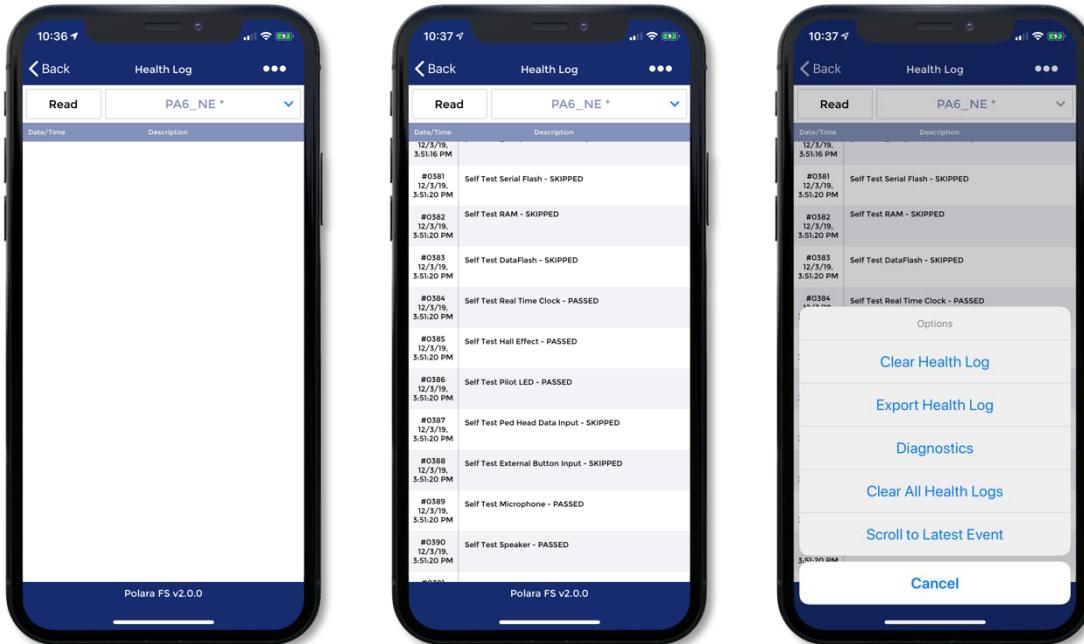
You can view the extracted messages by disconnecting from the iNav unit and tapping on the three dots in the upper left corner of the screen and selecting the “Audio Files” option. From this screen you can play the audio files or send them to another application, such as e-mail or Dropbox.

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

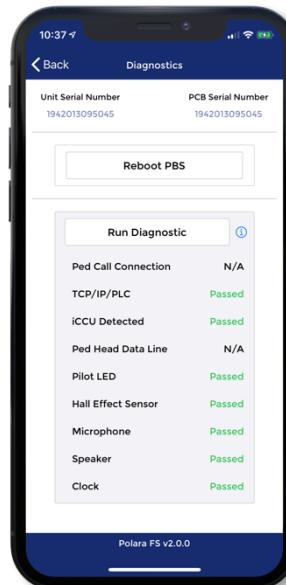
7.1 Accessing the Health Log

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.

Select “Health Log” in 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. Note: You must tap the Read button prior to exporting the health log, otherwise the health log export will only include device information and not the entire health log of the unit.



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

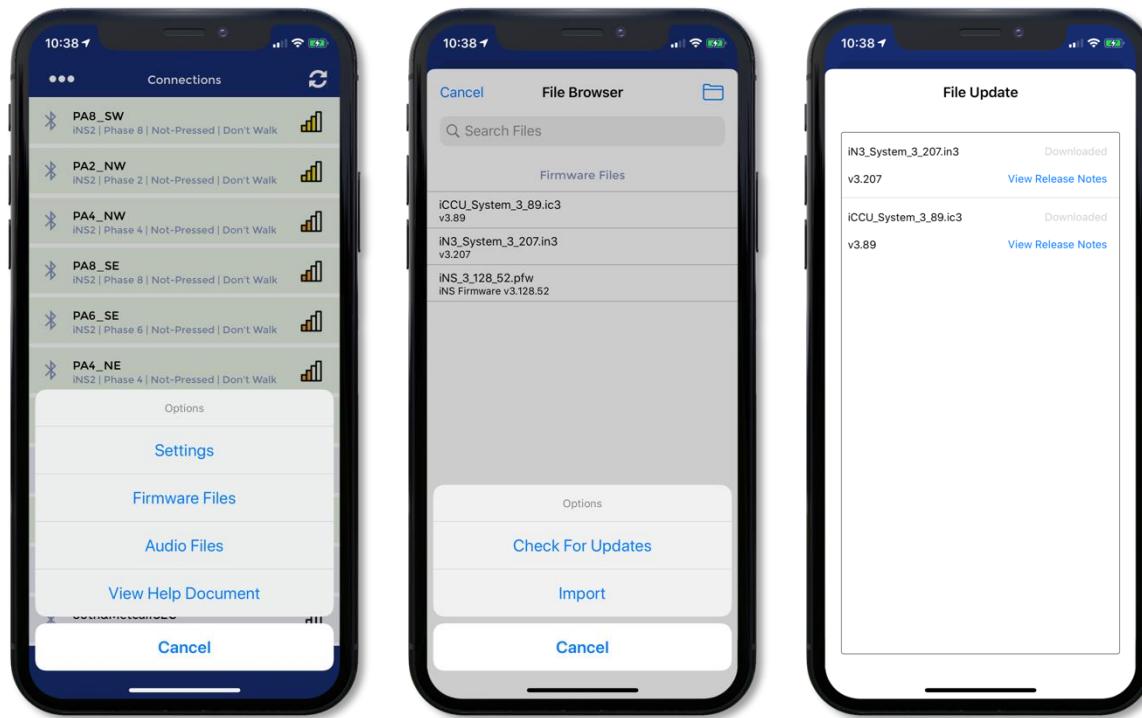


8. Using the Polara Field Service App for iOS for Firmware Updates

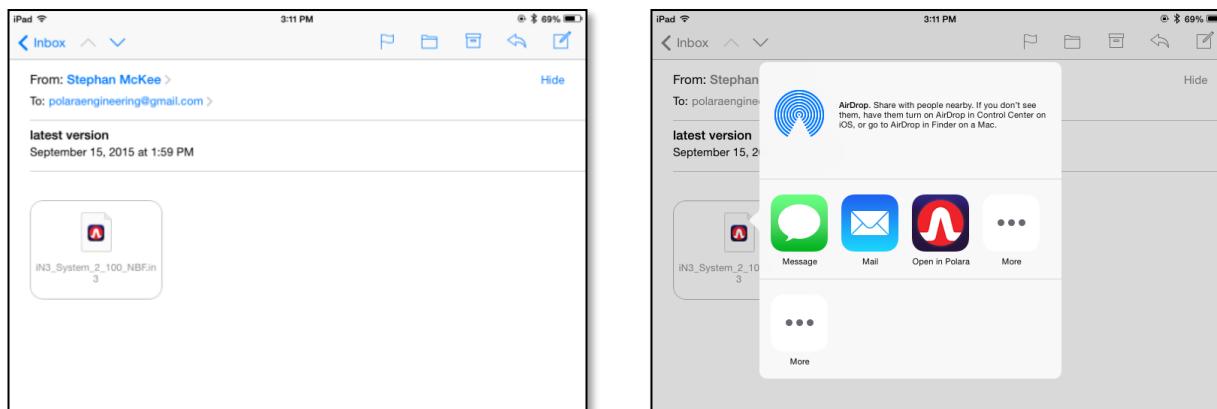
8.1 Checking for the Latest Firmware

Firmware files are automatically bundled with the Polara FS 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-X2 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 folder icon 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.

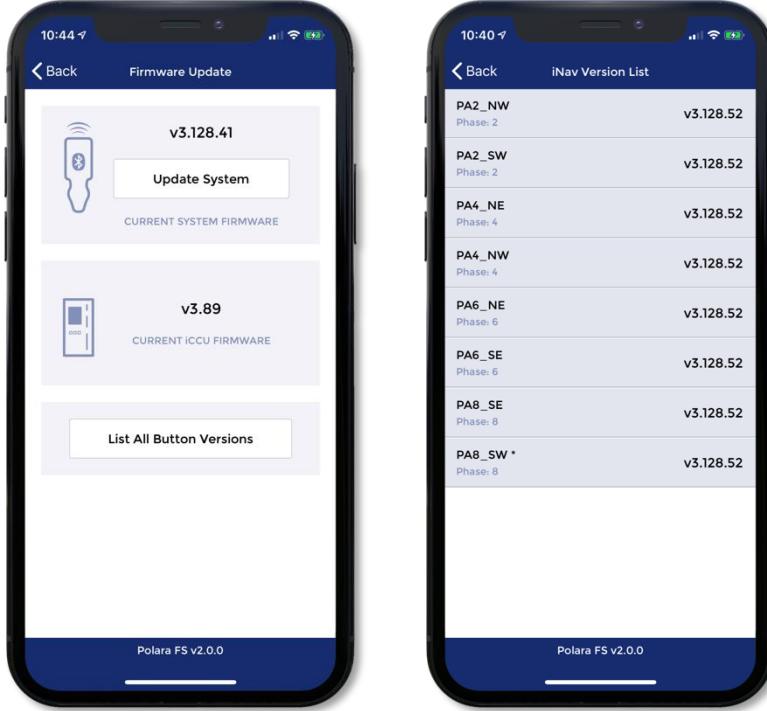


Firmware files to be uploaded can also be received as an email attachment on your iOS device. With the email app open and the message displayed, tap on the attachment, then tap “Open in Polara”.

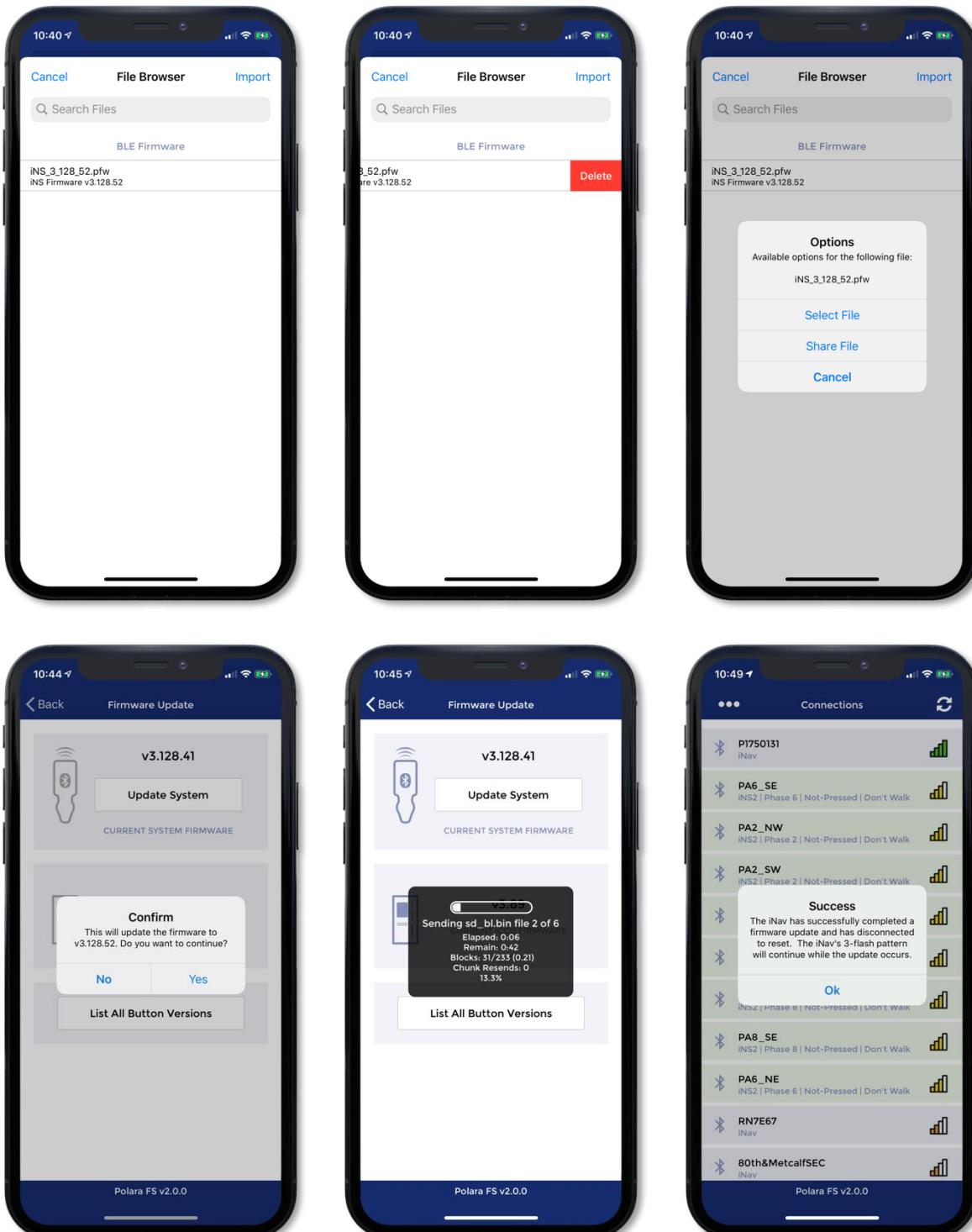


8.2 Performing a Firmware Update

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-X2 as well as the iNS2 device you are connected to. By tapping on List All Button Versions, a list of all connected iNS2 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

The calendar feature can no longer be used via the iOS Application. Due to the complexity of the feature, it must be enabled and configured using the PC application only.

10. Using Polara Field Service App for PC to Change iCCU-X2 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 iNS2 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-X2. All PBS and iCCU-X2 configuration options are accessible using either connection. File uploads containing firmware or audio must be performed by connecting directly to the target unit. Skip to section 12 for instructions on connecting via Bluetooth.

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 iNS2 PBS.

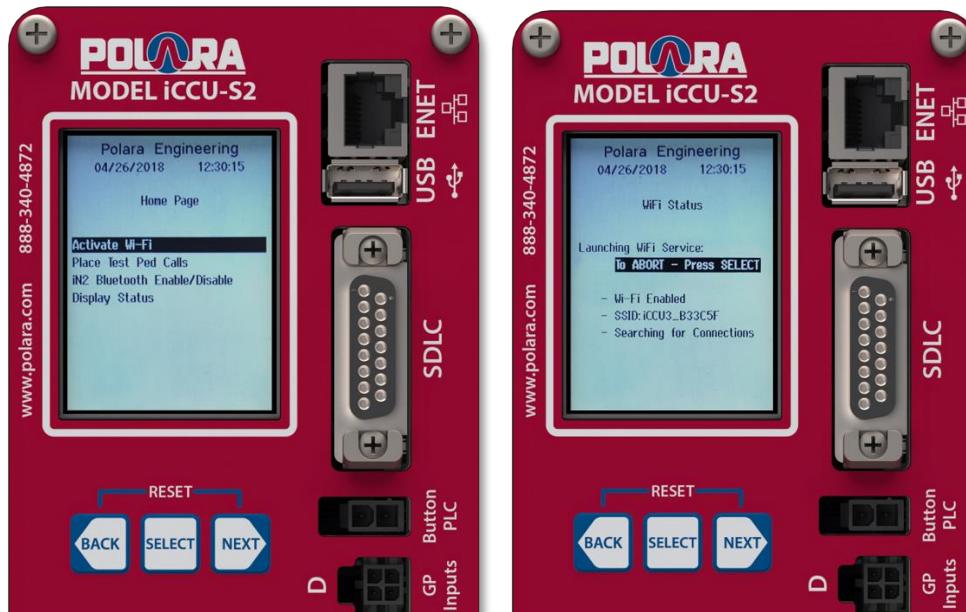
10.3 Application Installation

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.

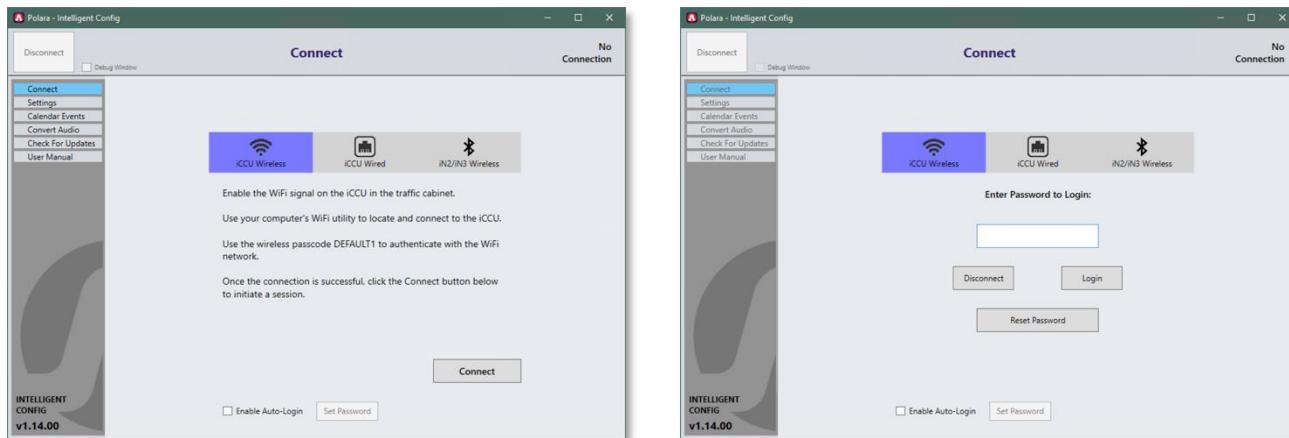
10.4 Wi-Fi Connection

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-X2. This is done by pressing the SELECT button on the iCCU-X2 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-X2 in the list of available devices. Select the iCCU-X2 device (SSID indicated on LCD of iCCU-X2), 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.

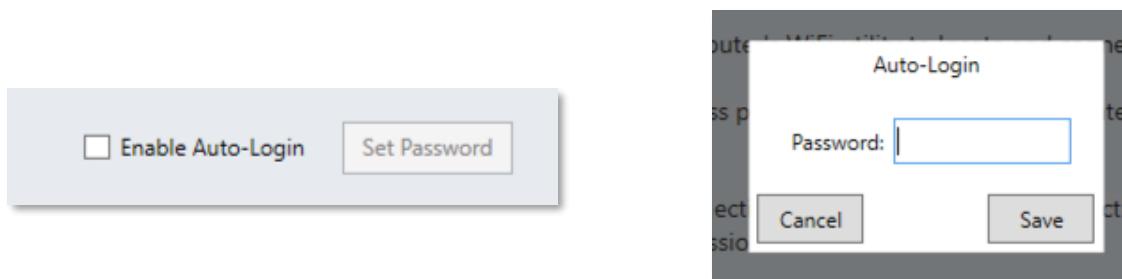


Click on the iCCU Wireless tab (if it is not already selected) and click the Connect button. Enter the password (factory default is 1234), then click Login.

10.4.1 Auto-Login

[New Feature in v1.14.00] At the bottom of the connection screen is a new checkbox to enable Auto-Login.

For customers where the majority or all of the intersections used within an area have the same password, a feature is available to enable logging in without having to re-enter the password. Click the checkbox to enable the feature and you will be presented with a dialog box for the desired password to attempt upon connection to a device. Once this password has been stored, upon any new connections, that password will automatically be tried. If that password fails, then the default password of 1234 will be attempted. If both password attempts fail, then the standard password prompt will appear. To change a previously stored password, click the Set Password button. Note: When the Auto-Login feature is disabled, the stored password is immediately deleted and must be re-entered when enabling the feature.

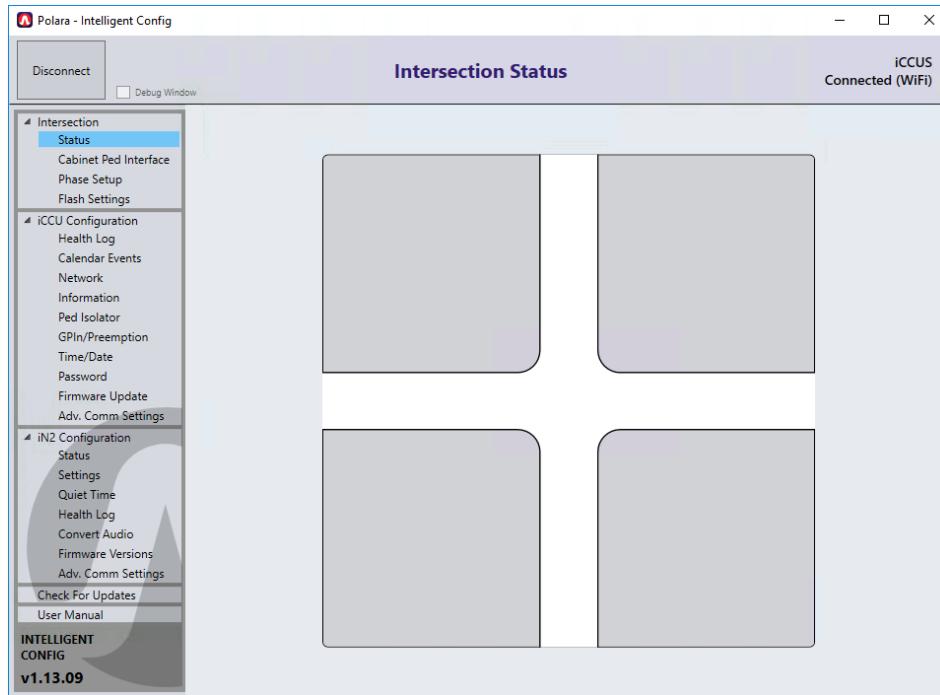


10.4.2 Initial System Setup

Once you have successfully logged in, you will then be presented with the Intersection Status screen.

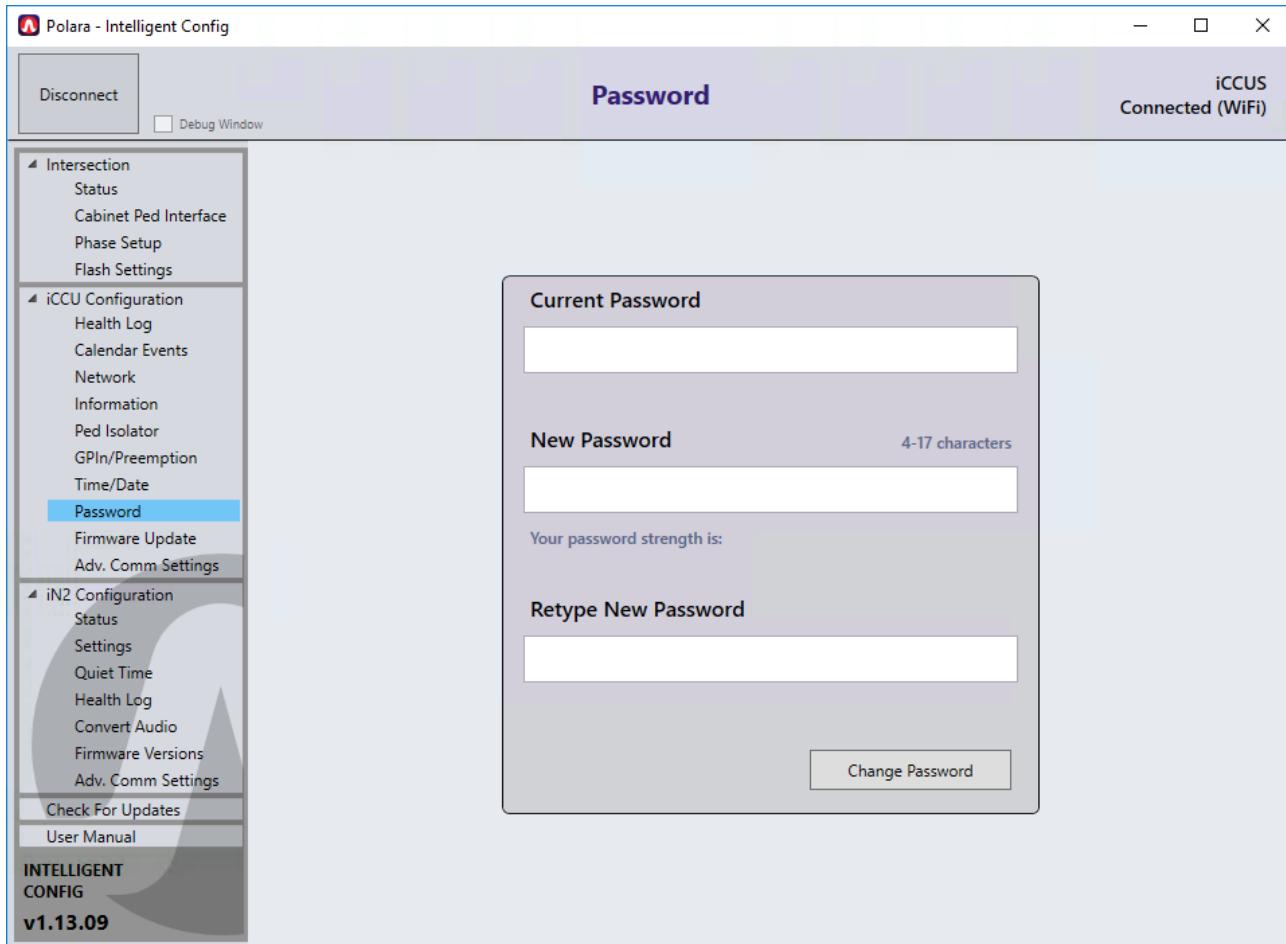
If the system has not yet been configured with PBSs, the Intersection will be blank as pictured below. Begin the setup process by selecting a Cabinet Ped Interface (10.7) and follow that up with assigning Phases to each PBS in Phase Setup (10.8).

Note: If the PBSs play the “Change Password” notification periodically, it is an indication that the iCCU-X2 contains the factory default password (1234). To disable this notification, proceed to the next section (10.5) and change the password to something other than factory default.



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 retype new password. Then click the Change Password button. This will update the password in the iCCU-X2. Once the password has been updated, the screen will clear. Click on another menu option to exit the password screen.

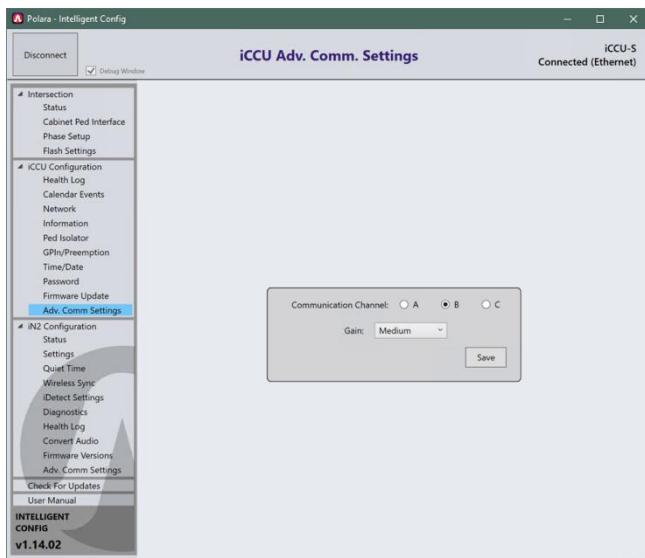


10.6 Advanced Communications Settings

All iNS2 PBSs connected to the interconnect board communicate with the iCCU-X2 via the field wires, using one of three communication channels A, B or C.

During initial startup, the iCCU-X2 will operate in Channel B by default. The first time an iNS2 PBS powers up, it will auto-calibrate by finding the communication channel the iCCU-X2 is operating on, and then adjust its signal until it establishes communication with the iCCU-X2. This process typically takes 1-3 minutes. Once calibrated, each iNS2 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-X2, 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-X2 for an extended period of time or if it cannot connect to the iCCU-X2 at start up, the PBS will restart itself in come up in an un-calibrated mode. It will search for the iCCU-X2 on each of the communication channels and calibrate itself once it locates the iCCU-X2's operating channel. If no iCCU-X2 is available, the PBS will continue to search until it finds the iCCU-X2. If one or more PBSs cannot connect to the iCCU-X2 during the calibration process (two flash pattern continues), the communication channel on the iCCU-X2 should be changed.



To change the Communications Channel of the iCCU-X2, connect to the iCCU-X2 and use the Advanced Communications Settings menu to select the desired channel and press "Save". Before changing the Communications Channel, the iCCU-X2 will signal all connected buttons to disconnect, restart, and recalibrate so the automatic recalibration function will happen automatically.

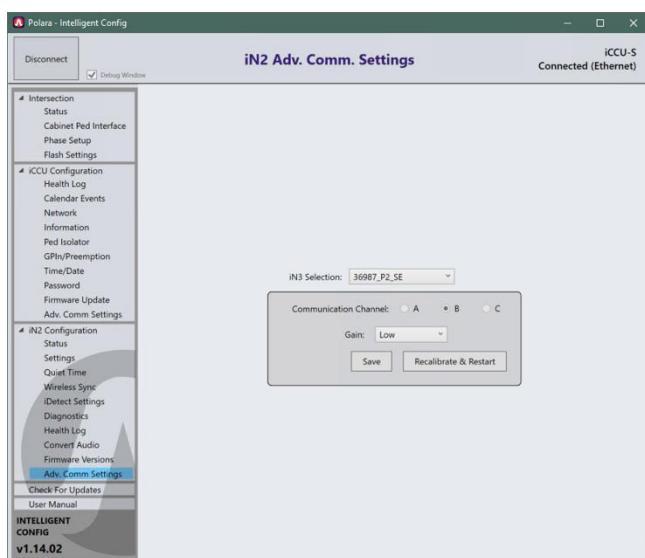
Note: Channel C requires iCCU-X2 v3.91 and all iNavs must have v4.11 or later and all iNS/iDS units must have v4.0.11 or later. If any connected PBS has older firmware when the iCCU-X2 is on Channel C, the units will remain in 2-flash mode and will not establish communication with the iCCU-X2 until their firmware is updated or the channel is changed.

If after changing Communication Channels, any of the following issues are present: iNS2 PBSs (one or more) still cannot connect to the iCCU-X2; an iNS2 PBS is connected but there are communication problems when attempting to read remote health logs (or trying to set parameters to all PBSs), please contact Polara technical support for further assistance.

Because of the various types and states of field wiring, communication may not work in all field wiring conditions, so Polara cannot guarantee an iNS2 system will work on all intersections. If the above steps fail in establishing reliable communication between a PBS and iCCU-X2, a 3-Wire system is the only option.

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

To change an iNS2 PBS to operate as an iN3 PBS (Ped-Head Based System), please see the iN3 Quick Start Guide.



10.7 Channel and Phase Setup

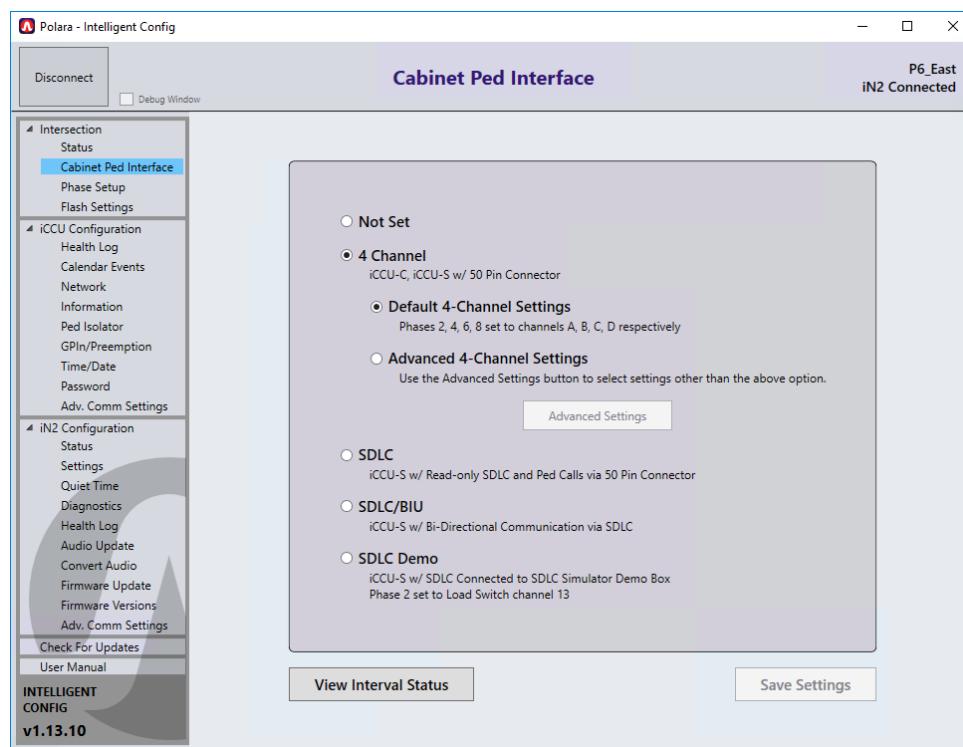
The iCCU-S2 can obtain Ped interval information by monitoring the outputs of the load switches (via the **Cable A** harness) or by monitoring the SDLC bus. The iCCU-C2 obtains Ped interval information via the C4 cable adapter and has automatic source selection. Follow the appropriate setup steps below, depending on which iCCU-X2 model you have installed, and how it is wired in the cabinet. Refer to section 3.3. The iCCU-S2 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 Cabinet Ped Interface Selection

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

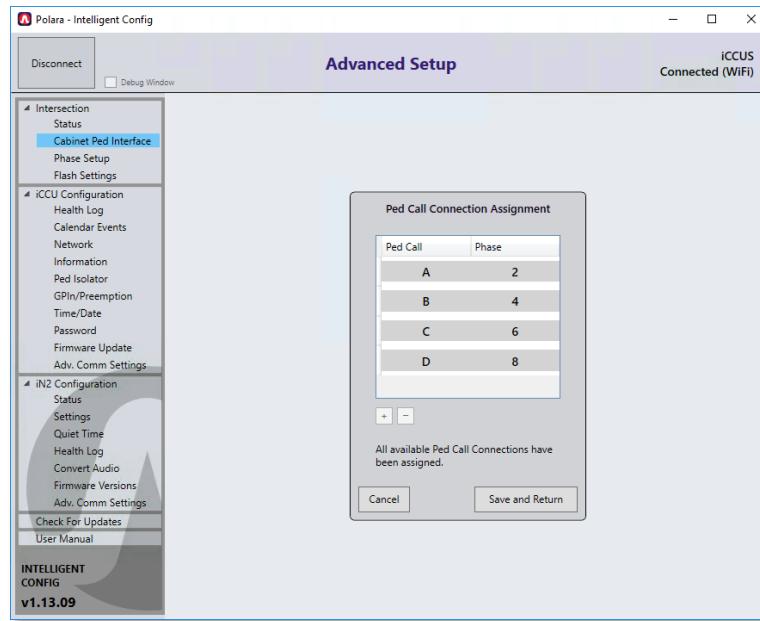
If Using Cable A for Load Switch Monitoring:

Click on the 4 Channel option, then click the Save Settings button.



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, choose the Advanced 4-Channel Settings sub-option and then click on Advanced Settings and modify the assignment as necessary.

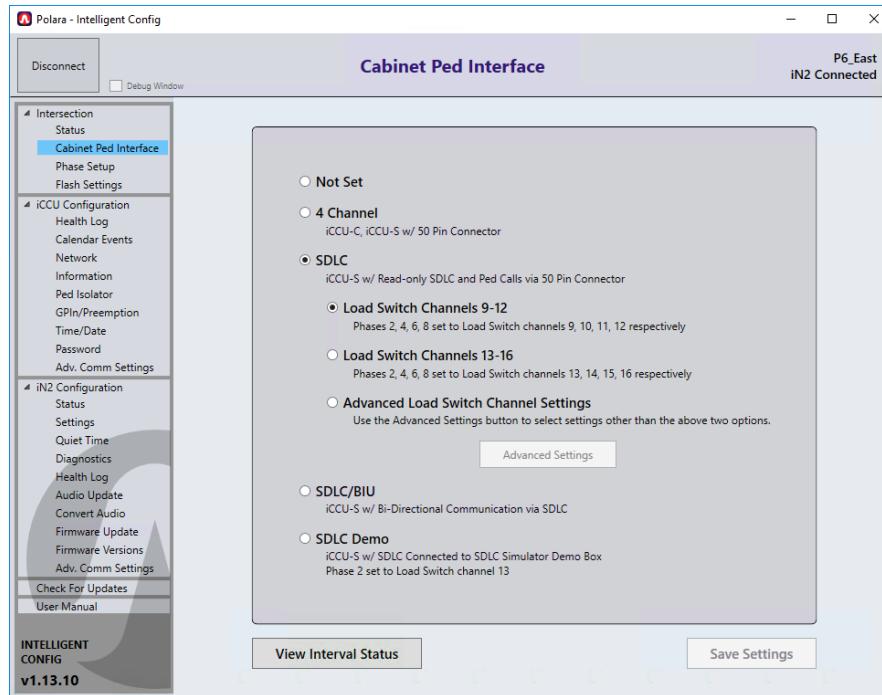
If using the iCCU-C2 and the cabinet input file is wired differently than the Cal-Trans standard such that the ped call wiring in the backplane is different than the C4 connection, select the Advanced 4-Chan Settings option and tap the Advanced Options button to change the configuration of the input file phase mapping.



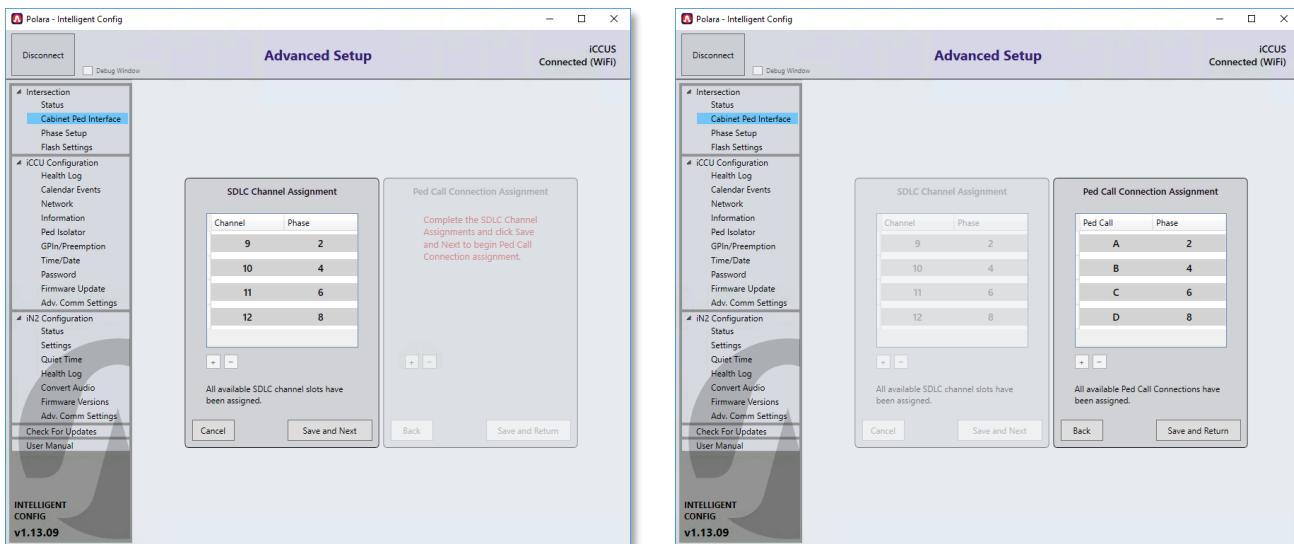
Proceed to Phase Setup in section 10.8.

If using an SDLC cable to monitor Ped Intervals only:

Typically, 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. Click the Save Settings button, then proceed to Assigning iNS2 PBSs to Phases in section 10.8.

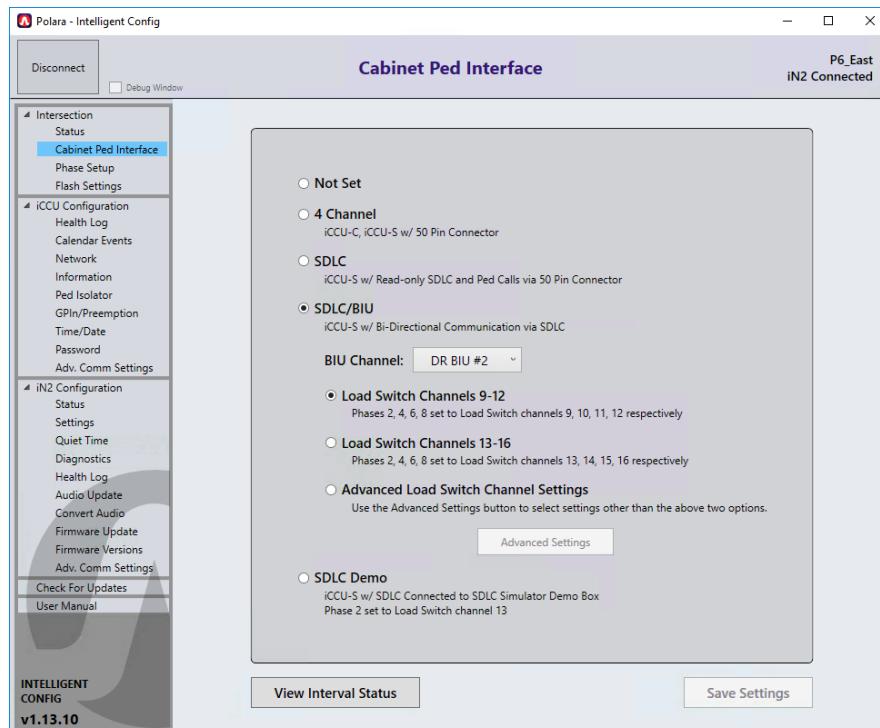


If your setup differs from one of the default SDLC options, choose the Advanced Load Switch Channel Settings option, click Save Settings, and then modify the setup for your specific needs.



If using an SDLC cable in BIU Mode (no Cable A and no Cable C) :

The NEMA TS 2 2003 specification defines SDLC command and response frames for 4 detector BIUs. The iCCU-S2 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-S2 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-S2 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-S2 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 communicate with a single BIU at each SDLC address. If the iCCU-S2 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-S2 as a BIU,

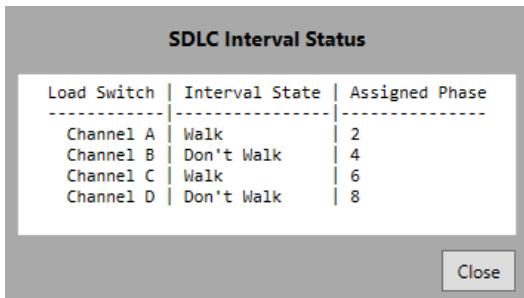
go to the “Cabinet Ped Interface” Menu and select an available detector BIU number and the proper pedestrian load switch configuration for the cabinet. If the pedestrian load switch configuration is not listed, or more than 4 pedestrian phases are needed, select the Advanced Load Switch Channel Settings option and click the Advanced Settings button, then 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.

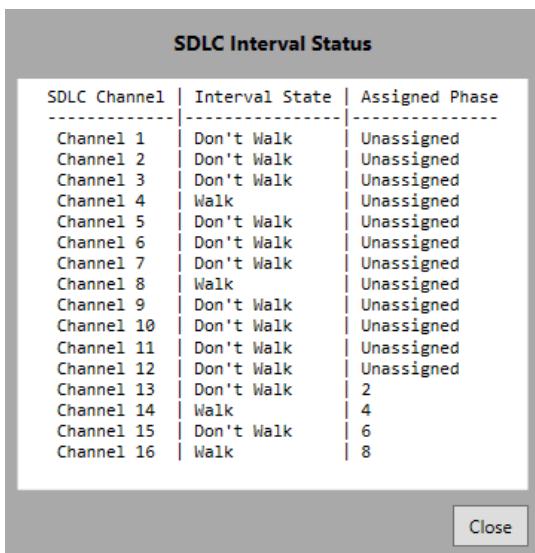
10.7.2 View Interval Status

While selecting the Cabinet Ped Interface type, you can view the status of the interval information coming into the iCCU-X2 by clicking on the View Interval Status button. In 4-Channel mode, the interval information will be displayed for the 4 channels wired to the load switches (or C4 connector for iCCU-C2).

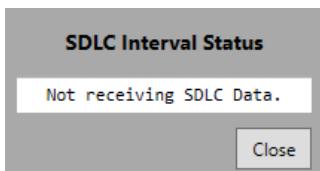
Note: In 4-Channel mode on iCCU-S2, the status displays the information received directly from the load switch. If the Walk signal is on, the status will be displayed as Walk, and in Don't Walk, the status will show as Don't Walk. In the flashing Don't Walk interval, the status will toggle between Don't Walk and Off matching the Ped head state.



When in SDLC mode, all 16 SDLC channels will be displayed showing the interval information. This can be useful to determine which Load Switch setting is desired (9-12 or 13-16) or if the advanced options are necessary.

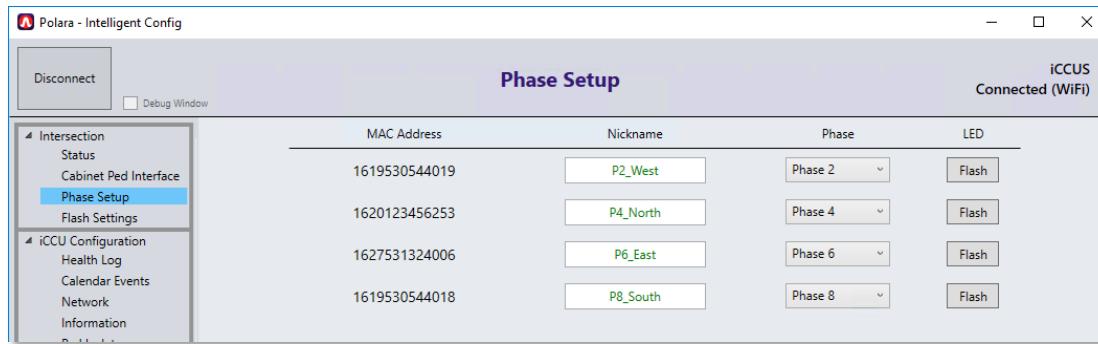


If no SDLC information is being received by the iCCU-S2, the notice will be displayed with that information. Check the SDLC cable to ensure a good connection.



10.8 Assigning iNS2 PBSs to Phases

Following the Channel Setup process, each connected iNS2 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.

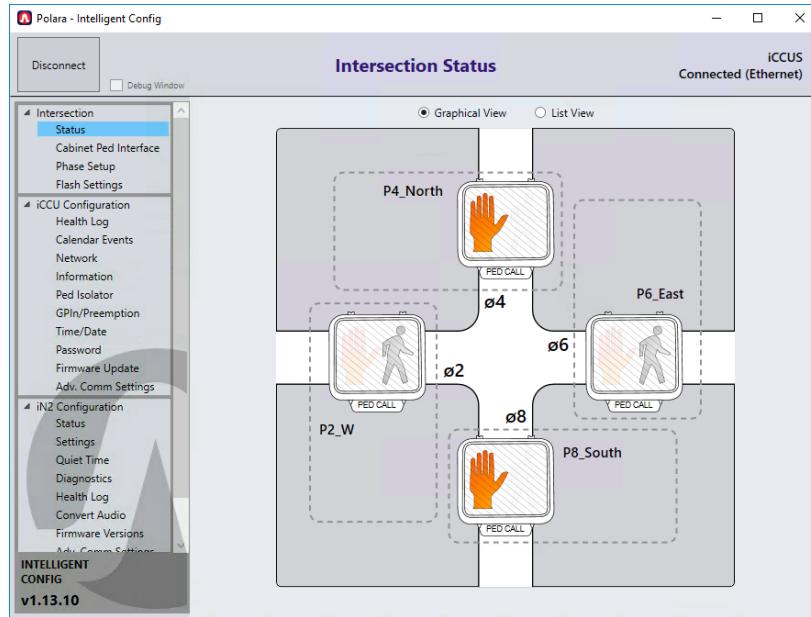


After these steps, the system should be fully operational. The steps leading up to this point must have been completed without error to ensure that the PBS walk indications are matched to the correct crosswalks. Walk the intersection and verify that each PBS is linked to the correct phase. At this point,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

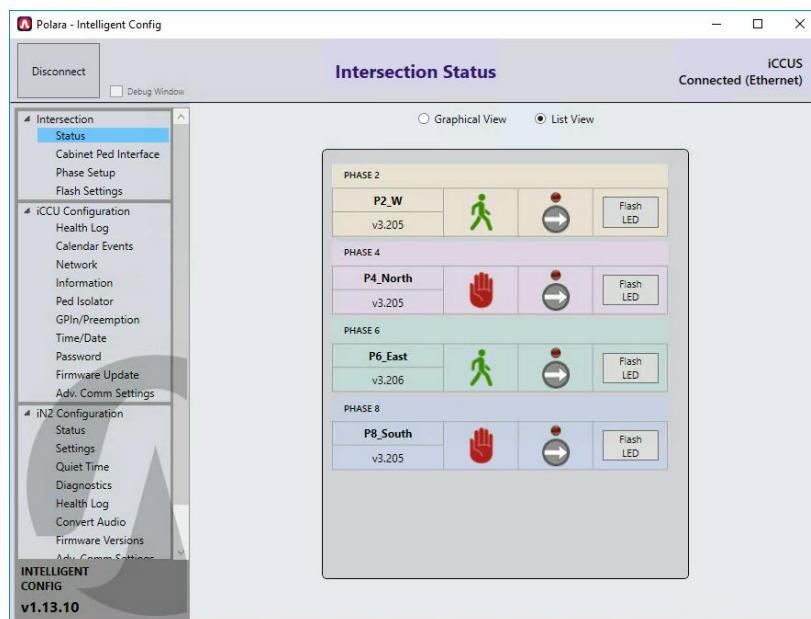
10.9 Intersection Status

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.

Note: The Ped Head Graphical view maps the phases based on the Ped Call Connection Assignments. Channels A, B, C and D are always depicted as West, North, East, South respectively. If your intersection does not match this setup, then it is recommended to use the list view and disregard the graphical view. Also, if using SDLC/BIU mode with more than 4 phases, only the first 4 will be depicted in the graphical view.



Click the List View radio button at the top of the page to view the list of buttons assigned to phases matching the views on the iOS and Android applications.



10.10 Health Log

The Health Log contains a list of events, including both normal conditions and error conditions. Each the iCCU-X2 and PBSs each maintain a separate log. These can be very useful for troubleshooting. View the iCCU health log from the Health Log option in the iCCU Configuration menu section and view the individual PBS health logs from the Health Log option in the iN2 Configuration menu section.

To read the Health Log, click the “Read” button. The current log is downloaded and displayed. Scroll the screen to browse through the log. Click “Clear” to erase all entries from the log. Click “Export” to generate a report with all health log entries and all iCCU unit information.

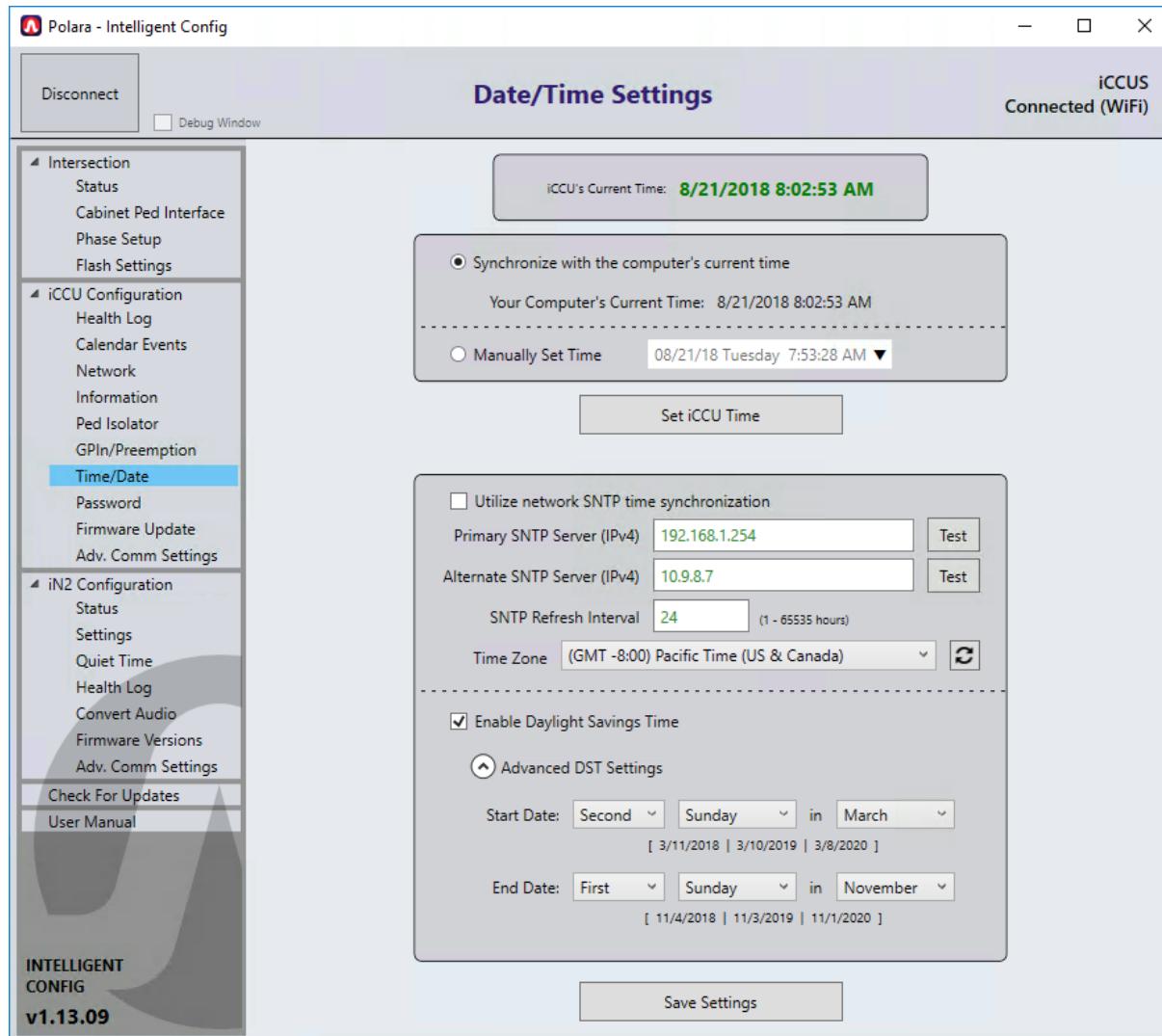
For help with a particular issue, or a message of concern, email the log to support@polara.com. Note: You must tap the Read button prior to exporting the health log, otherwise the health log export will only include device information and not the entire health log of the unit.

| ID | Date/Time | Description |
|------|-----------------------|---|
| 3171 | 6/19/2020 1:53:00 PM | System shutdown due to power loss. |
| 3172 | 6/22/2020 3:29:33 PM | Unit Startup, 3.89 |
| 3173 | 6/22/2020 3:29:34 PM | [Incl_state] Reset and configure PLC chip. |
| 3174 | 6/22/2020 3:29:34 PM | Comm Chip version: AM58-14.3.4 Universal |
| 3175 | 6/22/2020 3:29:36 PM | Bootloader Message: Main Program Memory check OK. Backup image OK. |
| 3176 | 6/22/2020 3:29:38 PM | [Incl_state] Successfully configured PLC chip. |
| 3177 | 6/22/2020 3:29:46 PM | Self Test Serial Flash - SKIPPED |
| 3178 | 6/22/2020 3:29:46 PM | Self Test DataFlash - SKIPPED |
| 3179 | 6/22/2020 3:29:46 PM | Self Test RAM - SKIPPED |
| 3180 | 6/22/2020 3:29:46 PM | Self Test Real Time Clock - PASSED |
| 3181 | 6/22/2020 3:29:47 PM | Self Test WiFi - PASSED |
| 3182 | 6/22/2020 3:29:47 PM | Self Test TCP/IP/PLC - PASSED |
| 3183 | 6/22/2020 3:29:47 PM | Self Test TCP/IP/Ethernet - PASSED |
| 3184 | 6/22/2020 3:29:47 PM | Self Test Keyboard - PASSED |
| 3185 | 6/22/2020 3:29:47 PM | Self Test Beeper - PASSED |
| 3186 | 6/22/2020 3:29:47 PM | Self Test SDLC - PASSED |
| 3187 | 6/22/2020 3:29:45 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 1 |
| 3188 | 6/22/2020 3:29:47 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 2 |
| 3189 | 6/22/2020 3:29:51 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 3 |
| 3190 | 6/22/2020 3:29:52 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 4 |
| 3191 | 6/22/2020 3:29:53 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 5 |
| 3192 | 6/22/2020 3:29:54 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 6 |
| 3193 | 6/22/2020 3:29:57 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 7 |
| 3194 | 6/22/2020 3:30:02 PM | User Logged On from device type 0 |
| 3195 | 6/22/2020 3:30:13 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 8 |
| 3196 | 6/22/2020 3:30:19 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 9 |
| 3197 | 6/22/2020 3:30:22 PM | User Logged On from device type 0 |
| 3198 | 6/22/2020 3:35:23 PM | [Button Server] Button rx'd Connect Req on deviceAddr: 2 |
| 3199 | 6/22/2020 3:38:23 PM | User Logged On from device type 0 |
| 3200 | 6/23/2020 12:18:06 PM | [App_WiFi] Successfully created access point with TCP Server on WiFi chip 0 |
| 3201 | 6/23/2020 12:54:05 PM | User Logged On from device type 3 |

10.11 Setting the iCCU-X2 Time/Date, SNTP & DST Settings

Click the Time/Date menu item under the iCCU Configuration category. Click the Set iCCU Time button to set the time on the iCCU-X2 to the time currently detected on your computer. If you wish to specify a specific date/time that is different from your computer's time select the Manually Set Time option and select the desired time, then click Set iCCU Time.

Note that this operation also sends the time to any iNS2 PBSs currently connected to the network.



The iCCU-X2 has the ability to connect to a network time server to periodically obtain the current time. The time server cannot be a device on the open internet but must be a local server connected to the same network as the iCCU-X2. Check with your IT Administrator for the appropriate IP Addresses to use. The iCCU-X2 uses the industry standard port 123 (UDP) for SNTP. The Refresh Interval setting adjusts how often (in hours) the iCCU-X2 will ask the server for the updated time. Select the appropriate time zone for the area or click the button to the right of the Time Zone dropdown to select the same time zone as your computer. If daylight savings time is used in your time zone, then the daylight savings time checkbox will automatically be selected. Click the Test button next to the SNTP server to test and the server will be queried for the current time. If successful, a dialog will appear with the current time in GMT and the time converted using the selected Time Zone and DST settings.

You can manually enable and disable the daylight savings time adjustment and can also modify the date that DST starts and ends.

Click the Save Settings button to save the SNTP and DST changes.

10.12 General Purpose Input and Pre-emption (iCCU-S2 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.

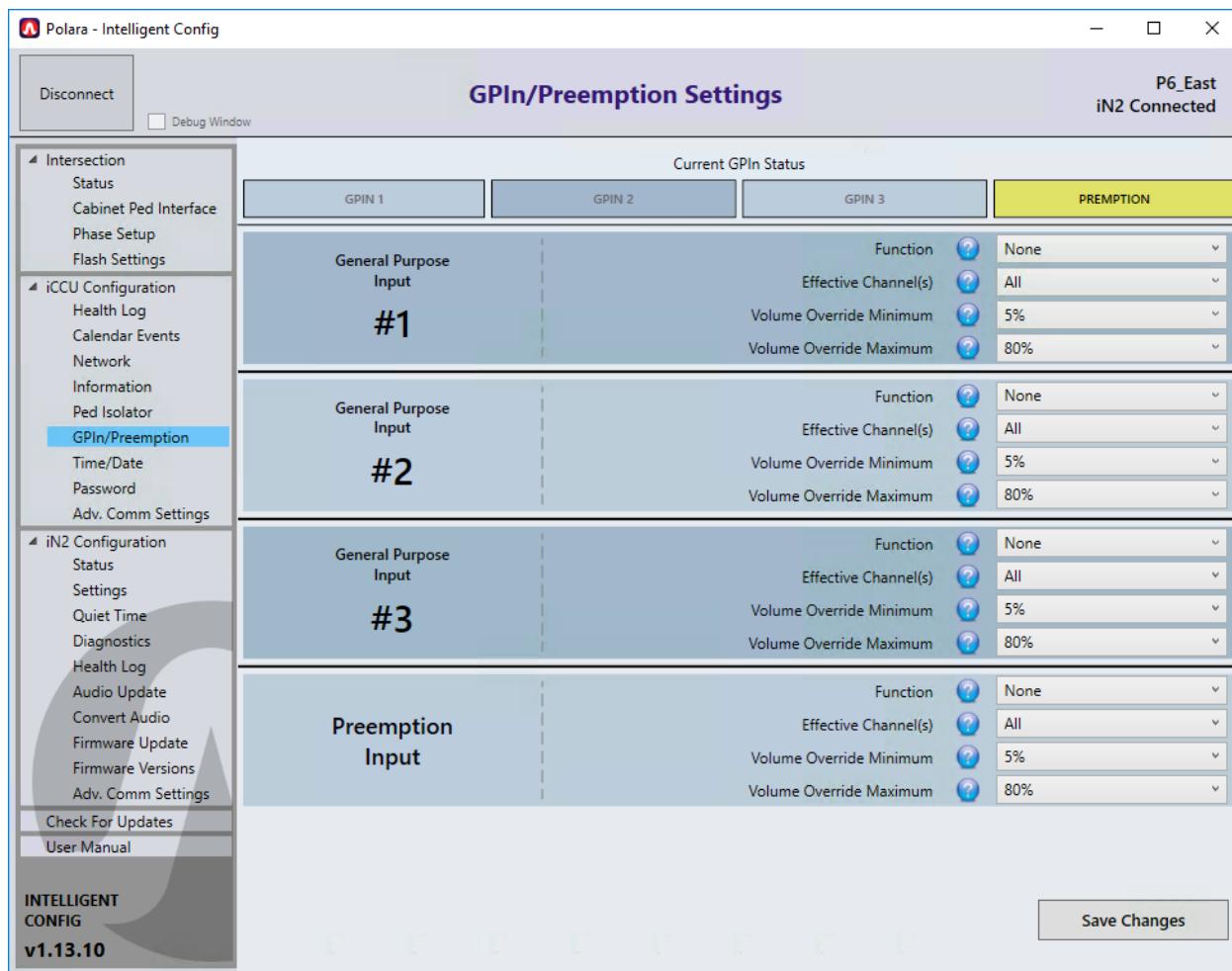
Each of the three General Purpose Inputs can be configured to a different function which will be activated by the corresponding input wire on the **Cable D** harness.

The 4 Preemption input wires on the **Cable B** harness all correspond to the Preemption Input (on the bottom of the screen).

Click the Save Changes button to write the configuration changes to the iCCU-X2.

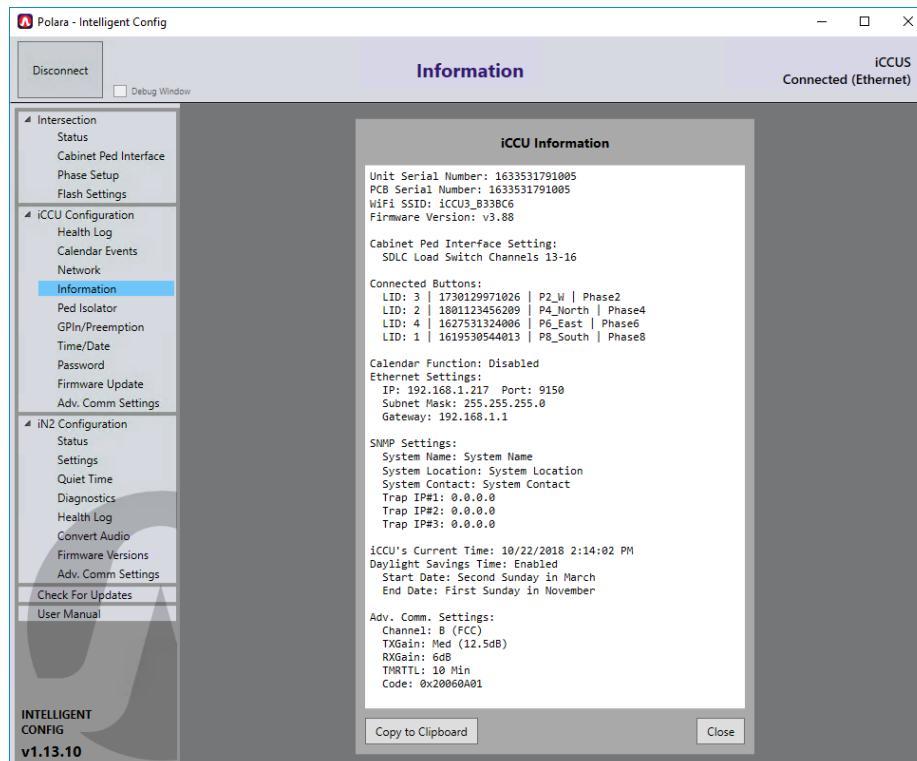
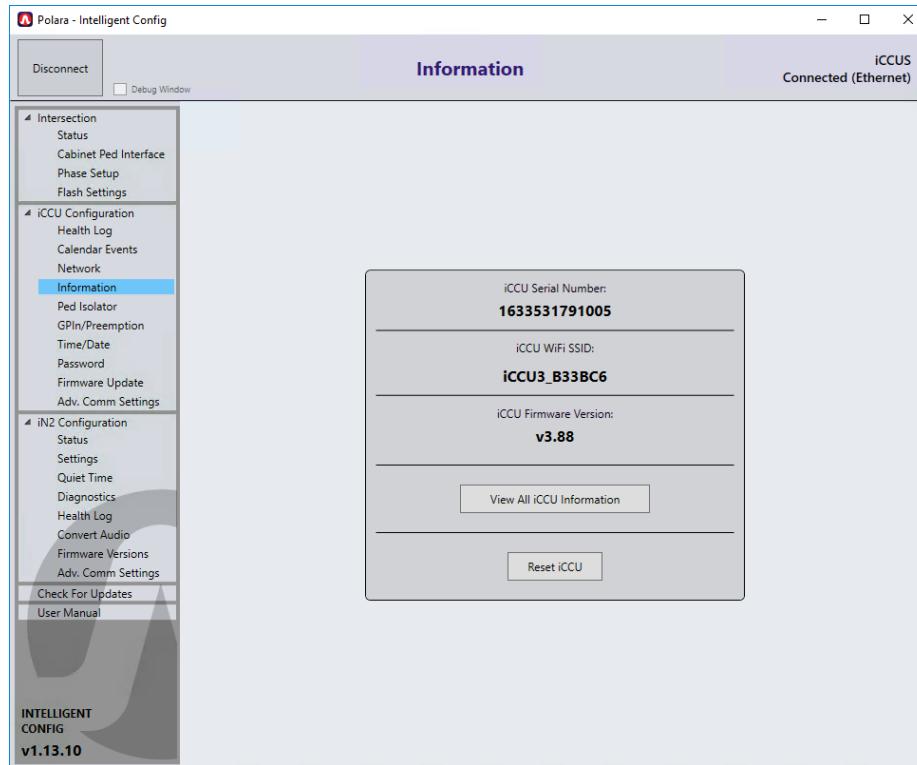
You can view the status of the GPIn/Preemption inputs by clicking on the View Current GPIn Status button. This will provide a live-updating bar at the top of the page with the status of each input. Asserting the input will change its background to yellow.

See the wiring diagram on page 14 for connecting the GPIn/Preemption wires.



10.13 Information

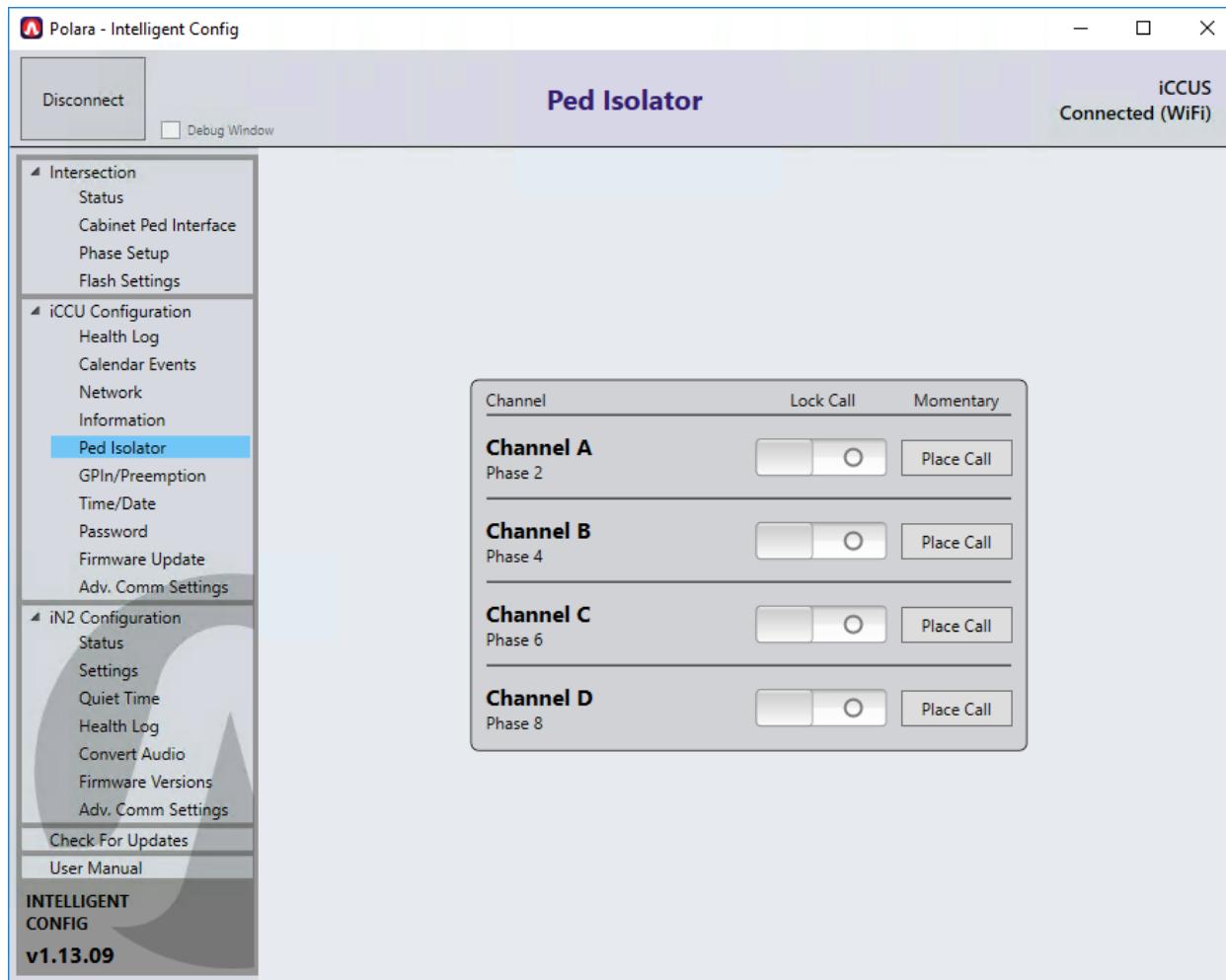
Click on the Information menu item under the iCCU Configuration category to view the iCCU-X2's Serial Number, Wi-Fi SSID and Firmware Version. You can also click the Reset iCCU button to cause the iCCU-X2 to restart. If you click on the "View All iCCU Information" button, you will be presented with a dialog which includes all factory and user-settable settings. This information is also prepended to the health log when exported to file.



10.14 Ped Isolator

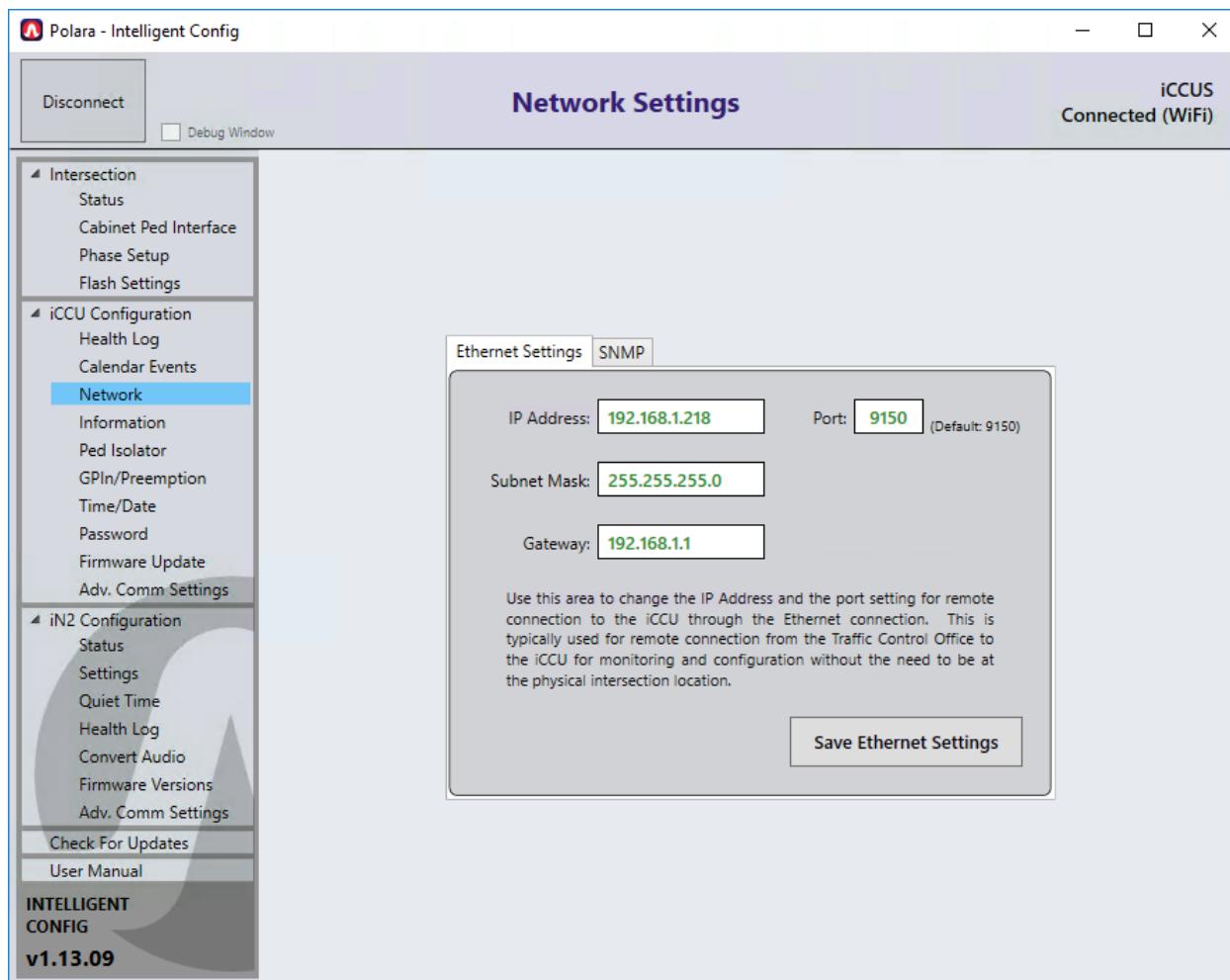
Click on the Ped Isolator menu item under the iCCU Configuration category. From this screen, single calls can be placed on individual phases by clicking the Place Call button. Also, calls can be locked in for any phase. As long as the lock call switch is activated, the call will remain locked, even after disconnecting from the Wi-Fi connection. The iCCU-X2 will continue to lock calls until the switch is deactivated or the iCCU-X2 is power-cycled.

This screen is accessible on the PC App, iOS App and also on the front LCD panel of the iCCU-X2.



10.15 Setting Ethernet Configuration

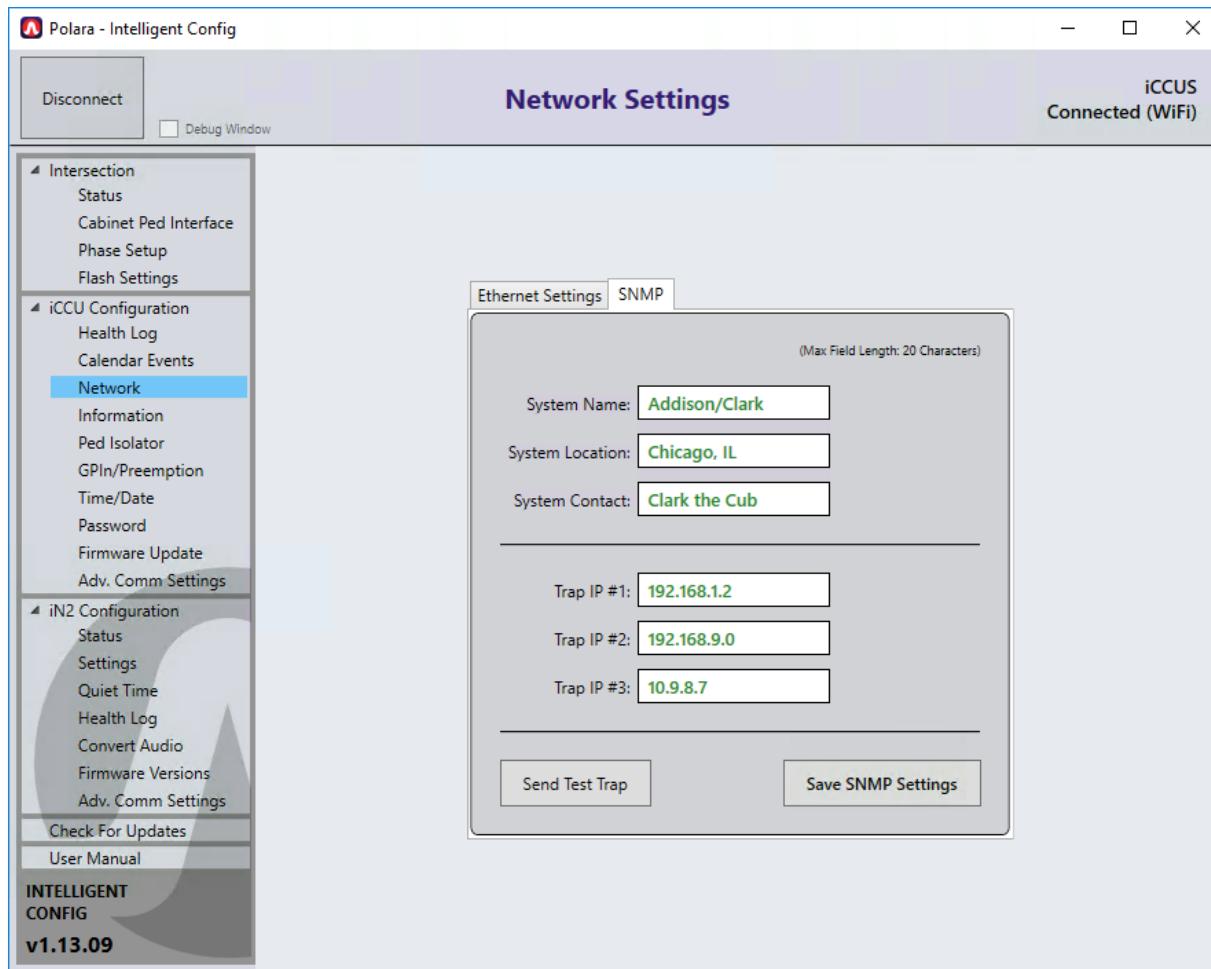
Click the Network menu item from the iCCU Configuration category. Enter the desired IP, Port, Subnet Mask, and Gateway. Click the Save Changes button.



10.16 Setting SNMP Configuration

The iCCU-X2 has the ability to respond to SNMP queries for basic information and send out SNMP Trap notifications when critical actions occur within the unit.

Click on the Network menu item from the iCCU Configuration category, then click on the SNMP tab in the main window.



Set appropriate information in the Name/Location/Contact fields for display in your SNTP manager to identify the unit. Enter IP Address of up to three SNTP managers to receive the SNTP traps. Click the Save SNMP Settings to save the settings. After saving the settings, click the Send Test Trap button to have the iCCU-X2 send a test trap to each IP in the list.

In order to receive and manage the reception of trap notifications you will need an SNMP network management system. Most SNMP managers have the ability to monitor for traps and there are many free dedicated trap receiver applications available for download online. Traps are sent to port 162 on your PC and this port will need to be unblocked from your firewall. Once you have your network management system installed, you can configure it to send you automatic email notifications any time a trap is received.

The SNMP MIB for the iCCU-X2 is available for download on Polara.com website under the iCCU-X2/iNS2 Installation downloads section.

11. Connecting to the iCCU-X2 via Ethernet

11.1 Direct Connection from PC to iCCU-X2

The IP address of the iCCU-X2 has been preset from the factory to 192.168.1.218. The Ethernet port on the iCCU-X2 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-X2 can be used.

If you are connecting the iCCU-X2 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-X2, you must set the TCP/IP settings on your computer to the same subnet as the settings on the iCCU-X2. 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

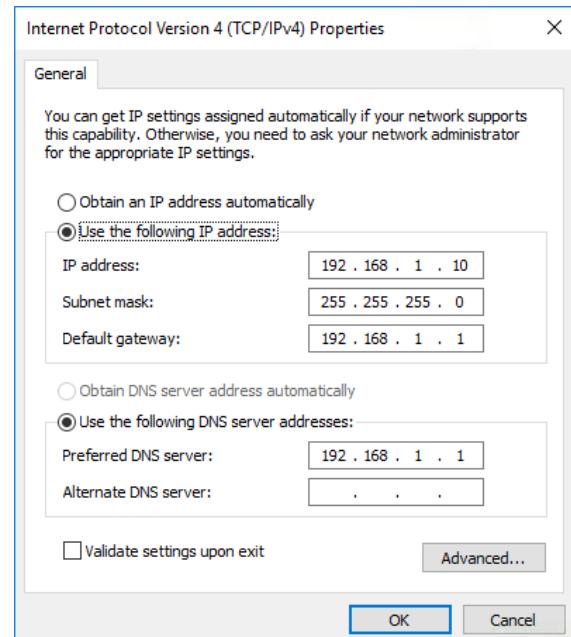
Subnet Mask: 255.255.255.0

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-X2 through Ethernet using the Intelligent Config App. Continue to the next section for detailed instructions.



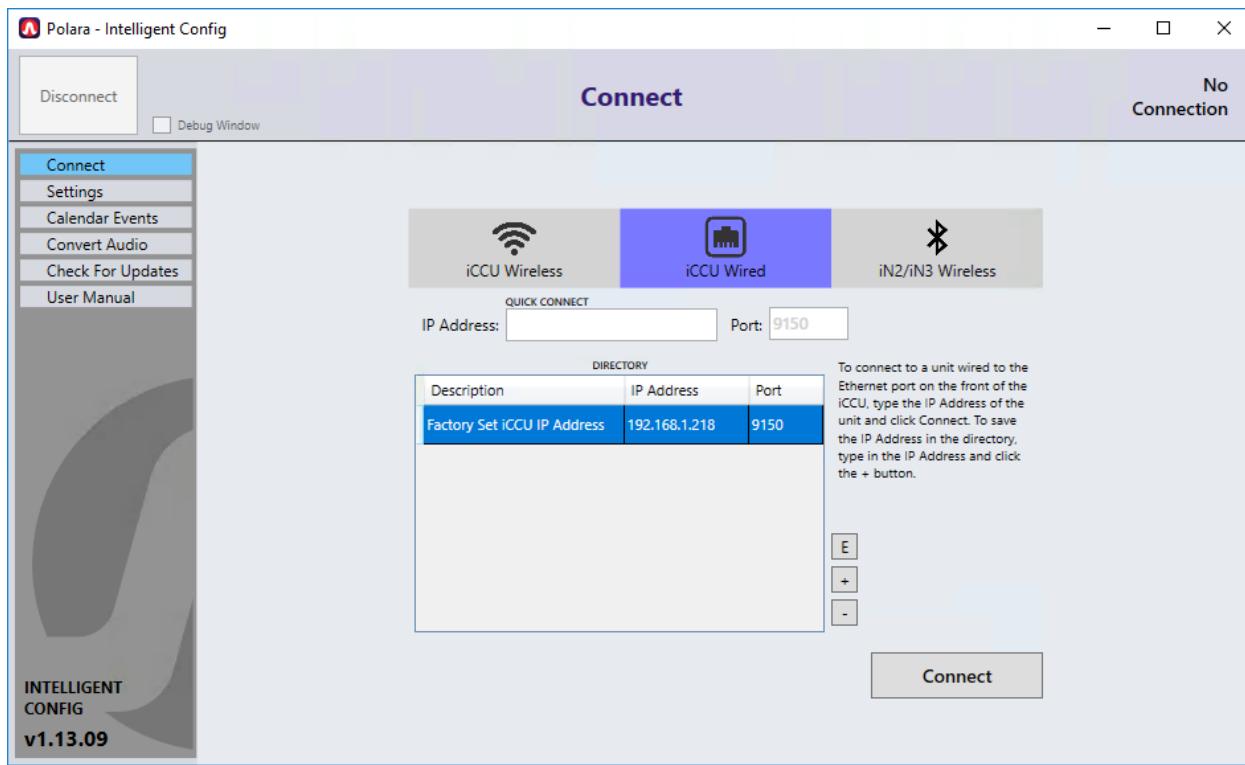
11.2 iCCU-X2 Wired Connection

The iCCU-X2 can be connected via Ethernet connection to an internal network. Any Ethernet connection to the iCCU-X2 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-X2 and the PC or Laptop in use is also connected either directly to the iCCU-X2 or connected through an intranet, the Intelligent Config software can be used to connect to the iCCU-X2.

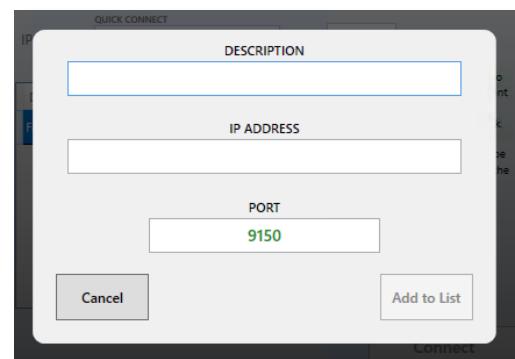
In the Intelligent Config software, click on the iCCU Wired tab on the Connect screen. If the iCCU-X2 you are connecting to has the factory default IP address, you can double-click on the Factory Set iCCU IP Address item in the list and the App will attempt to connect to the iCCU-X2. If a connection is successful, you will see a password prompt.

If the IP Address and/or port of the iCCU-X2 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-X2s, 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.

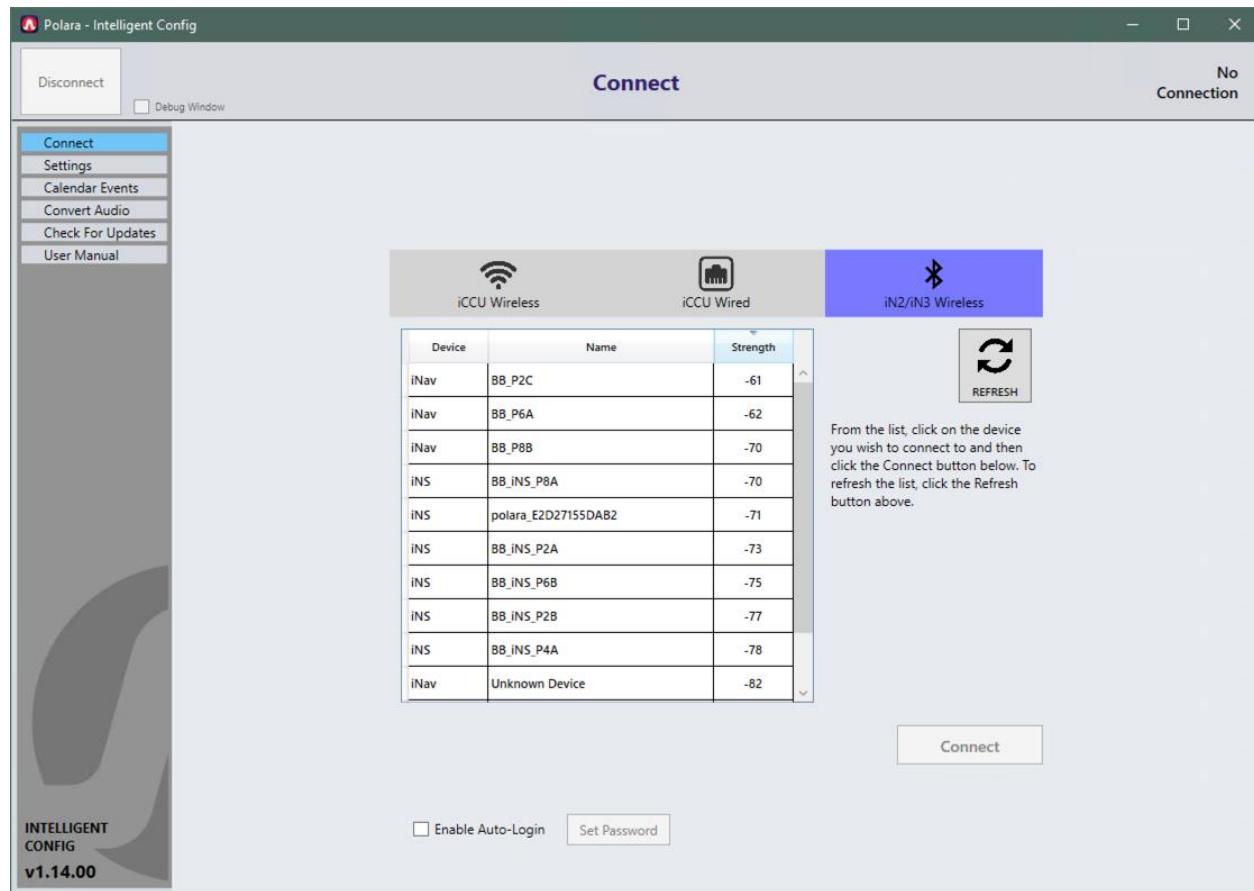


12. Using Polara Field Service App for PC to Change PBS Settings

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.

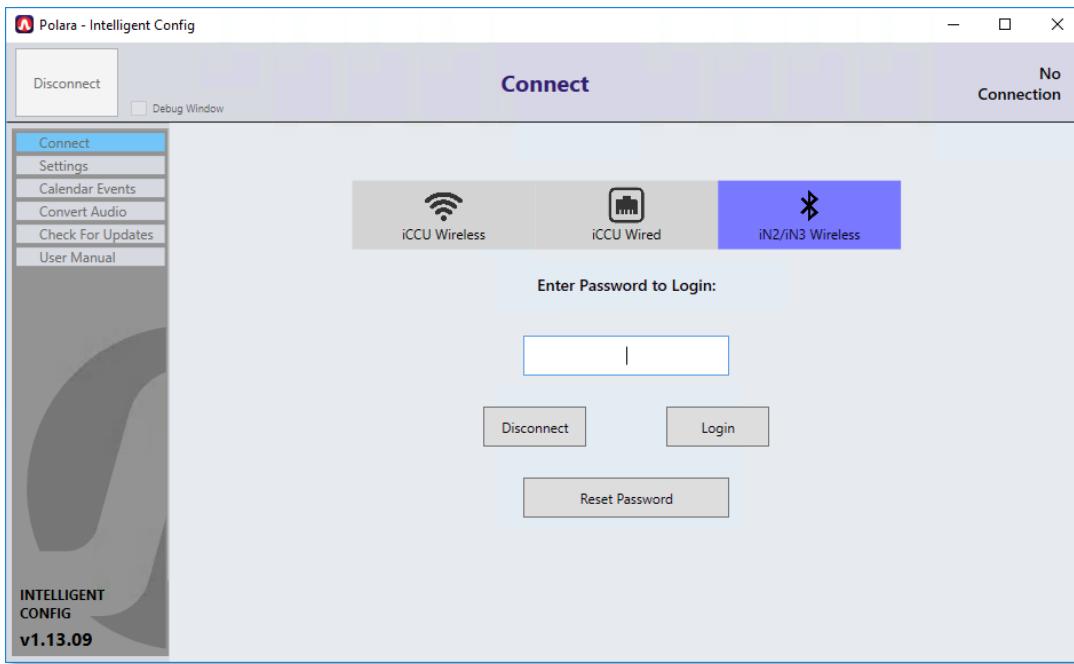


This screen shows that there are several iNav and iNS PBS units found by the application. Click on the REFRESH button to perform a new search for available units.

Note: See section 10.4.1 to learn about the Auto-Login feature.

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.

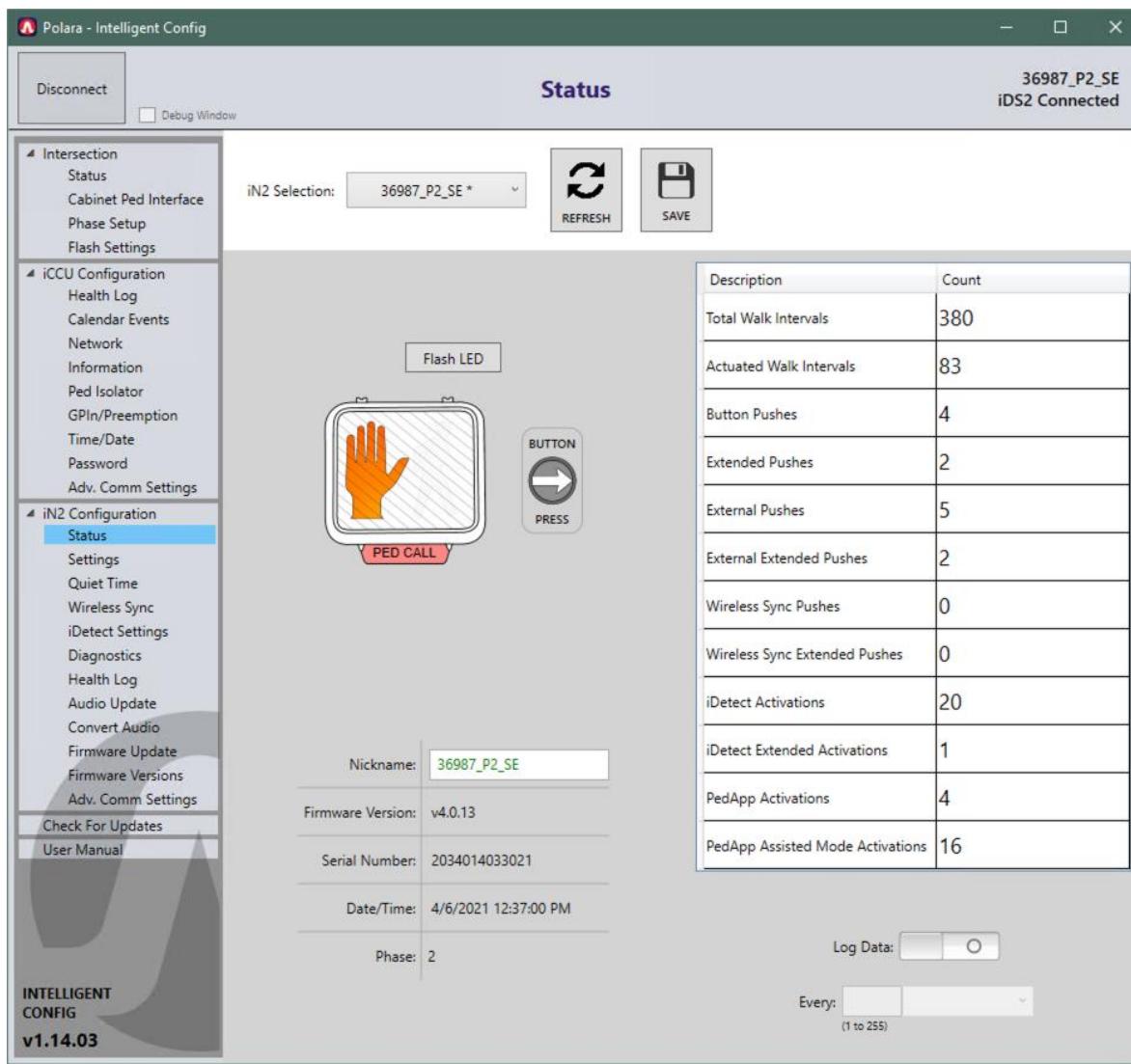


Login Page

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

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.

12.3.2 Button Counts

Each PBS keeps a count of events that have occurred in the button from the date of manufacture. These numbers act as a kind of odometer for the unit and cannot be reset. The counts are:

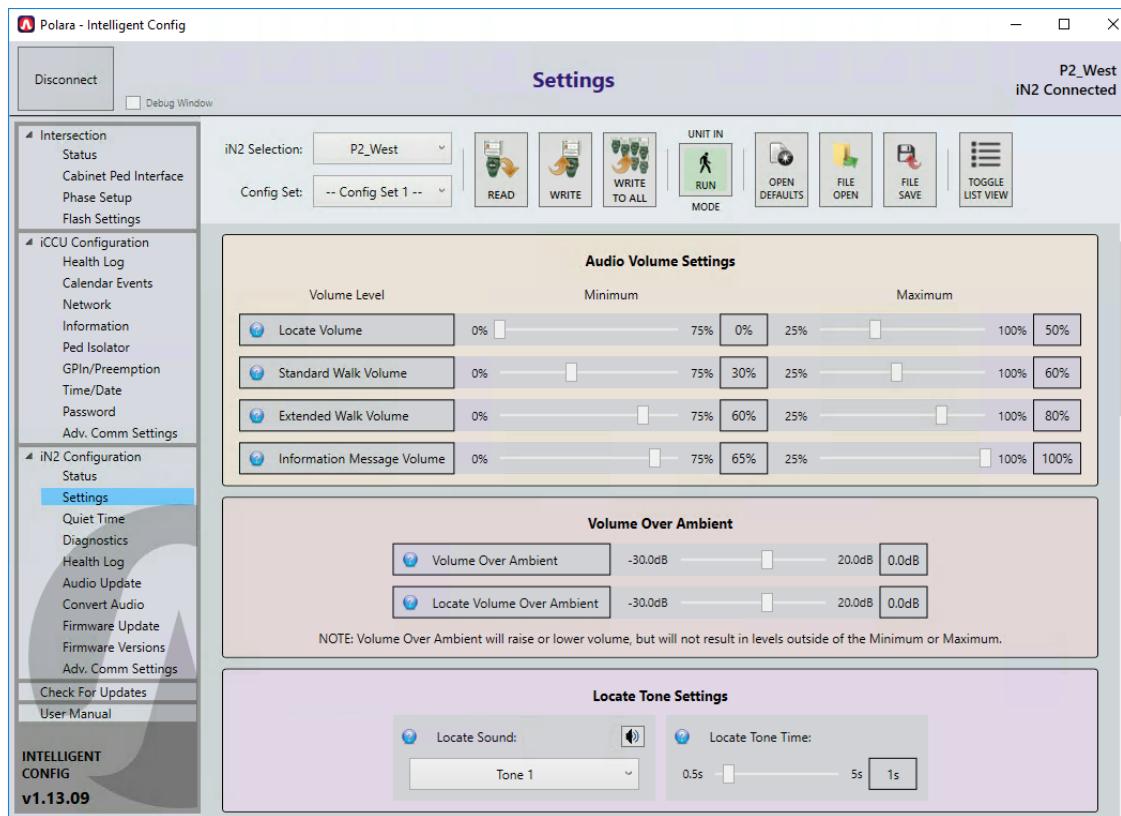
- Total Walk Intervals
 - The number of walk intervals the unit has received. This includes walk intervals which have been initiated by this PBS as well as walk intervals that occur while the intersection is in recall.

- Actuated Walk Intervals
 - The number of walk intervals which occurred following an internal button push. If the walk audio and button vibration occurred during a walk indication, then this counter is incremented.
- Button Pushes
 - The total number of button pushes that have been detected by the PBS's arrow button. This does not include any detected button pushes that were caused by other PBSs on the same phase.
- Extended Pushes
 - The number of extended pushes the PBS has detected on the arrow button.
- External Pushes / External Extended Pushes
 - Presses originating from another unit. Either from another unit on the same phase or from an externally connected button (see section 3.6.13.6.1). Short presses are listed as External Pushes, and long presses are listed as External Extended Pushes.
- Wireless Sync Pushes / Wireless Sync Extended Pushes
 - Short and Extended presses originating from a unit connected via the Wireless Sync feature.
- iDetect Activations / iDetect Extended Activations (iDS units only)
 - Pedestrian activations detected by the iDetect feature.
- PedApp Activations / PedApp Assisted Mode Activations
 - Pedestrian activations initiated using the PedApp.

In order to relate the above data to relative time, a logging feature is included which will add health log entries including all counters along with a timestamp at specific intervals. For example, if you want to log the data to find out how the counts change in a week, then enable Log Data Every and enter 168 hours. Then click the save button. Then, once a week, log entries will be added which include the counters.

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.



Options for selecting sounds have a button with a speaker symbol. To listen to sounds, click the speaker icon next to the sound you wish to hear. For safety, the unit will need to go into Maintenance Mode and the LED will perform a 3-flash pattern. Press Yes on the confirmation dialog box to enable Maintenance Mode. In this mode, the unit's main button will not operate or respond to interval changes so a pedestrian cannot use it. This will only be done on the iNS2 unit you are directly connected to, so a remote If you tap on the link for "View All iCCU Information" you will be presented with a dialog which includes all factory and user-settable settings. This information is also prepended to the health log when exported to file. button cannot be made to play a walk sound and confuse a pedestrian.

During normal operation, you will see the button:



And when the unit is in Maintenance mode, you will see the button:



Click the button to toggle between modes. When you exit the Settings page, the unit will automatically return to Run mode.

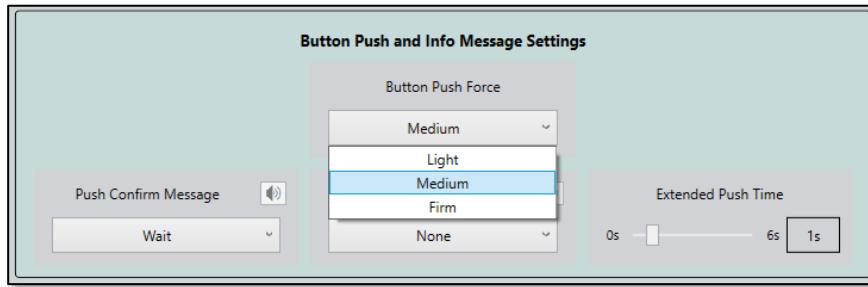
The configuration parameters can be saved using the File Save button. This will allow you to save the parameters to a file on your computer. They can later be recalled using the File Open button.

Note: The configuration files only save the PBS Settings listed on this screen and do not apply to additional parameters on other screens such as Quiet Time or Network Settings and also do not save audio files. Audio files must be extracted and uploaded separately.

The configuration files are the same between all apps (iOS, Android, & PC) and can be used interchangeably.

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.



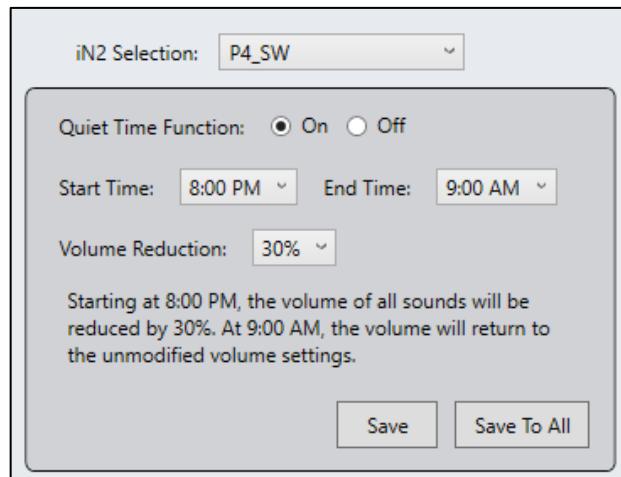
12.5 Quiet Time

The details of the feature's 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.

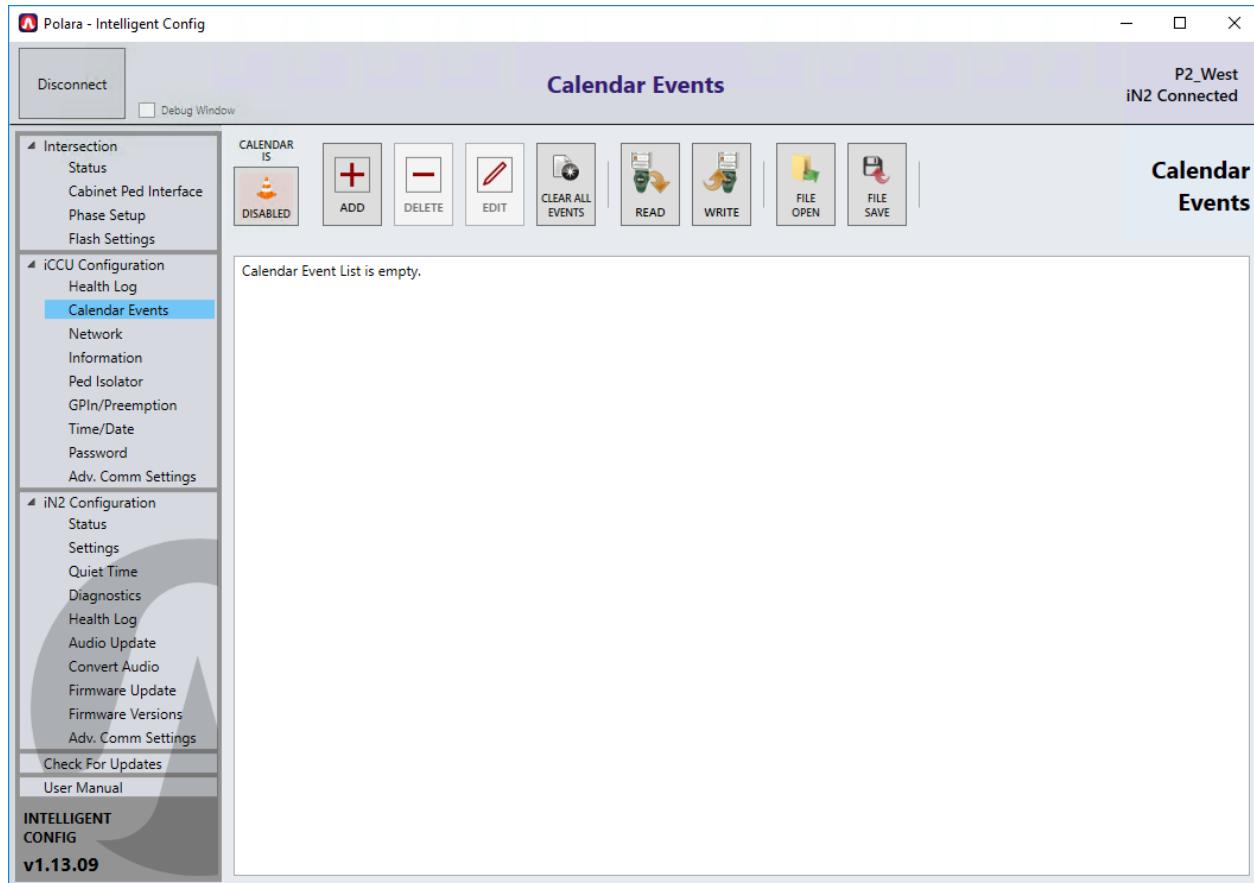
The table below shows what the effective volume settings would be with the Quiet Time set to reduce the volume by 30%. With the values set as shown in the screenshots, between the hours of 9:00am and 7:59pm, the volume will be as set configured in settings (shown in the "set value" column). At 8:00pm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

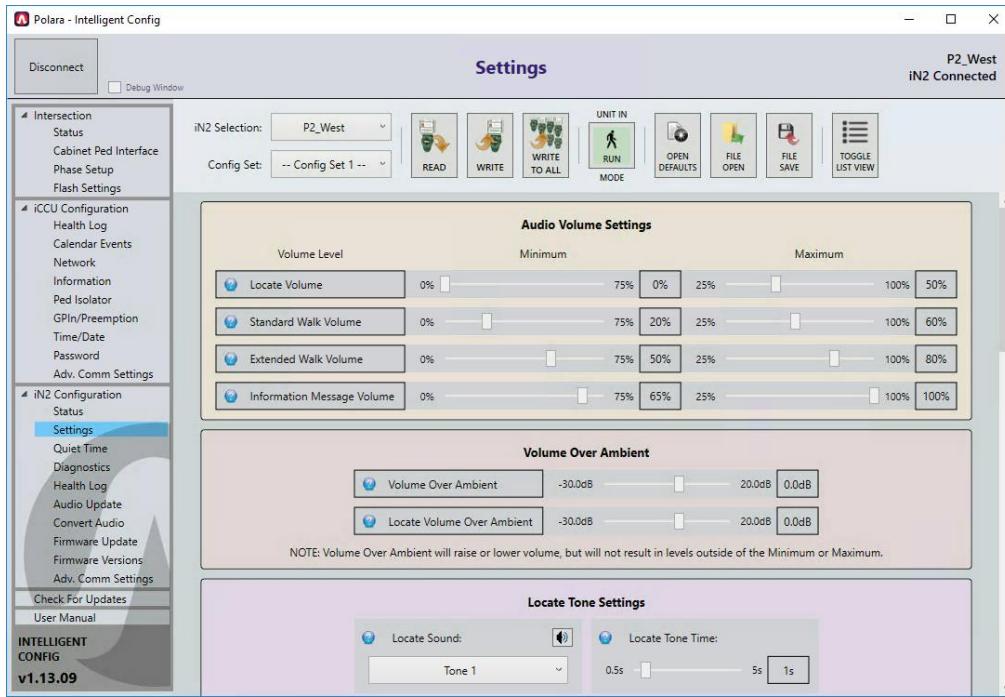
Calendar Events allow the configuration of time-based changes to operating characteristics from four possible configuration sets. This feature enables changes to the settings based on the time of day, day of week, or specific day of the year. For example, you can have low volumes in the early morning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

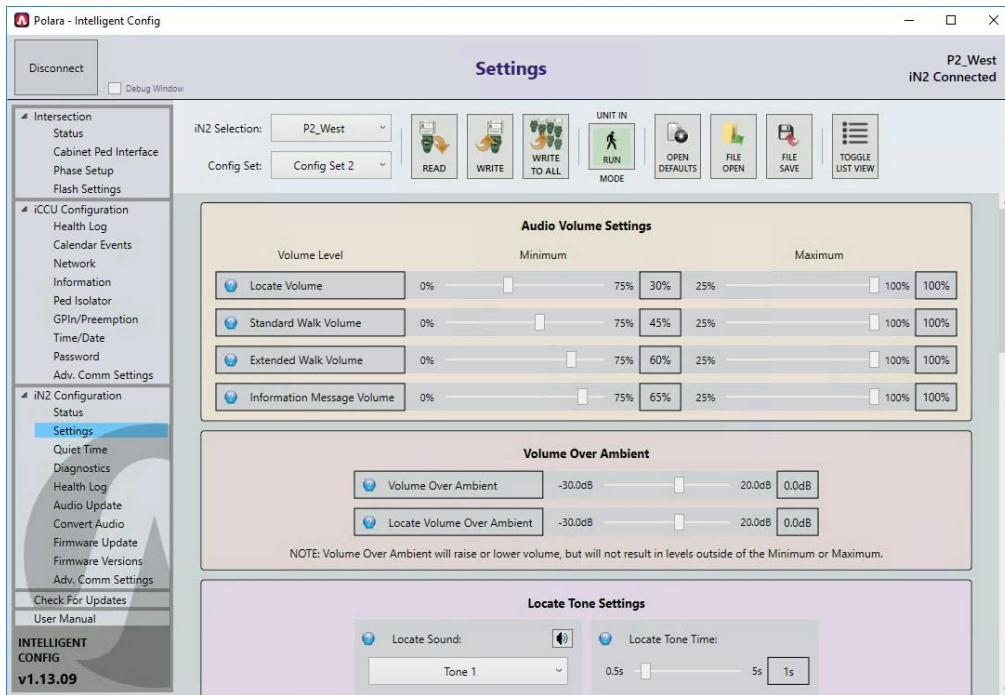
Step 1:

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:

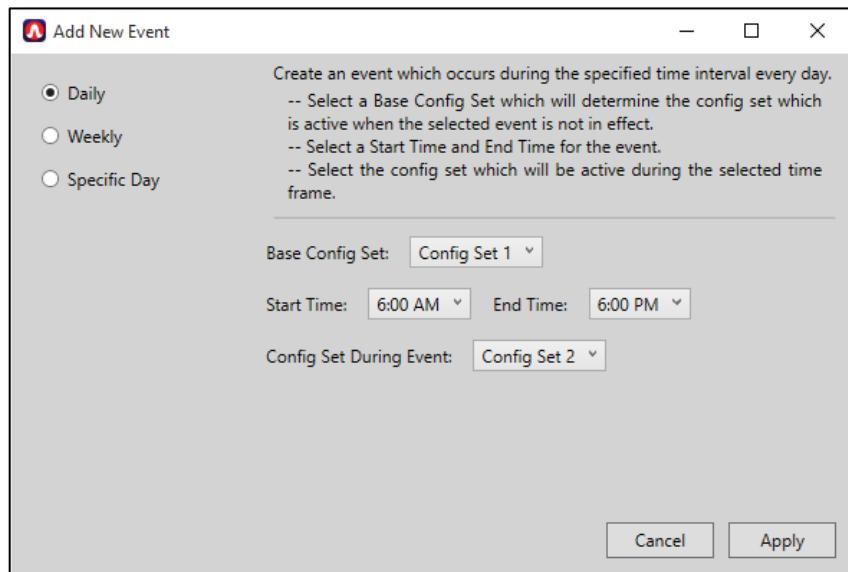
Write the higher volumes to Config Set 2.



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.

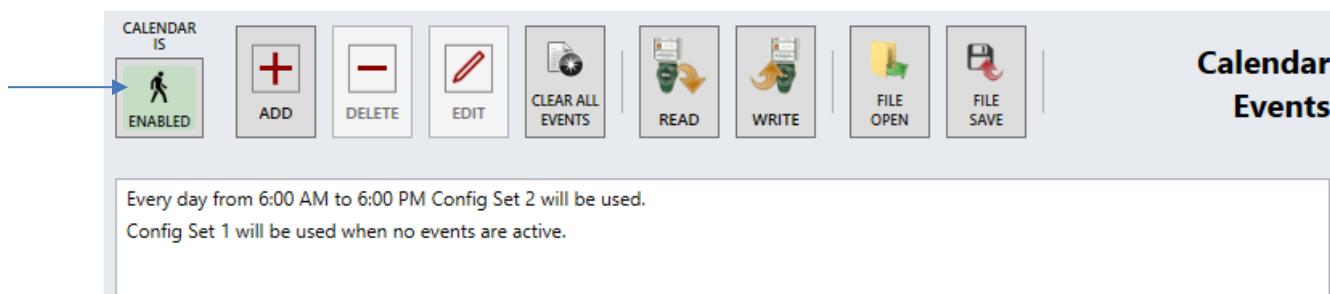


Then Click Apply.

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 Wireless Sync

Considering a scenario where a crossing on one side of the intersection does not have button wires, but does have a ped head, an iNS2 unit cannot be placed on that corner, so an iNS3 unit must be used. In this instance, there is no method of communicating a button press or ped call through a wired connection. The PBS has the capability to communicate via BLE from PBS to PBS to convey ped call information.

The wireless sync function provides a link between PBSs on the same PED phase such that a button press on one unit enables the Walk and Clearance sound on the other unit. Both standard and extended push status is transmitted.

Enable the wireless sync feature on the iNS3 unit as well as the iNS2 unit on the same phase on the opposite side of the intersection.

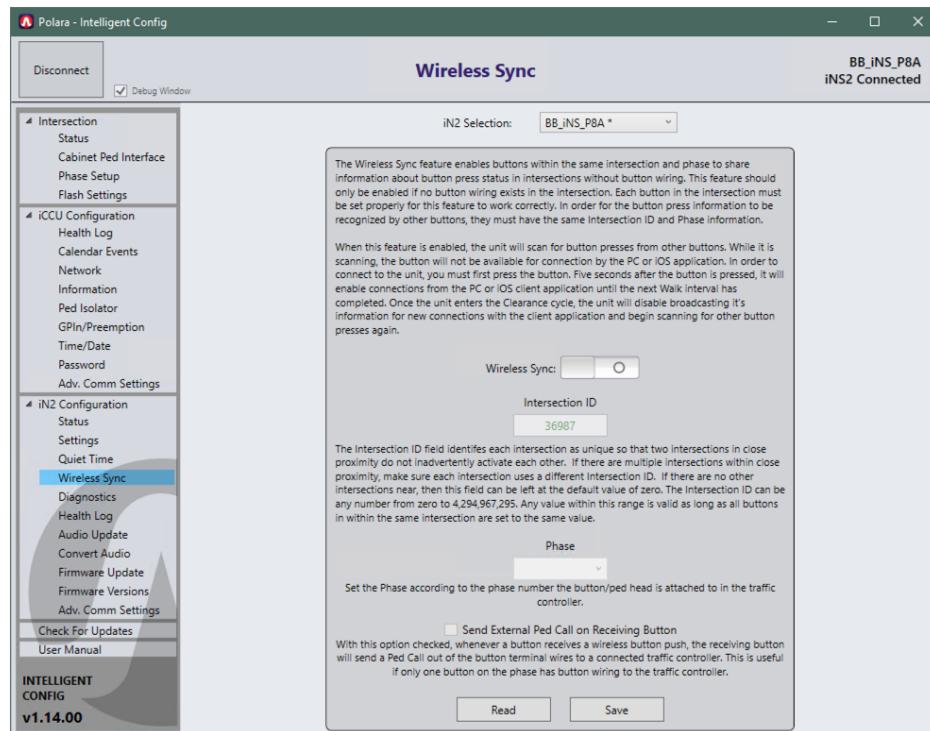
Enable this function by enabling the 'Wireless Sync' switch.

The Intersection ID is used to prevent any possible interference between nearby intersections which are also using this feature. Tap the 'Intersection ID' box and enter a number (up to 9 digits) and tap 'Save'. Any number is acceptable as long as it is different from that used on any nearby intersection. In the same manner, enter the PED phase number for this PBS. Note: The Intersection ID is shared between the Wireless Sync feature and the PedApp feature. The ID can be changed in both the Wireless Sync settings page and the PedApp Intersection Info screen, but they refer to the same ID.

When the Remote Ped Call option is enabled, if that unit receives a button push indication from a Wireless Sync transmission, then it will also cause a Ped Call indication to the traffic cabinet. Enable the Remote Ped Call feature on the iNS2 unit, but it does not need to be enabled on the iNS3 unit if there are no button wires connected to the large terminal block.

Note: In iNavigator units (iN2/iN3), when the Wireless Sync feature is active, the PBS will not accept Bluetooth connections via an iOS device or PC. However, 5 seconds after an Extended Push, the PBS will accept connections until the start of the next Clearance cycle. iNS units do not have this limitation.

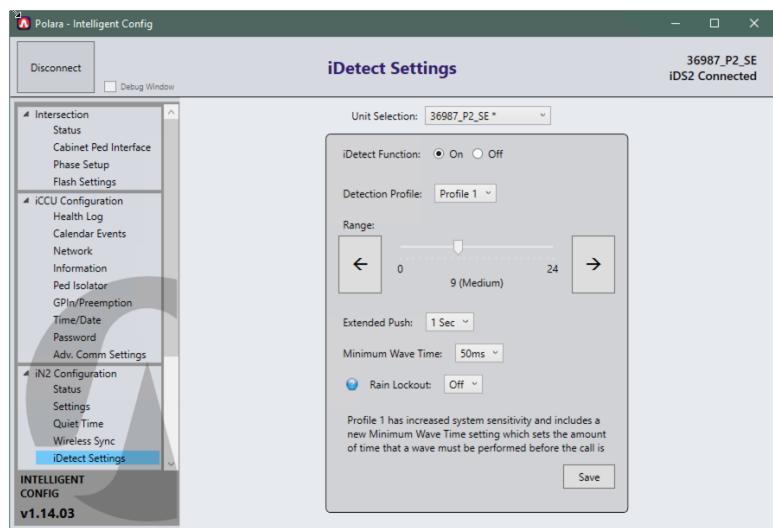
Wireless Sync is compatible between iNS and iN family products.



12.8 iDetect Settings

iDetect brings touchless actuation to APS and is an added feature in all iDS APS buttons. There are many technologies that can facilitate touchless actuation, but each has strengths and weaknesses. Polara has chosen to use radar technology because of its performance, reliability, and resistance to vandalism. The intent of iDetect is to provide touchless actuation within a sensing range of 2" to 6". A basic configuration of iDetect is necessary after installation is complete (e.g., the APS is mounted to the pole properly, the button cover is installed, and the sign is installed).

Settings for the performance of iDetect functionality can be modified in the iDetect Settings screen.



The iDetect function can be completely disabled by turning off the Enable iDetect switch. This switch must be enabled in order for iDetect to be operational.

Make the desired setting selections based on the information below. When the desired settings have been selected, click the Save button.

12.8.1 Detection Profile

The Detection Profile select sensitivity and detection Schemes.

- Profile 0 (zero) uses a basic wave detection scheme. It is not recommended for use in new installations and only remains for backward compatibility. It is recommended to update the iDS unit to the latest firmware and use Profile 1 for greater sensitivity.
- Profile 1 (one) has increased system sensitivity and includes a Minimum Wave Time setting.

12.8.2 Range

The Range setting adjusts how close or far away the iDetect feature will detect movement. This setting may need to be modified based on which size sign is installed in order to optimize the detection range. A lower setting will limit the user's hand to a very close proximity (~2") to the unit before detection occurs, whereas a higher number will open detection to a slightly further distance (~6") before detection occurs. The settable range goes from a setting of 0 to 24. The factory default value is 9.

12.8.3 Extended Push

The Extended Push setting will change how Extended Pushes are handled by iDetect. The settable options include disabling the detection of Extended Pushes (Off), Override Short Push, and detection times of 1 second to 3 seconds in ½ second increments. The factory default value is 1 second. When this option is set, the user must continuously move their hand near the unit for the set time. When the user's hand first approaches the unit, the "Wait" (or configured Button Push Confirmation sound) will play. Then as they continue to move their hand (e.g., in a circular pattern near the unit), after 1 second the configured Information Message sound will play. If Override Short Push is selected, then instead of the "Wait" sound, the Information Message will be heard and the Extended Push volumes will take effect for the following Walk and Clearance intervals.

12.8.4 Minimum Wave Time

Minimum Wave Time (Profile 1 only) sets the amount of time that a wave must be performed before the call is activated. The settings are in milliseconds and the available options are 0ms, 50ms, 250ms and 500ms. The factory default is 50ms. This setting can be adjusted if false activations are common. Note: The Minimum Wave Time does not increase the timing of the Extended Push, so if the Minimum Wave Time is set to 500ms (which is $\frac{1}{2}$ second), the user must wave for $\frac{1}{2}$ second to hear the "Wait" sound. Then, if the Extended Push setting is set to 1 sec, the user must continue waving for another $\frac{1}{2}$ second to hear the Extended Push sound. If the Extended push setting is set to 1.5 sec, then the user will wave for $\frac{1}{2}$ second to hear "Wait" and then continue waving for another full second to hear the Extended Push sound.

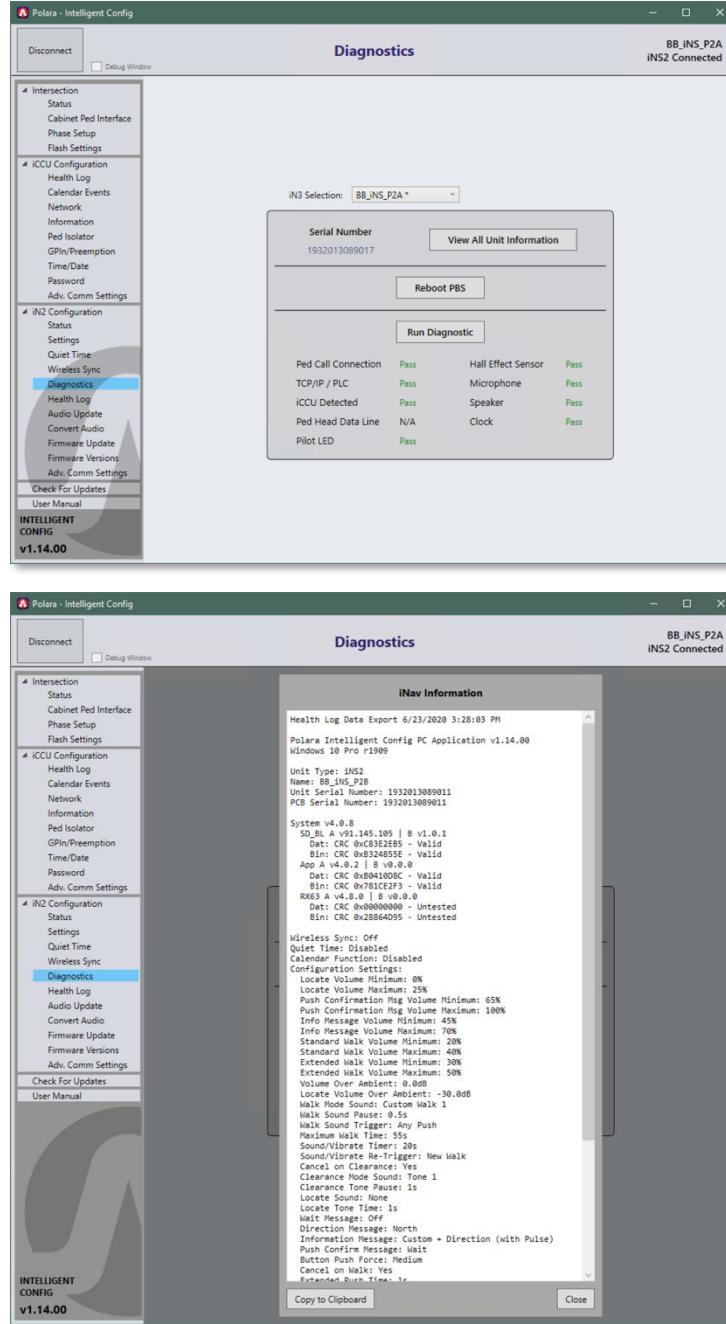
12.8.5 Rain Lockout

The Rain Lockout feature (Profile 1 only) temporarily disables iDetect for the selected duration of time if the iDetect sensor detects activations during an active walk cycle. The expectation is that pedestrians would not be attempting to activate the PBS while the walk message is playing and the button is vibrating. Therefore, if activations are detected during that time, then it is assumed that they are likely caused by rain so the Rain Lockout feature will disable additional ped calls for the set duration. The feature is disabled when the setting is set to Off. See the table below for the behavior for the remaining settings.

| Setting | If activations are detected during the walk cycle, iDetect will be disabled for the following duration: | Lockout automatically turns off if no additional activations occur during the following duration: |
|---------|---|---|
| Low | 15 minutes | 1 minute |
| Medium | 30 minutes | 2 minutes |
| High | 1 hour | 3 minutes |

12.9 Diagnostics

Helps to determine if there is a problem with the PBS hardware, and allows a reboot. If you click on the “View All Unit Information” button, you will be presented with a dialog which includes all factory and user-settable settings. This information is also prepended to the health log when exported to file.



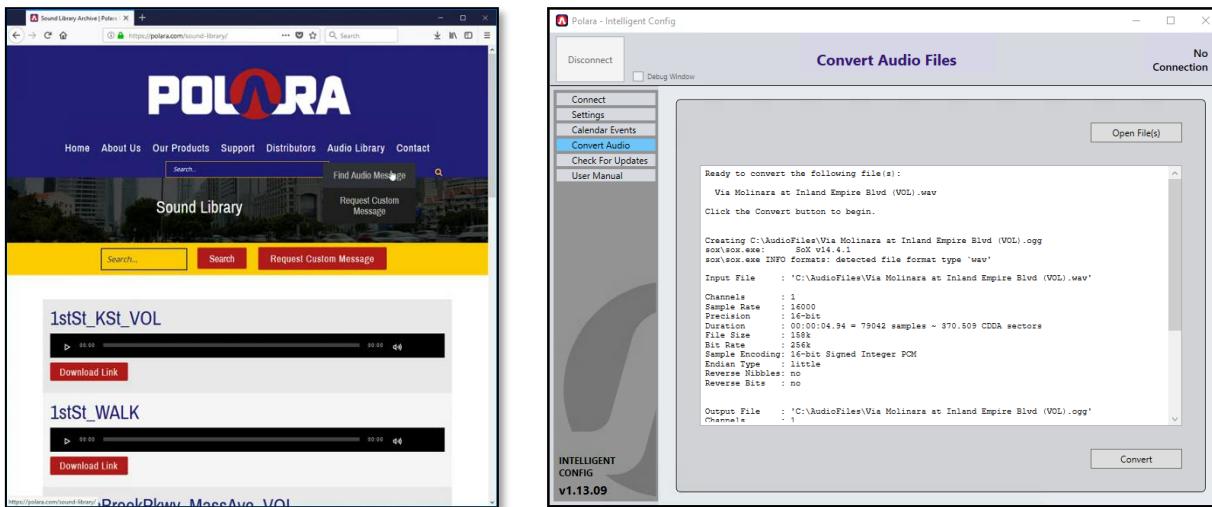
13. Using the Polara Field Service App for PC to Upload Audio Files

13.1 Preparing Audio Files

The audio files which are played in the iNav units are encoded using the open-source Ogg Vorbis codec. Polara provides professionally recorded custom audio files on the website. Go to Polara.com and click on the Audio Library option. You can search for audio files which have already been recorded if the streets on the desired intersection are common. However, you can also request to have messages recorded for you by clicking on the Request Custom Message option and filing out the form on the website.

If you wish to record your own messages or already have messages in another format (such as .wav or .mp3), these messages can be converted to the specific Ogg Vorbis format needed by the iNav devices using the Convert Audio option.

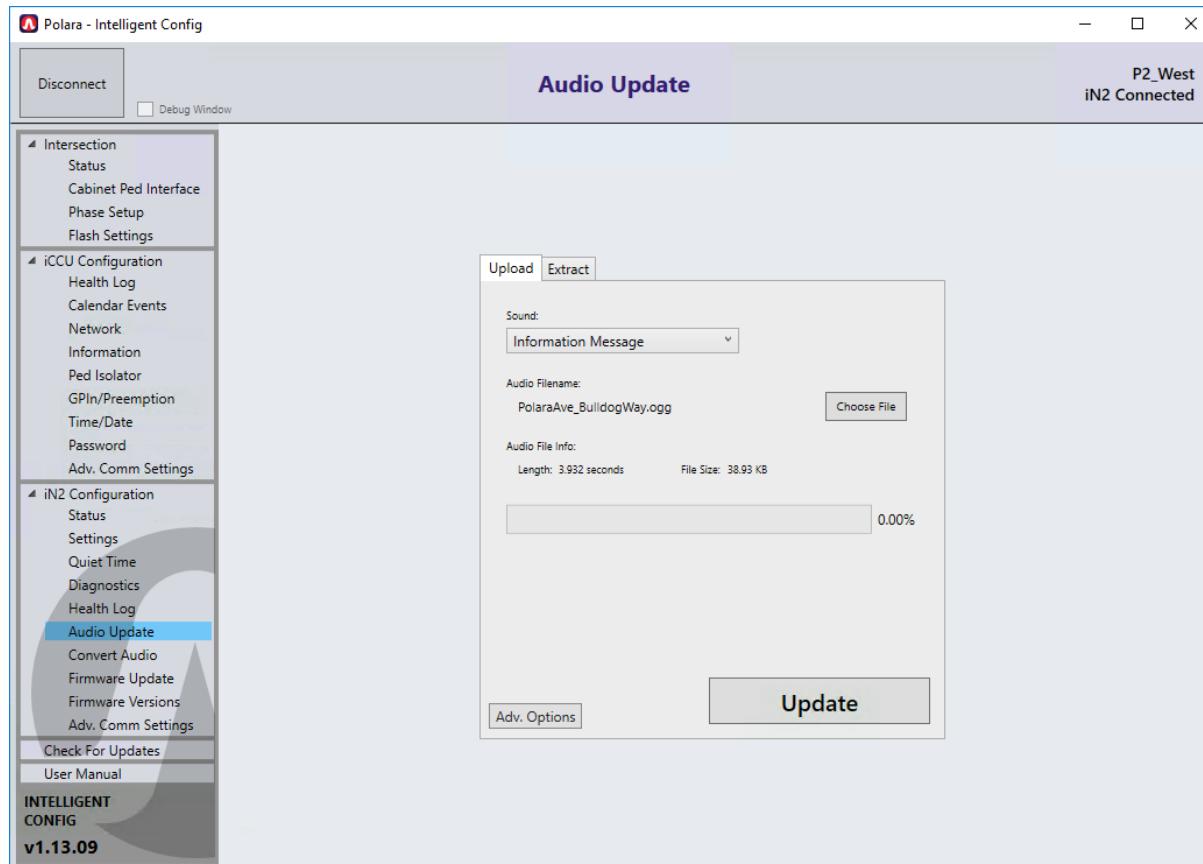
In the Convert Audio screen, click Open Files and select the files you wish to convert, or just drag and drop your audio files onto into the program. Then click Convert. The converted sound files will be saved to your PC in the same directory as the original files, ready to upload to the PBS



13.2 Uploading 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.

13.3 Extract Audio Files

The same messages that are available to be changed via Audio Update can be extracted from the PBS. This feature requires firmware version v3.199 or greater in the iNx unit.

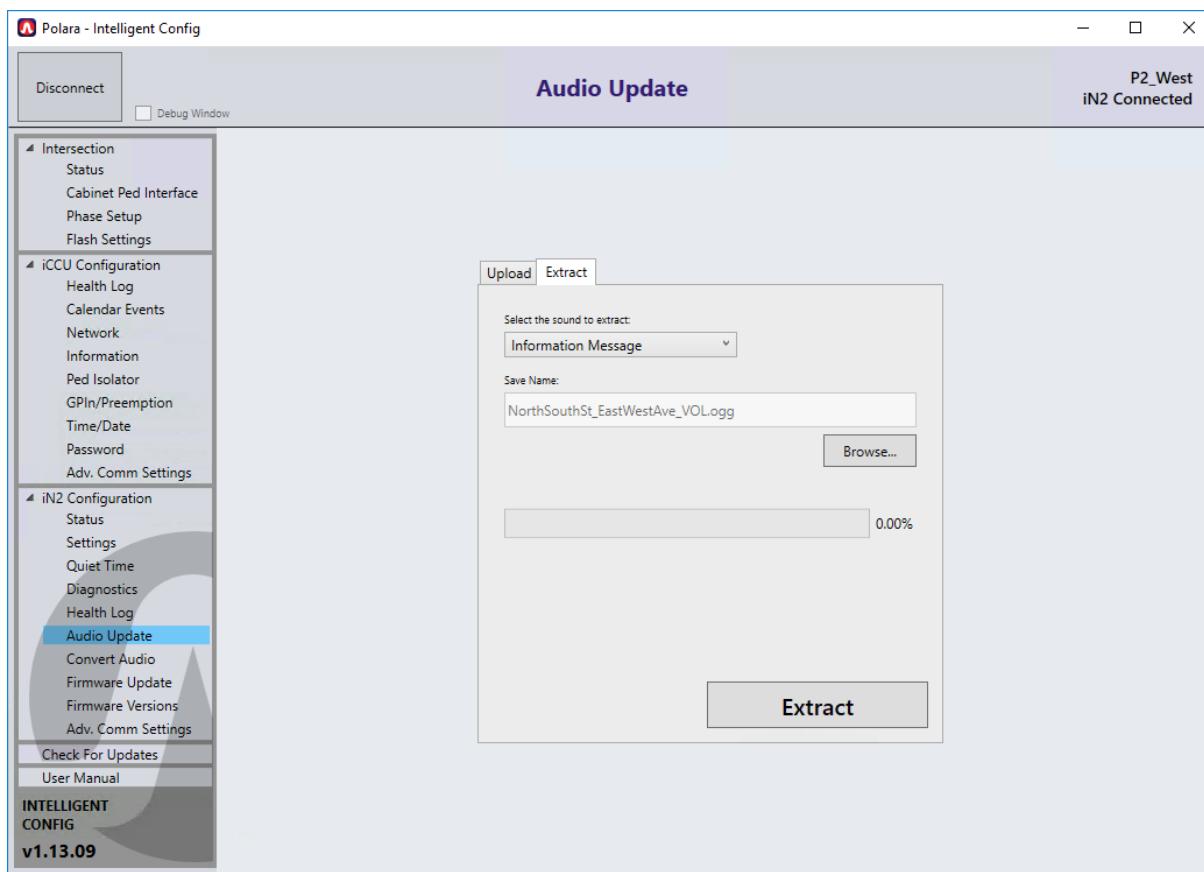
In the Audio Update screen, click the “Extract” tab in the upper portion of the window.

Select the message to extract in the dropdown menu.

It is recommended that you listen to the message prior to extracting it so you know how the message should be named. Perform an extended push on the unit to hear the Information Message and then wait to hear the Walk message, or use the sound play feature in the Settings screen.

Click the Browse... button to choose a location to save and then type a name for the file to be saved. Name the file appropriately for the intersection streets. For example, the intersection of Broadway and Main would have an information message named “Broadway_Main_VOL” and the corresponding walk message would be “Broadway_WALK”.

Click the Extract button to begin extraction.

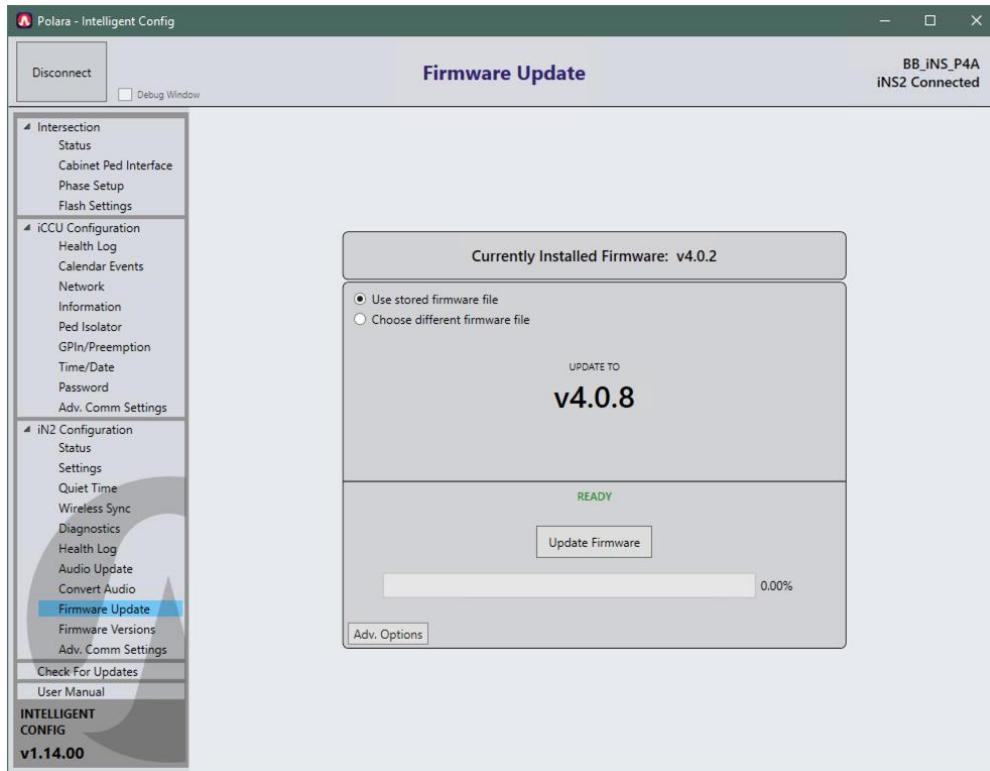


Once extraction is complete, you can extract additional messages from the unit or click the Upload tab to switch back to upload mode.

14. Firmware Update

From the left menu, click Firmware Update.

This page allows you to upload the latest firmware to the iNS2 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 iNS2 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.

iNS units have a 3-section version number [v1.2.3] whereas iN units have a 2-section version number [v1.02]. On iNS units, if a firmware update was unsuccessful or partially completed, there is a notice that there is an [Update Needed]. It is highly recommended to perform a firmware update on a unit in this condition as soon as possible.

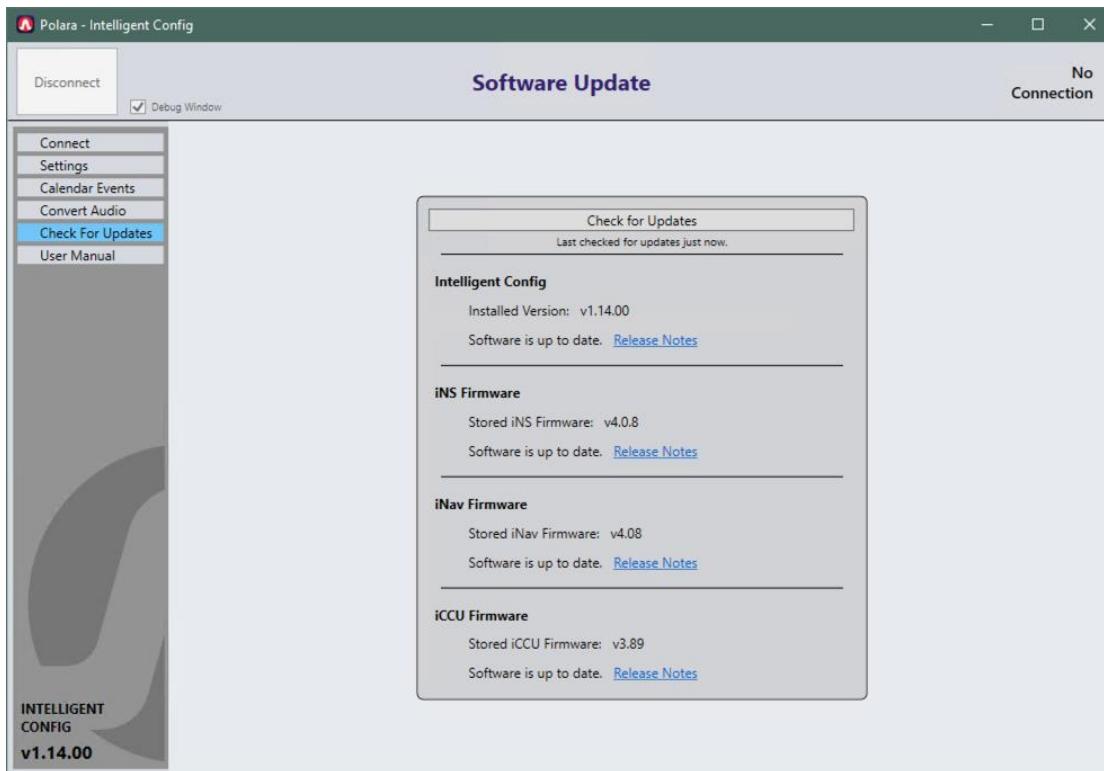
| PHASE 2 | |
|------------|-----------------|
| BB_INS_P2A | [Update Needed] |
| BB_INS_P2B | [v4.0.8] |
| BB_P2C | [v3.207] |
| PHASE 4 | |
| BB_INS_P4A | [v4.0.2] |
| BB_INS_P4B | [v4.0.8] |
| PHASE 6 | |
| BB_INS_P6B | [v4.0.8] |
| BB_P6A | [v4.02] |
| PHASE 8 | |
| BB_INS_P8A | [v4.0.8] |
| BB_P8B | [v4.08] |

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 iNS2 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. Descriptions of Pilot LED Operation

Note: You can view examples of each LED flash pattern in all of the Polara FS apps (iOS, Android & PC) by viewing the LED Flash Guide in the Help or User Manual section.

The iNx push button station (PBS) operates in two primary states, Traffic state or Offline state.

In the traffic state, the PBS allows pedestrians to place calls using the push button and notifies the pedestrian of pedestrian interval changes at the intersection.

In the offline state, all pedestrian traffic features are disabled and the Pilot LED is used to convey the offline sub-state to the traffic engineer who is maintaining the system.

16.1 Pilot LED in Traffic State

During traffic state the Pilot LED will be On, Off or dimmed. When the Pilot LED is off, no call is placed on the phase. When the Pilot LED is on, this represents a call has been placed. It could be placed from its own button press, a button press from another PBS on the same traffic phase or from the iCCU-X2 when operating in iNS2 mode. The iCCU-X2 will place calls at system startup, when it detects PBS errors or configuration issues, or when a maintenance personnel uses the iCCU-X2 to manually place calls. The Pilot LED will momentarily dim if the pedestrian pushes the button when the LED is already lit.

16.2 Pilot LED Offline Sub-States and Modes

16.2.1 Power-On-Self-Test / Maintenance Mode

Pilot LED will blink in a 3-flash pattern.

When a unit is powered on, it will perform an internal self-test to determine if all internal modules are operating as expected. If an internal module fails, the unit will switch to a 5-flash pattern. To determine the cause of the failure, connect to the unit via Bluetooth and read the unit's health log. If a unit completes the Power-On-Self-Test successfully, the flash pattern will switch to 2-flash.

The 3-flash pattern indicates that the unit is in "Maintenance Mode" which occurs during the Power-On-Self-Test, but also can occur under the following conditions:

- During a firmware update of the unit.
- When placed in maintenance mode by the user. This is usually done when testing the playing of sound files.
- When an iNS2 PBS is directed by the iCCU-X2 to go into Maintenance Mode by turning on iCCU Maintenance Mode in the iCCU Configuration / Setup screen of the Polara FS App.

16.2.2 Searching for iCCU-X2 Connection

Pilot LED will blink in a 2-flash pattern.

This state happens after the PBS determines that it is functioning correctly and is searching for the presence of an iCCU-X2.

If the unit is connected to an iCCU-X2, the iNS2 will perform the 2-flash pattern while the unit searches for a connection to the iCCU-X2 via PLC. It will begin the 2-flash pattern as it searches for an iCCU-X2 using the PLC interface. If the iCCU-X2 is not detected for an extended length of time, the PBS will switch to the other PLC frequency band(s) and restart itself. Once the iCCU-X2 is detected and the PBS makes a logical connection over PLC, it will exit this sub-state. View the Advanced Communications Settings section for additional help in diagnosing PLC connection issues.

16.2.3 No Pedestrian Interval Detected

Pilot LED will blink in a 4-flash pattern.

This indicates that the PBS is not receiving a valid Ped Interval even though it has PLC communication with the iCCU-X2. This will happen when the iNS2 is not assigned to a phase or if it is assigned to a phase and it is receiving an Off Interval from the iCCU-X2.

16.2.4 Power-On-Self-Test Failed

Pilot LED will blink in a 5-flash pattern.

This indicates the unit has failed the startup self-test routine. This will happen right after startup and the unit will stay in this state indefinitely. Only a power cycle will recover the unit. Usually this is caused by a faulty unit and it will return to this state after a power cycle. The health log should indicate what peripheral failed at startup.

16.2.5 Loss of iCCU-X2 Connection

Pilot LED will blink in a rapid flash pattern.

If the unit is fully operational and in the Traffic state or has an iCCU-X2 connection and is waiting for interval information or phase setup (4-flash mode) and the PLC connection is lost, then the unit will start flashing the Pilot LED rapidly.

During normal operations the iNS2 will receive PLC data from the iCCU-X2. When the iNS2 stops detecting PLC data from the iCCU-X2 for 4 seconds it will enter this condition. Once PLC connection is reestablished with the iCCU-X2, then the unit will return to the state it previously was in before the connection loss occurred.

16.3 Pilot LED Double-Flash

Pilot LED will perform 2 quick blinks, 3 times in row.

The Pilot LED will perform the double-flash as an informational indication of which unit is being operated. When a BLE connection is established with a unit, this double-flash will occur. Also, the user can cause the LED to double-flash by pressing the Flash LED button in the Polara FS App in the PBS Status screen or in the Phase Setup screen.

17. 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.

17.1 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.

17.1.1 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%

17.1.2 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%

17.1.3 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%

17.1.4 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%

17.1.5 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

17.1.6 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%

17.2 Walk Interval Settings

17.2.1 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

17.2.2 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

17.2.3 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

17.2.4 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

17.2.5 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

17.2.6 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

17.3 Clearance Interval Settings

17.3.1 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

17.3.2 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, Cuckoo

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

17.3.3 Clearance Tone Pause

This function selects the length of silence between clearance sounds.

The available options are selected in seconds: $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5

Factory Default: 1 second

17.4 Don't Walk Interval Settings

17.4.1 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

17.4.2 Locate Tone Time

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

The available options are selected in seconds: $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5

Factory Default: 1 second

17.4.3 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-X2 updates the date/time on the iNS2 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

17.4.4 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

17.4.5 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)

17.4.6 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

17.5 Other Settings

17.5.1 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

17.5.2 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

17.5.3 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

17.5.4 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

17.5.5 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.

17.5.6 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) then 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

17.5.7 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

17.5.8 External Button

This setting enables using the GND and PWR connections on the rightmost terminal block as an external button input.

The available options are: No, Yes

Factory Default: No

17.5.9 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

17.5.10 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

18. Fail Safety

The iNS2 and iCCU include fail safety operation that will automatically lock in a call when the following conditions arise:

1. If an iNS2 has been connected to an iCCU and assigned a phase, but the iCCU can no longer see it (e.g. knockdown or communication problem), the iCCU will place calls for the associated phase.
2. If an iNS2 is connected to the iCCU but not yet assigned to a phase, the iCCU will place calls on all phases.
3. If an iNS2 is in maintenance mode, a call will be placed on the associated phase. This can be achieved by explicitly placing the button into maintenance mode, enabling audio playback from within the Apps, or performing a firmware update.
4. If an iCCU is in maintenance mode, a call will be placed on all phases.
5. The iCCU-S2 will place calls over the hard-wired connection when they are not powered.
6. The iCCU-S2 will place calls over the hard-wired connection if operating in hybrid mode (obtaining ped intervals over SDLC), if the SDLC cable becomes disconnected.

19. 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.