

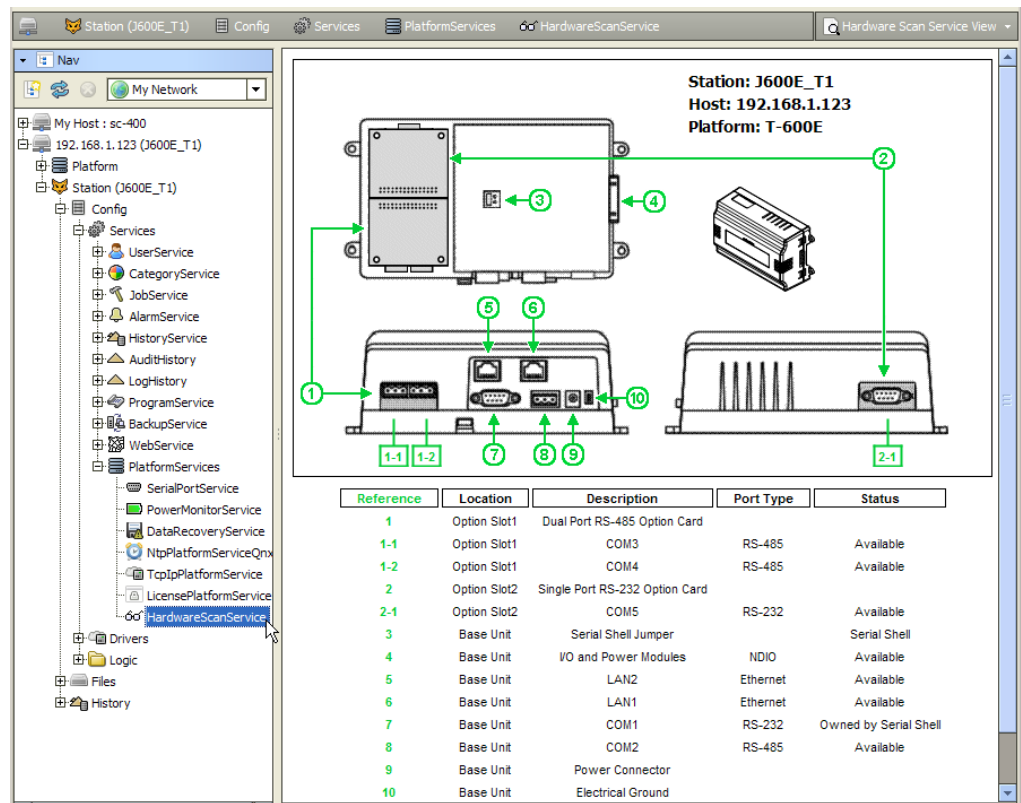
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JACE Hardware Scan Service

Starting in AX-3.7, NiagaraAX support was added for a “Hardware Scan Service” to be added under a JACE station’s PlatformServices. This *optional* service has a default view that shows a *diagram* of the hosting JACE controller, identifying the location of communication ports and other features (Figure 1).

Figure 1 Example Hardware Scan Service View for a JACE-6E



Included are callouts to a table that explain the description (such as COM2), port type, and status.

Also included are what types of JACE option cards are installed in option card slots (if applicable), plus other information on various controller features, such as the current “Serial Shell” jumper position.

The following sections provide more details:

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Hardware scan benefits

Note: The HardwareScanService is unlicensed, requiring only a JACE controller running AX-3.7 or later.

Prior to this service, the hardware configuration of a JACE host was often known to its station (and Workbench) in a *generic* way, for example by its “Host Model” value of “NPM2” or “NPM6”. Such values refer to a “Niagara Processor Module” board that fits on *different types* of controller base boards. Thus, an “NPM2” host could be either a JACE-2, JACE-202 Express (M2M JACE), or a Security JACE.

Although a station’s platform SerialPortService lists each serial port on a JACE host, including its assigned COM address, there was no indication as to which ports were on *option cards*. Other details on option cards (and slots) were also unknown—for example, if an option slot was available (open) or not.

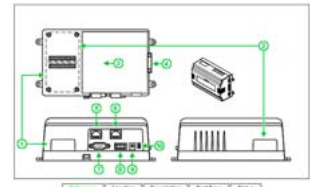
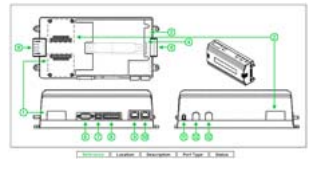
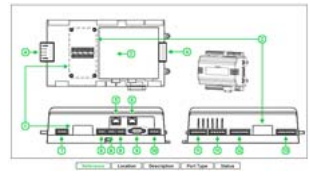
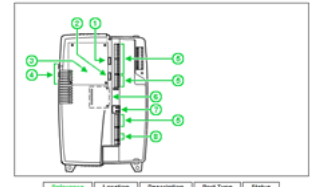
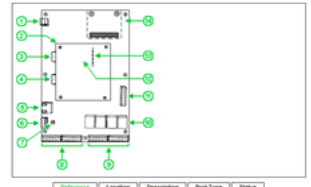
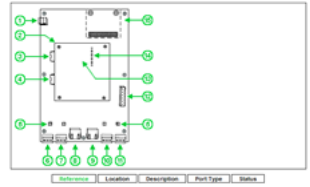
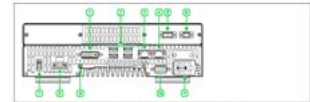
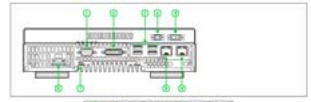
The Hardware Scan Service clarifies all of this by providing a complete hardware profile of the hosting JACE controller to its station and Workbench. Included is the controller’s “Product Model” type (combination of its base board and NPM module, if applicable) with a representative image, along with details about any installed JACE option cards. This information can be useful when troubleshooting remotely, or even after adding an option card to confirm a COM address for a specific port.

Additionally, this information could be useful to a developer of an “appliance” that runs on the controller, such that appliance (station) configuration could logically adapt to different hardware profiles.

Note: Currently, the service is unaware of any attached I/O modules, including NDIO, NRIO, or Security types.

Currently supported platforms

Currently supported platforms (at the time of this document) are listed below, showing a *thumbnail* of the “controller image” portion of the service’s default **Hardware Scan Service View**.

<p>JACE-2, JACE-3E, JACE-6, JACE-6E</p> 	<p>JACE-7 (JACE-700)</p> 	<p>Security JACE (201 and 601)</p> 
<p>JACE-x02 Express (M2M JACE)</p> 	<p>JACE-603</p> 	<p>JACE-645</p> 
<p>JACE-NXT</p> 	<p>JACE-NXS</p> 	

Below any image in the Hardware Scan Service View is a hardware reference table with details corresponding to items with callouts. For more details, see “Hardware Scan Service View notes” on page 3.

Adding the HardwareScanService

You can add the Hardware Scan Service in any JACE controller running AX-3.7 or later. To add the service, simply install two software modules, using the **Software Manager** in a platform connection:

- **platHwScan** (always necessary), plus:
- **platHwScanType**

where Type varies by the specific JACE model series (see below). If you select only the platHwScanType module, the required platHwScan module becomes automatically selected.

Note: *Installing these modules results in a reboot of the JACE controller.*

Figure 2 Choosing the two platHwScan modules needed for a JACE-2/6, JACE-3E, or JACE-6E series

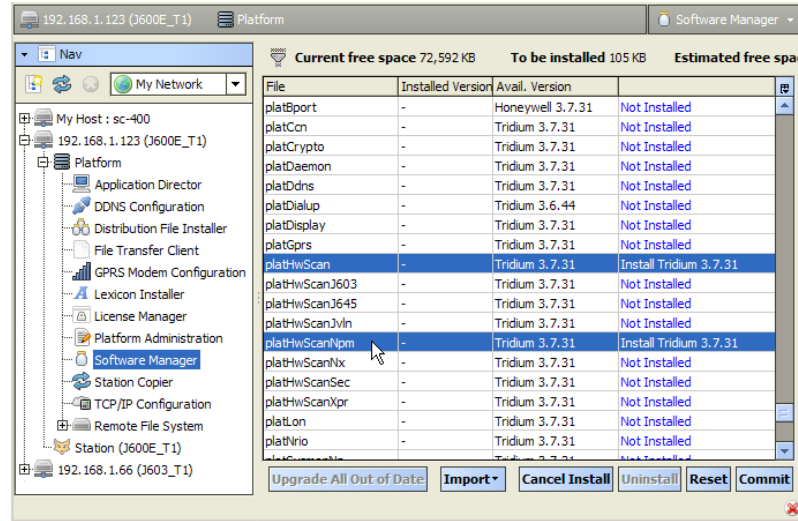


Figure 2 shows the two modules selected that are necessary for a JACE-2, JACE-3E, JACE-6, or JACE-6E series controller. By controller series, platHwScanType is as follows:

Table 1 platHwScanType module needed, by controller model series

Controller Series	platHwScanType module
JACE-2/6 (200/600), JACE-3E, JACE-6E	platHwScanNpm
JACE-7 (700)	platHwScanJvln
JACE-603 (JACE-403 with retrofit board)	platHwScanJ603
JACE-645 (JACE-545 with retrofit board)	platHwScanJ645
JACE-x02 Express (202/602-XPR or M2M)	platHwScanXpr
JACE-NXS/NXT	platHwScanNx
Security JACE (201/601)	platHwScanSec

Note: *If you install the incorrect platHwScanType module, or install only platHwScan module, the default view on the station's Hardware Scan Service will simply display:*

Jar file platHwScanType is required to support this platform
 In this case, simply install the correct type using the table above.

Hardware Scan Service View notes

The main usage of the service is expected from its default view, the **Hardware Scan Service View**. Regardless of the JACE controller type, this view consistently appears with one or more image views of the physical controller, with callouts to a table below with item details.

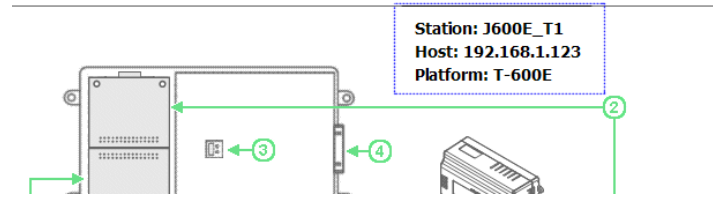
The following sections describe features of this view:

- [Text in image notes](#)
- [Option card notes](#)
- [Callout to table notes](#)
- [Px usage of Hardware Scan Service View](#)

Text in image notes

Three lines of text appear near the top of the controller image in a Hardware Scan Service View (Figure 3).

Figure 3 Text on three lines near top of image portion in Hardware Scan Service View

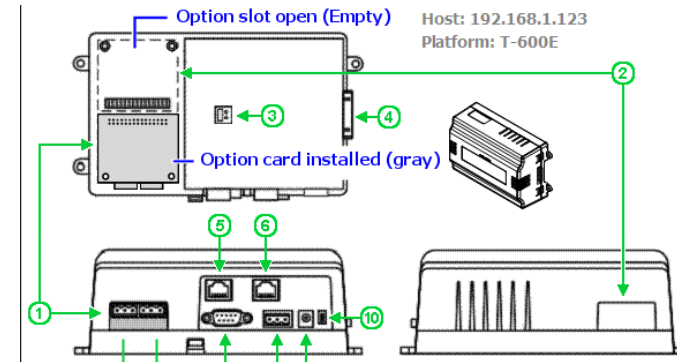


- **Station: *Station_Name***
The Niagara station name of the station running on the JACE.
- **Host: *IP_Address***
The IP address of the JACE used in this Fox (station) connection from Workbench.
- **Platform: *Product_Model***
“Product Model” descriptor, which may vary according to the vendor of the JACE controller.

Option card notes

Most JACEs support one or two JACE-2/6-type *option cards*, which install in option *slots* on the controller’s base board. An installed option card is “shaded gray” on the controller’s image (Figure 4).

Figure 4 Installed option cards are shaded gray

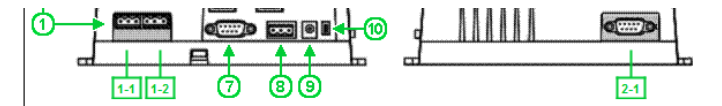


A numerical callout to the table below describes any installed option card. In the case of a JACE-700, which has a MiniPCI slot in addition to two option card slots, any installed WiFi (MiniPCI) option is also indicated by gray shading.

Callout to table notes

Callouts in the controller image are keyed to reference row entries in the table below it (Figure 5).

Figure 5 Referenced items in table have defined data columns



Reference	Location	Description	Port Type	Status
1	Option Slot1	Dual Port RS-485 Option Card		
1-1	Option Slot1	COM3	RS-485	Owned by ModbusAsyncNetwork
1-2	Option Slot1	COM4	RS-485	Owned by mstp2
2	Option Slot2	Single Port RS-232 Option Card		
2-1	Option Slot2	COM5	RS-232	Available
3	Base Unit	Serial Shell Jumper		Serial Shell
4	Base Unit	I/O and Power Modules	NDIO	Available

By default, columns in this table are labeled as below, and are explained as follows:

- **Reference**
The callout number for the item in the controller image. If an option card port, it may use a “1-*n*” or “2-*n*” number that relates to option slot 1 or 2 (for those platforms with two option card slots).
- **Location**
Usually either “Base Unit”, “Option Slot1”, or “Option Slot2” (the callout line in the image clarifies).

- **Description**
 Text description of the item, whether option card, COM port, or other physical feature.
Note: Any “vendor-unique” option card may incorrectly list, e.g. “Single Port RS-232 Option Card”. We recommend that you verify with the option card’s vendor as to how it lists/appears in this service.
- **Port Type**
 If applicable, the type of controller port, e.g. RS-485, RS-232, Ethernet, NDIO (Niagara Direct Input Output), and so on. If not applicable to the referenced item, this field is blank.
- **Status**
 If applicable, the disposition of the referenced item. If not applicable, this field is blank.
 - If a serial port currently in use in the station, status reads “Owned by *entity*”, where the *entity* could be a driver network (say `ModbusAsyncNetwork`), or low-level driver (say `mstp1`, for an `MstpPort` in a `BacnetNetwork`), or even `Serial Shell` for a COM1 port—if the serial shell jumper is installed. If a serial port not currently used in the station, status is `Available`.
 - If an Ethernet LAN port, status is either `Available` (port enabled in controller’s TCP/IP configuration) or `Disabled` (port not enabled in controller’s TCP/IP configuration).
 - Platforms with a “serial shell jumper” have status either `Normal Operation` or `Serial Shell`.

Px usage of Hardware Scan Service View

The view is based on a Px file and graphic images inside `platHwScan` modules. If desired, you can make this view available on a Px view, by dragging the Hardware Scan Service onto a canvas pane (Figure 6).

Figure 6 Dragging the HardwareScanService onto a Px view

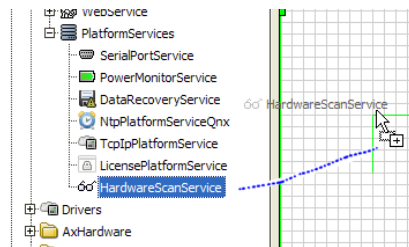
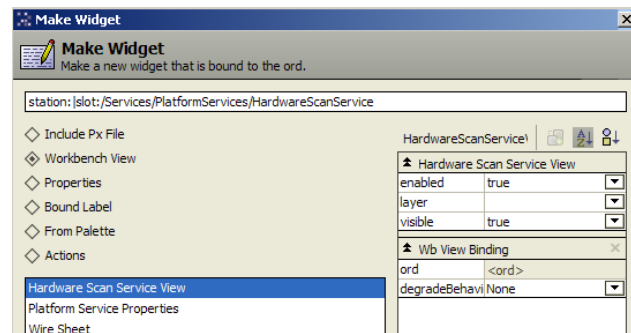


Figure 7 Make Widget selection for Hardware Scan Service View



If doing this, in the resulting “Make Widget” popup dialog select the **Workbench View** and **Hardware Scan Service View**, as shown in Figure 6.

You must resize the copied widget to see all of the view. Depending on the controller series, the overall “footprint” (pixel dimensions) varies. The approximate width and height dimensions for each view, including the lower “hardware reference table” area plus side scroll bar, are provided in Table 2.

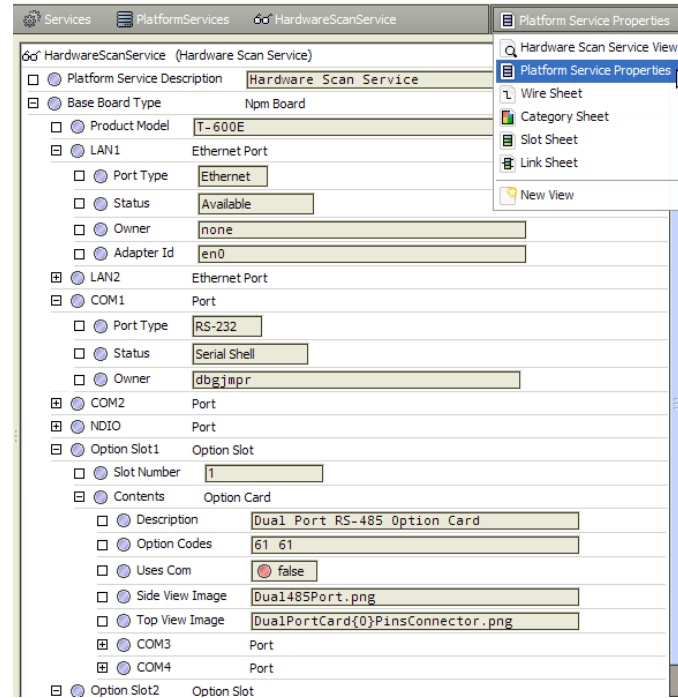
Table 2 Pixel dimensions of different Hardware Scan Service Views, by controller series

Controller Series	Width x Height (pixels)
JACE-2/6 (200/600), JACE-3E, or JACE-6E	660 x 720
JACE-7 (700)	820 x 700
JACE-603 or JACE-645 (403/545 with retrofit board)	660 x 740
JACE-x02 Express (202/602-XPR or M2M)	660 x 640
JACE-NXT	830 x 600
JACE-NXS	800 x 600
Security JACE (201/601)	790 x 800

HardwareScanService properties

The HardwareScanService has a number of properties, available by selecting its property sheet from the view selector (Figure 8). Values from many of these properties are reflected in the graphical default view.

Figure 8 Property sheet for example HardwareScanService



All properties but one are children of the “Base Board Type” container, which varies by controller type. The immediate child property is “Product Model”, a string property that describes the controller model. Other children are containers that contain a mixture of other string properties and enumerated values, such as for “Status” or “Port Type”. If needed, you can link any of these properties into other station logic.

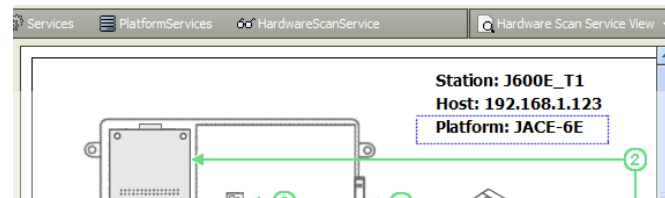
As with most other station platform services, there is an available “Poll” action on the HardwareScanService. However, usage should rarely be needed, due to the static nature of hardware configuration.

Lexicon customizing of HardwareScanService

Customizing text descriptors and values that appear in the service’s Hardware Scan Service View is possible by editing the *lexicon* for the `platHwScan` module and various `platHwScanType` modules. For example, if you edit the following lexicon key for the `platHwScanNpm` module:

```
NPM6E=JACE-6E
```

The “Platform=” value near the top of the controller image will be “JACE-6E” (instead of “T-600E”) when viewing the service in a JACE-6E, as shown below.

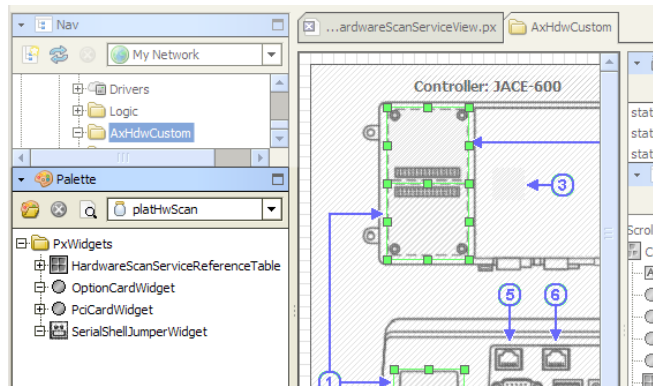


Note: Before such changes can become effective, you need to save and install the lexicon changes in the target JACE, and also reboot that controller.

Px customization

You can make a Px view in a station that provides a customized *alternative* to the default **Hardware Scan Service View**, by using Px widgets available in the palette of the `platHwScan` module, as well as any custom edited image (.png) file or files (for the controller “layout” diagrams).

Figure 9 Palette of `platHwScan` module has four Px widgets



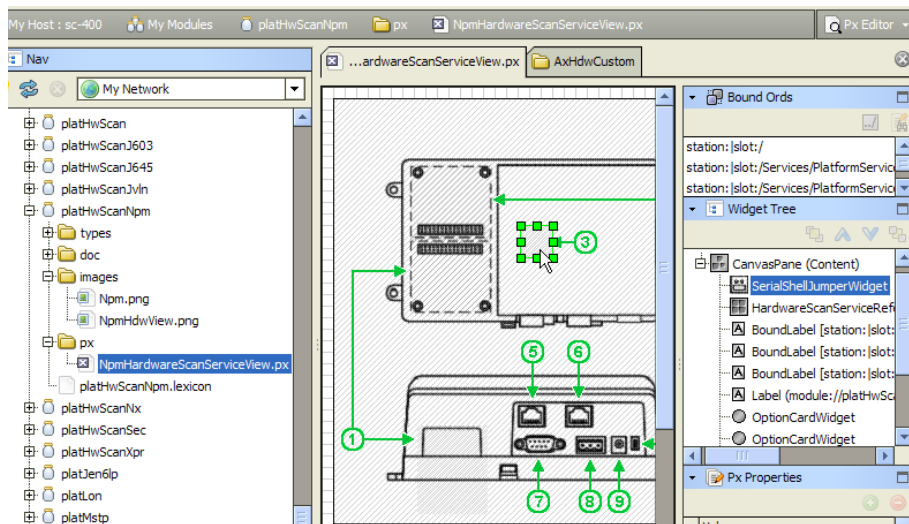
As shown in [Figure 9](#), there are four types of Px widgets in the `platHwScan` palette:

- **HardwareScanServiceReferenceTable**
This widget automatically receives values from the station’s platform `HardwareScanService`, presenting it in a table with five columns. It applies to any supported controller type.
- **OptionCardWidget**
This widget represents either a top view or side (port) view of any installed option card, and is designed to overlay an image file that represents a top and/or side layout view of a controller type. It applies to all supported controller types *except* the Windows-based ones (JACE-NXT, JACE-NXS).
- **PciCardWidget**
This widget represents an installed MiniPCI card, and also overlays a controller layout image file. It applies only to a WiFi option for a JACE-7 (700) series controller (using `platHwScanJv1n` module).
- **SerialShellJumperWidget**
This widget represents the current “serial shell jumper” position of a controller, and also overlays a controller layout image file. It applies to the same controller types as the `OptionCardWidget`.

Px widget usage in `platHwScan` module

Px widgets are used in the default **Hardware Scan Service View**. A good way to see *how* is to examine the local modules on your Workbench PC. Do this by expanding a `platHwScanType` module to look at the contents of its `px` folder in the PxEditor (edit mode). See [Figure 10](#).

Figure 10 Looking at the Px view in the `platHwScanNpm` module

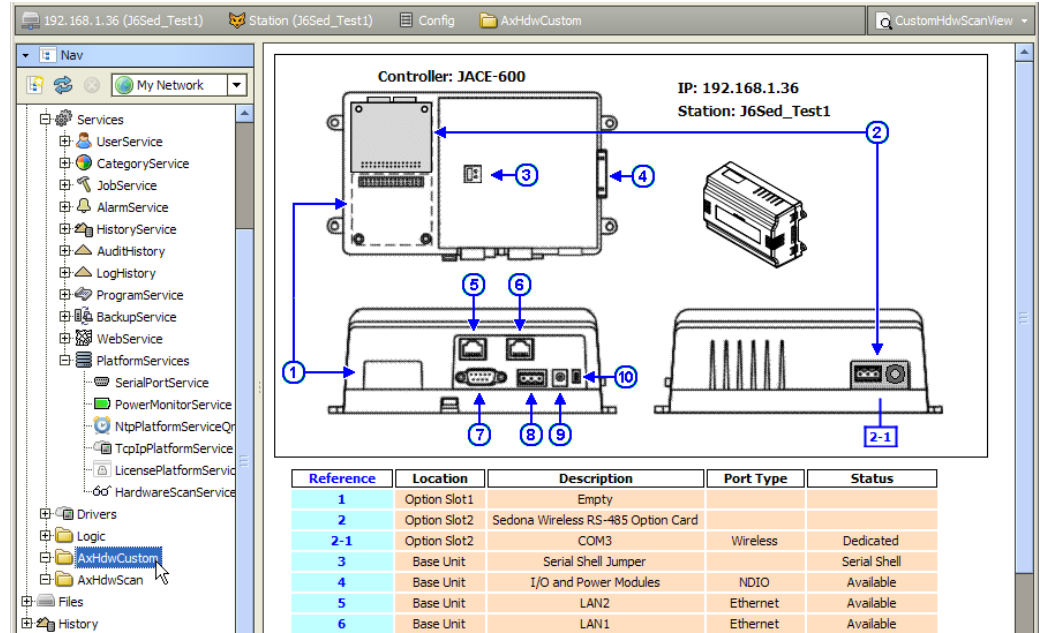


Look at widget properties to see how layout parameters and other items are set.

Example customized Px view for Hardware Scan Service

An example customized Px view for a JACE-2/6, JACE-3E, or JACE-6E series is shown in Figure 11.

Figure 11 Example customized Px view for Hardware Scan Service



In this example, the controller image (NpmHdwView.png) was copied from the platHwScanNpm module and then edited in a graphics program to “color replace” the callout arrows and numbers from the default green to blue. The edited png file was then copied to the JACE’s station folder (using the platform File Transfer Client view), and then referenced in the BoundLabel widget for it in the Px view.

The OptionCardWidgets used in the “side view” positions (topView=false) had “formatPalette” child properties for borderColor and referenceColor changed from (the default) green to blue, to match the edited image callout lines. (The color of these “arrowless” callout lines and border is set in the widgets).

Note: An OptionCardWidget must have its “slot” property value set to either 1 or 2, depending on location. If copied from the palette, the slot property value defaults to 0.

In the same way, properties were edited for the HardwareScanServiceReferenceTable widget, including reducing columnGap and rowGap from 3.0 to 2.0. Also this widget’s “formatPalette” had its child property for referenceColor set from (the default) green to blue, and properties referenceBackgroundColor and dataBackgroundColor were set from (default) white to colors cyan and peach, respectively.

Finally in this example, the BoundLabel widgets for “Platform:” and “Host:” near the top of the view had text property edits, to read (instead) “Controller:” and “IP:”, and all three BoundLabel widgets were repositioned and reduced in font size from 14pt to 12pt.

Note: You can save time by copying the contents of a Px file from one of your local platHwScanType modules (for the appropriate controller type), then pasting that in as the source XML for your new Px view. Using this as a starting point, you can then use the Px Editor to make tweaks in widget properties, and/or reference images outside of the platHwScanType modules. Combined with changes in lexicons for the platHwScan modules, this can provide a more tailored view of the Hardware Scan Service information.

Document change log

Changes/additions to this JACE Hardware Scan Service Engineering Notes document are listed below.

- Updated: March 7, 2013
 Minor edits to mention the newest JACE platform, the JACE-3E series, which uses an “NPM3” processor and requires AX-3.7 “Update 1” release (AX-3.7u1, or build 3.7.104) or later. In the “Callout to table notes” on page 4, in the “Description” property a Note: was added saying that any non-standard “vendor-specific” option card may incorrectly list, say as a “Single Port RS-232 Option Card”. Verify with the option card’s vendor as to how it appears in a station’s HardwareScanService.
- Publication: March 27, 2012
 Initial document.