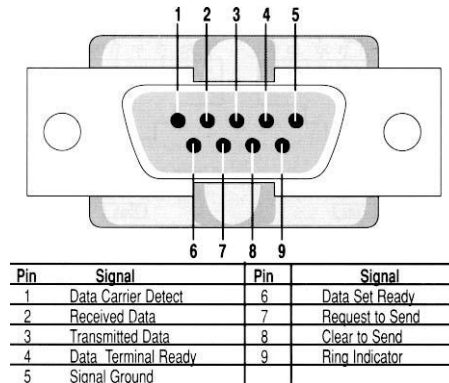


PBus On XPression

Overview

PBus (Peripheral Bus) is an industry standard protocol designed to allow production switchers to communicate with external devices. Most large production switchers have some capability of sending PBus commands to a device.

XPression supports PBus over standard RS232 or TCP/UDP sockets.



The chassis of some turnkey XPression systems might not include a standard RS232 port. However, it is possible to use an RS232-USB adaptor.

If the production switcher has an RS422 serial port, then you will require an RS232-RS422 adaptor. This adaptor will require its own power supply. Generally, the adaptors that are port-powered will not function for these purposes.

★ On an XPression Bluebox system, a limited subset of PBus functionality is available. PBus commands can be used to trigger take items that have been pre-built in an XPression sequence using either XPression Designer or Studio. It is not possible to customize the PBus registers actions using Bluebox. Each register number corresponds to a specific take item number and can not be changed. It is not possible to load the PBM or PBMS PBus mapping files on Bluebox.

The following topics are covered in this document:

- Configuring PBus and PBus Recalls
- PBus Triggers
- PBus Store Commands
- PBus Mapping
- Using PBus from a Switcher to Recall Items

Configuring PBus and PBus Recalls

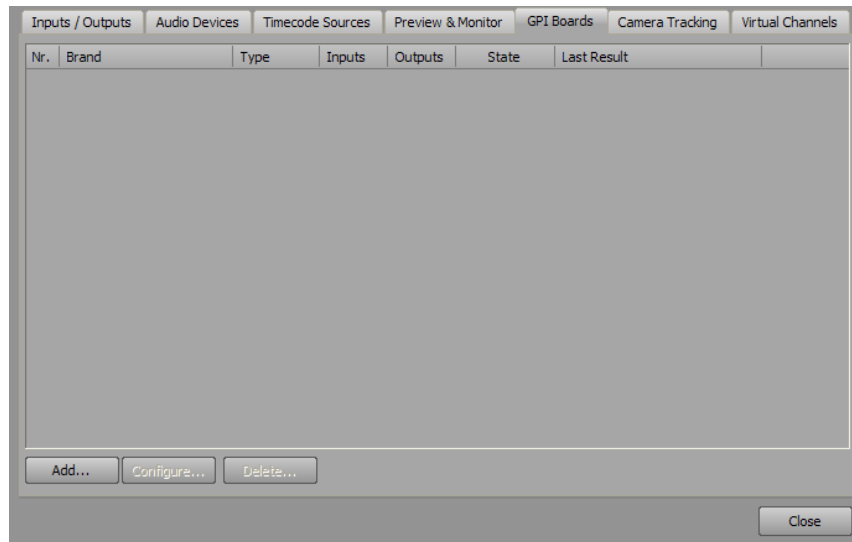
Use the Hardware Setup to configure XPression to accept PBus commands.

To enable XPression to accept PBus commands:

1. In XPression, click **Edit > Hardware Setup**.

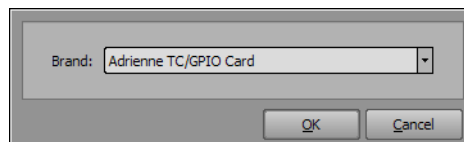
The **Hardware Setup** dialog box opens.

2. Click the **GPI Boards** tab.



3. Click **Add**.

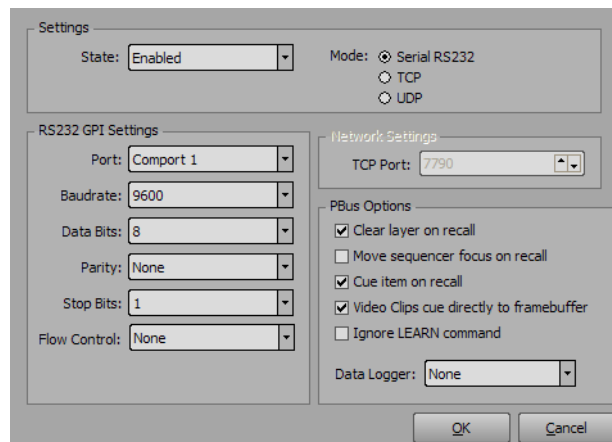
The **Add New GPI Board** dialog box opens.



4. Use the **Brand** list to select **PBus**.

5. Click **OK**.

The **PBus Setup** dialog box opens.



6. In the **Settings** section, select **Enabled** from the **State** list. Select **Disabled** to turn off PBus.

7. Select a **Mode** for PBus:

- **Serial RS232** — select to use RS232 to send PBus signals to XPression.
- **TCP** — select to use TCP/IP to send PBus signals to XPression.
- **UDP** — select to use UDP sockets to send PBus signals to XPression.

8. Configure the selected mode:

RS232 GPI Settings

- a. Use the **Port** list to select the Communication port that receives the signals.
- b. Use the **Baudrate** list to select the communication speed for the signals.
- c. Use the **Data Bits** list to select the number of bits used to represent one character of data for the signals.
- d. Use the **Parity** list to select the method used to check for lost data in a signal.
- e. Use the **Stop Bits** list to select the number of bits used to indicate the end of a byte in a signal.
- f. Use the **Flow Control** list to select the data transmission rate controller for a signal.

The flow control can be set to **Hardware** or **None**, but it must be set the same in both XPression and the transmitting device.

TCP & UDP

- a. In the **Network Settings** section, use the **TCP Port/UDP Port** box to enter or select the communication port that receives the signals.

9. In the **PBus Options** section, configure the PBus recall options.

XPression normally does not perform any action when a PBus recall command is issued. Instead, it stores the recall ID to be used later when a PBus trigger command is issued.

Configure the following PBus recall options:

- **Clear layer on recall** — when this option is selected and a PBus recall command is received, XPression will look to see which channel and layer that the take item being recalled has been assigned. It will then immediately clear that layer and channel. However, the take item will not be read to air until such time as a PBus Trigger command is received to put the item on air. This configuration option is recommended to be enabled in situations where XPression might be used to play back clips/graphics and to ensure that as soon the recall command is issued, any previous graphic that might have been left over on the layer will be removed.
- **Move sequencer focus on recall** — this configuration option can be selected to move the sequencer focus to the item that is being recalled. This can be useful as a means of generating a preview output that will show a rendered frame from the item that will be put on air when the PBus trigger command is received.
- **Cue item on recall** — selecting this option will place the take item into a cued state when the recall command is received. This is useful when using video clips which might take a few frames to cue.
- **Video Clips cue directly to framebuffer** — selecting this option will cause the video clips from the Clip Store that are assigned to a PBus register to cue directly onto the hardware output of XPression in a paused state. When the play command is received, they will begin playing.
- **Ignore LEARN command** — selecting this option will disable the switcher command that enables PBus to learn a set of commands or procedures in XPression that can be recalled by the switcher.

10. Use the **Data Logger** list to select an encoding scheme for the data log. The options are:

- **None** — select this option to use no data logging.
- **ASCII** — select this option to use ASCII encoding for the data log.
- **HEX** — select this option to use HEX file formatting for the data log.
- **Both** — select this option to use both ASCII encoding and HEX file formatting for the data log.

11. Click OK.

The PBus interface is displayed in the **GPI Board** list.

12. Click Close.

The **Hardware Setup** dialog box closes.

13. Click OK.

The **PBus Setup** dialog box closes and the new PBus interface is added to the GPI Boards table.

PBus Triggers

XPression supports many PBus Trigger commands.

- **Trigger 0 – Play Item**

★ This trigger can be overridden in the PBus mapping.

Trigger 0 is normally used to play a take item to air. However, this can be overridden to perform other actions on a per-register basis. These actions can be configured in the PBus mapping menu.

- **Trigger 1 – Take Sequence Item Off-Air**

Trigger 1 is used to take an item off air (assuming it was already on air). The item taken off air will be the take item that was previously recalled using a PBus recall command.

- **Trigger 2 – Execute GPI**

Trigger 2 is used to emulate a standard GPI input. In the XPression Keyboard/GPI Mapping, various actions can be configured to be executed on a GPI input being triggered. It is possible to trigger up to 99 different GPIs through PBus. The GPI number that will be triggered is the number that was previously recalled using a PBus recall command.

- **Trigger 3 – Clear Framebuffer**

Trigger 3 will clear the framebuffer assigned to the device in the PBus channel configuration. If the channel is set to **<default>**, this trigger will clear Channel 1.

- **Trigger 4 – Clear Framebuffer Channel 2**

Trigger 4 will clear the framebuffer assigned to the device in the PBus channel configuration. If the channel is set to **<default>**, this trigger will clear Channel 2.

- **Trigger 5 – Read Current Sequence Item to Air**

Trigger 5 will take the currently selected sequence item from the sequencer to air. It ignores the PBus recall command and uses whichever item currently has focus in the XPression sequencer.

- **Trigger 6 – Resume Channel**

Trigger 6 will resume all paused graphics currently on the framebuffer assigned to the device in the PBus Channel Configuration. If the framebuffer is set to **<default>**, this will resume Channel 1.

- **Trigger 7 – Resume Channel**

Trigger 7 will resume all paused graphics currently on the framebuffer assigned to the device in the PBus Channel Configuration. If the framebuffer is set to **<default>**, this will resume Channel 2.

- **Trigger 8 – Resume Take Item**

Trigger 8 will resume a single paused take item. The take item will be the item previously recalled by a PBus recall command.

- **Trigger 10 – Bank 0**

Trigger 10 will change the last recall command into an ID in the 0-99 range (refer to the Bank 1 command below for more details).

- **Trigger 11 – Bank 1**

Trigger 11 is used to allow switchers that can only send PBus recall commands up to 99 to be able to recall take items with values of between 100 and 199.

This “bank 1” command will add 100 to the last recalled item using a PBus recall command. For example; to recall take ID 135 and put it on air, a switcher could send:

- › Recall 035
- › Trigger 11 (changes the 035 into 135)
- › Trigger 0

It is not necessary to switch back to bank 0 after sending a bank 1 command. XPression will automatically revert to bank 0 for the next PBus recall command.

- **Trigger 12 – Bank 2**

Changes the last PBus recall command into an ID in the 200-299 range.

- **Trigger 13 – Bank 3**

Changes the last PBus recall command into an ID in the 300-399 range.

- **Trigger 14 – Bank 4**

Changes the last PBus recall command into an ID in the 400-499 range.

- **Trigger 15 – Bank 5**

Changes the last PBus recall command into an ID in the 500-599 range.

PBus Store Commands

When a PBus Learn command is received from a remote device, XPression will look to the configured server channel for the PBus device, and if there is a clip currently cued on that server channel it will assign that clip into the PBus register.

There is an option **Ignore LEARN command** in the **PBus Setup** dialog box in the **Hardware Setup**. This option is useful if you are manually assigning clips to PBus registers and you do not want to change/overwrite them when storing memories on the production switcher. Most production switchers automatically send the PBus Learn command when storing the memory.

For More Information on...

- the PBus Learn command, refer to the appropriate switcher documentation.

PBus Mapping

Use PBus mapping to assign clips, functions, scenes, scripts, and other actions and functions to device registers, and then save and load the maps.

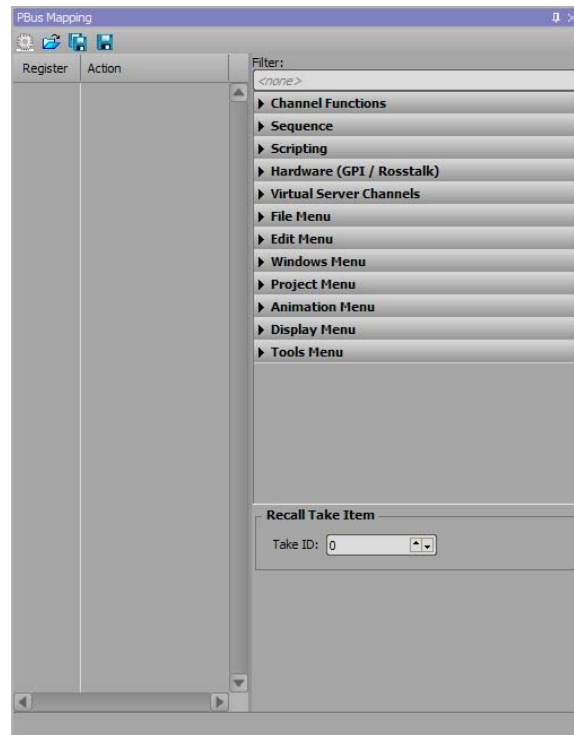
Configuring PBus Mapping

Use the PBus Device Configuration dialog box to configure the Device IDs and channels.

To configure PBus Mapping:

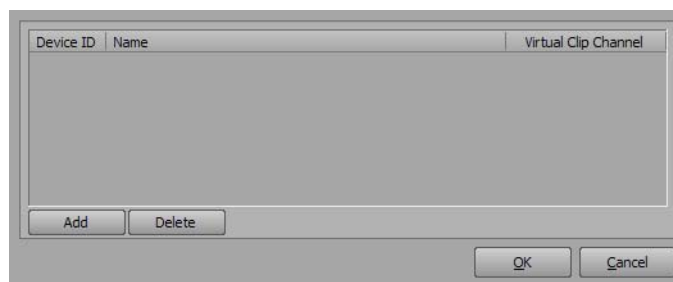
1. In XPression, open the **Sequencer**.
2. Click **Display > PBus Mapping**.

The **PBus Mapping** window opens.



3. Click the **Setup Device Configuration** (gear icon) icon.

The **PBus Device Configuration** dialog box opens.



4. Click **Add** to add a **Device ID**.

A device ID is added to the PBus Device Configuration list. At least one Device ID must be added. The Device ID is the ID number that will be sent in PBus messages transmitted from the production switcher.

Device ID	Name	Virtual Clip Channel
0	Device 0	<default>
1	Device 1	<default>
2	Device 2	<default>

Buttons: Add, Delete, OK, Cancel

5. Click inside the **Device ID** column of the ID and enter or select an ID number.

PBus Device IDs must be between 0 and 23.

6. Click inside the **Name** column of the ID and enter a name to refer to the Device ID. For example, Device A.

Device ID	Name	Virtual Clip Channel
0	Device A	<default>
1	Device B	<default>
2	Device C	<default>

Buttons: Add, Delete, OK, Cancel

7. Click inside the **Virtual Clip Channel** column of the ID and use the list to select a specific output framebuffer or use the **<default>** framebuffer.

If the framebuffer is set to anything other than <default> when a PBus recall command is received for a specific Device ID, then the item will be played on the selected framebuffer. If <default> is selected, then the item will be played on the framebuffer for which the original take item was configured. When a clip from the Clip Store is assigned to a register and <default> was selected for the Virtual Channel, the first device configured will use Virtual Channel 1, the next will use Virtual Channel 2, etc.

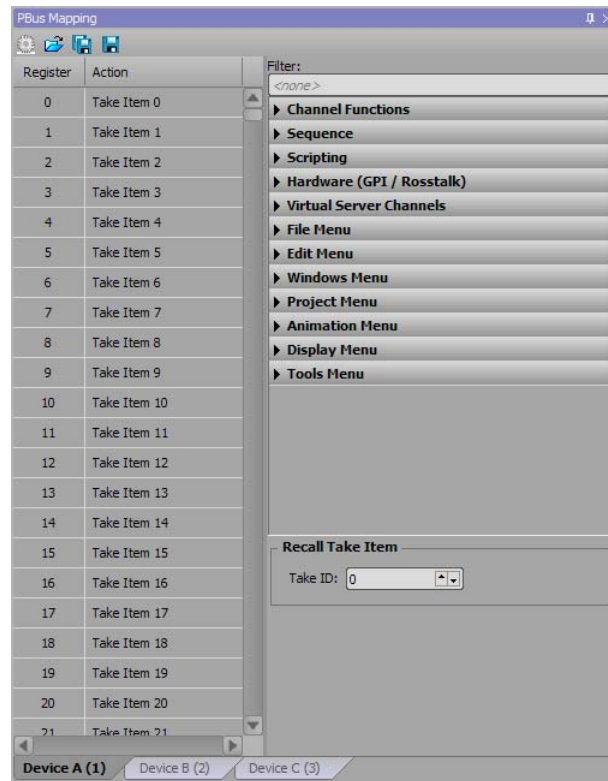
Device ID	Name	Virtual Clip Channel
0	Device A	Channel 1
1	Device B	Channel 2
2	Device C	Channel 3

Buttons: Add, Delete, OK, Cancel

If XPression does not have the Clip Server option, then the Virtual Clip Channel configuration column will be missing and all take items will be cued to the channel assigned to them through the Sequencer.

8. Click **OK**.

The Device IDs are added as tabs at the bottom of the PBus Mapping window under the assigned device names. If there are no tabs added, then a Device ID was not added to the PBus Device Configuration list.



Assigning an Action to a PBus Register

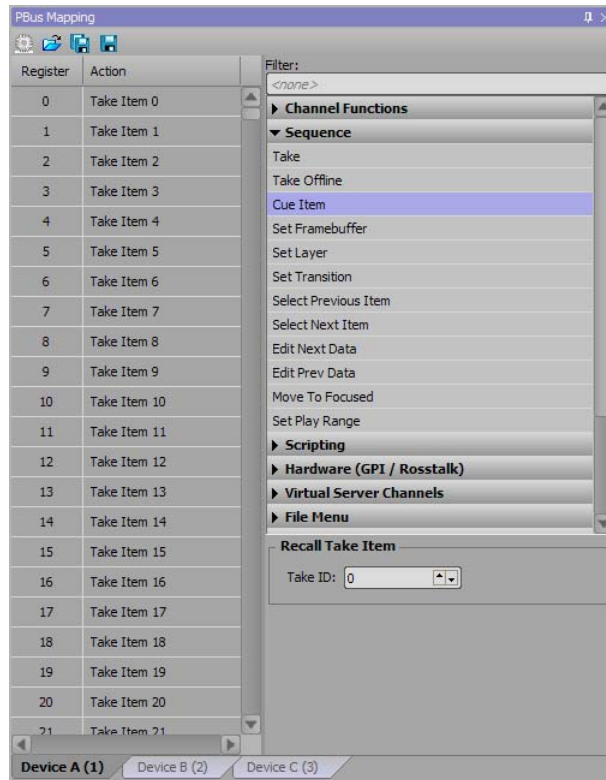
Each Device has a list of 4095 registers which can be recalled through PBus.

★ Some switchers can only support the first 99 registers.

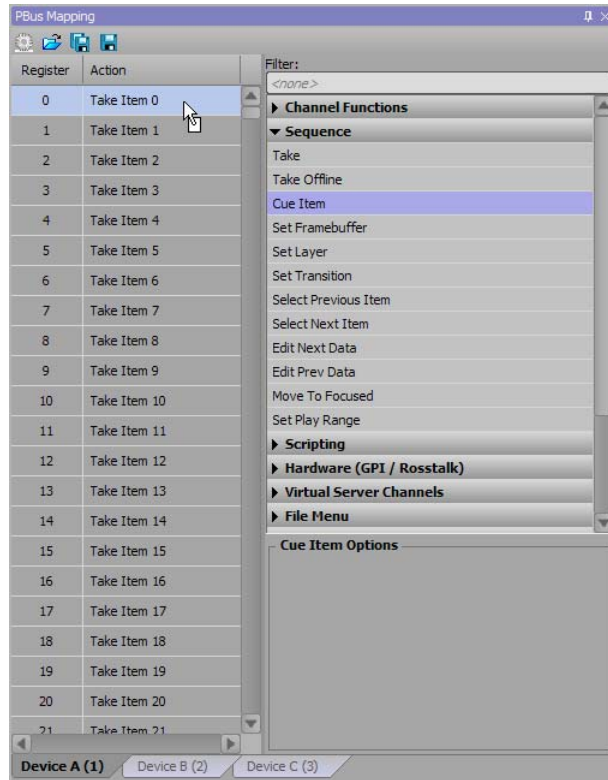
Each PBus register can be assigned an action that will be executed after the register is recalled and Trigger 0 is received. The default action for each register is to play the corresponding Take Item with the same number as the PBus register.

To assign an action to a PBus register:

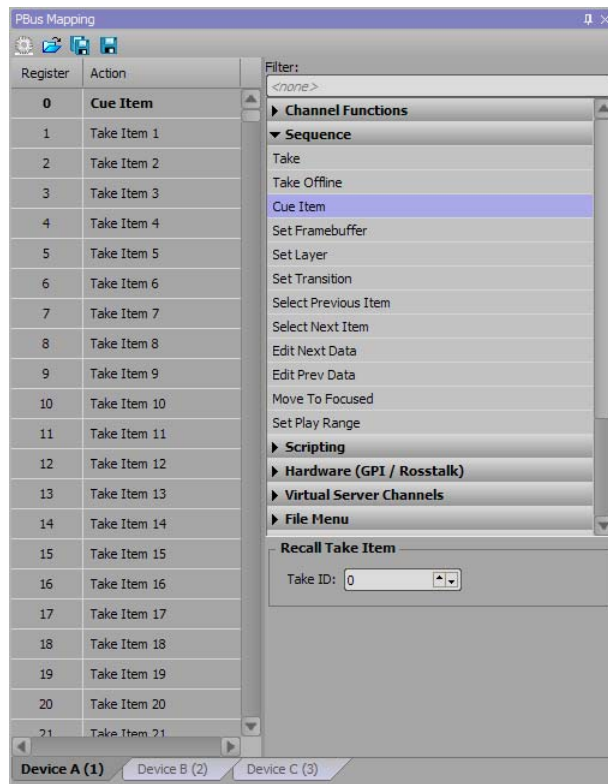
1. In the **PBus Mapping** window, select a function from the actions list to the right of the devices.



2. Drag and drop the action onto a register.



The action is added to the register.



Remapping a PBus Register

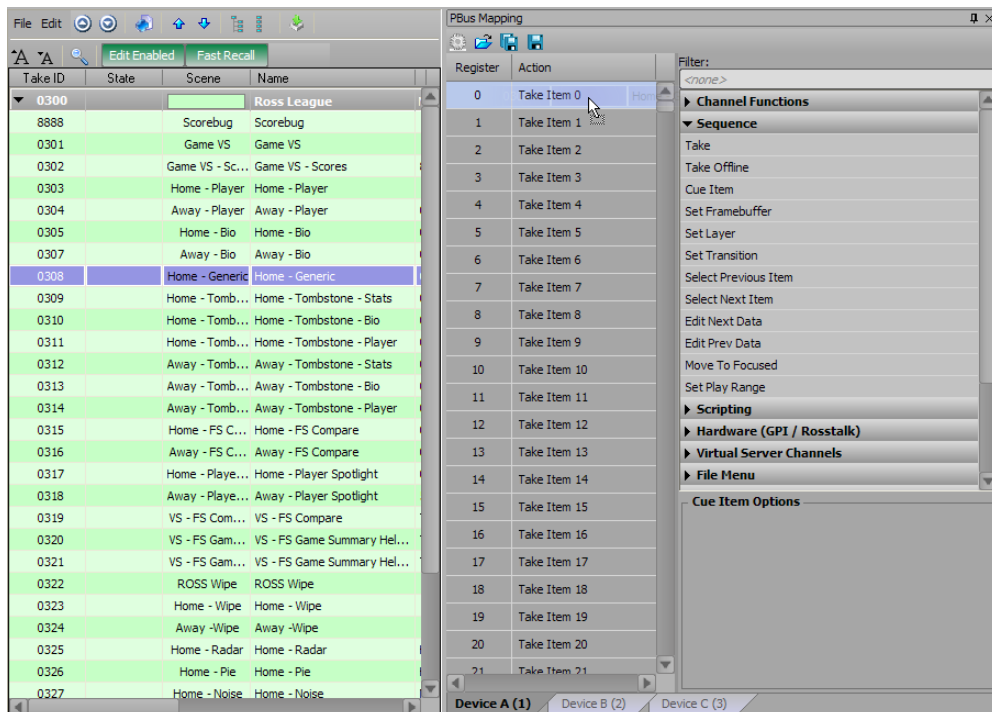
To remap a PBus register to play a different take item, the take item can be dragged and dropped from the sequencer onto the register in the PBus Mapping window or you can enter or select a different take ID using the **Take ID** box in the **Recall Take Item** section of the PBus Mapping window.

To remap a PBus register using drag and drop:

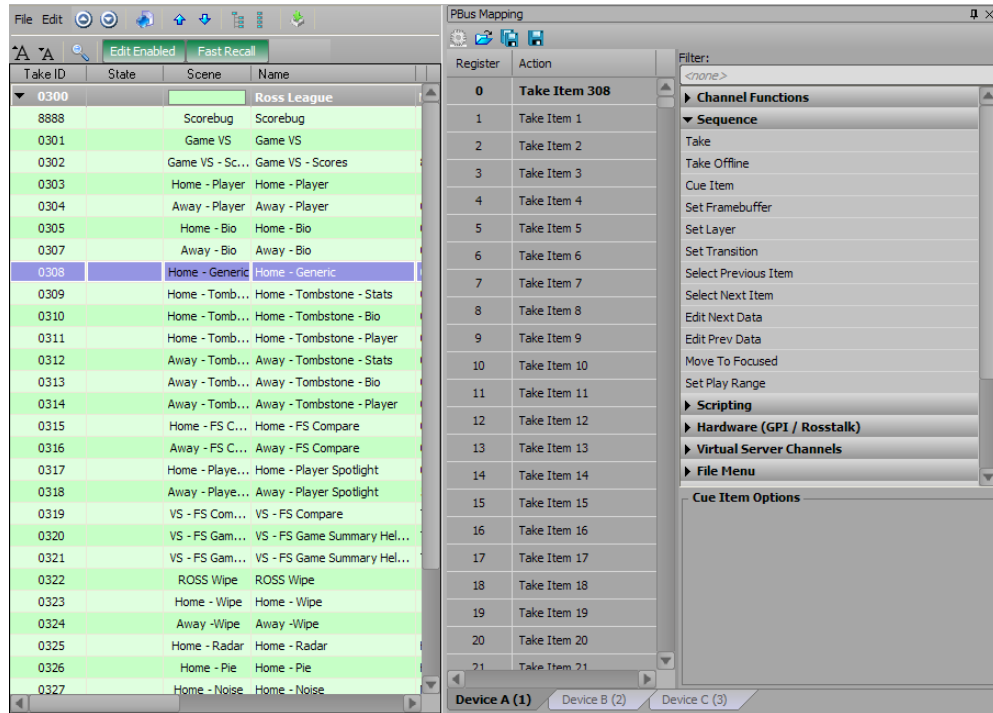
1. In the **Sequencer**, select a take item from the **Take ID** list.

Take ID	State	Scene	Name	Transition In / Out	Layer	Output	Start	End	Duration	GV
0300			Ross League							
8888		Scorebug	Scorebug	Cut / Cut	10	Framebuffer 1	00:00:00.00	00:00:02.00	00:00:02.00	
0301		Game VS	Game VS	Cut / Dissolve (10)	20	Framebuffer 1	00:00:00.00	00:00:06.20	00:00:06.20	
0302		Game VS - Sc...	Game VS - Scores	8 Cut / Dissolve (10)	20	Framebuffer 1	00:00:00.00	00:00:06.20	00:00:06.20	
0303		Home - Player	Home - Player	1 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0304		Away - Player	Away - Player	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0305		Home - Bio	Home - Bio	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0307		Away - Bio	Away - Bio	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0308		Home - Generic	Home - Generic	4 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0309		Home - Tomb...	Home - Tombstone - Stats	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0310		Home - Tomb...	Home - Tombstone - Bio	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0311		Home - Tomb...	Home - Tombstone - Player	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0312		Away - Tomb...	Away - Tombstone - Stats	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0313		Away - Tomb...	Away - Tombstone - Bio	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0314		Away - Tomb...	Away - Tombstone - Player	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:03.01	00:00:03.01	
0315		Home - FS C...	Home - FS Compare	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:02.21	00:00:02.21	
0316		Away - FS C...	Away - FS Compare	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:02.21	00:00:02.21	
0317		Home - Playe...	Home - Player Spotlight	0 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:02.21	00:00:02.21	
0318		Away - Playe...	Away - Player Spotlight	5 Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:02.21	00:00:02.21	
0319		VS - FS Com...	VS - FS Compare	T Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:02.21	00:00:02.21	
0320		VS - FS Gam...	VS - FS Game Summary Hel...	T Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:02.21	00:00:02.21	
0321		VS - FS Gam...	VS - FS Game Summary Hel...	T Dissolve (5) / Dissolve (5)	0 (middle)	Framebuffer 1	00:00:00.00	00:00:02.21	00:00:02.21	
0322		ROSS Wipe	ROSS Wipe	Cut / Cut	10	Framebuffer 1	00:00:00.00	00:00:06.20	00:00:06.20	
0323		Home - Wipe	Home - Wipe	Cut / Cut	10	Framebuffer 1	00:00:00.00	00:00:06.20	00:00:06.20	
0324		Away -Wipe	Away -Wipe	Cut / Cut	10	Framebuffer 1	00:00:00.00	00:00:06.20	00:00:06.20	
0325		Home - Radar	Home - Radar	H Dissolve (5) / Cut	0 (middle)	Framebuffer 1	00:00:00.00	00:00:20.00	00:00:20.00	
0326		Home - Pie	Home - Pie	Dissolve (5) / Cut	0 (middle)	Framebuffer 1	00:00:00.00	00:00:20.01	00:00:20.01	
0327		Home - Noise	Home - Noise	Cut / Cut	0 (middle)	Framebuffer 1	00:00:00.00	00:00:06.20	00:00:06.20	
0330		Home - Loud	Home - Loud	Cut / Cut	0 (middle)	Framebuffer 1	00:00:00.00	00:00:06.20	00:00:06.20	

2. Drag and drop the take item onto a register.

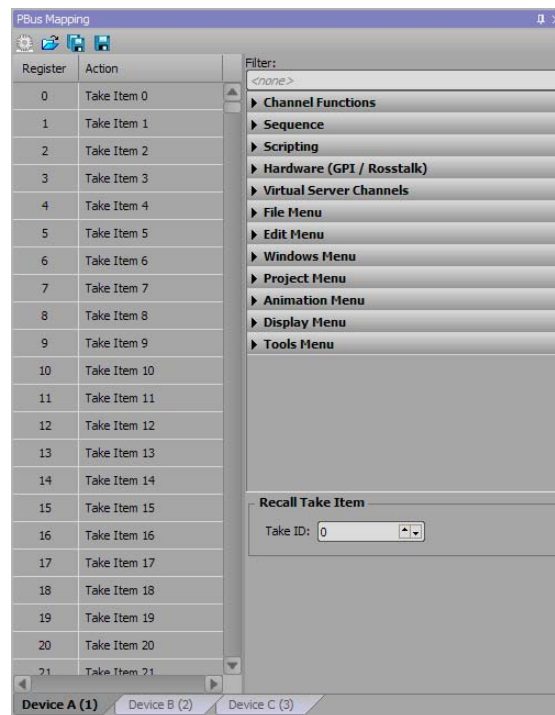


The take item is added to the register.

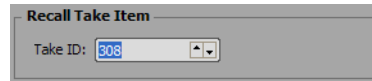


To remap a register using the Take ID box:

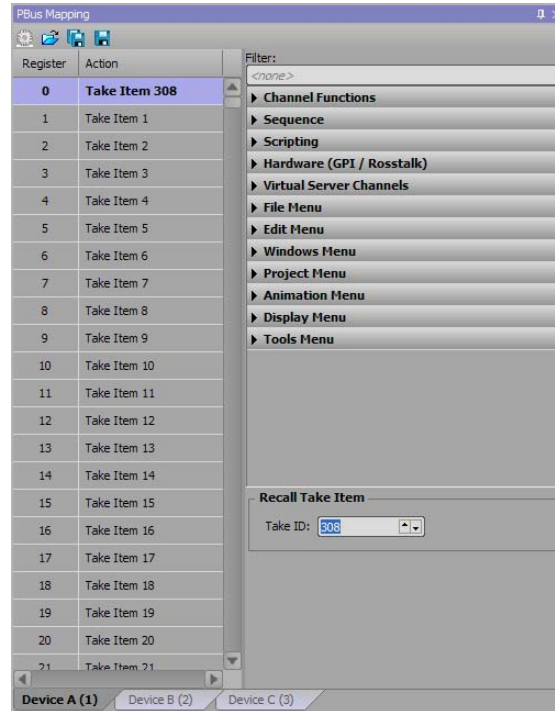
1. In the **PBus Mapping** window, select a register number from the devices to the left of the actions list.



- In the **Recall Take Item** section, use the **Take ID** box to enter or select a take item to add to the selected register.




The take item is added to the selected PBus register.





Loading and Saving Maps

PBus maps are not loaded and saved with XPression projects. They are loaded and saved to disk as .pbm or .pbms files using the PBus Mapping window. The .pbm file extension is used for a single PBus map and the .pbms file extension is used for multiple PBus maps.

Use the following PBus Mapping window toolbar icons to load and save PBus maps:

Load () – click this button to open a file browser to select a PBus map or multiple PBus maps to load.

Save All () – click this button to save multiple PBus maps to disk.

Save () – click this button to save a single PBus map to disk.

Using PBus from a Switcher to Recall Items

- ★ Consult the switcher documentation for a complete description of how to use PBus with your particular manufacturer/model. This section is only intended to provide some background information and tips.

Normally switchers will send a PBus recall command when an EMEM is recalled. The following procedure is an example using take item 0005.

To recall and play a specific take item from XPression:

- In **XPression**, use the **Sequencer** to create a take item and give it an ID of 0005.
- Create an EMEM/Memory on the switcher and store it as **EMEM 5**.

3. Within **EMEM 5**, ensure that you have enabled the sending of PBus commands.
4. Within the timeline for **EMEM 5**, issue a PBus Trigger 0 command.

When **EMEM 5** is recalled, it will send a PBus recall 5 command to XPression. This command will not yet do anything (unless the configuration options discussed in the **Configuring PBus and PBus Recalls** section are enabled).

When the timeline is run, the switcher will send a PBus Trigger 0 command. At this time, XPression will then put take item #5 on the output channel/layer previously assigned to that item in the sequencer.

- ★ There may be several frames of delay between issuing the Trigger 0 command and when the video for the item appears on the SDI output of XPression. This is normal and should be accounted for inside of the timeline on the switcher. For example, you will need a delay between the issuing of trigger 0 and when the keyer containing the XPression is keyed onto the PGM output.

To recall different take items, the timeline on the switcher can be copied into different switcher registers.

Using PBUS for XPression Clips with Recall IDs

- ★ The recall IDs for clips is part of the XPression Clips purchase. To purchase XPression Clips or for more information, please contact your Ross Video sales representative.

The PBus map contains a column named **Recall ID**:



Register	Action	Recall ID
0	Take Item 0	
1	Take Item 1	
2	Take Item 2	
3	Take Item 3	
4	Take Item 4	
5	Take Item 5	
6	Take Item 6	
7	Take Item 7	
8	Take Item 8	
9	Take Item 9	
10	Take Item 10	
11	Take Item 11	
12	Take Item 12	
13	Take Item 13	
14	Take Item 14	
15	Take Item 15	
16	Take Item 16	
17	Take Item 17	
18	Take Item 18	
19	Take Item 19	
20	Take Item 20	
21	Take Item 21	

If a clip in the Clip Store exists with that recall ID, it will be assigned to that PBus register. The PBus register will always recall the clip with that specific recall ID, so if a new clip is ingested with a matching recall ID, the PBus register will recall the new clip instead. If the clip is manually edited and the recall ID is changed or removed, the PBus register will no longer recall that clip.

A similar behavior exists when dragging a clip with a recall ID into the PBus register; meaning that the PBus register is bound to a specific recall ID and not to a specific clip.