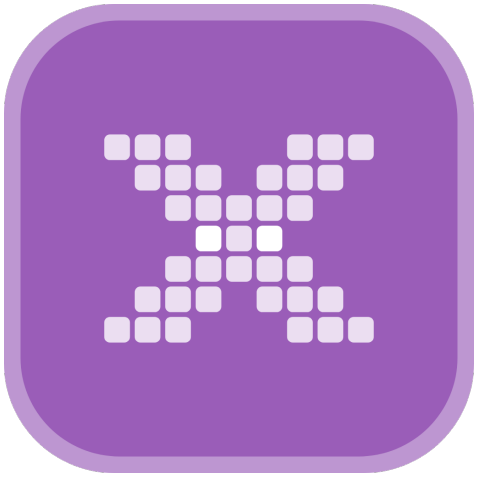
SKAARHOJ

XPanel X-keys

Software User Manual

November 18, 2026
Language: English
Version: v2.0.0-pre1



I Disclaimer

Before using this software product, please read and fully understand all instructions provided.

The information in this document is subject to change without notice. While SKAARHOJ strives to ensure the quality, reliability, and safety of its products—hardware as well as software—issues cannot be entirely ruled out.

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The source language of this manual is English. Translations into other languages are derived from the English version.

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This section explains the meaning of various alert levels and informational notes used throughout this document. Each label serves as a guide to indicate the level of attention required and the type of risk involved. Please review these legends carefully to ensure a clear understanding of the warnings, cautions, and helpful tips provided.

Danger

DANGER indicates an imminent hazard. Always follow the recommended actions to prevent this danger.

Warning

WARNING indicates a potential hazard. Always follow the recommended actions to prevent this risk.

Caution

CAUTION indicates a possible hazard. Always follow the recommended actions to prevent this hazard.

Notice

NOTICE indicates a potential risk. Always follow the recommended actions to avoid damage.

Hint

HINT provides additional information to clarify or simplify a procedure. It is not related to safety.

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1 About this Document

This operating manual is intended for all users of the SKAARHOJ XPanel X-keys. It provides essential guidelines for the safe and proper operation of the software. All users must read this manual before using the software for the first time to ensure correct usage.

The manual is an important part of the XPanel X-keys and should be kept easily accessible, close to the operator for reference at any time.

For more detailed information about the software's features and functionality, please refer to additional instructions available for download at https://www.skaarhoj.com or request them via support@skaarhoj.co

Ensure that any other relevant documentation is stored safely for future reference and for any potential future users of the software.

For more resources and helpful information, visit the SKAARHOJ website.

SKAARHOJ offers comprehensive training courses to provide deeper insights into maximizing the potential of SKAARHOJ products.

1.1 Intended Use

Notice

Intended Use of XPanel X-keys
All versions of XPanel X-keys are intended for professional use only and must be operated by skilled and trained personnel. They must not be used by inexperienced individuals without proper training.
Before use, carefully read and understand both the operating and user manuals. Use the product and its accessories solely for the purposes outlined in this document. Always follow the safety instructions and system requirements for all equipment involved.
SKAARHOJ assumes no liability for damages or modifications resulting from improper use. Modifying the product or its accessories is strictly prohibited.

2 About XPanel X-keys

XPanel X-keys turns X-keys USB devices from P.I. Engineering into SKAARHOJ Raw Panels. Each X-keys gets its own Raw Panel server on the network, so SKAARHOJ Reactor (or any other Raw Panel system) can use it like a SKAARHOJ panel: the X-keys sends key presses, jog, shuttle, joystick and T-bar movements, and Reactor sets the key backlights.

Key capabilities:

- **Plug and play**: every X-keys that is plugged in is added with its own Raw Panel port, and keeps that port and its settings.
- **Live copy in the browser**: see each X-keys with its backlights as they are, and operate it on screen.
- **Set up before the hardware arrives**: create a panel of any model and simulate it, so Reactor can be configured in advance. The X-keys takes over the panel when it's plugged in.
- **Discovery**: every panel is announced on the network with mDNS, so Reactor finds it.

2.1 How It Works

1. An X-keys is plugged into a USB port of the SKAARHOJ device.
2. XPanel X-keys gives it a panel: a Raw Panel server on its own TCP port (from 9933 up), announced on the network.
3. Reactor connects to the panel, reads its layout (topology) and sets the backlights.
4. XPanel X-keys lights the keys on the X-keys, and sends presses and movements back to Reactor.

A panel is on the network while its X-keys is connected. When the X-keys is unplugged, its panel goes off the network: connected systems are disconnected, and its port is closed. When the X-keys is plugged in again, the panel is back on the same port, and systems reconnect. Only a simulated panel stays on the network without its X-keys (Section 5.3).

2.2 Supported Models

Model	Controls	Raw Panel model
XK-24	24 keys, program switch	XP_XKEYS-XK24
XK-12 Jog-Shuttle	12 keys, jog and shuttle, program switch	XP_XKEYS-XK12JOG
XK-12 Joystick	12 keys, joystick, program switch	XP_XKEYS-XK12JOYSTICK
XK-60	60 keys, program switch	XP_XKEYS-XK60
XK-80	80 keys, program switch	XP_XKEYS-XK80
XK-68 Jog-Shuttle	68 keys, jog and shuttle, program switch	XP_XKEYS-XK68JOGSHUTTLE
XK-68 Joystick	68 keys, joystick, program switch	XP_XKEYS-XK68JOYSTICK
XKE-64 Jog T-bar	64 keys, jog and shuttle, T-bar	XP_XKEYS-XK64JOGTBAR
XKE-124 T-bar	124 keys, T-bar	XP_XKEYS-XKE124TBAR
XKE-128	128 keys	XP_XKEYS-XKE128
XBA-T-bar Module	14 keys with RGB backlights, T-bar	XP_XKEYS-XBATBAR
XKE-40	40 keys (rack unit), program switch	XP_XKEYS-XKE40
XK-4, XK-8, XK-16 Stick	4, 8 or 16 keys, program switch	XP_XKEYS-XK4 (XK8, XK16)
XK-3 Foot Pedal	3 pedals	XP_XKEYS-XK3FOOT
XK-3 Switch Interface	3 switch inputs	XP_XKEYS-XK3SI
XK-12 Switch Interface	12 switch inputs (6 ports)	XP_XKEYS-XK12SI
XK-HD15 Wire Interface	10 inputs, 2 ports	XP_XKEYS-XKHD15WI
XK-HD15 GPIO	10 inputs/outputs, 2 ports	XP_XKEYS-XKHD15GPIO

The keys of the XK, XKE and stick models have backlights (Section 10). An X-keys of another model is listed as Not supported. The component numbers (HWCs) Reactor uses for each model are listed in Section 14.

3 Getting Started

3.1 Installing

XPanel X-keys runs on SKAARHOJ products with the Blue Pill platform inside (skaarOS). Install it with the Package Manager on the SKAARHOJ device, where it is listed as **X-keys Integration**, and make sure it's enabled. Connect the X-keys to the USB ports of the SKAARHOJ device.

The app needs a license on the SKAARHOJ device (see Section 12).

3.2 Opening the App

Open the app from the app portal of the SKAARHOJ device, where it's called X-keys, or in a browser at:

```
http://<device IP>/ingress/xpanel-xkeys
```

The settings are managed in the app itself.

Hint

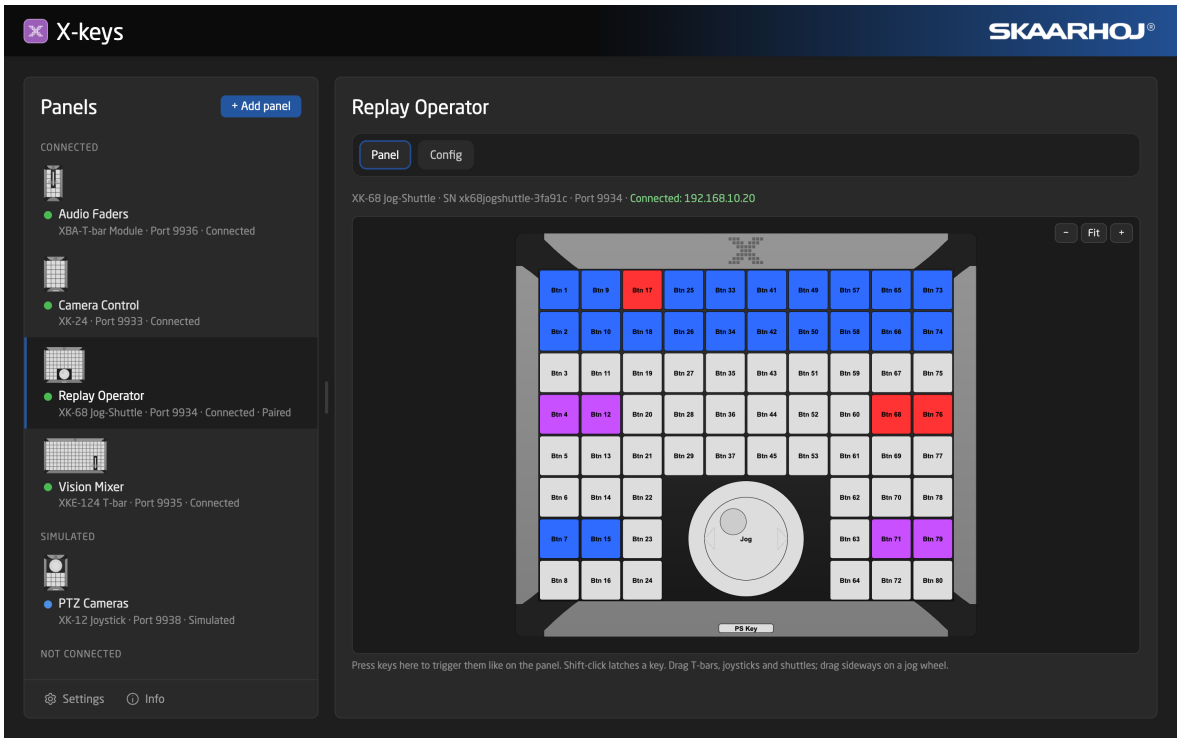
You can open the app from any computer, tablet or phone on the same network. Click **Go Mobile** on the **Info** page to show a QR code with its address.

3.3 Quick Start

1. Plug an X-keys into the SKAARHOJ device. It appears under **Panels** with its Raw Panel port (the first free port from 9933), and a notice confirms that it was added.
2. In Reactor, add a Raw Panel with the IP address of the SKAARHOJ device and that port. Reactor also finds the panel by itself on the network, as `XP_XKEYS-XK24 [serial]` for an XK-24.
3. Select the panel in the app to see it on screen. Clicking a key works like pressing it on the X-keys.

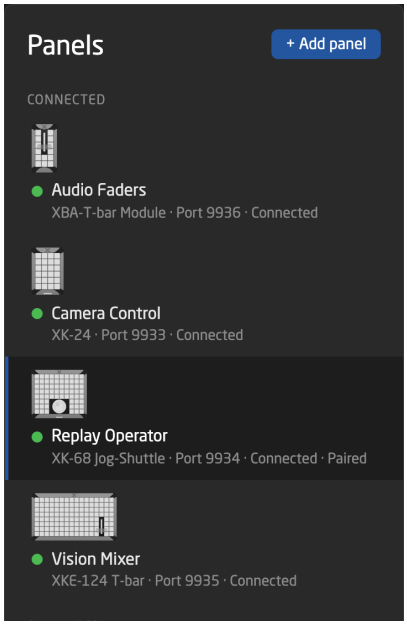
3.4 Interface Overview

- **Left: Panels** – the list of panels, with **+ Add panel** on top and **Settings** and **Info** at the bottom (in Expert mode also **Log**).
- **Right** – the selected panel: its name, and under it **Panel** (the live panel) and **Config** (its settings and pairing). The one you used last stays selected when you select another panel. Settings and Info from the left open the app's general settings and information here, and **+ Add panel** opens the models. Info has a link to this manual.
- **Expert** – the switch at the bottom of **Settings**. The version and Go Mobile are on the **Info** page.



Drag the divider between the two parts to resize them. On narrow screens (a phone) they are stacked.

4 The Panel List



Every panel is one row: a drawing of its model, its description (or model name), and a line with the model, the port and its state. Rows are grouped:

Group	Contains
Connected	Panels whose X-keys is connected.
Simulated	Panels running without their X-keys (Section 5.3).
Not connected	Panels whose X-keys isn't there, and turned off panels.
Not added	Connected X-keys that aren't in the list (Section 6.2).

4.1 Row Details

The second line of a row shows the model (when the panel has a description), the port (e.g. Port 9934) and the state:

State	Meaning
Connected	Running, and a system such as Reactor is connected.
Running	Running, waiting for a system to connect.
Simulated	Running without its X-keys.
Starting	The Raw Panel server is starting.
Not connected	Its X-keys isn't connected, or a panel created in the app isn't paired yet.
Turned off	Active is off in the panel's settings.
Not added	A connected X-keys that isn't in the list.
Not licensed	Paused for lack of a license (Section 12).

Paired is added for a panel created in the app whose X-keys is connected. A problem, such as a port that is in use or a model that isn't supported, is shown highlighted instead of the state. Hover over a row to see why a panel isn't running.

4.2 Status Dots

Dot	Meaning
Green	Running with its X-keys
Blue	Running, simulated
Gray	Waiting: starting, its X-keys isn't connected, or it isn't added yet
Amber	A problem (see the row), or paused for lack of a license
Dark gray	Turned off

A dot blinks briefly when its panel sends a trigger (a key press, jog, shuttle, joystick or T-bar movement, on the X-keys or on screen), so you can see which panel is in use.

4.3 Right-Click Menu

Right-click a row for:

- **Remove panel** — takes the panel out of the list, with its settings (Section 8.1). Not possible while its own X-keys is connected (unplug it first).
- **Add to the list** — on a connected X-keys that isn't in the list.

4.4 License Note

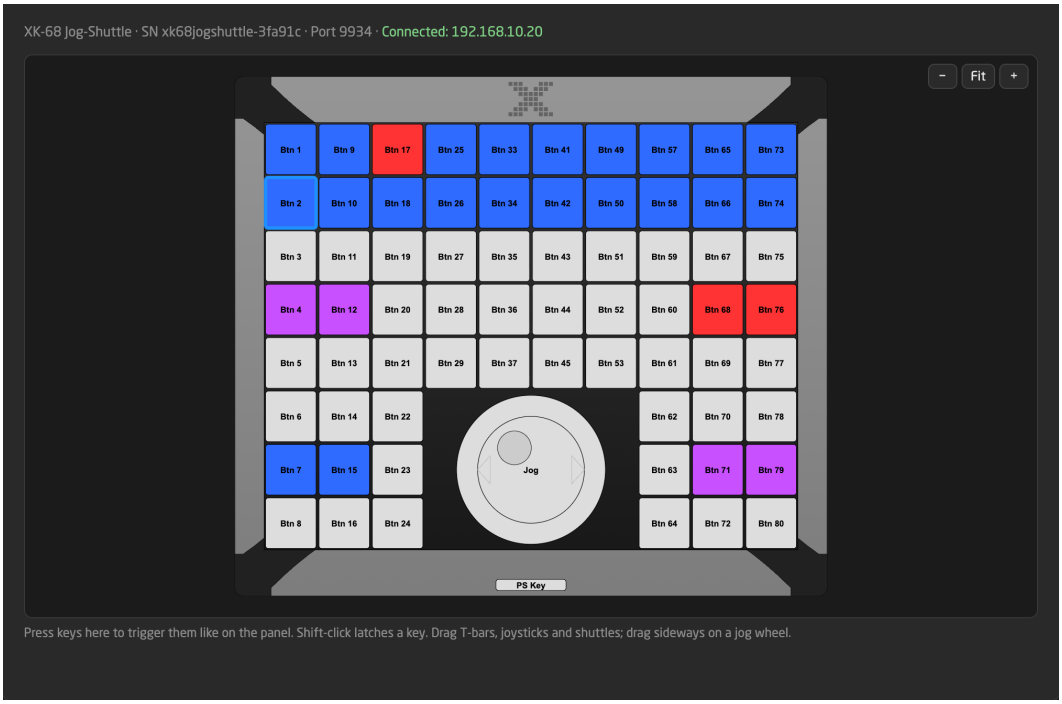
Without a license, a note under the list explains the trial:



See Section 12.

5 The Panel View

Select a panel to see it under **Panel**: a drawing of the X-keys with its backlights as they are on the hardware. A key held down on the X-keys, or on screen, has a blue outline.



5.1 Status Line

The line above the drawing shows details the list doesn't:



- The model, when the panel has a description.
- **SN** – the panel's serial number, as Reactor sees it.
- **Simulated** with **Stop simulation** – for a simulated panel (Section 5.3).
- **Port** – the Raw Panel port.
- **Connected: <IPs>** – the systems connected to the panel, or "Waiting for a system to connect".
- **Not licensed** – see Section 12.

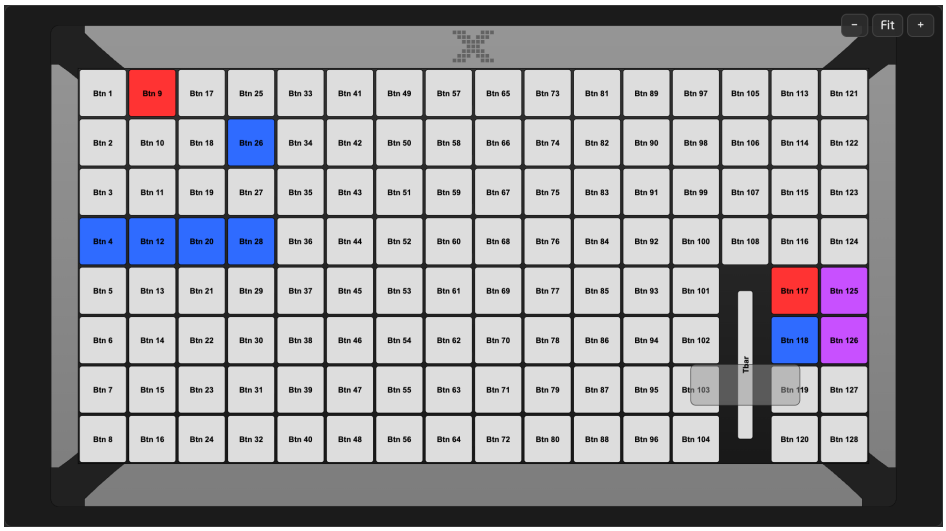
In expert mode, a **Restart** button on the right stops the panel's Raw Panel server and starts it again. Connected systems reconnect.

5.2 Operating the Panel on Screen

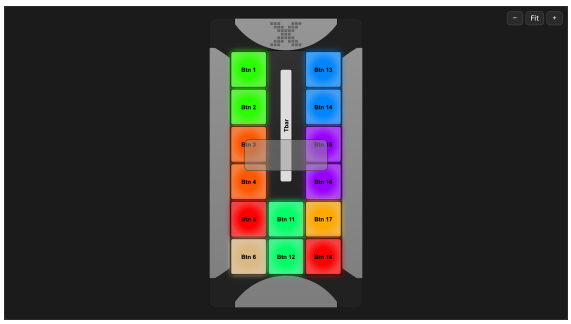
The panel on screen works like the real one. Reactor gets the same events either way, and presses and movements on the X-keys show on screen too.

- **Keys**: click to press. A key stays pressed while you hold the mouse button. Shift-click latches a key.
- **T-bars, joysticks and shuttles**: drag them.
- **Jog wheels**: drag sideways.
- **Zoom**: use the −, **Fit** and + buttons, Ctrl/Cmd + scroll, or pinch. Drag to move around when zoomed in.

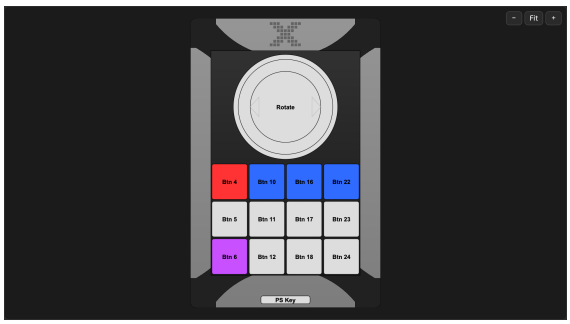
The colors on screen are what the X-keys shows: blue, red, or both (purple) on most models, and the full color on the XBA-T-bar Module (Section 10).



XKE-124 T-bar with its T-bar.



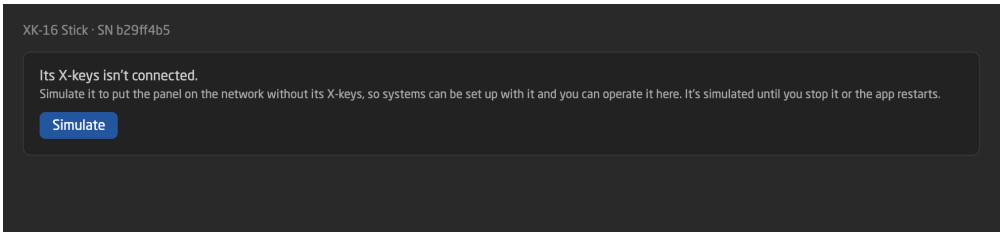
XBA-T-bar Module: RGB backlights.



XK-12 Joystick.

5.3 When the X-keys Isn't Connected

A panel whose X-keys isn't connected is off the network: systems can't connect to it, and ones that were connected are disconnected when the X-keys is unplugged. To set up Reactor before the X-keys is there, press **Simulate**:



A simulated panel is on the network on its port, systems can connect to it, and you operate it on screen. It stays simulated until you press **Stop simulation** in the status line, or the app restarts:



When its X-keys is plugged in, the X-keys takes over the running panel, without disconnecting the systems. While it's simulated, the panel also stays on the network when its X-keys is unplugged. A panel created with **+ Add panel** starts simulated (Section 6.3).

Simulated panels don't use license points.

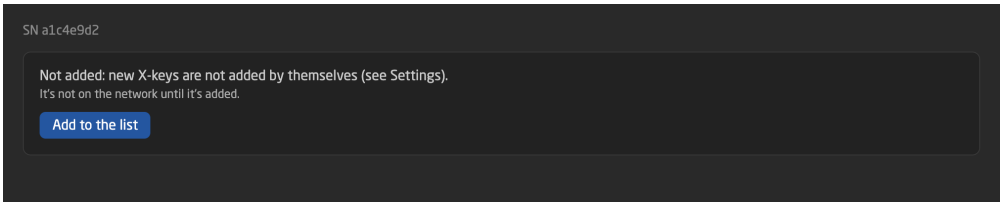
6 Adding Panels

6.1 X-keys on USB

An X-keys plugged in for the first time is added to the list automatically, on the first free port from the starting port (a port no panel uses and no other program has open). A notice confirms it. An X-keys seen before gets its panel back, with its port and settings.

6.2 Connected X-keys That Aren't Added

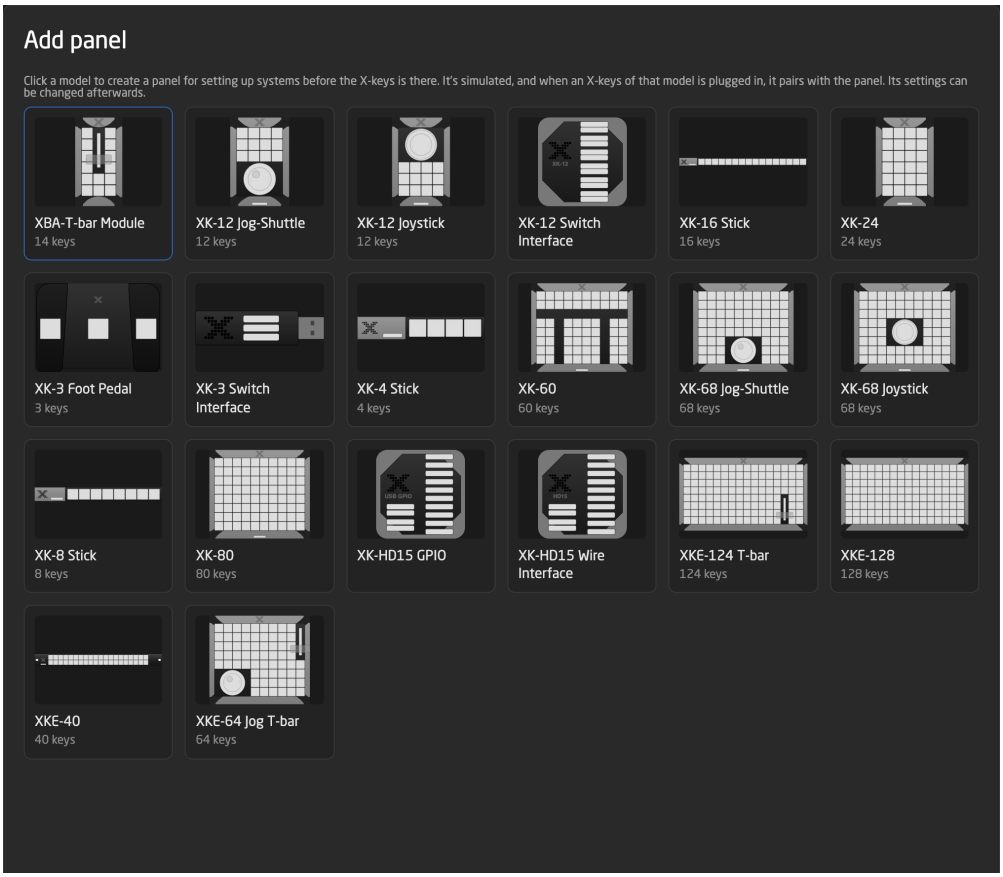
If **Add new X-keys** is off in the general settings, or the X-keys' serial number depends on the USB port (Section 9.1), a new X-keys is listed under **Not added**, but isn't on the network. Select it and click **Add to the list** (or right-click, **Add to the list**):



Its settings can be changed once it's in the list.

6.3 Creating a Panel Before the Hardware Is There

Click **+ Add panel** and click a model. The panel is created right away on the next free port, and simulated (until the app restarts), so you can set up Reactor with it before the X-keys arrives.

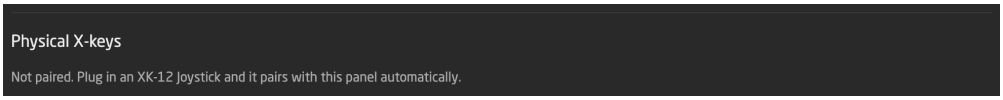


A panel created this way gets a made-up serial number, like `xk24-3fa91c`. Reactor knows the panel by that serial number, and it stays the same when an X-keys is paired with it (Section 7).

7 Pairing

A panel created in the app is shown and operated by the X-keys it's paired with. Pairing happens by itself: an X-keys that is plugged in and has no panel of its own pairs with the first unpaired, active panel of its model created in the app. A notice tells you which.

The **Physical X-keys** part of the panel's Config shows the state:



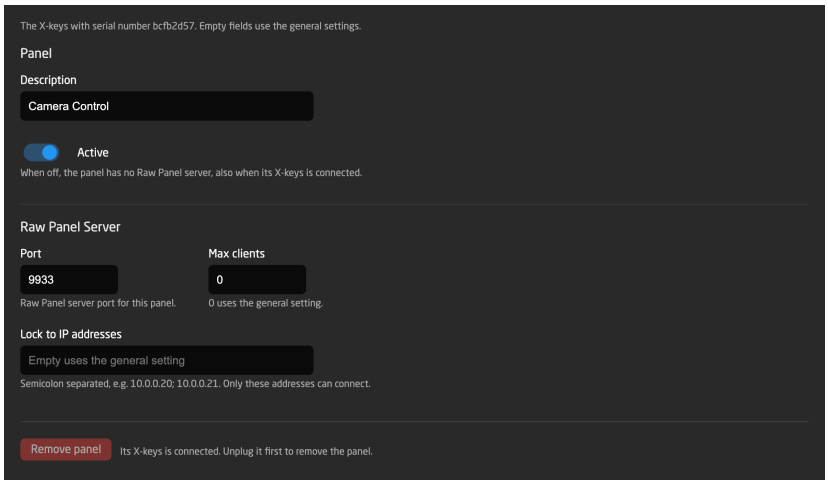
- **Not paired** – plug in an X-keys of the model. If one of the model is connected already with a panel of its own, choose it and click **Pair**: it then shows this panel on this panel's port, and its own panel is removed (you are asked first).
- **Paired** – shows the serial number of the paired X-keys. While that X-keys isn't connected, the panel can be simulated. **Unpair** makes the X-keys a panel of its own again, on a free port.



The other way round, the Config of a connected X-keys' own panel offers the panels of its model created in the app: pair the X-keys with one of them, and its own panel is removed.

8 Panel Settings

Select a panel and click **Config**. Empty fields use the general settings (Section 9). A change is saved as you make it: switches and lists right away, text and number fields when you leave the field or press Enter. A value that isn't valid is marked in red and not saved. A panel whose settings change restarts, and its connected systems reconnect.



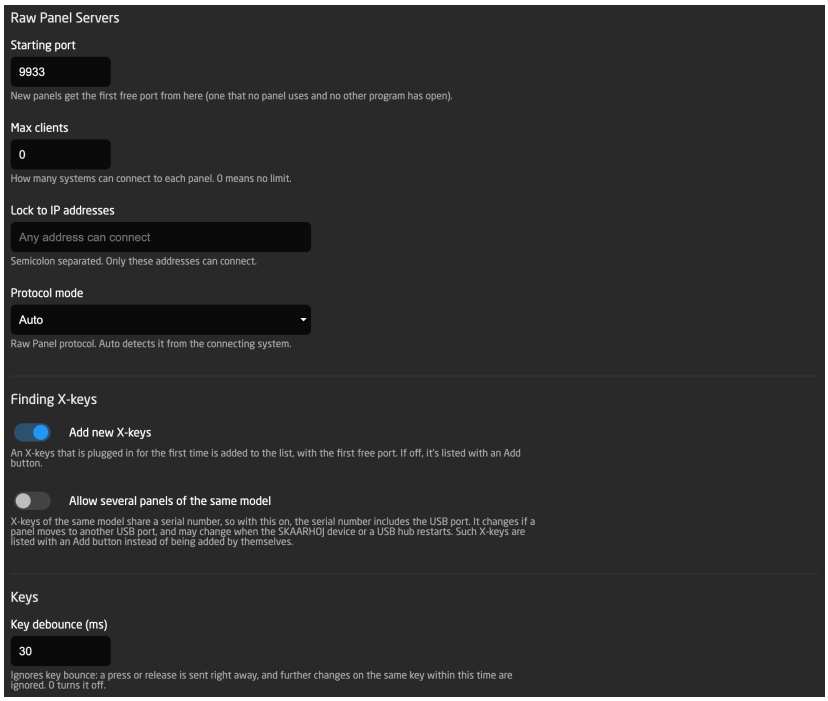
Setting	Description
Description	A name for the panel, shown in the list.
Active	If off, the panel has no Raw Panel server, also when its X-keys is connected.
Port	The TCP port of the panel's Raw Panel server. Each active panel needs its own port.
Max clients	How many systems may connect at the same time. 0 uses the general setting.
Lock to IP addresses	Semicolon-separated IP addresses that may connect, e.g. `10.0.0.20; 10.0.0.21`. Empty uses the general setting.

8.1 Removing a Panel

Remove panel at the bottom of Config (or in the right-click menu) takes the panel out of the list, with its settings. Systems connected to it are disconnected. A panel created in the app is no longer paired with its X-keys. If an X-keys whose own panel was removed is plugged in again later, it's added as a new panel, possibly on another port. A panel can't be removed while its own X-keys is connected.

9 General Settings

Click **Settings** at the bottom of the panel list. These settings apply to all panels, unless a panel has its own. A change is saved as you make it: switches and lists right away, text and number fields when you leave the field or press Enter. A value that isn't valid is marked in red and not saved. Panels whose settings change restart, and their connected systems reconnect.



Setting	Default	Description
Raw Panel Servers		
Starting port	9933	New panels get the first free port from here.
Max clients	0	How many systems may connect to a panel. 0: no limit.
Lock to IP addresses	(empty)	Semicolon-separated IP addresses that may connect. Empty: any.
Protocol mode	Auto	The Raw Panel protocol of the servers: Auto (detected from the connecting system), Binary or ASCII. Shown in expert mode.
Finding X-keys		
Add new X-keys	On	An X-keys plugged in for the first time is added to the list. If off, it's listed under Not added with an Add button.
Allow several panels of the same model	Off	See Section 9.1.
Keys		
Key debounce (ms)	30	See Section 9.2. 0-1000.

9.1 Several X-keys of the Same Model

Most X-keys don't have a serial number of their own. XPanel X-keys then makes one from the model, so all X-keys of one model have the same serial number, and only one of them can be used at a time.

To use several X-keys of the same model, turn on **Allow several panels of the same model**. The serial number then also includes the USB port the X-keys is plugged into. Note:

- The serial number changes if the X-keys is moved to another USB port, and may change when the SKAARHOJ device or a USB hub restarts. The X-keys then shows up as a new X-keys.
- Such X-keys are not added by themselves: they are listed under **Not added**. Add each one with **Add to the list**. They still pair automatically with panels created in the app.
- When you turn the setting on (or off), you are asked first: the serial numbers of the connected X-keys change. Their existing panels show Not connected, and the X-keys are listed as new.

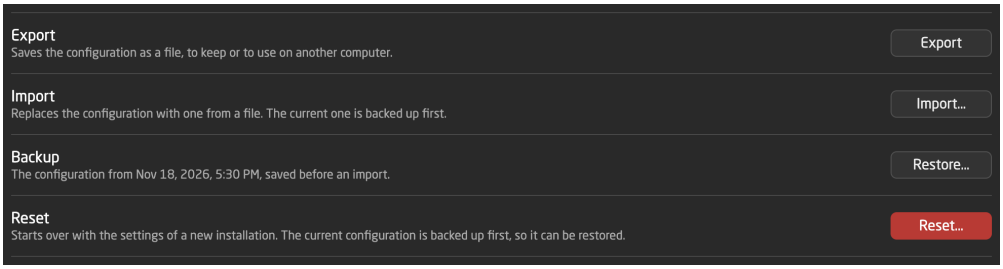
X-keys with a serial number of their own (such as the XBA-T-bar Module) keep it either way.

9.2 Key Debounce

Some keys and switches bounce: one press gives several presses and releases. Key debounce filters this. A press or release is sent right away, and further changes on the same key within the debounce time are ignored. When the time is up, the key's last state is sent if it differs, so a short tap still gets its release. 0 turns it off. A change applies right away. Key debounce applies to all keys, pedals, switch inputs and the program switch.

9.3 Configuration

Under **Configuration**, below the general settings:



- **Export** – saves the configuration (all panels and settings) as a file.
- **Import** – replaces the configuration with one from a file, also one exported by an earlier version.
- **Restore** – goes back to the configuration before the last import, reset or restore. Shown when there is a backup.
- **Reset** (expert mode) – removes all panels and settings. Connected X-keys are added again, possibly on other ports.

The running configuration is backed up before each import, reset or restore; the last 10 backups are kept. Panels restart to match the new configuration, and connected systems reconnect.

Notice

After a reset, panels created in the app get new serial numbers if you create them again, and ports can change, so systems that use them must be set up again.

9.4 Expert Mode

Turn on **Expert** at the bottom of **Settings** to show the Protocol mode setting, the Restart button on Panel, and Reset under Configuration. Expert mode is remembered in the browser.

10 What Raw Panel Systems Can Do

10.1 Events from the X-keys

Control	Event
Keys, pedals, switch inputs, program switch	Press and release.
Shuttle	Speed, -500 to 500 (7 steps each way; 0 at rest).
Jog	Pulses: one per step, the sign gives the direction.
Joystick left-right and up-down	Speed, -500 to 500 each.
Joystick rotation	Pulses, like a jog wheel.
T-bar	Absolute position, 0 to 1000.

10.2 Backlights

Systems set the keys on (with a color), dimmed, off, and blinking. What the X-keys can show depends on the model:

- **Most XK and XKE models** have a blue and a red LED under each key. The blue LED lights when the blue part of the color is more than half, and the red LED when the red part is. Both together look purple. Green has no LED, so green and cyan keys stay dark.
- **Stick models** (XK-4, XK-8, XK-16) have blue backlights. A key lights when any part of its color is more than half.
- **XBA-T-bar Module** has RGB backlights and shows the color.
- **Foot pedal, switch and wire interfaces** have no backlights.

With the SKAARHOJ colors on a blue/red backlight:

Color	Blue/red backlight
Blue, dark blue	Blue
Red, amber, yellow, warm, rose	Red
White, default (no color), purple, pink, ice	Blue and red
Green, cyan, spring, mint	Off

A dimmed key is drawn at a quarter of the color by default, so it's usually dark on blue/red and blue backlights. Systems can change this level (dimmed gain). Brightness commands from a system are accepted, but don't change the backlights.

When the first system connects, all backlights are cleared.

10.3 Outputs

The XK-HD15 GPIO has outputs (IO 1-10). They follow the output state a system sets for HWC 1-10.

11 Network

11.1 Raw Panel Servers

Each active panel runs a Raw Panel server on its own TCP port, from 9933 up. Systems connect to the IP address of the SKAARHOJ device and that port. The protocol (binary or ASCII) is detected automatically, unless the expert setting Protocol mode fixes it. Max clients and Lock to IP addresses limit who can connect.

A system that stops taking data from a panel (for example one that hangs) is disconnected after 10 seconds, so it doesn't slow the panel down for the other systems. It gets the panel's state again when it reconnects.

When a panel's port is used by another panel or another program, the panel isn't started; the list says so (naming the program when it can), and the panel starts as soon as the port is free (it's tried again every 5 seconds).

11.2 Discovery (mDNS)

Every running panel is announced on the local network as a `_skaarhoj-rwp._tcp` service, so Reactor and other SKAARHOJ tools find it:

- Instance name: model [serial], e.g. `XP_XKEYS-XK24 [bcfb2d57]`.
- Host name: `xp-<serial>.local`, e.g. `xp-bcfb2d57.local`.
- TXT records with the serial number, model, name and protocol.

12 License

XPanel X-keys needs a license for the app on the SKAARHOJ device. The license gives 1000 points, and each connected X-keys uses 100 points, so one license covers 10 X-keys. Simulated panels don't use points.

Without a license (or for X-keys beyond the points), panels work for 10 minutes, starting 30 seconds after the app starts. Outside that window they are paused: they still show what systems send, but their key presses and movements aren't sent. The panel is marked Not licensed, and the status line says Not licensed: paused, triggers are not sent. Inside the window, it says Not licensed (trial period).

13 Troubleshooting

Problem	What to do
An X-keys doesn't appear	Check the cable and try another USB port. If it's listed under Not added, click Add to the list, or turn on Add new X-keys.
"Not supported"	The model isn't one of the supported ones (Section 2.2).
"Could not open the device"	The X-keys didn't answer. Unplug it and plug it in again. The app tries again every few seconds.
Only one of several X-keys of the same model appears	They share a serial number. Turn on Allow several panels of the same model (Section 9.1).
An X-keys shows up as new after moving it to another USB port	Its serial number includes the USB port (Section 9.1). Plug it into the port it used before, or pair it with the panel.
"Port ... is used by another panel / program"	Give the panel another Port in its settings, or stop the other program. The panel starts as soon as the port is free.
"Its X-keys is the model ..., not ..."	The paired X-keys is another model than the panel. Unpair it, or remove the panel.
Reactor can't connect	Check the IP address and port in the status line, Lock to IP addresses and Max clients, and that the panel isn't turned off. The panel is only on the network while its X-keys is connected, or while it's simulated.
A key stays dark	Its color has no LED on this model, e.g. green on a blue/red backlight, or it's dimmed (Section 10).
One press gives several	Raise Key debounce (Section 9.2).
Presses aren't sent	No license, or not enough license points (Section 12).
A panel misbehaves	In expert mode, press Restart in the panel's status line.

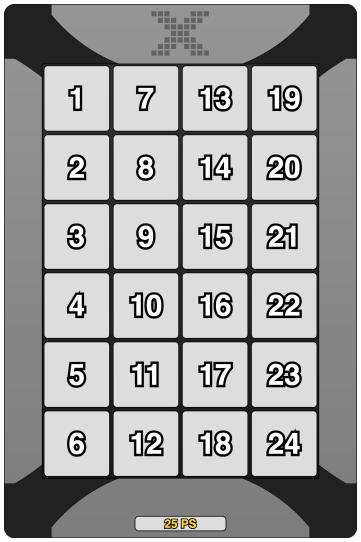
14 Hardware Components (HWC) Reference

The numbers Reactor uses for the controls of each model. On the XK and XKE models, keys are numbered by column: top to bottom, then the next column to the right. A key position taken by a jog, joystick or T-bar keeps its number free, and the first free number of that area is used for the control. The XKE-40 is numbered by row, and the sticks left to right.

Model	HWCs
XK-24	1-24 keys, 25 program switch
XK-12 Jog-Shuttle	Keys 1-3, 7-9, 13-15, 19-21; 4 shuttle, 5 jog; 25 program switch
XK-12 Joystick	1 left-right, 2 up-down, 3 rotation; keys 4-6, 10-12, 16-18, 22-24; 25 program switch
XK-60	60 keys of 1-80 (see the drawing), 81 program switch
XK-80	1-80 keys, 81 program switch
XK-68 Jog-Shuttle	68 keys of 1-80, 30 shuttle, 31 jog, 81 program switch
XK-68 Joystick	68 keys of 1-80, 28 left-right, 29 up-down, 30 rotation, 81 program switch
XKE-64 Jog T-bar	64 keys of 1-80, 6 shuttle, 7 jog, 73 T-bar
XKE-124 T-bar	124 keys of 1-128, 109 T-bar
XKE-128	1-128 keys
XBA-T-bar Module	Keys 1-6, 11-18; 7 T-bar
XKE-40	1-20 top row, 21-40 bottom row, 41 program switch
XK-4, XK-8, XK-16 Stick	1-4, 1-8 or 1-16 keys; 5, 9 or 17 program switch
XK-3 Foot Pedal	1 left, 2 middle, 3 right pedal
XK-3 Switch Interface	1-3 inputs
XK-12 Switch Interface	1-12: port 1 tip, port 1 ring, port 2 tip, ..., port 6 ring
XK-HD15 Wire Interface	1-10 inputs; 11 port 1 tip, 12 port 1 ring, 13 port 2 tip, 14 port 2 ring
XK-HD15 GPIO	1-10 inputs/outputs; 11 port 1 tip, 12 port 1 ring, 13 port 2 tip, 14 port 2 ring

The drawings below show the number of each component. Keys are white, other controls yellow.

14.1 XK-24, XK-12 Jog-Shuttle, XK-12 Joystick



XK-24

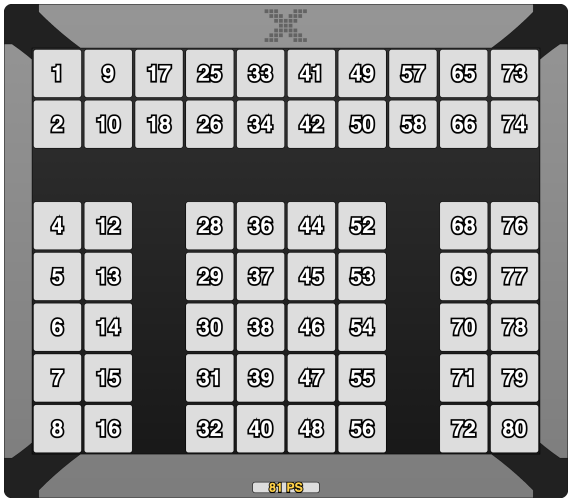


XK-12 Jog-Shuttle

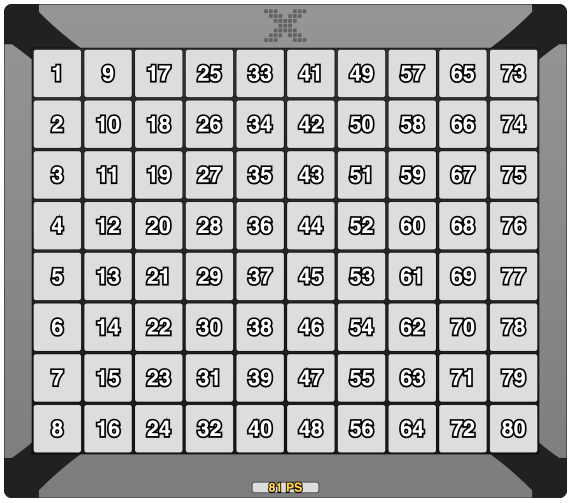


XK-12 Joystick

14.2 XK-60, XK-80

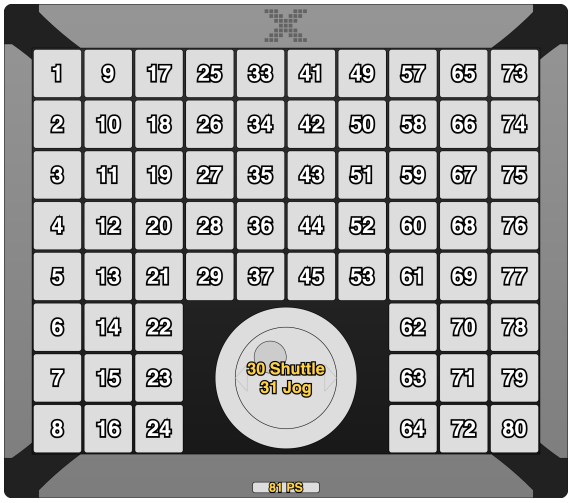


XK-60

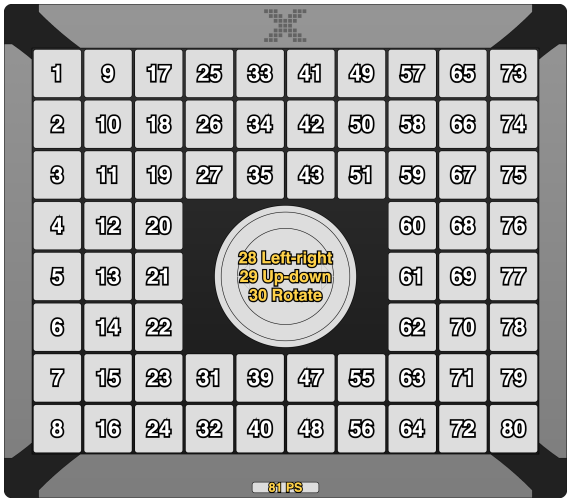


XK-80

14.3 XK-68 Jog-Shuttle, XK-68 Joystick

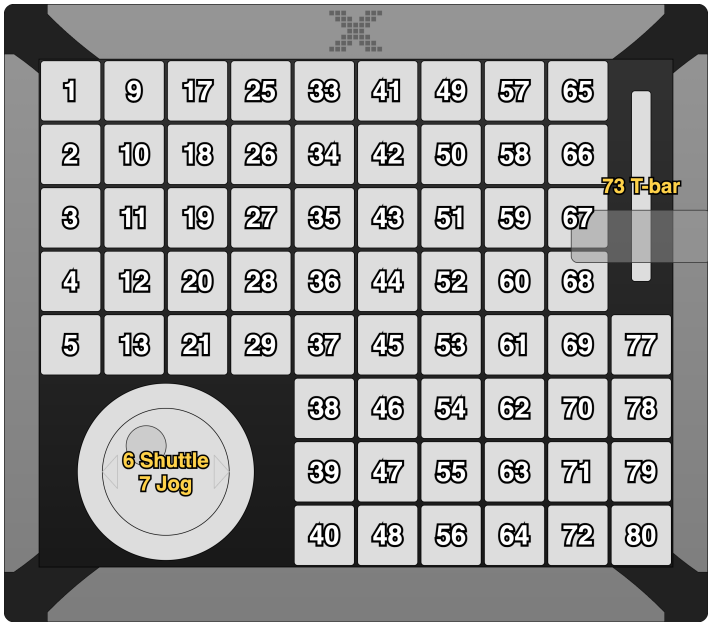


XK-68 Jog-Shuttle

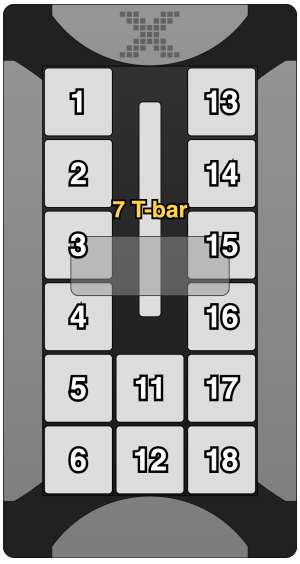


XK-68 Joystick

14.4 XKE-64 Jog T-bar, XBA-T-bar Module

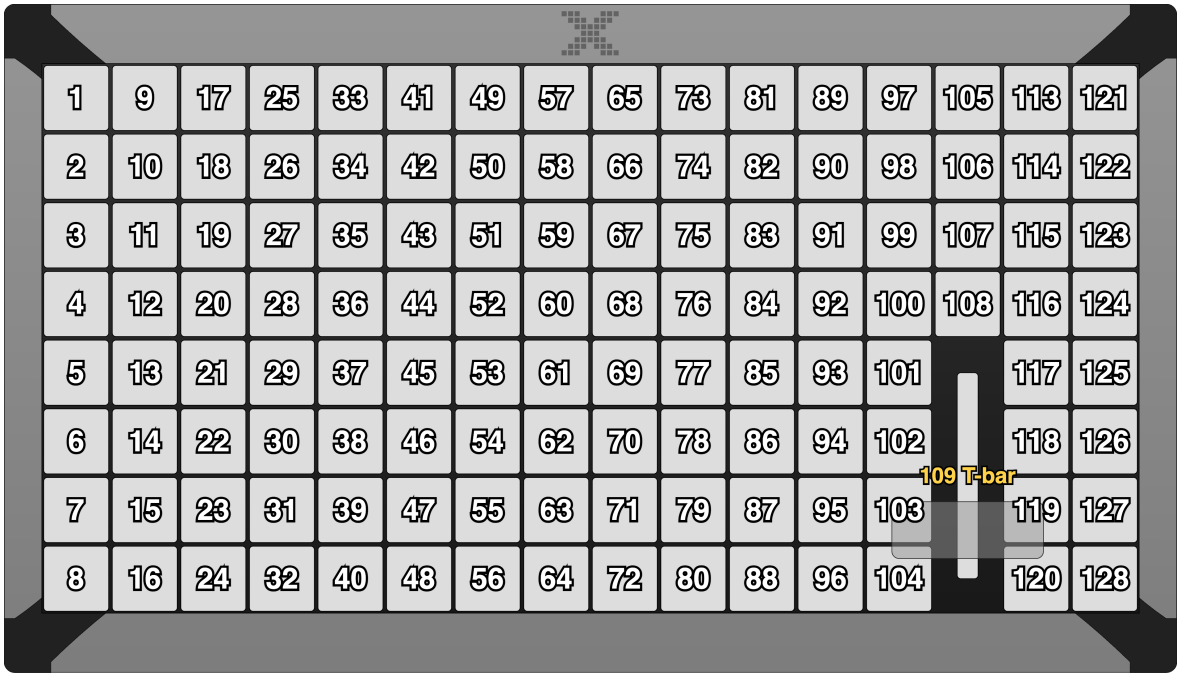


XKE-64 Jog T-bar

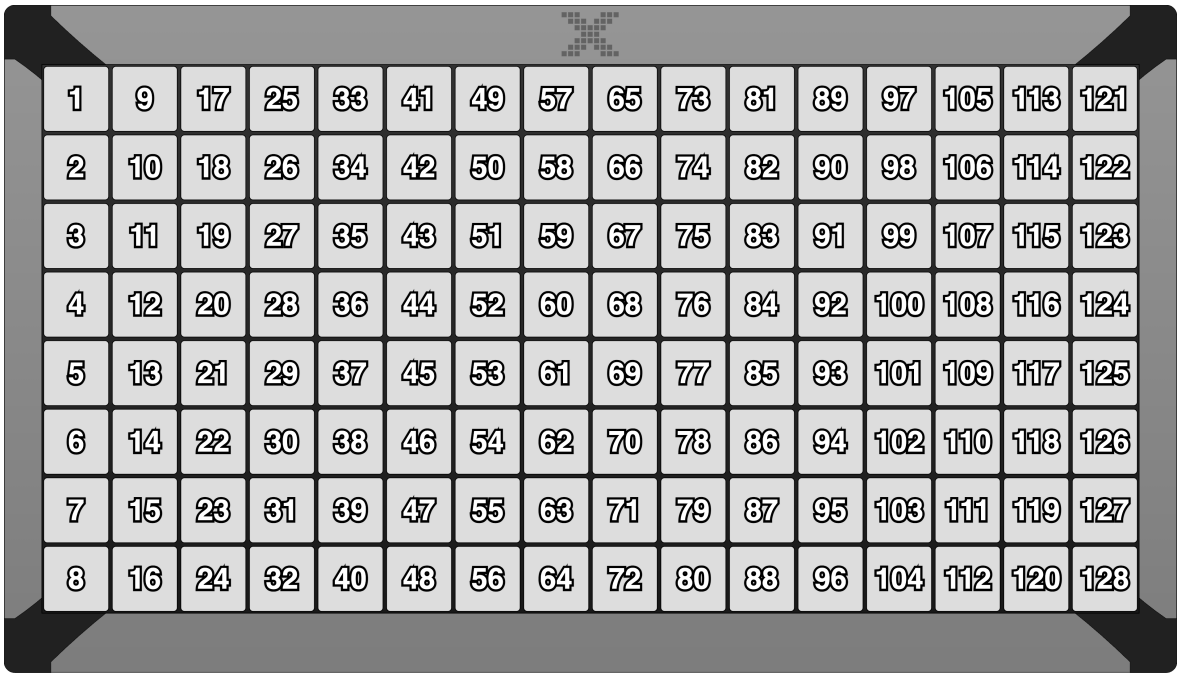


XBA-T-bar Module

14.5 XKE-124 T-bar, XKE-128



XKE-124 T-bar



XKE-128

14.6 XKE-40, Sticks, Foot Pedal



XKE-40



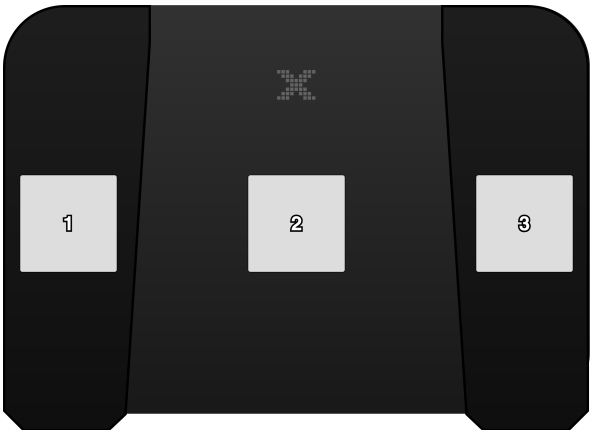
XK-16 Stick



XK-8 Stick



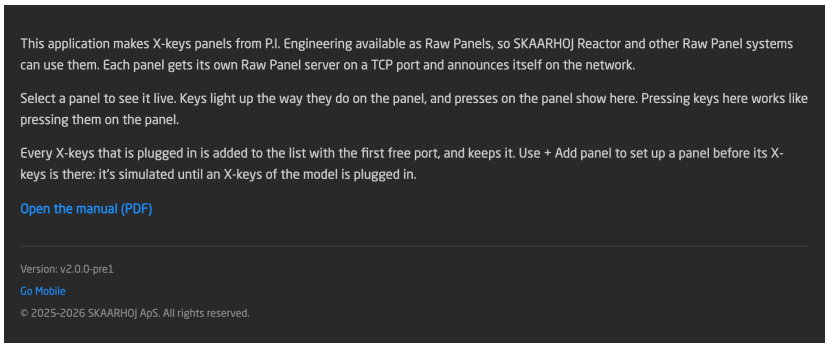
XK-4 Stick



XK-3 Foot Pedal

15 Reference

15.1 Info and Expert



Control	Description
Version	The running version, on the **Info** page.
Go Mobile	On the **Info** page: a QR code with the app's address, to open it on a phone or tablet.
Expert	At the bottom of **Settings**: shows the expert settings and controls. Remembered in the browser.

15.2 Ports

Port	Use
9933 and up (TCP)	Raw Panel servers, one per panel
5353 (UDP)	mDNS: announcing the Raw Panels

15.3 Stored Data

The app keeps its data in its folder in the SKAARHOJ device's configuration folder:

- `config.json` — the configuration (all panels and their settings).
- `config-backups/` — the newest 10 backups, made before import, restore and reset.
- `SerialInfo.json` — start counts and uptime per serial number.

15.4 Upgrading from Earlier Versions

Settings made with versions before the app interface (on the SKAARHOJ device's configuration page) are converted the first time the new version starts. Settings are now managed in the app only.

- X-keys with their own settings become panels with those settings.
- X-keys used before keep the port they had, except those whose serial number included the USB port.
- The "Max panels without own settings" and "Keep each panel on its port" settings are gone: every X-keys now has its own panel.
- The starting port of a converted configuration is kept. New installations start at 9933.
- The network name of each panel is now `xp-<serial>.local`.
- The package is now listed as X-keys Integration in the Package Manager.

15.5 Usage Statistics

The app sends anonymous usage statistics to SKAARHOJ: the app version, the operating system, and a summary of the configuration (number of panels and active panels, models, protocol mode, the Add new X-keys and Allow several panels of the same model settings, and the model and serial number of each paired or connected X-keys). The SKAARHOJ device's type and serial number are included. Descriptions, IP addresses and ports are not sent.