

Raw Panel



— Your parameter values

— Your encoder knobs

— Your joystick

— Your images

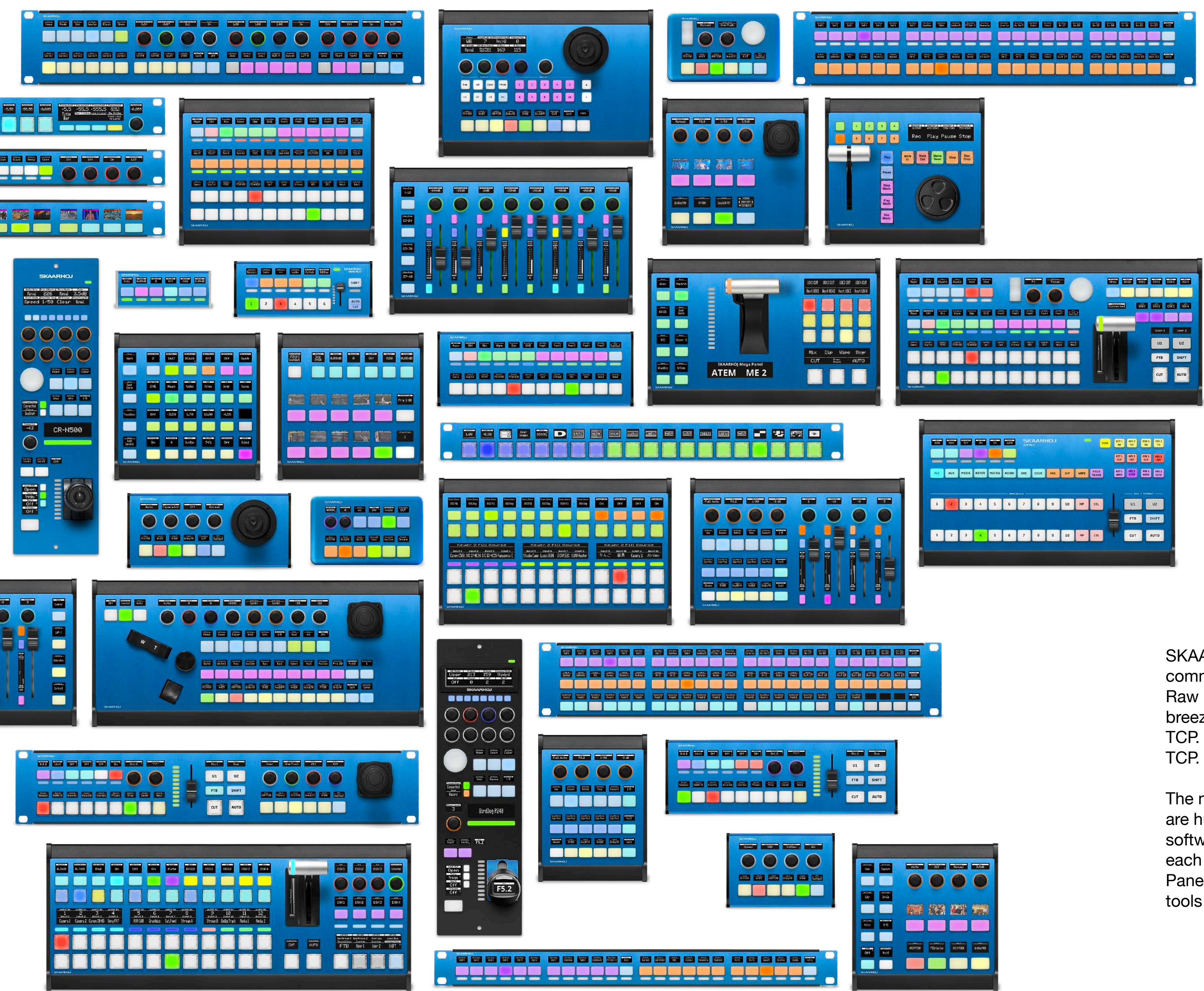
— Your button colors

— Your display text

— Your button press

— = Your panel!

Supercharge Your Product with SKAARHOJ Raw Panel



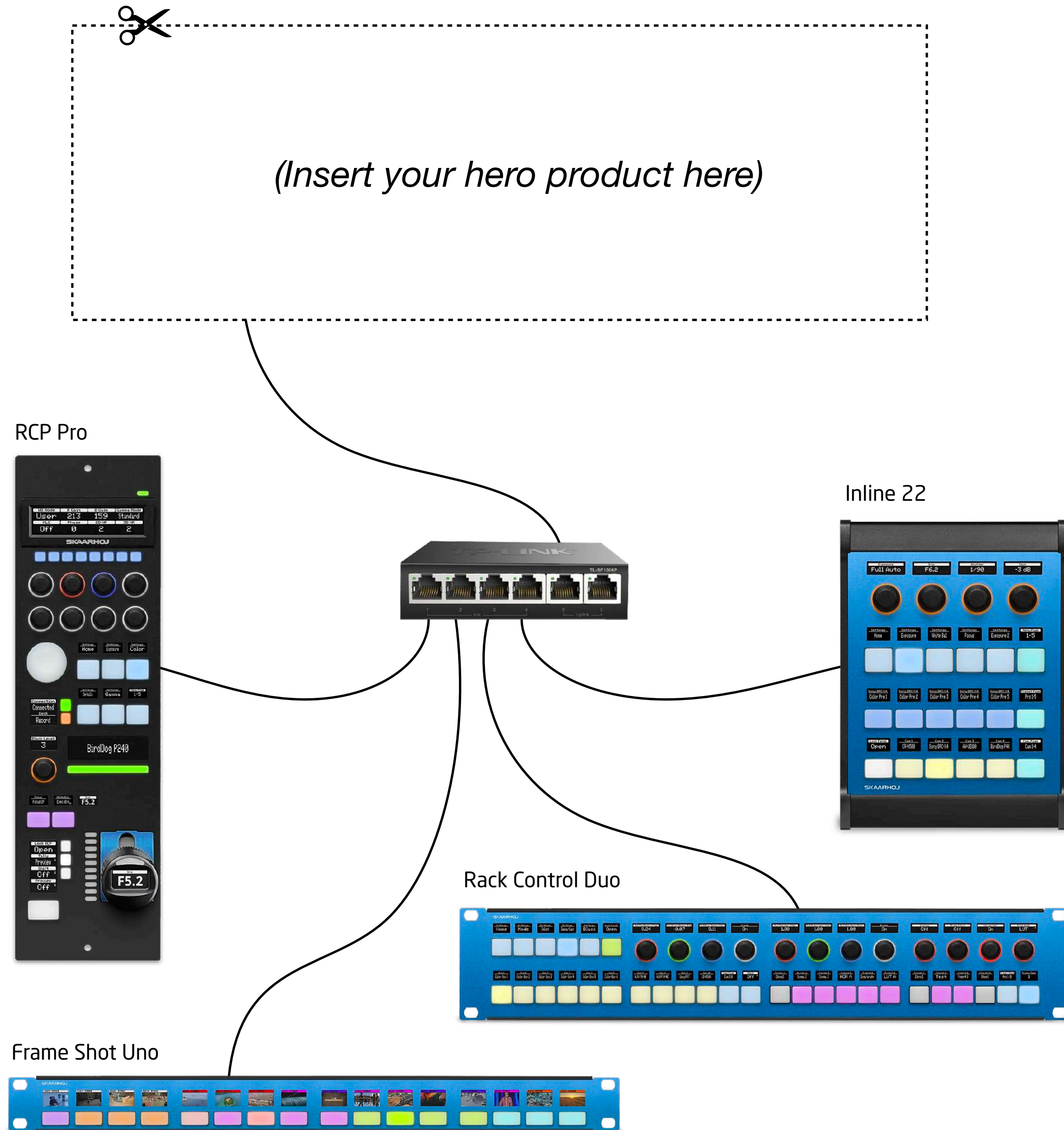
Raw Panel

- ★ Supports all SKAARHOJ panels
- ★ Quick and easy start
- ★ IP-networked with TCP server
- ★ Event-based trigger system
- ★ LED and display feedback
- ★ ASCII/binary message encoding
- ★ Self-describing panel topology
- ★ mDNS/ZeroConf discoverability
- ★ Comprehensive panel emulator
- ★ Valuable toolchain provided

SKAARHOJ panels are the real deal, tailored for broadcast and AV live productions. We're committed to providing a diverse range of tactile control panels for all your broadcasting needs. Raw Panel is our internal backbone protocol, making integration with any SKAARHOJ panel a breeze. Our panels are 100% IP-based with Power over Ethernet (PoE), connecting to clients via TCP. Press a button, turn a knob, move a fader or joystick, and the panel sends triggers back over TCP. Your product can then send color codes and display text or graphics back to the panel.

The messaging protocol is versatile, operating in ASCII or binary mode. In ASCII mode, messages are human-readable and easy to decode, while binary encoding offers greater efficiency for software integration. Raw Panel has a self-describing panel concept, revealing essential details of each hardware component to create configuration interfaces for any Raw Panel-compliant device. Panels are also discoverable with ZeroConf/mDNS, and SKAARHOJ offers a robust set of free tools to emulate any SKAARHOJ panel and explore the Raw Panel protocol.

Easy!



```
kasper — nc 192.168.11.196 9923 — nc — nc 192.168.11.196...
Last login: Fri Sep  2 22:22:55 on ttys034
[~ > nc 192.168.11.196 9923
list
_model=SK_INLINE22V2
_serial=999923
_name=Inline 22
_platform=simulator
_bluePillReady=1
_serverModeLockToIP=
HWC#2.4=Down
HWC#2.4=Up
HWC#26=Enc:1
```

Simply Connect

Type "list" and press enter - the panel reveals its identity. Interact with a hardware component (HWC), and you'll get instant feedback.

T-Bar:

HWC#50=Abs:0
 HWC#50=Abs:22
 HWC#50=Abs:39
 HWC#50=Abs:66
 HWC#50=Abs:92
 ...
 HWC#50=Abs:967
 HWC#50=Abs:988
 HWC#50=Abs:1000

Triggers

Feedback

Fader Position:

HWCx#87=21035

Alternative JSON encoding:
 {"HWCIDs":53,"HWCEntended":
 {"Interpretation":5,"Value":555}}



Encoder (Left/Right turns):

HWC#86=Enc:1
 HWC#86=Enc:2
 HWC#86=Enc:6
 HWC#86=Enc:1
 HWC#86=Enc:-4
 HWC#86=Enc:-3
 HWC#86=Enc:-6
 HWC#86=Enc:-5

Four-way buttons

HWC#55.8=Down
 HWC#55.8=Up
 HWC#55.1=Down
 HWC#55.1=Up
 HWC#55.2=Down
 HWC#55.2=Up
 HWC#55.4=Down
 HWC#55.4=Up

(Digits 1,2,4 and 8 are edge detection)

NKK Broadcast Buttons

HWC#12=Down
 HWC#12=Up
 HWC#13=Down
 HWC#12=Up

(Straight up old school)

Blue as RGB (3*2bit):

HWCc#52=203

Alternative JSON encoding:
 {"HWCIDs":52,"HWCColor":{"ColorRGB":
 {"Red":52,"Green":213,"Blue":255}}}

"On" and Amber:

HWC#53=4

HWCc#53=136

Alternative JSON encoding:
 {"HWCIDs":53,"HWCMoDe":
 {"State":4,"HWCColor":{"ColorIndex":{"Index":8}}}

Text

HWCt#54=|||Output 6|1|Feed1|Drone|1

Alternative JSON encoding:
 {"HWCIDs":53,"HWCText":
 {"Formatting":7,"Title":"Output
 6","Textline1":"Feed1","Textline2":"Drone","PairMo
 de":1}}



Message Encoding

Raw Panel ASCII Command sequence (v1):

```
HWC#53=4  
HWCC#53=136  
HWCx#53=21035  
HWct#53=|||Output 6|1|Feed1|Drone||1
```

Raw Panel ASCII JSON (v2):

```
{"HWCIDs": [53], "HWCMODE": {"State": 4}, "HWCCOLOR":  
{"ColorIndex": {"Index": 8}}, "HWCEXTENDED":  
{"Interpretation": 5, "Value": 555}, "HWCTEXT":  
{"Formatting": 7, "Title": "Output  
6", "Textline1": "Feed1", "Textline2": "Drone", "PairMode": 1}}
```

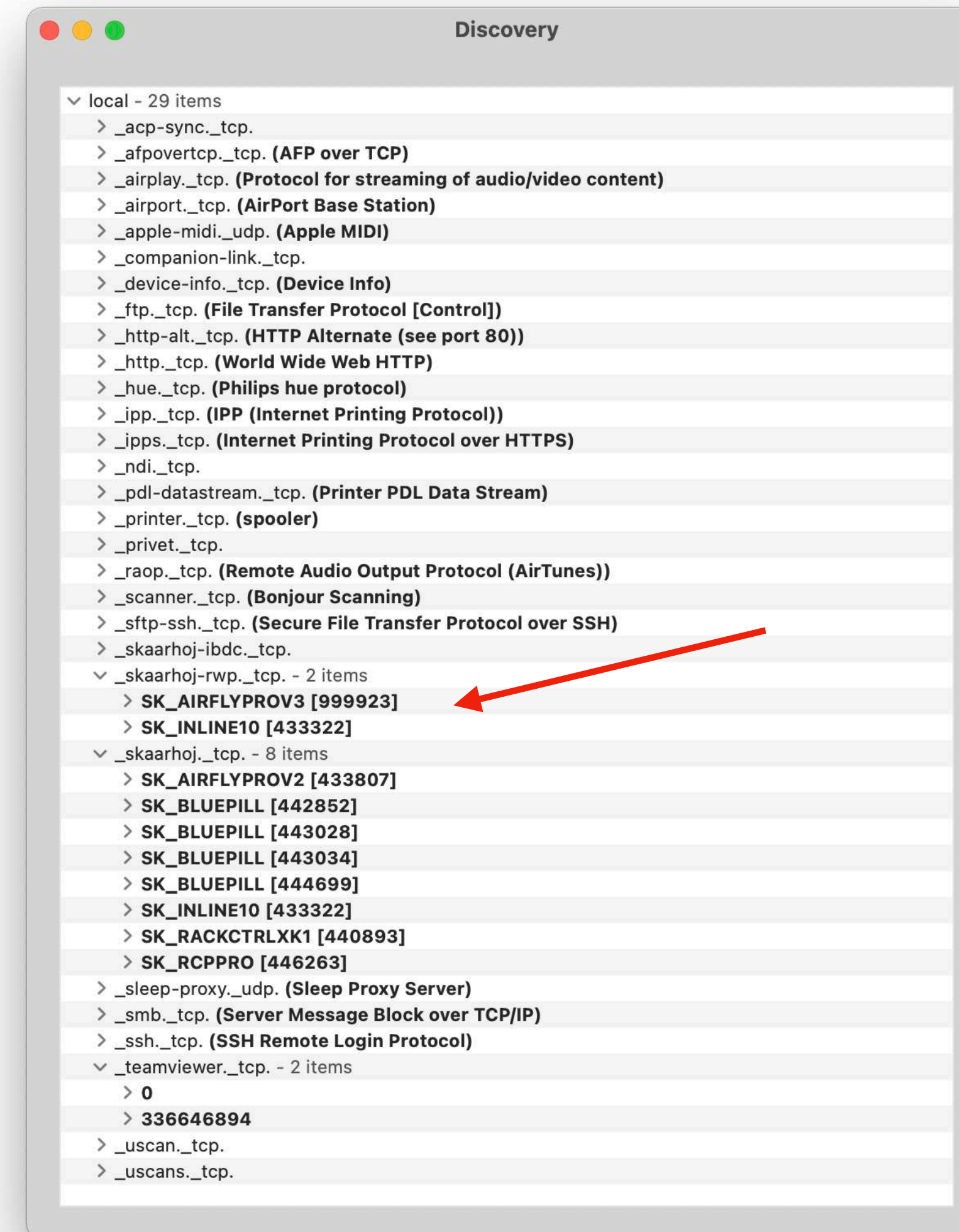
Raw Panel Binary Protobuf command:

```
34 00 00 00 42 32 0a 01 35 12 02 10 04 1a 04 12 02 08 08 22  
05 10 05 18 ab 04 2a 1c 18 07 3a 08 4f 75 74 70 75 74 20 36  
4a 05 46 65 65 64 31 52 05 44 72 6f 6e 65 60 01
```

For Raw Panel clients (that's *your* product), Raw Panel can be encoded in ASCII and binary form. SKAARHOJ UniSketch panels support ASCII V1 only, while Blue Pill based panels support ASCII V1, V2 (JSON encoding), and binary Protocol Buffer encoded forms.

Most third-party integrators start with ASCII V1, but may switch to ASCII V2 or binary encoding as needed. Binary encoding, used internally in all SKAARHOJ Blue Pill based products, is the easiest and fastest option for integration with Go (Golang) as we offer numerous free libraries for handling and conversion.

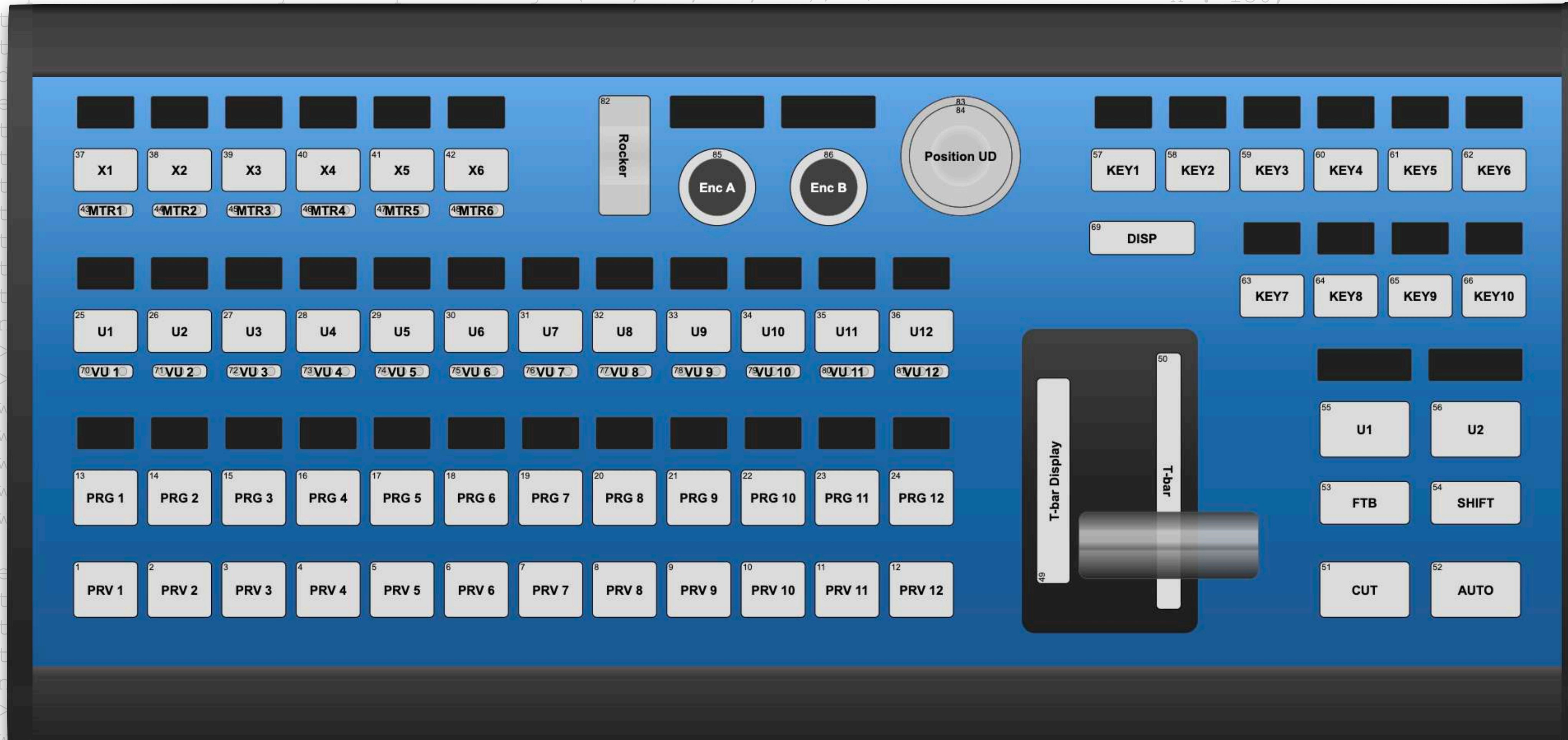
Where's Waldo?



Network Discovery

SKAARHOJ panels are easily discovered on your network using ZeroConf/mDNS look-up.

Self Describing Topology



JSON and SVG

Panel features are described using a combination of an SVG basis and a JSON data structure for each hardware component. Features include input type, output, extended features, and associated display resolution and color style.

SKAARHOJ utilizes the topology, SVG and JSON to render panel visualizations in our applications and emulators, and so can you!

Raw Panel Dummies

SKAARHOJ provides a versatile emulator for Windows, Mac, and Linux, capable of emulating any SKAARHOJ panel. Launch the emulator, and it initiates a TCP server while simultaneously opening a web browser featuring a panel view based on its topology. Engage with the virtual panel – press buttons, rotate encoders, and maneuver faders and joysticks – as the emulator accurately reproduces text, graphics, and LED colors. It even simulates button and display brightness commands along with the sleep timer, ensuring a true-to-life experience!

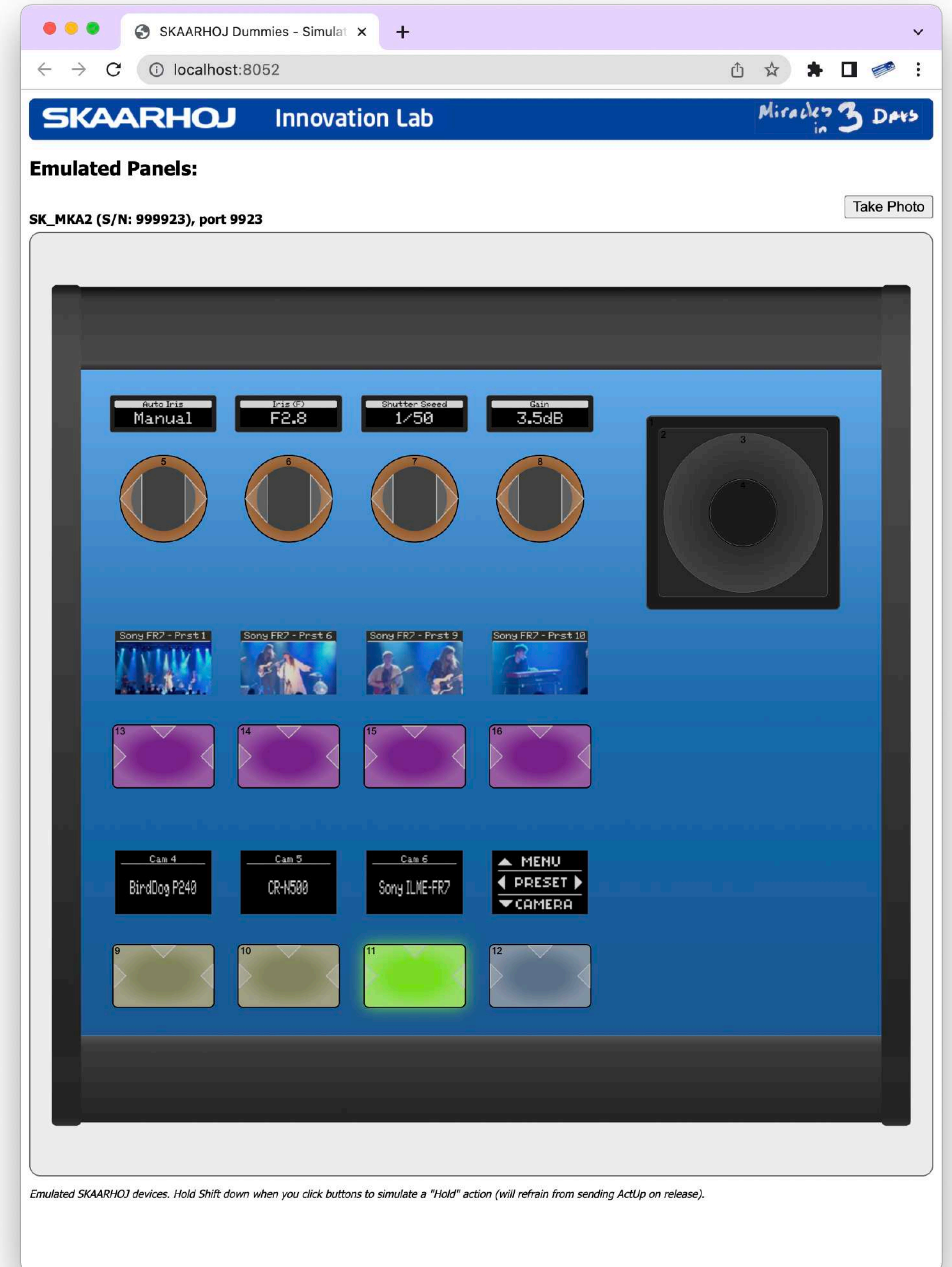


Real World Panel



Raw Panel Dummies

Emulated Panel



Have Fun Learning

Panel Explorer
Updated: 22:28:35.0

Panel Info:

Title:	PTZ Extreme V2	S/W version:	simulator	Boot Count:	524	Rdy/Bsy:	
Model:	SK_PTZEXTREMEV2	Platform:	Yes	Total Uptime:	1d 18h	Sleeping:	CPU
Serial:	999923	Blue Pill Ready:	Yes	Session Uptime:	0h 32m		
Max Clients:	192.168.11.196			Screen Save On:	0d 4h (9%)		

Connections: 192.168.11.196
Locked to IPs:

Clear All Clear Disp Clear LEDs Full Throttle Sleep 5s Sleep 2m Sleep 1h Never Wake Up
Brightness: Dimmed Gain: Load CPU Cores: Disconnected

Reference SVG Rendering:

Panel Communication:

HWC#37 State

Mode: State: Off Dimmed **On** Amber (On) Red (On) Green (On)

Output bit: Off On

Blink:

Color: Default White Warm Red (B) Rose Pink Purple Amber (B) Yellow (B) Dark Blue Blue Ice Cyan Spring (B) Green (B) Mint Light Gray Dark Gray

RGB code: [Pick] #.....

Extended Return Value: 0 VU Demo Stop Reset Ext

Text: Solid header

Textline 1:

Textline 2:

Images: B/W Gray Color Choose File No file chosen

Send full state - Start Demo Stop < Step Step >

Raw Panel ASCII Command sequence (v1):
HWC#37=4

Raw Panel ASCII JSON (v2):
{"HWCID":37,"HWCMode":{"State":4}}

Raw Panel Binary Protobuf command:
09 00 00 00 42 07 0a 01 25 12 02 10 04

Panel Explorer

Our Panel Explorer tool (Windows/Mac/Linux) lets you play around with Raw Panel. Scan your network for available panels, connect to them, and send feedback commands for colors and display contents. Panel triggers are displayed in Panel Explorer, complete with a "trigger scope" for graphical analysis of timing aspects.

Bonus: The source code (written in Go) is MIT licensed and public! Download binaries at GitHub: <https://github.com/SKAARHOJ/raw-panel-explorer>



Topology Summary:

HWC id	Text	In	Out	Ext	Display
1	Cam1	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
2	Cam2	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
3	Cam3	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
4	Cam4	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
5	Cam5	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
6	Cam6	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
7	Cam7	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
8	Cam8	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
9	Cam9	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
10	Cam10	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
11	Cam11	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
12	Cam12	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
13	X1	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
14	X2	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
15	X3	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
16	X4	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
17	X5	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
18	X6	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
19	X7	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
20	X8	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
21	X9	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
22	X10	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
23	X11	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
24	X12	Button, Four-way (b4)	RGB LED (rgb)		64x32, Gray
37	A 1	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
38	A 2	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
39	A 3	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
40	A 4	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
41	A 5	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
42	A 6	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
43	A 7	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
44	A 8	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
45	A 9	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
46	Knob A	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
47	Knob B	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
48	Knob C	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
49	Knob D	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
50	Knob E	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
51	Knob F	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
52	Knob G	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
53	Knob H	Encoder w/button (pb)	RGB LED (rgb)		112x32, Mono
54	A 10	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
55	A 11	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
56	A 12	Button, Four-way (b4)	RGB LED (rgb)		64x32, Mono
57	Iris	Encoder w/button (pb)	-		
58	Zoom	Intensity component, horizontal (ih)	-		
59	Focus	Encoder (pulsed input) (p)	-		
60	LR	Intensity component, horizontal (ih)	-		
61	UD	Intensity component, vertical (iv)	-		
62	Rotate	Intensity component, rotational (ir)	-		
63	Top button	Button (b)	-		



Raw Panel API



This Booklet