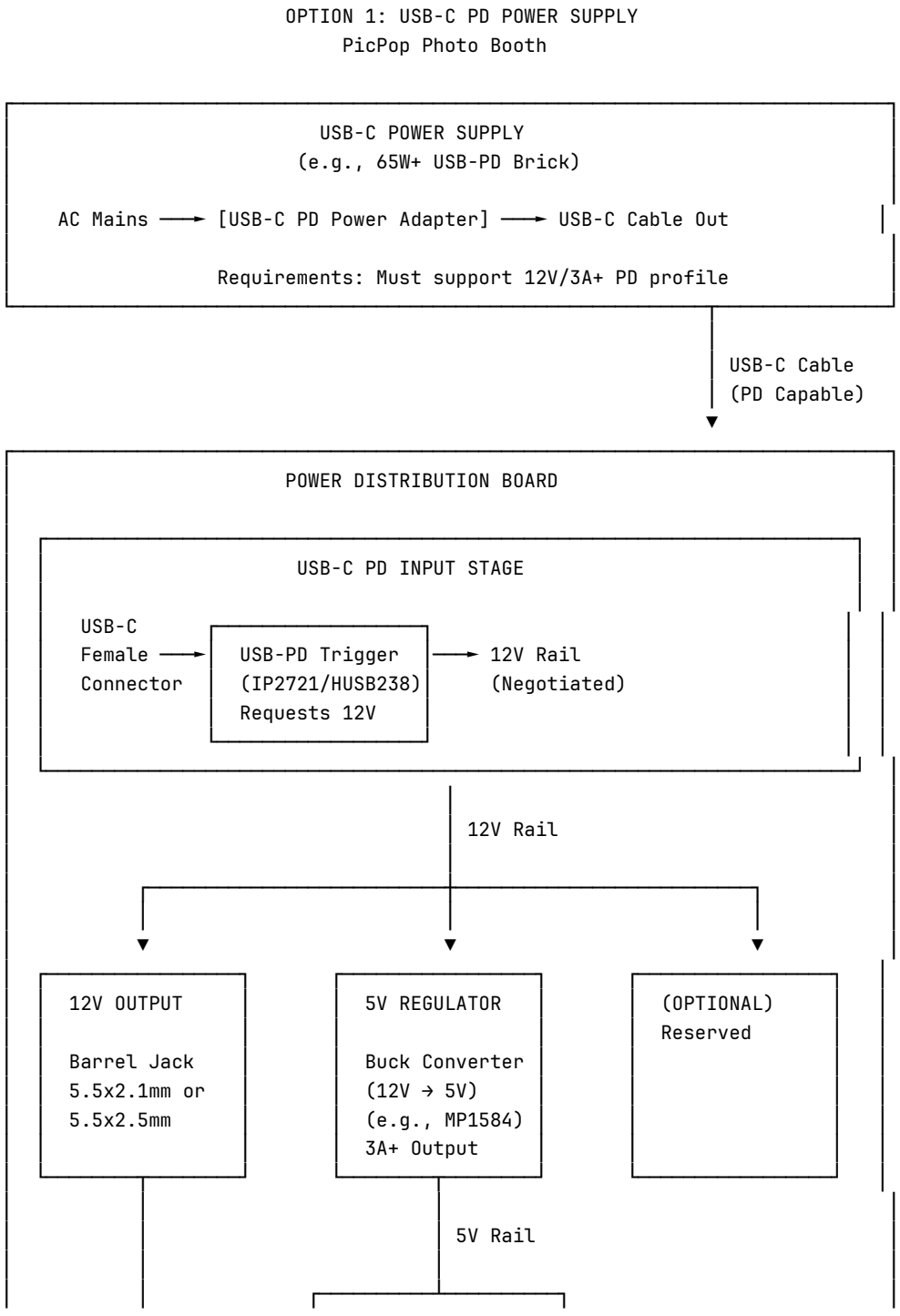
PicPop Power Distribution Plan

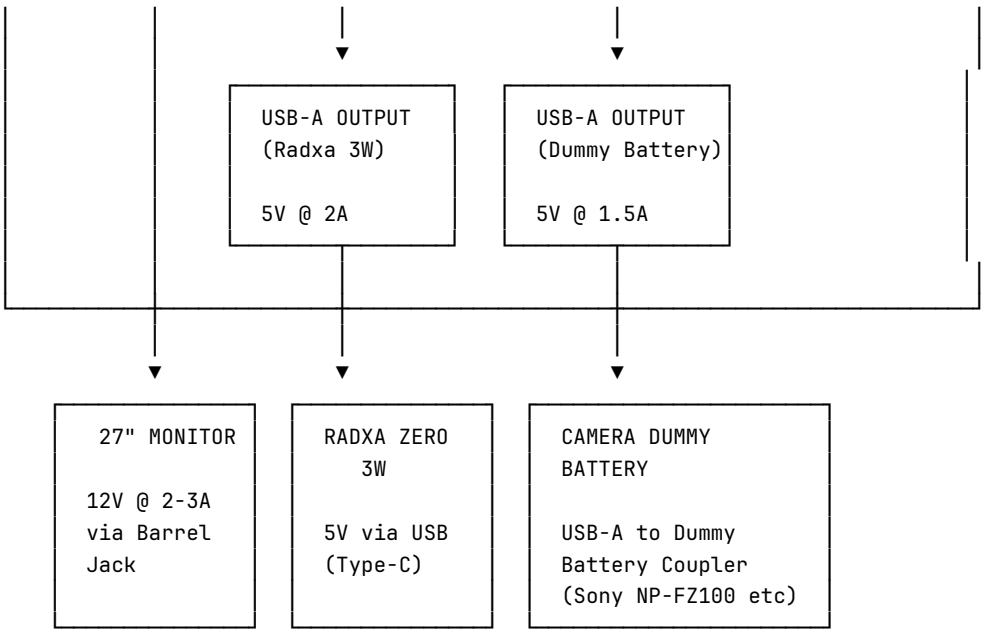
Single power supply feeding an intermediate power board that provides 12V for the monitor and 5V for the Radxa and camera.

OPTION 1: USB-C PD Power Supply

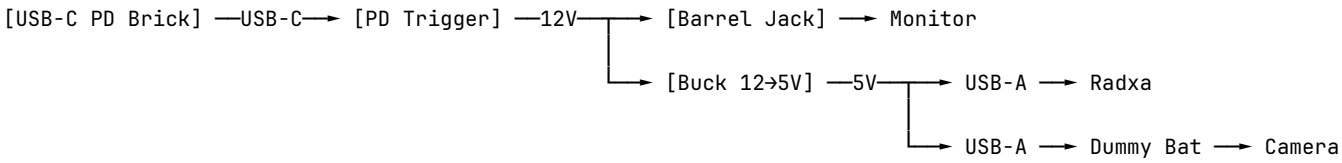
Uses a USB-C Power Delivery brick with a PD trigger to negotiate 12V.

System Diagram (Option 1)





Wiring Summary (Option 1)



USB-C PD Trigger Options

Module	Price	Notes
IP2721	$2-5	Simple fixed 12V trigger
HUSB238	$3-6	Programmable, I2C control
CH224K	$2-4	Popular, configurable via resistors

Option 1 Pros/Cons

Pros	Cons
Compact, portable power brick	Requires PD trigger module
USB-C is universal/modern	Not all bricks support 12V profile
Easy to find replacement bricks	More complex distribution board
Can double as laptop charger	PD negotiation adds failure point

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OPTION 2: 12V DC Power Supply

Uses a traditional 12V DC barrel jack power supply (like a laptop charger).

System Diagram (Option 2)

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OPTION 2: 12V DC POWER SUPPLY
     PicPop Photo Booth
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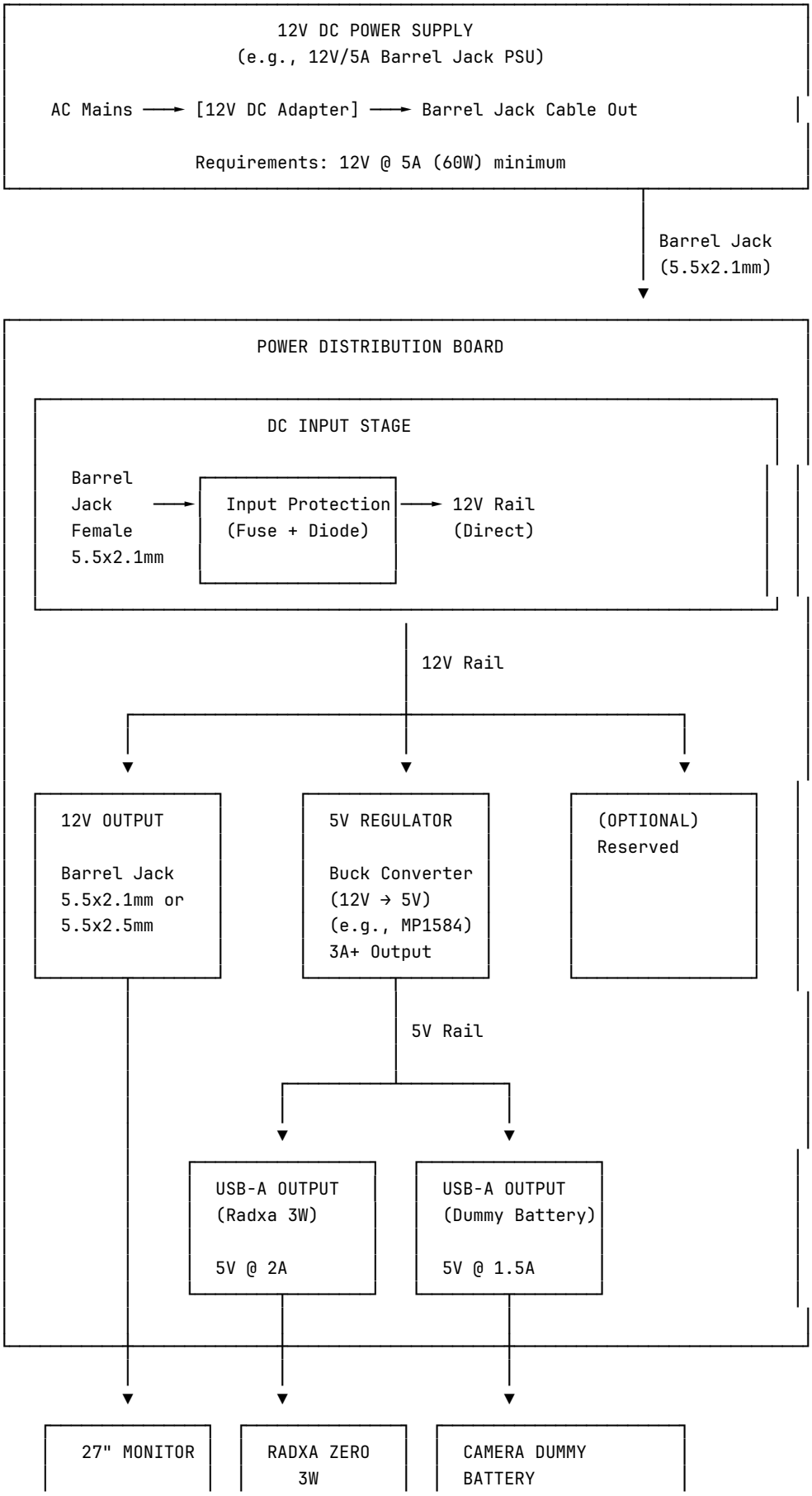
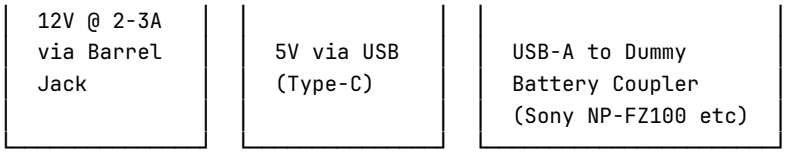
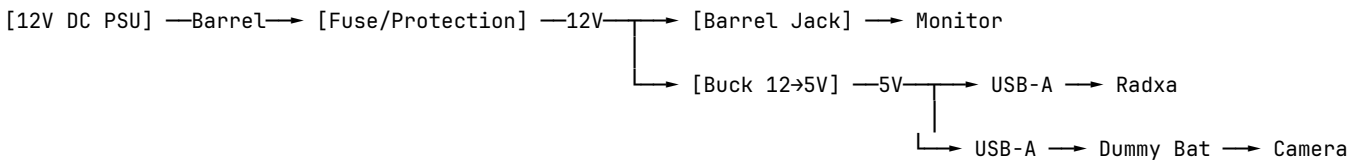

12V DC POWER SUPPLY
(e.g., 12V/5A Barrel Jack PSU)
AC Mains
[12V DC Adapter]
Barrel Jack Cable Out
Requirements: 12V @ 5A (60W) minimum
Barrel Jack
(5.5x2.1mm)
POWER DISTRIBUTION BOARD
DC INPUT STAGE
Barrel Jack Female 5.5x2.1mm
Input Protection (Fuse + Diode)
12V Rail (Direct)
12V Rail
12V OUTPUT
Barrel Jack 5.5x2.1mm or 5.5x2.5mm
5V REGULATOR
Buck Converter (12V → 5V)
(e.g., MP1584)
3A+ Output
(OPTIONAL)
Reserved
5V Rail
USB-A OUTPUT
(Radxa 3W)
5V @ 2A
USB-A OUTPUT
(Dummy Battery)
5V @ 1.5A
27" MONITOR
RADXA ZERO 3W
CAMERA DUMMY BATTERY



Wiring Summary (Option 2)



Option 2 Pros/Cons

Pros	Cons
Simple, no PD negotiation needed	Bulkier power supply
Cheap and widely available	Less portable
Direct 12V, fewer failure points	Need specific voltage PSU
Easy to find high-current units	Extra cable/brick to carry

Shared Components (Both Options)

Buck Converter (12V to 5V)

Module	Price	Max Current	Notes
MP1584	$1-3	3A	Compact, good efficiency
LM2596	$2-4	3A	Adjustable output
Mini360	$1-2	1.8A	Very compact (single device only)

Barrel Jack Connector (Monitor Output)

- **Check your monitor's barrel jack size!**
- Common sizes: 5.5x2.1mm or 5.5x2.5mm
- Verify polarity: Usually center-positive

Power Budget

Component	Voltage	Current	Power
27" Monitor	12V	2-3A	24-36W
Radxa ZERO 3W	5V	2A (peak)	10W
Dummy Battery (Camera)	5V	1.5A	7.5W
Total			**42-54W**

Recommendation:

- Option 1: Use a 65W+ USB-PD power supply (must support 12V profile)
- Option 2: Use a 12V/5A (60W) DC adapter minimum

Key Considerations

1. **Option 1 - USB-PD Negotiation**: The PD trigger module must successfully negotiate 12V. Verify your brick supports the 12V PD profile (not all do - many jump from 9V to 15V or 20V).
2. **Option 2 - Voltage Tolerance**: Cheap 12V adapters may output 12.5-13V. This is fine for monitors and buck converters but verify your monitor's tolerance.
3. **Barrel Jack Sizing**: Measure your monitor's barrel jack carefully. 5.5x2.1mm and 5.5x2.5mm look nearly identical but won't interchange properly.
4. **5V Rail Current**: The buck converter handles combined load of Radxa (~2A peak) + dummy battery (~1.5A). Use a converter rated for 4-5A minimum.
5. **Heat Dissipation**: The buck converter will dissipate ~3.5W as heat at full load. Ensure adequate ventilation or add a small heatsink.
6. **Input Protection (Option 2)**: Add a fuse (5A) and reverse polarity diode to protect against wrong adapter or shorts.

Recommendation

Option 2 (12V DC) is simpler and more reliable for a stationary photo booth:

- No PD negotiation complexity
- Cheaper overall
- Easier to troubleshoot
- More headroom on current capacity

Option 1 (USB-C PD) is better if:

- Portability is important
- You want to use one charger for multiple devices
- You already have a compatible USB-PD brick