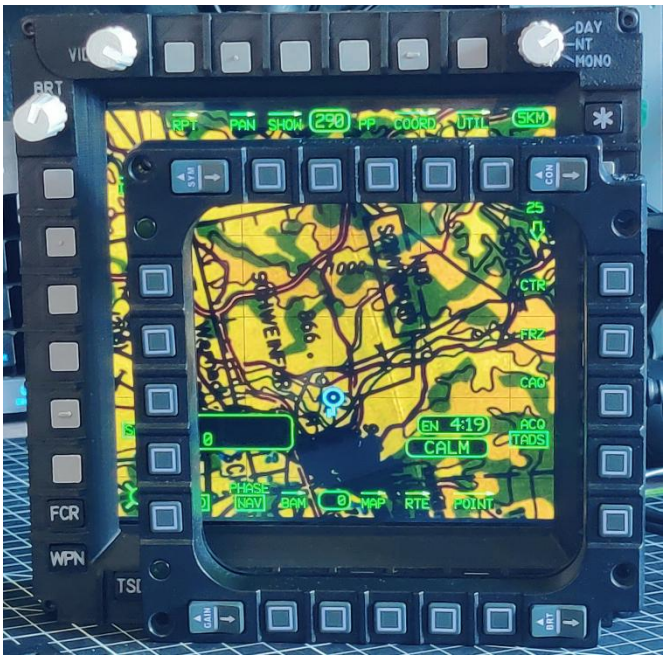
MilKris‘ Multi-Purpose-Display (MPD) for the DCS AH-64D Apache

DISCLAIMER: I’m not a professional maker! It’s not perfect, but it works and I’m fine with the result. Here and there, some filing, drilling, and gluing might be necessary...

My projects have been downloaded thousands of times in the past. Providing the files and creating a guide is very time-consuming. Since no one is willing to make even a small donation, I have decided to offer the 3D files only for a small fee from now on. https://cults3d.com/de/modell-3d/gadget/ah-64d-mpd-multi-purpose-display

This is my MPD for the DCS AH-64D Apache. The project includes 3D-printable files, optional parts with raised labels or laser engraving support, and of course my code for the Arduino. The total cost to build one MPD is approximately €70 or about $80. **If Arduino feels like a complete mystery to you**, I also describe an alternative build using a Leobodnar BBI-64 USB game controller board. This option is basically plug & play, but it does increase the cost.

A few things to know before you start building:



The MPDs are not true to the original scale! I intentionally resized them to perfectly fit an 8-inch display. Still, with dimensions of 174x174mm, they are significantly larger than, for example, the TM Cougar MFDs.

For **VR users**, an actual LCD screen doesn’t make much sense — that’s why I’ve included a “ScreenDummy.stl” for 3D printing. Additionally, I’ve designed a few special buttons with raised tactile markers to make identification easier by touch.

I chose the **Arduino Mega 2560** for this build because it's affordable and offers a shitload of digital input/output pins**. It constantly checks whether you are in the pilot or co-pilot/gunner position**, and the controls are automatically assigned accordingly.

Both MPDs are built identically. The enclosure features four cable openings, allowing you to route the wires according to your setup. This gives you flexibility to adapt the installation to your needs.

Since I’m using DCS-BIOS (Skunkworks), these MPDs are designed to work exclusively with the DCS AH-64D Apache! **There is a separate Arduino sketch (code) for a left and right MPD**.

Alternatively, I recommend using a *Leobodnar BBI-64*. It acts as a simple USB game controller and requires **no additional configuration**. Plus, you won't need to follow a specific pin layout during wiring, which makes installation much easier. If you're going the BBI-64 route, check the instructions on the last page.

If you want to build this project using the Arduino Mega 2560 you need to **flash my code** onto an **Arduino**. Here are my sketches:
LEFT MPD: https://github.com/MilKris666/AH-64D-Apache-MPD-Multi-Purpose-Display/blob/main/AH64_MPD_L_AutoSeatChange.ino

RIGHT MPD: https://github.com/MilKris666/AH-64D-Apache-MPD-Multi-Purpose-Display/blob/main/AH64_MPD_R_AutoSeatChange.ino

If you have no idea **how to set up DCS BIOS** or **upload code to an Arduino**, make sure to check out this **tutorial by Hornetsnest**! https://www.youtube.com/watch?v=ZGoG54vNyyI

3D printing:
Depending on whether you're using the Arduino Mega 2560 or the Leobodnar BBI-64, there are separate versions of the **ScreenHousing** included.
The MPD frame's buttons and labels are 3D-printed with white PLA, spray-painted with black acrylic lacquer, and then laser-engraved using a diode laser. If **laser engraving** is not an option for you, you can **3D print the buttons with raised lettering**. In this case, you should print the buttons with **black PLA** and use **white PLA only for the top layers**.

If you **don't have a dual-extruder 3D printer**, you can set up a Post-Process script in Cura ("Pause at Layer Height") and manually switch the filament.

Alternatively, you can **print the buttons entirely in black** and carefully **paint the lettering white** using a **white marker (e.g., Edding)**. To make the finish more durable, you should seal everything with a clear coat.

You'll need to experiment a bit to find out which method works best for you.

Display Setup:
The displays are, of course, powered via HDMI and operate independently of the Arduino or BBI-64. The AH-64D uses the DCS' standard viewport export method for rendering the left and right MPDs. On the final pages of this build guide, I'll show you the correct pixel-precise configuration for your MonitorSetup.lua.

I'm looking forward to your feedback — and of course, feel free to share pictures of your own MPDs!

Yours,
MilKris

Follow me
instagram
Reddit
YouTube
Thingiverse

Part list:

1x Wisecoco 8 Zoll LCD 1024 x 768 IPS Display:
https://aliexpress.com/item/4000155436637.html

1x 40 Pin FFC/FPC Cable Extention | 40 Pin, spacing 0.5 mm socket, 200mm long:
https://de.aliexpress.com/item/4000898466075.html

1x 3-Way-Switch | 2 Pole 3:
https://aliexpress.com/item/1005004551869432.html

31x Push Button| 6x6x4.3mm
https://aliexpress.com/item/4001166999847.html

2x 360 Rotary Encoder | EC11 20mm Plum Handle
https://aliexpress.com/item/1005002840845750.html

Dupont connector shell:
https://aliexpress.com/item/32665232173.html

If you don't already have one: a Dupont crimping tool:
https://de.aliexpress.com/item/1005007130436011.html

Arduino MEGA2560 R3 ATmega2560-16AU
https://aliexpress.com/item/1005006177033344.html

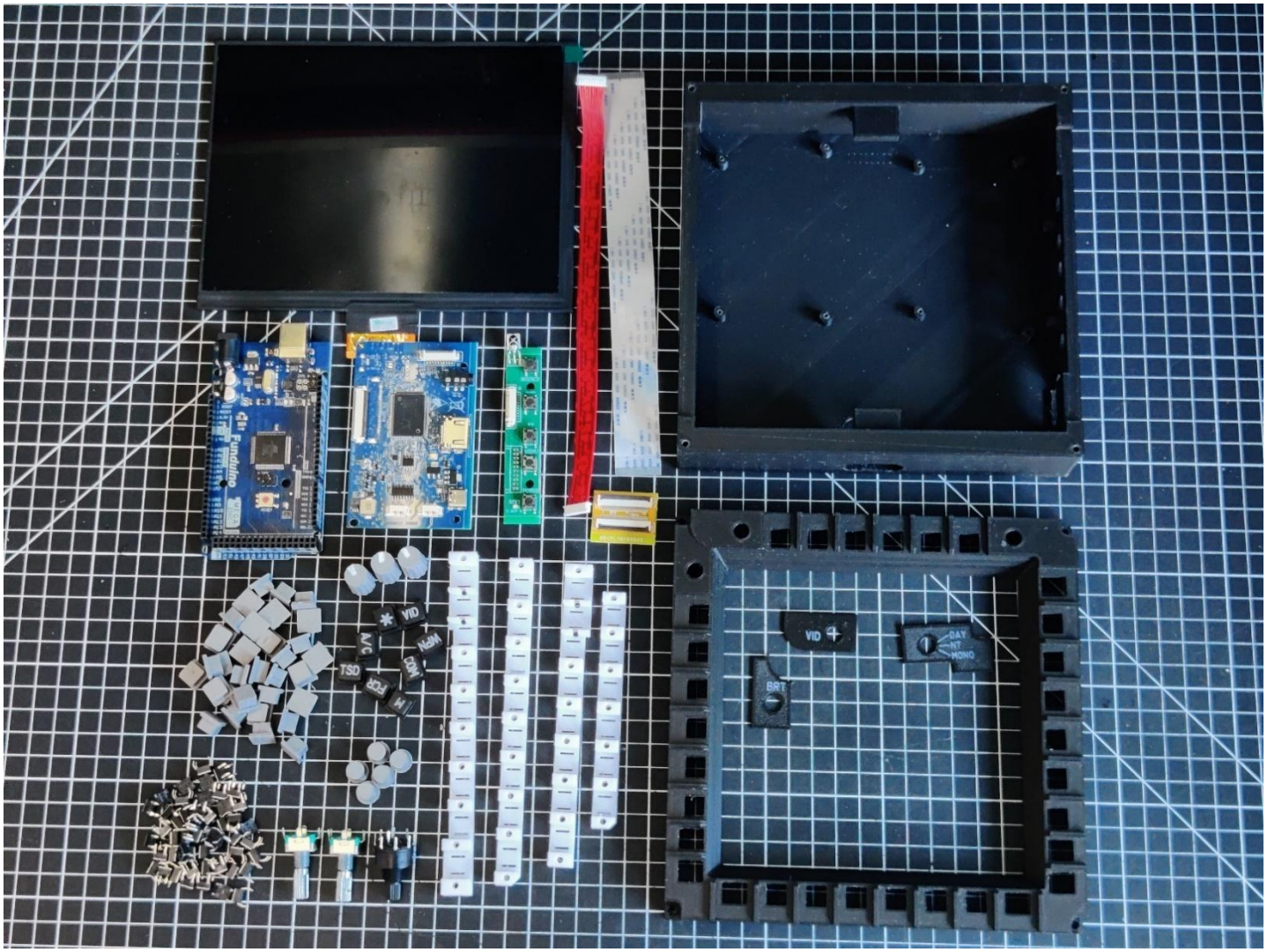
Dupont connector | **male** 2,54mm : **(if you build the Arduino version!)**
https://aliexpress.com/item/1005006626744976.html

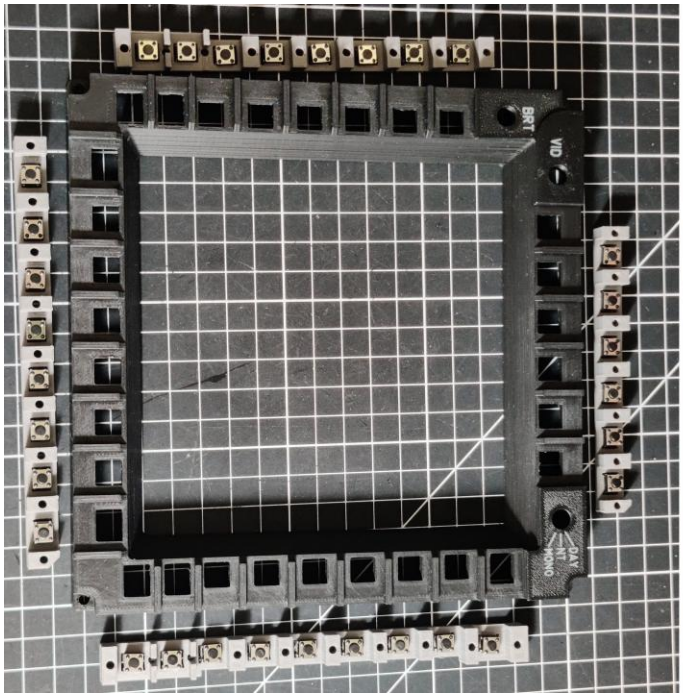
Loads of 0.14mm² copper wire…

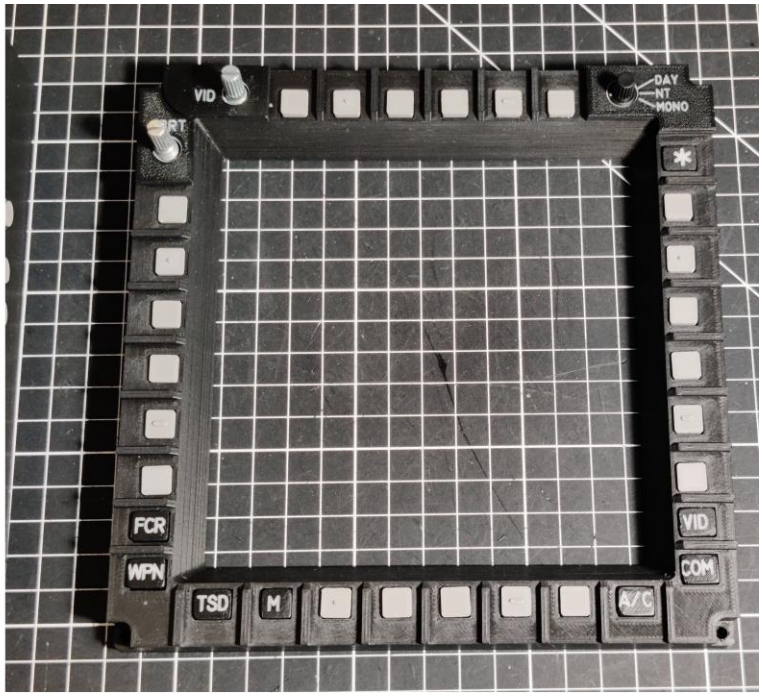
Alternativ to the Arduino MEGA2560:
Leobodnar BBI-64 Gamecontroller Board
https://www.leobodnar.com/shop/index.php?main_page=product_info&cPath=94&products_id=300&zenid=3ee50b521ef3f7be331c536754bb01a0

Dupont connector | **female** 2,54mm : **(if you build the BBI-64 version!)**
https://aliexpress.com/item/1005006626744976.html

Now have fun building!

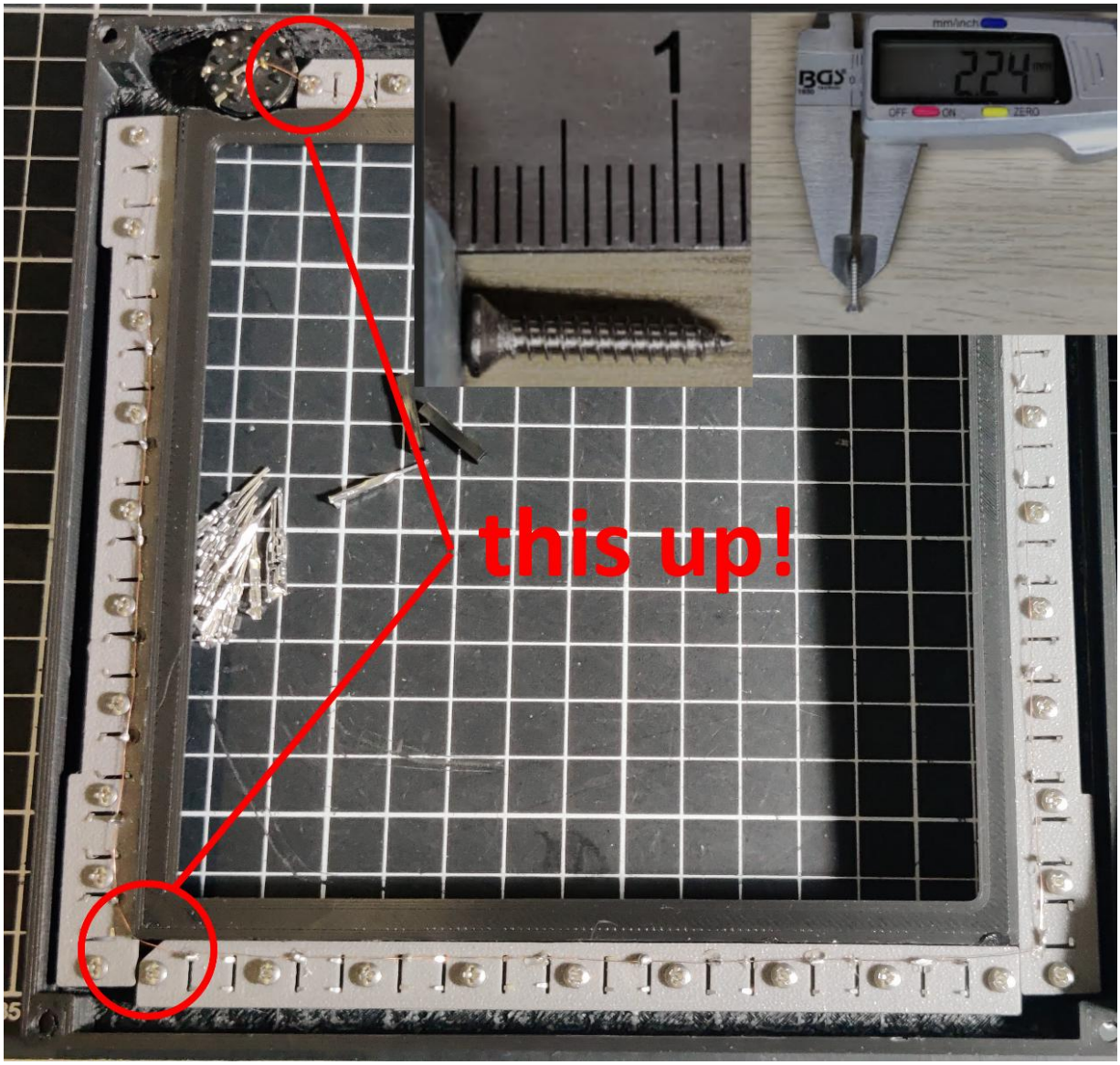




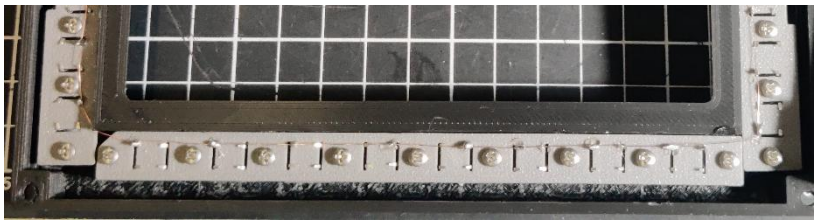


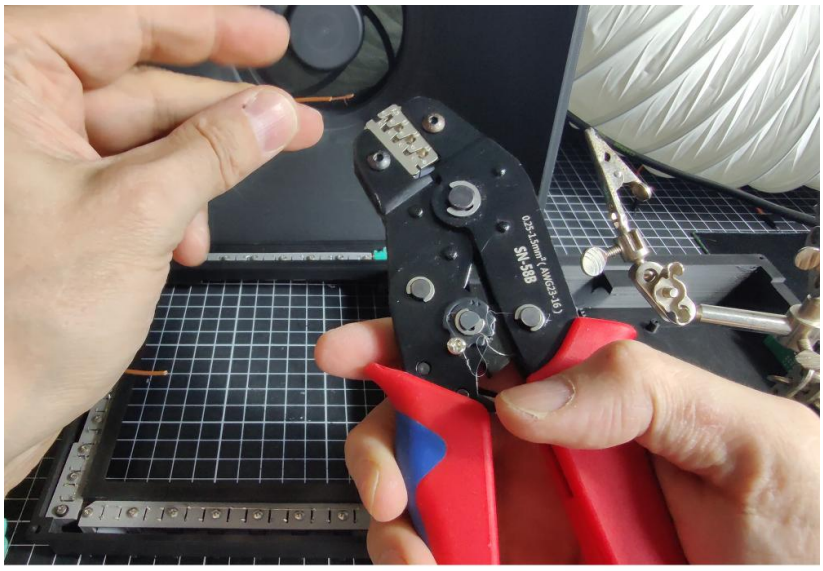
Insert the push buttons into the matrix boards and mount them into the MPD frame. I use regular screws with a diameter of 2.3 mm. The shaft length shouldn't exceed 10 mm. Simply glue the rotary encoder and the 3-way switch in place using superglue, and secure them with a bit of hot glue for extra stability.

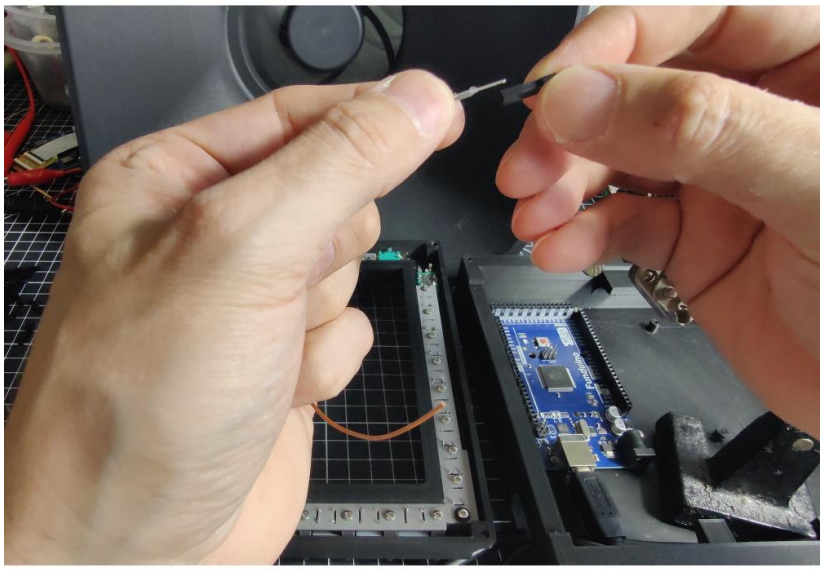
Make sure the matrix boards are correctly oriented — see the reference image.

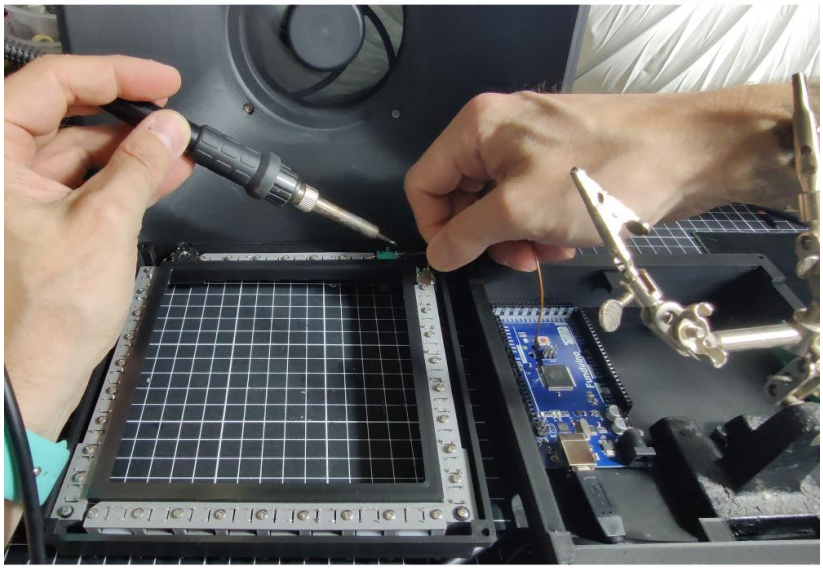


Screen buttons and screen controller Board.









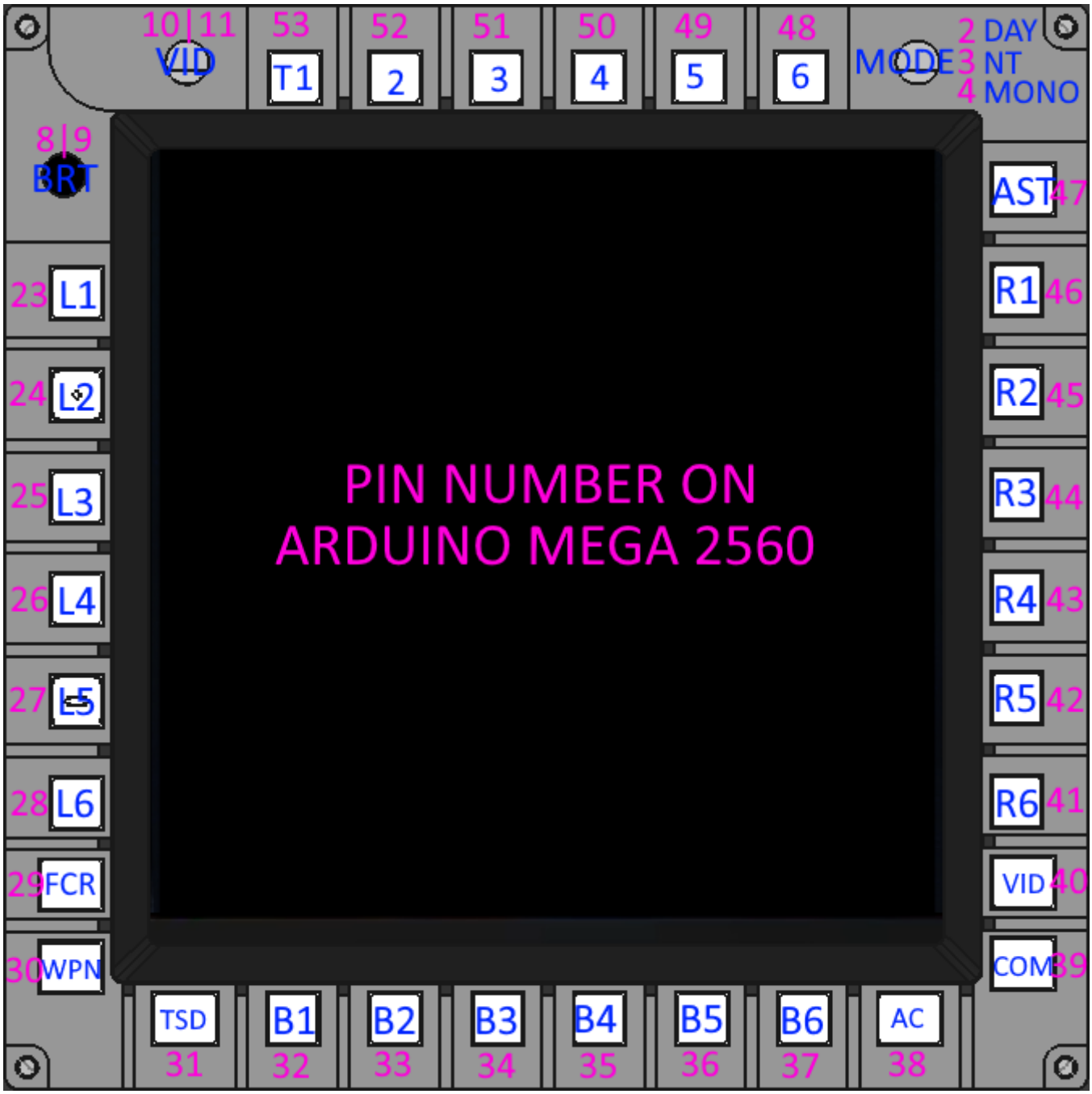
As shown in the image, solder a ground wire (you can use a stripped wire from a regular cable) in a loop to all inner pins of the push buttons, as well as to the GND pin of the 3-way switch and the two rotary encoders. Then connect the whole setup to a GND pin of the Arduino using a single wire.

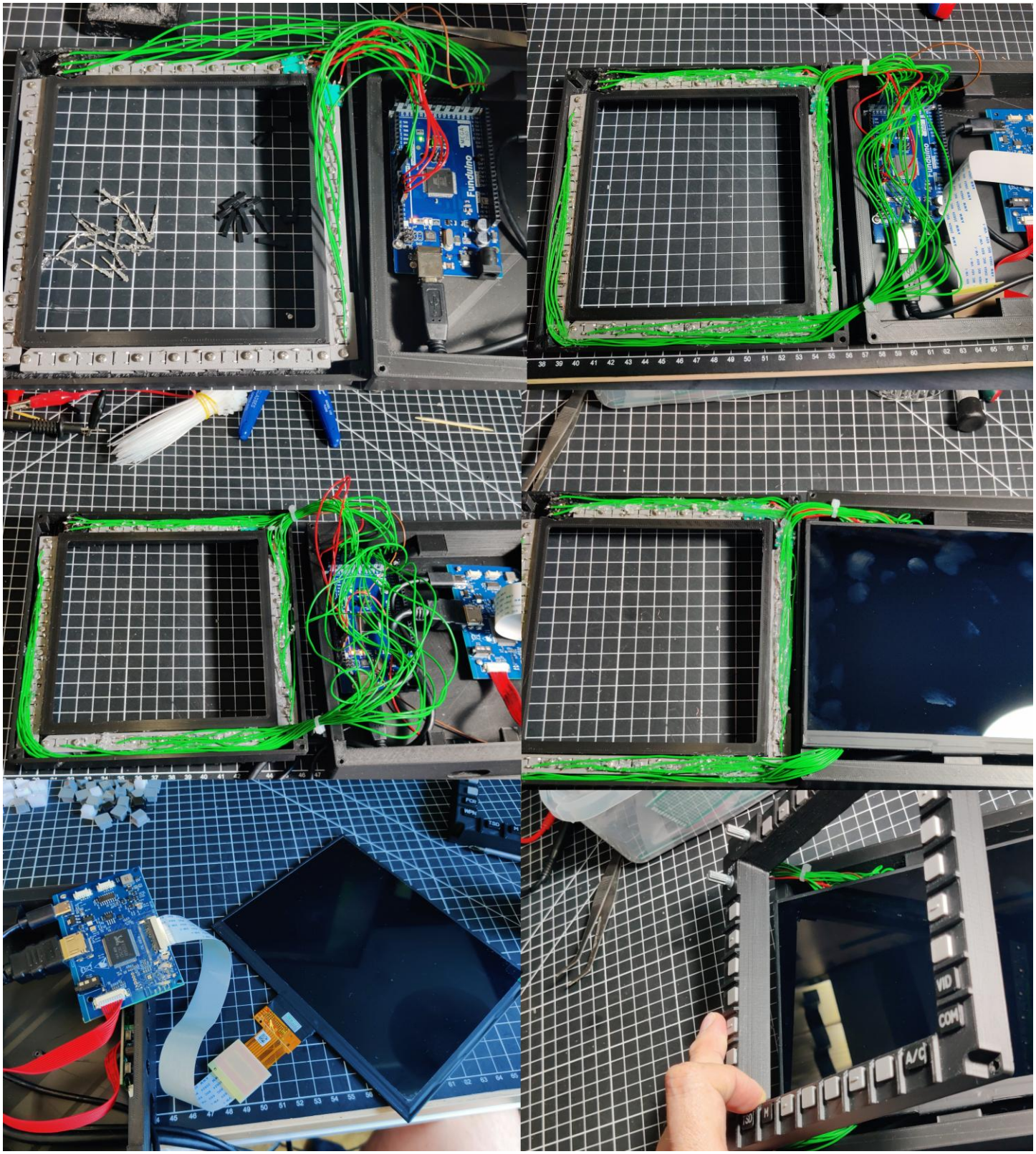
💡 **Tip:** Use Dupont connectors for easy wiring!

⚠ **Important:** Keep the wires as short as possible — it will make final assembly much easier. To help with this, position the MPD frame to the left of the enclosure (screen housing) during soldering.

Now simply follow the image sequence below — it provides a clear illustration of the assembly process.

⚠ **Note:** Pay attention to the pin number layout!


PIN NUMBER ON
ARDUINO MEGA 2560
10|11
VID
53
T1
52
2
51
3
50
4
49
5
48
6
MODE
2 DAY
3 NT
4 MONO
8|9
BRT
AST 47
23 L1
R1 46
24 L2
R2 45
25 L3
R3 44
26 L4
R4 43
27 L5
R5 42
28 L6
R6 41
29 FCR
VID 40
30 WPN
COM 39
TSD 31
B1 32
B2 33
B3 34
B4 35
B5 36
B6 37
AC 38

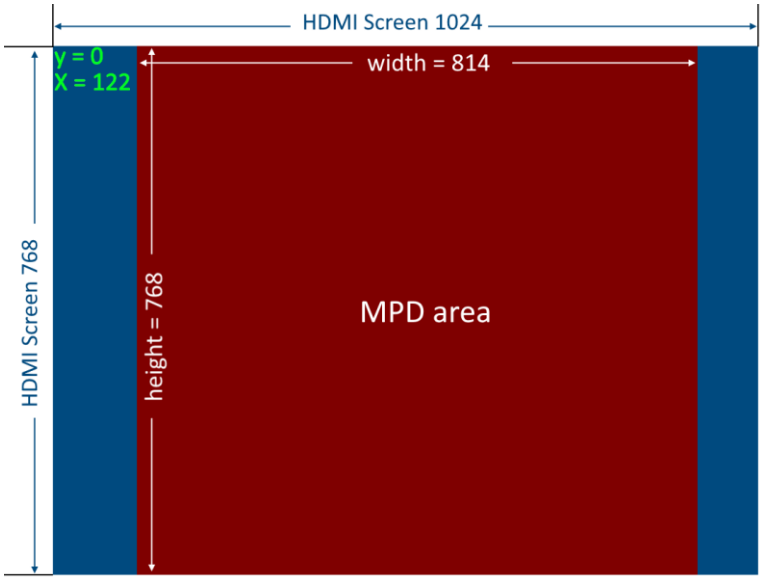


At the end, make sure to secure the wires with a bit of hot glue.
The LCD screen is only placed into position — it is not permanently fixed.

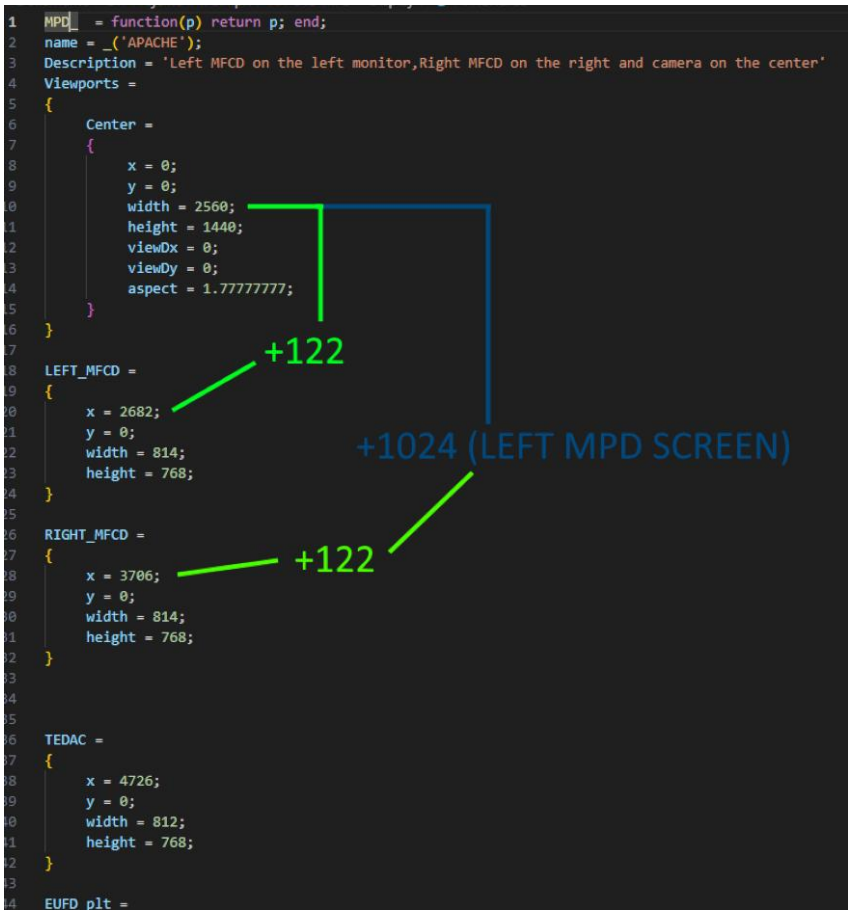
Simply use M3 screws between 12 mm and 20 mm in length to attach the MPD frame to the enclosure.
You can screw them directly into the PLA — the tolerances are designed to allow this.

Setting up the MPD Displays

As mentioned earlier, we use the viewport export method to display the MPDs on the HDMI screens. To do this, simply adjust your MonitorSetup.lua accordingly. You'll find all the details on how to configure external displays in DCS here: https://wiki.hoggitworld.com/view/Exporting_MFCD_Displays

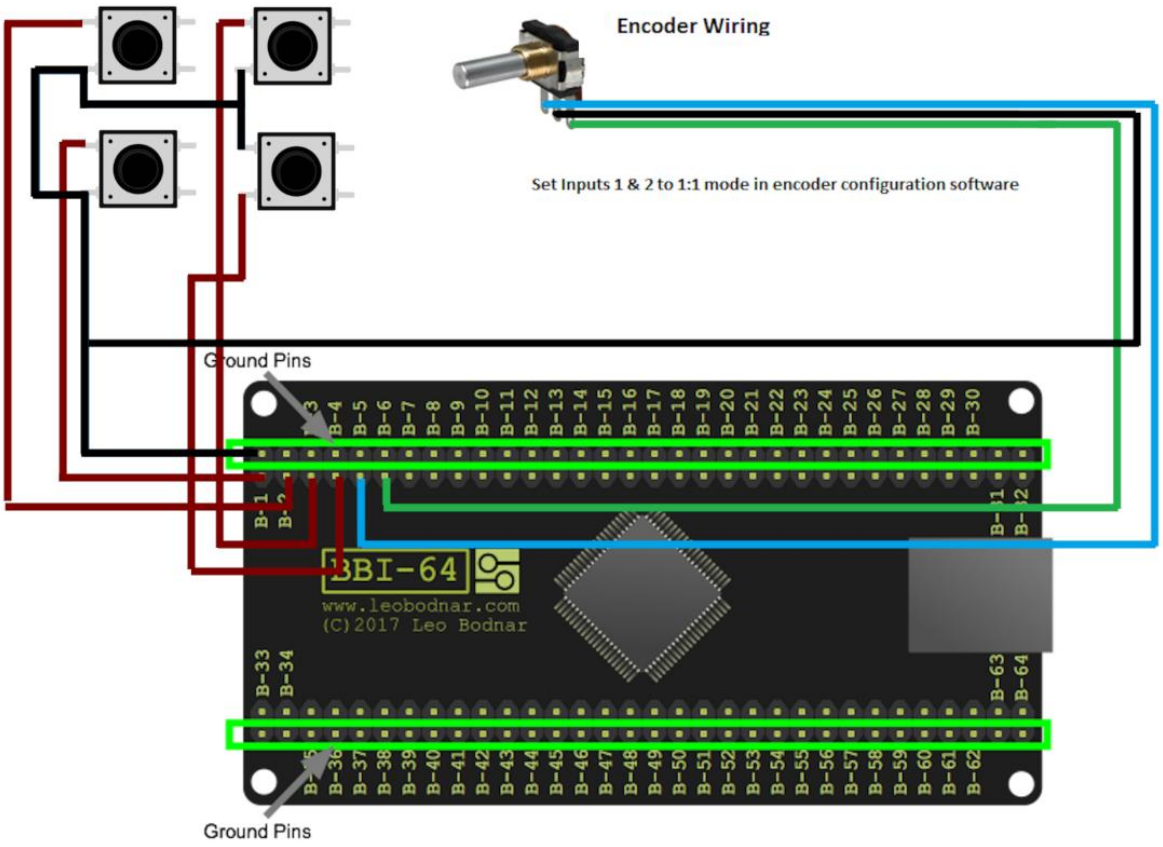


In this example, we assume a primary monitor resolution of 2560x1440.
The exported MPD viewports will be positioned relative to this main display.



Tip to save display outputs:
I'm installing the MPDs together with my new TEDAC (which also uses the Wisecoco 8-inch screen) and the EUFD (WIP with a 800x480 screen) into a complete dashboard (WIP) that can be mounted into my modular cockpit. Using the StarTech.com USB 3.0 to Quad HDMI Adapter – USB to 4x HDMI Monitor Converter, I can connect all displays to the PC using just a single USB port.

Setup with a Leobodnar BBI-64



For the Leobodnar boards, you don't need much prior knowledge. Simply solder the wires to the switches and connect them to the board.

WARNING! Windows only registers 32 buttons! But don’t worry — DCS recognizes all 64 buttons of the BBI-64!

Tip: It's sufficient for a single ground wire to run from the Leobodnar board, with the switches connected in series.

Rotary encoders are essentially digital rotary switches with **one ground pin and two input pins**. I've created a small diagram to illustrate this.

When using a **rotary encoder**, you need to define one or more **input pin pairs** in the **BBI-64 Config Tool** (available on the Leobodnar website) where the encoder is connected.

If you're using more than one BBI-64 (which you probably will if you're building two MPDs), you'll need to flash a different firmware onto each board using the **HidFlasher** tool (available on the Leobodnar website). Without this step, Windows won’t be able to tell the devices apart. Leobodnar provides 10 unique firmware versions specifically for this purpose.

Tip: You can rename the devices in the Windows Registry.
For example, instead of showing up as "BBI64-1" and "BBI64-2", they could appear as "**AH-64D MPD - Left**" and "**AH-64D MPD - Right**" — much easier to manage in DCS controller setup!

Stay tuned….