

Estlcam AVR64DB64 Main Schematic

This schematic is an overview of the Estlcam AVR64DB64 / AVR128DB64 hardware platform.

It is the common base for 2 main products:

- The Estlcam "Terminal Adapter":
 - All functions are made available on screw terminals.
- And the Estlcam "LPT / Parallel Port Adapter":
 - Step / Dir and other important signals are connected to a D-Sub 25 connector for machines or stepper drivers with parallel port interface.
 - Pin configuration of the D-Sub 25 connector can be selected by the user in Estlcam.

Both "Terminal Adapter" and "LPT / Parallel Port Adapter" can be customized with varying amounts of features:

- There can e.g. be up to 16 digital inputs – but you can implement less.
- Or you can e.g. change some of the voltage measuring analog inputs to current measuring inputs or do other modifications.

For both the "Terminal Adapter" and "LPT / Parallel Port Adapter" there are 2 predefined PCBs:

- An "XL" variant with all features and a "Light" version with just the most important functions.
- If you follow those suggestions:
- You'll find the PCBs in the "Terminal Adapter Variants" or "LPT Adapter Variants" folder.
- And can program the device with the matching predefined bootloader batch files in the "Bootloader" folder:
 - "Prog_Terminal_XL.bat" for the Terminal Adapter XL
 - "Prog_Terminal_Light.bat" for the Terminal Adapter Light
 - "Prog_LPT_XL.bat" for the LPT / Parallel Port Adapter XL
 - "Prog_LPT_Light.bat" for the LPT / Parallel Port Adapter Light

If you design your own, customized product:

- You need to choose the correct bootloader for flash programming in the "Bootloader" folder:
 - "Bootloader_Terminal.hex" for Terminal Adapter variants
 - "Bootloader_LPT.hex" for LPT / Parallel Port Adapter variants
- Program the fuses correctly:
 - "Bootsz": 0x02 / Bootloader size 1024 bytes
 - "WDTCFG": 0x09 / Watchdog 2 seconds
- And program the device EEPROM with a customized description of the available features:
 - Use "EEProm_Tool.exe" in the "Bootloader\EEProm_Tool\bin\Debug" folder to create the EEPROM description.
 - This tool can either directly program each device after the bootloader has been uploaded.
 - Or it can be used to create a .eep file for other programming software like AVRDUde.

- The EEPROM can also store some customizations – e.g.:
 - Links to your shop and user manuals.
 - Machine configuration presets so the customer is able to configure your machines with just a few clicks.
 - If this is interesting please contact me.

Main Product:	Terminal Adapter:	Parallel Port Adapter:
Predefined feature Set:	XL	Light
Digital Inputs:	4	5+7*
Frequency / Pulse counter input:	1	1
Analog Inputs:	7	7
Spindle motor relay driver output:	1	1+1**
Misc relay driver outputs:	12	8
PWM output:	1	1+1**
0–10V Analog output:	1	–
Spray coolant solenoid output:	1	1
Hand Wheel pendant connector:	1	1

* Inputs 01–05 are always connected to D-SUB25 connector pins 10/11/12/13/15 and MUST NOT be connected to screw terminals.

Inputs 06 to 12 can be connected to screw terminals.

** The "Spindle" and "PWM" signals exist 2 times each:

- The user can select any of the D-SUB25 output pins as Spindle or PWM signal. This is always possible.
- And you can additionally make the dedicated function pins "E2" / Spindle and "A3" / PWM available to screw terminals.
- Both will work at the same time.

The Estlcam hardware designs are free for personal and commercial use:

- You are allowed to manufacture and sell Estlcam compatible hardware.
- Actually I really appreciate it if you do so:
 - I'm a hardware and software development guy and get my income from the Estlcam software license sales.
 - I'm not much interested in manufacturing and hardware sales, especially not internationally.

There are only 2 conditions:

- 1: Your product = your responsibility.
 - Do everything at your own risk and don't hold me liable.
 - Ensuring the products compliance to your intended markets laws and regulations is up to you.
- 2: Put your company name and address on the finished product:
 - Customers must be able to tell who manufactured the board.
 - Using the Estlcam logo is OK.

Modifications are welcome:

- E.g. a board with integrated stepper drivers may be interesting.
- Or adding actual relays instead of just relay drivers.
- But consider the safety and regulatory issues this causes if users connect mains voltage!
- Please make sure to provide your customers with appropriate instructions if your hardware differs from my examples.

USB CNC control hardware has a somewhat undeserved reputation for being unreliable:

- Supply (or at least recommend) well shielded USB cables to your customers. Badly or not at all shielded cables are the number one reliability issue.
- (The cable to the computer must be good quality, the power supply cable can be cheap)
- Implementing the USB interface with galvanic isolation makes a huge difference in electrically noisy environments.

Support for other control software:

- I don't mind if you port e.g. "GRBL" to run on this hardware if you like to bundle boards or machines with a free software alternative.
- But please keep the bootloader so the user can easily switch from one system to the other (Bootloader protocol description see "Bootloader" folder).

I may – or may not – endorse your product. It depends on how much I like your version.

You can offer Estlcam compatible hardware without asking me – but it may still be a good idea to get in touch with me first.

Please keep in mind that while personal use and modifications are welcome I simply don't have enough time to assist with personal projects if you run into issues.

This project is mainly for commercial use.

