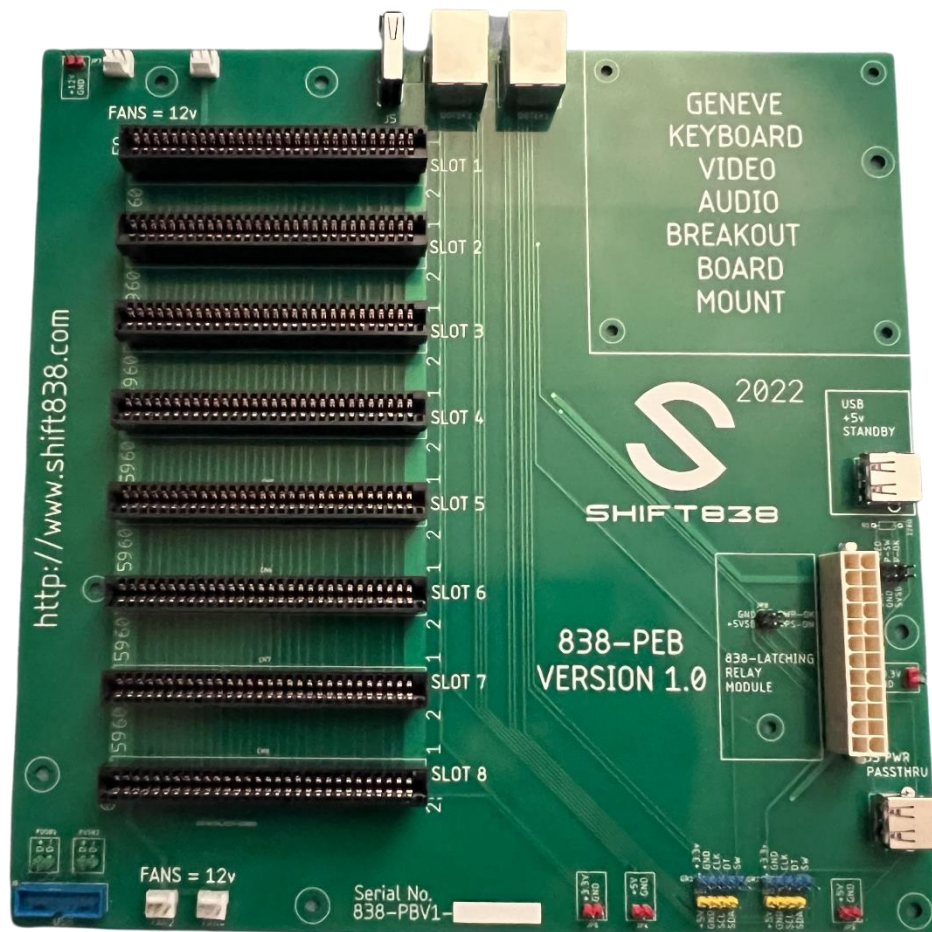


838-PEB Version 1.0

NEW For 2022!



Last updated September 28, 2022

<http://www.shift838.com>

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Description

Congratulations on your purchase of the new 838-PEB board.

This board allows a user to be able to build their own 838-PEB to be used with the TI-99/4 and TI-99/4A home computers as well as the Myarc Geneve 9640.

The 838-PEB board has a standard Micro-ATX board footprint with all mounting holes so that it can be placed directly into a ATX PC case and is designed to be used with a standard 24 pin ATX power supply.

Disclaimer

This unit has been thoroughly tested with many original and 3rd part peripheral expansion cards for the TI-99/4A and Geneve 9640 computers.

By purchasing the 838-PEB board the consumer agrees that SHIFT838 (Chris Schneider) is not responsible for any damage to your system, cause of fire or any issue resulting in injury, death or dismemberment!

Many of the original TI and 3rd party expansion boards may need to replace their voltage regulators. I recommend at minimum a 1.5-amp voltage regulator as they will run a bit cooler and with the newer regulators, they are more efficient.

Be aware that the ATX power supply will deliver 12v to the 8v line of the original expansion cards and the voltage regulators will take over to reduce the voltage to the 5v required.

For all 12v required boards, the 12v will be delivered to the +12v and -12v line.

Features

- 24 pin ATX power supply connector
- Headers for Power LED, Power Switch, +5v Standby and Power-OK
- Header for use with 838-Latching Relay Module
 - Using this module turns the existing momentary power switch that all ATX PC cases have to a latching switch using a timer relay circuit to pulse a ground signal to ensure the power supply is turned on.
 - If the relay module is installed then the PC power switch will be connected to the 838-Latching Relay Module instead of on the 838-PEB board.
 - Press power switch to turn on and press again to turn off.
- 8 x Peripheral Expansion Slots
- 1 x 12v power breakout
- 2 each of 5v and 3.3v power breakout
- 4 x 12v 3 pin PC fan connectors
- USB Power Pass Through Connectors
 - This can be used to connect a device like a Raspberry Pi power by connecting the RPi Power adapter to the back of the 838-PEB and using another USB cable to connect to the Raspberry Pi to power the unit.
 - This connector does not share any connections with the ATX power supply
- USB 5v Standby Power Connector
 - This connector is connected to the +5v Standby power rail of the ATX power supply and as long as the ATX supply is plugged into AC power there will be power provided all the time, even when the power unit is in the off position.
 - This can be used to power up a peripheral like a Raspberry Pi Zero W, RPi2 or RPi3 via a USB cable without having to use the Pass-Through USB connector.
 - Be aware that users need to check the maximum amperage details of the ATX power supply for the +5v Standby. Needs to be 1.5 amps max for a RPi Zero W, 2.5 amps max for Raspberry Pi2/3. Must use the passthrough for RPi 4 or higher.
- Use of front USB ports via USB 3.0 for Power and Data + / Data -
 - Great use for Micro-Gotek drives!
- Headers for Gotek1 and Gotek2 for use with external controlled rotary and display units
- 2 x RJ45 jacks to connect external rotary and display for Gotek drives #1 and #2.

Recommendations

Since the 838-PEB uses the 12v line to power the 8v line, the peripheral expansion cards voltage regulators will pull the 12v down to the required 5v power. For the cards that also have a 12v regulator the regulators will go into bypass mode and use the regulated 12v line from the ATX power supply.

Since the 838-PEB uses the 12v line to power the 8v line for the peripheral expansion cards as well as the 12v line the expansion cards will pull the 12v line down to the required 5v using the voltage regulators. However, these regulators may be old or as small as 500ma. I recommend using at least 1.5 AMP on existing cards. Check your regulators to see if they meet 1.5 AMP, or if they are old, it may be best to replace.

All of my 838 expansion cards are already equipped with 1.5 AMP voltage regulators on any cards that will be installed into a peripheral expansion system.

Below are the current part numbers that I use for through-hole voltage regulators.

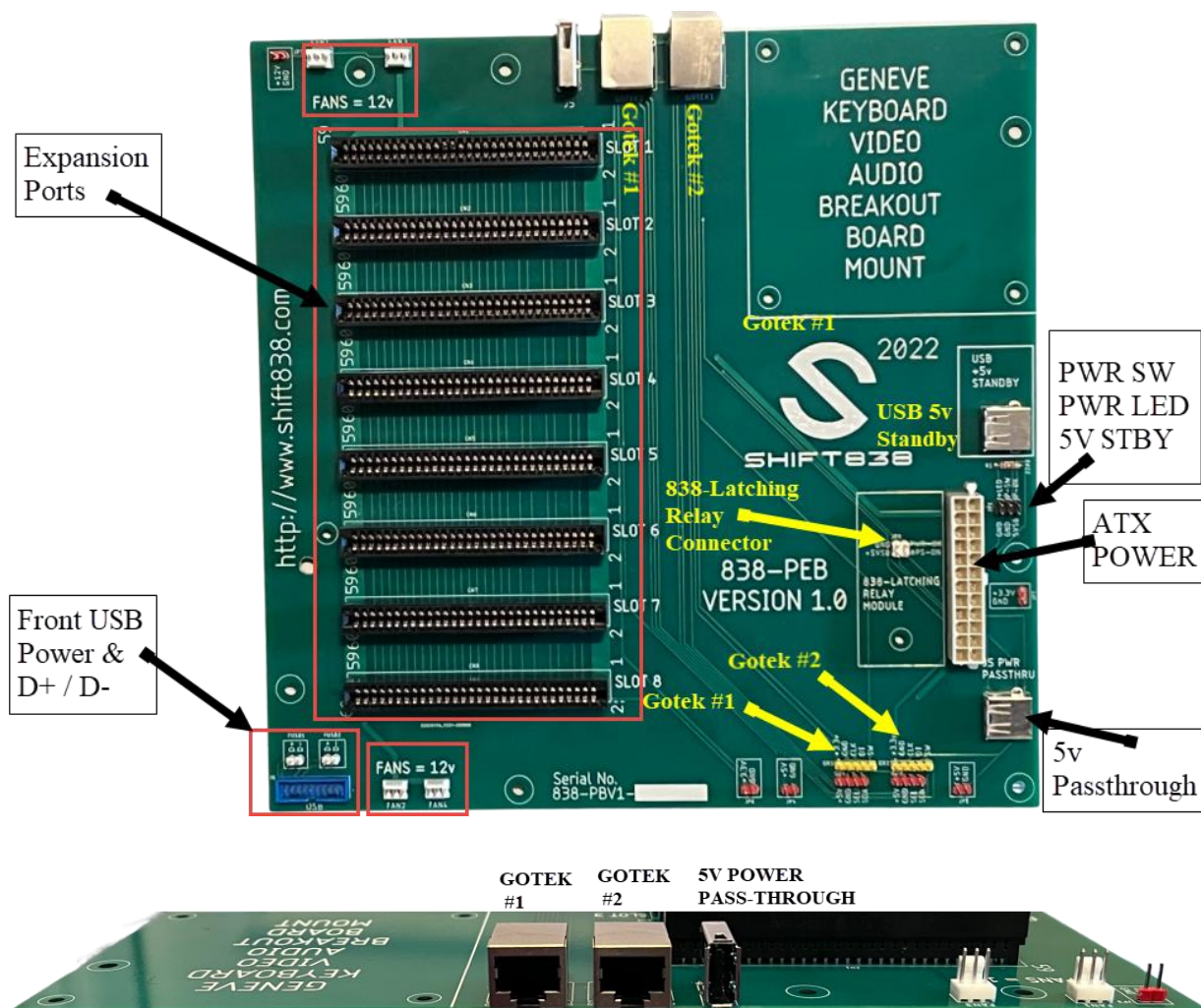
Regulator	Part Number
+5v DC	LM7805CT/NOPB
-5v DC	LM7905CT/NOPB
+12v DC	LM7812CT/NOPB

Warnings

The 838-PEB is a very quiet piece of hardware, you don't know if it is powered up unless you physically check.

Please ensure the power is **OFF** for at least 2 minutes before inserting or removing peripheral expansion cards, otherwise you risk damaging the 838-PEB and/or all peripheral expansion cards.

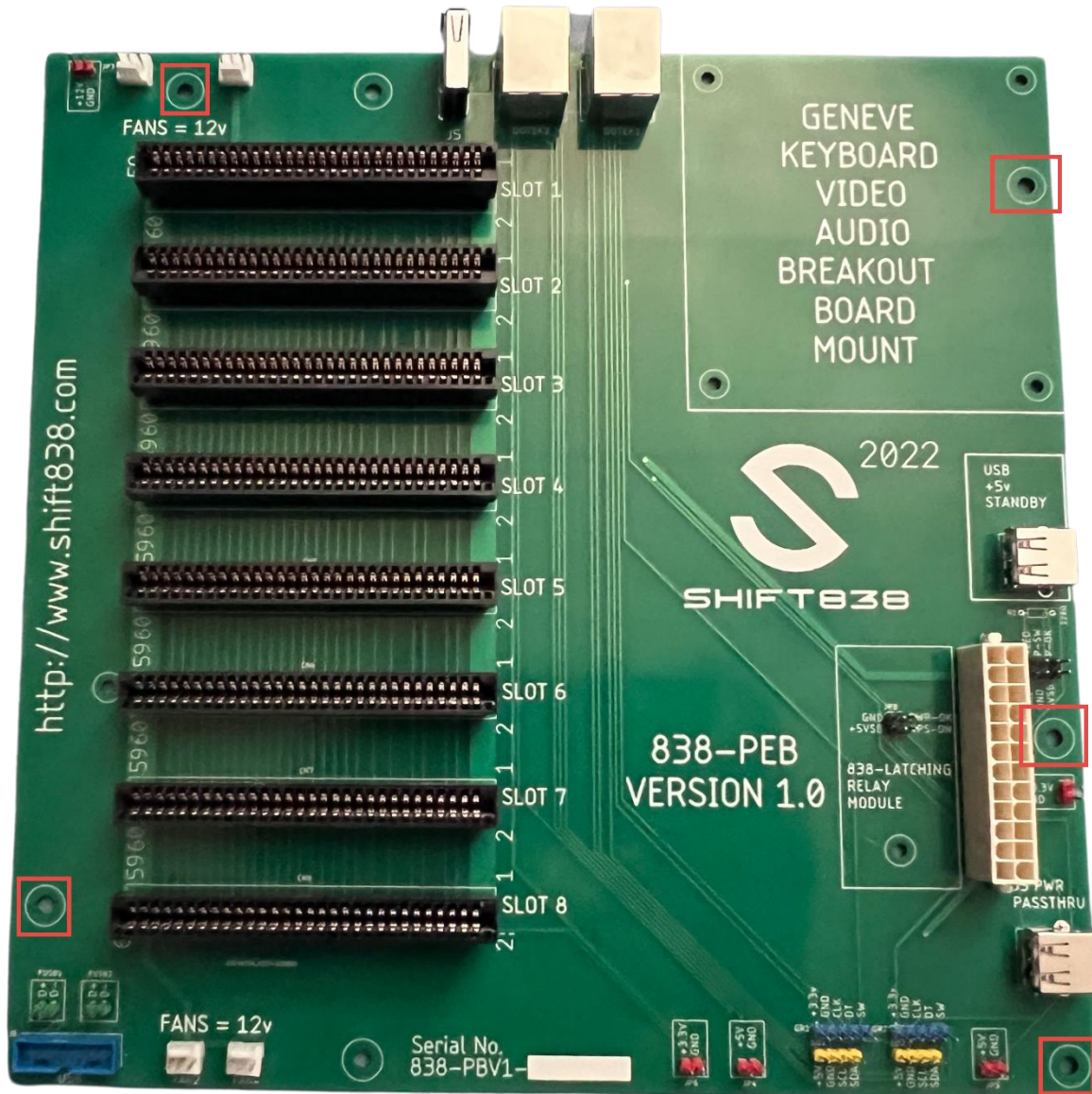
Connector Identification:



Installation

1. Open the PC case that will be used to mount the 838-PEB
2. If not installed, install the ATX power supply to be used
3. Install any drives or other peripherals in their required bays
 - a. Ensure to install 5.25 drives in the top 2 Drive slots to have clearance of board headers. (*This is dependent on the case you have chosen as well as the 5.25 floppy drive manufacturer and model*).
4. Mount 838-Latching Relay Module if Used
5. Install 838-PEB board and ensure PCB standoffs line up with mount holes
 - a. If not, determine which ones need to be moved and move them to the correct locations

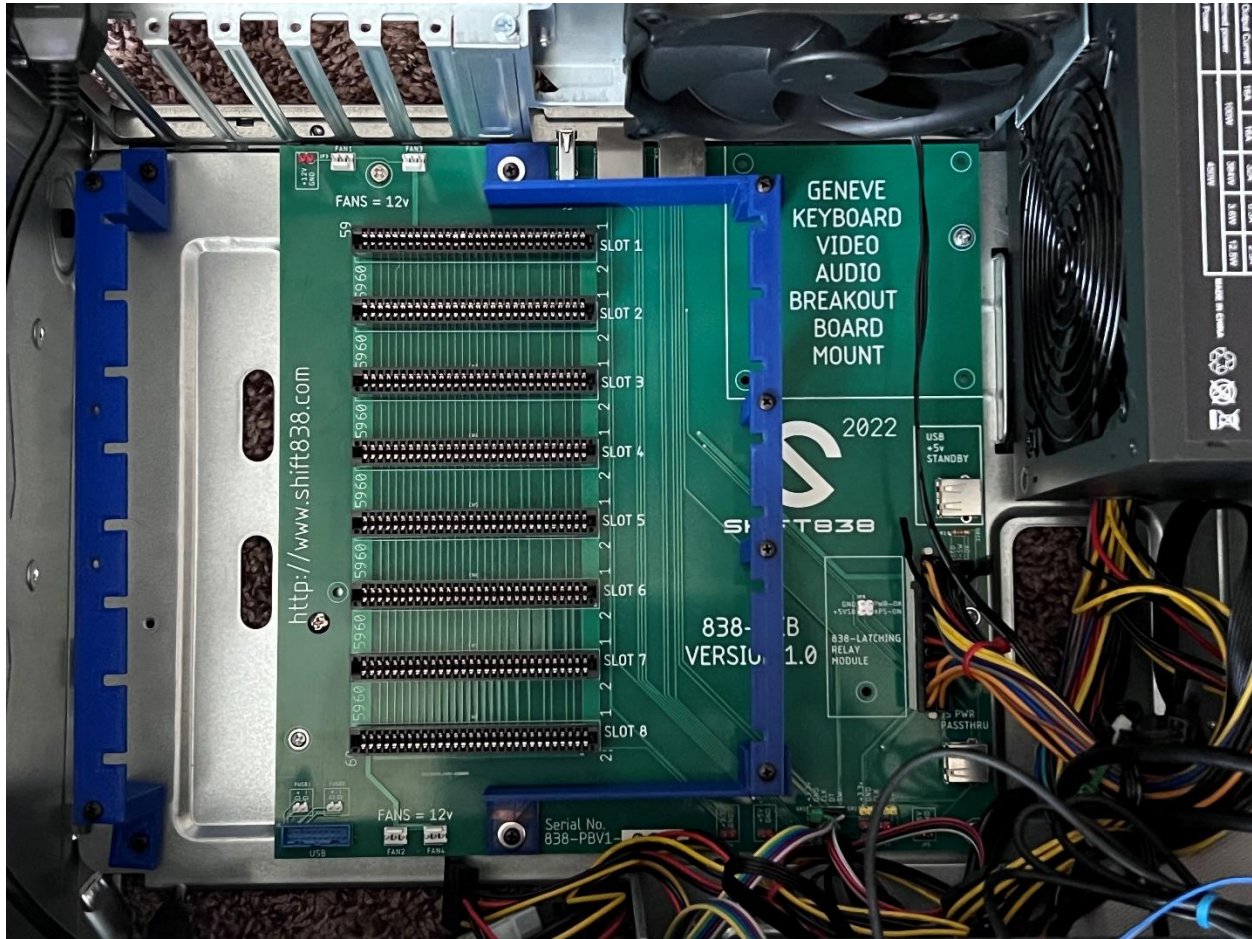
6. If using the 3D printed guide rail system only mount screws in the below identified locations as the rail guide will mount in the other holes. If not then go ahead and mount in all locations that line up with a PCB standoff.



7. If being used on a Geneve 9640 and if purchased the 838-Geneve Breakout mount then mount the ATX-Geneve KB/Video/Audio Plus breakout board to top right where annotated with M3 standoffs (female-female).
 - a. Ensure you use low standoffs to make sure it does not interfere with any card housings in slots 1-3. I use M3 threaded 5mm high standoffs, but 4mm would work better and give an extra clearance.

See 'Specific Wiring' section for all pinouts.

8. Mount PEB rail guides as shown:



9. Make connections if used for:

- a. Gotek 1
- b. Gotek 2
- c. PC Fans
- d. USB 3.0
- e. D- / D+ for Micro-Goteks #1 and #2
- f. USB 5v Standby
- g. USB 5v Pass-Through
- h. Power breakouts for 3.3v, 12v and 5v.
- i. Power Switch
- j. Power LED

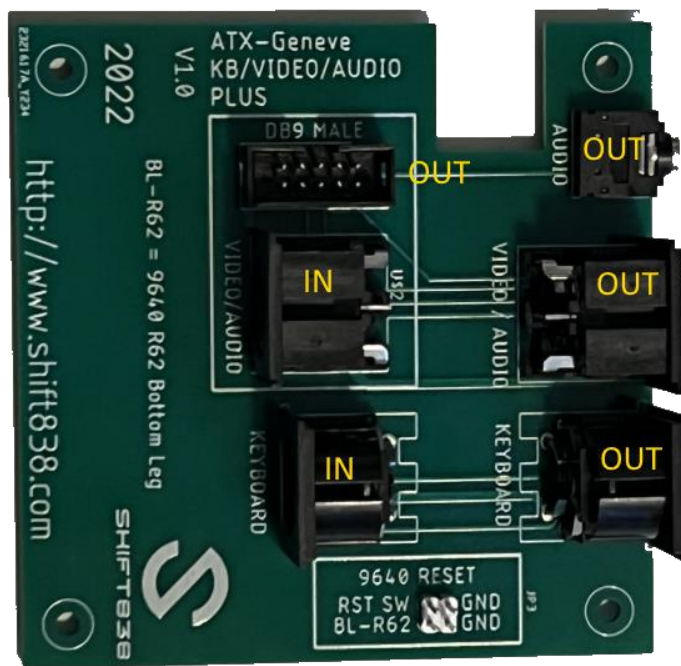
10. Connect ATX power supply connector to 838-PEB board

11. Install peripheral expansion cards

- a. If using on TI-99/4A install 838-IOP ATX into slot #1
- b. Snake the 838-IOP Cable from back of PC case through large I/O hole next to the RJ45 jacks and connect to the 838-IOP ATX card and secure with screws.

12. Connect drivers and other peripherals to their respective expansion cards and power connectors.
13. Double and Triple check all your connections!
14. Power up the 838-PEB first then your console if using a TI-99/4 or TI-99/4A.
15. Enjoy!

ATX-Geneve KB/VIDEO/AUDIO



This board is used with the 838-PEB if using a Myarc Geneve 9640. It allows for short cables to be used for Keyboard and Audio/Video connections between the Geneve 9640 and this breakout board. Allowing for these connections to be accessible from the back side of the case within the IO section.

I have worked with iec.net to manufacture these cables to my specifications. You do not have to order the cables from them if you don't want to, but you will need straight through cables for the DIN5 and DIN8, and one side needs to be a right angle. The cables I have had IEC create has the right angle facing a specific direction to ensure cable relief.

You will have to contact iec.net directly as the cables are not as of yet on their web page. You can get the contact information from their website at <https://www.iec.net>

DIN 8 Right Angle (1 foot) - Part Number: *CUSCS4001-01

DIN 5 Right Angle (1 foot) - Part Number: *CUSCS4002-01

This board does not account for joysticks or mouse. It is best to use a ribbon cable to wire these up and mount to PC card brackets to be able to access those from the back of the case PC slots.

Please note if placing the Geneve into slot 1-4 then you will need to find a right-angle Audio/Video DIN 8 for clearance if using the case purchased from SHIFT838. Otherwise, depending on the case you are using will depend if you can use a straight connector.

Simply obtain DIN5 and DIN8 cables that are wired straight through (1-1, 2-2, 3-3, etc) and plug into the Keyboard and Video/Audio connectors.

A standard XT keyboard can be plugged directly into the DIN5 keyboard input from the back side of the case. This connector also works with SHIFT838's USB to XT and PS2 to XT converter boards.

Using the standard video cable that was being used can now plug into the DIN8 from the back side of the case.

If using a GBSVGA Genie, then the video cable using a DB9 Female can be plugged into the DB9 Male of the breakout board.

Connections for PEB Cards:

All connections for Peripheral Expansion Cards like the FDC, RS232, etc are as follows:

Please note if using the Geneve 9640 with the 838-PEB and if in slots 1-3 you will need to use right angle DIN cables on the ends that plug into the Geneve and straight ends on the end that plugs into the Geneve ATX Breakout board.

1. Floppy Disk controllers/Hard Disk controllers - If you need to run a cable to the outside of the PEB to mount external drives then purchase or build a cable long enough to snake out of the case to connect to the drives.

2. Any cards that use a DB connector like the TI RS232 card (or any others). Use a standard ribbon cable with the appropriate connector on both ends and mount to a PC Slot Bracket.
3. Any cards that use a IDC type connector like the TI RS232 PIO – There are panel mount connectors that are IDC and can be crimped onto a ribbon cable and then mounted to a PC slot bracket.
4. Geneve Video/Audio/Keyboard – Use SHIFT838's Geneve ATX Breakout board for video/audio and keyboard. This board also allows for external speakers. Or run your own cables and create your own solution.
5. Geneve Joystick/Mouse – Use a standard ribbon cable with appropriate DB9 connectors on both ends and mount to a PC card slot bracket.
6. TiPi – The only connector I see a user for is the network jack. Depending on your Raspberry Pi, you can use either a RJ45 Extension cable that is panel mount as I have (link below) or you can use a MicroUSB Network Adapter Cable for Raspberry Pi Zero W or Zero W 2.
 - a. Network cable extension panel mount – [Amazon.com: Qaoquda CAT6 Network Extension Cable, RJ45 A Male to A Female Screw Panel Mount Extension Cable,Support Ethernet Cat 5e/Cat 6 \(RJ45 M/F 1M\) : Electronics](https://www.amazon.com/dp/B07V8G8DF2?psc=1&ref=ppx_yo2ov_dt_b_product_details)
https://www.amazon.com/dp/B07V8G8DF2?psc=1&ref=ppx_yo2ov_dt_b_product_details
 - b. USB Micro B Ethernet Adapter - [Amazon.com: OTG Micro B Ethernet Adapter for Linux Raspberry Pi Zero W, Windows 10 Tablet \(Lenovo Miix 2 8\), Android Samsung Galaxy Tab Pro 10.1" - Micro-USB 2.0 RJ45 10/100 LAN : Electronics](https://www.amazon.com/Smax-Micro-B-Ethernet-compatible-Raspberry/dp/B01AT4C3KQ/ref=sr_1_3?crid=S5T7XJTLHP37&keywords=OTG+Micro+B+Ethernet+Adapter+for+Linux+Raspberry+Pi+Zero+W&qid=1662243901&s=electronics&prefix=otg+micro+b+ethernet+adapter+for+linux+raspberry+pi+zero+w%2Celectronics%2C68&sr=1-3)
https://www.amazon.com/Smax-Micro-B-Ethernet-compatible-Raspberry/dp/B01AT4C3KQ/ref=sr_1_3?crid=S5T7XJTLHP37&keywords=OTG+Micro+B+Ethernet+Adapter+for+Linux+Raspberry+Pi+Zero+W&qid=1662243901&s=electronics&prefix=otg+micro+b+ethernet+adapter+for+linux+raspberry+pi+zero+w%2Celectronics%2C68&sr=1-3

Specific Wiring

Goteks:

The Gotek units including the MicroGoteks can be used with the rotary and display modifications. These modifications have been wired from the header units as follows:

- GR1 = Gotek Rotary #1
 - Connected to GOTEK1 RJ45 jack
- GD1 = Gotek Display #1
 - Connected to GOTEK1 RJ45 jack
- GR2 = Gotek Rotary #2
 - Connected to GOTEK2 RJ45 jack
- GD2 = Gotek Display #2
 - Connected to GOTEK2 RJ45 jack

The connections on the RJ45 jack are below:

- Pin #1 - +5v
- Pin #2 - SW
- Pin #3 - GND
- Pin #4 - DT
- Pin #5 - SDA
- Pin #6 - CLK
- Pin #7 - SCL
- Pin #8 - +3.3v

ATX-Geneve KB/VIDEO/KEYBOARD Plus Breakout board:

Note: All connections are wired straight through between connectors

- Keyboard
 - Pin #1 – Clock
 - Pin #2 – Data
 - Pin #3 – Reset
 - Pin #4 – Ground
 - Pin #5 – +5v
- Video / Audio
 - Pin #1 – +12V
 - Pin #2 – Ground
 - Pin #3 – Audio
 - Pin #4 – Composite Video

- Pin #5 – Red
- Pin #6 – Green
- Pin #7 – Blue
- Pin #8 – CSYNC

- DB9 Male

This connector is used to connect a GBSVGA Genie for the Geneve without the need of an adapter utilizing a standard DB9 Male ribbon cable connector.

- Pin #1 – +12V
 - Pin #2 – Ground
 - Pin #3 – Audio
 - Pin #4 – Composite Video
 - Pin #5 – Red
 - Pin #6 – Green
 - Pin #7 – Blue
 - Pin #8 – CSYNC
- Audio 3.5mm – This jack is wired up to ground and Pin #3 for Geneve Audio. Plug powered speakers into this jack. Pin 3 is wired to both left and right channels.

9640 Reset Headers

- Plug the PC case reset switch across the RST SW and Ground connection
- Run a wire from the bottom leg or R62 on the Geneve the BL-R62 header pin
- Run a ground wire from the Geneve to the GND header of BL-R62.

Pressing the reset switch will perform a hard reset on the Geneve. Use at your own risk.

Support

For all support related questions please send an email to support@shift838.com

SHIFT838 Website : <http://www.shift838.com>

SHIFT838 Store: <https://www.shift838.com/store>