



NEWKEY/80 Ultra Installation & User Guide v1.1a TRS-80 Keyboard Adapter 02/27/2023

Plaid Vest Software, LLC
www.plaidvest.com



IMPORTANT NOTES:

This manual may seem daunting but in practice it should only take about 15-20 minutes to complete the installation.

- Turn off your TRS-80 before attaching your NEWKEY/80 ribbon cable and power cable. You can easily damage NEWKEY/80 or your TRS-80 if you attach or remove the keyboard ribbon cable or power connections while the computer is on.
- Never power your NEWKEY/80 by two sources at the same time (micro-usb and 2-wire power cable).
- The use of an anti-static wrist strap is recommended when working with your TRS-80 and the NEWKEY/80 adapter.

THE TRS-80 MONITOR AND POWER SUPPLY CONTAINS EXTREMELY HIGH VOLTAGE EVEN WHEN THE POWER IS OFF. NEVER TOUCH OR MODIFY THE MONITOR OR ATTACHED CIRCUIT BOARD AND USE CAUTION WHEN WORKING WITH THE POWER SUPPLY.

Plaid Vest Software, LLC is not responsible or liable for any damage caused by NEWKEY/80. If you are not comfortable performing the installation and verifying the power voltage and polarity connections you may return your NEWKEY/80 for a full refund.

Contents:

- Read Me First! instruction page
- NEWKEY/80 Keyboard Adapter and protective bottom case
- Micro-usb to USB-A cable
- Keyboard stickers (@, Clear, Break)
- Disk drive 4-wire power splitter cable (Attaches to disk drive to provide +5v/ground)
- Plain 2-wire +5v Power Cable (alternative power installation)
- Deluxe 20 pin ribbon cable
- Laminated quick reference card



Opening Your TRS-80

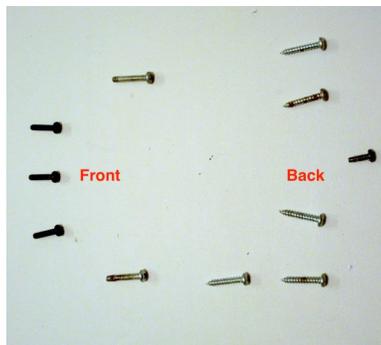
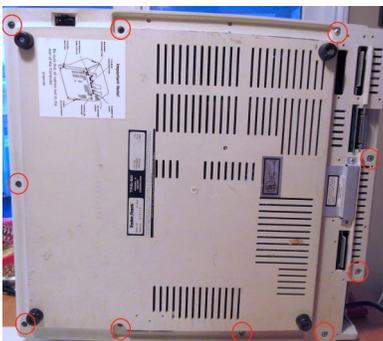
YouTube has several good videos on how to open your TRS-80. Make sure to be ***very*** careful when pulling up the cover to avoid breaking the CRT neck. The CRT yoke is only 1/2" from the motherboard and is very fragile. You can look through the top vents to watch the neck clearance as you gently lift the top. Be sure to lift **STRAIGHT UP**.

See video "TRS-80 checks before powering up" on YouTube for a very good procedure for opening your TRS-80: <https://www.youtube.com/watch?v=76bVeQP8m3Y>

A summary of the process is below.



Step 1: Remove back screw



Step 2: Remove 10 bottom screws. Note that the screws are different so keep track of the location of each screw.



Step 3: Carefully lift the case **STRAIGHT UP**. There is a fragile neck on the back of the monitor tube that can be easily damaged. Lifting the case straight up will prevent damage. You can look into the top of the vents above the rear of the monitor tube to see the neck and watch it for clearance as you lift.



Once the monitor tube neck has cleared the top of the motherboard enclosure you can rotate the case onto it's side. See picture below.

NOTE: Avoid making contact with the monitor tube and related circuit board as they contain very **High Voltage**.

**Do not touch!
High Voltage**



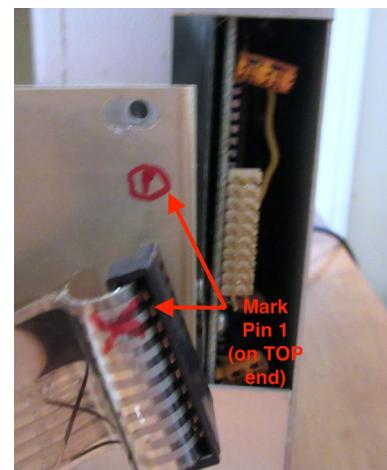
Keyboard Ribbon Cable Installation

Important: Pin 1 of the TRS-80 keyboard ribbon cable is located at the TOP of the TRS-80 motherboard. Contrary to industry standard markings, the TRS-80 keyboard cable may have a red or black mark on the pin 20 edge of the cable. Pin 1 on the NEWKEY/80 adapter is the side closest to the power connector (and is marked as "1").



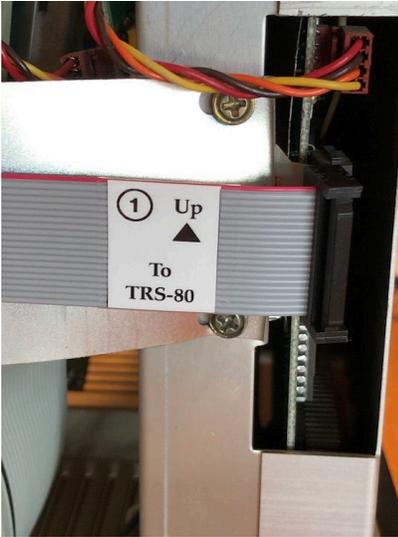
Step 1: Remove the protective ribbon cable bracket.

Step 2: Mark the TOP edge of your existing keyboard cable as "Pin 1". Then gently unplug your existing keyboard ribbon cable from the TRS-80 motherboard connector.



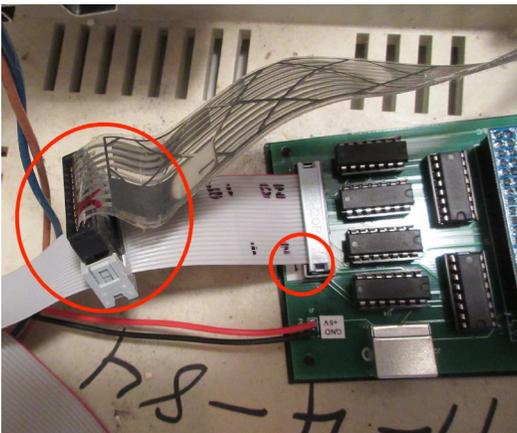
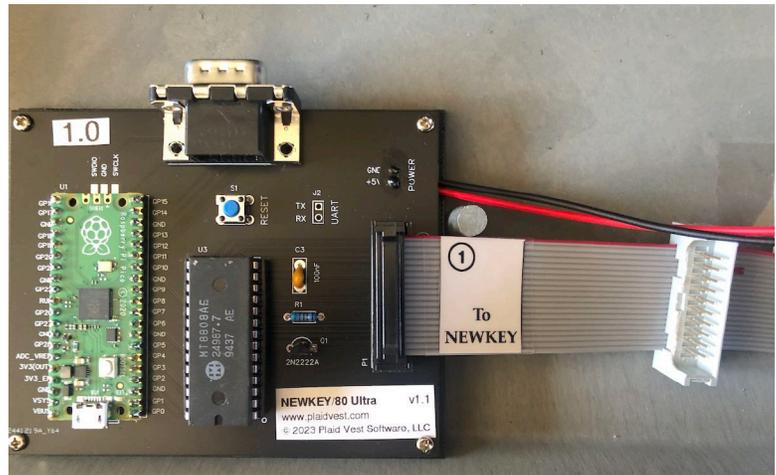


Step 3: Gently feed your existing keyboard cable under the drives (if present) and into the empty space in front of the keyboard.



Step 4: Plug the NEWKEY/80 ribbon cable (marked "To TRS-80") into TRS-80 motherboard connector with Pin 1 at the TOP and re-attach the protective metal bracket over the ribbon cable.

Step 5: Plug the other end of the NEWKEY/80 ribbon cable (marked To NEWKEY) into the NEWKEY/80 adapter, aligning Pin 1 markings.



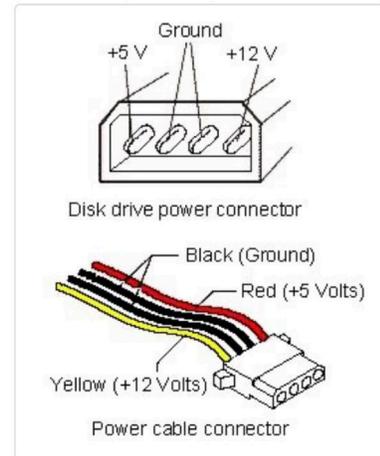
Optional: Use old and new keyboards at the same time:

Plug your old TRS keyboard ribbon cable (that you unplugged in Step 2) into the NEWKEY/80 ribbon cable box connector (aligning Pin 1).



IMPORTANT!

Please verify your power cable output voltage and polarity before using.



- Do not work on your TRS-80 with the power on. UNPLUG your TRS-80 while working inside of the case.
- **Voltage and polarity checks are critical to avoid damaging your TRS-80, disk drive, and NEWKEY/80.** You are responsible for confirming voltage and polarity of disk drive and NEWKEY/80 power cables before connecting the related devices.
- The disk drive uses both +5v and +12v and reversing these connections will permanently damage your disk drive. Vintage computers may not always have standard connections or wire colors. Check disk drive voltages and orientation BEFORE AND AFTER connecting the splitter. **DO NOT CONNECT YOUR DISK DRIVE until you have confirmed voltages and polarity out of the NEWKEY/80 disk drive power splitter are correct for your disk drive.**

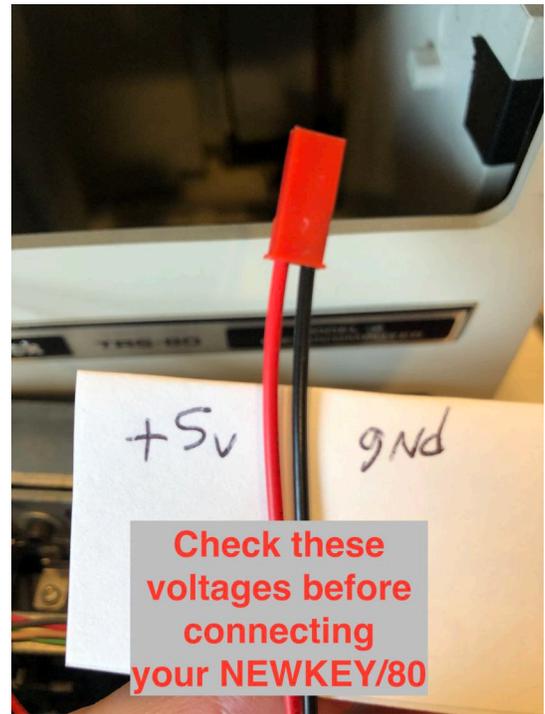
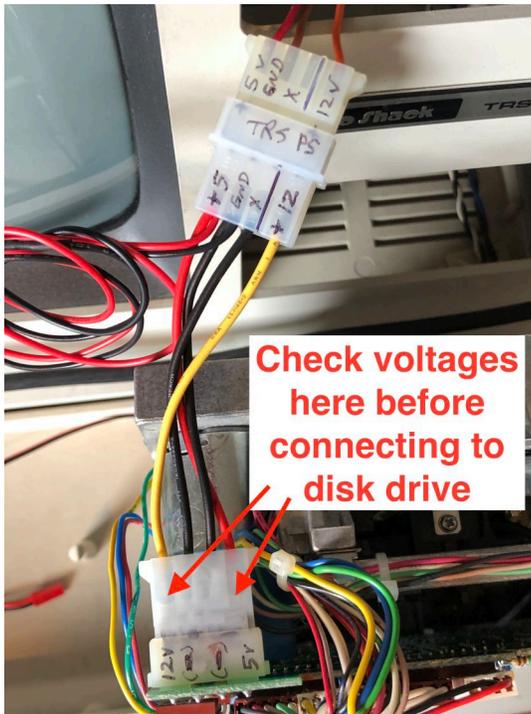
Two power cables are provided with your NEWKEY/80. A simple 2-wire red/black power cable and a disk drive power splitter cable. You may use either cable based on your preference.

2-wire NEWKEY/80 Power Cable

The 2-wire cable attaches to any +5v and ground connection in your TRS-80. Technical manuals for the TRS-80 can be found in PDF form online for free. These manuals will outline the TRS-80 power supply and where you can find +5v and ground connections.

4-wire NEWKEY/80 Disk Drive Power Splitter

The 4-wire disk drive power splitter cable attaches between the factory disk drive power connector and the disk drive. It provides 4 wires straight-through to the disk drive and a separate 2-wire power cable for your NEWKEY/80.

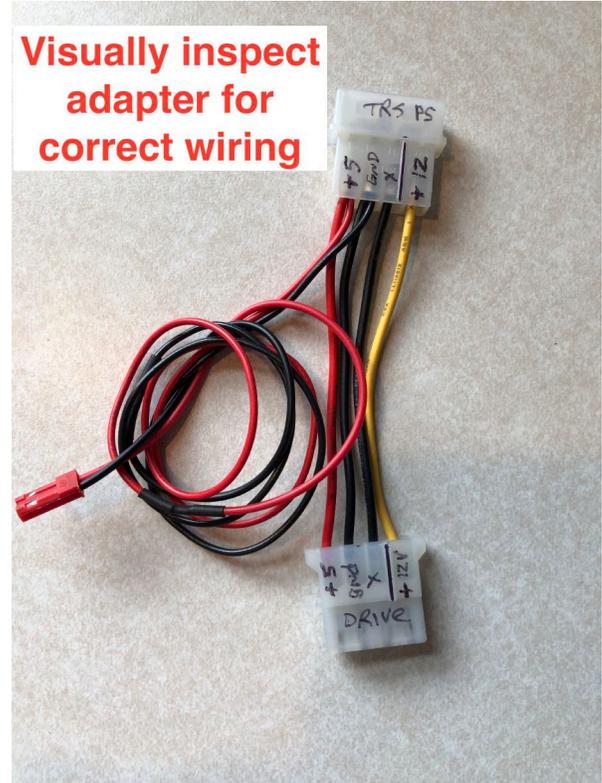
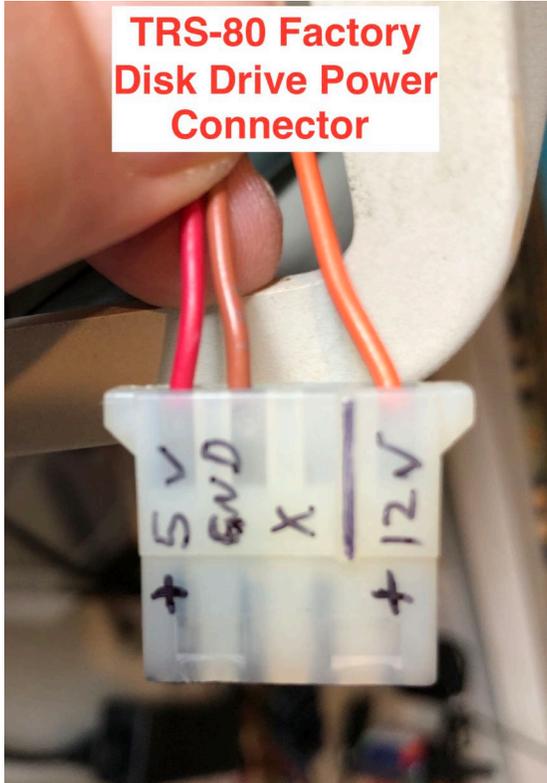


Check the voltage and polarity of the factory disk drive power cable and write this information down. You will need to re-check the output of the NEWKEY/80 disk drive power splitter connections to make sure they match the factory values.

The splitter is "straight through" so the input voltage/polarity/orientation should match the output voltage/polarity/orientation. If the disk drive power +5v and +12v connections are hooked up incorrectly they will permanently damage your disk drive.

Taking a few minutes to verify the before and after voltage and polarity connections will ensure your disk drive is not damaged.

The pictures below show "standard" TRS-80 disk drive connections and wire coloring. Please note that vintage computers have been known to use **non-standard** connections and wiring colors. Please verify disk drive and NEWKEY/80 power output BEFORE connecting them.



Power Details

See the power verification section above for additional information.

The NEWKEY/80 keyboard adapter requires a regulated +5v power and a ground connection. This can be provided either by an external +5v DC adapter (not included) or by using your existing TRS-80 power supply (recommended). The NEWKEY/80 adapter requires very low current so you should be able to tap into existing power wires used by the TRS-80's disk drives, motherboard, or RS232 adapter.

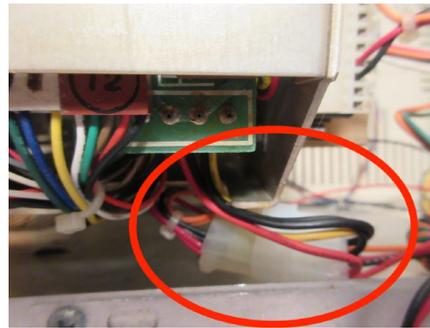


CAUTION: The TRS-80 monitor, related circuit board and power connections contain DANGEROUS VERY HIGH VOLTAGE. Never touch or modify the monitor or related circuit board. Only use the lower voltage connections that supply power to the motherboard, RS232 interface, or disk drives.

For a Disk-Based TRS-80, the easiest method is to use the included Molex 4-wire disk drive power splitter cable.

Do NOT power up your TRS-80 with the disk drive and NEWKEY/80 connected without verifying voltages first. Incorrect voltage/wiring will damage your disk drive and NEWKEY/80 board.

Depending on your TRS-80 this may be accomplished without removing the disk drive. Some TRS-80's require the drive to be partially removed to allow room to insert the 4-wire power splitter.



For a diskless TRS-80, you will need to connect to the TRS-80 internal power supply. Connect (soldering is recommended) the NEWKEY/80 2-wire power cable onto existing +5V (red) and Ground (black) wires.

Power supplies vary between TRS-80 models, so it is difficult to provide specific instructions. You will see markings on the power supply board that shows the output pin layouts. +5v is usually a red wire, and ground is usually ground. Technical manuals for the TRS-80 are readily available online in PDF form. These can be a good source of specific voltage/location information.

Make sure to test the power connections with a multimeter before connecting power to the NEWKEY/80 adapter. Red wire should be +5V and black wire should be ground (-). When using the 4-wire power splitter you MUST verify disk drive voltages before connecting disk drive power!

Feel free to contact support@plaidvest.com if you need any help identifying an existing +5v and ground wires.

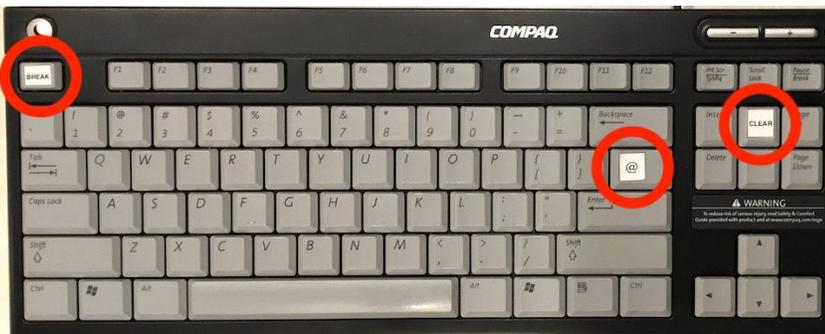


Final Assembly

1. Plug your keyboard into the NEWKEY/80 adapter board.

Please note that the NEWKEY/80 Ultra adapter has a micro-usb port. Use the included micro-usb to USB-A cable to connect to your USB keyboard or USB dongle (for 2.4Ghz driverless wireless keyboard).

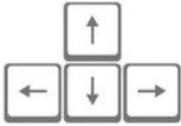
You may use inexpensive USB extension cables (not included) if you wish to route the cables outside of the TRS-80.



2. (optional) Apply the three special key stickers (included) to your keyboard, if desired. See the "Special Keys" section for key definitions.
3. (optional) Plug in your Atari joystick (DB-9 connector). Use of a 9-Pin Serial or Atari joystick extension cable is recommended to route your joystick port outside of the TRS-80 case.

You may choose to remove your existing keyboard and mount your keyboard in or on top of the TRS-80 keyboard opening.

It is recommended to use double-sided mounting tape to secure the NEWKEY/80 adapter to the bottom of your TRS-80 case.



Special Keys (Use included keyboard stickers if desired)

USB Key **TRS-80 Key**

\ (backslash)	@
ESC	<Break>
Home	<Clear>

Special Key Combinations:

CTL-ALT-DELETE = Reset TRS-80

CTL-ALT-SPACE = Reset TRS-80 and bypass FreHD

CTL-ALT-R = Reset NEWKEY/80 adapter

CTL-ALT-A = About NEWKEY/80, shows current version and settings

CTL-ALT-H = Help Screen, shows keyboard shortcuts

CTL-ALT-3 = Switch to Model 3 mode

CTL-ALT-4 = Switch to Model 4 mode (enables Ctrl, Caps, F1, F2, F3 keys)

CTL-ALT-I = BASIC program for RetroStoreCard BASIC loader program
(see <https://github.com/apuder/RetroStoreCard>)

CTL-ALT-P = BASIC program to test NEWPRINT/Multi card

Windows Key = Holding down the windows key will allow you to press multiple keys on your keyboard at the same time. Please note that most modern USB keyboards have difficulty with certain combinations (especially involving TY/GH/BN combinations). This feature is useful for applications that require certain keys to be pressed at the same time. A few common multi-key combinations have been predefined (see below).

ALT-1 = 123 combination (used to enter Debug mode in some versions of DOS)

ALT-D = DFG combination (used to enter MiniDos mode in some versions of DOS)

ALT-J = JKL combination (used to enter Debug mode in some versions of DOS)

If you require any additional predefined key combinations please contact me at support@plaidvest.com



Using NEWKEY/80 For The First Time

When connected correctly, NEWKEY/80 green power LED should flash 3 times when power is applied. If not, please check your power connections. (+5v = red wire, ground = black wire).

Make sure to set the type of TRS-80 you are using with **CTL-ALT-3** (Model 3) or **CTL-ALT-4** (Model 4). This setting is saved even when the power is turned off.

CTL-ALT-A (about) will show the current firmware version as well as your TRS-80 keyboard type.

CTL-ALT-H (help) will show NEWKEY/80 command shortcut key combinations

CTL-ALT-DELETE will reboot your TRS-80. Holding the <BREAK> key at the same time will force your TRS-80 to boot into BASIC (Cass? prompt).

Firmware Updates

USB Firmware files are available at www.plaidvest.com

IMPORTANT: Please unplug the NEWKEY/80 +5V power cable before uploading the firmware.

To update the firmware you will need to upload a new .uf2 file to the Raspberry Pi Pico microcontroller via a mini-USB cable and a PC (Windows, Linux, or Mac).

Hold down the small white reset button on the Pico microcontroller while plugging NEWKEY into your computer. It should show up as an external flash drive. Drag or copy the NEWKEY .uf2 firmware file onto the drive. It will then disconnect the Pico and your done.

Contact/Questions/Comments/Bugs

Firmware and Installation & User Guide updates available at www.plaidvest.com

Send any questions or comments to support@plaidvest.com

Thank you for your feedback!

FAQ (Frequently Asked Questions)

I am having trouble connecting the NEWKEY/80 power wires.

Please contact me directly at support@plaidvest.com. I am sure we can get it working for you.

Why are random characters appearing when I type on my new keyboard?

1) Double-check your cable connections. There is a very good chance you have one of the connectors on backwards. Please note the location of pin #1 on each connection.

2) Verify power to NEWKEY/80 is +5V (using Multimeter). Some external supply markings may not be accurate.

Why is <CAPS LOCK> key not working, or why am I seeing a "0" when I press <CAPS LOCK>?

You are probably not using the correct machine setting. Set the type of TRS-80 you are using with CTL-ALT-3 (Model 3) or CTL-ALT-4 (Model 4).

NEWKEY/80 is not working. The keyboard CapsLock and NumLock lights are not on and do not toggle the keyboard status LED's:

Your keyboard may not be compatible (this is very rare). The keyboard status lights (CapsLock and NumLock) should come on immediately after powering up the TRS-80. Try another keyboard, if possible.

NEWKEY/80 not working. Keyboard CapsLock and NumLock lights are on and toggling OK.

Try pressing CTRL-ALT-3 (hold down Ctrl key and Alt key and 3 key). If you see a "K5" on the TRS-80 screen and your TRS-80 reboots that means your keyboard cable is plugged in backwards.

Can I use my new keyboard at the same time as my original TRS-80 keyboard?

Yes!