

## Hall Effect Keystrip Installation Guide

### Introduction

Please read this guide in its entirety before putting in a single screw, tack, or magnet. This guide is based upon feedback from users and will help you install the keystrips successfully the first time.

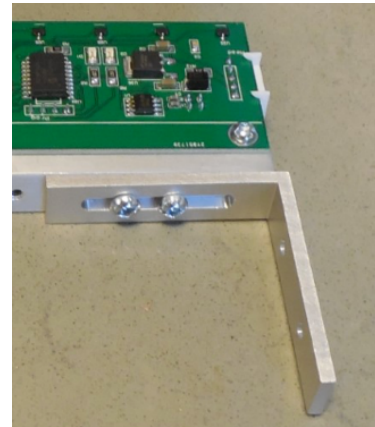
### Tools and Materials Needed per keyboard

- 5 Hall Effect Keystrip PCBs mounted to an aluminum rail (arrives assembled).
- (4) #6 x  $\frac{3}{4}$  or #8 x  $\frac{3}{4}$  screws to mount L brackets to keyboard frames
- (2) Ribflex Connectors
- (1) Ribflex Crimp Tool
- (1)  $\frac{1}{8}$ " Forstner Drill Bit or Brad Point Drill Bit
- (1) Drill Press or battery powered drill w/ very steady hand
- 1 Bottle Superglue Gel

### Understanding the bracket system

The strips should arrive mounted to a solid aluminum bar. This bar provides rigidity to the strips, so they don't move during use. If you feel that you can't use the aluminum bar and brackets for mounting, please consult with us. The product's proper operation is depending on an extremely rigid and stationary mount system.

The L brackets may or may not be installed when you get the strip sets. If they are not installed, install them as pictured here. For fitting, keep the two screws pictured slightly loose.



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### Fitting the strips to the keyboards

- 1) The keystrips require the magnets on the key body to move toward the sensors when depressed. That means the strips are either mounted under the keys (any pivot type) or above the keys (center pivot type). These instructions assume under key installation.
- 2) You will most likely find that the keystrip assembly is somewhat narrower than the space under the keys. On occasion, wood needs to be removed for the strip set to fit. Carefully place the assembly loosely on the keys, electronic components down. Be aware that it is preferable to install the sensors so that the “short” strip is toward top C.
- 3) On the back of the circuit board (should be facing toward you/away from the keys), you will note white squares. These squares represent the exact location of the sensors - the magnets should be positioned directly underneath the sensors. Make sure the assembly is perfect perpendicular to the keys and shift the assembly right-left until it each white square lines up within the edges of its key. It is expected that they may not be centered, and if the magnet can safely be on one key without physically interfering with another, that is fine. Adjust the brackets (shown above) so that they are pushed all the way out and hold the sensor set in position (and remove side to side play). Tighten screws. This will capture the side to side position of the wide axis adjustment. Verify that each square is within a key.
- 4) Now that the wide axis adjustments are complete, the depth axis/location of the rail must be determined. Generally, the more travel the better, and the further away from the pivot the better. It is important that sufficient travel exists for the sensor to be able to read a wide range of values. The most critical measurement is the measurement between magnet and sensor when the key is fully depressed – this should be about 1/4” gap. Once the location of the strips has been determined, use a mechanical pencil (or something precise) and draw a line from low C to high C (across all the keys) representing where the magnet will go on the perpendicular axis. We suggest using the edge of the PCB as a straight edge.
- 5) Now make sure once again that each white square lands within in a key (shift the assembly as necessary).
- 6) If you haven’t yet done it, extend the angle brackets until they are firmly touching the outside of the keyboard and tighten the screws. This will prevent the

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keystrips from drifting side to side. Once again verify that each white square lands within a key.

- 7) Now mark the center of the white square on each key (forming a + sign with the previously drawn cross-line. Repeat for each key. *Please note: It is highly unlikely that any re-use of old holes will be possible, because contact mounting holes are centered on each key, and the magnets will likely not be. We strongly suggest NOT trying to reuse any old holes and placing the magnets at a new location.*
- 8) Drill a 1/8" hole the exact depth of each magnet (perhaps by marking the bit depth with tape).
- 9) Verify that all of the holes line up with the white squares precisely. If they do not, this is the time to fix it!
- 10) Place a drop of superglue into each hole and immediately follow with a magnet. Each hole gets one magnet. If the depths of holes are correct, it is possible to keep the magnets connected in your hand in a continuous bundle. The installer pushes the end magnet of the series into the hole, pauses for a moment to allow the glue to tack, and slides the rest of the magnets sideways, leaving the inserted magnet behind. It is wise to have a non-steel (plastic or aluminum) hand tool ready to assist with this, as a finger is not the best way to do it (you will glue your fingers to the keys or magnets). Sometimes magnets will "float" back up and having something other than a finger at hand to push back down is helpful.
- 11) Verify magnets line up with the white squares precisely. If they do not, the time to fix it was at step 8, but this is still a better time than after the keyboards are installed. Some tolerance is allowable, but more than a half a magnet width is probably too much. There isn't a concern that the sensor will see the magnet, the concern is that the next closest magnet may interfere with position tracking.

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12) Keeping in mind that the keys pivot on a slight rotation, position the keystrips where the magnets will be parallel to the sensors in the down position (this will be a slight angle from level), and mark the furthest set of holes from the bar with an awl on either side (see photo). Pre-drill and install screws. Make final adjustments so that the 1/4" air gap is maintained between the bottom position of the magnet and the sensor (this prevents the sensor from saturating). Install the other set of mounting screws.

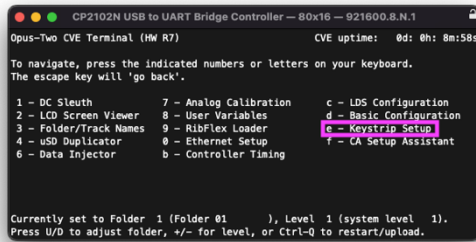


- 13) Install a connector on a piece of Ribflex cable. Make sure the cable is long enough to allow for neat routing and to allow the keyboards to be removed from the console and placed on the console bench for service. If a CVE is being used, the ribbon cable can “chain” from one keyboard to the other. For a CVA, each keyboard “home runs” to a RibFlex connector on the controller. Any tool that can carefully (and evenly) apply force will work to attach the connectors to the cable. The red strip on the cable should correspond to the marked edge of the ribbon connector.
- 14) Disconnect the console from the pipe chamber (the next step can be loud).
- 15) Power on the controller. LEDs should immediately illuminate on each keystrip. Physical installation is complete.

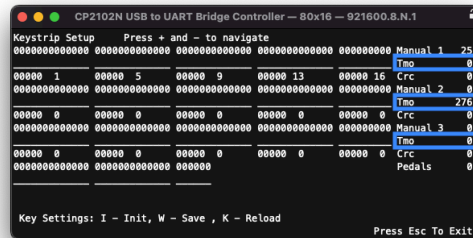
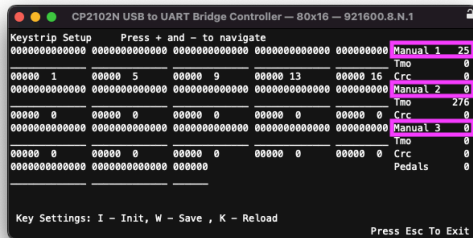
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## Configuration Within The Terminal

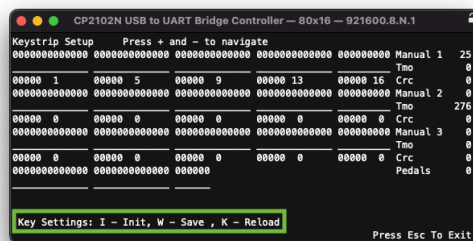
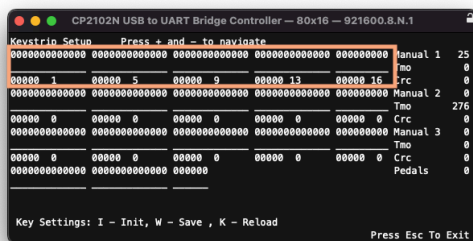
- 1) From the home screen, press “z” to stabilize the screen, then press “e” to enter Keystrip Setup.



- 2) On the main keystrip setup page, a short view of each manual is shown. Of particular interest are the confidence ratings for each keyboard (pink highlight below). A confidence rating of 25 is the highest it can be. When a controller times out waiting for a particular keystrip, the Tmo count is increased (blue highlight):

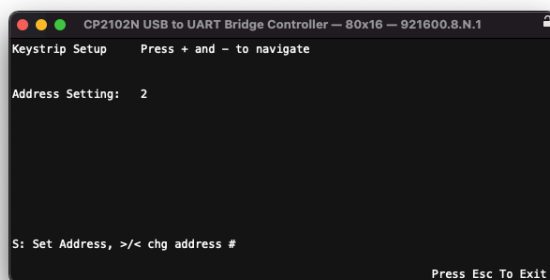


- 3) Each keyboard (Swell highlighted in orange) has a row of numbers. The number (0-9) indicates the relative magnet strength. If a particular note is considered on, a “1” will be shown for the note below the strength value. Instructions for calibration are (green box) at the bottom of the terminal window.



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- 4) Each keyboard has an “identifier” saved inside of it so that multiple keyboards on a single ribbon can be addressed individually. Typically, the swell keyboard is 1, great is 2, and the choir would be 3. 4 manual setups are not supported on a single ribbon. If multiple keyboards are connected and confidence is not obtained for both, or CRC errors appear, it is likely that both keyboards have the same identifier. This can be changed from the terminal by pressing “+” until this screen appears:



This is only necessary if you don’t get 25 level confidence on both keyboards. It is important to only have the keyboard you wish to change the address of plugged in (typically great or choir). The controller will send out a message asking any strips that can hear it to assume a new identifier. Since the goal is to eliminate conflicting addresses, it is important to make sure that only one keyboard can receive each message. Using the “>” and “<” characters, change the address to what you want the connected keystrips to become. Press “S” a few times to send address commands; the keystrips will immediately switch to the new address. Press “+” to return to the keystrip landing screen, keyboard 2 should have 25 confidence. Plug in keyboard 1, and it should also have confidence. If this is correct, the system is now ready for calibration.

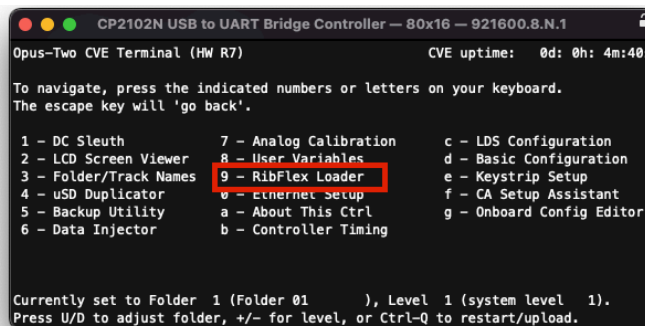
- 5) To calibrate the keyboards, make sure no stops are on (or the chambers are disconnected) and press “I” on the computer keyboard. Do not touch the organ keys while pressing the “I” or within a few seconds. The system will clear all learned values and establish a “baseline” position for each key. One key at a time, fully depress the key. It is important to do this one key at a time so that the software can determine magnet polarity.
- 6) Once all keyboards are calibrated, press the “W” key to save the settings.

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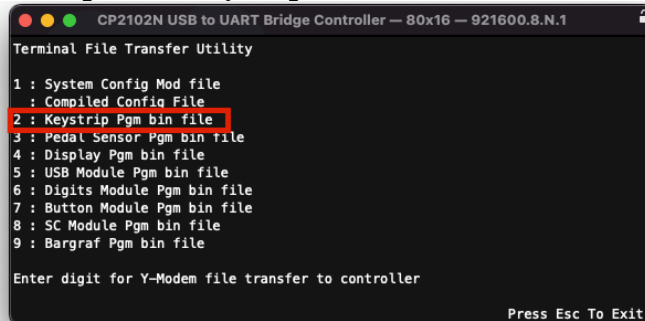
### Updating Keystrip Firmware

If a keystrip firmware update is needed and you are advised by Opus-Two technicians that your hardware is capable of this procedure, you can proceed.

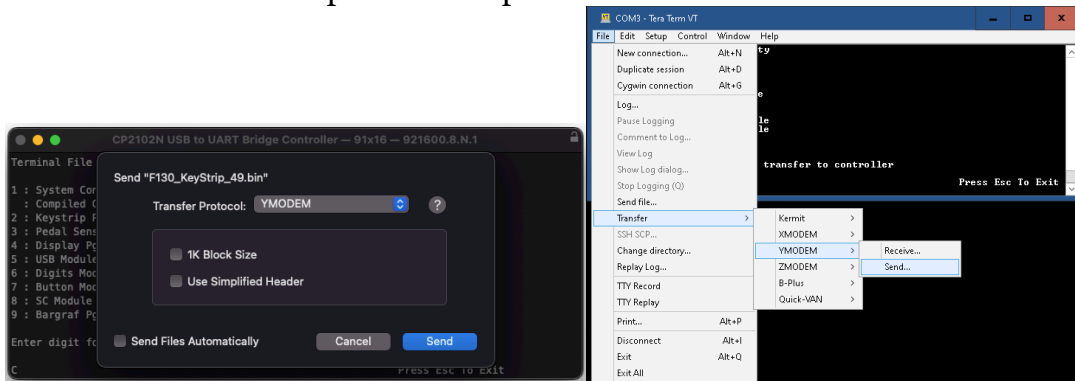
- 1) Build the site in any version of tools after July 1 2022.
- 2) From the home screen, enter the RibFlex Loader:



- 3) Select Option 2 to upload a keystrip bin file:



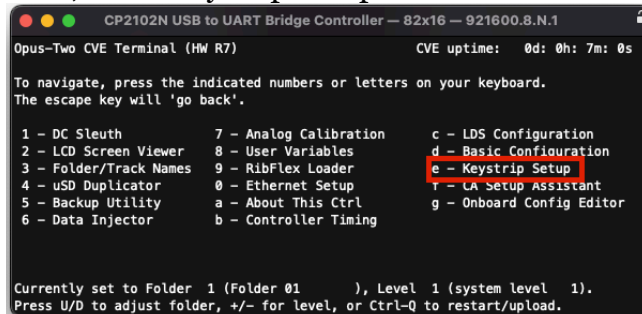
- 4) Initiate a Y-MODEM upload of the provided .bin file.



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After uploading the file, on some occasions, the terminal will become unresponsive. If that happens, it is necessary to restart the CVE controller by pressing the reset button.

- 5) From the home screen, enter Keystrip Setup:



```

CP2102N USB to UART Bridge Controller -- 82x16 -- 921600.8.N.1
Opus-Two CVE Terminal (HW R7)           CVE uptime: 0d: 0h: 7m: 0s

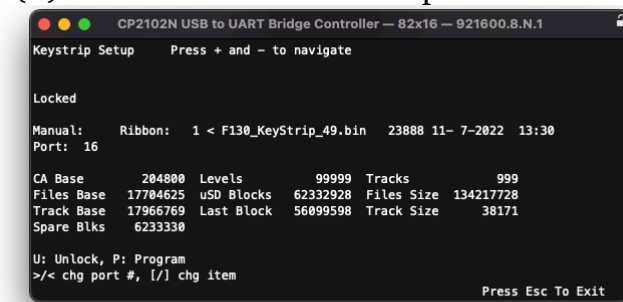
To navigate, press the indicated numbers or letters on your keyboard.
The escape key will 'go back'.

1 - DC Sleuth           7 - Analog Calibration   c - LDS Configuration
2 - LCD Screen Viewer  8 - User Variables      d - Basic Configuration
3 - Folder/Track Names 9 - RibFlex Loader      e - Keystrip Setup
4 - uSD Duplicator     0 - Ethernet Setup      t - CA Setup Assistant
5 - Backup Utility     a - About This Ctrl     g - Onboard Config Editor
6 - Data Injector      b - Controller Timing

Currently set to Folder 1 (Folder 01), Level 1 (system level 1).
Press U/D to adjust folder, +/- for level, or Ctrl-Q to restart/upload.

```

- 6) Press the plus key (+) twice to enter firmware upload mode:



```

CP2102N USB to UART Bridge Controller -- 82x16 -- 921600.8.N.1
Keystrip Setup   Press + and - to navigate

Locked

Manual:  Ribbon:  1 < F130_KeyStrip_49.bin  23888 11- 7-2022  13:30
Port:  16

CA Base   204800  Levels   99999  Tracks   999
Files Base 17704625 uSD Blocks 62332928 Files Size 134217728
Track Base 17966769 Last Block 56099598 Track Size  38171
Spare Blks 6233330

U: Unlock, P: Program
>/< chg port #, [/] chg item

Press Esc To Exit

```

- 7) Verify that the correct Port (16 for CVE) and Ribbon (1 for CVE) are selected.
- 8) Verify that the file that you uploaded “F130\_Keystrip\_xx” is listed on the screen.
- 9) Press “U” to unlock, and “P” to begin programming. Keystrips will now be programmed with the firmware listed.
- 10) Press the “+” button; on the next screen the version of each strip should be displayed and should all be the same. Repeat the process if it is not.
- 11) If the keystrips stop working, it may be necessary to power cycle them and re-address them.