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# ASSEMBLY INSTRUCTIONS

2

3 2810A M/E Source Selector module



6 Document control number: 2810-8010

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9 ABSTRACT: This document provides instructions on how to assemble and test a 2810A Source Selector module.  
A complete bill of materials is included as an annex.

10 Suggestions and corrections should be directed to <http://www.github.com/dslik/mix-effect/issues>

11 Serial number: Assembly date: Assembled by:

12 USAGE

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50 Revision history

Table 1: Document Revisions

Version	Date	Change	Approver
0.1	2022-06-04	Initial draft for internal review	D. Slik
0.2	2022-06-27	Added packaging section	D. Slik
0.3	2022-08-16	Added RoHS declarations	D. Slik
0.4	2022-09-05	Updated to use assembly documentation template version 2	D. Slik

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281

## **Part I**

282

# **2810A assembly instructions**

## 283 Section 1

# 284 Overview

285 This document describes the materials, processes, outcomes and verifications required to successfully assemble  
286 and test a 2810A Source Selector module, a sub-component of the Eurorack Mix/Effects Control Surface.

287 A first-time reader should carefully review section 2 - prerequisites, and section 3 - preparation before beginning  
288 the assembly process.

289 This document serves both as instructions and as a record of the assembly of the product. When you finish each  
290 step in this document, sign your name (or apply your stamp) in the "Signature/Stamp" box on the right to provide a  
291 record of completion.

292 When things go wrong, this document provides guidance for common issues that have been encountered in the  
293 past. When this document does not provide guidance, please contact your quality management representative,  
294 who will help you fill out an exception report. These reports help improve process quality and product quality, and  
295 these reports are incorporated into future revisions of this document.

296 Always remember: If you are unable to successfully complete these instructions, that means the processes sup-  
297 porting you (including this document) have failed you. Our processes are built for your success, and by improving  
298 our processes, we help everyone succeed.

## **299 Section 2**

# **300 Prerequisites**

### **301 2.1 Required safety training**

- 302 The following safety training units must be completed before assembling this product.
- 303 By signing (or applying your stamp) on the right, you indicate that you have completed the following training:

Table 2: Safety training

Item #	Description	Signature/Stamp
2.1.1	0102-0100 - Safety reporting policies and procedures training  Key topics: Understanding policies and procedures around how to identify, contain and report a safety-related issue in the workplace, including damaged or malfunctioning equipment, leaks, spills, and other occupational hazards.	Stamp or sign here
2.1.2	0102-0101 - Material safety data sheets training  Key topics: Understanding how to read material safety data sheets (MSDS) for materials you will be handling during product assembly, how they can affect your health and the health of the environment, how to safely handle and dispose of them, and what to do if there is a spill or accidental exposure.	Stamp or sign here
2.1.3	0102-0102 - Solder handling and disposal policies and procedures training  Key topics: Understanding policies and procedures related to handling solder and solder paste, stencil cleaning, and solder disposal.	Stamp or sign here
2.1.4	0102-0105 - Electro-static discharge controls policies and procedures training  Key topics: Understanding policies and procedures related to protecting equipment and components from electro-static discharge, including clothing, protective equipment, material handling and labelling.	Stamp or sign here

## 304 2.2 Required skills training

- 305 The following skills training units must be completed before assembling this product.
- 306 By signing (or applying your stamp) on the right, you indicate that you have completed the following training:

Table 3: Skills training

Item #	Description	Signature/Stamp
2.2.1	0103-0202 - ANSI/ESD S20.20 Electro-static discharge controls  Key topics: Understanding of ESD safety, the ESD control program, equipment and personnel grounding, EPAs, packaging and marking.	Stamp or sign here
2.2.2	0103-0203 - General components handling  Key topics: Understanding of safe component handling, including reeled components, components in JEDEC trays, and loose components. Includes avoiding contamination, moisture control, and component inventory management.	Stamp or sign here
2.2.3	0103-0204 - SMD Reel Handling  Key topics: Understanding of reel handling, including labeling, component counting, leader management, moisture sensitivity levels, and component inventory management.	Stamp or sign here
2.2.4	0103-0409 - SMT Caddy manual pick and place machine  Key topics: Safe and effective use of the SMT Caddy manual pick-and-place machine, including setup, reel mounting, component dispensing, ergonomic use, startup, shutdown, board mounting and component placement.	Stamp or sign here
2.2.5	0103-0414 - 5040-XTS reflow station  Key topics: Safe and effective use of the 5040-XTS reflow station, including use of the pre-heater, the hot air system, and the soldering iron. Covers inspection and verification, cleaning, preferred settings and best practice techniques.	Stamp or sign here
2.2.6	0103-0301 - IPC-A-610G - Acceptability of electronic assemblies  Key topics: Covers visual acceptability requirements for electronic assemblies, including handling considerations, hardware installation, component placement, soldering, terminal connections, wiring, marking and cleanliness.	Stamp or sign here
2.2.7	0103-0302 - IPC-J-STD-001F - Soldered electrical connections  Key topics: Covers soldering materials, general soldering and assembly requirements, wire and terminal connections, through-hole mounting, surface mounting of components, cleaning process requirements, PCB requirements, coatings and product assurance.	Stamp or sign here

## 307 Section 3

# 308 Preparation

### 309 3.1 Workspace

- 310 Before starting assembly, check out an assembly desk for a minimum of two hours. A single unit can be assembled  
 311 in two hours, with an additional hour per additional unit.

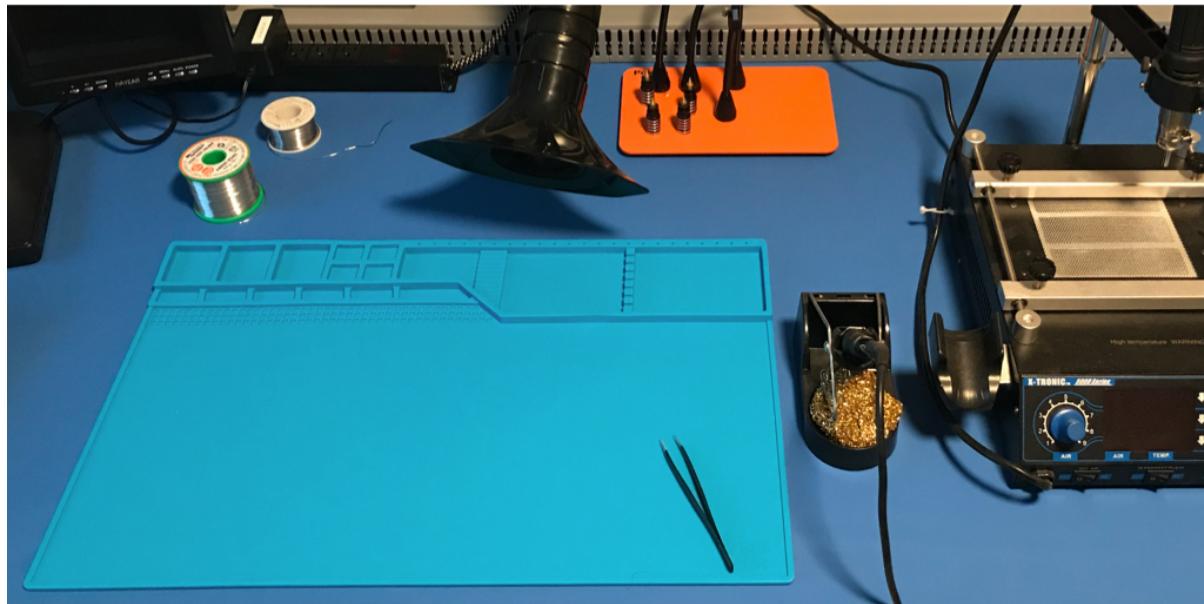


Fig. 1: Assembly Desk

Table 4: Prepare workspace

Step	Description	Signature/Stamp
3.1.1	Verify that the workspace has a clean assembly mat and anti-static mat, and that the cleaning record has been signed since last use.	Stamp or sign here
3.1.2	Verify that the HEPA fume extractor turns on, and you can feel air suction from the nozzle.	Stamp or sign here

continues on next page

Table 4 – continued from previous page

Step	Description	Signature/Stamp
3.1.3	Verify that the 5040-XTS rework station soldering iron tip is not worn down. If it is worn down, obtain a new 900M-T-I tip from the stores department.	Stamp or sign here

### 3.2 Project consumables

312 Obtain each of the below consumable items from the stores department:

Table 5: Assembly consumables

Item #	Description	Signature/Stamp
3.2.1	 <p>Fig. 2: 1 pair ESD gloves If you prefer to use your own pair of ESD gloves, make sure they are tested before use.</p>	Stamp or sign here
3.2.2	 <p>Fig. 3: 1 syringe of Chip Quik SMDLTLP Solder Paste Sn42/Bi57.6/Ag0.4 No-Clean Lead Free</p>	Stamp or sign here

continues on next page

Table 5 – continued from previous page

Item #	Description	Signature/Stamp
3.2.3		<input type="text"/> Stamp or sign here
3.2.4		<input type="text"/> Stamp or sign here

Fig. 4: 1 spool MG Chemicals 4900 Lead Free No-Clean Wire Solder Sn96.2Ag2.8Cu0.4 (96.2/2.8/0.4) 20 AWG

Fig. 5: 1 square of Scott Shop Towel

### 3.3 Project tools

- 314 Obtain a tools container labelled "28XX Assembly Tools" from the 28XX section of the stores supply shelf. At your assembly desk, use [Table 6](#) to verify that all the required tools are present.
- 315 If any required tools are missing, return all tools and the tools container to the stores department, and obtain another tools container.



Fig. 6: Tools Container

- 319 Remove each of the following tools from the tools container, and place them on the anti-static mat of the assembly desk:

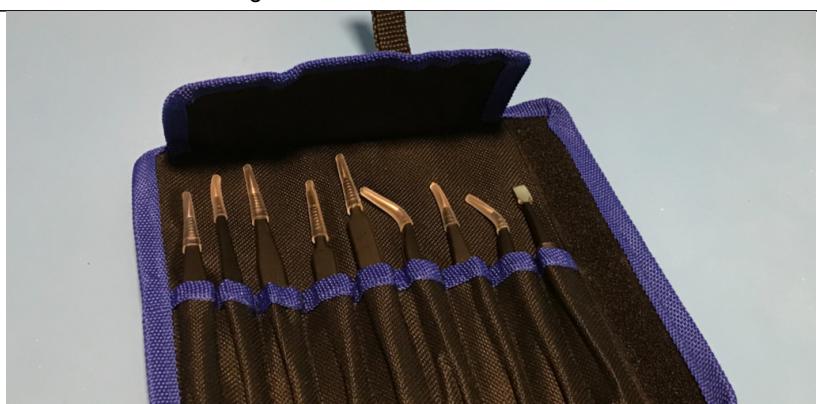
Table 6: Assembly tools

Item #	Description	Signature/Stamp
3.3.1		<span>Stamp or sign here</span>

Fig. 7: Hozan F-23 components tray

continues on next page

Table 6 – continued from previous page

Item #	Description	Signature/Stamp
3.3.2	 Fig. 8: 1.5mm Hex screwdriver	 Stamp or sign here
3.3.3	 Fig. 9: 1mm flat-head screwdriver	 Stamp or sign here
3.3.4	 Fig. 10: ESD tweezers	 Stamp or sign here

continues on next page

Table 6 – continued from previous page

Item #	Description	Signature/Stamp
3.3.5	 <p>A black solder paste dispenser with a green button and a black screw.</p>	<input type="button" value="Stamp or sign here"/>
3.3.6	 <p>A black fine-tipped Sharpie permanent marker.</p>	<input type="button" value="Stamp or sign here"/>
3.3.7	 <p>A red and white digital countdown timer.</p>	<input type="button" value="Stamp or sign here"/>

Fig. 11: Solder paste dispenser

Fig. 12: Fine-tipped Sharpie marker

Fig. 13: Countdown timer

continues on next page

Table 6 – continued from previous page

Item #	Description	Signature/Stamp
3.3.8		<input type="button" value="Stamp or sign here"/>
3.3.9		<input type="button" value="Stamp or sign here"/>
3.3.10		<input type="button" value="Stamp or sign here"/>

Fig. 14: Button label cutter

Fig. 15: 2810-0111 v0.2 fixture

Fig. 16: 28XX programmer

continues on next page

Table 6 – continued from previous page

Item #	Description	Signature/Stamp
3.3.11		Stamp or sign here
3.3.12		Stamp or sign here
3.3.13		Stamp or sign here

### 3.4 Parts preparation

#### 3.4.1 PCBs and PCBAs

- 321 NOTICE: All PCBs and PCBAs must be handled with gloves to prevent marking with skin oils.
- 322 NOTICE: PCBs are removed from manufacturer packaging only when needed.

Table 7: PCBs and PCBAs

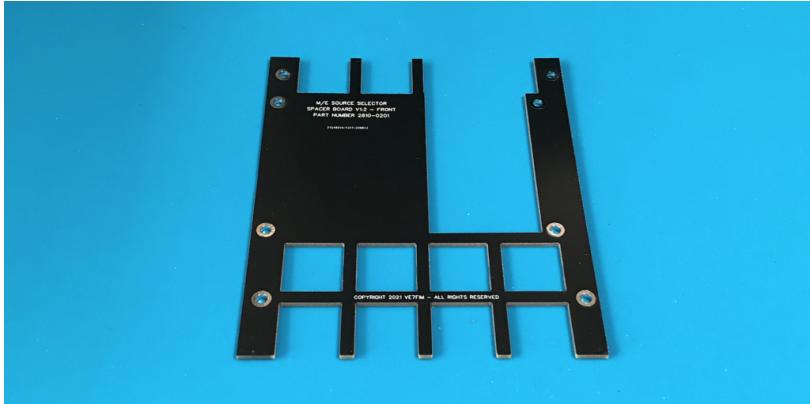
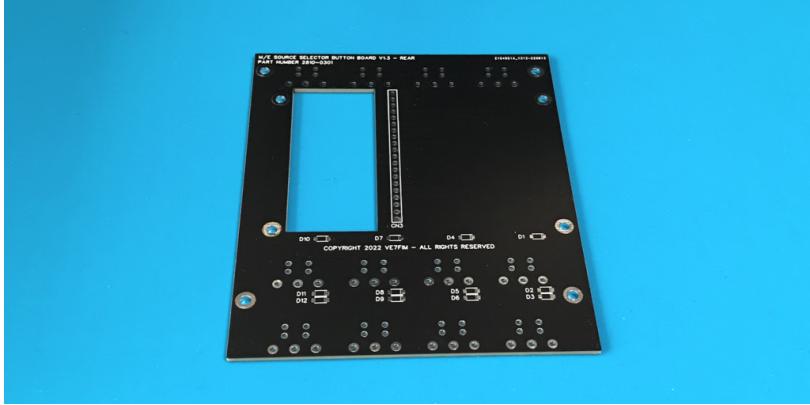
Item #	Description	Signature/Stamp
3.4.1.1	No marking required  The image shows a black printed circuit board (PCB) with a rectangular frame containing several smaller rectangular cutouts of varying sizes. The board is labeled "2810A" at the bottom right corner.	Stamp or sign here
3.4.1.2	No marking required  The image shows a black printed circuit board (PCB) with a central rectangular area and four vertical extensions on either side, each ending in a small circular component. The board is labeled "2810A" at the top center.	Stamp or sign here
3.4.1.3	No marking required  The image shows a black printed circuit board (PCB) with a central rectangular area and various electronic components and pads around the perimeter. The board is labeled "2810A" at the top center.	Stamp or sign here

Fig. 20: 1x 2810-0101 v1.2 - Front Panel PCB

continues on next page

Table 7 – continued from previous page

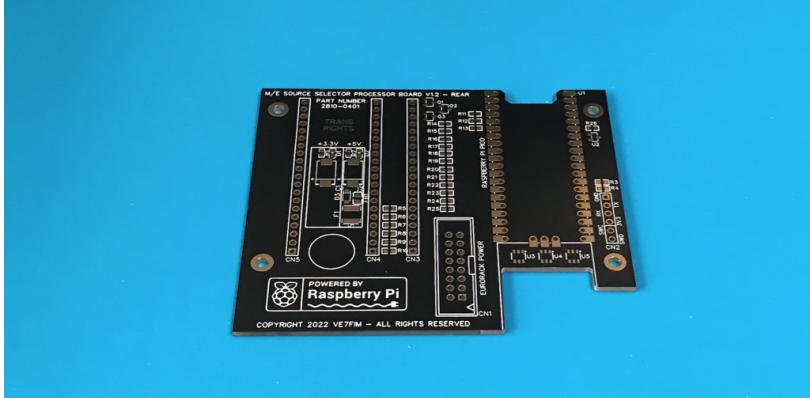
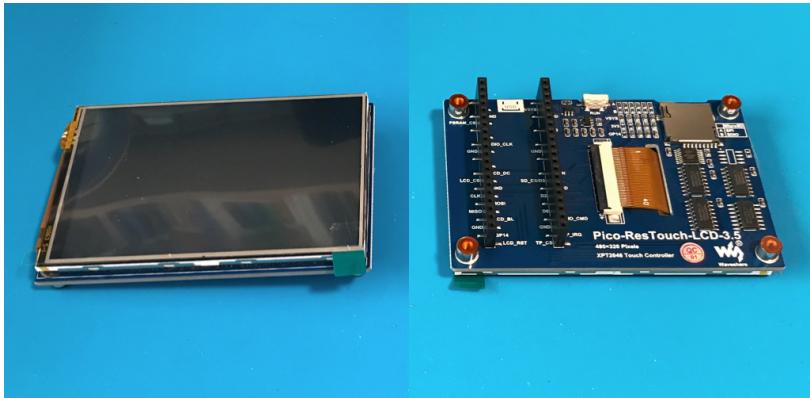
Item #	Description	Signature/Stamp
3.4.1.4	<p>No marking required</p> 	<p>Stamp or sign here</p>
3.4.1.5	<p>No marking required</p> 	<p>Stamp or sign here</p>

Fig. 23: 1x 2810-0401 v1.2 - Processor PCB

Fig. 24: 1x Pico-ResTouch-LCD-3.5 - LCD Module

### 3.4.2 Reel cuttings

- 326 All reels are stored in the bin labelled "28XX Reels" on the shelf labelled "28XX Components". As this is a manually  
 327 assembled product (no automated pick-and-place), tape should be cut off as needed for the number of units being  
 328 assembled, and placed in the assembly tray.

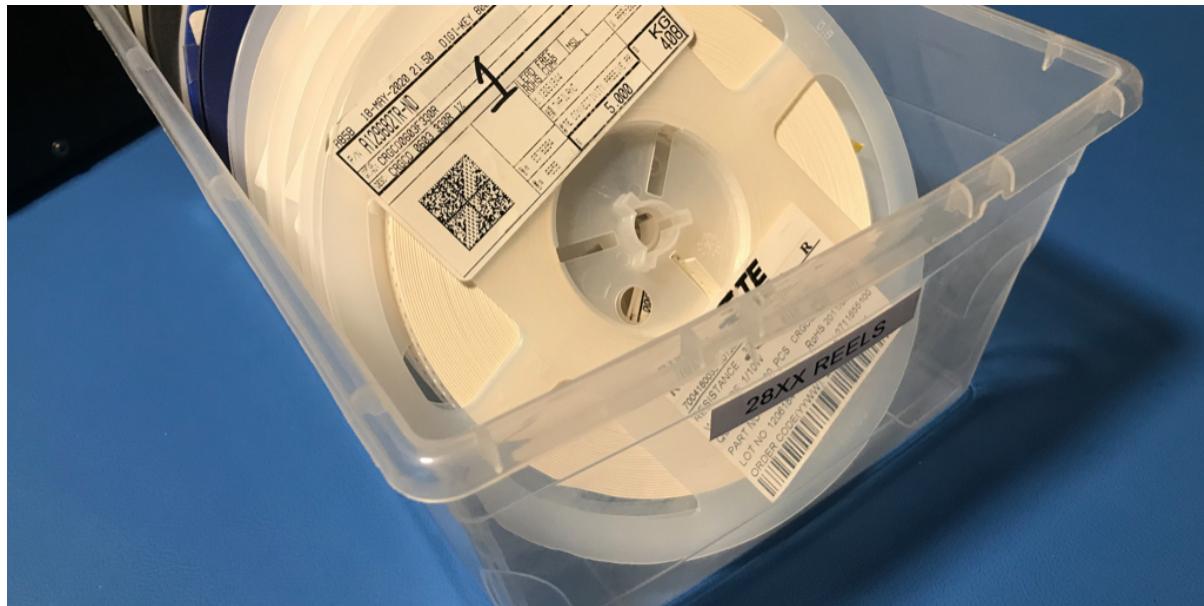


Fig. 25: Reels Container

- 329 Cut off the indicated number of parts (multiplied by the number of units to be assembled), and mark them with the  
 330 value:

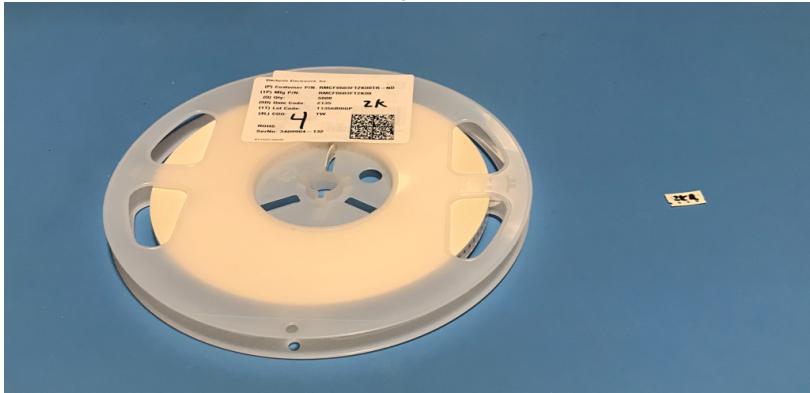
Table 8: Assembly reels

Reel #	Description	Signature/Stamp
3.4.2.1	<p>Mark with "330R"</p>	<p>Stamp or sign here</p>

Fig. 26: 12x 330 Ohm 0603 resistors

continues on next page

Table 8 – continued from previous page

Reel #	Description	Signature/Stamp
3.4.2.2	<p>Mark with "649R"</p> <p>(Cut off a minimum of 4 to have enough room to label)</p> 	<input type="text"/> <span style="font-size: small;">Stamp or sign here</span>
3.4.2.3	<p>Mark with "1KR"</p> <p>(Cut off a minimum of 4 to have enough room to label)</p> 	<input type="text"/> <span style="font-size: small;">Stamp or sign here</span>
3.4.2.4	<p>Mark with "2KR"</p> <p>(Cut off a minimum of 4 to have enough room to label)</p> 	<input type="text"/> <span style="font-size: small;">Stamp or sign here</span>

continues on next page

Table 8 – continued from previous page

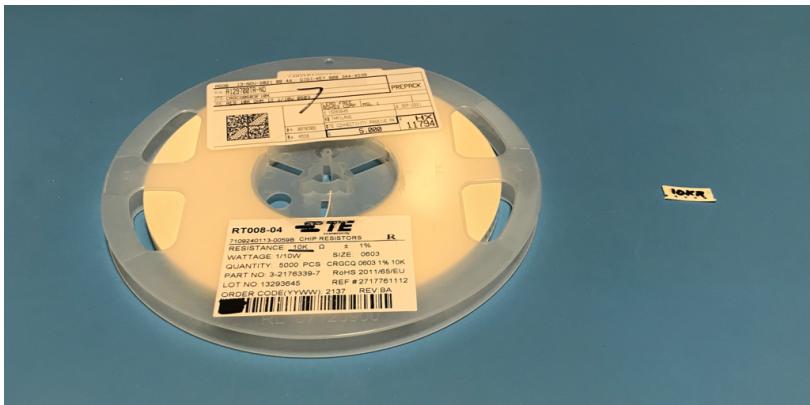
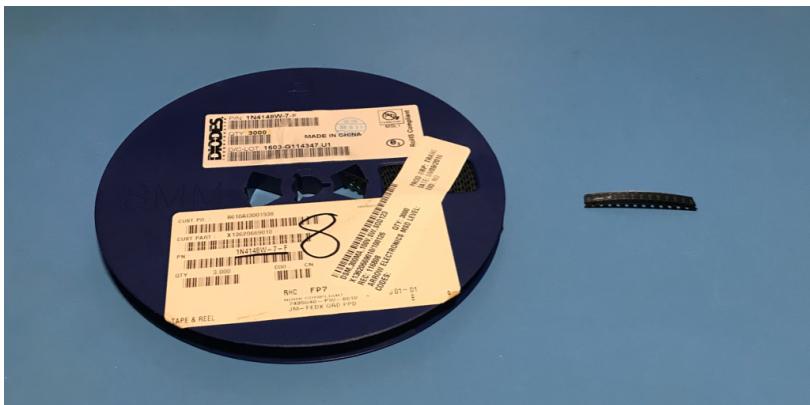
Reel #	Description	Signature/Stamp
3.4.2.5	Mark with "4KR" (Cut off a minimum of 4 to have enough room to label) 	Stamp or sign here
3.4.2.6	Mark with "8KR" (Cut off a minimum of 4 to have enough room to label) 	Stamp or sign here
3.4.2.7	Mark with "10KR" 	Stamp or sign here

Fig. 30: 1x 4.02K Ohm 0603 resistors

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Table 8 – continued from previous page

Reel #	Description	Signature/Stamp
3.4.2.8	No marking required  	Stamp or sign here
3.4.2.9	No marking required  	Stamp or sign here
3.4.2.10	Mark with "FB" (Cut off a minimum of 4 to have enough room to label)  	Stamp or sign here

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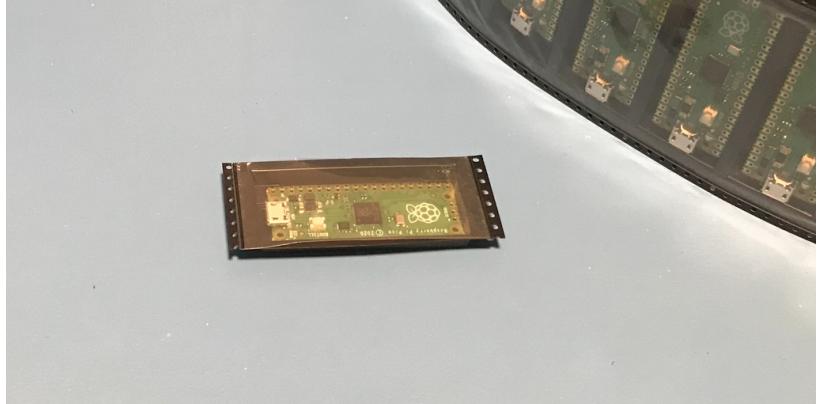
Table 8 – continued from previous page

Reel #	Description	Signature/Stamp
3.4.2.11	No marking required 	Stamp or sign here
3.4.2.12	No marking required 	Stamp or sign here
3.4.2.13	No marking required 	Stamp or sign here

Fig. 36: 2x TPSD226K025R0200 tantalum capacitors

continues on next page

Table 8 – continued from previous page

Reel #	Description	Signature/Stamp
3.4.2.14	No marking required 	Stamp or sign here
3.4.2.15	No marking required 	Stamp or sign here
3.4.2.16	No marking required 	Stamp or sign here

331 Be sure to return the 28XX Reels bin as soon as you have finished cutting off the required parts.

### 3.4.3 Loose components

- 332 All loose components are stored on the shelf labelled "28XX Components". Take the components tray and obtain the following quantities of the following parts:

Table 9: Loose components

Item #	Description	Signature/Stamp
3.4.3.1	No marking required 	Stamp or sign here
3.4.3.2	No marking required 	Stamp or sign here
3.4.3.3	No marking required 	Stamp or sign here

continues on next page

Table 9 – continued from previous page

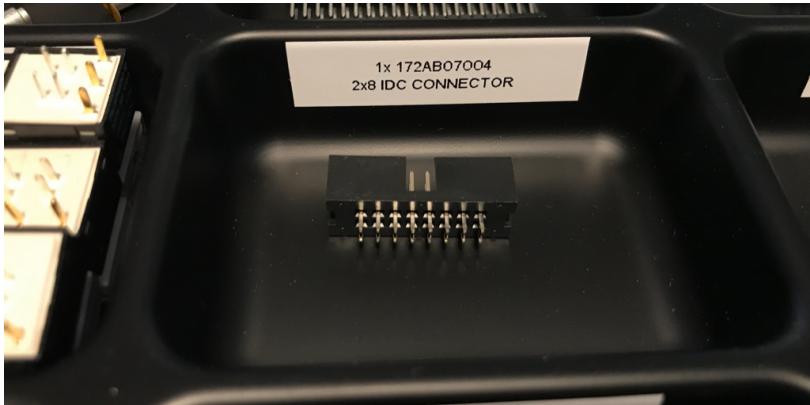
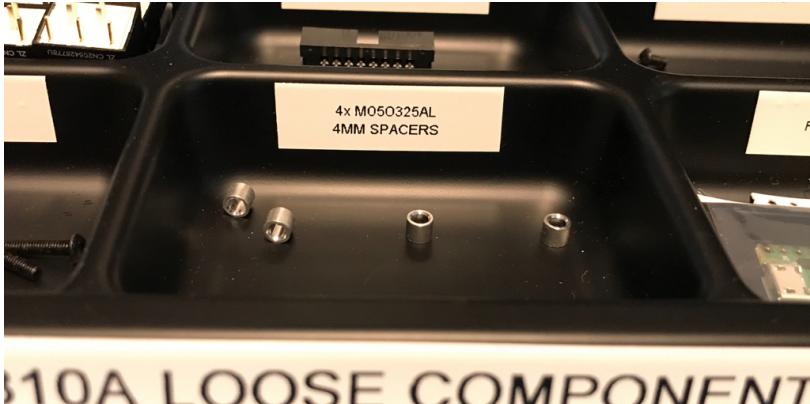
Item #	Description	Signature/Stamp
3.4.3.4	No marking required 	Stamp or sign here
3.4.3.5	No marking required 	Stamp or sign here
3.4.3.6	No marking required 	Stamp or sign here

Fig. 45: 12x PB26-13M-B-WT-RGB-N - RGB Buttons

Use the Scott towel to remove any machining oil that is left on the screws before placing it in the components tray.

continues on next page

Table 9 – continued from previous page

Item #	Description	Signature/Stamp
3.4.3.7	<p>No marking required</p>  <p>Fig. 48: 4x 12mm Screws Use the Scott towel to remove any machining oil that is left on the screws before placing it in the components tray.</p>	<input type="button" value="Stamp or sign here"/>
3.4.3.8	<p>No marking required</p>  <p>Fig. 49: 4x M050325AL - 4mm Spacers</p>	<input type="button" value="Stamp or sign here"/>
3.4.3.9	<p>No marking required</p>  <p>Fig. 50: Reel cuttings</p>	<input type="button" value="Stamp or sign here"/>

### 3.4.4 Packaging materials

- 336 All packaging materials are stored on the shelf labelled "28XX Components". Take the packaging box and obtain  
 337 the following quantities of the following materials:

Table 10: Packaging materials

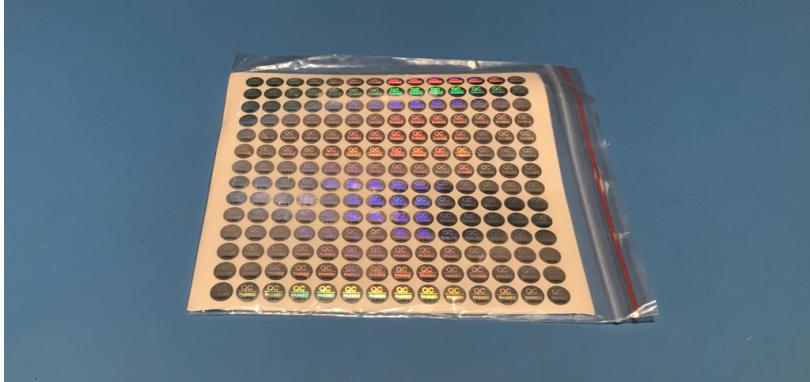
Item #	Description	Signature/Stamp
3.4.4.1	No marking required  	Stamp or sign here
3.4.4.2	No marking required  	Stamp or sign here
3.4.4.3	No marking required  	Stamp or sign here

Fig. 51: 1x QC Sticker

Fig. 52: 1x Medium size anti-static bag

Fig. 53: 1x Small size anti-static bag

continues on next page

Table 10 – continued from previous page

Item #	Description	Signature/Stamp
3.4.4.4	No marking required  	Stamp or sign here
3.4.4.5	No marking required  	Stamp or sign here
3.4.4.6	No marking required  	Stamp or sign here

Fig. 54: 1x Packing box with foam inserts

Fig. 55: 2x 2810A Stickers

Fig. 56: Roll of packing tape

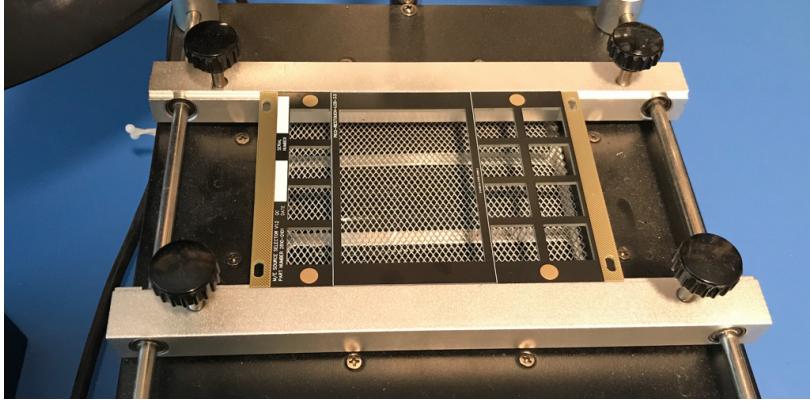
## 338 Section 4

# 339 Assembly

### 340 4.1 2810-0101 sub-assembly

341 This assembly step takes 15 minutes.

Table 11: 2810-0101 assembly steps

Step #	Description	Signature/Stamp
4.1.1	<p>Mount the 2810-0101 PCB rear-side up on the 5040-XTS pre-heater.</p>  <p>Fig. 57: 2810-0101 PCB mounted on 5040-XTS pre-heater</p>	<div style="text-align: center; border: 1px solid gray; border-radius: 50%; width: 100px; height: 100px; margin: auto;"> <span>Stamp or sign here</span> </div>
4.1.2	<p>Dispense one squeeze of solder paste onto the centre of each of the four front panel attachment pads.</p>  <p>Fig. 58: Front Panel attachment pads with solder paste</p>	<div style="text-align: center; border: 1px solid gray; border-radius: 50%; width: 100px; height: 100px; margin: auto;"> <span>Stamp or sign here</span> </div>

continues on next page

Table 11 – continued from previous page

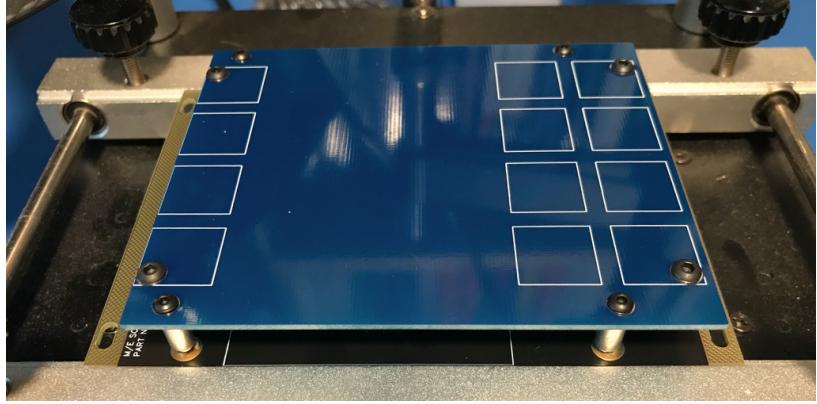
Step #	Description	Signature/Stamp
4.1.3	<p>Using the 5mm screws, attach all four 10mm standoffs to the 2810-0111 v0.1 fixture</p> 	<div style="text-align: center;">Stamp or sign here</div>
4.1.4	<p>Gently lower fixture on to 2810-0101 PCB, making sure there is no side-to-side motion.</p> 	<div style="text-align: center;">Stamp or sign here</div>
4.1.5	<p>Place the fixture weight on top of the fixture.</p> <div style="border: 1px solid black; height: 200px; width: 100%;"></div> <p style="text-align: center;"><b>FPO</b></p>	<div style="text-align: center;">Stamp or sign here</div>

Fig. 61: 2810-0111 v0.1 fixture being lowered

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Table 11 – continued from previous page

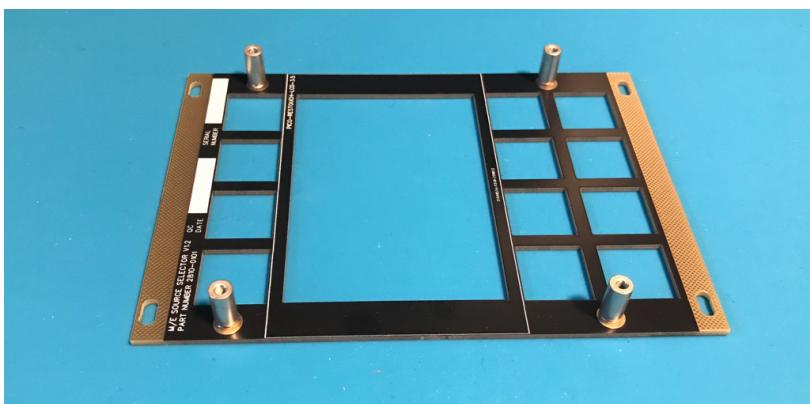
Step #	Description	Signature/Stamp
4.1.6	<p>Turn on the pre-heater to 240 degrees C, and heat for 10 minutes using the countdown timer. It will take 5 minutes for the set temperature to be reached.</p> <p>Once the timer finishes, turn the pre-heater off, and allow to cool for 5 minutes using the countdown timer.</p> 	Stamp or sign here
4.1.7	<p>Remove the fixture weight, then remove the 2810-0101 PCB from the 5040 using tweezers, and place it on the assembly mat. Unscrew the fixture from the four 10m standoffs.</p> 	Stamp or sign here

Fig. 62: 2810-0101 on heater

Fig. 63: Completed 2810-0101 assembly

## 4.2 2810-0301 sub-assembly

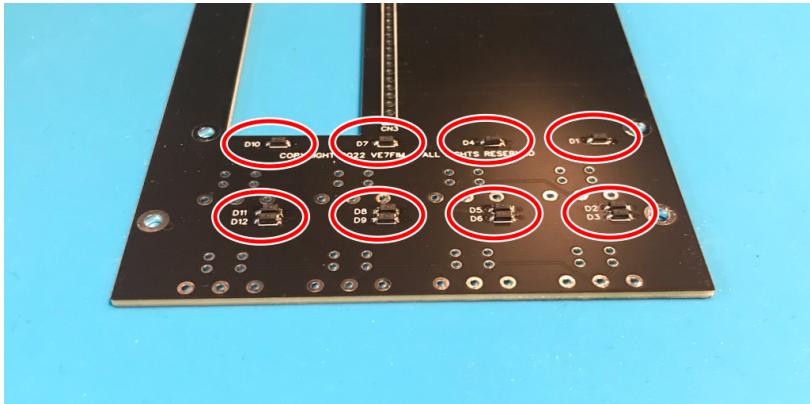
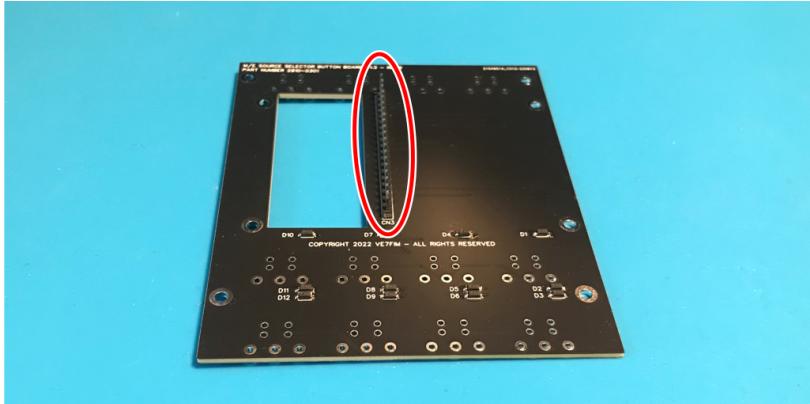
<sup>342</sup> This assembly step takes 15 minutes.

Table 12: 2810-0301 assembly steps

Step #	Description	Signature/Stamp
4.2.1	Cut out the 2810A button labels using the button label cutter. 	Stamp or sign here
4.2.2	Gently pop off the lid of the buttons using the 1mm flat-head screwdriver. 	Stamp or sign here
4.2.3	Place cut labels in button lid. 	Stamp or sign here

continues on next page

Table 12 – continued from previous page

Step #	Description	Signature/Stamp
4.2.4	Snap button on to lid. Be careful to ensure correct alignment — Bottom of text is on the side with the three gold connectors.	Stamp or sign here
	<b>FPO</b>	
4.2.5	Solder the 12 diodes onto the 2810-0301 PCB.	Stamp or sign here
		
	Fig. 67: Button with label	
4.2.6	Solder the 20 pin connector onto the 2810-0301 PCB.	Stamp or sign here
		
	Fig. 68: 2810-0301 PCB with diodes	
	Fig. 69: 2810-0301 PCB with 20 pin connector	

continues on next page

Table 12 – continued from previous page

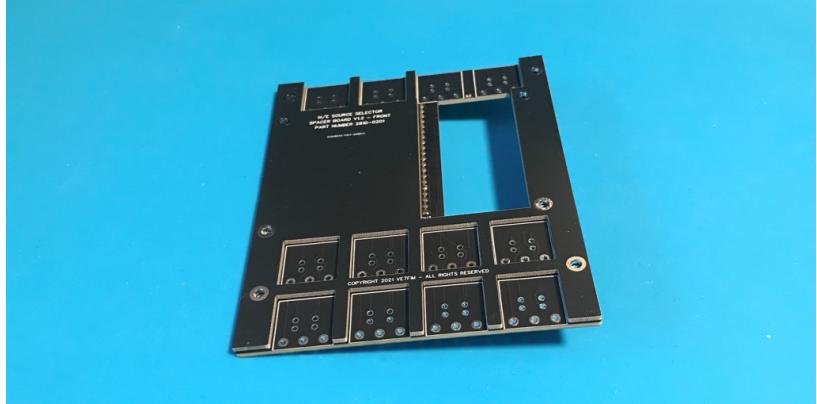
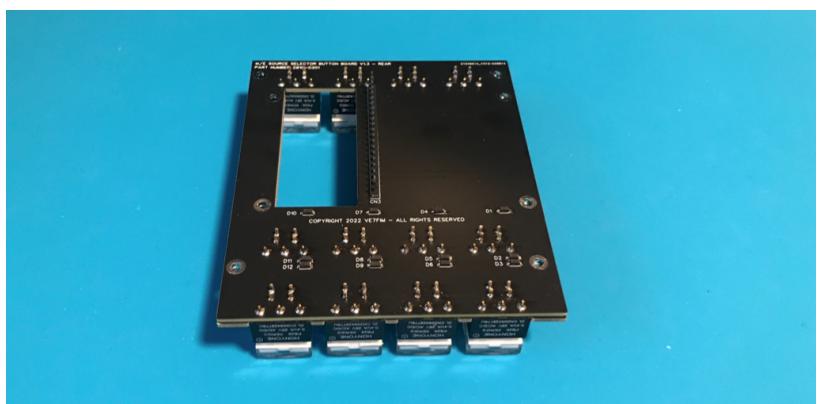
Step #	Description	Signature/Stamp
4.2.7	<p>Place the 2810-0201 PCB on top of the 2810-0301 PCB.</p> 	<div style="text-align: center; margin-top: 100px;">Stamp or sign here</div>
4.2.8	<p>Gently insert the 12 RGB buttons onto the 2810-0301 PCB through the holes in the 2810-0201 PCB. If custom labels are to be used, Make sure that the buttons with labels are oriented and placed correctly.</p> 	<div style="text-align: center; margin-top: 100px;">Stamp or sign here</div>
4.2.9	<p>Flip the PCB over, and solder the 12 buttons. Make sure that all of the buttons are fully inserted by pressing down on the board before starting to solder. Place the completed assembly beside the assembly mat.</p> 	<div style="text-align: center; margin-top: 100px;">Stamp or sign here</div>

Fig. 70: 2810-0301 PCB with 2810-0201 PCB

Stamp  
or sign  
hereStamp  
or sign  
hereStamp  
or sign  
here

### 344 4.3 2810-0401 sub-assembly

345 This assembly step takes 45 minutes.

Table 13: 2810-0401 assembly steps

Step #	Description	Signature/Stamp
4.3.1	<p>Bring the 2810-0401 PCB, the solder paste dispenser, the parts tray, and a pair of tweezers over to the stencil workstation.</p>  <p>Fig. 73: Stencil workstation</p>	 <p>Stamp or sign here</p>
4.3.2	<p>Pull the 2810-0401 v1.2 Stencil from the stencil library.</p>  <p>Fig. 74: 2810-0401 v1 stencil</p>	 <p>Stamp or sign here</p>
4.3.3	<p>Mount the stencil on the stencil machine</p>  <p>Fig. 75: Mounted stencil</p>	 <p>Stamp or sign here</p>

continues on next page

Table 13 – continued from previous page

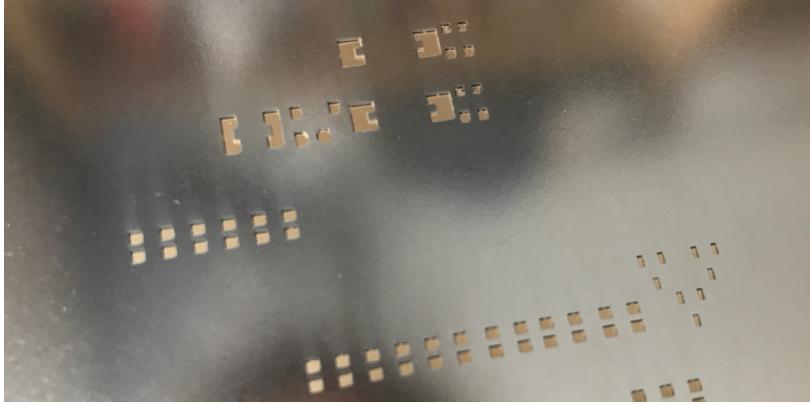
Step #	Description	Signature/Stamp
4.3.4	Mount the 2810-0401 PCB rear-side up on the stencil machine.  	Stamp or sign here
4.3.5	Align it with the stencil with the PCB.  	Stamp or sign here
4.3.6	Apply 20 squeezes of solder paste in a line at the bottom of the stencil.  	Stamp or sign here

Fig. 78: Solder paste on the stencil

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Table 13 – continued from previous page

Step #	Description	Signature/Stamp
4.3.7	Using the appropriately sized solder paste squeegee, align at a 45-degree angle below the line of solder paste, and drag upwards while applying moderate downwards force. Inspect for voids in stencil openings before lifting the stencil.	<div style="text-align: center; border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <span style="font-size: 2em;">FPO</span> </div>
4.3.8	Lift the stencil, remove the 2810-0401 PCB, and bring it over to the manual pick-and-place machine. Mount the board on the work surface using the magnetic board edge holders. Be careful to not drop or jar the board, or cause anything to come into contact with the solder paste.	<div style="text-align: center; border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <span style="font-size: 2em;">FPO</span> </div>

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Table 13 – continued from previous page

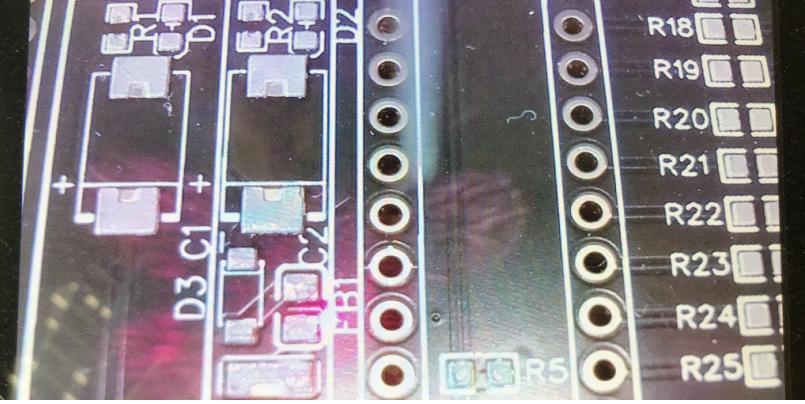
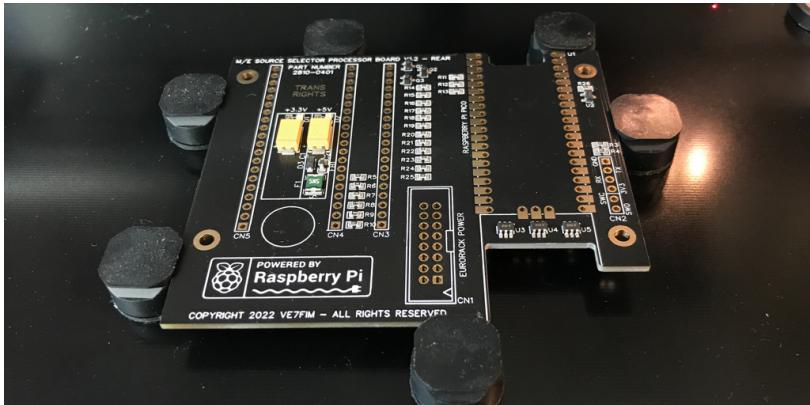
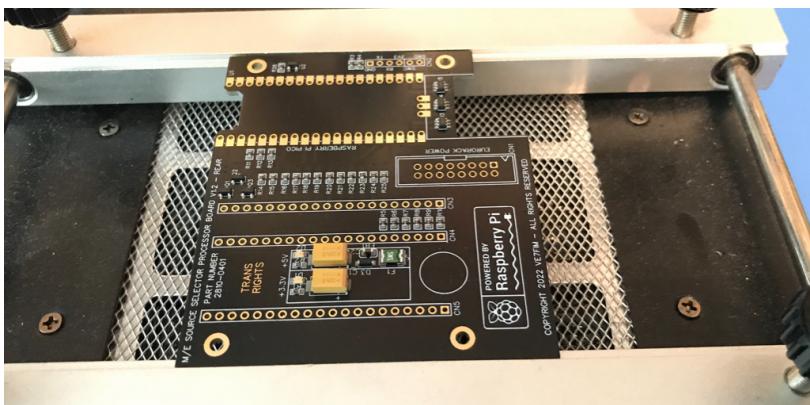
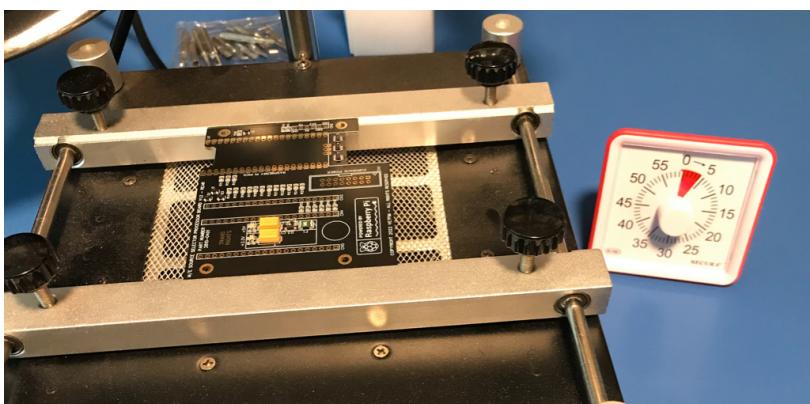
Step #	Description	Signature/Stamp
4.3.9	<p>Inspect all of the pads using the manual pick-and-place machine microscope to verify correct solder paste application. Verify that the solder paste is aligned with the pads, and that the edges of the paste are well-defined and has not slumped.</p> <p>If the solder paste application fails visual inspection, wipe down the board with IPA and go back to step 4.3.4. If there isn't enough solder paste, use more paste in step 4.3.6. If the paste slumps or runs, get a new syringe of solder paste. If problems continue, contact a supervisor for assistance.</p> 	Stamp or sign here
4.3.10	<p>Detach the stencil from the stencil machine, and put it on the “to clean” cart.</p> <p>FPO</p>	Stamp or sign here
4.3.11	<p>Log in to the computer and pull up the 2810-0401 Interactive BoM</p> <p>FPO</p>	Stamp or sign here

Fig. 81: Visual inspect of solder paste

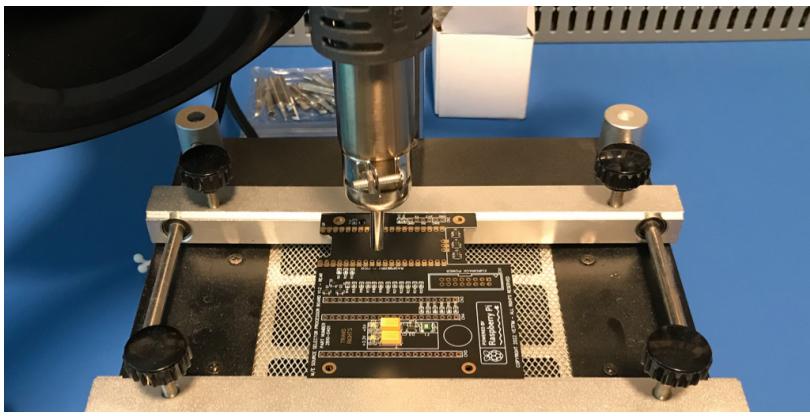
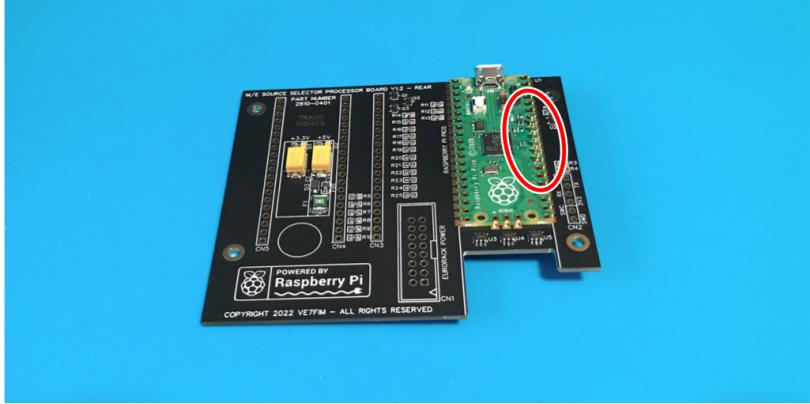
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Table 13 – continued from previous page

Step #	Description	Signature/Stamp
4.3.12	For each surface mount component in the BoM, remove the parts from the tape onto the pick-and-place component tray and place them in the correspondind locations on the PCB.	Stamp or sign here
		
Fig. 84: 2810-0401 with all components mounted		
4.3.13	Take the 2810-0401 PCB with all SMT components mounted back to the assembly workstation (along with the parts tray and tweezers). Mount the 2810-0401 PCB rear-side up on the 5040-XTS pre-heater.	Stamp or sign here
		
Fig. 85: 2810-0401 PCB mounted on 5040-XTS pre-heater		
4.3.14	Turn on the pre-heater to 240 degrees C, and heat for 10 minutes using the countdown timer. It will take 5 minutes for the set temperature to be reached.	Stamp or sign here
		
Fig. 86: 2810-0401 on heater		

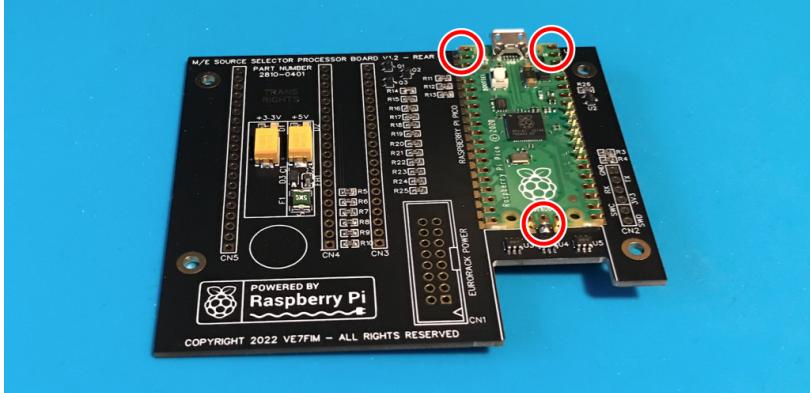
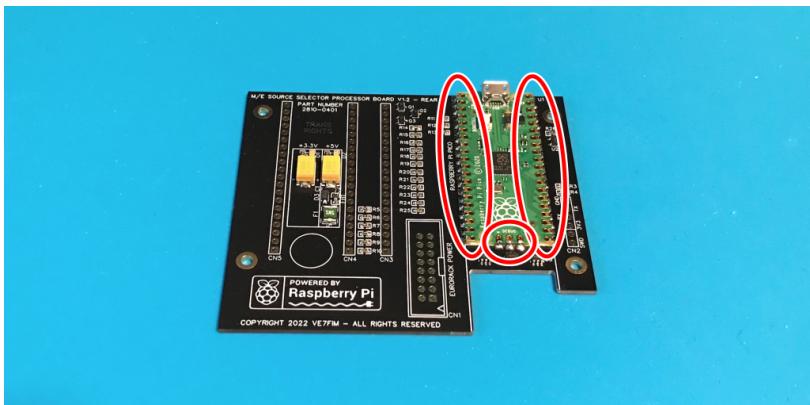
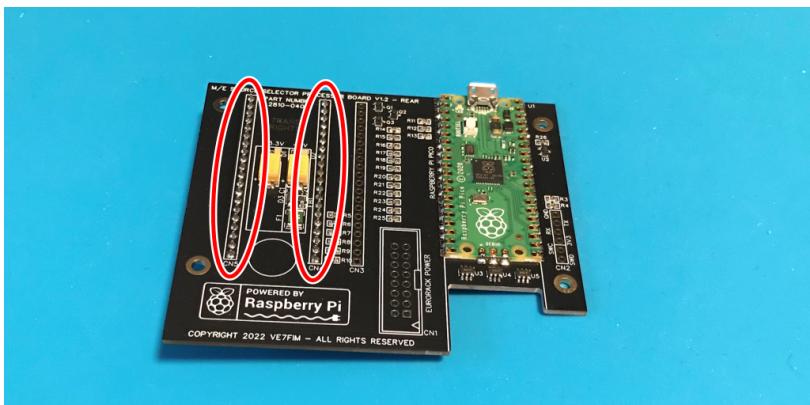
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Table 13 – continued from previous page

Step #	Description	Signature/Stamp
4.3.15	Once the timer finishes, turn on the hot air at 300 degrees C and velocity 2.5. Holding the nozzle two inches from the board, and keeping the airflow perpendicular to the board, melt all of the solder joints. Once complete, turn off the hot air and the pre-heater, and set the timer for 5 minutes to allow the board to cool down.	Stamp or sign here
		
	Fig. 87: Hot air application to SMT components	
4.3.16	Once the timer finishes, remove 2810-0401 PCB with tweezers, and place beside the assembly mat. Inspect for good solder joints for complete wetting. Re-work components as required.	Stamp or sign here
		
	Fig. 88: 2810-0401 PCB with soldered SMT components	
4.3.17	Using the 6 pin header, place and align the Pi Pico module.	Stamp or sign here
		
	Fig. 89: Pi Pico module aligned on the 2810-0401 PCB.	

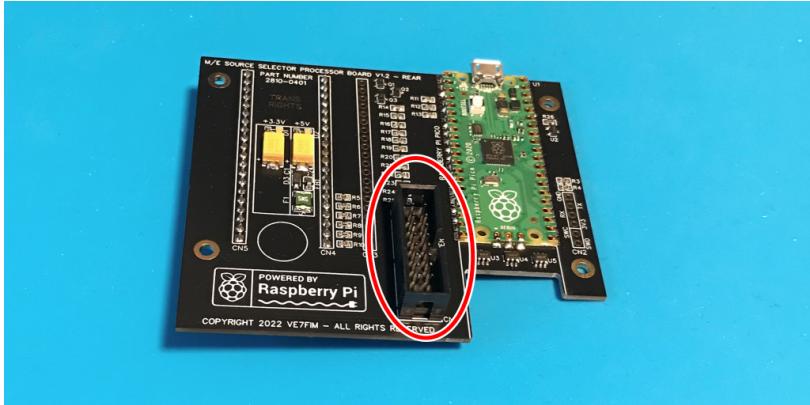
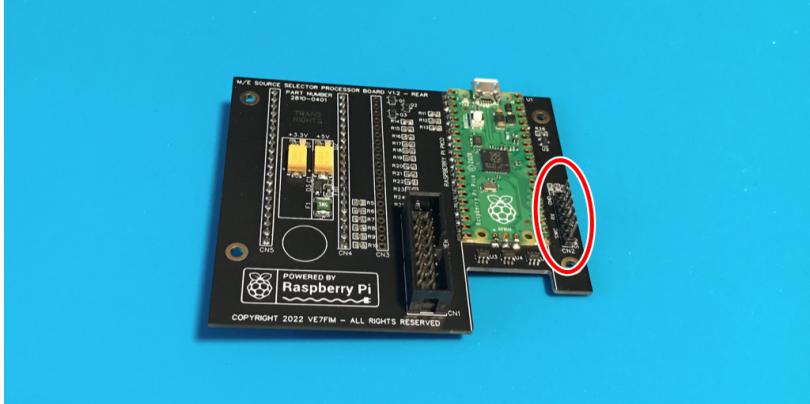
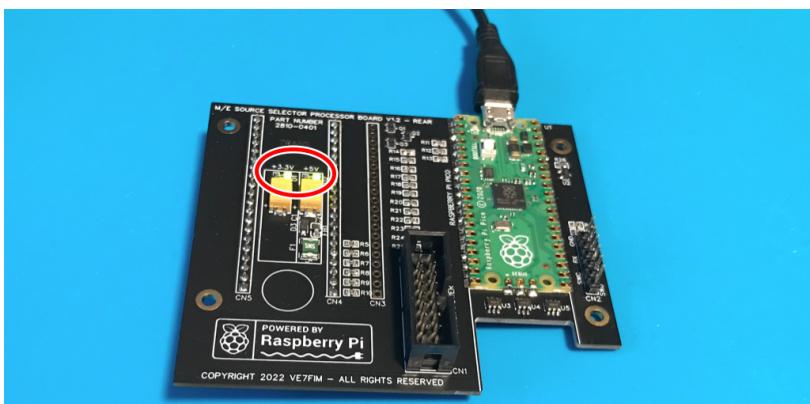
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Table 13 – continued from previous page

Step #	Description	Signature/Stamp
4.3.18	Solder the center DEBUG castellated pad on the bottom of the Pi Pico module, then the two corner castellated pads on the top.	Stamp or sign here
	 <p>Fig. 90: 2810-0401 PCB with the debug and right corners of the Pi Pico module soldered on.</p>	
4.3.19	Remove the 6 pin header, then solder the remainder of the castellated pads.	Stamp or sign here
	 <p>Fig. 91: 2810-0401 PCB with Pi Pico module fully soldered on.</p>	
4.3.20	<ul style="list-style-type: none"> <li>a) Insert the two 20 pin headers into CN4 and CN5 from the front of the board.</li> <li>b) Insert the six pin header into CN3 from the front of the board, to keep the board level. Do not solder CN3.</li> <li>c) Carefully flip the board, and solder one pin of CN4 and CN5, then flip the board again and sure that CN4 and CN5 are 90 degrees to the board. If not, re-align and re-solder to correct.</li> <li>d) Solder the remaining pins on CN4 and CN5.</li> </ul>	Stamp or sign here
	 <p>Fig. 92: 2810-0401 PCB with CN4 and CN5 soldered</p>	

continues on next page

Table 13 – continued from previous page

Step #	Description	Signature/Stamp
4.3.21	Solder CN1.	Stamp or sign here
	 A photograph showing a Raspberry Pi Pico microcontroller board and a 2810-0401 PCB. The 2810-0401 PCB has a black header labeled 'CN1' soldered onto its rear edge. A red circle highlights the solder joint where the header meets the board.	
	Fig. 93: 2810-0401 PCB with CN1 soldered	
4.3.22	<ul style="list-style-type: none"> <li>a) Insert the six pin header into CN3 from the rear of the board.</li> <li>b) Carefully flip the board, and solder one pin of the header on, then flip the board again, make sure it is 90 degrees to the board. If not, re-align and re-solder to correct.</li> <li>c) Solder the remaining pins on CN3.</li> </ul>	Stamp or sign here
	 A photograph showing a Raspberry Pi Pico microcontroller board and a 2810-0401 PCB. The 2810-0401 PCB has a black header labeled 'CN3' soldered onto its rear edge. A red circle highlights the solder joint where the header meets the board.	
	Fig. 94: 2810-0401 PCB with CN3 soldered	
4.3.23	Connect the USB to Micro USB cable to the workstation USB power adapter and the Pi Pico mounted on the 2810-0401 PCB. Verify that both power LEDs come on. Disconnect the USB cable, and place the completed assembly beside the assembly mat.	Stamp or sign here
	 A photograph showing a 2810-0401 PCB with a Raspberry Pi Pico microcontroller. A USB to Micro USB cable is connected from the board to a power adapter. A red circle highlights the connection point between the board and the power adapter.	
	Fig. 95: Powered 2810-0401 PCB	

## 346 4.4 2810A assembly

347 This assembly step takes 5 minutes.

Table 14: 2810A assembly steps

Step #	Description	Signature/Stamp
4.4.1	Using the tweezers, peel off the four Kapton tape protectors from the LCD module standoff.	Stamp or sign here
4.4.2	Take the LCD module and insert it in the hole in the 2810-0301 assembly.	Stamp or sign here
4.4.3	Connect the 2810-0401 assembly to the LCD and 2810-0301 assembly.	Stamp or sign here

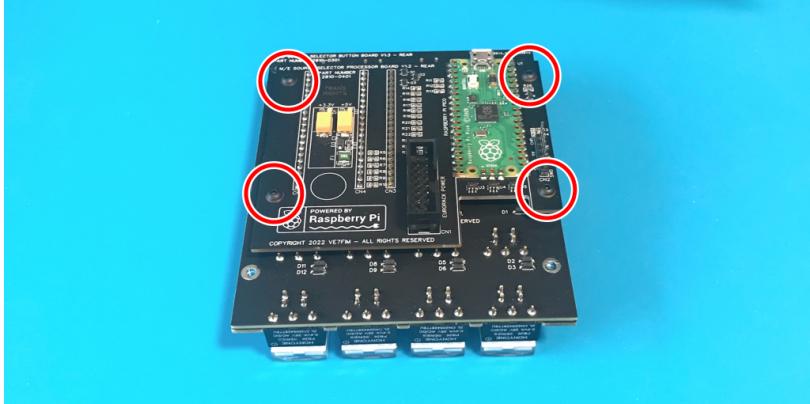
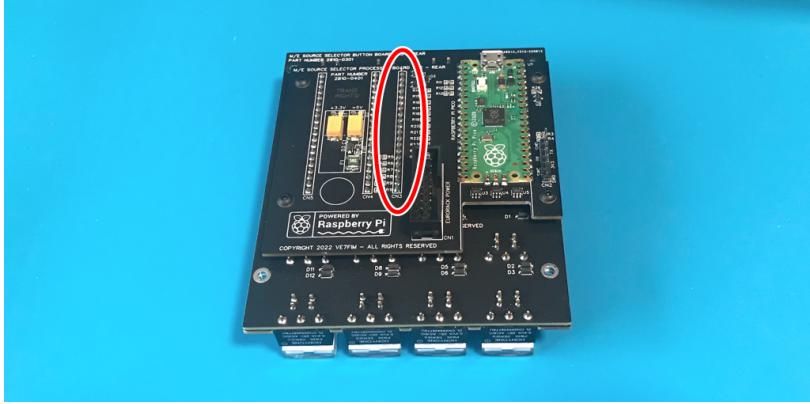
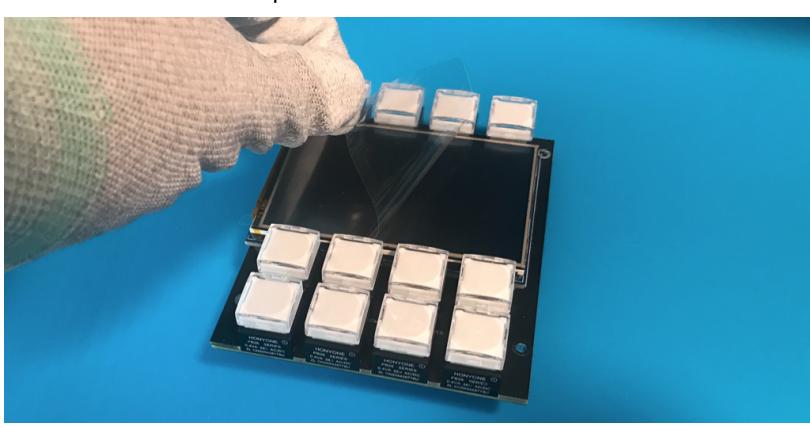
Fig. 96: LCD module Kapton tape protectors

Fig. 97: LCD inserted in 2810-0301 assembly

Fig. 98: 2810-0401 assembly connected to 2810-0301 assembly

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Table 14 – continued from previous page

Step #	Description	Signature/Stamp
4.4.4	For each of the four holes connecting the 2810-0401 assembly to the 2810-0301 assembly and to the LCD module, gently insert the 4mm spacer from the side, then insert the 12mm screws and turn until 2mm separates the screw head from the board. When all four spacers and screws have been attached, tighten all four screws one by one.	Stamp or sign here
	 <p>Fig. 99: Screw attachment of assemblies</p>	
4.4.5	Solder the CN3 connector to the 2810-0401 assembly.	Stamp or sign here
	 <p>Fig. 100: CN3 connector soldered to 2810-0401 assembly.</p>	
4.4.6	Remove the LCD screen protector	Stamp or sign here
	 <p>Fig. 101: Removing LCD protector</p>	

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Table 14 – continued from previous page

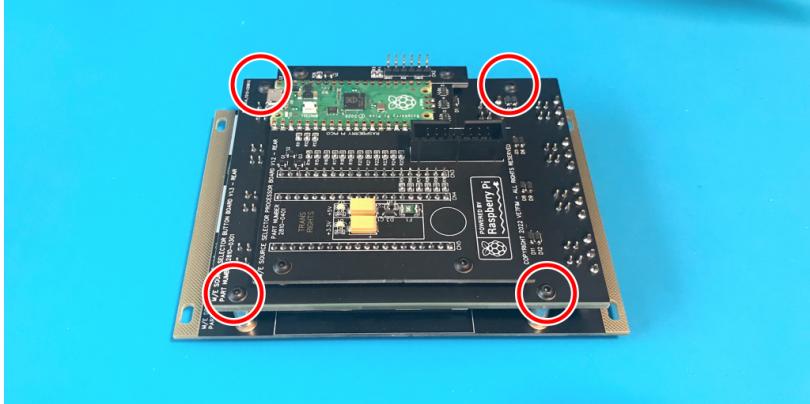
Step #	Description	Signature/Stamp
4.4.7	<p>Align and attach the 2810-0101 assembly using four 5mm screws.</p> <p>At this point, the 2810A is fully assembled and ready to program.</p> 	<span style="border: 1px solid gray; border-radius: 50%; padding: 10px; display: inline-block;">Stamp or sign here</span>

Fig. 102: Screw attachment of 2810-0101 assembly

## 4.5 2810A programming

348 This assembly step takes 5 minutes.

Table 15: 2810A programming steps

Step #	Description	Signature/Stamp
4.5.1	<p>Connect the programming cable connected to the 2810A programmer.</p>  <p style="text-align: center;"><b>FPO</b></p>	<span style="border: 1px solid gray; border-radius: 50%; padding: 10px; display: inline-block;">Stamp or sign here</span>

Fig. 103: Programmer connected to the 2810A assembly

continues on next page

Table 15 – continued from previous page

Step #	Description	Signature/Stamp
4.5.2	<p>Connect the USB to Micro USB cable to the workstation USB power adapter and the 2810A programmer. Verify that the screen turns on.</p>  <p style="text-align: center;"><b>FPO</b></p>	 <p>Stamp or sign here</p>
4.5.3	<p>Wait for two minutes for the programmer to start up and program the 2810A. The 2810 will go through its startup process, alternating through all of the button primary colours, and showing the logo and firmware version on the LCD. Record the firmware version in the “signature” column to the right:</p>  <p style="text-align: center;"><b>FPO</b></p>	 <p>Stamp or sign here</p>
4.5.4	<p>Disconnect the power USB connector from the programmer, then disconnect the programmer from the now programmed 2810A.</p>  <p style="text-align: center;"><b>FPO</b></p>	 <p>Stamp or sign here</p>

Fig. 106: Programmed 2810A

350 **Section 5**

351 **Test**

352 **5.1 Visual inspection**

353 This test process takes 2 minutes.

Table 16: 2810A visual inspection

Step #	Description	Signature
5.1.1	Verify that there are no loose parts.	Stamp or sign here
5.1.2	Verify that there are no visible fingerprints.	Stamp or sign here

## 354 5.2 QC final check

355 This test process takes 2 minutes.

Table 17: 2810A QC final check

Step #	Description	Signature
5.2.1	<p>Connect the USB to Micro USB cable to the workstation USB power adapter and the Pi Pico mounted on the 2810-0401 PCB. Verify that the 2810A starts up and displays the expected “Unconfigured” screen.</p> <p>If test does not pass, write down the unexpected behaviour in the “signature” column on the right.</p> 	<div style="text-align: center;">Stamp or sign here</div>
5.2.2	<p>While holding the bottom-left button, press the top-left button. The 2810A will enter self-test mode.</p> 	<div style="text-align: center;">Stamp or sign here</div>

continues on next page

Table 17 – continued from previous page

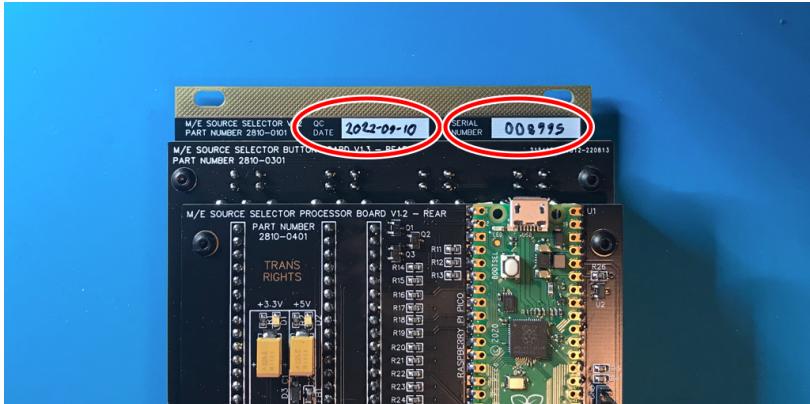
Step #	Description	Signature
5.2.3	<p>Press the button labelled “Button Test”. The 2810A will cycle through Red/Green/Blue for each button.</p> <p>If test does not pass, write down the unexpected behaviour in the “signature” column on the right.</p> 	<span>Stamp or sign here</span>
5.2.4	<p>Exit button test mode. Press the button labelled “Display Test”. The 2810A will display the logo. Press the Red, Green and Blue buttons to verify that there are no stuck pixels.</p> 	<span>Stamp or sign here</span>
5.2.5	Disconnect the USB cable	<span>Stamp or sign here</span>

### 356 5.3 QC PASS

357 Only perform these steps if all QC checks have passed.

358 This test process takes 1 minutes.

Table 18: 2810A QC approval

Step #	Description	Signature
5.3.1	<p>Using the tweezers, affix QC Passed sticker in location shown below, then write down the serial number from the QC sticker below the "Signature/Stamp" in the column to the right.</p> 	<div style="text-align: center;"> <span>Stamp or sign here</span> </div>
5.3.2	<p>Detach the front panel by unscrewing the four screws that attach the 2810-0101 PCBA. Using the sharpie pen, write down the serial number from the QC sticker, and QC date, on the front panel PCB. Re-attach the 2810-0101 PCBA.</p> 	<div style="text-align: center;"> <span>Stamp or sign here</span> </div>
5.3.3	<p>Take two photographs, one of the front of the 2810A, and one of the back of the 2819A.</p>	<div style="text-align: center;"> <span>Stamp or sign here</span> </div>

## 359 5.4 QC FAIL

- 360 Only perform these steps if any QC check have failed.  
361 This test process takes 2 minutes.

Table 19: 2810A QC fail

Step #	Description	Signature
5.4.1	Place the 2810A module in the bubble-wrap anti-static bag. 	Stamp or sign here
5.4.2	Place 2810A in the "QC Fail bin", along with this document. 	Stamp or sign here

Fig. 113: 2810A in anti-static bag.

Fig. 114: 2810A in QC Fail bin.

## 362 Section 6

# 363 Packaging

### 364 6.1 2810A packing

- 365 This packaging process takes 3 minutes.

Table 20: 2810A packaging

Step #	Description	Signature
6.1.1	Place the 2810A module in the anti-static bag. 	Stamp or sign here
6.1.2	Seal the anti-static bag with a 2810A sticker. 	Stamp or sign here

Fig. 115: 2810A in anti-static bag.

continues on next page

Table 20 – continued from previous page

Step #	Description	Signature
6.1.3	Using the Sharpie pen, Write down the serial number of the 2810A on the sticker, at the end of the line listing the 2810A.  	 Stamp or sign here
6.1.4	Place 2810A bag in the box on top of the bottom foam padding.  	 Stamp or sign here
6.1.5	Take a photograph of the 2810A in the box.	 Stamp or sign here
6.1.6	Close the box and Affix a 2810A sticker to the lid of the box.  	 Stamp or sign here

Fig. 119: 2810A in box with sticker.

continues on next page

Table 20 – continued from previous page

Step #	Description	Signature
6.1.7	<p>Using the Sharpie pen, Write down the serial number of the 2810A on the sticker, at the end of the line listing the 2810A.</p>  <p style="text-align: center;"><b>FPO</b></p>	
6.1.8	<p>Using the ESD tape, seal the lid of the box.</p>  <p style="text-align: center;"><b>FPO</b></p>	
6.1.9	<p>Take a photograph of the sealed 2810A box.</p>	

366   FIXME - Add screws and hex key

367

## Section 7

368

### Clean-up

369

#### 7.1 Consumables

370

This packaging process takes 5 minutes.

Table 21: Consumables cleanup

Step #	Description	Signature
7.1.1	If the ESD gloves have contacted solder paste, or are soiled, they shall be disposed of in the standard waste bin.	Stamp or sign here
7.1.2	If there is unused solder paste in the syringe, it shall be returned to stores.	Stamp or sign here
7.1.3	If there is unused solder wire on the spool, it shall be returned to stores.	Stamp or sign here
7.1.4	The Scott shop title shall be disposed of in the standard waste bin.	Stamp or sign here
7.1.5	Reel tape cuttings and loose component packaging shall be disposed of in the standard waste bin.	Stamp or sign here

**371 7.2 Tools**

372 This cleanup process takes 5 minutes.

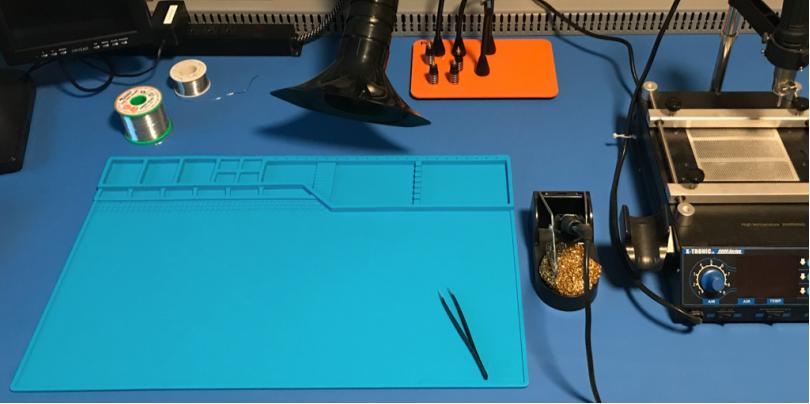
Table 22: Tools cleanup

Step #	Description	Signature
7.2.1	All tools shall be returned to the "M/E Assembly Tools" container, and returned to the stores supply shelf.  If any tools are damaged or worn, return the container to stores, and let the manager know which tool is damaged or worn.	Stamp or sign here
7.2.2	Remove this document from the springback binder.	Stamp or sign here
7.2.3	Print a new copy of this document, and insert it into the springback binder that this document was originally in.	Stamp or sign here
7.2.4	Return the springback binder with the newly printed document to the 2810A section of the store supply shelf.	Stamp or sign here

### 373 7.3 Workspace

374 This packaging process takes 5 minutes.

Table 23: Workspace cleanup

Step #	Description	Signature
7.3.1	<p>Make sure that the workspace is clean and as it was when you started the assembly.</p>  <p>Fig. 122: Clean assembly workstation</p>	Stamp or sign here

## 375 Section 8

# 376 Record keeping

### 377 8.1 2810A record keeping

378 This packaging process takes 1 minutes.

Table 24: 2810A record keeping

Step #	Description	Signature/Stamp
8.1.1	<p>Write the serial number, the date, and your first and last name in large print on the bottom of the front cover of this document.</p>  <p style="text-align: center;">FPO</p>	
8.1.2	Create a new folder under the 1510A folder, named with the serial number.	
8.1.3	Copy all photos taken during the assembly process into the newly created folder in step #2.	
8.1.4	Remove this document from the binding clamps, scan the document, and save the scanned PDF into the newly created folder in step #2, with the name "1510A-SNAAAAAA.pdf", where AAAAAA is replaced with the serial number.	

continues on next page

Table 24 – continued from previous page

Step #	Description	Signature/Stamp
8.1.5	Three-hole punch the document, then file it at the end of the current month's assembly records binder.	 Stamp or sign here
8.1.6	Add an entry to the assembly records binder, "<Date> - 2810A - SN# AAAAAAA - <Your Name>", where <Date> is replaced with today's date in ISO-8601 YYYY-MM-DD, where AAAAAAA is replaced with the serial number of the 2810A, and where <Your Name> is replaced with your first and last name.	 Stamp or sign here

379 **Section 9**

380 **Process improvement**

381 **9.1 Feedback**

382 Please submit an issue to the 2810A Issue Repository (<http://www.github.com/dslik/mix-effect/2810A/>) if you en-  
383 counter any of the below situations:

- 384 • Error in this document
- 385 • Unclear directions
- 386 • Suggested process improvements
- 387 • Results of QC failure investigations
- 388 • Tool change suggestions

389 Qualtiy processes and documentation is a team effort. This document would not exist without the participation and  
390 contributions of the entire assebly team.

391 Thank you for reading this assembly instructions document.

392 End of document.

393

## **Part II**

394

## **Annexes**

## 395 Section 10

### 396 Printed Circuit Boards

#### 397 10.1 2810-0101 PCB

Table 25: 2810-0101 PCB

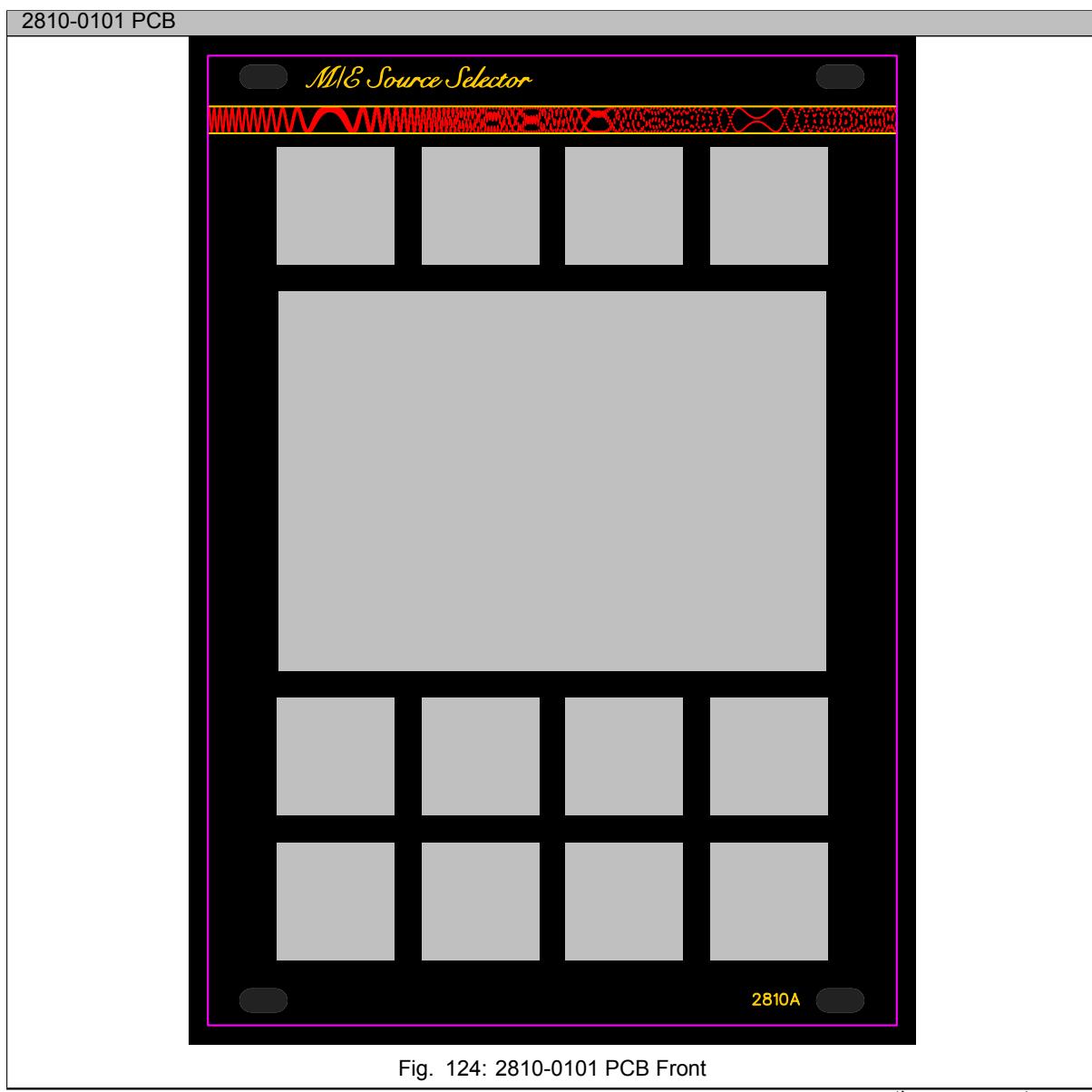
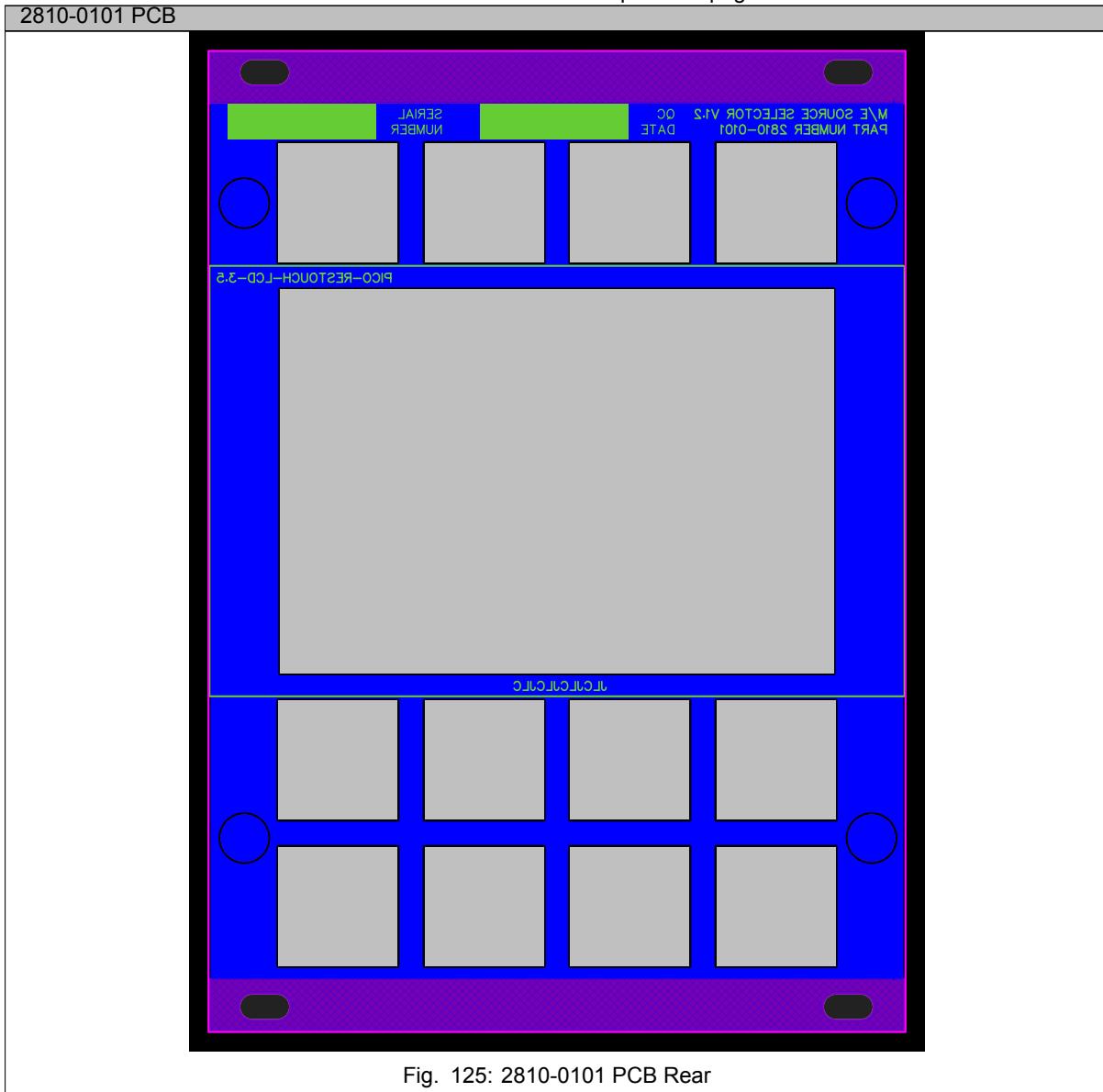


Fig. 124: 2810-0101 PCB Front

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Table 25 – continued from previous page



**398 10.2 2810-0201 PCB**

Table 26: 2810-0201 PCB

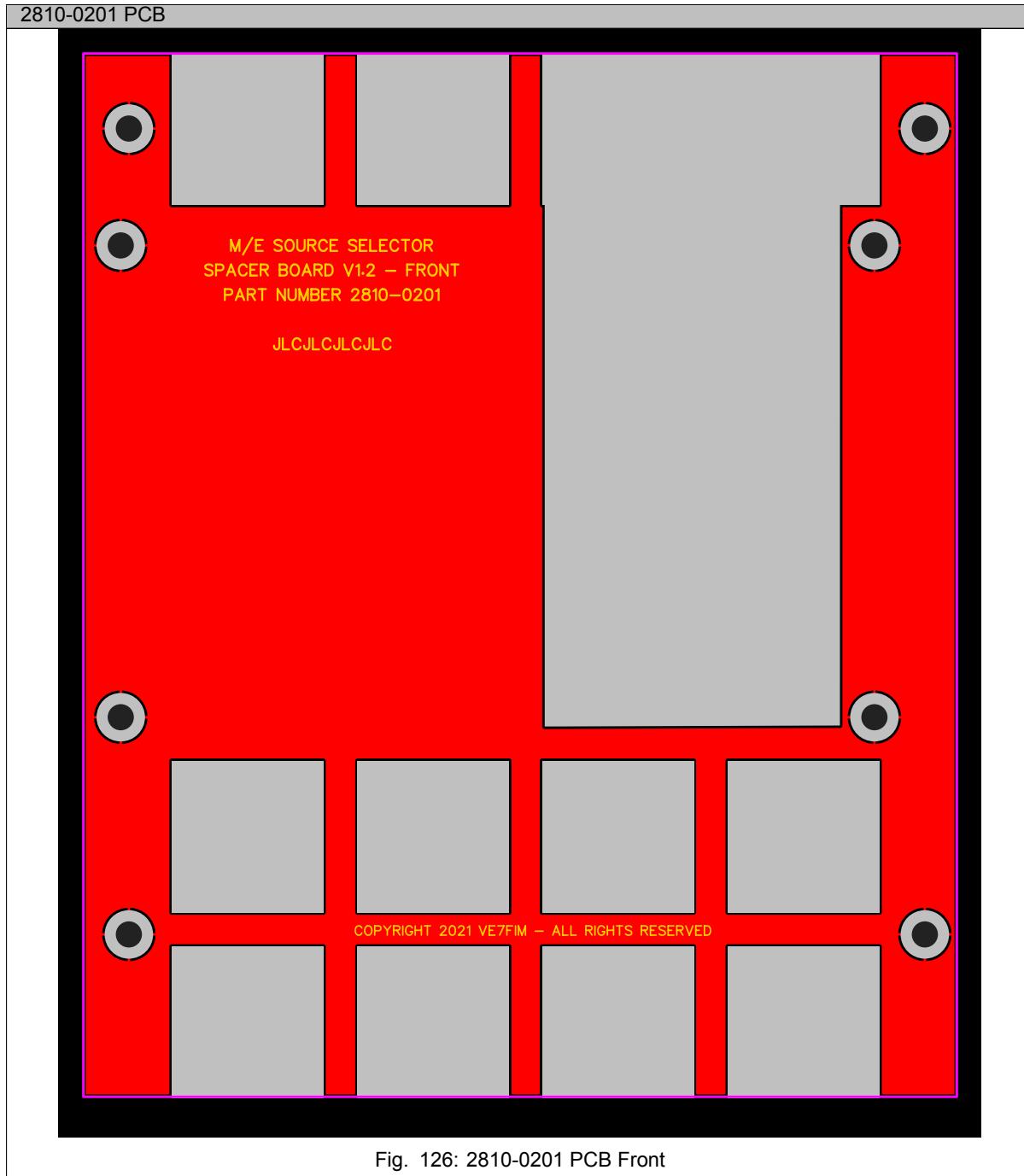


Fig. 126: 2810-0201 PCB Front

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Table 26 – continued from previous page

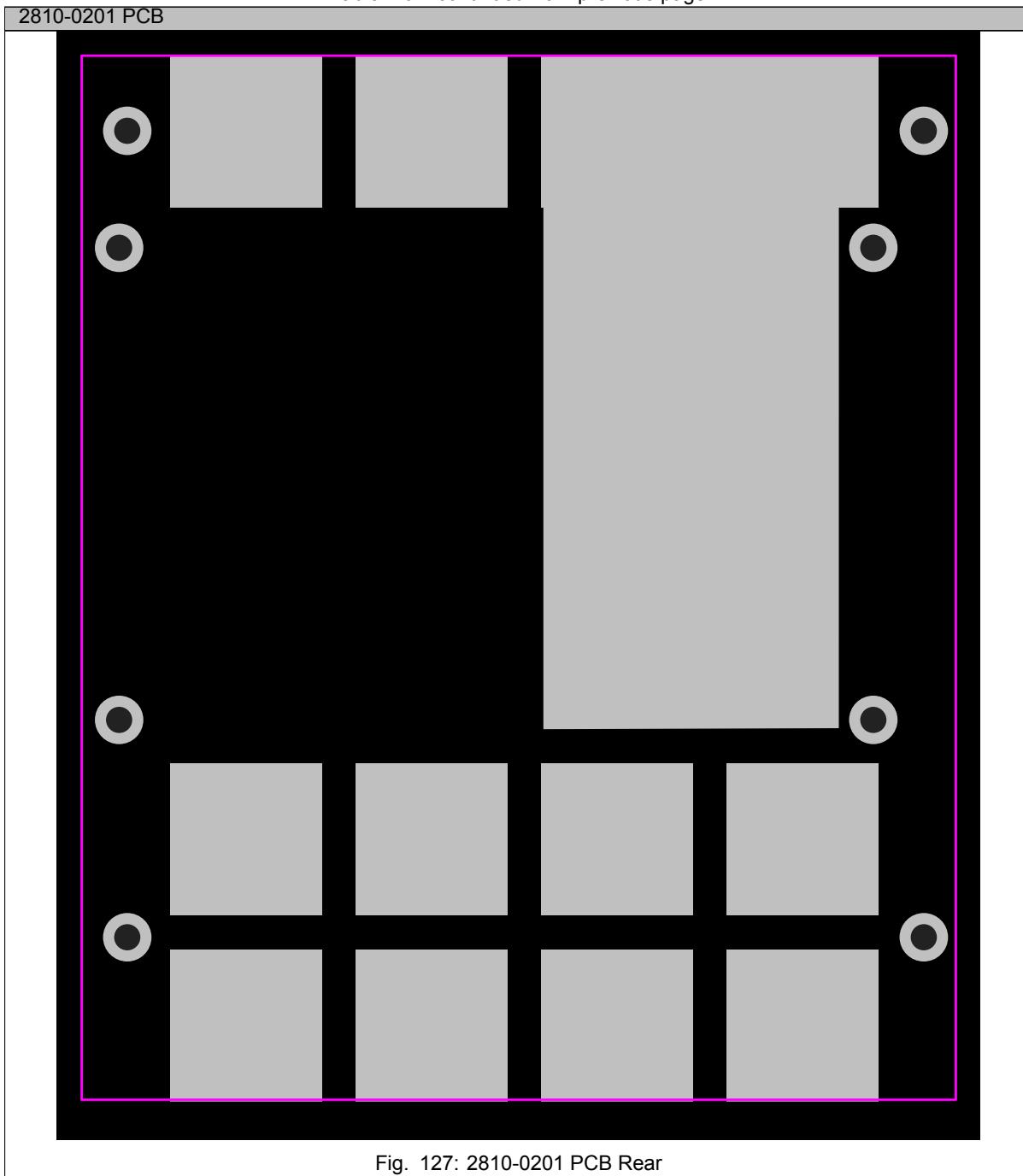


Fig. 127: 2810-0201 PCB Rear

399 **10.3 2810-0301 PCB**

Table 27: 2810-0301 PCB

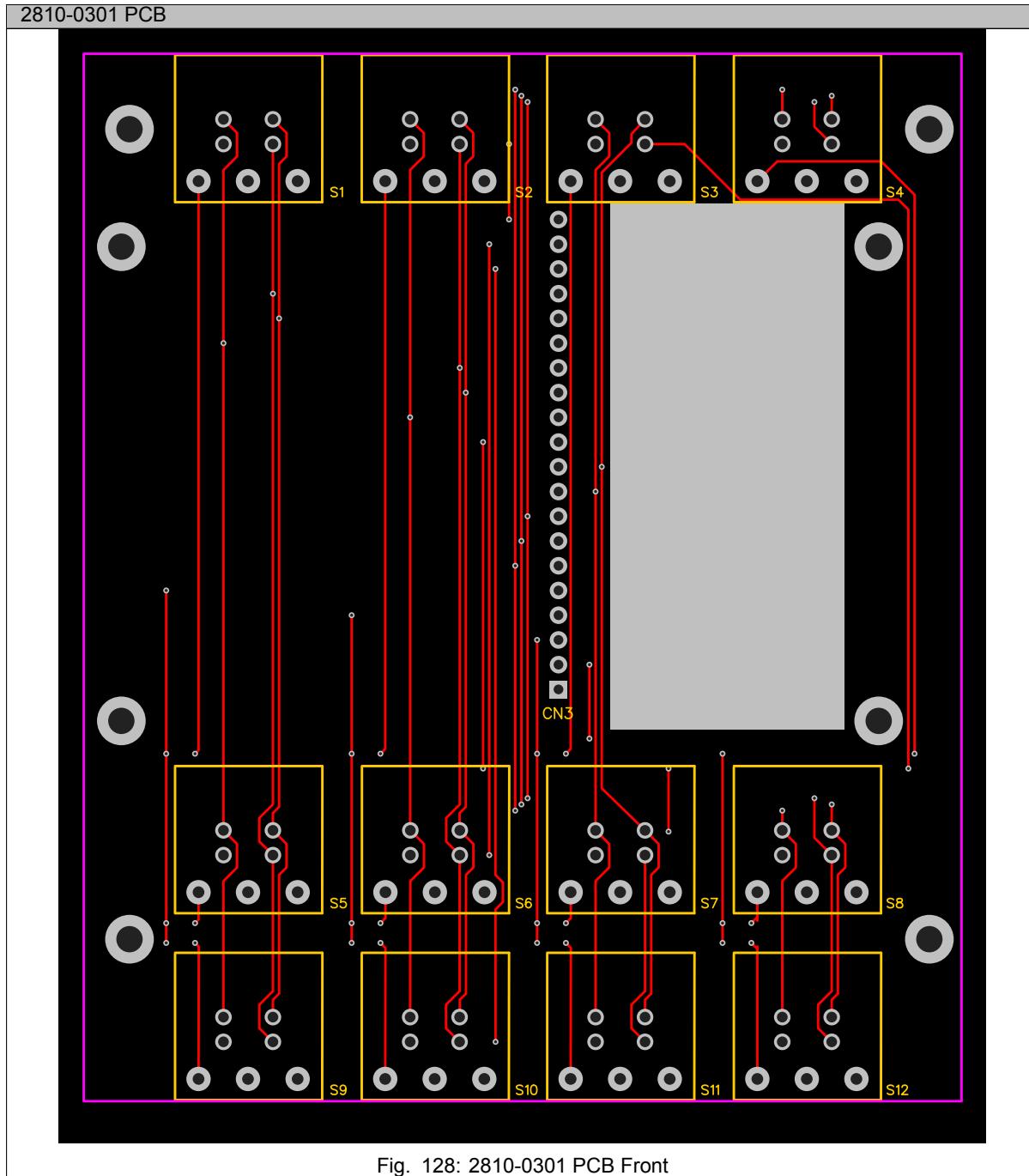


Fig. 128: 2810-0301 PCB Front

continues on next page

Table 27 – continued from previous page

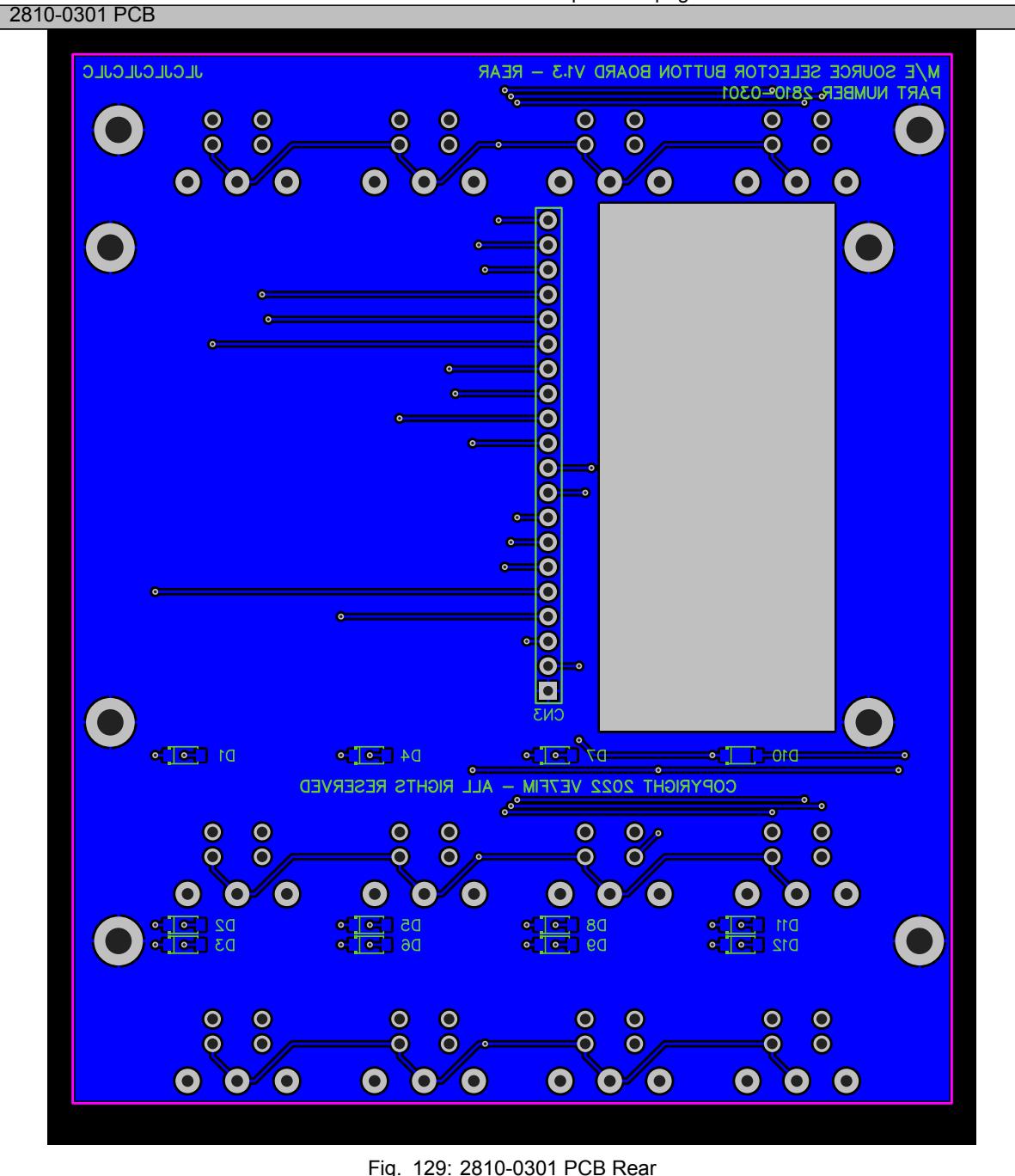


Fig. 129: 2810-0301 PCB Rear

400 **10.4 2810-0401 PCB**

Table 28: 2810-0401 PCB

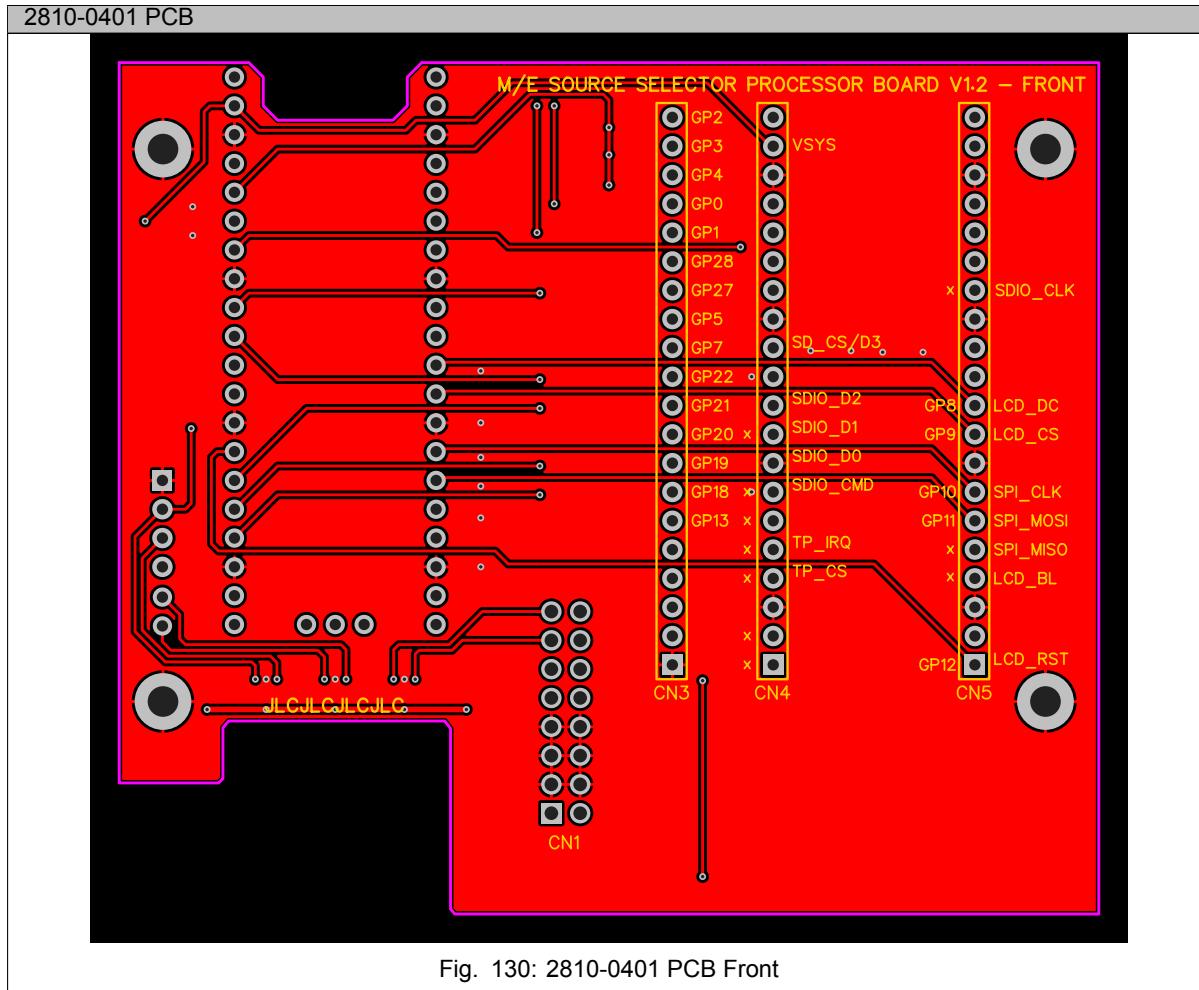


Fig. 130: 2810-0401 PCB Front

continues on next page

Table 28 – continued from previous page

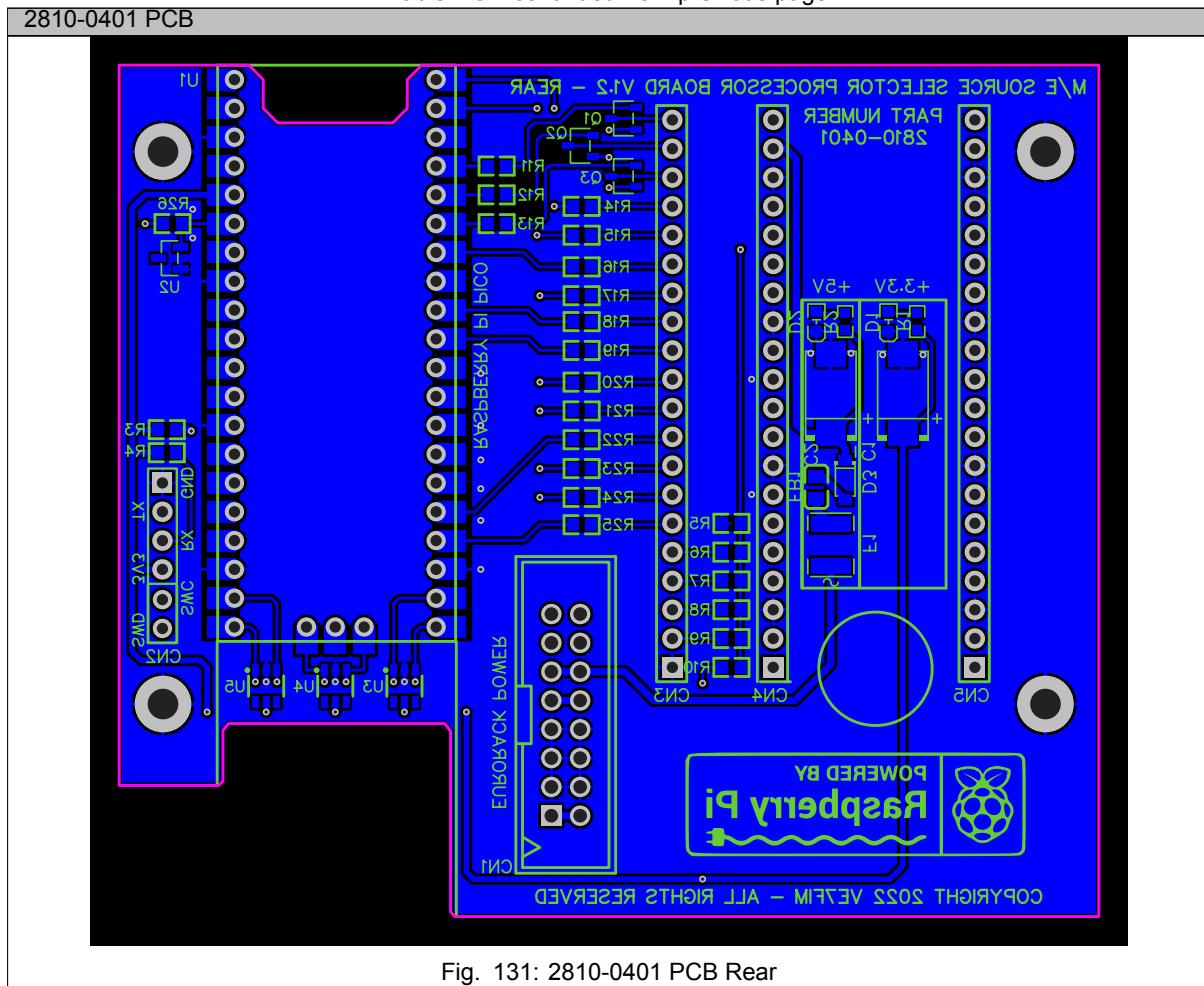


Fig. 131: 2810-0401 PCB Rear

## 401 Section 11

### 402 Bill of materials

#### 403 11.1 2810-0101A PCBA

404 The parts required to assemble a 2810-0101A PCB Assembly are listed in [Table 29](#).

Table 29: 2810-0101A parts

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
2810-0101 v1.1	1	Front Panel PCB	JLCPCB	Y138-2154951A	JLCPCB	\$3.44 CAD
SN1 - SN4	4	Round Standoff Threaded M2.5x0.45 Steel 0.394" (10.00mm)	Würth Elektronik	9774100151R	Digikey	\$5.76 CAD
Total						\$9.20 CAD

#### 405 11.2 2810-0301A PCBA

406 The parts required to assemble a 2810-0301A PCB Assembly are listed in [Table 30](#).

Table 30: 2810-0301A parts

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
2810-0201 v1	1	Button Spacer PCB	JLCPCB	Y110-2154951A	JLCPCB	\$1.40 CAD
2810-0301 v1	1	Button Board PCB	JLCPCB	Y127-2154951A	JLCPCB	\$1.39 CAD
CN3	1	Connector Header Through Hole 20 position 0.100" (2.54mm)	Molex	0022284200	Digikey	\$1.04 CAD
D1-D12	12	Diode Standard 100 V 300mA (DC) Surface Mount SOD-123	Diodes Incorporated	1N4148W-7-F	Digikey	\$3.00 CAD
S1-S12	12	SPST RGB LED pushbutton switch	Honyone Electrical Co.	PB26-13M-B-WT-RGB-N		\$59.88 CAD
LB1-LB12	12	Transparency sheet with pushbutton Labels	Manufactured in-house			
Total						\$66.71 CAD

### 407 11.3 2810-0401A PCBA

408 The parts required to assemble a 2810-0401A PCB Assembly are listed in Table 31.

Table 31: 2810-0401A parts

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
2810-0401 v1	1	Processor PCB	JLCPCB	Y126-2154951A	JLCPCB	\$1.97 CAD
CN1	1	2x8 2.54mm IDC connector (Eurorack power connector)	Boom Precision Electronics	0172-A-B07-004	LCSC	\$0.13 CAD
CN2	1	Connector Header Through Hole 6 position 0.100" (2.54mm)	Molex	0022284060	Digikey	\$0.36 CAD
CN4,CN5	2	Connector Header Through Hole 20 position 0.100" (2.54mm)	Molex	0022284200	Digikey	\$2.08 CAD
C1,C2	2	22 $\mu$ F Molded Tantalum Capacitors 25 V 2917 (7343 Metric) 200mOhm	Kyocera AVX	TPSD226K025R0200	Digikey	\$4.84 CAD
FB1	1	500mA 1 300m $\Omega$ 600 $\Omega$ @100MHz $\pm$ 25% 0805 Ferrite Bead	Sunlord	GZ2012D601TF	LCSC	\$0.026 CAD
D1,D2	2	Green LED Indication - Discrete 2V 0805 (2012 Metric)	Lumex Opto Components Inc.	SML-LXT0805GW-TR	Digikey	\$1.14 CAD
D3	1	Diode Standard 100 V 300mA (DC) Surface Mount SOD-123	Diodes Incorporated	1N4148W-7-F	Digikey	\$0.25 CAD
F1	1	Polymeric PTC Resettable Fuse 24V 500 mA lh Surface Mount 1812 (4532 Metric), Concave	Littelfuse Inc.	MINISMDC050F-2	Digikey	\$0.54 CAD
R1	1	649 Ohms $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Stackpole Electronics Inc	RMCF0603FT649R	Digikey	\$0.15 CAD
R2,R5,R6,R26	4	1 kOhms $\pm$ 5% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	TE Connectivity	CRGCQ0603J1K0	Digikey	\$0.60 CAD
R3,R4,R10-R13	6	10 kOhms $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	TE Connectivity	CRGCQ0603F10K	Digikey	\$0.90 CAD
R7	1	2 kOhms $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Stackpole Electronics Inc	RMCF0603FT2K00	Digikey	\$0.15 CAD
R8	1	4.02 kOhms $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Stackpole Electronics Inc	RMCF0603FT4K02	Digikey	\$0.15 CAD
R9	1	8.06 kOhms $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Stackpole Electronics Inc	RMCF0603FT8K06	Digikey	\$0.15 CAD
R14-R25	12	330 Ohms $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	TE Connectivity	CRGCQ0603F330R	Digikey	\$1.80 CAD
Q1-Q3	3	Bipolar (BJT) Transistor PNP 40 V 200 mA 250MHz 250 mW Surface Mount SOT-23-3 (TO-236)	Motorola	MMBT3906LT1 (PMBT3906,215 Substitute)	Digikey	\$0.54 CAD

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Table 31 – continued from previous page

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
U1	1	RP2040 Raspberry Pi Pico series ARM® Cortex®-M0+ MCU 32-Bit Embedded Evaluation Board	Raspberry Pi	SC0915	Digikey	\$5.53 CAD
U2	1	Shunt Voltage Reference IC Fixed 3.0V V ±0.2% 15 mA	Texas Instruments	LM4040BIM3-2.5	Digikey	\$2.99 CAD
U3-U5	3	16V Clamp 5A (8/20µs) Ipp Tvs Diode Surface Mount SOT-23-6L	YAGEO	UDT26A05L05-LC1	Digikey	\$8.73 CAD
Total						\$33.03 CAD

## 409 11.4 2810A

410 The parts required to assemble a 2810A are listed in [Table 32](#).

Table 32: 2810A parts

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
2810-0101A	1	Front Panel PCBA	In-house Assembly			\$9.20 CAD
2810-0301A	1	Button Board PCBA	In-house Assembly			\$66.71 CAD
2810-0401A	1	Processor Board PCBA	In-house Assembly			\$32.88 CAD
LCD1	1	3.5 Inch LCD Module	Waveshare	Pico-ResTouch-LCD-3.5	Waveshare	\$19.99 USD
MP1-MP4	4	Screw - M2.5 5mm 10.9 Black Alloy Steel Hex Socket Button Head	Order By Description			\$0.274 CAD
MP5-MP8	4	Screw - M2.5 12mm 10.9 Black Alloy Steel Hex Socket Button Head	Order By Description			\$0.274 CAD
SN5-SN8	4	Round Spacer Unthreaded Aluminum 0.157" (4.00mm)	RAF Electronic Hardware	M0503-25-AL	Digikey	\$2.48 CAD
SK1	1	QC Sticker	Order by Description			\$0.0094 CAD
Total						\$131.97 CAD

411 FIXME - Add M3 screws and hex wrench

## 412 11.5 2810A Packaging

413 The parts required to package a 2810 are listed in [Table 33](#).

Table 33: 2810 packing parts

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
N/A	1	Static Shielding Bag 5" X 7"	SCS	81757	Digikey	\$0.31 CAD
N/A	1	Static Shielding Bag 1.5" X 2.8" Ziplock	Order by Description			\$0.06 CAD

continues on next page

Table 33 – continued from previous page

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
N/A	1	CORREC-PAK SHIPPER 7 X 5 X 1.5" ID	Conductive Containers, Inc.	3080-1	<a href="#">Digikey</a>	\$8.67 CAD
1031-7001	2	2810A ESD Sticker	Jukebox Print			\$4.00 CAD
Total						\$13.04 CAD

## **414 Section 12**

# **415 Reduction of Hazardous Materials**

**416** Compliance declarations, in BOM order.

417 **12.1 MG Chemicals 4900**

Table 34: MG Chemicals 4900 RoHS Compliance

Declaration for MG Chemicals 4900 -  
<https://www.mgchemicals.com/downloads/msds/01%20English%20Can-USA%20SDS/sds-4900-4917.pdf>



**ISO 9001:2015 Quality Management System**  
 SAI Global File #004008  
 Burlington, Ontario, Canada

**SAC305 NO CLEAN SOLDER WIRE**

**4900-4917**

**California Proposition 65** (Chemicals known to cause cancer or reproductive toxicity, USA)

This product does not contain any of the listed substances.

**Europe**

**RoHS** (Restriction of Hazardous Substances Directive)

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, PBDE's, DEHP, BBP, DBP, or DIBP and complies with European RoHS regulations.

**WEEE** (Waste Electrical and Electronic Equipment Directive)

This product is not a piece of electrical or electronics equipment, and is therefore not governed by this regulation.

**Section 16: Other Information**

**SDS Prepared by** MG Chemical's Regulatory Department

**Date of Review** 06 March 2020

**Supersedes** 09 July 2019

**Reason for Changes:** Update to the emergency phone number information.

**Reference**

- 1) ACGIH 2017 TLVs and BEIs: Based on the documentation of the threshold limit values for chemical substances and physical agents & biological exposure indices, American Conference of Governmental of Industrial Hygienist Cincinnati, OH (2017).
- 2) All toxicological data were checked against the RTECS (Registry of Toxic Effects of Chemical Substances®)

*Section continued on the next page*

Page **12 of 13**

Date of Revision: 06 March 2020 / Ver. 3.01

418 **12.2 JLC lead-free PCB**

Table 35: JLC PCB RoHS Compliance

Declaration for JLCPBCB lead-free PCBs - <https://s3.amazonaws.com/helpscout.net/docs/assets/59f1de7804286313cffbb22c/images/5d4d09562c7d3a036965d6a3/ROHS-Certificate-of-Compliance.jpg>

ROHS-Certificate-of-Compliance.jpg 566x800 pixels

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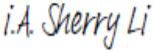
<https://s3.amazonaws.com/helpscout.net/docs/assets/59f1de7804286313cffbb22c/images/5d4d09562c7d3a036965d6a3/ROHS-Certificate-of-Compliance.jpg>

Page 1 of 1

419 **12.3 Würth 9774100151R**

Table 36: Würth 9774100151R RoHS Compliance

Declaration for Würth 9774100151R - [https://www.we-online.com/web/fr/index.php/show/media/07\\_electronic\\_components/download\\_center\\_1/reach\\_\\_rohs/rohs/Certificate\\_of\\_Compliance\\_ROHS\\_DecaBDE.pdf](https://www.we-online.com/web/fr/index.php/show/media/07_electronic_components/download_center_1/reach__rohs/rohs/Certificate_of_Compliance_ROHS_DecaBDE.pdf)

 <b>more than you expect</b>
<p><b>Würth Elektronik eiSos GmbH &amp; Co. KG</b>  <b>EMC &amp; Inductive Solutions</b>          Max-Eyth-Straße 1 · 74638 Waldenburg · Germany          Tel. +49 (0) 79 42 945-0 · Fax +49 (0) 79 42 945-400          eiSos@we-online.de · www.we-online.de</p> <p><b>WE</b>  <b>WÜRTH ELEKTRONIK</b></p> <p style="text-align: right;">Waldenburg, 18.05.2020</p> <p><b>Certificate of Compliance for Directive 2011/65/EU and 2015/863 (RoHS III)</b></p> <p>This document certifies that all components and all homogeneous subcomponents manufactured by Würth Elektronik eiSos GmbH &amp; Co.KG are in compliance with the Directive 2011/65/EU and the amendment of Directive 2015/863 of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS III Directives).</p> <p>Since the publication of the amendment Directive 2015/863 on June 4, 2015, Würth Elektronik eiSos GmbH &amp; Co.KG has been aware of our obligation and immediately launched verification of our products.</p> <p>In this amendment the member states are requested to ensure the compliance with this directive until the 21<sup>st</sup> July 2019.</p> <p>Since April 2018 the Würth Elektronik eiSos GmbH &amp; Co. KG can confirm that our products don't use any of four phthalates above its threshold in Directive 2015/863.</p> <p>As Würth Elektronik eiSos GmbH &amp; Co.KG is a manufacturer of electronic components, and since products are not placed or made available directly on the market for consumers and end-customers, we are not bound to label our products according to Article 7c) of Directive 2011/65/EU. On request of any government agency Würth Elektronik eiSos GmbH &amp; Co. KG will provide necessary documents, which verify the compliance to Directive 2011/65/EU and the amendment of Directive 2015/863 based on harmonized standards. Our suppliers are contractually bound to be compliant to the Directive 2011/65/EU and the amendment of Directive 2015/863.</p> <p>According to the directive, some of hazardous substances listed in this directive can be exempted in certain filed. To get the details for parts produced by Würth Elektronik eiSos GmbH &amp; Co.KG which are RoHS compliant with exemption, please go to below link:</p> <p><a href="#">Part List RoHS Exemptions</a></p> <p>The latest version of this document is available on our Homepage  <a href="http://www.we-online.com/DownloadCenter">www.we-online.com/DownloadCenter</a></p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>Michael Weser Environmental Manager</p> </div> <div style="text-align: center;">  <p>Sherry Li Material Management</p> </div> </div> <p><small>Würth Elektronik eiSos GmbH &amp; Co. KG Sitz Waldenburg, Registergericht Stuttgart HRB 580801          Komplementär Würth Elektronik eiSos Verwaltungs-GmbH, Sitz Waldenburg, Registergericht Stuttgart HRB 581033          Geschäftsführer Thomas Schrott, Alexander Gerler, Thomas Wild, Dirk Knorr, Josef Wörner          Bankverbindung UniCredit Bank AG Stuttgart, Konto 322 620 136, BLZ 600 202 90, IBAN DE86 6002 0290 0322 6201 36, SWIFT/BIC HYVEDEM473 - USt-IdNr. DE220618976</small></p>

420 **12.4 Molex 0022284200**

Table 37: Molex 0022284200 RoHS Compliance

Declaration for Molex 0022284200 - [https://www.molex.com/datasheets/rohspdf/0022284200\\_rohs.pdf](https://www.molex.com/datasheets/rohspdf/0022284200_rohs.pdf)**RoHS Certificate of Compliance**

07/26/2022

Molex is committed to managing the use of chemical substances in accordance with governmental regulations, industry standards, and customer-specific requirements in order to protect the environment. For each part listed, this document provides:

- EU RoHS Compliance Status.** EU RoHS status is declared per Directive 2011/65/EU and its subsequent amendments, including the Directive EU 2015/863 which additionally prohibited four phthalates. Homogeneous materials of parts that are compliant to this legislation have less than 0.1% by weight each of lead, mercury, hexavalent chromium, PBB, PBDE, DBP, BBP, DIBP, DEHP, and 0.01% by weight of cadmium. In situations where an exemption applies, the preceding limits, corresponding to the exempted substance(s), may be higher.

Molex's sole liability for incorrectly certifying a product shall be either replacement of the Molex product or, alternatively and in the sole discretion of Molex, return of the purchase price paid for the relevant Molex product.

For additional information regarding Molex's environmental initiatives and further explanation of this information, please visit [www.molex.com](http://www.molex.com)

Haim Eliyahu  
Director, Global Product Stewardship

**Table A**

Molex Part Number	Part Description	RoHS Compliance Status
0022284200	KK 254 Breakaway Header, Vertical, 20 Circuits, Tin (Sn) Plating, Mating Pin Length 6.09mm	Compliant

421 **12.5 Diodes, Inc. 1N4148W-7-F**

Table 38: Diodes, Inc. 1N4148W-7-F RoHS Compliance

Declaration for Diodes, Inc. 1N4148W-7-F -  
[https://www.diodes.com/assets/Quality-Reliability-Docs/Master\\_CofC.pdf](https://www.diodes.com/assets/Quality-Reliability-Docs/Master_CofC.pdf)

**Diodes Incorporated - Environmental Compliance**

Re: End of Vehicle Life Directive (ELV) 2000/53/EC and Annex II (EVL II) 2000/53/EC  
 Restrictions of Hazardous Substances Directive (RoHS) 2002/95/EC (repealed on 3 January 2013 but listed here for completeness), 2011/65/EU (RoHS 2) and 2015/863/EU (RoHS 3).  
 UK RoHS  
 Waste Electrical and Electronic Equipment (WEEE)  
 REACH (EC) No 1907/2006 Article 59 (REACH 223) 17 January 2022  
 REACH (EC) No 1907/2006 Article 59 (REACH 224) 10 June 2022 we are working with our suppliers to determine any presence of the newly-added substance in our products.  
 REACH (EC) No 1907/2006 Article 33 Annex XIV 6 February 2020  
 REACH (EC) No 1907/2006 Article 67 Annex XVII 6 April 2022  
 UK REACH Authorisation List Annex XIV 1 January 2021  
 UK REACH Restriction List Annex XVII 1 January 2021  
 GADSL: (Global Automotive Declarable Substance List) 1 February 2022 (Refer to page 12)  
 Japanese Chemical Substance Control Law (CSCL) and Industrial Safety and Health Law (ISHL).  
 JEDEC JS709C - Definition of "Low-Halogen" for Electronic Products (applies to "green" or "halogen-free" products only)  
 China RoHS  
 China Volatile Organic Compounds (VOCs) Regulations  
 California Proposition 65 – 25 February 2022 (Refer to page 12) See also [HERE](#)  
 IEC 62474 (Replaced JIG 101) Version D24 – February 1, 2022 (Refer to page 13)  
 Montreal Protocol  
 Stockholm Convention (POP Regulation) (EC Regulation 850/2004)  
 Canadian Regulation SOR/2014-254 Products containing Mercury Regulation  
 The Biocidal Product Regulation (BPR, Regulation (EU) 528/2012)  
 Toxic Substances Control Act (TSCA)

Diodes Incorporated and its subsidiaries have reviewed their manufacturing process and materials along with those of our contractors and suppliers against the above.

We hereby declare that all our products listed herein comply fully with the above and do not contain any of the following substances except as CURRENTLY exempted by ELV II and RoHS 3, or as impurities:

RoHS Restricted Substances	RoHS maximum permitted homogenous material levels	
Cadmium and cadmium compounds	100ppm (0.01%)	Not present
Hexavalent chromium compounds (Chromium VI compounds)	1,000ppm (0.1%)	Not present
Lead and lead compounds	1,000ppm (0.1%)	Refer to product list
Mercury and mercury compounds	1,000ppm (0.1%)	Not present
Polybrominated biphenyls (PBB)	1,000ppm (0.1%)	Not present
Polybrominated diphenyl ethers (PBDE)	1,000ppm (0.1%)	Not present
Bis(2-ethylhexyl) phthalate (DEHP)	1,000ppm (0.1%)	Not present
Benzyl butyl phthalate (BBP)	1,000ppm (0.1%)	Not present
Dibutyl phthalate (DBP)	1,000ppm (0.1%)	Not present
Diisobutyl phthalate (DIBP)	1,000ppm (0.1%)	Not present

Asbestos	Perfluorooctane Sulphonate (PFOS)
Azo compounds (Azocolourants and Azodyes)	Polychlorinated Biphenyls (PCBs)
Certain Short chain Chlorinated Paraffins	Polychlorinated Naphthalenes (>3 chlorine atoms)
Chlorinated organic compounds	Polychlorinated Terphenyls (PCTs)
Dimethyl fumarate	Polycyclic aromatic hydrocarbons (PAHs)
Formaldehyde	Radioactive Substances
Organic tin compounds	Red Phosphorous
Ozone Depleting Substances - Class I (CFCs, HCFCs, etc.)	Tributyl Tin (TBT) and Triphenyl Tin (TPT)
Ozone Depleting Substances - Class II (HCFCs)	Dibutyltin (DBT) compounds, Diocetyltin (DOT) compounds
Pentadecafluoroctanoic acid (PFOA)	Tributyl Tin Oxide (TBTO)

Please refer to the REACH section for details of SVHC substances within our products.

DIODES is a trademark of Diodes Incorporated in the United States and other countries.  
 The Diodes logo is a registered trademark of Diodes Incorporated in the United States and other countries.  
 PowerDI is a registered trademark of Diodes Incorporated in the United States and other countries.

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Diodes Incorporated Taiwan  
 Hsin-Tien, Taipei, Taiwan, R.O.C.  
 Tel: 011-886-2-8914-6000  
 Fax: 011-886-2-8914-6639

422 12.6 Molex 0022284060

Table 39: Molex 0022284060 RoHS Compliance

Declaration for Molex 0022284060 - [https://www.molex.com/datasheets/rohspdf/0022284060\\_rohs.pdf](https://www.molex.com/datasheets/rohspdf/0022284060_rohs.pdf)

### RoHS Certificate of Compliance

07/26/2022

Molex is committed to managing the use of chemical substances in accordance with governmental regulations, industry standards, and customer-specific requirements in order to protect the environment. For each part listed, this document provides:

- EU RoHS Compliance Status.** EU RoHS status is declared per Directive 2011/65/EU and its subsequent amendments, including the Directive EU 2015/863 which additionally prohibited four phthalates. Homogeneous materials of parts that are compliant to this legislation have less than 0.1% by weight each of lead, mercury, hexavalent chromium, PBB, PBDE, DBP, BBP, DIBP, DEHP, and 0.01% by weight of cadmium. In situations where an exemption applies, the preceding limits, corresponding to the exempted substance(s), may be higher.

Molex's sole liability for incorrectly certifying a product shall be either replacement of the Molex product or, alternatively and in the sole discretion of Molex, return of the purchase price paid for the relevant Molex product.

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Haim Eliyahu  
Director, Global Product Stewardship

Table A

Molex Part Number	Part Description	RoHS Compliance Status
0022284060	KK 254 Breakaway Header, Vertical, 6 Circuits, Tin (Sn) Plating, Mating Pin Length 6.09mm	Compliant

423 **12.7 RAF M0503-25-AL**

Table 40: RAF M0503-25-AL RoHS Compliance

Declaration for RAF M0503-25-AL - <https://mwi-production-app-storage.s3.us-east-1.amazonaws.com/MW-Components-RAF-RoHS-Compliant.pdf>



a Division of **MW Industries, Inc.**  
95 Silvermine Road, Seymour, Connecticut 06483-3995  
Tel: (203) 888-2133, Fax: (203) 888-9860  
E-mail: info@rafhdwe.com Web: http://www.rafhdwe.com

**RoHS Certificate of Conformity**

Date: January 25, 2019

The part(s) number listed below by RAF Electronic Hardware, meets the specific requirements of the EU directive (Directive 2015/863/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment), without exemption, unless noted, for the following banned substances:

<u>Substance</u>	<u>Maximum Concentration Value</u>
Lead	0.1% by weight (1000 ppm)
Mercury	0.1% by weight (1000 ppm)
Cadmium	0.01% by weight (100 ppm)
Hexavalent Chromium	0.1% by weight (1000 ppm)
Polybrominated Biphenyls (PBB)	0.1% by weight (1000 ppm)
Polybrominated Diphenyl Ethers (PBDE)	0.1% by weight (1000 ppm)
Bis (2-Eethylhexyl) phthalate (DEHP)	0.1% by weight (1000 ppm)
Benzyl butyl phthalate (BBP)	0.1% by weight (1000 ppm)
Dibutyl phthalate (DBP)	0.1% by weight (1000 ppm)
Diisobutyl phthalate (DIBP)	0.1% by weight (1000 ppm)

RAF Electronic Hardware would like to state that parts manufactured out of our aluminum and brass are compliant under the EU RoHS Directive per exemption 6 – lead as an alloying element. Parts manufactured out of stainless steel, steel, nylon, phenolic, Teflon & Delrin are fully compliant with the directive and do not contain any deca-BDE or any other substances restricted by this directive.

Also, all of our plating codes are RoHS compliant with the following exemptions: • -1 (Cadmium Commercial) • -6 (Gold Iridite) • -2 (Cadmium Clear Chromate) • -9 (Alodine 1200) • -3 (Cadmium Yellow Chromate) • -27 (Electro Tin Solder)

You can be assured that we here at RAF will be able to insure a continuous flow of product and continue to maintain a high level of service to our customers. If you have any questions or concerns, please contact us immediately at Jstein@rafhdwe.com

  
Mark Ignace  
QC Manager