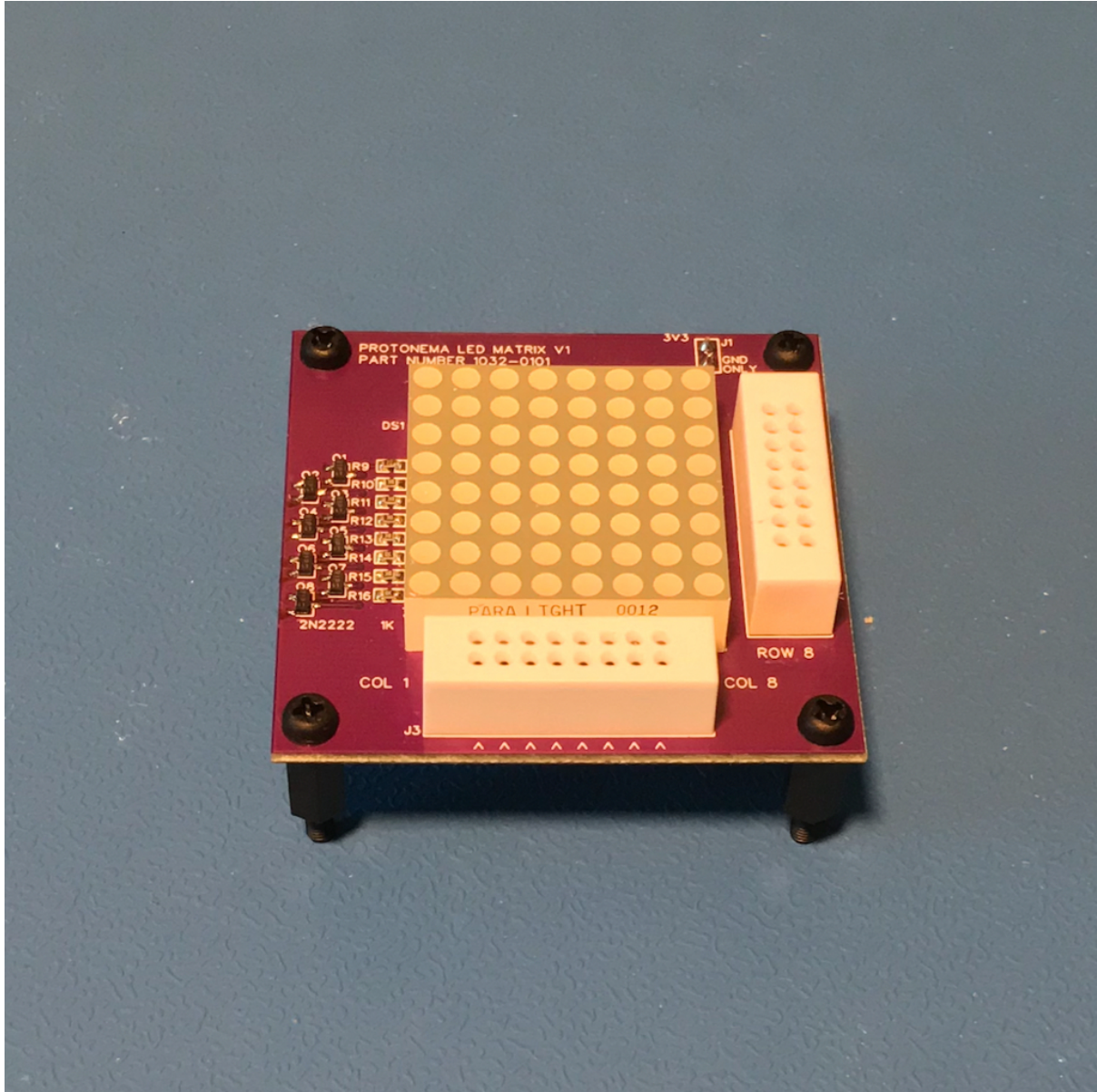


# ASSEMBLY INSTRUCTIONS

## 1032A LED Matrix Stamp



Document control number: 1032-8010

Document date: 2022-12-10

Document revision: 1.0.0-draft.3

ABSTRACT: This document provides instructions on how to assembly and test a 1032A LED matrix stamp. A complete bill of materials is included as an annex.

Suggestions and corrections should be directed to <http://www.github.com/dslik/protonema/issues>

Serial number:

Assembly date:

Assembled by:

## 12 USAGE

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## Revision history

Table 1: Document Revisions

Version	Date	Change	Approver
1.0.0-draft.1	2022-12-04	Initial draft	D. Slik
1.0.0-draft.2	2022-12-08	Added missing RoHS certificate	D. Slik
1.0.0-draft.3	2022-12-10	Added missing photos (2.4.2, 8.1.1), added missing numbering	D. Slik

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## Part I

# 1032A assembly instructions



# Section 1

## Overview

This document describes the materials, processes, outcomes and verifications required to successfully assemble and test a 1032A LED matrix stamp, a sub-component of the Protonema electronics prototyping and learning system.

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

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

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

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

## Section 2





# Prerequisites

### 2.1 Required safety training

The following safety training units must be completed before assembling this product.

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.	
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.	
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.	
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.	

## 2.2 Required skills training

The following skills training units must be completed before assembling this product.

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.	
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.	
2.2.3	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.	
2.2.4	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.	
2.2.5	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.	



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Section 3

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Preparation

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3.1 Workspace

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Before starting assembly, check out an assembly desk for a minimum of one hour. Units are assembled in batches

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of four, with each batch taking 20 minutes.

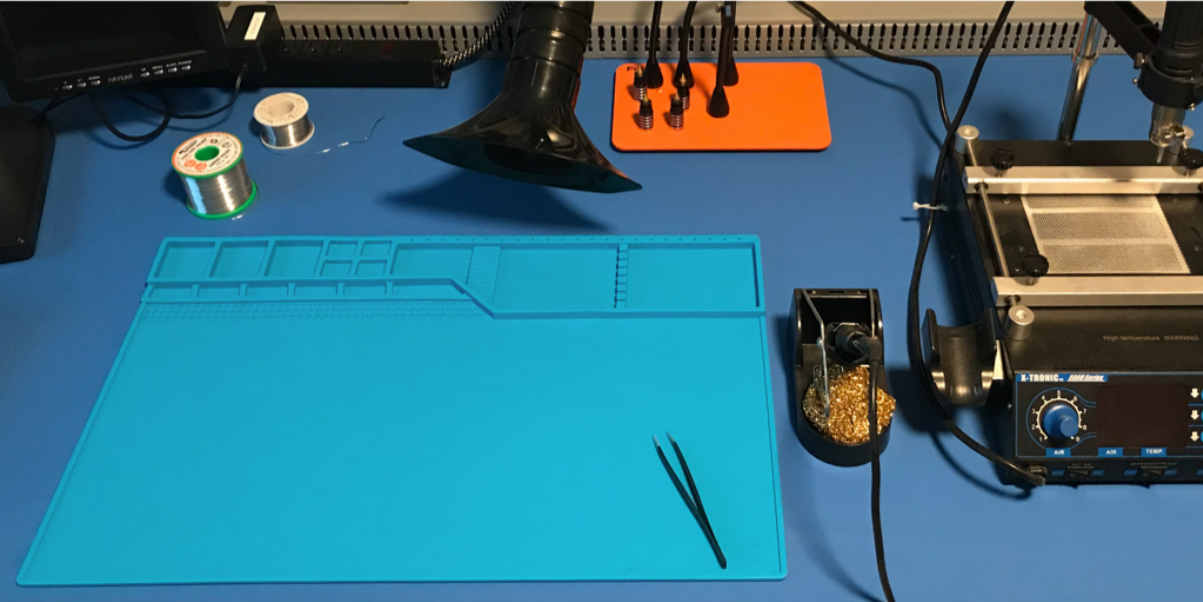


Fig. 1: Assembly Desk

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.	<div>Stamp or sign here</div>
3.1.2	Verify that the HEPA fume extractor turns on, and you can feel air suction from the nozzle.	<div>Stamp or sign here</div>

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.	<div>Stamp or sign here</div>
3.1.4	Verify that the heating surface of the MHP30 hot plate is clean.	<div>Stamp or sign here</div>

3.2 Project consumables

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

Table 5: Assembly consumables

Item #	Description	Signature/Stamp
3.2.1	<div></div> <div>Fig. 2: 1 pair ESD gloves If you prefer to use your own pair of ESD gloves, make sure they are tested before use.</div>	<div>Stamp or sign here</div>
3.2.2	<div></div> <div>Fig. 3: 1 spool MG Chemicals 4900 Lead Free No-Clean Wire Solder Sn96.2Ag2.8Cu0.4 (96.2/2.8/0.4) 20 AWG</div>	<div>Stamp or sign here</div>

### 3.3 Project tools

Obtain a tools container labelled “1XXX Assembly Tools” from the 1XXX section of the stores supply shelf. At your assembly desk, use Table 6 to verify that all the required tools are present.

If any required tools are missing, return all tools and the tools container to the stores department, and obtain another tools container.

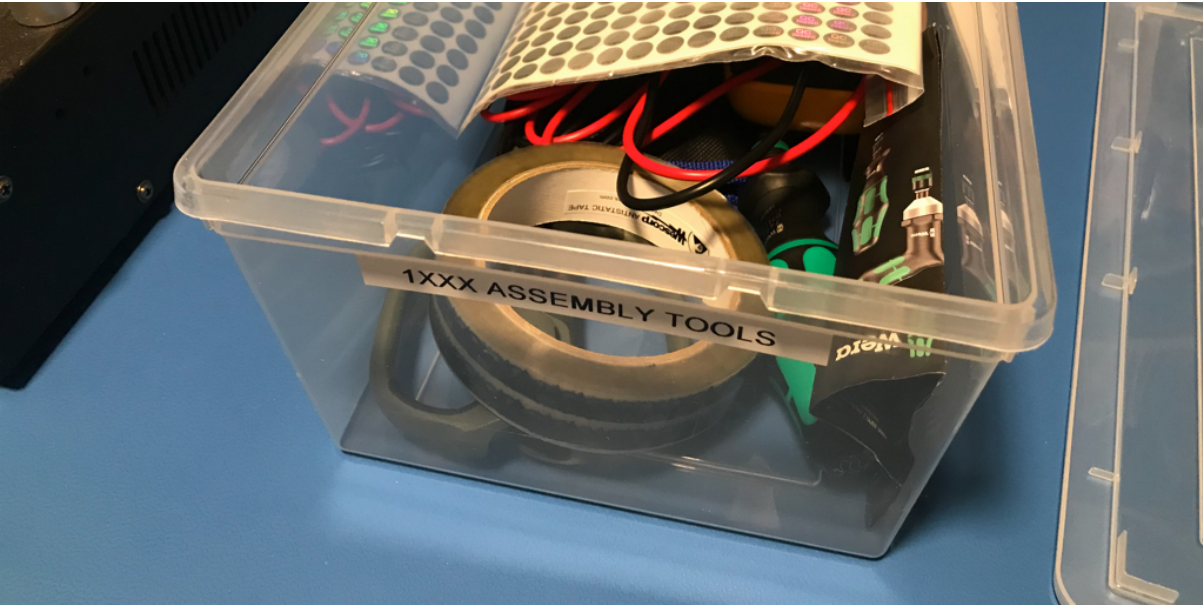


Fig. 4: Tools Container

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	<div></div> <p>Fig. 5: Hozan F-23 components tray</p>	<div>Stamp or sign here</div>

continues on next page



Table 6 – continued from previous page

Item #	Description	Signature/Stamp
3.3.2	 <p data-bbox="619 663 852 689">Fig. 6: ESD tweezers</p>	
3.3.3	 <p data-bbox="469 1117 1007 1144">Fig. 7: 3mm Phillips adjustable torque screwdriver</p>	
3.3.4	 <p data-bbox="549 1572 927 1599">Fig. 8: Fine-tipped Sharpie marker</p>	

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Table 6 – continued from previous page

Item #	Description	Signature/Stamp
3.3.5	 Fig. 9: Sissors	

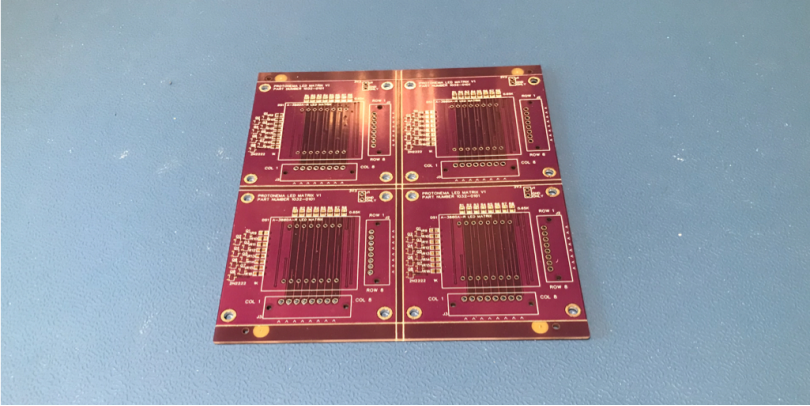
3.4 Parts preparation

3.4.1 PCBs and PCBAs

NOTICE: All PCBs and PCBAs must be handled with gloves to prevent marking with skin oils.

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 <div></div> <p>Fig. 10: 1x 1032-0101 v1.0 - LED Matrix Stamp PCB</p>	<div>Stamp or sign here</div>

3.4.2 Reel cuttings

All reels are stored in the bin labelled “1XXX Reels” on the shelf labelled “1XXX Components”. As this is a manually assembled product (no automated pick-and-place), tape should be cut off as needed for the number of units being assembled, and placed in the assembly tray.

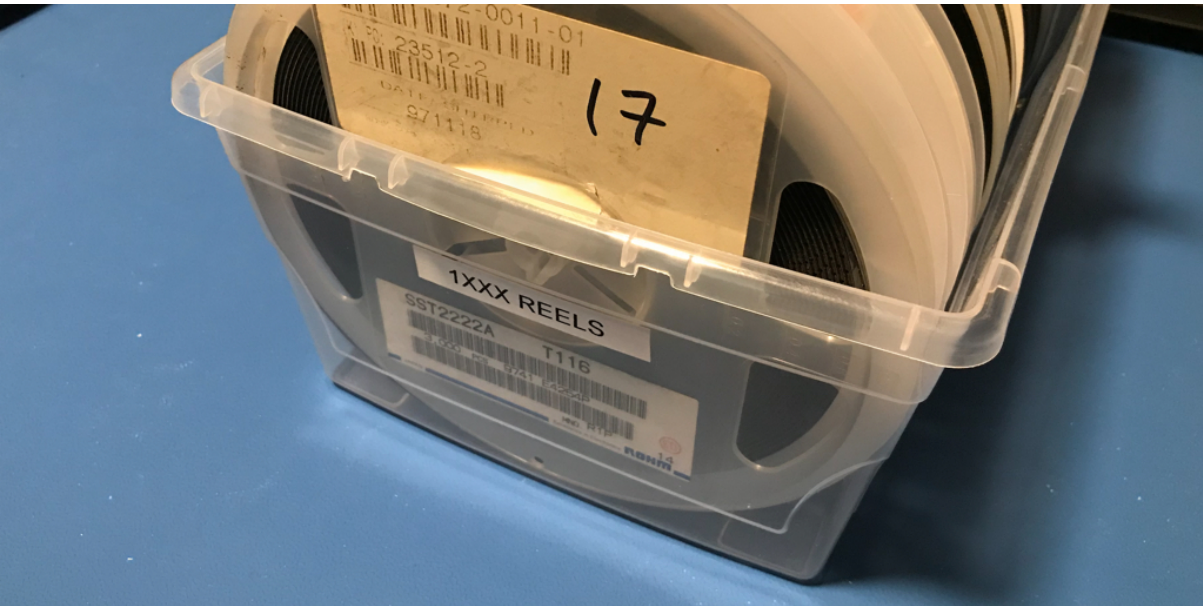


Fig. 11: Reels Container

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

Table 8: Assembly reels

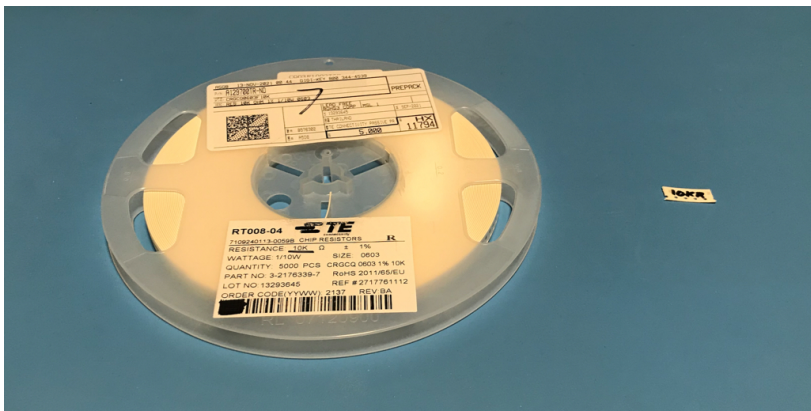

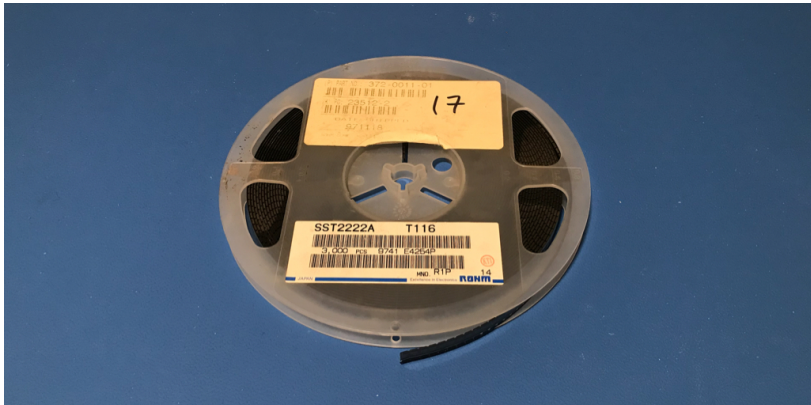

Reel #	Description	Signature/Stamp
1	Mark with “649R” <div></div>	<div>Stamp or sign here</div>

Fig. 12: 8x 649 Ohm 0603 resistors

continues on next page



Table 8 – continued from previous page



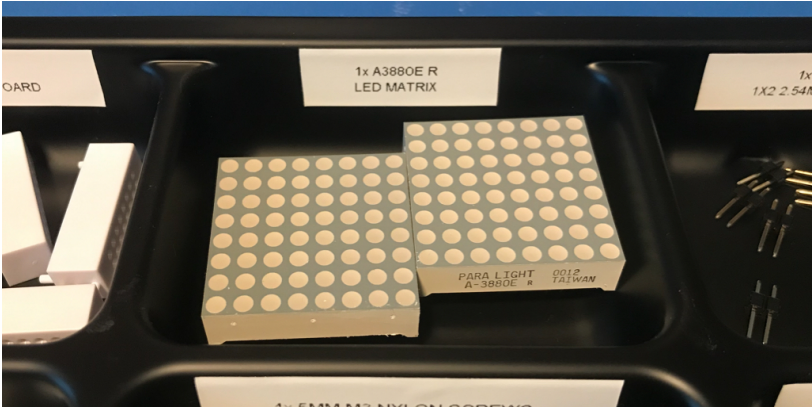



Reel #	Description	Signature/Stamp
7	Mark with "10KR" 	
17	No marking required 	

239 Be sure to return the 1XXX Reels bin as soon as you have finished cutting off the required parts.

3.4.3 Loose components

All loose components are stored on the shelf labelled “1XXX Components”. Take the components tray and obtain the following quantities of the following parts:

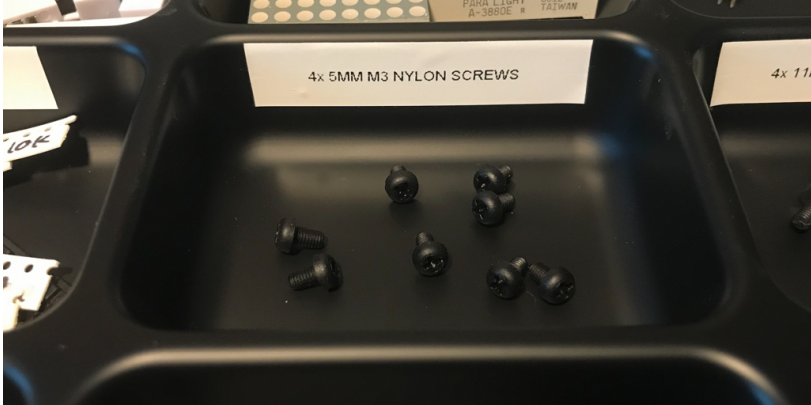


Table 9: Loose components

Item #	Description	Signature/Stamp
3.4.3.1	No marking required  Fig. 15: 1x ZY28 - 16 Point solderless breadboard	
3.4.3.2	No marking required  Fig. 16: 1x A3880E - LED matrix display	
3.4.3.3	No marking required  Fig. 17: 1x 0022284020 - 1x2 2.54mm Male Header	

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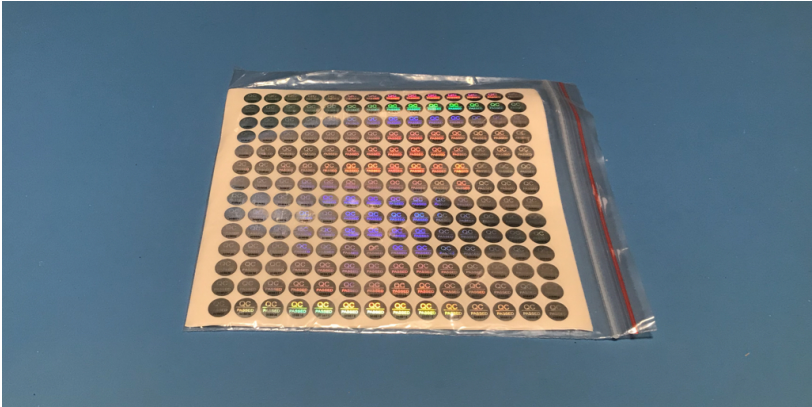





Table 9 – continued from previous page

Item #	Description	Signature/Stamp
3.4.3.4	<p data-bbox="328 248 549 277">No marking required</p>  <p data-bbox="549 701 924 730">Fig. 18: 4x 5mm M3 Nylon Screws</p>	<p data-bbox="1246 315 1318 389">Stamp or sign here</p>
3.4.3.5	<p data-bbox="328 734 549 763">No marking required</p>  <p data-bbox="485 1187 987 1216">Fig. 19: 4x M3 11mm+6 Black Nylon Standoffs</p>	<p data-bbox="1246 801 1318 875">Stamp or sign here</p>
3.4.3.6	<p data-bbox="328 1220 549 1249">No marking required</p>  <p data-bbox="560 1673 911 1702">Fig. 20: 4x M3 Black Nylon Nuts</p>	<p data-bbox="1246 1288 1318 1361">Stamp or sign here</p>

3.4.4 Packaging materials

All packaging materials are stored on the shelf labelled “1XXX Components”. Take the packaging box and obtain the following quantities of the following materials:

Table 10: Packaging materials

Item #	Description	Signature/Stamp
3.4.4.1	No marking required  Fig. 21: 1x QC Sticker	
3.4.4.2	No marking required  Fig. 22: 1x Long size anti-static bag	
3.4.4.3	No marking required  Fig. 23: 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 	
	Fig. 24: 1x Packing box with foam inserts	
3.4.4.5	No marking required 	
	Fig. 25: 2x 1032A Stickers	
3.4.4.6	No marking required 	
	Fig. 26: Roll of packing tape	



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Section 4

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Assembly

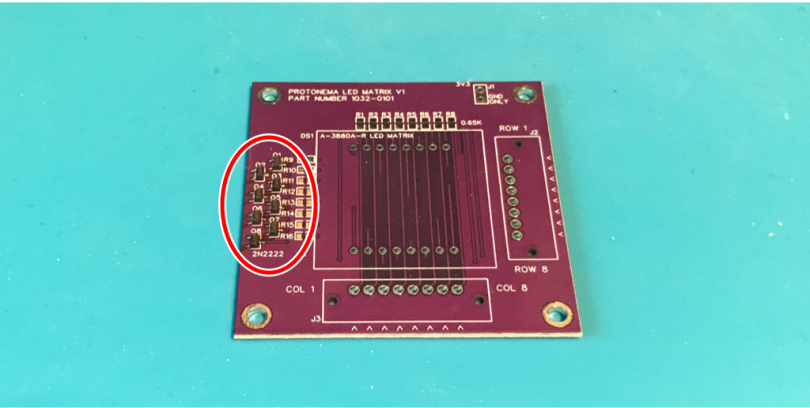
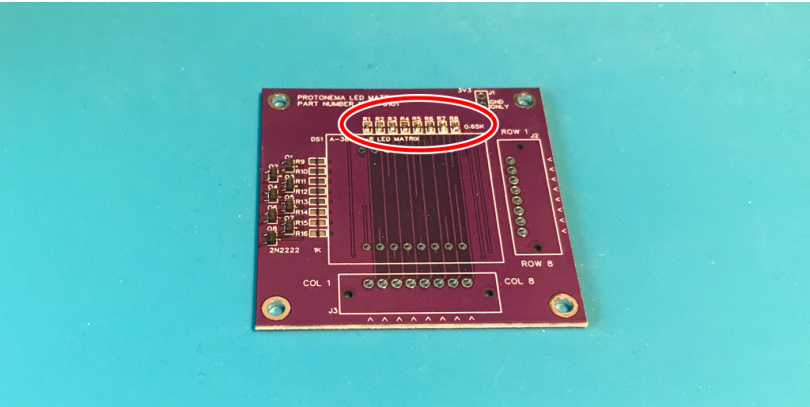
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4.1 1032A assembly

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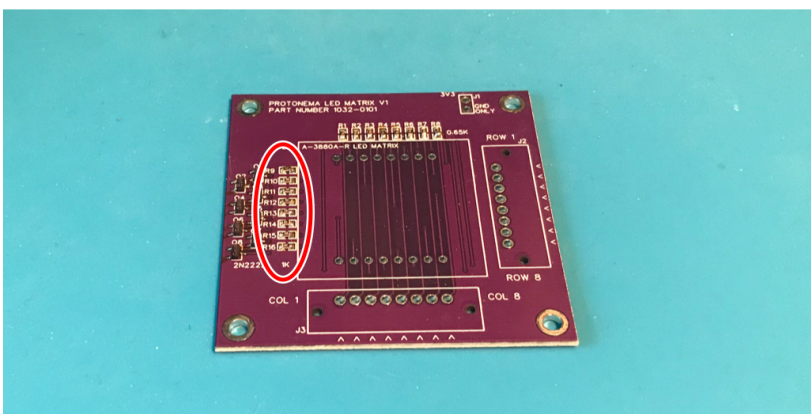
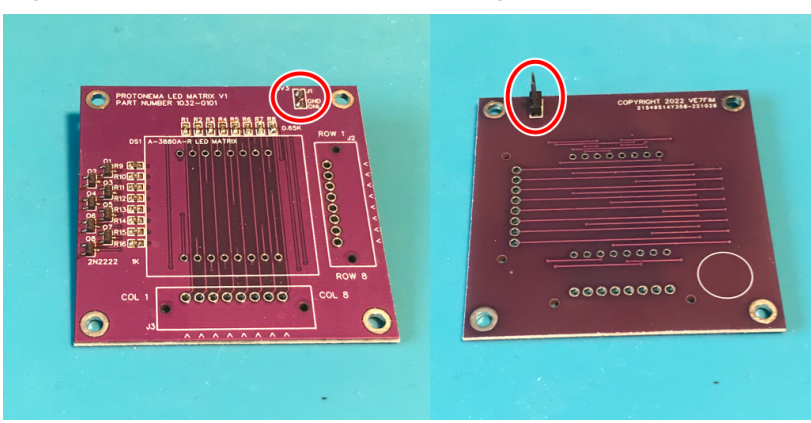
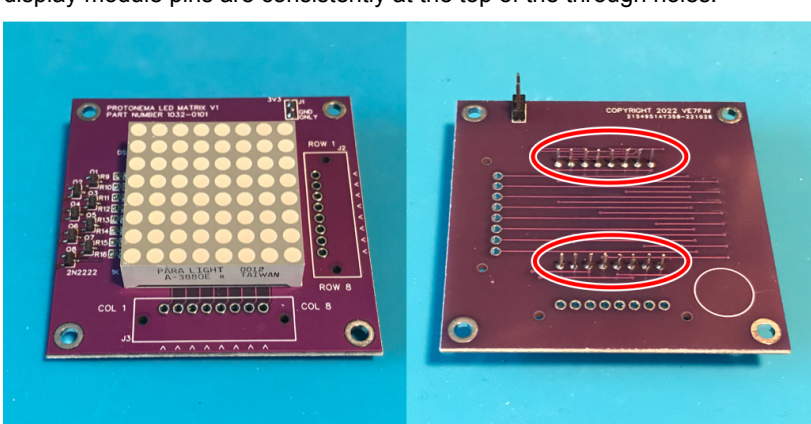
This assembly step takes 5 minutes.

Table 11: 1032A assembly steps

Step #	Description	Signature/Stamp
4.1.1	Solder Q1 through Q8 onto the 1032-0101 PCB. <div></div> <div>Fig. 27: 1032-0101 PCB with Q1-Q8 soldered on.</div>	<div>Stamp or sign here</div>
4.1.2	Solder R1 through R8 onto the 1032-0101 PCB. <div></div> <div>Fig. 28: 1032-0101 PCB with R1-R8 soldered on.</div>	<div>Stamp or sign here</div>

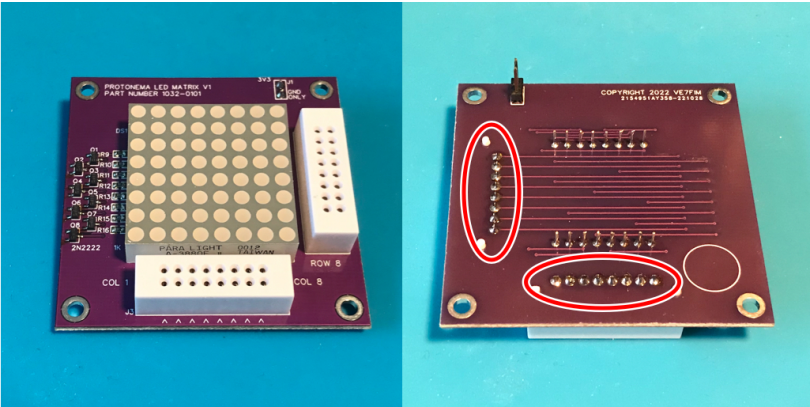
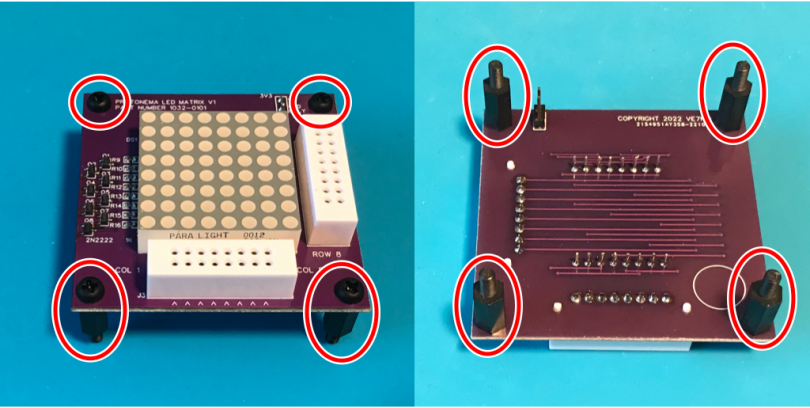
continues on next page

Table 11 – continued from previous page

Step #	Description	Signature/Stamp
4.1.3	Solder R9 through R16 onto the 1032-0101 PCB.	Signature/Stamp
	 <p data-bbox="464 701 1007 723">Fig. 29: 1032-0101 PCB with R9-R16 soldered on.</p>	<p data-bbox="1246 315 1310 383">Stamp or sign here</p>
4.1.4	Insert the 2 pin header into J1 from the rear of the board, flip the board, and solder one pin of the header on, flip the board again and sure it is 90 degrees to the board, then solder the remaining pin.	Signature/Stamp
	 <p data-bbox="491 1247 975 1270">Fig. 30: 1032-0101 PCB with J1 soldered on.</p>	<p data-bbox="1246 808 1310 875">Stamp or sign here</p>
4.1.5	Insert the A3880E display module with the part number label facing down. Flip the board, and solder the display connectors, making sure that the display module pins are consistently at the top of the through holes.	Signature/Stamp
	 <p data-bbox="403 1785 1062 1807">Fig. 31: 1032-0101 PCB with the display module soldered on.</p>	<p data-bbox="1246 1346 1310 1413">Stamp or sign here</p>

continues on next page

Table 11 – continued from previous page

Step #	Description	Signature/Stamp
4.1.6	<div>Insert the two breadboard modules, then solder.</div> <div></div> <div>Fig. 32: 1032-0101 PCB with the two breadboard modules soldered on.</div>	<div>Stamp or sign here</div>
4.1.7	<div>For each of the four corner holes, attach a nylon screw to a nylon post through the hole.</div> <div></div> <div>Fig. 33: 1032-0101 PCB with four nylon posts attached.</div>	<div>Stamp or sign here</div>



## Section 5

# Test

### 5.1 Visual inspection

This test process takes 2 minutes.

Table 12: 1032A visual inspection

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



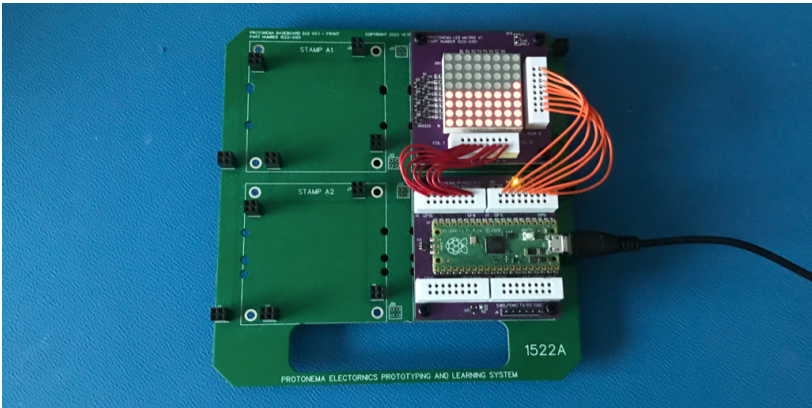
254

5.2 QC final check

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This test process takes 2 minutes.

Table 13: 1032A QC final check

Step #	Description	Signature/Stamp
5.2.1	<p>Connect the 1032A to a baseboard and to a pre-programmed 1031A, as shown below. Connect power and verify that all of the LEDs light up in sequence.</p> <p>If test does not pass, write down the unexpected behaviour in the “Signature/Stamp” column on the right.</p> <div></div> <p>Fig. 34: Powered 1032-0101 PCB driven by a 1031A.</p>	<div><div>Stamp or sign here</div></div>

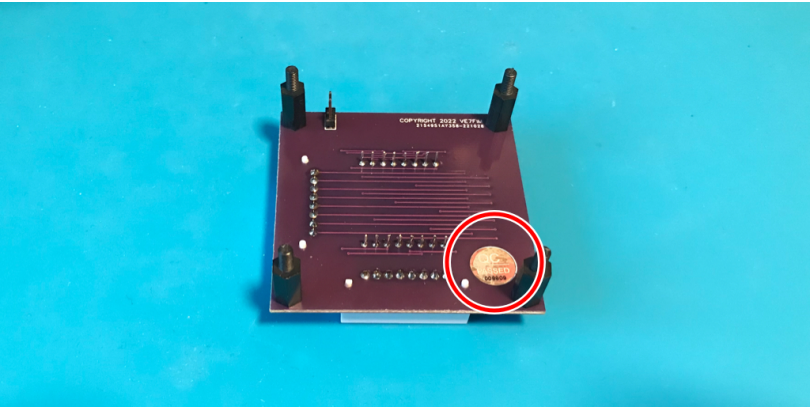


5.3 QC PASS

Only perform these steps if all QC checks have passed.

This test process takes 1 minutes.

Table 14: 1032A QC approval

Step #	Description	Signature/Stamp
5.3.1	<div>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.</div> <div></div> <div>Fig. 35: 1032A with QC Passed sticker</div>	<div>Stamp or sign here</div>
5.3.2	<div>Take two photographs, one of the front of the 1032A, and one of the back of the 1032A.</div>	<div>Stamp or sign here</div>

5.4 QC FAIL

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

Table 15: 1032A QC fail

Step #	Description	Signature/Stamp
5.4.1	<div>Place the 1032A module in the anti-static bag.</div> <div></div> <div>Fig. 36: 1032A in anti-static bag.</div>	<div>Stamp or sign here</div>
5.4.2	<div>Take an A4 plastic bag, and place the 1032A, along with this document, in the "QC Fail" bin</div> <div><div>FPO</div></div> <div>Fig. 37: 1032A in QC Fail bin.</div>	<div>Stamp or sign here</div>

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Section 6

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Packaging

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6.1 1032A packing

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This packaging process takes 3 minutes.

Table 16: 1032A packaging

Step #	Description	Signature/Stamp
6.1.1	Place the 1032A module in the anti-static bag. <div>A photograph showing a 1032A module, which is a small electronic component with a yellow label, placed inside a crinkled, silver anti-static bag. The bag is laid flat on a blue surface.</div> <div>Fig. 38: 1032A in anti-static bag.</div>	<div>Stamp or sign here</div>
6.1.2	Place four nylon nuts in a small anti-static bag, and add the bottom of the bag to the bag the 1032A module is in. <div>A photograph showing four small, yellow, hexagonal nylon nuts placed inside a small, crinkled, silver anti-static bag. The bag is laid flat on a light-colored surface.</div> <div>Fig. 39: Anti-static bag with nylon nuts in the small anti-static bag.</div>	<div>Stamp or sign here</div>

continues on next page

Table 16 – continued from previous page

Step #	Description	Signature/Stamp
6.1.3	Seal the anti-static bag with a 1032A sticker. 	
6.1.4	Using the Sharpie pen, Write down the serial number of the 1032A on the sticker, at the end of the line listing the 1032A. 	
6.1.5	Place 1032A bag in the box on top of the bottom foam padding. 	
6.1.6	Take a photograph of the 1032A in the box.	

continues on next page



Table 16 – continued from previous page

Step #	Description	Signature/Stamp
6.1.7	Using the ESD tape, secure the lid of the box. 	Stamp or sign here
6.1.8	Affix a 1032A sticker to the lid of the box. 	Stamp or sign here
6.1.9	Using the Sharpie pen, Write down the serial number of the 1032A on the sticker, at the end of the line listing the 1032A. 	Stamp or sign here
6.1.10	Take a photograph of the sealed 1032A box.	Stamp or sign here

Section 7

Clean-up

7.1 Consumables

This packaging process takes 5 minutes.

Table 17: Consumables cleanup

Step #	Description	Signature/Stamp
7.1.1	If the ESD gloves have contacted solder paste, or are soiled, they shall be disposed of in the standard waste bin.	<div>Stamp or sign here</div>
7.1.2	If there is unused solder wire on the spool, it shall be returned to stores.	<div>Stamp or sign here</div>
7.1.3	Loose component packaging shall be disposed of in the standard waste bin.	<div>Stamp or sign here</div>

7.2 Tools

This cleanup process takes 5 minutes.

Table 18: Tools cleanup

Step #	Description	Signature/Stamp
7.2.1	All tools shall be returned to the 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.	<div>Stamp or sign here</div>

continues on next page

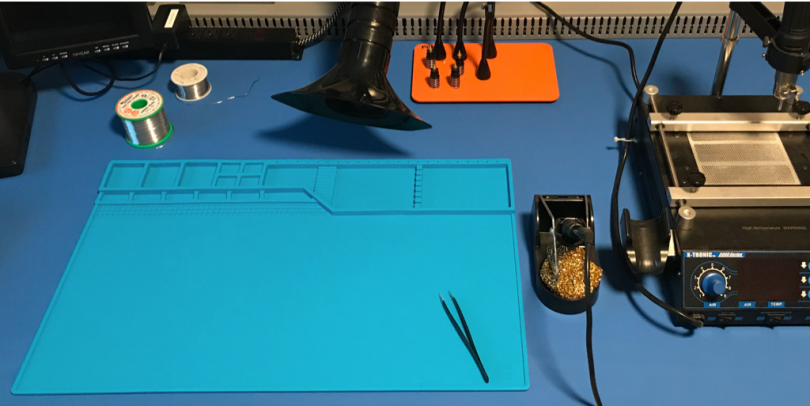
Table 18 – continued from previous page

Step #	Description	Signature/Stamp
7.2.2	Remove this document from the springback binder.	<div>Stamp or sign here</div>
7.2.3	Print a new copy of this document, and insert it into the springback binder that this document was originally in.	<div>Stamp or sign here</div>
7.2.4	Return the springback binder with the newly printed document to the 1032A section of the store supply shelf.	<div>Stamp or sign here</div>

7.3 Workspace

This packaging process takes 5 minutes.

Table 19: Workspace cleanup

Step #	Description	Signature/Stamp
7.3.1	<div>Make sure that the workspace is clean and as it was when you started the assembly.</div> <div></div> <div>Fig. 46: Clean assembly workstation</div>	<div>Stamp or sign here</div>

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Section 8

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Record keeping

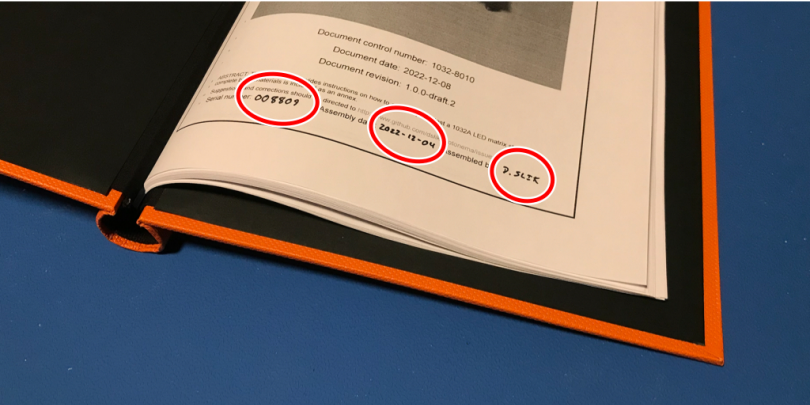
276

8.1 1032A record keeping

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This packaging process takes 5 minutes.



Table 20: 1032A record keeping

Step #	Description	Signature/Stamp
8.1.1	<div>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.</div> <div></div> <div>Fig. 47: Example of serial number on document cover</div>	<div>Stamp or sign here</div>
8.1.2	<div>Create a new folder under the 1032A folder, named with the serial number.</div>	<div>Stamp or sign here</div>
8.1.3	<div>Copy all photos taken during the asseblly process into the newly created folder in step #2.</div>	<div>Stamp or sign here</div>
8.1.4	<div>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 "1032A-SNAAAAAA.pdf", where AAAAAA is replaced with the serial number.</div>	<div>Stamp or sign here</div>

continues on next page



Table 20 – 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.	
8.1.6	Add an entry to the assembly records binder, "<Date> - 1032A - SN# AAAAAA - <Your Name>", where <Date> is replaced with today's date in ISO-8601 YYYY-MM-DD, where AAAAAA is replaced with the serial number of the 1032A, and where <Your Name> is replaced with your first and last name.	

## Section 9

# Process improvement

### 9.1 Feedback

Please submit an issue to the [Protonema Issue Repository](http://www.github.com/dslik/protonema/issues) (<http://www.github.com/dslik/protonema/issues>) if you encounter any of the below situations:

- Error in this document
- Unclear directions
- Suggested process improvements
- Results of QC failure investigations
- Tool change suggestions

Quality processes and documentation is a team effort. This document would not exist without the participation and contributions of the entire assembly team.

Thank you for reading this assembly instructions document.

End of document.

## Part II

# 1032A Annexes

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Section 10

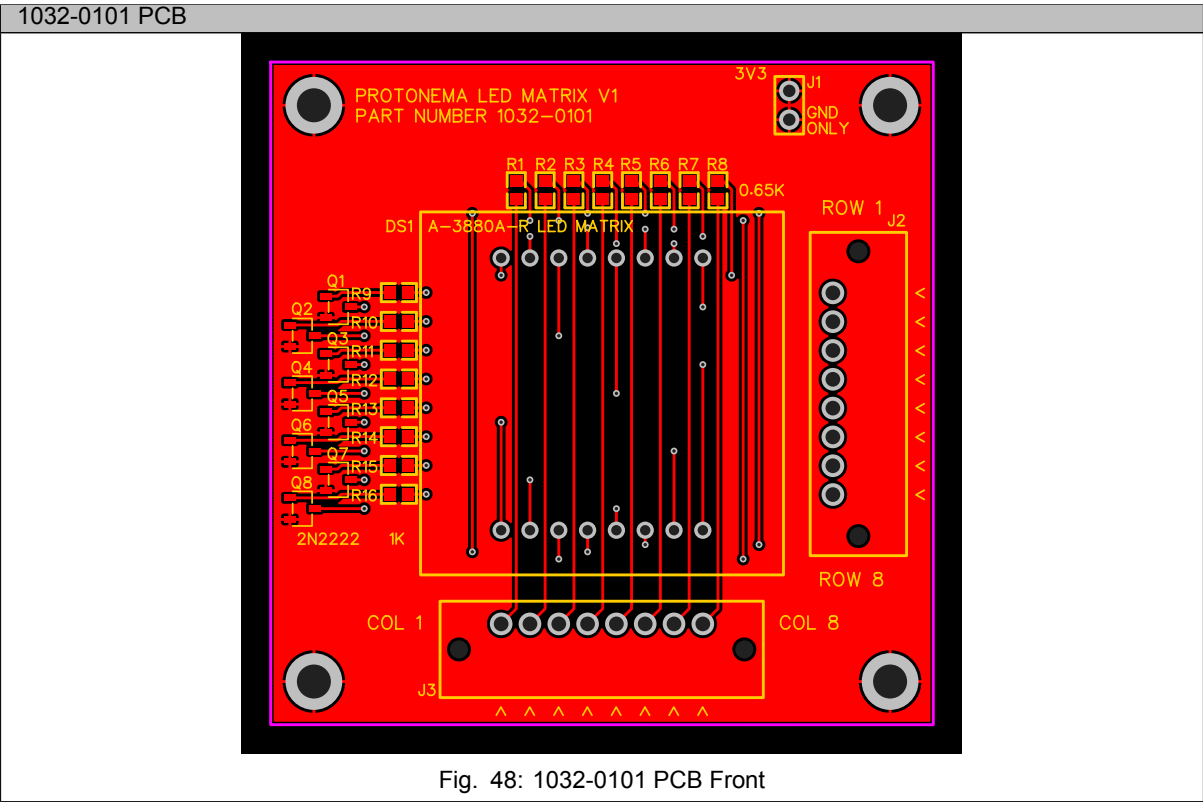
295

Printed Circuit Boards

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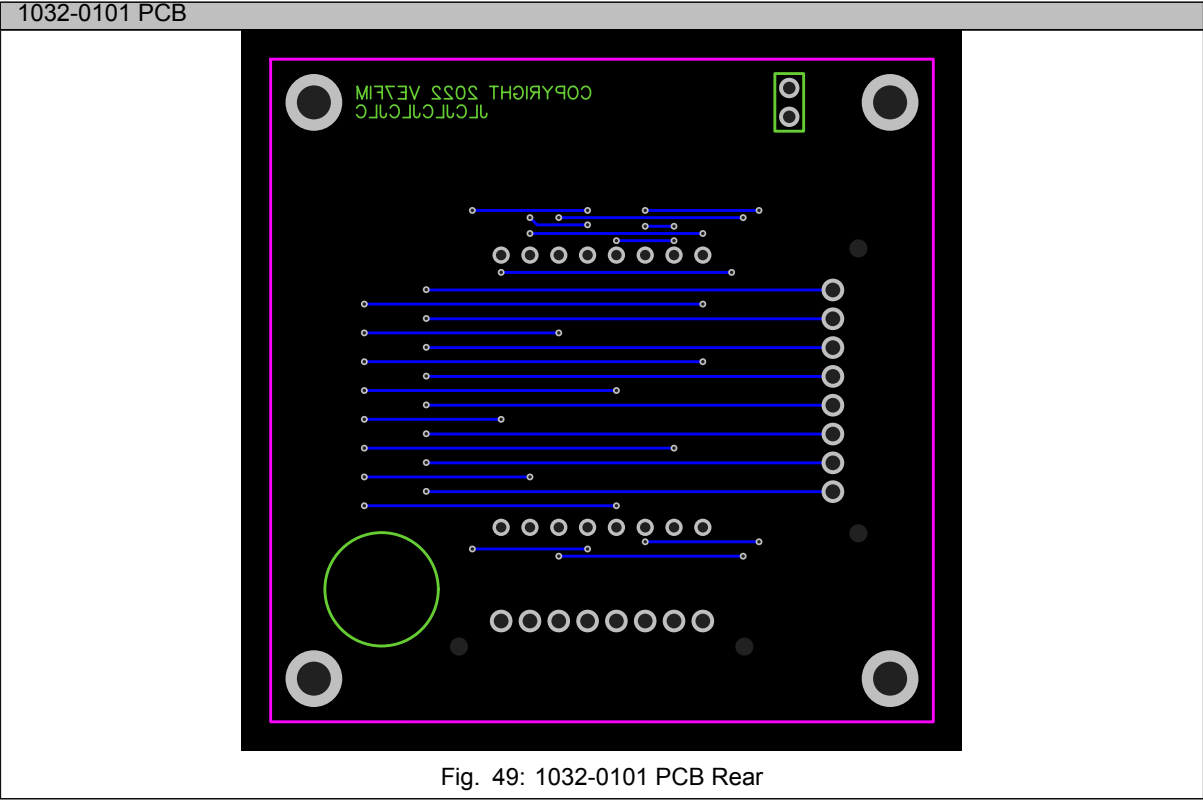
10.1 1032-0101 PCB

Table 21: 1032-0101 PCB



continues on next page

Table 21 – continued from previous page



## Section 11

# Bill of materials

## 11.1 1032A LED Matrix Stamp

The parts required to assemble a 1032A are listed in Table 22.

Table 22: 1032A parts

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
1032-0101	1	Stamp PCB	JLPCB	Y358-2154951A	JLPCB	\$0.59 CAD
DS1	1	8x8 32mm LED Matrix Display	Paralight	A3880E	Tayda	\$1.82
J1	1	Connector Header Through Hole 2 position 0.100" (2.54mm)	Molex	0022284020	Digikey	\$0.17 CAD
J2, J3	2	16 Point solderless breadboard	Cixi Zhongyi Electronics Factory	ZY28	Zhongyi	\$2.54 CAD
R1 - R8	8	649 Ohms $\pm 1\%$ 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Stackpole Electronics Inc	RMCF0603FT649R	Digikey	\$1.28 CAD
R9 - R16	8	10K Ohms $\pm 1\%$ 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Stackpole Electronics Inc	RMCF0603FT10K0	Digikey	\$1.28 CAD
Q1 - Q8	8	Bipolar (BJT) Transistor NPN 40V 600mA SOT-23	Nexperia USA Inc.	MMBT2222A	Digikey	\$1.76 CAD
MP1 - MP4	4	Screw - M3 5mm Black Nylon Phillips Socket Button Head	Order By Description			\$0.25 CAD
MP5 - MP8	4	Standoff - M3 11mm+6 Black Nylon	Order By Description			\$0.30 CAD
MP9 - MP12	4	Nut - M3 Black Nylon	Order By Description			\$0.35 CAD
SK1	1	QC Sticker	Order by Description			\$0.0094 CAD
Total						\$10.35 CAD

## 11.2 1032A Packaging

The parts required to package a 1032A are listed in [Table 23](#).

Table 23: 1032A packing parts

Reference Designation	Qty	Description	Manufacturer	Manufacturer Part Number	Supplier	Cost
N/A	1	Static Shielding Bag 4" X 4" Ziplock	SCS	30044	Digikey	\$0.22 CAD
N/A	1	Static Shielding Bag 1.5" X 2.8" Ziplock	Order by Description			\$0.06 CAD
N/A	1	CORREC-PAK SHIPPER 4 X 4 X 2" ID	Conductive Containers, Inc.	3631	Digikey	\$7.99 CAD
1032-7001	2	1032A ESD Sticker	Jukebox Print			\$4.00 CAD
Total						\$12.27 CAD



## Section 12

# Reduction of Hazardous Materials

Compliance declarations, in BOM order.

## 12.1 MG Chemicals 4900

Table 24: 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

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## 12.2 JLC lead-free PCB

Table 25: JLC PCB RoHS Compliance

Declaration for JLCPCB 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

2022-08-16, 23:45

<https://s3.amazonaws.com/helpscout.net/docs/assets/59f1de7804286...ages/5d4d09562c7d3a036965d6a3/ROHS-Certificate-of-Compliance.jpg>

Page 1 of 1

## 12.3 PARALIGHT A3880E

Table 26: PARALIGHT A3880E RoHS Compliance

Declaration for PARALIGHT A3880E - Received via e-mail



## Test Report

No. SHAEC2210695901

Date: 30 Jul 2022

Page 1 of 10

Client Name : PARALIGHT LIANYUNGANG ELECTRONICS CO.,LTD.

Client Address : Economic Development Zone, Guannan County, Lianyungang City, Jiangsu Province

Sample Name : DISPLAY LED

The above sample(s) and information were provided by the client.

SGS Job No. : SP22-015593 - SH

Date of Sample Received : 25 Jul 2022

Testing Period : 25 Jul 2022 - 30 Jul 2022

Test Requested : Selected test(s) as requested by the client.

Test Method(s) : Please refer to next page(s).

Test Result(s) : Please refer to next page(s).

Conclusion : Based on the performed tests on submitted sample(s), the results of Cadmium, Lead, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of  
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Jenny Lan

Approved Signatory



28646128



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Attention: To check the authenticity of testing/inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: [CN.Doccheck@sgs.com](mailto:CN.Doccheck@sgs.com)  
 3<sup>rd</sup> Building No. 889 Yahan Road Xuhui District, Shanghai China 200233 TEL (86-21) 61402553 FAX (86-21) 64953679 [www.sgs.com.cn](http://www.sgs.com.cn)  
 中国·上海·徐汇区宜山路889号3号楼 邮编: 200233 TEL (86-21) 61402594 FAX (86-21) 61156896 [e.sgs.china@sgs.com](mailto:e.sgs.china@sgs.com)

Member of the SGS Group (SGS SA)

## 12.4 Molex 0022284020

Table 27: Molex 0022284020 RoHS Compliance

Declaration for Molex 0022284020 - [https://www.molex.com/datasheets/rohspdf/0022284020\\_rohs.pdf](https://www.molex.com/datasheets/rohspdf/0022284020_rohs.pdf)**RoHS Certificate of Compliance**

06/29/2022

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
0022284020	KK 254 Breakaway Header, Vertical, 2 Circuits, Tin (Sn) Plating, Mating Pin Length 6.09mm	Compliant

## 12.5 Cixi ZY28

Table 28: Cixi ZY28 Compliance

Declaration for Cixi ZY28 -

<http://27696974.s21i.faiusr.com/2/ABUIABACGAAGhLXJiwYogKav1QYwoAY46wg.jpg>

 <b>BST</b>   A RELIABLE TESTING FOR TRUST <small>GLOBAL TESTING AND CERTIFICATION PRECISION SERVICE CLOUD FACTORY</small>	
<h1>Certificate of Compliance</h1>	
<b>Certificate Number: BSTDG190612860702CC</b>	
<b>Applicant</b>	: CIXI ZHONGYI ELECTRONICS FACTORY Yuxiang Road, Xiaolin Town 315321 Cixi City Zhejiang Province China
<b>Manufacturer</b>	: CIXI ZHONGYI ELECTRONICS FACTORY Yuxiang Road, Xiaolin Town 315321 Cixi City Zhejiang Province China
<b>Product Name</b>	: BREAD BOARD
<b>Test Standard</b>	: IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-6:2015, IEC 62321-7-1:2015, IEC 62321-7-2:2017, IEC 62321-8:2017
<b>As shown in the Test Report No.</b>	: BSTDG190612860702CR
<p>The EUT described above has been tested by us and found in compliance with the council RoHS 2 Directive 2011/65/EU Annex II (EU) 2015/863 as last amended by Directive (EU) 2017/2102. This certificate is only valid in conjunction with the test report.</p>	
	
	
<b>Tony Qian</b> Approved Signatory Jun.10, 2019	
<b>Dongguan BST Testing Co., Ltd</b> Add: A1201-1204 Xinsanqi of Dongbao Road, Dongcheng District, Dongguan, Guangdong, China Certificate Search: <a href="http://www.bst-lab.com">http://www.bst-lab.com</a> , Tel: 400-8829628, 800-9990305, E-mail: christina@bst-lab.com	



## 12.6 Stackpole RMCF0603FT10K0

Table 29: Stackpole RMCF0603FT10K0 RoHS Compliance

Declaration for Stackpole RMCF0603FT10K0 -

[https://www.seielect.com/catalog/SEI-RoHS\\_Compliance\\_Status.pdf](https://www.seielect.com/catalog/SEI-RoHS_Compliance_Status.pdf)

### RoHS Compliance Status

Stackpole Electronics, Inc.

Resistive Product Solutions

Resistors						
Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
NSP	Ceramic Housed - Consumer Grade Leaded Resistor <b>DISCONTINUED (May 3, 2013)</b>	Axial	YES	99.3/0.7 Sn/Cu	Jan-04	04/01
NSZ	Ceramic Housed Wirewound Resistor with Specialty Leads	Radial	YES	99.3/0.7 Sn/Cu	Jan-04	04/01
NVM	Ceramic Housed Vertical Mount Wirewound Resistor (Standard WW)	Radial	YES	100% Matte Sn	Always	Always
NWW	General Purpose and Precision Leaded Wirewound Resistor - Conformal Coated - Non-Inductive	Axial	YES	100% Matte Sn	Jan-06	06/01
PCB	Ceramic Housed Leaded Wirewound Resistor - PC Mount <b>DISCONTINUED (July 1, 2014)</b>	Radial	YES	100% Matte Sn	Always	Always
RACF	Thick Film Surface Mount Chip Resistor Array Concave Terminations <b>DISCONTINUED (Nov. 15, 2019)</b>	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-04	04/01
RAF	Thick Film Surface Mount Chip Resistor Array Flat Terminations	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jul-04	04/27
RAVF	Thick Film Surface Mount Chip Resistor Array Convex Terminations	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-04 (Japan) Jul-04 (Taiwan)	04/01 04/27
RAVS	Convex Anti-Sulfur Chip Resistor Array	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RC	Carbon Composition Leaded Resistor	Axial	YES	100% Matte Sn	Jan-86	86/01
RGC	Semi-Precision Thick Film Surface Mount Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jul-04	04/27
RHC	High Power Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jul-04	04/27
RMCA	Automotive Grade Thick Film Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMCF	General Purpose Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-04 (Japan) Jan-05 (Taiwan, China)	04/01 05/01
RMCG	Gold Barrier Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-06	06/01
RMCP	General Purpose High Power Thick Film Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMCS	Sulfur Resistant Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMCW	Wide Termination Thick Film Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMEF	General Purpose Thick Film Surface Mount Chip Resistor 100% Lead Free	SMD	YES	100% Matte Sn over Ni	Always	Always
RNCF	Precision Thin Film Surface Mount Chip Resistor	SMD	YES	100% Matte Sn over Ni	May-04	04/18
RNCH	Anti-Corrosive Tantalum Nitride Replacement Surface Mount Chip Resistor	SMD	YES	100% Matte Sn over Ni	Always	Always
RNCP	High Power Anti-Sulfur Thin Film Chip Resistor	SMD	YES	100% Matte Sn over Ni	Always	Always
RNCS	Anti-Corrosive Tantalum Nitride Replacement Surface Mount Chip Resistor	SMD	YES	100% Matte Sn over Ni	May-04	04/18
RNCW	Thin Film Wire-Bondable Chip Resistor - <b>DISCONTINUED (Jan. 17, 2018)</b>	SMD	YES	Gold Plating	Always	Always
RNF	General Purpose Metal Film Leaded Resistor	Axial	YES	99.3/0.7 Sn/Cu 100% Matte Sn	Apr-05 (Japan) Jan-04 (Taiwan, China)	05/14 04/01
RNMF	General Purpose Mini Metal Film Leaded Resistor	Axial	YES	99.3/0.7 Sn/Cu 100% Matte Sn	Apr-05 (Japan) Jan-04 (Taiwan, China)	05/14 04/01
RNS	Ultra-Miniature Metal Film Resistor	Axial	YES	100% Matte Sn	Always	Always

Note (1): RoHS Compliant by means of exemption 7c-I.

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## 12.7 Stackpole RMCF0603FT649R

Table 30: Stackpole RMCF0603FT649R RoHS Compliance

Declaration for Stackpole RMCF0603FT649R -

[https://www.seielect.com/catalog/SEI-RoHS\\_Compliance\\_Status.pdf](https://www.seielect.com/catalog/SEI-RoHS_Compliance_Status.pdf)

### RoHS Compliance Status

Stackpole Electronics, Inc.

Resistive Product Solutions

Resistors						
Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
NSP	Ceramic Housed - Consumer Grade Leaded Resistor <b>DISCONTINUED (May 3, 2013)</b>	Axial	YES	99.3/0.7 Sn/Cu	Jan-04	04/01
NSZ	Ceramic Housed Wirewound Resistor with Specialty Leads	Radial	YES	99.3/0.7 Sn/Cu	Jan-04	04/01
NVM	Ceramic Housed Vertical Mount Wirewound Resistor (Standard WW)	Radial	YES	100% Matte Sn	Always	Always
NWW	General Purpose and Precision Leaded Wirewound Resistor - Conformal Coated - Non-Inductive	Axial	YES	100% Matte Sn	Jan-06	06/01
PCB	Ceramic Housed Leaded Wirewound Resistor - PC Mount <b>DISCONTINUED (July 1, 2014)</b>	Radial	YES	100% Matte Sn	Always	Always
RACF	Thick Film Surface Mount Chip Resistor Array Concave Terminations <b>DISCONTINUED (Nov. 15, 2019)</b>	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-04	04/01
RAF	Thick Film Surface Mount Chip Resistor Array Flat Terminations	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jul-04	04/27
RAVF	Thick Film Surface Mount Chip Resistor Array Convex Terminations	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-04 (Japan) Jul-04 (Taiwan)	04/01 04/27
RAVS	Convex Anti-Sulfur Chip Resistor Array	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RC	Carbon Composition Leaded Resistor	Axial	YES	100% Matte Sn	Jan-86	86/01
RGC	Semi-Precision Thick Film Surface Mount Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jul-04	04/27
RHC	High Power Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jul-04	04/27
RMCA	Automotive Grade Thick Film Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMCF	General Purpose Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-04 (Japan) Jan-05 (Taiwan, China)	04/01 05/01
RMCG	Gold Barrier Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Jan-06	06/01
RMCP	General Purpose High Power Thick Film Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMCS	Sulfur Resistant Thick Film Surface Mount Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMCW	Wide Termination Thick Film Chip Resistor	SMD	YES <sup>(1)</sup>	100% Matte Sn over Ni	Always	Always
RMEF	General Purpose Thick Film Surface Mount Chip Resistor 100% Lead Free	SMD	YES	100% Matte Sn over Ni	Always	Always
RNCF	Precision Thin Film Surface Mount Chip Resistor	SMD	YES	100% Matte Sn over Ni	May-04	04/18
RNCH	Anti-Corrosive Tantalum Nitride Replacement Surface Mount Chip Resistor	SMD	YES	100% Matte Sn over Ni	Always	Always
RNCP	High Power Anti-Sulfur Thin Film Chip Resistor	SMD	YES	100% Matte Sn over Ni	Always	Always
RNCS	Anti-Corrosive Tantalum Nitride Replacement Surface Mount Chip Resistor	SMD	YES	100% Matte Sn over Ni	May-04	04/18
RNCW	Thin Film Wire-Bondable Chip Resistor - <b>DISCONTINUED (Jan. 17, 2018)</b>	SMD	YES	Gold Plating	Always	Always
RNF	General Purpose Metal Film Leaded Resistor	Axial	YES	99.3/0.7 Sn/Cu 100% Matte Sn	Apr-05 (Japan) Jan-04 (Taiwan, China)	05/14 04/01
RNMF	General Purpose Mini Metal Film Leaded Resistor	Axial	YES	99.3/0.7 Sn/Cu 100% Matte Sn	Apr-05 (Japan) Jan-04 (Taiwan, China)	05/14 04/01
RNS	Ultra-Miniature Metal Film Resistor	Axial	YES	100% Matte Sn	Always	Always

Note (1): RoHS Compliant by means of exemption 7c-I.

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## 12.8 Nexperia MMBT2222A

Table 31: Nexperia MMBT2222A RoHS Compliance

Declaration for Nexperia MMBT2222A - <https://www.nexperia.com/dam/jcr:96c06925-615d-4095-b779-3718c9f9cddde/Nexperia%20-%20Statement%20on%20RoHS.pdf>



July 2022

### CERTIFICATE OF COMPLIANCE - RoHS Declaration -

Nexperia B.V. declares that its semiconductor products (including homogeneous sub-components, pins, casing, and internal parts) are designed to be:

RoHS compliant by meeting the requirements defined under Directive 2011/65/EU of 2011-07-21, amended by Directive (EU) 2015/863 of 2015-03-31, on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE):

RoHS Restricted Substance	Allowable Limit
Cadmium (Cd)	100 ppm (0.01 weight %)
Mercury (Hg)	1000 ppm (0.1 weight %)
Hexavalent chromium (Cr <sup>6+</sup> )	1000 ppm (0.1 weight %)
Lead (Pb)	1000 ppm (0.1 weight %)
Polybrominated biphenyls (PBBs)	1000 ppm (0.1 weight %)
Polybrominated diphenyl ethers (PBDEs)*	1000 ppm (0.1 weight %)
Bis(2-ethylhexyl) phthalate (DEHP)	1000 ppm (0.1 weight %)
Butyl benzyl phthalate (BBP)	1000 ppm (0.1 weight %)
Dibutyl phthalate (DBP)	1000 ppm (0.1 weight %)
Diisobutyl phthalate (DIBP)	1000 ppm (0.1 weight %)

\* Including decabromodiphenylether (decaBDE).

All Nexperia devices are RoHS compliant. Nexperia devices contain no more than 0.1 % lead (Pb) by weight per homogeneous material or may contain lead (Pb) in applications allowed by the RoHS Directive. Nexperia may apply any of the following RoHS exemptions to RoHS compliant Nexperia devices:

RoHS Exemption	RoHS Exemption Description
7(a)	Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead)
7(c)-I	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound

Nexperia devices can be recognized by the "RoHS compliant" logo on the box label. In addition, products that do not make use of any exemption on the use of lead can be recognized by the "Lead-free" logo.

To facilitate customer requirements and to verify Nexperia product compliance, Nexperia material content information is available here:  
<https://www.nexperia.com/quality/download-multiple-product-compositions.html>

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12.9 M3 8mm Nylon Screw

Table 32: M3 8mm Nylon Screw RoHS Compliance

Declaration for M3 8mm Nylon Screw - N/A




12.10 M3 11mm Nylon Standoff

Table 33: M3 11mm Nylon Standoff RoHS Compliance

Declaration for M3 11mm Nylon Standoff - N/A


12.11 M3 Nylon Bolt

Table 34: M3 Nylon Bolt RoHS Compliance

Declaration for M3 Nylon Bolt - N/A
