

LiNC

**ROM Card and
Adapter kit for
LiNC80 SBC1**

Assembly guide

Version 0.1



Table of Contents

Introduction.....	2
Parts list.....	3
Assembly of adapter and cartridge card.....	4
Step 1: Add 2x15 2.54mm header connector.....	4
Step 2: Add 30-position 805 connector.....	4
Step 3: Add socket and/or ROM chip.....	5
Step 4, optional: Add jumpers (not included)	6
Assembly of ribbon cable.....	6
Step 1: Cut cable to length.....	6
Step 2: Identify pin 1.....	6
Step 3: Insert cable and align connector.....	6
Step 4: Use vice to crimp connector.....	7
Step 5: Add strain relief.....	8
Step 6-9:.....	8
Preparing for use.....	9

Introduction

This simple kit includes one ROM Card/cartridge PCB, one card-edge connector adapter PCB, and the needed connectors and cable. Depending on your selected options, your kit will include a standard 32-pin IC socket, a 32-pin Zero Insertion Force (ZIF) socket, or no IC socket for use with the ROM Cart.

The LiNC80 SBC1 has an on-board connector designed to connect to a card-edge connector for rapid and accessible swapping of ROM. This ROM Cartridge Kit is what plugs into that connector!

The card is designed to be large enough to comfortably insert and remove. It has a 28pin location for either a direct soldered or socketed ROM chip, and a central mounting hole for encased cartridges. The two two-position jumper locations allow for any ROM chip size between 16 and 64kByte, taking advantage of the LiNC80 ROM Bank select signals for ROM sizes above 16kByte. If your ROM application fits in a 4k or 8k chip, it's naturally no problem to use chips of those sizes, as the pinout on the connector is JEDEC compliant.

The most challenging part of assembling this kit, is the correct crimping of the IDC connectors. This manual suggests one method of assembling the cable without the need of a dedicated IDC connector crimping tool. If you have access to a PanaVise PanaPress for IDC connectors, it is recommended to use that, and not the method presented in this manual.



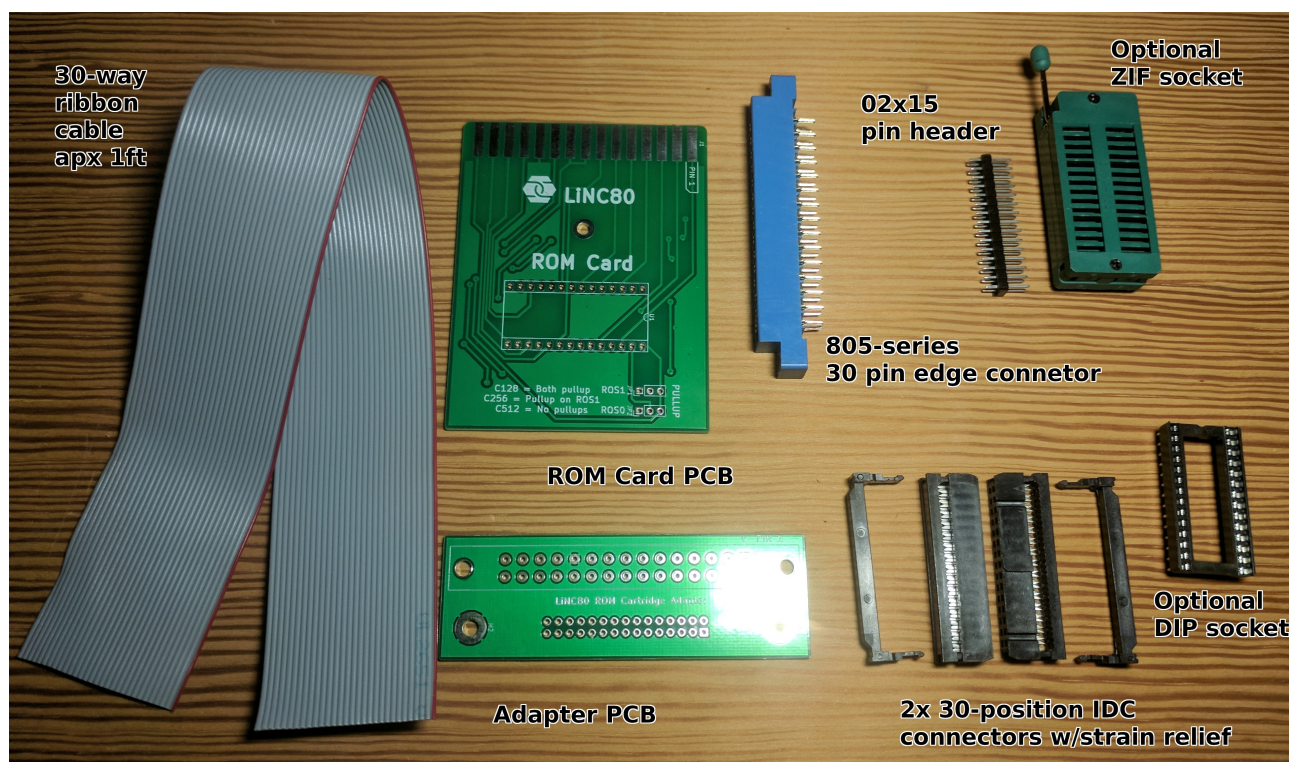
ROM Cart+adapter kit

Assembly guide

v 0.1

Parts list

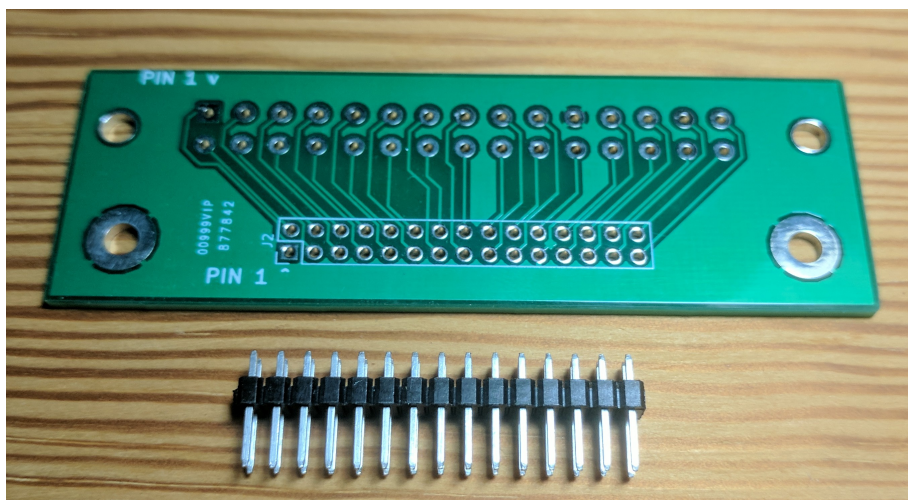
Part type	Positions
1x 2x15pin male header	J2 on adapter
1x 30 pin 805-series connector	J1 on adapter
2x 2x15 pin IDC connectors	
Ca 1ft 30 way ribbon cable	
Optionally 1x 32pin ZIF socket	U1 on cartridge
Optionally 1x 32pin IC socket	U1 on cartridge
1x ROM Card PCB	
1x Adapter PCB	



Assembly of adapter and cartridge card

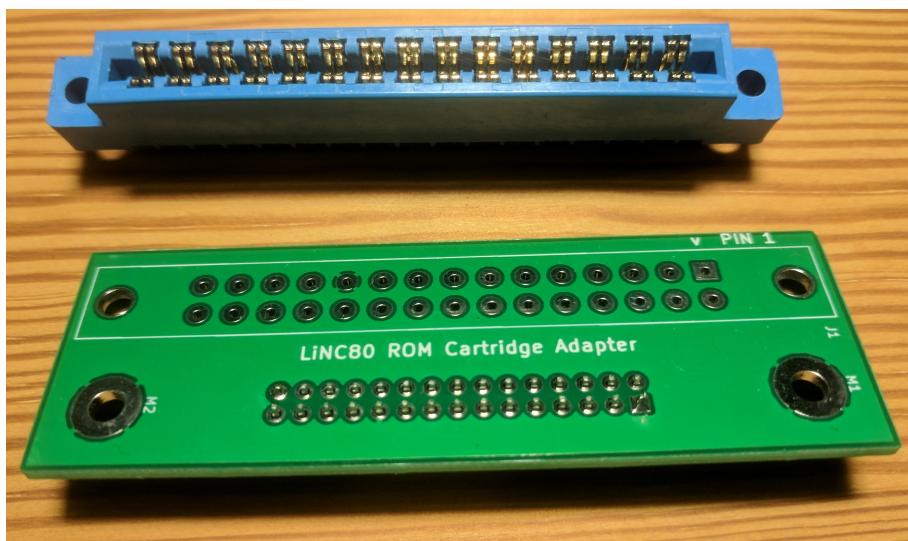
Step 1: Add 2x15 2.54mm header connector

Add the pin-header connector to the adapter PCB, with the connector on the side where the white rectangle for J2 is on the silk-screen.



Step 2: Add 30-position 805 connector

The 805-series card edge connector is placed on the opposite side of the pin-header. Its component side has the larger rectangle to show where the 805-series connector J1 gets located, as well as the text “LiNC80 ROM Cartridge adapter” on the silk-screen.



Step 3: Add socket and/or ROM chip

Moving on to the ROM card/cartridge PCB. If you ordered your kit with the optional ZIF socket or the optional DIP socket, we assume you will be installing it. If you did not order the kit with a socket of either kind, you can naturally install one of your own if you want/plan to do so.

In both cases, if you are installing a ROM chip directly, or if you are installing a socket, it's location should be straight-forward, as there is only one location for a 28-pin DIP package on the board.

Pay attention to the orientation of the U1 silk-screen and the location of pin 1.



Step 4, optional: Add jumpers (not included)

On to the ROM card/cartridge PCB, you can choose to install jumpers in the J1/J2 positions by the “PULLUPS” text. If you chose not to install jumpers, you will need to add solder-bridges or link-wire to these positions, according to what type of ROM and what banking you need. Please refer to the documentation at <http://linc.no/products/linc80-sbc1/memory-map/#romjumpers>

If you are going to install a socket for the ROM chip, having jumpers and not soldered links give you the most flexibility, but is not required if all the ROM chips you will be using are of the same type. One option is to make one ROM Card with socket per ROM chip type you will be experimenting with. For a single-purpose card with a soldered in place PROM, the best approach will be to use soldered links.

Assembly of ribbon cable

Step 1: Cut cable to length

Included in the kit is an approximately one foot long 30-way ribbon cable. This length is included as it gives you the most flexibility, however it is recommended that you make your cable significantly shorter than this length. Selecting a cable length shorter than 7cm will probably not give you a usable/practical setup, while using a cable much more than 25cm will be likely to cause stability issues for your system. A suggested, practical length is 18cm.

Cut a piece of ribbon cable to the desired length. Your kit includes strain reliefs for the connectors. If these relief are going to be used on the IDC connector, compensate for this by making the cable slightly longer. This is because the cable is doubled back over the top of the IDC connector before the strain relief clamp is inserted which uses up some of the cable length.

Step 2: Identify pin 1

Before assembling the cable, identify pin 1 on the IDC connector. This is marked by an arrow or triangle on the IDC connector as shown in the image below. The red wire on the cable must line up with pin 1 of the IDC connector.

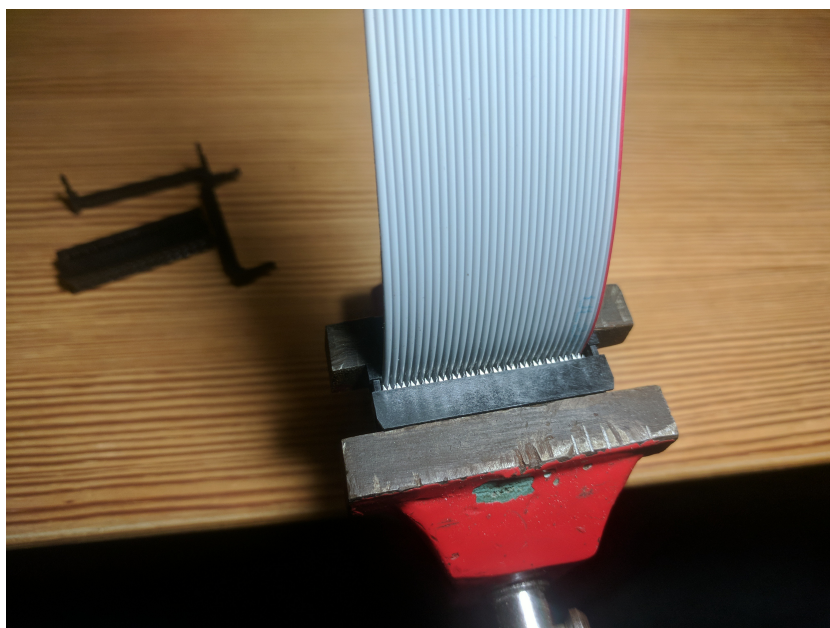
After cutting the ribbon cable to the desired length and finding pin 1 on the connector, decide which way the cable must face. Pin 1 must always line up with the red wire of the cable, so the cable can either go into the connector from the pin 1 marker side of the cable or from the opposite side. If strain relief is being used, it will turn the cable back 180 degrees, so compensate for this.

Step 3: Insert cable and align connector

Insert the cable into the IDC connector between the body of the connector and the plastic clip. Line up the end of the ribbon cable with the body of the connector so that it just sticks out past the body of the connector, less than 1mm. Check that the connector is neatly placed across the cable, making a clean 90 degree angle against the length of the cable. Push the top clip down firmly with your fingers so that it starts to clamp the cable.

Step 4: Use vice to crimp connector

With the connector placed with pin 1 correctly located in respect to the red mark on the cable, and positioned perpendicular to the ribbon, insert the connector in a flat faced vice, oriented so tightening the vice will press the two parts of the connectors together. Tighten the vice evenly to provide a firm crimped connection. Naturally, do not overdo the pressure, as the back piece of the connector is somewhat fragile.

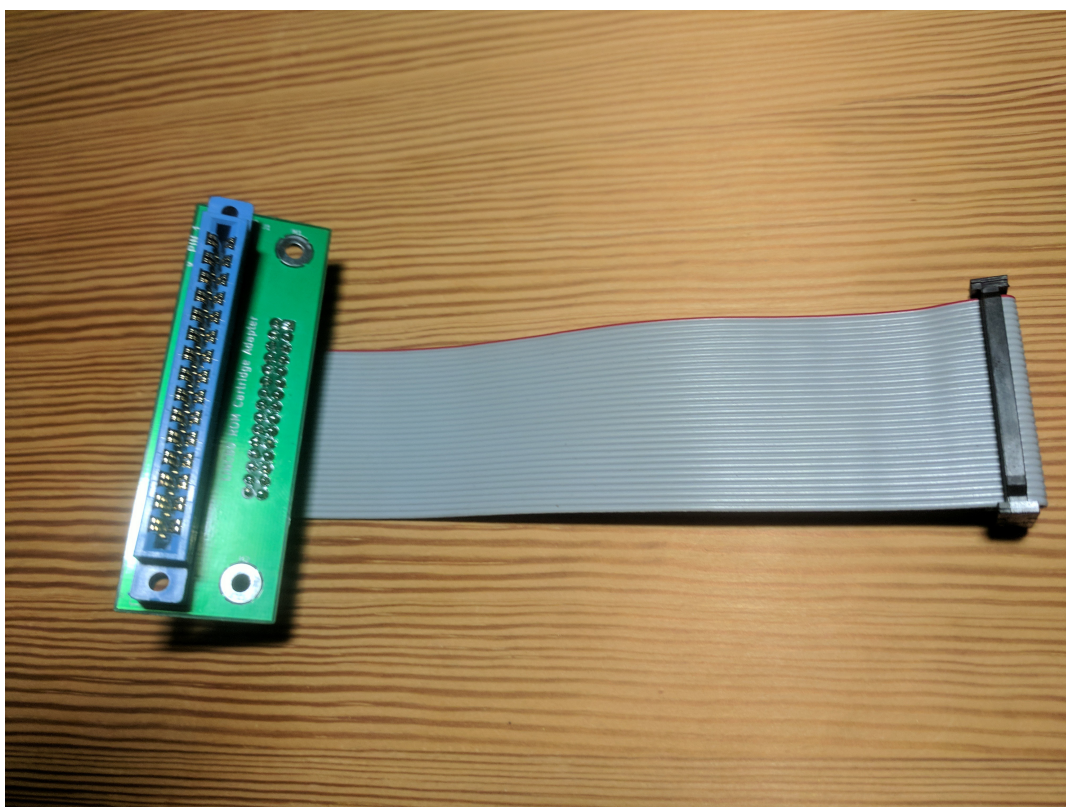


Step 5: Add strain relief

If strain relief is being used, double the cable back and insert the strain relief clip.

Step 6-9:

Repeat the above process (steps 2 to 5) for the second connector on the cable.



One example of a finished cable and adapter. The orientation of the connectors, and thus the orientation they “leave” the adapter is up to you and how you assemble the cable.



ROM Cart+adapter kit

Assembly guide

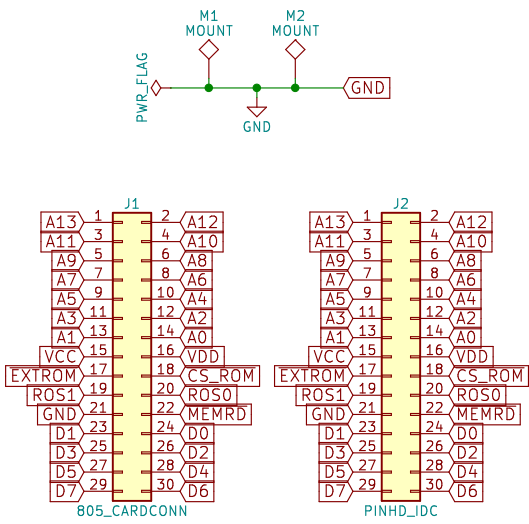
v 0.1

Preparing for use

The ribbon cable connects between the ROM Slot connector P2 of your LiNC80 SBC1 and J2 on the adapter. Make note of pin 1, as the ROM Slot is non-buffered and a direct interface to the data/address buses of the Z80 CPU of your LiNC80.

The two jumpers on the ROM Card labeled ROS0 and ROS1 replicate the functionality of the ROM Select jumpers of the LiNC80 SBC1. For information about appropriate settings, consult the documentation at <http://linc.no/products/linc80-sbc1/memory-map/#romjumpers>

With a programmed ROM either directly soldered or in a socket on the ROM Cart, this can now be inserted into the card-edge connector of the adapter. Inserting a cartridge should change the state of the onboard ROM Enable/EXTROM signal of your LiNC80, and disable the onboard ROM. In some instances this has not been 100% reliable. If you experience issues with the automatic switching between onboard and “external” ROM, change the setting of the OB_ROM jumper (J6 on the SBC1) from On to Off.



LINC

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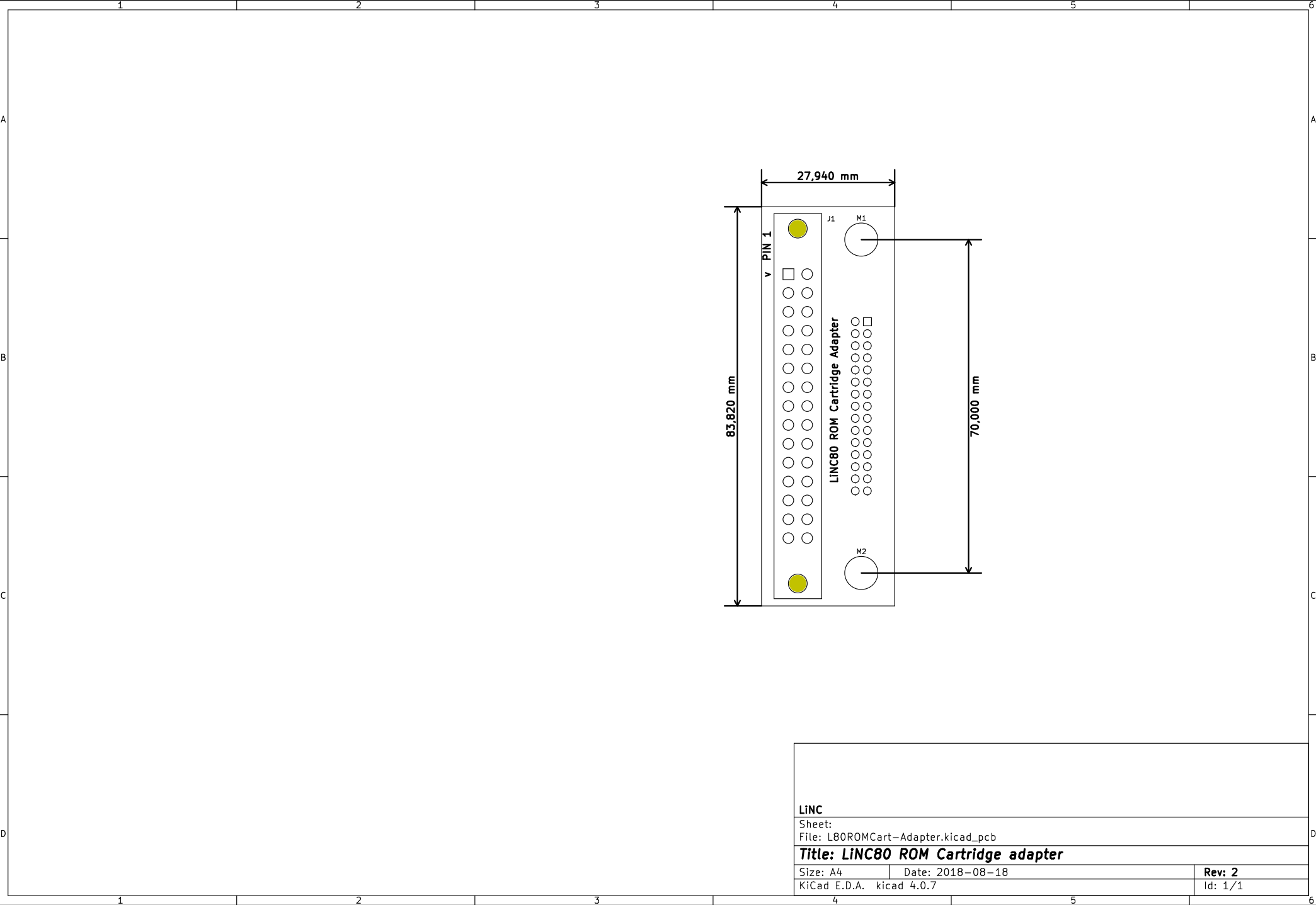
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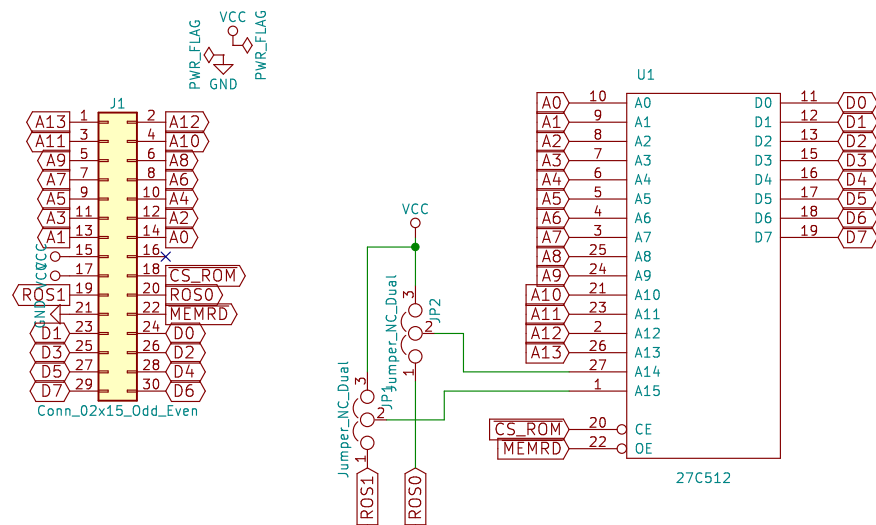
Rev: 2

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Id: 1/1



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LINC

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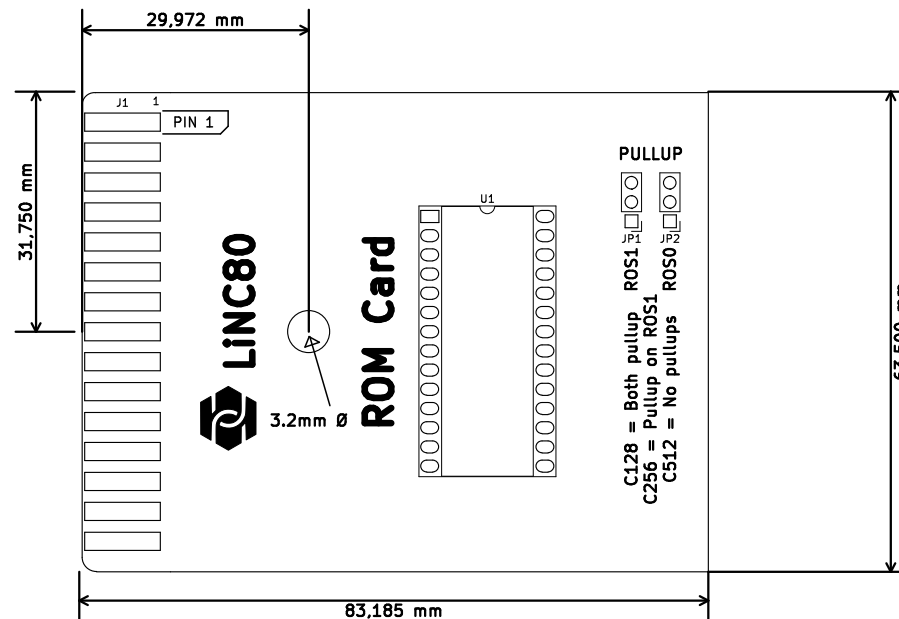
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KiCad E.D.A. kicad 4.0.7

Rev: 3

Id: 1/1



LINC

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Size: A4

Date: 2018-08-18

Rev: 3

KiCad E.D.A. kicad 4.0.7

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