

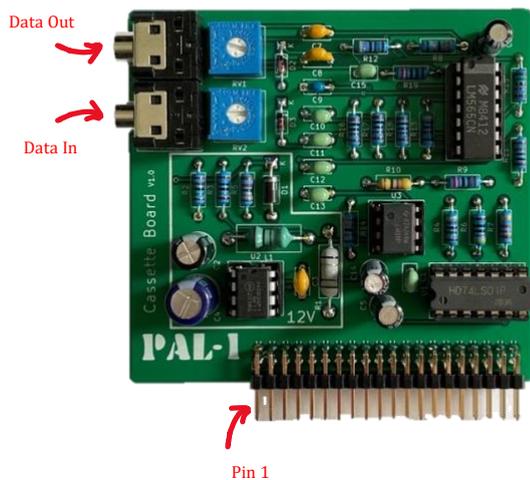
CASSETTE INTERFACE EXPANSION

PAL-1

2021-04-06

MANUAL

Use BOM symbol information to assemble the cassette tape expansion kit, the finished expansion card looks like this:



Top view



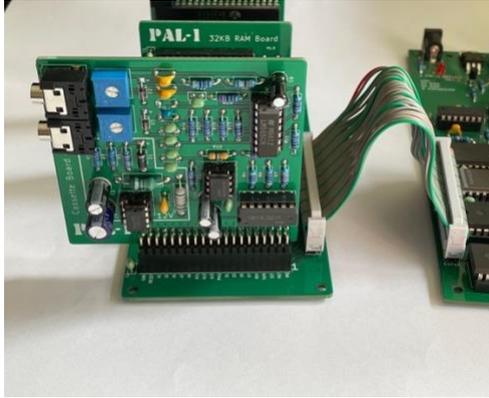
Left side view

Power off your PAL-1, connect the card to PAL-1 SBC using the motherboard card or a 40pin female/female IDC cable.

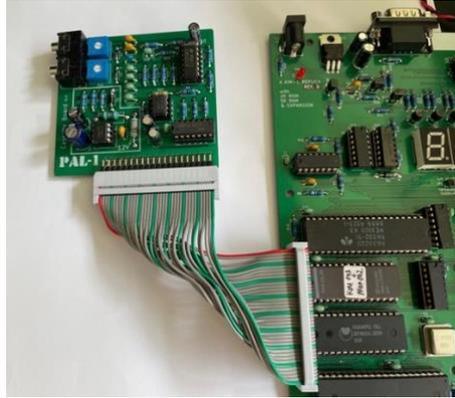
Please check if the pin 1 of the expansion card is aligned with the pin 1 of the motherboard socket or PAL-1 expansion port.

- You need prepare at least one/recommend two 3.5mm TRS cables (audio auxiliary cable) to connect PAL-1 and cassette tape recorder.

After connected, the computer system looks like this:



Connect via mainboard



Connect by cable

Then, connect cassette recorder and PAL-1:



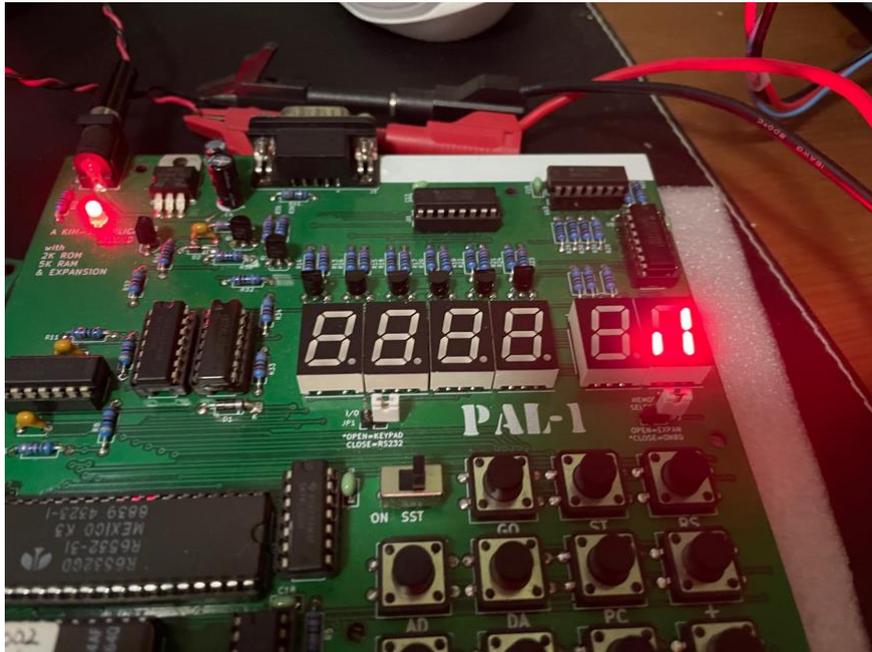
PAL-1 Data Out <-> Recorder Data In / Line In (microphone)

PAL-1 Data In <-> Recorder Data Out / Line Out (headphone)

To use cassette interface card, you need adjust the two potentiometers first. The RV1 (upper 1K potentiometer) is used for PAL-1 output stream control, **RV1 can be easily set to middle for working condition**. If your PAL-1 output stream is noisy, you can try to adjust RV1 to get a cleaner output stream. The RV2 (lower 5K potentiometer) is used for PAL-1 input stream control, **RV2 must be adjusted before use**. You can get references from KIM-1's books, such as The First Book of KIM, or you can make adjustments according to the following steps:

1. Connect cassette recorder to the cassette interface card, make/record a test cassette tape containing an endless stream of SYNC characters with the following program:
0000 A0 BF 8C 43 17 A9 16 20 7A 19 D0 F9

2. Set RV2 to the middle position. Load the VUTAPE program and run it at 0000. The last character in your display will come on in a random fashion. Now play the cassette you recorded at step 1, adjust your recorder volume to about 8. While playing this sync stream into your PAL-1, adjust the RV2 so that the sync pulse can be locked. Once locked in, the display should show a steady synchronization pattern consisting of segments b, c and e on the rightmost LED, as shown in the picture below.



VUTAPE program:

```
0000 D8 A9 7F 8D 41 17 A9 13 85 E0 8D 42 17 20 41 1A 46 F9 05 F9 85 F9
0016 8D 40 17 C9 16 D0 E9 20 24 1A C9 2A D0 F5 A9 00 8D E9 17 20 24 1A
002C 20 00 1A D0 D5 A6 E0 E8 E8 E0 15 D0 02 A2 09 86 E0 8E 42 17 AA BD
0042 E7 1F 8D 40 17 D0 DB
```

Now you can use the cassette interface for data storage. If the load process is not steady, you can fine-tune RV2 while loading a real program from tape.

If your PAL-1 has the RIOT expansion installed, you can also use the PLL-SET program to adjust RV2.