# A Beginners Guide to kees FLEX System

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There is a lot of information on the github (kees1948/FLEX) page.

This should be an essential step-by-step guide to get started.

1. Build the Cards

you need:

**CPUXXXCMI** (v1.1) – This is the CPU, Serial Port, RAM, ROM, Clock,…

**CPU09FLX** (v0.8) – This is just an Adapter for the next card,

see: Hardware/CPU09FLX/20220808_120345.jpg and 20220808_120409.jpg

**09FLPF** (v1.1) – This is the Floppy Interface,

**BP4,7** – any of the Backplane Cards will do.

For older card versions see the modifications.

2. Burn the GALs and the ROMs

**CPUXXXCMI** needs:

GAL G1 (U13): Hardware/CPUXXCMI/GALS/CMI_1.JED or

and only for 16MHz Clock Operation and ~~6809/~~6309 CPU: CMI-4_1.JED

GAL G2 (U14): Hardware/CPUXXCMI/GALS/CMI_2.JED

ROM 28C64 (U8): one can burn all three Monitors into the ROM.

6802 needs: Software/CPUXXCMI/68X02/cmi_68_4.bin

6809 needs: Software/CPUXXCMI/68x09/cmiMbug6.bin

6309 needs: Software/CPUXXCMI/63x09/cmiHbug6.bin

Use the Jumper R_A11 and R_A12 to select the correct Image.

**09FLPF** needs:

GAL (U2): Hardware/CPU09FLX/09FLP/GALS/09FLP.JED

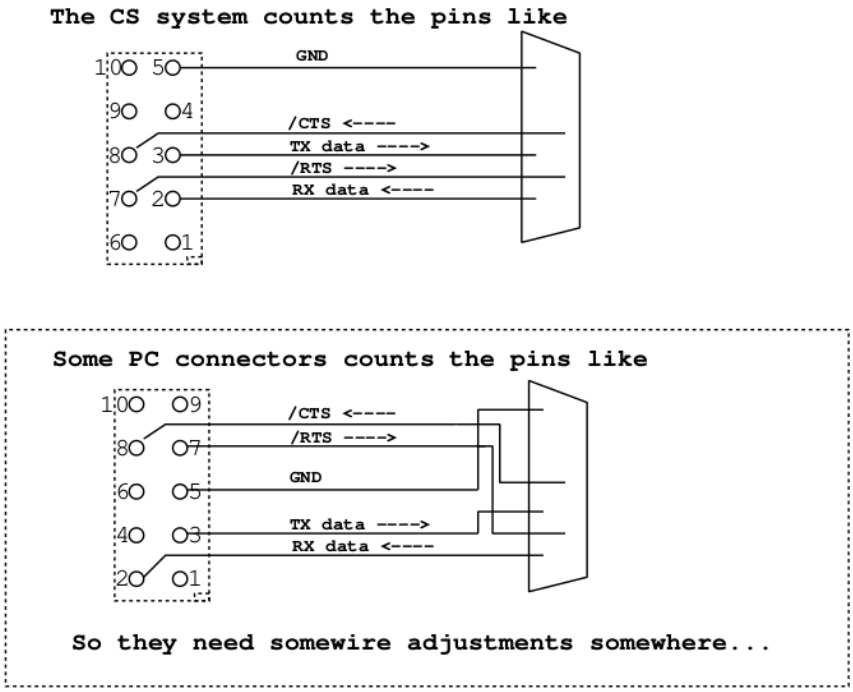
3. Finish the Backplane

For the Backplane there are two important connections! C1A to wherever the Floppy Card is in.

So for ex. Slot 1: CPU Card, Slot 2: Floppy – conn. C1A to C1B. This is the DIV5 Signal. And C2A to the IDE Card C23, this is the DIV6 Signal. If the IDE Card is in Slot 3, connect C2A to C23C.

4. Get the Monitor working

The Pinout of connector J2 is different:




I made a Cable with a DB-9 female connector so I can connect it directly to a Serial-USB Adapter.

I had to cross RX and TX and RTS and CTS.

So this is my cable:

Pinheader | DB9F Conn. | Signal

1 | n.c.

2 | 3 | RXD

3 | 2 | TXD

4 | n.c.

5 | 5 | GND

6 | n.c.

7 | 8 | RTS

8 | 7 | CTS

5. Use a Lab. Power Supply with current limit at 500mA.

Insert only the CPUXXCMI Card. Current draw should be about 300mA.

Connect to the serial port at the correct baudrate. I use picocom with linux, for Windows there is Tera Term or Realterm. (picocom -b 19200 --send-cmd "ascii-xfr -sv" /dev/ttyUSB0)

Check the Output when switching the Power off and on.

It should be:

cmi_sbug H1:6 – 60k

>

for the 6309 CPU.

Check the Reset Button. If it doesn't work, there is a Jumper on the BP7 Board.

6. Modify your Gotek

The PC Implementaion is slightly different from the Shugart implementation.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Disk Change Detect | /DCD | | 2 | 13 | 2 | /REDWC | Density Select |
| NO PIN - KEYING | Key | N/A | 3 | | | | |
| Device In Use | /INUSE | | 4 | | 4 | N/C | No Connection |
| Device Select 3 | /DS3 | ← | 6 | | 6 | N/C | No Connection |
| Index | /INDEX | → | 8 | 2 | 8 | /INDEX | Index |
| Device Select 0 | /DS0 | → | 10 | 4 | 10 | /MOTEA | Motor Enable A |
| Device Select 1 | /DS1 | → | 12 | | 12 | /DRVSB | Drive Sel B |
| Device Select 2 | /DS2 | → | 14 | | 14 | /DRVSA | Drive Sel A |
| Motor On | /MTRON | → | 16 | 10 | 16 | /MOTEB | Motor Enable B |

The Pins 10, 12, 14 and 16 are the "twist" in the cable. IBM has two Motor On Signals and all drives are Jumpered to DS1. The Gotek has no Jumper for DS2 or DS3. The Monitor has a Feature which can sense the used cable. For this to work properly a modification is necessary.

See: "GoTek FLEX/GoTek Modification/GoTek Modification"

7. Check the Floppy Card

If the CPU Card works, insert the Floppy card. Current is about 450mA with my Setup.

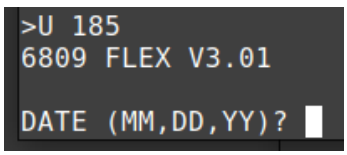
Jumper the Gotek to S0 and MO Jumper, Connect the Gotek with a straight cable.

Unzip "GoTek FLEX/FLEX_Images.zip"

Copy "FLEX_ Images/FLEX cable BOOT/FLEX4DRV.DSDD77-8.IMA"

and the Config Files FF.cfg and IMG.cfg to the USB Stick and select it on the Gotek Display.

Turn on and Enter "U". Output should be like this:




If so, congratulations!

The Gotek Images with 4 are for straight cable, the ones with 2 are for PC Cable.

The Gotek Images FLEXCMI work on both the cables.

8. Check the IDE Card

Make the SD or CF-Card.

See: Software\FLEX6809\FLEX IDE

Read: Documents\FLEX\FLEX9\FLEX CPU09CMI Utilities.pdf

Or boot Gotek Image: Software\FLEX6809FLEXxCMI.DSDD80-5.IMA

>U

and run:

+++LIST FLEXINFO.HLP

+++IDEFMT 2

+++IDEFMT 3

+++COPY  0,2

+++CMILINK FLEXIDE.SYS 2

+++MON

> W

Turn on and Enter “W”. Output should be like this: