

Getting started with the freeUSBi



Revision history

| Revision | Description | Date |
|----------|---|-------------|
| V 1.0 | Initial Version | 29 Sep 2015 |
| V 1.1 | Conversion to Google Docs + new driver installation | 06 Nov 2015 |
| V 1.2 | Added picture for alternative CY7C68013A MINI BOARD | 11 Nov 2015 |
| V 1.3 | Added fix for driver installation under Win 8.1 | 13 Nov 2015 |
| V 1.4 | Added fix for driver installation under Win 10 | 20 Apr 2016 |



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About the freeUSBi

The freeUSBi is a low-budget real-time programming device for the freeDSP and other DSP boards from Analog Devices. It is based on a CY7C68013A MINI BOARD combined with an adapter PCB (printed circuit board) that adds the possibility of realtime programming. It has the same features as the Analog Devices USB interface (EVAL-ADUSB2EBZ), such as changing parameters while already using the freeDSP or easy changes of the schematic in SigmaStudio. You also can write your program to the EEPROM.

Important information

The freeUSBi is provided to you 'as is'. We make no express or implied warranties whatsoever with respect to its functionality, operability, or use, including, without limitation, any implied warranties of merchantability, fitness for a particular purpose, or infringement. We expressly disclaim any liability whatsoever for any direct, indirect, consequential, incidental or special damages, including, without limitation, lost revenues, lost profits, losses resulting from business interruption or loss of data regardless of the form of action or legal theory under which the liability may be asserted, even if advised of the possibility or likelihood of such damages. Features and specifications might change without prior notice.

Please keep in mind that freeDSP and freeUSBi are open-source spare-time projects. Because the freeDSP is very flexible, many applications are possible. Questions and new ideas can be discussed online with other DIYers. Please use the 'Digital Line Level' subforum @ diyAudio.com to connect with other people working with the freeDSP. Please create individual threads for your topics. Link these threads in the [freeDSP main thread](#) - so that others can find them. Some questions can be answered by carefully reading this manual. **We cannot provide individual support via email.** Thank you for your understanding!

Overview

Figure 1 shows the key features of the freeUSBi board.



Figure 1 - Functions and orientation: CY7C68013A MINI BOARD with freeUSBi adapter shield V0.1.

How to get the freeUSBi up and running

The following steps will guide you through the workflow to get your freeUSBi up and running. Everything starts with ordering all necessary components. After soldering your board, the way to use it with SigmaStudio is described.

Get everything needed

You will need a soldering iron plus some soldering experience to assemble the through hole components. However, we think it is feasible for everyone. We **DO NOT** offer a freeUSBi DIY kit of parts including components and the printed circuit board. There is also **NO** completely assembled version of the freeUSBi available. Please follow the steps described below:

- a. The **CY7C68013A mini board** can be bought on [eBay using this search link](#). Be careful to order a board that looks identical to Figure 2 with **ONLY ONE JUMPER**.

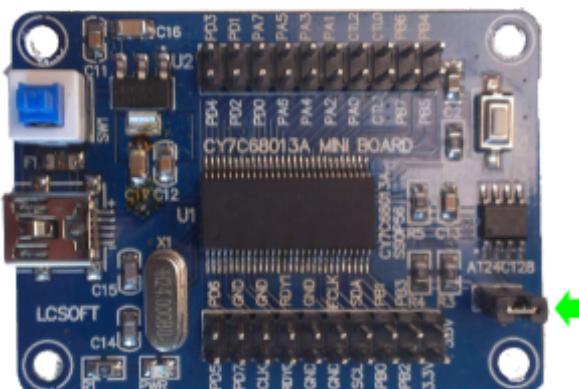


Figure 2 - CY7C68013A MINI BOARD - this board can be used as it is.

If your CY7C68013A mini board looks different and has **TWO JUMPERS** you **HAVE TO** modify it a little bit. Please pinch off two of the pins like shown in Figure 3. Otherwise you will damage your board.

(This step is no longer required if you're using freeUSBi v0.2 or later)

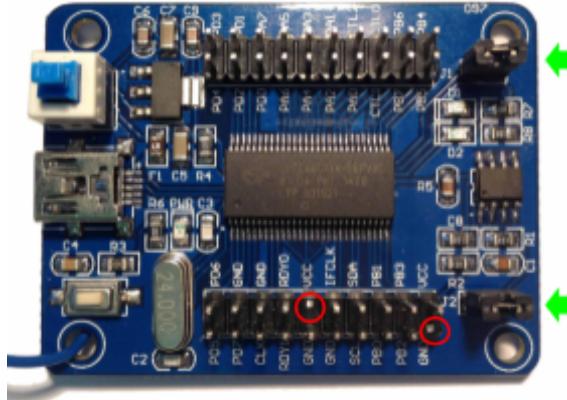


Figure 3 - CY7C68013A MINI BOARD - this board with two jumpers (marked with green arrows) HAS TO be modified by pinching off two pins marked with red circles! Otherwise you will damage your board.

- b. Remember that you will need an **additional USB cable!**
- c. Download the freeUSBi adapter files from our website and **manufacture the printed circuit board**. You might want to locally organize centralized buying and board production together with some friends. You can find the necessary KiCAD and GERBER files of the board on the freeDSP website www.freeDSP.cc.
- d. You will also need to **order all electronic parts** from the part list in the appendix. All parts are available from Reichelt using this [shopping basket](#).
- e. Install **SigmaStudio** (free) on your PC as described in the freeDSP Getting Started PDF, if not already done.
- f. Install the **freeUSBi Driver** on your PC as described later.

Solder the board

All components are through hole, so they can be soldered with basic soldering knowledge. You can find the part list and the assembly print in the appendix.

Important note: P3 is directly connected with +5V from the bottom of the CY7C68013A MINI BOARD using an additional cable as shown in Figure 4, optional you can add a 2x1 multi-pin connector.

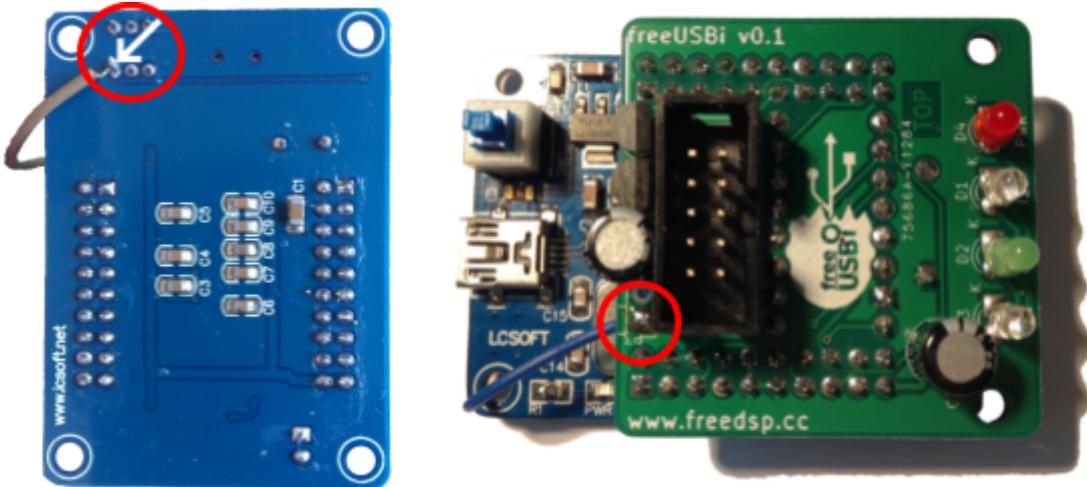


Figure 4 - P3 is directly connected with +5V from the bottom of the CY7C68013A MINI BOARD using an additional cable.

The flat cable needs to be configured 1:1 as seen in Figure 5.



Figure 5 - Flat cable.



Install the driver

1. Remove the available jumpers from the CY7C68013A MINI BOARD. Depending on your board there may be one or two jumpers.
2. Download the freeUSBi driver on the freeDSP website www.freeDSP.cc.
3. Search for the file ADI_USBi.spt in your SigmaStudio program folder (e.g., „C:\Program Files\Analog Devices\SigmaStudio 3.11\USB drivers\[x86 or x64]\ADI_USBi.spt“) and copy it into the freeUSBi driver folder you just downloaded: use the folder which corresponds to your operating system (e.g., Win8.1/x86 if you have a 32 bit system or Win8.1/x64 if your system is 64 bit).
4. Connect the board with your PC using a USB cable. Do NOT connect it with the freeDSP yet. (There might be a problem with some USB3 ports. If you get an USB error during programming, please try using a USB2 port if available.)
5. Install the driver from the freeUSBi driver folder which you have already used in step 3, e.g. using the Windows Device Manager. If required by your system, confirm that you want to install this uncertified driver. If any problems occur, please refer to the note below.
6. Reconnect your freeUSBi by unplugging and plugging the USB cable. Do NOT attach the jumper(s).
7. You're done! SigmaStudio should recognize the board as USB interface. It can now be used as USBi programmer for real time programming.

Note:

On Win 8.1 and Win 10 some troubles could occur during the driver installation process. This is due to the strict Windows security policy concerning the installation of unsigned drivers. If your driver installation fails, please try the following workaround:

Win 8.1

- A. Make sure that you have an Administrator user account
- B. Open the *PC-Settings* and choose the option *Change PC-Settings*
- C. Choose the option *Update / Recovery*
- D. Choose the option *Recovery*
- E. Choose the option *Restart*
- F. Wait a moment...



- G. Choose the option *Fix Problems*
- H. Choose *Further Options*
- I. Choose the option *Start Preferences*
- J. Choose the option *Restart*
- K. Wait a moment...
- L. During the restart procedure a further option window occurs: choose the option *Force Deactivation of Driver Signature* by pushing the key 7 (on NumBlock of your keyboard) or F7
- M. After the system has restarted, please repeat steps 5. to 7. of the driver installation procedure described above
-> The driver installation process should be successful now!

Tested under Win 8.1 Pro x64**Win 10**

- A. Make sure that you have an Administrator user account
- B. Open the *PC-Settings*
- C. Choose the option *Update / Security*
- D. Choose the option *Recovery*
- E. Choose the option *Extended Restart*
- F. Press *Restart Now*
- G. Wait a moment...
- H. Choose the option *Fix Problem*
- I. Choose *Further Options*
- J. Choose the option *Start Preferences*
- K. Choose the option *Restart*
- L. Wait a moment...



- M. During the restart procedure a further option window occurs: choose the option *Force Deactivation of Driver Signature* by pushing the key 7 (on Num Block of your keyboard) or F7
- N. After the system has restarted, please repeat steps 3. to 7. of the driver installation procedure described above
-> The driver installation process should be successful now!

Tested under Win 10 x64**Alternative driver installation process (no longer recommended):**

1. Install CySuiteUSB_3_4_7_B204.exe (which contains „CyConsole”) and cy3684setup.exe (which contains the driver for the CY7C68013A).
2. Remove the only available jumper from CY7C68013A MINI BOARD.
3. Connect the board with your PC using an USB cable. Do NOT connect it with the freeDSP.
4. Install driver (cyusb3.sys) if Windows asks for. It is usually placed here:
C:\Cypress\USB\CY3684_EZ-USB_FX2LP_DVK\1.1\Drivers.
5. Start CyConsole
6. Press „Load Script“ and choose this file:
„C:\Program Files\Analog Devices\SigmaStudio 3.11\USB drivers\[x86 or x64]\ADI_USBi.spt“
7. Press „Play Script“. The board should now be detected as „Analog Device USBi (programmed)“.
8. Reattach the jumper
9. Press „Reset Device“ or „Re-connect Device“
10. SigmaStudio should now recognize the board as USB Interface and can be used as USBi programmer for real time programming.
11. **Important note:** Steps 2 - 9 have to be done every time you disconnect and reconnect your freeUSBi from the USB port of your PC.



Troubleshooting

1. Please take the time to carefully read this getting started guide. **Please keep in mind that freeUSBi and freeDSP are open-source spare-time projects.** Thank you for your understanding!
2. Maybe your issue has already been discussed in the **freeDSP forum**. There might already be a solution for the problem you are facing. Please use the 'Digital Line Level' subforum @ diyAudio.com to connect with other people working with the freeDSP. Please create individual threads for your topics. Link these threads in the **freeDSP main thread** - so that others can find them.
3. **We cannot provide support via email or the contact form on the website.** We hope that you understand that freeDSP is not a commercial product. It is an **open-source spare-time project**. We hope that questions can be answered together with the freeDSP community in the freeDSP forum. Please be patient and remember that forums work on a voluntary basis. If you post to a **forum**, please provide:
 - a. The version of the freeDSP board you are working with. A good resolution photo of your soldered board from top and bottom. If you made some changes to the original design, please describe them in detail.
 - b. A detailed and clear explanation of the symptoms you are seeing.
 - c. A description of the troubleshooting steps you already performed and the results obtained.

Appendix

Part list

All parts in the following list are needed for the freeUSBi. There is a [Reichelt shopping basket](#), which might help to order parts.

Table 1 - Part list.

| Part | Description | Label | Qty. | Order number www.reichelt.de |
|--------------------|--|---------------------|------|--|
| C1, C2 | Electrolytic capacitor, radial, 100µF/16V | 100µF | 2 | SM 100/16RAD |
| D1, D3 | LED, 3mm, yellow | - | 2 | SLK 3MM GE |
| D2 | LED, 3mm, green | - | 1 | LED 3MM GN |
| D4 | LED, 3mm, red | - | 1 | LED 3MM RT |
| P1, P4 | Multi-pin connector, 2x10, RM 2.54mm | - | 2 | BL 2X10G8 2,54 |
| P2 | Boxed header, 10 pins | - | 1 | WSL 10G |
| P3 | Multi-pin connector, angled, 1x2, RM 2.54mm (optional) | - | 1 | |
| Q1, Q2 | n-MOSFET 2N7000 | - | 2 | 2N 7000 |
| R1 | Resistor, 49.9Ω | add color code here | 1 | METALL 49.9 |
| R2, R5, R6, R7, R9 | Resistor, 470Ω | add color code here | 5 | METALL 470 |
| R3, R4 | Resistor, 10kΩ | add color code here | 2 | METALL 10,0K |
| R8 | Resistor, 1MΩ | add color code here | 1 | METALL 1,00M |
| - | Flat cable, 10 pin | - | 1 | AWG 28-10F 3M |
| - | IDC socket, 10-pin, with cable clamp | - | 2 | PFL 10 |

Assembly print

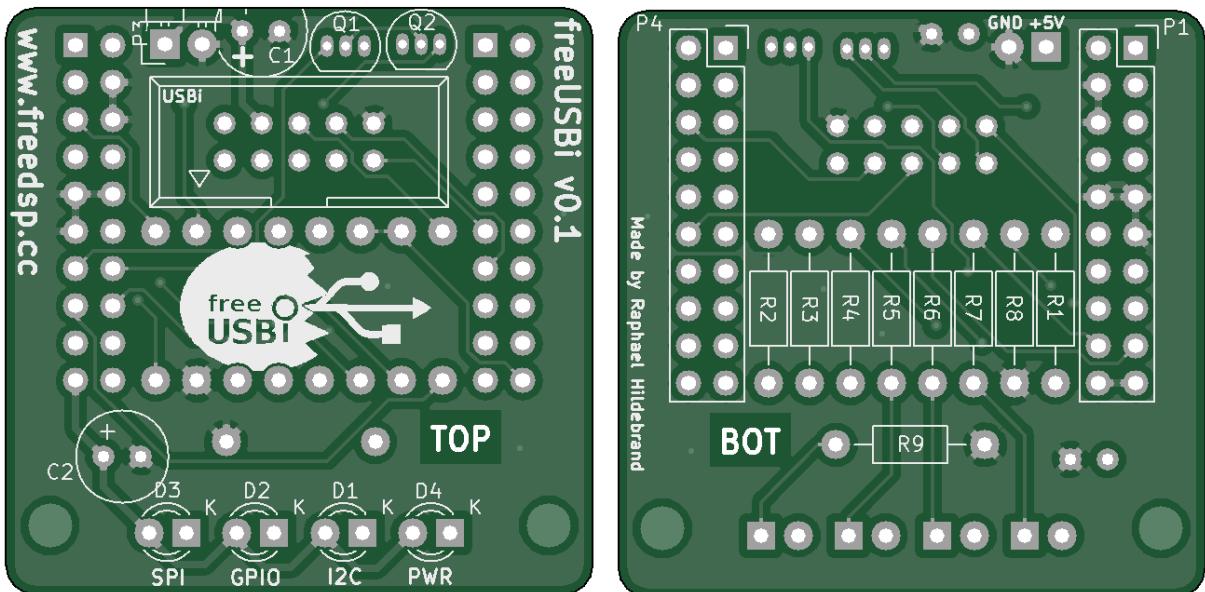


Figure 6 - Board silkscreen and parts placement for free USBi 0.1.

Schematic

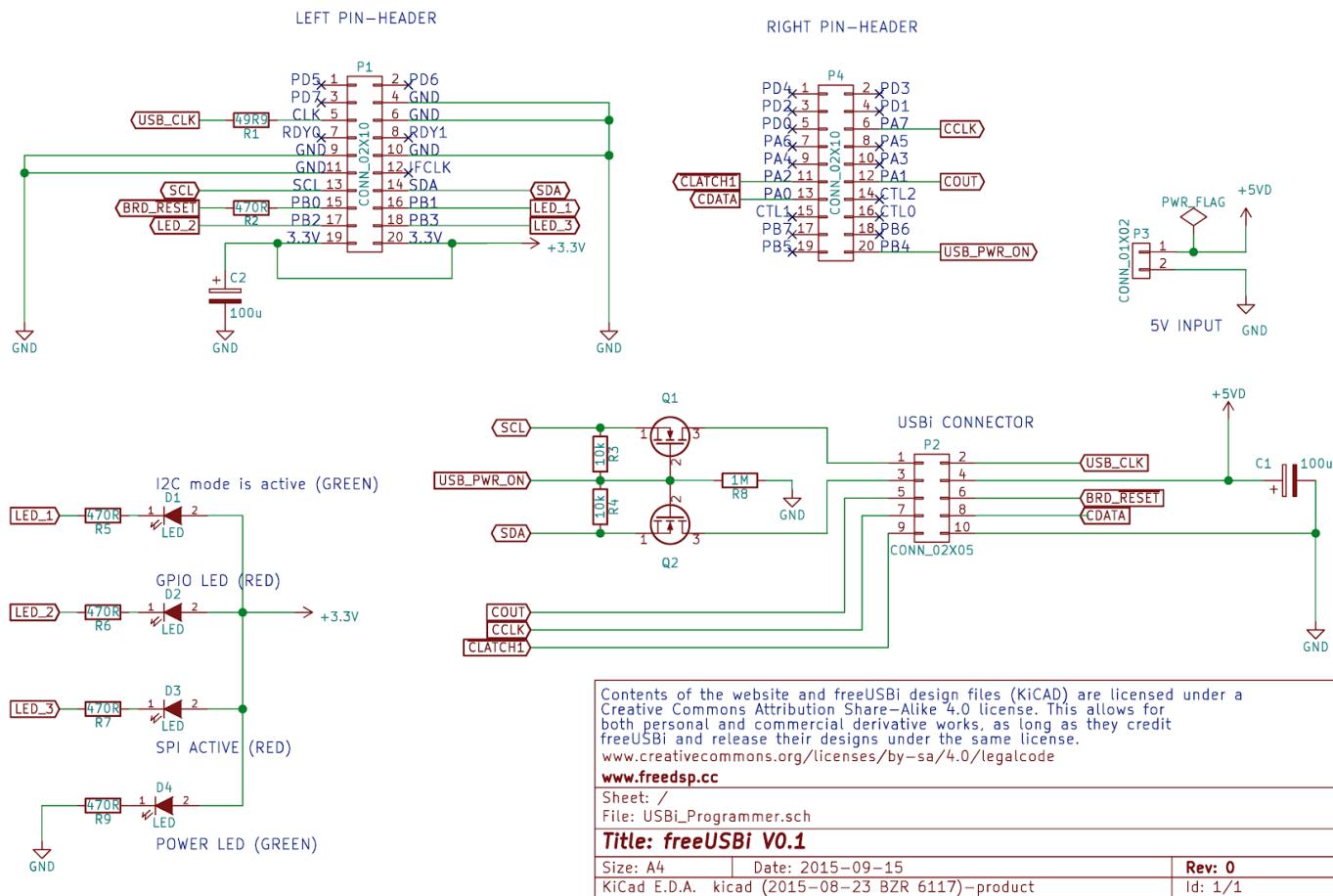


Figure 7 - Schematic of the freeUSBi 0.1. Please zoom in to see more details.

Pinout of the USBi connector

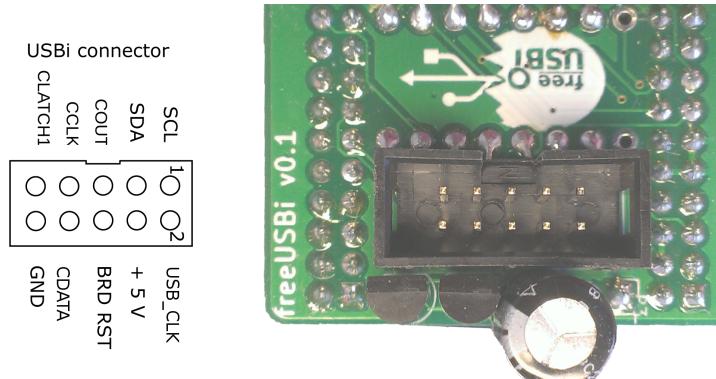


Figure 8 - Pinout of the USBi connector.