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FUSB301A Evaluation Board Users Guide

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Introduction

The FUSB301A is an autonomous USB Type-C controller device designed to negotiate the Type-C interface connections. This document along with the FUSB301A datasheet are a guide to using the evaluation board designed for this device.

The FUSB301A is designed to be controlled from an application processor so for demonstration purposes a microcontroller has been added to the board for convenient chip control and graphical user interface (GUI). Fairchild will supply this GUI to assist in the Evaluation of the FUSB301A. If no GUI control is available the FUSB301A will boot up in UFP mode.

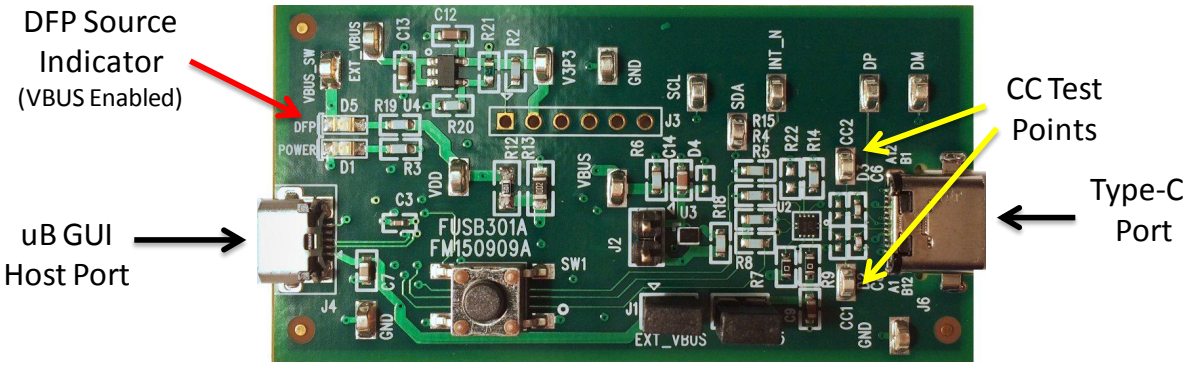


Figure 1 - FUSB301A Evaluation Board

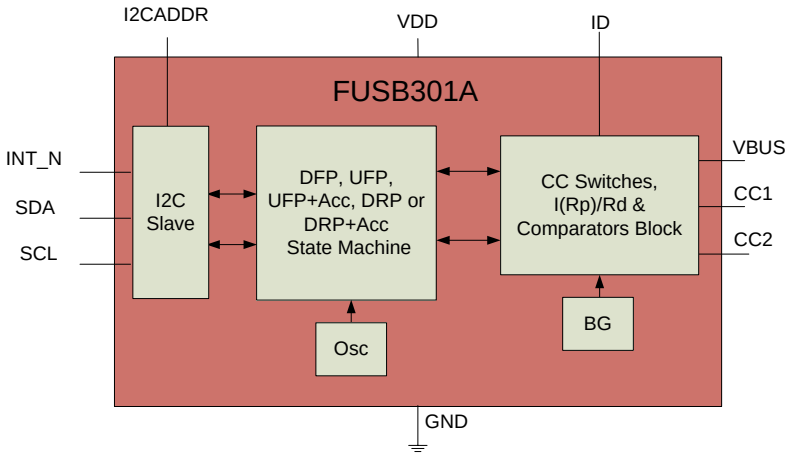


Figure 2 - FUSB301A Block Diagram

Power

The board can be powered directly from the GUI host USB connection or from bench power supplies for those that would like to alter the VDD voltage. VDDIO is tied to the VDD regulator fixed at 3.3V. Connecting jumper J5 connects the host USB VBUS to the on-board regulators. Jumpers J1 and J5 are connected by default to operate the board directly from the host USB controller VBUS. When DFP mode is entered the ID pin of the FUSB301A will go low and turn on the *FPF2411* power switch. If a bench supply is desired, removal of the J5 jumper and clip leads from the supply should be connected to J5, pin 1 and GND.

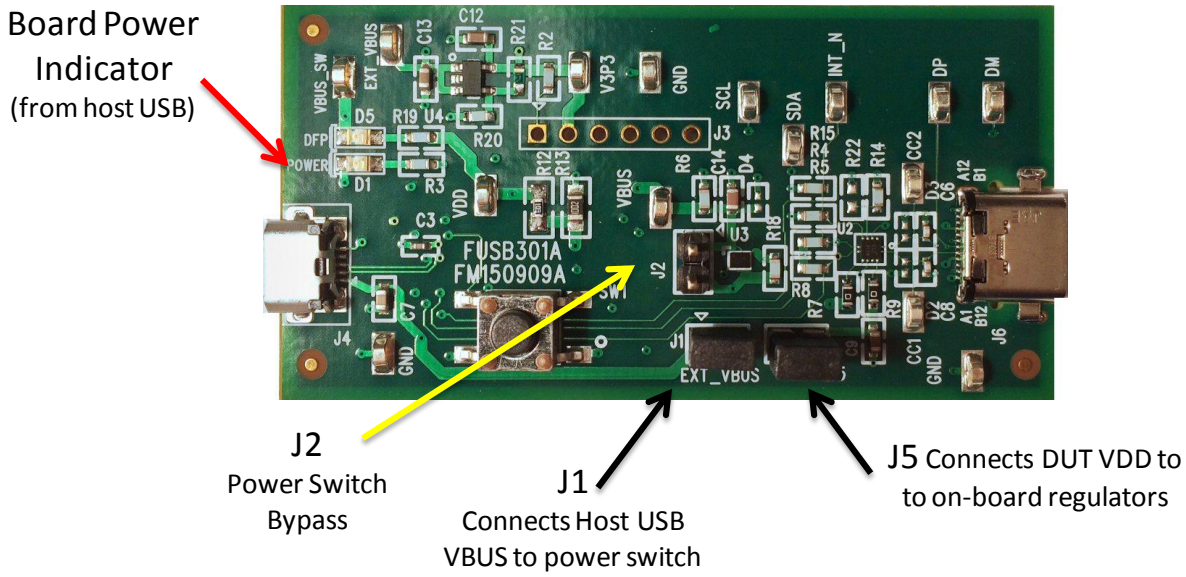
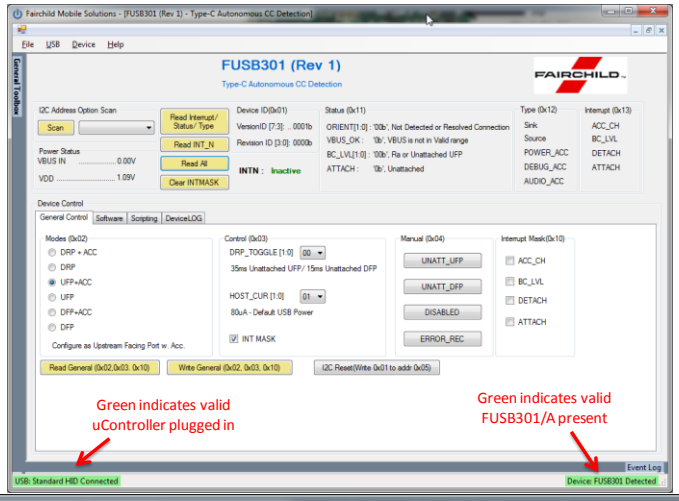


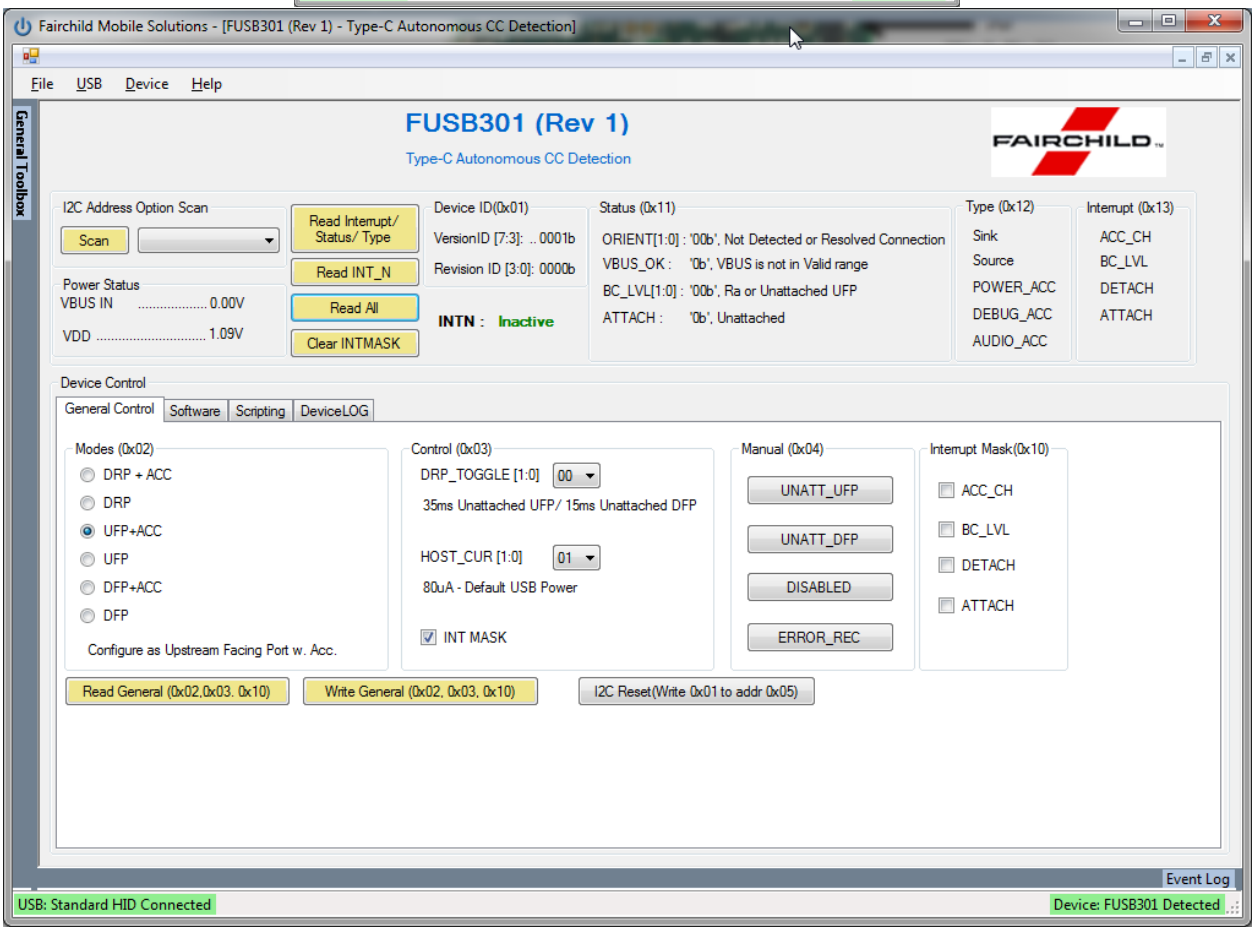
Figure 3 - FUSB301A Evaluation Board Power Configuration

There are many test points on the board for probing convenience. They are labeled on the board and schematic. There are also provisions for changing or upgrading the processor firmware. This can be done either with the 6 pin header (J3) or from a direct USB connection from the J4 host port (switch SW1 must be temporarily pressed while plugging in the USB cable to enable the bootloader (specific instructions will be included with any firmware changes).

FUSB301A GUI Control Program

Along with the board schematic and product datasheets Fairchild will provide a GUI program to control the board operation. All of the device features can be observed or exercised from this control point. Installing the software is accomplished by running the setup.exe program provided. This install will load the required executables, binaries and Microsoft Framework files (if not already installed). The GUI is based on an HID driver (native to Windows) so loading additional drivers is not necessary. The following is a description of how to run the GUI.



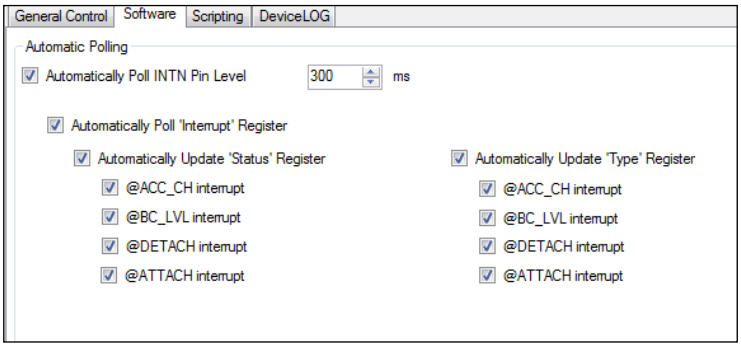


The top half of the window is for device and interrupt status, the tab control at the bottom is for setting up the various operating conditions of the FUSB301A. After successful board connection and power up the status field should indicate the current condition of the device. If the I2CADDR pin of the device has been changed from default, clicking on the 'Scan' button will find the appropriate I2C address of the device. *Note the two green status boxes at the bottom corners, they are pink in color when not successfully connected.*

The '**General Control**' tab will default to 'UFP+ACC' mode which will allow a type-c cable to be plugged into a valid DFP or DRP device on one of the CC pins. The status box will show the connection

status. When making changes in the tab controls it is generally required to click on the 'Write General' button to actually write the changes to the device. Clicking the 'I2C Reset' will return the device to power-up state. Referring to the datasheet will help in navigation of this GUI. Clearing the INT MASK check box, then 'Write General' will enable the FUSB301/A to respond with interrupts (masking all interrupts is the power-up default).

The '**Software**' tab sets up the polling that is done to update the GUI. This polling activity can mimic what an application processor would normally do.

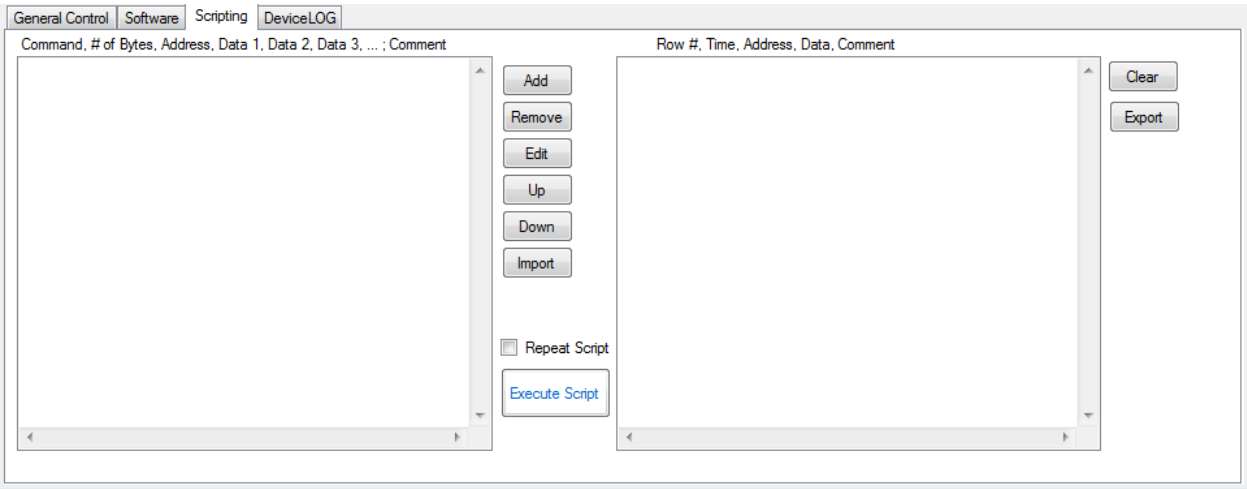


The '**Scripting**' tab is a convenient way to make many changes to any of the registers. This is handy when running repetitive tasks or recalling setups. The text at the top of the frame describes the syntax for the scripts:
The 'Scripting' tab enables the use of scripts to configure the FUSB301A.

The window in the left side of the tab controls the scripting. The control has the following functionality:

- Read through "**r**", "**rd**", "**read**"
- Write through "**w**", "**wr**", "**write**"
- Delay in milliseconds through "**d**", "**del**", "**delay**"
- Pause through "**p**", "**pa**", "**pause**"

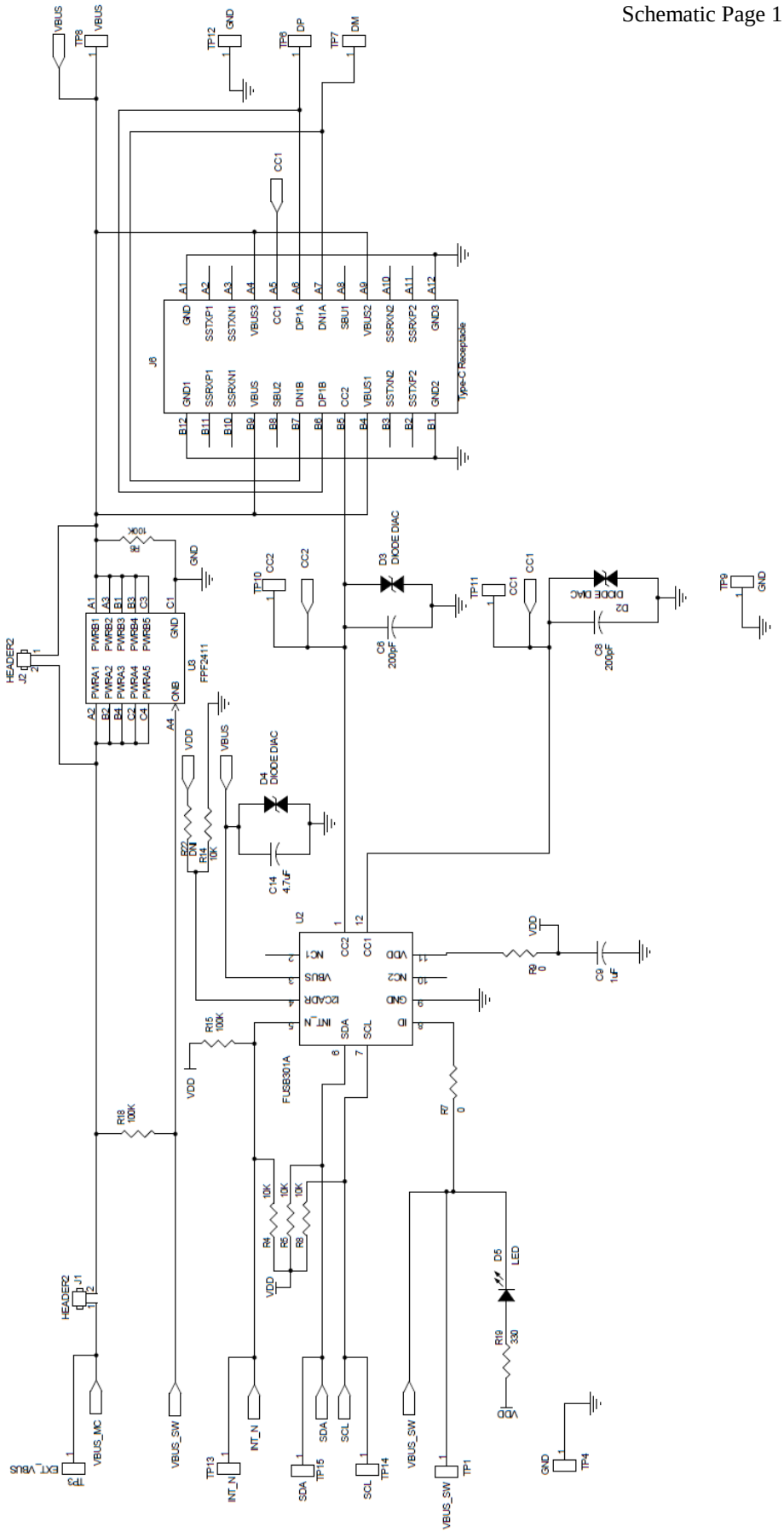
Scripts can be added through the GUI using the 'Add' button or imported from an external file using the 'Import' button. Individual lines can be reordered through the 'Up' and 'Down' buttons , edited through the 'Edit' button, or deleted with the 'Remove' button. After achieving a desired setup, a script can also be exported to a file.

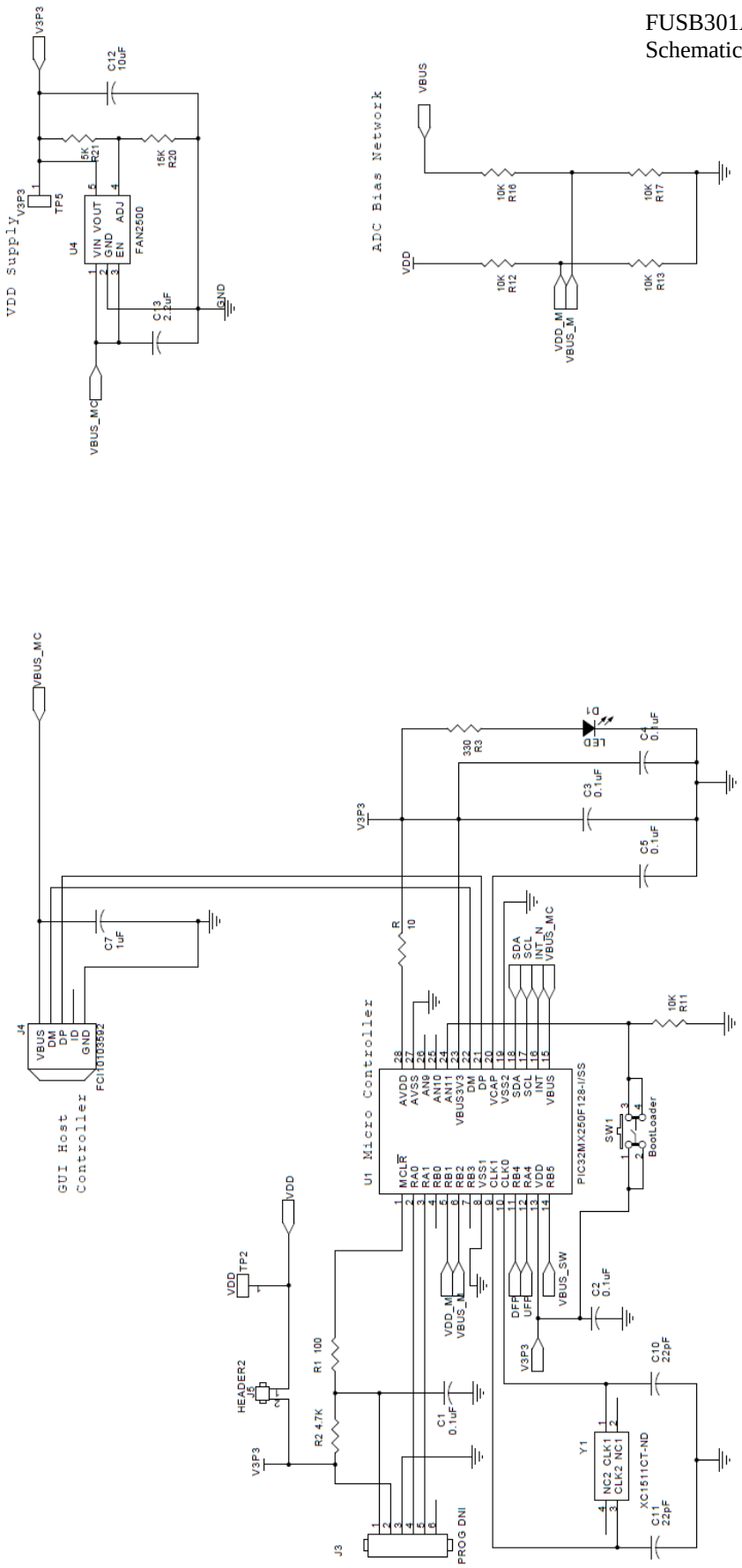


An example script could be: w,1,0x02,0x01 ; ### Set device to DFP mode ###
w=write
1 byte
Address 0x02
Data 0x01
Comment

Results of an executed script are shown in the box on the right side of the tab. These results can be exported to a file.

The '**Device Log**' tab keeps track of all the interrupt activity and can be controlled and exported from this tab.


VBUS
TP8
TP12
GND
TP6
DP
TP7
DM
CC1
J6
Type-C Receptacle
GND
SSTXP1
SSTXN1
VBUS3
CC1
DP1A
DN1A
SBU1
VBUS2
SSRXN2
SSRXP2
GND3
GND1
SSRXP1
SSRXN1
VBUS
SBU2
DN1B
DP1B
CC2
VBUS1
SSTXN2
SSTXP2
GND2
R6
100K
GND
HEADER2
J2
U3
FPF2411
PWRB1
PWRB2
PWRB3
PWRB4
PWRB5
PWRA1
PWRA2
PWRA3
PWRA4
PWRA5
ONB
TP10
CC2
D3
DIODE DIAC
C6
200pF
TP11
CC1
D2
DIODE DIAC
C8
200pF
TP9
GND
VDD
VBUS
D4
DIODE DIAC
C14
4.7uF
R2
DN
R14
10K
U2
FUSB301A
NC1
VBUS
ECHAR
INT_N
SDA
SCL
CC2
CC1
VDD
NC2
GND
ID
R8
0
C9
1uF
R15
100K
VDD
R18
100K
R7
0
R4
10K
R5
10K
R8
10K
VDD
D5
LED
R19
330
VBUS_SW
HEADER2
J1
J3
EXT_VBUS
VBUS_MC
VBUS_SW
TP13
INT_N
INT_N
SDA
TP15
SDA
SCL
TP14
SCL
VBUS_SW
TP1
VBUS_SW
GND
TP4


VDD Supply
ADC Bias Network
GUI Host Controller
U1 Micro Controller
PIC32MX250F128-I/SS
FAN2500
FCI10103582
XC1511CT-ND
PROG DNI
BootLoader
HEADER2
LED
VBUS_MC
VBUS_SW
VDD_M
VBUS_M