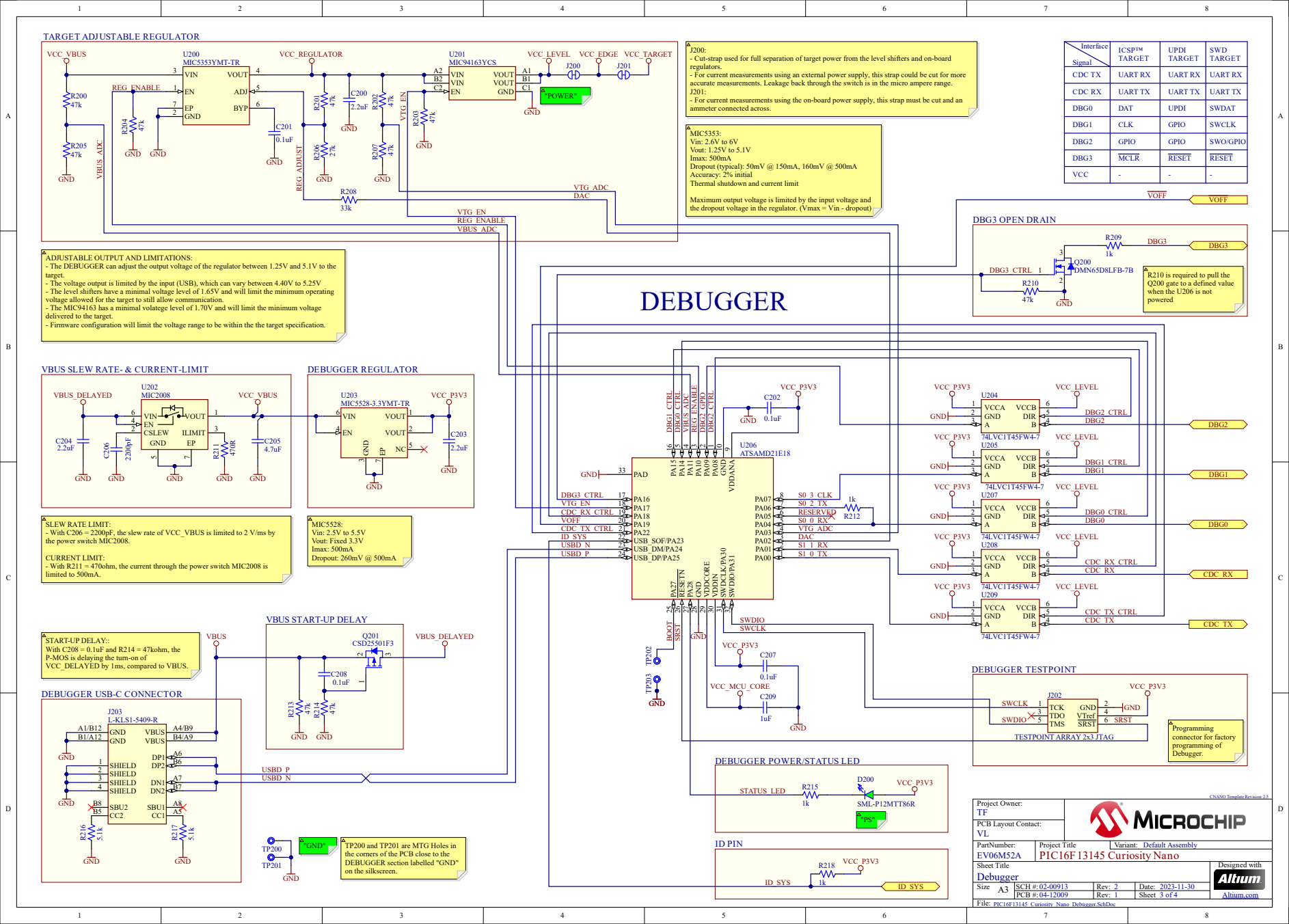
TARGET ADJUSTABLE REGULATOR
U200
MIC5353YMT-TR
VIN
VOUT
EN
ADJ
BYP
EP
GND
VCC_VBUS
VCC_REGULATOR
REG_ENABLE
VBUS_ADC
REG_ADJUST
VTG_EN
VTG_ADC
DAC
U201
MIC94163YCS
VCC_LEVEL
VCC_EDGE
VCC_TARGET
J200
J201
"POWER"
R200 47k
R201 47k
R202 47k
R203 47k
R204 47k
R205 47k
R206 2.7k
R207 47k
R208 3.3k
C200 2.2uF
C201 0.1uF
J200:
- Cut-strap used for full separation of target power from the level shifters and on-board regulators.
- For current measurements using an external power supply, this strap could be cut for more accurate measurements. Leakage back through the switch is in the micro ampere range.
J201:
- For current measurements using the on-board power supply, this strap must be cut and an ammeter connected across.
MIC5353:
Vin: 2.6V to 6V
Vout: 1.25V to 5.1V
Imax: 500mA
Dropout (typical): 50mV @ 150mA, 160mV @ 500mA
Accuracy: 2% initial
Thermal shutdown and current limit
Maximum output voltage is limited by the input voltage and the dropout voltage in the regulator. (Vmax = Vin - dropout)
Interface / Signal
ICSP™ TARGET
UPDI TARGET
SWD TARGET
CDC TX
UART RX
UART RX
UART RX
CDC RX
UART TX
UART TX
UART TX
DBG0
DAT
UPDI
SWDAT
DBG1
CLK
GPIO
SWCLK
DBG2
GPIO
GPIO
SWO/GPIO
DBG3
MCLR
RESET
RESET
VCC
-
-
-
ADJUSTABLE OUTPUT AND LIMITATIONS:
- The DEBUGGER can adjust the output voltage of the regulator between 1.25V and 5.1V to the target.
- The voltage output is limited by the input (USB), which can vary between 4.40V to 5.25V
- The level shifters have a minimal voltage level of 1.65V and will limit the minimum operating voltage allowed for the target to still allow communication.
- The MIC94163 has a minimal volatege level of 1.70V and will limit the minimum voltage delivered to the target.
- Firmware configuration will limit the voltage range to be within the the target specification.
DEBUGGER
DBG3 OPEN DRAIN
VOFF
R209 1k
Q200 DMN65D8LFB-7B
DBG3_CTRL
R210 47k
R210 is required to pull the Q200 gate to a defined value when the U206 is not powered
VBUS SLEW RATE- & CURRENT-LIMIT
U202
MIC2008
VBUS_DELAYED
VIN
VOUT
EN
CSLEW
ILIMIT
GND
EP
C204 2.2uF
C205 4.7uF
C206 220pF
R211 470R
SLEW RATE LIMIT:
- With C206 = 2200pF, the slew rate of VCC_VBUS is limited to 2 V/ms by the power switch MIC2008.
CURRENT LIMIT:
- With R211 = 470ohm, the current through the power switch MIC2008 is limited to 500mA.
DEBUGGER REGULATOR
U203
MIC5528-3.3YMT-TR
VCC_P3V3
NC
C203 2.2uF
MIC5528:
Vin: 2.5V to 5.5V
Vout: Fixed 3.3V
Imax: 500mA
Dropout: 260mV @ 500mA
U206
ATSAMD21E18
PAD
VDDANA
DBG3_CTRL
VTG_EN
CDC_RX_CTRL
VOFF
CDC_TX_CTRL
ID_SYS
USBD_N
USBD_P
PA16
PA17
PA18
PA19
PA22
PA23
PA24
PA25
PA07
PA06
PA05
PA04
PA03
PA02
PA01
PA00
S0_3_CLK
S0_2_TX
RESERVED
S0_0_RX
VTG_ADC
DAC
S1_1_RX
S1_0_TX
R212 1k
C202 0.1uF
U204
U205
U207
U208
U209
74LVC1T45FW4-7
VCCA
VCCB
DIR
DBG2_CTRL
DBG1_CTRL
DBG0_CTRL
CDC_RX_CTRL
CDC_TX_CTRL
DBG2
DBG1
DBG0
CDC_RX
CDC_TX
SWDIO
SWCLK
BOOT
SRST
TP202
TP203
C207 0.1uF
C209 1uF
VCC_MCU_CORE
VBUS START-UP DELAY
START-UP DELAY::
With C208 = 0.1uF and R214 = 47kohm, the P-MOS is delaying the turn-on of VCC_DELAYED by 1ms, compared to VBUS.
VBUS
VBUS_DELAYED
Q201
CSD25501F3
C208 0.1uF
R213 47k
R214 47k
DEBUGGER USB-C CONNECTOR
J203
L-KLS1-5409-R
A1/B12
B1/A12
A4/B9
B4/A9
VBUS
SHIELD
DP1
DP2
DN1
DN2
SBU1
SBU2
CC1
CC2
R216 5.1k
R217 5.1k
USBD_P
USBD_N
TP200
TP201
"GND"
TP200 and TP201 are MTG Holes in the corners of the PCB close to the DEBUGGER section labelled "GND" on the silkscreen.
DEBUGGER TESTPOINT
J202
TCK
TDO
TMS
GND
VTref
SRST
TESTPOINT ARRAY 2x3 JTAG
Programming connector for factory programming of Debugger.
DEBUGGER POWER/STATUS LED
STATUS_LED
R215 1k
D200
SML-P12MTT86R
"PS"
ID PIN
R218 1k
Project Owner: TF
PCB Layout Contact: VL
PartNumber: EV06M52A
Project Title: PIC16F13145 Curiosity Nano
Variant: Default Assembly
Sheet Title: Debugger
Size A3
SCH #: 02-00913
PCB #: 04-12009
Rev: 2
Rev: 1
Date: 2023-11-30
Sheet 3 of 4
File: PIC16F13145 Curiosity Nano Debugger.SchDoc
CNANO Template Revision: 2.5
MICROCHIP
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