GN100
OpenKNX NanoBCU

KNX_Conn

GND 2
KNX+ 1
J100

KNX+ 1
GND 2
SAVE 3 KNX_SAVE
Rx 4 KNX_Tx
Tx 5 KNX_Rx
3V3 6 +3.3V
Vcc2 7 VCC2

GND
KNX+

D100
SMAJ40CA

PROGLED

D101
LED

R101
1k

GND

SW100
Prog

PROGBTN

GND

Sheet: Controller

File: controller.sch

Sheet: /
File: UP1-Controller2040.sch
Title: UP1-Controller2040
Size: A4   Date: 2022-10-28   Rev: V00.10
KiCad E.D.A. kicad (5.1.4)-1   Id: 1/2

Connection to KUPS−Progger for SWD and USB

GND
+3V3
D−
D+
SWCLK
SWDIO
RUN
BOOTSEL

J101
Conn_01x08

+3V3
C109
10u
GND

+1V1
C132
100n
C131
100n
GND

+3V3
C110
100n
C111
100n
C112
100n
C113
100n
C114
100n
C115
100n
GND

Make sure C130 is close to pin 45 of RP2040
C130
1u
GND

C120
1u
Make sure C120 is close to pin 44 of RP2040
GND

Flash

+3V3
C103
100n
GND
R104
DNI

U101

BOOTSEL
R103
1k
QSPI_SS
QSPI_SCLK

CS 1
CLK 6
VCC 8
GND 4

DI(IO0) 5
DO(IO1) 2
IO2 3
IO3 7

QSPI_SD0
QSPI_SD1
QSPI_SD2
QSPI_SD3

W25Q128JVS

R107
27
D+
Make sure R107 and R108 are close to RP2040
R108
27
D−

U100

DVDD 50
DVDD 23
VREG_VOUT 45
VREG_IN 44
IOVDD 49
IOVDD 42
IOVDD 33
IOVDD 10
IOVDD 1
USB_VDD 48
ADC_AVDD 43

USB_DP 47
USB_DM 46

QSPI_SS
QSPI_SD0
QSPI_SD1
QSPI_SD2
QSPI_SD3
QSPI_SCLK

QSPI_SS 56
QSPI_SD0 53
QSPI_SD1 55
QSPI_SD2 54
QSPI_SD3 51
QSPI_SCLK 52

GPIO0 2
GPIO1 3
GPIO2 4
GPIO3 5
GPIO4 6
GPIO5 7
GPIO6 8
GPIO7 9
GPIO8 11
GPIO9 12
GPIO10 13
GPIO11 14
GPIO12 15
GPIO13 16
GPIO14 17
GPIO15 18
GPIO16 27
GPIO17 28
GPIO18 29
GPIO19 30
GPIO20 31
GPIO21 32
GPIO22 34
GPIO23 35
GPIO24 36
GPIO25 37

GPIO0 KNX_Tx
GPIO1 KNX_Rx
GPIO2
GPIO3
GPIO4
GPIO5 KNX_SAVE
GPIO6 PROGLED
GPIO7 PROGBTN
GPIO8
GPIO9
GPIO10
GPIO11
GPIO12 GPIO12
GPIO13 GPIO13
GPIO14 GPIO14
GPIO15 GPIO15
GPIO16 GPIO16
GPIO17 GPIO17
GPIO18 GPIO18
GPIO19 GPIO19
GPIO20 GPIO20
GPIO21 GPIO21
GPIO22 GPIO22
GPIO23 GPIO23
GPIO24 GPIO24
GPIO25 GPIO25

XIN 20
XOUT 21

XIN
XOUT

Raspberry Pi
RP2040

+3V3
R105
27Ω
C105
330pF

RUN
R106
220
RUN 26

SWCLK 24
SWDIO 25
SWCLK
SWD

GPIO26_ADC0 38
GPIO27_ADC1 39
GPIO28_ADC2 40
GPIO29_ADC3 41

GPIO26_ADC0 GPIO26
GPIO27_ADC1 GPIO27
GPIO28_ADC2 GPIO28
GPIO29_ADC3 GPIO29

TESTEN 19
GND 57

GND GND

RP2040

optional Pull−Ups
+3.3V
R109 R GPIO29
R110 R GPIO28
R111 R GPIO25
R112 R GPIO24
R113 R GPIO17
R114 R GPIO16
R115 R GPIO15
R116 R GPIO14

Crystal

Y100
XIN
C102 33p
C101 33p
GND
R102
1k
XOUT
12MHz

J102
OpenKNX UP1 Connector

GPIO29 20 GP29: SPI1 CS / UART0 RX / I2C0 SCL / PWM6 B / ADC3
GPIO28 19 GP28: SPI1 RX / UART0 TX / I2C0 SDA / PWM6 A / ADC2
GPIO27 18 GP27: SPI1 TX / UART1 RTS / I2C1 SCL / PWM5 B / ADC1
GPIO26 17 GP26: SPI1 SCK / UART1 CTS / I2C1 SDA / PWM5 A / ADC0
GPIO25 16 GP25: SPI1 CS / UART1 RX / I2C0 SCL / PWM4 B
GPIO24 15 GP24: SPI1 RX / UART1 TX / I2C0 SDA / PWM4 A
GPIO23 14 GP23: SPI0 SCK / UART1 RTS / I2C1 SCL / PWM3 B
GPIO22 13 GP22: SPI0 SCK / UART1 CTS / I2C1 SDA / PWM3 A
GPIO21 12 GP21: SPI0 CS / UART1 RX / I2C0 SCL / PWM2 B
GPIO20 11 GP20: SPI0 RX / UART1 TX / I2C0 SDA / PWM2 A
GPIO19 10 GP19: SPI0 TX / UART0 RTS / I2C1 SCL / PWM1 B
GPIO18 9   GP18: SPI0 SCK / UART0 CTS / I2C1 SDA / PWM1 A
GPIO17 8   GP17: SPI0 CS / UART0 RX / I2C0 SCL / PWM0 B
GPIO16 7   GP16: SPI0 RX / UART0 TX / I2C0 SDA / PWM0 A
GPIO15 6   GP15: SPI1 TX / UART0 RTS / I2C1 SCL / PWM7 B
GPIO14 5   GP14: SPI1 SCK / UART0 CTS / I2C1 SDA / PWM7 A
GPIO13 4   GP13: SPI1 CS / UART0 RX / I2C0 SCL / PWM6 B
VCC2 3   Vcc2 from BCU (5V)
+3.3V 2
GND 1

U102
AT24CS08−STUM
+3V3
VCC 4
GND 2
SDA 3 GPIO24
SCL 1 GPIO25
WP 5
GND
optional I2C EEPROM

U103
TMP100
+3V3
V+ 4
GPIO24 6 SDA
GPIO25 1 SCL
ADD0 5
ADD1 3
GND 2
GND
optional I2C temperature sensor