Firmware working parts / protocol

Path to flash-file:
igloo/system/teamprojekt2/designer/impl1/top.pdb

Config:
* 9600 Baudrate
* 8 data bits
* 1 stop bit
* no parity
* no handshake

The CLK Pin of the Connector (main) component has to be connected to 1MHz clocksource.

Peripherals

LEDs

LED No.	Indication
LED1	Master busy
LED2	ADT7301 busy
LED3	EEPROM busy
LED4	AD7782 busy
LED5	Watchdog enabled
LED8	System alive (blinking)

Switches

Switch No.	Function
1	En/disable watchdog for debug purposes

Watchdog

If the watchdog is enabled and the busy-flag is active for more than
~130 ms, a software-reset for all components will be triggered.

The watchdog can be disabled via the switch 1 on the board.
Make sure all jumpers are set correctly.

Master

Device ID: 0b0000

get firmware version

can be used for connection pinging
better distinction between firmware versions

TX

0x00
get firmware version command

RX

0xAA	0bHHHHLLLL
OK-byte	H-4 high-bits, L-4 low-bits, eg. 0b10000100 = version 8.4

EEPROM

Device ID: 0b0001

read

TX

0x10	0bxxxxxxxA	0bAAAAAAAA
read command	x-don't care, A-address MSB	A-address

RX

0xAA	0bDDDDDDDD
OK-byte	D-byte at address A

read 16bit

TX

0x17	0bAAAAAAAA
read 16bit command	A-address

RX

0xAA	0bDDDDDDDD	0bddddddddd
OK-byte	D-byte at address A	d-byte at address A+1

write

must be handled with care: only 1 000 000 cycles endurance
(should only be called by user, not automatically)
writeprotection is disabled automatically triggered by reset

TX

0x11	0bxxxxxxxA	0bAAAAAAAA	0bDDDDDDDD
write command	x-don't care, A-address MSB	A-address	D-byte

RX

0xAA	0xBB
OK-byte	Done-byte

write 16bit

must be handled with care: only 1 000 000 cycles endurance
(should only be called by user, not automatically)
writeprotection is disabled automatically triggered by reset

TX

0x18	0bAAAAAAAA	0bDDDDDDDD	0bddddddddd
write 16bit command	A-address	D-byte	d-byte for address

RX

0xAA	0xBB
OK-byte	Done-byte

erase all

erases complete memory (all bits set to 1)

must be handled with care: only 1 000 000 cycles endurance
(should only be called by user, not automatically)
eraseprotection is disabled automatically triggered by reset

TX

0x12
erase all command

RX

0xAA	0xBB
OK-byte	Done-byte

AD Converter

Device ID: 0b0010

HEX Code to Voltage

AIN: analog input (the real voltage you print out)
Vreff: refference voltage = 2.5
rng: range select
N = 24 : number of bits got by ADC (MISO)
dec_input: MISO (24 bit Vector) in Decimal

GAIN = 1 IF rng=2,56V ELSE 16;
v = 1.024 * VReff;
a = 2^(N-1);
AIN = (v*((dec_input/a)-1))/GAIN;

read

Reads all 24 bit seperated in three Bytes (from lowes to highest velued Byte(bit)).
The 24 bit value is Signed!
Highest bit '1': Indicates a zero or positive full-scale voltage.
Highest bit '0': Indicates a negative full-scale voltage.

TX

0x20
read command

RX

0xAA	0bDDDDDDDD	0bDDDDDDDD	0bDDDDDDDD
OK-byte	last Highest Byte	second Byte	first lowest Byte

CH1

Set the Chanal for the next AD Conversion on CH1.

TX

0x23
chanel select command

RX

0xAA
OK-byte

CH2

Set the Chanal for the next AD Conversion on CH2.

TX

0x24
chanel select command

RX

0xAA
OK-byte

RNG1

Set the range for the next AD Conversion on +- 2.56V

TX

0x25
range select command

RX

0xAA
OK-byte

RNG2

Set the range for the next AD Conversion on +- 0.16V

TX

0x26
range select command

RX

0xAA
OK-byte

ADT Temperature sensor

Device ID: 0b0011

temperature is updated on sensor every 1.5 sec

TX

0x30
read temperature command

RX

0xAA	0b00TTTTTT	0btttttttt
OK-byte	T-temperature data (signed, MSB)	t-temperature data (LSB)