EA DEMOPACK

2.8" SMART TOUCH INCL. APPLICATION BOARD

The picture shows EA DEMOPACK-RELAY
Display dimension 84x58x12mm

FEATURES

- 2.8" SMART TOUCH DISPLAY, IPS TECHNOLOGY
- PCAP TOUCHPANEL OPTICALLY BONDED
- SUPER BRIGHT >1000cd/m²
- HIGH CONTRAST TFT PANEL
- INTEGRATED HMI CONTROLLER
- USB, RS-232, SPI, I²C INTERFACE
- WYSIWYG EDITOR FOR WINDOWS
- WIDE TEMPERATURE RANGE (T_{OP} -20 .. +70°C)
- INDUSTRIAL GRADE DISPLAY

ORDERING CODES

1x SMART TOUCH 2.8"…

PLUS RGB-LED AND POTI FOR ANALOGUE INPUT	**EA DEMOPACK-RGBANA**
PLUS HUMIDITY, TEMPERATURE AND CO2 SENSOR	**EA DEMOPACK-CLIMA**
PLUS LEVEL SHIFTER FOR SPI,I²C,RS232,RS485/422 AND 5~30V REG.	**EA DEMOPACK-CONNI**
PLUS RELAY OUTPUT, ANALOGUE/DIGITAL INPUT AND 5~30V REG.	**EA DEMOPACK-RELAY**

SPARE PARTS (ALSO GOOD FOR uniTFTs020/035/043)

APPLICATION BOARD WITH RGB LED AND POTI	**EA 94998-RGBANA**
APPLICATION BOARD WITH HUMIDITY, TEMP. AND CO2 SENSOR	**EA 94998-CLIMA**
APPLICATION BOARD WITH LEVEL SHIFTER AND 5~30V REG.	**EA 94998-CONNI**
APPLICATION BOARD WITH RELAY OUTPUT, I/O AND 5~30V REG.	**EA 94998-RELAY**
APPLICATION BOARD WITH 5~30V REGULATOR	**EA 94998-POWER**
FPC CABLE 40 LINES, 0.5mm PITCH, 102mm	**EA KF050-40**
FPC CABLE 40 LINES, 0.5mm PITCH, 51mm	**EA KF050-40L51**
D-SUB9 CONNECTOR FOR EA 94998–CONNI	**EA D-SUB9LPB**
MINI USB CABLE, ABOUT 1m	**EA KUSB-MINI**

CONTENT

OVERVIEW - 2.8" SMART TOUCH

All EA DEMOPACKs come with a 2.8" IPS display incl. PCAP plus an individual application board.

This miniature touch panel is eminently suited to replace physical switches and controllers in home automation, for use as control panels in caravans or for integration into kitchen appliances as well as wellness and fitness equipment. Alongside the USB interface it provides some more typical interfaces, such as RS-232, SPI and I²C. Digital in- and outputs, 4 analogue inputs and a PWM output make it possible to use them as intelligent controllers for calculation and management of data and signals.

APPLICATION BOARDS

Together with the 2.8" display soon there will be several different DEMOPACKs with individual application boards available. These application boards show in an educational way how to connect external sensors and other circuits to the display. All boards are running directly out of the box.

EA DEMOPACK-	Demonstrating
-RGBANA	- Voltage measurement 0..3.3V - RGB LED via SPI output, display is master
-CLIMA	- CO_2 Sensor via I²C - Humidity and temperature sensor via I²C - RTC with battery backup
-CONNI	- Level Shifter for I²C, SPI, RS-232, RS-485/422 - Power supply 5~30V=
-RELAY	- 2x Relay output - incl. current measurement up to ±5A - digital input up to 30V - analogue input with voltage divider - Power supply 5~30V=

POWER SUPPLY

There are 3 ways to provide supply voltage to the display:
- Powering up the display requires an external USB charger/power supply. Direct connection to any USB port of your pc is also recommended.
- Alternatively the display may be powered by an external 3.3V supply (typ. 240mA).
- Some Application boards provide a voltage regulator for power supply from 5 to 30V=

SPARE PARTS EA 94998-XXX

If you like to get the applications board without the display then those are called EA 94998-xxx. May be you need it as a spare part to replace a defect one or you like to combine with other display sizes like 2.0", 3.5" and 4.3". Please order display and cable separately in this case.
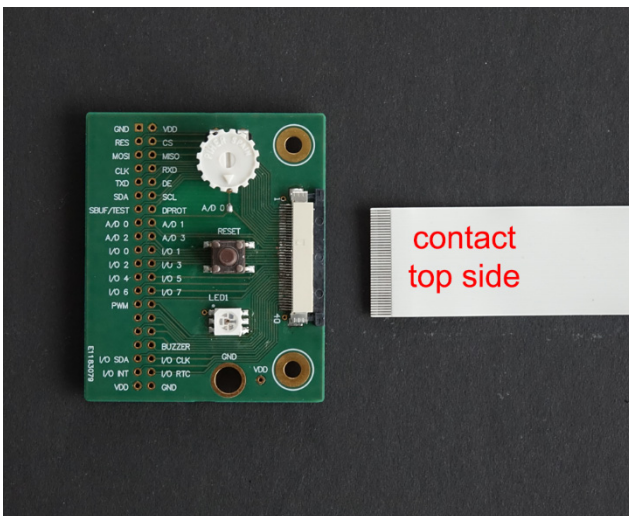
HOW TO CONNECT THE DISPLAY

First of all, plug in the FPC into ZIF connector of display:
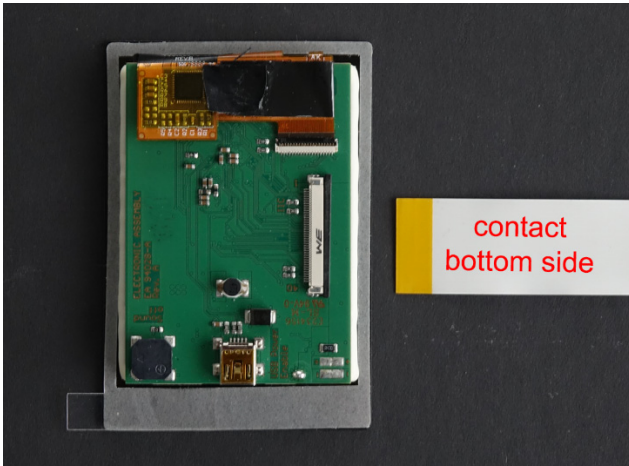
HOW TO CONNECT THE APPLICATION BOARD

Next, plug in the FPC cable into ZIF connector of pcb:

POWER ON

Finally plug in the black USB cable into the displays USB connector or other supply voltage.
Display will light up now and you may change measuring voltage by turning the potentiometer. Touching the display changes the function and provides an adjustment of LED color and brightness.

WYSIWYG EDITOR

We made the graphical design und built-in the function with the *uniTFTDesigner* which is the perfect WYSIWYG editor for Windows. The Download is available for free here. EA DEMOPACK will come with the relating demo application already installed in display. You may edit the delivered design with *uniTFTDesigner* at any time:

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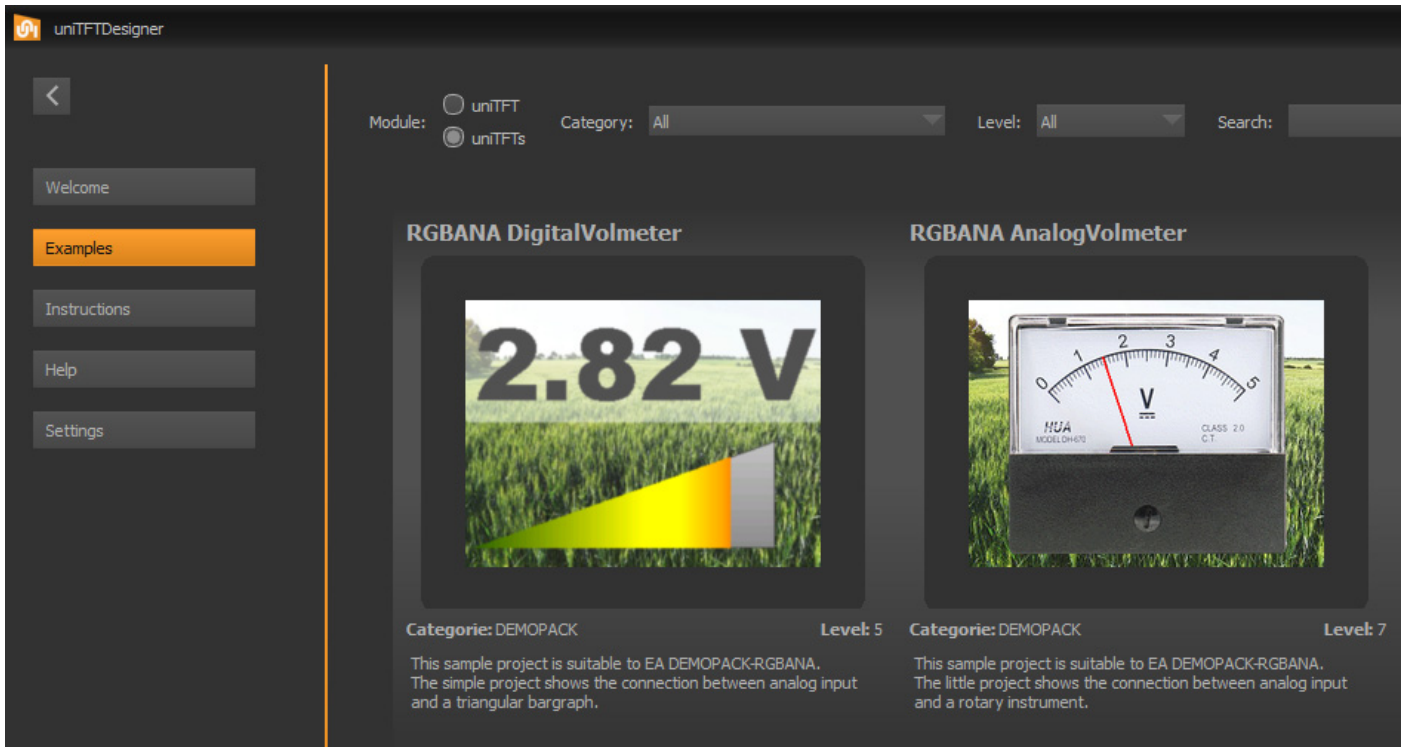
PINOUT 2X20 PIN EYELET

There's a 40-pin ZIF connector on display (bottom contact) and a 2x20-pin eyelet on application board. Both do provide same pinout. The 2x20 pin eyelet is available for all EA DEMOPACK and EA 94998

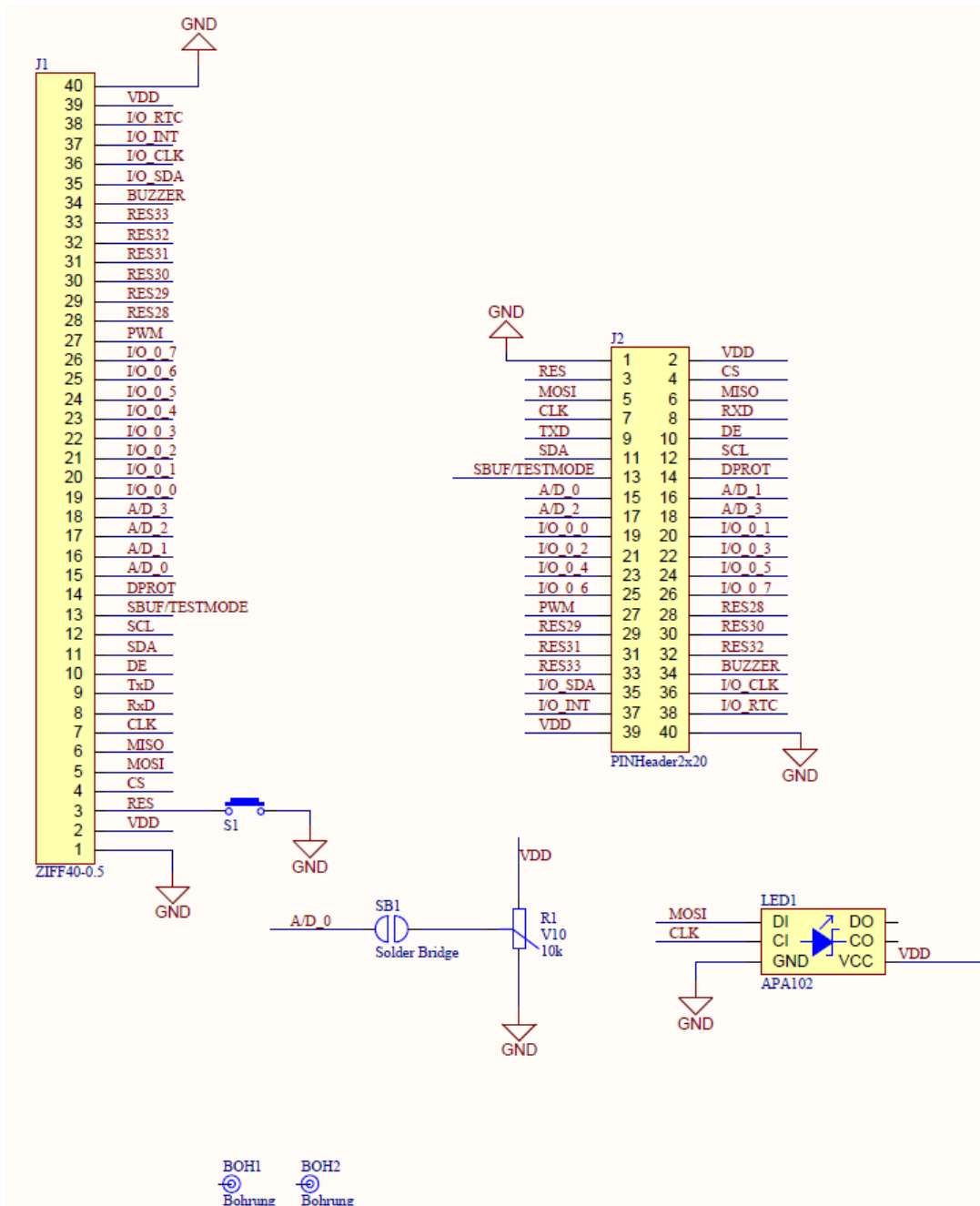| Pin	Symbol	I/O	Description	
1	GND		Ground 0 V	
2	VDD		Power Supply 3.3 V	
3	RES	I	Reset	internal Pull-Up: (10..75 kΩ)
4	CS	I	SPI: Chip Select	internal Pull-Up: (1 MΩ)
5	MOSI	I	SPI: MOSI	
6	MISO	O	SPI: MISO	
7	CLK	I	SPI: CLK	internal Pull-Up: (1 MΩ)
8	RxD	I	RS232: Receive Data	internal Pull-Up: (1 MΩ)
9	TxD	O	RS232: Transmit Data	
10	DE	O	RS485: Transmit Enable	
11	SDA	I/O	I²C: Serial Data	internal Pull-Up: (10 kΩ); Pull-Up resistors can be changed for proper I²C connection
12	SCL	I	I²C: Serial Clock	internal Pull-Up: (10 kΩ´
13	SBUF TESTMODE	I	Low: Data available in send buffer PowerOn Low: Test mode	internal Pull-Up: (10 kΩ)
14	DPROT	I	High: Small-/Shortprotokoll active Low: deactivated	internal Pull-Up: (10 kΩ)
15..18	A/D 0..3	I	Analog Input 0..3	internal Pull-Down: (1 MΩ)
19..26	I/O 0.0 .. 0.7	I/O	I/O 0.0 (Bit 0..7)	internal Pull-Up: (1 MΩ), Reset-state: Tri-State, default: input
27	PWM	O	PWM-Output	
28..33	DNC	---	Do not connect	Reserved for future use
34	BUZZER	O	Sound	PWM output for external speaker
35	IO SDA	I/O	I²C data to portexpander / RTC	Portexpander MCP23017-E can be connected here. For EA uniTFTs020-ATC and EA uniTFTs028-ATC RTC MCP7940N - SN can be connected, too
36	IO CLK	O	I²C clock to portexpander / RTC	If not used please leave open
37	IO INT	I	Interrupt portexpander	If not used please leave open
38	IO RTC	I	Interrupt RTC	For EA uniTFTs020 and EA uniTFTs028 only. If not used please leave open. EA uniTFTs035 and EA uniTFTs043: internally connected, for –CLIMA remove 2x RTC resistors
39	VDD		Power Supply 3.3 V	
40	GND		Ground 0 V	

EA DEMOPACK-RGBANA

The DEMOPACK-RGBANA includes a display and a board with RGB LED and potentiometer. It demonstrates how the display drives an external component via SPI interface (here a RGB LED). For that we're using the LED APA102C. The demopack also demonstrates how to measure an analogue voltage via display input line "A/D 0".
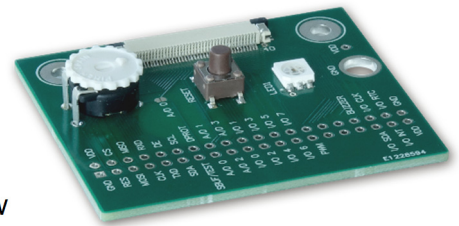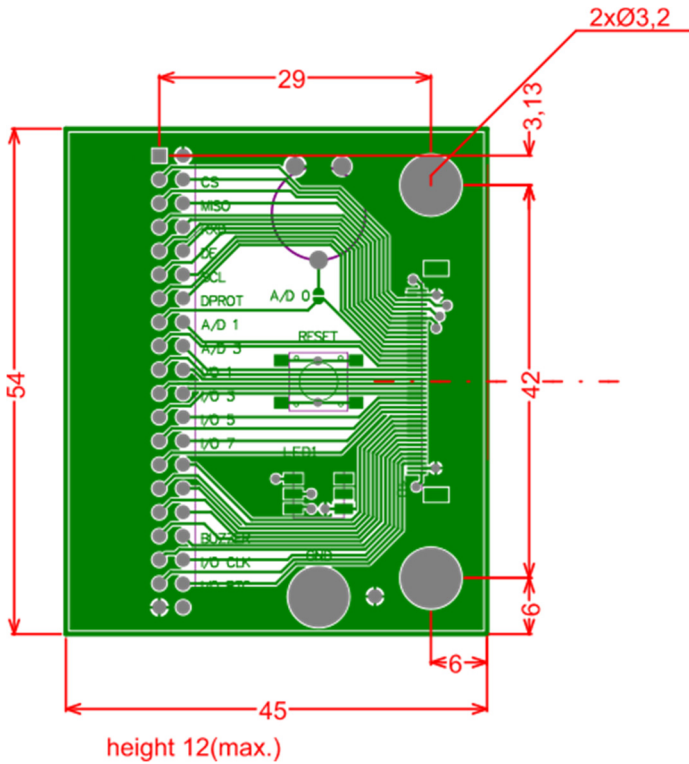
In addition there's a reset button onboard. The schematic below shows that there are less external components necessary.
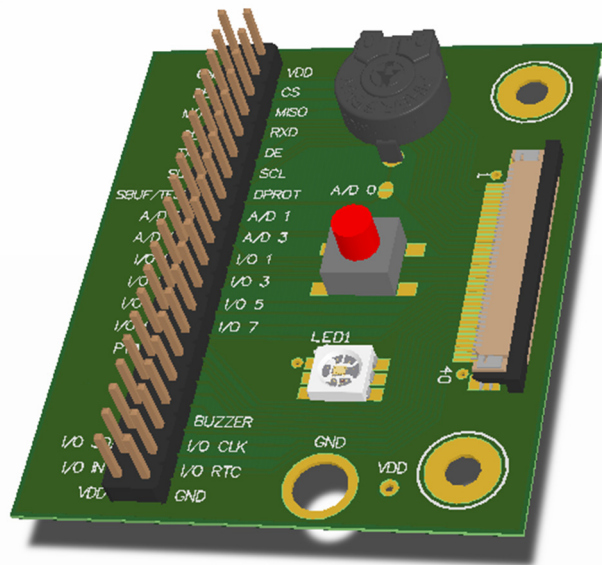
SCHEMATIC

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DIMENSION

height 12(max.)

All dimensions in mm.

If you are interested, we provide all production data incl. ALTIUM layout on our website.

CONNECTION

Note: Illustration shows a fully assembled pcb including optional components. Some components are not assembled ex factory.

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EA DEMOPACK-CONNI

The DEMOPACK-CONNI includes a display and a board with many level shifter components. Because the display provides 3.3V level at all in- and outputs, it may be necessary to adapt to a 5V system e.g.
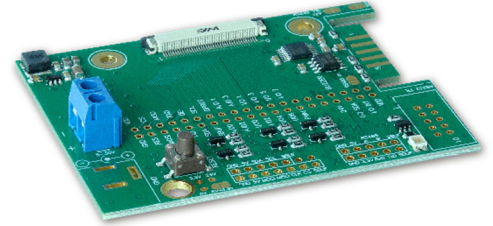
Also RS-232 signals at display are 3.3V level; this application board provides a level shifter for ±12V level (for pc).

The RS-485 driver chip allows direct connection to any RS-485 bus. Also good for RS-422.
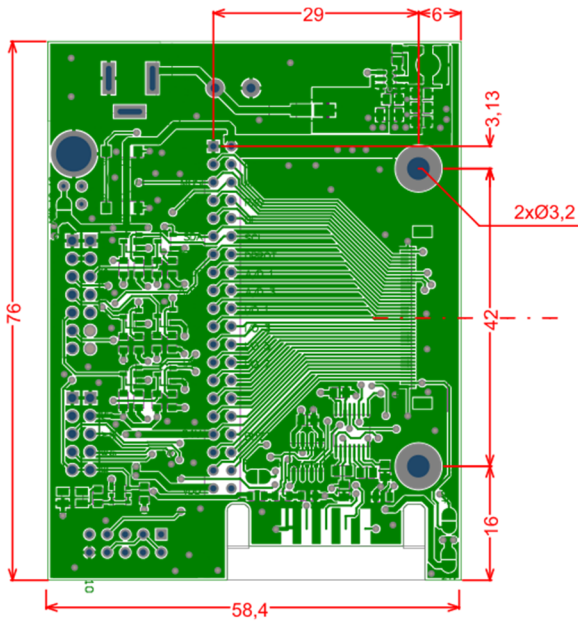Attention: RS-232 and RS-485/422 are alternative options. Short solder links SB1 and SB3 for RS-485/422 option to prevent data crash.

An onboard voltage regulator allows supply voltages from 5~30V=.
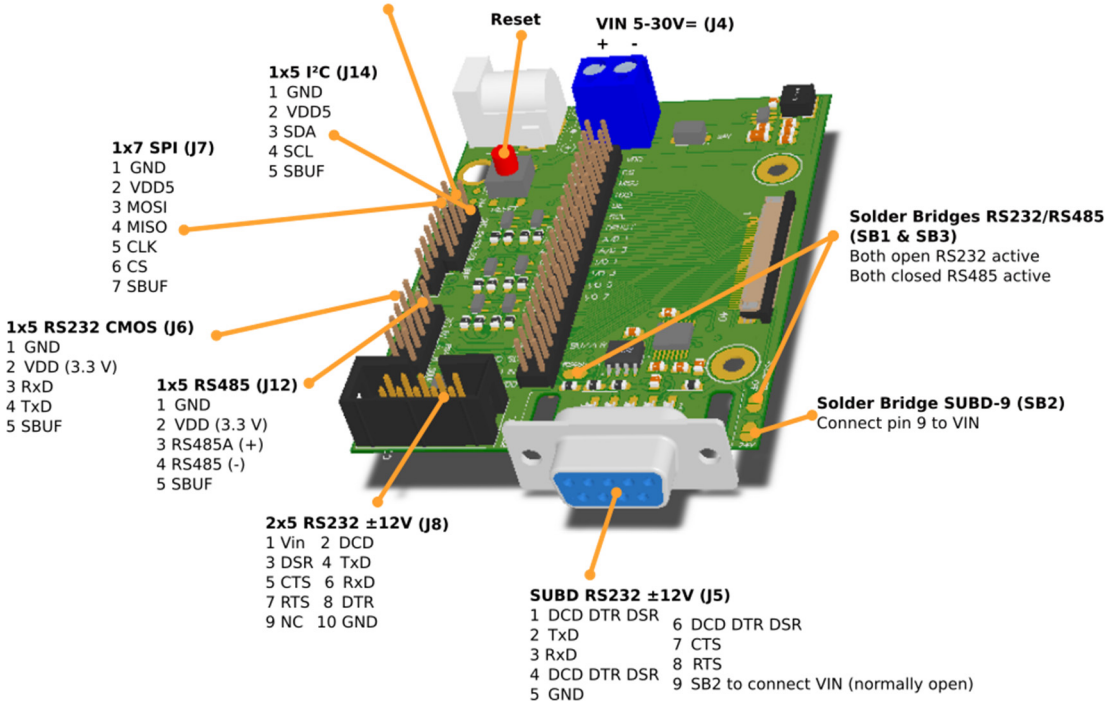
SCHEMATIC
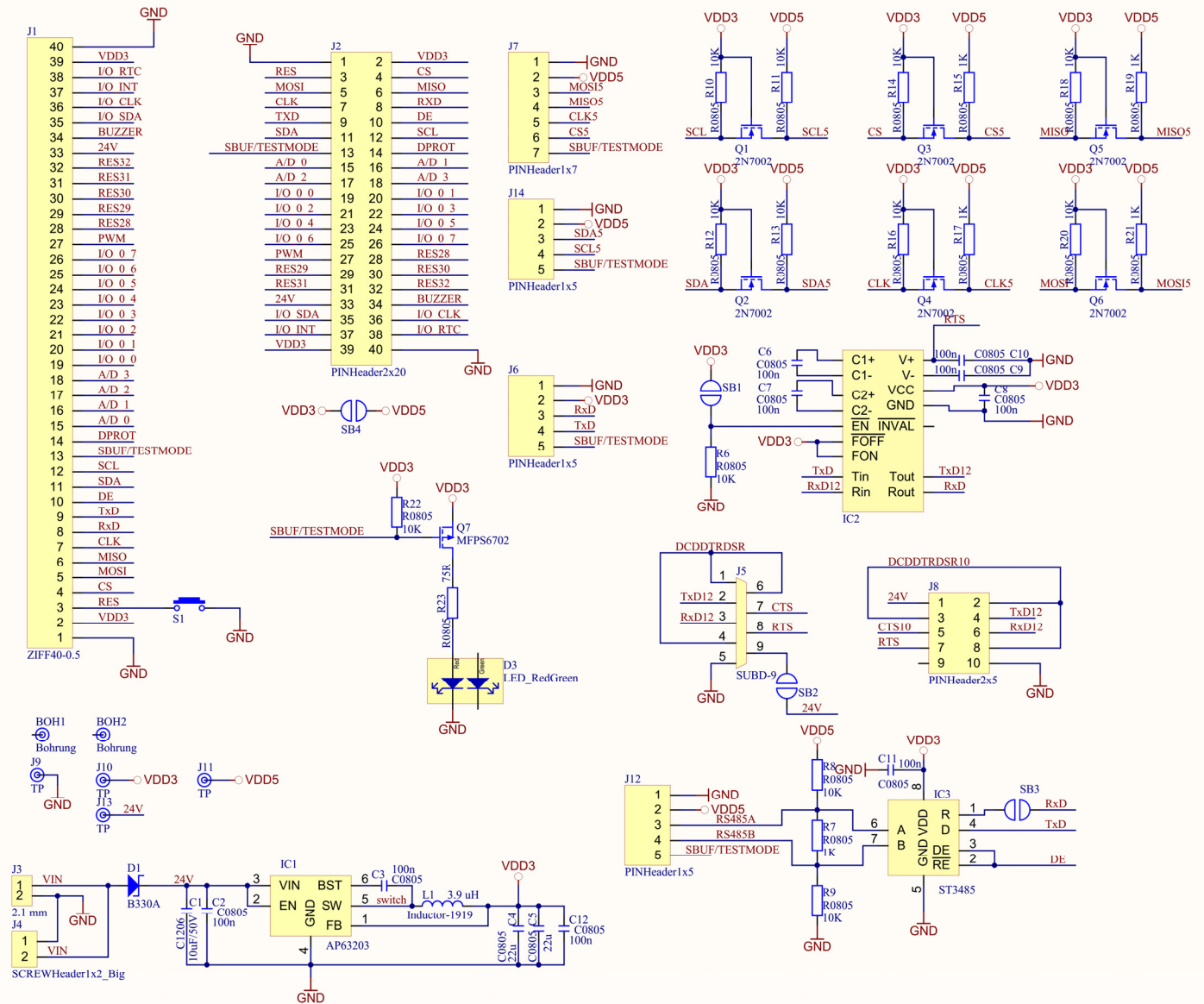
DIMENSION

height 13(max.)

All dimensions in mm.

CONNECTION

Solder Bridge VDD <-> VDD5 (SB4)
Close to short circuit VDD (max. 3.3V to) to VDD5 (5V)
The SPI and I²C level shifter use VDD5 as H-level

Reset

VIN 5-30V= (J4)
+ -

1x5 I²C (J14)
1 GND
2 VDD5
3 SDA
4 SCL
5 SBUF

1x7 SPI (J7)
1 GND
2 VDD5
3 MOSI
4 MISO
5 CLK
6 CS
7 SBUF

1x5 RS232 CMOS (J6)
1 GND
2 VDD (3.3 V)
3 RxD
4 TxD
5 SBUF

1x5 RS485 (J12)
1 GND
2 VDD (3.3 V)
3 RS485A (+)
4 RS485 (-)
5 SBUF

2x5 RS232 ±12V (J8)
1 Vin 2 DCD
3 DSR 4 TxD
5 CTS 6 RxD
7 RTS 8 DTR
9 NC   10 GND

Solder Bridges RS232/RS485 (SB1 & SB3)
Both open RS232 active
Both closed RS485 active

Solder Bridge SUBD-9 (SB2)
Connect pin 9 to VIN

SUBD RS232 ±12V (J5)
1 DCD DTR DSR   6 DCD DTR DSR
2 TxD   7 CTS
3 RxD   8 RTS
4 DCD DTR DSR   9 SB2 to connect VIN (normally open)
5 GND

Note: Illustration shows a fully assembled pcb including optional components. Some components are not assembled ex factory.

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EA DEMOPACK-RELAY

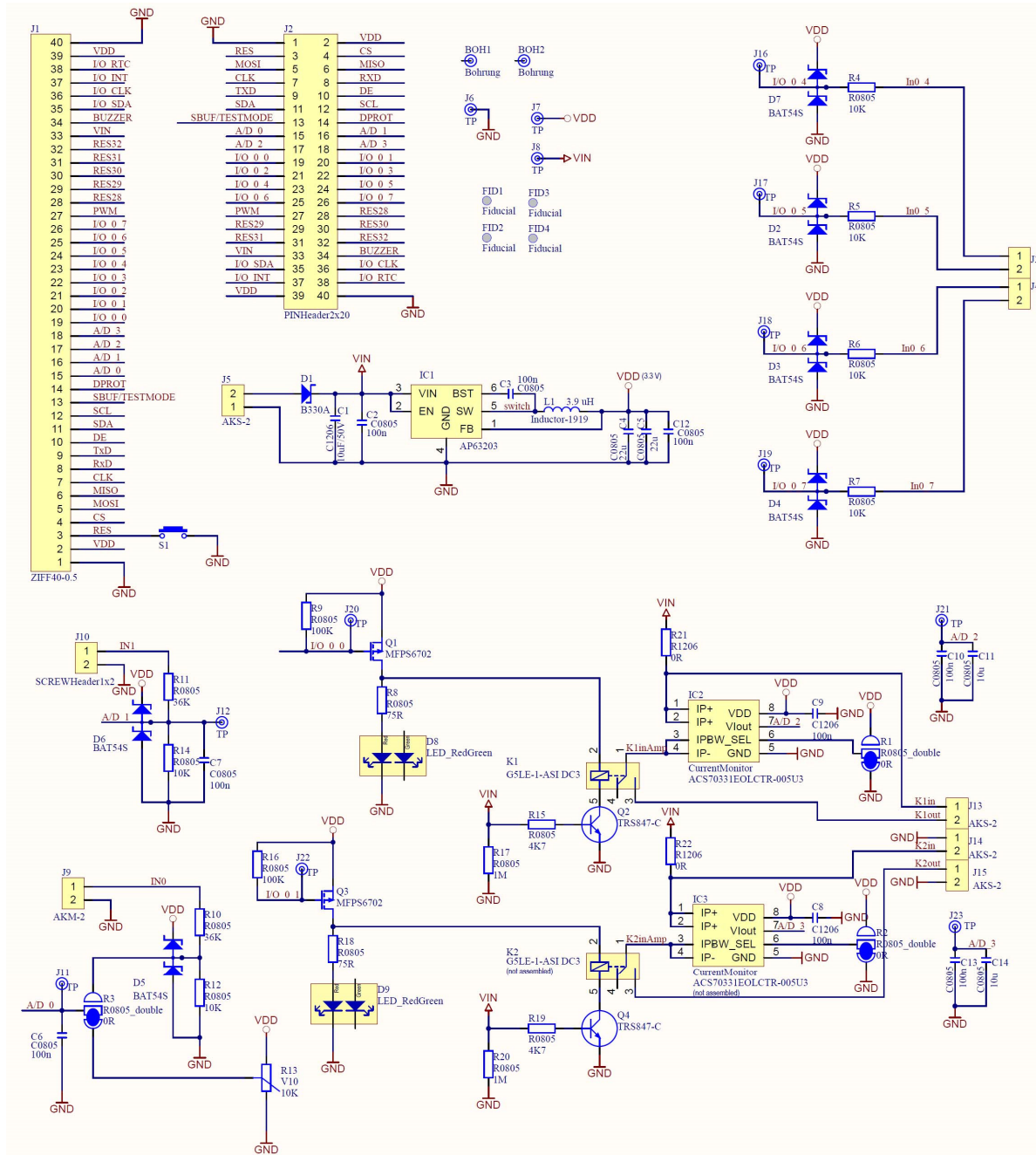The DEMOPACK-RELAY includes a display, a fan and an evaluation board with 1 relay output and current measurement (up to ±5A). There's some space and routing for a 2nd relay. It provides also 4 digital inputs for signals up to 30V.
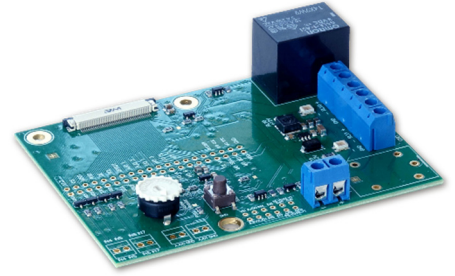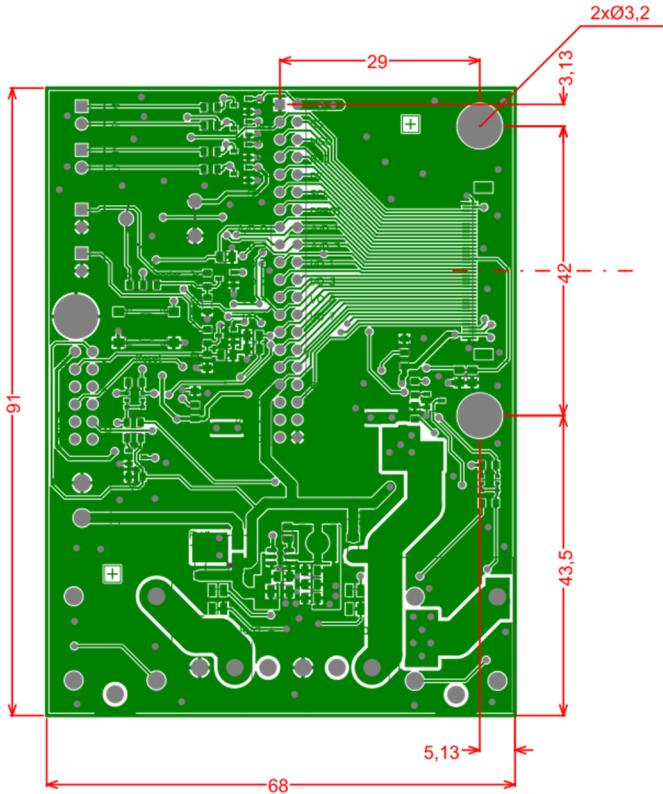
The 2 analogue inputs are open to measure external voltages of 0..+3.3V or higher with onboard voltage divider.

Power supply is 5~30V= at screw terminal J5. We suggest to provide around 12V= if provided fan is used. An onboard voltage regulator generates 3.3V (VDD) for display and relay.
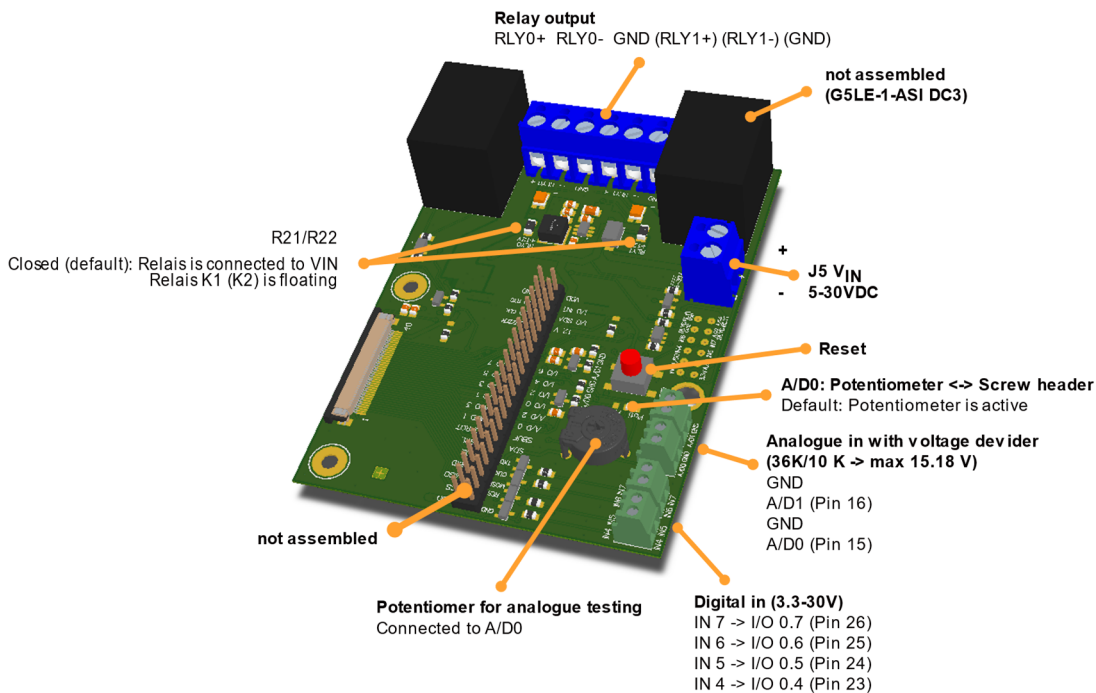
SCHEMATIC

DIMENSION

2xØ3,2

29

3,13

42

91

43,5

5,13

68

height 22(max.)

All dimensions in mm.

CONNECTION

Relay output
RLY0+ RLY0- GND (RLY1+) (RLY1-) (GND)

not assembled
(G5LE-1-ASI DC3)

R21/R22
Closed (default): Relais is connected to VIN
Relais K1 (K2) is floating

+
J5 V$_{IN}$
- 5-30VDC

Reset

A/D0: Potentiometer <-> Screw header
Default: Potentiometer is active

Analogue in with voltage devider
(36K/10 K -> max 15.18 V)
GND
A/D1 (Pin 16)
GND
A/D0 (Pin 15)

not assembled

Potentiomer for analogue testing
Connected to A/D0

Digital in (3.3-30V)
IN 7 -> I/O 0.7 (Pin 26)
IN 6 -> I/O 0.6 (Pin 25)
IN 5 -> I/O 0.5 (Pin 24)
IN 4 -> I/O 0.4 (Pin 23)

Note: Illustration shows a fully assembled pcb including optional components. Some components are not assembled ex factory (e.g. 1 relay)

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EA DEMOPACK-CLIMA

The DEMOPACK-CLIMA includes a display and an evaluation board with environmental sensors, such as temperature, humidity and gas sensor for monitoring indoor air quality, equivalent to CO_2 values.

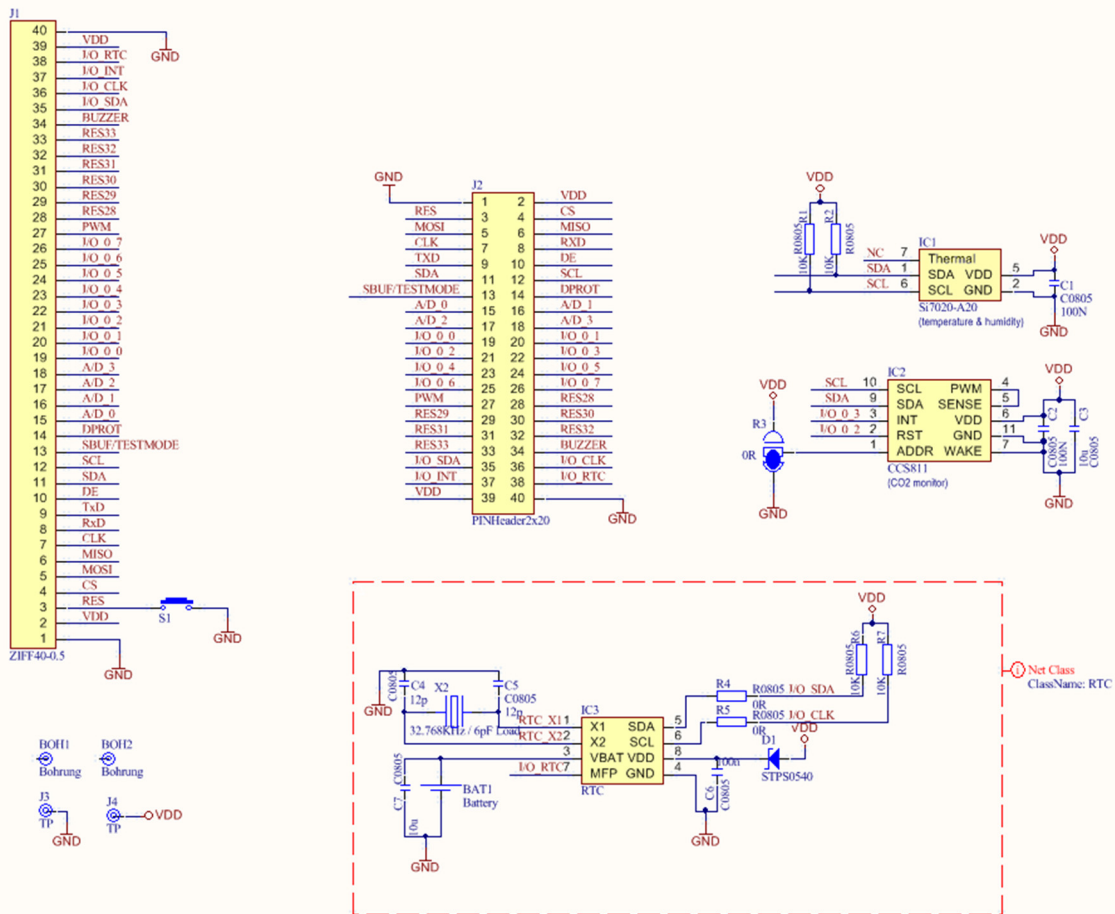Together with the build-in RTC the DEMOPACK-CLIMA can also be used for data recording.

For measuring temperature and humidity, we use a Silicon Labs Si7020-A20 I²C sensor.

For measuring CO_2 concentration we use an AMS CCS811B-JOPD500. The device is designed to monitor indoor air quality. The address pin is set to GND per default, which leads to address 0x5A (8-Bit: 0xB4), see R3.
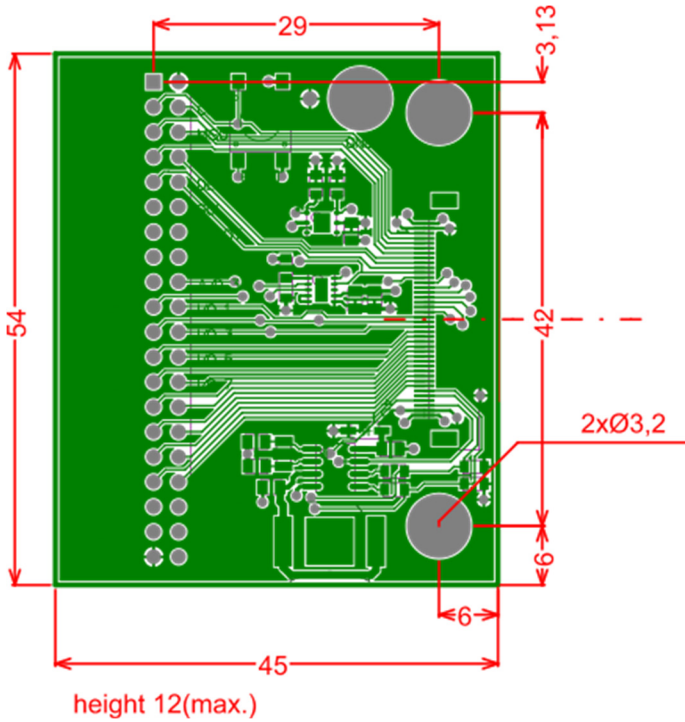
Note: EA DEMOPACK-CLIMA is designed to illustrate the use of I²C master interface. It is not a precision measuring instrument. The values differ depending on the temperature and humidity range.

Note for usage with EA uniTFTs035/043: remove R4 and R5 before use ("Disable RTC") because another RTC is assembled on display already.
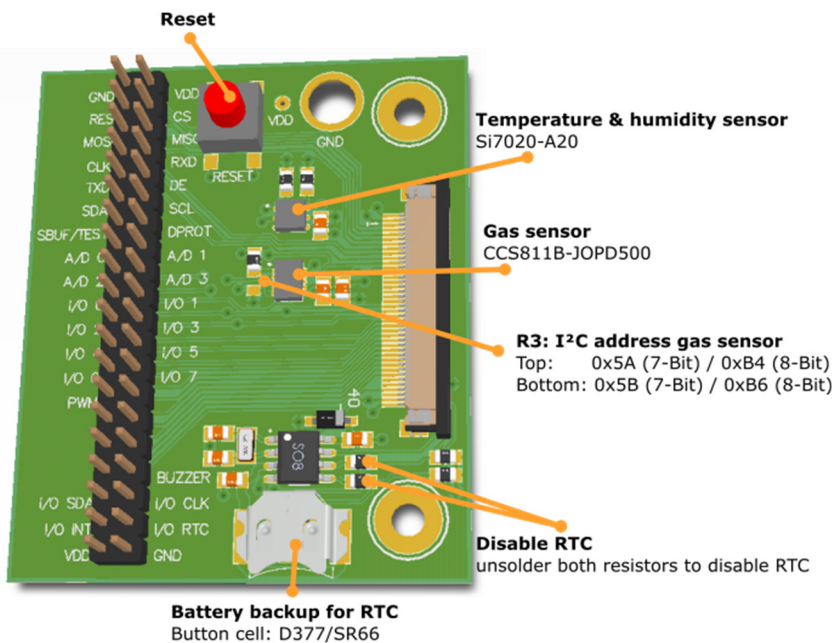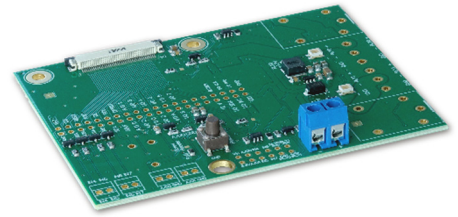
SCHEMATIC

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DIMENSION

height 12(max.)

All dimensions in mm.

CONNECTION

Reset

Temperature & humidity sensor
Si7020-A20

Gas sensor
CCS811B-JOPD500

R3: I²C address gas sensor
Top: 0x5A (7-Bit) / 0xB4 (8-Bit)
Bottom: 0x5B (7-Bit) / 0xB6 (8-Bit)

Disable RTC
unsolder both resistors to disable RTC

Battery backup for RTC
Button cell: D377/SR66

Note: Illustration shows a fully assembled pcb including optional components. Some components are not assembled ex factory.
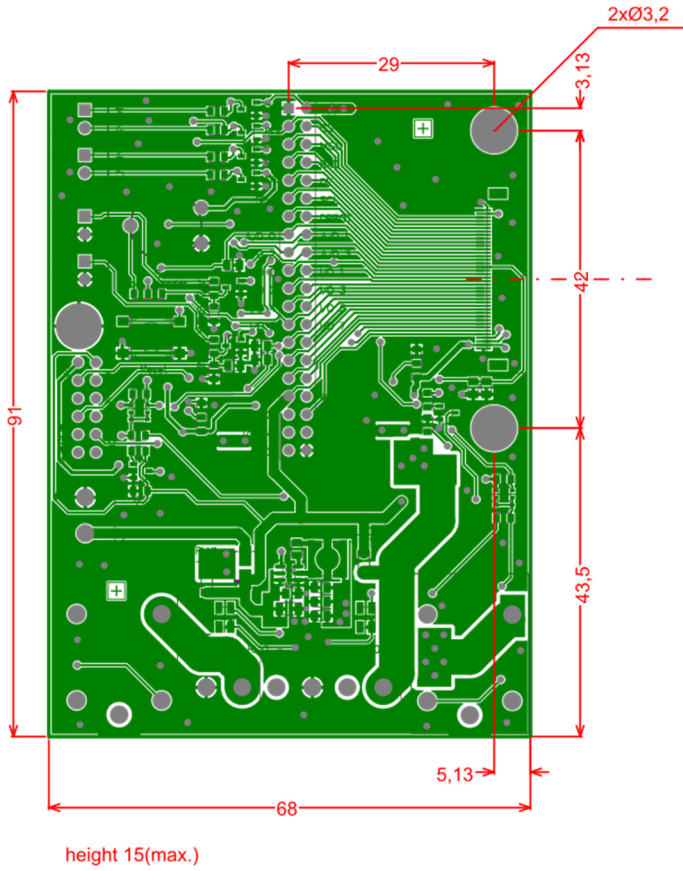
EA 94998-POWER

The EA 94998-POWER comes with an onboard voltage regulator. It allows supply voltages from 5 to 30V= and provides stabilized 3.3V to the ZIF connector e.g. for all displays in EA uniTFTs family.
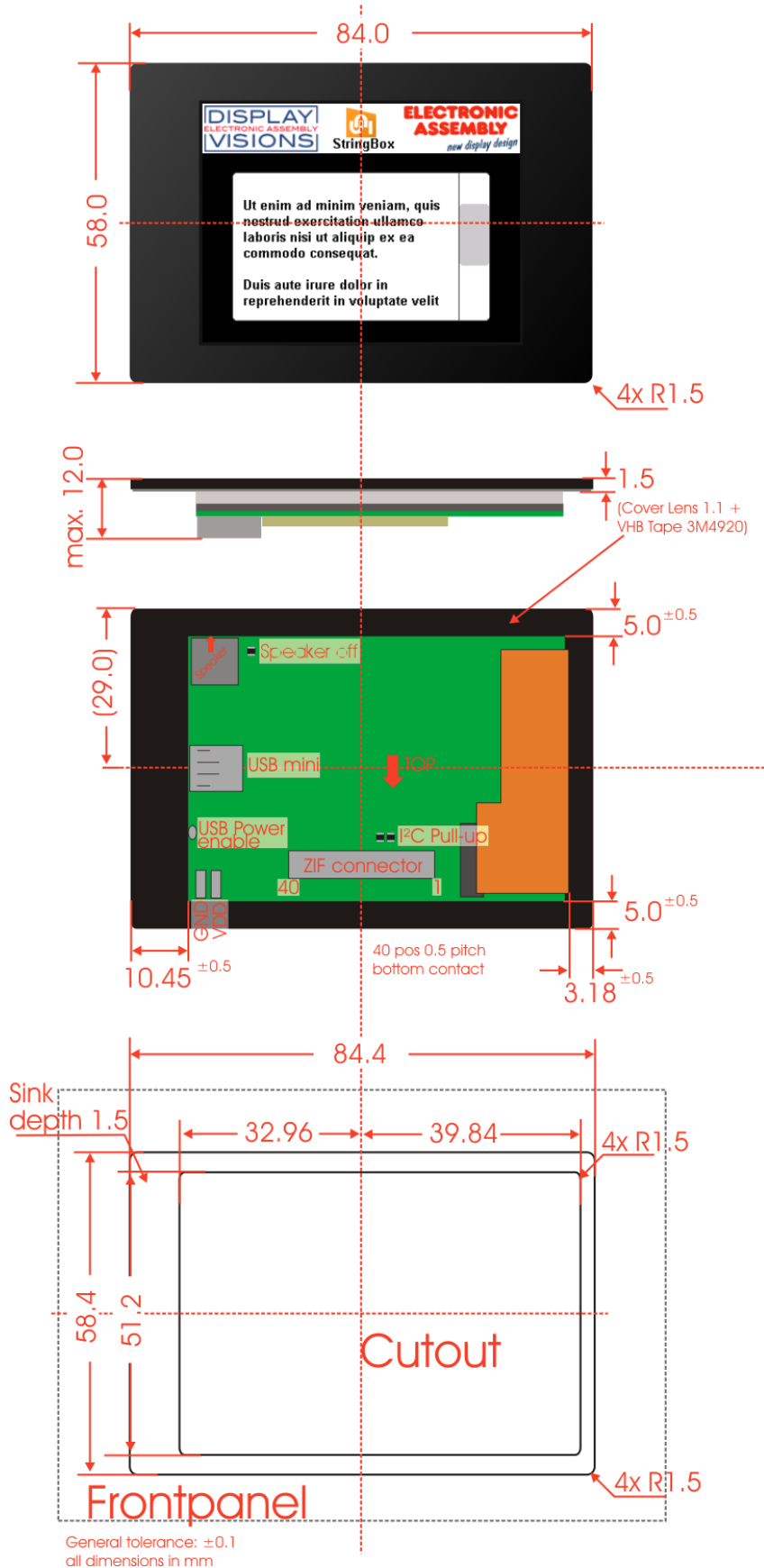
SCHEMATIC

DIMENSION

height 15(max.)
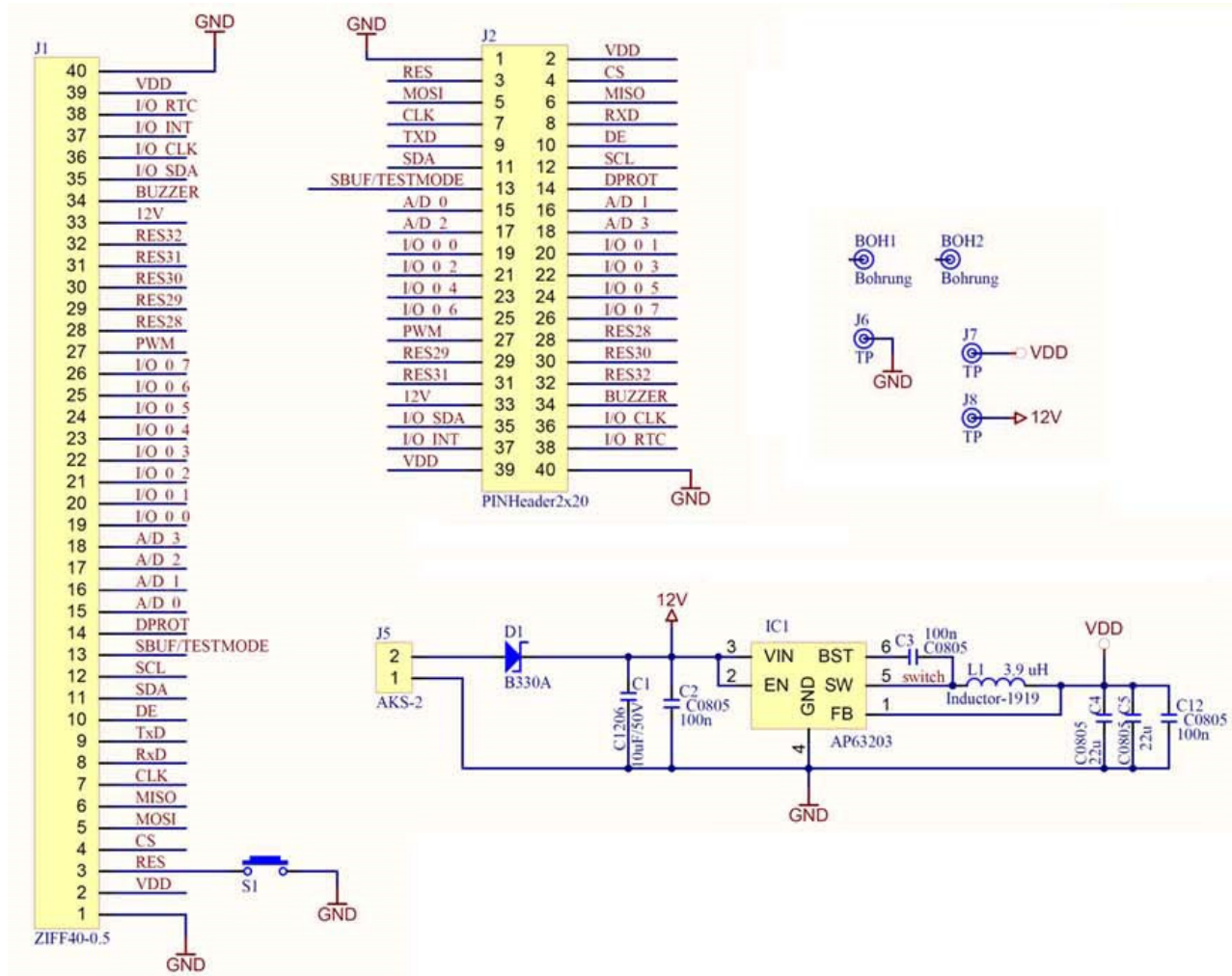
All dimensions in mm.

OUTLINE DIMENSION 2.8" DISPLAY

Every EA DEMOPACK-xxx comes with an intelligent HMI display unit incl. touchpanel EA uniTFTs028-ATC.

All dimension are in mm

84.0

58.0

4x R1.5

max. 12.0

1.5

(Cover Lens 1.1 + VHB Tape 3M4920)

5.0 ±0.5

(29.0)

Speaker off

USB mini — TQR

USB Power enable — I²C Pull-up

ZIF connector

40   1

GND VDD

10.45 ±0.5

40 pos 0.5 pitch bottom contact

5.0 ±0.5

3.18 ±0.5

84.4

Sink depth 1.5

32.96   39.84

4x R1.5

58.4

51.2

Cutout

Frontpanel

4x R1.5

General tolerance: ±0.1
all dimensions in mm

ELECTRONIC ASSEMBLY reserves the right to change specification without prior note.

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