PiRA RTC HAT

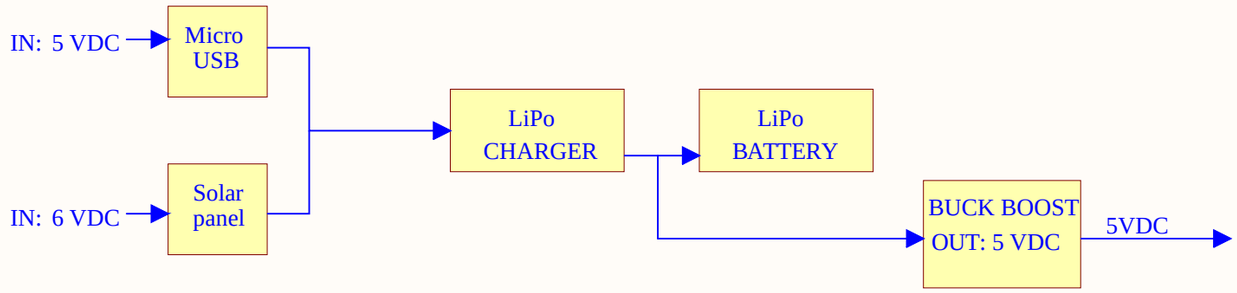
Power in Responsive Applications with RTC sleep mode.
Designed as a Raspberry Pi Zero HAT.

CONTENTS:

Version Revision:

v0.1 - 20.09.2017.
v0.2 - 31.10.2017.

POWER DIAGRAM



DESIGN CONSIDERATIONS

DESIGN NOTE:
Example text for informational design notes.

DESIGN NOTE:
Example text for critical design notes.

LAYOUT NOTE:
Example text for critical layout guidelines.

Irnas	www.irnas.eu	
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POWER, RTC, RPI

CHARGER INPUTS

Wireless charger

Solar panel

CON1 microUSB

P3 Header 2

D5 SE30AFG-M3/6A

D6 BZT52C6V2

R30 10R

R12 10k

R4 3k9

D2 3V

R1 470R

D1

R2 0R NP

CHARGER

U1 BQ24296RGET

VBUS PSEL PG STAT SCL SDA

INT OTG CE ILIM TS QON

BTST SW SW GND GND SYS SYS BAT BAT PAD

C1 10uF /16V

C2 4u7/16V

C3 47n

L1 1.5uH

C4 10uF /16V

C5 10uF /16V

R6 5k6

R5 10k

P4 Header 2

R7 220R

T1 MMBT3904

R13 470R

R16 10k

R14 0R

R15 33k

BATTERY CONNECTOR

VBAT F1 3A D4 RS1J-E3/61T.. P1 Header 2

BOOST CONVERTER

P2 Header 2

ENABLE_5V

L2 1.5uH

U2 TPS630701RNMT

VIN VIN EN VSEL PS/S PG VAUX L1 L2 GND VOUT VOUT FB2 FB

C6 10uF /16V

C7 22u

C8 22u

C9 22u

C10 22u

C11 10uF /16V

+5V

R3 0R

R8 150k NP

R9 470k

R10 10k

C12 100nF

MOSFET OUT

U5 DMG6602SVT

CPU_SELF_EN15V

TIMER_EN_5V3

R23 47k

U6 DMG6602SVT

CHG EN

VBUS

R24 0R

RTC_EN_5V

R25 47k

GPIO_FET

R18 100R

R17 100k

R27 100R

T3 2N7002,215

T2 BSZ120P03NS3GATMA1

R19 100k

FET_OUT

P7 Header 8

TXD RXD GPIO_BCM5 GPIO_BCM6

DESIGN NOTE:
Jumper to select ONE_SHOT mode of the TPL5110
HIGH - works as timer
LOW - the TPL5110 turns on the MOSFET one time for the programmed time interval. The next power on of the MOSFET is enabled by the manual power ON.

LoRa

U7 Lora RFM95

MISO MOSI SCK SPI_CSS LORA_RST

GND MISO MOSI SCK NSS RESET DIO5 GND

DIO2 DIO1 DIO0 3V3 DIO4 DIO3 GND ANT

3.3V ANTENA

J1 ANTENA

CON2 Socket

BATTERY VOLTAGE

R26 499k

R29 499k

C13 100nF

U4 MCP3021

VDD VSS AIN SCL SDA

SCL SDA

RPI CONNECTOR

P5 Header 20X2

3.3V +5V

SDA SCL RST_RTC TIMER_EN_5V TIMER_DONE RTC_EN_5V MOSI MISO SCK GPIO_BCM5 GPIO_BCM6 LORA_RST

TXD RXD CPU_SELF_EN_5V GPIO_FET GPIO_BCM25 SPI_CSS

RTC

U3 DS3231M

33KHZ VCC INT/SQW RST N.C. N.C. N.C. N.C.

SCL SDA VBAT GND N.C. N.C. N.C. N.C.

J3

C14 100nF

R22 10k

R20 10k

R21 10k

R28 0R

RTC_EN_5V

RST_RTC

P9 Header 2

TIMER

J2

U8 TPL5110

VDD EN/ONE_SHOT GND DELAY/M_DRV

DRV DONE

R31 10k

TIMER_EN_5V TIMER_DONE

I2C/DISPLAY

P6 Header 4

SDA SCL 3.3V

SENSOR

P8 Header 3

3.3V GPIO_BCM25

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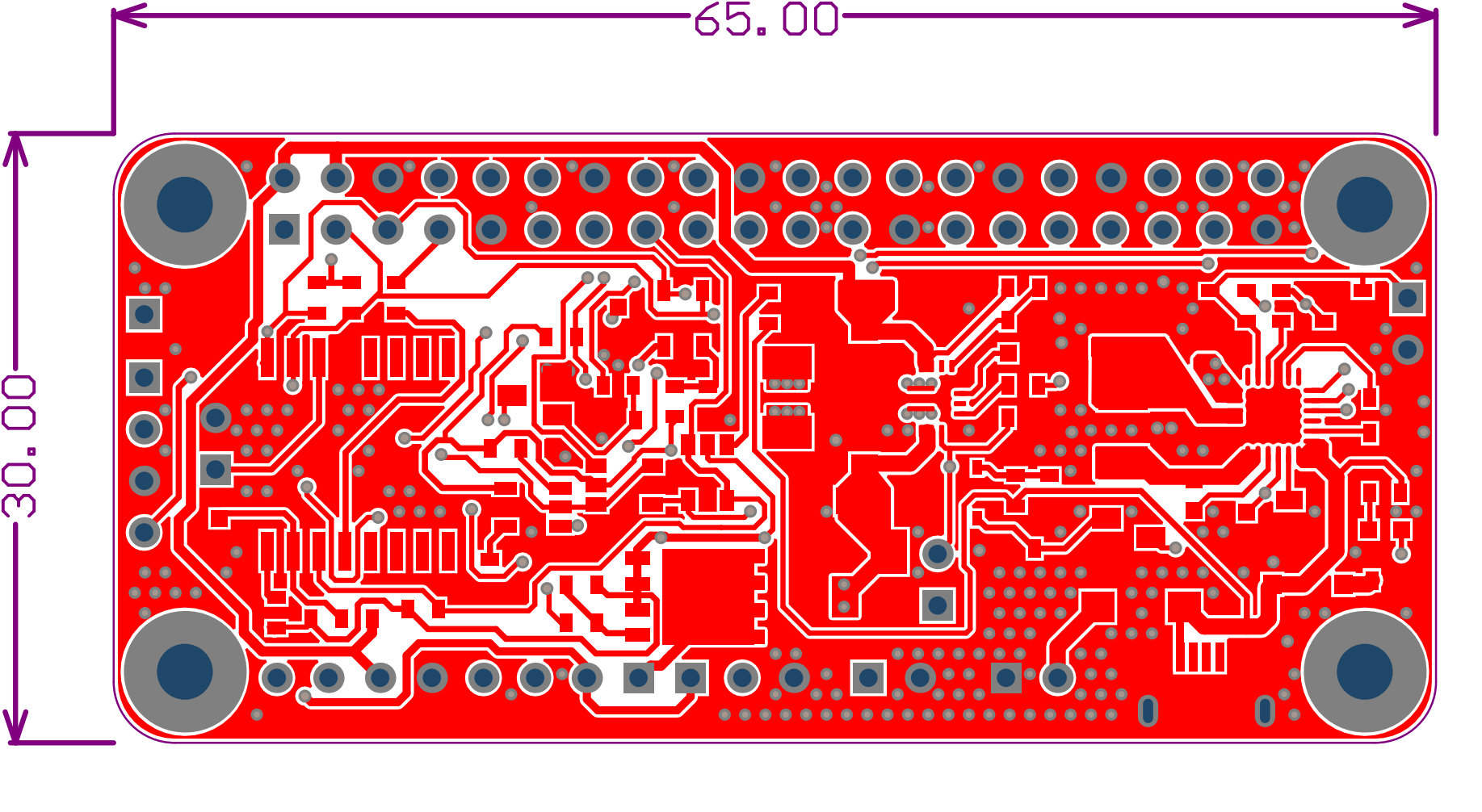
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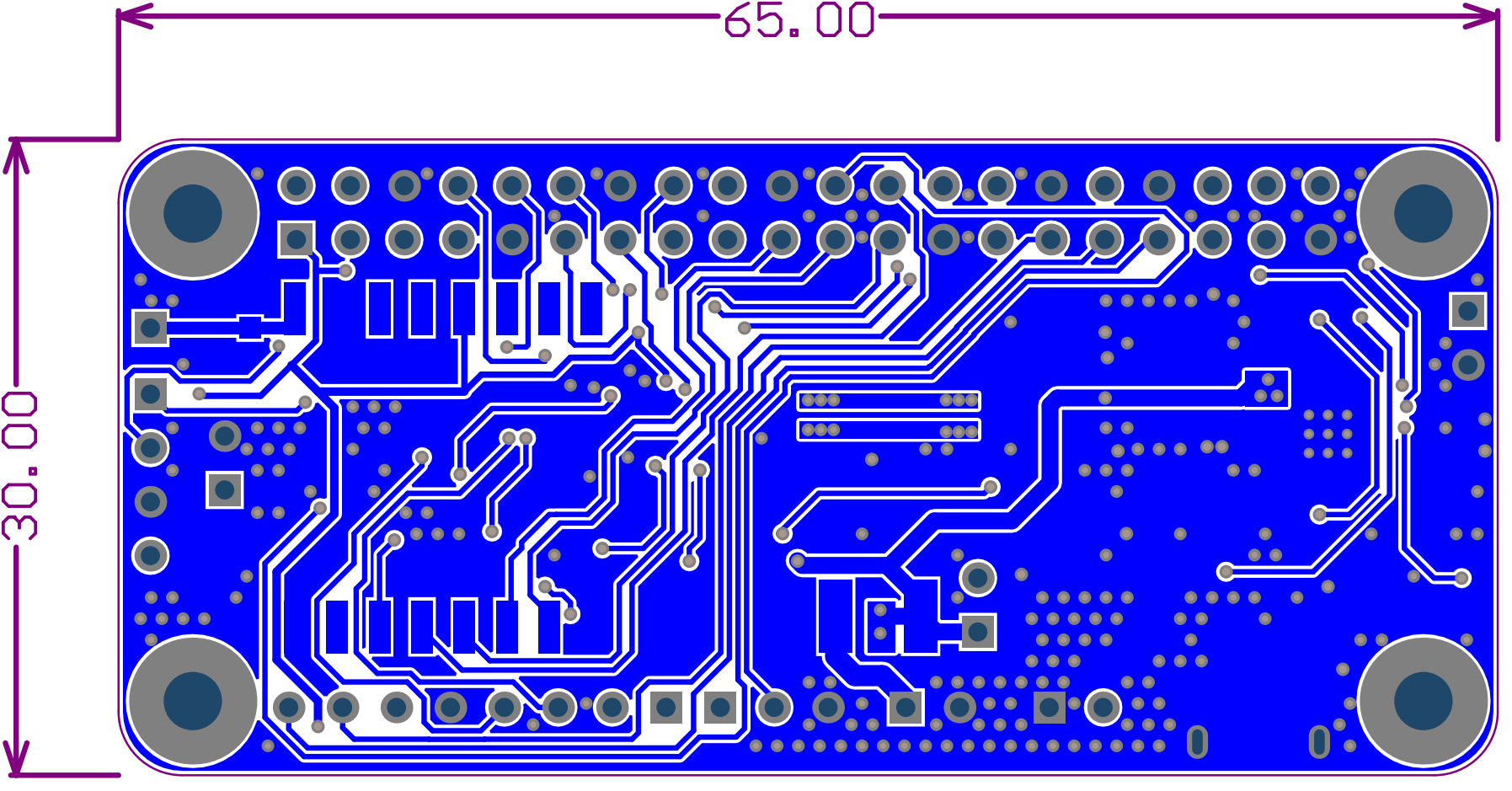
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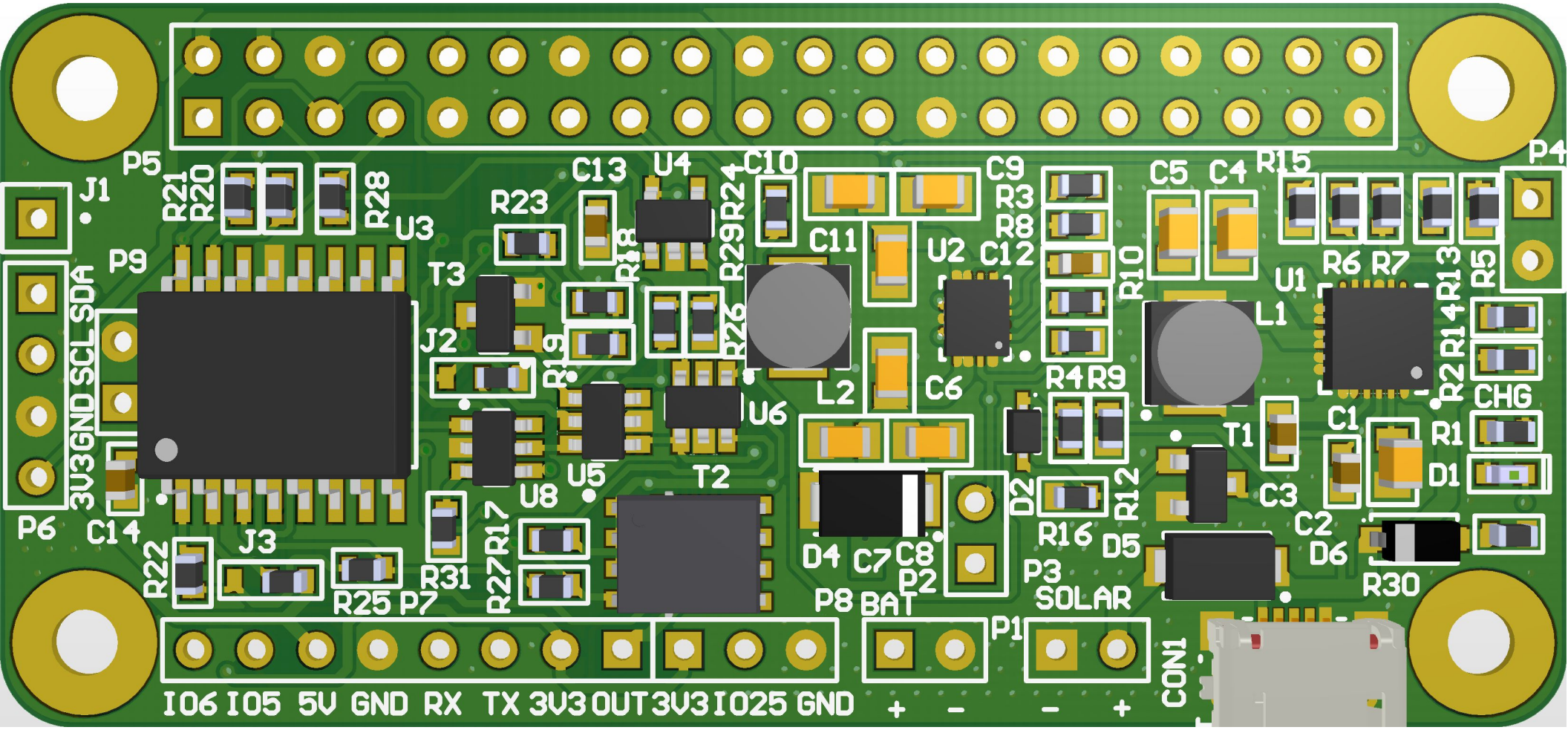
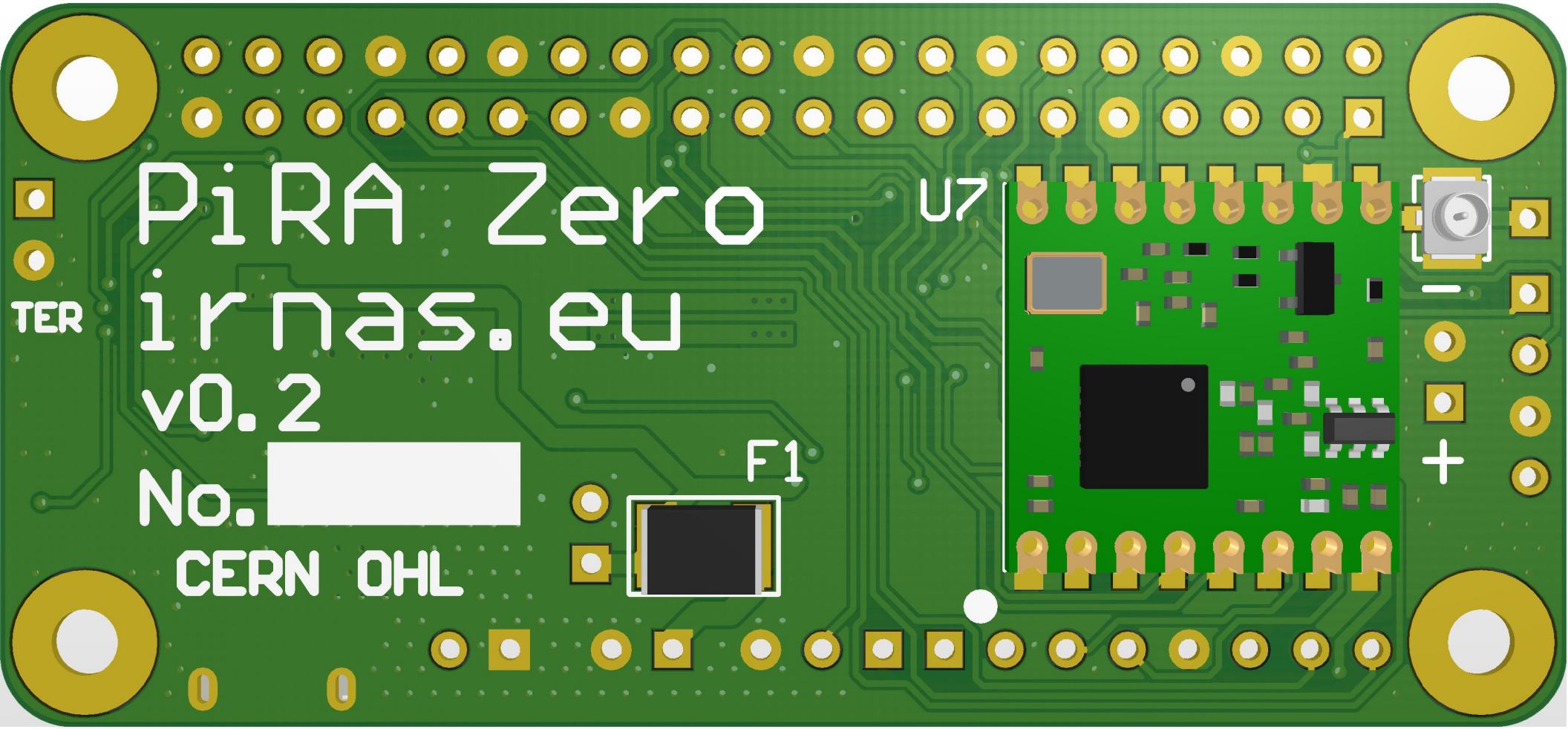

P5
J1
P9
R21
R20
R28
U3
R23
C13
U4
R18
R29
R24
C10
C11
C9
R3
R8
C12
U2
C5
C4
R15
P4
R10
L1
U1
R6
R7
R13
R5
R14
R2
R1
CHG
D1
C1
C3
T1
C2
D6
R30
D5
R12
D2
R16
R4
R9
C6
L2
U6
T3
J2
R19
R26
U5
T2
U8
R17
R27
R31
R25
P7
J3
R22
C14
P6
3V3
GND
SCL
SDA
D4
C7
C8
P2
P8
BAT
P1
P3
SOLAR
CON1
IO6
IO5
5V
GND
RX
TX
3V3 OUT
3V3
IO25
GND
+
-
-
+


PiRA Zero
irnas.eu
v0.2
No.
CERN OHL
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