DEXA-C097 ESP32S3 HAT

This PCB mission is to provide:

- ESP32S3 Espressif MCU with 2MB of external RAM
- WiFi
- BLE
- DS3231 real time clock and small CR1220 coin battery to keep time
- Fast 40Mhz SPI
- 3V to 5V step-up (And a way to enable this boost converter)
- 3.7v LiPo battery charger
- I2C connector for sensors
- Extra SPI connector with it's own Busy & Chip select pin

You can find more about the Schematic, BOM and PCB Routing in the following link:

https://github.com/martinberlin/H-cinread-it8951
This is an open source designed Hardware so the goal is that other developers can collaborate, make merge requests to add new features, or fork it and send to fabrication their own version provided the LICENSE is respected and does not go to mass production.

APPLICATION IDEAS
Wall digital clock with temperature, Photo-frame that receives image per Bluetooth, sensors that connect per I2C or SPI and display useful information. WiFi download of API information to the epaper display, etc.

CURRENT KNOWN ISSUES
- Charges battery too strong: This will make the Tp4056 and the diode heat, making the RTC temperature measurements go 10°C or more degrees hot. You might disconnect JP1 jumper for a slower charge.
- I2C connection with board below does block I2C and our RTC connection that uses same protocol. Still need to research on this one.
SOLUTION: Do not connect SDA, SCL pins to board below.

VCOM Setting this value via LovyanGFX library using SPI communication on this board is working but having unexpected behavior that is not caused by my PCB.
HENCE, the VCOM printed in my demo, is the default which is too high for most EPAPERS being 2600 (-2.6 V)

This project has applied for oshwa.org open source certification and we plan to keep all design files, documentation and demo software in this format.

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PIN UP Table

Description	Protocol	Out/Input in MCU	GPIO number
MOSI	SPI	OUT	11
MISO	SPI	IN	12
CLK	SPI	OUT	13
CS	SPI	OUT	10
BUSY	SPI	IN	3
MOSI/MISO/CLK	Shared SPI1 & SPI2	- - -	- - -
CS2	SPI 2	OUT	9
BUSY2	SPI 2	IN	14
SDA	I2C	Bidirectional	7
SCL	I2C	OUT	15
ENABLE_5V	- - -	OUT	38
ADC1_CH3	To measure battery	IN to ADC	4
TPS_STAT	Power by USB (LOW) Battery (HIGH)	IN	5
DS3231_INT	Interrupt pin from RTC w/pull-up	IN	6
Extra GPIOS for	**Buttons / sensors:**		
IO21	Below MCU	Per Firmware decide	21
IO45			45
IO47			47
IO48			48

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