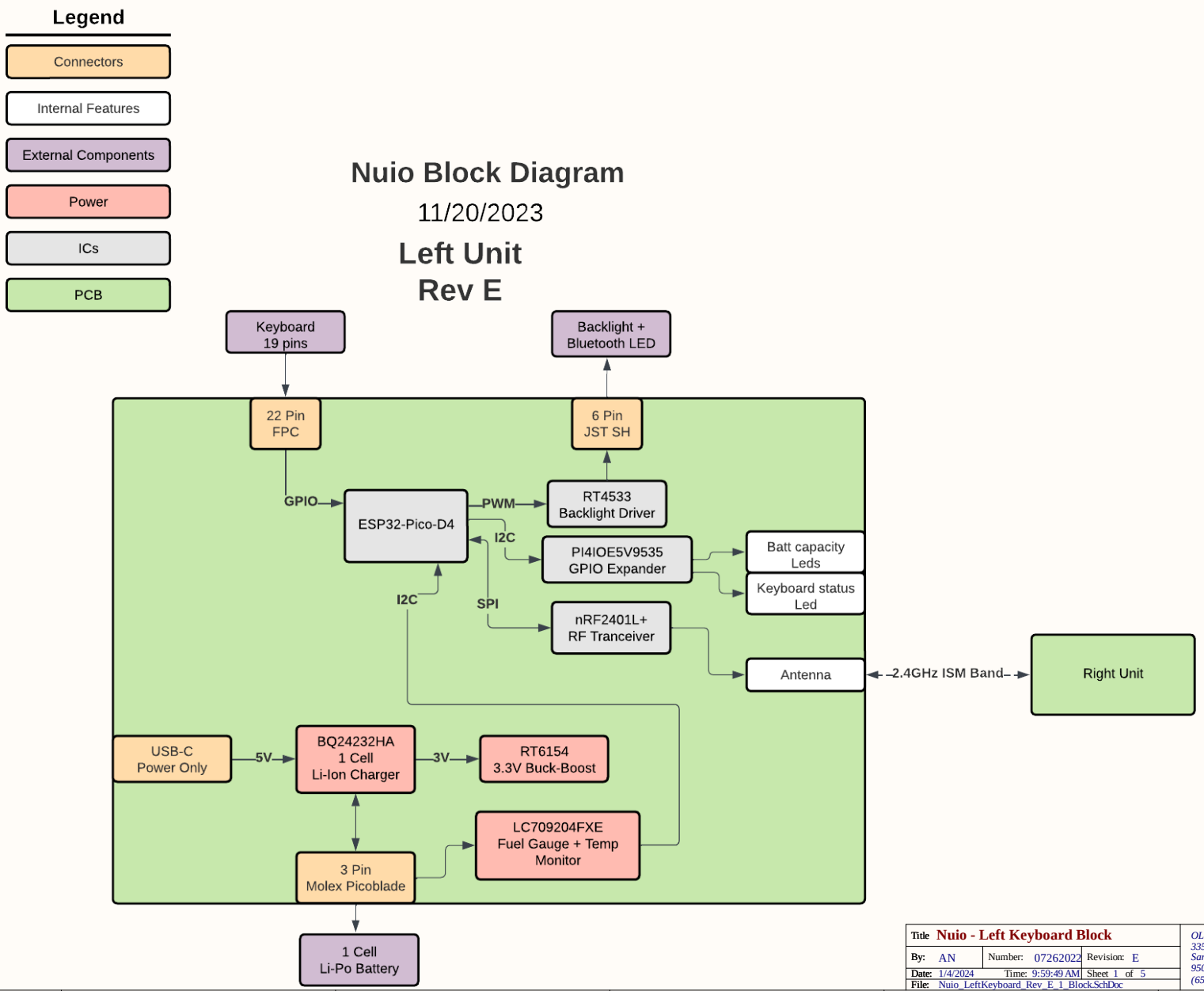
Legend
Connectors
Internal Features
External Components
Power
ICs
PCB
Nuio Block Diagram
11/20/2023
Left Unit
Rev E
Keyboard
19 pins
Backlight +
Bluetooth LED
22 Pin
FPC
6 Pin
JST SH
GPIO
ESP32-Pico-D4
PWM
RT4533
Backlight Driver
I2C
PI4IOE5V9535
GPIO Expander
Batt capacity
Leds
Keyboard status
Led
I2C
SPI
nRF2401L+
RF Tranceiver
Antenna
2.4GHz ISM Band
Right Unit
USB-C
Power Only
5V
BQ24232HA
1 Cell
Li-Ion Charger
3V
RT6154
3.3V Buck-Boost
LC709204FXE
Fuel Gauge + Temp
Monitor
3 Pin
Molex Picoblade
1 Cell
Li-Po Battery
Title Nuio - Left Keyboard Block
By: AN
Number: 07262022
Revision: E
Date: 1/4/2024
Time: 9:59:49 AM
Sheet 1 of 5
File: Nuio_LeftKeyboard_Rev_E_1_Block.SchDoc
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MTDI = GPIO12
MTDO = GPIO15

IO16 + IO17 Reserved

Table 3: Strapping Pins

Voltage of Internal LDO (VDD_SDIO)			
Pin	Default	3.3 V	1.8 V
MTDI	Pull-down	0	1
Booting Mode			
Pin	Default	SPI Boot	Download Boot
GPIO0	Pull-up	1	0
GPIO2	Pull-down	Don't-care	0
Enabling/Disabling Debugging Log Print over U0TXD During Booting			
Pin	Default	U0TXD Active	U0TXD Silent
MTDO	Pull-up	1	0
Timing of SDIO Slave			
Pin	Default	FE Sampling FE Output	FE Sampling RE Output	RE Sampling FE Output	RE Sampling RE Output
MTDO	Pull-up	0	0	1	1
GPIO5	Pull-up	0	1	0	1

Maybe Change I2C_CLK
OR Data to ESP_BOOT

ESP32 Pico D4

LU1
ESP32-PICO-D4
Run I2C @ 400kHz

BOOT

LSW1 DNP SKSVCAE010

~5s reset time

RESET

LSW2 TL3340AF160QG
LU3 LMV331SQ3T2G

R7 changed to 47.5k
R33 changed to 3M
C1 changed to 10uF

UI GPIO Expander

LU2 PI4IOE5V9535ZDEX
ADDR = 0x20

RevBit changed to 011 (5)

Changed R1 to 100k

LQ1 BSS138W-7-F 200mA 50V

added fet and resistor to invert interrupt

Test Points

Programming Header

LCN1 TC2050-IDC

Accelerometer

LU4 LIS3DHTR
I2C Adr: 0x6A

DNP'd whole accelerometer circuit

Ambient Light Sensor

LQ2 ALS-PT19-315C/L177/TR8

DNP'd whole ambient sensor circuit

Title	Nuio - Left Keyboard MCU		
By:	AN	Number: 07262022	Revision: E
Date:	1/4/2024	Time: 9:59:49 AM	Sheet 2 of 5
File:	Nuio_LeftKeyboard_Rev_E_2_MCU.SchDoc		

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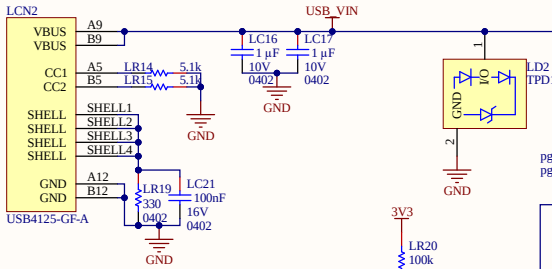
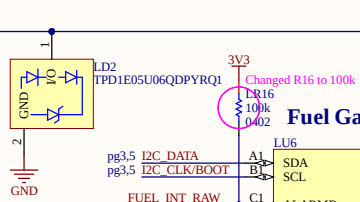
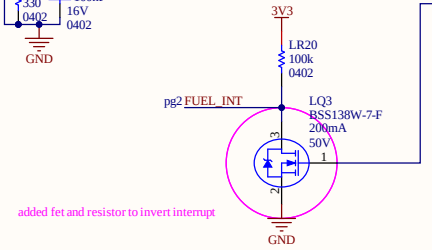
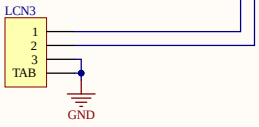
Battery Charging and Monitoring

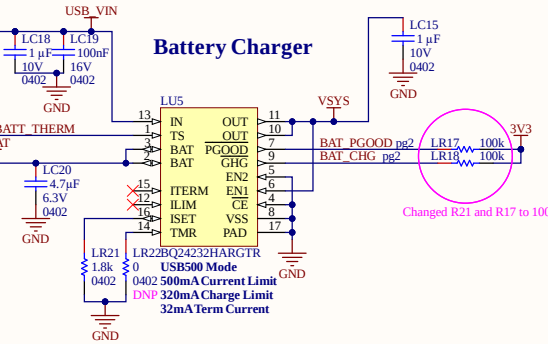
USBC Charge Port



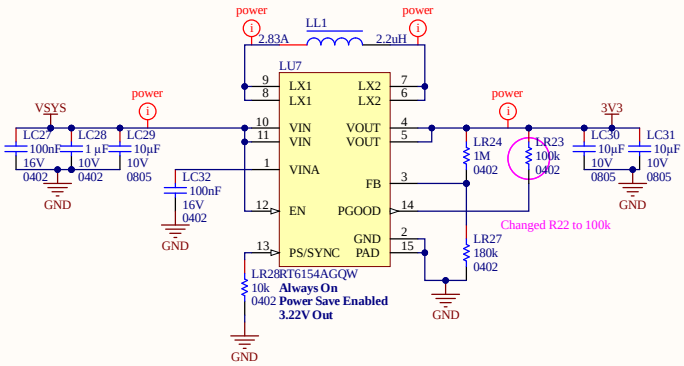




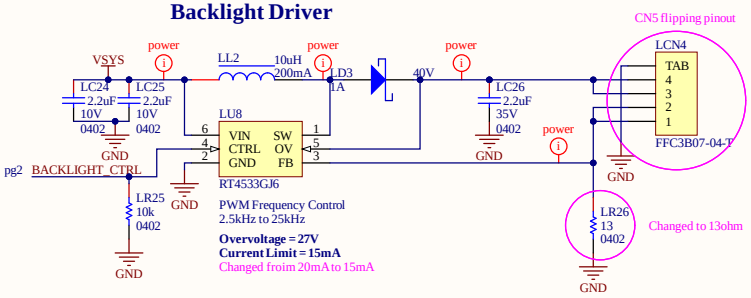




3.3V 3A Buck-Boost



Backlight Driver



Title	Nuio - Left Keyboard Power		
By: AN	Number: 07262022	Revision: E	
Date: 1/4/2024	Time: 9:59:49 AM	Sheet 3 of 5	
File: Nuio_LeftKeyboard_Rev_E_3_Power.SchDoc			

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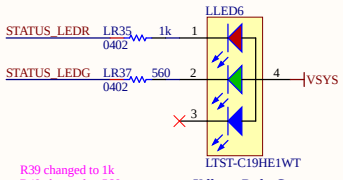
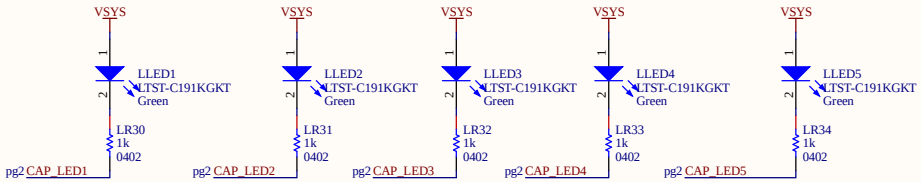
Battery Capacity LEDS

Status LEDs



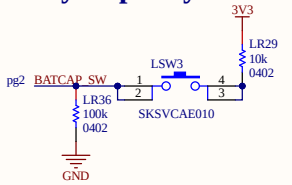
R39 changed to 1k
R40 changed to 560

Yellow = Red + Green
drop in EAST1616RGBB2
Green Vf = 2.8V
Red Vf = 1.9V



R27, R28, R29, R30, R31 changed to 1k

Battery Capacity Button



added pullup with weak pulldown instead of direct connect to 3.3V

Title	**Nuio - Left Keyboard UI**		
By: AN	Number: 07262022	Revision: E	
Date: 1/4/2024	Time: 9:59:50 AM	Sheet 4 of 5	
File: Nuio_LeftKeyboard_Rev_E_4_UI.SchDoc			

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ISM Band Tranceiver/Receiver

Mode	PWR_UP register	PRIM_RX register	CE input pin	FIFO state
RX mode	1	1	1	-
TX mode	1	0	1	Data in TX FIFOs. Will empty all levels in TX FIFOs[a].
TX mode	1	0	Minimum 10µs high pulse	Data in TX FIFOs.Will empty one level in TX FIFOs[b].
Standby-II	1	0	1	TX FIFO empty.
Standby-I	1	-	0	No ongoing packet transmission.
Power Down	0	-	-	-

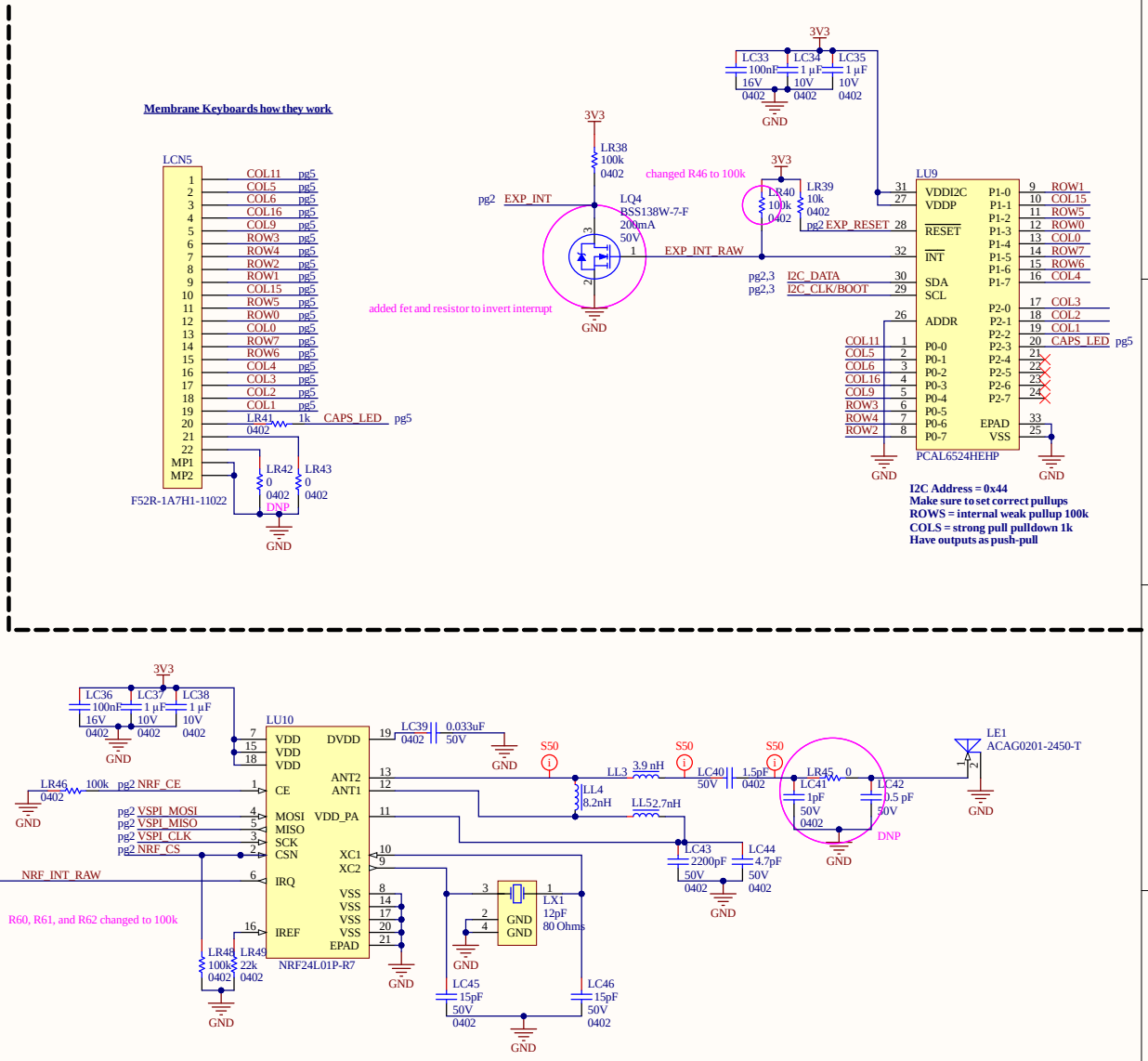
a. If **CE** is held high all TX FIFOs are emptied and all necessary ACK and possible retransmits are carried out. The transmission continues as long as the TX FIFO is refilled. If the TX FIFO is empty when the **CE** is still high, nRF24L01+ enters standby-II mode. In this mode the transmission of a packet is started as soon as the **CSN** is set high after an upload (UL) of a packet to TX FIFO.

b. This operating mode pulses the **CE** high for at least 10µs. This allows one packet to be transmitted. This is the normal operating mode. After the packet is transmitted, the nRF24L01+ enters standby-I mode.

Mode	PWR_UP register	PRIM_RX register	CE input pin	FIFO state
RX mode	1	1	1	-
TX mode	1	0	1	Data in TX FIFOs. Will empty all levels in TX FIFOs[a].
TX mode	1	0	Minimum 10µs high pulse	Data in TX FIFOs.Will empty one level in TX FIFOs[b].
Standby-II	1	0	1	TX FIFO empty.
Standby-I	1	-	0	No ongoing packet transmission.
Power Down	0	-	-	-

a. If **CE** is held high all TX FIFOs are emptied and all necessary ACK and possible retransmits are carried out. The transmission continues as long as the TX FIFO is refilled. If the TX FIFO is empty when the **CE** is still high, nRF24L01+ enters standby-II mode. In this mode the transmission of a packet is started as soon as the **CSN** is set high after an upload (UL) of a packet to TX FIFO.

b. This operating mode pulses the **CE** high for at least 10µs. This allows one packet to be transmitted. This is the normal operating mode. After the packet is transmitted, the nRF24L01+ enters standby-I mode.



Title	Nuio - Left Keyboard + nRF		
By: AN	Number: 07262022	Revision: E	
Date: 1/4/2024	Time: 9:59:50 AM	Sheet 5 of 5	
File: Nuio_LeftKeyboard_Rev_E_5_KeyboardNRF.SchDoc			

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