ATM3330e PV Keyboard Reference Design

Release Date	Revision	Design Eng.	Design Note
2022/09/21	Rev. 0.1	Chris TsaiLin	Preliminary release
2022/11/14	Rev. 0.2	Chris TsaiLin	1. Change power supply of LED from VAUX to HSC. 2. Change R2, R155 and R156 from 220ohm to 1Kohm 3. DM20 installed 4. 1uF cap added between P26(USB_detector) and GND 5. Correct PMOS symbol
2023/02/15	Rev.0.3	Chris TsaiLin	1.Add pull-down resistors(R24, R26) on USB connector. 2.C43 is changed to 1.6pF, C44 is changed to R151=0 ohm. 3.Add the second PV connector to support second PV cell. 4.Change the LDO output voltage to 3.9V: RA=18.2k Ohm, RB=4.7k Ohm. 5.Reserve another diode footprint D4 for D2. 6.Add the second power source VAUX for all the LEDs. 7.Reserve UART1_Tx to control the LDO for charging HSC.
2023/04/20	Rev. 0.4	Chris TsaiLin	1.Add the connection of VHARV to the connectors. 2.Change DM1,DM6,DM13,DM15,DM16,DM20 to 0 ohm resistor.
2023/08/21	Rev. 3	Chris TsaiLin	1.Add boost circuits for different applications. 2.Add R35 between the HSC and the net HYBRID. 3.Update the RFIO matching. 4.HARV_INP and HARV_INN are grounded. 5.Remove connector for VBAT, use test pad instead. 6.Update the "Boost" in schematics block diagrams to "Passive Boost".

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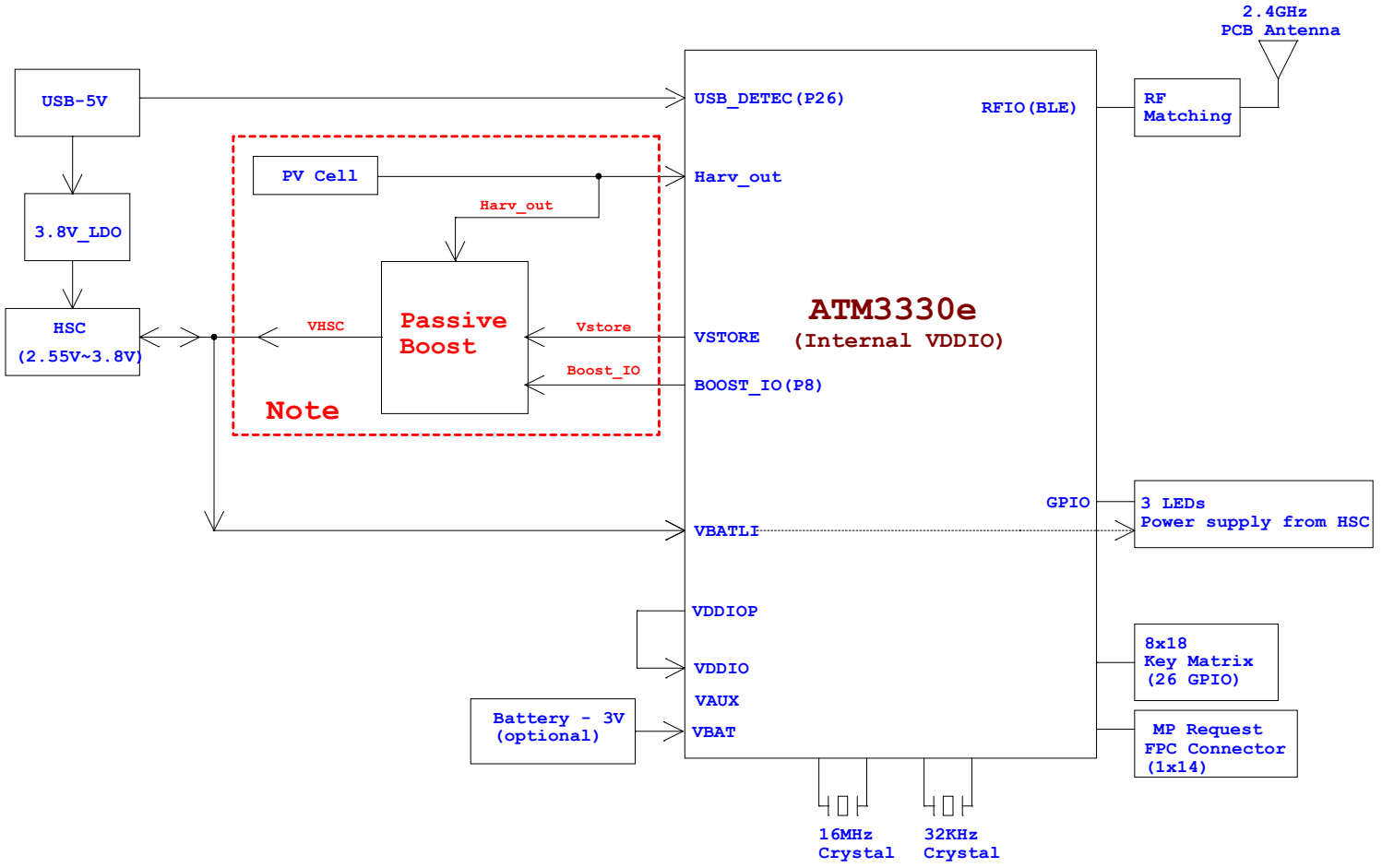
ATM3330e PV Keyboard Reference Design



Note: The passive boost circuit has three kinds of configurations depending on the type of PV cell, please see next page for the details.

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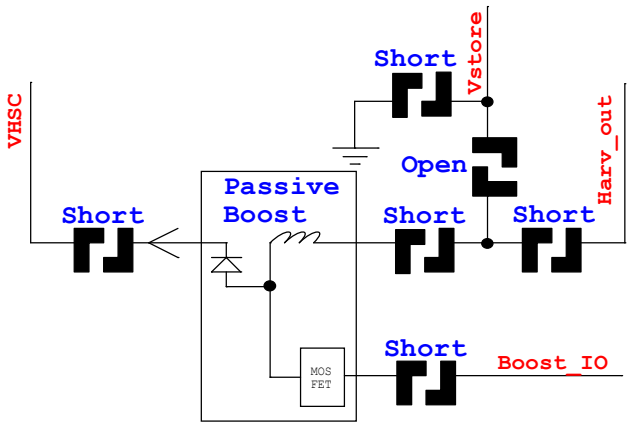
Different boost circuits depending on the type of PV cell & efficiency

Option1: Inductive Boost from Vharv

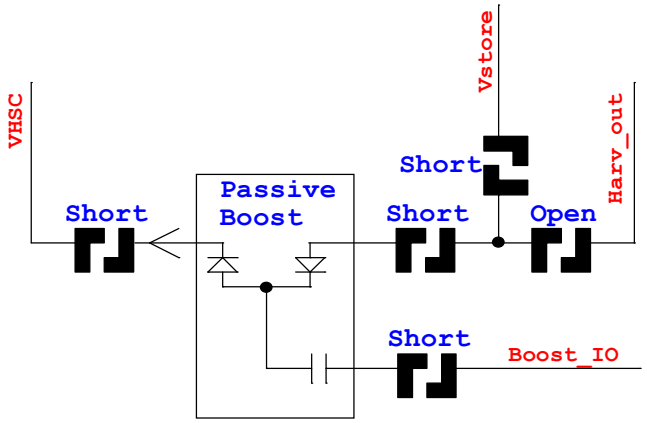
- Best Efficiency option for all PV cell within Vharv range



Boost IO: P8 CanHarv&MustHarv

Option2: 2-diode Boost from Vstore

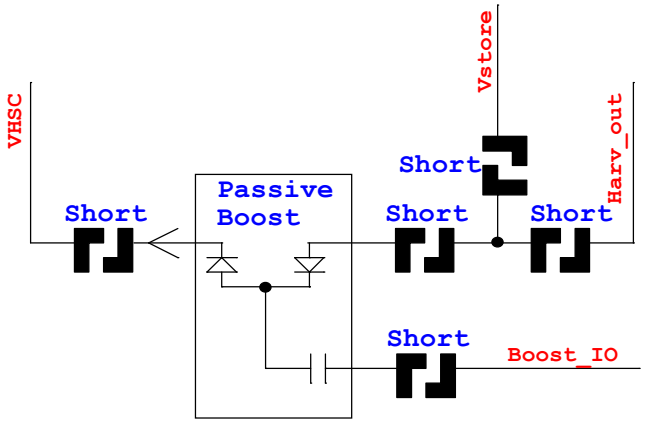
- Cost Optimized option for all PV cell within Vharv range



Boost IO: P8 Hardware Control

Option3: 2-diode Boost from Vharv

- High Efficiency, Lower Cost option for 6-cell PV



Boost IO: P8 Hardware Control

Note:
Open is no connection, Short is connection

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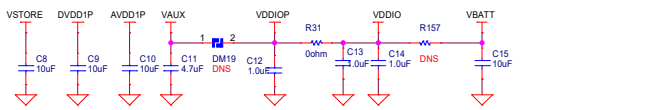
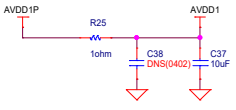
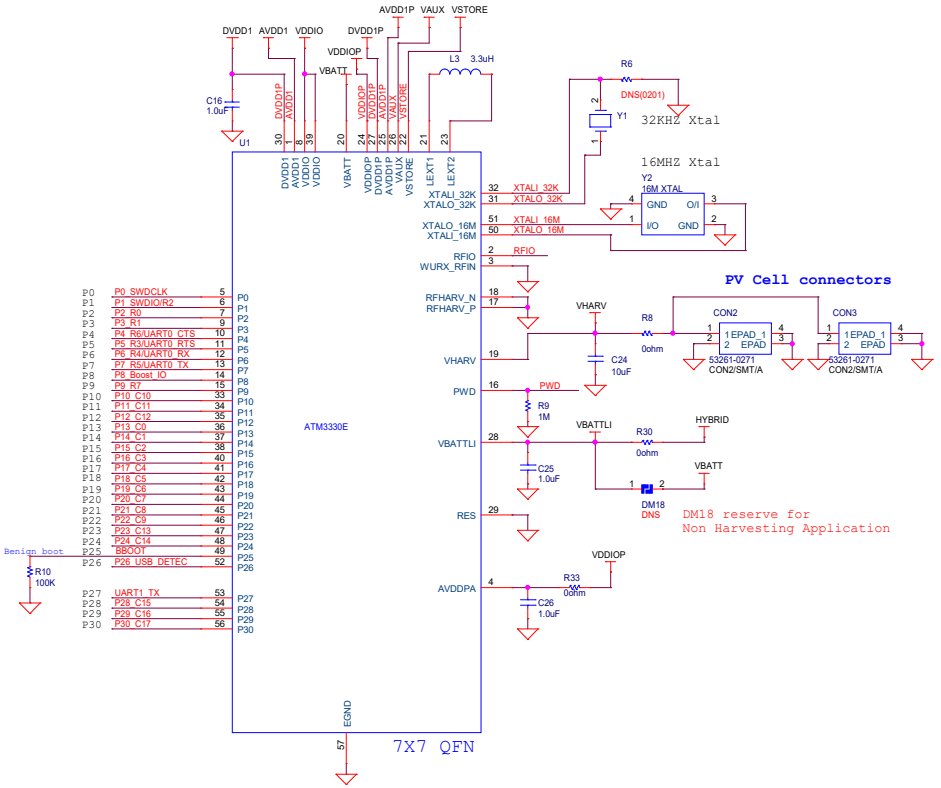
INTERNAL VDDIO
VDDIO=VDDIOP=1.8V





Change C37 to 22uF if needs to operate below -20 C

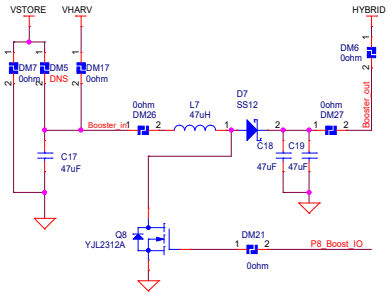


DM18 reserve for Non Harvesting Application

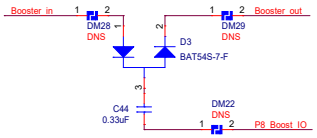
PV Cell connectors

Passive Boost

Option1 (default)



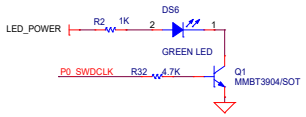
Option2/Option3



	DM5	DM6	DM7	DM17	DM21	DM22	DM26	DM27	DM28	DM29
Option1	0	1	1	1	1	0	1	1	0	0
Option2	1	1	0	0	0	1	0	0	1	1
Option3	1	1	0	1	0	1	0	0	1	1

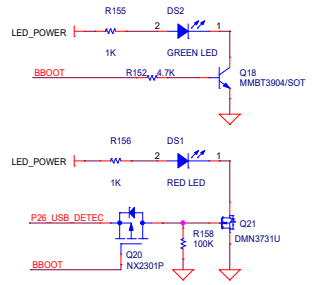
Note: 1 means 0 ohm, 0 means DNS.

CapsLock LED



LED for USB Charger

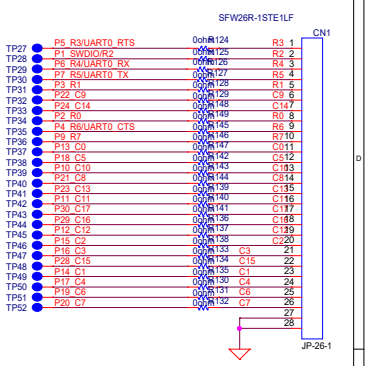
Fn Lock /Pairing/Reconnecting

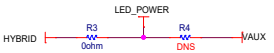


LED behavior
Pairing - Green LED blinking at 250ms interval
Fn lock - Green LED always on
Caps lock - Green LED always on
none USB and pairing completed without Fn - LED diabled
USB plug-in and start to charge - Red LED always on
USB plug-in and charge completed - Gren LED always on (LED will not be controlled by Fn-lock when this stage)
Reconnecting - Green LED blinking at 100ms interval

	P25 (BBOOT)	LED -G	LED -R
Pairing	1 0 1 0	Flash	OFF
Fn Lock	1	ON	OFF
USB plug-in and charge battery	0	OFF	ON
USB plug-in and charge complete	1	ON	OFF
none USB and pairing completed without Fn	0	OFF	OFF
Caps Lock	NA	ON	OFF
Reconnecting	1 0 1 0	Flash	OFF

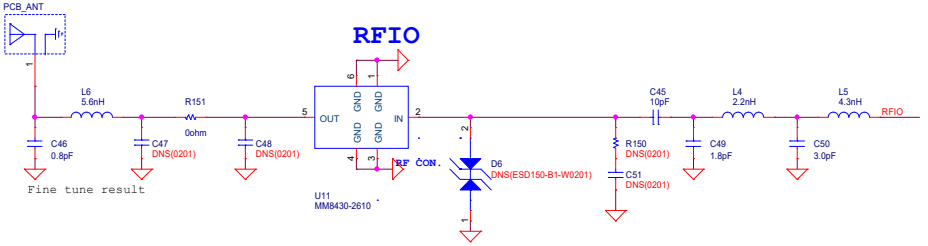
Keyboard connector



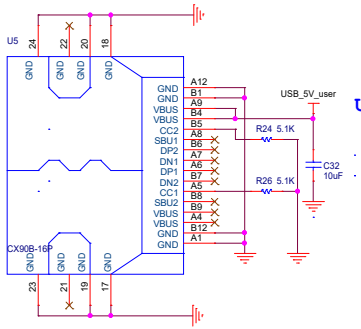


RF Antenna Matching Value need to be modified

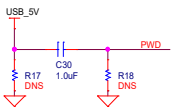
RFIO



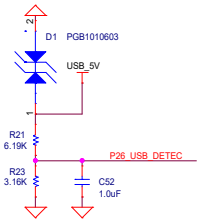
USB CONNECTOR



USB Plug-In Reset

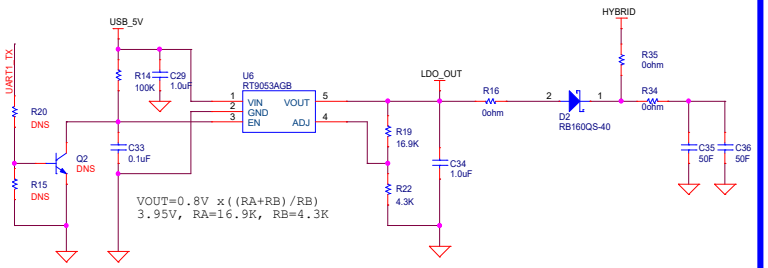


USB Plug-In Detect

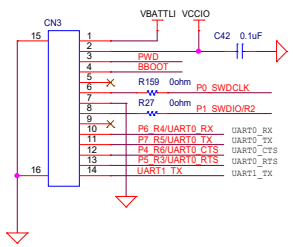


USB to LDO Charger

Hybrid Supercap

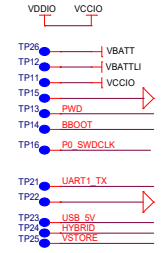


FPC TEST CONNECTOR



Note: When customer design, can change the connector to test pin for factory testing.

TEST POINTS



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