USBN9602 Eval Board Mods for Bus Powered Operation

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The following instructions can be used to convert a USBN9602 Evaluation Board for bus powered use. A high level of board rework skill is assumed.

Certain capabilities (such as the use of the “debug” port) are lost in the process, but the basic HID joystick functionality remains virtually identical to that of the original board.

1.0 General

1.1 Perform the steps below in sequence. Some of them assume that a prior step has already been completed and tested.

1.2 Test the board after each major step below (i.e. 2.0, 3.0, 4.0, and so on). The sequence is designed so that the board should be functional at each boundary.

1.3 Components needed:

- 1.3.1 1x 9.6 MHz crystal
- 1.3.2 1x 1.5K resistor
- 1.3.3 1x 3.3K resistor
- 1.3.4 1x 33K resistor
- 1.3.5 9x 150K resistors
- 1.3.6 1x Meg resistor
- 1.3.7 1x 0.01uF ceramic capacitor
- 1.3.8 1x 10uF tantalum capacitor, 10WV
- 1.3.9 3x 1N914 diodes
- 1.3.10 1x 74AC00
- 1.3.11 1x 14 pin right angle wirewrap socket
- 1.3.12 Cop8 preprogrammed with Bus Powered Firmware (rev A.31BP or later).

2.0 Make Board Fixes

2.1 Lift R21 pad nearest U8 pin 1 (V3V) and connect it to U8 pin 22 (V9602).

3.0 Isolate COP Clock (Install Private Crystal)

3.1 Cut TS3 embedded trace to isolate cop clock

3.2 Put 9.6 MHz crystal between U11 pins 6 and 7

3.3 Add 1 Meg resistor in parallel with crystal.

4.0 Pullup or Pulldown all Unused Inputs

4.1 Remove R2 (10K pot).

4.2 Pull U8 pin 2 (RD*) and U8 pins 8-15 (D0-D7) on 9602 down via individual 150K resistors (use R2 pin 3 for the ground connection).

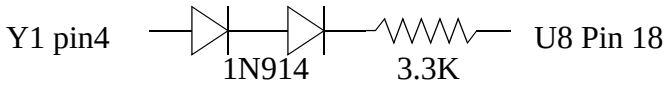
4.3 Tie U11 pins 12-16 (Cop8 I3-I7) to U 11 pin 11 (Cop8 I2).

5.0 Install 'Weak' Regulator ("Keep-Alive" Circuit).

5.1 Change C34 to 10uF. Observe polarity carefully.

5.2 Connect 2 diodes (1N914) and a 3.3k resistor in series, so that the diodes have the same polarity

5.3 Connect Anode side to Y1 pin 4 (VCC) and cathode side to U8 pin18 (V3V). For example:



6.0 Add Wire from D+ to Wake Up Processor.

6.1 D+ is high during standby... a H-L transition should wake us up.

6.2 Attach D+ (at R10/TP13 junction) to J12 pin 4 through a 1.5K resistor.

7.0 Alter Board to Use Internal 3.3V Regulator

7.1 J5 jumper must be between pins 2 and 3 (this is the default).

7.2 Remove U7 (3.3V regulator).

7.3 Remove C20 (22uF bulk at regulator).

7.4 Remove D3 (Power LED).

7.5 Test impedance to V3V trace... it should be high.

7.6 Install New Firmware.

7.6.1 Rev. A.31BP or later.

7.7 Test voltage level at TP7 with regulator enabled (normal operation) and with regulator disabled (in suspend, which should work here now) to make sure it is approximately 3.3V.

8.0 Clamp off 9602 Clock

8.1 Connect anode of 1N914 to 9602's XIN pin, via the unoccupied pad at C36 (the pad closest to the crystal). The diode lead must be kept as short as possible.

8.2 Connect cathode to J12 pin 7 (PORTD[5]) with a wire.

9.0 Change SI pullup to a pulldown

9.1 Remove R25

9.2 Remove R26

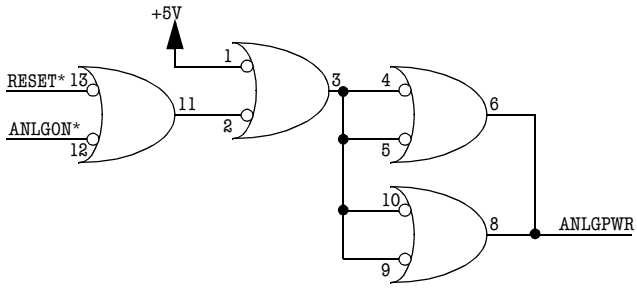
9.3 Remove U12 (EEPROM)

9.4 Remove U1 (DS14C232)

9.5 Add 33K resistor from R25 pad connected to SI (nearest C10) to U12 pin 5 (GND). Don't solder the latter connection yet.

10.0 Add Power "Switch" to Shut Down Analog Circuitry.

10.0.1 Add a 74AC00 as shown in the following circuit diagram:



10.0.2 Use a 14 pin right-angle wirewrap socket, and make the interchip connections before proceeding.

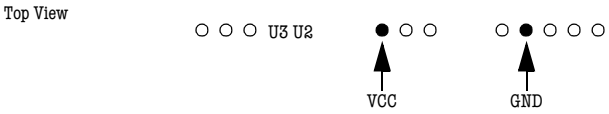
10.0.2.1 Connect pin 11 to pin 2.

10.0.2.2 Connect pins 3, 4, 5, 9, 10.

10.0.3 Get power and ground from the RF component pads.

10.0.3.1 Connect pins 1 and 14 to VCC

10.0.3.2 Connect pin 7 to GND.



10.0.4 Isolate D1 anode and U5 pin 8. Bus these together and add a .01uF bypass capacitor to ground (between U5 pin 8 and U12 pin 5). This is the analog power bus **ANLGPWR**.

10.0.5 The **ANLGON*** signal comes from PORTD6 at J12 pin 9.

10.0.6 The **RESET*** signal comes from the S2 pad nearest TP9.