

**Changes:
Supercaps (once solid)**

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Sheet: /
File: Nixie Clock.sch

Title: Root Sheet

Size: A Date: 2017-03-06
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The schematic diagram illustrates a power input circuit with overvoltage/undervoltage/reverse polarity lockout and input presence detection. The circuit is divided into two main sections: the top section for overvoltage/undervoltage/reverse polarity lockout and the bottom section for input presence detection.

Overvoltage/Undervoltage/Reverse Polarity Lockout Section:

- Power Input:** The circuit starts with a power input (J201) connected to a 3A fuse (F201). The input is labeled with VIN: MIN 22V, NOM 24V, MAX 26V.
- Reverse Polarity Protection:** A diode (D201) is connected in series with the input to protect against reverse polarity. A PWR_FLAG pin is connected to the input line.
- Overvoltage/Undervoltage Protection:** The input line is connected to the Vin pin of the LTC4365IDDB (U201). The Vin pin is also connected to a 100k resistor (R201) and a 100k resistor (R202) to ground. The Vin pin is also connected to a 100k resistor (R203) to ground. The Vin pin is also connected to a 100k resistor (R204) to ground.
- Gate Drive:** The Vin pin is connected to the Gate pin of the MOSFET (Q201A). The Gate pin is connected to the Vin pin through a 100k resistor (R201). The Gate pin is connected to the Vin pin through a 100k resistor (R202). The Gate pin is connected to the Vin pin through a 100k resistor (R203).
- Output:** The output of the MOSFET (Q201A) is connected to the VOUT pin of the LTC4365IDDB (U201). The VOUT pin is connected to the Vin pin through a 100k resistor (R201). The VOUT pin is connected to the Vin pin through a 100k resistor (R202). The VOUT pin is connected to the Vin pin through a 100k resistor (R203).
- FAULT Pin:** The FAULT pin of the LTC4365IDDB (U201) is connected to a 100k resistor (R204) to ground. The FAULT pin is connected to the Vin pin through a 100k resistor (R201). The FAULT pin is connected to the Vin pin through a 100k resistor (R202). The FAULT pin is connected to the Vin pin through a 100k resistor (R203).

Input Presence Detection Section:

- Input Presence Detection:** The input line is connected to the PLUG_R pin of the PLUG pin. The PLUG_R pin is connected to the PLUG pin through a 100k resistor (R208). The PLUG_R pin is connected to the PLUG pin through a 100k resistor (R209). The PLUG_R pin is connected to the PLUG pin through a 100k resistor (R210).
- Output:** The output of the input presence detection circuit is connected to the PLUG pin. The PLUG pin is connected to the PLUG_R pin through a 100k resistor (R208). The PLUG pin is connected to the PLUG_R pin through a 100k resistor (R209). The PLUG pin is connected to the PLUG_R pin through a 100k resistor (R210).

Component Values:

- F201: 3A
- R201: 100k
- R202: 100k
- R203: 100k
- R204: 100k
- R205: 100k
- R206: 100k
- R207: 100k
- R208: 100k
- R209: 100k
- R210: 100k
- C201: 0.1uF
- C202: 10nF
- C203: 1nF
- D201: SMD1200PL
- D202: SMD1200PL
- D203: PESD3V3L1BA
- Q201A: Si4946
- Q201B: Si4946
- U201: LTC4365IDDB

[illegible]

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**Monolithic Buck Switching Regulator
with Burst Mode and PGOOD flag
+3.3 Volts, 300mA @ 2.2MHz**

The schematic shows the LT3973-DD controller (U301) configured as a buck converter. The input voltage (VIN) is 3.3V, and the output voltage (VOUT) is 3.3V. The controller is configured with the following components:

- Input Filter:** A 4.7µF capacitor (C302) is connected to the VIN pin (pin 4).
- PGOOD Flag:** The PG pin (pin 9) is connected to the VCOM pin (pin 10) through a 1MΩ resistor (R301). The VCOM pin is connected to the VCOM pin (pin 10) through a 1MΩ resistor (R304).
- EN/UVLO:** The EN/UVLO pin (pin 3) is connected to the VCOM pin (pin 10) through a 1MΩ resistor (R304).
- RT:** The RT pin (pin 10) is connected to the VCOM pin (pin 10) through a 1MΩ resistor (R304).
- SW:** The SW pin (pin 6) is connected to the SW pin (pin 6) through a 1MΩ resistor (R301).
- BD OUT:** The BD OUT pin (pin 8) is connected to the SW pin (pin 6) through a 1MΩ resistor (R301).
- FB:** The FB pin (pin 1) is connected to the SW pin (pin 6) through a 1MΩ resistor (R301).
- Output Filter:** A 10µH inductor (L301) is connected to the SW pin (pin 6). A 22µF capacitor (C303) is connected to the output of the inductor (pin 7) to the GND pin (pin 11).
- Output Voltage:** The output voltage is 3.3V, with a tolerance of 20%.

Component Values:

- Capacitors: C302 (4.7µF, 35V, 20%), C301 (0.47µF, 25V, 10%), C304 (15pF, 50V, 10%), C303 (22µF, 6.3V, 20%).
- Resistors: R302 (100Ω, 5%, 1/16W), R301 (1MΩ, 5%, 1/16W), R304 (1MΩ, 5%, 1/16W), R303 (22MΩ, 1%, 1/16W), R305 (1.3MΩ, 1%, 1/16W).
- Inductor: L301 (10µH, 3A, 10%).

Legend:

- VCOM: 3.3V
- VDD: 3.3V
- PWR_FLAG: 3.3V

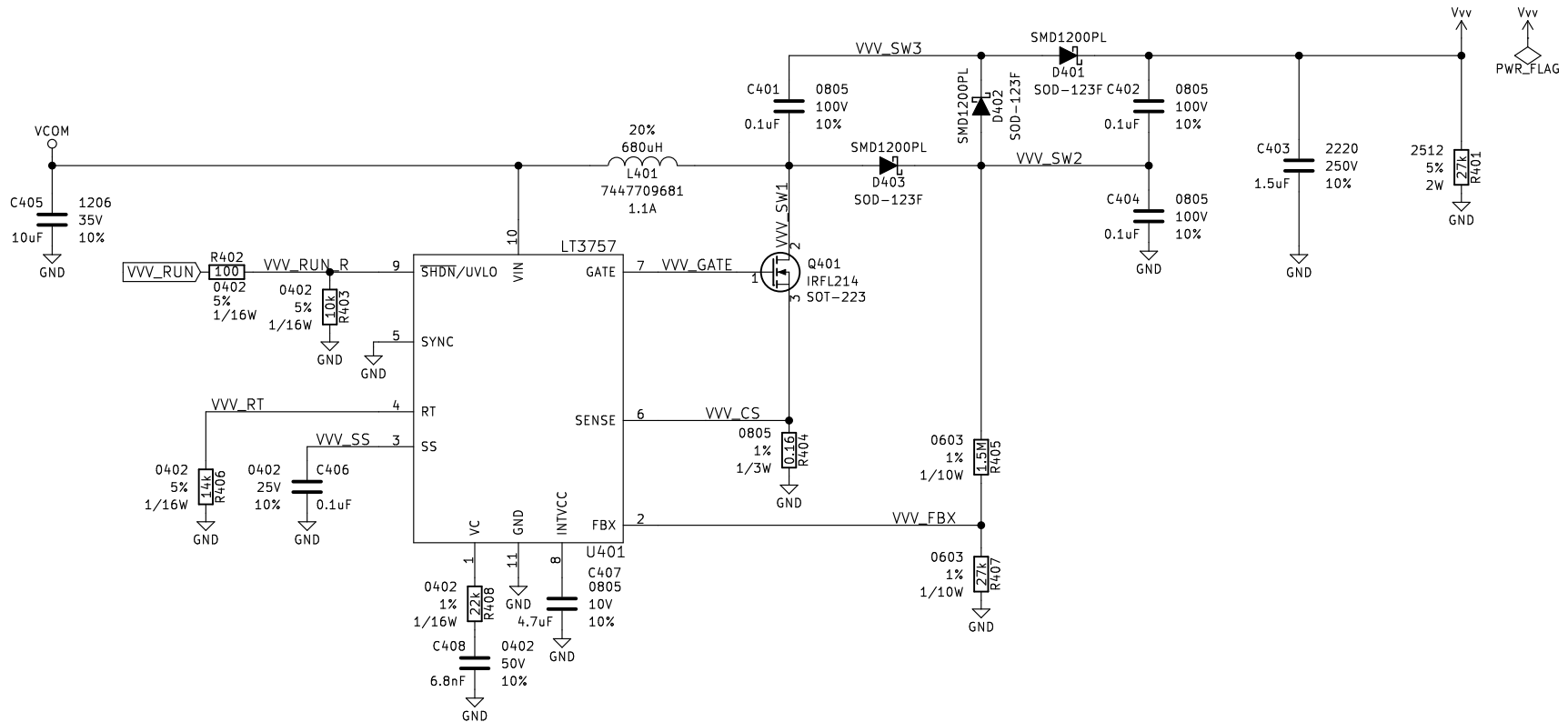
**Sheet: /Controller Supply/
File: ControllerSupply.sch**

Title: Controller Supply (Vdd and Vcc)

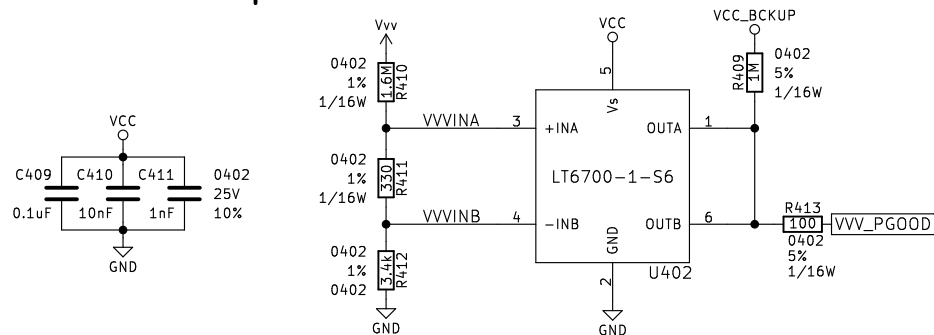
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KiCad E.D.A. kicad 4.0.5 Id: 3/15

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Valve High Voltage Supply Hybrid Boost Converter/Voltage Multiplier 180V, 30mA @ 800kHz



VVV PGOOD Window Comparator



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Sheet: /Display Supply/
File: DisplaySupply.sch

Title: Boost Converter

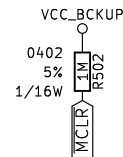
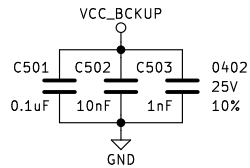
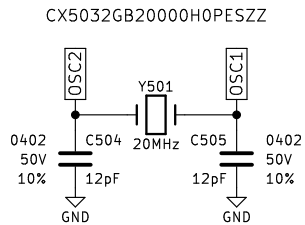
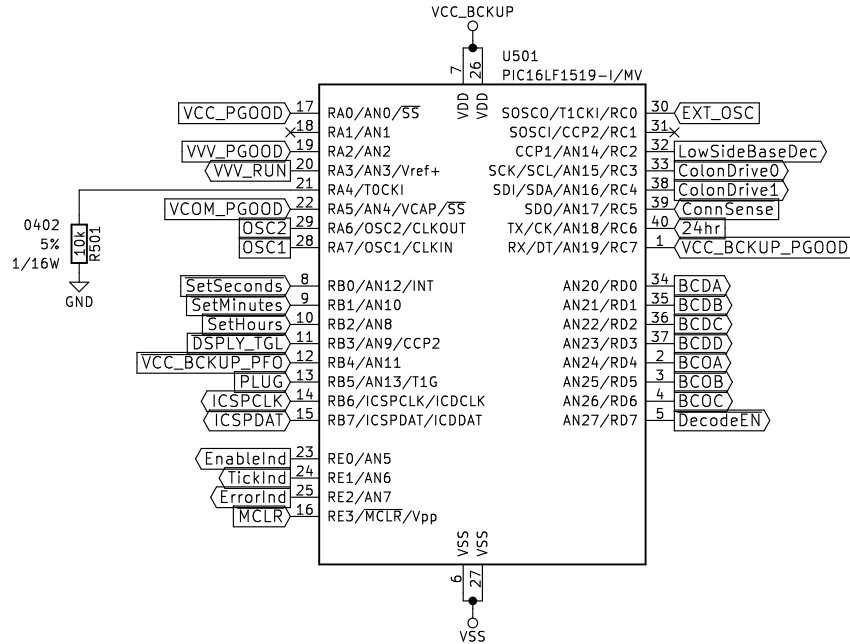
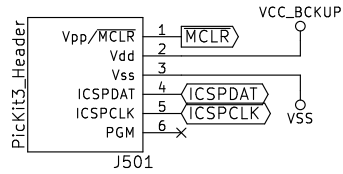
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Id: 4/15

8 Bit PIC Microcontroller



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Sheet: /Microcontroller/
File: Microcontroller.sch

Title: Microcontroller (PIC16F1519)

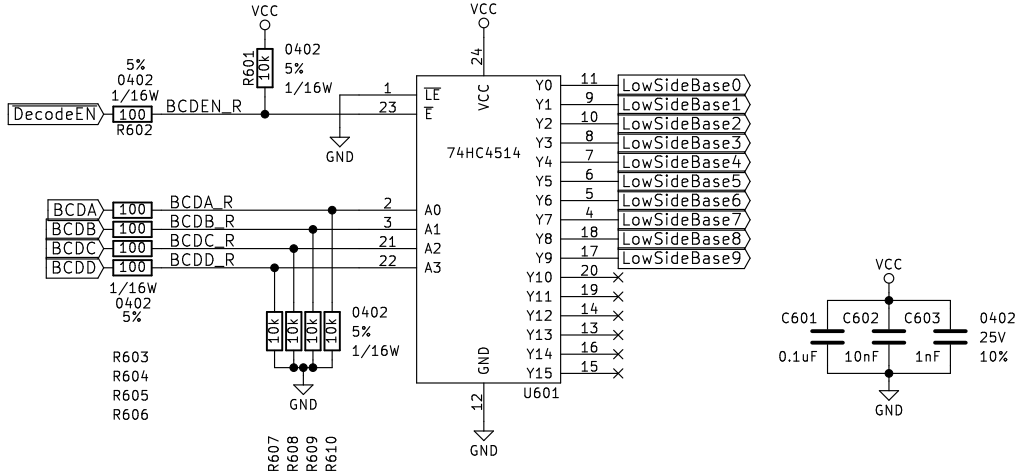
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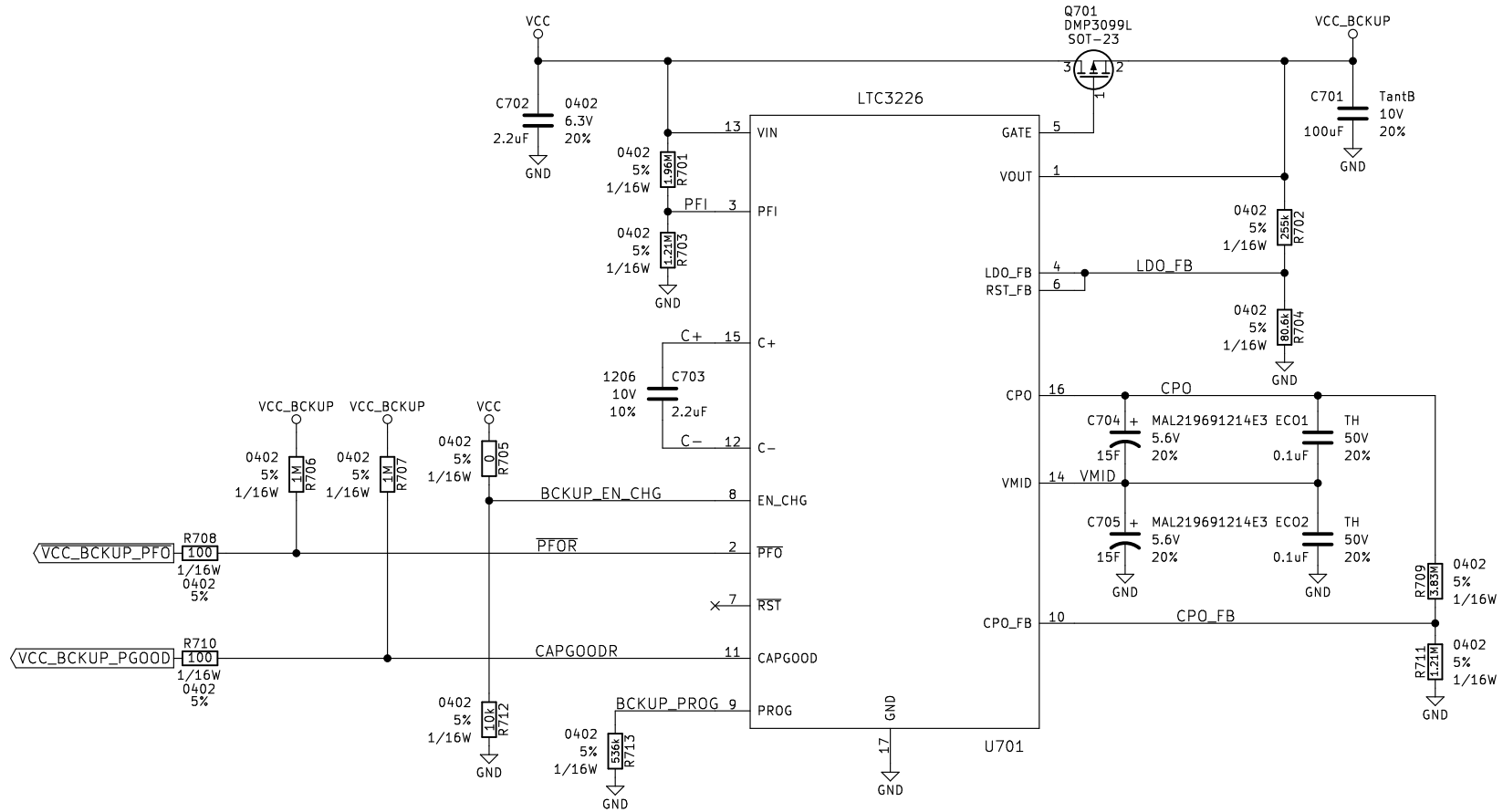
Rev: 2

Id: 5/15

BCD to Decimal Decoder



Backup VCC Supply



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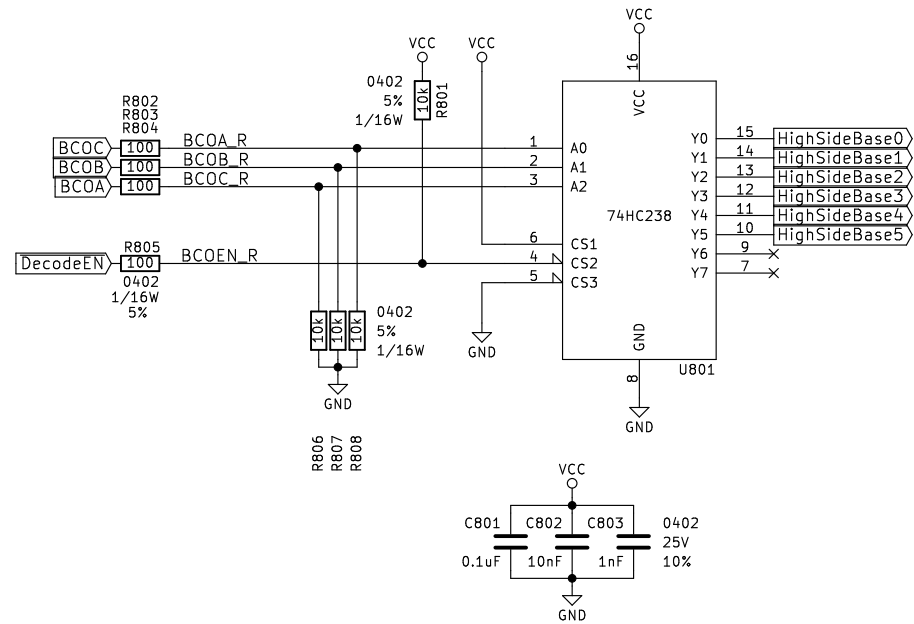
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File: BackupSupply.sch

Title: Vcc Backup Supply (Vcc_BCKUP)

Size: A Date: 2017-03-06
KiCad E.D.A. kicad 4.0.5

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Id: 7/15

Octal to Decimal Decoder



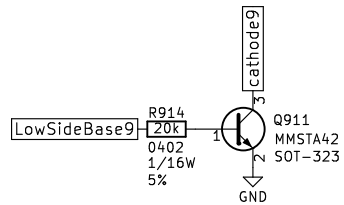
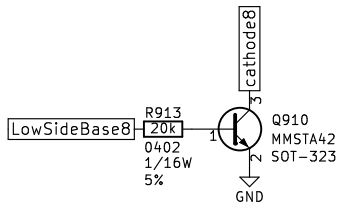
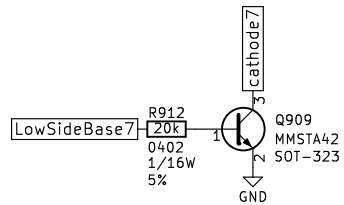
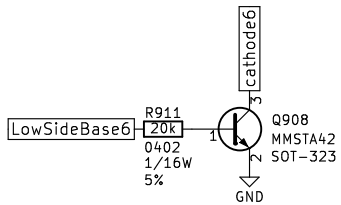
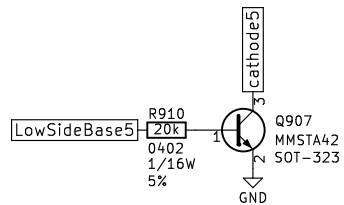
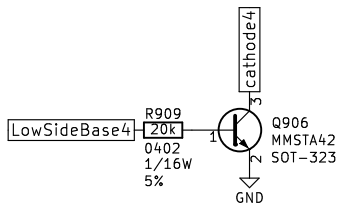
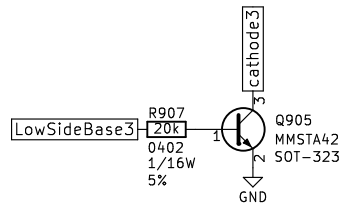
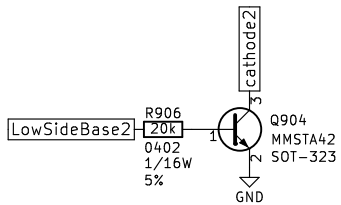
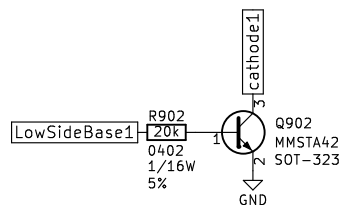
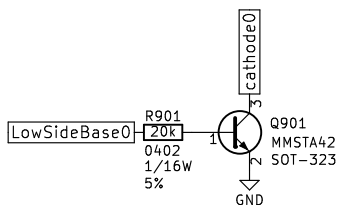
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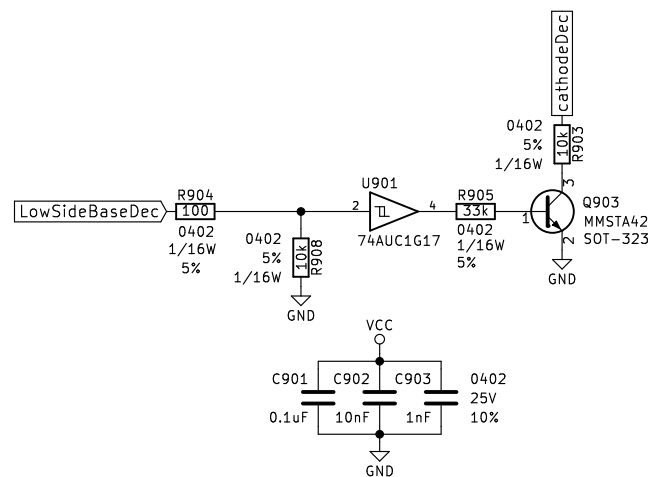
Title: High Side BCO Decoder

Size: A Date: 2017-03-06
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Lowside BJT Switches



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Sheet: /Lowside Switches/
File: LowsideSwitches.sch

Title: Lowside Cathode Switches

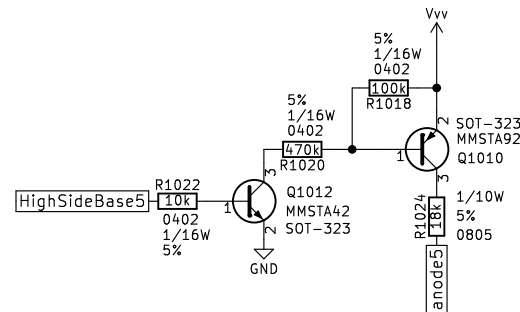
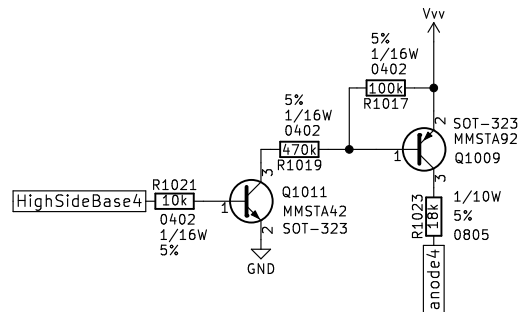
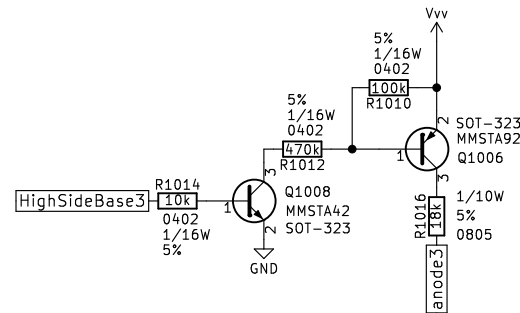
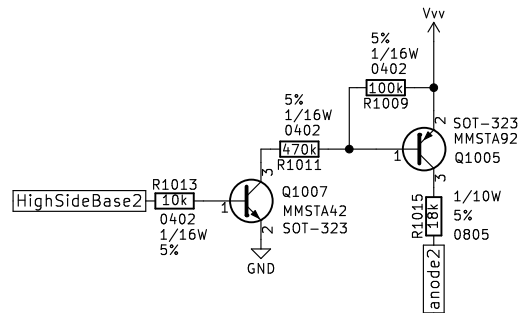
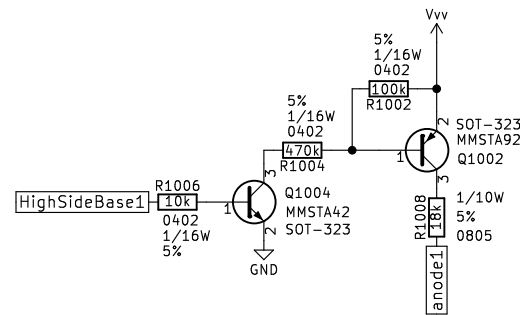
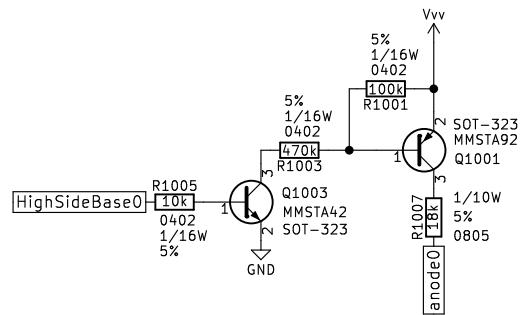
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High Side BJT Switches



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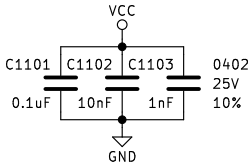
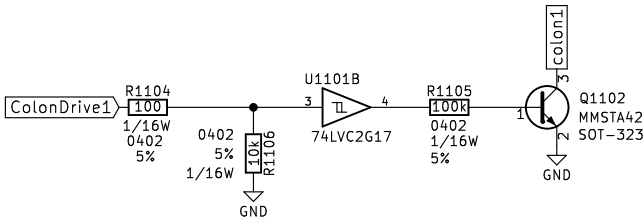
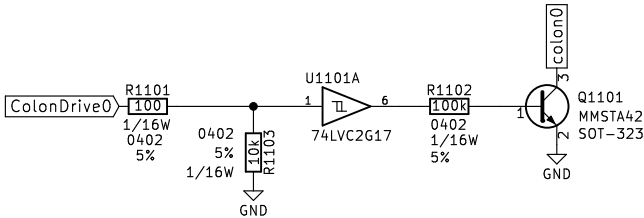
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File: HighsideSwitches.sch

Title: High Side Anode Switches

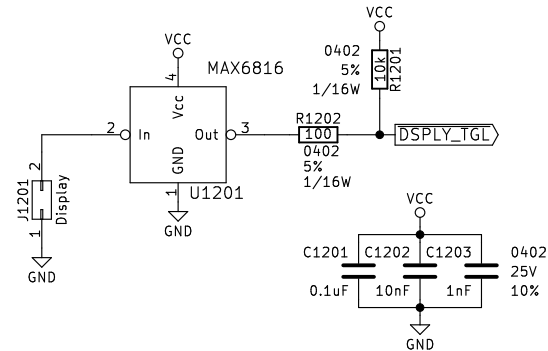
Size: A Date: 2017-03-06
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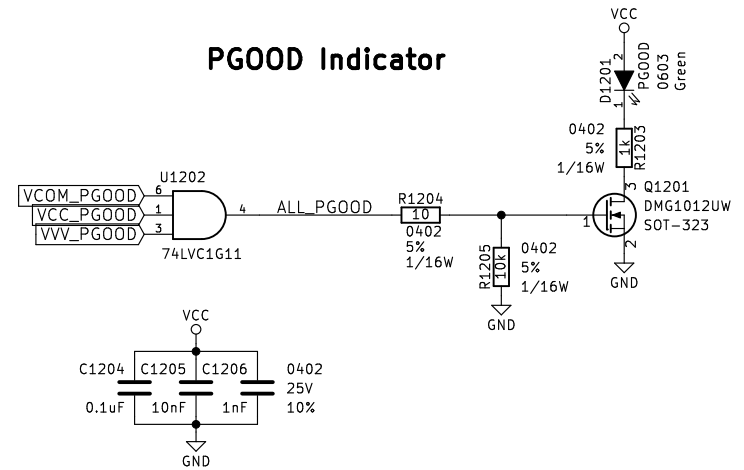
Colon Drivers/BJT Switches



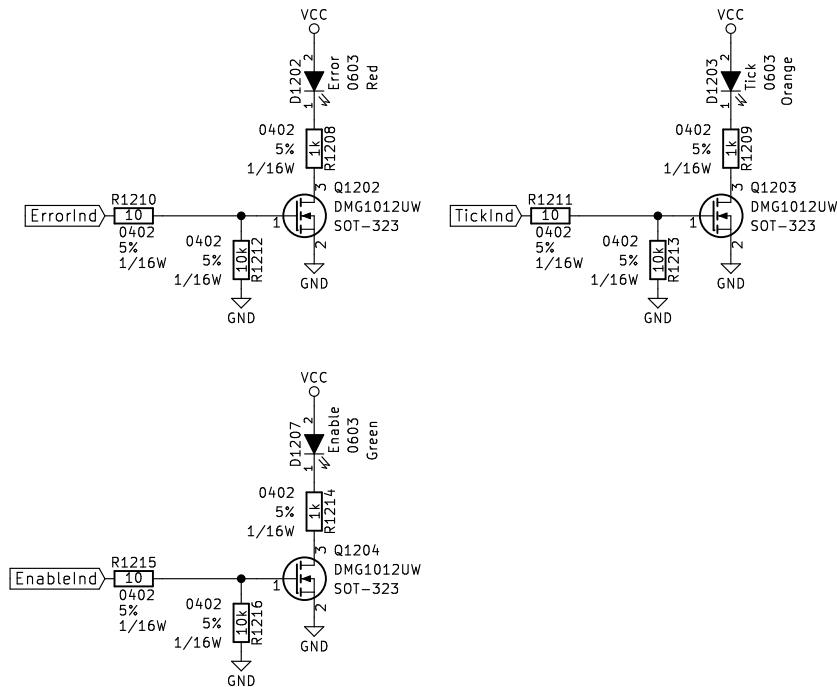
Display Toggle Pushbutton



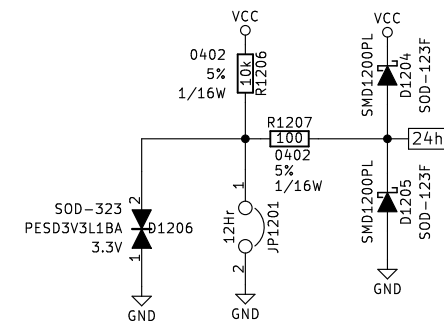
PGOOD Indicator



Status Indicators



24hr Set Jumper



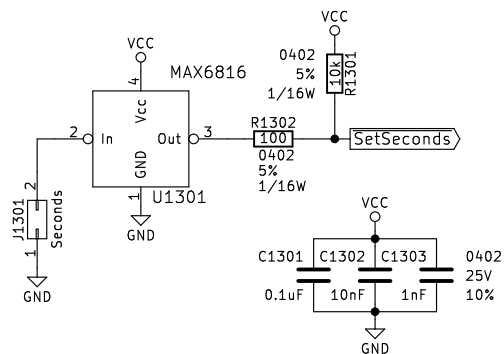
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Sheet: /Input/Output/
File: InputOutput.sch

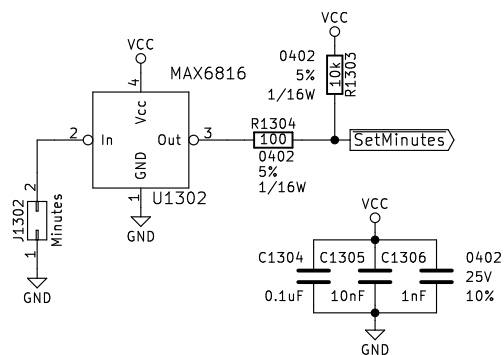
Title: Input/Output Facilities

Size: A Date: 2017-03-06
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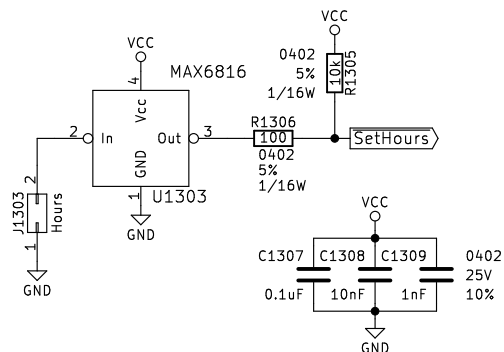
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Seconds Set Pushbutton



Minutes Set Pushbutton



Hours Set Pushbutton

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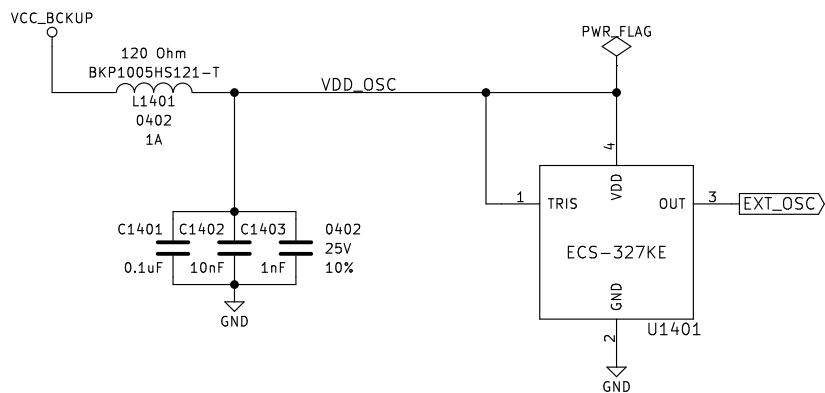
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File: TimeSet.sch

Title: Time Set Pushbuttons

Size: A Date: 2017-03-06
KiCad E.D.A. kicad 4.0.5

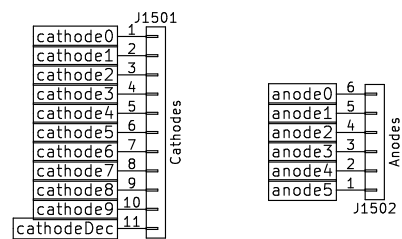
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Timekeeping Oscillator

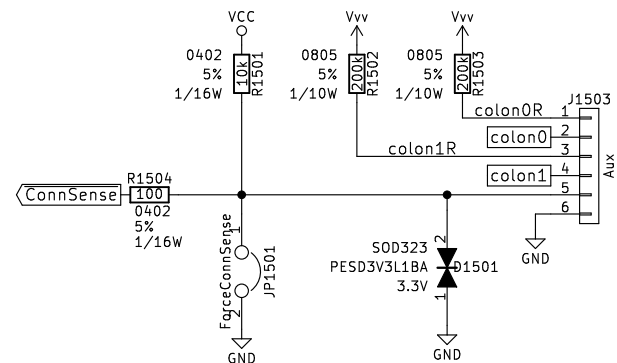


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Sheet: /External Oscillator/ File: ExternalOscillator.sch		
Title: External 32.768kHz CMOS Oscillator		
Size: A	Date: 2017-03-06	Rev: 2
KiCad E.D.A. kicad 4.0.5		Id: 14/15

Anode/Cathode Connectors



Aux Connector



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Sheet: /Connectors/

File: Connectors.sch

Title: Display Connectors

Size: A Date: 2017-03-06

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