Universal Multi-Voltage Power Module

REVISION RECORD			
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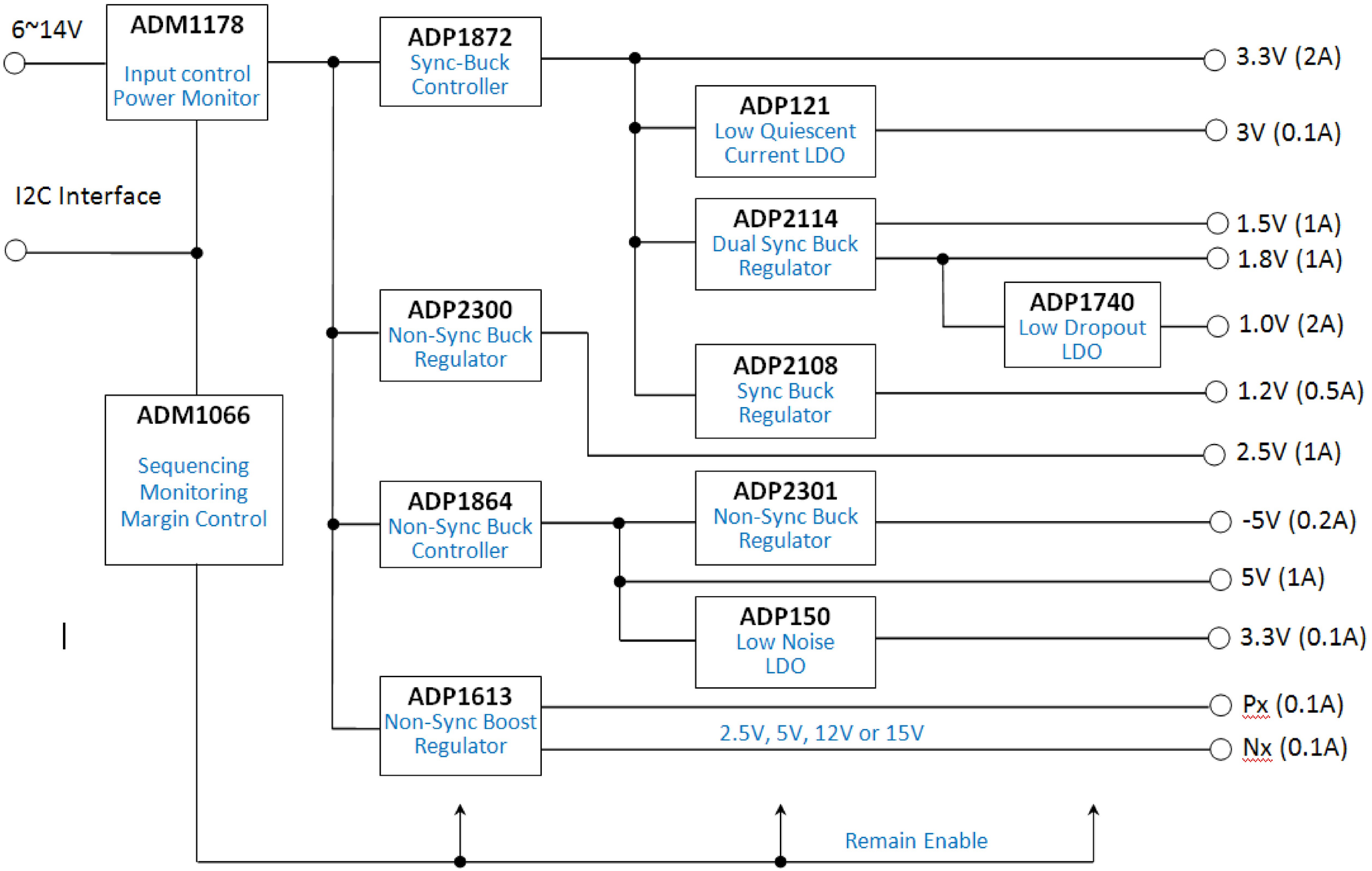

DRAWN: Willie Yue	DATED: 2010 10 19	COMPANY: ANALOG DEVICES INC	
CHECKED: <Checked By>	DATED: <Checked Date>	TITLE: CN0190 : Universal Multi-Voltage Power Module	
QUALITY CONTROL: <QC By>	DATED: <QC Date>	CODE: 1	SIZE: C
RELEASED: <Released By>	DATED: <Release Date>	DRAWING NO:	REV: B
		SCALE: 1:1	SHEET: 1 OF 15

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Universal Multi-Voltage Power Module

Version 01

PCB Number : EVAL-CN01900-EB1Z
Start Date : 16-09-2010
Release Date : 15-01-2011
Author: Willie.Yue
Checked by: Michael.Hu

Version 02

PCB Number : EVAL-CN0190-EB1Z
Start Date : 15-01-2011
Release Date : 30-01-2011
Author: Willie.Yue
Checked by: Michael.Hu
Change List

1: Change the footprint of Connector for power rail
2: Change the compensation RC network for 3.3,5,1.8,1.5V rials
3: Add Capactor for 5V,-5V power rail
4: Change the over current detection circuit through the negative power rails of speic-cuk circuit
5: Add LC noise filter on sepic by ADP1613

Version 03

PCB Number : EVAL-CN0190-EB1Z
Release Date : 09-06-2011
Author: Willie.Yue
Checked by: Michael.Hu
Change List

1: Add pull down resistor in output of AD628
2: Add external LC filter for noise reduction
3: Change the connection between ADM1066 and 3.3V(0.1A)

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H1 H3518 — M1 MARK — M2 MARK — M3 MARK — M4 MARK — H3 H3518

J1: Power Input Range : 6 to 14V
JP1: I2C Bus : Control Interface

TP43 — MAIN_POWER_MANAGEMENT — VIN — TP2

J1-1 — J1-2 — TP42 TP_GND — SYS_GND

SYSTEM_POWERIN — VIN — SCL — SDA — V3_3_AUX — SYS_GND

V3_3_AUX — R83 0603 2K 1% — R84 0603 2K 1% — JP1 — SYS_GND

R14 1210 0 1% — EN_ADP1872 — ADP1872_3_3V_2A1 — POWERIN_ADP1782 — VOUT(3.3V_2A) — EN_ADP1872 — FB_1872 — SYS_GND — FB_1872

R24 1210 0 1% — EN_ADP2300 — ADP2300_2_5V_1A1 — VIN_ADP2300 — VOUT(2.5V_1A) — EN_ADP2300 — SYS_GND

R49 1210 0 1% — EN_ADP1864 — ADP1864_5V_1A1 — VIN_ADP1864 — VOUT(5V_1A) — EN_ADP1864 — SYS_GND

R25 0805 0 1% — EN_ADP121 — ADP121_3_0V_0_1A1 — VIN_ADP121 — VOUT(3V_0.1A) — EN_ADP121 — SYS_GND

R26 1210 0 1% — EN1_ADP2114_1.8V — EN1_ADP2114_1.5V — ADP2114_1V&1_8V_2A1 — VIN_ADP2114 — VOUT(1.8V_2A) — EN1_ADP2114_1.8V — EN1_ADP2114_1.5V — SYS_GND — VOUT(1.5V_1A) — SYS_GND

V3_3_AUX — R42 0805 0 1% — EN_ADP1741 — ADP1741_1_0V_1A1 — V3_3_AUX — VOUT(1.0V_2A) — VIN_ADP1741 — EN_ADP1741

R43 0805 0 1% — EN_ADP2108 — ADP2108_1_2V_0_5A1 — VIN_ADP2108 — VOUT(1.2V_0.5A) — EN_ADP2108 — SYS_GND

R50 0805 0 1% — EN_ADP151 — ADP151_3_3V_0_1A1 — VIN_ADP151 — VOUT(3.3V_0.1A) — EN_ADP151 — SYS_GND

R75 0805 0 1% — EN_ADP1864 — R118 0R 5% 0603 — ADP2301_-5V_0.2A — VIN_ADP2301 — VOUT(-5V_0.2A) — EN_ADP2301 — SYS_GND

R78 1210 0 1% — EN_ADP1613 — ADP1613_+/-15V_0_1A — VIN_ADP1613 — PX(0.1A) — EN_ADP1613 — SYS_GND — NX(0.1A)

TP7 — VOUT(3.3V_2A) — J2-1 — J2-2 — TP_GND TP21 — SYS_GND

TP19 — VOUT(3V_0.1A) — J3-1 — J3-2 — TP_GND TP41 — SYS_GND

TP20 — VOUT(1.0V_2A) — J4-1 — J4-2 — TP_GND TP24 — SYS_GND

TP22 — VOUT(1.8V_2A) — J6-1 — J6-2 — TP_GND TP26 — SYS_GND

TP23 — VOUT(1.5V_1A) — J7-1 — J7-2 — TP_GND TP28 — SYS_GND

TP25 — VOUT(1.2V_0.5A) — J5-1 — J5-2 — TP_GND TP30 — SYS_GND

TP27 — VOUT(2.5V_1A) — J8-1 — J8-2 — TP_GND TP32 — SYS_GND

TP37 — VOUT(5V_1A) — J9-1 — J9-2 — TP_GND TP39 — SYS_GND

TP29 — VOUT(3.3V_0.1A) — J10-1 — J10-2 — TP_GND TP34 — SYS_GND

TP31 — VOUT(-5V_0.2A) — J14-1 — J14-2 — TP_GND TP36 — SYS_GND

TP33 — PX(0.1A) — J11-1 — J11-2 — TP_GND TP38 — SYS_GND

TP35 — NX(0.1A) — J12-1 — J12-2 — TP_GND TP40 — SYS_GND

PX_VOUT — NX_VOUT — ADM1066_MONITOR

VOUT(1.0V_2A) — VOUT(1.5V_1A) — VOUT(1.2V_0.5A) — VOUT(3.3V_0.1A) — VOUT(1.8V_2A) — VOUT(5V_1A) — VOUT(3.3V_2A) — VOUT(2.5V_1A) — VOUT(3V_0.1A) — VIN — SDA — SCL — A1 — A0 — FB_1872 — DAC2 — DAC3 — DAC4 — DAC5 — DAC6 — NX_VOUT — PX_VOUT — SYS_GND

EN_ADP1872 — EN_ADP2300 — EN_ADP1864 — EN_ADP1612 — EN1_ADP2114_1.8V — EN1_ADP2114_1.5V — EN_ADP2108 — EN_ADP1741 — EN_ADP121 — EN_ADP151

I2C Address : 01

V3_3_AUX — R79 10K 1% 0603 — NP — R81 10K 1% 0603 — SYS_GND

V3_3_AUX — R80 10K 1% 0603 — NP — R82 10K 1% 0603 — SYS_GND

DAC6 — J13-1 — DAC5 — J13-2 — DAC4 — J13-3 — DAC3 — J13-4 — DAC2 — J13-5 — FB_1872

NP

H2 H3518 — SYS_GND

NP : Not solder on

H4 H3518 — SYS_GND

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		SCALE: 1:1	SHEET: 3 OF 15

ADM1066

Super Sequencer with Margining Control and Auxiliary ADC Inputs
Complete supervisory and sequencing solution for up to 10 supplies
10 supply fault detectors
5 selectable input attenuators allow supervision of suppliesup to 14V on VH
10 programmable Open-collector driver outputs
Sequencing engine (SE) implements state machine control of PDO outputs
12-bit ADC for readback of all supervised voltages
2 auxiliary (single-ended) ADC inputs
Reference input (REFIN) has 2 input options
Device powered by the highest of VPx, VH for improved redundancy
User EEPROM: 256 bytes

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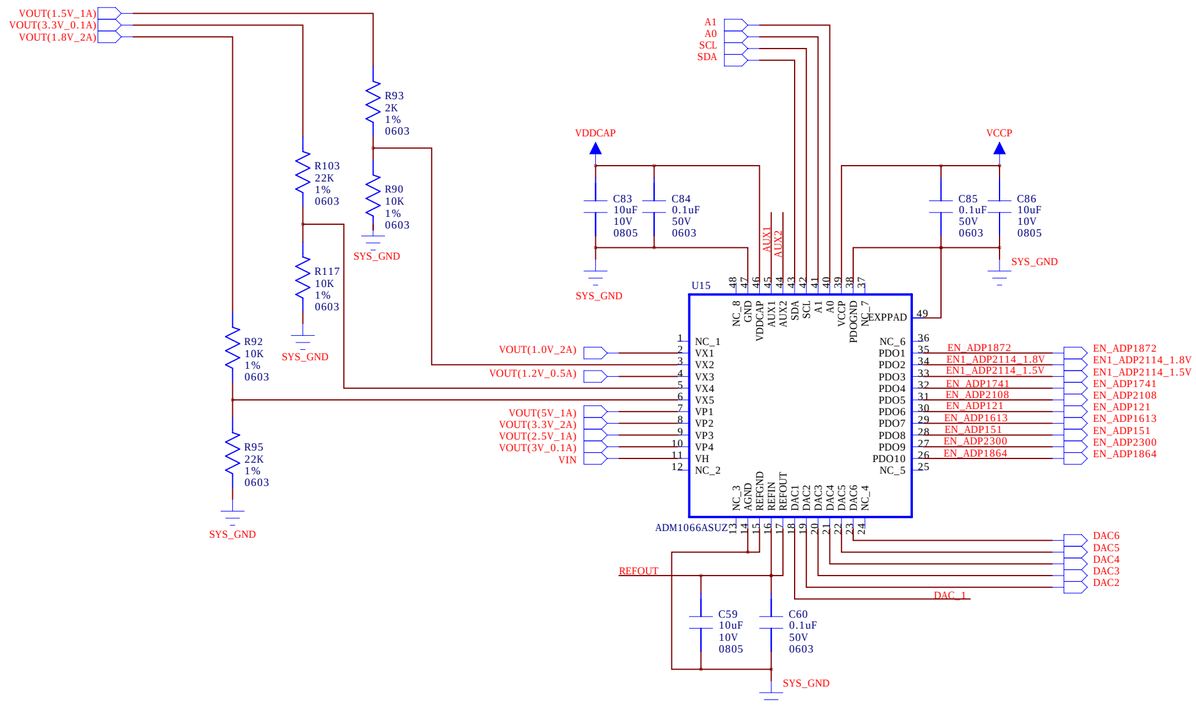
Detect the voltage and Control the Power up sequence of each power rail



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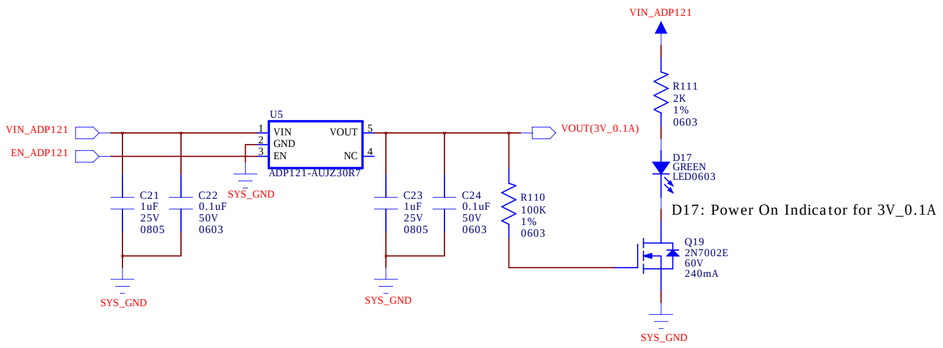
ADP121

150mA Low Quiescent Current CMOS Linear Regulator
Low Qusencent Current : 30uA Max
Input Voltage Range :2.3V ~ 5.5V
Low Dropout Voltage: 90mV@150MA Load
Initial Voltage Accuracy : +/-1%
Soft Start Control

3.3V iutput ,3V output 0.1 A Low Dropout Regulator



D17: Power On Indicator for 3V_0.1A

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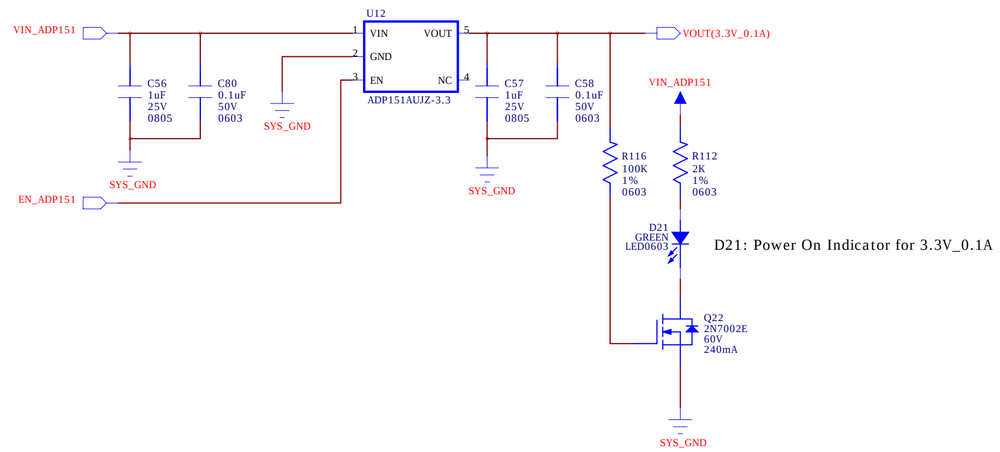
		SCALE: 1:1	SHEET: 1 OF 15

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

ADP150

Ultralow Noise, 200 mA CMOS Linear Regulator
Ultra low noise: 9 ¦ÌV rms, independent of V OUT
No additional noise bypass capacitor required
Stable with 1 ¦ÌF ceramic input and output capacitors
Input voltage range: 2.2 V to 5.5 V
Low quiescent current, 10 ¦ÌA with zero load
Low dropout voltage: 105 mV @ 150 mA load
Initial output voltage accuracy: ¡Á1%
Up to 14 fixed output voltage options: 1.8 V to 3.3 V
PSRR performance of 70 dB at 10 kHz
Soft Start and Logic-controlled enable

5V input 3.3V output Low Dropout Regulator



D21: Power On Indicator for 3.3V_0.1A

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QUALITY CONTROL: <QC By>	DATED: <QC Date>	CODE: 1	SIZE: C
RELEASED: <Released By>	DATED: <Release Date>	DRAWING NO:	REV: B
		SCALE: 1:1	SHEET: 1 OF 15

ADP1612/3

650 kHz /1.3 MHz Step-Up PWM DC-to-DC Switching Converters
Current limit : 1.4 A for the ADP1612 , 2 A for the ADP1613
Minimum input voltage : 1.8 V for the ADP1612 , 2.5 V for the ADP1613
Adjustable output voltage up to 20 V
Adjustable soft start
Undervoltage lockout
Thermal shutdown

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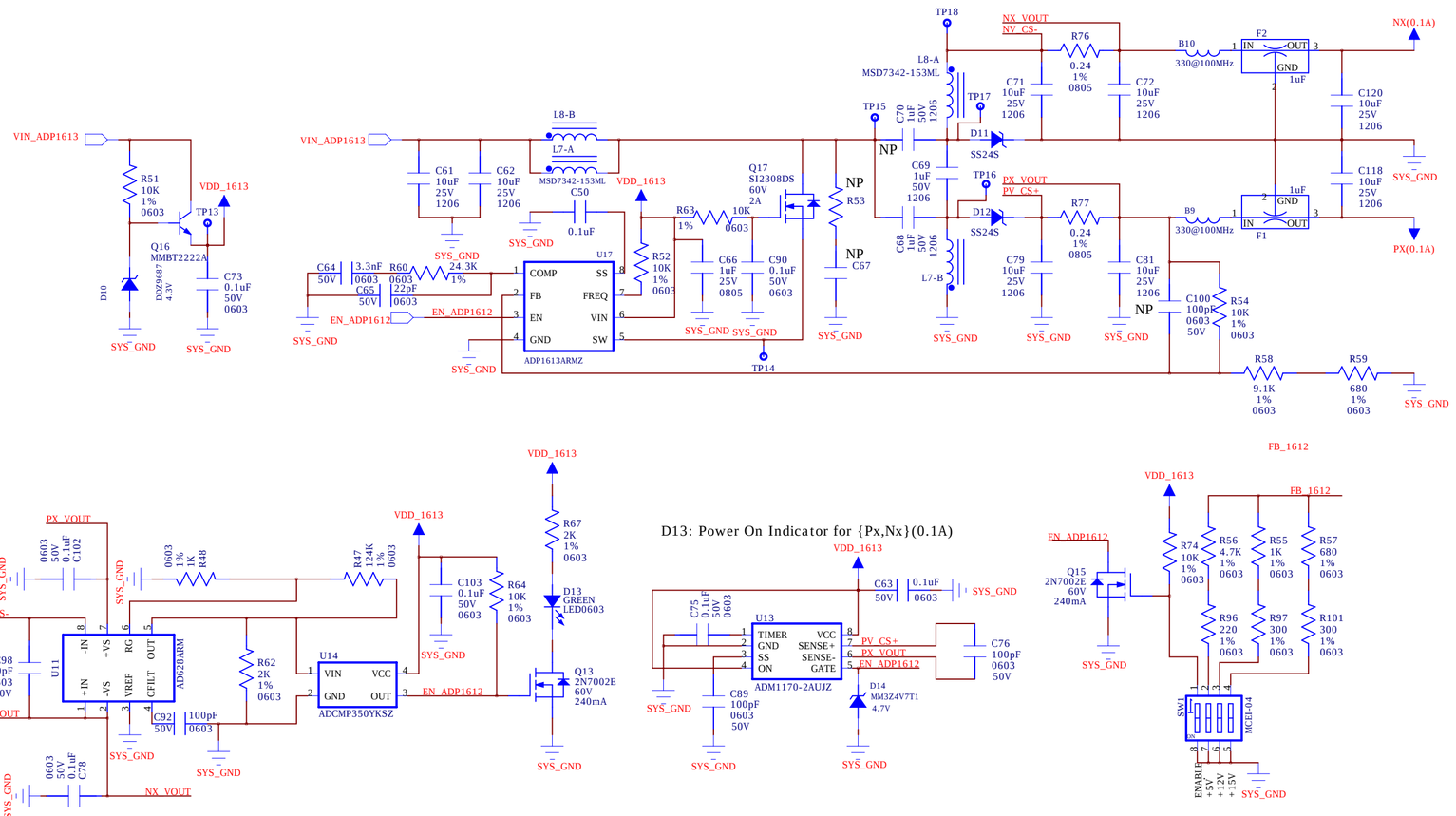
6V~14V input up to +/-15V output Sepic-Cuk Boost Circuit



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QUALITY CONTROL:	DATED:	CODE: 1	SIZE: C
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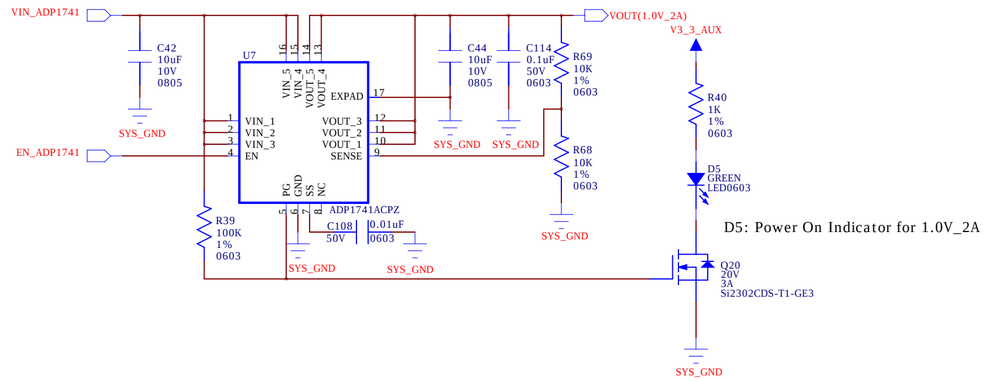
ADP1741

2A Output Adjustable, Low Vin, Low Dropout Linear Regulator
Input Voltage Range :1.6V ~ 3.3V
Low Dropout Voltage: 160mV@2A Load
Initial Voltage Accuracy : +/-1%
Soft Start Control
7 fixed output version 0.75V~2.5V(ADP1740)

1.8V iutput ,1.0V output 2 A Low Dropout Regulator



D5: Power On Indicator for 1.0V_2A

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CHECKED: <Checked By>	DATED: <Checked Date>	TITLE: CN0190 : Universal Multi-Voltage Power Module	
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RELEASED: <Released By>	DATED: <Release Date>	DRAWING NO:	REV: B
		SCALE: 1:1	SHEET: 1 OF 15

ADP1864

Constant Frequency Current-Mode Step-Down DC-to-DC Controller in TSOT
Wide input voltage range: 3.15 V to 14 V
Wide output voltage range: 0.8 V to input voltage
Up to 94% efficiency
0.8 V ¡À 1.25% reference accuracy over temperature
Internal soft start
100% duty cycle for low dropout voltage
Current-mode operation for good line and load transient response
Short-circuit and overvoltage protection
Small 6-lead TSOT package

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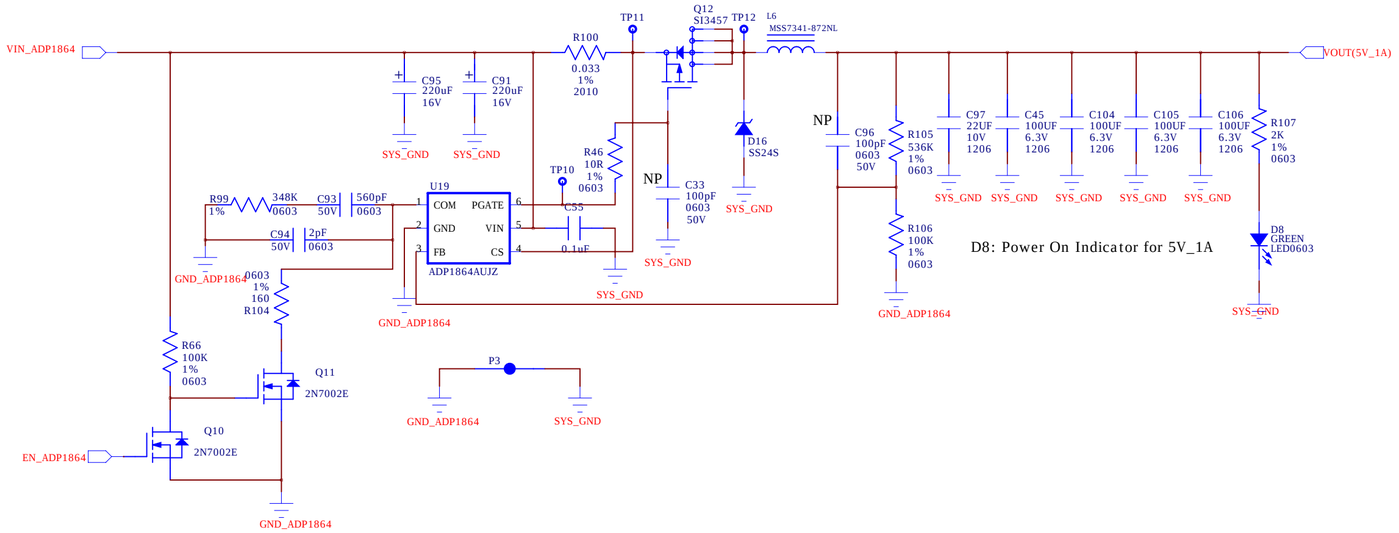
6V~14V input 5V output 2A Nonsynchronous Buck Circuit



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RELEASED: <Released By>	DATED: <Release Date>	DRAWING NO:	REV: B
		SCALE: 1:1	SHEET: 1 OF 15

ADP1872

Synchronous Current-Mode with Constant On-Time, PWM Buck Controller
Power input voltage as low as 2.75 V to 20 V
Bias supply voltage range: 2.75 V to 5.5 V
0.6 V reference voltage with ¡À1.0% accuracy
Supports all N-channel MOSFET power stages
Available in 300 kHz, 600 KHz, and 1.0 MHz options
No current-sense resistor required
Power saving mode (PSM) for light loads (ADP1873 only)
Resistor-programmable current-sense gain
Thermal overload protection Short-circuit protection
Integrated bootstrap diode for high-side drive

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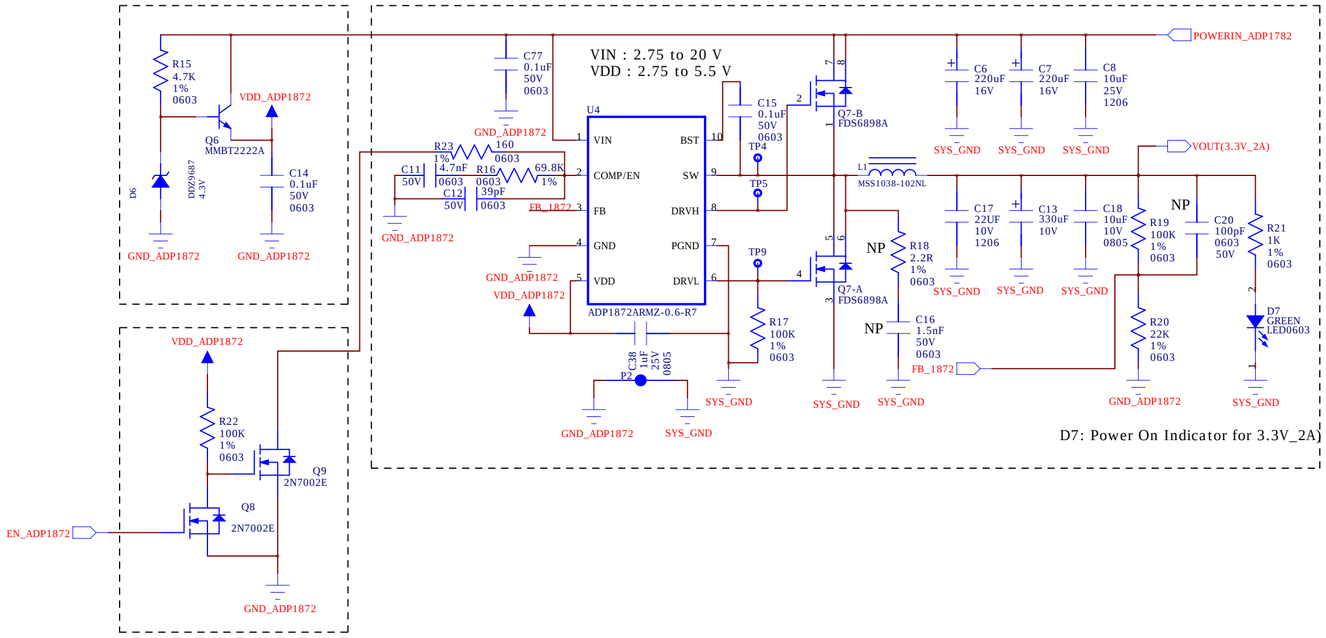
6~14 V input 3.3V 2 A output Synchronous Buck Circuit



D7: Power On Indicator for 3.3V_2A)

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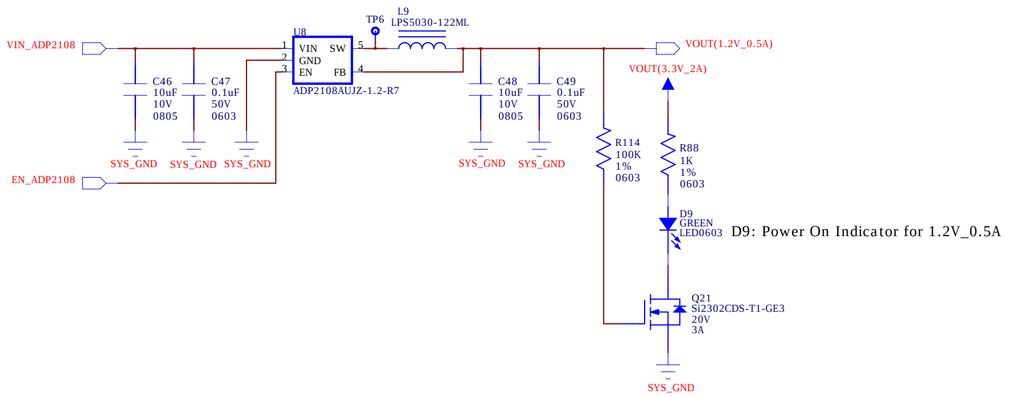
ADP2108

Compact, 600 mA, 3 MHz, Step-Down DC-to-DC Converter
Peak efficiency: 95%
3 MHz fixed frequency operation
Input voltage: 2.3 V to 5.5 V
Uses tiny multilayer inductors and capacitors
Current mode architecture for fast load and line transient response
100% duty cycle low dropout mode
Internal synchronous rectifier
Internal compensation
Internal soft start
Current overload protection, Thermal shutdown protection

3.3V input 1.2V output 0.5A Synchronous Buck Circuit



D9: Power On Indicator for 1.2V_0.5A

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		SCALE: 1:1	SHEET: 1 OF 15

ADP2114

Configurable 2 A/2 A or 3 A/1 A dual output or 4 A for single output
High efficiency: up to 95%
Input voltage V IN : 2.75 V to 5.5 V
Selectable fixed output: 0.8 V, 1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V or
Adjustable output voltage to 0.6 V minimum
¡Á1.5% accurate reference voltage
Selectable switching frequency: 300 kHz, 600 kHz, 1.2 MHz
or synchronized from 200 kHz to 2 MHz
Optimized gate slew rate for reduced EMI
Current mode for fast transient response
Pulse skip under light load or forced PWM operation
Independent enable inputs and PGOOD outputs
Overcurrent and thermal overload protection

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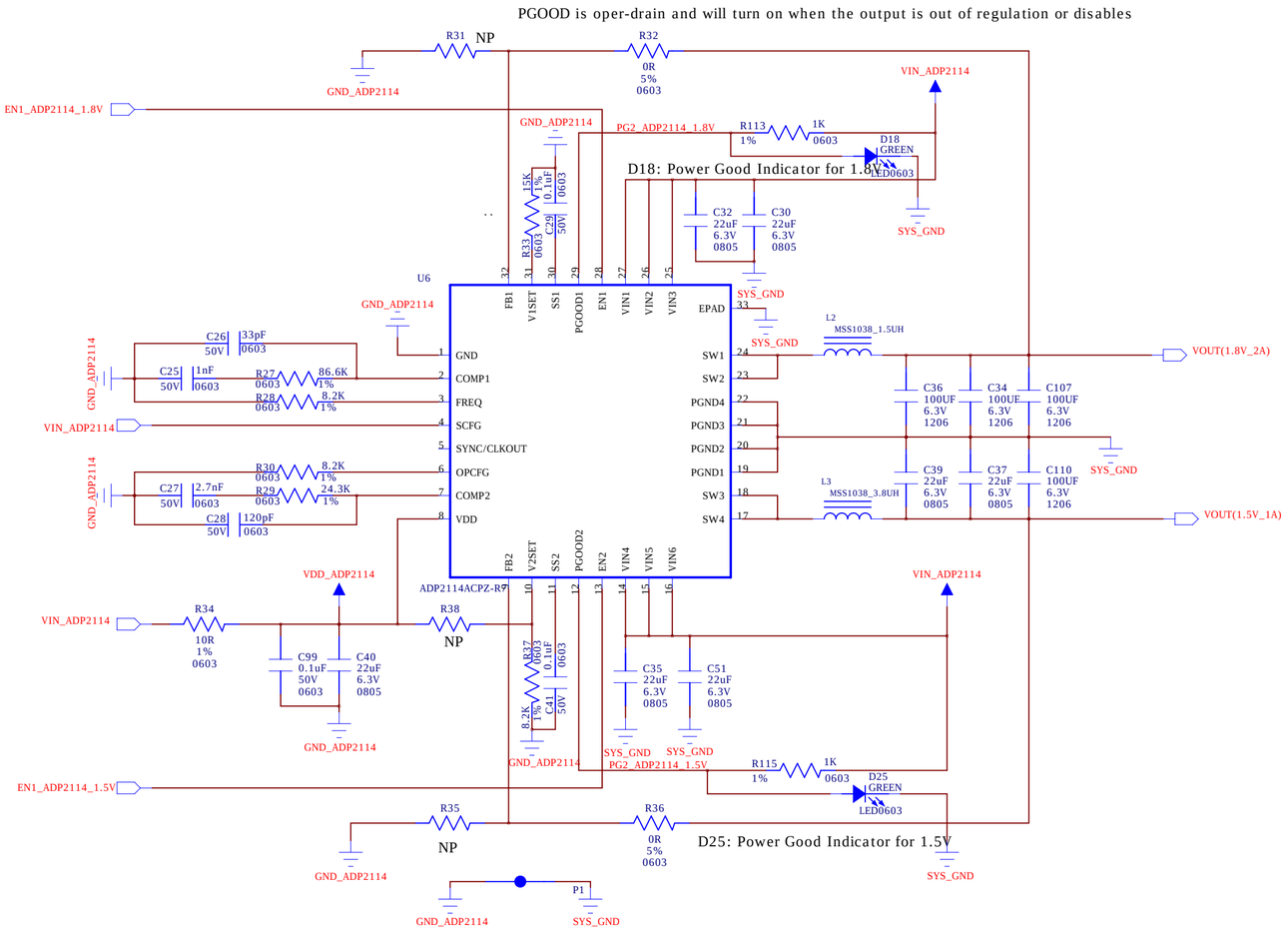
Dual Channel 3.3V input 1.8V 1.5V 1A output Synchronous Buck Circuit

R28 : 8.2K Set Switch Frequency to 600KHz
R30 : 8.2K Set Current Limit Operation Mode to 3A/1A
R33 : 15K Resister set the Vout1 to Fixed 1.8V
R37 : 8.2K Resister set the Vout2 to Fixed 1.5V
Tss1 = Vref*Css1/Iss = 0.6V*0.1uF/0.6uA = 0.1s
Tss2 = Vref*Css2/Iss = 0.6V*0.047uF/0.6uA = 47ms



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ADP2300

Nonsynchronous Step-Down Regulator
1.2 A maximum load current
Wide input voltage range: 3.0 V to 20 V
700 kHz (ADP2300) or 1.4 MHz (ADP2301) switching frequency options
High efficiency up to 91%
Current-mode control architecture
Integrated high-side MOSFET
Integrated bootstrap diode
Internal compensation and soft start
Internal soft start
Overcurrent protection (OCP) and thermal shutdown (TSD)

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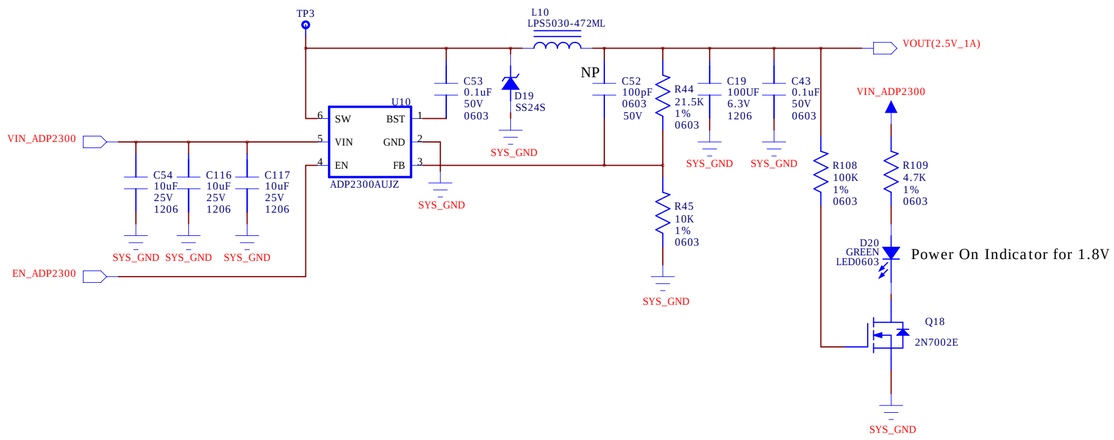
6V~14V input 2.5V output 1A Nonsynchronous Buck Circuit



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ADP2301

Nonsynchronous Step-Down Regulator
1.2 A maximum load current
Wide input voltage range: 3.0 V to 20 V
700 kHz (ADP2300) or 1.4 MHz (ADP2301) switching frequency options
High efficiency up to 91%
Current-mode control architecture
Integrated high-side MOSFET
Integrated bootstrap diode
Internal compensation and soft start
Internal soft start
Overcurrent protection (OCP) and thermal shutdown (TSD)

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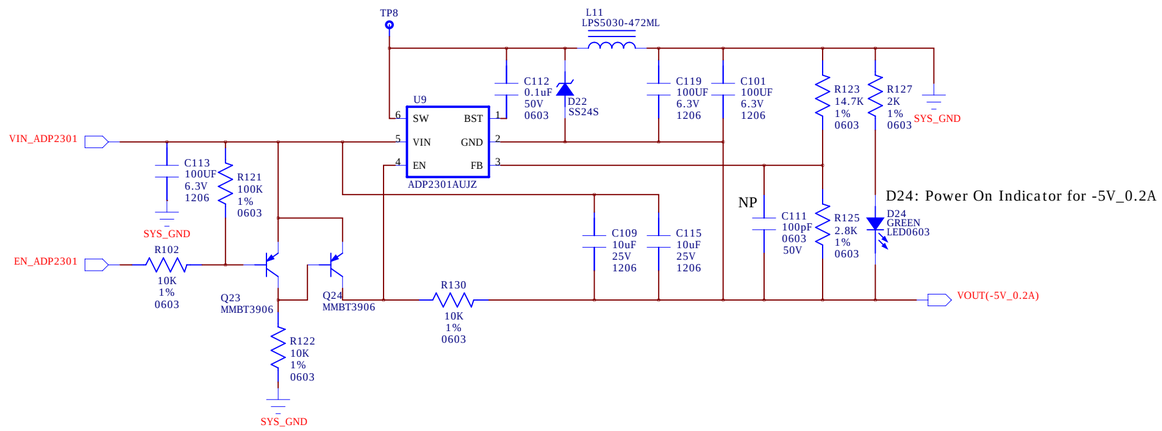
5V input -5V output 200mA Nonsynchronous Inverting Buck Boost Circuit



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ADM1178

Hot Swap Controller and Digital Power Monitor with ALERTB Output
Allows safe board insertion and removal from a live backplane
Controls supply voltages from 3.15 V to 16.5 V
Precision current sense amplifier
I 2 C fast mode-compliant interface (400 kHz maximum)
12-bit ADC for current and voltage readback
Charge-pumped gate drive for external N-channel FET
Adjustable analog current limit with circuit breaker
ALERTB output for overcurrent interrupt
Fast response limits peak fault current
Automatic retry or latch-off on current fault
Programmable hot swap timing via TIMER pin

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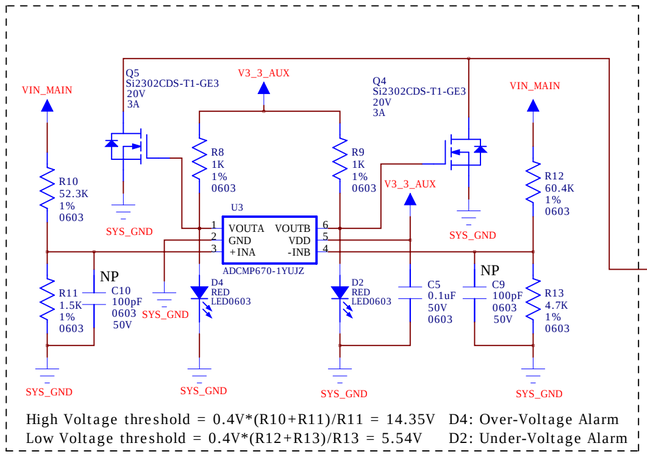
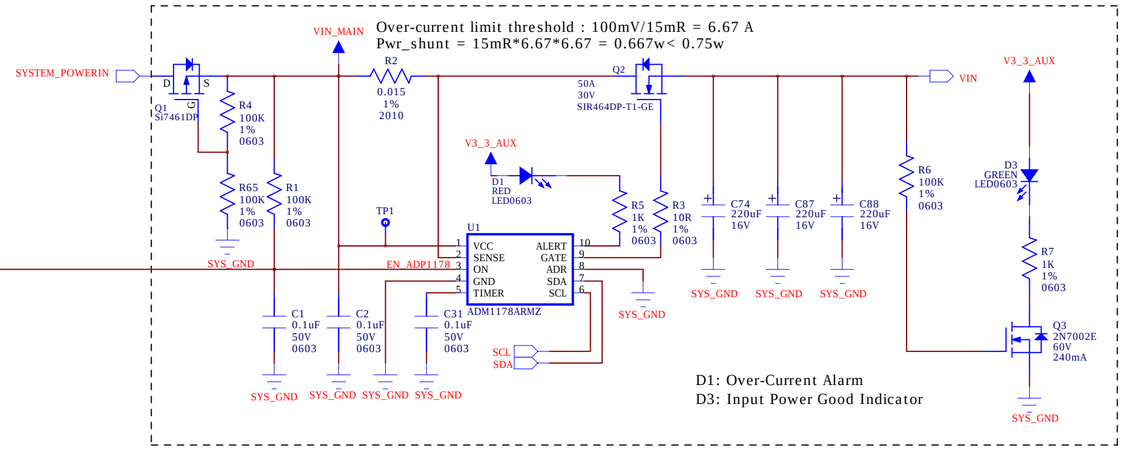
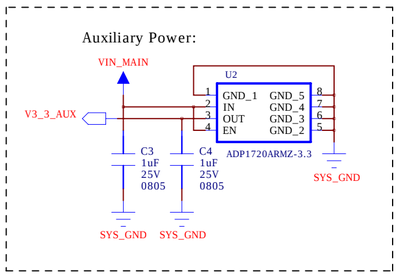
Detect the input Voltage ,Input Current and Hotswap Control







DRAWN: Willie Yue	DATED: 2010 10 19	COMPANY: ANALOG DEVICES INC	
CHECKED: <Checked By>	DATED: <Checked Date>	TITLE: CN0190 : Universal Multi-Voltage Power Module	
QUALITY CONTROL: <QC By>	DATED: <QC Date>	CODE: 1	SIZE: C
RELEASED: <Released By>	DATED: <Release Date>	DRAWING NO:	REV: B
		SCALE: 1:1	SHEET: 1 OF 15