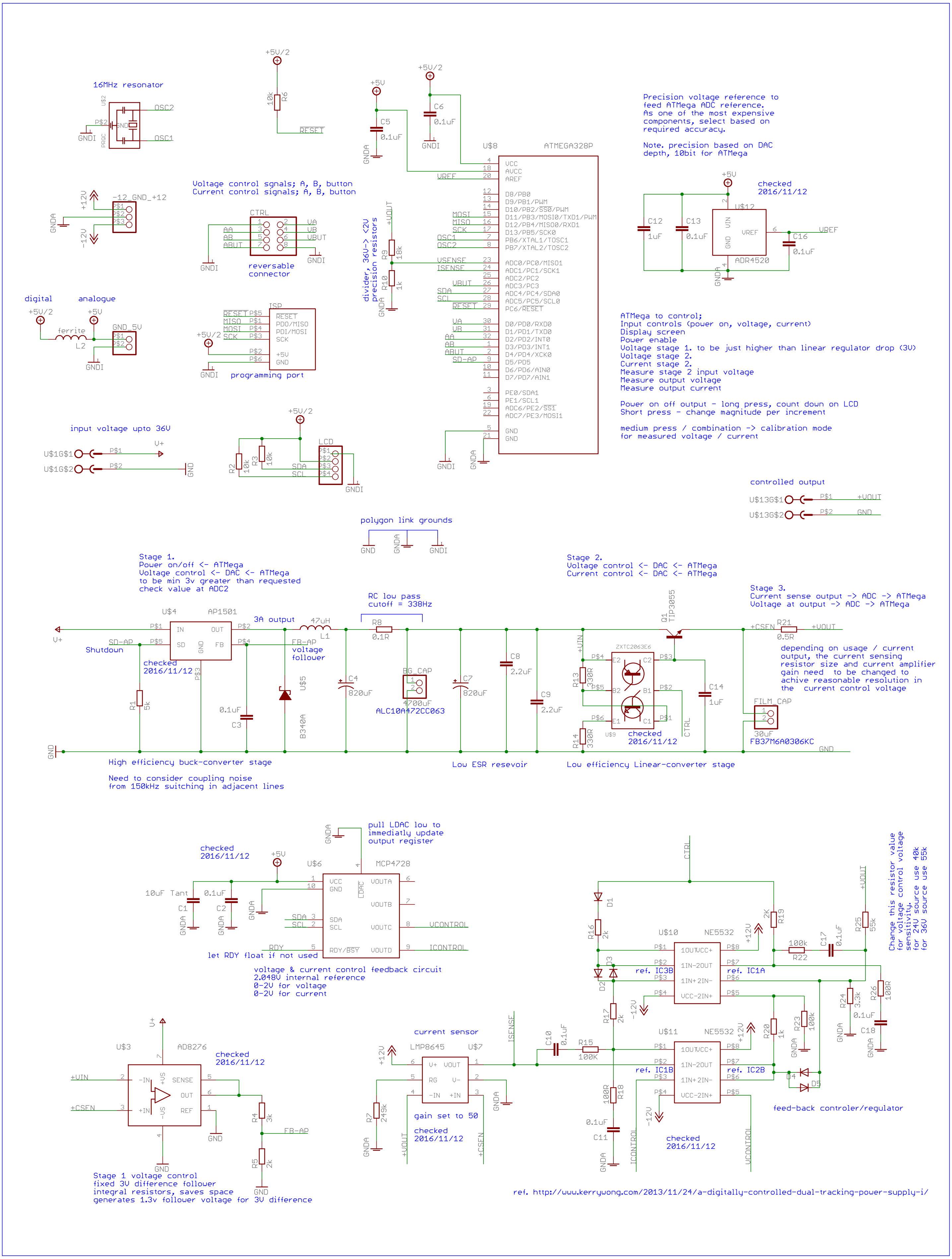

16MHz resonator
OSC2
OSC1
GNDI
-12_GND_+12
+12V
-12V
GNDA
digital
analogue
+5V/2
+5V
ferrite
L2
GND_5V
input voltage upto 36V
U$1G$1
U$1G$2
V+
GND
+5V/2
10k
R6
RESET
Voltage control sgnals; A, B, button
Current control signals; A, B, button
CTRL
reversable
connector
ISP
programming port
LCD
SDA
SCL
divider, 36V-> <2V
precision resistors
R9 18k
R10 1k
+VOUT
C5 0.1uF
C6 0.1uF
U$8
ATMEGA328P
VREF
Precision voltage reference to
feed ATMega ADC reference.
As one of the most expensive
components, select based on
required accuracy.
Note. precision based on DAC
depth, 10bit for ATMega
checked
2016/11/12
U$12
ADR4520
C12 1uF
C13 0.1uF
C16 0.1uF
ATMega to control;
Input controls (power on, voltage, current)
Display screen
Power enable
Voltage stage 1. to be just higher than linear regulator drop (3V)
Voltage stage 2.
Current stage 2.
Measure stage 2 input voltage
Measure output voltage
Measure output current
Power on off output - long press, count down on LCD
Short press - change magnitude per increment
medium press / combination -> calibration mode
for measured voltage / current
controlled output
U$13G$1
U$13G$2
+VOUT
polygon link grounds
Stage 1.
Power on/off <- ATMega
Voltage control <- DAC <- ATMega
to be min 3v greater than requested
check value at ADC2
U$4
AP1501
3A output
47uH
L1
RC low pass
cutoff = 338Hz
R8
0.1R
Shutdown
SD-AP
FB-AP
voltage
follower
checked
2016/11/12
R1 5k
0.1uF
C3
B340A
U$5
C4 820uF
BG_CAP
4700uF
ALC10A472CC063
C7 820uF
C8 2.2uF
C9 2.2uF
Stage 2.
Voltage control <- DAC <- ATMega
Current control <- DAC <- ATMega
Q1 TIP3055
ZXTC2063E6
R13 330R
R14 330R
C14 1uF
checked
2016/11/12
Stage 3.
Current sense output -> ADC -> ATMega
Voltage at output -> ADC -> ATMega
+CSEN
R21
0.5R
depending on usage / current
output, the current sensing
resistor size and current amplifier
gain need to be changed to
achive reasonable resolution in
the current control voltage
FILM_CAP
30uF
FB37M6A0306KC
High efficiency buck-converter stage
Need to consider coupling noise
from 150kHz switching in adjacent lines
Low ESR resevoir
Low efficiency Linear-converter stage
pull LDAC low to
immediatly update
output register
checked
2016/11/12
U$6
MCP4728
10uF Tant
0.1uF
C1
C2
VCONTROL
ICONTROL
let RDY float if not used
voltage & current control feedback circuit
2.048V internal reference
0-2V for voltage
0-2V for current
U$3
AD8276
checked
2016/11/12
+VIN
+CSEN
R4 3k
R5 2k
FB-AP
Stage 1 voltage control
fixed 3V difference follower
integral resistors, saves space
generates 1.3v follower voltage for 3V difference
current sensor
LMP8645
U$7
R7 249k
gain set to 50
checked
2016/11/12
U$10
NE5532
U$11
NE5532
ref. IC3B
ref. IC1A
ref. IC1B
ref. IC2B
R15 100k
C10 0.1uF
R16 2k
R17 2k
R18 100R
C11 0.1uF
R19 2K
R20 1k
R22 100k
R23 100k
R24 3.3k
R25 55k
R26 100R
C17 0.1uF
C18 0.1uF
D1
D2
D3
D4
D5
checked
2016/11/12
feed-back controler/regulator
Change this resistor value
for voltage control voltage
sensitivity.
for 24V source use 40k
for 36V source use 55k
ref. http://www.kerrywong.com/2013/11/24/a-digitally-controlled-dual-tracking-power-supply-i/