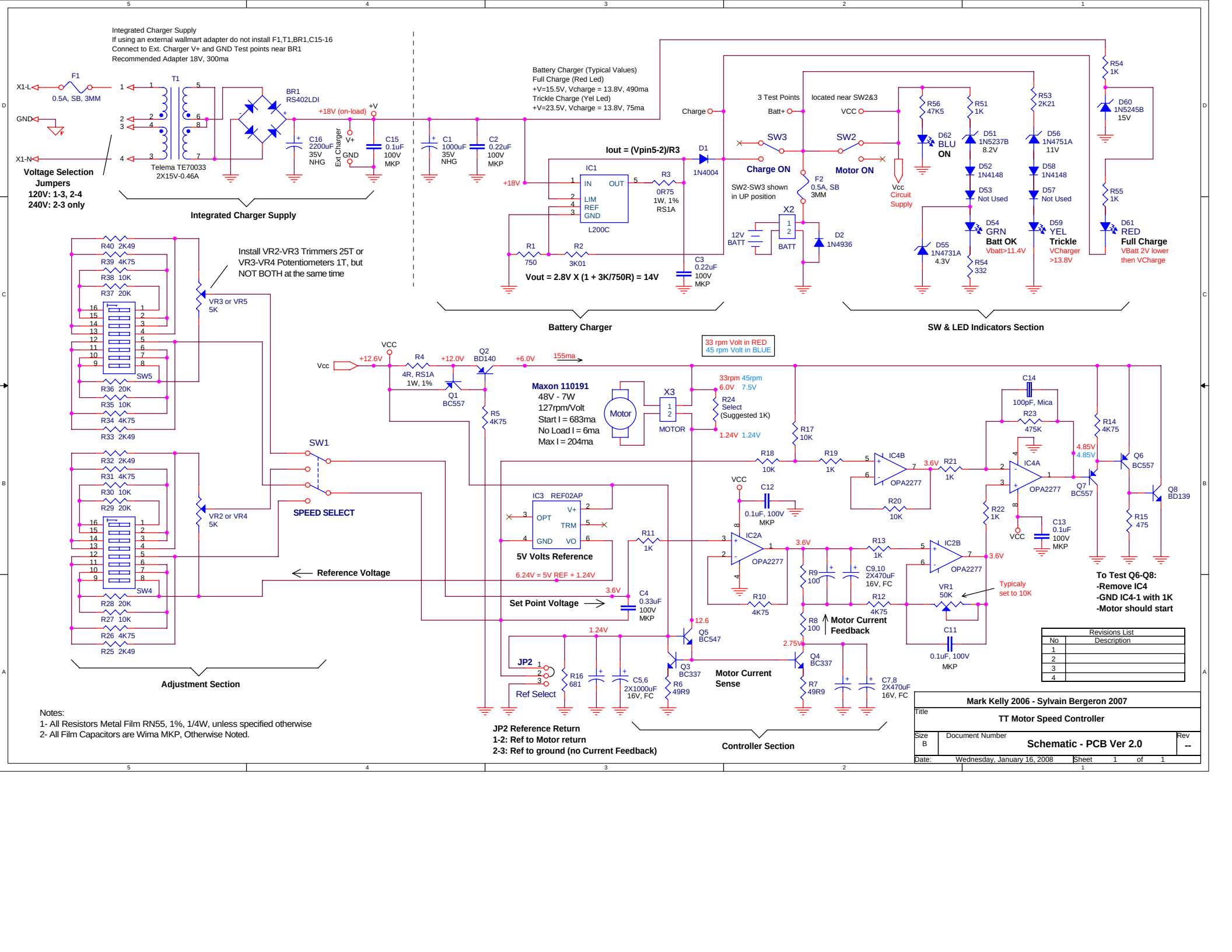
Integrated Charger Supply
If using an external wallmart adapter do not install F1,T1,BR1,C15-16
Connect to Ext. Charger V+ and GND Test points near BR1
Recommended Adapter 18V, 300ma
F1
0.5A, SB, 3MM
X1-L
GND
X1-N
T1
Telema TE70033
2X15V-0.46A
BR1
RS402LDI
+18V (on-load)
+V
C16
2200uF
35V
NHG
Ext Charger
V+
GND
C15
0.1uF
100V
MKP
Voltage Selection
Jumpers
120V: 1-3, 2-4
240V: 2-3 only
Integrated Charger Supply
Battery Charger (Typical Values)
Full Charge (Red Led)
+V=15.5V, Vcharge = 13.8V, 490ma
Trickle Charge (Yel Led)
+V=23.5V, Vcharge = 13.8V, 75ma
C1
1000uF
35V
NHG
C2
0.22uF
100V
MKP
Iout = (Vpin5-2)/R3
D1
1N4004
IC1
IN
OUT
LIM
REF
GND
L200C
R3
0R75
1W, 1%
RS1A
+18V
R1
750
R2
3K01
C3
0.22uF
100V
MKP
Vout = 2.8V X (1 + 3K/750R) = 14V
Battery Charger
Charge
3 Test Points
located near SW2&3
Batt+
VCC
SW3
SW2
Charge ON
Motor ON
SW2-SW3 shown
in UP position
F2
0.5A, SB
3MM
Vcc
Circuit
Supply
X2
12V
BATT
BATT
D2
1N4936
R56
47K5
D62
BLU
ON
R51
1K
D51
1N5237B
8.2V
D52
1N4148
D53
Not Used
D54
GRN
Batt OK
Vbatt>11.4V
D55
1N4731A
4.3V
R54
332
R53
2K21
D56
1N4751A
11V
D58
1N4148
D57
Not Used
D59
YEL
Trickle
VCharger
>13.8V
R54
1K
D60
1N5245B
15V
R55
1K
D61
RED
Full Charge
VBatt 2V lower
then VCharge
SW & LED Indicators Section
R40 2K49
R39 4K75
R38 10K
R37 20K
SW5
R36 20K
R35 10K
R34 4K75
R33 2K49
VR3 or VR5
5K
Install VR2-VR3 Trimmers 25T or
VR3-VR4 Potentiometers 1T, but
NOT BOTH at the same time
R32 2K49
R31 4K75
R30 10K
R29 20K
SW4
R28 20K
R27 10K
R26 4K75
R25 2K49
VR2 or VR4
5K
SW1
SPEED SELECT
Reference Voltage
Adjustment Section
33 rpm Volt in RED
45 rpm Volt in BLUE
VCC
Vcc
+12.6V
R4
4R, RS1A
1W, 1%
+12.0V
Q2
BD140
+6.0V
155ma
Q1
BC557
R5
4K75
Maxon 110191
48V - 7W
127rpm/Volt
Start I = 683ma
No Load I = 6ma
Max I = 204ma
Motor
X3
MOTOR
33rpm 45rpm
6.0V 7.5V
R24
Select
(Suggested 1K)
1.24V 1.24V
R17
10K
R18
10K
R19
1K
IC4B
OPA2277
3.6V
R21
1K
R20
10K
C14
100pF, Mica
R23
475K
IC4A
OPA2277
4.85V
4.85V
R14
4K75
Q6
BC557
Q7
BC557
Q8
BD139
R15
475
R22
1K
C13
0.1uF
100V
MKP
VCC
IC3 REF02AP
OPT
V+
TRM
GND
VO
5V Volts Reference
6.24V = 5V REF + 1.24V
R11
1K
C12
0.1uF, 100V
MKP
IC2A
OPA2277
3.6V
R13
1K
IC2B
OPA2277
3.6V
R9
100
C9,10
2X470uF
16V, FC
R10
4K75
R12
4K75
VR1
50K
Typicaly
set to 10K
C11
0.1uF, 100V
MKP
Motor Current
Feedback
C4
0.33uF
100V
MKP
Set Point Voltage
3.6V
12.6
Q5
BC547
1.24V
2.75V
Q4
BC337
R8
100
Q3
BC337
R6
49R9
R7
49R9
C7,8
2X470uF
16V, FC
Motor Current
Sense
JP2
Ref Select
R16
681
C5,6
2X1000uF
16V, FC
JP2 Reference Return
1-2: Ref to Motor return
2-3: Ref to ground (no Current Feedback)
Controller Section
To Test Q6-Q8:
-Remove IC4
-GND IC4-1 with 1K
-Motor should start
Revisions List
No
Description
1
2
3
4
Notes:
1- All Resistors Metal Film RN55, 1%, 1/4W, unless specified otherwise
2- All Film Capacitors are Wima MKP, Otherwise Noted.
Mark Kelly 2006 - Sylvain Bergeron 2007
Title
TT Motor Speed Controller
Size
B
Document Number
Schematic - PCB Ver 2.0
Rev
--
Date:
Wednesday, January 16, 2008
Sheet
1
of
1