

DESCRIPTION

Demonstration circuit DC512 is a single battery switching buck charge controller featuring the LTC4100. The recommended input power is 15 to 20V at 3.5Amps. A two position jumper allows the choice of a protected output voltage range suitable for 3 and 4 Cell Li-Ion batteries. Removal of the jumper allows full output voltage range. The maximum charge current is 4A. The demo board is initially configured for 12.6V @ 3A for popular 3 cell Li-Ion battery packs. The board will automatically charge a battery to termination as soon as input power is applied with a battery connected prior to power up. A

VOUT pin provides power to the system from the wall adapter or battery automatically. Status LEDs are provided for CHGEN, ACP, SMBALERT and SMBus activity. The optional DC410 SMBUS to Serial Port adapter and associated software to control, monitor and datalog the system for demonstration purposes only. You do not need this software to run the DC512. Contact your LT representative for ordering a DC410.

Design files for this circuit board are available. Call the LTC factory.

Table 1. Performance Summary

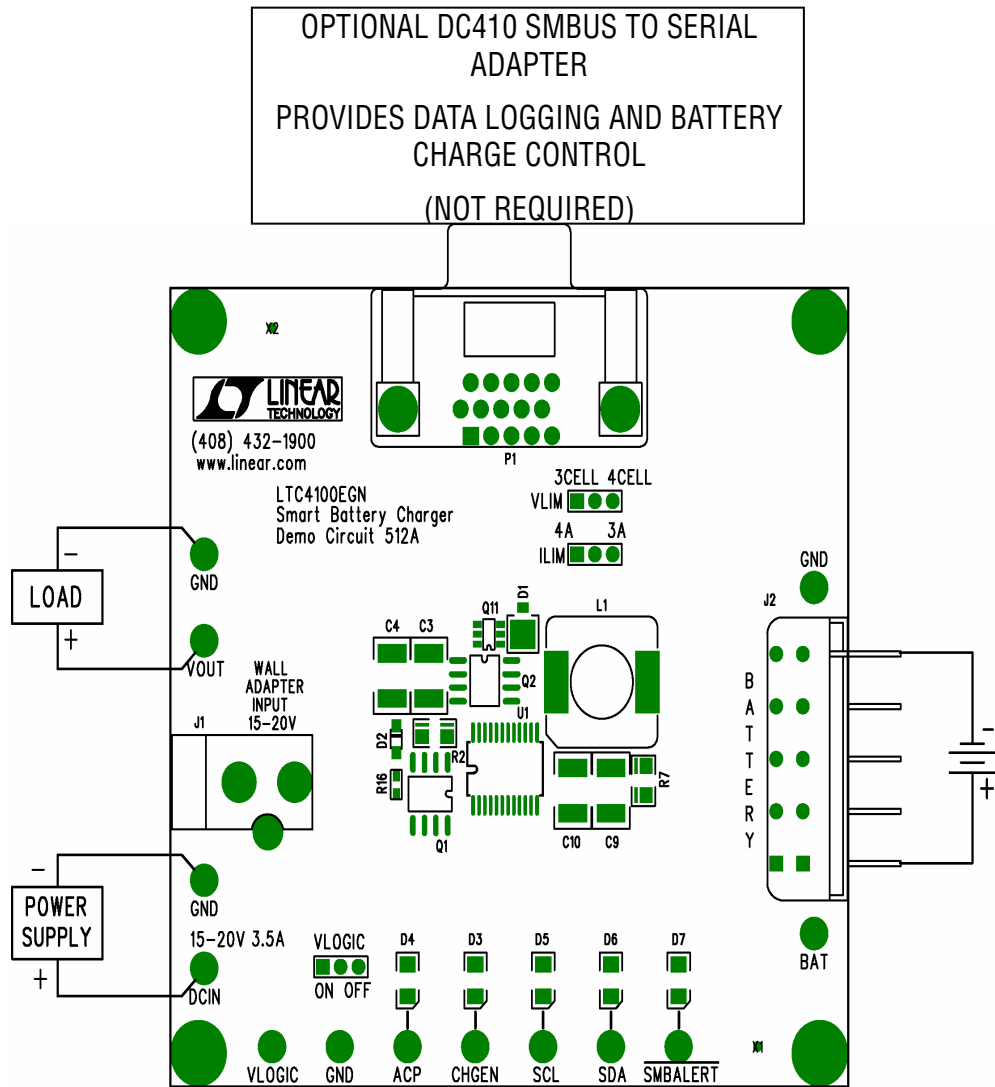
Parameter	Value	Conditions/Notes
Input Voltage Range	15 – 25V	V _{in} must exceed V _{bat} to charge. Max Input voltage is input cap limited.
ACP Trip voltage	14.6V+/-3%	
Recommended Wall Adapter Voltage	15 – 20V	See Note
Recommended Wall Adapter Current	•3.5A	See Note
Input Current Limit from Wall Adapter	3.5A+/-7%	5% Typical. See Note
Programmable Output Voltage Range	6V – V _{limit}	Preset 3 and 4 Cell jumper settings
Absolute maximum Output Voltage	25V	Max output voltage is output cap limited. V _{limit} = open
Program Voltage Accuracy	±0.8%	Typical
Minimum Voltage Step	16mV	All V _{limit} scales.
# of Voltage Steps	2048 Steps	11 Bit range
Programmable Output Current Range	0 – I _{limit}	Preset jumper for 3 and 4 Amp range
Absolute maximum Output Current	4.092A	I _{limit} = Open (4 Amp jumper setting)
Program Current Accuracy	±5%	3% is typical
Minimum Current Step	4mA	For 3 & 4 amp scale
# of Current Steps	1024 Steps	10 Bit range
Efficiency	85–96%	See DataSheet
Dropout voltage.	<1V	At 4 Amp charge rate

QUICK START PROCEDURE

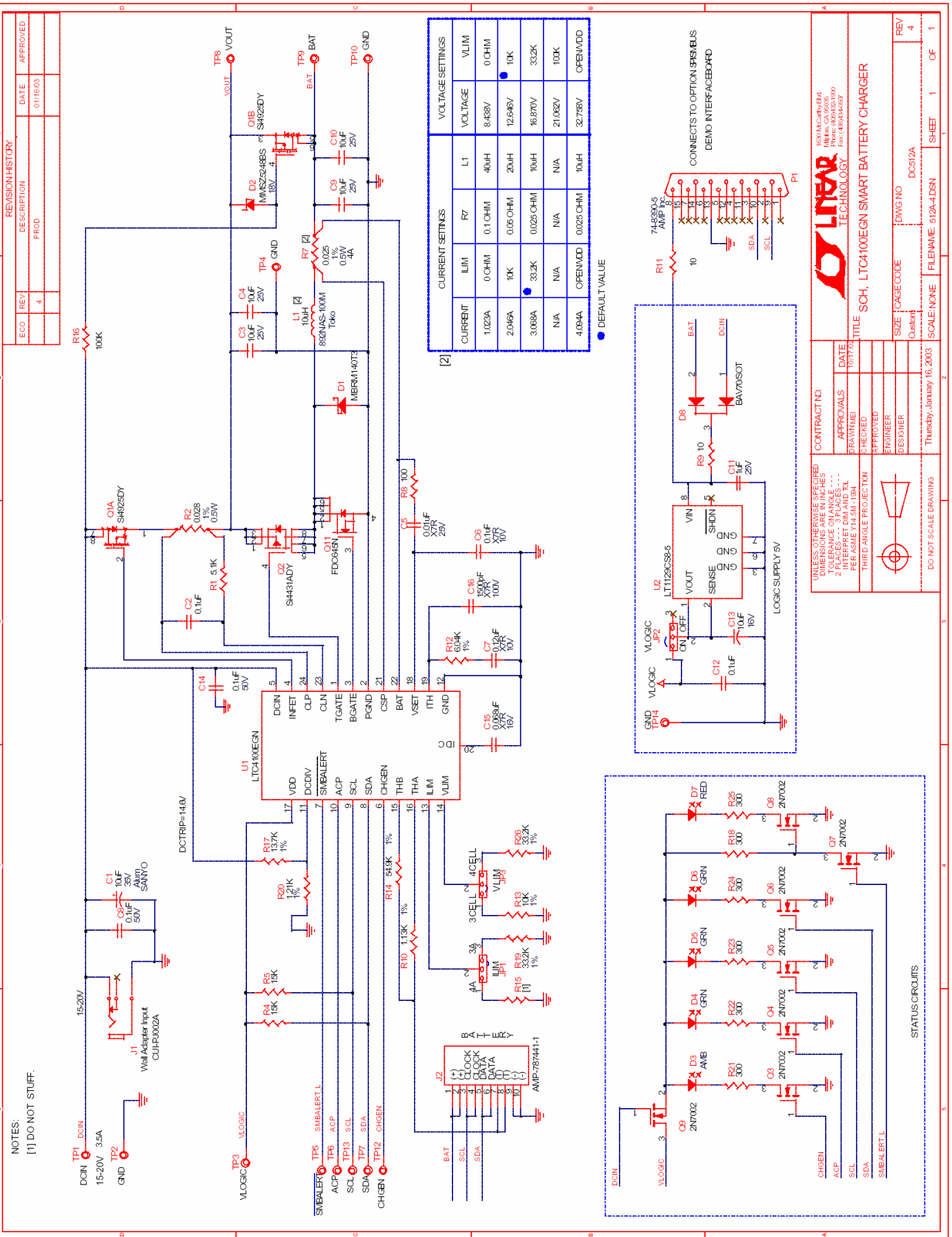
1. Connect a properly rated power source to DCIN terminals J1 or terminals labeled DCIN and GND.
2. Optionally connect a load to DCOUT and GND terminals.
3. Configure the jumpers for your specific battery.
4. Plug in the battery. Industry standard 5 Pin AMP Smart Battery connector is provided as well as generic soldering Test Points for hardwire connections.
5. Turn on the input power supply.
6. Optionally use the provided DC410 demonstration software to control and configure the DC512.
7. NOTE: If the board is allowed to get to warm, the onboard NTC thermistor may trip and momentarily suspend the charge process. This can be confirmed by the fault LED turning on. When the board cools down, charging will resume.

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT DC512

SMART BATTERY CHARGER BOARD

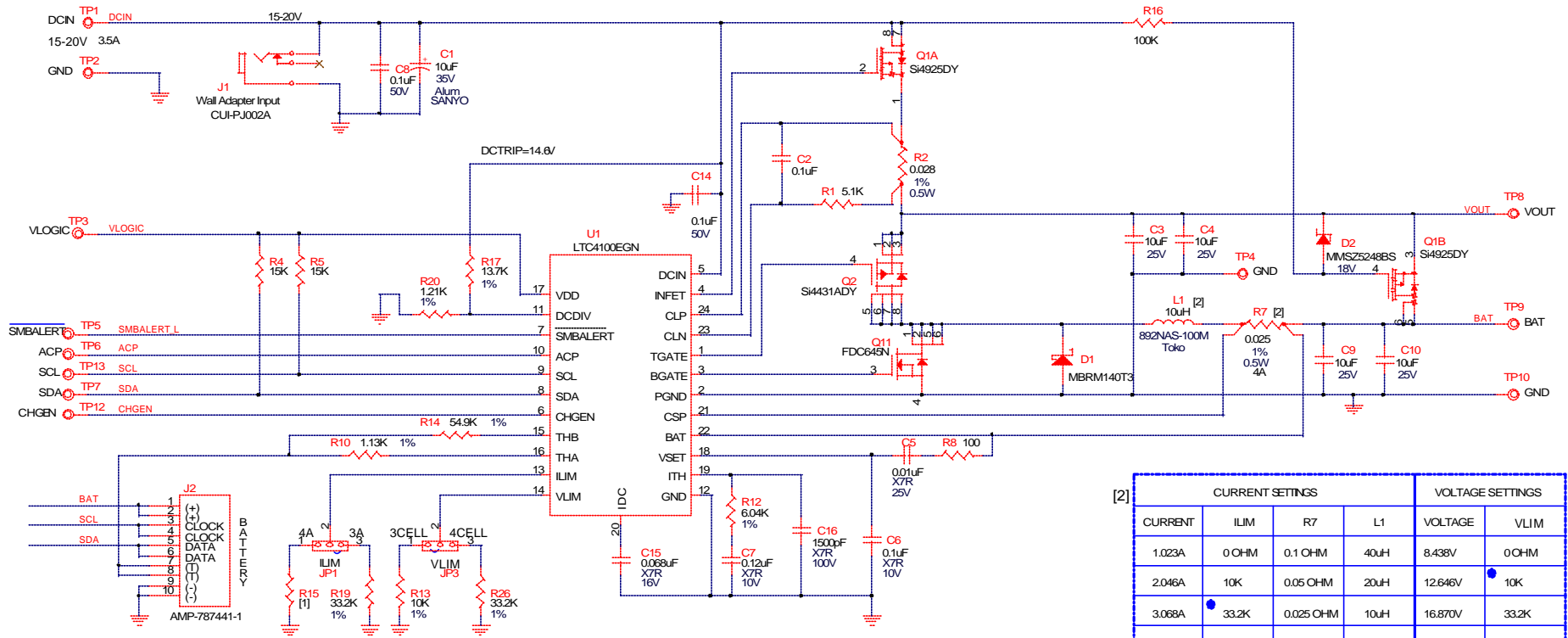


QUICK START GUIDE FOR DEMONSTRATION CIRCUIT DC512 SMART BATTERY CHARGER BOARD



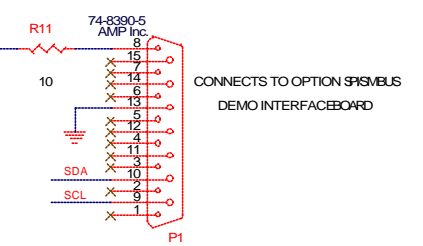
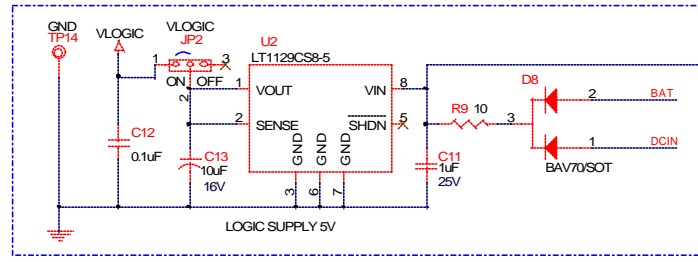
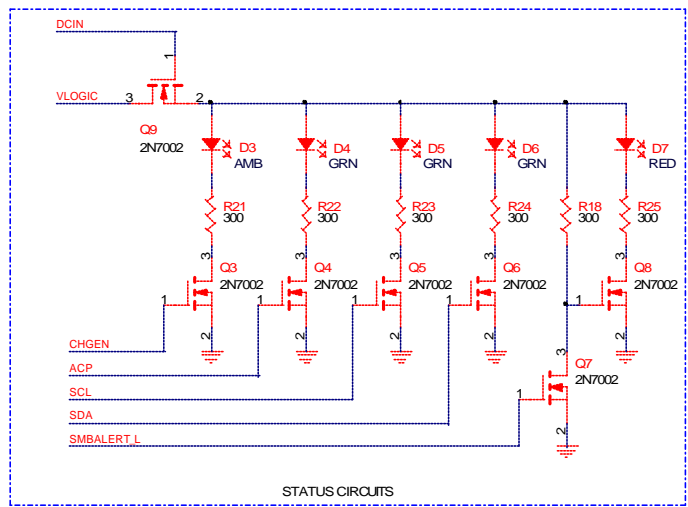
NOTES:
[1] DO NOT STUFF.

REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
	4	PROD	01/16/03	



CURRENT	CURRENT SETTINGS			VOLTAGE SETTINGS	
	ILIM	R7	L1	VOLTAGE	VLIM
1.023A	0 OHM	0.1 OHM	40uH	8.438V	0 OHM
2.046A	10K	0.05 OHM	20uH	12.646V	10K
3.068A	33.2K	0.025 OHM	10uH	16.870V	33.2K
N/A	N/A	N/A	N/A	21.062V	100K
4.094A	OPEN/VDD	0.025 OHM	10uH	32.758V	OPEN/VDD

● DEFAULT VALUE



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON ANGLE . . . 2 PLACES . . . 3 PLACES . . . INTERPRET DIM AND TOL. PER ASME Y14.5M-1994	CONTRACT NO.			1630 McCarthy Blvd Milpitas, CA 95035 Phone: (408)432-1900 Fax: (408)434-0507	
	APPROVALS	DATE		TITLE	
	DRAWN/MEI	10/17/02		SCH, LTC4100EGN SMART BATTERY CHARGER	
	CHECKED			SIZE	CAGE CODE
APPROVED		Custom		DC512A	REV
ENGINEER					4
DESIGNER					
THIRD ANGLE PROJECTION				Thursday, January 16, 2003	
DO NOT SCALE DRAWING		SCALE: NONE	FILENAME: 512A4.DSN	SHEET: 1	OF: 1

Item	Qty	Ref	Desc	Part Number
1	1	C1	CAP, ALUM 10uF 35V 10%	SANYO 35CV10AX
2	1	C2	CAP, Y5V 0.1uF 25V +80-20% 0603	AVX 06033G104ZAT2TA
3	4	C3,C4,C9,C10	CAP, X5R 10uF 25V 20% 1812	TAIYO YUDEN TMK432BJ106MM
4	1	C5	CAP, X7R 0.01uF 25V 10% 0603	AVX 06033C103KAT
5	1	C6	CAP, X7R 0.1uF 10V 20% 0603	AVX 0603ZC104MAT
6	1	C7	CAP, X7R 0.12uF 10V 20% 0603	AVX 0603ZC124MAT
7	2	C8,C14	CAP, X7R 0.1uF 10V 10% 0805	AVX 08055C104KAT
8	1	C11	CAP, Y5V 1uF 25V +80-20% 1206	AVX 12063G105ZATMA
9	1	C12	CAP, X7R 0.1uF 16V 10% 0603	AVX 0603YC104KAT
10	1	C13	CAP, TANT 10uF 16V 20% 3828	AVX TAJB106M016
11	1	C15	CAP, X7R 0.068uF 16V 10% 0603	TAIYO YUDEN EMK107BJ683KA
12	1	C16	CAP, X7R 1500pF 100V 10% 0603	AVX 06031C152KAT2A
13	1	D1	DIODE, MBRM140T3	MOTOROLA MBRM140T3
14	1	D2	DIODE, ZENER MMSZ5248BS 18V SOT323	DIODES INC. MMSZ5248BS
15	1	D3	LED, AMBER	PANASONIC LN1451C-(TR)
16	3	D4,D5,D6	LED, GREEN	PANASONIC LN1351C-(TR)
17	1	D7	LED, RED	PANASONIC LN1251C-(TR)
18	1	D8	DIODE, BAV70 SWITCHING 350mW SOT-23	DIODES INC. BAV70
19	3	JP1,JP2,JP3	JUMPER, 1X3 PINS, 2MM	COMM CON 2802S-03-G1
20	1	J1	CONN, 2 PIN	CUI-STACK CUI-PJ002A
21	1	J2	CONN, 10 PIN	AMP INC. 787441-1
22	1	L1	IND, 10uH	TOKO 892NAS-100M
23	1	P1	CONN, DSUB 15 PIN	AMP INC. 74-8390-5
24	1	Q1	XSTR, Si4925DY DUAL P-CHANNEL MOSFET SO8	VISHAY SILICONIX Si4925DY
25	1	Q2	XSTR, Si4431ADY P-CHANNEL MOSFET SO8	VISHAY SILICONIX Si4431ADY
26	7	Q3,Q4,Q5,Q6,Q7,Q8,Q9	XSTR, 2N7002 N-CHANNEL MOSFET	ZETEX 2N7002
27	1	Q11	XSTR, FDC645N N-CHANNEL MOSFET SUPERSOT	FAIRCHILD FDC645N
28	1	R1	RES, 5.1K OHMS 5% 1/16W 0603	AAC CR16-512JM
29	1	R2	RES, 0.028 OHM 1% 0.5W 1206	IRC LR1206-01-R028-F
30	2	R5,R4	RES, 15K OHMS 5% 1/16W 0603	AAC CR16-153JM
31	1	R7	RES, 1206 0.025 OHMS 1% 0.5W	IRC LRF1206-01-R025-F
32	1	R8	RES, 100 OHMS 5% 1/16W 0603	AAC CR16-101JM
33	2	R9,R11	RES, 10 OHMS 5% 1/16W 0603	AAC CR16-100JM
34	1	R10	RES, 1.13K OHMS 1% 1/16W 0603	AAC CR16-1131FM
35	1	R12	RES, 6.04K OHMS 1% 1/16W0603	AAC CR16-6041FM
36	1	R13	RES, 10K OHMS 1% 1/16W 0603	AAC CR16-1002FM

37	1	R14	RES, 54.9K OHMS 1% 1/16W 0603	AAC CR16-5492FM
38	0	R15	DO NOT STUFF	NONE
39	1	R16	RES, 100K OHMS 5% 1/16W 0603	AAC CR16-104JM
40	1	R17	RES, 13.7K OHMS 1% 1/16W 0603	AAC CR16-1372FM
41	6	R18,R21,R22,R23,R24,R25	RES, 300 OHMS 5% 1/16W 0603	AAC CR16-301JM
42	2	R26,R19	RES, 33.2K OHMS 1% 1/16W 0603	AAC CR16-3322FM
43	1	R20	RES, 1.21K OHMS 1% 1/16W 0603	AAC CR16-1211FM
44	13	TP1-TP10,TP12-TP14	TURRET	MILL-MAX 2308-2
45	1	U1	IC, LTC4100EGN SMART BATTERY CONTROLLER	LINEAR TECH LTC 4100EGN
46	1	U2	IC, LT1129CS8-5 SO8	LINEAR TECH. LT1129CS8-5
	4		SCREW, 4-40, 0.25" LONG	ANY
	4		STANDOFF, NYLON HEX 4-40 0.5" LONG	MICROPLASTICS 14HTSP003
	3	JP1,JP2,JP3	SHUNT, 2PIN 2mm	COMM CON CCIJ2mm-138G