

1. ALL RESISTANCE VALUES ARE IN OHMS, 0.1 WATT +/- 5%.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
3. ALL CRYSTALS & OSCILLATOR VALUES ARE IN HERTZ.


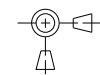
REV	ZONE	ECN	DESCRIPTION OF CHANGE	CK APPD DATE	ENG APPD DATE
01		229127	ENGINEERING RELEASED	07/22/02	?

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# BUBBA

DVT BUILD  
11/20/2002

PART#	QTY	DESCRIPTION	REFERENCE DESIGNATOR(S)	BOM OPTION
051-6283	1	SCHEM, BKUP BATT, BUBBA, P84	SCH1	
820-1391	1	PCBF, BKUP BATT, BUBBA, P84	PCB1	

DIMENSIONS ARE IN MILLIMETERS		METRIC		 Apple Computer Inc.	
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X.XX : _____				TITLE <b>SCHEM, BUBBA, P84</b>	
X.XXX : _____				DRAWING NUMBER <b>405592</b> REV. <b>AA</b>	
ANGLES : _____				SHT 1 OF 7	
DO NOT SCALE DRAWING				MATERIAL / FINISH NOTED AS APPLICABLE      SIZE <b>D</b>	
 THIRD ANGLE PROJECTION					

# PCB SPECS

THICKNESS : 1.2 MM / 0.047 IN  
 1/2 OZ CU THICKNESS: 0.7 MILS  
 1.0 OZ CU THICKNESS: 1.4 MILS

IMPEDANCE : 50 OHMS +/- 10%  
 DIELECTRIC: FR-4  
 LAYER COUNT: 12  
 SIGNAL TRACE WIDTH: 4 MILS  
 SIGNAL TRACE SPACING: 4 MILS  
 PREPREG THICKNESS: 2-3 MILS

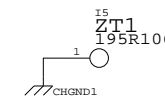
SEE PCB CAD FILES FOR MORE SPECIFIC INFO.

## BOARD STACK-UP AND CONSTRUCTION

20R10 TH VIA OR VIA IN PAD

1	SIGNAL (1/3 OZ + COPPER PLATING)
2	PREPREG (3MIL) GROUND (1/2 OZ)
3	LAMINATE (4MIL) SIGNAL (1/2 OZ)
4	PREPREG (3MIL) SIGNAL (1/2 OZ)
5	LAMINATE (4MIL) GROUND (1/2 OZ)
6	PREPREG (2MIL) CUT POWER PLANE(1 OZ)
7	LAMINATE (3MIL) CUT POWER PLANE(1 OZ)
8	PREPREG (2MIL) GROUND (1/2 OZ)
9	LAMINATE (4MIL) SIGNAL (1/2 OZ)
10	PREPREG (3MIL) SIGNAL (1/2 OZ)
11	LAMINATE (4MIL) GROUND (1/2 OZ)
12	PREPREG (3MIL) SIGNAL (1/3 OZ + COPPER PLATING)

BOARD HOLES



PCB BOARD STANDOFFS

### BOARD INFORMATION

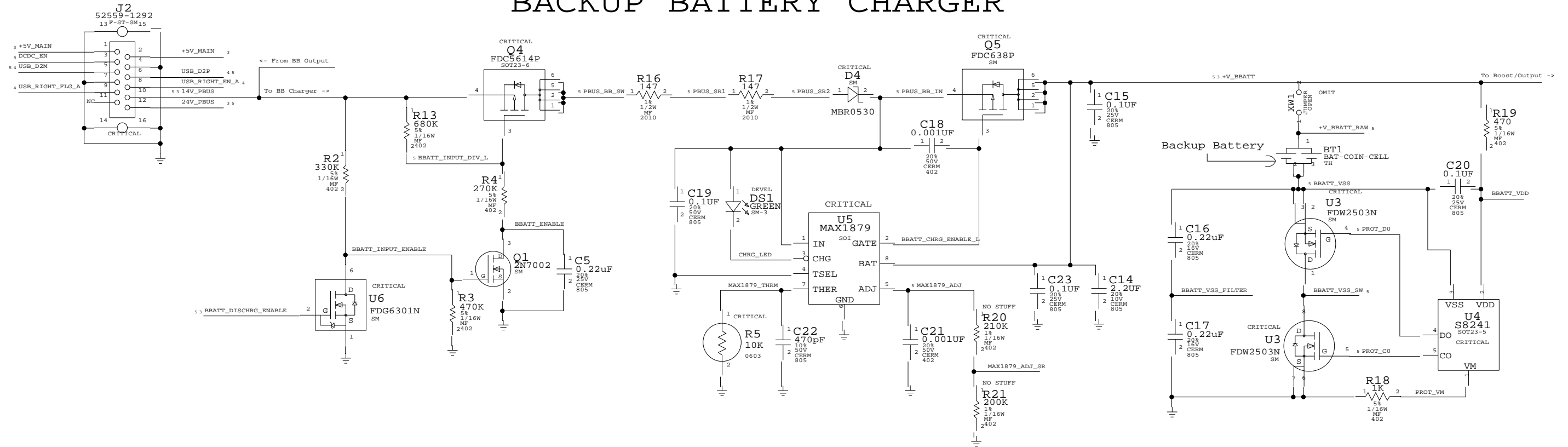
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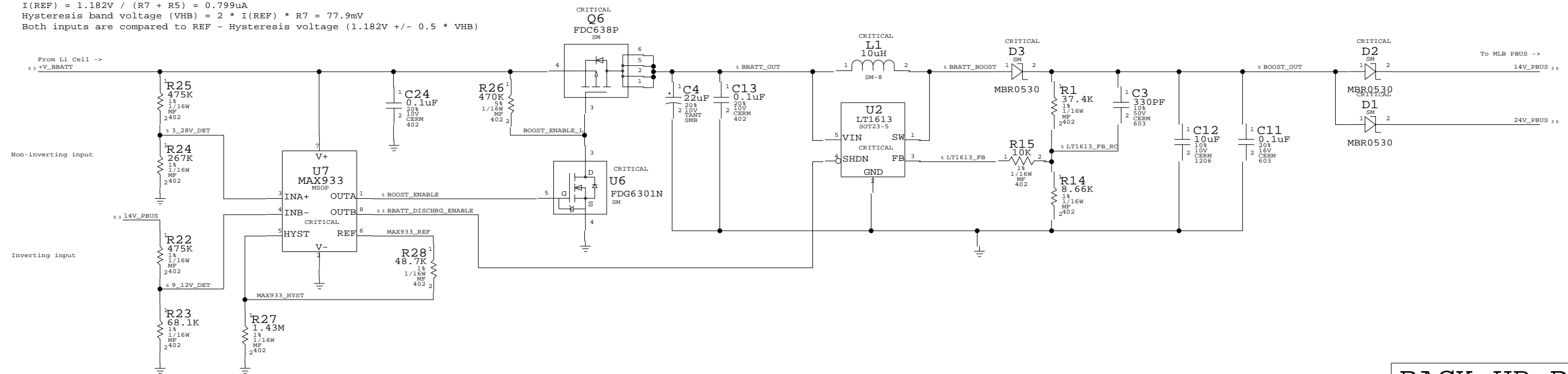
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SIZE	D	DRAWING NUMBER	405592	REV.	AA
SCALE	NONE	SHT	2	OF	7

# BACKUP BATTERY CHARGER



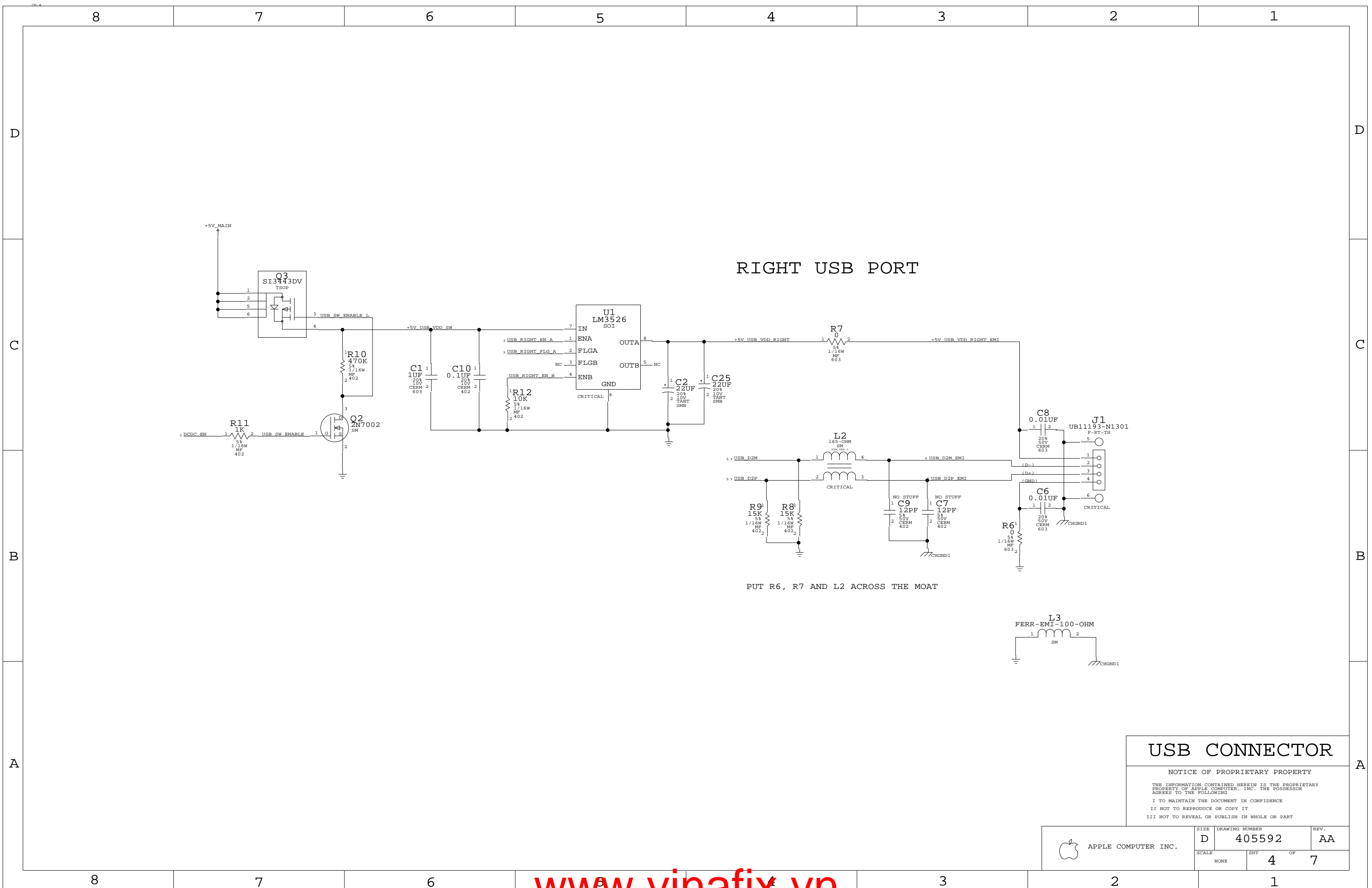
$I(REF) = 1.182V / (R7 + R5) = 0.799\mu A$   
 Hysteresis band voltage (VHB) =  $2 * I(REF) * R7 = 77.9mV$   
 Both inputs are compared to REF - Hysteresis voltage ( $1.182V \pm 0.5 * VHB$ )



## BACK UP BATTERY

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SCALE	SIZE	DRAWING NUMBER	REV.
	NONE	D 40592	AA
SCALE	SHT	OF	
	NONE	3	7



RIGHT USB PORT

PUT R6, R7 AND L2 ACROSS THE MOAT

USB CONNECTOR

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	D	405592	AA
SCALE	SHT	OF	
NONE	4	7	

GROUP	SIG_NAME	DIFFERENTIAL_PAIR	MATCHED_DELAY	MIN_LINE_WIDTH	NET_SPACING_TYPE
USB	USB_D2M	USB_D2	USB_D2:::20	MIN_LINE_WIDTH=5	10 MIL SPACING
	USB_D2P	USB_D2	USB_D2:::20	MIN_LINE_WIDTH=5	10 MIL SPACING
	USB_D2M_EMI	USB_D2_EMI	USB_D2_EMI:::20	MIN_LINE_WIDTH=5	10 MIL SPACING
	USB_D2P_EMI	USB_D2_EMI	USB_D2_EMI:::20	MIN_LINE_WIDTH=5	10 MIL SPACING

**Power Signals**

GROUP	SIG_NAME	VOLTAGE	MIN_LINE_WIDTH	MIN_NECK_WIDTH
BATTERY	24V_PBUS	VOLTAGE=24V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	14V_PBUS	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	PBUS_BB_IN	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	PBUS_SR2	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	PBUS_SR1	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	PBUS_BB_SW	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	+V_BBATT	VOLTAGE=4.2V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	+V_BBATT_RAM	VOLTAGE=4.2V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	BBATT_VSS	VOLTAGE=0V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	BBATT_VSS_SW	VOLTAGE=0V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
MAX1879	MAX1879_ADJ	VOLTAGE=1.4V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
	BBATT_INPUT_DIV_L	VOLTAGE=14V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
SB241	PROT_D0	VOLTAGE=4.2V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
	PROT_C0	VOLTAGE=4.2V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
MAX933	9_12V_DET	VOLTAGE=1.2V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
	3_28V_DET	VOLTAGE=1.2V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
	BOOST_ENABLE	VOLTAGE=4.2V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
	BBATT_DISCHRG_ENABLE	VOLTAGE=4.2V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
LT1613	BBATT_OUT	VOLTAGE=4.2V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	BBATT_BOOST	VOLTAGE=6.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	BOOST_OUT	VOLTAGE=6.5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	LT1613_FB	VOLTAGE=1.3V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
	LT1613_FB_RC	VOLTAGE=1.3V	MIN_LINE_WIDTH=8	MIN_NECK_WIDTH=10
	/+5V_MAIN	VOLTAGE=5V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10
	/GND	VOLTAGE=0V	MIN_LINE_WIDTH=20	MIN_NECK_WIDTH=10

**REVISION HISTORY**

BOARD INHERITS FROM P59 (LIBBY)

- 07/12/02 - RE-PINNED J2 (PG. 2)
- 07/12/02 - MINOR SCHEMATIC CLEAN-UP
- 07/12/02 - MAJOR CONSTRAINT FIXES
- PROTO2 08/12/02 - CHANGE J2 TO MOLEX 53398-0690(P/N 515S1473)
- 08/12/02 - DELETE LIGHT SENSOR AND ASSOCIATED COMPONENT
- 08/14/02 - CHANGE J2 TO MOLEX 52559-1292(P/N 518S00433)
- 08/14/02 - ADD BATTERY SYMBOL(P/N 742-0047)
- 08/16/02 - ADD USB 2.0 ASSOCIATED COMPONENT
- 08/16/02 - RE-PINNED J2 (PG. 2)
- 08/19/02 - ADD NET DCDC\_EN
- DVT 10/17/02 - CHANGE BATTERY SYMBOL TO 3P
- 11/22/02 - ADD L3 BETWEEN DIGITAL GND AND CHASSIS GND
- 11/22/02 - USE C2 & C25 TO REPLACE C2
- 11/24/02 - CHANGE C1,R6,R7 TO SMALL SIZE(0603)

**SIGNAL CONSTRAINTS**

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	D	405592	AA
SCALE	SHT	OF	
NONE	5	7	

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*** Signal Cross-Reference ***
--- for the entire design ---
+5V_MAIN      3D7 3D8
+5V_USB_VDD_RIGHT 4C4
+5V_USB_VDD_RIGHT_EN1 4C3
+5V_USB_VDD_SW 4C6
+V_SBATT      3B8 3D3 5D6
+V_SBATT_PAM   3D2 5D6
/+5V_MAIN     5C8
/DRD          5C8
2_28V_DET     3B7 5C6
9_12V_DET     3A7 5C6
14V_PRES      3B1 3B6 3D7 5D6
24V_PRES      3B1 3D7 5D6
SBATT_BOOST   3B4 5C6
SBATT_CHRG_ENABLE_L 3C4
SBATT_DISCHRG_ENABLE 3B6 3C7 5C6
SBATT_ENABLE  3C6
SBATT_INPOT_DIV_L 3D6 5C6
SBATT_INPOT_ENABLE 3C7
SBATT_OUT     3B5 5C6
SBATT_VDD     3C1
SBATT_VSS     3C2 5D6
SBATT_VSS_FILTER 3C2
SBATT_VSS_SW  3C2 5D6
BOOST_ENABLE  3B6 5C6
BOOST_ENABLE_L 3B6
BOOST_OUT     3B3 5C6
CHRG_LED      3C5
DCDC_EN       3D8 4B7
LT1413_FB     3B4 5C6
LT1413_FB_EC  3B3 5C6
MAX933_HYST   3A7
MAX933_SEF    3A6
MAX1879_ADJ   3C4 5C6
MAX1879_ADJ_SR 3C3
MAX1879_THERM 3C5
PRES_BB_IN    3D4 5D6
PRES_BB_SW    3D6 5D6
PRES_SR1      3D6 5D6
PRES_SR2      3D5 5D6
PROT_CO       3C2 5C6
PROT_D0       3C2 5C6
PROT_VM       3C2
USB_D2M       3D8 4B4 5D7
USB_D2M_DMI   4B3 5D7
USB_D2P       3D7 4B4 5D7
USB_D2P_DMI   4B3 5D7
USB_RIGHT_EN_A 3D7 4C6
USB_RIGHT_EN_B 4C6
USB_RIGHT_FLG_A 3D8 4C6
USB_SW_ENABLE 4B7
USB_SW_ENABLE_L 4C7

```

D  
C  
B  
A

D  
C  
B  
A

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	D	405592	AA
SCALE	SHT		OF
NONE	6		7

\*\*\* Unit Cross-Reference \*\*\*  
 --- for the entire design ---

B1	BATTERY_2PA	3D2
C1	CAP	4C6
C2	CAP_P	4C6
C3	CAP	3B3
C4	CAP_P	3B6
C5	CAP	3C6
C6	CAP	4B2
C7	CAP	4B3
C8	CAP	4C2
C9	CAP	4B3
C10	CAP	4C6
C11	CAP	3B3
C12	CAP	3B3
C13	CAP	3B6
C14	CAP	3C3
C15	CAP	3D3
C16	CAP	3C3
C17	CAP	3C3
C18	CAP	3D4
C19	CAP	3C3
C20	CAP	3D1
C21	CAP	3C4
C22	CAP	3C5
C23	CAP	3C3
C24	CAP	3B6
D1	DIODE_SCHOT	3B2
D2	DIODE_SCHOT	3B2
D3	DIODE_SCHOT	3B4
D4	DIODE_SCHOT	3D4
DB1	LED	3C5
J1	CONN_F48T_SMT_TH	4C2
J2	CONN_F128T_SMT_SMI	3D8
L1	IND	3B4
L2	FILTER_4P	4B4
Q1	TRIA_2N7002	3C5
Q2	TRIA_2N7002	4C6
Q3	TRIA_2134432V	4C7
Q4	TRIA_FDC631P	3D6
Q5	TRIA_FDC638P	3D4
Q6	TRIA_FDC638P	3B5
R1	RES	3B3
R2	RES	3D7
R3	RES	3C6
R4	RES	3C6
R5	THERMISTOR	3C5
R6	RES	4B3
R7	RES	4C4
R8	RES	4B4
R9	RES	4B4
R10	RES	4C6
R11	RES	4C7
R12	RES	4C6
R13	RES	3D6
R14	RES	3B3
R15	RES	3B4
R16	RES	3D5
R17	RES	3D5
R18	RES	3C2
R19	RES	3D1
R20	RES	3C4
R21	RES	3C4
R22	RES	3A7
R23	RES	3A7
R24	RES	3B7
R25	RES	3B7
R26	RES	3B6
R27	RES	3A7
R28	RES	3A6
U1	LM3526	4C5
U2	DCDC_L71613	3B4
U3	TRIA_POW503N	3C2
U4	BAT_PROT_S8241	3C1
U5	MAX1879	3C4
U6	TRIA_POW503N	3B5
U7	MAX933	3B7
XW1	JUMPER	3D2
Z1	WINDHOLE	3C2

D

D

C

C


B

B

A

A

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	SCALE NONE	SHT <b>7</b>	OF <b>7</b>