

V22

CANADA

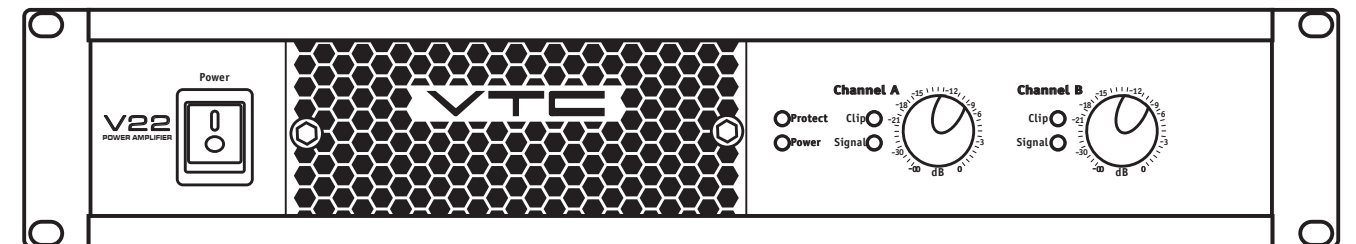
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Service Manual

IMPORTANT SAFETY INSTRUCTIONS



This lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Ce symbole d'éclair avec tête de flèche dans un triangle équilatéral est prévu pour alerter l'utilisateur de la présence d'un « voltage dangereux » non-isolé à proximité de l'enceinte du produit qui pourrait être d'ampleur suffisante pour présenter un risque de choc électrique.



CAUTION AVIS

**RISK OF ELECTRIC SHOCK
DO NOT OPEN**

**RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR**



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Le point d'exclamation à l'intérieur d'un triangle équilatéral est prévu pour alerter l'utilisateur de la présence d'instructions importantes dans la littérature accompagnant l'appareil en ce qui concerne l'opération et la maintenance de cet appareil.

FOLLOW ALL INSTRUCTIONS

**Instructions pertaining to a risk of fire,
electric shock, or injury to a person**

**CAUTION: TO REDUCE THE RISK OF ELECTRIC
SHOCK, DO NOT REMOVE COVER (OR BACK).**

NO USER SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

THIS DEVICE IS FOR INDOOR USE ONLY!

SUIVEZ TOUTES LES INSTRUCTIONS

**Instructions relatives au risque de feu,
choc électrique, ou blessures aux personnes**

**AVIS: AFIN DE REDUIRE LES RISQUE DE CHOC ELECTRIQUE,
N'ENLEVEZ PAS LE COUVERT (OU LE PANNEAU ARRIERE)**

NE CONTIENT AUCUNE PIECE REPARABLE PAR L'UTILISATEUR.

CONSULTEZ UN TECHNICIEN QUALIFIE POUR L'ENTRETIEN

CE PRODUIT EST POUR L'USAGE À L'INTÉRIEUR SEULEMENT

Read Instructions: The Owner's Manual should be read and understood before operation of your unit. Please, save these instructions for future reference and heed all warnings.

Clean only with dry cloth.

Packaging: Keep the box and packaging materials, in case the unit needs to be returned for service.

Warning: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. *Do not use this apparatus near water!*

Warning: When using electric products, basic precautions should always be followed, including the following:

Power Sources

Your unit should be connected to a power source only of the voltage specified in the owners manual or as marked on the unit. This unit has a polarized plug. Do not use with an extension cord or receptacle unless the plug can be fully inserted. Precautions should be taken so that the grounding scheme on the unit is not defeated. An apparatus with CLASS I construction shall be connected to a Mains socket outlet with a protective earthing ground. Where the MAINS plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

Hazards

Do not place this product on an unstable cart, stand, tripod, bracket or table. The product may fall, causing serious personal injury and serious damage to the product. Use only with cart, stand, tripod, bracket, or table recommended by the manufacturer or sold with the product. Follow the manufacturer's instructions when installing the product and use mounting accessories recommended by the manufacturer. Only use attachments/accessories specified by the manufacturer

Note: Prolonged use of headphones at a high volume may cause health damage on your ears.

The apparatus should not be exposed to dripping or splashing water; no objects filled with liquids should be placed on the apparatus.

Terminals marked with the "lightning bolt" are hazardous live; the external wiring connected to these terminals require installation by an instructed person or the use of ready made leads or cords.

Ensure that proper ventilation is provided around the appliance. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

No naked flame sources, such as lighted candles, should be placed on the apparatus.

Power Cord

Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet. The AC supply cord should be routed so that it is unlikely that it will be damaged. Protect the power cord from being walked on or pinched particularly at plugs. If the AC supply cord is damaged DO NOT OPERATE THE UNIT. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle. The mains plug of the power supply cord shall remain readily operable.

Unplug this apparatus during lightning storms or when unused for long periods of time.

Service

The unit should be serviced only by qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Veuillez Lire le Manuel: Il contient des informations qui devraient être comprises avant l'opération de votre appareil. Conservez. Gardez S.V.P. ces instructions pour consultations ultérieures et observez tous les avertissements.

Nettoyez seulement avec le tissu sec.

Emballage: Conservez la boîte au cas où l'appareil devait être retourner pour réparation.

Avertissement: Pour réduire le risque de feu ou la décharge électrique, n'exposez pas cet appareil à la pluie ou à l'humidité. *N'utilisez pas cet appareil près de l'eau!*

Attention: Lors de l'utilisation de produits électrique, assurez-vous d'adhérer à des précautions de bases incluant celle qui suivent:

Alimentation

L'appareil ne doit être branché qu'à une source d'alimentation correspondant au voltage spécifié dans le manuel ou tel qu'indiqué sur l'appareil. Cet appareil est équipé d'une prise d'alimentation polarisée. Ne pas utiliser cet appareil avec un cordon de raccordement à moins qu'il soit possible d'insérer complètement les trois lames. Des précautions doivent être prises afin d'éviter que le système de mise à la terre de l'appareil ne soit désengagé. Un appareil construit selon les normes de CLASS I devrait être raccordé à une prise murale d'alimentation avec connexion intacte de mise à la masse. Lorsqu'une prise de branchement ou un coupleur d'appareils est utilisée comme dispositif de débranchement, ce dispositif de débranchement devra demeurer pleinement fonctionnel avec raccordement à la masse.

Risque

Ne pas placer cet appareil sur un chariot, un support, un trépied ou une table instables. L'appareil pourrait tomber et blesser quelqu'un ou subir des dommages importants. Utiliser seulement un chariot, un support, un trépied ou une table recommandés par le fabricant ou vendus avec le produit. Suivre les instructions du fabricant pour installer l'appareil et utiliser les accessoires recommandés par le fabricant. Utilisez seulement les attachments/accessoires indiqués par le fabricant

Note: L'utilisation prolongée des écouteurs à un volume élevé peut avoir des conséquences néfastes sur la santé sur vos oreilles. .

Il convient de ne pas placer sur l'appareil de sources de flammes nues, telles que des bougies allumées.

L'appareil ne doit pas être exposé à des égouttements d'eau ou des éclaboussures et qu'aucun objet rempli de liquide tel que des vases ne doit être placé sur l'appareil.

Assurez que l'appareil est fourni de la propre ventilation. Ne procédez pas à l'installation près de source de chaleur tels que radiateurs, registre de chaleur, fours ou autres appareils (incluant les amplificateurs) qui produisent de la chaleur.

Les dispositifs marqués d'une symbole "d'éclair" sont des parties dangereuses au toucher et que les câblages extérieurs connectés à ces dispositifs de connexion extérieure doivent être effectués par un opérateur formé ou en utilisant des cordons déjà préparés.

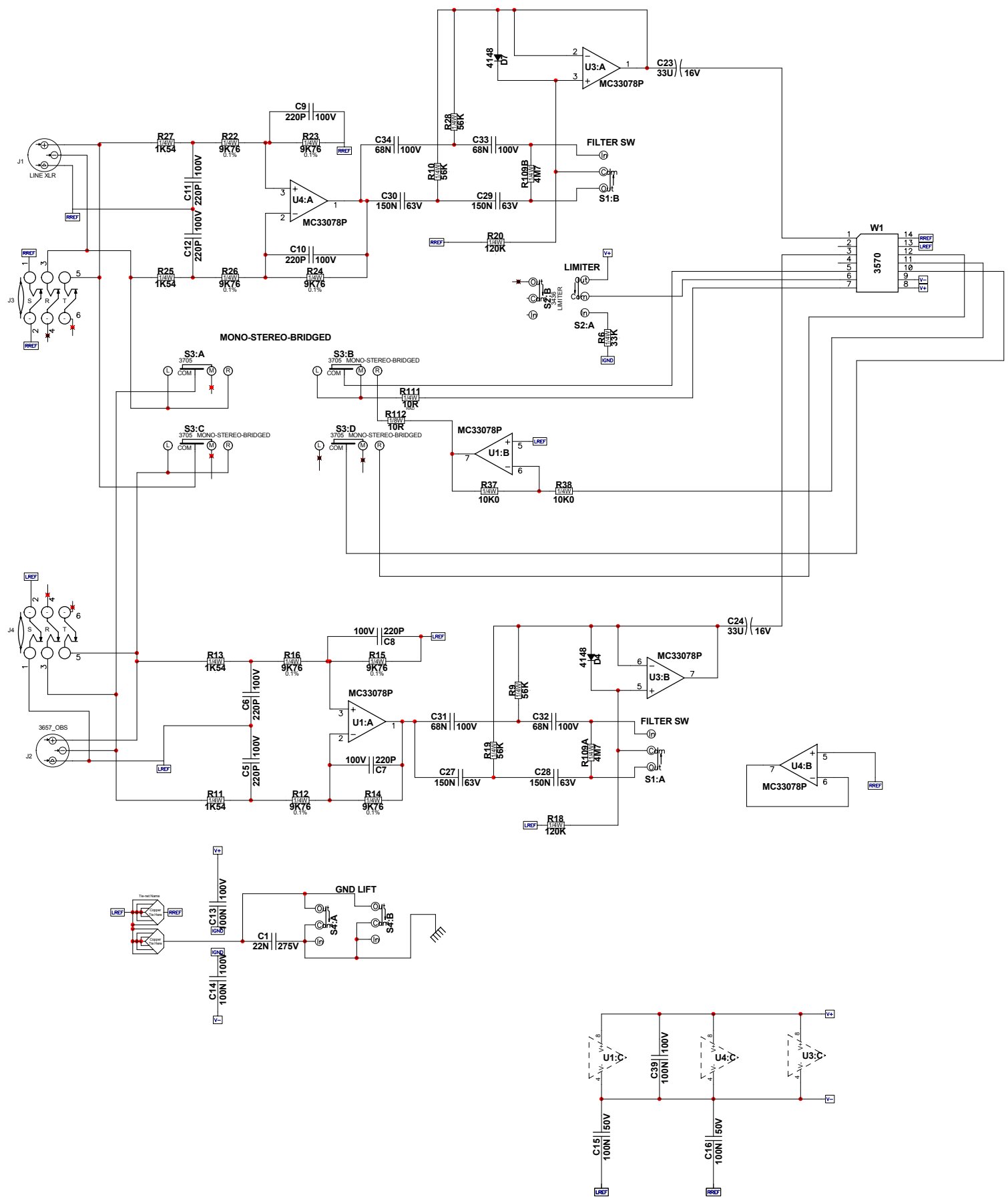
Cordon d'Alimentation

Ne pas enlever le dispositif de sécurité sur la prise polarisée ou la prise avec tige de mise à la masse du cordon d'alimentation. Une prise polarisée dispose de deux lames dont une plus large que l'autre. Une prise avec tige de mise à la masse dispose de deux lames en plus d'une troisième tige qui connecte à la masse. La lame plus large ou la tige de mise à la masse est prévu pour votre sécurité. La prise murale est désuète si elle n'est pas conçue pour accepter ce type de prise avec dispositif de sécurité. Dans ce cas, contactez un électricien pour faire remplacer la prise murale. Évitez d'endommager le cordon d'alimentation. Protégez le cordon d'alimentation. Assurez-vous qu'on ne marche pas dessus et qu'on ne le pince pas en particulier aux prises. **N'UTILISEZ PAS L'APPAREIL** si le cordon d'alimentation est endommagé. Pour débrancher complètement cet appareil de l'alimentation CA principale, déconnectez le cordon d'alimentation de la prise d'alimentation murale. Le cordon d'alimentation du bloc d'alimentation de l'appareil doit demeurer pleinement fonctionnel.

Débranchez cet appareil durant les orages ou si inutilisé pendant de longues périodes.

Service

Consultez un technicien qualifié pour l'entretien de votre appareil. L'entretien est nécessaire quand l'appareil a été endommagé de quelque façon que se soit. Par exemple si le cordon d'alimentation ou la prise du cordon sont endommagés, si il y a eu du liquide qui a été renversé à l'intérieur ou des objets sont tombés dans l'appareil, si l'appareil a été exposé à la pluie ou à l'humidité, si il ne fonctionne pas normalement, ou a été échappé.



M1129 Database History		
MODEL(S):- AP2020 AP4040 AM1CE		
#	DATE	VER# DESCRIPTION OF CHANGE
1	OCT/97	1.00 FIRST PRODUCTION
2	NOV/97	2.00 SWITCH NETS RREF WITH LREF AND RSPRE WITH LSPRE AT 14 PIN CONNECTOR. INPUT TO NONINVERTING
3		
4	DEC/02/97	3.00 CHANGE C27, C29, C28, C30 TO 150N
5	APR/16/98	4.00 PC#5694 PINS 10-12 OF MC2 CONNECTED TO BRG SWT
6	JUL/01/98	4.00 ISOLATE PIN OF S3
7	SEP/06/01	4.10 PC#6436 REPLACE R119 (10K) WITH JUMPER X119
8	APR/15/05	5.00 PC#6873 REDO SOLDERMASK
9	JUL/2005	6.00 CONVERT TO PCAD2002, PC#6944:ROUTE GAUGE, PC#6914:ADD TARGETS
10	AUG-15-2005	
11	D	V N
12	D	V N
13	D	V N

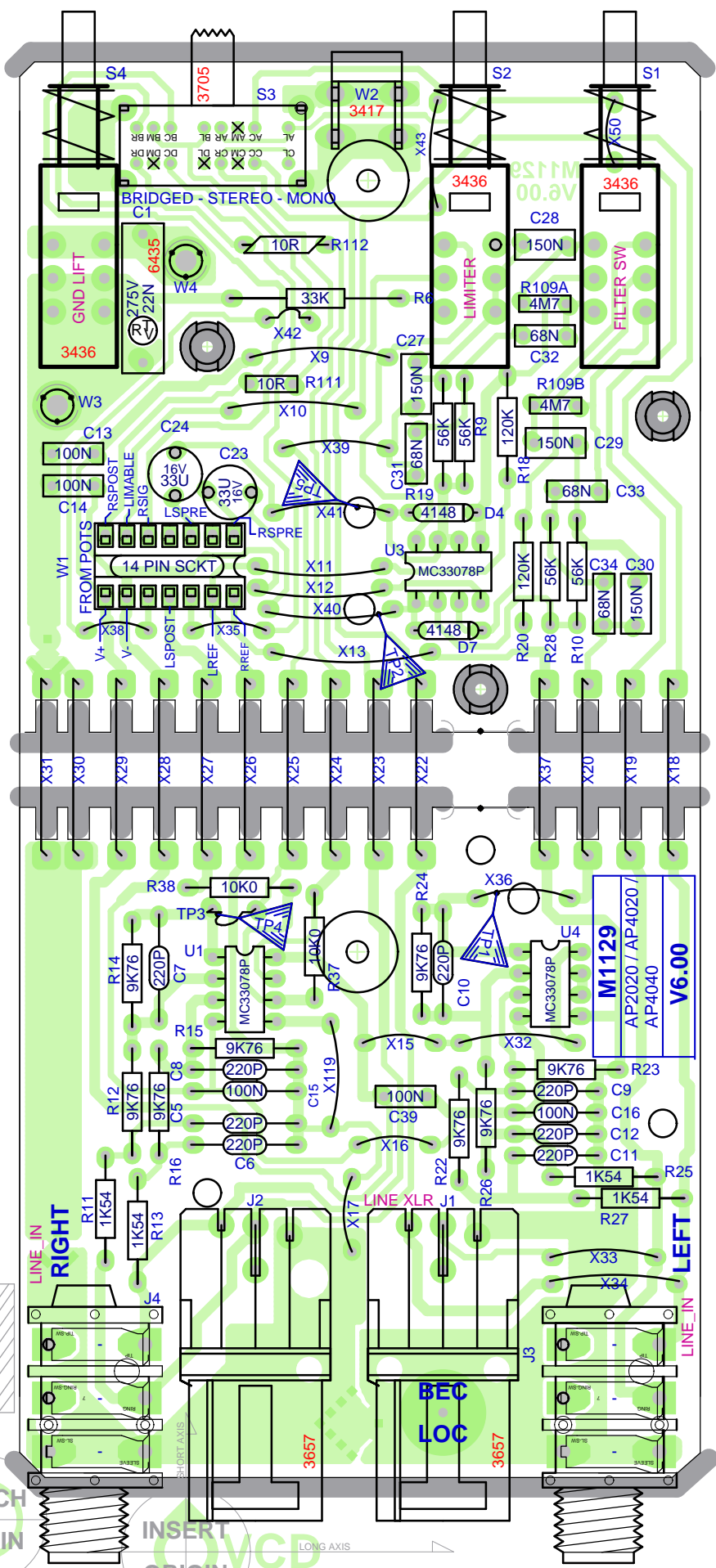
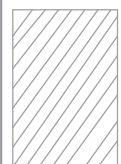
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MODEL(S):- AP4020 / AP4040 / AP2020 / AM1CE		
#	DATE	VER# DESCRIPTION OF CHANGE
1	OCT/1997	1.00 FIRST PRODUCTION
2	NOV/12/97	2.00 REVERSED INPUT POLARITY. MODIFIED FOR AP2020
3	DEC/02/97	3.00 C27, C28, C29, C30 TO 150n
4	APR/2/98	2.10 PC#6634 ADD NETS BRPRTCT, LVGND-28 TO BRG SW
5	SEP/06/01	2.20 DELETE R119
6	JUL/2005	3.00 CONVERT TO PCAD2002
7	D	V N
8	D	V N
9	D	V N
10	D	V N
11	D	V N
12	D	V N
13	D	V N

Product {Drawing Number}

{Title} PCB# M1129 Sheet 1 of 2

Date: Tue May 02, 2006 Rev: v6.00

Filename: M1129-6v00.sch2002



M1129
 AP2020 / AP4020 /
 AP4040
V6.00

CLINCH ORIGIN
 INSERT ORIGIN
 LONG AXIS

M1129.sch_schematic-DATABASE_HISTORY

MODEL(S):- AP4020 / AP4040 / AP2020 / AM1CE			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	OCT/1997	1.00	FIRST PRODUCTION
2	NOV/12/97	2.00	REVERSED INPUT POLARITY. MODIFIED FOR AP2020
3	DEC/02/97	.	C27, C28, C29, C30 TO 150n
4	APR/22/98	2.10	PC#5694 ADD NETS BRPRTCT, LVGND-28 TO BRG SW
5	SEP/06/01	2.20	DELETE R119
6	JUL/2005	3.00	CONVERT TO PCAD2002
7	D	V	N
8	D	V	N
9	D	V	N
10	D	V	N
11	D	V	N
12	D	V	N
13	D	V	N

M1129 DRILL HISTORY

MODEL(S):- AP2020/AP4020/AP4040/AM1CE			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	APR-03-2003	V06	N
2	AUG-15-2005	V07	CONVERT TO PCAD2002
3	D	V	N
4	D	V	N
5	D	V	N
6	D	V	N

M1129 Database History

MODEL(S):- AP2020 AP4020 AP4040 AM1CE			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	OCT/97	1.00	FIRST PRODUCTION
2	NOV/97	2.00	SWITCH NETS RREF WITH LREF AND RSPRE WITH
3	.	.	LSPRE AT 14 PIN CONNECTOR. INPUT TO NONINVERTING
4	DEC/02/97	.	CHANGE C27, C29, C28, C30 TO 150N
5	APR/16/98	3.00	PC#5694 PINS 10-12 OF MC2 CONNECTED TO BRG SWT
6	JUL/01/98	4.00	ISOLATE PIN OF S3
7	SEP/06/01	4.10	PC#6436 REPLACE R119 (10K0) WITH JUMPER X119
8	APR/15/05	5.00	PC#6873 REDO SOLDERMASK
9	JUL/2005	6.00	CONVERT TO PCAD2002, PC#6944:ROUTE GAUGE,
10	AUG-15-2005	.	PC#6914:ADD TARGETS
11	D	V	N
12	D	V	N
13	D	V	N

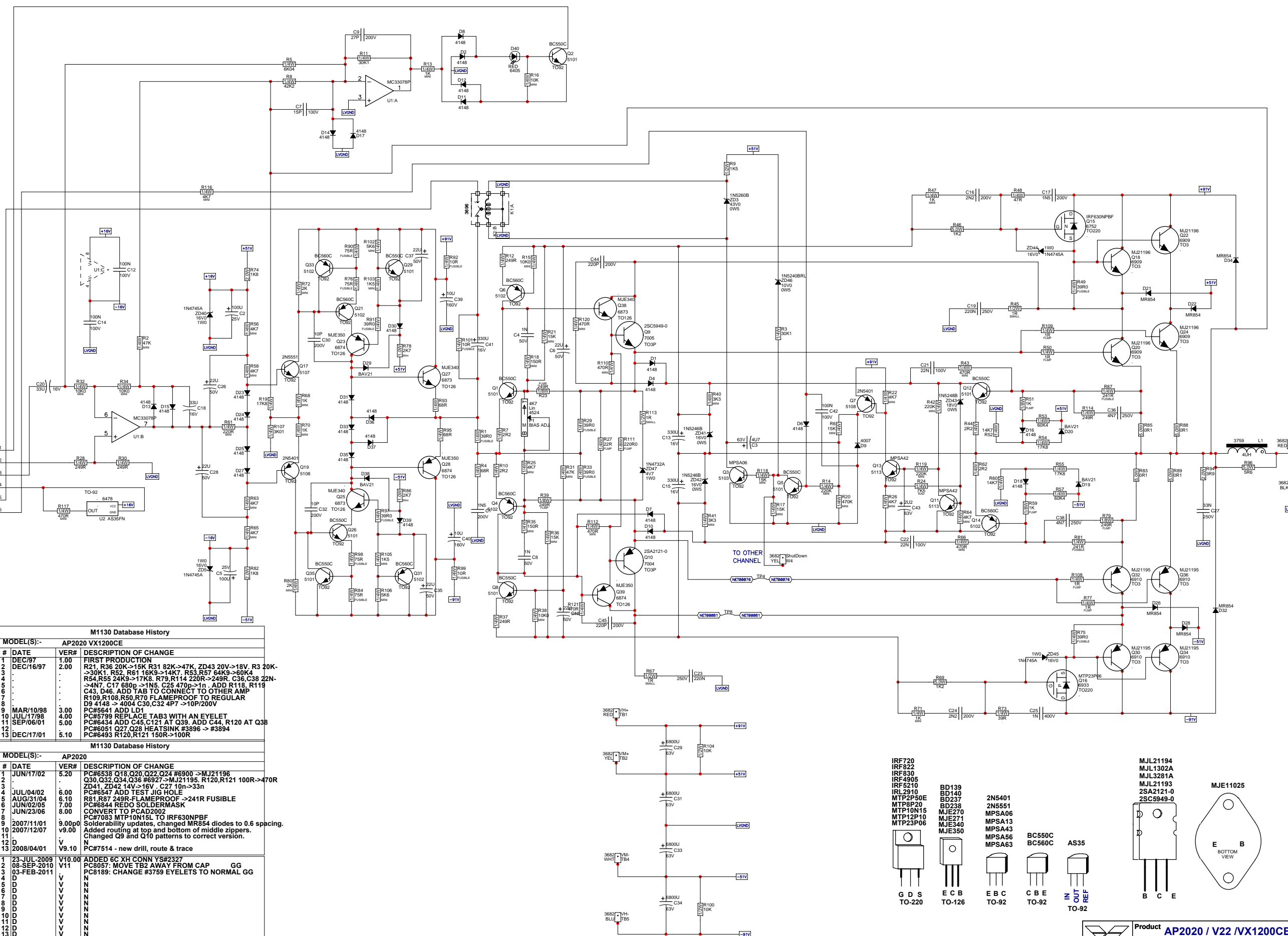
M1129 PRODUCTION NOTES

- 1 FOR XLR #3657 USE SCREW PT#8829
UP THROUGH THE BOTTOM
- 2 FOR M1129B VX1200/2400/J/2402
DO NOT STUFF X40 AND X41
ADD WIRES IN BOARD ASSEMBLY

M1129 PENDING CHANGES

MODEL(S):- AP2020/AP4020/AP4040/AM1CE		
#	PC#	PENDING CHANGE
1	PC	X
2	PC	X
3	PC	X
4	PC	X
5	PC	X
6	PC	X

***PLACE IMPLEMENTED CHANGES INTO BOARD HISTORY**



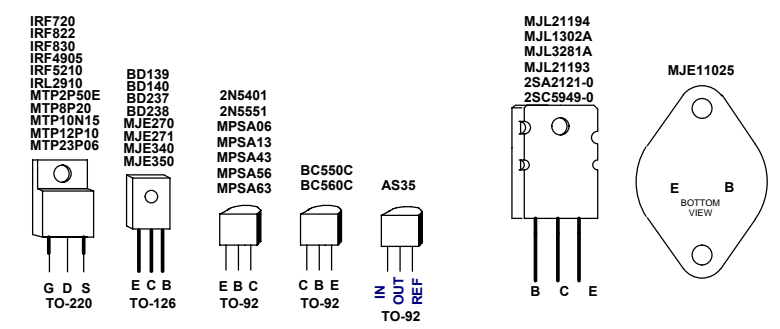
M1130 Database History
MODEL(S):- AP2020 VX1200CE

#	DATE	VER#	DESCRIPTION OF CHANGE
1	DEC/97	1.00	FIRST PRODUCTION
2	DEC/16/97	2.00	R21, R36 20K->15K R31 82K->47K, ZD43 20V->18V, R3 20K->30K, R52, R61 16K9->14K7, R53, R57 64K9->60K4, R54, R55 24K9->17K8, R79, R114 220R->249R, C36, C38 22N->4N7, C17 680p->1N5, C25 470p->1n, ADD R118, R119 C43, D46, ADD TAB TO CONNECT TO OTHER AMP
3			R109, R108, R50, R70 FLAMEPROOF TO REGULAR
4			D9 4148->4004 C30, C32 4P7->10P/200V
5			
6			
7			
8			
9	MAR/10/98	3.00	PC#5641 ADD LD1
10	JUL/17/98	4.00	PC#5799 REPLACE TAB3 WITH AN EYELET
11	SEP/06/01	5.00	PC#6434 ADD C45, C121 AT Q39, ADD C44, R120 AT Q38
12			PC#6051 Q27, Q28 HEATSINK #3896->#3894
13	DEC/17/01	5.10	PC#6493 R120, R121 150R->100R

M1130 Database History
MODEL(S):- AP2020

#	DATE	VER#	DESCRIPTION OF CHANGE
1	JUN/17/02	5.20	PC#6538 Q18, Q20, Q22, Q24 #6900->MJ21196
2			Q30, Q32, Q34, Q36 #6927->MJ21195, R120, R121 100R->470R
3			ZD41, ZD42 14V->16V, C27 10n->33n
4	JUL/04/02	6.00	PC#6547 ADD TEST JIG HOLE
5	AUG/31/04	6.10	R81, R87 249R-FLAMEPROOF->241R FUSIBLE
6	JUN/02/05	7.00	PC#6844 REDO SOLDERMASK
7	JUN/23/06	8.00	CONVERT TO PCAD2002
8			PC#7083 MTP10N15L TO IRF630NPNF
9	2007/11/01	9.00p0	Solderability updates, changed MR854 diodes to 0.6 spacing.
10	2007/12/07	v9.00	Added routing at top and bottom of middle zippers.
11			Changed Q9 and Q10 patterns to correct version.
12			
13	2008/04/01	V9.10	PC#7514 - new drill, route & trace

1	23-JUL-2009	V10.00	ADDED 6C VH CONN YSR2327	GG
2	08-SEP-2010	V11	PC#8057: MOVE TB2 AWAY FROM CAP	GG
3	03-FEB-2011		PC#8189: CHANGE #3759 EYELETS TO NORMAL GG	
4	D	V	N	
5	D	V	N	
6	D	V	N	
7	D	V	N	
8	D	V	N	
9	D	V	N	
10	D	V	N	
11	D	V	N	
12	D	V	N	
13	D	V	N	



StepAndRepeat - X2@8.725Y1@0.000

BlankSize - 18150x9650

BlankSize - 18150x9650 INTO WAVE

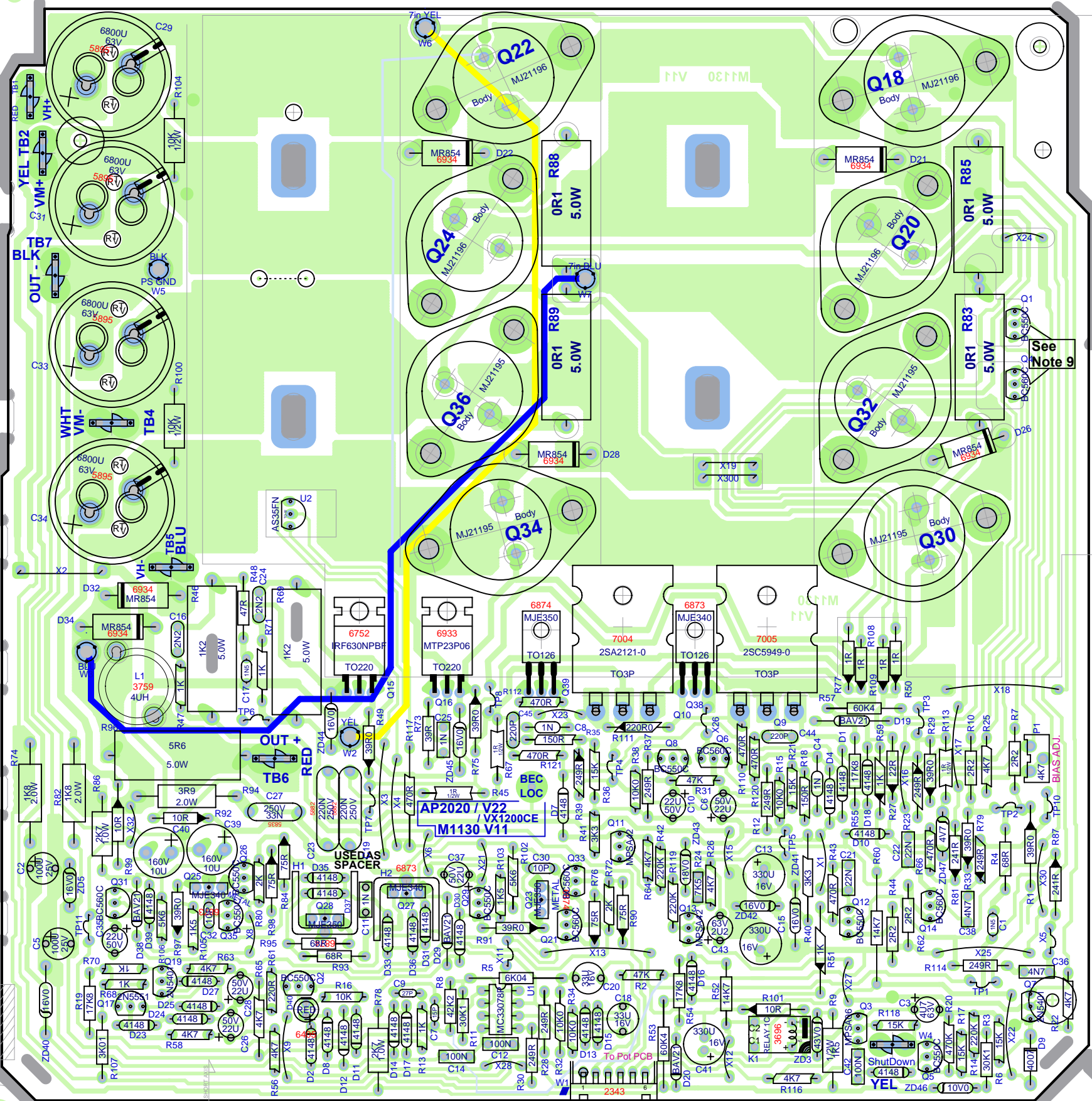
CLINCH ORIGIN

INSERT ORIGIN

Pcb Mech M1130 V11
Top Assy M1130 V11

Bottom M1130 V11

SEE LAYOUT DOCUMENTATION



See Note 9

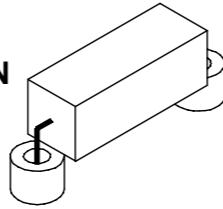


SEE LAYOUT DIAGRAM

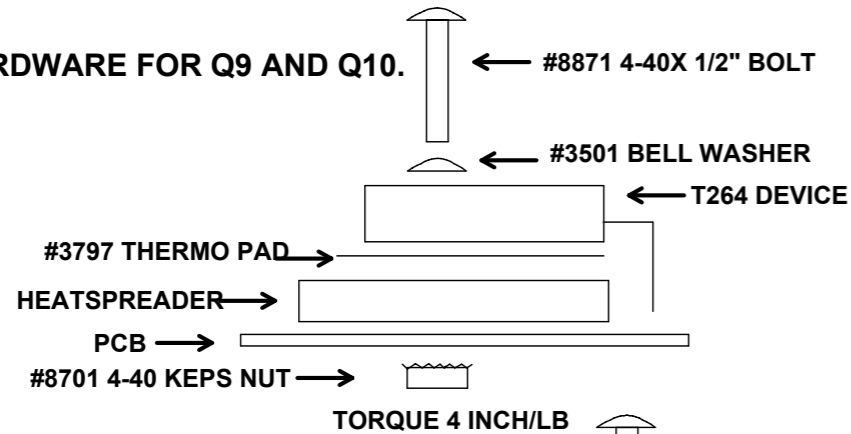


M1130 PRODUCTION NOTES

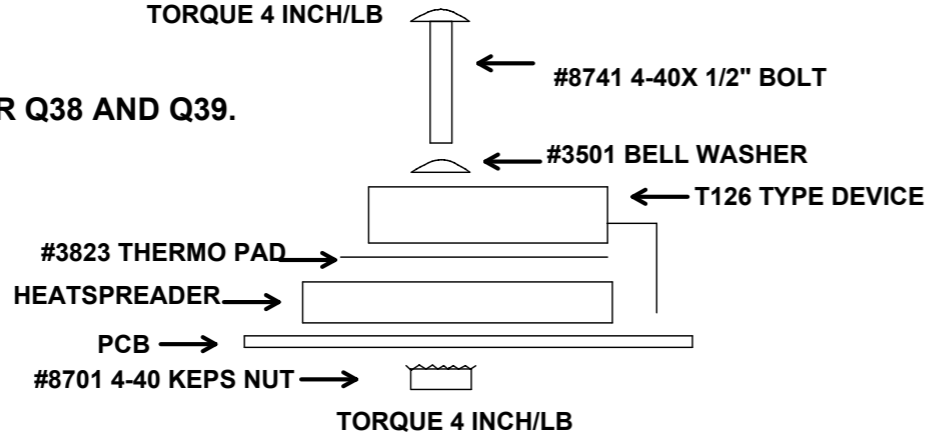
1. MOUNTING DETAILS FOR 5W ADD #8629 SPACERS ONLY ON 5 WATT RESISTORS R46 AND R69.



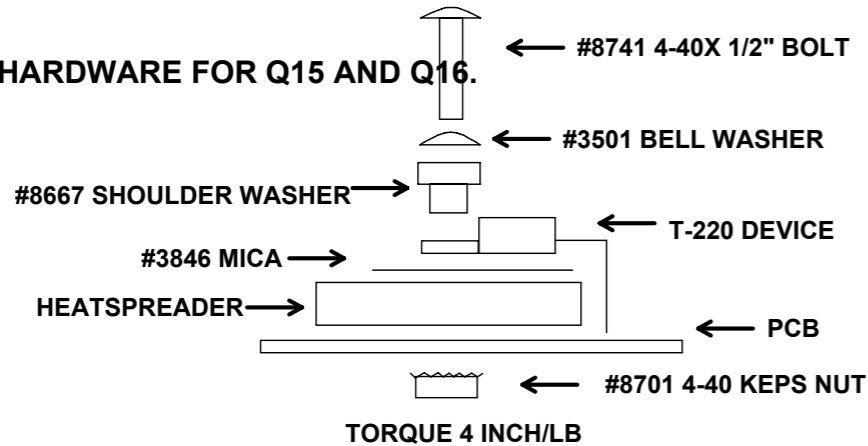
2. MOUNTING HARDWARE FOR Q9 AND Q10.



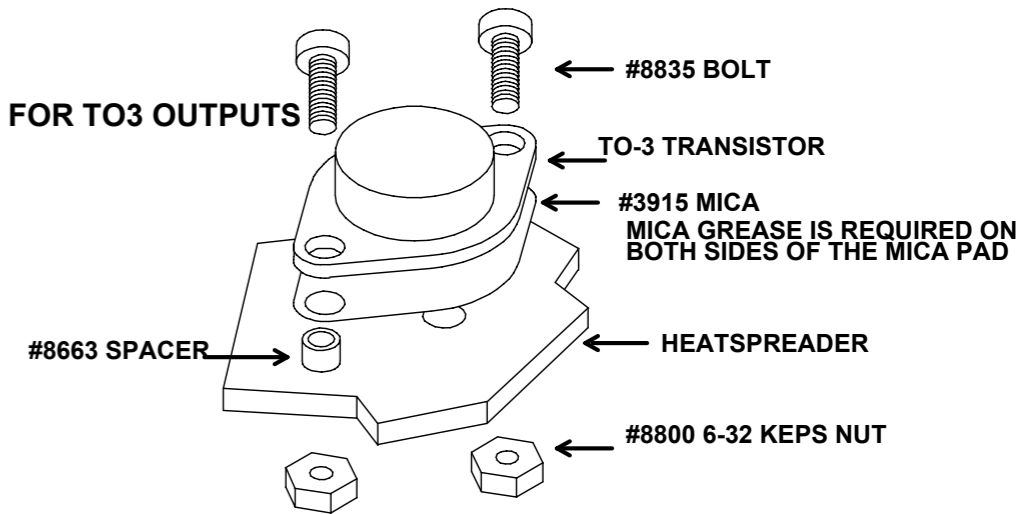
3. MOUNTING HARDWARE FOR Q38 AND Q39.



4. MOUNTING HARDWARE FOR Q15 AND Q16.

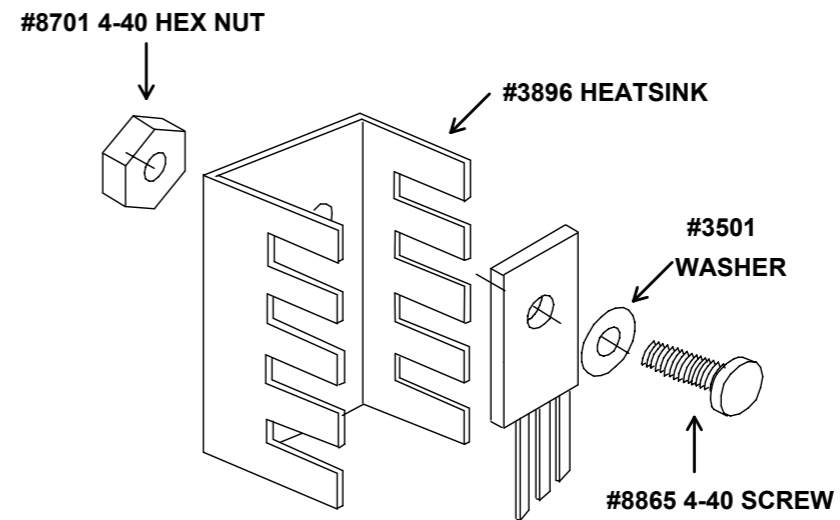


5. MOUNTING HARDWARE FOR TO3 OUTPUTS



INITIAL TORQUE FOR TO-3'S IS 8 INCH/LB
FINAL TORQUE AFTER HEATSINK HAS COOLED FROM WAVE SOLDER IS 6 INCH/LB

6. MOUNTING HARDWARE FOR Q28 AND Q37.

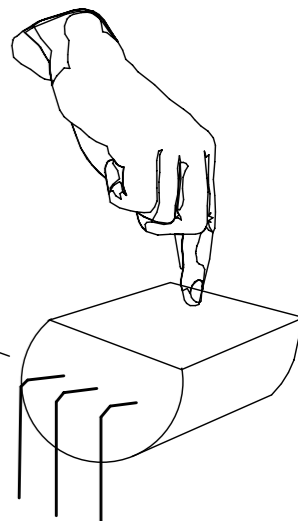


7. TAB WIRE COLOURS: TAB 1 RED 16AWG TAB 2 YEL 16AWG
TAB 4 WHT 16AWG TAB 5 BLU 16AWG
TAB 6 OUTPUT + TAB 7 OUTPUT -

8. Q37 IS HAND INSERTED AND BENT OVER WITH FLAT SIDE UP AS SHOWN.

9. Q1 AND Q4 ARE HAND INSERTED.

10. PCBSA: BREAK OUT BOARD BEFORE TESTING.



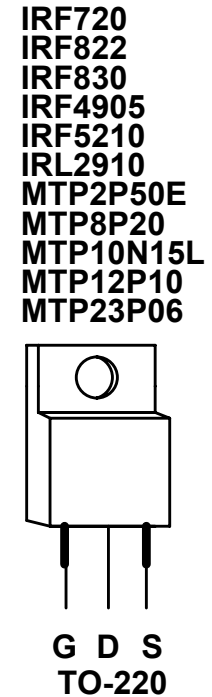
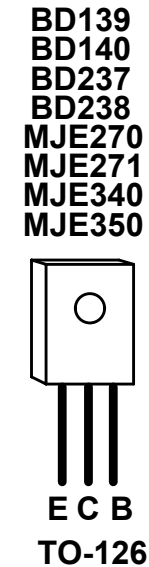
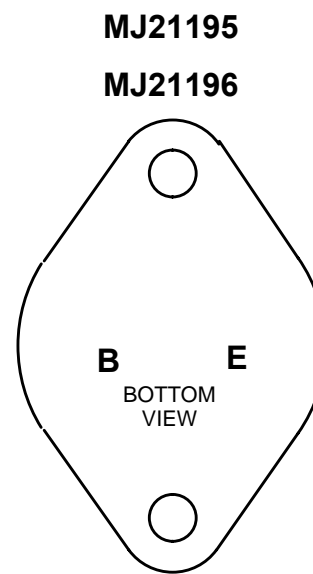
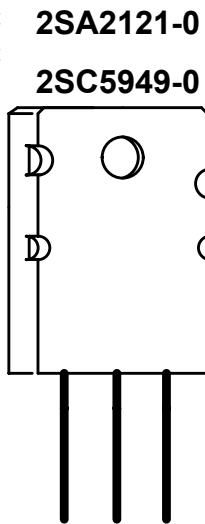
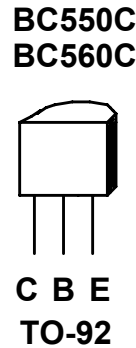
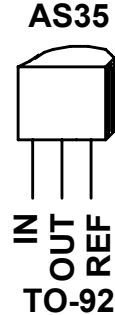


SEE LAYOUT DIAGRAM



M1130 Database History

MODEL(S):- AP2020 / V22 / VX1200CE			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	DEC/97	1.00	FIRST PRODUCTION
2	DEC/16/97	2.00	R21, R36 20K->15K R31 82K->47K, ZD43 20V->18V. R3 20K->30K1. R52, R61 16K9->14K7. R53,R57 64K9->60K4
3	.	.	R54,R55 24K9->17K8. R79,R114 220R->249R. C36,C38 22N->4N7. C17 680p ->1N5. C25 470p->1n . ADD R118, R119
4	.	.	C43, D46. ADD TAB TO CONNECT TO OTHER AMP
5	.	.	R109,R108,R50,R70 FLAMEPROOF TO REGULAR
6	.	.	D9 4148 -> 4004 C30,C32 4P7 ->10P/200V
7	.	.	
8	.	.	
9	MAR/10/98	3.00	PC#5641 ADD LD1
10	JUL/17/98	4.00	PC#5799 REPLACE TAB3 WITH AN EYELET
11	SEP/06/01	5.00	PC#6434 ADD C45,C121 AT Q39. ADD C44, R120 AT Q38
12	.	.	PC#6051 Q27,Q28 HEATSINK #3896 -> #3894
13	DEC/17/01	5.10	PC#6493 R120,R121 150R->100R



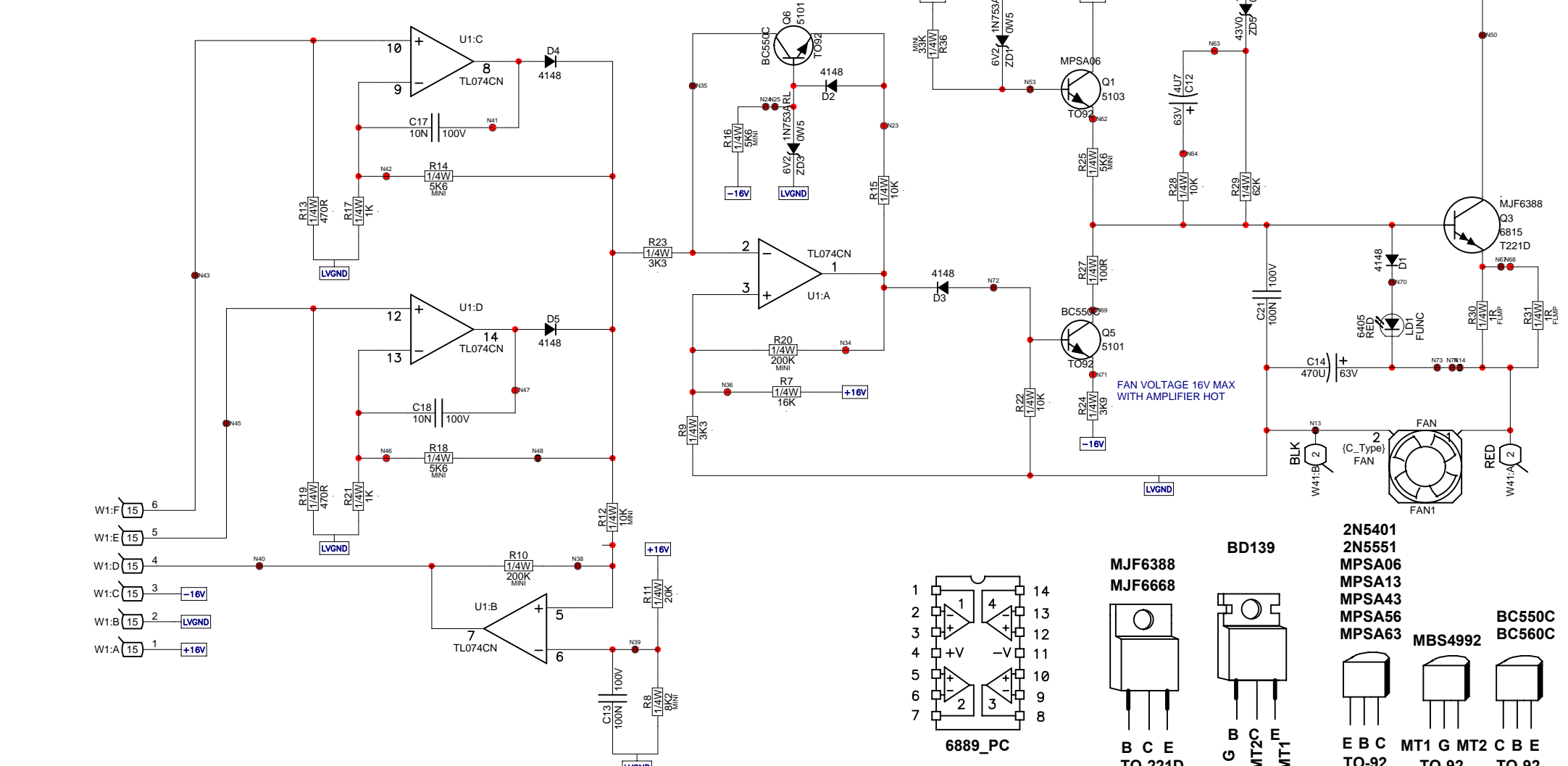
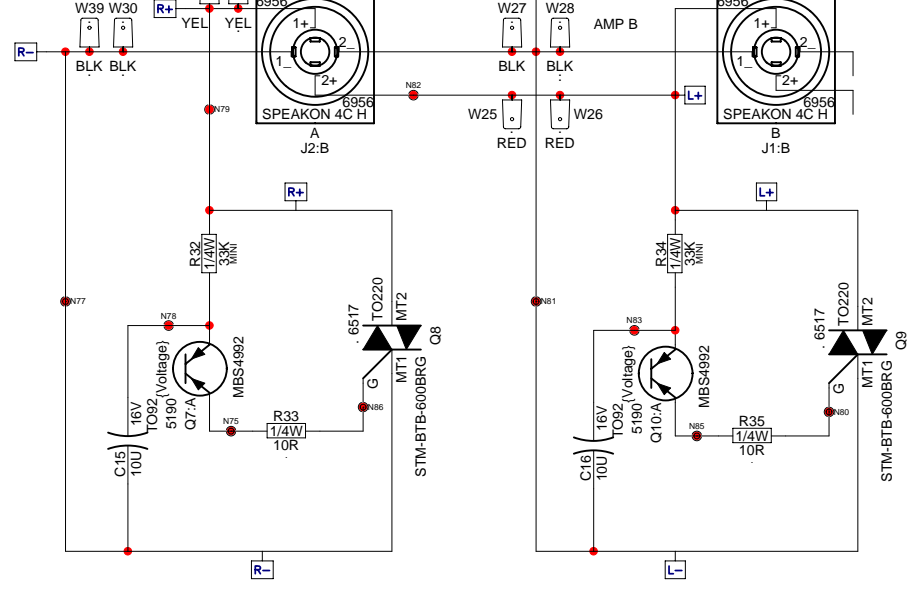
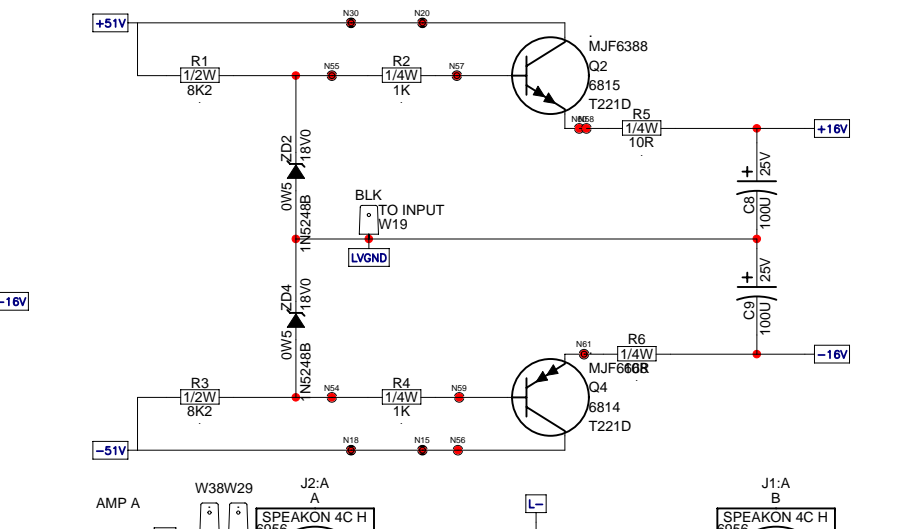
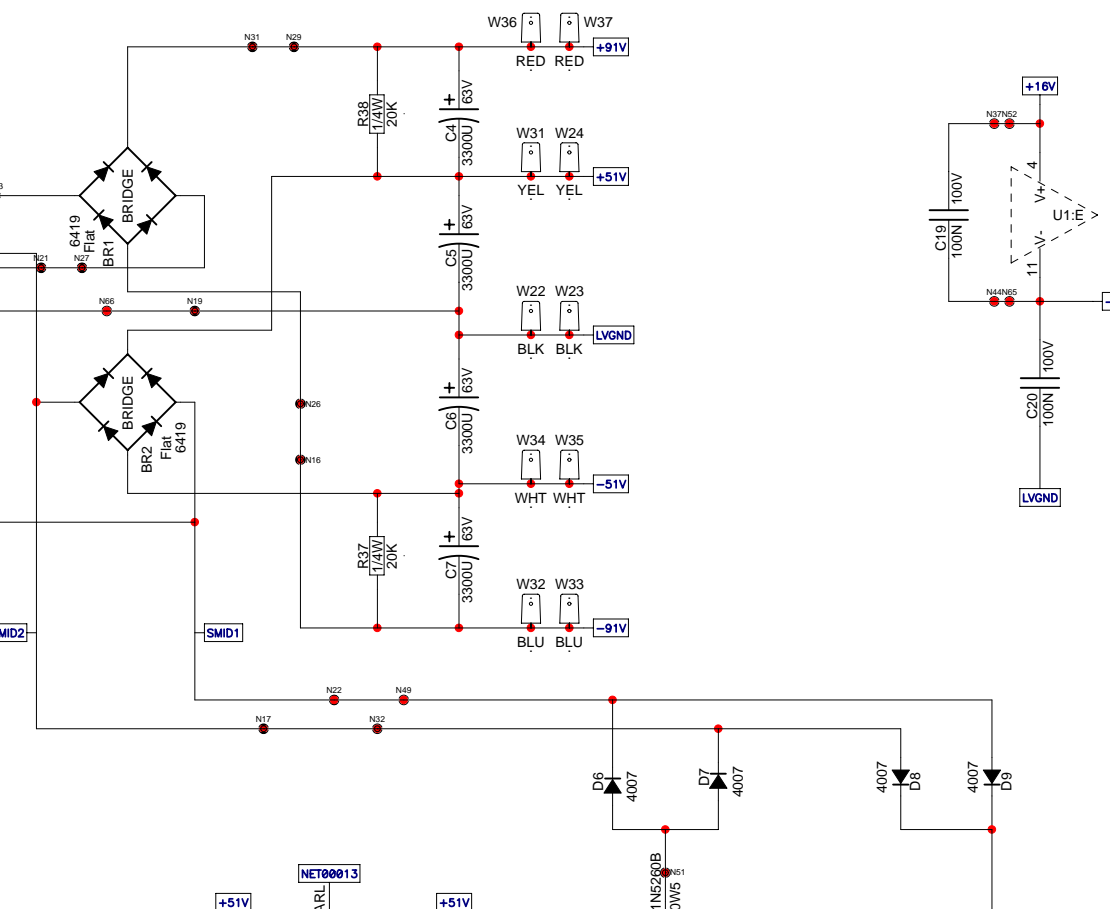
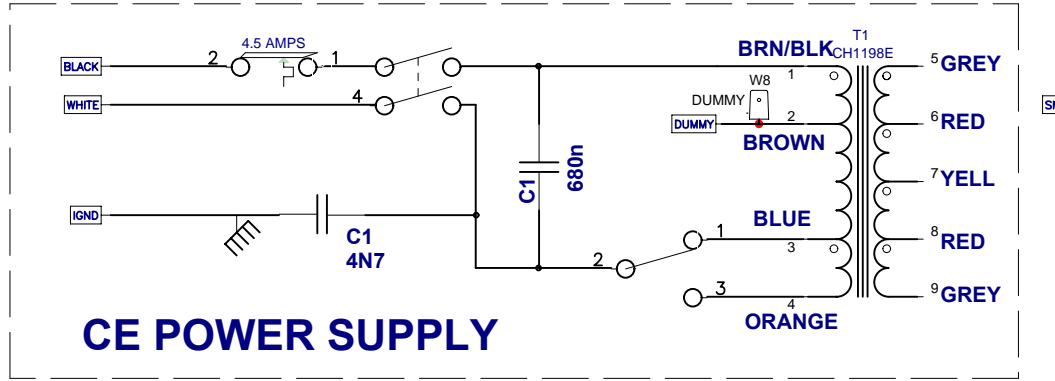
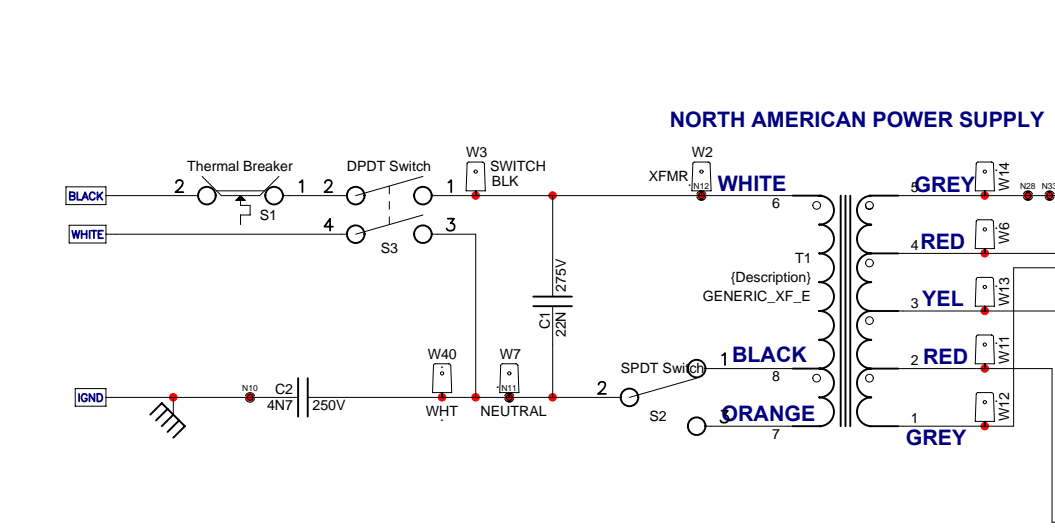
M1130 Database History

MODEL(S):- AP2020 / V22 / VX1200CE			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	JUN/17/02	5.20	PC#6538 Q18,Q20,Q22,Q24 #6900 ->MJ21196
2	.	.	Q30,Q32,Q34,Q36 #6927->MJ21195. R120,R121 100R->470R
3	.	.	ZD41, ZD42 14V->16V . C27 10n->33n
4	JUL/04/02	6.00	PC#6547 ADD TEST JIG HOLE
5	AUG/31/04	6.10	R81,R87 249R-FLAMEPROOF ->241R FUSIBLE
6	JUN/02/05	7.00	PC#6844 REDO SOLDERMASK
7	JUN/23/06	8.00	CONVERT TO PCAD2002
8	.	.	PC#7083 MTP10N15L TO IRF630NPBF
9	2007/11/01	9.00	Solderability updates, changed MR854 diodes to 0.6" spacing.
10	2007/12/07	.	Added routing at top and bottom of middle zippers.
11	.	.	Changed Q9 and Q10 patterns to correct version.
12	2008/MAR/11	.	PC#7076, REPLACE #6989 & #6990 WITH #7004 & #7005
13	2008/04/01	V9.10	PC#7514 - new drill, route & trace

1	23-JUL-2009	V10.00	ADDED 6C XH CONN YS#2327
2	08-SEP-2010	V11	PC8057: MOVE TB2 AWAY FROM CAP GG
3	03-FEB-2011	.	PC8189: CHANGE #3759 EYELETS TO NORMAL GG
4	D	V	N
5	D	V	N
6	D	V	N
7	D	V	N
8	D	V	N
9	D	V	N
10	D	V	N
11	D	V	N
12	D	V	N
13	D	V	N

M1130 Drilling History

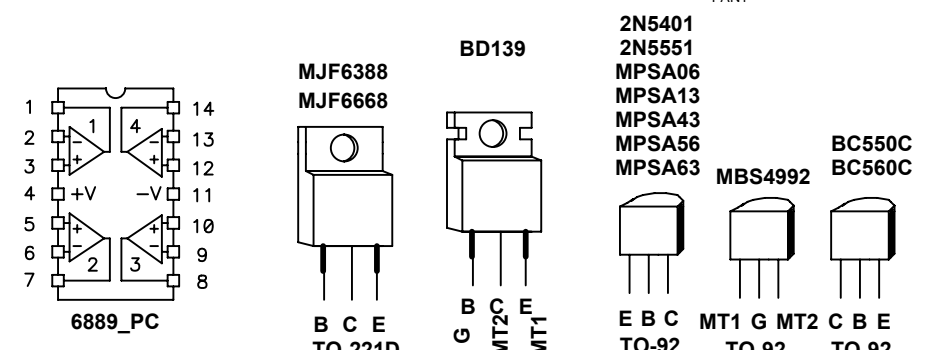
MODEL(S):- AP2020 / V22 / VX1200CE			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	2007/12/07	v13	Added routing to zipper. Deleted extra break holes in middle
2	.	.	Moved pads for Q9 and Q10 down 0.075in.
3	2008/04/01	V14	PC#7514 - moved routing on back side edges.
4	2009/07/23	V15	Added scores and revised routing.
5	D	V	N
6	D	V	N
7	D	V	N
8	D	V	N
9	D	V	N
10	D	V	N
11	D	V	N
12	D	V	N
13	D	V	N



M1131 Database History

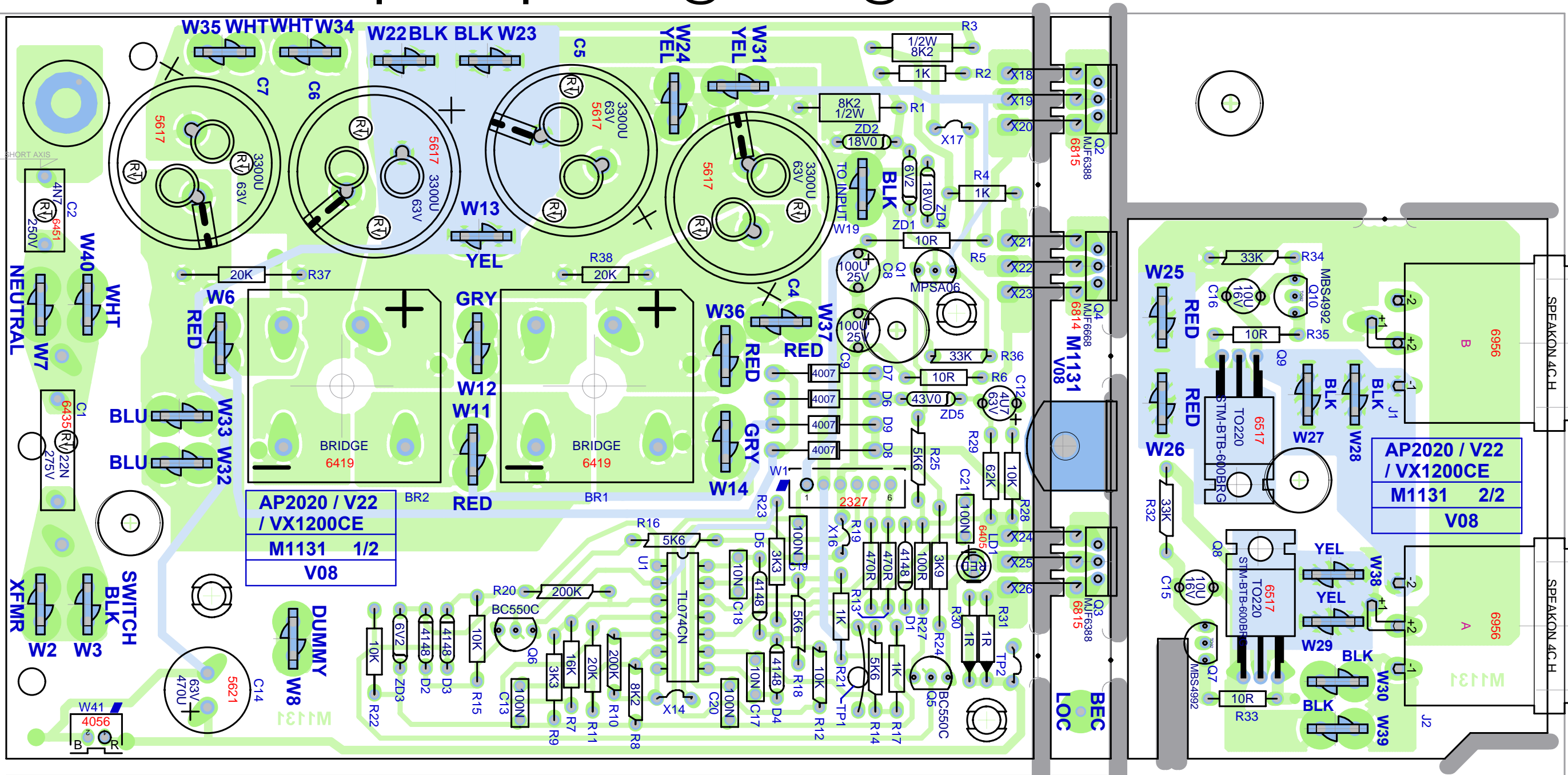
MODEL(S):-	AP2020/VX1200/V22		
#	DATE	VER#	DESCRIPTION OF CHANGE
1	MAY/12/98	2.00	PC#5654 ZD1 4V7 -> 6V2. SHEAR HOLES MOVED TO CLEAR HEATSPREADER. 1 EYLET TO TAB
2	AUG/24/99	3.00	PC#5943, PC#6064, PARTS MOVED FOR CLEARANCE IN AUTO-INS. C2 #6458 -> #6451. PC#6009 SPKON REMOVED
3	SEP/17/99	.	PC#6064 MOVE ZD4 AND W19
4	DEC/16/04	4.00	PC#6788 REDO AC FOR CE COMPLIANCE
5	MAY/27/05	5.00	PC#6919 REDO SOLDERMASK
6	APR/24/06	5.10	PC#7004 TRIAC MAC-224-4 TO STM-BTB-600BRG
7	MAY/15/06	6.00	CONVERT TO PCAD2002
8	FEB/01/08	6.10	REVISED SOLDER MASK.
9	AUG/11/09	7.00	REMOVE CLINCHS, RESIZE BOARD, ADD PATCH CABLE
10	11-MAR-2010	V08	PC7996: Replace eyelets with TABs. GG
11	17-MAR-2010	.	PC8040: Double sided board GG

1	D	V	N
2	D	V	N
3	D	V	N
4	D	V	N
5	D	V	N
6	D	V	N
7	D	V	N
8	D	V	N
9	D	V	N
10	D	V	N
11	D	V	N
12	D	V	N
13	D	V	N



BlankSize - 14450x10000

StepAndRepeat - X3@4.350Y1@0.000



INSERT ORIGIN

BlankSize - 14450x10000



SEE LAYOUT DOCUMENTATION



939903 505

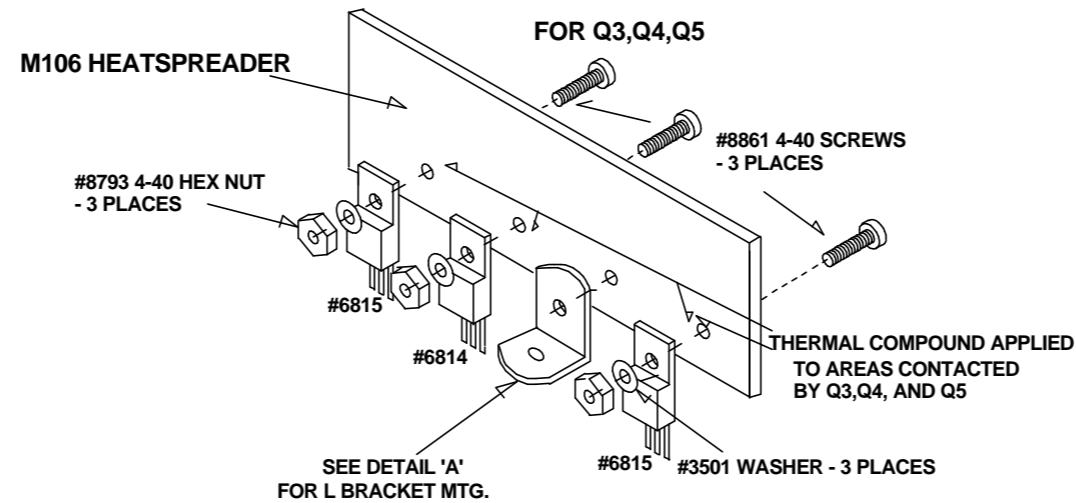


SEE LAYOUT DIAGRAM



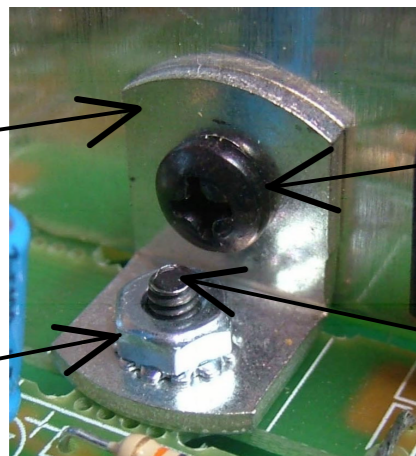
M1131 PRODUCTION NOTES:

1. DO NOT CUT CENTER LEAD OF THE TRIACS
BEND THE LEAD (UNCUT) ALONG THE TRACE
AND SOLDER
2. SEE DETAIL 'A' BEFORE MOUNTING L BRACKET
3. FOR C1 USE 22N FOR NORTH AMERICAN
AND 680N FOR EURO/CE
4. Q8,Q9 USE #8799 SELF TAPPING SCREW
5. Q2,Q3,Q4 BEND THE LEADS (UNCUT)
ALONG THE TRACE
6. CHECK THE WIRE LENGTH FOR AP2020 AND VX1200
BOTH PRODUCTS USE SAME BOARD M1131 BUT THE
WIRELISTS ARE DIFFERENT.

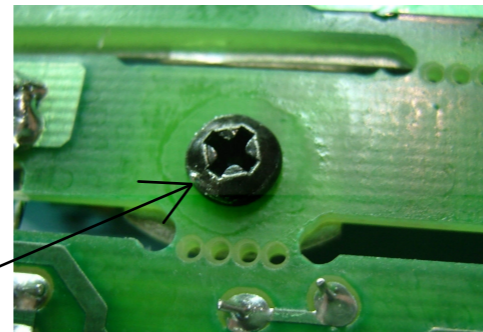


ASSEMBLED HEAT SPREADER SHOWN

DETAIL 'A' - L BRACKET ASSY



'L' BRACKET ASSEMBLY PARTS



4-40 screw shown from other side of pcb



SEE M1131 HISTORY TABLES

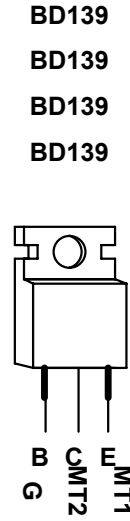
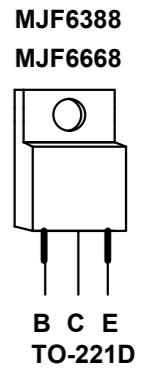
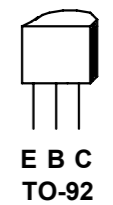
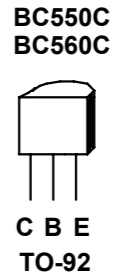
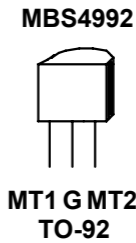
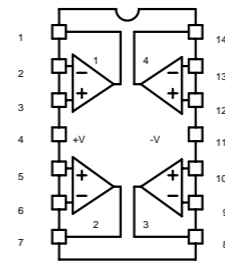


↑↑ SEE M1131 PRODUCTION NOTES ↑↑

M1131 Database History			
MODEL(S):- AP2020/VX1200/V22			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	MAY/12/98	2.00	PC#5654 ZD1 4V7 -> 6V2. SHEAR HOLES MOVED TO CLEAR HEATSPREADER. 1 EYLET TO TAB
2	.	.	PC#5943, PC#6064, PARTS MOVED FOR CLEARANCE
3	AUG/24/99	3.00	AUTO-INS. C2 #6458->#6451. PC#6009 SPKON REMOVED
4	.	.	PC#6064 MOVE ZD4 AND W19
5	SEP/17/99	.	PC#6788 REDO AC FOR CE COMPLIANCE
6	DEC/16/04	4.00	PC#6919 REDO SOLDERMASK
7	MAY/27/05	5.00	PC#7004 TRIAC MAC-224-4 TO STM-BTB-600BRG
8	APR/24/06	5.10	CONVERT TO PCAD2002
9	MAY/15/06	6.00	REVISED SOLDER MASK.
10	FEB/01/08	6.10	REMOVE CLINCHS, RESIZE BOARD, ADD PATCH CABLE
11	AUG/11/09	7.00	PC7996: Replace eyelets with TABs. GG
12	11-MAR-2010	V08	PC8040: Double sided board GG
13	17-MAR-2010	.	
1	D	V	N
2	DD	VV	NN
3	DD	VV	NN
4	DD	VV	NN
5	DD	VV	NN
6	DD	VV	NN
7	DD	VV	NN
8	DD	VV	NN
9	DD	VV	NN
10	DD	VV	NN
11	DD	VV	NN
12	DD	VV	NN
13	DD	VV	NN

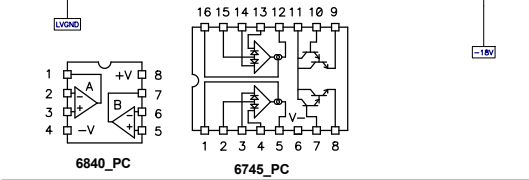
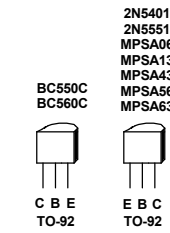
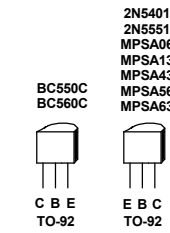
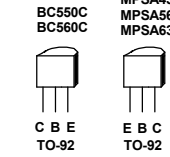
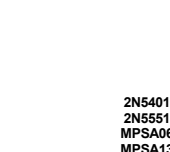
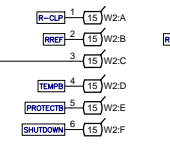
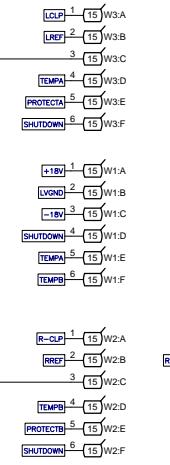
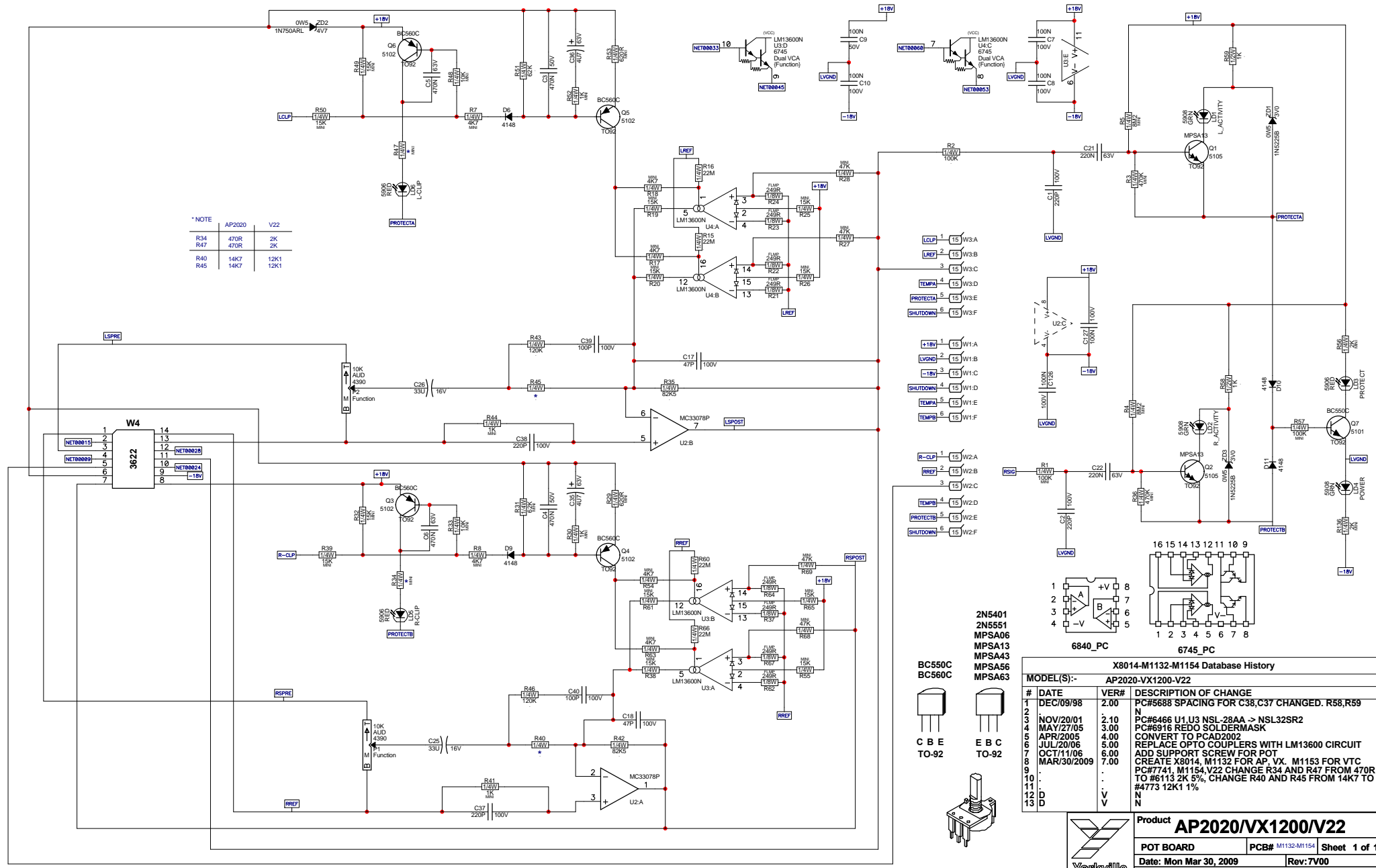
M1131 Drilling History			
MODEL(S):- AP2020/VX1200/V22			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	FEB/01/08	13	REVISED AS A RESULT OF FORCE UPDATE.
2	AUG/11/09	14	REVISED BOARD AND PANEL
3	D	V	N
4	D	V	N
5	D	V	N
6	D	V	N
7	D	V	N
8	D	V	N
9	D	V	N
10	D	V	N
11	D	V	N
12	D	V	N
13	D	V	N

PIN CONFIGURATION



* NOTE

AP2020	V22	
R34	470R	2K
R47	470R	2K
R40	14K7	12K1
R45	14K7	12K1



X8014-M1132-M1154 Database History

MODEL(S):-	VER#	DESCRIPTION OF CHANGE
AP2020-VX1200-V22		
1	DEC/09/98	2.00 PC#5688 SPACING FOR C38,C37 CHANGED. R58,R59 N
2	NOV/20/01	2.10 PC#6466 U1,U3 NSL 28AA -> NSL32SR2
3	MAY/27/05	3.00 PC#6916 REDO SOLDERMASK
4	APR/2005	4.00 CONVERT TO PCAD2002
5	JUL/20/06	5.00 REPLACE OPTO COUPLERS WITH LM13600 CIRCUIT
6	OCT/11/06	6.00 ADD SUPPORT SCREW FOR POT
7	MAR/30/2009	7.00 CREATE X8014, M1132 FOR AP_VX. M1153 FOR VTC
8		
9		
10		
11		
12		
13		
14		
15		

"STYLE_P22"

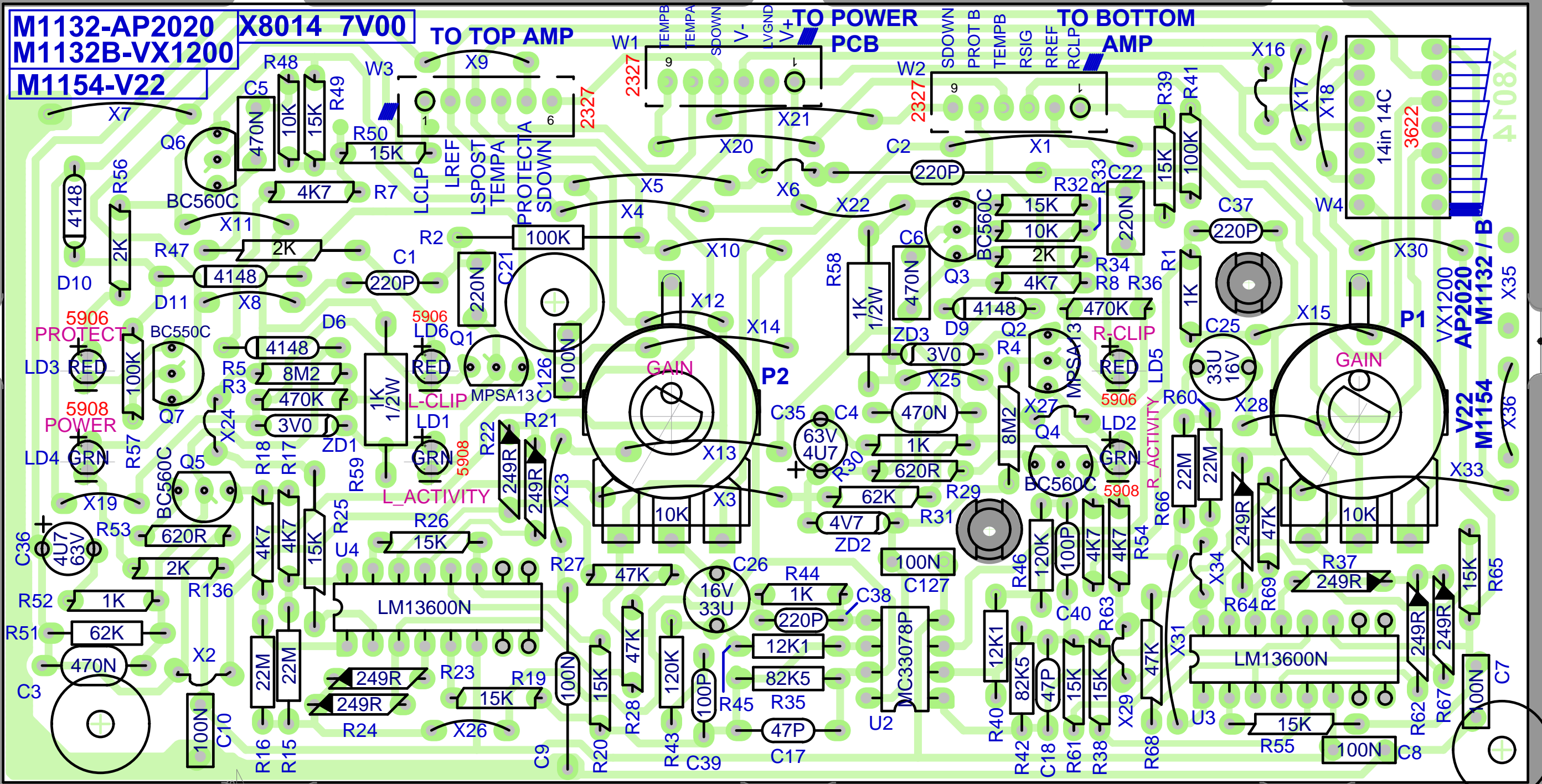
M1132-AP2020
M1132B-VX1200
M1154-V22

X8014 7V00

TO TOP AMP

TO POWER PCB

TO BOTTOM AMP



#3622-M1132
#3604-M1132B

M1154 V22

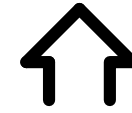


StepAndRepeat - X2@7.000Y3@3.100
BlankSize - 14000x11000

SEE LAYOUT DOCUMENTATION

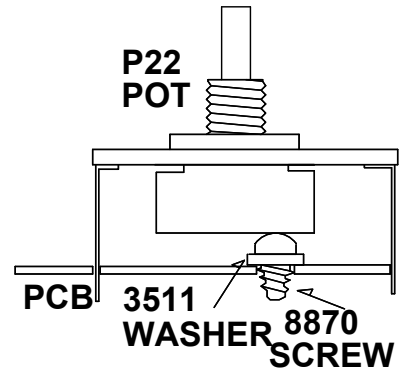


SEE LAYOUT DIAGRAM

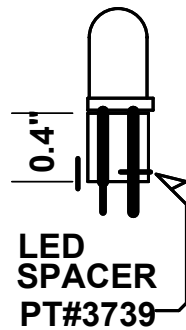


PRODUCTION NOTES M1154 V22

1.



2.



3. ADD A STICKER OVER THE LEGEND
"M1132B" TO AID IN IDENTIFYING
VX1200 BOARDS.

4. FOR M1132 USE #3622 CABLE
FOR M1132B USE #3604 CABLE



SEE LAYOUT DIAGRAM

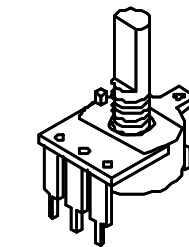
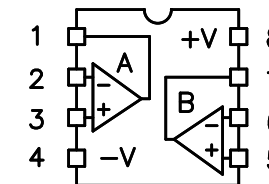
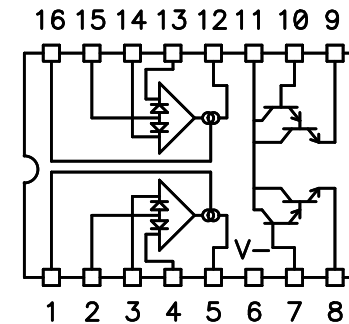


X8014-M1132-M1154 Database History			
MODEL(S):- AP2020-VX1200-V22			
#	DATE	VER#	DESCRIPTION OF CHANGE
1	DEC/09/98	2.00	PC#5688 SPACING FOR C38,C37 CHANGED. R58,R59
2	.	.	SPACING TO .6" FOR 1/2W. ADD POT SUPPORT SCREW
3	NOV/20/01	2.10	PC#6466 U1,U3 NSL-28AA -> NSL32SR2
4	MAY/27/05	3.00	PC#6916 REDO SOLDERMASK
5	APR/2005	4.00	CONVERT TO PCAD2002
6	JUL/20/06	5.00	REPLACE OPTO COUPLERS WITH LM13600 CIRCUIT
7	OCT/11/06	6.00	ADD SUPPORT SCREW FOR POT
8	JUN/23/09	7.00	CREATE X8014, M1132 FOR AP, VX. M1153 FOR VTC
9	.	.	PC#7741, M1154,V22 CHANGE R34 AND R47 FROM 470R
10	.	.	TO #6113 2K 5%, CHANGE R40 AND R45 FROM 14K7 TO
11	.	.	#4773 12K1 1%
12	D	V	N
13	D	V	N

X8014-M1132-M1154 PENDING CHANGES		
MODEL(S):- AP2020-VX1200-V22		
#	PC#	PENDING CHANGE
1	PC	X
2	PC	X
3	PC	X
4	PC	X
5	PC	X
6	PC	X

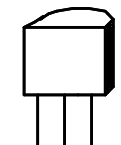
*PLACE IMPLEMENTED CHANGES INTO BOARD HISTORY

PIN CONFIGURATION



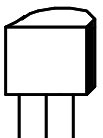
"STYLE_P22"

BC550C
BC560C



C B E
TO-92

2N5401
2N5551
MPSA06
MPSA13
MPSA43
MPSA56
MPSA63



E B C
TO-92

VTC V22 Parts List 8/14/2012

YS #	Description	Qty.	YS #	Description	Qty.	YS #	Description	Qty.
5906	RED 3MM LED 1V9 20MA 4SPCER T&R	3	3467	CLIP 205X032 14-16AWG DISC/INSUL	1	6141	1/4W 5K6 5%MINI T&R RES	8
6405	RED 3MM LED 2V0 20MA BRT	3	3485	CLIP 250X032 18-22AWG RIGHT ANGL	5	5001	1/4W 6K04 1% T&R RES	2
5908	GRN 3MM LED 1V9 20MA 4SPCER T&R	3	3490	CLIP 250X032 14-16AWG DISCO/INSL	20	4926	1/4W 7K5 5% 2U T&R RES	2
6419	BRIDGE 35A 400V WIRE LEAD GI3504	4	3529	CLIP 250X032 TN 18-22AWG MALE	2	4663	1/2W 8K2 5% T&R RES	2
6425	BAV21 200V 0A25 DIODE T&R	8	3601	RING TERMINAL 16AWG WIRE & #8 SCREW	1	4990	1/4W 8K2 5%MINI T&R RES	1
6825	1N4148 75V 0A45 DIODE T&R	63	3795	#8 GROUND LUG ZIERICK 505-169	1	4762	1/4W 9K760 0.1%*** T&R RES	8
6438	1N4007 1000V 1A0 DIODE T&R	6	3918	1/4" JCK PCB MT HORZ SLIM W/SCREW	2	4629	1/2W 10K 5% T&R RES	4
6934	MR854 400V 3A0 DIODE FASREC	12	6956	SPKON 4C PCB MT HORZ GRY #4	2	4800	1/4W 10K0 1% T&R RES	2
6432	1N5248B 18V0 0W5 ZENER 5% T&R	4	3922	XLR FEML PCB MT HORZ THIN SNAP-IN	2	4829	1/4W 10K 5% T&R RES	3
6436	1N753ARL 6V2 0W5 ZENER 5% T&R	2	3451	EYELET SMALL 0.089 OD PLATED	32	4983	1/4W 10K 5%MINI T&R RES	5
6439	1N5225B 3V0 0W5 ZENER 5% T&R	2	9198	FAN 80MM X 80MM 40CFM 12VDC	1	6116	1/4W 10K0 1%MINI MF T&R RES	8
6440	1N750ARL 4V7 0W5 ZENER 5% T&R	1	3894	HEATSINK TO-220 W/TAB BLACK ANODIZE	4	4773	1/4W 12K1 1% T&R RES	2
6460	1N5260B 43V0 0W5 ZENER 5% T&R	3	3501	B52200F006 COMP WASH #4 SMALL	19	5008	1/4W 14K7 1% T&R RES	4
6461	1N5240BRL 10V0 0W5 ZENER 5% T&R	2	3545	ANGLE BRACKET .5" X .5" X .57"	1	4979	1/4W 15K 5%MINI T&R RES	22
6824	1N5246B 16V0 0W5 ZENER 5% T&R	4	3801	5/8" BUMPER BUTTON BLACK	2	4876	1/4W 16K 5% T&R RES	1
6459	1N4732A 4V7 1W0 ZENER 5% T&R	2	3803	NYLON SECUR-A-TACH MINI PLASTIC TIE	1	4771	1/4W 17K8 1% T&R RES	6
6822	1N4745A 16V0 1W0 ZENER 5% T&R	8	3810	4" NYLON CABLE TIE	17	4885	1/4W 20K 5% T&R RES	3
5101	BC550C TO92 NPN TRAN T&R TB	17	3827	SQUARE BUMPER BUTTON BLACK	6	5003	1/4W 30K1 1% T&R RES	4
5102	BC560C TO92 PNP TRAN T&R TB	14	8433	KNOB AP SERIES PLASTIC	2	4840	1/4W 33K 5% T&R RES	1
5103	MPSA06 TO92 NPN TRAN T&R TA	3	8661	KNOB BUTTON FLAT GREY	3	6122	1/4W 33K 5%MINI T&R RES	3
5107	2N5551 TO92 NPN TRAN T&R TA	2	8437	FAN FILTER LABEL	1	5002	1/4W 42K2 1% T&R RES	2
5108	2N5401 TO92 PNP TRAN T&R TA	4	3468	8' 2/16 SUT AC LINE CORD STRIP 17"	1	6119	1/4W 47K 5%MINI T&R RES	8
5113	MPSA42 TO92 NPN TRAN T&R TA	4	3821	STRAIN RELIEF HEYCO #1200	1	4835	1/4W 56K 5% T&R RES	4
5105	MPSA13 TO92 NPN DARL T&R TA	2	8261	GE VELVET/MATTE LEXAN .007"X12"X24"	0.333	4761	1/4W 60K4 1% T&R RES	4
6814	MJF6668 T221D PNP TRAN DARL TJ	1	8263	METALIZED POLYESTER .005 X 12" X 24"	0.02	4848	1/4W 62K 5% T&R RES	2
6815	MJF6388 T221D PNP TRAN DARL TJ	2	8701	4-40 KEPS NUT ZINC	16	6139	1/4W 62K 5%MINI T&R RES	1
6873	MJE340 TO126 NPN TRAN TG	6	8793	4-40 HEX NUT ZINC	3	4772	1/4W 82K5 1% T&R RES	2
6874	MJE350 TO126 PNP TRAN TG	6	8666	6-32 X 1/4" PEM THRD SPACER 0.213	2	4838	1/4W 100K 5% T&R RES	1
6752	MTP10N15L TO220 NCH MFET TN	2	8760	6-32 KEPS NUT TIN PLATED	32	6120	1/4W 100K 5%MINI T&R RES	2
6933	MTP23P06 TO220 PCH MFET TN	2	8800	6-32 KEPS NUT ZINC	5	4851	1/4W 120K 5% T&R RES	4
6909	MJ21196 TO3 NPN TRAN TH	8	8712	5/16-24 JAM NUT JS500	1	6137	1/4W 200K 5%MINI T&R RES	2
7004	2SA2121-0 TO3P PNP TRAN TK	2	3797	TO-247 THERMO CONDUCTIVE PAD	4	6126	1/4W 220K 5%MINI T&R RES	6
7005	2SC5949-0 TO3 NPN TRANSISTOR TK	2	3846	TO220 THERMO PAD LARGE HOLE 56359B	4	6127	1/4W 470K 5%MINI T&R RES	4
6910	MJ21195 TO3 NPN TRAN TH	8	3916	TO3 SIL-PAD REPLACES MICA	16	4951	1/4W 4M7 5% .2U T&R RES	2
6840	MC33078P IC DUAL OP AMP	6	4124	SILPAD 1500ST 1.100 X0.820 BERQUIST	4	6132	1/4W 8M2 5%MINI T&R RES	2
6889	TL074CN IC QUAD O/A T.I ONLY	1	4597	22AWG STRAN TC WIR JMP	29	4751	1/4W 22M 5% T&R RES	4
6745	LM13600N IC XCONDUCTANCE AMP	2	4599	22AWG SOLID SC WIR T&R JMP	89	3622	14" 14C-28AWG DIP HDR CABLE .05"	1
5190	MBS4992 TO92 8V5 DIAC T&R	2	5299	24AWG SOLID SC WIR RAD JMP	37	3696	RELAY 1C 02AMP DC24 006MA PC-S	2
6517	BTB24-600 TO220AB 25A TRIAC 600V	2	4745	5.0W 0R1 5% BLK RES	8	8870	#4 X 1/4 PAN PH TYPE A ZINC	2
5200	.10P 200V 5%CAP T&R RAD CER.2NPO	4	2007	1/4W 1R 5%FLAME PROOF T&R RES	10	9975	#4 X 1/2 PAN PHIL TYPE A B.O.& WAX	4
5817	.15P 100V 2%CAP T&R RAD CER.2NPO	2	4682	1/2W 1R 5%PHILIPS SMAL T&R RES	6	8799	#6 X 1/4 PAN PH TYPE B JS500	2
5405	.27P 200V 5%CAP T&R RAD CER.2NPO	2	4911	1/4W 2R2 5% T&R RES	8	8865	4-40 X 5/16 PAN PH MS JS500	4
5408	.47P 100V 10%CAP T&R BEAD NPO	2	4748	2.0W 3R9 5% T&R	2	8742	4-40 X 3/8 PAN PH TAPTITE JS500	4
5410	100P 100V 10%CAP T&R BEAD NPO	2	4733	5.0W 5R6 5% BLK RES	2	8741	4-40 X 1/2 PAN PH MS JS500	11
5277	220P 200V 5%CAP T&R RAD CER.2NPO	4	2037	1/4W 10R FUSIBLE T&R RES	6	8871	4-40 X 5/8 PAN PH MS JS500	6
5412	220P 100V 10%CAP T&R BEAD NPO	12	4605	1/8W 10R 5% T&R RES	1	8902	4-40 X 3/4 PAN PHIL MS B/O & WAX	4
5206	.1N 400V 5%CAP T&R RAD .2FLM	4	4875	1/4W 10R 5% T&R RES	4	8832	6-32 X 1/4 PAN PH TAPTITE JS500	3
5422	.1N 50V 10%CAP T&R BEAD NPO	4	4930	1/4W 10R 5% .2U T&R RES	1	8801	6-32 X 3/8 PAN PH TAPTITE JS500	3
5273	.1N5 200V 5%CAP T&R RAD CER.2NPO	4	2039	1/4W 22R0 FUSIBLE T&R RES	2	8829	6-32 X 3/8 FLAT PH TAPTITE BO#C HEA	56
5274	.2N2 200V 5%CAP T&R RAD CER.2NPO	4	2041	1/4W 39R0 FUSIBLE T&R RES	14	8761	6-32 X 1/2 PAN PHIL MS ZINC CLEAR	32
5209	.4N7 250V 5%CAP T&R RAD .2FLM	4	4899	1/4W 39R 5% T&R RES	2	8823	6-32 X 1 PAN PH TAPTITE JS500	1
6451	.4N7 250V 20%CAP BLK 'Y' 10MM AC	1	4817	1/4W 47R 5% T&R RES	2	8763	8-32 X 1/2 PAN PH MS JS500 BLACK	4
5204	.10N 100V 10%CAP T&R RAD .2FLM	2	4811	1/4W 68R 5% T&R RES	6	8999	8-32 X 5/8 PAN PH TAPTITE JS500	11
5210	.22N 100V 10%CAP T&R RAD .2FLM	4	2043	1/4W 75R FUSIBLE T&R RES	8	8809	10-32 X 1/4 PAN PH TAPTITE JS500	8
6435	.22N 275V 20%CAP BLK 'X2' 15MM AC	2	4852	1/4W 100R 5% T&R RES	1	8711	5/16-24 X 3 GRD 5 HEX BOLT JS500	1
5835	.33N 250VDC 10%CAP BLK RAD PLY FLM	2	4984	1/4W 150R 5%MINI T&R RES	4	8731	10-16 X 5/8 TYPE B HEX W/SLOT JS500	12
5226	.68N 100V 5%CAP T&R RAD .2FLM	4	2023	1/6W 220R0 1%FLAME PROOF T&R RES	2	3570	14 PIN SCKT CLOSED FRAME DIP ONLY	1
5228	100N 100V 5%CAP T&R RAD .2FLM	18	4977	1/4W 220R 5%MINI T&R RES	2	8663	11/64 NYLON SPACER (MICRO PLASTIC)	32
5314	100N 50V 10%CAP T&R BEAD X7R	3	2046	1/4W 240R FUSIBLE T&R RES	4	3744	SNAP IN .375 SPACER RICHCO	5
5229	150N 63V 10%CAP T&R RAD .2FLM	4	2024	1/6W 249R 2%FLAME PROOF T&R RES	14	3741	.5 SPACER ID-.171 OD-.25 #912-500	2
5231	220N 63V 5%CAP T&R RAD .2FLM	2	4770	1/4W 249R 1% T&R RES	10	3851	1/2 PCB PLASTIC SPACER	4
5882	220N 250VDC 10%CAP BLK RAD PLY FLM	4	4821	1/4W 470R 5% T&R RES	2	3417	6-32 SCREW TERMINAL PC MNT SNAP-IN	1
5234	470N 63V 10%CAP T&R RAD .2FLM	2	4980	1/4W 470R 5%MINI T&R RES	14	8657	6-32 X 3/8" HEX SPACER ALUMINUM	1
5322	470N 50V 20%CAP T&R BEAD Z5U	2	5019	1/4W 620R 5%MINI T&R RES	2	8629	10-32 X 1/4 SPACER PHENOLIC	8
5257	.2U2 63V 20%CAP T&R RAD .2EL	2	2033	1/6W 1K 2%FLAME PROOF T&R RES	4	8735	0.125 X 0.190 ALUMINUM RIVET	1
5258	.4U7 63V 20%CAP T&R 8X7MM .2EL	2	4623	1/2W 1K 5% T&R RES	2	3502	NYLON FLAT WASHER OD.158ID.110H.070	2
5259	.4U7 63V 20%CAP T&R RAD .2	3	4823	1/4W 1K 5% T&R RES	4	8667	SHOULDER WASHER SWS-229 LENGTH 1/8	4
5282	.10U 16V 20%CAP T&R 5X7MM .2NP	2	4981	1/4W 1K 5%MINI T&R RES	14	3511	#6 FLAT WASHER NYLON	2
5629	.10U 160V 20%CAP BLK 10X13MM EL	4	4998	5.0W 1K2 5% BLK RES	4	8485	#6 SPLIT WASHER ZINC	4
5260	.22U 50V 20%CAP T&R RAD .2EL	12	4624	1/2W 1K5 5% T&R RES	2	8818	3/4 OD X 3/8 ID X .080 THICK WASHER	1
5961	.33U 16V 20%CAP T&R RAD .2IN NP	8	4988	1/4W 1K5 5%MINI T&R RES	4	3517	NYLON WASHER #8 0.062	4
5267	100U 25V 20%CAP T&R RAD .2EL	6	4791	1/4W 1K54 1% T&T RES	4	8491	#10 SPLIT LOCK WASHER BO	2
5897	330U 16V 20%CAP BLK 08X11MM EL	6	5005	2.0W 1K8 5% T&R RES	4	3705	4P3T SLID SW PCMT H	1
5621	470U 63V 20%CAP BLK 12X25MM EL	1	6113	1/4W 2K 5%MINI T&R RES	8	3436	DPDT PUSH SW PCMT H BREAK B4 MAKE	2
5617	3300U 63V 20%CAP BLK 25X31MM ELS	4	5006	1.0W 2K7 5% T&R RES	4	3587	DPDT ROKR SW QUIK 250VAC/PWR ON-OFF	1
5895	6800U 63V 20%CAP BLK 25X50MM EL	8	6206	1/4W 3K01 1% T&R RES	2	3429	SPDT ROKR SW QUIK 180V AC PWR BL/BL	1
4390	.10K AUD 16MM DETENT P22	2	4826	1/4W 3K3 5% T&R RES	2	CH1198	XFMR:AP2020/V22	1
4524	.4K7 TRIM POT V	2	6136	1/4W 3K3 5%MINI T&R RES	4			
3606	12.00 AMP CIRCUIT BREAKER	1	4850	1/4W 3K9 5% T&R RES	1			
3759	.4UH COIL 14AWG ZOBEL VERTICAL	2	4982	1/4W 4K7 5%MINI T&R RES	24			