

CA1500

Power Amplifier

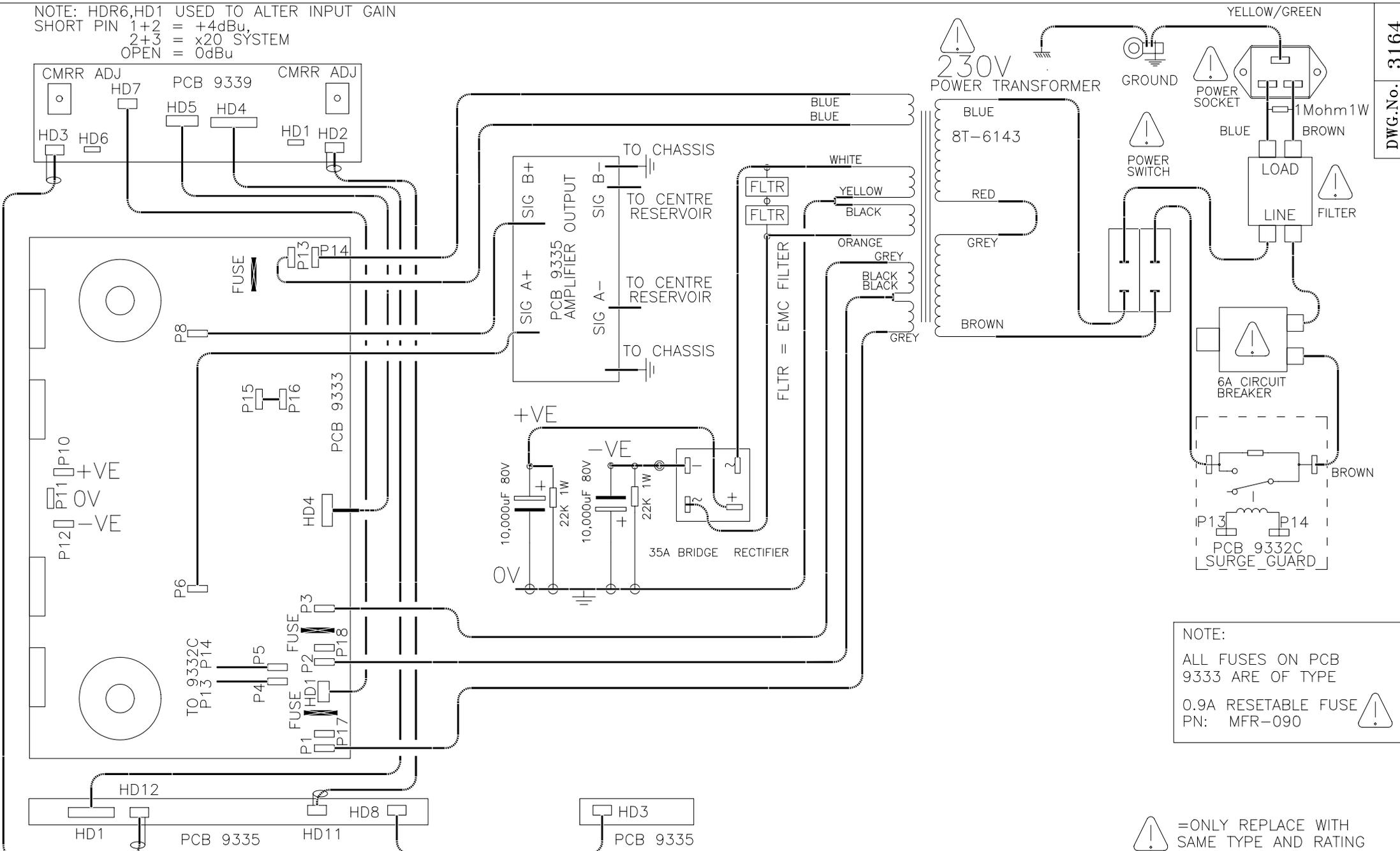


Service Information

Laney

WWW.LANEY.CO.UK

NOTE: HDR6, HD1 USED TO ALTER INPUT GAIN
 SHORT PIN 1+2 = +4dBu,
 2+3 = x20 SYSTEM
 OPEN = 0dBu



NOTE:
 ALL FUSES ON PCB 9333 ARE OF TYPE
 0.9A RESETTABLE FUSE
 PN: MFR-090

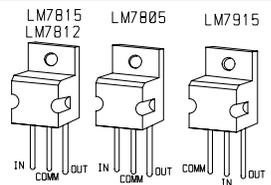
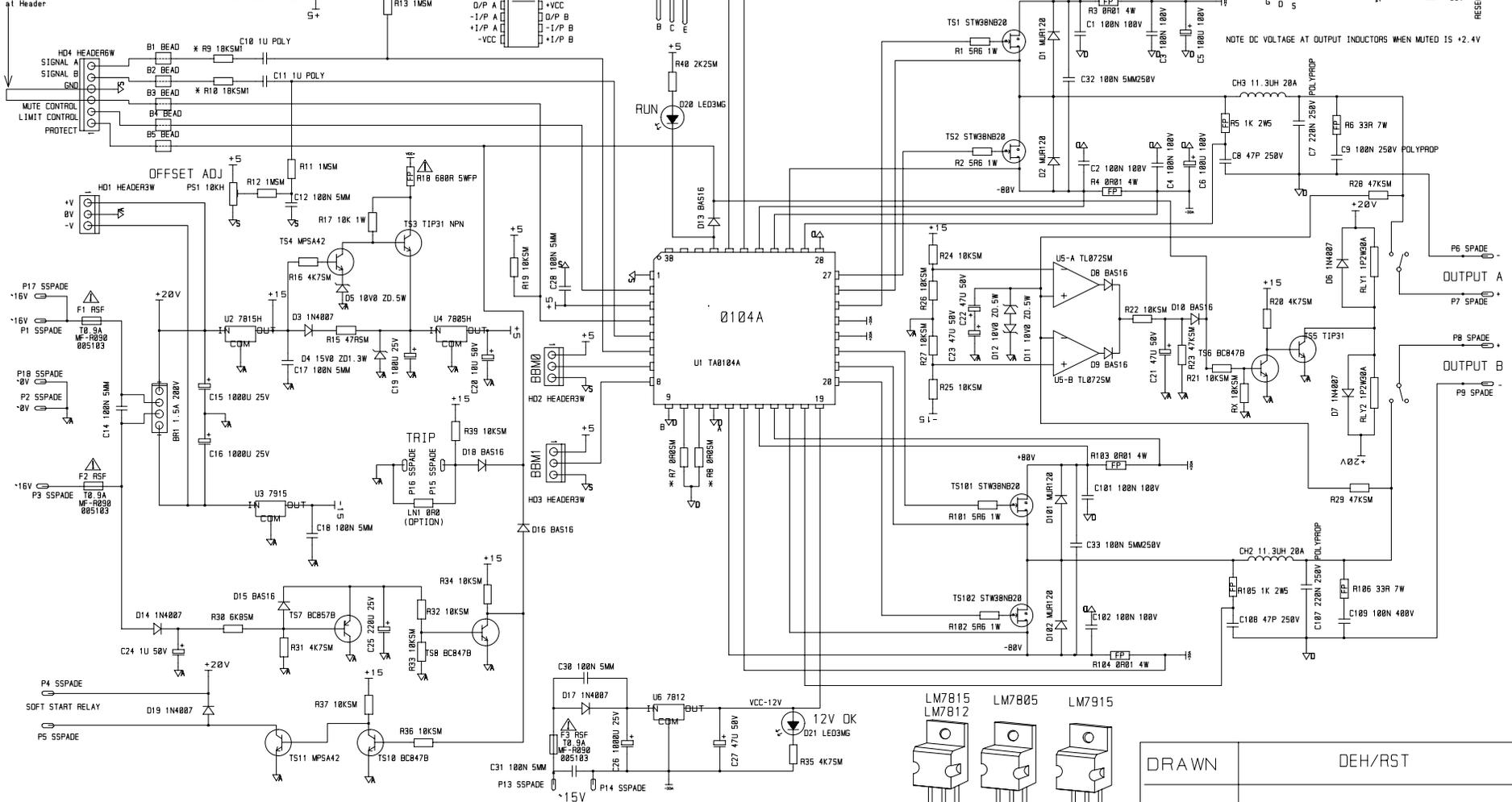
⚠ = ONLY REPLACE WITH SAME TYPE AND RATING

DWG.No. 3164

ISSUE	DESCRIPTION	APPD.	DATE	TITLE	DRAWN	TRACED	CHECKED	APPROVED	DATE
				BLT <i>Industries Ltd.</i>	R.S.T				6/11/00
						CA1500 Service Schematic PART No	DRAWING No.	3164	

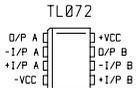
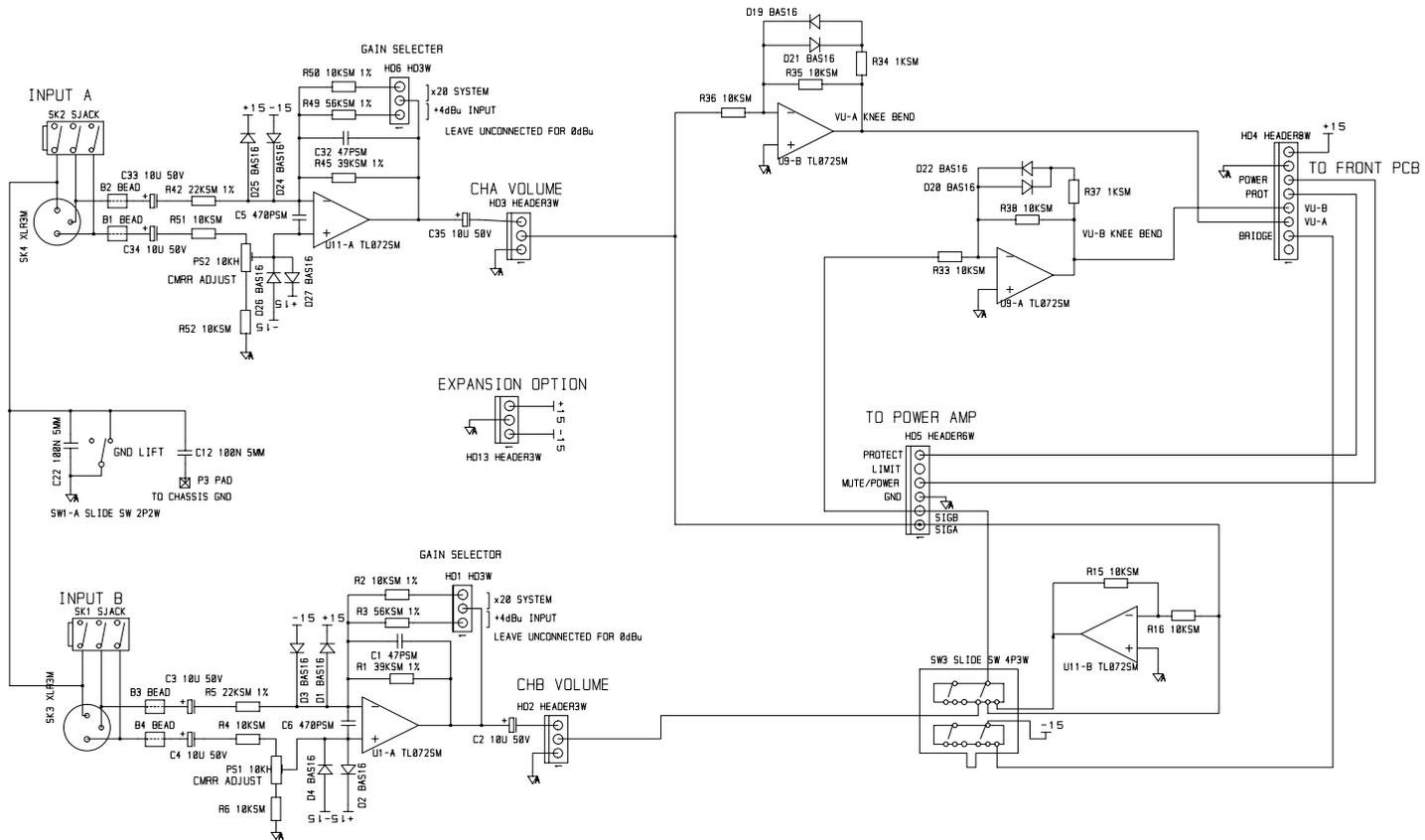
NOTE:
 RESISTOR CHANGES ON 600W MODEL
 * R7+R8 = 5k5
 * R9+R10 = 22K
 (ABOVE RESISTORS SHOWN ON DIAGRAM AS 1500W VERSION)

Join Mute Control to Ground at Header

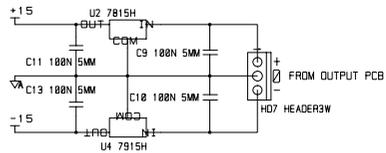


DRAWN	DEH/RST
DATE	12/10/00
TITLE	B1/CA POWER AMP
DRW. NO.	9333_6

ISSUE	6_16/01/01 C10,C11 TO BOX POLY TYPE R3/4/103/104 2W5 TO 4WFP	7/08/2001
TYPE	R6/106 TO 5W TO 7WFP R26/27 TO 1K TO 10KSM D11/12 TO 3V9 TO 10V	C9 and C109 to Polyprop type 10K base resistor added to T56 CA600 R7 and R8 changed to 5K5

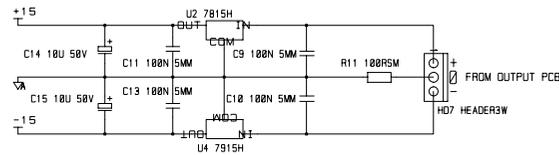
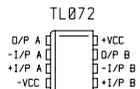
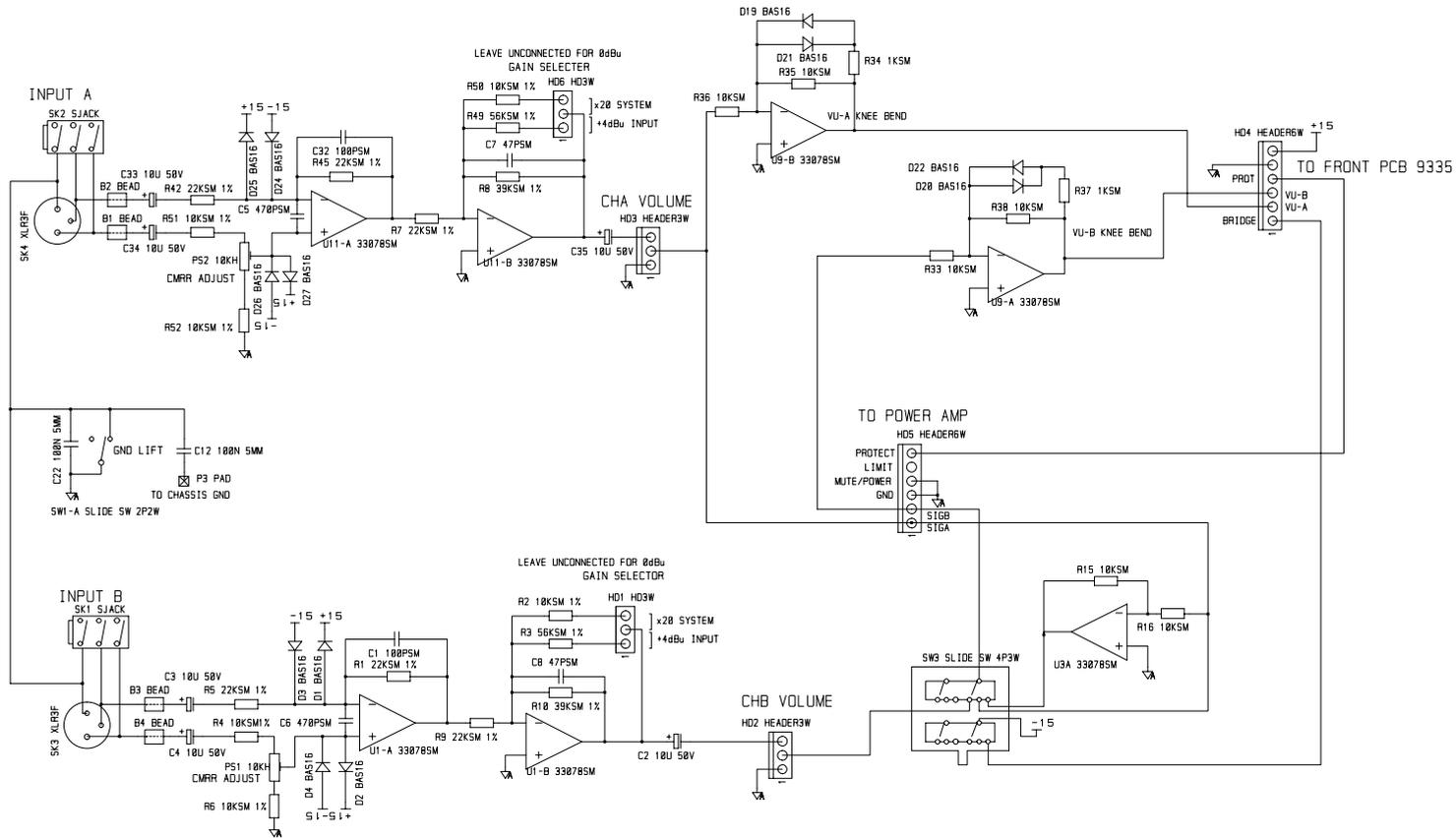


BC847B NPN



DRAWN	RST
DATE	01/09/00
TITLE	CONCEPT POWER AMP INPUT PCB
DRW. NO.	9339_1

ISSUE							
TYPE							



DRAWN	RST
DATE	10/10/00
TITLE	CONCEPT POWER AMP INPUT PCB
DRW. NO.	9339_2

ISSUE	ISSUE 2
TYPE	GAIN SELECT STAGE U11B/U11A ADDED HDS FROM 0W6W LAYOUT DETAILS

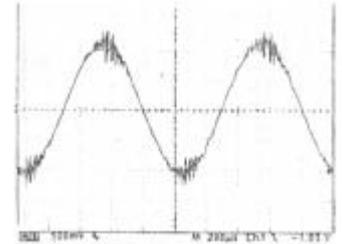
CA Series Power Amplifiers

Traditionally, Class A and Class A-B amplifiers have dominated the amplifier marketplace. These purely analogue devices have low power efficiency and most integrated circuit Class A-B amplifiers fall short of true high-fidelity audio quality.

Class D amplifiers however, solve the efficiency problem by using switching pulse-width modulation technology. However, this produces audio quality that is far inferior to class A or AB, so efficiency is gained at the expense of audio fidelity. The 'Holy Grail' of amplification: High audio quality AND high power efficiency has long eluded the market. Enter the CA range of power amplifiers delivering audiophile performance and very high efficiency.

If you have measured the output waveforms of CA amplifiers using traditional equipment and methods, you may have observed an unusual characteristic in the output waveform when the amplifier is driven close its maximum output. This characteristic appears to be a high frequency oscillation near the waveform peaks.

In reality, this apparent oscillation is an audio quality enhancement characteristic of the CA amplifier. The apparent oscillations are well outside the audio bandwidth, and are a unique feature of the digital power processor.



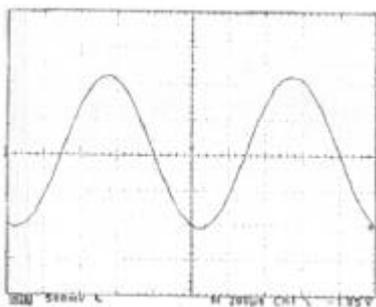
No Filtering on output

As the input signal, to any conventional amplifier is increased, at some point the output of the amplifier will distort/clip i.e. 'Square' off. This is bad news because for a split second the loudspeaker is not moving at all but still dissipating potentially huge power levels, this is the main cause of (expensive) compression driver failure.

When the CA power amplifier goes into this distortion region, it exhibits high frequency break-up of the peaks as shown above. This is actually the amplifier resetting the control processor overloads at a **frequency far above the audible range**. This is not instability or oscillation, nor does it degrade the performance of the amplifier in any way. In addition the CA series power amplifiers also have the ability to run almost rail-to-rail, and thus will not lose negative feedback. In other words, it will retain control of the load at all times.

Measurement of THD%+N

Unless your distortion analyser is designed to reject out of band noise when measuring THD (And very few are), the THD measurement actually reflects harmonic distortion plus any noise present up to the bandwidth of the analyser and so is actually a measurement of THD+N. Since the CA range of amplifiers have energy far outside the audible frequency range (As do inferior class D amplifiers), a test designed for linear amplifiers (such as class A, AB) will not yield valid results when applied to a CA amplifier. A sharp cut-off low-pass filter must be inserted between the amplifiers outputs and the test equipment's inputs prior to making any distortion measurements. Some measurement equipment (Such as Audio Precision2) have high quality low pass filters which can be used to limit the test bandwidth. Using these filters (as shown below) you will achieve what 'looks' like a high quality linear amplifier. Even though there appears to be 'lots going on' outside the audio bandwidth, the CA amplifier is designed to be well within current and future EMC guidelines, and as such is quieter than most linear amplifiers.



Output with 30Khz Low-pass filter

CA1500E

CA1500 EURO/UK 230V

	CA600/1500 CARTONS	1
	SPECIAL MAINS LEAD	1
	CA SERIES MANUAL	1
007912	CA1500 CHASSIS ASSY 230V	1

CA1500E

CA1500 EURO/UK 230V

007912	CA1500 CHASSIS ASSY 230V	1
->001048	10M .25W RESISTOR	1
->002022	10000UF 100V CAPACITOR/SAM	2
->002204	680NF 250V 22.9mm	3
->005319	3A FILTERED MAINS INLET	1
->005320	CHASSIS MOUNT MAINS FILTER	1
->005321	3A THERMAL RELEASE SWITCH	1
->005510	3MM SOLDER TAG	1
->005511	5MM SOLDER TAG	10
->005512	6mm SOLDER TAG	3
->005558	100mm TIE WRAP	20
->005612	M3*8 METAL SPACER	2
->005632	M3*20 PLASTIC SPACER HEX	4
->005659	SHORT BOARD SPACER 12.7MM	4
->005666	RED P402 KNOB	2
->009152	3*5mm PAN POZI	4
->009160	4mm HEX NUT	19
->009161	4mm INT. SHAKEPROOF	26
->009162	4*12mm PAN POZI	2
->009163	4*20mm PAN POZI	6
->009167	4*8 PAN POZI TAPTE	4
->009171	M5 INT SHAKEPROOF	2
->009173	5*12mm PAN POZI	1
->009181	5mm BRASS HEX NUT	1
->009183	WASHER 10MM O/D X 3 1/2MM	2
->009190	6 WAY END CONNECTOR	4
->009199	3 WAY IDC CONNECTOR	8
->009200	NO 6*3/8 FLANGE POZI	18
->009204	NO 4*1/4 PLASTITE	4
->009217	4mm NUTSERT	18
->009235	4 X 3/8 PAN POZI AB BLK PO	6
->522032	35A BRIDGE RECTIFIER	1
->530027	DPST EQ MAINS SWITCH	1
->530066	SPEAKON SOCKET	3
->540038	EARTH WARNING LABEL	1
->541004	HC25/50 4.8 FASTON	8
->541053	1/4" LG RECEPTACLE	17
->541071	POZI LOCK NYLON BOOT	16
->582005	4*25 PAN POZI	4
->582007	4*10mm SMALL F/H	8
->586002	M8 * 60 ROOFING BOLT	1
->586023	8mm SHKPRF WASHER	1
->588006	POP RIVET (BLACK)	6
->589020	S/A SQUARE RUBBER FOOT	4
->589041	50mm CAPACITOR CLAMP	2
->5P-50036	MX500 CAP STRAP	1
->8P-5063	CA1500 SUB FACIA DWG 3089	1
->8P-5064	CA1500/600 TRIM FACIA DWG	1
->8P-5065	CA1500/600 CHASSIS DWG 31	1
->8P-5067	CA1500/600C CHASSIS PARTIT	1
->8P-5068	75MM CA HEATSINK EXT	4
->8P-5069	CA1500/600 LID DWG	1
->8P-9250	CA1500/600 REAR DWG 3105	1
->8P-9255	CA SERIES RACK WINGS DWG	2
->8P-9256	CA SERIES HANDLE DWG 3128	2
->8P-9257	CA SERIES HANDLE SPACER	2
->8P-9258	CA SERIES FUSE BRACKET DW	1
->->8T-6143	CA1500/3000 MAINS TX 115/2	1

CA1500E

CA1500 EURO/UK 230V

->007906	B1/CA OUTPUT ASSY PCB 9333	1
->->001068	5R6 1W 5% WW RESISTOR	4
->->001069	OR01 2W5 5% WIREWOUND RES	4
->->001070	18KSM 1206 1% RESISTOR	2
->->001073	33R 2W5 5% RESISTOR	2
->->001300	ORO SHORTING LINK	2
->->001302	47R 5% RESISTOR	1
->->001305	2K2 5% RESISTOR	1
->->001306	10K 5% RESISTOR	11
->->001309	1M 5% RESISTOR	4
->->001312	4K7 5% RESISTOR	4
->->001315	47K 5% RESISTOR	3
->->001318	6K8 5% RESISTOR	1
->->001327	1K 5% RESISTOR	2
->->001400	10K 1W RESISTOR	1
->->001511	1K 2.5W RESISTOR	2
->->001705	680R 5W RESISTOR	1
->->001920	ZERO OHM RESISTOR	1
->->002004	47UF 50V RADIAL	4
->->002009	1000UF 25V RADIAL	3
->->002013	10UF 50V CAPACITOR	1
->->002014	100UF 35V RADIAL	1
->->002025	1UF 63V RADIAL	3
->->002029	220UF 25V CAPACITOR	1
->->002035	100N 100V 5MM BOX POLY	6
->->002036	100UF 100V RADIAL CAP	2
->->002039	220N 250V POLYPROPYLENE CA	2
->->002041	100N 250V 5MM POLYESTER CA	2
->->002410	100NF 400V 15MM	2
->->002419	100NF 63V 5mm	8
->->002818	47PF 500V CERAMIC	2
->->003000	1N4007 DIODE	6
->->003007	3V9 .5W ZENER DIODE	2
->->003014	15V 1.3W ZENER	1
->->003017	1.5A 200V BRIDGE	1
->->003018	10V .5W ZENER DIODE	1
->->003022	3mm GREEN LED	2
->->003041	5MM FERRITE BEAD	5
->->003042	BYW100-200-FAST RECOVERY D	4
->->003411	MPSA42/43 TRANSISTOR	2
->->003422	STW38NB20 N CHANNEL	4
->->003423	TA0104A TRIPATH DIGITAL AM	2
->->003424	LM7812 12V REGULATOR	1
->->003500	BAS16 DIODE	7
->->003503	BC847B TRANSISTOR	3
->->003504	BC857B TRANSISTOR	1
->->003508	34072 IC (SMD TL072)	1
->->003610	TIP31C TRANSISTOR	2
->->003901	7815 IC VOLT'REGULATOR	1
->->003902	7915 IC VOLT'REGULATOR	1
->->003905	7805 IC	1
->->004019	10K HORIZ PRESET	2
->->005030	HEATSINK TV5	3
->->005036	6 WAY LOCKING HEADER	1
->->005038	1/4" SPADE TERMINAL	7
->->005063	3 WAY LOCKING HEADER	3
->->005076	290MM TIE WRAP	1
->->005103	0.9A POLY SWITCH/MF-R090	3
->->005316	8W PCB SOCKET	2
->->005317	11.3UH 20A INDUCTOR	2
->->005318	12W PCB SOCKET	2
->->005322	ALUMINIUM OXIDE FET WASHER	4

CA1500E**CA1500 EURO/UK 230V**

->->005558	100mm TIE WRAP	2
->->005609	30A RELAY	2
->->005686	4.8MM TERMINAL SPADE	6
->->009150	3mm HEX NUT	7
->->009151	3mm INT SHAKEPROOF	7
->->009333	CA/B1 DIGITAL OUTPUT PCB	1
->->543508	SHORTING LINK (IDC)	2
->->581018	3*20mm PAN POZI	7
->->588006	POP RIVET (BLACK)	3
->->588058	M3*10mm HEX TAPPED	5
->->8P-9243	CA/B1 OUTPUT TRAY DWG NO	1
->->8P-5071	CA1500/600/B1 FET CLAMPING	2

CA1500E**CA1500 EURO/UK 230V**

->007909	CA SERIES INPUT PCB 9339 A	-1
->->001071	22K 1206 1% RESISTOR	2
->->001072	39K 1206 1% RESISTOR	2
->->001300	ORO SHORTING LINK	17
->->001327	1K 5% RESISTOR	2
->->001920	ZERO OHM RESISTOR	2
->->001923	56KSM 1206 1% RESISTOR	2
->->001924	10KSM 1206 1% RESISTOR	12
->->002013	10UF 50V CAPACITOR	6
->->002419	100NF 63V 5mm	6
->->002602	47PF 50V 10% COG	2
->->002605	470PF 50V 10% COG	2
->->003034	3mm LED YELLOW	2
->->003041	5MM FERRITE BEAD	4
->->003500	BAS16 DIODE	12
->->003509	MC33078 IC	3
->->003901	7815 IC VOLT'REGULATOR	1
->->003902	7915 IC VOLT'REGULATOR	1
->->004019	10K HORIZ PRESET	2
->->005003	STEREO JACK SOCKET	2
->->005030	HEATSINK TV5	2
->->005036	6 WAY LOCKING HEADER	2
->->005054	XLR SOCKET FEMALE	2
->->005063	3 WAY LOCKING HEADER	4
->->005065	3 WAY NON LOCKING	2
->->005331	LEDS-02-12-26 SPACER	1
->->005610	2 POLE 2 WAY (MX)	1
->->009199	3 WAY IDC CONNECTOR	1
->->009339	PCB ISSUE 2	1
->->530023	4P 3W SLIDE SWITCH	1
->->543508	SHORTING LINK (IDC)	2

CA1500E**CA1500 EURO/UK 230V**

->007913	CA1500 PCB 9335 VU/SS/O/P	-1
->->001003	1K .25W RESISTOR	1
->->001300	ORO SHORTING LINK	1
->->001305	2K2 5% RESISTOR	2
->->001306	10K 5% RESISTOR	3
->->001311	470R 5% RESISTOR	2
->->001327	1K 5% RESISTOR	4
->->002013	10UF 50V CAPACITOR	2
->->002401	22NF 400V 10MM	2
->->002402	220NF 250V 15MM DIPPED POL	2
->->003011	5V1 .5W ZENER DIODE	1
->->003022	3mm GREEN LED	7
->->003031	SURGE GUARD SCK20-10-8A	1
->->003033	3mm LED RED	4
->->003503	BC847B TRANSISTOR	1
->->003805	LB1413 BARGRAPH DRIVER	2
->->004113	10K VERTICAL PRESET	2
->->004110	B10K 27.5MM POT	2
->->005047	16A 24V RELAY	1
->->005072	3 WAY 90 DEGREE LOCKING HE	4
->->005062	6W 90o LOCKING HEADER	1
->->005657	LED SPACER 12.7mm	2
->->005686	4.8MM TERMINAL SPADE	4
->->009335	PCB ISSUE 3	1
->->543508	SHORTING LINK (IDC)	2
->->571014	10 TURN CHOKE	2

CA1500US

CA1500 115V

10462
10702
10959

CA600/1500 CARTONS	1
SPECIAL MAINS LEAD	1
CA SERIES MANUAL	1

CA1500US

CA1500 115V

7918	CA1500 CHASSIS ASSY 115V	-1
->001048	10M .25W RESISTOR	1
->002022	10000UF 100V CAPACITOR/SAM	2
->002204	680NF 250V 22.9mm	3
->005323	6 AMP FILTERED MAINS INLET	1
->005320	CHASSIS MOUNT MAINS FILTER	1
->005324	5A THERMAL RELEASE SWITCH	1
->005510	3MM SOLDER TAG	1
->005511	5MM SOLDER TAG	10
->005512	6mm SOLDER TAG	3
->005558	100mm TIE WRAP	20
->005612	M3*8 METAL SPACER	2
->005632	M3*20 PLASTIC SPACER HEX	4
->005659	SHORT BOARD SPACER 12.7MM	4
->005666	RED P402 KNOB	2
->009152	3*5mm PAN POZI	4
->009160	4mm HEX NUT	19
->009161	4mm INT. SHAKEPROOF	26
->009162	4*12mm PAN POZI	2
->009163	4*20mm PAN POZI	6
->009167	4*8 PAN POZI TAPTE	4
->009171	M5 INT SHAKEPROOF	2
->009173	5*12mm PAN POZI	1
->009181	5mm BRASS HEX NUT	1
->009183	WASHER 10MM O/D X 3 1/2MM	2
->009190	6 WAY END CONNECTOR	4
->009199	3 WAY IDC CONNECTOR	8
->009200	NO 6*3/8 FLANGE POZI	18
->009204	NO 4*1/4 PLASTITE	4
->009217	4mm NUTSERT	18
->009235	4 X 3/8 PAN POZI AB BLK PO	6
->522032	35A BRIDGE RECTIFIER	1
->530027	DPST EQ MAINS SWITCH	1
->530066	SPEAKON SOCKET	3
->540038	EARTH WARNING LABEL	1
->541004	HC25/50 4.8 FASTON	8
->541053	1/4" LG RECEPTACLE	17
->541071	POZI LOCK NYLON BOOT	16
->582005	4*25 PAN POZI	4
->582007	4*10mm SMALL F/H	8
->586002	M8 * 60 ROOFING BOLT	1
->586023	8mm SHKPRF WASHER	1
->588006	POP RIVET (BLACK)	6
->589020	S/A SQUARE RUBBER FOOT20MM	4
->589041	50mm CAPACITOR CLAMP	2
->5P-50036	MX500 CAP STRAP	-1
->8P-5063	CA1500 SUB FACIA DWG 3089	-1
->8P-5064	CA1500/600 TRIM FACIA DWG	-1
->8P-5065	CA1500/600 CHASSIS DWG 31	-1
->8P-5067	CA1500/600C CHASSIS PARTIT	-1
->8P-5068	75MM CA HEATSINK EXT	-4
->8P-5069	CA1500/600 LID DWG	-1
->8P-9250	CA1500/600 REAR DWG 3105	-1
->8P-9255	CA SERIES RACK WINGS DWG	-2
->8P-9256	CA SERIES HANDLE DWG 3128	-2
->8P-9257	CA SERIES HANDLE SPACER	2
->8P-9258	CA SERIES FUSE BRACKET DW	1
>8T-6146	CA1500 115V MAINS + CRIMPS	-1

CA1500US

CA1500 115V

CA1500US	CA1500 115V	
->007906	B1/CA OUTPUT ASSY PCB 9333	-1
->>001068	5R6 1W 5% WW RESISTOR	4
->>001069	OR01 2W5 5% WIREWOUND RESI	4
->>001070	18KSM 1206 1% RESISTOR	2
->>001073	33R 2W5 5% RESISTOR	2
->>001300	ORO SHORTING LINK	2
->>001302	47R 5% RESISTOR	1
->>001305	2K2 5% RESISTOR	1
->>001306	10K 5% RESISTOR	11
->>001309	1M 5% RESISTOR	4
->>001312	4K7 5% RESISTOR	4
->>001315	47K 5% RESISTOR	3
->>001318	6K8 5% RESISTOR	1
->>001327	1K 5% RESISTOR	2
->>001400	10K 1W RESISTOR	1
->>001511	1K 2.5W RESISTOR	2
->>001705	680R 5W RESISTOR	1
->>001920	ZERO OHM RESISTOR	1
->>002004	47UF 50V RADIAL	4
->>002009	1000UF 25V RADIAL	3
->>002013	10UF 50V CAPACITOR	1
->>002014	100UF 35V RADIAL	1
->>002025	1UF 63V RADIAL	3
->>002029	220UF 25V CAPACITOR	1
->>002035	100N 100V 5MM BOX POLY	6
->>002036	100UF 100V RADIAL CAP	2
->>002039	220N 250V POLYPROPYLENE CA	2
->>002041	100N 250V 5MM POLYESTER CA	2
->>002410	100NF 400V 15MM	2
->>002419	100NF 63V 5mm	8
->>002818	47PF 500V CERAMIC	2
->>003000	1N4007 DIODE	6
->>003007	3V9 .5W ZENER DIODE	2
->>003014	15V 1.3W ZENER	1
->>003017	1.5A 200V BRIDGE	1
->>003018	10V .5W ZENER DIODE	1
->>003022	3mm GREEN LED	2
->>003041	5MM FERRITE BEAD	5
->>003042	BYW100-200-FAST RECOVERY D	4
->>003411	MPSA42/43 TRANSISTOR	2
->>003422	STW38NB20 N CHANNEL MOSFET	4
->>003423	TA0104A TRIPATH DIGITAL AM	2
->>003424	LM7812 12V REGULATOR	1
->>003500	BAS16 DIODE	7
->>003503	BC847B TRANSISTOR	3
->>003504	BC857B TRANSISTOR	1
->>003508	34072 IC (SMD TL072)	1
->>003610	TIP31C TRANSISTOR	2
->>003901	7815 IC VOLT'REGULATOR	1
->>003902	7915 IC VOLT'REGULATOR	1
->>003905	7805 IC	1
->>004019	10K HORIZ PRESET	2
->>005030	HEATSINK TV5	3
->>005036	6 WAY LOCKING HEADER	1
->>005038	1/4" SPADE TERMINAL	7
->>005063	3 WAY LOCKING HEADER	3
->>005076	290MM TIE WRAP	1
->>005103	0.9A POLY SWITCH/MF-R090	3
->>005316	8W PCB SOCKET	2
->>005317	11.3UH 20A INDUCTOR	2
->>005318	12W PCB SOCKET	2
->>005322	ALUMINIUM OXIDE FET WASHER	4

CA1500US**CA1500 115V**

->->005558	100mm TIE WRAP	2
->->005609	30A RELAY	2
->->005686	4.8MM TERMINAL SPADE	6
->->009150	3mm HEX NUT	7
->->009151	3mm INT SHAKEPROOF	7
->->009333	CA/B1 DIGITAL OUTPUT PCB	1
->->543508	SHORTING LINK (IDC)	2
->->581018	3*20mm PAN POZI	7
->->588006	POP RIVET (BLACK)	3
->->588058	M3*10mm HEX TAPPED	5
->->8P-9243	CA/B1 OUTPUT TRAY DWG NO	-1
->->8P-5071	CA1500/600/B1 FET CLAMPING	2

CA1500US

CA1500 115V

->007909	CA SERIES INPUT PCB 9339 A	-1
->>001071	22K 1206 1% RESISTOR	2
->>001072	39K 1206 1% RESISTOR	2
->>001300	ORO SHORTING LINK	17
->>001327	1K 5% RESISTOR	2
->>001920	ZERO OHM RESISTOR	2
->>001923	56KSM 1206 1% RESISTOR	2
->>001924	10KSM 1206 1% RESISTOR	12
->>002013	10UF 50V CAPACITOR	6
->>002419	100NF 63V 5mm	6
->>002602	47PF 50V 10% COG	2
->>002605	470PF 50V 10% COG	2
->>003034	3mm LED YELLOW	2
->>003041	5MM FERRITE BEAD	4
->>003500	BAS16 DIODE	12
->>003509	MC33078 IC	3
->>003901	7815 IC VOLT'REGULATOR	1
->>003902	7915 IC VOLT'REGULATOR	1
->>004019	10K HORIZ PRESET	2
->>005003	STEREO JACK SOCKET	2
->>005030	HEATSINK TV5	2
->>005036	6 WAY LOCKING HEADER	2
->>005054	XLR SOCKET FEMALE	2
->>005063	3 WAY LOCKING HEADER	4
->>005065	3 WAY NON LOCKING	2
->>005331	LEDS-02-12-26 SPACER	1
->>005610	2 POLE 2 WAY (MX)	1
->>009199	3 WAY IDC CONNECTOR	1
->>009339	PCB ISSUE 2	1
->>530023	4P 3W SLIDE SWITCH	1
->>543508	SHORTING LINK (IDC)	2

CA1500US

CA1500 115V

->007913	CA1500 PCB 9335 VU/SS/O/P	-1
->>001003	1K .25W RESISTOR	1
->>001300	ORO SHORTING LINK	1
->>001305	2K2 5% RESISTOR	2
->>001306	10K 5% RESISTOR	3
->>001311	470R 5% RESISTOR	2
->>001327	1K 5% RESISTOR	4
->>002013	10UF 50V CAPACITOR	2
->>002401	22NF 400V 10MM	2
->>002402	220NF 250V 15MM DIPPED POL	2
->>003011	5V1 .5W ZENER DIODE	1
->>003022	3mm GREEN LED	7
->>003031	SURGE GUARD SCK20-10-8A	1
->>003033	3mm LED RED	4
->>003503	BC847B TRANSISTOR	1
->>003805	LB1413 BARGRAPH DRIVER	2
->>004113	10K VERTICAL PRESET	2
->>004110	B10K 27.5MM POT	2
->>005047	16A 24V RELAY	1
->>005072	3 WAY 90 DEGREE LOCKING HE	4
->>005062	6W 90o LOCKING HEADER	1
->>005657	LED SPACER 12.7mm	2
->>005686	4.8MM TERMINAL SPADE	4
->>009335	PCB ISSUE 3	1
->>543508	SHORTING LINK (IDC)	2
->>571014	10 TURN CHOKE	2