

LAB.GRUPPEN

IP450

SERVICE MANUAL

Version 2

Lab.gruppen AB
Gullregnsvägen 16, SE-434 44 KUNGSBACKA, SWEDEN
Phone: +46 300 56 28 00
Fax: +46 300 56 28 99
info@labgruppen.com
www.labgruppen.com

iP450

Internal connections	2
Component list	3
Variant specific components	3
Description for variant dependent components	3
Sparepart list for iP450	4

A02H

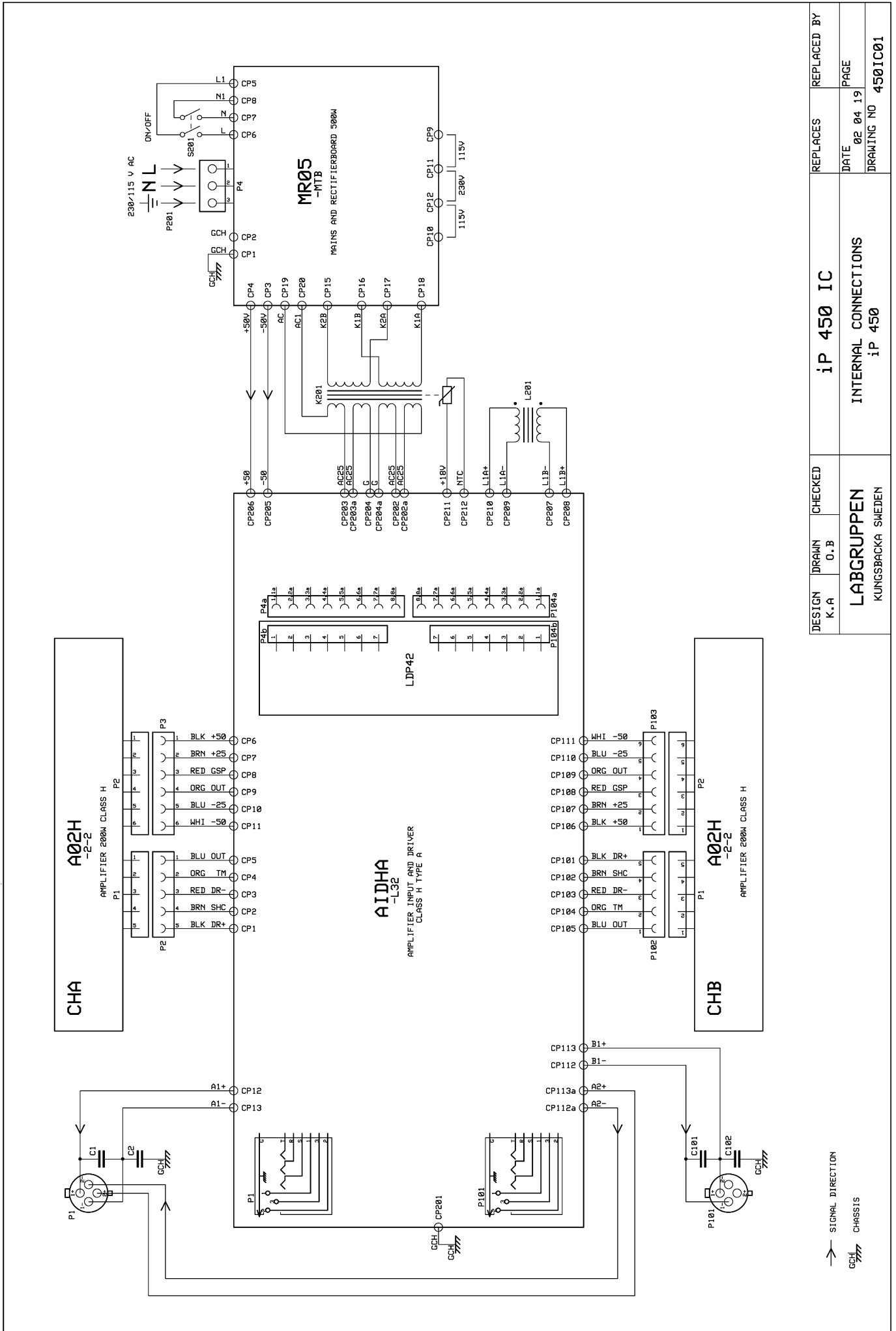
Schematics for A02H	2
Board placement for A02H	3
Component list for A02H-2-2 - rev 03A	4

AIDHA

Schematics for AIDHA	2
Board placement for AIDHA	3
Component list for LDP42, AIDHA - rev 03A	4
Variant specific components	9
Description for variant dependent components	10

MR05

Schematics for MR05	2
Board placement for MR05	3
Component list for MR05 - rev 02A	4
Variant specific components	4
Description for variant dependent components	4



DESIGN K.A	DRAWN O.B	CHECKED	REPLACES iP 450 IC	REPLACED BY
LABGRUPPEN KUNGSBACKA SWEDEN			INTERNAL CONNECTIONS iP 450	DATE 02 04 19
			DRAWING NO 450IC01	PAGE

→ SIGNAL DIRECTION
 CHASSIS

Component list

⚠ - Safety critical component. Should only be replaced with the specified type.

	Position	Partnumber	Description	Comment
	C1	680p400VK20005%5	Capacitor ceramic 680p 400V K2000 5% 5mm	
	C2	100n63VMMK5	Capacitor polyester 100n 63V MMK 5mm	
	C101	680p400VK20005%5	Capacitor ceramic 680p 400V K2000 5% 5mm	
	C102	100n63VMMK5	Capacitor polyester 100n 63V MMK 5mm	
⚠	K201	K45TOd165h35_LAB	Transformer 450W toridial dy165mm h 35mm LAB. Rev01	
⚠	L201	2x1mH8Ad58h27	Inductor 1mH ironcoil TOROID TI-01027	
⚠	P1	NL4MP_NEU	Connector speakon 4pole NEUTRIK NL4MP	
	P2	SOIDC5P3.96_AMP	Socket IDC 5pole 3.96mm AMP 640427-5	
	P3	SOIDC6P3.96_AMP	Socket IDC 6pole 3.96mm AMP 640427-6	
⚠	P101	NL4MP_NEU	Connector speakon 4pole NEUTRIK NL4MP	
	P102	SOIDC5P3.96_AMP	Socket IDC 5pole 3.96mm AMP 640427-5	
	P103	SOIDC6P3.96_AMP	Socket IDC 6pole 3.96mm AMP 640427-6	
⚠	P201		Variant dependent, see separate list	
⚠	S201	RK2-0-20A25x31	Switch Rocker Double Pole Single Trough on - off 20A 25x31mm	

Variant specific components

	Position	230V	115V
⚠	P201	MLEU3x.752mBLK	MLEU3x1.52.5mBLK

Description for variant dependent components

Partnumber	Description
MLEU3x.752mBLK	Mains lead EU Plug type CEE7/VII 3x.75mm ² 2m Black
MLEU3x1.52.5mBLK	Mains lead EU Plug type CEE7/VII 3x1.5mm ² 2.5m Black

Sparepart list for iP450

Completed modules

Partnumber	Description
A02H-2-2	Amplifier 200W class H, variant 2-2
AIDHA-L32	Amplifier input and driver class H type A, variant L32
LDP42	Led display and gain potentiometer 4 x led 2 channel
MR05-MTB	Mains and rectifierboard 500W, variant MTB

Mecanical parts

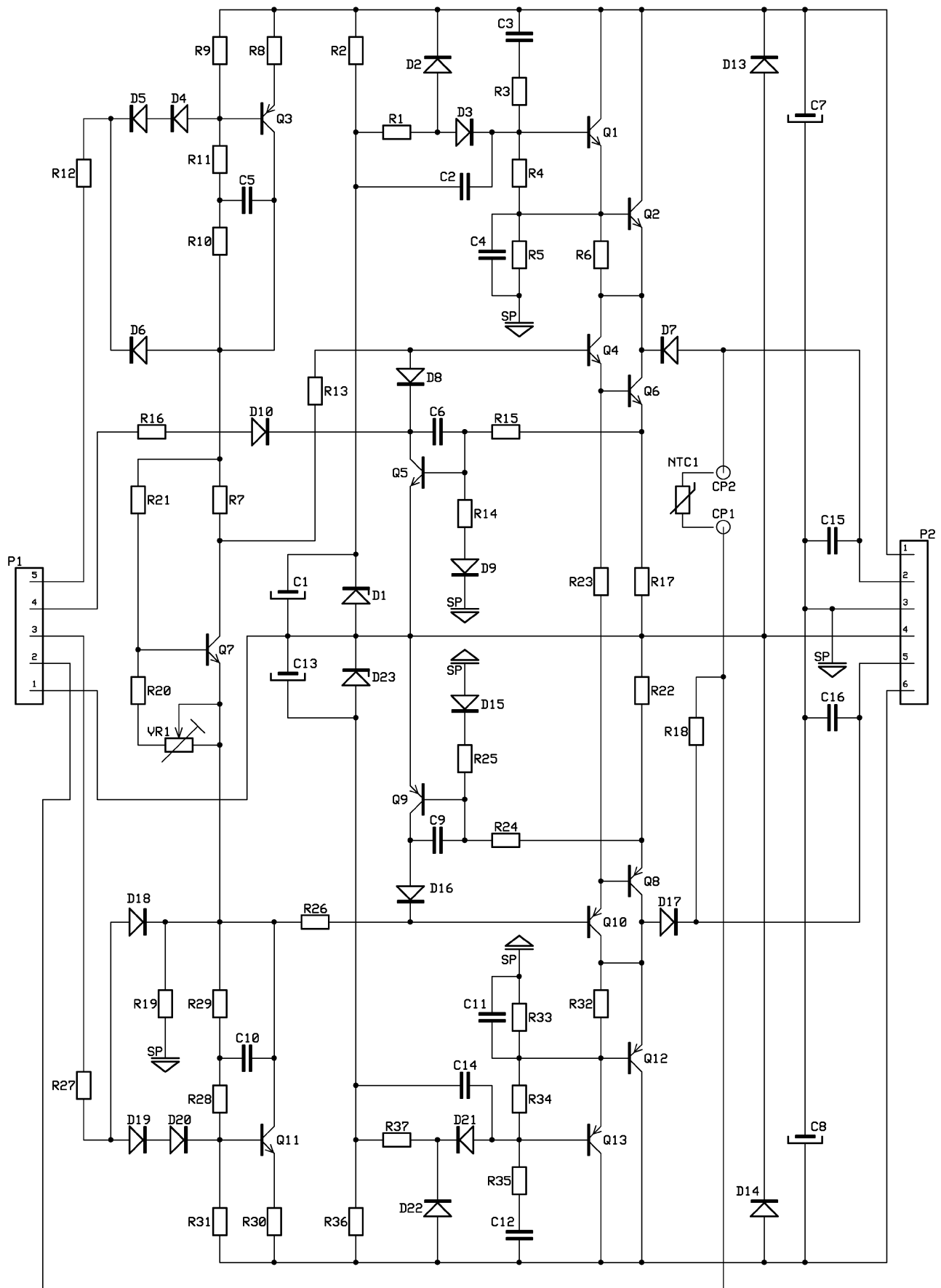
Partnumber	Description
TC04S-PBLK	Top cover
FP-IP450	Front panel
RP-IP450	Rear panel 230V
RP-IP450U	Rear panel 115V
HDL1HEM5_FIS	Handle
KNBD18.5_TAI	Gain potentiometer knob

Screws

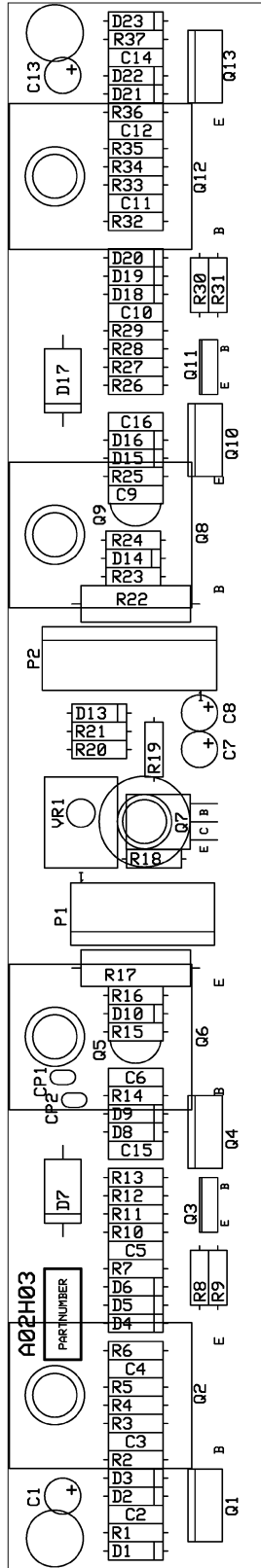
Partnumber	Description
MRX3x10SV	Machine screw, pan head, phillips, M3x10, black
MF3x12SV	Machine screw, countersunk head, phillips, M3x12, black
RXS-HST2.9x6.5SV	Self tapping screw, pan head, phillips, 2.9x6.5mm, black
RXS-HST2.9x13SV	Self tapping screw, pan head, phillips, 2.9x13mm, black
FXS-HST2.9x9.5SV	Self tapping screw, countersunk head, phillips, 2.9x9.5mm, black

A02H

Schematics for A02H	2
Board placement for A02H	3
Component list for A02H-2-2 - rev 03A	4



CON			A02H	REPLACES	REPLACED BY
DESIGN	DRAWN	CHECKED		01 12 14	
K.A	K.A		DATE	PAGE	
			02 03 20		
			DRAWING NO	A02H03	
			AMPLIFIER 200W CLASS H		



DESIGN K.A	DRAWN K.A	CHECKED	A02H		REPLACES Ø1 12 14	REPLACED BY
			AMPLIFIER 200W CLASS H		DATE Ø2 Ø3 20	PAGE
					DRAWING NO	A02H03-P

Component list for A02H-2-2 - rev 03A

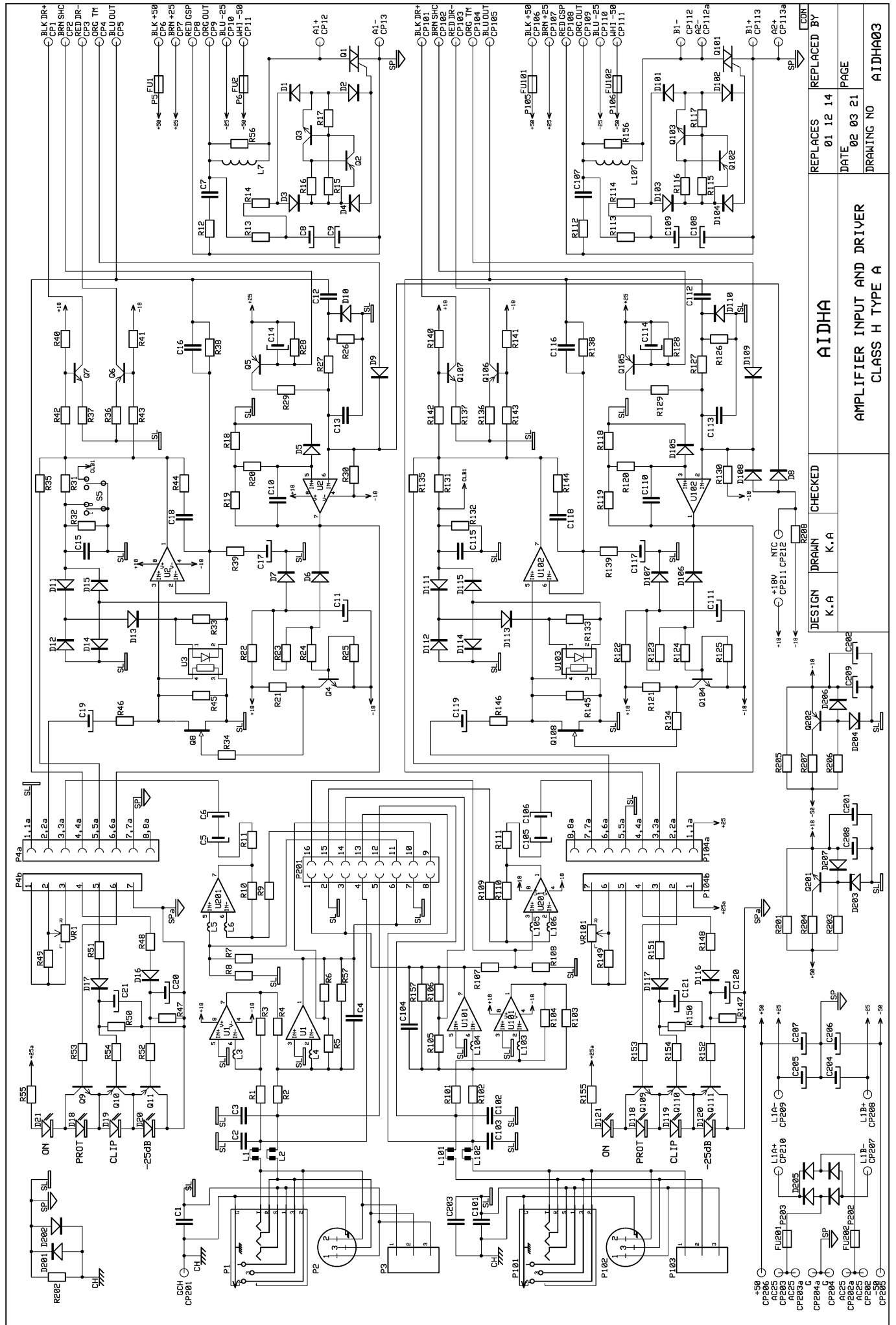
⚠ - Safety critical component. Should only be replaced with the specified type.

	Position	Partnumber	Description	Comment	Side
	C1	100u10V	Capacitor electrolytic 100u 10V 5mm		Top
	C2	2n2250VMMK5	Capacitor polyester 2n2 250V MMK 5mm		Top
	C3	10n250VMMK5	Capacitor polyester 10n 250V MMK 5mm		Top
	C4	15n250VMMK5	Capacitor polyester 15n 250V MMK 5mm		Top
	C5	220p200VNP05%5	Capacitor ceramic 220p 200V NP0 5% 5mm		Top
	C6	10n250VMMK5	Capacitor polyester 10n 250V MMK 5mm		Top
	C7	2u2100V	Capacitor electrolytic 2u2 100V 5mm		Top
	C8	2u2100V	Capacitor electrolytic 2u2 100V 5mm		Top
	C9	10n250VMMK5	Capacitor polyester 10n 250V MMK 5mm		Top
	C10	220p200VNP05%5	Capacitor ceramic 220p 200V NP0 5% 5mm		Top
	C11	15n250VMMK5	Capacitor polyester 15n 250V MMK 5mm		Top
	C12	10n250VMMK5	Capacitor polyester 10n 250V MMK 5mm		Top
	C13	100u10V	Capacitor electrolytic 100u 10V 5mm		Top
	C14	2n2250VMMK5	Capacitor polyester 2n2 250V MMK 5mm		Top
	C15	100n63VMMK5	Capacitor polyester 100n 63V MMK 5mm		Top
	C16	100n63VMMK5	Capacitor polyester 100n 63V MMK 5mm		Top
	D1	8V21.3W5%	Diode zener 8V2 1.3W 5%		Top
	D2	1N4004	Diode power 1N4004		Top
	D3	1N4004	Diode power 1N4004		Top
	D4	1N4148	Diode signal 1N4148		Top
	D5	1N4148	Diode signal 1N4148		Top
	D6	BAV21	Diode signal BAV21		Top
	D7	MR852	Diode power MR852		Top
	D8	BAV21	Diode signal BAV21		Top
	D9	BAV21	Diode signal BAV21		Top
	D10	BAV21	Diode signal BAV21		Top
	D13	1N4004	Diode power 1N4004		Top
	D14	1N4004	Diode power 1N4004		Top
	D15	BAV21	Diode signal BAV21		Top
	D16	BAV21	Diode signal BAV21		Top
	D17	MR852	Diode power MR852		Top
	D18	BAV21	Diode signal BAV21		Top
	D19	1N4148	Diode signal 1N4148		Top
	D20	1N4148	Diode signal 1N4148		Top
	D21	1N4004	Diode power 1N4004		Top
	D22	1N4004	Diode power 1N4004		Top
	D23	8V21.3W5%	Diode zener 8V2 1.3W 5%		Top
	NTC1	NTC220K_BCC_TX	Resistor NTC 220K BCC 232264063224		Top
	P1	PH5PL3.96 AMP	Pin header PCB 5pole locking 3.96mm AMP 640445-5		Top
	P2	PH6PL3.96 AMP	Pin header PCB 6pole locking 3.96mm AMP 640445-6		Top
	Q1	MJE15030	Transistor bipolar power MJE15030		Top
	Q2	MJL3281LY	Transistor bipolar power MJL3281 lying	May have different value	Top
	Q3	MJE350	Transistor bipolar power MJE350		Top
	Q4	MJE15030	Transistor bipolar power MJE15030		Top
	Q5	MPSA42	Transistor bipolar signal MPSA42		Top
	Q6	MJL3281LY	Transistor bipolar power MJL3281 lying	May have different value	Top
	Q7	BD329LYb	Transistor bipolar power BD329 lying		Top
	Q8	MJL1302LY	Transistor bipolar power MJL1302 lying	May have different value	Top
	Q9	MPSA92	Transistor bipolar signal MPSA92		Top

	Position	Partnumber	Description	Comment	Side
	Q10	MJE15031	Transistor bipolar power MJE15031		Top
	Q11	MJE340	Transistor bipolar power MJE340		Top
	Q12	MJL1302LY	Transistor bipolar power MJL1302 lying	May have different value	Top
	Q13	MJE15031	Transistor bipolar power MJE15031		Top
	R1	22R.25W5%	Resistor Carbon Film 22R.25W5%		Top
	R2	3K91W5%SO5	Resistor metal film 3K9 1W 5% 5mm stand off		Top
	R3	15R.25W5%	Resistor Carbon Film 15R.25W5%		Top
	R4	390R.7W1%	Resistor Metal Film 390R.7W1%		Top
	R5	2K7.7W1%	Resistor Metal Film 2K7.7W1%		Top
	R6	470R.7W1%	Resistor Metal Film 470R.7W1%		Top
	R7	33R.25W5%	Resistor Carbon Film 33R.25W5%		Top
	R8	47R.25W5%	Resistor Carbon Film 47R.25W5%		Top
	R9	1K.7W1%	Resistor Metal Film 1K.7W1%		Top
	R10	220K.7W1%	Resistor Metal Film 220K.7W1%		Top
	R11	820R.7W1%	Resistor Metal Film 820R.7W1%		Top
	R12	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R13	15R.25W5%	Resistor Carbon Film 15R.25W5%		Top
	R14	3K3.7W1%	Resistor Metal Film 3K3.7W1%		Top
	R15	180R.7W1%	Resistor Metal Film 180R.7W1%		Top
	R16	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R17	R054W10%	Resistor wirewound R05 4W 10%		Top
	R18	12K.7W1%	Resistor Metal Film 12K.7W1%		Top
	R19	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R20	560R.7W1%	Resistor Metal Film 560R.7W1%		Top
	R21	1K8.7W1%	Resistor Metal Film 1K8.7W1%		Top
	R22	R054W10%	Resistor wirewound R05 4W 10%		Top
	R23	100R.7W1%	Resistor Metal Film 100R.7W1%		Top
	R24	180R.7W1%	Resistor Metal Film 180R.7W1%		Top
	R25	3K3.7W1%	Resistor Metal Film 3K3.7W1%		Top
	R26	47R.25W5%	Resistor Carbon Film 47R.25W5%		Top
	R27	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R28	820R.7W1%	Resistor Metal Film 820R.7W1%		Top
	R29	220K.7W1%	Resistor Metal Film 220K.7W1%		Top
	R30	47R.25W5%	Resistor Carbon Film 47R.25W5%		Top
	R31	1K.7W1%	Resistor Metal Film 1K.7W1%		Top
	R32	470R.7W1%	Resistor Metal Film 470R.7W1%		Top
	R33	2K7.7W1%	Resistor Metal Film 2K7.7W1%		Top
	R34	390R.7W1%	Resistor Metal Film 390R.7W1%		Top
	R35	15R.25W5%	Resistor Carbon Film 15R.25W5%		Top
	R36	3K91W5%SO5	Resistor metal film 3K9 1W 5% 5mm stand off		Top
	R37	22R.25W5%	Resistor Carbon Film 22R.25W5%		Top
	VR1	VR220RLY2X3M	Trim potentiometer 220R lying 2x3modules		Top

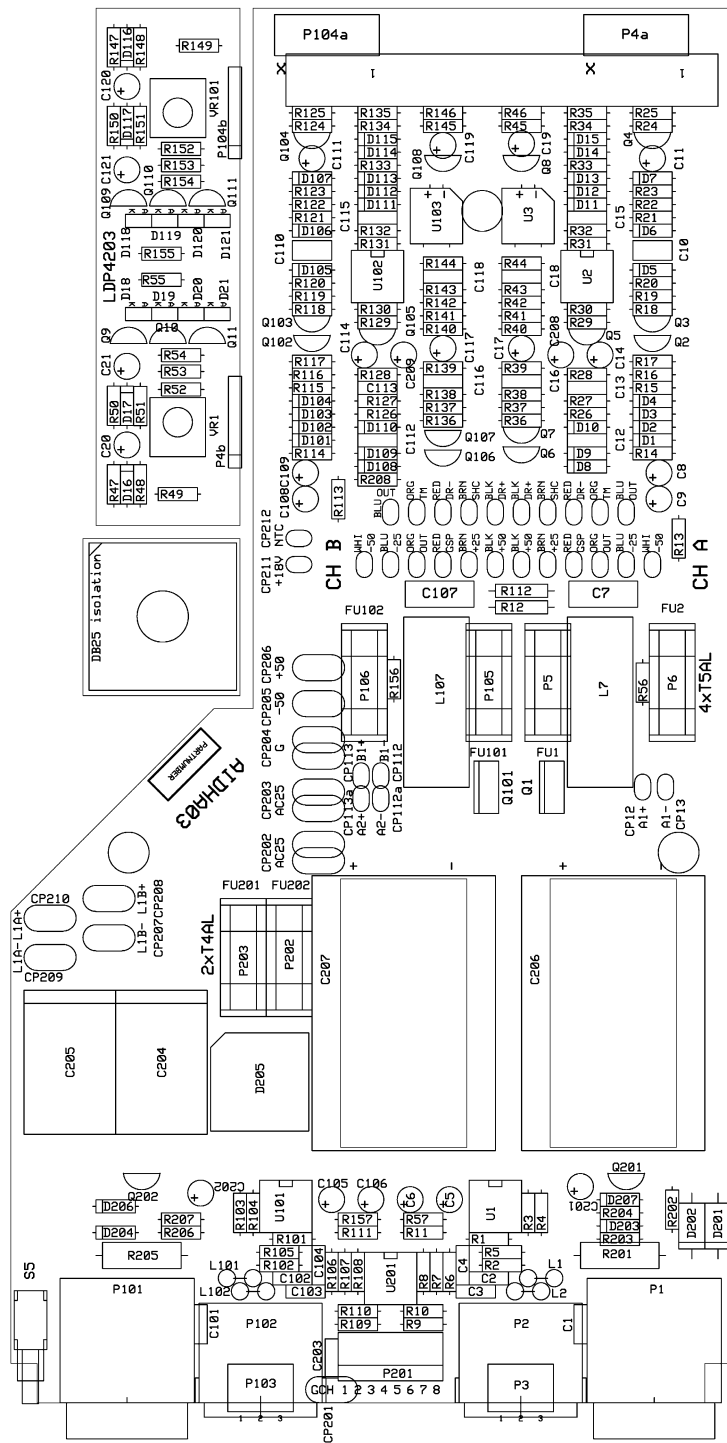
AIDHA

Schematics for AIDHA	2
Board placement for AIDHA	3
Component list for LDP42, AIDHA - rev 03A	4
Variant specific components	9
Description for variant dependent components	10



DESIGN		DRAWN		CHECKED		REPLACES		REPLACED BY	
K. A		K. A		K. A		Ø1 12 14		Ø1 12 14	
K. A		K. A		K. A		DATE		DATE	
K. A		K. A		K. A		Ø2 03 21		Ø2 03 21	
K. A		K. A		K. A		DRAWING NO		DRAWING NO	
K. A		K. A		K. A		AIDHA03		AIDHA03	

AIDHA
AMPLIFIER INPUT AND DRIVER
CLASS H TYPE A



DESIGN K.A	DRAWN K.A	CHECKED	AIDHA	REPLACES Ø1 12 14	REPLACED BY
			AMPLIFIER INPUT AND DRIVER CLASS H TYPE A	DATE Ø2 03 21	PAGE
				DRAWING NO	AIDHA03-P

Component list for LDP42, AIDHA - rev 03A

⚠ - Safety critical component. Should only be replaced with the specified type.

	Position	Partnumber	Description	Comment	Side
	C1	100n63VMMK5	Capacitor polyester 100n 63V MMK 5mm		Top
	C2	22p200VNP05%5	Capacitor ceramic 22p 200V NP0 5% 5mm		Top
	C3	22p200VNP05%5	Capacitor ceramic 22p 200V NP0 5% 5mm		Top
	C4	22p200VNP05%5	Capacitor ceramic 22p 200V NP0 5% 5mm		Top
	C5	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C6	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C7	100n250VMMK10	Capacitor polyester 100n 250V MMK 10mm		Top
	C8	4u750V	Capacitor electrolytic 4u7 50V 5mm		Top
	C9	4u750V	Capacitor electrolytic 4u7 50V 5mm		Top
	C10	220n63VMMK5	Capacitor polyester 220n 63V MMK 5mm		Top
	C11	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C12	68p200VNP05%5	Capacitor ceramic 68p 200V NP0 5% 5mm		Top
	C13	10n250VMMK5	Capacitor polyester 10n 250V MMK 5mm		Top
	C14	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C15	470p200VNP05%5	Capacitor ceramic 470p 200V NP0 5% 5mm		Top
	C16	68p200VNP05%5	Capacitor ceramic 68p 200V NP0 5% 5mm		Top
	C17	220u16V	Capacitor electrolytic 220u 16V 5mm		Top
	C18	82p100VNP05%5	Capacitor ceramic 82p 100V NP0 5% 5mm		Top
	C19	4u750V	Capacitor electrolytic 4u7 50V 5mm		Top
	C20		Variant dependent, see separate list		Top
	C21		Variant dependent, see separate list		Top
	C101	100n63VMMK5	Capacitor polyester 100n 63V MMK 5mm		Top
	C102	22p200VNP05%5	Capacitor ceramic 22p 200V NP0 5% 5mm		Top
	C103	22p200VNP05%5	Capacitor ceramic 22p 200V NP0 5% 5mm		Top
	C104	22p200VNP05%5	Capacitor ceramic 22p 200V NP0 5% 5mm		Top
	C105	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C106	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C107	100n250VMMK10	Capacitor polyester 100n 250V MMK 10mm		Top
	C108	4u750V	Capacitor electrolytic 4u7 50V 5mm		Top
	C109	4u750V	Capacitor electrolytic 4u7 50V 5mm		Top
	C110	220n63VMMK5	Capacitor polyester 220n 63V MMK 5mm		Top
	C111	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C112	68p200VNP05%5	Capacitor ceramic 68p 200V NP0 5% 5mm		Top
	C113	10n250VMMK5	Capacitor polyester 10n 250V MMK 5mm		Top
	C114	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C115	470p200VNP05%5	Capacitor ceramic 470p 200V NP0 5% 5mm		Top
	C116	68p200VNP05%5	Capacitor ceramic 68p 200V NP0 5% 5mm		Top
	C117	220u16V	Capacitor electrolytic 220u 16V 5mm		Top
	C118	82p100VNP05%5	Capacitor ceramic 82p 100V NP0 5% 5mm		Top
	C119	4u750V	Capacitor electrolytic 4u7 50V 5mm		Top
	C120		Variant dependent, see separate list		Top
	C121		Variant dependent, see separate list		Top
	C201	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C202	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C203	100n50VY5W5%5	Capacitor ceramic 100n 50V Y5W 5% 5mm		Top
	C204	2200u40V18x30A	Capacitor electrolytic 2200u 40V 18x30mm axial		Top
	C205	2200u40V18x30A	Capacitor electrolytic 2200u 40V 18x30mm axial		Top
	C206	10000u63V35X45LY	Capacitor electrolytic 10000u 63V 35x45mm snap in lying		Top
	C207	10000u63V35X45LY	Capacitor electrolytic 10000u 63V 35x45mm snap in lying		Top
	C208	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	C209	22u50V	Capacitor electrolytic 22u 50V 5mm		Top
	D1	1N4148	Diode signal 1N4148		Top

	Position	Partnumber	Description	Comment	Side
	D2	1N4148	Diode signal 1N4148		Top
	D3	1N4148	Diode signal 1N4148		Top
	D4	1N4148	Diode signal 1N4148		Top
	D5	1N4148	Diode signal 1N4148		Top
	D6	1N4148	Diode signal 1N4148		Top
	D7	1N4148	Diode signal 1N4148		Top
	D8	1N4148	Diode signal 1N4148		Top
	D9	1N4148	Diode signal 1N4148		Top
	D10	1N4148	Diode signal 1N4148		Top
	D11	1N4148	Diode signal 1N4148		Top
	D12	1N4148	Diode signal 1N4148		Top
	D13	1N4148	Diode signal 1N4148		Top
	D14	1N4148	Diode signal 1N4148		Top
	D15	1N4148	Diode signal 1N4148		Top
	D16		Variant dependent, see separate list		Top
	D17		Variant dependent, see separate list		Top
	D18		Variant dependent, see separate list		Top
	D19		Variant dependent, see separate list		Top
	D20		Variant dependent, see separate list		Top
	D21		Variant dependent, see separate list		Top
	D101	1N4148	Diode signal 1N4148		Top
	D102	1N4148	Diode signal 1N4148		Top
	D103	1N4148	Diode signal 1N4148		Top
	D104	1N4148	Diode signal 1N4148		Top
	D105	1N4148	Diode signal 1N4148		Top
	D106	1N4148	Diode signal 1N4148		Top
	D107	1N4148	Diode signal 1N4148		Top
	D108	1N4148	Diode signal 1N4148		Top
	D109	1N4148	Diode signal 1N4148		Top
	D110	1N4148	Diode signal 1N4148		Top
	D111	1N4148	Diode signal 1N4148		Top
	D112	1N4148	Diode signal 1N4148		Top
	D113	1N4148	Diode signal 1N4148		Top
	D114	1N4148	Diode signal 1N4148		Top
	D115	1N4148	Diode signal 1N4148		Top
	D116		Variant dependent, see separate list		Top
	D117		Variant dependent, see separate list		Top
	D118		Variant dependent, see separate list		Top
	D119		Variant dependent, see separate list		Top
	D120		Variant dependent, see separate list		Top
	D121		Variant dependent, see separate list		Top
	D201	1N5404	Diode power 1N5404		Top
	D202	1N5404	Diode power 1N5404		Top
	D203	18V1.3W5%	Diode zener 18V 1.3W 5%		Top
	D204	18V1.3W5%	Diode zener 18V 1.3W 5%		Top
	D205	PBC10-04	Diode bridge PBC10-04		Top
	D206	1N4148	Diode signal 1N4148		Top
	D207	1N4148	Diode signal 1N4148		Top
⚠	FU1	T5A250-5x20	Fuse slow blow 5A 250V 5x20mm		Top
⚠	FU2	T5A250-5x20	Fuse slow blow 5A 250V 5x20mm		Top
⚠	FU101	T5A250-5x20	Fuse slow blow 5A 250V 5x20mm		Top
⚠	FU102	T5A250-5x20	Fuse slow blow 5A 250V 5x20mm		Top
⚠	FU201	T4A250-5x20	Fuse slow blow 4A 250V 5x20mm		Top
⚠	FU202	T4A250-5x20	Fuse slow blow 4A 250V 5x20mm		Top

	Position	Partnumber	Description	Comment	Side
	L1	L2xBEAD2M	Inductor bead double 2 modules		Top
	L2	L2xBEAD2M	Inductor bead double 2 modules		Top
	L7	1u2HD1.4_LAB	Inductor 1,2uH axial LAB. Rev 01		Top
	L101	L2xBEAD2M	Inductor bead double 2 modules		Top
	L102	L2xBEAD2M	Inductor bead double 2 modules		Top
	L107	1u2HD1.4_LAB	Inductor 1,2uH axial LAB. Rev 01		Top
	P1	NCJ6FI-H_NEU	Connector XLR/J 3pole female+jack 90dg NEUTRIK NCJ6FI-H		Top
	P2	-	Not used		Top
	P3		Variant dependent, see separate list		Top
	P4a	SO8P901M	Socket 8pole 90dg 1module		Top
	P4b		Variant dependent, see separate list		Top
	P5	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	P6	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	P101	NCJ6FI-H_NEU	Connector XLR/J 3pole female+jack 90dg NEUTRIK NCJ6FI-H		Top
	P102	-	Not used		Top
	P103		Variant dependent, see separate list		Top
	P104a	SO8P901M	Socket 8pole 90dg 1module		Top
	P104b		Variant dependent, see separate list		Top
	P105	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	P106	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	P201	DI16P901M_PRE	Dil socket 16pole 90dg 1 module PRECI-DIP 299-93-316-11-001		Top
	P202	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	P203	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	Q1	Q6015L5	Triac Q6015L5		Top
	Q2	BC557B	Transistor bipolar signal BC557B		Top
	Q3	BC547B	Transistor bipolar signal BC547B		Top
	Q4	BC547B	Transistor bipolar signal BC547B		Top
	Q5	BC557B	Transistor bipolar signal BC557B		Top
	Q6	MPSA92	Transistor bipolar signal MPSA92		Top
	Q7	MPSA42	Transistor bipolar signal MPSA42		Top
	Q8	2N5457	Transistor Jfet signal 2N5457		Top
	Q9		Variant dependent, see separate list		Top
	Q10		Variant dependent, see separate list		Top
	Q11		Variant dependent, see separate list		Top
	Q101	Q6015L5	Triac Q6015L5		Top
	Q102	BC557B	Transistor bipolar signal BC557B		Top
	Q103	BC547B	Transistor bipolar signal BC547B		Top
	Q104	BC547B	Transistor bipolar signal BC547B		Top
	Q105	BC557B	Transistor bipolar signal BC557B		Top
	Q106	MPSA92	Transistor bipolar signal MPSA92		Top
	Q107	MPSA42	Transistor bipolar signal MPSA42		Top
	Q108	2N5457	Transistor Jfet signal 2N5457		Top
	Q109		Variant dependent, see separate list		Top
	Q110		Variant dependent, see separate list		Top
	Q111		Variant dependent, see separate list		Top
	Q201	MPSA42	Transistor bipolar signal MPSA42		Top
	Q202	MPSA92	Transistor bipolar signal MPSA92		Top
	R1	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R2	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R3	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R4	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R5	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R6	30K.7W1%	Resistor Metal Film 30K.7W1%		Top
	R7	2K.7W1%	Resistor Metal Film 2K.7W1%		Top
	R8	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top

	Position	Partnumber	Description	Comment	Side
	R9	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R10	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R11	47R.25W5%	Resistor Carbon Film 47R.25W5%		Top
	R12	2R22W5%	Resistor metal film 2R2 2W 5%		Top
	R13	220K.7W1%	Resistor Metal Film 220K.7W1%		Top
	R14	47R.25W5%	Resistor Carbon Film 47R.25W5%		Top
	R15	390K.7W1%	Resistor Metal Film 390K.7W1%		Top
	R16	22K.7W1%	Resistor Metal Film 22K.7W1%		Top
	R17	22K.7W1%	Resistor Metal Film 22K.7W1%		Top
	R18	120K.7W1%	Resistor Metal Film 120K.7W1%		Top
	R19	4M7.25W5%	Resistor Carbon Film 4M7.25W5%		Top
	R20	4M7.25W5%	Resistor Carbon Film 4M7.25W5%		Top
	R21	150K.7W1%	Resistor Metal Film 150K.7W1%		Top
	R22	330K.7W1%	Resistor Metal Film 330K.7W1%		Top
	R23	150R.7W1%	Resistor Metal Film 150R.7W1%		Top
	R24	150K.7W1%	Resistor Metal Film 150K.7W1%		Top
	R25	19K6.7W1%	Resistor Metal Film 19K6.7W1%		Top
	R26	33K.7W1%	Resistor Metal Film 33K.7W1%		Top
	R27	680K.7W1%	Resistor Metal Film 680K.7W1%		Top
	R28	33K.7W1%	Resistor Metal Film 33K.7W1%		Top
	R29	33K.7W1%	Resistor Metal Film 33K.7W1%		Top
	R30	4M7.25W5%	Resistor Carbon Film 4M7.25W5%		Top
	R31	2K2.7W1%	Resistor Metal Film 2K2.7W1%		Top
	R32	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R33	330K.7W1%	Resistor Metal Film 330K.7W1%		Top
	R34	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R35	100R.7W1%	Resistor Metal Film 100R.7W1%		Top
	R36	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R37	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R38	22K6.7W1%	Resistor Metal Film 22K6.7W1%		Top
	R39	620R.7W1%	Resistor Metal Film 620R.7W1%		Top
	R40	12K.7W1%	Resistor Metal Film 12K.7W1%		Top
	R41	12K.7W1%	Resistor Metal Film 12K.7W1%		Top
	R42	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R43	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R44	2K2.7W1%	Resistor Metal Film 2K2.7W1%		Top
	R45	22K.7W1%	Resistor Metal Film 22K.7W1%		Top
	R46	34K.7W1%	Resistor Metal Film 34K.7W1%		Top
	R47		Variant dependent, see separate list		Top
	R48		Variant dependent, see separate list		Top
	R49		Variant dependent, see separate list		Top
	R50		Variant dependent, see separate list		Top
	R51		Variant dependent, see separate list		Top
	R52		Variant dependent, see separate list		Top
	R53		Variant dependent, see separate list		Top
	R54		Variant dependent, see separate list		Top
	R55		Variant dependent, see separate list		Top
	R56	10R.7W1%	Resistor Metal Film 10R.7W1%		Top
	R57		Variant dependent, see separate list		Top
	R101	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R102	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R103	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R104	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R105	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R106	30K.7W1%	Resistor Metal Film 30K.7W1%		Top

	Position	Partnumber	Description	Comment	Side
	R107	2K.7W1%	Resistor Metal Film 2K.7W1%		Top
	R108	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R109	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R110	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R111	47R.25W5%	Resistor Carbon Film 47R.25W5%		Top
	R112	2R22W5%	Resistor metal film 2R2 2W 5%		Top
	R113	220K.7W1%	Resistor Metal Film 220K.7W1%		Top
	R114	47R.25W5%	Resistor Carbon Film 47R.25W5%		Top
	R115	390K.7W1%	Resistor Metal Film 390K.7W1%		Top
	R116	22K.7W1%	Resistor Metal Film 22K.7W1%		Top
	R117	22K.7W1%	Resistor Metal Film 22K.7W1%		Top
	R118	120K.7W1%	Resistor Metal Film 120K.7W1%		Top
	R119	4M7.25W5%	Resistor Carbon Film 4M7.25W5%		Top
	R120	4M7.25W5%	Resistor Carbon Film 4M7.25W5%		Top
	R121	150K.7W1%	Resistor Metal Film 150K.7W1%		Top
	R122	330K.7W1%	Resistor Metal Film 330K.7W1%		Top
	R123	150R.7W1%	Resistor Metal Film 150R.7W1%		Top
	R124	150K.7W1%	Resistor Metal Film 150K.7W1%		Top
	R125	19K6.7W1%	Resistor Metal Film 19K6.7W1%		Top
	R126	33K.7W1%	Resistor Metal Film 33K.7W1%		Top
	R127	680K.7W1%	Resistor Metal Film 680K.7W1%		Top
	R128	33K.7W1%	Resistor Metal Film 33K.7W1%		Top
	R129	33K.7W1%	Resistor Metal Film 33K.7W1%		Top
	R130	4M7.25W5%	Resistor Carbon Film 4M7.25W5%		Top
	R131	2K2.7W1%	Resistor Metal Film 2K2.7W1%		Top
	R132	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R133	330K.7W1%	Resistor Metal Film 330K.7W1%		Top
	R134	4K7.7W1%	Resistor Metal Film 4K7.7W1%		Top
	R135	100R.7W1%	Resistor Metal Film 100R.7W1%		Top
	R136	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R137	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R138	22K6.7W1%	Resistor Metal Film 22K6.7W1%		Top
	R139	620R.7W1%	Resistor Metal Film 620R.7W1%		Top
	R140	12K.7W1%	Resistor Metal Film 12K.7W1%		Top
	R141	12K.7W1%	Resistor Metal Film 12K.7W1%		Top
	R142	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R143	1K5.7W1%	Resistor Metal Film 1K5.7W1%		Top
	R144	2K2.7W1%	Resistor Metal Film 2K2.7W1%		Top
	R145	22K.7W1%	Resistor Metal Film 22K.7W1%		Top
	R146	34K.7W1%	Resistor Metal Film 34K.7W1%		Top
	R147		Variant dependent, see separate list		Top
	R148		Variant dependent, see separate list		Top
	R149		Variant dependent, see separate list		Top
	R150		Variant dependent, see separate list		Top
	R151		Variant dependent, see separate list		Top
	R152		Variant dependent, see separate list		Top
	R153		Variant dependent, see separate list		Top
	R154		Variant dependent, see separate list		Top
	R155		Variant dependent, see separate list		Top
	R156	10R.7W1%	Resistor Metal Film 10R.7W1%		Top
	R157		Variant dependent, see separate list		Top
	R201	1K53W5%	Resistor metal film 1K5 3W 5%		Top
	R202	10R.7W1%	Resistor Metal Film 10R.7W1%		Top
	R203	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R204	100R.7W1%	Resistor Metal Film 100R.7W1%		Top

	Position	Partnumber	Description	Comment	Side
	R205	1K53W5%	Resistor metal film 1K5 3W 5%		Top
	R206	10K.7W1%	Resistor Metal Film 10K.7W1%		Top
	R207	100R.7W1%	Resistor Metal Film 100R.7W1%		Top
	R208	5K62.7W1%	Resistor Metal Film 5K62.7W1%		Top
	S5	SPPJ32F29A_ALP	Switch inter locking PCB DPDT ALPS SPPJ32F29A		Top
	U1	MC33078	IC Operational amplifier MC33078		Top
	U2	LF353	IC Operational amplifier LF353		Top
	U3	VTL5C4	IC photocoupler VTL5C4		Top
	U101	MC33078	IC Operational amplifier MC33078		Top
	U102	LF353	IC Operational amplifier LF353		Top
	U103	VTL5C4	IC photocoupler VTL5C4		Top
	U201	NE5532	IC Operational amplifier NE5532		Top
	VR1		Variant dependent, see separate list		Top
	VR101		Variant dependent, see separate list		Top

Variant specific components

	Position	AIDHA-L32	AIDHA-L30	AIDHA-30
	C20	1u50V	1u50V	-
	C21	1u50V	1u50V	-
	C120	1u50V	1u50V	-
	C121	1u50V	1u50V	-
	D16	1N4148	1N4148	-
	D17	1N4148	1N4148	-
	D18	LYEL2.5X5	LYEL2.5X5	-
	D19	LRED2.5X5	LRED2.5X5	-
	D20	LGRN2.5X5	LGRN2.5X5	-
	D21	LGRN2.5X5	LGRN2.5X5	-
	D116	1N4148	1N4148	-
	D117	1N4148	1N4148	-
	D118	LYEL2.5X5	LYEL2.5X5	-
	D119	LRED2.5X5	LRED2.5X5	-
	D120	LGRN2.5X5	LGRN2.5X5	-
	D121	LGRN2.5X5	LGRN2.5X5	-
	P3	TBPI3P90M_SAU	-	-
	P4b	PH7P1M	PH7P1M	-
	P103	TBPI3P90M_SAU	-	-
	P104b	PH7P1M	PH7P1M	-
	Q9	BC547B	BC547B	-
	Q10	BC557B	BC557B	-
	Q11	BC557B	BC557B	-
	Q109	BC547B	BC547B	-
	Q110	BC557B	BC557B	-
	Q111	BC557B	BC557B	-
	R47	33K.7W1%	33K.7W1%	-
	R48	8K2.7W1%	8K2.7W1%	-
	R49	4K32.7W1%	4K32.7W1%	-
	R50	33K.7W1%	33K.7W1%	-
	R51	2K2.7W1%	2K2.7W1%	-
	R52	2K2.7W1%	2K2.7W1%	-
	R53	68K.7W1%	68K.7W1%	-
	R54	2K2.7W1%	2K2.7W1%	-

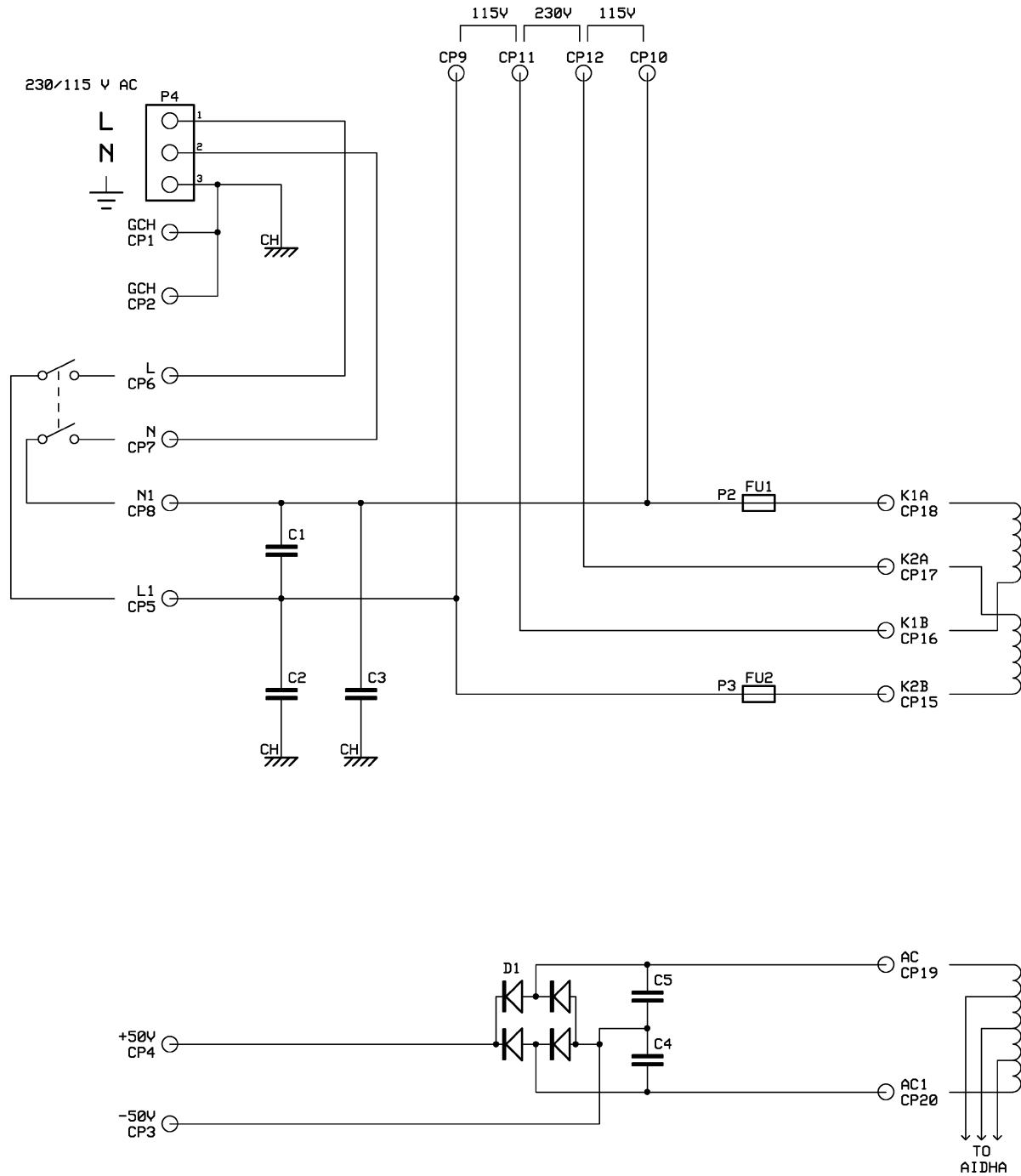
	Position	AIDHA-L32	AIDHA-L30	AIDHA-30
	R55	2K71W5%	2K71W5%	-
	R57	-	150K.7W1%	150K.7W1%
	R147	33K.7W1%	33K.7W1%	-
	R148	8K2.7W1%	8K2.7W1%	-
	R149	4K32.7W1%	4K32.7W1%	-
	R150	33K.7W1%	33K.7W1%	-
	R151	2K2.7W1%	2K2.7W1%	-
	R152	2K2.7W1%	2K2.7W1%	-
	R153	68K.7W1%	68K.7W1%	-
	R154	2K2.7W1%	2K2.7W1%	-
	R155	2K71W5%	2K71W5%	-
	R157	-	150K.7W1%	150K.7W1%
	VR1	VR10KLIN31_TOK	VR10KLIN31_TOK	-
	VR101	VR10KLIN31_TOK	VR10KLIN31_TOK	-

Description for variant dependent components

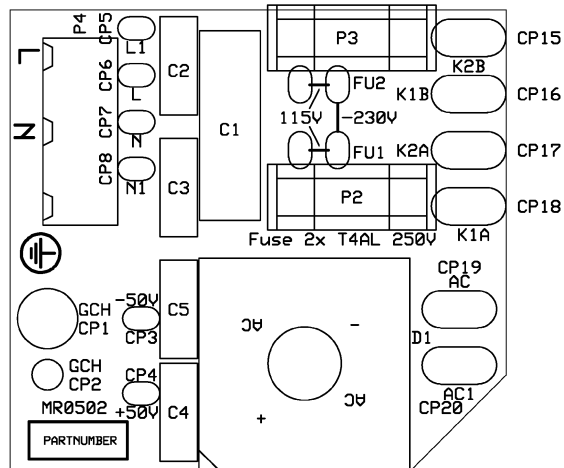
Partnumber	Description
150K.7W1%	Resistor Metal Film 150K.7W1%
1N4148	Diode signal 1N4148
1u50V	Capacitor electrolytic 1u 50V 5mm
2K2.7W1%	Resistor Metal Film 2K2.7W1%
2K71W5%	Resistor metal film 2K7 1W 5%
33K.7W1%	Resistor Metal Film 33K.7W1%
4K32.7W1%	Resistor Metal Film 4K32.7W1%
68K.7W1%	Resistor Metal Film 68K.7W1%
8K2.7W1%	Resistor Metal Film 8K2.7W1%
BC547B	Transistor bipolar signal BC547B
BC557B	Transistor bipolar signal BC557B
LGRN2.5X5	Diode LED Green 2.5x5mm
LRED2.5X5	Diode LED Red 2.5x5mm
LYEL2.5X5	Diode LED Yellow 2.5x5mm
PH7P1M	Pin header 7pole 1module
TBPI3P90M_SAU	Terminal block plug in 3pole 90dg male 3.81mm Sauro CTM039PT
VR10KLIN31_TOK	Potentiometer 10K LIN 31step TOKOS B103 TP96N08 Y4929 Rev1

MR05

Schematics for MR05.....	2
Board placement for MR05.....	3
Component list for MR05 - rev 02A	4
Variant specific components	4
Description for variant dependent components.....	4



CON					
DESIGN K.A	DRAWN K.A	CHECKED	MR05		REPLACES 01 11 16
			MAINS AND RECTIFIERBOARD 500W		DATE 02 03 19
					DRAWING NO MR0502
					REPLACED BY
					PAGE



DESIGN K.A	DRAWN K.A	CHECKED	MR05	REPLACES 01 11 16	REPLACED BY
				DATE 02 03 19	PAGE
			MAINS AND RECTIFIERBOARD 500W		

Component list for MR05 - rev 02A

⚠ - Safety critical component. Should only be replaced with the specified type.

	Position	Partnumber	Description	Comment	Side
⚠	C1	u22X22.5	Capacitor 220n X2 metallized propylene 22.5mm		Top
⚠	C2	2n2Y10	Capacitor 2n2 Y2 metallized paper 10mm		Top
⚠	C3	2n2Y10	Capacitor 2n2 Y2 metallized paper 10mm		Top
	C4	100n250VMMK10	Capacitor polyester 100n 250V MMK 10mm		Top
	C5	100n250VMMK10	Capacitor polyester 100n 250V MMK 10mm		Top
	D1	KBPC35-06mh	Diode bridge KBPC35-06		Top
⚠	FU1	T4A250-5x20	Fuse slow blow 4A 250V 5x20mm		Top
	FU2	T4A250-5x20	Fuse slow blow 4A 250V 5x20mm		Top
⚠	P2	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	P3	FBPC5x209M	Fuseblock PCB 5x20mm fuse 9 modules		Top
	P4		Variant dependent, see separate list		Top

Variant specific components

	Position	MR05-MTB	MR05-MVS
	P4	TBPC3P4M4	-

Description for variant dependent components

Partnumber	Description
TBPC3P4M4	Terminal block PCB 3pole 4module 4mm2