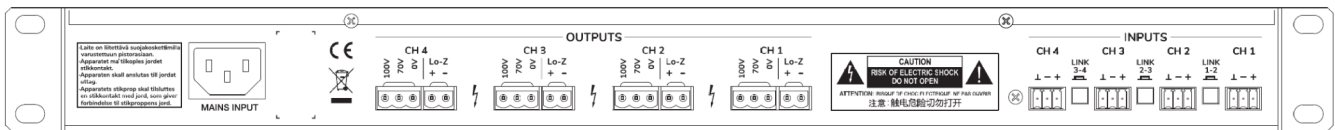
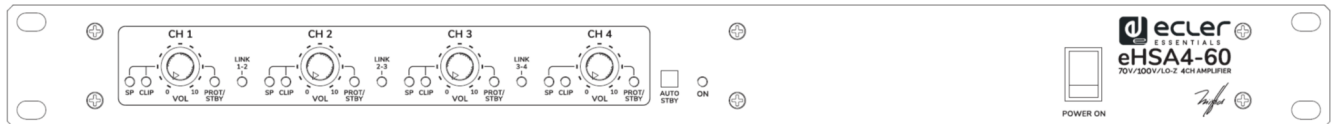


eHSA4-60

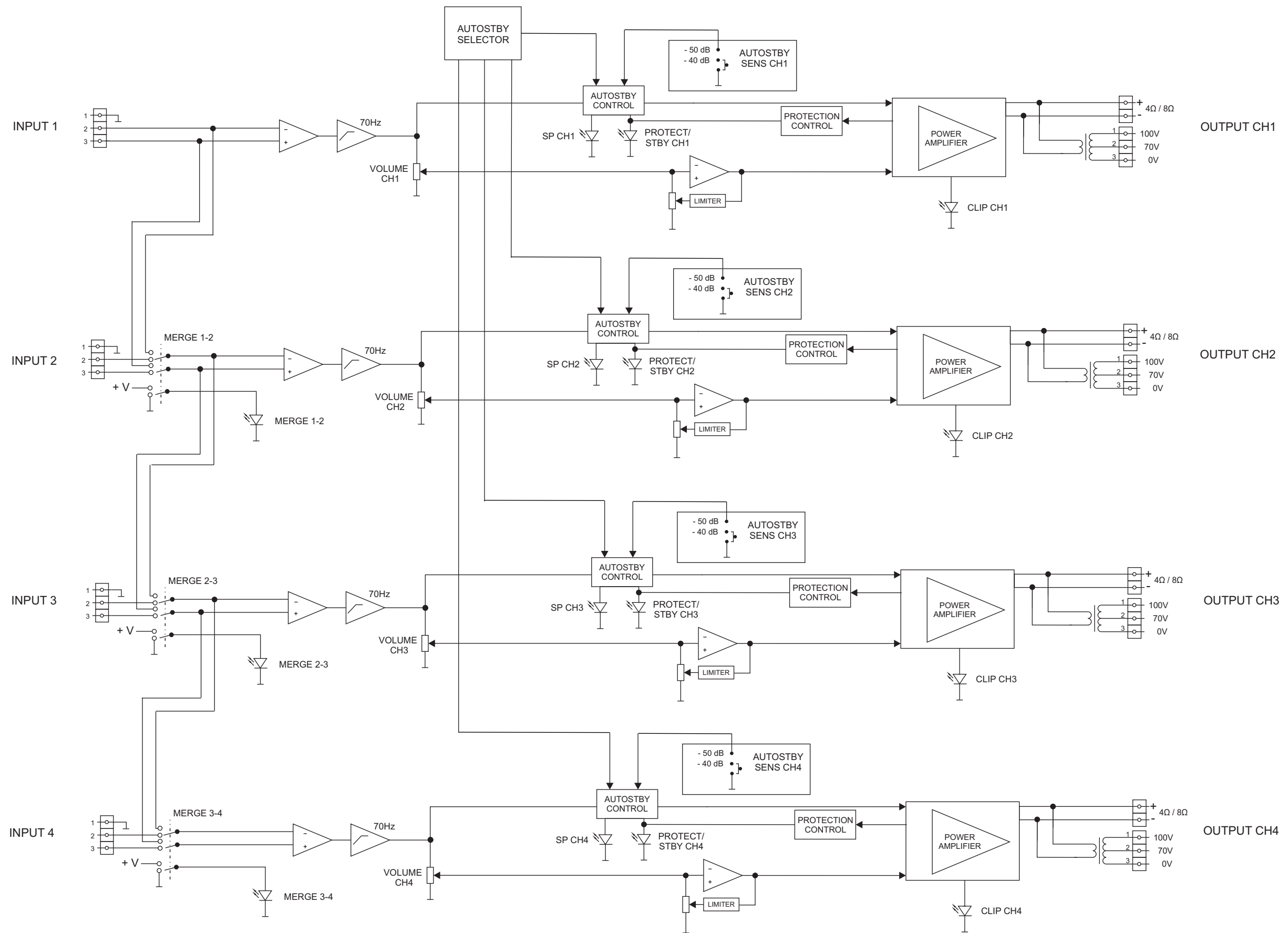
SERVICE MANUAL

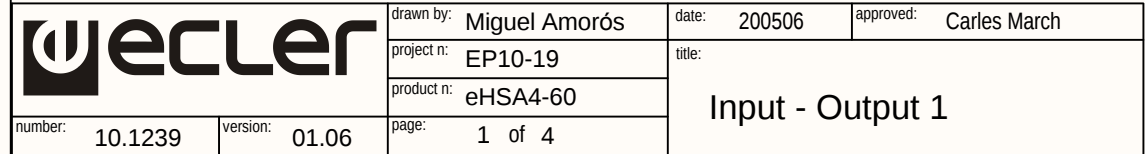


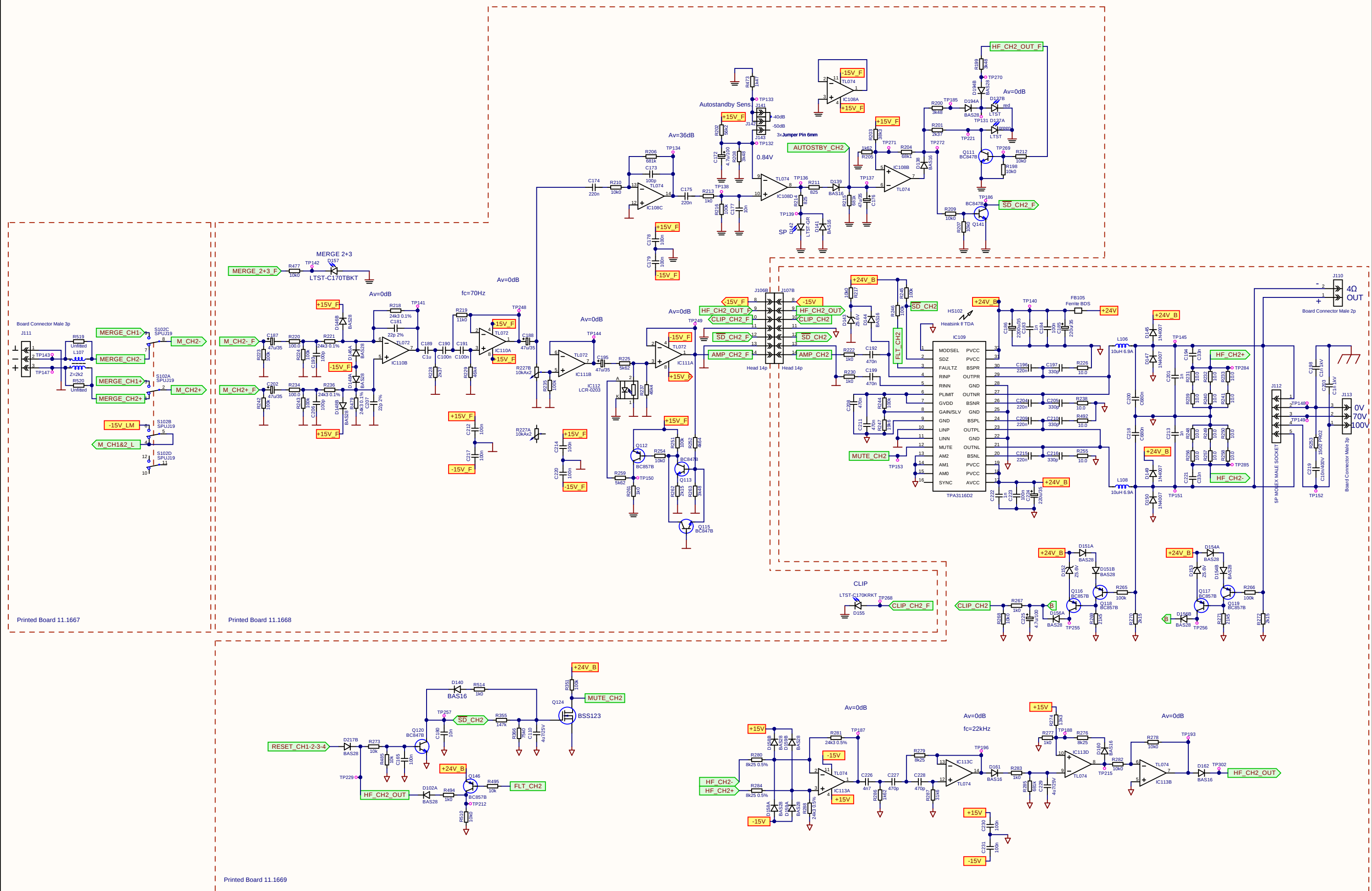
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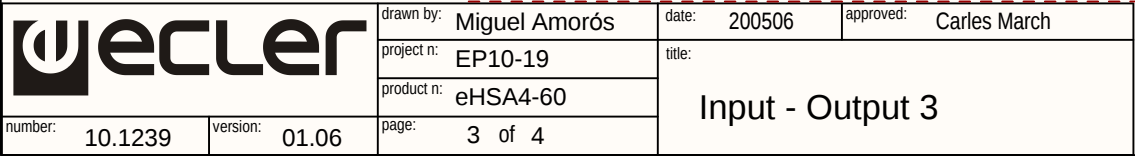
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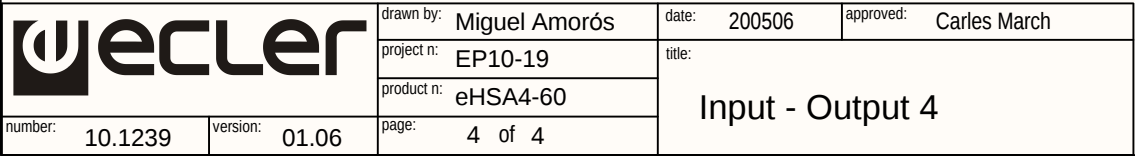
- BLOCK DIAGRAM
- SCHEMATICS
- COMPONENTS LOCATION SCHEMA
- TESTING AND QUALITY CONTROL
- TECHNICAL CHARACTERISTICS
- WIRING DIAGRAM
- MECHANICAL DIAGRAM
- PACKING DIAGRAM

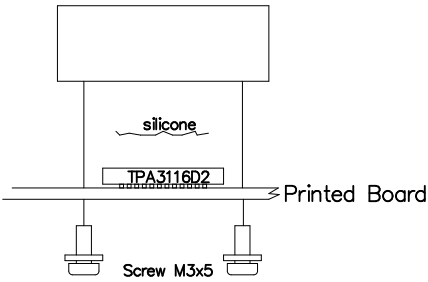
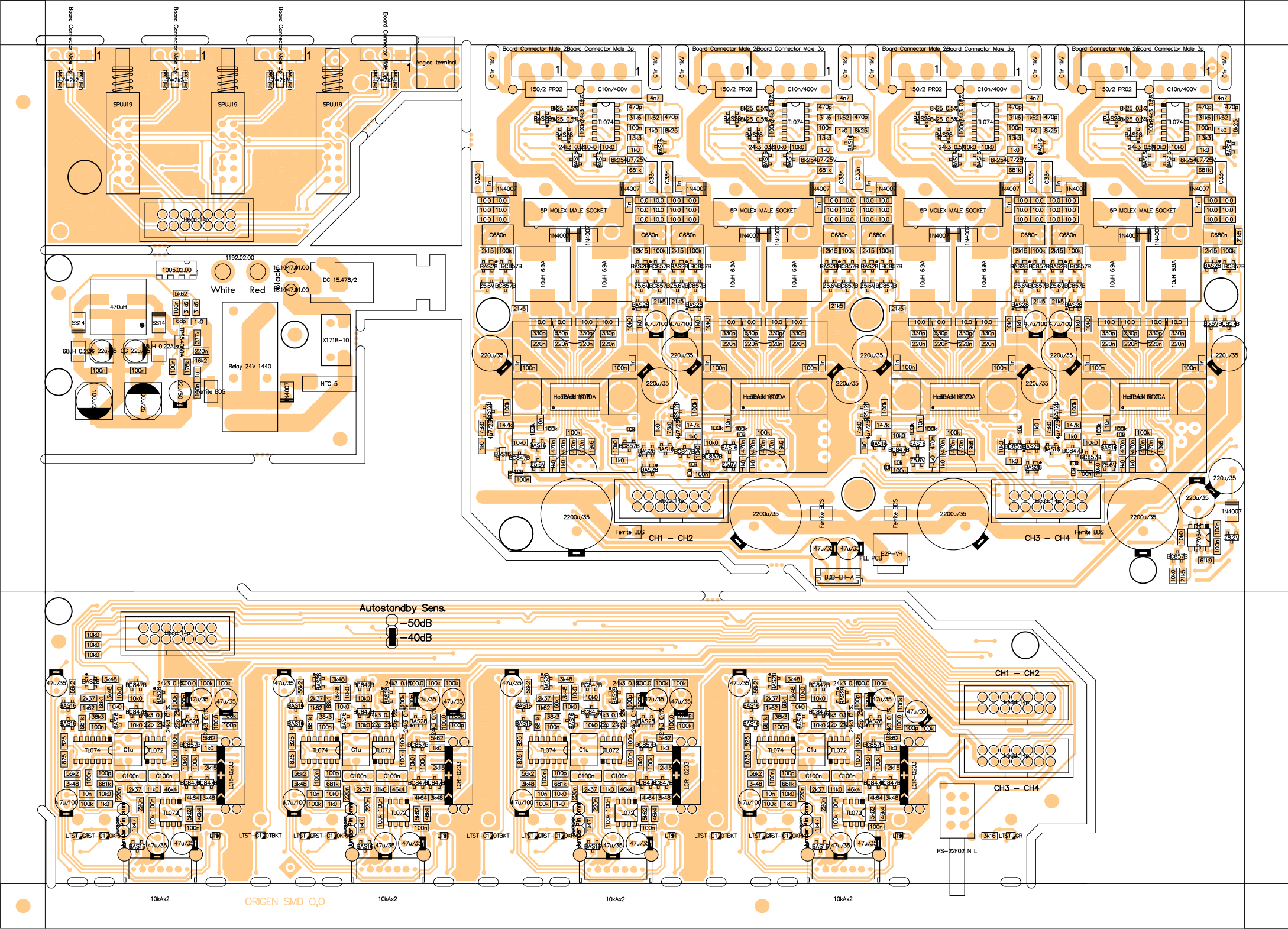












		related to:	circuit no: 11.1671.06.00 schema no: 10.1239.01.06 insertion file no: 81.0326.01.06	side: Component
number: 33.1626	version: 01.06	project n: EP10-19	Main Ct.	view: Value
drawn by: T. Lozano	date: 200506	product n: eHSA4-60		
		approved: Carles March		

PARTS LIST: Printed Board 11.1671.06

Q	Code	Description	Reference
8	FCCE20004700	4.7u/100	C101, C154, C172, C225, C232, C285, C292, C345
12	FCXCD2100000	100p	C102, C129, C139, C173, C193, C206, C233, C253, C266, C293, C313, C326
25	FCXCD4220000	220n	C103, C104, C119, C132, C137, C142, C174, C175, C196, C204, C209, C215, C234, C235, C256, C264, C269, C275, C294, C295, C316, C324, C329, C335, C512
22	FCCE10000000	47u/35	C105, C118, C121, C122, C136, C167, C171, C176, C187, C188, C195, C202, C236, C247, C248, C255, C262, C296, C307, C308, C315, C322
8	FCXCD4010000	10n	C106, C109, C177, C180, C182, C237, C240, C297
51	FCXCD4100000	100n	C107, C108, C112, C145, C146, C149, C150, C152, C155, C161, C163, C164, C165, C168, C170, C178, C179, C184, C212, C214, C217, C220, C223, C230, C231, C238, C239, C244, C272, C274, C277, C280, C283, C290, C291, C298, C299, C302, C304, C332, C334, C337, C340, C343, C350, C351, C503, C504, C506, C509, C513
8	FCXCD4004720	4u7/25V	C110, C162, C166, C169, C229, C289, C349, C352
16	FCXCD4001000	1n	C111, C128, C141, C151, C183, C201, C213, C222, C243, C261, C273, C282, C303, C321, C333, C342
10	FCCE15220000	220u/35	C113, C153, C156, C160, C185, C224, C245, C284, C305, C344
4	FCCE21220000	2200u/35	C114, C186, C246, C306
16	FCXCD4470000	470n	C115, C123, C134, C135, C192, C199, C208, C211, C252, C259, C268, C271, C312, C319, C328, C331
8	FCXCD1220100	22p 2%	C116, C140, C181, C207, C241, C267, C301, C327
8	FCCDK1033000	C33n	C117, C148, C194, C221, C254, C281, C314, C341
16	FCXCD2330000	330p	C120, C133, C138, C143, C197, C205, C210, C216, C257, C265, C270, C276, C317, C325, C330, C336
4	FCCDK2001000	C1u	C124, C189, C249, C309
8	FCCDK1100000	C100n	C125, C126, C190, C191, C250, C251, C310, C311
8	FCCDK1680000	C680n	C127, C144, C200, C218, C260, C278, C320, C338
8	FCCCD5100100	C1n 1kV	C130, C131, C198, C203, C258, C263, C318, C323
4	FCCDH7101100	C10n/400V	C147, C219, C279, C339
4	FCXCD4004700	4n7	C157, C226, C286, C346
8	FCXCD2470000	470p	C158, C159, C227, C228, C287, C288, C347, C348
2	FCCEZ1502235	CG 22u/35	C501, C507
2	FCCEZ1510025	100u/25	C502, C508
1	FCCE25022000	22u/50 ZL	C505
1	FCXCD1680000	68p	C510
1	FCXCD4001020	1u	C511

PARTS LIST: Printed Board 11.1671.06

Q	Code	Description	Reference
1	FCCI01671000	Printed Board 11.1671	CI101
36	FCXDDBAS1600	BAS16	D101, D104, D105, D106, D107, D108, D109, D110, D112, D129, D130, D135, D138, D139, D140, D141, D144, D160, D161, D162, D165, D166, D167, D168, D171, D187, D188, D189, D192, D193, D195, D198, D214, D215, D216, D219
36	FCXDDBAS2800	BAS28	D102, D115, D116, D119, D122, D124, D127, D128, D136, D146, D148, D151, D154, D156, D158, D159, D163, D173, D175, D178, D181, D183, D185, D186, D190, D194, D200, D202, D205, D208, D210, D211, D212, D213, D217, D218
4	FCLEDSMD4000	LTST	D103, D137, D164, D191
4	FCXZ00006800	Z5.6V	D111, D143, D170, D197
18	FCXDD4007000	1N4007	D113, D114, D117, D118, D126, D133, D145, D147, D149, D150, D172, D174, D176, D177, D199, D201, D203, D204
8	FCXZ00005600	Z5.6V	D120, D121, D152, D153, D179, D180, D206, D207
4	FCLEDSMD4020	LTST-C170KRKT	D123, D155, D182, D209
1	FCXZ00008200	Z8.2V	D125
3	FCLEDSMD4050	LTST-C170TBKT	D131, D157, D184
5	FCLEDSMD4030	LTST-GR	D132, D134, D142, D169, D196
2	FCXDDSB14000	SS14	D501, D502
5	FCFER0050000	Ferrite BDS	FB101, FB102, FB103, FB104, FB105
4	FCRAD3389000	Heatsink f/ TDA	HS101, HS102, HS103, HS104
8	FCIC07401000	TL074	IC101, IC107, IC108, IC113, IC114, IC119, IC120, IC125
4	FCIC03116000	TPA3116D2	IC102, IC109, IC115, IC121
4	FCOPTVTLS100	LCR-0203	IC105, IC112, IC118, IC124
1	FCIC77050000	TL7705ACD	IC106
8	FCIC07201000	TL072	IC110, IC111, IC116, IC117, IC122, IC123, IC130, IC131
1	FCIC54060A00	TPS54060A	IC501
4	FCREG1016000	Board Connector Male 2p	J101, J110, J114, J118
4	FCREG3007000	Board Connector Male 3p	J102, J111, J115, J119
4	FCCTAMP05100	5P MOLEX MALE SOCKET	J103, J112, J116, J120
4	FCREG1017000	Board Connector Male 3p	J104, J113, J117, J121
1	FCBASAL15478	DC 15.478/2	J105
6	FCHEA1001400	Head 14p	J106, J107, J108, J109, J126, J135
1	FCCTJ1002000	B2P-VH	J122

PARTS LIST: Printed Board 11.1671.06

Q	Code	Description	Reference
1	FCCTM0003000	B3B-EH-A	J123
12	FCTERM010000	Jumper Pin 6mm	J130, J131, J132, J141, J142, J143, J144, J145, J146, J147, J148, J149
1	FCREL1007400	Relay 24V 1440	K101
8	FCCHKX100010	10uH 6.9A	L101, L103, L106, L108, L109, L111, L112, L114
4	FCCHKX220000	Z=2k2	L102, L107, L110, L113
1	FCCHK0100B10	X171B-10	L104
2	FCCHKX068000	68uH 0.22A	L501, L503
1	FCCHKX470400	470uH	L502
4	FCMJ00010000	Jumper	MJ101, MJ102, MJ103, MJ104
1	FCSUJ3010000	Angled terminal	MP101
20	FCXTT0847000	BC847B	Q101, Q103, Q105, Q110, Q111, Q113, Q115, Q120, Q121, Q123, Q125, Q130, Q131, Q133, Q135, Q140, Q141, Q142, Q143, Q144
25	FCXTT0857000	BC857B	Q102, Q104, Q106, Q107, Q108, Q109, Q112, Q116, Q117, Q118, Q119, Q122, Q126, Q127, Q128, Q129, Q132, Q136, Q137, Q138, Q139, Q145, Q146, Q147, Q148
4	FCTR123BS100	BSS123	Q114, Q124, Q134, Q149
49	FCXR54100000	10k0	R101, R114, R116, R117, R123, R160, R170, R174, R183, R187, R190, R198, R207, R209, R210, R212, R217, R254, R260, R268, R278, R282, R289, R298, R300, R301, R303, R308, R345, R359, R369, R373, R380, R389, R391, R392, R394, R399, R436, R450, R460, R464, R476, R477, R478, R483, R510, R511, R512
16	FCXR53348000	3k48	R102, R104, R115, R169, R199, R200, R208, R263, R290, R291, R299, R354, R381, R382, R390, R445
8	FCXR54562000	56k2	R103, R105, R107, R108, R111, R202, R293, R384
8	FCXR53237000	2k37	R106, R143, R201, R228, R292, R319, R383, R410
4	FCXR54383000	38k3	R109, R203, R294, R385
4	FCXR54681000	68k1	R110, R204, R295, R386
8	FCXR53162000	1k62	R112, R205, R286, R296, R377, R387, R468, R489
12	FCXR55681000	681k	R113, R121, R191, R206, R215, R285, R297, R306, R376, R388, R397, R467
8	FCXR52825000	825	R118, R120, R211, R214, R302, R305, R393, R396
37	FCXR53100000	1k0	R119, R126, R131, R167, R173, R182, R188, R193, R213, R222, R230, R261, R267, R277, R283, R304, R313, R321, R352, R358, R368, R374, R395, R404, R412, R443, R449, R459, R465, R494, R496, R499, R506, R513, R514, R515, R516

PARTS LIST: Printed Board 11.1671.06

Q	Code	Description	Reference
44	FCXR55100000	100k	R122, R135, R136, R137, R146, R151, R152, R157, R171, R172, R196, R216, R223, R224, R235, R242, R243, R244, R251, R265, R266, R307, R314, R315, R326, R333, R334, R335, R342, R351, R356, R357, R398, R405, R406, R417, R424, R425, R426, R433, R442, R447, R448, R493
16	FCXR64243001	24k3 0.1%	R124, R130, R149, R156, R218, R221, R236, R309, R312, R327, R400, R403, R418, R479, R481, R482
4	FCXR54110000	11k0	R125, R219, R310, R401
9	FCXR53562000	5k62	R127, R165, R225, R259, R316, R350, R407, R441, R502
16	FCXR11100000	10.0	R128, R139, R161, R195, R226, R238, R255, R317, R329, R346, R408, R420, R437, R491, R492, R508
8	FCXR52100000	100.0	R129, R220, R234, R311, R325, R402, R416, R480
48	FCXR51100000	10.0	R132, R133, R134, R140, R141, R142, R153, R154, R155, R162, R163, R164, R231, R232, R233, R239, R240, R241, R248, R249, R250, R256, R257, R258, R322, R323, R324, R330, R331, R332, R339, R340, R341, R347, R348, R349, R413, R414, R415, R421, R422, R423, R430, R431, R432, R438, R439, R440
8	FCXR54464000	46k4	R138, R144, R229, R237, R320, R328, R411, R419
4	FCPR21004000	10kAx2	R145, R227, R318, R409
8	FCXR31000300	100k	R147, R148, R245, R246, R336, R337, R427, R428
4	FCXR54196000	19k6	R150, R247, R338, R429
4	FCXR53464000	4k64	R158, R252, R343, R434
4	FCRP53150000	150/2 PR02	R159, R253, R344, R435
9	FCXR54215000	21k5	R166, R175, R177, R269, R271, R360, R362, R451, R453
12	FCXR53215000	2k15	R168, R176, R178, R262, R270, R272, R353, R361, R363, R444, R452, R454
1	FCXR54619000	61k9	R179
4	FCXR54133000	13k3	R180, R274, R365, R456
8	FCXR53825000	8k25	R181, R184, R276, R279, R367, R370, R458, R461
8	FCXR63825000	8k25 0.5%	R185, R189, R280, R284, R371, R375, R462, R466
8	FCXR64243000	24k3 0.5%	R186, R281, R288, R372, R379, R463, R470, R490
12	FCXR31000200	10k	R192, R273, R364, R455, R484, R485, R486, R487, R488, R495, R497, R498
6	FCXR54316000	31k6	R194, R287, R378, R469, R503, R504
1	FCNTC0000500	NTC 5	R197
4	FCXR55147000	147k	R264, R355, R446, R500
4	FCXR54750000	75k0	R275, R366, R457, R509
1	FCXR53316000	3k16	R471
4	FCXR53147000	1k47	R472, R473, R474, R475
1	FCXR55178000	178k	R501

PARTS LIST: Printed Board 11.1671.06

Q	Code	Description	Reference
1	FCXR54162000	16k2	R505
1	FCXR55237000	237k	R507
1	FCINTAP01700	PS-22F02 N L	S101
3	FCINTAP01200	SPUJ19	S102, S103, S104
8	FCT803005000	Screw M3x5 combi	SC101, SC102, SC103, SC104, SC105, SC106, SC107, SC108
2	FC0F04720000	16.1047.01.00	WI101, WI102
1	FC4F19220000	1192.02.00	WI103
1	FC4I00520000	1005.02.00	WI105

		author: C. March	date: 200522	project: EP10-19	product: eHSA4-60
num: 51.0535		version: 01.0 1	title: VERIFICATION PROCESS		

BURNING TEST

TEST TIME	24h ALTERNATING ON – OFF cycles.
TEST CLASS	CLASS 3 on the BURNING TEST SCREEN.

INPUT CONDITIONS	OUTPUT CONDITIONS	DEVICE CONFIGURATION
➤ All INPUTS connected to SIGNAL from BENCH. ➤ AC INPUT Connected to 230V from the BENCH.	➤ All OUTPUTS loaded with 4Ω from BENCH.	➤ VOLUME Knob placed to MAX POSITION. ➤ AUTOSTBY Pushbutton RELEASED. ➤ ALL LINK Pushbuttons RELEASED.

SAFETY VERIFICATION TESTS

Preliminary:

Unplug the unit to be tested from the mains outlet.

Short all ground terminals from signal inputs, outputs and other external connectors, except the mains plug's ground.

Turn ON the unit's main power switch.

Ground continuity test:

Connect the tester probes between the mains ground contact and the unit's backside main ground test point. When applying a 10A current, verify that the ground impedance is lower than 0'1Ω.

Electrical strength test:

Test 1 – Between L/N and earthed enclosure:

Connect the electrical insulation tester probes between both shorted mains input poles (L/N) and earthed metal enclosure.

Adjust the tester's current limit down to 10mA.

Apply 1600VAC during 5 seconds.

The unit's insulation should be able to resist this voltage, without generating spurious sparks or a sparkover effect, and the tester may not detect any malfunction.

Test 2 – Between L/N and secondary accessible terminals:

Connect the electrical insulation tester probes between both shorted mains input poles (L/N) and the output/input connectors of audio signal.

Adjust the tester's current limit down to 10mA.

Apply 2550VAC during 5 seconds.

The unit's insulation should be able to resist this voltage, without generating spurious sparks or a sparkover effect, and the tester may not detect any malfunction.

CAUTION: Do not disconnect nor touch the test probes until the test has finished completely!

REQUIRED MATERIAL

- 1 LOW-Z Loudspeaker (4Ω or similar).
- 1 100V line speaker.
- Cables for audio connections.
- CD player and mixer.
- EUROBLOCK 2 Pin to short the channel output.

CONTROL'S INITIAL POSITION

1. Place the rear panel controls according the table below:

SWITCH	POSITION
AUTOSTBY	OFF (RELEASED)
LINK CH1-2, CH2-3, CH3-4	OFF (RELEASED)
VOLUME CH1, CH2, CH3, CH4	MIN (LEFT)

2. Plug the MAINS 230V into the AC INPUT of the device.

INPUTS CHECKING

1. Turn ON the device by pressing the MAINS SWITCH. Ensure the ON LED turns ON in GREEN color. When powered, verify all the PROT/STBY LEDS are ON in RED color and then change to OFF after a while.
2. Connect the LOW-Z LOUDSPEAKER into CH1 OUTPUT.
3. Before applying audio signal to the device, verify that the background noise remain free from hum, hiss or switching noise.
4. Connect the MIXER with the CD PLAYER (or other audio signal source) to the CH1 INPUT. Verify that the music sounds properly in the loudspeaker connected to the CH1 OUTPUT by increasing the VOLUME slowly.
5. Check the CH1 potentiometer sweep. Verify that it does not scratch, it fades smoothly and the music mutes completely when it is turned down. Leave the volume to the maximum level.
6. Look at the CH1 SP (GREEN color) and CLIP (RED color) leds. Both should light properly. Increase the MIXER OUTPUT VOLUME in order to reach CLIP level if necessary.
7. Short the output terminals of CH1 while the music sounds in the loudspeaker. Verify that, once the short-circuit is removed, the output sounds properly. When shorting the output, the PROT/STBY LED must turn ON in RED color.
8. Remove the LOW-Z loudspeaker and connect the 100V line loudspeaker to the 100V OUTPUT. Verify that the output sounds properly and is free of hum, hiss or switching noise.
9. Remove the HIGH-Z from the 100V OUTPUT and connect the 100V line loudspeaker to the 70V OUTPUT. Verify that the output sounds properly and is free of hum, hiss or switching noise.
10. Repeat steps 2 to 9 for all the other three channels.
11. Verify the behavior of the LINK PUSHBUTTONS by checking the following:

- a. Press all the LINK PUSHBUTTONS and verify all LINK LEDS turn ON in BLUE color. Check there is OUTPUT SIGNAL on all the OUTPUTS by just entering INPUT SIGNAL on CH1.
 - b. Release the LINK PUSHBUTTONS one by one and verify the LINK LEDS turn OFF as their PUSHBUTTONS are released. End this LINK TESTING with all the PUSHBUTTONS released.
12. Remove the input signal from all the channels. Press the AUTOSTBY PUSHBUTTON in order to enter AUTOSTBY mode. With the AUTOSTBY PUSHBUTTON pressed, check the following.
 - a. After around 90s, the PROT/STBY LEDS will turn ON in ORANGE color. The amplifier modules are independent between them, so all the channels will take different time to enter into AUTOSTBY condition.
 - b. Now, RELEASE the AUTOSTBY PUSHBUTTON in order to leave this mode. Verify the PROT/STBY LEDS turn OFF when RELEASED.

QUALITY CONTROL

1. All mechanical parts should be visually revised, in order to detect scratches on the unit's painting; all screws should be on their place, correctly tight and unmarked. Check out the unit's general presentation.

2. To ensure that all electrical junctions are well-fixed, hit the tested unit softly against your working table.
3. Turn the amplifier OFF and ON again with the main power switch. Even when signal is applied to the tested channel's input, the speakers should remain quiet during the STANDBY run-up time.

FACTORY DEFAULTS

All the units must finish the MUSIC VERIFICATION process with the following conditions on jumpers, gains and volumes:

- All VOLUMES must be in the MINIMUM position.
- All PUSHBUTTONS must be RELEASED (OFF) position.
- All possible MINI-JUMPERS in the circuit must be in the position of the CONFIGURATION SHEET of the device.

POWER 1% THD

1 Channel @ 4Ω	60W @ 4Ω 1% THD
1 Channel @ 8Ω	30W @ 8Ω 1% THD
All Channels @ 4Ω	60W @ 4Ω 1% THD
1 Channel @ 100V	60W @ 100V 1% THD
1 Channel @ 70V	55W @ 70V 1% THD
All Channels @ 100V	60W @ 100V 1% THD

FREQUENCY RESPONSE

LOW-Z Output @ 4Ω	70Hz - 30kHz (-3dB)
HIGH-Z Output @ 100V	70Hz - 20kHz (-3dB)

THD+NOISE

LOW-Z Output @ 4Ω	<0.06%
HIGH-Z Output @ 100V	<0.1%

SIGNAL TO NOISE RATIO

LOW-Z Output @ 4Ω	>90dBV
HIGH-Z Output @ 100V	>70dBV

CROSSTALK and CMRR

Channel CROSSTALK @ 1kHz	>65dBV
Channel CMRR @ 1kHz	>60dBV

INPUT CHARACTERISTICS

Input SENSITIVITY	0dBV
Input IMPEDANCE	>20kΩ

POWER CHARACTERISTICS

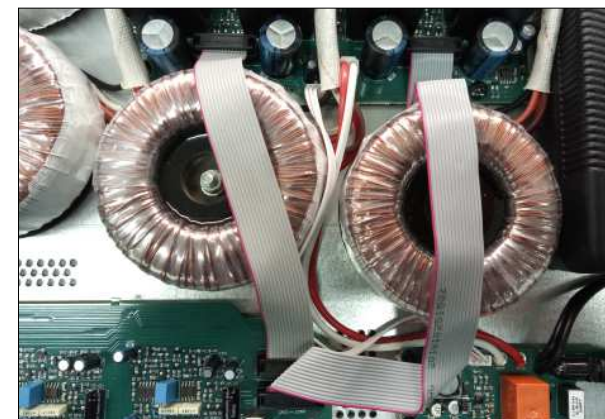
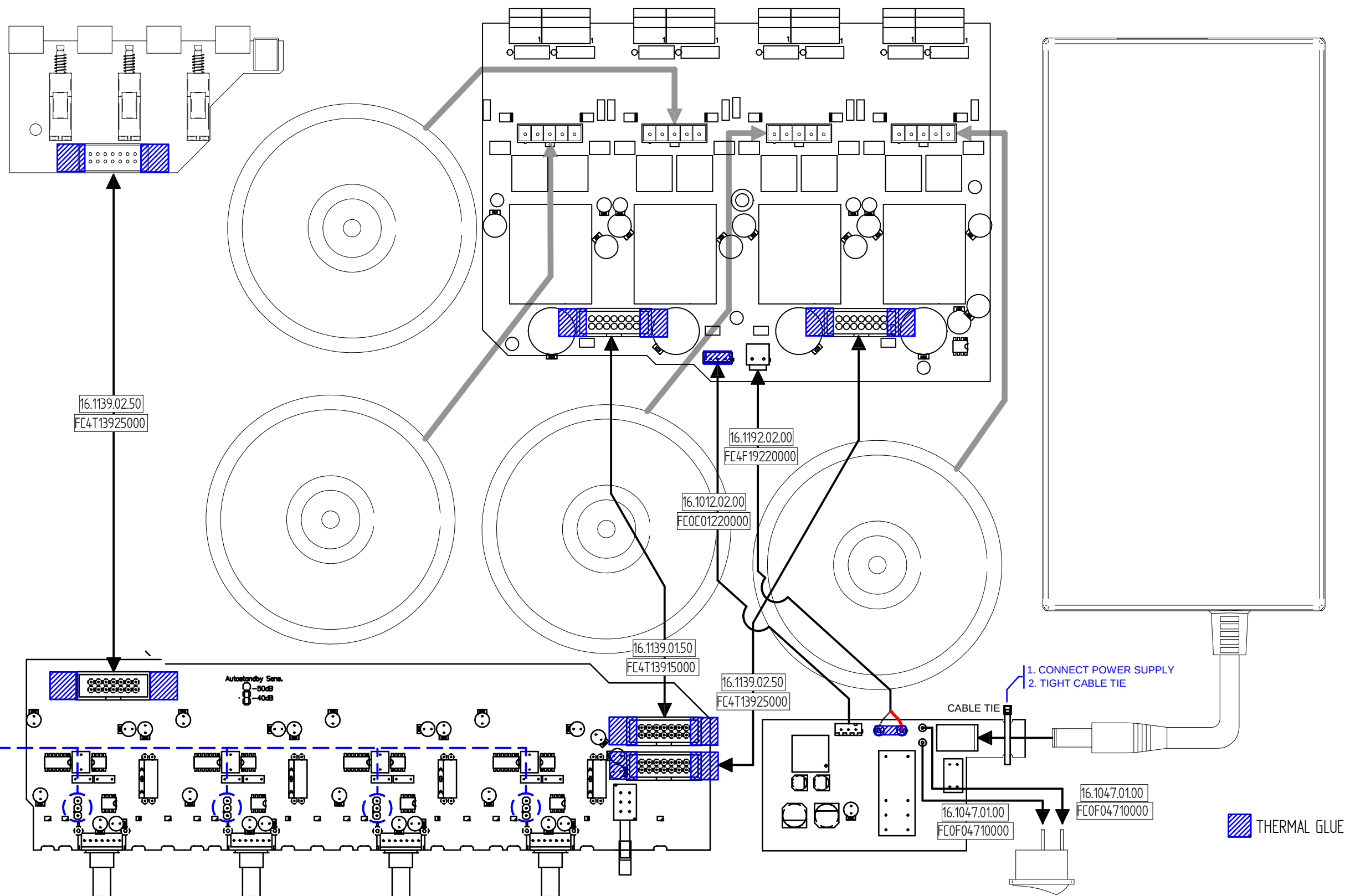
Power Consumption (1/3 POWER, @ 4Ω)	106 W / 115 VA
Power Consumption (1/8 POWER, @ 4Ω)	52 W / 68 VA
Power Consumption (IDLE)	15 W / 30 VA
Power Consumption (STBY)	7.6 W / 18 VA
Mains Voltage	100 – 240VAC, 50 – 60 Hz

AUTOSTBY CHARACTERISTICS

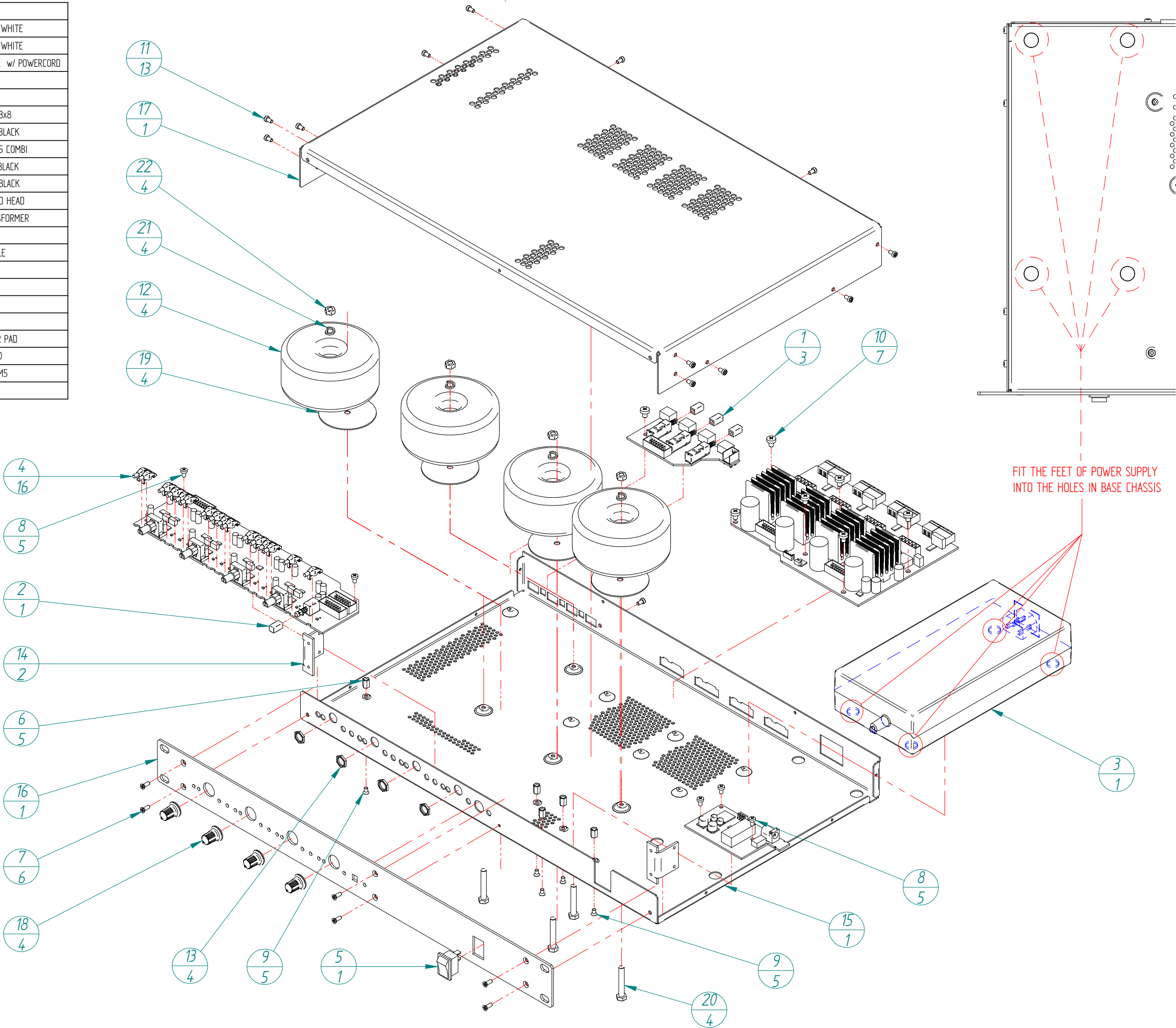
Auto Stand-By Threshold	40dB - 50dB, Internally Selectable
Auto Stand-By Time	90 seconds

MISCELLANEOUS

Dimensions (WxDxH – Knobs excluded)	482.6 mm x 280mm x 44mm
Net Weight	7.8 kg



N°	Qty.	Code	Description
1	3	FLB0TRE01000	SWITCH KNOB 5,5X5,5 WHITE
2	1	FLB0TRE01030	SWITCH KNOB 5,5X5,5 WHITE
3	1	FLFONTE90246	EXTERNAL P.S. MODULE w/ POWERCORD
4	16	FLGUIAL15000	LED GUIDE 90°
5	1	FLINTRED7000	MAINS SWITCH
6	5	FLSEP3080000	HEXAGONAL SPACER M3x8
7	6	FLT200300800	SCREW DIN965 M3x8 BLACK
8	5	FLT803005000	SCREW DIN 7985 M3x5 COMBI
9	5	FLT803005500	SCREW DIN965 M3x5 BLACK
10	7	FLT804006000	SCREW M4x6 SPANLO BLACK
11	13	FLT850300500	SCREW M3x5 REDUCED HEAD
12	4	FLTFTHMA6000	HIGH Z OUTPUT TRANSFORMER
13	4	FLTUPOT00000	ROTARY POT. NUT M9
14	2	FP0347900000	FRONTAL SUPORT ANGLE
15	1	FP0368000000	BASE CHASSIS
16	1	FP0368100000	FRONT PANEL
17	1	FP0368200000	TOP COVER
18	4	FRB0T0049000	ROTARY KNOB D14
19	4	GENERIC	TRANSFORMER RUBBER PAD
20	4	GENERIC	SCREW DIN933E M5x30
21	4	GENERIC	SPRING WASHER FOR M5
22	4	GENERIC	NUT M5



Nº	Qty.	Code	Description
1	4	FCARANY06000	WASHER M6 NYLON BLACK 12x6,4x1,5
2*	1	FCBOL0010000	PLASTIC SLEEVE 60x80
3	1	FCBOL0020000	PLASTIC SLEEVE 120x180
4	1	FCCAJSTA510E	PACKING CARDBOARD BOX 1U
5	2	FCCAJSTA5131	INTERIOR PACKING REINFORCEMENT ST51
6	1	FCCONX017500	MAINS CORD 3x1,5 STANDARD
7	1	FCCONX056050	MAINS CORD MULTIPLUG NO EU 3x1,5
8	1	FCETI0951140	PRODUCT LABEL PACK (ONE FOR EACH UNIT)
9	1	FCFUNMAN0000	USER MANUAL BAG
10	1	FCMANGEN0000	GENERIC USER MANUAL
11	4	FCPIE1125500	RUBBER FOOT
12	4	FCREG1006000	CONNECTING TERMINAL STRIPS 2C P=5.08
13	4	FCREG1007000	CONNECTING TERMINAL STRIPS 3C P=5.08
14	4	FCREG2007000	CONNECTING TERMINAL STRIPS 3C
15	1	FCTARJG00000	WARRANTY CARD

