



# Technical Manual

# STEREO INTEGRATED AMPLIFIER RA-12

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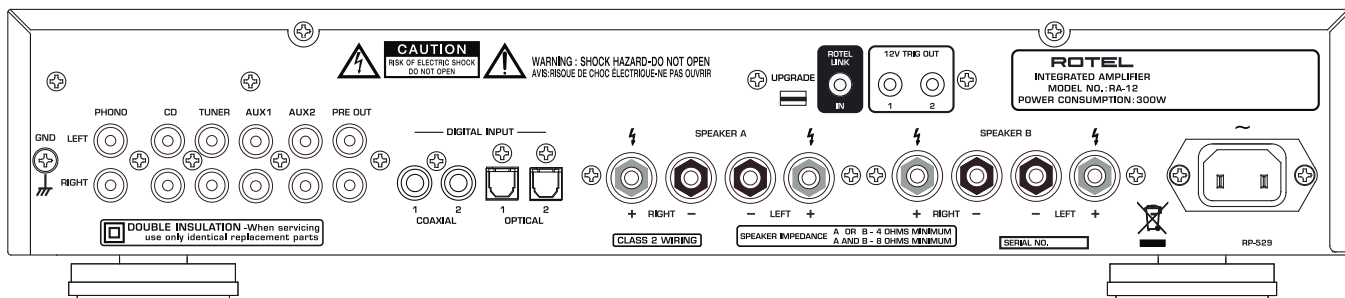
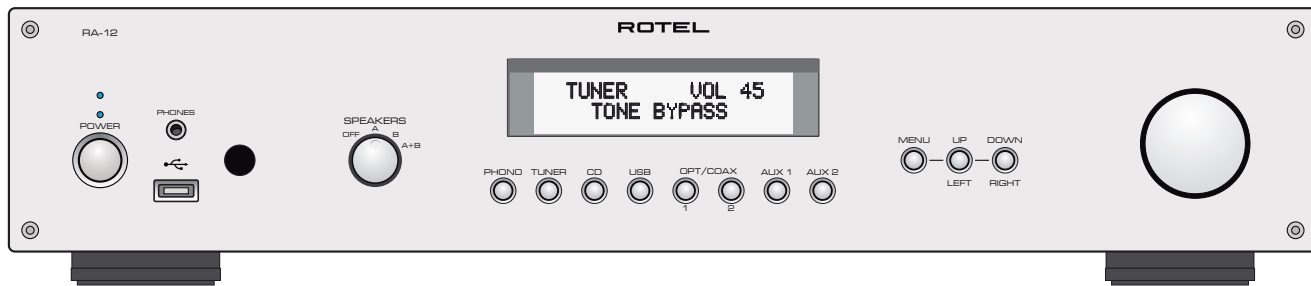
### Specifications

<b>Continuous Power Output</b> (20-20 kHz, < 0.03%, 8 ohms)	60 watts/ch (RA-12)	<b>Power Requirements</b>	120V, 60 Hz (USA)
<b>Total Harmonic Distortion (20Hz-20kHz)</b>	< 0.03% at rated power, 1/2 power or 1 watt	<b>Standby Power Consumption</b>	230V, 50 Hz (Europe)
<b>Intermodulation Distortion (60 Hz : 7 kHz, 4:1)</b>	< 0.03% at rated power, 1/2 power or 1 watt	<b>RA-12 Power Consumption</b>	0.5W
<b>Frequency Response</b>		<b>RA-12 Dimensions (W, H, D)</b>	300 Watts
Phone input	20Hz-15kHz, ±0.3dB	<b>RA-12 Panel Height</b>	17" x 3 <sup>5</sup> / <sub>8</sub> " x 13 <sup>1</sup> / <sub>2</sub> "
Line Level Inputs	10Hz-100kHz, ±1dB	<b>RA-12 Weight (net)</b>	430 x 92 x 342 mm
<b>Damping Factor (20-20,000 Hz, 8 ohms)</b>	180		80 mm / 3 <sup>1</sup> / <sub>16</sub> ".
<b>Input Sensitivity / Impedance</b>			8.02 kg, 18lbs.
Phone input	2.5mV / 47 kOhms		
Line Level Inputs	150 mV / 24 kOhms		
<b>Input Overload</b>			
Phone input	180mV		
Line Level Inputs	5V		
<b>Premp Output / Impedance</b>	1V / 470 Ohms		
<b>Tone Controls - Bass / Treble</b>	±10 dB at 100Hz / 10kHz		
<b>Signal to Noise Ratio (IHF "A" weighted)</b>			
Phone input	80 dB		
Line Level Inputs	100 dB		
<b>Digital Section</b>			
<b>Frequency Response</b>	10Hz-95kHz ±3.0dB(MAX)		
<b>Signal to Noise Ratio (IHF "A" weighted)</b>	100dB		
<b>Input Sensitivity/Impedance:</b>	0 dBfs/75 ohms		
<b>Preout/Impedance:</b>	1.2V/470 ohms (at -20dB)		
<b>Decodable front USB/iPod Digital Signals:</b>	AAC(m4a), WAV, MP3, WMA (up to 48K 16 bit)		
<b>Coaxial/Optical</b>	PCM up to 192K 24 bit		

## THE ROTEL CO., LTD

2-11-4, NAKANE, MEGURO-KU,  
TOKYO 152-0013, JAPAN

Serial. NO. Beginning
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SYMBOL	PARTS NO.	DESCRIPTION
<b>016 X-1644B01-13 PCB ASSY</b>		
	501 X-1644B-1	PCB ASSY (MAIN)
(IC901-903,Q905-906)	017 C-4401A02	SUB HEAT SINKER H=35
Q601/603,602/604,607/609,608/610	019 C-4334A04	TRANSISTOR CAPACITOR TP752522
(IC903)	019 TW-5	BUSH POWER TRANSISTOR
L103-104	021 2888100012	PULSE TRANS EP7-01-201M
L101-102	021 LAL02TB4R7K	MICRO INDUCTOR 4.7UH
L601-602	021 TRL-332	SPEAKER COIL 1F 23T
T001	022 T-1119N01-V01	STBY TRANS 11.4V-11mA
IC601	031 IC0008601	IC UPC1237C-A SMD (PROTECTION)
IC302,401,502	031 IC0008802	IC NE5532AP (OPE DUAL)
IC901	031 IC0010600	IC NJM7805FA (KIA7805API-U/P) (REC.+5VDC)
IC801,902	031 IC0031400	IC BA33BC0T 3V3 LDO.
IC204	031 IC0036000	IC REMOCON SENSER RPM7238-H8
IC301	031 IC0037000	IC MPC507AU SWITCH ALLEY(8 STEREO IN) SMD
IC303	031 IC0037100	IC NJW1194V ELEC 4IN-VOL-TONE SMD
IC903	031 IC0037400	IC LM317BTG TO-220
IC501	031 IC0037600	IC PGA2311UA ELEC VOLUME SMD
Q625-626	032 A1837	TRANSISTOR 2SA1837
Q623-624	032 C4793	TRANSISTOR 2SC4793
Q301-303	032 KRC107M	TRANSISTOR KRC107M/P
Q653,655,656,908,910	032 TA608-FG	TRANSISTOR 2SA608KAA-FG
Q304,640,801-802,903-904,	032 TC536-FG	TRANSISTOR 2SC536KAA-FG
Q907,909	032 TC536-FG	TRANSISTOR 2SC536KAA-FG
Q613-614,902,906	033 B631-EF	TRANSISTOR 2SB631K-EF(PAIR 2SD600K)
Q615-616,901,905	033 D600-EF	TRANSISTOR 2SD600K-EF(PAIR 2SB631K)
Q607-610	033 KTA1268-GR	TRANSISTOR KTA1268-GP (PAIR KTC3200)
Q611-612	033 KTA1268-GRBL	TRANSISTOR KTA1268-GRBL/P (PAIR KTC3200)
Q601-604	033 KTC3200-GR	TRANSISTOR KTC3200-GP (PAIR KTA1268)
Q605-606,651-652	033 KTC3200-GRBL	TRANSISTOR KTC3200-GRBL/P (PAIR KTA1268)
Q621-622	033 TA1207-ST	TRANSISTOR 2SA1207S/T-AA(PAIR 2SC2909)
Q619-620	033 TC2909-ST	TRANSISTOR 2SC2909S/T-AA(PAIR 2SA1207)
D801	034 DB0000100	POWER DIODE W02M (1.5A 200V)
D904	034 DB0000400	POWER DIODE BR84 (8A 400V)
D913-914	034 DB0001000	POWER DIODE KBP206 (2A 600V)
D609-612,901-902,915-916,803	034 DD0000200	DIODE 1N4004-F (AMMO) 1A 400V
D601-608,613-617,620,903	034 DD0000300	DIODE 1N4148 (AMMO) WA 150mA 75V
D301,618-619,802	034 DD0000300	DIODE 1N4148 (AMMO) WA 150mA 75V
D907-908	034 DZ0100151	ZENER DIODE HZS15NB3-TD-E
D905-906	034 DZ0100181	ZENER DIODE HZS18NB3-TD-E
D804	034 DZ0103R31	ZENER DIODE HZS3.3NB2-TD-E
D911 , 912	034 DZ0105R61	ZENER DIODE HZS5.6NB2-TD-E
D909-910	034 DZ0107R51	ZENER DIODE HZS7.5NB2-TD-E
TH601	034 TH0000603	POSISTOR PTFLO4BD222Q2N34B0
F801	036 5ST250-R	FUSE 250VT250mA
F901-902	036 5ST6.3-R	FUSE 250VT6.3A
C924,927	041 16SEP82M	ELECTROLYTIC CAPACITOR 16V82UF
C307-308	041 35ZA10MEFCTZ	ELECTROLYTIC CAPACITOR 35V10UF
C309-310	041 35ZA4R7MEFCTZ	ELECTROLYTIC CAPACITOR 35V4.7UF
C501-502,509-510	041 35ZLG10MEFCT5	ELECTROLYTIC CAPACITOR 35V/10UF
C601-602	041 35ZLG4R7MEFCT5	ELECTROLYTIC CAPACITOR 35V4.7UF
C315-316,513-514,607-608	041 50ZL100MEFC	ELECTROLYTIC CAPACITOR 50V100UF
C909-910	041 ALC20S1044DG	ELECTROLYTIC CAPACITOR 50V10000UF
C01	041 EEUFC1E101SB	ELECTROLYTIC CAPACITOR 25V100UF
C305-306,320-321,413-414,503,	041 EEUFC1E221B	ELECTROLYTIC CAPACITOR 25V220UF
C505,507,515-516,913-916,921	041 EEUFC1E221B	ELECTROLYTIC CAPACITOR 25V220UF
C611-612	041 EEUFC1E470B	ELECTROLYTIC CAPACITOR 25V47UF
C317-318,411-412	041 EEUFC1H100LB	ELECTROLYTIC CAPACITOR 50V10UF
C911-912	041 EEUFC1V102	ELECTROLYTIC CAPACITOR 35V1000UF
C920,923,926	041 TUTES1C222-7TS	ELECTROLYTIC CAPACITOR 16V2200UF
C622,805-806	041 TUTES1E101-7TF	ELECTROLYTIC CAPACITOR 25V100UF
C240,621	041 TUTES1E470-7TF	ELECTROLYTIC CAPACITOR 25V47UF

SYMBOL	PARTS NO.	DESCRIPTION
C804	041 TUTES1E471-7TS	ELECTROLYTIC CAPACITOR 25V470UF
C150,319,651-652	041 TUTES1H100-7TF	ELECTROLYTIC CAPACITOR 50V10UF
C903	041 TUTES1H221-7TS	ELECTROLYTIC CAPACITOR 50V220UF
C904	041 TUTES1H471-7TS	ELECTROLYTIC CAPACITOR 50V470UF
C808	041 TUTES1H4R7-7TF	ELECTROLYTIC CAPACITOR 50V4.7UF
C403-404	041 U25V10LN	ELECTROLYTIC CAPACITOR LOW NOISE UKL1E100MDD
C313-314	042 TP50V332JE	MYLAR CAPACITOR 0.0033UF 1HUMXRTF332JE
C803,901-902,905-908,917-919	043 TC500V103	CERAMIC CAPACITOR 500V0.01UF
C242-243	043 TC50V101	CERAMIC CAPACITOR 50V100PF
C245,246	043 TC50V103	CERAMIC CAPACITOR 50V0.04UF
C05,101-104,241,244	043 TC50V104	CERAMIC CAPACITOR 50V0.1UF
C02	043 TC50V473	CERAMIC CAPACITOR 50V0.047UF
C801	044 DE2E3KH472MA3B	SPARK KILLER 4700PF
C311-312	044 ECQV1H104JL	SF CAPACITOR 50V0.1UF
C401-402	044 FSC160V151H	STYROL CAPACITOR 160V150PF
C617-618	044 FSC160V221H	STYROL CAPACITOR 160V220PF
C609-610	044 FSC160V331H	STYROL CAPACITOR 160V330PF
C603-604	044 FSCEX160V101H	STYROL CAPACITOR 160V100PF
C303-304,511-512	044 FSCEX160V470H	STYROL CAPACITOR 160V47PF
C613-616	044 FSCEX160V471H	STYROL CAPACITOR 160V470PF
C619-620	044 KT18-2A104K	M.P CAPACITOR MKT1818-410/015
C405-406	044 S50V1000PG	STYROL CAPACITOR 50V1000PF
C407-408	044 S50V200PG	STYROL CAPACITOR 50V200PF
C409-410	044 S50V4300PG	STYROL CAPACITOR 50V4300PF
VR601-602	051 SFR001-222	SEMI FIXED RESISTOR VM6CKPH1S-2.2K
R681-682	054 1WS1.2KJF	MOF RESISTOR 1WS 1.2K
R922-923	054 1WS1JF	MOF RESISTOR 1WS 1
R683-684	054 1WS330JF	MOF RESISTOR 1WS 330
R907	054 1WS560JF	MOF RESISTOR 1WS 560
R651-652	054 2WS10JF	MOF RESISTOR 2WS 10
R910-911	054 2WS150JF	MOF RESISTOR 2WS 150
R643-650	054 NIR2-0.22JF	NON-INDUCTIVE RESISTOR 2W 0.22
R801	054 TMF1000	MOF RESISTOR 100
R317,328,804,925	054 TMF1002	MOF RESISTOR 10K
R501,802	054 TMF10R0	MOF RESISTOR 10
R687	054 TMF1503	MOF RESISTOR 150K
R241-249	054 TMF16-1001	METAL RESISTOR 1/6W 1K
R251-252,318-320,331-332,	054 TMF16-1002	METAL RESISTOR 1/6W 10K
R686,904-905	054 TMF16-1002	METAL RESISTOR 1/6W 10K
R502,673,690-691,906	054 TMF16-1003	METAL RESISTOR 1/6W 100K
R101-102,240	054 TMF16-10R0	METAL RESISTOR 1/6W 10
R667-668	054 TMF16-1201	METAL RESISTOR 1/6W 1.2K
R671	054 TMF16-1202	METAL RESISTOR 1/6W 12K
R679-680	054 TMF16-1203	METAL RESISTOR 1/6W 120K
R665-666,688,692	054 TMF16-1502	METAL RESISTOR 1/6W 15K
R661-662	054 TMF16-2702	METAL RESISTOR 1/6W 27K
803	054 TMF16-4701	METAL RESISTOR 1/6W 4.7K
R669-670,903	054 TMF16-4702	METAL RESISTOR 1/6W 47K
R250	054 TMF16-47R0	METAL RESISTOR 1/6W 47
R689	054 TMF16-5602	METAL RESISTOR 1/6W 56K
R103-106	054 TMF16-75R0	METAL RESISTOR 1/6W 75
R663-664	054 TMF16-8203	METAL RESISTOR 1/6W 820K
R918-919	054 TMF1801	MOF RESISTOR 1.8K
R909	054 TMF1802	MOF RESISTOR 18K
R924	054 TMF2200	MOF RESISTOR 220
R805,901,920-921	054 TMF2201	MOF RESISTOR 2.2K
R914-915	054 TMF2700	MOF RESISTOR 270
R685	054 TMF2701	MOF RESISTOR 2.7K
R641-642	054 TMF3300	MOF RESISTOR 330
R908	054 TMF3302	MOF RESISTOR 33K
R912-913	054 TMF3901	MOF RESISTOR 3.9K
R507 , 508	054 TMF4700	MOF RESISTOR 470
R329-330,806	054 TMF4701	MOF RESISTOR 4.7K

SYMBOL	PARTS NO.	DESCRIPTION
R926	054 TMF6800	MOF RESISTOR 680
R902	054 TMF8201	MOF RESISTOR 8.2K
R415-416,631-632	054 TMFR4001KI	RESISTOR MFR4 1K
R603-604	054 TMFR4012KI	RESISTOR MFR4 12K
R405-406	054 TMFR401K2I	RESISTOR MFR4 1.2K
R607-610,615-618	054 TMFR401K5I	RESISTOR MFR4 1.5K
R303-304,307-308,311-312,	054 TMFR4027KI	RESISTOR MFR4 27K
R315-316	054 TMFR4027KI	RESISTOR MFR4 27K
R509-510	054 TMFR402K2I	RESISTOR MFR4 2.2K
R627-628	054 TMFR403K9I	RESISTOR MFR4 3.9K
R603-604,621-622	054 TMFR4047KI	RESISTOR MFR4 47K
R633-634	054 TMFR4047RI	RESISTOR MFR4 47
R407-408	054 TMFR404K7I	RESISTOR MFR4 4.7K
R409-410	054 TMFR4056KI	RESISTOR MFR4 56K
R323-324,417-418,511-512	054 TMFR4100KI	RESISTOR MFR4 100K
R623-624,629-630	054 TMFR4100RI	RESISTOR MFR4 100
R611-612,619-620,637-640	054 TMFR4220RI	RESISTOR MFR4 220
R301-302,305-306,309-310,	054 TMFR4470RI	RESISTOR MFR4 470
R313-314 R916-917	054 TMFR4470RI	RESISTOR MFR4 470
R413-414	054 TMFR4680RI	RESISTOR MFR4 680
R327	054 TMFR4820RI	RESISTOR MFR4 820
R411-412	054 TMFR4910KI	RESISTOR MFR4 910K
R635-636	054 TPR9372-012KD	AUDIO RESISTOR PR9372GP1/4T-TC50(D)AMMO 012K
R505 , R506	054 TPR9372-100KD	AUDIO RESISTOR PR9372GP1/4T-TC50(D)AMMO 100K
R503-504	054 TPR9372-470RD	AUDIO RESISTOR PR9372TGP1/4T-TC50(D)AMMO 470
R321-322	054 TPR9372-560RD	AUDIO RESISTOR PR9372GP1/4T-TC50(D)AMMO 560
R401-402	054 TRC55D1001C	RESISTOR RC55D 1K
R513-514	054 TRC55D4700C	RESISTOR RC55D 470
R403-404	054 TRC55D4702C	RESISTOR RC55D 47K
R601-602,613-614	054 TRC55D5600C	RESISTOR RC55D 560
R625-626	054 TRC55D6801C	RESISTOR RC55D 6K8
R325-326	054 TRC55Y1000C	RESISTOR RC55D 100
ENC201	056 C-4678A01	ROTARY ENCODER (WITHOUT DETEN)
SW802	061 C-4176A08	POWER SW PS3-22SPA-P7CZ TV-8 (PC)
SW201-211	061 C-4679A03 GRY	TACT SW 5MM GRY HV061050GS
SW601	062 C-4174A23	ROTARY SWITCH RS1312SWA0X-VA-1-005
RY601-602	063 DH2TU-24	RELAY DH24D2-OT(M)
RY901	063 DH2U-24	RELAY DH24D2-O(M)
RY301-302,603	063 EA2-24NU	RELAY
RY801	063 OZT-SS-112LM1	RELAY DC12V TV8
HJ101	065 C-4939B01	3.5F MINI JACK PJ-35047S
JK101,104	066 4TR-2166#4 2P WHT.RED	2P PIN JACK AU (WHT.RED)
JK102-103	066 4TR-2408#3 4P WHT.RED	4P PIN JACK AU (WHT.RED)
JK105	066 C-4859A01 2P BLK	2P PIN JACK AU (BLACK)
JK106-107	066 TORX147L	OPTICAL MODULE TORX147L
SPA,SPB	067 C-4493B00	4P SPEAKER TERMINAL (W/HOLE) RBBR
CP603-604,902	068 B2B-EH	CONNECTOR POST 2P
CP107B	068 B2B-PH-KS	CONNECTOR POST 2P
CP802,803,804,805	068 B2P3-VH	CONNECTOR POST 2P
CP602,605	068 B3B-PH-KS	CONNECTOR POST 3P
TP1,2	068 C-3683#1	PCB TERMINAL 2P P7.5
CON901	068 C-3683#2	PCB TERMINAL 3P P7.5
CON801	068 C-3683#3	PCB TERMINAL 4P P7.5
CP201	068 S3B-PH-KS	CONNECTOR POST 3P
CP203	068 S4B-PH-KS	CONNECTOR POST 4P
CP202	068 S5B-PH-KS	CONNECTOR POST 5P
K1A	068 TD04LG	CONNECTOR POST 4P
K2A,K3A	068 TD06LG	CONNECTOR POST 6P
	<b>016 E-1642A00 PCB ASSY</b>	
	501 E-1642A-2	PCB ASSY (TELECHIPS)
XT302	023 CY0900100	X-TAL 12MHz SRXA-SI-A8 SMD
L301-L302	025 BK2125HS601	BEAD COIL BK2125HS601-T

SYMBOL	PARTS NO.	DESCRIPTION
L303	025 CIL10J2R2K	COIL CHIP 1608 2.2UH-CIL10J2R2K
IC305	031 IC0002703	IC AME1117CCGTZ ABF SMD (REGULATOR)
IC304	031 IC0002704	IC AME1117ECGTZ AXH SMD (REGULATOR)
IC302	031 IC0030500	IC TCC8600 32-bit RISC for Host Player SMD
IC306	031 IC0032600	IC EN29LV160T-70TIP SMD FLASH MEMORY
IC307	031 IC0036800	IC MF1337S3959I-POD 2.0C CP Authentication SMD
IC303	031 IC0036900	IC K4S281632O-LC/L60 SDRAM SMD
C307-308	047 GRM1882C1H220JA01D	CERAMIC CAPACITOR CHIP 50V22PF
C305	047 GRM1882C1H391JA01D	CERAMIC CAPACITOR CHIP 50V390PF
C306	047 GRM188B11H122KA01D	CERAMIC CAPACITOR CHIP 50V1200PF
C309	047 GRM188F11C105ZA01D	CERAMIC CAPACITOR CHIP 16V1UF
C324	047 GRM188F11C105ZA01D	CERAMIC CAPACITOR CHIP 16V1UF
C310-313	047 GRM188F11H104ZA01D	CERAMIC CAPACITOR CHIP 50V0.1UF
C314-318;C321-323;C325329,C331-340	047 GRM188F11H104ZA01D	CERAMIC CAPACITOR CHIP 50V0.1UF
C301-C304	047 TCSCS1A226M	TANTAL CAPACITOR CHIP 22UF10V
R318,R345	055 ERJ3EKF1001V	RESISTOR CHIP 1K
R327-R328,R333,R340	055 ERJ3EKF1002V	RESISTOR CHIP 10K
R305	055 ERJ3EKF1004V	RESISTOR CHIP 1M
R322-R325	055 ERJ3EKF1502V	RESISTOR CHIP 15K
R336-R337	055 ERJ3EKF2201V	RESISTOR CHIP 2.2K
R301-R304	055 ERJ3EKF22R0V	RESISTOR CHIP 22
R317R319-R320,R330-R331,R334	055 ERJ3EKF4701V	RESISTOR CHIP 4.7K
R332	055 ERJ3EKF4702V	RESISTOR CHIP 47K
R335	055 ERJ3EKF56R0V	RESISTOR CHIP 56
R306-R316	055 EXB28V470JX	RESISTOR CHIP ARRAL 47
<b>016 E-1643B01-03 PCB ASSY</b>		
	501 X-1643B-2	PCB ASSY (DIGITAL)
B105	021 FBA103	FELITE BEAD BL02RN2R1M2B
XT201	023 CY0300400	CRYSTAL TOGETHER TEC HC49S-20MHZ
XT101	023 CY0600100	CRYSTAL ISXO-3E-24.576MHZ
B203-204 ,701-702	025 BK2125HS101	BEAD COIL BK2125HS101-T
B104,107,202	025 BK2125HS102	BEAD COIL BK2125HS102-T
B103,106,108,201	025 BK2125HS601	BEAD COIL BK2125HS601-T
IC101	031 IC0001900	IC AK4114VQP SMD (D/A TRANSCEIVER)
IC103-105	031 IC0012700	IC OPA2604AP (OPE DUAL)
IC106	031 IC0025400	IC SN74LVC257APWR SMD (MULTIPLEXER)
IC102	031 IC0027600	IC SMD WM8740SEDS (DAC)
IC206,U702-703	031 IC0028600	IC SN65220DBVR USB port Transient Suppressor
IC205	031 IC0029100	IC TPS2553DBVR Adjustable current limite S/W
IC202-203	031 IC0033300	IC SN74LVC1G08DBV SINGLE 2-INPUT AND GATE
U701	031 IC0036300	IC CP2102 QFN-28 SMD
IC201	031 IC0037300	IC R5F212B8SNFP-64 MCU SMD
Q201-202,701	032 KRC107S	TRANSISTOR KRC107S-RTK/P
D201	034 DD0000500	DIODE CHIP KDS184RTK/P
DZ701-702	034 DZ0053R30	ZENER DIODE SMD KDZ3V3 UDZSNPTE 173.3B
C121	041 16SEP82M	OS-CON SEP 16V82UF D8.0XL7.0XF3.5
C106,110,114,119	041 25SEP10M	OS-CON SEP 25V10UF
C123-126	041 35ZLG10MEFCTZ	ELECTROLYTIC CAPACITOR 35V10UF
C139-140	041 50ZL100MEFC	ELECTROLYTIC CAPACITOR 50V100UF
C116	041 EEUFC1E101SB	ELECTROLYTIC CAPACITOR 25V100UF
C141-146,C111,C232	041 EEUFC1E221B	ELECTROLYTIC CAPACITOR 25V220UF
C201,210	041 TUTES1E470-7TF	ELECTROLYTIC CAPACITOR 25V47UF
C203,707	041 TUTES1H4R7-7TF	ELECTROLYTIC CAPACITOR 50V4.7UF
C107	041 TUTES1HR47-7TF	ELECTROLYTIC CAPACITOR 50V0.47UF
C135-138	044 FSC160V220H	STYROL CAPACITOR 160V22PF
C127-134	044 FSCEX160V102H	STYROL CAPACITOR 160V1000PF
C149	044 KP37-2C104K	PP CAPACITOR MKP1837-410-165 160V0.1UF(K)
C112-113,115,117-118,120	046 T50V473K	CERAMIC CAPACITOR RPER11H473K2M1A01A
C122	047 GRM2162C1H102JA01D	CERAMIC CAPACITOR CHIP 50V1000PF
C205-206	047 GRM2162C1H200JZ01D	CERAMIC CAPACITOR CHIP 50V20PF
C105,108-109,147-148,202,204,	047 GRM219F11H104ZA01D	CERAMIC CAPACITOR CHIP 50V0.1UF
C207-208,211,230-231,233,704,706	047 GRM219F11H104ZA01D	CERAMIC CAPACITOR CHIP 50V0.1UF

SYMBOL	PARTS NO.	DESCRIPTION
C209,703	047 GRM21BR71C105KA01L	CERAMIC CAPACITOR CHIP 16V1UF
C705	047 GRM21BR71C475KA73L	CERAMIC CAPACITOR CHIP 16V4.7UF
R135-138	054 TMFR4001KI	RESISTOR MFR4 1KFI
B105	054 TMFR4010RI	RESISTOR MFR4 10RI
R113-116	054 TMFR402K7I	RESISTOR MFR4 2.7KI
R125-128	054 TMFR4075RI	RESISTOR MFR4 75RI
R139,140	054 TMFR4560KI	RESISTOR MFR4 560KFI
R129-130	054 TMFR4680RI	RESISTOR MFR4 680RFI
R117-124	054 TPR9372-470RD	AUDIO RESISTOR PR9372GP1 470
R131-134	054 TRC55D1001C	RESISTOR RC55D 1K
R141-142	054 TRC55Y1000C	RESISTOR RC55Y 100
R143,705-706	055 ERJ6ENF1000V	RESISTOR CHIP 100
R212-213,710-711	055 ERJ6ENF1001V	RESISTOR CHIP 1K
R201-202,205,209-211,215-216	055 ERJ6ENF1002V	RESISTOR CHIP 10K
R218-221,224,225,260,704	055 ERJ6ENF1002V	RESISTOR CHIP 10K
R203	055 ERJ6ENF1004V	RESISTOR CHIP 1M
R240	055 ERJ6ENF1201V	RESISTOR CHIP 1.2K
R107	055 ERJ6ENF1802V	RESISTOR CHIP 18K
R261	055 ERJ6ENF2202V	RESISTOR CHIP 22K
R228-229,263-264,701-702,707-708	055 ERJ6ENF22R0V	RESISTOR CHIP 22
R204,222-223,230-234,239	055 ERJ6ENF33R0V	RESISTOR CHIP 33
R226-227,703	055 ERJ6ENF4701V	RESISTOR CHIP 4.7K
R108-111,235-238	055 ERJ6ENF47R0V	RESISTOR CHIP 47
R241,262,709	055 ERJ6GEY0R00V	RESISTOR CHIP 0
JK701-703	065 YKB21-5406N	3.5 DIA MINITURE JACK (ST)
JK201	066 C-5131A00	JACK USB 1P TYCO 292303-4 ANGLE
P101	066 C-5133A20	CNT SOCKET P2.0 TM2502-DG-20P
J704	066 C-5167A00	JACK USB MINI SND 5P
CP105	068 B10B-PH-KS	CONNECTOR POST 10P
CP104	068 B11B-PH-KS	CONNECTOR POST 11P
CP107A,606	068 B3B-PH-KS	CONNECTOR POST 3P
CP103	068 B6B-PH-KS	CONNECTOR POST 6P
CP101-102,106	068 B7B-PH-KS	CONNECTOR POST 7P
<b>HEAT SINKER ASSEMBLY</b>		
	505 HSRA-12	HEAT SINKER ASSY (with 501X-1644-01)
	013 4FD-16	PCB SUPPORT
	017 VE3-07A00	HEAT SINKER BOARD
	019 TO-3P	INSULATION SHEET #9043
Q617-618	032 D1953	TRANSISTOR 2SD1953
Q631-634	033 B817P-DE	TRANSISTOR 2SB817P-DE
Q627-630	033 D1047P-DE	TRANSISTOR 2SD1047P-DE
<b>OTHERS</b>		
	011 FP-690-B	BLACK PANEL ASSY
	011 FP-690-S	SILVER PANEL ASSY
	012 C-4915A00	KNOB 15F (BLACK)
	012 C-4911A00	KNOB 15F (SILVER)
	012 C-4917A03	KNOB 33F NO MARK (BLACK)
	012 C-4913A03	KNOB 33F NO MARK (SILVER)
	012 C-5192A00	TACT BUTTON 1KEY (BLACK)
	012 C-5192A01	TACT BUTTON 1KEY (SILVER)
	012 RV4-09A00	PUSH BUTTON 14F (BLACK)
	012 RV4-09A01	PUSH BUTTON 14F (SILVER)
	014 C-5184A00	UPPER COVER (BLACK)
	014 C-5184A00S	UPPER COVER (SILVER)
	014 C-5186A00	PLASTIC SIDE CAP 77.5H (BLACK)
	014 C-5186A01	PLASTIC SIDE CAP 77.5H (SILVER)
	015 RP-529	REAR CHASSIS
	019 4TSH-19#2	PLASTIC FOOT 50F BLK 4TSH-19#2-RO
	019 4TQF-17C#2	KNOB RING (BLUE) 33F
	019 C-4923B00	POWER KNOB RING 14F (BLACK)
	019 C-4923B01	POWER KNOB RING 14F (SILVER)
	019 C-5187A00	TACT BUTTON 3X5 RING (BLACK)

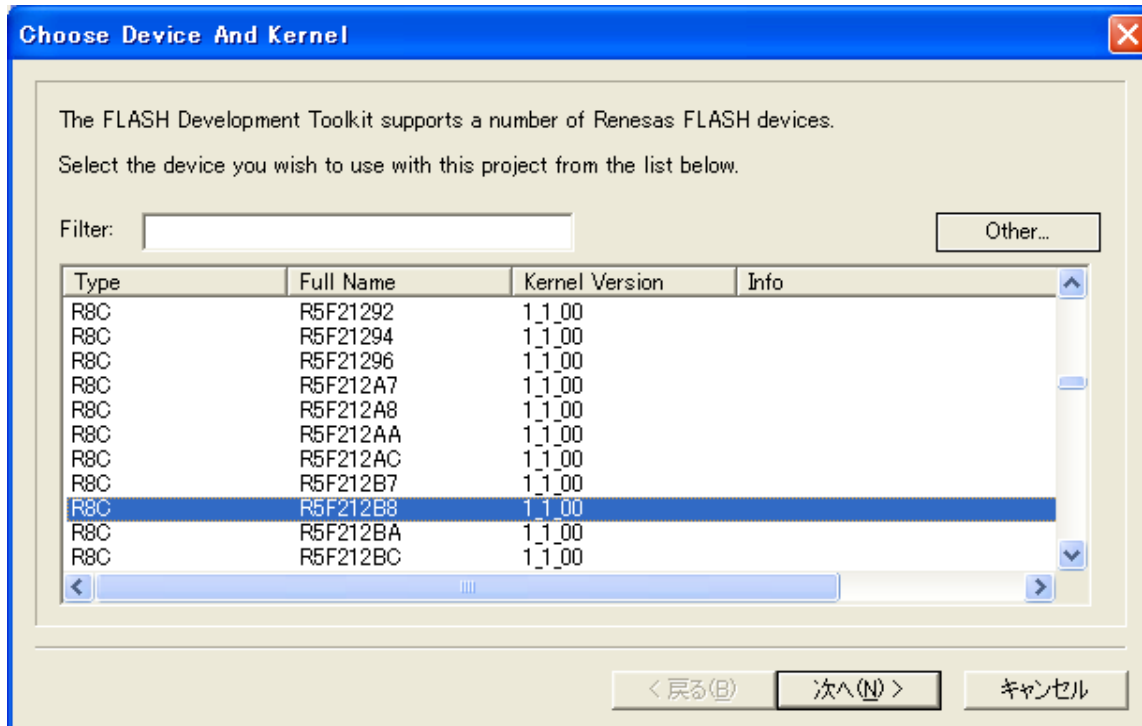
SYMBOL	PARTS NO.	DESCRIPTION
T001	019 C-5187A01	TACT BUTTON 3X5 RING (SILVER)
D001,D002	022 T-1128U01	POWER TRANSFORMER
	034 LE0002700	LED LJS5UBW007J (BLUE) 2F
	069 C-4629A01	AC 2P INLET 6102.3100 (WIRING)
	071 C-5189A00	APPEARANCE SCREW HD5.5 M3 L6 (BLACK)
	071 C-5189A01	APPEARANCE SCREW HD5.5 M3 L6 (SILVER)
	072 C-4620A03	AC CORD SET SVT 18AWG/2C
	072 C-4623A02	AC CORD SET BS H05VV-F 2C
	072 C-4624A03	AC CORD SET for EUROPE
	081 EPS-1280L	EPS MOULDING LEFT
	081 EPS-1280R	EPS MOULDING RIGHT
	081 AAZ-10A00	INSIDE CARTON
	081 AAZ-11A00	SHIPPING CARTON
	082 OMRA-12-81	OWNER'S MANUAL
	092 RR-AX91	REMOTE UNIT



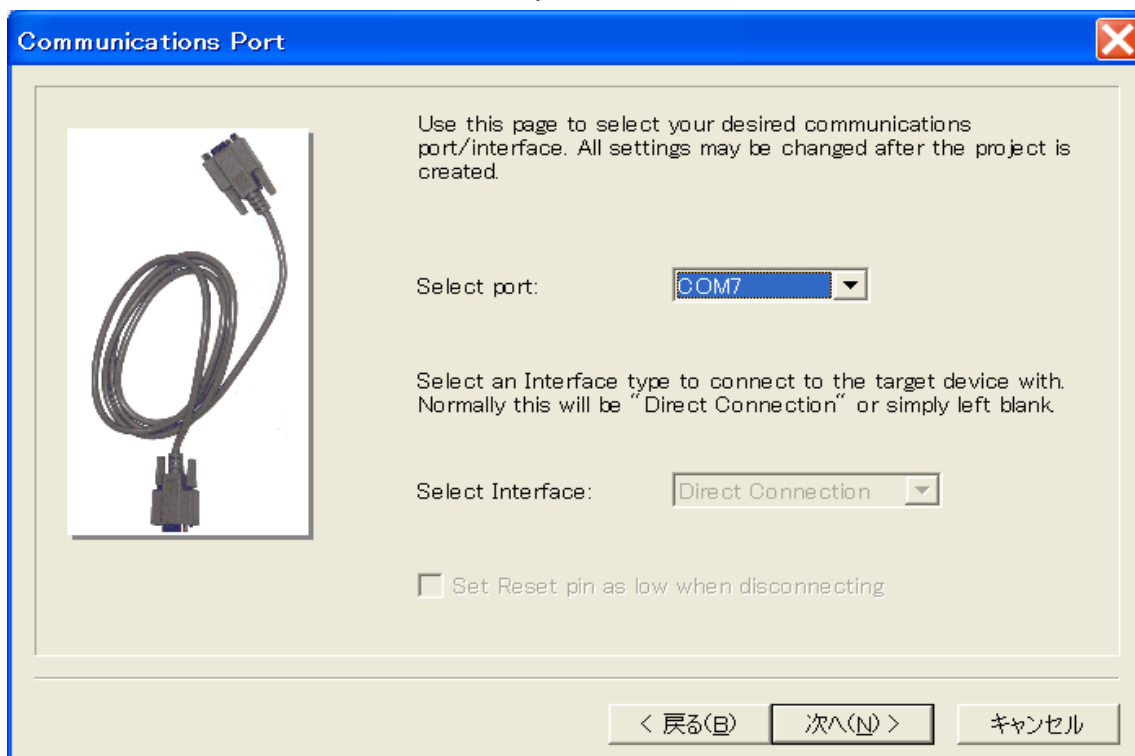
## RA-11\_12 Main software update procedure with USB mini port.

Mar.15.2012

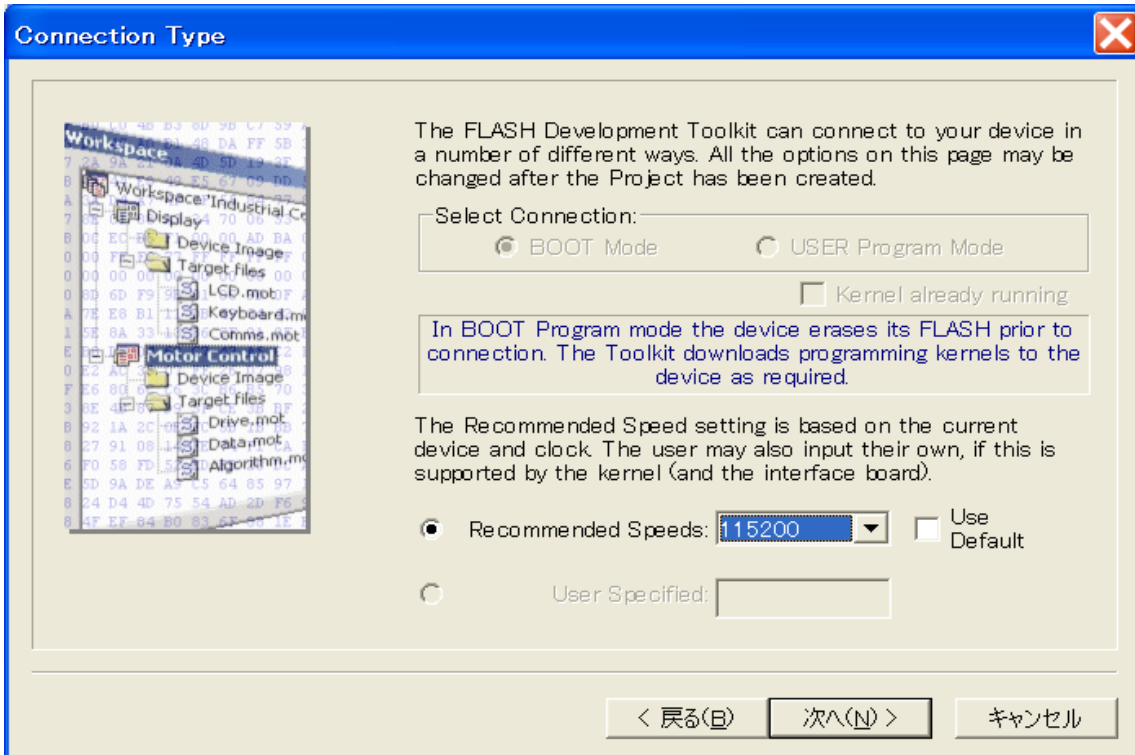
1. Execute E8a program (Renesas: Flash Development Toolkit ~~4.05~~ or 4.07 **Basic**)
2. Appeared "FDT Simple Interface (Unsupported Freeware Version)" window.
3. Select "New Setting" from "OPTION" folder.
4. "Choose Device And Kernel" window. Select "Type: R8C", and "Full Name: R5F212B8", then press "Next".



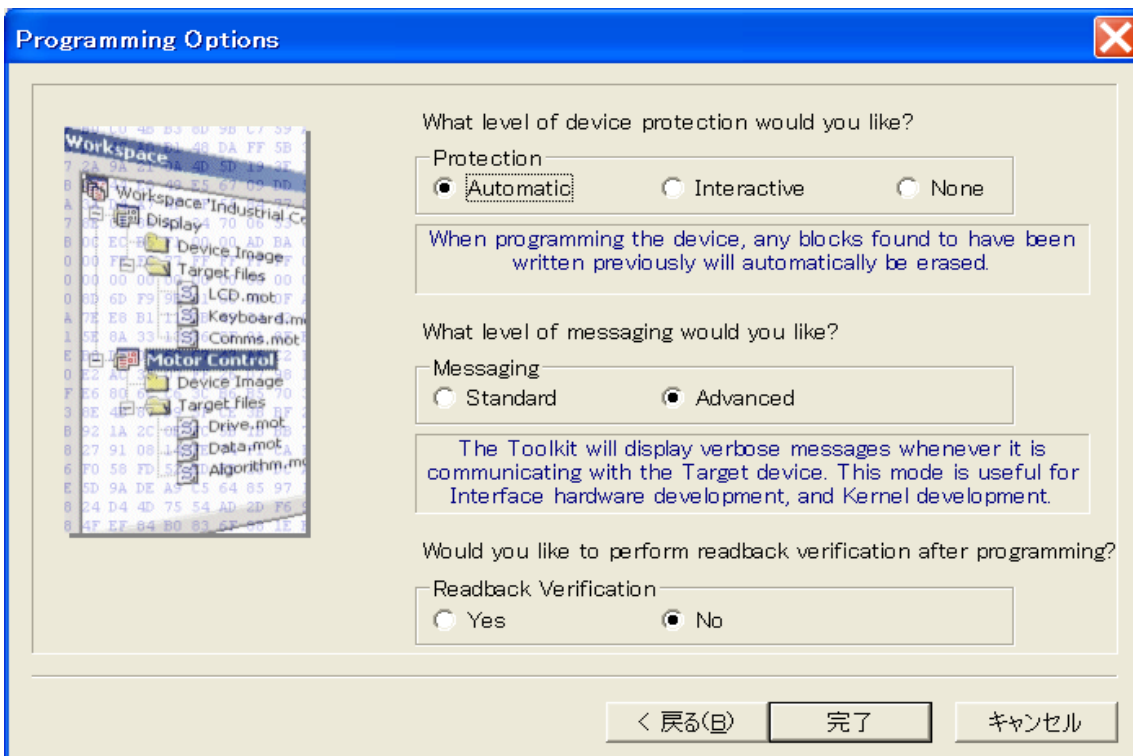
5. "Communications Port" window. Select "Select port: COM5", others are no check as default, then, press "Next".



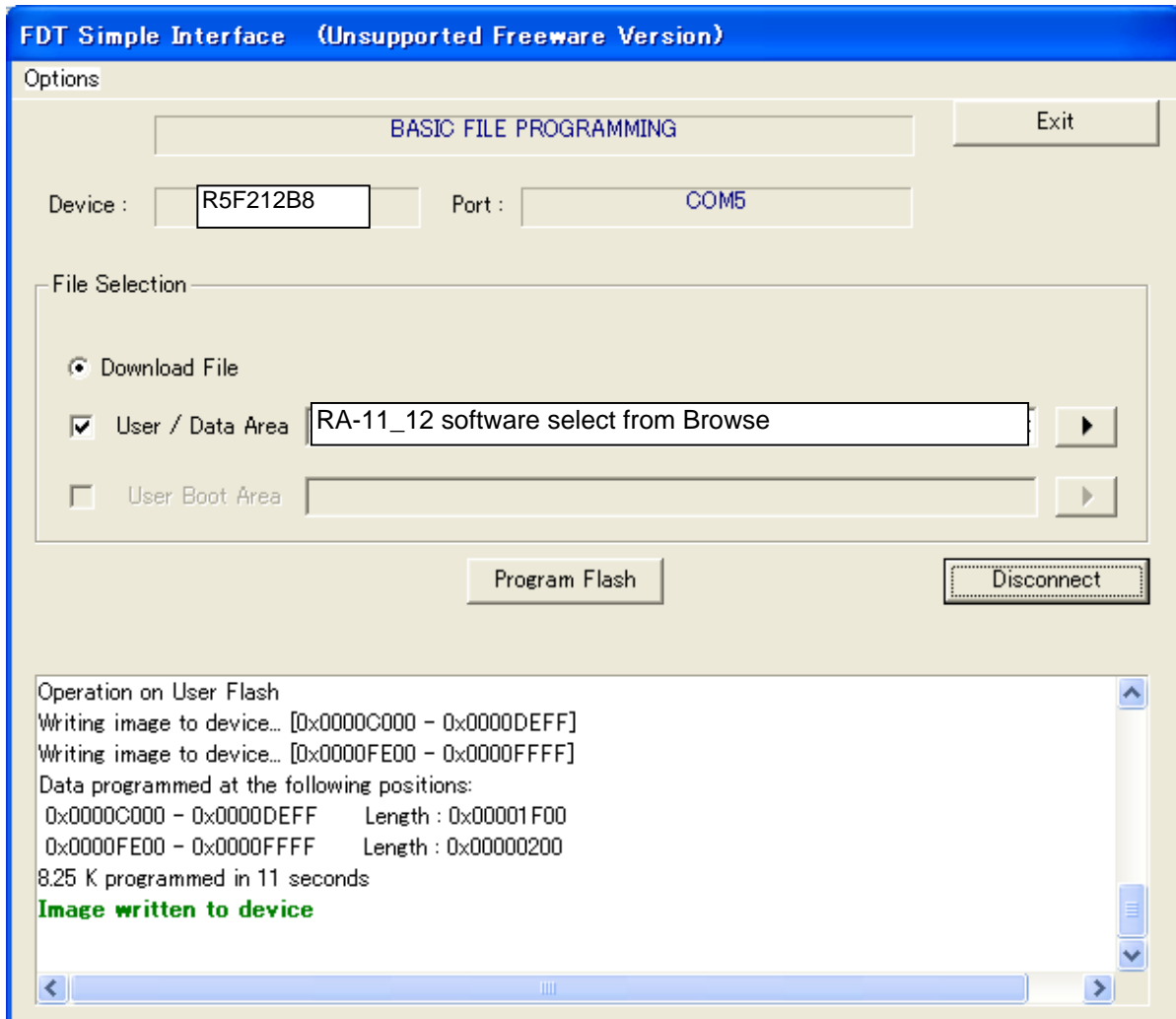
6. "Connection Type" window. Check "**Recommend Speed: 115200**", and Press "Next".



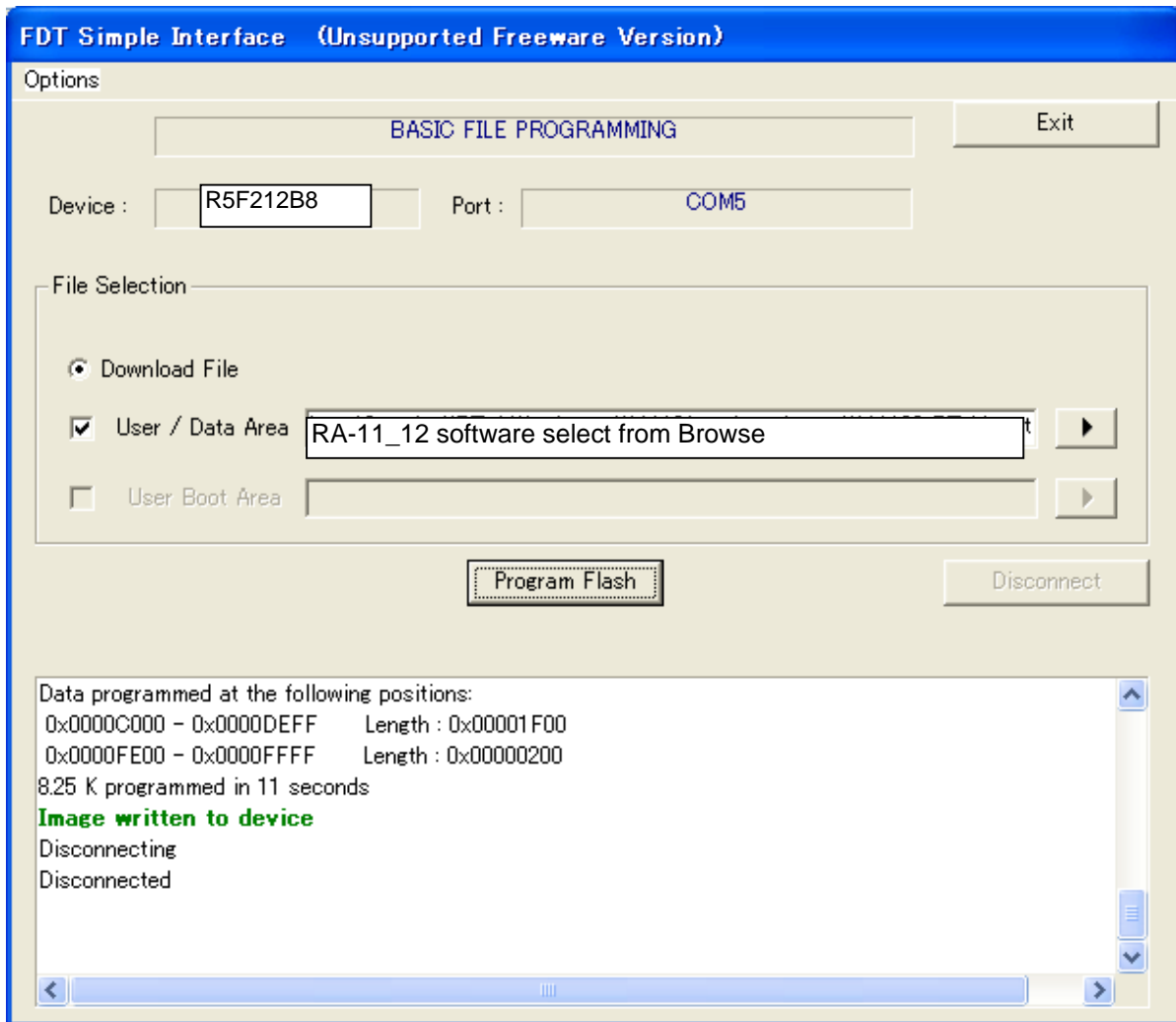
7. "Programming Option" window. Press "Finish" as default. **Then**, power ON the RA-11\_12.



- Shows selected value in "FDT Simple Interface (Unsupported Freeware Version)" window. Then check mark in "Download File" and "User / Data Area". Select loaded update file in Browse.
- Press "Program Flash" and run. There is appeared green letter Image written to devise in bottom window. It is written completed.



10. After installed completely, press "Disconnect" and remove "mini USB" cable from RA-11\_12.



11. Recycle power on RA-11\_12.

## Adjustment

Instruments : DC milli-voltmeter

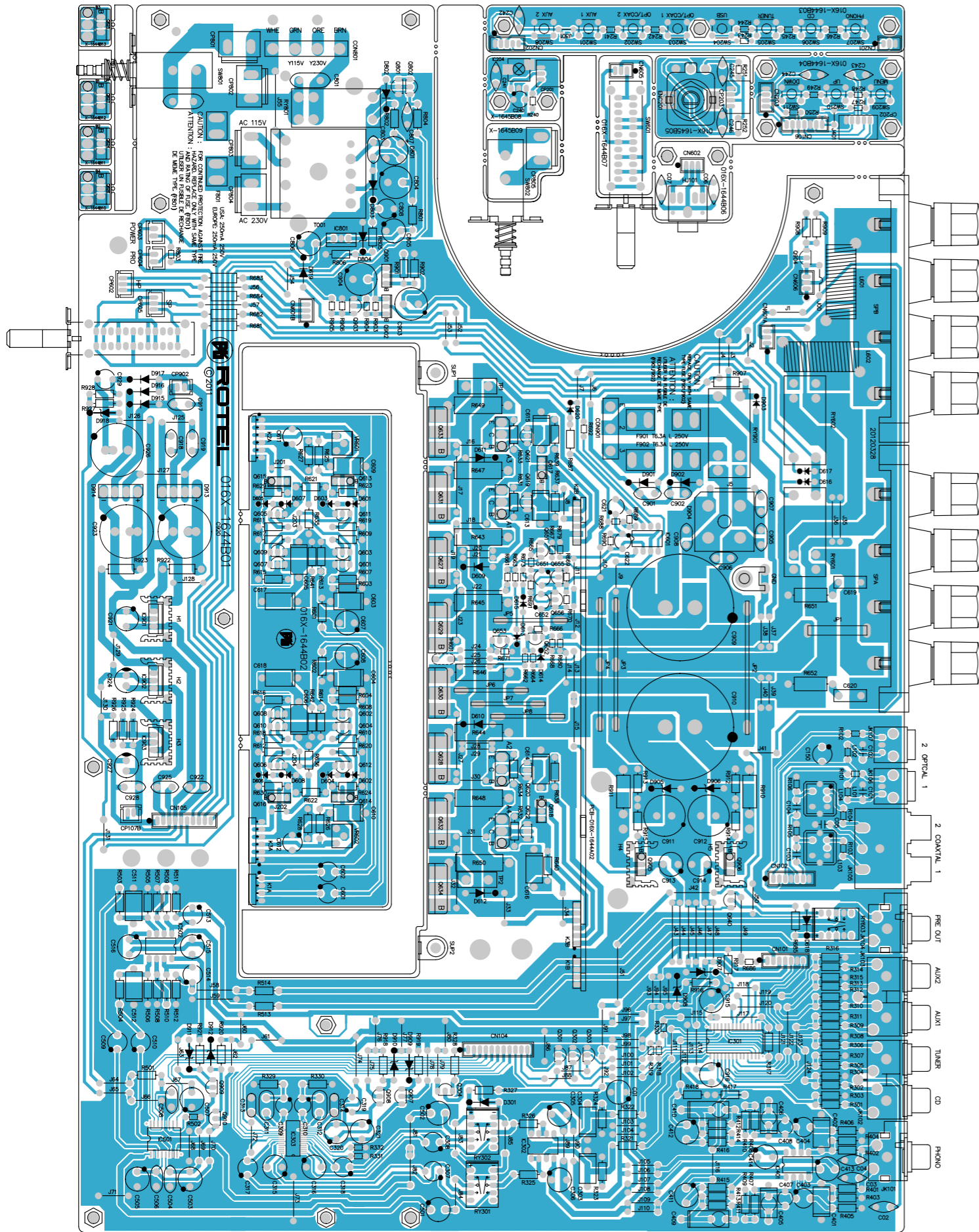
Notes : Prior to Bias Adjustment, run about 5minutes with rated output(8ohms) and warm up Power Transistor and Heat Sink. Set input off.

Step	Coupling	Location	Adjust	Adjust for
<b>1</b>	TP1	X-1644-01 PCB	VR601	DC milli-voltmeter reads 4mV
<b>2</b>	TP2	X-1644-01 PCB	VR602	

<Memo>

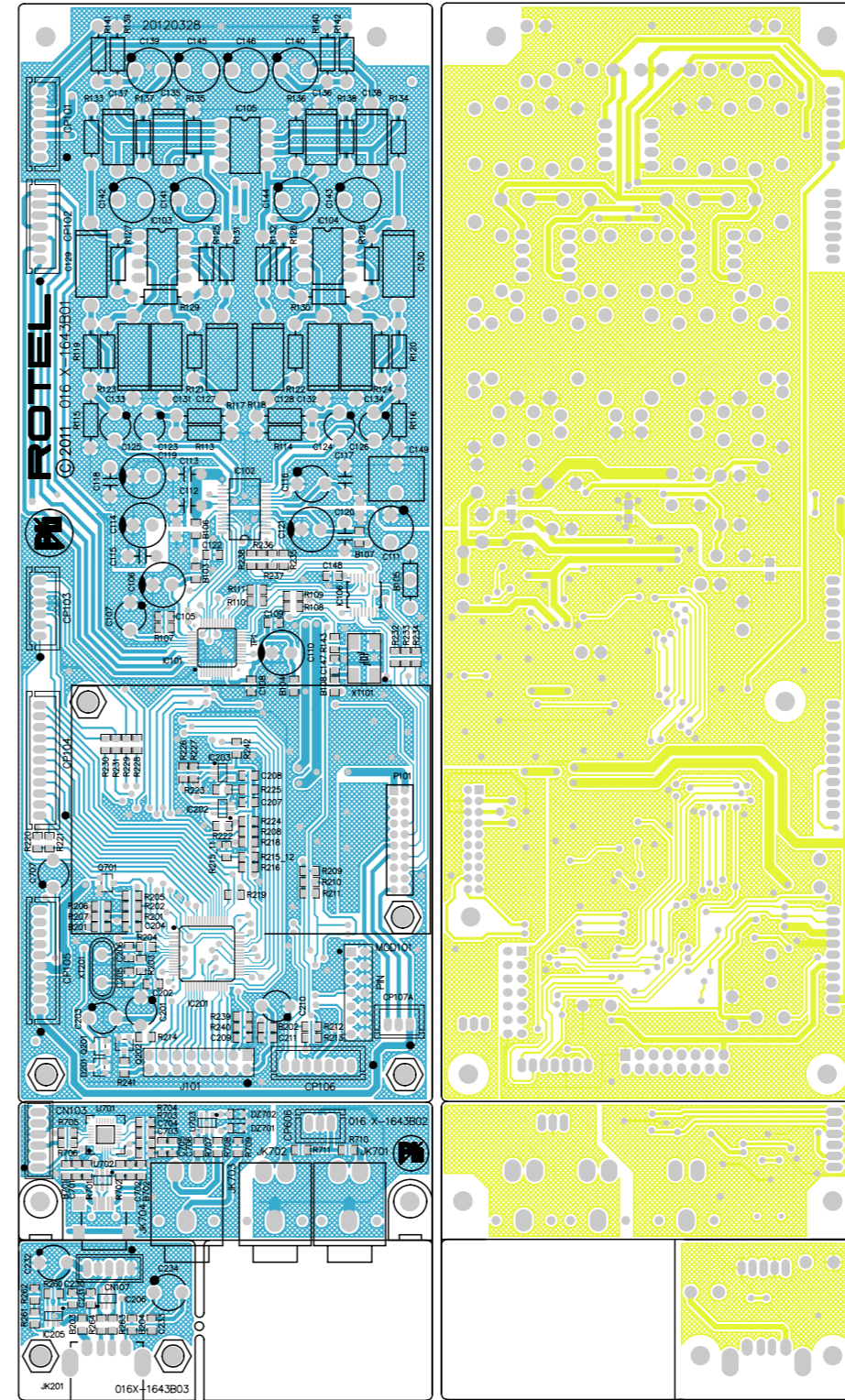
MAIN PCB

016 X-1644B01~13

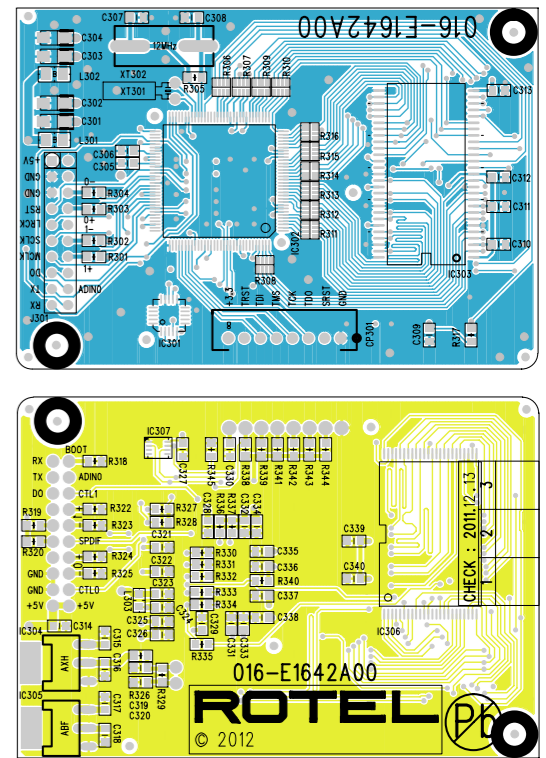


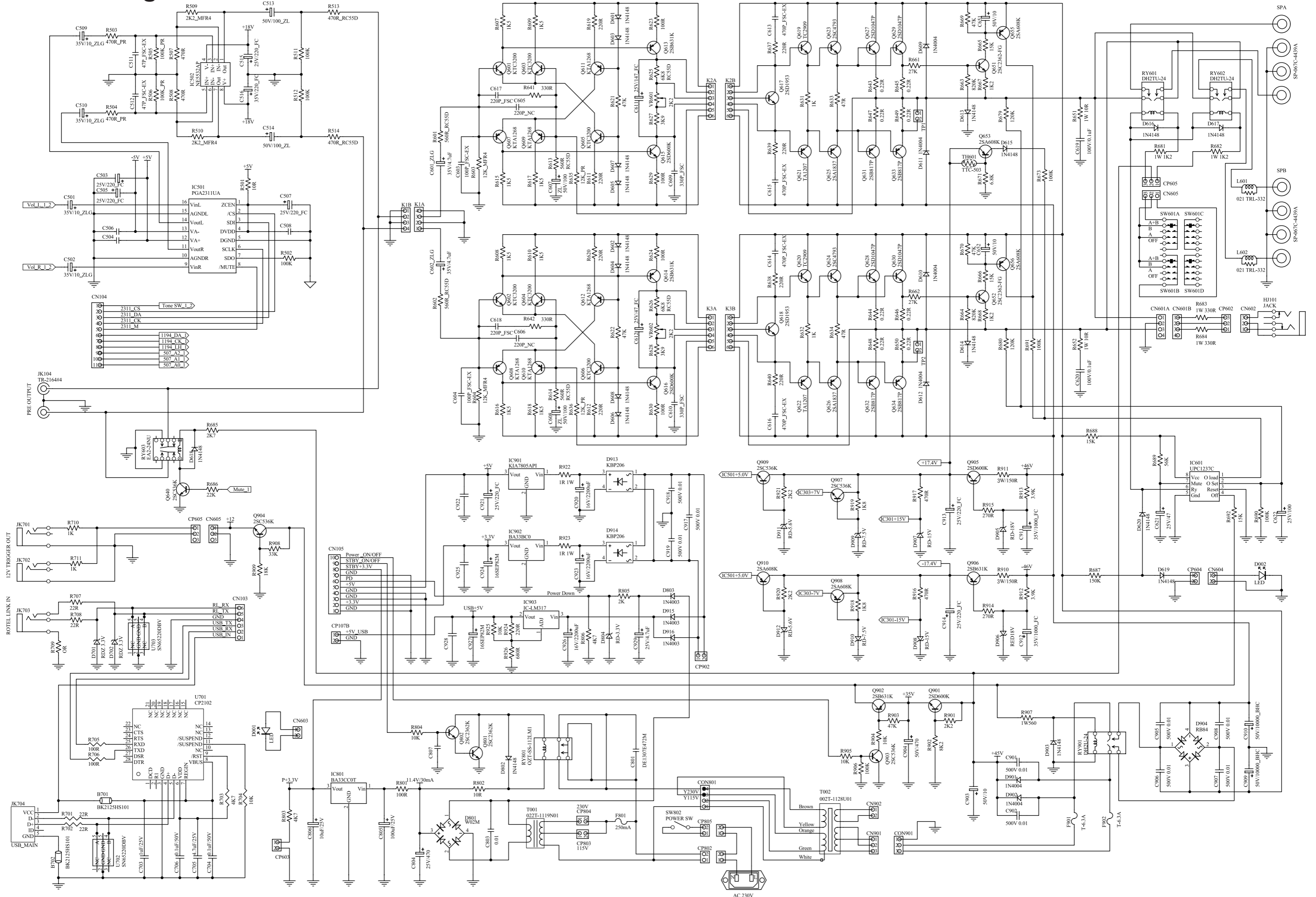
DIGITAL PCB

016 X-1643B01~03

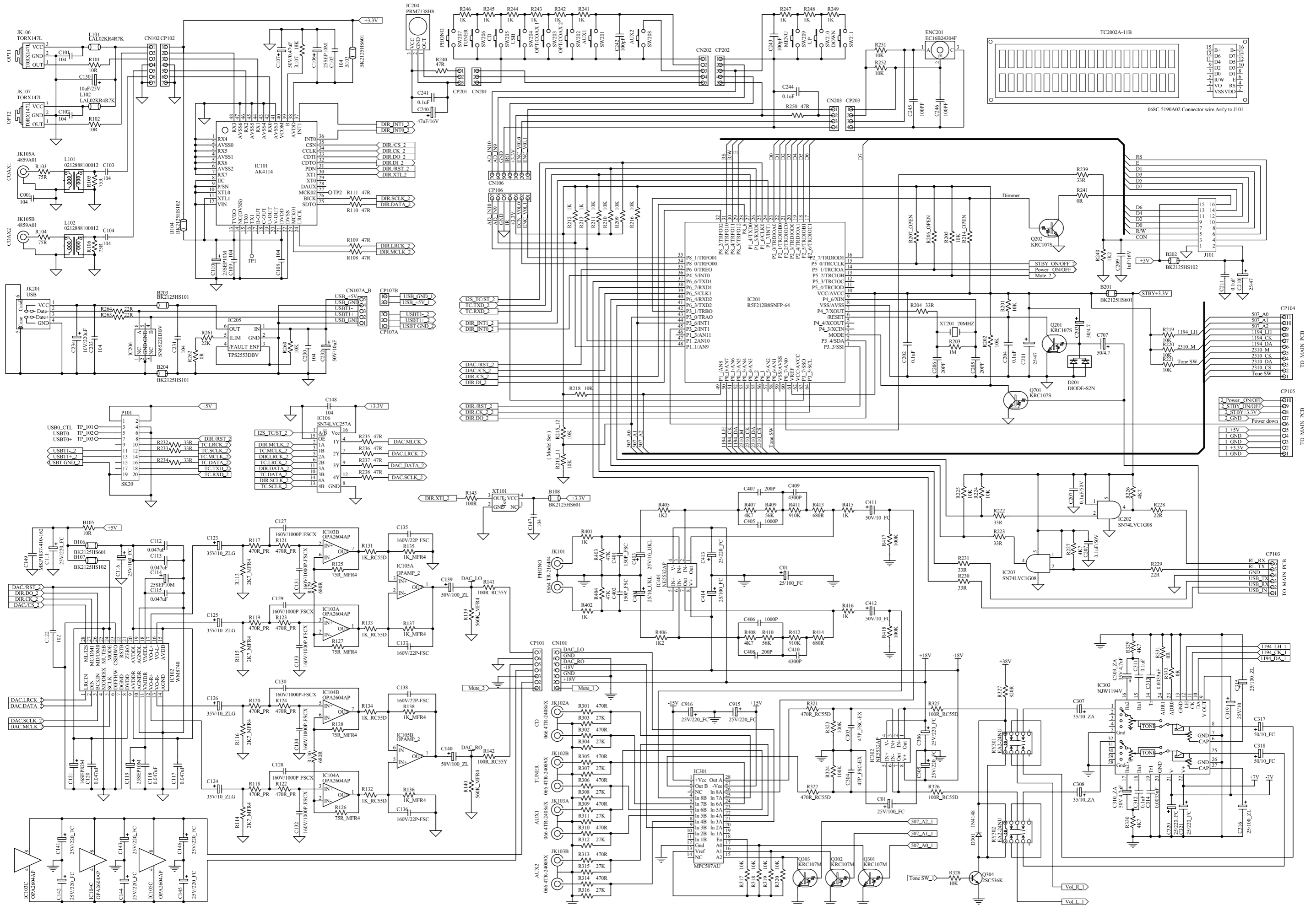


TELECHIPS PCB  
016 E-1642A00









TELECHIPS PCB 016 E-1642A00

