

SERVICE MANUAL

NAD

C 445

C 445
CFM / AM
DAB TUNER

FM / AM
DAB TUNER

PRODUCT SAFETY SERVICING GUIDELINES

CAUTION : DO NOT ATTEMPT TO MODIFY THIS PRODUCT IN ANY WAY. NEVER PERFORM CUSTOMIZED INSTALLATIONS WITHOUT MANUFACTURER'S APPROVAL. UNAUTHORIZED MODIFICATIONS WILL NOT ONLY VOID THE WARRANTY, BUT MAY LEAD TO YOUR BEING LIABLE FOR ANY RESULTING PROPERTY DAMAGE OR USER INJURY.

SERVICE WORK SHOULD BE PERFORMED ONLY AFTER YOU ARE THOROUGHLY FAMILIAR WITH ALL OF THE FOLLOWING SAFETY CHECKS AND SERVICING GUIDELINES. TO DO OTHERWISE, INCREASES THE RISK OF POTENTIAL HAZARDS AND INJURY TO THE USER.

WHILE SERVICING, USE AN ISOLATION TRANSFORMER FOR PROTECTION FROM AC LINE SHOCK.

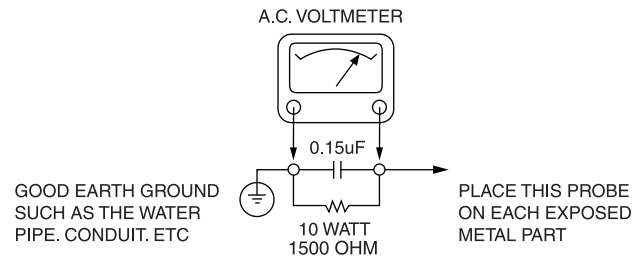
SAFETY CHECKS

AFTER THE ORIGINAL SERVICE PROBLEM HAS BEEN CORRECTED. A CHECK SHOULD BE MADE OF THE FOLLOWING.

SUBJECT : FIRE & SHOCK HAZARD

1. BE SURE THAT ALL COMPONENTS ARE POSITIONED IN SUCH A WAY AS TO AVOID POSSIBILITY OF ADJACENT COMPONENT SHORTS. THIS IS ESPECIALLY IMPORTANT ON THOSE MODULES WHICH ARE TRANSPORTED TO AND FROM THE REPAIR SHOP.
2. NEVER RELEASE A REPAIR UNLESS ALL PROTECTIVE DEVICES SUCH AS INSULATORS, BARRIERS, COVERS, SHIELDS, STRAIN RELIEFS, POWER SUPPLY CORDS, AND OTHER HARDWARE HAVE BEEN REINSTALLED PER ORIGINAL DESIGN. BE SURE THAT THE SAFETY PURPOSE OF THE POLARIZED LINE PLUG HAS NOT BEEN DEFEATED.
3. SOLDERING MUST BE INSPECTED TO DISCOVER POSSIBLE COLD SOLDER JOINTS, SOLDER SPLASHES OR SHARP SOLDER POINTS. BE CERTAIN TO REMOVE ALL LOOSE FOREIGN PARTICLES.
4. CHECK FOR PHYSICAL EVIDENCE OF DAMAGE OR DETERIORATION TO PARTS AND COMPONENTS. FOR FRAYED LEADS, DAMAGED INSULATION (INCLUDING AC CORD). AND REPLACE IF NECESSARY FOLLOW ORIGINAL LAYOUT, LEAD LENGTH AND DRESS.
5. NO LEAD OR COMPONENT SHOULD TOUCH A RECEIVING TUBE OR A RESISTOR RATED AT 1 WATT OR MORE. LEAD TENSION AROUND PROTRUDING METAL SURFACES MUST BE AVOIDED.
6. ALL CRITICAL COMPONENTS SUCH AS FUSES, FLAMEPROOF RESISTORS, CAPACITORS, ETC. MUST BE REPLACED WITH EXACT FACTORY TYPES, DO NOT USE REPLACEMENT COMPONENTS OTHER THAN THOSE SPECIFIED OR MAKE UNRECOMMENDED CIRCUIT MODIFICATIONS.
7. AFTER RE-ASSEMBLY OF THE SET ALWAYS PERFORM AN AC LEAKAGE TEST ON ALL EXPOSED METALLIC PARTS OF THE CABINET, (THE CHANNEL SELECTOR KNOB, ANTENNA TERMINALS. HANDLE AND SCREWS) TO BE SURE THE SET IS SAFET TO OPERATE WITHOUT DANGER OF ELECTRICAL SHOCK. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST USE AN AC VOLTMETER, HAVING 5000 OHMS PER VOLT OR MORE SENSITIVITY, IN THE FOLLOWING MANNER; CONNECT A 1500 OHM 10 WATT RESISTOR, PARALLELED BY A .15 MFD, 150V AC TYPE CAPACITOR BETWEEN A KNOWN GOOD EARTH GROUND (WATER PIPE, CONDUIT, ETC.) AND THE EXPOSED METALLIC PARTS, ONE AT A TIME.
MEASURE THE AC VOLTAGE ACROSS THE COMBINATION OF 1500 OHM RESISTOR AND .15 MFD CAPACITOR.
REVERSE THE AC PLUG AND REPEAT AC VOLTAGE MEASUREMENTS FOR EACH EXPOSED METALLIC PART.

VOLTAGE MEASURE MUST NOT EXCEED 75 VOLTS R.M.S. THIS CORRESPONDS TO 0.5 MILLIAMPS AC ANY VALUE EXCEEDING THIS LIMIT CONSTITUTES A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED IMMEDIATELY.



SUBJECT : GRAPHIC SYMBOLS



THE 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.



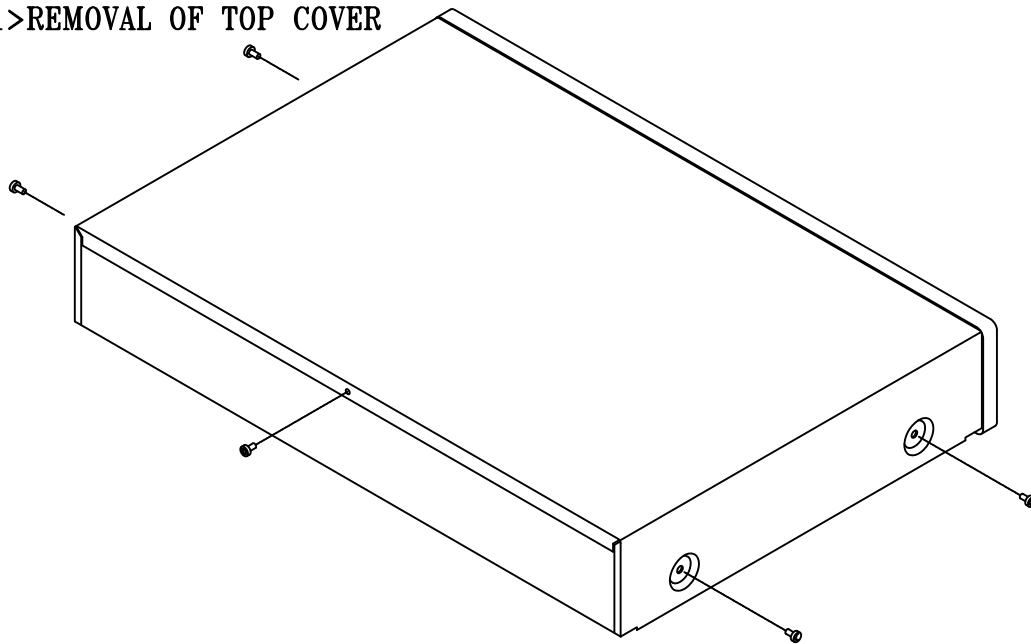
THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE USER TO THE PRESENCE OF IMPORTANT OPERATING AND MAINTENANCE (SERVICING) INSTRUCTIONS IN THE LITERATURE ACCOMPANYING THE APPLIANCE.

SUBJECT : TIPS ON PROPER INSTALLATION

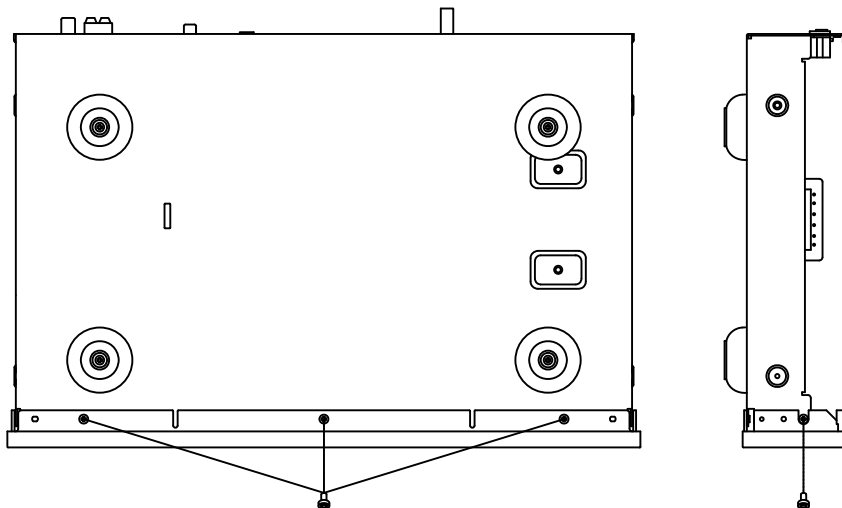
1. NEVER INSTALL ANY PRODUCT IN A CLOSED-IN RECESS, CUBBYHOLE OR CLOSELY FITTING SHELF SPACE. OVER OR CLOSE TO HEAT DUCT, OR IN THE PATH OF HEATED AIR FLOW.
2. AVOID CONDITIONS OF HIGH HUMIDITY SUCH AS: OUTDOOR PATIO INSTALLATIONS WHERE DEW IS A FACTOR, NEAR STEAM RADIATORS WHERE STEAM LEAKAGE IS A FACTOR, ETC.
3. AVOID PLACEMENT WHERE DRAPERIES MAY OBSTRUCT REAR VENTING. THE CUSTOMER SHOULD ALSO AVOID THE USE OF DECORATIVE SCARVES OR OTHER COVERINGS WHICH MIGHT OBSTRUCT VENTILATION.
4. WALL AND SHELF MOUNTED INSTALLATIONS USING A COMMERCIAL MOUNTING KIT MUST FOLLOW THE FACTORY APPROVED MOUNTING INSTRUCTIONS A PRODUCT MOUNTED TO A SHELF OR PLATFORM MUST RETAIN ITS ORIGINAL FEET (OR THE EQUIVALENT THICKNESS IN SPACERS) TO PROVIDE ADEQUATE AIR FLOW ACROSS THE BOTTOM, BOLTS OR SCREWS USED FOR FASTENERS MUST NOT TOUCH ANY PARTS OR WIRING. PERFORM LEAKAGE TEST ON CUSTOMIZED INSTALLATIONS.
5. CAUTION CUSTOMERS AGAINST THE MOUNTING OF A PRODUCT ON SLOPING SHELF OR A TILTED POSITION, UNLESS THE PRODUCT IS PROPERLY SECURED.
6. A PRODUCT ON A ROLL-ABOUT CART SHOULD BE STABLE ON ITS MOUNTING TO THE CART. CAUTION THE CUSTOMER ON THE HAZARDS OF TRYING TO ROLL A CART WITH SMALL CASTERS ACROSS THRESHOLDS OR DEEP PILE CARPETS.
7. CAUTION CUSTOMERS AGAINST THE USE OF A CART OR STAND WHICH HAS NOT BEEN LISTED BY UNDERWRITERS LABORATORIES, INC. FOR USE WITH THEIR SPECIFIC MODEL OF TELEVISION RECEIVER OR GENERICALLY APPROVED FOR USE WITH T.V.'S OF THE SAME OR LARGER SCREEN SIZE.
8. CAUTION CUSTOMERS AGAINST THE USE OF EXTENSION CORDS, EXPLAIN THAT A FOREST OF EXTENSIONS SPROUTING FROM A SINGLE OUTLET CAN LEAD TO DISASTROUS CONSEQUENCES TO HOME AND FAMILY.

DISASSEMBLY

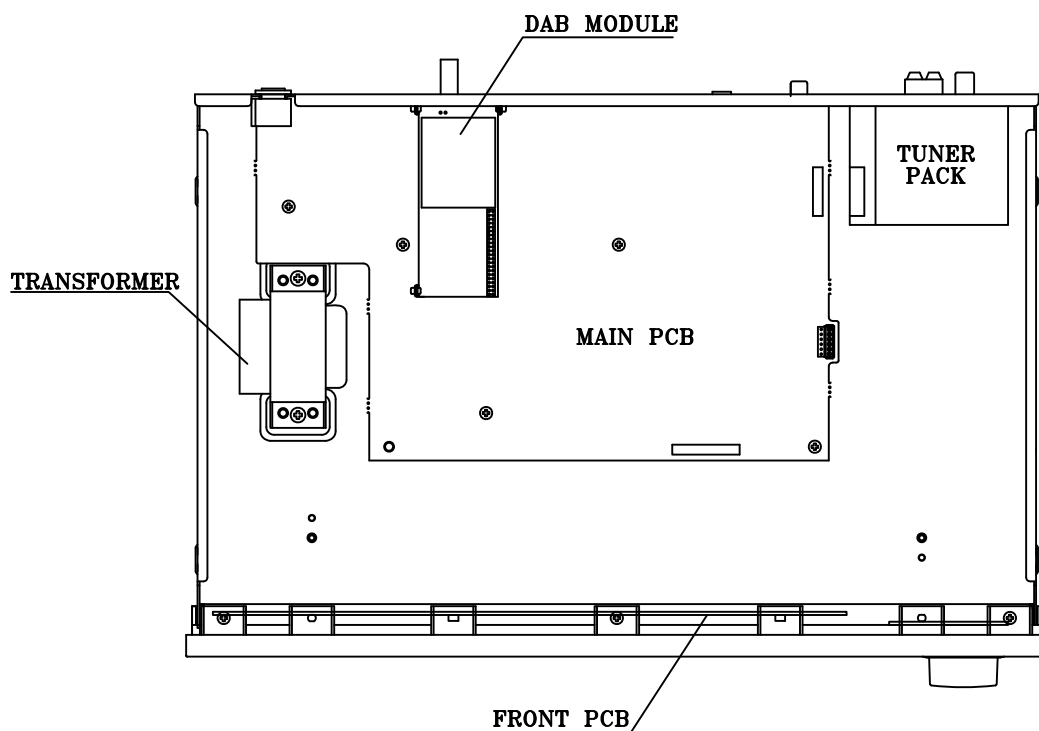
1>REMOVAL OF TOP COVER



2>REMOVAL OF FRONT PANEL



PRINCIPAL PARTS LOCATION



SPECIFICATIONS

FM SECTION

Frequency Range:	87.50 MHz to 108.00 MHz (50 kHz steps)
Signal-to-Noise Ratio: 65dB (Mono) 60dB (Stereo)	
Presets:	30

AM SECTION

Frequency Range:	522 kHz to 1620 kHz (9 kHz steps)
Signal-to-Noise Ratio:	35dB
Presets:	30

DAB SECTION

Band III:	174MHz - 240MHz
Band L :	1452MHz - 1492MHz
Max signal:	~ -3dBm
Sensitivity:	~ -96dBm
Adjacent Channel Rejection:	~ 35dB
Presets:	99
Display:	2-line by 16-character DOT Matrix
Audio Output Stereo:	2.5V P-P
48kHz sample rate,	16 bit sample resolution
Optical S/PDIF:	IEC60958 Compliant.
48kHz sample rate, 24 bit sample resolution	

GENERAL

Power Requirement:	230-240V AC, 50Hz
Power Consumption:	12W 0.8W(standby)

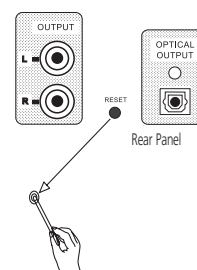
DIMENSIONS (MAX)

Width Height Depth:	435 x 86 x 318mm
Weight:	6kg

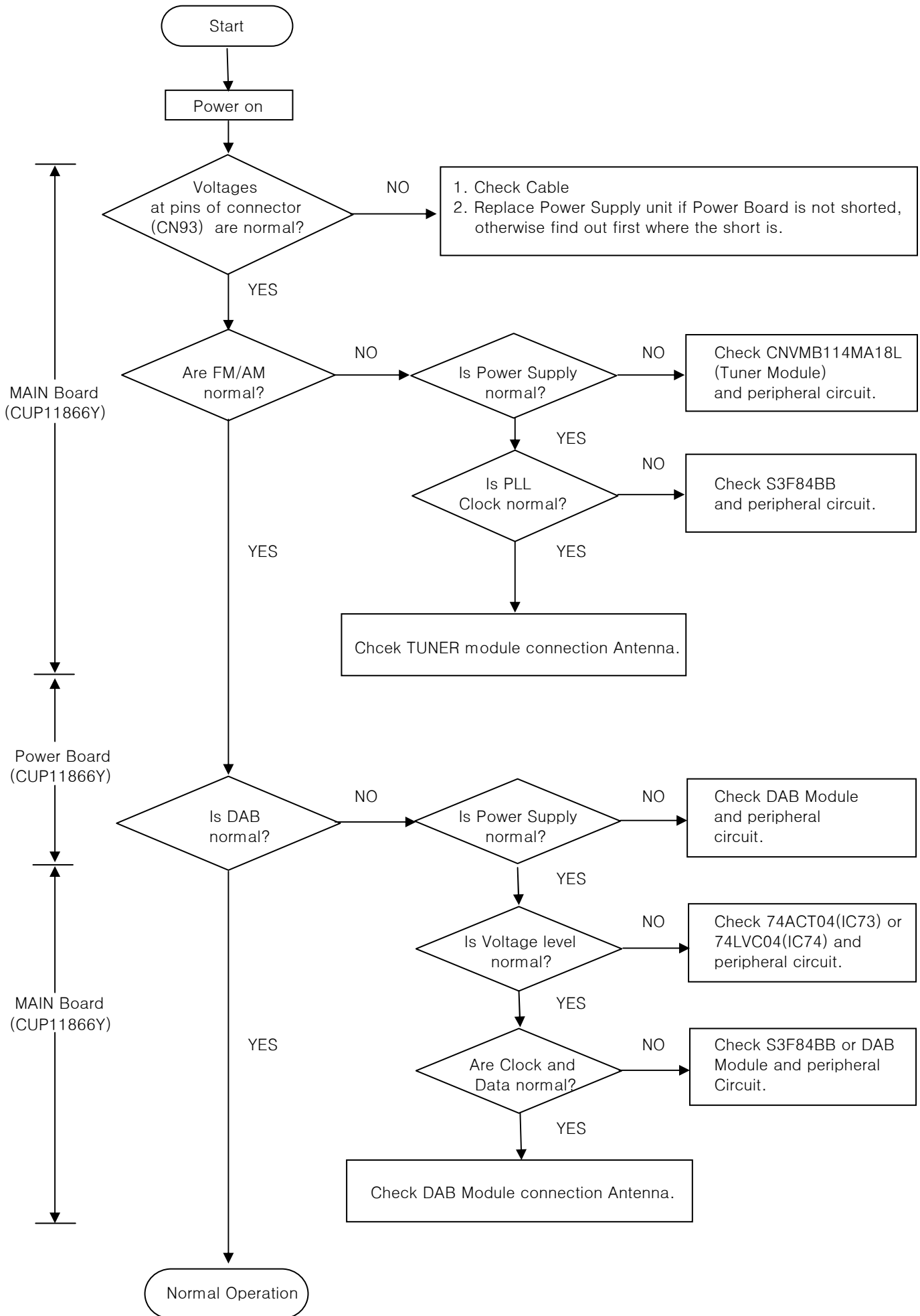
TROUBLESHOOTING

This unit is designed for trouble-free operation. Most problems users encounter are due to operating errors. If you have a problem, first check this list for a possible solution. If the problem persists, consult your authorized Service Centre.

Symptom	Cause/Correction
No lights appear when System Power button is pressed	Unit is plugged into a live outlet. Make sure the outlet is active.
No sound is heard	Tune to an active station. Check for correct amplifier settings. Check the connections and wires.
Sound distorts, particularly in stereo mode.	Use a more directional antenna.
Intermittent or continuous buzzing or hissing	Place the unit further away from these appliances. Install noise filters on the appliances.
Display says 'No stations Available'	Check that antenna is connected. Ensure that DAB coverage exists in your area.
Display has gone blank or says 'service off air'	This may occur if a broadcaster changes the label of a service or removes a label whilst you are listening to it. Try to retune to this station, using the Autotune procedure.
Unit's operation or the displays seem abnormal	To correct this problem, first unplug the unit from the AC wall outlet and wait at least three minutes. After the pause, reconnect the AC power cord and check the unit's operation. Reset the C445 Tuner; press and hold the Menu/FM Mute Button for 5 seconds, until the Information Display shows FACTORY RESET. Note that when the system is reset, all tuner presets will be lost and must be re-entered. Press the RESET switch lightly once or twice with a pencil or ballpoint pen as per example below. If these steps do not solve the problem, consult your dealer or an authorized service centre.

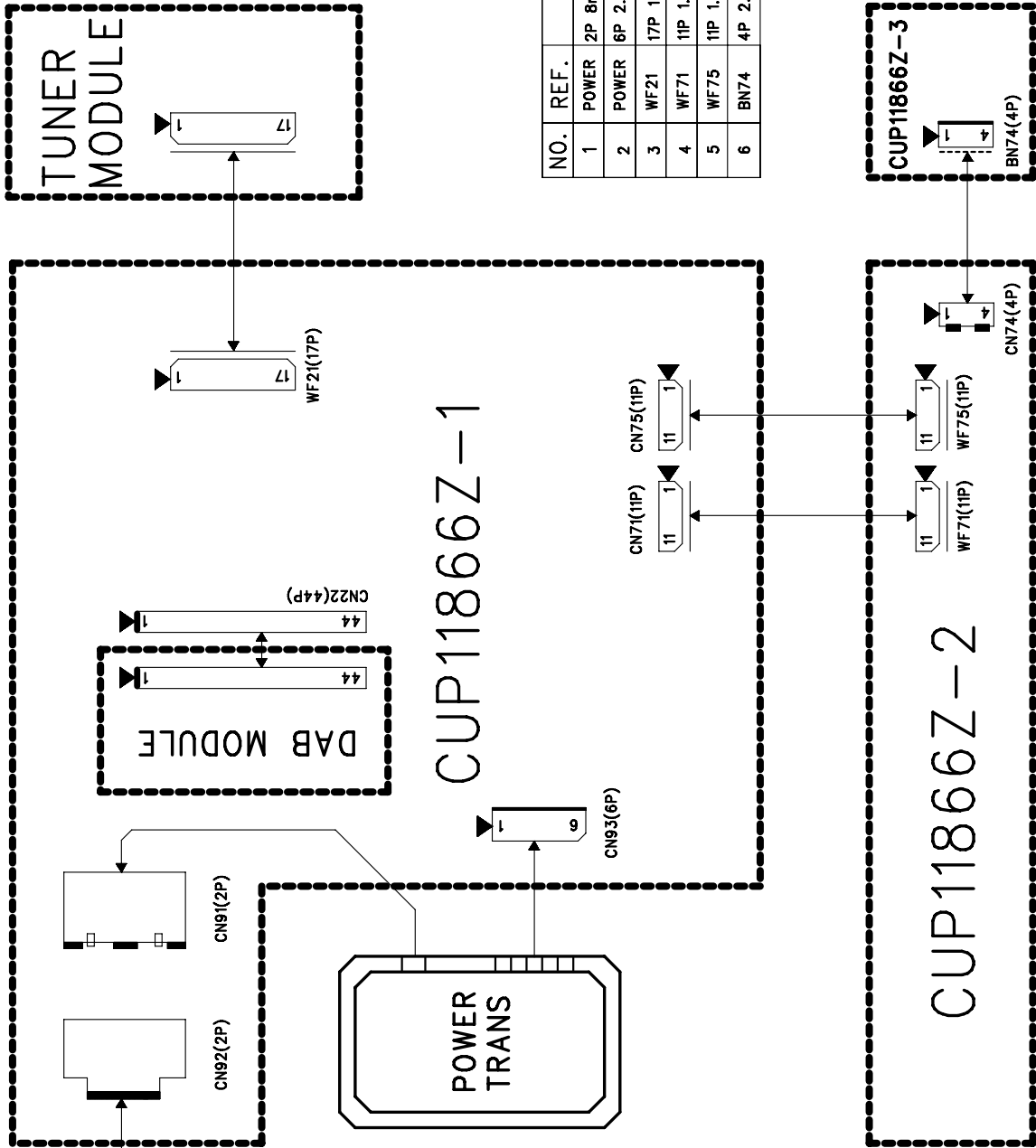


MAINTENANCE FLOW CHART



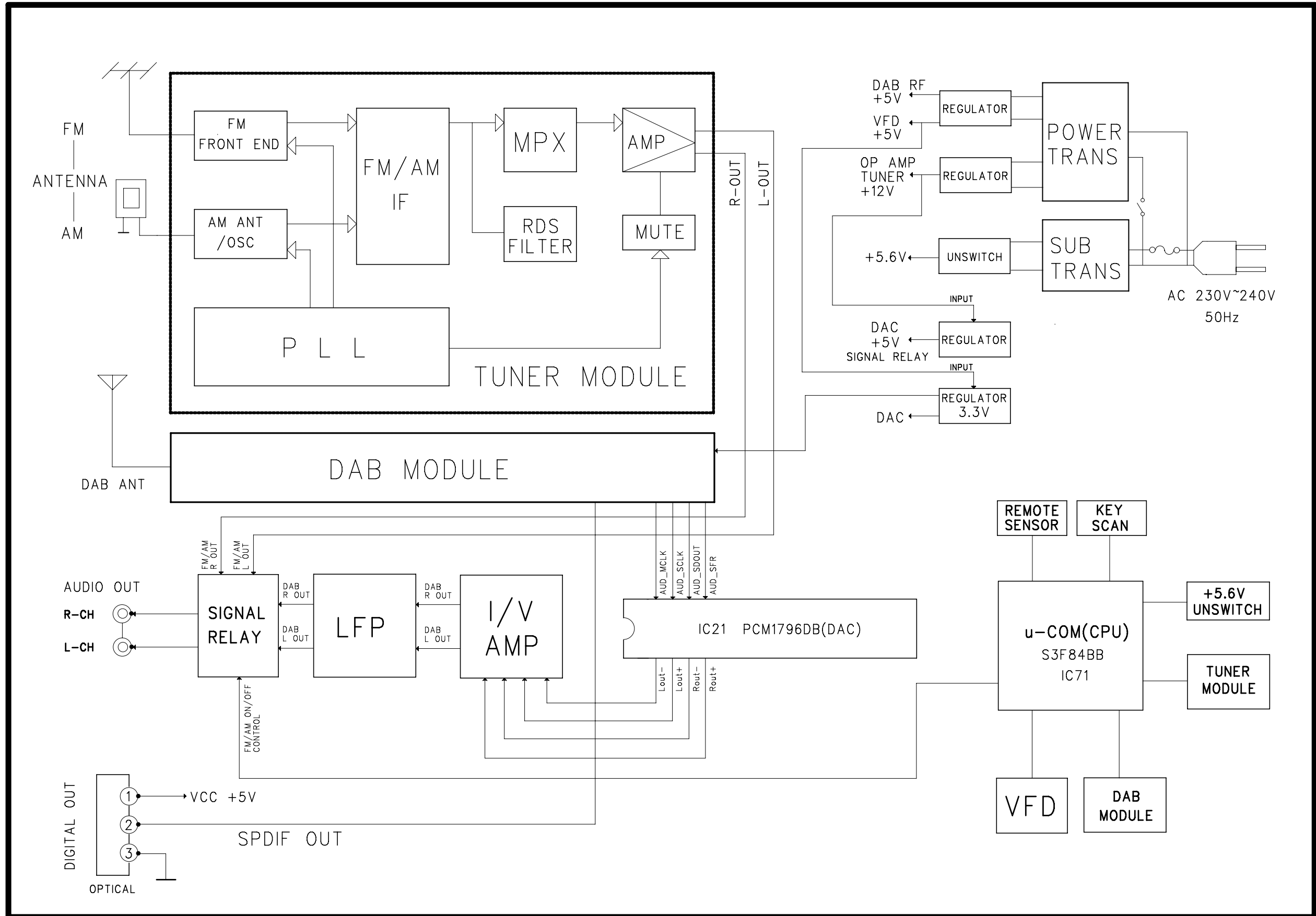
WIRING DIAGRAM

EUR : 230V~240V 50Hz



NO.	REF.	SPEC
1	POWER	2P 8mm pitch 180mm UL 1672
2	POWER	6P 2.5mm pitch 60mm UL 1007
3	WF21	17P 1.25mm pitch 70mm
4	WF71	11P 1.0mm pitch 120mm
5	WF75	11P 1.0mm pitch 120mm
6	BN74	4P 2.0mm pitch 50mm

■ BLOCK DIAGRAM

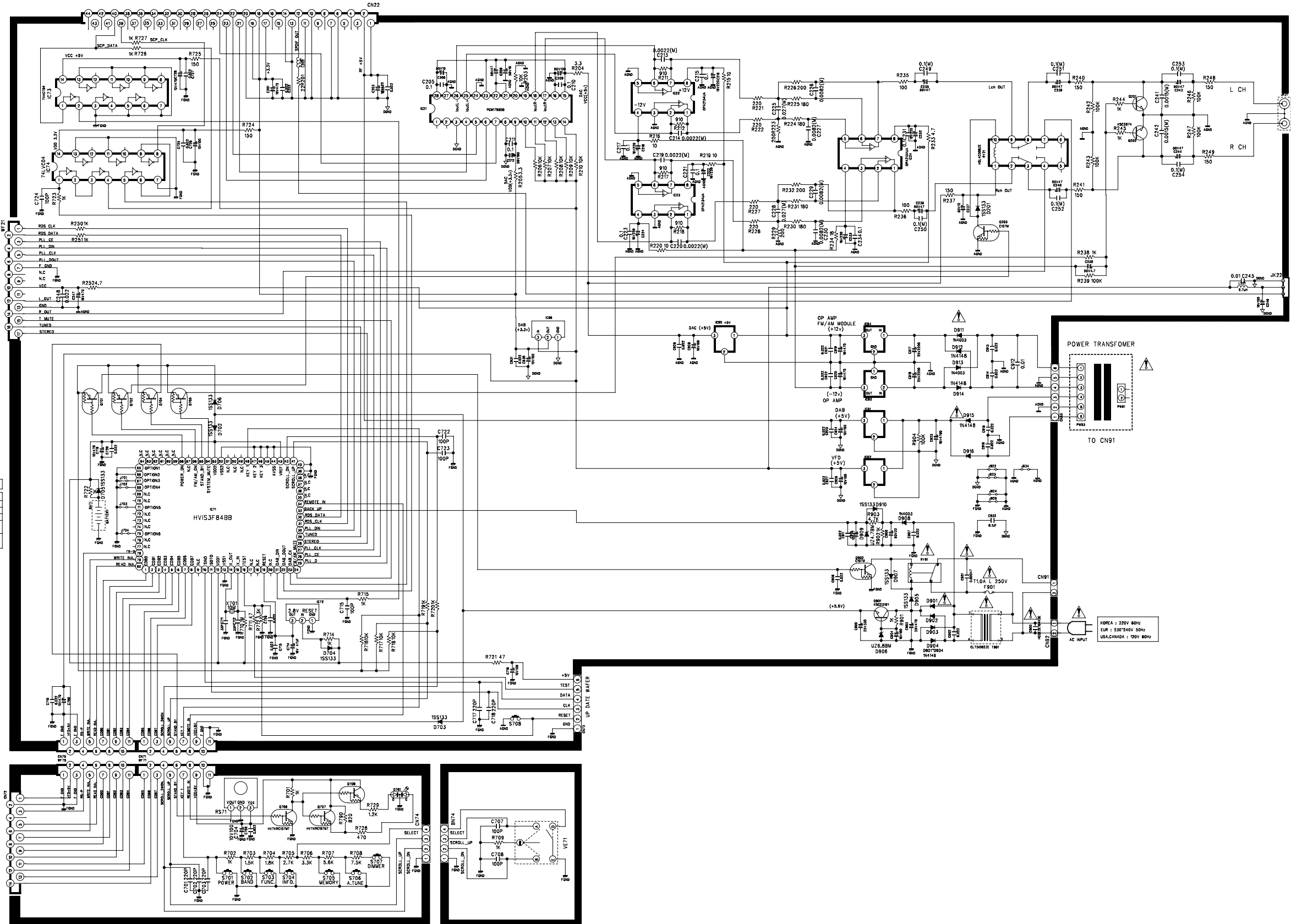


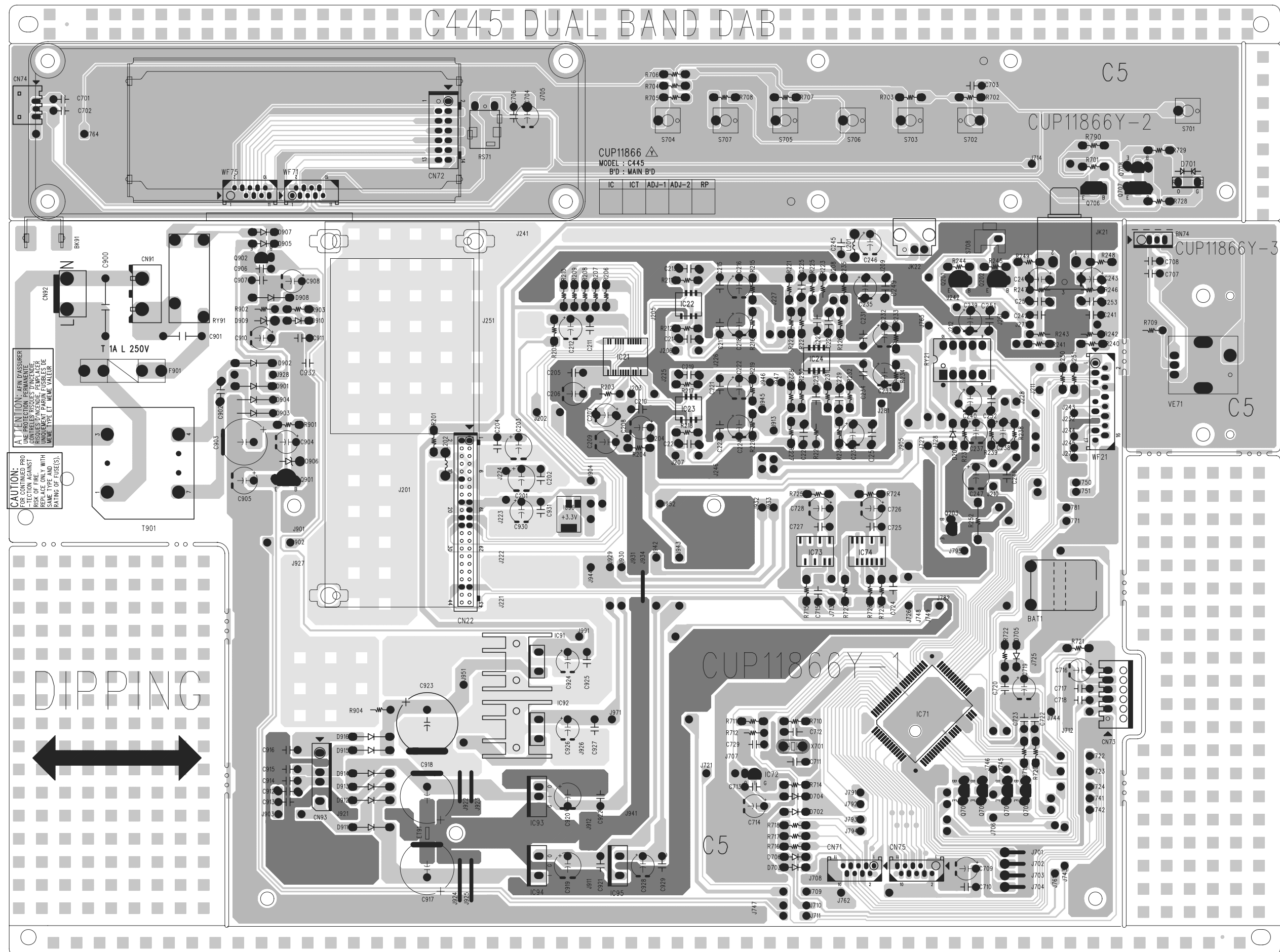
SCHEMATIC DIAGRAM

DAB MODULE

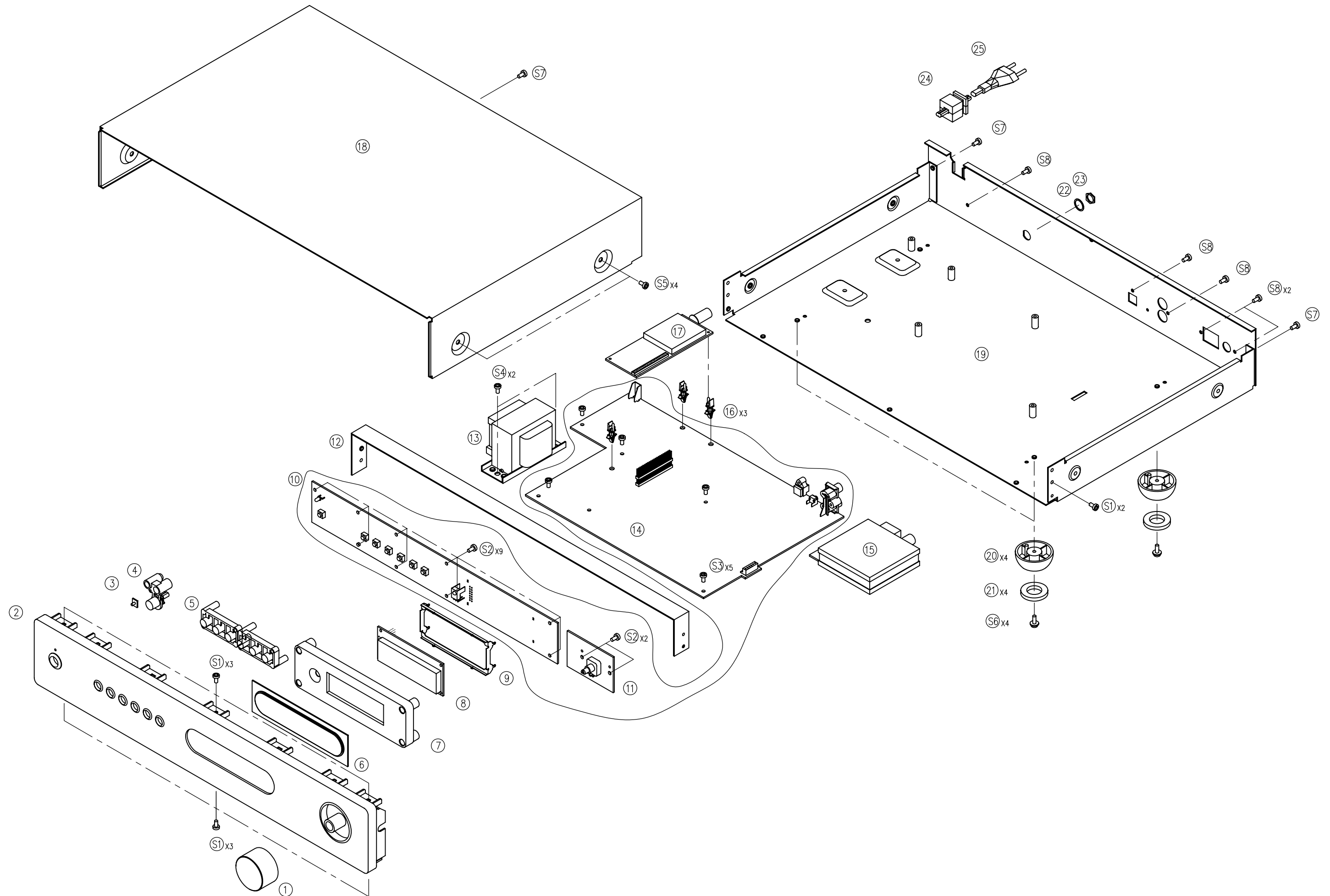
MODULE
FM/AM

OPTION			
PIN 65	FM 50K STEP	ACTIVE L	
PIN 66	AM 5K STEP	ACTIVE L	
PIN 67	RDS ON	ACTIVE L	
PIN 68	MW DISPLAY	ACTIVE L	
PIN 71	NAD R/C CODE	OPEN	
	H/K R/C CODE	ACTIVE L	
PIN 75	L BAND ON	OPEN	
	L/C/WBAND ON	ACTIVE L	





EXPLODED VIEW (C445C/CT)



C445C/CT EXPLODED VIEW PARTS LIST

S8	CTB3+8JFZR	SCREW	5
S7	CTB3+8JFZR	SCREW(GRAY)	3
	CTB3+8JFCR	SCREW(TITAN)	
S6	CTW3+8JR	SCREW	4
S5	CTB3+6FFZR	SCREW(GRAY)	4
	CTB3+6FFCR	SCREW(TITAN)	
S4	CTB4+6FR	SCREW	2
S3	CTB3+8FR	SCREW	5
S2	CTB3+10JR	SCREW	11
S1	CTB3+6JR	SCREW	8
No.	PARTS No.	DESCRIPTION	Q'TY

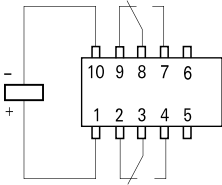
25	CJA2B043ZA	POWER CORD	1
24	KHR1A028	BUSHING, AC CORD	1
23	CNE1A009	NUT, DAB	1
22	CNW1A038	WASHER	1
21	CHG1A297	CUSHION, FOOT	4
20	CKL1A086	FOOT	4
19	CUA1A263ZK1	CHASSIS	1
18	CKC1A172G37	CABINET, TOP(GRAY)	1
	CKC1A172G39	CABINET, TOP(TITAN)	
17	CNVKS2022VB1	DAB MODULE	1
16	CMH1A226	SUPPORT, PCB	3
15	CNVMB114MA18L	TUNER MODULE	1
14	CUP11866Z-1	PCB ASS'Y(MAIN)	1
13	CLT5M029ZET	TRANS	1
12	CMD1A588	FRAME, FRONT	1
11	CUP11866Z-3	PCB ASS'Y(VOLUME)	1
10	CUP11866Z-2	PCB ASS'Y (FRONT)	1
9	CMD1A580	BRACKET, VFD	1
8	HFL16T202DA1E	VFD	1
7	CMH1A253	SUPPORT, VFD	1
6	CGU1A388	WINDOW, VFD	1
5	CBT1A1016G36	KNOB, FUNCTION(GRAY)	2
	CBT1A1016G38	KNOB, FUNCTION(TITAN)	
4	CBT1A1015G36	KNOB, POWER(GRAY)	1
	CBT1A1015G38	KNOB, POWER(TITAN)	
3	CGL1A247	INDICATOR, POWER	1
2	CGW2A417ZG36	PANEL, FRONT(GRAY)	1
	CGW2A417ZG38	PANEL, FRONT(TITAN)	
1	CBN1A208G36	KNOB, VOLUME(GRAY)	1
	CBN1A208G38	KNOB, VOLUME(TITAN)	
No.	PARTS No.	DESCRIPTION	Q'TY

FP2 Relay (RT21)

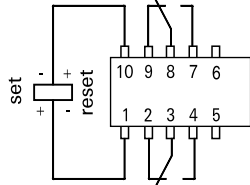
Terminal assignment

Relay - top view

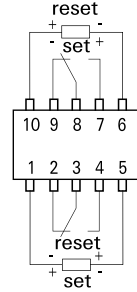
Non-latching type,
not energized condition



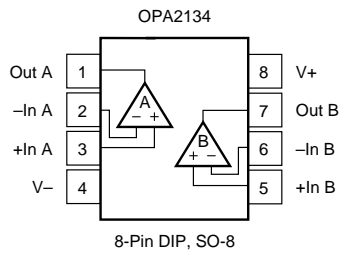
Latching type,
reset condition



latching, 2 coils
reset condition

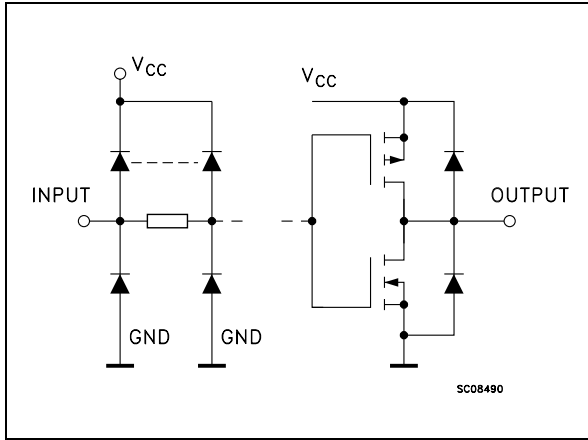


BLOCK DIAGRAM (IC22, IC23, IC24: OP AMP)



HEX INVERTER (IC73: 74ACT04)

INPUT AND OUTPUT EQUIVALENT CIRCUIT



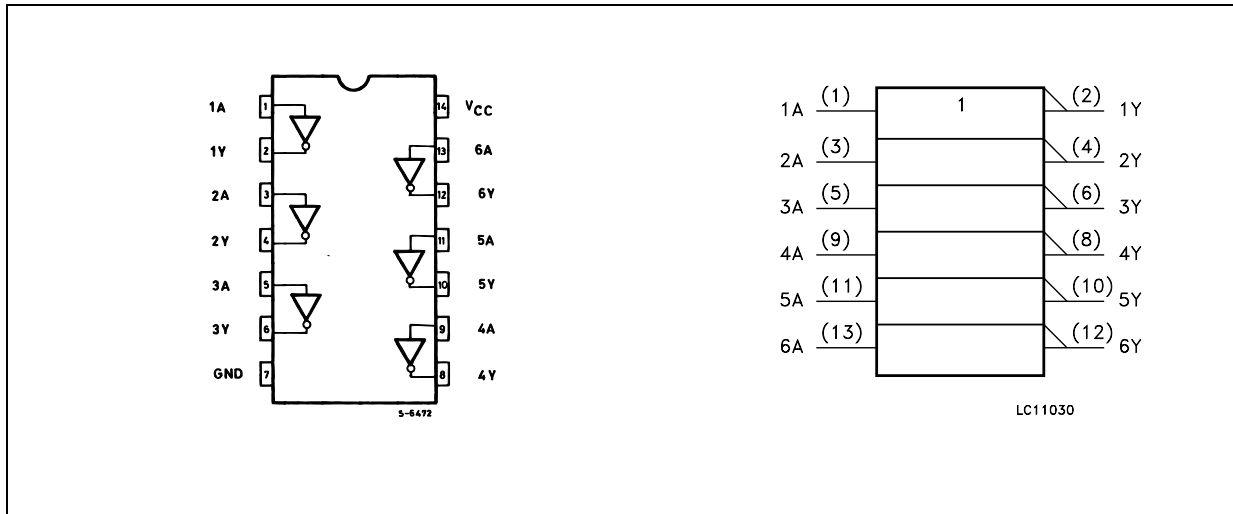
PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 3, 5, 9, 11, 13	1A to 6A	Data Inputs
2, 4, 6, 8, 10, 12	1Y to 6Y	Data Outputs
7	GND	Ground (0V)
14	V _{CC}	Positive Supply Voltage

TRUTH TABLE

A	Y
L	H
H	L

PIN CONNECTION AND IEC LOGIC SYMBOLS



Terminal Functions (IC21: PCM1796)

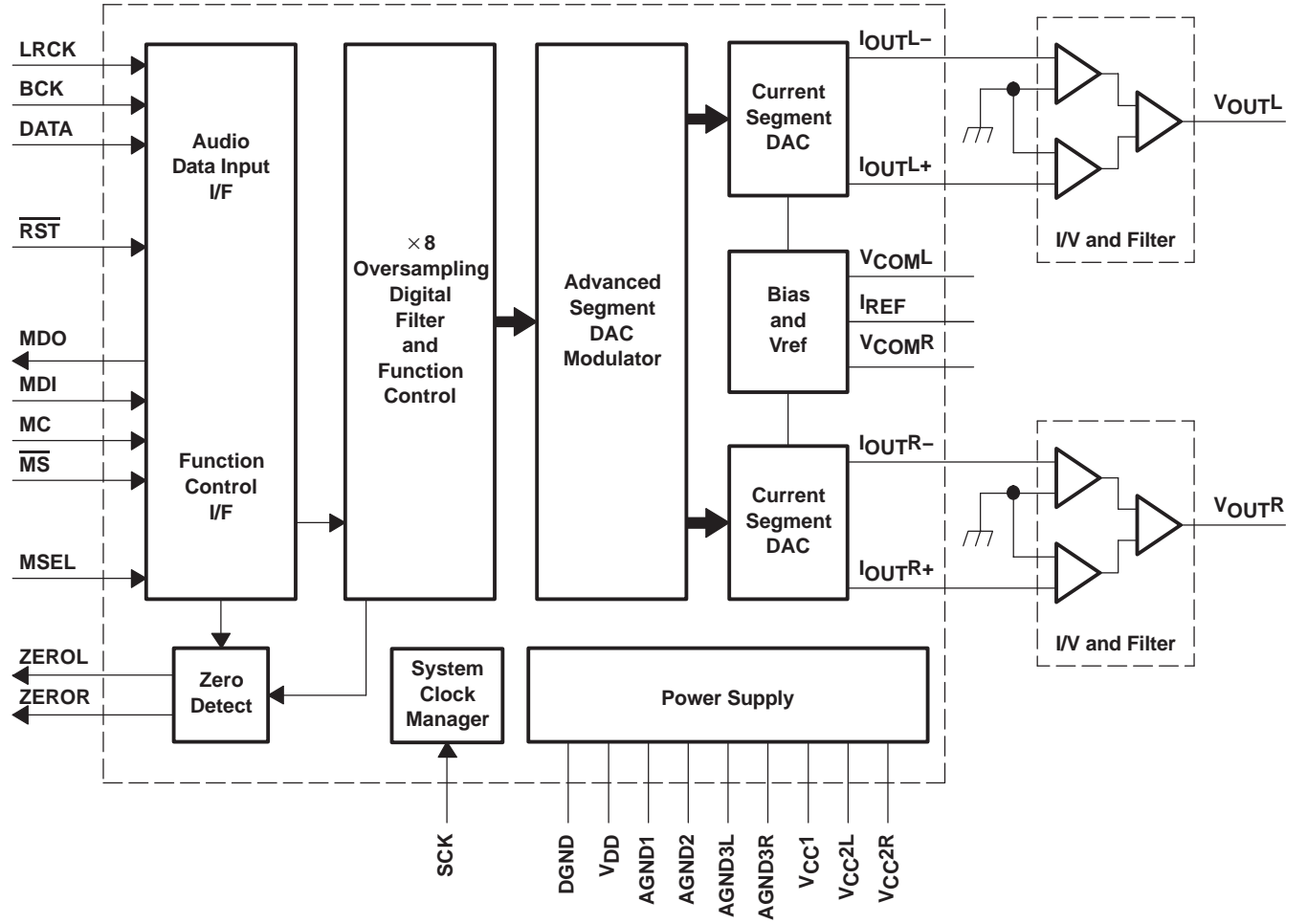
TERMINAL NAME	PIN	I/O	DESCRIPTIONS
AGND1	19	–	Analog ground (internal bias)
AGND2	24	–	Analog ground (internal bias)
AGND3L	27	–	Analog ground (L-channel DACFF)
AGND3R	16	–	Analog ground (R-channel DACFF)
BCK	6	I	Bit clock input ⁽¹⁾
DATA	5	I	Serial audio data input ⁽¹⁾
DGND	8	–	Digital ground
IOUTL+	25	O	L-channel analog current output+
IOUTL–	26	O	L-channel analog current output–
IOUTR+	17	O	R-channel analog current output+
IOUTR–	18	O	R-channel analog current output–
IREF	20	–	Output current reference bias pin
LRCK	4	I	Left and right clock (f_S) input ⁽¹⁾
MC	12	I	Mode control clock input ⁽¹⁾
MDI	11	I	Mode control data input ⁽¹⁾
MDO	13	I/O	Mode control readback data output ⁽³⁾
\overline{MS}	10	I/O	Mode control chip-select input ⁽²⁾
MSEL	3	I	I ² C/SPI select ⁽¹⁾
\overline{RST}	14	I	Reset ⁽¹⁾
SCK	7	I	System clock input ⁽¹⁾
VCC1	23	–	Analog power supply, 5 V
VCC2L	28	–	Analog power supply (L-channel DACFF), 5 V
VCC2R	15	–	Analog power supply (R-channel DACFF), 5 V
VCOML	22	–	L-channel internal bias decoupling pin
VCOMR	21	–	R-channel internal bias decoupling pin
VDD	9	–	Digital power supply, 3.3 V
ZEROL	1	I/O	Zero flag for L-channel ⁽²⁾
ZEROR	2	I/O	Zero flag for R-channel ⁽²⁾

(1) Schmitt-trigger input, 5-V tolerant

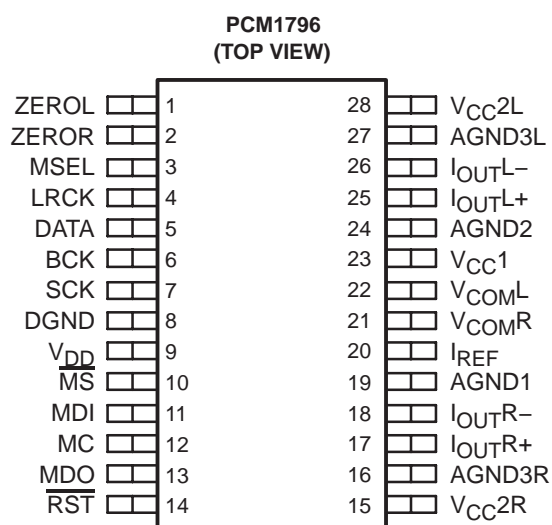
(2) Schmitt-trigger input and output. 5-V tolerant input and CMOS output

(3) Schmitt-trigger input and output. 5-V tolerant input. In I²C mode, this pin becomes an open-drain 3-state output; otherwise, this pin is a CMOS output.

FUNCTIONAL BLOCK DIAGRAM (IC21: PCM1796)

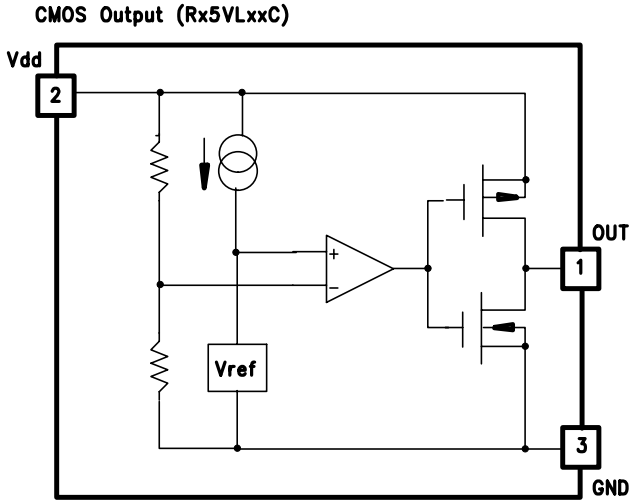


PIN ASSIGNMENTS(IC21: PCM1796)

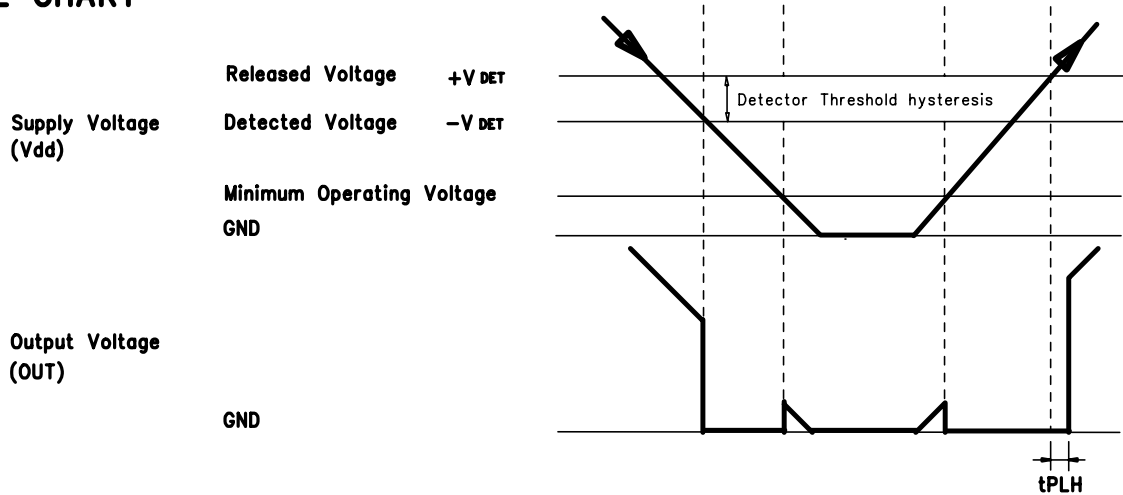


RESET IC (RE5VL28CATZ) : IC72

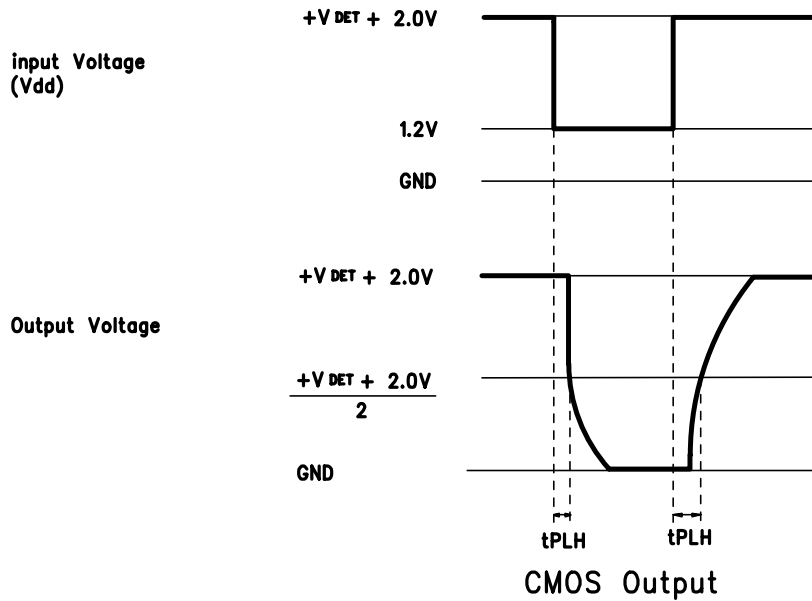
■ BLOCK DIAGRAM



■ TIME CHART



■ DEFINITION OF OUTPUT DELAY TIME tPLH



IC71 FUNCTION (MI-COM S3F84BB)

Pin No.	PIN NAME	I/O	DESCRIPTION
1~8	FIP-DA	O	FIP Data output port
9	N.C	-	Non connection
10	SINO	I	UART Data input port
11	SOTO	O	UART Data output port
12	VDD1	I	Power supply port(+5V)
13	VSS1	I	GND
14	XTOUT	O	10MHz crystal connection port
15	XIN	I	
16	TEST	I	Back-up Input
17,18	N.C	-	Non connection
19	RESET	I	Reset input port("L")
20	N.C	-	Non connection
21	DAB_DIN	I	DAB Data input port
22	DAB_DOUT	O	DAB Data output port
23	DAB_CLK	O	DAB Clock control port("L")
24	FM/AM_MUTE	O	FM/AM MUTE control port("L")
25	PLL_DATA	O	PLL Data output port
26	PLL_CE	O	PLL Enable control port
27	PLL_CLK	O	PLL Clock control port
28	STEREO	I	Tuner module stereo control port
29	TUNED	I	Tuner module tuned control port
30	PLL_DIN	I	PLL Data input port
31	RDS_CLK	O	RDS Clock control port
32	RDS_DATA	I	RDS Data input port
33	BACK_UP	I	BACK-UP mode control port("L")
34	REMOTE_IN	I	Remote unit data input port
35~38	N.C	-	Non connection
39,40	GND	I	GND
41	SCROLL_UP	I	Scroll up control port
42	SCROLL_DN	I	Scroll down control port
43	VREF	I	A/D converter reference voltage
44	AVSS	I	GND
45	GND	I	
46	KEY3	I	
47	KEY2	I	
48	KEY1	I	KEY 1 control port
49~51	N.C	-	Non connection
52	VSS2	I	GND
53	VDD2	I	Power supply port(+5V)
54	SYSTEM_MUTE	O	System MUTE control port("L")
55	STAND_BY	O	Standby on control port("L")
56	FM/AM_ON	O	FM/AM on control port("L")
57	N.C	-	Non connection
58	POWER_ON	O	Unit turn on control port("L")
59~64	N.C	-	Non connection
65~68	OPTION	I	GND or OPEN
69~70	N.C	-	Non connection
71	OPTION	I	GND or OPEN
72~74	N.C	-	Non connection
75	OPTION	I	GND or OPEN
76~77	N.C	-	Non connection
78	RS_P	O	Register selection port
79	WRITE	O	Write enable port
80	READ	O	Read enable port

BLOCK DIAGRAM (IC71: S3F84BB)

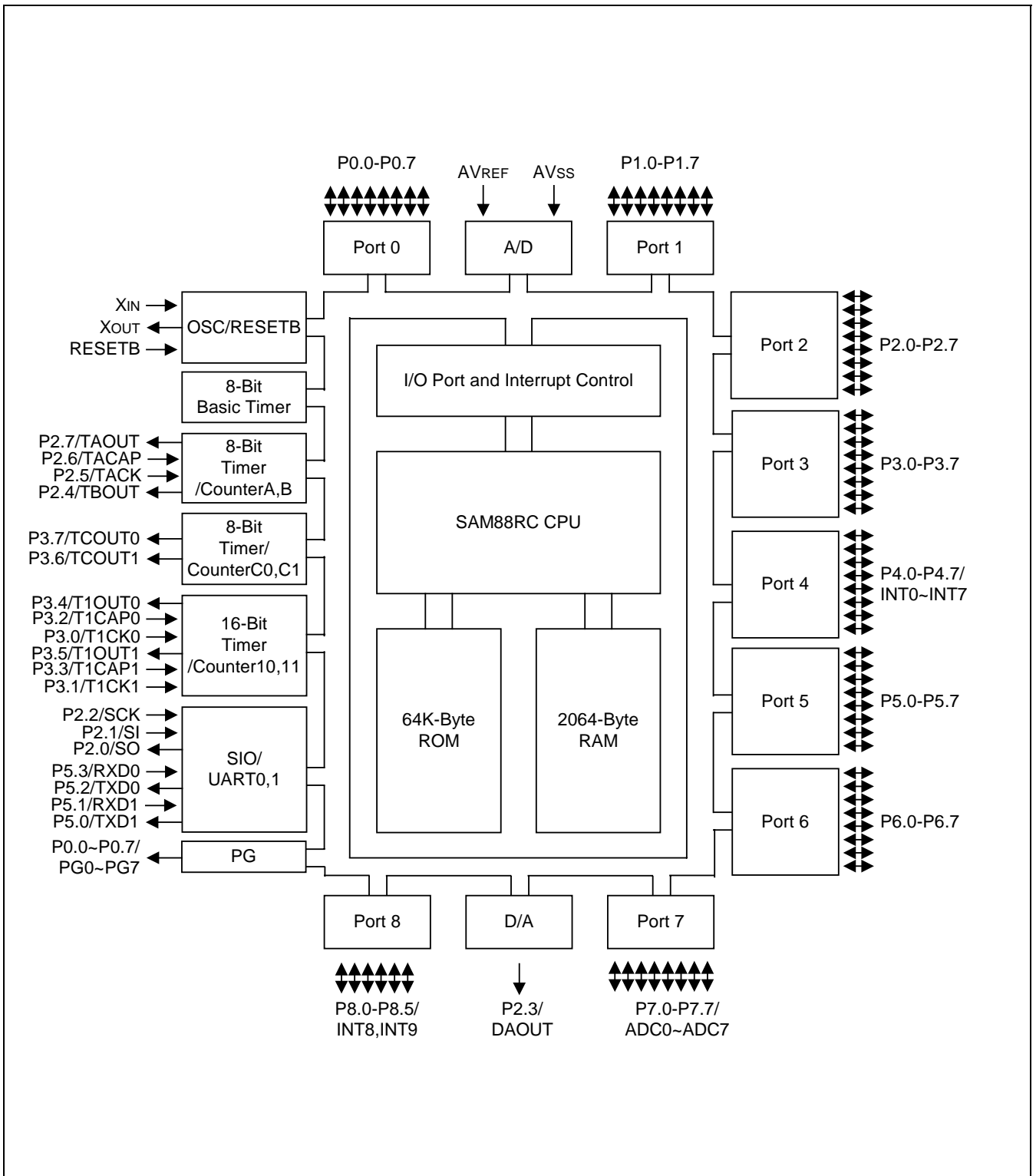


Figure 1-1. S3C84BB/F84BB Block Diagram

PIN ASSIGNMENT (IC71: S3F84BB)

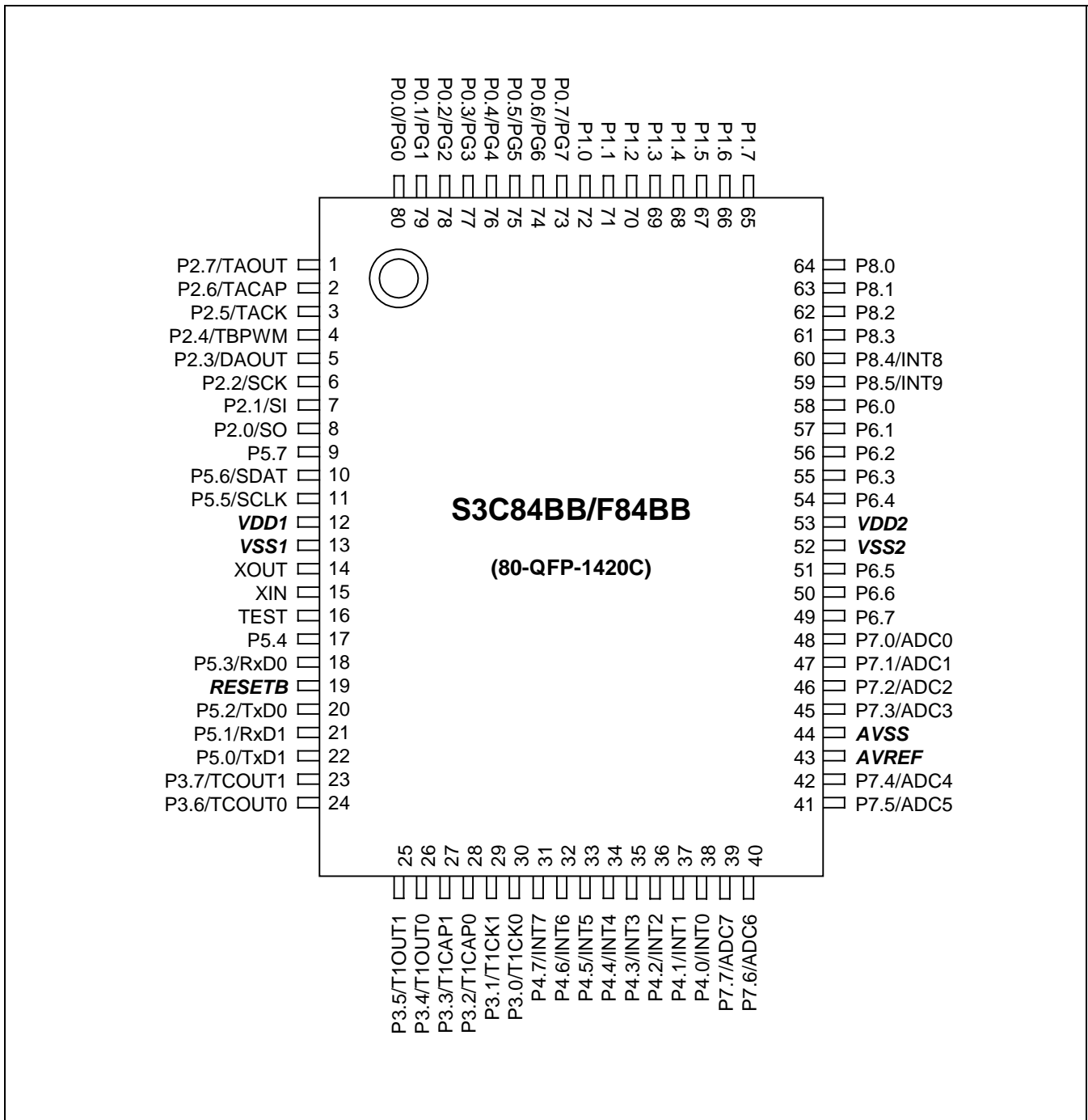
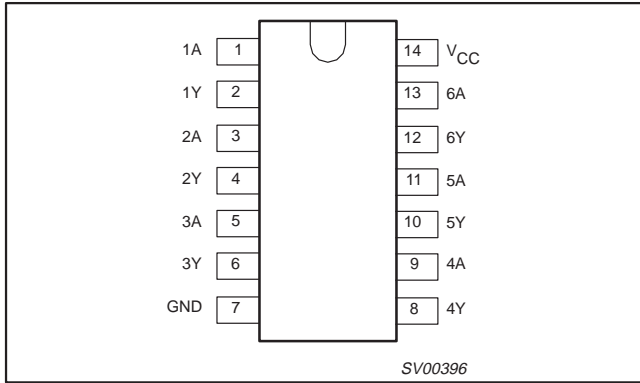


Figure 1-2. S3C84BB/F84BB Pin Assignment (80-QFP)

HEX INVERTER (IC74: 74LVC04A)

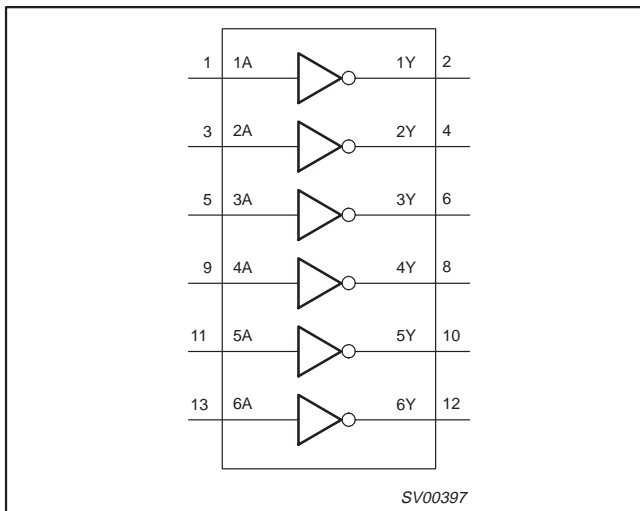
PIN CONFIGURATION



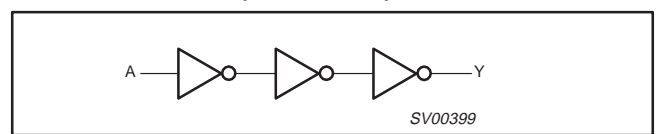
PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
1, 3, 5, 9, 11, 13	1A to 6A	Data inputs
2, 4, 6, 8, 10, 12	1Y to 6Y	Data outputs
7	GND	Ground (0 V)
14	V _{CC}	Positive supply voltage

LOGIC SYMBOL



LOGIC DIAGRAM (ONE GATE)



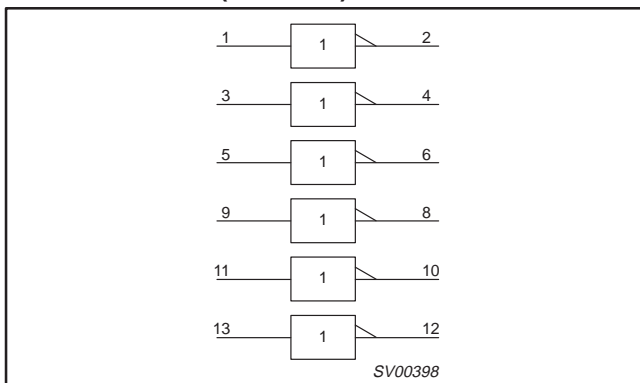
FUNCTION TABLE

INPUTS	OUTPUTS
nA	nY
L	H
H	L






NOTES:

H = HIGH voltage level
L = LOW voltage level

LOGIC SYMBOL (IEEE/IEC)



TRANSISTOR, REGULATOR IC BLOCK DIAGRAM

<p>TO-92</p>  <p>123</p> <p>KTC2874</p> <p>1. Emitter 2. Collector 3. Base</p>	<p>TO-220FP</p>  <p>123</p> <p>L7912CP</p> <p>1. GND 2. INPUT 3. OUTPUT</p>	<p>TO-92L</p>  <p>123</p> <p>KTC2316</p> <p>1. Emitter 2. Collector 3. Base</p>
<p>TO-220FP</p>  <p>123</p> <p>NJM7805FA L7812CP</p> <p>1. INPUT 2. GND 3. OUTPUT</p>	<p>TO-92M</p>  <p>123</p> <p>KRA107M KRC107M</p> <p>1. Emitter 2. Collector 3. Base</p>	

ELECTRICAL PARTS LIST

RESISTORS AND CAPACITORS

Notes • Parts numbers are indicated for most mechanical parts.

Please use this part number for parts order.

• **IMPORTANT SAFETY NOTICE.**

Components identified by ! Mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.

• The unit of resistance is OHM (Ω)

k=1000 (Ω) , M=1000 (k Ω)

• The unit of capacitance is MICROFARAD (μ F)

P=10⁻⁶ μ F

Numbering System of Resistor

Example

CRD Type	25 Wattage	F Shape	J Tolerance	101 Value
Resistor Type	Wattage		Tolerance	
K[C]RD : Carbon	20 : 1/5W		F : \pm 1%	
K[C]RD : Metal Oxide	25 : 1/4W		J : \pm 5%	
	50 : 1/2W		K : \pm 10%	
	1 : 1W			
	2 : 2W			
	3 : 3W			
K[C]RJ : Carbon, Chip	10 : 1/10W			
	14 : 1/4W			

Numbering System of Capacitor

Example

HCKR Type	1H Wattage	101 Value	K Tolerance	B Peculiarity
Capacitor Type	Voltage		Tolerance	
	HCEA Type	Other		
HCB : Ceramic	0J : 6.3V	1H : 50V DC	C : \pm 0.25pF	
CCC : Ceramic	1A : 10V	1 : 125V DC	G : \pm 2%	
CCK : Ceramic	1C : 16V	KC : 400V AC	J : \pm 5%	
HCQI : Polyester	1E : 25V		K : \pm 10%	
HCQP : Polypropylene	1V : 35V		Z : +80% , -20%	
HCQS : Polystyrol	1H : 50V			
HCUS : Ceramic	1J : 63V			
HCEA : ELECT				

LOAD NO.	PART NO.	DESCRIPTION	SPECIFICATION
	CUP11866Y	PCB MAIN (DUAL DAB)	
	CUP11866Y-1	MAIN PCB	
C201	CCEA1AH471T	CAP , ELECT	470UF 10V
C202	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C203	CCEA1AH471T	CAP , ELECT	470UF 10V
C204	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C205	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C206	CCEA1CH100T	CAP , ELECT	10UF 16V
C207	CCEA1CH470T	CAP , ELECT	47UF 16V
C208	CCEA1CH100T	CAP , ELECT	10UF 16V
C209	CCEA1CH101T	CAP , ELECT	100UF 16V
C210 , C211	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C212	CCEA1CH101T	CAP , ELECT	100UF 16V
C213 , C214	HCQI1H222JZT	CAP , MYLAR	0.0022UF 50V
C215	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C216	CCEA1CH221T	CAP , ELECT	220UF 16V
C217	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C218	CCEA1CH221T	CAP , ELECT	220UF 16V
C219 , C220	HCQI1H222JZT	CAP , MYLAR	0.0022UF 50V
C221	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C222	CCEA1CH221T	CAP , ELECT	220UF 16V
C223	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C224	CCEA1CH221T	CAP , ELECT	220UF 16V
C225	HCQI1H273JZT	CAP , MYLAR	0.027UF 50V

C226 , C227	HCQI1H822JZT	CAP , MYLAR	0.0082UF 50V
C228	HCQI1H273JZT	CAP , MYLAR	0.027UF 50V
C229 , C230	HCQI1H822JZT	CAP , MYLAR	0.0082UF 50V
C231	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C232 , C233	CCEA1CH221T	CAP , ELECT	220UF 16V
C234	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
C235 , C236	CCEA1HH470T	CAP , ELECT	47UF 50V
C237	CCEA1CH100T	CAP , ELECT	10UF 16V
C238	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V
C239 , C240	CCEA1HH470T	CAP , ELECT	47UF 50V
C241 , C242	HCQI1H152JZT	CAP , MYLAR	0.0015UF 50V
C243 , C244	CCEA1HH470T	CAP , ELECT	47UF 50V
C245	CCFT1H103ZF	CAP , CERAMIC	0.01UF 50V
C246	CCEA1AH101T	CAP , ELECT	100UF 10V
C247	CCEA1CH471T	CAP , ELECT	470UF 16V
C248	CCFT1H223ZF	CAP , CERAMIC	0.1UF 50V
C249 ~ C254	HCQI1H104JZT	CAP , MYLAR	0.1UF 50V
C706	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C710	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C711 , C712	HCBS1H330JT	CAP , CERAMIC	33PF 50V
C713	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C714	CCEA1CH470T	CAP , ELECT	47UF 16V
C715	CCKT1H101KB	CAP , CERAMIC	100PF 50V
C716	CCEA1AH101T	CAP , ELECT	100UF 10V
C717 , C718	CCKT1H221KB	CAP , CERAMIC	220PF 50V
C719	CCEA1AH471T	CAP , ELECT	470UF 10V
C720	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C722 ~ C724	CCKT1H101KB	CAP , CERAMIC	100PF 50V
C725	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C726	CCEA1AH101T	CAP , ELECT	100UF 10V
C727	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C728	CCEA1AH471T	CAP , ELECT	470UF 10V
C729 , C902	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C903	CCEA1EH471T	CAP , ELECT	470UF 25V
C904	CCEA1CH101T	CAP , ELECT	100UF 16V
C905	CCEA1EH331T	CAP , ELECT	330UF 25V
C906,C907	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C908	CCEA1HH220T	CAP , ELECT	22UF 50V
C910	CCEA1CH470T	CAP , ELECT	47UF 16V
C911 ~ C916	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C919 , C920	CCEA1CH471T	CAP , ELECT	470UF 16V
C921 , C922	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C924	CCEA1AH101T	CAP , ELECT	100UF 10V
C925	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C926	CCEA1AH101T	CAP , ELECT	100UF 10V
C927	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C928	CCEA1AH101T	CAP , ELECT	100UF 10V
C929	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C930	CCEA1AH101T	CAP , ELECT	100UF 10V
C931	CCFT1H223ZF	CAP , CERAMIC	0.022UF 50V
C932	CCFT1H104ZF	CAP , SEMICONDUCTOR	0.1UF 50V
D201 , D702 ~ D706	CVD1SS133MT	DIODE	1SS133
D901 ~ D904	CVD1N4003ST	RECT , DIODE	1N4003
D905	CVD1SS133MT	DIODE	1SS133
D906	CVDZJ6.8BT	DIODE , ZENER	ZJ6.8B 1/2W
D907	CVD1SS133MT	DIODE	1SS133
D908	CVD1N4003ST	RECT , DIODE	1N4003
D909	CVDZJ4.7BT	DIODE , ZENER	ZJ4.7B 1/2W
D910	CVD1SS133MT	DIODE	1SS133
D911 ~ D916	CVD1N4003ST	RECT , DIODE	1N4003
F901	KJCF5S	HOLDER , FUSE	
IC72	HVIRE5VL28CATZ	IC , RESET	
L201 , L202	HLQ02C2R7KT	COIL , AXIAL	2.7UH, K
Q201 , Q202	HVTKTC2874BT	T.R , MUTE	KTC2874B
Q203	HVTKRC107MT	T.R	KRC107M
Q701 , Q702 , Q704 , Q	HVTKRA107MT	T.R	KRA107M

Q901	HVTKSC2316YT	T.R	KSC2316Y
Q902	HVTKRC107MT	T.R	KRC107M
R201	CRD20TJ220T	RES , CARBON	22 OHM 1/5W J
R203	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J
R204 , R205	CRD20TJ3R3T	RES , CARBON	3.3 OHM 1/5W J
R206 ~ R210	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J
R211 , R212	CRD20TJ911T	RES , CARBON	910 OHM 1/5W J
R215 , R216	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J
R217 , R218	CRD20TJ911T	RES , CARBON	910 OHM 1/5W J
R219 , R220	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J
R221 , R222	CRD20TJ221T	RES , CARBON	220 OHM 1/5W J
R223	CRD20TJ201T	RES , CARBON	200 OHM 1/5 W
R224 , R225	CRD20TJ181T	RES , CARBON	180 OHM 1/5W J
R226	CRD20TJ201T	RES , CARBON	200 OHM 1/5 W
R227 , R228	CRD20TJ221T	RES , CARBON	220 OHM 1/5W J
R229	CRD20TJ201T	RES , CARBON	200 OHM 1/5 W
R230 , R231	CRD20TJ181T	RES , CARBON	180 OHM 1/5W J
R232	CRD20TJ201T	RES , CARBON	200 OHM 1/5 W
R233	CRD20TJ4R7T	RES , CARBON	4.7 OHM 1/5W J
R234	CRD20TJ180T	RES , CARBON	18 OHM 1/5W J
R235 , R236	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J
R237	CRD20TJ151T	RES , CARBON	150 OHM 1/5W J
R238	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R239	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J
R240 , R241	CRD20TJ151T	RES , CARBON	150 OHM 1/5W J
R242 , R243	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J
R244 , R245	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R246 , R247	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J
R248 , R249	CRD20TJ151T	RES , CARBON	150 OHM 1/5W J
R250 , R251	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R252	CRD25TJ4R7T	RES , CARBON	4.7 OHM 1/4W J
R709	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R710	CRD20TJ105T	RES , CARBON	1M OHM 1/5W J
R711	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J
R712	CRD20TJ332T	RES , CARBON	3.3K OHM 1/5W J
R714 , R715	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R716 ~ R718	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J
R719 , R720	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R721	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J
R722 , R723	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R724 , R725	CRD20TJ151T	RES , CARBON	150 OHM 1/5W J
R726 , R727	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R901 , R902	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R903	CRD20TJ472T	RES , CARBON	4.7K OHM 1/5W J
R904	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J
	K4FH300	TAPE , PROTECTIVE	
BAT1	HABGP40BVH3A3H	BATTERY , RECHARGEABLE	GP40BBVH3A3H
BK91	CMD1A387	BRACKET , PCB	
CN22	CJP44TT153ZY	PIN , HEADER (2.00MM)	DAB2025
CN71	CJP11GA117ZY	WAFER	
CN73	CJP06HA37ZM	WAFER	
CN75	CJP11GA117ZY	WAFER	
CN91	CJP02GA89ZM	WAFER	
CN92	CJP02KA060ZY	WAFER	
CN93	CJP06GA01ZY	WAFER, 6PIN	
C900	HCQE2E104KDE	CAP , LINE ACROSS	
C901	KCKDKS471ME	CAP , CERAMIC(KH TYPE)	DKS471ME
C917 , C918	CCEA1EH222E	CAP , ELECT	2200UF 25V
C923	CCEA1CH472E	CAP , ELECT	
ET91	CNE75	PLATE , EARTH	
IC21	CVIPCM1796DB	IC , DAC	
IC22 ~ IC24	HVIOPA2134UA	OP AMP	
IC71	HVIS3F84BB	I.C , FLASH U-COM	S3F84BB
IC73	HVI74ACT04MTR	I.C , HEX	
IC74	HVI74LVC04ADT	IC, HEX INVERTER	74LVC04AD-T
IC91	CVINJM7805FAXA	I.C ASS'Y	

	CMY1A025	HEAT SINK	
	CTB3+8JR	SCREW	
	HVINJM7805FA	I.C	NJM7805FA
	K8AYG6260	COMPOUND , SILICONE	
IC92	CVINJM7805FAXA	I.C ASS'Y	
	CMY1A025	HEAT SINK	
	CTB3+8JR	SCREW	
	HVINJM7805FA	I.C	NJM7805FA
	K8AYG6260	COMPOUND , SILICONE	
IC93	HVIL7912CP	I.C , REGULATOR	L7912(ST)
IC94	HVIL7812CP	I.C , REGULATOR	L7812(ST)
IC95	HVINJM7805FA	I.C	NJM7805FA
IC96	HVIRC1117S33	REGULATOR, 3.3V (FAIRDCHILD)	FAN1117AS-33X
JK21	CJJ4N067Z	2P, JACK	RCA-201DAG-01
JK22	HJSTOTX177L	MODULE , OPTICAL(TX)	TOTX177L
RY21	HSL4C008ZE	RELAY	CVR700
RY91	HSL1D016ZE	RELAY	SDT-S-109DMR
S708	KST1A010Z	SW , TACT CN	
T901	CLT5I002ZE	TRANS , SUB	SR5400(6400)/N1
WF21	CJP17GA115ZY	WAFER , CARDCABLE	
X701	HOX10000E220C	CRYSTAL	
	CUP11866Y-2	FRONT PCB	
C701 ~ C703	CCKT1H221KB	CAP , CERAMIC	220PF 50V
C704	CCEA1AH101T	CAP , ELECT	100UF 10V
Q706 , Q707	HVTKRC107MT	T.R	KRC107M
Q708	HVTKRA107MT	T.R	KRA107M
R701 , R702	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J
R703	CRD20TJ152T	RES , CARBON	1.5K OHM 1/5W J
R704	CRD20TJ182T	RES , CARBON	1.8K OHM 1/5W J
R705	CRD20TJ272T	RES , CARBON	2.7K OHM 1/5W J
R706	CRD20TJ332T	RES , CARBON	3.3K OHM 1/5W J
R707	CRD20TJ562T	RES , CARBON	5.6K OHM 1/5W J
R708	CRD20TJ752T	RES , CARBON	7.5K OHM 1/5W J
R728	CRD20TJ471T	RES , CARBON	470 OHM 1/5W J
R729	CRD20TJ122T	RES , CARBON	1.2K OHM 1/5W J
R790	CRD20TJ821T	RES , CARBON	820 OHM 1/5W J
S701 ~ S707	CST1A022ZT	SW , TACT(H=7MM)	
CN72	HFL16T202DA1E	VFD , MODULE	16T202DA1E
CN74	CJP04GB46ZY	WAFER	
D701	CVD50BOGDWGA	L.E.D , 2 COLOR	
RS71	HRVNJL34H380A	SENSOR , REMOTE	
WF71 , WF75	CJP11GB113ZY	WAFER , CARDCABLE	
	CUP11866Y-3	ENCODER PCB	
C707 , C708	CCKT1H101KB	CAP , CERAMIC	100PF 50V
C709	CCEA1AH471T	CAP , ELECT	470UF 10V
BN74	CWB2B004050EN	WIRE ASS'Y	
VE71	HSR2A025Z	ENCODER , SWITCH	EC12B24S2034ZZZ
	CQXC445C	INSTRUCTION MANUAL ASS'Y	
	CABR03P	BATTERY (SIZE 'AAA') 2PCS IN 1PACK	
	CJS4N014Z	CORD , PIN	
	CARTC445	REMOCON TRANSMITER ASS'Y	
	CQX1A1079Z	MANUAL , INSTRUCTION	
	CSA1A018Z	FM 1 POLE ANT	
	CSA1A020Z	AM LOOP ANT	
	CSA272	ANT , DAB T	T17020N
	OTHERS		
	KBA2C1000TLEZ	FUSE	
	CJA2B043ZA	CORD , POWER(EUR)	
	CLT5M029ZET	TRANS , POWER	
	CWC1C4A17B070B	CABLE , CARD	
	CWC4F2A11A120B	CABLE , CARD	
	CNVFS2022V131	MODULE , DUAL BAND DAB	FS2022-0101-000
	CNVMB114MA18L	TUNER MODULE(EUR)	
	CJP14TT198ZY	PIN HEADER(DUAL TYPE 2.54MM)	