

# Service Manual

**Pioneer**



ORDER NO.  
ARP3039

## CANAL PLUS TUNER TS4

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Type	Model	Power Requirement	Remarks
	TS4		
NYXK/FR	○	AC230V	

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# 1. SAFETY INFORMATION

This service manual is intended for qualified service technicians ; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.



## WARNING

This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Health & Safety Code Section 25249.6 – Proposition 65



## NOTICE

(FOR CANADIAN MODEL ONLY)

Fuse symbols  (fast operating fuse) and/or  (slow operating fuse) on PCB indicate that replacement parts must be of identical designation.

## REMARQUE

(POUR MODÈLE CANADIEN SEULEMENT)

Les symboles de fusible  (fusible de type rapide) et/ou  (fusible de type lent) sur CCI indiquent que les pièces de remplacement doivent avoir la même désignation.

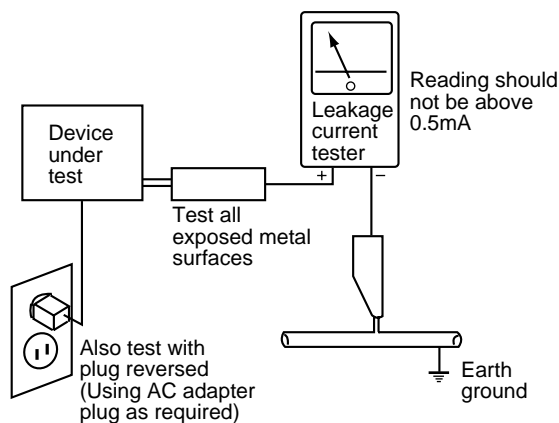
(FOR USA MODEL ONLY)

## 1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

### LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

**ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.**

## 2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a  $\Delta$  on the schematics and on the parts list in this Service Manual.

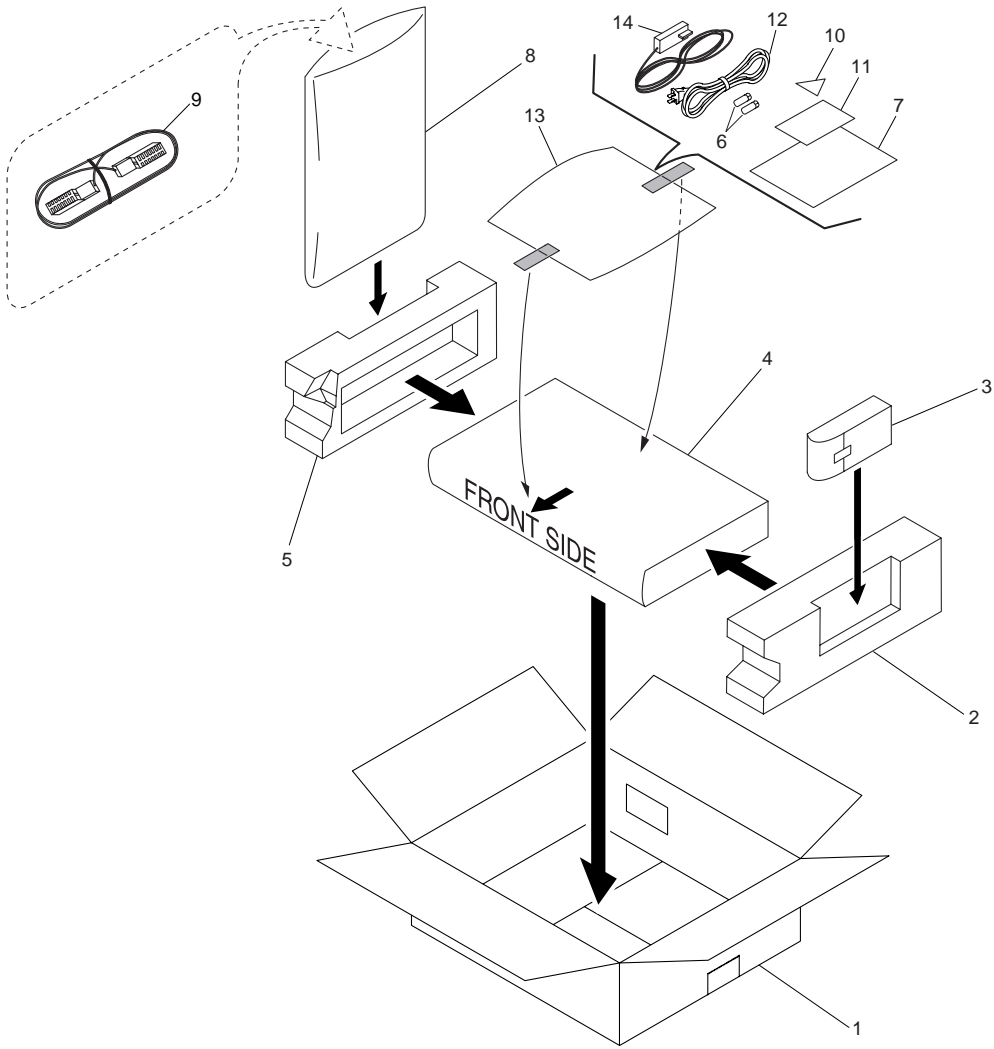
The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

# 2. EXPLODED VIEWS AND PARTS LIST

NOTES: ●Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.  
●The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part.  
Therefore, when replacing, be sure to use parts of identical designation.  
●Screws adjacent to ▼ mark on the product are used for disassembly.

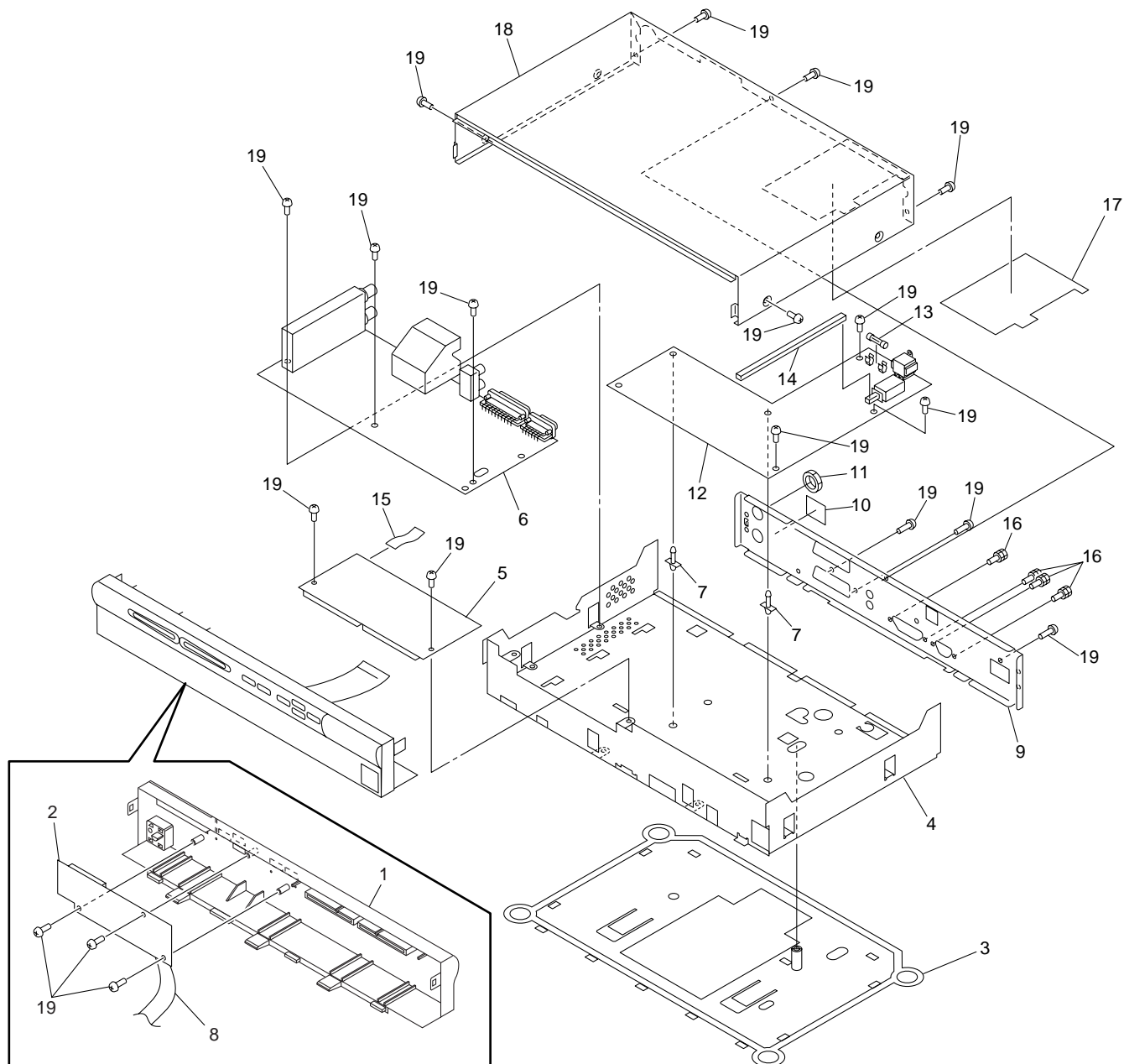
## 2.1 PACKING



### • PACKING PARTS LIST

Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
	1	PACKING CASE(PAP)	BHD1369		8	POLYETHYLENE BAG	Z21-038
	2	SIDE PAD R	BHA1147		9	SCART CABLE (1m:Black)	BDH1018
	3	REMOTE CONTROL UNIT	BXD1010	NSP	10	STICKER	BAX1271
	4	SHEET	AHG1153		11	MODEM APPROVAL CARD	BRM1022
	5	SIDE PAD L	BHA1146		12	AC POWER CORD(2m:Black)	BDG1035
NSP	6	BATTERY (R03) 2P	VEM1018	NSP	13	CATALOGUE BAG	BHG1047
	7	INSTRUCTION MANUAL (French)	BRC1003		14	MODEM CABLE (10m:White)	BDH1014

## 2.2 EXTERIOR SECTION



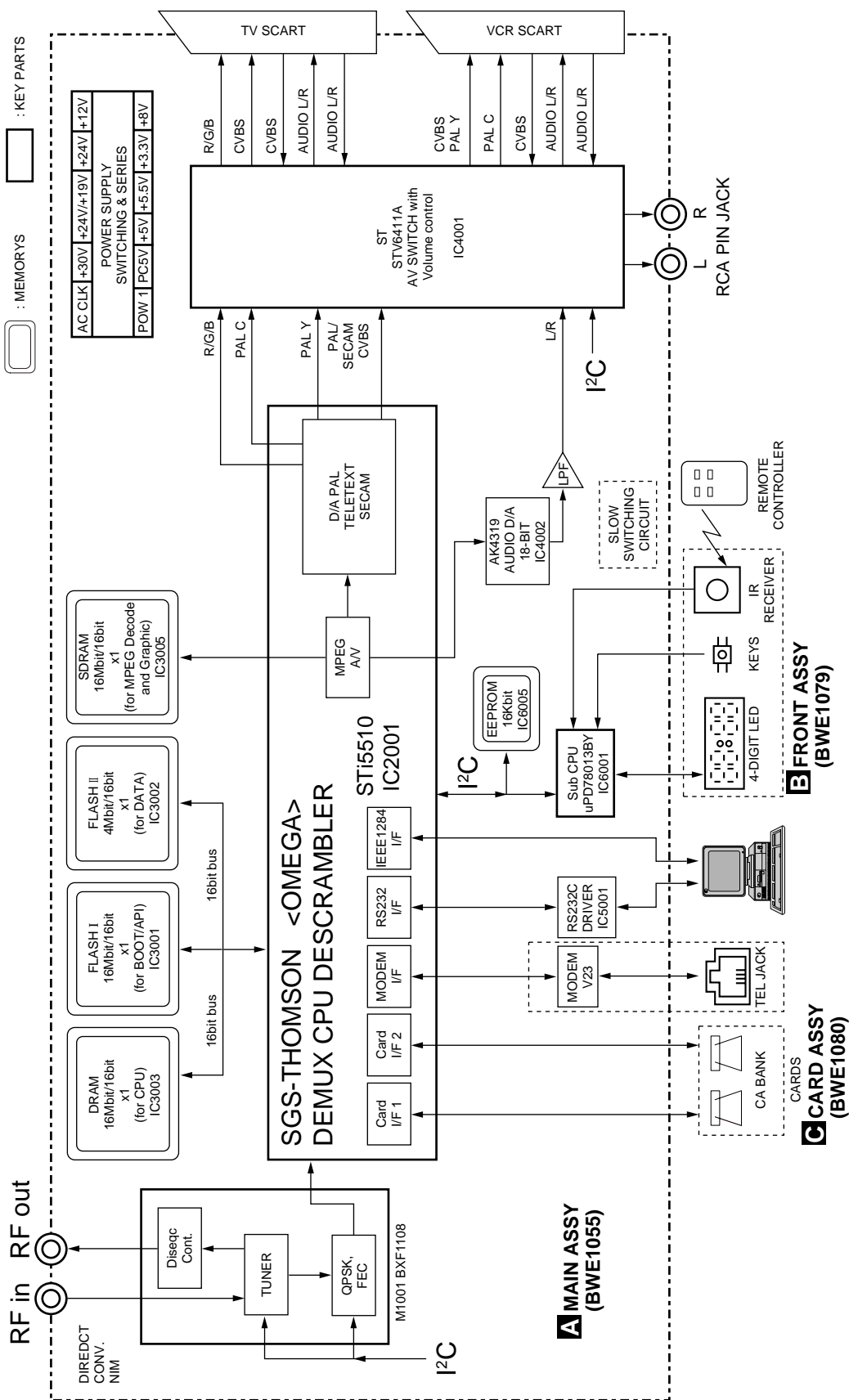
### EXTERIOR PARTS LIST

Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
	1	FRONT PANEL ASSY	BMB1071		11	WASHER FACED NUT	BBN1005
	2	FRONT ASSY	BWE1079		12	POWER ASSY	BXF1112
	3	PLASTIC BASE(PLS)	BMA1001	⚠	13	FUSE (F101: T2AH250V)	REK1101
	4	CHASSIS(MET)	BNA1149		14	JOINT	BMR1133
	5	CARD ASSY	BWE1080		15	12P FFC(J2)	BDD1033
	6	MAIN ASSY(FRANCE)	BWE1055		16	HEXAGON HEADED SCREW	BBA1059
	7	PCB SUPPORT	AEC1215		17	BARRIER(PLS)	BEC1173
	8	20P FFC(J1)	BDD1032		18	BONNET CASE(MET)	BNE1090
	9	REAR PANEL(MET)	BNC1137		19	SCREW	BBZ30P080FZK
	10	NAME LABEL(PAP)	BAL1366				

### 3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

#### 3.1 BLOCK DIAGRAM

Note : When ordering service parts, be sure to refer to "EXPLODED VIEWS and PARTS LIST" or "PCB PARTS LIST".



A

B

C

D

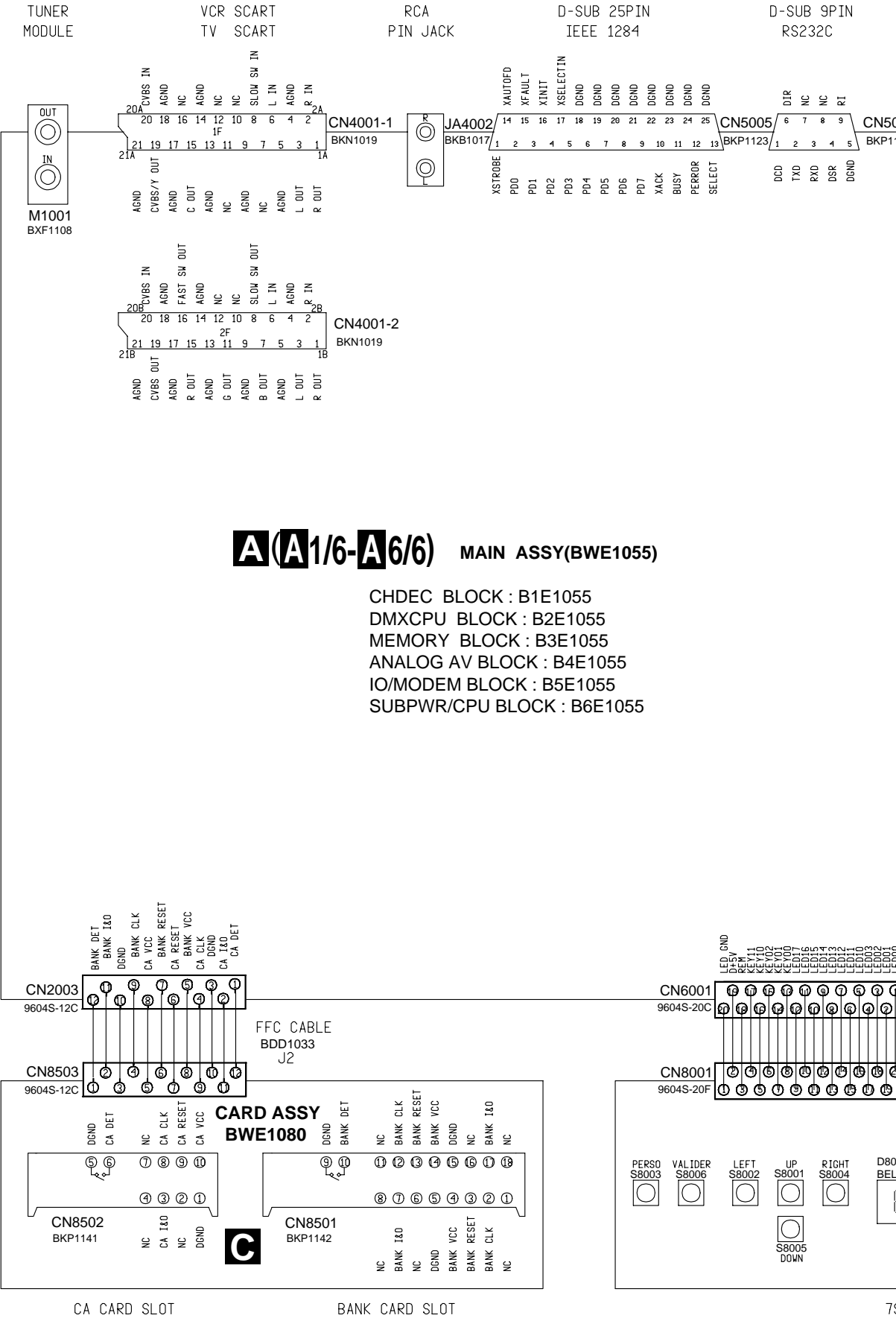
3.2 OVERALL CONNECTION DIAGRAM

A

B

C

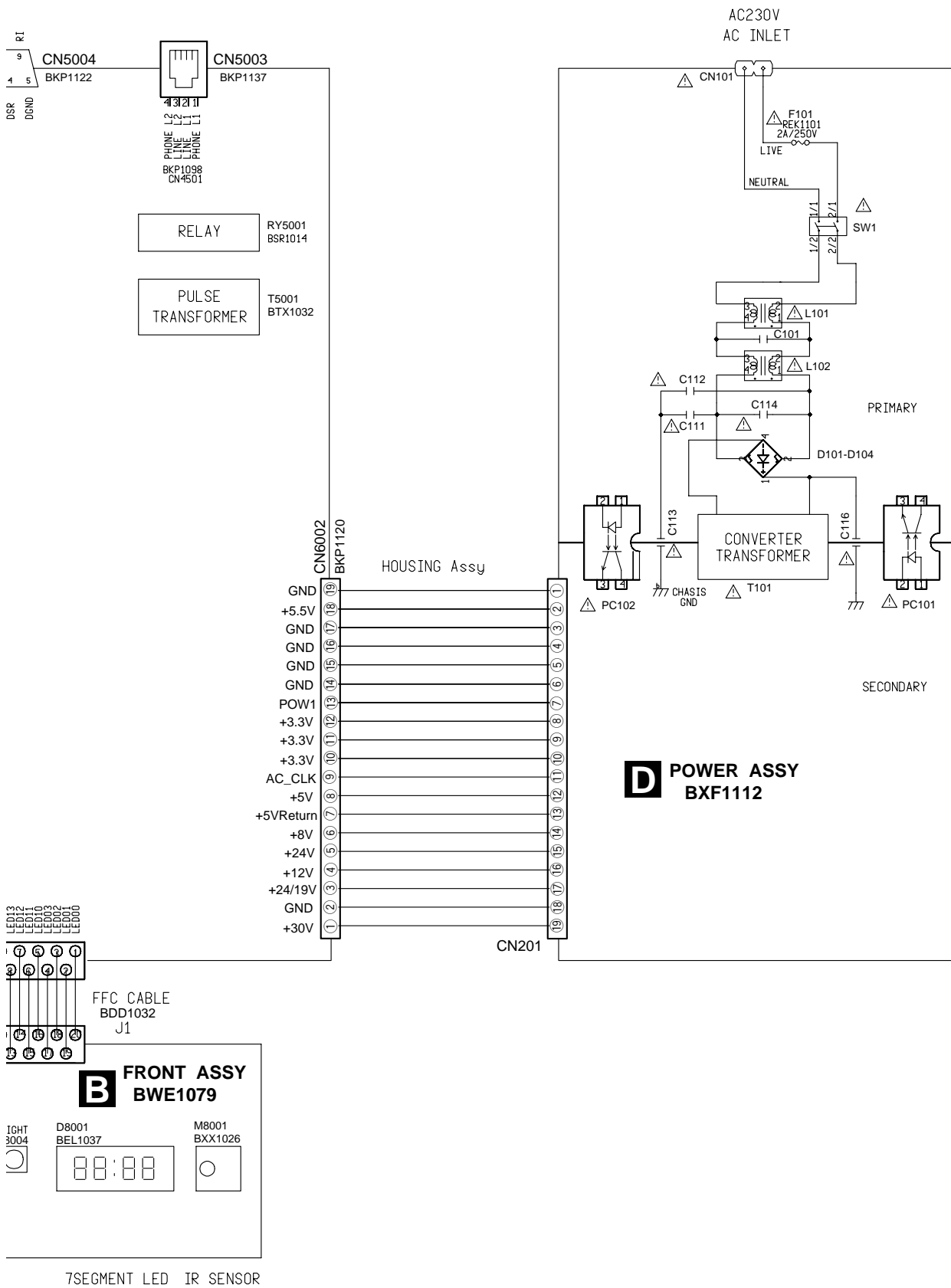
D



**A(A1/6-A6/6)** MAIN ASSY(BWE1055)

CHDEC BLOCK : B1E1055  
DMXCPU BLOCK : B2E1055  
MEMORY BLOCK : B3E1055  
ANALOG AV BLOCK : B4E1055  
IO/MODEM BLOCK : B5E1055  
SUBPWR/CPU BLOCK : B6E1055

PIN  
MODULAR JACK



A

B

C

D

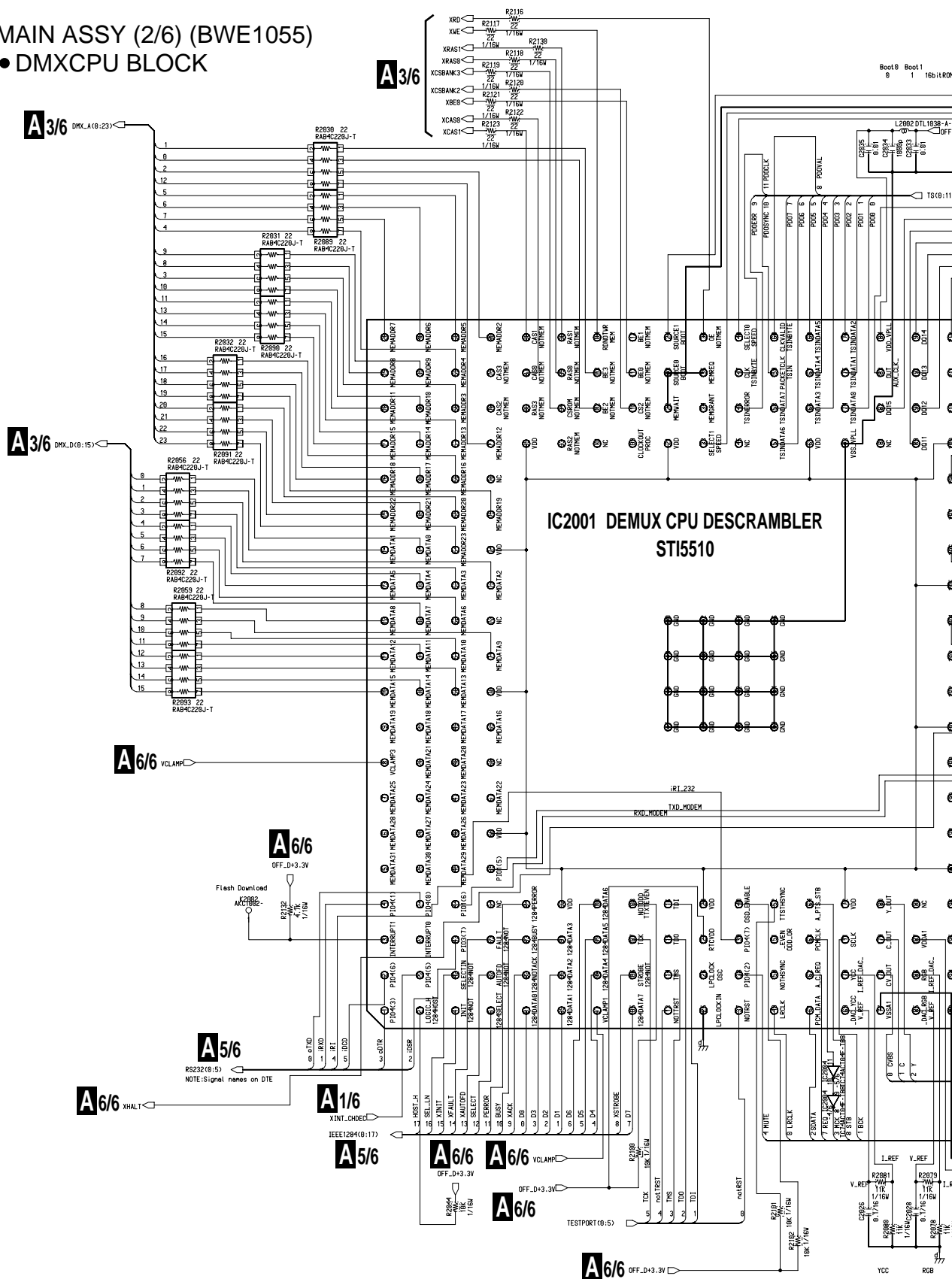


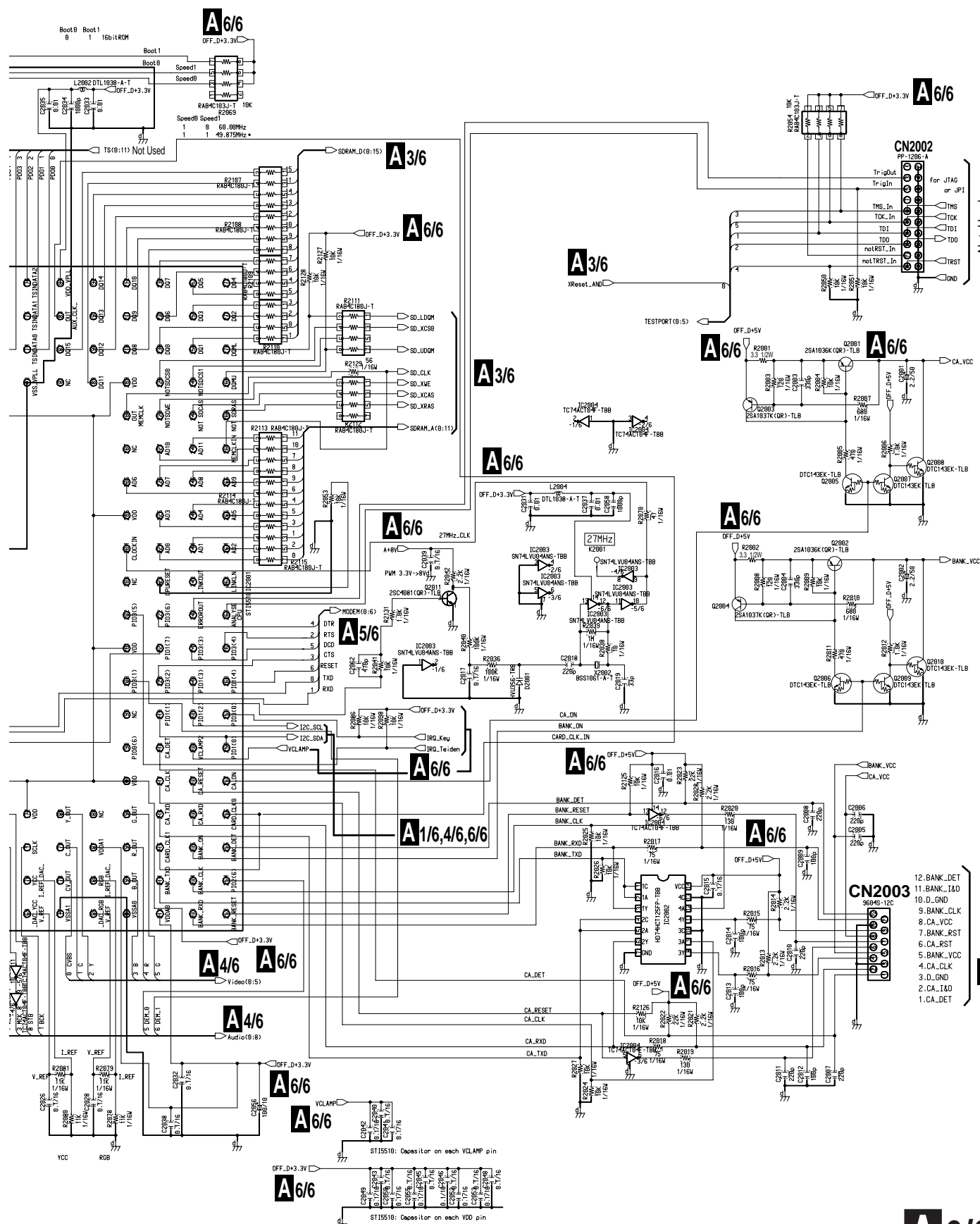




### 3.4 MAIN ASSY(2/6)

**A 2/6** MAIN ASSY (2/6) (BWE1055)  
• DMXCPU BLOCK



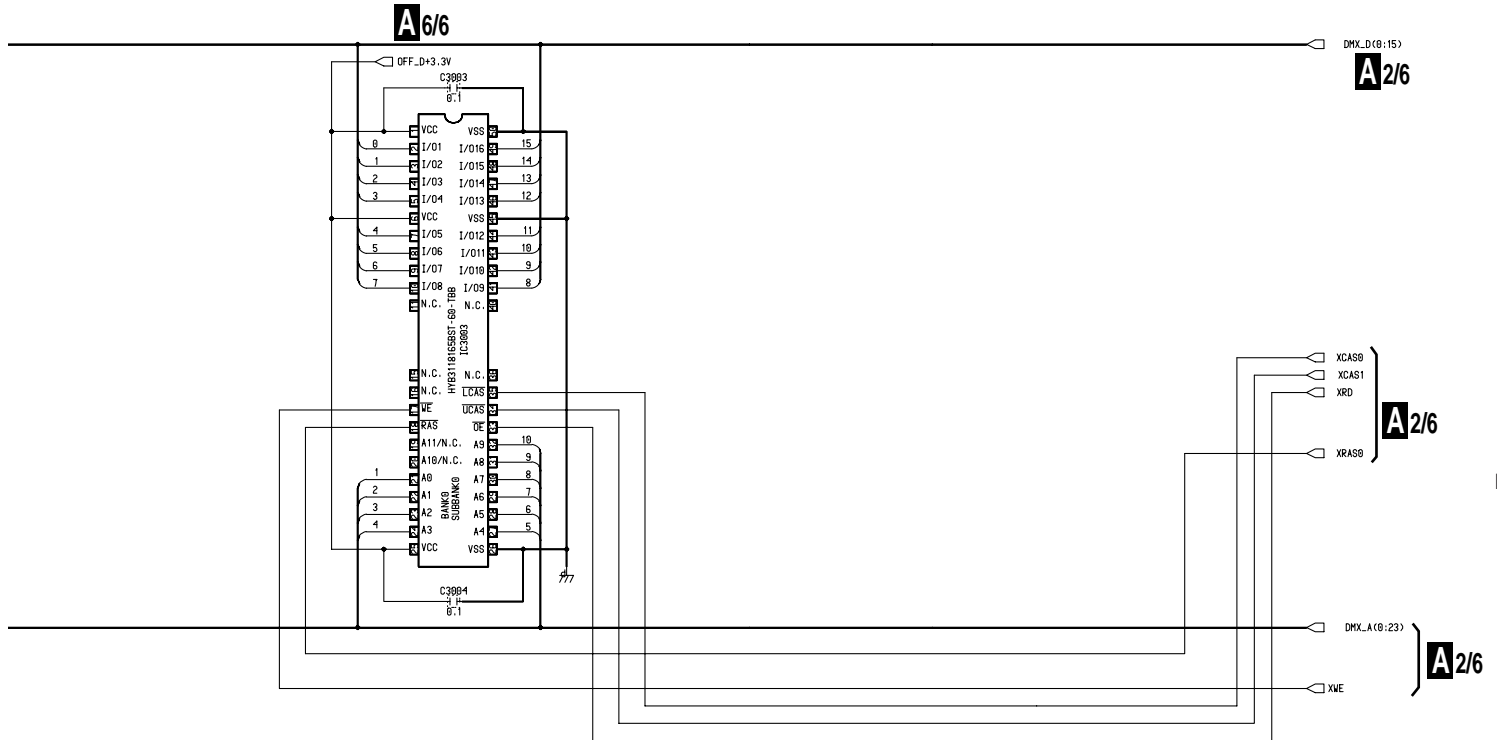


**C** CN8503

**A 3/6** MAIN ASSY (3/6) (BWE1055)  
• MEMORY BLOCK



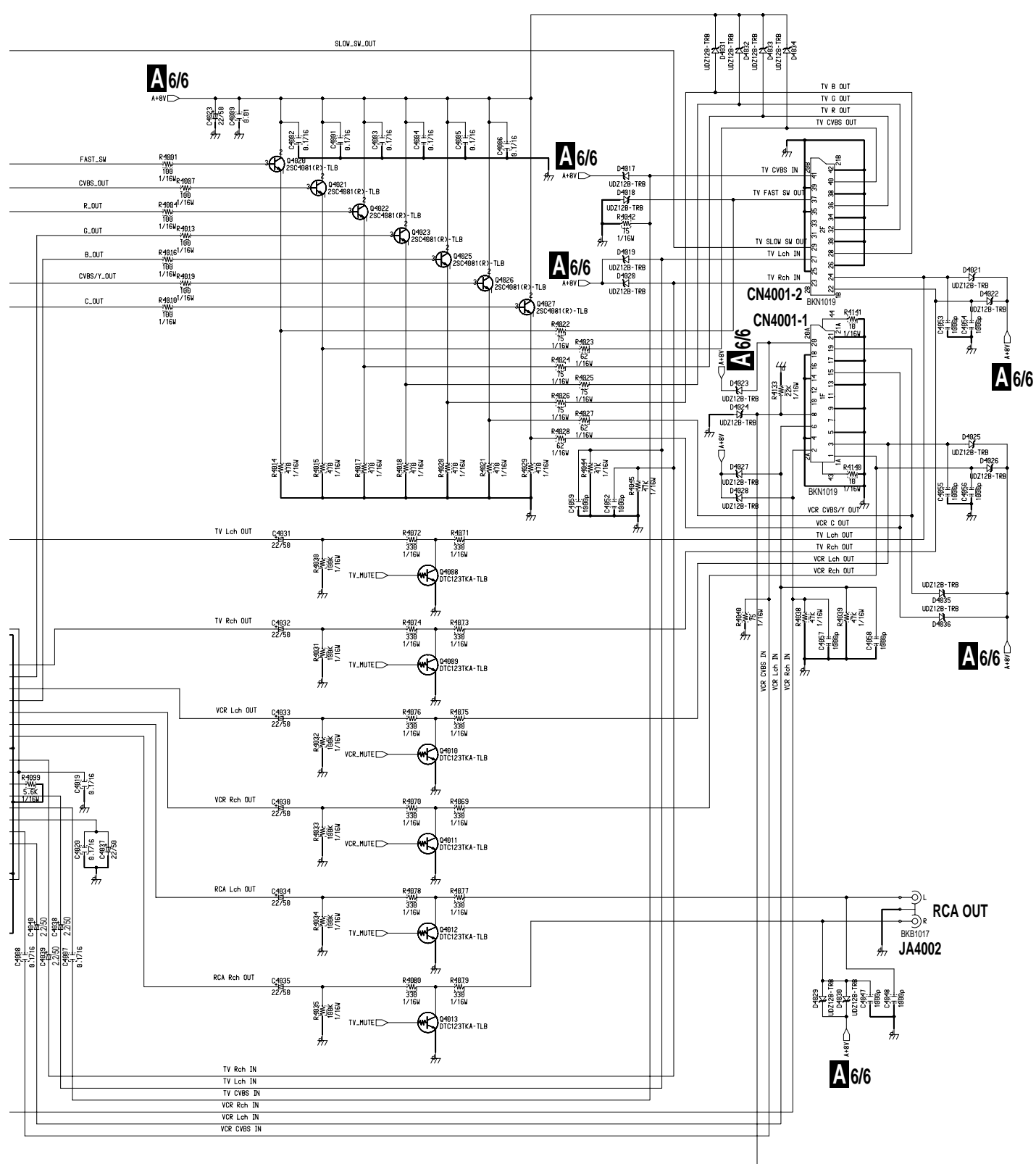
IC3003 : 16M DRAM



**A 4/6** MAIN ASSY (4/6) (BWE1055)  
• ANALOG AV BLOCK

**A 4/6** MAIN ASSY (4/6) (BWE1055)  
• ANALOG AV BLOCK





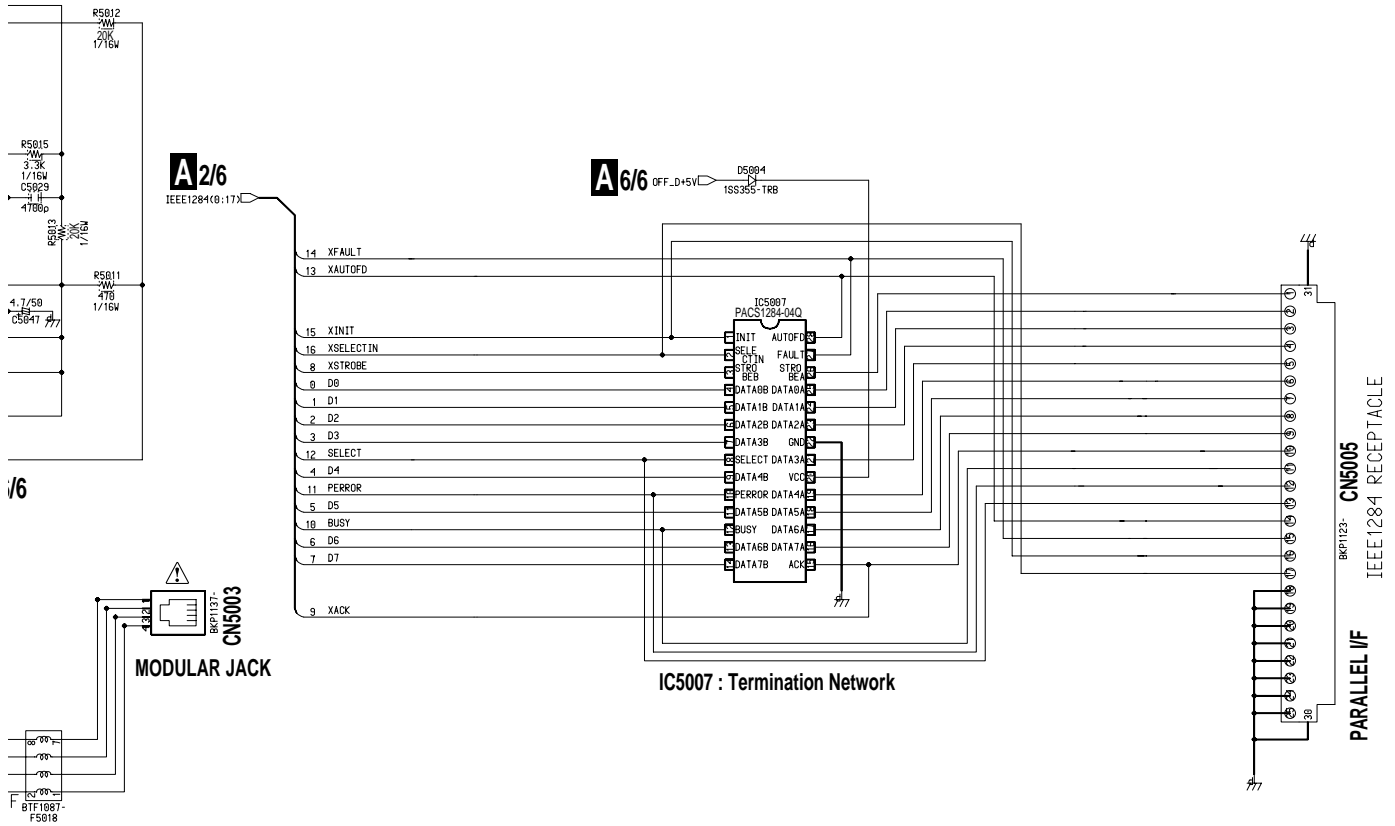
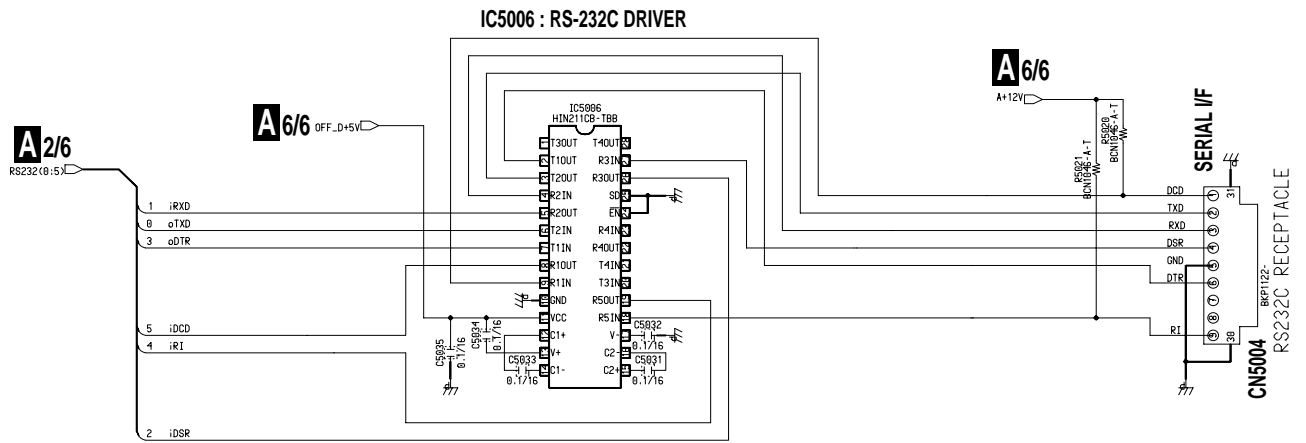
## A

## B




D

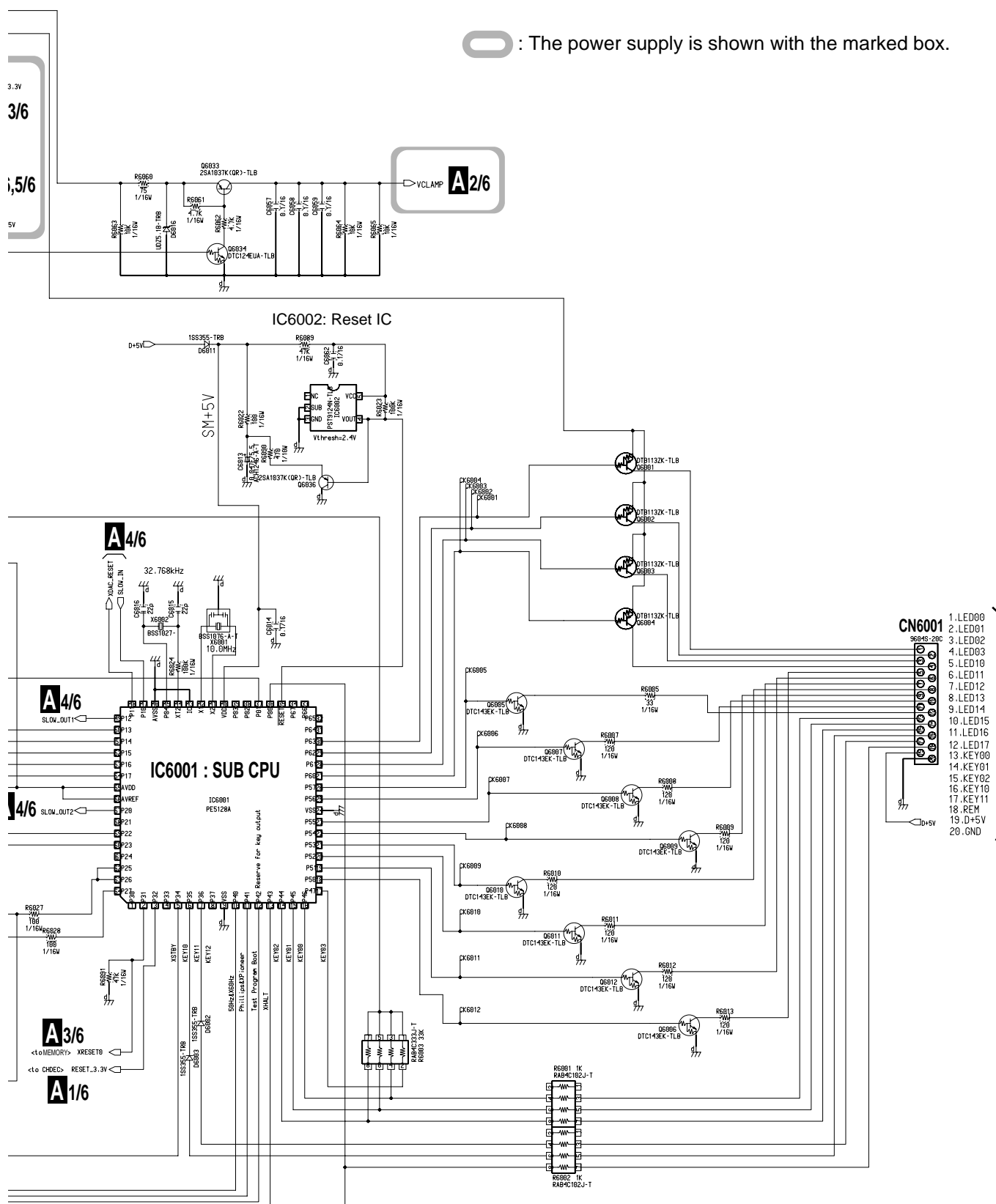




**A 6/6** MAIN ASSY (6/6) (BWE1055)  
• SUBPWR/SUBCPU BLOCK



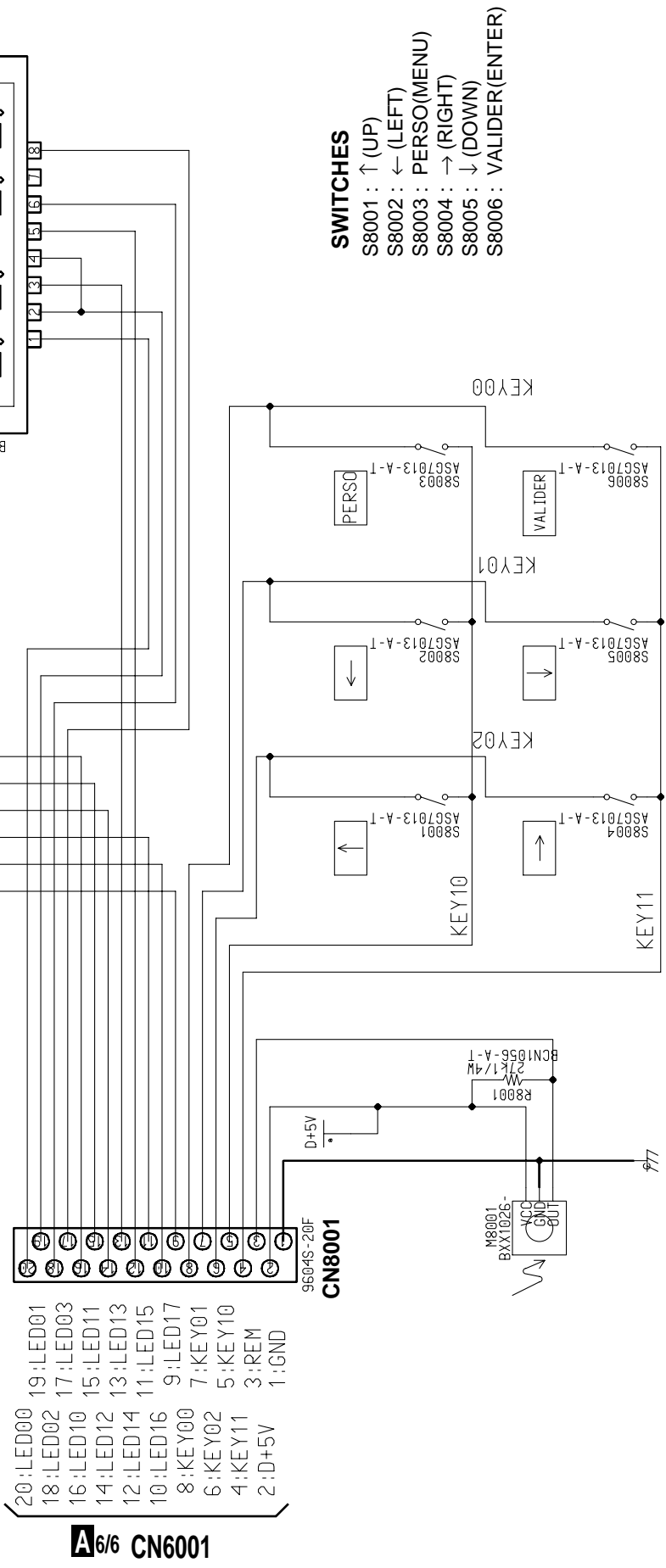
: The power supply is shown with the marked box.



**B** CN8001

3.9 FRONT ASSY

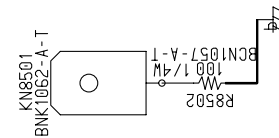
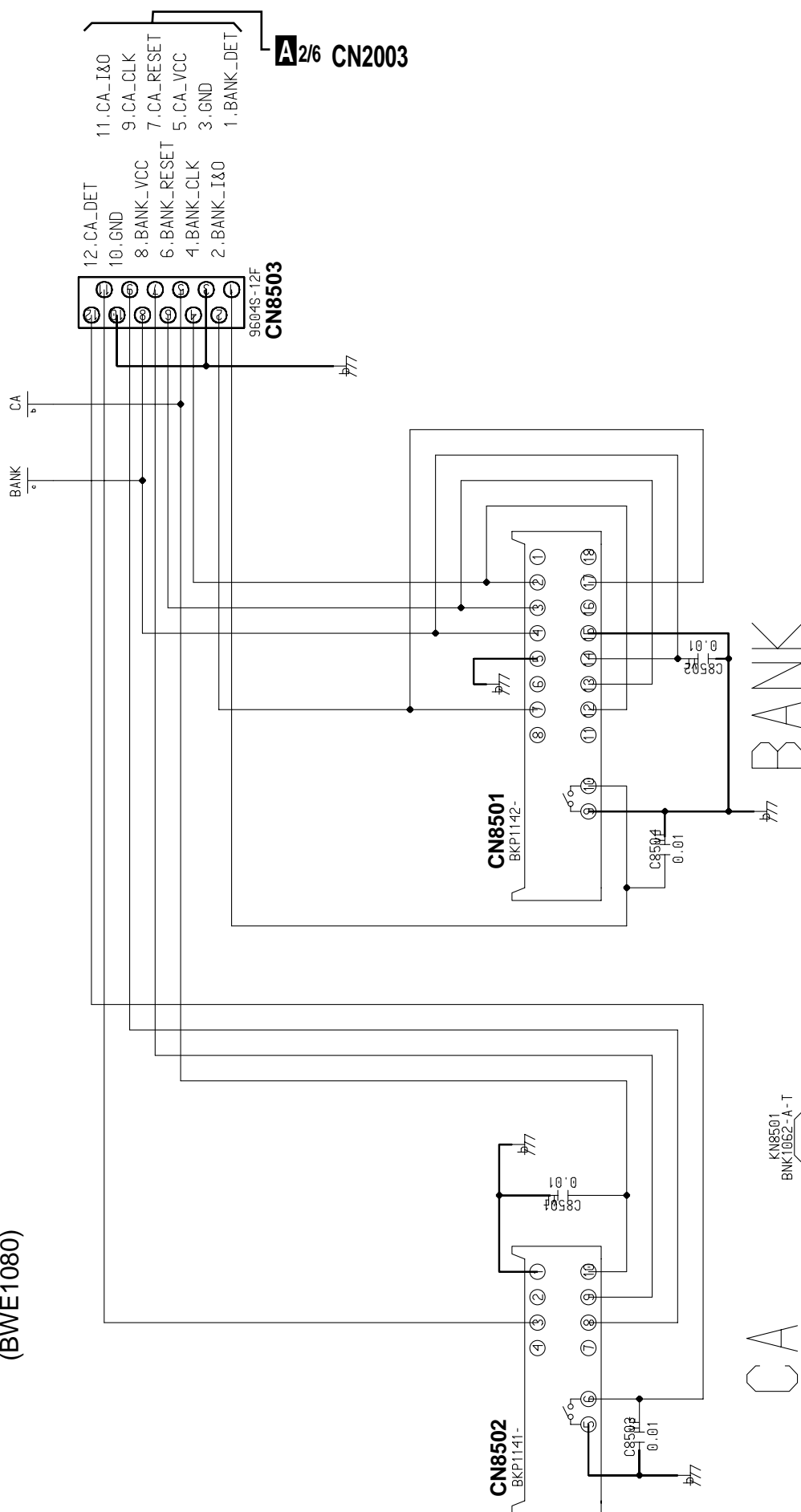
**B** FRONT ASSY  
(BWE1079)



### 3.10 CARD ASSY

TS4

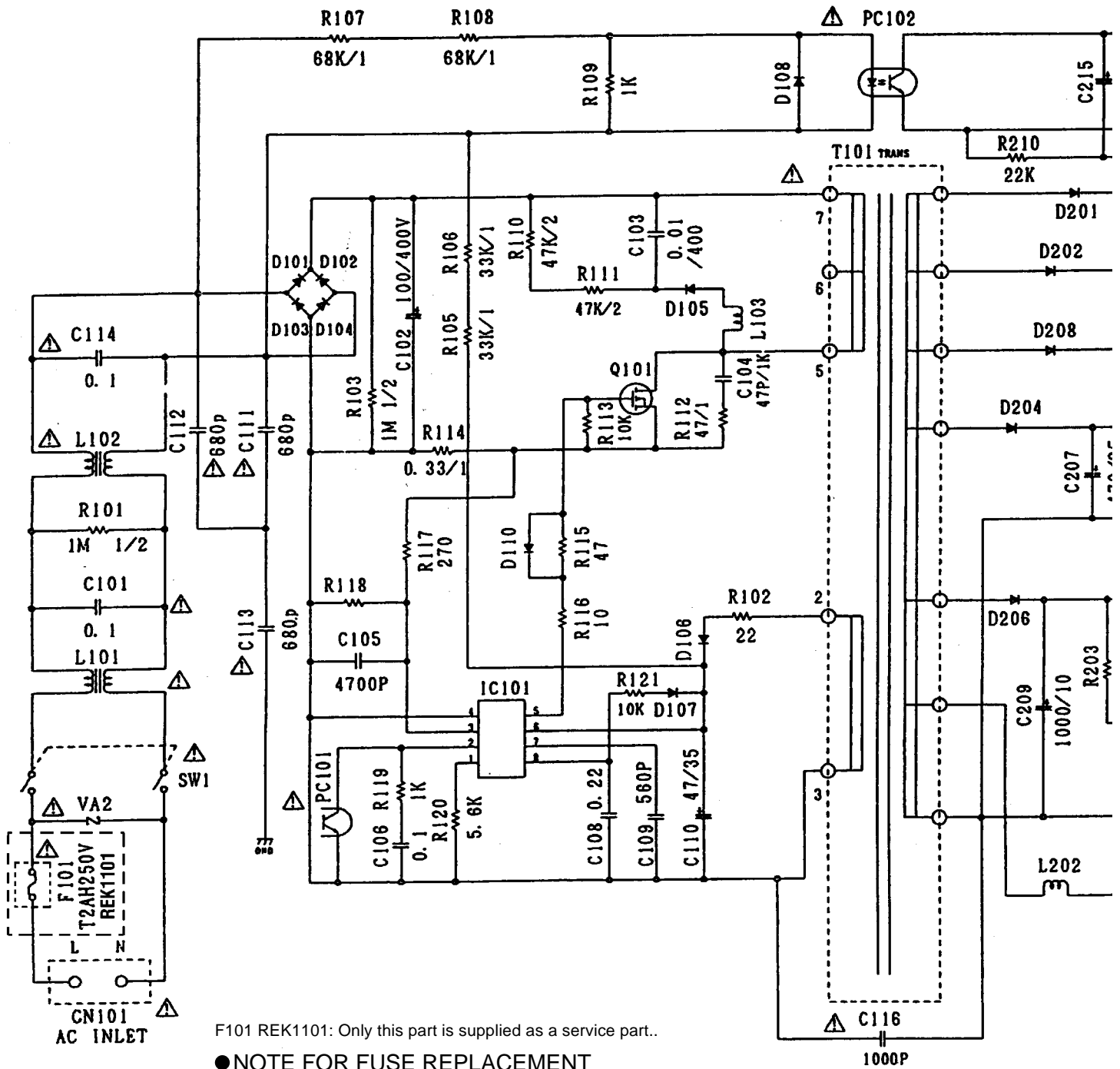
**C** CARD ASSY  
(BWE1080)



**C**

### 3.11 POWER ASSY

#### D POWER ASSY (BXF1112)



F101 REK1101: Only this part is supplied as a service part..

#### NOTE FOR FUSE REPLACEMENT

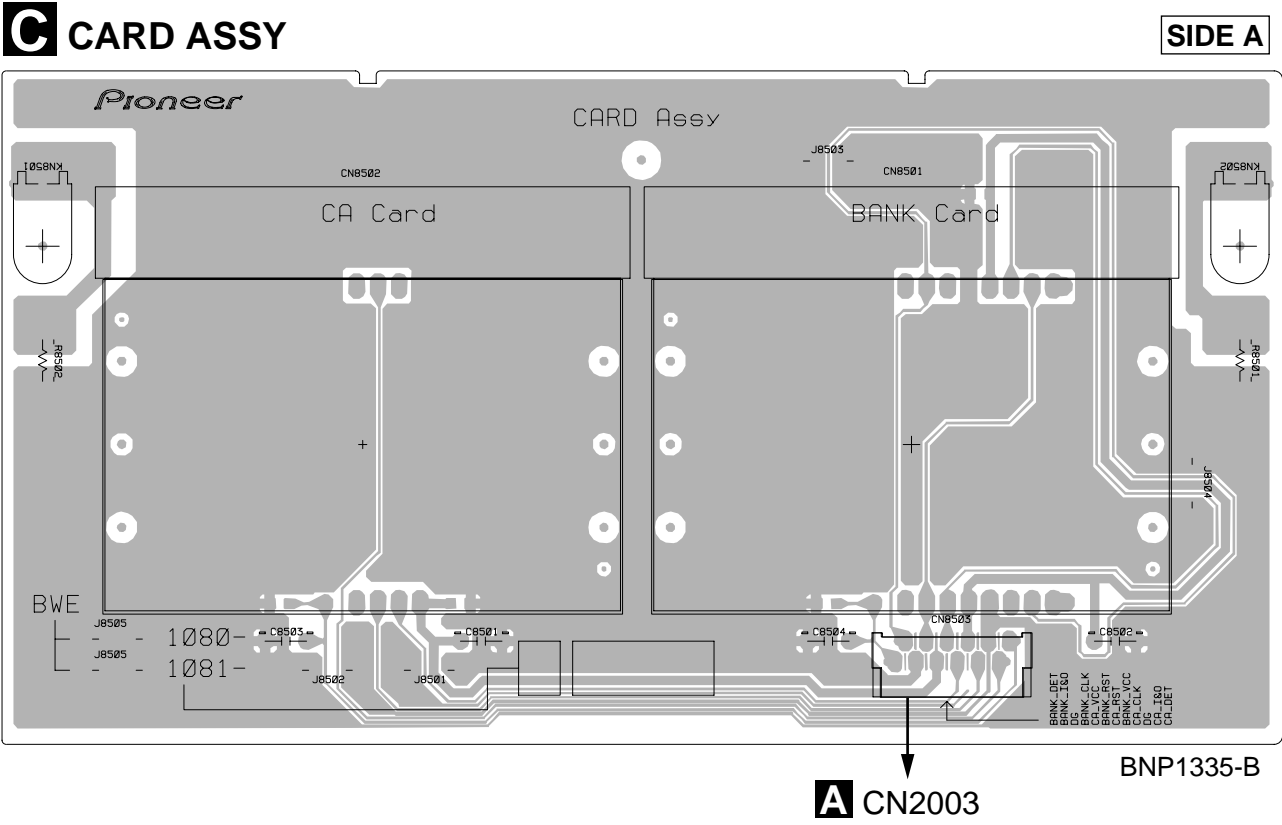
**CAUTION** - FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATINGS ONLY.





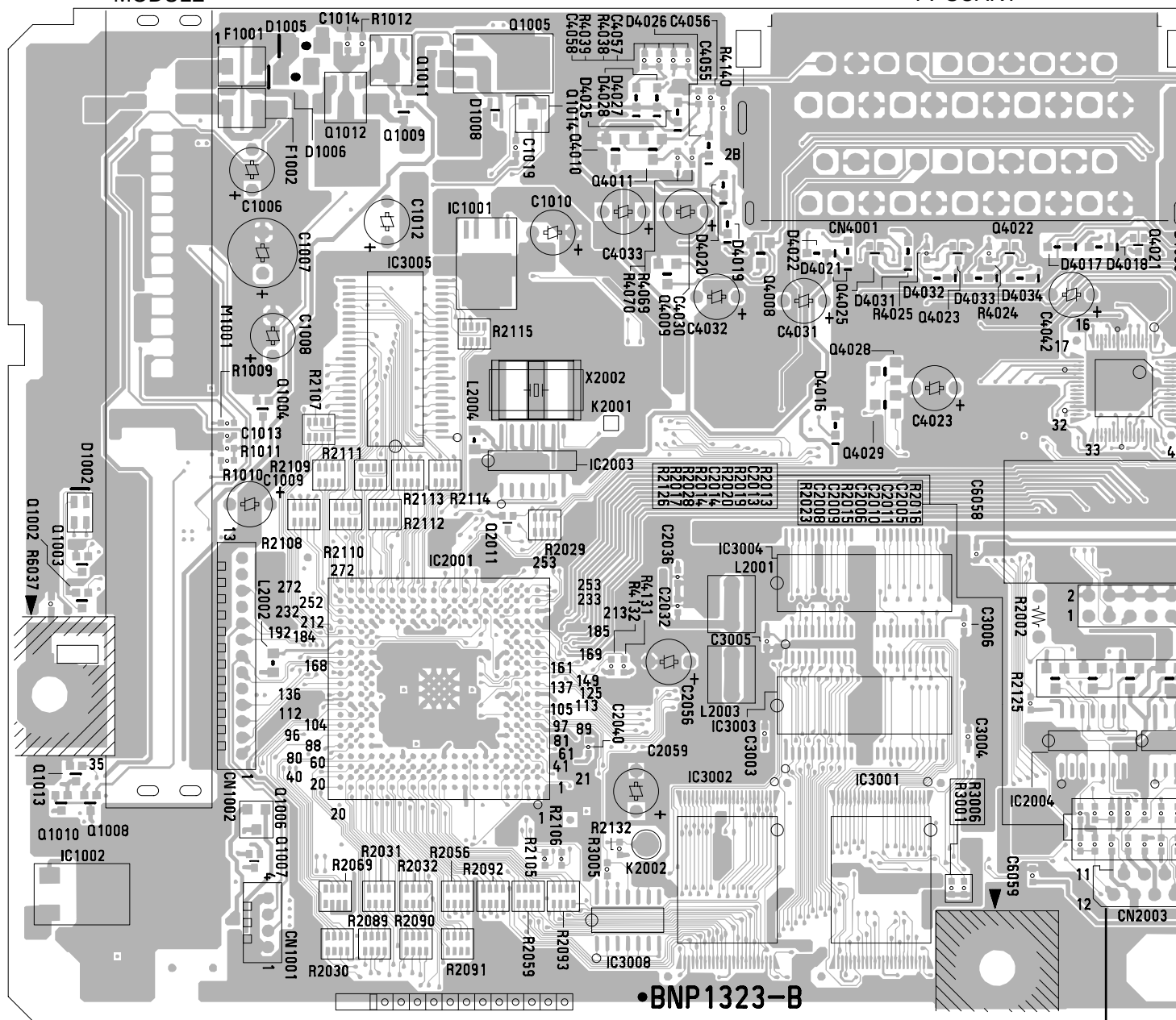


4.2 CARD ASSY



**A MAIN ASSY**

VCR SCART  
TV SCART



•BNP1323-B

**C** CN8503

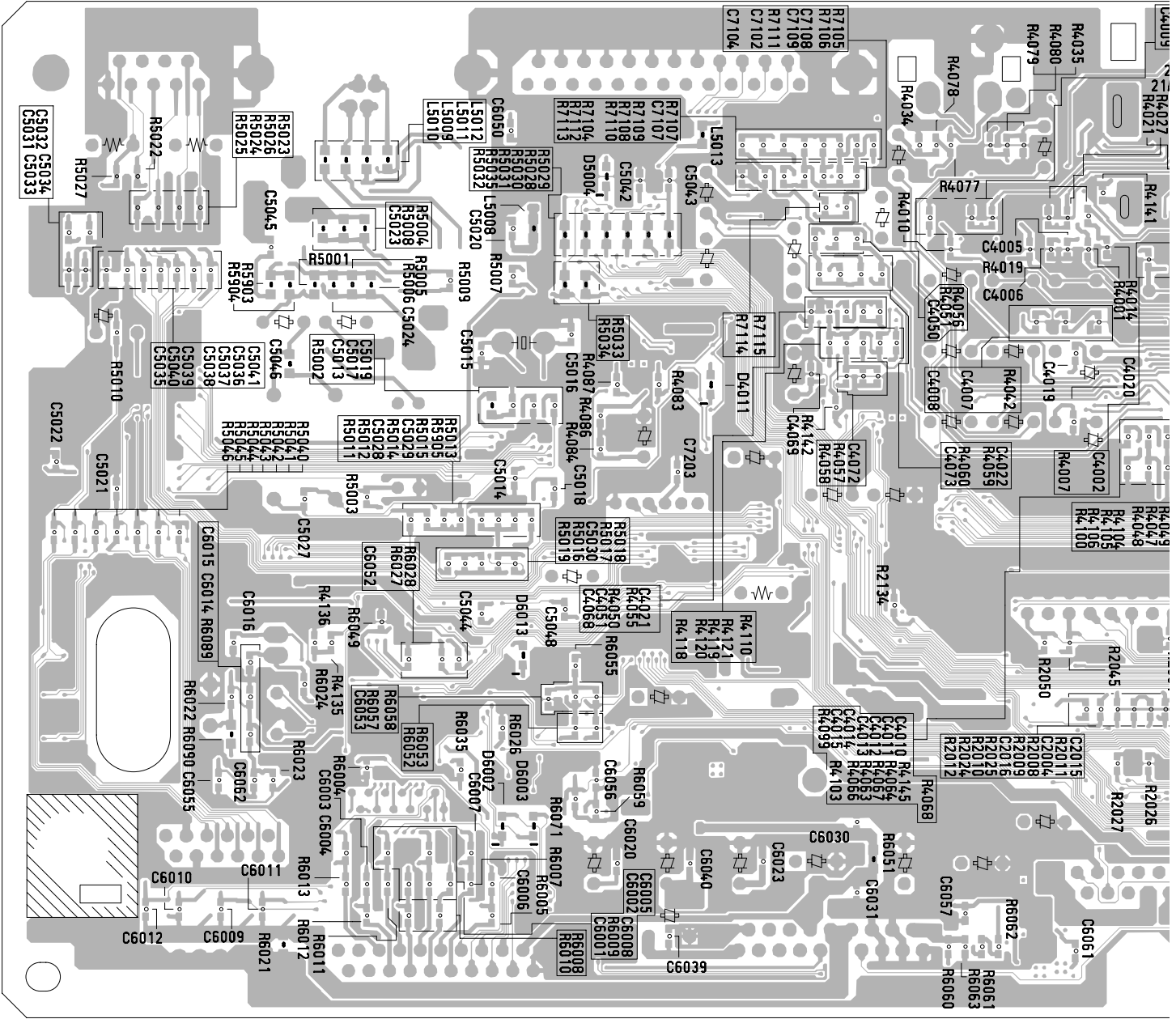
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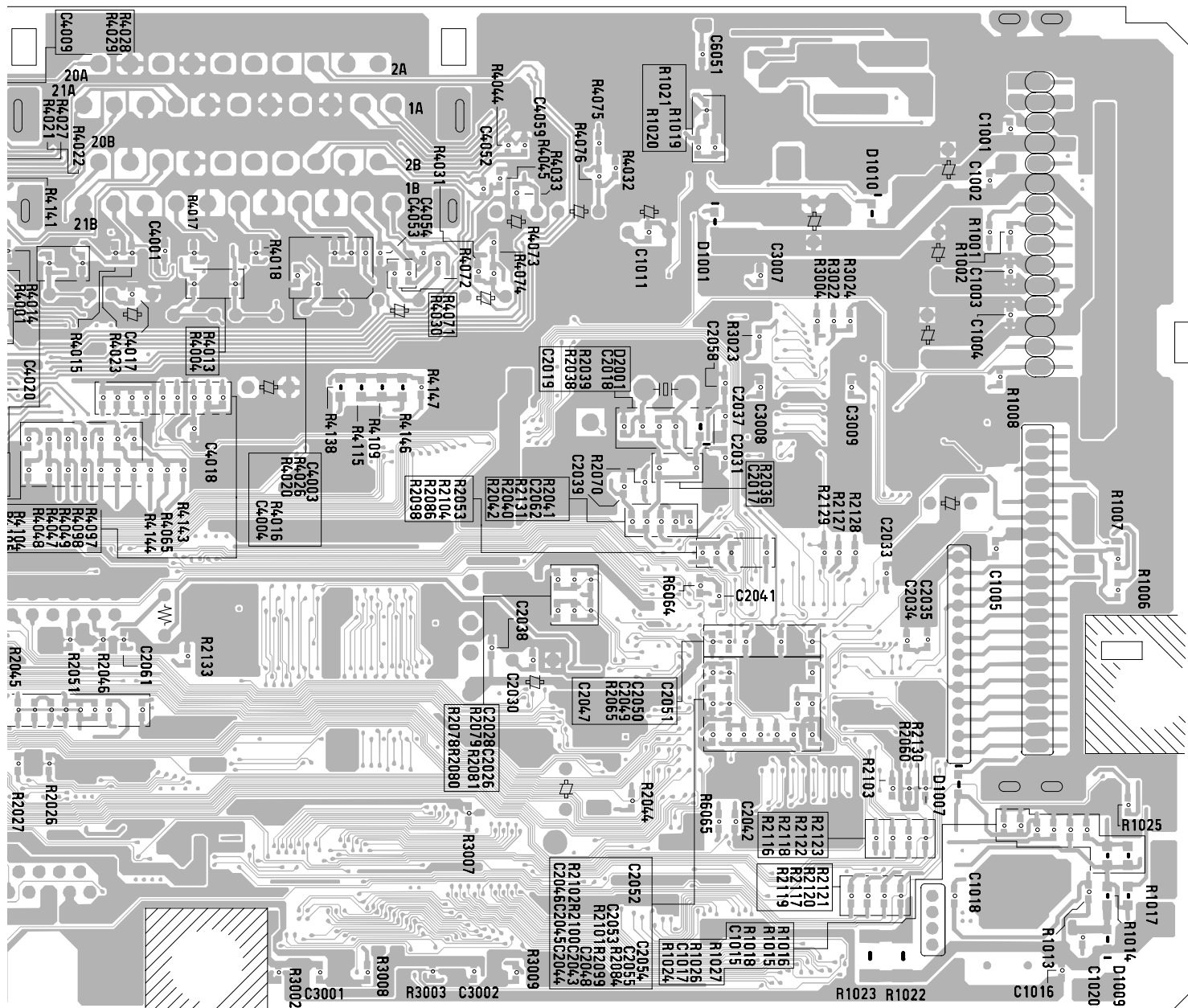
**SIDE A**

BNP1323-B

「

A MAIN ASSY





BNP1323-B

5. PCB PARTS LIST

NOTES: ●Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.  
●The Δ mark found on some component parts indicates the importance of the safety factor of the part.  
Therefore, when replacing, be sure to use parts of identical designation.  
●When ordering resistors, first convert resistance values into code form as shown in the following examples.  
Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).  
560 Ω → 56 × 10<sup>1</sup> → 561 ..... RD1/4PU 5 6 1 J  
47k Ω → 47 × 10<sup>3</sup> → 473 ..... RD1/4PU 4 7 3 J  
0.5 Ω → R50 ..... RN2H R 5 0 K  
1 Ω → 1R0 ..... RS1P 1 R 0 K  
Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).  
5.62k Ω → 562 × 10<sup>1</sup> → 5621 ..... RN1/4PC 5 6 2 1 F

Mark	No.	Description	Part No.
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LIST OF ASSEMBLIES

	MAIN ASSY	BWE1055
	FRONT ASSY	BWE1079
	CARD ASSY	BWE1080
△	POWER ASSY	BXF1112
<b>A MAIN ASSY</b>		
<b>SEMICONDUCTORS</b>		
	IC5001	73K321L-IH
	IC4002	AK4319A-VM
	IC1001	BA05SFP
	IC5005	BA10324AF
	IC6005	CAT24WC16JI
	IC2002	HD74HCT125FP
	IC5006	HIN211CB
	IC3003	HYB3118165BST-
	IC3005	HYB39S16160AT-
	IC3001	BGC1002-A-AV
	IC3002	MBM29LV400TC-S
	IC1002	NJM317DL1
	IC4003	NJM3404AM
	IC5004	P80C52
	IC5007	PACS1284-04Q
△	IC5002	PC123F2
	IC6001	PE5128A
	IC6002	PST9124N
	IC2003	SN74LVU04ANS
	IC2001	STI5510
	IC4001	STV6411A
△	IC2004	TC74ACT04F
	IC5003	TLP127
	Q2001,Q2002	2SA1036K
	Q1006,Q2003,Q2004,Q6033,Q6036	2SA1037K
	Q1012	2SB1132
	Q5007	2SC4061K
	Q1007,Q2011,Q4015,Q4018-Q4023	2SC4081
	Q4025-Q4027,Q5003,Q5004,Q6031	2SC4081
	Q6035	2SC4081
	Q5001,Q5002	2SC4793
	Q1011	2SD1664
	Q6017	2SK2103
	Q6018	2SK2503
	Q5005	DTA113TKA

Mark	No.	Description	Part No.
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Q1014	DTA124EK
Q5006	DTA143EK
Q6001-Q6004	DTB113ZK
Q4008-Q4013,Q4028,Q4029	DTC123TKA
Q1004,Q1008-Q1010,Q1013,Q6032	DTC124EUA
Q6034	DTC124EUA
Q4030	DTC124TKA
Q2005-Q2010,Q6005-Q6012	DTC143EK
Q1005	IRFR9024N
Q5008	MMSTA13
Q4014,Q4016,Q4017	UMD2N
D5002	1SR154-400
D1001,D1007,D1009,D1010,D5004	1SS355
D6002,D6003,D6011,D6013	1SS355
D1008,D6017	DA204U
D4012,D4013	DAN202K
D2001	HVU356
D4011	PDZ4.7B
D1005,D1011	RB160L-40
D5003	S1ZB60-4072
D4016	UDZ11B
D4017-D4036	UDZ12B
D6016	UDZS5.1B
<b>COILS AND FILTERS</b>	
F1001	BTF1072
△ F5018	BTF1087
L4005	BTH1065
△ T5001	BTX1032
L2002,L2004	DTL1038
<b>SWITCHES AND RELAYS</b>	
△ RY5001	BSR1014
<b>CAPACITORS</b>	
C6013 (0.047F/5.5V)	ACH1246
C2009,C2012-C2014	CCSRCH101J50
C5015	CCSRCH150J50
C4021,C4022,C4050,C4051	CCSRCH220J50
C6015,C6016	CCSRCH220J50
C2005-C2008,C2010,C2011	CCSRCH221J50
C2019	CCSRCH330J50
C2003,C2004	CCSRCH331J50
C5028	CCSRCH391J50
C5016	CCSRCH8R0D50
C4070	CEAT100M50
C1009,C2056	CEAT101M10
C1006	CEAT101M16
C1007	CEAT101M50
C5026	CEAT1R0M50



Mark	No.	Description	Part No.
	C4023,C4030-C4035,C4037 C4061 C2001,C2002,C4038-C4041 C4074,C4075 C6022	CEAT220M50 CEAT221M16 CEAT2R2M50 CEAT2R2M50 CEAT330M35	
	C4065 C1010,C1012 C6019 C4060,C6025,C6026 C5012,C5025,C5047	CEAT470M10 CEAT470M16 CEAT470M25 CEAT471M10 CEAT4R7M50	
	C5046 C5023,C5024 C2034,C2058,C4047,C4048 C4052-C4059,C5020,C5022 C1001-C1005,C1011,C1016,C2031	CKSQYB273K50 CKSQYB471K50 CKSRYB102K50 CKSRYB102K50 CKSRYB103K50	
	C2037 C1015 C2062,C4071,C6036,C6037 C5029 C6056,C6063	CKSRYB103K50 CKSRYB332K50 CKSRYB471K50 CKSRYB472K50 CKSRYB473K16	
	C5030 C1017-C1020,C2016,C2033,C2035 C4009,C4066,C4068,C6031,C6035 C2015,C2017,C2026,C2028,C2032 C2038-C2043,C2045,C2046	CKSRYB821K50 CKSRYF103Z50 CKSRYF103Z50 CKSRYF104Z16 CKSRYF104Z16	
	C2048-C2050,C2052,C2053,C2055 C3001-C3004,C3007-C3009 C4001-C4008,C4010-C4015 C4017-C4020,C4062,C4069 C4072,C4073,C5013,C5014	CKSRYF104Z16 CKSRYF104Z16 CKSRYF104Z16 CKSRYF104Z16 CKSRYF104Z16	
	C5017-C5019,C5021,C5031-C5035 C5044,C5045,C6014,C6033 C6052,C6053,C6057-C6059,C6062 C5027	CKSRYF104Z16 CKSRYF104Z16 CKSRYF104Z16 CKSRYF333Z50	
<b>RESISTORS</b>			
	R5020,R5021 (680Ω/1/2W) R2001,R2002 R6001,R6002 R2054,R2069,R6019 R2107-R2115	BCN1046 RD1/2VM3R3J RAB4C102J RAB4C103J RAB4C180J	
	R2030-R2032,R2056,R2059 R2089-R2093 R6003 R1014 R1016	RAB4C220J RAB4C220J RAB4C333J RS1/10S1200F RS1/10S1202F	
	R1015 R1017 R4142 R2038,R4140,R4141 R4001,R4004,R4007,R4010,R4013	RS1/10S1801F RS1/10S3601F RS1/16S0R0J RS1/16S100J RS1/16S101J	
	R4016,R4019,R4047,R4048,R6022 R6027,R6028,R6052,R6053 R1020,R2006,R2012,R2131,R4090 R6055 R1011,R1024,R2004,R2009	RS1/16S101J RS1/16S101J RS1/16S102J RS1/16S102J RS1/16S103J	
	R2024-R2027,R2041,R2044 R2050,R2051,R2053,R2086,R2098 R2100-R2102,R2125-R2128,R3004 R3023,R4057,R4059,R4083,R4089 R5010,R5901-R5903,R6063-R6065	RS1/16S103J RS1/16S103J RS1/16S103J RS1/16S103J RS1/16S103J	
	R1012,R2036,R2040,R4030-R4035 R4084,R6004,R6023,R6024 R2039	RS1/16S104J RS1/16S104J RS1/16S105J	

Mark	No.	Description	Part No.
	R4064,R4065,R4068 R2078-R2081 R2003,R2008,R6007-R6013 R2019,R2020 R1021	RS1/16S111J RS1/16S113J RS1/16S121J RS1/16S131J RS1/16S152J	
	R5016 R5015 R4136 R4063,R4066,R4067 R5012,R5013,R5017-R5019	RS1/16S153J RS1/16S182J RS1/16S183J RS1/16S201J RS1/16S203J	
	R2116-R2123,R2130,R3005 R1009,R1013,R2013,R2014,R2021 R2028,R2042 R1026,R1027,R2022,R2023,R4133 R4082	RS1/16S220J RS1/16S222J RS1/16S222J RS1/16S223J RS1/16S224J	
	R4058,R4060 R6005 R4069-R4080,R4147,R5007 R6057,R6058,R6071 R4135,R6059	RS1/16S242J RS1/16S330J RS1/16S331J RS1/16S332J RS1/16S333J	
	R5014 R2070,R6037 R2005,R2011,R4014,R4015 R4017,R4018,R4020,R4021,R4029 R4086,R5011,R6090	RS1/16S363J RS1/16S470J RS1/16S471J RS1/16S471J RS1/16S471J	
	R1010,R1025,R2132,R3001-R3003 R3006,R4049,R4085,R4091,R5003 R6049,R6061,R6062 R3007-R3009,R4038,R4039 R4044,R4045,R6039,R6089,R6091	RS1/16S472J RS1/16S472J RS1/16S472J RS1/16S473J RS1/16S473J	
	R5904 R4050,R4051,R4055,R4056 R4118-R4121 R2129 R4097-R4100,R4103-R4106	RS1/16S474J RS1/16S513J RS1/16S513J RS1/16S560J RS1/16S562J	
	R6088 R4023,R4027,R4028 R1019 R2007,R2010 R4087	RS1/16S563J RS1/16S620J RS1/16S680J RS1/16S681J RS1/16S682J	
	R1018,R2015-R2018,R4022 R4024-R4026,R4040,R4042,R6060 R4143-R4145 R1022,R1023 Other Resistors	RS1/16S750J RS1/16S750J RS1/16S910J RS1/2S1R3J RS1/10S	

**OTHERS**

△	M1001	DIGITAL TUNER MODULE	BXF1108
	CN2003	12P FFC CONNECTOR	9604S-12C
	CN6001	20P FFC CONNECTOR	9604S-20C
	JA4002	SERIAL NO. LABEL(PAP) 2P PIN JACK	BAX1145 BKB1017
	CN4001	SCART CONNECTOR	BKN1019
	CN6002	19P PLUG	BKP1120
	CN5004	DSUB 9P CONNECTOR	BKP1122
	CN5005	DSUB 25P CONNECTOR	BKP1123
△	CN5003	4P MODULAR JACK	BKP1137
	X6002	(32.768KHz)	BSS1027
	X5001	(11.0592MHz)	BSS1059
	X2002	(27MHz)	BSS1061
	X6001	(10.0MHz)	BSS1076

Mark	No.	Description	Part No.
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## **B** FRONT ASSY

### SEMICONDUCTORS

D8001			BEL1037
-------	--	--	---------

### SWITCHES AND RELAYS

S8001-S8006			ASG7013
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### RESISTORS

R8001 (27K $\Omega$ /1/4W)			BCN1056
----------------------------	--	--	---------

### OTHERS

CN8001	20P CONNECTOR		9604S-20F
M8001	REMOTE SENSOR UNIT		BXX1026

## **C** CARD ASSY

### CAPACITORS

C8501-C8504			CKCYF103Z50
-------------	--	--	-------------

### RESISTORS

R8502 (100 $\Omega$ /1/4W)			BCN1057
----------------------------	--	--	---------

### OTHERS

CN8503	12P CONNECTOR		9604S-12F
CN8502	8P CARD CONNECTOR		BKP1141
CN8501	16P CARD CONNECTOR		BKP1142

## **D** POWER ASSY

This ASSY has no service part as a assy part.

Only the fuse (F101:REK1101) is the service part as a set part.Refer to page 4.

Mark	No.	Description	Part No.
------	-----	-------------	----------



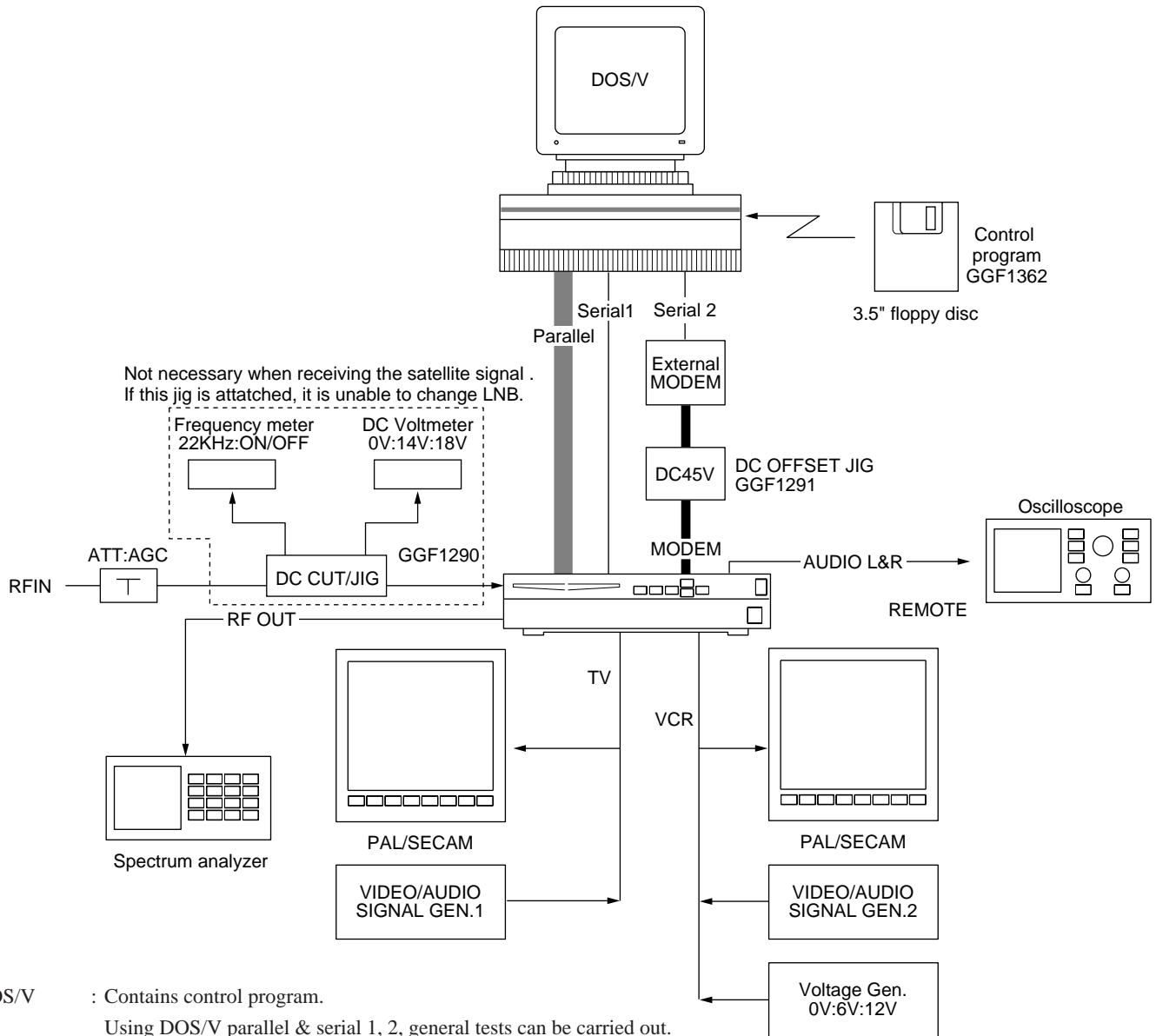
## 6. GENERAL INFORMATION

### 6.1 DIAGNOSIS

#### 6.1.1 Test Software

##### 1. Test Software Operating Environment

The following shows the environment for running the test software using the control program and performing various measurements.



DOS/V : Contains control program.

Using DOS/V parallel & serial 1, 2, general tests can be carried out.

Parallel : For downloading data to Flash ROM (II).

Straight cable.

Serial 1 : For control program control using RS-232C.

Straight cable.

Serial 2 : Controls the External modem using RS-232C.

For performing modem operation check.

External modem

: DOS/V modem. Controlled using RS-232C.

For performing modem operations check.

DC45V JIG : Jig for biasing DC45V to the modem cable.

Voltage Gen : Control voltage generator for SLOW SW output selection.

**Note:** The Communication check

softwares are different in each countries as below;

French version : GGF1362

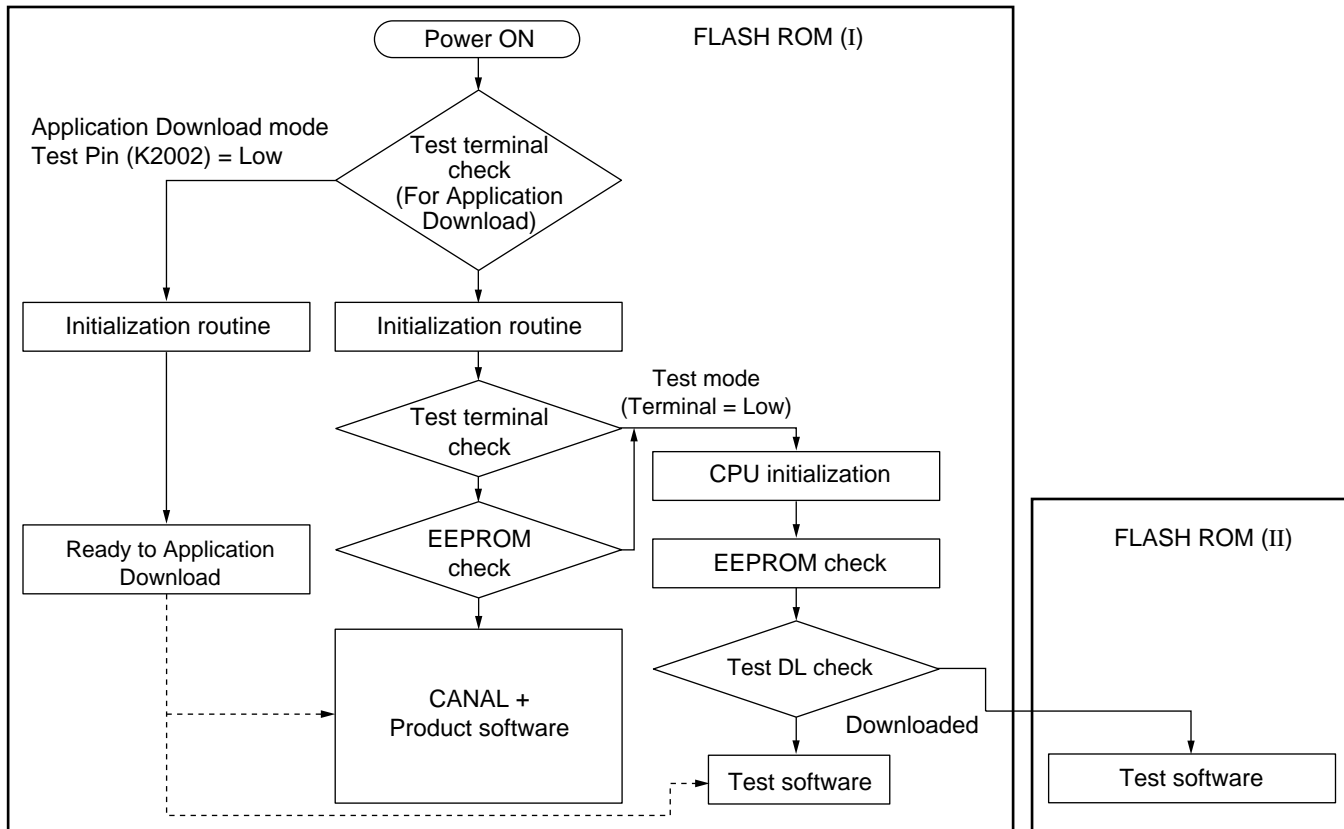
Spanish version : GGF1364

Italian version : GGF1366

Polish version : GGF1367

## ■Software Configuration

The following shows the test software and Application Download configuration.



The Test software is composed of Boot and Main. Boot exists together with the product software on the FLASH ROM (I). Main exists on the FLASH ROM (II). (FLASH ROM (I) is MBM29LV160T-90PFTN or TC58FVT160FT-85.)

The Test software Boot has only the function of the least required devices (IC) initialization, diagnosis, and downloads the Test software Main into the FLASH ROM (II).

The Test software Main is downloaded into the FLASH ROM (II) and performs the operation checks of all devices, and settings of IC parameters.

Application Download mode is the unusual mode. If the IRD is need to be changed “CANAL +Product software” in FLASH ROM (I), select the Application Download mode.

Application Download mode can download the new “CANAL +Product software”.

## ■LED DISPLAYS

### • Initialization

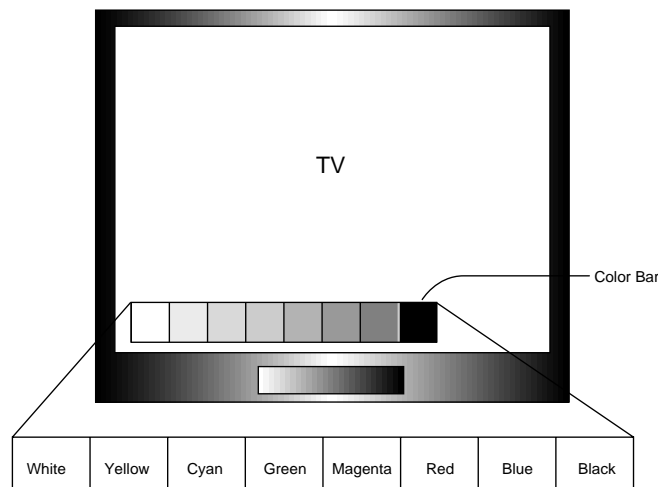
Checks of devices are performed in the following order and results are displayed on the LED.

- 1) LEDs all lit
- 2) LED “0” lights      Reading the Version (reading each version of the software ,hardware and Patch inside the EEPROM)
- 3) LED “1” lights      Initializing the Tuner section (setting the data to the register by IIC)
- 4) LED “2” lights      Initializing the EEPROM 16K (24LC16B/CAT24WC16J/CAT24WC16JI/BR24C16F) (writing the factory delivery data by IIC) .
- 5) LED “3” lights      Initializing the Video Encoder (inside STi5510) (initializing on the software)
- 6) LED “4” lights      Initializing the demultiplexer part of the Main CPU STi5510 (inside STi5510 , initializing on the software)
- 7) LED “5” lights      Initializing the MPEG VIDEO part (initializing on the software)
- 8) LED “6” lights      Initializing the MPEG AUDIO part (initializing on the software)
- 9) LED “7” lights      DAC reset ON

- 10) LED “8” lights      Initializing the FLASH ROM (II) 4M(MBM29LV400TC-90PFTN / TC58FVT400FT-85) (reading the electronic signature ,initializing on the software)
- 11) LED “9” lights      Initializing the Teletext part (inside STi5510 , initializing on the software)
- 12) LED “10” lights      Initializing the Subtitle part (initializing on the software)
- 13) LED “11” lights      Initializing the Mailbox (initializing on the software)
- 14) LED “12” lights      Initializing the Task (initializing on the software)
- 15) LED “13” lights      Initializing the Device\_manager (initializing on the software)
- 16) LED “14” lights      Initializing the interrupt of STi5510 (initializing inside STi5510)
- 17) LED “15” lights      Initializing the SHUTDOWN Task (inside STi5510 , initializing on the software)
- 18) LED “16” lights      Initializing the Service part (initializing on the software)
- 19) LED “17” lights      Initializing Sound part (initializing on the software)
- 20) LED “18” lights      Initializing the Section part (inside STi5510 ,initializing on the software)
- 21) LED “19” lights      Initializing the Mload part (initializing on the software)
- 22) LED “20” lights      Initializing the OSD part (initializing on the software)
- 23) LED “21” lights      Initializing the Parallel part (initializing on the software)
- 24) LED “22” lights      Initializing the Parallel TASK (inside STi5510 ,initializing on the software)
- 25) LED “23” lights      Initializing the Backup part (initializing on the software ,reading EEPROM)
- 26) LED “24” lights      Initializing the Card part(inside STi5510, initializing on the software)
- 27) LED “25” lights      Initializing the Emm part (initializing on the software)
- 28) LED “26” lights      Initializing the Ecm part (initializing on the software)
- 29) LED “27” lights      Initializing the MCOM TASK part (initializing on the software)
- 30) LED “28” lights      Initializing the Clock part (reading SubCPU and EEPROM by IIC ,initializing on the software)
- 31) LED “29” lights      Initializing the Serial part (initializing on the software)
- 32) LED “30” lights      Initializing the Serial TASK (inside STi5510 ,initializing on the software)
- 33) LED “31” lights      Initializing the AV Switch(STV6411A) (writing the necessary data to STV6411A by IIC, initializing on the software)
- 34) LED “32” lights      Initializing the Scvcr part (writing the necessary data to AV Switch(STV6411A) , Video encoder (inside STi5510) and SubCPU by IIC , initializing on the software)
- 35) LED “33” lights      Initializing the Sctv part (writing the necessary data to AV Switch(STV6411A) , Video encoder (inside STi5510) and Subcpu by IIC , initializing on the software)
- 36) LEDs all lit

Note : The right side two digit of the LED indicator of the frontpanel display the selfcheck number during executing each step.

## ■OSD Display



## 6.1.2 Self-Diagnosis Mode

### Procedure

- 1) Open the bonnet and short the Test Pin K6003 and GND.  
(The Test Pin terminal is located at the upper side of CN6002 as seen from the front.)
- 2) Turn ON the power.  
Push any key.  
The self-diagnosis mode is set.  
LED “0 to 33” on the IRD front panel light up one by one and then all lit. If a LED stops between “0 and 33”, the circuit block corresponding to that number should be checked.
- 3) When all the LEDs are lit, it indicates that the IRD is waiting for downloading of the Test software Main.  
The Test software Main will be downloaded from the PC connected to the IRD.
- 4) When the downloading completes normally, OK is displayed on the PC display. If OK, it indicates that the parallel port of the IRD is operating normally.
- 5) After completing the downloading, resetting the power supply, and this time all LEDs “0 to 33” will light up one by one, and finally all lit.  
If a LED stops, the circuit block corresponding to that number should be checked.

### Example

#### Downloading of Self-Diagnosis Program

- 1) Move the cursor to “Program Download” at MAKE CHECK\_STEP, press the RETURN key and then press the F10 key to end the setting.
- 2) When the IRD side sets into the downloading standby state, select IRD CHECK from the main menu, and press the RETURN key. Press the RETURN key once more to download the program.

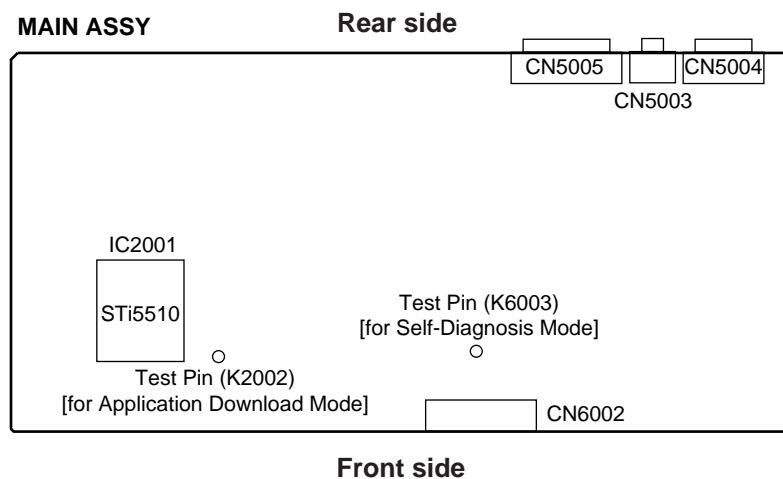


Fig.1 Test Pin LOCATION

## ■Starting and Operating the Communication Check Software GGF1362

PC Operation Environment

DOS/V machine      OS : MS-DOS

Execution program :      MAIN. EXE

When the MAIN.EXE is started, the following initial screen is displayed.

```

MAIN MENU

--- IRD CHECK ---

--- MAKE CHECK_STEP ---
--- RETURN to DOS ---
Ver. * * *
```

Select MAKE CHECK\_STEP with the cursor, and press the RETURN key.

The following will be displayed.

```

1: Self check error list          20: Check Slow_SW 16:9 (6V)
2: Program Download              21: Check Fast_SW
3: Set Parameter 1               22: Check MONO/STEREO (VCR_SCART)
4: Set Parameter 2               23: Check MONO/STEREO (TV_SCART)
5: Set Parameter 3               24: Check Input Voltage
6: Set Parameter 4               25: Check High BAND (22kHz)
7: Tuner Check                   26: Check LNB DC (18V)
8: Check DSCR/BANK/Card Detect    27: Check LNB DC (14V)
9: DSCR/BANK Card R/W Check      28: Check MODEM (SET)
10: DSCR Card R/W Check           29: Check DSCR Card Detect
11: BANK Card R/W Check           30: Check BANK Card Detect
12: Check Audio Volume            31: Application DownLoad
13: Check Video Contrast (RGB)    32: Check Parallell Port
14: Check Video Mute (RGB)        33: Check MODEM Sensitivity
15: Check Video Mute (VIDEO)      34: Check MODEM Carrier Frequency
16: Check Audio Mute              35: Check VCXO
17: Check SECAM Mode              36: Check Slow_SW 4:3 (12V)
18: Check S_VHS Mode              37: Flash Soft clear
19: Check Slow_SW OFF (0V)        38: Set data for V42
STEP:

Push Enter key after choose by Arrow key
f10: END
```

Press the “F10” key after inputting the command number to be transmitted to IRD.

After returning to the initial screen, select “IRD CHECK” with the cursor key and press the RETURN key. The screen for executing the command will be displayed. Pressing the RETURN key will execute the command selected at “MAKE CHECK\_STEP”.

The following shows a list of commands and their functions.

No.	Command	Function
1	Self Check error list	Not used.
2	Program Download	Used for downloading the Test program to IRD.
3	Set parameter 1	Transmits the command used for setting the parameters required for IRD tuning signals. (To set parameters, press the function key F1 at the IRD Check Mode Screen.)
4	Set Parameter 2	Same as above except the use of function key F2.
5	Set Parameter 3	Same as above except the use of function key F3.
6	Set Parameter 4	Same as above except the use of function key F4.
7	Tuner Check	Used to check if the Tuner Bit Error Rate is OK or not at limited MPEG stream signal. OK :Bit Error rate OK, NG : Bit Error rate NG
8	Check DSCR/BANK Card Detect	Checks the DETECT terminal of DSCR Card and BANK Card.
9	DSCR/BANK Card Check	Checks both the No. 10 and No. 11 command function.
10	DSCR Card Check	Used to check if the DSCR Card is present and to check the communication with the main microprocessor. OK : Communication check OK NG : Communication check NG
11	BANK Card Check	Used to check if the Bank Card is present and to check the communication with the main microprocessor. OK : Communication check OK NG : Communication check NG
12	Check Audio Volume	Varies the audio output level (Recovers after two seconds)
13	Check Video Contrast (RGB)	Varies the RGB output contrast level (4 step: 0.7V, 0.8V, 0.9V, 1.0V)
14	Check Video Mute (RGB)	Mutes RGB output (Recovers after 2 seconds)
15	Check Video Mute (Video)	Mutes composite video output (Recovers after 2 seconds)
16	Check Audio Mute	Mutes all audio outputs (TV_SCART, RCA) (Recovers after 2 seconds)
17	Check SECAM Mode	Switches the video output to SECAM
18	Check S_VHS Mode	Switches the video output to Y/C separation output Also switches the video output to PAL
19	Check Slow_SW OFF (0V)	Sets the SLOW_SW (16:9/4:3 discrimination signal) to OFF (Low Level)
20	Check Slow_SW 16:9 (6V)	Sets the SLOW_SW to 16:9
21	Check Fast_SW ON	Sets the FAST_SW (RGB/Video switching signal) to ON (High Level)
22	Check Mono/Stereo (VCR_SCART)	Switches the VCR_SCART audio output to monaural
23	Check Mono/Stereo (TV_SCART)	Switches the SCART mode 5, 2, 4 and 1. (Refer to the next page Fig 2)

No.	Command	Function
24	Check Input Voltage	Checks the tuner AGC voltage, external Slow_SW input voltage OK : Both check are OK, NG : Both check are NG  * The IRD has to be set to the initial state, and 6V or 12V has to be applied from outside.
25	Check High Band (22kHz)	Checks the oscillation circuit in the IRD 22kHz pulse is carried from the antenna input
26	Check LNB DC (18V)	DC18V is carried from the antenna input
27	Check LNB DC (14V)	DC14V is carried from the antenna input
28	Check MODEM(SET)	Checks the communication between the MODEM in the IRD and External MODEM. (Refer to the Appendix Page 71.) OK : Communication check is OK, NG:Communication check is NG (Use DC OFFSET JIG)
29	Check DSCR Card Detect	Checks the DETECT terminal of the DSCR Card
30	Check BANK Card Detect	Checks the DETECT terminal of the BANK Card
31	Application Download	Used for downloading the Application to IRD
32	Check pararell Port	Performs parallel port loop back test
33	Check MODEM Sensitivity	Check sensitivity between IRD's modem and external modem.
34	Check MODEM Carrier Frequency	Check carrier frequency at 390 Hz, 450 Hz, 1300 Hz and 2100 Hz.
35	Check VCXO	Check VCXO frequency at upper and lower side.
36	Check Slow_SW4:3(12V)	Sets the Slow_SW to 4:3
37	Flash Soft clear	Erase the Test Program
38	Set data for V42	Sets V42 packet communication timing.

Fig.2 TV VCR SCART TEST

	TV SCART output	RCA audio output	VCR SCART output
Mode 1	VCR output	VCR output	TV output
Mode 2	VCR output	VCR output	MPEG A/V output
Mode 3	MPEG A/V output	MPEG Audio output	TV output
Mode 4	MPEG A/V output	MPEG Audio output	Mute
Mode 5	VCR output	VCR output	Mute
Mode 6	MPEG A/V output	MPEG Audio output	MPEG A/V output

■Outline of the IRD Check on the Main Menu

Select IRD CHECK on the MAIN MENU, and press the RETURN key.  
The following screen will be displayed.

STEP : \* \* \*

NEXT : \* \* \*

F1 : Set Tuning parameter1

F2 : Set Tuning parameter2

F3 : Set Tuning parameter3

F4 : Set Tuning parameter4

F5 : Set the state of IRD

F6 :

F7 : Set eeprom data

F8 :

F9 : Set AV level data

ESC : Return

The command selected at “MAKE CHECK\_STEP” on the MAIN MENU will be displayed onto \* \* \*.

F7 --- Refer to the Precautions after repairs (P.42)

Pressing the RETURN key at this screen will transmit the selected command to the IRD.

If the IRD operates normally for the transmitted command, “OK” will be displayed.  
If a problem exists, NG will be displayed.



## ■ Function keys

Set Parameter : Sets the parameters of the received signal.

Example

-- Set Parameter 1 --

Tuner freq : 0950000KHz (Min: 950000 Max: 2150000)

Code rate : 1/2 2/3 3/4 5/6 7/8

Symbol rate : 27500k (Min : 18000, Max : 30000)

IQ mode : I,Q I,-Q

RF switch : LNB-A LNB-B

Video PID : 0200 (0000 - 1FFF)

Audio PID : 0280 (0000 - 1FFF)

Pcr PID : 1FFE (0000 - 1FFF)

Error rate : Normal Viterbi

APR : 1 2 3 4 5 R

AQ Time : Known Unknown

AQ freq : 2150000KHz (Min : 950000, Max : 2150000)

AQ C rate : 1/2 2/3 3/4 5/6 7/8

AQ S rate : 25000k (Min : 18000, Max : 30000)

IQ mode : I,Q I,-Q

RF switch : LNB-A LNB-B

AQ V PID : 0200 (0000 - 1FFF)

AQ A PID : 0280 (0000 - 1FFF)

AQ P PID : 1FFC (0000 - 1FFF)

f1 : sweep f2 : up f3 : down f9 : send Esc : return

After the completion of data setting of each function, using the F9 key, data can be transmitted to control the IRD.

Set the state of IRD

Example

-- Set Sub CPU\_port --

HI_BAND	:	ON	OFF	
LNB_POWER	:	OFF	14V	18V
TV/NOT	:	NOT	TV	
16:9/4:3	:	4 : 3	16 : 9	
RGB ON/OFF	:	OFF	ON	
VCR OUT	:	SVHS	CVBS	
PAL/SECAM	:	SECAM	PAL	
REC/PB (TV)	:	PB	REC	
TV AUDIO	:	Stereo	Mono	
VCR AUDIO	:	Stereo	Mono	
Mute TV a	:	off	on	
Mute VCR a/v	:	on	off (REC)	off (PB)

F9 : send Esc : return

Set AV level data: Used to control the Audio volume and RGB level.

-- Set Audio & RGB level --

Audio volume	: 0	(Min: 9 Max: 0)			
RGB level	: 0.7	0.8	0.9	1.0	

f2 : up      f3 : down      F9 : send      Esc : return

After the completion of data setting of each function, using the F9 key, data can be transmitted to control the IRD.

## Precautions after repairs

When the test software operates, in the EEPROM data, the effective data is written to the address from 0x7F0 to 0x7FF which is related with the test software. when the power is turned ON again, the test software instead of the CANAL + product software will operate and problems will result. After completing repairs, break the above data so that the test software will not operate.

The following describes the procedure.

There are 2 ways to break the test software data. (But use method 1 as much as possible)

### Method 1 (Recommended)

- 1) Operate the test software (do not short the test pin).
  - 2) Select MAKE CHECK\_STEP with the cursor, and press the RETURN key.
  - 3) In the menu, select the command “37: Flash soft clear” and press the RETURN key.
  - 4) Select IRD CHECK from the main menu, and press the RETURN key.
- And then press the F10 key to end the setting.
- Press the RETURN key once more to clear the Flash data.

### Method 2

- 1) Operate the test software (do not short the test pin).
  - 2) Press **F7** and set the EEPROM DATA SET mode.
  - 3) Press **ALT** and **F10**.
  - 4) Press **PAGE UP** so that the address at the most bottom on the display becomes 0x7F0.
  - 5) Press the **↓** key to move the cursor to the 0x7F0 position, and change the address 0x7F0 to 0x7FF data to all FF.
  - 6) Press **F9**.

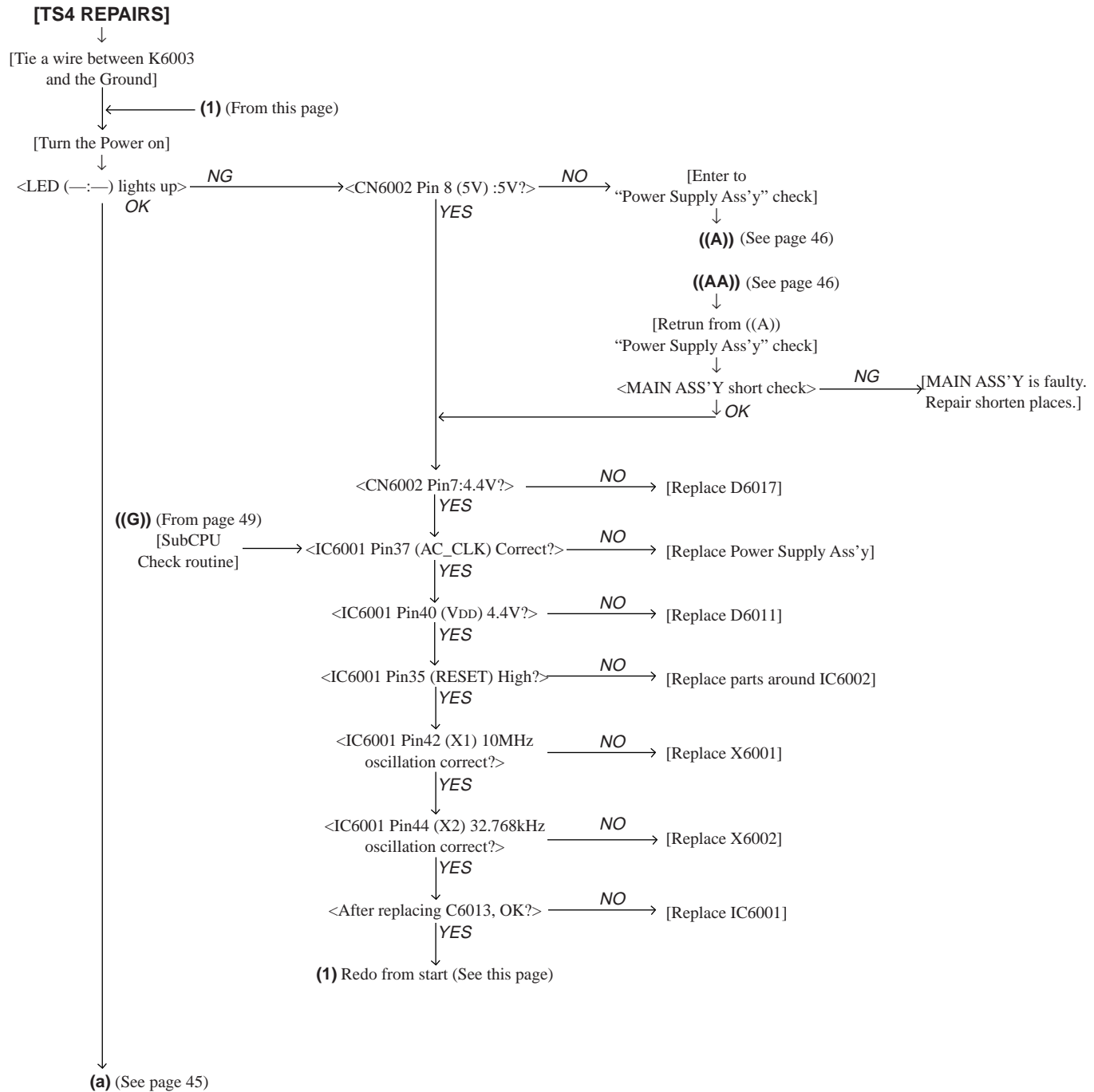
Here, turn ON the power again, and check that the normal software operates.

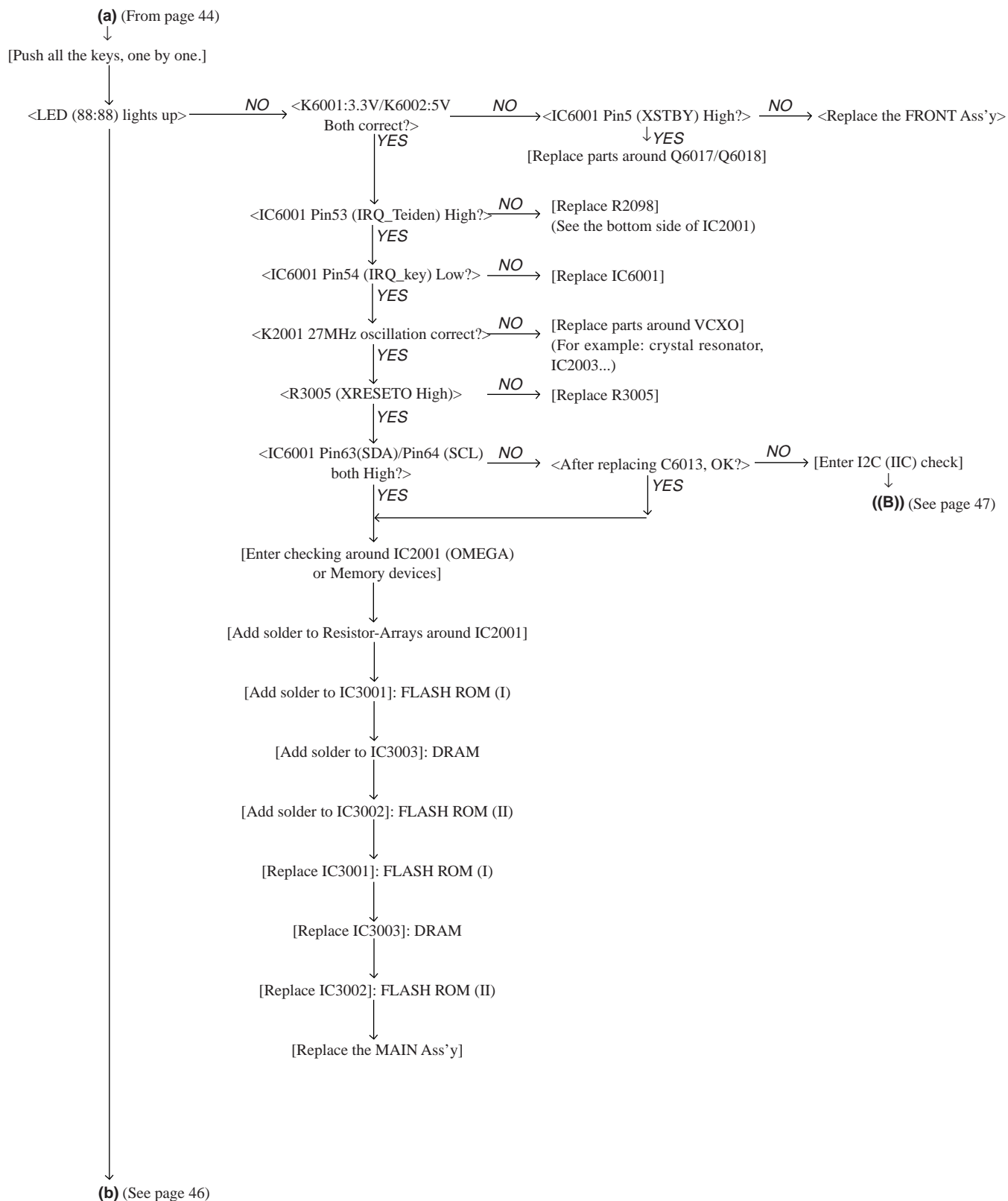
### 6.1.3 TROUBLESHOOTING

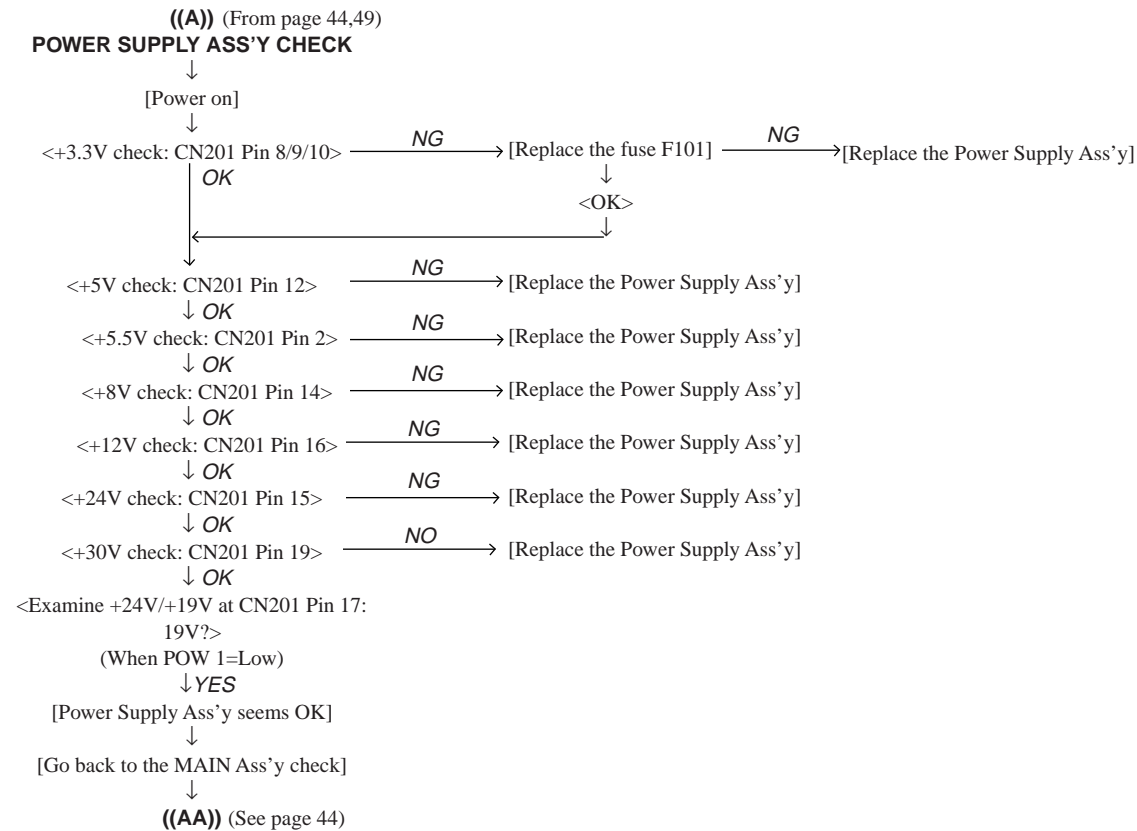
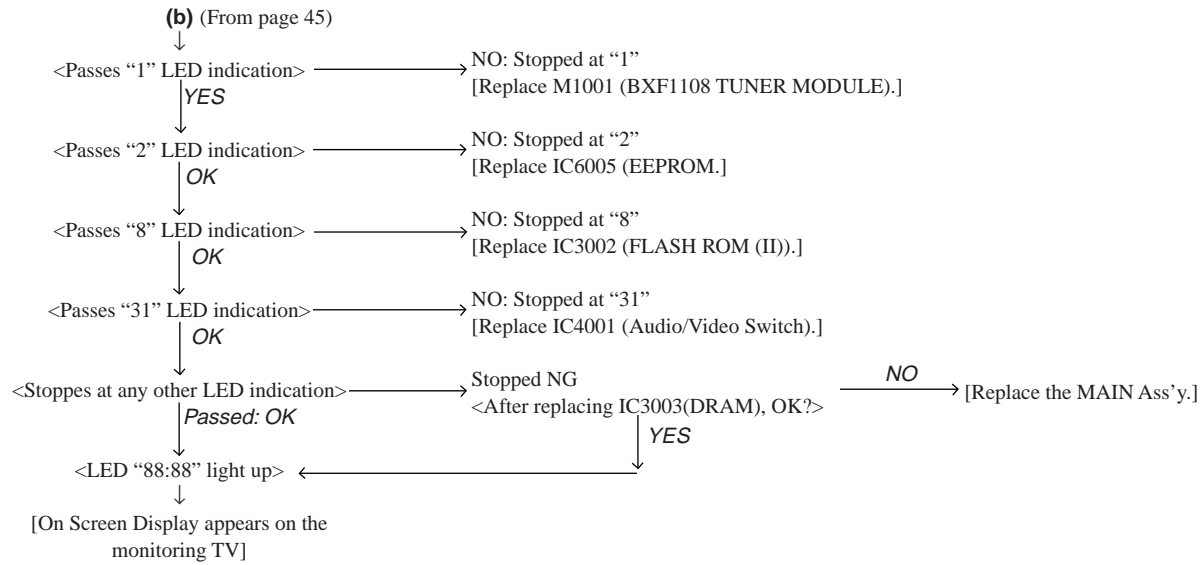
#### Prologue

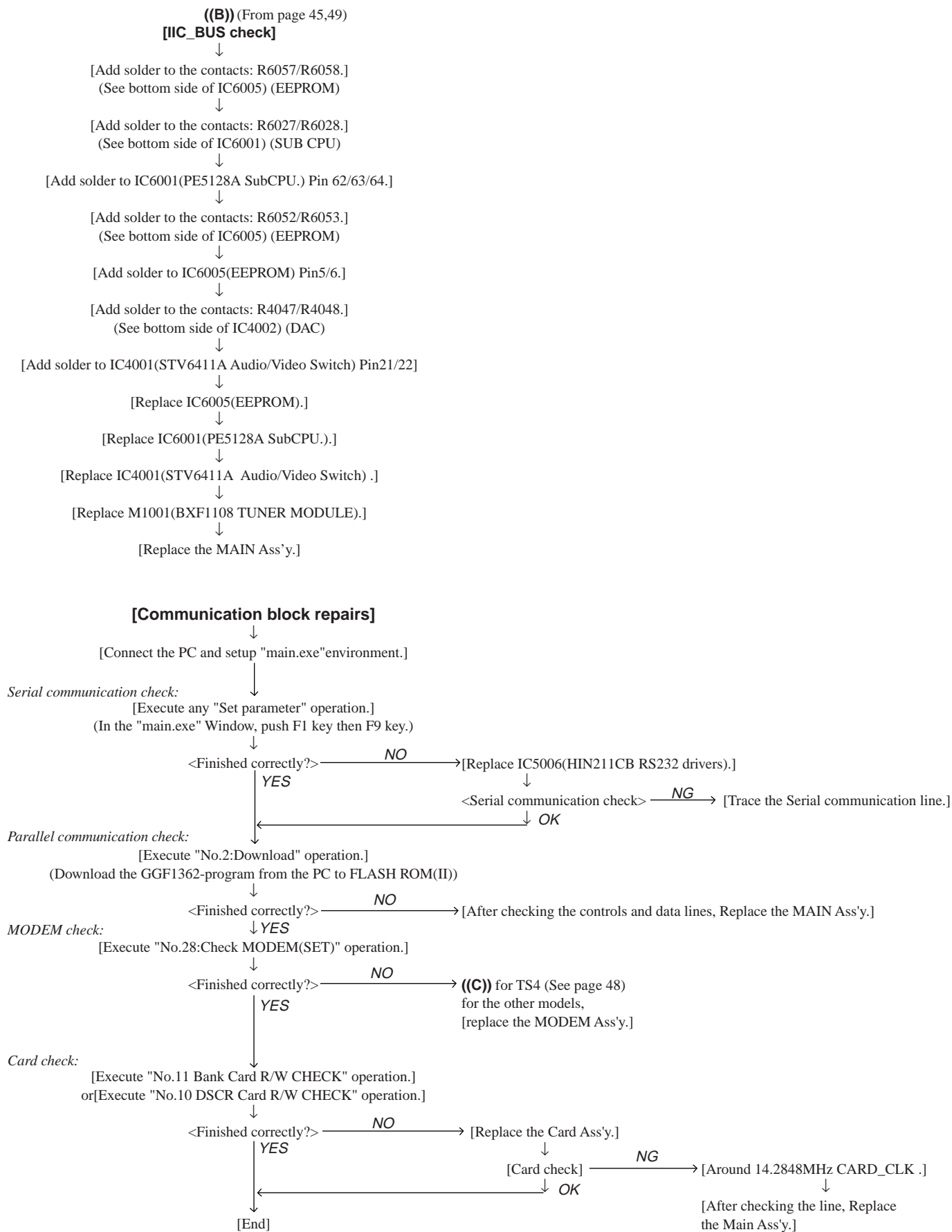
Before entering into repairing stages, we recommend you to make confirmations as following;

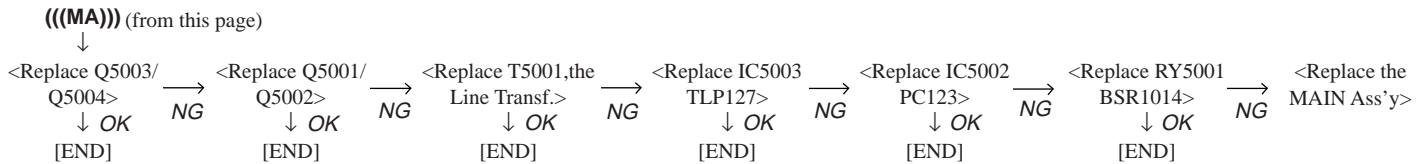
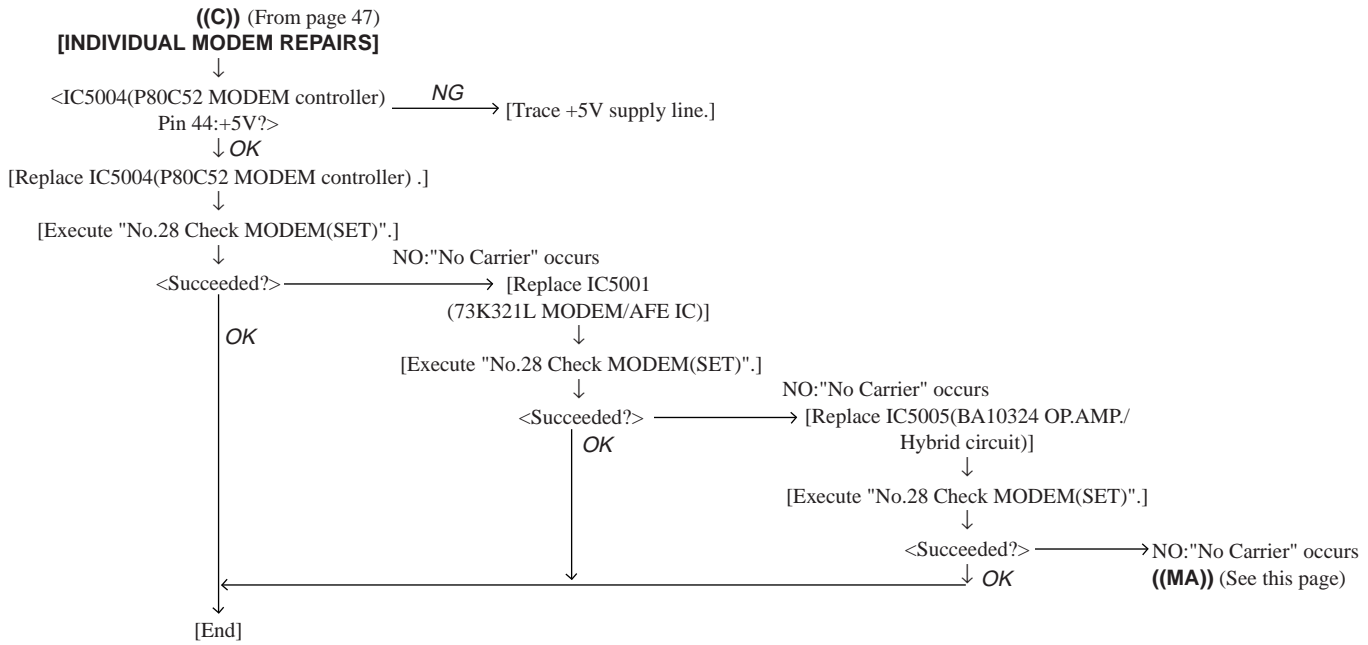
- 1) This flow chart doesn't describe simple defections like below.  
So check them before your starting;
  - \* Whether push-switch(s) is(are) broken.
  - \* Whether connector plug(s) or socket(s) get(s) out of place(s).
  - \* Whether there are poor contacts of the wire(s).
- 2) Generally, the IRD may have;
  - \* Soldering defections made by the mechanical stresses.
  - \* Devices failures which show an evident change of their colour.



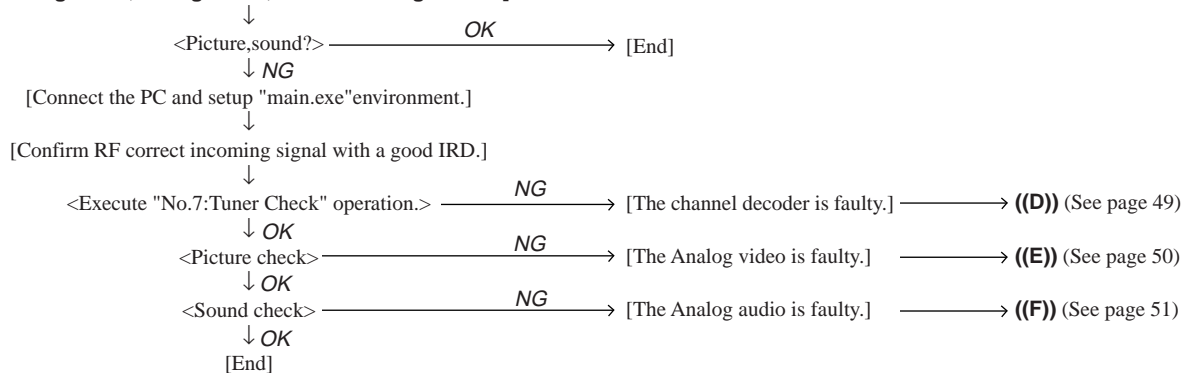








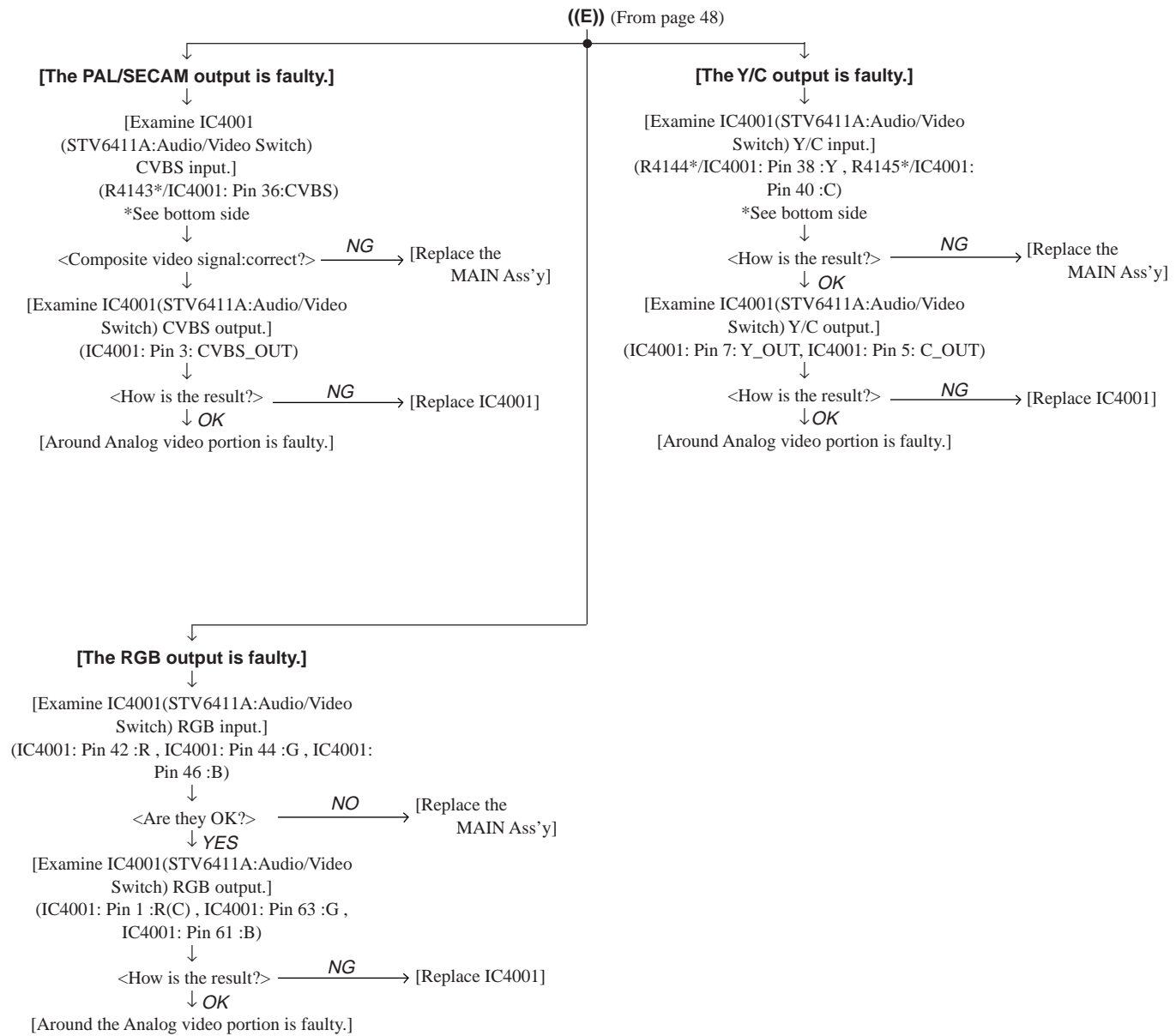
**[Analog video,analog audio,tuner receiving checks]**







[Analog Video section]



**[Analog Audio section]****((F))** (From page 48)

[Check the Power supplied properly.]



[Examine IC4002(AK4319A-VM D/A converter) input]

(IC4002:Pin 6: SDATA)



&lt;How was the result?&gt;

**NO**

→ [Trace the line going up to IC2001 OMEGA:STi5510A.]

↓ **OK**

[Examine IC4002(AK4319A-VM D/A converter) output.]

(IC4002:Pin 18/19: L, IC4002:Pin 16/17: R)

↓ **YES**

&lt;Are they OK?&gt;

**NO**

→ [Replace IC4002]



[Examine IC4003(NJM3404AM OP. Amplifier) output]

(IC4003:Pin 1: L, IC4003:Pin 7: R)



&lt;How is the result?&gt;

**NO**

→ [Replace IC4003]

↓ **OK**

[Examine IC4001(STV6411A:Audio/Video Switch) Audio outputs.]



[Select where to go from below.]



Audio output terminals which are NG		Examine: IC4001					
		Pin 2: TV_L	Pin 64: TV_R	Pin 62: VCR_L	Pin 60: VCR_R	Pin 59: RCA_L	Pin 58: RCA_R
TV-SCART & VCR-SCART & CINCI	→	○	○	○	○	○	○
TV-SCART & VCR-SCART	→	○	○	○	○		
TV-SCART & CINCI	→	○	○			○	○
TV-SCART	→	○	○				
VCR-SCART	→			○	○		
CINCI	→					○	○
Others	→	○	○	○	○	○	○



&lt;How is the result?&gt;

**NG**

→ [Replace IC4001]

↓ **OK**

&lt;Q4014/Q4017(UMD2N)Pin 3: High?&gt;

**NO**

→ [Add solder to the CN4001]

(TV\_MUTE/VCR\_MUTE)

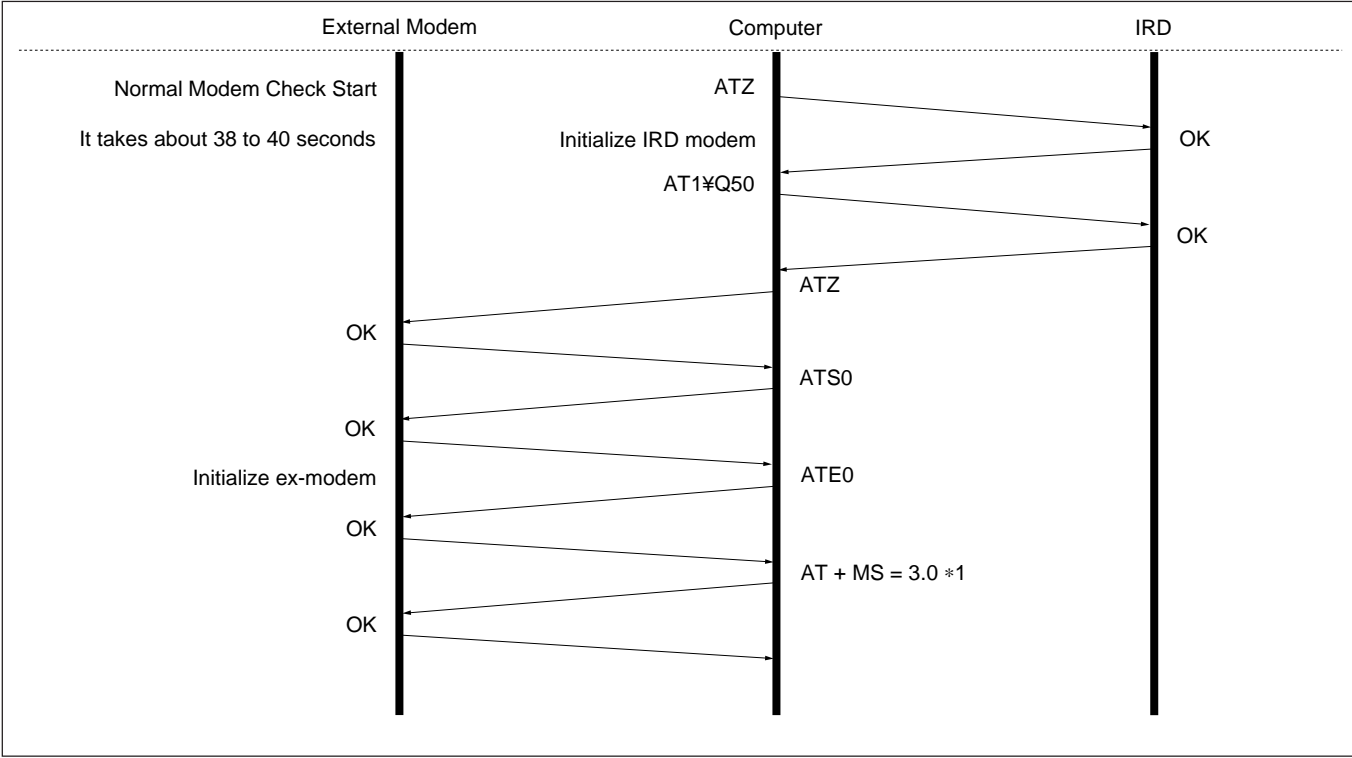
↓ **YES**

[Examine around the Muting circuitry]

(Q4015/Q4016/Q4018/Q4019/Q4030/D4012/D4013/Q4014/Q4017)

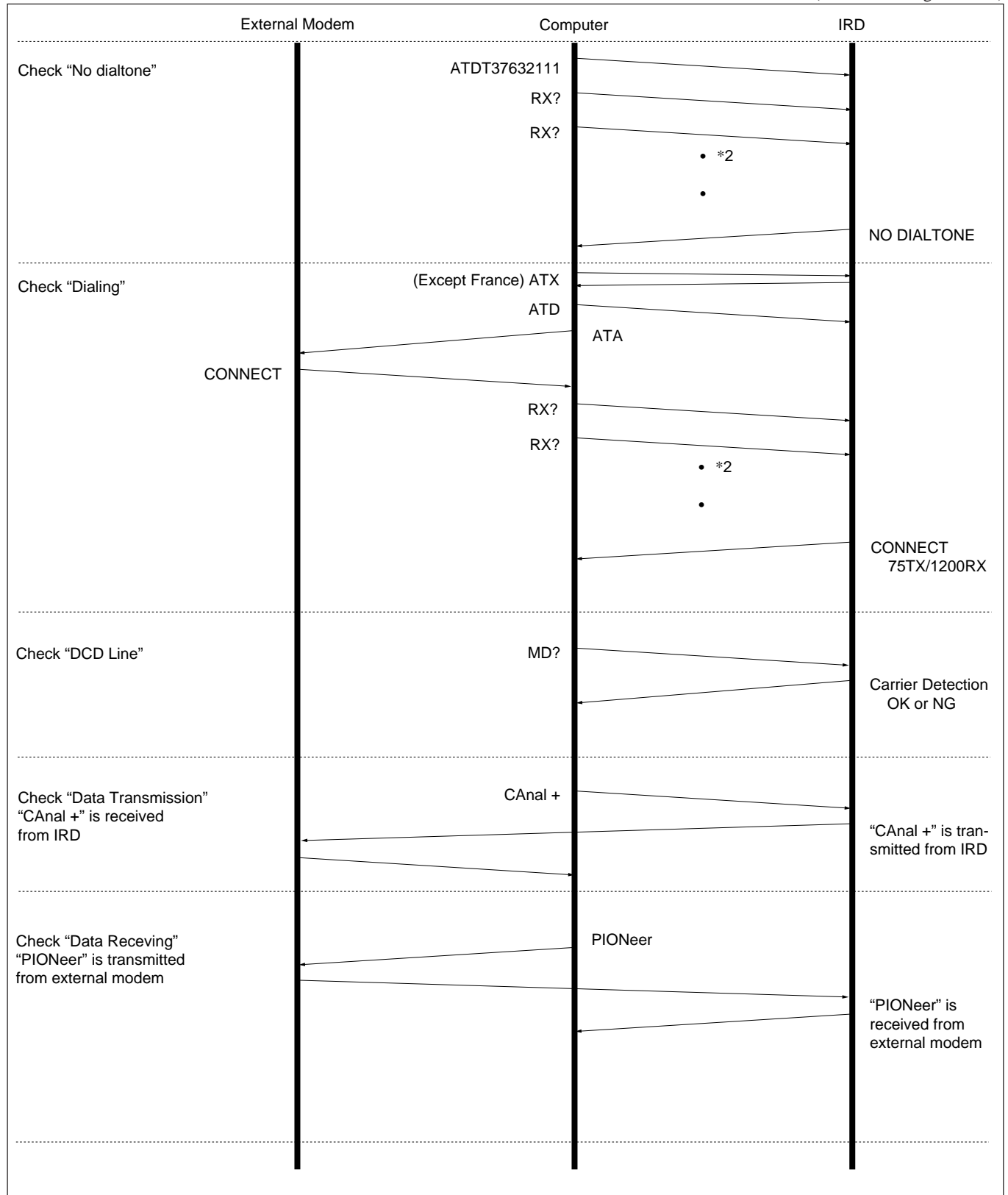
■Appendix.  
MODEM Check Sequence

1. Initialization (This is for 4<sup>TH</sup> generation)



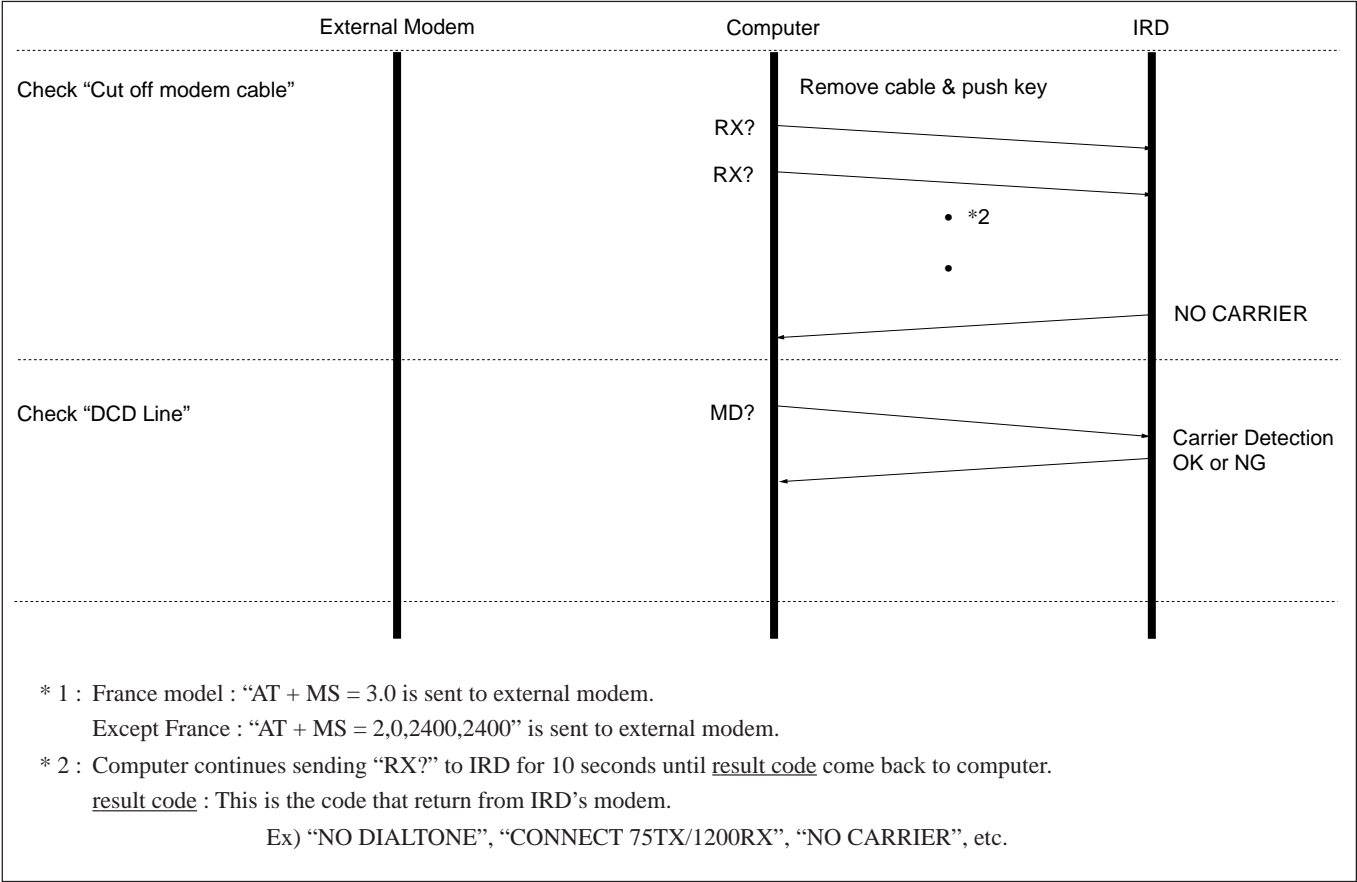
## 2. Dialing, Transmission & Receiving

(This is for 4<sup>TH</sup> generation)



3. Cut off detect confirmation

(This is for 4<sup>TH</sup> generation)



## 6.2 IC

- The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

**CAUTION :** Use handling procedures necessary for a static sensitive component.

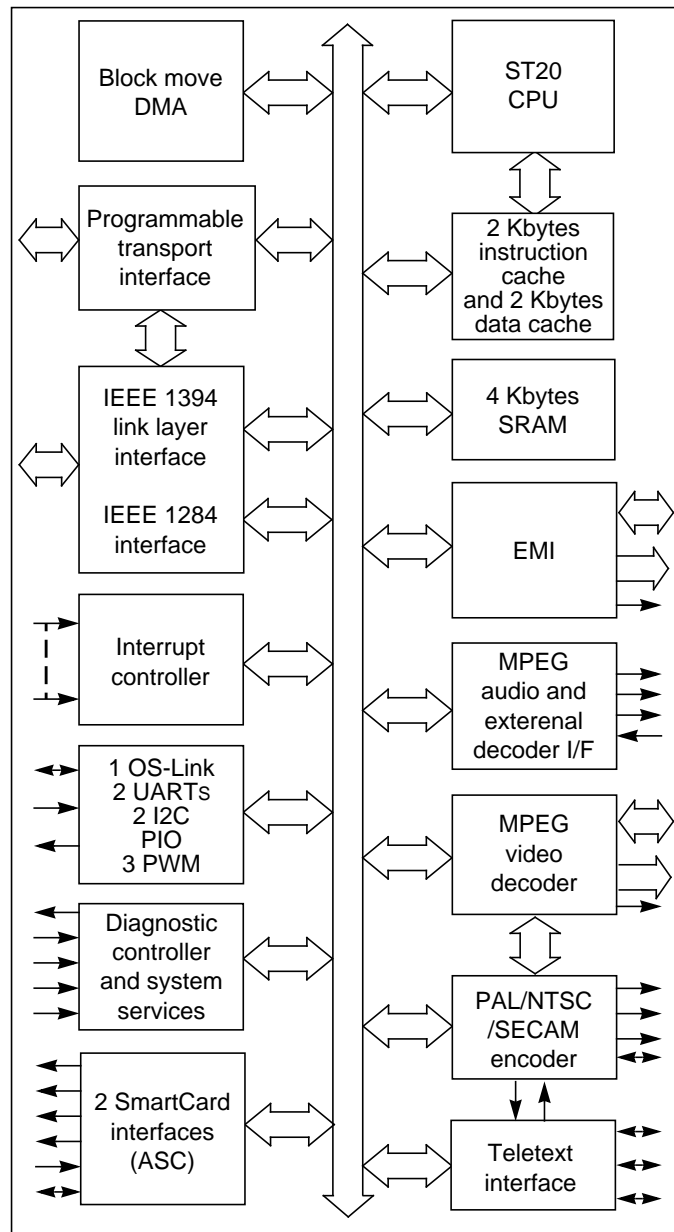
### ● List of IC

STI5510	BGC1002-A-AV	HYB3118165BST-60	STV6411A	AK4319A-VM
73K321L-IH	HIN211CB	PST9124N	CAT24WC16JI	

### ■ STI5510 (MAIN ASSY (2/6): IC2001)

#### PROGRAMMABLE TRANSPORT IC

#### ● Block Diagram



## ● Pin Function

Signal names are prefixed by **not** if they are active low; otherwise they are active high.

Power supplies

Pin	Number	Function
VDD	13	Power supply.
GND	16	Ground.
VClamp1-3	3	Power supply for clamp diodes.
VDDA0-1	2	Analog power supply for PAL/NTSC/SECAM encoder.
VSSA0-1	2	Analog ground for PAL/NTSC/SECAM encoder.
RTCVDD	1	Real time clock supply.
VDD_VPLL	1	Analog power supply for video PLL.
VSS_VPLL	1	Analog ground for video PLL.

Video output interface

Pin	In/Out	Function
R_OUT	out	Red output.
G_OUT	out	Green output.
B_OUT	out	Blue output.
C_OUT	out	Chroma output.
CV_OUT	out	Composite video output.
Y_OUT	out	Luma output.
I_REF_DAC_RGB	in	DAC current reference.
I_REF_DAC_YCC	in	DAC current reference.
V_REF_DAC_RGB	in	DAC voltage reference.
V_REF_DAC_YCC	in	DAC voltage reference.
OSD_ENABLE	in/out	OSD enable.
notHSYNC	in/out	Horizontal sync.
ODD_OR_EVEN	in/out	Vertical sync.

Audio output interface

Pin	In/Out	Function
SCLK/A_C_STB	out	Serial clock or AC-3 data strobe.
PCM_DATA/A_C_DATA	out	PCM data out or AC-3 data out.
PCMCLK	in/out	PCM clock.
LRCLK/A-WORD_CLK	out	Left/right clock or AC-3 word clock.
A_C_REQ	in	AC-3 data request.
A_PTS_STB	in	AC-3 audio PTS strobe.



## External interrupts

Pin	In/Out	Function
Interrupt0-1	in	Interrupt.

## System services

Pin	In/Out	Function
ClockIn	in	System input clock - PLL or TimesOneMode.
SpeedSelect0-1	in	PLL speed selector.
notRST	in	System reset.
CPUAnalyse / TrigIn	in	Error analysis / External trigger input to DCU.
CPUReset	in	Soft reset for analyzing from OS-Link.
ErrorOut / TrigOut <sup>1</sup>	in/out, out	Error indicator / Signal to trigger external debug circuitry (e.g. LSA).

- 1 This pin is tri-stated during reset and then sampled at the end of the reset to determine whether the OS-Link is active and to determine the function of the shared **CPUAnalyse / TrigIn** and the **ErrorOut / TrigOut**. If the **ErrorOut** pin is sampled high (i.e. at VDD) then the DCU signals (**TrigIn** and **TrigOut**) are selected and a low value indicates OS-Link signals (i.e. **CPUAnalyse**, **ErrorOut**) are to be used.

## External memory interface

Pin	In/Out	Function
MemAddr2-23	out	Address bus.
MemData0-31	in/out	Data bus. MemData0 is the least significant bit (LSB) and MemData31 is the most significant bit (MSB).
MemRdnotWr	out	ReadnotWrite strobe.
MemReq	in	Direct memory access request.
MemGrant	out	Direct memory access granted.
MemWait	in	Memory cycle extender.
notMemCAS0-3	out	CAS strobes - bytes 0-3 or banks 0,1.
notMemRAS0-3	out	RAS strobes - banks 0,1.
notMemCSROM	out	Chip select strobe for ROM in bank3.
notMemOE	out	Output enable strobe - banks 0-3.
notMemBE0-3	out	Byte enable strobes - banks 0-3.
notMemCS2	out	Chip select strobe for memory in bank 2.
BootSource0-1	in	Boot from ROM or from link.
ProcClockOut	out	Processor clock.

## SDRAM interface

Pin	In/Out	Function
AD0-11	out	SDRAM address bus.
DQ0-15	in/out	SDRAM data bus (lower byte).
notSDCS0-1	out	SDRAM chip select.
notSDCAS	out	SDRAM CAS.
notSDRAS	out	SDRAM RAS.
notSDWE	out	SDRAM write enable.
MEMCLKIN	in	SDRAM memory clock input.
MEMCLKOUT	out	SDRAM memory clock output.
DQML	out	DQ mask enable (lower).
DQMU	out	DQ mask enable (upper).

## Clocks

Pin	In/Out	Function
LPClockIn	in	Low power input clock.
LPClockOsc	in/out	Low power clock oscillator.
AUX_CLK_OUT	out	Auxiliary clock for general use.

## Parallel input/output

Pin	In/Out	Function
PIO0[0-7]	in/out	Parallel input/output pin or alternative function (see Table 4.15).
PIO1[0-7]	in/out	Parallel input/output pin or alternative function (see Table 4.15).
PIO2[0-7]	in/out	Parallel input/output pin or alternative function (see Table 4.15).
PIO3[0-7]	in/out	Parallel input/output pin or alternative function (see Table 4.15).
PIO4[0-7]	in/out	Parallel input/output pin or alternative function (see Table 4.15).

## OS-Link

Pin	In/Out	Function
LinkIn	in	Serial data input channel.
LinkOut	out	Serial data output channel.

## Transport stream input

Pin	In/Out	Function
TSInByteClk	in	Transport stream input byte clock.
TSInByteClkValid	in	Transport stream input byte clock valid edge.
TSInData0-7	in	Transport stream input data.
TSInError	in	Transport stream input packet error.
TSInPacketClk	in	Transport stream input packet strobe.

## Teletext interface

Pin	In/Out	Function
TtxtEvennotOdd	in	Teletext even not odd vertical sync signal.
TtxtHsync	in	The HSYNC signal input when the teletext interface is operating in the input mode.

The teletext clock and data inputs are shared PIO pins, as shown in Table 1.

## High speed data port

These pins have a dual function, and can be used either to interface to an external IEEE 1394 link layer controller or provide an IEEE 1284 parallel port interface.

Pin	In/Out	Function
1284Data0-7 / AVData7-0	in/out	IEEE 1284 por data or AV data.
1284notSelectIn	in	IEEE 1284 port control signals or AV signals.
1284notInit / AVPacketTag3	in	
1284notFault / AVPacketTag2	out	
1284notAutoFd / AVPacketTag1	in	
1284Select / AVPacketTag0	out	
1284PErrror / AVByteClkValid	out, in/out	
1284Busy / AVPacketClk	out, in/out	
1284notAck / AVByteClk	out	
1284notStrobe / AVPacketError	in	

## Test access port (TAP)

Pin	In/Out	Function
TDI	in	Test data input.
TDO	out	Test data output.
TMS	in	Test mode select.
TCK	in	Test clock.
notTRST	in	Test logic reset.

## PIO pins and alternative functions

Table 1 shows the assignment of the alternative functions to the PIO bits. Parentheses ( ) in the table indicate suggested or possible pin usages as a PIO, not an alternative function connection.

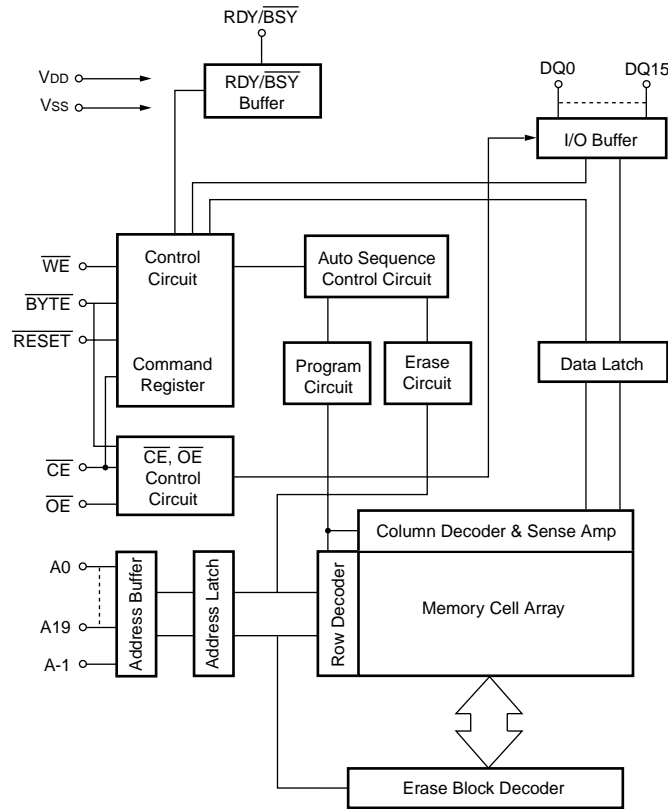
Port bit	Alternative function of PIO pins				
	PIO port 0	PIO port 1	PIO port 2	PIO port 3	PIO port 4
0	ASC0TxD or Sc1DataOut	SSC0 MTSR	ASC2TxD or Sc0DataOut	SSC1 MTSR	ASC3TxD
1	ASC0TRxD or Sc1DataIn	SSC0 MRST	ASC2RxD or Sc0DataIn	SSC1 MRST	ASC3RxD
2	Sc1ClkGenExtClk	SSC0 SClk	Sc0ClkGenExtClk	SSC1 SClk	TtxtClockIn
3	Sc1Clk	PWMOut0	Sc0Clk	CaptureIn0	1284PeriphLogicH
4	(Sc1RST)	PWMOut1	(Sc0RST)	CaptureIn1	1284HostLogicH
5	(Sc1CmdVcc)	ASC1TxD	(Sc0CmdVcc)	CaptureIn2	Interrupt2
6	(Sc1CmdVpp) Sc1Dir	ASC1RxD	(Sc0CmdVpp) Sc2Dir	CompareOut2	Interrupt3
7	(Sc1Detect)	PWMOut2	(Sc0Detect)	1284InnotOut	TtxtData

Table 1 Alternative functions of PIO pins

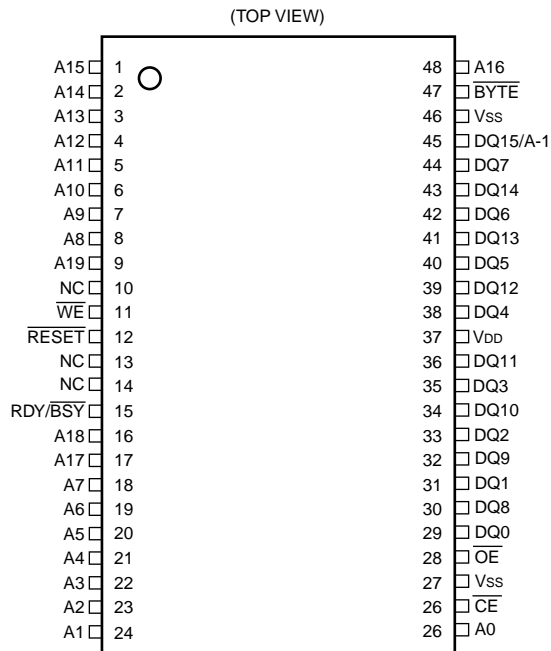
# ■ BGC1002-A-AV (MAIN ASSY (3/6): IC3001)

## 16MB FLASH MEMORY

### ● Block Diagram



### ● Pin Assignment



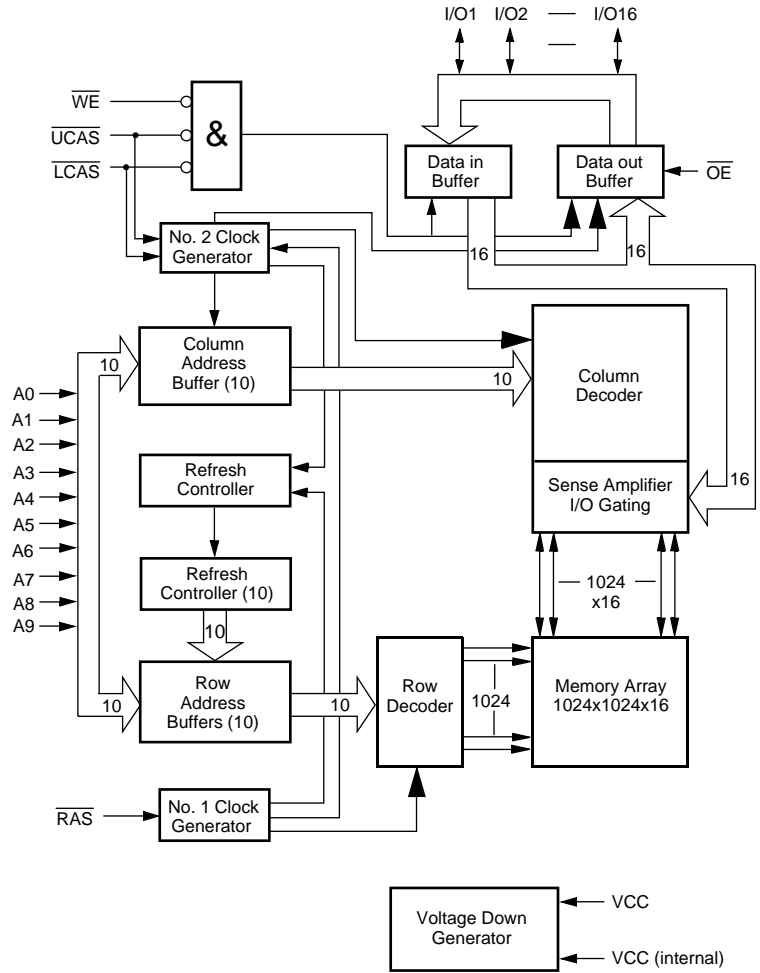
### ● Pin Function

A0 to A19	Address Input
DQ0 to DQ14	Data Input / Output
DQ15/A-1	Output (Input) / Address Input
$\overline{CE}$	Chip Enable Input
$\overline{OE}$	Output Enable Input
$\overline{BYTE}$	Word / Byte Select Input
$\overline{WE}$	Write Enable Input
$\overline{RDY} / \overline{BSY}$	Ready / Busy Output
$\overline{RESET}$	Hardware Reset Input
NC	No Connection
VDD	Power Supply
VSS	Ground

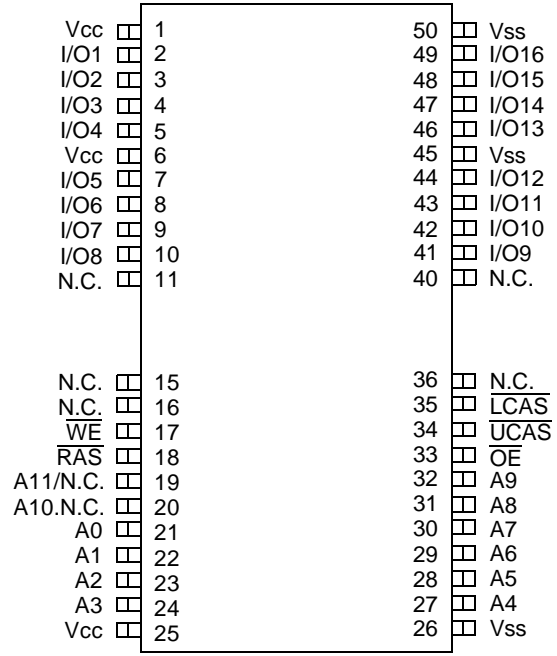
■ HYB3118165BST-60 (MAIN ASSY (3/6): IC3003)

EDO-DRAM

● Block Diagram



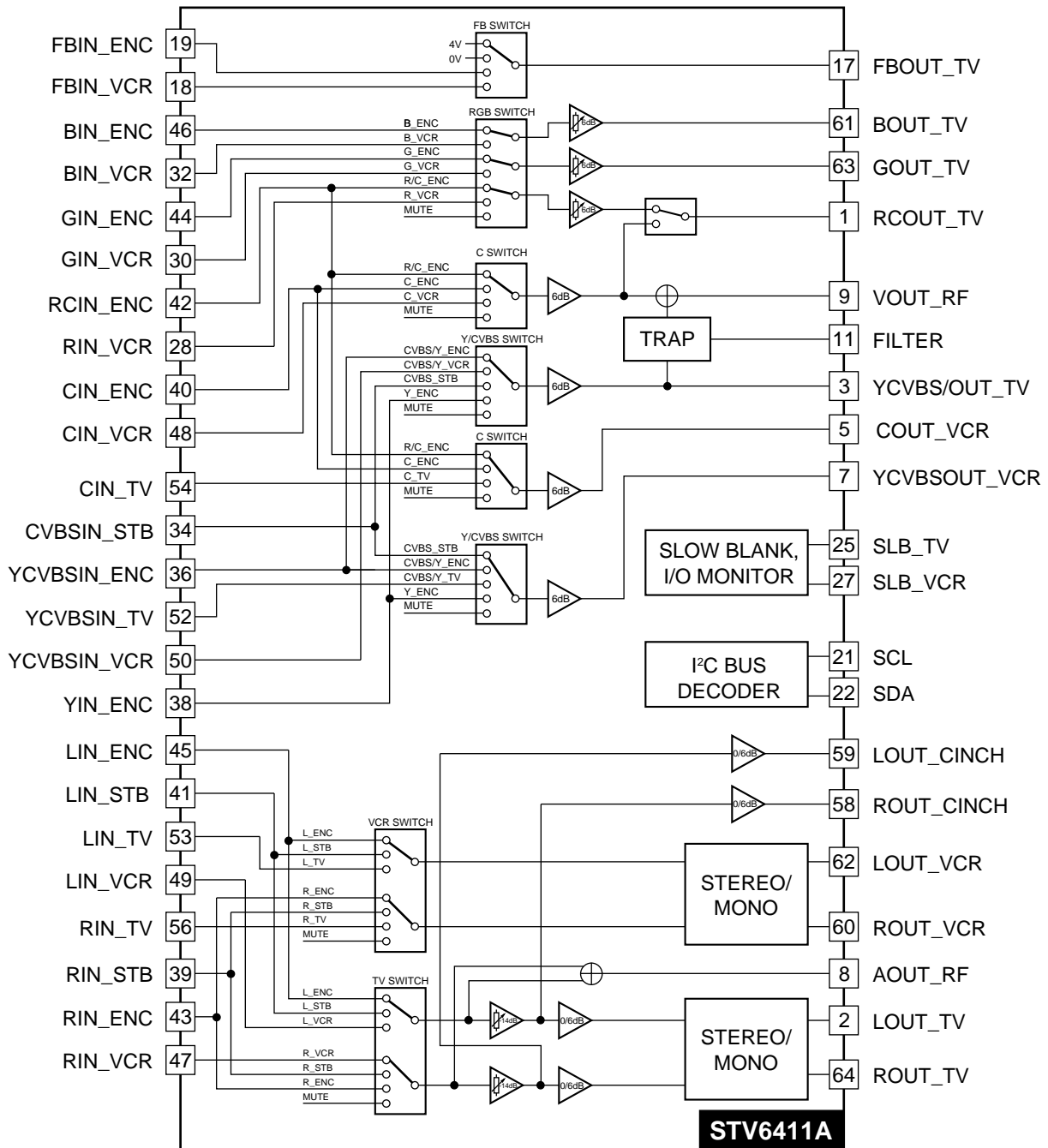
● Pin Assignment



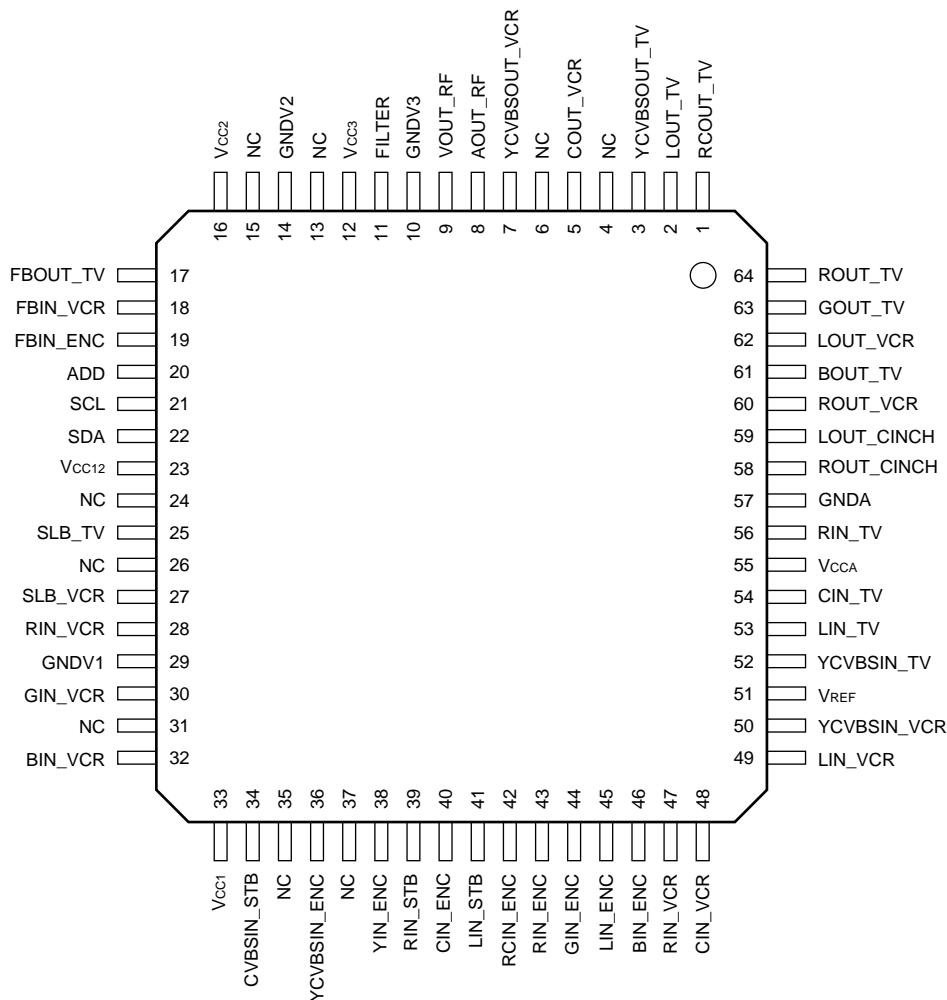
# **STV6411A (MAIN ASSY (4/6): IC4001)**

## **AV SWITCH IC**

### **● Block Diagram**



● Pin Assignment



● Pin Function

Pin Number	Symbol	Description
1	RCOUT_TV	Red/chroma Output, to TV Scart
2	LOUT_TV	Audio Left Output, to TV Scart
3	YCVBSOUT_TV	Y/CVBS Output, to TV scart
4	NC	Not Connected
5	COUT_VCR	Chroma Output, to VCR Scart
6	NC	Not Connected
7	YCVBSOUT_VCR	Y/CVBS Output, to VCR Scart
8	AOUT_RF	Audio (L+R) Output to RF Modulator
9	VOUT_RF	Video (CVBS) Output to RF Modulator
10	GNDV3	Video Switches Ground 3
11	FILTER	Chroma Trap Filter
12	Vccv3	Video Switches Supply 3 (8V)
13	NC	Not Connected
14	GNDV2	Video Switches Ground 2
15	NC	Not Connected
16	Vccv2	Video Switches Supply 2 (8V)



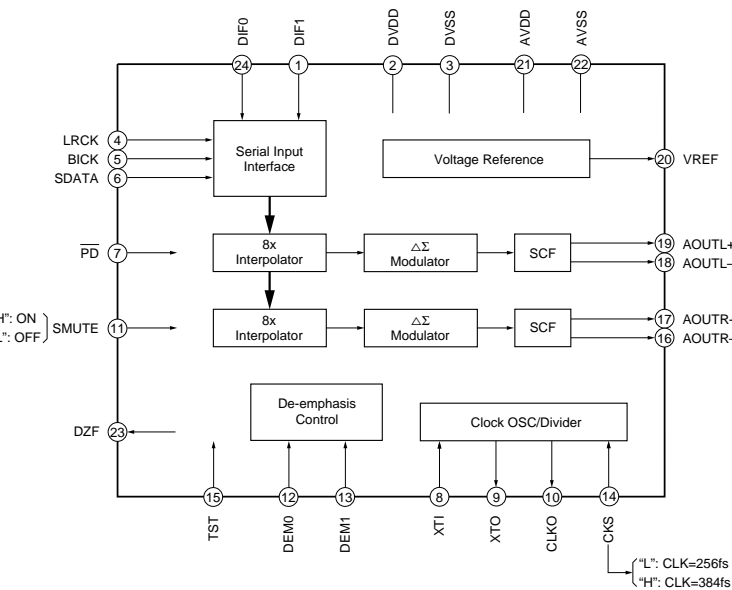
Pin Number	Symbol	Description
17	FBOUT_TV	Fast Blanking Output, to TV Scart
18	FBIN_VCR	Fast Blanking Input, from VCR Scart
19	FBIN_ENC	Fast Blanking Input, from Encoder
20	ADD	I <sup>2</sup> C Bus IC Address Programming
21	SCL	I <sup>2</sup> C Bus Clock
22	SDA	I <sup>2</sup> C Bus Data
23	VCC12	Slow Blanking Power Supply (12V)
24	NC	Not Connected
25	SLB_TV	Slow Blanking Input/Output from TV
26	NC	Not Connected
27	SLB_VCR	Slow Blanking Input/Output from VCR
28	RIN_VCR	Red Input, from VCR Scart
29	GNDV1	Video Switches Ground 1
30	GIN_VCR	Green Input, from VCR Scart
31	NC	Not Connected
32	BIN_VCR	Blue Input, from VCR Scart
33	VCCV1	Video Switches Supply 1 (8V)
34	CVBSIN_STB	CVBS Input from STB
35	NC	Not Connected
36	YCVBSIN_ENC	Y/CVBS Input from Encoder
37	NC	Not Connected
38	YIN_ENC	Y Input, from Encoder
39	RIN_STB	Audio Right Input, from STB
40	CIN_ENC	Chroma Input, from Encoder
41	LIN_STB	Audio Left Input, from STB
42	RCIN_ENC	Red/Chroma Input, from Encoder
43	RIN_ENC	Audio Right Input, from Encoder
44	GIN_ENC	Green Input, from Encoder
45	LIN_ENC	Audio Left Input, from Encoder
46	BIN_ENC	Blue Input, from Encoder
47	RIN_VCR	Audio Right Input, from VCR Scart
48	CIN_VCR	Chroma Input, from VCR Scart
49	LIN_VCR	Audio Left Input, from VCR
50	YCVBSIN_VCR	Y/CVBS Input from VCR Scart
51	VREF	Voltage Reference Decoupling
52	YCVBSIN_TV	Y/CVBS Input, from TV Scart
53	LIN_TV	Audio Left Input, from TV Scart
54	CIN_TV	Chroma Input, from TV Scart
55	VCCA	Audio Switches Supply (8V)
56	RIN_TV	Audio right input, from TV Scart
57	GNDA	Audio Switches Ground
58	ROUT_CINCH	Audio Right Output, to CINCH
59	LOUT_CINCH	Audio Left Output, to CINCH
60	ROUT_VCR	Audio Right Output, to VCR Scart
61	BOUT_TV	Blue Output, to TV Scart
62	LOUT_VCR	Audio Left Output, to VCR Scart
63	GOUT_TV	Green Output, to TV Scart
64	ROUT_TV	Audio Right Output, to TV Scart

**Notes :** 1. In application, all unused pins should be left open or high frequency bypassed to ground.

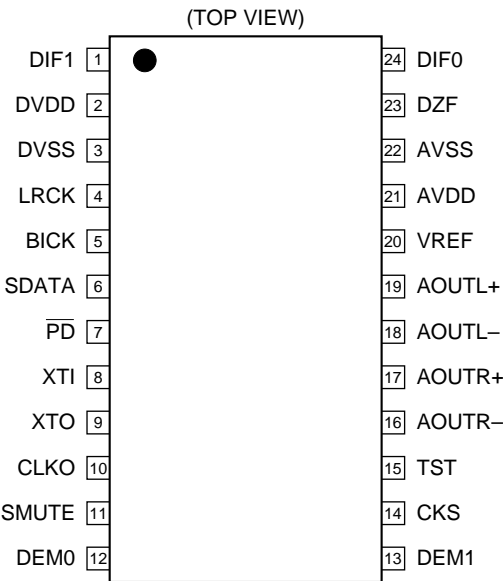
■ AK4319A-VM (MAIN ASSY (4/6): IC4002)

18 bit 2ch D/A

● Block Diagram



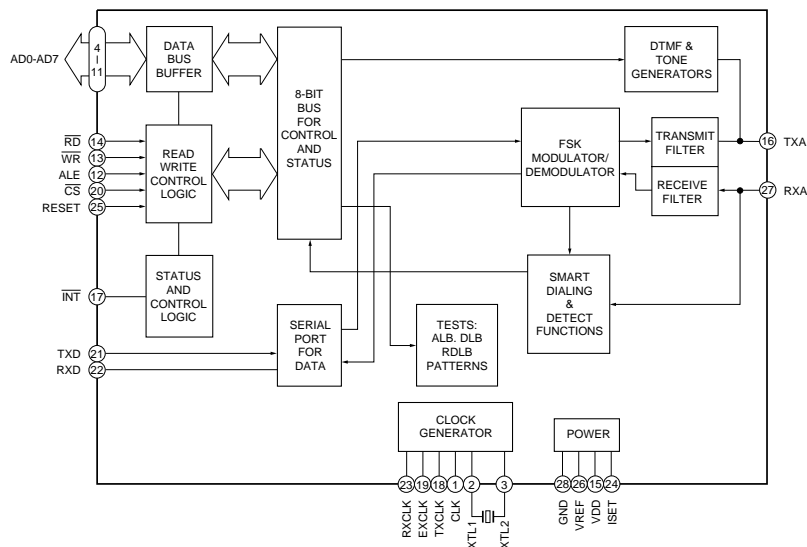
● Pin Assignment



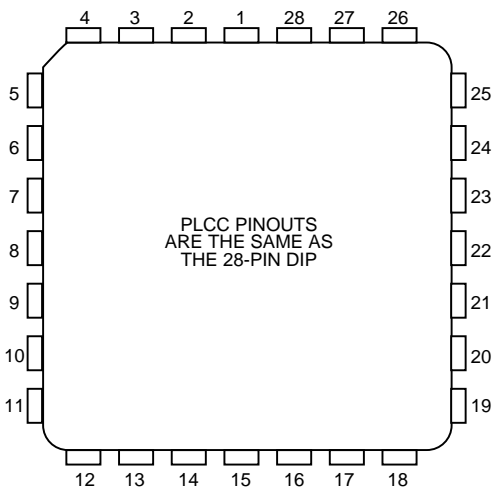
■ 73K321L-IH (MAIN ASSY (5/6): IC5001)

MODEM IC

● Block Diagram



● Pin Assignment



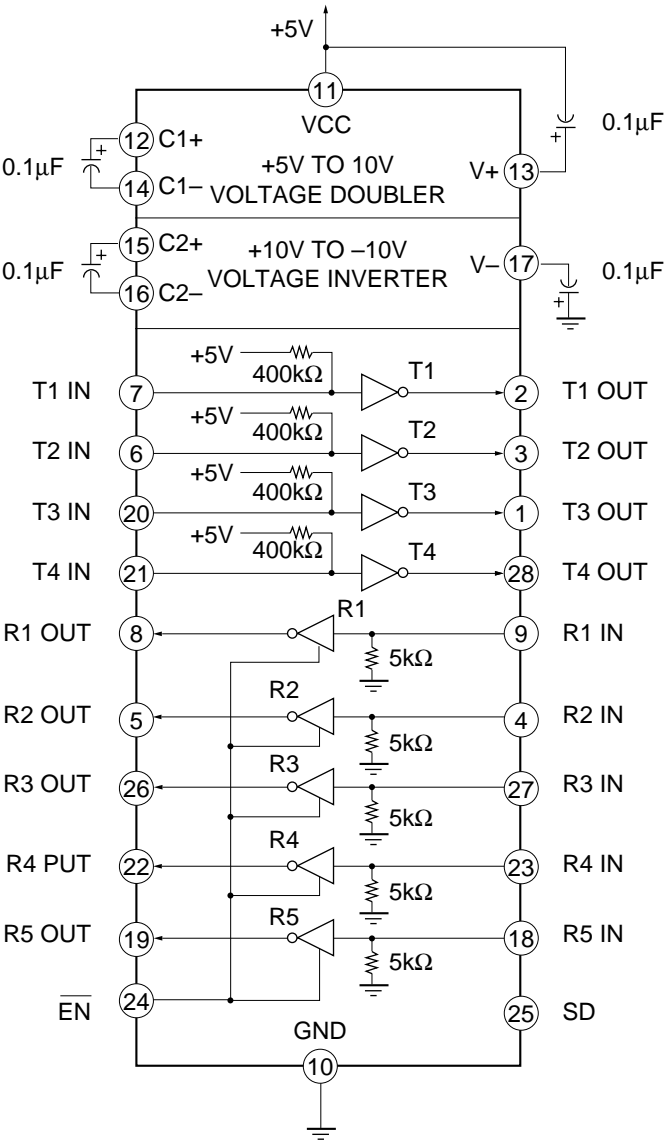
## ● Pin Function

Pin No.	Pin Name	I/O	Function
1	CLK	O	Output clock. This pin is the output of the crystal oscillator frequency only in the TSC 73K321.
2	XTL1	I	This pin is for the internal crystal oscillator.
3	XTL2	I	This pin is for the internal crystal oscillator. XTL2 can also be driven from an external clock.
4	AD0	I/O	Bidirectional tri-state address/data bus.
5	AD1	I/O	Bidirectional tri-state address/data bus.
6	AD2	I/O	Bidirectional tri-state address/data bus.
7	AD3	I/O	Bidirectional tri-state address/data bus.
8	AD4	I/O	Bidirectional tri-state address/data bus.
9	AD5	I/O	Bidirectional tri-state address/data bus.
10	AD6	I/O	Bidirectional tri-state address/data bus.
11	AD7	I/O	Bidirectional tri-state address/data bus.
12	ALE	I	Address latch enable. The falling edge of ALE latches the address on AD0–AD2 and the chip select on $\overline{CS}$ .
13	$\overline{WR}$	I	Write. A low on this informs the TSC 73K321L that data is available on AD0–AD7 for writing into an internal register. Data is latched on the rising edge of $\overline{WR}$ .
14	$\overline{RD}$	I	Read. A low request a read of the TSC 73K321L internal registers. Data cannot be output unless both $\overline{RD}$ and the latched $\overline{CS}$ are active or low.
15	VDD	I	Power supply input.
16	TXA	O	Transmit analog output to the phone line.
17	$\overline{INT}$	O	Interrupt. This open drain output signal is used to inform the processor that a detect flag has occurred. $\overline{INT}$ will stay low until the processor reads the detect register or does a full reset.
18	TXCLK	O	Transmit Clock. TXCLK is always active.
19	EXCLK	I	External Clock. Used for serial control interface to clock control data in or out of the TSC 73K321L.
20	$\overline{CS}$	I	Chip select. A low during the falling edge of ALE on this pin allows a read cycle or a write cycle to occur. The state of $\overline{CS}$ is latched on the falling edge of ALE.
21	TXD	I	Transmit Digital Data Input. Serial data for transmission is input on this pin. In Asynchronous modes (1200 or 300 baud) no clocking is necessary.
22	RXD	O/ Weak pull-up	Received Digital Data Output. Serial receive data is available on this pin. The data is always valid on the rising edge of RXCLK when in Synchronous mode. RXD will output constant marks if no carrier is detected.
23	RXCLK	O	Receive Clock. A clock which is 16 x 1200, or 16 x 75 in V.23 mode, or 16 x 300 baud data rate is output in V.21.
24	ISSET	I	Chip current reference. Sets bias current for op-amps.
25	RESET	I	Reset. An active high signal high on this pin will put the chip into an inactive state. The output of the CLK pin will be set to the crystal frequency.
26	VREF	O	An internally generated reference voltage.
27	RXA	I	Received modulated analog signal input from the phone line.
28	GND	I	System Ground.

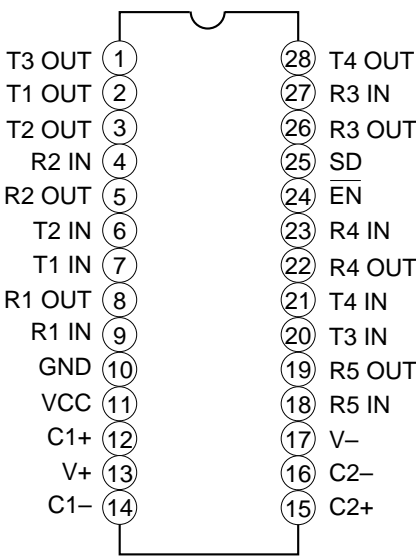
■ HIN211CB (MAIN ASSY (5/6): IC5006)

RS232C IC

● Block Diagram



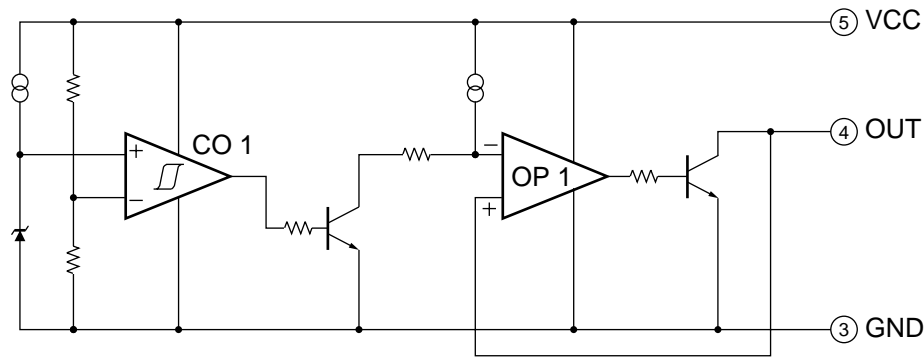
● Pin Assignment



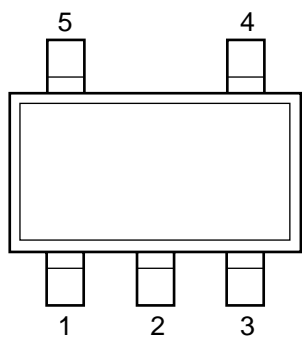
■ PST9124N (MAIN ASSY (6/6): IC6002)

RESET IC

● Block Diagram



● Pin Assignment

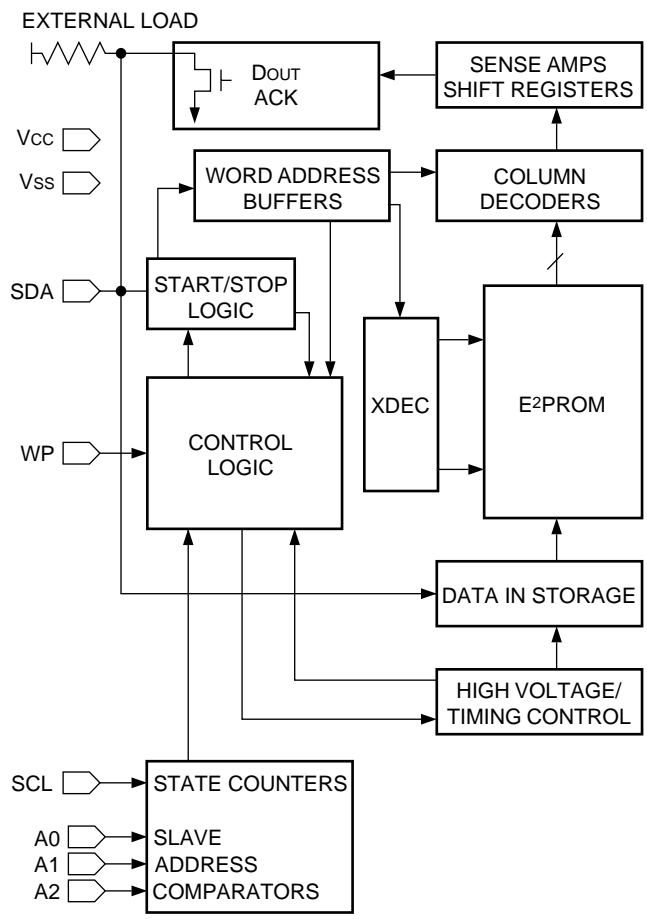


\* The Pin 2 this product is SUB, so connect the pin to Ground.

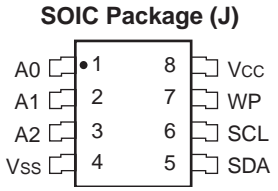
■ CAT24WC16JI (MAIN ASSY (6/6): IC6005)

16K-EEPROM

● Block Diagram



● Pin Assignment

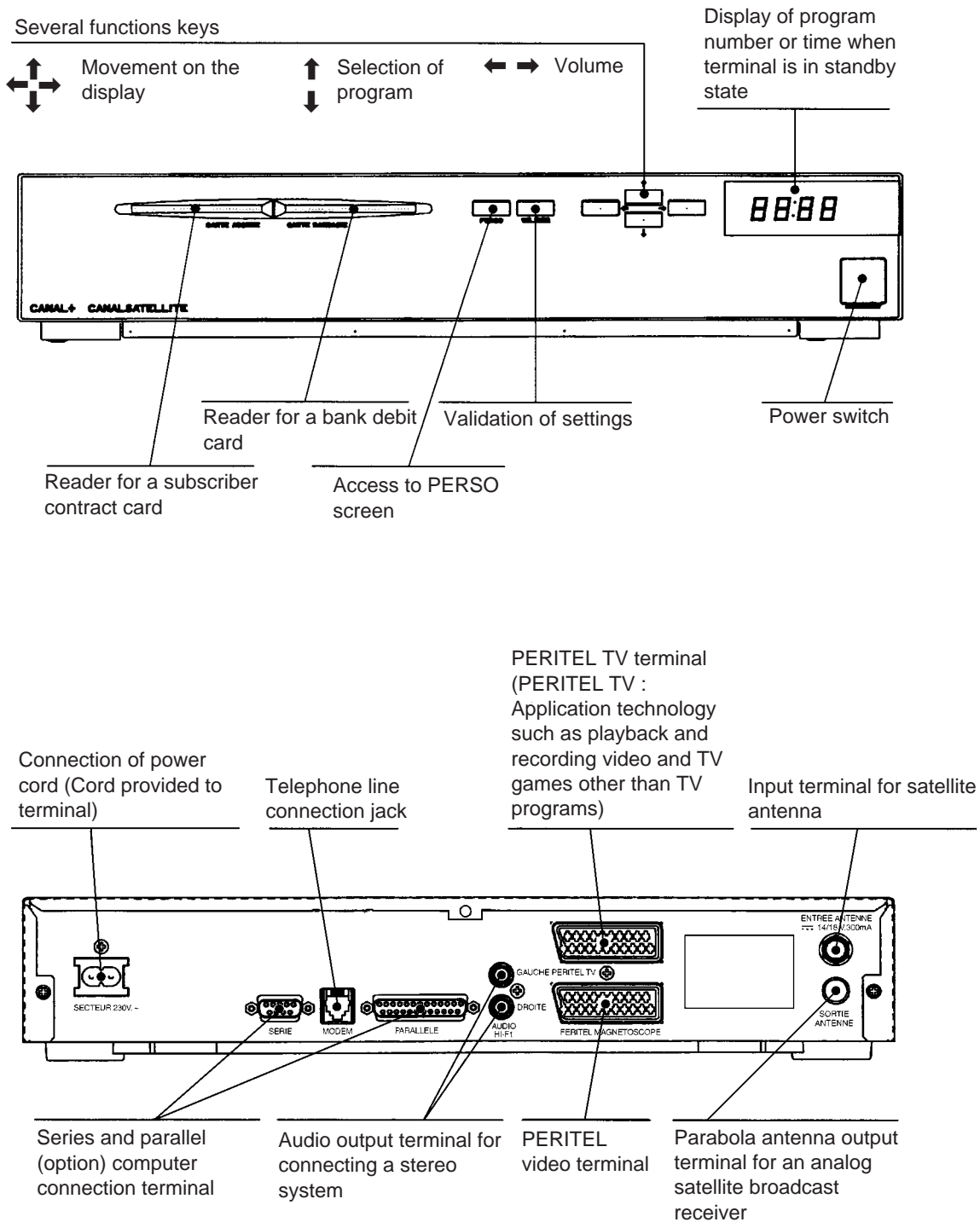


● Pin Function

Pin Name	Function
A0, A1, A2	Device Address Inputs
SDA	Serial Data/Address
SCL	Serial Clock
WP	Write Protect
Vcc	+1.8V to +6.0V Power Supply
Vss	Ground

## 7. PANEL FACILITIES AND SPECIFICATIONS

### 7.1 PANEL FACILITIES



## 7.2 SPECIFICATIONS

### RF

Moduration Method .....	QPSK
Symbol Rate .....	22, 27, 27.5Mbaud
Inner Code Rate .....	1/2, 2/3, 3/4, 5/6
Error Correction .....	Viterbi+Reed-solomon
Frequency Range .....	950 to 2150MHz
Input Level .....	-65 to -25dBm
Max. Input Level .....	0dBm
Return Loss .....	8.0dB min.
Spurious Signal and	
Local Oscillator Level .....	-63dBm max.
LNB Power Supply .....	Ver. : 12.5V to 14V
	Hor. : 17V to 19V

### VIDEO

S/N .....	55dB min.
Responce Flatness .....	-2 ± 2.5dB at 4.7MHz
Differential Gain .....	10% max.
Differential Phase .....	5deg max.
Chroma Delay .....	±40nsec max.
Non Linearity .....	5% max.

### AUDIO

S/N .....	72dB min.
Response flatness .....	±0.5dB at 20 to 20kHz
Channel Separation .....	50dB min.

### DATA COMMUNICATION

Serial Interface .....	RS-232C
Parallel Interface .....	IEEE1284
Modem .....	V23
IC Card .....	ISO-7816

### GENERAL

Power Requirement .....	AC230V/50Hz
Power Consumption .....	18W typ.
Dimensions .....	380 (W) X 253 (D) X 71 (H)
Net Weight .....	2.3kg