

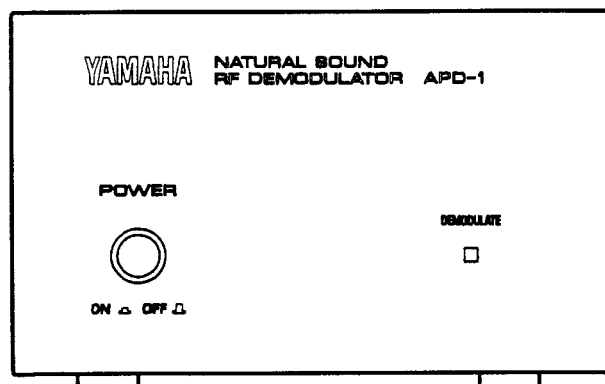
# DOLBY DIGITAL RF DEMODULATOR

# APD-1

## SERVICE MANUAL



YAMA-01355



### IMPORTANT NOTICE

This manual has been provided for the use of authorized YAMAHA Retailers and their service personnel.

It has been assumed that basic service procedures inherent to the industry, and more specifically YAMAHA Products, are already known and understood by the users, and have therefore not been restated.

**WARNING:** Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components, and failure of the product to perform as specified. For these reasons, we advise all YAMAHA product owners that any service required should be performed by an authorized YAMAHA Retailer or the appointed service representative.

**IMPORTANT:** The presentation or sale of this manual to any individual or firm does not constitute authorization, certification or recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of YAMAHA are continually striving to improve YAMAHA products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

**WARNING:** Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

**IMPORTANT:** Turn the unit OFF during disassembly and part replacement. Recheck all work before you apply power to the unit.

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100590

# YAMAHA

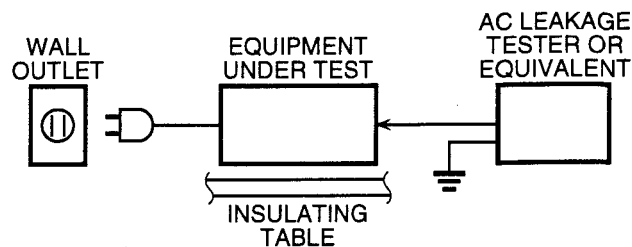
YAMAHA CORPORATION  
P.O. Box 1, Hamamatsu, Japan

2.9K-95 Printed in Japan '97.6

1355

■ TO SERVICE PERSONNEL

Critical Components Information.  
Components having special characteristics are marked and must be replaced with parts having specifications equal to those originally installed.



WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and /or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHATSOEVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

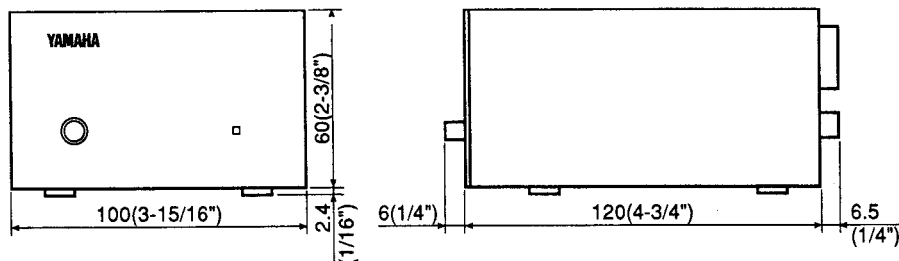
■ SPECIFICATIONS

|                                |                             |
|--------------------------------|-----------------------------|
| Output Level                   | 0.5V p-p                    |
| Output Impedance               | 75 ohms                     |
| Power Consumption              |                             |
| U.S.A. and Canada model        | 8W                          |
| Australia model                | 8W                          |
| U.K. and Europe model          | 8W                          |
| General model                  | 8W/8W                       |
| Power Supply                   |                             |
| U.S.A. and Canada model        | AC120V, 60Hz                |
| Australia model                | AC240V, 50Hz                |
| U.K. and Europe model          | AC230V, 50Hz                |
| General model                  | AC110-120/220-240V, 50/60Hz |
| Dimensions (W x H x D)         |                             |
| 100 x 62.4 x 132.5 mm          |                             |
| (3-15/16" x 2-7/16" x 5-3/16") |                             |
| Weight                         | 0.8kg (1lbs. 12oz.)         |

\* Specifications subject to change without notice.

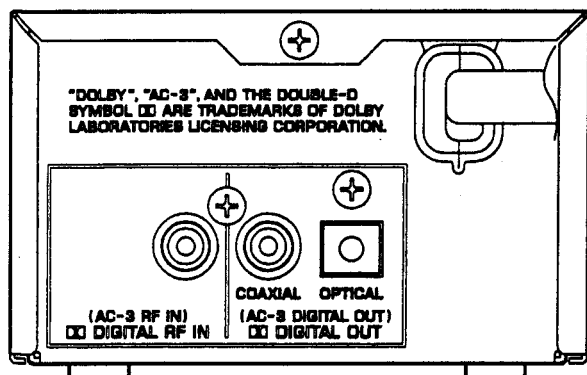
Dimensions

Unit:mm(inch)

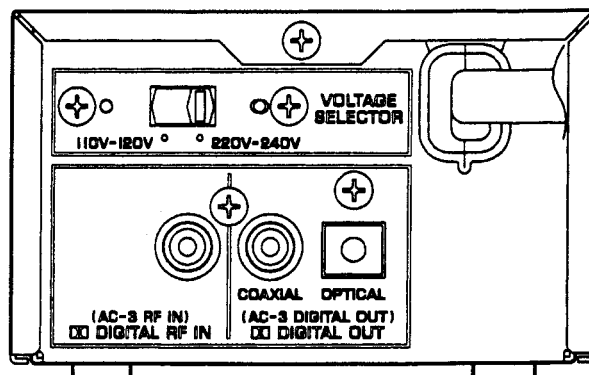


## REAR PANELS

U, C, A, B, G models



R models



## DISASSEMBLY PROCEDURES

(Remove parts in the order as numbered.)

### 1. Removal of the Top Cover

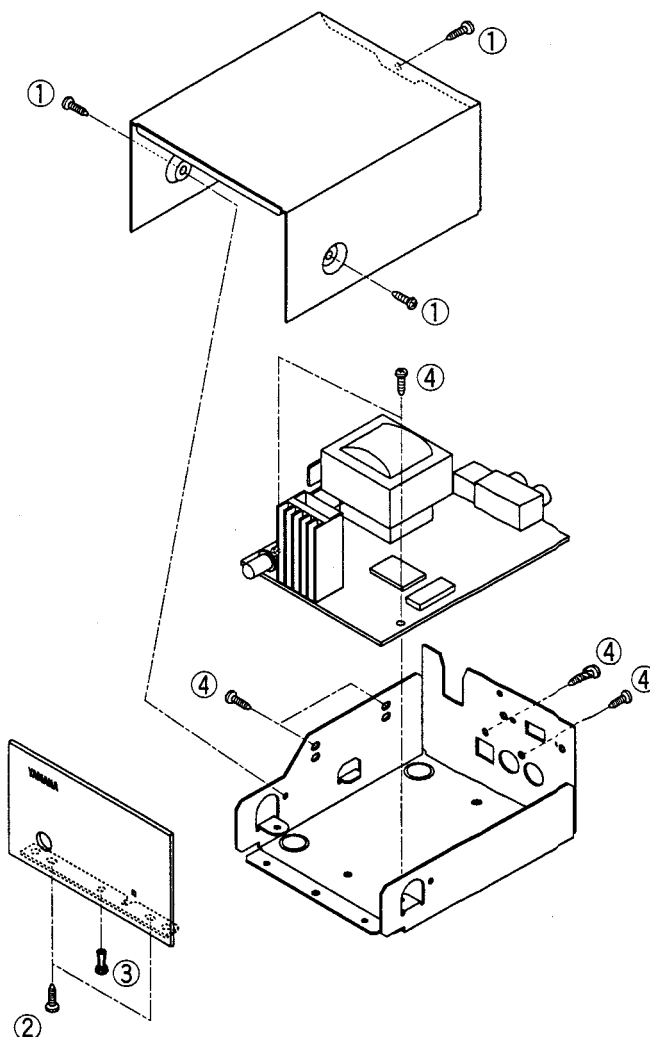
- a. Remove 3 screws (①), and remove the Top Cover.

### 2. Removal of the Front Panel

- a. Remove 2 screws (②) and 1 plastic rivet (③), and remove the Front Panel.

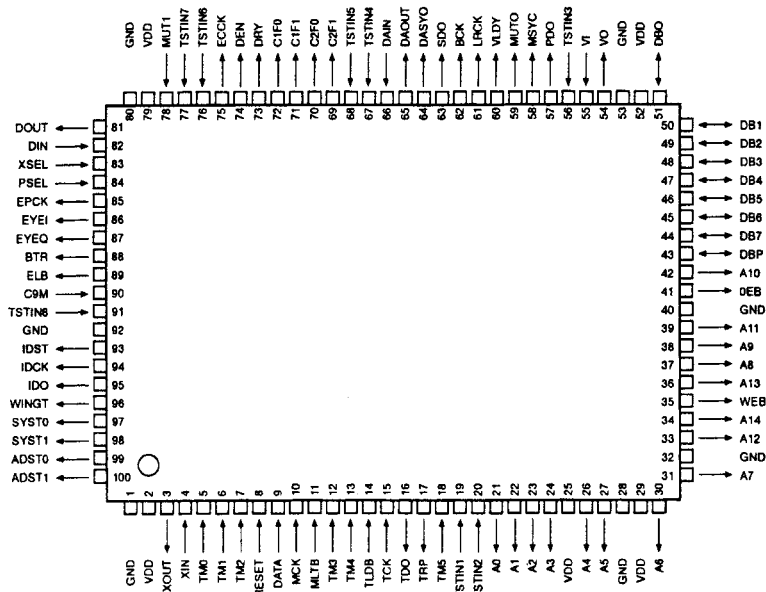
### 3. Removal of the Main P.C.B.(1)

- a. Remove 6 screws (④), and remove the Main P.C.B.(1).



IC DATA

IC6:PD4606A(AC-3 RF Demodulator)



| No. | Name   | I/O | Function                                                                                                  |
|-----|--------|-----|-----------------------------------------------------------------------------------------------------------|
| 1   | GND    |     | GND (0V)                                                                                                  |
| 2   | VDD    |     | Power supply (+5V)                                                                                        |
| 3   | XOUT   | O   | X'tal oscillation circuit output                                                                          |
| 4   | XIN    | I   | X'tal oscillation circuit input                                                                           |
| 5   | TM0    | I   | Terminal for setting IC test mode, normally unconnected                                                   |
| 6   | TM1    | I   | Terminal for setting IC test mode, normally unconnected                                                   |
| 7   | TM2    | I   | Terminal for setting IC test mode, normally unconnected                                                   |
| 8   | RESET  | I   | System reset (reset at "L", set to "L" once after turning on the power.                                   |
| 9   | DATA   | I   | Serial data input from CPU (LSB fast)                                                                     |
| 10  | MCK    | I   | CPU serial input clock, data latched at rising edge of clock                                              |
| 11  | MLTB   | I   | CPU input latch, serial data (8 bits) latched from CPU to register                                        |
| 12  | TM3    | I   | Terminal for setting IC test mode, normally unconnected                                                   |
| 13  | TM4    | I   | Terminal for setting IC test mode, normally unconnected                                                   |
| 14  | TLDB   | I   | Tag code load signal, tag code loaded in 16-bit shift register at "L"                                     |
| 15  | TCK    | I   | Tag code output clock, data output at rising edge of clock                                                |
| 16  | TDO    | O   | Tag code serial data output (MSB fast)                                                                    |
| 17  | TRP    | O   | Tag code revising signal, set to "H" if tag code is free from error when each 1 block has been corrected. |
| 18  | TM5    | I   | Terminal for setting IC test mode, normally unconnected                                                   |
| 19  | TSTIN1 | I   | Terminal for IC test, normally unconnected                                                                |
| 20  | TSTIN2 | I   | Terminal for IC test, normally unconnected                                                                |
| 21  | A0     | O   | External RAM address output, Address 0 (LSB)                                                              |
| 22  | A1     | O   | External RAM address output, Address 1                                                                    |
| 23  | A2     | O   | External RAM address output, Address 2                                                                    |
| 24  | A3     | O   | External RAM address output, Address 3                                                                    |
| 25  | VDD    |     | Power supply (+5V)                                                                                        |
| 26  | A4     | O   | External RAM address output, Address 4                                                                    |
| 27  | A5     | O   | External RAM address output, Address 5                                                                    |
| 28  | GND    |     | GND (0V)                                                                                                  |
| 29  | VDD    |     | Power supply (+5V)                                                                                        |
| 30  | A6     | O   | External RAM address output, Address 6                                                                    |
| 31  | A7     | O   | External RAM address output, Address 7                                                                    |
| 32  | GND    |     | GND (0V)                                                                                                  |
| 33  | A12    | O   | External RAM address output, Address 12                                                                   |
| 34  | A14    | O   | External RAM address output, Address 14 (MSB)                                                             |
| 35  | WEB    | O   | External RAM write enable signal, active at "L"                                                           |
| 36  | A13    | O   | External RAM address output, Address 13                                                                   |
| 37  | A8     | O   | External RAM address output, Address 8                                                                    |
| 38  | A9     | O   | External RAM address output, Address 9                                                                    |
| 39  | A11    | O   | External RAM address output, Address 11                                                                   |

| No. | Name   | I/O | Function                                                                                                                                                                     |
|-----|--------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40  | GND    |     | GND (0V)                                                                                                                                                                     |
| 41  | OEB    | O   | External RAM output enable signal, active at "L"                                                                                                                             |
| 42  | A10    | O   | External RAM address output, Address 10                                                                                                                                      |
| 43  | DBP    | I/O | External RAM data terminal, for erasure pointer                                                                                                                              |
| 44  | DB7    | I/O | External RAM data terminal, Data bus 7                                                                                                                                       |
| 45  | DB6    | I/O | External RAM data terminal, Data bus 6                                                                                                                                       |
| 46  | DB5    | I/O | External RAM data terminal, Data bus 5                                                                                                                                       |
| 47  | DB4    | I/O | External RAM data terminal, Data bus 4                                                                                                                                       |
| 48  | DB3    | I/O | External RAM data terminal, Data bus 3                                                                                                                                       |
| 49  | DB2    | I/O | External RAM data terminal, Data bus 2                                                                                                                                       |
| 50  | DB1    | I/O | External RAM data terminal, Data bus 1                                                                                                                                       |
| 51  | DB0    | I/O | External RAM data terminal, Data bus 0                                                                                                                                       |
| 52  | VDD    |     | Power supply (+5V)                                                                                                                                                           |
| 53  | GND    |     | GND (0V)                                                                                                                                                                     |
| 54  | VO     | O   | VCXO output                                                                                                                                                                  |
| 55  | VI     | I   | VCXO input                                                                                                                                                                   |
| 56  | TSTIN3 | I   | Terminal for IC test, normally unconnected                                                                                                                                   |
| 57  | PDO    | O   | Phase comparator output (tri-state)                                                                                                                                          |
| 58  | MSYC   | O   | Terminal for monitoring, set to "H" at AC-3 synchronous signal                                                                                                               |
| 59  | MUTO   | O   | Muting output, muting available at "H", set to "H" when MUTI=H or when AC-3 synchronization has not been executed.                                                           |
| 60  | VLDY   | O   | Validity flag output, correct data at "L", possibly error at "H".                                                                                                            |
| 61  | LRCK   | O   | L/R ch select clock, (48kHz), Lch selected at "H"                                                                                                                            |
| 62  | BCK    | O   | Bit clock, 3.072MHz                                                                                                                                                          |
| 63  | SDO    | O   | Serial data output                                                                                                                                                           |
| 64  | DASYO  | O   | Digital out preamble B identification signal                                                                                                                                 |
| 65  | DAOUT  | O   | Digital out output                                                                                                                                                           |
| 66  | DAIN   | I   | Digital audio interface signal input, digital out signal processed in IC according to internal register setting and that from "DAIN" selected and output at "DAOUT" terminal |
| 67  | TSTIN4 | I   | Terminal for IC test, normally unconnected                                                                                                                                   |
| 68  | TSTIN5 | I   | Terminal for IC test, normally unconnected                                                                                                                                   |
| 69  | C2F1   | O   | Error state after C2 correction indicated, by outputting whether correction has been completed                                                                               |
| 70  | C2F0   | O   | Error state after C2 correction indicated, by outputting number of errors at C2                                                                                              |
| 71  | C1F1   | O   | Error state after C1 correction indicated, by outputting whether an error exists or not at C1                                                                                |
| 72  | C1F0   | O   | Error state after C1 correction indicated, by outputting number of errors at C1                                                                                              |
| 73  | DRY    | O   | Terminal for monitoring error corrected section                                                                                                                              |
| 74  | DEM    | O   | Terminal for monitoring error corrected section                                                                                                                              |
| 75  | ECCK   | O   | Clock for error corrected section, 576kHz                                                                                                                                    |
| 76  | TSTIN6 | I   | Terminal for IC test, normally unconnected                                                                                                                                   |
| 77  | TSTIN7 | I   | Terminal for IC test, normally unconnected                                                                                                                                   |
| 78  | MUTI   | I   | Muting input, muting available at "H"                                                                                                                                        |
| 79  | VDD    |     | Power supply (+5V)                                                                                                                                                           |
| 80  | GND    |     | GND (0V)                                                                                                                                                                     |
| 81  | DOUT   | O   | QPSK reversed output                                                                                                                                                         |
| 82  | DIN    | I   | QPSK signal input                                                                                                                                                            |
| 83  | XSEL   | I   | X'tal select, used at "H"                                                                                                                                                    |
| 84  | PSEL   | I   | PLL select, used at "L"                                                                                                                                                      |
| 85  | EPCK   | O   | Clock for QPSK eye pattern, 288kHz                                                                                                                                           |
| 86  | EYEI   | O   | Eye pattern output : Phase I                                                                                                                                                 |
| 87  | EYEQ   | O   | Eye pattern output : Phase Q                                                                                                                                                 |
| 88  | BTR    | O   |                                                                                                                                                                              |
| 89  | ELB    | O   |                                                                                                                                                                              |
| 90  | C9M    | O   | 9.216MHz                                                                                                                                                                     |
| 91  | TSTIN8 | I   | Terminal for IC test, normally unconnected                                                                                                                                   |
| 92  | GND    |     | GND (0V)                                                                                                                                                                     |
| 93  | IDST   | O   | Signal to indicate ID start position                                                                                                                                         |
| 94  | IDCK   | O   | ID signal sample clock, data varying at falling edge of clock                                                                                                                |
| 95  | IDO    | O   | ID data output (MSB first)                                                                                                                                                   |
| 96  | WINGT  | O   | Set to "L" while synchronous signal in correction block being searched                                                                                                       |
| 97  | SYST0  | O   | Lock state of synchronous signal in correction block indicated                                                                                                               |
| 98  | SYST1  | O   | Lock state of synchronous signal in correction block indicated                                                                                                               |
| 99  | ADST0  | O   | Continuity state of ID address in correction block indicated                                                                                                                 |
| 100 | ADST1  | O   | Continuity state of ID address in correction block indicated                                                                                                                 |

**MAIN P.C.B. (2)**



1

**PRINTED CIRCUIT BOARD (Foil side)**

2

**MAIN P.C.B. (1)**

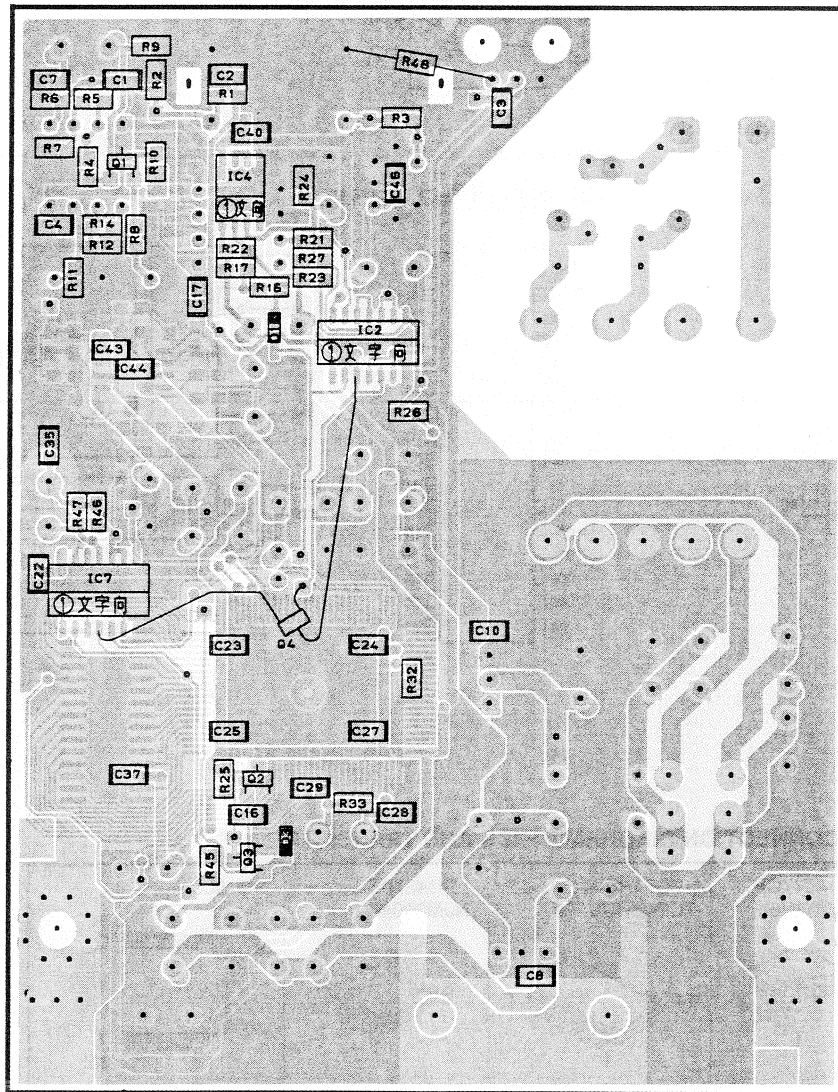
3

4

5

6

7

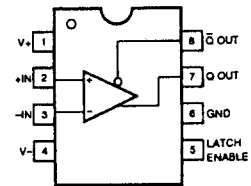
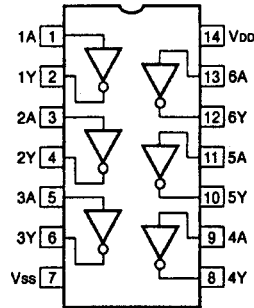
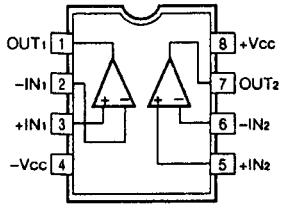


IC DATA

IC1 : MC14577CP (Dual VCR)  
IC5 : NJM2904G (OP Amp.)

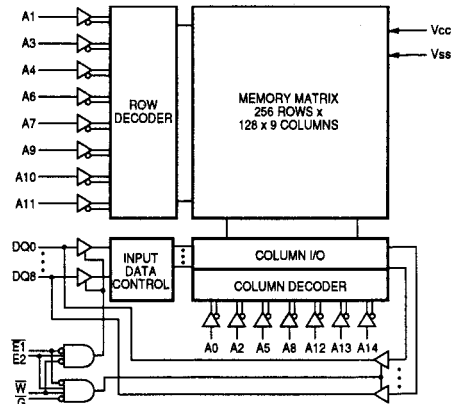
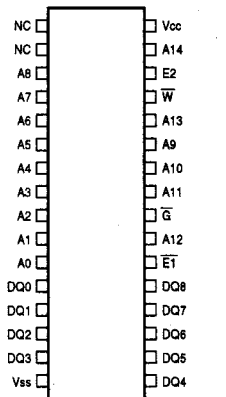
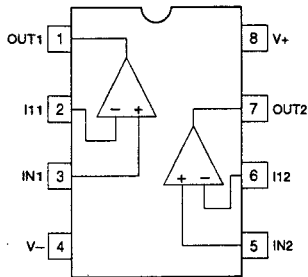
IC2 :  $\mu$ PD74HC04G (Inverter)  
IC7 : TC74HCU04AF

IC3 : LT1016IN8 (Comparator)

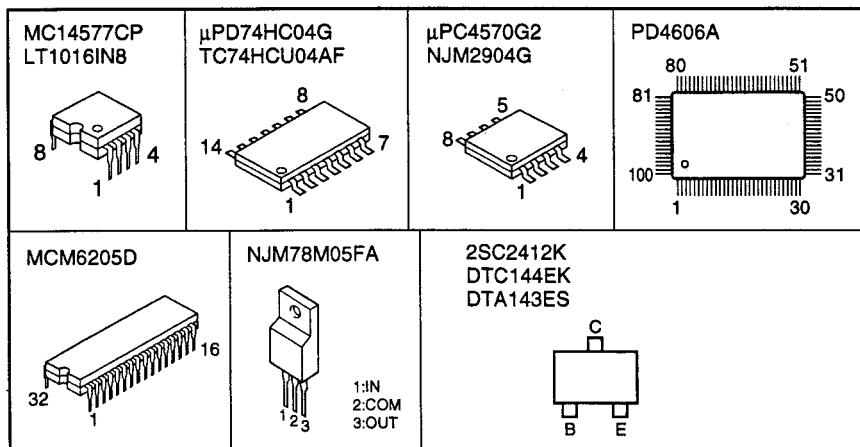


IC4 :  $\mu$ PC4570G2 (OP Amp.)

IC8 : MCM6205D (SRAM)



PIN CONNECTION DIAGRAM OF ICS AND TRANSISTOR



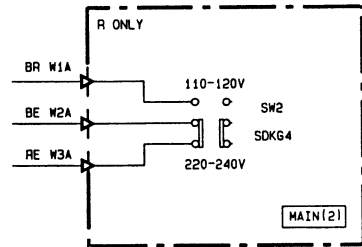
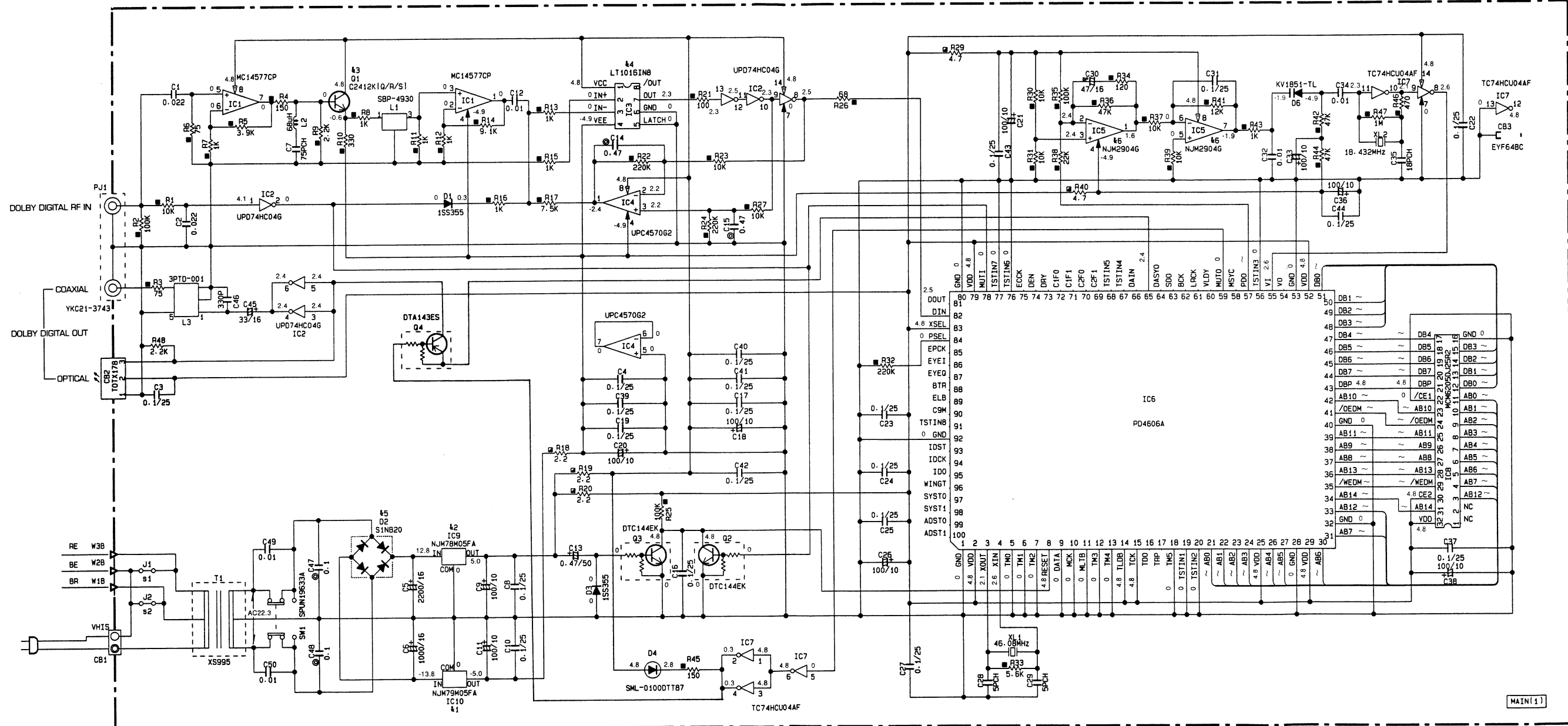
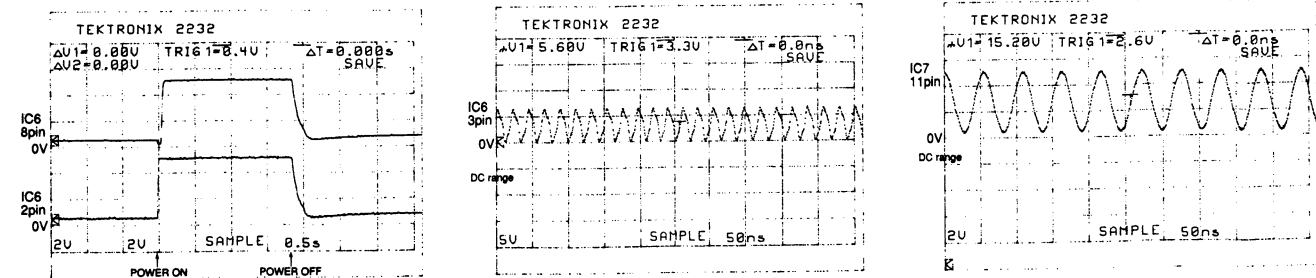
SCHEMATIC DIAGRAM

| REMARKS | PARTS NAME                      |
|---------|---------------------------------|
| NO MARK | CARBON FILM RESISTOR (P=5)      |
| □       | CARBON FILM RESISTOR (P=10)     |
| △       | METAL OXIDE FILM RESISTOR       |
| ▲       | METAL FILM RESISTOR             |
| ■       | METAL PLATE RESISTOR            |
| ▣       | FIRE PROOF CARBON FILM RESISTOR |
| ▢       | CEMENT MOLDED RESISTOR          |
| ⊗       | SEMI VARIABLE RESISTOR          |
| ■       | CHIP RESISTOR                   |

| REMARKS | PARTS NAME                       |
|---------|----------------------------------|
| NO MARK | ELECTROLYTIC CAPACITOR           |
| ⊗       | TANTALUM CAPACITOR               |
| NO MARK | CERAMIC CAPACITOR                |
| ⊙       | CERAMIC TUBULAR CAPACITOR        |
| ⊖       | POLYESTER FILM CAPACITOR         |
| ○       | POLYSTYRENE FILM CAPACITOR       |
| ⊕       | MICA CAPACITOR                   |
| ⊖       | POLYPROPYLENE FILM CAPACITOR     |
| ●       | SEMICONDUCTIVE CERAMIC CAPACITOR |

NOTICE (model)  
(J)..... JAPANESE  
(U)..... U. S. A  
(C)..... CANADIAN  
(R)..... GENERAL  
(A)..... AUSTRALIAN  
(B)..... BRITISH  
(G)..... EUROPEAN  
(T)..... CHINA  
(L)..... SINGAPORE

WAVEFORMS



Interchangeable Parts at Manufacture-Stage

| Mark | Reference Parts Number | Parts Name                        |
|------|------------------------|-----------------------------------|
| k1   | IC10                   | NJM79M05FA<br>AN79M05F            |
| k2   | IC9                    | NJM79M05FA<br>AN79M05F            |
| k3   | Q1                     | 2SC2412K1Q/R/S1<br>2SD601A1Q/R/S1 |
| k4   | IC3                    | LT1016INB<br>LT1016CNB            |
| k5   | D2                     | S1NB20<br>DF02M                   |
| k6   | IC5                    | NJM2904G-T1<br>NJM2904M-T1        |

|    | J.U.C | R | A.B.G |
|----|-------|---|-------|
| s1 | J1    | X | X     |
| s2 | J2    | 0 | X     |

★ All voltage are measured with a 10MΩ/V DC electric volt meter.  
★ Components having special characteristics are marked △ and must be replaced with parts having specifications equal to those originally installed.  
★ Schematic diagram is subject to change without notice.

PARTS LIST

ELECTRICAL PARTS

WARNING

Components having special characteristics are marked  $\Delta$  and must be replaced with parts having specifications equal to those originally installed.

- Carbon resistors (1/6W or 1/4W) are not included in the ELECTRICAL PARTS List. For the parts No. of the carbon resistors, refer to last page.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

|                                          |                                        |
|------------------------------------------|----------------------------------------|
| C.A.EL.CHP : CHIP ALUMI.ELECTROLYTIC CAP | L.EMIT : LIGHT EMITTING MODULE         |
| C.CE : CERAMIC CAP                       | LED.DSPLY : LED DISPLAY                |
| C.CE.ARRAY : CERAMIC CAP ARRAY           | LED.INFRD : LED,INFRARED               |
| C.CE.CHP : CHIP CERAMIC CAP              | MODUL.RF : MODULATOR,RF                |
| C.CE.ML : MULTILAYER CERAMIC CAP         | PHOT.CPL : PHOTO COUPLER               |
| C.CE.M.CHP : CHIP MULTILAYER CERAMIC CAP | PHOT.INTR : PHOTO INTERRUPTER          |
| C.CE.SAFTY : RECOGNIZED CERAMIC CAP      | PHOT.RFLCT : PHOTO REFLECTOR           |
| C.CE.TUBLR : CERAMIC TUBULAR CAP         | PIN.TEST : PIN,TEST POINT              |
| C.CE.SMI : SEMI CONDUCTIVE CERAMIC CAP   | PLST.RIVET : PLASTIC RIVET             |
| C.EL : ELECTROLYTIC CAP                  | R.ARRAY : RESISTOR ARRAY               |
| C.MICA : MICA CAP                        | R.CAR. : CARBON RESISTOR               |
| C.ML.FLM : MULTILAYER FILM CAP           | R.CAR.CHP : CHIPRESISTOR               |
| C.MP : METALLIZED PAPER CAP              | R.CAR.FP : FLAME PROOF CARBON RESISTOR |
| C.MYLAR : MYLAR FILM CAP                 | R.FUS : FUSABLE RESISTOR               |
| C.MYLAR.ML : MULTILAYER MYLAR FILM CAP   | R.MTL.CHP : CHIP METAL FILM RESISTOR   |
| C.PAPER : PAPER CAPACITOR                | R.MTL.FLM : METAL FILM RESISTOR        |
| C.PLS : POLYSTYRENE FILM CAP             | R.MTL.OXD : METAL OXIDE FILM RESISTOR  |
| C.POL : POLYESTER FILM CAP               | R.MTL.PLAT : METAL PLATE RESISTOR      |
| C.POLY : POLYETHYLENE FILM CAP           | RSNR.CE : CERAMIC RESONATOR            |
| C.PP : POLYPROPYLENE FILM CAP            | RSNR.CRYS : CRYSTAL RESONATOR          |
| C.TNTL : TANTALUM CAP                    | R.TW.CEM : TWIN CEMENT FIXED RESISTOR  |
| C.TNTL.CHP : CHIP TANTALUM CAP           | R.WW : WIRE WOUND RESISTOR             |
| C.TRIM : TRIMMER CAP                     | SCR.BND.HD : BIND HEAD B-TITE SCREW    |
| CN : CONNECTOR                           | SCR.BW.HD : BW HEAD TAPPING SCREW      |
| CN.BS.PIN : CONNECTOR,BASE PIN           | SCR.CUP : CUP TITE SCREW               |
| CN.CANNON : CONNECTOR,CANNON             | SCR.TERM : SCREW TERMINAL              |
| CN.DIN : CONNECTOR,DIN                   | SCR.TR : SCREW,TRANSISTOR              |
| CN.FLAT : CONNECTOR,FLAT CABLE           | SUPRT.PCB : SUPPORT,P.C.B.             |
| CN.POST : CONNECTOR,BASE POST            | SURG.PRTCT : SURGE PROTECTOR           |
| COIL.MX.AM : COIL,AM MIX                 | SW.TACT : TACT SWITCH                  |
| COIL.AT.FM : COIL,FM ANTENNA             | SW.LEAF : LEAF SWITCH                  |
| COIL.DT.FM : COIL,FM DETECT              | SW.LEVER : LEVER SWITCH                |
| COIL.MX.FM : COIL,FM MIX                 | SW.MICRO : MICRO SWITCH                |
| COIL.OUTPT : OUTPUT COIL                 | SW.PUSH : PUSH SWITCH                  |
| DIOD.ARRAY : DIODE ARRAY                 | SW.RT.ENC : ROTARY ENCODER             |
| DIODE.BRG : DIODE BRIDGE                 | SW.RT.MTR : ROTARY SWITCH WITH MOTOR   |
| DIODE.CHP : CHIP DIODE                   | SW.RT : ROTARY SWITCH                  |
| DIODE.VAR : VARACTOR DIODE               | SW.SLIDE : SLIDE SWITCH                |
| DIOD.Z.CHP : CHIP ZENER DIODE            | TERM.SP : SPEAKER TERMINAL             |
| DIODE.ZENR : ZENER DIODE                 | TERM.WRAP : WRAPPING TERMINAL          |
| DSCR.CE : CERAMIC DISCRIMINATOR          | THRMST.CHP : CHIP THERMISTOR           |
| FER.BEAD : FERRITE BEADS                 | TR.CHP : CHIP TRANSISTOR               |
| FER.CORE : FERRITE CORE                  | TR.DGT : DIGITAL TRANSISTOR            |
| FET.CHP : CHIP FET                       | TR.DGT.CHP : CHIP DIGITAL TRANSISTOR   |
| FL.DSPLY : FLUORESCENT DISPLAY           | TRANS : TRANSFORMER                    |
| FLTR.CE : CERAMIC FILTER                 | TRANS.PULS : PULSE TRANSFORMER         |
| FLTR.COMB : COMB FILTER MODULE           | TRANS.PWR : POWERTRANSFORMER ASS'Y     |
| FLTR.LC.RF : LC FILTER,EMI               | TUNER.AM : TUNER PACK,AM               |
| GND.MTL : GROUND PLATE                   | TUNER.FM : TUNER PACK,FM               |
| GND.TERM : GROUND TERMINAL               | TUNER.PK : FRONT-ENDTUNER PACK         |
| HOLDER.FUS : FUSE HOLDER                 | VR : ROTARY POTENTIOMETER              |
| IC.PRTCT : IC PROTECTOR                  | VR.MTR : POTENTIOMETER WITH MOTOR      |
| JUMPER.CN : JUMPER CONNECTOR             | VR.SW : POTENTIOMETER WITH ROTARY SW   |
| JUMPER.TST : JUMPER,TEST POINT           | VR.SLIDE : SLIDEPOTENTIOMETER          |
| L.DTCT : LIGHT DETECTING MODULE          | VR.TRIM : TRIMMER POTENTIOMETER        |

Note) Those parts marked with “#” are not included in the P.C.B. ass'y.

| Schm Ref. | PART NO. | Description |
|-----------|----------|-------------|
|           | VY641700 | P.C.B.      |
|           | VY641800 | P.C.B.      |
|           | VY641900 | P.C.B.      |
| CB1       | VG879900 | CN.BS.PIN   |
| CB2       | VT707200 | L.EMIT      |
| CB3       | VS996100 | CLIP.FUSE   |
| C1        | UB044220 | C.CE.M.CHP  |
| C2        | UB044220 | C.CE.M.CHP  |
| C3        | UB245100 | C.CE.M.CHP  |
| C4        | UB245100 | C.CE.M.CHP  |
| C5        | VF904800 | C.EL        |
| C6        | VJ651100 | C.EL        |
| C7        | VJ901600 | C.CE.M.CHP  |
| C8        | UB245100 | C.CE.M.CHP  |
| C9        | VF760000 | C.EL        |
| C10       | UB245100 | C.CE.M.CHP  |
| C11       | VF760000 | C.EL        |
| C12       | UB044100 | C.CE.M.CHP  |
| C13       | VJ839000 | C.EL        |
| C14       | VR169200 | C.MYLAR.ML  |
| C15       | VR169200 | C.MYLAR.ML  |
| C16       | UB245100 | C.CE.M.CHP  |
| C17       | UB245100 | C.CE.M.CHP  |
| C18       | VF760000 | C.EL        |
| C19       | UB245100 | C.CE.M.CHP  |
| C20       | VF760000 | C.EL        |
| C21       | VF760000 | C.EL        |
| C22       | UB245100 | C.CE.M.CHP  |
| C23       | UB245100 | C.CE.M.CHP  |
| C24       | UB245100 | C.CE.M.CHP  |
| C25       | UB245100 | C.CE.M.CHP  |
| C26       | VF760000 | C.EL        |
| C27       | UB245100 | C.CE.M.CHP  |
| C28       | VJ899000 | C.CE.M.CHP  |
| C29       | VJ899000 | C.CE.M.CHP  |
| C30       | UN837470 | C.EL        |
| C31       | UB245100 | C.CE.M.CHP  |
| C32       | UB044100 | C.CE.M.CHP  |
| C33       | VF760000 | C.EL        |
| C34       | UB044100 | C.CE.M.CHP  |
| C35       | VJ900100 | C.CE.M.CHP  |
| C36       | VF760000 | C.EL        |
| C37       | UB245100 | C.CE.M.CHP  |
| C38       | VF760000 | C.EL        |
| C39       | UB245100 | C.CE.M.CHP  |
| C40       | UB245100 | C.CE.M.CHP  |
| C41       | UB245100 | C.CE.M.CHP  |
| C42       | UB245100 | C.CE.M.CHP  |
| C43       | UB245100 | C.CE.M.CHP  |
| C44       | UB245100 | C.CE.M.CHP  |
| C45       | UM397330 | C.EL        |
| C46       | UB012330 | C.CE.M.CHP  |
| C47       | VR168300 | C.MYLAR.ML  |
| C48       | VR168300 | C.MYLAR.ML  |
| C49       | FG214100 | C.CE        |

\* New Parts

| Schm Ref. | PART NO. | Description |
|-----------|----------|-------------|
| C50       | FG214100 | C.CE        |
| D1        | VT332900 | DIODE       |
| D2        | VR253700 | DIODE.BRG   |
| D3        | VT332900 | DIODE       |
| D4        | VT914900 | LED(or)     |
| D6        | VT707700 | C.TRIM      |
| IC1       | Xi110D00 | IC          |
| IC2       | XE819A00 | IC          |
| IC3       | XR323A00 | IC          |
| IC4       | XF291A00 | IC          |
| IC5       | XR318A00 | IC          |
| IC6       | XR043A00 | IC          |
| IC7       | XD660A00 | IC          |
| IC8       | XS801A00 | IC          |
| IC9       | XJ604A00 | IC          |
| IC10      | XE436A00 | IC          |
| L1        | VT623200 | FLTR.LC     |
| L2        | GE901970 | COIL        |
| L3        | Vi530800 | TRANS.PULS  |
| PJ1       | VU144300 | JACK.PIN    |
| Q1        | iC241200 | TR.CHP      |
| Q2        | VB504200 | TR.DGT      |
| Q3        | VB504200 | TR.DGT      |
| Q4        | VH964100 | TR.DGT      |
| R1        | RD257100 | R.CAR.CHP   |
| R2        | RD258100 | R.CAR.CHP   |
| R3        | RD254750 | R.CAR.CHP   |
| R4        | RD255150 | R.CAR.CHP   |
| R5        | RD256390 | R.CAR.CHP   |
| R6        | RD254750 | R.CAR.CHP   |
| R7        | RD256100 | R.CAR.CHP   |
| R8        | RD256100 | R.CAR.CHP   |
| R9        | RD256220 | R.CAR.CHP   |
| R10       | RD255330 | R.CAR.CHP   |
| R11       | RD256100 | R.CAR.CHP   |
| R12       | RD256100 | R.CAR.CHP   |
| R13       | RD256100 | R.CAR.CHP   |
| R14       | RD256910 | R.CAR.CHP   |
| R15       | RD256100 | R.CAR.CHP   |
| R16       | RD256100 | R.CAR.CHP   |
| R17       | RD256750 | R.CAR.CHP   |
| R18       | HV453220 | R.CAR.FP    |
| R19       | HV453220 | R.CAR.FP    |
| R20       | HV453220 | R.CAR.FP    |
| R21       | RD255100 | R.CAR.CHP   |
| R22       | RD258220 | R.CAR.CHP   |
| R23       | RD257100 | R.CAR.CHP   |
| R24       | RD258220 | R.CAR.CHP   |
| R25       | RD258100 | R.CAR.CHP   |
| R26       | RD254680 | R.CAR.CHP   |
| R27       | RD257100 | R.CAR.CHP   |
| R29       | HV453470 | R.CAR.FP    |
| R30       | RD257100 | R.CAR.CHP   |
| R31       | RD257100 | R.CAR.CHP   |
| R32       | RD258220 | R.CAR.CHP   |

\* New Parts

| Schm<br>Ref. | PART NO. | Description                   |
|--------------|----------|-------------------------------|
| R33          | RD256560 | R.CAR.CHP 5.6K $\Omega$ 1/10W |
| R34          | RD255120 | R.CAR.CHP 120 $\Omega$ 1/10W  |
| R35          | RD258100 | R.CAR.CHP 100K $\Omega$ 1/10W |
| R36          | RD257470 | R.CAR.CHP 47K $\Omega$ 1/10W  |
| R37          | RD257100 | R.CAR.CHP 10K $\Omega$ 1/10W  |
| R38          | RD257220 | R.CAR.CHP 22K $\Omega$ 1/10W  |
| R39          | RD257100 | R.CAR.CHP 10K $\Omega$ 1/10W  |
| R40          | HV453470 | R.CAR.FP 4.7 $\Omega$ 1/4W    |
| R41          | RD257120 | R.CAR.CHP 12K $\Omega$ 1/10W  |
| R42          | RD257470 | R.CAR.CHP 47K $\Omega$ 1/10W  |
| R43          | RD256100 | R.CAR.CHP 1K $\Omega$ 1/10W   |
| R44          | RD257470 | R.CAR.CHP 47K $\Omega$ 1/10W  |
| R45          | RD255150 | R.CAR.CHP 150 $\Omega$ 1/10W  |
| R46          | RD255470 | R.CAR.CHP 470 $\Omega$ 1/10W  |
| R47          | RD259100 | R.CAR.CHP 1M $\Omega$ 1/10W   |
| SW1          | VN121000 | SW.PUSH SPUN19-2N-W           |
| SW2          | VE962600 | SW.SLIDE SDKGA4(R)            |
| T1           | XS995A00 | TRANS.PWR                     |
| XL1          | VT707500 | RSNR.CRYS 46.08MHz            |
| XL2          | VT928600 | RSNR.CRYS 18.432MHz           |
|              | VL391100 | RADIATOR OSH-2440-SPL         |
|              | ED330086 | SCR.BND.HD 3x8 FCRM3-BL       |

\* New Parts

A

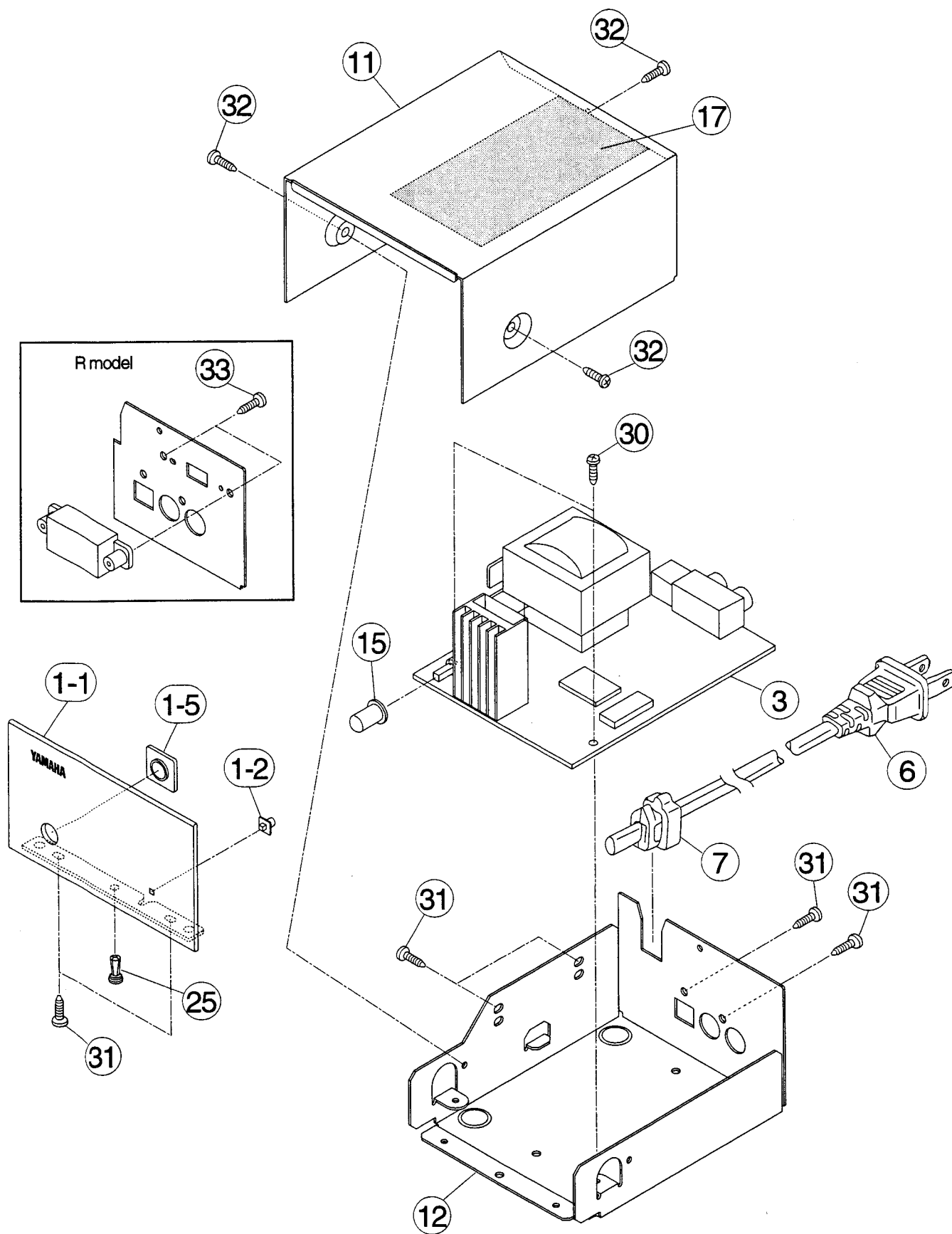
B

C

D

E

APD-1

**EXPLODED VIEW**

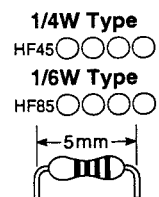
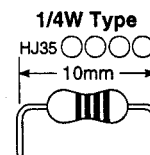
# MECHANICAL PARTS

| Ref.<br>NO. | PART NO. | Description                  |          |          |         |  |
|-------------|----------|------------------------------|----------|----------|---------|--|
| * 1-1       | VV598200 | FRONT PANEL                  |          |          |         |  |
| 1-2         | VH897700 | LENS                         | 2.2Lx2.2 |          |         |  |
| 1-5         | VY848300 | ESCUTCHEON                   | D7       |          |         |  |
| * 3         | VY641700 | P.C.B. ASS'Y                 | FUNCTION |          | (UC)    |  |
| * 3         | VY641800 | P.C.B. ASS'Y                 | FUNCTION |          | (R)     |  |
| * 3         | VY641900 | P.C.B. ASS'Y                 | FUNCTION |          | (ABG)   |  |
| 6           | VL238900 | POWER CORD ASS'Y             |          |          | (G)     |  |
| 6           | VP418300 | POWER CORD ASS'Y             |          |          | (A)     |  |
| 6           | VQ458400 | POWER CORD ASS'Y             |          |          | (R)     |  |
| 6           | VS168300 | POWER CORD ASS'Y             |          |          | (UC)    |  |
| 6           | VS680700 | POWER CORD ASS'Y             |          |          | (B)     |  |
| 7           | VN158600 | CORD STOPPER                 | No.2104  |          |         |  |
| * 11        | VV597800 | TOP COVER                    |          |          |         |  |
| * 12        | VV945600 | CHASSIS ASS'Y                |          |          | (UCABG) |  |
| * 12        | VV945700 | CHASSIS ASS'Y                |          |          | (R)     |  |
| 15          | VS048300 | BUTTON                       | D7       |          |         |  |
| 17          | VZ056500 | DAMPER                       |          |          |         |  |
| 25          | CB099600 | PLASTIC RIVET                | No.920   |          |         |  |
| 30          | VT669300 | PW HEAD B-TITE SCREW         | 3x8-8    | MFC2     |         |  |
| 31          | VN413300 | BIND HEAD BONDING B-T. SCREW | 3x8      | MFZN2-BL |         |  |
| 32          | EP600190 | BIND HEAD B-TITE SCREW       | 3x8      | ZMC2-BL  |         |  |
| 33          | VF617600 | PAN HEAD P-TITE SCREW        | 2.6x8    | FCRM3-BL | (R)     |  |
|             |          | ACCESSORIES                  |          |          |         |  |
|             | VT970000 | AV CABLE                     | 1P 1.0m  |          |         |  |

\* New Parts

# Parts List for Carbon Resistors

| Value          | 1/4W Type Part No. | 1/6W Type Part No. | Value          | 1/4W Type Part No. | 1/6W Type Part No. |
|----------------|--------------------|--------------------|----------------|--------------------|--------------------|
| 1.0 $\Omega$   | HJ35 3100          | HF85 3100          | 10 k $\Omega$  | HF45 7100          | HF45 7100          |
| 1.8 $\Omega$   | HJ35 3180          | *                  | 11 k $\Omega$  | HF45 7110          | HF45 7110          |
| 2.2 $\Omega$   | HJ35 3220          | HF85 3220          | 12 k $\Omega$  | HJ35 7120          | HF85 7120          |
| 3.3 $\Omega$   | HJ35 3330          | HF85 3330          | 13 k $\Omega$  | HF45 7130          | HF45 7130          |
| 4.7 $\Omega$   | HJ35 3470          | HF85 3470          | 15 k $\Omega$  | HF45 7150          | HF45 7150          |
| 5.6 $\Omega$   | HJ35 3560          | HF85 3560          | 18 k $\Omega$  | HF45 7180          | HF45 7180          |
| 10 $\Omega$    | HF45 4100          | HF45 4100          | 22 k $\Omega$  | HF45 7220          | HF45 7220          |
| 15 $\Omega$    | HJ35 4150          | HF85 4150          | 24 k $\Omega$  | HF45 7240          | HF45 7240          |
| 22 $\Omega$    | HF45 4220          | HF45 4220          | 27 k $\Omega$  | HJ35 7270          | HF85 7270          |
| 27 $\Omega$    | HJ35 4270          | HF85 4270          | 30 k $\Omega$  | HF45 7300          | HF45 7300          |
| 33 $\Omega$    | HF45 4330          | HF45 4330          | 33 k $\Omega$  | HF45 7330          | HF45 7330          |
| 39 $\Omega$    | HJ35 4470          | HF85 4390          | 36 k $\Omega$  | HF45 7360          | HF45 7360          |
| 47 $\Omega$    | HF45 4470          | HF45 4470          | 39 k $\Omega$  | HF45 7390          | HF45 7390          |
| 56 $\Omega$    | HF45 4560          | HF45 4560          | 47 k $\Omega$  | HF45 7470          | HF45 7470          |
| 68 $\Omega$    | HF45 4680          | HF45 4680          | 51 k $\Omega$  | HF45 7510          | HF45 7510          |
| 75 $\Omega$    | HF45 4750          | HF45 4750          | 56 k $\Omega$  | HF45 7560          | HF45 7560          |
| 82 $\Omega$    | HF45 4820          | HF45 4820          | 62 k $\Omega$  | HF45 7620          | HF45 7620          |
| 91 $\Omega$    | HF45 4910          | HF45 4910          | 68 k $\Omega$  | HF45 7680          | HF45 7680          |
| 100 $\Omega$   | HF45 5100          | HF45 5100          | 82 k $\Omega$  | HF45 7820          | HF45 7820          |
| 110 $\Omega$   | HJ35 5110          | HF85 5110          | 91 k $\Omega$  | HF45 7910          | HF45 7910          |
| 120 $\Omega$   | HF45 5120          | HF45 5120          | 100 k $\Omega$ | HF45 8100          | HF45 8100          |
| 150 $\Omega$   | HF45 5150          | HF45 5150          | 110 k $\Omega$ | HF45 8110          | HF45 8110          |
| 160 $\Omega$   | HJ35 5160          | *                  | 120 k $\Omega$ | HF45 8120          | HF45 8120          |
| 180 $\Omega$   | HF45 5180          | HF45 5180          | 150 k $\Omega$ | HF45 8150          | HF45 8150          |
| 200 $\Omega$   | HF45 5200          | HF45 5200          | 180 k $\Omega$ | HF45 8180          | HF45 8180          |
| 220 $\Omega$   | HF45 5220          | HF45 5220          | 220 k $\Omega$ | HJ35 8220          | HF85 8220          |
| 270 $\Omega$   | HF45 5270          | HF45 5270          | 270 k $\Omega$ | HF45 8270          | HF45 8270          |
| 330 $\Omega$   | HF45 5330          | HF45 5330          | 300 k $\Omega$ | HF45 8300          | HF45 8300          |
| 390 $\Omega$   | HF45 5390          | HF45 5390          | 330 k $\Omega$ | HF45 8330          | HF45 8330          |
| 430 $\Omega$   | HF45 5430          | HF45 5430          | 390 k $\Omega$ | HJ35 8390          | HF85 8390          |
| 470 $\Omega$   | HF45 5470          | HF45 5470          | 470 k $\Omega$ | HF45 8470          | HF45 8470          |
| 510 $\Omega$   | HF45 5510          | HF45 5510          | 560 k $\Omega$ | HJ35 8560          | HF85 8560          |
| 560 $\Omega$   | HF45 5560          | HF45 5560          | 680 k $\Omega$ | HJ35 8680          | HF85 8680          |
| 680 $\Omega$   | HF45 5680          | HF45 5680          | 820 k $\Omega$ | HJ35 8820          | HF85 8820          |
| 820 $\Omega$   | HF45 5820          | HF45 5820          | 1.0 M $\Omega$ | HF45 9100          | HF45 9100          |
| 910 $\Omega$   | HF45 5910          | HF45 5910          | 1.2 M $\Omega$ | HJ35 9120          | *                  |
| 1.0 k $\Omega$ | HF45 6100          | HF45 6100          | 1.5 M $\Omega$ | HJ35 9150          | HF85 9150          |
| 1.2 k $\Omega$ | HF45 6120          | HF45 6120          | 1.8 M $\Omega$ | HJ35 9180          | HF85 9180          |
| 1.5 k $\Omega$ | HF45 6150          | HF45 6150          | 2.2 M $\Omega$ | HJ35 9220          | HF85 9220          |
| 1.8 k $\Omega$ | HF45 6180          | HF45 6180          | 3.3 M $\Omega$ | HJ35 9330          | HF85 9330          |
| 2.0 k $\Omega$ | HJ35 6200          | HF85 6200          | 3.9 M $\Omega$ | HJ35 9390          | *                  |
| 2.2 k $\Omega$ | HF45 6220          | HF45 6220          | 4.7 M $\Omega$ | HJ35 9470          | HF85 9470          |
| 2.4 k $\Omega$ | HJ35 6240          | HF85 6240          |                |                    |                    |
| 2.7 k $\Omega$ | HF45 6270          | HF45 6270          |                |                    |                    |
| 3.0 k $\Omega$ | HF45 6300          | HF45 6300          |                |                    |                    |
| 3.3 k $\Omega$ | HF45 6330          | HF45 6330          |                |                    |                    |
| 3.6 k $\Omega$ | HJ35 6360          | HF85 6360          |                |                    |                    |
| 3.9 k $\Omega$ | HF45 6390          | HF45 6390          |                |                    |                    |
| 4.7 k $\Omega$ | HF45 6470          | HF45 6470          |                |                    |                    |
| 5.1 k $\Omega$ | HF45 6510          | HF45 6510          |                |                    |                    |
| 5.6 k $\Omega$ | HF45 6560          | HF45 6560          |                |                    |                    |
| 6.8 k $\Omega$ | HF45 6680          | HF45 6680          |                |                    |                    |
| 8.2 k $\Omega$ | HF45 6820          | HF45 6820          |                |                    |                    |
| 9.1 k $\Omega$ | HF45 6910          | HF45 6910          |                |                    |                    |



\* : Not available