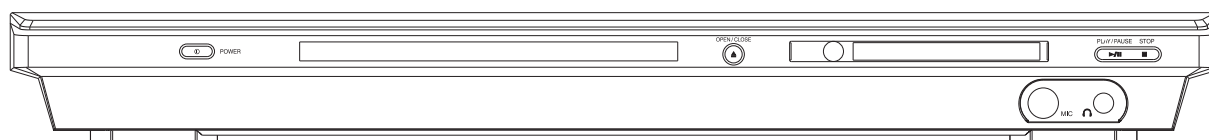


# SERVICE MANUAL

## DV722S



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# 1. SAFETY PRECAUTIONS

## 1.1 GENERAL GUIDELINES

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barrier, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

## 2. PREVENTION OF ELECTROSTATIC DISCHARGE(ESD) TO ELECTROSTATICALLY SENSITIVE(ES) DEVICES

Some semiconductor(solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive(ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by electrostatic discharge(ESD).

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging ESD wrist strap, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as anti-static (ESD protected) can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

### Caution

Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

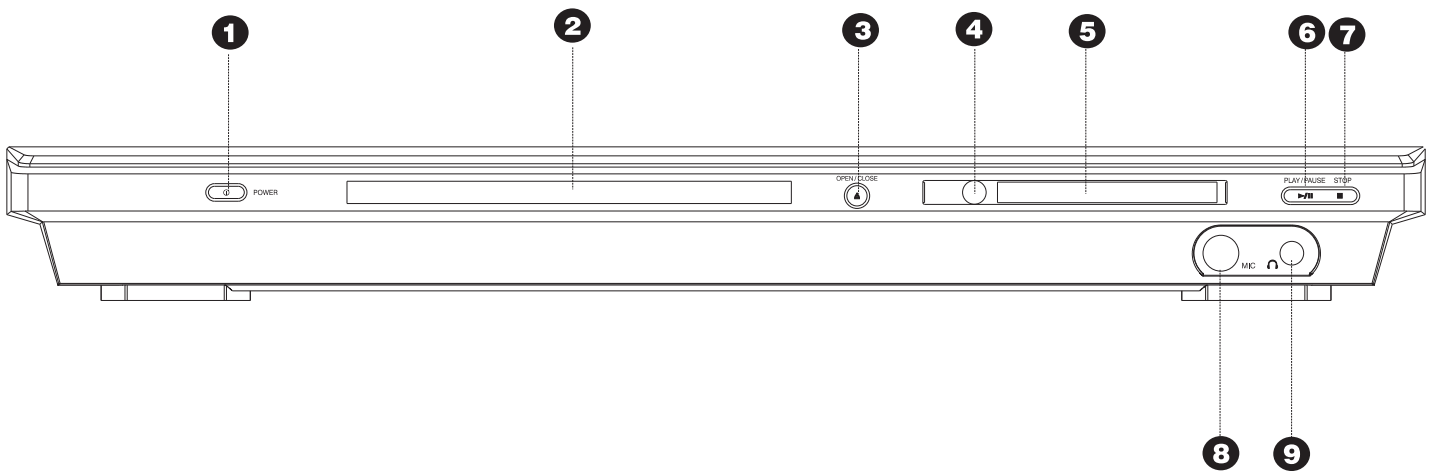
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity(ESD).

notice (1885x323x2 tiff)

### IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  $\Delta$  in the schematic diagrams, Exploded Views and replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

## ■ Front Panel Illustration



**1** POWER switch

**2** Disc tray

**3** OPEN/CLOSE button

**4** Remote control signal sensor

**5** LED display window

**6** PLAY/PAUSE button

**7** STOP button

**8** MIC jack

**9** Headphone jack

## 4. PREVENTION OF STATIC ELECTRICITY DISCHARGE

The laser diode in the traverse unit (optical pickup) may break down due to static electricity of clothes or human body. Use due caution to electrostatic breakdown when servicing and handling the laser diode.

### 4.1. Grounding for electrostatic breakdown prevention

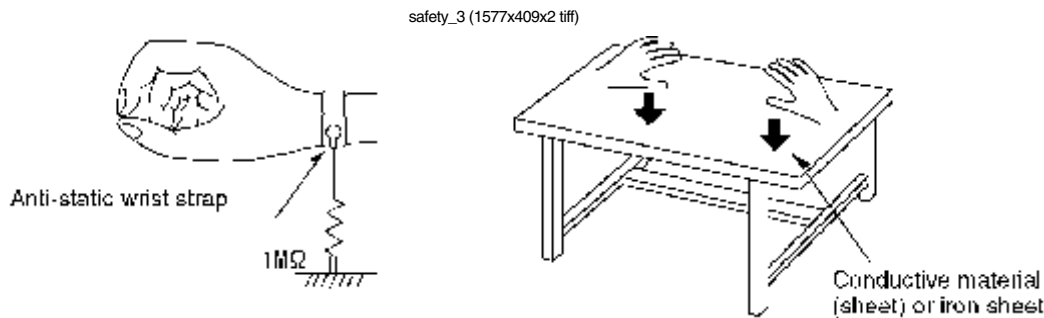
Some devices such as the DVD player use the optical pickup (laser diode) and the optical pickup will be damaged by static electricity in the working environment. Proceed servicing works under the working environment where grounding works is completed.

#### 4.1.1. Worktable grounding

1. Put a conductive material (sheet) or iron sheet on the area where the optical pickup is placed, and ground the sheet.

#### 4.1.2. Human body grounding

- 1 Use the anti-static wrist strap to discharge the static electricity from your body.



#### 4.1.3. Handling of optical pickup

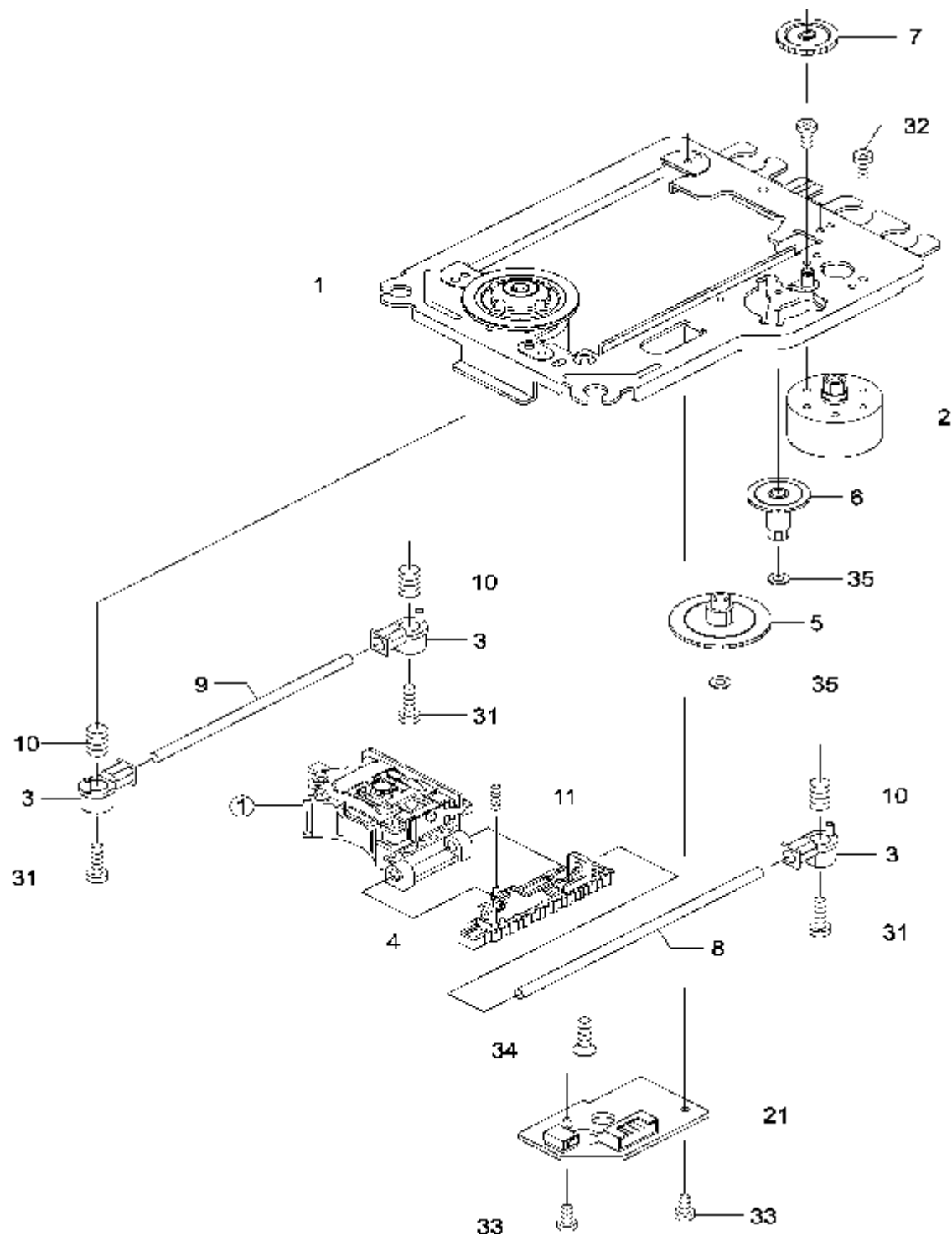
1. To keep the good quality of the optical pickup maintenance parts during transportation and before installation, the both ends of the laser diode are short-circuited. After replacing the parts with new ones, remove the short circuit according to the correct procedure. (See this Technical Guide).
2. Do not use a tester to check the laser diode for the optical pickup. Failure to do so will damage the laser diode due to the power supply in the tester.

### 4.2. Handling precautions for Traverse Unit (Optical Pickup)

1. Do not give a considerable shock to the traverse unit (optical pickup) as it has an extremely high-precision structure.
2. When replacing the optical pickup, install the flexible cable and cut its short lead with a nipper. See the optical pickup replacement procedure in this Technical Guide. Before replacing the traverse unit, remove the short pin for preventing static electricity and install a new unit. Connect the connector as short times as possible.
3. The flexible cable may be cut off if an excessive force is applied to it. Use caution when handling the cable.
4. The half-fixed resistor for laser power adjustment cannot be adjusted. Do not turn the resistor.

## 5. Assembling and disassembling the mechanism unit

### 5.1 Optical pickup Unit Exploded View and Part List



Pic (1)

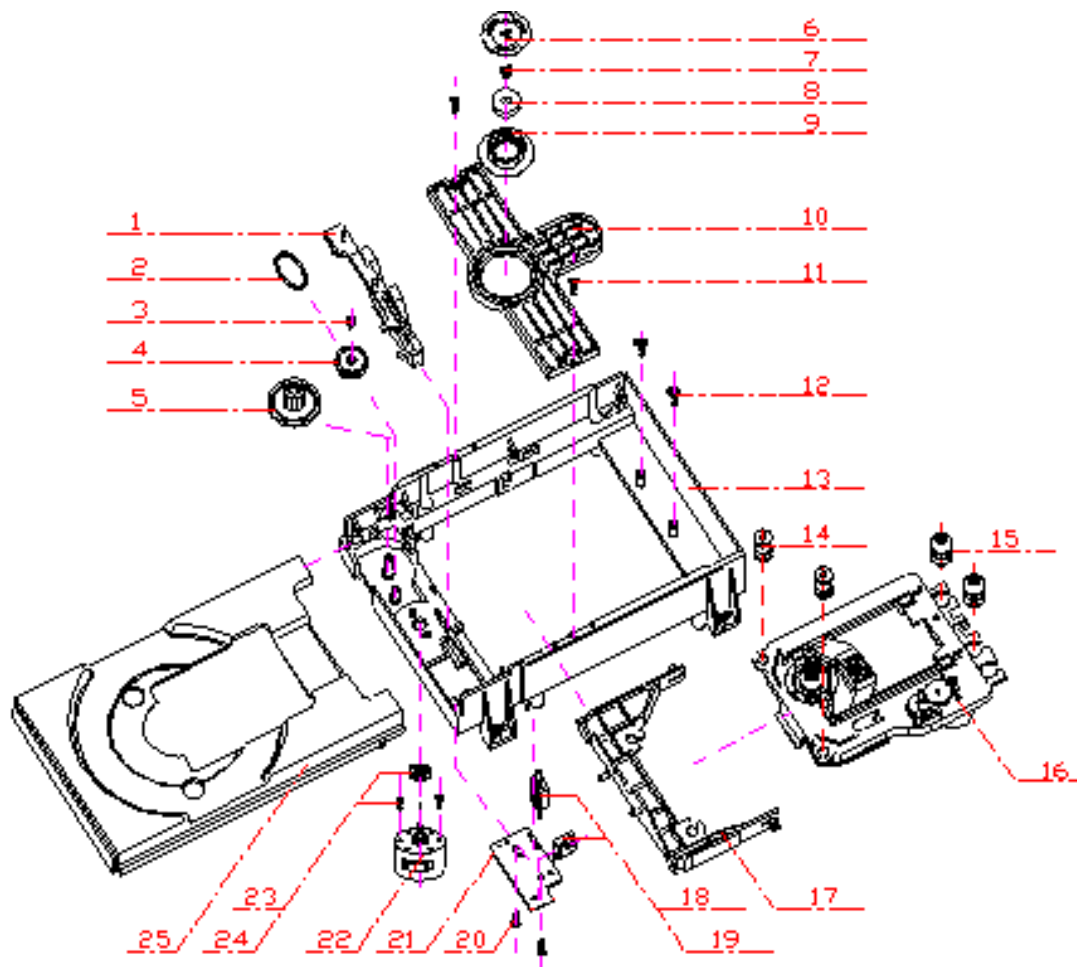
### Materials to Pic (1)

| No.                                                                               | PARTS CODE    | PARTS NAME                 | Q' ty |
|-----------------------------------------------------------------------------------|---------------|----------------------------|-------|
|  | 14692200      | SF-HD60                    | 1     |
| 1                                                                                 | 1EA0311A06300 | ASSY, CHASSIS, COMPLETE    | 1     |
| 2                                                                                 | 1EA0M10A15500 | ASSY, MOTOR, SLED          | 1     |
| Or                                                                                | 1EA0M10A15501 | ASSY, MOTOR, SLED          | 1     |
| 3                                                                                 | 1EA2451A24700 | HOLDER, SHAFT              | 3     |
| 4                                                                                 | 1EA2511A29100 | GEAR, RACK                 | 1     |
| 5                                                                                 | 1EA2511A29200 | GEAR, DRIVE                | 1     |
| 6                                                                                 | 1EA2511A29300 | GEAR, MIDDLE, A            | 1     |
| 7                                                                                 | 1EA2511A29400 | GEAR, MIDDLE, B            | 1     |
| 8                                                                                 | 1EA2744A03000 | SHAFT, SLIDE               | 1     |
| 9                                                                                 | 1EA2744A03100 | SHAFT, SLIDE, SUB          | 1     |
| 10                                                                                | 1EA2812A15300 | SPRING, COMP, TYOUSEI      | 3     |
| 11                                                                                | 1EA2812A15400 | SPRING, COMP, RACK         | 1     |
|                                                                                   |               |                            |       |
| 21                                                                                | 1EA0B10B20100 | ASSY, PWB                  | 1     |
| Or                                                                                | 1EA0B10B20200 | ASSY, PWB                  | 1     |
|                                                                                   |               |                            |       |
| 31                                                                                | SEXEA25700--- | SPECIAL SCREW BIN+-M2X11   | 3     |
| 32                                                                                | SEXEA25900--- | SPECIAL SCREW M1.7X2.2     | 2     |
| 33                                                                                | SFBPN204R0SE- | SCR S-TPG PAN 2X4          | 2     |
| 34                                                                                | SFSFN266R0SE- | SCR S-TPG FLT 2.6X6        | 1     |
| 35                                                                                | SWXEA15400--- | SPECIAL WASHER 1.8X4 X0.25 | 2     |

[illegible]

Note : This parts list is not for service parts supply.

## 5.2 Bracket Exploded View and Part List



**Pic (2)**

### **Materials to Pic(2)**

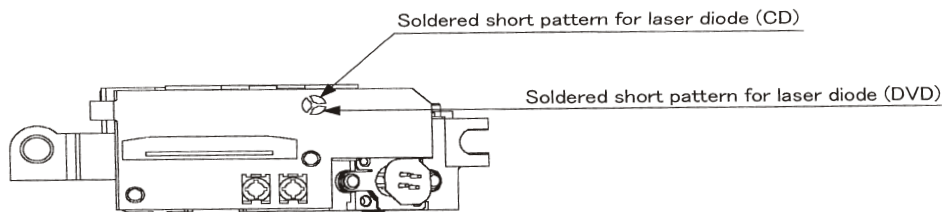
- |                                   |                          |
|-----------------------------------|--------------------------|
| 1.bracket                         | 14. front silicon rubber |
| 2.belt                            | 15. Back silicon rubber  |
| 3.screw                           | 16. Pick-up              |
| 4.belt wheel                      | 17. Pick-up              |
| 5.gearwheel                       | 18. switch               |
| 6.iron chip                       | 19. Five-pin flat plug   |
| 7. Immobility mechanism equipment | 20. screw                |
| 8. Magnet                         | 21. PCB                  |
| 9. Platen                         | 22. motor                |
| 10. Bridge bracket                | 23. Motor wheel          |
| 11. screw                         | 24. screw                |
| 12. screw                         | 25.tray                  |
| 13. Big bracket                   |                          |

**Before going process with disassembly and installation, please carefully both peruse the chart and confirm the materials.**

## 5.3 MISCELLANEOUS

### 5.3.1 Protection of the LD(Laser diode)

Short the parts of LD circuit pattern by soldering.



### 5.3.2 Cautions on assembly and adjustment

Make sure that the workbenches, jigs, tips, tips of soldering irons and measuring instruments are grounded, and that personnel wear wrist straps for ground.

Open the LD short lands quickly with a soldering iron after a circuit is connected.

Keep the power source of the pick-up protected from internal and external sources of electrical noise.

Refrain from operation and storage in atmospheres containing corrosive gases (such as  $H_2S$ ,  $SO_2$ ,  $NO_2$  and  $Cl_2$ ) or toxic gases or in locations containing substances (especially from the organic silicon, cyan, formalin and phenol groups) which emit toxic gases. It is particularly important to ensure that none of the above substances are present inside the unit. Otherwise, the motor may no longer run.

# 6.Electrical Confirmation

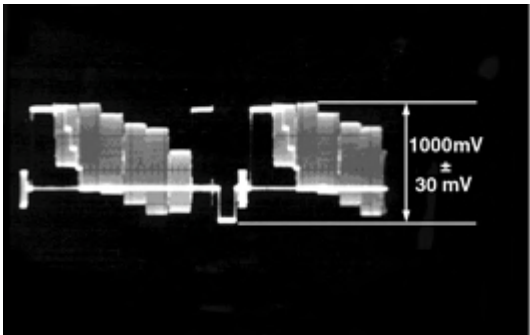
## 6.1. Video Output (Luminance Signal) Confirmation

DO this confirmation after replacing a P.C.B.

| Measurement point         | Mode                                                                | Disc                       |
|---------------------------|---------------------------------------------------------------------|----------------------------|
| Video output terminal     | Color bar 75%<br>PLAY(Title 46):DVDT-S15<br>PLAY(Title 12):DVDT-S01 | DVDT-S15<br>or<br>DVDT-S01 |
| Measuring equipment,tools | Confirmation value                                                  |                            |
| 200mV/dir,10 μ sec/dir    | 1000mVp-p±30mV                                                      |                            |

Purpose:To maintain video signal output compatibility.

- 1.Connect the oscilloscope to the video output terminal and terminate at 75 ohms.
- 2.Confirm that luminance signal(Y+S)level is 1000mVp-p±30mV



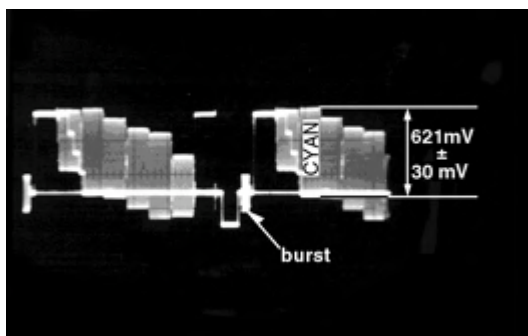
## 6.2 Video Output(Chrominance Signal) Confirmation

Do the confirmation after replacing P.C.B.

| Measurement point                                      | Mode                                                                | Disc                       |
|--------------------------------------------------------|---------------------------------------------------------------------|----------------------------|
| Video output terminal                                  | Color bar 75%<br>PLAY(Title 46):DVDT-S15<br>PLAY(Title 12):DVDT-S01 | DVDT-S15<br>or<br>DVDT-S01 |
| Measuring equipment,tools                              | Confirmation value                                                  |                            |
| Screwdriver,Oscilloscope<br>200mV/dir,10 $\mu$ sec/dir | 621mVp-p $\pm$ 30mV                                                 |                            |

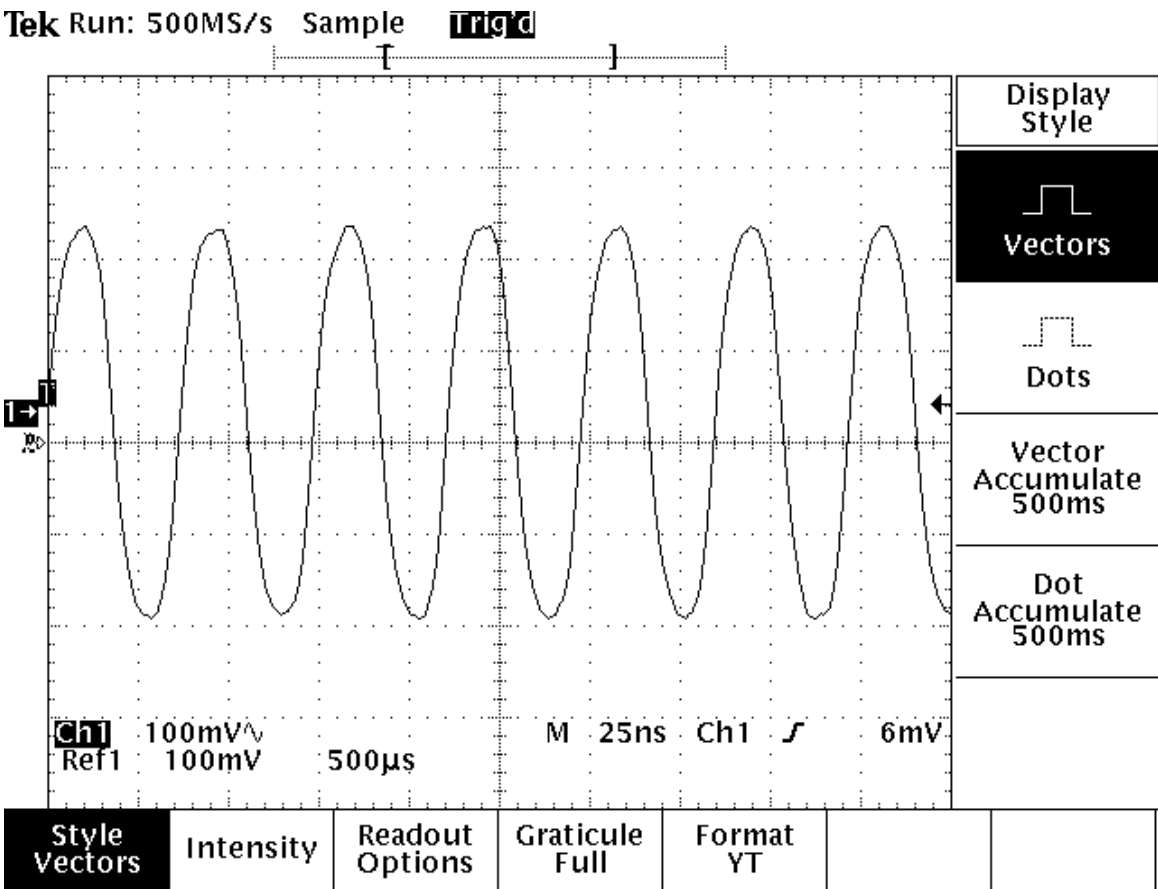
Purpose:To maintain video signal output compatibility.

- 1.Connect the oscilloscope to the video output terminal and terminate at 75 ohme.
- 2.Confirm that the chrominance signal(C)level is 621 mVp-p $\pm$ 30mV

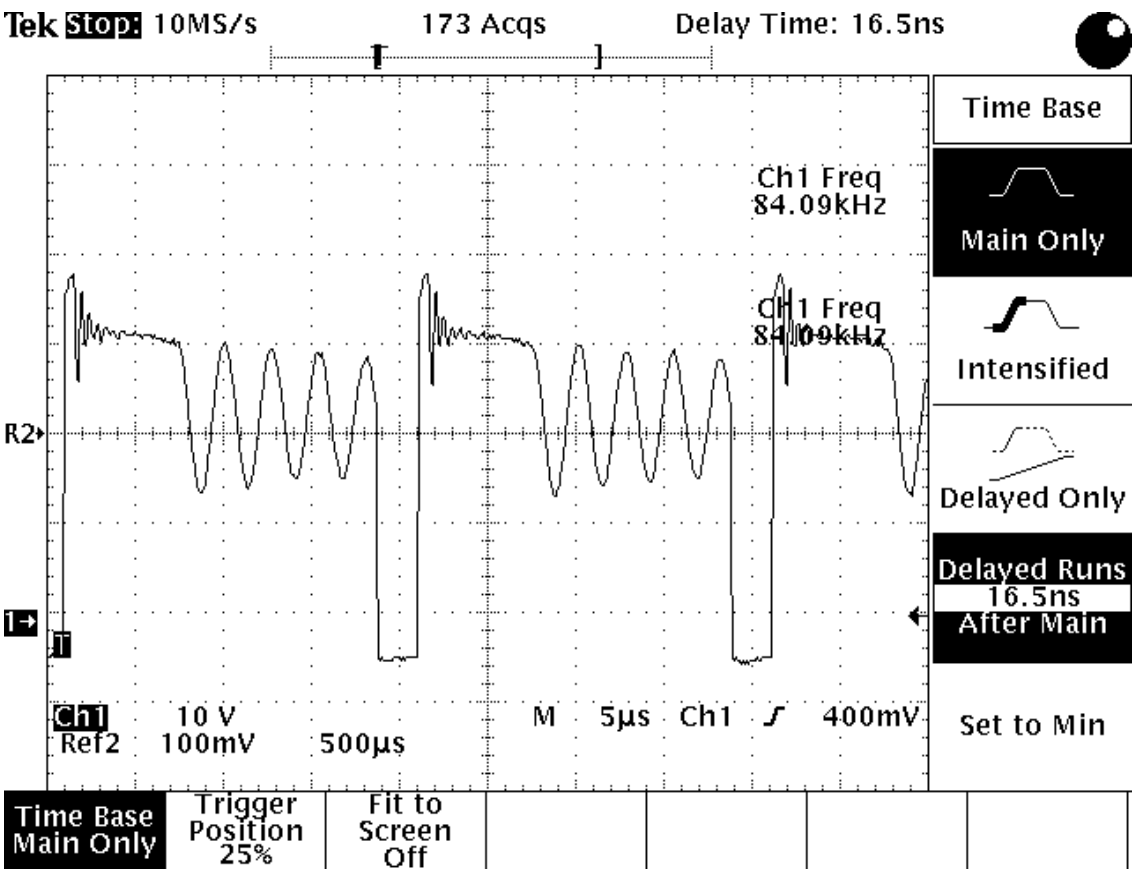


7.MPEG BOARD CHECK WAVEFORM

7.1 27MHz WAVEFORM



7.2 IC5L0380R PIN.2 WAVEFORM DIAGRAM



## 8. Am29LV160D

### 16 Megabit (2 M x 8-Bit/1 M x 16-Bit) CMOS 3.0 Volt-only Boot Sector Flash Memory

#### DISTINCTIVE CHARACTERISTICS

##### ■ Single power supply operation

- Full voltage range: 2.7 to 3.6 volt read and write operations for battery-powered applications
- Regulated voltage range: 3.0 to 3.6 volt read and write operations and for compatibility with high performance 3.3 volt microprocessors

##### ■ Manufactured on 0.23 $\mu$ m process technology

- Fully compatible with 0.32  $\mu$ m Am29LV160B device

##### ■ High performance

- Access times as fast as 70 ns

##### ■ Ultra low power consumption (typical values at 5 MHz)

- 200 nA Automatic Sleep mode current
- 200 nA standby mode current
- 9 mA read current
- 20 mA program/erase current

##### ■ Flexible sector architecture

- One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and thirty-one 64 Kbyte sectors (byte mode)
- One 8 Kword, two 4 Kword, one 16 Kword, and thirty-one 32 Kword sectors (word mode)
- Supports full chip erase
- Sector Protection features:
  - A hardware method of locking a sector to prevent any program or erase operations within that sector
  - Sectors can be locked in-system or via programming equipment
  - Temporary Sector Unprotect feature allows code changes in previously locked sectors

##### ■ Unlock Bypass Program Command

- Reduces overall programming time when issuing multiple program command sequences

##### ■ Top or bottom boot block configurations available

##### ■ Embedded Algorithms

- Embedded Erase algorithm automatically preprograms and erases the entire chip or any combination of designated sectors
- Embedded Program algorithm automatically writes and verifies data at specified addresses

##### ■ Minimum 1,000,000 write cycle guarantee per sector

##### ■ 20-year data retention at 125°C

- Reliable operation for the life of the system

##### ■ Package option

- 48-ball FBGA
- 48-pin TSOP
- 44-pin SO

##### ■ CFI (Common Flash Interface) compliant

- Provides device-specific information to the system, allowing host software to easily reconfigure for different Flash devices

##### ■ Compatibility with JEDEC standards

- Pinout and software compatible with single-power supply Flash
- Superior inadvertent write protection

##### ■ Data# Polling and toggle bits

- Provides a software method of detecting program or erase operation completion

##### ■ Ready/Busy# pin (RY/BY#)

- Provides a hardware method of detecting program or erase cycle completion (not available on 44-pin SO)

##### ■ Erase Suspend/Erase Resume

- Suspends an erase operation to read data from, or program data to, a sector that is not being erased, then resumes the erase operation

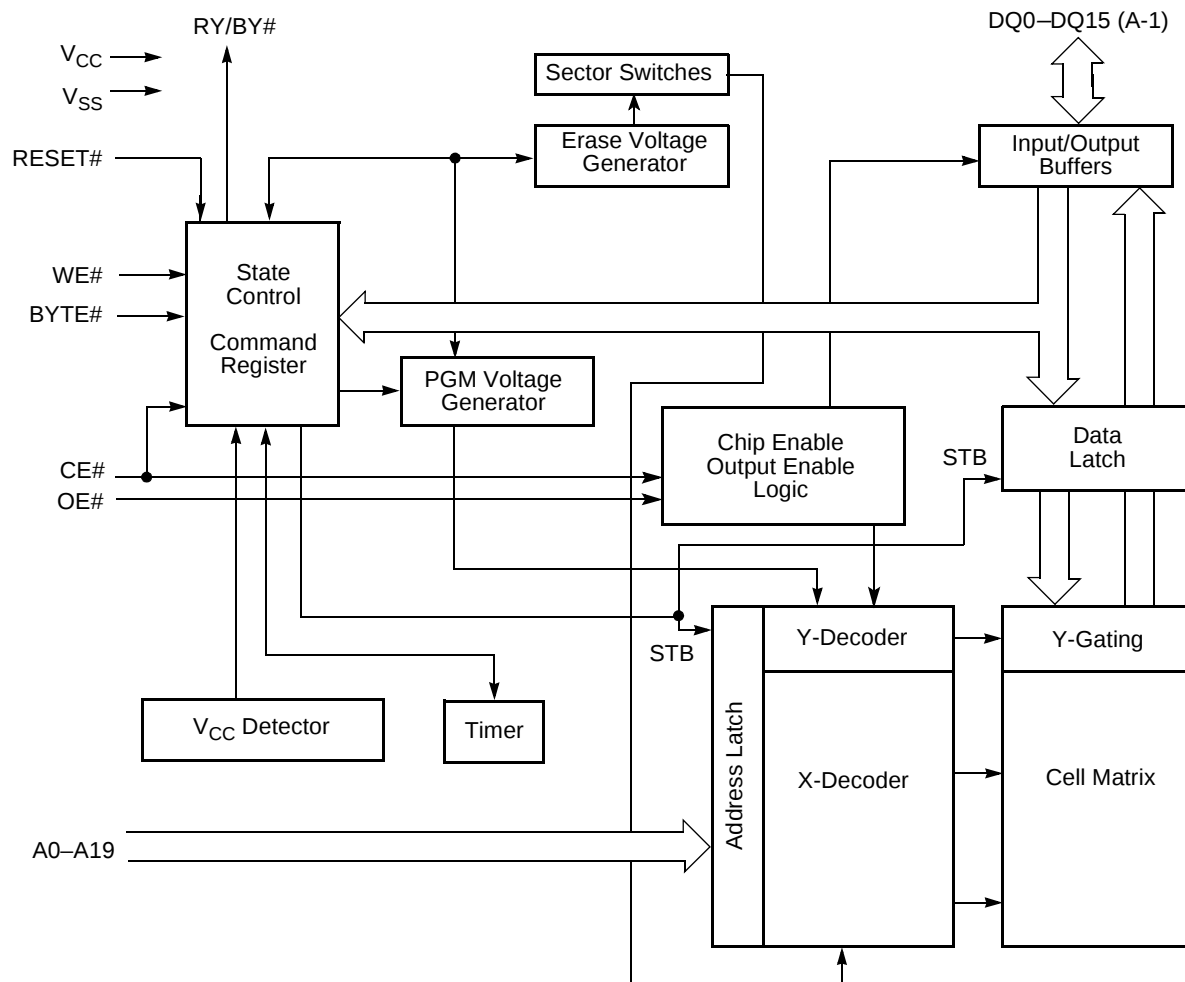
##### ■ Hardware reset pin (RESET#)

- Hardware method to reset the device to reading array data

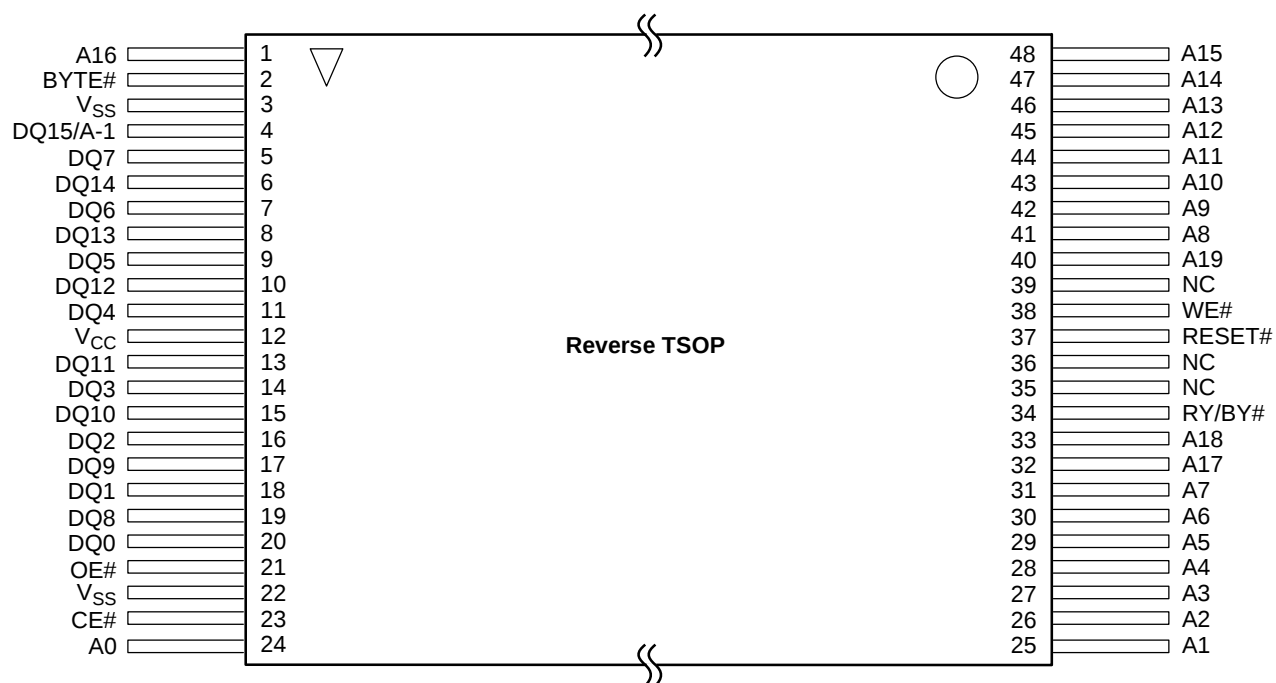
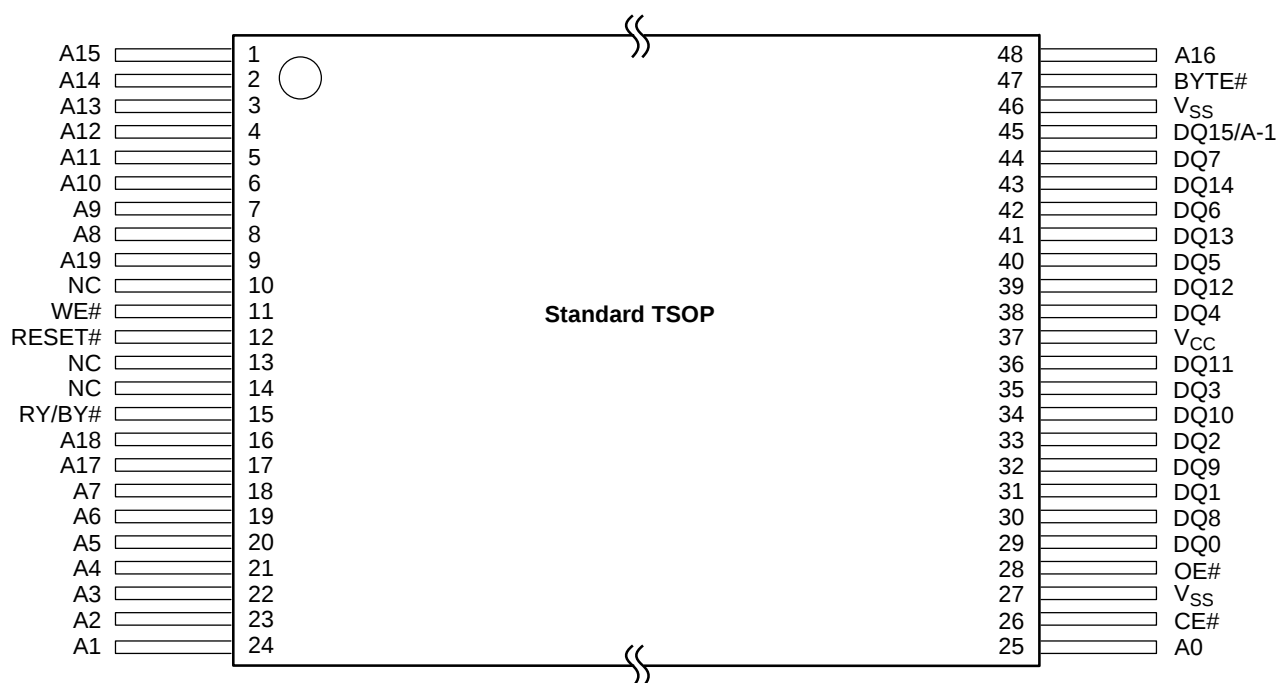
**PRODUCT SELECTOR GUIDE**

| Family Part Number                   |                                                    | Am29LV160D |            |             |
|--------------------------------------|----------------------------------------------------|------------|------------|-------------|
| Speed Option                         | Voltage Range: $V_{CC} = 2.7\text{--}3.6\text{ V}$ | <b>-70</b> | <b>-90</b> | <b>-120</b> |
| Max access time, ns ( $t_{ACC}$ )    |                                                    | 70         | 90         | 120         |
| Max CE# access time, ns ( $t_{CE}$ ) |                                                    | 70         | 90         | 120         |
| Max OE# access time, ns ( $t_{OE}$ ) |                                                    | 30         | 35         | 50          |

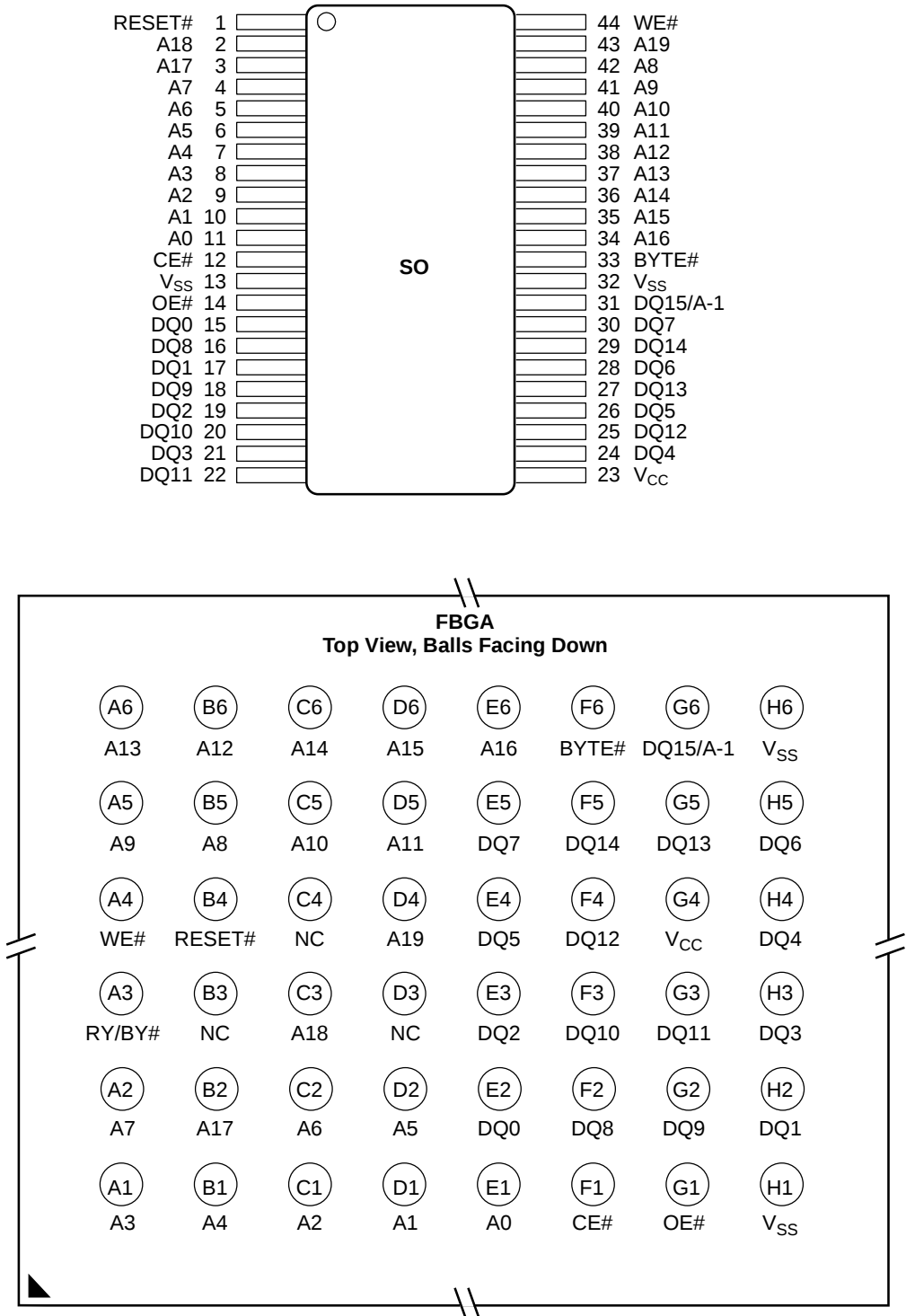
**Note:** See “AC Characteristics” for full specifications.

**BLOCK DIAGRAM**


## CONNECTION DIAGRAMS



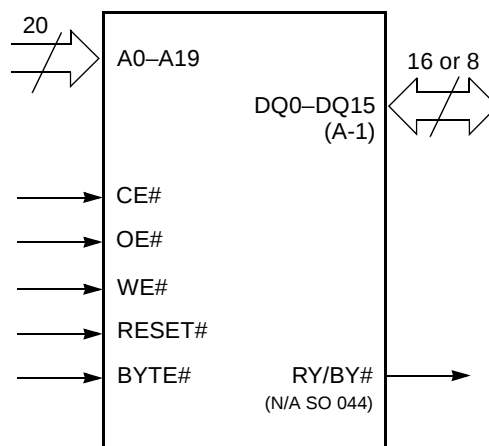
CONNECTION DIAGRAMS



## PIN CONFIGURATION

|                 |   |                                                                                                                      |
|-----------------|---|----------------------------------------------------------------------------------------------------------------------|
| A0–A19          | = | 20 addresses                                                                                                         |
| DQ0–DQ14        | = | 15 data inputs/outputs                                                                                               |
| DQ15/A-1        | = | DQ15 (data input/output, word mode),<br>A-1 (LSB address input, byte mode)                                           |
| BYTE#           | = | Selects 8-bit or 16-bit mode                                                                                         |
| CE#             | = | Chip enable                                                                                                          |
| OE#             | = | Output enable                                                                                                        |
| WE#             | = | Write enable                                                                                                         |
| RESET#          | = | Hardware reset pin                                                                                                   |
| RY/BY#          | = | Ready/Busy output<br>(N/A SO 044)                                                                                    |
| V <sub>CC</sub> | = | 3.0 volt-only single power supply<br>(see Product Selector Guide for speed<br>options and voltage supply tolerances) |
| V <sub>SS</sub> | = | Device ground                                                                                                        |
| NC              | = | Pin not connected internally                                                                                         |

## LOGIC SYMBOL



## 8.1 HY57V641620HG

### DESCRIPTION

The Hyundai HY57V641620HG is a 67,108,864-bit CMOS Synchronous DRAM, ideally suited for the main memory applications which require large memory density and high bandwidth. HY57V641620HG is organized as 4banks of 1,048,576x16.

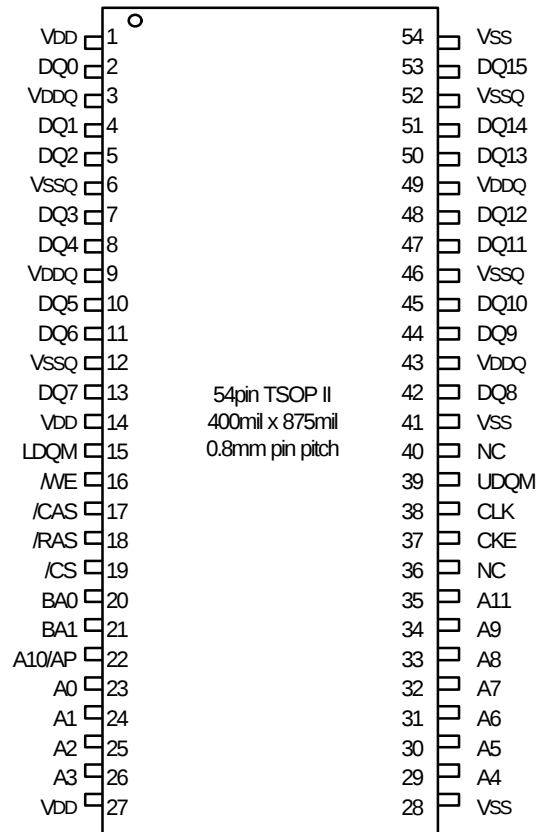
HY57V641620HG is offering fully synchronous operation referenced to a positive edge of the clock. All inputs and outputs are synchronized with the rising edge of the clock input. The data paths are internally pipelined to achieve very high bandwidth. All input and output voltage levels are compatible with LVTTL.

Programmable options include the length of pipeline (Read latency of 2 or 3), the number of consecutive read or write cycles initiated by a single control command (Burst length of 1,2,4,8 or Full page), and the burst count sequence(sequential or interleave). A burst of read or write cycles in progress can be terminated by a burst terminate command or can be interrupted and replaced by a new burst read or write command on any cycle. (This pipelined design is not restricted by a `2N` rule.)

### FEATURES

- Single 3.3±0.3V power supply <sup>Note)</sup>
- All device pins are compatible with LVTTL interface
- JEDEC standard 400mil 54pin TSOP-II with 0.8mm of pin pitch
- All inputs and outputs referenced to positive edge of system clock
- Data mask function by UDQM or LDQM
- Internal four banks operation
- Auto refresh and self refresh
- 4096 refresh cycles / 64ms
- Programmable Burst Length and Burst Type
  - 1, 2, 4, 8 or Full page for Sequential Burst
  - 1, 2, 4 or 8 for Interleave Burst
- Programmable  $\overline{\text{CAS}}$  Latency ; 2, 3 Clocks

### PIN CONFIGURATION

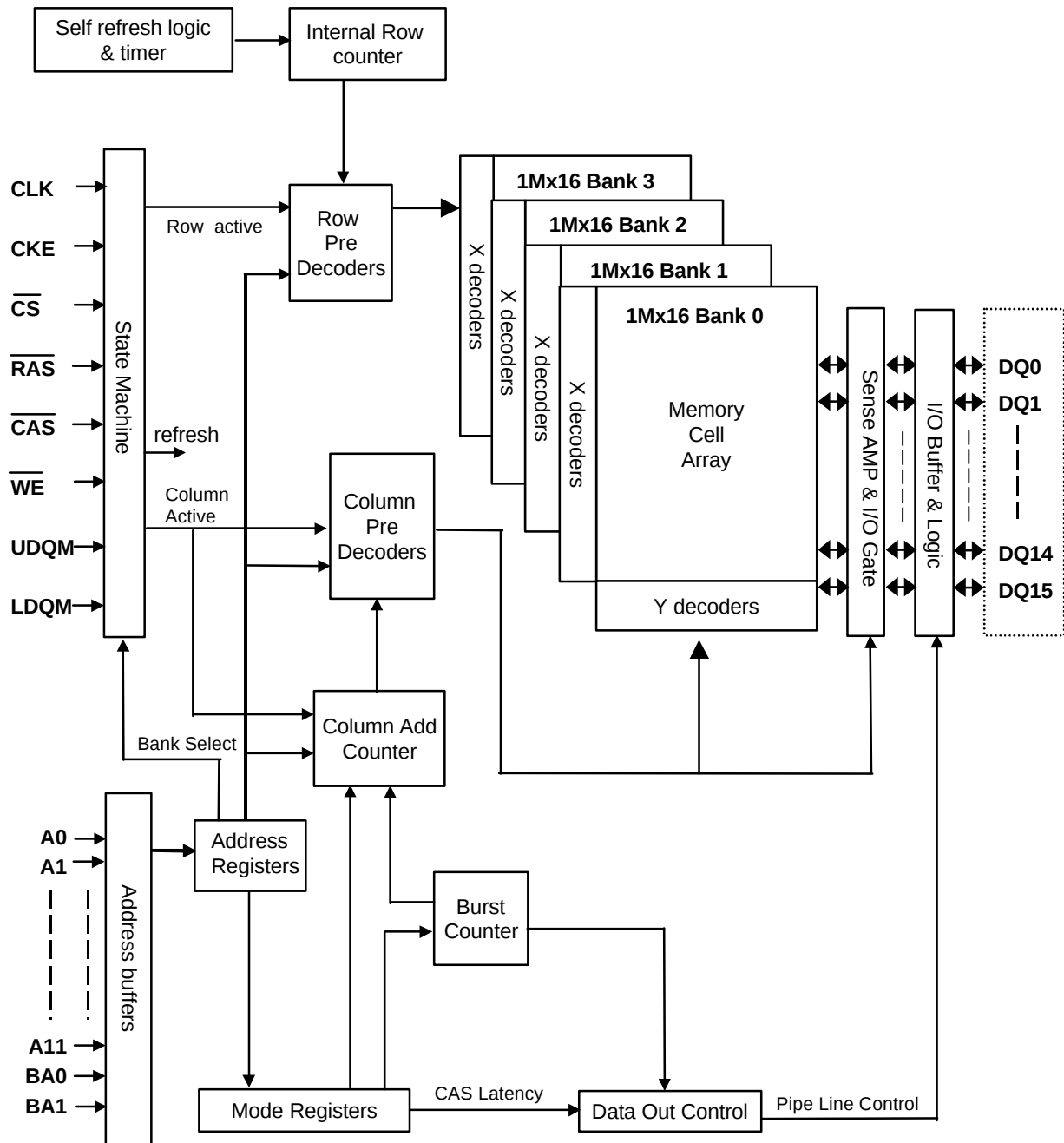


### PIN DESCRIPTION

| PIN                                                   | PIN NAME                                                      | DESCRIPTION                                                                                                                        |
|-------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| CLK                                                   | Clock                                                         | The system clock input. All other inputs are registered to the SDRAM on the rising edge of CLK                                     |
| CKE                                                   | Clock Enable                                                  | Controls internal clock signal and when deactivated, the SDRAM will be one of the states among power down, suspend or self refresh |
| $\overline{CS}$                                       | Chip Select                                                   | Enables or disables all inputs except CLK, CKE and DQM                                                                             |
| BA0,BA1                                               | Bank Address                                                  | Selects bank to be activated during $\overline{RAS}$ activity<br>Selects bank to be read/written during CAS activity               |
| A0 ~ A11                                              | Address                                                       | Row Address : RA0 ~ RA11, Column Address : CA0 ~ CA7<br>Auto-precharge flag : A10                                                  |
| $\overline{RAS}$ , $\overline{CAS}$ , $\overline{WE}$ | Row Address Strobe,<br>Column Address Strobe,<br>Write Enable | $\overline{RAS}$ , $\overline{CAS}$ and $\overline{WE}$ define the operation<br>Refer function truth table for details             |
| LDQM, UDQM                                            | Data Input/Output Mask                                        | Controls output buffers in read mode and masks input data in write mode                                                            |
| DQ0 ~ DQ15                                            | Data Input/Output                                             | Multiplexed data input / output pin                                                                                                |
| VDD/VSS                                               | Power Supply/Ground                                           | Power supply for internal circuits and input buffers                                                                               |
| VDDQ/VSSQ                                             | Data Output Power/Ground                                      | Power supply for output buffers                                                                                                    |
| NC                                                    | No Connection                                                 | No connection                                                                                                                      |

## FUNCTIONAL BLOCK DIAGRAM

1Mbit x 4banks x 16 I/O Synchronous DRAM



## 8.2 MT1389

## MT1389

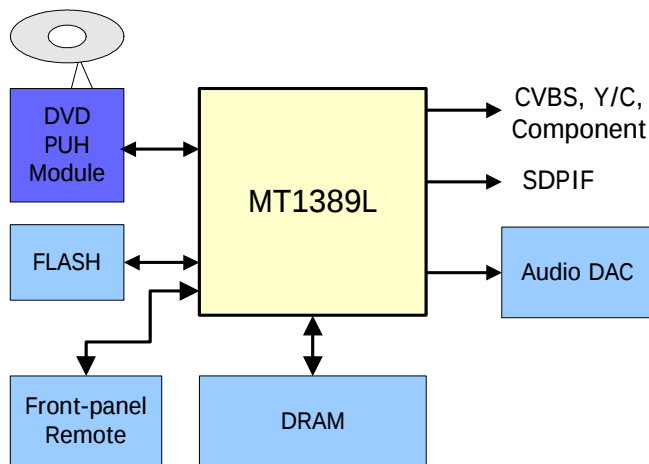
### Progressive-Scan DVD Player SOC

*Specifications are subject to change without notice*

**MediaTek MT1389** is a DVD player system-on-chip (SOC) which incorporates advanced features like high quality TV encoder and state-of-art de-interlace processing. The MT1389 enables consumer electronics manufacturers to build high quality, cost-effective DVD players, portable DVD players or any other home entertainment audio/video devices.

Based on MediaTek's world-leading DVD player SOC architecture, the MT1389 is the 3<sup>rd</sup> generation of the DVD player SOC. It integrates the MediaTek 2<sup>nd</sup> generation front-end analog RF amplifier and the Servo/MPEG AV decoder.

The progressive scan of the MT1389 utilized a proprietary advanced motion-adaptive de-interlace algorithm to achieve the best movie/video playback. It can easily detect 3:2/2:2 pull down source and restore the correct original pictures. It also supports a patent-pending edge-preserving algorithm to remove the saw-tooth effect.



DVD Player System Diagram Using MT1389

#### Key Features

- RF/Servo/MPEG Integration
- High Performance Audio Processor
- Motion-Adaptive, Edge-Preserving De-interlace
- 108MHz/12-bit, 6 CH TV Encoder

#### Applications

- Standard DVD Players
- Portable DVD Players

## General Feature List

- Super Integration DVD player single chip
  - High performance analog RF amplifier
  - Servo controller and data channel processing
  - MPEG-1/MPEG-2/JPEG video
  - Dolby AC-3/DTS/DVD-Audio
  - Unified memory architecture
  - Versatile video scaling & quality enhancement
  - OSD & Sub-picture
  - 2-D graphic engine
  - Built-in clock generator
  - Built-in high quality TV encoder
  - Built-in progressive video processor
  - Audio effect post-processor
  - Audio input port
- High Performance Analog RF Amplifier
  - Programmable fc
  - Dual automatic laser power control
  - Defect and blank detection
  - RF level signal generator
- Speed Performance on Servo/Channel Decoding
  - DVD-ROM up to 4XS
  - CD-ROM up to 24XS
- Channel Data Processor
  - Digital data slicer for small jitter capability
  - Built-in high performance data PLL for channel data demodulation
  - EFM/EFM+ data demodulation
  - Enhanced channel data frame sync protection & DVD-ROM sector sync protection
- Servo Control and Spindle Motor Control
  - Programmable frequency error gain and phase error gain of spindle PLL to control spindle motor on CLV and CAV mode
  - Built-in ADCs and DACs for digital servo control
  - Provide 2 general PWM
  - Tray control can be PWM output or digital output
- Embedded Micro controller
  - Built-in 8032 micro controller
  - Built-in internal 373 and 8-bit programmable lower address port
- 1024-bytes on-chip RAM
- Up to 4M bytes FLASH-programming interface
- Supports 5/3.3-Volt. FLASH interface
- Supports power-down mode
- Supports additional serial port
- DVD-ROM/CD-ROM Decoding Logic
  - High-speed ECC logic capable of correcting one error per each P-codeword or Q-codeword
  - Automatic sector Mode and Form detection
  - Automatic sector Header verification
  - Decoder Error Notification Interrupt that signals various decoder errors
  - Provide error correction acceleration
- Buffer Memory Controller
  - Supports 16Mb/32Mb/64Mb/128Mb SDRAM
  - Supports 16-bit SDRAM data bus
  - Provide the self-refresh mode SDRAM
  - Block-based sector addressing
  - Support 3.3 Volt. DRAM Interface
- Video Decode
  - Decodes MPEG1 video and MPEG2 main level, main profile video (720/480 and 720x576)
  - Smooth digest view function with I, P and B picture decoding
  - Baseline, extended-sequential and progressive JPEG image decoding
  - Support CD-G titles
- Video/OSD/SPU/HLI Processor
  - Arbitrary ratio vertical/horizontal scaling of video, from 0.25X to 256X
  - 65535/256/16/4/2-color bitmap format OSD,
  - 256/16 color RLC format OSD
  - Automatic scrolling of OSD image
  - Slide show transition as DVD-Audio Specification
- 2-D Graphic Engine
  - Support decode Text and Bitmap
  - Support line, rectangle and gradient fill
  - Support bitblt
  - Chroma key copy operation
  - Clip mask

- Audio Effect Processing
  - Dolby Digital (AC-3)/EX decoding
  - DTS/DTS-ES decoding
  - MLP decoding for DVD-Audio
  - MPEG-1 layer 1/layer 2 audio decoding
  - MPEG-2 layer1/layer2 2-channel audio
  - High Definition Compatible Digital (HDCD)
  - Windows Media Audio (WMA)
  - Advanced Audio Coding (AAC)
  - Dolby ProLogic II
  - Concurrent multi-channel and downmix out
  - IEC 60958/61937 output
    - PCM / bit stream / mute mode
    - Custom IEC latency up to 2 frames
  - Pink noise and white noise generator
  - Karaoke functions
    - Microphone echo
    - Microphone tone control
    - Vocal mute/vocal assistant
    - Key shift up to +/- 8 keys
    - Chorus/Flanger/Harmony/Reverb
  - Channel equalizer
  - 3D surround processing include virtual surround and speaker separation
- TV Encoder
  - Six 108MHz/12bit DACs
  - Support NTSC, PAL-BDGHINM, PAL-60
  - Support 525p, 625p progressive TV format
  - Automatically turn off unconnected channels
  - Support PC monitor (VGA)
  - Support Macrovision 7.1 L1, Macrovision 525P and 625P
  - CGMS-A/WSS
  - Closed Caption
- Progressive Output
  - Automatic detect film or video source
  - 3:2 pull down source detection
  - Advanced Motion adaptive de-interlace
  - Edge Preserving
  - Minimum external memory requirement
- Audio Input
  - Line-in/SPDIF-in for versatile audio processing
- Outline
  - 256-pin LQFP package
  - 3.3/1.8-Volt. Dual operating voltages

**CMOS Analog Multiplexers/Demultiplexers  
with Logic Level Conversion**

The CD4051B, CD4052B, and CD4053B analog multiplexers are digitally-controlled analog switches having low ON impedance and very low OFF leakage current. Control of analog signals up to  $20V_{P-P}$  can be achieved by digital signal amplitudes of 4.5V to 20V (if  $V_{DD}-V_{SS} = 3V$ , a  $V_{DD}-V_{EE}$  of up to 13V can be controlled; for  $V_{DD}-V_{EE}$  level differences above 13V, a  $V_{DD}-V_{SS}$  of at least 4.5V is required). For example, if  $V_{DD} = +4.5V$ ,  $V_{SS} = 0V$ , and  $V_{EE} = -13.5V$ , analog signals from -13.5V to +4.5V can be controlled by digital inputs of 0V to 5V. These multiplexer circuits dissipate extremely low quiescent power over the full  $V_{DD}-V_{SS}$  and  $V_{DD}-V_{EE}$  supply-voltage ranges, independent of the logic state of the control signals. When a logic "1" is present at the inhibit input terminal, all channels are off.

The CD4051B is a single 8-Channel multiplexer having three binary control inputs, A, B, and C, and an inhibit input. The three binary signals select 1 of 8 channels to be turned on, and connect one of the 8 inputs to the output.

The CD4052B is a differential 4-Channel multiplexer having two binary control inputs, A and B, and an inhibit input. The two binary input signals select 1 of 4 pairs of channels to be turned on and connect the analog inputs to the outputs.

The CD4053B is a triple 2-Channel multiplexer having three separate digital control inputs, A, B, and C, and an inhibit input. Each control input selects one of a pair of channels which are connected in a single-pole, double-throw configuration.

When these devices are used as demultiplexers, the "CHANNEL IN/OUT" terminals are the outputs and the "COMMON OUT/IN" terminals are the inputs.

**Features**

- Wide Range of Digital and Analog Signal Levels
  - Digital ..... 3V to 20V
  - Analog .....  $\leq 20V_{P-P}$
- Low ON Resistance, 125 $\Omega$  (Typ) Over 15V $_{P-P}$  Signal Input Range for  $V_{DD}-V_{EE} = 18V$
- High OFF Resistance, Channel Leakage of  $\pm 100pA$  (Typ) at  $V_{DD}-V_{EE} = 18V$
- Logic-Level Conversion for Digital Addressing Signals of 3V to 20V ( $V_{DD}-V_{SS} = 3V$  to 20V) to Switch Analog Signals to 20V $_{P-P}$  ( $V_{DD}-V_{EE} = 20V$ )
- Matched Switch Characteristics,  $r_{ON} = 5\Omega$  (Typ) for  $V_{DD}-V_{EE} = 15V$
- Very Low Quiescent Power Dissipation Under All Digital-Control Input and Supply Conditions, 0.2 $\mu W$  (Typ) at  $V_{DD}-V_{SS} = V_{DD}-V_{EE} = 10V$
- Binary Address Decoding on Chip
- 5V, 10V and 15V Parametric Ratings
- 10% Tested for Quiescent Current at 20V
- Maximum Input Current of 1 $\mu A$  at 18V Over Full Package Temperature Range, 100nA at 18V and 25 $^{\circ}C$
- Break-Before-Make Switching Eliminates Channel Overlap

**Applications**

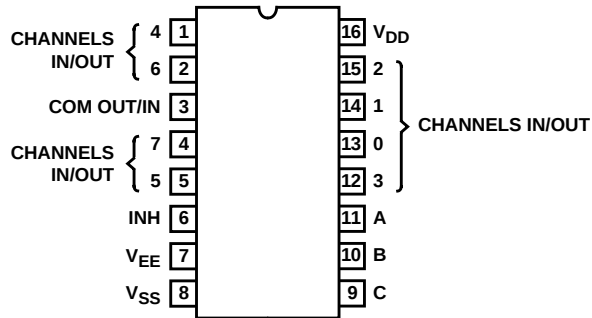
- Analog and Digital Multiplexing and Demultiplexing
- A/D and D/A Conversion
- Signal Gating

**Ordering Information**

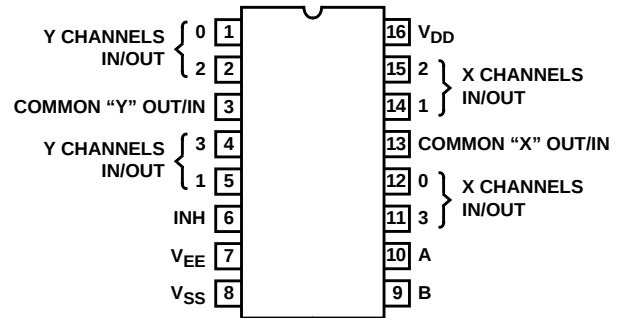
| PART NUMBER                        | TEMP. RANGE<br>( $^{\circ}C$ ) | PACKAGE              |
|------------------------------------|--------------------------------|----------------------|
| CD4051BF, CD4052BF,<br>CD4053BF    | -55 to 125                     | 16 Ld CERAMIC<br>DIP |
| CD4051BE, CD4052BE,<br>CD4053BE    | -55 to 125                     | 16 Ld PDIP           |
| CD4051BM, CD4051BNS                | -55 to 125                     | 16 Ld SOIC           |
| CD4051BPW, CD4052BPW,<br>CD4053BPW | -55 to 125                     | 16 Ld TSSOP          |

## Pinouts

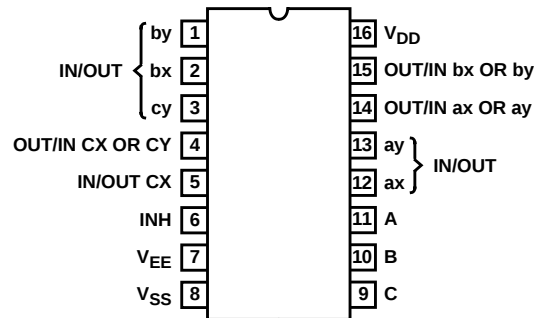
CD4051B (PDIP, CDIP, SOIC, TSSOP)  
TOP VIEW



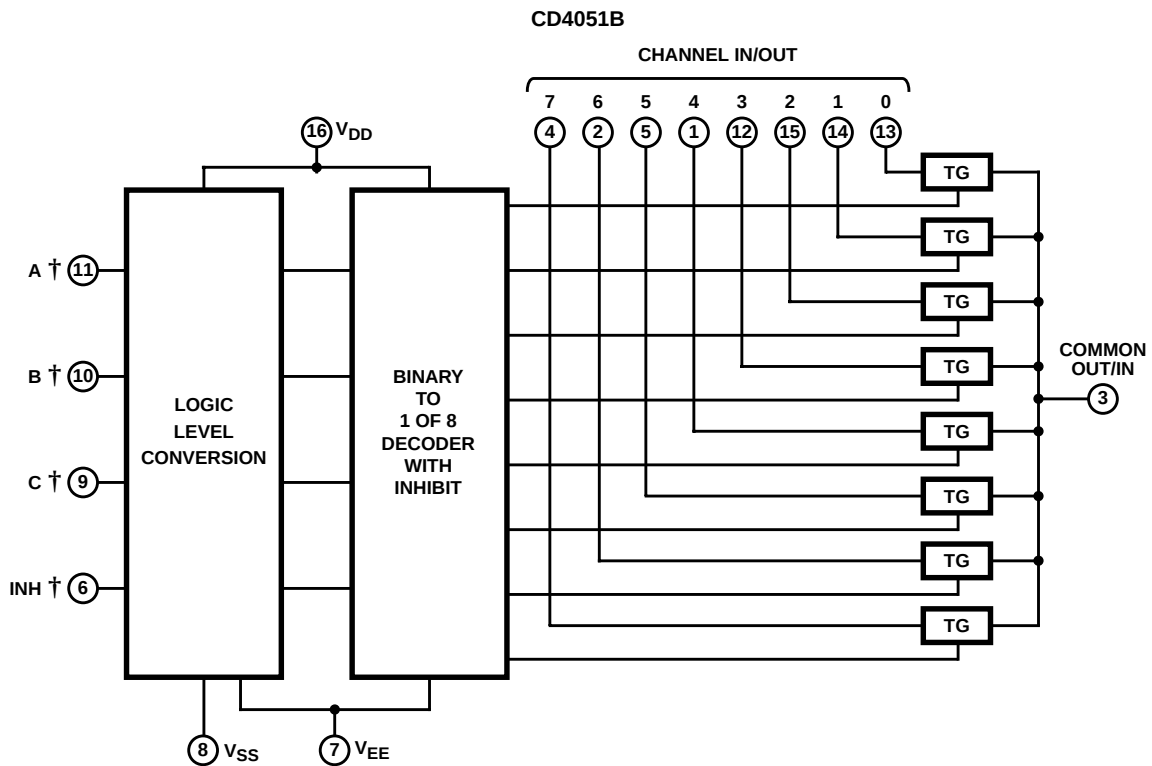
CD4052B (PDIP, CDIP, TSSOP)  
TOP VIEW



CD4053B (PDIP, CDIP, TSSOP)  
TOP VIEW

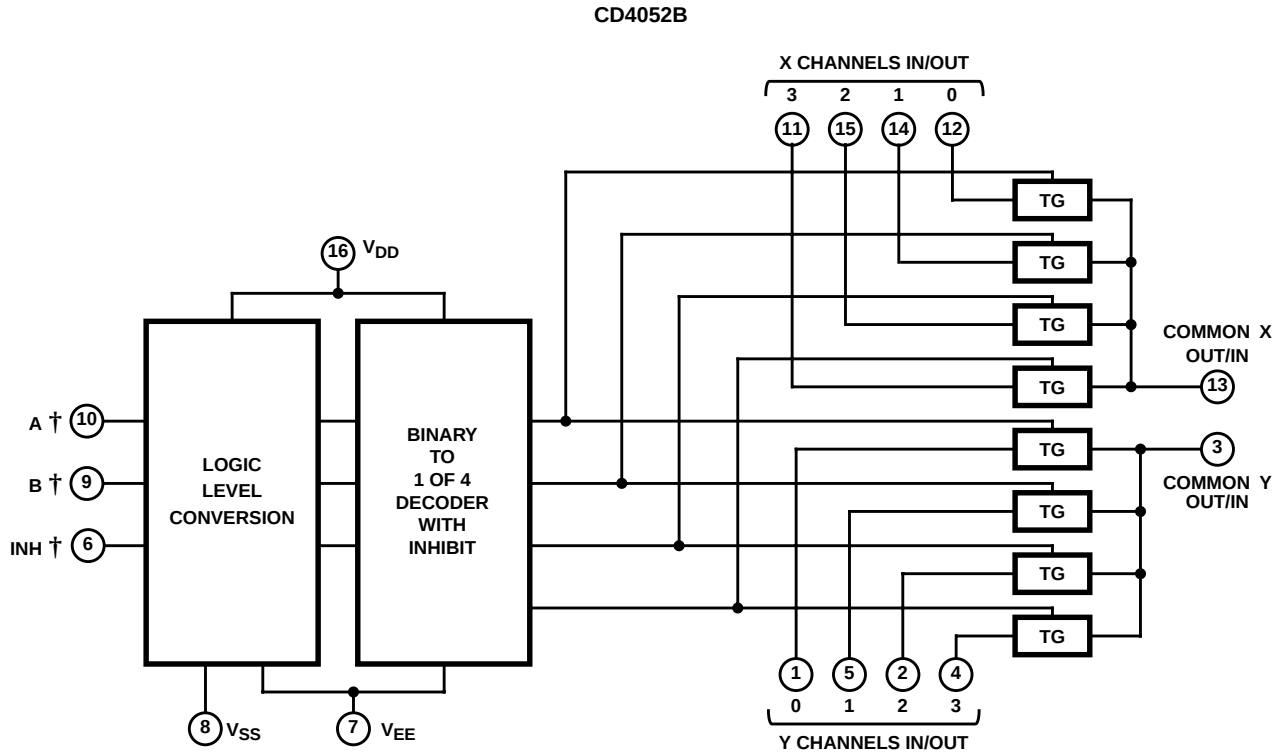


## Functional Block Diagrams



† All inputs are protected by standard CMOS protection network.

Functional Block Diagrams (Continued)



† All inputs are protected by standard CMOS protection network.

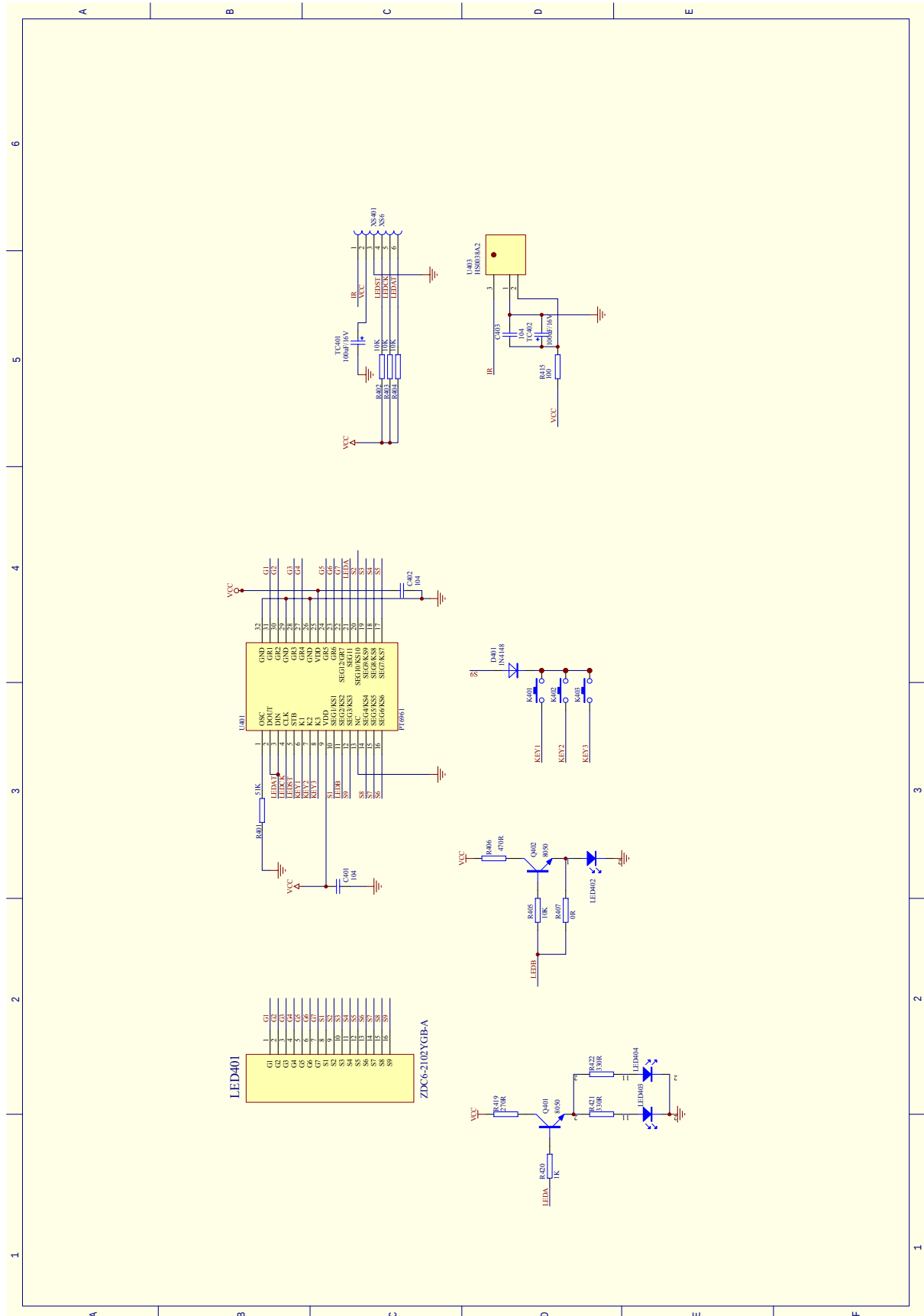
**TRUTH TABLES**

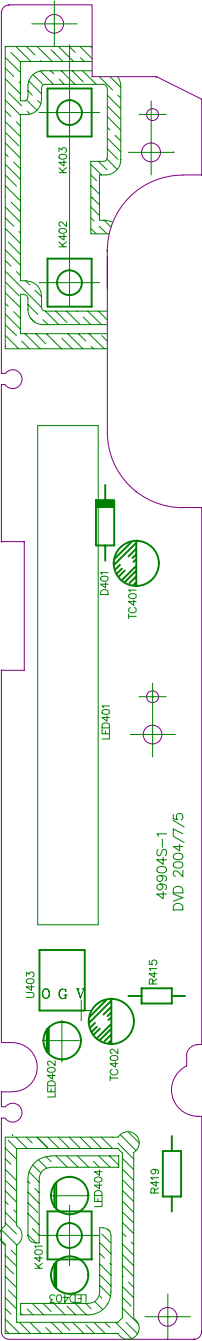
| INPUT STATES |             |   |   | “ON” CHANNEL(S) |
|--------------|-------------|---|---|-----------------|
| INHIBIT      | C           | B | A |                 |
| CD4051B      |             |   |   |                 |
| 0            | 0           | 0 | 0 | 0               |
| 0            | 0           | 0 | 1 | 1               |
| 0            | 0           | 1 | 0 | 2               |
| 0            | 0           | 1 | 1 | 3               |
| 0            | 1           | 0 | 0 | 4               |
| 0            | 1           | 0 | 1 | 5               |
| 0            | 1           | 1 | 0 | 6               |
| 0            | 1           | 1 | 1 | 7               |
| 1            | X           | X | X | None            |
| CD4052B      |             |   |   |                 |
| INHIBIT      | B           |   | A |                 |
| 0            | 0           |   | 0 | 0x, 0y          |
| 0            | 0           |   | 1 | 1x, 1y          |
| 0            | 1           |   | 0 | 2x, 2y          |
| 0            | 1           |   | 1 | 3x, 3y          |
| 1            | X           |   | X | None            |
| CD4053B      |             |   |   |                 |
| INHIBIT      | A OR B OR C |   |   |                 |
| 0            | 0           |   |   | ax or bx or cx  |
| 0            | 1           |   |   | ay or by or cy  |
| 1            | X           |   |   | None            |

X = Don't Care

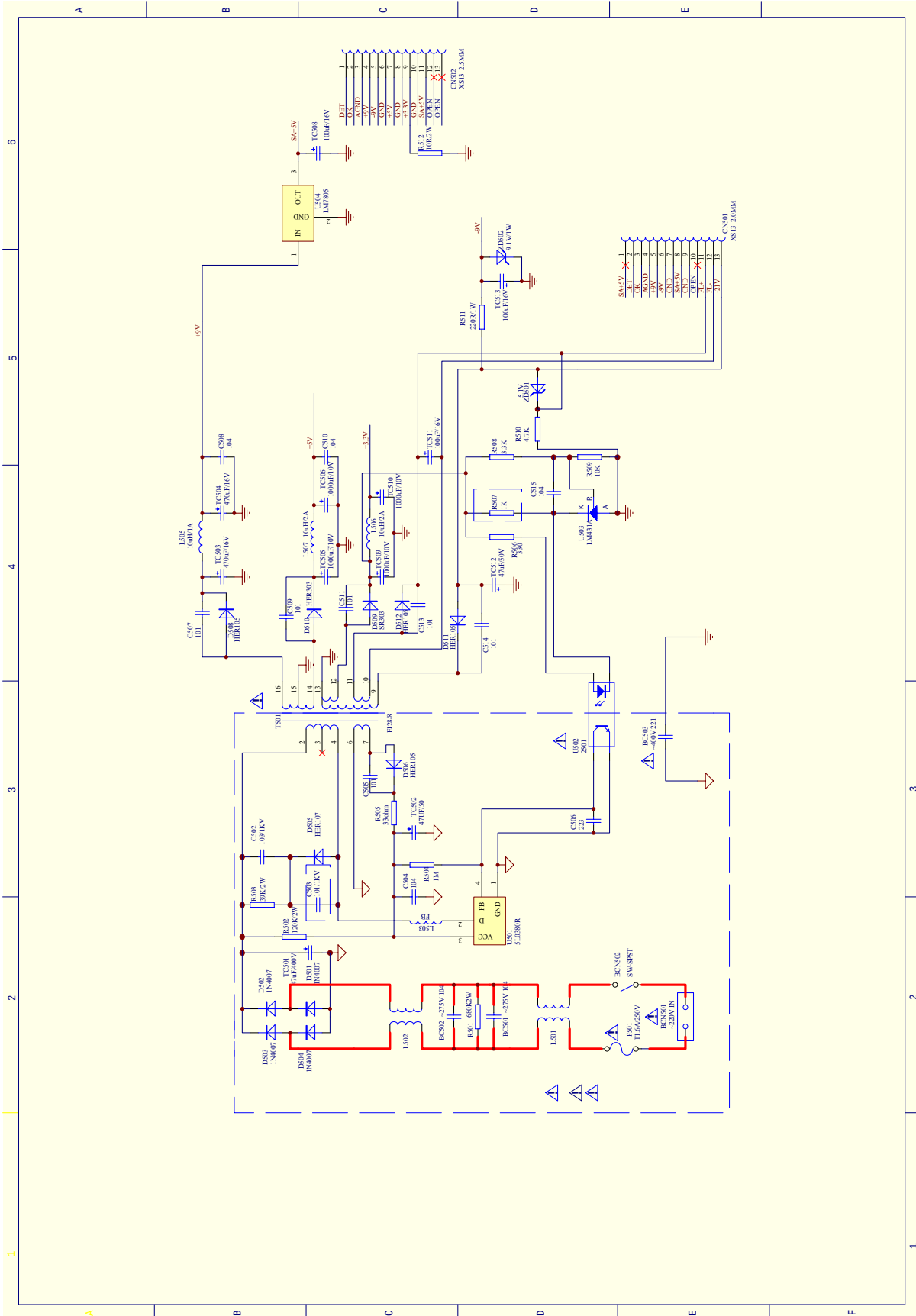
## 9. SCHEMATIC & PCB WIRING DIAGRAM

### FRONT SCHEMATIC DIAGRAM

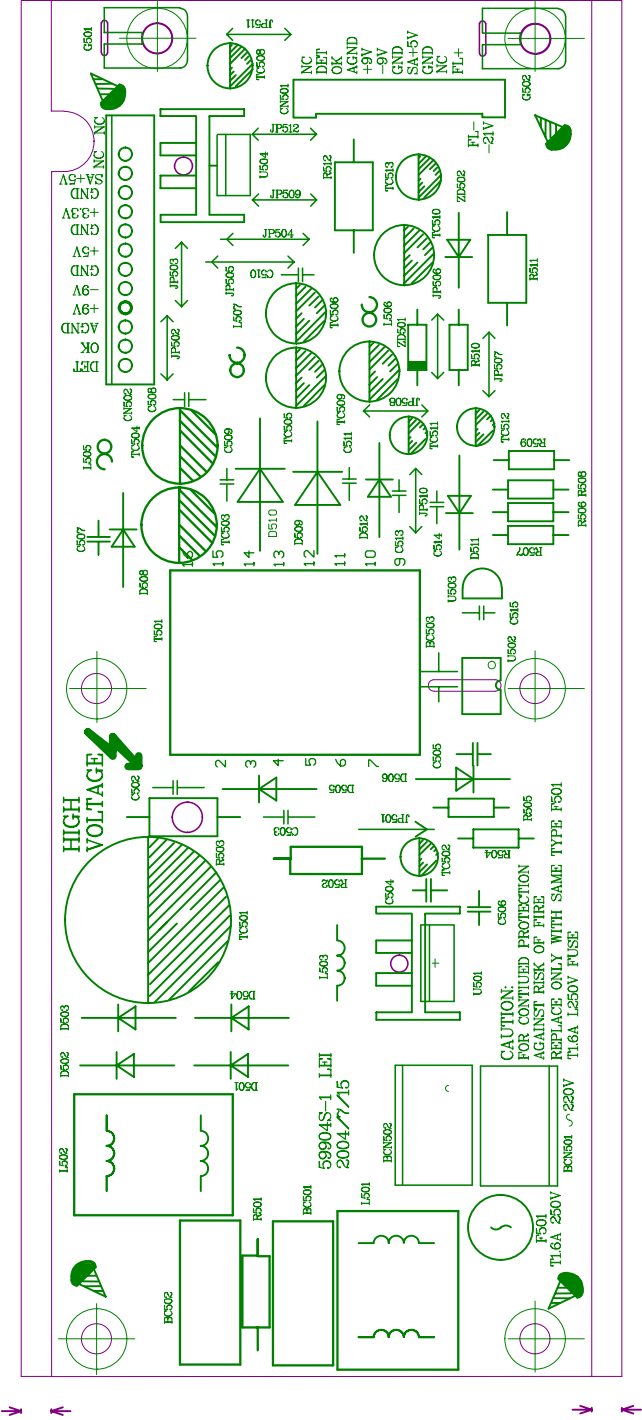




## POWER BOARD SCHEMATIC DIAGRAM



POWER BOARD SCHEMATIC DIAGRAM



1 2 3 4 5 6

A B C D E

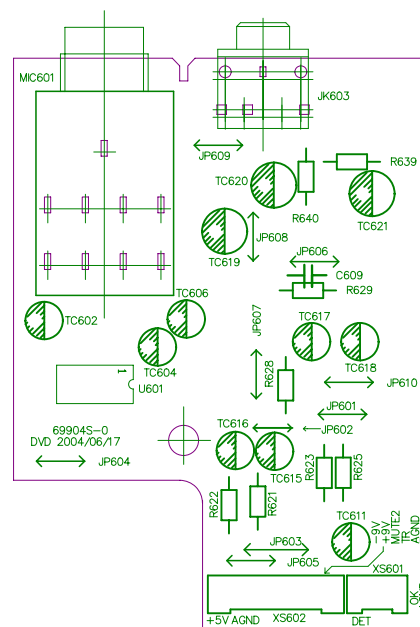
FROM MPEG BOARD

TO POWER AND AV BOARD

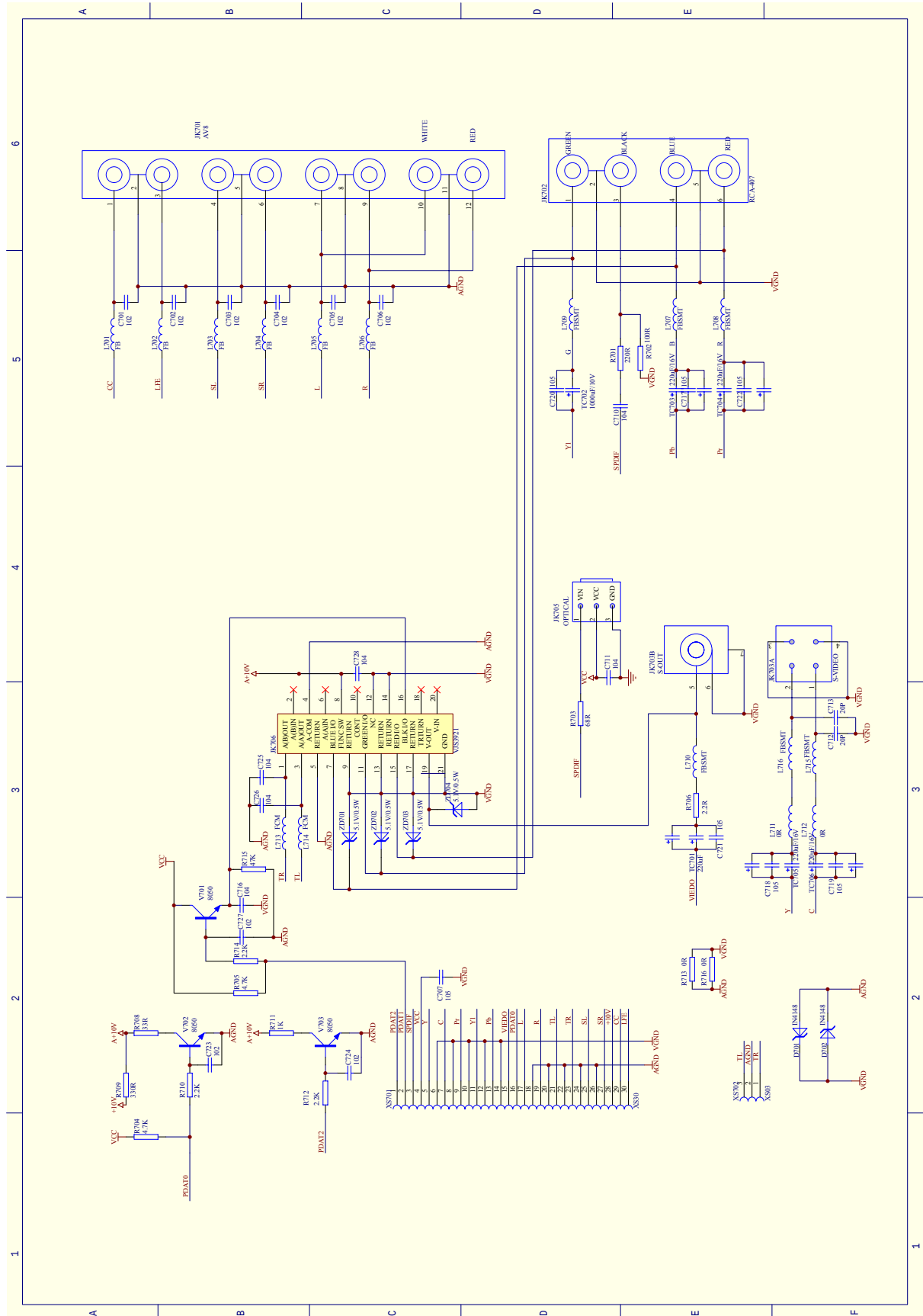
1 2 3

A B C D E F

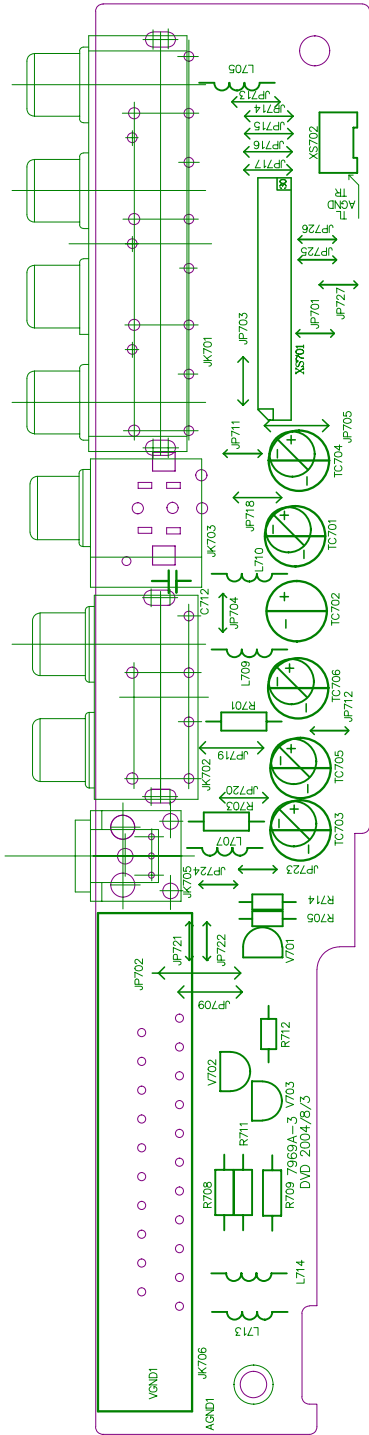
## OK SCHEMATIC DIAGRAM



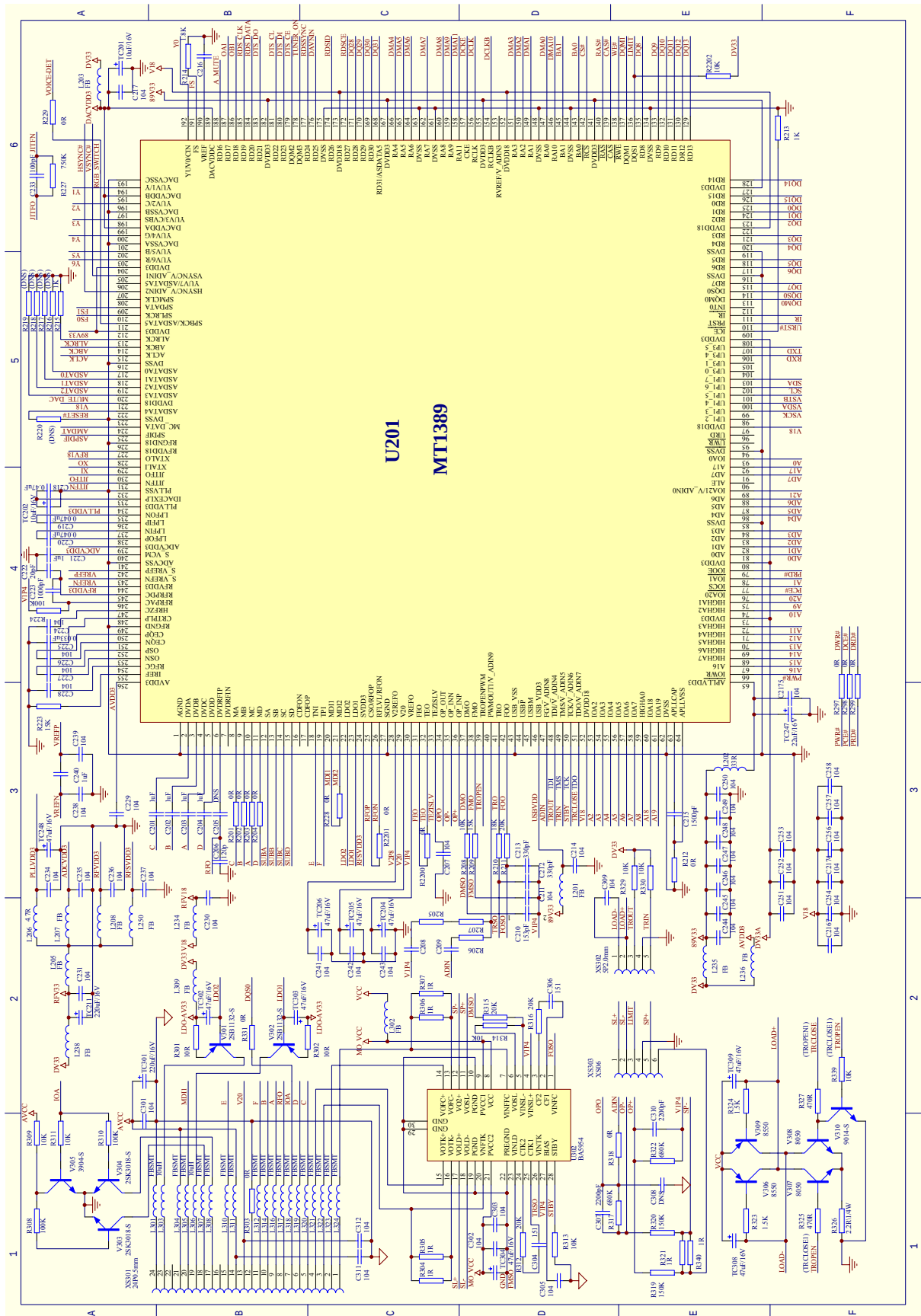
# OUTPUT BOARD SCHEMATIC DIAGRAM



OUTPUT BOARD SCHEMATIC DIAGRAM



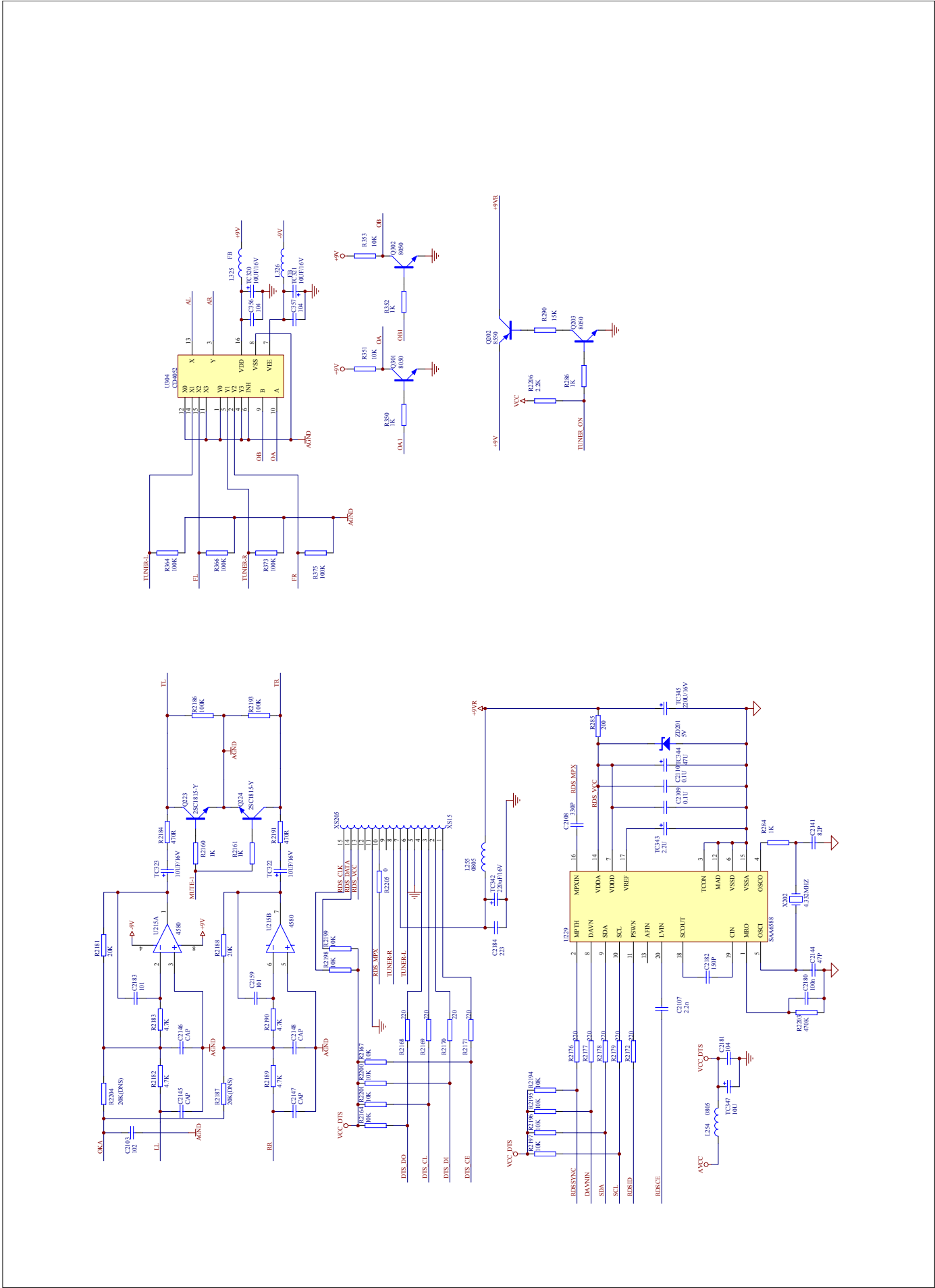
MIAN SCHEMATIC DIAGRAM



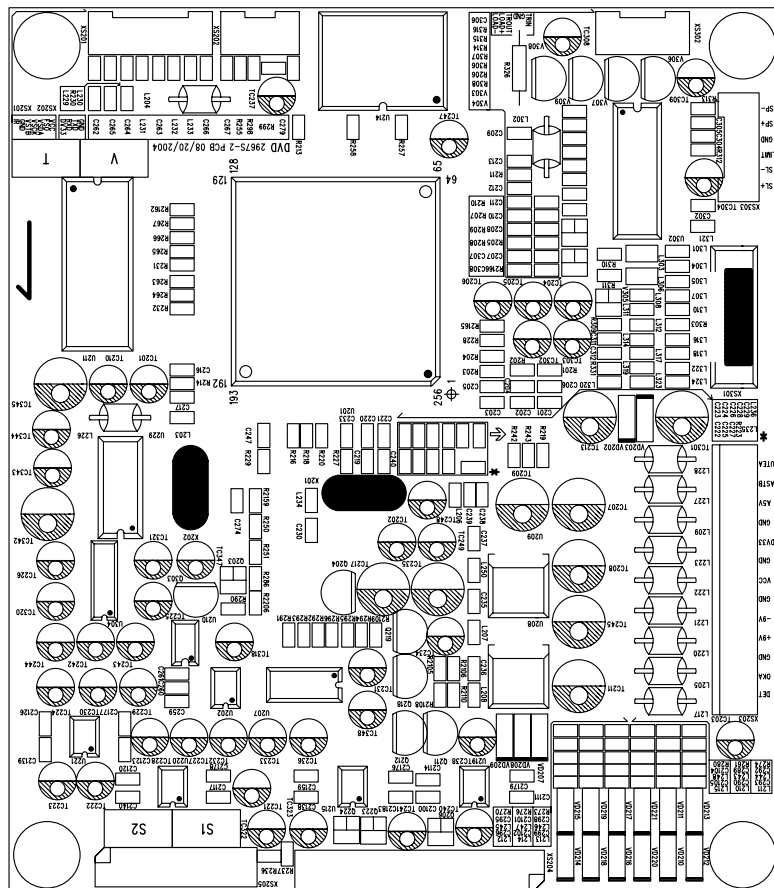
[illegible]



MIAN SCHEMATIC DIAGRAM



## MIAN SCHEMATIC DIAGRAM



# 10. SPARE PARTS LIST

DV722S MATERIAL LIST

## 1. POWER BOARD

| MATERIAL CODE | MATERIAL NAME               | SPECIFICATIONS             | UNIT | QUANTITY | LOCATION                       |
|---------------|-----------------------------|----------------------------|------|----------|--------------------------------|
| 0000273       | CARBON FILM RESISTOR        | 1/4W33Ω±5% SHAPED 10       | PCS  | 1        | R505                           |
| 0000278       | CARBON FILM RESISTOR        | 1/4W330Ω±5% SHAPED 10      | PCS  | 1        | R506                           |
| 0000294       | CARBON FILM RESISTOR        | 1/4W10K±5% SHAPED 10       | PCS  | 1        | R507                           |
| 0000289       | CARBON FILM RESISTOR        | 1/4W4.7K±5% SHAPED 10      | PCS  | 1        | R510                           |
| 0000310       | CARBON FILM RESISTOR        | 1/4W1MΩ±5% SHAPED 10       | PCS  | 1        | R504                           |
| 0010128       | METAL FILM RESISTOR         | 1/4W 3.9K ±1% SHAPED 10    | PCS  | 1        | R508                           |
| 0010101       | METAL FILM RESISTOR         | 1/4W12K±1% SHAPED 10       | PCS  | 1        | R509                           |
| 0010134       | METAL OXIDE FILM RESISTOR   | 1W330Ω±5% SHAPED R 15×8    | PCS  | 1        | R511                           |
| 0010135       | METAL OXIDE FILM RESISTOR   | 2W39K±5% SHAPED FLAT 15×9  | PCS  | 1        | R503                           |
| 0010159       | METAL OXIDE FILM RESISTOR   | 2W39K±5% SHAPED FLAT 15×7  | PCS  | 1        | R503                           |
| 0010148       | METAL OXIDE FILM RESISTOR   | 2W120K±5% SHAPED FLAT 15×7 | PCS  | 1        | R502                           |
| 0010219       | METAL OXIDE FILM RESISTOR   | 2W10Ω±5% SHAPED FLAT 15×7  | PCS  | 1        | R512                           |
| 0070001       | HIGH VOLTAGE RESISTOR       | 1/2W680K±5%                | PCS  | 1        | R501                           |
| 0200105       | PORCELAIN CAPACITOR         | 50V 100P ±10% 5mm          | PCS  | 6        | C505,C507,C509,C511,C513,C514  |
| 0200138       | PORCELAIN CAPACITOR         | 50V 104 ±20% 5mm           | PCS  | 4        | C504,C508,C510,C515            |
| 0200223       | PORCELAIN CAPACITOR         | 1000V 101 +80%-20% 7.5mm   | PCS  | 1        | C503                           |
| 0200228       | PORCELAIN CAPACITOR         | 1000V 101 ±10% 7.5mm       | PCS  | 1        | C503                           |
| 0200224       | PORCELAIN CAPACITOR         | 1000V 103 +80%-20% 7.5mm   | PCS  | 1        | C502                           |
| 0200267       | CERAMIC CAPACITOR           | CT81 250VAC221±20% 10mm    | PCS  | 1        | BC503                          |
| 0200268       | CERAMIC CAPACITOR           | CT81 250VAC221±10% 10mm    | PCS  | 1        | BC503                          |
| 0210023       | TERYLENE CAPACITOR          | 100V 223 ±10% 5mm          | PCS  | 1        | C506                           |
| 0210066       | TERYLENE CAPACITOR          | 275V 104 ±20% 15mm         | PCS  | 1        | BC502                          |
| 0210070       | TERYLENE CAPACITOR          | 275V 104 ±10% 15mm         | PCS  | 1        | BC502                          |
| 0210166       | ANTI-DISTURBANCE CAPACITOR  | MKP41 275VAC 103 ±20% 10   | PCS  | 1        | BC501                          |
| 0260557       | CD                          | CD11T 16V100u±20%6×12 2.5  | PCS  | 3        | TC508,TC511,TC513              |
| 0260558       | CD                          | CD11T 25V470u±20%10×16 5   | PCS  | 2        | TC503,TC504                    |
| 0260559       | CD                          | CD11T 50V47u±20%6×12 2.5   | PCS  | 2        | TC502,TC512                    |
| 0260560       | CD                          | CD11T 10V1000u±20%8×16 3.5 | PCS  | 4        | TC505,TC506,TC509,TC510        |
| 0260527       | CD                          | CD294 400V47U±20%22×25 10  | PCS  | 1        | TC501                          |
| 0390057       | MAGNETIC BEADS INDUCTOR     | RH354708                   | PCS  | 1        | L503                           |
| 0410010       | CHOKE COIL                  | VERTICAL 10UH 1A 5mm       | PCS  | 1        | L505                           |
| 0410011       | CHOKE COIL                  | VERTICAL 10UH 2A 5mm       | PCS  | 2        | L506,L507                      |
| 0460282       | SWITCHING POWER TRANSFORMER | BCK-28-0286                | PCS  | 1        | T501                           |
| 0460283       | SWITCHING POWER TRANSFORMER | BCK2801-624                | PCS  | 1        | T501                           |
| 0570013       | DIODE                       | HER105                     | PCS  | 4        | D506,D508,D511,D512            |
| 0570028       | DIODE                       | HER306                     | PCS  | 1        | D510                           |
| 0680007       | SCHOTTKY DIODE              | SR360                      | PCS  | 1        | D509                           |
| 0570014       | DIODE                       | HER107                     | PCS  | 1        | D505                           |
| 0580006       | VOLTAGE REGULATOR DIODE     | 5.1V 1/2W                  | PCS  | 1        | ZD501                          |
| 0580054       | VOLTAGE REGULATOR DIODE     | 9.1V 1W                    | PCS  | 1        | ZD502                          |
| 0570005       | DIODE                       | 1N4007                     | PCS  | 4        | D501~D504                      |
| 0880765       | IC                          | 5L0380R YDTU               | PCS  | 1        | U501                           |
| 0880553       | IC                          | LM431ACZ TO-92             | PCS  | 1        | U503                           |
| 0880581       | IC                          | TL431C TO-226AA(LP)        | PCS  | 1        | U503                           |
| 0880800       | IC                          | 431L TO-92                 | PCS  | 1        | U503                           |
| 0880888       | IC                          | KA431AZ TO-92              | PCS  | 1        | U503                           |
| 1000004       | POWER GRID FILTER           | UT-20 40mH ±20% 10×13      | PCS  | 2        | L501,L502                      |
| 1080011       | PHOTO-ELECTRIC COUPLER      | HS817                      | PCS  | 1        | U502                           |
| 0880379       | IC                          | LM7805 GOLD-SEALED TO-220  | PCS  | 1        | U504                           |
| 1940022       | SOCKET                      | 4P 2.0mm                   | PCS  | 1        | CN501                          |
| 1940030       | SOCKET                      | 10P 2.5mm                  | PCS  | 1        | CN502                          |
| 1940045       | SOCKET                      | 2P 8.0mm 2#                | PCS  | 2        | BCN501,BCN502                  |
| 2100004       | CONNECTION CORDS            | Φ0.6 SHAPED 10mm           | PCS  | 9        | JP501~JP503,JP506~JP510,J P511 |

|         |                            |                      |     |   |                              |
|---------|----------------------------|----------------------|-----|---|------------------------------|
| 2100006 | CONNECTION CORDS           | Φ0.6 SHAPED 12.5mm   | PCS | 2 | JP504,JP505                  |
| 2300021 | FUSE                       | T1.6AL 250V WITH PIN | PCS | 1 | F501                         |
| 3580039 | HEAT RADIATION BOARD       | 11×15×25 AB009K      | PCS | 2 | U501,U504 FOR HEAT RADIATION |
| 3580054 | HEAT RADIATION BOARD       | 11×15×25 WHITE AB905 | PCS | 2 | U501,U504 FOR HEAT RADIATION |
| 1563276 | PCB                        | 59904S-1             | PCS | 1 |                              |
| 3870115 | GROUND CHIP OF POWER BOARD | AB903                | PCS | 2 | G501,G502                    |
| 4000073 | TAPPING SCREW              | BT 3×8 BLACK         | PCS | 2 | FIX HEAT RADIATION BOARD     |
|         |                            |                      |     |   |                              |

## 2. MAIN PANEL

| MATERIAL CODE | MATERIAL NAME              | SPECIFICATIONS                                        | UNIT | QUANTITY | LOCATION                         |
|---------------|----------------------------|-------------------------------------------------------|------|----------|----------------------------------|
| 0000009       | CARBON FILM RESISTOR       | 1/6W100Ω±5%                                           | PCS  | 1        | R415                             |
| 0090023       | SMD RESISTOR               | 1/16W 10K ±5% 0603                                    | PCS  | 3        | R402~R404                        |
| 0090192       | SMD RESISTOR               | 1/16W 51K ±5% 0603                                    | PCS  | 1        | R401                             |
| 0310222       | SMD CAPACITOR              | 25V 104 ±20% X7R 0603                                 | PCS  | 3        | C401~C403                        |
| 0260206       | CD                         | CD11C 10V100U±20%5×7 2                                | PCS  | 2        | TC401,TC402                      |
| 0570006       | DIODE                      | 1N4148                                                | PCS  | 1        | D401                             |
| 1631730       | PCB                        | 49904S-1                                              | PCS  | 1        |                                  |
| 1200608       | LED SCREEN                 | ZDC6-2102YGB-A                                        | PCS  | 1        | LED401                           |
| 1200618       | LED SCREEN                 | TOS-2601BG-B29                                        | PCS  | 1        | LED401                           |
| 2360026       | IR SENSOR                  | AT138BV3 LENGTH 27mm                                  | PCS  | 1        | U403                             |
| 1340003       | LIGHT TOUCH RESTORE SWITCH | HORIZONTAL 6×6×1                                      | PCS  | 3        | K401~K403                        |
| 0881426       | IC                         | PT6961 SOP                                            | PCS  | 1        | U401                             |
| 5233992       | SOFT SPONGE SPACER         | 8×7×16.5 DOUBLE-FACED HARD                            | PCS  | 1        | 1PC FOR IR SENSOR AND MAIN PANEL |
| 2121516       | FLAT CABLE                 | 6-7P 100 2.0 2PLUG WITH L PIN THE SAME DIRECTION 6PIN | PCS  | 1        | XS401                            |
|               |                            |                                                       |      |          |                                  |

## 3.AV BOARD

| MATERIAL CODE | MATERIAL NAME               | SPECIFICATIONS                              | UNIT | QUANTITY | LOCATION                      |
|---------------|-----------------------------|---------------------------------------------|------|----------|-------------------------------|
| 0090181       | SMD RESISTOR                | 1/16W 100Ω ±5% 0603                         | PCS  | 1        | R702                          |
| 0090002       | SMD RESISTOR                | 1/16W 2.2Ω ±5% 0603                         | PCS  | 1        | R706                          |
| 0310066       | SMD CAPACITOR               | 50V 102 ±10% 0603                           | PCS  | 13       | C701~C706,C716,C723~C728      |
| 0310222       | SMD CAPACITOR               | 25V 104 ±20% X7R 0603                       | PCS  | 1        | C710                          |
| 0310207       | SMD CAPACITOR               | 50V 104 ±20% X7R 0603                       | PCS  | 1        | C710                          |
| 0310543       | SMD CAPACITOR               | 50V 104 ±10% X7R 0603                       | PCS  | 1        | C710                          |
| 0390095       | SMD MAGNETIC BEADS          | FCM1608K-221T05                             | PCS  | 8        | L701~L704,L706,L708,L715,L716 |
| 0310085       | SMD CAPACITOR               | 50V 20P ±5% NPO 0603                        | PCS  | 1        | C713                          |
| 0090019       | SMD RESISTOR                | 1/16W 4.7K ±5% 0603                         | PCS  | 1        | R704                          |
| 0090029       | SMD RESISTOR                | 1/16W 47K ±5% 0603                          | PCS  | 1        | R715                          |
| 0090017       | SMD RESISTOR                | 1/16W 2.2K ±5% 0603                         | PCS  | 1        | R710                          |
| 0310234       | SMD CAPACITOR               | 16V 105 +80%-20% 0603                       | PCS  | 2        | C707,C711                     |
| 0090001       | SMD RESISTOR                | 1/16W 0Ω ±5% 0603                           | PCS  | 8        | L711,L712,C717~C722           |
| 0700007       | SMD DIODE                   | 1N4148                                      | PCS  | 2        | D701,D702                     |
| 0700001       | SMD DIODE                   | LS4148                                      | PCS  | 2        | D701,D702                     |
| 0700002       | SMD DIODE                   | LL4148                                      | PCS  | 2        | D701,D702                     |
| 0700004       | SMD VOLTAGE REGULATOR DIODE | 5.1V 1/2W                                   | PCS  | 4        | ZD701~ZD704                   |
| 1563192       | PCB                         | 7969A-3                                     | PCS  | 1        |                               |
| 0000171       | CARBON FILM RESISTOR        | 1/4W68Ω±5%                                  | PCS  | 1        | R703                          |
| 0000181       | CARBON FILM RESISTOR        | 1/4W220Ω±5%                                 | PCS  | 1        | R701                          |
| 0000286       | CARBON FILM RESISTOR        | 1/4W2.2K±5% SHAPED 10                       | PCS  | 1        | R711                          |
| 0000132       | CARBON FILM RESISTOR        | 1/6W2.2K±5% SHAPED 7.5                      | PCS  | 2        | R712,R714                     |
| 0000436       | CARBON FILM RESISTOR        | 1/4W2K±5% SHAPED 10                         | PCS  | 1        | R709                          |
| 0000133       | CARBON FILM RESISTOR        | 1/6W4.7K±5% SHAPED 7.5                      | PCS  | 1        | R705                          |
| 0390057       | MAGNETIC BEADS INDUCTOR     | RH354708                                    | PCS  | 6        | L705,L707,L709,L710,L713,L714 |
| 1090045       | ELECTRO-OPTIC TRANSFORMER   | TX179ATW                                    | PCS  | 1        | JK705                         |
| 1090024       | ELECTRO-OPTIC TRANSFORMER   | TX179AT                                     | PCS  | 1        | JK705                         |
| 1910078       | TERMINAL SOCKET             | AV4-8.4-6G-3                                | PCS  | 1        | JK702                         |
| 1910129       | TERMINAL SOCKET             | SA-001-012 BLACK IRON PIECE SCREEN-SHIELDED | PCS  | 1        | JK703                         |
| 1910079       | TERMINAL SOCKET             | AV8-8.4-6G-3                                | PCS  | 1        | JK701                         |

|         |                      |                                               |     |    |                                         |
|---------|----------------------|-----------------------------------------------|-----|----|-----------------------------------------|
| 1940193 | CABLE SOCKET         | 15P 1.0mm DUAL LINE TOUCH POINT STRAIGHT PLUG | PCS | 1  | XS701                                   |
| 2100010 | CONNECTION CORDS     | Φ0.6 SHAPED 5mm                               | PCS | 11 | JP701,JP704,JP711~JP712,J<br>P721~JP727 |
| 2100003 | CONNECTION CORDS     | Φ0.6 SHAPED 7.5mm                             | PCS | 8  | JP703,JP713~JP718,JP720                 |
| 2100004 | CONNECTION CORDS     | Φ0.6 SHAPED 10mm                              | PCS | 3  | JP705,JP709,JP719                       |
| 2100006 | CONNECTION CORDS     | Φ0.6 SHAPED 12.5mm                            | PCS | 1  | JP702                                   |
| 1860029 | SCART SOCKET         | SCART-01                                      | PCS | 1  | JK706                                   |
| 1940026 | SOCKET               | 3P 2.0mm                                      | PCS | 1  | XS702                                   |
| 0200031 | PORCELAIN CAPACITOR  | 50V 20P ±10% NPO 5mm                          | PCS | 1  | C712                                    |
| 0780050 | TRIODE               | S8050D                                        | PCS | 3  | V701~V703                               |
| 0000167 | CARBON FILM RESISTOR | 1/4W33Ω±5%                                    | PCS | 1  | R708                                    |
|         |                      |                                               |     |    |                                         |

#### 4. OK BOARD

| MATERIAL CODE | MATERIAL NAME        | SPECIFICATIONS           | PCS | UNIT | LOCATION                 |
|---------------|----------------------|--------------------------|-----|------|--------------------------|
| 0000118       | CARBON FILM RESISTOR | 1/6W10Ω±5% SHAPED 7.5    | PCS | 2    | R621,R622                |
| 0090009       | SMD RESISTOR         | 1/16W 330Ω ±5% 0603      | PCS | 1    | R616                     |
| 0090012       | SMD RESISTOR         | 1/16W 560Ω ±5% 0603      | PCS | 1    | R604                     |
| 0090014       | SMD RESISTOR         | 1/16W 1K ±5% 0603        | PCS | 3    | R608,R611,R619           |
| 0000129       | CARBON FILM RESISTOR | 1/6W1K±5% SHAPED 7.5     | PCS | 2    | R623,R625                |
| 0090023       | SMD RESISTOR         | 1/16W 10K ±5% 0603       | PCS | 5    | R606,R620,R618,R633,R634 |
| 0090026       | SMD RESISTOR         | 1/16W 22K ±5% 0603       | PCS | 2    | R602,R610                |
| 0090034       | SMD RESISTOR         | 1/16W 100K ±5% 0603      | PCS | 2    | R615,R617                |
| 0310045       | SMD CAPACITOR        | 50V 47P ±5% NPO 0603     | PCS | 1    | C606                     |
| 0310072       | SMD CAPACITOR        | 50V 103 ±10% 0603        | PCS | 1    | C604                     |
| 0310084       | SMD CAPACITOR        | 50V 104 +80%-20% 0603    | PCS | 3    | C601,C602,C608           |
| 0310058       | SMD CAPACITOR        | 25V 104 +80%-20% 0603    | PCS | 3    | C601,C602,C608           |
| 0260094       | CD                   | CD110 16V47U±20%5×11 2   | PCS | 3    | TC611,TC615,TC616        |
| 0260025       | CD                   | CD11 16V47U±20%5×11 2    | PCS | 3    | TC611,TC615,TC616        |
| 0260200       | CD                   | CD11C 16V47U±20%5×7 2    | PCS | 3    | TC611,TC615,TC616        |
| 0260127       | CD                   | CD11 16V4.7U±20%5×11 2   | PCS | 2    | TC602,TC604              |
| 0260021       | CD                   | CD11 16V22U±20%5×11 2    | PCS | 1    | TC606                    |
| 0260037       | CD                   | CD11 25V22U±20%5×11 2    | PCS | 1    | TC606                    |
| 0390095       | SMD MAGNETIC BEADS   | FCM1608K-221T05          | PCS | 1    | L601                     |
| 0700007       | SMD DIODE            | 1N4148                   | PCS | 3    | VD601~VD603              |
| 0880124       | IC                   | NJM4558D DIP             | PCS | 1    | U601                     |
| 0880308       | IC                   | KA4558 DIP               | PCS | 1    | U601                     |
| 1980006       | MIC SOCKET           | CK3-6.35-106             | PCS | 1    | MIC601                   |
| 1940209       | SOCKET               | 7P 2.0mm RIGHT-ANGLED    | PCS | 1    | XS602                    |
| 1940216       | SOCKET               | 3P 2.0mm RIGHT-ANGLED    | PCS | 1    | XS601                    |
| 1563436       | PCB                  | 69904S-1                 | PCS | 1    |                          |
| 2100003       | CONNECTION CORDS     | Φ0.6 SHAPED 7.5mm        | PCS | 8    | JP601,JP604 ~ JP610      |
| 2100010       | CONNECTION CORDS     | Φ0.6 SHAPED 5mm          | PCS | 1    | JP602                    |
| 2100004       | CONNECTION CORDS     | Φ0.6 SHAPED 10mm         | PCS | 1    | JP603                    |
| 0000030       | CARBON FILM RESISTOR | 1/6W3.3K±5%              | PCS | 1    | R628                     |
| 0090224       | SMD RESISTOR         | 1/16W 3.9K ±5% 0603      | PCS | 4    | R627,R630~R632           |
| 0000288       | CARBON FILM RESISTOR | 1/4W3.9K±5% SHAPED 10    | PCS | 1    | R629                     |
| 0090106       | SMD RESISTOR         | 1/16W 4.7Ω ±5% 0603      | PCS | 2    | R635,R636                |
| 0260039       | CD                   | CD11 25V47U±20%5×11 2    | PCS | 2    | TC617,TC618              |
| 0260201       | CD                   | CD11C 16V100U±20%6×7 2.5 | PCS | 3    | TC619~TC621              |
| 0310207       | SMD CAPACITOR        | 50V104 ±20% 0603         | PCS | 5    | C612~C616                |
| 0200138       | PORCELAIN CAPACITOR  | 50V 104 ±20% 5mm         | PCS | 1    | C609                     |
| 0881537       | IC                   | TDA1308 SOP              | PCS | 1    | U602                     |
| 1980058       | HEADPHONE SOCKET     | 2SJ-05231N23             | PCS | 1    | JK603                    |
| 1980060       | HEADPHONE SOCKET     | 2SJ-05232N23             | PCS | 1    | JK603                    |
| 0090030       | SMD RESISTOR         | 1/16W 56K ±5% 0603       | PCS | 2    | R624,R626                |
|               |                      |                          |     |      |                          |

#### 5. DECODE BOARD

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS     | UNIT | UNIT | LOCATION                                                                                                                                                                                 |
|---------------|---------------|--------------------|------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0090001       | SMD RESISTOR  | 1/16W 0Ω ±5% 0603  | PCS  | 37   | C2119,C2128,C2131,L210~L<br>215,R201~R204,R212,R226,R<br>228,R234,R236,R245,R247,R<br>222,R251,R255,R257,R258,R<br>282,R298,R299,R303,R318,R<br>331,R2159,R297,R2205,R211<br>0,R279,R268 |
| 0090006       | SMD RESISTOR  | 1/16W 75Ω ±5% 0603 | PCS  | 7    | R233,R261,R270,R273,R274,<br>R276,R280                                                                                                                                                   |

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|---------|------------------------|--------------------------|-----|----|-------------------------------------------------------------------------------------------------------------------------------------|
| 0000375 | CARBON FILM RESISTOR   | 1/4W2.2Ω±5%              | PCS | 1  | R326                                                                                                                                |
| 0090272 | SMD RESISTOR           | 1/16W1Ω±5% 0603          | PCS | 6  | R304~R307,R321,R340                                                                                                                 |
| 0090003 | SMD RESISTOR           | 1/16W 10Ω ±5% 0603       | PCS | 2  | R301,R302                                                                                                                           |
| 0090005 | SMD RESISTOR           | 1/16W 33Ω ±5% 0603       | PCS | 16 | R231,R232,R256,R263~R267,<br>R291~R296,R2162 ,L202                                                                                  |
| 0090232 | SMD RESISTOR           | 1/16W 150Ω ±5% 0603      | PCS | 1  | R2180                                                                                                                               |
| 0090008 | SMD RESISTOR           | 1/16W 220Ω ±5% 0603      | PCS | 4  | R2168~R2171                                                                                                                         |
| 0090009 | SMD RESISTOR           | 1/16W 330Ω ±5% 0603      | PCS | 1  | R2105                                                                                                                               |
| 0090011 | SMD RESISTOR           | 1/16W 470Ω ±5% 0603      | PCS | 2  | R325,R327                                                                                                                           |
| 0090013 | SMD RESISTOR           | 1/16W 680Ω ±5% 0603      | PCS | 2  | R259,R260                                                                                                                           |
| 0090014 | SMD RESISTOR           | 1/16W 1K ±5% 0603        | PCS | 27 | L225,R213,R215,R2101,R210<br>2,R2104,R2117,R2118~R2128<br>,R254,R2184,R2160,R2161,R<br>2191,R350,R352,R286,R2109                    |
| 0090223 | SMD RESISTOR           | 1/16W 2K ±5% 0603        | PCS | 1  | R2103                                                                                                                               |
| 0090016 | SMD RESISTOR           | 1/16W 1.5K ±5% 0603      | PCS | 3  | R323,R324,R243                                                                                                                      |
| 0090249 | SMD RESISTOR           | 1/16W 510Ω ±5% 0603      | PCS | 1  | R214                                                                                                                                |
| 0090018 | SMD RESISTOR           | 1/16W 3.3K ±5% 0603      | PCS | 1  | R242                                                                                                                                |
| 0090019 | SMD RESISTOR           | 1/16W 4.7K ±5% 0603      | PCS | 21 | R238~R240,R2130,R2131,R2<br>134,R2135,R2138~R2140,R21<br>42,R2143,R2146,R2147,R215<br>0,R2151<br>,R2182,R2183,R2189,R2190,<br>R2206 |
| 0090021 | SMD RESISTOR           | 1/16W 6.8K ±5% 0603      | PCS | 8  | R2136,R2148,R2152~R2155,<br>R376,R2100                                                                                              |
| 0090023 | SMD RESISTOR           | 1/16W 10K ±5% 0603       | PCS | 20 | R208,R229,R252,R309,R311,<br>R313,R314,R329,R330,R339,<br>R2164,R2200,R2201,R2167,R<br>351,R353,R290,R2202,R2106,<br>R2108          |
| 0090024 | SMD RESISTOR           | 1/16W 15K ±5% 0603       | PCS | 2  | R209,R223                                                                                                                           |
| 0090025 | SMD RESISTOR           | 1/16W 20K ±5% 0603       | PCS | 4  | R211,R312,R315,R316                                                                                                                 |
| 0090255 | SMD RESISTOR           | 1/16W24K±5% 0603         | PCS | 8  | R2129,R2133,R2137,R2141,R<br>2145,R2149,R2181,R2188                                                                                 |
| 0090188 | SMD RESISTOR           | 1/16W 18K ±5% 0603       | PCS | 1  | R210                                                                                                                                |
| 0090029 | SMD RESISTOR           | 1/16W 47K ±5% 0603       | PCS | 1  | R289                                                                                                                                |
| 0090197 | SMD RESISTOR           | 1/16W 150K ±5% 0603      | PCS | 2  | R319,R320                                                                                                                           |
| 0090231 | PRECISION SMD RESISTOR | 1/16W 680K ±1% 0603      | PCS | 2  | R317,R322                                                                                                                           |
| 0090319 | PRECISION SMD RESISTOR | 1/16W 750K ±1% 0603      | PCS | 1  | R227                                                                                                                                |
| 0090034 | SMD RESISTOR           | 1/16W 100K ±5% 0603      | PCS | 16 | R224,R308,R310,R2111~R21<br>16,R246,R2186,R2193,R364,<br>R366,R373,R375                                                             |
| 0260019 | CD                     | CD11 16V10U±20%5×11 2    | PCS | 29 | TC201,TC202,TC217,TC221<br>~TC233,TC236,TC240,TC24<br>1,TC323,TC322,TC347,TC32<br>0,TC321,TC348,TC249,TC20<br>3,TC318,TC244         |
| 0260126 | CD                     | CD11 16V1U±20%5×11 2     | PCS | 2  | TC242,TC243                                                                                                                         |
| 0260028 | CD                     | CD11 16V220U±20%6×12 2.5 | PCS | 10 | TC207~TC209,TC211,TC213<br>,TC235,TC345,TC301,TC342<br>,TC245                                                                       |
| 0260025 | CD                     | CD11 16V47U±20%5×11 2    | PCS | 13 | TC204~TC206,TC210,TC234<br>,TC237,TC302~TC304,TC30<br>8,TC309 ,TC247,TC248                                                          |
| 0310085 | SMD CAPACITOR          | 50V 20P ±5% NPO 0603     | PCS | 1  | C222                                                                                                                                |
| 0310190 | SMD CAPACITOR          | 50V 27P ±5% NPO 0603     | PCS | 2  | C275,C276                                                                                                                           |
| 0310045 | SMD CAPACITOR          | 50V 47P ±5% NPO 0603     | PCS | 17 | C266,C289,C290,C292,C293,<br>C295,C296,C298,C299,C2101<br>,C2102,C2104,C2105,C262~C<br>265                                          |
| 0310047 | SMD CAPACITOR          | 50V 101 ±5% NPO 0603     | PCS | 10 | C233,C2111,C2114,C2117,C2<br>120,C2123,C2126,C206,C215<br>9,C2183                                                                   |
| 0310051 | SMD CAPACITOR          | 50V 331 ±5% NPO 0603     | PCS | 2  | C212,C213                                                                                                                           |
| 0310048 | SMD CAPACITOR          | 50V 151 ±5% NPO 0603     | PCS | 2  | C304,C306                                                                                                                           |

|         |                         |                       |     |    |                                                                                                                                                                                                                                                                            |
|---------|-------------------------|-----------------------|-----|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0310084 | SMD CAPACITOR           | 50V 104 +80%-20% 0603 | PCS | 83 | C207,C211,C214,C216,C217,C224,C226~C231,C234~C239,C241~C254,C256~C259,C267~C274,C279,C301~C303,C305,C309,C311,C312,C2138~C2140,C2153~C2157,C2161,C2163,C2169,C2166,C2174,C2175,C2168,C2100,C2179,C2181,C356,C357,C2164,C2171,C2167,C2176,C2177,C2178,C2150~C2152,C287,C284 |
| 0310058 | SMD CAPACITOR           | 25V 104 +80%-20% 0603 | PCS | 83 | C207,C211,C214,C216,C217,C224,C226~C231,C234~C239,C241~C254,C256~C259,C267~C274,C279,C301~C303,C305,C309,C311,C312,C2138~C2140,C2153~C2157,C2161,C2163,C2169,C2166,C2174,C2175,C2168,C2100,C2179,C2181,C356,C357,C2164,C2171,C2167,C2176,C2177,C2178,C2150~C2152,C287,C284 |
| 0310234 | SMD CAPACITOR           | 16V 105 +80%-20% 0603 | PCS | 8  | C201~C204,C221,C240,C285,C286                                                                                                                                                                                                                                              |
| 0310066 | SMD CAPACITOR           | 50V 102 ±10% 0603     | PCS | 11 | C2112,C2115,C2118,C2121,C2124,C2127,C223,C278,C2146,C2148,C288                                                                                                                                                                                                             |
| 0310231 | SMD CAPACITOR           | 50V 122 ±10% 0603     | PCS | 8  | C2122,C2129,C2130,C2133,C2135,C2136,C2145,C2147                                                                                                                                                                                                                            |
| 0310067 | SMD CAPACITOR           | 50V 152 ±10% 0603     | PCS | 1  | C215                                                                                                                                                                                                                                                                       |
| 0310068 | SMD CAPACITOR           | 50V 222 ±10% 0603     | PCS | 2  | C307,C310                                                                                                                                                                                                                                                                  |
| 0310201 | SMD CAPACITOR           | 50V 153 ±10% 0603     | PCS | 1  | C210                                                                                                                                                                                                                                                                       |
| 0310202 | SMD CAPACITOR           | 50V 223 ±10% 0603     | PCS | 1  | C2184                                                                                                                                                                                                                                                                      |
| 0310055 | SMD CAPACITOR           | 16V 333 ±10% 0603     | PCS | 1  | C225                                                                                                                                                                                                                                                                       |
| 0310056 | SMD CAPACITOR           | 16V 473 ±10% 0603     | PCS | 2  | C219,C220                                                                                                                                                                                                                                                                  |
| 0310362 | SMD CAPACITOR           | 16V474 +80%-20% 0603  | PCS | 1  | C218                                                                                                                                                                                                                                                                       |
| 0390044 | SMD INDUCTOR            | 10UH ±10% 2012        | PCS | 2  | L303,L306                                                                                                                                                                                                                                                                  |
| 0390096 | SMD INDUCTOR            | 1.8UH ±10% 1608       | PCS | 6  | L243~L248                                                                                                                                                                                                                                                                  |
| 0390057 | MAGNETIC BEADS INDUCTOR | RH354708              | PCS | 11 | L205,L209,L217,L220,L221,L222,L223,L227,L228,L226.L302                                                                                                                                                                                                                     |
| 0390095 | SMD MAGNETIC BEADS      | FCM1608K-221T05       | PCS | 39 | L201,L203,L207,L208,L224,L234~L236,L238,L250,L309,L229~L233,L301,L304,L305,L307,L308,L310~L312,L314,L316~L324,L325,L326,L327,L218,L219                                                                                                                                     |
| 0390087 | SMD MAGNETIC BEADS      | FCM2012V-221T07       | PCS | 2  | L254,L255                                                                                                                                                                                                                                                                  |
| 0090106 | SMD RESISTOR            | 1/16W 4.7Ω ±5% 0603   | PCS | 1  | L206                                                                                                                                                                                                                                                                       |
| 0700007 | SMD DIODE               | 1N4148                | PCS | 18 | VD201,VD205~VD221                                                                                                                                                                                                                                                          |
| 0700001 | SMD DIODE               | LS4148                | PCS | 18 | VD201,VD205~VD221                                                                                                                                                                                                                                                          |
| 0700002 | SMD DIODE               | LL4148                | PCS | 18 | VD201,VD205~VD221                                                                                                                                                                                                                                                          |
| 0780085 | SMD TRIODE              | 8050D                 | PCS | 3  | Q301,Q302,Q203                                                                                                                                                                                                                                                             |
| 0780029 | TRIODE                  | C8050                 | PCS | 2  | V307,V308                                                                                                                                                                                                                                                                  |
| 0780030 | TRIODE                  | 8550C                 | PCS | 3  | V306,V309,Q303                                                                                                                                                                                                                                                             |
| 0780062 | SMD TRIODE              | 9014C                 | PCS | 1  | V310                                                                                                                                                                                                                                                                       |
| 0780033 | TRIODE                  | 9015C                 | PCS | 1  | Q204                                                                                                                                                                                                                                                                       |
| 0780020 | TRIODE                  | C1815V                | PCS | 1  | Q212                                                                                                                                                                                                                                                                       |
| 0780197 | SMD TRIODE              | C1815                 | PCS | 8  | Q205~Q210,Q223,Q224                                                                                                                                                                                                                                                        |
| 0780043 | TRIODE                  | 2SA1015               | PCS | 3  | Q211,Q218,Q219                                                                                                                                                                                                                                                             |
| 0780040 | SMD TRIODE              | 3904                  | PCS | 1  | V305                                                                                                                                                                                                                                                                       |
| 0780193 | SMD TRIODE              | 2SK3018               | PCS | 2  | V303,V304                                                                                                                                                                                                                                                                  |
| 0780115 | SMD TRIODE              | 2SB1132               | PCS | 2  | V301,V302                                                                                                                                                                                                                                                                  |
| 0880185 | IC                      | NJM4558M SOP          | PCS | 4  | U219 , U220 , U221,U215                                                                                                                                                                                                                                                    |
| 0880562 | IC                      | 4580 SOP              | PCS | 4  | U219 , U220 , U221,U215                                                                                                                                                                                                                                                    |
| 0880361 | IC                      | 4558 SOP              | PCS | 4  | U219 , U220 , U221,U215                                                                                                                                                                                                                                                    |
| 0880322 | IC                      | MM74HCU04M SOP        | PCS | 1  | U205                                                                                                                                                                                                                                                                       |

|         |                    |                                               |     |   |       |
|---------|--------------------|-----------------------------------------------|-----|---|-------|
|         |                    |                                               |     |   |       |
| 0880513 | IC                 | HCU04 SOP                                     | PCS | 1 | U205  |
| 0881415 | IC                 | HY57V641620HGT-7 TSOP                         | PCS | 1 | U211  |
| 0881872 | IC                 | KSV464P4JA-70 TSOP                            | PCS | 1 | U211  |
| 881182  | IC                 | LM1117MP-ADJ SOT-223                          | PCS | 1 | U209  |
| 0881057 | IC                 | CS4360 SSOP                                   | PCS | 1 | U207  |
| 0881059 | IC                 | CS5333 SSOP                                   | PCS | 1 | U210  |
| 0881031 | IC                 | 24C02N SOP                                    | PCS | 1 | U202  |
| 0881897 | IC                 | MT1389EE QFP                                  | PCS | 1 | U201  |
| 0881994 | IC                 | MT1389FE QFP                                  | PCS | 1 | U201  |
| 0881378 | IC                 | BA5954FP HSOP                                 | PCS | 1 | U302  |
| 0881886 | IC                 | 36C7T 3MCD4052BM SOP                          | PCS | 1 | U304  |
| 0960020 | CRYSTAL OSCILLATOR | 27.00MHz 49-S                                 | PCS | 1 | X201  |
| 1940072 | CABLE SOCKET       | 6/5P 1.25mm STRAIGHT DUAL LINE PLUG           | PCS | 1 | XS205 |
| 1940193 | CABLE SOCKET       | 15P 1.0mm DUAL LINE TOUCH POINT STRAIGHT PLUG | PCS | 1 | XS204 |
| 1631529 | PCB                | 2967S-2                                       | PCS | 1 |       |
| 1940024 | SOCKET             | 5P 2.0mm                                      | PCS | 1 | XS302 |
| 1940023 | SOCKET             | 7P 2.0mm                                      | PCS | 1 | XS201 |
| 1940005 | SOCKET             | 6P 2.0mm                                      | PCS | 1 | XS303 |
| 1940171 | SOCKET             | 13P 2.5mm                                     | PCS | 1 | XS203 |
| 1940094 | CABLE SOCKET       | 24P 0.5mm SMD WITH CLASP                      | PCS | 1 | XS301 |
|         |                    |                                               |     |   |       |

## 11. APPENDIX-AM/FM Tuner Specificadtion

## AM/FM Tuner Specification

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|          |      |                   |                |
|----------|------|-------------------|----------------|
|          |      |                   | TFCFIU800A     |
| END CUST | CUST | CUST<br>MODEL NO. | ALPS MODEL NO. |

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|       |             |      |       |       |              |      |      |        |               |
|       |             |      |       |       |              |      |      |        |               |
|       |             |      |       |       | APPD         | CHKD | DSGD |        |               |
|       |             |      |       |       |              |      |      |        |               |
|       |             |      |       |       |              |      |      | TITLE  | PRODUCT       |
|       |             |      |       |       |              |      |      | TFCF1U | SPECIFICATION |
|       |             |      |       |       | DOCUMENT NO. |      |      |        |               |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. | 0/11         |      |      |        |               |

## AM/FM Tuner Specification

1.Application product P/N      TFCF1U TYPE FM/AM TUNER

1-1.Manufacturing location      Japan and People Republic of China and Malaysia

2.Specification      Customer Specification USA / CND Version

3.Test conditions

Usual standard test with next condition

Measurement shall be started to minutes after power applied

The apply voltege must be regulated +9 v  $\pm$  2%

Condition      Temperature      :5 $^{\circ}$   $\pm$  35 $^{\circ}$

Humidity      :45 $^{\circ}$   $\pm$  85 % Rh

If there is an objection to test result, they set up with next test condition

Condition      Temperature      :20 $\pm$ 2 $^{\circ}$

Humidity      :60 $^{\circ}$   $\pm$  70 % Rh

Unit:      Scale /      Tolerance

|   | Components | Materials Finish/ Specifications |   |  |   | Components | Materials Finish/ Specifications |  |  |
|---|------------|----------------------------------|---|--|---|------------|----------------------------------|--|--|
| 1 |            |                                  | 6 |  |   |            |                                  |  |  |
| 2 |            |                                  | 7 |  |   |            |                                  |  |  |
| 3 |            |                                  | 8 |  |   |            |                                  |  |  |
| 4 |            |                                  | 9 |  |   |            |                                  |  |  |
| 5 |            |                                  | 1 |  | 0 |            |                                  |  |  |

|       |             |      |       |       |       |                                                                   |  |  |
|-------|-------------|------|-------|-------|-------|-------------------------------------------------------------------|--|--|
|       |             |      |       |       | DSGD. |                                                                   |  |  |
|       |             |      |       |       |       |                                                                   |  |  |
|       |             |      |       |       | CHKD. | TITLE                      PRODUCT<br><b>TFCF1U</b> SPECIFICATION |  |  |
|       |             |      |       |       | APPD  | (1/11)                                                            |  |  |
|       |             |      |       |       |       |                                                                   |  |  |
|       |             |      |       |       |       |                                                                   |  |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                                                                   |  |  |

#### 4.General Specifications

##### 4-1.FM Tuner General Specifications

|                        |                           |
|------------------------|---------------------------|
| Frequency Range        | 87.5MHz. #108.0MHz        |
| STEP Frequency         | 50KHz/100KHz              |
| Intermediate Frequency | 10.7MHz(Upper Heterodyne) |
| Operating Temperature  | 40C20. #1 #70.            |
| ANT Input Impedance    | 75 Unbalanced             |

##### 4-2. PLL General Specifications

|                      |   |       |     |  |  |  |  |  |
|----------------------|---|-------|-----|--|--|--|--|--|
| Cutout port function |   | B01   | B02 |  |  |  |  |  |
|                      |   | FM/AM | o I |  |  |  |  |  |
| Seral date           | 0 | AM    | o I |  |  |  |  |  |
|                      | 1 | FM    | o I |  |  |  |  |  |

Crystal Frequency :75KHz

|       |             |      |       |       |       |                 |                          |  |
|-------|-------------|------|-------|-------|-------|-----------------|--------------------------|--|
|       |             |      |       |       | DSGD. |                 |                          |  |
|       |             |      |       |       |       |                 |                          |  |
|       |             |      |       |       | CHKD. | TITLE<br>TFCF1U | PRODUCT<br>SPECIFICATION |  |
|       |             |      |       |       | APPD  |                 |                          |  |
|       |             |      |       |       |       | (2/11)          |                          |  |
|       |             |      |       |       |       |                 |                          |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                 |                          |  |

### 4-3.AM Tuner General Specifications

|                        |                                                                                 |
|------------------------|---------------------------------------------------------------------------------|
| Frequency Range        | 530KHz to 1710KHz                                                               |
| STEP Frequency         | 10KHz or 9KHz                                                                   |
| Intermediate Frequency | 450KHz (Upper Heterodyne)                                                       |
| Operating Temperature  | 0°C to 70°C                                                                     |
| ANT Input Impedance    | Use Dummy antenna which specified<br>If there happened, should use loop antenna |

## 5. Mechanical specifications

|                          |                                                                 |
|--------------------------|-----------------------------------------------------------------|
| Dimensions               | See Assembly drawing                                            |
| Core torque              | 3.0 ± 30 mN·m                                                   |
| Variable Resistor Torque | 3.0 ± 30 mN·m                                                   |
| Antenna Connector        | FMJ 3 Sticker S DIN 45325/F<br>AMJ 3 SMK LPR0210-XX09 or 7 稿7ニキ |

|       |             |      |       |       |       |                      |  |  |
|-------|-------------|------|-------|-------|-------|----------------------|--|--|
|       |             |      |       |       | DSGD. |                      |  |  |
|       |             |      |       |       |       |                      |  |  |
|       |             |      |       |       | CHKD. | TITLE PRODUCT        |  |  |
|       |             |      |       |       |       | TFCF1U SPECIFICATION |  |  |
|       |             |      |       |       | APPD  |                      |  |  |
|       |             |      |       |       |       | (3/11)               |  |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                      |  |  |

#### 6-1. Terminal load connections

Specified jig should be used for measurement

Jig circuit follows 10-2

During FM measurement, use specified by IHF T-200 (200Hz,  $\pm 15$ KHz B.P.F)

Filter for audio output of filter \*Less than 200Hz  $\geq 18$ dB/act.out

\*220Hz and 15KHz  $\geq 3$ dB MIN

19KHz  $\geq 30$ dB MAX

#### 6-2. Standard connection diagram

FM section

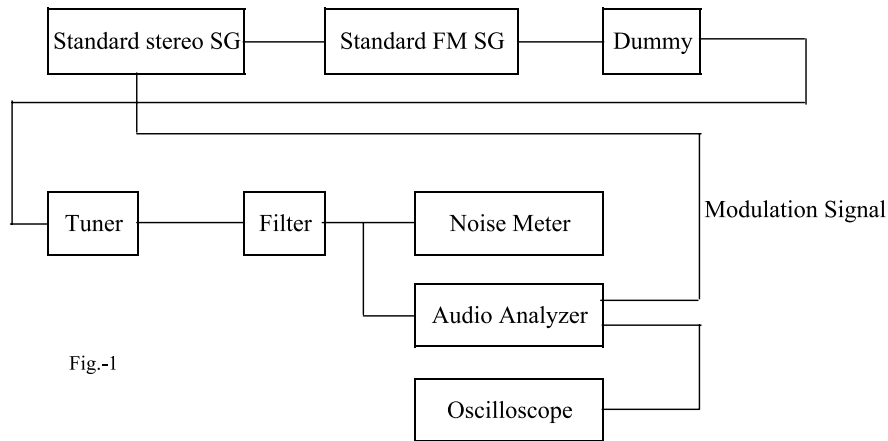


Fig.-1

|       |             |      |       |       |       |                                       |  |  |
|-------|-------------|------|-------|-------|-------|---------------------------------------|--|--|
|       |             |      |       |       | DSGD. |                                       |  |  |
|       |             |      |       |       |       |                                       |  |  |
|       |             |      |       |       | CHKD. | TITLE PRODUCT<br>TFCF1U SPECIFICATION |  |  |
|       |             |      |       |       |       |                                       |  |  |
|       |             |      |       |       | APPD  | (4/11)                                |  |  |
|       |             |      |       |       |       |                                       |  |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                                       |  |  |

### 6-3. Test Modulation

|                   |                          |                                               |
|-------------------|--------------------------|-----------------------------------------------|
| FM J MONO 1KHz    | 75.0KHz dev              | AM J 4400hz 30% mod                           |
| STEREO 1KHz L J R | 67.5KHz dev              | Use Dunmy antenna which<br>specified by ALPS. |
| PILOT             | 7.5KHz dev               | RF Input level J 94dBu (ANT Input)            |
| Antenna Input     | 757 Opened SSG-Dunmy los |                                               |
| RF Input Level    | 60dBu                    |                                               |

### 7. DC Specification

| ITEM                | TEST Condition | SPEO ケ 紹 |     |     | UNIT |
|---------------------|----------------|----------|-----|-----|------|
|                     |                | MIN      | TYP | MAX |      |
| Supply Voltage J 9v | Off Station    | 8.5      | 9   | 9.5 | V    |
| Supply Currant J 9v | Off Station    | 0.1      | 65  | 90  | mA   |

|       |             |      |       |       |       |                                       |  |  |
|-------|-------------|------|-------|-------|-------|---------------------------------------|--|--|
|       |             |      |       |       | DSGD. |                                       |  |  |
|       |             |      |       |       |       |                                       |  |  |
|       |             |      |       |       | CHKD. | TITLE PRODUCT<br>TFCF1U SPECIFICATION |  |  |
|       |             |      |       |       | APPD  |                                       |  |  |
|       |             |      |       |       |       | (5/11)                                |  |  |
|       |             |      |       |       |       |                                       |  |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                                       |  |  |

8.FM Tuner Electrical Specification (Measurement Points Unless Otherwise Stated are 87.5,98,100MHz.  
Concerning MONORAL test shall be at L out terminal)

| ITEM                          | TEST Condition       |          | SPEC 仕様 |     |     | UNIT 単位 |
|-------------------------------|----------------------|----------|---------|-----|-----|---------|
|                               |                      |          | MIN     | TYP | MAX |         |
| 50dB S/N Sensitivity          |                      | 87.5MHz  | 0.1     | 17  | 25  | dBu     |
|                               |                      | 98.0MHz  | —       | 15  | 25  |         |
|                               |                      | 106.0MHz | 0.1     | 17  | 25  |         |
| IHF Sensitivity               | Distortion 3%        | 87.5MHz  | 0.1     | 14  | 20  | dBu     |
|                               |                      | 98.0MHz  | 0.1     | 12  | 20  |         |
|                               |                      | 106.0MHz | 0.1     | 14  | 20  |         |
| Max S/N Ratio                 | MONO                 | 98.0MHz  | 65      | 72  | 0.1 | dB      |
|                               |                      | STEREO   | 98.0MHz | 60  | 67  |         |
| Distortion                    | MONO                 | 98.0MHz  | 0.1     | 0.2 | 1.5 | %       |
|                               |                      | STEREO   | 98.0MHz | 0.1 | 0.3 |         |
| Distortion with strong signal | 120dBu               | MONO     | 98.0MHz | 0.1 | 0.2 | %       |
|                               |                      | STEREO   | 98.0MHz | 0.1 | 0.3 |         |
| Audio Output Level            | L and R out          | MONO     | 98.0MHz | 0   | 3   | dBs     |
|                               |                      | STEREO   | 98.0MHz | -1  | 2   |         |
| Stereo Separation             |                      | 98.0MHz  | 25      | 40  | —   | dB      |
| Stereo Work Level             | SDCOJ 10<br>SDCTJ 10 | 98.0MHz  | 10      | 18  | 27  | dBu     |
| Tuned Level                   | SDCOJ 10<br>SDCTJ 10 | 98.0MHz  | 10      | 18  | 27  | dBu     |
| Auto Stop Level               | SDCOJ 10<br>SDCTJ 10 | 98.0MHz  | 10      | 20  | 33  | dBu     |

|       |             |      |       |       |       |                                       |  |        |
|-------|-------------|------|-------|-------|-------|---------------------------------------|--|--------|
|       |             |      |       |       | DSGD. |                                       |  |        |
|       |             |      |       |       | CHKD. | TITLE PRODUCT<br>TFCF1U SPECIFICATION |  |        |
|       |             |      |       |       | APPD  |                                       |  |        |
|       |             |      |       |       |       |                                       |  | (6/11) |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                                       |  |        |

| ITEM                         | TEST Condition                  |         | SPEC 仕様 |     |     | UNIT 単位 |
|------------------------------|---------------------------------|---------|---------|-----|-----|---------|
|                              |                                 |         | MIN     | TYP | MAX |         |
| Image Rejection              | MONO                            | 98.0MHz | 17      | 23  | —   | dB      |
| Carrier Leak                 |                                 | 98.0MHz | 28      | 33  | —   | dB      |
| Emphasis                     | -12.29<br>IHF Filter Off        | 98.0MHz | -3      | 0   | 3   | dB      |
| Pilot Margin                 |                                 | 98.0MHz | 4       | 10  | —   | dB      |
| Adjacent Channel Selectivity | ±400KHz                         | 98.0MHz | 20      | 30  | —   | dB      |
| AM Rejection                 |                                 | 98.0MHz | 40      | 60  | —   | dB      |
| I.F. Rejection               |                                 | 98.0MHz | 60      | 90  | —   | dB      |
| Spurious Response Ratio      |                                 | 98.0MHz | 40      | 50  | —   | dB      |
| Spurious Radiation           | Meat FOC Requirements<br>Note1. |         | 3       | 10  | —   | dB      |
| Antenna Leakage              | Meat FOC Requirements<br>Note1. |         | 3       | 8   | —   | dB      |

Note1. Spurious Radiation and Antenna Leakage : Use Radio Set Provided by CUSTOMER

|       |             |      |       |       |       |                        |               |  |
|-------|-------------|------|-------|-------|-------|------------------------|---------------|--|
|       |             |      |       |       | DSGD. |                        |               |  |
|       |             |      |       |       |       |                        |               |  |
|       |             |      |       |       | CHKD. | TITLE<br><b>TFCF1U</b> | PRODUCT       |  |
|       |             |      |       |       | APPD  |                        | SPECIFICATION |  |
|       |             |      |       |       |       | (7/11)                 |               |  |
|       |             |      |       |       |       |                        |               |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                        |               |  |

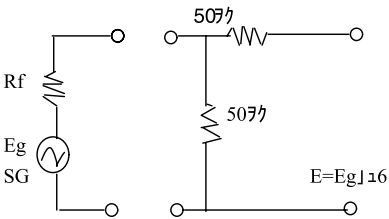
9.AM Tuner Electrical Specification (Test shall be at L out Terminal)

| ITEM                          | TEST Condition           |         | SPEC 仕様 |     |      | UNIT 単位 |
|-------------------------------|--------------------------|---------|---------|-----|------|---------|
|                               |                          |         | MIN     | TYP | MAX  |         |
| S/N 20dB Sensitivity          |                          | 620KHz  | —       | 54  | 61   | dBu     |
|                               |                          | 1050KHz | —       | 48  | 57   |         |
|                               |                          | 1490KHz | —       | 48  | 56   |         |
| Max S/N                       |                          | 1050KHz | 43      | 54  | —    | dB      |
| Distortion                    |                          | 1050KHz | —       | 1.3 | 2.5  | %       |
| Distortion with Strong Signal | 104dBu<br>RF Input Level | 1050KHz | —       | 1.3 | 2.5  | %       |
| Audio Output Level            | L.R OUT                  | 1050KHz | -11     | -7  | —    | dBs     |
| One Signal Selectivity        | ±10KHz                   | 1050KHz | 18      | 27  | —    | dB      |
| Image Rejection               |                          | 1050KHz | 30      | 36  | —    | dB      |
| I.F. Rejection                |                          | 1050KHz | 45      | 55  | —    | dB      |
| AGC Form                      |                          | 1050KHz | 44      | 50  | —    | dB      |
| Audio Frequency Response      | O Point 400Hz            | 100Hz   | 1050KHz | -10 | -5.5 | dB      |
|                               | Ref 10400Hz              | 4KHz    | 1050KHz | -22 | -16  |         |
| Auto stop level               |                          | 1050KHz | —       | 50  | 66   | dBu     |
| Tuned Level                   |                          | 1050KHz | —       | 52  | 61   | dBu     |

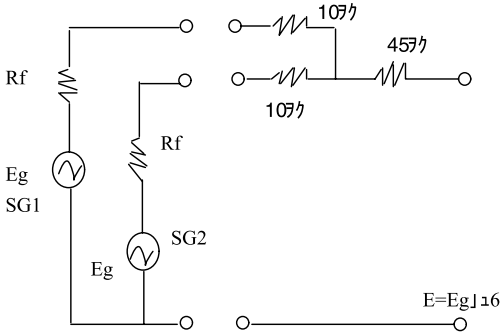
|       |             |      |       |       |       |                        |                          |  |
|-------|-------------|------|-------|-------|-------|------------------------|--------------------------|--|
|       |             |      |       |       | DSGD. |                        |                          |  |
|       |             |      |       |       |       |                        |                          |  |
|       |             |      |       |       | CHKD. | TITLE<br><b>TFCF1U</b> | PRODUCT<br>SPECIFICATION |  |
|       |             |      |       |       | APPD  |                        |                          |  |
|       |             |      |       |       |       | (8/11)                 |                          |  |
|       |             |      |       |       |       |                        |                          |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                        |                          |  |

10-1.ANT PAD

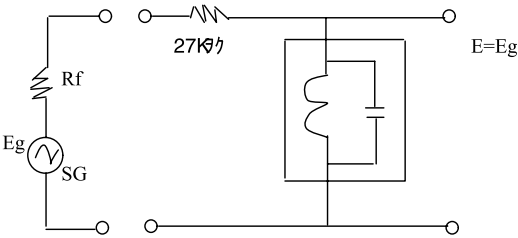
(1).FM1 SIGNAL



(2).FM2 SIGNAL



(3).AM1 SIGNAL



Trans mand TOKO  
(L=15.2uH , C=30PF)

ANT Input Signal Voltage is Open Voltage ON SSG

NOTE] Use Test jig which specified

$R_f = 50\Omega$

|       |             |      |       |       |       |                                       |  |        |
|-------|-------------|------|-------|-------|-------|---------------------------------------|--|--------|
|       |             |      |       |       | DSGD. |                                       |  |        |
|       |             |      |       |       | CHKD. | TITLE PRODUCT<br>TFCF1U SPECIFICATION |  |        |
|       |             |      |       |       | APPD  |                                       |  |        |
|       |             |      |       |       |       |                                       |  | (9/11) |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                                       |  |        |

# 11. Printed-Wiring Board Material

| ITEM                | Contents                 |                          |                          |
|---------------------|--------------------------|--------------------------|--------------------------|
| Material Supplier   | Hitachi Chemical CO.,LTD | Hitachi Chemical CO.,LTD | Hitachi Chemical CO.,LTD |
| Trade Name          | MCL - 437F               | MCL - 437F               | MCL - 437F               |
| UL Grade            | 94V - 0                  | 94V - 0                  | 94V - 0                  |
| Edging Supplier     | NIPPON ELEC Co.,LTD      | NIPPON ELEC Co.,LTD      | PNE PCB LTD.             |
| UL Type Designation | NE 49S△                  | NE M PF2△                | PNE - 1B                 |
| UL File NO.         | E41166 (S)               | E41166 (S)               | E67640                   |

|                     |                                            |                                               |
|---------------------|--------------------------------------------|-----------------------------------------------|
| Material Supplier   | SUZHOU Matsushita Electric Work Co.,LTD    | Suzhou Matsushita Electric Work Co.,LTD       |
| Trade Name          | R8700                                      | R8700                                         |
| UL Grade            | 94V - 0                                    | 94V - 0                                       |
| Etching Supplier    | Yamanashi Matsushita Electric Work Co.,LTD | Suzhou Matsushita Electric Works(PWB) Co.,LTD |
| UL Type Designation | NTP-N870A-T<br>YMEW-N870A-T                | SMEW-N870A-T                                  |
| UL File NO.         | E107496 (S)                                | E164387 (S)                                   |

|                                    |         |
|------------------------------------|---------|
| Dimension of<br>Print-Wiring Board | 56 × 49 |
|------------------------------------|---------|

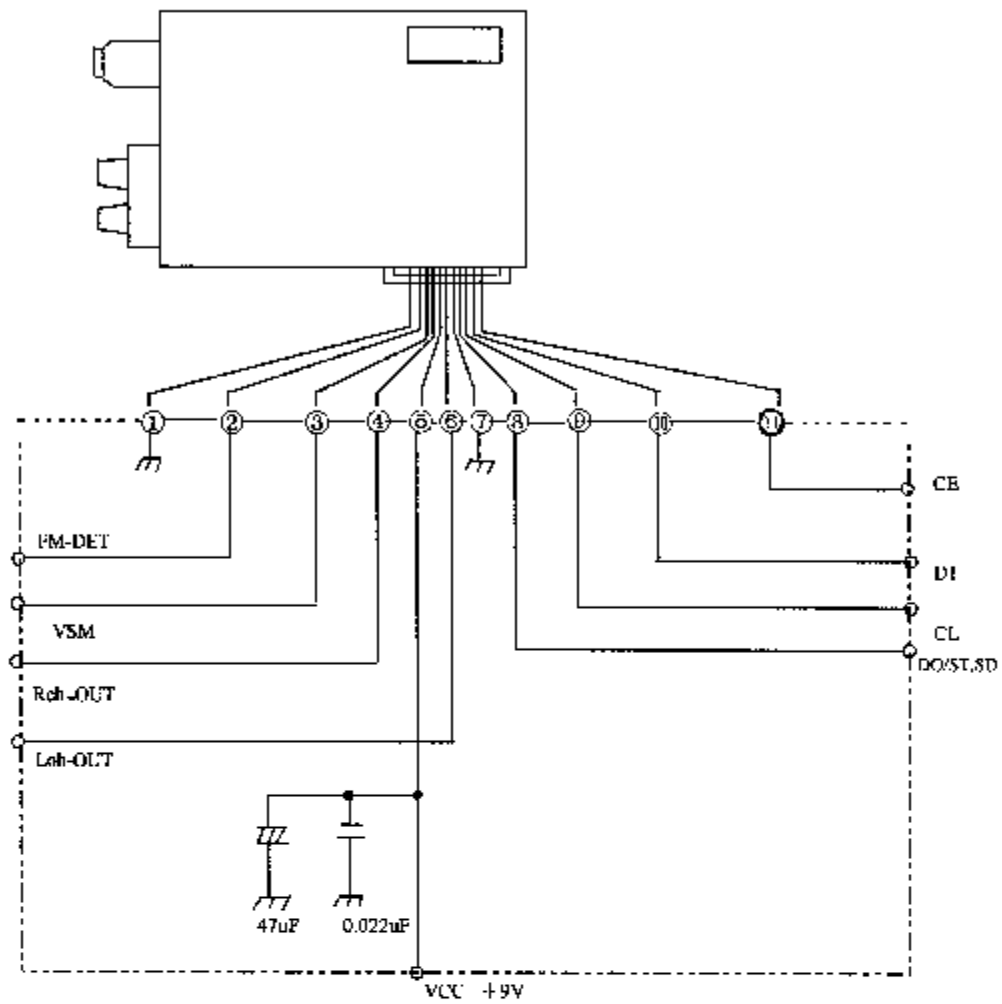
|       |             |      |       |       |       |                                            |  |        |
|-------|-------------|------|-------|-------|-------|--------------------------------------------|--|--------|
|       |             |      |       |       | DSGD. |                                            |  |        |
|       |             |      |       |       | CHKD. | TITLE      PRODUCT<br>TFCF1U SPECIFICATION |  |        |
|       |             |      |       |       | APPD  |                                            |  |        |
|       |             |      |       |       |       |                                            |  | (11/E) |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                                            |  |        |

Description of DI control Data

| No. | Control block data                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Related data              |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
|-----|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------|-----|------------------------|------------------------|---|---|----|--------------|---------------------|---|---|----|--------------|-----------|---|---|----|-----------|-----------|-----|-----|-------|---------------------------|----|---|------|--------------|---|------|------|------------|---|---|------|--------------|---|---|---|-------|---|---|---|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|------------------------------|---|---|---|---|-------------|--|
| (1) | Programmable divider data<br><br>P0 to P15<br>DVS,SNS | <ul style="list-style-type: none"><li>Data to set the dividing number of programmable divider<br/>Binary value with P15 assumed to be MSB. LSB varies according to DVS and SNS.<br/>(*: don't care)</li></ul> <table><tr><th>DVS</th><th>SNS</th><th>LSB</th><th>set dividing number(N)</th><th>actual dividing number</th></tr><tr><td>1</td><td>*</td><td>P0</td><td>272 to 65535</td><td>Twice the set value</td></tr><tr><td>0</td><td>1</td><td>P0</td><td>272 to 65535</td><td>Set value</td></tr><tr><td>0</td><td>0</td><td>P4</td><td>4 to 4095</td><td>Set value</td></tr></table> <ul style="list-style-type: none"><li>P0 to P3 invalid when LSB:P4</li><li>To select the signal input (FMIN, AMIN) to the programmable divider and to change the input frequency range.<br/>(*: don't care)</li></ul> <table><tr><th>DVS</th><th>SNS</th><th>Input</th><th>Operation frequency range</th></tr><tr><td>1</td><td>*</td><td>FMIN</td><td>10 to 160MHz</td></tr><tr><td>0</td><td>1</td><td>AMIN</td><td>2 to 40MHz</td></tr><tr><td>0</td><td>0</td><td>AMIN</td><td>0.5 to 10MHz</td></tr></table>                                                                                                                                                                                                                                                                                                                                                               | DVS                       | SNS                          | LSB | set dividing number(N) | actual dividing number | 1 | * | P0 | 272 to 65535 | Twice the set value | 0 | 1 | P0 | 272 to 65535 | Set value | 0 | 0 | P4 | 4 to 4095 | Set value | DVS | SNS | Input | Operation frequency range | 1  | * | FMIN | 10 to 160MHz | 0 | 1    | AMIN | 2 to 40MHz | 0 | 0 | AMIN | 0.5 to 10MHz |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| DVS | SNS                                                   | LSB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | set dividing number(N)    | actual dividing number       |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | *                                                     | P0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 272 to 65535              | Twice the set value          |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                     | P0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 272 to 65535              | Set value                    |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                     | P4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4 to 4095                 | Set value                    |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| DVS | SNS                                                   | Input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Operation frequency range |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | *                                                     | FMIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10 to 160MHz              |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                     | AMIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 to 40MHz                |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                     | AMIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.5 to 10MHz              |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| (2) | Reference divider data<br><br>R0 to R3                | <ul style="list-style-type: none"><li>Reference frequency (fref) selection data</li></ul> <table><tr><th>R3</th><th>R2</th><th>R1</th><th>R0</th><th>Reference frequency</th></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>25 kHz</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>25</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td><td>25</td></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>25</td></tr><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>12.5</td></tr><tr><td>0</td><td>1</td><td>0</td><td>1</td><td>6.25</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>3.125</td></tr><tr><td>0</td><td>1</td><td>1</td><td>1</td><td>3.125</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>5</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>5</td></tr><tr><td>1</td><td>0</td><td>1</td><td>0</td><td>5</td></tr><tr><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td><td>0</td><td>3</td></tr><tr><td>1</td><td>1</td><td>0</td><td>1</td><td>15</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>PLL INHIBIT + X'tal OSC STOP</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>PLL INHIBIT</td></tr></table> <ul style="list-style-type: none"><li>PLL INHIBIT</li><li>The programmable divider and IF counter stop, with FMIN,AMIN, and IFIN inputs being in the pull-down condition (GND), and the charge pump has the high impedance.</li></ul> | R3                        | R2                           | R1  | R0                     | Reference frequency    | 0 | 0 | 0  | 0            | 25 kHz              | 0 | 0 | 0  | 1            | 25        | 0 | 0 | 1  | 0         | 25        | 0   | 0   | 1     | 1                         | 25 | 0 | 1    | 0            | 0 | 12.5 | 0    | 1          | 0 | 1 | 6.25 | 0            | 1 | 1 | 0 | 3.125 | 0 | 1 | 1 | 1 | 3.125 | 1 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 1 | 5 | 1 | 0 | 1 | 0 | 5 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 15 | 1 | 1 | 1 | 0 | PLL INHIBIT + X'tal OSC STOP | 1 | 1 | 1 | 1 | PLL INHIBIT |  |
| R3  | R2                                                    | R1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | R0                        | Reference frequency          |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | 25 kHz                       |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | 25                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | 25                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | 25                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | 12.5                         |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | 6.25                         |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | 3.125                        |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | 3.125                        |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | 5                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | 5                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | 5                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | 1                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | 3                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | 15                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0                         | PLL INHIBIT + X'tal OSC STOP |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                         | PLL INHIBIT                  |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |

# 10-2. TEST JIG

NOTE: Use Test jig which specified

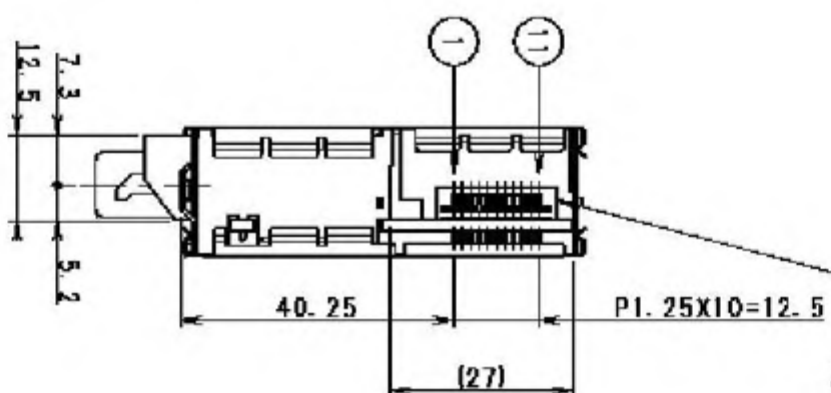
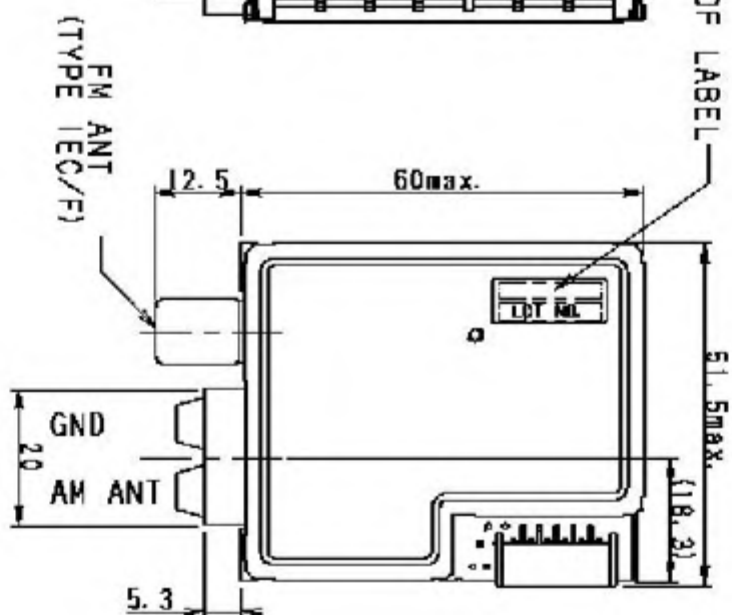
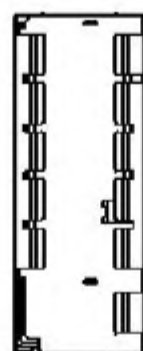


|       |              |      |       |       |       |                      |         |  |
|-------|--------------|------|-------|-------|-------|----------------------|---------|--|
|       |              |      |       |       | DSGD. |                      |         |  |
|       |              |      |       |       | CHKD. |                      |         |  |
|       |              |      |       |       | APPD  | TITLE                | PRODUCT |  |
|       |              |      |       |       |       | TECFIU SPECIFICATION |         |  |
|       |              |      |       |       |       | (10/11)              |         |  |
| SYNR. | DATE CR. NO. | APPD | CHKD. | DSGD. |       |                      |         |  |

## 11. Printed-Wiring Board Material

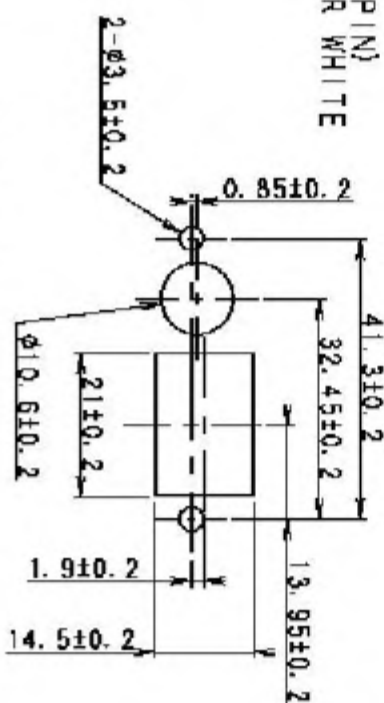
| ITEM                            | Contents                                  |                                               |                          |
|---------------------------------|-------------------------------------------|-----------------------------------------------|--------------------------|
| Material Suppliar               | Hitachi Chemical CO.,LTD                  | Hitachi Chemical CO.,LTD                      | Hitachi Chemical CO.,LTD |
| Trade Name                      | MCL J1 437F                               | MCL J1 437F                                   | MCL J1 437F              |
| UL Grade                        | 94V J1 0                                  | 94V J1 0                                      | 94V J1 0                 |
| Edging Supplier                 | NIPPON ELEC Co.,LTD                       | NIPPON ELEC Co.,LTD                           | PNE PCB LTD.             |
| UL Type Designation             | NE 49S。                                   | NE M PF2。                                     | PNE J1 1B                |
| UL File NO.                     | E41166 (S)                                | E41166 (S)                                    | E67640                   |
| Material Suppliar               | SUZHOU Matsushita Electric Work Co.,LTD   | Suzhou Matsushita Electric Work Co.,LTD       |                          |
| Trade Name                      | R8700                                     | R8700                                         |                          |
| UL Grade                        | 94V J1 0                                  | 94V J1 0                                      |                          |
| Etching Supplier                | Yamanashi Matsushita Elactic Work Co.,LTD | Suzhou Matsushita Electric Works(PWB) Co.,LTD |                          |
| UL Type Designation             | NTPJ1N870AJ1T<br>YMEWJ1N870AJ1T           | SMEWJ1N870AJ1T                                |                          |
| UL File NO.                     | E107496 (S)                               | E164387 (S)                                   |                          |
| Dimension of Print-Wiring Board | 56 × 49                                   |                                               |                          |

|       |             |      |       |       |       |                      |         |  |
|-------|-------------|------|-------|-------|-------|----------------------|---------|--|
|       |             |      |       |       | DSGD. |                      |         |  |
|       |             |      |       |       | CHKD. |                      |         |  |
|       |             |      |       |       |       | TITLE                | PRODUCT |  |
|       |             |      |       |       | APPD  | TFCF1U SPECIFICATION |         |  |
|       |             |      |       |       |       | (11/E)               |         |  |
|       |             |      |       |       |       |                      |         |  |
| SYNB. | DATE CR NO. | APPD | CHKD. | DSGD. |       |                      |         |  |



FCC CONNECTOR (11 PIN)  
\*COLOR IS BRACK OR WHITE

RECOMMENDED MOUNTING HOLE (REFERENCE ONLY)



NOTE 1. TOLERANCES ARE  $\pm 0.5\text{mm}$ .

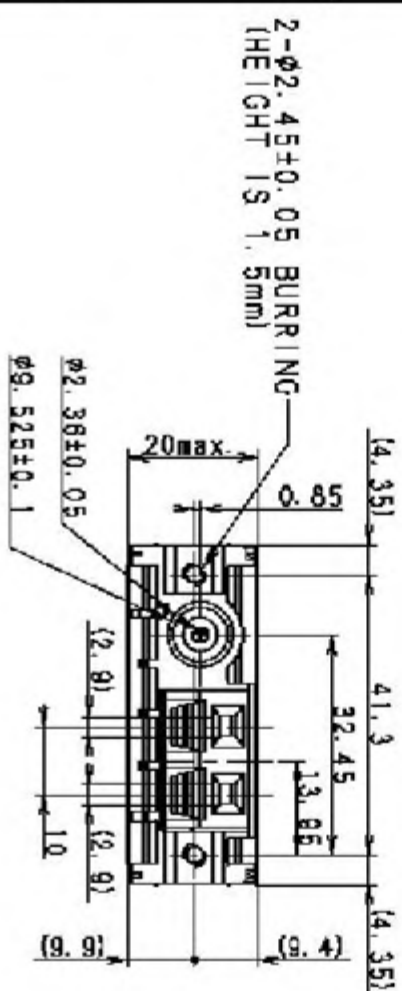
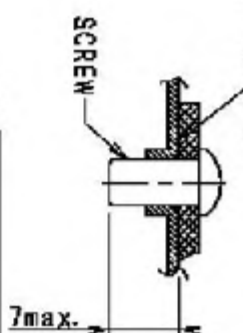
UNLESS OTHERWISE SPECIFIED.

2. ALPS CAN ALTER COVER HOLE DESIGN

WITHOUT NOTICE IF NO ELECTRICAL DEGRADATION.

3. SCREW LENGTH FROM MOUNTING FACE IS 8mm MAX.

MOUNTING FACE



2- $\phi 2.45 \pm 0.05$  BURNING  
(HEIGHT IS 1.5mm)

| PART NO.                                | NAME                | MATERIAL | SPEC. | FINISH |
|-----------------------------------------|---------------------|----------|-------|--------|
| C-5 B1                                  | 89.9.02M.K.Y.S.J.K  |          |       |        |
| D-1 A1                                  | K020108 H.Q.Y.S.J.K |          |       |        |
| ZONE SYN. DATE OR NO. APPD. CHKD. DESG. |                     |          |       |        |

PRESENTATION OF LABEL CUST PARTS NO. ALPS MODEL NO.

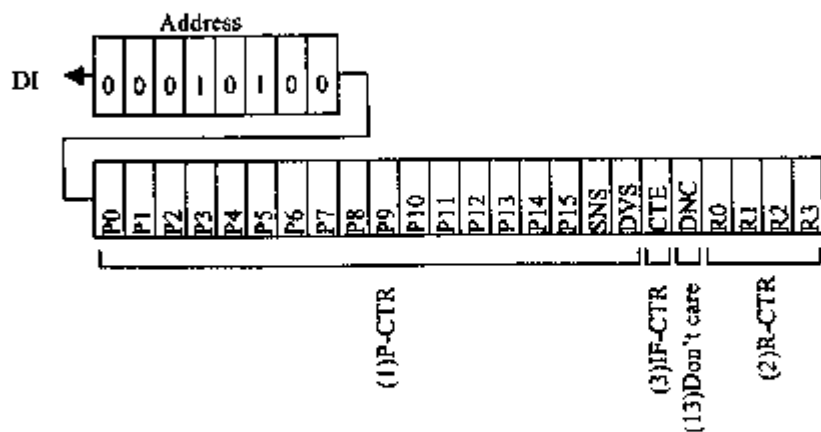
TFCF1U

| DRG.  | SCALE | TITLE                  |
|-------|-------|------------------------|
| CHKD. | 1:1   | TFCF1 ASSEMBLY DRAWING |
| UNIT  | MM    |                        |

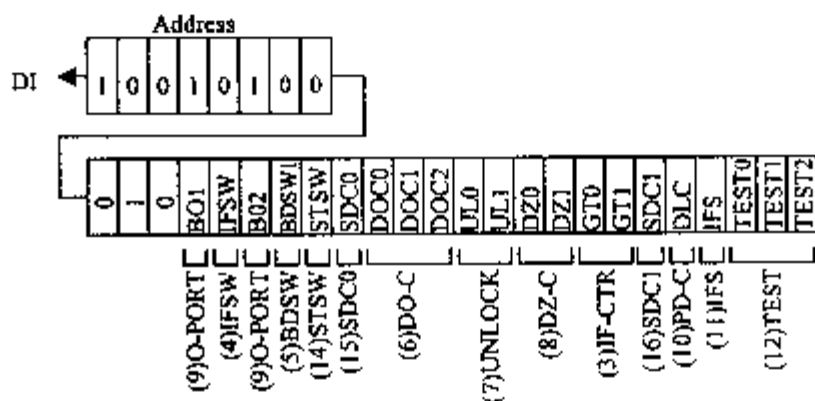
KEY NO. U111A6 (A3・標準図)

# Composition of DI control data (serial data input)

## (1) IN mode



## (2) IN2 mode



Description of DI control Data

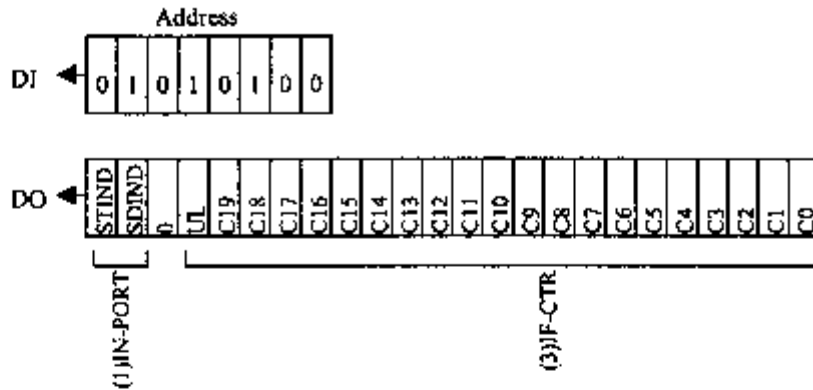
| No. | Control block data                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Related data              |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
|-----|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------|-----|------------------------|------------------------|---|---|----|--------------|---------------------|---|---|----|--------------|-----------|---|---|----|-----------|-----------|-----|-----|-------|---------------------------|----|---|------|--------------|---|------|------|------------|---|---|------|--------------|---|---|---|-------|---|---|---|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|------------------------------|---|---|---|---|-------------|--|
| (1) | <p>Programmable divider data</p> <p>P0 to P15<br/>DVS,SNS</p> | <ul style="list-style-type: none"><li>• Data to set the dividing number of programmable divider<br/>Binary value with P15 assumed to be MSB. LSB varies according to DVS and SNS.<br/>(*: don't care)</li></ul> <table><tr><th>DVS</th><th>SNS</th><th>LSB</th><th>set dividing number(N)</th><th>actual dividing number</th></tr><tr><td>1</td><td>+</td><td>P0</td><td>272 to 65535</td><td>Twice the set value</td></tr><tr><td>0</td><td>1</td><td>P0</td><td>272 to 65535</td><td>Set value</td></tr><tr><td>0</td><td>0</td><td>P4</td><td>4 to 4095</td><td>Set value</td></tr></table> <ul style="list-style-type: none"><li>* P0 to P3 invalid when LSB:P4</li><li>• To select the signal input (FMIN, AMIN) to the programmable divider and to change the input frequency range.<br/>(*: don't care)</li></ul> <table><tr><th>DVS</th><th>SNS</th><th>Input</th><th>Operation frequency range</th></tr><tr><td>1</td><td>+</td><td>FMIN</td><td>10 to 160MHz</td></tr><tr><td>0</td><td>1</td><td>AMIN</td><td>2 to 40MHz</td></tr><tr><td>0</td><td>0</td><td>AMIN</td><td>0.5 to 10MHz</td></tr></table>                                                                                                                                                                                                                                                                                                                                                               | DVS                       | SNS                          | LSB | set dividing number(N) | actual dividing number | 1 | + | P0 | 272 to 65535 | Twice the set value | 0 | 1 | P0 | 272 to 65535 | Set value | 0 | 0 | P4 | 4 to 4095 | Set value | DVS | SNS | Input | Operation frequency range | 1  | + | FMIN | 10 to 160MHz | 0 | 1    | AMIN | 2 to 40MHz | 0 | 0 | AMIN | 0.5 to 10MHz |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| DVS | SNS                                                           | LSB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | set dividing number(N)    | actual dividing number       |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | +                                                             | P0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 272 to 65535              | Twice the set value          |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                             | P0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 272 to 65535              | Set value                    |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                             | P4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4 to 4095                 | Set value                    |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| DVS | SNS                                                           | Input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Operation frequency range |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | +                                                             | FMIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10 to 160MHz              |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                             | AMIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 to 40MHz                |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                             | AMIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.5 to 10MHz              |                              |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| (2) | <p>Reference divider data</p> <p>R0 to R3</p>                 | <ul style="list-style-type: none"><li>• Reference frequency (fref) selection data</li></ul> <table><tr><th>R3</th><th>R2</th><th>R1</th><th>R0</th><th>Reference frequency</th></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>25 kHz</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>25</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td><td>25</td></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>25</td></tr><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>12.5</td></tr><tr><td>0</td><td>1</td><td>0</td><td>1</td><td>6.25</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>3.125</td></tr><tr><td>0</td><td>1</td><td>1</td><td>1</td><td>3.125</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>5</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>5</td></tr><tr><td>1</td><td>0</td><td>1</td><td>0</td><td>5</td></tr><tr><td>1</td><td>0</td><td>1</td><td>1</td><td>5</td></tr><tr><td>1</td><td>1</td><td>0</td><td>0</td><td>3</td></tr><tr><td>1</td><td>1</td><td>0</td><td>1</td><td>15</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>PLL INHIBIT + X'tal OSC STOP</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>PLL INHIBIT</td></tr></table> <ul style="list-style-type: none"><li>* PLL INHIBIT</li><li>• The programmable divider and IF counter stop, with FMIN,AMIN, and IFIN inputs being in the pull-down condition (GND), and the charge pump has the high impedance.</li></ul> | R3                        | R2                           | R1  | R0                     | Reference frequency    | 0 | 0 | 0  | 0            | 25 kHz              | 0 | 0 | 0  | 1            | 25        | 0 | 0 | 1  | 0         | 25        | 0   | 0   | 1     | 1                         | 25 | 0 | 1    | 0            | 0 | 12.5 | 0    | 1          | 0 | 1 | 6.25 | 0            | 1 | 1 | 0 | 3.125 | 0 | 1 | 1 | 1 | 3.125 | 1 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 1 | 5 | 1 | 0 | 1 | 0 | 5 | 1 | 0 | 1 | 1 | 5 | 1 | 1 | 0 | 0 | 3 | 1 | 1 | 0 | 1 | 15 | 1 | 1 | 1 | 0 | PLL INHIBIT + X'tal OSC STOP | 1 | 1 | 1 | 1 | PLL INHIBIT |  |
| R3  | R2                                                            | R1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | R0                        | Reference frequency          |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | 25 kHz                       |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | 25                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | 25                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 0                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | 25                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | 12.5                         |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | 6.25                         |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | 3.125                        |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 0   | 1                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | 3.125                        |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | 5                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | 5                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | 5                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 0                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | 5                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | 3                            |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | 15                           |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                         | PLL INHIBIT + X'tal OSC STOP |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |
| 1   | 1                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                         | PLL INHIBIT                  |     |                        |                        |   |   |    |              |                     |   |   |    |              |           |   |   |    |           |           |     |     |       |                           |    |   |      |              |   |      |      |            |   |   |      |              |   |   |   |       |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |                              |   |   |   |   |             |  |

| (3)  | CTE<br>GT0,GT1                                  | <table border="1"> <tr> <th>GT1</th><th>GT0</th><th>Counting time</th><th>Wait time</th></tr> <tr> <td>0</td><td>0</td><td>4 ms</td><td>3 to 4 ms</td></tr> <tr> <td>0</td><td>1</td><td>8</td><td>3 to 4</td></tr> <tr> <td>1</td><td>0</td><td>16</td><td>3 to 4</td></tr> <tr> <td>1</td><td>1</td><td>32</td><td>3 to 4</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | GT1                                      | GT0  | Counting time | Wait time        | 0 | 0 | 4 ms | 3 to 4 ms | 0 | 1 | 8 | 3 to 4                       | 1 | 0 | 16 | 3 to 4                                   | 1 | 1 | 32 | 3 to 4 | IFS |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
|------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------|---------------|------------------|---|---|------|-----------|---|---|---|------------------------------|---|---|----|------------------------------------------|---|---|----|--------|-----|---|---|------|---|---|---|---------------|---|---|---|-----------------|---|---|---|------|----------------|
| GT1  | GT0                                             | Counting time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Wait time                                |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 0    | 0                                               | 4 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3 to 4 ms                                |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 0    | 1                                               | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3 to 4                                   |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 1    | 0                                               | 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3 to 4                                   |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 1    | 1                                               | 32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3 to 4                                   |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| (4)  | MUTE control<br>data<br>IFSW                    | <ul style="list-style-type: none"> <li>Data to determine the output of output port IFSW, controlling the MUTE function.<br/>"Data"=0: at receiving<br/>1: MUTE</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| (5)  | FM/AM BAND<br>selection<br>control data<br>BDSW | <ul style="list-style-type: none"> <li>Data to determine the output of output port BDSW, controlling selection of BAND.<br/>"Data"=0: AM<br/>1: FM</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| (6)  | DO pin control<br>data<br>DOC0<br>DOC1<br>DOC2  | <ul style="list-style-type: none"> <li>Data to control DO pin output <table border="1"> <tr> <th>DOC2</th><th>DOC1</th><th>DOC0</th><th>DO pin condition</th></tr> <tr> <td>0</td><td>0</td><td>0</td><td>Open</td></tr> <tr> <td>0</td><td>0</td><td>1</td><td>Low when unlock is detected.</td></tr> <tr> <td>0</td><td>1</td><td>0</td><td>end-UC(See the item with asterisk below)</td></tr> <tr> <td>0</td><td>1</td><td>1</td><td>Open</td></tr> <tr> <td>1</td><td>0</td><td>0</td><td>Open</td></tr> <tr> <td>1</td><td>0</td><td>1</td><td>Low when SDON</td></tr> <tr> <td>1</td><td>1</td><td>0</td><td>Low when stereo</td></tr> <tr> <td>1</td><td>1</td><td>1</td><td>Open</td></tr> </table> </li> <li>The open condition is selected at power ON/reset.</li> <li>IF counter counting end check <div style="text-align: center;"> <p>① Counting start      ② Counting end      ③ CE: HI</p> </div> </li> </ul> <p>① With end-UC set and IF counter starting (CTE=0→1), DO pin opens automatically.</p> <p>② At end of counting of the IF counter, DO pin goes LOW and check on counting end can be made.</p> <p>③ DO pin opens when serial data is entered/output (CE pin: HI)</p> <p>Note: DO pin is always in the open condition during data input (IN1 and IN2 modes, during CE: Hi period), regardless of DO pin control data (DOC0 to 2). In the DO pin condition during data output (OUT mode, CE-Hi period), the content of internal DO serial data is output in synchronization with CL, regardless of DO pin control data (DOC).</p> | DOC2                                     | DOC1 | DOC0          | DO pin condition | 0 | 0 | 0    | Open      | 0 | 0 | 1 | Low when unlock is detected. | 0 | 1 | 0  | end-UC(See the item with asterisk below) | 0 | 1 | 1  | Open   | 1   | 0 | 0 | Open | 1 | 0 | 1 | Low when SDON | 1 | 1 | 0 | Low when stereo | 1 | 1 | 1 | Open | UL0,UL1<br>CTE |
| DOC2 | DOC1                                            | DOC0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DO pin condition                         |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 0    | 0                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Open                                     |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 0    | 0                                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Low when unlock is detected.             |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 0    | 1                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | end-UC(See the item with asterisk below) |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 0    | 1                                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Open                                     |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 1    | 0                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Open                                     |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 1    | 0                                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Low when SDON                            |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 1    | 1                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Low when stereo                          |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |
| 1    | 1                                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Open                                     |      |               |                  |   |   |      |           |   |   |   |                              |   |   |    |                                          |   |   |    |        |     |   |   |      |   |   |   |               |   |   |   |                 |   |   |   |      |                |

| No.          | Control block data                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Related data                   |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
|--------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------|--------------------------|------------------|---|---------------|------|------|-----|---|---|---------------------------|---|---|--------------|--------------------------------|----------------------|
| (7)          | Unlock detection data<br><br>UL0,UL1            | <ul style="list-style-type: none"><li>Phase error (<math>\phi E</math>) detection width selection data to judge if PLL is locked.<br/>Phase error exceeding the detection width is judged that PLL is locked<br/>(*:don't care)</li></ul> <table><tr><th>UL1</th><th>UL0</th><th><math>\phi E</math> Detection width</th><th>Detection output</th></tr><tr><td>0</td><td>0</td><td>Stop</td><td>Open</td></tr><tr><td>0</td><td>1</td><td>0</td><td>Direct output of <math>\phi E</math></td></tr><tr><td>1</td><td>*</td><td><math>\pm 6.6\mu</math></td><td><math>\phi E</math> extended by 1 to 2 ms</td></tr></table> <p>* DO pin is LOW. Serial data output: UL = 0.</p> | UL1                            | UL0                  | $\phi E$ Detection width | Detection output | 0 | 0             | Stop | Open | 0   | 1 | 0 | Direct output of $\phi E$ | 1 | * | $\pm 6.6\mu$ | $\phi E$ extended by 1 to 2 ms | DOC0<br>DOC1<br>DOC2 |
| UL1          | UL0                                             | $\phi E$ Detection width                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Detection output               |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 0            | 0                                               | Stop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Open                           |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 0            | 1                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Direct output of $\phi E$      |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 1            | *                                               | $\pm 6.6\mu$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $\phi E$ extended by 1 to 2 ms |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (8)          | Phase comparator control data<br><br>DZ0,DZ1    | <ul style="list-style-type: none"><li>Data to control the dead zone of phase comparator</li></ul> <table><tr><th>DZ1</th><th>DZ0</th><th>Dead zone mode</th></tr><tr><td>0</td><td>0</td><td>DZA</td></tr><tr><td>0</td><td>1</td><td>DZB</td></tr><tr><td>1</td><td>0</td><td>DZC</td></tr><tr><td>1</td><td>1</td><td>DZD</td></tr></table> <p>Dead zone width: DZA&lt;DZB&lt;DZC&lt;DZD</p>                                                                                                                                                                                                                                                                                | DZ1                            | DZ0                  | Dead zone mode           | 0                | 0 | DZA           | 0    | 1    | DZB | 1 | 0 | DZC                       | 1 | 1 | DZD          |                                |                      |
| DZ1          | DZ0                                             | Dead zone mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 0            | 0                                               | DZA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 0            | 1                                               | DZB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 1            | 0                                               | DZC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 1            | 1                                               | DZD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (9)          | Output port data<br><br>BO1,BO2                 | <ul style="list-style-type: none"><li>Data to determine the output of output ports BO1 and BO2<br/>"Data"=0: OPEN<br/>1: Low</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (10)         | Charge pump control data<br><br>DLC             | <ul style="list-style-type: none"><li>Data to enforce control of charge pump output</li></ul> <table><tr><th>DLC</th><th>Charge pump output</th></tr><tr><td>0</td><td>Normal</td></tr><tr><td>1</td><td>Forced to LOW</td></tr></table> <p>In case of dead lock because of VCO oscillation stop when the VCO control voltage (Vtune) is 0 V, it is possible to clear dead lock by setting the charge pump output to LOW and V tune to Vcc. (Dead lock clear circuit)</p>                                                                                                                                                                                                     | DLC                            | Charge pump output   | 0                        | Normal           | 1 | Forced to LOW |      |      |     |   |   |                           |   |   |              |                                |                      |
| DLC          | Charge pump output                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 0            | Normal                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| 1            | Forced to LOW                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (11)         | IFS                                             | <ul style="list-style-type: none"><li>Normally, set Data = 1. Setting Data = 0 causes the input sensitivity worsening mode and the sensitivity decreases by about 10 to 30mVrms.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (12)         | LSI test data<br>TEST0 to 2                     | <ul style="list-style-type: none"><li>LSI test data</li></ul> <table><tr><td>TEST0</td><td rowspan="3">All to be set to "0"</td></tr><tr><td>TEST1</td></tr><tr><td>TEST2</td></tr></table> <p>All set to zero at power ON/reset</p>                                                                                                                                                                                                                                                                                                                                                                                                                                          | TEST0                          | All to be set to "0" | TEST1                    | TEST2            |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| TEST0        | All to be set to "0"                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| TEST1        |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| TEST2        |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (13)         | DNC                                             | <ul style="list-style-type: none"><li>Set data = 0.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (14)         | Forced monaural control data<br><br>STSW        | <ul style="list-style-type: none"><li>Data to determine the output of output port STSW, controlling the forced stereo functions.<br/>"Data"=0: MONO<br/>1: STEREO</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |
| (15)<br>(16) | SD sensitivity control data<br><br>SDC0<br>SDC1 | <ul style="list-style-type: none"><li>Data to determine the output of output ports SDC0 and SDC1, controlling the SD sensitivity<br/>"Data"=SDC0: 0, SDC1: 0 → SD sensitivity = 42dBuV (Typ)<br/>SDC0: 0, SDC1: 1 → SD sensitivity = 45dBuV (Typ)<br/>SDC0: 1, SDC1: 0 → SD sensitivity = 51dBuV (Typ)<br/>SDC0: 1, SDC1: 1 → SD sensitivity = 56dBuV (Typ)</li></ul>                                                                                                                                                                                                                                                                                                         |                                |                      |                          |                  |   |               |      |      |     |   |   |                           |   |   |              |                                |                      |

## DO control data (serial data output) composition

### (1) OUT mode

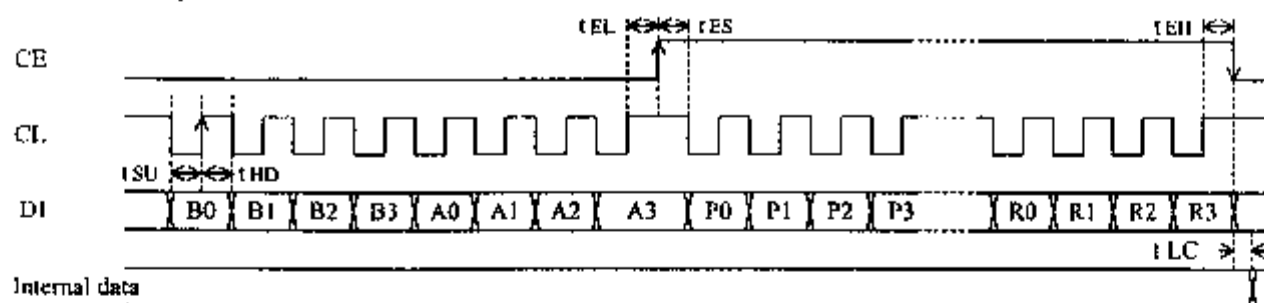


### Description of the DO output data

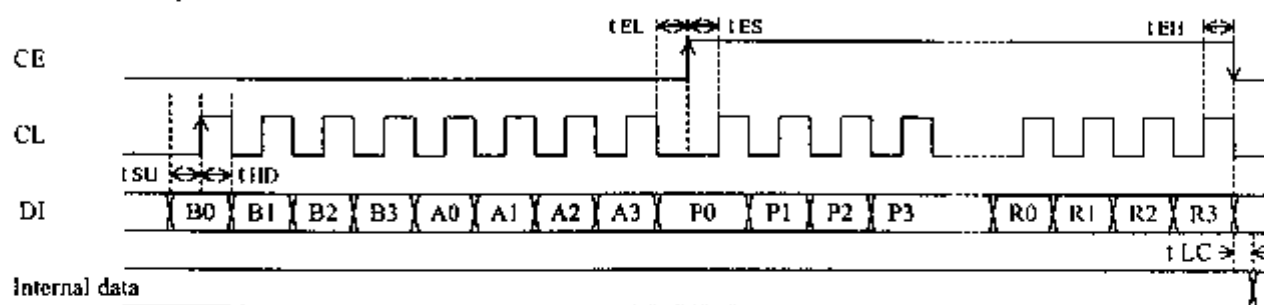
| No. | Control block data                                        | Description                                                                                                                                                                                                                                                                            | Related data      |
|-----|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| (1) | Stereo and SD indicators control data<br><br>STIND, SDIND | <ul style="list-style-type: none"> <li>Data latching stereo and SD indicator conditions. Latching made in the data output (OUT) mode.</li> <li>STIND ← Stereo indicator condition    0: ST ON, 1: ST OFF</li> <li>SDIND ← SD indicator condition        0: SD ON, 1: SD OFF</li> </ul> |                   |
| (2) | PLL unlock data<br><br>UL                                 | <ul style="list-style-type: none"> <li>Data latching the content of unlock detection circuit</li> <li>UL ← 0: At unlock</li> <li>     1: At lock or detection stop mode</li> </ul>                                                                                                     | UL0<br>UL1        |
| (3) | IF counter, binary counter<br><br>C19 to C0               | <ul style="list-style-type: none"> <li>Data latching the content of IF counter (20-bit binary counter)</li> <li>C19 ← MSB of binary counter</li> <li>C0 ← LSB of binary counter</li> </ul>                                                                                             | CTE<br>GT0<br>GT1 |

Serial data input (IN1/IN2)  $t_{SU}, t_{HD}, t_{EL}, t_{ES}, t_{EH} \geq 0.75 \mu s$   $t_{LC} < 0.75 \mu s$

① CL: Normally Hi

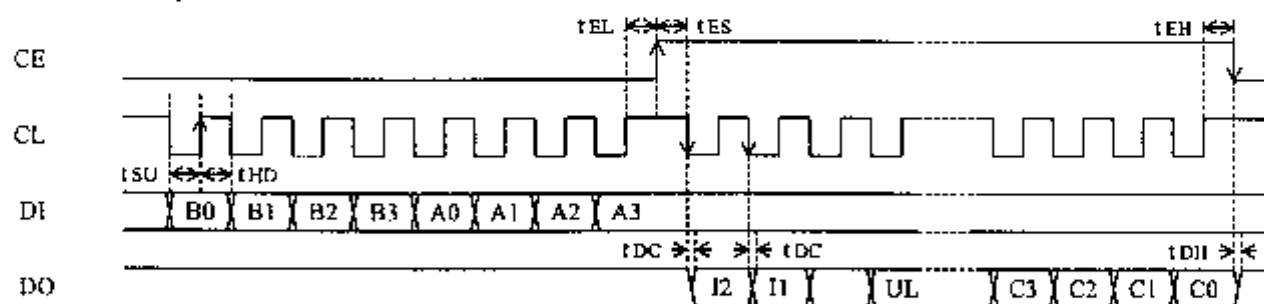


② CL: Normally LOW

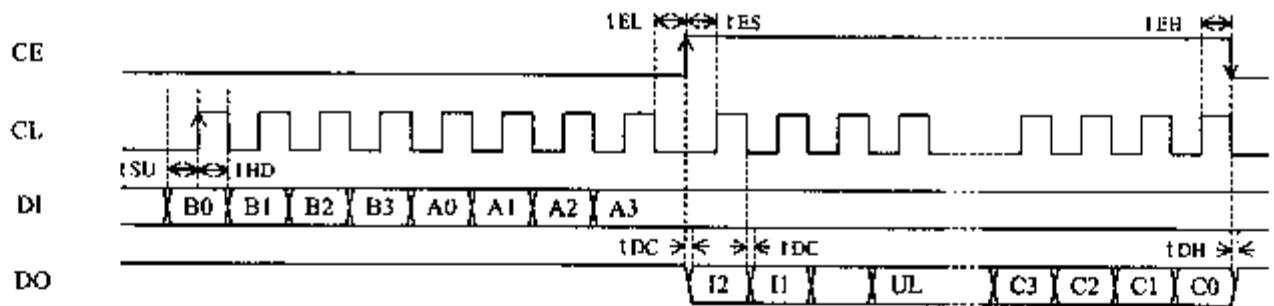


Serial data output (OUT)  $t_{SU}, t_{HD}, t_{EL}, t_{ES}, t_{EH} \geq 0.75 \mu s$   $t_{DC}, t_{DH} < 0.35 \mu s$

① CL: Normally Hi

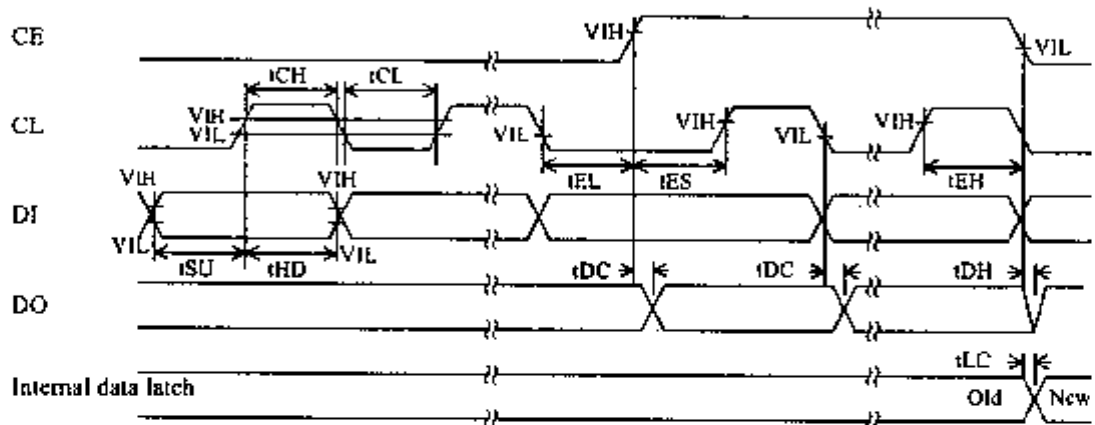


② CL: Normally low

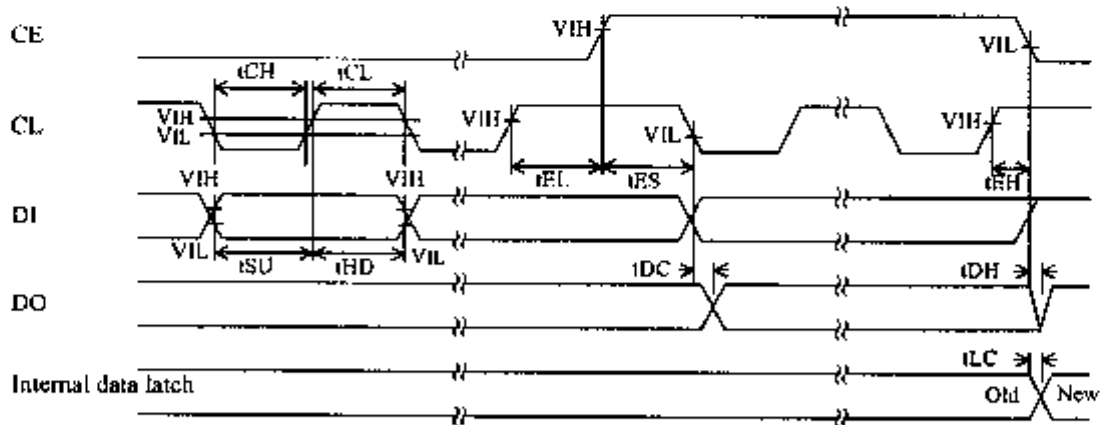


(Note) DO pin is an Nch open drain pin, so that the data varying time ( $t_{DC}$  and  $t_{DH}$ ) differs depending on the pull-up resistance and substrate capacity.

### Serial data timing



<< When CL stops at the "L" level >>



<< When CL stops at the "H" level >>

| Parameter              | Symbol | Pin   | Conditions                                                         | Min  | Typ | Max  | Unit |
|------------------------|--------|-------|--------------------------------------------------------------------|------|-----|------|------|
| Data setup time        | tSU    | DI,CL |                                                                    | 0.75 |     |      | μs   |
| Data hold time         | tHD    | DI,CL |                                                                    | 0.75 |     |      | μs   |
| Clock "L" level time   | tCL    | CL    |                                                                    | 0.75 |     |      | μs   |
| Clock "H" level time   | tCH    | CL    |                                                                    | 0.75 |     |      | μs   |
| CE wait time           | tEL    | CE,CL |                                                                    | 0.75 |     |      | μs   |
| CE setup time          | tES    | CE,CL |                                                                    | 0.75 |     |      | μs   |
| CE hold time           | tEH    | CE,CL |                                                                    | 0.75 |     |      | μs   |
| Data latch change time | tLC    |       |                                                                    |      |     | 0.75 | μs   |
| Data output time       | tDC    | DO,CL | Differs depending on the pull-up resistance and substrate capacity |      |     | 0.35 | μs   |
|                        | tDH    | DO,CE |                                                                    |      |     |      |      |

最新カスタムIC搭載により容積30%減（当社従来品比）の小形化を実現。  
**30 % less volume than our traditional models thanks to state-of-the-art customized IC.**



#### ■特長

- 独自開発のICを搭載し、当社従来品容積比約30%減の小形化（60ml）を達成。
- ANTコネクタ部を直出構造とし、内部をフルシールド化することにより、優れたノイズ除去能力を発揮。

#### ■用途

- マイクロコンポーネントステレオ、MDラジカセ、DVD、オーディオレシーバなど多機能化、小形化傾向の進む、各種オーディオ機器、ミニコンポーネントステレオ、各種多機能オーディオ機器。

#### ■Features

- Uniquely developed IC has achieved a small volume of 60 ml, 30 % less than our traditional models.
- Fully shielded structure with ANT connector effectively filters out noise.

#### ■Applications

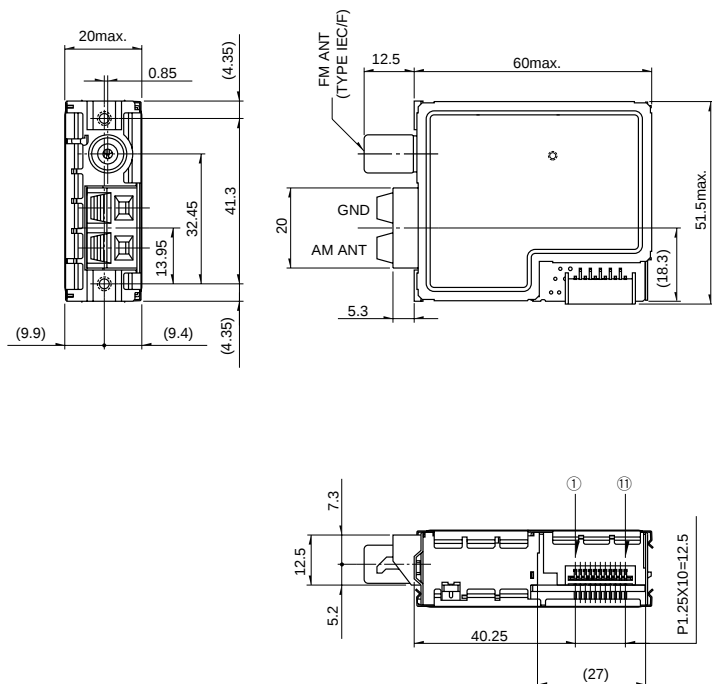
- Offers a wide range applications to audio equipment, especially multi-functional, compact audio equipment, such as mini- and micro-component stereo equipment, MD radio cassette recorders, DVDs and audio receivers.

#### ■主な仕様 Typical Specifications

| Items                         |           | Specifications |
|-------------------------------|-----------|----------------|
| Receiving frequency range     | AM (kHz)  | 530 to 1710    |
|                               | FM (MHz)  | 87.5 to 108    |
| Input impedance (Ω)           | AM        | —              |
|                               | FM        | 75             |
| Receive sensitivity (dB μ)    | AM@SN20dB | 51             |
|                               | FM@SN50dB | 15             |
| Stereo separation (dB)        | FM        | 45             |
| Output level (dBs)            | AM        | -7.5           |
|                               | FM        | 2.5            |
| Total harmonic distortion (%) | AM        | 1.2            |
|                               | FM        | 0.25           |
| Power consumption (V/W)       |           | 9/500          |
| Volume (ml)                   |           | 60             |

## ■外形図 Dimensions

Unit : mm



| Terminal No. | Terminal name |
|--------------|---------------|
| ①            | GND           |
| ②            | FM DET        |
| ③            | VSM           |
| ④            | Rch OUT       |
| ⑤            | Vcc           |
| ⑥            | Lch OUT       |
| ⑦            | GND           |
| ⑧            | DO            |
| ⑨            | CL            |
| ⑩            | DI            |
| ⑪            | CE            |

## ■回路ブロックダイアグラム Circuit Block Diagram

