



DVD Recorder

Service Manual

MODEL: DVR-5003

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SPECIFICATION

DISC TYPES SUPPORTED	
DVD+RW	Playback, Recoding
DVD+R	Playback, Recording
DVD-RW	Playback, Recording
DVD-R	Playback, Recording
DVD-Video	Playback
SVCD	Playback
CD-Audio	Playback
CD-R/RW	Playback
MP3	Playback
JPEG	Playback
Kodak Picture CD	Playback
MPEG4	Playback
WMA	Playback
RECORDING	
Media	DVD+R, DVD+RW, DVD-R, DVD-RW
Diameter	12cm
Capacity	4.7GB
Recording Time	Approximately 6 hours (SLP Mode)
TV System	NTSC /PAL
Digital Compression	MPEG 2, MPEG 1
Recording Types	Live, Timer
Max Simultaneous Timer Recordings	8
Recording Features	Pause Record, Auto-Insert Chapter, Index Screen Navigator, Multi Record Modes
Editing Features	Erase Disc, Show Chapter, Edit Title Name
PLAYBACK	
MP3 & JPG Navigator	
Fast Forward /Reverse to 32X	
Slow Motion Playback	
Repeat Playback (Chapter /Disc & A-B)	
Zoom in or out to 12%, 25%, 50%, 100%, 200%, 400% when viewing JPG images and to 150%, 200% when playing movie.	

VIDEO PERFORMANCE		
Resolution		720 x 480 NTSC, 720x576 PAL in HQ Mode
DA Converter		8-bit
AD Converter		9-bit
Video Output		Composite, S-Video, Component
Scanning		Progressive Scan, Interlaced
Laser		65 0nm
AUDIO PERFORMANCE		
DA Converter		24 bit
AD Converter		24 bit
DVD Liner Sound	48 kHz Sampling	4Hz to 22 k Hz
	96 kHz Sampling	4Hz to 44 kHz
Audio CD		4Hz to 20kHz
Signal to Noise Ratio		>90dB
Audio Dynamic Range		>80dB
Harmonic Distortion		<0.001% (W.PEAK)
OUTPUT CONNECTION		
Component Video Out	Y	0.7±0.14Vp-p (75Ohm)
	Negative Sync Pb/Pr	0.7±0.14Vp-p (75Ohm)
	S-Video Out	Mini DIN 4-Pin (y=0.7±0.14Vp-p C=0.3±0.06Vp-p 75Ohm)
Composite Video Out		One Pin Jack, 1±0.2Vp-p (75Ohm)
Coaxial Digital Out		One Pin Jack, 0.5v +0.1V/-0.2V (75Ohm)
Analog Audio Out		2.0+0.2 /2.0-1.0 VRMS (470Ohm)
INPUT CONNECTION		
S-Video In (Front /Rear)		Mini DIN 4-Pin (75Ohm)
Composite Video In (Front /Rear) Cinch, 1Vp-p (75Ohm) Stereo Audio In (Front /Rear)		1.6VRMS (470Ohm)
PHYSICAL		
Operating Conditions		0°C to 40°C
Power Supply		~110V – 240V, 50 /60Hz
Power Consumption		30W
Dimensions (H x W x L) mm		48 x 430 x 250 (mm)
Weight		7 LBS

ATTACHMENT

SUPPORT MEDIA (DVD±R)

Recommend		Media	Speed	Manufacture ID	Media ID
Max Write Speed: 8 X	DVD-R	mitsubishi	4 X	MCC 01 RG 20	/
		mitsubishi	8 X	MCC 02 RG 20	/
	DVD+R	TDK	8 X	RICOHJPN	003
		RICOH	4 X	RICOHJPN	R01

NOT Recommend		Media	Speed	Manufacture ID	Media ID
Max Write Speed: 8 X	DVD-R	PRINCO	4 X	PRINCO	/
		FUSION	8 X	YUDEN000	/
	DVD+R	OPTO	4 X	OPTODISC	Op1
		FUJIFILM	8 X	YUDEN000	T02

SUPPORT MEDIA (DVD±RW)

Recommend		Media	Speed	Manufacture ID	Media ID
Max Write Speed: 4 X	DVD-RW	TDK	2 X	TDK 502SAKUM3	/
		mitsubishi	4 X	MCC 01RW4X	/
	DVD+RW	mitsubishi	2 X	MCC 01 RW 11N9	A01
		RICOH	4 X	RICOHJPN	W11

NOT Recommend		Media	Speed	Manufacture ID	Media ID
Max Write Speed: 4 X	DVD-RW	SKC	2.4 X	OPTODISC	/
		RISHENG	4 X	OPTODISC	/
	DVD+RW	IMATION	4 X	RICOHJPN	W11
		RISHENG	4 X	OPTODISC	Op4

TERMINOLOGY AND ABBREVIATIONS

AC-3	The former name of the Dolby Digital audio-coding system. AC-3 followed AC-1 and AC-2. Still used in some standard documents.
A/V	Audio /Video
Angle	In DVD-video, a specific view of a scene, usually recorded from a certain camera angle. Different angles can be chosen while viewing the scene.
ATAPI	Advanced Technology Attachment (ATA) Packet Interface. An interface between a computer and its internal peripherals such as DVD-ROM drives. ATAPI provides the command set for controlling devices connected via an IDE interface. ATAPI is part of the Enhanced IDE (E-IDE) interface, also known as ATA-2. ATAPI was extended for use in DVD-ROM drives by the SFF 8090 specification.
CD	Short for compact disc, an optical disc storage format developed by Philips and Sony.
CD-DA	Compact disc digital audio. The original music CD format, storing audio information as digital PCM data. Defined by the Red Book standard.
CD+G	Compact disc plus graphics. A variation of CD, which embeds graphical data in with the audio data, allowing video pictures to be displayed periodically as music is played. Primarily used for karaoke.
CD-R	An extension of the CD format allowing data to be recorded once on a disc using dye-sublimation technology. Defined by the Orange Book standard.
Channel	A part of an audio track. Typically there is one channel allocated for each loudspeaker.
Chapter	In DVD-Video, a division of a title. Technically called a part of title (PTT).
Closed Caption	Text captions for video, which are not normally visible, as opposed to open captions, which are a permanent part of the picture. In the United State, the official NTSC Closed Caption standard requires that all TVs larger than 13 inches include circuitry to decode and display caption information stored on line 21 of the video signal. DVD-Video can provide closed caption data, but the sub picture format is preferred for its versatility.
Component	Video A video system containing three separate color component signals, either red /green /blue (RGB) or chroma /color difference (YCbCr, YPbPr, YUV), in analog or digital form. The MPEG-2 encoding system used by DVD is based on color-difference component digital video. Very few televisions have component video input.

Composite Video	An analog video signal in which the luma and chroma components are combined (by frequency multiplexing), along with sync and burst. Also called CVBS. Most televisions and VCRs have composite video connectors, which are usually colored yellow.
Dolby Digital	A perceptual coding system for audio, developed by Dolby Laboratories and accepted as an international standard. Dolby Digital is the most common means of encoding audio for DVD-Video and is the mandatory audio compression system for 525/60 (NTSC) disc.
Dolby Surround	The standard for matrix encoding surround-sound channels in a stereo signal by applying a set of defined mathematical functions when combining center and surround channels with left and right channels. The center and surround channels can then be extracted by a decoder such as Dolby Pro Logic circuit which applies the inverse of the mathematical functions. A Dolby Surround decoder extracts surround channel, while a Dolby Pro Logic decoder uses tally independent of the recoding or transmission format. Both Dolby Digital and MPEG audio compression systems are compatible with Dolby Surround audio.
DTS	Digital Theater Sound. A perceptual audio-coding system developed for theaters. A competitor to Dolby Digital and an optional audio track format for DVD-Video.
DV	Digital Video. A camcorder format for high-quality video, different from PEG. It is converted into MPEG 2 Video when recorded on DVD+RW.
DVD	An acronym that officially stands for nothing, but is often expanded as Digital Video Disc or Digital Versatile Disc. The audio /video /data storage system based on 12 and 8 cm optical discs.
DVD+R	These discs can only be written to once. Existing recordings can be hidden but not deleted. So, any disc space already used by a recoding cannot be regained. DVD+R discs are required to be “Finalized” before they will be compatible with standard DVD Players. Once a disc is finalized, no further recordings can be made.
DVD+RW	Discs can be written to and erased multiple times. Existing recordings can be deleted and disc space regained. These discs do not require a finalization procedure. As soon as a recoding is made, the disc will be compatible with standard DVD Players.
EasyLink	If your TV set and your video recorder are equipped with this feature, they can exchange information to adjust certain setting to each other, such as the TV channel order and other user preferences.
I.LINK	Also known as ‘FireWire’ and ‘IEEE1394.’ A cable for transfer of high bandwidth digital signals, as used by Digital Video camcorders.

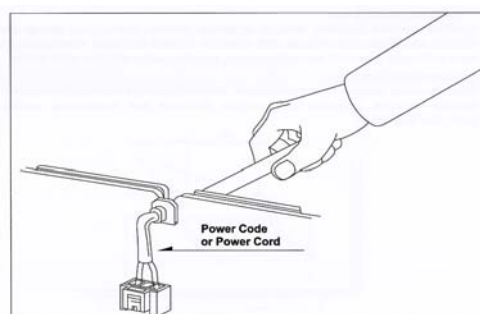
Index Picture Screen	A screen that gives an overview of a DVD+RW disc, with index pictures that each represents a recording.
JPEG	Joint Photographic Experts Group. The international committee, which created its namesake standard for compressing still images.
Karaoke	Literally empty orchestra. The social sensation from Japan where sufficiently inebriated people embarrass themselves in public by singing along to a music track. Karaoke was largely responsible for the success of laserdisc in Japan, thus supporting it elsewhere.
Macro vision	An ant taping process that modifies a signal so that it appears unchanged on most televisions but is distorted and unmatchable when played back from a video tape recording. Macro vision takes advantage of characteristics of AGC circuits and burst decoder circuits in VCRs to interfere with the recording process.
MPEG	Motion Picture Experts Group. A collection of compression systems for digital audio and video.
Multiangle	A DVD-Video program containing multiple angles allowing different views of a scene to be selected during playback.
Multilanguage	A DVD-Video program containing sound tracks and subtitle tracks for more than one language.
NICAM	System for reception of digital stereo TV sound.
NTSC	See TV system. NTSC is the most common color system in the U.S.
OTR	One-Touch Recording. With this feature you can easily start a recording (by pushing just one button) and select the switch-off time in intervals of 30 minutes.
OSD	On-screen Display. The 'user interface' by which you can control the DVD recorder via the TV screen.
PAL	See TV system.
PBC	Playback Control. A special feature on a VCD 2.0 or Super VCD disc that enables interactive use.
PBS	Public Broadcast Service. The channel that transmits data for Auto Clock Set and VCR Plus+ programming.
PCM	Pulse Code Modulation. A digital encoding system.
PDC	Program Delivery Control
RGB	Red-Green-Blue. A top quality video connection where red, green and blue components of a video signal are carried through separate wires.
SCART cable	Also known as Euro-AV cable. This standard cable is an easy way to connect various AV devices and television. In addition to audio and video it can carry control signals.
S/N	Signal-to noise ratio. Also called SNR.

Subtitle	A textual representation of the spoken audio in a video program. Subtitles are often used with foreign languages and do not serve the same purpose as captions for the hearing impaired.
SECAM	See TV system
ShowView	See VideoPlus+. 'Show View' is a trademark of Gemstar Development Group.
S-video	A video interface standard that carries separate luma and chrome signal, usually on a four-pin mini-DIN connector. Also called Y/C. The quality of s-video is significantly better than composite video since it does not require a comb filter to separate the signals, but it's not quite as good as component video. Most high-end televisions have s-video input. S-video is often erroneously called S-VHS.
System menu	The main menu of a DVD-Video disc from which titles are selected. Also called the title selection menu or disc menu.
Title	The largest unit of a DVD-Video disc (other than the entire volume or side). Usually a movie, TV program, music album, or so on. A disc can hold up to 99 titles, which can be selected from the disc menu.
TruSurround	A system for simulating Multi-channel sound reproduction via a two channel set-up, by SRS Labs, Inc.
TV system	There are various systems for transmitting television signals, for example PAL, PAL-I, PAL-BG, SECAM, SECAM-DK, NTSC, etc. The TV system is country dependant.
Video CD	An extension of CD based on MPEG-1 video and audio. Allows playback of near-VHS-quality video on a Video CD player, CD-I player, or computer with MPEG decoding capability.
VCR PLUS+	A system by which you can easily program the TIMER of your video recorder by entering a code of maximum 9 digits, which is printed in TV guides. Video Plus+ is a trademark of Gemstar Development Group.
VCR	Video Cassette Recorder
CPS	Video Programming System
YUV	In the general sense, any form of color-difference video signal containing one luma and two chroma components. Technically, YUV is applicable only to the process of encoding component video into composite video.

IMPORTANT SAFETY PRECAUTIONS

Precaution during servicing

1. Location requiring special caution are denoted by labels and inscriptions on the rear panel and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.
2. Parts identified by  symbol in schematic diagram parts are critical for safety. Replace only with specified part numbers.
Note: Parts in this category also include those specifies to comply with laser emission standards for Products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation.
3. Use specified internal wiring. Note especially:
 - a. Double insulated wires
 - b. High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
 - a. Insulation Tape
 - b. PVC tubing
 - c. Spacers
 - d. Insulation sheets for transistor
5. Observe that wires do not contact heat producing part (heat sinks, oxide metal film resistors, fusible resistors, etc.)
6. Check that replaced wires do not contact sharp edge or pointed parts.
7. When a power cord has been replaced, check that A mark is made on the cord, under strain, near the aperture, and the flexible cord is subjected 100 times to a pull of 40N for a duration of 1 second each. During the test, the cord shall not be displaced by more than 2mm.



8. Also check areas surrounding repaired locations.
9. The internal wiring is secured so as not to approach the heating parts and high voltage parts by its shape. So these wires must be restored to its former state.
10. After updated the hazardous live part or accessible part, if the clearance or creep age distance can't accord with the safe request, then need adopt reinforced insulation method for ensure safety.

Safety check after servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following test and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminal, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) See table below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) See table below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d) between soldered terminals and between terminals and surrounding metallic parts. See table below.

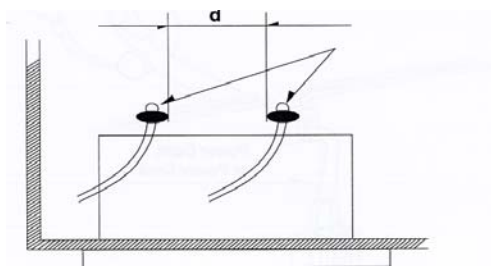


Table 1: Ratings for selected areas

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d)
*110 to 240V 110 to 230V	USA, Australia, Europe	F4M/ 500VDC	4kv/minute	F 6mm(d)

*Class 11 model only.

Note: This table is unofficial and for reference only. Be sure to confirm the precise value for your particular country and locality.

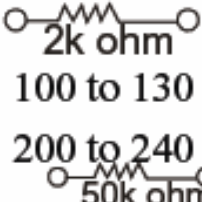
Leakage Current Test

Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.)

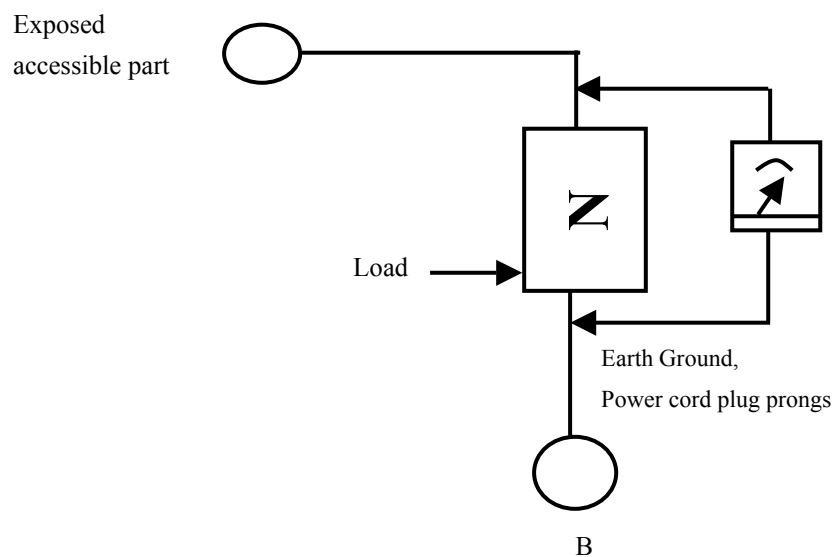
Measuring method: (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

Table 2: Leakage current ratings for selected areas.

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) To:
	Europe Australia		<Or=0.7mA peak <Or=2mA DC	Antenna earth Terminals
			<Or=0.7mA peak <Or=2mA DC	Other terminal

Note: This table is for IEC member only. Be sure to confirm the precise values for your particular country and locality.



SOFTWARE UPDATE

1. RW loader upgrade solution

a. **How to make CD-R download disc for DRL-200**

- i. Please add attached the file to be download (extension of the file name is CVT) to a blank CD-R.
CD-R download disc should have only 1 file to be downloading, so you must add no other files to CD-R Disc.
Set Recording Options as followings.
File Format (or Mode): CD-ROM Mode 1 format.
File System: ISO Level 2, Length of file name exceeds 8 (so Max 31 or Higher)
- ii. Please type the volume name of the CD-R/RW as "ATPLDR_DOWN" exactly. The volume name is not case-sensitive.
- iii. When you are ready to make a CD-R download disc, you should make CD-R session closed. That is, CD-R download disc must be a single session disc.

b. **The downloading procedure with CD-R download disc is as below.**

- i. Please power on your set without any disc.
- ii. Please insert the download CD-R. Downloading program will be started automatically. After DRL-100 reads all of the code to be downloaded. Tray is automatically opened.
- iii. Please remove the download CD-R and don't close the Tray.
- iv. Writing the code to flash memory will be progressed.
- v. Please certainly wait until tray closed of itself. Maybe it takes about 1 minutes to end the downloading.
- vi. If the tray is closed automatically, download is successful. Or if the tray is not closed automatically in several minutes, download is failed.
- vii. If success, please power off and on to reset it.

2. LSI+ATAPI (dmn8600 /dmn8602) upgrade solution

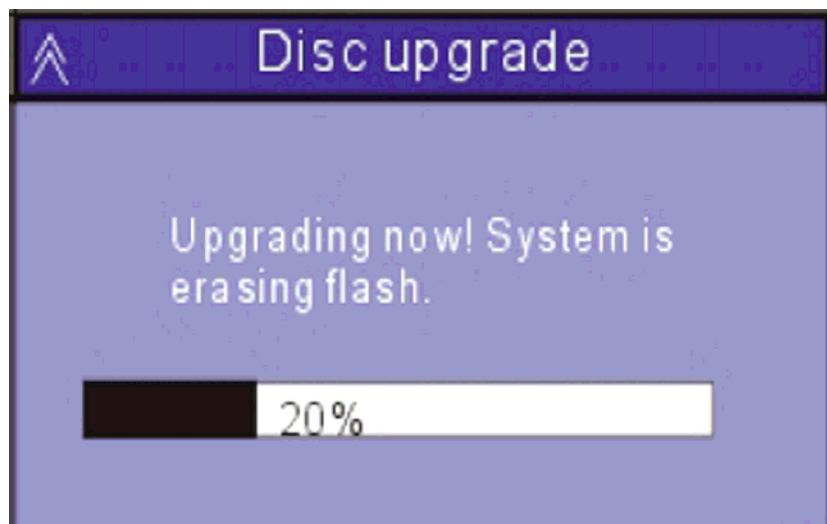
a. **How to make CD-R download disc for DMN8600 /DMN8602**

- i. Please add attached the file to be download (extension of the file name is dmn8600.cub) to a blank CD-R
CD-R download disc should have only 1 file to be downloading, so you must ass no other files to CD-R Disc.
- ii. When you are ready to make a CD-R download disc, you should make CD-R session closed.
That is, CD-R download disc must be a single session disc.

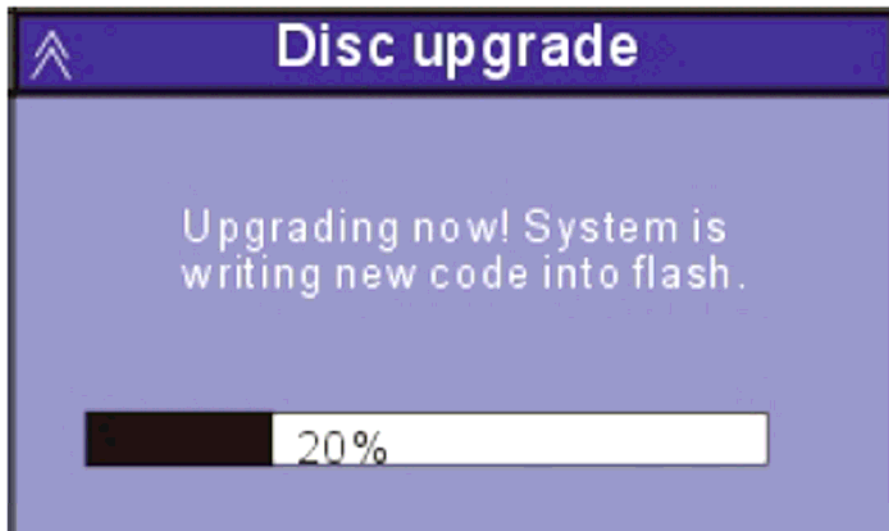
- b. The downloading procedure with CD-R download disc is as below.
 - i. Please power on your set without any disc.
 - ii. Please eject the tray.
 - iii. Please insert the download CD-R. Downloading program will be started automatically.
 - 1. After RW Loader reads the DMN8600 upgrade disc, the disc upgrade menu as below will be displayed on TV screen.



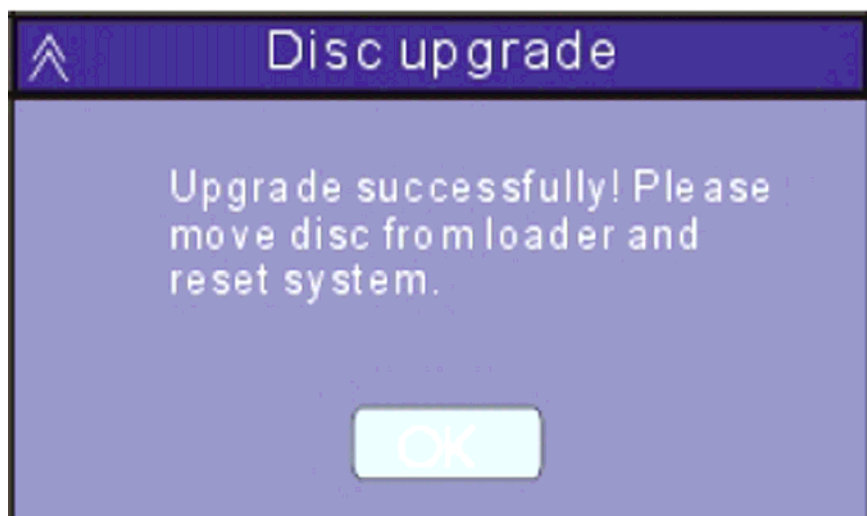
- 2. Select Cancel to quit upgrade and the tray will auto open. Select OK to start upgrade, then the disc upgrade menu will be changed.



3. After select OK to start upgrade, System will erase and Write the code to flash memory. The schedule will indicate upgrade progressed status.



4. After upgrade successfully, VFD will display FINISH character and TV will display the Upgrade successfully menu. Then the tray is automatically opened. Please remove the download CD-R.



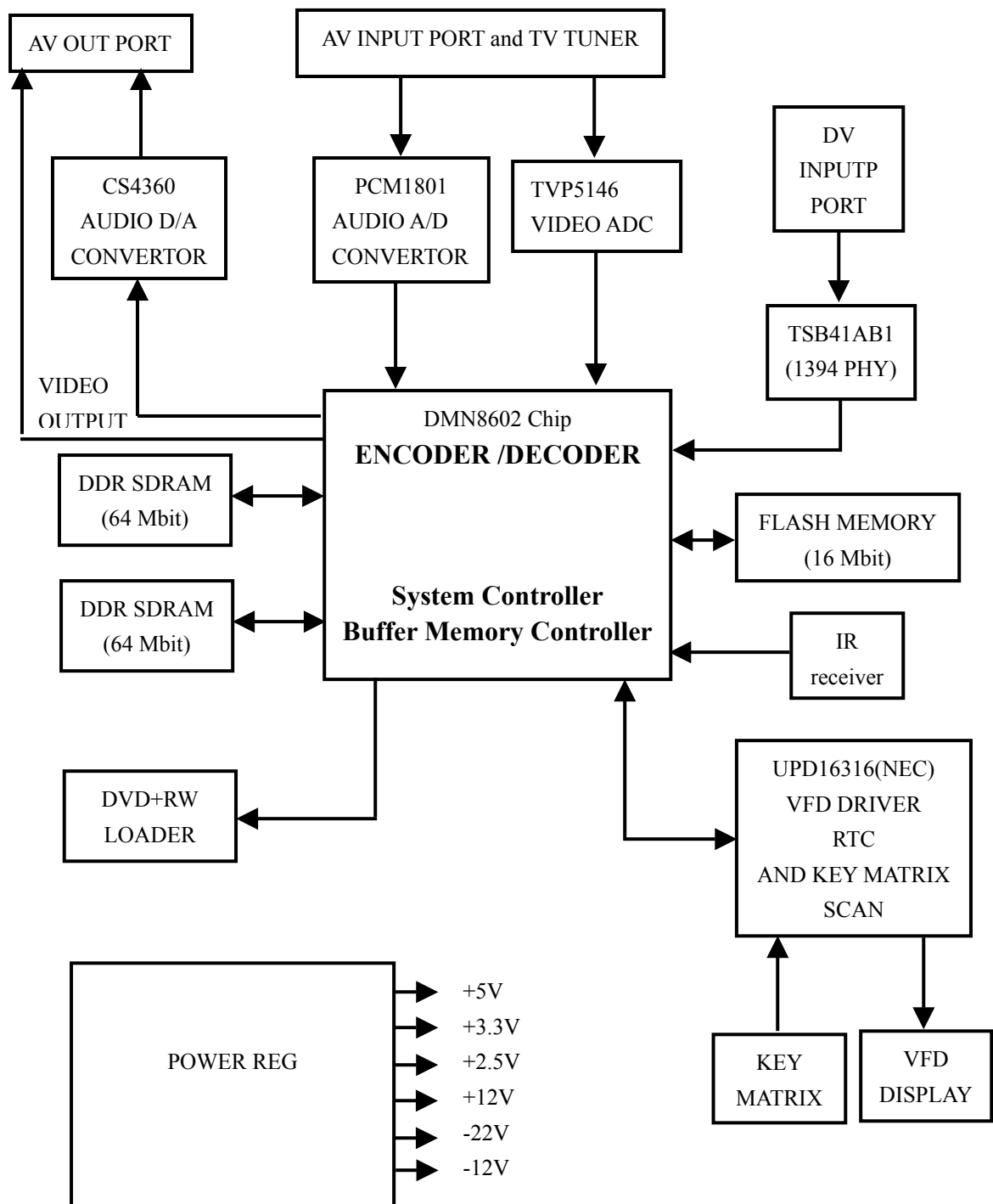
5. Please select OK to reset it. If can't software reset, please power off and restart it.

Note:

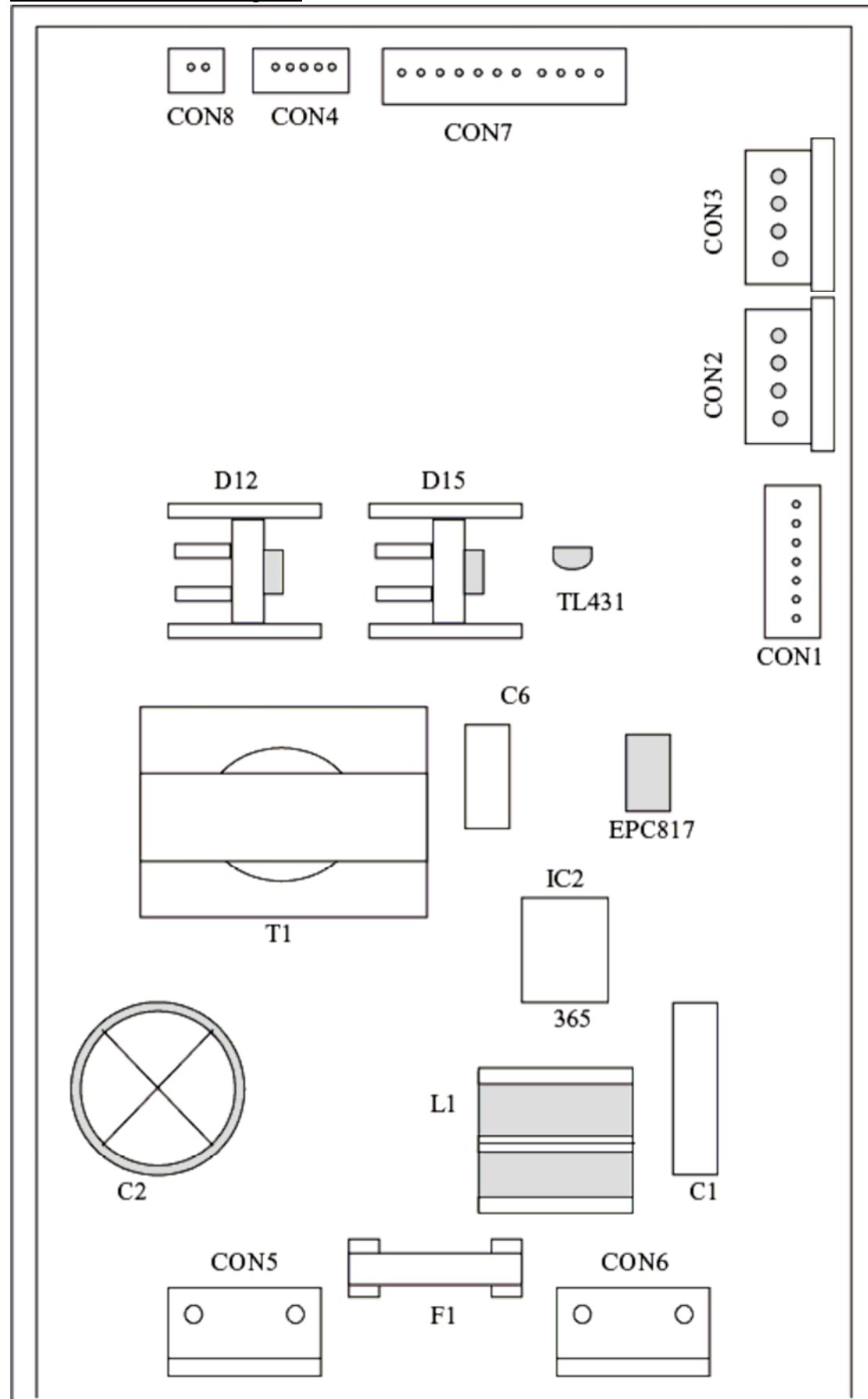
1. If the upgrade menu display that upgrade failed, it perhaps the upgrade disc not be recorded successfully. Please make download disc again.
2. During upgrading, the RECORDER machine could not be operated.
3. If there is no picture, no sound after restarting, this is a hang-up during upgrading.

At this stage, the RECORDER machine could not be functional and a correct procedure of FLASHMEMORY has to be replaced.

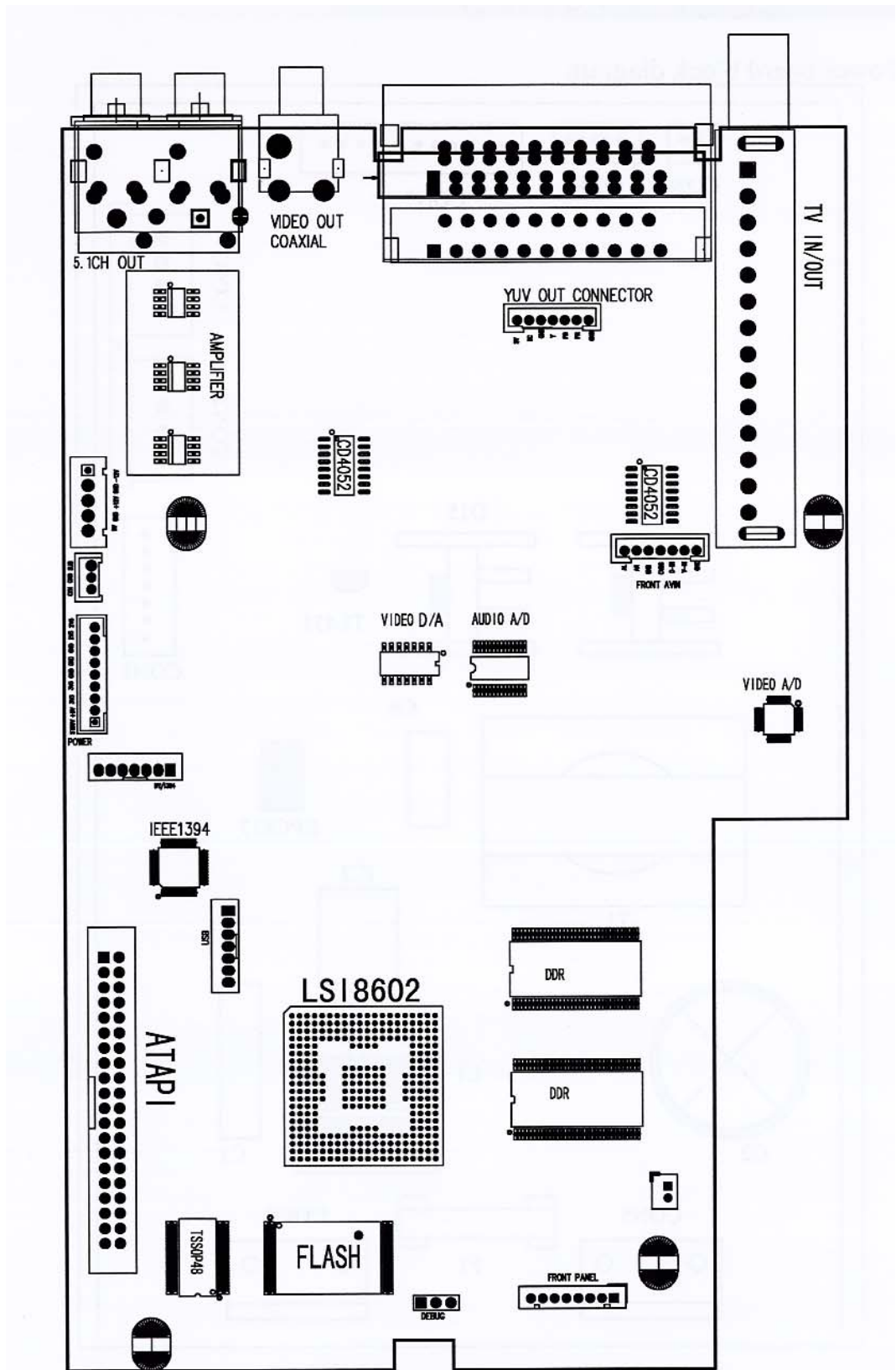
CIRCUIT BLOCK DIAGRAM



Power Board Block Diagram



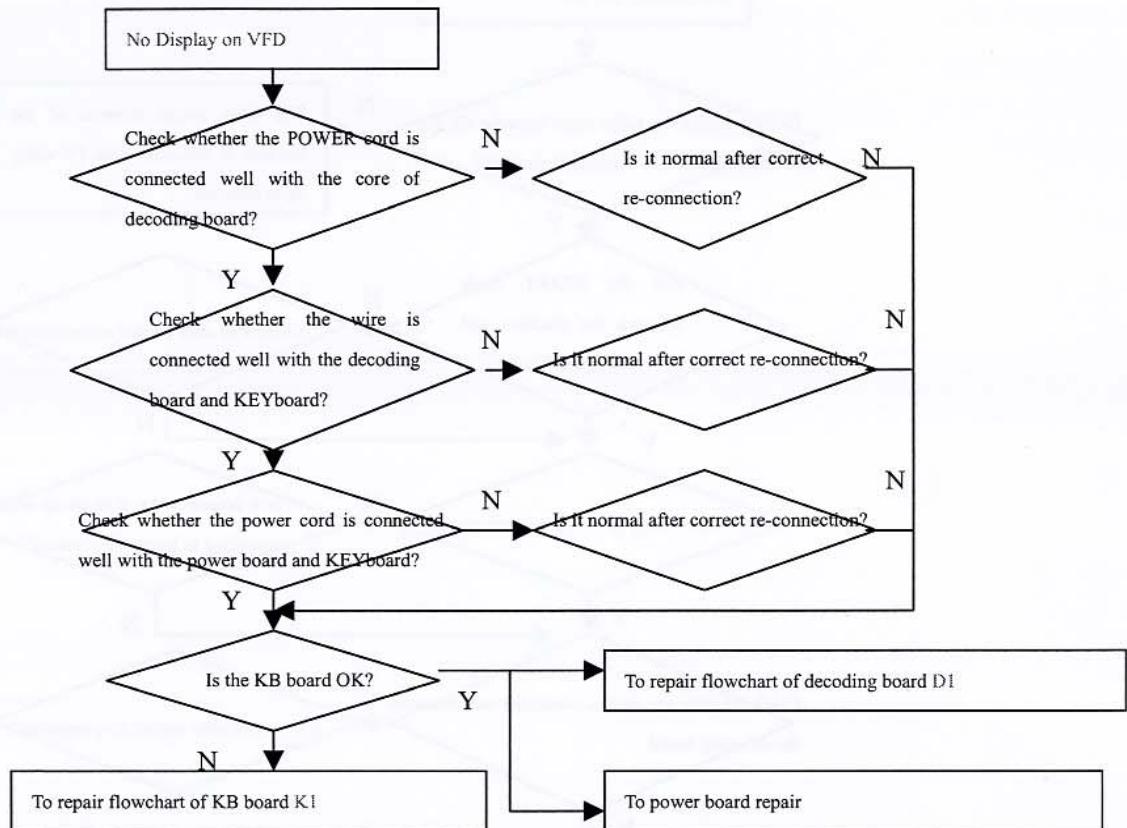
Decoder Board Block Diagram



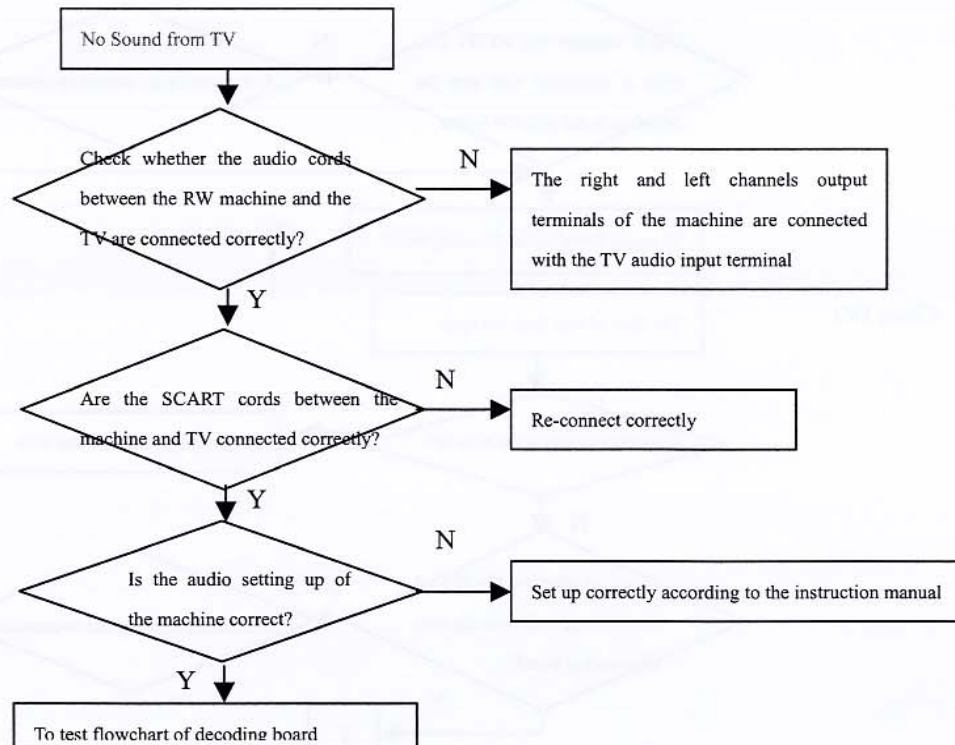
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GENERAL CLASSIFICATION OF SYMPTOMS

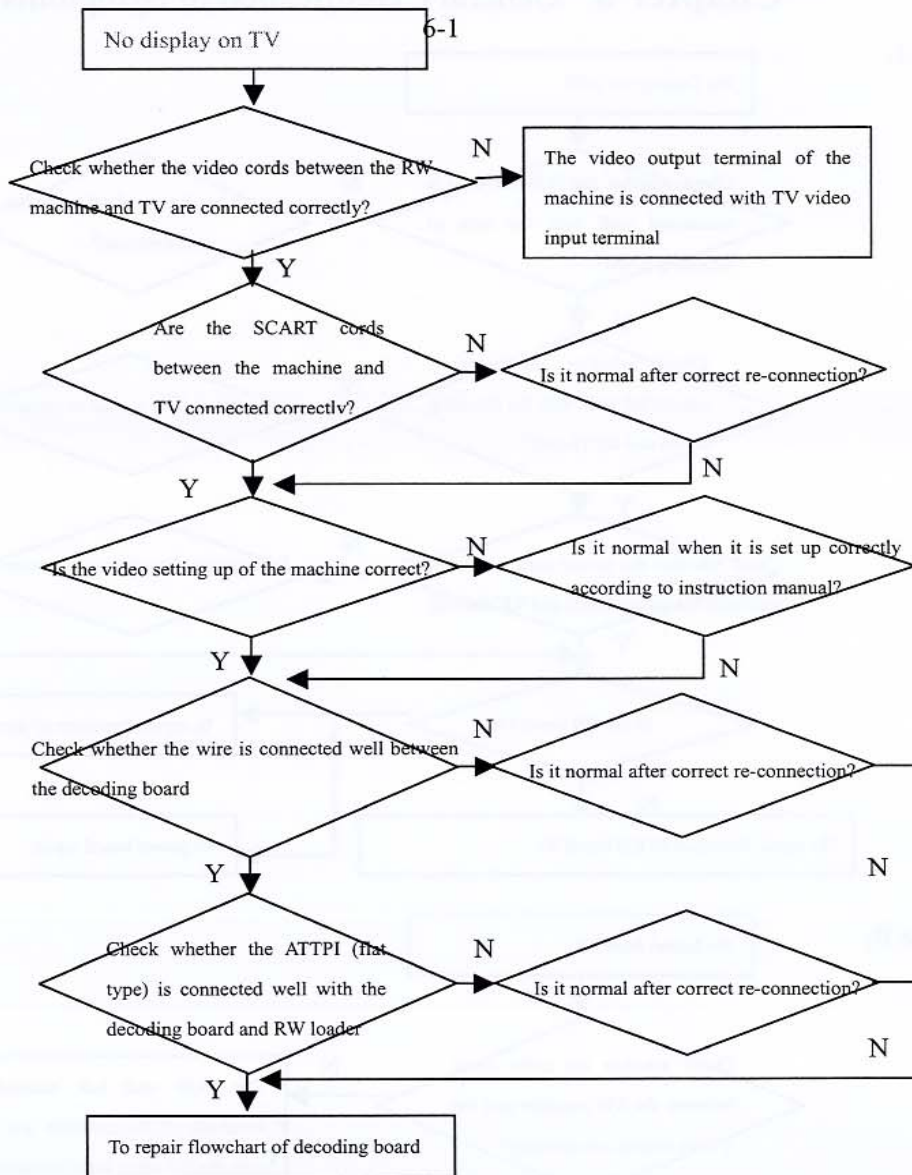
Class I:



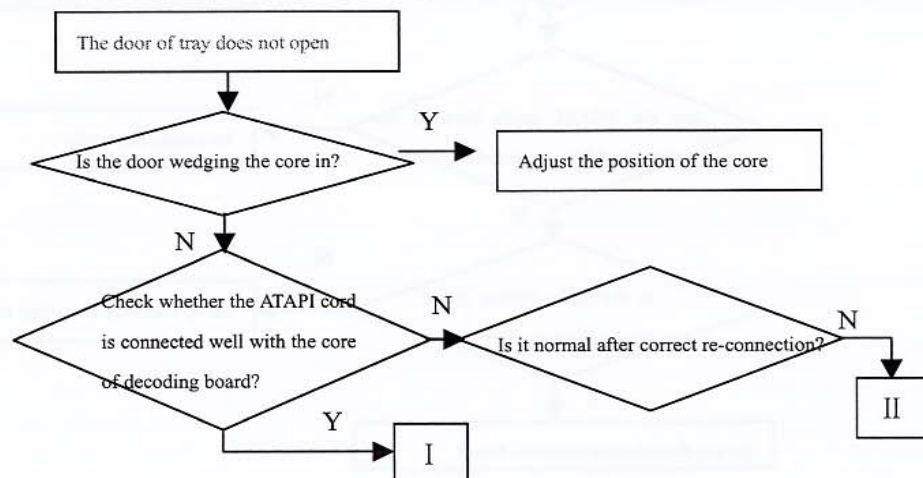
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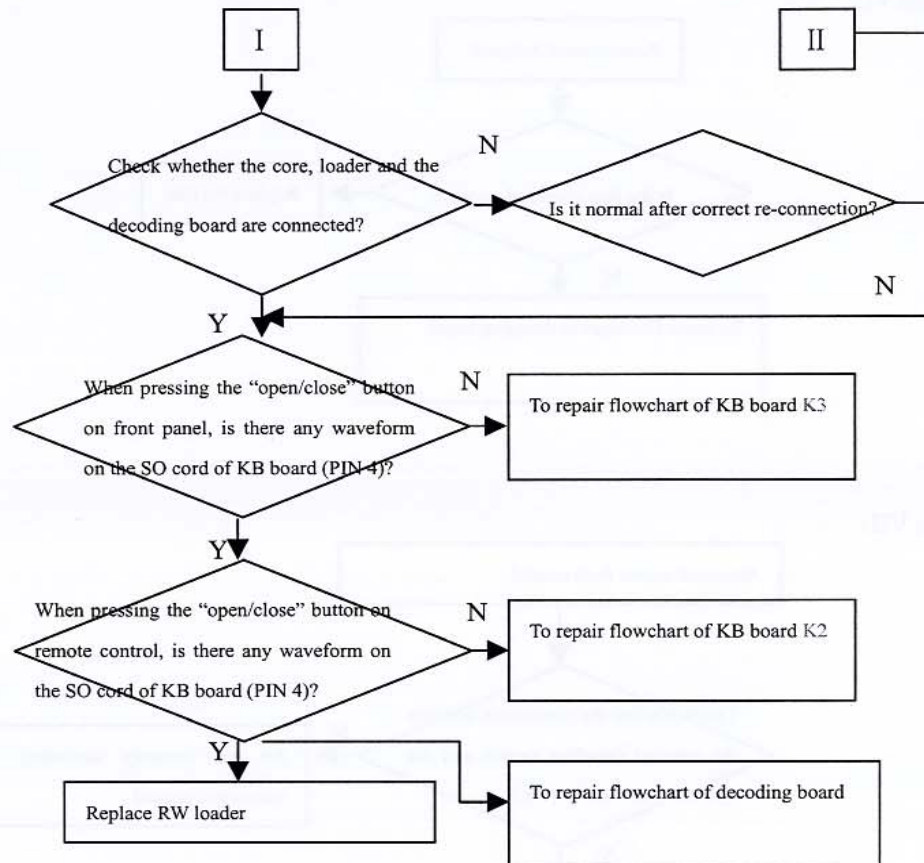


Class III:

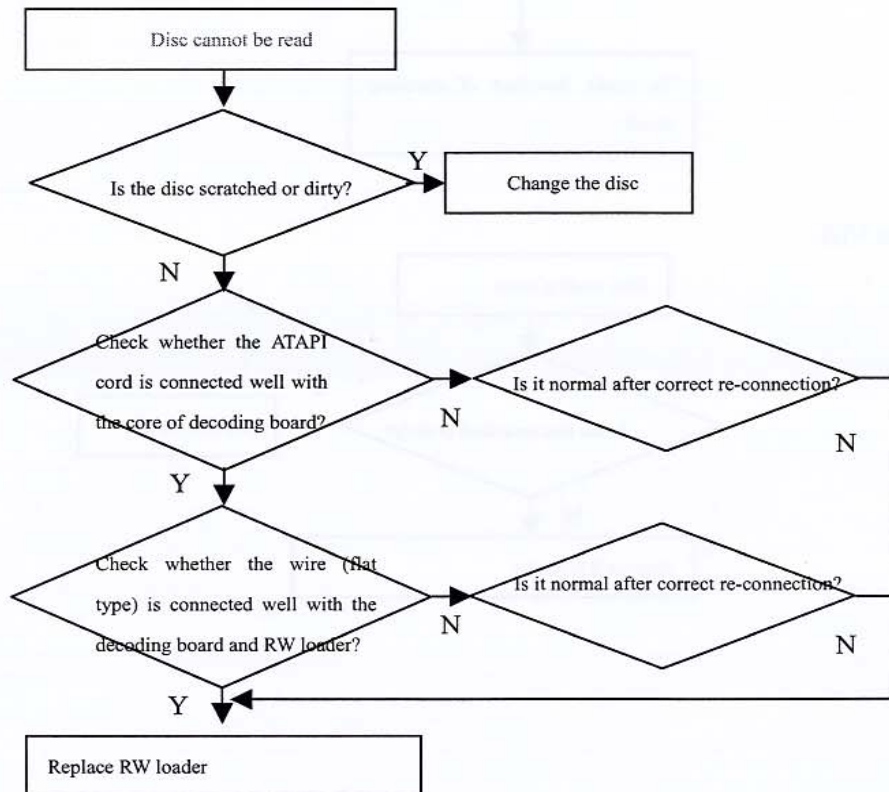


Class IV:

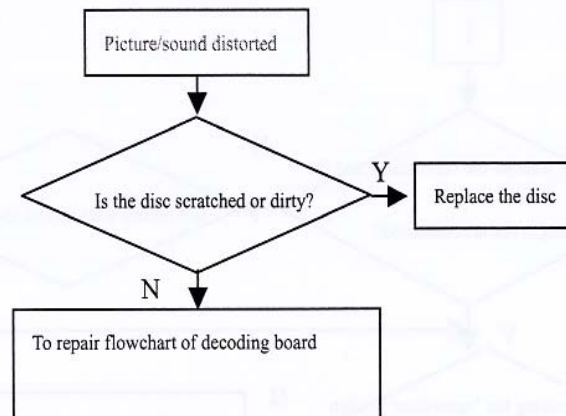




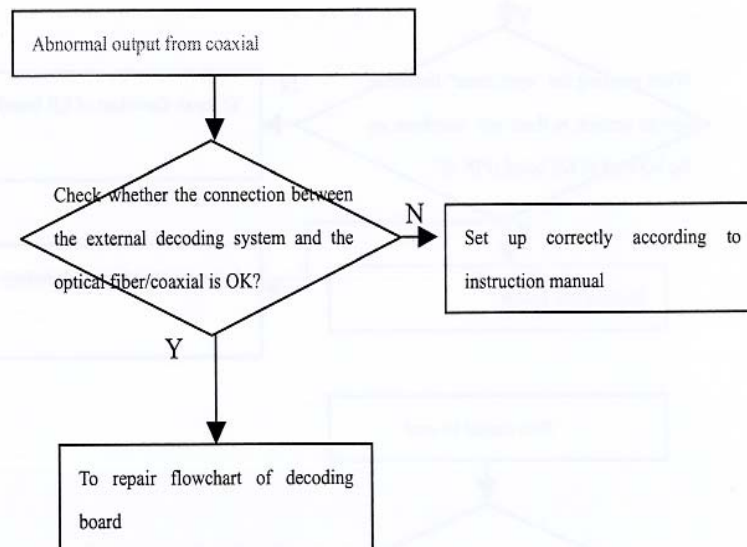
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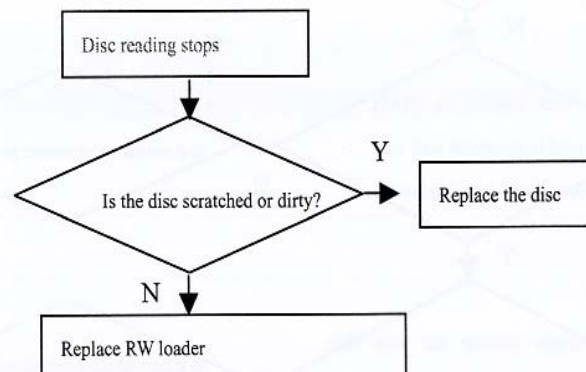
Class VI:



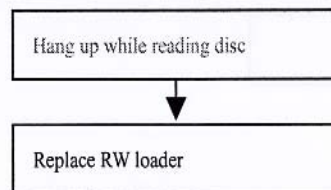
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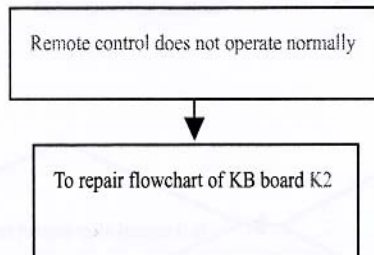
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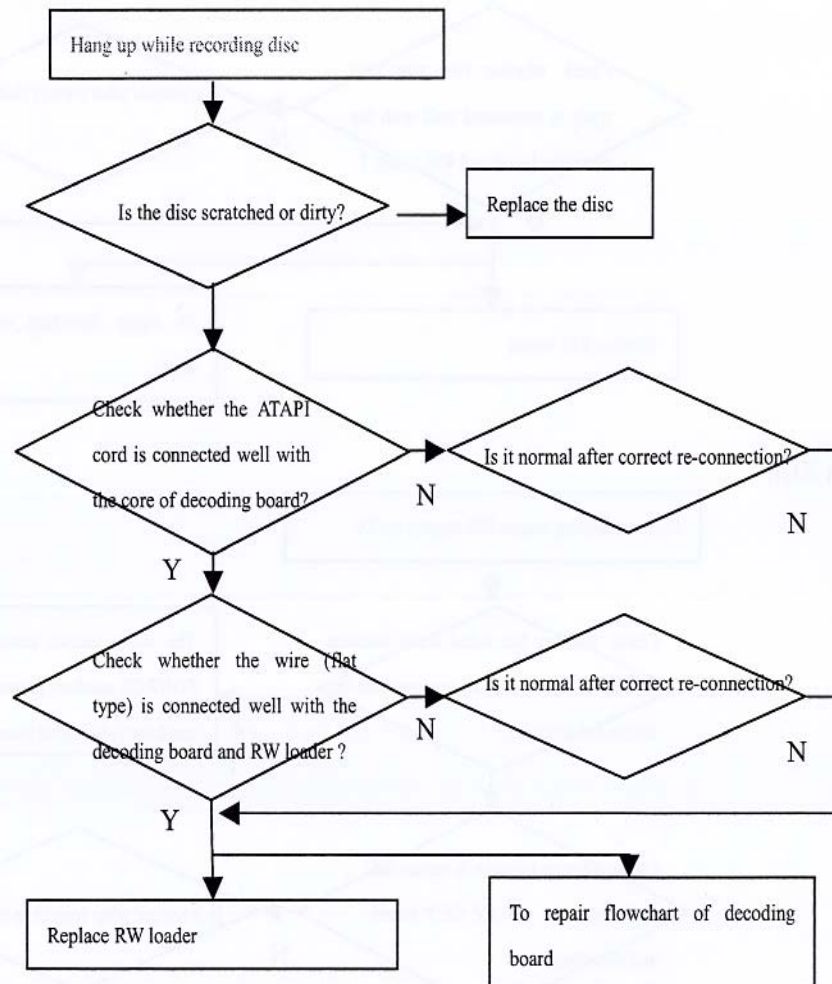
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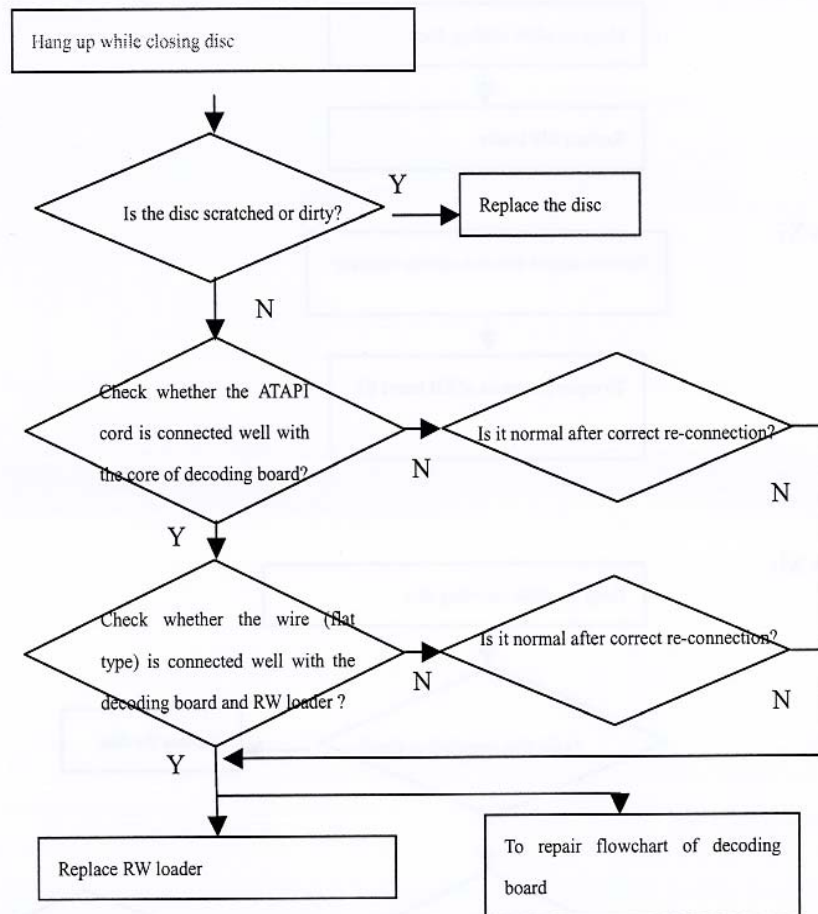
Class X:



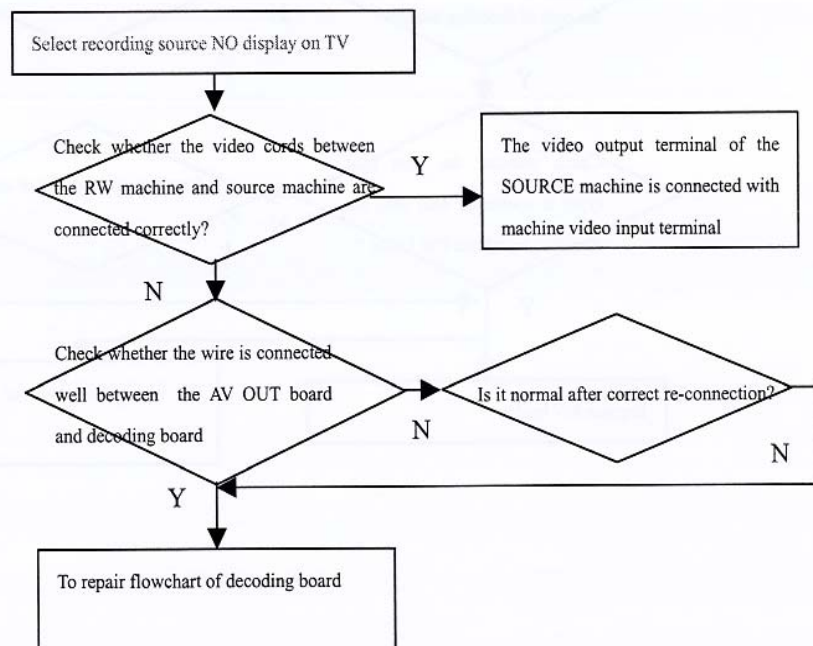
Class XI:



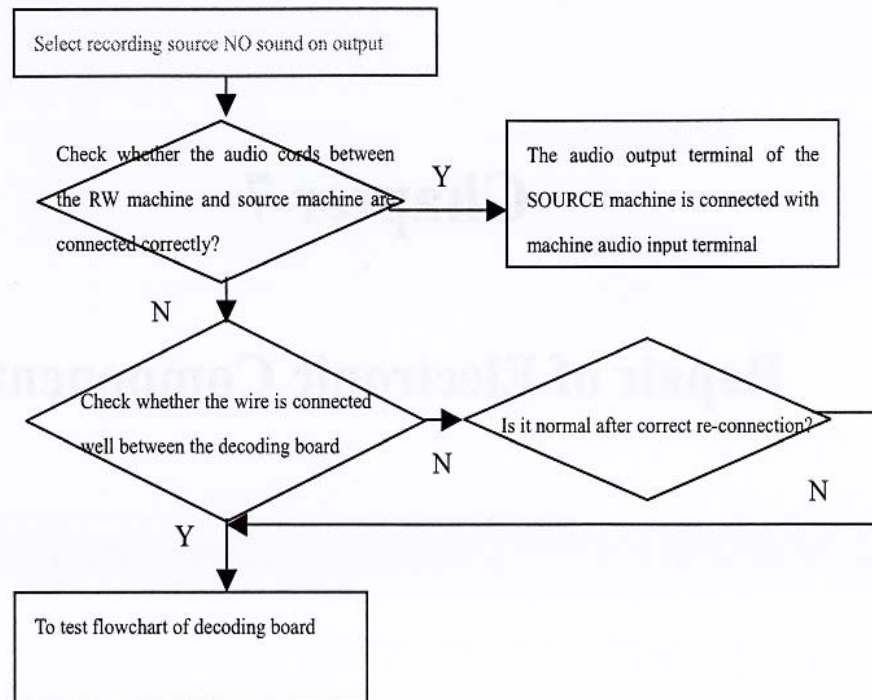
Class XII:



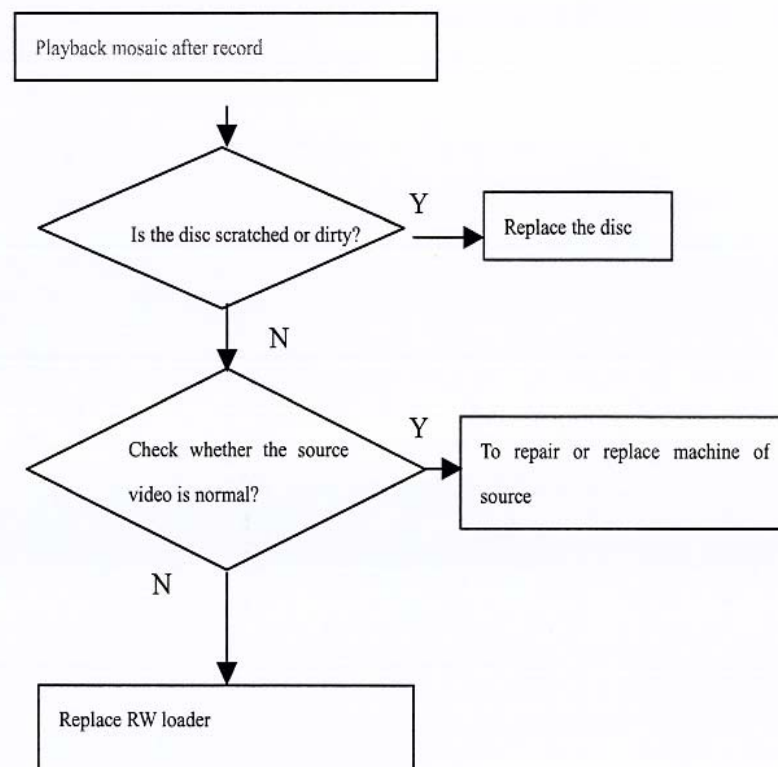
Class XIII:



Class XIII:



Class XIV:



REPAIR OF ELECTRONIC COMPONENTS

REPAIR OF POWER BOARD

1. Power switch working principles

The internal parts of main power switch IC 2A365 (IC2) consist of: oscillation circuit, error test and T-ratio over current overheating protection, under-voltage and over voltage protection, and power-amp MOSFET.

a. Conversion from AC to DC circuit

230V /110V AC current flows restrictively through F1 fuse, L1 and C1, C6, C7 combines to be share-mode and differential-mode filter circuit, filtering external disturbance and preventing internal electromagnetic radiation and through D1~D2 and D5~D6 to combine as bridge rectification. After C2 undergoes electrolytic filter, we can obtain a 320 /140V DC voltage (U_{hv}).

b. Process to start up the software

Connect R3, R8 to the multi-function VCC pin of IC2, test DC input voltage U_{hv}. This can effect as a protective function to restrict under-voltage current and reduce over voltage T-ratio. C44 and C24 are the charging circuits to start up software, and electric current inside IC flows from control pin 1. When V_c reaches 5.3V, internal oscillation circuit initiates, motivating power-amp MOSFET, forming AC current on T1 P1~P3 primary winding, coupling to secondary winding. Power switch start-up has completed.

c. Bias winding

After starting the power, T1 P5~P6 winding supplies bias current and error current to pin71 of IC2, through D10 and C13 rectifier filter.

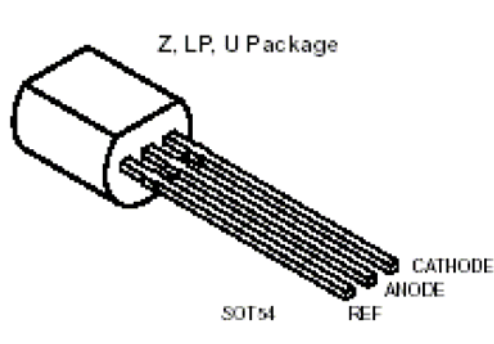
d. Clamping protection circuit

C3, R2, D8 are connected to primary switch transformer, in order to fix the leakage electrode voltage of IC2 and to prevent the voltage exceeding the limit of IC2 leakage electrode voltage when switch transformer discharges at startup or overloading stage.

e. Regulation process of output voltage

When the input current of control pin (FB) IC2 decreases or increase, oscillation waveform will be regulated automatically so that T ratio will increase (or decrease) and the output voltage will increase (or decrease).

Output voltage feedback circuit is completed by Q5, U3. Q5 (TL431) is a reference regulation IC, reference voltage is 2.5V: Its pins are shown on the diagram below.



- i. Anode voltage V_{ka}, anode change in voltage
- ii. Reference voltage, reference change in voltage.
Secondary main winding, set 5V to output change in voltage ΔV_o ; we can deduce $\Delta V_{R305} = 356 \Delta V_o$

From this formula we can deduce: If 5V Voltage rises, the voltage V_{R25} of the two ends of R25 will rise, error voltage increases by 356 times. V_{R25} error voltage is added to the light-emitting diode of U3 optical coupling, so that the emitting intensity increases. Coupling increases the current of U3 light-electric triode. The control current of IC2 then rises and the T ratio of open /close power reduces, thus reducing 5V output voltage.

On the other hand, if 5V voltage reduces, negative feedback will cause it to rise automatically.

f. Output voltage for the first time

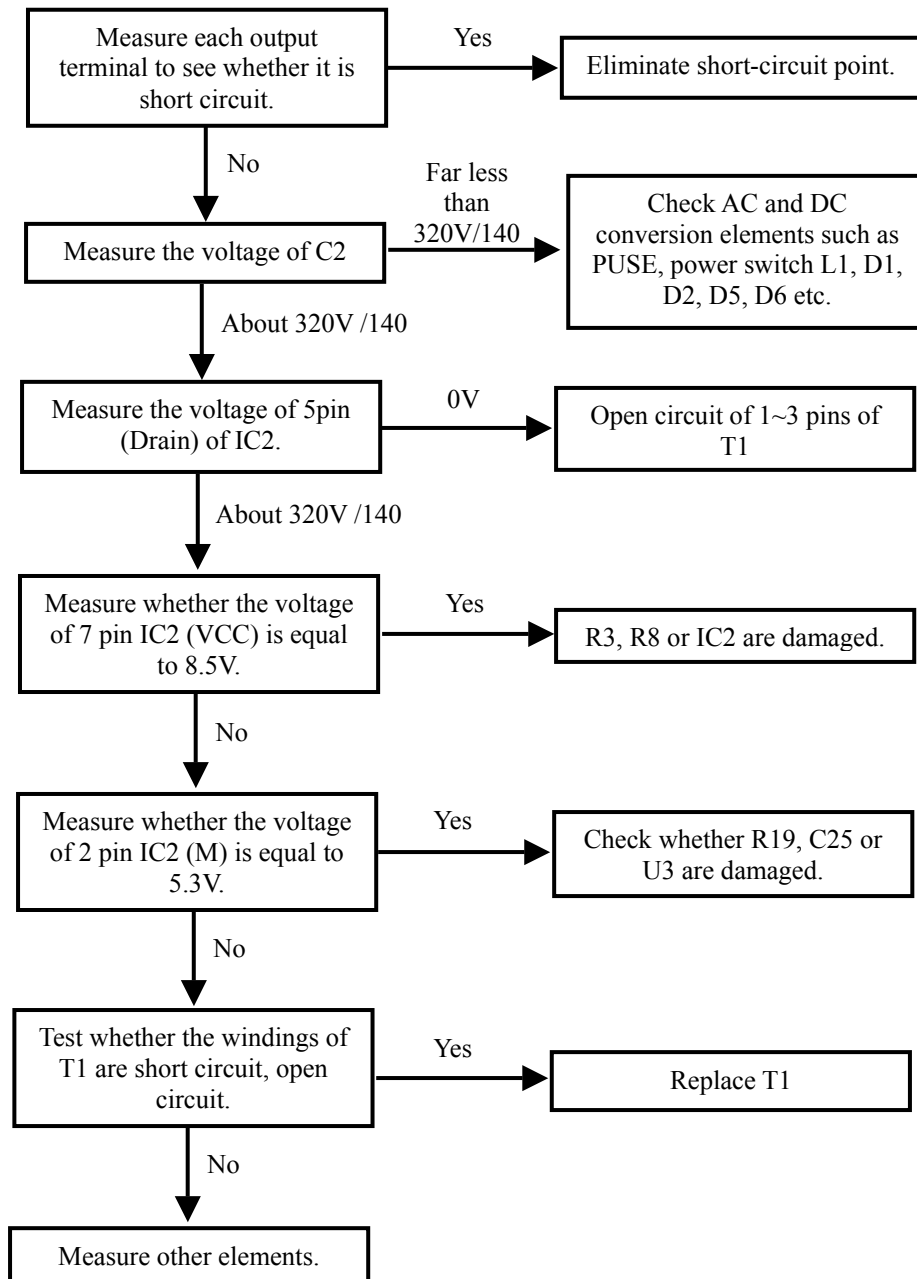
After 5V main feedback winding has been regulated, other windings will be regulated relatively and the voltage required by each circuit of the RECORDER machine can be obtained. D3 provides a ground impedance bias voltage to filament voltage. When it is damaged, the VFD cannot be lightened up.

Since there are only half of the cycle which is useful for regulation among the open /close waveforms (the other half cycle voltage rises when the input voltage rises), and the open /close frequency is as high as 130KHz, so that all secondary class uses rectification.

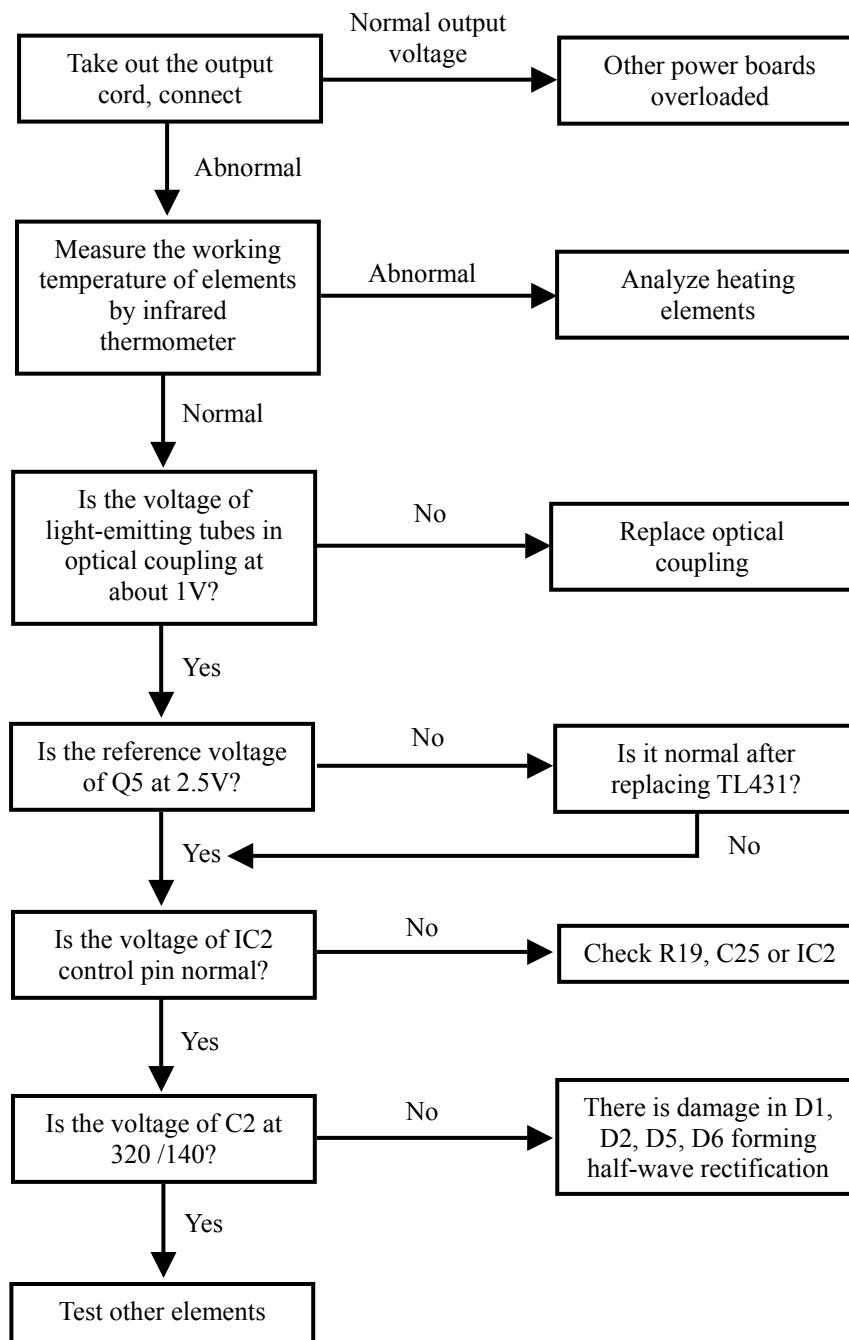
2. Repair flowchart of open /close power:

Below are two flowchart for troubleshooting which occur frequently when open /close power.

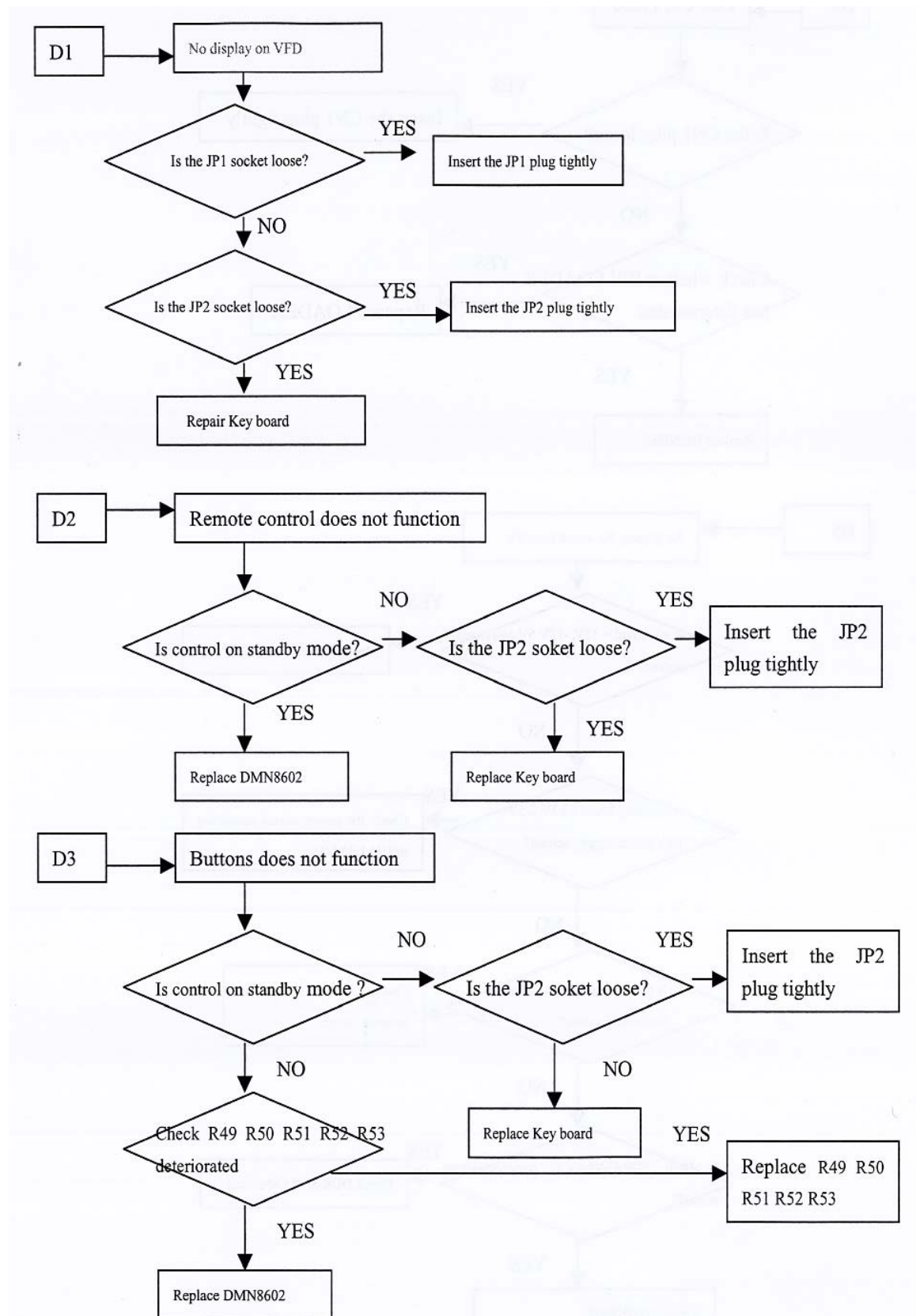
No Voltage Output

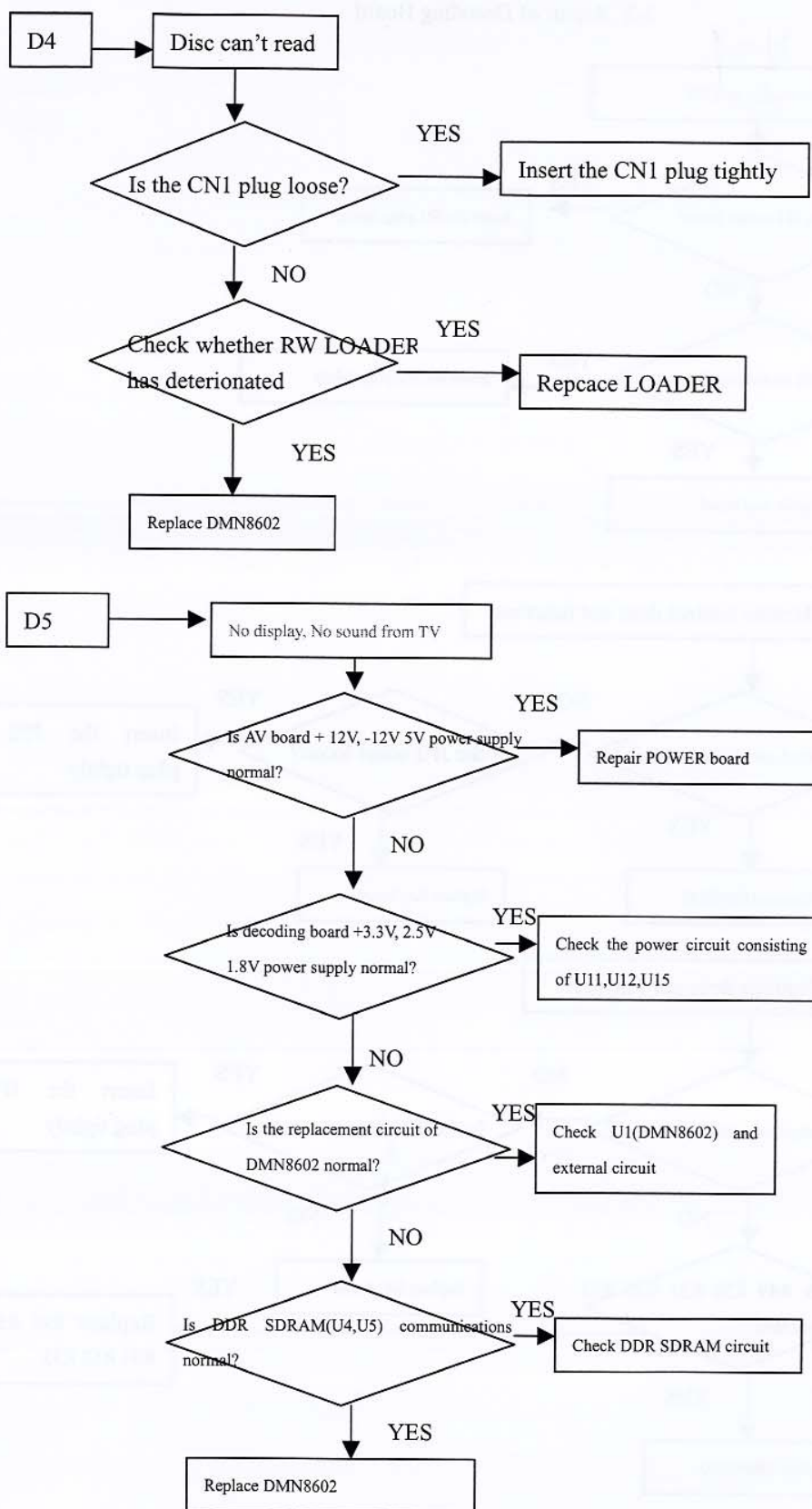


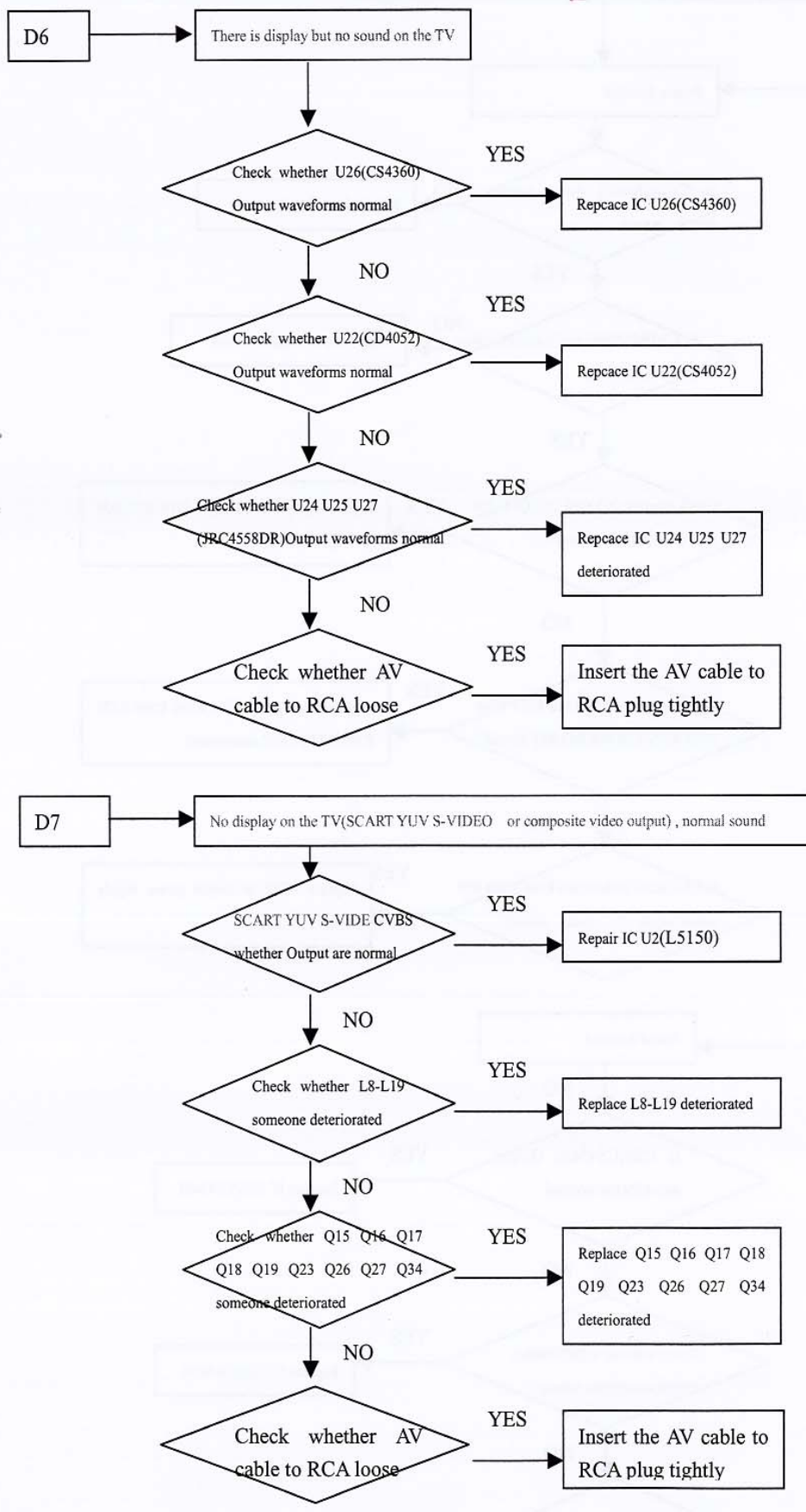
Unstable voltage output, decrease of carrier capability

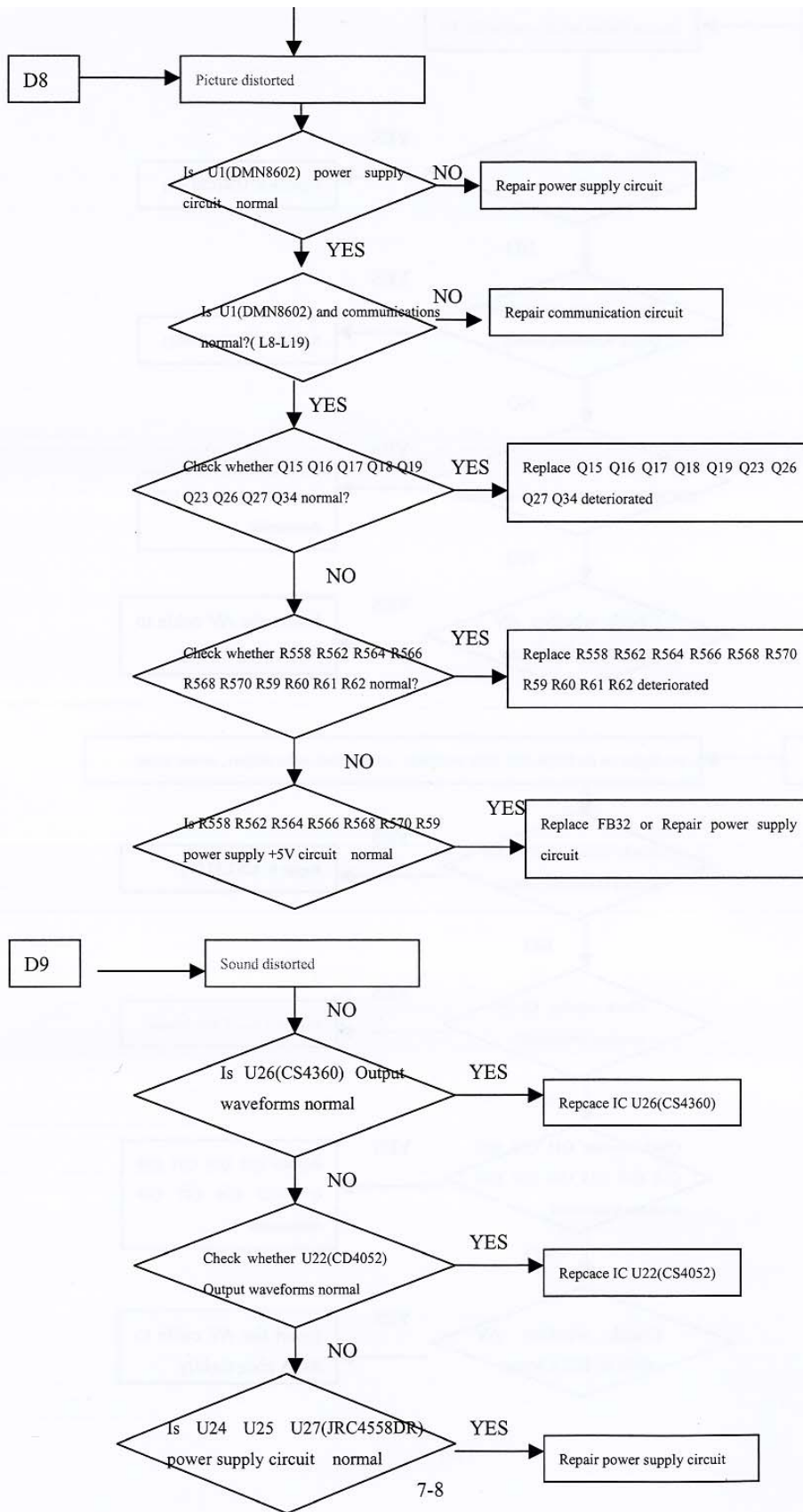


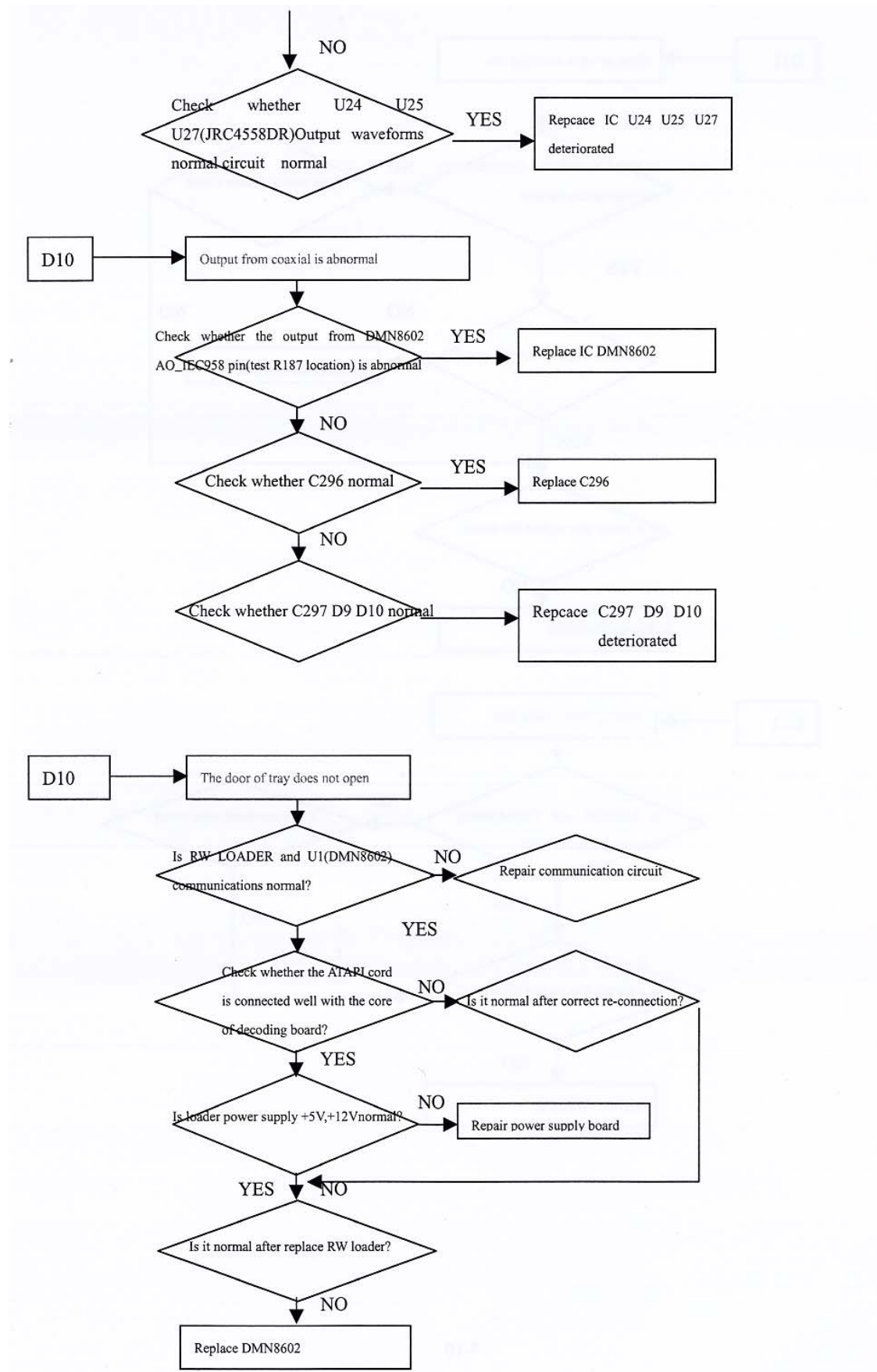
Repair for decoding board

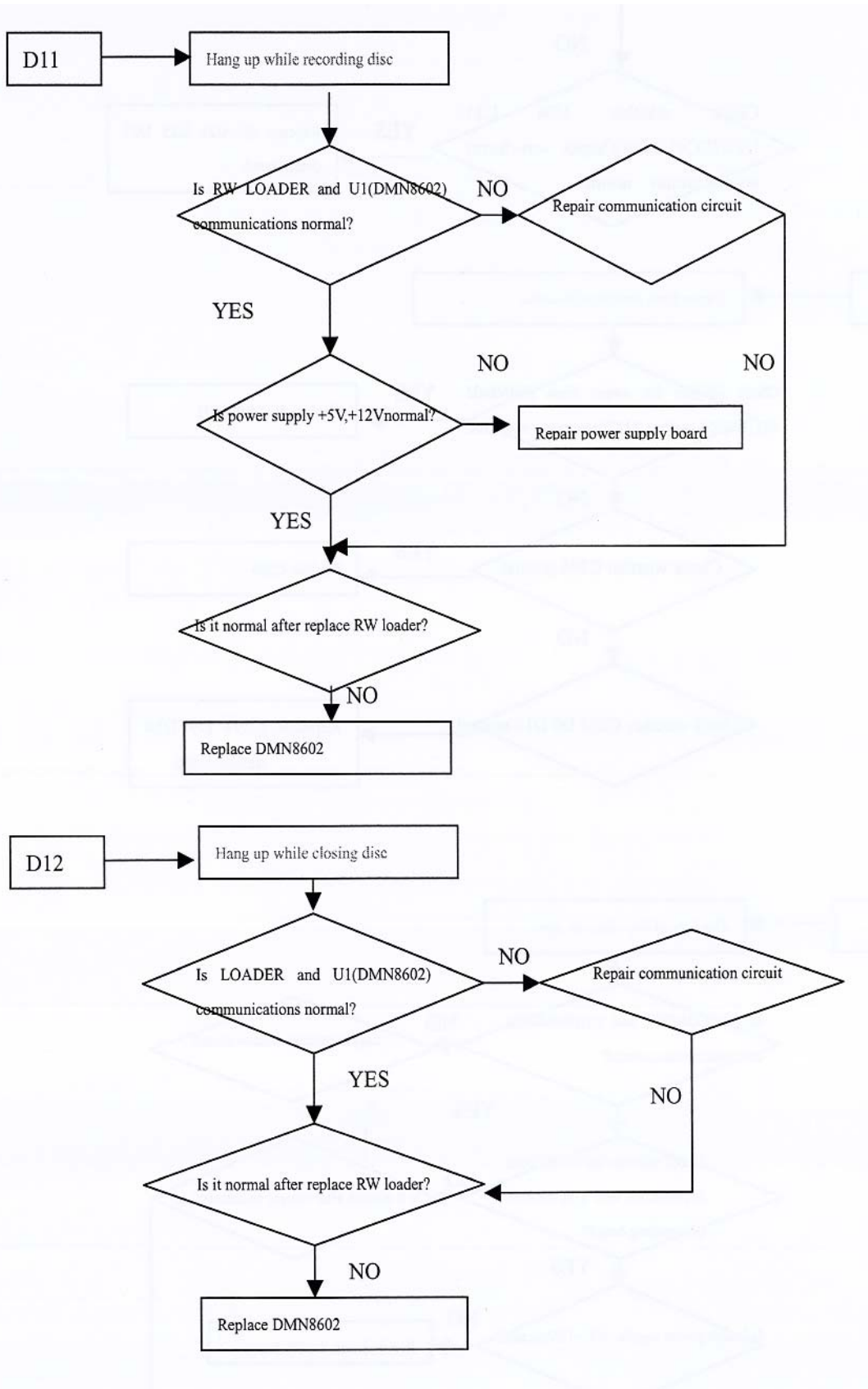


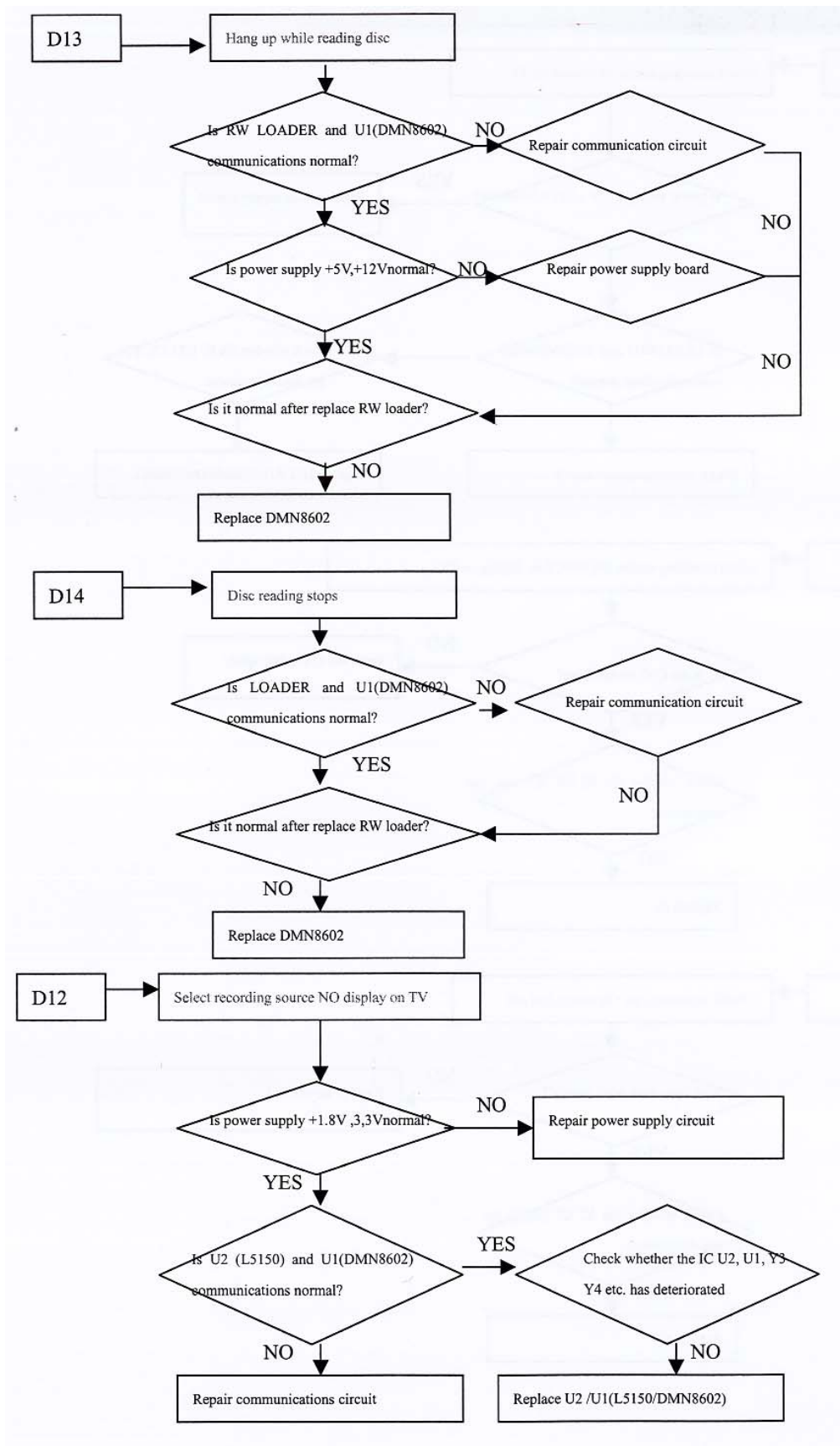


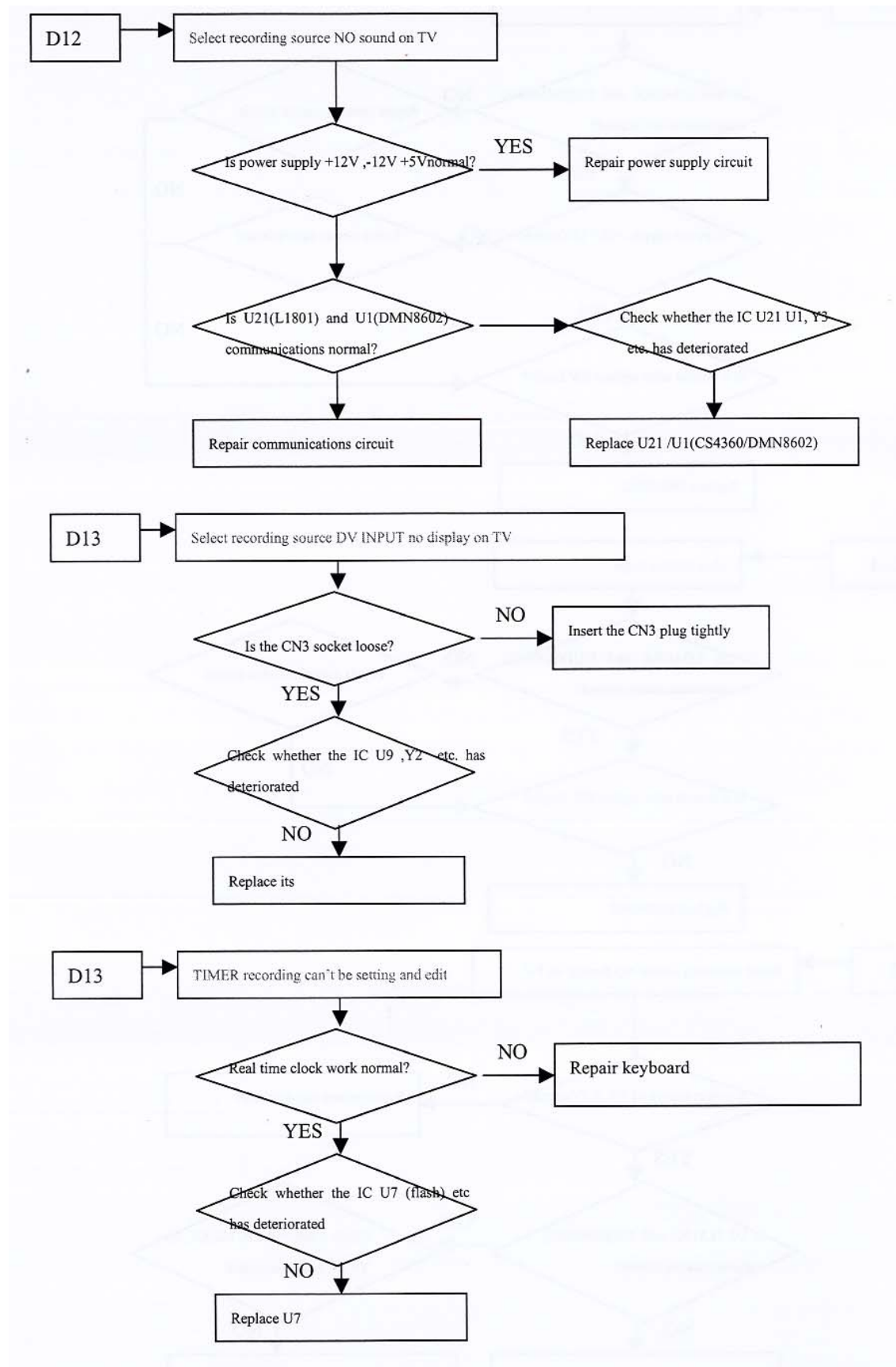




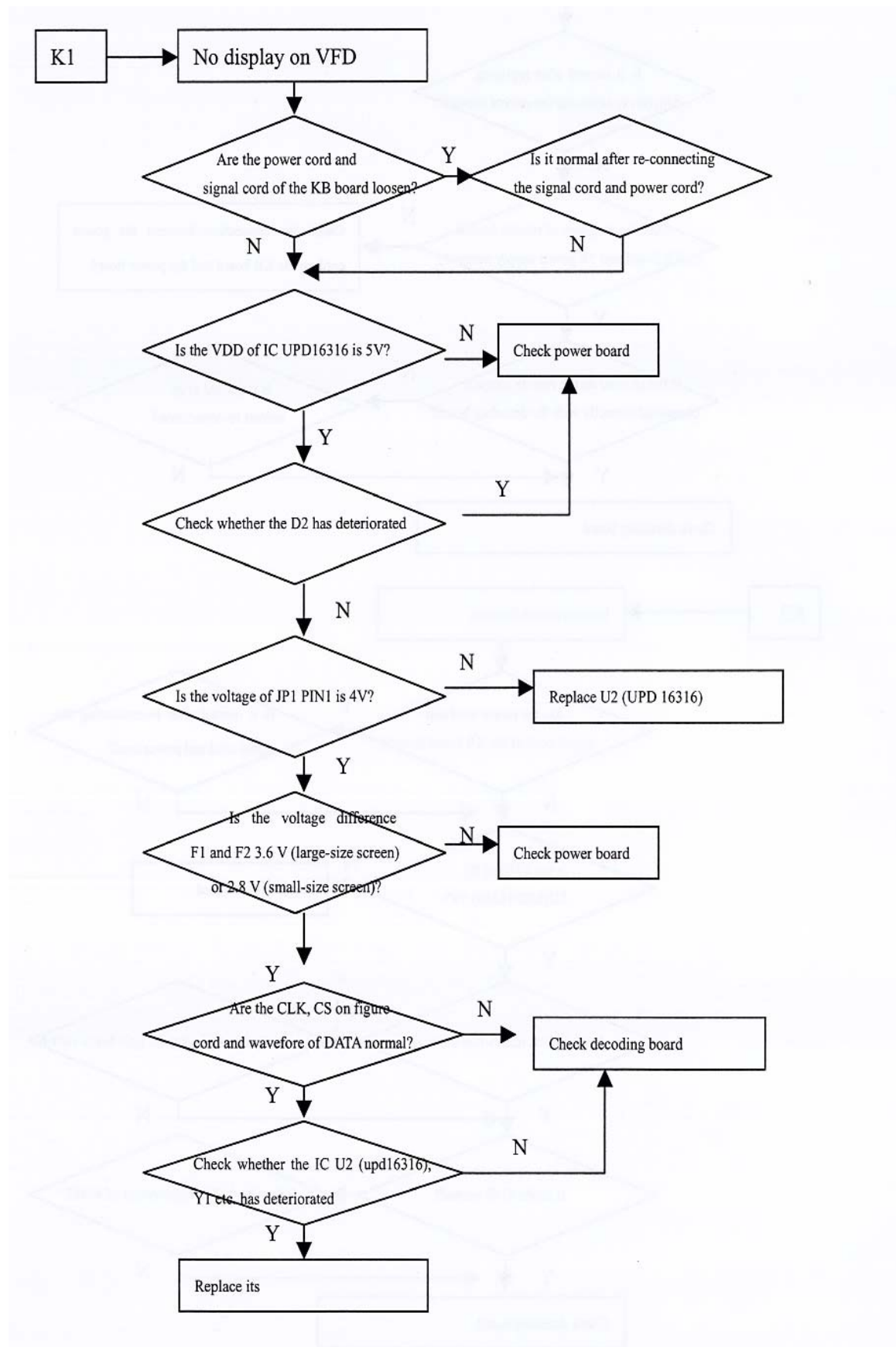


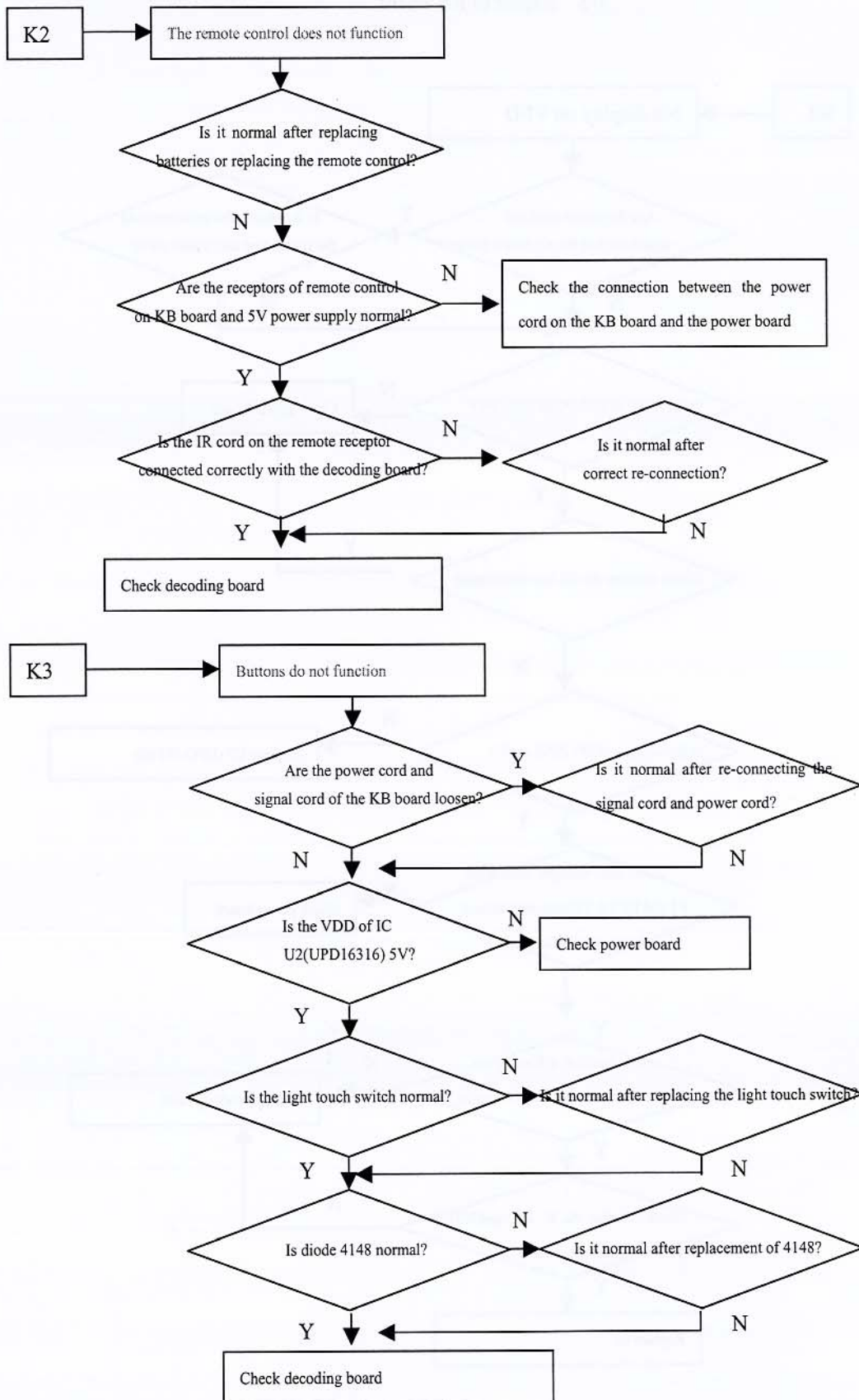


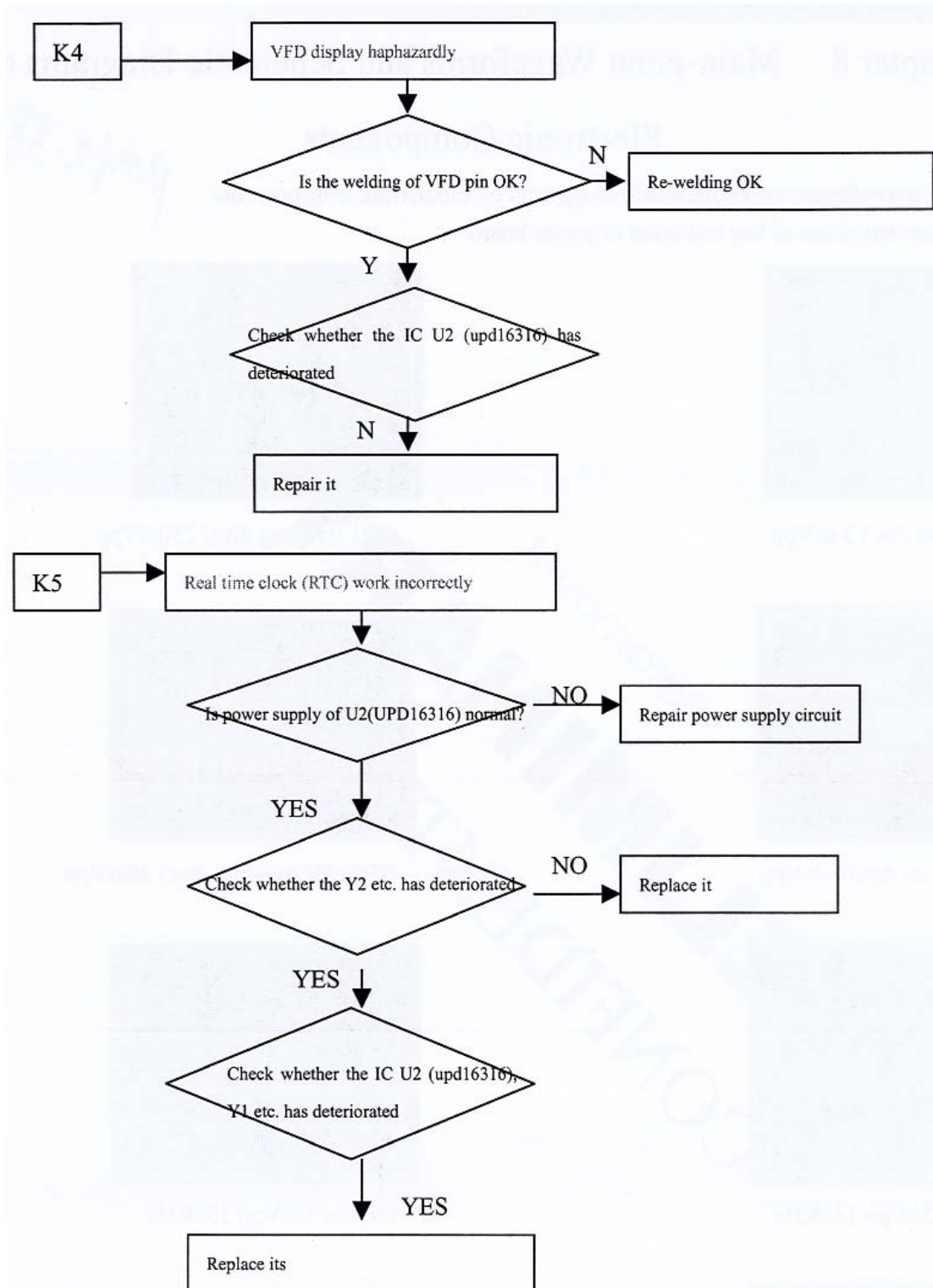




Repair of KB Board



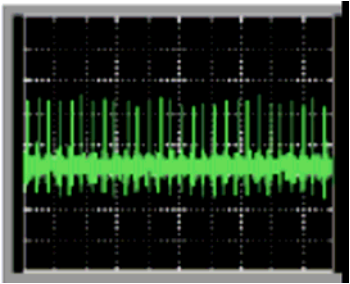
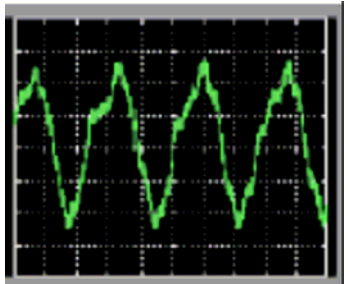
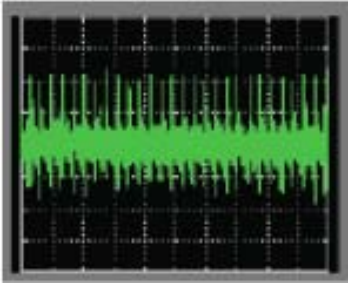
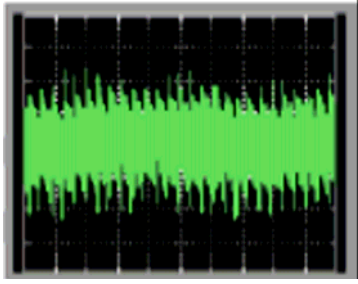
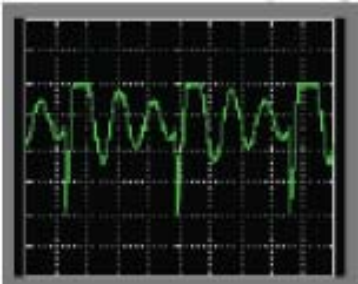
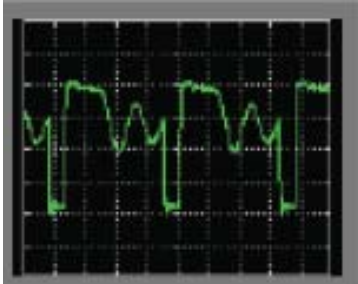
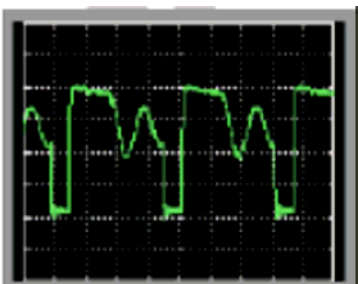




MAIN-POINT WAVEFORMS AND CIRCUIT DIAGRAM OF ELECTRONIC COMPONENTS

WAVEFORMS OF POWER BOARD

Reference waveform of key test point of power board

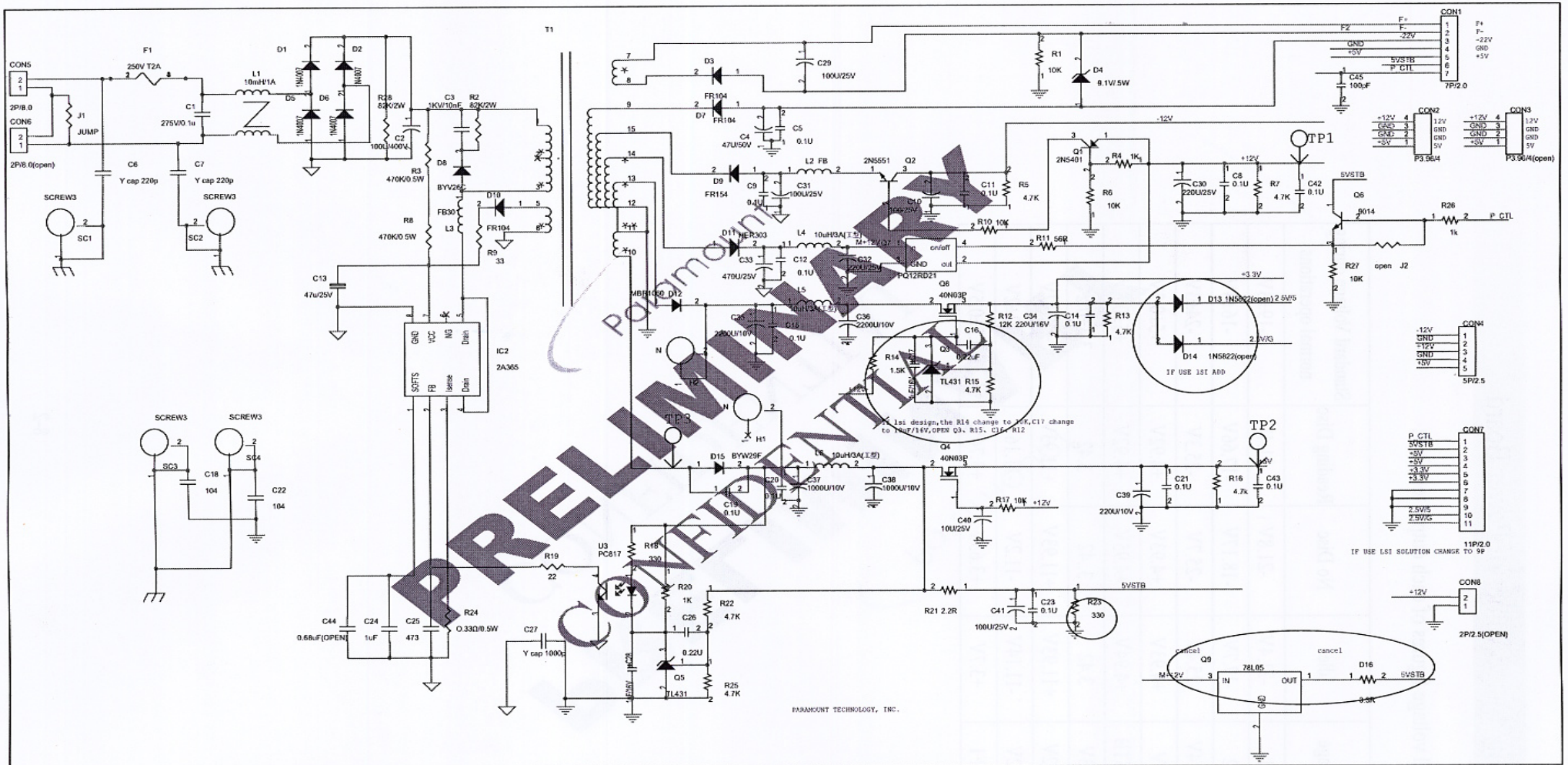
	
TP1 +12V (no disc) 3-mVpp	TP1 (reading disc) 250m Vpp
	
TP2 +5V (no disc) 3-mVpp	TP2 +5V (reading disc) 40mVpp
	
TP3 (idle) 20Vpp 130KHz	TP3 (no disc) 20Vpp 130KHz
	
TP3 (reading disc) 20Vpp 130KHz	

MAIN VOLTAGE VALUES OF POWER BOARD

Actual voltage figures of each output terminal:

Voltage	Idle	No Disc	Reading Disc	Standard voltage during normal operations
F1	-21.4V	-21.8V	-21.4V	-19±3V
F1	-17.7V	-18.17V	-17.66V	-16±3V
-24V	-25.4V	-25.7V	-25.3V	-24 ±3V
+5V	+4.93V	+4.93V	+4.92V	+5±0.2V
+5STB	+4.94V	+4.95V	+4.92V	+5±0.5V
+3.3V	3.42	3.42	3.42	3.3 ±0.2V
+12V	+11.93V	+11.93V	+11.93V	+12 ±2V
-12V	-11.14V	-11.2V	-11.16V	-12 ±2V
F2-F1	+3.7V	+3.63V	+3.74V	3.5 ±0.5V

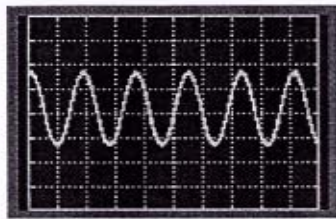
CIRCUIT DIAGRAM



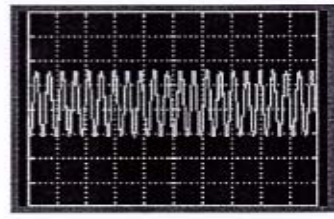
WAVEFORM OF LSI8602 DECODING

Waveforms of main reference points of decoding board

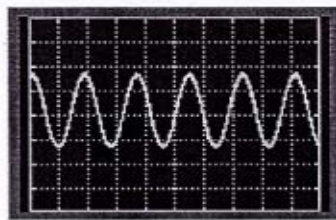
Reference waveforms of main points of LSI8602 decoding board



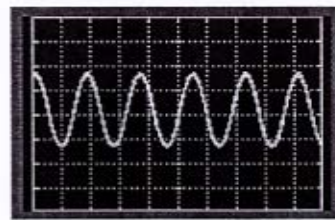
TP1 13.5MHz XTAL



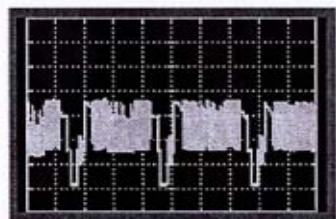
TP2 -DRAMCLK 148.5MHz



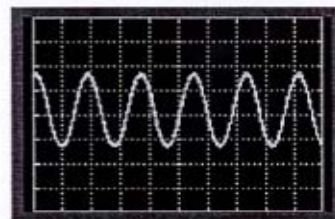
TP3 14.31818MHz XTAL



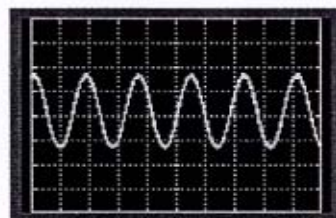
TP4 24.576 MHz XTAL



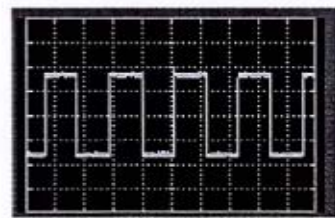
TP5 CVBS1



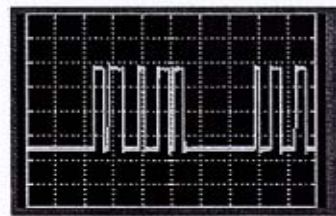
TP6 - AUDIO-L 1KHz



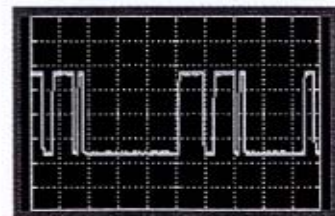
TP7 AUDIO-R 1KMHz



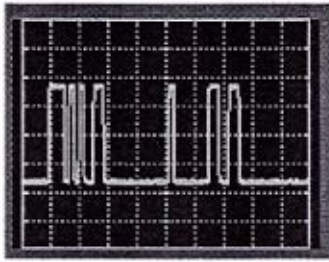
TP9 AO_FSYNC 48KHz



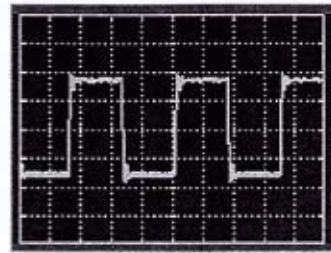
TP10 AO_D1



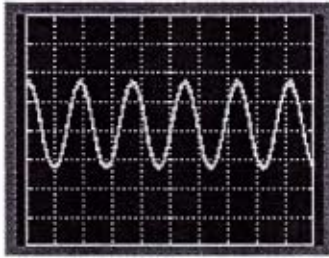
TP11 AO_D2



TP12 AO_D3



TP13 AO_SCLK 3.072MHz



TP14 AO_MCLK 12.288MHz

FIGARO - 2

DMN8602MK Main Codec Board (DDR SDRAM)

LSI Logic Corp. Copyright 2002

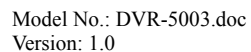
REVISION HISTORY

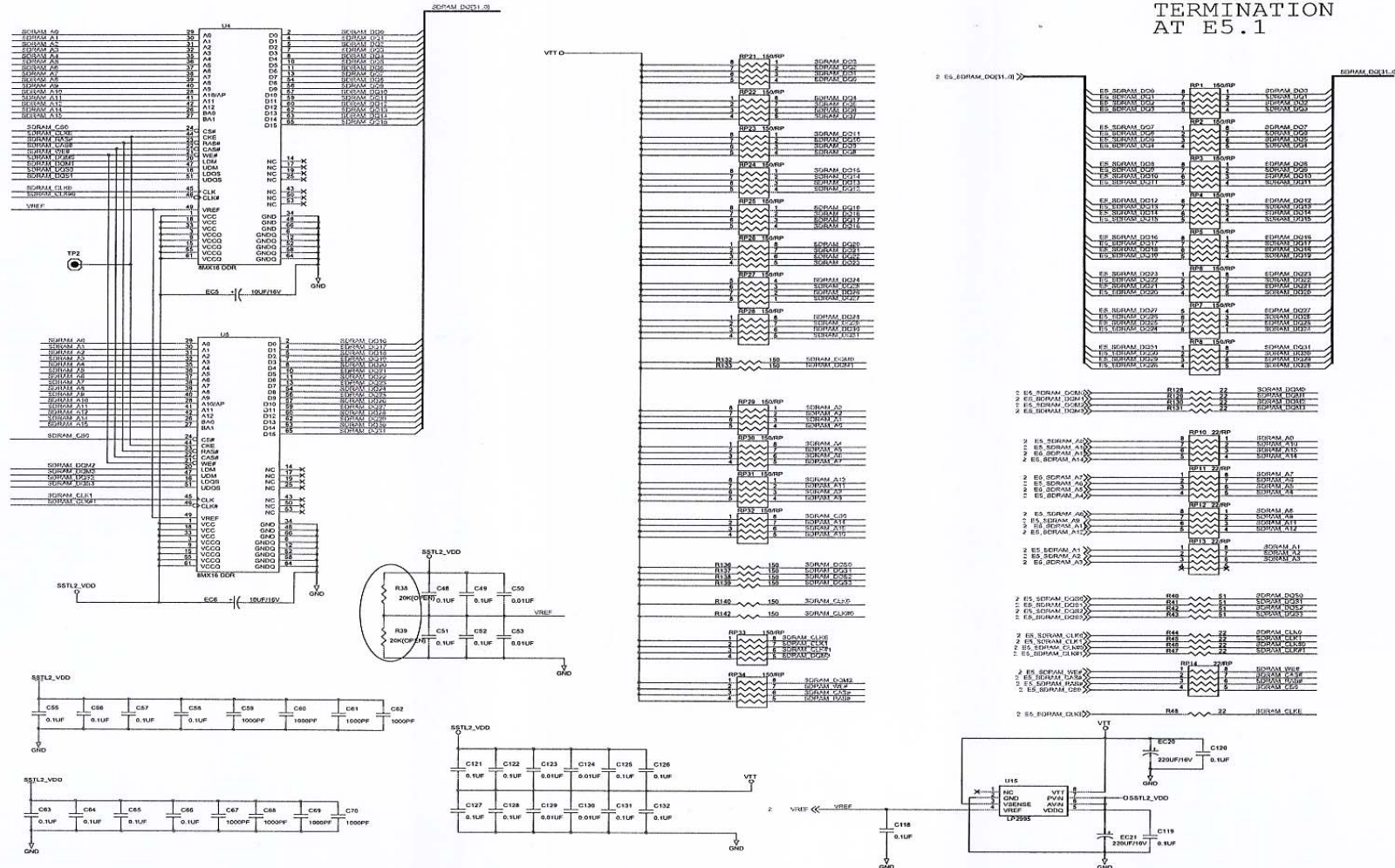
VER	REV	DATE	DESCRIPTION
A	0	08/20/2003	Initial Draft
A	1	09/27/2003	1: Correct net name E5_SDRAM_DQ0 (U27_M18) and E5_SDRAM_DQ1 (U27_M19).
B	0	11/22/2003	1. Redefine the analog video input for TVP5146 to support fast switch between Scart's RGB and CVBS. 2. Add +2.5V supply on J1 for 1.8V LDO's input. Use Sharp's LDO for 1.8V and 2.5V regulators. 3. Redefine AVIO connector to add SPI interface for AVIO board. 4. Redefine E-Link interface, use IDE-40pin connector for E-Link. 5. Re-arrange 8602's GPIO pin for TI's audio DAC(SPI interface) and audio input switch control. 6. For reduce the cost, chang all SMT electrolytic capacitor to through hole style, change all tantalum capacitor to multilayer ceramic capacitor, change all SMT crystal to through hole style. 7. Delete U32(MM1623XF), remove analog video driver circuit to AVIO board. 8. Delete U21(74AHCT14), Add U1(TPS3809I50) and U2(PCA9515).
B	1	02/02/2004	1. Remove R48,R49,R50,R438,R439,R453 on SCART interface j6, stuff J6 for SCART GPIO. 2. Change R355 from 330ohm to 1K. 3. Remove CA11 in DDR-SDRAM power supply circuit, change all DDR_VDD net to SSTL2_VDD. 4. Replace L7,L9 (2.7uh/0805) with ferrite bead (FBMJ2125HS420-T/0805). 5. Add R535 (2.2Kohm) to pull TVP5146 pin69 to ground. 6. Remove all pull up resistors (R33,R34,R35,R36,R38) on front panel interface. 7. Remove pull up resistors R445,R446,R447,R448 on AVIO interface JP2. 8. Stuff R106 to support default 4MB flash. Use totally 64MB DDR-SDRAM to support 'Yes Video'function. 9. Change R100/R101(SCL/SDA) pull up voltage from 5V to 3.3V. 9. Change ferrit bead part value from BK1608HM601-T to BK1608HM121-T in audio/video/clock/atapi interface circuit. 10. Add choke coil T1 in 1394 interface to reduce EMI issue. 11. Pull U31-pin7(AT24C16-WP) to ground. 12. Add R420(300ohm) to protect E5_GPIOx33. 13. Add J15(TV_CVBS_IN) and J16(CVBS_IN) socket.

SCHEMATICS CONTENTS

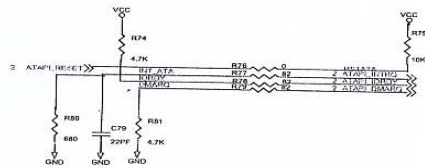
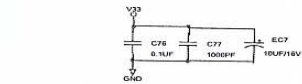
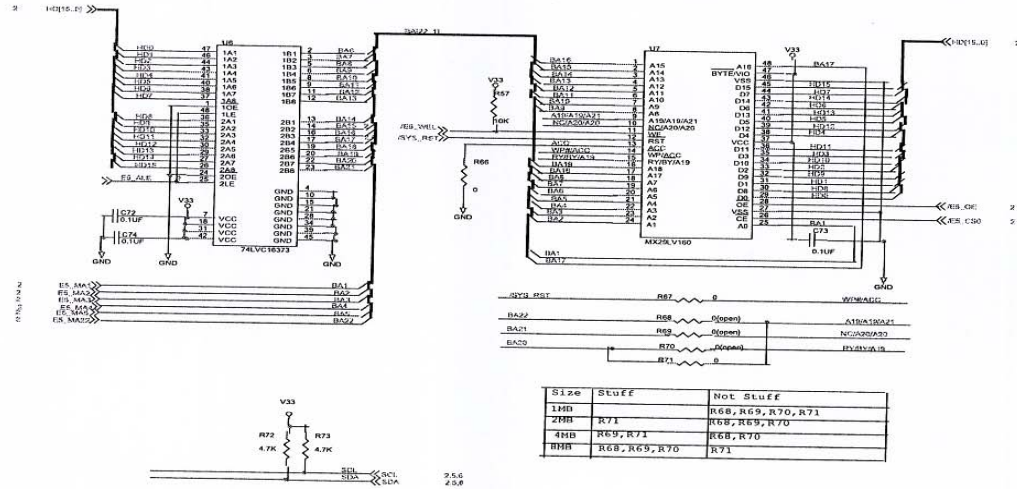
TITLE	PAGE	DESCRIPTION
FIGARO-2 COVER PAGE	1	
E5.1	2	
TERM AT E5 & DDR & VREF/VT	3	
2 (8M x 16) DDR SDRAM	4	
RST, IR, AV IO/ELink-3 Connector, UART	5	
FLASH, ATA, EEPROM, IR	6	
1394 PHY & USB	7	
POWER CONN	8	
VIDEO IN	9	

Paramount digital			
File	FIGARO-2 COVER PAGE		*
Size	Document Number		Rev B1
Date	Sheet 1	of 9	

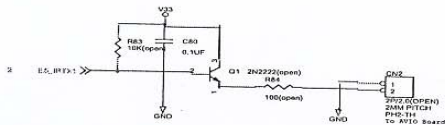




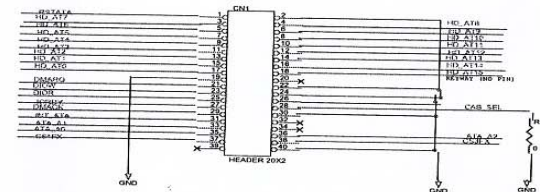
FLASH MEMORY (2 or 4 or 8 MB)

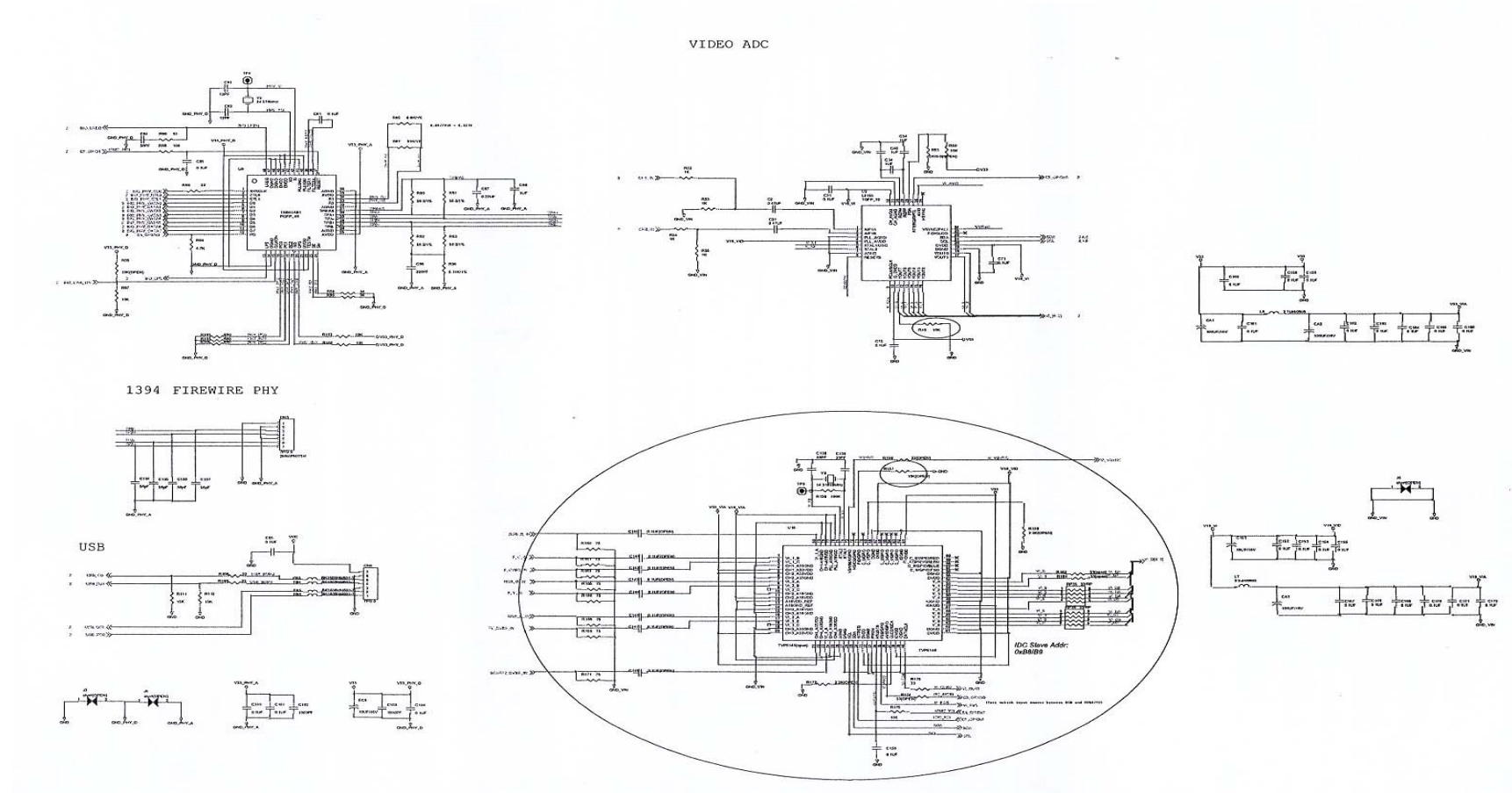


IR EMITTER

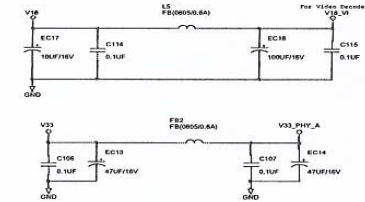
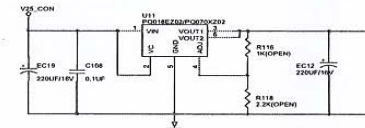
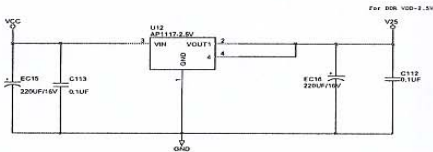
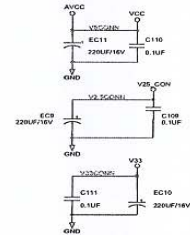
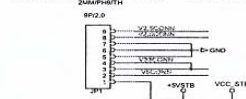


DEDICATED ATAPI INTERFACE

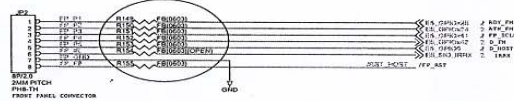




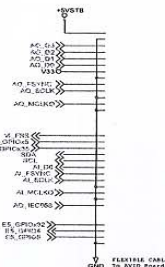
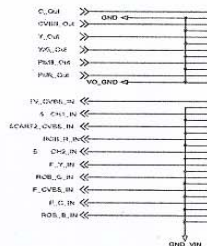
MAIN POWER CONN



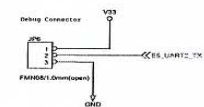
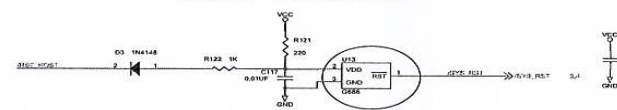
FRONT PANEL INTERFACE

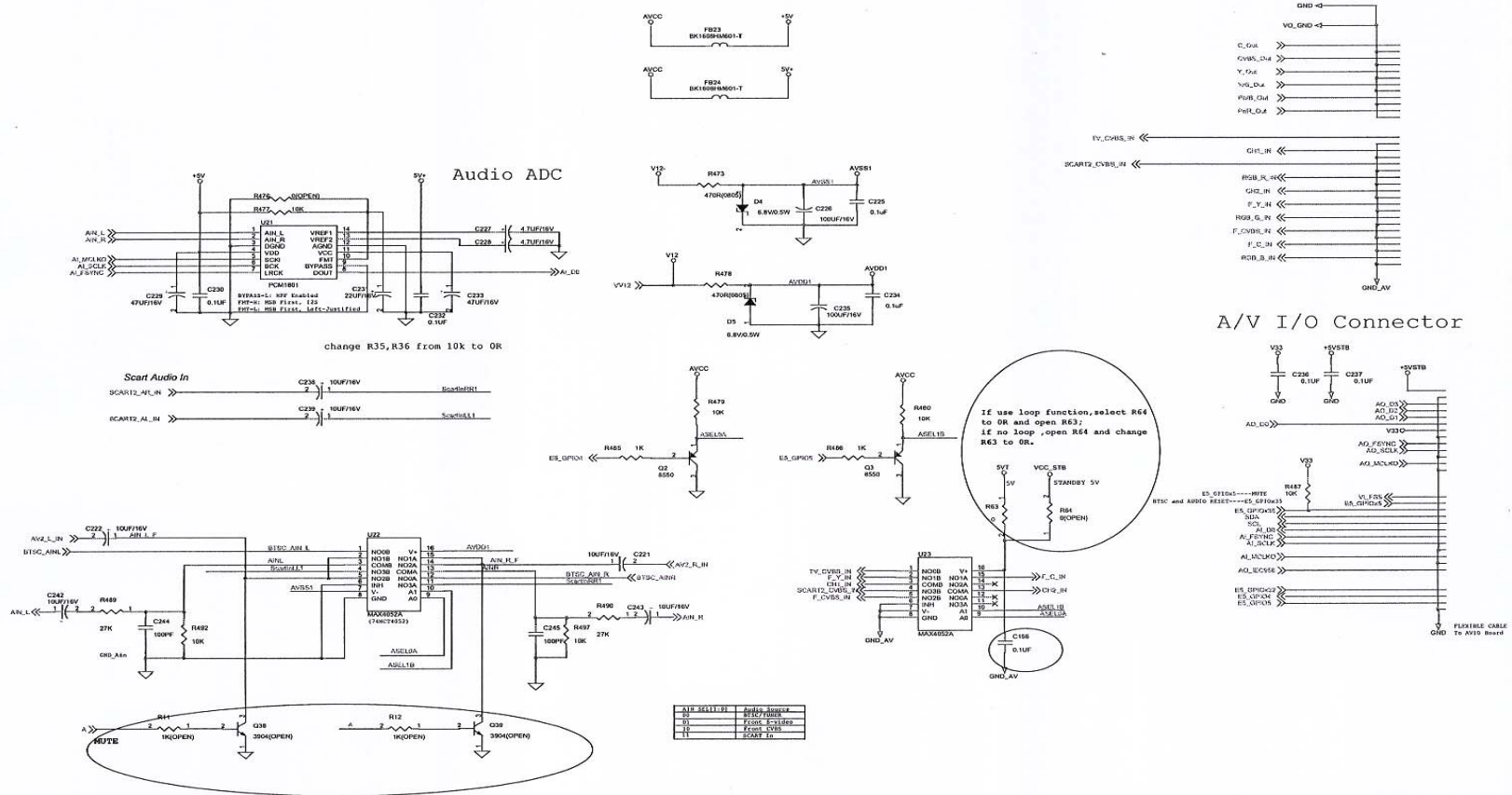


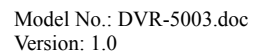
A/V I/O Connector

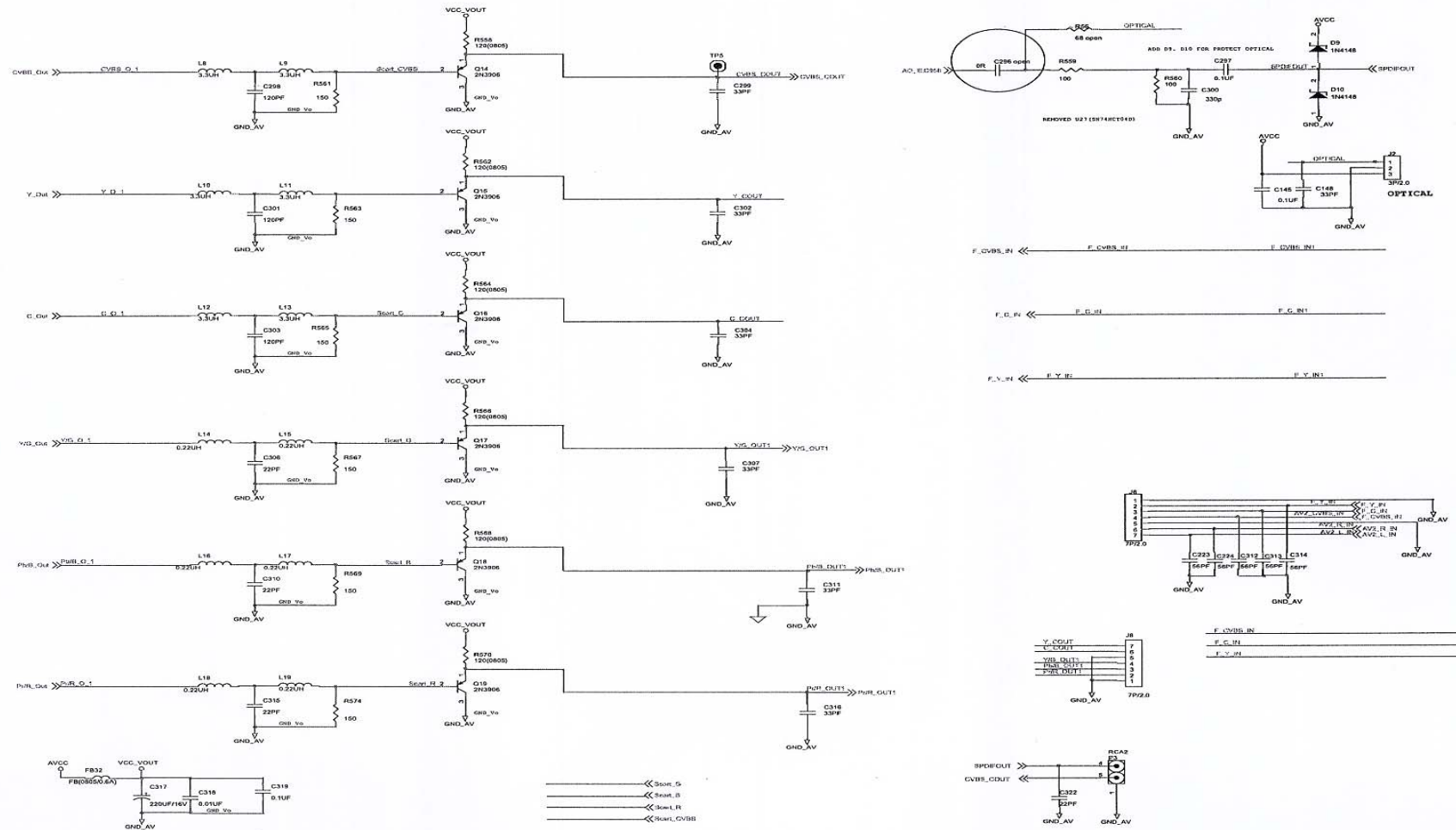


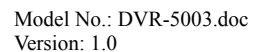
RESET CIRCUITRY

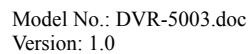








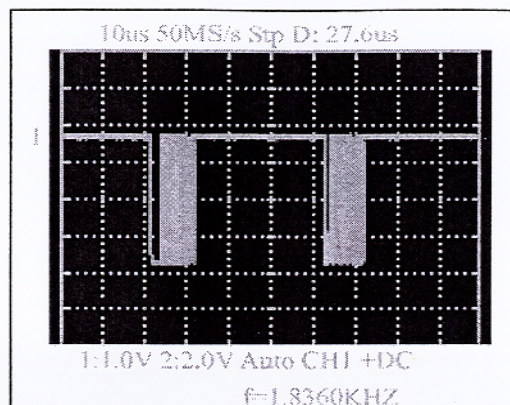
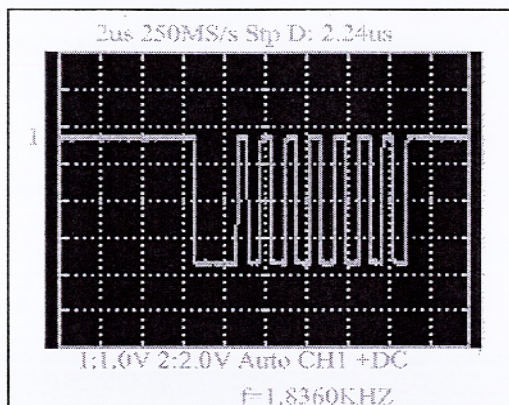




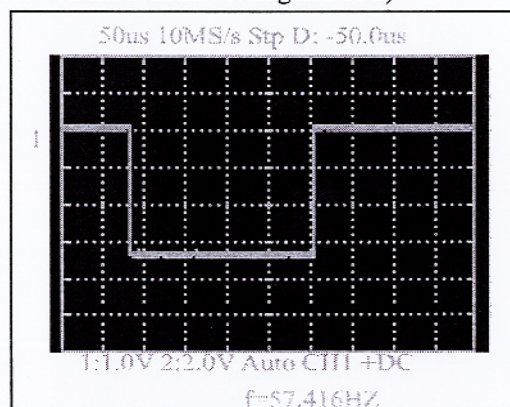
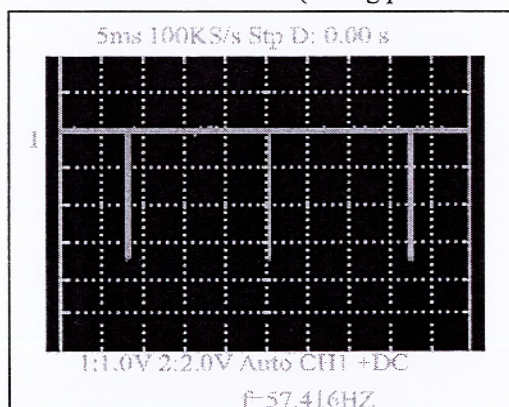
WAVEFORMS OF KB Board

Waveforms Diagrams of KB Board (All waveforms are obtained during a NO DISC condition)

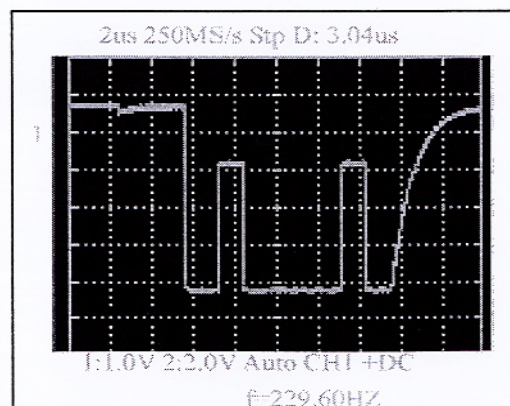
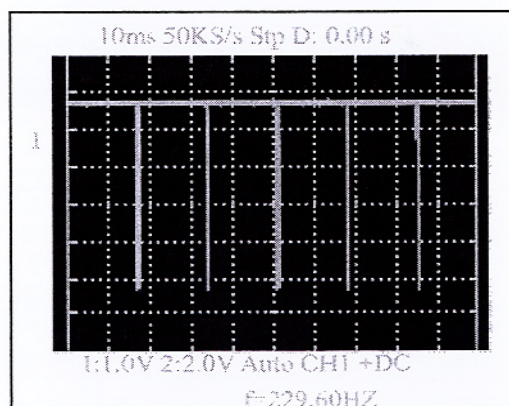
1. Waveforms on CLK cord (testing point as indicated on the schematic diagram TP1)

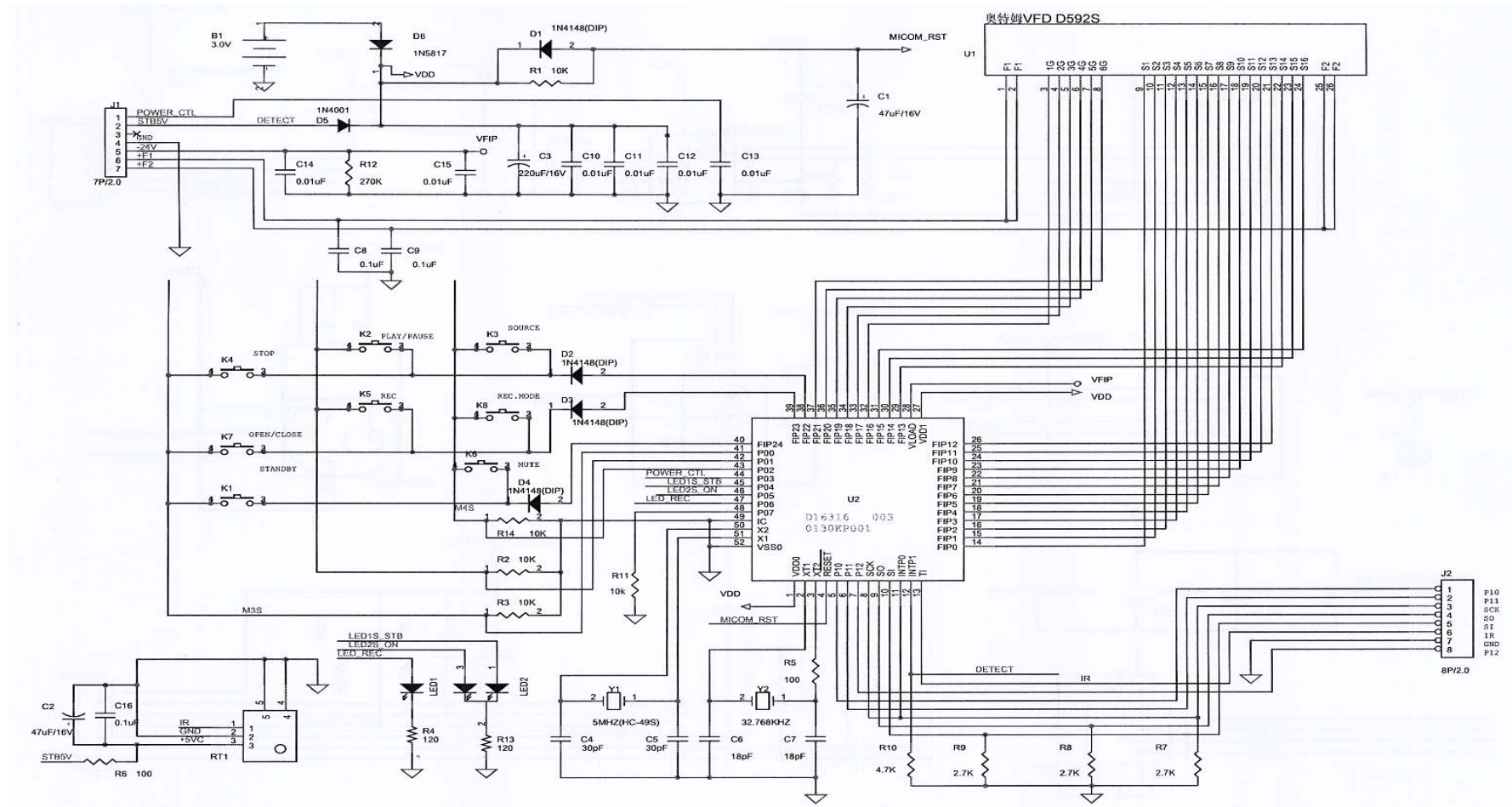


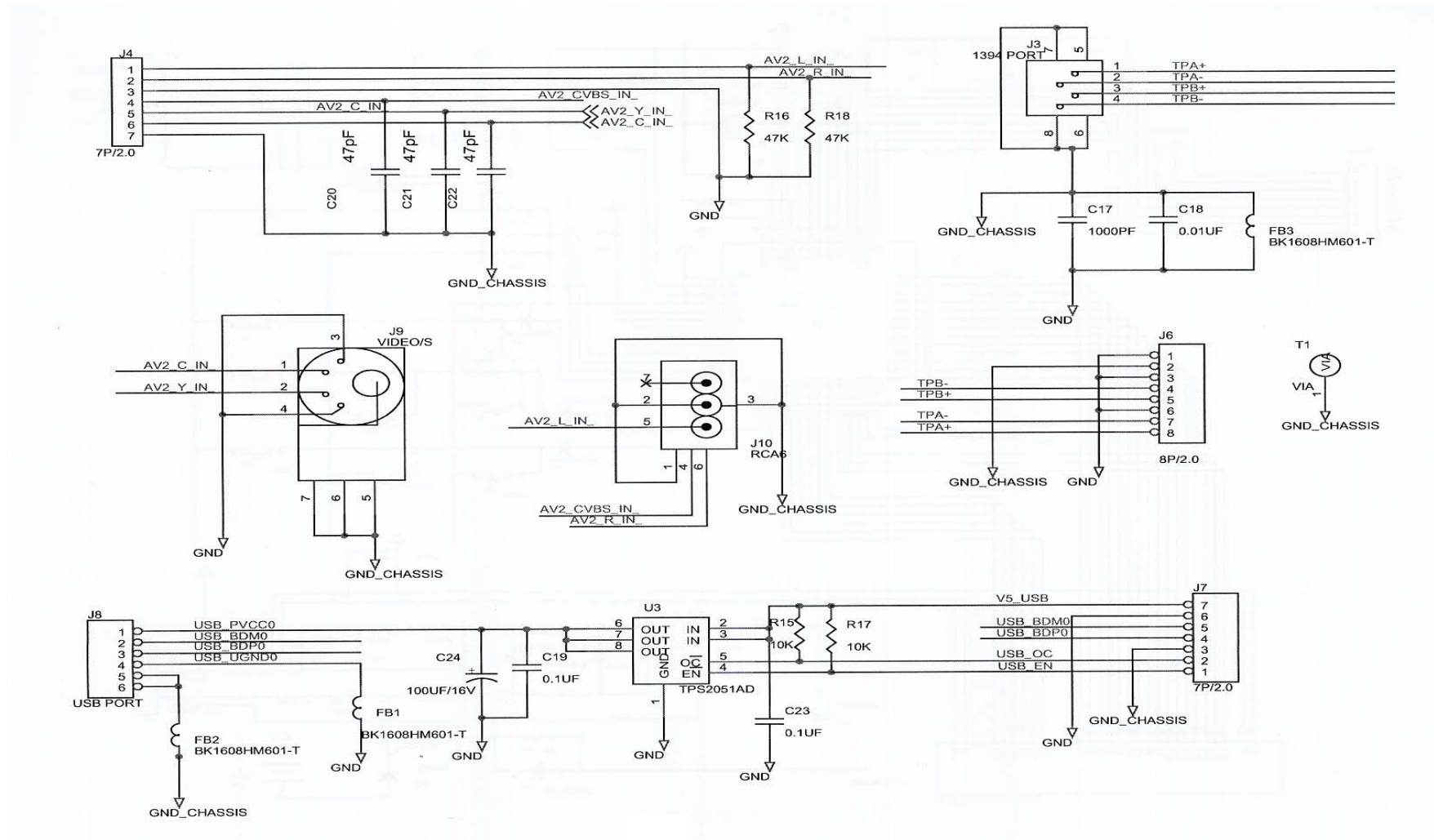
2. Waveforms on CS cord (testing point as indicated on the schematic diagram TP2)



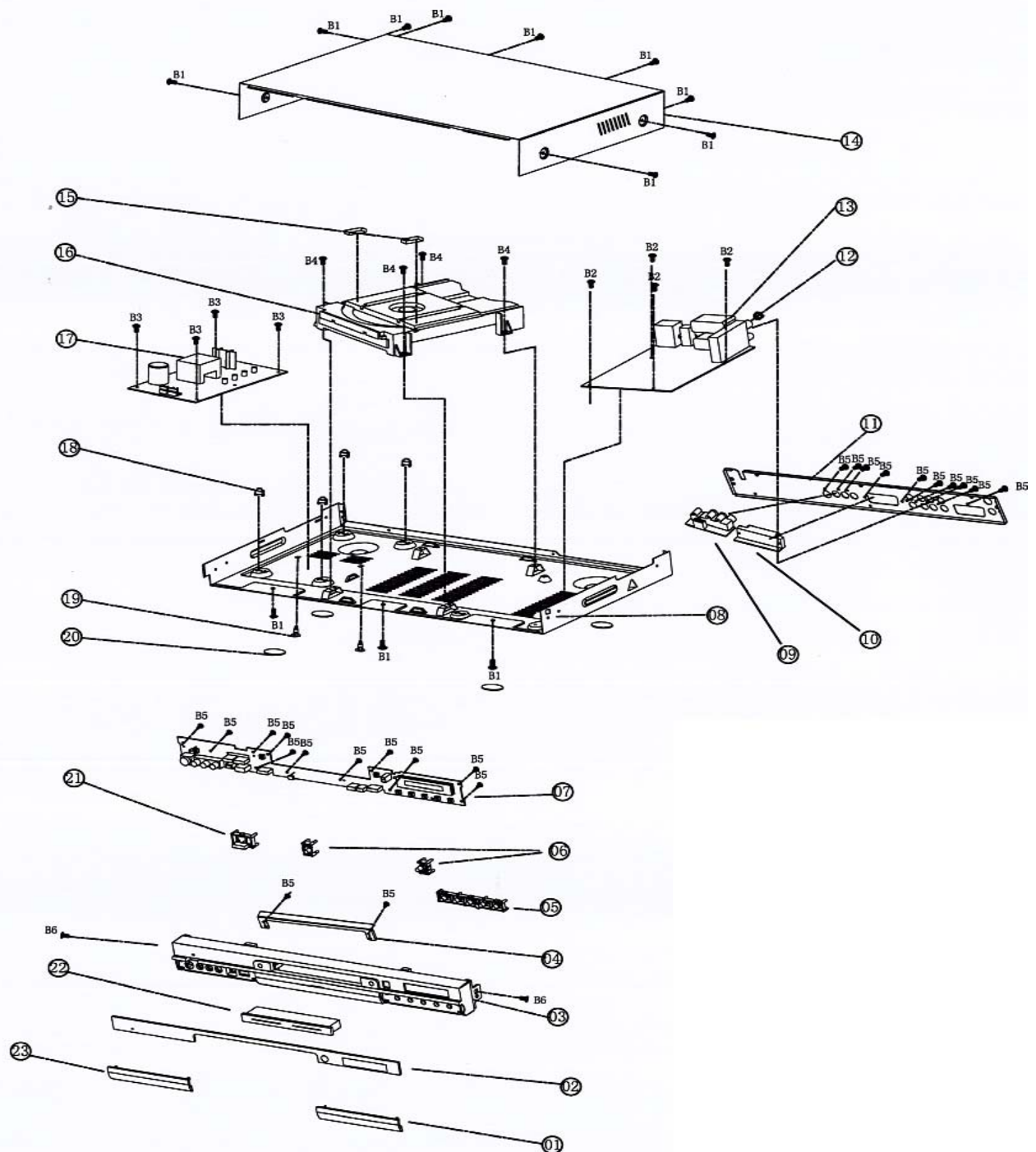
3. Waveforms on DATA cord (testing point as indicated on the schematic diagram TP3)







EXPLODED VIEW



PART LIST

No	Part name
1	Right Cover
2	Lens
3	Front Panel
4	Bracket
5	Five-Knob
6	One-Knob
7	KB Board
8	Bottom Cover
9	YUV Board
10	Scart Board
11	Rear Panel
12	Spring
13	AV-Decoding Board
14	Case
15	Core Sponge
16	Core
17	Power Board
18	Plastic Support
19	Space Support
20	EVA Foot
21	Power Knob
22	Door
23	Left Cover
B1	Screw
B2	Screw
B3	Screw
B4	Screw
B5	Screw
B6	Screw

AKIRA
makes life better