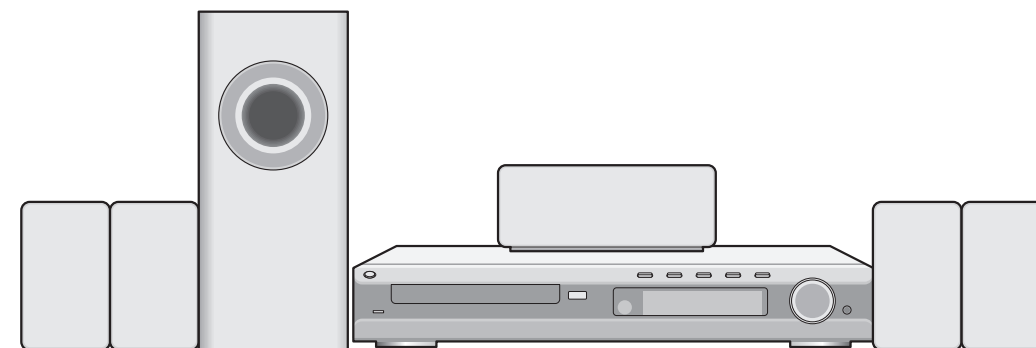




SERVICE MANUAL
MODEL: LH-T6447D LHS-T6447C, LHS-T6447W, LHS-T6447T



DVD/CD RECEIVER SERVICE MANUAL



MODEL: LH-T6447D
LHS-T6447C, LHS-T6447W, LHS-T6447T

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SECTION 1. GENERAL

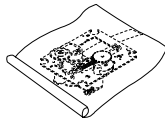
□ SERVICING PRECAUTIONS

NOTES REGARDING HANDLING OF THE PICK-UP

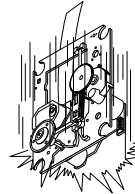
1. Notes for transport and storage

- 1) The pick-up should always be left in its conductive bag until immediately prior to use.
- 2) The pick-up should never be subjected to external pressure or impact.

Storage in conductive bag

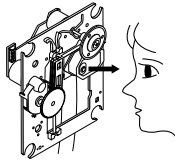


Drop impact



2. Repair notes

- 1) The pick-up incorporates a strong magnet, and so should never be brought close to magnetic materials.
- 2) The pick-up should always be handled correctly and carefully, taking care to avoid external pressure and impact. If it is subjected to strong pressure or impact, the result may be an operational malfunction and/or damage to the printed-circuit board.
- 3) Each and every pick-up is already individually adjusted to a high degree of precision, and for that reason the adjustment point and installation screws should absolutely never be touched.
- 4) Laser beams may damage the eyes!
Absolutely never permit laser beams to enter the eyes!
Also NEVER switch ON the power to the laser output part (lens, etc.) of the pick-up if it is damaged.

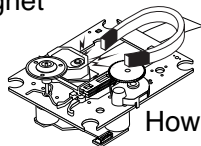


NEVER look directly at the laser beam, and don't let contact fingers or other exposed skin.

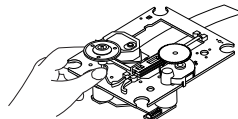
5) Cleaning the lens surface

If there is dust on the lens surface, the dust should be cleaned away by using an air bush (such as used for camera lens). The lens is held by a delicate spring. When cleaning the lens surface, therefore, a cotton swab should be used, taking care not to distort this.

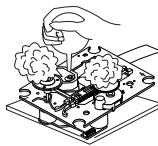
Magnet



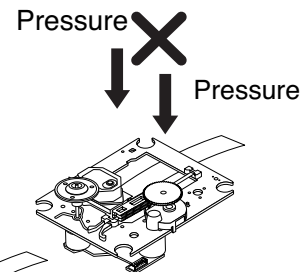
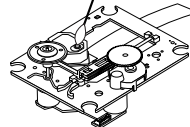
How to hold the pick-up



Cotton swab



Conductive Sheet



6) Never attempt to disassemble the pick-up.

Spring by excess pressure. If the lens is extremely dirty, apply isopropyl alcohol to the cotton swab. (Do not use any other liquid cleaners, because they will damage the lens.) Take care not to use too much of this alcohol on the swab, and do not allow the alcohol to get inside the pick-up.

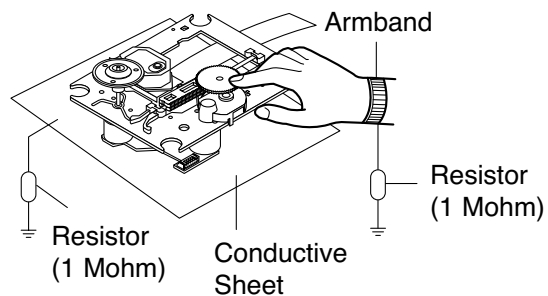
NOTES REGARDING COMPACT DISC PLAYER REPAIRS

1. Preparations

- 1) Compact disc players incorporate a great many ICs as well as the pick-up (laser diode). These components are sensitive to, and easily affected by, static electricity. If such static electricity is high voltage, components can be damaged, and for that reason components should be handled with care.
- 2) The pick-up is composed of many optical components and other high-precision components. Care must be taken, therefore, to avoid repair or storage where the temperature of humidity is high, where strong magnetism is present, or where there is excessive dust.

2. Notes for repair

- 1) Before replacing a component part, first disconnect the power supply lead wire from the unit
- 2) All equipment, measuring instruments and tools must be grounded.
- 3) The workbench should be covered with a conductive sheet and grounded.
When removing the laser pick-up from its conductive bag, do not place the pick-up on the bag. (This is because there is the possibility of damage by static electricity.)
- 4) To prevent AC leakage, the metal part of the soldering iron should be grounded.
- 5) Workers should be grounded by an armband (1M Ω)
- 6) Care should be taken not to permit the laser pick-up to come in contact with clothing, in order to prevent static electricity changes in the clothing to escape from the armband.
- 7) The laser beam from the pick-up should NEVER be directly facing the eyes or bare skin.



❑ ESD PRECAUTIONS

Electrostatically Sensitive Devices (ESD)



Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD 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 static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, 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 ESD 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 ESD devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
6. Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).
7. Immediately before removing the protective material from the leads of a replacement ESD 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 ESD 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 sufficient to damage an ESD device).

CAUTION. GRAPHIC SYMBOLS

	THE LIGHTNING FLASH WITH APROWHEAD SYMBOL. WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.
	THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

SPECIFICATIONS

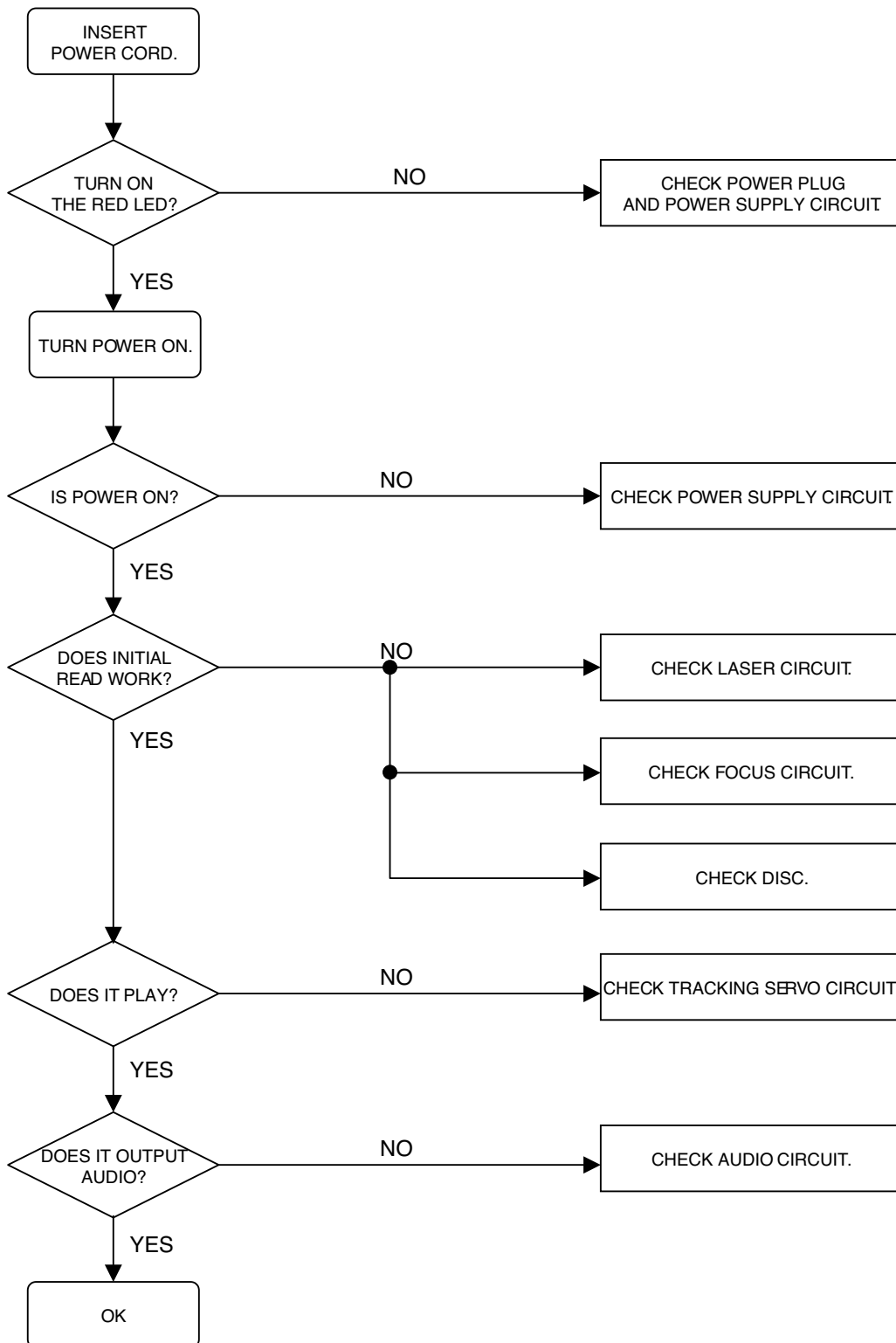
General		Power supply	Refer to main label		
		Power consumption	Refer to main label		
		Mass	4.4kg		
		External dimensions (W x H x D)	430 x 60 x 350 mm		
		Operating conditions	Temperature: 5°C to 35°C, Operation status: Horizontal		
		Operating humidity	5% to 85%		
CD/DVD		Laser	Semiconductor laser, wavelength 650 nm		
		Signal system	PAL 625/50, NTSC 525/60		
		Frequency response (audio)	150 Hz to 18 kHz		
		Signal-to-noise ratio (audio)	More than 70 dB (1 kHz, NOP, 20 kHz LPF/A-Filter)		
		Dynamic range (audio)	More than 70 dB		
		Harmonic distortion (audio)	0.5 % (1 kHz, at 12W position) (20 kHz LPF/A-Filter)		
Video		Video input	1.0 V (p-p), 75Ω , negative sync., RCA jack x 2/ SCART (TO TV)		
		Video output	1.0 V (p-p), 75Ω , negative sync., RCA jack x 1/ SCART (TO TV)		
		S-video output	(Y) 1.0 V (p-p), 75Ω , negative sync., Mini DIN 4-pin x 1 (C) 0.3 V (p-p), 75Ω		
		COMPONENT VIDEO OUT	(Y) 1.0 V (p-p), 75 ohms, negative sync, RCA jack x 1 (Pb)/(Pr) 0.7 V (p-p), 75 ohms, RCA jack x 2		
Tuner	FM	Tuning Range	87.5 - 108.0 MHz or 65.0 - 74.0 MHz, 87.5 - 108.0 MHz		
		Intermediate Frequency	10.7 MHz		
		Signal-to Noise Ratio	60 dB (Mono)		
		Frequency Response	150 - 8,000 Hz		
		AM [MW]	Tuning Range	522 - 1,611 kHz or 530 - 1,610 kHz	
		Intermediate Frequency	450 kHz		
Amplifier		Stereo mode	45W + 45W (8Ω at 1 kHz, THD 10 %)		
		Surround mode (* Depending on the sound mode settings and the source, there may be no sound output.)	Front: 45W + 45W (THD 10 %) Centre*: 45W Surround*: 45W + 45W (8Ω at 1 kHz, THD 10 %) Subwoofer*: 60W (6Ω at 30 Hz, THD 10 %)		
		Inputs	VIDEO 1, VIDEO 2, COAXIAL AUDIO, OPTICAL AUDIO		
		Outputs	PHONES: (32Ω , 1.0 V)		
Speakers			Satellite Speaker (LHS-T6447T)	Centre speaker (LHS-T6447C)	Passive Subwoofer (LHS-T6447W)
		Type	1 Way 1 Speaker	1 Way 1 Speaker	1 Way 1 Speaker
		Impedance	8Ω	8Ω	6Ω
		Frequency Response	150 - 20,000 Hz	160 - 20,000 Hz	40 - 1,500 Hz
		Sound Pressure Level	84 dB/W (1m)	83 dB/W (1m)	70 dB/W (1m)
		Rated Input Power	45 W	45 W	60 W
		Max. Input Power	90 W	90 W	120 W
		Net Dimensions (W x H x D)	93 x 132.5 x 113 mm	210 x 132.5 x 113 mm	160 x 350 x 330 mm
		Net Weight	0.6kg	0.65kg	4.5kg
Supplied Accessories		• Speakers6			
		• Speaker cables6			
		• AM loop antenna1			
		• FM antenna1			
		• Remote control1			
		• Batteries (AAA).....2			

MEMO

SECTION 2. AUDIO PART

ELECTRICAL TROUBLESHOOTING GUIDE

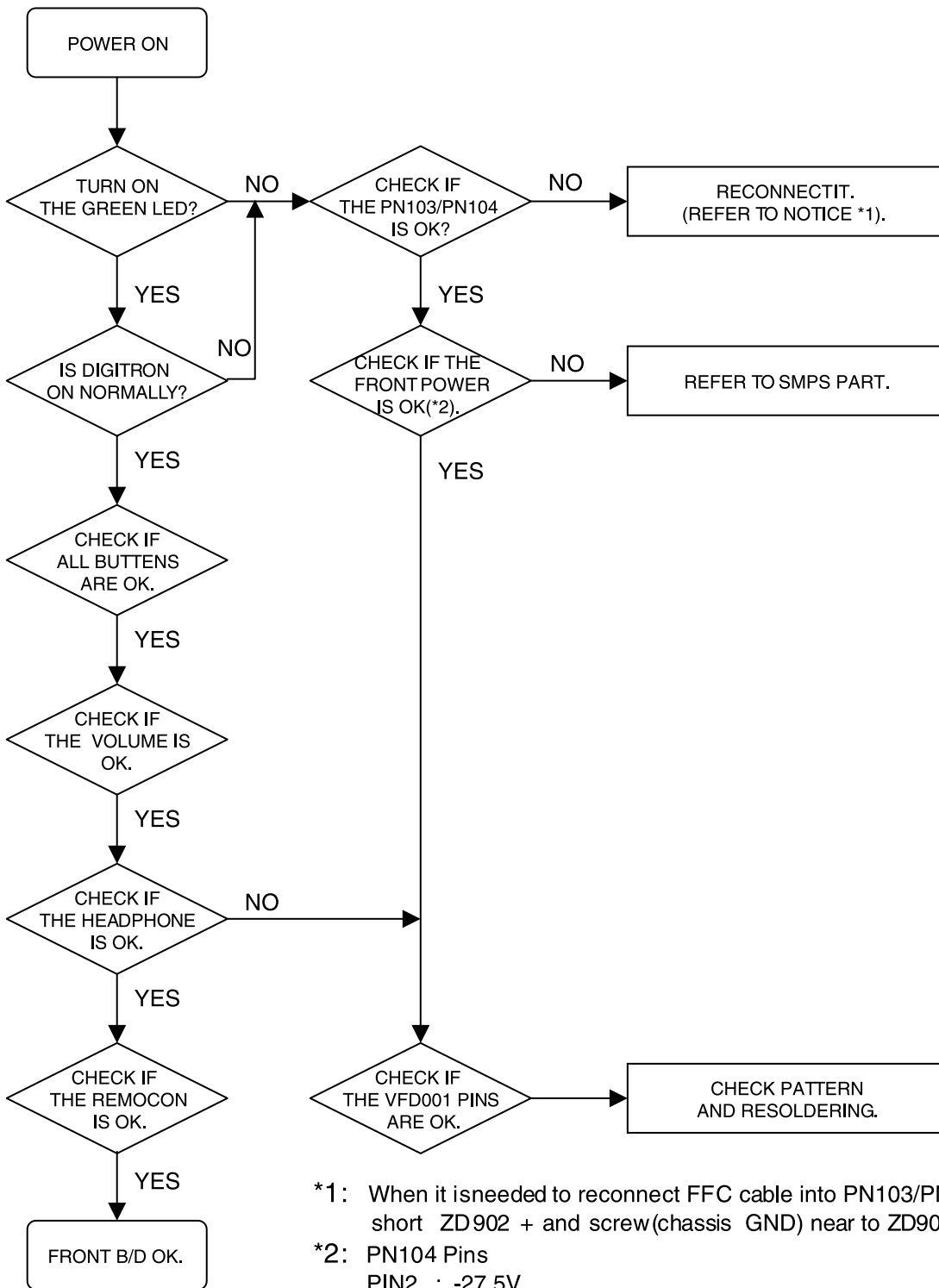
1. Power check flow




```

graph TD
    Start([POWER ON]) --> D1{Does CD/DVD appear at FLD?}
    D1 -- Y --> D2{Does LOADING appear at FLD?}
    D1 -- N --> D3{Does AV 1/2, TV, AUDIO, OPTICAL IN, COAXIAL IN, FM87.5 appear at FLD?}
    D2 -- Y --> D4{Does no Disc or Time appear at FLD?}
    D2 -- NO --> D5{Does it appear DVD Error at FLD?}
    D4 -- Y --> P1[Check if DVD an Audio Micom Interface is OK.]
    D4 -- N --> D6{Check power.}
    P1 --> D6
    D6 -- Y --> P2[Check DVD Module.]
    D6 -- N --> P3[Check SMPS.]
    P2 --> D6
    P3 --> D6
    D5 -- Y --> D7{Check Connector(PN902) if is normally.}
    D5 -- N --> P4[Reconnect it.]
    D7 -- Y --> D8{Check power part of Main B/D.}
    D7 -- N --> P4
    D8 -- Y --> D9{Check oscillator of x101.}
    D8 -- N --> P5[Refer to SMPS]
    D9 -- Y --> D10{Check if IC101 PIN1 is High.}
    D9 -- N --> P6[Refer to oscillator Circuit.]
    D10 -- Y --> D11{Check if IC101 PIN11 is High.}
    D10 -- N --> P7[Check DVD Reset Waveform.]
    D11 -- Y --> D12{Check if IC101 PIN 17, 46, 72, 90 is high 5V.}
    D11 -- N --> P8[Check IC101 Reset Waveform.]
    D12 -- Y --> D13{Check if IC101 PIN26 is High.}
    D12 -- N --> P9[Check 5V line.]
    D13 -- Y --> P10[Replace IC101.]
    D13 -- N --> P11[Check Power dection Circuit.]
    D3 -- Y --> P12[OK.]
    D3 -- N --> D8
  
```

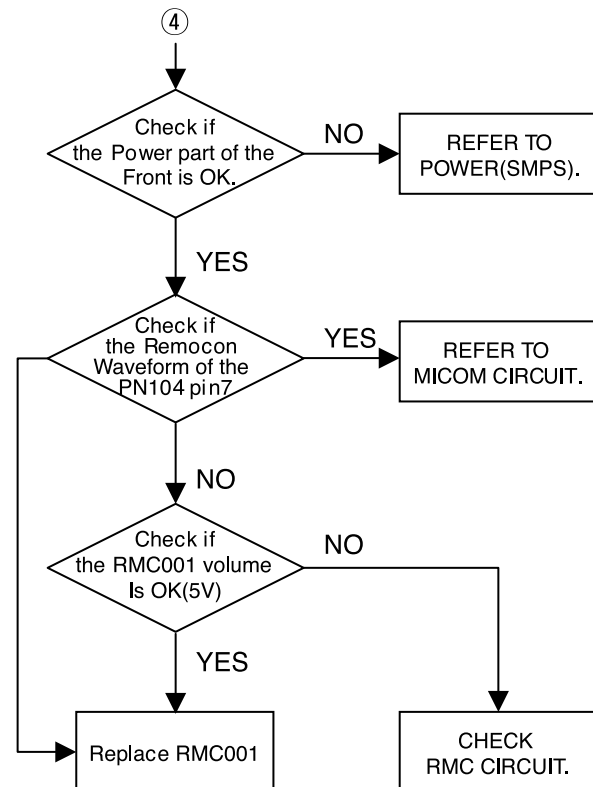
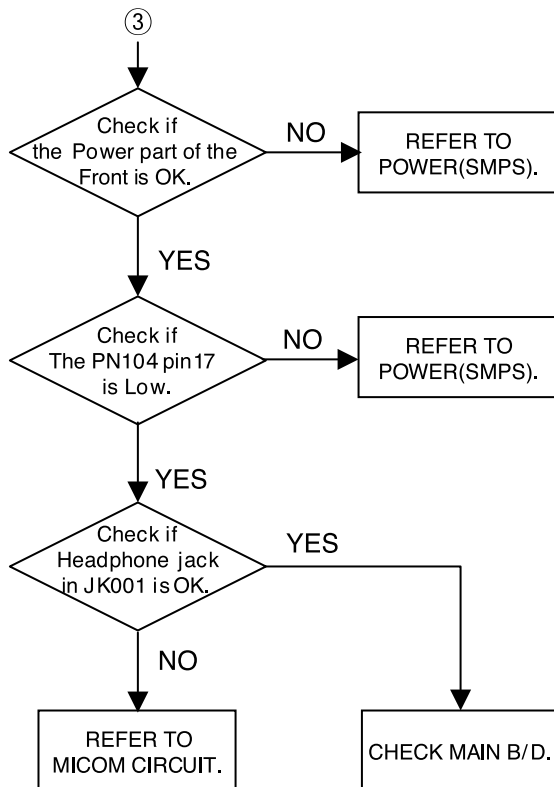
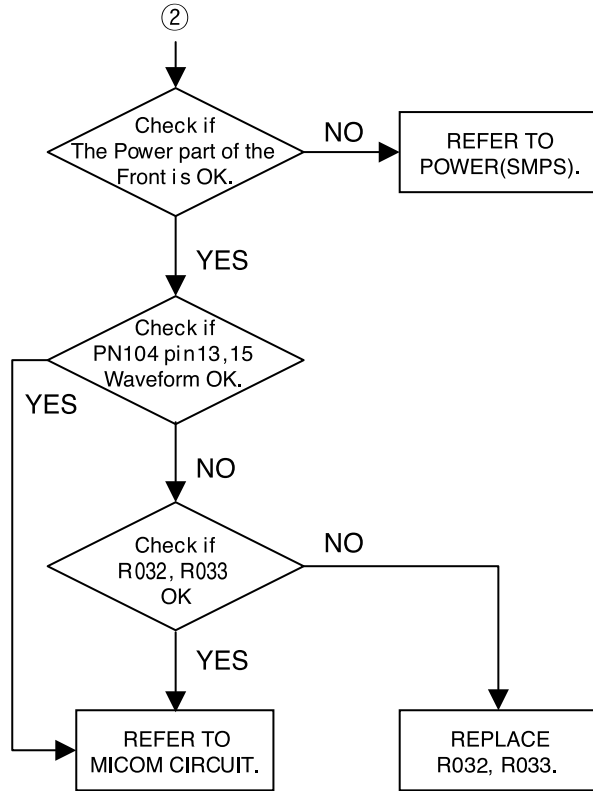
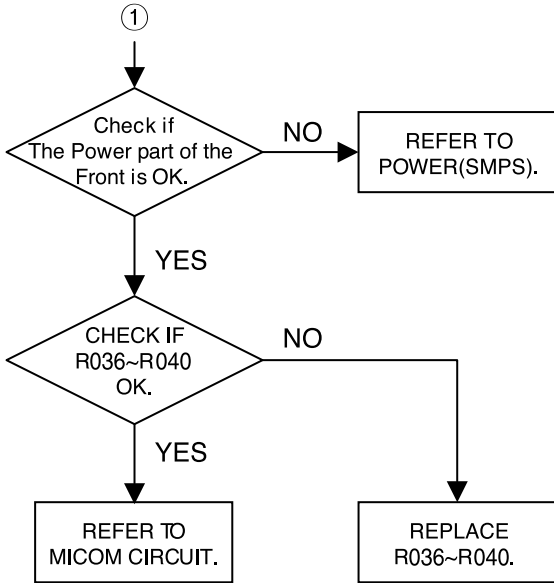
3.FRONT CIRCUIT (1/2)



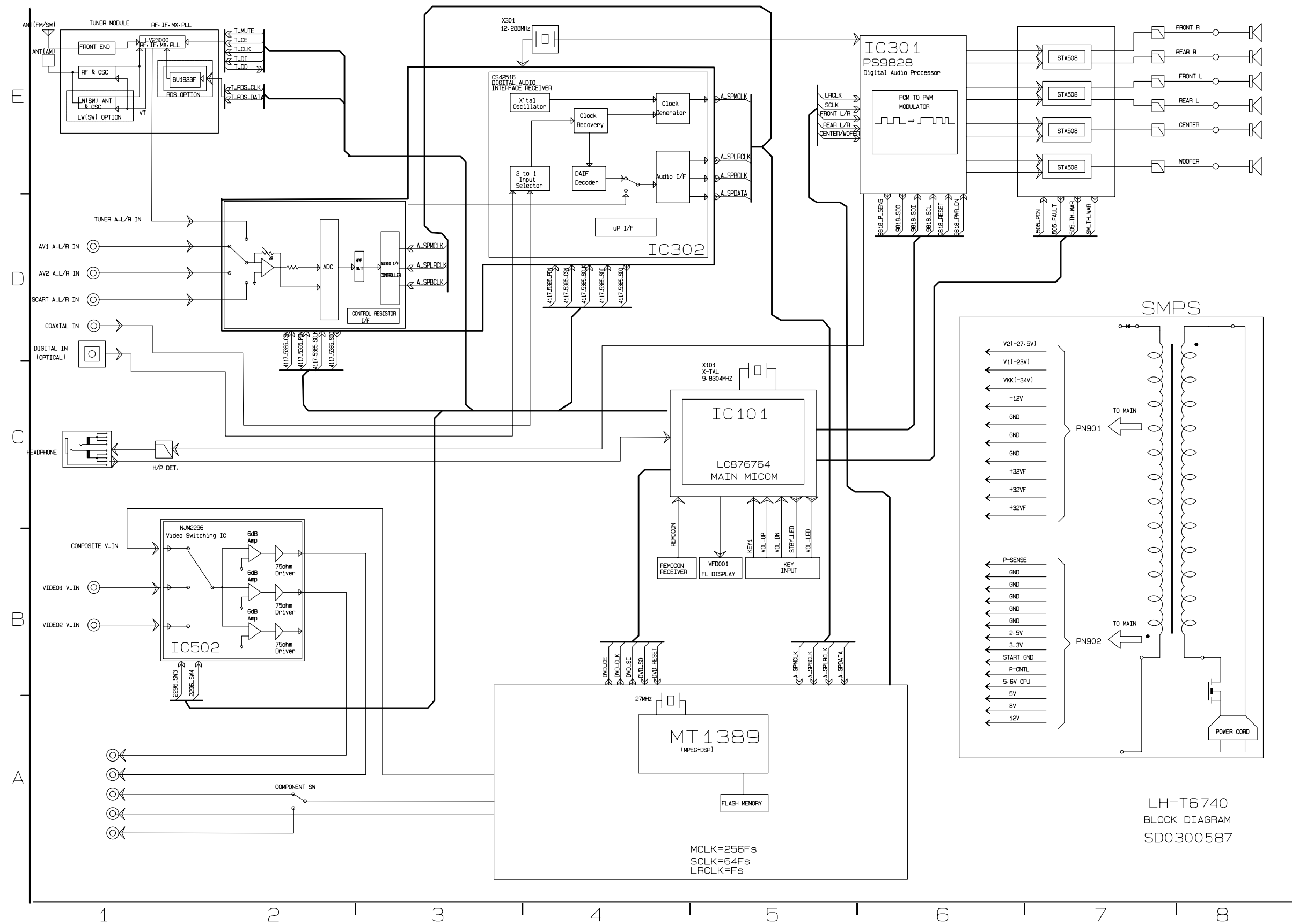
*1: When it is needed to reconnect FFC cable into PN103/PN104, short ZD902 + and screw(chassis GND) near to ZD902.

*2: PN104 Pins
 PIN2 : -27.5V
 PIN3 : -23.0V
 PIN4 : 5.0V
 PIN11 : -34.0V

4.FRONT CIRCUIT (2/2)

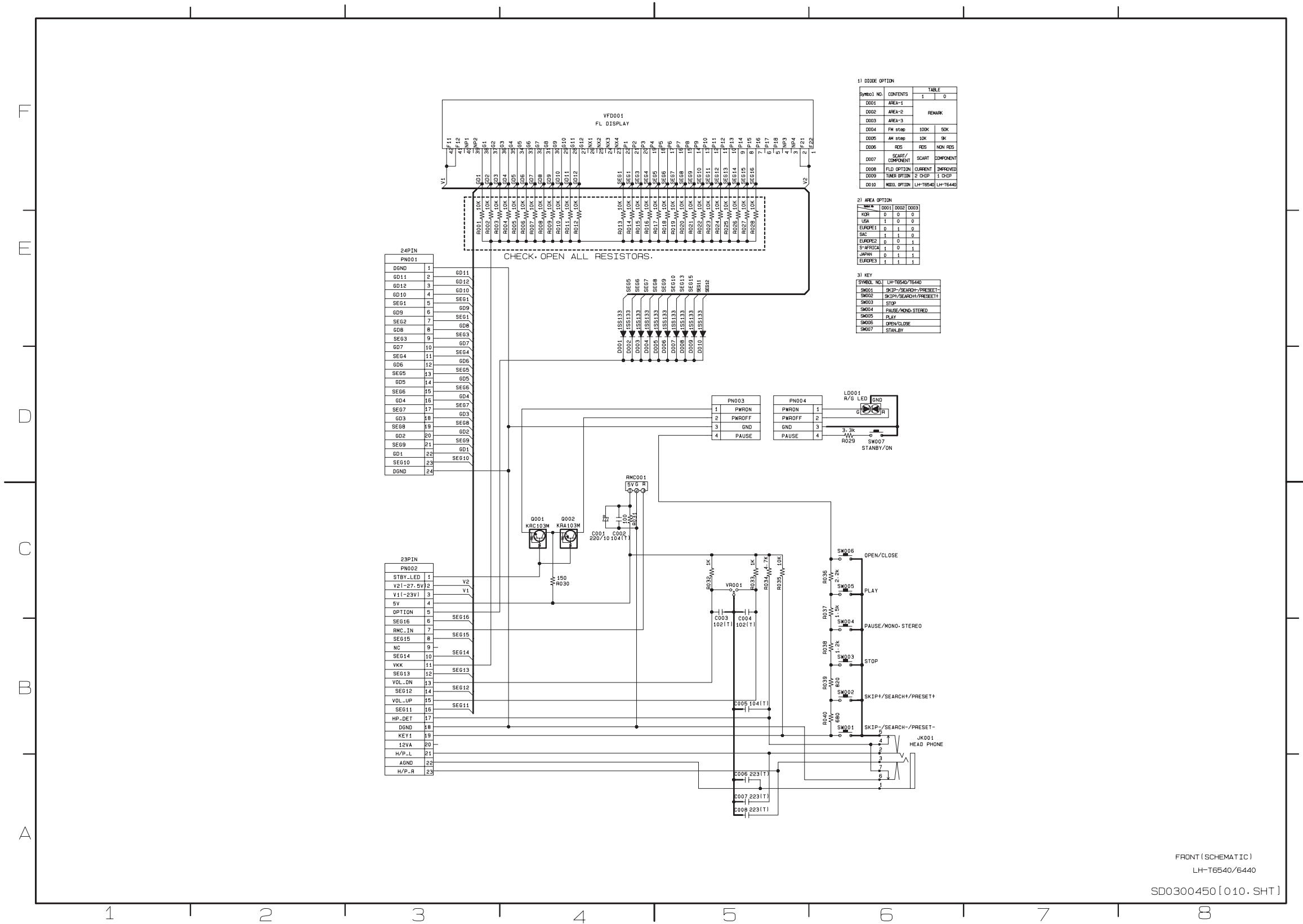


❏ BLOCK DIAGRAM

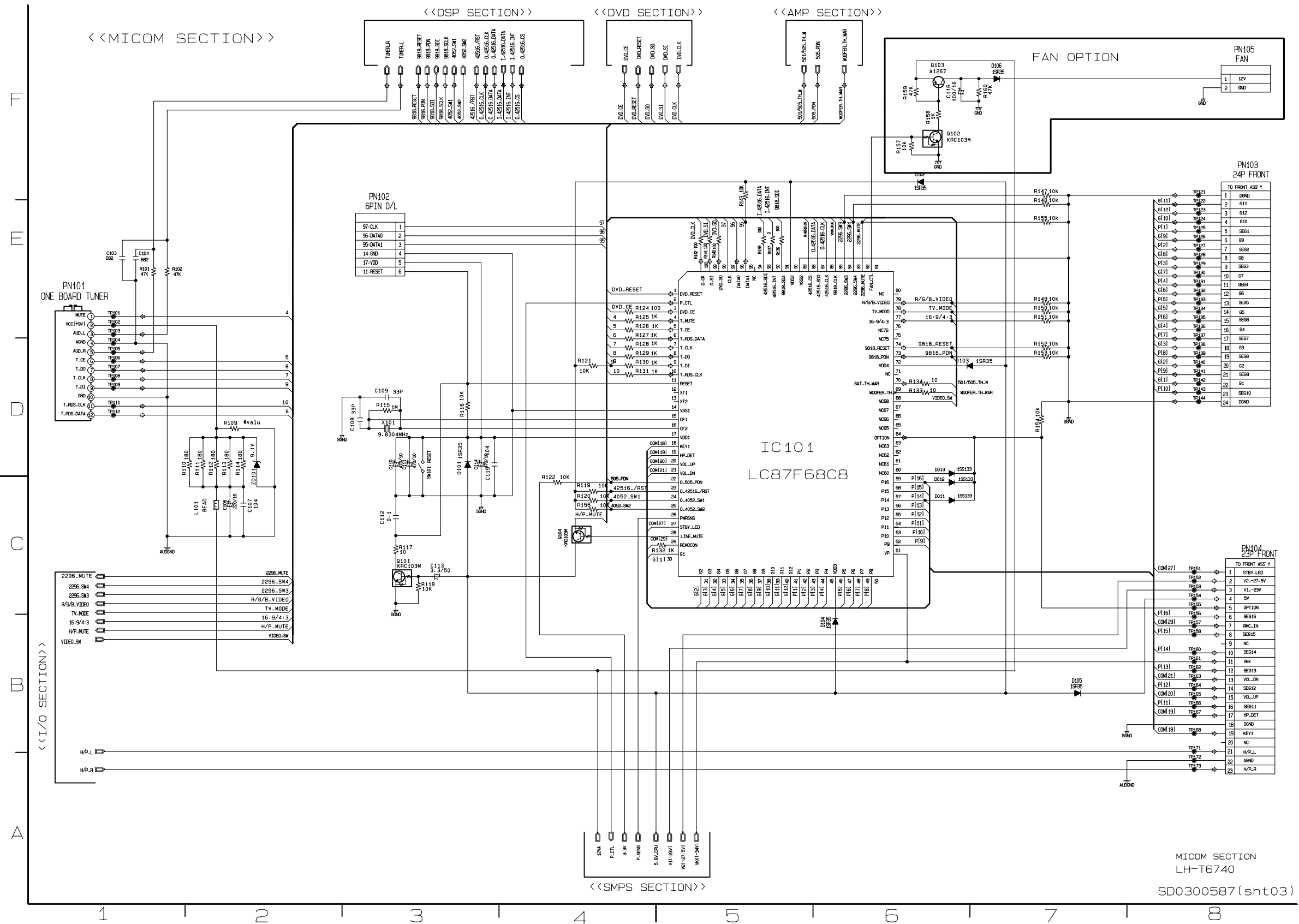


SCHEMATIC DIAGRAMS

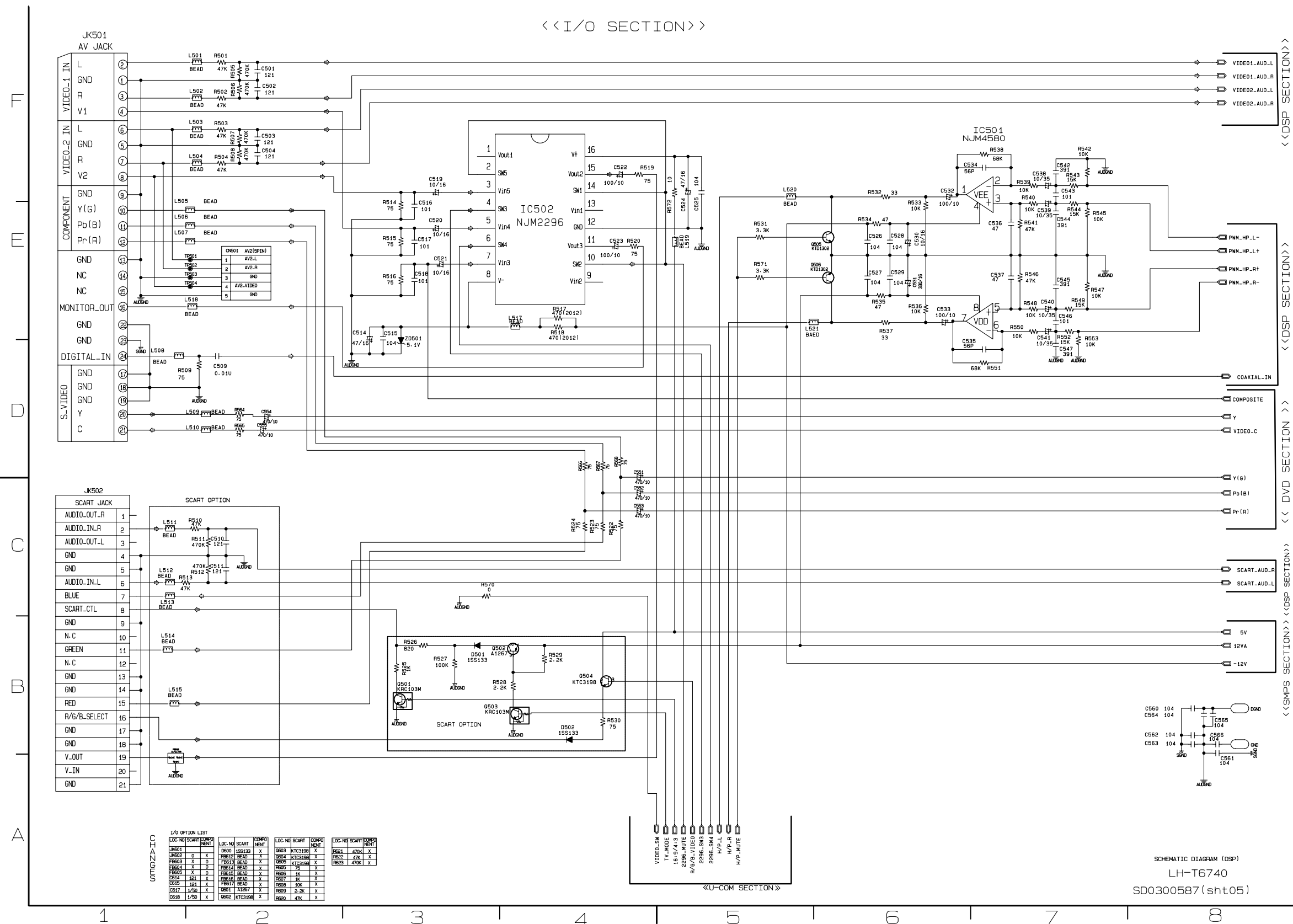
FRONT SCHEMATIC DIAGRAM



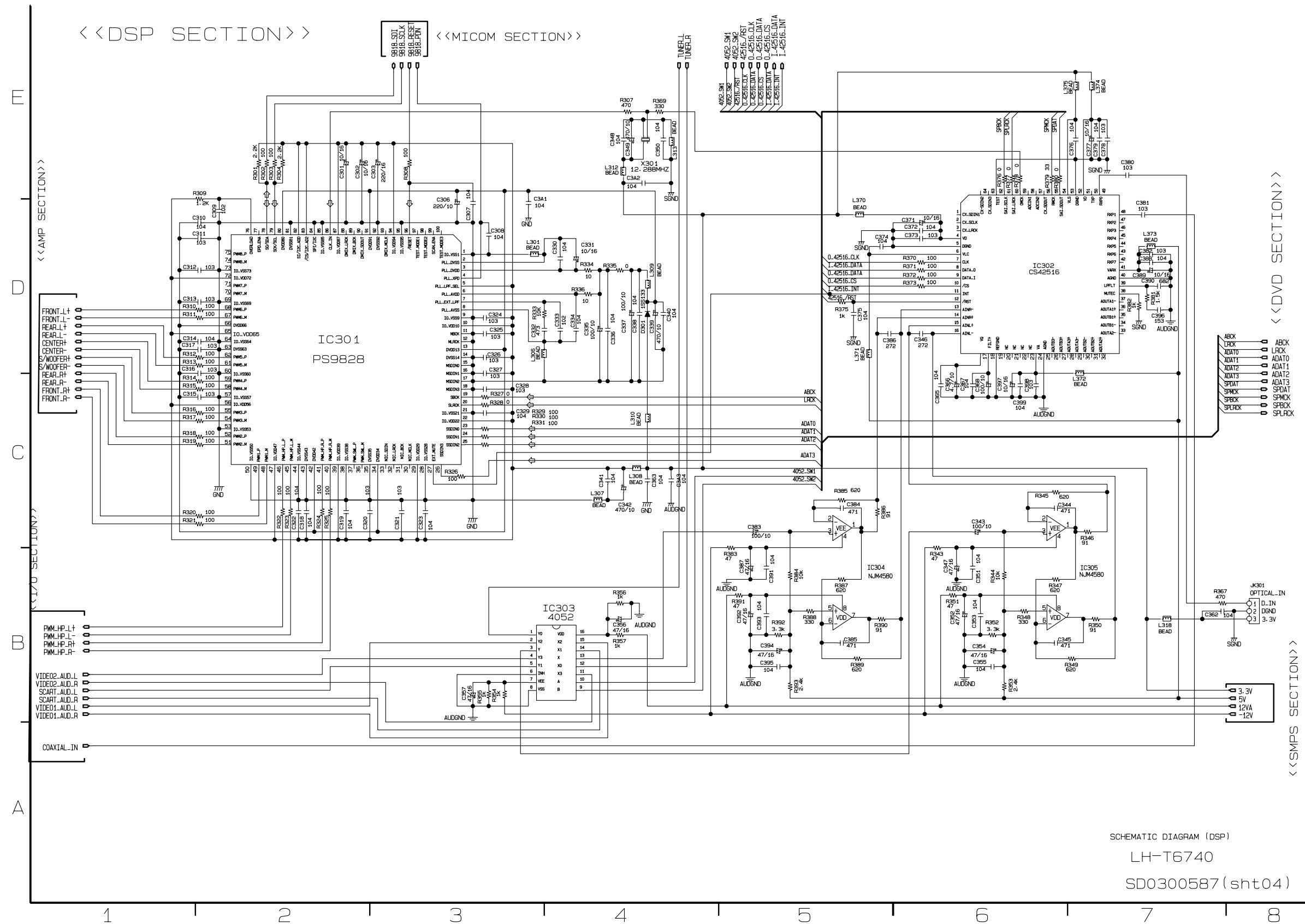
• MICOM SCHEMATIC DIAGRAM



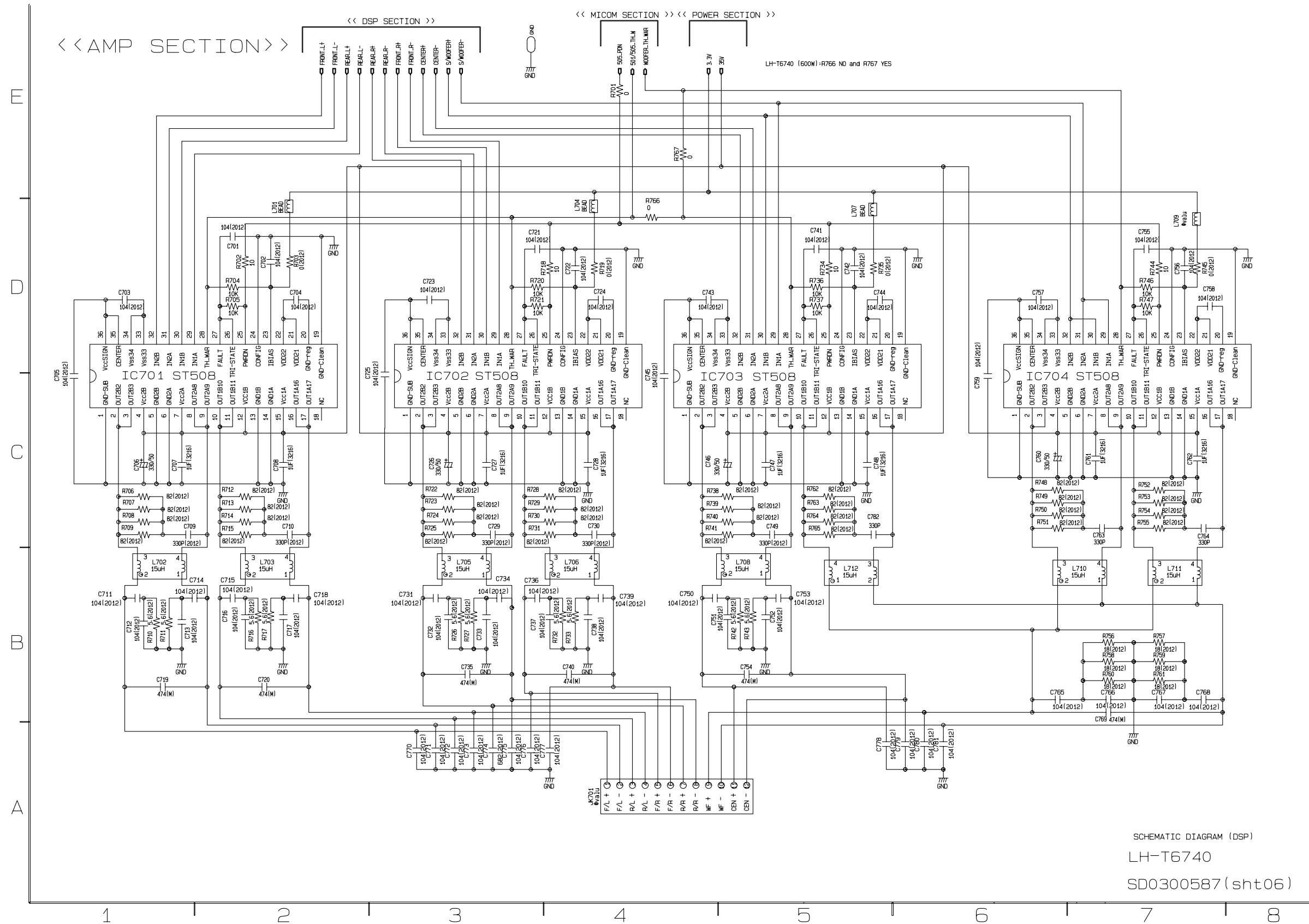
- **I/O SCHEMATIC DIAGRAM**



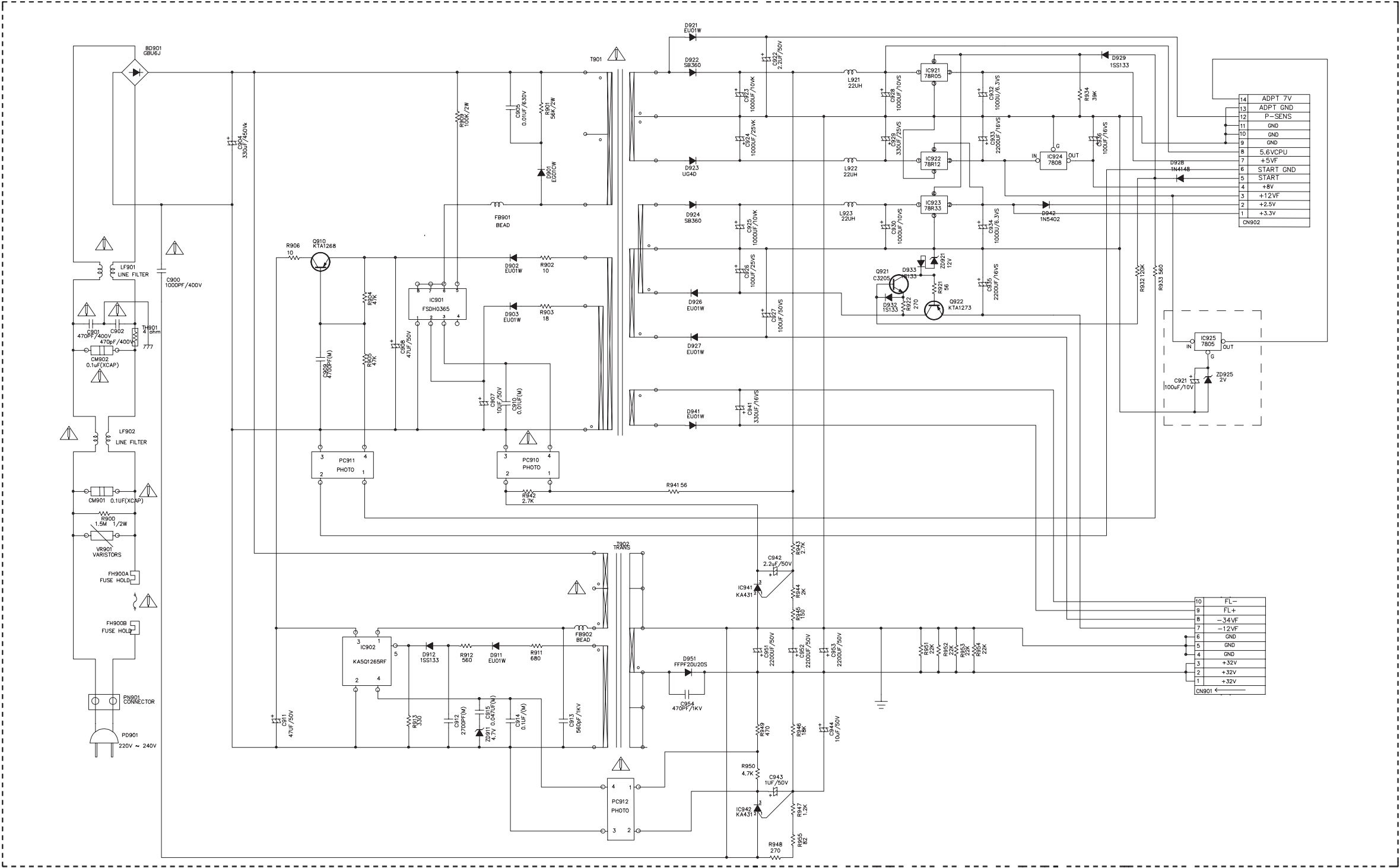
- **DSP SCHEMATIC DIAGRAM**



- **AMP SCHEMATIC DIAGRAM**

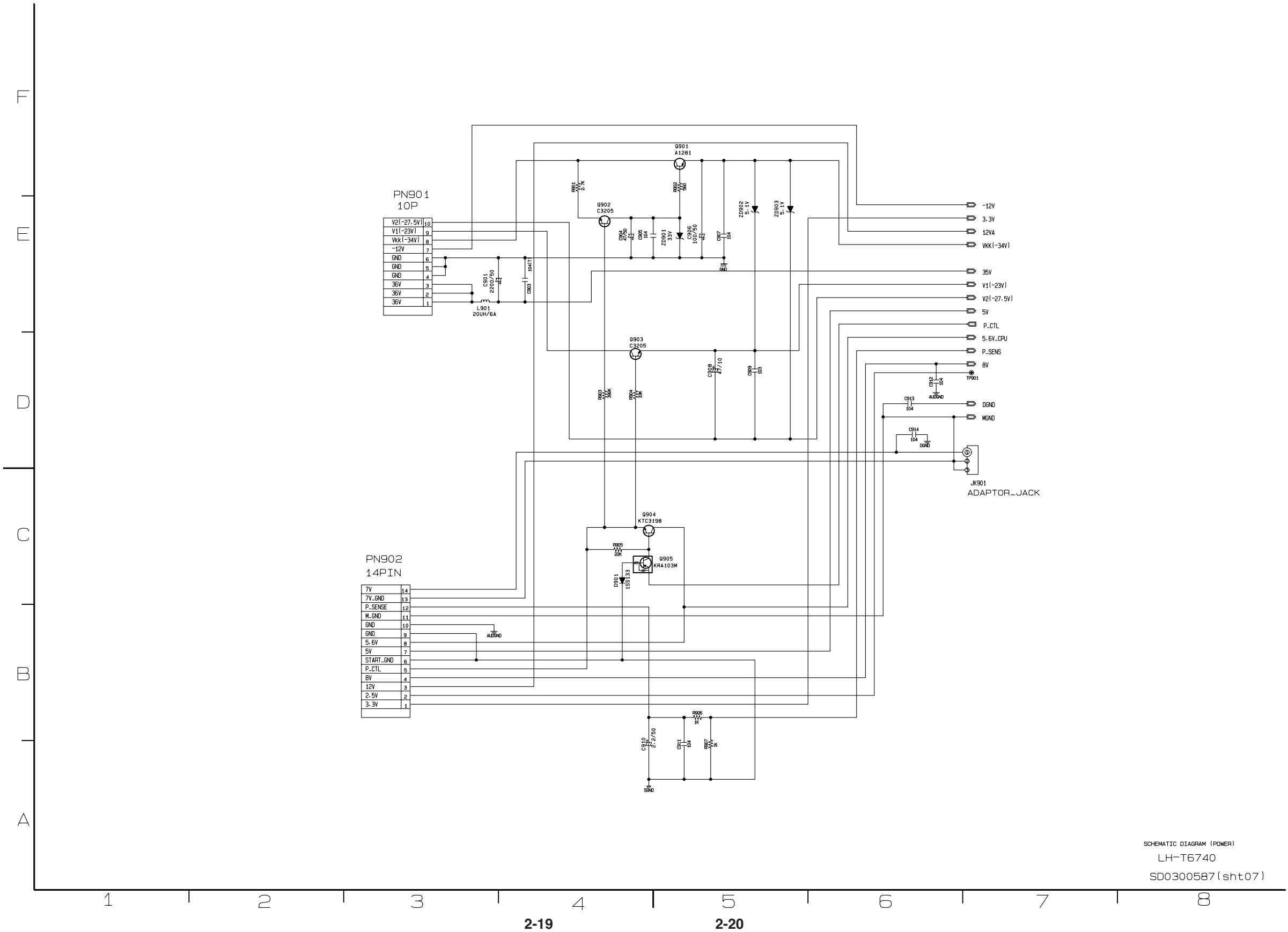


• SMPS SCHEMATIC DIAGRAM

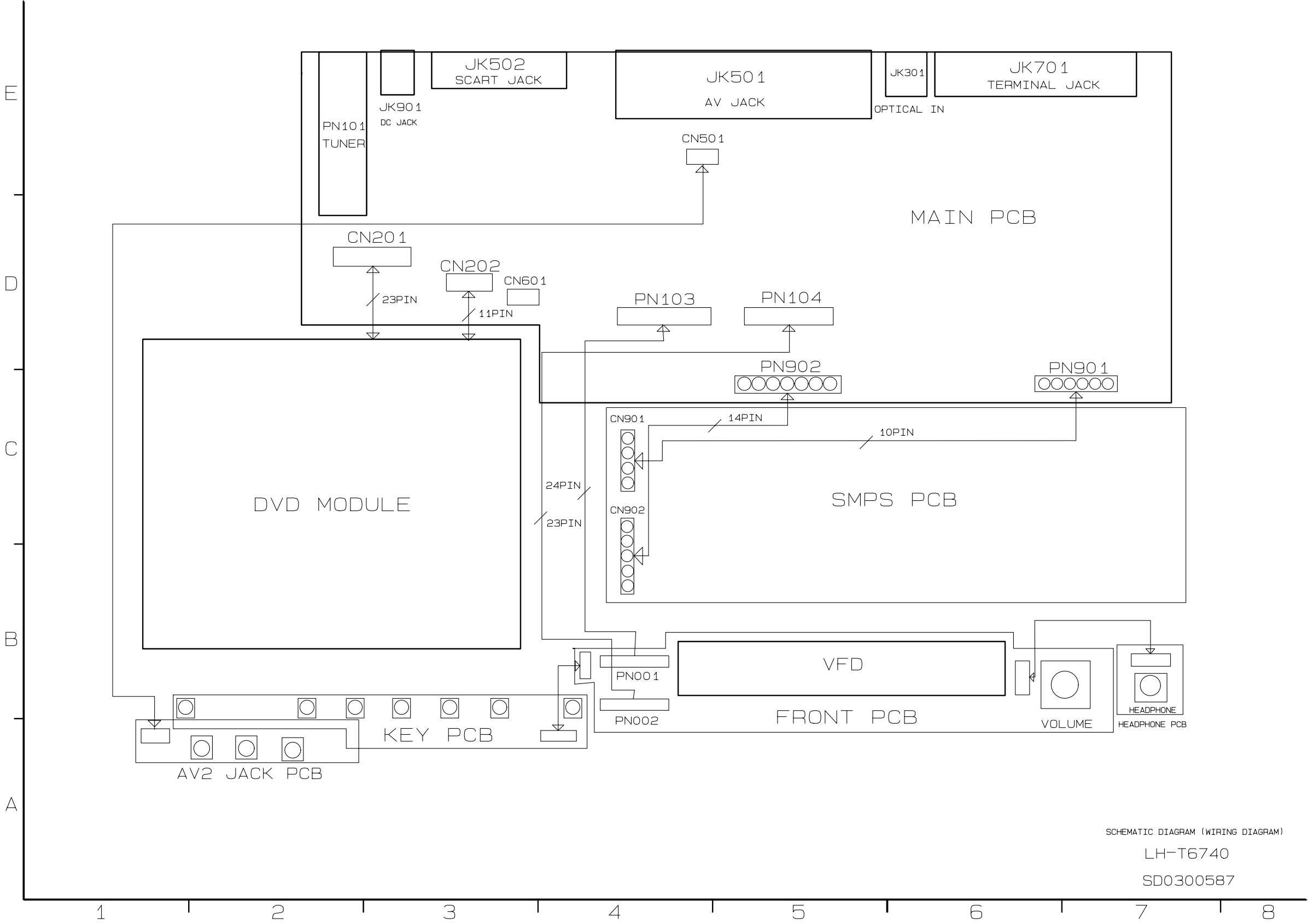


SCHEMATIC(SMPS--WIDE)
LH-T6540
VD 3854R16540A

• POWER SCHEMATIC DIAGRAM



❑ WIRING DIAGRAMS



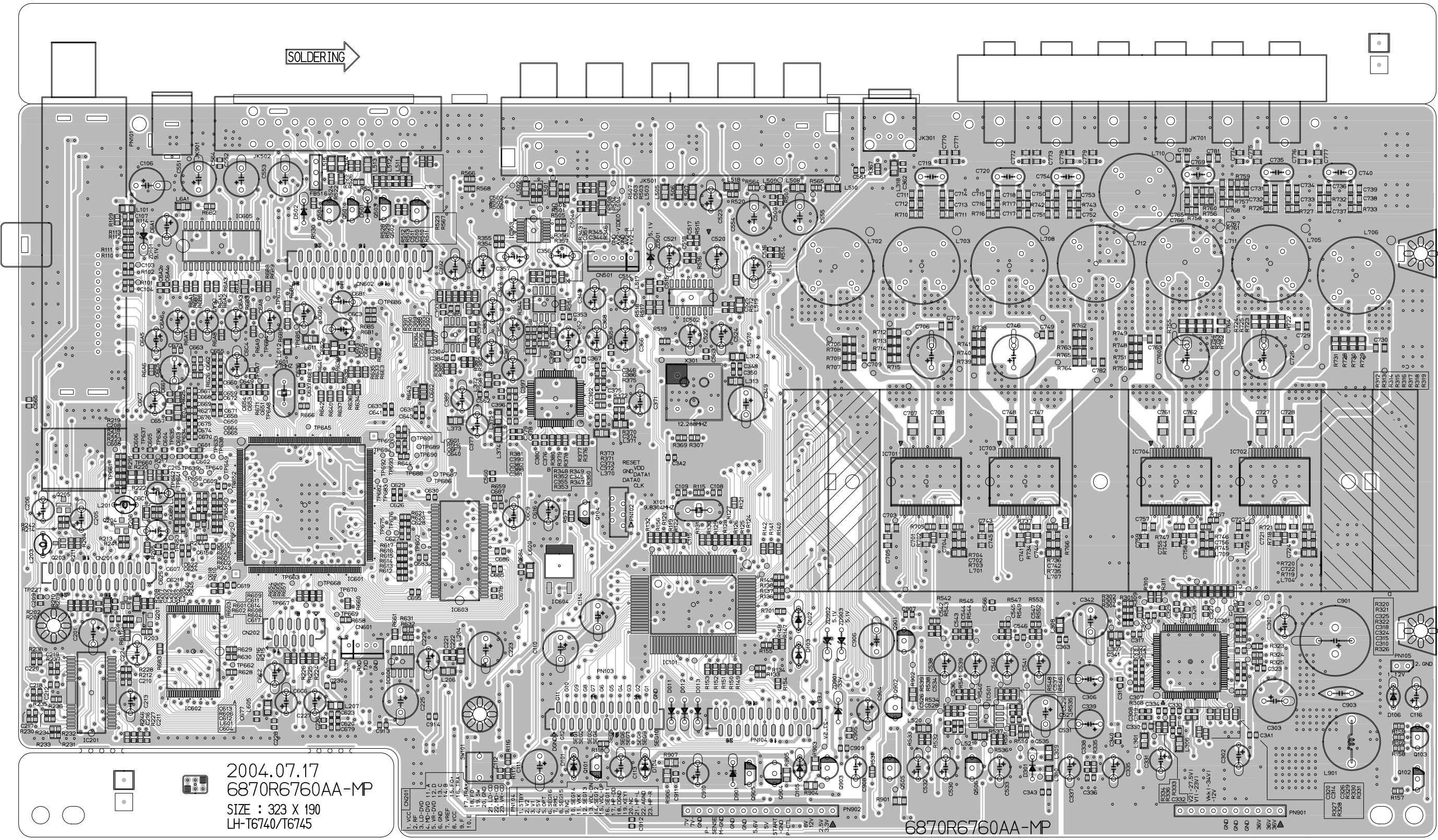
SCHEMATIC DIAGRAM (WIRING DIAGRAM)

LH-T6740

SD0300587

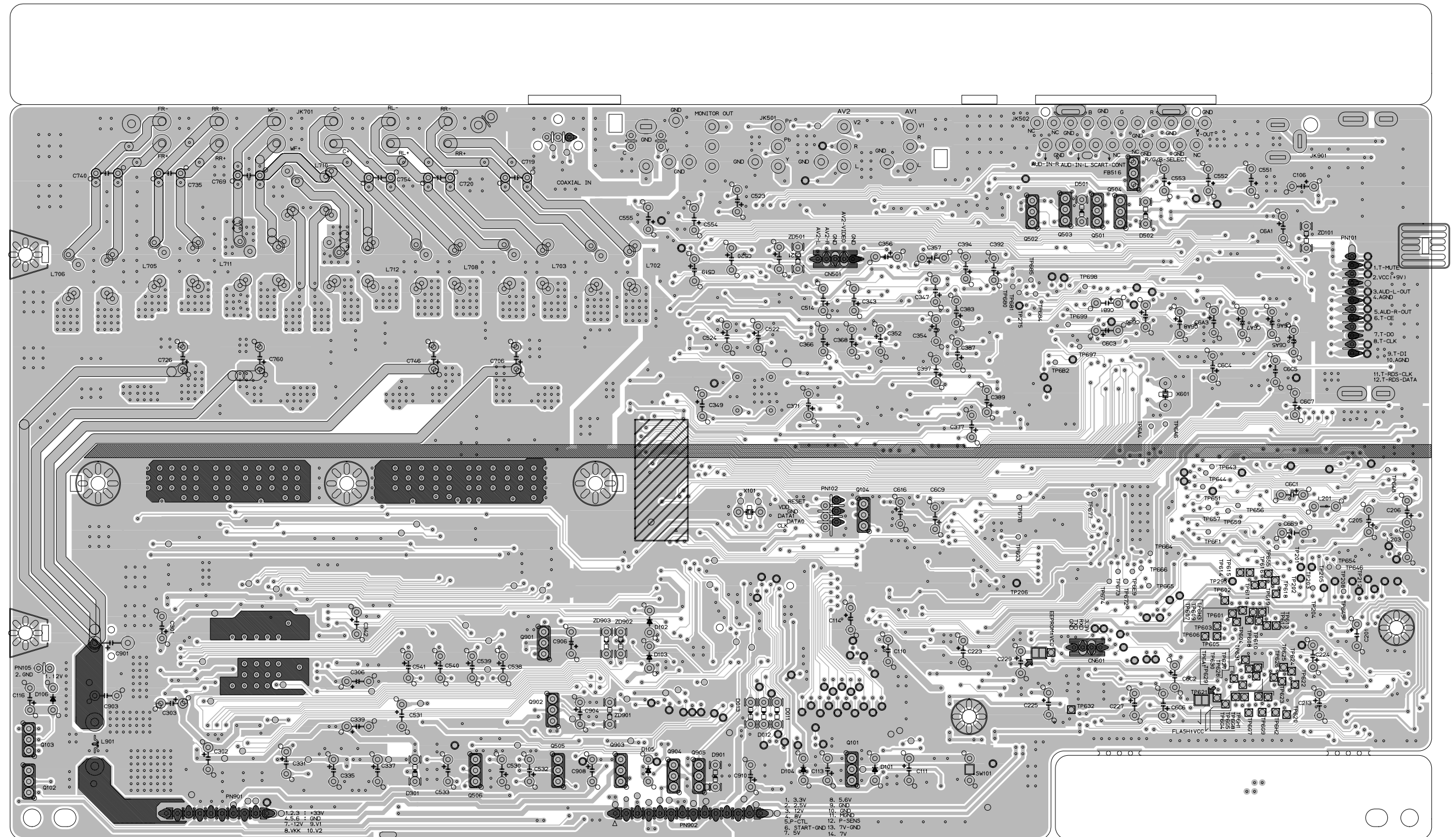
PRINTED CIRCUIT DIAGRAMS

MAIN P.C. BOARD (COMPONENT SIDE)



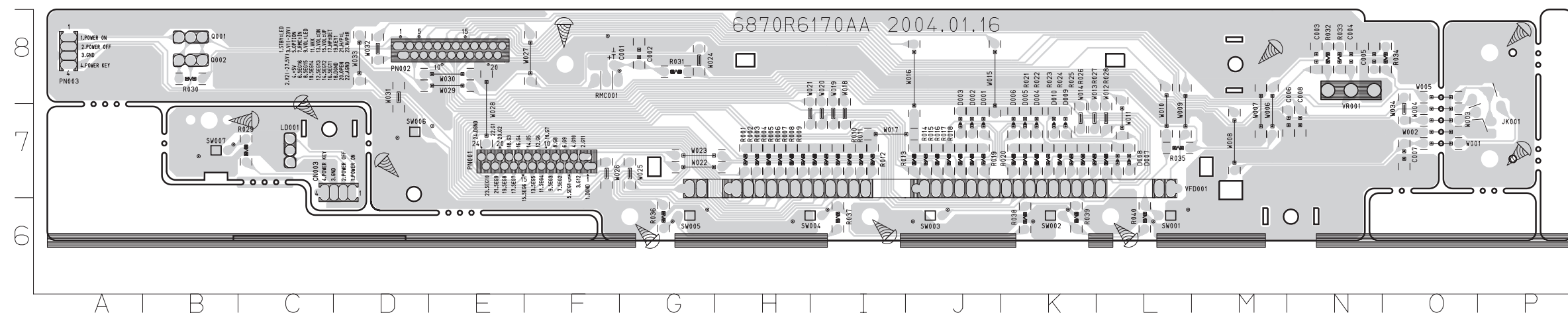
TOP-SOLDER

• MAIN P.C. BOARD (SOLDER SIDE)



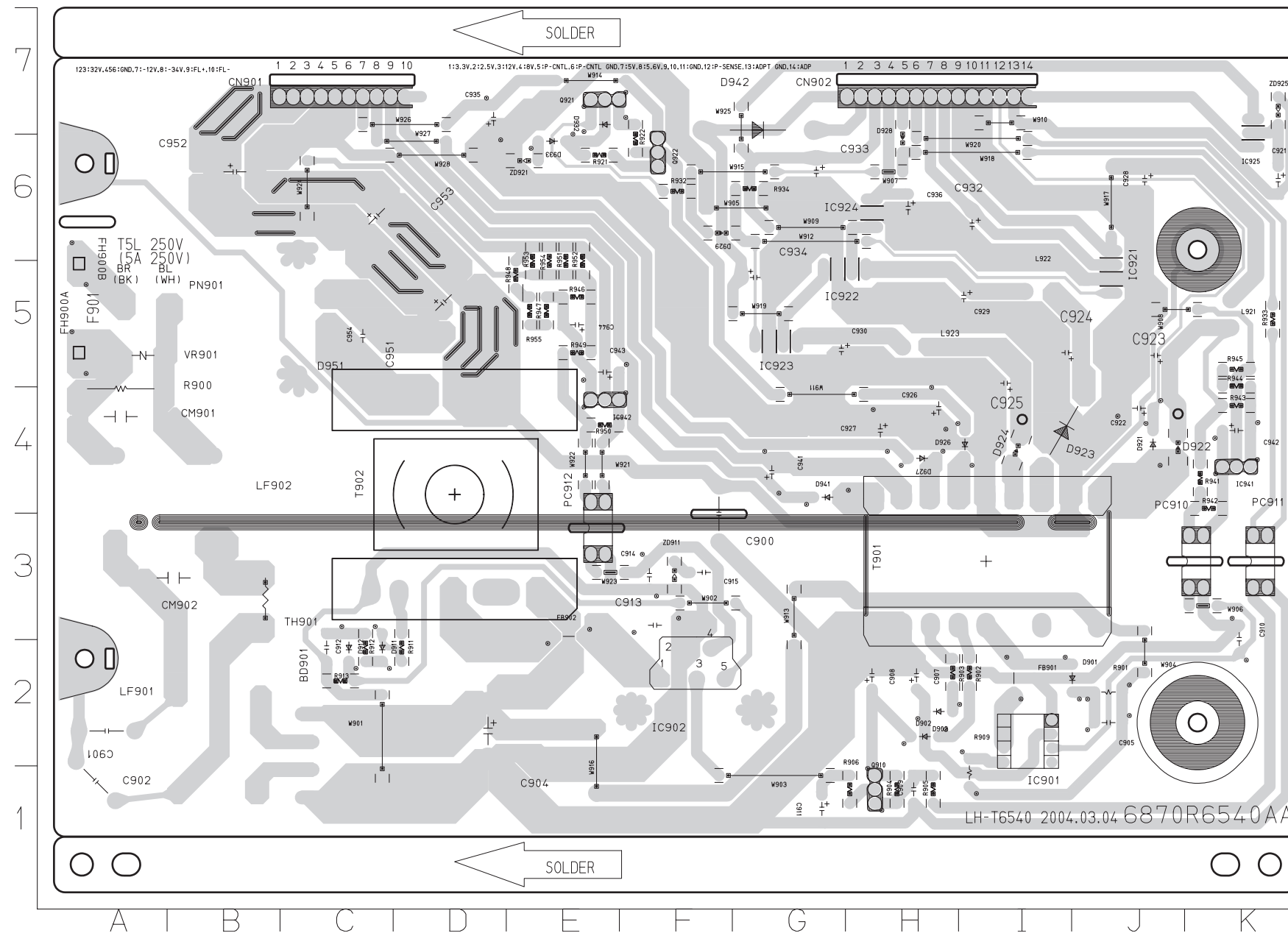
BOTTOM-SILK

- **FRONT P.C.BOARD**



C001	F8	R013	J7
C002	G8	R014	J7
C003	N8	R015	J7
C004	N8	R016	J7
C005	N8	R017	J7
C006	N7	R018	J7
C007	07	R019	J7
C008	N7	R020	K7
CN003	D7	R021	K7
D001	J7	R022	K7
D002	J7	R023	K7
D003	J7	R024	K7
D004	K7	R025	K7
D005	K7	R026	K7
D006	K7	R027	K7
D007	L7	R028	L7
D008	L7	R029	C7
D009	K7	R030	B8
D010	K7	R031	G8
JK001	P7	R032	N8
LD001	C7	R033	N8
PN001	E7	R034	08
PN002	E8	R035	L7
PN003	A8	R036	G6
Q001	B8	R037	I6
Q002	B8	R038	K6
R001	H7	R039	K6
R002	H7	R040	L6
R003	H7	RMC001	F7
R004	H7	SW001	L6
R005	H7	SW002	K6
R006	H7	SW003	J6
R007	I7	SW004	I6
R008	I7	SW005	G6
R009	I7	SW006	D7
R010	I7	SW007	B7
R011	I7	VF0001	L7
R012	I7	VR001	N7

- **POWER P.C.BOARD**



BD901	C2	CN902	H7	Q910	H1
C900	F3	D901	J2	Q921	E7
C901	A2	D902	H2	Q922	F6
C902	A1	D903	H2	R900	A4
C904	D2	D911	C2	R901	J2
C905	J2	D912	C2	R902	I2
C907	H2	D921	J4	R903	H8
C908	H2	D922	J4	R904	H1
C909	H1	D923	14	R905	H1
C910	K3	D924	14	R906	H1
C911	G1	D926	14	R909	I1
C912	C2	D927	H4	R911	D2
C913	F3	D928	H6	R912	C2
C914	F3	D929	F6	R913	C2
C915	F3	D932	E7	R921	E6
C921	K6	D933	E6	R922	F6
C922	J4	D941	G4	R932	F6
C923	J5	D942	G7	R933	K5
C924	15	D951	C5	R934	G6
C925	15	FB901	12	R941	K4
C926	H4	FB902	E3	R942	K4
C927	H4	FH900A	A5	R943	K4
C928	J6	FH900B	A5	R944	K5
C929	15	IC901	12	R945	K5
C930	G5	IC902	F2	R946	E5
C932	16	IC921	J5	R947	E5
C933	G6	IC922	G5	R948	E5
C934	G5	IC923	G5	R949	E5
C935	D7	IC924	H6	R950	E4
C936	H6	IC925	K7	R951	E5
C941	G4	IC941	K4	R952	E5
C942	K4	IC942	E4	R953	E5
C943	E5	L921	K5	R954	E5
C944	E5	L922	15	R955	E5
C951	D5	L923	H5	T901	I3
C952	B6	LF901	B2	T902	D4
C953	C6	LF902	A4	TH901	B3
C954	C5	PC910	K3	VR901	A5
CM901	A4	PC911	K3	ZD911	F3
CM902	B3	PC912	E4	ZD921	E6
CN901	C7	PN901	A5	ZD925	K7

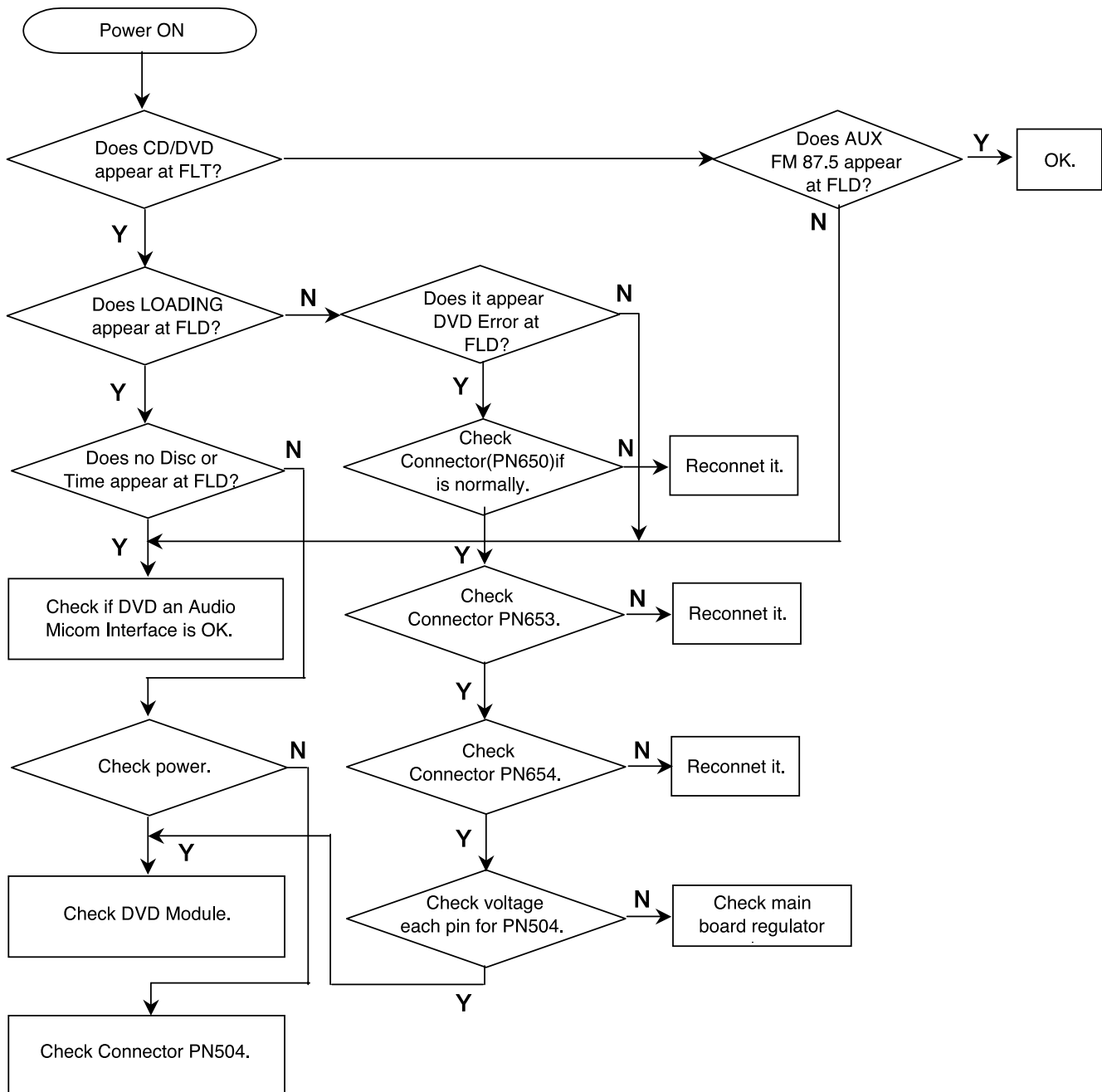
MEMO

MEMO

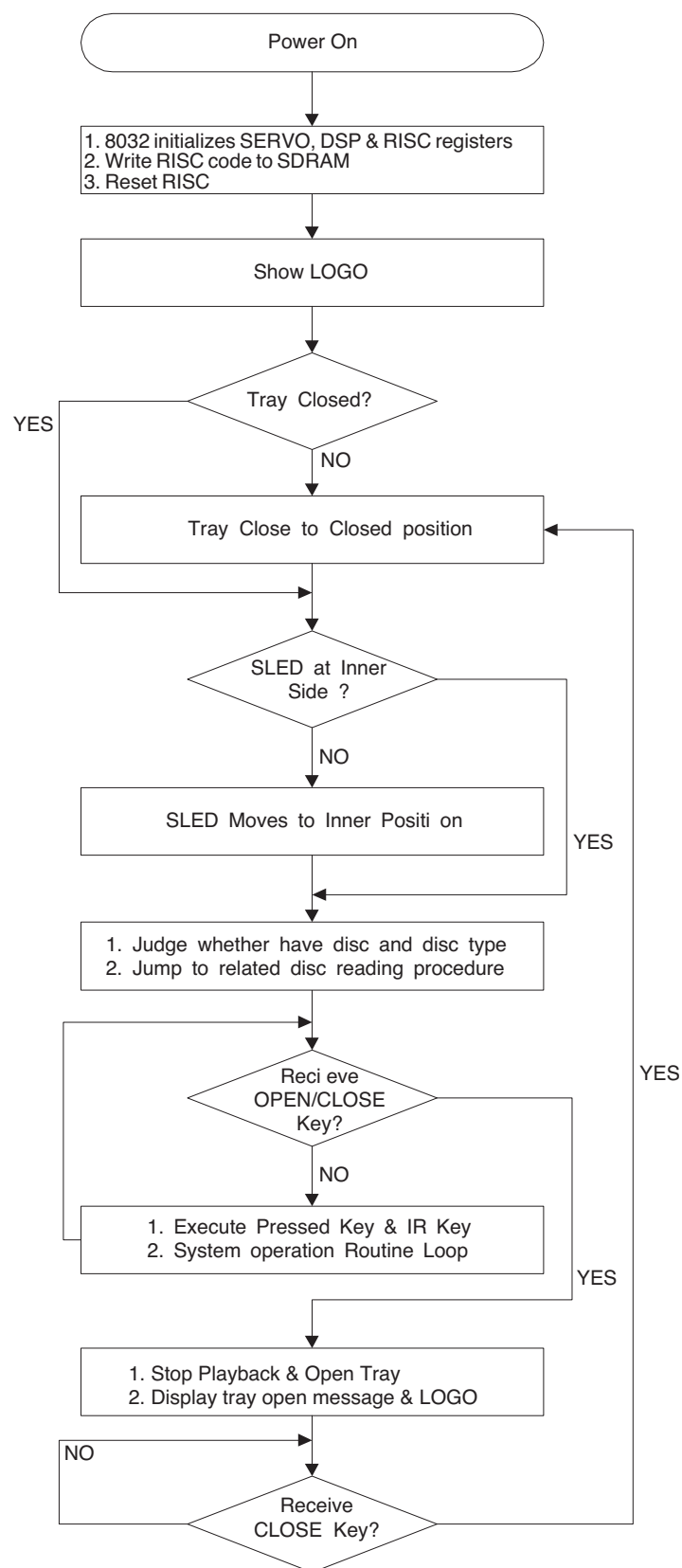
SECTION 3. DVD PART

ELECTRICAL TROUBLESHOOTING GUIDE

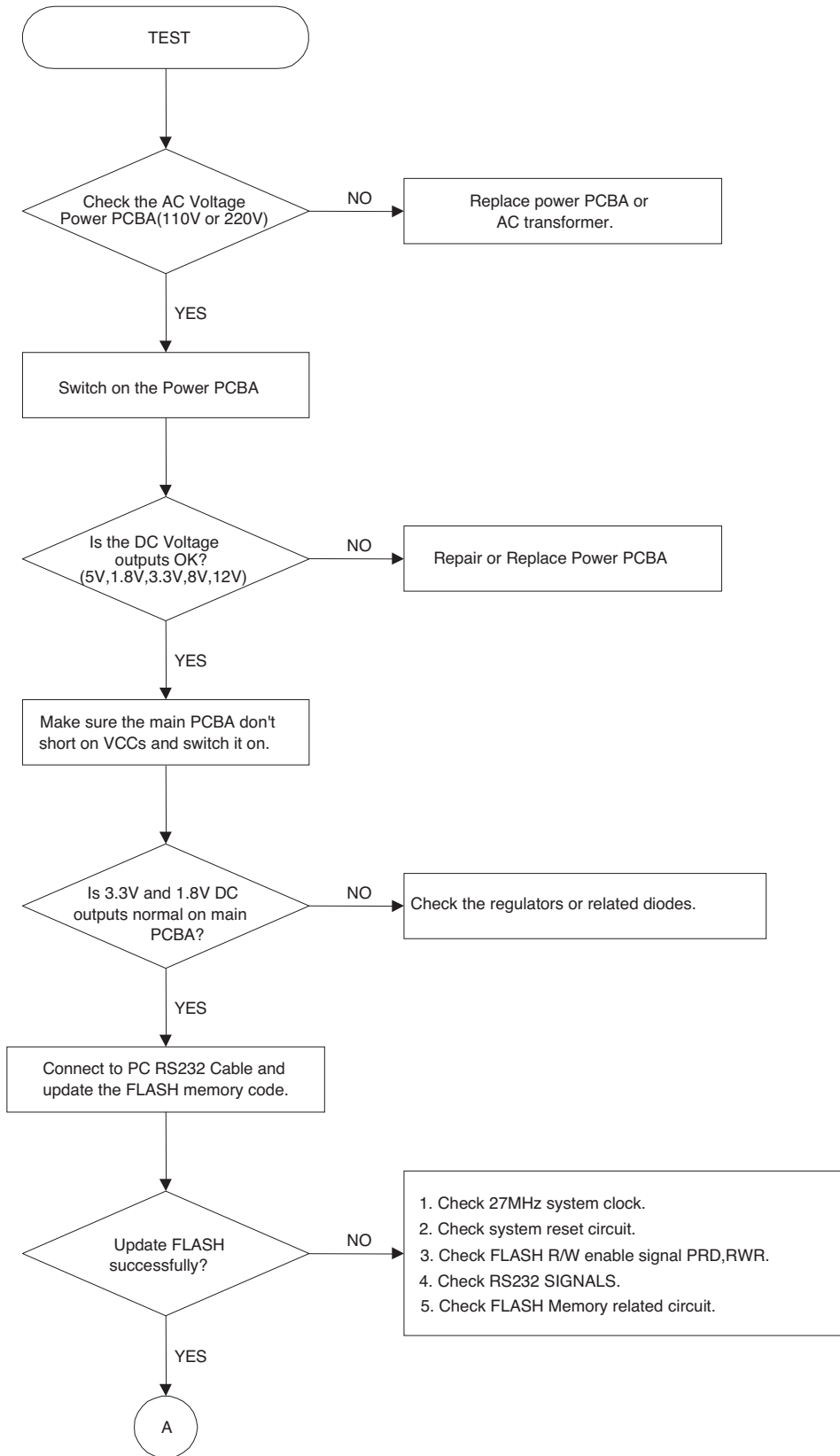
1. Power check flow

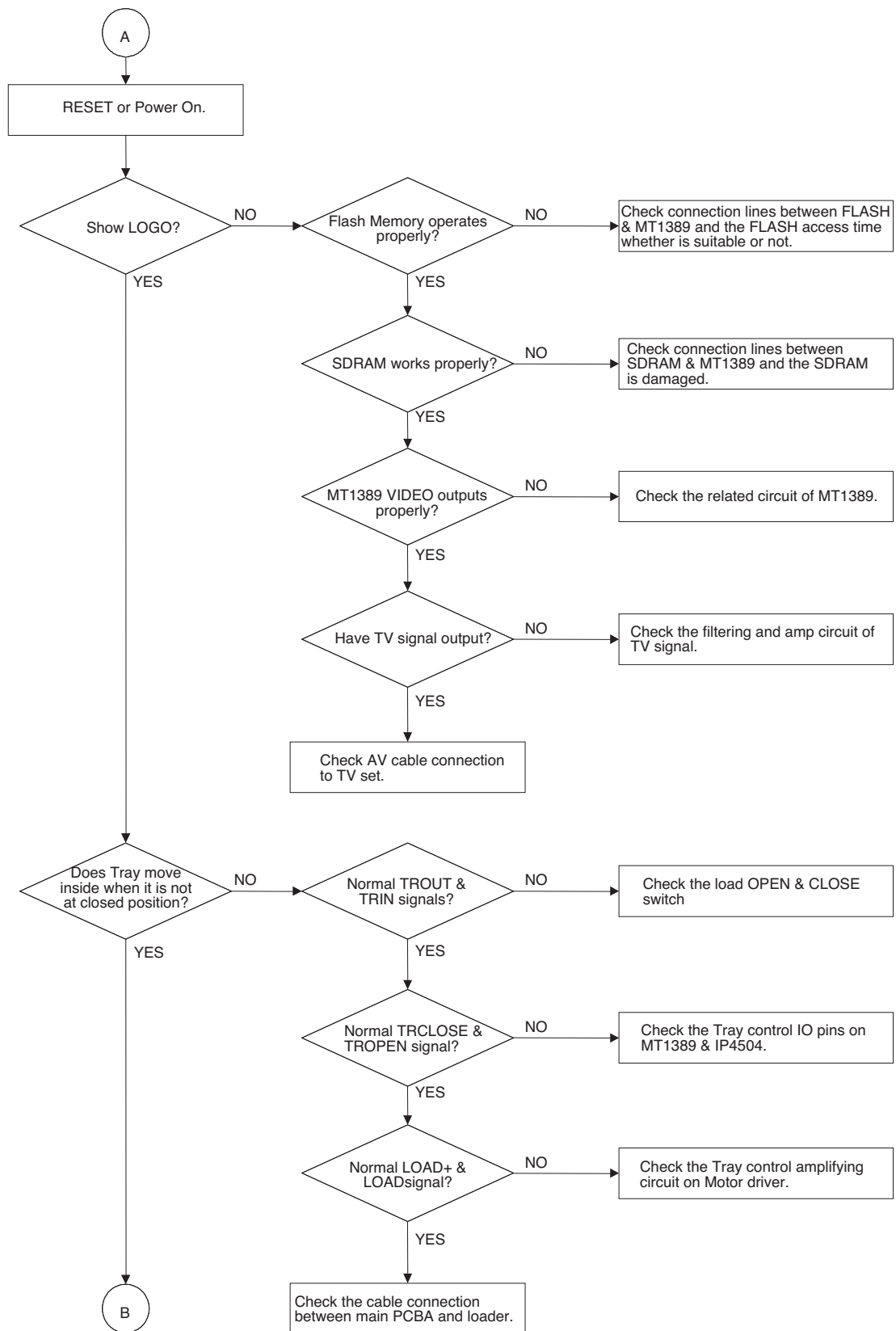


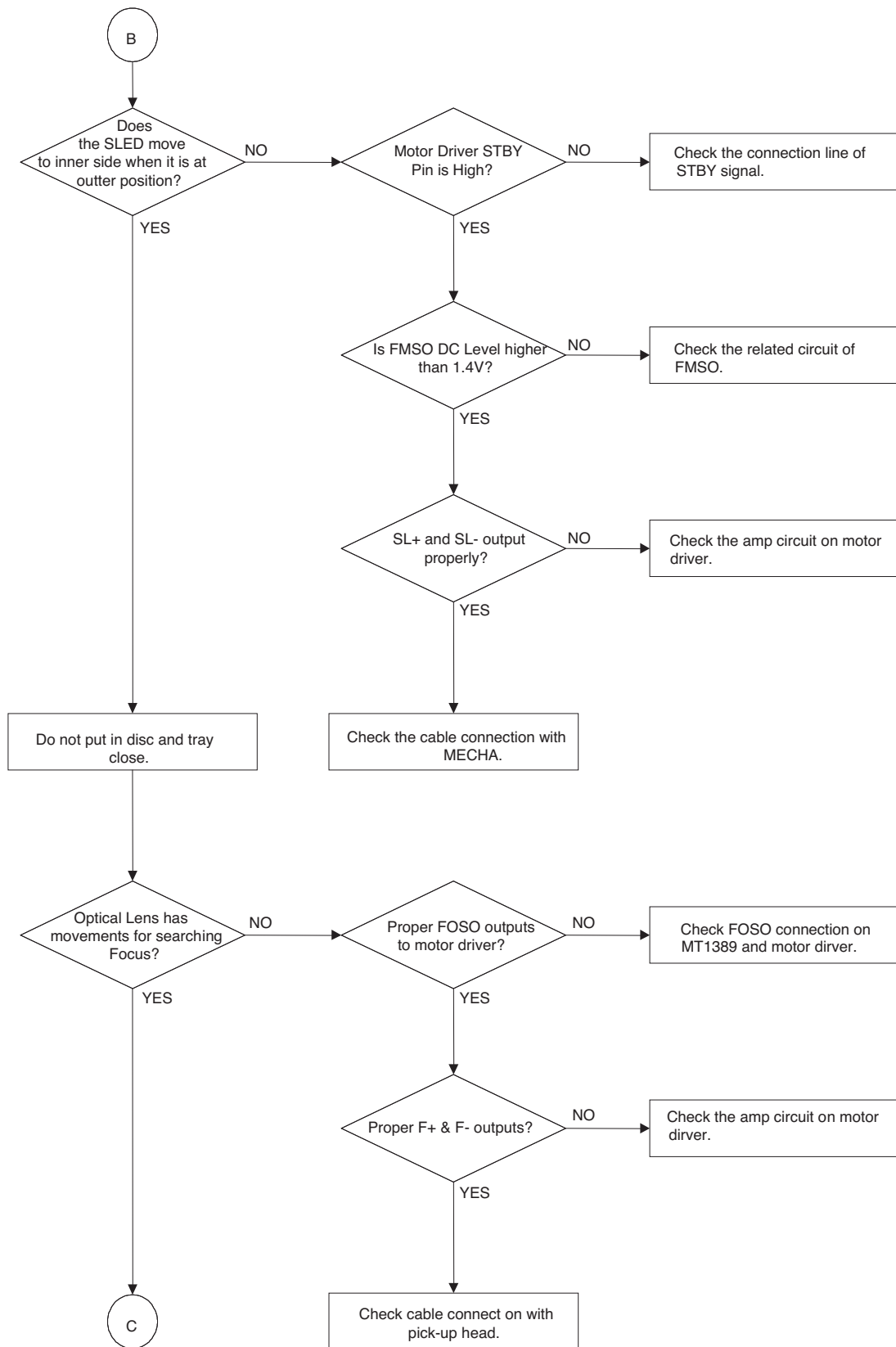
2. System operation flow

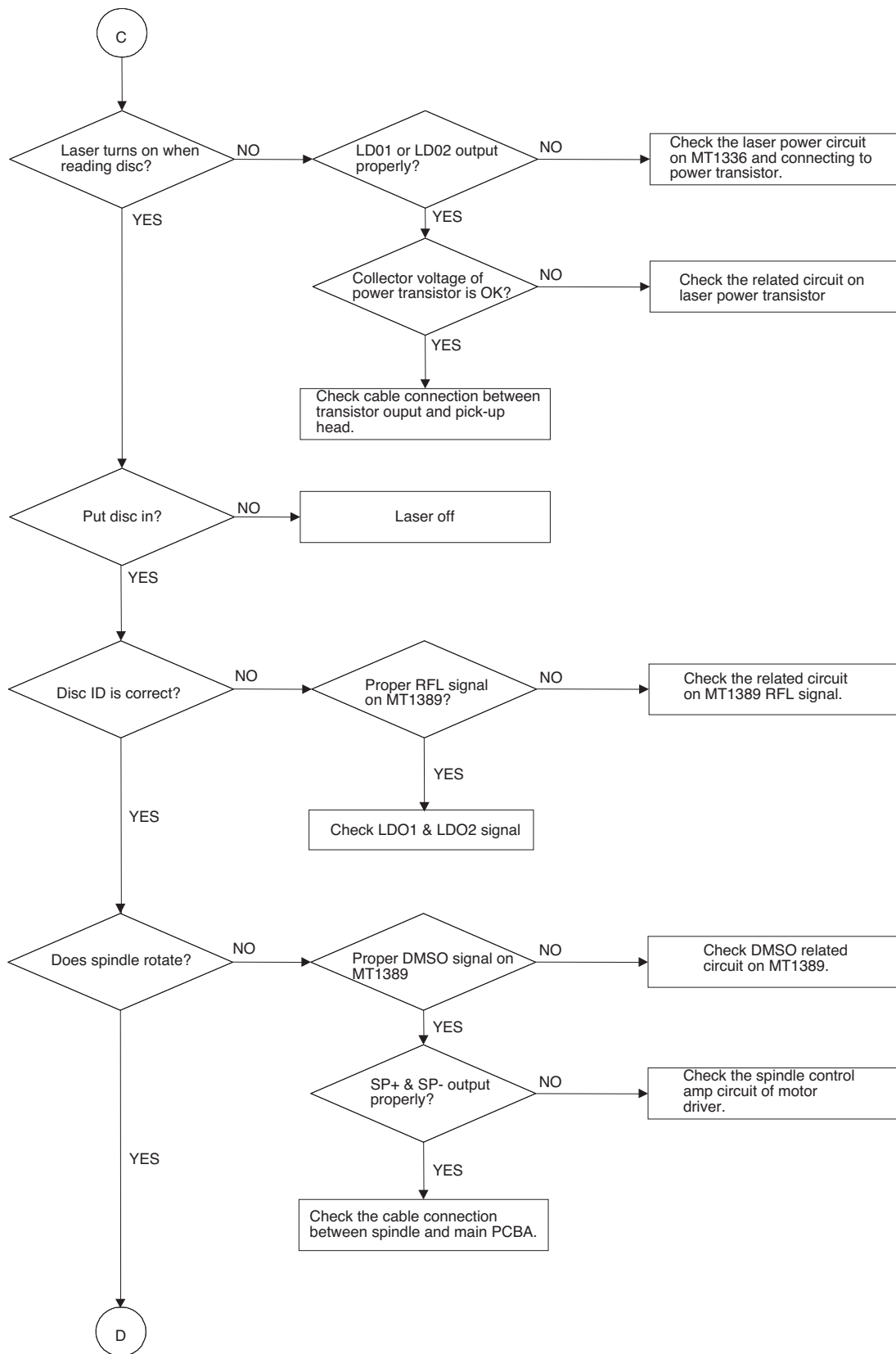


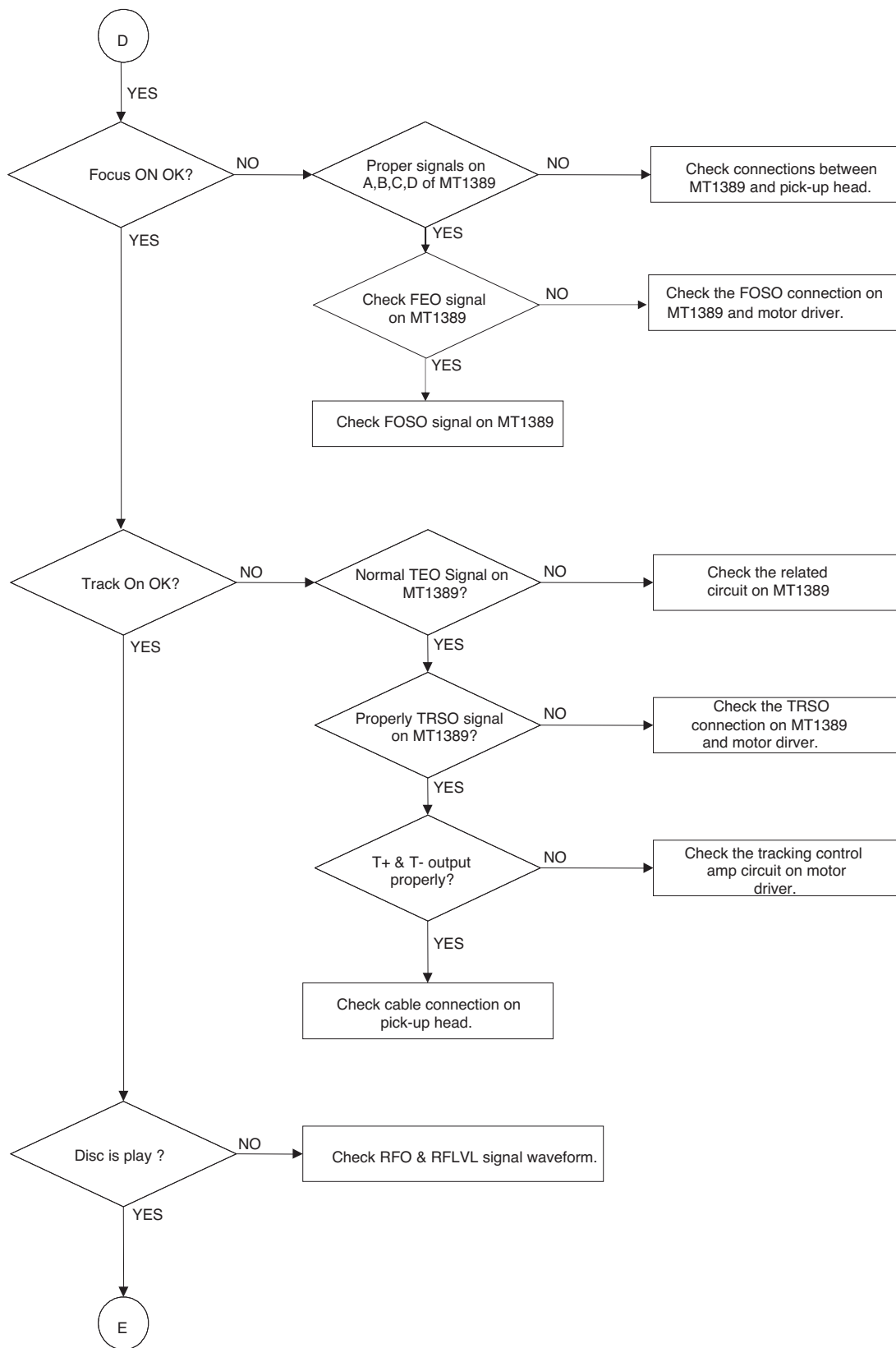
3. Test & debug flow

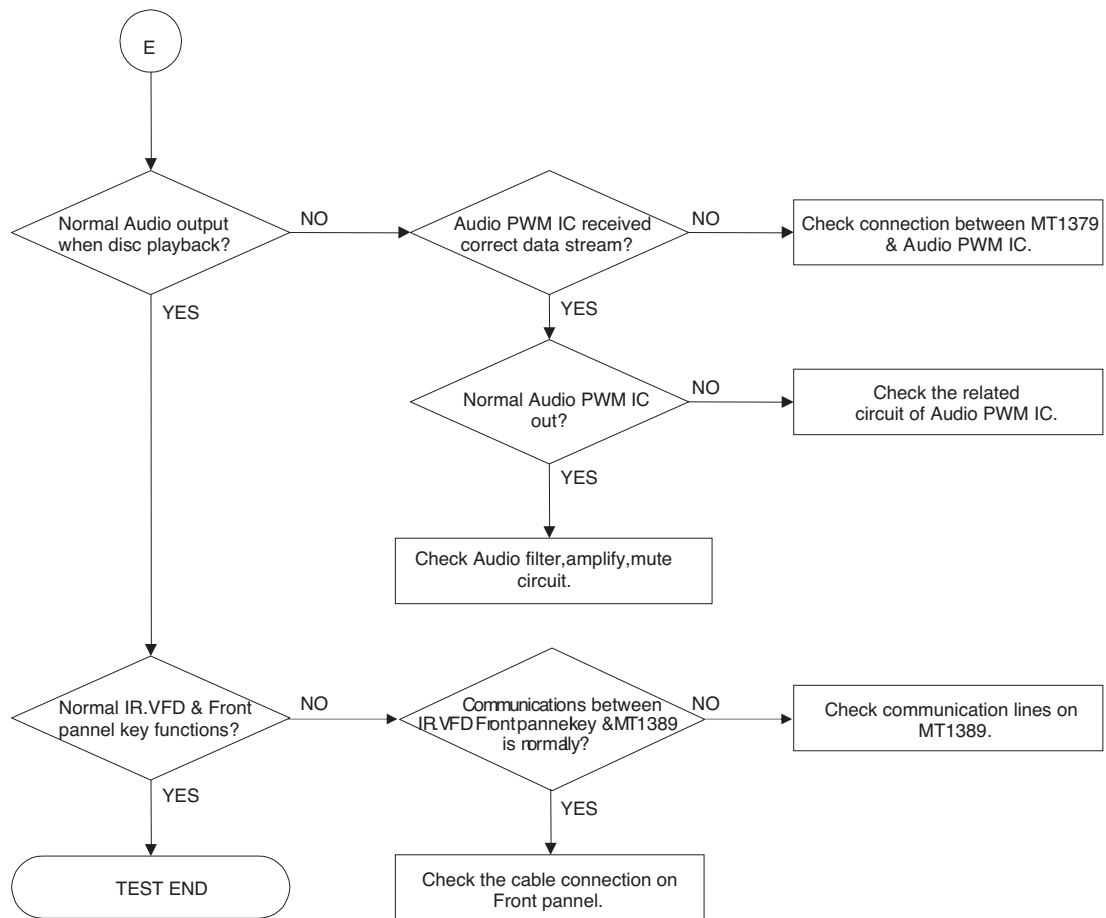












❑ DETAILS AND WAVEFORMS ON SYSTEM TEST AND DEBUGGING

1. SYSTEM 27MHz CLOCK, RESET, FLASH R/W SIGNAL

1) MT1389 main clock is at 27MHz(X501)

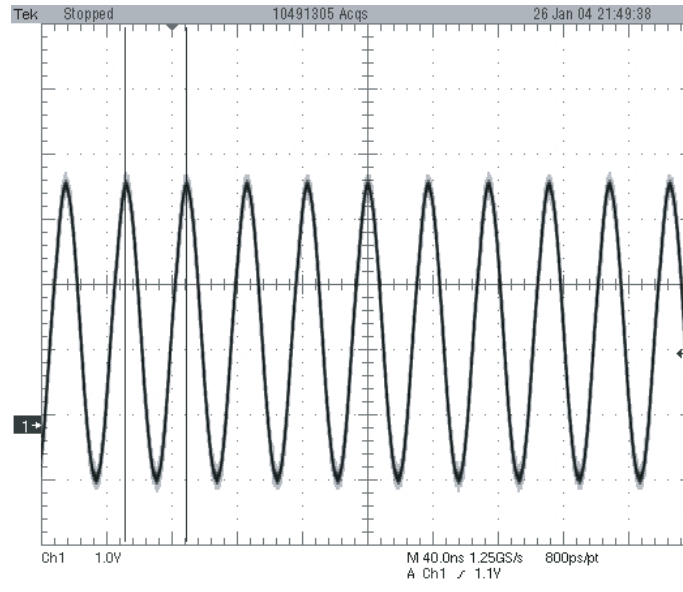


FIG 1-1

2) MT1336 reset is high active

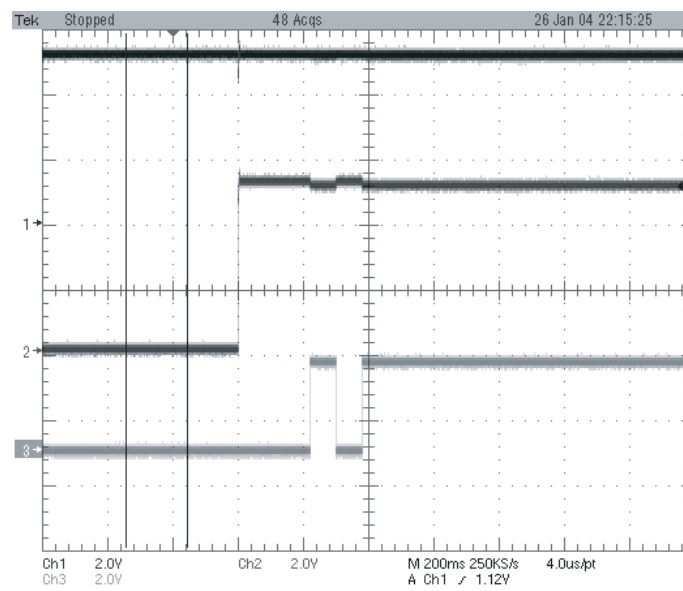


FIG 1-2

3) RS232 waveform during procedure(Downloading)

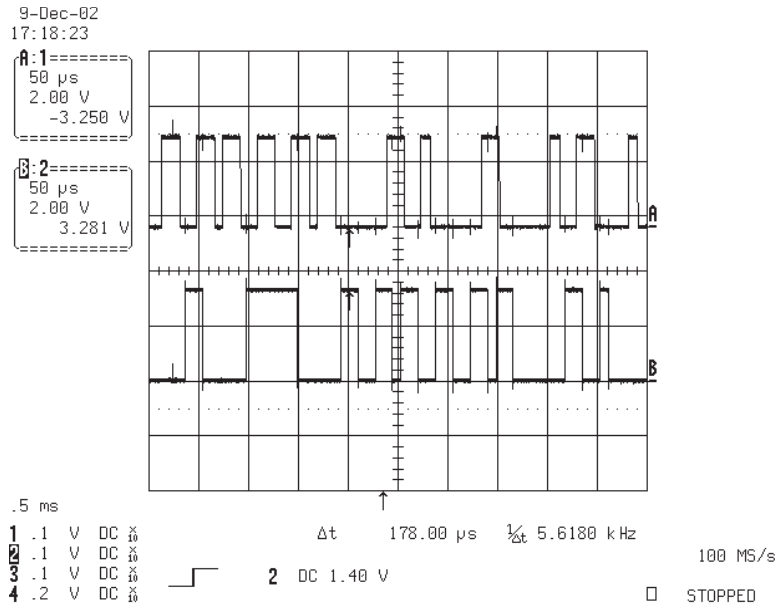


FIG 1-3

4) Flash R/W enable signal during download(Downloading)

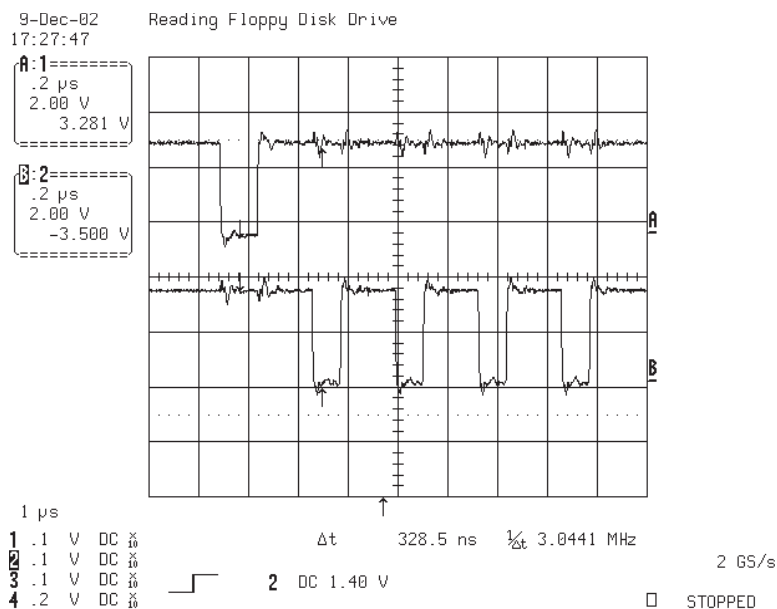


FIG 1-4

2. SDRAM CLOCK

1) MT1389 main clock is at 27MHz(X501)

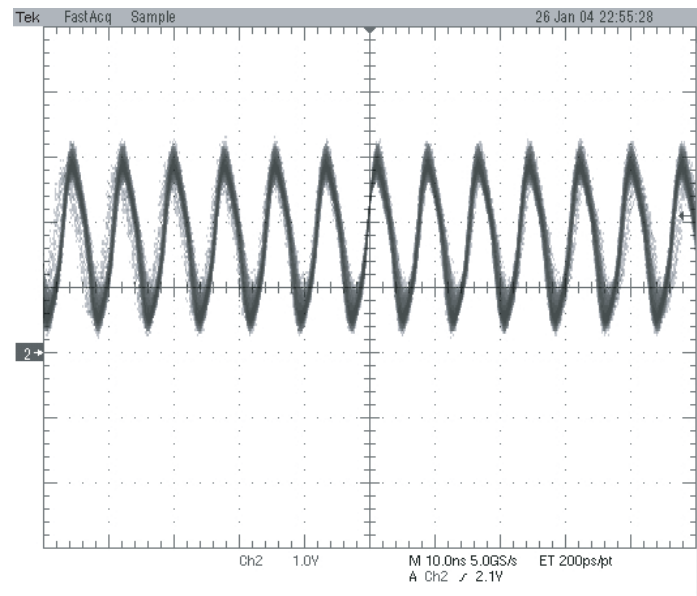


FIG 2-1

3. TRAY OPEN/CLOSE SIGNAL

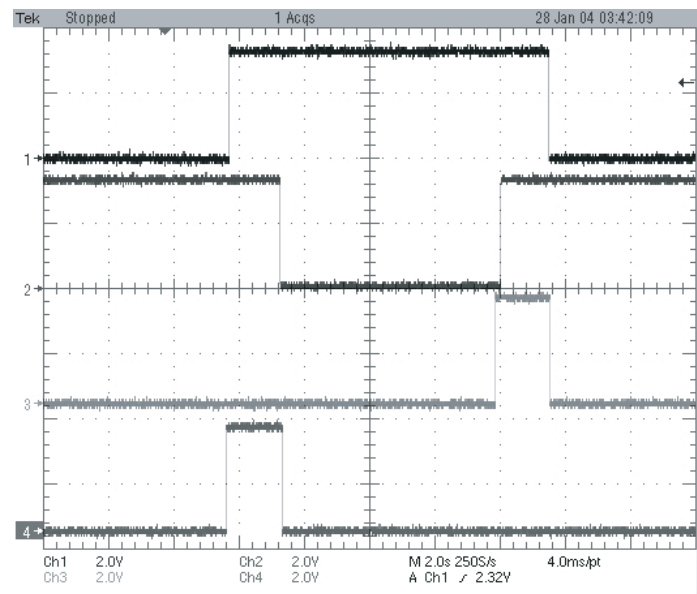


FIG 3-1

4. SLED CONTROL RELATED SIGNAL (NO DISC CONDITION)

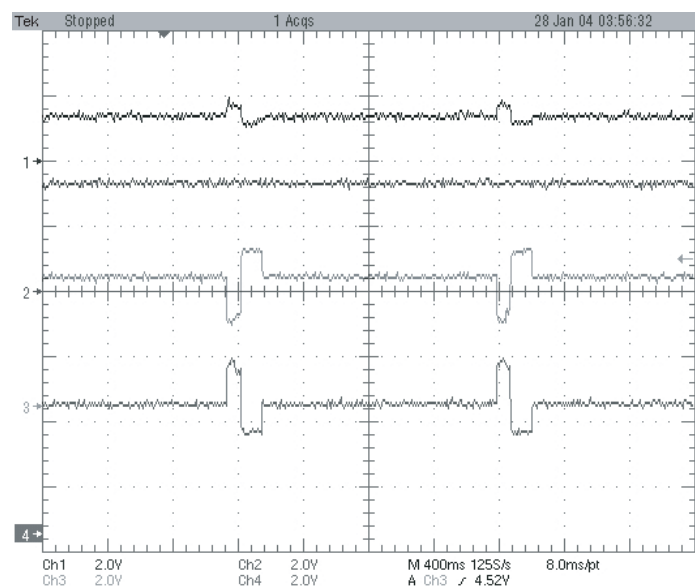


FIG 4-1

5. LENS CONTROL RELATED SIGNAL(NO DISC CONDITION)

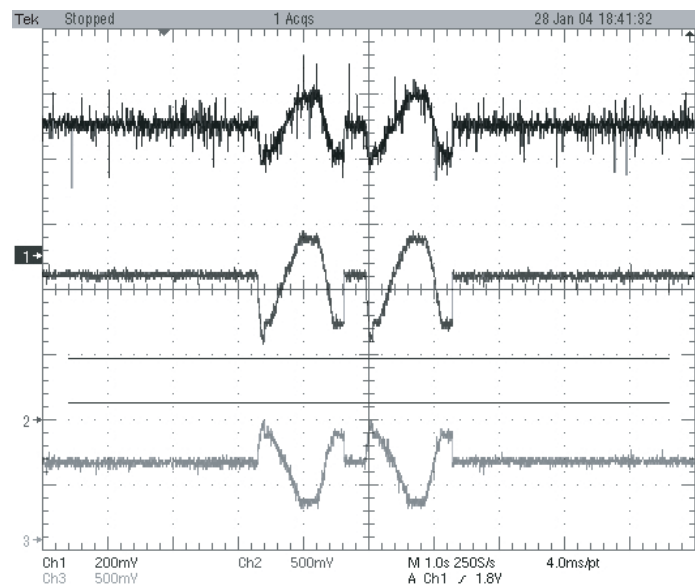


FIG 5-1

6. LASER POWER CONTROL RELATED SIGNAL
(NO DISC CONDITION)

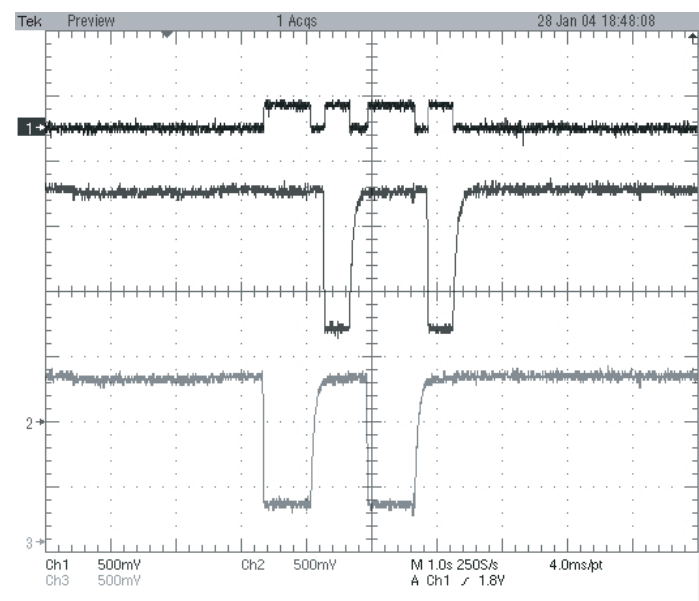


FIG 6-1

7. DISC TYPE JUDGEMENT WAVEFORM

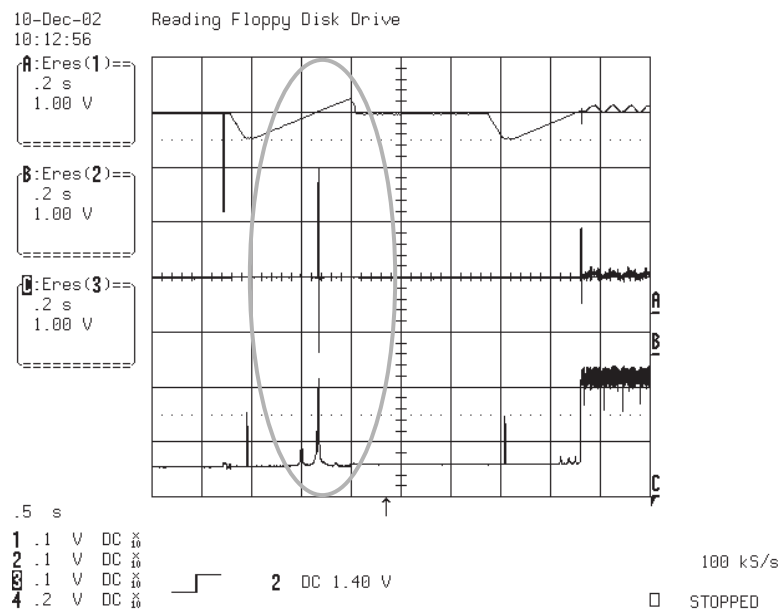


FIG 7-1

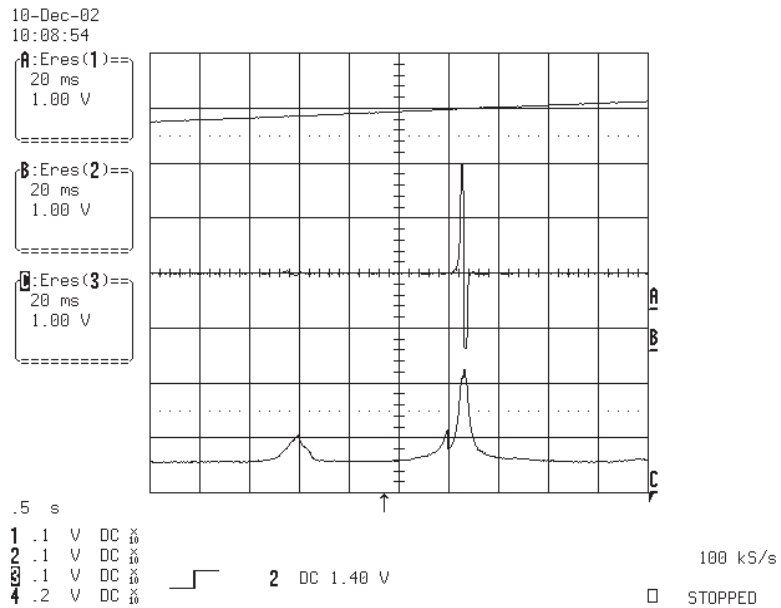


FIG 7-2 (DVD)

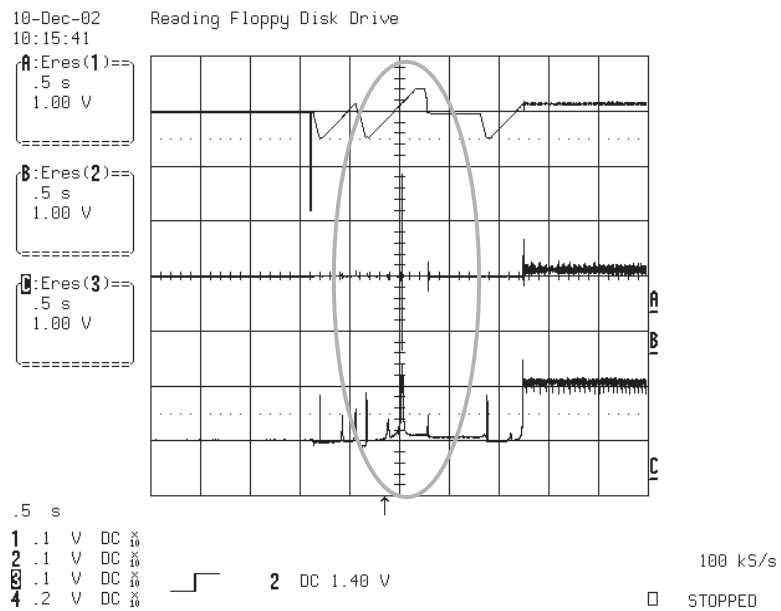


FIG 7-3 (CD)

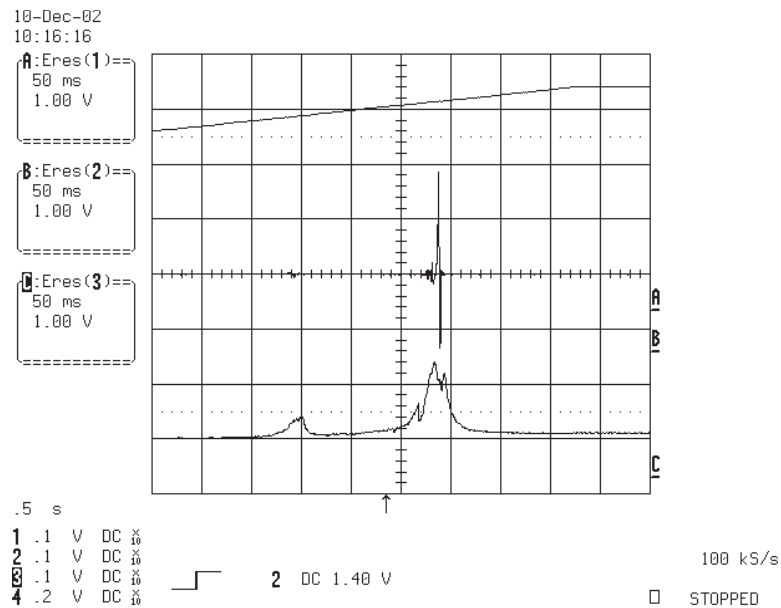


FIG 7-4 (CD)

8. FOCUS ON WAVEFORM

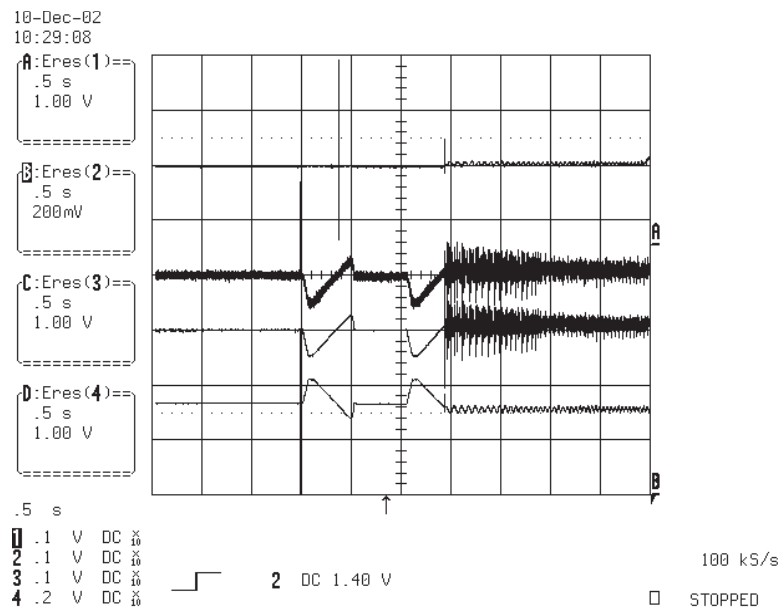


FIG 8-1 (DVD)

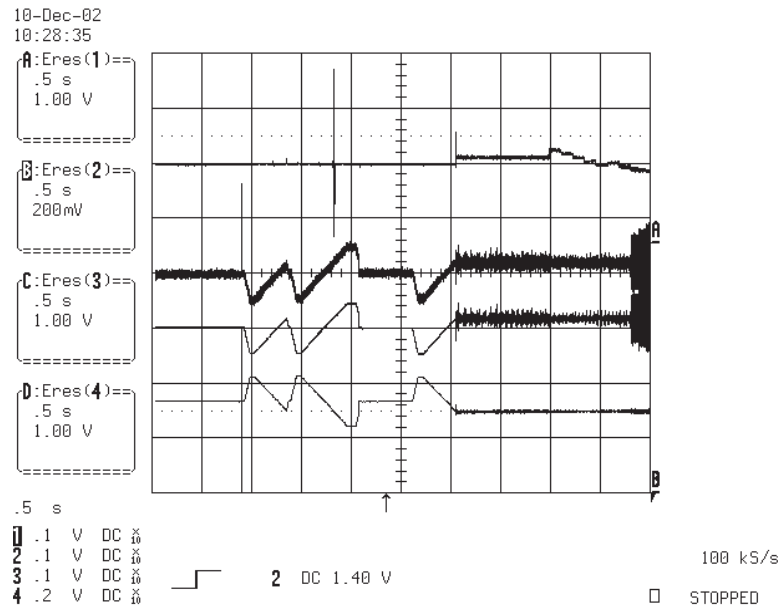


FIG 8-2 (CD)

9. SPINDLE CONTROL WAVEFORM (NO DISC CONDITION)

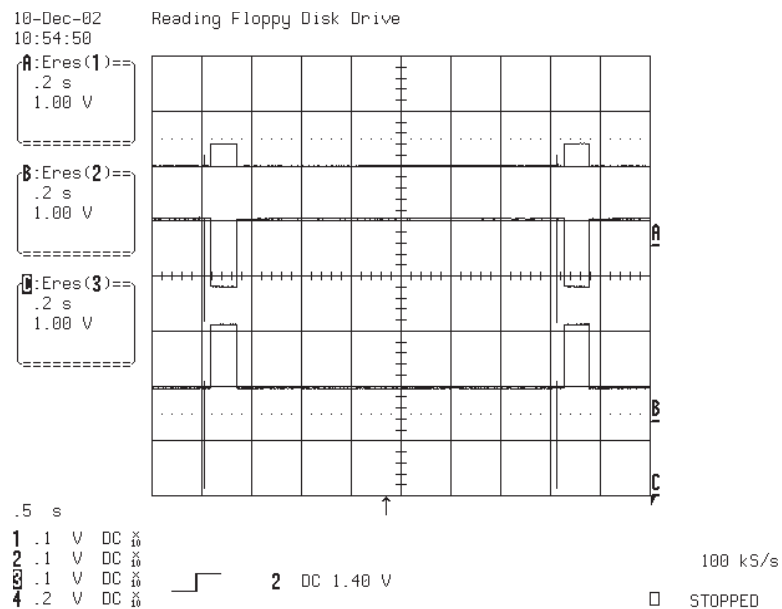


FIG 9-1

10. TRACKING CONTROL RELATED SIGNAL(System checking)

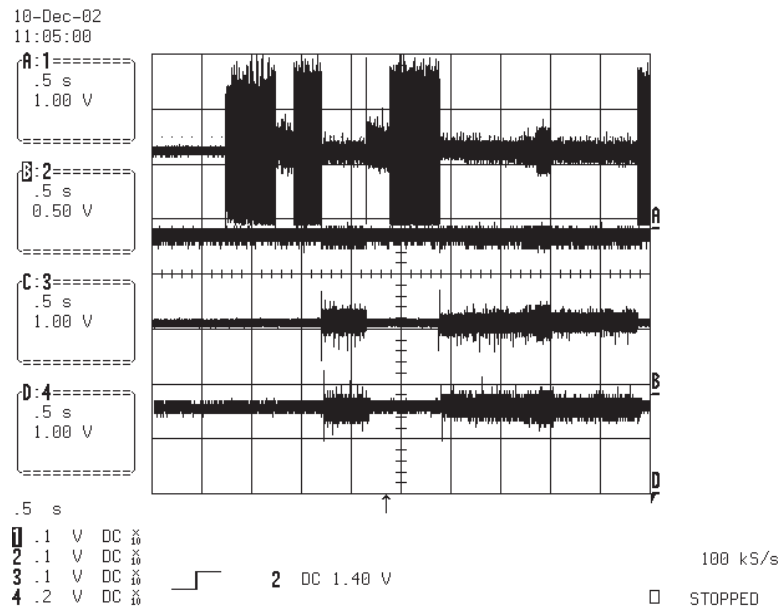


FIG 10-1 (DVD)

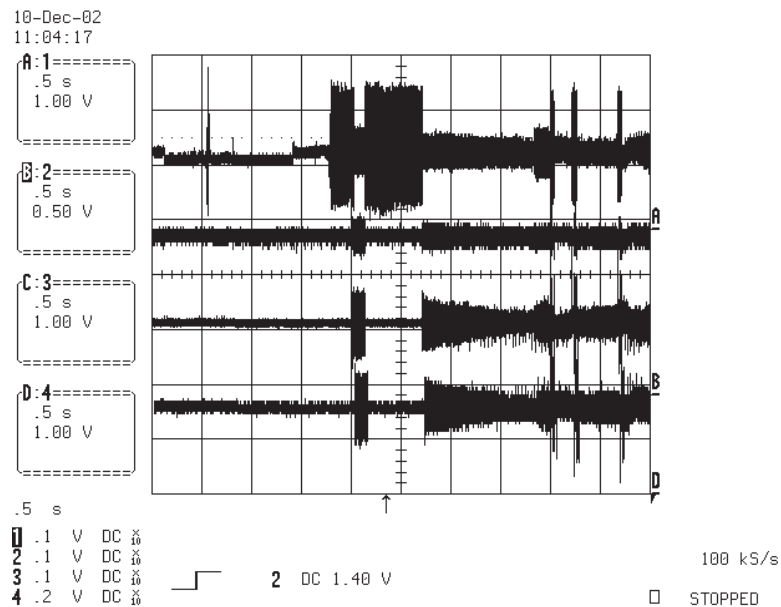


FIG 10-2 (CD)

11. MT1389 AUDIO OPTICAL AND COAXIAL INPUT (SPDIF)

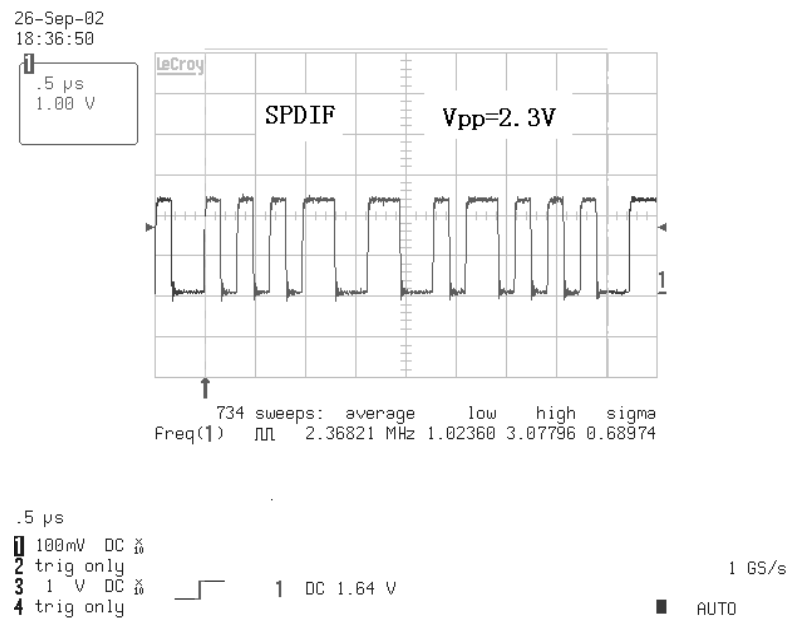


FIG 11-1 (DVD)

12. MT1389 VIDEO OUTPUT WAVEFORM

1)100%

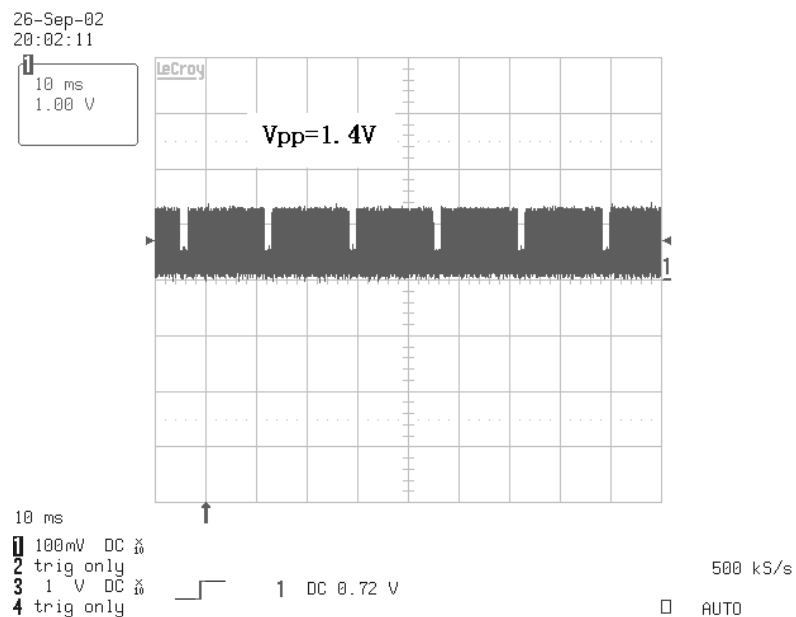


FIG 12-1

2) COMPOSITE VIDEO SIGNAL

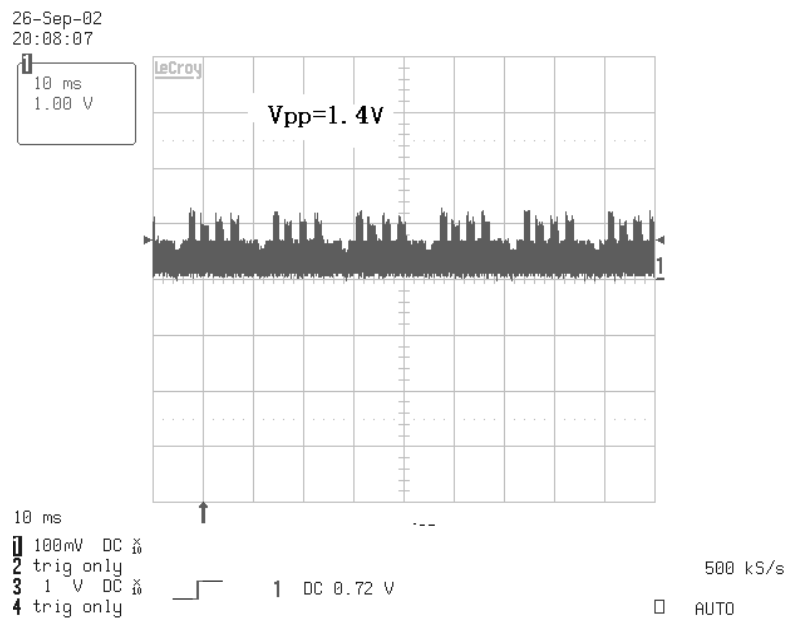


FIG 12-2

13. MT1389 AUDIO OUTPUT TO PWM IC

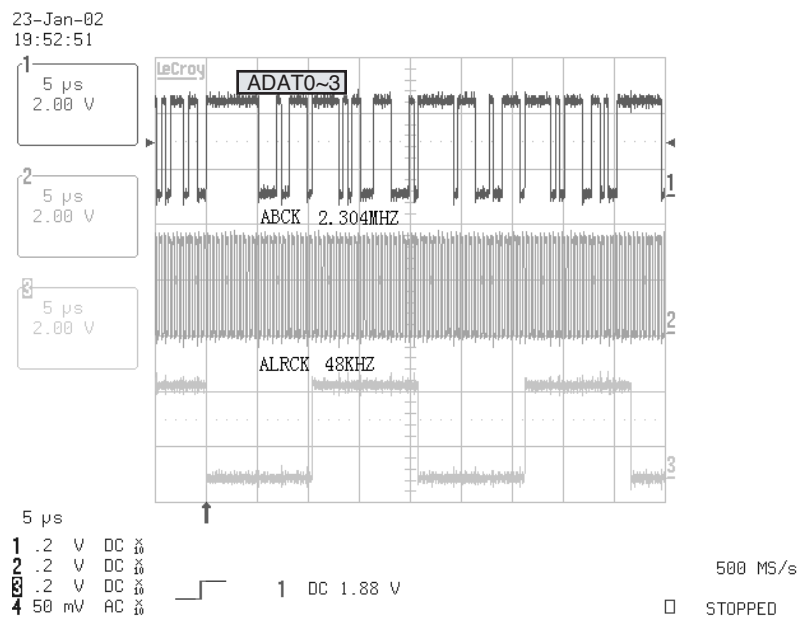


FIG 13-1

14. AUDIO OUTPUT FROM PWM IC

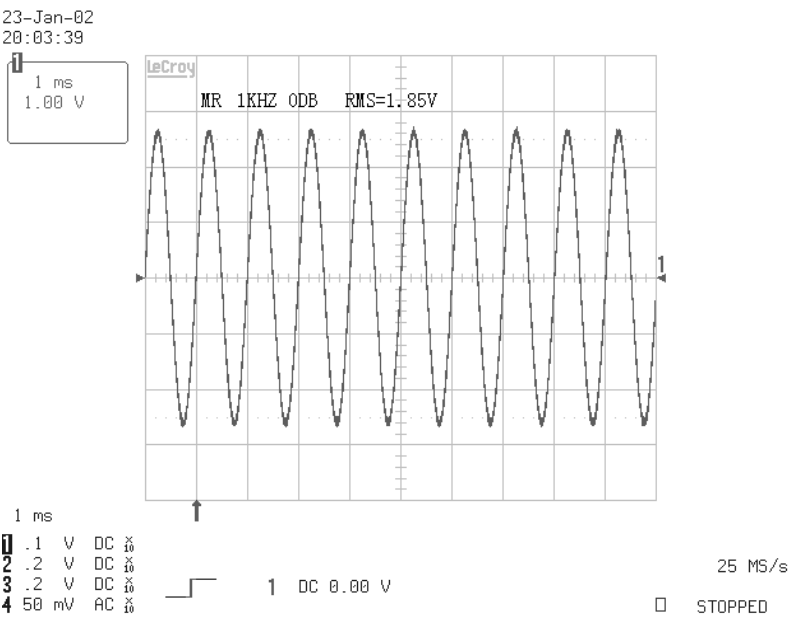
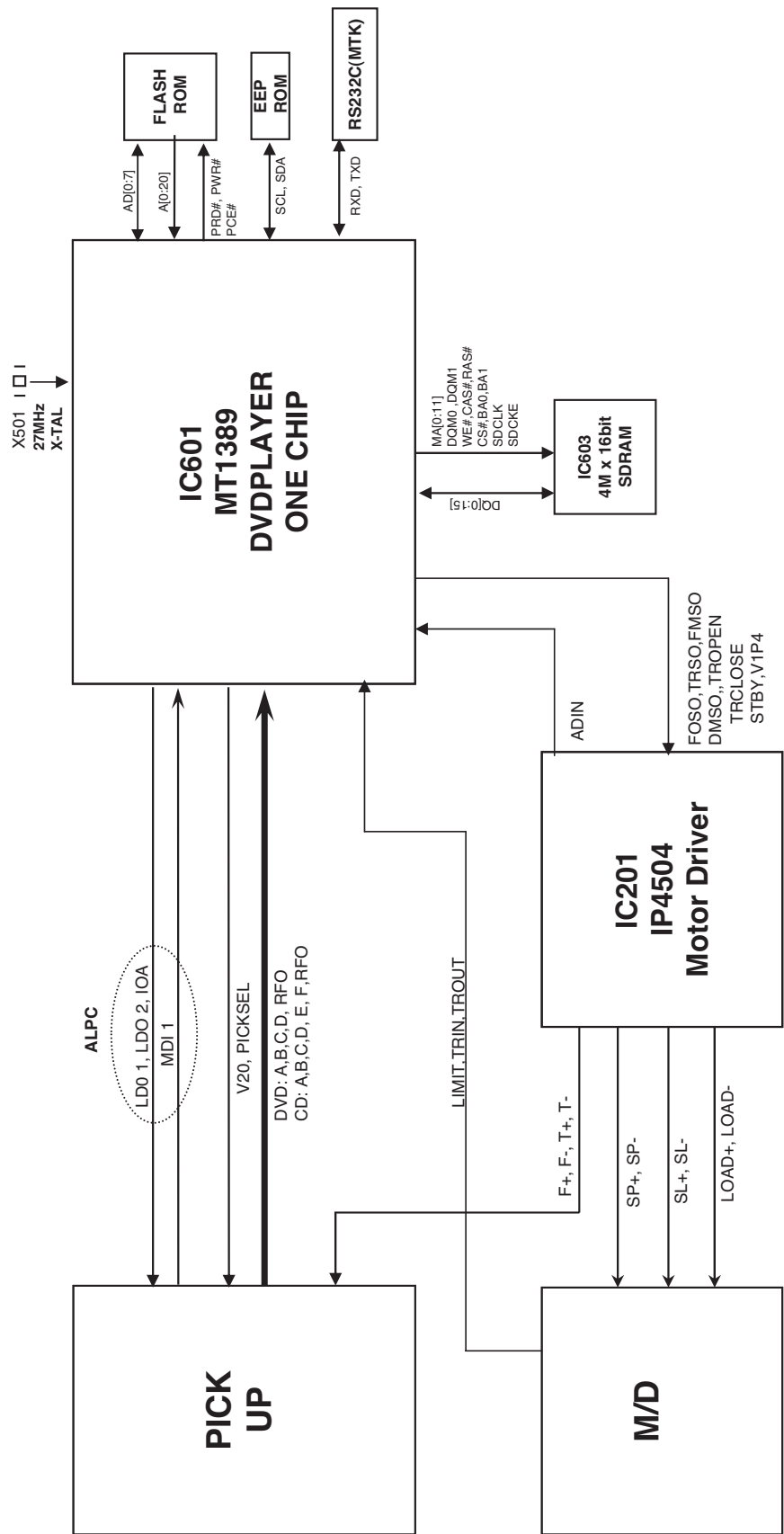


FIG 14-1

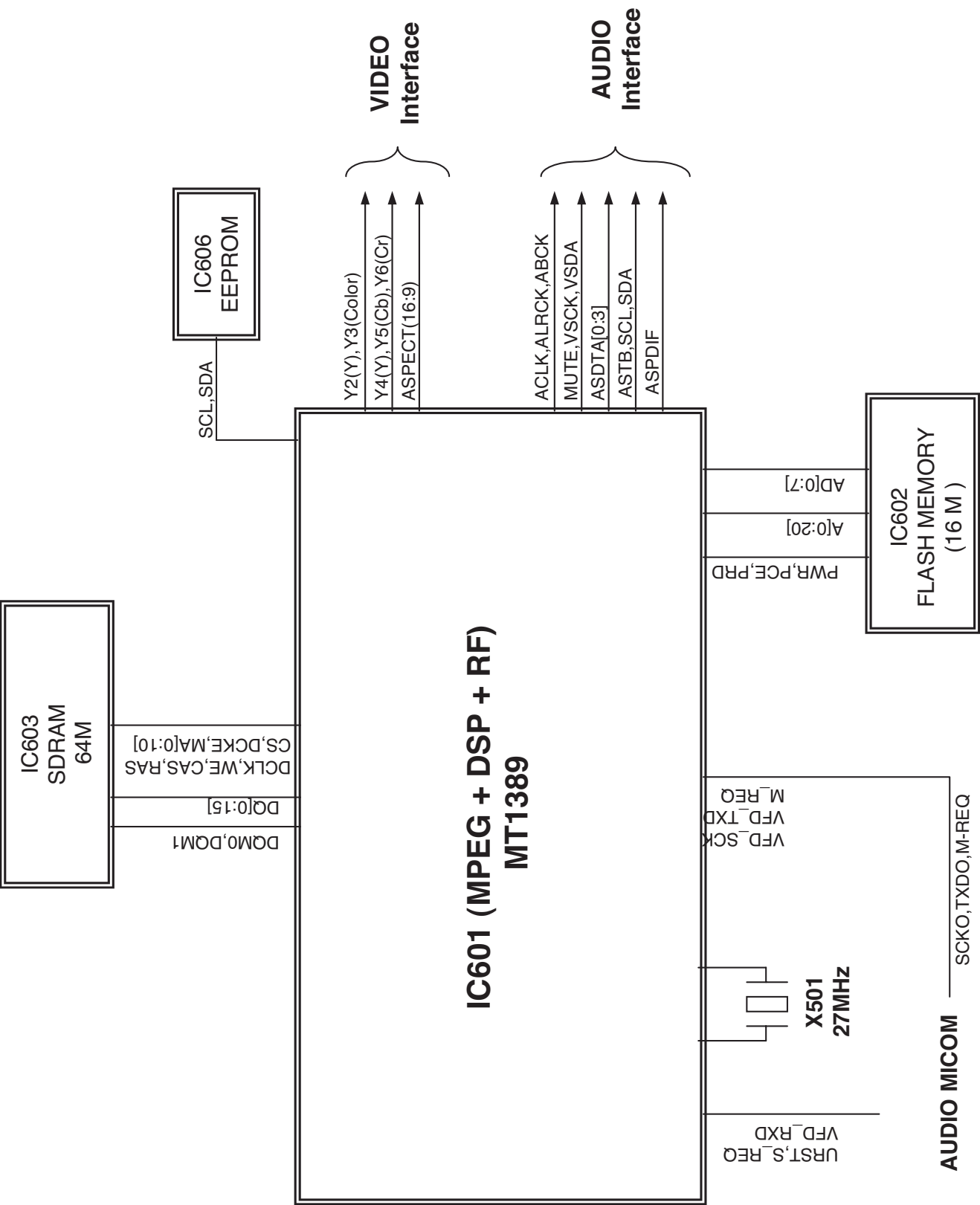
1. Overall Block Diagram



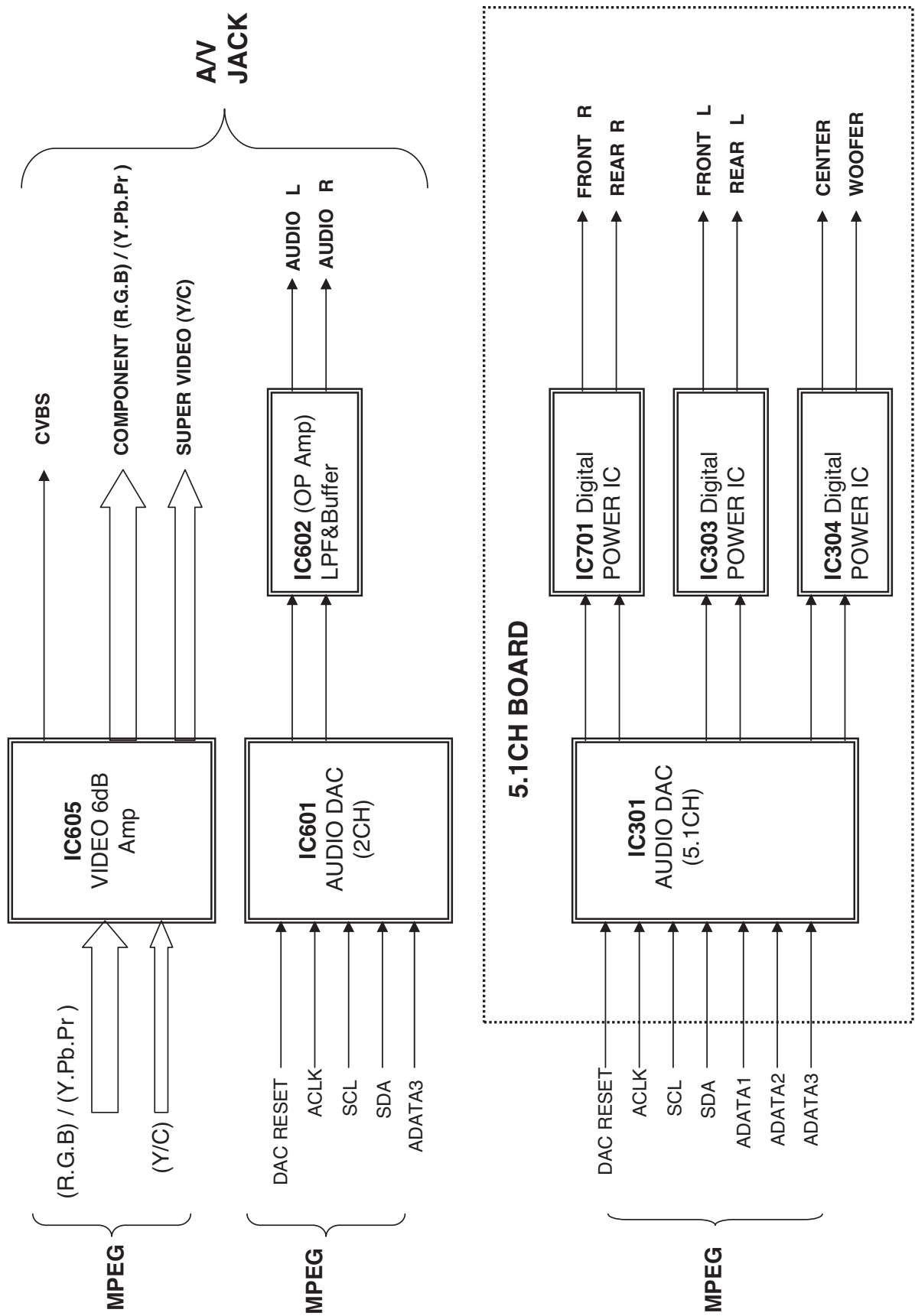
2. SERVO Block Diagram



3. MPEG & MEMORY Block Diagram



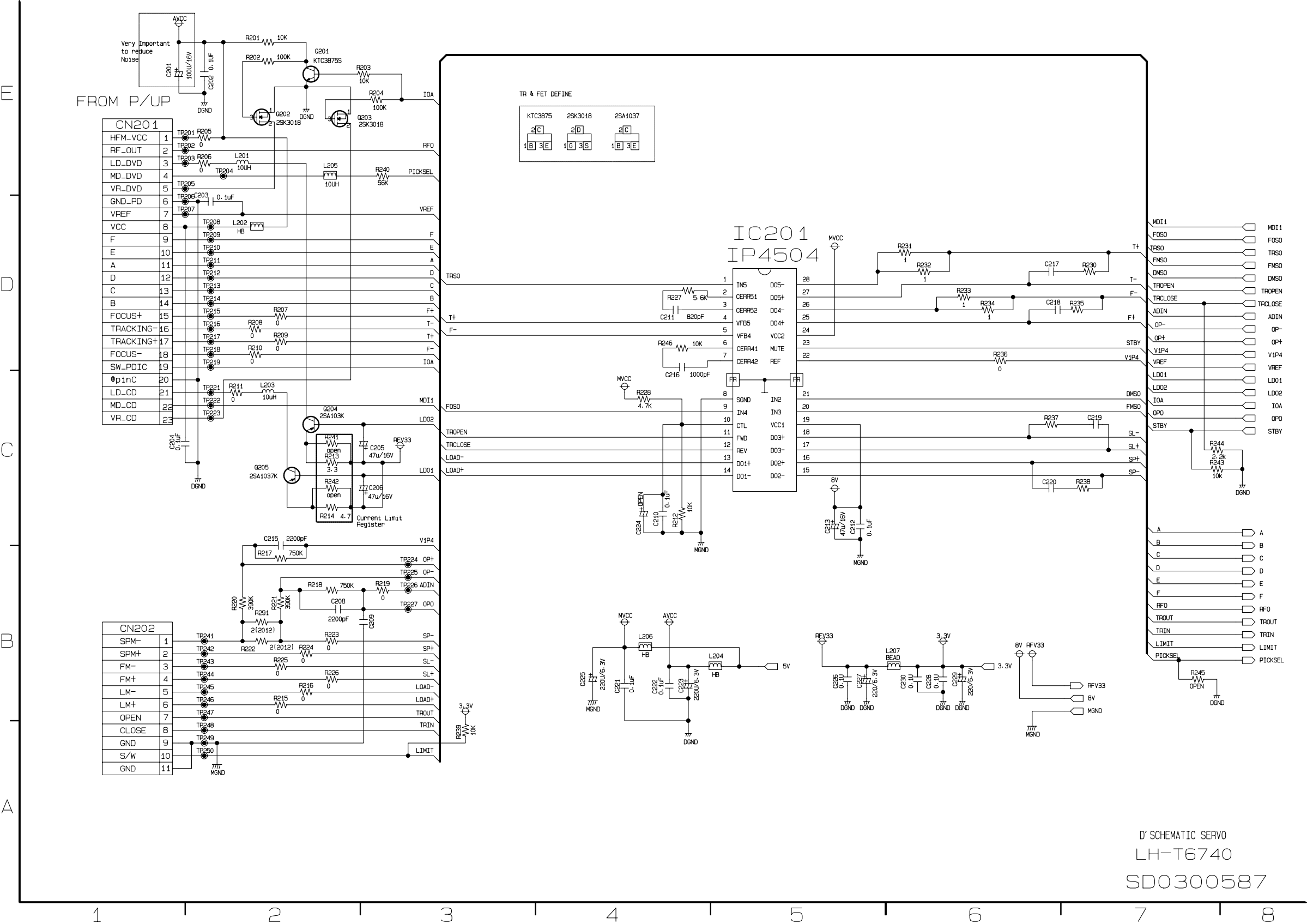
4. VIDEO & AUDIO Block Diagram



- **MPEG SCHEMATIC DIAGRAM**



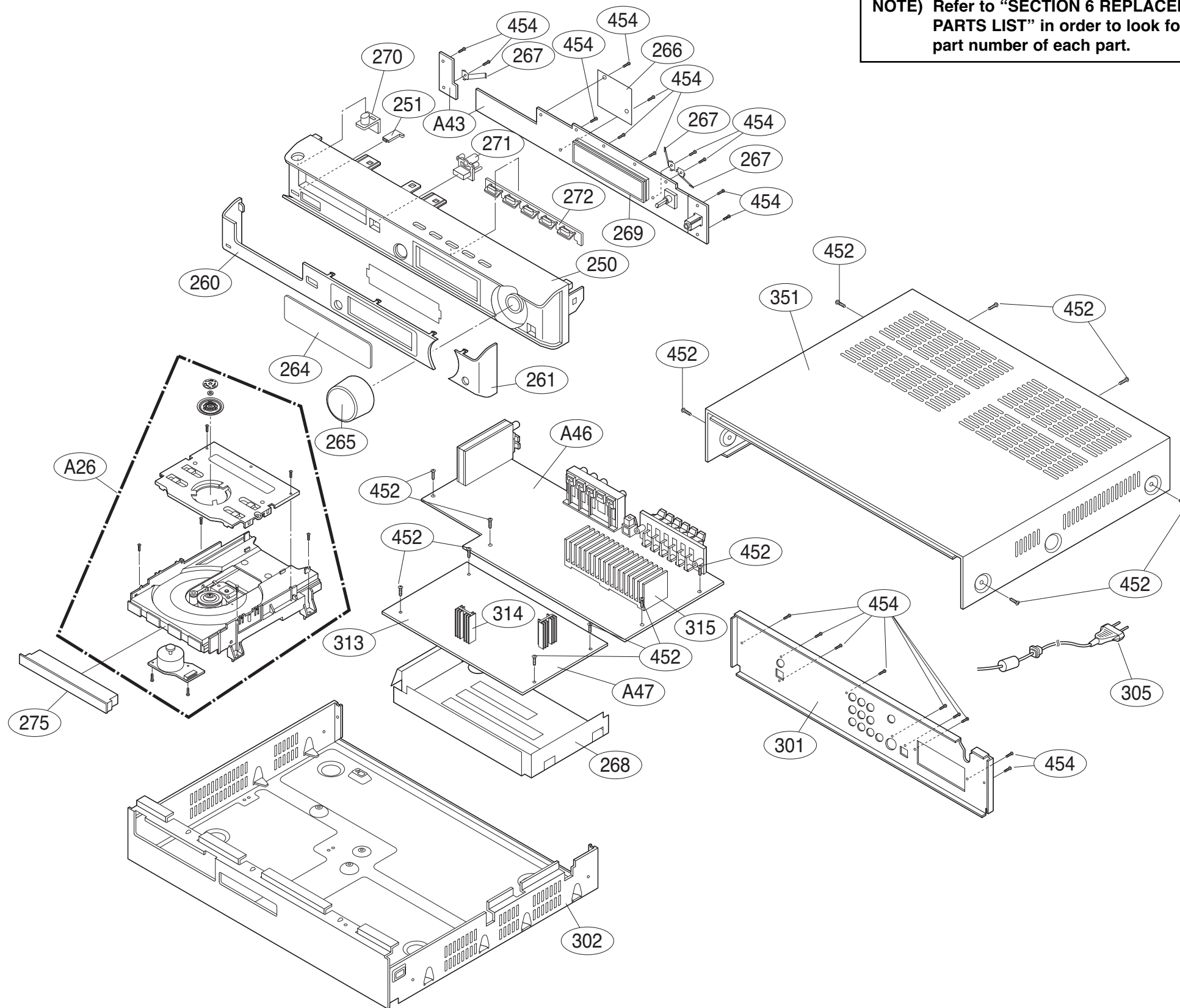
• SERVO SCHEMATIC DIAGRAM



D' SCHEMATIC SERVO
LH-T6740
SD0300587

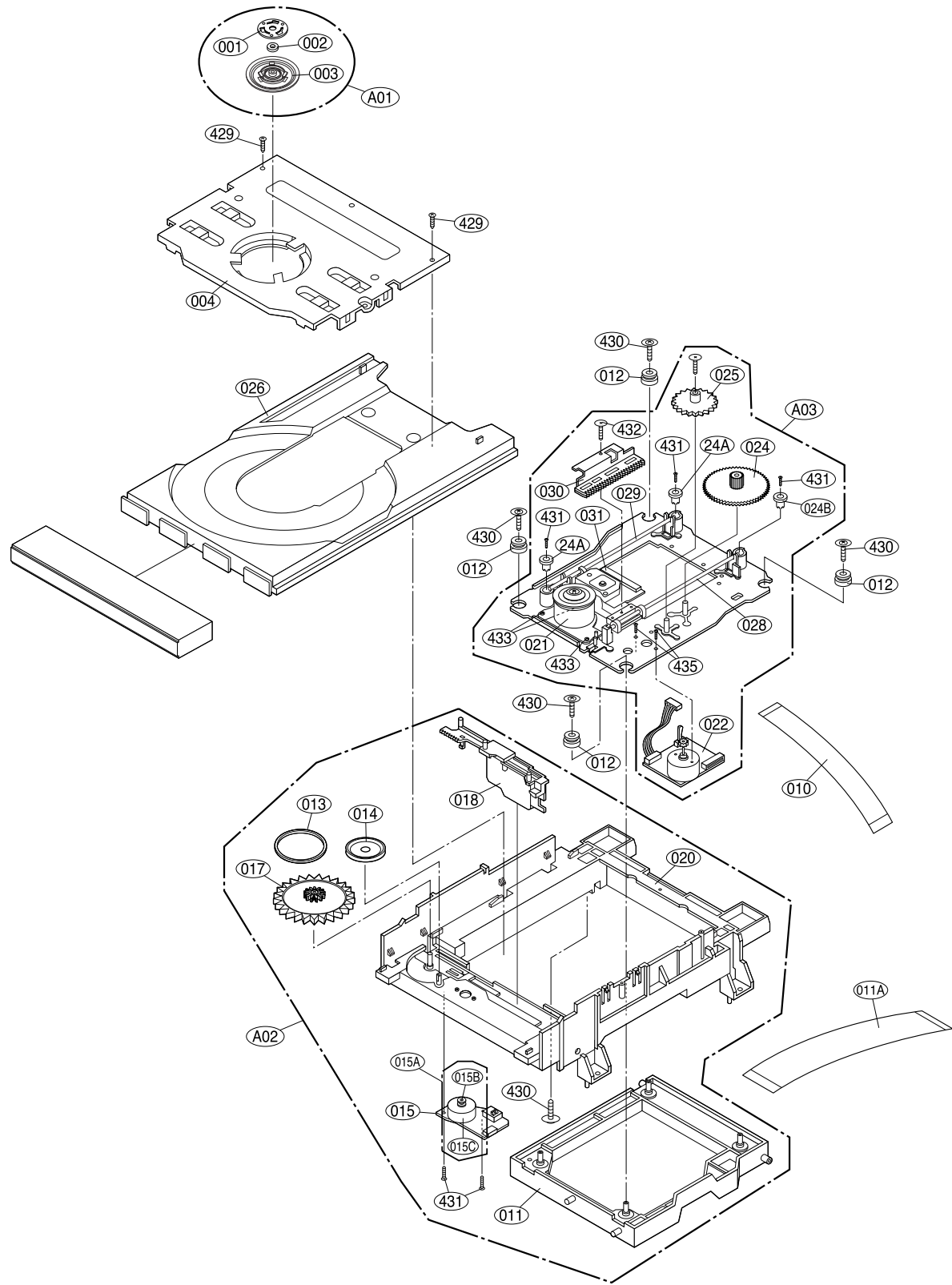
SECTION 4. EXPLODED VIEWS

• CABINET AND MAIN FRAME SECTION



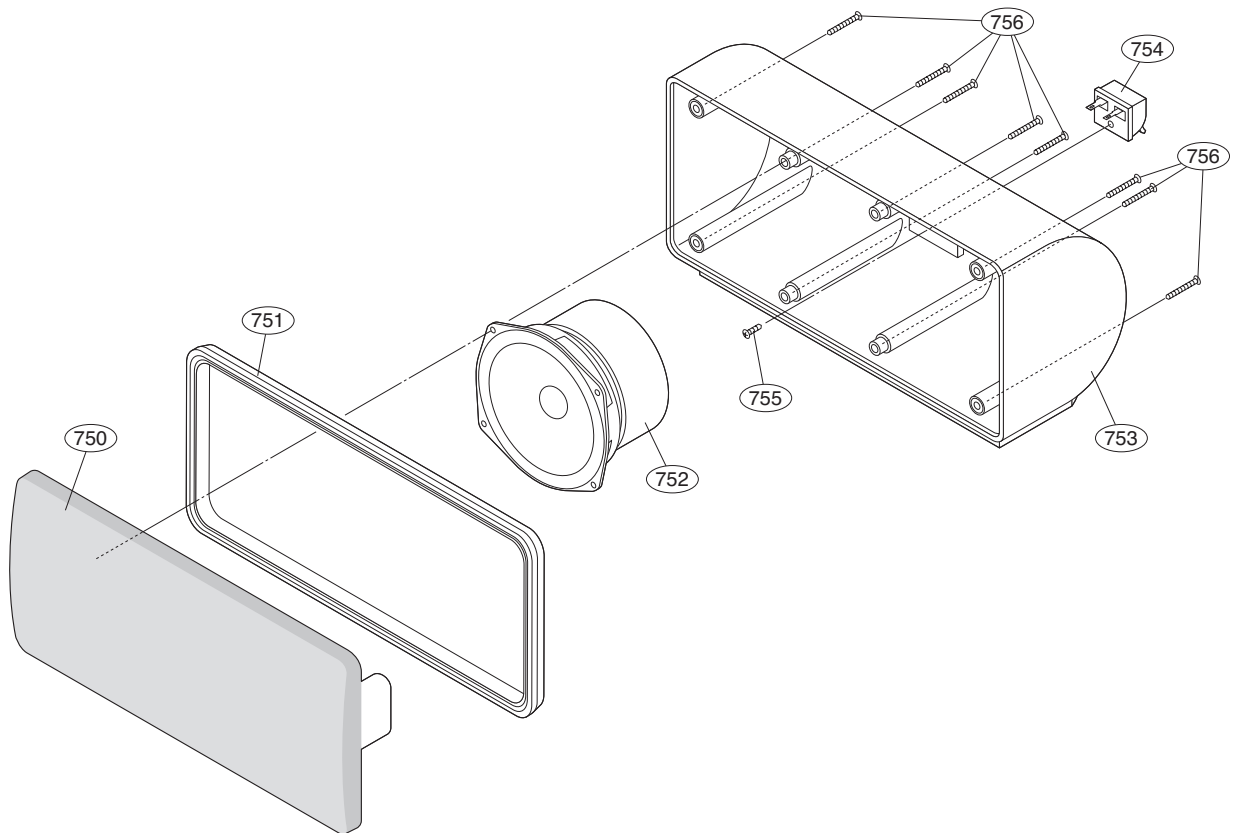
NOTE) Refer to “SECTION 6 REPLACEMENT PARTS LIST” in order to look for the part number of each part.

• DECK MECHANISM EXPLODED VIEW

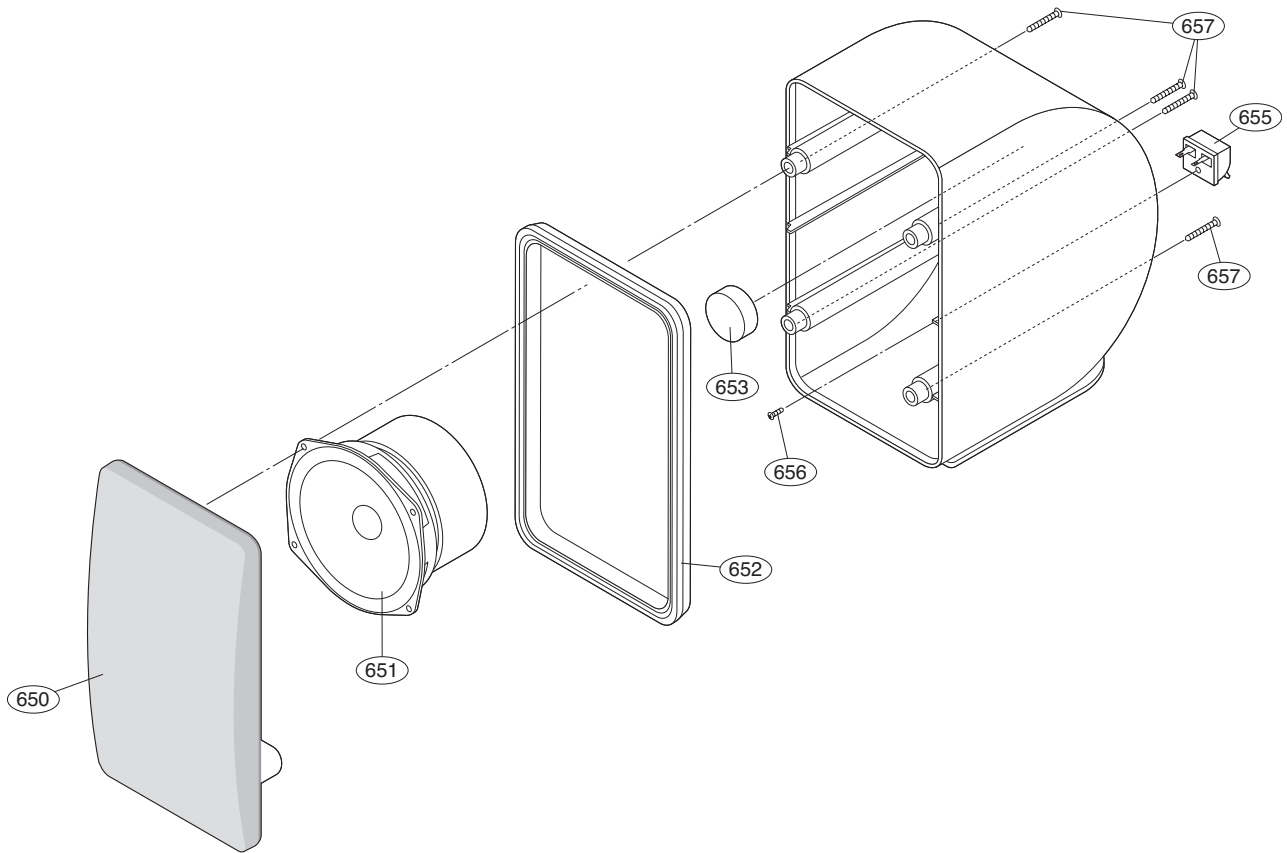


SECTION 5. SPEAKER PART

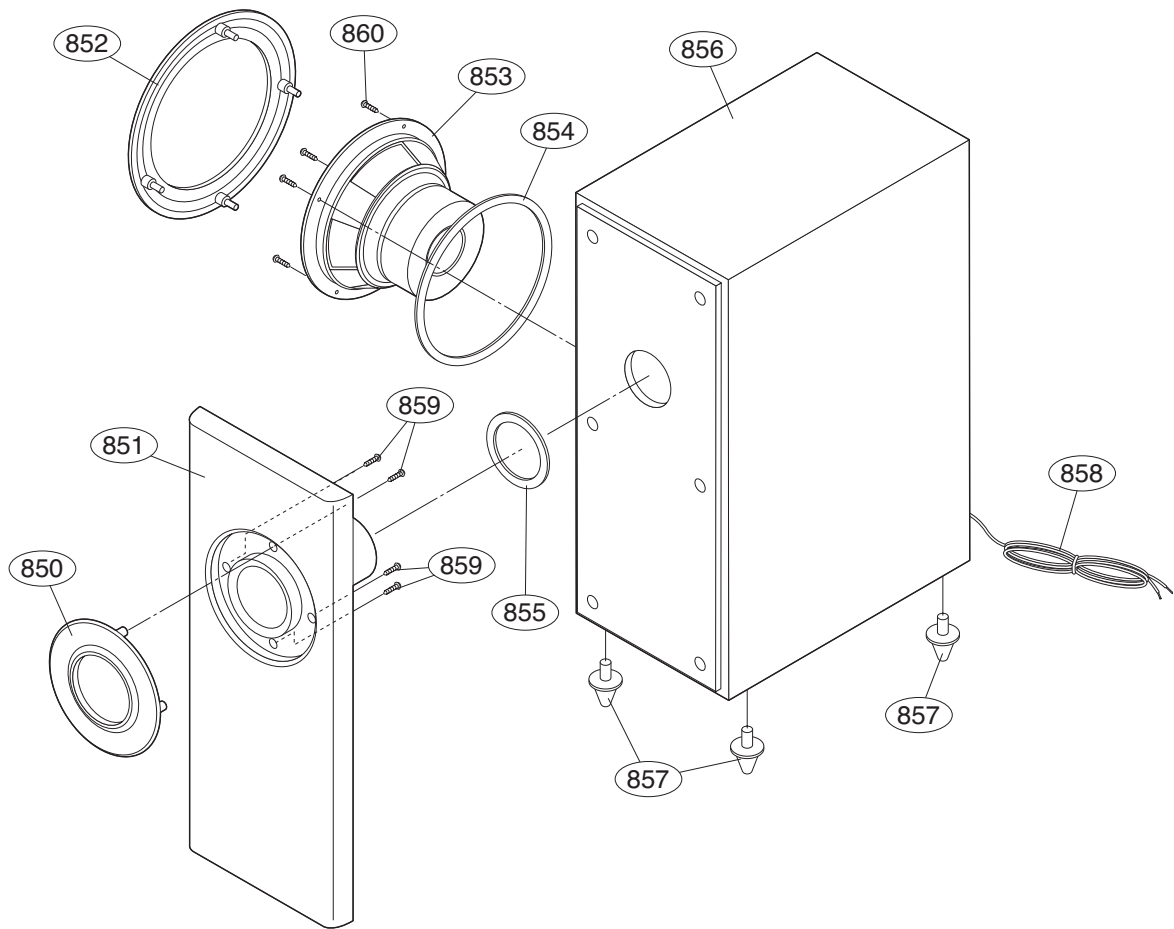
□ MODEL: LHS-T6447C



❑ **MODEL: LHS-T6447T**



❑ MODEL: LHS-T6447W



MEMO