



SERVICE MANUAL

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MODELS : T515AH/T515AHT

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**T515AH/
T515AHT**

DVD VIDEO PLAYER

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T515AH/T515AHT



T515AH/T515AHT
DVD VIDEO PLAYER

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**NAD ELECTRONICS INTERNATIONAL
TORONTO**

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SECTION 1

SUMMARY

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PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO PRODUCTS

CAUTION : DO NOT ATTEMPT TO MODIFY THIS PRODUCT IN ANY WAY. NEVER PERFORM CUSTOMIZED INSTALLATIONS WITHOUT MANUFACTURER'S APPROVAL. UNAUTHORIZED MODIFICATIONS WILL NOT ONLY VOID THE WARRANTY, BUT MAY LEAD TO YOUR BEING LIABLE FOR ANY RESULTING PROPERTY DAMAGE OR USER INJURY.

SERVICE WORK SHOULD BE PERFORMED ONLY AFTER YOU ARE THOROUGHLY FAMILIAR WITH ALL OF THE FOLLOWING SAFETY CHECKS AND SERVICING GUIDELINES. TO DO OTHERWISE, INCREASES THE RISK OF POTENTIAL HAZARDS AND INJURY TO THE USER.

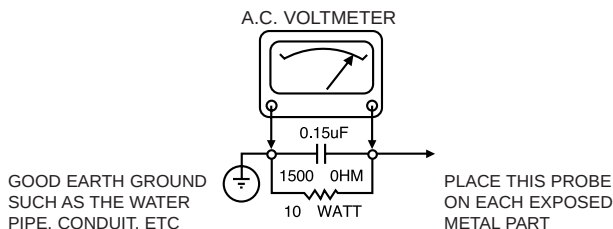
WHILE SERVICING, USE AN ISOLATION TRANSFORMER FOR PROTECTION FROM A.C. LINE SHOCK.

SAFETY CHECKS

AFTER THE ORIGINAL SERVICE PROBLEM HAS BEEN CORRECTED, A CHECK SHOULD BE MADE OF THE FOLLOWING.

SUBJECT : FIRE & SHOCK HAZARD

1. BE SURE THAT ALL COMPONENTS ARE POSITIONED IN SUCH A WAY AS TO AVOID POSSIBILITY OF ADJACENT COMPONENT SHORTS. THIS IS ESPECIALLY IMPORTANT ON THOSE MODULES WHICH ARE TRANSPORTED TO AND FROM THE REPAIR SHOP.
2. NEVER RELEASE A REPAIR UNLESS ALL PROTECTIVE DEVICES SUCH AS INSULATORS, BARRIERS, COVERS, SHIELDS, STRAIN RELIEFS, POWER SUPPLY CORDS, AND OTHER HARDWARE HAVE BEEN REINSTALLED PER ORIGINAL DESIGN. BE SURE THAT THE SAFETY PURPOSE OF THE POLARIZED LINE PLUG HAS NOT BEEN DEFEATED.
3. SOLDERING MUST BE INSPECTED TO DISCOVER POSSIBLE COLD SOLDER JOINTS, SOLDER SPLASHES OR SHARP SOLDER POINTS. BE CERTAIN TO REMOVE ALL LOOSE FOREIGN PARTICLES.
4. CHECK FOR PHYSICAL EVIDENCE OF DAMAGE OR DETERIORATION TO PARTS AND COMPONENTS. FOR FRAYED LEADS, DAMAGED INSULATION (INCLUDING A.C. CORD), AND REPLACE IF NECESSARY FOLLOW ORIGINAL LAYOUT, LEAD LENGTH AND DRESS.
5. NO LEAD OR COMPONENT SHOULD TOUCH A RECEIVING TUBE OR A RESISTOR RATED AT 1 WATT OR MORE. LEAD TENSION AROUND PROTRUDING METAL SURFACES MUST BE AVOIDED.
6. ALL CRITICAL COMPONENTS SUCH AS FUSES, FLAMEPROOF RESISTORS, CAPACITORS, ETC. MUST BE REPLACED WITH EXACT FACTORY TYPES, DO NOT USE REPLACEMENT COMPONENTS OTHER THAN THOSE SPECIFIED OR MAKE UNRECOMMENDED CIRCUIT MODIFICATIONS.
7. AFTER RE-ASSEMBLY OF THE SET ALWAYS PERFORM AN A.C. LEAKAGE TEST ON ALL EXPOSED METALLIC PARTS OF THE CABINET, (THE CHANNEL SELECTOR KNOB, ANTENNA TERMINALS, HANDLE AND SCREWS) TO BE SURE THE SET IS SAFE TO OPERATE WITHOUT DANGER OF ELECTRICAL SHOCK. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST USE AN A.C. VOLT-METER, HAVING 5000 OHMS PER VOLT OR MORE SENSITIVITY, IN THE FOLLOWING MANNER; CONNECT A 1500 OHM 10 WATT RESISTOR, PARALLELED BY A .15 MFD. 150.V A.C TYPE CAPACITOR BETWEEN A KNOWN GOOD EARTH GROUND (WATER PIPE, CONDUIT, ETC.) AND THE EXPOSED METALLIC PARTS, ONE AT A TIME. MEASURE THE A.C. VOLTAGE ACROSS THE COMBINATION OF 1500 OHM RESISTOR AND .15 MFD CAPACITOR. REVERSE THE A.C. PLUG AND REPEAT A.C. VOLTAGE MEASUREMENTS FOR EACH EXPOSED METALLIC PART. VOLTAGE MEASURED MUST NOT EXCEED 75 VOLTS R.M.S. THIS CORRESPONDS TO 0.5 MILLIAMPS A.C. ANY VALUE EXCEEDING THIS LIMIT CONSTITUTES A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED IMMEDIATELY.



SUBJECT: 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.

SUBJECT : X-RADIATION

1. BE SURE PROCEDURES AND INSTRUCTIONS TO ALL SERVICE PERSONNEL COVER THE SUBJECT OF X-RADIATION. THE ONLY POTENTIAL SOURCE OF X-RAYS IN CURRENT T.V. RECEIVERS IS THE PICTURE TUBE. HOWEVER, THIS TUBE DOES NOT EMIT X-RAYS WHEN THE HIGH VOLTAGE IS AT THE FACTORY SPECIFIED LEVEL. THE PROPER VALUE IS GIVEN IN THE APPLICABLE SCHEMATIC. OPERATION AT HIGHER VOLTAGES MAY CAUSE A FAILURE OF THE PICTURE TUBE OR HIGH VOLTAGE SUPPLY AND, UNDER CERTAIN CIRCUMSTANCES, MAY PRODUCE RADIATION IN EXCESS OF DESIRABLE LEVELS.
2. ONLY FACTORY SPECIFIED C.R.T. ANODE CONNECTORS MUST BE USED. DEGAUSSING SHIELDS ALSO SERVE AS X-RAY SHIELD IN COLOR SETS, ALWAYS RE-INSTALL THEM.
3. IT IS ESSENTIAL THAT SERVICE PERSONNEL HAVE AVAILABLE AN ACCURATE AND RELIABLE HIGH VOLTAGE METER. THE CALIBRATION OF THE METER SHOULD BE CHECKED PERIODICALLY AGAINST A REFERENCE STANDARD, SUCH AS THE ONE AVAILABLE AT YOUR DISTRIBUTOR.
4. WHEN THE HIGH VOLTAGE CIRCUITRY IS OPERATING PROPERLY THERE IS NO POSSIBILITY OF AN X-RADIATION PROBLEM. EVERY TIME A COLOR CHASSIS IS SERVICED, THE BRIGHTNESS SHOULD BE RUN UP AND DOWN WHILE MONITORING THE HIGH VOLTAGE WITH A METER TO BE CERTAIN THAT THE HIGH VOLTAGE DOES NOT EXCEED THE SPECIFIED VALUE AND THAT IT IS REGULATING CORRECTLY. WE SUGGEST THAT YOU AND YOUR SERVICE ORGANIZATION REVIEW TEST PROCEDURES SO THAT VOLTAGE REGULATION IS ALWAYS CHECKED AS A STANDARD SERVICING PROCEDURE. AND THAT THE HIGH VOLTAGE READING BE RECORDED ON EACH CUSTOMER'S INVOICE.
5. WHEN TROUBLESHOOTING AND MAKING TEST MEASUREMENTS IN A PRODUCT WITH A PROBLEM OF EXCESSIVE HIGH VOLTAGE, AVOID BEING UNNECESSARILY CLOSE TO THE PICTURE TUBE AND THE HIGH VOLTAGE SUPPLY. DO NOT OPERATE THE PRODUCT LONGER THAN IS NECESSARY TO LOCATE THE CAUSE OF EXCESSIVE VOLTAGE.
6. REFER TO HV. B+ AND SHUTDOWN ADJUSTMENT PROCEDURES DESCRIBED IN THE APPROPRIATE SCHEMATIC AND DIAGRAMS (WHERE USED).

SUBJECT: IMPLOSION

1. ALL DIRECT VIEWED PICTURE TUBES ARE EQUIPPED WITH AN INTEGRAL IMPLOSION PROTECTION SYSTEM, BUT CARE SHOULD BE TAKEN TO AVOID DAMAGE DURING INSTALLATION, AVOID SCRATCHING THE TUBE. IF SCRATCHED REPLACE IT.
2. USE ONLY RECOMMENDED FACTORY REPLACEMENT TUBES.

SUBJECT : TIPS ON PROPER INSTALLATION

1. NEVER INSTALL ANY PRODUCT IN A CLOSED-IN RECESS, CUBBY-HOLE OR CLOSELY FITTING SHELF SPACE. OVER OR CLOSE TO HEAT DUCT, OR IN THE PATH OF HEATED AIR FLOW.
2. AVOID CONDITIONS OF HIGH HUMIDITY SUCH AS: OUTDOOR PATIO INSTALLATIONS WHERE DEW IS A FACTOR, NEAR STEAM RADIATORS WHERE STEAM LEAKAGE IS A FACTOR, ETC.
3. AVOID PALCEMENT WHERE DRAPERIES MAY OBSTRUCT REAR VENTING. THE CUSTOMER SHOULD ALSO AVOID THE USE OF DECORATIVE SCARVES OR OTHER COVERINGS WHICH MIGHT OBSTRUCT VENTILATION.
4. WALL AND SHELF MOUNTED INSTALLATIONS USING A COMMERCIAL MOUNTING KIT. MUST FOLLOW THE FACTORY APPROVED MOUNTING INSTRUCTIONS A PRODUCT MOUNTED TO A SHELF OR PLATFORM MUST RETAIN ITS ORIGINAL FEET (OR THE EQUIVALENT THICKNESS IN SPACERS) TO PROVIDE ADEQUATE AIR FLOW ACROSS THE BOTTOM, BOLTS OR SCREWS USED FOR FASTENERS MUST NOT TOUCH ANY PARTS OR WIRING. PERFORM LEAKAGE TEST ON CUSTOMIZED INSTALLATIONS.
5. CAUTION CUSTOMERS AGAINST THE MOUNTING OF A PRODUCT ON SLOPING SHELF OR A TILTED POSITION, UNLESS THE PRODUCT IS PROPERLY SECURED.
6. A PRODUCT ON A ROLL-ABOUT CART SHOULD BE STABLE ON ITS MOUNTING TO THE CART. CAUTION THE CUSTOMER ON THE HAZARDS OF TRYING TO ROLL A CART WITH SMALL CASTERS ACROSS THRESHOLDS OR DEEP PILE CARPETS.
7. CAUTION CUSTOMERS AGAINST THE USE OF A CART OR STAND WHICH HAS NOT BEEN LISTED BY UNDERWRITERS LABORATORIES, INC. FOR USE WITH THEIR SPECIFIC MODEL OF TELEVISION RECEIVER OR GENERALLY APPROVED FOR USE WITH T.V.'S OF THE SAME OR LARGER SCREEN SIZE.
8. CAUTION CUSTOMERS AGAINST THE USE OF EXTENSION CORDS, EXPLAIN THAT A FOREST OF EXTENSIONS SPROUTING FROM A SINGLE OUTLET CAN LEAD TO DISASTROUS CONSEQUENCES TO HOME AND FAMILY.

SERVICING PRECAUTIONS

CAUTION : Before servicing the DVD covered by this service data and its supplements and addends, read and follow the **SAFETY PRECAUTIONS**. **NOTE :** if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publication, always follow the safety precautions.

Remembers Safety First:

General Servicing Precautions

1. Always unplug the DVD AC power cord from the AC power source before:
 - (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
 - (2) Disconnection or reconnecting any internal electrical plug or other electrical connection.
 - (3) Connecting a test substitute in parallel with an electrolytic capacitor.

Caution : A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Do not spray chemicals on or near this DVD or any of its assemblies.
3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator. Unless specified otherwise in this service data, lubrication of contacts is not required.
4. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
5. Do not apply AC power to this DVD and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
6. Always connect test instrument ground lead to the appropriate ground before connection the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter(500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1M-ohm.

Note 1 : Accessible Conductive Parts including Metal panels, Input terminals, Earphone jacks, etc.

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.

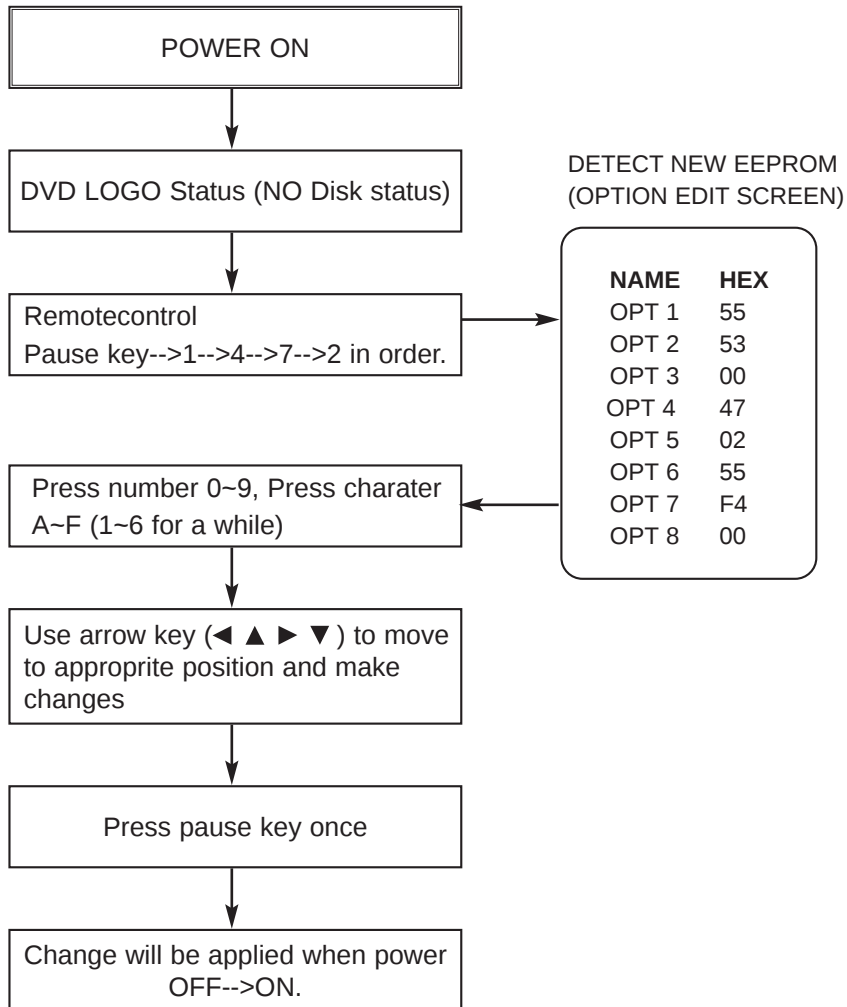
The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

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 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 a "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charge 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. (Normally 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 ES device.)

SERVICE INFORMATION FOR EEPROM



SPECIFICATIONS

• GENERAL

Power requirements	Power requirements: AC 120V, 60 Hz NTSC Region 1, 200-240 50/60 Hz PAL Region 2
Power consumption	10 W
Dimensions (approx.)	435 x 45 x 250 mm (W x H x D) with feet and RCA plugs
Weight (approx.)	2 kg (4.4 lb)
Operating temperature	5 °C to 35 °C (41 °F to 95 °F)
Operating humidity	5 % to 90 %

• SYSTEM

Laser	Semiconductor laser, wavelength 650 nm
Signal system	NTSC for 120V North American version, NTSC/PAL for 230V European version
Frequency response	DVD (PCM 96 kHz): 8 Hz to 44 kHz DVD (PCM 48 kHz): 8 Hz to 22 kHz CD: 8 Hz to 20 kHz
Signal-to-noise ratio	More than 100 dB (ANALOG OUT connectors only)
Harmonic distortion	Less than 0.008%
Dynamic range	More than 90 dB (DVD/CD)

• OUTPUTS

VIDEO OUT	1 Vp-p 75 Ω , sync negative, RCA jack x 1
S-VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω , negative sync, Mini DIN 4-pin x 1 (North American version only) (C) 0.3 V (p-p) 75 Ω
COMPONENT VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω , negative sync, RCA jack x 1 (Cb/Pb)/(Cr/Pr) 0.7 V (p-p), 75 Ω , RCA jack x 2
AUDIO OUT	2.0 Vrms (1 KHz, 0 dB), 600 Ω , RCA jack (L, R) x 2
DIGITAL OUT (COAXIAL)	0.5 V (p-p), 75 Ω , RCA jack x 1
DIGITAL OUT (OPTICAL)	3 V (p-p), 75 Ω , Optical Connector x 1
DIGITAL OUT (HDMI)	2-channel 48 kHz PCM/Bitstream
HDMI VIDEO OUT	HDCP 480p (NTSC) HDCP 576p (PAL)

SECTION 2

CABINET & MAIN CHASSIS

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NOTES) THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

★ OPTIONAL PART

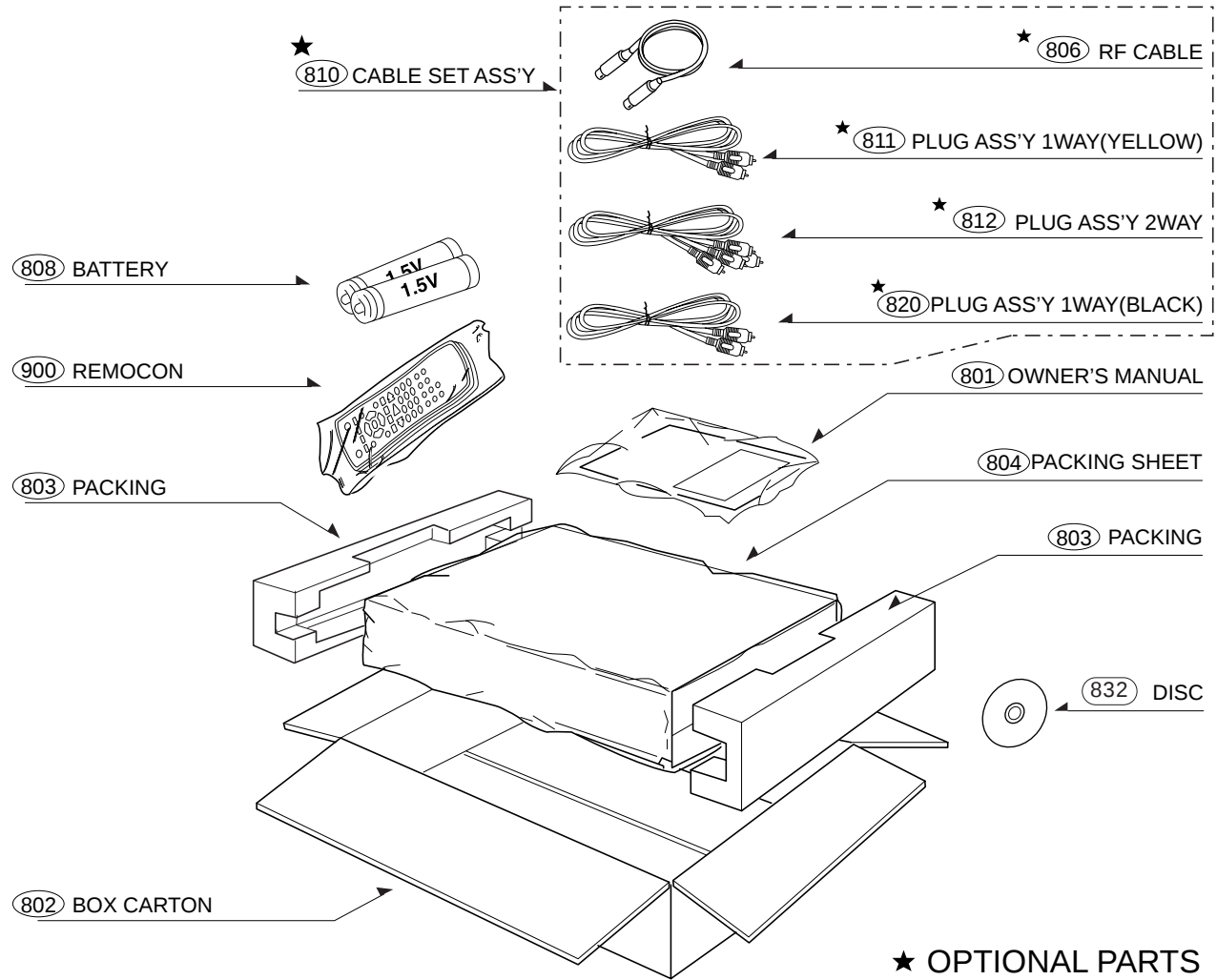


This diagram illustrates the exploded view of a mechanical assembly, showing the relationship between various components. The assembly is divided into three main sections, A00, A01, and A03, which are further subdivided into A02 and A04.

Section A00:

- A02:** Includes components 012, 013, 014, 015, 015A, 015B, 016, 017, 018, 019, 020, 026, 030, 036, 040, 043, 044, 045, 046, 047, 048, 049, 050, 051, 052, 053, 054, 055, 056, 057, 058, 059, 060, 061, 062, 063, 064, 065, 066, 067, 068, 069, 070, 071, 072, 073, 074, 075, 076, 077, 078, 079, 080, 081, 082, 083, 084, 085, 086, 087, 088, 089, 090, 091, 092, 093, 094, 095, 096, 097, 098, 099, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824,

3. PACKING ACCESSORY SECTION



SECTION 3

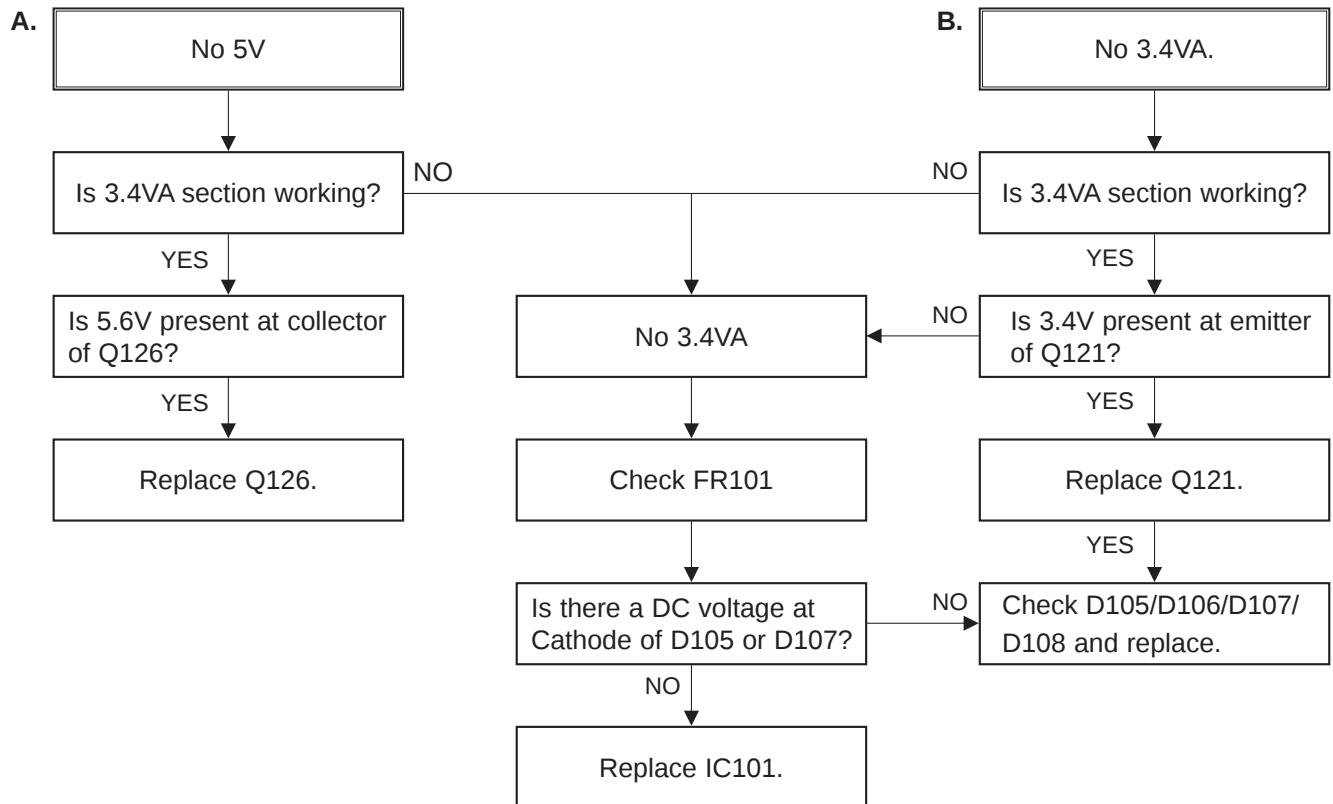
ELECTRICAL

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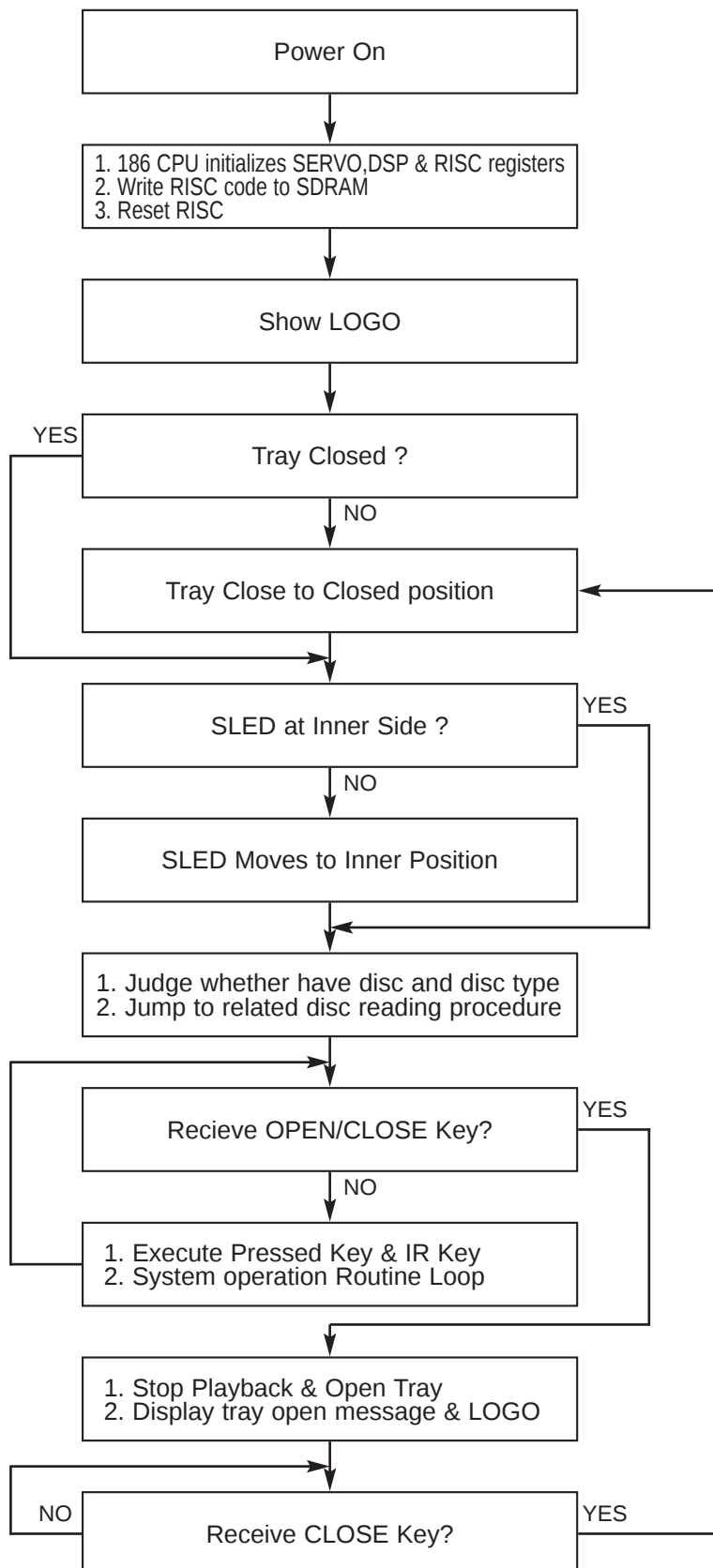
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ELECTRICAL TROUBLESHOOTING GUIDE

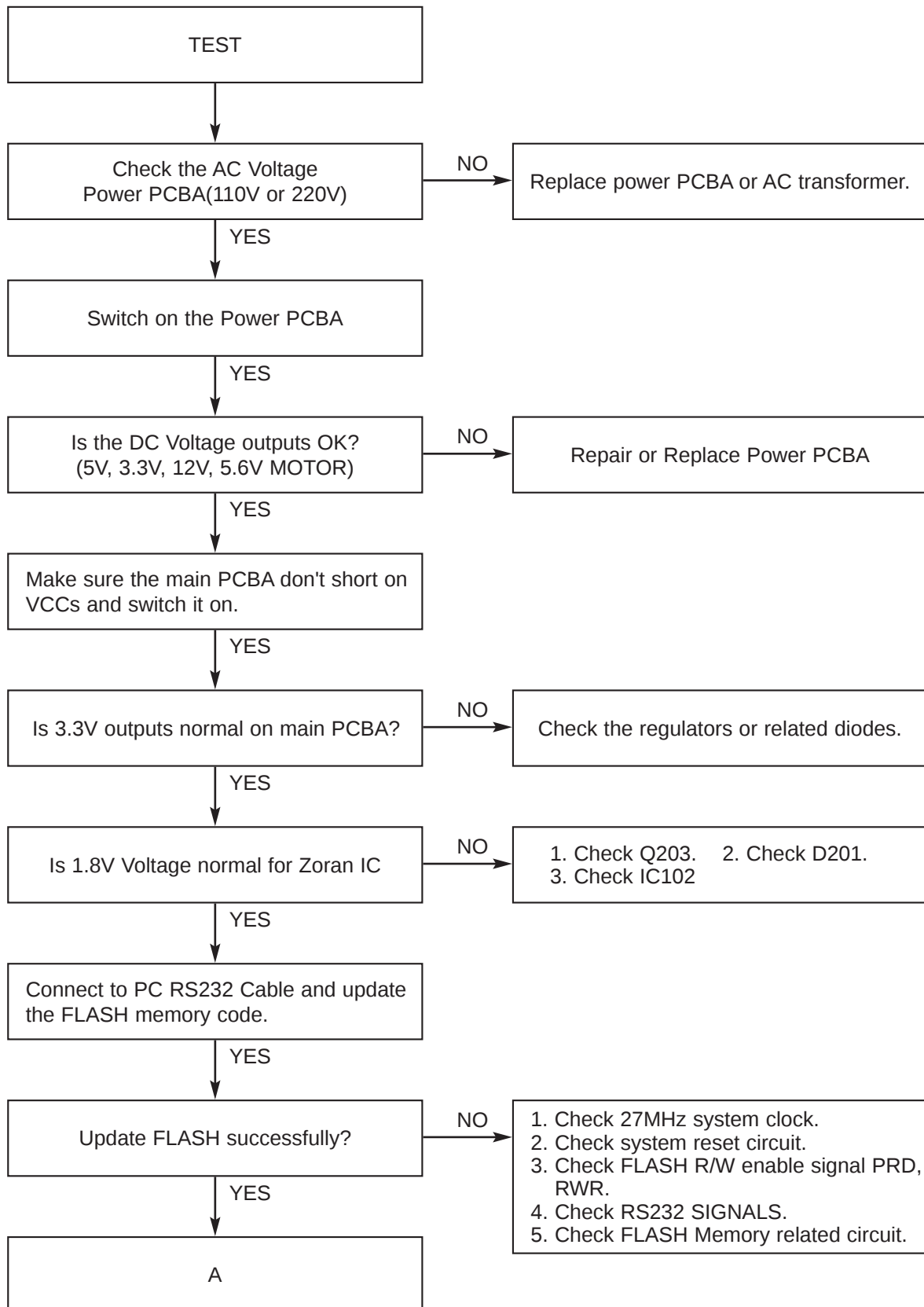
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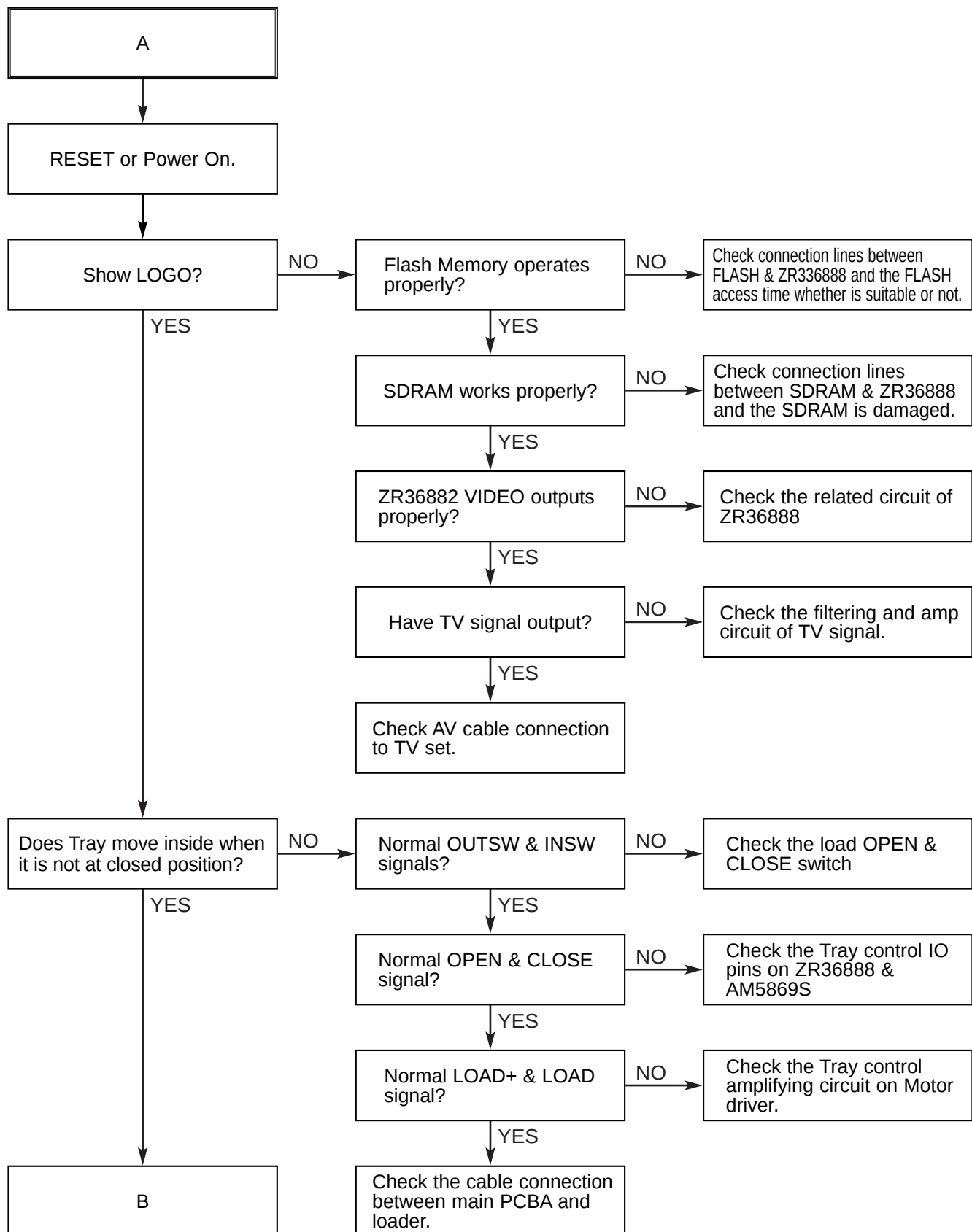


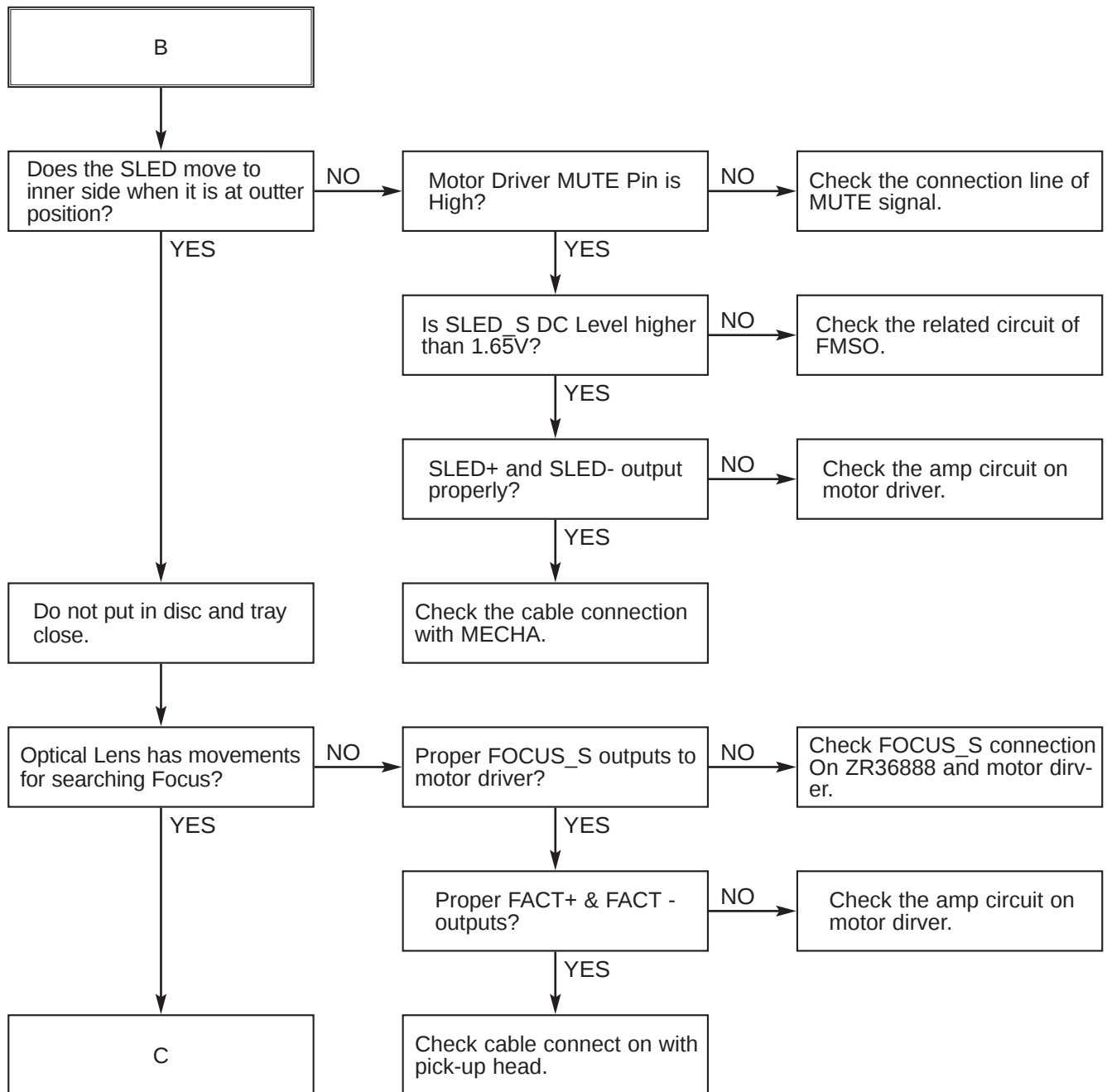
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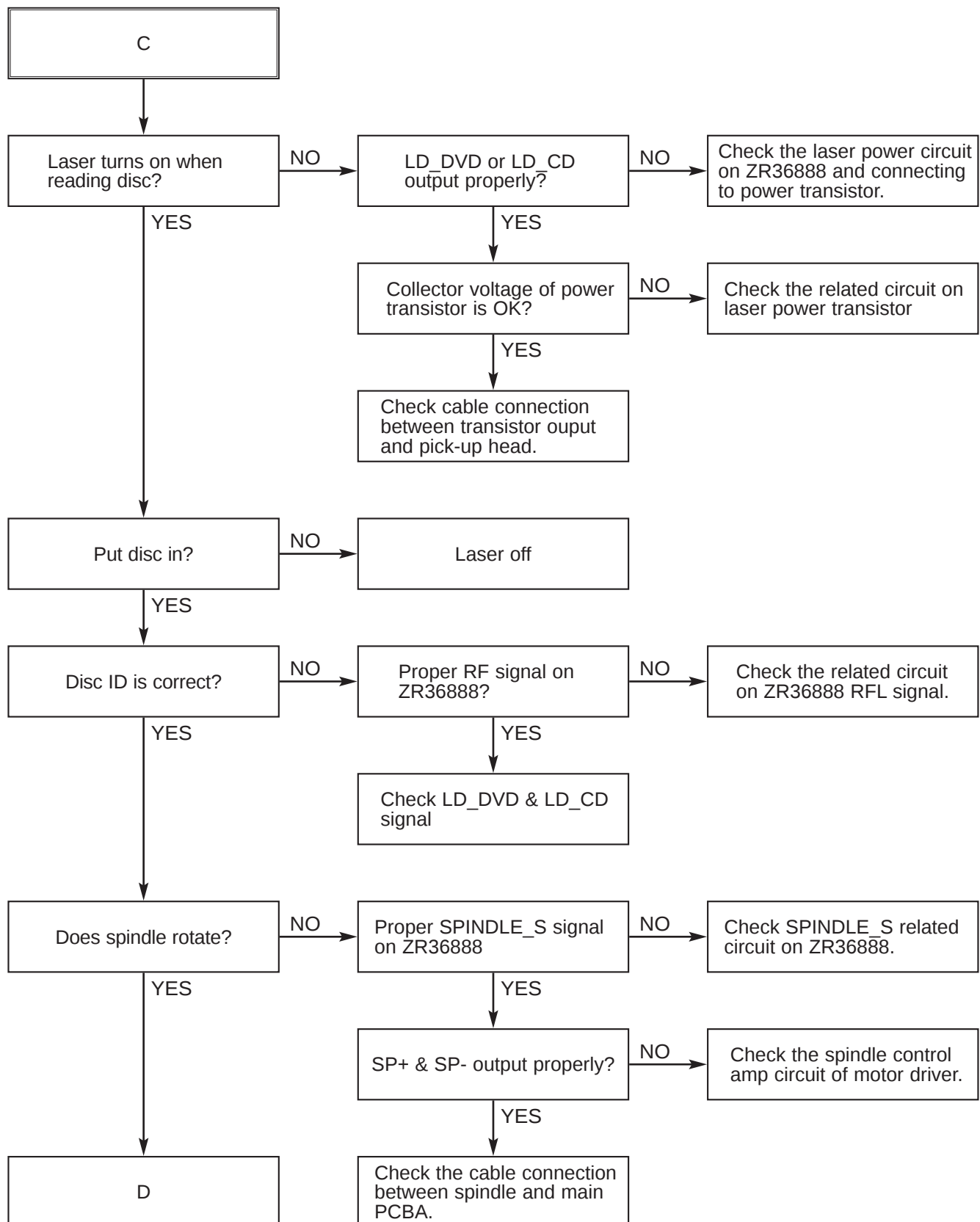


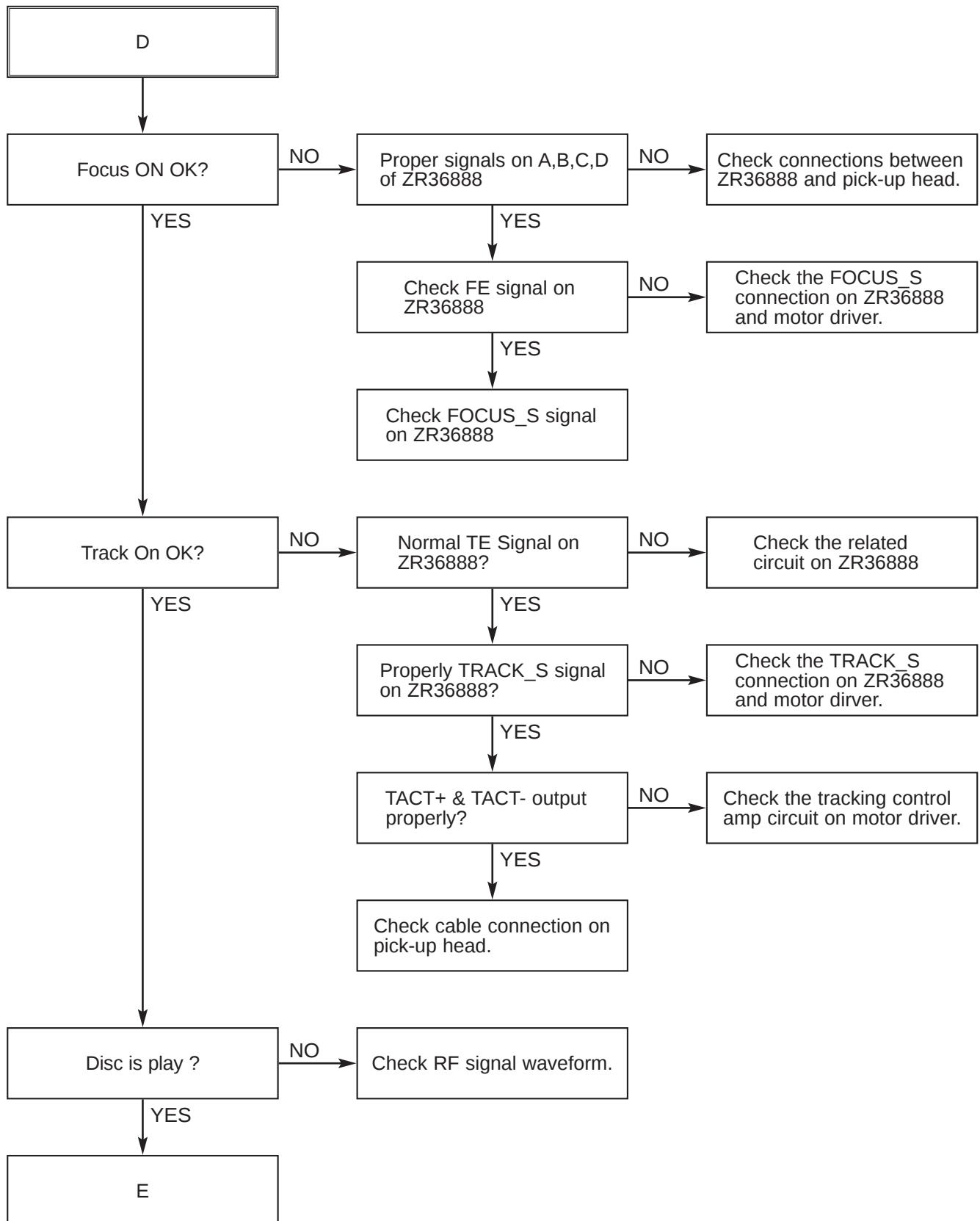
3. TEST & DEBUG FLOW

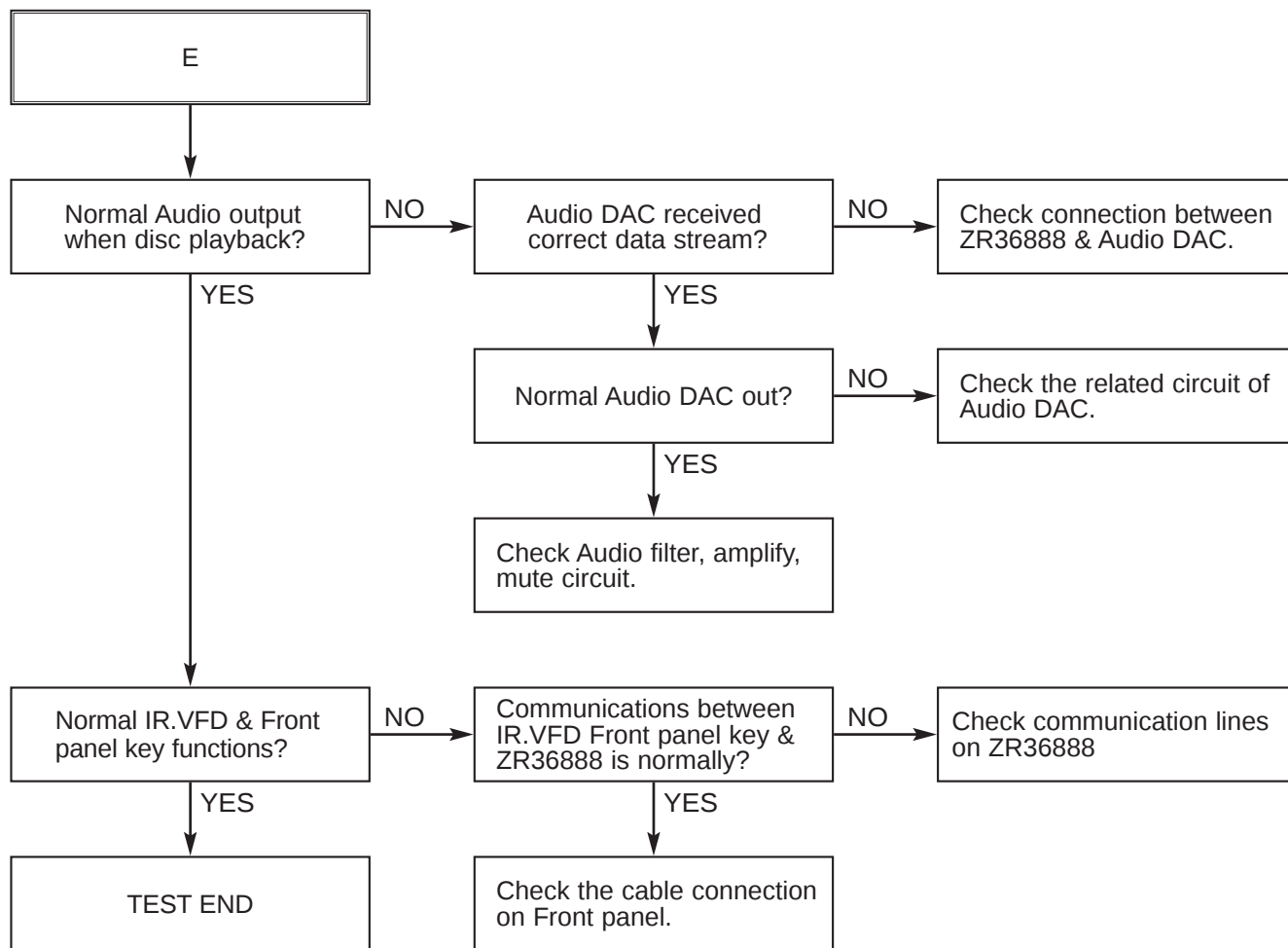












DETAILS AND WAVEFORMS ON SYSTEM TEST AND DEBUGGING

1. SYSTEM 27MHz CLOCK, RESET SIGNAL

1) ZR36882 main clock is at 27MH(X601)

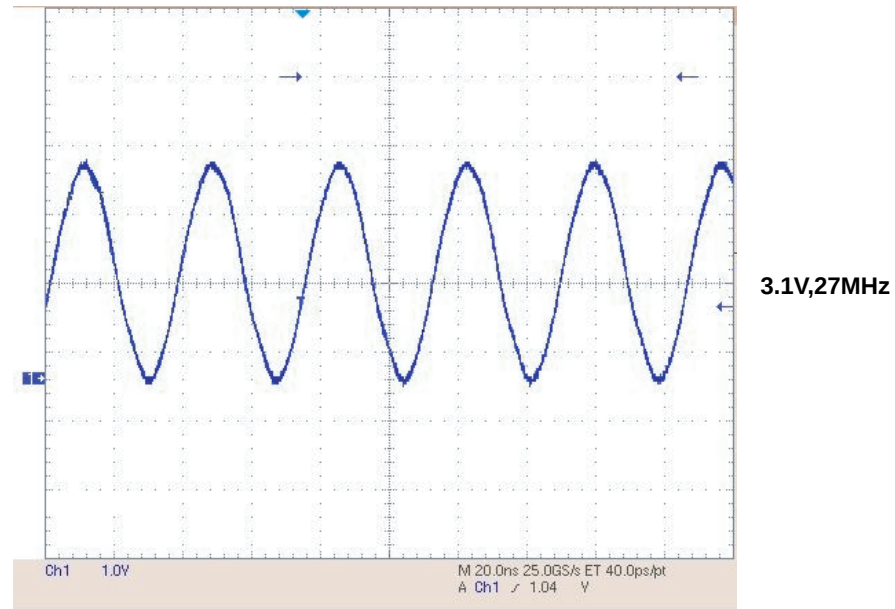


FIG 1-1

2) ZR3682 reset is low active

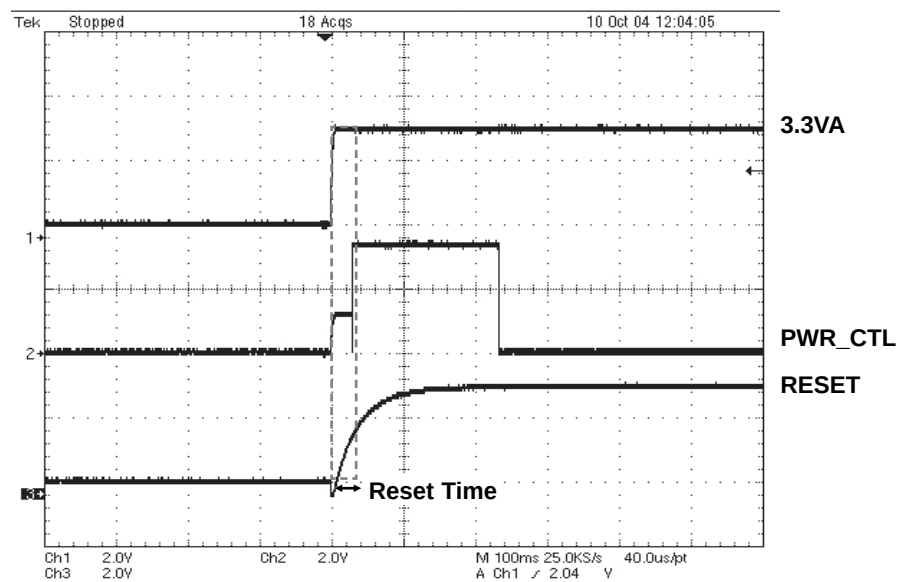


FIG 1-2

2. SDRAM CLOCK

1) SDRAM clock is at 143MHz

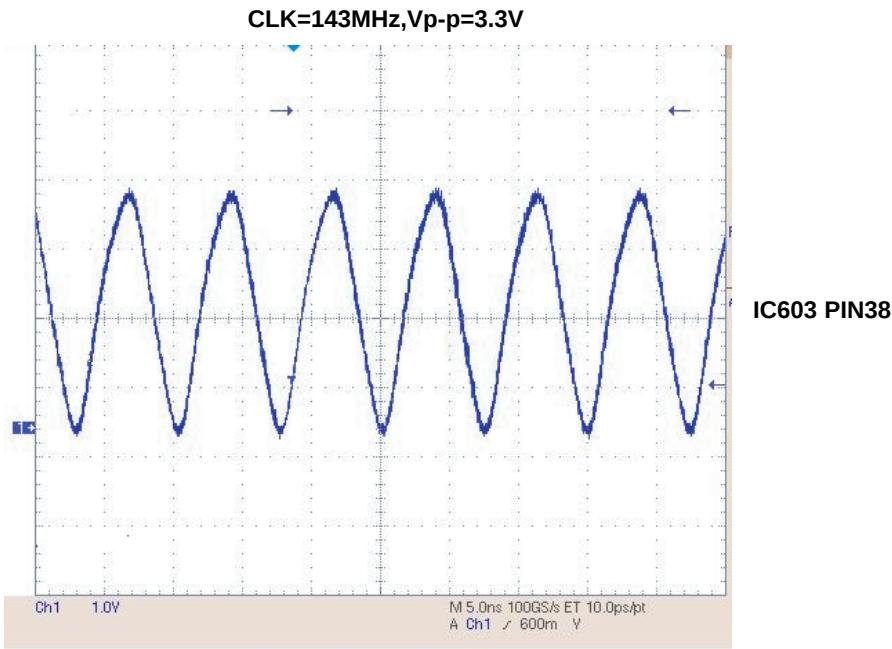


FIG 2-1

3. TRAY OPEN/CLOSE SIGNAL

1) Tray open/close waveform

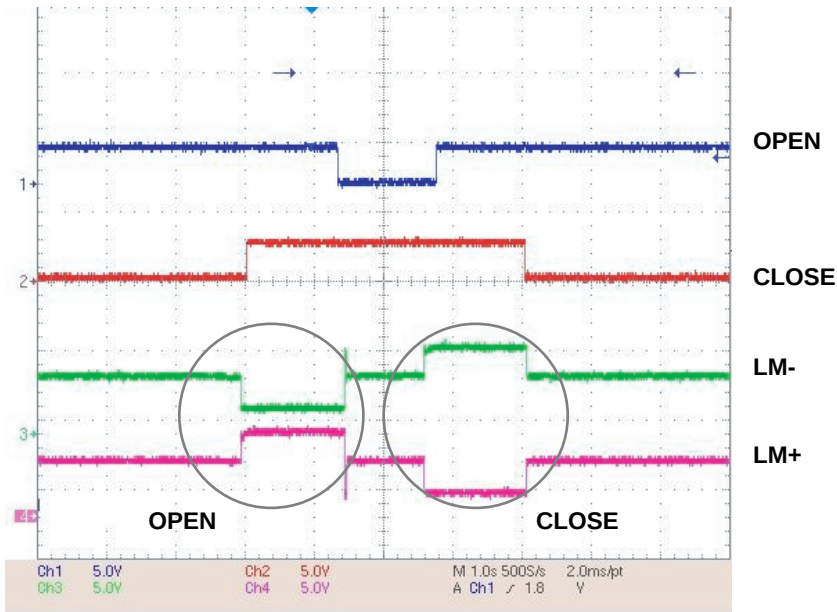


FIG 3-1

2) Tray open waveform

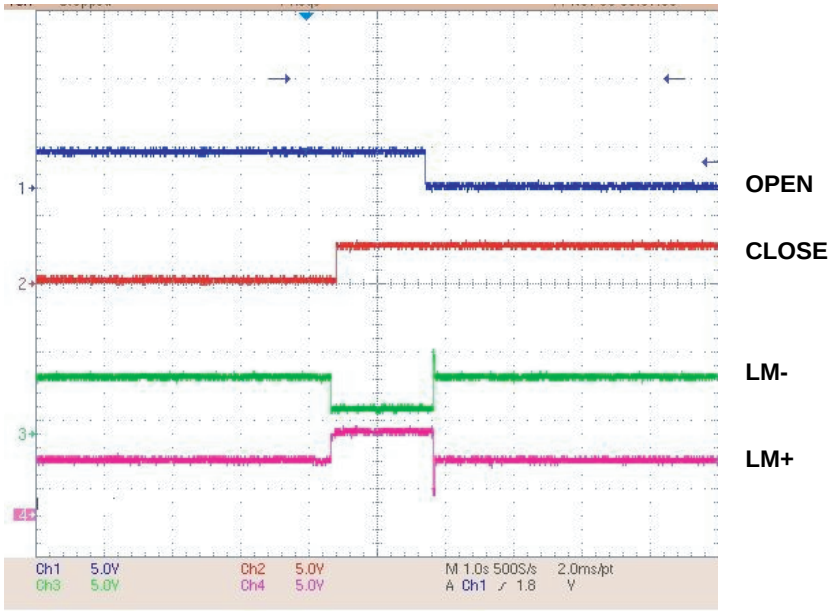


FIG 3-2

3) Tray close waveform

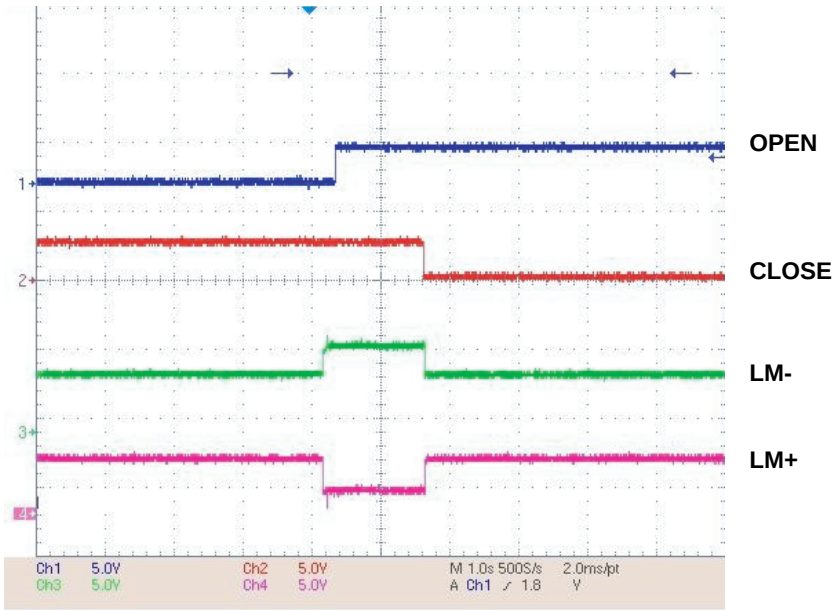


FIG 3-3

4. SLED CONTROL RELATED SIGNAL(NO DISC CONDITION)

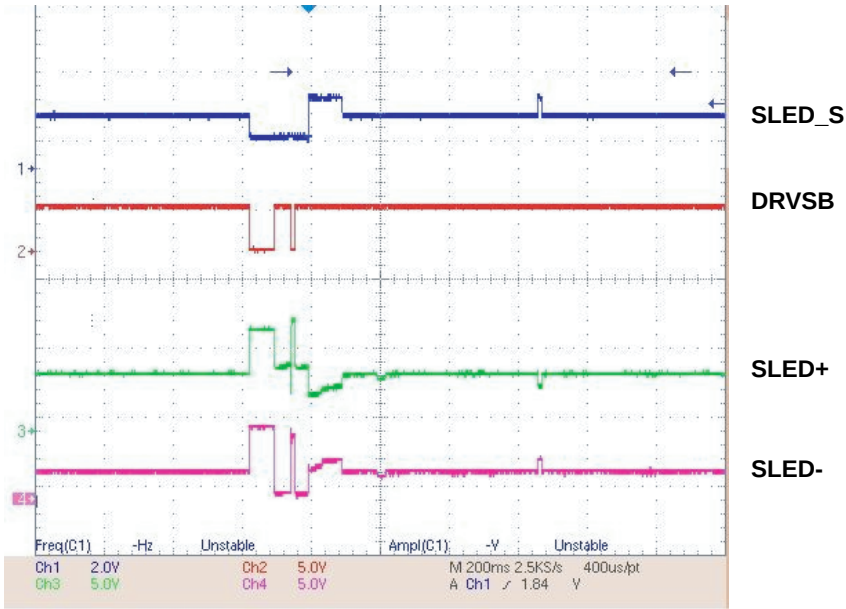


FIG 4-1

5. LENS CONTROL RELATED SIGNAL(NO DISC CONDITION)

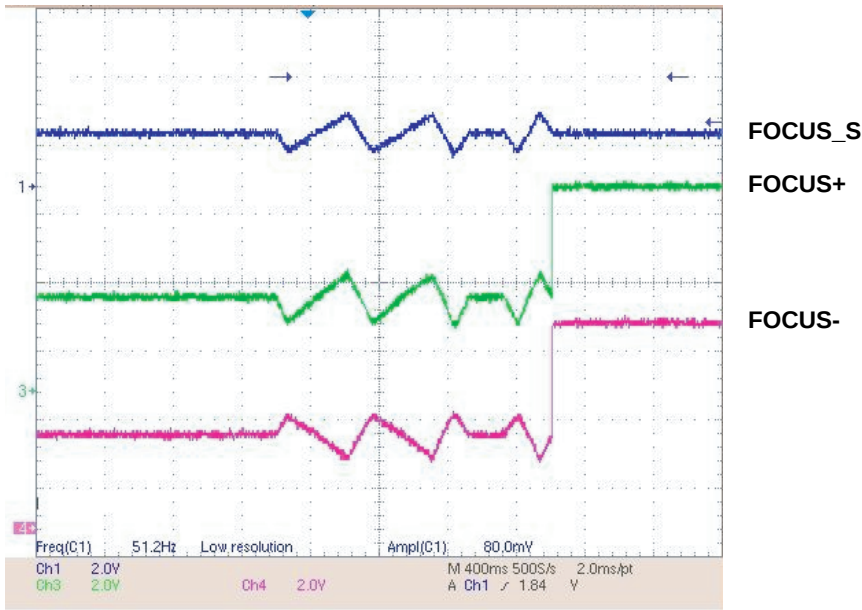


FIG 5-1

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

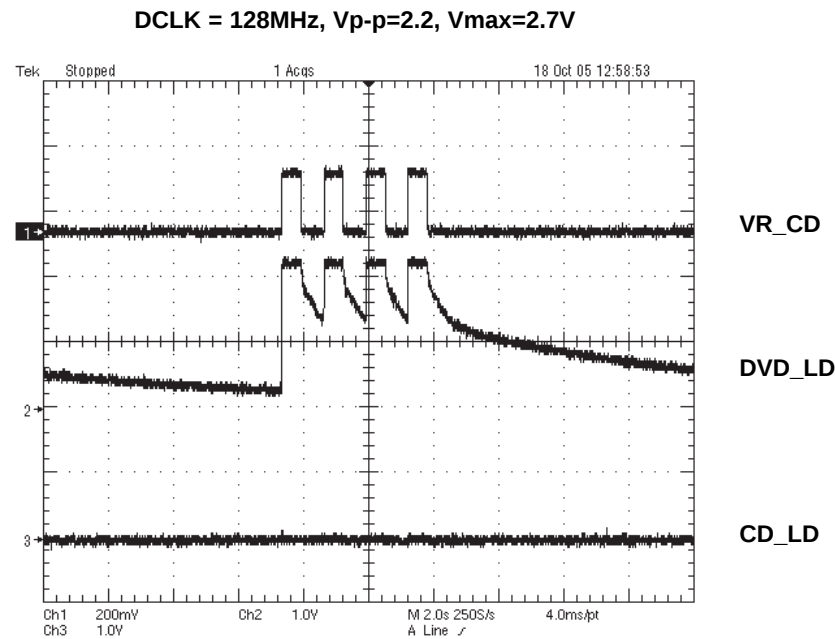


FIG 6-1

7. DISC TYPE JUDGEMENT WAVEFORM

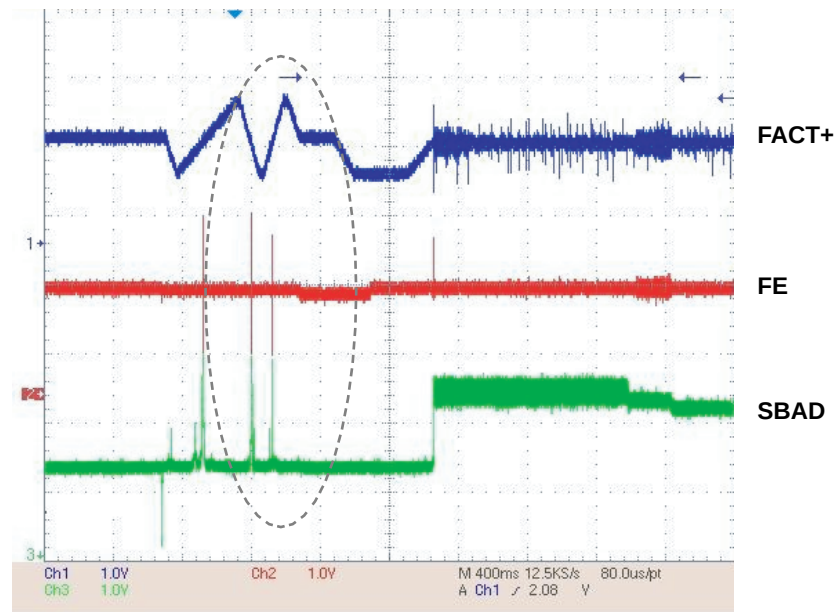


FIG 7-1(DVD)

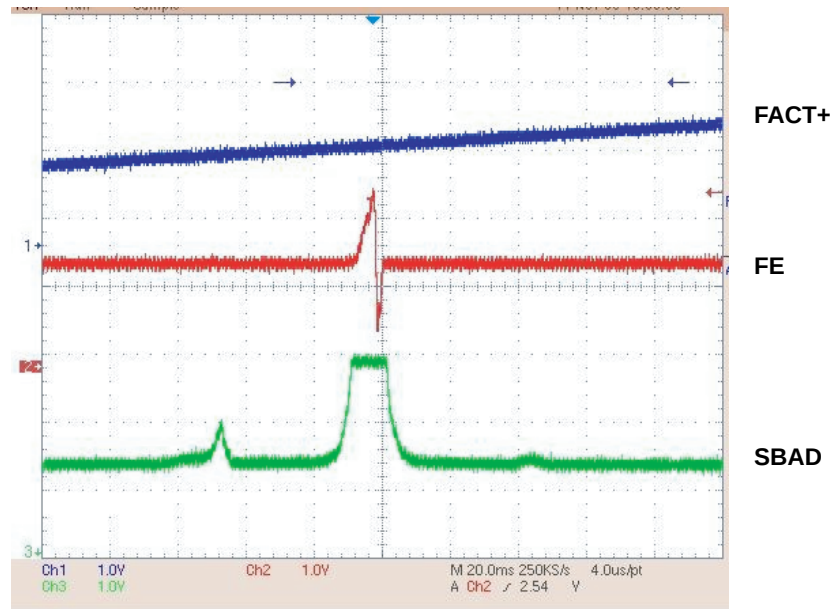


FIG 7-2 (DVD)

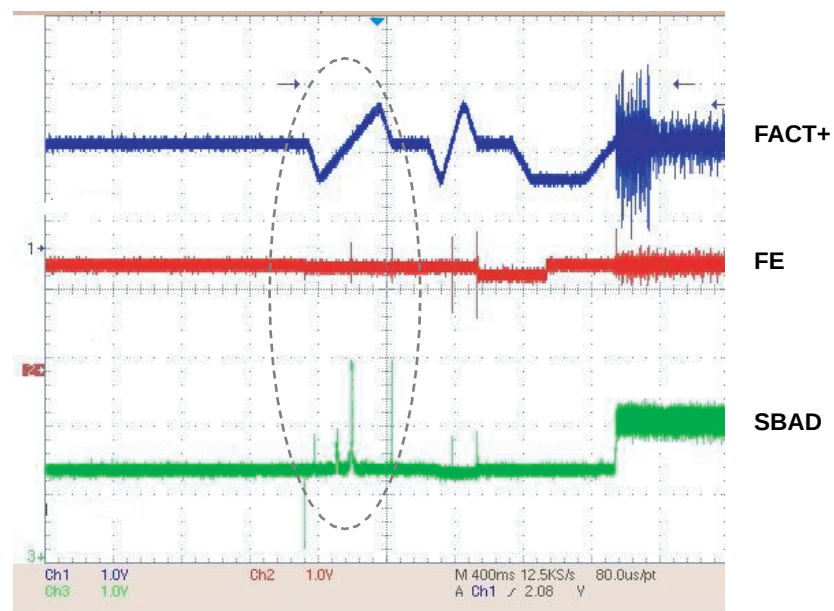


FIG 7-3 (CD)

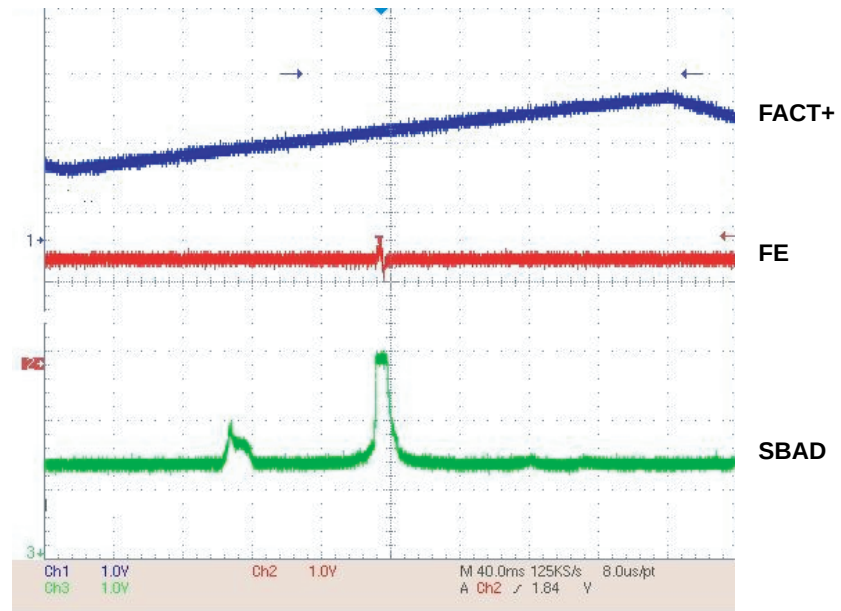


FIG 7-4 (CD)

8. FOCUS ON WAVEFORM

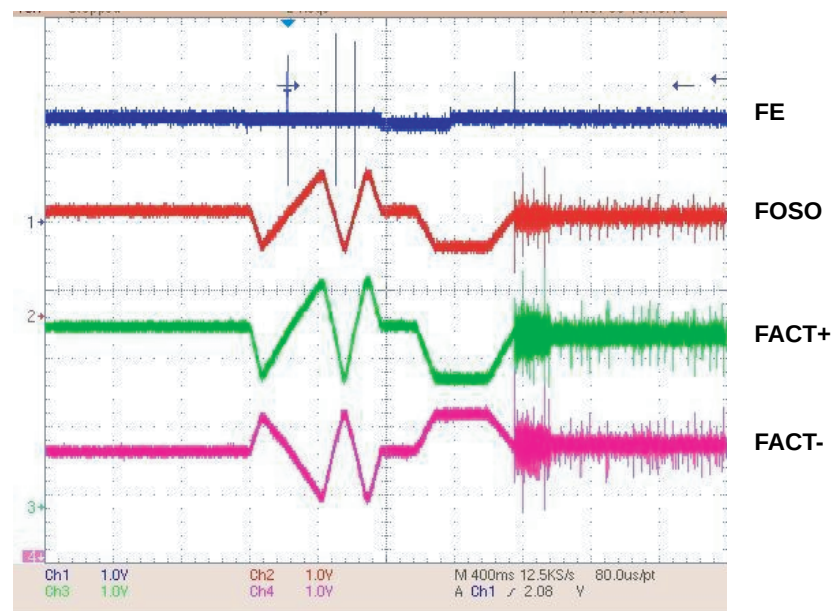


FIG 8-1 (DVD)

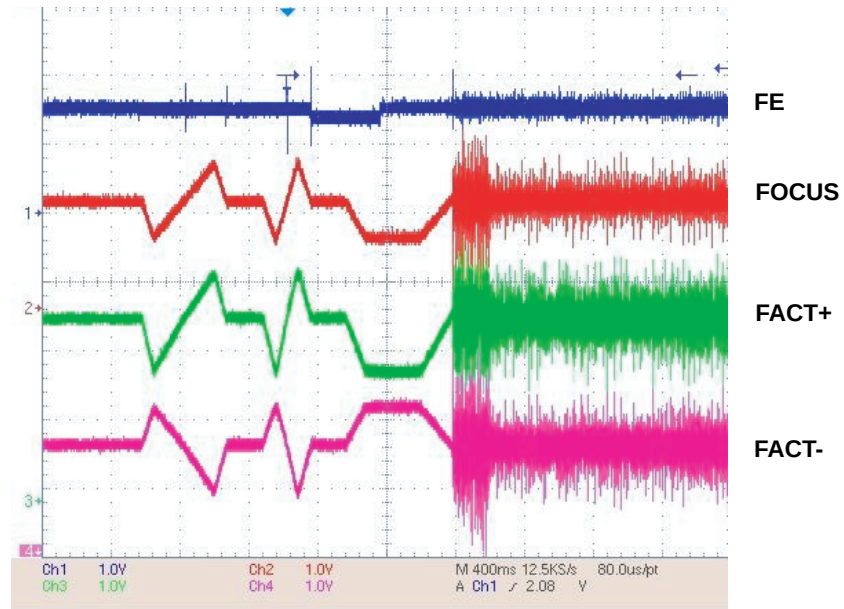


FIG 8-2 (CD)

9. SPINDLE CONTROL WAVEFORM(NO DISC CONDITION)

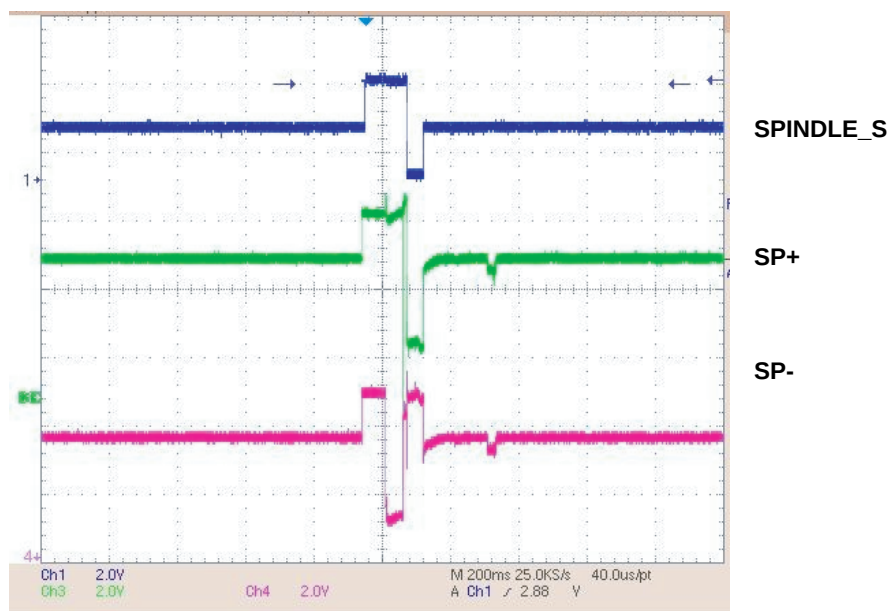


FIG 9-1 (DVD)

10. TRACKING CONTROL RELATED SIGNAL(System checking)

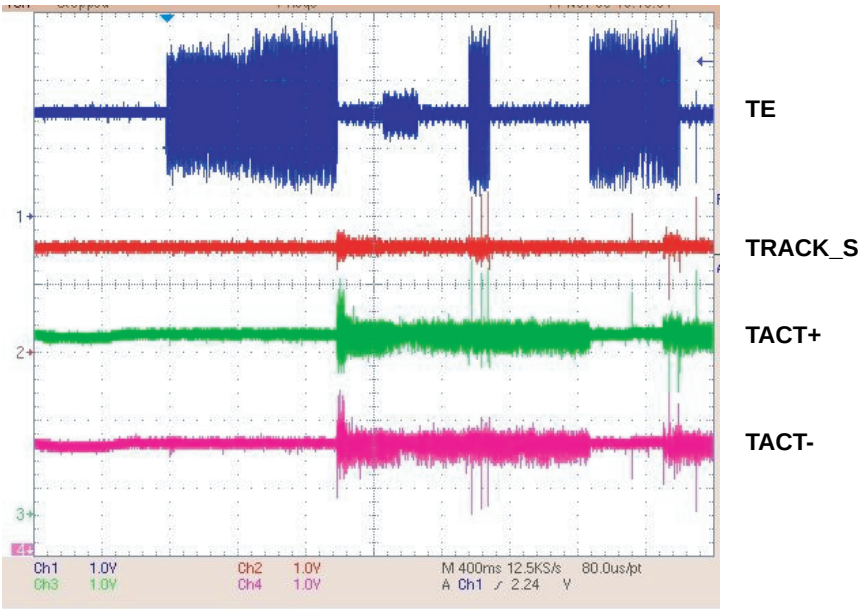


FIG 10-1 (DVD)

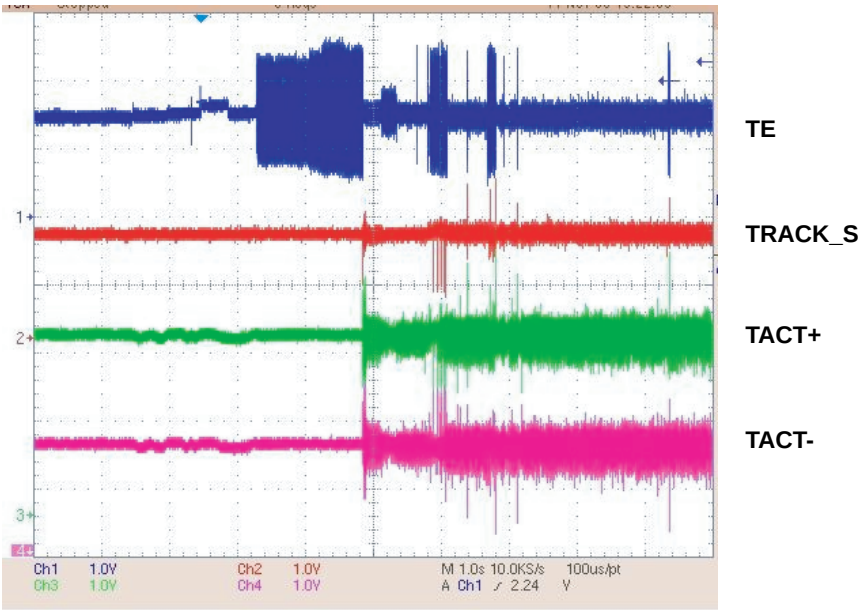
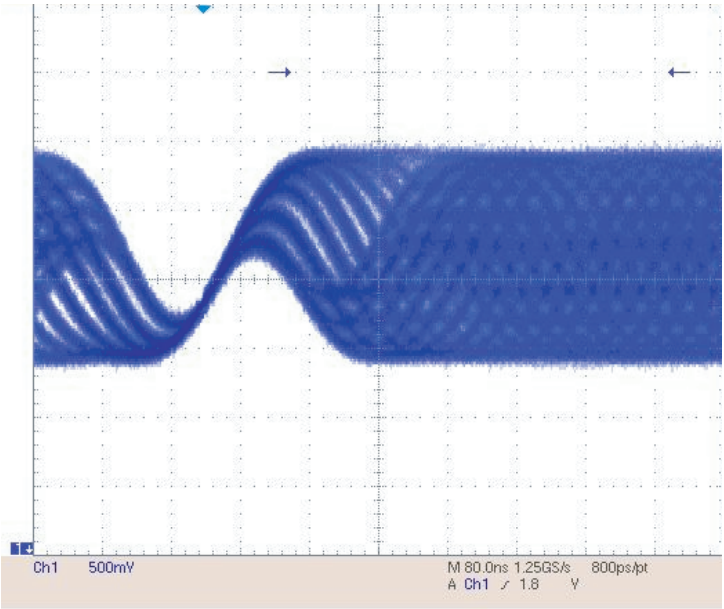


FIG 10-2 (CD)

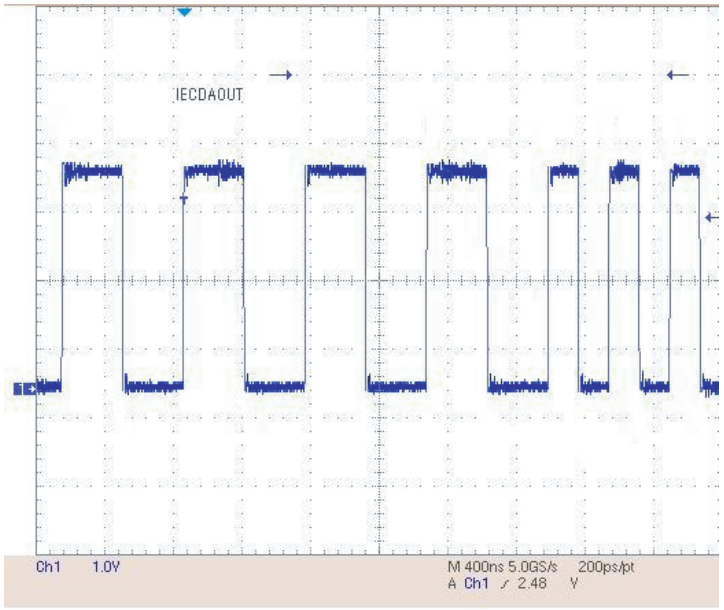
11. RF WAVEFORM



RFO

FIG 11-1

12. ZR36888 AUDIO OPTICAL AND COAXIAL OUTPUT(SPDIF)



SPDIF

FIG 12-1

13. ZR36888 VIDEO OUTPUT WAVEFORM
1) Full colorbar signal(CVBS)

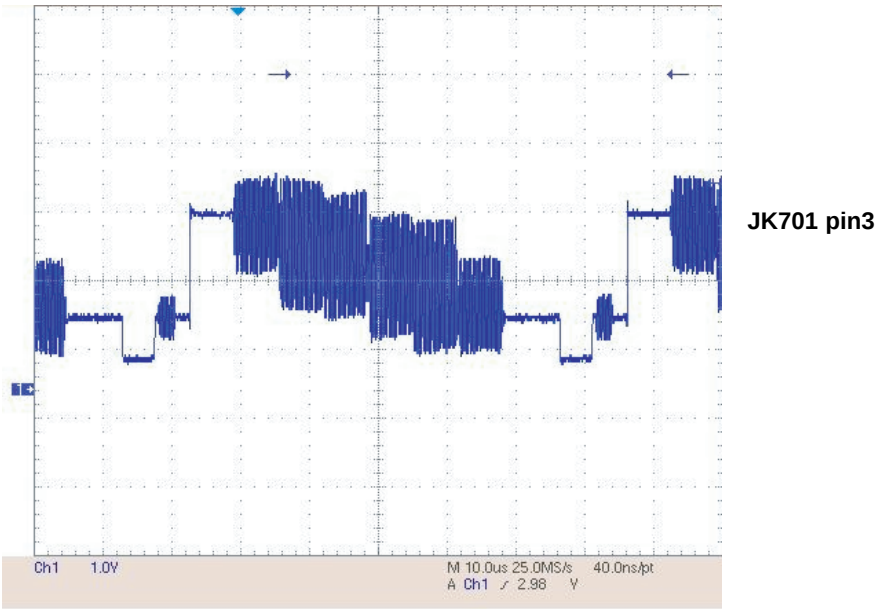


FIG 13-1

2) Y

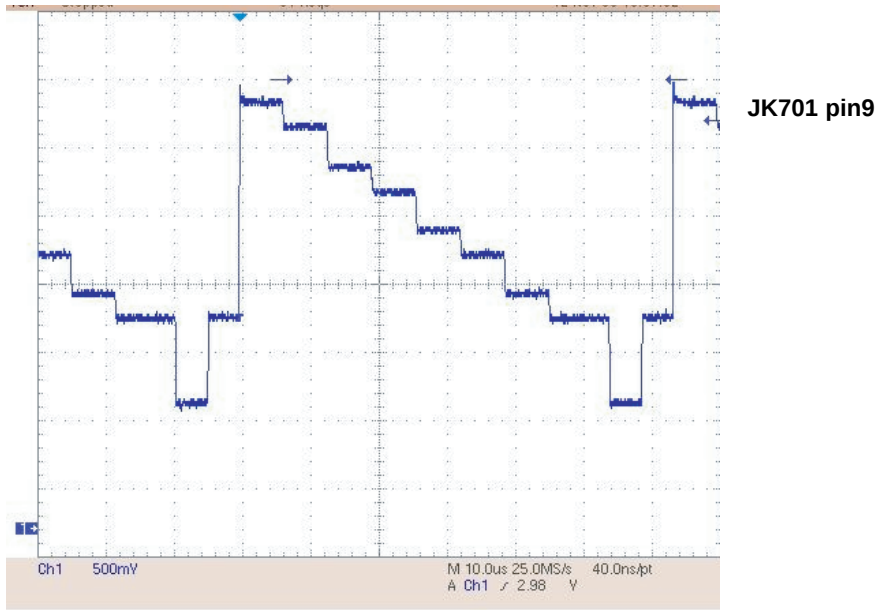


FIG 13-2

3) C

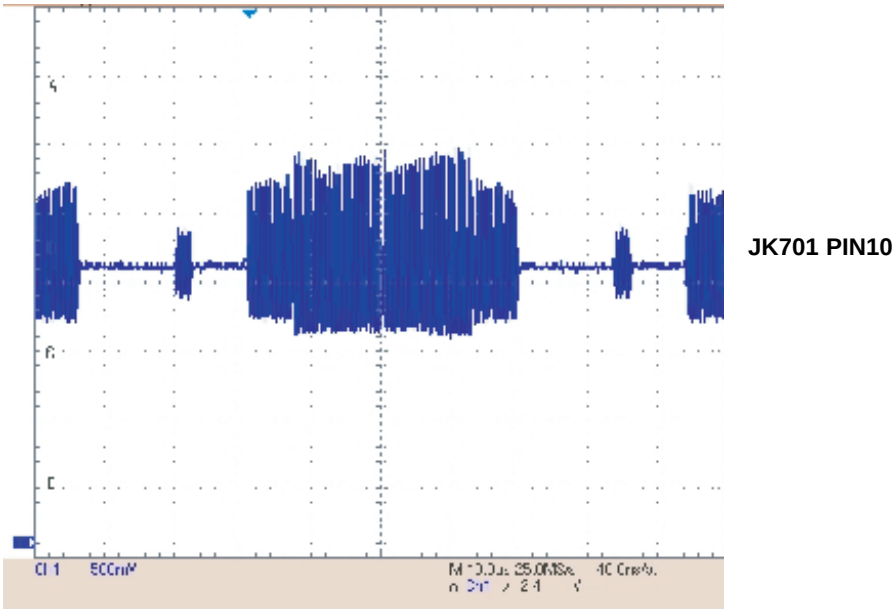


FIG 13-3

14. AUDIO OUTPUT FROM AUDIO DAC
1) AUDIO L/R

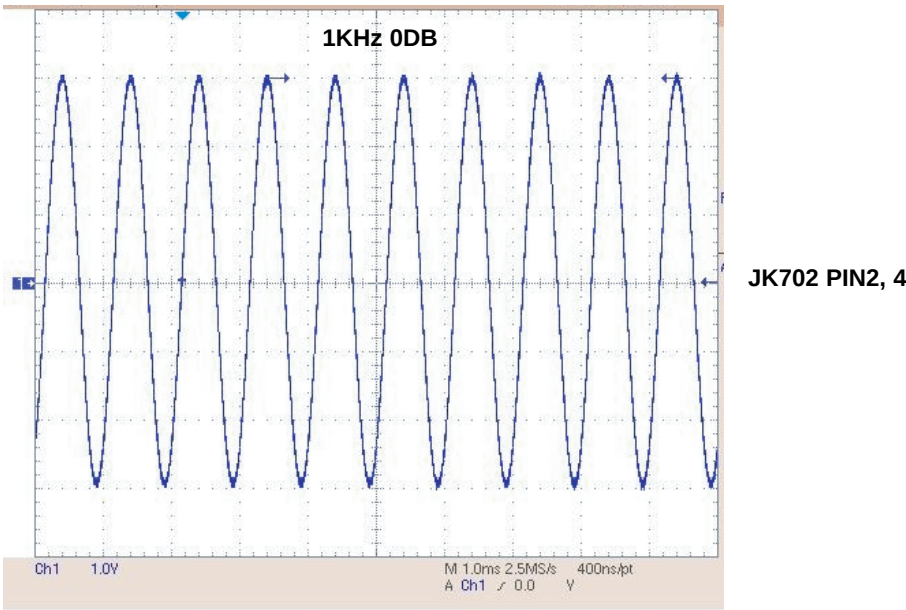


FIG 14-1

2) Audio Related Signal

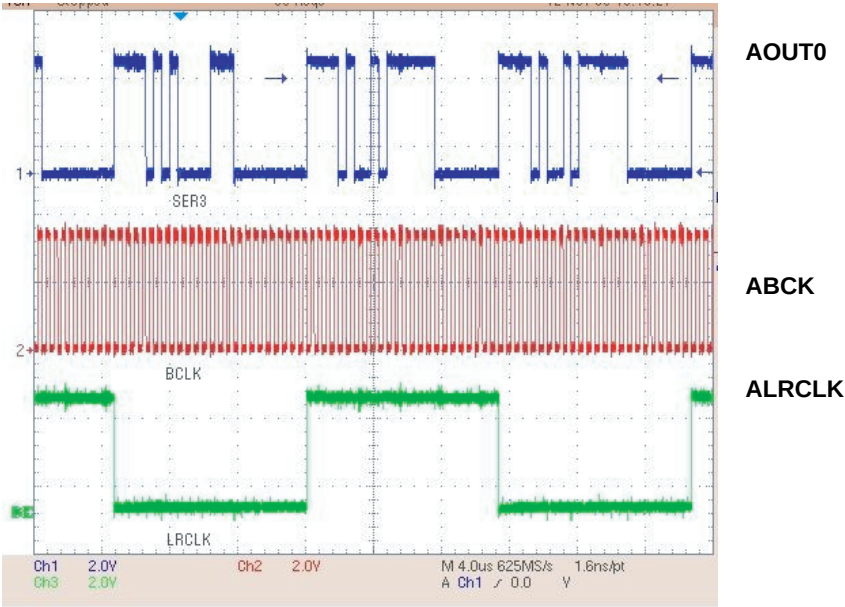
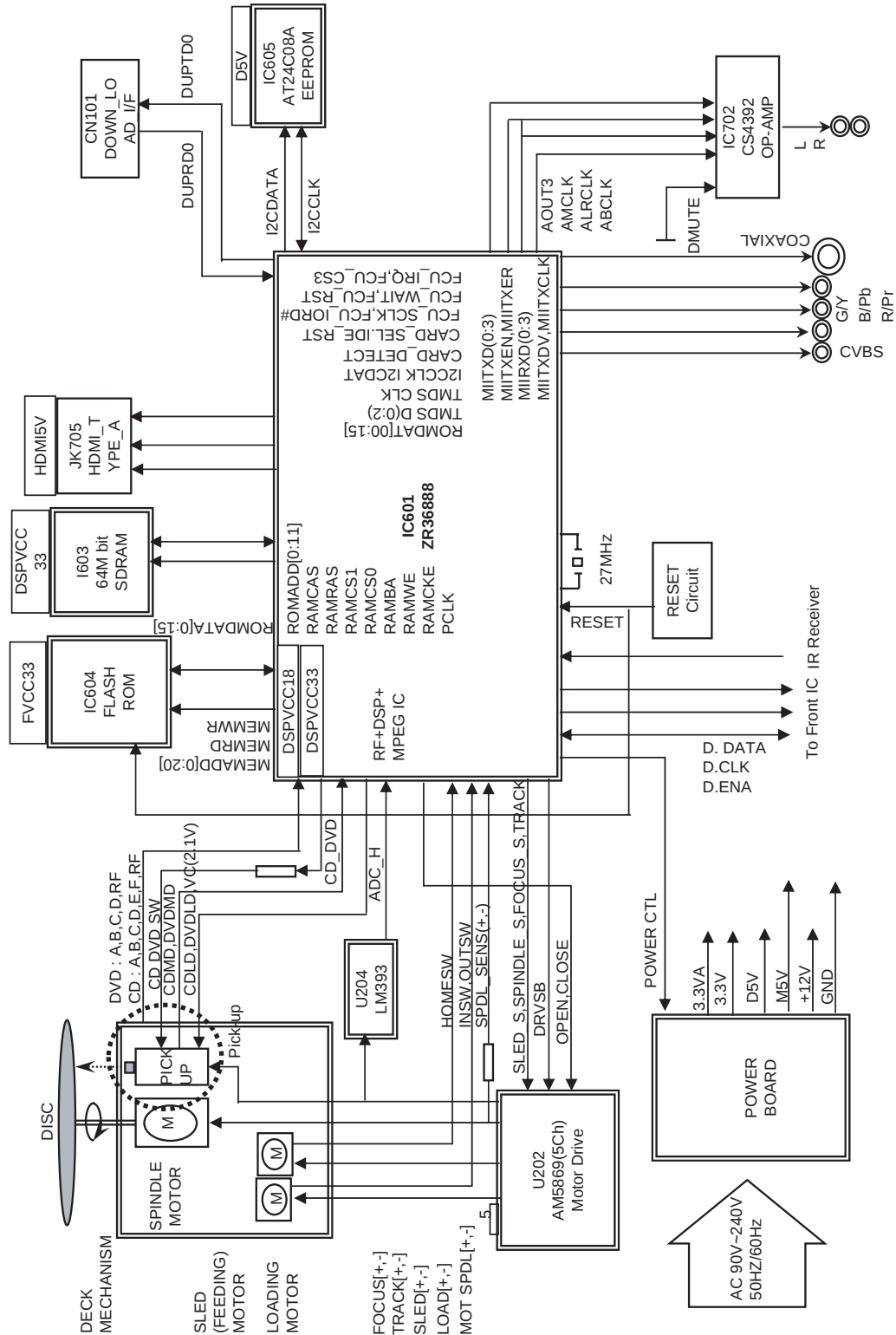


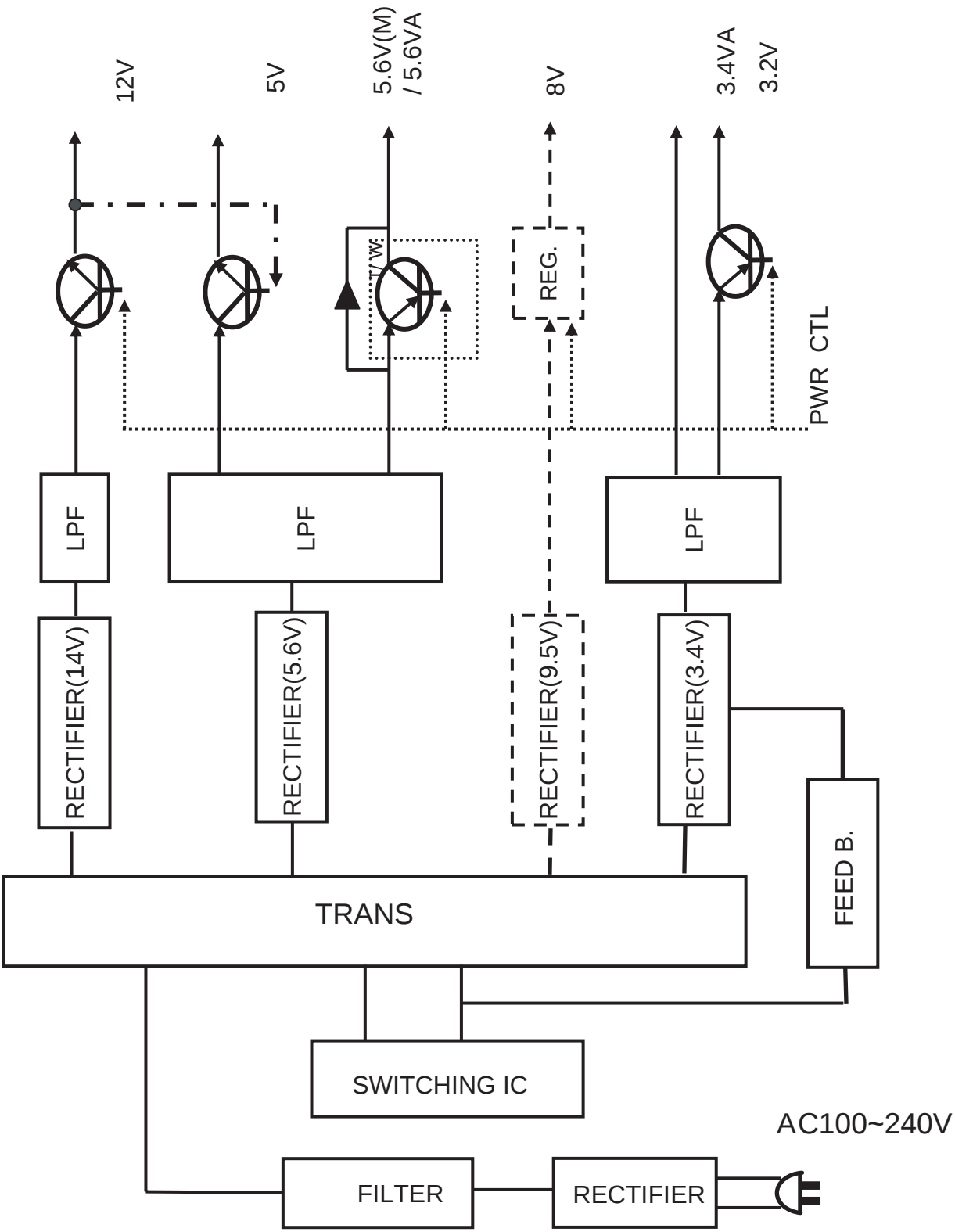
FIG 14-2

BLOCK DIAGRAMS

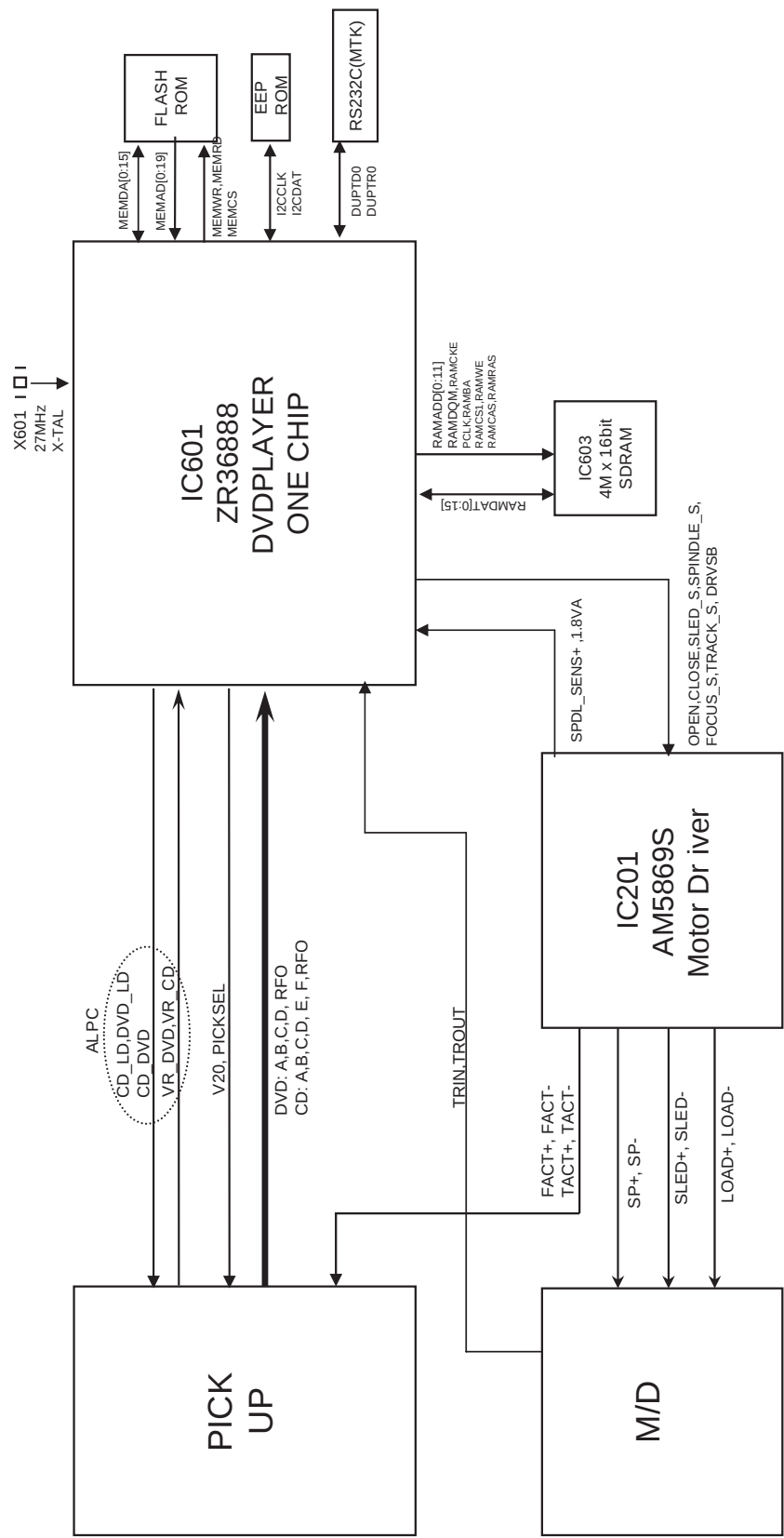
1. OVERALL BLOCK DIAGRAM



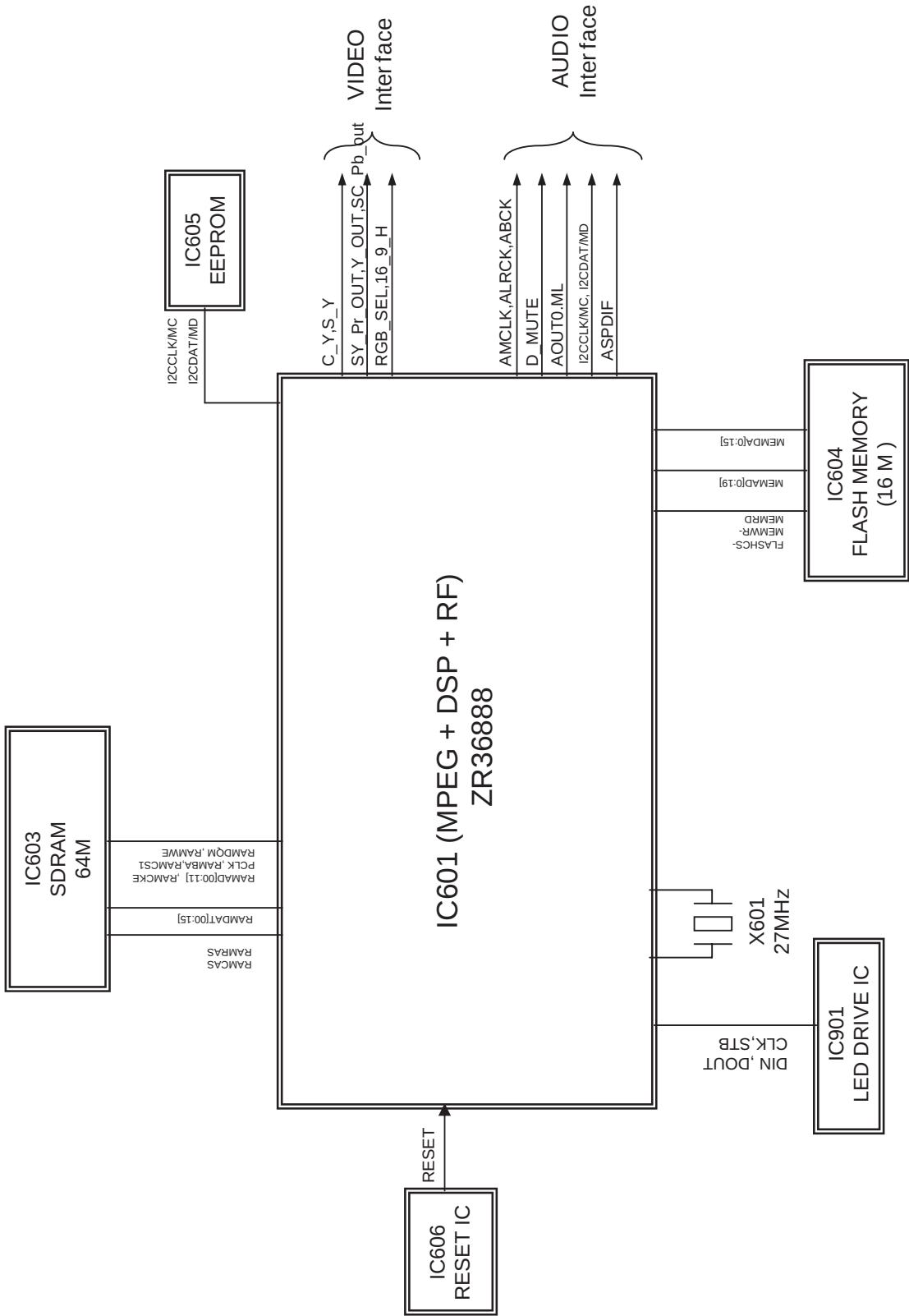
2. POWER(SMPS) BLOCK DIAGRAM



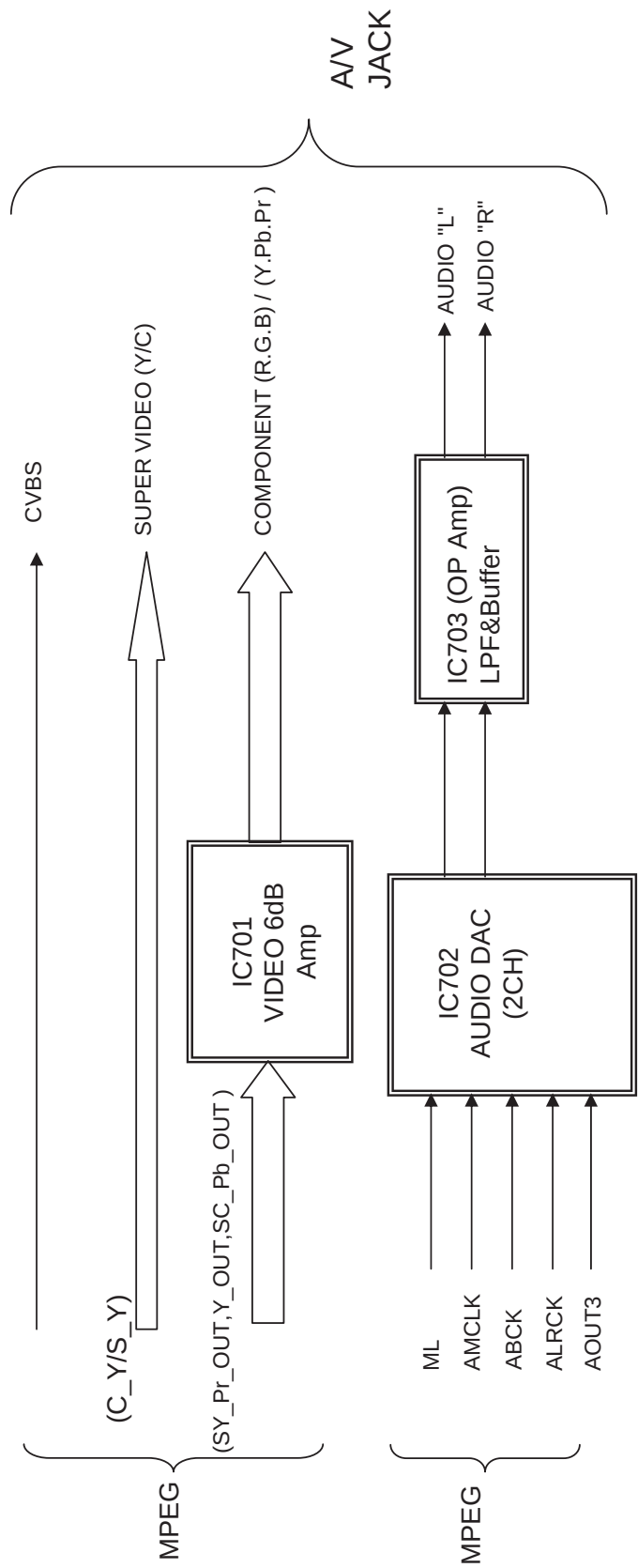
3. SERVO BLOCK DIAGRAM



4. MPEG & MEMORY BLOCK DIAGRAM

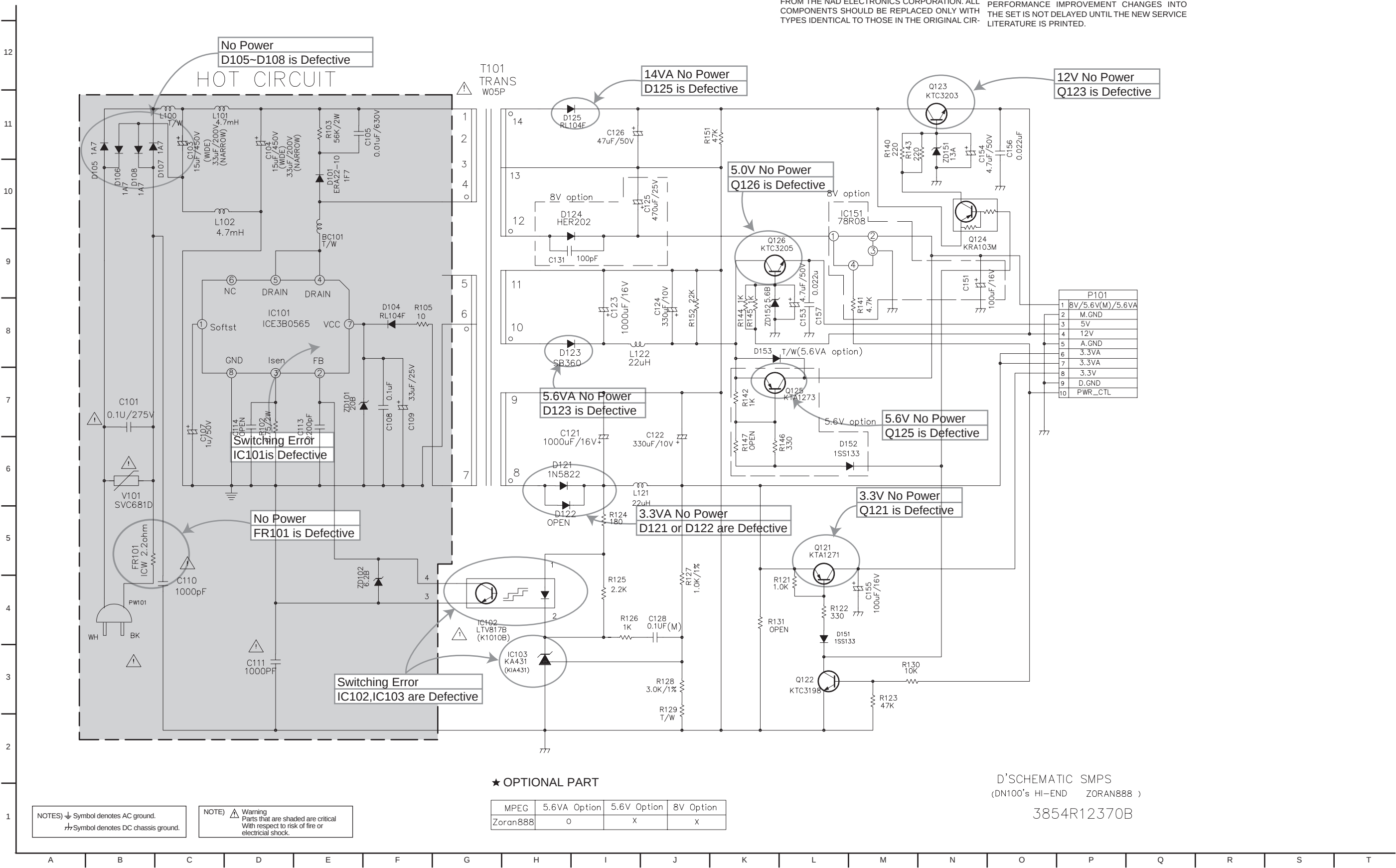


5. VIDEO & AUDIO BLOCK DIAGRAM



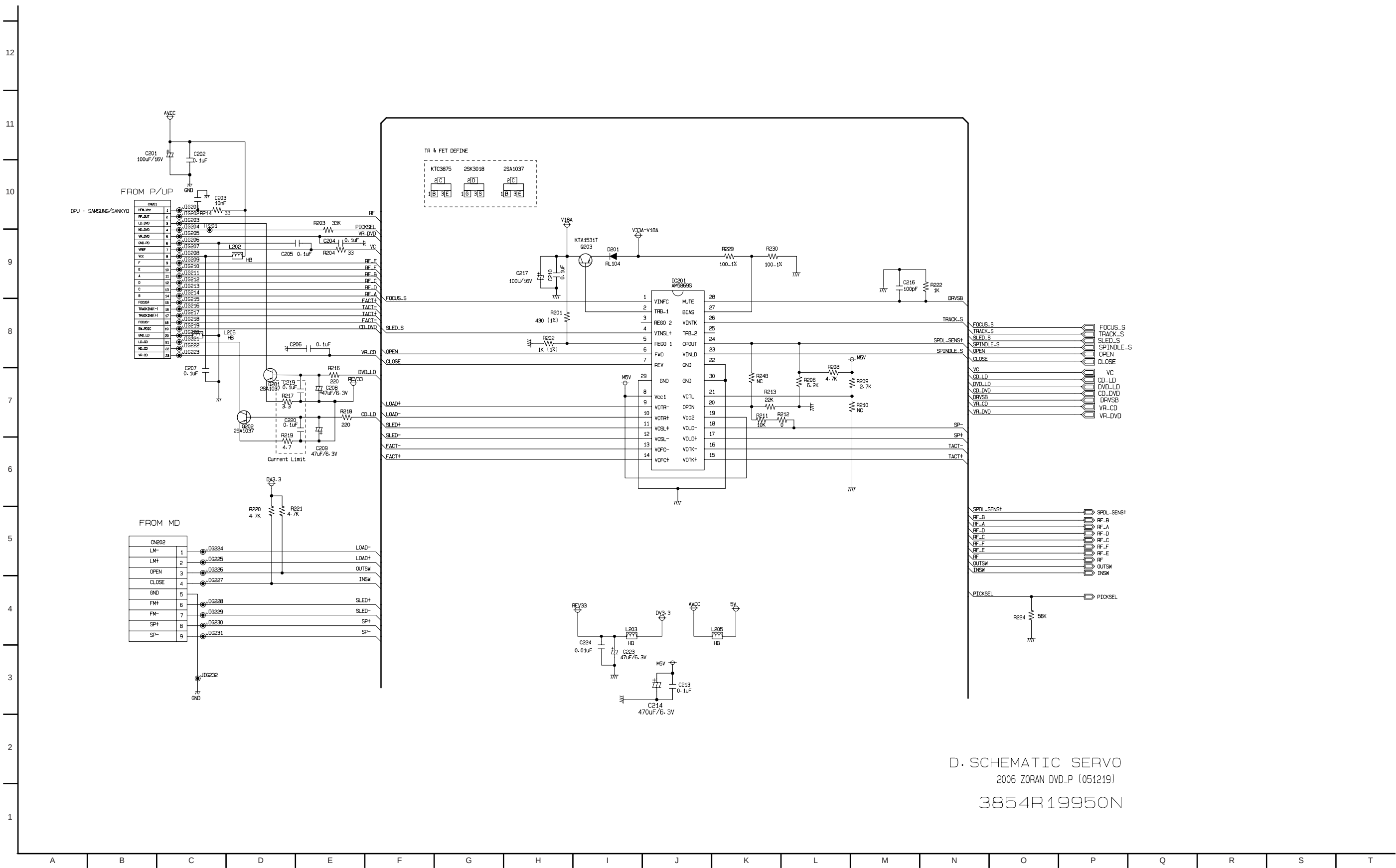
CIRCUIT DIAGRAMS

1. POWER(SMPS) CIRCUIT DIAGRAM

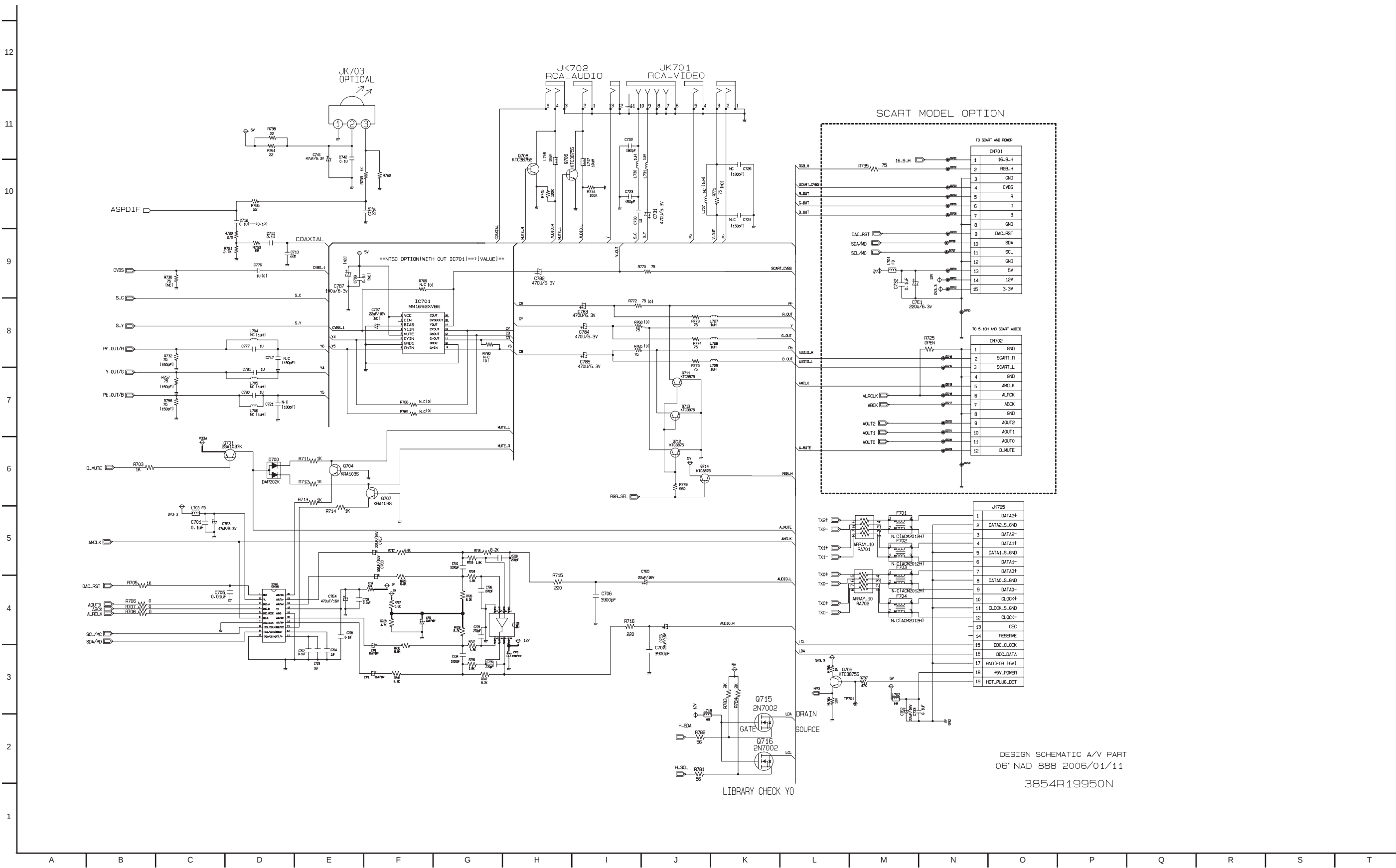




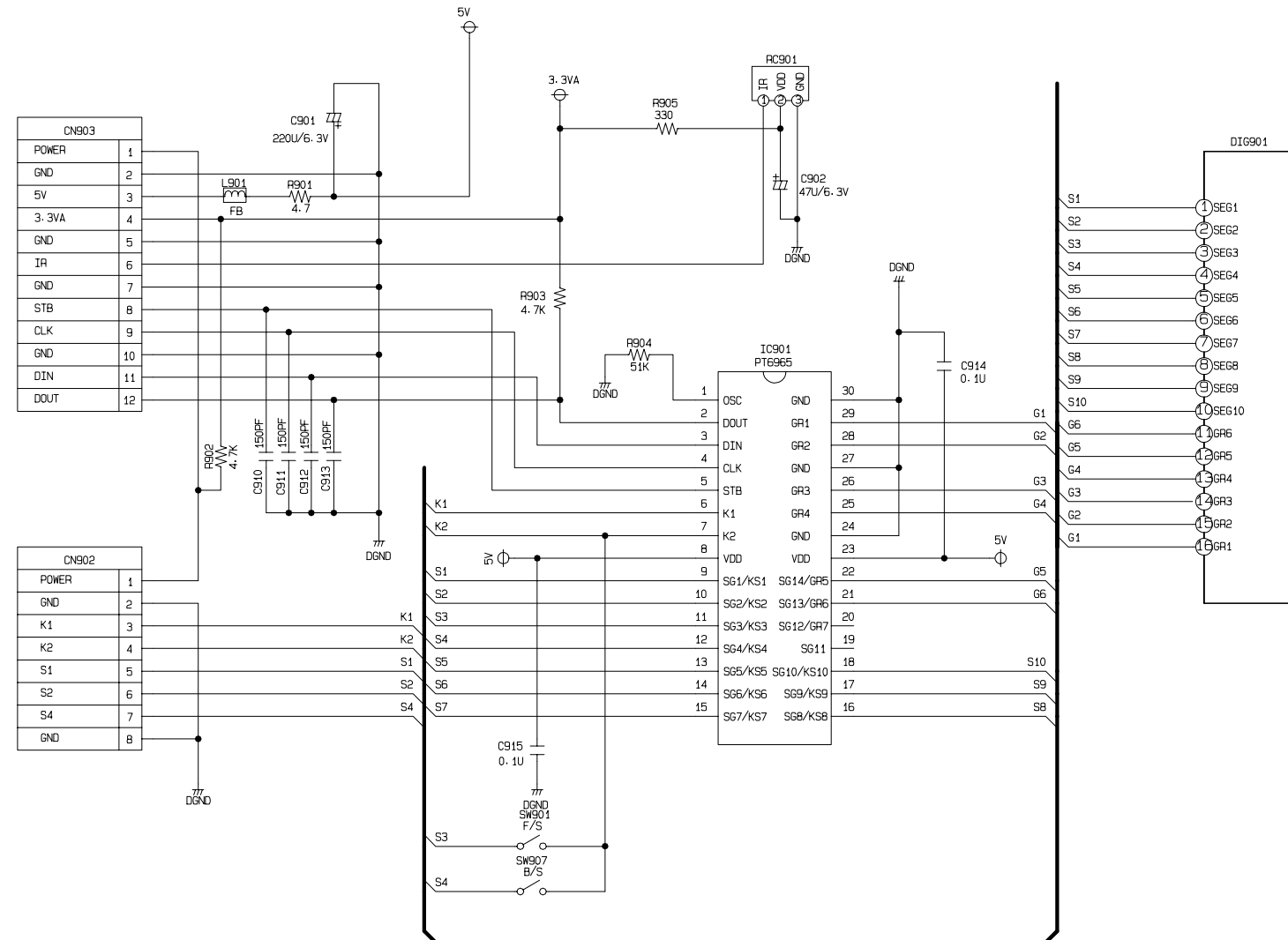
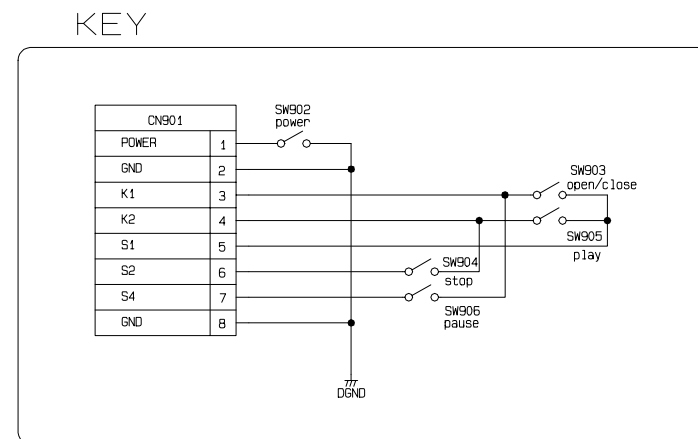
3. SERVO CIRCUIT DIAGRAM



4. AV/JACK CIRCUIT DIAGRAM



6. TIMER CIRCUIT DIAGRAM



06 NAD TIMER
3854R19284A(060116)

• CIRCUIT VOLTAGE CHART

MODE condenser	(PLAY) +I/A	(PLAY) -I/K	MODE condenser	(PLAY) +I/A	(PLAY) -I/K
C686	4.89	0.00	C787	4.90	0.00
C214	5.69	0.00	C7C1	5.54	0.00
C201	4.90	0.00	C7E2	4.89	0.00
C217	1.79	0.00	C7C3	5.55	0.00
C208	3.25	2.37	C7E6	5.55	2.45
C6E6	3.25	0.00	C7E9	5.54	2.45
C223	3.25	0.00	C727	2.45	0.00
C6B2	12.06	0.00	C6E1	3.25	0.00
C6B3	5.52	0.00	C6C9	3.25	0.00
C209	3.25	3.12	C7E1	4.92	0.00
C6K2	4.88	0.00	C6A1	1.79	0.00
C6A4	3.25	0.00	C6E4	1.76	0.00
C6F7	3.26	0.00	C6E5	3.26	0.00
C6J1	3.25	0.00	C6A6	3.26	0.00
C6A2	3.25	0.00	C741	4.88	0.00
C6A7	1.78	0.00	C686	4.93	0.00
C6E2	3.24	0.00	C731	1.24	1.00
C6E3	3.24	0.00	C782	1.85	0.26
C6A5	1.78	0.00	C783	2.30	0.00
C7C2	12.06	0.00	C784	1.20	0.00
C7E4	4.84	0.00	C785	2.31	0.00
C7E5	2.42	0.00	D601	3.255	3.257
C7E8	5.55	0.00	D201	3.242	2.453

MODE PIN NO.	STOP	PLAY
IC201		
1	1.68	1.82
2	1.84	1.82
3	0.8	0.84
4	1.68	1.68
5	1.28	1.32
6	0.007	0.023
7	0.008	0.026
8	5.76	5.72
9	0.003	0.008
10	0.003	0.0068
11	2.84	2.98
12	2.84	2.8
13	2.76	3.3
14	2.76	3.34
15	2.82	3.46
16	2.82	3.18
17	1.66	3.6
18	1.68	2.16
19	5.76	5.72
20	1.128	1.52
21	5.76	5.7
22	0.006	0.0052
23	1.66	1.96
24	0.488	0.48
25	5.52	5.52
26	1.66	1.64
27	1.66	1.64
28	0.012	3.12
IC601		
1	0.01	0.01
2	0.008	0.009
3	0.006	0.007
4	0.026	0.028
5	0.006	0.008
6	3.32	3.3
7	2.8	3.24
8	3.34	3.32
9	3.32	3.3
10	3.34	3.32
11	3.34	3.32
12	3.34	3.34
13	3.34	3.32
14	3.34	3.34
15	3.34	3.32
16	3.34	3.32
17	3.34	3.34
18	3.34	3.3
19	3.34	3.34
20	3.32	3.3
21	0.01	0.012
22	3.34	3.32
23	3.36	3.3
24	3.34	3.34
25	3.32	3.32

MODE PIN NO.	STOP	PLAY
26	3.34	3.34
27	3.32	3.32
28	3.32	3.32
29	3.3	3.3
30	3.34	3.34
31	3.32	3.32
32	3.36	3.36
33	3.3	3.3
34	1.82	1.82
35	3.32	3.32
36	3.32	3.3
37	3.3	3.3
38	0.0024	0.003
39	3.32	3.32
40	3.3	3.3
41	0.0031	0.004
42	3.32	3.32
43	3.34	3.34
44	3.34	3.34
45	3.34	3.34
46	3.32	3.32
47	3.34	3.34
48	3.34	3.34
49	3.34	3.34
50	3.34	3.34
51	3.34	3.34
52	3.34	3.34
53	3.34	3.34
54	3.34	3.34
55	3.34	3.34
56	3.34	3.34
57	3.34	3.34
58	3.3	3.28
59	0.004	0.005
60	0.0024	3.32
61	3.34	3.32
62	2.36	2.34
63	3.16	3.12
64	3.32	3.32
65	3.34	3.32
66	0.001	0.002
67	0.0013	0.0015
68	0.0023	0.003
69	3.32	3.32
70	3.32	3.32
71	3.32	3.32
72	3.32	3.3
73	3.32	3.32
74	3.34	3.34
75	3.32	3.34
76	3.34	3.3
77	3.32	3.3
78	0.01	0.009
79	3.3	3.3
80	1.82	1.8

MODE PIN NO.	STOP	PLAY
81	3.34	3.32
82	0.014	0.016
83	3.3	3.3
84	3.34	3.34
85	3.32	3.32
86	3.34	3.34
87	3.32	3.3
88	0.002	0.005
89	3.34	3.34
90	3.34	3.32
91	3.34	3.34
92	3.34	3.32
93	3.34	3.34
94	0.0028	0.003
95	0.0012	0.002
96	1.96	1.96
97	3.48	3.34
98	3.28	3.28
99	0.005	0.009
100	3.36	3.32
101	3.38	3.34
102	3.38	3.32
103	3.34	3.32
104	3.38	3.34
105	3.38	3.32
106	3.36	3.34
107	0.0099	0.01
108	1.96	1.98
109	1.82	1.8
110	3.36	3.32
111	0.009	0.01
112	3.36	3.32
113	3.34	3.34
114	3.4	3.32
115	3.38	3.32
116	3.38	3.32
117	0.008	0.01
118	3.38	3.32
119	3.38	3.3
120	3.38	3.32
121	3.34	3.32
122	3.92	3.96
123	0.008	0.01
124	0.016	3.32
125	0.012	0.014
126	3.32	3.3
127	0.032	0.03
128	0.032	0.01
129	0.024	3.32
130	0.0258	0.03
131	3.34	3.32
132	3.34	3.32
133	0.0048	0.005
134	3.26	3.24
135	3.34	3.34

MODE PIN NO.	STOP	PLAY
136	0.02	0.022
137	0.007	0.01
138	3.34	3.32
139	0.006	0.009
140	0.011	0.14
141	3.34	3.38
142	0.013	0.1
143	0.013	0.28
144	0.013	0.015
145	0.014	0.14
146	0.0059	0.006
147	1.82	1.82
148	0.013	0.02
149	0.013	0.015
150	0.013	0.014
151	0.012	0.01
152	0.01	0.01
153	0.01	0.01
154	3.34	3.34
155	0.005	0.006
156	0.005	0.007
157	3.32	3.32
158	1.84	1.82
159	2.38	2.38
160	1.66	1.86
161	1.84	1.84
162	0.005	0.008
163	0.0053	0.007
164	0.005	0.007
165	0.0058	0.007
166	3.34	3.32
167	0.0056	0.008
168	0.0048	0.0048
169	0.0048	0.0048
170	0.0054	0.0054
171	0.0052	0.0054
172	3.34	3.32
173	0.0052	0.005
174	0.0054	0.005
175	0.005	0.0048
176	1.064	1.1
177	0.0044	0.005
178	1.86	1.84
179	0.0052	0.006
180	0.0052	0.006
181	1.16	1.08
182	3.28	3.3
183	2.22	2.06
184	0.8	0.6
185	3.32	3.3
186	1.58	1.54
187	0.82	0.5
188	3.32	3.3
189	0.88	0.78
190	1.3	1.3

MODE PIN NO.	STOP	PLAY
191	0.005	0.006
192	0.005	0.004
193	1.33	1.86
194	1.328	1.36
195	0.104	0.14
196	2.2	2.34
197	3.32	3.3
198	2.2	2.5
199	3.32	3.3
200	3.32	3.3
201	2.2	2.4
202	0.14	0.14
203	2.2	2.34
204	0.16	0.14
205	0.005	0.006
206	2.16	2.16
207	0.56	0.48
208	2.16	2.18
209	2.22	2.22
210	1.4	1.38
211	1.38	1.38
212	0.006	0.007
213	0.0072	0.24
214	3.14	3.14
215	3.16	2.36
216	0.0044	0.005
217	0.0064	0.005
218	1.72	1.7
219	0.0064	0.005
220	0.0046	0.007
221	3.32	3.32
222	0.034	0.1
223	3.34	3.32
224	0.0044	0.005
225	0.005	0.006
226	0.0048	0.006
227	0.0042	0.007
228	3.34	3.34
229	0.0064	0.006
230	0.01	0.009
231	3.18	3.28
232	0.029	0.03
233	0.0074	0.008
234	3.18	3.32
235	3.43	3.32
236	0.016	3.14
237	3.18	3.3
238	3.18	3.3
239	0.026	0.03
240	3.1	3.08
241	0.0072	0.005
242	3.34	3.32
243	0.0064	0.006
244	0.091	0.14
245	3.34	3.34

MODE PIN NO.	STOP	PLAY
246	3.34	0.14
247	0.0052	0.005
248	3.22	3.22
249	0.01	0.005
250	0.0048	0.007
251	0.036	0.004
252	0.02	0.004
253	0.019	0.02
254	3.16	3.26
255	3.28	3.36
256	0.0048	0.005
IC603		
1	3.36	3.34
2	3.34	3.34
3	3.34	3.34
4	3.34	3.34
5	3.34	3.34
6	0.0088	0.014
7	3.34	3.34
8	3.34	3.34
9	3.34	3.34
10	3.34	3.34
11	3.32	3.32
12	0.0072	0.017
13	3.32	3.32
14	3.34	3.34
15	3.3	3.3
16	3.34	3.34
17	3.34	3.34
18	3.34	3.34
19	3.34	3.34
20	3.32	3.32
21	3.32	3.32
22	3.34	3.34
23	3.32	3.32
24	3.32	3.32
25	3.34	3.34
26	3.32	3.32
27	3.38	3.38
28	0.01	0.0088
29	3.32	3.32
30	3.32	3.32
31	3.32	3.32
32	3.32	3.32
33	3.32	3.32
34	3.3	3.3
35	3.32	3.32
36	0.008	0.0096
37	3.32	3.32
38	1.94	1.94
39	0.035	3.34
40	0.003	0.007
41	0.0064	0.008
42	3.36	3.32
43	3.36	3.34

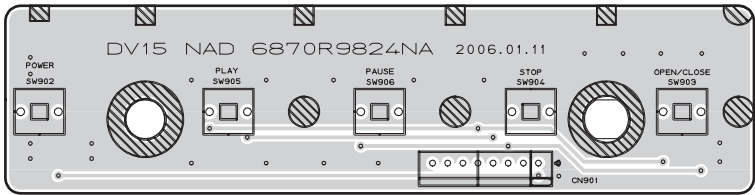
MODE PIN NO.	STOP	PLAY
44	3.36	3.34
45	3.36	3.34
46	0.006	0.007
47	3.36	3.34
48	3.36	3.34
49	3.36	3.34
50	3.36	3.34
51	3.34	3.32
52	0.005	0.007
53	3.34	3.32
54	0.005	0.0064
IC604		
1	3.32	3.34
2	3.32	3.34
3	3.28	3.34
4	3.28	3.34
5	3.28	3.34
6	3.28	3.34
7	3.32	3.34
8	3.28	3.36
9	3.28	3.32
10	0.011	0.007
11	3.36	3.38
12	3.34	3.34
13	3.34	3.34
14	3.34	3.34
15	0.013	0.005
16	3.3	3.32
17	3.34	3.

(TOP VIEW)

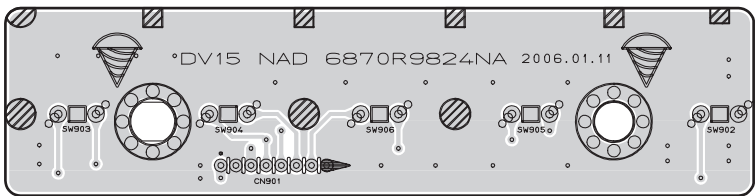


3-46

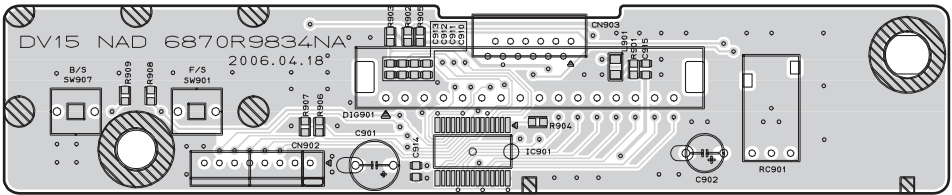
2. KEY P.C.BOARD
(TOP VIEW)



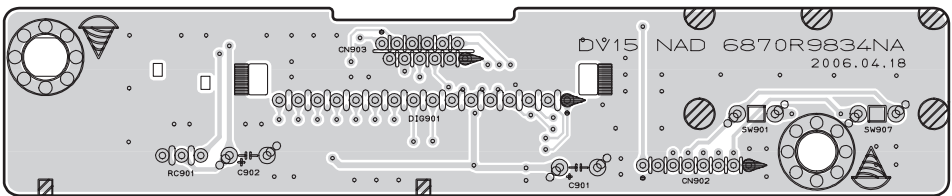
(BOTTOM VIEW)



3. TIMER P.C.BOARD
(TOP VIEW)



(BOTTOM VIEW)



NOTES)  Warning
Parts that are shaded are critical
with respect to risk of fire or
electrical shock.

Location	Part Number	Description	Quantity
1	3300R-0547A	Plate	3
2	5016H-1016B	Magnet	3
3	4860R-0021A	Clamp	3
10	6850R-JW24Y	Cable,FFC	3
12	5040R-0083A	Damper	2
13	4400R-0010A	Belt	3
14	4470R-0154A	Gear	3
15	4681R-A015A	Motor,Unclassified	3
16	6871R-4067A	PCB Assembly	3
17	4470R-0176A	Gear	3
18	4974R-0066A	Guide	3
19	3210R-M007A	Frame	3
20	3040R-M062A	Base	3
21	4681R-B009C	Motor,Unclassified	3
24	4470R-0179A	Gear	3
25	4470R-0178A	Gear	3
26	3390R-0029A	Tray	2
30	4470R-0180A	Gear	3
36	4370R-0136A	Shaft	3
250	3110R-D036A	Case	1
260	3140R-D020E	Chassis	2
261	5040R-5040C	Damper	2
280	3721R-F465A	Panel Assembly,Front	2
283	3580R-T229A	Door,Case	1
300	6410RAHX03A	Power Cord Assembly	1
320	3720R-D145X	Panel,Rear	2
430	1SZZR-0064B	Screw,Customized	2
431	1SZZR-0062A	Screw,Customized	3
432	1SZZR-0072A	Screw,Customized	3
435	1SZZR-0011A	Screw,Customized	3
439	1SZZR-0075A	Screw,Customized	3
440	1SZZH-1007B	Screw,Customized	3
452	1SZZR-0098A	Screw,Customized	2
463	1SZZR-0098G	Screw,Customized	1
465	1SZZR-0097K	Screw,Customized	1
467	1SZZR-0097N	Screw,Customized	2
801	3835RD0090G	Manual Assembly	1
802	3890R-C420B	Box,Master	2
803	3920R-E227A	Packing	2
804	3880R-E002A	Bag,Vinyl	2
808	6910A90004A	BATTERY,ALKALINE	1
810	6851R-0074D	Accessory Assembly	1
811	6850R-PAA2F	Cable,Assembly	2
812	6850R-PBA2H	Cable,Assembly	2
900	6711R2N124C	Remote Controller Assembly	1
012A	5040R-0110A	Damper	2
015A	4680R-E008A	Motor,DC	4
015B	4560R-0008A	Pulley	4
A00	6721RHD080D	Deck Assembly,DVD	1
A01	4861R-0016B	Clamp Assembly	2
A02	3041R-D041A	Base Assembly	2
A03	3041R-M076A	Base Assembly	2
A42	6871R-9374A	PCB Assembly	2
A43	3501RF9903A	Board Assembly	1
A44	3141R-D083X	Frame Assembly	1
A46	6885R-8313X	Option Code Assembly	1
A47	6871R-2398E	PCB Assembly	1
A49	6871R-9634A	PCB Assembly	2