

# Service Manual

Pioneer



ORDER NO.  
RRV2423

DVD-R/RW CD-R/RW WRITER

# DVR-A03

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

| Type | Model   | Power Requirement                 | Remarks |
|------|---------|-----------------------------------|---------|
|      | DVR-A03 |                                   |         |
| KB   | O       | DC Power supply from other system |         |

NECESSARY INFORMATION FOR DHHS RULES MARKED ON THE TOP COVER BELOW:

DANGER – VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN.  
AVOID DIRECT EXPOSURE TO BEAM.

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# 1. SAFETY INFORMATION



This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

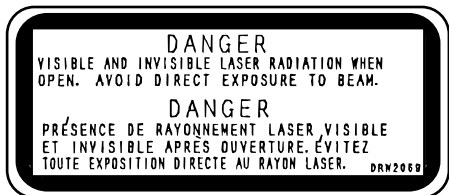
## WARNING

This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Health & Safety Code Section 25249.6 – Proposition 65

|  |   |   |   |
|--|---|---|---|
| <p>VARO!<br/>AVATTAESSA JA SUOJALUKITUS<br/>OHITETTAESSA OLET ALTTIINA<br/>NÄKYMÄTTÖMÄLLE LASERSÄTEIYLLE.<br/>ÄLÄ KATSO SÄTEESEEN.</p>         |  | <p>WARNING!<br/>DEVICE INCLUDES LASER DIODE WHICH<br/>EMITS INVISIBLE INFRARED RADIATION<br/>WHICH IS DANGEROUS TO EYES. THERE IS<br/>A WARNING SIGN ACCORDING TO PICTURE<br/>1 INSIDE THE DEVICE CLOSE TO THE LASER<br/>DIODE.</p> |  |
| <p>ADVARSEL :<br/>USYNLIG LASERSTRÅLING VED ÅBNING<br/>NÅR SIKKERHED SAFBRYDERE ER UDE AF<br/>FUNKTION. UNDGÅ UDSÆTTELSE FOR<br/>STRÅLING.</p> | <p>LASER<br/>kuva 1<br/>Lasersäteilyn<br/>varoituserkki</p>                         | <p>IMPORTANT<br/>THIS PIONNER APPARATUS CONTAINS<br/>LASER OF CLASS 1.<br/>SERVICING OPERATION OF THE APPARATUS<br/>SHOULD BE DONE BY A SPECIALLY<br/>INSTRUCTED PERSON.</p>  | <p>LASER<br/>Picture 1<br/>Warning sign for<br/>laser radiation</p>                   |
| <p>VARNING!<br/>OSYNLIG LASERSTRÅLNING NÅR DENNA<br/>DEL ÄR ÖPPNAD OCH SPÄRREN<br/>ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.</p>                      |   | <p>LASER DIODE CHARACTERISTICS<br/>MAXIMUM OUTPUT POWER : 35 mw<br/>WAVELENGTH : 658 nm</p>   |   |

■ LABEL CHECK



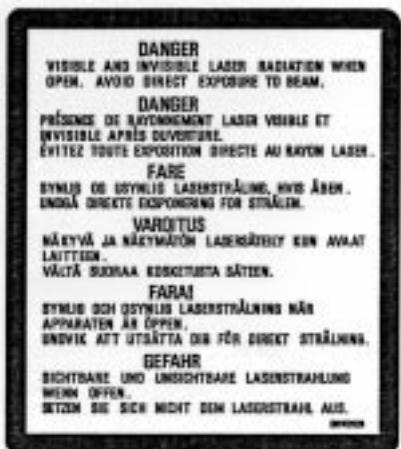
DRW2069

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:  
1) THIS DEVICE MUST NOT CAUSE HARMFUL INTERFERENCE, AND  
2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRABLE OPERATION.

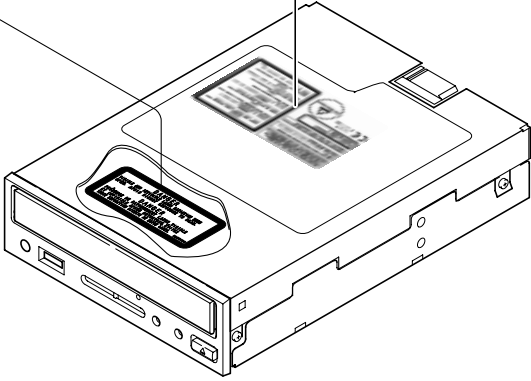
THIS CLASS B DIGITAL APPARATUS COMPLIES WITH CANADIAN ICES-003.  
CET APPAREIL NUMÉRIQUE DE LA CLASSE B EST CONFORME À LA NORME NBN-003 DU CANADA.

CERTIFICATION: THIS PRODUCT COMPLIES WITH DIRECTIVE 2002/95/EC, SUBCHAPTER J, PART 1040 AT DATE OF MANUFACTURE.

**CLASS 1 LASER PRODUCT  
LASER KLASSE 1**



DRW2020



Additional Laser Caution

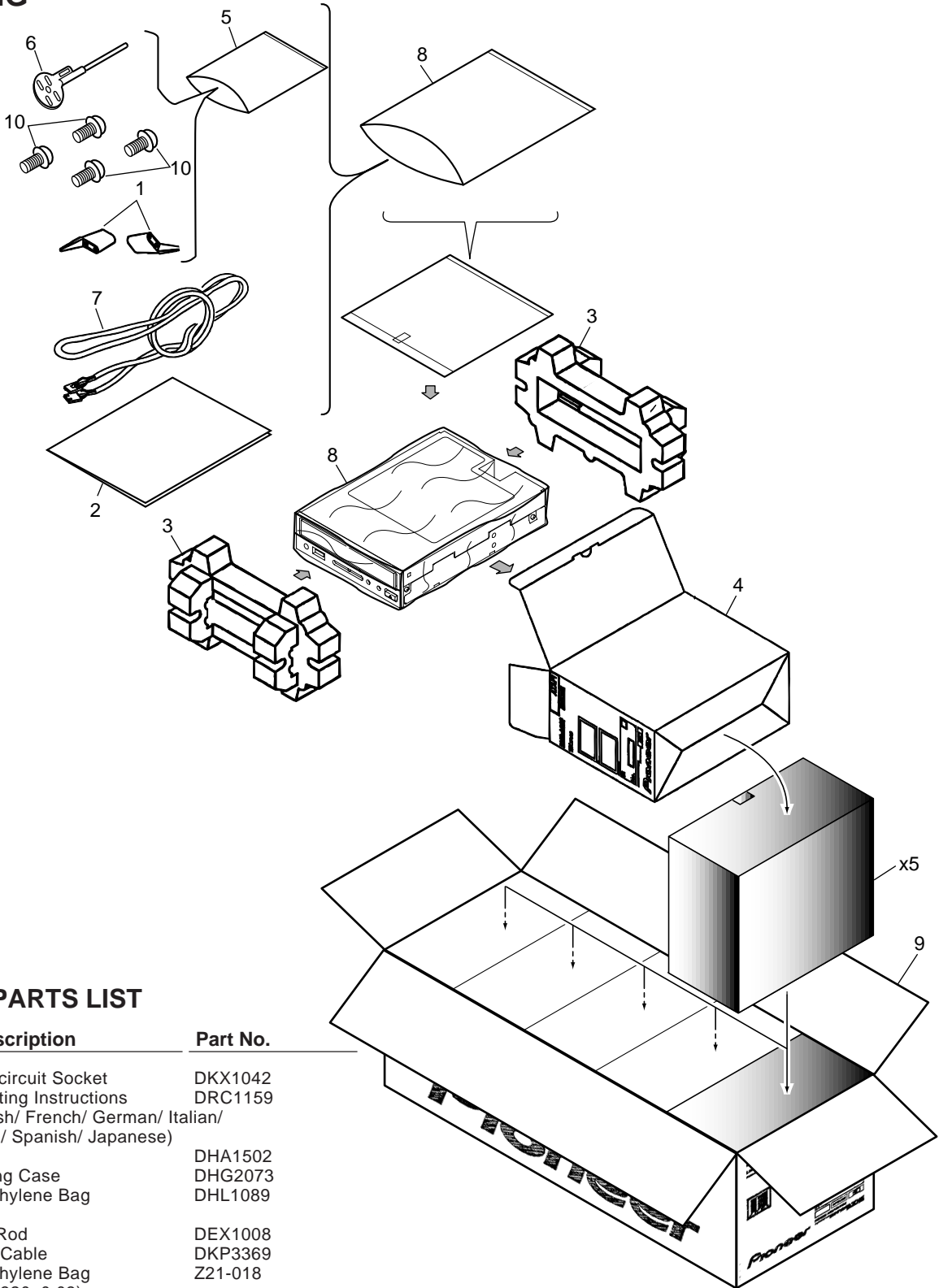
1. The ON/OFF(ON:low level,OFF:high level) status of the CLAMP signals for detecting the loading state are detected by the drive CPUs, and the design prevents laser diode oscillation when the CLAMP signal turns OFF.  
In normal operation, if no disc is clamped, the laser diode oscillation is disabled.  
However, the interlock does not always operate in the test mode. \*
2. When the cover is opened, close viewing of the objective lens with the naked eye will cause exposure to a Class 3A laser beam.

\* Refer to pages 43.

## 2. EXPLODED VIEWS AND PARTS LIST

- NOTES:
- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
  - The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
  - Screws adjacent to  $\blacktriangledown$  mark on the product are used for disassembly.

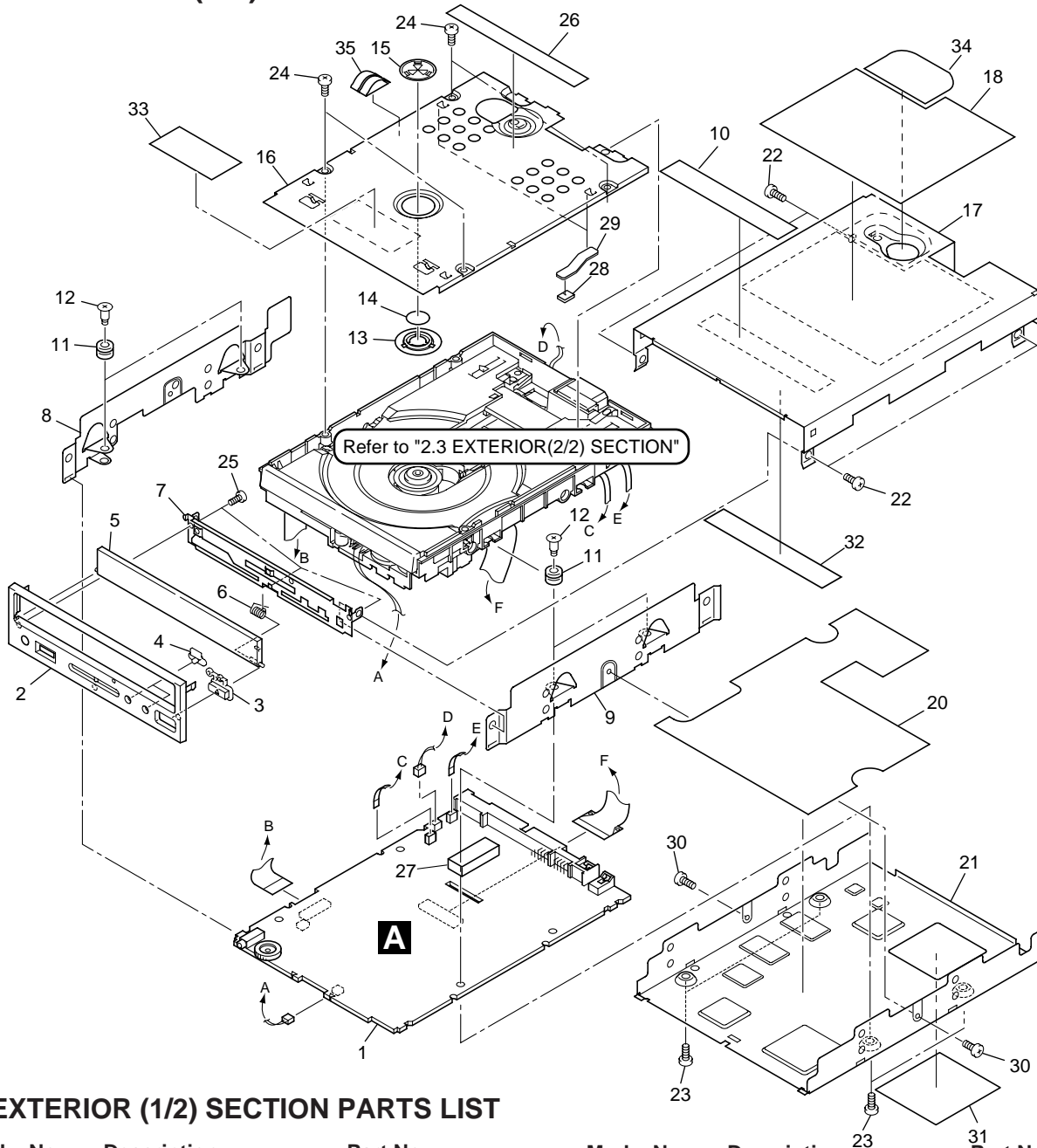
### 2.1 PACKING



#### ● PACKING PARTS LIST

| Mark | No. | Description   | Part No.     |
|------|-----|---|--------------|
|      | 1   | Short-circuit Socket  | DKX1042      |
|      | 2   | Operating Instructions<br>(English/ French/ German/ Italian/<br>Dutch/ Spanish/ Japanese) | DRC1159      |
|      | 3   | Pad   | DHA1502      |
|      | 4   | Packing Case  | DHG2073      |
|      | 5   | Polyethylene Bag  | DHL1089      |
|      | 6   | Push Rod  | DEX1008      |
|      | 7   | Audio Cable   | DKP3369      |
| NSP  | 8   | Polyethylene Bag<br>(235×320×0.03)  | Z21-018      |
|      | 9   | Master Carton (A03)   | DHG2149      |
|      | 10  | Mounting Screw  | AMZ30P060FMC |

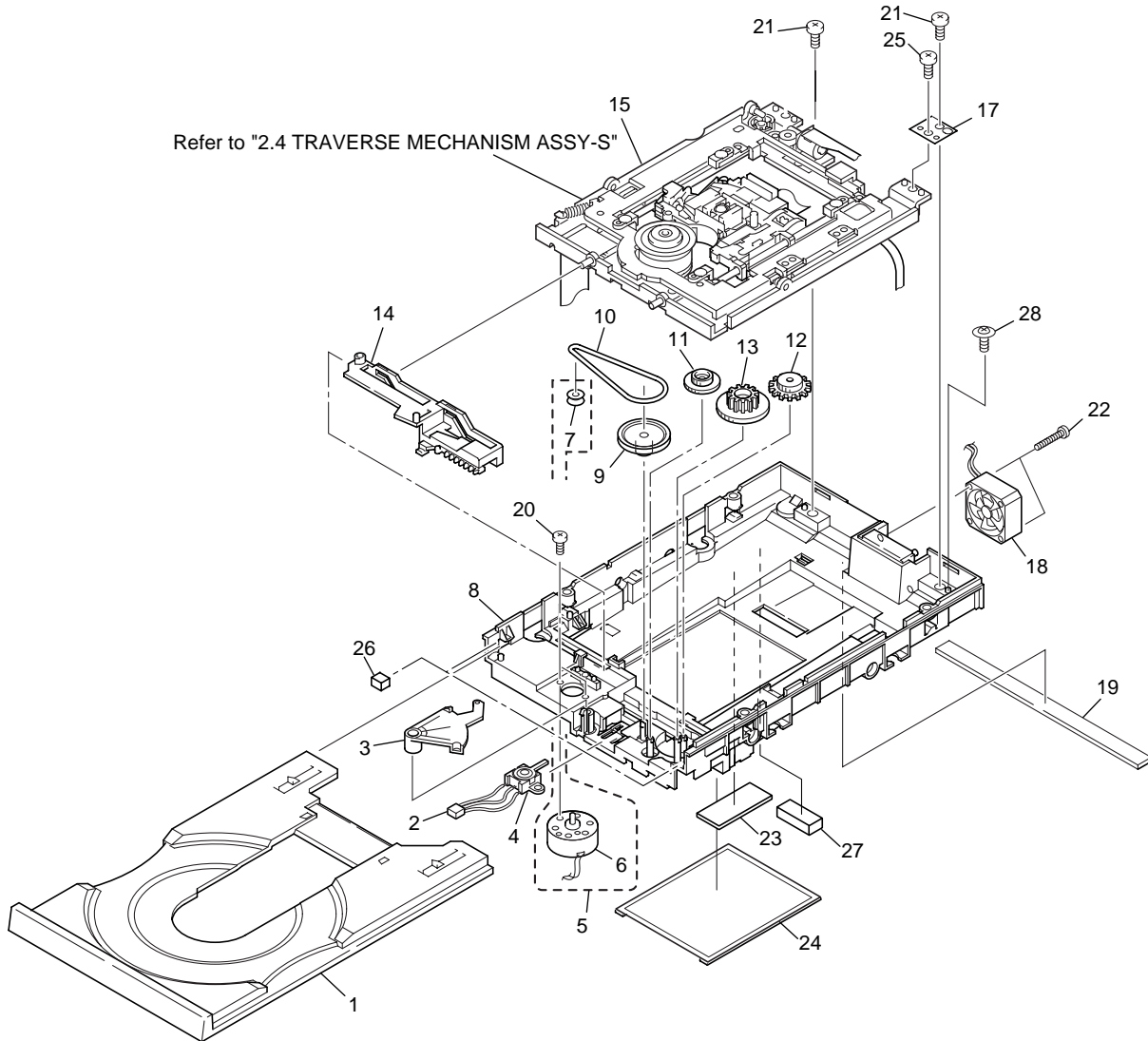
## 2.2 EXTERIOR (1/2) SECTION



### ● EXTERIOR (1/2) SECTION PARTS LIST

| Mark | No. | Description         | Part No. | Mark | No. | Description   | Part No.     |
|------|-----|---------------------|----------|------|-----|---------------|--------------|
|      | 1   | DVR ATAPI MAIN Assy | DWX2147  | NSP  | 18  | Model Label   | DRW2020      |
|      | 2   | Front Bezel R3      | DAH1977  |      | 19  | •••••         |              |
|      | 3   | Function Button R3  | DAC1966  |      | 20  | Sheet         | DEB1473      |
|      | 4   | Lens                | DAC1855  |      | 21  | Base Chassis  | DNC1549      |
|      | 5   | Front Door R3Z      | DAH2016  |      | 22  | Screw         | BMZ26P050FMC |
|      | 6   | Door Spring         | DBH1477  |      | 23  | Screw         | PMA26P040FMC |
|      | 7   | Shield Plate        | DNE1398  |      | 24  | Screw         | BPZ26P060FZK |
|      | 8   | Frame L             | DNB1084  |      | 25  | Screw         | DBA1154      |
|      | 9   | Frame R             | DNB1085  |      | 26  | Air Packing   | DEB1474      |
| NSP  | 10  | Label               | DRW2086  |      | 27  | Air Cushion   | DEB1488      |
|      | 11  | Floating Rubber     | DEB1466  |      | 28  | Spacer        | DEB1483      |
|      | 12  | Float Screw         | DBA1148  |      | 29  | Plate         | DNK3839      |
|      | 13  | Clamper             | DNK3829  |      | 30  | Screw         | DBA1159      |
|      | 14  | Clamper Yoke        | DNH2467  | NSP  | 31  | Label         | DRW2053      |
|      | 15  | Upper Clamper       | DNK3830  |      | 32  | 65 Label      | ARW7050      |
|      | 16  | Clamper Holder      | DNC1548  |      | 33  | Caution Label | DRW2069      |
|      | 17  | Bonnet              | DNC1550  |      | 34  | Sheet         | DEC2421      |
|      |     |                     |          |      | 35  | Stick Finger  | DNB1092      |

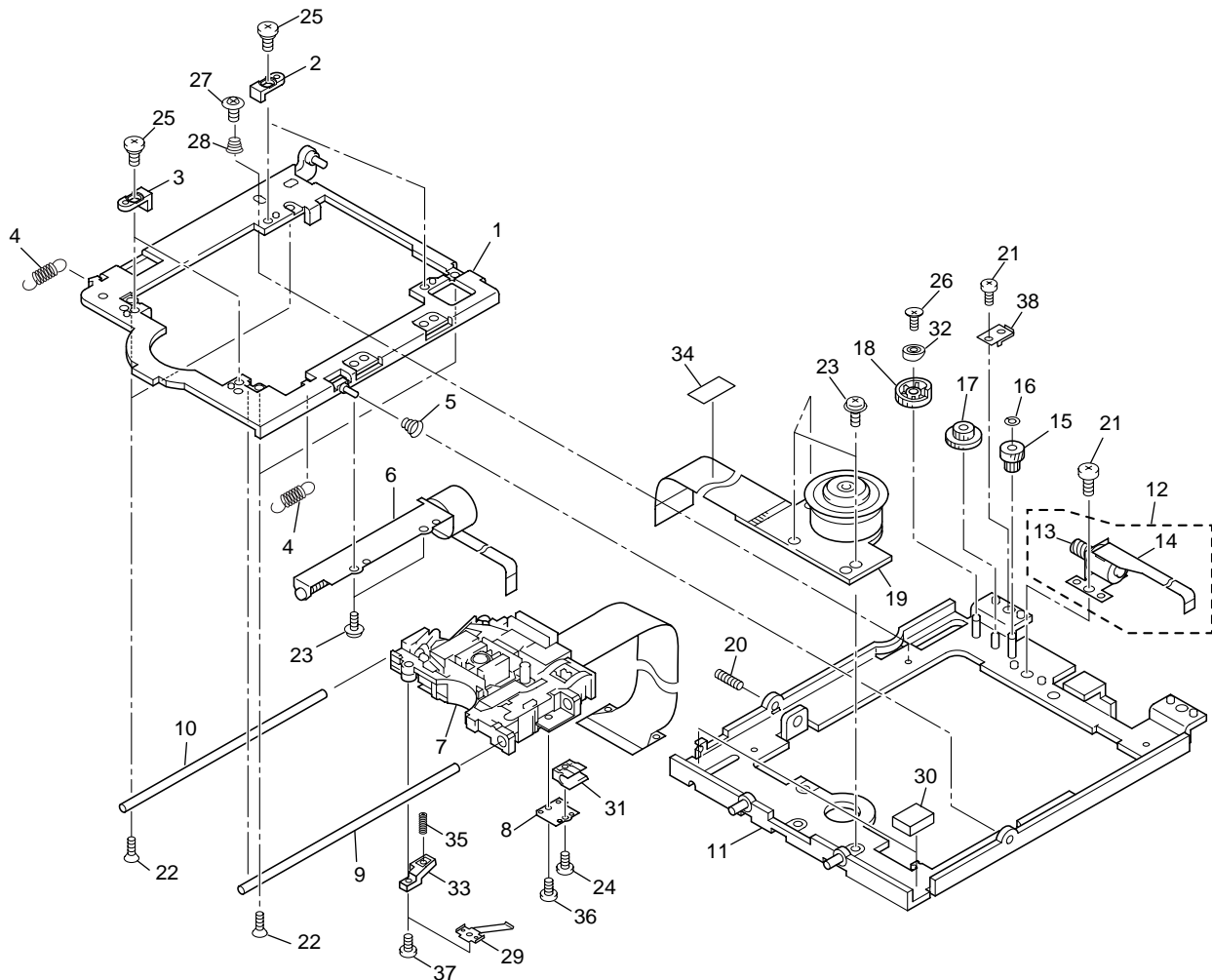
2.3 EXTERIOR (2/2) SECTION



● EXTERIOR (2/2) SECTION PARTS LIST

| Mark | No. | Description               | Part No. | Mark | No. | Description      | Part No.     |
|------|-----|---------------------------|----------|------|-----|------------------|--------------|
|      | 1   | Tray                      | DNK3812  |      | 16  | •••••            |              |
|      | 2   | Connector Assy (3P)       | DKP3544  |      | 17  | Plate            | DBK1208      |
|      | 3   | Eject Lever               | DNK3817  |      | 18  | Fan Motor (25mm) | DXM1123      |
|      | 4   | S Lever Switch            | DSK1001  |      | 19  | Packing          | DEB1474      |
|      | 5   | Loading Motor Assy        | DXX2491  |      | 20  | Screw            | JGZ17P030FMC |
| NSP  | 6   | Carriage Motor            | RXM1090  |      | 21  | Screw            | BPZ26P060FZK |
|      | 7   | Motor Pulley              | PNW1634  |      | 22  | Screw (2.6×16)   | DBA1153      |
|      | 8   | Loading Base              | DNK3811  |      | 23  | Air Cushion      | DEB1488      |
|      | 9   | Gear Pulley               | DNK3813  |      | 24  | Sheet (Rubber)   | DEC2411      |
|      | 10  | Rubber Belt               | DEB1465  |      | 25  | Screw            | BMZ26P060FMC |
|      | 11  | Gear A                    | DNK3814  |      | 26  | Spacer POR (T5)  | DEB1485      |
|      | 12  | Gear C                    | DNK3816  |      | 27  | Spacer           | DEB1482      |
|      | 13  | Gear B                    | DNK3815  |      | 28  | Screw            | VBA1034      |
|      | 14  | Clamp Cam                 | DNK3818  |      |     |                  |              |
|      | 15  | Traverse Mechanism Assy-S | DXX2498  |      |     |                  |              |

## 2.4 TRAVERSE MECHANISM ASSY-S



## ● TRAVERSE MECHANISM ASSY-S PARTS LIST

| Mark | No. | Description     | Part No.     | Mark | No. | Description     | Part No.     |
|------|-----|-----------------|--------------|------|-----|-----------------|--------------|
|      | 1   | Tilt Base       | DNH2466      |      | 21  | Screw           | BMZ26P040FMC |
|      | 2   | Stopper R       | DEB1469      |      | 22  | Screw           | CMZ20P050FMC |
|      | 3   | Stopper F       | DEB1471      |      | 23  | Screw           | PMA20P040FMC |
|      | 4   | Tilt Spring Y   | DBH1479      |      | 24  | Screw           | DBA1121      |
|      | 5   | Tilt Spring X   | DBH1478      |      | 25  | Screw           | DBA1149      |
|      | 6   | Stepping Motor  | DXM1151      |      | 26  | Tilt Screw      | DBA1157      |
| NSP  | 7   | Pickup Assy     | OWY8001      |      | 27  | Shoulder        | DBA1158      |
|      | 8   | Joint Spring    | DBK1196      |      | 28  | Tilt Spring Z   | DBH1482      |
|      | 9   | Main Shaft      | DLA1921      |      | 29  | Guide Spring    | DBK1195      |
|      | 10  | Sub Shaft       | DLA1923      |      | 30  | Cushion         | DEB1484      |
|      | 11  | Mecha Base      | DNH2465      | NSP  | 31  | Guide Blade     | DNK3721      |
|      | 12  | Tilt Motor Assy | DXX2492      |      | 32  | Cam Cover       | DNK3863      |
|      | 13  | Worm            | DNK3825      |      | 33  | Sub Guide       | DNS1217      |
|      | 14  | Tilt Motor      | DXM1152      | NSP  | 34  | Acetate Tape(F) | REH1008      |
|      | 15  | Tilt Gear A     | DNK3826      |      | 35  | TAN Screw       | VNL1761      |
|      | 16  | Washer          | WT21D040D050 |      | 36  | Screw           | PBZ20P040FMC |
|      | 17  | Tilt Gear B     | DNK3827      |      | 37  | Screw           | PBZ20P060FMC |
|      | 18  | Tilt Cam        | DNK3828      |      | 38  | Hold Plate      | DBK1198      |
|      | 19  | Spindle Motor   | DXM1150      |      |     |                 |              |
|      | 20  | Screw           | ZMR30H080FZK |      |     |                 |              |

# 3. BLOCKDIAGRAM AND SCHEMATIC DIAGRAM

## 3.1 BLOCK DIAGRAM

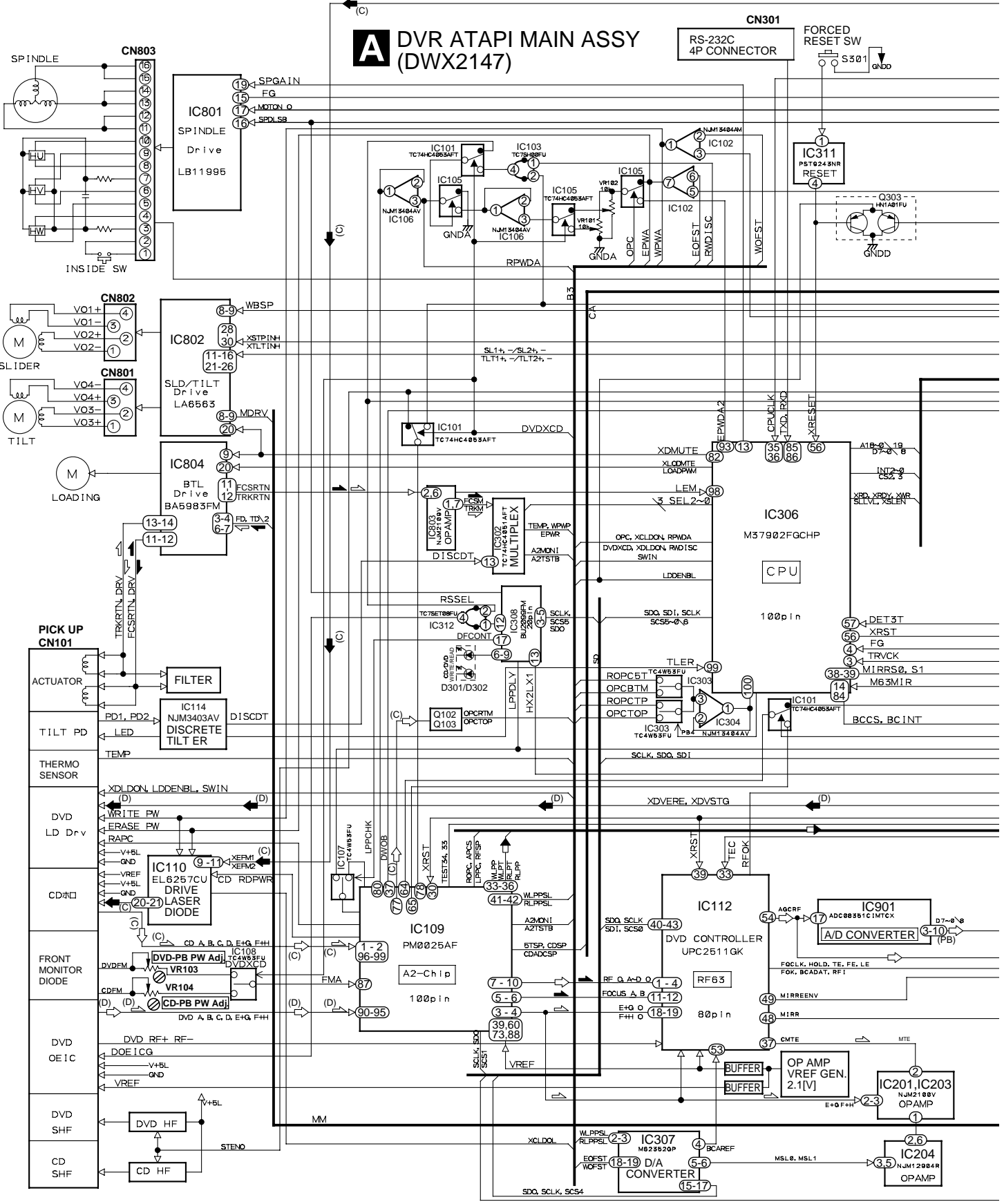
A

B

C

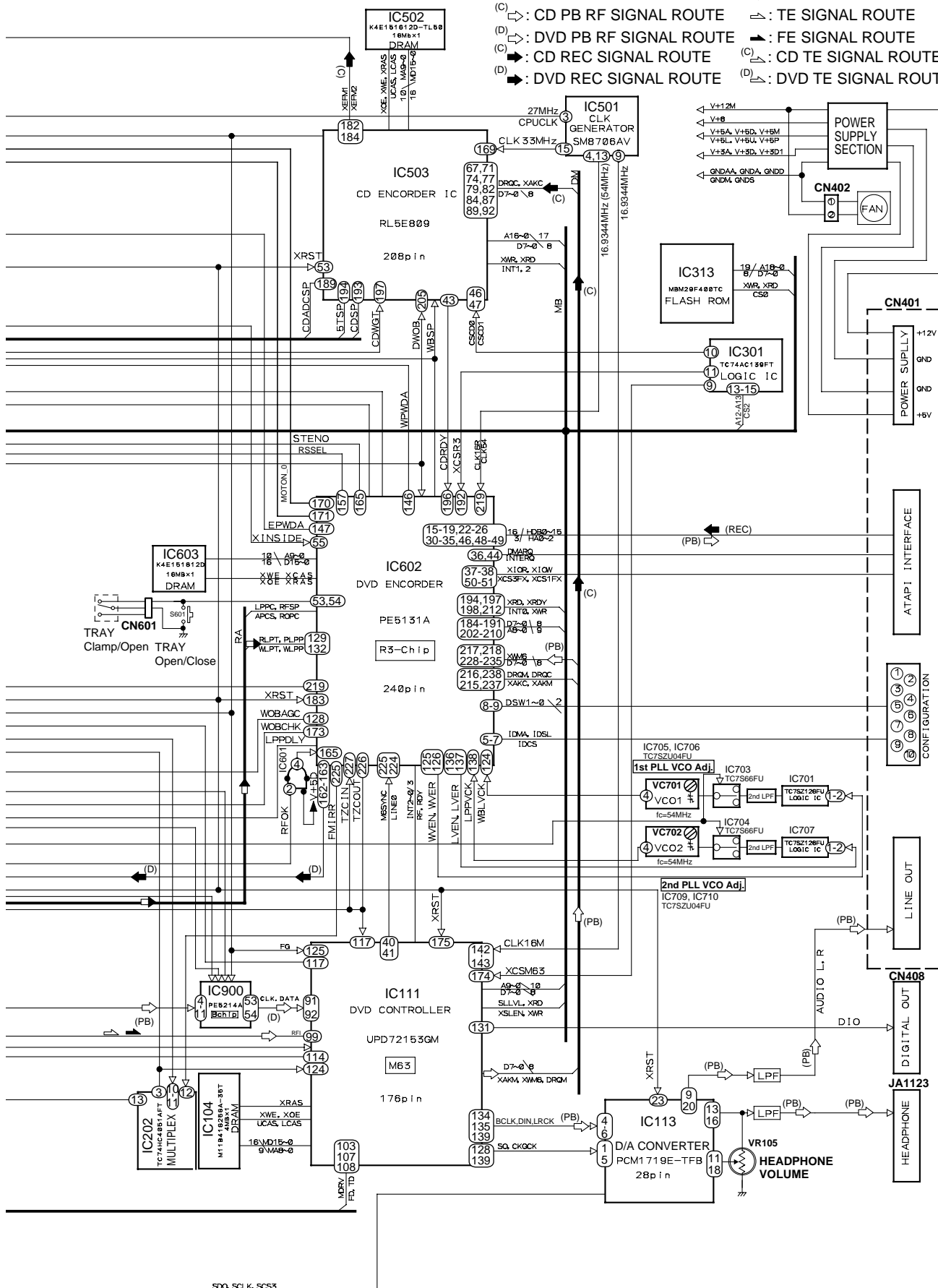
D

### A DVR ATAPI MAIN ASSY (DWX2147)





- (PB) ⇨ : PB SIGNAL ROUTE
- ⇨ : PB RF SIGNAL ROUTE
- (C) ⇨ : CD PB RF SIGNAL ROUTE
- (D) ⇨ : DVD PB RF SIGNAL ROUTE
- (C) ⇨ : CD REC SIGNAL ROUTE
- (D) ⇨ : DVD REC SIGNAL ROUTE
- ⇨ : LPP SIGNAL ROUTE
- ⇨ : TE SIGNAL ROUTE
- (C) ⇨ : CD TE SIGNAL ROUTE
- (D) ⇨ : DVD TE SIGNAL ROUTE



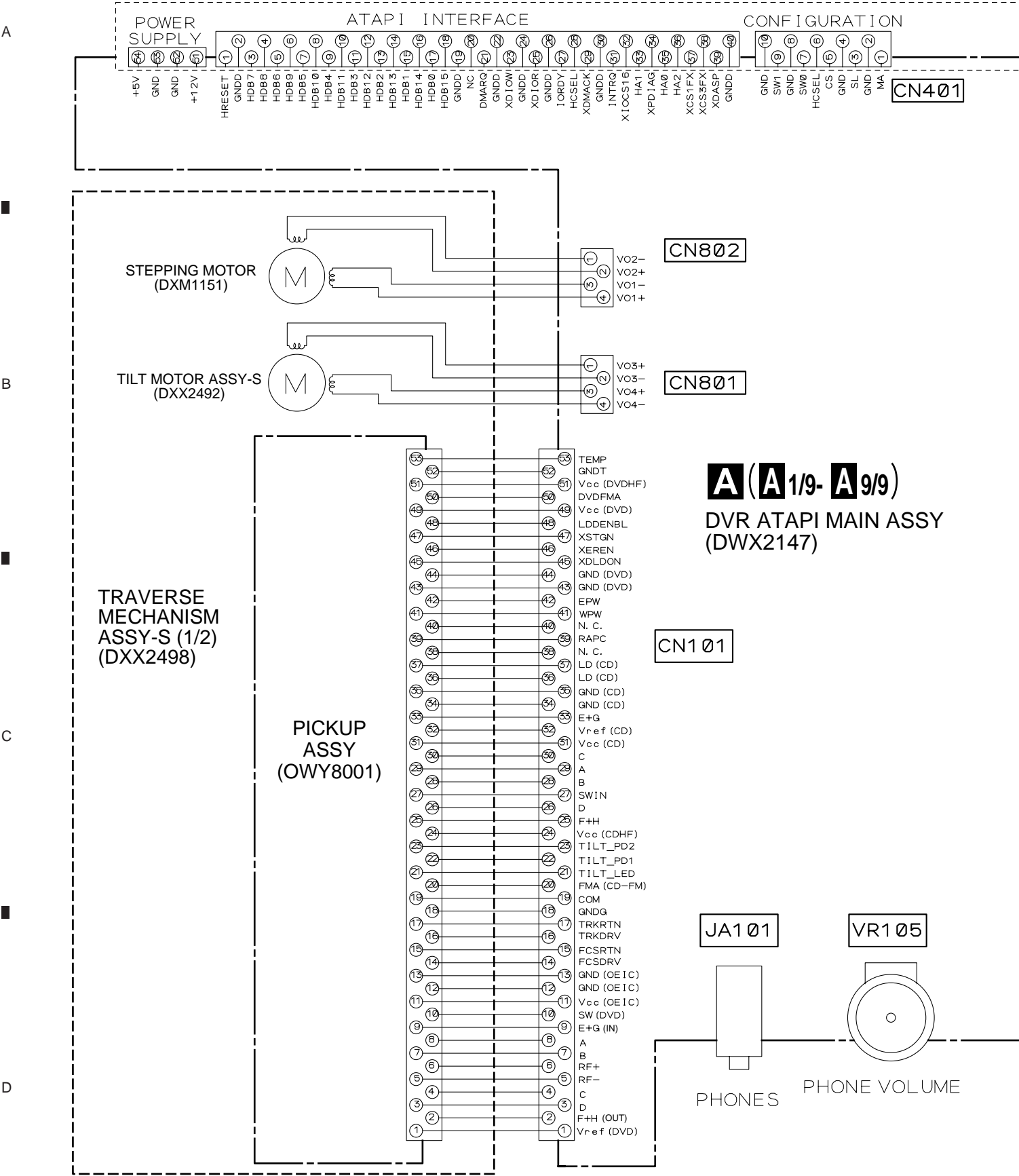
A

B

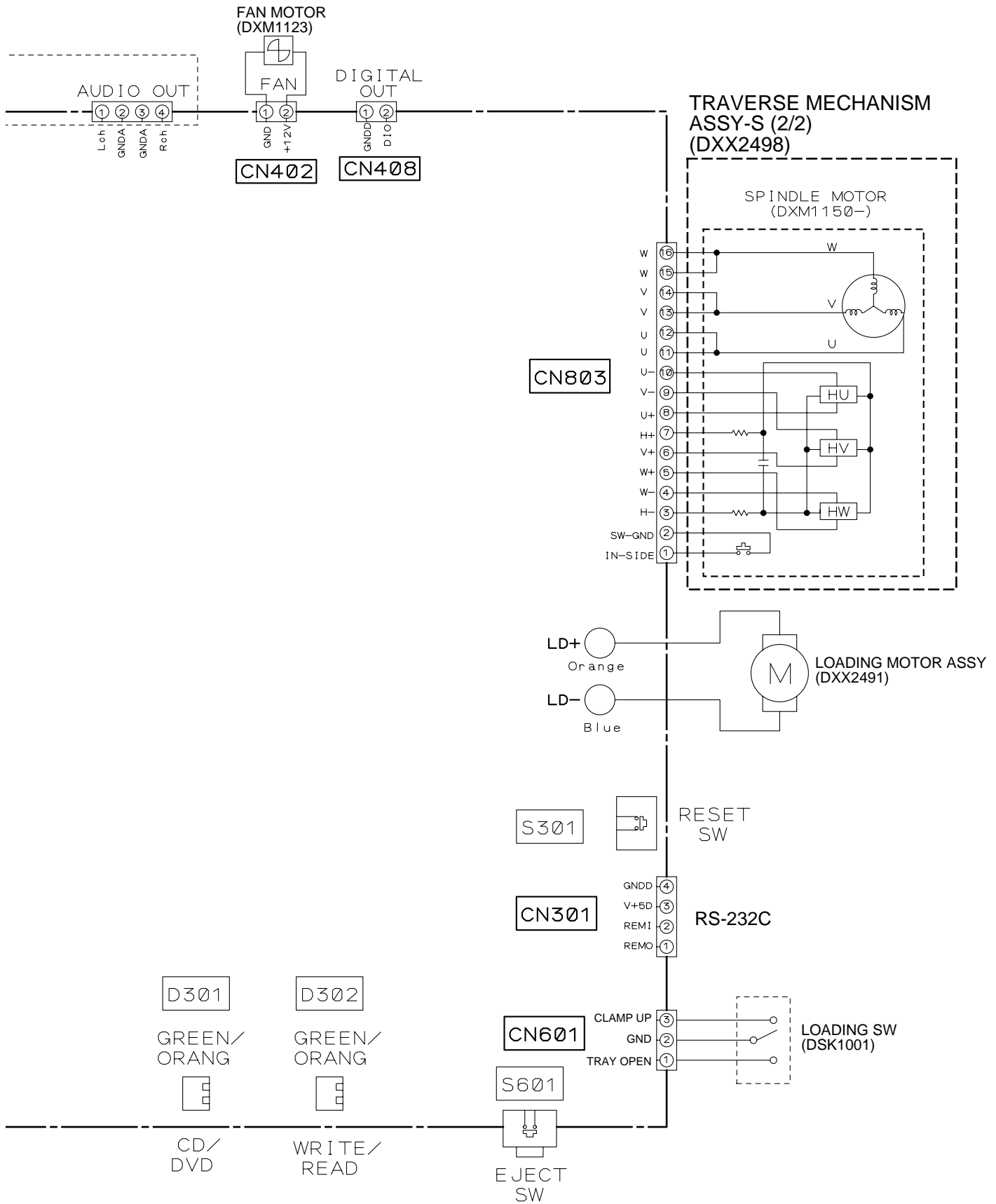
C

D

3.2 OVERALL WIRING DIAGRAM



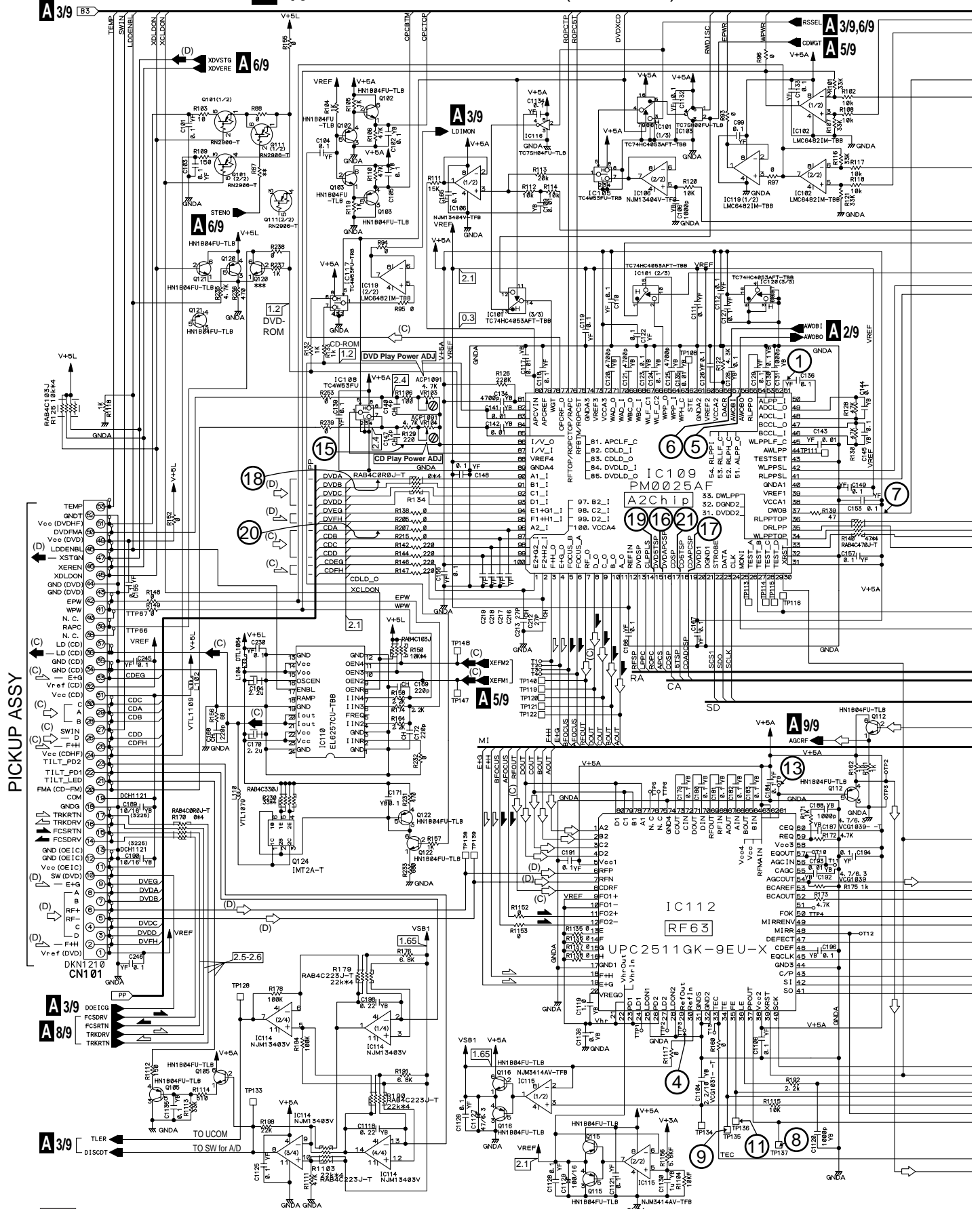
Note : When ordering service parts, be sure to refer to "EXPLODED VIEWS and PARTS LIST" or "PCB PARTS LIST".



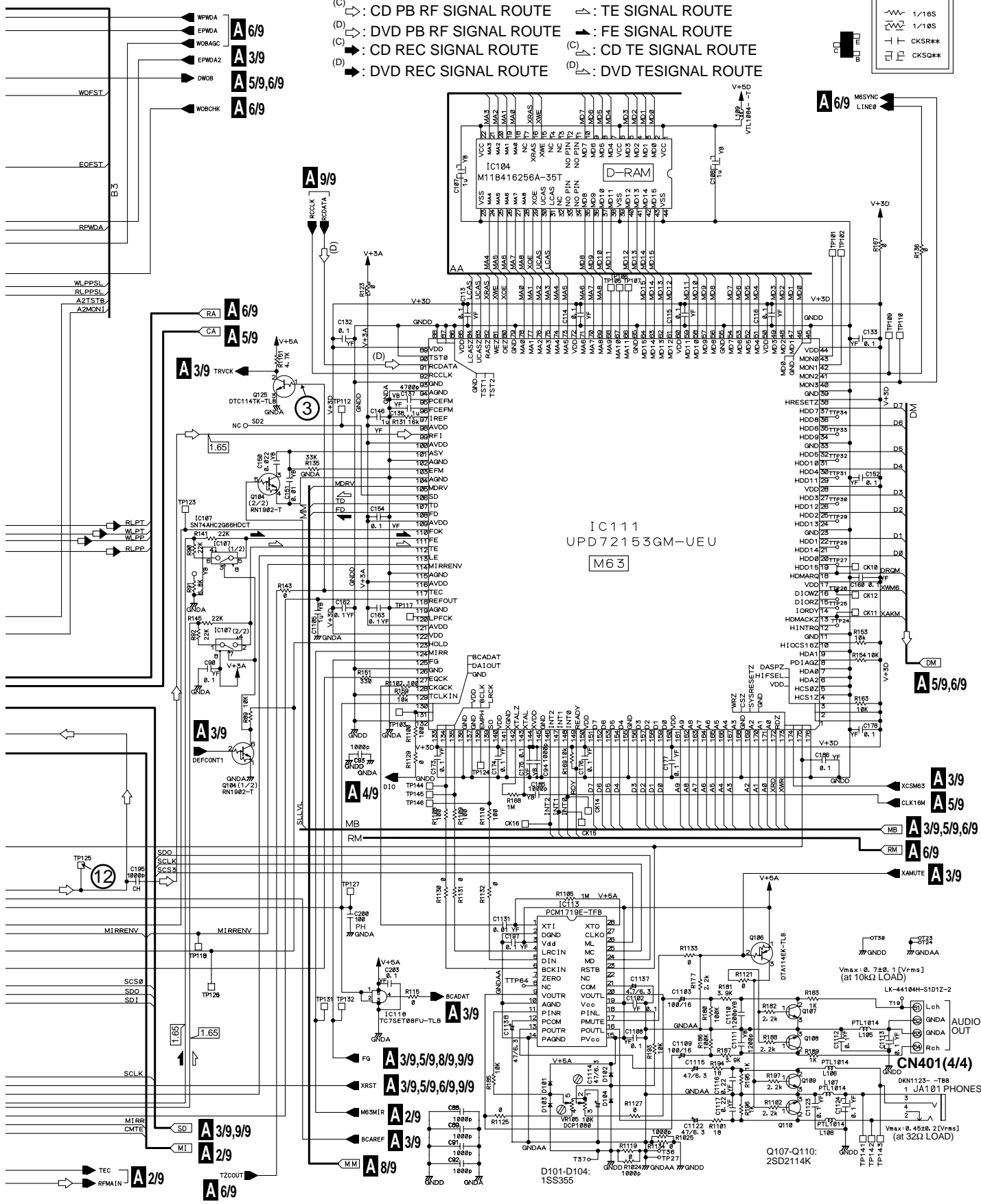
A  
B  
C  
D

3.3 DVR ATAPI MAIN ASSY (1/9)

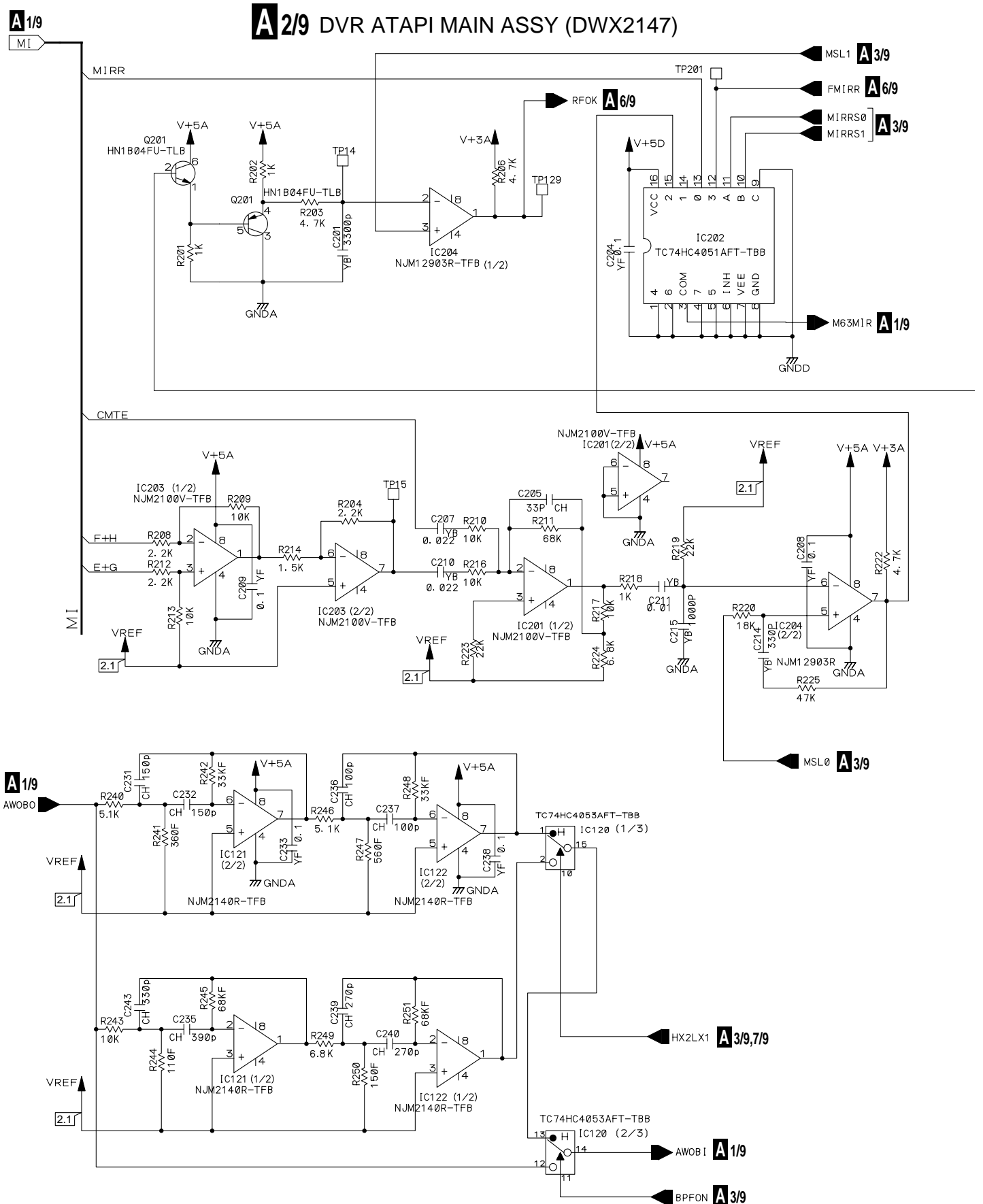
A 1/9 DVR ATAPI MAIN ASSY (DWX2147)



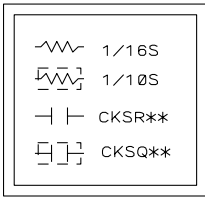
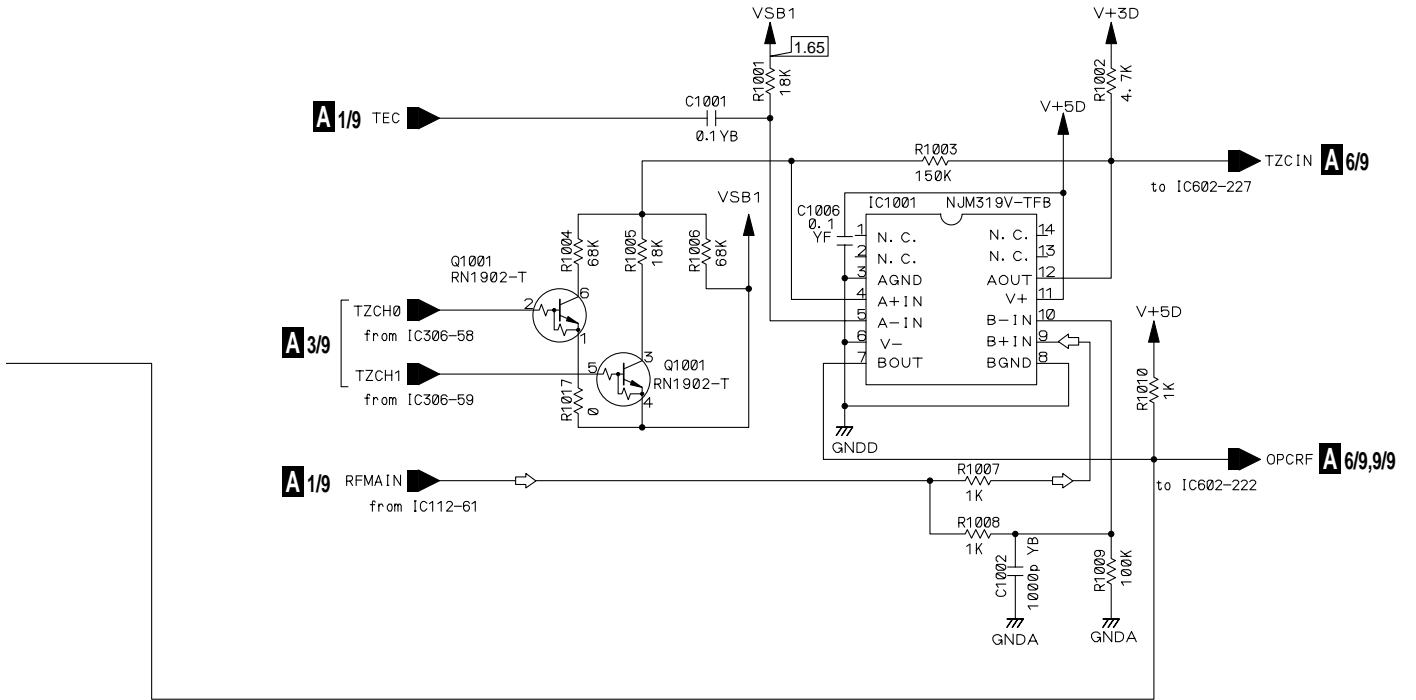
- ⇩ : PB RF SIGNAL ROUTE
- ⇩ (C) : CD PB RF SIGNAL ROUTE
- ⇩ (D) : DVD PB RF SIGNAL ROUTE
- ⇩ (C) : CD REC SIGNAL ROUTE
- ⇩ (D) : DVD REC SIGNAL ROUTE
- ⇨ : LPP SIGNAL ROUTE
- ⇨ (C) : TE SIGNAL ROUTE
- ⇨ (D) : FE SIGNAL ROUTE
- ⇨ (C) : CD TE SIGNAL ROUTE
- ⇨ (D) : DVD TESIGNAL ROUTE



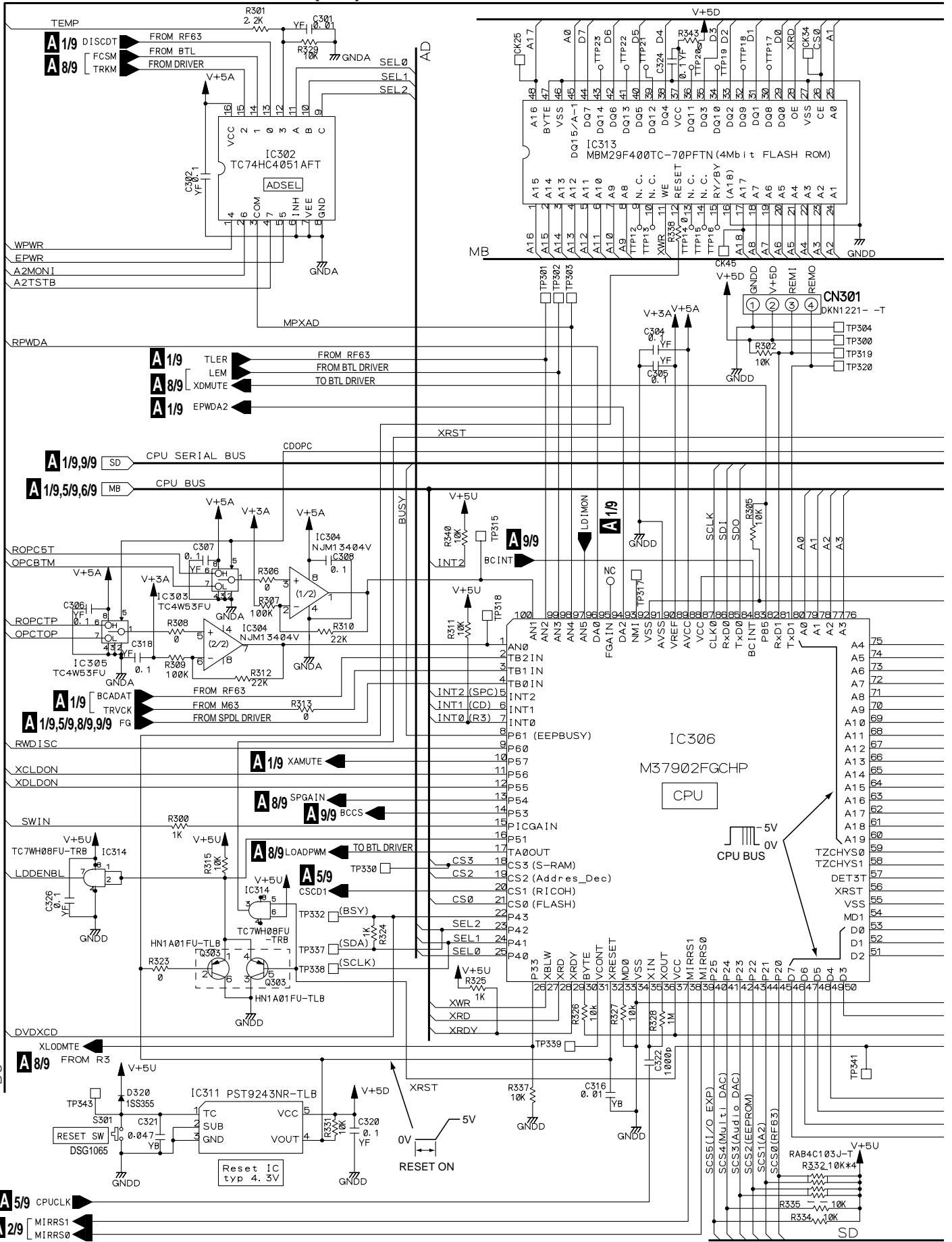
3.4 DVR ATAPI MAIN ASSY (2/9)



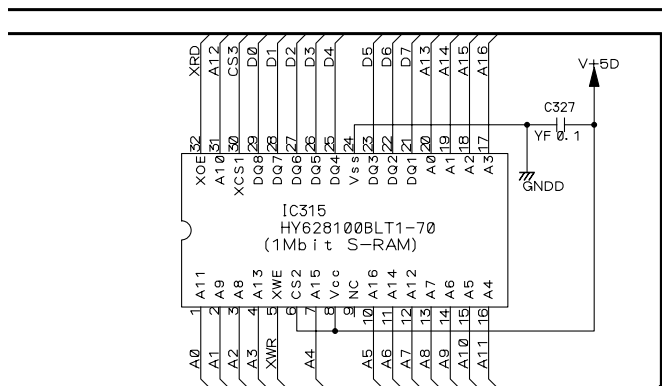
⇨: PB RF SIGNAL ROUTE



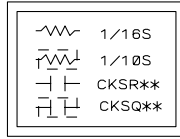
3.5 DVR ATAPI MAIN ASSY (3/9)





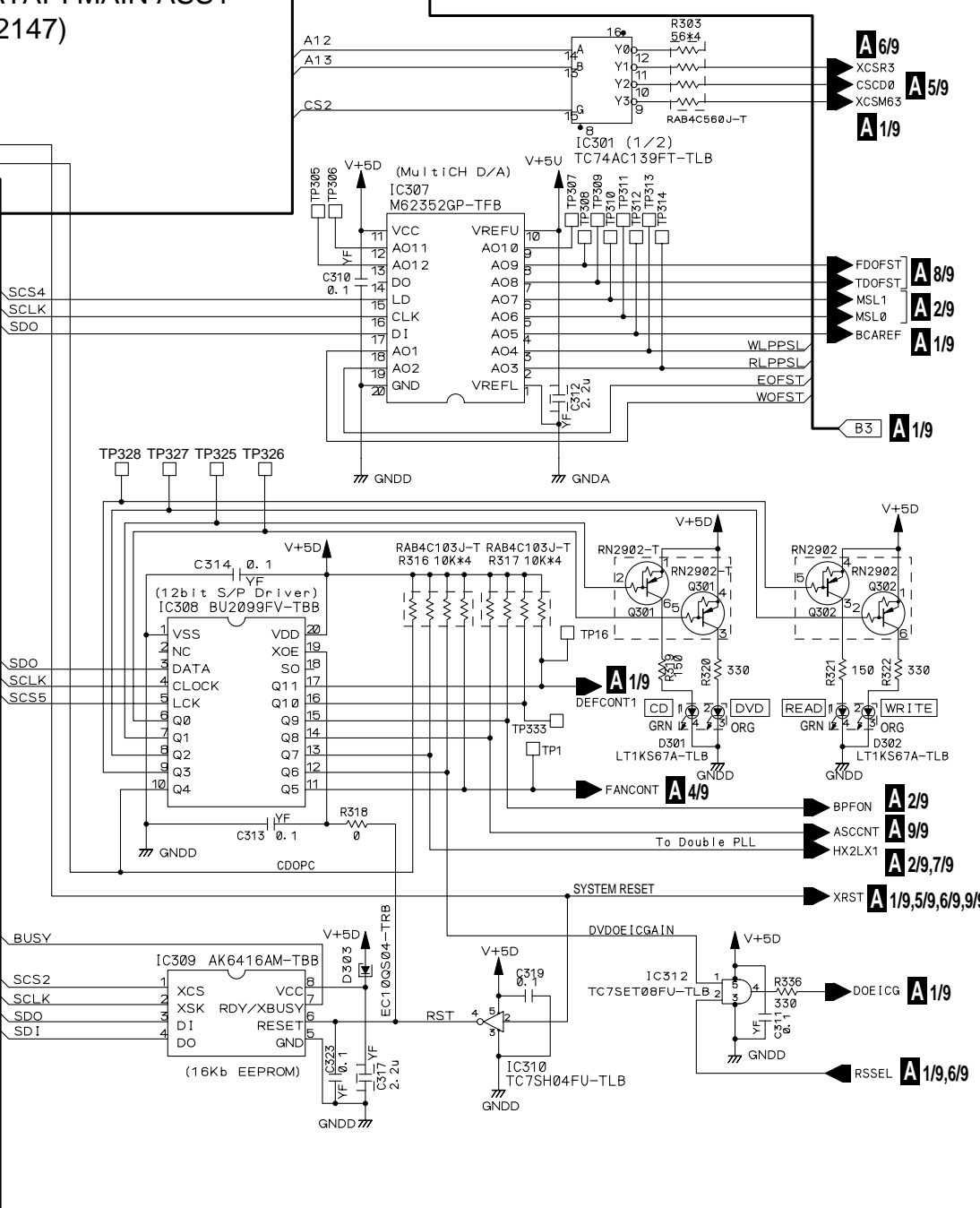
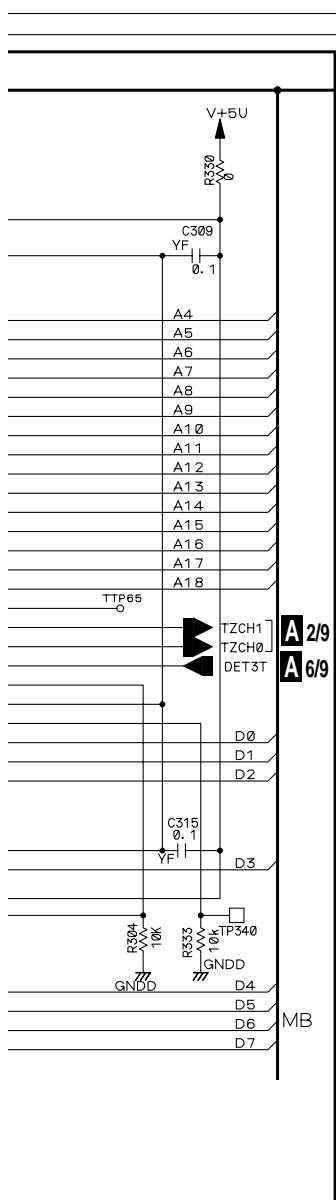
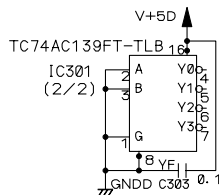


**A 3/9** DVR ATAPI MAIN ASSY  
(DWX2147)

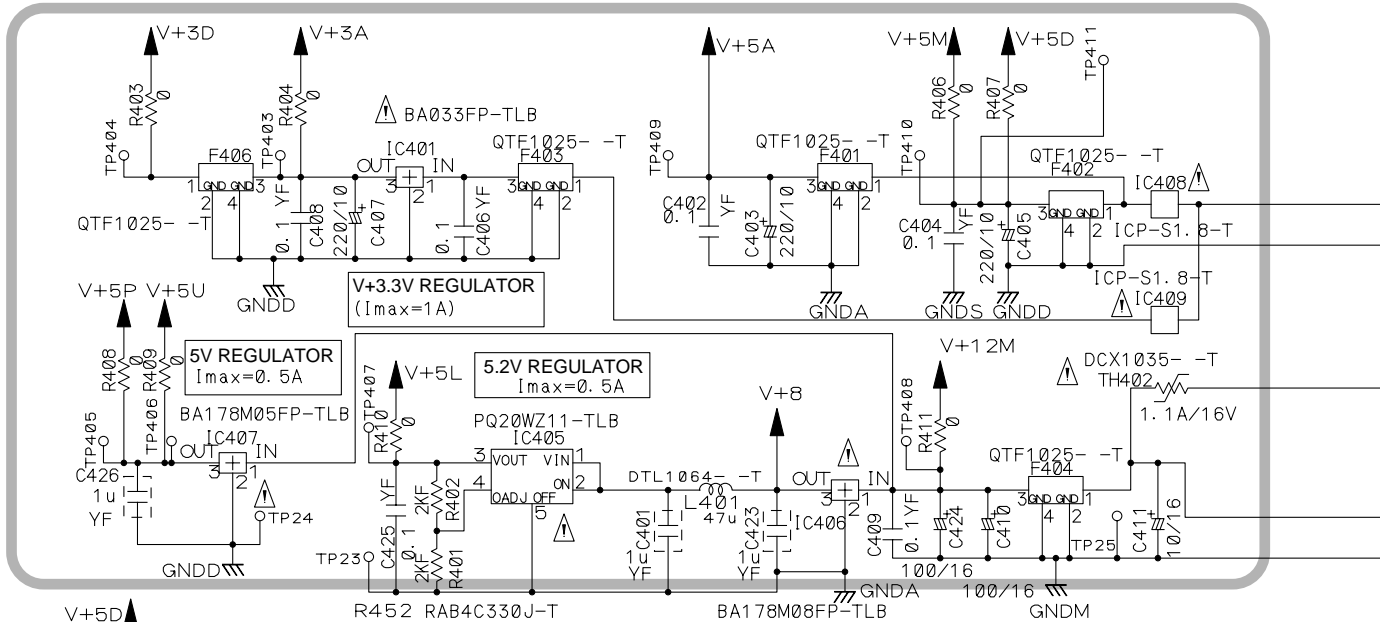


**IC307 (M62352GP)**

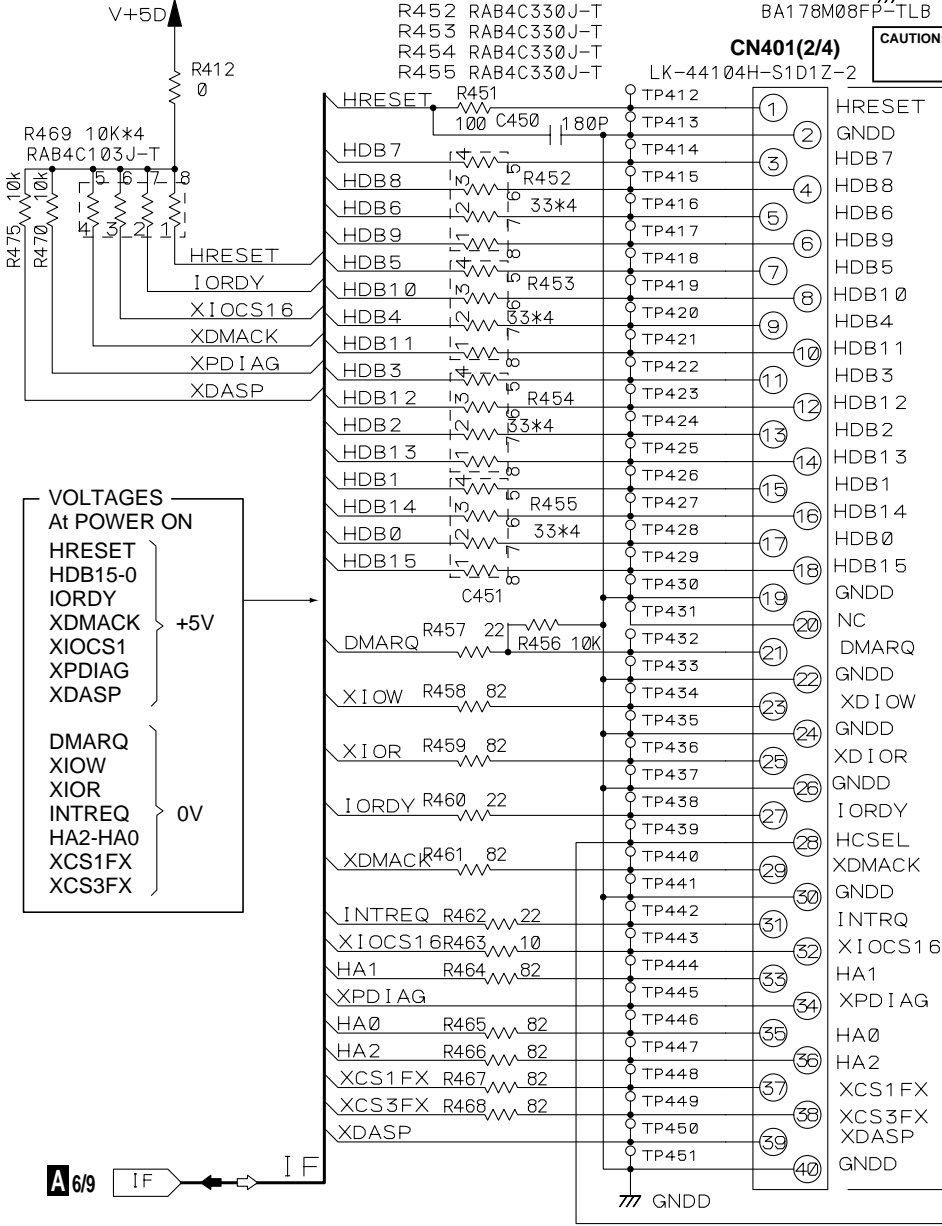
|    |        |                       |
|----|--------|-----------------------|
| 1  | WOFST  | WRITE POWER OFFSET    |
| 2  | EOFST  | ERASE POWER OFFSET    |
| 3  | RLPPSL | READ LPP SLICE LEVEL  |
| 4  | WLPPSL | WRITE LPP SLICE LEVEL |
| 5  | BCAREF | BCA REFERENCE LEVEL   |
| 6  | MSL0   | MIRR SLICE LEVEL 0    |
| 7  | MSL1   | MIRR SLICE LEVEL 1    |
| 8  | TD0FST | TD OFFSET             |
| 9  | FD0FST | FD OFFSET             |
| 10 |        |                       |
| 11 |        |                       |
| 12 |        |                       |



3.6 DVR ATAPI MAIN ASSY (4/9)

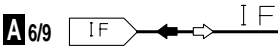


**CAUTION:** FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE ONLY WITH SAME TIME NO. ICP-S1.8. MFD BY ROHM CO., LTD. FOR IC408 and IC409.

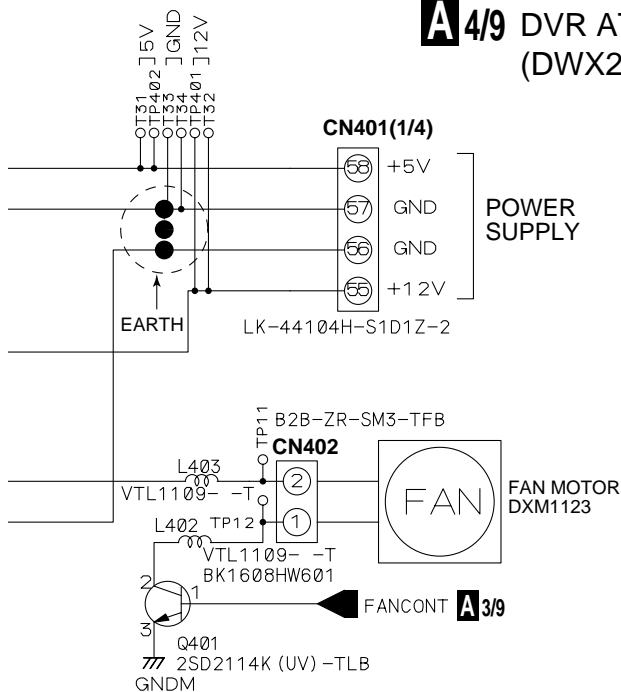


ATAPI INTERFACE

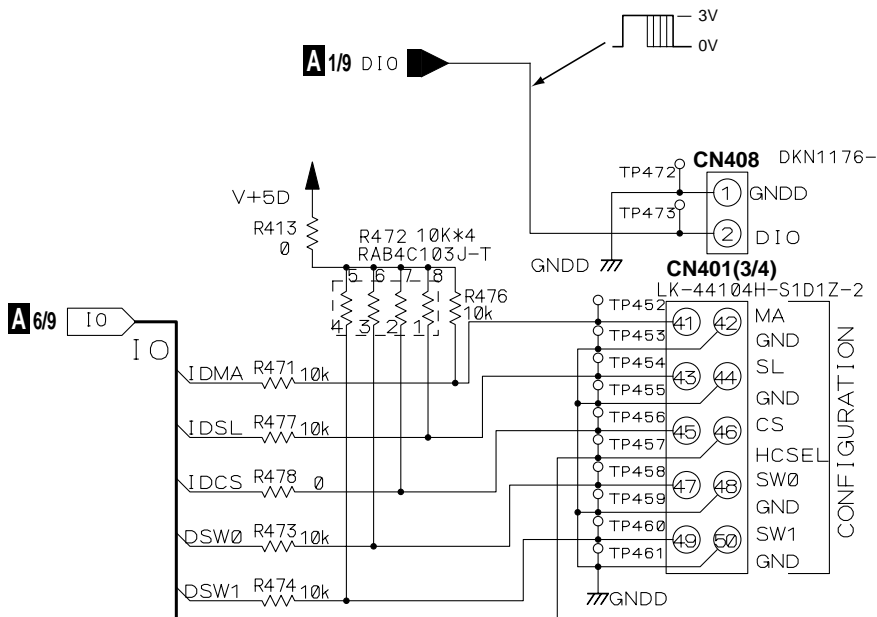
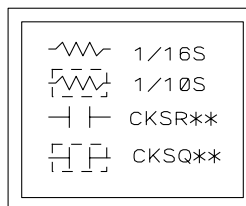
⇨: PB DATA SIGNAL ROUTE  
 ⇨: REC DATA SIGNAL ROUTE



### A 4/9 DVR ATAPI MAIN ASSY (DWX2147)



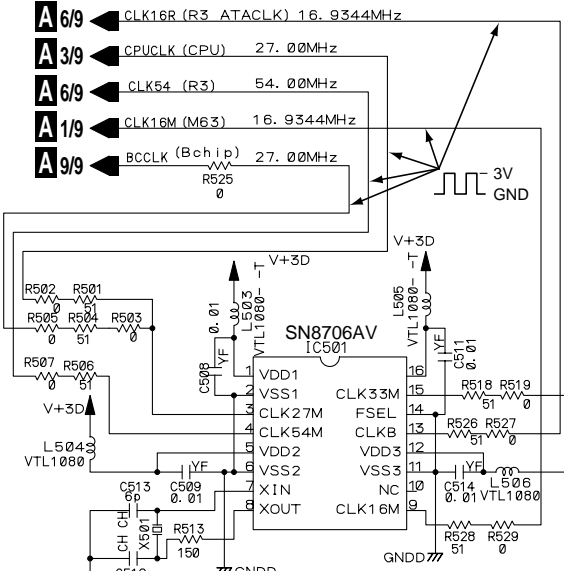
: The power supply is shown with the marked box.



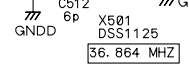
3.7 DVR ATAPI MAIN ASSY (5/9)

A 5/9 DVR ATAPI MAIN ASSY (DWX2147)

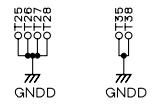
A



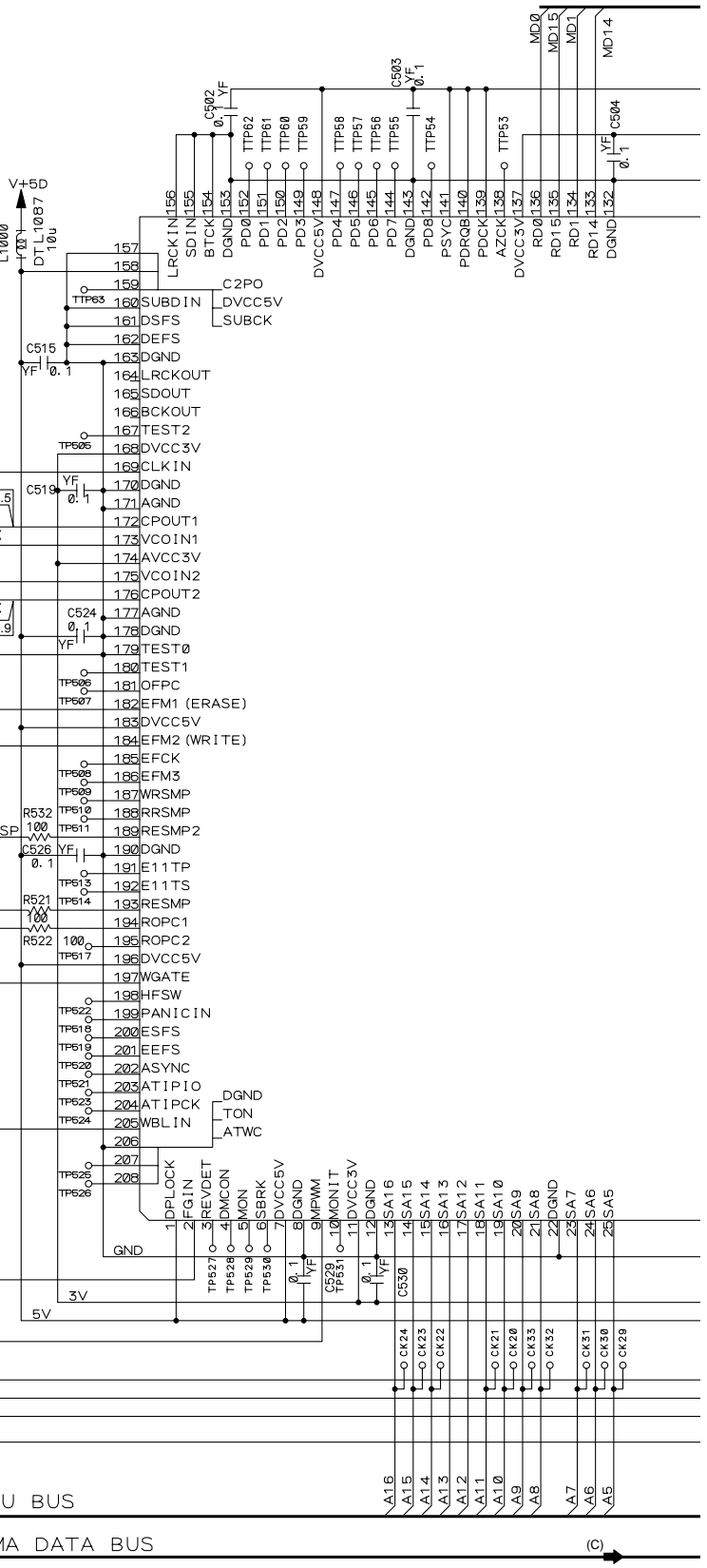
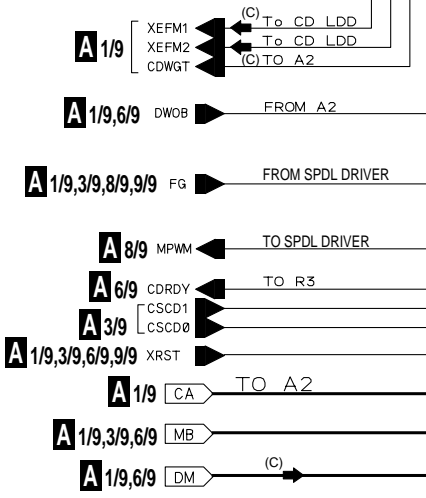
B



C

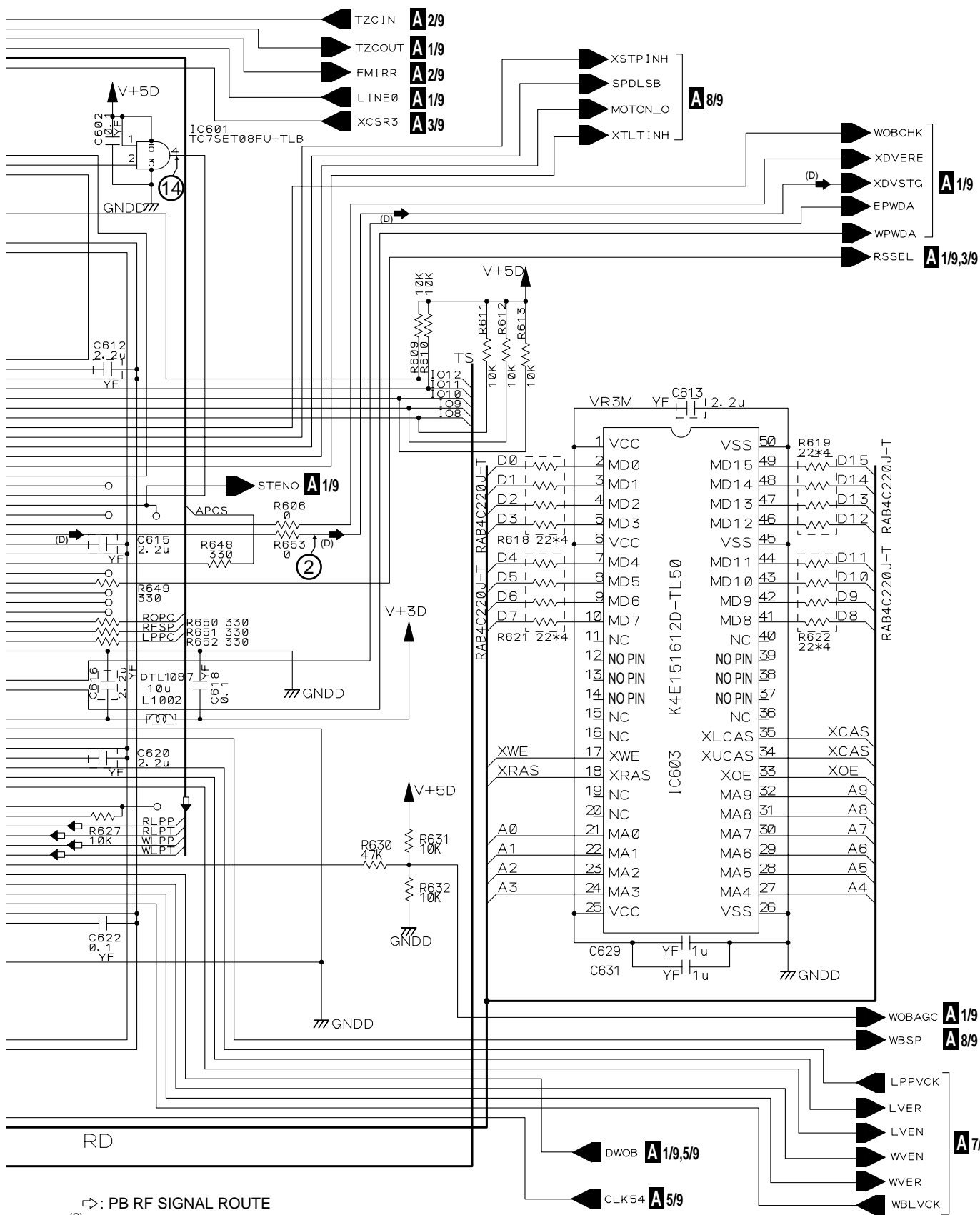


D





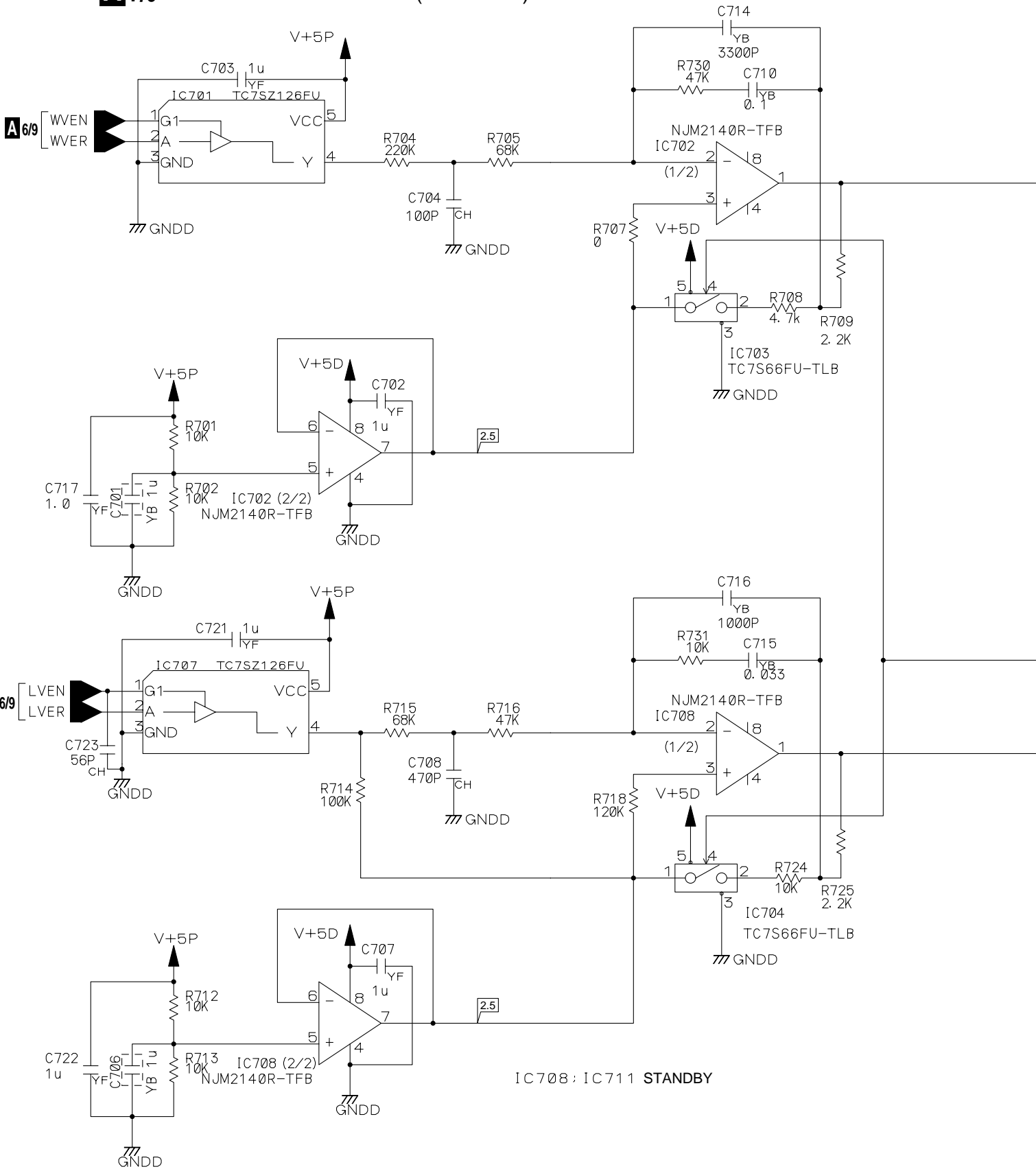




- (C) ⇨ PB RF SIGNAL ROUTE
- (D) ⇨ CD REC SIGNAL ROUTE
- (D) ⇨ DVD REC SIGNAL ROUTE
- ⇨ REC DATA SIGNAL ROUTE
- ⇨ LPP SIGNAL ROUTE

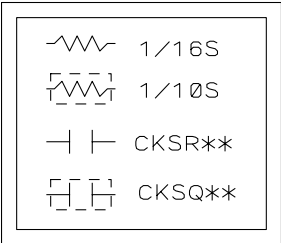
3.9 DVR ATAPI MAIN ASSY (7/9)

**A** 7/9 DVR ATAPI MAIN ASSY (DWX2147)



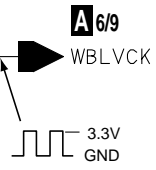
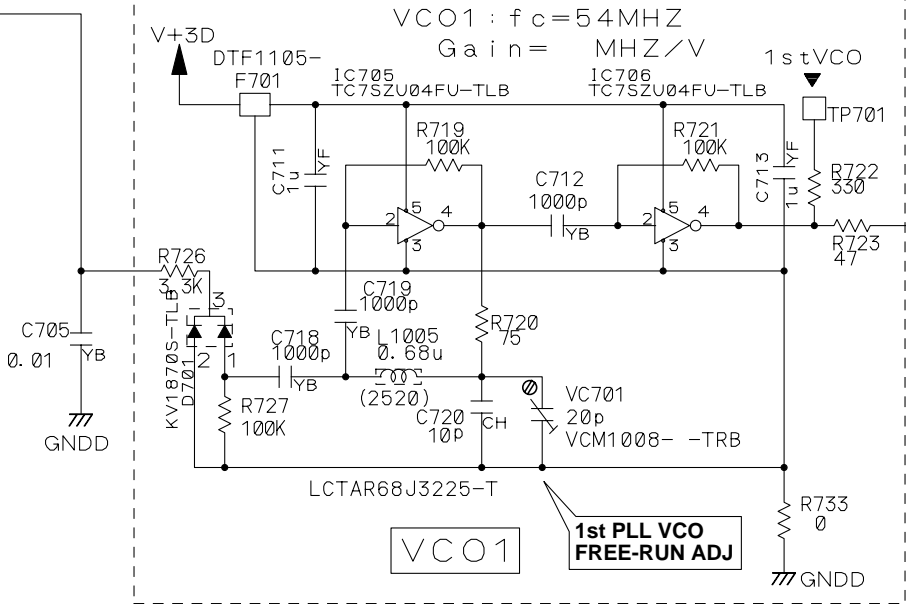


At POWER ON }  
 At CD-ROM PLAY } 0V  
 At CD-R/RW REC/PLAY }  
 At DVD-ROM PLAY } 2.5V  
 At DVD-R/RW REC/PLAY }



TP17  
 FOR FREE-RUN ADJ

R710  
 3.3K



FILTER CHECK  
 DOUBLE PLL

OT22  
 GNDD

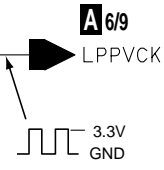
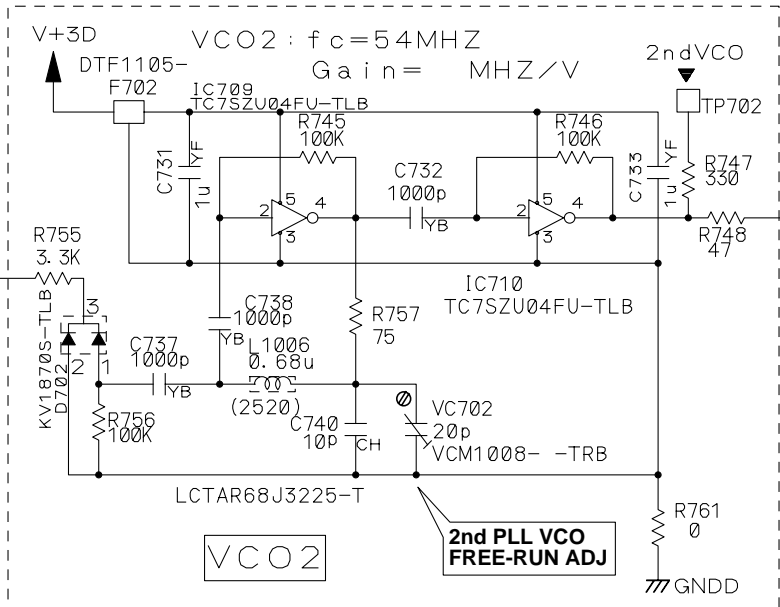
A 2/9,3/9

from S/P Dr HX2LX1

TP18  
 FOR FREE-RUN ADJ

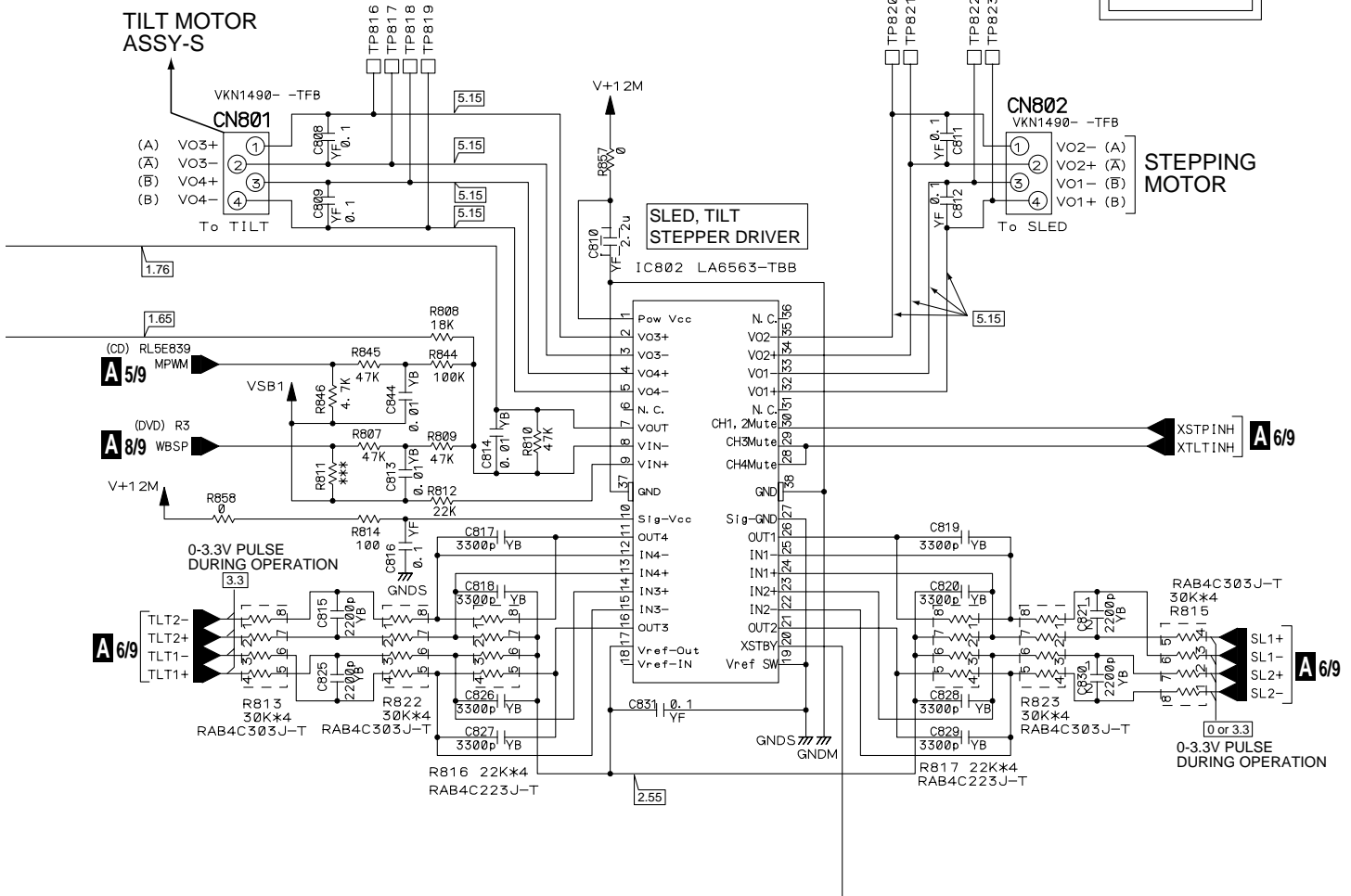
R728  
 3.3K

At POWER ON }  
 At CD-ROM PLAY } 0V  
 At CD-R/RW REC/PLAY }  
 At DVD-ROM PLAY } 2.5V  
 At DVD-R/RW REC/PLAY }



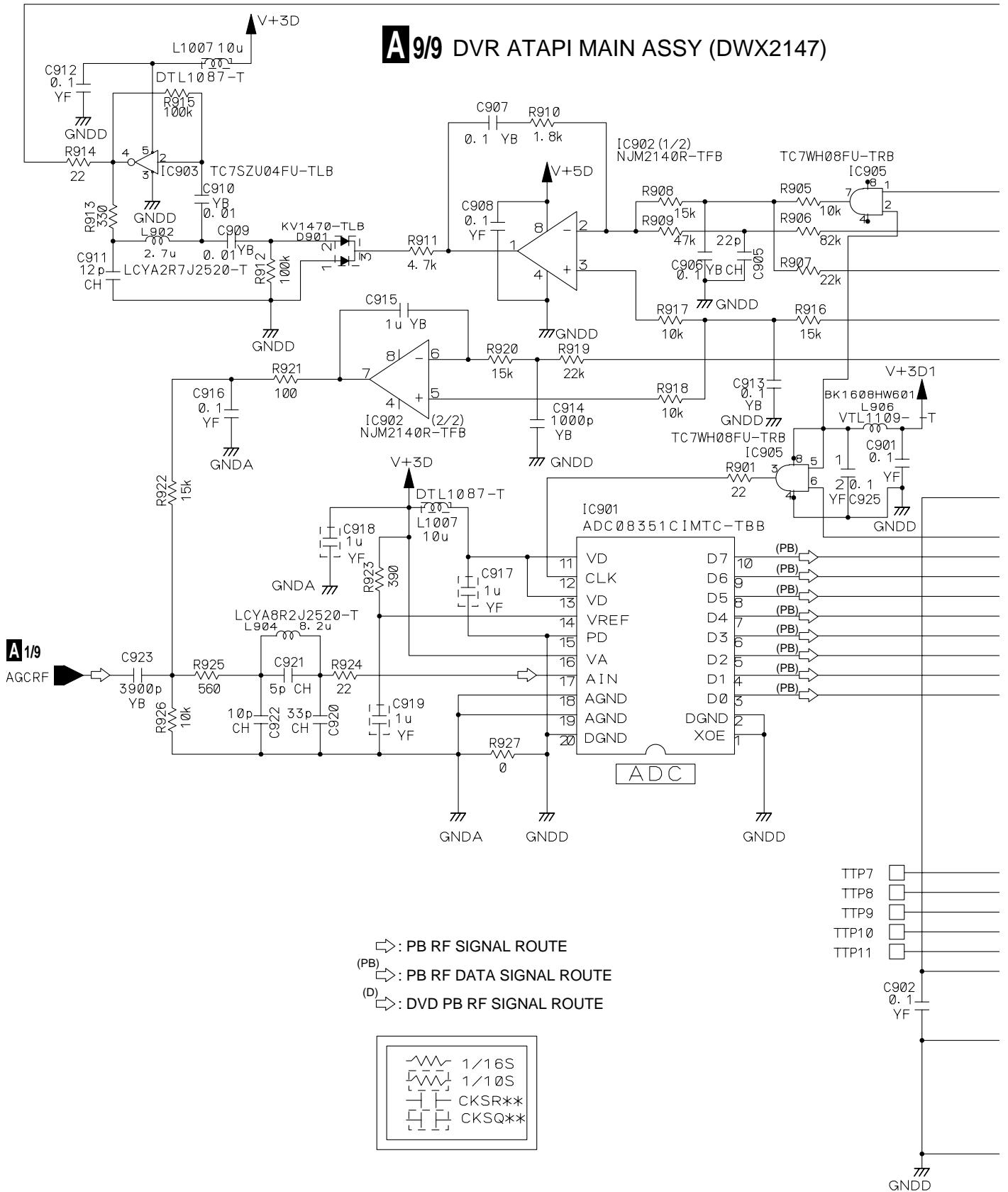


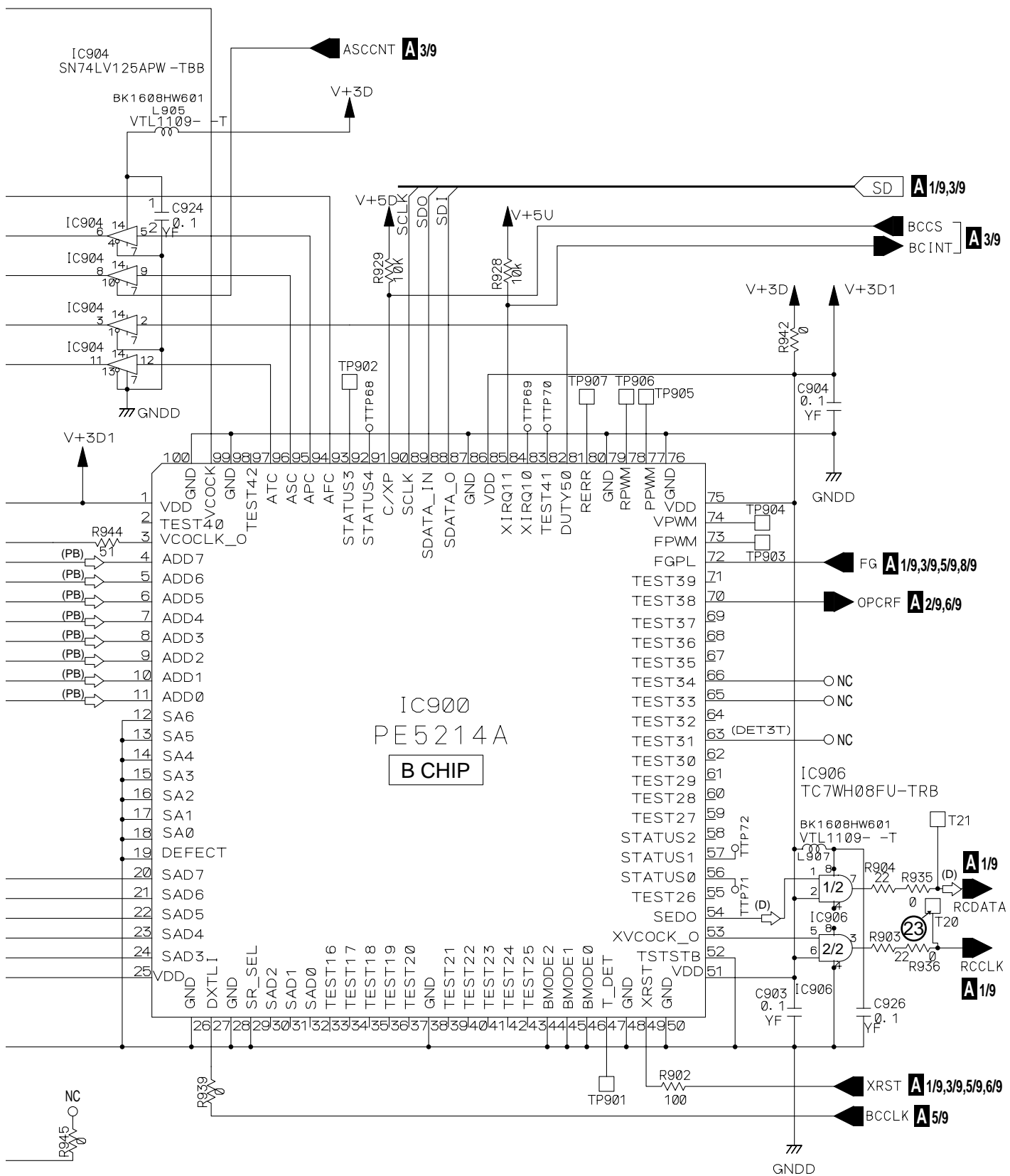
# A 8/9 DVR ATAPI MAIN ASSY (DWX2147)



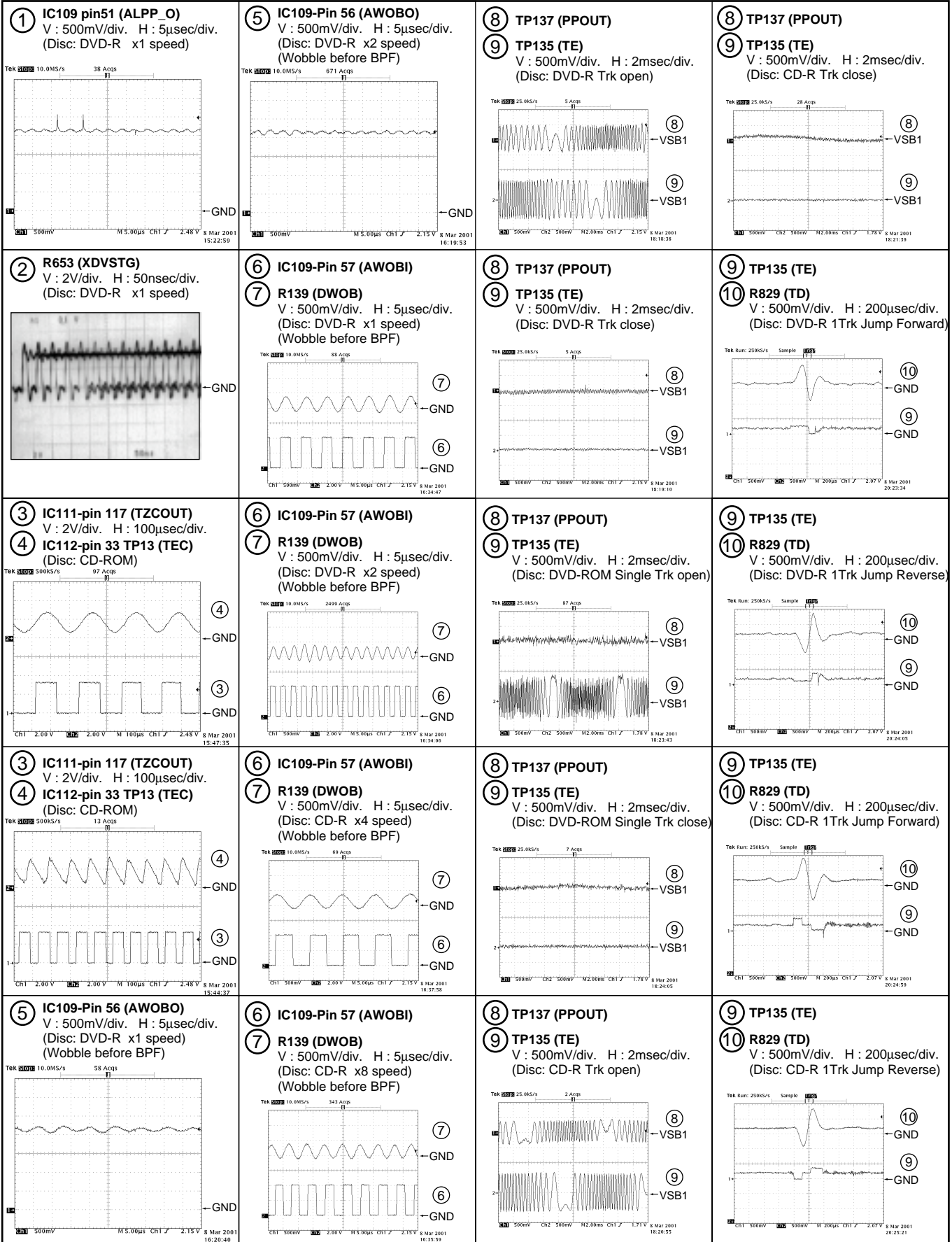
3.11 DVR ATAPI MAIN ASSY (9/9)

**A** 9/9 DVR ATAPI MAIN ASSY (DWX2147)

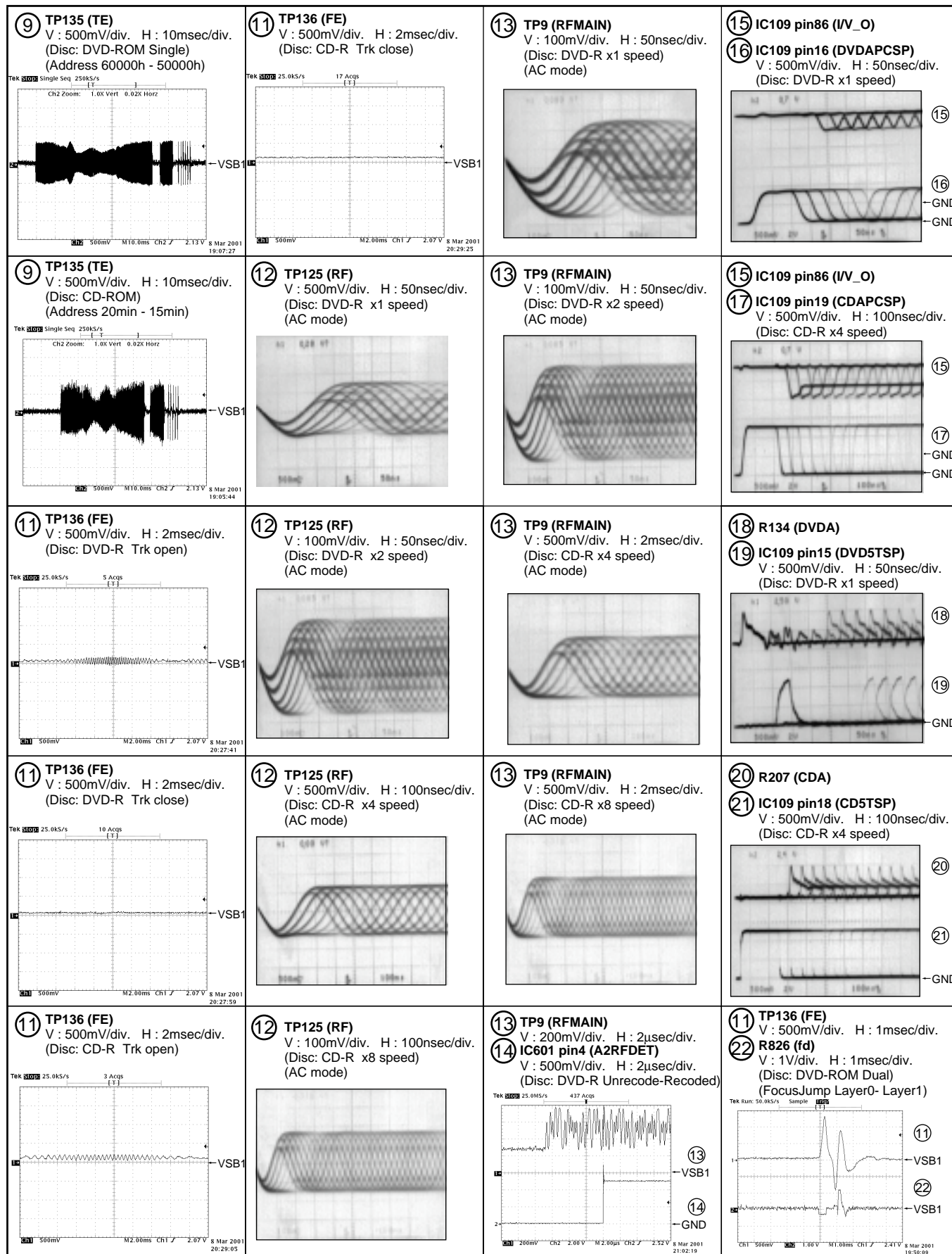




● Waveforms (1/3)

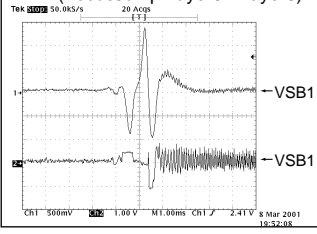


● Waveforms (2/3)

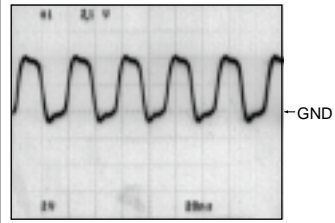


● Waveforms (3/3)

① TP136 (FE)  
V : 500mV/div. H : 1msec/div.  
② R826 (FD)  
V : 1V/div. H : 1msec/div.  
(Disc: DVD-ROM Dual)  
(FocusJump Layer0 - Layer0)



③ TP20 (PCCLK)  
V : 2V/div. H : 20msec/div.  
(Disc: DVD-R x1 speed)


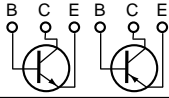

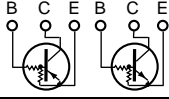

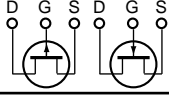

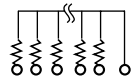






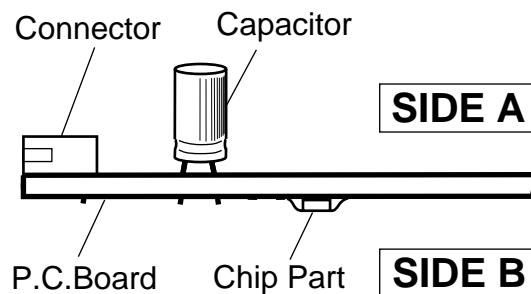
# 4. PCB CONNECTION DIAGRAM

## NOTE FOR PCB DIAGRAMS :

1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

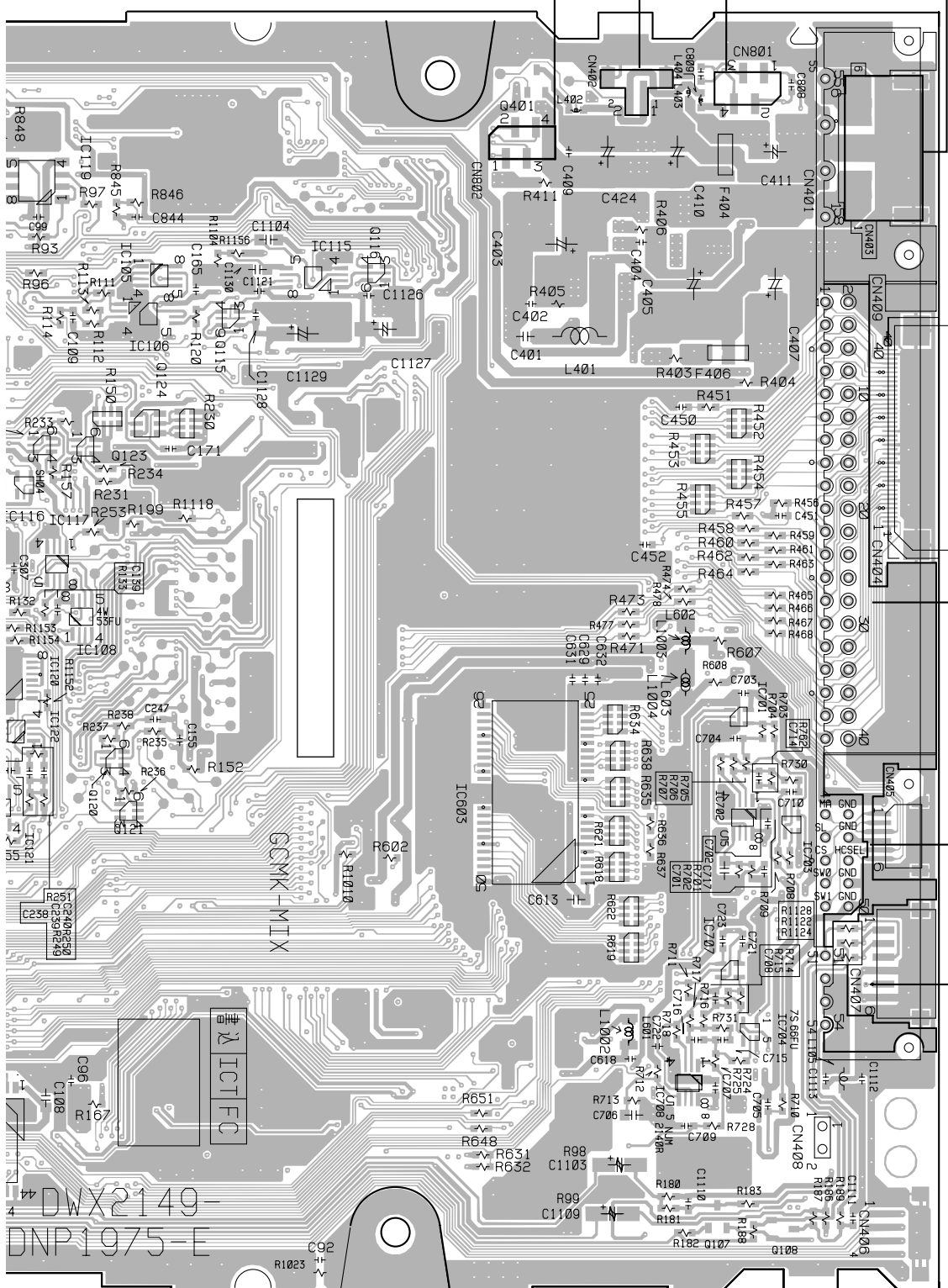
| Symbol In PCB Diagrams  | Symbol In Schematic Diagrams  | Part Name                |
|---|---|--------------------------|
|  |  | Transistor               |
|  |  | Transistor with resistor |
|  |  | Field effect transistor  |
|  |  | Resistor array           |
|  |  | 3-terminal regulator     |

3. The parts mounted on this PCB include all necessary parts for several destinations.  
For further information for respective destinations, be sure to check with the schematic diagram.
4. View point of PCB diagrams.





STEPPING MOTOR FAN MOTOR TILT MOTOR POWER SUPPLY



DWX2149-DNP1975-E

ATAPI INTERFACE SIDE A

CONFIGURATION

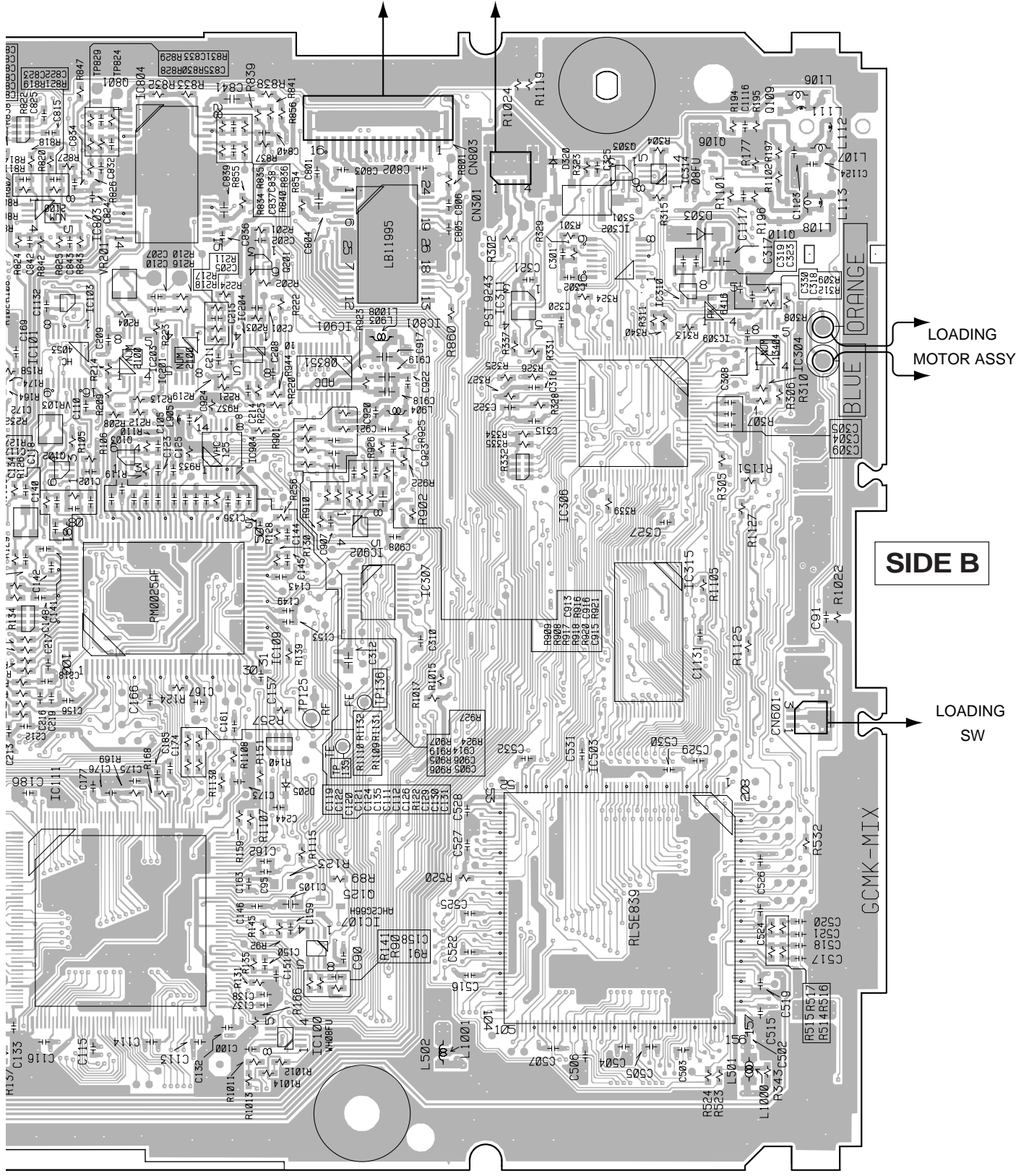
AUDIO OUT

|       |       |       |       |             |
|-------|-------|-------|-------|-------------|
| IC119 | IC105 | Q116  | Q401  | (DNP1975-E) |
| Q122  | Q123  | IC106 | Q115  |             |
| IC116 |       |       |       |             |
| IC305 | IC117 | IC105 | Q401  | IC701       |
|       | IC108 | IC106 | IC603 | IC702       |
| IC122 | Q120  |       |       | IC707       |
| C121  | Q121  |       |       | IC704       |
|       |       |       |       | IC708       |





SPINDLE MOTOR      ADJ.JIG



|       |       |       |       |       |       |       |       |             |
|-------|-------|-------|-------|-------|-------|-------|-------|-------------|
| IC803 | Q801  | IC804 |       |       | IC314 | Q106  | Q109  | (DNP1975-E) |
| IC101 | VR201 | IC201 | IC204 | IC311 | IC302 | IC310 | IC309 | IC304       |
| VR103 | Q103  | IC904 |       |       | IC306 |       |       |             |
| R104  | Q102  | IC111 | IC109 | Q125  | IC503 | IC315 |       |             |
|       |       | IC107 | IC307 | IC100 |       |       |       |             |



# 5. PCB PARTS LIST

- NOTES: ●Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.  
 ●The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.  
 ●When ordering resistors, first convert resistance values into code form as shown in the following examples.  
 Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω → 56 × 10<sup>1</sup> → 561 ..... RD1/4PU 5 6 1 J  
 47k Ω → 47 × 10<sup>3</sup> → 473 ..... RD1/4PU 4 7 3 J  
 0.5 Ω → R50 ..... RN2H R 5 0 K  
 1 Ω → 1R0 ..... RS1P 1 R 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).  
 5.62k Ω → 562 × 10<sup>1</sup> → 5621 ..... RN1/4PC 5 6 2 1 F

| Mark | No. | Description | Part No. | Mark | No. | Description | Part No. |
|------|-----|-------------|----------|------|-----|-------------|----------|
|------|-----|-------------|----------|------|-----|-------------|----------|

## LIST OF ASSEMBLIES

DVR ATAPI MAIN ASSY DWX2147

## A DVR ATAPI MAIN ASSY SEMICONDUCTORS

|   |                                   |                    |
|---|-----------------------------------|--------------------|
|   | IC901                             | ADC08351CIMTC      |
|   | IC309                             | AK6416AM           |
| △ | IC401                             | BA033FP            |
| △ | IC407                             | BA178M05FP         |
| △ | IC406                             | BA178M08FP         |
|   | IC804                             | BA5983FM           |
|   | IC308                             | BU2099FV           |
|   | IC315                             | HY628100BLT1-70    |
| △ | IC408, IC409 (1.8A /50V)          | ICP-S1.8           |
|   | IC502, IC603                      | K4E151612D-TL50    |
|   | IC802                             | LA6563             |
|   | IC801                             | LB11995-TFB        |
|   | IC102, IC119                      | LMC6482IM          |
|   | IC104                             | M11B416256A-35T    |
|   | IC306                             | M37902FGCHP        |
|   | IC307                             | M62352GP-TFB       |
|   | IC313                             | MBM29F400TC-70PFTN |
|   | IC204                             | NJM12903R-TFB      |
|   | IC114                             | NJM13403V-TFB      |
|   | IC106, IC304                      | NJM13404V-TFB      |
|   | IC201, IC203, IC803               | NJM2100V-TFB       |
|   | IC121, IC122, IC702, IC708, IC902 | NJM2140R-TFB       |
|   | IC1001                            | NJM319V-TFB        |
|   | IC115                             | NJM3414AV-TFB      |
|   | IC113                             | PCM1719E           |
|   | IC602                             | PE5131A            |
|   | IC900                             | PE5214A            |
|   | IC109                             | PM0025AF           |
| △ | IC405                             | PQ20WZ11           |
|   | IC311                             | PST9243NR          |
|   | IC503                             | RL5E839            |
|   | IC501                             | SM8706AV           |
|   | IC107                             | SN74AHC2G66HDCT    |
|   | IC904                             | SN74LV125APW       |
|   | IC105, IC108, IC117, IC303, IC305 | TC4W53FU           |

|  |                     |               |
|--|---------------------|---------------|
|  | IC301               | TC74AC139FT   |
|  | IC202, IC302        | TC74HC4051AFT |
|  | IC101, IC120        | TC74HC4053AFT |
|  | IC703, IC704        | TC7S66FU      |
|  | IC118, IC312, IC601 | TC7SET08FU    |

|  |                                   |            |
|--|-----------------------------------|------------|
|  | IC103                             | TC7SH00FU  |
|  | IC116, IC310                      | TC7SH04FU  |
|  | IC701, IC707                      | TC7SZ126FU |
|  | IC705, IC706, IC709, IC710, IC903 | TC7SZU04FU |

|  |                     |                 |
|--|---------------------|-----------------|
|  | IC314, IC905, IC906 | TC7WH08FU       |
|  | IC112               | UPC2511GK-9EU-X |
|  | IC111               | UPD72153GM-UEU  |
|  | Q 107-Q 110, Q 401  | 2SD2114K        |
|  | Q 106               | DTA114EK        |

|  |                                   |          |
|--|-----------------------------------|----------|
|  | Q 125                             | DTC114TK |
|  | Q 303                             | HN1A01FU |
|  | Q 102, Q 103, Q 105, Q 112        | HN1B04FU |
|  | Q 115, Q 116, Q 121, Q 122, Q 201 | HN1B04FU |
|  | Q 1001, Q 104                     | RN1902   |

|  |                    |          |
|--|--------------------|----------|
|  | Q 301, Q 302       | RN2902   |
|  | Q 101, Q 111       | RN2906   |
|  | D 101-D 104, D 320 | 1SS355   |
|  | D 303              | EC10QS04 |
|  | D 901              | KV1470   |

|  |              |          |
|--|--------------|----------|
|  | D 701, D 702 | KV1870S  |
|  | D 301, D 302 | LT1KS67A |

## SWITCHES

|  |      |         |
|--|------|---------|
|  | S301 | DSG1065 |
|  | S601 | DSG1071 |

## COILS AND FILTERS

|  |                                       |              |
|--|---------------------------------------|--------------|
|  | F 701, F 702                          | DTF1105      |
|  | L 401                                 | DTL1064      |
|  | L 104                                 | DTL1084      |
|  | L 1000-L 1002, L 1004, L 1007, L 1008 | DTL1087      |
|  | L 902                                 | LCYA2R7J2520 |
|  | L 904                                 | LCYA8R2J2520 |
|  | L 1005, L 1006                        | LCYAR68J2520 |
|  | L 105-L 108                           | PTL1014      |
|  | F 401-F 404, F 406                    | QTF1025      |
|  | L 110                                 | VTL1079      |

| Mark              | No.                                  | Description | Part No.     |
|-------------------|--------------------------------------|-------------|--------------|
|                   | L 503-L 506                          |             | VTL1080      |
|                   | L 109                                |             | VTL1084      |
|                   | L 102, L 402, L 403, L 905-L 907     |             | VTL1109      |
| <b>CAPACITORS</b> |                                      |             |              |
|                   | C 720, C 740, C 922                  |             | CCSRCH100D50 |
|                   | C 200, C 236, C 237, C 704           |             | CCSRCH101J50 |
|                   | C 195                                |             | CCSRCH102J50 |
|                   | C 147, C 911                         |             | CCSRCH120J50 |
|                   | C 231, C 232, C 835                  |             | CCSRCH151J50 |
|                   | C 450                                |             | CCSRCH181J50 |
|                   | C 905                                |             | CCSRCH220J50 |
|                   | C 168, C 169, C 172                  |             | CCSRCH221J50 |
|                   | C 212, C 213                         |             | CCSRCH270J50 |
|                   | C 239, C 240                         |             | CCSRCH271J50 |
|                   | C 205, C 920                         |             | CCSRCH330J50 |
|                   | C 243                                |             | CCSRCH331J50 |
|                   | C 235                                |             | CCSRCH391J50 |
|                   | C 708, C 833                         |             | CCSRCH471J50 |
|                   | C 140                                |             | CCSRCH4R0C50 |
|                   | C 723                                |             | CCSRCH560J50 |
|                   | C 921                                |             | CCSRCH5R0C50 |
|                   | C 512, C 513                         |             | CCSRCH6R0D50 |
|                   | C 1103, C 1109, C 411                |             | CEV100M16    |
|                   | C 1129, C 410, C 424                 |             | CEV101M16    |
|                   | C 1114, C 1115, C 1122, C 1127       |             | CEV470M6R3   |
|                   | C 107, C 108, C 1105, C 1130, C 701  |             | CKSQYB105K10 |
|                   | C 706, C 915                         |             | CKSQYB105K10 |
|                   | C 401, C 423, C 426, C 917-C 919     |             | CKSQYF105Z16 |
|                   | C 164, C 170, C 312, C 317, C 501    |             | CKSQYF225Z16 |
|                   | C 523, C 604, C 606, C 612, C 613    |             | CKSQYF225Z16 |
|                   | C 615, C 616, C 620, C 621, C 624    |             | CKSQYF225Z16 |
|                   | C 626, C 630, C 804, C 810, C 839    |             | CKSQYF225Z16 |
|                   | C 841                                |             | CKSQYF225Z16 |
|                   | C 1002, C 106, C 1120, C 131, C 185  |             | CKSRYB102K50 |
|                   | C 188, C 215, C 322, C 712, C 716    |             | CKSRYB102K50 |
|                   | C 718, C 719, C 732, C 737, C 738    |             | CKSRYB102K50 |
|                   | C 832, C 88, C 89, C 91, C 914       |             | CKSRYB102K50 |
|                   | C 92-C 94                            |             | CKSRYB102K50 |
|                   | C 109, C 117, C 135, C 141, C 142    |             | CKSRYB103K50 |
|                   | C 151, C 193, C 211, C 316, C 705    |             | CKSRYB103K50 |
|                   | C 813, C 814, C 844, C 909, C 910    |             | CKSRYB103K50 |
|                   | C 1001, C 102, C 105, C 1135, C 1136 |             | CKSRYB104K16 |
|                   | C 123, C 124, C 128, C 130           |             | CKSRYB104K16 |
|                   | C 144, C 145, C 171, C 179-C 183     |             | CKSRYB104K16 |
|                   | C 196, C 710, C 801-C 803, C 805     |             | CKSRYB104K16 |
|                   | C 834, C 845, C 906, C 907, C 913    |             | CKSRYB104K16 |
|                   | C 1110, C 1111                       |             | CKSRYB122K50 |
|                   | C 815, C 821, C 822, C 825, C 830    |             | CKSRYB222K50 |
|                   | C 843                                |             | CKSRYB222K50 |
|                   | C 150, C 207, C 210, C 838, C 840    |             | CKSRYB223K50 |
|                   | C 1118, C 198                        |             | CKSRYB224K10 |
|                   | C 214                                |             | CKSRYB331K50 |
|                   | C 201, C 714, C 817-C 820            |             | CKSRYB332K50 |
|                   | C 826-C 829                          |             | CKSRYB332K50 |
|                   | C 715                                |             | CKSRYB333K16 |
|                   | C 923                                |             | CKSRYB392K50 |
|                   | C 517                                |             | CKSRYB393K16 |
|                   | C 120, C 121, C 125, C 134, C 137    |             | CKSRYB472K50 |
|                   | C 321, C 518                         |             | CKSRYB472K50 |

| Mark | No.                                | Description | Part No.     |
|------|------------------------------------|-------------|--------------|
|      | C 520, C 806, C 823, C 842         |             | CKSRYB473K16 |
|      | C 521                              |             | CKSRYB562K50 |
|      | C 1131, C 143, C 301, C 508, C 509 |             | CKSRYF103Z50 |
|      | C 511, C 514, C 836                |             | CKSRYF103Z50 |
|      | C 1006, C 101, C 103, C 104, C 110 |             | CKSRYF104Z25 |
|      | C 1102, C 1106, C 1108, C 111      |             | CKSRYF104Z25 |
|      | C 1112, C 1113, C 112, C 1121      |             | CKSRYF104Z25 |
|      | C 1123-C 1126, C 1128, C 113       |             | CKSRYF104Z25 |
|      | C 1132-C 1134, C 114-C 116         |             | CKSRYF104Z25 |
|      | C 118, C 119, C 122, C 126, C 127  |             | CKSRYF104Z25 |
|      | C 129, C 132, C 133, C 136, C 139  |             | CKSRYF104Z25 |
|      | C 148, C 149, C 152-C 157, C 160   |             | CKSRYF104Z25 |
|      | C 162, C 163, C 165-C 167          |             | CKSRYF104Z25 |
|      | C 173-C 178, C 184, C 186, C 191   |             | CKSRYF104Z25 |
|      | C 194, C 197, C 203, C 204         |             | CKSRYF104Z25 |
|      | C 208, C 209, C 230, C 233, C 238  |             | CKSRYF104Z25 |
|      | C 245, C 246, C 302-C 311          |             | CKSRYF104Z25 |
|      | C 313-C 315, C 318-C 320           |             | CKSRYF104Z25 |
|      | C 323, C 324, C 326, C 327, C 402  |             | CKSRYF104Z25 |
|      | C 404, C 406, C 408, C 409, C 425  |             | CKSRYF104Z25 |
|      | C 502-C 507, C 515, C 516, C 519   |             | CKSRYF104Z25 |
|      | C 522, C 524-C 532, C 602          |             | CKSRYF104Z25 |
|      | C 607-C 611, C 614, C 618, C 619   |             | CKSRYF104Z25 |
|      | C 622, C 623, C 625, C 627, C 628  |             | CKSRYF104Z25 |
|      | C 807-C 809, C 811, C 812, C 816   |             | CKSRYF104Z25 |
|      | C 824, C 831, C 90, C 901-C 904    |             | CKSRYF104Z25 |
|      | C 908, C 912, C 916, C 924-C 926   |             | CKSRYF104Z25 |
|      | C 99                               |             | CKSRYF104Z25 |
|      | C 1119, C 138, C 146, C 629, C 631 |             | CKSRYF105Z10 |
|      | C 702, C 703, C 707, C 711, C 713  |             | CKSRYF105Z10 |
|      | C 717, C 721, C 722, C 731, C 733  |             | CKSRYF105Z10 |
|      | C 1116, C 1117                     |             | CKSRYF224Z16 |
|      | C 189, C 190 (10µF/16V)            |             | DCH1121      |
|      | C 403, C 405, C 407 (220µF/10V)    |             | DCH1136      |
|      | C 1137, C 1138 (4.7µF/16V)         |             | DCH1142      |
|      | C 1104 (2.2µF/10V)                 |             | VCG1031      |
|      | C 187, C 192 (4.7µF/6.3V)          |             | VCG1039      |
|      | VC701, VC702 (20p)                 |             | VCM1008      |

**RESISTORS**

|                                    |              |
|------------------------------------|--------------|
| R 134, R 170                       | RAB4C0R0J    |
| R 626                              | RAB4C102J    |
| R 125, R 150, R 316, R 317, R 332  | RAB4C103J    |
| R 469, R 472, R 620, R 625         | RAB4C103J    |
| R 639, R 640                       | RAB4C103J    |
| R 618, R 619, R 621, R 622         | RAB4C220J    |
| R 1103, R 179, R 190, R 816, R 817 | RAB4C223J    |
| R 813, R 815, R 822, R 823         | RAB4C303J    |
| R 230, R 452-R 455, R 511, R 512   | RAB4C330J    |
| R 140, R 634, R 635, R 638         | RAB4C470J    |
| R 303                              | RAB4C560J    |
| R 123                              | RS1/10S0R0J  |
| R 803-R 805                        | RS1/10S1R0J  |
| R 1104, R 819, R 821, R 824, R 825 | RS1/16S1002F |
| R 244                              | RS1/16S1100F |
| R 839, R 841                       | RS1/16S1203F |
| R 250                              | RS1/16S1500F |
| R 401, R 402                       | RS1/16S2001F |
| R 242, R 248                       | RS1/16S3302F |
| R 241                              | RS1/16S3600F |

# DVR-A03

| <b>Mark</b>   | <b>No.</b>                    | <b>Description</b>               | <b>Part No.</b>   |
|---------------|-------------------------------|----------------------------------|-------------------|
|               | R 247                         |                                  | RS1/16S5600F      |
|               | R 1156                        |                                  | RS1/16S5601F      |
|               | R 245, R 251                  |                                  | RS1/16S6802F      |
|               | VR103, VR104 (4.7k $\Omega$ ) |                                  | ACP1091           |
|               | VR105 (10k $\Omega$ )         |                                  | DCP1080           |
|               | Other Resistors               |                                  | RS1/16S □□□ J     |
| <b>OTHERS</b> |                               |                                  |                   |
|               | JA101                         | MINI JACK                        | DKN1123           |
|               | CN402                         | ZH CONNECTOR 2P                  | B2B-ZR-SM3        |
|               | CN408                         | D-OUT CONNECTOR(2P)              | DKN1176           |
|               | CN101                         | 53P CONNECTOR                    | DKN1210           |
|               | CN601                         | 3P CONNECTOR                     | DKN1220           |
|               | CN301                         | 4P CONNECTOR                     | DKN1221           |
|               | CN401                         | LK CONNECTOR<br>(4IN1/AT)        | LK-44104H-S1D1Z-2 |
|               | CN803                         | 16P CONNECTOR                    | SFW16R-2ST        |
|               | CN801,CN802                   | 4P CONNECTOR                     | VKN1490           |
|               | X501                          | CRYSTAL RESONATOR<br>(36.864MHz) | DSS1125           |
| △             | TH402                         | POLY SWITCH                      | DCX1035           |



## 6. ADJUSTMENT

### ● Adjustment Items

Perform the adjustment of this model in the order as shown below.

#### Adjustment and confirmation of the main unit

##### 6.2 Adjustment

###### Initial Setting

###### 6.2.1 VCO Free-running Adjustment

[1st PLL Adjustment]

[2nd PLL Adjustment]

###### 6.2.2 Power Adjustment

###### (1) DVD Power Adjustment

###### (1.1) Playback Power Adjustment

###### (1.2) Recording Power Adjustment

[Write Power Low Adjustment]

[Write Power High Adjustment]

[Erase Power APC Low Adjustment]

[Erase Power APC High Adjustment]

[RW Erase Power Low Adjustment]

[RW Erase Power High Adjustment]

###### (2) CD Power Adjustment

###### (2.1) Playback Power Adjustment

###### (2.2) Recording Power Adjustment

[Write Power Low Adjustment]

[Write Power High Adjustment]

[Erase Power Low Adjustment]

[Erase Power High Adjustment]

[Erase Power APC Low Adjustment]

[Erase Power APC High Adjustment]

[RW Erase Power Low Adjustment]

[RW Erase Power High Adjustment]

###### 6.2.3 Radial Tilt Circuit Adjustment

###### 6.2.4 Focus Position Adjustment

[DVD-ROM (Dual) Adjustment]

[Focus Position Adjustment of Layer 0]

[Focus Position Adjustment of Layer 1]

###### 6.2.5 Wobble SPDL Bias Adjustment

###### 6.2.6 Playback Ability Confirmation

###### 6.2.7 Recording Ability Confirmation

#### Note:

When Traverse Mechanism Assy-S is replaced, adjustment of the mechanism section is not required because of it's adjusted already.

### ● Measuring Instruments and Tools

#### Use disc

- DVD-ROM (Single) disc ..... GGV1035
- DVD-ROM (Dual) disc ..... GGV1036
- New DVD-R disc ..... GGV1049
- New DVD-RW disc ..... GGV1050
- CD-ROM and CD-DA disc ..... GGV1054
- New CD-R disc ..... GGX1011
- New CD-RW disc ..... GGV1053
- Recorded DVD-R disc ..... (        )
- Recorded DVD-RW disc ..... (        )
- Recorded CD-R disc ..... (        )
- Recorded CD-RW disc ..... (        )

#### Measuring instruments

- Digital multimeter
- Oscilloscope (with monitor output)
- Light power meter ..... TQ8210 or equivalent
- Jitter meter ..... KJM6765S or equivalent

#### Control

- DOS-V Personal computer (for command transmission : RS-232C port)
- General-purpose communication software

#### Others

- Adjustment screwdriver

● Adjustment Points and Their Names

- VC701 : 1st PLL adjustment
- VC702 : 2nd PLL adjustment
- VR103 : DVD playback power adjustment
- VR104 : CD playback power adjustment

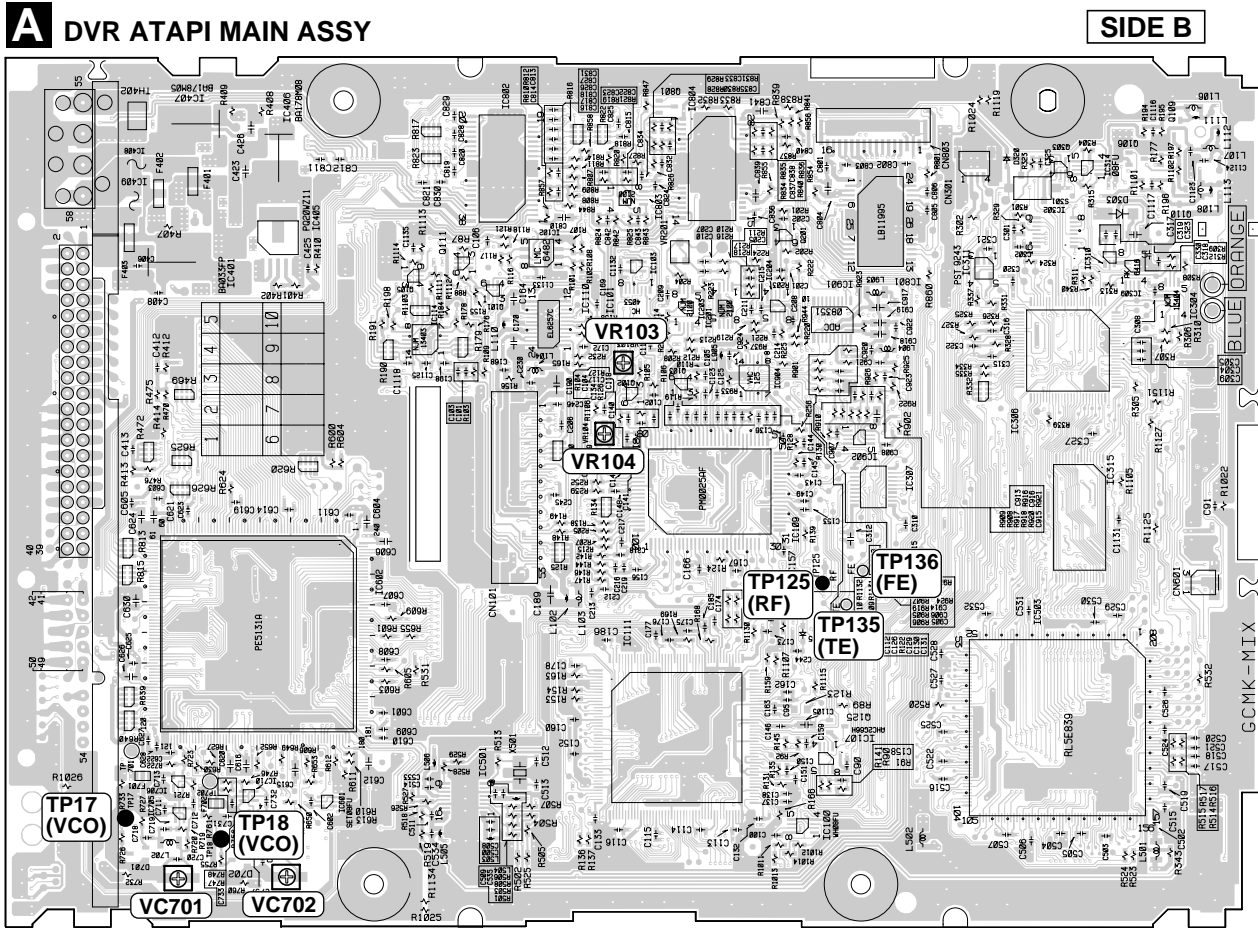


Fig.1 Adjustment point

● NECESSARY ADJUSTMENT POINTS

When

Adjustment Points

■ EXCHANGE TRAVERSE MECHA ASSY

Exchange TRAVERSE MECHANISM ASSY-S



|                  |  |
|------------------|--|
| Mechanical point | _____  |
| Electric point   | Adjustment and confirmation of the main unit |

■ EXCHANGE PCB ASSY

Exchange board DVR ATAPI MAIN ASSY



|                  |  |
|------------------|--|
| Mechanical point | _____  |
| Electric point   | Adjustment and confirmation of the main unit |

## 6.1 TEST MODE

### 6.1.1 Sending Test Mode Commands

To operate this unit directly in Test mode, connect the COM port of the personal computer with CN301 in the DVD ATAPI MAIN Assy via interface.

To send commands, use RS-232C general-purpose communication software (e.g. WTERM, CCT). Communication protocols are as follows:

Baud rate : 38400 (fixed)  
 Character length : 8 bit  
 Stop bit : 1 bit  
 Parity : none  
 Flow control : none  
 Others : LSB 1st

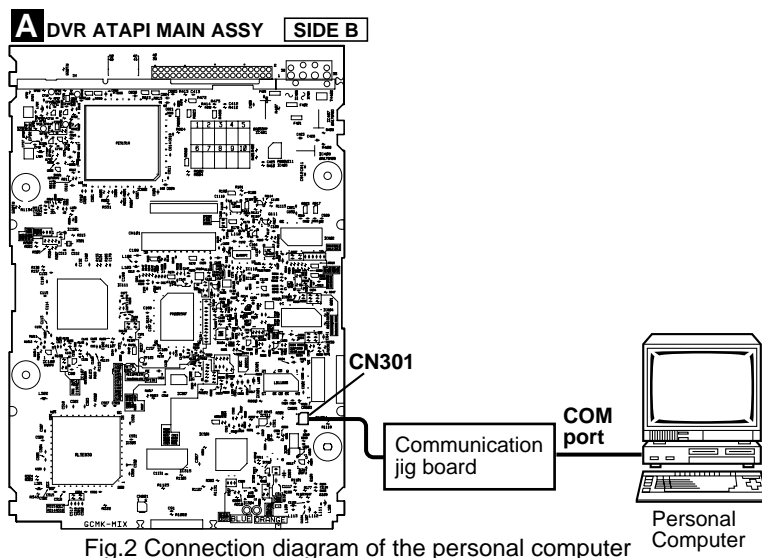


Fig.2 Connection diagram of the personal computer

### 6.1.2 Disc Selection

To set the 4.7GB DVR mode, enter the code "5DT" from the communication software. This operation calls as "Selects 4.7R mode".

It becomes each disc mode when entering the following codes.

| Enter code | Mode                              |
|------------|-----------------------------------|
| "0DT"      | : "Selects CD-ROM mode"           |
| "1DT"      | : "Selects CD-R mode"             |
| "2DT"      | : "Selects CD-RW mode"            |
| "3DT"      | : "Selects DVD-ROM (Single) mode" |
| "4DT"      | : "Selects DVD-ROM (Dual) mode"   |
| "7DT"      | : "Selects DVD-RWmode"            |

## 6.2 ADJUSTMENT

### Initial Setting

Short-circuit with jumper pin at the second (MA and SL) from the right side of the short-pin while looking from the rear side. (Test mode)  
Enter code "9AJ". (Taking in command of adjustment initial value.)

**Note:** This command does not need to issue it once again if issued it once. However, perform the Power Adjustment surely afterwards when issued this command.

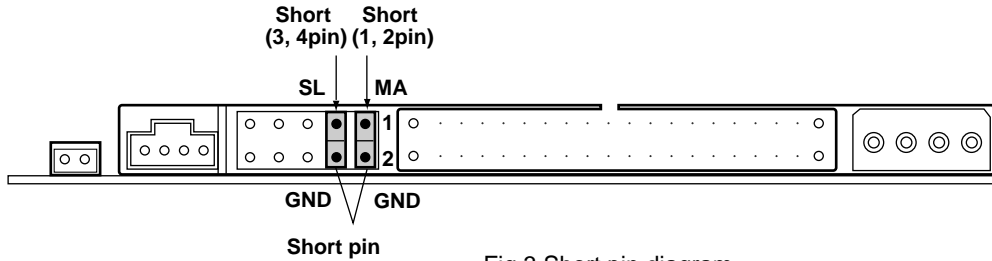


Fig.3 Short pin diagram

## ■ Adjustment and confirmation of the main unit

### Initial Setting

#### 6.2.1 VCO Free-running Adjustment

|   |  |                            |                 |
|---|--|----------------------------|-----------------|
| <b>Objective</b>  |  |                            |                 |
| <b>Symptom when out of adjustment</b>   |  |                            |                 |
| <b>Measurement Instrument connections</b>   | Connect the digital multimeter to TP17 and TP18.                       | <b>Player state</b>        | POWER ON        |
| <b>Adjustment standard value</b>  | [1st PLL adjustment] 2.5V ± 0.01V<br>[2nd PLL adjustment] 2.5V ± 0.01V | <b>Adjustment location</b> | VC701 and VC702 |
|   |  | <b>Disc</b>                | None needed     |
| <b>[Procedure]</b>  |  |                            |                 |
| Enter the RS-232C command.<br>"6MS"<br>"+A4+AS"<br>"+0E+DW" (Enter the VCO free-running adjustment mode)            |  |                            |                 |
| <b>[1st PLL Adjustment]</b>   |  |                            |                 |
| Adjust VC701 so that the voltage of TP17 (periphery of IC602 R3 chip) becomes 2.5V ± 0.01V.                         |  |                            |                 |
| <b>[2nd PLL Adjustment]</b>   |  |                            |                 |
| Adjust VC702 so that the voltage of TP18 becomes 2.5V ± 0.01V.<br>"+00+DW" (Release from the VCO free-running mode) |  |                            |                 |

## 6.2.2 Power Adjustment

Before adjustment, turn VR103 and VR104 (periphery of CN101) fully counterclockwise to set their laser power output to minimum.

### (1) DVD Power Adjustment

- Set the wavelength of the light power meter to 660 nm, and shine the sensor to the objective lens.

#### (1.1) Playback Power Adjustment

|  |  |                            |  |
|--|--|----------------------------|--|
| <b>Objective</b>   | To optimize the playback power of laser diode (LD).  |                            |  |
| <b>Symptom when out of adjustment</b>  | When a gap is terrible : Player does not playback, track search is impossible<br>When a gap is light : RF waveform is dirty. |                            |  |
| <b>Measurement Instrument connections</b>  | Shine the light emitted from the objective lens on the light power meter sensor.<br>Wavelength 660nm Ave. mode               | <b>Player state</b>        |  |
| <b>Adjustment standard value</b>   | Wavelength 660nm,<br>1.03 ± 0.03mW (Ave.)  | <b>Adjustment location</b> |  |
|  |  | <b>Disc</b>                |  |
| <b>[Procedure]</b>   |  |                            |  |
| "5DT" (Selects 4.7R mode)  |  |                            |  |
| "LD" (LD ON)   |  |                            |  |
| Adjust VR103 so that the indication of light power meter becomes 1.03 ± 0.03mW.  |  |                            |  |
| "LD" (LD OFF)  |  |                            |  |
| <b>Note:</b> When confirm the output power once again after the Playback Power Adjustment, if indication of the light power meter is limit of 1.03 ± 0.06mW, there is not a problem. |  |                            |  |

#### (1.2) Recording Power Adjustment

|   |  |                            |                                |
|---|--|----------------------------|--------------------------------|
| <b>Objective</b>  | To optimize the playback power of laser diode (LD).  |                            |                                |
| <b>Symptom when out of adjustment</b>   | When a gap is terrible : Player does not playback, track search is impossible<br>When a gap is light : RF waveform is dirty. |                            |                                |
| <b>Measurement Instrument connections</b>   | Shine the light emitted from the objective lens on the light power meter sensor.<br>Wavelength 660nm Ave. mode               | <b>Player state</b>        | STOP                           |
|   |  | <b>Adjustment location</b> | Set the value with the command |
|   |  | <b>Disc</b>                | None needed                    |
| <b>[Procedure]</b>  |  |                            |                                |
| <b>[Write Power Low Adjustment]</b>   |  |                            |                                |
| "1AW"   |  |                            |                                |
| Adjust with UP/DN command so that the indication of light power meter becomes 5.4 ± 0.2mW. (When enters the "5UP/5DN", it can send every 5 step.) |  |                            |                                |
| "EE" (Store the adjustment value in the nonvolatile memory)   |  |                            |                                |

## [Write Power High Adjustment]

"0AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $10.7 \pm 0.2\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

Selects DVD-RW mode.

## [Erase Power APC Low Adjustment]

"5AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $5.4 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

## [Erase Power APC High Adjustment]

"4AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $10.8 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

## [RW Erase Power Low Adjustment]

"7AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $1.07 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

## [RW Erase Power High Adjustment]

"6AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $1.13 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

## (2) CD Power Adjustment

- Set the wavelength of the light power meter to 780 nm, and shine the sensor to the objective lens.

### (2.1) Playback Power Adjustment

|   |  |                            |             |
|---|--|----------------------------|-------------|
| <b>Objective</b>                          | To optimize the playback power of laser diode (LD).  |                            |             |
| <b>Symptom when out of adjustment</b>     | When a gap is terrible : Player does not playback, track search is impossible<br>When a gap is light : RF waveform is dirty. |                            |             |
| <b>Measurement Instrument connections</b> | Shine the light emitted from the objective lens on the light power meter sensor.<br>Wavelength 780nm Ave. mode               | <b>Player state</b>        | STOP        |
| <b>Adjustment standard value</b>          | Wavelength 780nm,<br>$1.26 \pm 0.03\text{mW}$ (Ave.)   | <b>Adjustment location</b> | VR104       |
|   |  | <b>Disc</b>                | None needed |

#### [Procedure]

"1DT" (Selects CD-R mode)

"LD" (LD ON)

Adjust VR104 so that the indication of light power meter becomes  $1.26 \pm 0.03\text{mW}$ .

"LD" (LD FF)

**Note:** When confirm the output power once again after the Playback Power Adjustment, if indication of the light power meter is limit of  $1.26 \pm 0.06\text{mW}$ , there is not a problem.

**(2.2) Recording Power Adjustment**

|   |  |                            |                                |
|---|--|----------------------------|--------------------------------|
| <b>Objective</b>                          | To optimize the playback power of laser diode (LD).  |                            |                                |
| <b>Symptom when out of adjustment</b>     | When a gap is terrible : Player does not playback, track search is impossible<br>When a gap is light : RF waveform is dirty. |                            |                                |
| <b>Measurement Instrument connections</b> | Shine the light emitted from the objective lens on the light power meter sensor.<br>Wavelength 780nm Ave. mode               | <b>Player state</b>        | STOP                           |
|   |  | <b>Adjustment location</b> | Set the value with the command |
|   |  | <b>Disc</b>                | None needed                    |

**[Procedure]****[Write Power Low Adjustment]**

"1AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $3.4 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

**[Write Power High Adjustment]**

"0AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $5.9 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

**[Erase Power Low Adjustment]**

"3AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $3.6 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

**[Erase Power High Adjustment]**

"2AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $6.5 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

**[Erase Power APC Low Adjustment]**

"2DT" (Selects CD-RW mode)

"5AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $7.6 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

**[Erase Power APC High Adjustment]**

"4AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $15.1 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

**[RW Erase Power Low Adjustment]**

"7AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $5.3 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

**[RW Erase Power High Adjustment]**

"6AW"

Adjust with UP/DN command so that the indication of light power meter becomes  $10.2 \pm 0.1\text{mW}$ .

"EE" (Store the adjustment value in the nonvolatile memory)

### 6.2.3 Radial Tilt Circuit Adjustment

|   |   |                            |   |
|---|---|----------------------------|---|
| <b>Objective</b>                          | To adjust the target value of tilt servo so that pickup and disc become to be level relatively. |                            |   |
| <b>Symptom when out of adjustment</b>     | Playback RF waveform is dirty (Playback jitter is defective).                                   |                            |   |
| <b>Measurement Instrument connections</b> | Connect the total T-jitter meter to TP125 (RF) terminal.  | <b>Player state</b>        | PLAY, Tilt servo ON   |
| <b>Adjustment standard value</b>          | Playback jitter is minimum.   | <b>Adjustment location</b> | Set the tilt error value with the command input.                        |
|   |   | <b>Disc</b>                | DVD-ROM(Dual)/ DVD-ROM(Single)/ Unrecorded DVD-RW/ Recorded CD-R discs. |

#### [Procedure]

- "3TL" (Initialize the tilt)
  - Enters code "4TL" in the state that does not clamp a disc.
  - Calmp the unrecorded DVD-RW disc and enters code "5TL".
  - Calmp the DVD-ROM (Dual) disc and enters code "6TL".
  - Calmp the DVD-ROM (Single) disc.
  
- "3DT" (Selects DVD-ROM (Single) mode)
- "1XN" (Set the CLV normal speed)
- "+100000+PL" (Search for address 100000h)
- Monitor the pin 54 (AGCOUT) of IC112 (RF63). ("RF" is marked on the test land of the DVD ATAPI MAIN Assy.)
- Connect the jitter meter to TP125 (RF), search for a point where the jitter of both total-T edges become minimum with "1TL" (Tilt UP) / "2TL" (Tilt Down). At this time, turn the equalizer of jitter meter to OFF.
- "7TL" (Obtain the TILT TARGET)
- "RJ" (REJECT)
  
- Clamp the recorded CD-R disc.
- "1DT" (Selects CD-R mode)
- "4XN" (Set the CLV 4th speed)
- "+200000+PL" (Search for 20 minutes)
- Monitor the pin 54 (AGCOUT) of IC112 (RF63). ("RF" is marked on the test land of the DVD ATAPI MAIN Assy.)
- Connect the jitter meter to TP125 (RF), search for a point where the jitter of both total-T edges become minimum with "1TL" (Tilt UP) / "2TL" (Tilt Down). At this time, turn the equalizer of jitter meter to OFF.
- "7TL" (Obtain the TILT TARGET)
- "RJ" (REJECT)



## 6.2.4 Focus Position Adjustment

|   |  |                            |   |
|---|--|----------------------------|---|
| <b>Objective</b>                          | To optimize the playback characteristic of the RF signal.  |                            |   |
| <b>Symptom when out of adjustment</b>     | Playback RF waveform is dirty (Playback jitter is defective).<br>REC/PLAY RF waveform is dirty (REC/PLAY jitter is defective). |                            |   |
| <b>Measurement Instrument connections</b> | Connect the total T-jitter meter to TP125 (RF) terminal.   | <b>Player state</b>        | PLAY, tilt servo ON   |
| <b>Adjustment standard value</b>          | Playback jitter is minimum.  | <b>Adjustment location</b> | Set the DAC value with the command input.                             |
|   |  | <b>Disc</b>                | DVD-ROM (Single)/ DVD-ROM (Dual)/<br>Recorded CD-R/ New DVD-RW discs. |

### [Procedure]

- Clamp the DVD-ROM (Single) disc.
  - "3DT" (Selects DVD-ROM (Single) mode)
  - "#+99070000+FR " (ACT sensitivity adjustment)
- Note:** Issue the CD-ROM disc only.
  - "1XN" (Set the CLV normal speed)
  - "+100000+PL" (Search for address 100000h)
  - "0MS"
  - "0AS"
- Connect the jitter meter to TP125 (RF) and adjust "+\*\*\*\*\*DW" command so that the jitter of the both total-T edges become minimum, and focus position will be changed. (Value to input into \*\*\*\* performs coarse adjustment with 0400h step and fine adjustment with 0100h step.)
  - "FE" (Store the adjustment value in the nonvolatile memory)
  - "RJ" (REJECT)
  - "RS" (RESET)
- Perform the Focus Position Adjustment as same step as in the recorded DVD-R and DVD-RW discs.

### [DVD-ROM (Dual) Adjustment]

Adjust the layer 0 and layer 1 of DVD-ROM (Dual) disc together.

#### [Focus Position Adjustment of layer 0]

- "4DT" (DVD-ROM Dual mode)
- "1XN" (Set the CLV normal speed)
- "+100000+PL" (Search for address 100000h)
- "0MS"
- "0AS"
- "EE" (Store the adjustment value in the nonvolatile memory)

#### [Focus Position Adjustment of layer 1]

- "2FC" (Focus Jump UP (layer 0 to layer 1) )
- "0MS"
- "0AS"
- "EE" (Store the adjustment value in the nonvolatile memory)

### CD System Adjustment

Boot the CD system disc.

- "+99070000+FR" (ACT sensitivity adjustment)

**Note:** Issue the disc only.

- "4XN" (Set the CLV 4th speed)
- "PL" (PLAY)
- "+20000000+FR" (TOC information readout, etc.)
- "+200000+PL" (Search for 20 minutes)

- Perform the Focus Position Adjustment as same step in the recorded CD-R and CD-RW discs.

### 6.2.5 Wobble SPDL Bias Adjustment

|  |  |                            |                      |
|--|--|----------------------------|----------------------|
| <b>Objective</b>   | Correct the dispersion of spindle motor.   |                            |                      |
| <b>Symptom when out of adjustment</b>  | Recording performance becomes poor, and jitter value of self recording/playback becomes outside of standard specification. |                            |                      |
| <b>Measurement Instrument connections</b>  | _____  | <b>Player state</b>        | PLAY                 |
|  |  | <b>Adjustment location</b> | None                 |
|  |  | <b>Disc</b>                | New 4.7GB DVD-R disc |
| <p><b>[Procedure]</b></p> <ul style="list-style-type: none"> <li>Clamp the unrecorded 4.7GB DVD-R disc. <ul style="list-style-type: none"> <li>"PL" (PLAY)</li> <li>"+99050000+FR" (Wobble SPDL adjustment command)</li> <li>"2XN" (Set the CLV double speed)</li> <li>"+99050000+FR" (Wobble SPDL adjustment command)</li> <li>"RJ" (REJECT)</li> <li>"RS" (RESET)</li> </ul> </li> </ul> |  |                            |                      |

### 6.2.6 Playback Ability Confirmation

|  |  |                            |   |
|--|--|----------------------------|---|
| <b>Symptom when out of adjustment</b>  | Confirm that the adjustment was done correctly.          |                            |   |
| <b>Measurement Instrument connections</b>  | Connect the total T-jitter meter to TP125 (RF) terminal. | <b>Player state</b>        | PLAY                                      |
| <b>Adjustment standard value</b>   | jitter is less than 12%.                                 | <b>Adjustment location</b> | None                                      |
|  |  | <b>Disc</b>                | Recorded DVD-R disc<br>Recorded CD-R disc |
| <p><b>[Procedure]</b></p> <p><b>(1) DVD System</b></p> <ul style="list-style-type: none"> <li>Clamp the recorded DVD-R disc. <ul style="list-style-type: none"> <li>"5DT" (Selects 4.7R mode)</li> <li>"1XN" (Set the CLV normal speed)</li> <li>"PL" (PLAY)</li> </ul> </li> </ul> <p>Connect the jitter meter to TP125 (RF) and measure the jitter of both total-T edges. Confirm that jitter is less than 12%.</p> <ul style="list-style-type: none"> <li>"RJ" (REJECT)</li> <li>"RS" (RESET)</li> </ul> <p><b>(2) CD System</b></p> <ul style="list-style-type: none"> <li>Clamp the recorded CD-R disc. <ul style="list-style-type: none"> <li>"1DT" (Selects CD-R mode)</li> <li>"4XN" (Set the CLV 4th speed)</li> <li>"PL" (PLAY)</li> <li>"+20000000+FR" (TOC information readout, etc.)</li> </ul> </li> </ul> <p>Connect the jitter meter to TP125 (RF) and measure the jitter of both total-T edges. Confirm that jitter is less than 12%.</p> <ul style="list-style-type: none"> <li>"RJ" (REJECT)</li> <li>"RS" (RESET)</li> </ul> |  |                            |   |

## 6.2.7 Recording Ability Confirmation

|   |   |                                 |   |
|---|---|---------------------------------|---|
| <b>Symptom when out of adjustment</b>   | Confirm that the adjustment was done correctly. |                                 |   |
| <b>Measurement Instrument connections</b>   | _____   | <b>Player state</b>             | PLAY                                    |
| <b>Adjustment standard value</b>  | jitter is less than 12%.                        | <b>Adjustment location Disc</b> | None<br>New DVD-R disc<br>New CD-R disc |
| <p><b>[Procedure]</b></p> <p><b>(1) DVD System</b></p> <ul style="list-style-type: none"> <li>Clamp the New DVD-R disc. <ul style="list-style-type: none"> <li>"5DT" (Selects 4.7R mode)</li> <li>"1XN" (Set the CLV normal speed)</li> <li>"PL" (PLAY)</li> <li>"+20000000+FR" (LPP information readout, etc.)</li> <li>"OE" (OPC END SEEK)</li> </ul> </li> </ul> <p>Address of result of OPC END SEEK calls as "*****h".<br/>Following OW and OR commands enter the address which subtracted 1 from the above address.</p> <ul style="list-style-type: none"> <li>"*****+OW" (Perform OPC from the address *****h)</li> <li>"*****+OR" (Outputs the OPC result from the address *****h)</li> <li>"+E00+LN" (Test write the E00h block)</li> <li>"*****+WR" (Test write. *****h is start address and set the physical address.)</li> <li>"RJ" (REJECT)</li> </ul> <ul style="list-style-type: none"> <li>"*****+PL" (Measure the self recording/playback jitter and confirm that jitter is less than 12%.)</li> <li>"RJ" (REJECT)</li> <li>"RS" (RESET)</li> </ul> <p><b>(2) CD System</b></p> <ul style="list-style-type: none"> <li>Clamp the New CD-R disc. <ul style="list-style-type: none"> <li>"1DT" (Selects CD-R mode)</li> <li>"4XN" (Set the CLV 4th speed)</li> <li>"PL" (PLAY)</li> <li>"+20000000+FR" (TOC information readout, etc.)</li> <li>"OE" (OPC END SEEK)</li> </ul> </li> </ul> <p>Address of result of OPC END SEEK calls as "*****h" (MSF). Meaning of MSF is minute, second and frame.<br/>Following OW and OR commands enter the address which subtracted 5 from the above address.</p> <ul style="list-style-type: none"> <li>"5LN" (Perform OPC of 5 frames)</li> <li>"*****+OW" (Perform OPC from the address *****h)</li> <li>"*****+OR" (Outputs the OPC result from the address *****h)</li> <li>"+F00+LN" (Test write the F00h frame)</li> <li>"*****+WR" (Test write. *****h is start address and set the MSF.)</li> <li>"RJ" (REJECT)</li> </ul> <ul style="list-style-type: none"> <li>"*****+PL" (Measure the self recording/playback jitter and confirm that jitter is less than 12%.)</li> <li>"RJ2" (REJECT)</li> </ul> |   |                                 |   |

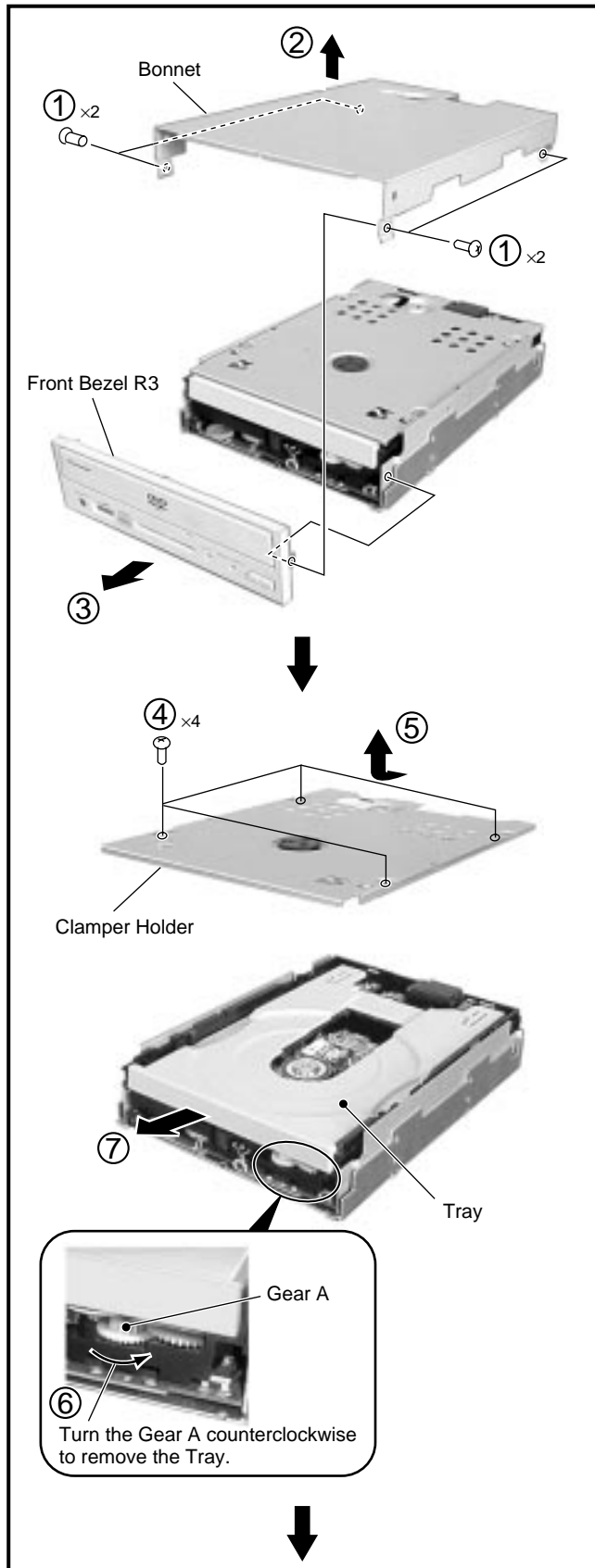
## 6.3 Release the Test mode

Remove the short-pin which short-circuited in the initial setting, and release the Test mode.

# 7. GENERAL INFORMATION

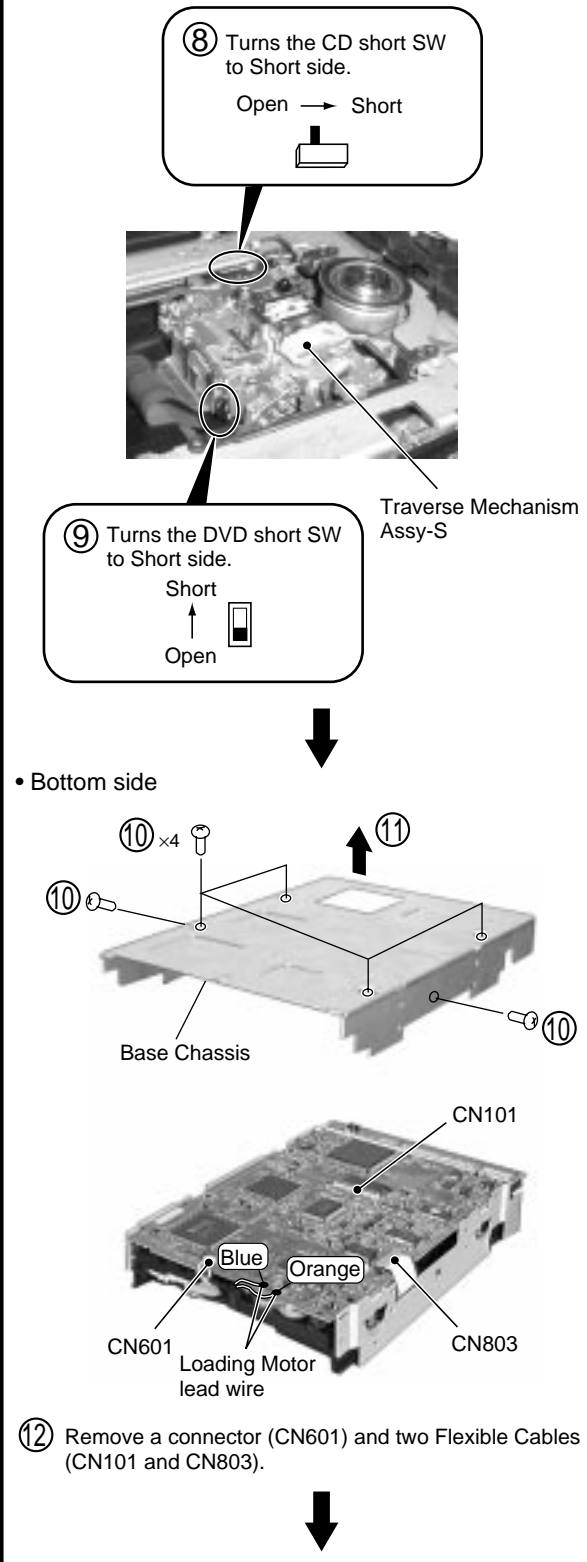
## 7.1 DIAGNOSIS

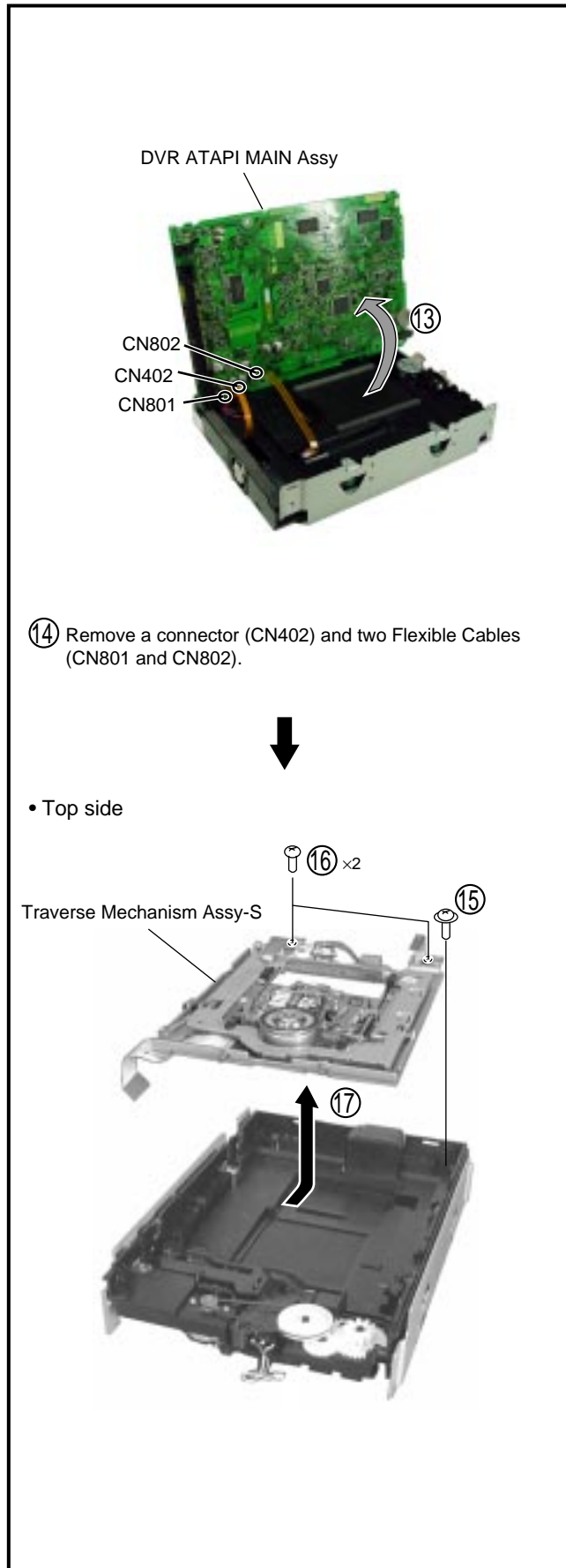
### 7.1.1 DISASSEMBLY



**Caution:**

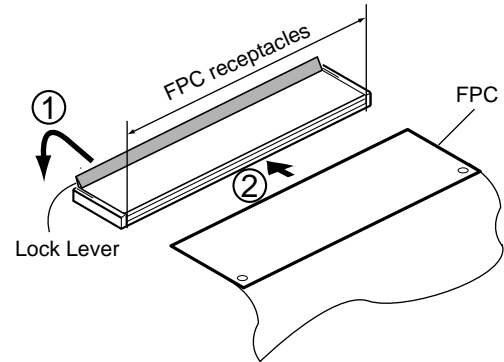
Be sure to turn the CD and DVD short switches to the Short side when you remove the flexible pickup cable.





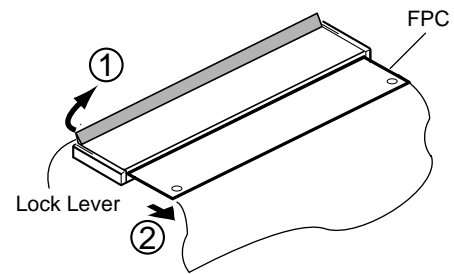
### ■ Connecting the Flexible Pickup Cable

1. Insert the FPC with the conductor side upward.  
Properly insert it to the slot until it stops.
2. Push down both sides of the Lock Lever until they stop.  
It cannot be locked with one side only.  
Imperfection of pushing down may cause unlocking.



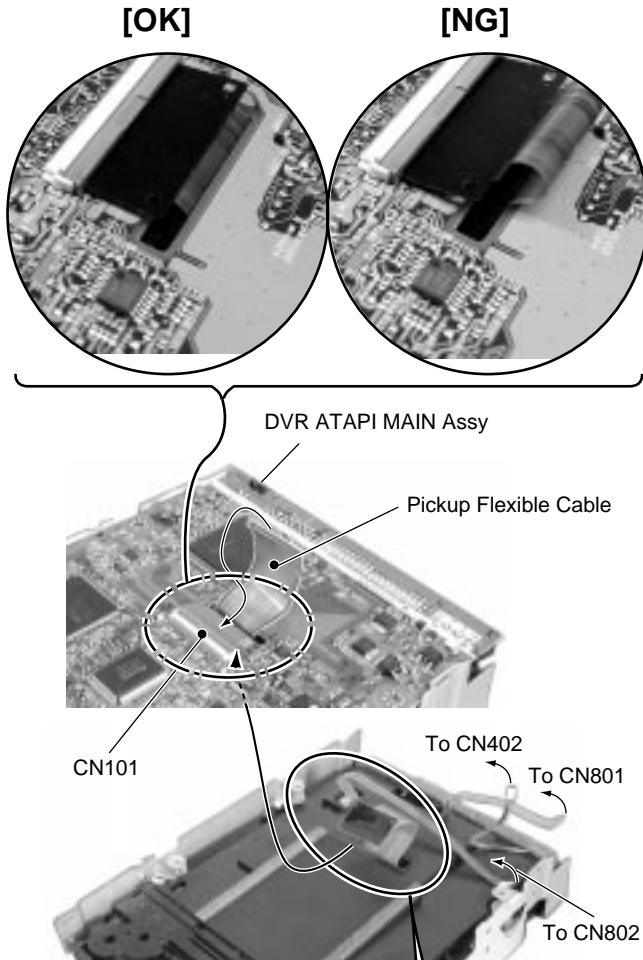
### ● Disconnecting the flexible pickup cable

1. Pull up the Lock Lever upward.
2. After unlocking, pull out the FPC.

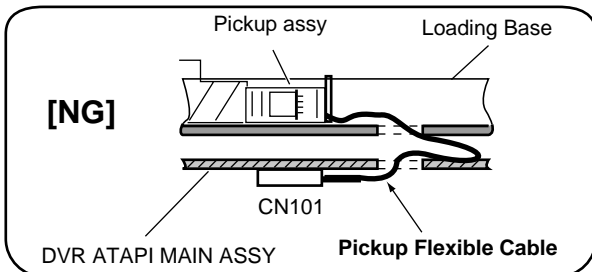
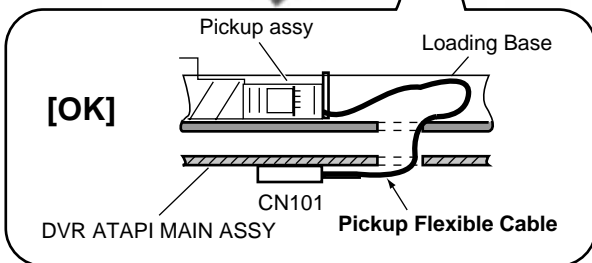


### ■ Styling the Flexible Cables

Perform styling of the Flexible Cables as shown in the figure below.

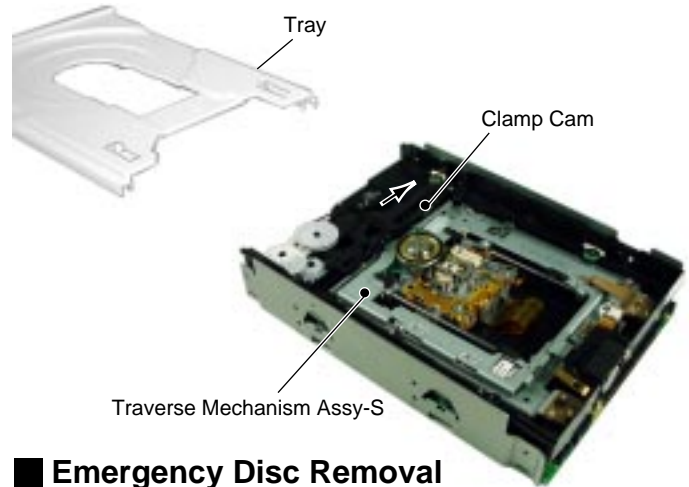


**Cautions:**  
**Be careful so that the Pickup flexible cable is not caught between the Loading base and PC Boards.**



### ■ Caution When Installing the Tray

Confirm the position of Clamp Cam there is in the arrow direction.

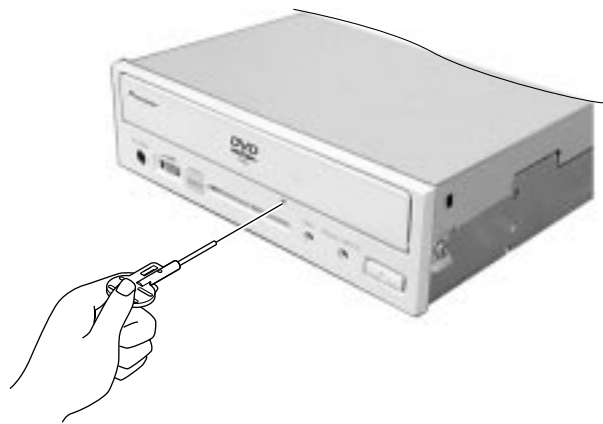


### ■ Emergency Disc Removal

In the following cases, discs can be ejected using the emergency ejection hole.

- Trouble with the device makes it impossible to remove the disc using the OPEN/CLOSE button or a software command.
- A disc that you need to eject remains inside the device but the power is off.

1. Confirm that the power for the device is OFF and that the disc has stopped spinning.
2. Insert the accompanying pin for emergency ejection straight into the emergency ejection hole and press firmly.



3. Pull it out as far as you need to and remove the disc. (The disc tray will open about 5 to 10 mm.)

#### Notes:

- Make sure to use only the accompanying pin for emergency ejection. (No other object should be inserted.)
- Never attempt to forcibly eject a disc that is still rotating, as doing so could result in injury personal or in damage to the disc.
- Do not place items within 12 cm of the front of this device, as doing so could obstruct the disc ejection operation.

## 7.2 PARTS

### 7.2.1 IC

• The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

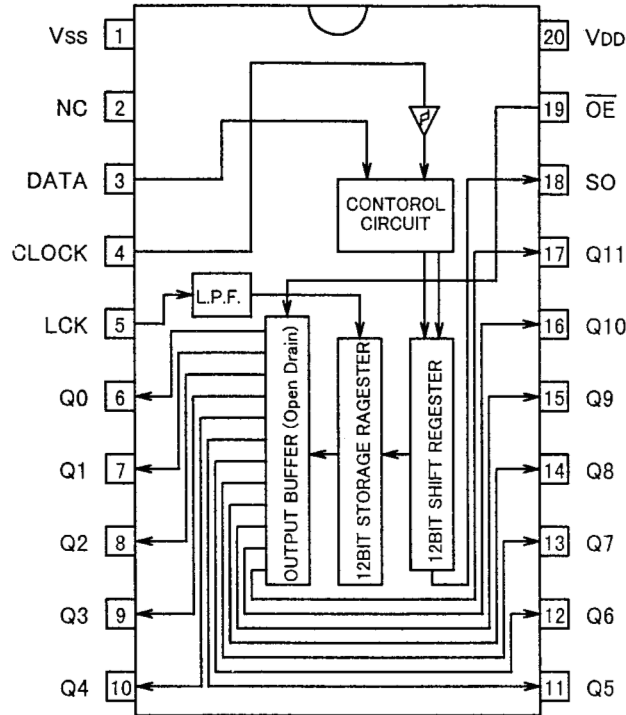
#### •List of IC

BU2099FV, BA5983FM, HY628100BLT1-70, AK6416AM, M11B416256A, SM8706AV, MBM29F400TC-70PFTN, UPC2511GK-9EU-X, UPD72153GM-UEU, PST9243NR, PM0025AF, M37902FGCHP

#### ■ BU2099FV (DVR ATAPI MAIN ASSY : IC308)

##### • Serial In/Parallel Out Expander

##### ● Block Diagram



##### ● Pin Function

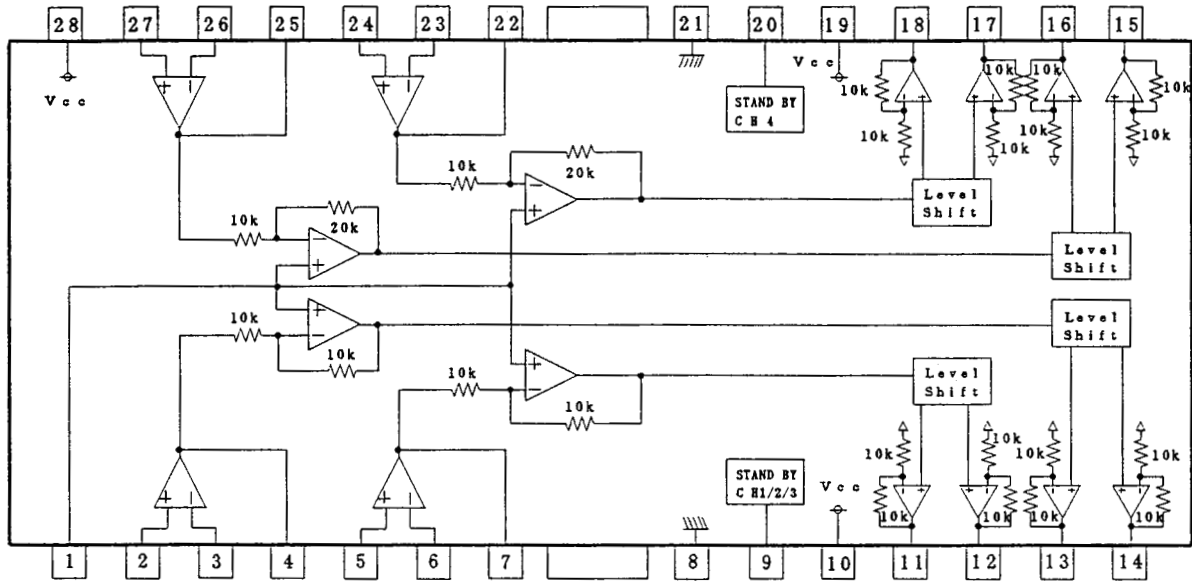
| No.        | Symbol          | I/O | Function   |            |   |   |            |    |     |
|------------|-----------------|-----|--|------------|---|---|------------|----|-----|
| 1          | Vss             | —   | GND  |            |   |   |            |    |     |
| 2          | NC              | —   | Non Connection   |            |   |   |            |    |     |
| 3          | DATA            | I   | Input Serial Data  |            |   |   |            |    |     |
| 4          | CLOCK           | I   | Shift Clock (Rising Edge Trigger)  |            |   |   |            |    |     |
| 5          | LCK             | I   | Latch Clock (Rising Edge Trigger)  |            |   |   |            |    |     |
| 6~17       | Q0~Q11<br>(Qx)  | O   | Output Parallel data(Nch Open Drain FET) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>LATCH DATA</td> <td>L</td> <td>H</td> </tr> <tr> <td>OUTPUT FET</td> <td>ON</td> <td>OFF</td> </tr> </table> | LATCH DATA | L | H | OUTPUT FET | ON | OFF |
| LATCH DATA | L               | H   |  |            |   |   |            |    |     |
| OUTPUT FET | ON              | OFF |  |            |   |   |            |    |     |
| 18         | SO              | O   | Serial Output Data   |            |   |   |            |    |     |
| 19         | $\overline{OE}$ | I   | Output Enable Control  |            |   |   |            |    |     |
| 20         | VDD             | —   | Power Supply   |            |   |   |            |    |     |

\*  $\overline{OE}$  Pull down to Vss

■ BA5983FM (DVR ATAPI MAIN ASSY : IC804)

• 4ch BTL Driver IC

● Block Diagram



resistor unit : Ω

● Pin Function

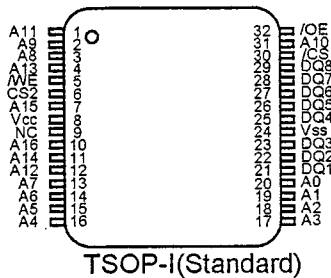
| NO | Symbol   | Function                            | NO | Symbol   | Function                            |
|----|----------|-------------------------------------|----|----------|-------------------------------------|
| 1  | BIAS IN  | Input for Bias- amplifier           | 15 | VO4 (+)  | Non inverted output of CH4          |
| 2  | OPIN1(+) | Non inverting input for CH1 OP- AMP | 16 | VO4 (-)  | Inverted output of CH4              |
| 3  | OPIN1(-) | Inverting input for CH1 OP- AMP     | 17 | VO3 (+)  | Non inverted output of CH3          |
| 4  | OPOUT1   | Output for CH1 OP- AMP              | 18 | VO3 (-)  | Inverted output of CH3              |
| 5  | OPIN2(+) | Non inverting input for CH2 OP- AMP | 19 | PowVcc2  | Vcc for CH3/4 power block           |
| 6  | OPIN2(-) | Inverting input for CH2 OP- AMP     | 20 | STBY2    | Input for CH4 stand by control      |
| 7  | OPOUT2   | output for CH2 OP- AMP              | 21 | GND      | Substrate ground                    |
| 8  | GND      | Substrate ground                    | 22 | OPOUT3   | Output for CH3 OP- AMP              |
| 9  | STBY1    | Input for CH1/2/3 stand by control  | 23 | OPIN3(-) | Inverting input for CH3 OP- AMP     |
| 10 | PowVcc1  | Vcc for CH1/2 power block           | 24 | OPIN3(+) | Non inverting input for CH3 OP- AMP |
| 11 | VO2 (-)  | Inverted output of CH2              | 25 | OPOUT4   | Output for CH4 OP- AMP              |
| 12 | VO2 (+)  | Non inverted output of CH2          | 26 | OPIN4(-) | Inverting input for CH4 OP- AMP     |
| 13 | VO1 (-)  | Inverted output of CH1              | 27 | OPIN4(+) | Non inverting input for CH4 OP- AMP |
| 14 | VO1 (+)  | Non inverted output of CH1          | 28 | PreVcc   | Vcc for pre block                   |

notes) Symbol of + and - (output of drivers) means polarity to input pin.  
(For example if voltage of pin4 high, pin14 is high.)



■ HY628100BLT1-70 (DVR ATAPI MAIN ASSY : IC351)

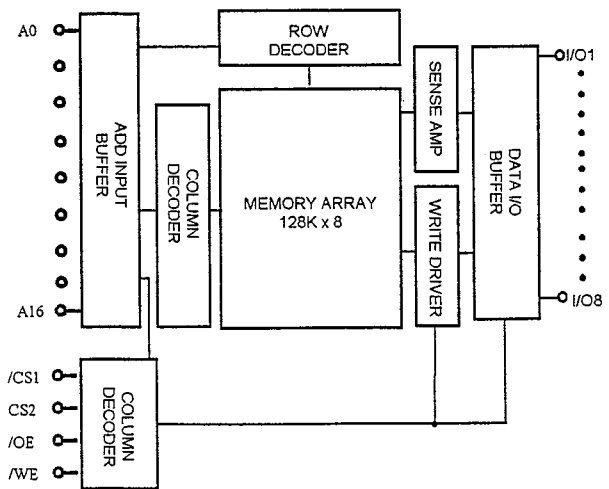
- SRAM (1Mbit)
- Pin Arrangement (Top view)



- Pin Function

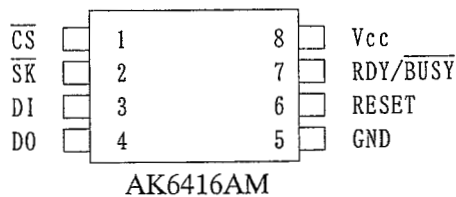
| Pin Name    | Pin Function      |
|-------------|-------------------|
| /CS1        | Chip Select 1     |
| CS2         | Chip Select 2     |
| /WE         | Write Enable      |
| /OE         | Output Enable     |
| A0 ~ A16    | Address Input     |
| I/O1 ~ I/O8 | Data Input/Output |
| Vcc         | Power(5.0V)       |
| Vss         | Ground            |

- Block Diagram



■ AK6416AM (DVR ATAPI MAIN ASSY : IC309)

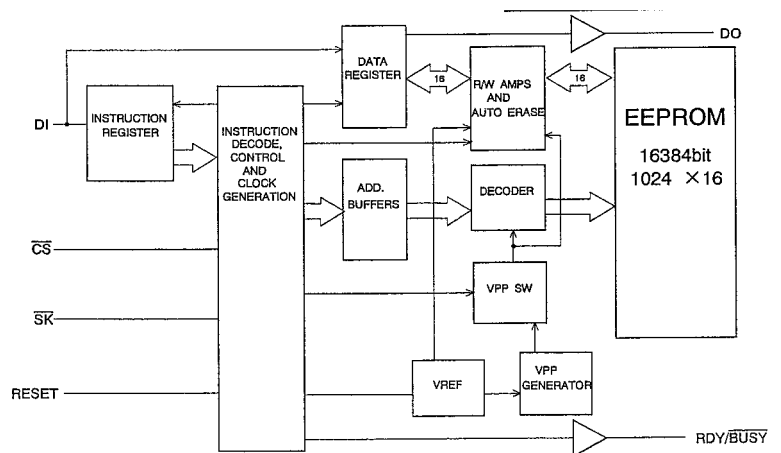
- EEPROM
- Pin Arrangement (Top view)



- Pin Function

| PIN NO.  | DESCRIPTION        |
|----------|--------------------|
| CS       | Chip select        |
| SK       | Serial clock Input |
| DI       | Serial data Input  |
| DO       | Serial data output |
| RESET    | Reset Input        |
| RDY/BUSY | RDY/BUSY output    |
| Vcc      | Power supply       |
| GND      | Ground             |

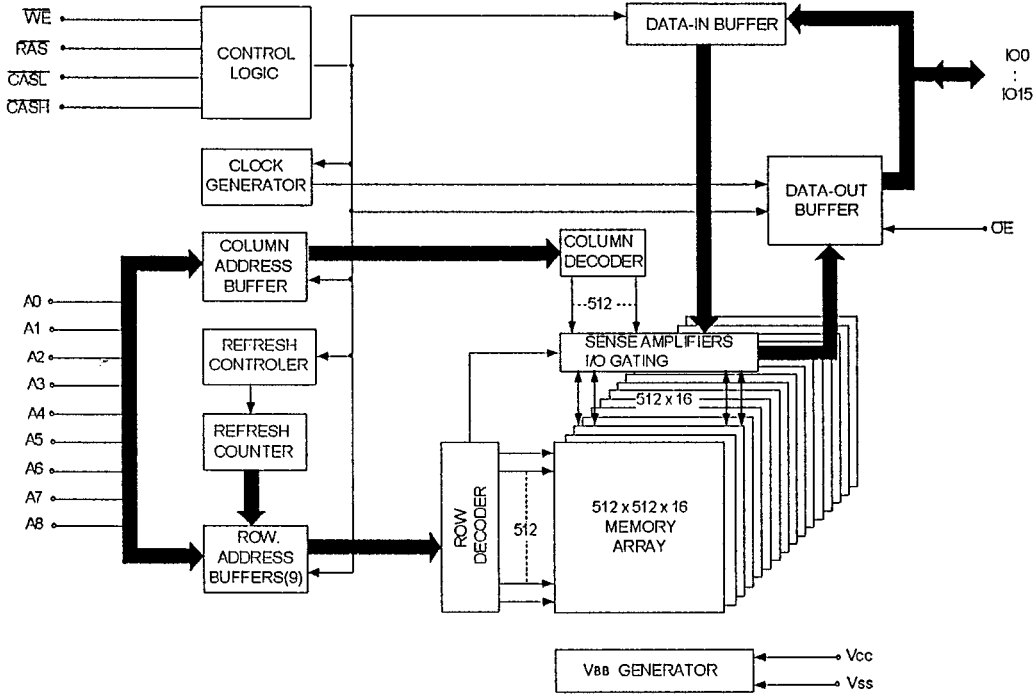
- Block Diagram



■ M11B416256A-35T (DVR ATAPI MAIN ASSY : IC104)

• EDO RAM (4Mbit)

● Block Diagram

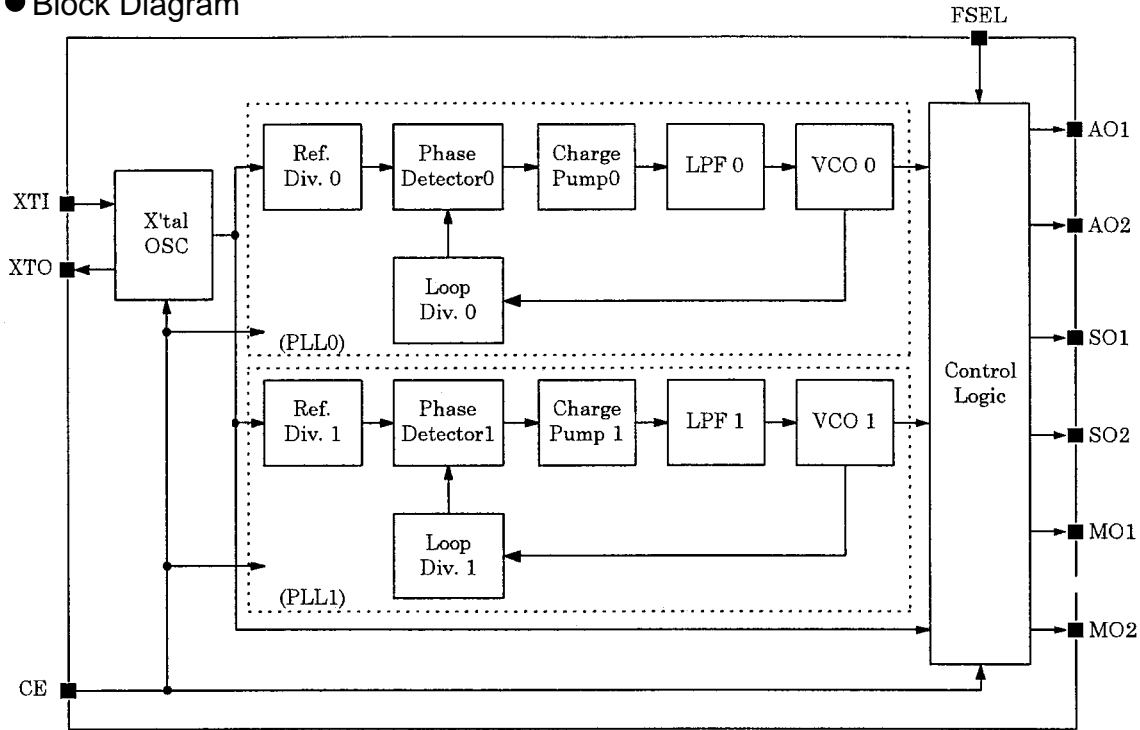


● Pin Function

| PIN NO.              | PIN NAME          | TYPE           | DESCRIPTION  |
|----------------------|-------------------|----------------|--|
| 16~19,22~26          | A0~A8             | Input          | Address Input<br>Row Address : A0~A8<br>Column Address : A0~A8 |
| 14                   | $\overline{RAS}$  | Input          | Row Address Strobe   |
| 28                   | $\overline{CASH}$ | Input          | Column Address Strobe / Upper Byte Control                     |
| 29                   | $\overline{CASL}$ | Input          | Column Address Strobe / Lower Byte Control                     |
| 13                   | $\overline{WE}$   | Input          | Write Enable   |
| 27                   | $\overline{OE}$   | Input          | Output Enable  |
| 2~5,7~10,31~34,36~39 | I/O0 ~ I/O15      | Input / Output | Data Input / Output  |
| 1,6,20               | Vcc               | Supply         | Power, 5V  |
| 21,35,40             | Vss               | Ground         | Ground   |
| 11,12,15,30          | NC                | -              | No Connect   |

■ SM8706AV (DVR ATAPI MAIN ASSY : IC501)

- Clock Generator
- Block Diagram



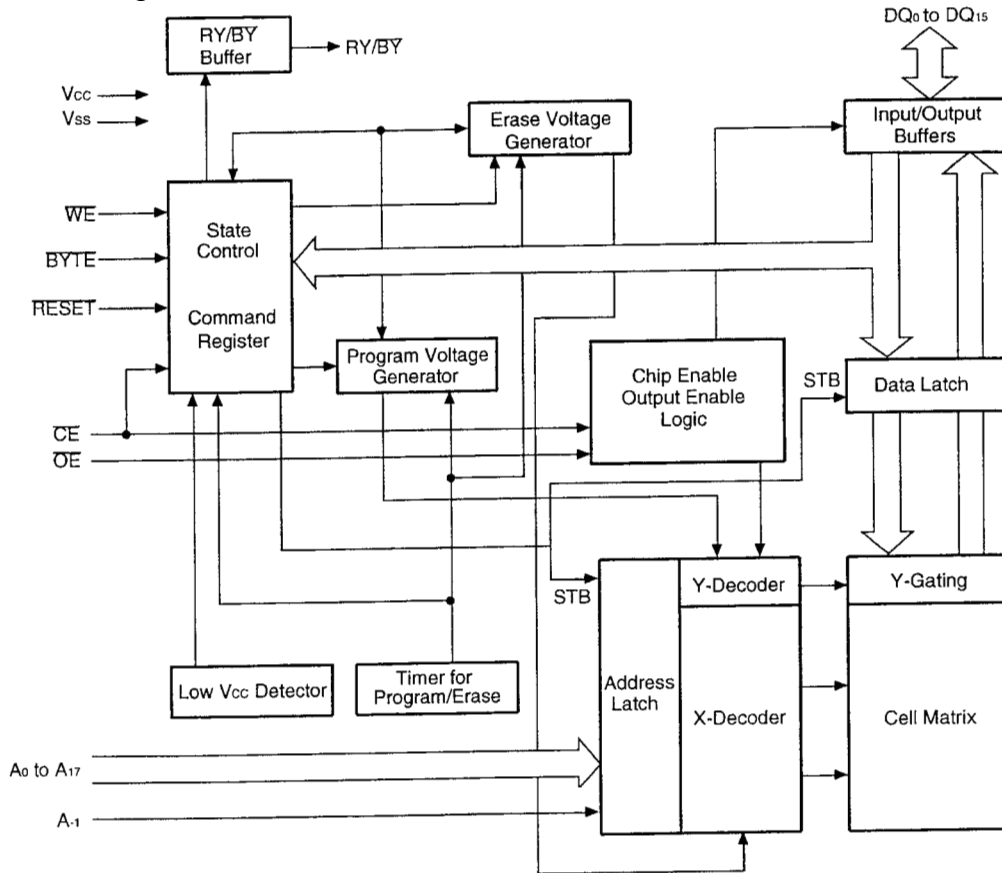
● Pin Function

| Number | Name | I/O | Function   |
|--------|------|-----|--|
| 1      | VDD1 | PWR | Supply 1 (for digital block)   |
| 2      | VSS1 | GND | Ground 1 (for digital block)   |
| 3      | MO1  | O   | Video system output 1 (27MHz fixed)  |
| 4      | MO2  | O   | Video system output 2 (54MHz fixed)  |
| 5      | VDD2 | PWR | Supply 2 (for analog block)  |
| 6      | VSS2 | GND | Ground 2 (for analog block)  |
| 7      | XTI  | I   | Crystal oscillator connection or external clock input  |
| 8      | XTO  | O   | Crystal oscillator connection  |
| 9      | AO1  | O   | Audio system output 1 (384fs output)   |
| 10     | AO2  | O   | Audio system output 2 (768fs output)   |
| 11     | VSS3 | GND | Ground 3 (for digital block)   |
| 12     | VDD3 | PWR | Supply 3 (for digital block)   |
| 13     | SO1  | O   | Signal processor system output 1 (16.9344MHz fixed)  |
| 14     | FSEL | I   | Sampling frequency select<br>FSEL="H": fs=48kHz<br>FSEL="L": fs=44.1kHz<br>(with internal pull-up resistor, Schmitt-trigger input) |
| 15     | SO2  | O   | Signal processor system output 2 (33.8688MHz fixed)  |
| 16     | CE   | I   | Chip enable ("H"=Enable, "L"=Disable)  |

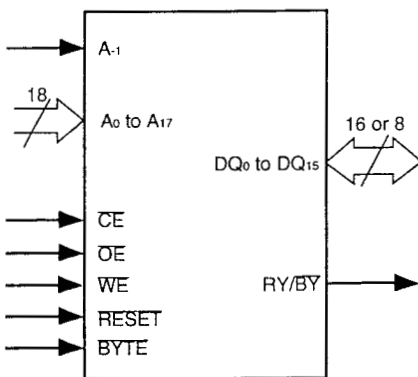
■ MBM29F400TC-70PFTN (DVR ATAPI MAIN ASSY : IC313)

• Flash Memory (4Mbit)

● Block Diagram



● Pin Function

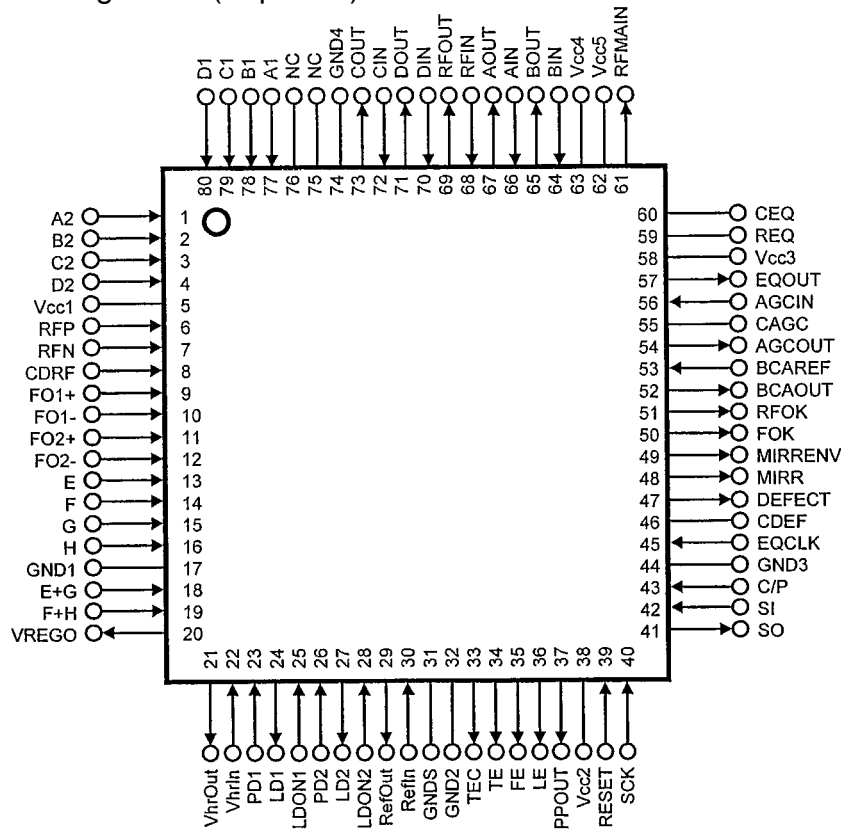


| Pin            | Function   |
|----------------|--|
| A-1, A0 to A17 | Address Inputs                                       |
| DQ0 to DQ15    | Data Inputs/Outputs                                  |
| CE             | Chip Enable  |
| OE             | Output Enable  |
| WE             | Write Enable   |
| RY/BY          | Ready-Busy Output                                    |
| RESET          | Hardware Reset Pin/<br>Temporary Sector Unprotection |
| BYTE           | Selects 8-bit or 16-bit mode                         |
| N.C.           | No Internal Connection                               |
| Vss            | Device Ground  |
| Vcc            | Device Power Supply                                  |

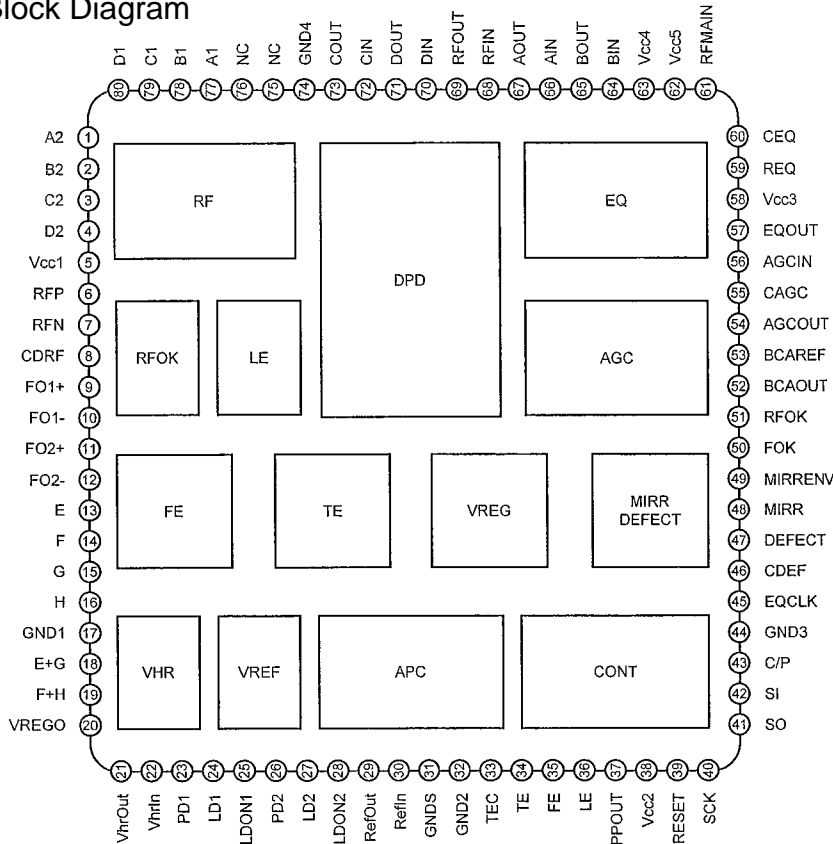
■ UPC2511GK-9EU-X (DVR ATAPI MAIN ASSY : IC112)

• CD/DVD RF FEP

● Pin Arrangement (Top view)



● Block Diagram



## ● Pin Function (1/2)

| No. | Pin Name | Function                           | Input/Output |
|-----|----------|------------------------------------|--------------|
| 1   | A2       | A2 signal input                    | Input        |
| 2   | B2       | B2 signal input                    | Input        |
| 3   | C2       | C2 signal input                    | Input        |
| 4   | D2       | D2 signal input                    | Input        |
| 5   | Vcc1     | Power supply (5 V) pin             | -            |
| 6   | RFP      | RF (differential signal) + input   | Input        |
| 7   | RFN      | RF (differential signal) - input   | Input        |
| 8   | CDRF     | RF signal input                    | Input        |
| 9   | FO1+     | FOCUS1+ signal input               | Input        |
| 10  | FO1-     | FOCUS1- signal input               | Input        |
| 11  | FO2+     | FOCUS2+ signal input               | Input        |
| 12  | FO2-     | FOCUS2- signal input               | Input        |
| 13  | E        | E signal input                     | Input        |
| 14  | F        | F signal input                     | Input        |
| 15  | G        | G signal input                     | Input        |
| 16  | H        | H signal input                     | Input        |
| 17  | GND1     | GND                                | -            |
| 18  | E+G      | E+G signal input                   | Input        |
| 19  | F+H      | F+H signal input                   | Input        |
| 20  | VREGO    | Power output for monitor diode     | Output       |
| 21  | VhrOut   | PDIC reference voltage output      | Output       |
| 22  | VhrIn    | PDIC reference voltage input       | Input        |
| 23  | PD1      | APC circuit 1 input                | Input        |
| 24  | LD1      | APC circuit 1 output               | Output       |
| 25  | LDON1    | APC circuit 1 laser on/off control | Input        |
| 26  | PD2      | APC circuit 2 input                | Input        |
| 27  | LD2      | APC circuit 2 output               | Output       |
| 28  | LDON2    | APC circuit 2 laser on/off control | Input        |
| 29  | RefOut   | Reference voltage output           | Output       |
| 30  | RefIn    | Reference voltage input            | Input        |
| 31  | GNDS     | GND                                | -            |
| 32  | GND2     | GND                                | -            |
| 33  | TEC      | Track count signal output          | Output       |
| 34  | TE       | Tacking error signal output        | Output       |
| 35  | FE       | Focus error signal output          | Output       |
| 36  | LE       | Lenz error signal output           | Output       |
| 37  | PPOUT    | Push/pull signal output            | Output       |
| 38  | Vcc2     | Power supply (5 V) pin             | -            |
| 39  | RESET    | reset input                        | Input        |
| 40  | SCK      | Serial port clock input            | Input        |

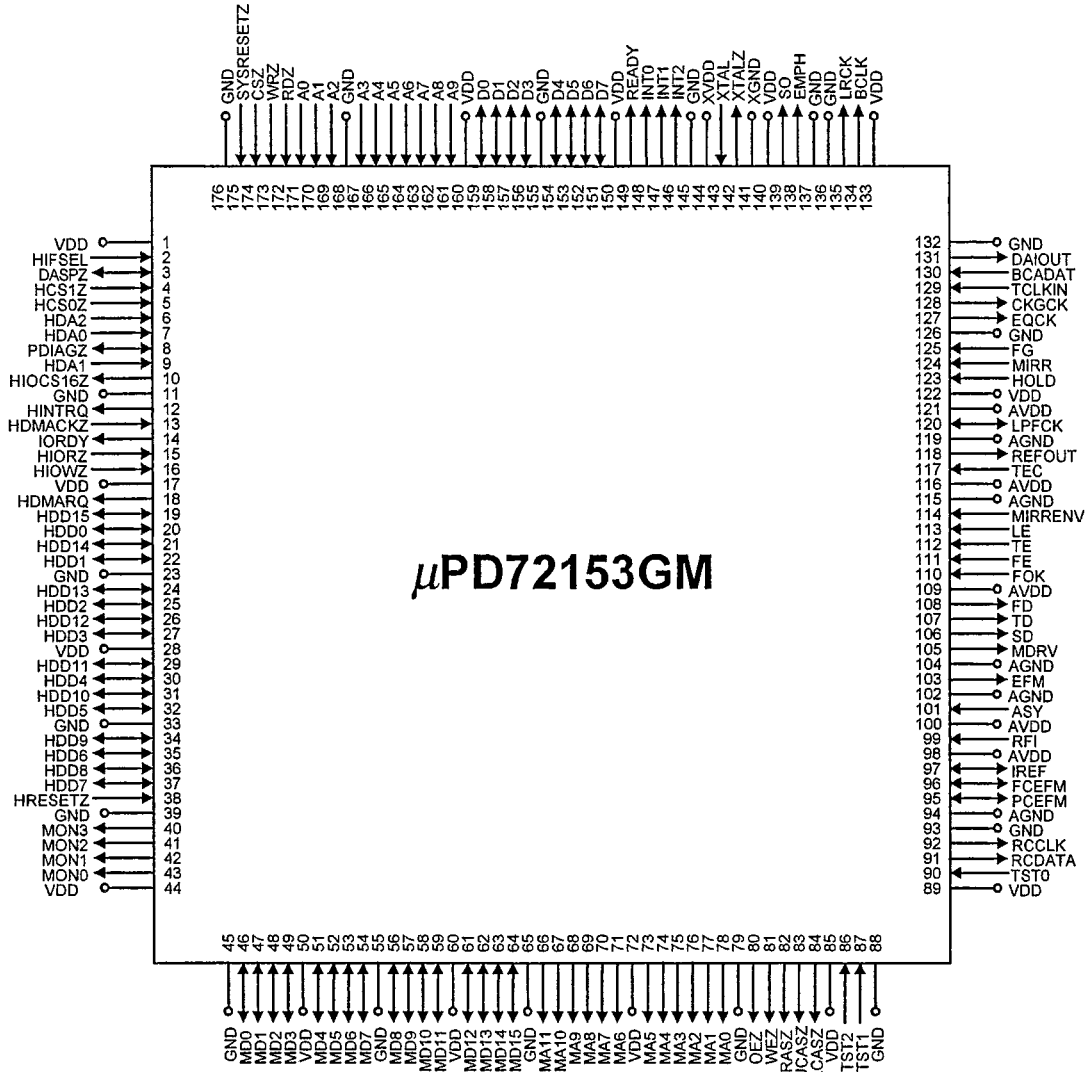
## ● Pin Function (2/2)

| No. | Pin Name | Function   | Input/Output |
|-----|----------|--|--------------|
| 41  | SO       | Serial data output   | Output       |
| 42  | SI       | Serial data input  | Input        |
| 43  | C/P      | Command (address)/parameter (data) identification signal input         | Input        |
| 44  | GND3     | GND  | -            |
| 45  | EQCLK    | Reference clock input for equalizer fc automatic adjustment circuit    | Input        |
| 46  | CDEF     | Capacitor connection for bottom detection for defect detection circuit | -            |
| 47  | DEFECT   | Defect detection signal output   | Output       |
| 48  | MIRR     | Mirror detection signal output   | Output       |
| 49  | MIRRENV  | RF signal bottom envelop output for mirror comparator level setting    | Output       |
| 50  | FOK      | RF peak envelop output for focus search                                | Output       |
| 51  | RFOK     | RF signal presence/absence judgment signal output                      | Output       |
| 52  | BCAOUT   | BCA circuit output   | Output       |
| 53  | BCAREF   | BCA circuit comparator voltage input                                   | Input        |
| 54  | AGCOUT   | AGC output   | Output       |
| 55  | CAGC     | AGC charge pump capacitor connection                                   | -            |
| 56  | AGCIN    | AGC amplifier input  | Input        |
| 57  | EQOUT    | RF equalizer output  | Output       |
| 58  | Vcc3     | Power source (5 V) pin   | -            |
| 59  | REQ      | Resistor connection for equalizer current setting                      | -            |
| 60  | CEQ      | Capacitor connection for equalizer fc automatic adjustment circuit     | -            |
| 61  | RFMAIN   | RF signal output (for monitoring)                                      | Output       |
| 62  | Vcc5     | Power supply (5 V) pin   | -            |
| 63  | Vcc4     | Power supply (5 V) pin   | -            |
| 64  | BIN      | DPD B signal AC input  | Input        |
| 65  | BOUT     | DPD B signal output (connect to BIN)                                   | Output       |
| 66  | AIN      | DPD A signal AC input  | Input        |
| 67  | AOUT     | DPD A signal output (connect to AIN)                                   | Output       |
| 68  | RFIN     | DPD RF signal AC input   | Input        |
| 69  | RFOUT    | DPD RF signal output (connect to RFIN)                                 | Output       |
| 70  | DIN      | DPD D signal AC input  | Input        |
| 71  | DOUT     | DPD D signal output (connect to DIN)                                   | Output       |
| 72  | CIN      | DPD C signal AC input  | Input        |
| 73  | COUT     | DPD C signal output (connect to CIN)                                   | Output       |
| 74  | GND4     | GND  | -            |
| 75  | NC       | Non Connection   | -            |
| 76  | NC       | Non Connection   | -            |
| 77  | A1       | A1 signal input  | Input        |
| 78  | B1       | B1 signal input  | Input        |
| 79  | C1       | C1 signal input  | Input        |
| 80  | D1       | D1 signal input  | Input        |

■ UPD72153GM-UEU (DVR ATAPI MAIN ASSY : IC111)

- 1-chip Controller

- Pin Arrangement (Top view)





## ● Pin Function

Pins whose names have a bar above them ( $\overline{\text{XXXX}}$ ) are active low. Other pins are active high.

Note that the initial value indicates the status of the output pin at the time of reset. For the input pin, input the value specified at the time of reset.

### <1> System interface

| No.  | Pin Name               | Pin Function Description   | I/O | Initial Value | Remarks                   |
|--|------------------------|--|-----|---------------|---------------------------|
| 146, 147<br>148  | INT2-INT0              | $\mu$ PD72153 interrupt request signals<br>INT2: Servo interface-related interrupt request output<br>INT1: Host interface-related interrupt request output<br>INT0: Interrupt request output other than Servo and Host interface | O   |               | 5V_tolerant pins (others) |
| 149  | READY                  | Wait signal output to the local CPU during buffer memory access  | O   |               | 5V_tolerant pin (others)  |
| 173  | WR                     | Write control signal from the local CPU  | I   |               | 5V_tolerant pin (others)  |
| 172  | $\overline{\text{RD}}$ | Read control signal from the local CPU   | I   |               | 5V_tolerant pin (others)  |
| 174  | $\overline{\text{CS}}$ | Chip select signal from the local CPU to the internal register and buffer memory   | I   |               | 5V_tolerant pin (others)  |
| 161, 162<br>163, 164<br>165, 166<br>167, 169<br>170, 171 | A9-A0                  | Address input signals. A9 is the MSB, and A0 is the LSB.   | I   |               | 5V_tolerant pins (others) |
| 151, 152<br>153, 154<br>156, 157<br>158, 159             | D7-D0                  | Data input signals. D7 is the MSB, and D0 is the LSB   | I   |               | 5V_tolerant pins (others) |

### <2> ATAPI interface (referred to SCSI controller DMA and MPEG decoder DMA interface)

| No. | Pin Name                | Pin Function Description  | I/O | Initial Value | Remarks               |
|-----|-------------------------|---|-----|---------------|-----------------------|
| 14  | IORDY                   | I/O channel ready signal to the host. It indicates that the drive is ready to receive transferred data. It is pulled up at 1.0 k $\Omega$ on the host side. | O   |               | 5V_tolerant pin (IDE) |
| 15  | DIOR                    | Read control signal from the host (HIFSEL pin = low)  | I   |               | <b>Note 7</b>         |
|     |                         | Read signal output when DMA transfer operation is performed for an external SCSI controller (HIFSEL pin = Hi)   | O   |               | 5V_tolerant pin (IDE) |
| 16  | $\overline{\text{DOW}}$ | Write control signal from the host (HIFSEL pin = low)   | I   |               | <b>Note 7</b>         |
|     |                         | Write signal output when DMA transfer operation is performed for an external SCSI controller (HIFSEL pin = Hi)  | O   |               | 5V_tolerant pin (IDE) |

| No.  | Pin Name       | Pin Function Description  | I/O | Initial Value | Remarks                   |
|--|----------------|---|-----|---------------|---------------------------|
| 18   | HDMARQ         | DMA request signal output to the host (tristate)<br>(HIFSEL pin = low)  | O   |               | 5V_tolerant<br>pin (IDE)  |
|  |                | Operates as a DREQ signal input pin when DMA<br>transfer operation is performed for an external SCSI<br>controller (HIFSEL pin = Hi)          | I   |               |                           |
| 19, 21<br>24, 26<br>29, 31<br>34, 36<br>37, 35<br>32, 30<br>27, 25<br>22, 20 | HDD15-<br>HDD0 | IDE data bus signal input/output pins (HIFSEL pin = low)  | I/O |               | 5V_tolerant<br>pins (IDE) |
|  |                | 16-bit data signal input/output pin used when data<br>transfer operation is performed for an external SCSI<br>controller<br>(HIFSEL pin = Hi) | I/O |               |                           |
| 38   | HRESET         | Reset signal input from the host  | I   |               | 5V_tolerant<br>pin (IDE)  |
| 2  | HIFSEL         | Signal used to select the host interface<br>L: IDE interface; H: General-purpose DMA<br>interface   | I   |               | 5V_tolerant<br>pin (IDE)  |
| 3  | DASP           | Pin used to input and output the device active and<br>device 1 present signals for the IDE control bus. Pull<br>up at 10 kΩ.                  | I/O |               | 5V_tolerant<br>pin (IDE)  |
| 4  | HCST           | Control block register selection signal for the task<br>register file   | I   |               | 5V_tolerant<br>pin (IDE)  |
| 5  | HCS0           | Command block register selection signal for the task<br>register file   | I   |               | 5V_tolerant<br>pin (IDE)  |
| 6, 9, 7  | HDA2-<br>HDA0  | IDE address bus input signals   | I   |               | 5V_tolerant<br>pins (IDE) |
| 8  | PDIAG          | Pin used to input and output the password diagnostics<br>signal for the IDE control bus. Pull up at 10 kΩ.                                    | I/O |               | 5V_tolerant<br>pin (IDE)  |
| 10   | HIOCS16        | 16-bit I/O output signal to the host. It indicates that 16-<br>bit data can be transferred in the PIO transfer mode.<br>Open drain output.    | O   |               | 5V_tolerant<br>pin (IDE)  |
| 12   | HINTRQ         | Interrupt request signal to the host  | O   |               | 5V_tolerant<br>pin (IDE)  |
| 13   | HDMACK         | DMA acknowledgement signal from the host. It<br>indicates that the DMA transfer request has been<br>accepted. (HIFSEL pin = low)              | I   |               | 5V_tolerant<br>pin (IDE)  |
|  |                | Outputs the DACK signal when DMA transfer is<br>performed for an external SCSI controller (HIFSEL pin =<br>Hi)                                | O   |               |                           |

Note 7. Pull up at 10 kΩ.

## &lt;3&gt; Buffer interface

| No.  | Pin Name          | Pin Function Description                                | I/O | Initial Value | Remarks                   |
|--|-------------------|---|-----|---------------|---------------------------|
| 64, 63<br>62, 61<br>59, 58<br>57, 56<br>54, 53<br>52, 51<br>49, 48<br>47, 46 | MD15-<br>MD0      | 16-bit data input/output pins for the buffer memory     | I/O |               | 5V_tolerant pins (others) |
| 66, 67<br>68, 69<br>70, 71<br>73, 74<br>75, 76<br>77, 78                     | MA11-<br>MA0      | Address output pins for the buffer memory               | O   |               | 3V pins                   |
| 80   | $\overline{OE}$   | Output pin connected to the DRAM $\overline{OE}$ signal | O   |               | 3V pin                    |
| 81   | $\overline{WE}$   | Output pin connected to the DRAM $\overline{WE}$ signal | O   |               | 3V pin                    |
| 82   | $\overline{RAS}$  | $\overline{RAS}$ signal output pin                      | O   |               | 3V pin                    |
| 83   | $\overline{UCAS}$ | $\overline{UCAS}$ signal output pin                     | O   |               | 3V pin                    |
| 84   | $\overline{LCAS}$ | $\overline{LCAS}$ signal output pin                     | O   |               | 3V pin                    |

## &lt;4&gt; BCA channel interface

| No. | Pin Name | Pin Function Description | I/O | Initial Value | Remarks |
|-----|----------|--------------------------|-----|---------------|---------|
| 130 | BCADAT   | BCA signal input pin     | I   |               | 3V pin  |

## &lt;5&gt; Audio interface

| No. | Pin Name | Pin Function Description  | I/O | Initial Value | Remarks |
|-----|----------|---|-----|---------------|---------|
| 134 | BCLK     | Synchronization clock output pin for serial voice data. Serial data changes at the falling edge of this clock.                            | O   |               | 3V pin  |
| 135 | LRCK     | Signal used to distinguish between S0 serial voice data L and R   | O   |               | 3V pin  |
| 139 | SO       | Serial voice data output pin. Data is output MSB first as a 2's complement and justified to LSB, in response to the change point of LRCK. | O   |               | 3V pin  |
| 138 | EMPH     | Emphasis identification signal  | O   |               | 3V pin  |
| 131 | DAIOUT   | Digital audio output pin  | O   |               | 3V pin  |

## &lt;6&gt; Servo interface

| No. | Pin Name | Pin Function Description   | I/O | Initial Value | Remarks                      |
|-----|----------|--|-----|---------------|------------------------------|
| 105 | MDRV     | Spindle drive output pin   | O   | Undefined     | Analog pin <sup>Note 8</sup> |
| 106 | SD       | Thread drive output pin  | O   | Undefined     | Analog pin <sup>Note 8</sup> |
| 107 | TD       | Tracking drive output pin  | O   | Undefined     | Analog pin <sup>Note 8</sup> |
| 108 | FD       | Focus drive output pin   | O   | Undefined     | Analog pin <sup>Note 8</sup> |
| 123 | HOLD     | HOLD control signal input pin  | I   |               | 5V_tolerant pin (others)     |
| 124 | MIRR     | MIRR detection signal input pin  | I   |               | 5V_tolerant pin (others)     |
| 110 | FOK      | RF signal peak envelop waveform input for focus search   | I   |               | Analog pin                   |
| 114 | MIRRENV  | RF signal bottom envelop waveform input for MIRR signal comparator level setting   | I   |               | Analog pin                   |
| 111 | FE       | Focus error signal input pin   | I   |               | Analog pin                   |
| 112 | TE       | Tracking error signal input pin  | I   |               | Analog pin                   |
| 113 | LE       | Lenz error signal input pin  | I   |               | Analog pin                   |
| 117 | TEC      | Tracking comparator input pin. Input a tracking error signal with the DC component cut. This signal detects tracking zero cross. | I   |               | Analog pin                   |
| 118 | REFOUT   | A/D converter mid-point potential output pin<br>It can be used as a reference potential for the RF amplifier.                    | O   | 1/2VDD        | Analog pin                   |
| 125 | FG       | FG signal input pin  | I   |               | 5V_tolerant pin (others)     |

**Note 8.** The electric potential is undefined during the reset. It is fixed to 1/2VDD about 60  $\mu$ sec (maximum) after the power is turned on or the reset is canceled (XTAL must be oscillating). To protect the mechanical part, keep the driver powered off until the device is activated.

## &lt;7&gt; Read channel interface

| No. | Pin Name | Pin Function Description  | I/O | Initial Value | Remarks    |
|-----|----------|---|-----|---------------|------------|
| 92  | RCCLK    | Bit clock monitor pin   | O   |               | 3V pin     |
| 91  | RCDATA   | NRZI data monitor pin used after bit clock synchronization<br>CD: EFM<br>DVD: (8.16) is output. | O   |               | 3V pin     |
| 127 | EQCK     | RF amplifier programmable equalizer reference clock output                                      | O   |               | 3V pin     |
| 128 | CKGCK    | Clock generator clock monitor pin   | O   |               | 3V pin     |
| 99  | RFI      | EFM comparator RF signal input pin  | I   |               | Analog pin |
| 101 | ASY      | EFM comparator level input  | I   |               | Analog pin |
| 103 | EFM      | EFM signal output pin   | O   |               | Analog pin |
| 95  | PCEFM    | Pull down to AGND using the 4700-pF capacitor.  | I/O |               | Analog pin |
| 96  | FCEFM    | Pull down to AGND using the 1- $\mu$ F capacitor.   | I/O |               | Analog pin |
| 97  | IREF     | PLL reference current input pin   | I   |               | Analog pin |

## &lt;8&gt; Monitor information

| No. | Pin Name | Pin Function Description | I/O | Initial Value | Remarks |
|-----|----------|--------------------------|-----|---------------|---------|
| 43  | MON0     | Outputs test signals.    | O   |               | 3V pin  |
| 42  | MON1     | Outputs test signals.    | O   |               | 3V pin  |
| 41  | MON2     | Outputs test signals.    | O   |               | 3V pin  |
| 40  | MON3     | Outputs test signals.    | O   |               | 3V pin  |

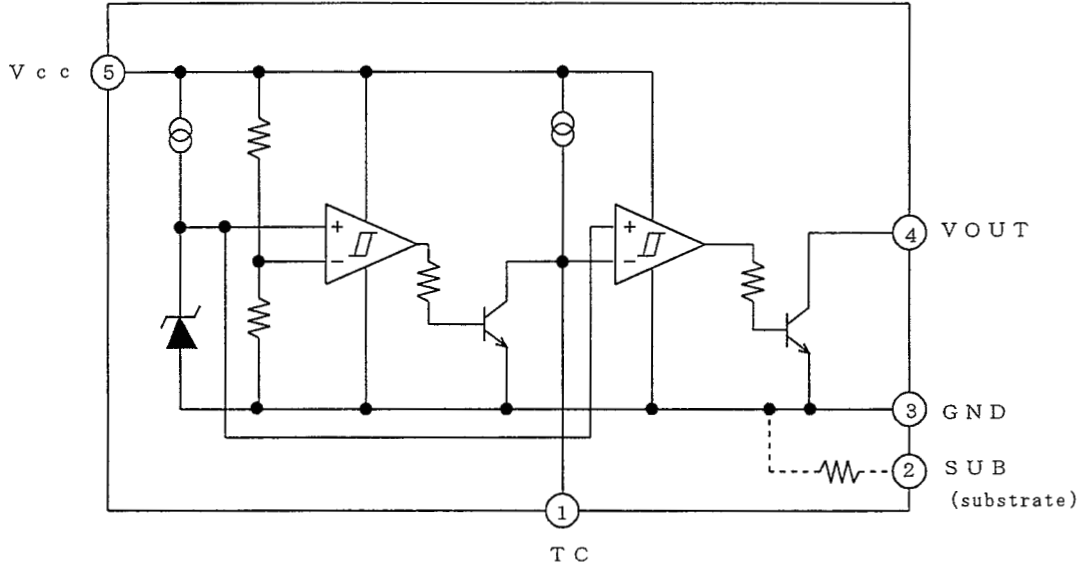
## &lt;9&gt; Other signals

| No.  | Pin Name | Pin Function Description                            | I/O | Initial Value | Remarks                  |
|--|----------|---|-----|---------------|--------------------------|
| 175  | SYSRST   | $\mu$ PD72153 reset input pin                       | I   |               | 5V_tolerant pin (others) |
| 142  | XTAL     | Crystal oscillator connection pin                   | O   |               |                          |
| 143  | XTAL     | Crystal oscillator connection pin                   | I   |               |                          |
| 144  | XVDD     | Positive power source pin of the crystal oscillator | I   |               |                          |
| 141  | XGND     | GND pin of the crystal oscillator                   | I   |               |                          |
| 121, 116<br>109, 100<br>98   | AVDD     | Analog positive power source pins                   | I   |               |                          |
| 119, 115<br>104, 102<br>94   | AGND     | Analog GND pins                                     | I   |               |                          |
| 1, 17, 28<br>44, 50<br>60, 72<br>85, 89<br>122, 133<br>140, 150<br>160                         | VDD      | Digital positive power source pins                  | I   |               |                          |
| 11, 23<br>33, 39<br>45, 55<br>65, 79<br>88, 93<br>126, 132<br>136, 137<br>145, 155<br>168, 176 | GND      | Digital GND pins                                    | I   |               |                          |
| 129  | TCLKIN   | Test pin (Be sure to connect it to GND.)            | I   |               | 3V pin                   |
| 120  | LPFCK    | Test pin (Be sure to connect it to GND.)            | I/O |               | Analog pin               |
| 86, 87<br>90   | TST2-0   | Test pins (Be sure to connect them to GND.)         | I   |               | 3V pins                  |

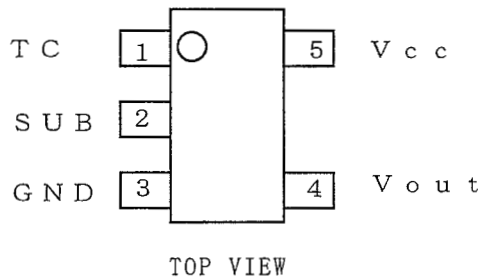
■ PST9243NR (DVR ATAPI MAIN ASSY : IC311)

• Reset IC

● Block Diagram



● Pin Arrangement (Top view)



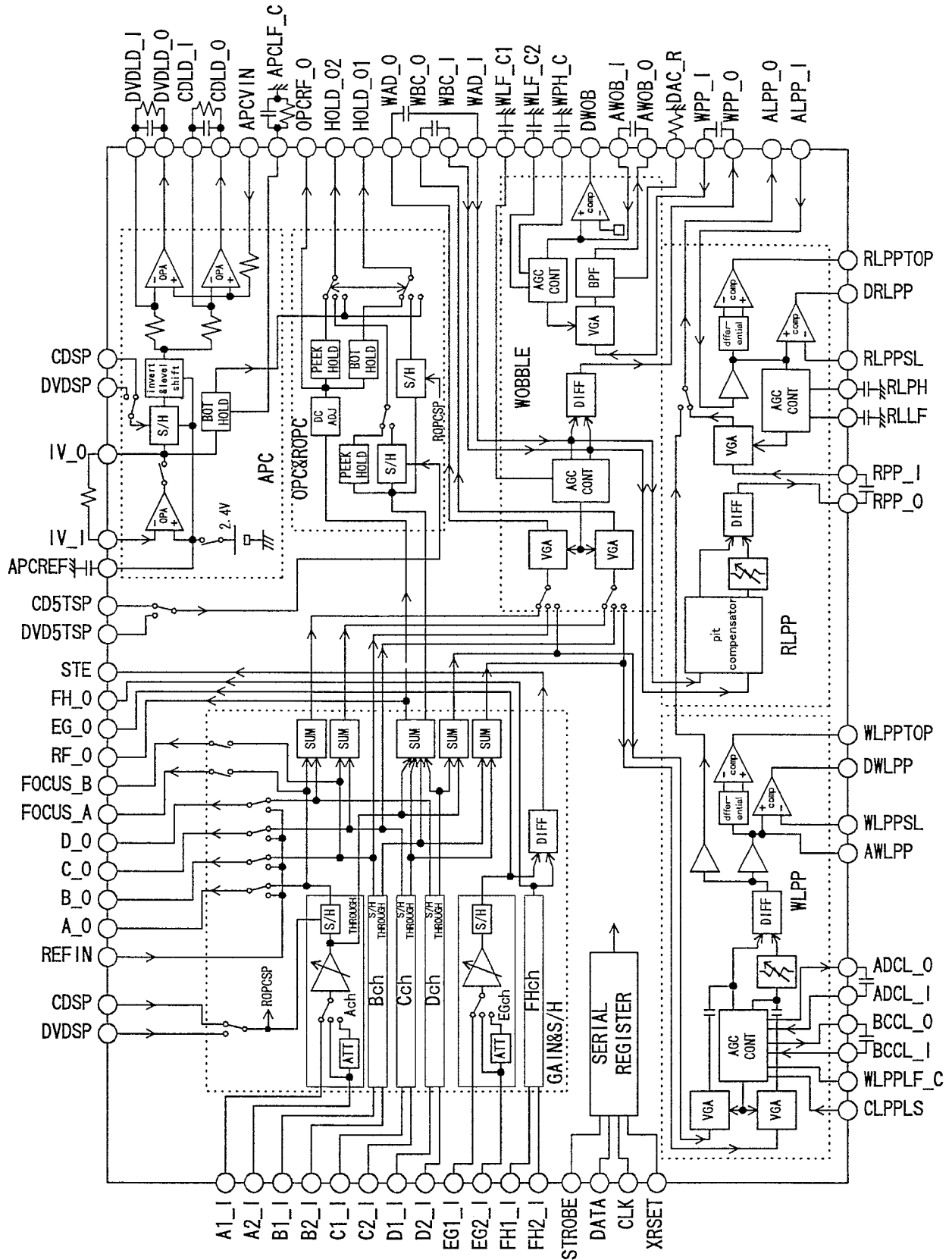
● Pin Function

| PIN No. | PIN NAME | FUNCTIONS                    | INTERNAL EQUIVALENT CIRCUIT |
|---------|----------|------------------------------|-----------------------------|
| 1       | TC       | TPLH Control PIN             | Refer to BLOCK DIAGRAM.     |
| 2       | SUB      | Substrate PIN (*1)           |                             |
| 3       | GND      | GND PIN                      |                             |
| 4       | Vout     | Reset Signal Output PIN      |                             |
| 5       | Vcc      | Vcc PIN / Voltage Detect PIN |                             |

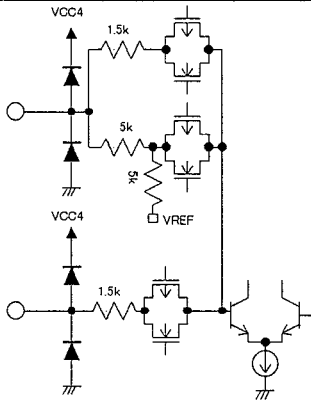
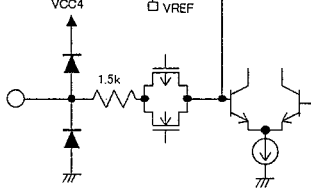
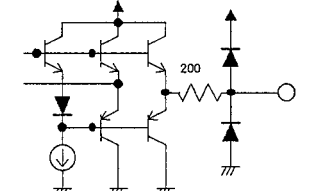
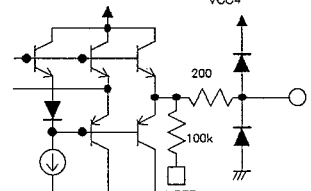
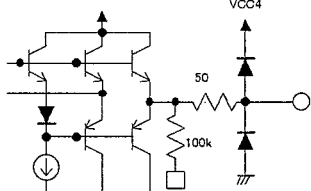
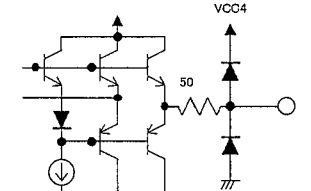
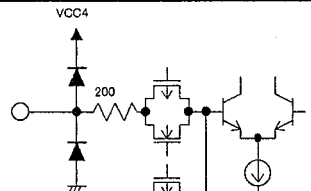
(\*1) Connect to GND.

PM0025AF (DVR ATAPI MAIN ASSY : IC109)

- DVD-R/RW Frontend IC
- Pin Arrangement (Top view)



● Pin Function (1/6)

| Pin No.                          | Symbol   | I/O | Equivalent circuit  | Function                             |
|----------------------------------|--|-----|---|--------------------------------------|
| 1<br>2<br>96<br>97<br>98<br>99   | E2G2_I<br>F2H2_I<br>A2_I<br>B2_I<br>C2_I<br>D2_I | I   |    | A - D, EG, FH signal input (for CD)  |
| 90<br>91<br>92<br>93<br>94<br>95 | A1_I<br>B1_I<br>C1_I<br>D1_I<br>E1G1_I<br>F1H1_I | I   |    | A - D, EG, FH signal input (for DVD) |
| 3<br>4<br>5<br>6                 | FH_O<br>EG_O<br>FOCUS_B<br>FOCUS_A               | O   |    | FH, EG, FOCUS_A - B signal output    |
| 5<br>6                           | FOCUS_B<br>FOCUS_A                               | O   |   | FOCUS_A - B signal output            |
| 7                                | RF_O   | O   |  | RF signal output                     |
| 8<br>9<br>10<br>11               | D_O<br>C_O<br>B_O<br>A_O                         | O   |  | A - D signal output                  |
| 12                               | REFIN  | I   |  | Reference power supply input         |



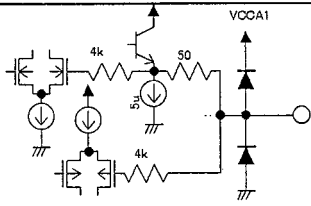
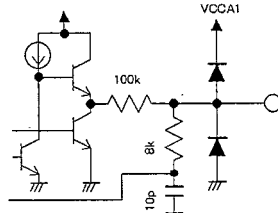
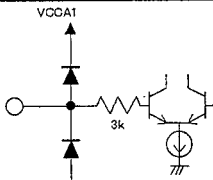
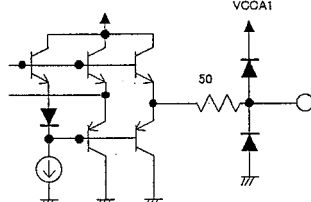
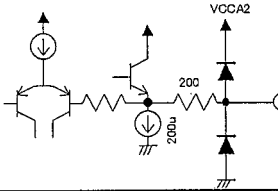
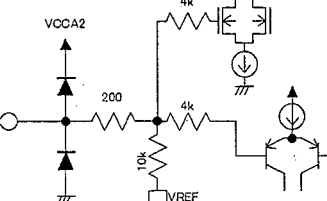
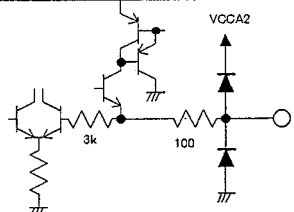
● Pin Function (2/6)

| Pin No.                    | Symbol                                       | I/O                           | Equivalent circuit | Function   |
|----------------------------|--|-------------------------------|--------------------|--|
| 13<br>15<br>16             | DVDSP<br>DVD5TSP<br>DVDAPCSP                 | I                             |                    | The sample hold pulse input for DVD (L:hold)<br>DVDSP:S/H Block<br>DVD5TSP:ROPC Block<br>DVDAPCSP:APC Block<br>It is internal 100k and is a pull-up.   |
| 17<br>18<br>19             | CDSP<br>CD5TSP<br>CDAPCSP                    | I                             |                    | The sample hold pulse input for CD (L:hold)<br>CDSP:S/H Block<br>CD5TSP:ROPC Block<br>CDAPCSP:APC Block<br>It is internal 100k and is a pull-up.   |
| 14                         | CLPPLS                                       | I                             |                    | WLPP clamp pulse input<br>It is internal 100k and is a pull-up.  |
| 20                         | DVDD1  | -                             |                    | 5V Power supply DGND1 and pair   |
| 21                         | DGND1  | -                             |                    | GND  |
| 22<br>23<br>24             | STROBE<br>DATA<br>CLK                        | I                             |                    | 3 line serial data input   |
| 25<br>26<br>27<br>28<br>29 | MONI<br>TESTA<br>TESTB<br>TESTC<br>TESTD     | O<br>I/O<br>I/O<br>I/O<br>I/O |                    | Internal signal monitor terminal   |
| 30                         | XRESET                                       | I                             |                    | Register reset input (Low:reset)<br>It is internal 25k and is a pull-up.   |
| 31                         | DVDD2  | -                             |                    | 5V Power supply DGND2 and pair   |
| 32                         | DGND2  | -                             |                    | GND  |
| 33<br>34<br>35<br>36<br>37 | DWLPP<br>WLPPTOP<br>DRLPP<br>RLPPTOP<br>DWOB | O                             |                    | DWLPP: WLPP 2value-ized output<br>WLPPTOP: RLPP differentiation 2value-ized output<br>DRLPP: RLPP 2 value-ized output<br>RLPPTOP: LPP differentiation in reproduction 2value-ized output<br>DWOB: WOBBLE 2value-ized output<br>It is internal 100k and is a pull-up. |
| 38                         | VCCA1  | -                             |                    | 5V Power supply GNDA1 and pair   |
| 39                         | VREF1  | -                             |                    | Standard voltage 2.1V input GNDA1 and pair   |
| 40                         | GNDA1  | -                             |                    | GND  |

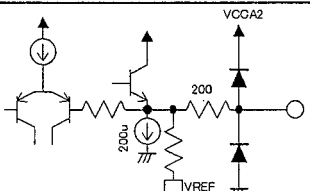
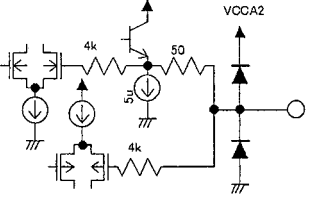
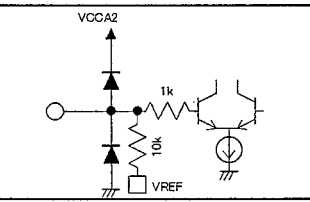
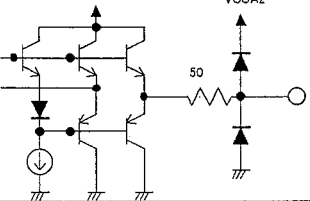
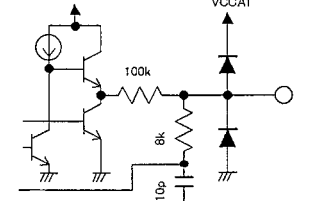
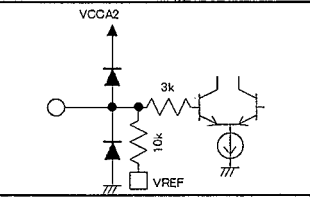
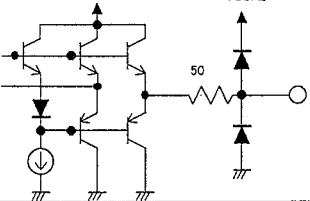
● Pin Function (3/6)

| Pin No.  | Symbol           | I/O | Equivalent circuit | Function   |
|----------|------------------|-----|--------------------|--|
| 41<br>42 | RLPSSL<br>WLPPSL | I   |                    | LPP slice level input<br>RLPSSL:RLPP Block<br>WLPPSL:WLPP Block                      |
| 43       | TESTSET          | I   |                    | Test setting terminal  |
| 44       | AWLPP            | O   |                    | WLPP Analog output   |
| 45       | WLPLF_C          |     |                    | The capacitor connection terminal for WLPP AGC filters                               |
| 46<br>48 | BCCL_I<br>ADCL_I | I   |                    | WLPP clamp Amplifier input<br>BCCL_I : (B+C)signal side<br>ADCL_I: (A+D)signal side  |
| 47<br>49 | BCCL_O<br>ADCL_O | O   |                    | WLPP clamp Amplifier output<br>BCCL_O : (B+C)signal side<br>ADCL_O: (A+D)signal side |
| 50       | ALPP_I           | I   |                    | RLPP analog input  |
| 51       | ALPP_O           | O   |                    | RLPP analog output   |

● Pin Function (4/6)

| Pin No. | Symbol | I/O | Equivalent circuit  | Function   |
|---------|--------|-----|---|--|
| 52      | RLPH_C | O   |    | The capacity connection terminal for RLPP peak detection |
| 53      | RLLF_C | O   |    | The capacity connection terminal for RLPP AGC            |
| 54      | RPP_I  | I   |    | RLPP push pull input                                     |
| 55      | RPP_O  | O   |   | RLPP push pull output                                    |
| 56      | AWOB_O | O   |  | WOBBLE analog output                                     |
| 57      | AWOB_I | I   |  | WOBBLE analog input                                      |
| 58      | DAC_R  | O   |  | The standard resistor connection terminal for DAC        |
| 59      | VCCA2  | -   |   | 5V Power supply GND A2 and pair                          |
| 60      | VREF2  | -   |   | Standard voltage 2.1V input GND A2 and pair              |
| 61      | GND A2 | -   |   | GND  |

● Pin Function (5/6)

| Pin No.  | Symbol           | I/O | Equivalent circuit  | Function   |
|----------|------------------|-----|---|--|
| 62       | STE              | O   |    | STE Output (FH-EG)   |
| 63       | WPH_C            | O   |    | The capacity connection terminal for WOBBLE peak detection   |
| 64       | WPP_I            | I   |    | WOBBLE push pull input   |
| 65       | WPP_O            | O   |   | WOBBLE push pull output  |
| 66<br>67 | WLF_C2<br>WLF_C1 | O   |  | WLF_C2: Capacitor connection terminal for WOBBLE AGC<br>WLF_C1: Capacitor connection terminal for WOBBLE RFAGC |
| 68<br>70 | WBC_I<br>WAD_I   | I   |  | WBBLE B+C (A+D) input  |
| 69<br>71 | WBC_O<br>WAD_O   | O   |  | WBBLE B+C (A+D) output   |
| 72       | VCCA3            | -   |   | 5V Power supply GND A2 and pair  |
| 73       | VREF3            | -   |   | Standard voltage 2.1V input GND A2 and pair  |
| 74       | GND A3           | -   |   | GND  |

● Pin Function (6/6)

| Pin No.                    | Symbol   | I/O                   | Equivalent circuit | Function  |
|----------------------------|--|-----------------------|--------------------|---|
| 75<br>76                   | HOLD_O1<br>HOLD_O2                               | O                     |                    | APC, OPC, and ROPC output terminal  |
| 77                         | OPCRF_O  | O                     |                    | RF signal output (A+B+C+D) for OPEC   |
| 78                         | APCREF   | I/O                   |                    | APC Reference power supply (2.4V)<br>Requires a bypass capacitor to GNDA3   |
| 80<br>82<br>83<br>84<br>85 | APCVIN<br>CDLD_I<br>CDLD_O<br>DVDLD_I<br>DVDLD_O | I<br>I<br>O<br>I<br>O |                    | APCVIN: APC power setting input<br>CDLD_I: CD APC amplifier input<br>CDLD_O: CD Read power output<br>DVDLD_I: DVD APC amplifier input<br>DVDLD_O: DVD Read power output |
| 81                         | APCLF_C  | O                     |                    | The capacitor connection terminal for RAPC bottom hold  |
| 86<br>87                   | IV_O<br>IV_I                                     | O<br>I                |                    | IV_O: I/V amplifier output<br>IV_I: I/V amplifier input   |
| 88                         | VREF4  | -                     |                    | Standard voltage 2.1V input GNDA4 and pair  |
| 89                         | GNDA4  | -                     |                    | GND   |
| 100                        | VCCA4  | -                     |                    | 5V Power supply GNDA4 and pair  |

## ■ M37902FGCHP (DVR ATAPI MAIN ASSY : IC306)

### • CPU

#### ● PinFunction (1/3)

| No. | Mark   | Pin Name | Type | Function   |
|-----|--------|----------|------|--|
| 1   | AN0    | OPT_T    | I    | A / D input of OPC top level                                 |
| 2   | TB2IN  | BCADATA  | I    | BCA DATA input after a party rate                            |
| 3   | TB1IN  | TVRCK    | I    | TE input for a tracking error count                          |
| 4   | TB0IN  | FG       | I    | Spindle FG pulse signal input                                |
| 5   | INT2   | INT      | I    | Interruption (for SCSI)                                      |
| 6   | INT1   | INT      | I    | Interruption (CD)  |
| 7   | INT0   | INT      | I    | Interruption (R3,M63)  |
| 8   | P61    | ECPBUS   | I    | Time BUSY of EEPROM access                                   |
| 9   | P60    | DISCRW   | O    | Time High of RW  |
| 10  | P57    | XAUDMUTE | O    | AUDIO MUTE (being L MUTE)                                    |
| 11  | P56    | XCLDON   | O    | CD LD ON (LOW ACTIVE)  |
| 12  | P55    | XDLDON   | O    | DVD LD ON (LOW ACTIVE)                                       |
| 13  | P54    | SPGAIN   | I/O  | Spindle gain It is usually an input HIZ.                     |
| 14  | P53    | BCHIPCS  | O    | CS of B-CHIP   |
| 15  | P52    | PICGAIN  | O    | GAIN change in Pickup  |
| 16  | P51    | LDDENBL  | O    | LD DRIVER ENABLE (being H ENABLE)                            |
| 17  | TA0OUT | LOADPWN  | O    | PWM output for loading mechanism                             |
| 18  | CS3    | CS3      | O    | CS of S-RAM (negative logic)                                 |
| 19  | CS2    | CS2      | O    | CS for address decoders (negative logic)                     |
| 20  | CS1    | CS1      | O    | CS for ENCODER (negative logic)                              |
| 21  | CS0    | CS0      | O    | CS of a flash ROM (negative logic)                           |
| 22  | P43    | DVDXCD   | O    | A change of OPC A / D input (it is CD and H in L and is DVD) |
| 23  | P42    | ADSEL2   | O    | A / D multiplexer input change 2                             |
| 24  | P41    | ADSEL1   | O    | A / D multiplexer input change 1                             |
| 25  | P40    | ADSEL0   | O    | A / D multiplexer input change 0                             |
| 26  | P33    | XLODMTE  | O    | Loading drive mute (being L MUTE)                            |
| 27  | XBLW   | WR       | O    | Write strobe (being L write)                                 |
| 28  | XRD    | RD       | O    | Lead strobe (it leads by L)                                  |
| 29  | XRDY   | READY    | I    | Ready (being H: READY)                                       |
| 30  | BYTE   | BYTE     | I    | Bus width setup (8 bits)                                     |
| 31  | VCONT  | VCONT    | O    | Filter circuit connection                                    |
| 32  | RESET  | RESET    | I    | Power-on reset (it resets by L)                              |
| 33  | MD0    | MD0      | -    | CPU operation mode setup 0                                   |
| 34  | VSS    | VSS      | -    | GND  |
| 35  | XIN    | XIN      | I    | 27MHz  |
| 36  | XOUT   | -        | -    | XOUT   |
| 37  | VCC    | VCC      | -    | +5V  |
| 38  | P27    | MIRRS1   | O    | MIRROR signal change setup 1                                 |
| 39  | P26    | MIRRS0   | O    | MIRROR signal change setup 0                                 |
| 40  | P25    | SCS5     | O    | The serial access strobe signal for I/O EXP                  |

## ● PinFunction (2/3)

| No. | Mark | Pin Name | Type | Function   |
|-----|------|----------|------|--|
| 41  | P24  | SCS5     | O    | The serial access strobe signal for external DAC |
| 42  | P23  | SCS3     | O    | The serial access strobe signal for AUDIO DAC    |
| 43  | P22  | SCS2     | O    | The serial access strobe signal for EEPROM       |
| 44  | P21  | SCS1     | O    | The serial access strobe signal for A2           |
| 45  | P20  | SCS0     | O    | The serial access strobe signal for RF63         |
| 46  | D7   | D7       | I/O  | Data bus 7                                       |
| 47  | D6   | D6       | I/O  | Data bus 6                                       |
| 48  | D5   | D5       | I/O  | Data bus 5                                       |
| 49  | D4   | D4       | I/O  | Data bus 4                                       |
| 50  | D3   | D3       | I/O  | Data bus 3                                       |
| 51  | D2   | D2       | I/O  | Data bus 2                                       |
| 52  | D1   | D1       | I/O  | Data bus 1                                       |
| 53  | D0   | D0       | I/O  | Data bus 0                                       |
| 54  | MD1  | MD1      | I    | CPU operation mode setup 1                       |
| 55  | VSS  | VSS      | I    | GND  |
| 56  | P07  | XRST     | O    | SYSTEM RESET (resets: L)                         |
| 57  | P06  | DET3T    | I    | 3T DETECT signal input                           |
| 58  | P05  | TZCHYS0  | O    | Tracking zero crossing hysteresis change 0       |
| 59  | P04  | TZCHYS1  | O    | Tracking zero crossing hysteresis change 1       |
| 60  | A19  | A19      | O    | Address bus 19                                   |
| 61  | A18  | A18      | O    | Address bus 18                                   |
| 62  | A17  | A17      | O    | Address bus 17                                   |
| 63  | A16  | A16      | O    | Address bus 16                                   |
| 64  | A15  | A15      | O    | Address bus 15                                   |
| 65  | A14  | A14      | O    | Address bus 14                                   |
| 66  | A13  | A13      | O    | Address bus 13                                   |
| 67  | A12  | A12      | O    | Address bus 12                                   |
| 68  | A11  | A11      | O    | Address bus 11                                   |
| 69  | A10  | A10      | O    | Address bus 10                                   |
| 70  | A9   | A9       | O    | Address bus 9                                    |
| 71  | A8   | A8       | O    | Address bus 8                                    |
| 72  | A7   | A7       | O    | Address bus 7                                    |
| 73  | A6   | A6       | O    | Address bus 6                                    |
| 74  | A5   | A5       | O    | Address bus 5                                    |
| 75  | A4   | A4       | O    | Address bus 4                                    |
| 76  | A3   | A3       | O    | Address bus 3                                    |
| 77  | A2   | A2       | O    | Address bus 2                                    |
| 78  | A1   | A1       | O    | Address bus 1                                    |
| 79  | A0   | A0       | O    | Address bus 0                                    |
| 80  | TXD1 | TXD1     | O    | RS232C transmission                              |

## ● PinFunction (3/3)

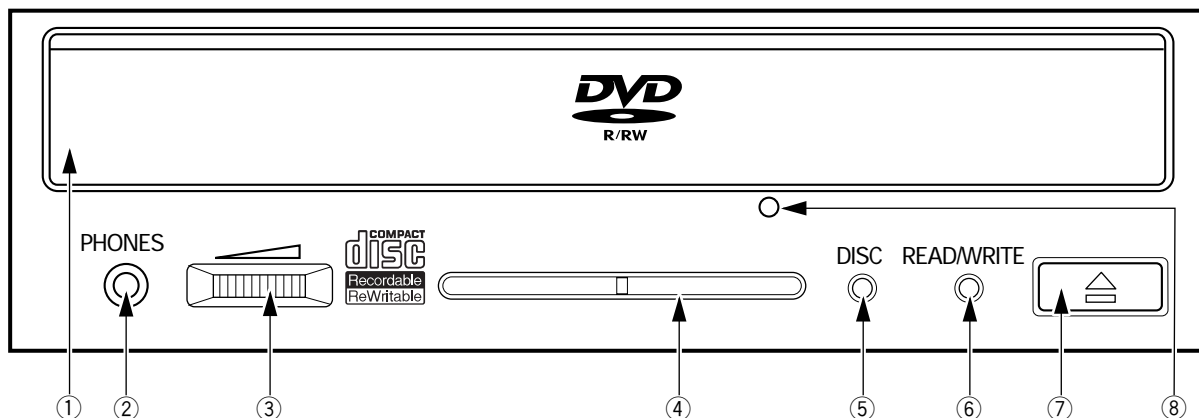
| No. | Mark  | Pin Name | Type | Function                                  |
|-----|-------|----------|------|---|
| 81  | RXD1  | RXD1     | I    | RS232C reception                          |
| 82  | P85   | XDMUTE   | O    | BTL driver mute                           |
| 83  | P84   | BCHIPINT | I    | Interruption of B-CHIN                    |
| 84  | TXD0  | SD0      | O    | Synchronous serial transmission           |
| 85  | RXD0  | SDI      | I    | Synchronous serial reception              |
| 86  | CLKD0 | SCLK     | O    | Synchronous serial clock                  |
| 87  | VCC1  | VCC      | -    | +5V                                       |
| 88  | AVCC  | AVCC     | I    | Analog power supply (+5V)                 |
| 89  | VREF  | VREF     | I    | Standard voltage input (+3.3V)            |
| 90  | AVSS  | AVSS     | I    | GND                                       |
| 91  | VSS   | VSS      | I    | GND                                       |
| 92  | NMI   | NMI      | I    | -   |
| 93  | DA1   | EPWDA2   | O    | DAC output for an erase power             |
| 94  | P77   | FGIN     | O    | FOCUS gain change signal                  |
| 95  | DA0   | RPWDA    | O    | Read power offset adjustment value output |
| 96  | P75   | LDIDET   | I    | LD DRIVER current value detection         |
| 97  | AN4   | MPXAD    | I    | ADC Input (signal after MPX)              |
| 98  | AN3   | LEM      | I    | A/D Input for Lens error                  |
| 99  | AN2   | TLER     | I    | A/D Input for Tilt error                  |
| 100 | AN1   | OPEC_B   | I    | A/D Input of OPC bottom level             |



## 8. PANEL FACILITIES AND SPECIFICATIONS

### 8.1 PANEL FACILITIES

#### ■ Front Panel



#### ① Disc Loading Tray

Open the loading tray by pressing the eject button, then place a CD or DVD disc into the slit with the label facing up. Press the eject button or push the front part of tray to load the tray with the disc.

#### ② Headphone Jack (PHONES)

Stereo mini jack for head-phone.

Set "Volume Control Knob" minimum position before inserting headphone jack.

The audio output of rear panel is active even when a jack is inserted into the headphone plug.

#### ③ Volume Control Knob

This is the volume control knob for adjusting sound level on the headphone.

When the knob is turned to the right, the headphone volume goes up, when turned to the left, the volume goes down.

#### ④ Ventilation Holes

Do not block this part.

#### ⑤ DISC Indicator

Lights when a disc has been inserted.

When tray is opened or closed

Blinks green

Read only disc

Lights green

Recordable disc

Lights orange

Unsupported disc

Blinks orange

#### ⑥ READ/WRITE Indicator

Operation status is indicated as follows.

During reading Lights green

During writing Lights orange

When an error occurs Blinks orange

• Abnormal rise of internal temp

• Blinks 1x and then repeats

• Lens or disc dirty

• Blinks 2x and then repeats

• Other error

• Blinks 3x and then repeats

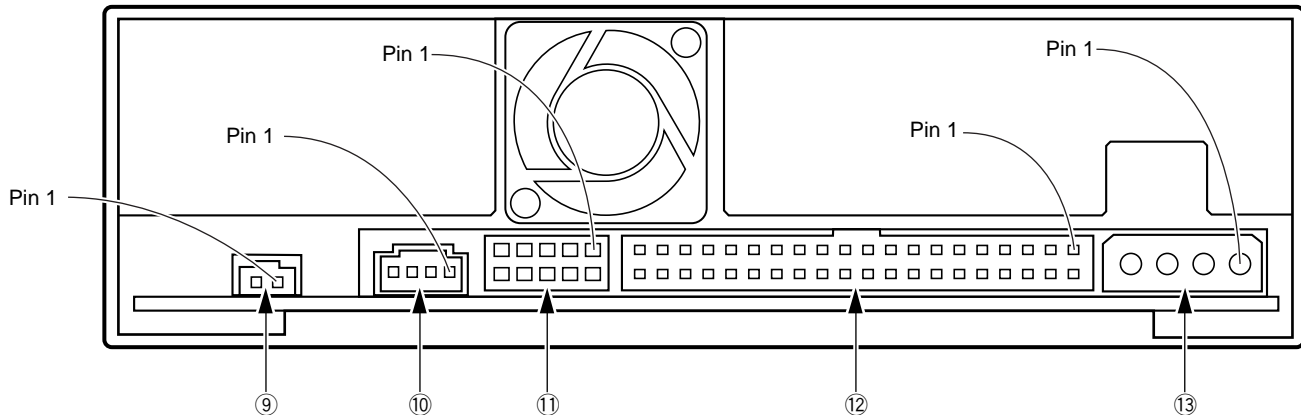
#### ⑦ Eject Button (▲)

To unload /load the disc, press the button.

#### ⑧ Forced Ejection Hole

Insert a stiff rod into the hole and push to eject the tray when the tray doesn't unload by pressing the Eject button. In the normal operation, the eject button should be used to unload the tray. Make sure the power of the drive is turned off and wait more than one minute till the disc rotation is stopped when access the eject hole.

## ■ Rear Panel



### ⑨ Digital Audio Output

This is a connector for output of digital audio signal.

| Pin | Name        | Function                     |
|-----|-------------|------------------------------|
| 1   | GND         | Ground.                      |
| 2   | Digital Out | Digital audio signal output. |

### ⑩ Audio Output

This is a connector for output of analog audio.

This connector is compatible with 'Molex 70553', choose a suitable connection cable.

| Pin | Name | Function                    |
|-----|------|-----------------------------|
| 1   | L    | Left channel audio output.  |
| 2   | G    | Ground.                     |
| 3   | G    | Ground.                     |
| 4   | R    | Right channel audio output. |

### ⑪ Device Configuration Jumper

Switch becomes ON when short socket is put.

Make sure the power of the drive is off before changing jumper setting.

Pin # 1 is ON at the time of shipping from the plant.

| Pin | Name | Function                             |
|-----|------|--------------------------------------|
| 1   | MA   | on The drive is used in master mode. |
| 2   | SL   | on The drive is used in slave mode.  |
| 3   | CS   | on Using Cable Select function.      |
| 4   |      | Reserved.                            |
| 5   |      | Reserved.                            |

### ⑫ Host IDE Interface

This is a 40 pin I/O connector according to the ATA specifications.

### ⑬ DC Input

| Pin | Name | Function                         |
|-----|------|----------------------------------|
| 1   | +12  | Power supply input for DC +12 V. |
| 2   | G    | Ground.                          |
| 3   | G    | Ground.                          |
| 4   | +5   | Power supply input for DC +5 V.  |

## 8.2 SPECIFICATIONS

[Setting]

This drive is Horizontal Use.

[Disc Size]

- 120 mm (4.72") / 80 mm (3.5")

[Data Transfer Rate]

Data Read (Sustained)

DVD ..... Max. 5,400 KBytes/sec.

CD Max. 3,600 KBytes/sec.

(10.3 – 24X CAV Mode over 16 block transfer)

Data Write (Sustained)

DVD ..... Ave. 2,859 KBytes/sec. (2X DVD-R)

CD Ave. 1,200 KBytes/sec. (8X CD-R)

Host Interface specification

PIO Mode 4, Multi word DMA Mode 2 ..... 16.6 Mbytes/sec.

- The data transfer rate may not be output due to disc conditions (scratches, etc.).

[Access Time/ Seek Time]

Access time (Random average)

DVD-ROM 200 ms ..... CD-ROM 180 ms

Seek time (Random average)

DVD-ROM 150 ms ..... CD-ROM 130 ms

[Audio Characteristic]

Line Out ..... 0.7 ± 0.1 Vrms (at 10 kΩ load)

Headphone Out ..... 0.6 ± 0.5 Vrms (at 32 Ω load)

[Others]

Power Supply

DC +12 V, ..... 0.9 A

DC +5 V, ..... 1.6 A

Dimensions ..... 148 (W) x 42.3 (H) x 207.5 (D) mm

(including front panel) ..... 5-27/32 (W) x 1-11/16 (H) x 8-5/32 (D) in.

Weight ..... 1.1 kg (2.2 lb)

Operation temperature ..... +5°C to +45°C (41°F to 113°F)

Operation humidity ..... 5% to 85% (no condensation)

Storage temperature ..... - 40°C to +60°C (- 40°F to 140°F)

Storage humidity ..... 5% to 90% (no condensation)

[Accessories]

Short-circuit socket x 2

Audio cable x 1

Mounting screw x 4

Push rod x 1

Operating instructions x 1

NOTE:

- Specifications and design subject to possible modifications without notice, due to improvements.

