

MDP-A800K2

RMT-M29A

SERVICE MANUAL

*E Model
Tourist Model*



SPECIFICATIONS

System

Type

CD/CDV/LD player

Signal readout

Optical (Laser beam reflection)

Signal format system

EIA standard, NTSC colour system

Playing time

See "Optical discs" on page 31.

Digital audio specifications**Frequency response**

4 Hz to 20 kHz (± 1.0 dB)

Signal-to-noise ratio

More than 110 dB (EIAJ)*

Dynamic range

More than 99 dB (EIAJ)

Wow and flutter

Below measurement limit
(+0.001 % W.PEAK)(EIAJ)

Video specification**Horizontal video resolution**

425 lines

Signal-to-noise ratio

More than 49 dB

* Measured according to EIAJ (Electric Industries Association of Japan) standards.

Input and Output

LINE OUT 1,2

VIDEO output, Phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced
AUDIO output, Phono jacks (2)
Stereo L, R
Analog: 200 mVrms
(1 kHz, 40 % modulation)
Digital: 200 mVrms
(1 kHz, -20 dB)

LINE IN

VIDEO input, Phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO input, Phono jacks (2)
Stereo L, R
Input signal: 2 Vrms
Input impedance:
more than 47 kilohms

MIC 1/2 jacks

Standard jacks
1 mV
(Impedance below 1 kilohm)

General

Power requirements

120/220/240 V AC, adjustable,
50/60 Hz

Power consumption

40 W

Operating temperature

5°C to 35°C

Ambient humidity

5% to 90 %

Dimensions

Approx. 430 × 120 × 437 mm
(w/h/d)
including projecting parts and controls

Mass

Approx. 10.3 kg

— Continued on next page —

CD/CDV/LD PLAYER
SONY®

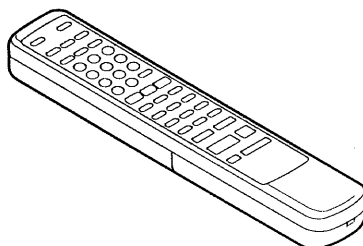
Supplied accessories

Remote Commander RMT-M29A (1)
R6 (size AA) batteries (2)
Audio/Video Cable
(phono plug 3↔phono plug 3)(1)
AC plug adaptor (1)

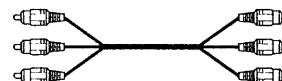
Design and specifications are subject to change without notice.

Check that you have the following items:

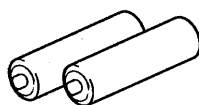
- Remote commander



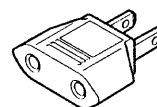
- Audio/Video cable



- Two R6 (size AA) batteries



- AC plug adaptor



WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

This CD CDV LD Player is classified as a CLASS 1 LASER product.

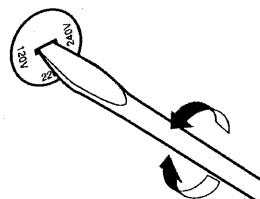
CAUTION

The use of optical instruments with the product will increase eye hazard.



As the laser beam used in this player is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.

Operating voltage

- Before operating the player, make sure that the operating voltage of your unit is identical with that of your local power supply. If necessary, reset the selector at the rear of the player to the voltage corresponding to your local power supply (120, 220 or 240 volts AC). The voltage selector of this unit is set to 220 V AC originally. When using in Malaysia, reset the selector to 240 V AC.
- To reset the voltage selector, disconnect the mains lead and turn the selector with a blade screwdriver so that the arrow on the rear panel points to the appropriate voltage.



SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit Board Repairing
 - Keep the temperature of the soldering iron around 270°C during repairing.
 - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
 - Be careful not to apply force on the conductor when soldering or unsoldering.

TABLE OF CONTENTS

1. GENERAL	1-1	7. ELECTRICAL ADJUSTMENTS	
2. DISASSEMBLY		7-1. LIST OF SERVICING JIGS	7-1
2-1. UPPER CASE, FRONT PANEL ASSEMBLY	2-1	7-2. CAUTIONS ON ADJUSTMENT	7-1
2-2. MB-712 BOARD	2-2	7-3. DEBUGGING MODE	7-1
2-3. CHUCKING ASSEMBLY	2-2	1. How to enter the debugging mode	7-1
2-4. OPTICAL PICK-UP BLOCK	2-3	2. How to exit the debugging mode	7-1
2-5. MD CHASSIS ASSEMBLY	2-5	3. Switching the screen display	7-2
2-6. CONTROL GEAR	2-7	4. Explanation of the debugging display	7-2
2-7. TRAY ASSEMBLY	2-8	4-1. [FRAME/TIME] Version number of the	
2-8. PUTTING OUT DISC WHEN A TROUBLE HAS		microprocessor	7-2
OCCURRED WITH THE DISC LOADED	2-9	4-2. [1] History of the function modes	7-2
2-9. TURNTABLE ASSEMBLY HEIGHT		4-3. [2] History of the emergency occurrence	7-3
ADJUSTMENT	2-10	4-4. [3] Information for repair service, sent from the	
2-10. INTERNAL VIEWS	2-10	mechanism controller	7-4
2-11. CIRCUIT BOARDS LOCATION	2-11	4-5. [4] Trap-flag	7-7
		4-6. [5] Key/remote control data	7-7
		4-7. [7] Information on communication with the	
		mechanism controller	7-8
3. DIAGRAMS		7-4. SERVICE MODE	7-9
3-1. OVERALL BLOCK DIAGRAM	3-1	1. How to enter the service mode	7-9
3-2. VIDEO BLOCK DIAGRAM	3-4	2. How to exit the service mode	7-9
3-3. SERVO BLOCK DIAGRAM	3-7	3. How to use the special key functions	7-9
3-4. SYSTEM CONTROL BLOCK DIAGRAM	3-9	3-1. PLAY key	Focusing search
3-5. MODE CONTROL BLOCK DIAGRAM	3-11	3-2. SIDE A key	Sledding in reverse direction
3-6. AUDIO BLOCK DIAGRAM	3-13	3-3. SIDE B key	Sledding in normal direction
3-7. LINE IN BLOCK DIAGRAM	3-15	3-4. PAUSE key	Tilt servo ON
3-8. POWER SUPPLY BLOCK DIAGRAM	3-17	7-5. OPERATING THE MDP-A800K2 WITH	
		HIDDEN KEY FUNCTION	7-11
4. PRINTED WIRING BOARDS AND		1. How to use the "simultaneous main-unit-key-press	
SCHEMATIC DIAGRAMS		functions"	7-11
4-1. FRAME SCHEMATIC DIAGRAM	4-1	2. How to use the "simultaneous main-and-remote-	
4-2. PRINTED WIRING BOARDS AND SCHEMATIC		control-units-key-press functions"	7-12
DIAGRAMS	4-5	7-6. 7-SEGMENT-DISPLAY-DURING-STANDBY	
·MB-712 board	4-6	FUNCTION	7-13
·MT-702, SW-719 boards	4-15	1. How to use the "7-segment-display-during-	
·FP-738, FP-739, HP-716, VR-703,		standby"	7-13
PW-708 boards	4-31	7-7. ADJUSTMENT AFTER THE ATTACHMENT	
·BI-702, FG-704, MD-703, MT-703 boards	4-27	OF THE OPTICAL PICK-UP BLOCK	7-13
·KP-708, MA-709, EC-704, MT-705 boards	4-38	7-7-1. JIGS AND TOOLS	7-13
·PS-716, TR-718, VS-707 boards	4-44	7-7-2. CD ADJUSTMENT	7-14
5. REPAIR PARTS LIST		7-8. POWER SUPPLY CHECK (PS-716 BOARD)	7-16
5-1. EXPLODED VIEWS		7-9. SYSTEM CONTROL SYSTEM	
5-1-1. UPPER CASE, FRONT PANEL ASSEMBLY	5-1	ADJUSTMENT	7-16
5-1-2. CHUCK FRAME ASSEMBLY	5-2	7-9-1. Master Clock Adjustment (MB-712 Board)	7-16
5-1-3. SUB FRONT PANEL ASSEMBLY	5-3	7-10. LD SIDE A TILT BALANCE ADJUSTMENT	7-17
5-1-4. CHASSIS ASSEMBLY	5-4	7-11. LD SIDE B TILT BALANCE	7-18
5-1-5. MD CHASSIS ASSEMBLY	5-5	7-12. VIDEO SYSTEM ADJUSTMENT	7-19
5-2. ELECTRICAL PARTS LIST	5-6	7-12-1. Burst Gate Position Adjustment	
		(MB-712 Board)	7-19
		7-12-2. REF H Adjustment (MB-712 Board)	7-19
		7-12-3. Color DOC Adjustment (MB-712 Board)	7-19
		7-12-4. Video Output Level Adjustment	
		(MB-712 Board)	7-20
6. INTERFACE IC PIN FUNCTION		7-13. PARTS ARRANGEMENT DIAGRAM FOR	
6-1. SYSTEM CONTROL MICROPROCESSOR PIN		ADJUSTMENT	7-21
FUNCTION			
(MB-712 BOARD IC501 MB89094PF-G-127)	6-1		
6-2. EXPANSION OUTPUT PORT IC PIN FUNCTION			
(MB-712 BOARD IC502 MB606F06)	6-2		
6-3. MODE CONTROL MICROPROCESSOR PIN			
FUNCTION			
(FP-738 BOARD IC202 MB89094PF-G-146)	6-3		

SECTION 1
GENERAL

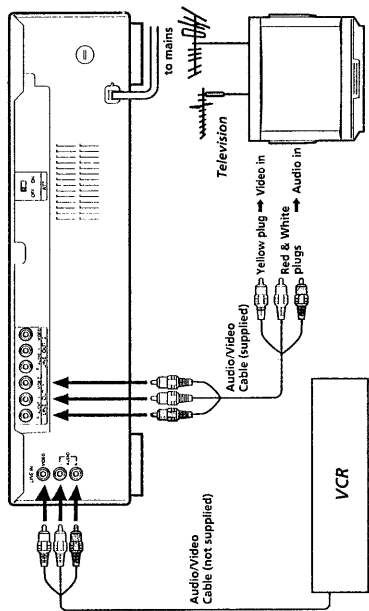
This section is extracted from instruction manual.

Step 3

Connecting the player

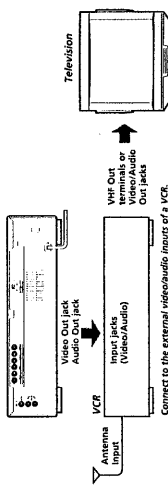
Television hook-up

To play LDs or CDVs, hook up a television to the LD Player. Take out the supplied audio/video connecting cable (yellow, red and white plugs). Use this to connect the player to the television. Once you have hooked-up the television, set the input selector on the TV to "Video." Before connecting or disconnecting any of the cables, turn off all equipment.



Television/VCR hook-up

Connect the player to the VCR's inputs when:
- the Video inputs of the TV are already used for the VCR or a similar machine.
- the TV has only an aerial input.
When you connect this player using the VCR's inputs, do not use the LINE IN jacks of the player to connect the VCR because doing so will cause interference with the sound or picture.

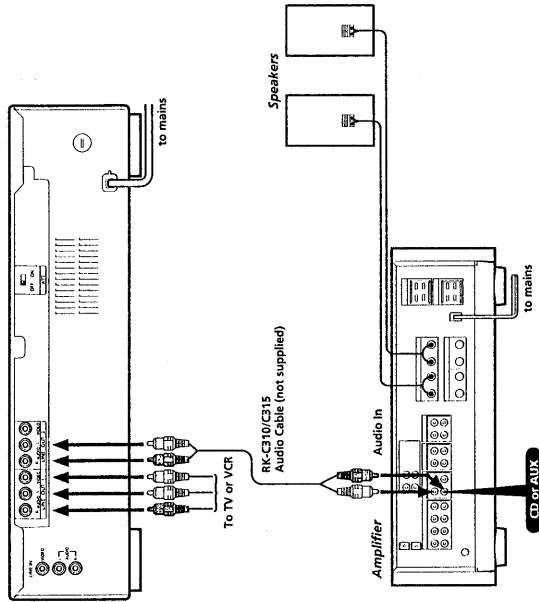


Notes

- Make sure all equipment is turned off before connecting or disconnecting any cables.
- Connection methods may differ; when in doubt about a connection, consult the TV or VCR manufacturer's manual.
- If the sound or picture is disturbed by noise, try moving the equipment farther apart.
- Firmly insert plugs into the jacks. A loose connection may cause noise.
- To prevent interference with TV broadcast reception, turn off all equipment connected but not currently in use.
- If the TV only has a monaural phono jack for audio input, use a YMC-910/915 Connecting Cable (not supplied).

Audio equipment hook-up

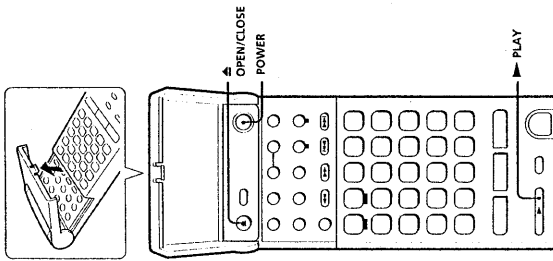
To achieve full stereo sound from your LD Player, hook up a stereo system following the diagram below. Use an RK-C310 (or RK-C315) audio connecting cable (not supplied) to connect the LD Player to your amplifier or receiver. Before connecting or disconnecting any cables, turn off all equipment.



Notes

- Make sure all equipment is turned off before making any of the above connections.
- Firmly insert plugs into the jacks. A loose connection may cause noise.
- When listening to a radio broadcast, switch off the LD Player to get better reception.

Basic Operations Playing a disc



Tip

- You can also turn on the player by pressing **OPEN/CLOSE** on the player.


Notes

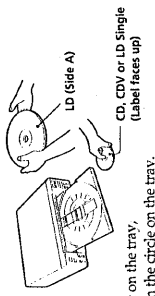
- If you place more than one disc on the disc tray, or if the disc is not seated properly, the disc may not start playing, and may damage the disc or player.
- Do not transport the player while playing a disc, doing so may damage your disc or player.
- Do not use a CD stabilizer when playing a CD as doing so may damage your disc or player.
- When you press **PAUSE**, the picture goes blank if you are playing a CLV LD or CDV, and the picture freezes if you are playing a CAV LD.

This section shows you how to play an LD, CD or CDV.

Before you start...
Connect the player to your TV and set the input selector on the TV to "Video" (see "Connecting the player" on page 6).

Loading and playing a disc

- 1 Set the mode selector on the player to NORMAL.**

- 2 Press POWER to turn on the player.**
You can also turn on the player by pressing **PLAY**.
- 3 Press OPEN/CLOSE to open the disc tray.**
The front cover of the player automatically slides down and the disc tray comes out.
- 4 Place a disc on the disc tray.**



5 Press PLAY.

The disc tray closes and the upper side of the disc starts playing. You can also start playing by pushing the disc tray to close it.
When play back of the upper side of an LD (side A) ends, the other side (side B) starts playing automatically.

To	Press
Stop play	STOP
Pause play	PAUSE
Resume play after pause	PAUSE or PLAY
Scan forward or backward	SKIP or SCAN
Skip chapters or tracks	SKIP or ACS/AMS
Remove the disc	OPEN/CLOSE

To start playing from the beginning of either LD side

Press DISC SIDE A to play the upper side of the LD from the beginning. Press DISC SIDE B to play the other side of the LD from the beginning.

To stop playing and turn off the player

Press **POWER**.
You can resume playback from the point you stopped at by simply pressing **PLAY** (See "Resuming LD playback" on page 22).

To stop playing and remove the disc

Press **OPEN/CLOSE**.
Remove the disc and press **OPEN/CLOSE** again to close the empty tray.

To pause playing just before starting

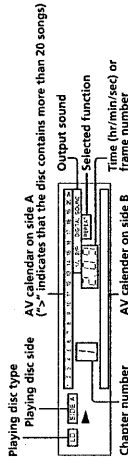
Press **PAUSE** instead of doing step 5 on page 8.
The disc tray closes and the player waits at the start of the disc until you press **PLAY** or **PAUSE**. If you want to start from side B of an LD, press **DISC SIDE B**.

To listen with headphones

Plug headphones into the headphones jack on the front panel and adjust the volume with the PHONES LEVEL control above the jack.

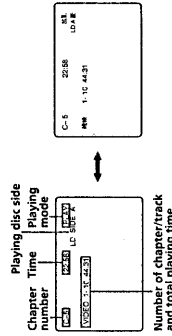
Reading the front panel display

The illustration below is an example of what is displayed on the front panel of the player.



Viewing the on-screen display

Press **DISPLAY** twice. The on-screen display appears (see "Understanding on-screen indications" on page 23). You can select the language of on-screen display, English or Chinese, by pressing **LANGUAGE** on the front panel.

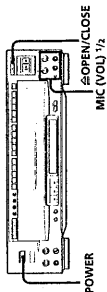


- Tips**
- When playing a double-sided LD, the player determines that the upper side of the disc is side "A" and the other side is "B", regardless of the label "A" or "B" printed on the disc.
 - When playing back of LD side B, the player plays side A.
 - When playing a CD or CDV, the player plays side B.

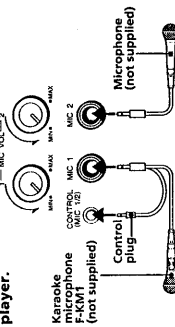
- Tips**
- The AV calendar on the front panel appears when playing a disc containing TOC data (Calendar data). The AV calendar shows the chapters/tracks remaining on the disc. As chapters/tracks are played, the corresponding numbers on the calendar disappear.
 - TOC data is contained in all CDs, CDV's and many LD's. When you save karaoke settings for a song (see "Saving your favorite songs" on page 16), the player uses TOC data to recognize which disc contains the song.
 - When there is no disc in the player, "NO DISC" appears on the front panel display.

Playing Karaoke

This section gives you short instructions for playing "karaoke" (singing along with a disc).



- 1 Set the MIC VOL 1/2 control on the player to MIN, then plug a microphone into the MIC 1 or 2 jack on the LD player.



When using the karaoke microphone FKM1 (not supplied), plug the CONTROL plug into the CONTROL (MIC 1/2) jack.

- 2 Press POWER to turn on the player.

- 3 Turn on the TV and stereo system.

TV:

Set to "Video."

Stereo system:

Turn on the amplifier or receiver and select CD or AUX for audio output.

- 4 Set the mode selector on the player to KARAOKE.

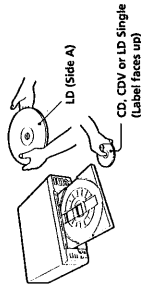
The front cover slides down, revealing the karaoke function buttons.



- 5 Press OPEN/CLOSE.

The disc tray comes out.

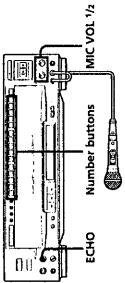
- 6 Place a disc on the disc tray.



Place only one disc on the tray, carefully fitting it in the circle on the tray.

Notes

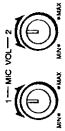
- If you insert more than one disc, or if the disc is not seated properly, the disc may not start playing, and may damage the disc or player.
- When playing a double-sided LD, the player determines that the upper side (the side is "side-A") and the other side is "B," regardless of the label "A" or "B" printed on the disc.



- 7 Press one of the number buttons to choose the song you want to play.

The disc tray automatically closes and the song starts playing. To choose a song on side B of the LD, press (DISC) SIDE B, then press the number button.

- 8 Set the ON/OFF switch on the microphone to ON and turn the MIC VOL 1/2 control to adjust the microphone volume.



- 9 Turn the ECHO control to adjust the strength of echo.

The same echo level is applied to both MIC 1 and MIC 2.



Now you can enjoy playing karaoke. After the song is played, the player pauses and waits until you enter the number of the next song.

Fading out automatically when you stop playing

If you press ■ STOP, ▲ OPEN/CLOSE or POWER to while playing a song in karaoke mode, the sound automatically fades out and playback stops.

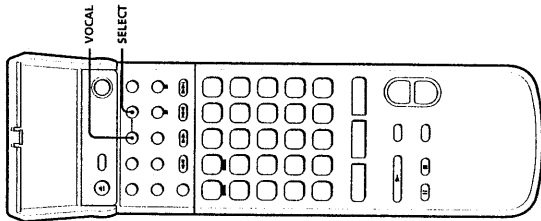
Tips

- In karaoke mode, the player pauses every time a song is played (Auto Pause). To play songs on the disc continuously, press AUTO PAUSE on the player. The AUTO PAUSE button indicator goes off and "A" appears on the screen. To resume the song, press the AUTO PAUSE button again to turn on the AUTO PAUSE button indicator. "A" PAUSE" appears on the screen. If you reserve more than one song (see "Specifying the next songs" on page 19), the player plays them through without pausing, then pauses.
- If howling occurs
 - Move the microphone away from the speakers.
 - Lower the microphone volume or echo level.
 - Lower the volume.
- If the sound is distorted or the picture flickers when listening through your TV speakers, set the ATT selector at the rear of the player to ON to lower the output level.

Note

- If you play a CD or CDV in karaoke mode, the player automatically outputs the sound on the left track. To listen to a normal (non-karaoke) CD or CDV in stereo, set the mode selector to NORM. Select "Voice" on the screen. Select to choose "VOCAL 2" (see "To listen to the original vocals on karaoke CDs, CDV's or tapes" on page 12).

Using karaoke functions



You can enjoy karaoke using various functions.

Singing along with the original vocals (Vocal Select)

You can listen to the words or melody you forget by listening to the original vocals. This is available in karaoke mode for karaoke discs or tapes.

To listen to the original vocals on MULTI AUDIO LDs

On MULTI AUDIO karaoke LDs, vocals are recorded on an analog track. When playing MULTI AUDIO karaoke LDs, the player automatically outputs the backup sound recorded on digital tracks in stereo. To listen to the vocals, use Vocal Select. You can easily select the analog track on which the vocals are recorded.

- 1 Press VOCAL to turn on the VOCAL button indicator.
 - 2 Press SELECT on the remote commander repeatedly until the vocals are heard.
- With each press, the on-screen indication changes as follows:

→ VOCAL 1 → VOCAL 2 → VOCAL 3

Indication

Output sound recorded on	
VOCAL 1	Right analog track
VOCAL 2	Left analog track
VOCAL 3	Right analog track (with stereo sound on digital tracks)

To listen to the original vocals on karaoke CDs, DVDs or tapes

When playing karaoke CDs (or DVDs) or karaoke tapes in karaoke mode, the player automatically outputs the backup sound recorded on the left channel. To listen to the vocals, use Vocal Select to also output the original vocals recorded on another track.

- 1 Press VOCAL to turn on the VOCAL button indicator.
 - 2 Press SELECT repeatedly to select the sound.
- With each press, the on-screen indication changes as follows:

→ VOCAL 1 → VOCAL 2

Indication

Output	
VOCAL 1	Vocals with backup from both speakers
VOCAL 2	Backup from left speaker Vocals from right speaker

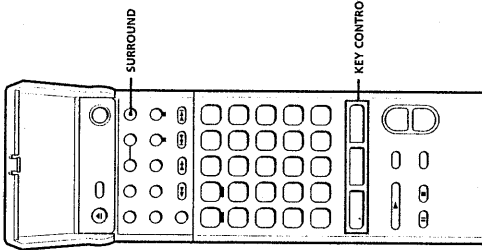
To return to the back up sound

Press VOCAL to turn off the VOCAL button indicator.

Tip
When you connect your VCR to the LINE IN input on the player and set the mode selector to LINE IN (KARAOKE), you can also use Vocal Select for karaoke video tapes.

Notes

- When playing multiplex DVDs or non-multi audio (analog or digital) LDs, you can only use VOCAL 1.
- You cannot use Vocal Select and Surround at the same time.



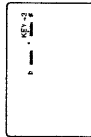
Changing the backup key (Key Control)

In karaoke mode, you can adjust the backup key to your voice.

Press # UP or P DOWN repeatedly to find the backup key that suits your voice.

To	Press
Raise the key	# UP
Lower the key	P DOWN
Return to the original key	NATURAL

The key is adjustable to one of 17 steps (8 steps higher, 8 steps lower than the original key, and the original key). Your setting appears on the screen briefly.



Playing a disc with sound effect (Surround Sound)

You can play a disc in one of three acoustic atmospheres: SIMULATED, KARAOKE BAR or MOVIE.

Press SURROUND repeatedly to select the effect.

With each press, the effect changes as follows on the screen:

→ SIMULATED → KARAOKE BAR → MOVIE → SURROUND OFF

The SURROUND indicator on the player lights up.

To cancel the surround effect, press SURROUND repeatedly until "SURROUND OFF" appears on the screen. The SURROUND indicator goes off.

Effect mode

Effect mode	Atmosphere
SIMULATED	Good for playing software recorded in monaural. Enhances the dynamic range of monaural programmes like old movies and news programmes.
KARAOKE BAR	Creates the effect of singing in a bar. Gives your song a rich carrying tone.
MOVIE	Suitable for movie software. Emphasizes the bass and extends the dynamic mid range.

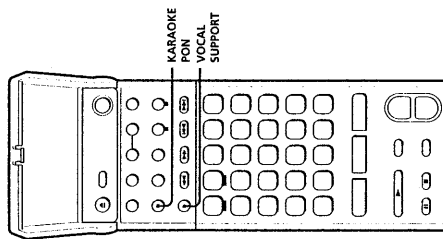
Tips

- You can use Key Control when you set the mode selector to KARAOKE or LINE IN (KARAOKE).
- When a higher or lower key is set, the # UP or P DOWN indicator on the player lights up. The NATURAL indicator also lights up.
- The key returns to the original key automatically when playback pauses at the end of a chapter/track.
- If Auto Pause is cancelled, or when playing in single repeat mode, the key does not return to the original key.
- You can adjust the key from the karaoke microphone (see the "Using the optional karaoke microphone" on page 15).
- You can also use Surround in non-karaoke (NORMAL) mode.

Note

- You cannot use Surround and any of the following functions at the same time:
 - Vocal Select
 - Vocal Support
 - Karaoke Pan

Using karaoke functions (continued)



Letting the vocals help you (Vocal Support)

You can let the original vocals come in when you forget the words or melody. This is available for MULTI AUDIO or multiplex discs.

Press VOCAL SUPPORT to turn on the VOCAL SUPPORT button indicator. While you are singing into the microphone, the player outputs the backup sound, but when you are not, it also outputs the singer's voice to help you.

Enjoying karaoke with non-karaoke discs (Karaoke Pon)

With a disc recorded in stereo, you can enjoy karaoke even if it is a non-karaoke disc.

Press KARAOKE PON to turn on the KARAOKE PON indicator on the player. The volume of the singer's voice is lowered.

Using the optional karaoke microphone

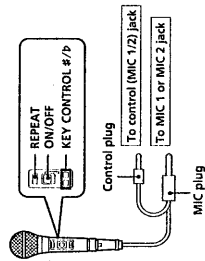
You can control the player from the karaoke microphone (F-KM1, not supplied) by connecting the control plug to the CONTROL jack on the player.

Singing one portion repeatedly

You can go back to any point of a selection using the REPEAT button on the microphone. Hold down REPEAT and release it at the desired point. Playback continues again from the point at which the button is released.

Using Key Control

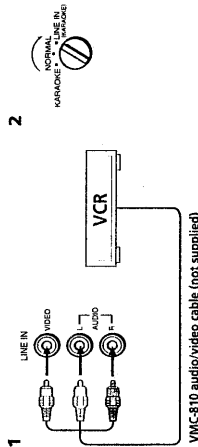
You can change the backup key by pressing KEY CONTROL #/p on the microphone. This is the same operation as KEY CONTROL on the player or remote commander (see "Changing the backup key" on page 13).



Playing karaoke using auxiliary equipment

You can also enjoy karaoke by connecting auxiliary equipment such as a VCR to the LINE IN AUDIO/VIDEO inputs on the player. The karaoke functions (Vocal Select, Key Control, Surround Effect, Vocal Support and Karaoke Pon) are available as they would be for discs.

- 1 Connect the VCR to the LINE IN AUDIO/VIDEO inputs on the rear.
- 2 Set the mode selector on the player to LINE IN (KARAOKE). Now you can enjoy playing karaoke with your video tape.



Tip

- When using two microphones, Repeat Singing and Key Control are only operable on the microphone connected to the CONTROL (MIC 1/2) jack.

Notes

- When you play a VCR etc. using LINE IN (KARAOKE), always turn on the LD player.
- You cannot play discs when the mode selector is set to LINE IN (KARAOKE). If you want to play a disc, set the selector to NORMAL or KARAOKE.
- The on-screen indications of karaoke functions and of output sound do not appear while using LINE IN (KARAOKE) to view VCR output. To view the on-screen indications, press DISPLAY to clear the screen.

Tips

- When you use LINE IN (KARAOKE), the player outputs monaural sound. When you listen to the VCR in stereo, use Vocal Select to choose "VOCAL 2" (see "To listen to the original vocals on karaoke CDs, CDNs or tapes" on page 12) or use Audio Monitor to choose "1/1 2/2" (see "To alternate the sound output" on page 28).
- When you use LINE IN (KARAOKE), Vocal Select operates as it would do for CDs (VOCAL 1 and VOCAL 2).

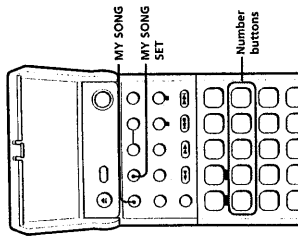
Tip

- Using the Vocal Support function, you can sing a duet by yourself. You sing the male part (or female part) and the other part comes in when you stop singing.

Notes

- You can use Vocal Support or Karaoke Pon only in karaoke mode.
- You cannot use Vocal Support or Karaoke Pon and Surround at the same time.
- Karaoke Pon is only available for discs recorded in stereo. With monaural discs, the backup level is also lowered.
- You cannot completely shut off the vocals by using Karaoke Pon. Even with stereo discs, if the voice deviates from the centre, its level may not be lowered well.
- When using Karaoke Pon, the stereo effect is reduced.

Saving your favorite songs (My Song)



- Tips**
- You can also save the current song while in pause mode.
 - If the current song has already been saved, the corresponding indication flashes on the screen when you press MY SONG SET. If you want to re-save current karaoke settings, press the number button corresponding to the flashing indication. The new settings are saved and old ones are cleared.

- Notes**
- You cannot save songs with Vocal Support or Karaoke Surround mode at the same time.
 - While the MY SONG SET indicator on the player is flashing, you cannot change the settings. If you want to change them, press MY SONG SET to exit My Song Set mode, then change the settings and save the selection.
 - If the power is cut while the player is turned on, any newly saved songs are cleared. Therefore, when you unplug the player, first turn off the player by pressing POWER, then disconnect the cord.

In karaoke mode, you can save your favorite songs with the various karaoke settings (Key Control, Echo level, and Vocal or Surround mode) you selected. You can save up to five songs, either from one disc or from different discs. Each time you select a saved song, all the karaoke settings are restored automatically so that you can sing the song in your favorite atmosphere. This function is available for LDs containing TOC data, CDs and CDVs.

Before you start...
Set the Mode Selector to KARAOKE.

Saving your favorite song

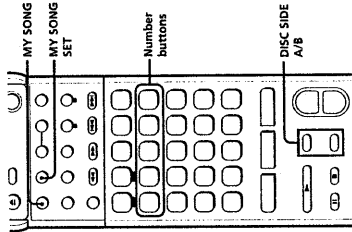
- Load a disc containing TOC data and play the song you want to save.**
When you play an LD, the player reads the TOC data when the disc starts playing.

- Set the karaoke function modes as you want to save them.**
You can save Key Control, Echo level, and Vocal or Surround mode.

- Press MY SONG SET while playing the song.**
The MY SONG SET indicator on the player flashes and the setting menu appears on the screen.

- Press one of the number buttons from 1 to 5 to save the song currently played.**
The MY SONG SET indicator goes off and the menu on the screen disappears. The song is saved.

Repeat steps 1 to 4 to save other songs. You can save songs from both sides of the LD, if you want to save songs from another disc, change the disc, then repeat steps 1 to 4.

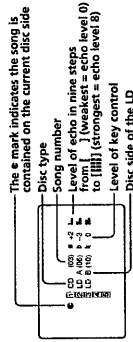


- Tip**
- You can also start playing the set song by pressing in the disc tray the MY SONG SET button instead of pressing DISC SIDE A in step 4. If you press PAUSE instead of pressing DISC SIDE A, the player goes to the beginning of the song and pauses.

Notes

- You can start playing the saved song while in stop mode by pressing DISC SIDE A/B, PLAY (or II PAUSE). However, if you press PLAY (or II PAUSE) while the AUTO RESUME indicator on the player is lit, the player resumes playing the LD from the point you stopped at before (Auto Resume, for more information, see "Resuming LD playback" on page 22). To override Auto Resume and start playing the song saved by My Song Set, press DISC SIDE A (or B).
- If you saved more than one song, the song saved in the smallest number is played.
- When saved karaoke functions are restored, the echo level is set to the level you set when you saved the song regardless of the song regulation of the ECHO control. If you turn the ECHO control, the echo level changes in the level of the position of the control.

On-screen indications when you press MY SONG SET



To exit My Song Set mode, press MY SONG SET again. You return to the original screen.

Playing your favorite song

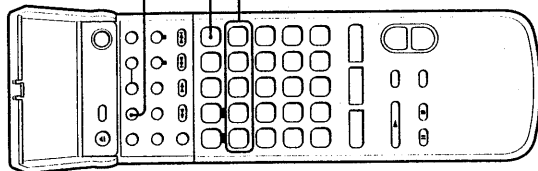
- Set the mode selector to KARAOKE.**
- Press MY SONG to turn on the MY SONG button indicator on the player.**
- Open the disc tray and place the disc on it.**
When you place a double-sided LD on the tray, place it with the same side facing up as when you saved the song.
- Press DISC SIDE A (or B).**
If the song is on side B of the LD, press DISC SIDE B. When playing an LD single or CD, press DISC SIDE A.
The tray closes and the song you saved starts playing automatically. The karaoke settings you selected when you saved the song are restored automatically.

To display on-screen indications to review saved songs

Press MY SONG. The indications appear briefly. To hold the indications on the screen, press DISPLAY twice when the MY SONG button indicator is lit.

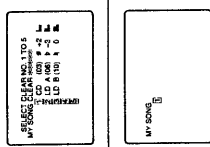
When the MY SONG button indicator on the player is lit

Each time you play a saved song, saved karaoke settings are restored automatically. You can change these settings while playing the song. To revert to the saved settings, press MY SONG to turn off the MY SONG button indicator, then press MY SONG again to turn on the indicator.



Clearing your favorite song

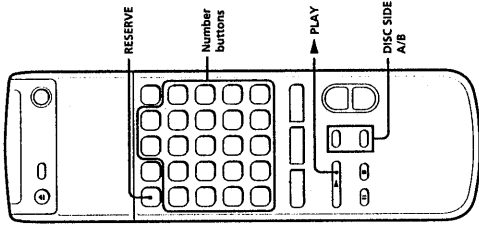
- 1 Press MY SONG SET while playing a disc containing TOC data.**
The MY SONG button indicator flashes.
- 2 Press CLEAR.**
"MY SONG CLEAR" appears on the screen.
- 3 Press one of the number buttons (1) to (5).**
The song corresponding to the number you entered is cleared.



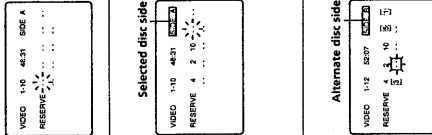
To clear all saved songs
Press **0** in step 3 instead of pressing **1-5**.

Specifying the next songs (Reserve)

You can specify up to 9 songs to be played in any order you like, regardless of disc side, even while a song is being played. The songs are played continuously in the order you specify so that you can enjoy non-stop karaoke playing. The MDJ-A800K2 also allows you to specify songs on another disc in advance (Next Disc Reserve).



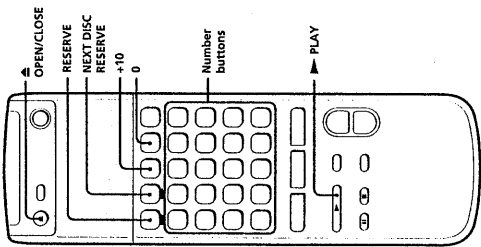
- 1 Press RESERVE.**
"RESERVE" appears.
- 2 Select the disc side by pressing DISC SIDE A (or B), then press the number buttons to specify songs in the order you want them to play.**
If you enter a wrong number, press CLEAR. With each press, the last song you entered is deleted.
- 3 To enter songs from the other disc side, press DISC SIDE B (or A), then press the number buttons to specify the songs in the order you want them to play.**



Tip
• You can also use Reserve in non-karaoke (NORMAL) mode.

Notes
• You cannot use Auto Pause while using Reserve.
• You cannot use Reserve and Repeat at the same time.

Specifying the next songs (continued)



Tip

- You can also use Next Disc Reserve in non-karaoke (NORMAL) mode.

Note

- You cannot specify tracks over 80 on a CD using Next Disc Reserve.

Specifying selections on another disc (Next Disc Reserve)

- Press NEXT DISC RESERVE after steps 1 to 4 above.**

"CD" appears on the screen, rotating. Now you can specify songs on another disc. Follow steps 2 (and 3) above to specify the songs.
- Press RESERVE (then ► PLAY).**

The songs on the current disc are played, then the player stops automatically and prompts you to change the disc.
- Press ◀ OPEN/CLOSE to open the disc tray, then change the disc.**
- Press ► PLAY or push in the disc tray.**

The selected songs on the new disc start playing automatically.

To enter a number greater than 20

Press **[REVERSE]** on the remote commander, then one of the number buttons. If you press **[REVERSE]** by mistake, press **[REVERSE]** repeatedly until "..." flashes, then enter the correct number.

To	Press
Enter 25	[REVERSE] , [REVERSE] , then [5]
Enter 30	[REVERSE] , [REVERSE] , [REVERSE] , then [0]

To check the songs to be played

Press **DISPLAY** twice. The numbers of songs to be played appear. When a song has been played, its number disappears.



To skip the current song

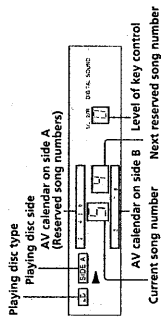
Press **►►**. The next reserved song starts playing.

Cancelling Reserve

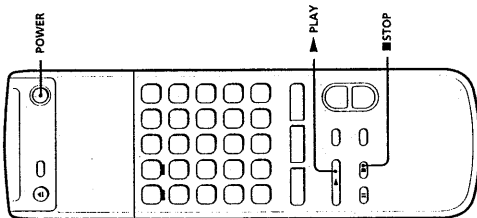
Press **CLEAR**. "CLEAR" appears briefly and the player exits Reserve mode. All reserved songs are cleared.

The front panel display when you play karaoke

The illustration below is an example of what is displayed on the front panel of the player in karaoke mode.



Additional Operations Resuming LD playback (Auto Resume)



This function can only be used for LDs. Once you stop playing by pressing **STOP** or **POWER**, the player stores the point you stopped at so that you can continue viewing from the same point.

- 1 Press **STOP** (or **POWER**) to stop playback.

The ALTO RESUME indicator on the player lights up and the point you stopped at is stored. (When you press **POWER**, the indicator lights up briefly, then goes off with the power.)

- 2 Press **PLAY**.

The player searches for the scene where you stopped playing, then playback starts.

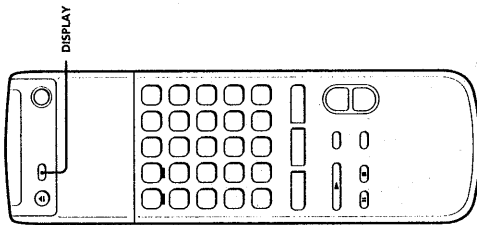
To pause playing just before starting

When the player is turned on, press **PAUSE** instead of **PLAY**. When the player is turned off, press **POWER**, then press **PAUSE**.

To view from the beginning of the LD

Press **DISC SIDE A** to start playing from the beginning of side A. Press **DISC SIDE B** to start playing from the beginning of side B. The point where you stopped is cleared.

Understanding on- screen indications

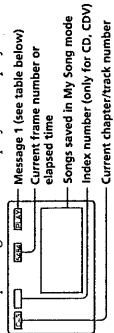


You can view the operating status of the player or disc information on the TV screen.

Displaying on-screen indications

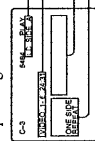
Press **DISPLAY**.

The operating status of the player is displayed on the screen.



Press **DISPLAY** again.

Operating status and disc information are displayed on the screen.



Press **DISPLAY** once again to turn off the indications.

Message 1

Display

Current status of the player

OPEN	Disc tray open
CLOSE	Disc tray closed
PLAY	Playing a disc
STOP	Playback stopped
PAUSE	Playback temporarily stopped
SEARCH	Speed scanning
SEARCH	Searching

Message 2

Display

Currently playing

LD SIDE A	Side A of an LD
LD SIDE B	Side B of an LD
CD	CD
CDV	CDV
1/L	First soundtrack/left channel
2/R	Second soundtrack/right channel
↑ DIGITAL	Digital sound
↓ ANALOG	Analog sound

Tip

- Select the display language, English or Chinese, by pressing **LANGUAGE** on the player.

Notes

- When playing an LD which does not contain TOC data, total playing time of the disc does not appear.
- When playing an LD which does not contain chapters, the chapter number does not appear.
- When playing a CLV LD which does not contain time data to the second, the digital number such as "22", appearing 22 minutes, appears.

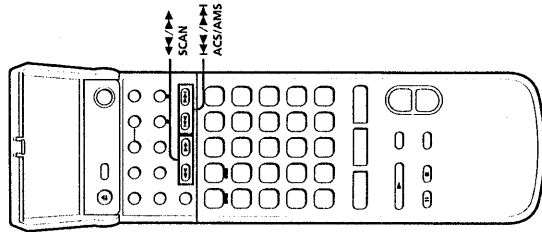
Tips

- Each time you stop playing, the point where you stopped is stored.
- The point where you stopped playing is cleared when:
 - you press **OPEN**/**CLOSE**, **DISC SIDE A** or **DISC SIDE B**, **AGS** or **AMS**.
 - you insert a Chapter Search.
 - you unplug the player.

Note

- If you press **PLAY** when the power is off, the player turns on automatically. If a disc is loaded, playback resumes where you last stopped.

Searching for a particular point on the disc



The LD player has various "search" functions. You can locate a particular point on a disc by scanning scenes or skipping chapters/tracks. You can also specify a chapter/track number directly.

Scanning a disc quickly (Speed Scan)

Hold down **SCAN** while playing the disc.

To	Hold down
Scan forward	SCAN
Scan backward	SCAN

To resume normal playback, release **SCAN**.

Skipping chapters or tracks (Skip Search)

Press or hold down **ACS/AMS**.

To	Press
Next chapter/track	ACS/AMS once
Current chapter/track	ACS/AMS once
Previous chapter/track	ACS/AMS twice before the picture or sound resumes

Hold down **SCAN** or **ACS/AMS** to skip chapters/tracks continuously.

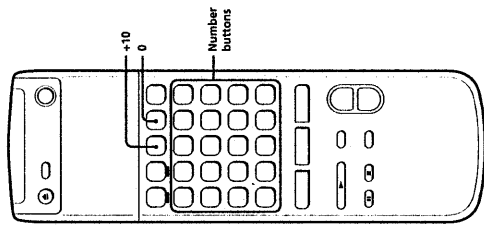
Notes

- When scanning a CLV LD or CDV, frames are skipped.
- A certain amount of visual noise and instability is inevitable when scanning an LD.

Tips

- ACS/AMS stands for Automatic Chapter Sensor/Automatic Music Sensor.
- In addition to normal play mode, you can conduct Speed Scan and Skip Search while in Repeat or Pause mode. After a scan or search, playback continues in the same mode.

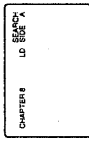
Specifying a chapter or track directly (Chapter/Track Search)



LDs are divided into sections called "chapters." CDs and CDVs are divided into sections called "tracks." Simply enter the desired chapter/track number to go to a chapter or track and start playing it immediately.

Locating a particular chapter/track

Press one of the number buttons to enter the chapter/track number.



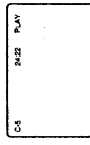
To play a chapter on the opposite side of the LD, press DISC SIDE B (or A), then enter the chapter number.

To enter a number greater than 20, press **0**, then one of the **0-9** buttons. If you press **0** by mistake, press CLEAR, then enter the correct number.

To	Press
Enter 25	0 , 2 , 5 , then 0
Enter 30	0 , 3 , 0 , then 0

To view the current chapter/track number on the screen

Press DISPLAY to display the chapter track number. The number appears in the upper left-hand corner of the screen. If the LD does not contain chapter numbers, no number is displayed.



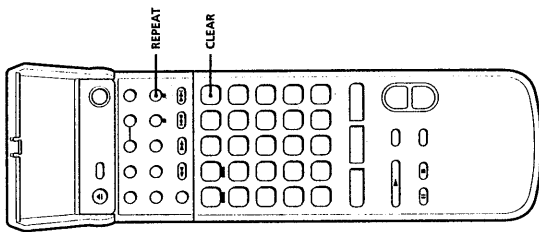
Tips

- You can conduct Chapter/Track Search while in Repeat or Pause mode. When the specified chapter or track is located, playback continues in the same mode.
- When you carry out Chapter/Track search while a selection is paused in karaoke mode, the selected chapter or track starts playing immediately without pausing.

Note

- Chapter Search does not function properly if the disc does not contain chapter numbers, or if the chapter number entered does not exist.

Playing repeatedly (Repeat Play)

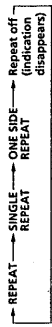


Repeat play allows you to play the disc over and over. You can replay both sides, a single side or one chapter of an LD, and a whole disc or a single track on a CD.

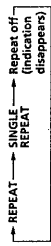
Repeating chapters/tracks

Press REPEAT.

When playing an LD, the on-screen indication changes as follows each time you press REPEAT:



When playing a CD or CDV, the on-screen indication changes as follows each time you press REPEAT:



Indication

Indication	Repeated chapters/tracks
REPEAT (All Disc Repeat)	All chapters on both sides of the LD All tracks on the CD/CDV
SINGLE REPEAT	Current chapter/track
ONE SIDE REPEAT (LD only)	All chapters on the current side of the LD

To view the replaying status on the screen

Press DISPLAY twice.

Cancelling Repeat Play

Press CLEAR.

Tip

- When you play an LD in All Disc Repeat mode, the player plays through both sides of the LD repeatedly.

Note

- You cannot use Repeat and Reserve at the same time.

Replaying a specific portion on the disc (Repeat A ↔ B)

1 Press REPEAT A→B at the beginning of the scene or phrase you want to replay.

This tells the player where replay is to start. "REPEAT" and "A" appear, "B" flashes on the screen.



2 Let the player run to the end of the scene or phrase.

3 Press REPEAT A→B again.

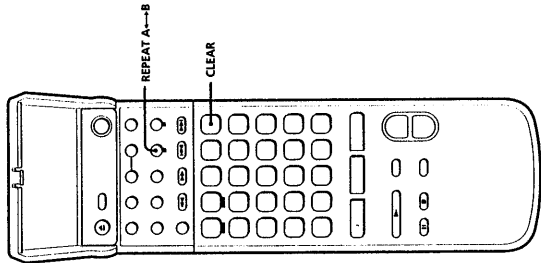
This tells the player where replay is to end. "REPEAT" and "A-B" appear. The player repeatedly plays the scenes or phrases between the two points you specified.

To replay a different portion

Repeat steps 1 to 3 to reenter new starting and ending points.

To cancel Repeat A→B

Press CLEAR.



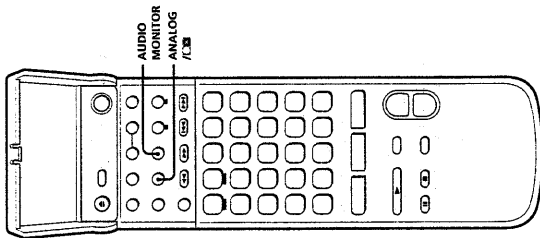
Note

- When you play an LD, you can do Repeat A→B only on the current side of the LD. You cannot do it on both sides of the LD.

Tip

- You can scan the disc between points A and B by holding down ←/→/SCAN.

Using the sound quality functions

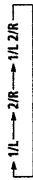


Playing a stereo disc or Second Audio Programme (SAP) disc

When playing SAP discs such as bilingual discs, you can alternate the sound output using AUDIO MONITOR.

To alternate the sound output

Press AUDIO MONITOR while playing the disc. Each time you press AUDIO MONITOR, the on-screen indication changes as follows:



The indication appears on the screen briefly, then disappears.

Indication	From stereo disc	From SAP disc
1/L	Left channel	Sound track 1 (Left channel)
2/R	Right channel	Sound track 2 (Right channel)
1/L 2/R	Stereo (both channels)	Sound track 1 (Left channel) Sound track 2 (Right channel)

When you select 1/L (or 2/R), the sound of the left (or right) channel is output from both speakers.

Listening to analog sound on an LD

If your LD contains digital soundtracks, the player automatically outputs digital sound. To listen to sound recorded on analog soundtracks, use ANALOG/CX.

Press ANALOG/CX while playing the disc.

"J" ANALOG" appears on the screen briefly and analog sound is output.

To return to digital sound

Press ANALOG/CX repeatedly until "J DIGITAL" appears on the screen.

Discs with a CX (CX) logo

LDs bearing the CX logo are recorded with the CX noise reduction system, which gives lower noise level and higher dynamic range on analog sound. The player detects most CX discs and activates the CX noise reduction system automatically when outputting analog sound. If your CX LD does not contain a code to activate the CX noise reduction system, you can activate the CX noise reduction system manually. Press ANALOG/CX repeatedly until "CX ON" appears. The CX noise reduction system is activated.

Notes

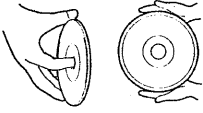
- The output level of digital and analog sound may differ.
- The AUDIO MONITOR and ANALOG/CX buttons do not operate while using Vocal Select, Vocal Support or Karaoke Fun.

Optical discs (continued)

Optical Disc Maintenance

Holding CDs or CDVs

Hold CDs or CDVs by putting your index finger through the centre hole and grasping the edge of the disc with the thumb and other fingers as pictured in the illustration.



Holding LDs

Hold LDs by grasping the outside edge in both hands as illustrated.

Light Exposure

Do not expose the disc to direct sunlight or heat sources such as hot air ducts, or leave the disc in a car parked in direct sunlight where there can be a considerable rise in temperature.

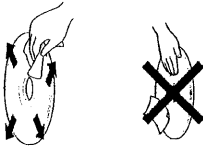
Cracked or Damaged Discs

Do not play cracked or damaged discs, or try to play discs that have been repaired with adhesive glues.

Keeping the Disc Surface Clean

Clean the surface of the disc before playing, using a soft, dry, cleaning cloth. Wipe the disc from the centre out. Do not use solvents such as benzene, paint thinner, commercially available cleaners, or anti-static spray intended for LP record discs.

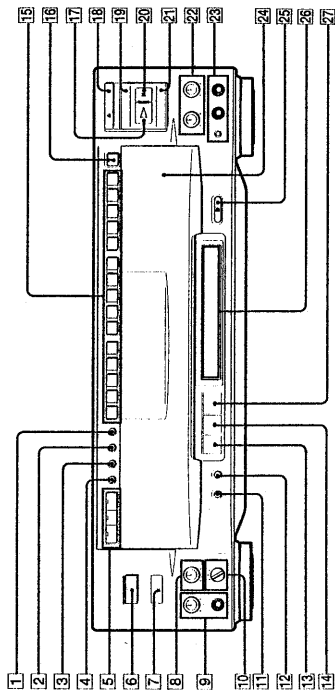
To prevent damage to the disc, after playing, remove the disc and put it back in its jacket. Putting your fingers on, or sticking anything to the surface of the disc such as sticky note pad paper or adhesive tape will lower the quality of the playing surface, and thus the output quality.



See the pages indicated in () for details.

Index to parts and controls

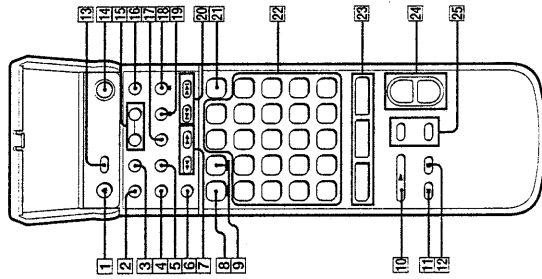
Front



- 1 NEXT DISC RESERVE button and indicator (20)
- 2 RESERVE button and indicator (19)
- 3 VOCAL SUPPORT button and indicator (14)
- 4 VOCAL button and indicator (12)
- 5 KEY CONTROL # DOWN/NATURAL/# UP buttons and indicators (13)
- 6 POWER switch and indicator (8)
- 7 ON:Green
STANDBY: Red
- 8 Remote sensor (29)
- 9 Mic ECHO control (11)
- 9 Headphones jack and PHONES LEVEL control (9)
- 10 Mode (NORMAL/KARAOKE/LINE IN (KARAOKE) selector (8) (10) (15)
- 11 AUTO PAUSE button and indicator (11)
- 12 LANGUAGE button (9)
- 13 SURROUND indicator (13)
- 14 KARAOKE PON indicator (14)
- 15 Number buttons (11) (16) (19) (25)
- 16 MY SONG button and indicator (16)
- 17 (Play) button (8)
- 18 OPEN/CLOSE button (8)
- 19 SIDE A button and indicator (9)
- 20 (Pause) button (8)
- 21 SIDE B button and indicator (9)
- 22 MIC VOL 1/2 control (10)
- 23 MIC 1/2 and CONTROL (MIC 1/2) jacks (10)
- 24 Front cover (8)
- 25 (Stop) button (8)
- 26 Display (9)
- 27 AUTO RESUME indicator (22)

Index to parts and controls (continued)

Remote commander



- 1 OPEN/CLOSE button (8)
- 2 MY SONG button (16)
- 3 MY SONG SET button (16)
- 4 KARAOKE PON button (14)
- 5 ANALOG/CX button (28)
- 6 VOCAL SUPPORT buttons (14)
- 7 <</> SCAN buttons (24)
- 8 RESERVE button (19)
- 9 NEXT DISC RESERVE button (20)
- 10 PLAY button (8)
- 11 PAUSE button (8)
- 12 STOP button (8)
- 13 DISPLAY button (23)
- 14 POWER switch (8)
- 15 VOCAL/SELECT buttons (12)
- 16 SURROUND button (13)
- 17 AUDIO MONITOR button (28)
- 18 REPEAT button (26)
- 19 REPEAT A ↔ B button (27)
- 20 <</> ACS/AMS buttons (24)
- 21 CLEAR button (18) (21) (26)
- 22 Number buttons (11) (16) (19) (25)
- 23 KEY CONTROL buttons (13)
- 24 # UP
- 25 NATURAL
- 26 DOWN
- 27 TV VOL +/- buttons
- 28 DISC SIDE A/B buttons (9)

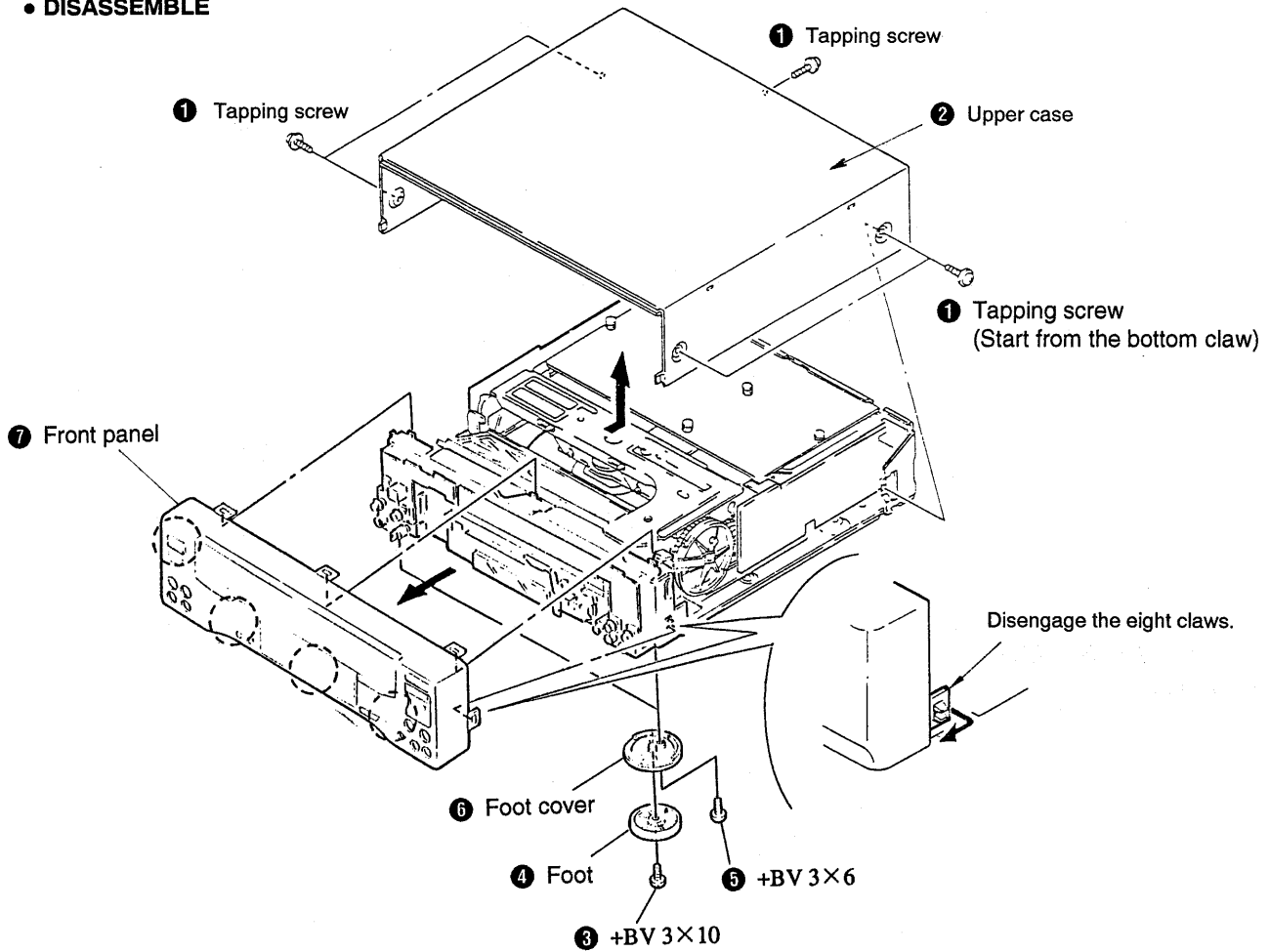
A function activated by pressing a button with an orange mark can be cancelled by pressing the CLEAR button.

**SECTION 2
DISASSEMBLY**

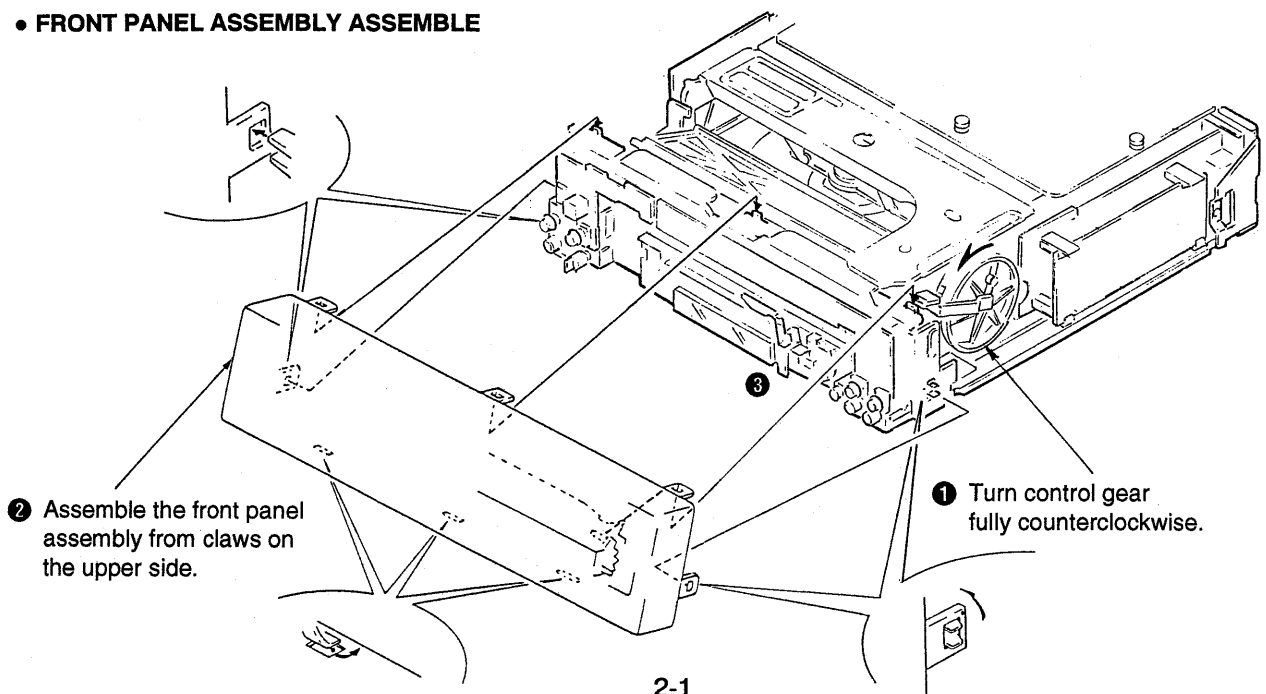
NOTE: Follow the disassembly procedure in the numerical order given.

2-1. UPPER CASE, FRONT PANEL ASSEMBLY

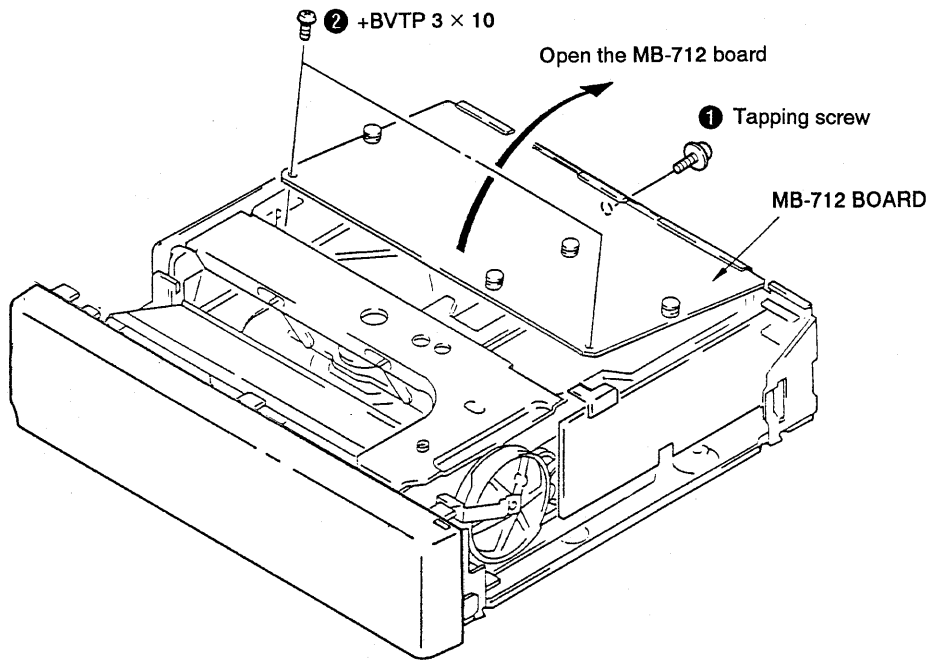
• DISASSEMBLE



• FRONT PANEL ASSEMBLY ASSEMBLE

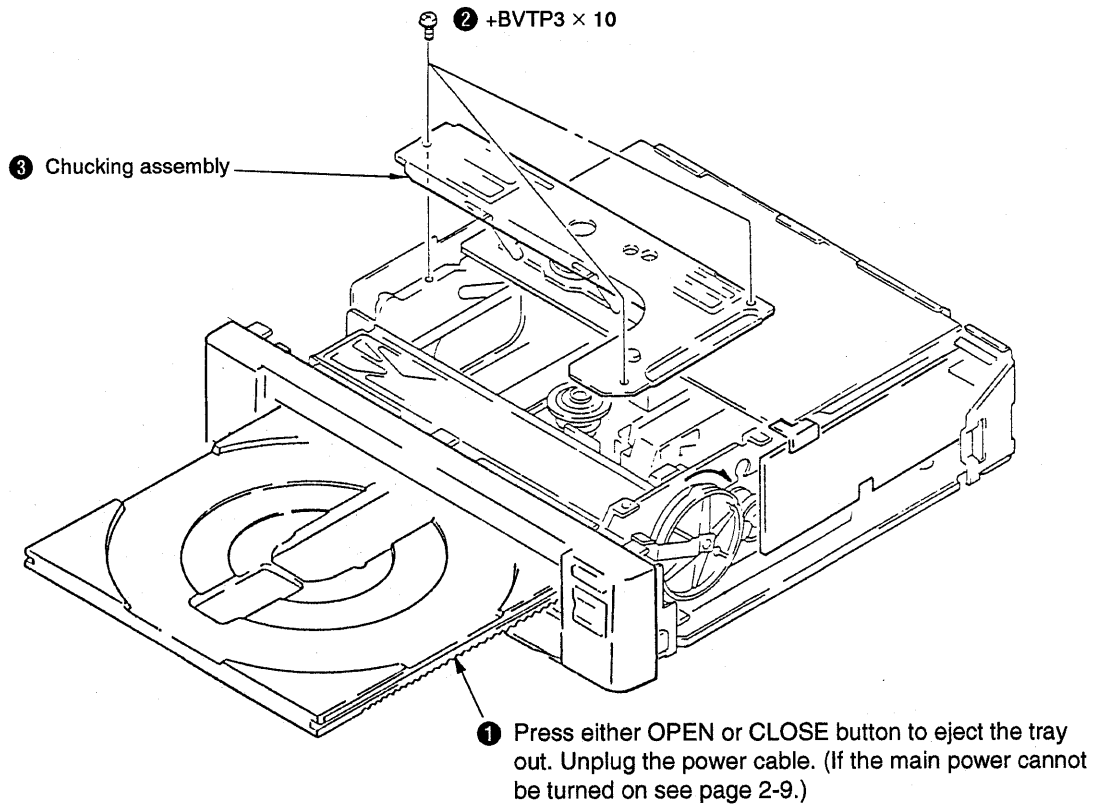


2-2. MB-712 BOARD

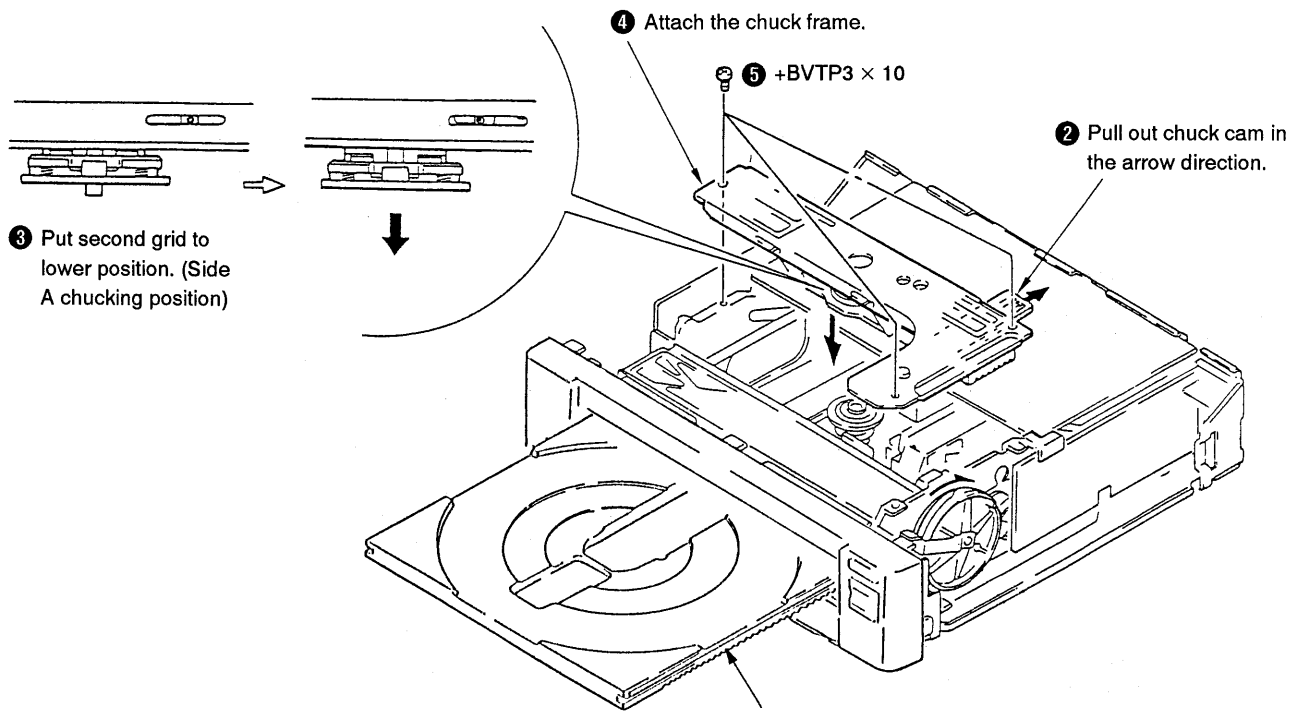


2-3. CHUCKING ASSEMBLY

• DISASSEMBLE

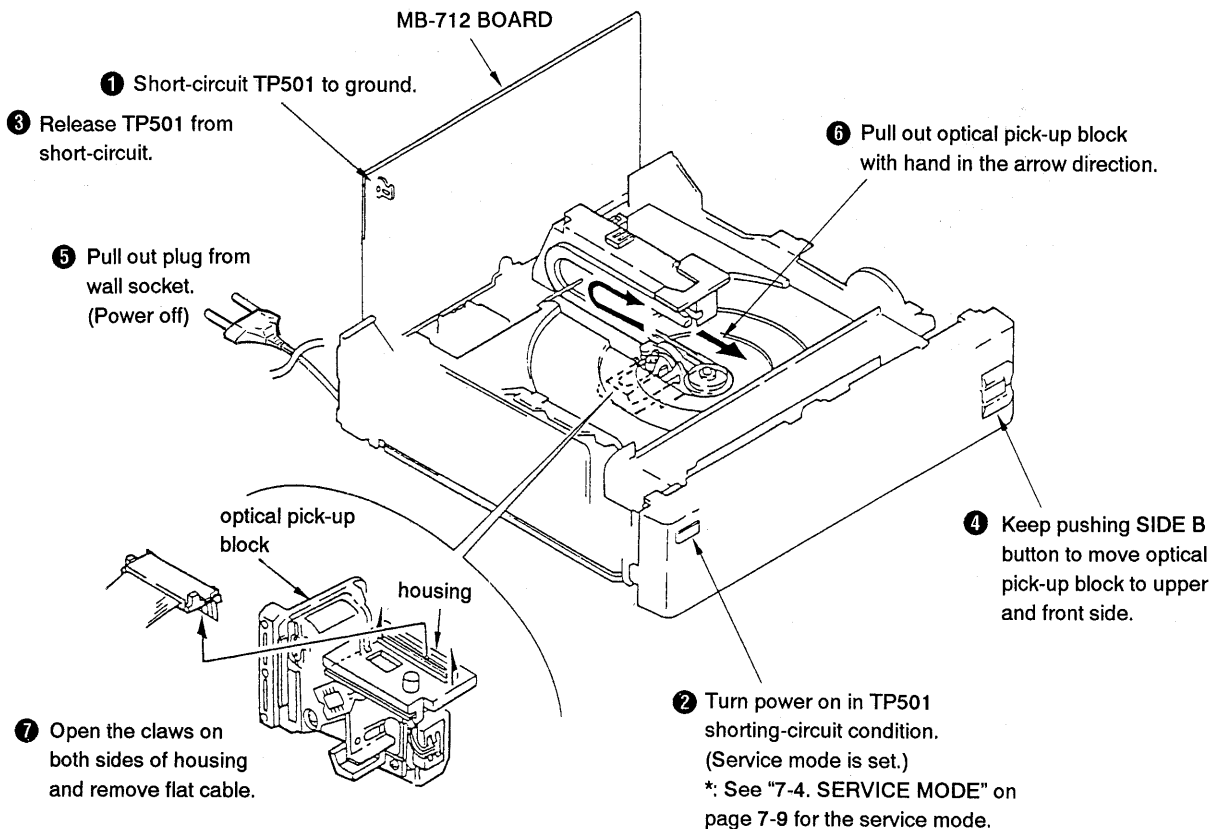


• ASSEMBLE

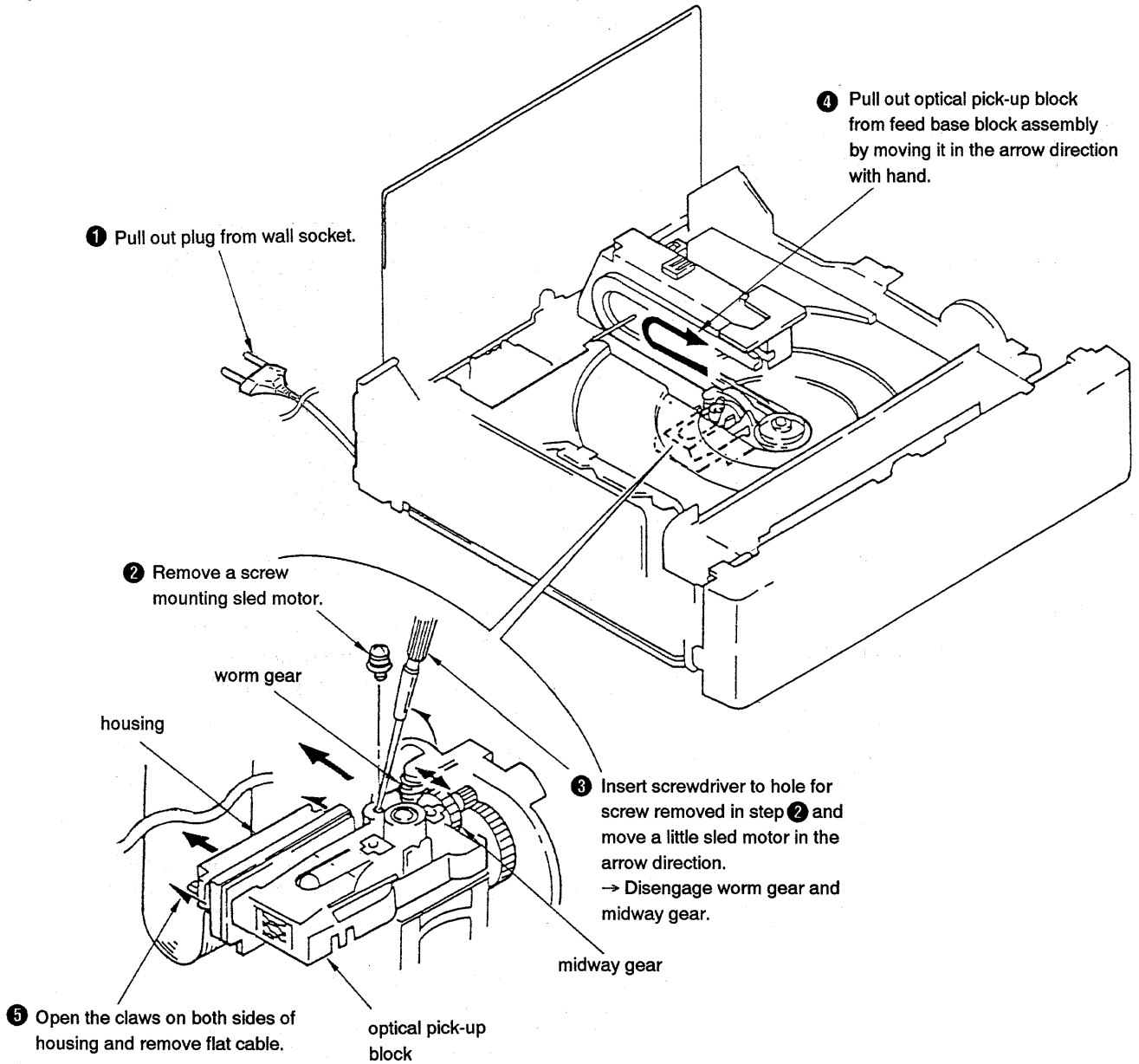


2-4. OPTICAL PICK-UP BLOCK

• DISASSEMBLE I
(OPTICAL PICK-UP BLOCK MOTOR OPERATES)



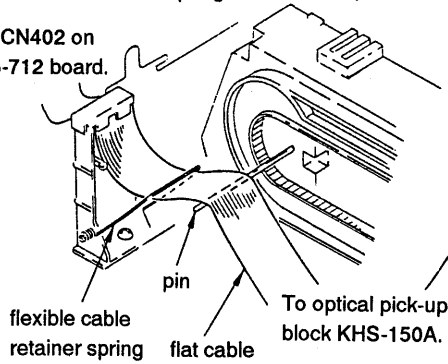
• **DISASSEMBLE II**
(OPTICAL PICK-UP BLOCK MOTOR DOESN'T OPERATE)



• ASSEMBLE

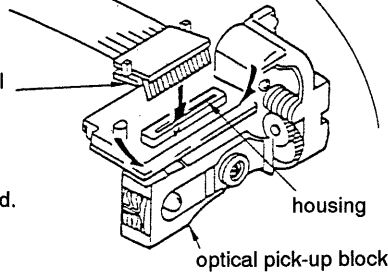
- ③ Confirm the flat cable goes through the flexible cable retainer spring and over the pin.

To CN402 on MB-712 board.



- ④ Insert plug to wall socket.

- ① Insert flat cable to housing on optical pick-up block. Confirm the claws on both sides of housing are locked.



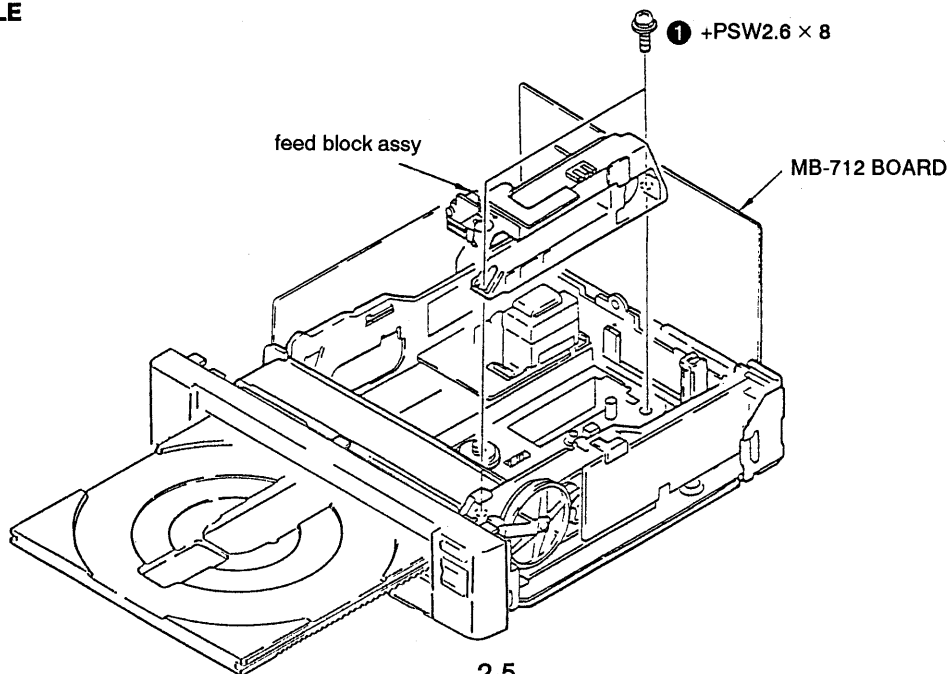
feed block assy

- ② Insert optical pick-up block to feed base block assembly.

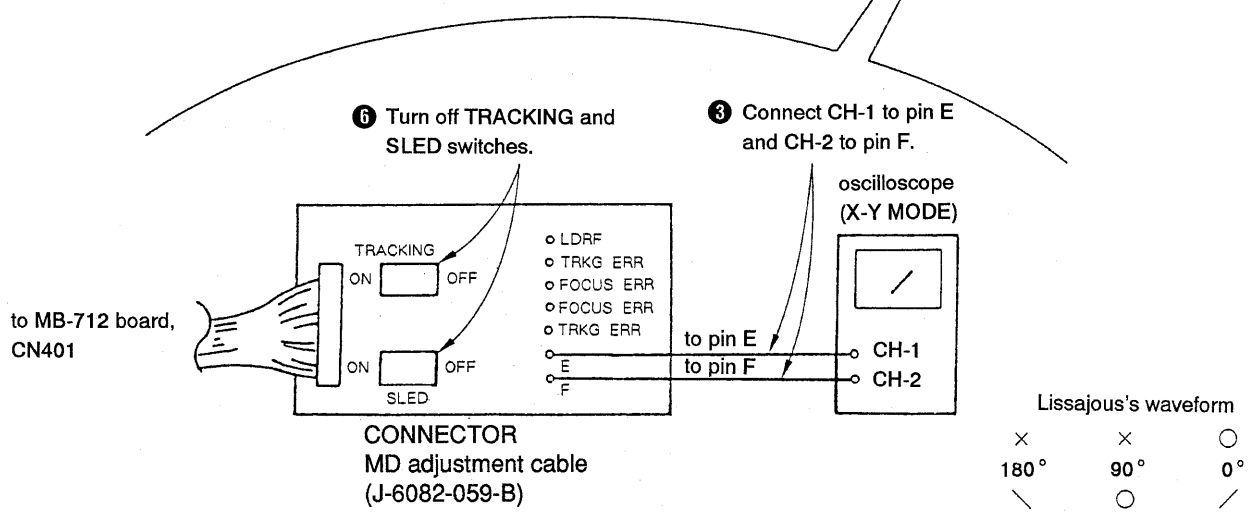
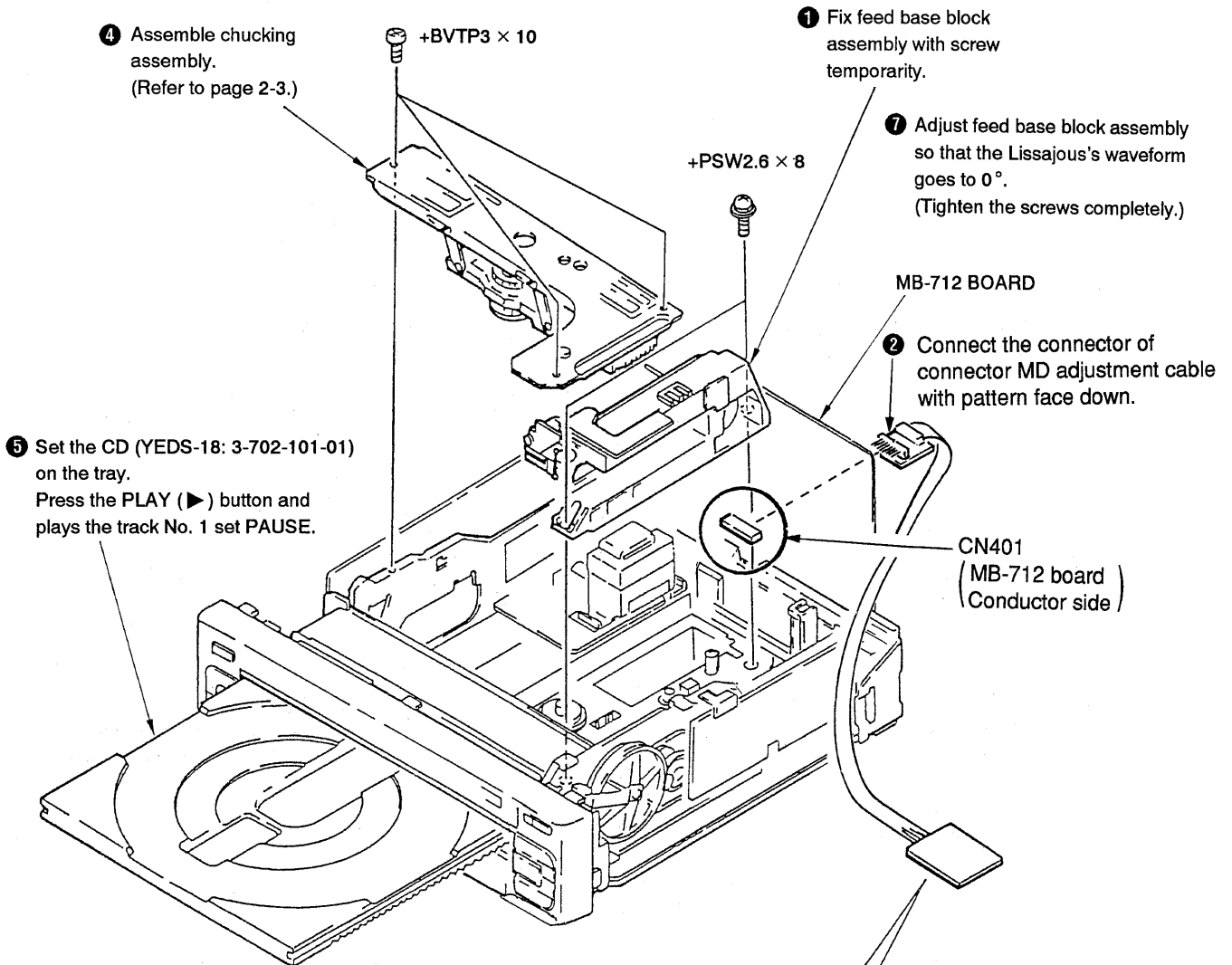
- ⑤ Turn power on. → Optical pick-up block moves into feed base block assembly.

2-5. MD CHASSIS ASSEMBLY

• DISASSEMBLE

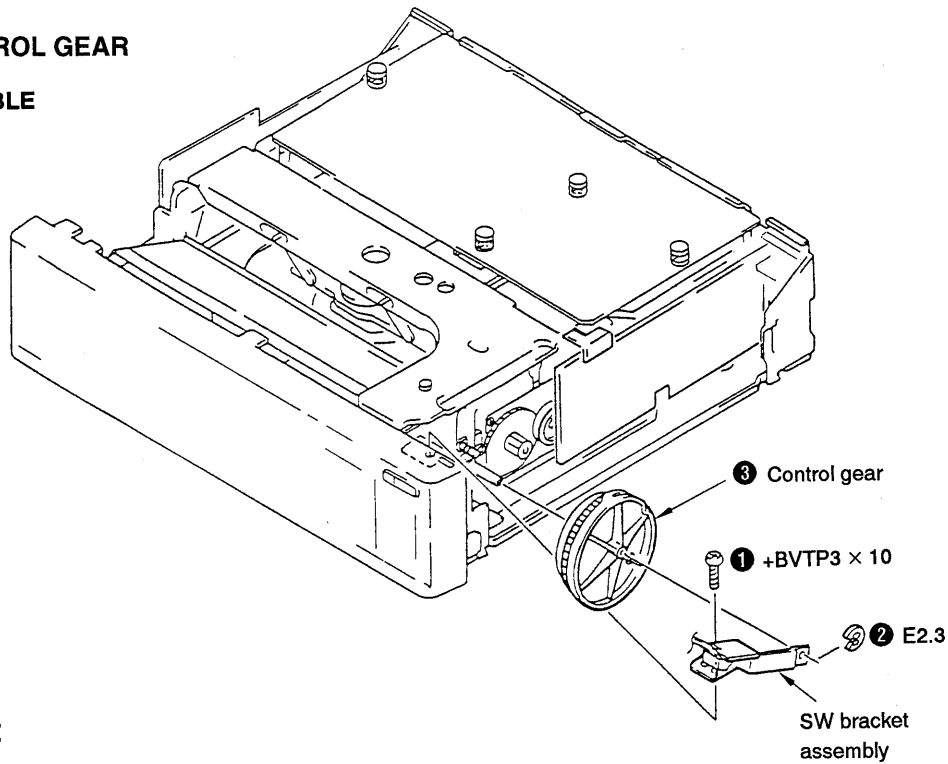


• ASSEMBLE



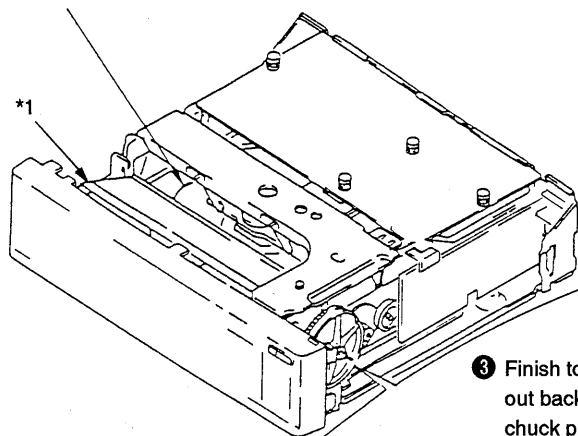
2-6. CONTROL GEAR

• DISASSEMBLE



• ASSEMBLE

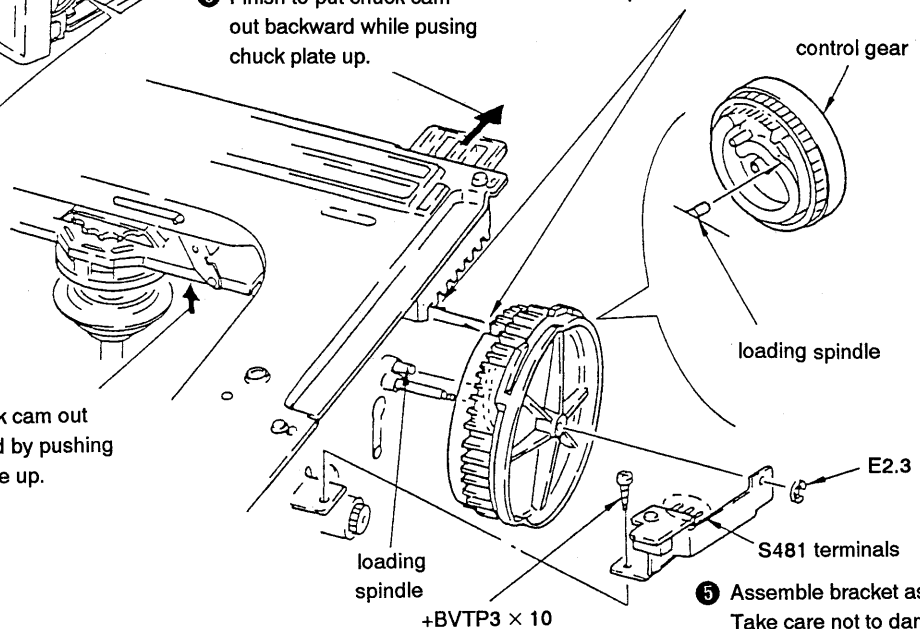
- 1 Make tray holding in the set.



- 4 Attach the control gear so that its left end tooth on the inner side engages the left end groove on the chuck plate gear. Insert the loading spindle to the loading groove of the control gear while slightly moving the part marked with *1 up and down.

- 3 Finish to put chuck cam out backward while pushing chuck plate up.

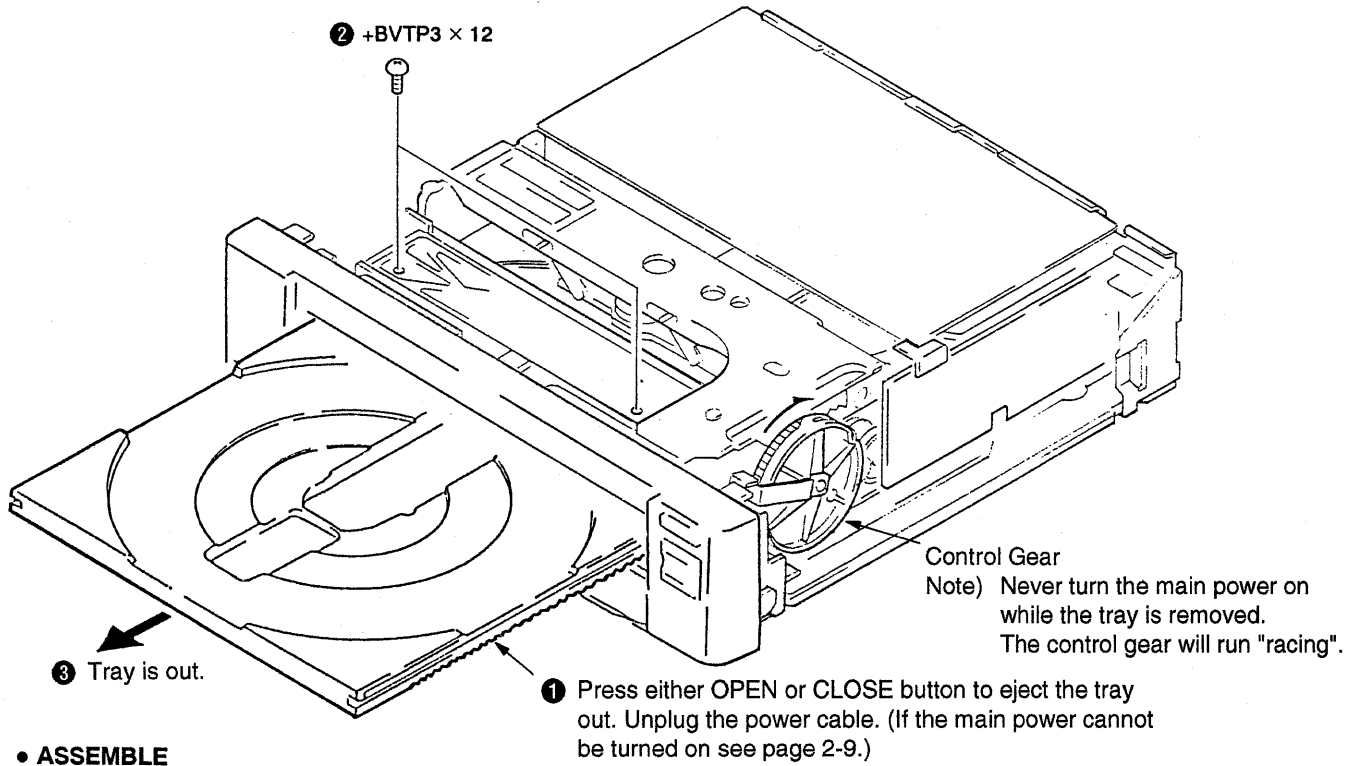
- 2 Put chuck cam out backward by pushing chuck plate up.



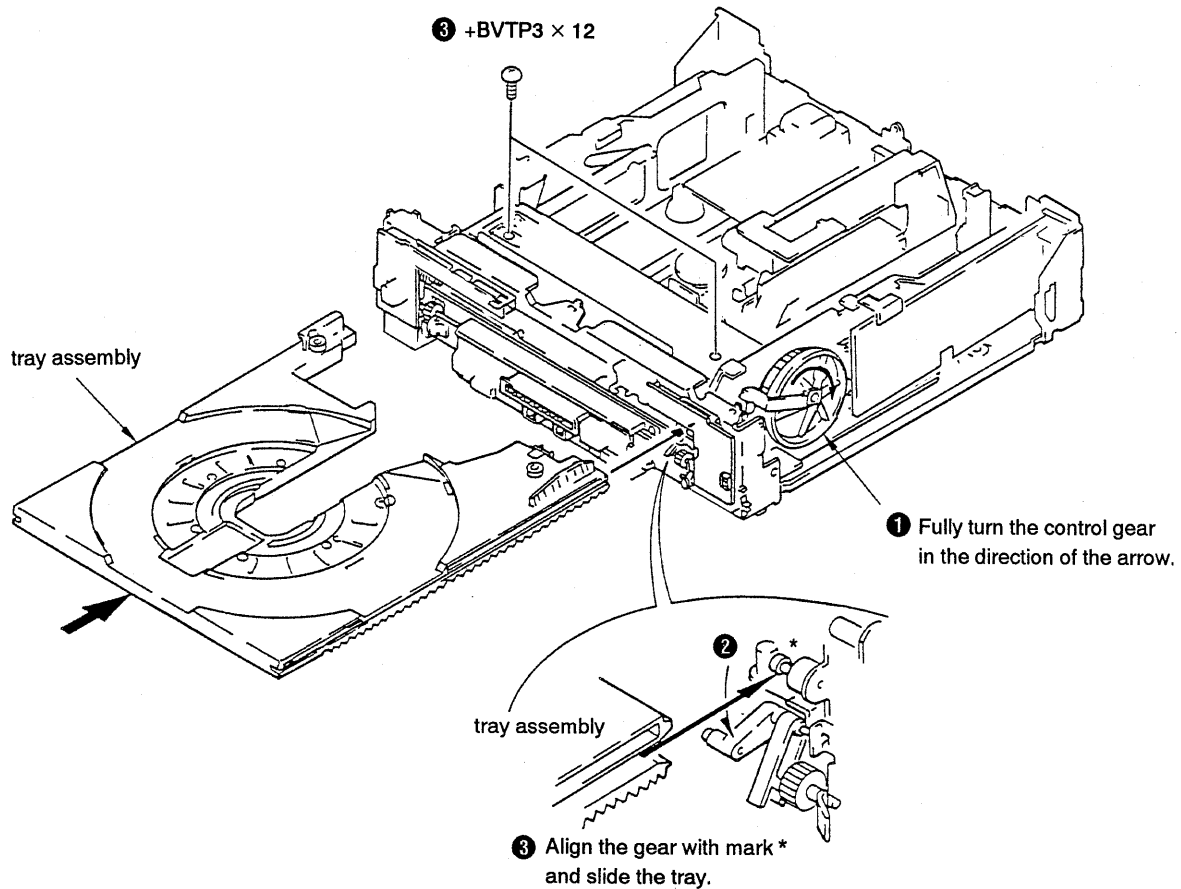
- 5 Assemble bracket assembly. Take care not to damage the terminals of S481.

2-7. TRAY ASSEMBLY

• DISASSEMBLE

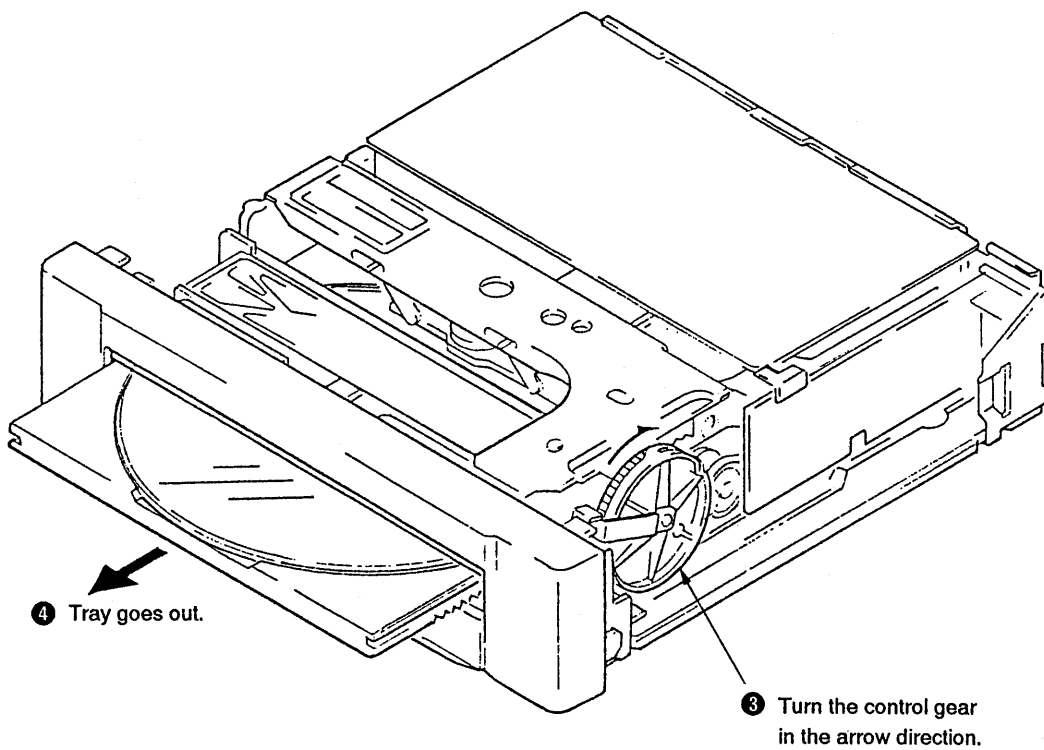
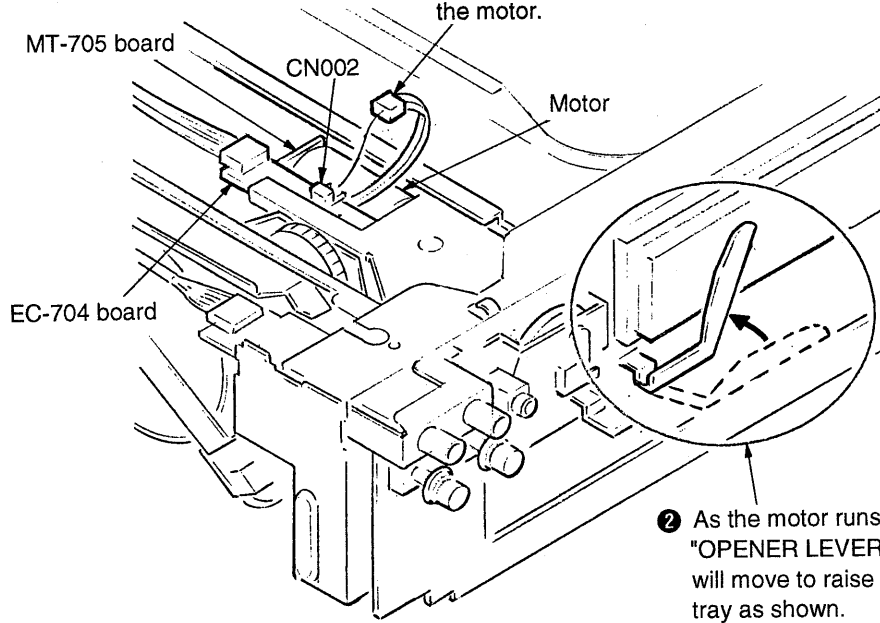


• ASSEMBLE



2-8. HOW TO EJECT THE TRAY WHEN THE MAIN POWER CANNOT BE TURNED ON.

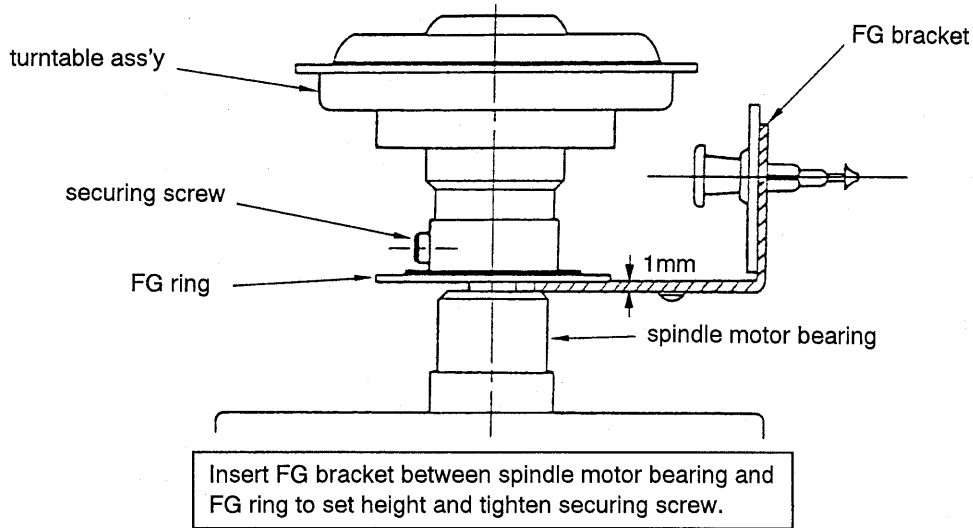
- 1 Remove the connector from the MT-705 board where the connector comes from the EC-704 board CN002. Add DC+5V instead of the removed connector to run the motor.



2-9. TURNTABLE ASSEMBLY HEIGHT ADJUSTMENT

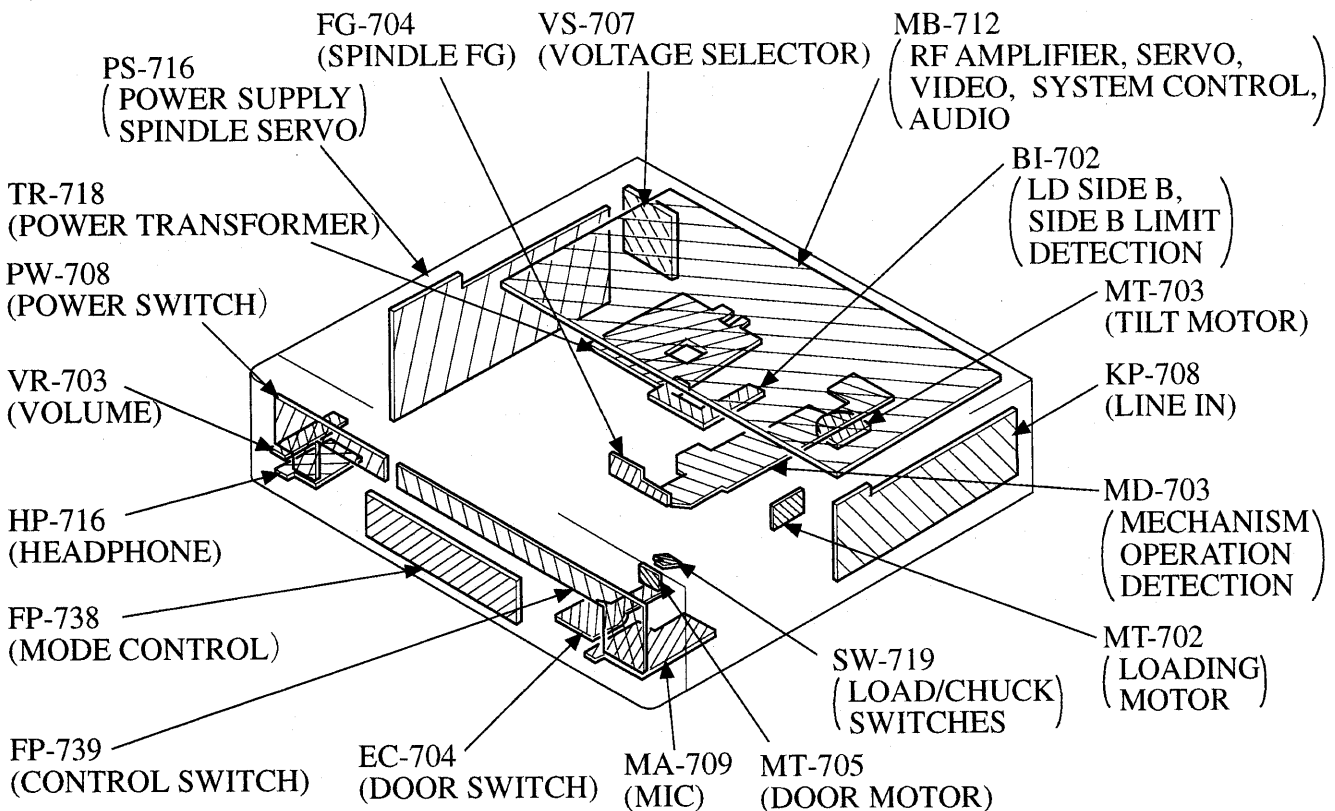
1. Open the tray by turning the control gear recured on the right side of the set clockwise.
2. Remove chucking assembly. (Refer to 2-3.)
3. Remove FG bracket with FG board.
4. Replace turntable assembly.

Adjust turntable assembly height using FG bracket(1 mm thickness)as followings.



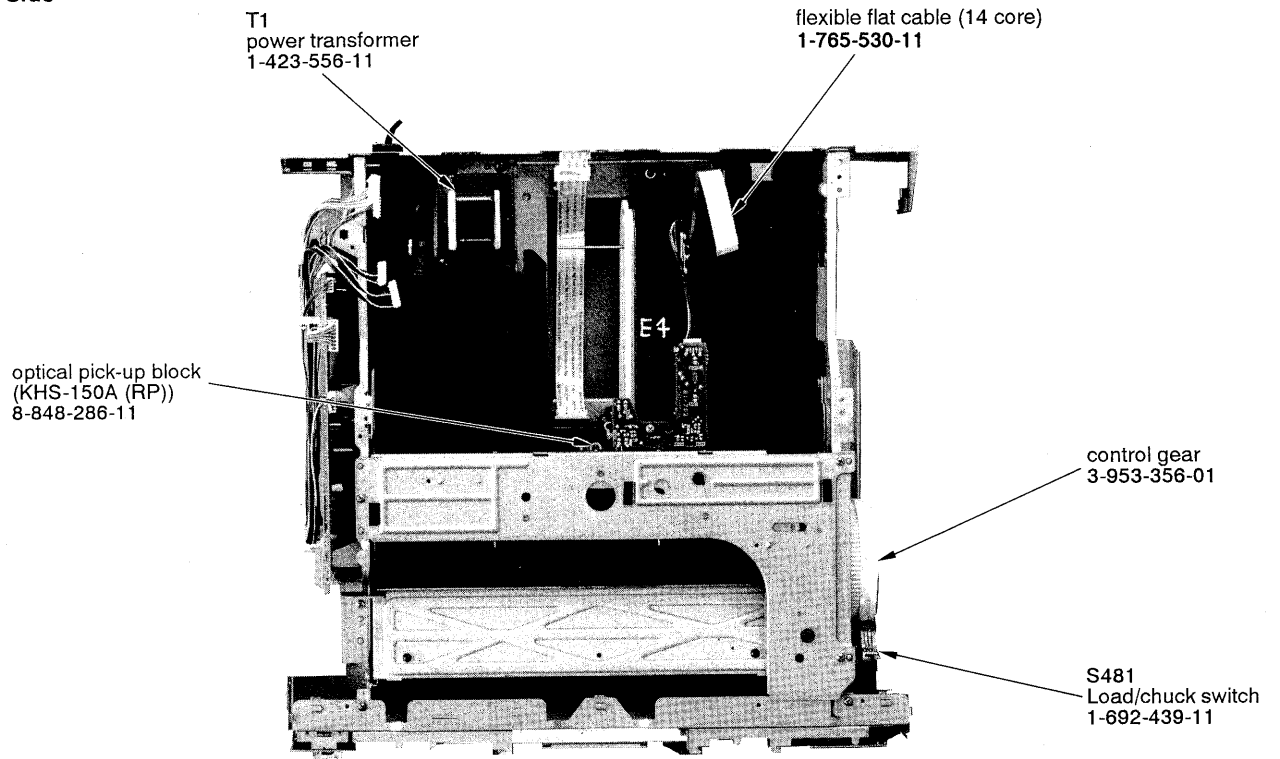
5. Fit FG bracket with FG board in its original position.

2-10. CIRCUIT BOARDS LOCATION

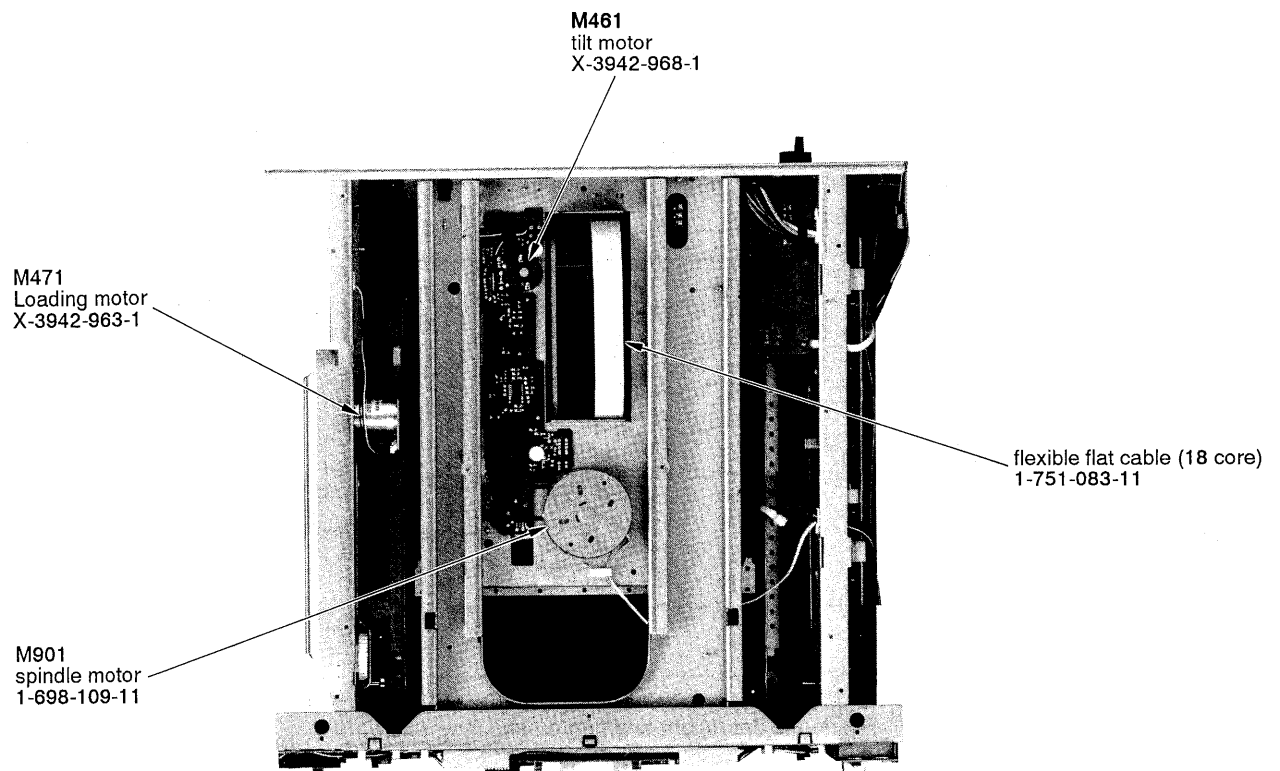


2-11. INTERNAL VIEWS

– Top Side –

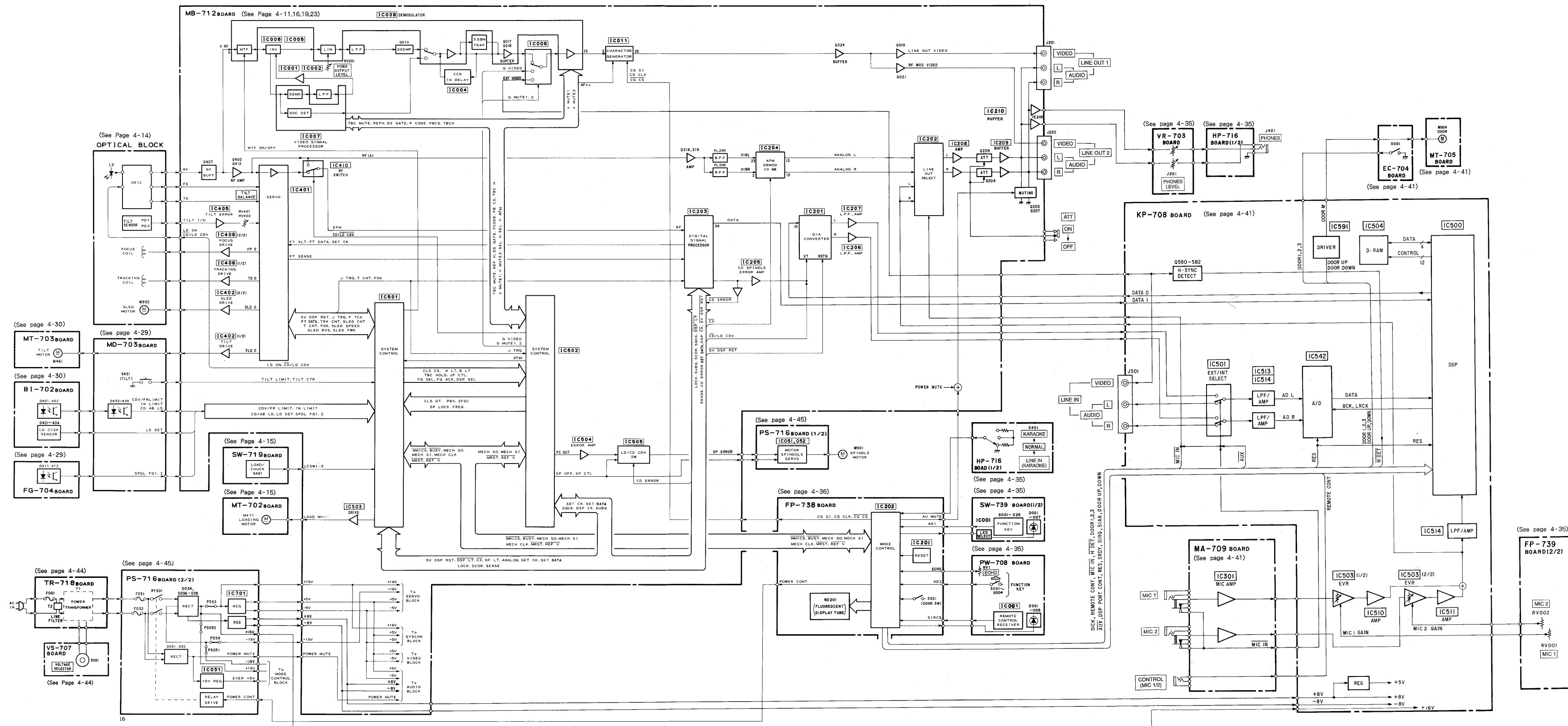


– Bottom Side –

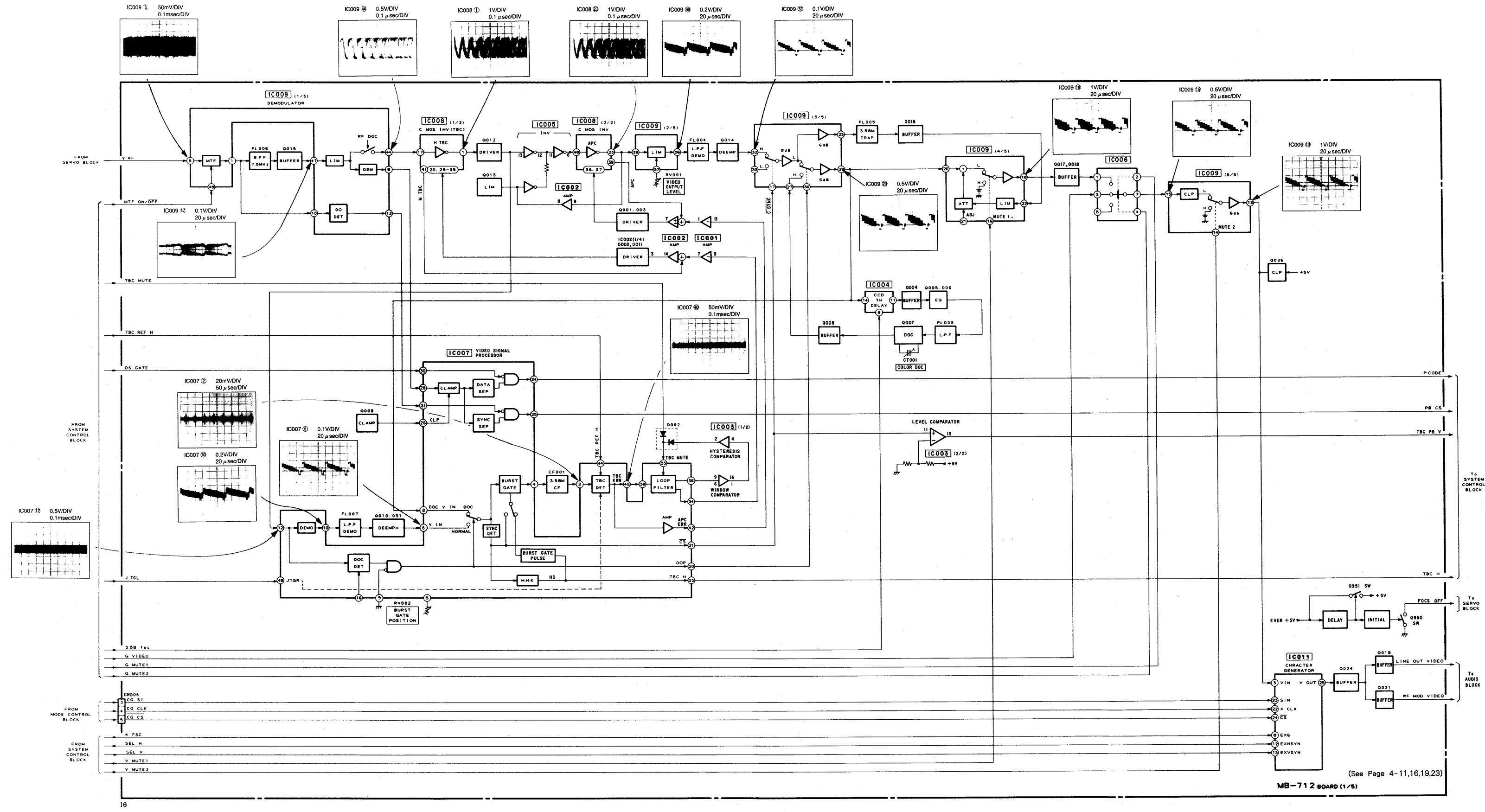


SECTION 3
DIAGRAMS

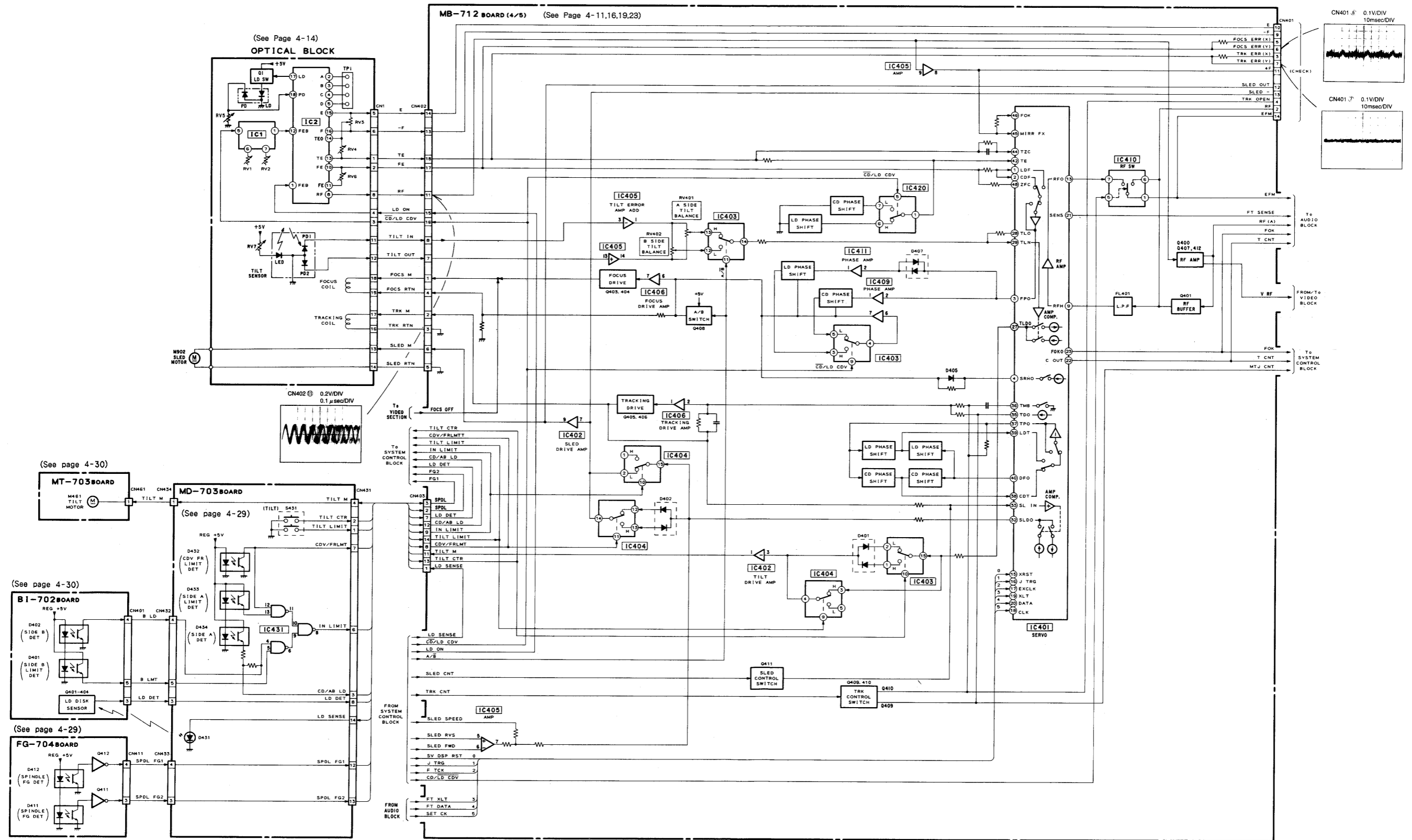
3-1. OVERALL BLOCK DIAGRAM



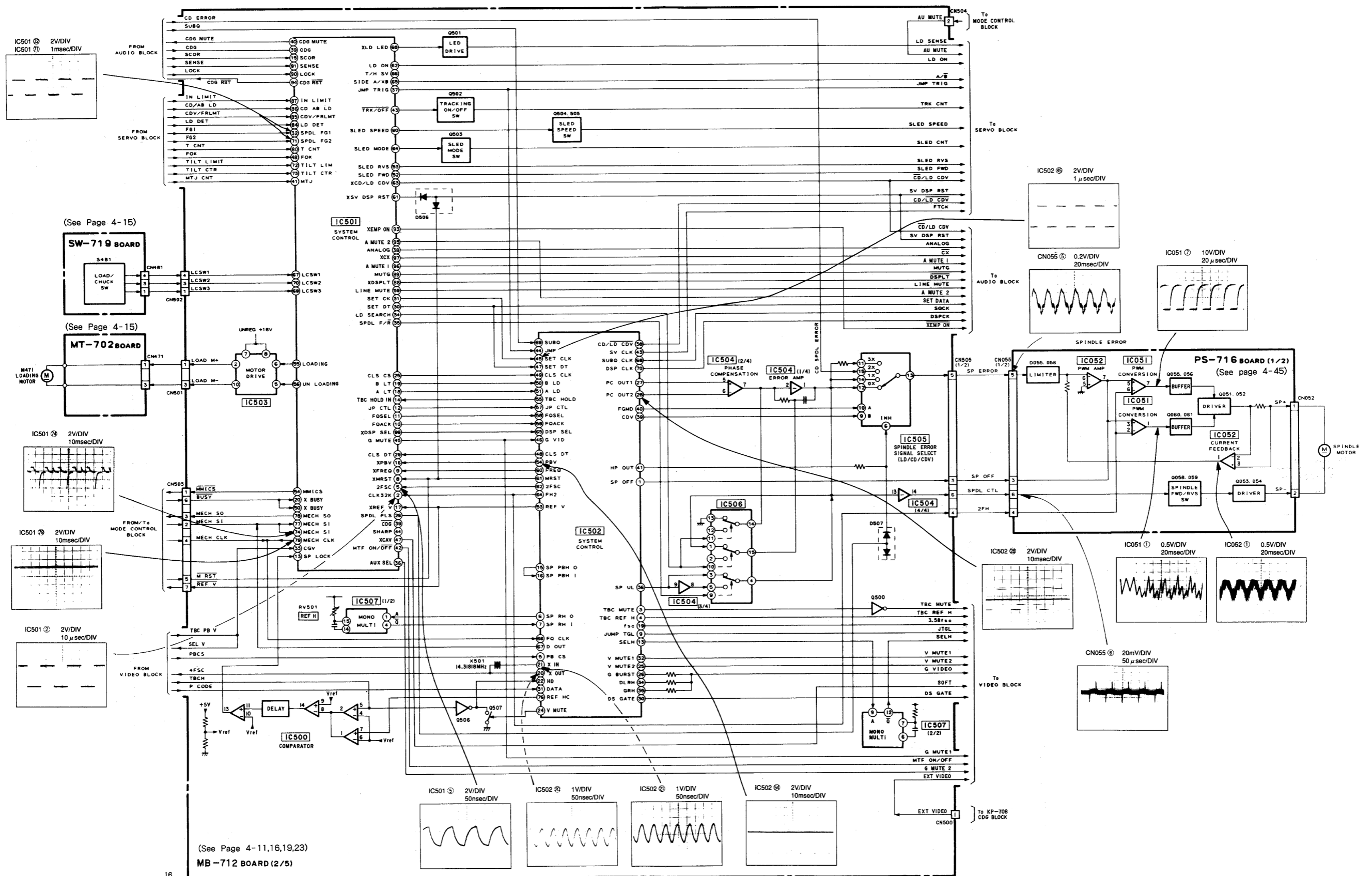
3-2. VIDEO BLOCK DIAGRAM



3-3. SERVO BLOCK DIAGRAM

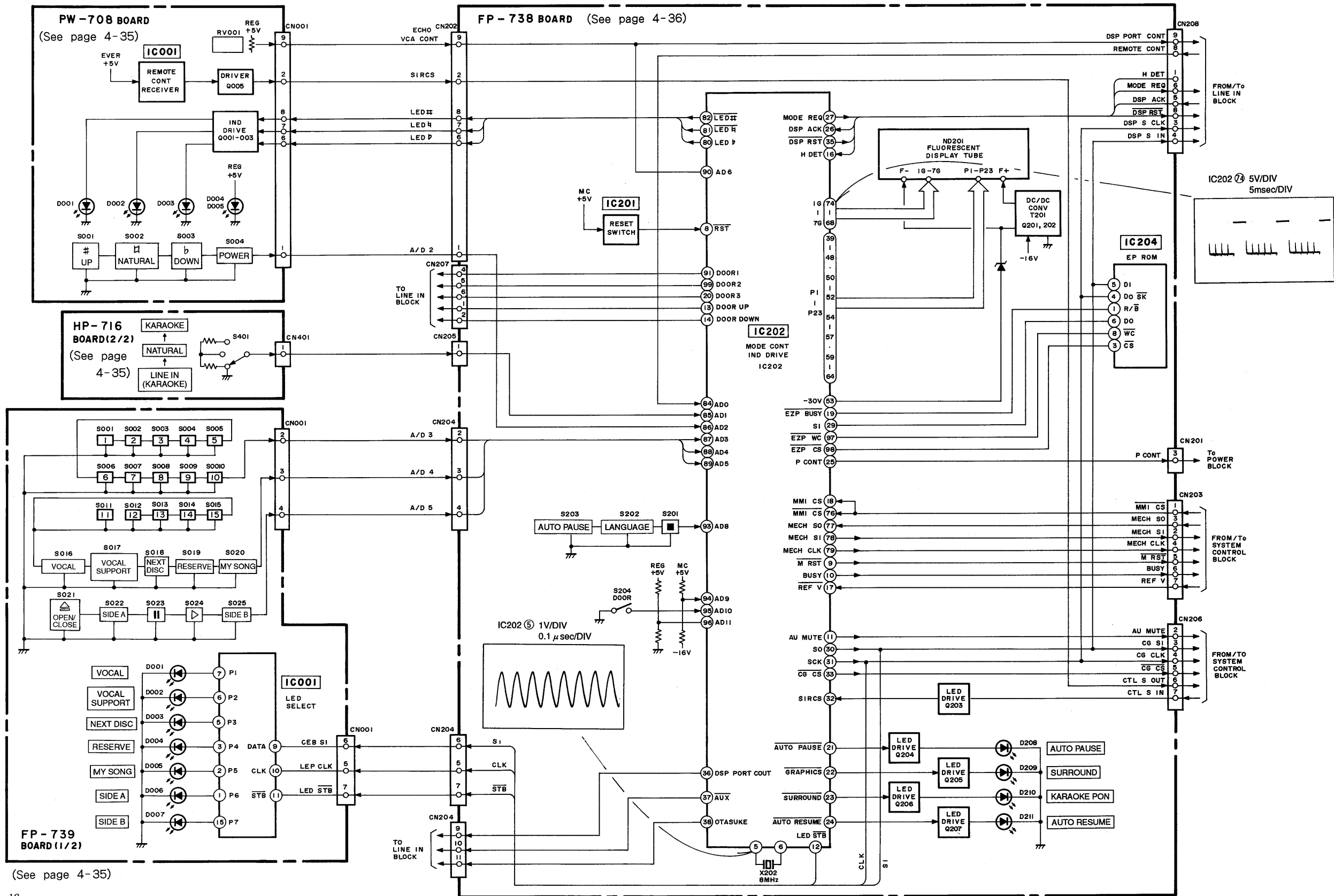


3-4. SYSTEM CONTROL BLOCK DIAGRAM



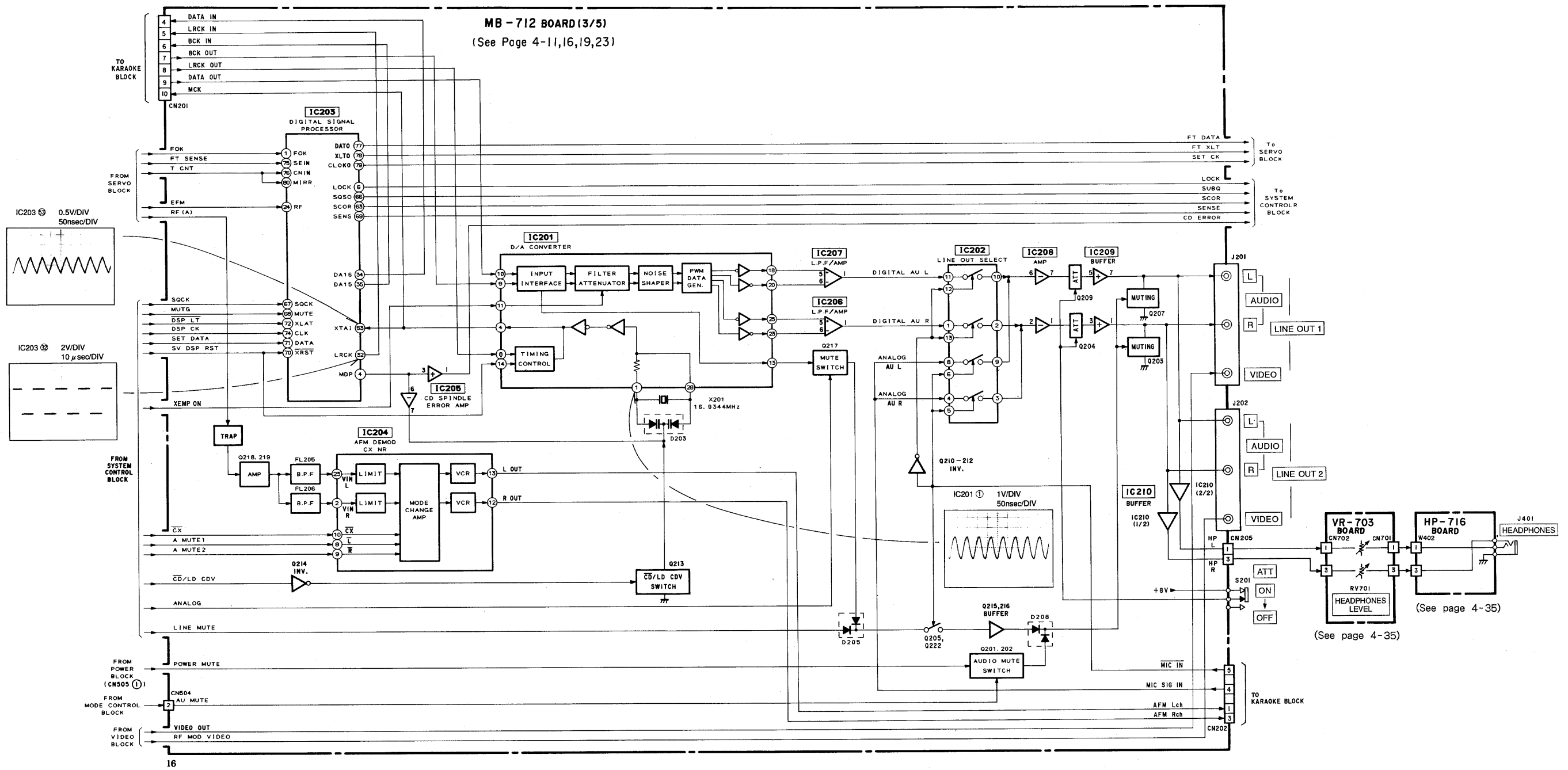
(See Page 4-11,16,19,23)
MB-712 BOARD (2/5)

3-5. MODE CONTROL BLOCK DIAGRAM

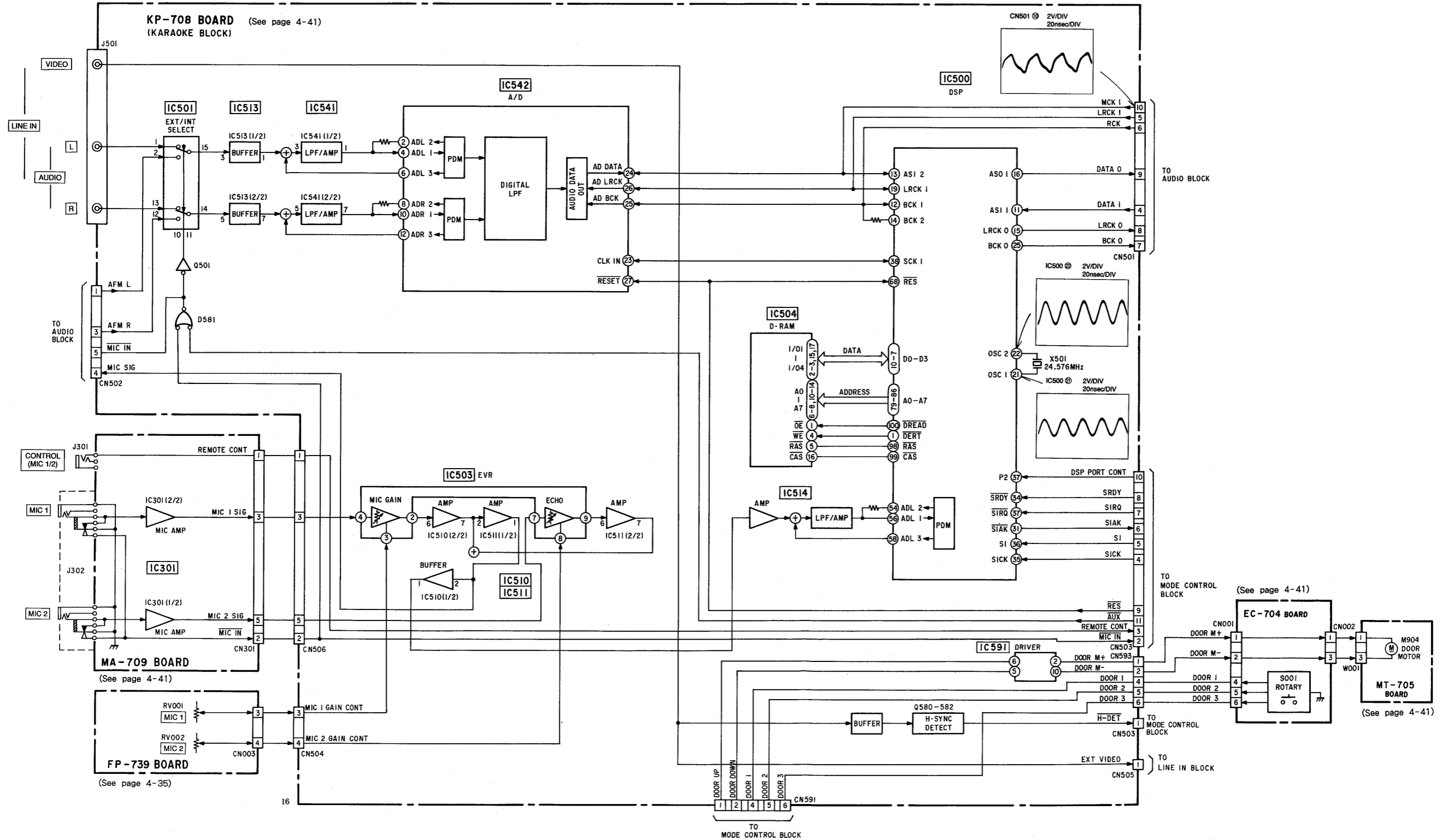


(See page 4-35)

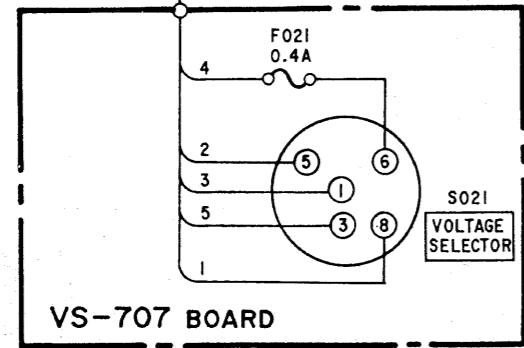
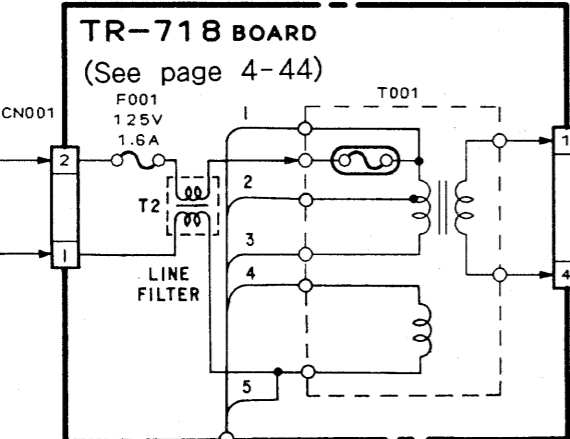
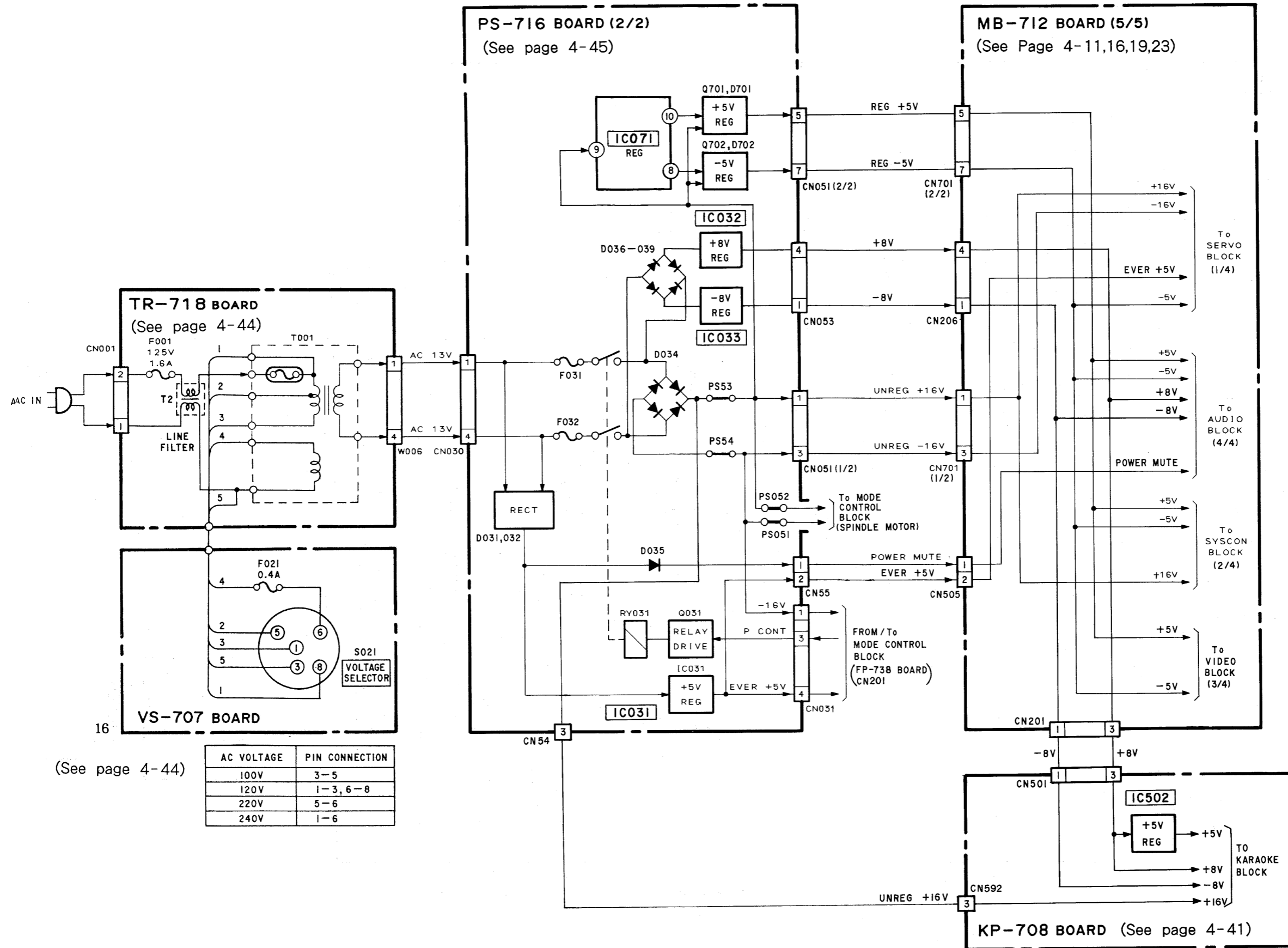
3-6. AUDIO BLOCK DIAGRAM



3-7. LINE IN BLOCK DIAGRAM



3-8. POWER SUPPLY BLOCK DIAGRAM

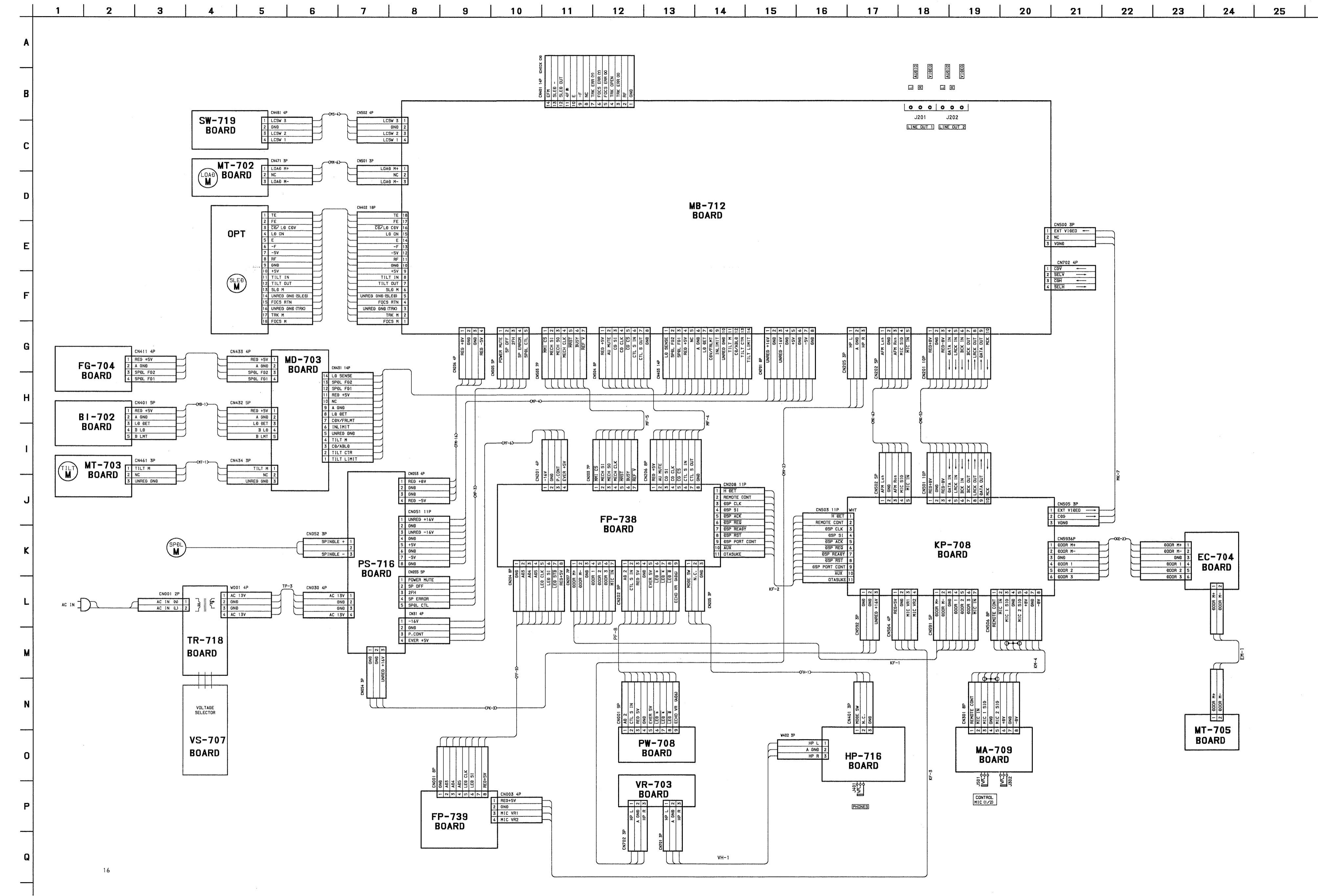


(See page 4-44)

AC VOLTAGE	PIN CONNECTION
100V	3-5
120V	1-3, 6-8
220V	5-6
240V	1-6

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM



4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS. (In addition to this, the necessary note is printed in each block.)

- For printed wiring boards:
- — : indicated a lead wire mounted on the component side.
 - — : indicated a lead wire mounted on the conductor side.
 - ▨ : Pattern from the side which enables seeing.
 - ▩ : Pattern of the rear side.*

Caution :

Pattern face side: Parts on the pattern face side seen from the (Conductor Side) pattern face are indicated.

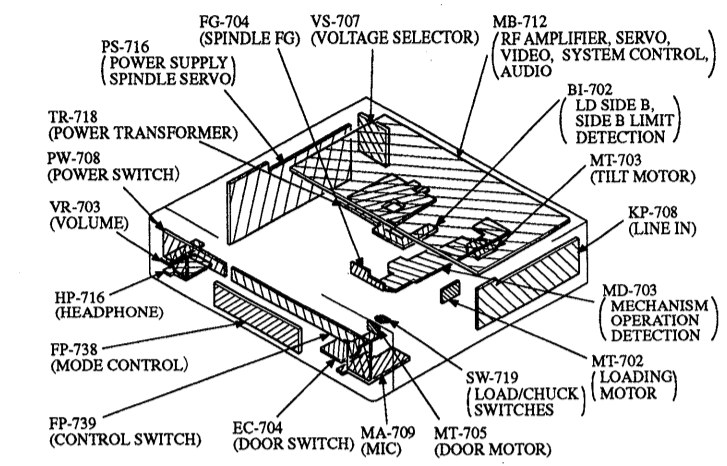
Parts face side: Parts on the parts face side seen from the (Component side) parts face are indicated.

- For schematic diagram:
- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
 - All resistors are in ohms, 1/4 W unless otherwise noted. Chip resistors: 1/10 W unless otherwise noted. k Ω : 1000 Ω, M Ω : 1000k Ω.
 - All capacitors are in μF unless otherwise noted. pF: μF. 50V or less are not indicated except for electrolytics and tantalums.
 - All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
 - : nonflammable resistor.
 - : fusible resistor.
 - : panel designation.
 - : internal component.
 - : adjustment for repair.*
 - : B + Line.*
 - : B - Line.*
 - Voltage are dc between measurement points and ground when playing back the reference disc (HLV-8) color bar segment.*
 - Readings are taken with a digital multimeter (DC10 MΩ).
 - Voltage variations may be noted due to normal production tolerances.
 - : IN/OUT direction of B line (+, -).*
 - : Circled numbers refer to waveforms.*

When indicating parts by reference number, please include the board name.

Note : The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

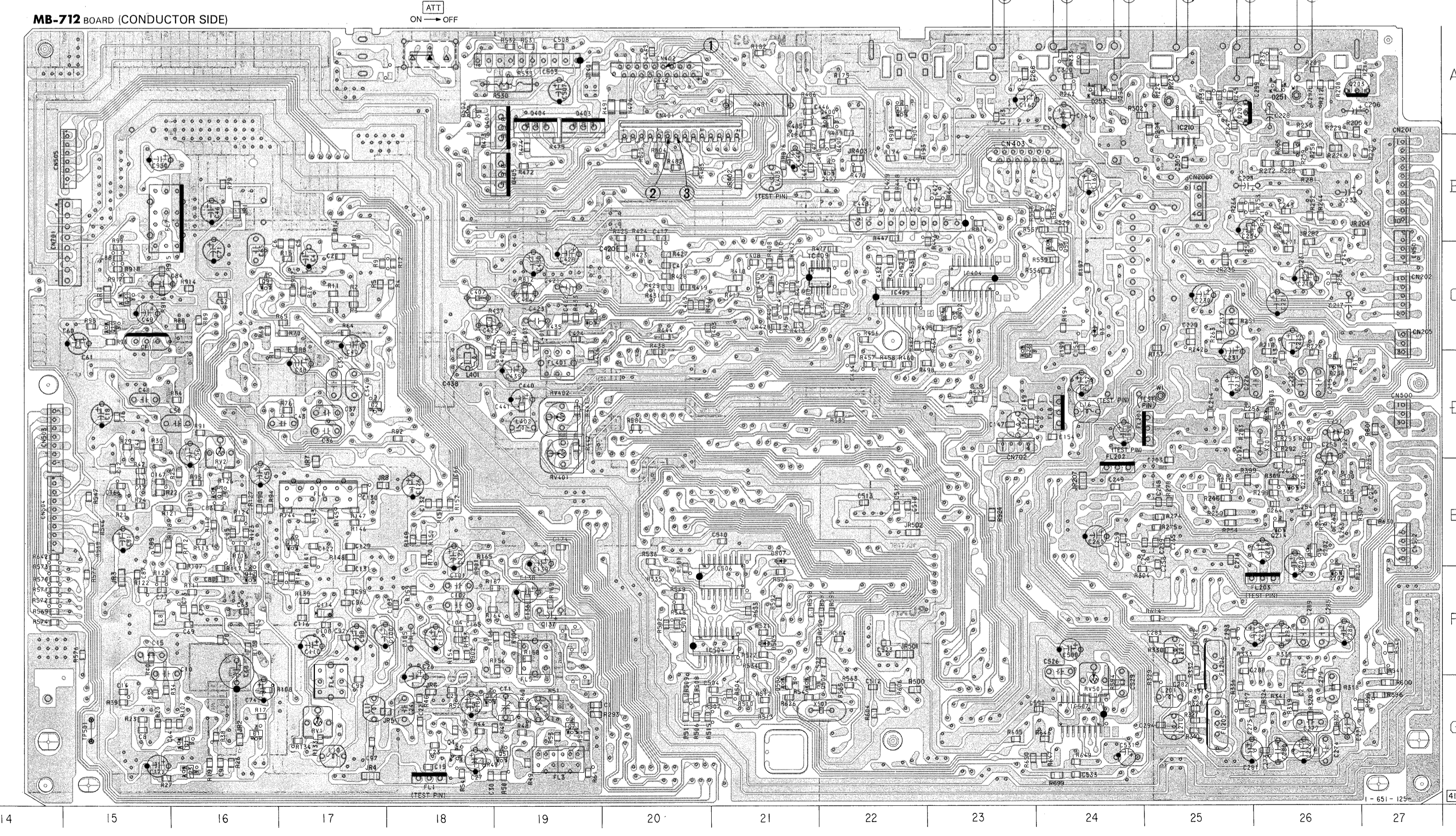
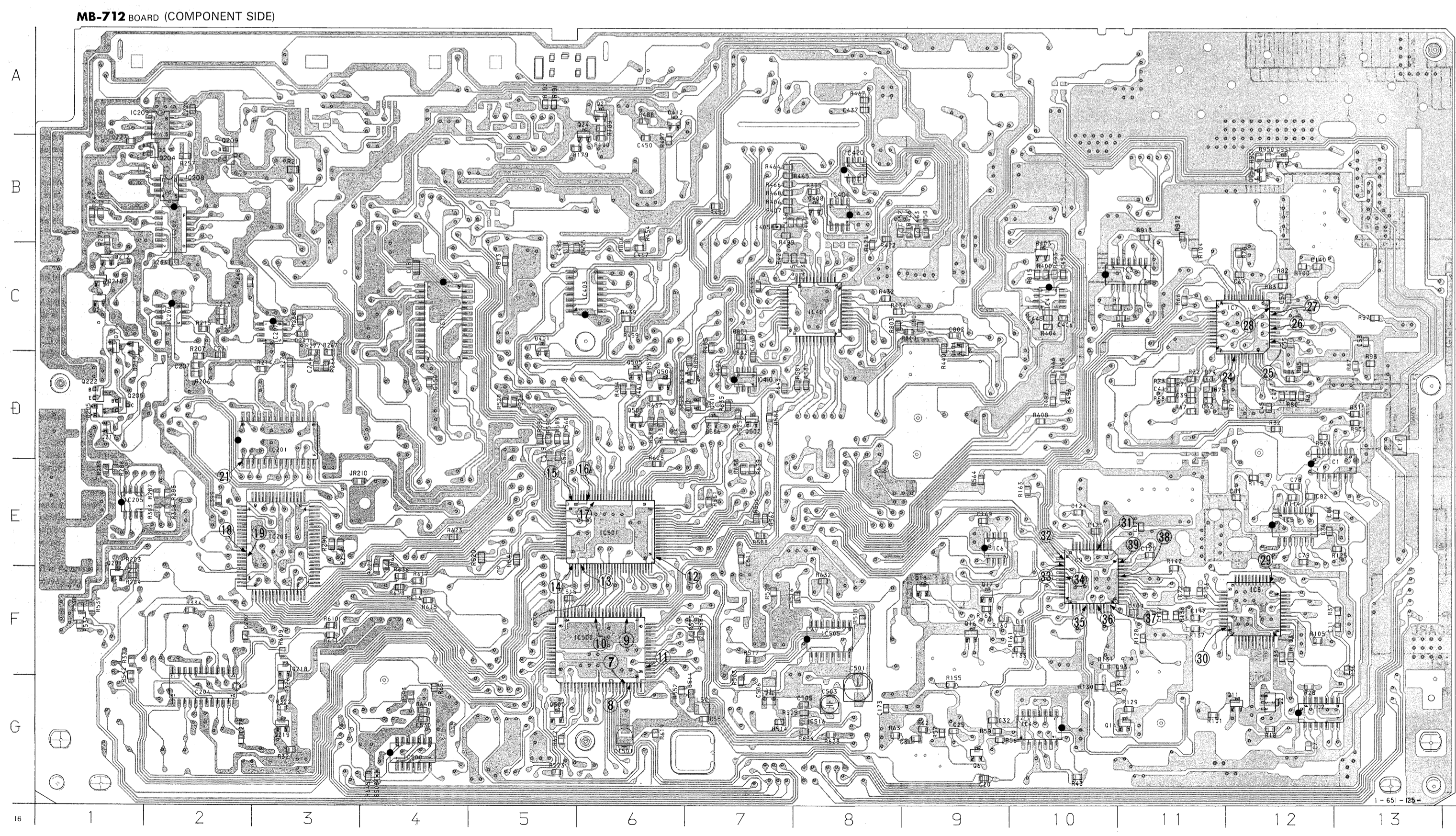
- * : indicated by the color red.



MB-712 (VIDEO, RF AMPLIFIER, SERVO, SYSTEM CONTROL, AUDIO) PRINTED WIRING BOARD
 —Ref. No. MB-712 Board: 1,000 Series—

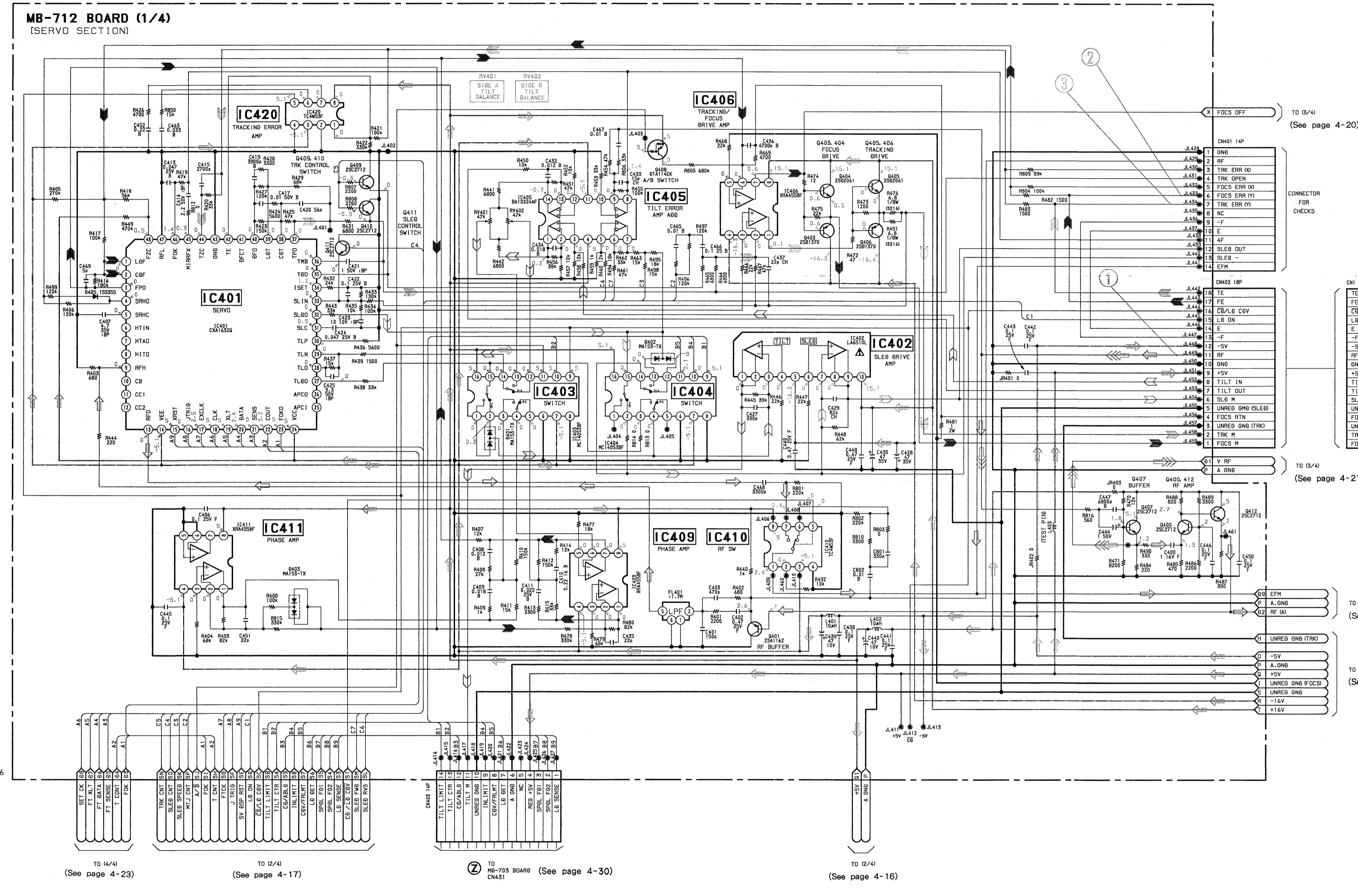
MB-712 BOARD

CK205	C-27	0001	G-16
CK210	A-21	0002	G-12
CK401	A-20	0003	G-16
CK402	A-20	0004	G-18
CK403	B-23	0005	G-19
CK501	C-27	0006	G-9
CK502	E-27	0007	G-19
CK503	D-14	0008	G-18
CK504	E-14	0009	C-16
CK505	B-15	0010	C-15
CK701	B-15	0011	G-12
		0012	F-16
CT001	G-19	0013	E-16
CT501	G-6	0014	G-10
		0015	E-17
0001	C-16	0016	F-9
0002	D-17	0017	F-9
0003	C-24	0018	F-9
0202	E-27	0019	A-22
0203	D-26	0021	A-6
0205	D-1	0024	A-6
0208	D-26	0026	D-23
0251	A-26	0031	C-15
0252	A-24	0201	F-1
0401	C-5	0202	F-26
0402	C-23	0203	A-26
0403	C-10	0206	E-24
0405	B-7	0207	A-25
0502	A-18	0210	C-1
0503	F-21	0211	C-1
0506	D-7	0212	C-1
0507	E-21	0213	E-26
0508	G-4	0214	E-26
		0215	D-11
IC001	E-12	0216	C-1
IC002	G-12	0217	D-1
IC003	C-11	0218	F-3
IC004	G-10	0219	G-3
IC005	E-12	0400	A-22
IC006	E-9	0401	C-9
IC007	C-12	0403	A-19
IC008	F-12	0404	A-19
IC009	E-10	0405	B-19
IC011	C-4	0406	A-19
IC201	D-3	0407	B-22
IC202	B-2	0408	B-8
IC203	E-3	0409	D-6
IC204	G-2	0410	D-7
IC205	E-1	0411	C-19
IC206	C-2	0412	A-6
IC207	C-3	0500	G-5
IC401	C-8	0501	B-24
IC402	B-22	0502	D-7
IC403	C-6	0503	D-6
IC404	C-23	0504	D-6
IC405	C-22	0505	D-6
IC406	B-8	0506	G-21
IC409	C-21	0507	G-22
IC410	D-7	0550	B-12
IC411	C-10	0551	B-12
IC420	B-8		
IC500	G-4	RV001	G-17
IC501	E-6	RV002	D-16
IC502	F-6	RV401	E-19
IC503	A-19	RV402	D-19
IC504	F-21	RV501	G-24
IC505	F-8		
IC506	F-21		
IC507	G-24		



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

A
B
C
D
E
F
G
H
I
J
K
L
M

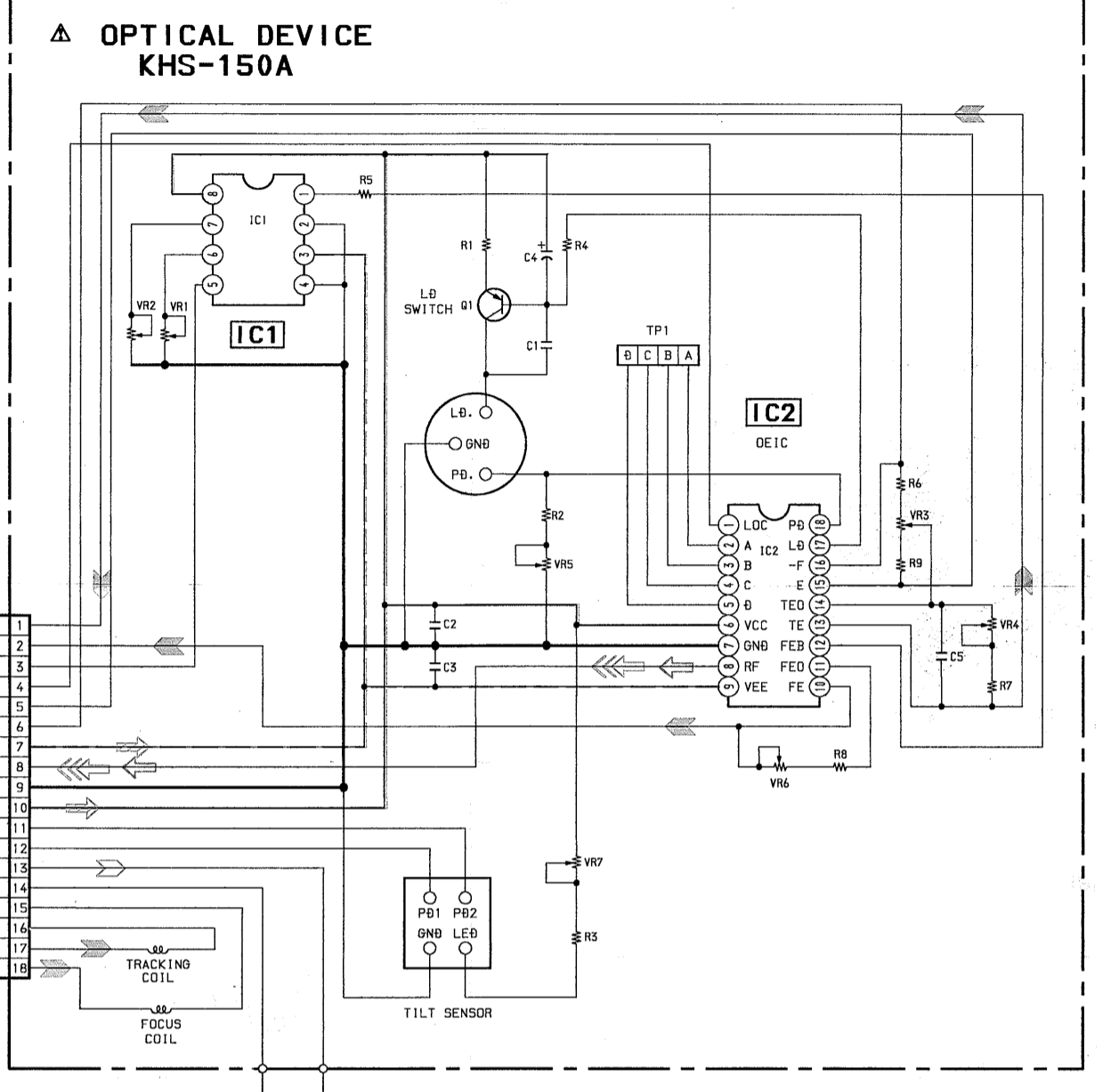


MB-712 BOARD

● CN402 ① 0.2V/DIV
0.1 μsec/DIV

● CN401 ⑤ 0.1V/DIV
10msec/DIV

● CN401 ⑦ 0.1V/DIV
10msec/DIV

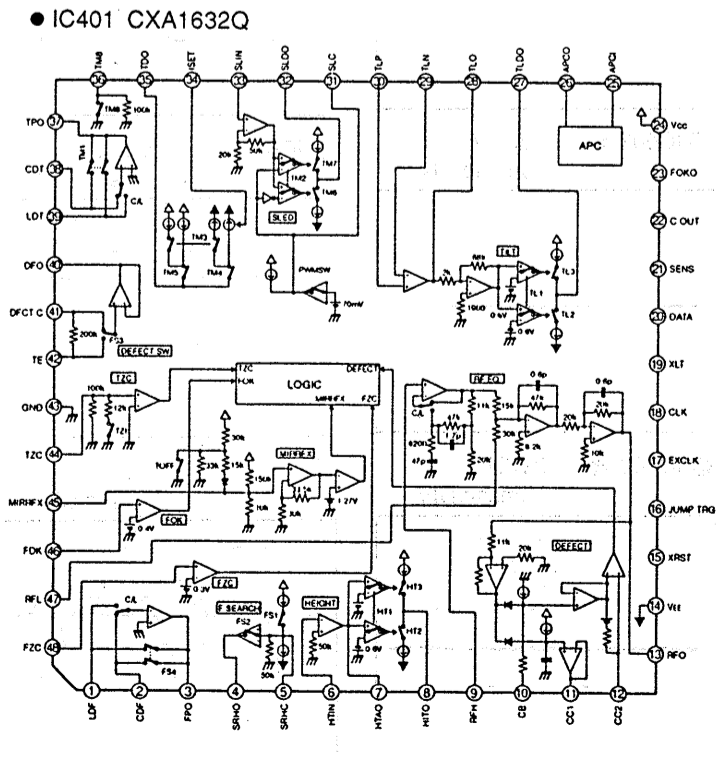


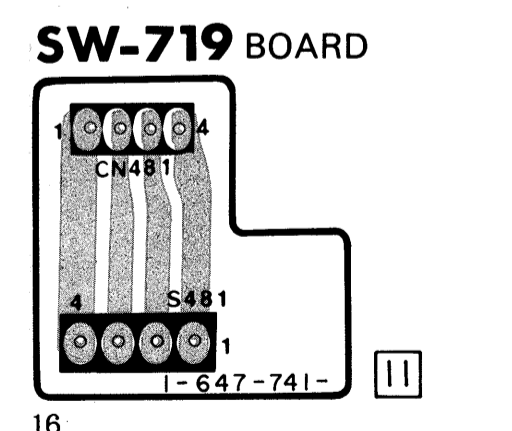
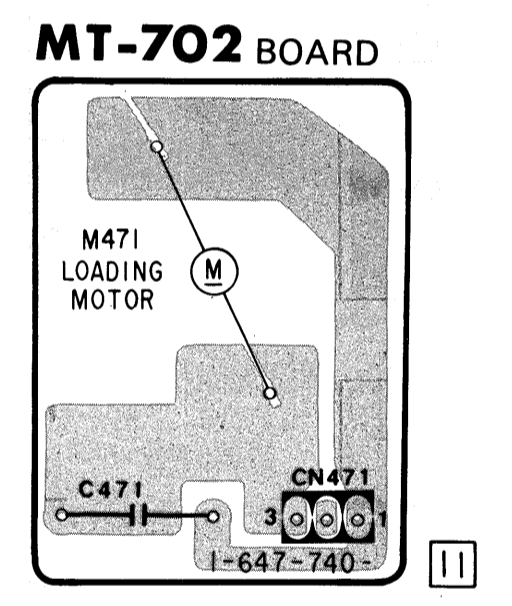
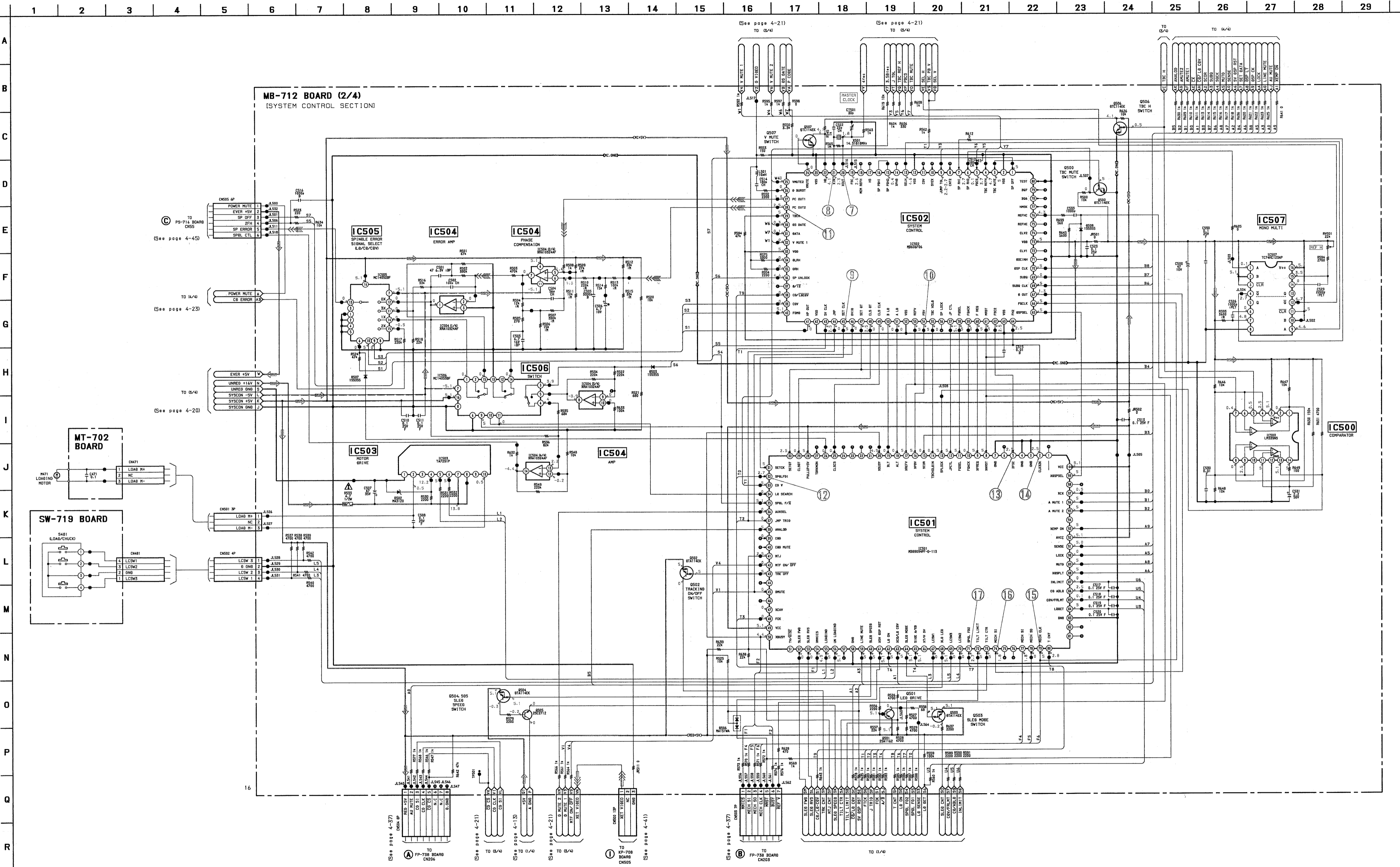
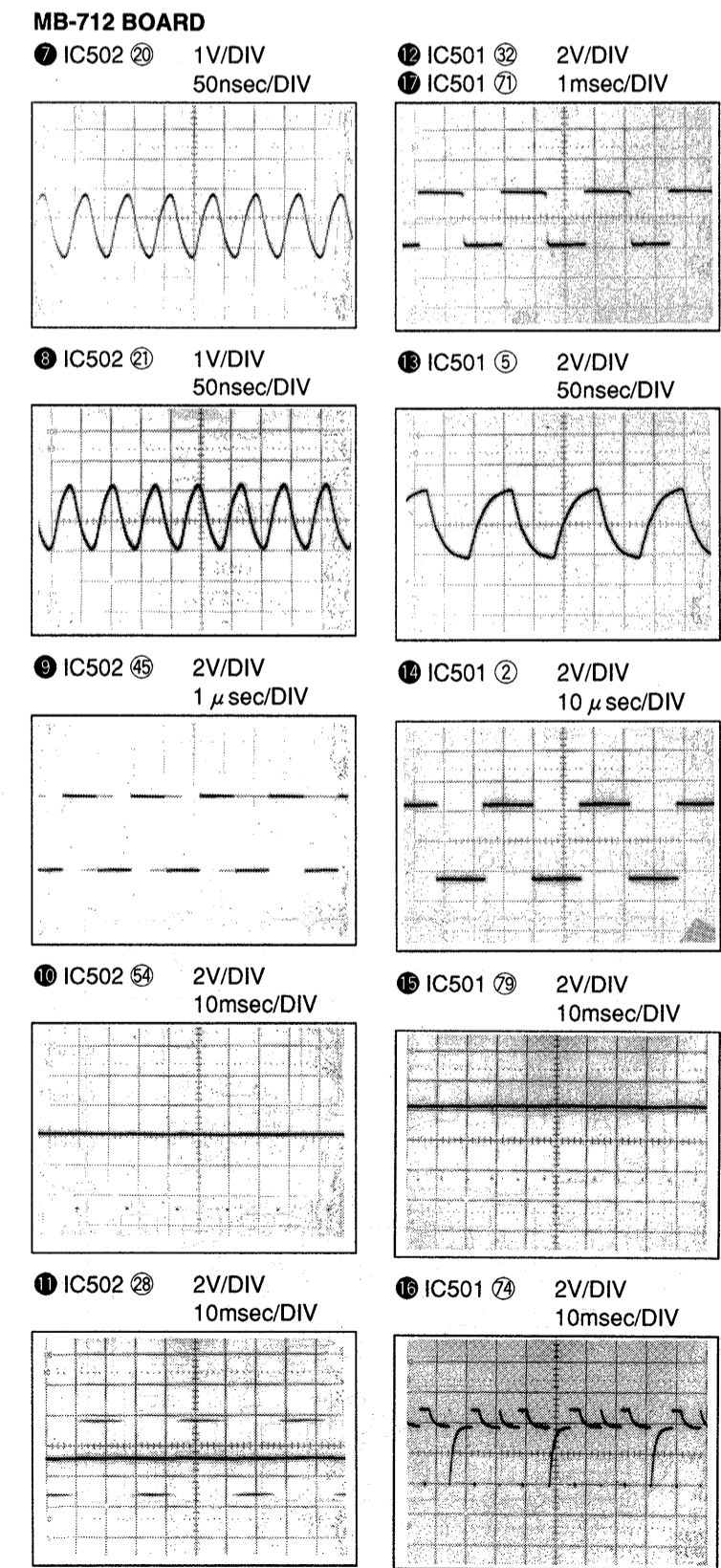
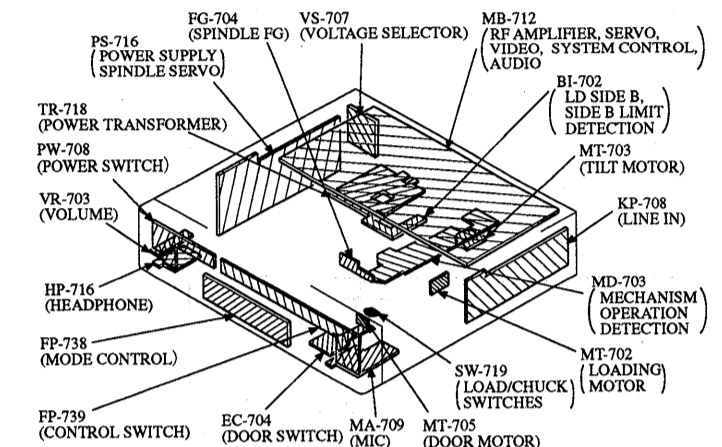
TO (4/4)
(See page 4-23)

TO (5/4)
(See page 4-22)

● SIGNAL PATH

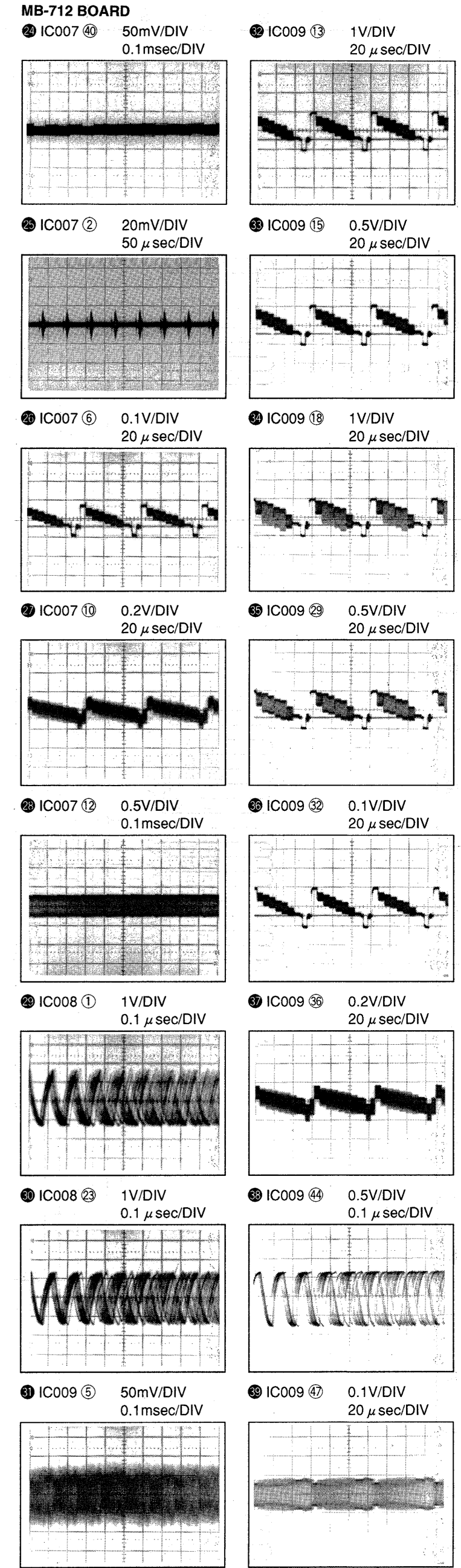
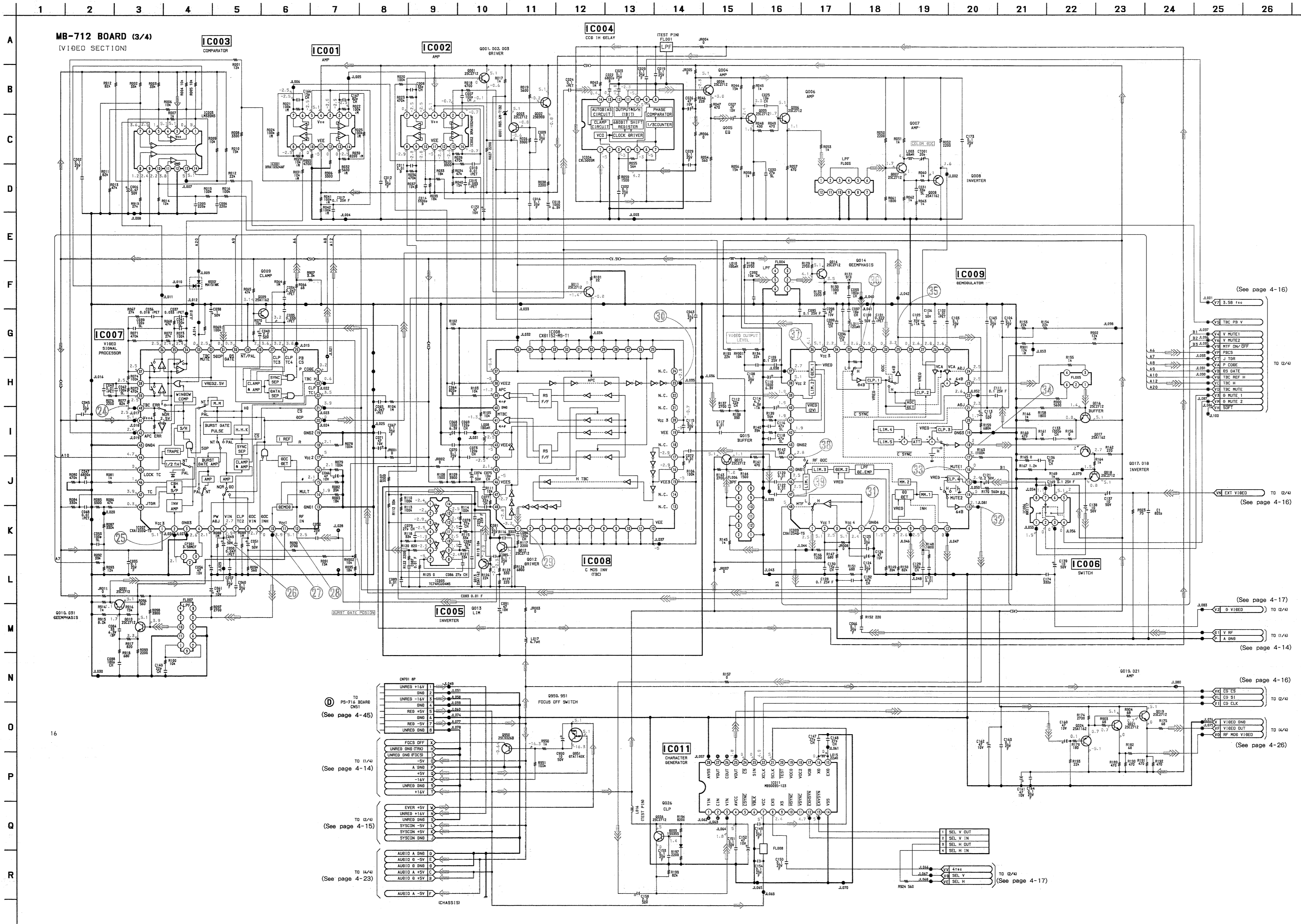
PB	VIDEO SIGNAL		AUDIO SIGNAL
	CHROMA	Y	
Spindle phase servo			
Spindle servo (Speed and phase)			
Tracking servo			
Sled servo			
Focus servo			
Skew servo			



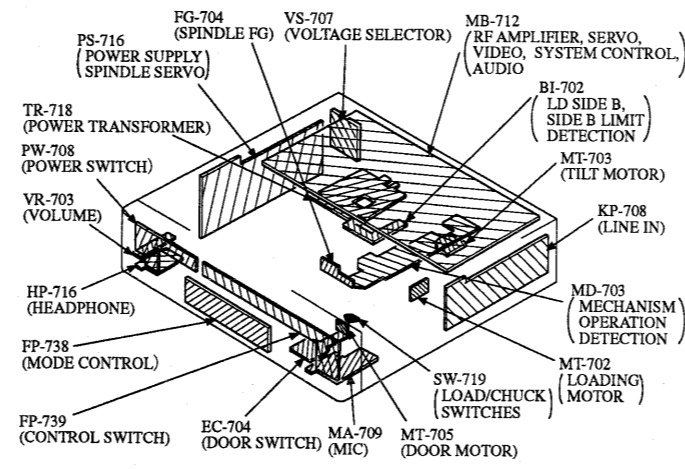
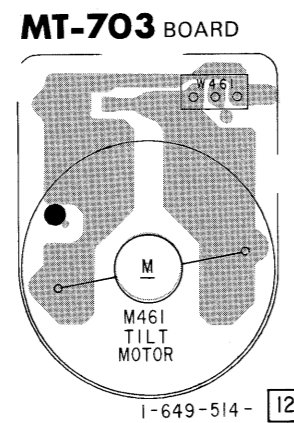
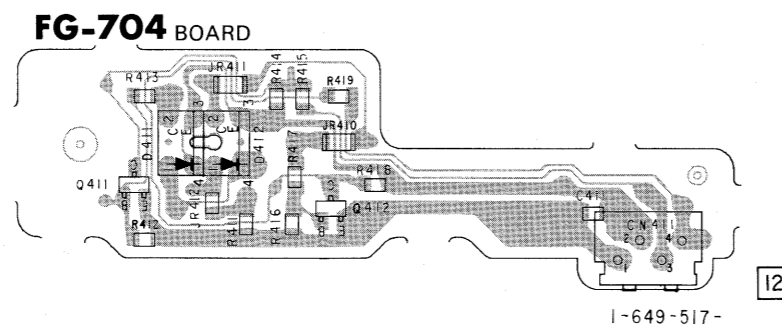
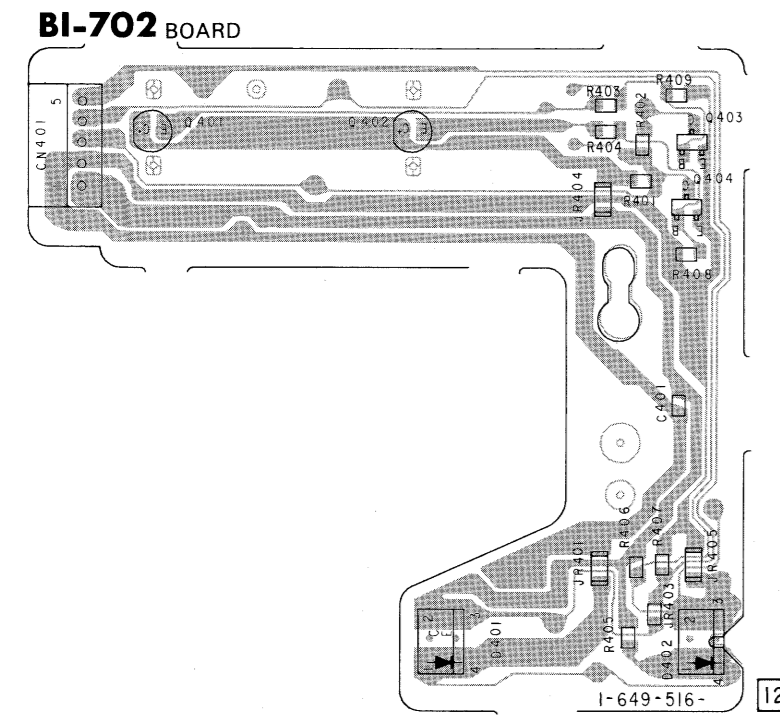


• SIGNAL PATH

Spindle phase servo	
Spindle servo (Speed and phase)	➡➡➡
Tracking servo	
Sled servo	



BI-702 (LD SIDE B, LIMIT DETECTION), FG-704 (SPINDLE FG), MD-703 (MECHANISM OPERATION DETECTION), MT-703 (TILT MOTOR) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS
 —Ref. No. BI-702, FG-704, MD-703 and MT-703 Boards; 2,000 Series—

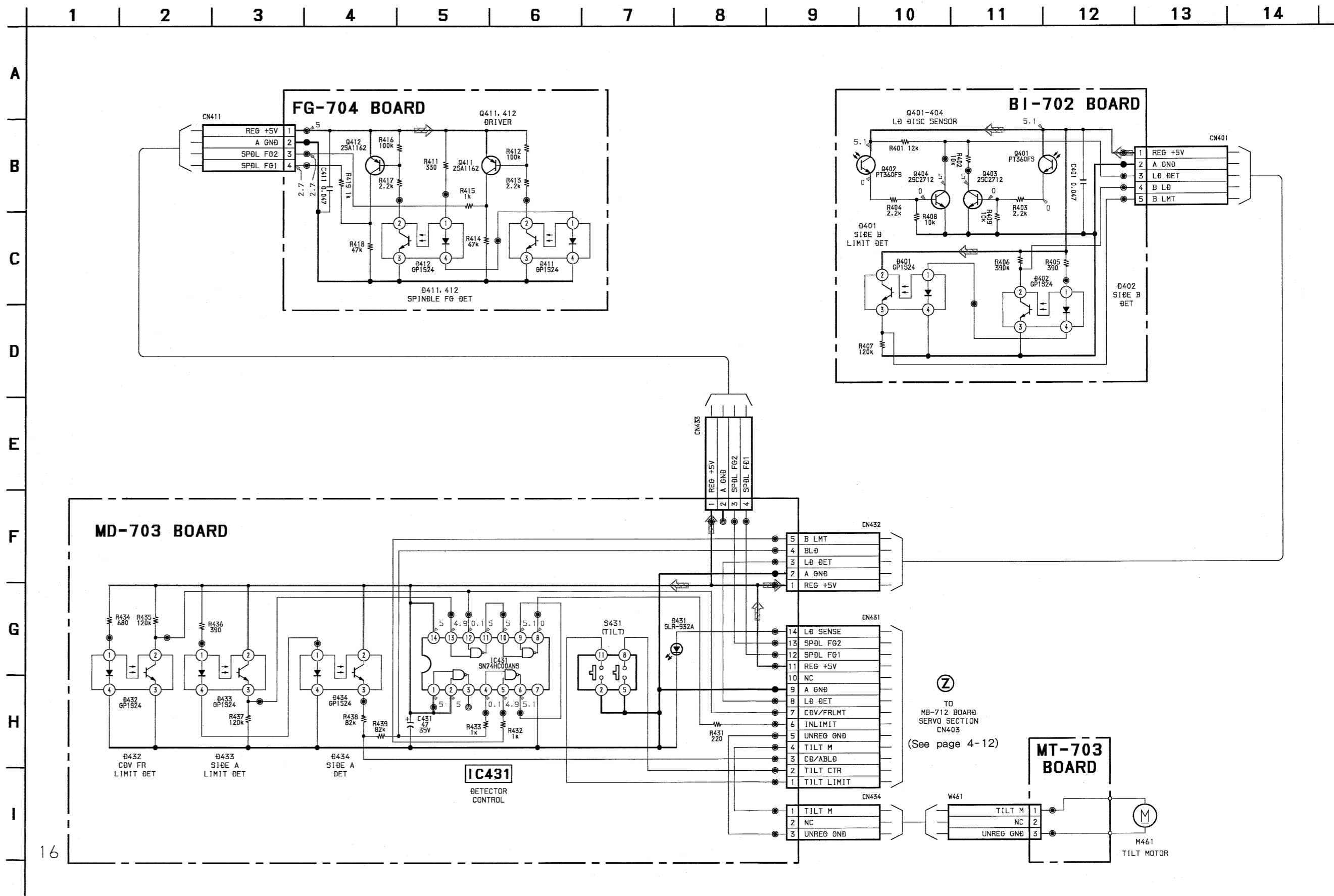
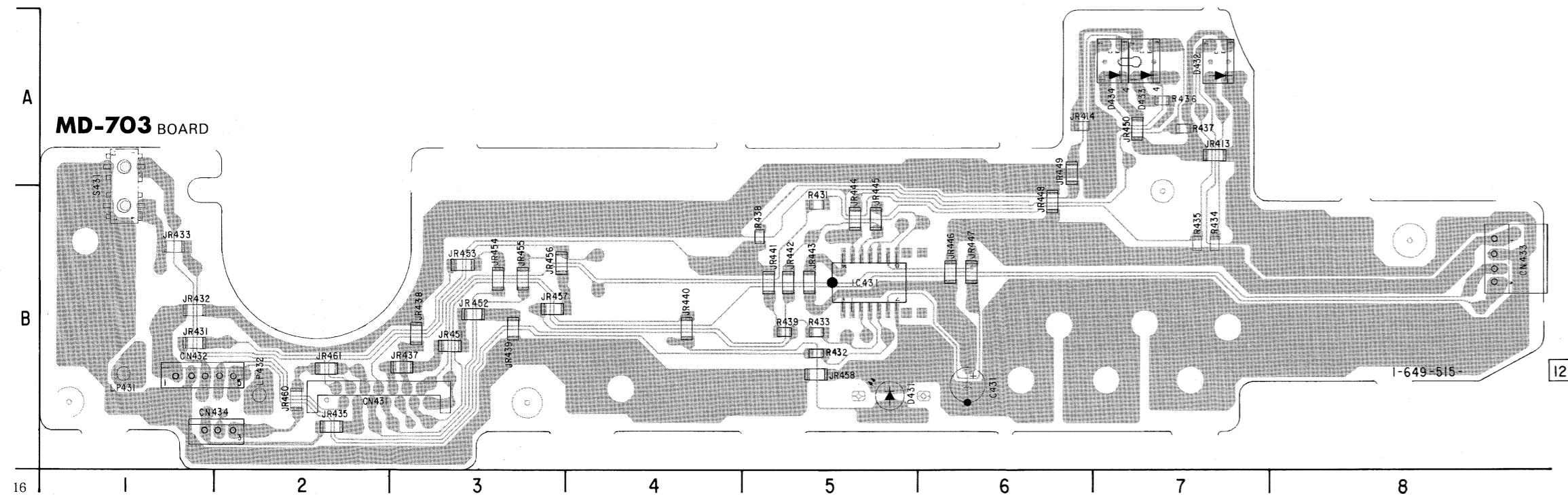


MD-703 BOARD

- CN431 B-2
- CN432 B-1
- CN433 B-8
- CN434 B-1

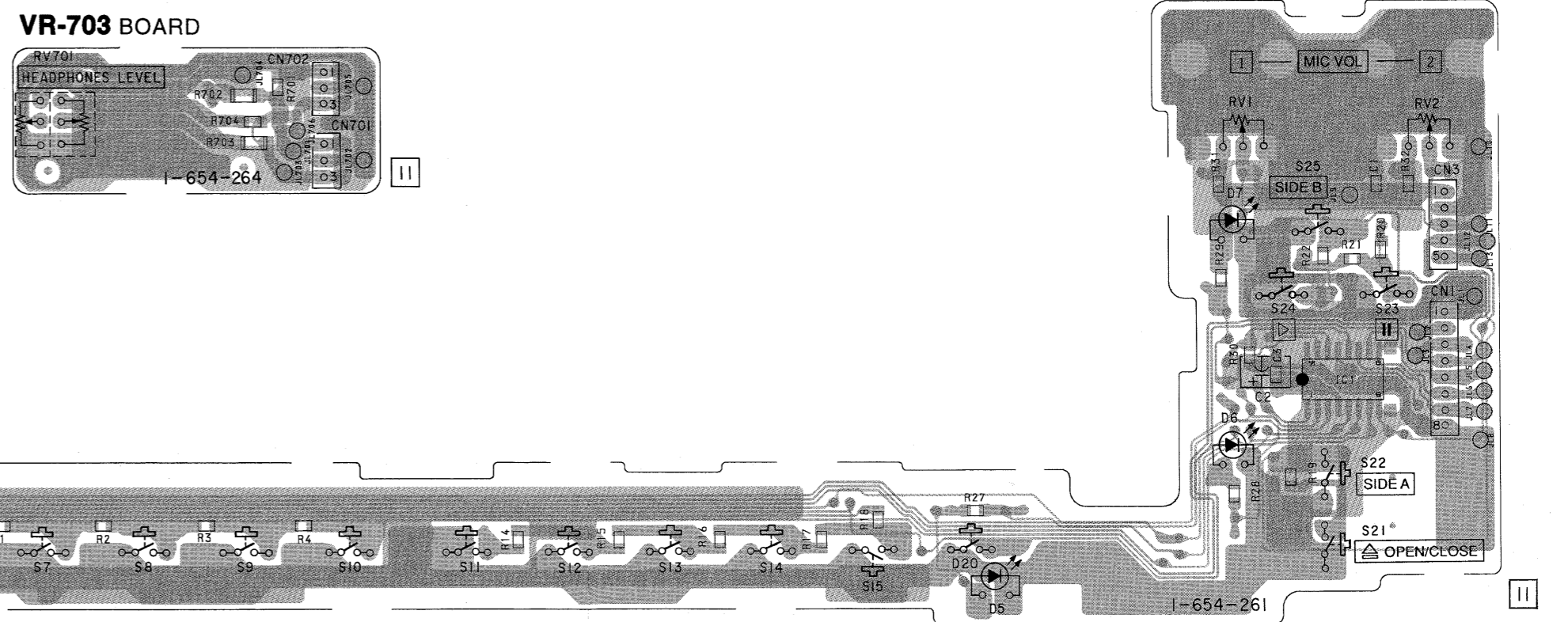
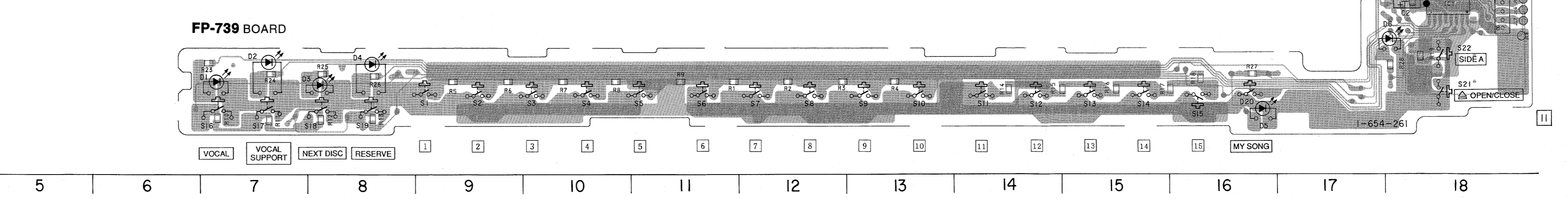
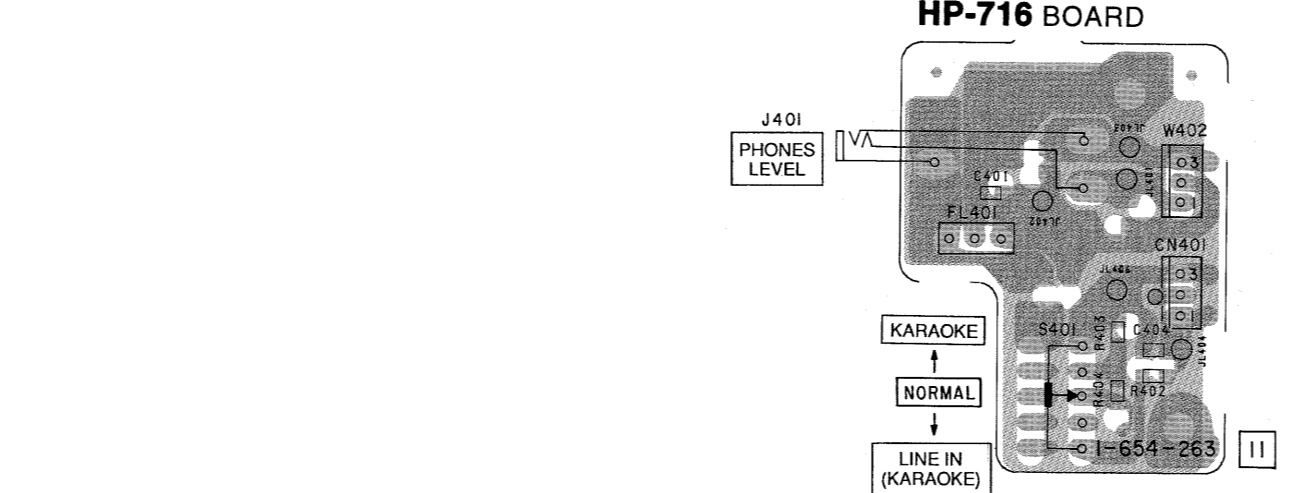
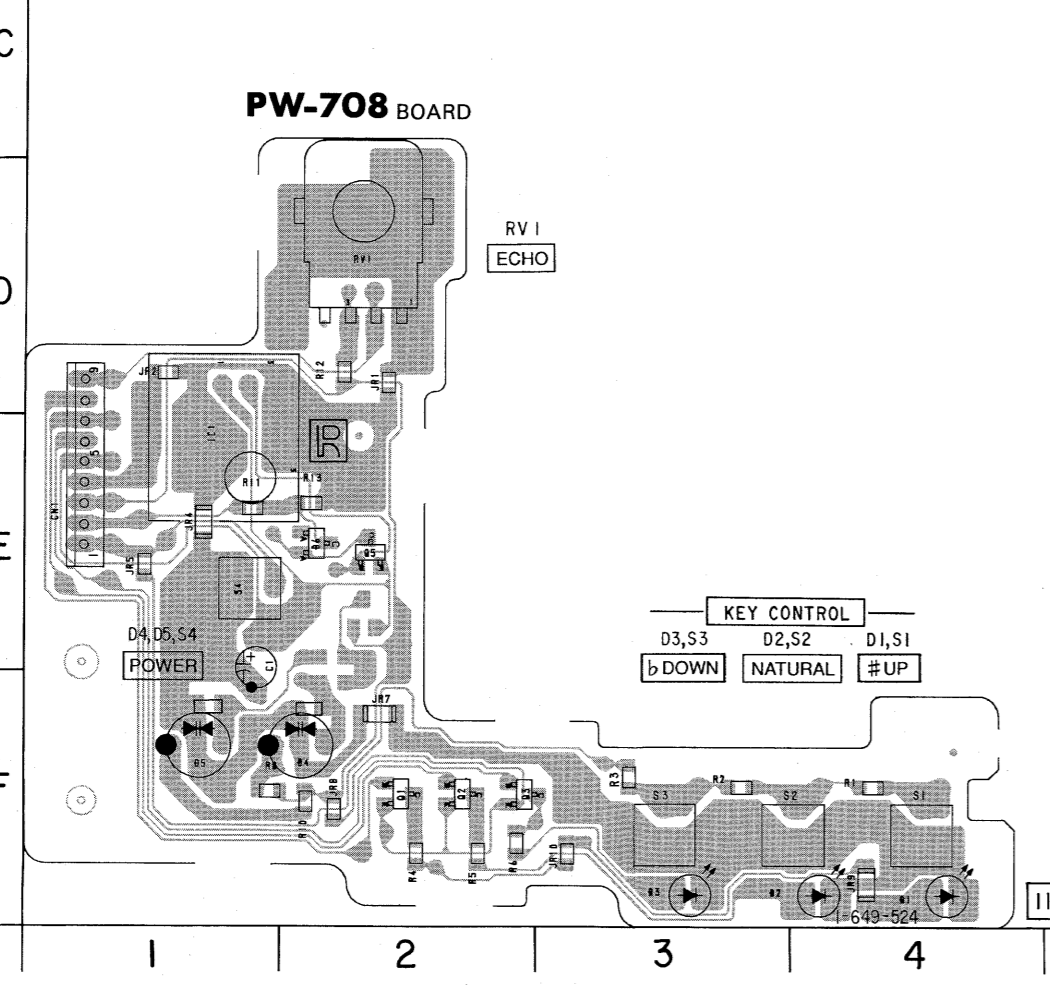
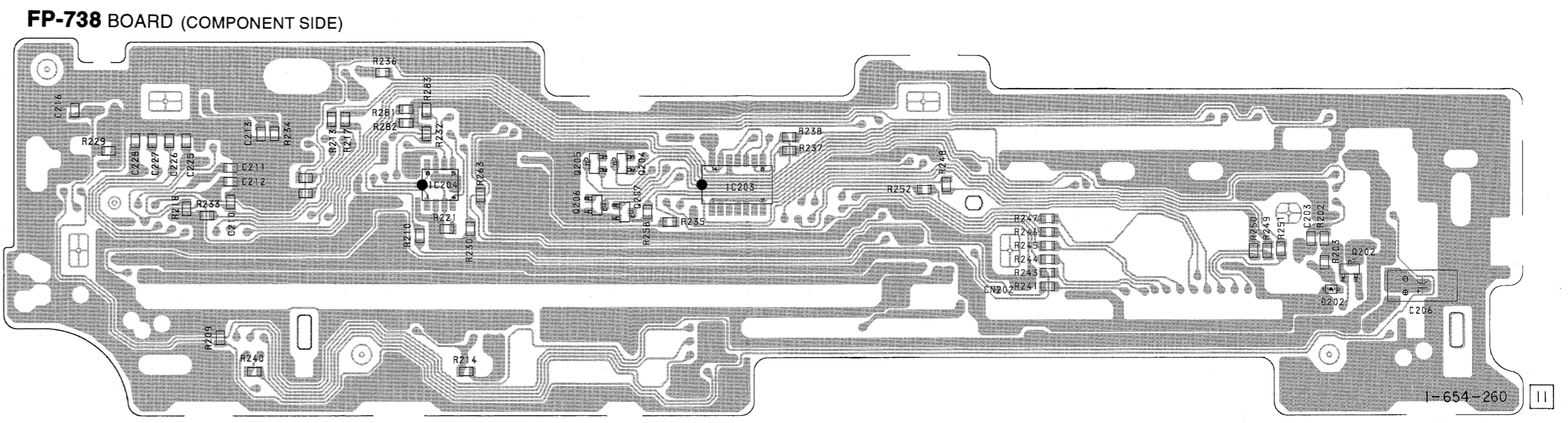
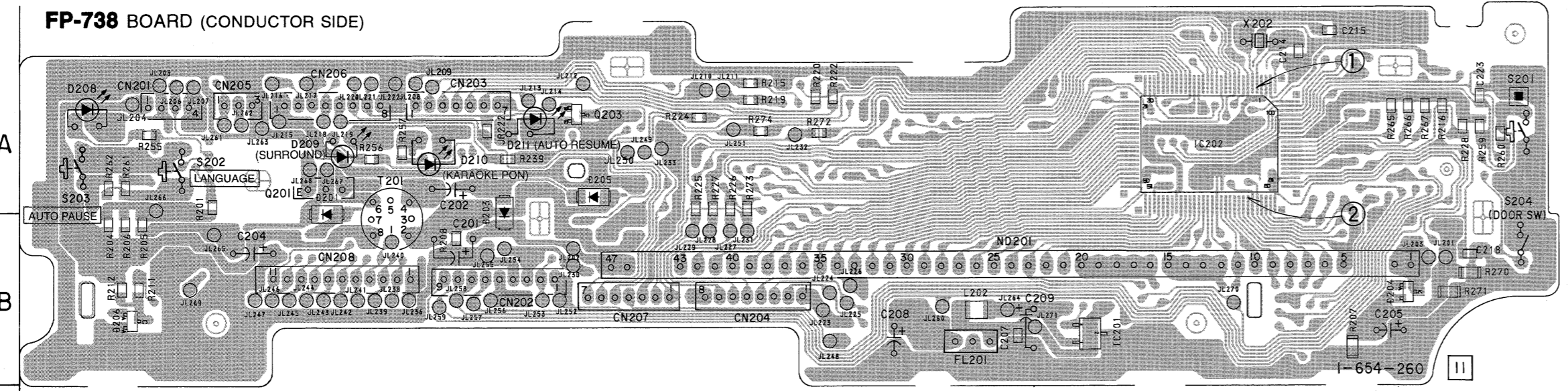
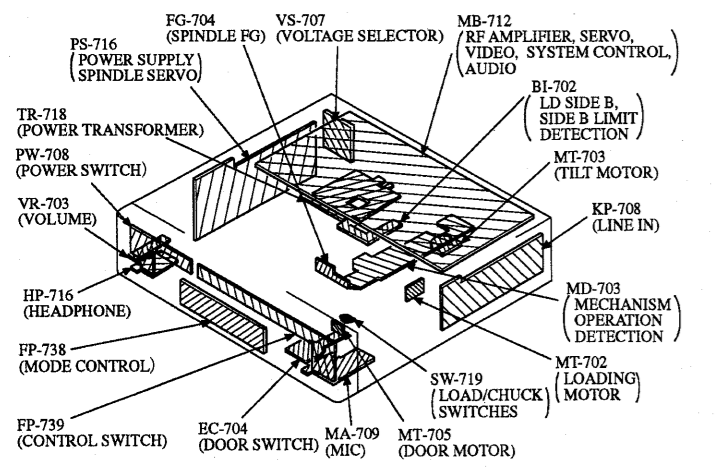
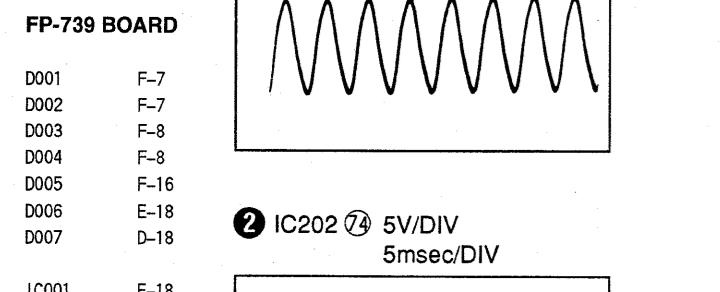
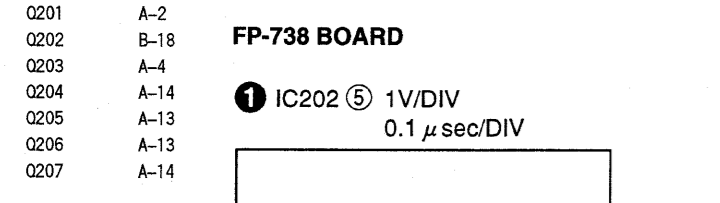
- D431 B-5
- D432 A-7
- D433 A-7
- D434 A-7

- IC431 B-5

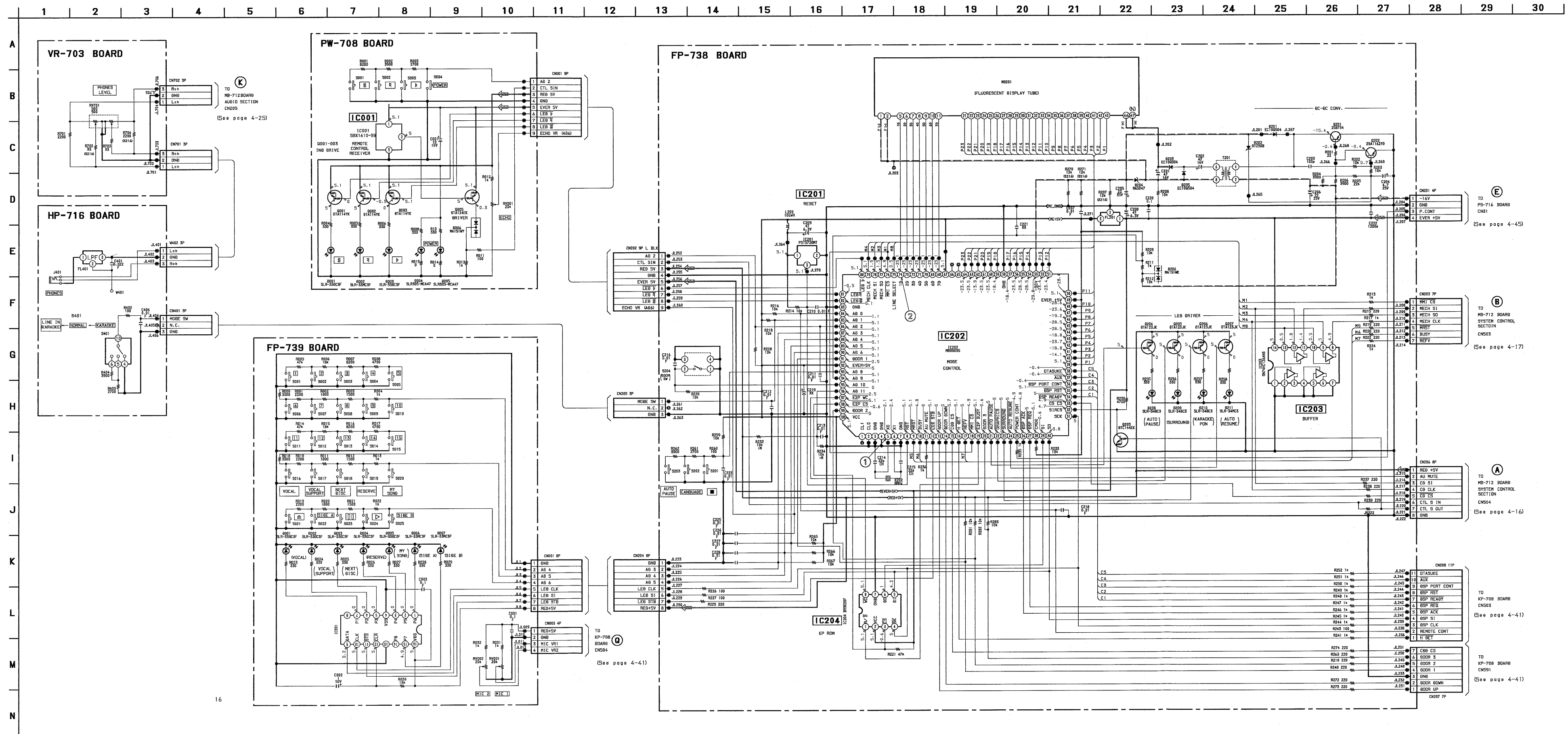


FP-738 (MODE CONTROL), FP-739 (CONTROL SWITCHES), HP-716 (HEADPHONE), VR-703 (VOLUME), PW-708 (POWER SWITCH) PRINTED WIRING BOARDS
 —Ref. No. FP-738 Board; 3,000 Series, FP-739 Board; 7,000 Series, HP-716 Board; 10,000 Series, VR-703 Board; 11,000 Series, PW-708 Board; 12,000 Series—

FP-738 BOARD		PW-708 BOARD	
D201	B-2	D001	F-4
D202	B-18	D002	F-4
D203	B-3	D003	F-3
D204	B-9	D004	F-2
D205	B-4	D005	F-1
D206	B-1	D006	E-2
D208	A-1		
D209	A-2	IC001	E-1
D210	A-3		
D211	A-4	0001	F-2
		0002	F-2
IC201	B-7	0003	F-2
IC202	A-7	0005	E-2
IC203	A-14		
IC204	A-13		



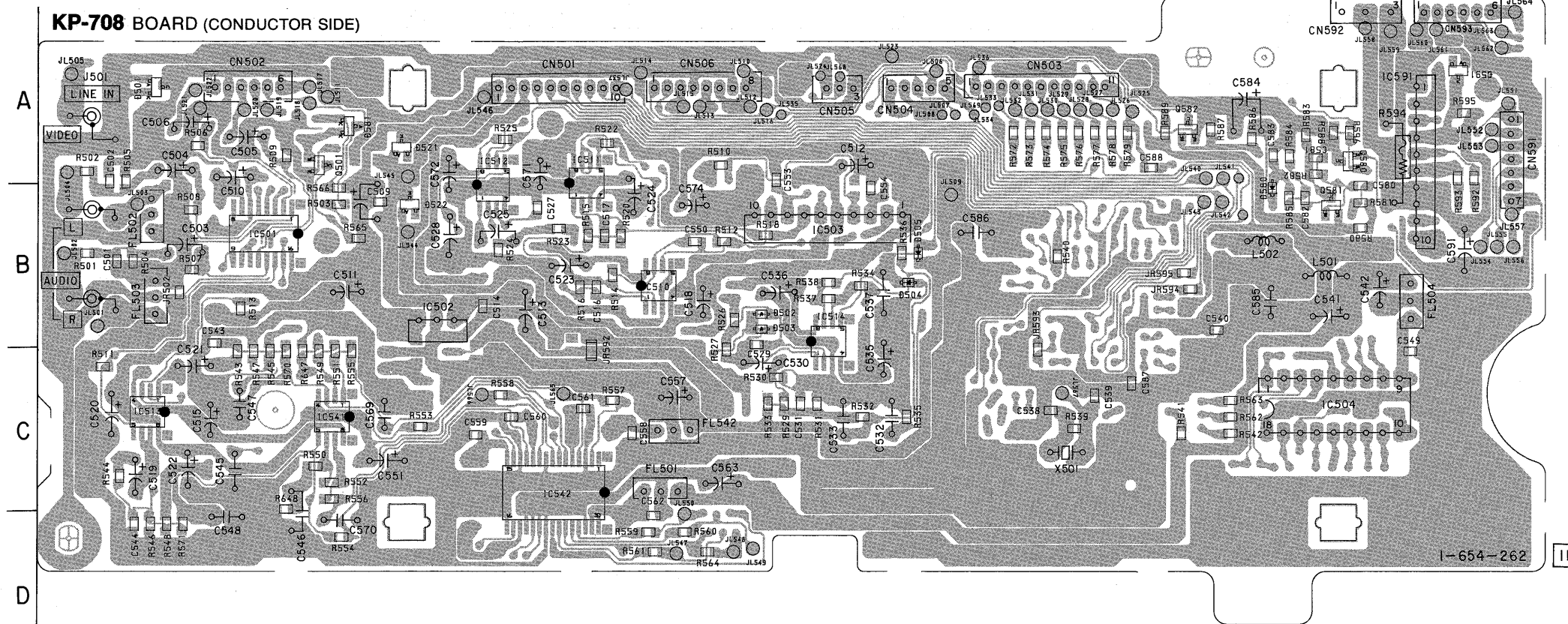
FP-738 (MODE CONTROL), FP-739 (CONTROL SWITCHES), HP-716 (HEADPHONE), VR-703 (VOLUME), PW-708 (POWER SWITCH) SCHEMATIC DIAGRAMS
—Ref. No. FP-738 Board; 3,000 Series, FP-739 Board; 7,000 Series, HP-716 Board; 10,000 Series, VR-703 Board; 11,000 Series, PW-708 Board; 12,000 Series—



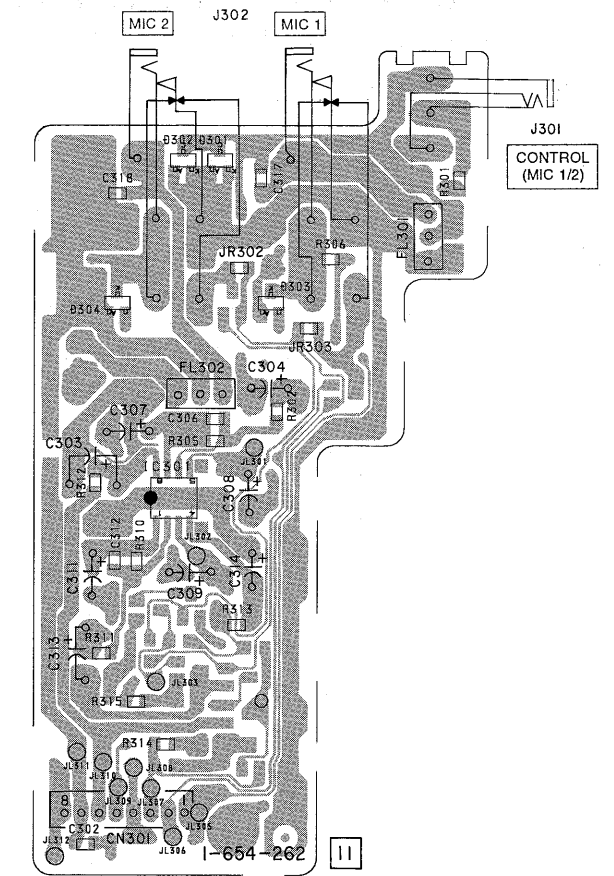
KP-708 (LINE IN), MA-709 (MIC), EC-704 (DOOR SWITCH), MT-705 (DOOR MOTOR) PRINTED WIRING BOARDS

—Ref. No. KP-708 Board; 8,000 Series, MA-709 Board; 13,000 Series, EC-704 Board; 14,000, MT-705 Board; 15,000 Series—

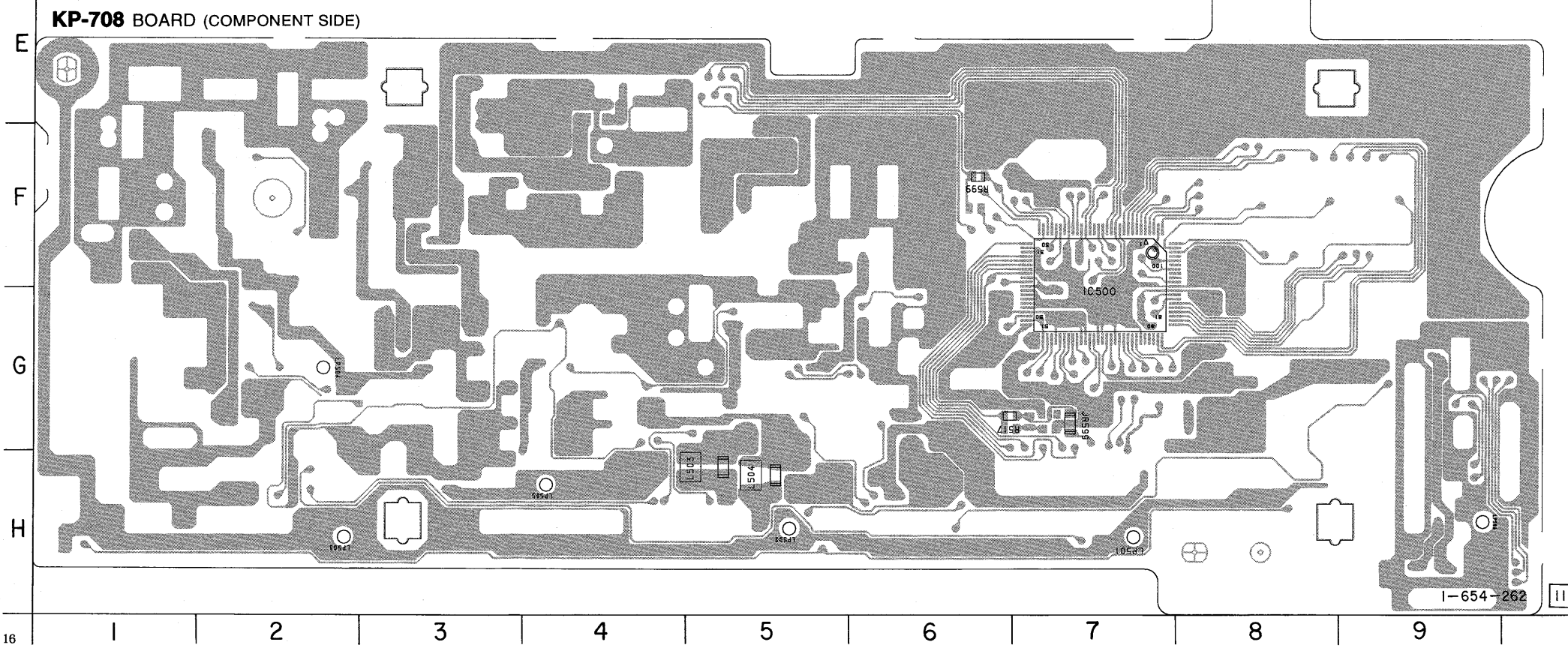
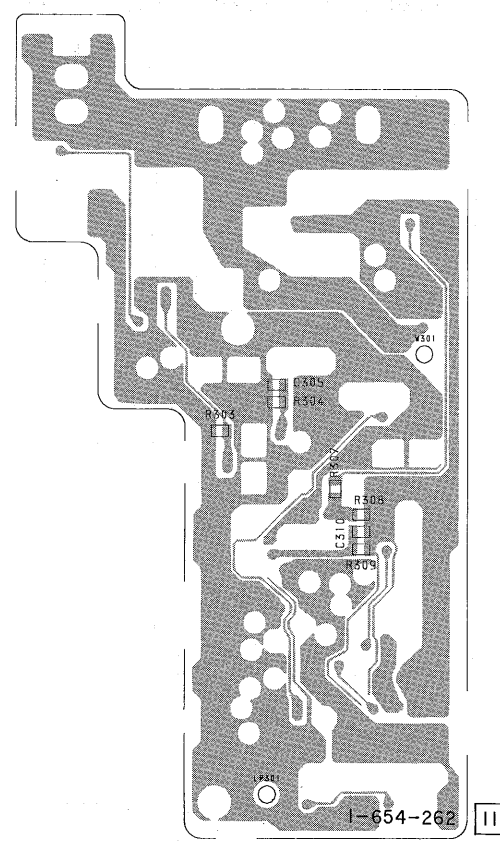
KP-708 BOARD		MA-709 BOARD	
D501	A-1	D301	A-12
D502	B-5	D302	A-12
D503	B-5	D303	B-12
D504	B-6	D304	B-11
D505	B-6		
D521	A-3	IC301	C-12
D522	B-3		
D580	B-8		
D581	A-2		
D591	A-9		
IC500	G-7		
IC501	B-2		
IC502	B-3		
IC503	B-5		
IC504	C-8		
IC510	B-4		
IC511	A-4		
IC512	B-3		
IC513	C-1		
IC514	B-5		
IC541	C-2		
IC542	C-4		
IC591	A-9		
O501	A-2		
O580	A-9		
O581	B-8		
O582	A-8		



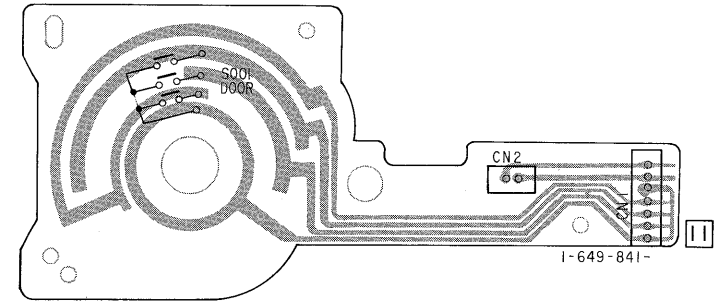
MA-709 BOARD (CONDUCTOR SIDE)



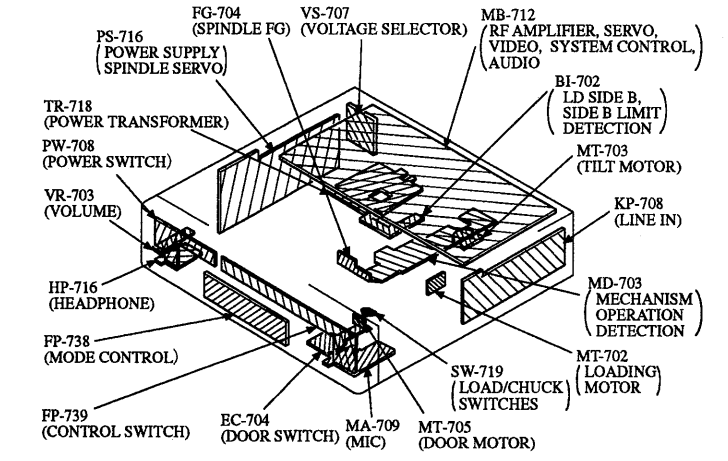
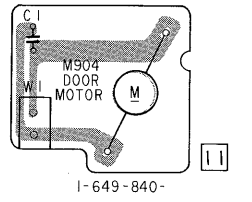
MA-709 BOARD (COMPONENT SIDE)



EC-704 BOARD

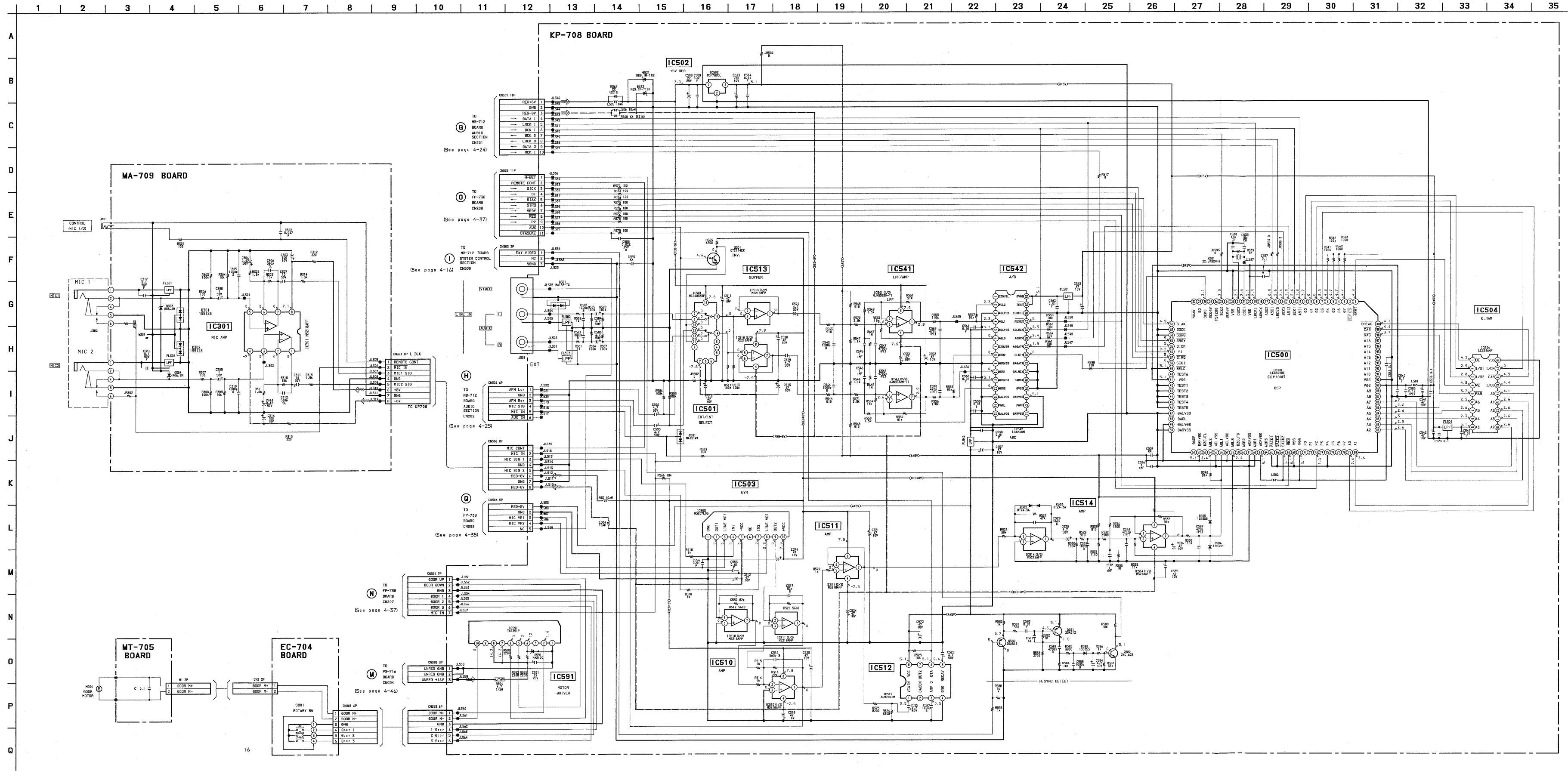


MT-705 BOARD



KP-708 (LINE IN), MA-709 (MIC), EC-704 (DOOR SWITCH), MT-705 (DOOR MOTOR) SCHEMATIC DIAGRAMS

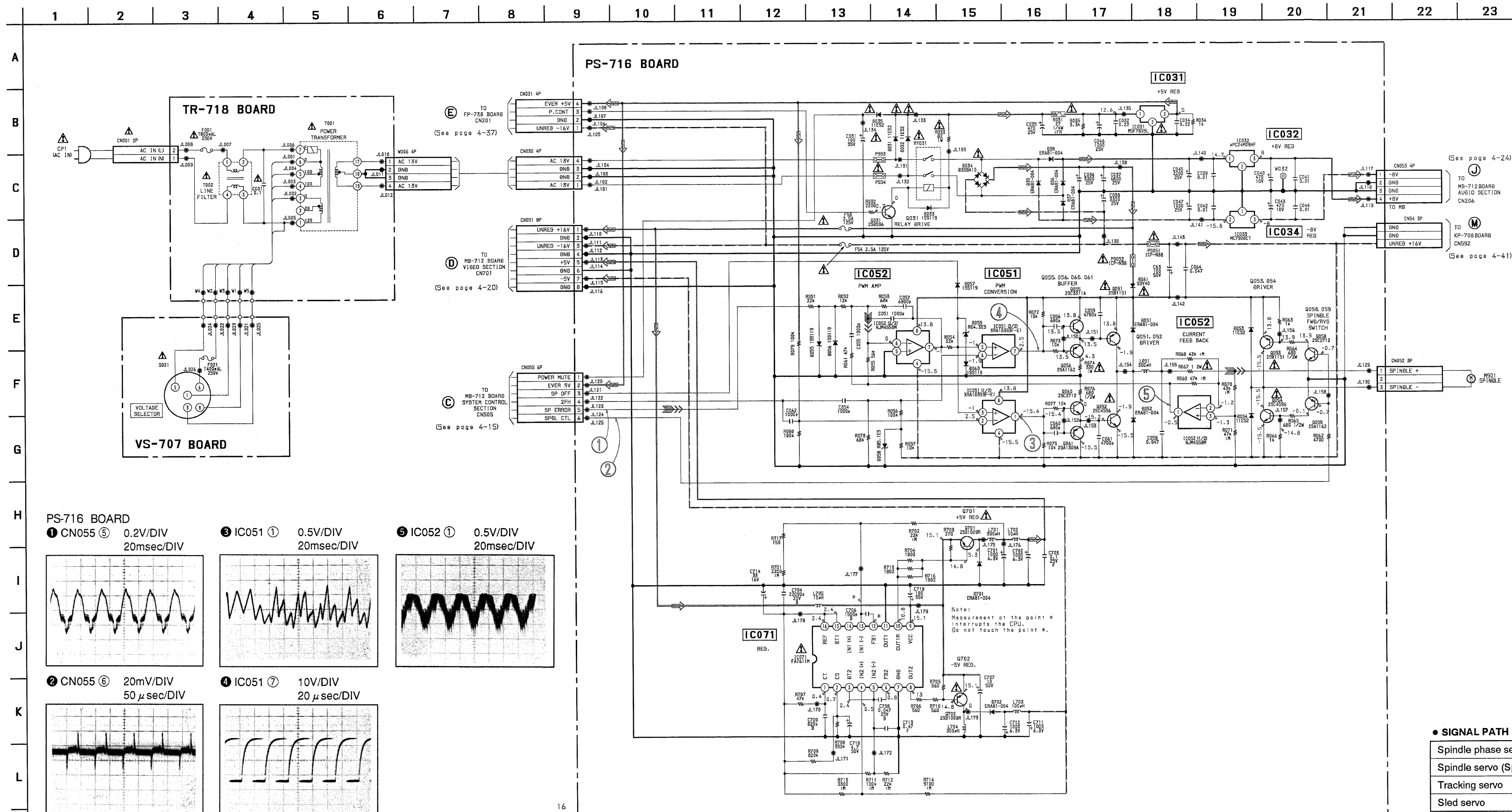
—Ref. No. KP-708 Board; 8,000 Series, MA-709 Board; 13,000 Series, EC-704 Board; 14,000, MT-705 Board; 15,000 Series—



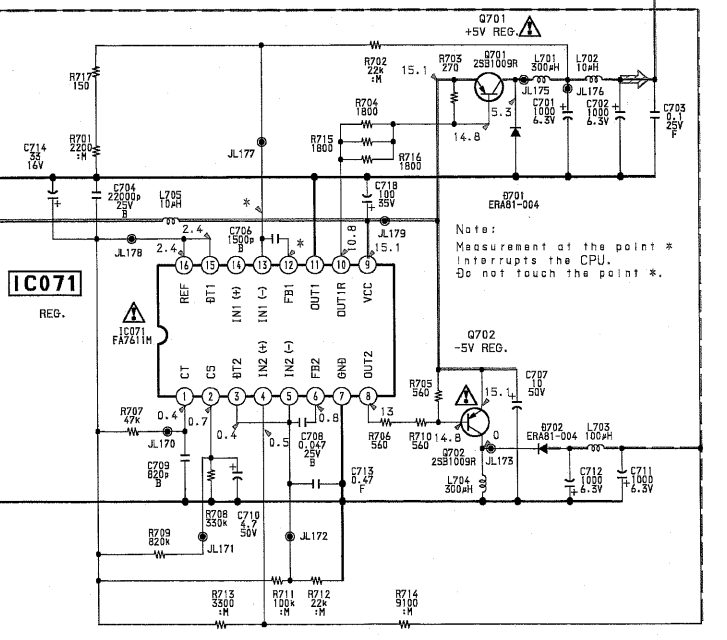
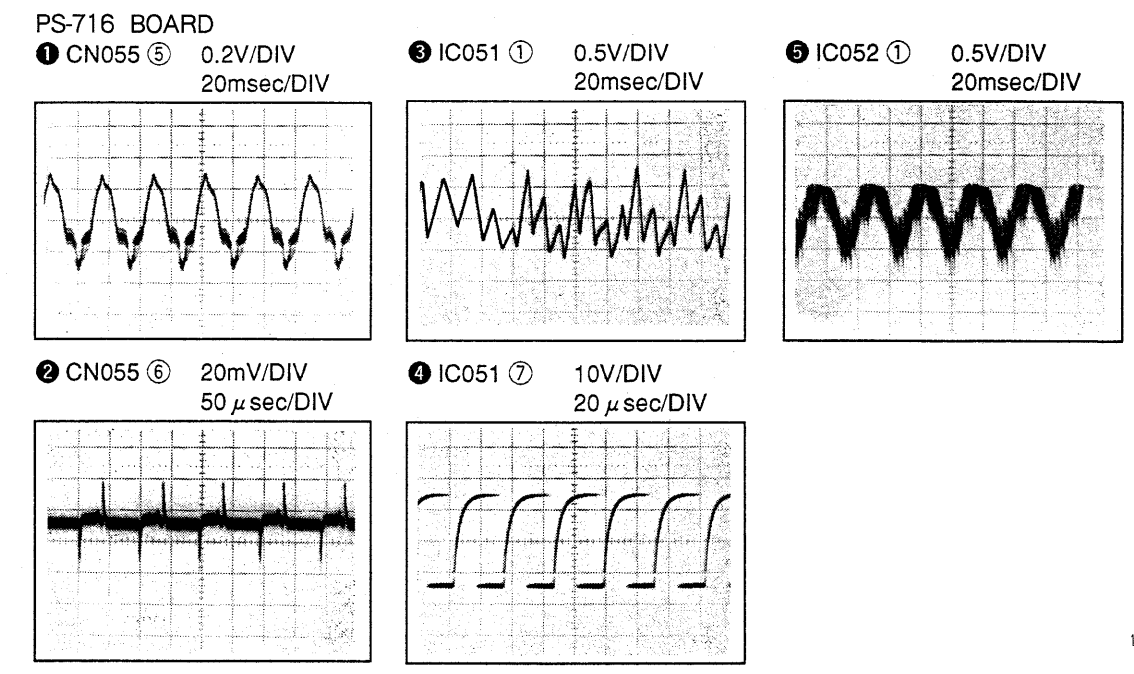
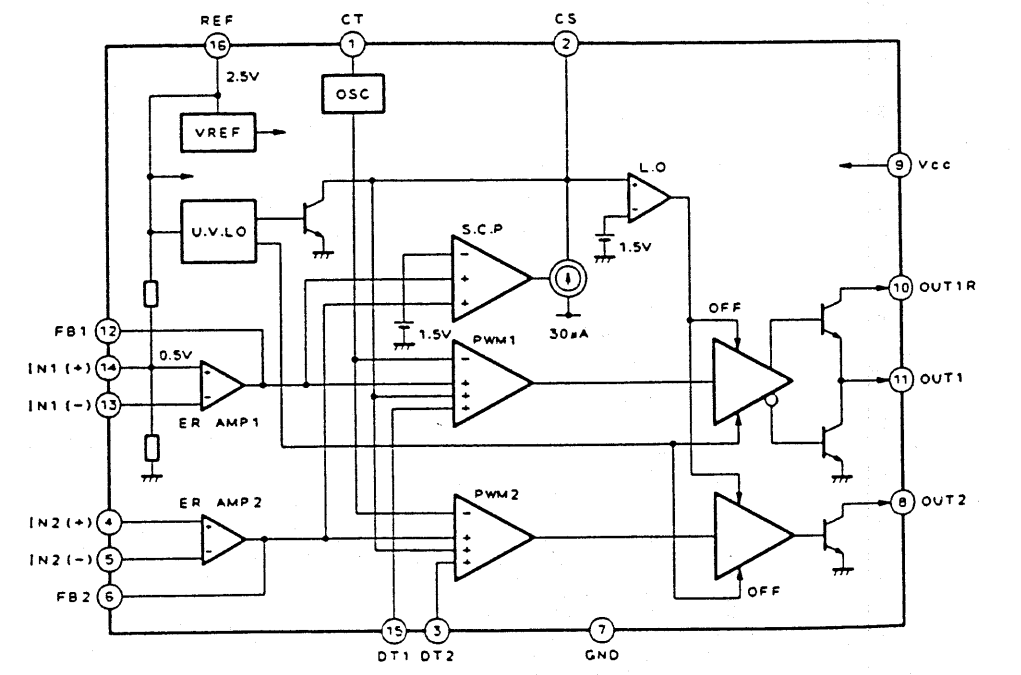
MDP-A800K2

PS-716 (POWER SUPPLY, SPINDLE SERVO), TR-718 (POWER TRANSFORMER), VS-707 (VOLTAGE SELECTOR) SCHEMATIC DIAGRAMS

—Ref. No. PS-716 Board; 6,000Series, TR-718 Board; 5,000 Series, VS-707 Board; 9,000 Series —



•IC071 FA7611M

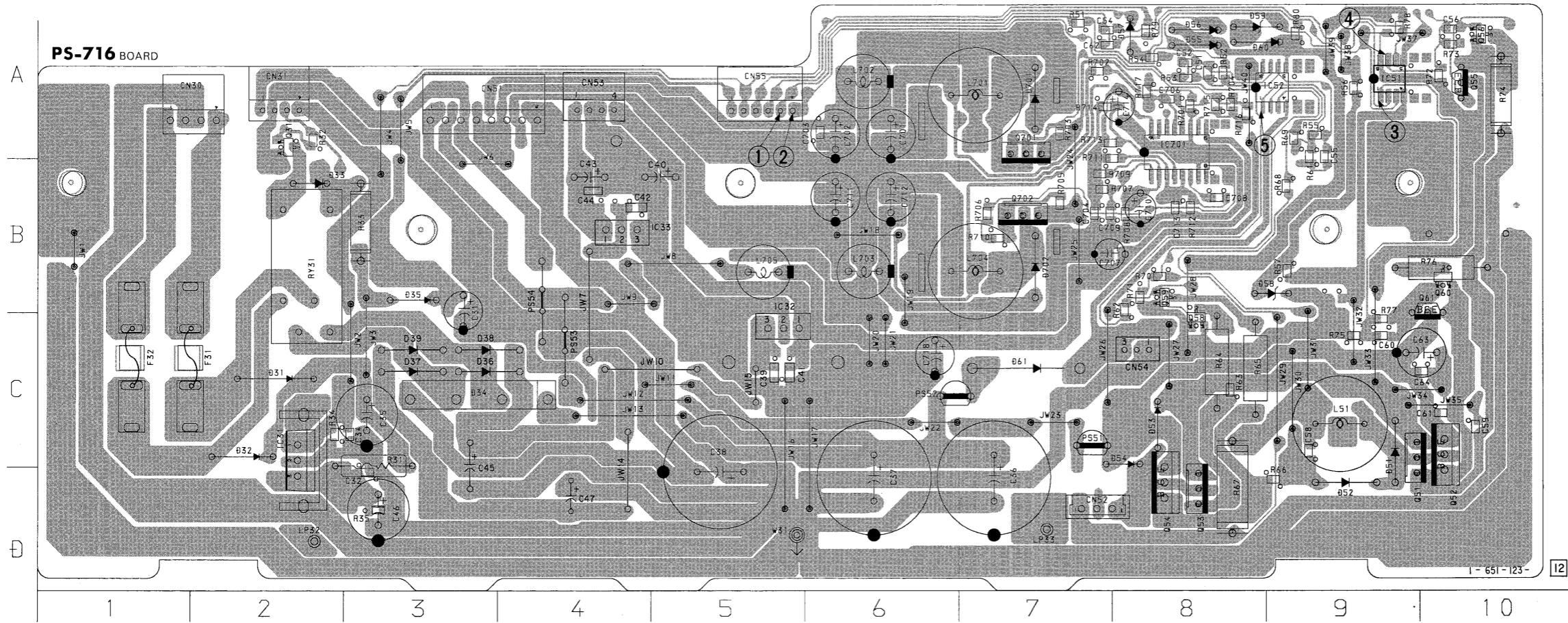


• SIGNAL PATH

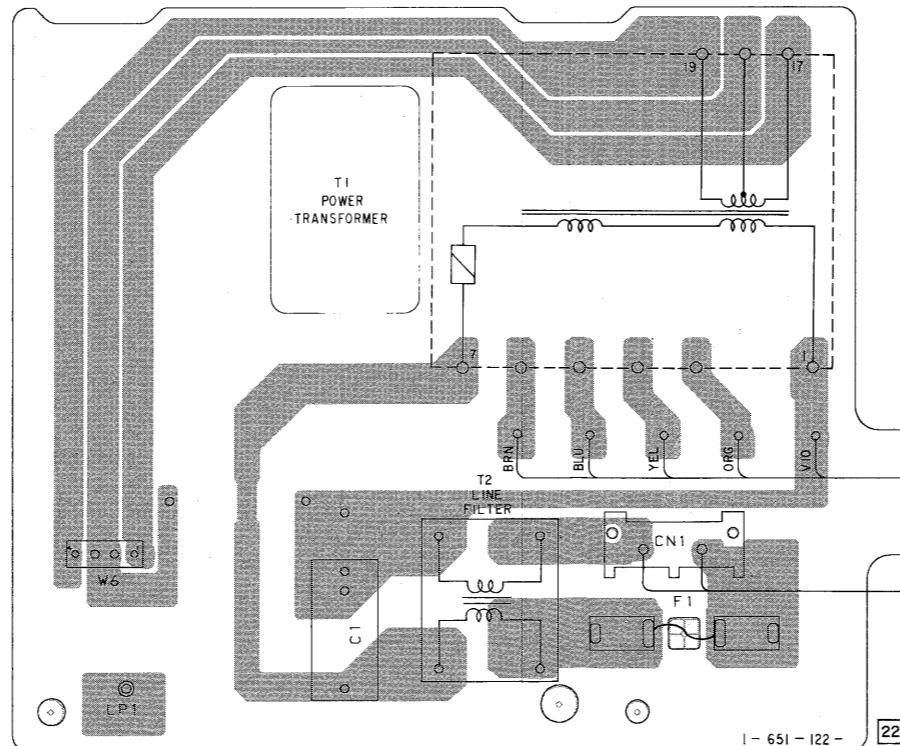
Spindle phase servo	
Spindle servo (Speed and phase)	➡➡➡
Tracking servo	
Sled servo	

PS-716 (POWER SUPPLY, SPINDLE SERVO), TR-718 (POWER TRANSFORMER), VS-707 (VOLTAGE SELECTOR) PRINTED WIRING BOARDS

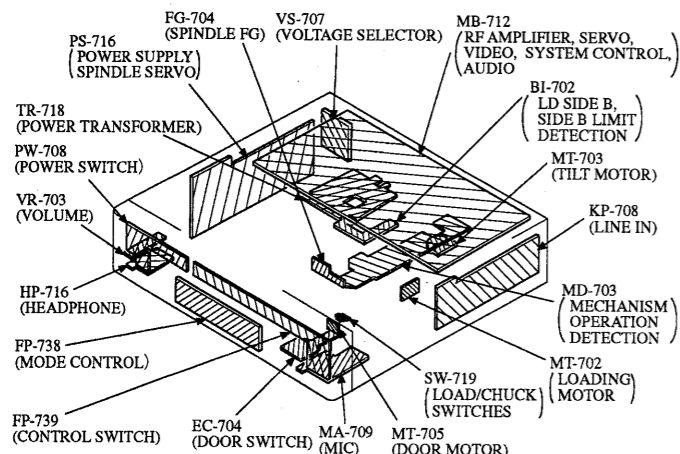
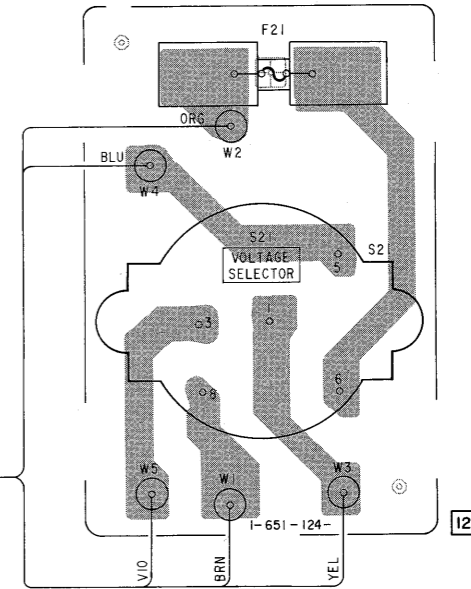
—Ref. No. PS-716 Board; 6,000Series, TR-718 Board; 5,000 Series, VS-707 Board; 9,000 Series —



TR-718 BOARD



VS-707 BOARD



SECTION 5 REPAIR PARTS LIST

5-1. EXPLODED VIEWS

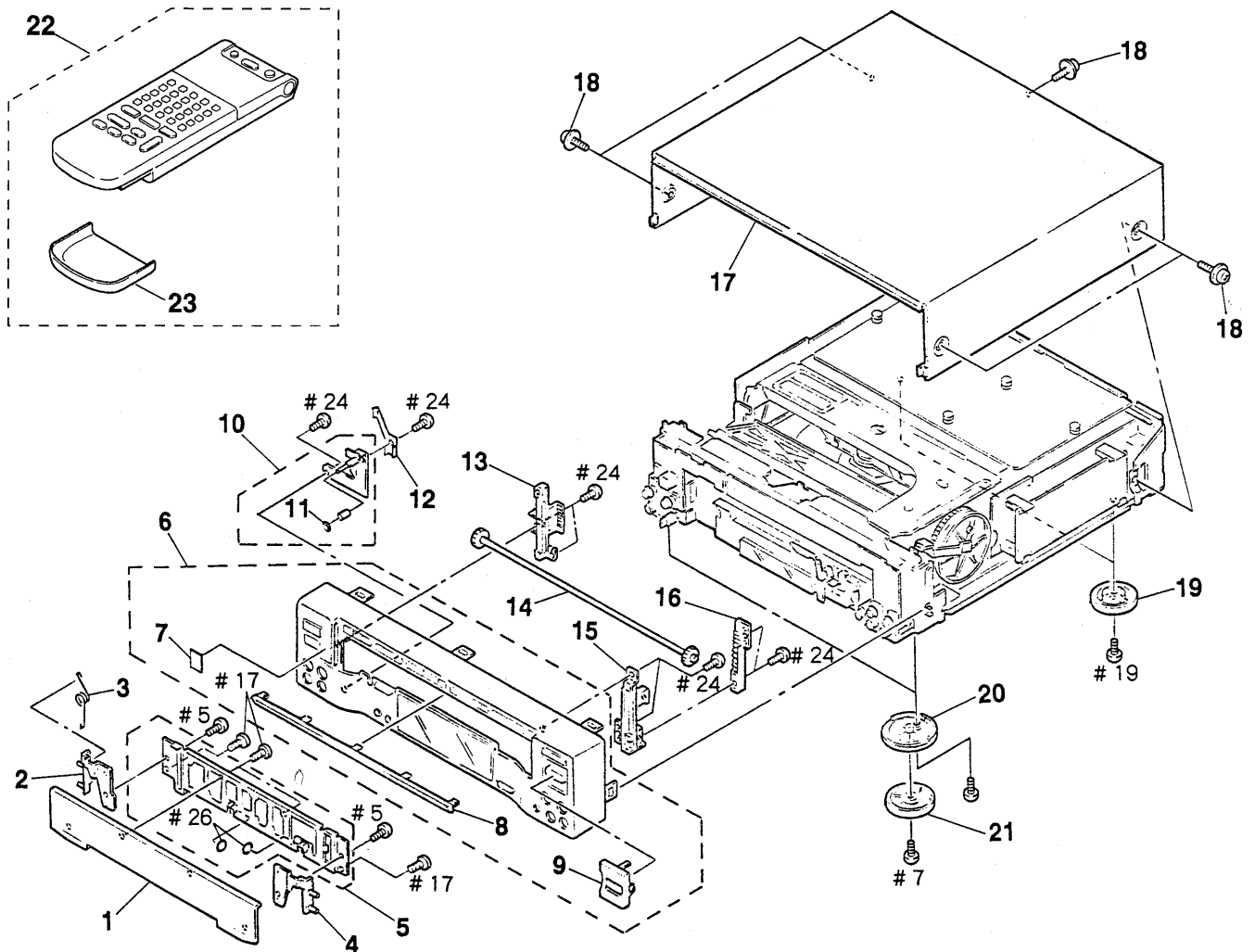
NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
Example:
KNOB, BALANCE (WHITE) ... (RED)
 ↑ ↑
 Parts color Cabinet's color

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (#mark) list is given in the last of this parts list.

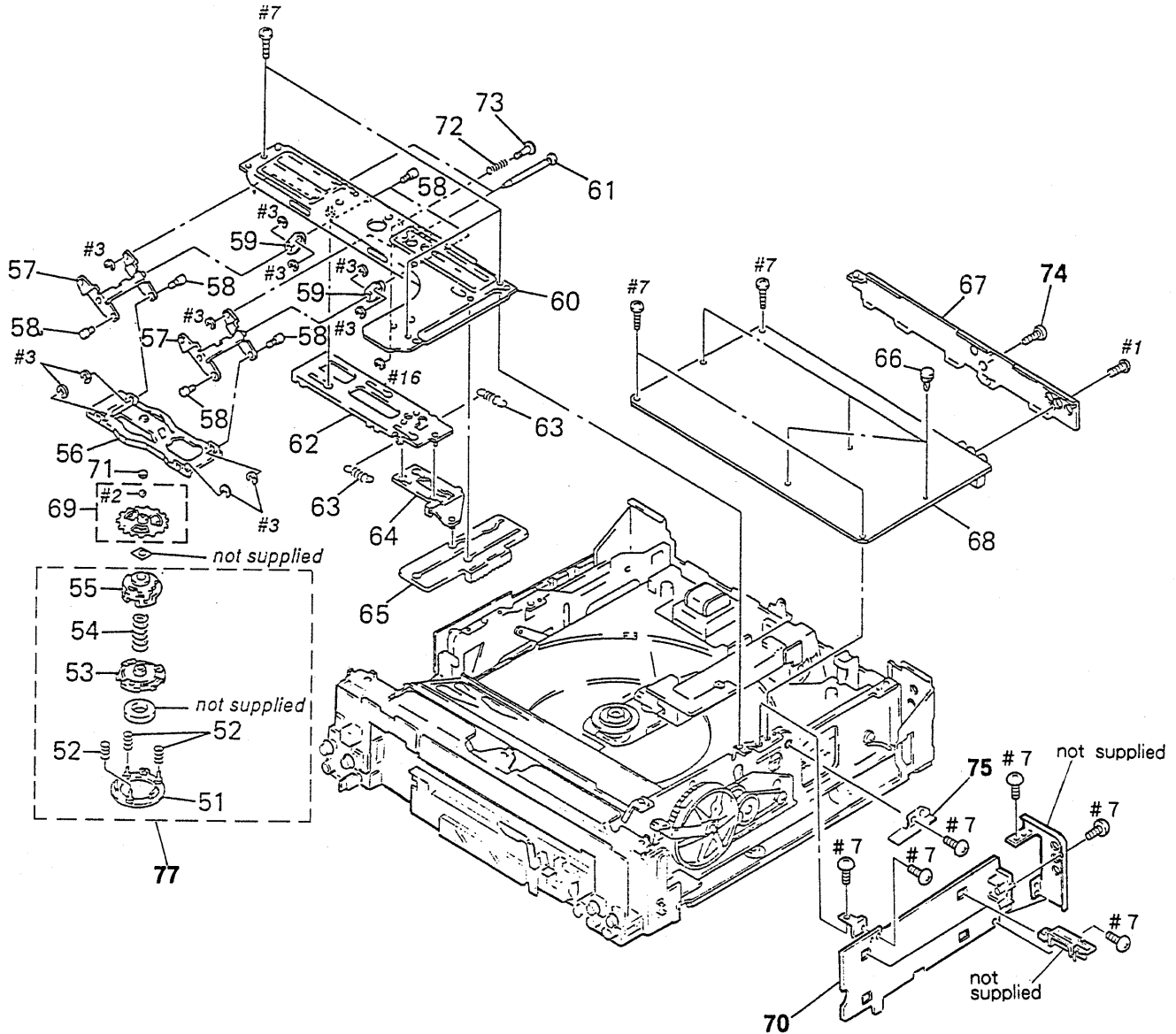
The components identified by mark or dotted line with mark are critical for safety. Replace only with part number specified.

5-1-1. UPPER CASE, FRONT PANEL ASSEMBLY



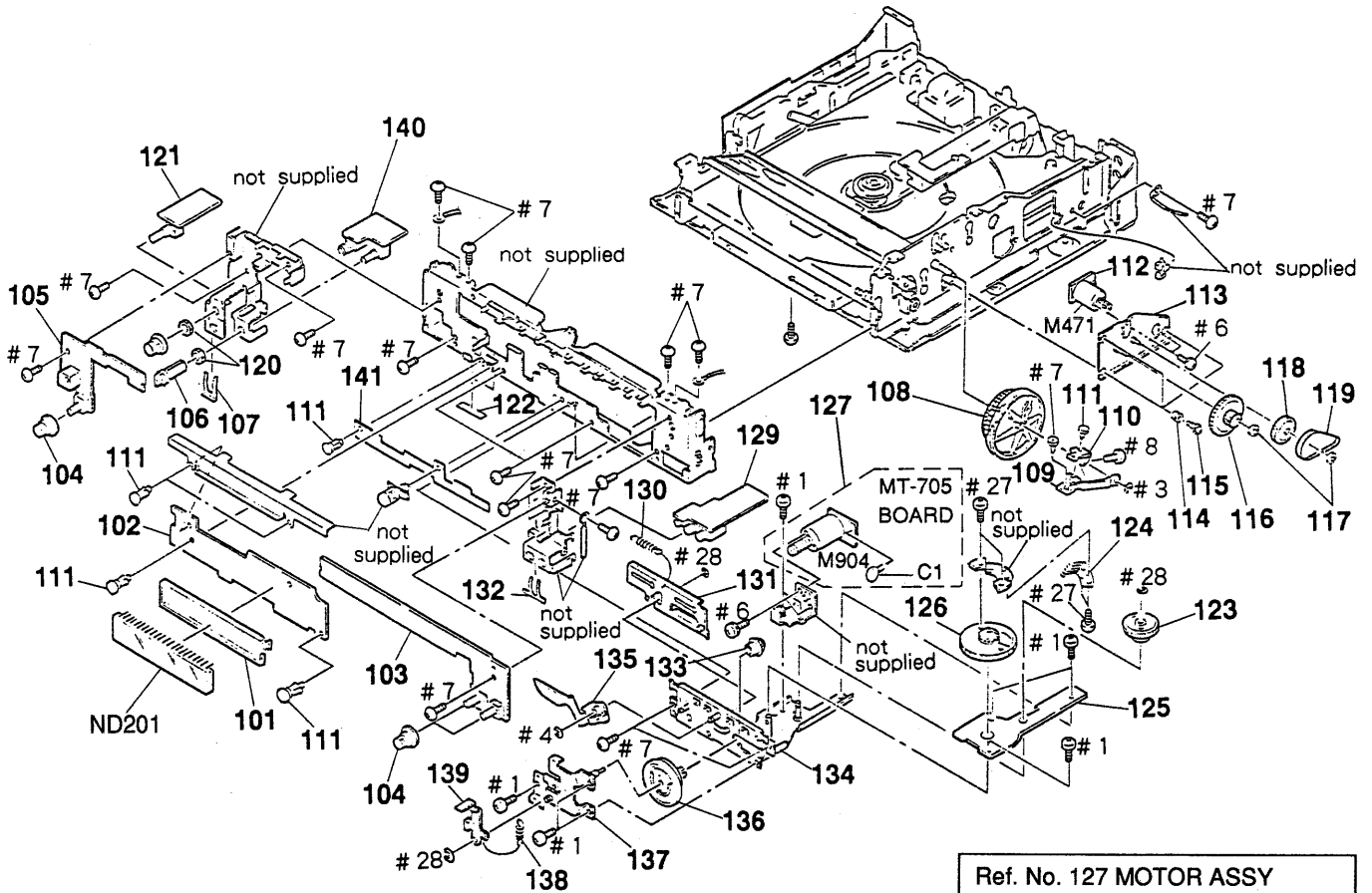
Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
1	3-961-345-31	DOOR		13	3-955-440-01	GUIDE (L)	
2	X-3943-267-1	JOINT (L) ASSY		14	X-3943-269-3	GEAR ASSY, PHASE	
3	3-955-422-01	SPRING, DOOR		15	3-955-425-01	GUIDE (R)	
4	X-3943-268-1	JOINT (R) ASSY		16	3-955-426-01	RACK (R), BACK	
* 5	X-3943-266-1	REINFORCEMENT ASSY, DOOR		* 17	X-3943-911-1	CASE ASSY (J81), UPPER	
6	X-3944-260-1	PANEL ASSY, FRONT		18	3-710-901-41	SCREW, TAPPING	
7	3-703-710-41	STICKER, SONY SYMBOL (12)		19	X-3363-548-1	FOOT ASSY	
8	3-553-566-01	CUSHION		20	3-955-343-11	COVER, FOOT	
9	X-3942-783-1	BUTTON ASSY, AB SELECTION (SIDE A/B)		21	X-3942-810-1	FOOT ASSY	
* 10	X-3943-265-1	PLATE ASSY, GUIDE		22	1-467-896-21	REMOTE COMMANDER (RMT-M29A)	
11	3-321-393-01	WASHER, STOPPER		23	3-708-950-01	LID, BATTERY CASE	
12	3-956-250-01	SPRING, FP ELECTROSTATIC					

5-1-2. CHUCK FRAME ASSEMBLY



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
51	X-3943-043-1	GUIDE (B) ASSY, CENTER		64	X-3942-800-1	LIMITER ASSY	
52	3-953-290-01	SPRING (2), COMPRESSION		65	3-953-348-01	CAM, CHUCK	
53	X-3942-776-1	HOLDER ASSY, MAGNET		* 66	4-386-173-01	SPACER	
54	3-953-291-01	SPRING (1), COMPRESSION		* 67	3-956-077-31	PLATE, JACK	
55	3-953-288-01	PLATE, CHUCKING		* 68	A-6423-211-A	MB-712 BOARD, COMPLETE	
* 56	3-953-354-01	PLATE, CHUCK		69	X-3942-787-1	PLATE ASSY, TOP	
57	X-3942-801-1	ARM (L) ASSY		* 70	A-6423-210-A	KP-708 BOARD, COMPLETE	
* 58	3-953-345-01	SHAFT, ARM (S)		71	3-953-392-01	RETAINER, THRUST	
* 59	3-953-352-01	ARM (S)		72	3-353-241-01	SPRING, COMPRESSION	
60	X-3942-798-1	FRAME ASSY, CHUCK		* 73	3-953-831-01	STOPPER, OPT	
* 61	3-953-355-01	SHAFT, SLIDE		74	3-710-901-41	SCREW, TAPPING	
62	X-3942-799-1	PLATE ASSY, SLIDE		75	3-955-673-01	SPRING, LEAF	
63	3-486-135-XX	SPRING, TENSION		77	A-6415-644-G	CHUCK BLOCK ASSY	

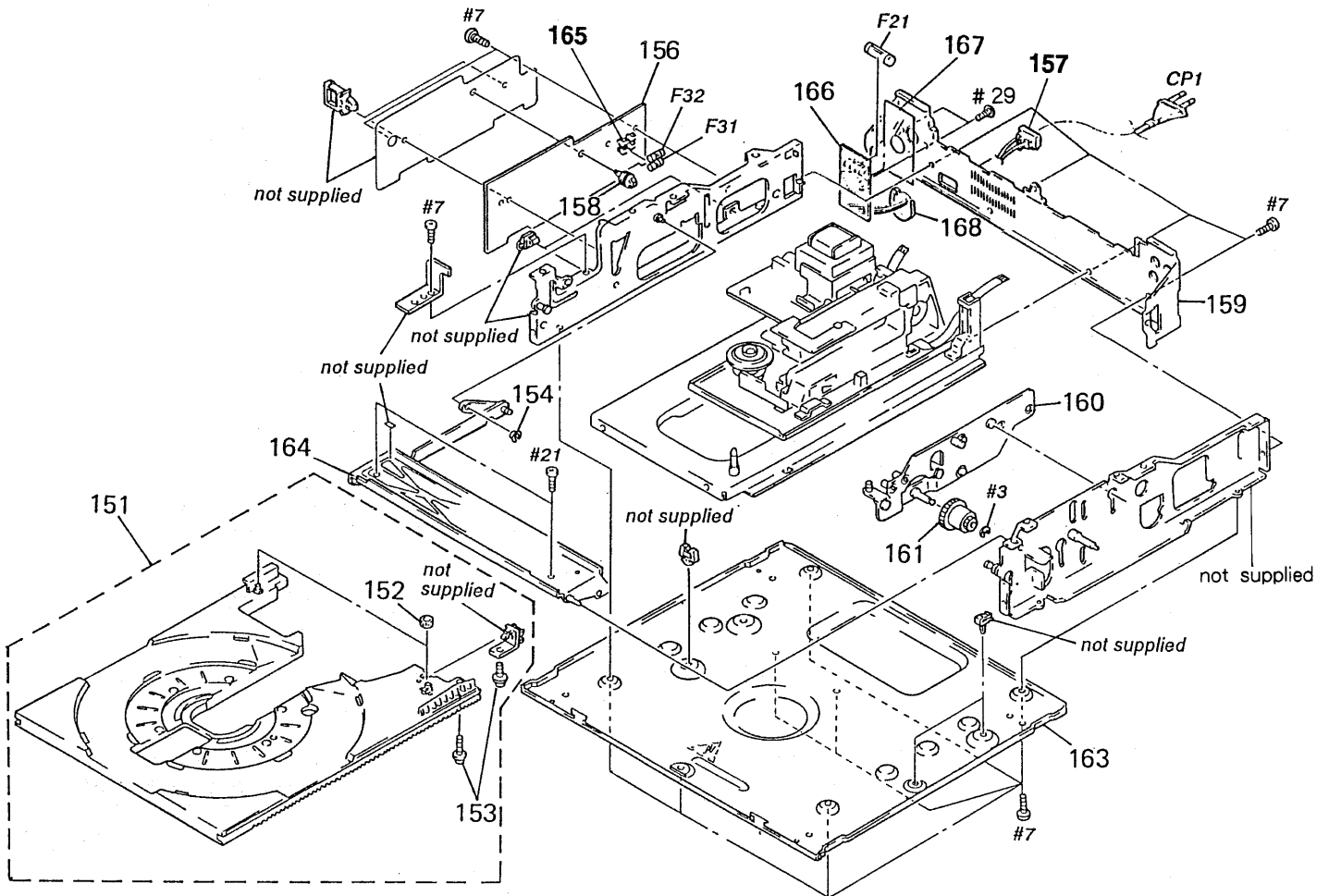
5-1-3. SUB FRONT PANEL ASSEMBLY



Ref. No. 127 MOTOR ASSY
includes M904 of MT-705 BOARD

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
101	3-953-317-01	HOLDER, TUBE, FL		123	3-955-396-01	WHEEL, WORM	
* 102	A-6423-215-A	FP-738 BOARD, COMPLETE		124	3-955-399-01	BRUSH	
* 103	A-6423-208-A	FP-739 BOARD, COMPLETE		* 125	1-649-841-11	EC-704 BOARD	
104	3-749-922-21	KNOB		126	3-955-397-01	GEAR, COMMUNICATION	
* 105	A-6423-013-A	PW-708 BOARD, COMPLETE		127	X-3943-274-1	MOTOR ASSY	(including MT-705 BOARD, M904)
106	4-922-531-21	KNOB (A TYPE), LOV		* 129	A-6423-205-A	MA-709 BOARD, COMPLETE	
* 107	3-684-436-01	PLATE, MOUNT		130	3-532-725-01	SPRING, TENSION	
108	3-953-356-01	GEAR, CONTROL		* 131	X-3943-275-1	SLIDE ASSY, CAM	
* 109	3-953-357-01	BRACKET, SW		132	3-955-377-01	PLATE (2GANG), MOUNT	
110	A-6421-954-A	SW-719 BOARD, COMPLETE		133	3-955-409-01	GEAR, MITA	
111	3-531-576-11	RIVET		* 134	X-3943-273-1	CHASSIS ASSY	
112	A-6421-953-A	MT-702 BOARD, COMPLETE		* 135	X-3943-278-1	LEVER ASSY, OPENER	
113	X-3942-805-1	BRACKET ASSY, GEAR		136	3-955-408-01	CAM	
114	3-570-118-00	CUSHION, MOTOR		* 137	X-3943-276-1	CHASSIS ASSY, CAM	
115	3-570-027-00	SCREW, MOTOR		138	3-305-526-00	SPRING, TENSION	
116	3-953-358-01	GEAR, MIDWAY		* 139	X-3943-277-1	STOPPER ASSY	
117	3-669-595-00	WASHER (2), STOPPER		* 140	A-6423-203-A	HP-716 BOARD, COMPLETE	
118	3-953-394-01	PULLEY (A)		* 141	3-955-384-01	COVER, FF	
119	3-953-393-01	BELT, TIMING		C1	1-161-772-11	CERAMIC 0.1uF 10% 25V	
120	3-950-989-01	NUT (M7), HEXAGON		M471	X-3942-963-1	MOTOR ASSY (LOADING)	
* 121	A-6423-204-A	VR-703 BOARD, COMPLETE		ND201	1-517-161-11	INDICATOR TUBE, FLUORESCENT	
122	9-911-835-XX	SPACER					

5-1-4. CHASSIS ASSEMBLY

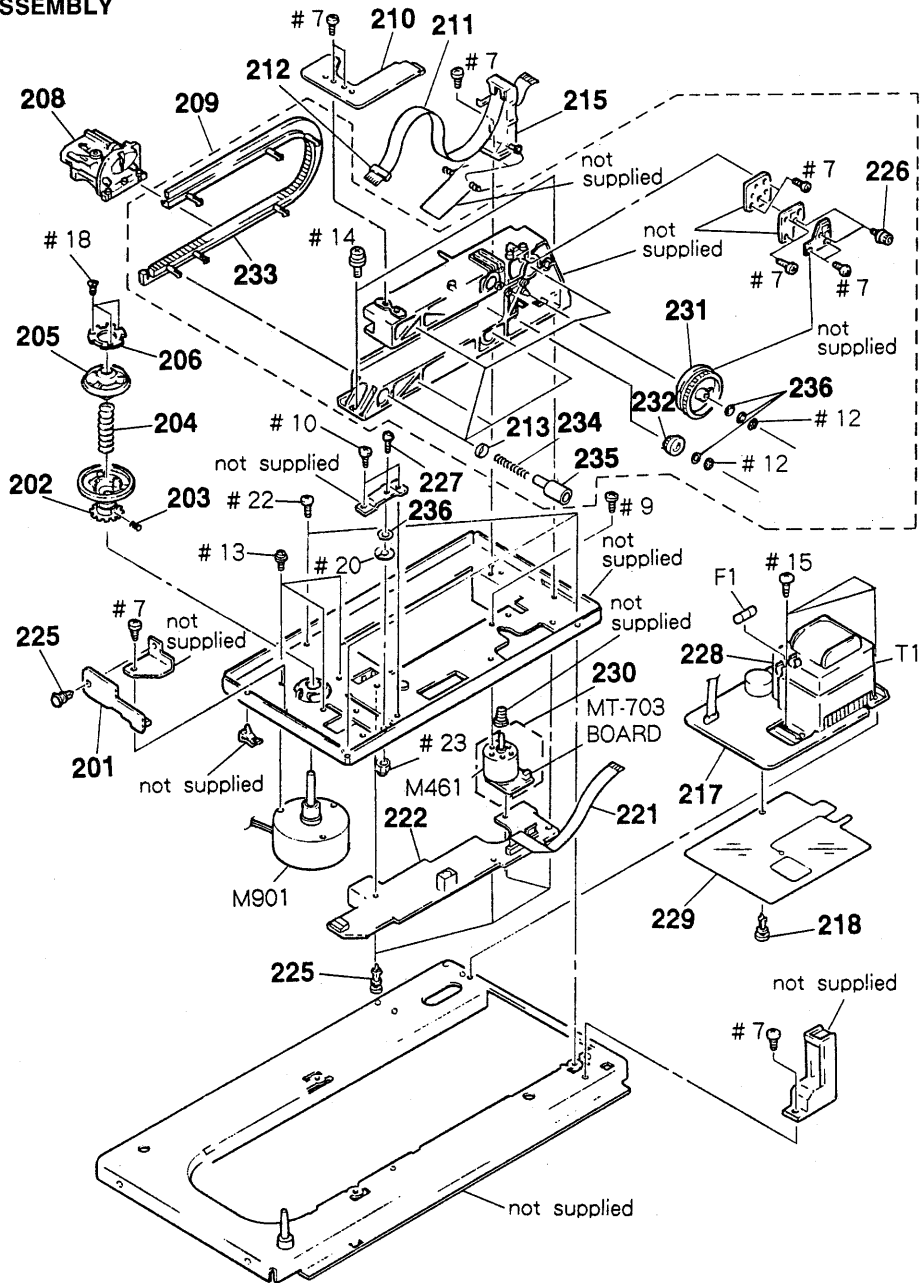


Ref. No.	Part No.	Description	Remarks
151	X-3942-781-1	TRAY ASSY	
* 152	4-914-248-01	STOPPER, RUBBER	
153	3-710-901-11	SCREW, TAPPING	
154	3-703-074-01	CAP 3, SHAFT	
* 155	A-6423-212-A	PS-716 BOARD, COMPLETE	
157	3-703-244-00	BUSHING (2104), CORD	
* 158	4-884-834-00	SUPPORT, PC	
* 159	3-956-082-91	PANEL, REAR	
160	X-3942-802-1	PLATE ASSY, LOADING BASE	
161	3-953-361-01	GEAR, IDLER	

Ref. No.	Part No.	Description	Remarks
* 163	3-955-544-01	PLATE, BOTTOM	
164	X-3942-796-1	FRAME ASSY, TRAY (T)	
▲ 165	1-533-223-11	HOLDER, FUSE	
* 166	A-6423-214-A	VS-707 BOARD, COMPLETE	
* 167	3-953-821-03	SHEET, INSULATING	
* 168	3-703-150-11	CLAMP	
▲ CP1	1-575-912-21	CORD, POWER	
▲ F21	1-532-066-00	FUSE, TIME-LAG (0.4A/250V)	
▲ F31	1-532-299-00	FUSE, TIME-LAG (5A/250V)	
▲ F32	1-532-299-00	FUSE, TIME-LAG (5A/250V)	

Note: The components identified by mark ▲ or dotted line with mark ▲ are critical for safety. Replace only with part number specified.

5-1-5. MD CHASSIS ASSEMBLY



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
201	A-6421-957-A	FG-704 BOARD, COMPLETE		225	4-812-134-11	RIVET NYLON, 3.5	
202	X-3942-779-1	TURNTABLE ASSY		226	3-899-249-01	BOLT, HEXAGON SOCKET	
203	3-701-507-00	SET SCREW, DOUBLE POINT, (M3X5)		227	3-953-829-01	BOLT	
204	3-953-289-01	SPRING (3), COMPRESSION		△228	1-533-223-11	HOLDER, FUSE	
205	3-953-292-01	GUIDE, CENTER		229	3-953-377-02	SHEET, INSULATING, TR	
206	3-953-293-01	PLATE (C), YOKE		230	X-3942-968-1	MOTOR BLOCK ASSY, TILT	
△208	8-848-286-11	DEVICE, OPTICAL KHS-150A		231	3-953-254-01	CAM, TILT DRIVING	
209	A-6404-082-A	BASE BLOCK ASSY, FEED		232	3-953-259-01	GEAR, TILT MIDWAY	
210	A-6421-958-A	BI-702 BOARD, COMPLETE		233	3-953-253-01	GUIDE, U	
211	1-751-083-11	CABLE, FLEXIBLE FLAT (18 CORE)		234	3-953-267-01	SPRING, COMPRESSION	
212	3-953-268-01	HOLDER (18P), FLEXIBLE		235	3-953-255-03	HOLDER, U	
213	3-953-830-01	WASHER, U		236	3-701-439-21	WASHER	
215	A-6404-076-A	STAND ASSY, FLEXIBLE RETAINER		△F1	1-532-215-00	FUSE, TIME-LAG (0.8A/250V)	
* 217	A-6423-213-A	TR-718 BOARD, COMPLETE		M461	1-541-930-11	MOTOR, DC	
218	3-531-576-11	RIVET		M901	1-698-109-11	MOTOR, DD (SPINDLE)	
221	1-765-530-11	CABLE, FLEXIBLE FLAT (14 CORE)		△T1	1-423-556-11	TRANSFORMER, POWER	
222	A-6421-956-A	MD-703 BOARD, COMPLETE					

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

BI-702**EC-704****FG-704****5-2. ELECTRICAL PARTS LIST****NOTE:**

When indicating parts by reference number, please include the board name.

The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:
uF: μ F

- RESISTORS
All resistors are in ohms.
METAL: metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable
- COILS
uH: μ H
- SEMICONDUCTORS
In each case, u: μ , for example:
uA...: μ A... , uPA... , μ PA... ,
uPB... , μ PB... , uPC... , μ PC... ,
uPD... , μ PD...

Ref. No.	Part No.	Description	Remarks
	A-6421-958-A	BI-702 BOARD, COMPLETE ***** (Ref.No.2,000 Serie)	
	3-953-261-01	HOLDER, PD < CAPACITOR >	
C401	1-163-035-00	CERAMIC CHIP 0.047uF	50V
		< CONNECTOR >	
CN401	1-506-484-11	PIN, CONNECTOR 5P < DIODE >	
D401	8-729-020-74	DIODE GP1S24	
D402	8-729-020-74	DIODE GP1S24 < JUMPER RESISTOR >	
JR401	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR403	1-214-743-00	METAL 3.9K 1% 1/4W	
JR404	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR405	1-216-296-00	METAL CHIP 0 5% 1/8W < TRANSISTOR >	
Q401	8-729-904-10	TRANSISTOR PT-360FS	
Q402	8-729-904-10	TRANSISTOR PT-360FS	
Q403	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q404	8-729-230-49	TRANSISTOR 2SC2712-YG < RESISTOR >	
R401	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R402	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R403	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R404	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R405	1-216-039-00	METAL CHIP 390 5% 1/10W	
R406	1-216-111-00	METAL CHIP 390K 5% 1/10W	
R407	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R408	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R409	1-216-073-00	METAL CHIP 10K 5% 1/10W	

Ref. No.	Part No.	Description	Remarks
*	1-649-841-11	EC-704 BOARD ***** (Ref.No.14,000 Serie)	
		< CONNECTOR >	
CN001	1-506-485-11	PIN, CONNECTOR 6P	
W001	1-506-481-11	PIN, CONNECTOR 2P *****	
	A-6421-957-A	FG-704 BOARD, COMPLETE ***** (Ref.No.2,000 Serie)	
		< CAPACITOR >	
C411	1-163-035-00	CERAMIC CHIP 0.047uF	50V
		< CONNECTOR >	
CN411	1-691-863-11	CONNECTOR, BOARD TO BOARD < DIODE >	
D411	8-729-020-74	DIODE GP1S24	
D412	8-729-020-74	DIODE GP1S24 < JUMPER RESISTOR >	
JR410	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR411	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR412	1-214-743-00	METAL 3.9K 1% 1/4W < TRANSISTOR >	
Q411	8-729-216-22	TRANSISTOR 2SA1162-G	
Q412	8-729-216-22	TRANSISTOR 2SA1162-G < RESISTOR >	
R411	1-216-037-00	METAL CHIP 330 5% 1/10W	
R412	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R413	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R414	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R415	1-216-049-00	METAL CHIP 1K 5% 1/10W	

FG-704

FP-738

Ref. No.	Part No.	Description	Remarks
R416	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R417	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R418	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R419	1-216-049-00	METAL CHIP 1K 5% 1/10W	

*	A-6423-215-A	FP-738 BOARD, COMPLETE	

		(Ref.No.3,000 Serie)se	
	3-953-317-01	HOLDER, TUBE, FL	
		< CAPACITOR >	
C201	1-124-589-11	ELECT 47uF 20% 16V	
C202	1-124-589-11	ELECT 47uF 20% 16V	
C203	1-163-117-00	CERAMIC CHIP 100PF 5% 50V	
C204	1-126-163-11	ELECT 4.7uF 20% 50V	
C205	1-124-248-00	ELECT 22uF 20% 35V	
C206	1-128-243-11	ELECT CHIP 22uF 0 25V	
C207	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C208	1-126-154-11	ELECT 47uF 20% 6.3V	
C209	1-126-154-11	ELECT 47uF 20% 6.3V	
C210	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C211	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C212	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
△C213	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C214	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C215	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C216	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C218	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C223	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C225	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C226	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C227	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C228	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
		< CONNECTOR >	
CN201	1-506-483-21	PIN, CONNECTOR 4P	
CN202	1-506-488-11	PIN, CONNECTOR 9P	
CN203	1-506-486-11	PIN, CONNECTOR 7P	
CN204	1-506-487-11	PIN, CONNECTOR 8P	
* CN205	1-564-013-11	PIN, CONNECTOR 3P	
CN206	1-506-487-11	PIN, CONNECTOR 8P	
CN207	1-506-486-11	PIN, CONNECTOR 7P	
CN208	1-506-490-21	PIN, CONNECTOR 11P	
		< DIODE >	
△D201	8-719-210-39	DIODE EC10QS-04	
D202	8-719-978-93	DIODE DTZ-TT11-30B	
△D203	8-719-210-39	DIODE EC10QS-04	
△D204	8-719-105-73	DIODE RD4.7M-B2	

Ref. No.	Part No.	Description	Remarks
D205	8-719-210-39	DIODE EC10QS-04	
△D206	8-719-801-78	DIODE 1SS184	
D208	8-719-946-30	LED SLR34DC3 (AUTO PAUSE)	
D209	8-719-946-30	LED SLR34DC3 (LANGUAGE)	
D210	8-719-946-30	LED SLR34DC3 (KARAOKE PON)	
D211	8-719-940-82	LED SLR34MC3 (AUTO RESUME)	
		< FILTER >	
FL201	1-424-031-11	FILTER, NOISE	
		< IC >	
IC201	8-759-074-40	IC PST572DMT-T1 (RESET)	
IC202	8-759-291-72	IC MB89096PF-G-147-BND (MODE)	
IC203	8-759-032-29	IC MC74HC126AF (BUFFER CONTROL)	
IC204	8-759-276-29	IC XL9020F-S-E2 (EP ROM)	
		< JUMPER RESISTOR >	
JR222	1-214-743-00	METAL 3.9K 1% 1/4W	
		< COIL >	
L202	1-410-393-11	INDUCTOR CHIP 100uH	
		< FLUORECENT INDICATOR >	
ND201	1-517-161-11	INDICATOR TUBE, FLUORESCENT	
		< TRANSISTOR >	
△Q201	8-729-140-97	TRANSISTOR KSA708	
Q202	8-729-216-22	TRANSISTOR 2SA1162-G	
Q203	8-729-901-01	TRANSISTOR DTC144EK	
Q204	8-729-923-62	TRANSISTOR DTA123JK	
Q205	8-729-923-62	TRANSISTOR DTA123JK	
Q206	8-729-923-62	TRANSISTOR DTA123JK	
Q207	8-729-923-62	TRANSISTOR DTA123JK	
		< RESISTOR >	
R201	1-216-009-00	METAL CHIP 22 5% 1/10W	
R202	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R203	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R204	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R205	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R206	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R207	1-216-224-91	METAL GLAZE 12K 5% 1/8W	
R208	1-216-073-00	METAL CHIP 10K 5% 1/10W	
△R209	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R210	1-216-033-00	METAL CHIP 220 5% 1/10W	
△R211	1-216-049-00	METAL CHIP 1K 5% 1/10W	
△R212	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R213	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R214	1-216-073-00	METAL CHIP 10K 5% 1/10W	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

FP-738

FP-739

Ref. No.	Part No.	Description	Remarks		
R215	1-216-033-00	METAL CHIP	220	5%	1/10W
R216	1-216-073-00	METAL CHIP	10K	5%	1/10W
R217	1-216-049-00	METAL CHIP	1K	5%	1/10W
R218	1-216-073-00	METAL CHIP	10K	5%	1/10W
R219	1-216-033-00	METAL CHIP	220	5%	1/10W
R220	1-216-033-00	METAL CHIP	220	5%	1/10W
R221	1-216-089-00	METAL CHIP	47K	5%	1/10W
R222	1-216-033-00	METAL CHIP	220	5%	1/10W
R224	1-216-049-00	METAL CHIP	1K	5%	1/10W
R225	1-216-033-00	METAL CHIP	220	5%	1/10W
R226	1-216-025-00	METAL CHIP	100	5%	1/10W
R227	1-216-025-00	METAL CHIP	100	5%	1/10W
R228	1-216-073-00	METAL CHIP	10K	5%	1/10W
R229	1-216-073-00	METAL CHIP	10K	5%	1/10W
R230	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R232	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W
R233	1-216-073-00	METAL CHIP	10K	5%	1/10W
△R234	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W
R235	1-216-049-00	METAL CHIP	1K	5%	1/10W
R236	1-216-049-00	METAL CHIP	1K	5%	1/10W
R237	1-216-033-00	METAL CHIP	220	5%	1/10W
R238	1-216-033-00	METAL CHIP	220	5%	1/10W
R239	1-216-033-00	METAL CHIP	220	5%	1/10W
R240	1-216-033-00	METAL CHIP	220	5%	1/10W
R241	1-216-049-00	METAL CHIP	1K	5%	1/10W
R243	1-216-025-00	METAL CHIP	100	5%	1/10W
R244	1-216-049-00	METAL CHIP	1K	5%	1/10W
R245	1-216-049-00	METAL CHIP	1K	5%	1/10W
R246	1-216-049-00	METAL CHIP	1K	5%	1/10W
R247	1-216-049-00	METAL CHIP	1K	5%	1/10W
R248	1-216-049-00	METAL CHIP	1K	5%	1/10W
R249	1-216-049-00	METAL CHIP	1K	5%	1/10W
R250	1-216-049-00	METAL CHIP	1K	5%	1/10W
R251	1-216-049-00	METAL CHIP	1K	5%	1/10W
R252	1-216-049-00	METAL CHIP	1K	5%	1/10W
R255	1-216-037-00	METAL CHIP	330	5%	1/10W
R256	1-216-037-00	METAL CHIP	330	5%	1/10W
R257	1-216-037-00	METAL CHIP	330	5%	1/10W
R258	1-216-037-00	METAL CHIP	330	5%	1/10W
R259	1-216-073-00	METAL CHIP	10K	5%	1/10W
R260	1-216-025-00	METAL CHIP	100	5%	1/10W
R261	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R262	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R263	1-216-033-00	METAL CHIP	220	5%	1/10W
R265	1-216-073-00	METAL CHIP	10K	5%	1/10W
R266	1-216-073-00	METAL CHIP	10K	5%	1/10W
R267	1-216-073-00	METAL CHIP	10K	5%	1/10W
R270	1-216-224-91	METAL GLAZE	12K	5%	1/8W
R271	1-216-224-91	METAL GLAZE	12K	5%	1/8W
R272	1-216-033-00	METAL CHIP	220	5%	1/10W

Ref. No.	Part No.	Description	Remarks		
R273	1-216-033-00	METAL CHIP	220	5%	1/10W
R274	1-216-033-00	METAL CHIP	220	5%	1/10W
R281	1-216-073-00	METAL CHIP	10K	5%	1/10W
R282	1-216-073-00	METAL CHIP	10K	5%	1/10W
R283	1-216-073-00	METAL CHIP	10K	5%	1/10W
< SWITCH >					
S201	1-572-946-11	SWITCH, TACTIL (■)			
S202	1-572-946-11	SWITCH, TACTIL (LANGUAGE)			
S203	1-572-946-11	SWITCH, TACTIL (AUTO PAUSE)			
S204	1-572-126-11	SWITCH, PUSH (1 KEY) (DOOR SW)			
< TRANSFORMER >					
△T201	1-448-740-21	TRANSFORMER, DC-DC CONVERTER			
< VIBRATOR >					
X202	1-579-223-11	OSCILLATOR, CERAMIC			

*	A-6423-208-A	FP-739 BOARD, COMPLETE (7,000)			

< CAPACITOR >					
C001	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C002	1-128-049-11	ELECT CHIP	1uF	0	50V
C003	1-163-038-00	CERAMIC CHIP	0.1uF		25V
< CONNECTOR >					
CN001	1-506-487-11	PIN, CONNECTOR 8P			
CN003	1-506-483-21	PIN, CONNECTOR 4P			
< DIODE >					
D001	8-719-042-48	DIODE SLR-33DC3F (VOCAL)			
D002	8-719-042-48	DIODE SLR-33DC3F (VOCAL SUPPORT)			
D003	8-719-042-48	DIODE SLR-33DC3F (NEXT DISC)			
D004	8-719-042-48	DIODE SLR-33DC3F (RESERVE)			
D005	8-719-042-48	DIODE SLR-33DC3F (MY SONG)			
D006	8-719-042-50	DIODE SLR-33MC3F (SIDE A)			
D007	8-719-042-50	DIODE SLR-33MC3F (SIDE B)			
< IC >					
IC001	8-752-842-94	IC CXP2007M (LED DRIVER)			
< RESISTOR >					
R001	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R002	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R003	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R004	1-216-049-00	METAL CHIP	1K	5%	1/10W
R005	1-216-089-00	METAL CHIP	47K	5%	1/10W

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

FP-739

HP-716

KP-708

Ref. No.	Part No.	Description	Remarks
R006	1-216-079-00	METAL CHIP 18K 5%	1/10W
R007	1-216-071-00	METAL CHIP 8.2K 5%	1/10W
R008	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
R009	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
R010	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
R011	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
R012	1-216-053-00	METAL CHIP 1.5K 5%	1/10W
R013	1-216-049-00	METAL CHIP 1K 5%	1/10W
R014	1-216-089-00	METAL CHIP 47K 5%	1/10W
R015	1-216-079-00	METAL CHIP 18K 5%	1/10W
R016	1-216-071-00	METAL CHIP 8.2K 5%	1/10W
R017	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
R018	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
R019	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
R020	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
R021	1-216-053-00	METAL CHIP 1.5K 5%	1/10W
R022	1-216-049-00	METAL CHIP 1K 5%	1/10W
R023	1-216-037-00	METAL CHIP 330 5%	1/10W
R024	1-216-037-00	METAL CHIP 330 5%	1/10W
R025	1-216-037-00	METAL CHIP 330 5%	1/10W
R026	1-216-037-00	METAL CHIP 330 5%	1/10W
R027	1-216-037-00	METAL CHIP 330 5%	1/10W
R028	1-216-037-00	METAL CHIP 330 5%	1/10W
R029	1-216-037-00	METAL CHIP 330 5%	1/10W
R030	1-216-073-00	METAL CHIP 10K 5%	1/10W
R031	1-216-049-00	METAL CHIP 1K 5%	1/10W
R032	1-216-049-00	METAL CHIP 1K 5%	1/10W
< VARIABLE RESISTOR >			
RV001	1-223-504-21	RES. VAR. CARBON 20K (MIC VOL 1)	
RV002	1-223-504-21	RES. VAR. CARBON 20K (MIC VOL 2)	
< SWITCH >			
S001	1-572-946-11	SWITCH, TACTIL (1)	
S002	1-572-946-11	SWITCH, TACTIL (2)	
S003	1-572-946-11	SWITCH, TACTIL (3)	
S004	1-572-946-11	SWITCH, TACTIL (4)	
S005	1-572-946-11	SWITCH, TACTIL (5)	
S006	1-572-946-11	SWITCH, TACTIL (6)	
S007	1-572-946-11	SWITCH, TACTIL (7)	
S008	1-572-946-11	SWITCH, TACTIL (8)	
S009	1-572-946-11	SWITCH, TACTIL (9)	
S010	1-572-946-11	SWITCH, TACTIL (10)	
S011	1-572-946-11	SWITCH, TACTIL (11)	
S012	1-572-946-11	SWITCH, TACTIL (12)	
S013	1-572-946-11	SWITCH, TACTIL (13)	
S014	1-572-946-11	SWITCH, TACTIL (14)	
S015	1-572-946-11	SWITCH, TACTIL (15)	
S016	1-572-946-11	SWITCH, TACTIL (VOCAL)	
S017	1-572-946-11	SWITCH, TACTIL (VOCAL SUPPORT)	

Ref. No.	Part No.	Description	Remarks
S018	1-572-946-11	SWITCH, TACTIL (NEXT DISC)	
S019	1-572-946-11	SWITCH, TACTIL (RESERVE)	
S020	1-572-946-11	SWITCH, TACTIL (MY SONG)	
S021	1-572-946-11	SWITCH, TACTIL (▲)	
S022	1-572-946-11	SWITCH, TACTIL (SIDE A)	
S023	1-572-946-11	SWITCH, TACTIL (■)	
S024	1-572-946-11	SWITCH, TACTIL (▶)	
S025	1-572-946-11	SWITCH, TACTIL (SIDE B)	

*	A-6423-203-A	HP-716 BOARD, COMPLETE	

(Ref.No.10,000 Serieese)			
< CAPACITOR >			
C401	1-163-033-00	CERAMIC CHIP 0.022uF	50V
C404	1-163-031-11	CERAMIC CHIP 0.01uF	50V
< CONNECTOR >			
CN401	1-564-002-11	PIN, CONNECTOR 3P	
< FILTER >			
FL401	1-424-031-11	FILTER, NOISE	
< JACK >			
J401	1-507-796-71	JACK (PHONES)	
< RESISTOR >			
R402	1-216-025-00	METAL CHIP 100 5%	1/10W
R403	1-216-059-00	METAL CHIP 2.7K 5%	1/10W
R404	1-216-063-00	METAL CHIP 3.9K 5%	1/10W
< SWITCH >			
S401	1-692-189-11	SWITCH, ROTARY	

*	A-6423-210-A	KP-708 BOARD, COMPLETE	

(Ref.No.8,000 Serieese)			
< CAPACITOR >			
C501	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V
C502	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V
C503	1-124-927-11	ELECT 4.7uF	20% 100V
C504	1-124-927-11	ELECT 4.7uF	20% 100V
C505	1-124-927-11	ELECT 4.7uF	20% 100V
C506	1-124-927-11	ELECT 4.7uF	20% 100V
C508	1-124-916-11	ELECT 22uF	20% 63V
C509	1-163-031-11	CERAMIC CHIP 0.01uF	50V

Note: The components identified by mark ▲ or dotted line with mark ▲ are critical for safety. Replace only with part number specified.

KP-708

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
C510	1-126-947-11	ELECT	47uF 20% 10V	C566	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C511	1-126-947-11	ELECT	47uF 20% 10V	C569	1-130-467-00	MYLAR	470PF 5% 50V
C512	1-126-947-11	ELECT	47uF 20% 10V	C570	1-130-467-00	MYLAR	470PF 5% 50V
C513	1-126-923-11	ELECT	220uF 20% 10V	C571	1-126-947-11	ELECT	47uF 20% 10V
C514	1-163-031-11	CERAMIC CHIP	0.01uF 50V	C572	1-126-947-11	ELECT	47uF 20% 10V
C515	1-126-947-11	ELECT	47uF 20% 10V	C573	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C516	1-163-006-11	CERAMIC CHIP	560PF 10% 50V	C574	1-126-947-11	ELECT	47uF 20% 10V
C517	1-163-115-00	CERAMIC CHIP	82PF 5% 50V	C580	1-163-031-11	CERAMIC CHIP	0.01uF 50V
C518	1-126-947-11	ELECT	47uF 20% 10V	C581	1-163-087-00	CERAMIC CHIP	4PF 50V
C519	1-124-927-11	ELECT	4.7uF 20% 100V	C582	1-163-017-00	CERAMIC CHIP	0.0047uF 5% 50V
C520	1-126-947-11	ELECT	47uF 20% 10V	C583	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V
C521	1-124-927-11	ELECT	4.7uF 20% 100V	C584	1-124-927-11	ELECT	4.7uF 20% 100V
C523	1-126-947-11	ELECT	47uF 20% 10V	C585	1-136-166-00	FILM	0.12uF 5% 50V
C524	1-126-947-11	ELECT	47uF 20% 10V	C586	1-136-177-00	FILM	1uF 5% 50V
C525	1-124-927-11	ELECT	4.7uF 20% 100V	C587	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C527	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	C588	1-163-037-11	CERAMIC CHIP	0.022uF 10% 25V
C528	1-124-927-11	ELECT	4.7uF 20% 100V	C591	1-124-248-00	ELECT	22uF 20% 35V
C529	1-163-006-11	CERAMIC CHIP	560PF 10% 50V	< CONNECTOR >			
C530	1-124-927-11	ELECT	4.7uF 20% 100V	CN501	1-506-489-11	PIN, CONNECTOR	10P
C531	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	CN502	1-506-484-11	PIN, CONNECTOR	5P
C532	1-136-177-00	FILM	1uF 5% 50V	CN503	1-506-490-21	PIN, CONNECTOR	11P
C533	1-130-479-00	MYLAR	0.0047uF 5% 50V	CN504	1-506-483-21	PIN, CONNECTOR	4P
C535	1-126-947-11	ELECT	47uF 20% 10V	CN505	1-506-482-11	PIN, CONNECTOR	3P
C536	1-126-947-11	ELECT	47uF 20% 10V	CN506	1-506-487-11	PIN, CONNECTOR	8P
C537	1-130-467-00	MYLAR	470PF 5% 50V	CN591	1-506-472-11	PIN, CONNECTOR	7P
C538	1-163-099-00	CERAMIC CHIP	18PF 5% 50V	CN592	1-506-468-11	PIN, CONNECTOR	3P
C539	1-163-099-00	CERAMIC CHIP	18PF 5% 50V	* CN593	1-568-783-31	PIN, CONNECTOR	6P
C540	1-163-038-00	CERAMIC CHIP	0.1uF 25V	< DIODE >			
C541	1-126-947-11	ELECT	47uF 20% 10V	D501	8-719-800-76	DIODE	1SS226
C542	1-126-947-11	ELECT	47uF 20% 10V	D502	8-719-976-91	DIODE	DTZ4.3B
C543	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	D503	8-719-976-91	DIODE	DTZ4.3B
C544	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V	D504	8-719-988-62	DIODE	1SS355
C545	1-136-177-00	FILM	1uF 5% 50V	D505	8-719-988-62	DIODE	1SS355
C546	1-136-177-00	FILM	1uF 5% 50V	D521	8-719-106-43	DIODE	RD9.1M-B1
C547	1-130-479-00	MYLAR	0.0047uF 5% 50V	D522	8-719-106-43	DIODE	RD9.1M-B1
C548	1-130-479-00	MYLAR	0.0047uF 5% 50V	D580	8-719-988-62	DIODE	1SS355
C549	1-163-031-11	CERAMIC CHIP	0.01uF 50V	D581	8-719-104-34	DIODE	1S2836
C550	1-163-115-00	CERAMIC CHIP	82PF 5% 50V	D591	8-719-402-34	DIODE	MA3120-TX
C551	1-126-947-11	ELECT	47uF 20% 10V	< FILTER >			
C552	1-126-947-11	ELECT	47uF 20% 10V	FL501	1-424-031-11	FILTER, NOISE	
C553	1-163-031-11	CERAMIC CHIP	0.01uF 50V	FL502	1-424-031-11	FILTER, NOISE	
C554	1-163-031-11	CERAMIC CHIP	0.01uF 50V	FL503	1-424-031-11	FILTER, NOISE	
C556	1-163-038-00	CERAMIC CHIP	0.1uF 25V	FL504	1-424-031-11	FILTER, NOISE	
C557	1-126-947-11	ELECT	47uF 20% 10V	FL542	1-424-031-11	FILTER, NOISE	
C558	1-163-031-11	CERAMIC CHIP	0.01uF 50V	< IC >			
C559	1-163-031-11	CERAMIC CHIP	0.01uF 50V	IC500	8-759-262-34	IC	LC83020E (DSP)
C560	1-163-031-11	CERAMIC CHIP	0.01uF 50V	IC501	8-759-300-71	IC	HD14053BFP (EXT/INT SELECT)
C561	1-163-031-11	CERAMIC CHIP	0.01uF 50V				
C562	1-163-031-11	CERAMIC CHIP	0.01uF 50V				
C563	1-126-947-11	ELECT	47uF 20% 10V				

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
IC502	8-759-231-53	IC M5F7805	(+5V REG)	R513	1-216-097-00	METAL CHIP	100K 5% 1/10W
IC503	8-759-634-96	IC M5207L05	(EVR MIC GAIN/ECHO)	R514	1-216-049-00	METAL CHIP	1K 5% 1/10W
IC504	8-759-262-35	IC LC32464P-80	(D RAM)	R515	1-216-049-00	METAL CHIP	1K 5% 1/10W
IC510	8-759-636-55	IC M5218AFP	(BUFFER)	R516	1-216-081-00	METAL CHIP	22K 5% 1/10W
IC511	8-759-636-55	IC M5218AFP	(AMP)	R517	1-214-743-00	METAL	3.9K 1% 1/4W
IC512	8-759-701-51	IC NJM2072M	(DETECTOR)	R518	1-216-049-00	METAL CHIP	1K 5% 1/10W
IC513	8-759-636-55	IC M5218AFP	(BUFFER)	R520	1-216-067-00	METAL CHIP	5.6K 5% 1/10W
IC514	8-759-636-55	IC M5218AFP	(AMP)	R522	1-216-049-00	METAL CHIP	1K 5% 1/10W
IC541	8-759-982-04	IC RC5532M	(LPF/AMP)	R523	1-216-071-00	METAL CHIP	8.2K 5% 1/10W
IC542	8-759-177-64	IC LC8390M-TLM	(A/D)	R524	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
△IC591	8-759-231-92	IC TA7291P	(MOTOR DRIVER)	R525	1-216-073-00	METAL CHIP	10K 5% 1/10W
< JACK >				R526	1-216-689-11	METAL CHIP	39K 0.5% 1/10W
J501	1-565-351-41	JACK, PIN 3P	(LINE IN)	R527	1-216-089-00	METAL CHIP	47K 5% 1/10W
< JUMPER RESISTOR >				R529	1-216-048-00	METAL CHIP	910 5% 1/10W
JR502	1-214-743-00	METAL	3.9K 1% 1/4W	R530	1-216-097-00	METAL CHIP	100K 5% 1/10W
JR504	1-216-296-00	METAL CHIP	0 5% 1/8W	R531	1-216-050-00	METAL GLAZE	1.1K 5% 1/10W
JR505	1-216-296-00	METAL CHIP	0 5% 1/8W	R532	1-216-063-00	METAL CHIP	3.9K 5% 1/10W
JR592	1-216-296-00	METAL CHIP	0 5% 1/8W	R533	1-216-048-00	METAL CHIP	910 5% 1/10W
JR593	1-214-743-00	METAL	3.9K 1% 1/4W	R534	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
JR594	1-214-743-00	METAL	3.9K 1% 1/4W	R535	1-216-121-00	METAL CHIP	1M 5% 1/10W
JR595	1-214-743-00	METAL	3.9K 1% 1/4W	R536	1-216-074-00	METAL CHIP	11K 5% 1/10W
JR599	1-216-296-00	METAL CHIP	0 5% 1/8W	R537	1-216-096-00	METAL GLAZE	91K 5% 1/10W
< COIL >				R538	1-216-098-00	METAL CHIP	110K 5% 1/10W
L501	1-424-033-21	FILTER, NOISE		R539	1-216-121-00	METAL CHIP	1M 5% 1/10W
L502	1-424-033-21	FILTER, NOISE		R540	1-216-096-00	METAL GLAZE	91K 5% 1/10W
L505	1-408-777-00	INDUCTOR CHIP	10uH	R541	1-216-097-00	METAL CHIP	100K 5% 1/10W
L506	1-408-777-00	INDUCTOR CHIP	10uH	R542	1-216-097-00	METAL CHIP	100K 5% 1/10W
< TRANSISTOR >				R543	1-216-048-00	METAL CHIP	910 5% 1/10W
Q501	8-729-900-53	TRANSISTOR	DTC114EK	R544	1-216-048-00	METAL CHIP	910 5% 1/10W
Q580	8-729-216-22	TRANSISTOR	2SA1162-G	R545	1-216-048-00	METAL CHIP	910 5% 1/10W
Q581	8-729-216-22	TRANSISTOR	2SA1162-G	R546	1-216-050-00	METAL GLAZE	1.1K 5% 1/10W
Q582	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R547	1-216-050-00	METAL GLAZE	1.1K 5% 1/10W
< RESISTOR >				R548	1-216-048-00	METAL CHIP	910 5% 1/10W
R501	1-216-049-00	METAL CHIP	1K 5% 1/10W	R549	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
R502	1-216-049-00	METAL CHIP	1K 5% 1/10W	R550	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
R503	1-216-073-00	METAL CHIP	10K 5% 1/10W	R551	1-216-096-00	METAL GLAZE	91K 5% 1/10W
R504	1-216-097-00	METAL CHIP	100K 5% 1/10W	R552	1-216-096-00	METAL GLAZE	91K 5% 1/10W
R505	1-216-097-00	METAL CHIP	100K 5% 1/10W	R553	1-216-074-00	METAL CHIP	11K 5% 1/10W
R506	1-216-097-00	METAL CHIP	100K 5% 1/10W	R554	1-216-074-00	METAL CHIP	11K 5% 1/10W
R507	1-216-097-00	METAL CHIP	100K 5% 1/10W	R555	1-216-098-00	METAL CHIP	110K 5% 1/10W
R508	1-216-097-00	METAL CHIP	100K 5% 1/10W	R556	1-216-098-00	METAL CHIP	110K 5% 1/10W
R509	1-216-097-00	METAL CHIP	100K 5% 1/10W	R557	1-216-096-00	METAL GLAZE	91K 5% 1/10W
R510	1-216-049-00	METAL CHIP	1K 5% 1/10W	R558	1-216-096-00	METAL GLAZE	91K 5% 1/10W
R511	1-216-097-00	METAL CHIP	100K 5% 1/10W	R559	1-216-025-00	METAL CHIP	100 5% 1/10W
R512	1-216-067-00	METAL CHIP	5.6K 5% 1/10W	R560	1-216-025-00	METAL CHIP	100 5% 1/10W
				R561	1-216-025-00	METAL CHIP	100 5% 1/10W
				R562	1-216-097-00	METAL CHIP	100K 5% 1/10W
				R563	1-216-097-00	METAL CHIP	100K 5% 1/10W
				R564	1-216-025-00	METAL CHIP	100 5% 1/10W
				R565	1-216-065-00	METAL CHIP	4.7K 5% 1/10W

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

KP-708**MA-709**

Ref. No.	Part No.	Description	Remarks		
R566	1-216-073-00	METAL CHIP	10K	5%	1/10W
R570	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R571	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R572	1-216-025-00	METAL CHIP	100	5%	1/10W
R573	1-216-025-00	METAL CHIP	100	5%	1/10W
R574	1-216-025-00	METAL CHIP	100	5%	1/10W
R575	1-216-025-00	METAL CHIP	100	5%	1/10W
R576	1-216-025-00	METAL CHIP	100	5%	1/10W
R577	1-216-025-00	METAL CHIP	100	5%	1/10W
R578	1-216-025-00	METAL CHIP	100	5%	1/10W
R579	1-216-025-00	METAL CHIP	100	5%	1/10W
R580	1-216-049-00	METAL CHIP	1K	5%	1/10W
R581	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R582	1-216-121-00	METAL CHIP	1M	5%	1/10W
R583	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R584	1-216-073-00	METAL CHIP	10K	5%	1/10W
R585	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R586	1-216-049-00	METAL CHIP	1K	5%	1/10W
R587	1-216-085-00	METAL CHIP	33K	5%	1/10W
R589	1-216-073-00	METAL CHIP	10K	5%	1/10W
R592	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R593	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
△R594	1-212-950-00	FUSIBLE	4.7	5%	1/2W F
R595	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R596	1-216-049-00	METAL CHIP	1K	5%	1/10W
R599	1-216-025-00	METAL CHIP	100	5%	1/10W
R647	1-216-121-00	METAL CHIP	1M	5%	1/10W
R648	1-216-121-00	METAL CHIP	1M	5%	1/10W
< VIBRATOR >					
X501	1-567-814-11	VIBRATOR, CRYSTAL 24.576MHz			

*	A-6423-205-A	MA-709 BOARD, COMPLETE			

(Ref.No.13,000 Serie)se					
< CAPACITOR >					
C302	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C303	1-124-584-00	ELECT	100uF	20%	10V
C304	1-124-465-00	ELECT	0.47uF	20%	50V
C305	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C306	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C307	1-124-261-00	ELECT	10uF	20%	50V
C308	1-126-160-11	ELECT	1uF	20%	50V
C309	1-126-160-11	ELECT	1uF	20%	50V
C310	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C311	1-124-261-00	ELECT	10uF	20%	50V

Ref. No.	Part No.	Description	Remarks		
C312	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C313	1-124-465-00	ELECT	0.47uF	20%	50V
C314	1-124-584-00	ELECT	100uF	20%	10V
C317	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C318	1-165-319-11	CERAMIC CHIP	0.1uF		50V
< CONNECTOR >					
CN301	1-506-487-11	PIN, CONNECTOR 8P			
< DIODE >					
D301	8-719-800-76	DIODE 1SS226			
D302	8-719-800-76	DIODE 1SS226			
D303	8-719-157-33	DIODE RD6.2M-B			
D304	8-719-157-33	DIODE RD6.2M-B			
< FILTER >					
FL301	1-424-031-11	FILTER, NOISE			
FL302	1-424-031-11	FILTER, NOISE			
< IC >					
IC301	8-759-636-55	IC M5218AFP (MIC AMP)			
< JACK >					
J301	1-507-678-00	JACK			
J302	1-750-990-11	JACK (LARGE TYPE) 2P			
< JUMPER RESISTOR >					
JR302	1-214-743-00	METAL	3.9K	1%	1/4W
JR303	1-214-743-00	METAL	3.9K	1%	1/4W
< RESISTOR >					
R301	1-216-025-00	METAL CHIP	100	5%	1/10W
R302	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R303	1-216-097-00	METAL CHIP	100K	5%	1/10W
R304	1-216-073-00	METAL CHIP	10K	5%	1/10W
R305	1-216-077-00	METAL CHIP	15K	5%	1/10W
R306	1-216-025-00	METAL CHIP	100	5%	1/10W
R307	1-216-025-00	METAL CHIP	100	5%	1/10W
R308	1-216-097-00	METAL CHIP	100K	5%	1/10W
R309	1-216-073-00	METAL CHIP	10K	5%	1/10W
R310	1-216-077-00	METAL CHIP	15K	5%	1/10W
R311	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R312	1-216-033-00	METAL CHIP	220	5%	1/10W
R313	1-216-033-00	METAL CHIP	220	5%	1/10W
R314	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R315	1-216-053-00	METAL CHIP	1.5K	5%	1/10W

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

MB-712

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
*	A-6423-211-A	MB-712 BOARD, COMPLETE ***** (Ref.No.1,000 Serie)		C047	1-163-019-00	CERAMIC CHIP	0.0068uF 10% 50V
				C048	1-137-370-11	FILM	0.01uF 5% 50V
				C049	1-124-903-11	ELECT	1uF 20% 50V
				C050	1-137-374-11	FILM	0.047uF 5% 50V
				C051	1-124-903-11	ELECT	1uF 20% 50V
△	1-533-223-11	HOLDER, FUSE < CAPACITOR >		C052	1-163-038-00	CERAMIC CHIP	0.1uF 25V
				C053	1-163-117-00	CERAMIC CHIP	100PF 5% 50V
C001	1-163-139-00	CERAMIC CHIP	820PF 5% 50V	C055	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C002	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C056	1-126-947-11	ELECT	47uF 20% 10V
C004	1-124-465-00	ELECT	0.47uF 20% 50V	C057	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C005	1-163-125-00	CERAMIC CHIP	220PF 5% 50V	C060	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C006	1-163-125-00	CERAMIC CHIP	220PF 5% 50V	C061	1-126-947-11	ELECT	47uF 20% 10V
C007	1-163-251-11	CERAMIC CHIP	100PF 5% 50V	C063	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C008	1-163-239-11	CERAMIC CHIP	33PF 5% 50V	C064	1-163-139-00	CERAMIC CHIP	820PF 5% 50V
C009	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C065	1-137-374-11	FILM	0.047uF 5% 50V
C010	1-137-370-11	FILM	0.01uF 5% 50V	C066	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C011	1-164-232-11	CERAMIC CHIP	0.01uF 50V	C067	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C012	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C068	1-126-916-11	ELECT	1000uF 20% 6.3V
C014	1-164-182-11	CERAMIC CHIP	0.0033uF 10% 50V	C069	1-163-253-11	CERAMIC CHIP	120PF 5% 50V
C015	1-130-489-00	MYLAR	0.033uF 5% 50V	C070	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C016	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C071	1-126-947-11	ELECT	47uF 20% 10V
C017	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C072	1-163-031-11	CERAMIC CHIP	0.01uF 50V
C018	1-126-916-11	ELECT	1000uF 20% 6.3V	C073	1-163-253-11	CERAMIC CHIP	120PF 5% 50V
C019	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C074	1-124-903-11	ELECT	1uF 20% 50V
C020	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C075	1-163-227-11	CERAMIC CHIP	10PF 0.5PF 50V
C022	1-163-019-00	CERAMIC CHIP	0.0068uF 10% 50V	C076	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C023	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C077	1-163-235-11	CERAMIC CHIP	22PF 5% 50V
C024	1-137-399-11	FILM	0.1uF 5% 50V	C078	1-163-237-11	CERAMIC CHIP	27PF 5% 50V
C025	1-163-227-11	CERAMIC CHIP	10PF 0.5PF 50V	C079	1-163-237-11	CERAMIC CHIP	27PF 5% 50V
C026	1-126-947-11	ELECT	47uF 20% 10V	C080	1-163-253-11	CERAMIC CHIP	120PF 5% 50V
C027	1-126-947-11	ELECT	47uF 20% 10V	C081	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C029	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C082	1-163-103-00	CERAMIC CHIP	27PF 5% 50V
C030	1-163-103-00	CERAMIC CHIP	27PF 5% 50V	C083	1-163-031-11	CERAMIC CHIP	0.01uF 50V
C031	1-163-107-00	CERAMIC CHIP	39PF 5% 50V	C084	1-124-292-00	ELECT	33uF 20% 6.3V
C032	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C085	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C034	1-137-374-11	FILM	0.047uF 5% 50V	C086	1-163-237-11	CERAMIC CHIP	27PF 5% 50V
C035	1-130-489-00	MYLAR	0.033uF 5% 50V	C087	1-163-031-11	CERAMIC CHIP	0.01uF 50V
C036	1-137-440-11	FILM	0.018uF 5% 50V	C088	1-163-257-11	CERAMIC CHIP	180PF 5% 50V
C037	1-130-489-00	MYLAR	0.033uF 5% 50V	C089	1-163-031-11	CERAMIC CHIP	0.01uF 50V
C038	1-124-903-11	ELECT	1uF 20% 50V	C091	1-126-947-11	ELECT	47uF 20% 10V
C039	1-163-117-00	CERAMIC CHIP	100PF 5% 50V	C092	1-163-227-11	CERAMIC CHIP	10PF 0.5PF 50V
C040	1-124-925-11	ELECT	2.2uF 20% 100V	C093	1-163-257-11	CERAMIC CHIP	180PF 5% 50V
C041	1-163-117-00	CERAMIC CHIP	100PF 5% 50V	C095	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C042	1-163-117-00	CERAMIC CHIP	100PF 5% 50V	C096	1-163-235-11	CERAMIC CHIP	22PF 5% 50V
C043	1-137-370-11	FILM	0.01uF 5% 50V	C097	1-163-099-00	CERAMIC CHIP	18PF 5% 50V
C045	1-163-038-00	CERAMIC CHIP	0.1uF 25V	C098	1-126-947-11	ELECT	47uF 20% 10V
C046	1-126-947-11	ELECT	47uF 20% 10V	C099	1-163-235-11	CERAMIC CHIP	22PF 5% 50V
				C100	1-124-903-11	ELECT	1uF 20% 50V
				C101	1-137-372-11	FILM	0.022uF 5% 50V
				C102	1-137-370-11	FILM	0.01uF 5% 50V

Note: The components identified by mark **△** or dotted line with mark **△** are critical for safety. Replace only with part number specified.

MB-712

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks				
C103	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C172	1-126-947-11	ELECT	47uF	20%	10V	
C104	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C173	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C105	1-131-347-00	TANTALUM	1uF	10%	35V	C174	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C106	1-124-903-11	ELECT	1uF	20%	50V	C203	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C108	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C206	1-124-927-11	ELECT	4.7uF	20%	100V	
C109	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C207	1-163-125-00	CERAMIC CHIP	220PF	5%	50V	
C110	1-126-916-11	ELECT	1000uF	20%	6.3V	C208	1-126-964-11	ELECT	10uF	20%	50V
C111	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C211	1-163-251-11	CERAMIC CHIP	100PF	5%	50V	
C112	1-163-235-11	CERAMIC CHIP	22PF	5%	50V	C212	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C113	1-124-925-11	ELECT	2.2uF	20%	100V	C213	1-126-947-11	ELECT	47uF	20%	10V
C114	1-135-181-21	TANTALUM CHIP	4.7uF	20%	6.3V	C214	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C115	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C215	1-137-368-11	FILM	0.0047uF	5%	50V	
C116	1-163-109-00	CERAMIC CHIP	47PF	5%	50V	C216	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C117	1-163-031-11	CERAMIC CHIP	0.01uF	50V	C217	1-124-927-11	ELECT	4.7uF	20%	100V	
C118	1-163-109-00	CERAMIC CHIP	47PF	5%	50V	C218	1-126-947-11	ELECT	47uF	20%	10V
C120	1-163-031-11	CERAMIC CHIP	0.01uF	50V	C219	1-124-927-11	ELECT	4.7uF	20%	100V	
C121	1-124-925-11	ELECT	2.2uF	20%	100V	C220	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C122	1-163-031-11	CERAMIC CHIP	0.01uF	50V	C221	1-126-947-11	ELECT	47uF	20%	10V	
C124	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C222	1-137-433-11	FILM	0.0012uF	5%	50V	
C125	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C223	1-126-947-11	ELECT	47uF	20%	10V	
C126	1-126-947-11	ELECT	47uF	20%	10V	C225	1-126-947-11	ELECT	47uF	20%	10V
C128	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C226	1-137-433-11	FILM	0.0012uF	5%	50V	
C129	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	C227	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C130	1-163-097-00	CERAMIC CHIP	15PF	5%	50V	C228	1-124-927-11	ELECT	4.7uF	20%	100V
C131	1-163-031-11	CERAMIC CHIP	0.01uF	50V	C229	1-163-251-11	CERAMIC CHIP	100PF	5%	50V	
C132	1-163-243-11	CERAMIC CHIP	47PF	5%	50V	C230	1-126-947-11	ELECT	47uF	20%	10V
C133	1-163-139-00	CERAMIC CHIP	820PF	5%	50V	C231	1-126-947-11	ELECT	47uF	20%	10V
C136	1-163-116-00	CERAMIC CHIP	91PF	5%	50V	C233	1-126-947-11	ELECT	47uF	20%	10V
C137	1-126-964-11	ELECT	10uF	20%	50V	C234	1-124-927-11	ELECT	4.7uF	20%	100V
C138	1-126-964-11	ELECT	10uF	20%	50V	C237	1-137-368-11	FILM	0.0047uF	5%	50V
C139	1-126-964-11	ELECT	10uF	20%	50V	C239	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C140	1-163-235-11	CERAMIC CHIP	22PF	5%	50V	C240	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C141	1-126-947-11	ELECT	47uF	20%	10V	C241	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C147	1-163-237-11	CERAMIC CHIP	27PF	5%	50V	C243	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C148	1-163-237-11	CERAMIC CHIP	27PF	5%	50V	C244	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C149	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C245	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C150	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C248	1-163-235-11	CERAMIC CHIP	22PF	5%	50V	
C151	1-163-077-91	CERAMIC CHIP	0.1uF	50V	C249	1-163-128-00	CERAMIC CHIP	300PF	5%	50V	
C152	1-126-947-11	ELECT	47uF	20%	10V	C251	1-124-287-00	ELECT	10uF	20%	10V
C153	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C252	1-163-243-11	CERAMIC CHIP	47PF	5%	50V	
C154	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C253	1-163-243-11	CERAMIC CHIP	47PF	5%	50V	
C158	1-124-925-11	ELECT	2.2uF	20%	100V	C254	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C160	1-126-947-11	ELECT	47uF	20%	10V	C255	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C162	1-126-947-11	ELECT	47uF	20%	10V	C257	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C163	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C258	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	
C164	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C259	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V	
C165	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C260	1-126-947-11	ELECT	47uF	20%	10V	
C166	1-163-097-00	CERAMIC CHIP	15PF	5%	50V	C261	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C167	1-163-249-11	CERAMIC CHIP	82PF	5%	50V	C262	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C169	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C263	1-163-038-00	CERAMIC CHIP	0.1uF		25V	

Ref. No.	Part No.	Description		Remarks	Ref. No.	Part No.	Description		Remarks
C264	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C421	1-124-499-11	ELECT, NONPOLAR	1uF	20% 50V
C265	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C422	1-164-004-11	CERAMIC CHIP	0.1uF	10% 25V
C266	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C423	1-124-287-00	ELECT	10uF	20% 10V
C271	1-124-287-00	ELECT	10uF	20% 10V	C424	1-163-809-11	CERAMIC CHIP	0.047uF	10% 25V
C272	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	C425	1-124-273-00	ELECT	3.3uF	20% 50V
C273	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C427	1-163-129-00	CERAMIC CHIP	330PF	5% 50V
C274	1-137-368-11	FILM	0.0047uF	5% 50V	C428	1-126-947-11	ELECT	47uF	20% 35V
C275	1-163-017-00	CERAMIC CHIP	0.0047uF	5% 50V	C429	1-163-249-11	CERAMIC CHIP	82PF	5% 50V
C276	1-126-947-11	ELECT	47uF	20% 10V	C430	1-126-947-11	ELECT	47uF	20% 35V
C277	1-137-399-11	FILM	0.1uF	5% 50V	C432	1-163-022-00	CERAMIC CHIP	0.012uF	10% 50V
C278	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	C433	1-163-097-00	CERAMIC CHIP	15PF	5% 50V
C279	1-137-442-11	FILM	0.039uF	5% 50V	C434	1-163-024-00	CERAMIC CHIP	0.018uF	10% 50V
C280	1-136-169-00	FILM	0.22uF	5% 50V	C435	1-163-101-00	CERAMIC CHIP	22PF	5% 50V
C281	1-126-933-11	ELECT	100uF	20% 10V	C436	1-163-017-00	CERAMIC CHIP	0.0047uF	5% 50V
C282	1-163-241-11	CERAMIC CHIP	39PF	5% 50V	C437	1-163-235-11	CERAMIC CHIP	22PF	5% 50V
C283	1-164-232-11	CERAMIC CHIP	0.01uF	50V	C438	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C284	1-136-169-00	FILM	0.22uF	5% 50V	C439	1-126-947-11	ELECT	47uF	20% 10V
C285	1-137-442-11	FILM	0.039uF	5% 50V	C440	1-126-947-11	ELECT	47uF	20% 10V
C286	1-124-902-00	ELECT	0.47uF	20% 50V	C441	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C287	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	C442	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C288	1-163-017-00	CERAMIC CHIP	0.0047uF	5% 50V	C443	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C289	1-137-368-11	FILM	0.0047uF	5% 50V	C444	1-126-160-11	ELECT	1uF	20% 50V
C290	1-126-947-11	ELECT	47uF	20% 10V	C445	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C291	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	C446	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C292	1-164-232-11	CERAMIC CHIP	0.01uF	50V	C447	1-163-019-00	CERAMIC CHIP	0.0068uF	10% 50V
C293	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C448	1-164-005-11	CERAMIC CHIP	0.47uF	25V
C294	1-163-119-00	CERAMIC CHIP	120PF	5% 50V	C449	1-164-005-11	CERAMIC CHIP	0.47uF	25V
C297	1-163-005-11	CERAMIC CHIP	470PF	10% 50V	C450	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C298	1-163-005-11	CERAMIC CHIP	470PF	10% 50V	C451	1-163-101-00	CERAMIC CHIP	22PF	5% 50V
C299	1-163-005-11	CERAMIC CHIP	470PF	10% 50V	C452	1-164-489-11	CERAMIC CHIP	0.22uF	10% 16V
C300	1-163-005-11	CERAMIC CHIP	470PF	10% 50V	C463	1-163-989-11	CERAMIC CHIP	0.033uF	10% 25V
C302	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C465	1-164-232-11	CERAMIC CHIP	0.01uF	50V
C305	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C466	1-164-004-11	CERAMIC CHIP	0.1uF	10% 25V
C399	1-214-743-00	METAL	3.9K 1%	1/4W	C467	1-164-232-11	CERAMIC CHIP	0.01uF	50V
C400	1-164-346-11	CERAMIC CHIP	1uF	16V	C468	1-164-699-11	CERAMIC CHIP	0.0033uF	5% 50V
C401	1-163-121-00	CERAMIC CHIP	150PF	5% 50V	C469	1-163-088-00	CERAMIC CHIP	5PF	50V
C402	1-164-005-11	CERAMIC CHIP	0.47uF	25V	C500	1-126-947-11	ELECT	47uF	20% 10V
C403	1-163-133-00	CERAMIC CHIP	470PF	5% 50V	C501	1-128-453-21	ELECT CHIP	47uF	20% 6.3V
C406	1-163-038-00	CERAMIC CHIP	0.1uF	25V	C502	1-163-251-11	CERAMIC CHIP	100PF	5% 50V
C407	1-124-277-11	ELECT	4.7uF	20% 35V	C503	1-126-603-11	ELECT CHIP	4.7uF	20% 35V
C408	1-163-022-00	CERAMIC CHIP	0.012uF	10% 50V	C504	1-163-245-11	CERAMIC CHIP	56PF	5% 50V
C409	1-163-024-00	CERAMIC CHIP	0.018uF	10% 50V	C505	1-164-182-11	CERAMIC CHIP	0.0033uF	10% 50V
C410	1-164-489-11	CERAMIC CHIP	0.22uF	10% 16V	C506	1-128-024-11	ELECT CHIP	4.7uF	0 10V
C411	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	C507	1-126-947-11	ELECT	47uF	20% 35V
C413	1-163-809-11	CERAMIC CHIP	0.047uF	10% 25V	C508	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C414	1-124-767-00	ELECT	2.2uF	20% 50V	C510	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C415	1-163-014-00	CERAMIC CHIP	0.0027uF	5% 50V	C511	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C417	1-164-232-11	CERAMIC CHIP	0.01uF	50V	C512	1-163-257-11	CERAMIC CHIP	180PF	5% 50V
C419	1-163-016-00	CERAMIC CHIP	0.0039uF	10% 50V	C513	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C420	1-163-245-11	CERAMIC CHIP	56PF	5% 50V	C514	1-163-257-11	CERAMIC CHIP	180PF	5% 50V

MB-712

Ref. No.	Part No.	Description	Remarks
C515	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C516	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V
C517	1-163-038-00	CERAMIC CHIP 0.1uF	25V
C518	1-163-038-00	CERAMIC CHIP 0.1uF	25V
C519	1-163-038-00	CERAMIC CHIP 0.1uF	25V
C520	1-163-038-00	CERAMIC CHIP 0.1uF	25V
C522	1-163-235-11	CERAMIC CHIP 22PF	5% 50V
C523	1-163-038-00	CERAMIC CHIP 0.1uF	25V
C526	1-137-364-11	FILM 0.001uF	5% 50V
C529	1-137-366-11	FILM 0.0022uF	5% 50V
C530	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C531	1-124-925-11	ELECT 2.2uF	20% 100V
C533	1-163-141-00	CERAMIC CHIP 0.001uF	5% 50V
C590	1-163-038-00	CERAMIC CHIP 0.1uF	25V
C801	1-163-129-00	CERAMIC CHIP 330PF	5% 50V
C802	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C950	1-126-964-11	ELECT 10uF	20% 50V
< FILTER >			
CF001	1-527-831-00	FILTER, CERAMIC	
< CONNECTOR >			
CN201	1-506-475-11	PIN, CONNECTOR 10P	
CN202	1-506-470-11	PIN, CONNECTOR 5P	
CN205	1-506-468-11	PIN, CONNECTOR 3P	
CN206	1-506-469-11	PIN, CONNECTOR 4P	
CN401	1-750-687-11	HOUSING, CONNECTOR (PC BOARD)	
* CN402	1-764-594-21	CONNECTOR, FPC 18P	
* CN403	1-764-595-21	CONNECTOR, FPC 14P	
CN500	1-506-468-11	PIN, CONNECTOR 3P	
CN501	1-506-468-11	PIN, CONNECTOR 3P	
CN502	1-506-469-11	PIN, CONNECTOR 4P	
CN503	1-506-472-11	PIN, CONNECTOR 7P	
CN504	1-506-473-11	PIN, CONNECTOR 8P	
* CN505	1-568-783-11	PIN, CONNECTOR 6P	
CN701	1-506-473-11	PIN, CONNECTOR 8P	
CN702	1-506-469-11	PIN, CONNECTOR 4P	
< TRIMMER >			
CT001	1-141-442-91	TRIMMER, CERAMIC 20PF	
CT501	1-141-424-11	CAP, ADJ 30PF	
< DIODE >			
D001	8-719-105-52	DIODE RD3.6M-B2	
D002	8-719-801-78	DIODE 1SS184	
D003	8-719-988-62	DIODE 1SS355	
D202	8-719-105-82	DIODE RD5.1M-B2	
D203	8-719-032-05	DIODE KV1460TL00	
D205	8-719-801-78	DIODE 1SS184	
D208	8-719-801-78	DIODE 1SS184	

Ref. No.	Part No.	Description	Remarks
D251	8-719-800-76	DIODE 1SS226	
D253	8-719-800-76	DIODE 1SS226	
D401	8-719-800-76	DIODE 1SS226	
D402	8-719-800-76	DIODE 1SS226	
D403	8-719-800-76	DIODE 1SS226	
D405	8-719-988-62	DIODE 1SS355	
D502	8-719-402-34	DIODE MA3120-TX	
D503	8-719-988-62	DIODE 1SS355	
D506	8-719-104-34	DIODE 1S2836	
D507	8-719-988-62	DIODE 1SS355	
D508	8-719-988-62	DIODE 1SS355	
< FILTER >			
FL003	1-235-901-11	FILTER, LOW PASS	
FL004	1-236-478-11	FILTER, LOW PASS	
FL005	1-239-823-11	FILTER, CHROMA TRAP	
FL006	1-235-943-11	BPF	
FL007	1-239-824-11	LPF (3MHz)	
FL008	1-408-409-00	INDUCTOR 10uH	
FL205	1-760-185-11	FILTER, CERAMIC	
FL206	1-760-186-11	FILTER, CERAMIC	
FL401	1-235-922-11	FILTER, LOW PASS (1.7MHz)	
< IC >			
IC001	8-759-058-52	IC XRA10324AF-E2 (AMP)	
IC002	8-759-058-52	IC XRA10324AF-E2 (AMP)	
IC003	8-759-100-97	IC uPC339G2 (HYSTERESIS COMPARATOR)	
IC004	8-752-353-92	IC CXL5005M-T4 (CCD 1H DELAY)	
IC005	8-759-233-64	IC TC74HCU04AF (INVERTER)	
IC006	8-759-257-87	IC MM1117XFBE (SWITCH)	
IC007	8-752-055-37	IC CXA1255Q (VIDEO SIGNAL PROCESSOR)	
IC008	8-759-296-96	IC CXD1152-MS-E2 (C MOS INV)	
IC009	8-752-055-36	IC CXA1254Q (DEMODULATOR)	
IC011	8-759-291-70	IC MB90084PF-G-156-EF (CHARACTER GENERATOR)	
IC201	8-759-093-98	IC CXD8451M-ET (D/A CONVERTER)	
IC202	8-759-008-67	IC MC14066BF (LINE OUT SELECT)	
IC203	8-752-351-78	IC CXD2500BQ (DIGITAL SIGNAL PROCESSOR)	
IC204	8-759-253-26	IC CA0002AM-TP (AFM DEMOD CX NR)	
IC205	8-759-700-43	IC NJM4558M (CD SPINDLE ERROR AMP)	
IC206	8-759-700-43	IC NJM4558M (L.P.F AMP)	
IC207	8-759-700-43	IC NJM4558M (L.P.F AMP)	
IC208	8-759-700-43	IC NJM4558M (AMP)	
IC209	8-759-700-43	IC NJM4558M (AMP)	
IC210	8-759-700-43	IC NJM4558M (AMP)	
IC401	8-752-056-79	IC CXA1632Q-T6 (SERVO)	
△IC402	8-759-048-30	IC LA6510L (SLED DRIVE AMP)	
IC403	8-759-300-71	IC HD14053BFP (SWITCH)	
IC404	8-759-300-71	IC HD14053BFP (SWITCH)	
IC405	8-759-060-00	IC LM324DR-E1 (TILT ERROR AMP ADD)	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remarks
IC406	8-759-700-43	IC NJM4558M	(DRIVE AMP)
IC409	8-759-700-43	IC NJM4558M	(PHASE AMP)
IC410	8-759-242-64	IC TC4W53F	(RF AMP)
IC411	8-759-700-43	IC NJM4558M	(PHASE AMP)
IC420	8-759-242-64	IC TC4W53F	(TRACKING ERROR AMP)
IC500	8-759-100-97	IC uPC339G2	(COMPARATOR)
IC501	8-759-291-73	IC MB89094PF-G-127-BND	(SYSTEM CONTROL)
IC502	8-759-098-78	IC MB606F06	(SYSTEM CONTROL)
IC503	8-759-231-92	IC TA7291P	(MOTOR DRIVE)
IC504	8-759-058-52	IC XRA10324AF-E2	(AMP)
IC505	8-759-009-06	IC MC14052BF	(SIGNAL SELECT)
IC506	8-759-300-71	IC HD14053BFP	(SWITCH)
IC507	8-759-206-28	IC MC74HC123AF	(MONO MULTI)
< JACK >			
J201	1-764-592-11	JACK 3P (LINE OUT)	
J202	1-764-592-11	JACK 3P (LINE OUT)	
< JUMPER RESISTOR >			
JR001	1-216-296-00	METAL CHIP	0 5% 1/8W
JR002	1-214-743-00	METAL	3.9K 1% 1/4W
JR003	1-216-296-00	METAL CHIP	0 5% 1/8W
JR004	1-216-296-00	METAL CHIP	0 5% 1/8W
JR005	1-214-743-00	METAL	3.9K 1% 1/4W
JR006	1-214-743-00	METAL	3.9K 1% 1/4W
JR007	1-214-743-00	METAL	3.9K 1% 1/4W
JR008	1-214-743-00	METAL	3.9K 1% 1/4W
JR009	1-214-743-00	METAL	3.9K 1% 1/4W
JR010	1-214-743-00	METAL	3.9K 1% 1/4W
JR011	1-216-296-00	METAL CHIP	0 5% 1/8W
JR204	1-216-097-00	METAL CHIP	100K 5% 1/10W
JR207	1-216-296-00	METAL CHIP	0 5% 1/8W
JR210	1-214-743-00	METAL	3.9K 1% 1/4W
JR235	1-214-743-00	METAL	3.9K 1% 1/4W
JR282	1-214-743-00	METAL	3.9K 1% 1/4W
JR401	1-216-296-00	METAL CHIP	0 5% 1/8W
JR402	1-216-296-00	METAL CHIP	0 5% 1/8W
JR403	1-214-743-00	METAL	3.9K 1% 1/4W
JR501	1-216-296-00	METAL CHIP	0 5% 1/8W
JR502	1-214-743-00	METAL	3.9K 1% 1/4W
JR511	1-214-743-00	METAL	3.9K 1% 1/4W
< COIL >			
L003	1-408-419-00	INDUCTOR 68uH	
L008	1-410-657-21	INDUCTOR CHIP 180uH	
L010	1-408-421-00	INDUCTOR 100uH	
L011	1-408-422-00	INDUCTOR 120uH	
L015	1-410-385-11	INDUCTOR CHIP 22uH	

Ref. No.	Part No.	Description	Remarks
L016	1-408-609-41	INDUCTOR 33uH	
L017	1-408-773-31	INDUCTOR CHIP 4.7uH	
L201	1-408-421-00	INDUCTOR 100uH	
L202	1-408-418-00	INDUCTOR 56uH	
L210	1-408-417-00	INDUCTOR 47uH	
L401	1-408-409-00	INDUCTOR 10uH	
L402	1-408-409-00	INDUCTOR 10uH	
L501	1-410-381-11	INDUCTOR CHIP 10uH	
< PIN >			
L LP002	4-352-844-01	PIN, LEAD, COATING	
< TRANSISTOR >			
Q001	8-729-230-49	TRANSISTOR	2SC2712-YG
Q002	8-729-140-75	TRANSISTOR	2SD999-CLCK
Q003	8-729-230-49	TRANSISTOR	2SC2712-YG
Q004	8-729-230-49	TRANSISTOR	2SC2712-YG
Q005	8-729-230-49	TRANSISTOR	2SC2712-YG
Q006	8-729-230-49	TRANSISTOR	2SC2712-YG
Q007	8-729-230-49	TRANSISTOR	2SC2712-YG
Q008	8-729-216-22	TRANSISTOR	2SA1162-G
Q009	8-729-216-22	TRANSISTOR	2SA1162-G
Q010	8-729-230-49	TRANSISTOR	2SC2712-YG
Q011	8-729-230-49	TRANSISTOR	2SC2712-YG
Q012	8-729-230-49	TRANSISTOR	2SC2712-YG
Q013	8-729-216-22	TRANSISTOR	2SA1162-G
Q014	8-729-230-49	TRANSISTOR	2SC2712-YG
Q015	8-729-230-49	TRANSISTOR	2SC2712-YG
Q016	8-729-230-49	TRANSISTOR	2SC2712-YG
Q017	8-729-216-22	TRANSISTOR	2SA1162-G
Q018	8-729-230-49	TRANSISTOR	2SC2712-YG
Q019	8-729-230-49	TRANSISTOR	2SC2712-YG
Q021	8-729-230-49	TRANSISTOR	2SC2712-YG
Q024	8-729-216-22	TRANSISTOR	2SA1162-G
Q026	8-729-230-49	TRANSISTOR	2SC2712-YG
Q031	8-729-230-49	TRANSISTOR	2SC2712-YG
Q201	8-729-901-04	TRANSISTOR	DTA114EK
Q202	8-729-900-53	TRANSISTOR	DTC114EK
Q203	8-729-231-55	TRANSISTOR	2SC2878-AB
Q204	8-729-202-38	TRANSISTOR	2SC3326N
Q205	8-729-901-04	TRANSISTOR	DTA114EK
Q207	8-729-231-55	TRANSISTOR	2SC2878-AB
Q209	8-729-202-38	TRANSISTOR	2SC3326N
Q210	8-729-901-04	TRANSISTOR	DTA114EK
Q211	8-729-900-53	TRANSISTOR	DTC114EK
Q212	8-729-900-53	TRANSISTOR	DTC114EK
Q213	8-729-230-49	TRANSISTOR	2SC2712-YG
Q214	8-729-901-04	TRANSISTOR	DTA114EK

MB-712

Ref. No.	Part No.	Description	Remarks		
R071	1-216-113-00	METAL CHIP	470K	5%	1/10W
R072	1-216-083-00	METAL CHIP	27K	5%	1/10W
R073	1-216-097-00	METAL CHIP	100K	5%	1/10W
R074	1-216-097-00	METAL CHIP	100K	5%	1/10W
R075	1-216-113-00	METAL CHIP	470K	5%	1/10W
R076	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R077	1-216-095-00	METAL CHIP	82K	5%	1/10W
R078	1-216-097-00	METAL CHIP	100K	5%	1/10W
R079	1-216-097-00	METAL CHIP	100K	5%	1/10W
R080	1-216-113-00	METAL CHIP	470K	5%	1/10W
R081	1-216-049-00	METAL CHIP	1K	5%	1/10W
R082	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R083	1-216-079-00	METAL CHIP	18K	5%	1/10W
R084	1-216-109-00	METAL CHIP	330K	5%	1/10W
R085	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R086	1-216-089-00	METAL CHIP	47K	5%	1/10W
R087	1-216-109-00	METAL CHIP	330K	5%	1/10W
R088	1-216-121-00	METAL CHIP	1M	5%	1/10W
R089	1-216-121-00	METAL CHIP	1M	5%	1/10W
R090	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R091	1-216-077-00	METAL CHIP	15K	5%	1/10W
R092	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R093	1-216-075-00	METAL CHIP	12K	5%	1/10W
R094	1-216-043-00	METAL CHIP	560	5%	1/10W
R095	1-216-079-00	METAL CHIP	18K	5%	1/10W
R096	1-216-043-00	METAL CHIP	560	5%	1/10W
R097	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R098	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R099	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R100	1-216-073-00	METAL CHIP	10K	5%	1/10W
R101	1-216-009-00	METAL CHIP	22	5%	1/10W
R102	1-216-073-00	METAL CHIP	10K	5%	1/10W
R103	1-216-073-00	METAL CHIP	10K	5%	1/10W
R104	1-216-121-00	METAL CHIP	1M	5%	1/10W
R105	1-216-073-00	METAL CHIP	10K	5%	1/10W
R106	1-216-097-00	METAL CHIP	100K	5%	1/10W
R107	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R108	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R109	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R110	1-216-097-00	METAL CHIP	100K	5%	1/10W
R111	1-216-073-00	METAL CHIP	10K	5%	1/10W
R112	1-216-085-00	METAL CHIP	33K	5%	1/10W
R113	1-216-097-00	METAL CHIP	100K	5%	1/10W
R114	1-216-097-00	METAL CHIP	100K	5%	1/10W
R115	1-216-085-00	METAL CHIP	33K	5%	1/10W
R116	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R117	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R118	1-216-085-00	METAL CHIP	33K	5%	1/10W
R119	1-216-079-00	METAL CHIP	18K	5%	1/10W
R120	1-216-047-00	METAL CHIP	820	5%	1/10W

Ref. No.	Part No.	Description	Remarks		
R121	1-216-085-00	METAL CHIP	33K	5%	1/10W
R122	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R123	1-216-037-00	METAL CHIP	330	5%	1/10W
R124	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R125	1-214-743-00	METAL	3.9K	1%	1/4W
R126	1-216-081-00	METAL CHIP	22K	5%	1/10W
R127	1-216-033-00	METAL CHIP	220	5%	1/10W
R128	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R129	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R130	1-208-782-11	METAL GLAZE	1K	0.50%	1/10W
R131	1-208-781-11	METAL GLAZE	910	0.50%	1/10W
R132	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R133	1-216-081-00	METAL CHIP	22K	5%	1/10W
R134	1-216-081-00	METAL CHIP	22K	5%	1/10W
R137	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R138	1-216-039-00	METAL CHIP	390	5%	1/10W
R139	1-216-091-00	METAL CHIP	56K	5%	1/10W
R140	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R141	1-216-041-00	METAL CHIP	470	5%	1/10W
R142	1-216-043-00	METAL CHIP	560	5%	1/10W
R143	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R144	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R145	1-216-049-00	METAL CHIP	1K	5%	1/10W
R146	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R147	1-216-045-00	METAL CHIP	680	5%	1/10W
R148	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R149	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R150	1-216-095-00	METAL CHIP	82K	5%	1/10W
R151	1-216-045-00	METAL CHIP	680	5%	1/10W
R152	1-216-033-00	METAL CHIP	220	5%	1/10W
R153	1-216-081-00	METAL CHIP	22K	5%	1/10W
R154	1-216-081-00	METAL CHIP	22K	5%	1/10W
R155	1-216-049-00	METAL CHIP	1K	5%	1/10W
R156	1-214-743-00	METAL	3.9K	1%	1/4W
R157	1-214-743-00	METAL	3.9K	1%	1/4W
R158	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R159	1-216-117-00	METAL CHIP	680K	5%	1/10W
R160	1-216-041-00	METAL CHIP	470	5%	1/10W
R161	1-214-743-00	METAL	3.9K	1%	1/4W
R162	1-216-033-00	METAL CHIP	220	5%	1/10W
R163	1-216-097-00	METAL CHIP	100K	5%	1/10W
R164	1-216-049-00	METAL CHIP	1K	5%	1/10W
R165	1-214-743-00	METAL	3.9K	1%	1/4W
R166	1-216-049-00	METAL CHIP	1K	5%	1/10W
R167	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R169	1-216-049-00	METAL CHIP	1K	5%	1/10W
R170	1-216-115-00	METAL CHIP	560K	5%	1/10W
R174	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R175	1-216-021-00	METAL CHIP	68	5%	1/10W
R179	1-216-031-00	METAL CHIP	180	5%	1/10W

MB-712

Ref. No.	Part No.	Description	Quantity	Weight	Remarks
R182	1-216-021-00	METAL CHIP	68	5%	1/10W
R189	1-216-041-00	METAL CHIP	470	5%	1/10W
R190	1-216-041-00	METAL CHIP	470	5%	1/10W
R191	1-216-041-00	METAL CHIP	470	5%	1/10W
R192	1-216-041-00	METAL CHIP	470	5%	1/10W
R193	1-216-081-00	METAL CHIP	22K	5%	1/10W
R194	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R197	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R199	1-216-095-00	METAL CHIP	82K	5%	1/10W
R200	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R201	1-216-073-00	METAL CHIP	10K	5%	1/10W
R202	1-216-049-00	METAL CHIP	1K	5%	1/10W
R203	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R204	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R205	1-216-651-11	METAL CHIP	1K	0.5%	1/10W
R206	1-216-676-11	METAL CHIP	11K	0.5%	1/10W
R207	1-208-803-11	METAL GLAZE	7.5K	2%	1/10W
R208	1-216-635-11	METAL CHIP	220	0.5%	1/10W
R209	1-216-649-11	METAL CHIP	820	0.5%	1/10W
R210	1-216-049-00	METAL CHIP	1K	5%	1/10W
R211	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R212	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R213	1-216-657-11	METAL CHIP	1.8K	0.5%	1/10W
R214	1-216-676-11	METAL CHIP	11K	0.5%	1/10W
R215	1-208-803-11	METAL GLAZE	7.5K	2%	1/10W
R216	1-216-073-00	METAL CHIP	10K	5%	1/10W
R217	1-216-685-11	METAL CHIP	27K	0.5%	1/10W
R218	1-216-685-11	METAL CHIP	27K	0.5%	1/10W
R219	1-214-743-00	METAL	3.9K	1%	1/4W
R220	1-216-073-00	METAL CHIP	10K	5%	1/10W
R221	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R224	1-216-649-11	METAL CHIP	820	0.5%	1/10W
R226	1-216-657-11	METAL CHIP	1.8K	0.5%	1/10W
R228	1-216-073-00	METAL CHIP	10K	5%	1/10W
R229	1-216-105-00	METAL CHIP	220K	5%	1/10W
R231	1-216-651-11	METAL CHIP	1K	0.5%	1/10W
R232	1-214-743-00	METAL	3.9K	1%	1/4W
R233	1-214-743-00	METAL	3.9K	1%	1/4W
R234	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R236	1-216-084-00	METAL CHIP	30K	5%	1/10W
R237	1-216-085-00	METAL CHIP	33K	5%	1/10W
R238	1-216-651-11	METAL CHIP	1K	0.5%	1/10W
R239	1-216-635-11	METAL CHIP	220	0.5%	1/10W
R240	1-216-649-11	METAL CHIP	820	0.5%	1/10W
R241	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R242	1-216-685-11	METAL CHIP	27K	0.5%	1/10W
R243	1-216-081-00	METAL CHIP	22K	5%	1/10W
R244	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R245	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R246	1-214-743-00	METAL	3.9K	1%	1/4W

Ref. No.	Part No.	Description	Quantity	Weight	Remarks
R247	1-216-073-00	METAL CHIP	10K	5%	1/10W
R248	1-216-651-11	METAL CHIP	1K	0.5%	1/10W
R250	1-214-743-00	METAL	3.9K	1%	1/4W
R251	1-216-657-11	METAL CHIP	1.8K	0.5%	1/10W
R252	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R253	1-216-084-00	METAL CHIP	30K	5%	1/10W
R254	1-214-743-00	METAL	3.9K	1%	1/4W
R255	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R256	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R257	1-216-085-00	METAL CHIP	33K	5%	1/10W
R258	1-216-073-00	METAL CHIP	10K	5%	1/10W
R259	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R262	1-216-649-11	METAL CHIP	820	0.5%	1/10W
R263	1-216-657-11	METAL CHIP	1.8K	0.5%	1/10W
R264	1-216-081-00	METAL CHIP	22K	5%	1/10W
R265	1-216-105-00	METAL CHIP	220K	5%	1/10W
R266	1-216-676-11	METAL CHIP	11K	0.5%	1/10W
R267	1-208-803-11	METAL GLAZE	7.5K	2%	1/10W
R268	1-216-685-11	METAL CHIP	27K	0.5%	1/10W
R269	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R271	1-218-760-11	METAL GLAZE	220K	2%	1/10W
R272	1-216-073-00	METAL CHIP	10K	5%	1/10W
R273	1-214-743-00	METAL	3.9K	1%	1/4W
R274	1-216-074-00	METAL CHIP	11K	5%	1/10W
R275	1-216-097-00	METAL CHIP	100K	5%	1/10W
R276	1-216-676-11	METAL CHIP	11K	0.5%	1/10W
R277	1-208-803-11	METAL GLAZE	7.5K	2%	1/10W
R278	1-216-121-00	METAL CHIP	1M	5%	1/10W
R279	1-216-095-00	METAL CHIP	82K	5%	1/10W
R281	1-216-097-00	METAL CHIP	100K	5%	1/10W
R283	1-216-121-00	METAL CHIP	1M	5%	1/10W
R284	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R286	1-208-838-11	METAL GLAZE	220K	0.50%	1/10W
R287	1-208-798-11	METAL GLAZE	4.7K	0.50%	1/10W
R289	1-208-829-11	METAL GLAZE	91K	0.50%	1/10W
R290	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R291	1-208-824-11	METAL GLAZE	56K	0.50%	1/10W
R292	1-216-097-00	METAL CHIP	100K	5%	1/10W
R293	1-216-097-00	METAL CHIP	100K	5%	1/10W
R294	1-214-743-00	METAL	3.9K	1%	1/4W
R295	1-216-073-00	METAL CHIP	10K	5%	1/10W
R298	1-216-073-00	METAL CHIP	10K	5%	1/10W
R299	1-216-097-00	METAL CHIP	100K	5%	1/10W
R300	1-208-824-11	METAL GLAZE	56K	0.50%	1/10W
R301	1-214-743-00	METAL	3.9K	1%	1/4W
R303	1-216-097-00	METAL CHIP	100K	5%	1/10W
R304	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R305	1-208-824-11	METAL GLAZE	56K	0.50%	1/10W
R306	1-208-824-11	METAL GLAZE	56K	0.50%	1/10W
R307	1-208-837-11	METAL GLAZE	200K	0.50%	1/10W

Ref. No.	Part No.	Description	Remarks		
R308	1-216-073-00	METAL CHIP	10K	5%	1/10W
R309	1-216-073-00	METAL CHIP	10K	5%	1/10W
R311	1-216-097-00	METAL CHIP	100K	5%	1/10W
R315	1-216-095-00	METAL CHIP	82K	5%	1/10W
R317	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R318	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R319	1-216-101-00	METAL CHIP	150K	5%	1/10W
R320	1-216-101-00	METAL CHIP	150K	5%	1/10W
R321	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R322	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R323	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R324	1-216-077-00	METAL CHIP	15K	5%	1/10W
R325	1-216-104-00	METAL CHIP	200K	5%	1/10W
R326	1-216-017-00	METAL CHIP	47	5%	1/10W
R327	1-216-049-00	METAL CHIP	1K	5%	1/10W
R328	1-216-049-00	METAL CHIP	1K	5%	1/10W
R329	1-216-049-00	METAL CHIP	1K	5%	1/10W
R330	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R331	1-216-041-00	METAL CHIP	470	5%	1/10W
R332	1-216-023-00	METAL CHIP	82	5%	1/10W
R333	1-216-077-00	METAL CHIP	15K	5%	1/10W
R334	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R335	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R336	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R340	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R341	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R399	1-214-743-00	METAL	3.9K	1%	1/4W
R400	1-216-097-00	METAL CHIP	100K	5%	1/10W
R401	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R402	1-216-045-00	METAL CHIP	680	5%	1/10W
R403	1-216-045-00	METAL CHIP	680	5%	1/10W
R404	1-216-093-00	METAL CHIP	68K	5%	1/10W
R405	1-216-107-00	METAL CHIP	270K	5%	1/10W
R406	1-216-099-00	METAL CHIP	120K	5%	1/10W
R407	1-216-075-00	METAL CHIP	12K	5%	1/10W
R408	1-216-083-00	METAL CHIP	27K	5%	1/10W
R409	1-216-049-00	METAL CHIP	1K	5%	1/10W
R410	1-216-101-00	METAL CHIP	150K	5%	1/10W
R411	1-216-077-00	METAL CHIP	15K	5%	1/10W
R412	1-216-101-00	METAL CHIP	150K	5%	1/10W
R413	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R414	1-216-075-00	METAL CHIP	12K	5%	1/10W
R415	1-216-085-00	METAL CHIP	33K	5%	1/10W
R416	1-216-103-91	METAL GLAZE	180K	5%	1/10W
R417	1-216-097-00	METAL CHIP	100K	5%	1/10W
R418	1-216-091-00	METAL CHIP	56K	5%	1/10W
R419	1-216-089-00	METAL CHIP	47K	5%	1/10W
R420	1-216-085-00	METAL CHIP	33K	5%	1/10W
R421	1-216-097-00	METAL CHIP	100K	5%	1/10W
R422	1-216-109-00	METAL CHIP	330K	5%	1/10W

Ref. No.	Part No.	Description	Remarks		
R423	1-216-101-00	METAL CHIP	150K	5%	1/10W
R424	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R425	1-216-085-00	METAL CHIP	33K	5%	1/10W
R426	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R427	1-216-099-00	METAL CHIP	120K	5%	1/10W
R428	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R429	1-216-093-00	METAL CHIP	68K	5%	1/10W
R431	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R432	1-216-082-00	METAL GLAZE	24K	5%	1/10W
R433	1-216-100-00	METAL GLAZE	130K	5%	1/10W
R434	1-216-097-00	METAL CHIP	100K	5%	1/10W
R435	1-216-073-00	METAL CHIP	10K	5%	1/10W
R436	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R437	1-216-077-00	METAL CHIP	15K	5%	1/10W
R438	1-216-085-00	METAL CHIP	33K	5%	1/10W
R439	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R440	1-216-049-00	METAL CHIP	1K	5%	1/10W
R441	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R442	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R443	1-216-085-00	METAL CHIP	33K	5%	1/10W
R444	1-216-033-00	METAL CHIP	220	5%	1/10W
R445	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R446	1-216-081-00	METAL CHIP	22K	5%	1/10W
R447	1-216-081-00	METAL CHIP	22K	5%	1/10W
R448	1-216-092-00	METAL GLAZE	62K	5%	1/10W
R449	1-216-113-00	METAL CHIP	470K	5%	1/10W
R450	1-216-073-00	METAL CHIP	10K	5%	1/10W
R451	1-216-089-00	METAL CHIP	47K	5%	1/10W
R452	1-216-073-00	METAL CHIP	10K	5%	1/10W
R453	1-216-085-00	METAL CHIP	33K	5%	1/10W
R454	1-216-089-00	METAL CHIP	47K	5%	1/10W
R455	1-216-097-00	METAL CHIP	100K	5%	1/10W
R456	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R457	1-216-073-00	METAL CHIP	10K	5%	1/10W
R458	1-216-073-00	METAL CHIP	10K	5%	1/10W
R459	1-216-049-00	METAL CHIP	1K	5%	1/10W
R460	1-216-075-00	METAL CHIP	12K	5%	1/10W
R461	1-216-089-00	METAL CHIP	47K	5%	1/10W
R462	1-216-085-00	METAL CHIP	33K	5%	1/10W
R463	1-216-077-00	METAL CHIP	15K	5%	1/10W
R464	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R465	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R466	1-216-081-00	METAL CHIP	22K	5%	1/10W
R467	1-216-089-00	METAL CHIP	47K	5%	1/10W
R468	1-216-081-00	METAL CHIP	22K	5%	1/10W
R469	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R470	1-216-075-00	METAL CHIP	12K	5%	1/10W
R471	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R472	1-216-017-00	METAL CHIP	47	5%	1/10W
R473	1-216-051-00	METAL CHIP	1.2K	5%	1/10W

MB-712

Ref. No.	Part No.	Description	Remarks		
R474	1-216-003-11	METAL GLAZE	12	5%	1/10W
R475	1-216-081-00	METAL CHIP	22K	5%	1/10W
R476	1-216-146-00	METAL GLAZE	6.8	5%	1/8W
R477	1-216-079-00	METAL CHIP	18K	5%	1/10W
R478	1-216-109-00	METAL CHIP	330K	5%	1/10W
R479	1-216-093-00	METAL CHIP	68K	5%	1/10W
R480	1-216-095-00	METAL CHIP	82K	5%	1/10W
R481	1-216-369-00	METAL OXIDE	1	5%	2W F
R482	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R483	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R484	1-216-033-00	METAL CHIP	220	5%	1/10W
R485	1-216-041-00	METAL CHIP	470	5%	1/10W
R486	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R487	1-216-039-00	METAL CHIP	390	5%	1/10W
R488	1-216-047-00	METAL CHIP	820	5%	1/10W
R489	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R490	1-216-037-00	METAL CHIP	330	5%	1/10W
R491	1-216-146-00	METAL GLAZE	6.8	5%	1/8W
R492	1-216-073-00	METAL CHIP	10K	5%	1/10W
R493	1-216-095-00	METAL CHIP	82K	5%	1/10W
R494	1-216-079-00	METAL CHIP	18K	5%	1/10W
R495	1-216-079-00	METAL CHIP	18K	5%	1/10W
R496	1-216-099-00	METAL CHIP	120K	5%	1/10W
R497	1-216-099-00	METAL CHIP	120K	5%	1/10W
R498	1-216-077-00	METAL CHIP	15K	5%	1/10W
R499	1-216-099-00	METAL CHIP	120K	5%	1/10W
R500	1-216-073-00	METAL CHIP	10K	5%	1/10W
R501	1-216-089-00	METAL CHIP	47K	5%	1/10W
R502	1-216-111-00	METAL CHIP	390K	5%	1/10W
R503	1-216-113-00	METAL CHIP	470K	5%	1/10W
R504	1-208-808-11	METAL GLAZE	12K	0.50%	1/10W
R505	1-216-035-00	METAL CHIP	270	5%	1/10W
R506	1-208-810-11	METAL GLAZE	15K	0.50%	1/10W
R507	1-208-844-11	METAL GLAZE	390K	0.50%	1/10W
R508	1-216-049-00	METAL CHIP	1K	5%	1/10W
R509	1-208-816-11	METAL GLAZE	27K	0.50%	1/10W
R510	1-208-838-11	METAL GLAZE	220K	0.50%	1/10W
R511	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W
R512	1-208-818-11	METAL GLAZE	33K	0.50%	1/10W
R513	1-208-830-11	METAL GLAZE	100K	0.50%	1/10W
R514	1-216-077-00	METAL CHIP	15K	5%	1/10W
R515	1-208-818-11	METAL GLAZE	33K	0.50%	1/10W
R516	1-216-085-00	METAL CHIP	33K	5%	1/10W
R517	1-216-105-00	METAL CHIP	220K	5%	1/10W
R518	1-216-081-00	METAL CHIP	22K	5%	1/10W
R520	1-216-073-00	METAL CHIP	10K	5%	1/10W
R521	1-216-045-00	METAL CHIP	680	5%	1/10W
R522	1-216-105-00	METAL CHIP	220K	5%	1/10W
R523	1-216-033-00	METAL CHIP	220	5%	1/10W
R524	1-216-089-00	METAL CHIP	47K	5%	1/10W

Ref. No.	Part No.	Description	Remarks		
R525	1-216-073-00	METAL CHIP	10K	5%	1/10W
R526	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R527	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R528	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R529	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R530	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R531	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R532	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R533	1-212-950-00	FUSIBLE	4.7	5%	1/2W F
R534	1-216-105-00	METAL CHIP	220K	5%	1/10W
R535	1-216-093-00	METAL CHIP	68K	5%	1/10W
R536	1-216-095-00	METAL CHIP	82K	5%	1/10W
R537	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R538	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R539	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R540	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R541	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R542	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R545	1-216-049-00	METAL CHIP	1K	5%	1/10W
R546	1-216-049-00	METAL CHIP	1K	5%	1/10W
R547	1-216-049-00	METAL CHIP	1K	5%	1/10W
R548	1-216-073-00	METAL CHIP	10K	5%	1/10W
R549	1-216-105-00	METAL CHIP	220K	5%	1/10W
R550	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R552	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R553	1-216-029-00	METAL CHIP	150	5%	1/10W
R554	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R556	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R557	1-216-081-00	METAL CHIP	22K	5%	1/10W
R558	1-216-021-00	METAL CHIP	68	5%	1/10W
R559	1-216-097-00	METAL CHIP	100K	5%	1/10W
R560	1-216-049-00	METAL CHIP	1K	5%	1/10W
R561	1-216-049-00	METAL CHIP	1K	5%	1/10W
R562	1-216-049-00	METAL CHIP	1K	5%	1/10W
R563	1-216-049-00	METAL CHIP	1K	5%	1/10W
R564	1-216-049-00	METAL CHIP	1K	5%	1/10W
R565	1-216-121-00	METAL CHIP	1M	5%	1/10W
R566	1-216-049-00	METAL CHIP	1K	5%	1/10W
R568	1-216-049-00	METAL CHIP	1K	5%	1/10W
R569	1-216-049-00	METAL CHIP	1K	5%	1/10W
R570	1-216-049-00	METAL CHIP	1K	5%	1/10W
R571	1-216-049-00	METAL CHIP	1K	5%	1/10W
R572	1-216-049-00	METAL CHIP	1K	5%	1/10W
R573	1-216-049-00	METAL CHIP	1K	5%	1/10W
R574	1-216-049-00	METAL CHIP	1K	5%	1/10W
R575	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R576	1-216-049-00	METAL CHIP	1K	5%	1/10W
R577	1-216-049-00	METAL CHIP	1K	5%	1/10W
R578	1-216-049-00	METAL CHIP	1K	5%	1/10W
R579	1-216-057-00	METAL CHIP	2.2K	5%	1/10W

Ref. No.	Part No.	Description	Remarks			Ref. No.	Part No.	Description	Remarks		
R580	1-216-049-00	METAL CHIP	1K	5%	1/10W	R637	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R581	1-216-049-00	METAL CHIP	1K	5%	1/10W	R638	1-216-081-00	METAL CHIP	22K	5%	1/10W
R582	1-216-049-00	METAL CHIP	1K	5%	1/10W	R639	1-216-081-00	METAL CHIP	22K	5%	1/10W
R583	1-216-049-00	METAL CHIP	1K	5%	1/10W	R641	1-214-743-00	METAL	3.9K	1%	1/4W
R584	1-216-089-00	METAL CHIP	47K	5%	1/10W	R642	1-216-089-00	METAL CHIP	47K	5%	1/10W
R585	1-216-049-00	METAL CHIP	1K	5%	1/10W	R643	1-216-049-00	METAL CHIP	1K	5%	1/10W
R586	1-216-049-00	METAL CHIP	1K	5%	1/10W	R644	1-214-743-00	METAL	3.9K	1%	1/4W
R587	1-216-049-00	METAL CHIP	1K	5%	1/10W	R645	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R588	1-216-049-00	METAL CHIP	1K	5%	1/10W	R646	1-216-073-00	METAL CHIP	10K	5%	1/10W
R589	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R647	1-216-073-00	METAL CHIP	10K	5%	1/10W
R590	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R648	1-216-073-00	METAL CHIP	10K	5%	1/10W
R591	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R649	1-216-025-00	METAL CHIP	100	5%	1/10W
R592	1-216-049-00	METAL CHIP	1K	5%	1/10W	R650	1-216-101-00	METAL CHIP	150K	5%	1/10W
R593	1-208-795-11	METAL GLAZE	3.6K	0.50%	1/10W	R651	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R594	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	R699	1-216-043-00	METAL CHIP	560	5%	1/10W
R595	1-216-049-00	METAL CHIP	1K	5%	1/10W	R801	1-216-105-00	METAL CHIP	220K	5%	1/10W
R596	1-216-049-00	METAL CHIP	1K	5%	1/10W	R802	1-216-105-00	METAL CHIP	220K	5%	1/10W
R597	1-216-049-00	METAL CHIP	1K	5%	1/10W	R803	1-214-743-00	METAL	3.9K	1%	1/4W
R598	1-214-743-00	METAL	3.9K	1%	1/4W	R804	1-216-097-00	METAL CHIP	100K	5%	1/10W
R599	1-216-049-00	METAL CHIP	1K	5%	1/10W	R805	1-216-117-00	METAL CHIP	680K	5%	1/10W
R600	1-216-049-00	METAL CHIP	1K	5%	1/10W	R806	1-216-085-00	METAL CHIP	33K	5%	1/10W
R601	1-214-743-00	METAL	3.9K	1%	1/4W	R807	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R604	1-216-049-00	METAL CHIP	1K	5%	1/10W	R808	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R605	1-214-743-00	METAL	3.9K	1%	1/4W	R809	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R606	1-216-037-00	METAL CHIP	330	5%	1/10W	R810	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R608	1-216-049-00	METAL CHIP	1K	5%	1/10W	R812	1-214-743-00	METAL	3.9K	1%	1/4W
R609	1-216-049-00	METAL CHIP	1K	5%	1/10W	R813	1-214-743-00	METAL	3.9K	1%	1/4W
R610	1-216-049-00	METAL CHIP	1K	5%	1/10W	R814	1-214-743-00	METAL	3.9K	1%	1/4W
R611	1-216-049-00	METAL CHIP	1K	5%	1/10W	R815	1-216-109-00	METAL CHIP	330K	5%	1/10W
R612	1-214-743-00	METAL	3.9K	1%	1/4W	R816	1-216-043-00	METAL CHIP	560	5%	1/10W
R613	1-216-049-00	METAL CHIP	1K	5%	1/10W	R850	1-216-077-00	METAL CHIP	15K	5%	1/10W
R614	1-216-049-00	METAL CHIP	1K	5%	1/10W	R900	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R615	1-216-049-00	METAL CHIP	1K	5%	1/10W	R901	1-208-807-11	METAL GLAZE	11K	0.50%	1/10W
R616	1-216-049-00	METAL CHIP	1K	5%	1/10W	R902	1-208-808-11	METAL GLAZE	12K	0.50%	1/10W
R617	1-216-049-00	METAL CHIP	1K	5%	1/10W	R903	1-216-021-00	METAL CHIP	68	5%	1/10W
R618	1-216-049-00	METAL CHIP	1K	5%	1/10W	R904	1-216-021-00	METAL CHIP	68	5%	1/10W
R619	1-216-073-00	METAL CHIP	10K	5%	1/10W	R905	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R620	1-216-049-00	METAL CHIP	1K	5%	1/10W	R906	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R621	1-216-049-00	METAL CHIP	1K	5%	1/10W	R907	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R622	1-216-049-00	METAL CHIP	1K	5%	1/10W	R912	1-216-095-00	METAL CHIP	82K	5%	1/10W
R623	1-216-049-00	METAL CHIP	1K	5%	1/10W	R913	1-216-083-00	METAL CHIP	27K	5%	1/10W
R625	1-216-049-00	METAL CHIP	1K	5%	1/10W	R914	1-216-049-00	METAL CHIP	1K	5%	1/10W
R626	1-216-073-00	METAL CHIP	10K	5%	1/10W	R915	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R628	1-216-041-00	METAL CHIP	470	5%	1/10W	R916	1-216-077-00	METAL CHIP	15K	5%	1/10W
R630	1-216-049-00	METAL CHIP	1K	5%	1/10W	R917	1-216-047-00	METAL CHIP	820	5%	1/10W
R632	1-216-049-00	METAL CHIP	1K	5%	1/10W	R918	1-216-045-00	METAL CHIP	680	5%	1/10W
R633	1-216-097-00	METAL CHIP	100K	5%	1/10W	R923	1-216-022-00	METAL CHIP	75	5%	1/10W
R634	1-216-073-00	METAL CHIP	10K	5%	1/10W	R924	1-216-043-00	METAL CHIP	560	5%	1/10W
R635	1-216-049-00	METAL CHIP	1K	5%	1/10W	R950	1-216-049-00	METAL CHIP	1K	5%	1/10W
R636	1-216-049-00	METAL CHIP	1K	5%	1/10W	R951	1-216-097-00	METAL CHIP	100K	5%	1/10W

Note: The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

MB-712**MD-703****MT-702**

Ref. No.	Part No.	Description	Remarks
----------	----------	-------------	---------

< VARIABLE RESISTOR >

RV001	1-223-239-11	RES, ADJ, CARBON 10K	
RV002	1-223-239-11	RES, ADJ, CARBON 10K	
RV401	1-238-602-11	RES, ADJ, CARBON 47K	
RV402	1-238-602-11	RES, ADJ, CARBON 47K	
RV501	1-223-240-11	RES, ADJ, CARBON 22K	

< SWITCH >

S201	1-553-725-21	SWITCH, SLIDE (ATT)	
------	--------------	---------------------	--

< VIBRATOR >

X201	1-567-908-11	VIBRATOR, CRYSTAL (16.934MHz)	
X501	1-567-900-11	OSCILLATOR, CRYSTAL (14.31818MHz)	

A-6421-956-A MD-703 BOARD, COMPLETE

(Ref.No.2,000 Seriese)

3-953-262-01 HOLDER, LED

< CAPACITOR >

C431	1-126-947-11	ELECT	47uF	20%	35V
------	--------------	-------	------	-----	-----

< CONNECTOR >

* CN431	1-764-595-21	CONNECTOR, FPC 14P	
CN432	1-506-470-11	PIN, CONNECTOR 5P	
CN433	1-564-014-11	PIN, CONNECTOR 4P	
CN434	1-506-468-11	PIN, CONNECTOR 3P	

< DIODE >

D431	8-719-912-39	LED SLR932A	
D432	8-729-020-74	DIODE GP1S24	
D433	8-729-020-74	DIODE GP1S24	
D434	8-729-020-74	DIODE GP1S24	

< IC >

IC431	8-759-256-60	IC HD74HC00FPER	(DETECTOR CONTROL)
IC431	8-759-256-59	IC SN74HC00ANS-E20	(DETECTOR CONTROL)

< JUMPER RESISTOR >

JR413	1-216-296-00	METAL CHIP	0	5%	1/8W
JR414	1-214-743-00	METAL	3.9K	1%	1/4W
JR431	1-216-296-00	METAL CHIP	0	5%	1/8W
JR432	1-216-296-00	METAL CHIP	0	5%	1/8W
JR433	1-216-296-00	METAL CHIP	0	5%	1/8W
JR435	1-216-296-00	METAL CHIP	0	5%	1/8W
JR437	1-216-296-00	METAL CHIP	0	5%	1/8W
JR438	1-216-296-00	METAL CHIP	0	5%	1/8W

JR439	1-216-296-00	METAL CHIP	0	5%	1/8W
JR440	1-216-296-00	METAL CHIP	0	5%	1/8W
JR441	1-216-296-00	METAL CHIP	0	5%	1/8W
JR442	1-216-296-00	METAL CHIP	0	5%	1/8W
JR443	1-216-296-00	METAL CHIP	0	5%	1/8W
JR444	1-216-296-00	METAL CHIP	0	5%	1/8W
JR445	1-216-296-00	METAL CHIP	0	5%	1/8W

JR446	1-216-296-00	METAL CHIP	0	5%	1/8W
JR447	1-216-296-00	METAL CHIP	0	5%	1/8W
JR448	1-216-296-00	METAL CHIP	0	5%	1/8W
JR449	1-216-296-00	METAL CHIP	0	5%	1/8W
JR450	1-216-296-00	METAL CHIP	0	5%	1/8W

JR451	1-216-296-00	METAL CHIP	0	5%	1/8W
JR452	1-216-296-00	METAL CHIP	0	5%	1/8W
JR453	1-216-296-00	METAL CHIP	0	5%	1/8W
JR454	1-216-296-00	METAL CHIP	0	5%	1/8W
JR455	1-216-296-00	METAL CHIP	0	5%	1/8W

JR456	1-216-296-00	METAL CHIP	0	5%	1/8W
JR457	1-216-296-00	METAL CHIP	0	5%	1/8W
JR458	1-216-296-00	METAL CHIP	0	5%	1/8W
JR460	1-216-296-00	METAL CHIP	0	5%	1/8W
JR461	1-216-296-00	METAL CHIP	0	5%	1/8W

< RESISTOR >

R431	1-216-033-00	METAL CHIP	220	5%	1/10W
R432	1-216-049-00	METAL CHIP	1K	5%	1/10W
R433	1-216-049-00	METAL CHIP	1K	5%	1/10W
R434	1-216-045-00	METAL CHIP	680	5%	1/10W
R435	1-216-099-00	METAL CHIP	120K	5%	1/10W

R436	1-216-039-00	METAL CHIP	390	5%	1/10W
R437	1-216-099-00	METAL CHIP	120K	5%	1/10W
R438	1-216-095-00	METAL CHIP	82K	5%	1/10W
R439	1-216-095-00	METAL CHIP	82K	5%	1/10W

< SWITCH >

S431 1-692-440-11 SWITCH, PUSH (TILT)

A-6421-953-A MT-702 BOARD, COMPLETE

(Ref.No.4,000 Seriese)

< CAPACITOR >

C471	1-161-063-00	CERAMIC	0.1uF	10%	50V
------	--------------	---------	-------	-----	-----

< CONNECTOR >

* CN471 1-695-105-11 PIN, CONNECTOR (PC BOARD) 3P BOARD

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
*	A-6423-212-A	PS-716 BOARD, COMPLETE ***** (Ref.No.6,000 Serie)				< CONNECTOR >	
	7-685-646-81	SCREW +BVTP 3X8 TYPE2		* CN030	1-564-029-00	PIN, CONNECTOR 4P	
		< CAPACITOR >		CN031	1-506-483-21	PIN, CONNECTOR 4P	
C031	1-126-948-11	ELECT 100uF	20%	CN051	1-506-487-11	PIN, CONNECTOR 8P	
C032	1-164-222-11	CERAMIC CHIP 0.22uF		CN052	1-564-506-11	PLUG, CONNECTOR 3P	
C034	1-164-222-11	CERAMIC CHIP 0.22uF		CN053	1-506-483-21	PIN, CONNECTOR 4P	
C035	1-126-941-11	ELECT 470uF	20%	CN054	1-506-468-11	PIN, CONNECTOR 3P	
C036	1-126-944-11	ELECT 3300uF	20%	CN055	1-506-485-11	PIN, CONNECTOR 6P	
						< DIODE >	
C037	1-126-946-11	ELECT 6800uF	20%	△D031	8-719-200-82	DIODE 11ES2	
C038	1-126-944-11	ELECT 3300uF	20%	△D032	8-719-200-82	DIODE 11ES2	
C039	1-163-031-11	CERAMIC CHIP 0.01uF		D033	8-719-911-19	DIODE 1SS119	
C040	1-124-997-11	ELECT 470uF	20%	△D034	8-719-025-17	DIODE D3SBA10-4100	
C041	1-163-031-11	CERAMIC CHIP 0.01uF		D035	8-719-911-19	DIODE 1SS119	
C042	1-163-031-11	CERAMIC CHIP 0.01uF		△D036	8-719-980-78	DIODE ERA81-006	
C043	1-124-997-11	ELECT 470uF	20%	△D037	8-719-980-78	DIODE ERA81-006	
C044	1-163-031-11	CERAMIC CHIP 0.01uF		△D038	8-719-980-78	DIODE ERA81-006	
C045	1-124-563-11	ELECT 2200uF	20%	△D039	8-719-980-78	DIODE ERA81-006	
C046	1-124-557-11	ELECT 1000uF	20%	D051	8-719-980-78	DIODE ERA81-006	
C047	1-124-557-11	ELECT 1000uF	20%	D052	8-719-980-78	DIODE ERA81-006	
C051	1-163-009-11	CERAMIC CHIP 0.001uF	10%	D053	8-719-200-82	DIODE 11ES2	
C052	1-163-019-00	CERAMIC CHIP 0.0068uF	10%	D054	8-719-200-82	DIODE 11ES2	
C054	1-163-009-11	CERAMIC CHIP 0.001uF	10%	D055	8-719-911-19	DIODE 1SS119	
C055	1-163-009-11	CERAMIC CHIP 0.001uF	10%	D056	8-719-911-19	DIODE 1SS119	
C056	1-163-007-11	CERAMIC CHIP 680PF	10%	D057	8-719-911-19	DIODE 1SS119	
C058	1-163-035-00	CERAMIC CHIP 0.047uF		D058	8-719-109-85	DIODE RD5.1ES-B2	
C059	1-163-017-00	CERAMIC CHIP 0.0047uF	5%	D059	8-719-109-75	DIODE RD4.3ES-B2	
C060	1-163-007-11	CERAMIC CHIP 680PF	10%	D060	8-719-911-19	DIODE 1SS119	
C061	1-163-017-00	CERAMIC CHIP 0.0047uF	5%	△D061	8-719-503-40	DIODE S3V40	
C062	1-163-009-11	CERAMIC CHIP 0.001uF	10%	D701	8-719-980-78	DIODE ERA81-006	
C063	1-124-122-11	ELECT 100uF	20%	D702	8-719-980-78	DIODE ERA81-006	
C064	1-163-035-00	CERAMIC CHIP 0.047uF				< IC >	
C701	1-126-916-11	ELECT 1000uF	20%	IC031	8-759-231-53	IC M5F7805 (+5V REG)	
C702	1-126-916-11	ELECT 1000uF	20%	IC032	8-759-199-82	IC uPC24M08HF (+8 REG)	
C703	1-163-038-00	CERAMIC CHIP 0.1uF		IC033	8-759-012-70	IC MC7908CT (-8V REG)	
C704	1-163-037-11	CERAMIC CHIP 0.022uF	10%	IC051	8-759-509-91	IC XRA10393F (PWM CONVERSION)	
C706	1-163-011-11	CERAMIC CHIP 0.0015uF	10%	IC052	8-759-700-43	IC NJM4558M (PWM AMP/CURRENT FEED BACK)	
C707	1-126-964-11	ELECT 10uF	20%	IC701	8-759-946-09	IC FA7611M (REG)	
C708	1-163-809-11	CERAMIC CHIP 0.047uF	10%			< COIL >	
C709	1-163-139-00	CERAMIC CHIP 820PF	5%	L051	1-424-219-11	COIL, CHOKE 300uH	
C710	1-124-927-11	ELECT 4.7uF	20%	L701	1-424-219-11	COIL, CHOKE 300uH	
C711	1-126-916-11	ELECT 1000uF	20%	L702	1-412-525-21	INDUCTOR 10uH	
C712	1-126-916-11	ELECT 1000uF	20%	L703	1-412-537-31	INDUCTOR 100uH	
C713	1-164-005-11	CERAMIC CHIP 0.47uF		L704	1-424-219-11	COIL, CHOKE 300uH	
C714	1-126-966-11	ELECT 33uF	20%	L705	1-412-525-21	INDUCTOR 10uH	
C718	1-126-948-11	ELECT 100uF	20%				

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

PS-716

PW-708

Ref. No.	Part No.	Description	Remarks
< IC LINK >			
△PS051	1-532-675-00	LINK, IC 1.5A	
△PS052	1-532-675-00	LINK, IC 1.5A	
△PS053	1-532-843-21	LINK, IC	
△PS054	1-532-843-21	LINK, IC	
< TRANSISTOR >			
△Q031	8-729-141-75	TRANSISTOR 2SD596DV345	
△Q051	8-729-117-11	TRANSISTOR 2SB1151	
△Q052	8-729-019-31	TRANSISTOR 2SC4596E	
△Q053	8-729-117-11	TRANSISTOR 2SB1151	
△Q054	8-729-019-31	TRANSISTOR 2SC4596E	
Q055	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q056	8-729-216-22	TRANSISTOR 2SA1162-G	
Q058	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q059	8-729-216-22	TRANSISTOR 2SA1162-G	
Q060	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q061	8-729-119-76	TRANSISTOR 2SA1175-HFE	
△Q701	8-729-925-37	TRANSISTOR 2SB891	
△Q702	8-729-925-37	TRANSISTOR 2SB891	
< RESISTOR >			
△R031	1-212-867-00	FUSIBLE 27 5%	1/4W F
R032	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
△R033	1-216-426-11	METAL OXIDE 82 5%	1W F
R034	1-216-049-00	METAL CHIP 1K 5%	1/10W
R035	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
R051	1-216-081-00	METAL CHIP 22K 5%	1/10W
R052	1-216-075-00	METAL CHIP 12K 5%	1/10W
R053	1-216-093-00	METAL CHIP 68K 5%	1/10W
R054	1-216-081-00	METAL CHIP 22K 5%	1/10W
R055	1-216-091-00	METAL CHIP 56K 5%	1/10W
R056	1-216-097-00	METAL CHIP 100K 5%	1/10W
R057	1-216-073-00	METAL CHIP 10K 5%	1/10W
R061	1-216-089-00	METAL CHIP 47K 5%	1/10W
R062	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
R063	1-216-049-00	METAL CHIP 1K 5%	1/10W
R064	1-247-750-11	CARBON 680 5%	1/2W F
R065	1-247-750-11	CARBON 680 5%	1/2W F
R066	1-216-049-00	METAL CHIP 1K 5%	1/10W
△R067	1-216-369-00	METAL OXIDE 1 5%	2W F
R068	1-219-387-21	METAL CHIP 43K 0.10%	1/16W
R069	1-219-391-21	METAL CHIP 47K 0.10%	1/16W
R070	1-219-387-21	METAL CHIP 43K 0.10%	1/16W
R071	1-219-391-21	METAL CHIP 47K 0.10%	1/16W
R072	1-216-073-00	METAL CHIP 10K 5%	1/10W
R073	1-216-073-00	METAL CHIP 10K 5%	1/10W

Ref. No.	Part No.	Description	Remarks
△R074	1-215-866-11	METAL OXIDE 330 5%	1W F
R075	1-216-073-00	METAL CHIP 10K 5%	1/10W
R076	1-247-750-11	CARBON 680 5%	1/2W F
R077	1-216-073-00	METAL CHIP 10K 5%	1/10W
R078	1-216-093-00	METAL CHIP 68K 5%	1/10W
R079	1-216-097-00	METAL CHIP 100K 5%	1/10W
R080	1-216-097-00	METAL CHIP 100K 5%	1/10W
R701	1-208-790-11	METAL GLAZE 2.2K 0.50%	1/10W
R702	1-208-814-11	METAL GLAZE 22K 0.50%	1/10W
R703	1-216-035-00	METAL CHIP 270 5%	1/10W
R704	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
R705	1-216-043-00	METAL CHIP 560 5%	1/10W
R706	1-216-043-00	METAL CHIP 560 5%	1/10W
R707	1-208-822-11	METAL GLAZE 47K 0.50%	1/10W
R708	1-216-109-00	METAL CHIP 330K 5%	1/10W
R709	1-216-119-00	METAL CHIP 820K 5%	1/10W
R710	1-216-043-00	METAL CHIP 560 5%	1/10W
R711	1-208-830-11	METAL GLAZE 100K 0.50%	1/10W
R712	1-208-814-11	METAL GLAZE 22K 0.50%	1/10W
R713	1-208-794-11	METAL GLAZE 3.3K 0.50%	1/10W
R714	1-208-805-11	METAL GLAZE 9.1K 0.50%	1/10W
R715	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
R716	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
R717	1-216-029-00	METAL CHIP 150 5%	1/10W
< RELAY >			
△RY031	1-515-833-11	RELAY	

*	A-6423-013-A	PW-708 BOARD, COMPLETE	

(Ref.No.12,000 Seriese)			
< CAPACITOR >			
C001	1-126-157-11	ELECT 10uF	20% 16V
< CONNECTOR >			
CN001	1-506-474-11	PIN, CONNECTOR 9P	
< DIODE >			
D001	8-719-042-48	DIODE SLR-33DC3F	
D002	8-719-042-50	DIODE SLR-33MC3F	
D003	8-719-042-48	DIODE SLR-33DC3F	
D004	8-719-981-49	DIODE GL3ED8	
D005	8-719-981-49	DIODE GL3ED8	
D006	8-719-801-78	DIODE 1SS184	
< IC >			
IC001	8-741-810-59	IC SBX1610-59 (REMOTE CONT)	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

PW-708**SW-719****TR-718****VR-703****VS-707**

Ref. No.	Part No.	Description	Remarks
		< TRANSISTOR >	
Q001	8-729-901-46	TRANSISTOR DTA114YK	
Q002	8-729-901-46	TRANSISTOR DTA114YK	
Q003	8-729-901-46	TRANSISTOR DTA114YK	
Q005	8-729-901-05	TRANSISTOR DTA124EK	
		< RESISTOR >	
R001	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R002	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R003	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R004	1-216-037-00	METAL CHIP 330 5% 1/10W	
R005	1-216-037-00	METAL CHIP 330 5% 1/10W	
R006	1-216-037-00	METAL CHIP 330 5% 1/10W	
R008	1-216-037-00	METAL CHIP 330 5% 1/10W	
R010	1-216-037-00	METAL CHIP 330 5% 1/10W	
R011	1-216-025-00	METAL CHIP 100 5% 1/10W	
R012	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R013	1-216-049-00	METAL CHIP 1K 5% 1/10W	
		< VARIABLE RESISTOR >	
RV001	1-223-504-21	RES, VAR, CARBON 20K (ECHO)	
		< SWITCH >	
S001	1-571-977-11	SWITCH, TACTIL (UP)	
S002	1-571-977-11	SWITCH, TACTIL (NATURAL)	
S003	1-571-977-11	SWITCH, TACTIL (DOWN)	
S004	1-571-977-11	SWITCH, TACTIL (POWER)	

	A-6421-954-A	SW-719 BOARD, COMPLETE	

		(Ref.No.4,000 Serie)	
		< CONNECTOR >	
* CN481	1-566-779-11	PIN, CONNECTOR (PC BOARD) 4P BOARD	
		< SWITCH >	
S481	1-692-439-11	SWITCH, PUSH (LOAD/CHUCK)	

Ref. No.	Part No.	Description	Remarks
*	A-6423-213-A	TR-718 BOARD, COMPLETE	

		(Ref.No.5,000 Serie)	
△	1-533-223-11	HOLDER, FUSE	
		< CAPACITOR >	
△C001	1-104-705-11	FILM 0.1uF 20% 250V	
		< CONNECTOR >	
△CN001	1-564-419-11	HEADER, SPRING (POWER) 2P	
		< TRANSFORMER >	
△T002	1-406-884-11	FILTER, LINE	

*	A-6423-204-A	VR-703 BOARD, COMPLETE	

		(Ref.No.11,000 Serie)	
		< CONNECTOR >	
CN701	1-564-013-21	PIN, CONNECTOR 3P	
CN702	1-564-013-31	PIN, CONNECTOR 3P	
		< RESISTOR >	
R701	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R702	1-216-162-00	METAL GLAZE 33 5% 1/8W	
R703	1-216-162-00	METAL GLAZE 33 5% 1/8W	
R704	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
		< VARIABLE RESISTOR >	
RV701	1-241-139-11	RES, VAR, CARBON 500/500 (PHONES LEVEL)	

*	A-6423-214-A	VS-707 BOARD, COMPLETE	

		(Ref.No.9,000 Serie)	
△	1-533-223-11	HOLDER, FUSE	
		< SWITCH >	
△S021	1-570-615-11	SELECTOR, POWER VOLTAGE	

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Ref. No. Part No. Description Remarks

MISCELLANEOUS

22 1-467-896-21 REMOTE COMMANDER (RMT-M29A)
 ▲208 8-848-286-11 DEVICE, OPTICAL KHS-150A
 211 1-751-083-11 CABLE, FLEXIBLE FLAT (18 CORE)
 221 1-765-530-11 CABLE, FLEXIBLE FLAT (14 CORE)
 C1 1-161-772-11 CERAMIC 0.1uF 10% 25V
 ▲CP1 1-575-912-21 CORD, POWER
 ▲F1 1-532-215-00 FUSE, TIME-LAG (0.8A/250V)
 ▲F21 1-532-066-00 FUSE, TIME-LAG (0.4A/250V)
 ▲F31 1-532-299-00 FUSE, TIME-LAG (5A/250V)
 ▲F32 1-532-299-00 FUSE, TIME-LAG (5A/250V)
 M461 1-541-930-11 MOTOR, DC
 M471 X-3942-963-1 MOTOR ASSY (LOADING)
 M901 1-698-109-11 MOTOR, DD (SPINDLE)
 ▲T1 1-423-556-11 TRANSFORMER, POWER

ACCESSORIES & PACKING MATERIALS

1-569-008-11 ADAPTER, CONVERSION 2P
 1-575-334-11 CORD, CONNECTION
 3-759-104-11 MANUAL, INSTRUCTION
 (ENGLISH/CHINESE/SPANISH)
 * 3-955-619-31 INDIVIDUAL CARTON
 * 3-960-421-01 CUSHION (UPPER)
 * 3-960-422-01 CUSHION (LOWER)

Ref. No. Part No. Description Remarks

HARDWARE LIST

#1 7-685-133-19 SCREW +P 2.6X6 TYPE2
 #2 7-671-155-01 STEEL BALL 3.0
 #3 7-624-105-04 STOP RING 2.3, TYPE -E
 #4 7-624-106-04 STOP RING 3.0, TYPE -E
 #5 7-621-773-86 SCREW +PTT 2.6X4 (S)
 #6 7-682-645-01 SCREW +PS 3X4
 #7 7-685-647-79 SCREW +BVTP 3X10 TYPE2
 #8 7-627-553-48 SCREW, PRECISION +P 2X4
 #9 7-628-253-05 SCREW +PS 2X4
 #10 7-621-759-35 +PSW, 2.6X5
 #12 7-624-190-81 STOP RING 2, TYPE-CS
 #13 7-682-946-09 SCREW +PSW 3X5
 #14 7-621-759-65 +PSW, 2.6X8
 #15 7-685-661-14 SCREW +BVTP 4X12 TYPE2 IT-3
 #16 7-624-102-04 STOP RING 1.5, TYPE -E
 #17 7-685-131-19 SCREW +BTP 2.6X4 TYPE2 N-S
 #18 7-685-103-19 SCREW +P 2X5 TYPE2 SLIT
 #19 7-685-158-19 SCREW +P 4X6 TYPE2 NON-SLIT
 #20 7-623-210-22 SW 4, TYPE 2
 #21 7-685-648-79 SCREW +BVTP 3X12 TYPE2
 #22 7-685-646-81 SCREW +BVTP 3X8 TYPE2
 #23 7-684-220-02 NUT 3, HEXAGON CAP
 #24 7-685-534-19 SCREW +BTP 2.6X8 TYPE2 N-S
 #25 7-685-645-79 SCREW +BVTP 3X6 TYPE2 N-S
 #26 7-624-209-00 O RING, P-5
 #27 7-685-102-19 SCREW +P 2X4 NON-SLIT TYPE 2
 #28 7-624-104-04 STOP RING 2.0, TYPE -E
 #29 7-621-775-20 +B 2.6X5

Note: The components identified by mark ▲ or dotted line with mark ▲ are critical for safety. Replace only with part number specified.

SECTION 6
IC PIN FUNCTION

6-1. SYSTEM CONTROL MICROPROCESSOR PIN FUNCTION
(MB-712 BOARD IC501 MB89094PF-G-127)

Pin No.	Signal	I/O	Function
1	CL1	O	32 kHz clock (Connected at open).
2	CL0	I	32 kHz clock.
3	MOD0	I	(Connected to GND).
4	MOD1	I	(Connected to GND).
5	X0	I	2 fsc clock (7.159 MHz).
6	X1	O	2 fsc clock (Connected at open).
7	VSS	I	GND.
8	MRS _T	I	Mechanical controller reset signal (L: Reset).
9	FR _{EQ}	I	Philips code (frame number) read enable.
10	FQ _{ACK}	O	Philips code/Sub Q (sub code) data output control signal (H: Data output).
11	FQ _{SEL}	O	Philips code/Sub Q data switch (L: Sub Q).
12	JPC _{TR} L	O	One track jump (JT)/Multi track jump (MTJ) switch signal (H: JT).
13	SP _{LOCK}	I	Spindle servo lock signal (H: The spindle servo is being locked).
14	TB _{CHOLD}	O	Chroma TBC control signal.
15	SC _{OR}	I	H when the sub code sync. is detected.
16	PB _V	I	Playback V sync signal input.
17	REF _V	I	Reference V sync signal input.
18	AL _T	O	Internal register A latch signal of the extension output port IC (IC502 on the MB-712 board).
19	BL _T	O	Internal register B latch signal of the extension output port IC (IC502 on the MB-712 board).
20	BU _S Y	I	Communication enable signal sent from the mode controller (L: Communication enabled).
21	N. C.		
22	N. C.		
23	N. C.		
24	N. C.		
25	CL _S CS	O	Chip select of the CLS DT (pin 29) signal.
26	SP _{DL} PLS	O	Spindle pulse drive signal (H: The spindle runs free).
27	BR _K MON	O	Not used.
28	CM _{OD}	I	Start mode select signal input after resetting (+5 V pull-up).
29	CL _S DT	I	CLV scan V sync. phase difference data input from IC502 (Data is input when CLS CS is H).
30	SE _{DT} T	O	Serial data output to the DSP/extension output port IC.
31	SE _T CK	O	Serial data transmission clock to the DSP and IC502.
32	SP _{DL} FG1	I	Spindle FG input 1 (12 pulses per rotation).
33	CG _V MUTE	I	CGV mute signal (H, L output). Normally set to input and Hi Imp.
34	LD _{SE} ARCH	O	Spindle servo control signal output (H: LD search).
35	SP _{DL} F/R	O	Spindle direction signal (H: FWD).
36	AUX _{SEL}	O	H when signal is externally input (including CD-G).
37	JMP _{TR} IG	O	Track jump trigger pulse output.
38	AN _A LOG	O	Audio analog/digital switch (H: Analog, L: Digital).
39	CD _G	I	H when CD-G (The decode IC tells the disk whether it is a CD or CD-G).
40	CD _G MUTE	O	Graphic data mute (L: Pb, H: Others).
41	MTJ	I	MTJ tracking pulse output. Normally set to input and Hi Imp. The pulse is output when track jump is carried out (L: FWD).
42	MTF _{ON} /OFF	O	MTF correct ON/OFF signal (H: MTF ON).
43	TR _K OFF	O	Turns off the servo IC tracking control (L: Tracking OFF).
44	N. C.		
45	GM _{UTE}	O	Gray picture mute control signal output when CLV is scanned (L: Tracking OFF, H: Gray picture).
46	JOG	O	L: Variable speed playback with TI, H: Others.
47	CA _V	O	L: CAV disk, H: Other disk or unknown disk.
48	FO _K	I	Focus lock signal (H: Focus is locked).
49	VCC	I	Power supply pin, REG + 5 V.
50	BU _S Y	I	Communication enable signal sent from the mode controller (L: Communication enabled).

Pin No.	Signal	I/O	Function
51	TV/DISC	O	RF TV/Disk switch (H: TV, L: Disk).
52	SLED FWD	O	Sled FWD enforced transmission signal sent from the port (H: FWD transfer).
53	SLED REV	O	Sled REV enforced transmission signal sent from the port (H: REV transfer).
54	MMICS	O	Serial communication chip select signal sent to the mode controller.
55	LOADING	O	Loads the tray.
56	UNLOADING	O	Ejects the tray.
57	N. C.		
58	VSS	I	GND.
59	LINE MUTE	O	Audio output mute signal (H: Mute).
60	SLED SPEED	O	Sled driving speed switch (L: Slow).
61	SV DSP RST	O	Reset signal of the servo, DSP and DF (L: Reset).
62	LD ON	O	Laser diode ON/OFF signal (H: ON (lights)).
63	CD/LD CDV	O	L: Audio part of CD or CDV is played, H: Others.
64	SLED MODE	O	Sled control output (H: Play mode, L: Enforced mode).
65	SIDE A/B	O	TIH servo side switch (A: H, B: L).
66	T/H SV	O	TIH/height switch (L: TIH).
67	LCSW1	I	Loading/chucking position sensor input 1.
68	LD LED	O	LED light signal used to determine the kind of the disk (L: lights).
69	LCSW3	I	Loading/chucking position sensor input 3.
70	LCSW2	I	Loading/chucking position sensor input 2.
71	SPDL FG2	I	Spindle FG input 2.
72	TILT LIMIT	I	TIH up/down limits switch input.
73	TILT CTR	I	TIH center switch input.
74	MBCH SI	I	32-byte serial transmission data input.
75	N. C.		
76	N. C.		
77	MBCH SI	I	32-byte serial transmission data input (Input from the mode controller and IC502).
78	MBCH SO	O	32-byte serial transmission data output (Output to the mode controller).
79	MBCH CLK	O	32-byte serial transmission clock.
80	T CNT	I	Count signal input of the number of track jumps (Not used).
81	N. C.		
82	N. C.		
83	AVSS	I	GND.
84	LD DET	I	A/D input (Detects whether a disk is set or not and disk size (8- or 12-inch)).
85	CDY/FRLMT	I	A/D input sled position (CDV).
86	CD ABLD	I	A/D input sled position (CD, ALD and BLD).
87	INLMT	I	A/D input sled position (In-limit).
88	DSPLT	O	DSP IC latch signal.
89	MUTG	O	DSP mute signal (H: Muted).
90	LOCK	I	Frame sync (BFM) lock signal (H: Locked).
91	SENSE	I	SENSE input signals sent from the DSP.
92	AVCC	I	Power supply pin, Reg + 5 V.
93	EM _P ON	O	Emphasis switching output (L: Emphasis ON).
94	N. C.		
95	A MUTE 2	O	Audio L output mode switch (H: Analog audio R muted).
96	A MUTE 1	O	Audio R output mode switch (H: Analog audio L muted).
97	CK	O	CK ON/OFF control signal output (L: CK ON).
98	N. C.		
99	DS _P SEL	O	Communication select with the DSP (L: Connect, H: Disconnect).
100	VCC	I	Power supply pin, REG + 5 V.

**6-2. EXPANSION OUTPUT PORT IC PIN FUNCTION
(MB-712 BOARD IC502 MB606F06)**

PIN NO.	PIN NAME	I/O	FUNCTION
1	SP OFF	0	SPINDLE MOTOR ON/OFF SIGNAL OUTPUT (H: SPINDLE MOTOR ON)
2	V _{SS}		GND
3	TBC MUTE	0	TBC MUTE SIGNAL OUTPUT
4	TBC REPH	0	REFERENCE HORIZONTAL SYNC SIGNAL FOR TBC OUTPUT
5	PBCS	1	PB COMPOSITE V. H SYNC SIGNAL INPUT
6	SP RHO	0	REFERENCE H SYNC SIGNAL FOR SPINDLE SERVO OUTPUT
7	SP RHI	1	REFERENCE H SYNC SIGNAL FOR SPINDLE SERVO INPUT
8	CNT2	0	TBC CONTROL OUTPUT (H: LINE SYSTEM, L: BURST SYSTEM)
9	JUMP TOL	0	JUMP TOGGLE OUTPUT
10	SYEX	0	SYNC SIGNAL FOR CHARACTER GENERATOR SELECT: NOT USED
11	CCV	0	V SYNC. GENERAL FOR CHARACTER GENERATOR OUTPUT. NOT USED
12	V _{SS}		GND
13	SELH	0	H SYNC. SIGNAL FOR CHARACTER GENERATOR (IC011 ON MB-712 BOARD) OUTPUT
14	XPHS	0	PB H SYNC. SIGNAL OUTPUT. NOT USED
15	SP PBHO	0	PB H SYNC. SIGNAL FOR SPINDLE SERVO OUTPUT
16	SP PBHI	1	PB H SYNC. SIGNAL FOR SPINDLE SERVO INPUT
17	HS	0	CENTER OF ECCENTRICITY OUTPUT. NOT USED
18	MEM REFH	0	REF H OUTPUT FOR THE SET WITH MEMORY (NOT RESET). NOT USED
19	FSC	0	fsc (0.579545 MHz) OUTPUT
20	XOUT	0	4 fsc (14.31818 MHz) OUTPUT
21	XIN	1	4 fsc (14.31818 MHz) INPUT (CLOCK)
22	HD	1	H SYNC. SIGNAL FOR DIGITAL TBC INPUT
23	V _{SS}		GND
24	V MUTE	0	VIDEO MUTE SIGNAL OUTPUT
25	V MUTE2	0	SIGNAL FOR ADDING REF. V SYNC. SIGNAL TO PLAYBACK VIDEO SIGNAL DURING CLV SCANNING
26	G BURST	0	BURST SIGNAL (3.58 MHz) FOR GRAY PICTURE GENERATION DURING CLV SCANNING
27	PC OUT1	0	SPINDLE SERVO FORCED ACCELERATION/DECELERATION SIGNAL OUTPUT. (H: ACCELERATION, L: DECELERATION, Hiz: OTHERS)
28	PC OUT2	0	SPINDLE SERVO H SERVO ERROR OUTPUT
29	TBC H	1	H SYNC. SIGNAL AFTER TBC CORRECTION FOR CHARACTER GENERATOR INPUT
30	DS GATE	0	GATE SIGNAL FOR READING OUT PHILLIPS CODE (FRAME NO.)
31	DATA	1	PHILLIPS CODE DATA INPUT
32	V MUTE1	0	BLANKING V SYNC. SIGNAL OF PLAYBACK VIDEO SIGNAL DURING CLV SCANNING
33	V _{DD}		+3 V
34	DLRH	0	GRAY SIGNAL FOR GENERATING GRAY PICTURE DURING CLV SCANNING
35	-GRH	0	H SYNC. SIGNAL FOR GENERATING GRAY PICTURE DURING CLV SCANNING
36	SP UNLOCK	0	SIGNAL FOR SETTING BY MECHANISM CONTROLLER OUTPUT WHEN SPINDLE IS UNLOCKED
37	8/12	0	LD DISC SIZE SET OUTPUT. (H: 3 INCHES, L: 12 INCHES) NOT USED
38	CD/LDDV	0	DISC TYPE SET OUTPUT H: PLAYBACK CD OR AUDIO PART OF CDV L: PLAYBACK LD OR VIDEO PART OF CDV
39	CDV	0	SPINDLE SERVO MODE SET (H: VIDEO PART OF CDV)
40	FGMD	0	SPINDLE SERVO MODE SET (H: FG MODE (WHILE COUNTING SPINDLE FG. FORCING TO ACCELERATE/DECELERATE SPINDLE MOTOR))

PIN NO.	PIN NAME	I/O	FUNCTION
41	HP OUT	0	HOLD PULSE OUTPUT. NORMALLY OUT. PULSE OUTPUT DURING JUMPING TRACKS
42	V _{SS}		GND
43	SV CLK	0	CLOCK FOR SERVO IC (IC401 ON MB-712 BOARD). 1/8 fsc (APPROX. 450 kHz)
44	JMP	1	TRACK JUMP CONTROL SIGNAL INPUT. (GATE FOR HP OUT)
45	SET CLK	1	INTERNAL A, B REGISTER CLOCK INPUT FROM SYSTEM CONTROL MICROPROCESSOR (IC301 ON MB-712 BOARD)
46	OVID	1	GRAY PICTURE CONTROL SIGNAL INPUT DURING CLV SCANNING (H: GRAY PICTURE, L: PLAYBACK PICTURE)
47	SET DT	1	INTERNAL A, B REGISTER SERIAL DATA INPUT FROM SYSTEM CONTROLLER
48	CLS DT	0	CLV SCAN V SYNC. COUNTER DATA OUTPUT TO SYSTEM CONTROLLER. NORMALLY L DATA OUTPUT WHEN CLS CLK (PIN 49) IS H. CLOCK IS SET CLK (PIN 45)
49	CLS CLK	1	CLOCK FOR READING OUT CLV SCAN V SYNC COUNTER DATA CONTROL SIGNAL INPUT
50	B LD	1	INTERNAL B REGISTER LATCH INPUT
51	A LD	1	INTERNAL A REGISTER LATCH INPUT
52	V _{SS}		GND
53	REF V	0	REFERENCE V SYNC. SIGNAL OUTPUT
54	PB V	0	PLAYBACK V SYNC. SIGNAL OUTPUT
55	TBC HOLD	1	CHROMA TBC CONTROL SIGNAL INPUT
56	SP LOCK	0	SPINDLE SERVO LOCK SIGNAL OUTPUT (H: DURING LOCKING, NOT USED)
57	JP CTL	1	TRACK JUMP SELECT SIGNAL INPUT (H: 1 TRACK JUMP, L: MULTI TRACK JUMP)
58	FOSEL	1	PHILLIPS CODE/SUBQ (SUB CODE) SELECT SIGNAL INPUT (L: SUBQ)
59	FOACK	1	PHILLIPS CODE. SUBQ DATA OUTPUT CONTROL (H: DATA OUTPUT)
60	F REQ	0	PHILLIPS CODE READING OUT ENABLE SIGNAL OUTPUT
61	MRST	1	SYSTEM RESET INPUT (L: RESET)
62	FSC2	0	2 fsc (7.159 MHz) OUTPUT
63	V _{SS}		GND
64	PH2	0	2 H (3.15 kHz). CARRIER FOR SPINDLE MOTOR PWM DRIVE CIRCUIT
65	DSPSEL	1	CLOCK CONTROL SIGNAL FOR DSP IC (IC203 ON MB-712 BOARD) (L: CONNECTED TO DSP)
66	FOCLK	1	CLOCK FOR READING OUT PHILLIPS CODE, SUBQ DATA INPUT
67	D OUT	0	PHILLIPS CODE, SUBQ CODE SERIAL DATA OUTPUT
68	SUBQ CLK	0	SUBQ TRANSFERRING CLOCK
69	SUBQ	1	SUBQ DATA INPUT
70	DSP CLK	0	CLOCK FOR DSP IC OUTPUT
71	DOCIH	0	DROP OUT CORRECTION INHIBITION OUTPUT. NOT USED
72	CLV1	0	SPINDLE SERVO GAIN MONITOR OUTPUT. NOT USED
73	V _{DD}		+3 V
74	CLV2	0	SPINDLE SERVO GAIN MONITOR OUTPUT. NOT USED
75	REF HE	0	REF HE MONITOR OUTPUT. NOT USED
76	REF HC	0	REF HC MONITOR OUTPUT
77	HMSK	0	PHILLIPS CODE MASKING SIGNAL MONITOR OUTPUT
78	BO6	0	B REGISTER D6 OUTPUT. NOT USED
79	BO7	0	B REGISTER D7 OUTPUT. NOT USED
80	TEST	1	TEST MODE INPUT (H: TEST)

**6-3. MODE CONTROL MICROPROCESSOR PIN FUNCTION
(FP-738 BOARD IC202 MB89096PF-G-146)**

Pin No.	Signal	I/O	Function
1	CL1	O	32 kHz clock (Connected at open).
2	CL0	I	32 kHz clock (Connected to GND).
3	MOD0	I	(Connected to GND).
4	MOD1	I	(Connected to GND).
5	X0	I	8 MHz clock.
6	X1	O	8 MHz clock.
7	VSS	I	GND.
8	RST	I	Mode controller reset. (L: Reset)
9	MRST	O	Mechanical controller reset (L: Reset)
10	BUSY	O	Transmission enable signal sent from the mode controller to the mechanical controller (L: Communication enabled).
11	AU MUTE	O	H when audio is muted.
12	LED STB	O	FP-739 LED strobe signal output pin.
13	DOOR UP	O	H: Front door goes up.
14	DOOR DOWN	O	H: Front door goes down.
15	MIC IN	I	L: MIC IN.
16	H DET	I	L: Video signal is input.
17	REF V	I	Reference V sync. signal input.
18	MMTCS	I	Chip select signal sent from the mechanical controller to the mode controller (L: The signal is being transmitted).
19	E2P BUSY	I	EEPROM write signal. H: Ready, L: Busy.
20	DOOR3	I	Door position code 3.
21	AUTO PAUSE	O	LED output (L: Lights).
22	SURROUND	O	
23	KARAOKE PON	O	
24	AUTO RESUME	O	
25	POWER CONT	O	Turns on or off the unit power. (H: The power is turned on).
26	DSP ACK	I	Communication enable signal sent from the karaoke DSP (L: Transmission enabled).
27	DSP REQ	O	Communication request signal to the karaoke DSP (L: Transmission requested).
28	CMOD	I	Start mode select signal input after resetting (+5 V pull-up).
29	SI	I	Received data from the EEPROM.
30	SO	O	Transmission data to the EEPROM, karaoke DSP and serial/parallel IC for the LEDs.
31	SCK	O	Communication clock for the EEPROM, karaoke DSP and serial/parallel IC for the LEDs.
32	SIRCS	I	SIRCS input.
33	CG CS	O	CG chip select.
34	DSP READY	O	Communication end (transmission end) signal sent to the karaoke DSP (L: Transmission ended)
35	DSP RST	O	Reset signal output to the karaoke DSP.
36	DSP PORT CONT	O	Control signal of karaoke DSP port 2.
37	AUX	O	H: AUX switch OFF, L: AUX switch ON.
38	OTASUKE	I	H: No audio is input from the microphone. L: Audio is input from the microphone.
39	P1	O	FL segment output.
40	P2	O	
41	P3	O	
42	P4	O	
43	P5	O	
44	P6	O	
45	P7	O	
46	P8	O	
47	P9	O	
48	P10	O	
49	Vcc	I	Power supply pin. EVER + 5 V.
50	P11	O	FL segment output.

Pin No.	Signal	I/O	Function
51	P12	O	FL segment output.
52	P13	O	FL segment output.
53	VTFDF	I	-30 V high-voltage, resistant pull-down, power supply pin.
54	P14	O	FL segment output.
55	P15	O	
56	P16	O	
57	P17	O	
58	Vss	I	GND.
59	P18	O	FL segment output.
60	P19	O	
61	P20	O	
62	P21	O	
63	P22	O	
64	P23	O	
65	N. C.	-	
66	N. C.	-	
67	VCC	I	Power supply pin. EVER + 5 V.
68	7G	O	FL digit output.
69	6G	O	
70	5G	O	
71	4G	O	
72	3G	O	
73	2G	O	
74	1G	O	
75	LINE SELECT	O	H: Communication with the mechanical controller. L: Communication with the CG.
76	MMTCS	I	Chip select signal sent from the mechanical controller (L: The signal is being transmitted).
77	MECH SO	I	Data input from the mechanical controller.
78	MECH SI	O	Data output to the mechanical controller and CG.
79	MECH CLK	O	Communication clock output for the mechanical controller and CG.
80	LED b	O	LED output (L: Lights).
81	LED h	O	
82	LED #	O	
83	AVss	I	GND.
84	AD0	I	Microphone remote input.
85	AD1	I	Mode switch input.
86	AD2	I	PW-708 key input.
87	AD3	I	FP-739 key input.
88	AD4	I	
89	AD5	I	
90	AD6	I	Echo VR input.
91	DOOR1	I	Door position code 1.
92	AVcc	I	Power supply pin. EVER + 5 V.
93	AD8	I	FP-738 key input.
94	AD9	I	-16 V tuning monitor.
95	AD10	I	Door switch (L: Close H: Open).
96	AD11	I	+5 V res monitor.
97	E2P WC	O	EEPROM line control signal output.
98	E2P CS	O	EEPROM chip select signal output.
99	DOOR2	I	Door position code 2.
100	Vcc	I	Power supply pin. EVER + 5 V.

SECTION 7 ELECTRICAL ADJUSTMENTS

During the adjustments, see the parts alignment diagram for adjustment starting from page 7-21.

7-1. LIST OF SERVICING JIGS

- Oscilloscope
- Color monitor TV
- Digital voltmeter
- Frequency counter
- Remote commander (RMT-M29A)
- LD alignment disc HVL-8 (8-797-008-00)
NTSC Reference Disc (Reference 7 can also be used.)

7-2. CAUTIONS ON ADJUSTMENT

- Disc load/unload operation must not be performed when servicing with the unit laying down sideways. (Never press the OPEN and CLOSE buttons.)
- When laying the unit down sideways, perform adjustment with the left side down and with the power on.
- When adjusting the servo system, be sure to set up the unit horizontally.

7-3. DEBUGGING MODE

- What is the debugging mode?

The contents in the RAM of the microprocessor can be displayed on the screen for the repair and maintenance purposes. The status of the MDP-A800K2 in which this debugging function is available is called "the debugging mode".

The followings are the differences between the debugging mode and the normal operation mode.

- (1) The background color of the screen changes in green when the debugging commands are effective. (When the background color is set to display.)
- (2) Under the status described item (1) above, pressing the key on the remote control unit displays the history of emergency conditions or other debugging information.
Some keys are not effective when the background color is green.

1. How to enter the debugging mode

To enter the debugging mode from a normal operation mode (in a normal status of operation), turn on the unit, press the 0 key and then the STOP key on the remote control unit while holding down the KEY CONTROL "NATURAL" key on the main unit.

When the following display appears on the screen, the unit is in the debugging mode. This display shows the version number of the microprocessor. For details, refer to 4-1. "[FRAME/TIME] key for displaying version number of the microprocessor".

The KEY CONTROL "NATURAL" key functions as the debug command ON/OFF switch key when the main unit is in the debugging mode.

The FL tube turns off when the debugging command is valid.

Also when the background color is displayed (in the STOP, PAUSE or some other modes), and if the debug command is effective, the background color changes in green.

(Note that it is violet in the service mode.)

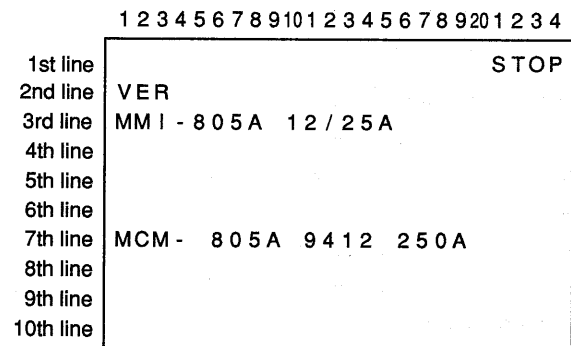


Fig. 7-1 Debugging mode initial display

2. How to exit the debugging mode

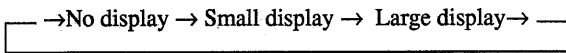
To exit the debugging mode, press the CLEAR key on the remote control unit when the menu (version number of the microprocessor indication in the green background color) in Fig. 7-1 is displayed.

The same key operation as step (1) also sets the mode back in the normal operation mode. The KEY CONTROL "NATURAL" key will have its normal key function after the machine exists the debugging mode.

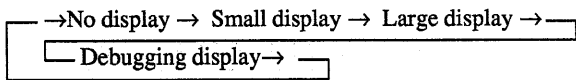
3. Switching the screen display

The display is set for “debugging display” immediately after entering the debugging mode. The display mode can be switched in the same way as in the normal operation mode by pressing the screen display key. In the debugging mode, however, “debugging display” mode can be selected as one of the display modes, in addition to “no display (displays nothing in most cases)”, “small display (displays only the 1st line in most cases)”, and “large display (displays full screen in most cases)” modes.

Pressing the screen display key in the normal operation mode changes the display mode as follows:



Pressing the screen display key in the debugging mode changes the display mode as follows:



4. Explanation of the debugging display

In the debugging display mode, the information on the mode controller is displayed on the screen as a dump list. The title is displayed at the left on the 2nd line from the top. The data is displayed on the 3rd line through the 9th line.

The display of the data in one line consists of up to four sets (total of 8 bytes) of four character (2 bytes character each) sets in hexadecimal notation.

The information to be displayed can be selected in the “debugging mode”, by setting the back ground color to green and pressing the desired key (as listed below).

The following table lists the information which are currently available and which can be displayed.

Table 7-1 List of the keys to be used in the debugging mode and corresponding information

Keys	Information to be displayed
[FRAME/TIME]	Version number of the microprocessor
[1]	History of the function modes
[2]	History of the emergency occurrence
[3]	Information for repair service in normal mode
[4]	Trap-flag
[5]	Key/remote control data
[7]	Information on communication with the mechanism controller

4-1. [FRAME/TIME] Version number of the microprocessor

[FRAME/TIME] key for displaying version number of the microprocessor

Pressing this key displays the version number of the microprocessor. The version number of the mode controller appears on the 3rd line, and that of the mechanism controller appears on the 7th line. An example in Fig. 7-2 shows that the version number of the mode controller is “MMI-805A 12/25A” and that of the mechanism controller is “MCM-805A 9412 250A”.

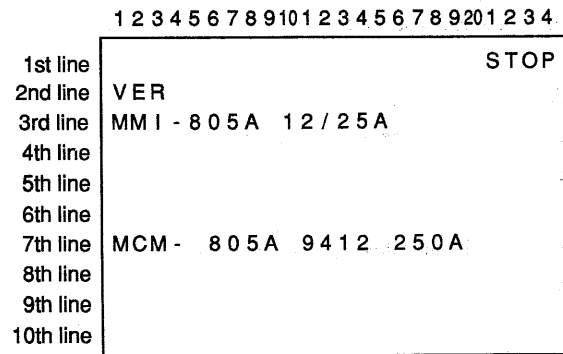


Fig. 7-2 Version number of the microprocessor

4-2. [1] History of the function modes

[1] key for displaying the history of the function modes

Pressing this key displays the history of the principal operation commands such as STOP and PLAY (which represent function modes) sent from the mode controller to the mechanism controller.

The function mode data is the one-byte (two digits in hexadecimal notation) data. Up to 8 histories of the function modes can be displayed on a line. A total of 16 histories of the function modes are available using two lines. Unless the unit is unplugged, the data are kept intact in memory even when the unit is turned off.

The data to be stored appears on the screen from left to right 1 byte by 1 byte, and “FF” appears to the right of the last data byte. The data byte continues from the right end on the 1st line to the left end of the 2nd line, and from the right end on the 2nd line to the left end on the 1st of line. The last stored data of the function modes (which is the mode selected at present) appears on the left of “FF”. That is, when “FF” appears at the left end of the 1st (or the 2nd) line, the last stored data appears at the right end on the 2nd (or the 1st respectively) line.

“FE” means there has been an emergency case at the data point. To check the type of the emergency case, refer to 4-3 “The [2] key for displaying the history of the emergency occurrence”.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4
1st line																								STOP
2nd line	FM		H	I	S	T																		
3rd line		0	1	2	0		3	0	FE		5	0	6	0		7	0	6	0					
4th line		2	0	FF		0	0	0	0		0	0	0	0		0	0	0	0					
5th line																								
6th line																								
7th line																								
8th line																								
9th line																								
10th line																								

Fig. 7-3 History of the function modes

Figure 7-3 shows that the function modes have changed as follows:

- 01 (Power on start up)
- 20 (Stop)
- 30 (Start up of side A)
- FE (An emergency occurred.)
- 50 (Chapter search)
- 60 (Playback)
- 70 (Slow speed scanning in normal direction)
- 60 (Playback)
- 20 (Stop) [The last function mode]

Table 7-2 lists the function modes.

All the function modes available are listed and shown in Table 7-2. Please refer to page 7-5 for Table 7-2.

4-3. [2] History of the emergency occurrence

Some emergency codes simply have the meanings of the status codes such as “64 (Detection of minimum chapter)”. The emergency codes “80” and higher are generated by the mode controller itself, not input from the mechanism controller.

The data will show “00” if there has been no emergency occurrence since when the unit has been plugged in.

The display type is the same as that for the history of the function modes. However, up to 8 histories using only one are available in this case. The emergency code which appears just before “FF” corresponds to the data of “FE” in the history of the function modes, which is the closest one to “FF”.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4
1st line																								STOP
2nd line	EMG		H	I	S	T																		
3rd line							6	0	7	4		6	4	6	1		6	4	6	4		7	4	FF
4th line																								
5th line																								
6th line																								
7th line																								
8th line																								
9th line																								
10th line																								

Fig. 7-4. History of emergency occurrence

Figure 7-4 shows that the emergency has occurred in the following order because the data next to “FF” is 60 on the left of the line.

- 60 (Detection of lead-in point)
- 74 (Focusing failed)
- 64 (Detection of minimum chapter)
- 61 (Detection of lead-out point)
- 64 (Detection of minimum chapter)
- 64 (Detection of minimum chapter)
- 74 (Focusing failed) [The last function mode]

Table 7-3. lists the emergency code.

All the emergency codes available are listed and shown in Table 7-3. Please refer to page 7-6 for Table 7-3.

4-4. [3] Information for repair service, sent from the mechanism controller

Pressing this key displays the information sent from the mechanism controller, which is necessary for repair service.

At present, the information listed in Table 7-4 is available. Data numbers in the table correspond to the numbers on the 3rd line through the 5th line in Figure 7-5.

Data number	Data
(02)	Mode of mechanisms (internal mode of the mechanism controller) See the following section for details.

Table 7-4. Information for repair service, sent from the mechanism controller

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	
1st line																									STOP
2nd line	S	E	R	V	I	C	E																		
3rd line		(00)	(01)	(02)	(03)	(04)	(05)	(06)	(07)																
4th line		(08)	(09)	(10)	(11)	(12)	(13)	(14)	(15)																
5th line		(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)																
6th line																									
7th line																									
8th line																									
9th line																									
10th line																									

Fig. 7-5. Information for repair service, sent from the mechanism controller

• About the operation modes of the mechanisms

The operation modes of the mechanisms are the basic operation mod in the mechanism controller. Those almost the same as those available with the unit as the function modes. But, there are several supplemental modes for the mechanisms.

The table below shows the operation modes of the mechanisms.

No.	Functions
00	Power off
01	Initialization of the mechanism controller (Without operating the mechanisms)
03	In the process from power ON to power OFF
04	In the process from power OFF to power ON
05	Initialization of the mechanisms and related ICs.
10	Ejected status of the tray
11	In the process of ejection of the tray
12	In the process of loading of the tray
20	In stop status with the disc chucking up
21	In the process of chucking up from chucking of side A
22	In the process of chucking of side A from chucking up
23	In chucking status of side A
30	Until focus servo of side A has been locked.
31	From lock of focus servo to start-up of 0 search
32	In operation from side A/B to stop
33	In process of reversing side B from side A
40	Until focus servo of side B has been locked.
50	Chapter search
51	Frame/Time search
60	Playback
61	Pause
70	Slow speed normal direction scanning
71	High speed normal direction scanning
72	Slow speed reverse direction scanning
73	High speed reverse direction scanning
74	In the process of scanning completion
80~FF	The same as function mode)

Table 7-5. Operation modes of the mechanisms

Table 7-2. List of the function modes

Number	State	Description
00	Power OFF	
01	Power ON and start up	Initializes when power is turned ON.
10	Open	Opens the door and ejects the tray.
20	Stop	Closes the tray and stops.
30	Preparation for side A playback	From stop up to immediately before side A search
40	Preparation for side B playback	From stop up to immediately before side B search
50	Chapter search	Searches a chapter, including disc top search.
51	Frame/time search	Searches a frame and time in CAV.
60	Playback	Plays back.
61	Pause	Pauses.
70	Slow speed scanning in normal direction	>>
71	High speed scanning in normal direction	>>>
72	Slow speed scanning in reverse direction	<<
73	High speed scanning in reverse direction	<<<
80	Still playback in normal direction	Plays back in STILL mode. (Only in CAV mode)
81	Step playback in normal direction	Plays back one frame after frame. (Only in CAV mode)
82	1/90 times speed playback in normal direction	(Only in CAV mode)
83	1/30 times speed playback in normal direction	(Only in CAV mode)
84	1/16 times speed playback in normal direction	(Only in CAV mode)
85	1/8 times speed playback in normal direction	(Only in CAV mode)
86	1/4 times speed playback in normal direction	(Only in CAV mode)
87	1/2 times speed playback in normal direction	(Only in CAV mode)
88	Normal (1 time) speed playback in normal direction	(Only in CAV mode)
89	2 times speed playback in normal direction	(Only in CAV mode)
8A	3 times speed playback in normal direction	(Only in CAV mode)
8B	5 times speed playback in normal direction	(Only in CAV mode)
8C	10 times speed playback in normal direction	(Only in CAV mode)
90	Still playback in reverse direction	Plays back in STILL mode. (Only in CAV mode)
91	Step playback in reverse direction	Plays back one frame after frame. (Only in CAV mode)
92	1/90 times speed playback in reverse direction	(Only in CAV mode)
93	1/30 times speed playback in reverse direction	(Only in CAV mode)
94	1/16 times speed playback in reverse direction	(Only in CAV mode)
95	1/8 times speed playback in reverse direction	(Only in CAV mode)
96	1/4 times speed playback in reverse direction	(Only in CAV mode)
97	1/2 times speed playback in reverse direction	(Only in CAV mode)
98	Normal (1 time) speed playback in reverse direction	(Only in CAV mode)
99	2 times speed playback in reverse direction	(Only in CAV mode)
9A	3 times speed playback in reverse direction	(Only in CAV mode)
9B	5 times speed playback in reverse direction	(Only in CAV mode)
9C	10 times speed playback in reverse direction	(Only in CAV mode)
FE	Appears for indicating an occurrence of emergency.	An emergency occurred.
FF	Appears next to the last data.	(The last function mode)

Table 7-3. List of the emergency codes

Number	State	Description
01	Requirement of forced power off	Power off
02	Requirement of forced ejection of the tray	Eject
03	Requirement of stop	Stop
04	Requirement of stop when opening the door	stop
05	Requirement of forced playback	Play
06	Requirement of determination for mode change when power off	Freezes power off display
07	Requirement of power off after communication stops.	Power off
08	Front door does not move.	Power off
10	Detection of movement for pushing in the tray	Play
11	Detection of no movement of the tray	Power off
20	Detection of no movement of the sledder	Power off
30	Detection of no movement of the tilt	Power off
31	TILT does not operate. Escape process is used.	None
40	No detection of the spindle FG	Power off
41	No achievement of continuous servo lock from FG servo to H servo	Stop
42	Above the high rotation limit	Stop
43	Below the low rotation limit	Stop
44	No complete stop operation for the spindle movement	Power off
45	Time over error for the spindle control operation	Power off
50	Focusing failed	Stop
51	Focusing failed (with a disc loaded)	Stop
52	Detected as if the disc was an LD	Stop
53	Focusing of LD8 failed	Stop
54	Reading of TOC failed on a disc of CD or CDV	Stop
60	Detection of the lead-in code	Play or so
61	Detection of the lead-out code	Stop/Pause or so
62	Detection of the lead-out of part A on CDV	Stop/Pause or so
63	Detection of a picture stop	Still
64	Detection of the minimum chapter	None
65	Reading of subcode failed on a disc of CD or CDV	Stop
66	Reading of Philips code failed on a disc of LD	Stop
67	The locked groove processing was executed.	None
70	Detection of over search	Play
71	Detection of under search	Play
72	Time over for the search operation	Play
74	Focusing failed during search	Stop
76	Focus servo unlocked and retry was executed.	None
80	Emergency time out	Power off
81	Search time out	Play
82	Mechanism controller communication time out	Power off
83	DSP communication time out	Power off

Table 7-7. List of SIRCS codes for MDPs

No.	Functions
00	Numeral 1
01	Numeral 2
02	Numeral 3
03	Numeral 4
04	Numeral 5
05	Numeral 6
06	Numeral 7
07	Numeral 8
08	Numeral 9
09	Numeral 0
0F	Clear
15	Power ON/OFF
16	Close/open of tray
17	Audio monitoring
18	Stop
19	Pause
1A	Playback
1E	Reverse direction scanning
1F	Normal direction scanning
29	Repeat
30	Program
34	ACS in normal direction
35	ACS in reverse direction
38	Repeat A-B
39	Numeral + 10
3A	Screen display
40	Analog audio/CX
5D	Side A
5E	Side B
5F	Karaoke pon
60	Key con up
60	Key con natu
62	Key con down
63	Language
64	Numeral 10
65	Numeral 11
66	Numeral 12
67	Numeral 13
77	Numeral 14
79	Numeral 15
7B	Reserve
7E	Replay
(The followings are the expended codes.)	
90	Vocal
92	Vocal support
94	Vocal select
9B	My song
9C	My song select
9D	Numeral 16
9E	Numeral 17
9F	Numeral 18
A0	Numeral 19
A1	Numeral 20
FF	No keys are pressed.

FF Appears when there is no input.

4-7. [7] Information on communication with the mechanism controller

[7] key for displaying the information on communication with the mechanism controller

Pressing this key displays the communication data with the mechanism controller.

The data transmitted from the mode controller to the mechanism controller appears on the 3rd line through the 5th line. The data transmitted from the mechanism controller to the mode controller appears on the 7th line through the 9th line. The exclamation marks “!” at the left on the 8th and the 9th lines indicate that the communication is carried out successfully. Question mark “?” appears if communication stops. A bracket mark [■] appears if communication stops after carrying out once the communication on the purpose of servicing.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	
1st line																									
2nd line																									
3rd line																									
4th line																									
5th line																									
6th line																									
7th line																									
8th line																									
9th line																									
10th line																									

Fig. 7-8. Information on communication with the mechanism

The table bellow shows some communication information.

Table 7-8. Data from the mode controller to the mechanism (Upper block in Figure 7-8)

No.	Description
(01)	The function mode at present (next)
(02)	The function mode of final purpose
(03-05)	Target address of search (Time/Frame)
(21)	Karaoke door position

Table 7-9. Data from the mechanism controller to the mode controller (Lower block in Figure 7-8)

No.	Description
(01)	The function mode at present (next)
(06)	The flag for completion of function mode change (0 bit)
(13)	Current chapter/track number
(14)	Current index number
(15-17)	Current address (Time/Frame)

7-4. SERVICE MODE

- What is the service mode?

1. How to enter the service mode

The following procedure shows how to enter the service mode.

- (1) While the power is turned off, connect the test pin (TP501 for service mode setting) on the MB board of the main unit, to the ground.
- (2) Turn on the power by pressing the power key of the main unit. Nothing is displayed on the screen at this moment.
- (3) Disconnect the test pin (the connection was performed in step (1) above) from the ground.

The service mode can be started when the background color changes in violet. If the background color is blue or black, the service mode is not ready yet. If so, restart the procedure from step (1) above.

However, since violet is used also in Karaoke mode with the microphone plugged-in, remove the microphone before-hand so as not to misunderstand the violet display.

When the unit enters the service mode, the unit is also entered in the debugging mode (the functions those available in both modes can be used). Therefore, the version number of the microprocessor appears on the screen.

2. How to exit the service mode

To exit the service mode, press the power key to turn off the power. If you cannot turn off the power in this way (the operation of the mechanisms is not complete), carry out the forced power off function by pressing the reverse direction scanning key and the power key on the main unit at the same time.

3. How to use the special key functions

The special key functions in the service mode are available only under NO DISC and STOP conditions, for safety purposes.

Check that the indication for those conditions is displayed without flashing on the screen. In order to carry out the special key functions listed in Table 7-3, in the status above, press KEY CONTROL "NATURAL" key to turn off the FL tube, then press the desired key such as PLAY or PAUSE on the main unit.

The sledding motion with the SIDE A or SIDE B key is effective only while holding the key pressed. However, the operation started with the PLAY or PAUSE key continues, once it is pressed, until you press the STOP key. While the unit is carrying out the special key function, the LED of side B of the main unit is lit.

Note that multiple special key functions cannot be started even if you press multiple keys at the same time.

When the FL tube is turned off, some keys are not effective. Be sure to press KEY CONTROL "NATURAL" key to turn on the FL tube if you don't want to carry out the special key functions.

Table 7-10. List of the special key functions

Key	Special key functions
SIDE A	Sledding in reverse direction (downward)
SIDE B	Sledding in normal direction (upward)
PLAY	Focusing search
PAUSE	Tilt servo ON
STOP	Stop special operations

The followings are the details of the special key functions available with the MD-A800K2.

3-1. PLAY key ••••• Focusing search

Focusing search can be carried out repeatedly by holding the PLAY key. There is no fault with the unit if the pickup lens moves up and down.

Be sure to start the focusing search after checking the condition that the sled is placed in appropriate position (at around the center of side A). To stop the focusing search, press the STOP key.

3-2. SIDE A key ••••• Sledding in reverse direction

The sled can be moved in reverse direction (center of side B, to edge of side B, to edge of side A, and then to center of side A) after completing initialization of the tilt (the tilt is placed in neutral position) by holding down the SIDE A key. To stop the sledding in reverse direction, release the SIDE A key.

3-3. SIDE B key ····· Sledding in normal direction

As contrary to item (2) above, the sled can be moved in normal direction (center of side A, to edge of side A, to edge of side B, and then to center of side B). This movement of the sled is desired when replacing the optical part. To stop the sledding in normal direction, release the SIDE B key.

3-4. PAUSE key ····· Tilt servo ON

The tilt servo is activated while holding down the PAUSE key. Move the sled to around the center of side A with the SIDE A and SIDE B keys, and put a CD or equivalent on the tray so that it screens the skew sensor. Then, if the tilt moves by pressing the PAUSE key, operation is normal.

The tilt can be placed back in neutral position by moving the sled with the SIDE A and SIDE B keys. To deactivate the tilt servo, press the STOP key.

7-5. OPERATING THE MDP-A800K2 WITH HIDDEN KEY FUNCTION

1. How to use the “simultaneous main-unit-key-press functions”

The functions available by pressing simultaneously the multiple specific keys only on the main unit are called “simultaneous main-unit-key-press functions”. These functions are to be used when a quick operation such as “forced power off” is required.

The following table lists the currently available simultaneous main-unit-key-press functions.

Table 7-11. List of simultaneous main-unit-key-press functions.

Functions	Keys to be pressed on the main unit
<p>① <u>Forced power off</u></p> <p>This function turns off power forcibly. It is to be used if you want to turn off the power in the following cases.</p> <ul style="list-style-type: none"> • Operation of the mechanisms is out of control. • Power cannot be turned off by pressing the power key. <p>Note that this function be used with care because it may turn off the power in a half way of the operation of the mechanisms.</p>	<p>“1” key and “power” key</p>
<p>② <u>Forced reset</u></p> <p>This function carries out initialization of the mode controller in addition to the forced power off function. It is to be used if you want to reset the mode controller in the following case.</p> <p>Something is wrong with the mode controller such that it operates with incorrect display.</p> <p>Note that once this function has been carried out, all information, including the history of emergency occurrence, other than the trap-flag information in the debugging mode, will be deleted.</p>	<p>“PLAY” key and “power” key</p>
<p>③ <u>Lighting up all LEDs on the main unit</u></p> <p>This function turns on all LEDs after turning on the power automatically. Until you switched off the power, normal operation is possible while all LEDs are lit.</p>	<p>“B side” key and “MY SONG” and “power” key (With power off only)</p>

2. How to use the “simultaneous main-and-remote-control-units-key-press functions”

The functions available by pressing the two specific keys only on remote control unit while holding down the specific key on the main unit are called “simultaneous main-and-remote-control-units-key-press functions”. It is necessary to press two keys on the remote control unit within about one seconds. This prevents an accidental use of these functions by the user.

These functions are to be carried out by using the KEY CONTROL “NATURAL” key of the main unit so that the operation of the mechanisms should not be affected.

The following table lists the currently available simultaneous main-and-remote-control-units-key-press functions.

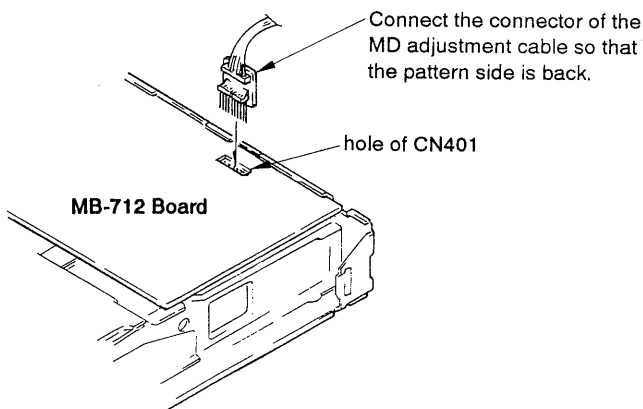
Table. 7-12. List of simultaneous main-and-remote-control-units-key-press functions.

Functions	Step	Keys to be pressed on the main unit and on the remote control unit
① <u>Debugging mode ON/OFF</u> This function puts the unit in the debugging mode from another mode, or puts the unit in any mode other than the debugging mode from the debugging mode.	1	KEY CONTROL “NATURAL” key and “0” key
	2	KEY CONTROL “NATURAL” key and “STOP” key
② <u>Forced V muting ON/OFF</u> This function releases the unit from the forced V muting condition if it is in the forced V muting condition, or puts the unit in the forced V muting condition if it is not in the forced V muting condition. It can be used to obtain a blue background during playback, or removing the blue background while the unit is in the stop mode.	1	KEY CONTROL “NATURAL” key and “0” key
	2	KEY CONTROL “NATURAL” key and “screen display” key
③ <u>Resetting of V muting</u> This function resets the unit in the V muting condition to normal condition. This is, it releases the unit from condition ≠ above.	1	KEY CONTROL “NATURAL” key and “0” key
	2	KEY CONTROL “NATURAL” key and “clear” key
④ <u>Make mechanism controller time out ineffective.</u> Make the function turning power off ineffective when communication with mechanism controller cannot be done. When mechanism controller doesn’t operate, it is used to hasten to operate mode controller.	1	KEY CONTROL “NATURAL” key and “0” key
	2	KEY CONTROL “NATURAL” key and “+10” key
⑤ <u>Make mechanism controller time out effective.</u> Make the function turning power off effective when communication with mechanism controller cannot be done.	1	KEY CONTROL “NATURAL” key and “0” key
	2	KEY CONTROL “NATURAL” key and “0” key
⑥ <u>EEPROM clear</u> Clearing all the content of the EEPROM can be reserved at power OFF, instead of storing the good-at-sing music data or storing the debugging modl in EEPROM. This function is valid only during power ON.	1.	KEY CONTROL “NATURAL” key and “0” key
	2.	KEY CONTROL “NATURAL” key and KEY CONTROL “NATURAL”

7-6. ADJUSTMENT AFTER THE ATTACHMENT OF THE OPTICAL PICK-UP BLOCK

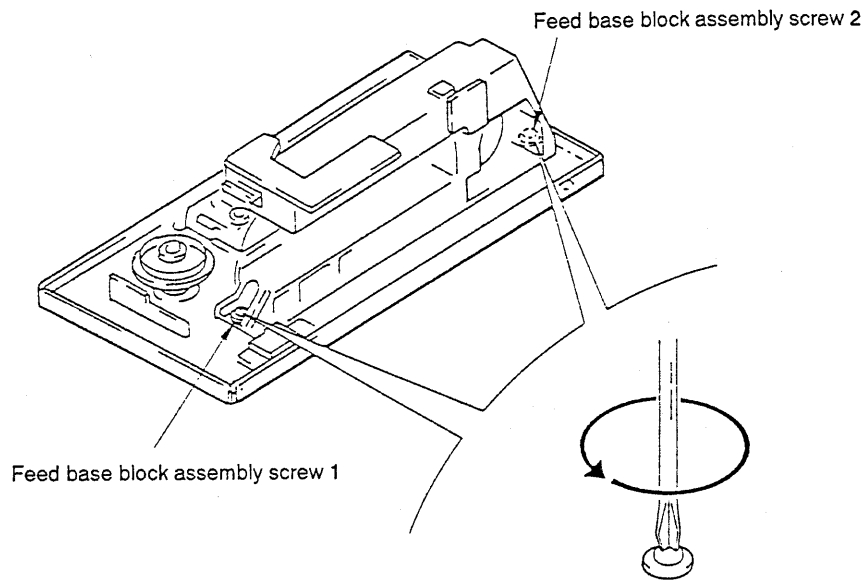
7-6-1. JIGS AND TOOLS

- Hexagonal wrench (Tangential screwdriver: 7-700-766-04)
 - Oscilloscope
 - MD adjustment cable (J-6082-059-B)
 - Alignment disc Ref. 8 (HVL8: 8-797-008-00) /LD YEDS-18 (3-702-101-01) or an equivalent/CD
 - Decentering screwdriver 4 ϕ (J-6095-029-A)
- * Insert the terminal of the connector conversion jig to CN401 of the MB-712 Board.



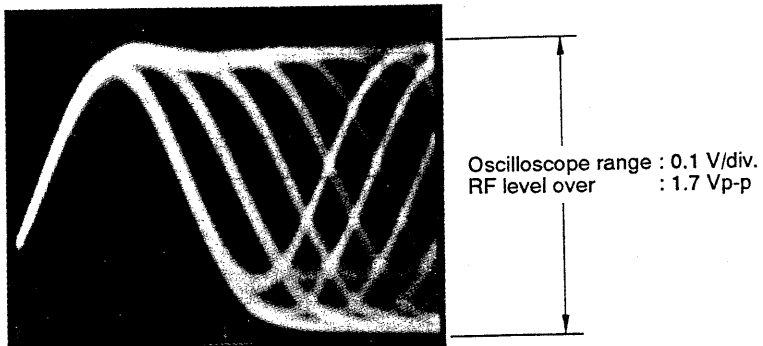
7-6-2. CD ADJUSTMENT

- ① Loosen the screws of feed base block assembly.

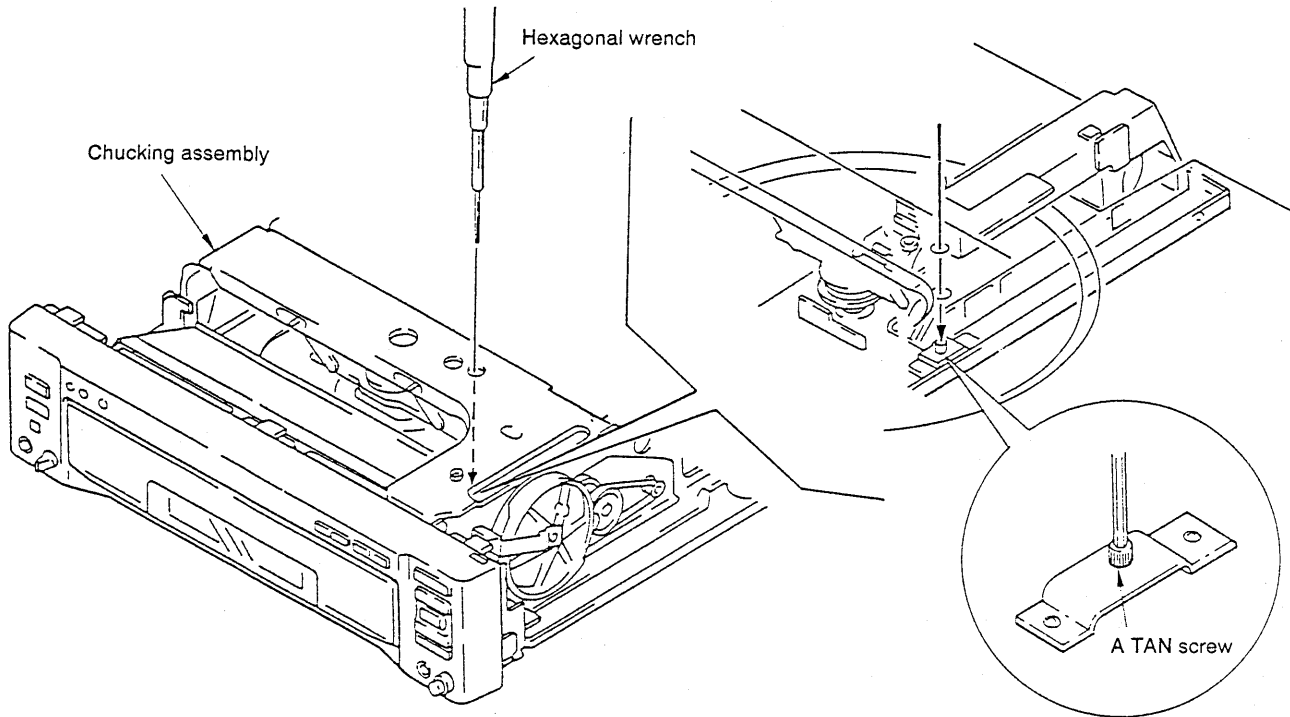


Loosen the screw about a turn from the state of being tight.

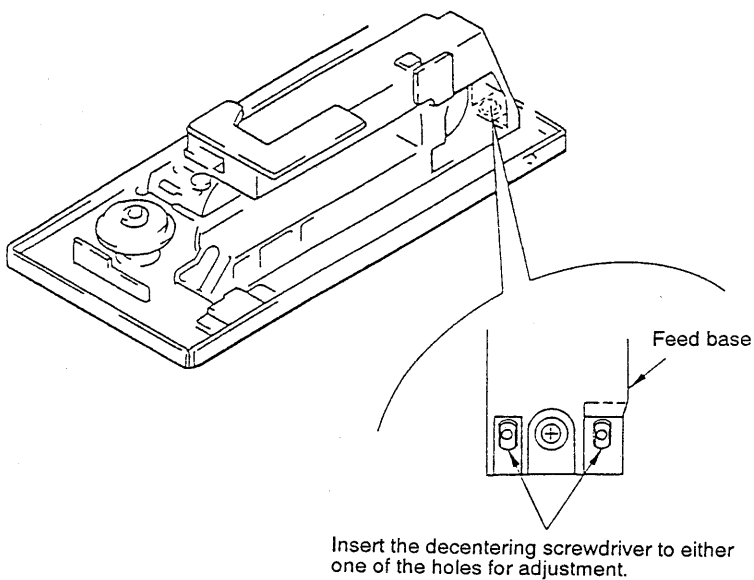
- ② Playback the CD alignment disc (YEDS-18) to press the Pause button about 3 seconds later.
- ③ Connect the oscilloscope to LD RF of the connector conversion jig to see if the waveform shown below appears.



- ④ Insert the A TAN screw with hexagonal wrench 2.6 into the hole of top surface of chucking assembly to adjust so that RF Level is maximum. (Over 1.7 Vp-p)

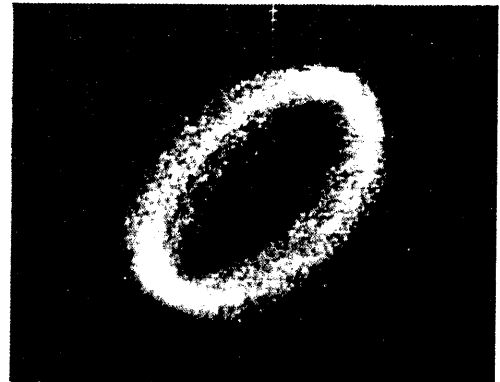


- ⑤ Insert decentering screwdriver into the feed base block assembly for RD adjustment.



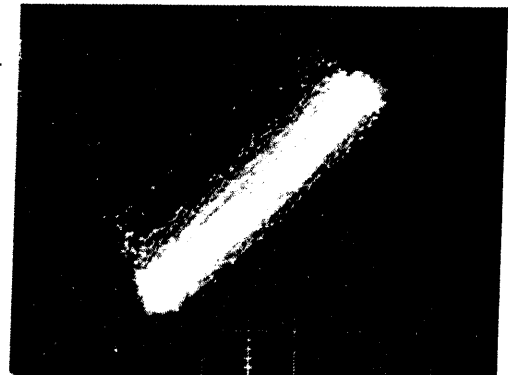
Terminal E,F/TRK, SLED OFF
Oscilloscope X/Y Lissagous range
Difference within 35° with each 20 mV/div.

Before the adjustment.



↓ Make the figure straight.

After the adjustment.



- ⑥ Take the DISC out to tighten the 2 screws of the feed base.
- ⑦ Apply suitable locking compound to A TAN screw.

**7-7. POWER SUPPLY CHECK
(PS-716 BOARD)**

Mode	Stop
Measuring equipment	Digital voltmeter
UNREG +16 V check	
Measurement point	Pin ① of CN051 (Pin ②, GND)
Specified value	15.5 ± 1.0 V
UNREG -16 V check	
Measurement point	Pin ③ of CN051 (Pin ③, GND)
Specified value	-16.5 ± 1.0 V
REG +5 V check	
Measurement point	Pin ⑤ of CN051 (Pin ④, GND)
Specified value	5.1 ± 0.5 V
REG -5 V check	
Measurement point	Pin ⑦ of CN051 (Pin ④, GND)
Specified value	-5.1 ± 0.5 V
POWER MUTE check	
Measurement point	Pin ① of CN055 (Pin ② of CN051, GND)
Specified value	15.7 ± 1.0 V
EVER 5 V check	
Measurement point	Pin ④ of CN031 (Pin ②, GND)
Specified value	5.0 ± 0.3 V

- Confirm that the power supply voltages satisfy the respective specified values.

**7-8. SYSTEM CONTROL SYSTEM
ADJUSTMENT**

7-8-1. Master Clock Adjustment (MB-712 Board)

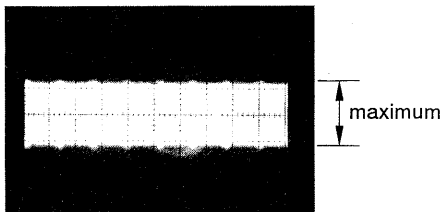
Mode	Stop
Measurement point	Pin ⑩ of IC502
Measuring equipment	Frequency counter
Adjusting element	CT501
Specified value	3,579,545 ± 10 Hz

Adjustment method:

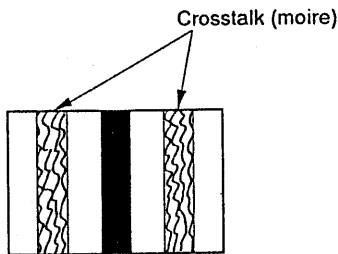
- 1) Adjust CT501 to 3,579,545 ± 10 Hz.

7-9. LD SIDE A TILT BALANCE ADJUSTMENT

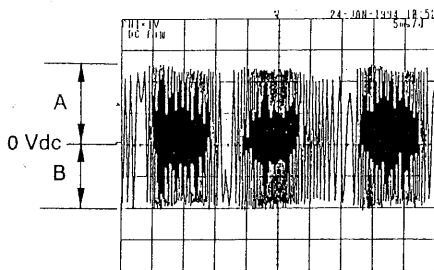
- ① Put the LD alignment disc HLV-8 in with the CAV side to the side A, play it and pause at the chapter 3 (#2201).
- ② Connect an oscilloscope to LD RF terminal on the MD adjustment cable and adjust RV401 so that the RF waveform goes maximum in the state the tracking and the sled are on.



- ③ Play #770 and pause.
- ④ Check that the vertical bar appears on TV monitor and right and left crosstalks (moire) are the same level and minimum.

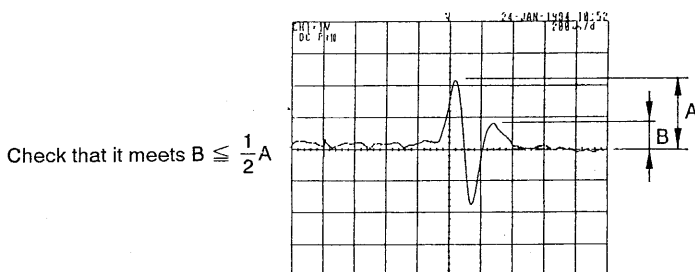


- ⑤ Tracking gain and focus gain adjustments are not necessary. —Already adjusted at the optical pick-up block side—
- ⑥ Check the tracking bal.
Measure the registance at the Y terminal of TRACKING ERR on jig with oscilloscope.

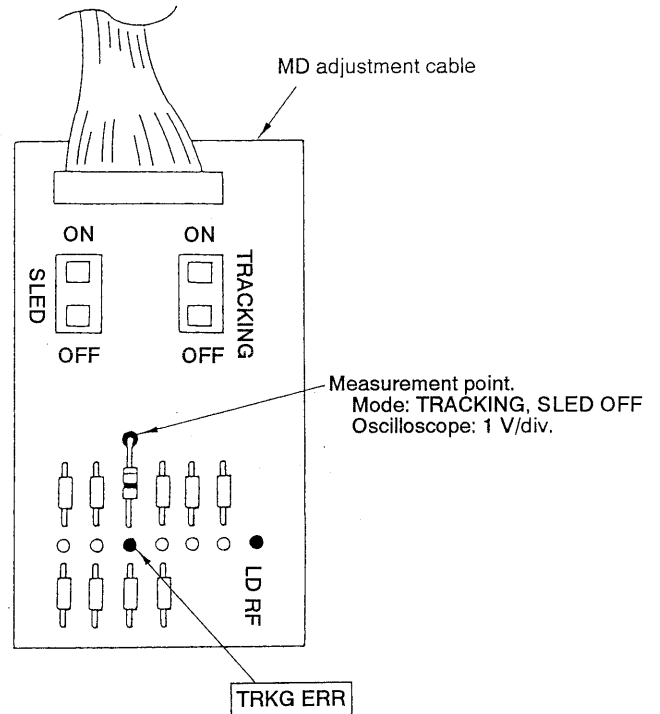


Check that it meets
$$-5 \leq \frac{A - B}{2(A+B)} \times 100 (\%) \leq 8$$

- ⑦ Then turn on the TRACKING and SLED to check the waveform of 1 track jump in STILL.

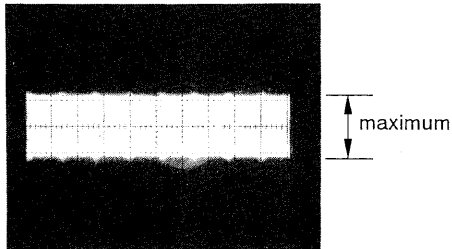


Check the TRACKING BALANCE.

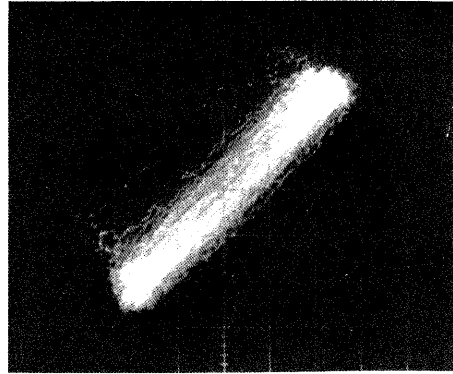


7-10. LD SIDE B TILT BALANCE ADJUSTMENT

- ① Loosen the side B RD screw and TAN screw (hexagonal screw 2.6) on the feed base.
- ② Put the LD alignment disc HLV-8 in with the CAV side to the side B, play it and pause at the chapter 3 (#2201).
- ③ Connect an oscilloscope to LD RF terminal on the MD adjustment cable and adjust RV402 so that the RF waveform goes maximum in the state the tracking and the sled are on.



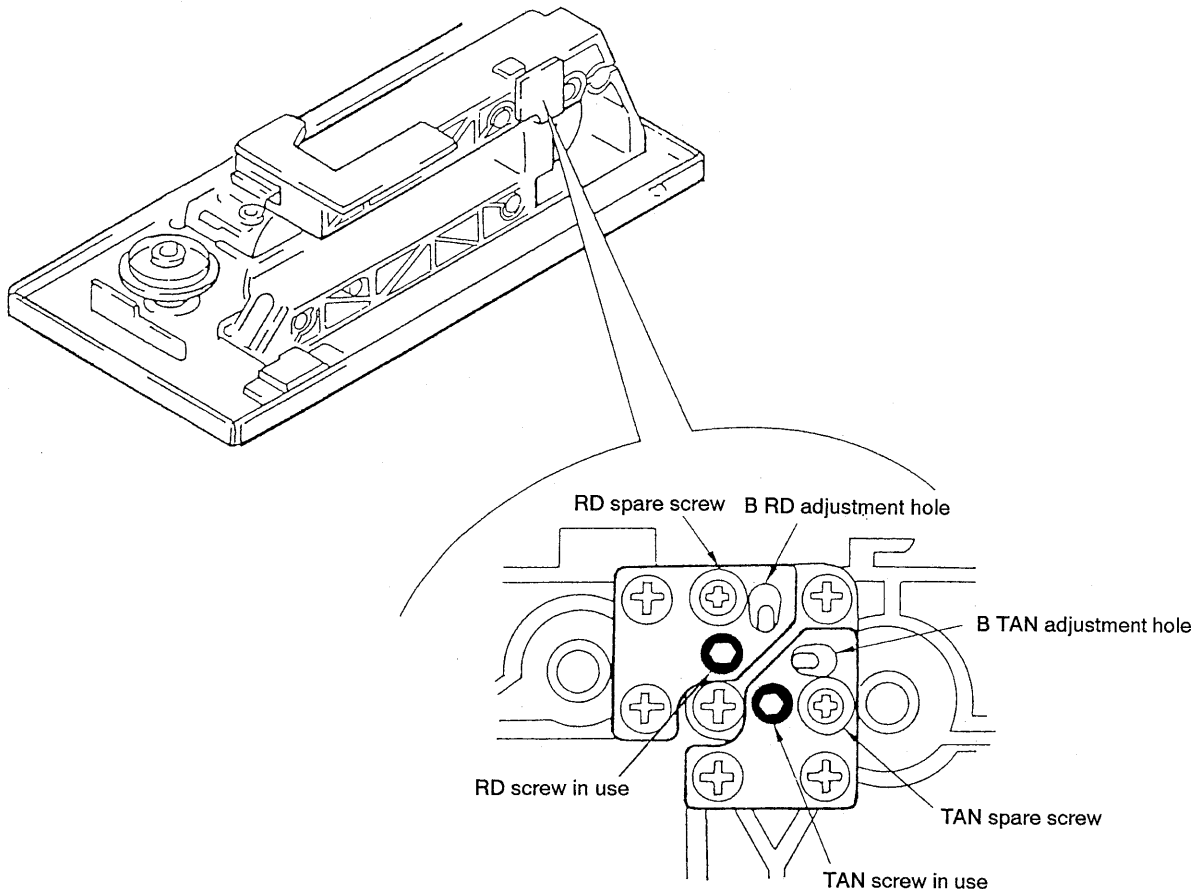
- ⑦ Turn off the SLED and tracking, and adjust inserting an eccentric screwdriver to B RD adjustment hole so that the Lissagous waveform meets the standard.



Jig terminal : E, F
 Oscilloscope : X/Y lissagous 20 mV/div.
 Phase difference : Within 35°

- ④ Insert an eccentric screwdriver to B TAN adjustment hole and adjust the RF waveform goes maximum similarly to the item ③.
- ⑤ Play #770 and pause.
 At this time in the same manner as the side A, check that the vertical bar appears on TV monitor and right and left crosstalks (moire) are the same level and maximum.
- ⑥ Forward the chapter 3 (#2201) and pause.

- ⑧ Take out the disc to tighten B TAN and RD screw.



7-11. VIDEO SYSTEM ADJUSTMENT

7-11-1. Burst Gate Position Adjustment (MB-712 Board)

Mode	Pause
Signal	Frame 4100 (Color bar)
Measurement point	Pin ③ of IC007
Adjusting element	RV002
Specified value	$8.5 \pm 0.1 \mu \text{ sec}$

Adjustment method:

- 1) Press PAUSE (II) button.
- 2) Search the frame 4100.
- 3) Adjust RV002 so that t_w is $8.5 \pm 0.1 \mu \text{ sec}$.

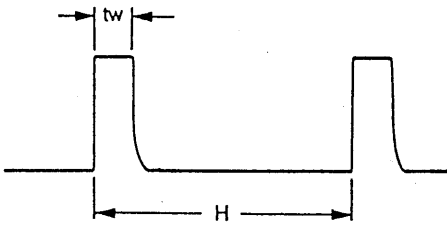


Fig. 7-9.

7-11-2. REF H Adjustment (MB-712 Board)

Mode	Pause
Signal	Frame 4100 (Color bar)
Measurement point	CH1: Pin ⑤ of IC008
	CH2: Pin ② of IC008
Measuring instrument	Oscilloscope (DC range)
Adjusting element	RV501
Specified value	Potential difference:
	$4.2 \pm 0.1 \text{ Vdc}$

Adjustment method:

- 1) Press PAUSE (II) button.
- 2) Search the frame 4100.
- 3) Adjust RV501 so that the electric difference between the center value of the TBC voltage (Pin ⑤ of IC008) and the VEE (Pin ② of IC008) is $4.2 \pm 0.1 \text{ Vdc}$.

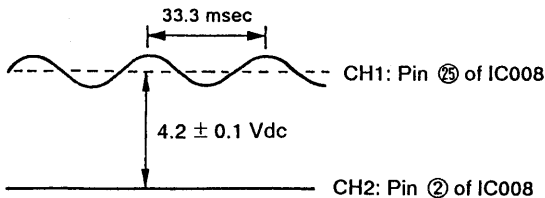


Fig. 7-10.

7-11-3. Color DOC Adjustment (MB-712 Board)

Mode	Pause
Signal	Frame 23500 (Yellow Green)
Measuring instrument	Monitor screen
Adjusting element	CT001
Specified value	Dropout section and surrounding section are of the same colors.

Preparations:

- 1) Paste a black tape onto the 1H interval of the outer most circumference of the LD reference disc CAV recording side (The side where the radial can be seen).
(Length: Approx. 10 mm)

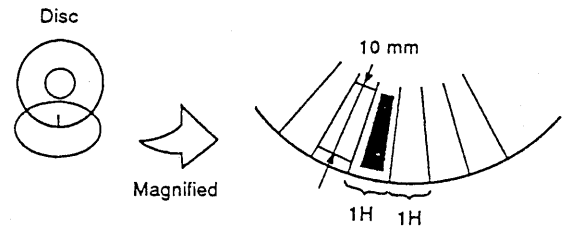


Fig. 7-11.

Adjustment method:

- 1) Press PAUSE (II) button.
- 2) Search the frame 23500.
- 3) Adjust the color of the dropout section of CT001 to that of the surrounding section.

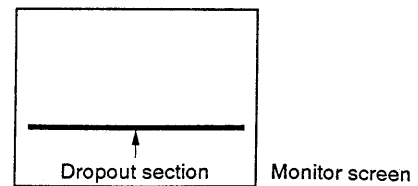


Fig. 7-12.

7-11-4. Video Output Level Adjustment (MB-712 Board)

Mode	Pause
Signal	Frame 4100 (Color bar)
Measurement point	J201 (VIDEO OUT terminal) (Terminated to 75Ω)
Measuring instrument	Oscilloscope
Adjusting element	RV001
Specified value	1.00 ± 0.03 Vp-p

Adjustment method:

- 1) Press PAUSE (II) button.
- 2) Search the frame 4100 and apply a vertical bar signal.
- 3) Adjust RV001 for 1.00 ± 0.03 Vp-p.

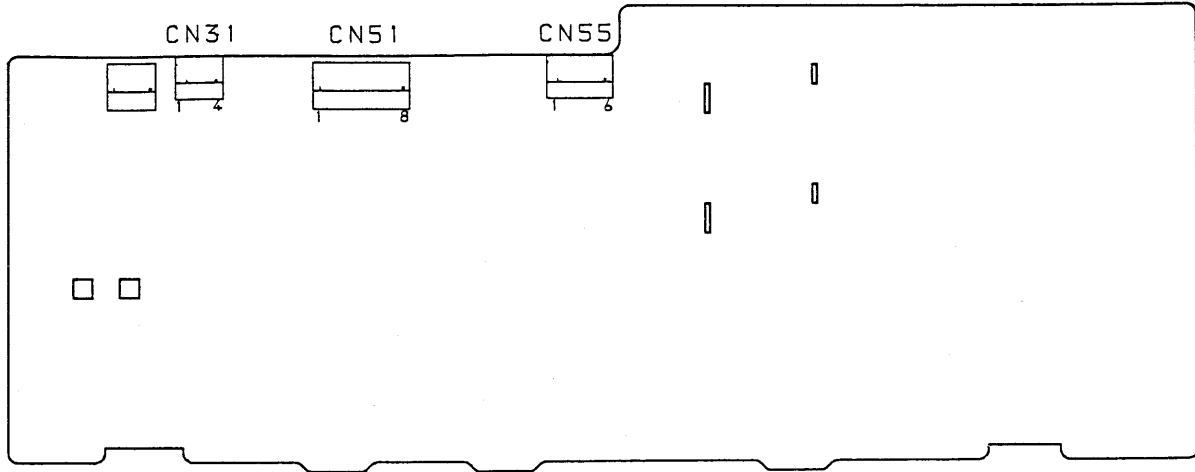


Fig. 7-13.

7-12. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENT

PS-716 BOARD (CONDUCTOR SIDE)

NOTE: CN31/51/55 ARE MOUNTED COMPONENT SIDE.



MB-712 BOARD (COMPONENT SIDE)

