

MZ-1

SONY[®] SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
E Model
Tourist Model

CORRECTION-1

Correct your service manual as shown below.

Description of PIN FUNCTION, TEST MODE and Electrical Adjustment contains mistakes.
Please replace that page with this CORRECTION-1.
The TEST MODE and Electrical Adjustment in the Service Manual must be discarded.

* The jigs for MZ-1 have been registered.
LIST OF MZ-1 JIGS

• TEST DISC (CD: Optical Disc)
TGYS-1 P/N : 4-959-188-01
• TEST DISC (MO : Magnet Optical Disc)
PTDM-1 P/N : J-2501-054-A
※ Linking data already registered
• LASER POWER METER
LPM-8001 P/N : J-2501-046-A
• ERROR RATE COUNTER
MDPE-1 P/N : J-2501-047-A

PIN FUNCTION

 : Indicates corrected portion

Page	INCORRECT	CORRECT																								
34	<table border="1"> <thead> <tr> <th>Pin. No.</th> <th>Name</th> <th>I/O</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>QFP</td> <td>VQFP</td> <td></td> <td></td> </tr> <tr> <td>34</td> <td>32</td> <td>DQSY O</td> <td>Output of subcode Q Sync (SCOR) in digital IN U-bit CD format.</td> </tr> </tbody> </table>	Pin. No.	Name	I/O	Function	QFP	VQFP			34	32	DQSY O	Output of subcode Q Sync (SCOR) in digital IN U-bit CD format.	<table border="1"> <thead> <tr> <th>Pin. No.</th> <th>Name</th> <th>I/O</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>QFP</td> <td>VQFP</td> <td></td> <td></td> </tr> <tr> <td>34</td> <td>32</td> <td>DQSY O</td> <td>Output of subcode Q sync (SCOR) in digital IN U-bit CD format.</td> </tr> </tbody> </table>	Pin. No.	Name	I/O	Function	QFP	VQFP			34	32	DQSY O	Output of subcode Q sync (SCOR) in digital IN U-bit CD format.
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SECTION 4 TEST MODE

The microcomputer of this set provides the TEST mode.

The following describes TEST mode function and its operating method.

[CAUTION ON LASER EMISSION]

Never look into the laser unit from top position when confirming laser emission during adjustment. Otherwise, you could lose your eyesight.

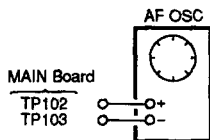
[CAUTION in TEST mode]

- Pressing ENTER key with all servo ON erases the contents of disc(UTOC erasing).
- Confirm RF waveform since no playback signal is output during playback in the TEST mode.

[Activation or deactivation of TEST mode]

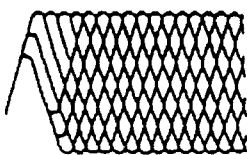
1. With an AC cord unplugged and battery removed, short JR106 with solder jumper.
2. Plug—in the AC cord, and the TEST mode will be activated.
3. To deactivate the TEST mode, remove the solder jumper.

[Checking RF waveform]



1. Place the set in STOP status, and connect an oscilloscope to TP102.
2. Select either CLV servo mode of "a" to "d" listed in Table 2 on page 39, and load a suitable disc(MO should have been already written).
3. Press the PLAY key, and RF waveform will be output.
4. Check that proper waveforms are output in all modes "a" to "d" listed in Table 2

RF signal Waveform



[Operation in TEST mode]

1. Output of SIN wave

- 1-1. After power ON initialization, the SIN wave of 1KHz -12dB is output from LINE OUT and PHONE, which will be continuously output until any key is pressed(but, this operation is only performed immediately after power ON).
- 1-2. The audio circuit will be normal if this signal is output.

- * The 212-byte data is transferred from IC801 (microcomputer)to IC602 and IC602 generates a fixed pattern.

2. Checking loading operation of cassette compartment

- 2-1. Loading is started when caddy is inserted.
- 2-2. The caddy is ejected when EJECT key is pressed.
- 2-3. The head is moved up and down when pressing PAUSE key with an MO disc loaded. (Do not use CD disc.)

- * Unplug the power cord immediately when you find any abnormality because the cassette compartment keeps operating by ignoring mechanical failure.

3. Checking servo system

3-1. Checking laser emission

- 3-1-1. Confirm that repetitional operation of laser beam emission and lens up-down movement is performed when pressing the PLAY key without loading a disc.
- 3-2. Focus search and CLV is kicked up to rough servo
- 3-2-1. Load a disc and press the PLAY key in STOP status.
- 3-2-2. Focus search, Focus on and CLV-A are executed.
- 3-2-3. Disc reflection is checked, and the laser power is set to MO/CD READ power.
- 3-2-4. Tracking brake is turned on.

3-3. All servo ON

- 3-3-1. With the set in STOP status or during servo system check 3-2, press PLAY key.
- 3-3-2. Focus on, CLV-A, sled motor and tracking motor are turned on respectively.

- 3-4. Movement of optical pickup
- 3-4-1. With the set in STOP status or during servo system check 3-1, 3-2, 3-3, press NEXT key.
- 3-4-2. The sled motor and tracking run forward while the NEXT key is pressed.
- 3-4-3. With the set in STOP status or during servo system check 3-1, 3-2, 3-3, press PREV key.
- 3-4-4. The sled motor and tracking reverse while the PREV key is pressed.
- 3-4-5. Check for smooth operation.
- 3-5. All servo OFF
- 3-5-1. With the set in STOP status or during servo system check 3-1, 3-2, 3-3, press STOP key.
- 3-5-2. Focus on, CLV – A, sled motor and tracking motor are turned off respectively one by one.

4. Switching laser power

- 4-1. With the set in STOP status, press EDIT key.
- 4-2. Each time the EDIT key is pressed, laser power varies like : [CD-READ] → [MO-READ] → [3.5mW] → [MO-WRITE] → [OFF] ([Laser CD PIT] → [Laser MO GRV] → [Laser 1/2 GRV] → [Laser MOW GRV] → [Laser OFF PIT])

Remarks : In the CD/MO READ power mode, the module is turned on about 10ms after the laser is turned on.

- * Use for MO – WRITE power adjustment and READ power checking.

5. Checking REC monitor system

- 5-1. With the set in STOP status, press REC key.
- 5-2. The input status at the time when REC key is pressed is activated (see Table 1).

Table 1

OPTICAL (DIGITAL) IN	MIC IN	INPUT STATUS
Not connected	Not connected	Analog
Connected	Not connected	Digital

Remarks : 1) IC301(MIC line IN, AMP)
 IC309(AD converter)
 IC603(ATRAC)input interface
 IC601(EFM encode, decode)digital
 IN/OUT These can be checked.

Remarks : 2) IC601 COMMAND DATA

AIN : SYSTEM SET	\$ 80. 04
SYSTEM CONTROL	\$ 81. 20
DIN : SYSTEM SET	\$ 80. 24
SYSTEM CONTROL	\$ 81. 38

6. Selection of CLV servo mode

- 6-1. With the set in STOP status, press PLAY key and PLAY MODE key, so that each mode is selected depending on setting of REFLECT, RESUME and HOLD switches as shown in Table 2.

Table 2

Mode	Operation			Applicable disc	LCD DISPLAY	CLV mode
	REF.	RESUME	HOLD	Applicable area	PIT/GRV	
a	L	ON	HOLD	CD:PIT	PIT	EFM
b	H	ON	HOLD	MO:PIT	GRV	EFM
c	H	OFF	HOLD	MO:Recorded	GRV	EFM
d	H	OFF	OFF	MO:Groove	GRV	ADIP

- * Always use a disc suitable for each mode.
- * REF. is automatically changed over when caddy is loaded, It is in "H" status when caddy is not loaded, or in "L" status when TP520 is connected to GND.
- * In mode "b", optical pickup must be positioned on the most inside track.
- * In mode "c" and "d", move optical pickup to proper Groove area.

7. Linking data recording 1

(for checking recording error rate)

- 7-1. Load an Mo disc and press REC key(no IN terminal is connected : Analog recording).
- 7-2. Move optical pickup to a proper position in Groove area. (Inside from 0600. FC cluster)
- 7-3. Press PLAY key and PLAY MODE key to activate ALL SERVO ON status.
- 7-4. When pressing REC key, the pickup makes an access to 0600. FC cluster to start linking recording.
- 7-5. Upon display of 0700. FC cluster, press STOP key, and the pickup makes an access to 0600. FC and stops.

8. Linking data recording 2(for adjusting focus bias)

- * This disc has been registered as a service tool.
- * Prepare for focus bias adjustment because it takes about 20 minutes to complete this operation.

- 8-1. Load an MO disc and press REC key(no In terminal is connected : Analog recording).
- 8-2. Move optical pickup to a proper position in Groove area.
- 8-3. Press PLAY key, PLAY MODE key, "O" key and REC key, and the pickup makes an access to 0032 cluster.
- 8-4. Perform linking recording over 0700. cluster display (for about 20 minutes), then stop by pressing the STOP key.

9. LCD display

POWER ON	'■■■■■■■' (ALL on)
(POWER ON & LOAD/EJECT)	'Welcome to Disc World' (Continuous scroll)
	' [SONY] '
1st line	
PLAY KEY	'Focus Srch'
	'Focus ON ! '
STOP KEY	'ALL SV OFF'
P MODE KEY	'ALL SV ON'
NEXT KEY	'T. SLED FWD'
PREV KEY	'T. SLED RVS'
REC KEY	'REC' analog'
	'RED digital' (When DIGITAL IN is connected)
2nd line	
EDIT KEY	'Laser OFF PIT'
	'laser CD PIT'
	'laser MO GRV'
	'laser 1/2 GRV'
	'laser MOW GRV'
P MODE KEY	'xxxxC xxS' } (Displayed alternately with DATE key.
	'Error-xxxx' } Cluster (error) is displayed at All servo on.

[Reference]

1. Erasing of UTOC area

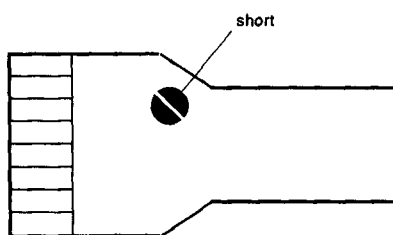
CAUTION : This should be executed only when the contents of disc are not erased completely through ALL ERASE operation because the contents of UTOC area are all erased, resulting in an empty disc just as a new disc.

- 1-1. Press NEXT key to move optical pick up to a proper position in Groove area.
- 1-2. Press PLAY key and PLAY MODE key to place the set in ALL SERVO ON status.
- 1-3. When pressing ENTER key, the pickup makes an access to inside track, erases UTOC area, and stops.

SECTION 5 ELECTRICAL ADJUSTMENTS

[Notes]

1. Adjust all items in the listed order (up to (1-10) when optical pickup is replaced).
2. Power supply voltage : DC10. 5V
3. Use a disc(MO or CD)suitable for the CLV servo mode, whenever so specified.
4. Place the set in TEST mode before adjustment (see page 2) and reset the mode after adjustment.
5. Short the laser taps on flexible board with solder during removal and mounting, because optical pickup could easily be broken by static electricity.



optical pickup flexible board

[Before adjustment]

Place the set in TEST mode, and perform operation check in TEST mode and confirm the following items.

1. Checking power supply

- 1-1. In the TEST mode, check that each output voltage satisfies standard value (in this set, no adjustment can be made because of parts layout, and therefore replace the unit if power supply is faulty).

	Standard value	
UPV	6. 5V±0. 5	TP405
CPUV	4. 0V±0. 15	TP841
4. 5	4. 5±0. 2	TP402
VP	5. 5±0. 2	TP404
4. 1	4. 1V±0. 1	TP401
4. 75	4. 75V±0. 2	TP403
REC(recording)	4. 0V±0. 05	TP910
10	8. 7V±0. 2	TP1

[Adjustment]

1-1. Adjustment of temperature compensation

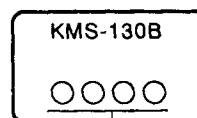
1. With the set in cold status, measure voltage at TP120.
2. Calculate voltage based on the room temperature, then adjust RV509 meeting that value.

Remarks : 1) Compensated voltage will vary in a step of $-9\text{mV}/\text{deg}$ (voltage lowers by 9mV when room temperature rises 1°C) on the basis of voltage at TP120 at room temperature 25°C ($\text{VC}=0\text{V}$).

Remarks : 2) Temperature sensor : Q512 (on operation board)

1-2. Adjustment of MO write power

1. Short R530 (between TP550 and TP120).
2. Press te EDIT key four times to display "LaserMOW" (write power mode).
3. Place a probe of laser power meter on objective lens and fix the probe where meter indicates the maximum reading.
4. Adjust RV505 so that meter reading is $6. 8\text{mW}\pm 0. 1$.
5. Measure voltage between TP126 and 127 and calculate current from resistance across these test points to confirm that it is within $\pm 30\%$ of the value specified on optical pickup label.



Current

(Example : $1072=107.2\text{mA}$)

6. Remove a short between TP120 and TP550.

- * Some of the following adjustments use both CD (PIT) and MO(PIT/Groove)discs. In such a case, switch the CLV servo mode by referring to page 39.
- * In order to activate REF-L(Table 2 - a)without using a disc (CD status), TP520 must be shorted to GND.

1-3. Adjustment of focus offset

1. Place the set in STOP status (disc must be removed).
2. Short TP105 to VC(TP101).
3. Adjust RV511 in PIT mode (Table 2 - a), or RV510 in Groove mode (Table 2 - d) so that the voltage at TP107 is $VC \pm 50mV$.
4. Remove a short between TP105 and VC.

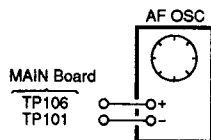
* For the PIT mode, connect TP520 to GND with a jumper wire, and remove the wire after adjustment.

1-4. Adjustment of FOK offset

1. Place the set in STOP status(disc must be removed).
2. Adjust RV512 in PIT mode (Table 2 - a), or RV513 in Groove mode (Table 2 - d)so that the voltage at TP103 is $VC \pm 50mV$.

1-5. Adjustment of tracking error

1-5-1. Up to last digit—12 of main board



1. Activate MO-PIT, EFM-CLV mode(Table 2 - b).
2. Load an MO disc and optical pickup moves to the most inside track, then press the PLAY key.
3. Connect an oscilloscope to TP106, and adjust RV504 so that a waveform at TP106 is vertically symmetric(noise measures).
4. Press the STOP key and optical pickup moves to middle track(Groove area).
5. With MO-GRV, ADIP-GRV mode (Table 2 - d). press PLAY key for focusing, and press EDIT key to activate the write power mode("LaserMOW" is displayed).

At this time, adjust RV501 so that a waveform at TP106 is vertically symmetric against VC.

6. Repeat steps 1) to 3) for adjustment, then unload the disc.
7. Activate CD-PIT, EFM-CLV mode (Table 2 - a). (Connect TP520 to GND with a jumper wire)
8. In the STOP status, adjust RV503 so that the voltage at TP106 is $VC \pm 50mV$.

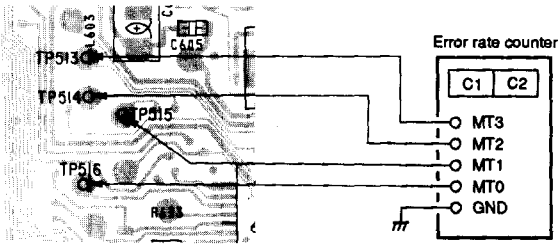
9. Load a CD disc, and press PLAY key and adjust RV502 so that a waveform at TP106 is vertically symmetried against VC.

10. Remove a jumper wire between TP520 and GND.

1-5-2. Up to last digit -13 of main board

1. Place MO in GRV status and ADIP in CLV status (Table 2 - d).
2. Load an MO disc, move the optical pickup to a middle track of disc, and press the PLAY key.
3. Connect an oscilloscope to TP106, and adjust RV504 so that a waveform at TP106 becomes vertically symmetric against VC.
4. Press the EDIT key to select WRITE POWER mode ("Laser MOW" is displayed).
5. Adjust RV501 so that waveform at TP106 becomes vertically symmetric against VC.
6. Press the EDIT key to select READ POWER mode ("Laser MO" is displayed), and execute above steps 1 to 3 again.
7. Place MO in PIT status and EFM in CLV status (Table 2 - b).
8. Move the optical pickup to the most inside track of disc, and press the PLAY key.
9. Adjust RV502 so that a waveform at TP106 becomes vertically symmetric against VC.
10. Press the STOP key, and unload an MO disc.
11. Place CD in PIT status and EFM in CLV status (Table 2 - a).
12. Load a CD disc, and press the PLAY key.
13. Adjust RV503 so that a waveform at TP106 becomes vertically symmetric against VC.

1-6. Adjustment of focus bias

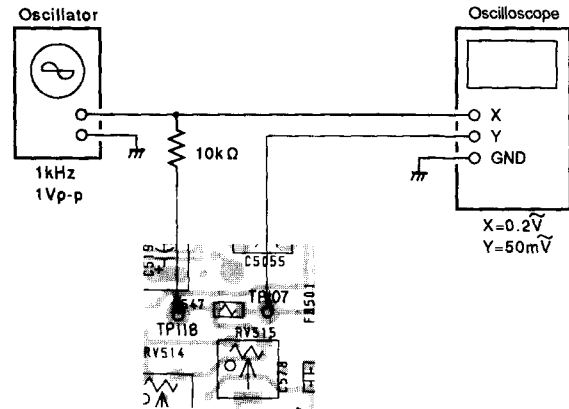


1. Load an MO disc on which the linking data recording 2 as described on page 40 was executed, and press PLAY key on inside track in Groove area, then the PLAY MODE key.
2. Adjust RV508 to search a point where the error rate (C1) is about 100 or 200, then press STOP key.
3. Record voltage at TP107.
4. Again perform playback and adjust RV508 in reverse direction of step 2) to search a point where the error rate (C1) is about 100 or 200, then press STOP key.
5. Record voltage at TP107.
6. Adjust RV508 so that the voltage at TP107 is intermediate value of those measured in steps 3) and 5).

1-7. Adjustment of CD read power

1. Load a CD disc.
2. Turn on the HOLD and RESUME switch (Servo = PIT, CLV = EFM). (Table 2 - a)
3. Press the PLAY key, then the PLAY MODE key.
4. Adjust RV519 (on main F board) so that the RF amplitude (at TP102) is $1.0V \pm 0.1$.

1-8. Adjustment of focus gain



1. Load a disc (CD / MO), and press the PLAY key, then PLAY MODE key.
2. Enter 1kHz 1Vpp from oscillator to TP118 through 10kΩ.
3. Draw Lissajous' figure on oscilloscope with the oscillator output assumed as X axis and TP107 output as Y axis.
4. Adjust on the oscilloscope so as to attain the status (a=b) shown in Fig. 1.
5. Adjust each RV so that phase difference is $95 \pm 5 \text{ deg}$ (Fig. 2).

For CD (Table 2 - a) : RV515

For MO (Table 2 - d) : RV514

1-9. Adjustmetnt of tracking gain

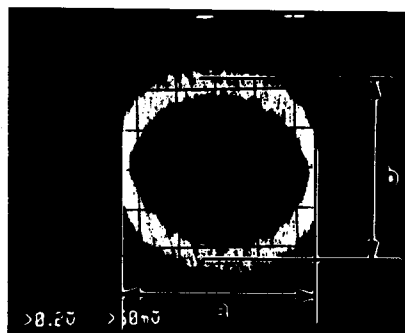
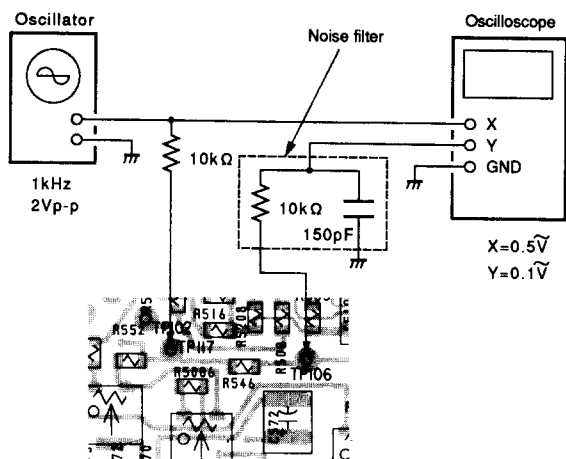


Fig. 1 Focus gain adjustment (95 deg)

1. Load a disc(CD/MO), and press the PLAY KEY, then PLAY MODE key.
2. Enter 1kHz 2Vpp from oscillator to TP117 through 10kΩ.
3. Draw Lissajous' figure on oscilloscope with the oscillator output assumed as X axis and TP106 output as Y axis.
4. Adjust on the oscilloscope so as to attain the status (a=b) shown in Fig. 1.
5. Adjust each RV so that phase difference is 100 ± 5 deg (Fig. 2).

For CD (Table 2 - a) : RV516

For MO (Table 2 - d) : RV517

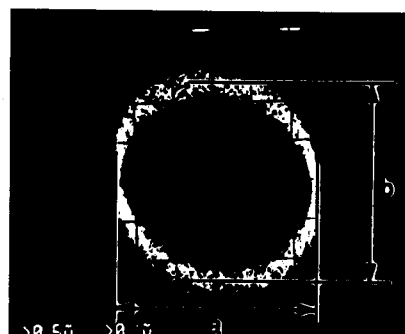
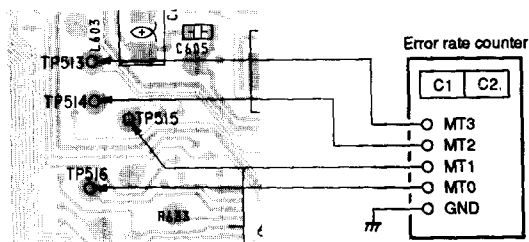


Fig. 2 Tracking gain adjustment (100 deg : inserting noise filter)

1-10. Confirmation of recording(playback)error rate



1. Connect the error rate counter (TP513-516, GND).
2. Perform the linking data recording 1 from 0600. FC cluster to 0700. FC cluster (for more than 2 minutes), then press the STOP key.
3. Press the PLAY key, and the PLAY MODE key. (table 2 - d)
4. Confirm error rate from 0600. FC cluster to the end of recording.

Max. C1 error rate : 100 or less
C2 error : No interpolation

* If this condition is not satisfied, check disc for damage or dust.

Remarks : LCD display will be switched between error and cluster number each time the DATE key is pressed.

1-11. Adjustment of encoder PLL

1. Make sure that nothing is connected to the DIGITAL LINE IN terminal.
2. Press the REC key, and adjust RV602 so that the waveform at TP545 is vertically symmetric against VC.

1-12. Adjustment of DIGITAL IN PLL

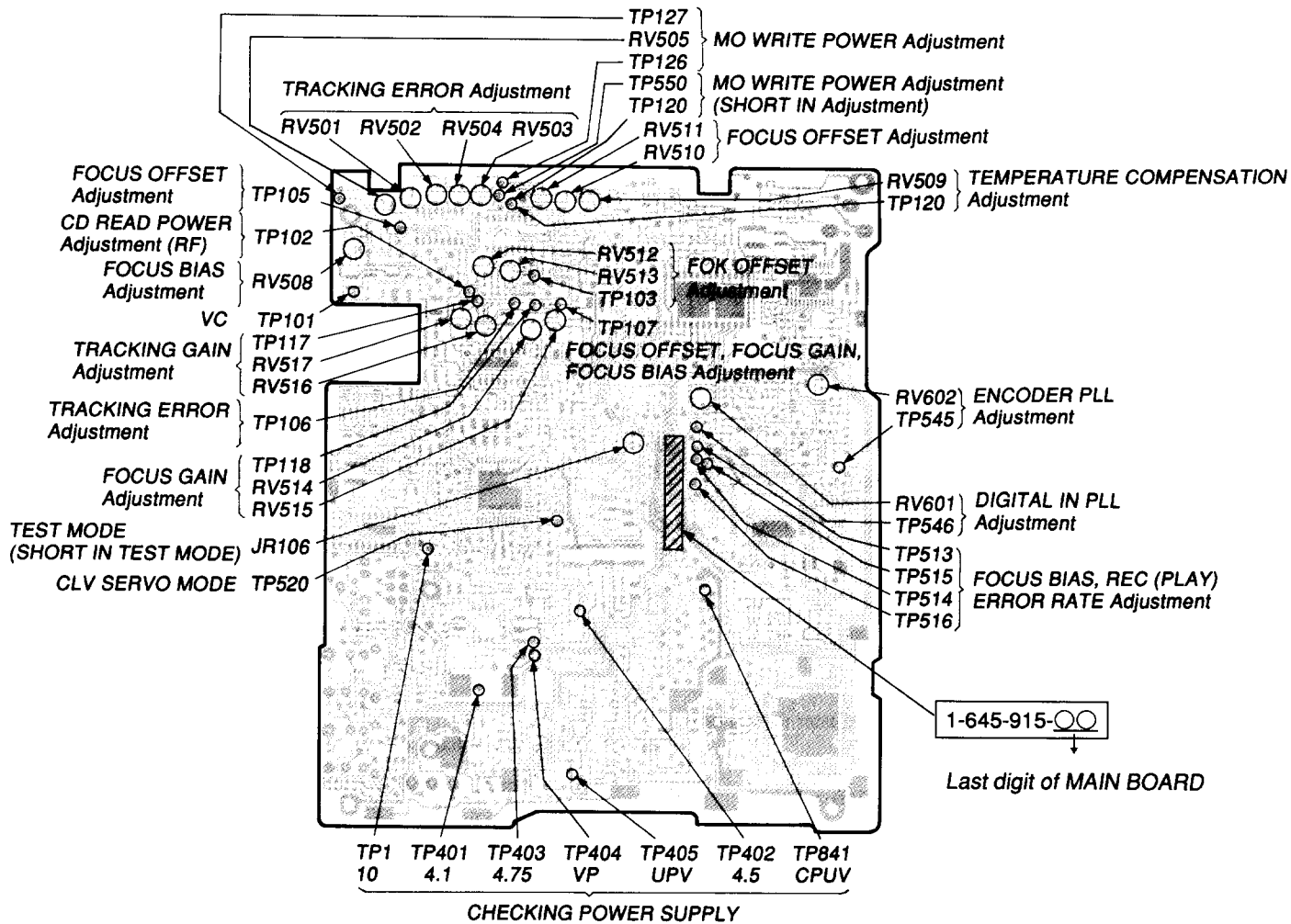
1. Connect digital output of CD player to the DIGITAL IN terminal of the set, and place the CD player in play back status.
2. Press the REC key, and adjust RV601 so that the waveform at TP546 is vertically symmetric against VC.

1-13. Charging Operation Check

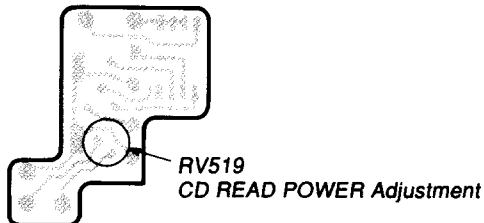
1. Supply 10.5V to DC jack from external power supply connected with an ammeter while pressing the DATE (DISPLAY MODE) key to activate the POWER SUPPLY TEST mode. At this time, the "スタンバイ" is displayed on the screen.
2. Press the DATE key 5 times to display "チャージ".
3. Insert a battery which is not charged fully.
The ammeter indicates between 0.8 and 1.0A.
4. Press the PLAY key once to activate the CHARGE OPERATION CHECK mode. (Display will not change.)
5. Confirm that the ammeter indicates between 0.8 and 1.0A.
(Confirming charging voltage control circuit)
6. Lower the power supply voltage to 8V. The ammeter indicates about 0.4A.
7. Confirm that the set completes charging operation in about 30 seconds, then the "スタンバイ" is displayed.
(Confirming completion of charging operation)

Note : Pressing the PLAY key twice causes the CHARGE OPERATION CHECK mode to be returned to POWER SUPPLY TEST mode. Therefore, the PLAY key must be pressed only once.

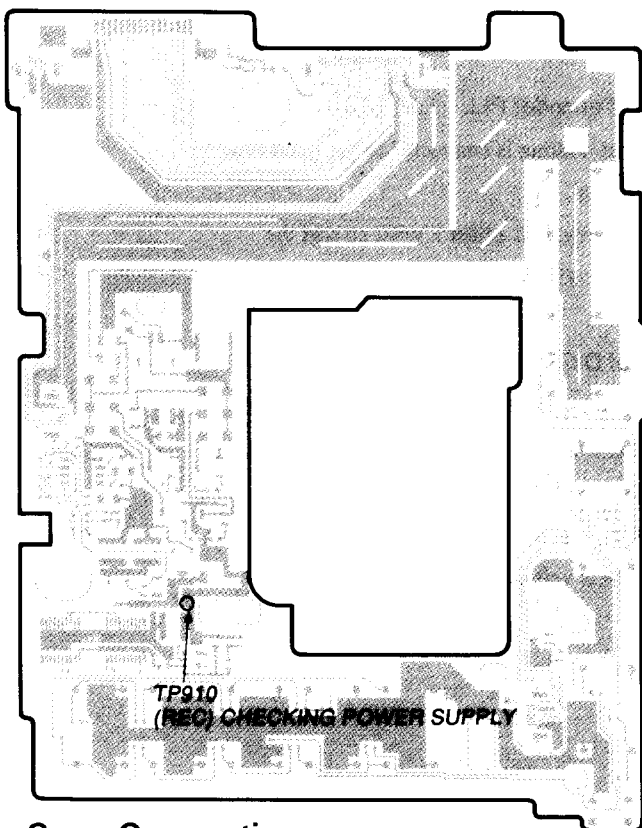
[MAIN BOARD] (SIDE-B)



[MAIN F BOARD] (Component side)



[CONTROL BOARD] (Component side)



9-957-535-91

Sony Corporation
General Audio Group

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93C1897-1
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