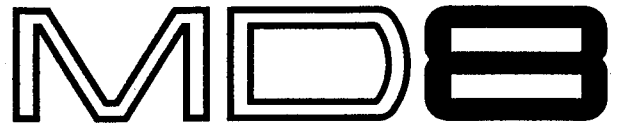


MULTITRACK MD RECORDER



MD8 Adjustment Manual

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1 MD8 Error Code Table

| | Error Number | Contents |
|----|--------------|--|
| 1 | Disc ERROR01 | Recording Re-try Failure |
| 2 | Disc ERROR02 | Recording Data Overflow |
| 3 | Disc ERROR03 | PLAY Data Lack (to indicate data overflow at Recording) |
| 4 | Disc ERROR10 | Address Inconsistency at recording |
| 5 | Disc ERROR08 | A magnetic head doesn't fall down. |
| 6 | ERROR01 | Sled (or laser unit) doesn't move to inside. |
| 7 | ERROR02 | Sled doesn't move to outside. |
| 8 | ERROR04 | A magnetic head doesn't rise. |
| 9 | ERROR05 | Spindle Error |
| 10 | ERROR06 | Focus Error |
| 11 | ERROR07 | Tracking Error |
| 12 | ERROR08 | A magnetic head doesn't search. |

2 Preparations

Adjustment STEP Table

| STEP Number | Title | Purpose | Remarks |
|-------------|---|---|----------------------|
| STEP 00 | I/O Port Check | | For factory use only |
| STEP 01 | VCO Oscillator Frequency Adjustment | | Manual adjustment |
| STEP 02 | ATrac LSIs Check | | Check |
| STEP 03 | Laser Power Reference Voltage Check | | Check |
| STEP 04 | APC Drive Circuit Check | | Check |
| STEP 05 | MD Mechanism Check | | For factory use only |
| STEP 06 | Focus Off-Set Adjustment (FOK) | ABCD 0 adjustment in laser off condition | Automatic Adjustment |
| STEP 07 | Focus Off Set Adjustment | FE 0 adjustment in laser off condition | Automatic Adjustment |
| STEP 08 | APC Temperature compensation Adjustment | Temperature Detector Circuit Adjustment Temperature of the Diode is used. | Automatic Adjustment |
| STEP 09 | Laser Power Adjustment | Laser Power Adjustment Read Power is check only | Manual Adjustment |
| STEP 10 | Tracking Off Set Initial Adjustment | Recordable Disc Groove Part Rough Adjustment | Automatic Adjustment |
| STEP 11 | LG Tracking Balance Adjustment | Tracking EF Balance Rough Adjustment | Automatic Adjustment |
| STEP 12 | LG Tracking Off Set 2 Adjustment | Recordable Disc Groove Part Tracking Gain Adjustment | Automatic Adjustment |
| STEP 13 | LG Tracking Balance 2 Adjustment | Tracking EF Balance Precise Adjustment | Automatic Adjustment |
| STEP 14 | LG Tracking Gain Adjustment | Recordable Disc Groove Part Tracking Gain Adjustment | Automatic Adjustment |
| STEP 15 | LG Focus Gain Adjustment | Recordable Disc Groove Part Focus Gain Adjustment | Automatic Adjustment |
| STEP 16 | LG Focus Bias Adjustment | Recordable Disc Groove Part Focus Bias Adjustment to minimum Jitter. | Automatic Adjustment |
| STEP 17 | LP Tracking Off Set Adjustment | Recordable Disc Pit Part EF Balance Adjustment | Automatic Adjustment |
| STEP 18 | LP Focus Bias Adjustment | Recordable Disc Pit Part Focus Bias Adjustment to minimum Jitter. | Automatic Adjustment |
| STEP 19 | HP Tracking OFF Set Adjustment | Pre-mastered Disc Off-Set Adjustment | Automatic Adjustment |
| STEP 20 | HP Tracking Gain Adjustment | Pre-mastered Disc Tracking Gain Adjustment | Automatic Adjustment |
| STEP 21 | HP Focus Gain Adjustment | Pre-mastered Disc Focus Gain Adjustment to minimum jitter. | Automatic Adjustment |
| STEP 22 | HP Focus Bias Adjustment | | Automatic Adjustment |

(LG = Low refraction Groove ALow = Low refraction Pit AHP = High refraction Pit)

The MD8 is adjusted by using a personal computer and the adjustment program. The adjustment program contains the two kinds of programs. One is for manual adjustment mode and the other is for automatic adjustment mode. Load these programs into the personal computer and adjust the MD8 according to the indication of the display.

1. Main Circuit Board Adjustment (STEP 01~04)

By using this mode, the check and the change in the adjustment steps can be performed. Normally this adjustment is not required. When the main circuit board has replaced, this adjustment should be performed.

2. Automatic Adjustment Mode (STEP06~22)

By using this mode, the adjustment can be performed automatically and sequentially the except STEP 09 from the STEP 06 to the STEP 22. (The STEP 09 can be done by Manual Adjustment)

3. Kinds of the Program Mode

md8con = Adjustment Main
 md8con -a = Starting from the selected STEP
 md8con -s = STEP SETTING
 md8man = Manual Mode

* The automatic adjustment should be done as soon as the power switch turned on. If long time has passed after turning the power switch on, the temperature of the main circuit board rises up and the TEMP and GAIN adjustment can not performed correctly.

A. ADJUSTMENT PREPARATION

The devices, the TEST Disks and the jigs are required for the adjustment.

Devices:

Program Disk for adjustment
 Personal Computer DOS/V or PC98**
 Frequency Counter
 Digital Multi-Meter
 Oscilloscope 2ch, more than 100 MHz
 TX800630 Laser Power Meter
 TX800640 Sensor for Laser Power Meter

Test Discs:

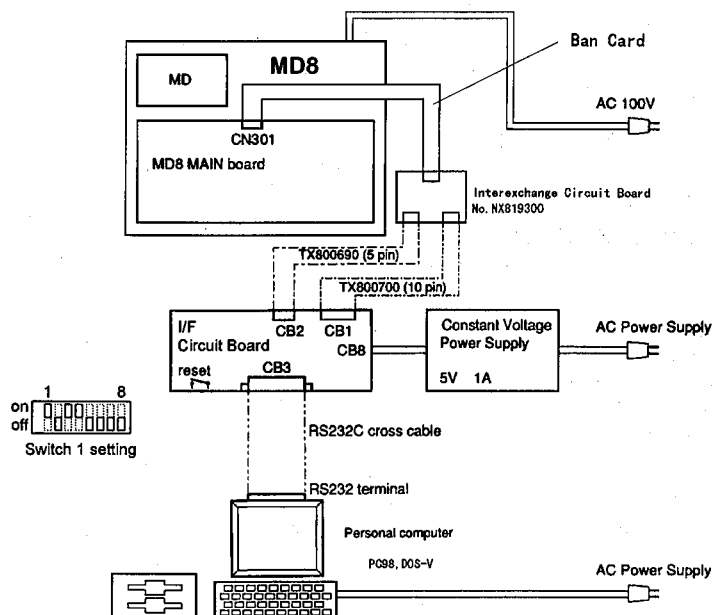
TX800710 Reference Disc MDW-74/AU1
 (This disk is supplied for a blank disk . Before using this disk, record a sound signal to the last.)
 TX800720 Test 1 TGYS1(Sony MD Audio Test-1)
 MD DATA 140MB (MMD-140)

Jigs:

TX800650 Adjustment Jig Circuit Board (I/F Circuit Board)
 NX819300 Adjustment Jig Additional Kit
 Interexchange
 Interexchange Circuit board1, Rom1, (common for MD4/MD8)
 Interexchange Cable2, Ban Card2
 TX800690 5P cable (Connection cable between the I/F Circuit Board and MD8)
 TX800700 10P cable (Connection cable between the I/F Circuit Board and MD8)
 TX800660 Ceramic Driver(For STEP 09 adjustment)
 Reference Voltage Power supply For the Adjustment Jig Circuit Board (5V, 1A)
 RS232C Cross Cable Connection cable between the personal computer and the I/F circuit board.
 CX816070 ROM FRAME Parts on the Adjustment Jig Circuit Board.

B. Connections

Referring the disassembly procedure of the service manual, remove the bottom cover of the MD8. Connect the MD8, the devices and the jigs with the cables. (Fig. 1)



(Fig1)

C POWER ON Procedure

After connecting the MD8, the devices and jigs, turn the power switches on in the order below.

- (1) Turn the power switch of the personal computer on.
- (2) Turn the power switch of the I/F Circuit Board.
- (3) While pressing the [DISPLAY] and the [ENTER] of the MD8, turn the power switch on and set the MD8 to the PC mode. (When the "PC mode Rev 32" is displayed on the LCD of the MD8, the test mode can be entered.)

(MD8 Display)
PCmode Rev32

(Display)

A>

1 Opening the Adjustment Main Program

Insert the floppy disk for Adjustment Program to the Floppy Disk slot of the personal computer. Change the computer mode to the MS-DOS and select the 3.5" Floppy Disk Drive.

ex. If "A:" is input and the [RETURN] key is pressed when "C>" is displayed, the "A" drive can be selected. Input "md8con" after A>, and press the [RETURN] key.

(Display)

>md8con

The display changes as blow.

(Display)

Check MD8-Farmwore-Version....Done32
Check EEPROM..Done06
Load data to PWMports....

After a while, the display changes as blow.

(Display)

MD8 MANUAL OPERATION CONTROLLER ver19 Nov 13 1997

00

| | | | |
|-------------------|----------------------------|------------------|----------------------------|
| Laser | 1:on 0: off | rEflexivity | B Direct serial command |
| Focus | 1:on 0: off | 1: high 0: low | R Macro |
| Tracking | 1:on 0: off | pit/Groove | H Toc display |
| Sled | 1:on 0: off | 1: pit 0: groove | I UToc display |
| X Move center | | readWrite | J Load data from DRAM file |
| Y Move onner | | 1: write 0:read | N Write UTOC |
| All servo off | 10ad all pwmports | <x1.25 >:x2.50 | |
| Kick set | Variable pwmport | P EEPROM display | |
| 0: move | write md-lsi Command | Quit | |
| 1: 1 track kick | read Md-lsi status %adjust | | |
| 2: 10 track kick | [write gate-arrays | 0: FOKOFT | 1: FCSOFT |
| 3: 32 track kick |]read gate-arrays | 2: init TRKOFT | 3: LG TRKBAL |
| 4: 64 track kick | (write eeprom | 4: LG TRKOFT | 5: LP TRKBAL |
| 5: 128 track kick |)read eeprom | 6: HP TRKOFT | 7: LG FCSBIAS |
| | Dump CCT Z Dump DRAM | 8: LP FCSBIAS | 9:HP FCSBIAS |
| right outside | -:off ^:SUBQorADIP \ | | |
| left inside | Current address | | |
| down head down | (off) | | |
| up head up | C1 error | | |
| | Header | | |

2 Set up of the Step Number

When starting from the STEP 01

Press the [()] key.

```
(Display)

MD8 MANUAL OPERATION CONTROLLER ver19 Nov 13 1997      00

Laser 1:on 0: off  rEflexivity          B Direct serial command
Focus 1:on 0: off  1: high 0: low       R Macro
Tracking 1:on 0: off  pit/Groove        H Toc display
Sled 1:on 0: off  1: pit 0: groove      I UToc display
X Move center      readWrite power     J Load data from DRAM file
Y Move onner      1: write 0:read       N Write UTOC
All servo off     10ad all pwpports    <x1.25 >:x2.50
Kick set          Variable pwpport     P EEPROM display
0: move          write md-lsi Command   Quit
1: 1 track kick  read Md-lsi status  %adjust
2: 10 track kick ]read gate-arrays      0: FOKOFT 1: FCSOFT
3: 32 track kick (write eeprom      2: init TRKOFT 3: LG TRKBAL
4: 64 track kick )read eeprom      4: LG TRKOFT 5: LP TRKBAL
5: 128 track kick Dump CCT Z Dump DRAM 8: LP FCSBIAS 9:HP FCSBIAS
right outside    -:off ^:SUBQorADIP \
left inside      Current address
down head down  ( off )
up head up      C1 error
Header
write E2PROM [ adr+data ] =
```

Input "0001" and press the [ENTER] key twice.

```
(Display)

MD8 MANUAL OPERATION CONTROLLER ver19 Nov 13 1997      00

Laser 1:on 0: off  rEflexivity          B Direct serial command
Focus 1:on 0: off  1: high 0: low       R Macro
Tracking 1:on 0: off  pit/Groove        H Toc display
Sled 1:on 0: off  1: pit 0: groove      I UToc display
X Move center      readWrite power     J Load data from DRAM file
Y Move onner      1: write 0:read       N Write UTOC
All servo off     10ad all pwpports    <x1.25 >:x2.50
Kick set          Variable pwpport     P EEPROM display
0: move          write md-lsi Command   Quit
1: 1 track kick  read Md-lsi status  %adjust
2: 10 track kick ]read gate-arrays      0: FOKOFT 1: FCSOFT
3: 32 track kick (write eeprom      2: init TRKOFT 3: LG TRKBAL
4: 64 track kick )read eeprom      4: LG TRKOFT 5: LP TRKBAL
5: 128 track kick Dump CCT Z Dump DRAM 8: LP FCSBIAS 9:HP FCSBIAS
right outside    -:off ^:SUBQorADIP \
left inside      Current address
down head down  ( off )
up head up      C1 error
Header
write E2PROM [ adr+data ] =0001
```

When starting from the STEP06

Press the [] key.

```
(Display)
MD8 MANUAL OPERATION CONTROLLER ver19 Nov 13 1997      00

Laser 1:on 0: off  rEflexivity          B Direct serial command
Focus 1:on 0: off  1: high 0: low       R Macro
Tracking 1:on 0: off pit/Groove         H Toc display
Sled 1:on 0: off  1: pit 0: groove      I UToc display
X Move center      readWrite power     J Load data from DRAM file
Y Move onner      1: write 0:read       N Write UTOC
All servo off     10ad all pwmports    <x1.25 >:x2.50
Kick set         Variable pwmport      P EEPROM display
0: move          write md-lsi Command  Quit
1: 1 track kick read Md-lsi status    %adjust
2: 10 track kick [write gate-arrays   0: FOKOFT 1: FCSOFT
3: 32 track kick ]read gate-arrays    2: init TRKOFT 3: LG TRKBAL
4: 64 track kick (write eeprom       4: LG TRKOFT 5: LP TRKBAL
5: 128 track kick )read eeprom      6: HP TRKOFT 7: LG FCSBIAS
Dump CCT Z Dump DRAM 8: LP FCSBIAS 9:HP FCSBIAS
right outside     -:off ^:SUBQorADIP \
left inside       Current address
down head down   ( off )
up head up       C1 error
Header
write E2PROM [ adr+data ] =
```

Input "0006" and press the [ENTER] key twice.

```
(Display)
MD8 MANUAL OPERATION CONTROLLER ver19 Nov 13 1997      00

Laser 1:on 0: off  rEflexivity          B Direct serial command
Focus 1:on 0: off  1: high 0: low       R Macro
Tracking 1:on 0: off pit/Groove         H Toc display
Sled 1:on 0: off  1: pit 0: groove      I UToc display
X Move center      readWrite power     J Load data from DRAM file
Y Move onner      1: write 0:read       N Write UTOC
All servo off     10ad all pwmports    <x1.25 >:x2.50
Kick set         Variable pwmport      P EEPROM display
0: move          write md-lsi Command  Quit
1: 1 track kick read Md-lsi status    %adjust
2: 10 track kick [write gate-arrays   0: FOKOFT 1: FCSOFT
3: 32 track kick ]read gate-arrays    2: init TRKOFT 3: LG TRKBAL
4: 64 track kick (write eeprom       4: LG TRKOFT 5: LP TRKBAL
5: 128 track kick )read eeprom      6: HP TRKOFT 7: LG FCSBIAS
Dump CCT Z Dump DRAM 8: LP FCSBIAS 9:HP FCSBIAS
right outside     -:off ^:SUBQorADIP \
left inside       Current address
down head down   ( off )
up head up       C1 error
Header
write E2PROM [ adr+data ] =0006
```

3 Check of the Step Number

Press the [D] key. Then the "read E2PROM [adr]=" is displayed.
Input "00" and Press the [ENTER] key.

A step number is shown on the display.

```
read E2PROM [adr] =  
= 01 or 06 is displayed.
```

4 Exit of the Program

When the [Q] key is pressed after pressing the [ENTER] key, the personal computer can exit from the Adjustment Main Program.

| |
|--|
| (Display) MD8 Controller finished A: > |
|--|

5 Initialization of the E2PROM

When the "write E2PROM [adr+data] = " is displayed after pressing the [I] key on the Adjustment Main Program, input the "0080" and press the [ENTER] key. Then the E2PROM can be initialized. After setting the STEP number, don't initialize the E2PROM.

6 Another setup manner of the Step Number

The MD Adjustment Program can be started from the optionally selected step.

Load of the Program

Insert the Adjustment Program disk into the Floppy Disk slot of the computer.

After the "A>", input the "md8con -s" and press the [ENTER] key. (Before "-s", insert a space.)

```
(Display)
>md8con -s
```

The display changes as below.

```
(Display)
MD4 Controller for Adjusting Ver. 15 Jun 21 1996 YAMAHA corporation
Check file(md4con.set) Done
Initialize Serial port Done
```

Soon the display changes as next.

```
(Display)
Check MD8-Farmwore-Version....Done32
Check EEPROM..Done06
Load data to PWMports....
```

The display below is the example of setting the STEP "06".

```
(Display)
Step Converter for MD8
Select the New Step Number with left key or right key!!
Done? [y/n]
Current Step = 06 Adjust FOK OFFSET
New Step = 06 Adjust FOK OFFSET
```

Select the New Step "06" by using the cursor keys ("←" and "→") and press, the [y] key.

```
(Display)
MD8 Controller finished
A:>
```

After the "A>", input the "md8con -a" and press the [ENTER] key (Before "-a", insert a space)

```
(Display)
A:>md8con -a
```

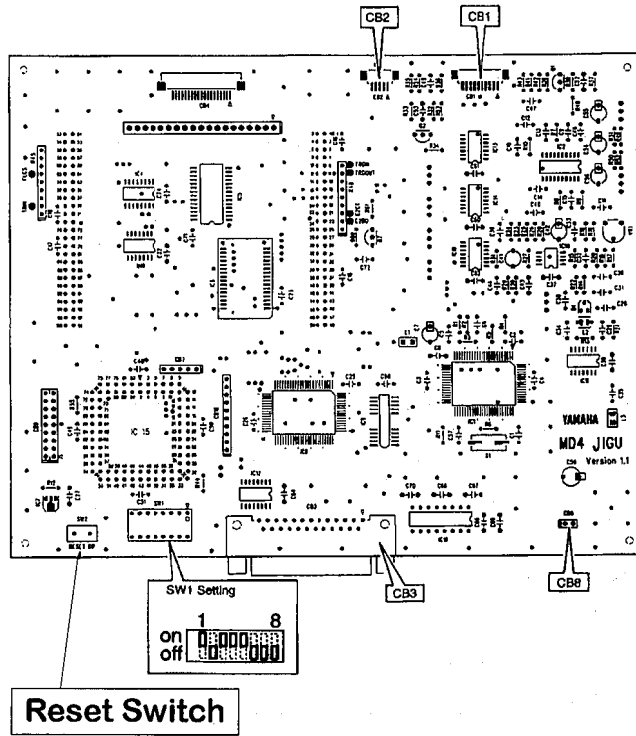
The display changes as blow

```
(Display)
Check MD8-Farmwore-Version....Done32
Check EEPROM..Done06
Load data to PWMports....
```

Soon the display changes as next.

(Display)
Push Reset SwitchDone? (y/n)

After pressing the reset switch of the Adjustment Jig Circuit Board, press the [y] key. (Fig. 2)



(Fig. 2)

The EEPROM IC can be initialized.

(Display)
Initialize EEPROM....

After pressing of the EEPROM IC, the personal computer enters to the FOK Adjustment automatically.

3 Automatic Mode

When starting the Adjustment from the Step 06, enter to the test mode in the manner page 6.

STEP 06 Focus Off Set Adjustment (FOK)

It takes a little time depended on the PC model to show the display below. ([*]= undefined)

```

(Display)

      ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
value =****

```

STEP 07 Focus Off Set Adjustment

```

(Display)

Step07: Now Adjusting Focus OFFSET.

      ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
value =****

```

STEP 08 APC Temperature Compensation Adjustment

This Adjustment can be performed automatically.

STEP 09 Laser Power Adjustment

(Rough Adjustment)

* Check that the Laser Power meter shows 780n long wave, if not so, after pressing the fÉ switch of the power meter, set the wave length to 780n. by using up/down switches.

```

(Display)

09 Step09: Adjust Laser Power.
Check FPC and Set Laser Power Monitor To MECHA unit
Insert Power Meter into MECHA unit
Done? [y/n]

```

After connecting the sensor (TX800640) to the Laser Power Meter (TX800630), insert the sensor (TX800640) to the MD8 disc slot and adjust the laser power by fitting the ceramic driver (TX800660) from the front right side to the VR1 of the HSUB1 Circuit Board.

```
(Display)
09 Step09: Adjust Laser Power.
  Check FPC and Set Laser Power Monitor To MECHA unit
  Insert Power Meter into MECHA unit
Done? [y/n] Yes
  Rough Adjust
  TP          Power-Meter
  Value 3.000 mW -- 3.900 mW
  AdjustVR1 (HSUB1)
Done? [y/n]
```

(Laser Power Adjustment)

Adjust the VR1 of the HSUB1 Circuit Board so that the Laser Power should be between 3.000 mW and 3.900 mW.(Fig 3)

(Fig. 3)

When the adjustment is finished, press the [y] key.

```
(Display)
09 Step09: Adjust Laser Power.
  Check FPC and Set Laser Power Monitor To MECHA unit
  Insert Power Meter into MECHA unit
Done? [y/n] Yes
  Rough Adjust
  TP          Power-Meter
  Value 3.000 mW -- 3.900 mW
  AdjustVR1 (HSUB1)
Done? [y/n] Yes
  Adjust MAX Write Power
  TP          Power-Meter
  Value 8.120 mW -- 8.220 mW
  AdjustVR1 (HSUB1)
Done? [y/n]
```

(MAX Write Power Adjustment)

Adjust the VR1 of the HSUB1 Circuit Board so that the Laser Power should be between 8.120 mW and 8.220 mW. (Fig. 3)

When the adjustment is finished, press the [y] key.

```
(Display)

09 Step09: Adjust Laser Power.
  Check FPC and Set Laser Power Monitor To MECHA unit
  Insert Power Meter into MECHA unit
Done? [y/n] Yes
  Rough Adjust
  TP          Power-Meter
  Value 3.000 mW -- 3.900 mW
  Adjust VR1 (HSUB1)
Done? [y/n] Yes
  Adjust MAX Write Power
  TP          Power-Meter
  Value 8.120 mW -- 8.220 mW
  Adjust VR1 (HSUB1)
Done? [y/n] Yes
  Check Read Power (Recordable Disc)
  TP          Power-Meter
  Value 850 µW -- 1250 µW
Done? [y/n]
```

(Laser Power check for Recordable Disc)

Adjust the VR1 of the HSUB1 Circuit Board so that the Laser Power should be between 850 µ W and 1250 µ W. (Fig. 3)

When the adjustment is finished, press the [y] key.

```
(Display)

09 Step09: Adjust Laser Power.
  Check FPC and Set Laser Power Monitor To MECHA unit
  Insert Power Meter into MECHA unit
Done? [y/n] Yes
  Rough Adjust
  TP          Power-Meter
  Value 3.000 mW -- 3.900 mW
  Adjust VR1 (HSUB1)
Done? [y/n] Yes
  Adjust MAX Write Power
  TP          Power-Meter
  Value 8.120 mW -- 8.220 mW
  Adjust VR1 (HSUB1)
Done? [y/n] Yes
  Check Read Power (Recordable Disc)
  TP          Power-Meter
  Value 850 µW -- 1250 µW
Done? [y/n] Yes
  Check Read Power (Pre-mastered Disc)
  TP          Power-Meter
  Value 400 µW -- 600 µW
Done? [y/n]
```

(Laser Power check for Pre-mastered Disc)

Adjust the VR1 of the HSUB1 Circuit Board so that the Laser Power should be between 400 µ W and 600 µ W. (Fig. 3)

When the adjustment is finished, press the [y] key.

STEP 10 Tracking Off Set Initial Automatic Adjustment

(Display)
0A Step10: Now Initial-Adjusting Tracking Offset.
Insert Recordable MD (AU-1) into MECHA unit.
Done? [y/n]

Insert the Reference Disk (TX800710) to the MD8 Disk slot and press the [key]. Then the automatic adjustment can be performed.

STEP 11 LG Tracking Balance Automatic Adjustment ([*]=undefined)

(Display)
0B Step11: Now Adjusting LG Tracking Balance
ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **

STEP 12 LG Tracking Off Set 2 Automatic Adjustment ([*]=undefined)

(Display)
0C Step12: Now Adjusting LG Tracking Offset 2
ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **

STEP 13 LG Tracking Balance 2 Automatic Adjustment ([*]=undefined)

(Display)
0D Step13: Now Adjusting LG Tracking Balance 2
ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **

STEP 14 LG Tracking Gain Automatic Adjustment ([*]=undefined)

(Display)

0E Step14: Now Adjusting LG Tracking Gain

```
ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
```

STEP 15 LG Focus Gain Automatic Adjustment ([*]=undefined)

(Display)

0F Step15: Now Adjusting LG Focus Gain

```
ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
```

STEP 16 LG Focus Bias Automatic Adjustment ([*]=undefined)

```
(Display)
Step16: Now Adjusting LG Focus BIAS.

Search port - value = 0x          C1 Error =  Header =
Search port - value = 0x          C1 Error =  Header =
fixed port - value = 0x          C1 Error =  Header =

C1 Error =  Header =
```

```
(Display)
Step16: Now Adjusting LG Focus BIAS.
Check (*1.25) c1<30 and jitter<25! [y/n]

Search port - value = 0x**        C1 Error = **** Header = *****
L on F on T on S on SV off
Search port - value = 0x**        C1 Error = **** Header = *****
L on F on T on S on SV off
fixed port - value = 0x**        C1 Error =  Header =

C1 Error =  Header =
```

Check that the average of the C1 Error value of the Fixed-port value is less than 30. After checking this, press the [y] key.

```
(Display)
0F Step16: Now Adjusting LG Focus BIAS
Check C1<30 and Jitter<25 [y/n]

search port-value = ****        C1 error = ****        Header =**** ****
L on F on T on S on SV off
search port-value ****        C1 error = ****        Header =**** ****
L on F on T on S on SV off
Fixed port-value **** C1 error = ****        Header =**** ****
```

Check that the average of the C1 Error value of the Fixed-port value is less than 30. After checking this, press the [y] key.

STEP 17 LP Tracking Off Set Automatic Adjustment ([*]=undefined)

```
(Display)
Step17: Now Adjusting LG Tracking Offset

ref-value =****
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
Port-value** vari-value**** ***** sv-state **
```


STEP 18 LP Focus Bias Automatic Adjustment ([*]=undefined)

```
(Display)

Step18: Now Adjusting LG Focus BIAS
Check c1<30 and jitter ! [y/n]

search port-value = ****      C1 error = ****      Header =**** ****
L on F on T on S on SV off
search port-value ****      C1 error = ****      Header =**** ****
L on F on T on S on SV off
Fixed port-value **** C1 error = **10      Header =**** ****
```

Check that the average of the C1 Error value of the Fixed-port value is less than 30. After checking this, press the [y] key.

STEP 19 HP Tracking Off Set Automatic Adjustment

```
(Display)

12 Step19: Now Adjusting HP Tracking offset
Insert Pre-mastered MD(TGYS1) into MECHA unit
Done? [y/n]
```

Insert the Test Disc (TX800720) to the MD8 Disc slot and press [y] key. Then the Adjustment can be performed automatically. From this point, the Adjustment Program can be performed automatically and sequentially.

STEP 20 HP Tracking Gain Automatic Adjustment ([*]=undefined)

```
(Display)

14 Step20: Now Adjusting HP Tracking Gain

ref-value =****
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
```

STEP 21 HP Focus Gain Automatic Adjustment ([*]=undefined)

```
(Display)

15 Step21: Now Adjusting HP Focus Gain

ref-value =****
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
Port-value** vari-value**** **** sv-state **
```

STEP 22 HP Focus Bias Automatic Adjustment ([*]=undefined)

```
(Display)

Step22: Now Adjusting HP Focus Bias

Check C1 and Jitter ! [y/n]

Push Reset Switch ....Done?(y/n)
```

After pressing the reset switch of the Adjustment Jig, press the [y] key. (Fig. 2)

```
(Display)

Step22: Now Adjusting HP Focus Bias
Check C1<30 and Jitter<25 [y/n]

search port-value = ****      C1 error = ****      Header =**** ****
L on  F on  T on  S on  SV off
search port-value ****      C1 error = ****      Header =**** ****
L on  F on  T on  S on  SV off
fixed port-value ****      C1 error = ****      Header =**** ****
```

When the "Check C1<30 and Jitter < 25? [y/n]" is displayed, press the [y] key.

```
(Display)

Step22: Now Adjusting HP Focus Bias

Done?[y/n]

search port-value = ****      C1 error = ****      Header =**** ****
L on  F on  T on  S on  SV off
search port-value ****      C1 error = ****      Header =**** ****
L on  F on  T on  S on  SV off
fixed port-value ****      C1 error = **10      Header =**** ****
```

Check that the average of the C1 Error value of the Fixed-port value is less than 30. After checking this, press the [y] key. After finishing this check, press the [y] key to display the Adjustment results. Check that Adjustment results are within the range of the reference table.

```
(Display)

80 EEPROM DATA LIST
```

The display changes to the Adjustment results.

```

(Display)

CHKBYTE  MD8VER  PCVER  PARITY
80 32 19 AC
REC MODE TEMP FOKOF FOFST
81 8F 7A 72
HP-PWR LP-PWR LG-PWR WR-PWR
77 72 72 2F
HP-FBIAS LP-FBIAS LG-FBIAS WR-FBIAS
70 70 6C 6C
HP-FGAIN LP-FGAIN LG-FGAIN WR-FGAIN
55 55 88 88
HP-TBAL LP-TBAL LG-TBAL WR-TBAL
91 91 91 91
HP-TOFST LP-TOFST LG-TOFST WR-TOFST
81 89 91 91
HP-TGAIN LP-TGAIN LG-TGAIN WR-TGAIN
34 6A 6A 6A
HP-FGAIN LP-FGAIN LG-FGAIN WR-FGAIN
55 55 BE BE
HP-TGAIN LP-TGAIN LG-TGAIN WR-TGAIN
34 8C 8C 8C

MD8 Controller finished

A>

```

The Adjustment is completed.

2-3 End of the program

When the STEP 22 is finished, the Adjustment program ends.

Reference

[MD8 Adjustment Result Reference Table] '97.11.20.

| 80 EEPROM DATA LIST | | | |
|---------------------|----------|----------|----------|
| CHKBYTE | MD8VER | PCVER | PARITY |
| 80 32 | 19 ** | | |
| REC MODE | TEMP | FOKOF | FOFST |
| 81 71 ~ A5 | 6C ~ 8C | 66 ~ 84 | |
| HP-PWR | LP-PWR | LG-PWR | WR-PWR |
| 77 72 | 72 2F | | |
| HP-FBIAS | LP-FBIAS | LG-FBIAS | WR-FBIAS |
| 6B ~ 7B | 6B ~ 7F | 68 ~ 7E | 68 ~ 7E |
| HP-FGAIN | LP-FGAIN | LG-FGAIN | WR-FGAIN |
| 2F ~ 6B | 2F ~ 6B | 49 ~ AB | 49 ~ AB |
| HP-TBAL | LP-TBAL | LG-TBAL | WR-TBAL |
| 84 ~ AA | 84 ~ AA | 84 ~ AA | 84 ~ AA |
| HP-TOFST | LP-TOFST | LG-TOFST | WR-TOFST |
| 6D ~ 93 | 76 ~ 96 | 7D ~ 99 | 7D ~ 99 |
| HP-TGAIN | LP-TGAIN | LG-TGAIN | WR-TGAIN |
| 34 ~ 84 | 68 ~ C0 | 68 ~ C0 | 68 ~ C0 |
| HP-FGAIN | LP-FGAIN | LG-FGAIN | WR-FGAIN |
| 2F ~ 6B | 2F ~ 6B | 76 ~ E3 | 76 ~ E3 |
| HP-TGAIN | LP-TGAIN | LG-TGAIN | WR-TGAIN |
| 34 ~ 84 | 8A ~ D5 | 8A ~ D5 | 8A ~ D5 |

When the Adjustment Result is within the range (**~**), it is OK.

Conditions

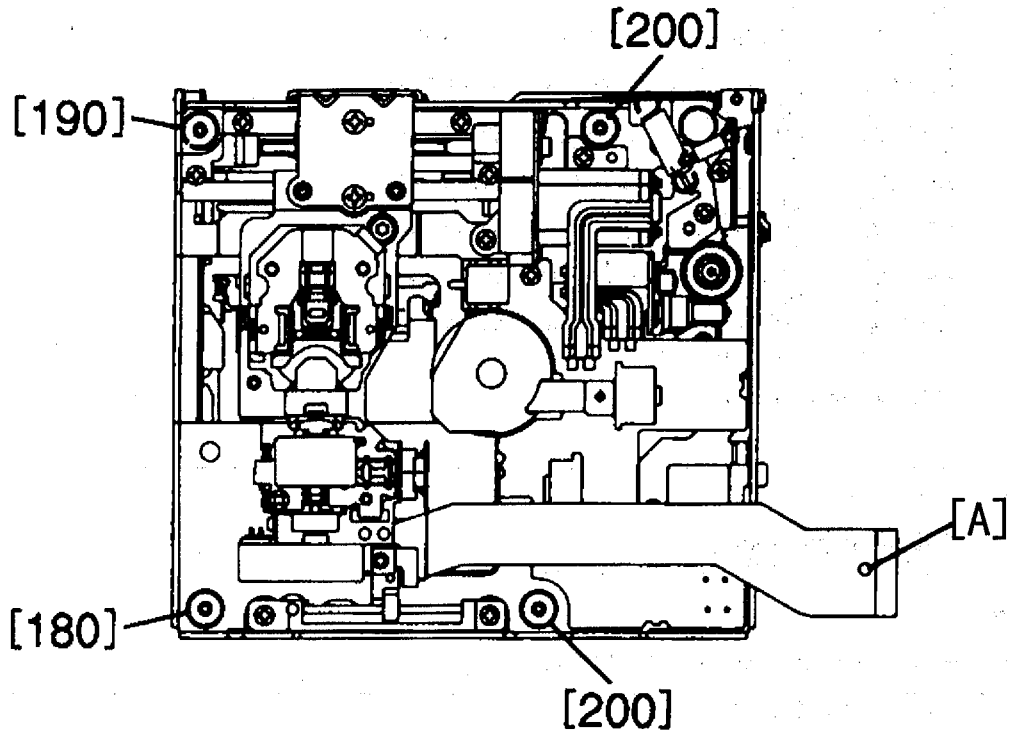
Check the conditions below

HP-FGAIN < LG-FGAIN

HP-TGAIN < LP-TGAIN

Adjustment of the Main Circuit Board

The Adjustment of the Main Circuit Board can be performed by using the STEPs from the STEP01 to the STEP04 to the by disconnecting from the MD Unit. Remove the CN1 cable of the HSUB Circuit Board attached with the MD Mechanism.(Fig.4)
The MD mechanism operation can be checked by visual on the STEP05. For this check, connect the MD mechanism Unit again.
* For the Laser Head protection in the mechanism, short-circuit with solder the Laser Head output terminal [A] of the connecting cable. (Fig. 4)



(Fig. 4)

The STEP Number Setting

By using the Adjustment Main Program or the SSTEP change Program (md8con -s), the step number can be set.

Load of the program

Insert the Adjustment Program Disk to the Floppy Disk slot. After "A>", input the "md8con -a" and press the [ENTER] key.

STEP 01 VCO Oscillation Frequency Check

(Display)

01 Step01: check Vco

Check upper of VCO... TP.....TP360 (ALRCK)
Value... 49.40 --- 49.41(KHz)

OK? [y/n]

By fitting the frequency counter terminal to the TP360 (ALRCK) terminal of the Main Circuit Board, rotate the VR1 to adjust 44.1KHz +/- 1KHz. When finishing the adjustment, press the [y] key.

(Display)

01 Step01: check Vco

Check upper of VCO... TP.....TP360 (ALRCK)
Value... 49.40 --- 49.41(KHz)

OK? [y/n] Yes

Check lower of VCO... TP.....TP360 (ALRCK)
Value... 38.79 --- 38.80(KHz)

OK? [y/n]

Check that the frequency of the TP360(ALRCK) terminal is within the ranges above.
When finishing the check, press the [y] key.

STEP 02 ATRAC LSIs Check

(Display)

02 Step02: check ATRAC LSIs
Input MUSIC signal to AD
and listen MUSIC through DA

OK? [y/n]

Inputting the music signals to Line 1-8 and raising the volumes of the CH CUE1-8 and the master volume up, check the ATRAC LSI by listening the track direct sound. When finishing this check, press the [y] key.

STEP 03 Laser Power Reference Voltage Check

```
(Display)

03 Step03: Check Laser Power Reference Voltage
Read Power
TP ..... TP105 (PREF)
Value ... 2.6 --- 2.8 (V)
OK? [y/n]
```

Press the [y] key.

```
(Display)

03 Step03: Check Laser Power Reference Voltage
Read Power
TP ..... TP105 (PREF)
Value ... 2.6 --- 2.8 (V)
OK? [y/n] Yes
Write Power
TP ..... TP105 (PREF)
Value ... 3.025 --- 3.225 (V)
OK? [y/n] Yes
```

By using a digital tester, check that the (PREF) terminal TP105 voltage of the Main Circuit Board is within the range above. When finishing the check, press the [y] key.

STEP 04 APC DRIVE Circuit Check

```
(Display)

04 Step04: Check APC Driver.
Laser OFF
  ILCC 0.0 --- 0.5 (V)   MOD 0.0 --- 0.5(V)
OK? [y/n]

Press the [y] key.

(Display)

04 Step04: Check APC Driver.
Laser OFF
  ILCC 0.0 --- 0.5 (V)   MOD 0.0 --- 0.5(V)
OK? [y/n] Yes
Laser Read mode
  ILCC 4.5 --- 5.5 (V)   MOD 2.55 --- 2.95 (V)
OK? [y/n]
```

Check that the ILCC terminal and the MOD terminal voltages of the Main Circuit Board are within the range above. When finishing the check, press the [y] key.

```
(Display)

04 Step04: Check APC Driver.
Laser OFF
  ILCC 0.0 --- 0.5 (V)   MOD 0.0 --- 0.5(V)
OK? [y/n] Yes
Laser Read mode
  ILCC 4.5 --- 5.5 (V)   MOD 2.55 --- 2.95 (V)
OK? [y/n] Yes
Laser Write mode
  ILCC 4.5 --- 5.5 (V)   MOD 1.9 --- 2.3 (V)
OK? [y/n]
```

Press the [y] key.

STEP 05 MD Mechanism Check

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Are you ready ? [y/n]

Press the [y] key.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Check M-Head moving downside [y/n]?

Press the [y] key.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Check M-Head moving upside [y/n]?

Press the [y] key.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Check O-Head moving outside [y/n]?

Press the [y] key.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Check O-Head moving inside [y/n]?

Press the [y] key.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
MECA-DATA Loading

After a while, the display changes as below.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Insert Pre-masterd MD [y/n]?

After setting the Test Disk (TX800710) into the MD Mechanism, press the [y] key.
After a while, the display changes as below.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Done ? push[y]
L on F on T on S on
Header 040A0D
SubQ 040506 (This number is undefined.)
C1 error 0004

When the C1 error is less than 30, press the [y] key.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Done ? push[y]
L on F on T on S on All off
Header 040A0D
SubQ 040506 (This number is undefined.)
C1 error 0004

Insert Recordable MD [y/n] ?

Press the [y] key.

(Display)
Step05: M-Head up / down, Sled moving and Servo signal check
Done ? push[y]
L on F on T on S on All off
Header 040A0D
SubQ 040506 (This number is undefined.)
C1 error 0004

Done ? push[y]
L on F on T on S on
Header 030A0D
Adip 030506 (This number is undefined.)
C1 error 0004

Press the [y] key.

(Display)
Step05: M-Head Up / Down, Sled Moving And Servo Signal Check
Done ? push[y]
L on F on T on S on All off
Header 040A0D
SubQ 040506 (This number is undefined.)
C1 error 0004

Done ? push[y]
L on F on T on S on All off
Header 030A0D
Adip 030506 (This number is undefined.)
C1 error 0004

When the C1 error is less than 30, press the [y] key.
After a while, the display changes as below.

(Display)

Continue ? [y/n]

To finish this Adjustment program, press the [n] key.

(Display)

A:>

When progressing to the STEP06, press the [y] key.

(Display)

Initialize EEPROM....

It takes a little time to progress the next step.

4. Manual Mode

MD8 Manual Mode Program

This Manual Mode is programmed for the customer service of the MD8. The operation check and the error check of each mode can be performed.

How to enter the program

After "A>", input the "md8man" and press the [ENTER] key.

| (Display) | | |
|---------------------------------------|------------------|------------------|
| MD8 MANUAL OPERATION CONTROLLER ver19 | | |
| PLAY MODE80 | LASER POWER MODE | OTHER FUNCTION |
| X move center | Y move inner | right outside |
| Cd type disc | Power meter disc | left inside |
| Mo type disc | Laser on | down head down |
| Laser on | Write power | up head up |
| Focus on | Read power | Kick on |
| Tracking on | All servo off | D EEPROM display |
| Sled on | Quit | All servo off |
| All servo off | | Quit |
| Quit | | |
| Focus | Adjust | |
| Tracking (OK) | 8.12---8.22mW | |
| Spindle (OK) | Check | |
| Sled (OK) | 850---1250uW | |
| C1 error **** | | |
| Header ***** | | |

Continuous PLAY MODE

- (1) Press the [X] key and move the pick-up to the central area of the Disk. When using a Pre-mastered Disc, press the [C] key. When using a Recordable Disc, press the [M] key. Next press the [L] key. Then the Laser will emit with the Read Power.
- (2) When pressing the [F] key, the Focus Search Operation is started. When the focus can be performed, the "OK" is displayed. When the focus can not be performed, the "Error" is displayed.
- (3) When pressing the [T] key, the Tracking Servo Operation is started. When the tracking can be performed the "OK" is displayed. When the tracking can not be performed, the "ERROR" is displayed. Soon after the tracking is started, normally the spindle servo operation is started and the "OK" is displayed. If not so, the "ERROR" is displayed.
- (4) When pressing the [S] key, the sled servo is started. When the sled servo can be performed, the "OK" is displayed. When the sled servo can not be performed, the "ERROR" is displayed. When the sled servo is performed, the C1 error and the Header address are displayed. When the C1 error is less than 30 and the Header address is simply increasing, the sled servo is OK. At this time, if the cursor key([←] or [→]) is pressed after pressing the [K] key, the 64 track jump operation can be performed.
- (5) If the [P] key is pressed after pressing the disk select key ([C] or [M]), the sequence program can be performed in the order ([L],[F],[T],[S] key operation.) above.

LASER POWER MODE

- (1) Press the [Y] key. Then the pick-up move to the center area of the disc.
- (2) Insert the POWER METER DISC and press the [Z] key.
- (3) Press the [L] key. Then the laser emits with the Read Power.
- (4) Press the [W] key. Then the laser changes to the Write Power.

At this time, the display shows as below

```
Adjust
8.12 ~ 8.22(m W)
```

When the value of the adjustment is not within it above, rotate the VR1 of the HUB1 circuit board to adjust the value of the POWER METER.

If the value is less than 8.12(mW) when the VR1 is rotated fully in clockwise. The laser may be degraded.

If the value is not changed when the VR1 is rotated, the VR1 or the HSUB1 Circuit Board may be abnormal.

When the value is changing but less than the standard value during the rotation of the VR1, the Head Error may occur. At this time, the display shows as below.

```
Check
850 ~ 1250(W)
```

Check the value of the POWER METER. If the sled can not be Performed, the "ERROR" is displayed. If the sled can be Performed, the C1 error and the Header Address are displayed. When the C1 error is less than 30 and the Header address is simply increasing, the result is OK.

OTHER FUNCTION

- **How To Save The Data**

When the cursor keys ([←], [→], [↑], [↓]) are pressed, the sled motor or the magnetic Head up motor can be operated even if the disc is not inserted.

When the [D] key is pressed, the current Adjustment data Table is displayed and the data can be stored into a Floppy disk if the data are needed.

- **How To Stop The Operation**

Press the [A] key. Then the all operations are OFF.

- **How To Finish The Program.**

Press the [Q] key. The program can be finished.