

A General

1. How to start Service Center

Click “ServiceCenter” icon in PRC-100 Menu. After start-up, a connection with I/O center is created and initial menu of Service Center is displayed automatically. If it is impossible to create a connection, a warning display is shown. (Press [Play] to create a connection.)

2. Number of ServiceCenters that can be connected to one piano

Any number of “Interfaces” can be connected to one piano, but only one “Service Center” can be connected to one piano.

3. How to enter Maintenance Mode

“Service Center” is accessible to general users, but “Maintenance Mode” is for servicing engineers only. To enter the mode, start "Service Center" and press and hold keys [D], [M], and [P] in sequence within a half second. Do not release any key when holding the keys. To go back to user mode of "Service Center" after entering "Maintenance Mode", press [U]. After entering the "Maintenance Mode", though, five software buttons will still be displayed in upper portion of the display.

In traditional models, “Maintenance Mode” is a mode for calibrations, but we refer to the entire program for service personnel as “Maintenance Mode” in this model. The “Maintenance Mode” is divided into two main categories, “Calibration” and “Test”.

4. How to quit

Press [Close] button in upper portion of the display, or [Fn] + [→] hardware buttons.

5. Changing character size in display

Change character size with [Fn] + [↑] / [↓]. (Caution: Fonts may be changed along with character size.)

6. Changing languages in display

[Fn] + [←] switches between English and Japanese. If the PRC-100 is export model, however, display is not shown in Japanese.

7. Software buttons

[Close] and [Back] buttons are displayed in upper portion of the display in “Service Center”. In “Maintenance Mode”, [Top], [Clr], and [Acoustic/Quiet] buttons are also shown.

- [Close] Closes an application. Same as pressing [E].
- [Back] Returns to previous menu. Same as hardware button [Back].
- [Top] Moves to the top menu of “Maintenance Mode”. Same as pressing [T].
- [Clr] Clears TextArea.
- [Acoustic/Quiet] Switches between Acoustic and Quiet.

8. Hardware buttons

- [◀◀] [▶▶]
- [play] [stop]
- [+] [-]
- [↑] [↓] [←] [→] (cursor buttons)
- [Enter] (round button between cursor buttons)
- [Fn] (keyboard function button)
- [A] – [Z] (keyboard)

9. Menu

The menus of the program are hierarchized. Menus are shown by graphic buttons and can be directly selected from touch panel. If using hardware buttons, select with [↑] or [↓] button and enter with [Enter] button.

10. About indications of “ / ” and “ . ” at the end of menu characters

A menu button with characters of the menu item ending with “ / ” indicates that submenus are operable under the menu. A menu button with its characters ending with “ . ” indicates that a function is executed with the button and that no submenus are under the menu.

11. TextArea

TextArea is a part in the display for displaying character string from I/O center or CSP. A scroll bar is displayed to the right.

12. Song playback method

Songs can be played with easy operation in “Maintenance Mode”. This function is added to play a song easily because it takes a lot of time and effort to close “Service Center” and run Interface for playback.

13. About Test Song

Test songs for maintenance are stored in an area which is not open to users.

14. About Dlog

CSP unit stores various logs (records) in database called dlog. The logs contain errors, warnings, normal, calibration record, start-up record memo, etc. These substitute for traditional error history.

15. Storing display contents (changing to a file)

If TextArea is shown, [S] adds its contents to a file “ta.txt” in a SD card. If dlog is shown, [S] adds the list to a file “dlog.txt” in a SD card. Both contain time information. If there is no previous file, a new file is created. If an SD card is not attached, error message is displayed.

16. Completion of calibration

When calibration is completed normally, C chord is played. In case of abnormal termination or forced termination, C minor or Cm-5 is played. The ending sound may not be heard if the calibration is performed in Quiet Mode, so attention is needed. (Pedal Calibration.)

17. Quick Calibration (Calibration without PRC)

Calibrates without PRC. While holding down the SW keys, 10 seconds or more after switched from [STANDBY] to [ON] in Media Center, (or over 5 seconds after CSP start-up), release the keys.

SW keys are the highest “C# (77key) + D# (79key)” and

- ① F# (82 key) Sensor calibration
- ② G# (84 key) Pedal calibration
- ③ A# (86 key) Key drive calibration

in turn. If one of F#, G#, A# keys is pressed, one calibration is performed. If more than one keys are pressed, calibrations are performed in turn.

“Pedal-HP Adjustment.” is performed separately from the above calibrations. Press “C# (77 key) + D# (79 key) + C (88 key)”.

- Pressing 3 keys delays mute.
- Pressing 1 key quickens mute.
- Turning on shift pedal enters and exits.

B Service Center/

“Service Center/” is an entrance to “Service Center” and is accessible to users. If you want to return to “Service Center” after entering “Maintenance Mode” described below, press [U].

1. Post Delivery Check

Post Delivery Check includes songs below. [Play] plays them by turns. [Stop] stops playback. Double-clicking on [Stop] returns to the beginning of the song. [◀◀] [▶▶] select songs. Selected song is shown in green and character string stored as lyrics show status.

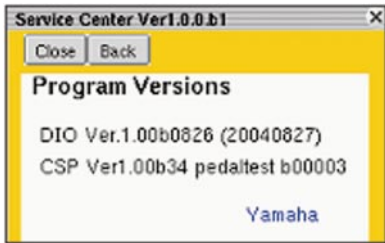


- Scale: (scale of piano) Shows key number.
- Right pedal movement
- Left pedal movement
- Right channel (audio sound. WAV)
- Left channel (audio sound. WAV)
- Both channels (audio sound. WAV)
- Melody (audio sound. Sound generator). The sound generator handles piano (AWM), Choir (XG), guitar (AWM), and SAX (AEM) in turn.

Selected songs are shown in green, and songs are selected with [◀◀] [▶▶]. (Take care that these are not cursor operations.) Pressing at short intervals repeatedly tentatively selects a song (yellow) and the song is selected when released.

2. Program Versions

Display contents are shown below.



- DIO version display
- CSP version display
- “Yamaha” characters (color is changed by communication status of “Disklavier Piano System”)
 - Blue: with HS, Green: without HS, Red: Malfunction in I2C (HS: Hammer Sensor)

Malfunction in I2C is inability of communication with MD, PD (pedal) or PS (power source).

3. Pedal Calibration

The same Pedal Calibration as the one in “Maintenance Mode”.

4. Piano Odometer

Displays integration value of CSP power on time.

C Maintenance Mode/

To enter the mode, start “Service Center” and press and hold keys [D], [M], and [P] in sequence. Do not release any key when holding the keys.

1. Check All Connection.

Displays the following results inquired of the system.



- DIO-Service Center Server:
- DIO-Remote Cntrl Server:
- CSP
- PS (Power Supply)
- MD (Motor Drive):
- Damper (Right) Pedal:
- Shift (Left) Pedal:
- Hammer Sensor:
- Key Sensor
- Key Drive
- 48V in Key Drive (2 points)
- 48V in Pedal Drive (damper and shift)

“ok” is displayed if connection is OK, and “---” is displayed if connection is not OK. “---” is displayed for Hammer Sensor of KS model (having no hammer sensors).

2. Disklavier Piano System/

Maintenances Disklavier Piano System.

2-1 Piano Information/

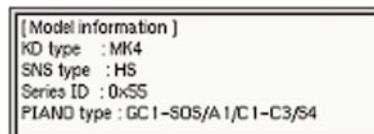
Displays various information on Disklavier Piano System.

2-1-1 Program Versions-Piano.

Displays versions of each module collected by CSP. CSP, CSP-LOADER, CSP-FLASH In/Out, HS-M4, PS (Power Supply), CSP-DIR, MD, PDL (Damper Pedal) and PDS (Shift Pedal) are displayed.



2-1-2 Model Info.

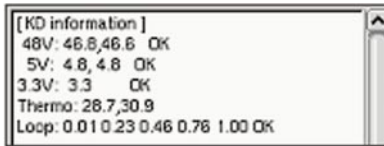


- KD type: Mk4/Pro
- SNS type: HS/KS
- Series ID: Model ID written to MIDI file
- Piano type: Sets piano size (proportion to pedal lever)

2-1-3 Key Drive Info.

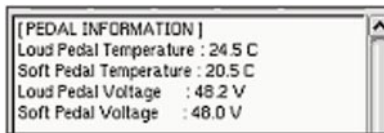
Displays AD values of each power supply voltage, temperature at 2 points in the unit (Thermo), and loop check of ASIC on KD circuit board. Loop Check checks if signal sent from CSP to ASIC returns, providing an indication if hardware circuits and connections are normal.

Whether the values are proper or not can be used for communications check of CSP and KD unit.



2-1-4 Pedal Info.

Displays AD values of solenoid-controlled voltage of 48 V and temperature on the surface of the solenoid monitored by PD (pedal drive).



2-1-5 Piano Odometer-Detail.

Displays overall power on time. Number of times each key was pressed.

2-1-6 Piano Type Setting (Pedal)

This enables model settings related to the following parameters.



- Lever ratio of right pedal
- Cancels sostenuto sensor in base damper model.
- Current value change of motor drive in CF

The models are as shown below.

- GC1 (base damper)
- GC1 (sostenute) A1/C1-C3/S4.
- C5.
- C6/C7/S6.
- CFIIIS.

2-1-7 Clear Odometer/

- Clear all except for total time.
- Clear all.
- Clear time only.

2-2 Piano Calibration-Standard/

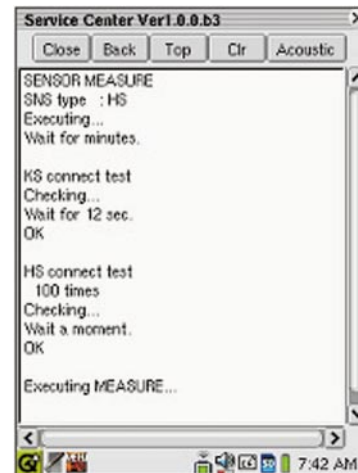
Standard calibrations are arranged in a group as Piano Calibration -Standard.

• Sensor Calibration.

Standard sensor calibrations. Sensors are calibrated in the order shown below. Time required: 4 minutes and 40 seconds (HS model). There is no difference between Pro and Mark IV, but some calibrations are omitted in KS model compared to HS model.

1. Light intensity, Received light step settings
2. Checks communication with KS
3. Checks communication with HS
4. Calibration of KS REST, END value
5. Tentative calibration of HS REST, END value-①
6. Tentative calibration of HS REST, END value-②
7. Precise calibration of HS END
8. Calibration of END value of HS when muted

Linearity Check of GS (Grey Scale) of hammer sensor is not performed in this step.

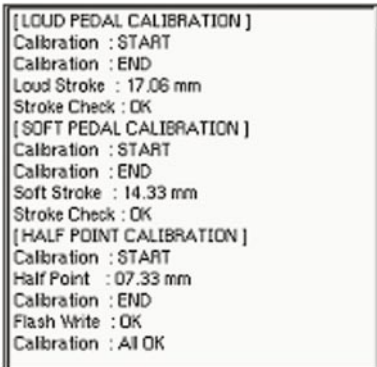


• Pedal Calibration.

Executes automatic calibration of pedals in the order shown below. Time required: Approximately 1 minute.

1. Right pedal (2 laps)
2. Measuring left pedal stroke (2 laps)
3. Half point automatic calibration (4 laps)

Half point should be adjusted manually if necessary.



• Key Drive Calibration-Std.

Time required: Approximately 6 minutes and 45 seconds

• Pedal-HP Adjustment.

Manual adjustment of half point. Adjustment of 1.5 seconds as before.



[Play]: Saves and completes.

[Stop]: Cancels.

[+]: Shortens.

[-]: Lengthens.

Automatically canceled if returned halfway by [Back].

2-3 Piano Calibration-Full/

• Calbr. in Series w/GS check.

Executes calibrations of sensor, pedals, and key drive in succession as entire check.

Time required: Approximately 17 minutes (Pro)

• Calbr. in Series w/o GS check.

Same calibrations as above except that above-mentioned GS (Grey Scale) linearity measurement is not included.

• Sensor Calibration w/ GS check.

GS (Grey Scale) linearity check is added to standard sensor calibrations.

Time required: Approximately 5 minutes and 30 seconds

1. Light intensity, Received light step settings
2. Checks communication with KS
3. Checks communication with HS
4. GS (Grey Scale) linearity check
5. Calibration of KS REST, END value
6. Tentative calibration of HS REST, END value –①
7. Tentative calibration of HS REST, END value –②
8. Precise calibration of HS END
9. Calibration of END value of HS when muted

• Pedal Calibration.

Exactly same as the standard Pedal Calibration.

• Key Drive Calibration.

Time required: Approximately 8 minutes and 30 seconds (MkIV), 10 minutes and 45 seconds (Pro).

If “E0” is displayed during calibration, it does not indicate any abnormality.

“E1” indicates error, requiring servicing.



- **Pedal-HP Adjustment.**

Exactly same as the Pedal-HP Adjustment of standard calibration.

2-4 Piano Calibration-Extra/

2-4-1 Sensor-Extra/

Special calibration of sensors are described below. These calibrations are not commonly used.

(1) Sensor Auto (Overrides Errors).

This menu continues calibration even if an error occurs halfway. KS/HS communication check and GS linearity check are omitted. Time required: 4 minutes and 30 seconds (HS model). Use this to override errors when calibration is necessary by any means.

(2) Sensor Manual (Overrides Errors).

This allows manual calibration. As automatic sensor calibration cannot be performed if key drive is defective, the manual calibration is performed. The order is shown below. Press [PLAY] button when appropriate according to the indication in the display. Precise string striking position of hammers may be lost, but it is no problem from a practical standpoint in most cases.

- REST reading of hammers and keys
- (All key should be pressed lightly by servicing personnel)
- Reading END of hammer and key (Reads minimum value of AD.)
- (Automatically goes to mute mode)
- Reads hammer END when muted.

(3) Key Drive-Extra (All Keys)/

Some items of key drive calibrations are separately performed on all keys. The items are shown below.

- Key Drive MM.
- Key Drive ON, OFF, ACC, ON-P.
- Key Drive ON.
- Key Drive OFF.
- Key Drive ACC.
- Key Drive ON-P.

(4) Key Drive-Extra (One Key)/

Some items of key drive calibrations are separately performed on a key. The items are shown below.

- 1Key Drive MM.
- 1Key Drive ON,OFF,ACC,ON-P.
- 1Key Drive ON.
- 1Key Drive OFF.
- 1Key Drive ACC.
- 1Key Drive ON-P.

Procedures of key selecting during 1 key calibration:

Keyboard Dialog is displayed (screen below)

Select a key using cursor or touch panel in the screen, and press [Enter].

A key can also be selected by pressing a key on the piano.

Pressing [Enter] will change the display to TextArea screen as with other calibrations, but calibration is not started.

Press [Play] to start.

Caution: Plural keys cannot be selected.



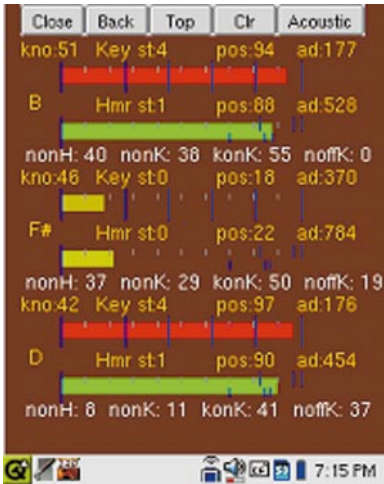
(5) Key Drive-ppp Adjustment.

Key Drive -ppp Adjustment is the same as that of prior Pro and are not used usually.

2-5 Piano Tests/

2-5-1 Sensor Depth Test (BarGraph).

Monitors AD value of both hammer and key sensors in realtime. Up to 3 keys are displayed.



St	Status, showing keys K1, K2, K3, K4, hammers M1, M2, or mute status.
Pos	Position (normalized with 0 being REST, and 100 being END.) Computed by ServiceCenter
Ad	AD value of light intensity
nonH	MIDI velocity by hammer sensor. This is the official velocity for HS model.
nonK	MIDI velocity by hammer sensor. This is the official velocity for KS model
konK	Key press event
noffK	Key release event

Key bar:

Blue vertical line indicates REST, K1, K2, K3, K4, and END. White scales divide REST and END (10mm) into 10 equal parts. Bar colors change as follows.

REST-K1	Brown
K1	Green
K2	Yellow
K3	Purple
K4	Red

Hammer Bar:

Blue vertical lines indicate REST and END. The upper half line indicates M1 and M2. The lower lines indicate M1 and M2 when muted.

White scales divide REST and END (48mm) into 10 equal parts. Bar colors change as follows.

REST-M1	Brown
M1	Green
M2	Yellow

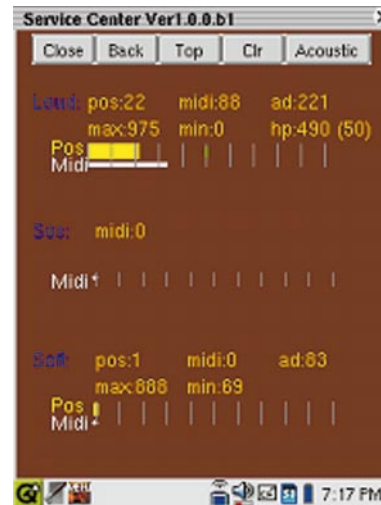
* Display may stop responding due to communications error. In that case, quit "ServiceCenter" and restart.

2-5-2 Pedal Depth Test (BarGraph).

Status of 3 pedals, Damper, Sostenuto, and Shift/Soft are shown in bars. The bars indicate both Pos (Position) and Midi (Midi value).

Loud vertical line in green indicates half point.

Sostenuto is an On/Off switch and only Midi is displayed.



pos	Position (normalized with 100 being END.)
midi	Midi value
ad	AD value
max	Maximum stroke gained by calibration
min	Minimum stroke gained by calibration
hp	Ad value of calibrated half point. Value in parentheses "()" are normalized value.

2-5-3 Key Sensing Stability.

Checks connection and communications with key sensor. Both centers and CPS are connected through long connectors with relays by high-speed communications. It takes about 10 seconds. **Do not move keys during this checking** because communication reliability depends on stability of AD values from each key. Error will happen if a key is moved.

2-5-4 Hmr Sensing Stability.

Checks connection and communications with hammer sensor. It takes about 10 seconds. 100 checks are performed to see stability of communications. 100 checks are performed to see stability of communications.

2-5-5 Check Brightness from AD.

Checks light intensity of AD value. Errors will happen if too dark.

2-5-6 Current AD of the Sensor/

Shows current AD value. The menu are divided into two submenus for Key and Hammer.

- Key AD.
- Hmr AD.

REST, END, and current AD value are shown. Hammer REST is generally 700 to 900 and END is about half as much. Key REST shows more variations in value because of lack of adjusting received light

2-5-7 Check Calibration Data/

Shows calibration results. The menu consists of the following submenus.

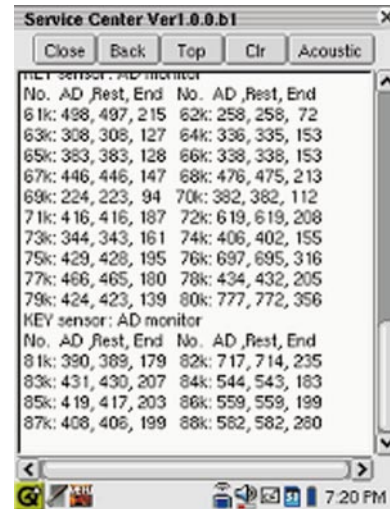
- Check Key Sensor Cal Data.
- Check Hmr Sensor Cal Data.

Reference of normal value for REST is 800, and about half as much for END. If the value for REST is 300 or under, it is abnormal.

- Check Hmr Sensor AD offset Data.

Shows AD offset results of light-sensitivity element. This is performed for hammer sensor only.

- Check Key Drive Cal Data.



2-5-8 Sensor Test-Extra/

(1) Check Sensor AD Volatility.

(2) Check Sensor Hmr GS Linearity/

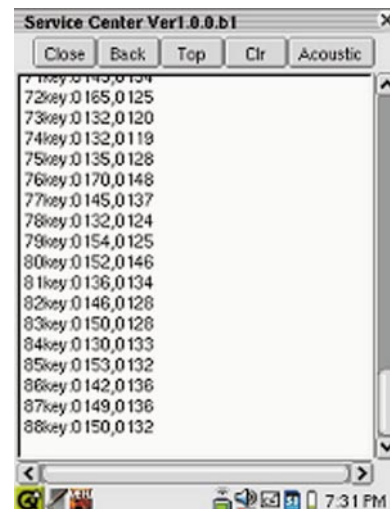
Press a key to check linearity of Grey Scale. In case of error, GS (Grey Scale) may be damaged or dirt may be attached to it. The menu consists of the following submenus.

- Execute Test.

Executes tests. Tests are also executed automatically when calibrating sensors.

- Results.

Shows results.



- Results-Graph.

This is a mode for showing results with a graph.



(3) Check Sensor Optical Step.

Light intensity (Key, Hmr) and received light (Hmr only) are adjusted to optimize light output, and their setting values are called "Step". The Step value is shown in this menu. The higher the both Step values, the higher the both AD values. For light intensity, four steps from 1 to 4 for each LED, and for received light, 8 steps from 1 to 8 for each key.

(4) Rest Value Validity Check.

Compares current AD value and REST value recognized in system. The two values should be about the same if the keys are in REST position.

If the system recognizes a Key REST value wrongly for some reason, playback volume will be out of the normal value.

(5) CSP-HS Data Direction check.

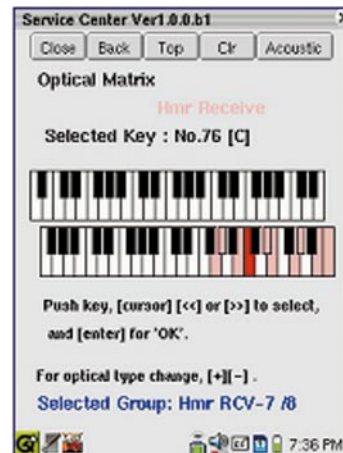
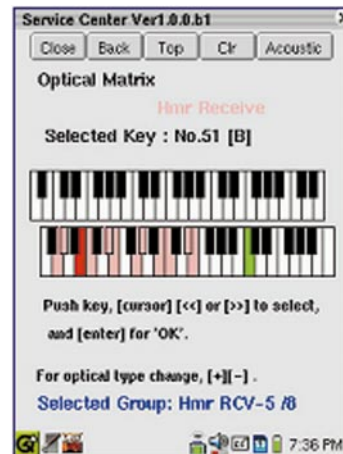
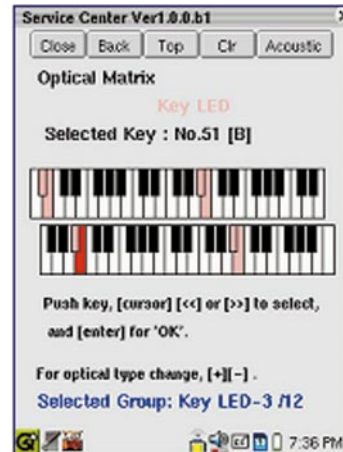
Checks CSP and HS communications in detail including directions. You will see if input to the HS or output from the HS is abnormal.

2-5-9 Sensor Test-Other Extra/

Other special sensor tests.

(1) Optical Matrix.

Checks matrix (wiring) of optical fiber.



Same as 1 key calibration (P.103). Use the keyboard dialog screen above.

- ① Tentatively select a key (green).
- ② Changes to red if determined.
- ③ Keys of the same group will be in pink at the same time.

Types of matrix (referred to as OpticalType) are

- Key light intensity (LED): 12 groups
- Key received light (Received) : 8 groups
- Hammer light intensity (LED): 12 groups
- Hammer received light (Received): 8 groups

which can be selected with [+] [-].

(2) Optical Step Adj-Auto/

One of the two ways mentioned below are selected when powering on, and optimizes light intensity. Light intensity is automatically set at each start-up.

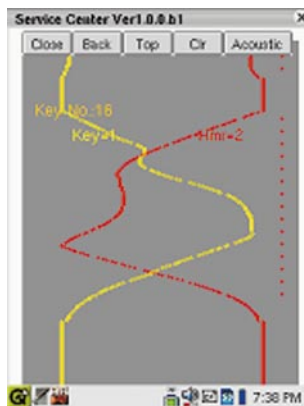
- High S/N.
- Long Shelf Life.

(3) Refresh All the Rest.

Renews REST values of the system to the current AD value.

(4) Sensor Draw Key Motion.

Draws movements of a hammer and key. The drawing is associated with pressed key.



2-6 Piano Test Play/

Tests for playback system.

2-6-1 Key Scaling.

[play] starts.

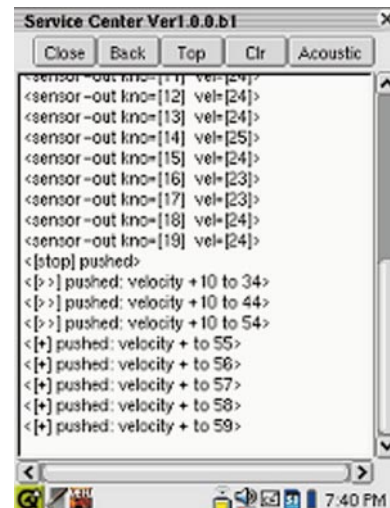
[stop] stops.

[+] [-] increase or decrease playback velocity by 1 step.

[◀◀] [▶▶] increase or decrease playback velocity by 10 steps.

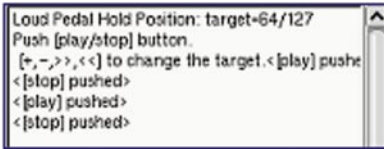
[Keyboard] jumps playback key.

Sensor values of played key are displayed as below.



2-6-2 Damper (Right) Pedal Hold.

Moves the pedal to the specified position.



2-6-3 Shift/Soft (Left) Pedal Hold.

Moves the pedal to the specified position.

2-7 CSP Update/

Updates CSP program.

2-7-1 Set the update media. Ready?.

Sets CSP program in Intel-Hex format to a media, FD, CD or USB memory.

Caution: As data are too big for FD, data are to be compressed by a prescribed way.

2-8 CSP Parameter Backup/Restore/

Reads or writes all parameters (calibration data and setting data) of CSP. The menu consists of the following submenus.

2-8-1 Backup CSP Param.-Execute.

Backups all parameters of CSP to HD (hard disk) of I/O center. Pressing this button starts backup immediately. It takes about 8 minutes in total. Status is displayed in percentage. CSP is automatically rebooted when backed up successfully.

Connecting to CSP
Connecting to CSP
Reading CSP 2 % (Status)

2-8-2 Restore CSP Param.-Execute.

Writes parameter from HD to CSP. When the button is pressed, the following will be shown in some seconds:

[Parameter Back Up File]
CSP Parameter: (2004/9/14/14:23) ← Example

Check the date and press [Play] to restore. Status is displayed in percentage. It will take about 1 minute and a half. Again, CSP is automatically rebooted when backed up successfully.

2-8-3 Copy CSP Param. fromHD toFD.

Copies the parameters backed up by the above way from HD to an FD.

2-8-4 Copy CSP Param. fromFD toHD.

Copies from an FD to HD.

3. <Database>/

This is a mode for accessing database in I/O center.

3-1 Song Library/

Accesses to song database.

3-1-1 Test (Closed Area).

The storage group of song data cannot be accessed from users and is operable in "Maintenance Mode" only.

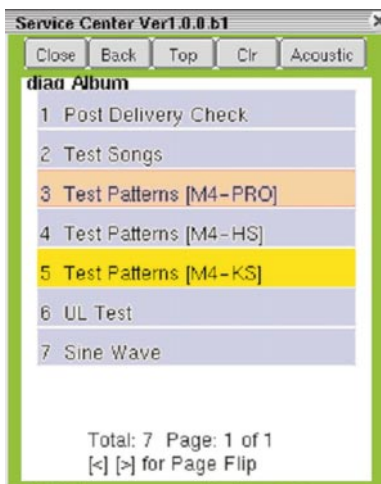
Press this button and "Album name list" is displayed, hierarchized by "Song list in album" and "1 song details".

3-1-2 PianoSoft., User., Audio., FD., CD., USB.

Same as the above test, but these groups are data users normally use.

Key functions for any test is as shown in the table below.

Function	Operating method
Starts playback.	[Play]
Stops playback.	[Stop]
Forward Song, Rewind Song	[<] [>] Moves in the page only. Press repeatedly a button and the song number will change by the number of times the button was pressed.
Goes to the beginning of a song.	Double-click [Stop] and the song will be stopped.
Changing time in a song.	Drag or click a time bar.
Main volume	[+] [-]
Transpose	[M]: +1, [N]: Reset, [B]: -1
Quiet, Acoustic switches	Software buttons in the display
Turning pages of list display	[←] [→]
Album/song temporary selection	[↑] [↓] Temporary selection is shown in yellow in the list.
Album/song temporary selection	[Play] or [Enter] Selected status is shown in red in the list.
Determines Album/song.	[Enter]



Album list



Song list



Song details

3-2 Edit Test Album/

Edits albums in test. The menu consists of the following submenus.

3-2-1 Copy from FD to HD/

- Are you sure? Yes.
- No, exit.

3-2-2 Copy from CD to HD/

- Are you sure? Yes.
- No, exit.

3-2-3 Rename Test Album.

3-2-4 Remove Test Album.

3-3 Log View/

Shows a log list like errors happened in the CSP. Warning, Calibration records, start-up records as well as errors are stored in a database. If 50000 or more logs are stored, older logs are automatically deleted.

Up to 2000 logs can be shown.

Basically, newer logs are shown first.

The log has the following fields as data structure.

- Id: Log number (shown as “original id”)
- Code: Log code
- Type: Log type (error, warning, memo, OK, etc.)
- Time: System time (I/O center time)
- Time After On: Elapsed time of CSP after turned on
- Msg: Message
- Msg_jp: Message in Japanese
- Location: Location information
- Loc-no: Location sub-information, key number, etc.
- Value: Value.
- Info: Other information.
- Display: Whether displayed by PRC

“null” in the display indicates that there is no value. “index” is keyboard operation:

[↑] [↓] Temporary selection of data (yellow)



[Enter] Selects data (red) and shows details.



If the following keys are pressed, only a list of the data having the same data as the temporary selected data is shown.

- [T] Data of the same type
- [C] Data of the same Code
- [P] Data whose Code starts with the same character (The first character of a Code indicates the reported module).
- [L] Data of the same Location
- [N] Data having the same Loc-No.
- [V] Sorts data according to Value. Switching between ascending order and descending order.
- [A] Displays all data before sorting.

3-3-1 All data/

Displays all data. The following data sorting can be selected.

- Order By Date/Time.
- Order By Code.
- Order By Type (E0,E1,LG,OK-).

3-3-2 Specific Date/

Searches for data according to date. The following search condition can be selected. The sorting according to date takes some time, and it may take about 20 seconds.

- Today.
- Since Yesterday.
- From 2days before.
- From 3days before.
- 1week.
- 2weeks.
- 3weeks.
- 1month.

3-3-3 All Errors (Type: E1)/

Shows only the whole errors.

- Order By Date/Time.
- Order By Code.

3-3-4 All Warnings (Type: E0)/

Shows only the whole warnings.

- Order By Date/Time.
- Order By Code.

3-3-5 All OKs (Type: OK)/

Shows OK records.

- Order By Date/Time.
- Order By Code.

3-3-6 All Memos (Type: LG)/

Shows records on memos. The memos refer to type field = "LG" log.

- Order By Date/Time.
- Order By Code.

3-3-7 Search For Special/

Searches for logs related to specific locations.

(1) CSP/

- CSP ALL.
- Errors.
- Warnings.
- CSP boot/exit records.
- CSP boot records.

(2) Key Drive/

- Key Drive ALL.
- Errors.
- Warnings.
- All Key Drive Memos.
- KD Temperature Memos.

("V=***" is shown for temperature value in the list. [v] re-sorts by temperature value.)

- KD Voltage Memos.

("V=***" is shown for voltage value in the list. [v] re-sorts by temperature value.)

- Calibration.

(3) Sensor/

- Sensor All.
- Errors.
- Warnings.
- OKs.
- Key.
- Hmr.
- Except Key/Hmr.
- Test Results.
- Calibration.

(4) Damper Pedal/

- Damper Pedal All.
- Errors.
- Warnings.
- Temperature Memos.

("V=***" is shown for temperature value in the list. [v] re-sorts by temperature value.)

- Stroke Calibration.
- Half Auto Calibration.
- Half Manual Calibration.

(5) Shift/Soft Pedal/

- Shift/Soft Pedal All.
- Errors.
- Warnings.
- Temperature Memos.

("V=***" is shown for temperature value in the list. [v] re-sorts by temperature value.)

- Stroke Calibration.

(6) Motor/

- Errors.
- Warnings.

(7) Power Supply/

- Errors.
- Warnings.

(8) Specified Key (Loc:KNO)/

Displays logs on keys (keyboard). Key numbers cannot be specified.

- All.

3-4 Log Clear/

Clears logs. Before each deletion, the following step

- Are you sure? Yes.
- No, exit.

is shown for confirmation.

- Clear All Data/
Clears all logs.
- Clear All Data Except Errors/
- Clear All Memos/
- Clear All OKs/
- Clear Today's Data Only/
- Clear All until Yesterday/
- Clear All until 1Week/
- Clear All until 1Month/
- Clear All until 1Year/

3-5 Refer to Last SQL.

SQL means statement inquiring of database. In this menu, the SQL executed last is referred to.

4. Disklavier Control System.

Normally, test mode of control system should be executed with USB keyboard and display console, and simplified environment can be used in the "Maintenance Mode" as well. This is positioned as emergency method when display is small and keys are hard to input.

- **Controller Testmode.**
- **Controller I/O Check.**
- **Controller Test Play.**

Pressing the menu button starts Controller Test mode. Press [Return] in PRC keyboard to enter. To quit this mode, select <Exit The Mode> and press [Enter].



5. Audio Through.

For factory check

6. Factory Data Cleaning.

Resets all odometers and deletes all logs.

■ I/O CENTER TEST PROGRAM

There are three kinds of test programs for I/O Center, testmode, ioc (I/Ocheck), and tp (test play). They check I/O Center (DIO-100) and Media Center (DMC-100).

I/O Center alone can check the I/O Center.

If a new PRC-100 is to be used, however, the I/O Center and the new PRC-100 should be paired with the pairing setting. (Refer to P. 180)

1. Preparation

Jig: USB keyboard, Monitor, MIDI cable, USB cable, CD, FD, LAN cable (connection with NET), Foot pedal (EXP), Pin cord, Headphone, Microphone

Connection: ① Connect a keyboard to the USB terminal of the I/O Center.
 ② Connect a monitor to the VIDEO terminal of the I/O Center.
 ③ Turn on (upper) the DIP SW number 7 of the I/O Center.
 Outputs picture signal.
 ④ Make NTSC/PAL setting with DIP SW number 6 of the I/O Center.
 ⑤ Turn on the Media Center. (Standby Mode is unacceptable).

2. Starting a test program

- ① Press [Enter] on the keyboard.
- ② "DKVxxxxxx login: " will be displayed.
- ③ Input test program item (e.g. testmode) and press [Enter].
- ④ Top menu will be displayed.
- ⑤ Input an item number and press [Enter].

★ Tips (Advice on I/O Center fault diagnosis)

Start-up messages are continuously displayed during start-up. The following messages work as important information to diagnose failures in I/O Center.

- a. SH3 Download End!! →
TGM4 Circuit board is running normally.
- b. DSP Running!! →
AP Circuit board is running normally.

3. Main Menu

A: "testmode" Top Menu

- 1: Motherboard and Mediacyber (Same as "ioc")
- 2: Synthesizer card
- 3: Audio process card,
- q: End

B: "ioc" (I/O check) Top Menu

- 1: Unit Test,
- 2: Diagnostic – prohibited
- 3: Interactive
- q: End

C: "tp" (test play)

A. "test mode"

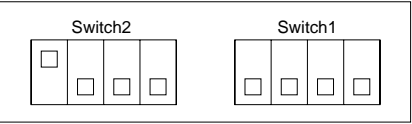
No.	Test items	Test contents and judgment criteria, etc.
1	Motherboard and Mediacyber	Checks motherboard and Mediacyber. See the item No. 1-2 (Motherboard and Mediacyber) of "B. ioc".
2	Synthesizer card (Circuit Board)	Checks TGM4 circuit board.
2-1	Reboot synthesizer card [reload the firmware of the tgm-4]	For factory check.
2-2	Show FPGA version	Shows version of FPGA (for PCI and interface of motherboard)
2-3	Sound check [sound notes C - D - E - F - G - A]	<p>Checks sound. If no sound is produced, consult the flowchart for information on checking. (See P. 121)</p> <p>① AWM Piano (C) (McBSP-1) Piano part playback ② AWM Piano (D) (McBSP-2) Ensemble part playback ③ AWM Piano (E) (McBSP-3) For sounds produced by pressing keys. ④ AEM Brass (F) (McBSP-2) AEM ⑤ SWX (XG) (G) Strings (McBSP-4) ⑥ IIS input (Connect GREEN and BLUE of [TO PIANO] with a pin cord in advance.) Piano keys will move if connected to the piano. ※ Use this checking to judge if the piano or the I/O Center is defective.</p>
2-4	Board test	Not "any key", but only [Enter] is received in the tests from 2-4-1 to 2-4-q. Please enter any key !!
2-4-1	Sh3-Dsp Sdram All Area	<p>Checks SDRAM for SH3 and DSP. (It will take about 5 minutes.) Check that "TEST OK" is displayed.</p> <p>-- Sh3-Dsp Sdram All Area Start -- SH3 SDRAM 1 Loop end DSP SDRAM 1 Loop end SH3 SDRAM 2 Loop end DSP SDRAM 2 Loop end -- Sh3-Dsp Sdram All Area End -- TEST OK</p>
2-4-2	Wave Transfer/Wave Buffer/Semaphore	<p>AEM wave transfer check. Check that "TEST OK" is displayed.</p> <p>-- Wave Transfer/Wave Buffer/Semaphore Start -- memory map start address mapped& wave File size : 65536 -- Wave Transfer/Wave Buffer/Semaphore End -- TEST OK</p>
2-4-3	Sh3-Dsp Sdram/Command&Tone Buffer	<p>Checks MIDI event AEM, and other control information. Check that "TEST OK" is displayed.</p> <p>-- Sh3-Dsp Sdram/Command & Tone Buffer Start -- -- Sh3-Dsp Sdram/Command & Tone Buffer End -- TEST OK</p>
2-4-4	Fifo (HDD Read/PciMidi/Data/IIS MidiIn)	For factory checks.

No.	Test items	Test contents and judgment criteria, etc.
2-4-5	Timer/DoorBell/USB/Serial	<p>Checks SH3, MIDI, and USB functions. Connect [MIDI IN] and [MIDI OUT] with a MIDI cable in advance. Connect [USB](B) and [USB](A) with USB cable. Check that "TEST OK" is displayed.</p> <p>-- Timer/DoorBell/USB/Serial Start --</p> <p>-- Timer/DoorBell/USB/Serial End -- TEST OK</p>
2-4-6	msg-register/gen-register/irregular-interrupt	<p>Checks register of SH3. Check that "TEST OK" is displayed.</p> <p>-- msg-register/gen-register/irregular-interrupt Start -- -- msg-register/gen-register/irregular-interrupt End -- TEST OK</p>
2-4-7	SWX CHECK	<p>Checks communications of SH3-sound generator SWX. Check that "TEST OK" is displayed.</p> <p>----- SWX check Start ----- Swx Check complete !!! ----- SWX check End ----- TEST OK</p>
2-4-p	PCI Configuration Read/Board Revision Read	<p>Displays information.</p> <p>board type : 0x04051708 TGM4_board_type success !! VendorID : 0x10ee DeviceID : 0x0300 Command : 0x0006 Status : 0x0200 RevisionID : 0x00 ProgIf : 0x00 SubClass : 0x00 BaseClass : 0xff CacheLineSize : 0x00 LatencyTimer : 0x40 HeaderType : 0x00 BaseAddresses0 : 0xefdfdf00 BaseAddresses1 : 0xefde0000 BaseAddresses2 : 0x00000000 InterruptLine : 0x07 InterruptPin : 0x01 MinimumGrant : 0x1e MaximumLatency : 0x00 Please enter any key!!</p>
2-4-q	End of Menu	Quits the menu.
2-5	Check codebook partition [check data in the aem area of the HD]	<p>Checks AFM area in the hard disk. Check that "Code Book is OK" is displayed.</p>
2-q	End	Quits the menu.

No.	Test items	Test contents and judgment criteria, etc.
3	Audio process card (AP Circuit Board)	
3-1	Reboot audio process card	Prohibited.
3-2	audio loop check	For factory check.
3-3	exec setmixer script	For factory check.
3-4	DSP test 1: PCI information 2: FPGA test 3: DSP onchip RAM (random) 4: DSP onchip RAM 5: DSP onchip RAM 6: Load ? Verify - Run 7: Trigger Interrupt	Checks items 1 to 7 automatically. Check that "total 0 Error (s)" is displayed. Ignore error message for item 7. 1. Displays PCI-BUS information.
3-5	SDRAM test	Checks SDRAM. Clicking sound noise is produced. Check that "total 0 Error (s)" is displayed.
3-q	End	Quits the menu.
q	End	Quits the menu.

B. "ioc"

No.	Test items	Test contents and judgment criteria, etc.
1	Unit Test	
1-1	unit All test	Prohibited.
1-2	Motherboard and Mediacenter	Checks motherboard and Mediacenter.
1-2-1	all test	Prohibited.
1-2-2	CD Drive test	Checks CD drive. Insert the CD in the Mediacenter in advance.
1-2-3	FD Drive test	Checks FD drive. Insert the FD in the Mediacenter in advance.
1-2-4	Serial Loop test	Checks communications between the motherboard and PANEL circuit board. Check that "Loop test start -----OK" and "Serial loop check -----success" are displayed.
1-2-5	MediaCenter test	Checks buttons of Mediacenter, foot SW, headphone jack, and microphone jack. (Photo. 1)
1-2-6	Wireless Mac test	Check that "Wireless Mac test-----success" is displayed.
1-2-7	Pci test	Check that "Pci test -----success" is displayed.
1-2-8	Pci slot loop test	For factory check.
1-2-q	End	Quits the menu.
1-3	Synthesizer card (TGM4 Circuit Board)	* Same as the item No. 2 (Synthesizer card) of the "test mode". Check that "TEST OK" is displayed.
1-3-1	all test	Prohibited.
1-3-2	WAVE Transfer/Buffer/Semp test	* Refer to 2-4-2
1-3-3	SDRAM Command/Buffer test	* Refer to 2-4-1
1-3-4	USB/Serial Loop	* Refer to 2-4-5
1-3-5	Msg/Gen Register Irregular	* Refer to 2-4-6
1-3-6	SWX Check test	* Refer to 2-4-7
1-3-q	End	Quits the menu.
1-4	Audio process card (AP Circuit Board)	
1-4-1	all test	Prohibited.
1-4-2	PCI Infomation	Displays information.
1-4-3	FPGA test Note: Noise will be produced.	Check that "total 0 Error (s)" is displayed.
1-4-4	DSP test Note: White noise will be produced.	Check that "total 0 Error (s)" is displayed.
1-4-5	Interrupt test	Check that "total 0 Error (s)" is displayed.

No.	Test items	Test contents and judgment criteria, etc.
1-4-6	Piano Loop Back test	Connect GREEN and BLUE of [TO PIANO] with a pin cord in advance. Check that "total 0 Error (s)" is displayed.
1-4-q	End	Quits the menu.
1-5	Audio level test	For factory check.
1-6	ESS ID	Wireless LAN identification ID lo no wireless extensions. wlan0 IEEE 802.11b ESSID: "DKV xxxxxx" Nickname: "DKV xxxxxx" Mode:Master Frequency: 2.462GHz Access Point: 00:00:0E:62:BC:2E Bit Rate: 11Mb/s Sensitivity=1/3 Retry min limit:8 RTS thr:off Fragment thr:off Encryption key:off Power Management:off Link Quality: 0 Signal level: 0 Noise level: 0 Rx invalid nwid: 0 Rx invalid crypt: 20 Rx invalid frag: 0 Tx excessive retries: 69 Invalid misc: 544 Missed beacon: 0
1-7	eject (CDROM)	Prohibited.
1-8	Halt	Prohibited.
1-q	End	Quits the menu.
2	Diagnostic	Prohibited.
3	Interactive	
3-1	Motherboard and Mediacenter	
3-1-1	bios [bios version]	Displays bios version. /usr/local/sbin/test_bios LYRA V.02.9 bios check----->>success
3-1-2	boarded [board id]	Displays version of the circuit board. /usr/local/sbin/test_boardid BoardID:0 boardid check----->>success
3-1-3	calendar [calendar rewrite and check]	Checks calendar function. /usr/local/sbin/test_calendar calendar check----->> success
3-1-4	cddrive [cd-drive read check for inner and outer track]	Insert the CD in the Mediacenter in advance. Checks first/mid/last track. /usr/local/sbin/test_cddrive test_cddrive: CD Playback check [1, 9, 19] test_cddrive: Playback [1] : OK test_cddrive: Playback [9] : OK test_cddrive: Playback [19] : OK cd drive check----->> success
3-1-5	cmos [check cmos memory, battery]	Checks CS5535. /usr/local/sbin/test_cmos test_cmos:Battery check is OK. test_cmos:CMOS check sum verify is OK. cmos check----->>success
3-1-6	dipsw [Dip-SW on/off check]	Checks DIP SW. Moves DIP SW. Note: Put the SW back into place after the test. 

No.	Test items	Test contents and judgment criteria, etc.
3-1-7	floppy [check]	Checks FD. Insert the FD in the Mediacycenter in advance. /usr/local/sbin/test_fddrive mke2fs 1.27 (8-Mar-2002) /dev/sda is mounted; mke2fs forced anyway. Hope /etc/mstab is incorrect. test_fddrive: [1] FD write test... success test_fddrive: [2] compare... success fd drive check ----->> success
3-1-8	harddrive [check harddisk]	Scans HDD for errors. It takes about 30 minutes. harddrive ----->> success
3-1-9	serial [check serial between host and panel mini-cpu]	Checks communications of motherboard and PANEL circuit board. /usr/local/sbin/test_serial loop test start ----->> OK Serial loop check ----->> success
3-1-10	mediacycenter	Prohibited.
3-1-11	NIC-i (OnBoard) [check DHCP address thru wired-LAN is accessible]	Connects to LAN. Checks if IP address for DHCP is assigned from the server. ipaddress check ----->> success
3-1-12	NIC-m (OnBoard) [check MAC address of wired-LAN is accessible]	Connects to LAN. Wired LAN: Checks if Mac address is assigned. macaddress check ----->> success
3-1-13	NIC-m (wireless) [check MAC address of wireless-LAN is accessible]	Connects to LAN. Wireless LAN: Checks if Mac address is assigned. macaddress check ----->> success
3-1-14	NICtoNIC (card-OnBoard) [loop test using PCMCIA LAN board]	For factory check.
3-1-15	Second menu	
3-1-15-1	pci [check if PCI device on the motherboard is accessible]	Checks PCI bus of motherboard. pcicheck ----->> success
3-1-15-2	ram [256M ram check]	Checks mounted RAM. memory check ----->> success
3-1-15-3	usbmem [USB memory read/write check]	Prohibited.
3-1-15-4	video [for video-out, video test image]	Color bar is displayed on the screen. (Photo. 2)
3-1-15-5	wlanToZaurus	Press [Enter]. Test screen is displayed. (Photo. 3)
3-1-15-6	NICtoNIC (Pci-OnBoard) [loop test using PCI LAN board]	Prohibited.
3-1-15-q	exit	Quits the menu.
3-1-q	exit	Quits the menu.
3-2	Synthesizer card (TGM4 circuit board)	* Same as the item No. 2-4 (Board test) of the "test mode".
3-2-1	Sh3-Dsp Sdram All Area	* Refer to 2-4-1
3-2-2	Wave Transfer/Wave Buffer/Semaphore	* Refer to 2-4-2
3-2-3	Sh3-Dsp Sdram/Command&Tone Buffer	* Refer to 2-4-3
3-2-4	Fifo(HDD Read/PciMidi/Data/IIS MidiIn)	Prohibited.
3-2-5	Timer/DoorBell/USB/Serial [check usb, midi]	* Refer to 2-4-5
3-2-6	msg-register/gen-register/irregular-interrupt	* Refer to 2-4-6
3-2-7	SWX CHECK [XG (swx00b) rom,ram check]	* Refer to 2-4-7
3-2-p	PCI Configuration Read/Board Revision Read	* Refer to 2-4-p
3-2-q	End of Menu	Quits the menu.

No.	Test items	Test contents and judgment criteria, etc.
3-3	Audio process card (AP circuit board)	Check that "total 0 Error (s)" is displayed.
3-3-1	all test	<p>----- 1. TEST PCI Configuration Value ----- ----- 2. Start FPGA Test ----- ----- 6. Start DSP test. ----- ----- 7. Start Interrupt test. ----- -----11. Start Midi Loopback test. -----</p>
3-3-2	PCI Information	<p>Checks PCI bus of AP circuit board. ----- 1. TEST PCI Configuration Value ----- VnderID =104c DeviceID =ac60 Subsystem Vender ID =1073 Subsystem ID =3010 Base Class =04 Sub Class =01 PCI Configuration Test Completed. Total 0 Error (s)</p>
3-3-3	FPGA test	<p>Checks FPGA (IC017). ----- 2. Start FPGA Test ----- Reset board ... CPLD configuration OK Reset board ... FPGA Test Completed. Total 0 Error (s)</p>
3-3-4	IRAM-RANDOM test	<p>Checks RAM in the DSP (IC002). ----- 3. Start DSP Onchip RAM test (random). ----- Configure CPLD CPLD configuration OK DSP Onchip RAM test (random) completed. Total 0 Error (s)</p>
3-3-5	IRAM-55/AA test	<p>Checks RAM in the DSP (IC002). ----- 3. Start DSP Onchip RAM test (random). ----- Configure CPLD CPLD configuration OK DSP Onchip RAM test (random) completed. Total 0 Error (s)</p>
3-3-6	IRAM-00/FF test	<p>Checks RAM in the DSP (IC002). ----- 5. Start DSP Onchip RAM test (0x00000000 / 0xffffffff). ----- Configure CPLD CPLD configuration OK DSP Onchip RAM test (0x00000000 / 0xffffffff) completed. Total 0 Error (s)</p>
3-3-7	DSP test	<p>Checks DSP (IC002). ----- 6. Start DSP test. ----- Configure CPLD CPLD configuration OK LOAD DSP Program. VERIFY DSP Program. Verify OK. START DSP Program Start DSP test Completed. Total 0 Error (s)</p>

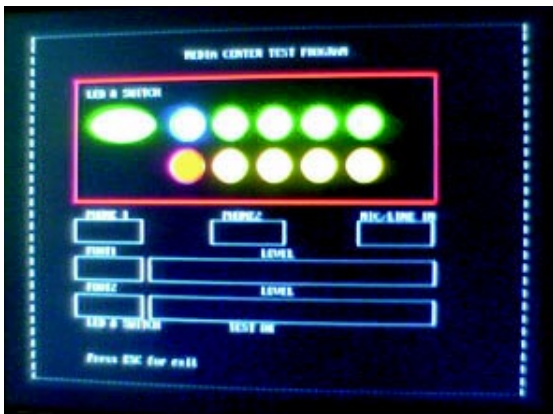
No.	Test items	Test contents and judgment criteria, etc.
3-3-8	Interrupt test	<p>----- 7. Start Interrupt test. -----</p> <p>Configure CPLD CPLD configuration OK Loading DSP Program Starting DSP Program Triger Interrupt Mon Dec 6 21:38:56 2004 Audio Process Card: 12 Device Busy. [Some programs are using this Device] Total 1 Error (s)</p>
3-3-9	SDRAM-RANDOM test	<p>Checks SDRAM (IC001). ----- 8. Start SDRAM test (random). -----</p> <p>Configure CPLD CPLD configuration OK</p>
3-3-10	SDRAM-55/AA test	<p>Checks SDRAM (IC001). ----- 9. Start SDRAM test (0x55555555 / 0xaaaaaaaa). -----</p> <p>Configure CPLD CPLD configuration OK DSP SDRAM test (0x55555555 / 0xaaaaaaaa) completed. Total 0 Error (s)</p>
3-3-11	SDRAM-00/FF test	<p>Checks SDRAM (IC001). ----- 10. Start SDRAM test (0x00000000 / 0xffffffff). -----</p> <p>Configure CPLD CPLD configuration OK DSP SDRAM test (0x00000000 / 0xffffffff) completed. Total 0 Error (s)</p>
3-3-12	Piano Loop Back test	<p>Connect GREEN and BLUE of [TO PIANO] with a pin cord in advance. White noise will be produced. ----- 11. Start Midi Loopback test. -----</p> <p>Configure CPLD CPLD configuration OK Loading DSP Program Starting DSP Program MIDI STATE=MIDI_DEVICEOFF set DEVICE ON MIDI STATE=MIDI_UNLOCKED MIDI STATE=MIDI_UNLOCKED MIDI STATE=MIDI_LOCKED ActiveSensing ON MIDI STATE=MIDI_ENABLED</p> <p>Set MIDI mask = 0x0000</p> <p>..... ActiveSensing OFF MIDI STATE=MIDI_LOCKED set DEVICE OFF MIDI STATE=MIDI_DEVICEOFF</p> <p>MIDI loopback test completed. Total 0 Error (s)</p>
3-3-13	Synth Loop Back test	Prohibited.
3-3-14	Audio Loop Back test	For factory check.

No.	Test items	Test contents and judgment criteria, etc.
3-3-q	End	Quits the menu.
3-q	End	Quits the menu.
q	End	Quits the menu.

C. "tp" (test play)

Demo song is output from [OUTPUT] terminal of I/O Center and L, Rch of [OMNI OUT] terminal. It is output from Rch of [SYNC OUT] terminal as well.

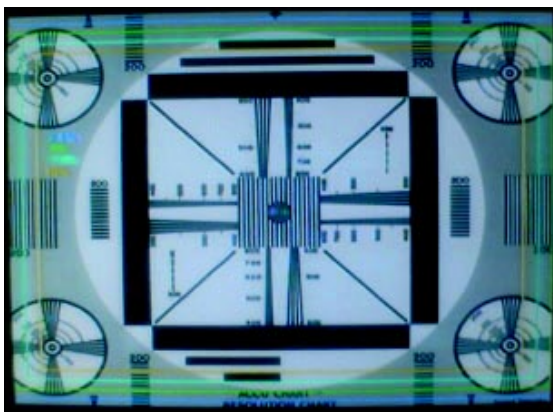
Key in "tp" and return to start test demo play (trumpet is AEM voice). Push return key to quit.



(Photo. 1)

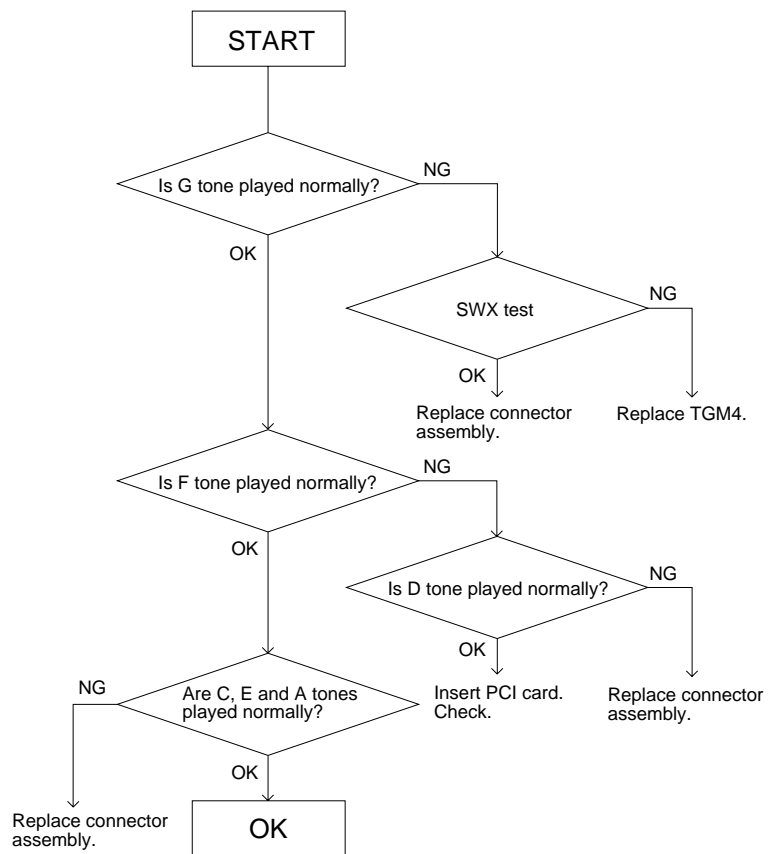


(Photo. 2)



(Photo. 3)

Flowchart

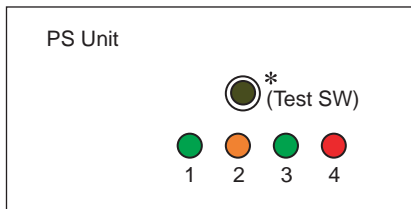


LED DISPLAY AND SW ON CIRCUIT BOARD

1 : PS Unit

1-1 : PSDC Board

Ref No.	Printed	What	Normal								
LD10 (1)	CPU ACTIVE	CPU running state	<table border="1"> <tr> <td colspan="2">Lighting/Blinking pattern</td> </tr> <tr> <td>①</td> <td>Piano Standby Status once / 3sec</td> </tr> <tr> <td>②</td> <td>Time elapsing from status 1 to status 3. Fast blinking</td> </tr> <tr> <td>③</td> <td>On Status once /1.5sec</td> </tr> </table> <p>※ 2 times /3 sec blinking or more during abnormal time.</p>	Lighting/Blinking pattern		①	Piano Standby Status once / 3sec	②	Time elapsing from status 1 to status 3. Fast blinking	③	On Status once /1.5sec
Lighting/Blinking pattern											
①	Piano Standby Status once / 3sec										
②	Time elapsing from status 1 to status 3. Fast blinking										
③	On Status once /1.5sec										
LD11 (2)	---	Power 5VSB (standby) output on	Lighting (green) When primary SW is ON,5VSB is alive. NOTE: In override mode,it is orange. *(override mode is made by pushing the Test SW, and Primary SW ON))								
LD5 (3)	+12VOUT	12V output	Lighting (green)								
LD3 (4)	+48VIN	48V output	Lighting (red) When some errors occurred,system will shutdown 48V intet. ※ Off during abnormal time, but it takes some time until the LED is turned off because a large-volume chemical capacitor is connected.								



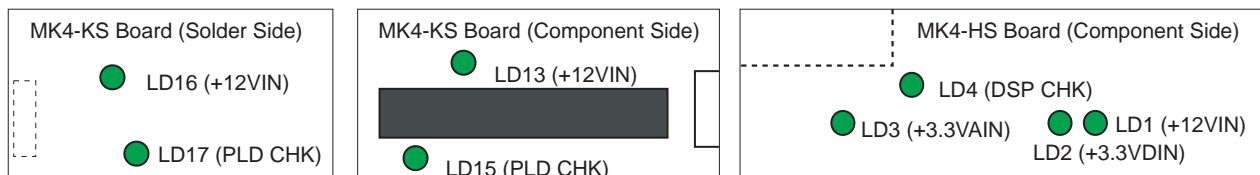
2 : Key Sensor Unit, HAMMER Sensor Unit

2-1 : MK4-KS Board

Ref No.	Printed	What	Normal
LD13	+12VIN	+12V Power Income	lighting (green)
LD15	PDLCHL	PLD status / clock coming	blinking (green)
LD16	+12VIN	+12V Power Income	lighting (green)
LD17	PDLCHK	PLD Running	blinking (green)

2-2 : MK4-HS Board

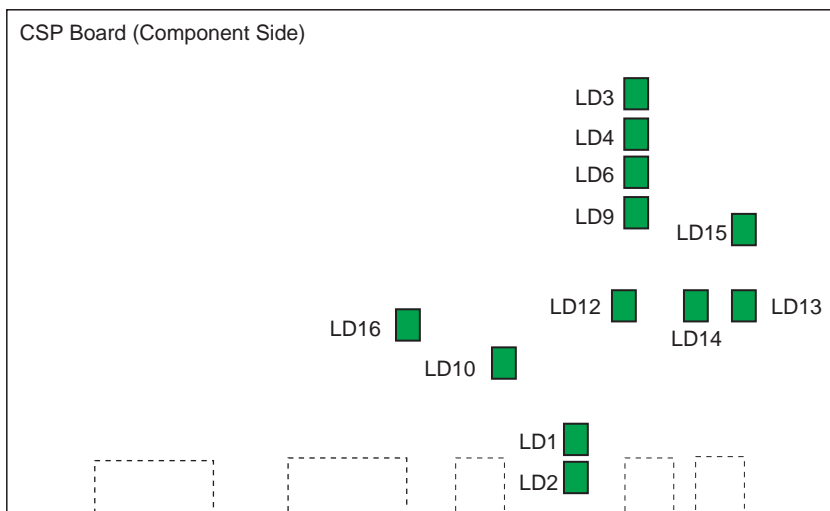
Ref No.	Printed	What	Normal
LD1	+12VIN	+12V Power Income	lighting(green)
LD2	+3.3DIN	+3.3V Digital Power Income	lighting(green)
LD3	+3.3AIN	+3.3V Analog Power Income	lighting(green)
LD4	DSPCHK	DSP Running	blinking(green)



3 : CSP Unit

3-1 : CSP Board

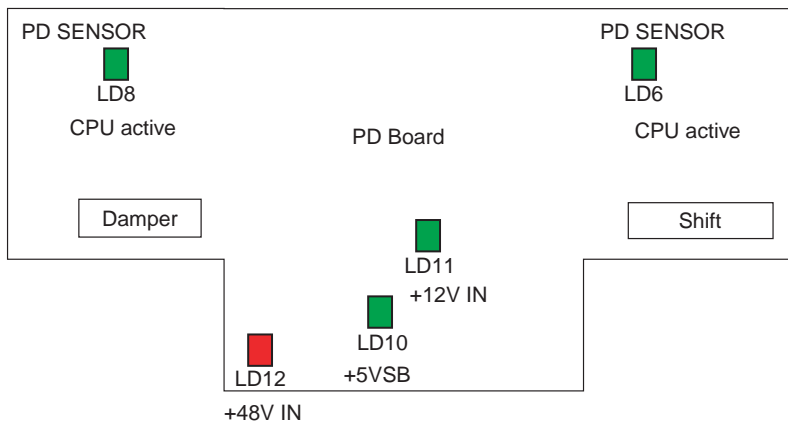
Ref No.	Printed	What	Normal
LD1	12V _{on}		Lighting (green)
LD2	5V _{SBon}		Lighting (green)
LD3	---		Lighting (green) Program started at DSP on CSP.
LD4	---		Blinking (green) Data on start-up is exchanged between CSP and other units.
			Lighting (green) Above-mentioned data exchange is completed.
LD6	---	For design	
LD9	DSP _{run}		Blinking (green) DSP on CSP is working normally.
LD10	DIR-H8 _{run}		Blinking with shorter light on time (green) No signal is coming from I/O center. Power of the piano is turned off.
			Blinking with the same lighting time as the extinguished time (light on time and light off time are 50%/50%) (green)
			Receiving signal from I/O center. Power of the piano is turned on.
LD12	3.3V _{SBon}	+3.3V _{SB}	Lighting (green)
LD13	5V _{on}	+5V	Lighting (green)
LD14	3.3V _{on}	+3.3V	Lighting (green)
LD15	1.26V _{on}	+1.26V	Lighting (green)
LD16	DIR-ALIVE	For design	



4 : Pedal Unit

4-1 : PD Board

Ref No.	Printed	What	Normal								
LD10	+5VSB	+5VPower Income	lighting(green)								
LD11	+12V IN	+12VPower Income	lighting(green)								
LD12	+48V IN	+48VPower Income	lighting(red)								
LD8	CPU active	Damper CPU status	blinking(green) <table border="1"> <tr> <th colspan="2">Lighting/blinking pattern</th> </tr> <tr> <td>Standby</td> <td>3 times / sec</td> </tr> <tr> <td>On</td> <td>Fast blinking</td> </tr> <tr> <td>Normal</td> <td>Once / 1.5s</td> </tr> </table>	Lighting/blinking pattern		Standby	3 times / sec	On	Fast blinking	Normal	Once / 1.5s
Lighting/blinking pattern											
Standby	3 times / sec										
On	Fast blinking										
Normal	Once / 1.5s										
LD6	CPU active	Shift CPU status	blinking(green) same as damper pedal								

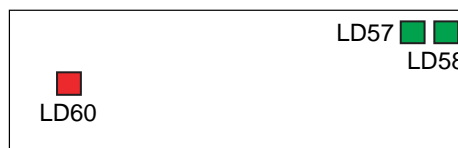


5 : Key Drive Unit

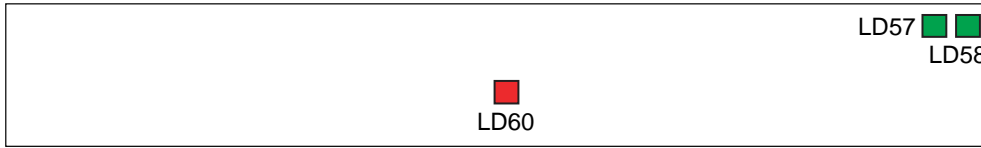
5-1 : PRO-KD1~4 Board

Ref No.	Printed Name	What	Normal
LD57	+5VIN	+5VPower Income	lighting(green)
LD58	+3.3VIN	+3.3VPower Income	lighting(green)
LD60	+48V	+48VPower Income	lighting(red)

Common in all KD boards



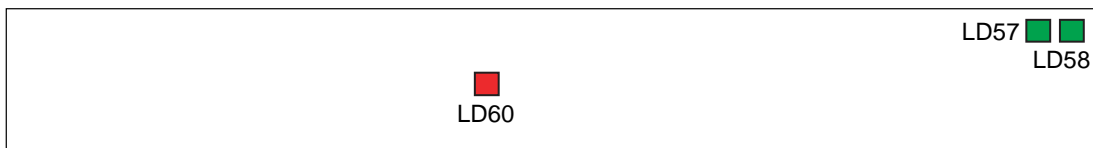
PRO-KD1 Board (key 1-12)



PRO-KD2 Board (key 13-40)



PRO-KD3 Board (key 41-56)



PRO-KD4 Board (key 57-88)

5-2 : MK4-KD1~4 Board



MK4-KD1 Board (key 1-12)



MK4-KD2 Board (key 13-40)



MK4-KD3 Board (key 41-56)

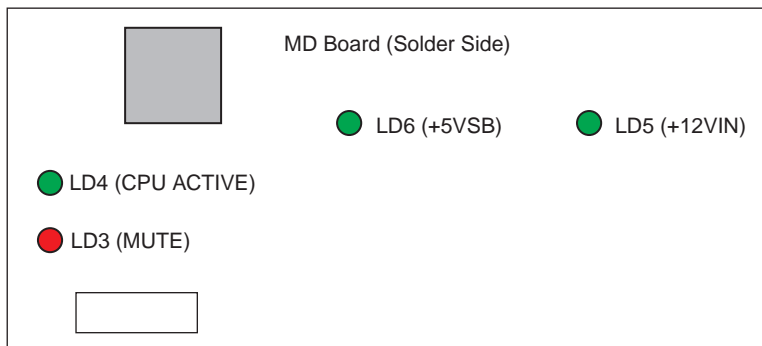


MK4-KD4 Board (key 57-88)

6 : MD Unit

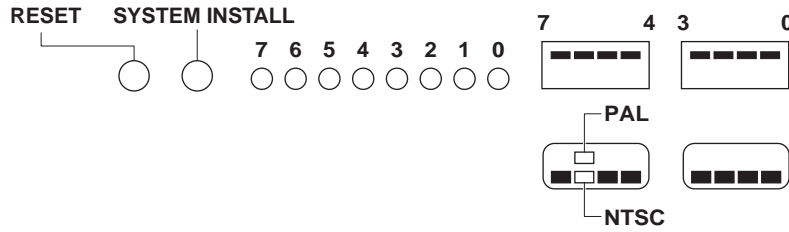
6-1 : MD Board

Ref No.	Printed Name	What	Normal
LD5	+12VIN	+12VPower Income	lighting(green)
LD6	+5VSB	+5VSBPower Income	lighting(green)
LD4	CPU ACTIVE	CPU status	blinking(green)
LD3	MUTE	During quiet mode	lighting(red)



7 : I/O Center

7-1 : Mother Board



- ① RESET RESET
- ② SYSTEM INSTALL After inserting the CD, press this button while holding down the reset to rewrite the data on the hard disk.
- ③ DIP SW

0	Not used
1	Not used
2	Not used
3	Not used
4	Wireless LAN channel set
5	ch5 (5:off, 4:0ff), ch1(off, on), ch10(on, off), ch11(on, on)
6	NTSC(off) , PAL(on)
7	Disable(off) or enable(on) "login", "video out"

■ ERROR MESSAGES

Situation	Error Messages	Description
You tried to copy copy-protected song files into a removable medium.	CANNOT EXECUTE - PROTECTED FILE	The commercially available copy-protected song files cannot be copied into any removable media.
You tried to copy song files into an album that already contains 999 song files.	CANNOT EXECUTE - Over 999 songs	The maximum number of the files in an album (folder) is 999.
You tried to copy song files into a certain medium.	NOT ENOUGH DISK SPACE	The storage space in the destination medium is not enough.
You tried to erase entire contents in a floppy disk. ([Delete All])	CANNOT EXECUTE - DISK FORMAT	The floppy disk is not formatted in MS-DOS. In such a case, reformat on a Windows PC.
	CANNOT EXECUTE - PROTECTED FILE EXIST	When the floppy disk contains copy-protected song files, this function cannot be executed.

■ RESETTING THE DISKLAVIER

If you want to return your Disklavier to its initial factory settings, follow the procedure below.

1 Tap on **Setup** in the [Main] screen, and then on **System** .

2 Tap on **System Reset** .



— Tap to cancel resetting.

3 Tap on **OK** to start resetting.

4 Tap on **Exit** to complete the operation.

YAMAHA [Disklavier]
Model: Mark IV series

MIDI IMPLEMENTATION CHART

Date : 14-Feb-2005
Version : 1.05

Function . . .	Transmitted	Recognized	Remarks	
Basic Default	1-16	1-16	Memorized	
Channel Changed	1-16	1-16		
Mode Default	3	3		
Message Altered	× *****	3,4 (M=1) *3, *6 ×		
Note Number: True voice	0-127 *****	0-127 0-127		
Velocity Note ON	○ 9nH, V=1-127	○ V=1-127		
Note OFF	○	○		
After Key's	○ *8	○		
Touch Ch's	×	○ *1, *3, *4		
Pitch Bend	×	○ 0-24 semi *1, *3, *4, *5		
Control Change	0,32	○	*1, *3, *4, *5	Bank Select
	1	×	○ *1, *3, *4, *5	
	5	×	○ *1, *3, *4	Portament Time
	7,11	×	○ *5	
	10	×	○ *1, *3, *4, *5	Pan
	6,38	×	○ *3, *4	Data Entry
	64	○	○ *2, *3, *4, *5	Hold 1 (Sustain)
	65	×	○ *3, *4	Portament
	66	○ *7	○ *2, *3, *4	Sostenuto
	67	○	○ *2, *3, *4	Soft(Shift) Pedal
	71-74,84	×	○ *3, *4	
91,93,94	×	○ *3	Effect Depth	
96-101	×	○ *1, *3, *4		
Program Change: True #	○ 0-127 *****	○ 0-127 *3, *4, *5		
System Exclusive	○	○		
Common	: Song Pos	×	×	
	: Song Sel	×	×	
	: Tune	×	×	
System Real time	: Clock	×	×	
	: Commands	×	×	
Aux Messages	: All Sound Off	○	○	
	: Reset All Cntrls	○	○	
	: Local ON/OFF	×	○	
	: All Notes OFF	○	○	
	: Active Sense	○	○	
: Reset	×	×		
Notes	*1 = Received if switch is on. *7 = Transmit if this model has a Sostenuto Pedal *2 = "Player Piano" can recognize. *8 = Applying further pressure on the key does not output *3 = Tone for Ensemble (XG,GM) can recognize. "key aftertouch" information. Instead, key position is *4 = Tone for Quiet (AWM2) can recognize. transmitted as additional information. *5 = Tone for Quiet (AEM) can recognize. *6 = M is always treated as "1" regardless of its value.			

Mode 1 : OMNI ON. POLY Mode 2 : OMNI ON. MONO ○ : Yes
 Mode 3 : OMNI OFF. POLY Mode 4 : OMNI OFF. MONO × : No

POCKET CONTROLLER (PRC-100)

A. Specifications

• System configuration

Configuration of PDA WC61660

Model Number	Brand designation	Trade name	Remarks
PRC-100	YAMAHA	Pocket Controller	

Configuration of accessory unit WC66070

Model Number	Brand designation	Trade name	Remarks
YCE-ST9	YAMAHA	CRADLE	
EA-70	SHARP	AC ADAPTER	
EA-BL08	SHARP	RECHARGEABLE LITHIUM-ION BATTERY	Polyglot

Configuration of accessory unit WD08840

Model Number	Brand designation	Trade name	Remarks
YCE-ST9	YAMAHA	Charging rack	
EA-70	SHARP	AC ADAPTER	
EA-BL08	SHARP	Rechargeable lithium-ion battery	Polyglot

1. Specifications of main unit <WC61660>


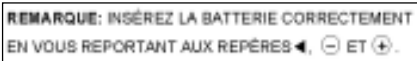
Item	WC61660 specifications	
Trade name	Pocket Controller	
Model Number	PRC-100	
OS	Embedded Linux	
CPU	Intel processor PXA255 (400 MHz)	
Memory	P2ROM	8 MB (including Japanese fonts and kana-kANJI conversion dictionary)
	Flash-ROM	64 MB
	RAM	32 MB
Display system	3.5 type reflective TFT color LCD (with front light)	
Number of pixels/ number of colors	240 x 320 dots, 65,536 colors	
Touch panel	Analog resistive membrane touch panel	
Keys/buttons	Movable side keys	12 keys (7 keys, 4 cursor keys, 1 center key)
	Fixed side keys	37 keys (QWERTY keyboard)
Card slot	CF card slot (TYPEII) x 1, SD card slot x 1	
Optical communication interface	IrDA Ver1.2 (115 kbps)	
Wireless LAN compatibility	Wireless LAN card attached	
Headphone terminal	1 (3.5 ϕ , three pole) stereo compatible	
I/O port	1 (16-pin, for cradle connection)	
Audio	Speaker, microphone included	
LED	Charging state	Charge light
	Green LED	Software controllable (usage depends on Yamaha software)
Power supply part	Rechargeable lithium-ion battery <EA-BL08> *1 Sub battery: none	
Dimensions (except protruding portions)	When display protect cover is not attached: Approximately 74 mm (W) x 138 mm (D) x 18 mm (H) Highest portion: Approximately 22.7 mm When display protect cover is attached: Approximately 74 mm (W) x 138 mm (D) x 20.6 mm (H) Highest portion: Approximately 25.3 mm	
Mass	Approximately 210 g (including rechargeable battery and stylus pen, except display protect cover) Approximately 228 g (including rechargeable battery, stylus pen, and display protect cover)	

Item	WC61660 specifications
Operating temperature/humidity	0–40 °C, 20–90 %RH (non-condensing)
Chargeable temperature	5–35 °C, 20–90 %RH (non-condensing)
Storage temperature/humidity	-20–60 °C, 5–95 %RH (non-condensing)
Software	(described separately) After the shipment by Sharp Corporation, the remote control software developed by Yamaha Corporation is installed by Yamaha Corporation.
Accessories	Display protect cover (attached to the main unit), Stylus pen (attached to the main unit), CF slot protect card (attached to the main unit), I/O port cover (attached to the main unit) *2
Available countries	Japan, USA, UK, Germany, Spain, Italy, Australia, Finland, Norway, Sweden, France, Canada
Safety standard, EMI	VCCI Class B, FCC part 15 Class B, CE, C-tick

*1: Even if the main unit is turned off, the rechargeable battery runs down for backing up the RAM and RTC (clock function). The battery fully charged will die in about 20 days even if it is not used.

*2: The cradle, AC adaptor, and battery will be supplied separately as accessory units.

2. Signage specifications

Signage location	Signage contents
Front	Company name: "Yamaha" logo Green light: (graphical symbol: none) Charge light: (graphical symbol: battery + arrow) Slide cover key part *See key layout on the next page
Top	"Compact Flash" Headphone icon
Right side	None
Left side	"SD Card"
Bottom	SD card slot: "SD" logo + card icon Rechargeable battery cover open/close switch part (NORMAL OPERATION, REPLACE BATTERY) ■ Nameplate 
Battery holding part	Polarity indication: [+] mark, [-] mark Direction of insertion: ▲ mark Notice for mounting method: English, Spanish, German, Italy ■ Contents of French label  Dimensions: 46 mm x 11.5 mm

3. Key layout

Slide cover (Movable side)





4. LED specifications

Part name	Charge light	Green light
Number of pieces/ color	1/orange	1/green
Specifications	During charging: Orange light is lit Charging completed: Light turned off During abnormal charging: Quick flash	Controlled by software developed by Yamaha Corporation

5. Accessory unit <WC66070>

WC66070 is an accessory unit containing rechargeable lithium-ion battery, AC adaptor for overseas market, and cradle.


5-1. Rechargeable lithium-ion battery <EA-BL08>

Item	Specifications
Brand designation	SHARP
Trade name	RECHARGEABLE LITHIUM-ION BATTERY
Battery	Rechargeable lithium-ion battery
Nominal capacity	1700 mAh
Nominal voltage	3.7 V
Dimensions	Approximately 53.1 mm (W) x 35.3 mm (D) x 11.3 mm (H)
Mass	Approximately 46.5 g
Charging time	Time required to be fully charged: Approximately 4 hours (reference value at 25 °C)
Operating temperature/humidity	0–40 °C, 20–90 %RH (non-condensing)
Charging temperature/humidity	5–35 °C, 20–90 %RH (non-condensing)
Life span	500 cycles of charge and discharge
Languages for notice	Japanese, English, German, Spanish, Italy
Languages for country of origin	English, French, Spanish
Safety standard	CE, recycle mark (Japan)
Nameplate/notice	<p>■ Top</p>  <p>■ Bottom</p> 
French label	<p>■ Content</p> <p>ATTENTION: POUR LA RECHARGER, UTILISER UNIQUEMENT L'APPAREIL PRINCIPAL OÙ LE CHARGEUR SPÉCIFIÉ.</p> <p>NE JAMAIS COURT-CIRCUITER LES BORNES. NE PAS DEMONTER NI MODIFIER. NE PAS JETER À L'EAU NI AU FEU. (RISQUE DE CHALEUR, BRULURES OU EXPLOSION.)</p> <p>Dimensions: 51 mm x 33 mm</p>

5-2. AC adaptor <EA-70>

Item	Specifications
Brand designation	SHARP
Trade name	AC ADAPTER
Input	100 V–240 V 50/60 Hz
Output	5 V, 2 A
Dimensions	Approximately 47 mm (W) x 72 mm (D) x 27 mm (H)
Mass	Approximately 120 g
Cord length at DC side	Approximately 1.8 m
Operating temperature/humidity	0–40 °C, 20–90 %RH (non-condensing)
Storage temperature/humidity	-20–60 °C, 5–95 %RH (non-condensing)
Languages for country of origin	English, German, French, Spanish
Safety standard	cUL, C-Tick, CE, GS/TÜV, PSE
Nameplate/notice	

5-3. Cradle <YCE-ST9>

Item	Specifications	Remarks
Brand designation	YAMAHA	
Trade name	Cradle	
Connection to PDA body	16-pin connector	
Power supply	Connect AC adaptor EA-70, DC-IN 5V	
Connection to PC	USB connection	None
	RS-232C connection	None
Button	Equipped	“ONE TOUCH”
Dimensions	Approximately 86 mm (W) x 107 mm (D) x 53 mm (H) * Except rubber foot parts	
Mass	Approximately 135 g	
Operating temperature/humidity	0–40 °C, 20–90 %RH (non-condensing)	
Storage temperature/humidity	-20–60 °C, 5–95 %RH (non-condensing)	
Languages for country of origin	English, French, Spanish	Printed on the nameplate
Safety standard	No indication	
Nameplate/notice		Size: Approximately 40 x 20 (mm)

6. Accessory unit

Accessory unit containing rechargeable lithium-ion battery, AC adaptor, and cradle.

6-1. Rechargeable lithium-ion battery <EA-BL08>

6-2. AC adaptor<EA-70>

Item	Specifications
Brand designation	SHARP
Trade name	AC adaptor
Input	100 V–240 V 50/60 Hz
Output	5 V 2 A
Dimensions	Approximately 47 mm (W) x 72 mm (D) x 27 mm (H)
Mass	Approximately 120 g
Cord length at DC side	Approximately 1.8 m
Operating temperature/humidity	0–40 °C, 20–90 %RH (non-condensing)
Storage temperature/humidity	-20–60 °C, 5–95 %RH (non-condensing)
Languages for country of origin	English
Safety standard	PSE
Nameplate/notice	

6-3. Cradle <YCE-ST9>

7. Software

- ① Tab of Qtopia launcher

Tab	Applications, Disklavier, Settings
------------	------------------------------------

- ② Software provided by Sharp Corporation

Applications Tab	Opera Browser
Games Tab	None
Jeode (Disklavier) Tab	None. Deletes sample Java application. The application shown left developed by Yamaha Corporation is installed by Yamaha Corporation (after the shipment by Sharp Corporation).
Settings Tab	<ul style="list-style-type: none"> • Light & Power • Add/Remove Software • Recalibrate • Date/Time • Network • System Info Adds On/Off functions for ScreenSaver and Suspend setting.

- ③ Changes key code assignment, changes if long press function is activated, adds repeat function
- ④ Compatible with automatic connection to W-LAN
- ⑤ Changes all Fast Load settings of the application software to “Disable”.
- ⑥ Changes the screens (2 kinds) at start-up. (The screen below is one of them.)



Please wait for approximately 2 minutes...

- ⑦ Deletes Welcome application.
- ⑧ Embeds mechanism to auto-launch Yamaha application when rebooted.
- ⑨ Changes Screen Saver screen.

8. Operating time

Note: Reference period operable when fully charged

Refer to the following table for the reference value of the operating time for which this product can be continuously used.

- The value is based on the working temperature of 25 °C with the rechargeable battery fully charged.
- The operating time varies depending on service condition like ambient temperature.
- The operating time can be reduced by approximately half at low temperature, but it will become normal again at normal temperature.

If the front light is turned off:

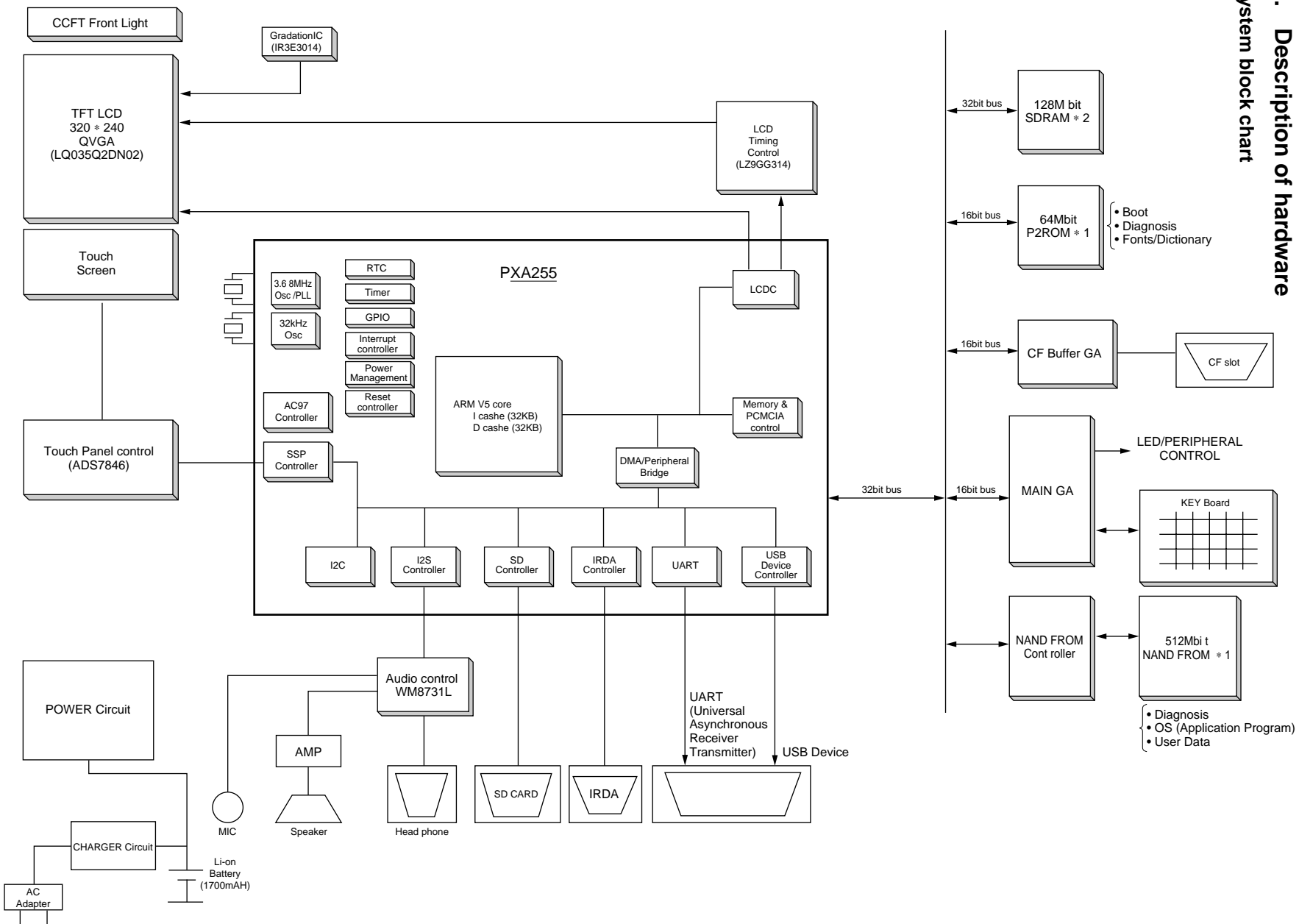
Continuous operating time	State of the product
Approximately 18 hours	When continuously displayed
Approximately 14 hours	When search (calling) is conducted for five minutes and display condition is continued for 55 minutes per hour consecutively.
Approximately 3 hours	When connected to Internet using wireless LAN card GW-CF11H (manufactured by Planex Communications Inc.) and home pages are browsed continuously.

If the front light is turned on (with its brightness at “maximum”):

Continuous operating time	State of the product
Approximately 3 hours and a half	When continuously displayed
Approximately 3 hours	When search (calling) is conducted for five minutes and display condition is continued for 55 minutes per hour consecutively.
Approximately 1 hour and 40 minutes	When connected to Internet using wireless LAN card GW-CF11H (manufactured by Planex Communications Inc.) and home pages are browsed continuously.

Even if the main unit is turned off, the rechargeable battery runs down. In case of the main body only, the battery fully charged will die in about 20 days even if it is not used, so we recommend you to charge before that.

B. Description of hardware System block chart



C. Service repair procedures

1. If the set is abnormal. (Hardware malfunction, OS version is not displayed, etc.)

1-1. Resetting to Sharp's factory default

- 1) Make the fix.
- 2) Write the OS.
Refer to "3-6. How to write the OS"
- 3) Check various settings.
Refer to "3-4. Various checks"
- 4) Write touch panel default value and LCD common voltage adjusted value.
Refer to "3-5. Default setting specific to the set"
- 5) Erase the flash memory. (*3)
Refer to "3-7. How to delete the flash memory"
- 6) Write the OS.
Refer to "3-6. How to write the OS"

1-2. Restoring to the state where a user used

- 1) **Do the service backup. (*1)**
Refer to "3-2. Service backup/restoration method"
- 2) Performs the sum check of the flash memory and checks OS version
Refer to "3-3. How to check sum check of the flash memory and OS version"
- 3) Make the fix.
- 4) Write the OS in the version checked in the procedure 2. (*2)
Refer to "3-6. How to write the OS"
- 5) Check various settings.
Refer to "3-4. Various checks"
- 6) Write touch panel default value and LCD common voltage adjusted value. (blank compact flash (128 MB))
- 7) Erase the flash memory. (*3)
Refer to "3-7. How to delete the flash memory"
- 8) **Do the service restoration of the backup data. (*4)**
Refer to "3-2. Service backup/restoration method"
- 9) Write the OS in the version checked in the procedure 2. (*5)
Refer to "3-6. How to write the OS"
- 10) Perform the error check in maintenance menu.
Refer to "3-8. How to check errors in maintenance menu"
- 11) Reset and adjust settings like time setting on application.

*1 OS, application, and diagnosis modifying software as well as user data are backed up with the service backup.

*2 The writing of OS in this procedure is for writing diagnosis repair patch for deleting the flash memory.

*3 The erasing of the flash memory is for erasing old data which may be in a circuit board or the like if parts are changed during repair.

*4 OS, application, and diagnosis modifying software as well as user data are restored with the service restoration.

*5 OS and application stored on user set, which may be damaged, are restored with the service backup. Therefore, normal OS is written again in this procedure.

2. If the set is normal and only the OS version is to be upgraded.

- 1) Back up with application. If the secret is set, cancel the secret.
- 2) Perform updates in the maintenance menu.
- 3) Do a format in the maintenance menu.
- 4) Restore with application.

Refer to the operation manual for respective operation method.

3-1. Explanation of Service Diagnosis

Various operations from writing adjustment values, various setting checks to backup and restoration of user data are performed with the software "Service Diagnosis".

The following is the explanation on the "Service Diagnosis". Original version of the Service Diagnosis is written to the P2ROM and modified version is written to the flash memory. Except for the cases mentioned below, the modified version of Service Diagnosis written to the flash memory should be used during servicing.

● When to use the original version

1. During service restoration after the flash memory is cleared in the service operation when the set is abnormal.
2. When the Service Diagnosis written to the flash memory does not run due to the malfunction of the flash memory or the like.
Refer to "3-9-1. How to restore if it is impossible to run because of the flash malfunction".

(1) How to run the Service Diagnosis

[How to start]

While holding down [D] and [M] main keys, press the reset switch.

Caution: It is impossible to run the Service Diagnosis if you press an unnecessary key or if you don't press the correct keys.

Note: In a mode in the product, a diagnosis flag is written if some sets of procedures are performed, and if reset from then on, diagnosis is run and the application cannot be run. If you happen to be in a state where a diagnosis flag is written, delete the flag with the procedure below.

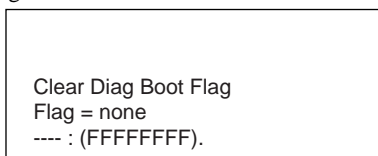
[How to check state of the diagnosis flag]

If a diagnosis flag is written, "DIAG" is shown at the "Boot Flg" section in the information display field in the lower portion of the Service Diagnosis menu screen.

Normally (if no boot flag is written), "----" is displayed.

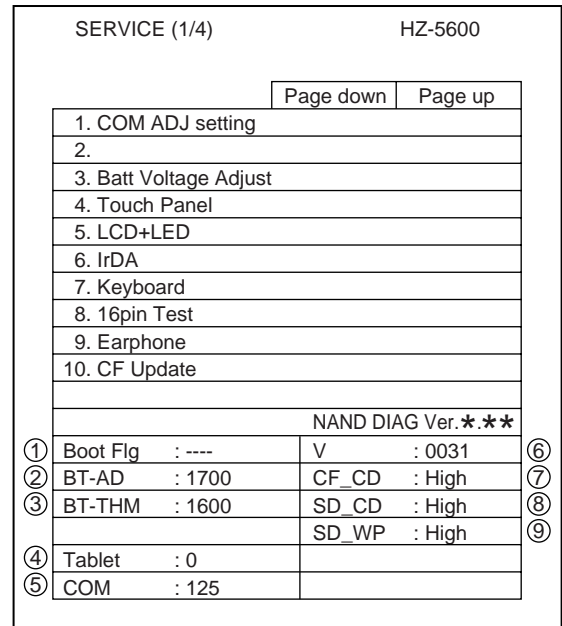
[How to delete a diagnosis flag]

- ① Start the diagnosis for the procedure. (While holding down the [Fn], [D] and [P] main keys, press the reset switch.)
- ② Tap on the [Page Down] to select the DIAG MENU (4/4).
- ③ Tap on the [9. Clear Diag Flag] twice and check that the following screen is shown.



- ④ Press the [Center] key to return to the DIAG MENU (4/4) screen.
Check that the [BootFlg:----] is shown.

(2) Service Diagnosis Menu Screen



Contents of each information	Normal Display
① BootFlg: State of Boot flag	---- (“DIAG” if a diagnosis flag is written.)
② BT-AD: AD conversion value of battery voltage	1430–1760 in case of a fully charged rechargeable battery
③ BT-THM: AD conversion value of voltage at battery temperature detection terminal	1300–2200 at 25 °C
④ Tablet: Display with or without tablet adjustment value	0 (“***” if not written)
⑤ COM: Common voltage adjustment value	Approximately 110–140 (“***” if not written)
⑥ V: Version of the P2ROM	0031 (As of March, 2004)
⑦ CF_CD: DETECT signal of CF card	High (“Low” if a CF card is inserted)
⑧ SD_CD: CD signal of SD card	High (“Low” if a SD card is inserted)
⑨ SD_WP: WP signal of SD card	High (“Low” if a writable SD card is inserted) (“High” if a write-protect SD card is inserted)

(3) Service Diagnosis Menu

• Modified version

SERVICE (1/4)

1. COM ADJ setting
2.
3. Batt Voltage Adjust
4. Touch Panel
5. LCD+LED
6. IrDA
7. Keyboard
8. 16pin Test
9. Earphone
10. CF Update

SERVICE (2/4)

1.
2. Compact Flash
3. SD card
4. Low Battery
5. NAND Bad Count
6. NAND Flash (SUM)
7. ROM (SUM)
8. Speaker/Mic
9. LCD check2
10. Charge

SERVICE (3/4)

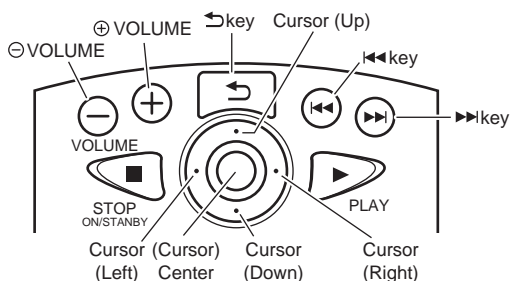
1.
2.
3.
4. RAM Write
5. RAM Read
6. RAM Write&Read Rpt
7.
8.
9.
10. RAM (Full)

SERVICE (4/4)

1. IrDA Checker
2. NAND Flash Back Up
3. NAND Flash Restore
4. H Display
5.
6.
7.
8. Front Light
9. USB Test
10.

■ Key operation content

Slide key	Main key	Function
[■] STOP (ON/STANBY)		Turns on power
Cursor (Up)	A	Moves the selected field in the menu upward. (Operable only in menu screen)
Cursor (Down)	D	Moves the selected field in the menu downward. (Operable only in menu screen)
Cursor (Right)	B	Moves to the next page. (Operable only in menu screen)
Cursor (Left)	L	Moves back to the previous page. (Operable only in menu screen)
[▶] PLAY	ENTER (↵)	Start the selected check and moves to the next check.
(Cursor) Center	← (Del)	Stops the active check and returns to the menu.
VOLUME (+) + [▶] (PLAY)	Fn + ENTER	Writes set value during common voltage adjustment.
[◀◀]		Turns on/off Front Light. (toggle type)
	1, 2 . . . 9, 0	Selects/executes the menu. (Operable only in menu screen)



3-2. Service backup/restoration method

During servicing (repair/replacement of circuit board units), it is necessary to back up user data to protect them. In the PRC-100, all the user data are stored in the flash memory. The flash memory holds data even if power is turned off.

• Data to be backed up/restored by the Service Backup/Restoration

The following data are written in the flash memory of the PRC-100.

1. Adjustment value specific to the set (Touch panel initial value, LCD common voltage adjustment value)
2. Boot flag (the previously mentioned diagnosis flag, etc.)
3. OS, application, and diagnosis modifying software
4. User data (including preset data written before shipment)

All the above data are backed up in a card by the Service Backup. The above data except 1 and 2 are restored into the PRC-100 by the Service Restoration.

3-2-1. Service Backup Method

If display and tablet are not functioning normally, replace the LCD unit first and then perform backup with the following procedure.

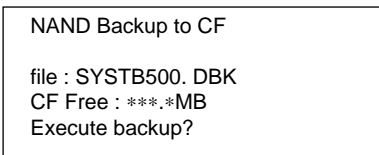
(Note that OS, application, and diagnosis modifying software are backed up together in the PRC-100.)

There are two methods.

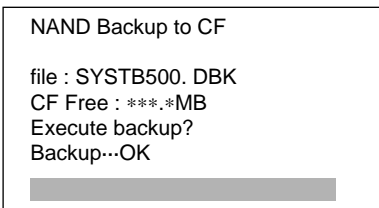
- If the display is normal (1)
- If the display is not normal even after replacing the display unit (2)

(1) If the display is normal

- a. Insert both the battery and AC adaptor into the set.
- b. Insert a CF card with 128 MB or over into the card slot with the set turned off.
 - * The card should be blank before the backup operation. If a file remains, backup may not be performed normally.
- c. Start the Service Diagnosis. Refer to “3-1. (1) How to run the Service Diagnosis”
- d. Execute [NAND Flash Back Up] in the menu “SERVICE (4/4)”.



- e. Press the [PLAY] key when the above screen is shown.



- f. Backup is completed when “OK” is displayed. It will take about eight minutes to back up (with a CF card).
- g. Press the [Center] key to return to the diagnosis menu.
- h. Turn off the set with the [ON/STANDBY] key and eject the card.

(2) If the display is not normal after replacing the display unit

- a. Insert both the battery and AC adaptor into the set.
- b. Insert a CF card with 128 MB or over into the card slot with the set turned off.
 - * The card should be blank before the backup operation. If a file remains, backup may not be performed normally.
- c. While holding down the main keys [A] and [B], press the reset switch.

(Keep holding the keys until the LED lights even after pressing the reset switch.)

If the keys do not work, press the reset switch with 3.3 VDC inputted to test pad PA13 to start.
- d. When the backup software starts, both green and orange LEDs will light for a second.
- e. The green LED flashes during the backup.
- f. The LEDs are off when normally completed.

LED states during operation, at completion, and error

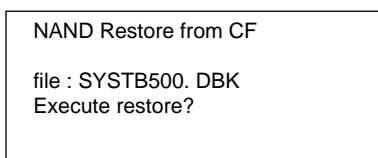
Green LED	Orange LED	State
Flashes (quick flash)	OFF	In operation
OFF	OFF	Normally completed
Flashes every one second	Flashes every one second (same phase as the green LED)	Card is not inserted/formatting error
Flashes every one second	Flashes every one second (anti-phase to the green LED)	Out of card space
Flashes every half second	Flashes every half second (anti-phase to the green LED)	File open/write error
Flashes every half second	Flashes every half second (same phase as the green LED)	Other errors

- g. Turn off the set with the [ON/STANDBY] key and eject the card.

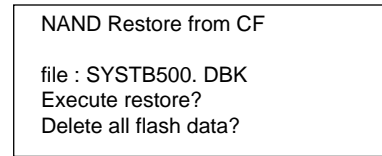
(3) Service Restoration Method

- a. Insert both the battery and AC adaptor to the set.
- b. Insert a CF card containing service backup data into the card slot with the set turned off.
- c. Run the Service Diagnosis.

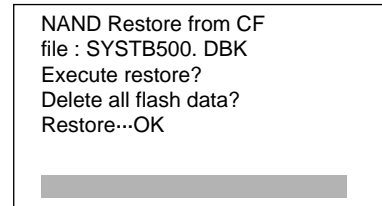
Refer to “3-1. (1) How to run the Service Diagnosis”
- d. Execute [NAND Flash Restore] in the menu “SERVICE (4/4)”.



- e. Press the [PLAY] key when the above screen is shown.



- f. Press the [PLAY] key when the above screen is shown.



- g. Restoration is completed when “OK” is displayed. It will take about two minutes and a half to restore (with a CF card).
- h. Press the [Center] key to return to the diagnosis menu.
- i. Turn off the set with the [ON/STANDBY] key and eject the card.

3-3. How to check sum check of the flash memory and OS version

As PRC-100 data including the OS and application are written in the flash memory, check the OS and application written in the flash memory when servicing.

If you cannot check OS version with the application, check the version with the procedure mentioned in this section before writing OS and write the right version of OS.

- a. Run the Service Diagnosis.
- b. Execute [NAND Flash (SUM)] in the menu “SERVICE (2/4)”
- c. Each block is checked and results are shown. (It will take about 50 seconds to check all the blocks).

<p>Version Check SUM Left: Assumed value Right: Calculated value</p>	<pre> NAND CheckSum Block Sum1 Sum2 M ----- MAINT: Ver.*.** #### #### OK OK DIAG : Ver.*.** #### #### OK OK KERNEL2 : Ver.*.** #### #### OK OK FLSYS2 : Ver.*.** #### #### OK OK KERNEL1 : Ver.*.** #### #### OK OK ROFLSYS : Ver.*.** #### #### OK OK PRESET : Ver.*.** #### #### NG OK INFO : Ver.*.** #### #### OK OK ----- Total : **** Master : *.* ** **** NG </pre>	<p>Check items</p> <p>Check all the results are OK except those for PRESET and MASTER.</p> <p>Check that all the “Ver.” are the same.</p> <p>[Caution] When [NAND Flash (SUM)] is executed, there may be cases where “Ver.” and check sum values (Assumed values) to the left are shown correctly, but the check sum values (calculated values) to the right are “0000” and NG is shown in each block. In that case, press the [Center] key to exit and execute the [NAND Flash (SUM)] again. (Do not turn off or reset before executing the [NAND Flash (SUM)] again.) If the display is normal after the retry, the results are normal.</p>
--	--	---

- d. Check the results, press the [Center] key to return to the menu, and turn off the set with the [ON/STANDBY] key.
- e. If any results other than those for PRESET and MASTER are "NG" or version display is not normal, the data in the flash are changed. In that case, check the version and write the correct version data with OS Writing.

3-4. Various checks

Set the battery change switch to "NORMAL OPERATION" when checking each item.

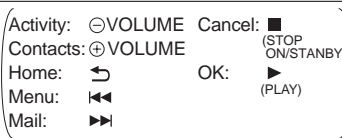
(1) LCD + LED check

O: Lit X: Off F: Flashes

NO	Operation	Display	LED		F/L	Check items
			Green	Orange		
1	Attach the AC adaptor and start the diagnosis.	Diagnosis Menu (1/4)	X	X	X	Diagnosis should run.
2	5. Select "LCD+LED" and press the [PLAY] key.	Solid white	X	X	MAX	Display should be in solid white. F/L should light.
3	Press the [PLAY] key.	Solid white	X	X	X	Display should be in solid white. F/L should be off.
4	Press the [PLAY] key.	Solid white	X	X	MIN	Display should be in solid white. F/L should light. (MIN)
5	Press the [PLAY] key.	Gradation sequence	X	X	3rd	Lower side is black and the upper, the brighter.
6	Press the [PLAY] key.	One black and white stagger	X	X	3rd	Staggered display (Ignore moire patterns.) F/L should slightly brighten.
7	Press the [PLAY] key.	One black and white stagger	X	X	MAX	Staggered display (Ignore moire patterns.) F/L should slightly brighten.
8	Press the [PLAY] key.	Solid black	X	O	MAX	Solid black (Ignore the bluish tint) Orange LED should light.
9	Press the [PLAY] key.	Solid red	O	X	MAX	Solid red Green LED should light.
10	Press the [PLAY] key.	Solid green	O	O	MAX	Solid green Both LEDs should light.
11	Press the [PLAY] key.	Solid blue	F	F	MAX	Solid blue Both LEDs should blink.
12	Press the [PLAY] key.	Diagnosis Menu (1/4)	X	X	X	Diag menu should be displayed. Both LEDs and F/L should be off.

Caution: 1. Display should be free from unevenness, flickering, and dirt.

(2) Key check

NO	Operation	Display	Check items
0	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)	Slide key should be closed.
1	Select "7. Keyboard" and press the [PLAY] key.		
2	Lower the slide key.		Note: Lower it to the end.
3	Press the keys in order according to the display. [Q] [W] [E] [R] [T] [Y] [U] [I] [O] [P] [A] [S] [D] [F] [G] [H] [J] [K] [L] [←] [⇧] [Z] [X] [C] [V] [B] [N] [M] [;] [⇧] [Fn] [Tab] [/?] [Space] [,,,] [..] [ENTER]		Should not be NG.
4	Lift the slide key.		Note: Lift it to the end.
5	Press the keys in order according to the display. [Activity] [Contacts] [Home] [Menu] [Mail] [Cancel] [Up] [OK] [Left] [Center] [Right] [Down]	About keys 	Should not be NG.
6		Diag menu (1/4)	
7	Press the [ON/STANBY] key to turn off.		
8	After the display is completely off, remove the AC adaptor.		

(3) ROM check (Read)

NO	Operation	Display	Check items
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)	
2	Move to the 2/4 with the cursor key (Right).	Diag menu (2/4)	
3	Select "7. ROM (SUM)" and press the [PLAY] key.	ROM (SUM) stored value . . .xxxx calculated value . . .xxxx *** OK! *** ROM Size if 8MB	ROM DATA (SUM) stored value . . .xxxx calculated value . . .xxxx *** OK! ***
4	Press the [Center] key.	Diag menu (2/4)	Should be "OK". Should be "8MB".

(4) RAM check (Write/Read)

NO	Operation	Display	Check items
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)	
2	Move to the 3/4 with the cursor key (Right).	Diag menu (3/4)	
3	Select "10. RAM (Full)" and press the [PLAY] key.	RAM Check (R/W) [Read] OK Check size : 27MB RAM 4 (size : 0x00900000)	Should be "OK".
4	Press the [Center] key.	Diag menu	

(5) NAND Flash check (Read)

NO	Operation	Display	Check items																																												
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)																																													
2	Move to the 2/4 with the cursor key (Right).	Diag menu (2/4)																																													
3	Select "6. NAND Flash (SUM)" and press the [PLAY] key.	NAND CheckSum <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Block</th> <th style="text-align: right;">Sum1</th> <th style="text-align: right;">Sum2</th> <th style="text-align: right;">M</th> </tr> </thead> <tbody> <tr> <td>MAINTE :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>DIAG :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>KERNEL2 :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FLSYS2 :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>KERNEL1 :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>ROFLSYS :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>PRESET :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>INFO :</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total :</td> <td></td> <td style="text-align: right;">XXXX</td> <td></td> </tr> <tr> <td>Master :</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Block	Sum1	Sum2	M	MAINTE :				DIAG :				KERNEL2 :				FLSYS2 :				KERNEL1 :				ROFLSYS :				PRESET :				INFO :				Total :		XXXX		Master :				Refer to "3-3. How to check sum check of the flash memory and OS version" for judgment.
Block	Sum1	Sum2	M																																												
MAINTE :																																															
DIAG :																																															
KERNEL2 :																																															
FLSYS2 :																																															
KERNEL1 :																																															
ROFLSYS :																																															
PRESET :																																															
INFO :																																															
Total :		XXXX																																													
Master :																																															
4	Press the [Center] key.	Diag menu																																													

(6) SD card check

NO	Operation	Display	Check items
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)	Note: Use a blank SD card.
2	Move to the 2/4 with the cursor key (Right).	Diag menu (2/4)	
3	After inserting the SD card, select "3. SD card" and press [PLAY] key.	SD CARD Write&Read Test Write sector xxxx Writing... OK Read sector xxxx Reading... OK Verifying... OK	Writing... OK Reading... OK Verifying... OK three "OKs" should be shown as above.
4	Press the [Center] key.	Diag menu	
5	Press the [ON/STANBY] key to turn off. When the display is completely turned off, remove the AC adaptor.		

Caution: Use an SD card whose operation is checked by Sharp Corporation if possible though manufactures and capacity of the card is not specified.

(7) Speaker/Mic check

NO	Operation	Display	Check items
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)	
2	Move to the 2/4 with the cursor key (Right).	Diag menu (2/4)	
3	Select "8. Speaker/Mic" and press [PLAY] key.	Frequency select menu	
4	Press [PLAY] key (select 300 Hz).		The speaker should produce a booming reproduced sounds for one second. The sound should not be too soft. Distinct abnormal sounds should not be mixed.
5	Then, press [PLAY] key.		The speaker should produce a booming reproduced sounds for one second. The volume depends on the set. If only distinct abnormal sounds are produced, the check result is negative. (positive if booming reproduced sounds are played with the abnormal sounds.)
6	Press the [Center] key twice.	Diag menu	Sound should be stopped.

Caution: In rare cases, normal sounds are not produced. In that case, check the above again. The result is positive if the booming sounds are reproduced for one second.

(8) Earphone check

Caution: Ignore intermittence of sounds during mode change and increasing volume.

NO	Operation	Display	Check items
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)	
2	Press the cursor key (Up) twice to select "9. Earphone".		
3	Connect an earphone.		
4	Press [PLAY] key.	Frequency select menu	
5	Press [PLAY] key to select "No. 1 300 Hz".		Sounds should be produced from left and right earphones.
6	Press the [Center] key twice.	Diag menu	Sounds should stop.

Caution: Do not insert the earphones in your ears because sounds are too loud.

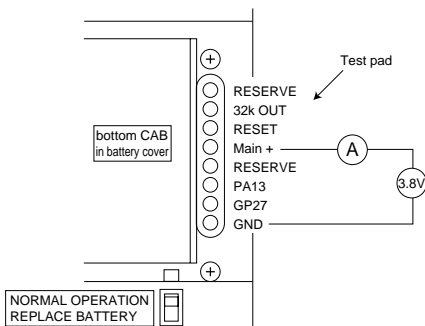
Ignore intermittence of sounds during sound repeat.

(9) IRDA check * Companion base unit (Checker) is necessary. (Companion base unit: PRC-100)

NO	Test target	Checker
1	Attach the AC adaptor and start the diagnosis. (M+D+Reset)	Attach the AC adaptor and start the diagnosis. (M+D+Reset)
2	Diag menu	Diag menu
3	Select "6. IrDA" on page 1/4.	Select "1. IrDA Checker" on page 4/4.
4		Press [OK] key. Display SIR Master Mode IrDA BaudRate = 115200 parity = odd Hit Any Key to Exit
5	Press [PLAY] key. Display SIR Slave Test IrDA BaudRate = 115200 parity = odd Sending... Receiving... OK! ←Check display.	
6	Press [Center] key to return to the menu.	Press [Center] key to return to the menu.

(10) Current check

NO	Operation	Display	Check items
1	Connect DC power source as shown below and supply 3.8 V.		
2	Make sure battery replacement switch is set at lock (operation) position.		
3	Start the OS.		
4	(If it is impossible to start, press [RESET] and then [ON/STANBY].)		
5	Turn off F/L in application screen and check ammeter.	Application screen (F/L off)	ON current=130 mA or below
6	Press [ON/STANBY] key to turn off and check ammeter.	OFF	OFF current =1.5 mA–3.2 mA



(11) NAND Flash Bad Block check

NO	Operation	Display	Check items
1	Connect the AC adaptor.		
2	Holding down [M] and [D] keys, press [RESET].	Diag menu (1/4)	
3	Go to page 2/4.	Diag menu (2/4)	
4	Select "5. NAND Bad Count".	Diag menu (2/4)	
5	Press [PLAY] key.	Numbers of Bad Blocks for each partition is displayed.	Make sure "OK!" is shown at the bottom.
6	Press [Center] key to return to the menu.	Diag menu (2/4)	
7	Press the [ON/STANBY] key to turn off. When the display and LEDs are completely turned off, remove the AC adaptor.		

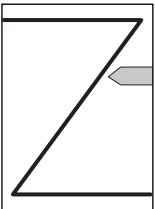
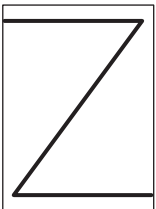
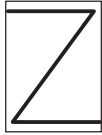

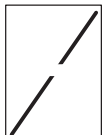

3-5. Default setting specific to the set

Default setting values specific to the set (Touch panel initial value and LCD common voltage adjustment value) are written to the flash memory storing OS, application, diagnosis modifying software, and user data.

The setting values are not erased by normal service checking, but write the setting values according to the procedures below if PWBs are replaced or flash memory is replaced for repair.

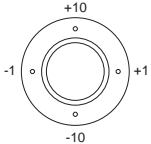
(1) How to write touch panel initial value

Caution: Check with your eyes right above the center of the display.

NO	Operation	Display	Check items
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)	Slide key is closed.
2	Press [◀◀] key to turn on front light.		F/L lights.
3	Select "4. Touch Panel" and press [Play] key.	Touch panel adjustment screen	
4	Tap on "+" at two positions. Set the values carefully because the settings are written to the FLASH.	White screen	"+" marks should be turned red.
5			<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>OK</p>  <p>Lines should be drawn straightly.</p> </div> <div style="text-align: center;"> <p>NG</p>  <p>Eroded line (±2 dots or more) is not acceptable.</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>NG</p>  <p>Discontinued line</p> </div> <div style="text-align: center;"> <p>NG</p>  <p>Line is displaced from the pen.</p> </div> </div>
6	Press the [Center] key.	Diag menu	

Caution: Battery replacement switch should be set to "NORMAL OPERATION".

(2) How to write LCD common voltage adjustment value

NO	Operation	Display	Check items												
1	Attach the AC adaptor and start the diagnosis.	Diag menu (1/4)													
2	Select "1. COM ADJ setting" and press [Play] key.	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>+100</td> <td>+10</td> <td>+1</td> <td>CLA</td> </tr> <tr> <td>-100</td> <td>-10</td> <td>-1</td> <td>UPDATE</td> </tr> <tr> <td>***</td> <td></td> <td>***</td> <td></td> </tr> </table> <p style="text-align: center;">Adjusted value Setting value</p>	+100	+10	+1	CLA	-100	-10	-1	UPDATE	***		***		
+100	+10	+1	CLA												
-100	-10	-1	UPDATE												
***		***													
3	Adjust the setting value with cursor keys to eliminate flicker. Check with vertically-striped pattern on the display.		Flickering should be eliminated.												
4	Remember the [adjustment value] displayed and tap on [UPDATE] in the tablet.	Return to "Diag menu (1/4)"	Lower left in the display COM: *** The value in the positions of "***" should be the above-mentioned value.												
5	Press [◀◀] key to turn off light.	Diag menu (1/4)	F/L should be turned off.												
6	Press [ON/STANBY] key to turn off. After the display is completely off, remove the AC adaptor.														

Caution: Set the battery replacement switch to "NORMAL OPERATION"

3-6. How to write the OS

The explanation here is for writing software (supplied OS program or the like) to the built-in flash memory using a CF card.

If circuit board is replaced, write the program in the procedures mentioned below after the circuit is repaired.

- a. Copy all the latest files for writing OS to a CF card using a personal computer or the like. (Preparing the CF card for writing OS)
- b. Connect the battery and AC adaptor to the PRC-100, and then insert the CF card for writing OS to the PRC-100, and hold down the keys [Q] and [T] to perform reset operation. (Don't attach battery cover.)
- c. When the writing starts, both the two LEDs will light.
- d. When the writing completes normally, both the two LEDs will go out.
If the writing is not completed normally, LED will flash.

3-7. How to delete the flash memory

It is necessary to erase the flash memory during servicing before restoring backed up data (especially if the circuit board units are repaired/changed) because the flash memory in the repaired circuit board may contain old data.

The following description is for explaining how to delete the flash memory.

• **Data deleted by erasing the flash memory**

The following data are written in the flash memory of the PRC-100.

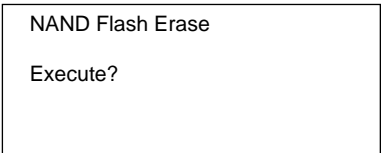
1. Adjustment value specific to the set (Touch panel initial value, LCD common voltage adjustment value)
2. Boot flag (the previously mentioned diagnosis flag, etc.)
3. OS, application, and diagnosis modifying software
4. User data
(including factory preset data)

The above data except 1 and 2 are deleted by erasing the flash memory.

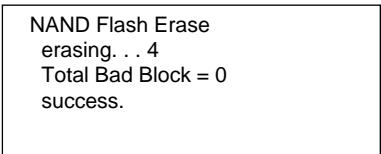
Therefore, back up user data in advance if necessary.

<Operation procedure>

- a. Start the diagnosis for process checking. (While holding down main keys [Fn], [D] and [P], press the RESET switch.)
- b. Tap on the [Page Down] to select the "DIAG MENU (4/4)".
- c. Tap on [5. NAND Flash Erase] twice.



- d. When the above screen is displayed, press the [PLAY] key.



- e. When the check is finished and the above screen is displayed, erasing is completed. If "success" is not displayed, repair again because the flash memory may be defective.
 - f. Press the [Center] key to return to "DIAG MENU" and turn off with the [ON/STANDBY] key.
- * If reset or powered off during erasing, adjustment values peculiar to the set will be deleted as well.

3-8. How to check errors in maintenance menu

If the resetting operation does not make the application to start normally, perform error checks. Check if there is any error in user data stored in the PRC-100 memory or in user data stored in memory card.

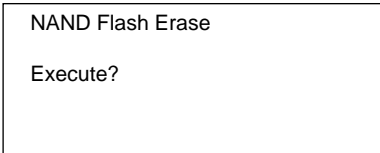
Perform the error checks in "Maintenance menu". Refer to 3-9-(3) "Maintenance of PRC-100" for operations and precautions.

3-9. Other precautions for servicing

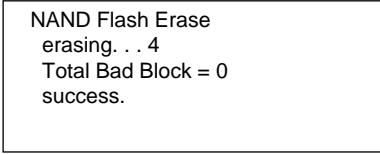
(1) How to restore if it is impossible to start because of defective flash.

Restore with the procedures mentioned below if writing OS is not successful and the diagnosis cannot be run.

- a. Holding down the keys [Fn], [P] and [D], press the RESET switch.
- b. The diagnosis for process checking written to P2ROM will start.
If it is necessary to back up user data, perform the backup in the menu on page 4.
- c. Tap on the [Page Down] to select the "DIAG MENU (4/4)".
- d. Tap on the [NAND Flash Erase] twice.



- e. When the above screen is displayed, press the [PLAY] key.



- f. When the check is finished and the display is as shown above, erasing is completed. If "success" is not displayed, repair again because the Flash Memory may be defective.
 - g. Press the [Center] key to return to the "DIAG MENU (4/4)" and turn off with [ON/STANBY] key.
- * If the diagnosis for process checking is run on the PRC-100, it is not necessary to terminate because resetting will quit the diagnosis for process checking.

(2) How to deal with malfunctions

In case of malfunctions, for example, data are not normally displayed, tapping on the screen or key controls do not work properly, the following procedures should be taken by turns.

① Rebooting

② Resetting

③ Error checks (defective data may be lost)

If the above procedures do not solve the problems, perform formatting. The formatting will erase all the input data and added software.

If it is necessary to store data, perform backup, erasing and restoration according to the repair procedures.

① Rebooting

Data being edited will be lost during rebooting. Therefore, reboot after saving the data. (The saved data will not be lost).

1. Quit all the applications. Display application home screen.
2. Select the “Rebooting” in the menu displayed by pressing the [◀◀] key.

If the key operation is not operable, tap on the “☰” in the task bar and tap on the “Rebooting” in the menu.

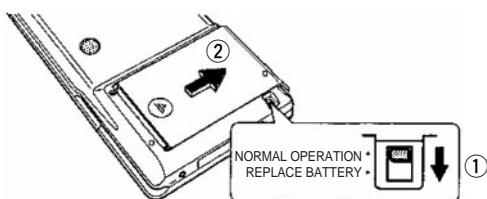
3. Check the displayed contents and select “Yes”.
Reboot. It will take about two minutes to reboot.
4. Home screen is displayed.

After the rebooting, check if the time is correct.

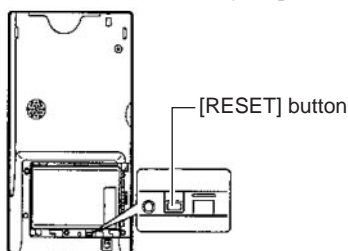
② Resetting

If the rebooting is not operable or the rebooting does not make the operation normal, try the Reset operation mentioned below. Data being edited will be lost during resetting, too. Therefore, reset after saving the data. (The saved data will not be lost).

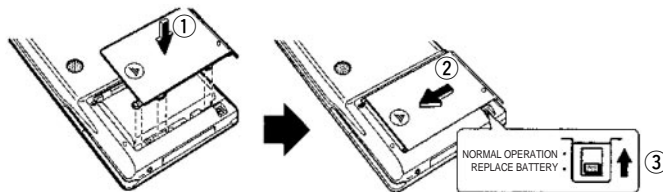
1. Quit all the applications and turn off power.
2. Set the battery replacement switch on the rear side of the PRC-100 to “REPLACE BATTERY” and remove the battery cover.



3. Wait for five seconds and tap on the [RESET] button in the battery cover with the attached stylus pen.



4. Attach the battery cover (①, ②), and set the battery replacement switch to “NORMAL OPERATION” (③).



5. Press the [ON/STANBY] key to turn on power.
Resetting is performed (it will take about two minutes).
Home screen is displayed.

After the resetting, check if the correct time is shown.

③ Error checks

If the application does not run normally after the resetting, perform the error checks. Check if there is any error in the data stored in the PRC-100 memory like calendar or the mail data stored in memory card.

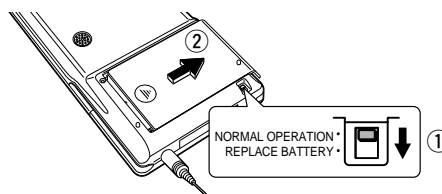
Perform the error checks from “Maintenance menu”. Refer to “Maintenance of PRC-100” in the next chapter for operations and precautions.

(3) Maintenance of PRC-100

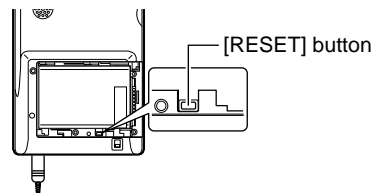
Maintenance of PRC-100 can be performed from the “Maintenance menu”.

● Changing to “Maintenance menu”

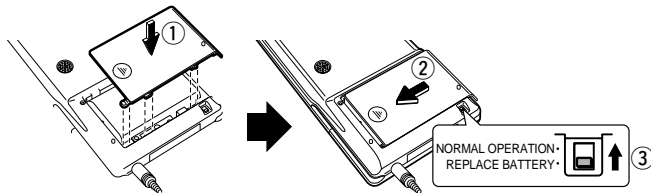
1. Terminate all applications and turn off power.
2. Connect the AC adaptor.
Check that the charge light is lit.
3. Change the battery replacement switch to [REPLACE BATTERY] and remove the battery cover.



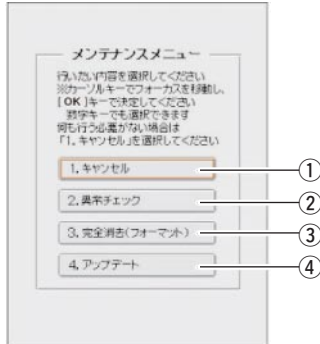
4. Wait for five seconds and tap on the [RESET] button with the attached stylus pen.



5. Attach the battery cover (①, ②), and set battery replacement switch to [NORMAL OPERATION] (③).



- Check that the charge light (orange) is lit, and while holding down [PLAY] key, press [ON/STANBY] key.
The screen will change to maintenance menu.



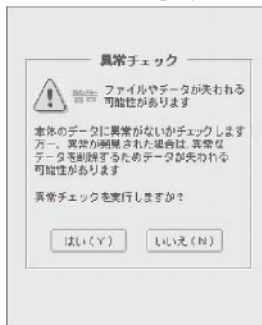
① Cancel	Completes the maintenance and displays home screen. Select [Cancel] and then press [PLAY] key to reset and display home screen.
② Error check	Checks if there are errors in memory in the unit and the data of the attached memory card (mail data). Use this function when resetting cannot make work to run properly.
③ Complete erasing (Formatting)	Formats by erasing all the data in the unit. Preinstalled applications and data, data and settings input during use, and software added are all erased. Updated (④) unit system is not erased (the updated version remains the same.)
④ Updating	Used when updating the main unit system.

● Perform the error check.

Checks if there is any error in the data stored in the unit memory or in the memory card.

Caution: When errors are detected, delete data according to the indication in the screen to delete all the data of the application for normal startup.

- Display the maintenance menu.
Then follow the procedures below with the AC adaptor connected.
- Press the [W(2)] key. (Select [error check].)
Error check screen will be displayed.



- Check the contents shown and press [Y] key.
Error check will start and error check screen will be displayed a little later. Operate according to the indication in the screen.
When the error check is completed, home screen will be displayed.
After the error check, check if the time is correct.

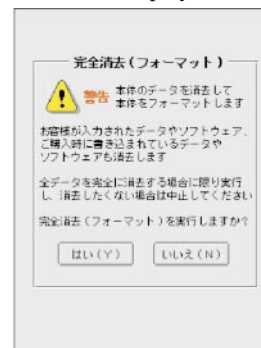
● Erase completely (format).

Deletes all the PRC-100 data to format.

Caution: All the data will be erased.

Preinstalled applications and data, data and settings input during use, and software added are all erased. Updated unit system is not erased (the updated version remains the same.)

- Display the maintenance menu.
Then follow the procedures below with the AC adaptor connected.
- Press the [E(3)] key. (Select [format].)
Formatting screen will be displayed.



- Check the contents shown and press [Y] key. (Select "Yes".)
Formatting will start. Wait until the formatting will be completed.
When completed, the display will change to setup screen.
Follow the indication in the screen to setup.

● Updating

Use this menu to update the system of the Zaurus unit. Connect with a PC and update with updating software on the PC.

Caution: Data may be deleted.

Depending on updating contents, data or setting may be deleted. Be sure to back up before updating.

(3) About rechargeable battery

- Compatible rechargeable batteries

Kind	Model number	Number of piece
Rechargeable battery	EA-BL08	1

* Do not use a rechargeable battery other than EA-BL08.



Note: • Normally, it will take about 4 hours till the battery is fully charged, but the charge time varies depending on how much time has passed after the shipment.

- Even if the rechargeable battery is not in use, it will automatically discharge. In order to avoid troubles caused by the battery drain, recharging before using is recommended after a long period of nonuse.

• Charging

Attach a rechargeable battery to the PRC-100 and connect the AC adaptor to charge.

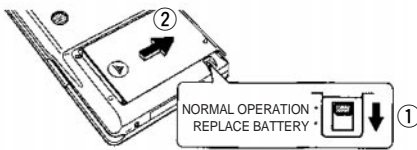
• Check the remaining level

Remaining level of the rechargeable battery can be checked by the state of the  at the lower right of the screen or by the screen which will be displayed by tapping on the . If the remaining level of the rechargeable battery is low, charge immediately.

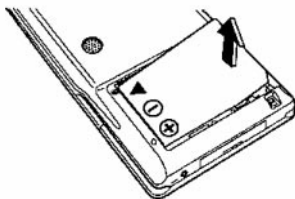
• Replacing the rechargeable battery

Power is not supplied for operating the PRC-100 during the replacement of the rechargeable battery. Be sure to set date and time with the time setting screen displayed after replacing the rechargeable battery.

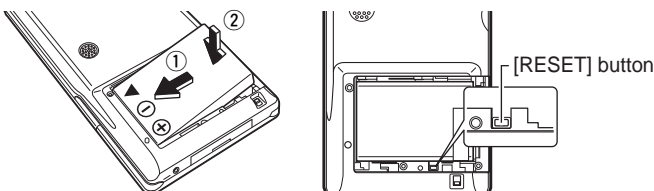
- Turn off the PRC-100.
- Set the battery replacement switch on the rear side of the PRC-100 to “REPLACE BATTERY” and remove the battery cover on the rear side.



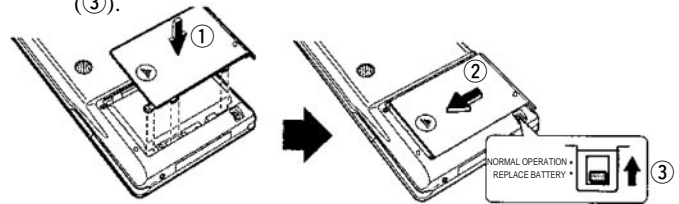
- Remove the dead rechargeable battery.



- Attach the rechargeable battery with the indications ⊕ ⊖ facing up (①, ②), and press the [RESET] button with the attached stylus pen.



- Attach the battery cover on the rear side (①, ②), and change the battery replacement switch to “NORMAL OPERATION” (③).



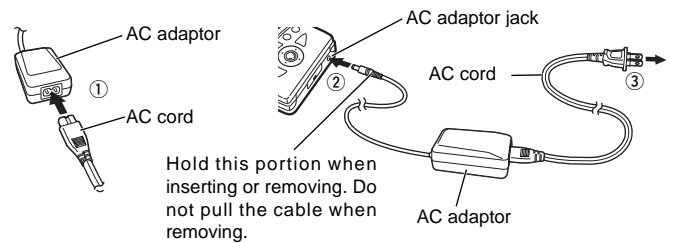
If the rechargeable battery is not charged, connect the AC adaptor to charge it.

- Press the [ON/STANBY] key to turn on power.
- Set date and time.

• Charging the rechargeable battery (EA-BL08).

- Press and hold the [ON/STANBY] key for some time to turn off power.
- Connect the AC adaptor by following the steps ①, ②, ③ in numerical order.

The charge light is lit and charging starts.





- When fully charged, the charge light of the unit turns off and charging is completed. Usually, it will take about 4 hours, though it varies depending on the battery level or ambient temperature.
- Remove the AC adaptor from the jack of the PRC-100 and remove it from the AC outlet.

Caution: • Be sure to use the AC adaptor (EA-70) that comes with the PRC-100. Never use other type of AC adaptor, which may cause trouble.

- Do not connect the AC adaptor to a commercially available electric transformer or the like, which may cause trouble to the AC adaptor.

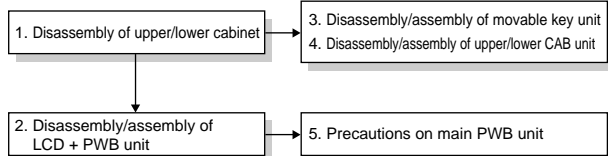
Note: • Charging should be performed at the ambient temperature of 5 °C to 35 °C. The lower the temperature, the difficult it is to charge. Charging should be kept until fully charged.

- It will take longer than usual to charge the rechargeable battery which was not used for a long time.
- Remaining level of the rechargeable battery can be checked by the state of the  at the lower right of the screen or by the screen which will be displayed by tapping on the .
- The AC adaptor may be warm during charging, which is not abnormal.
- Charging can be performed by connecting to the cradle (YCE-ST9).

D. Precautions for disassembly/assembly

This chapter explains disassembly procedures mainly. Basically, assembly is the reverse of the disassembly, but “Precautions for assembly” is explained for points which need special attention. Descriptions are omitted for replacement of units/parts requiring no special attention.

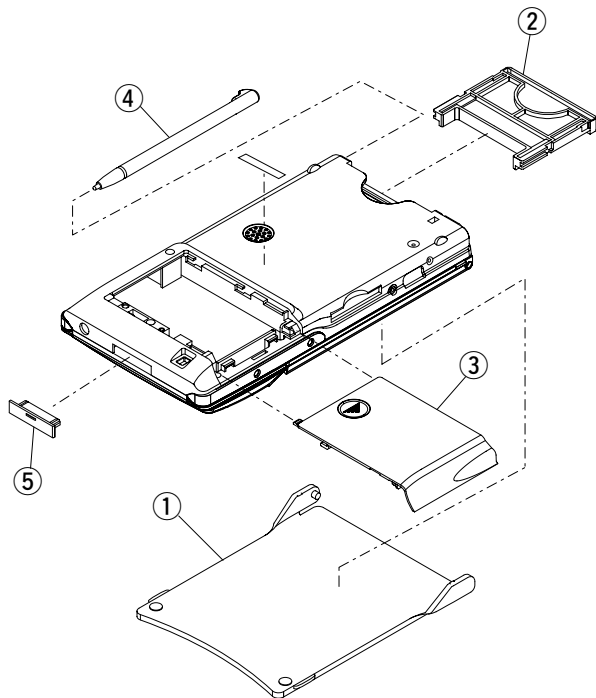
• Disassembly flowchart



1. Disassembly of upper/lower cabinet

1. Remove the hard cover unit ①, CF slot protect card ②, battery cover ③, stylus pen ④, and connector cover ⑤.

No.	Part name
①	Hard cover unit
②	CF slot protect card
③	Battery cover
④	Stylus pen
⑤	Connector cover



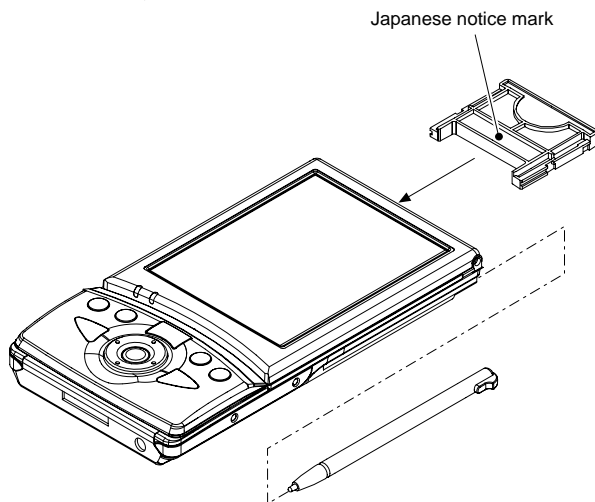
• Precautions for assembly

(a) Mounting the CF slot protect card

- ① Insert the CF slot protect card into the CF card slot with its Japanese notice mark facing the top side of the set. (Insert until it clicks.)
- ② Check that the card can be inserted and removed easily (twice or three times).
- ③ Take care not to squeeze the card upside down or the CF card connector frame will be damaged.

(b) Mounting the stylus pen

- ① Insert the stylus pen with its protrusion fitting into the notch of the set.
- ② Check that it can be inserted and removed easily (twice or three times).

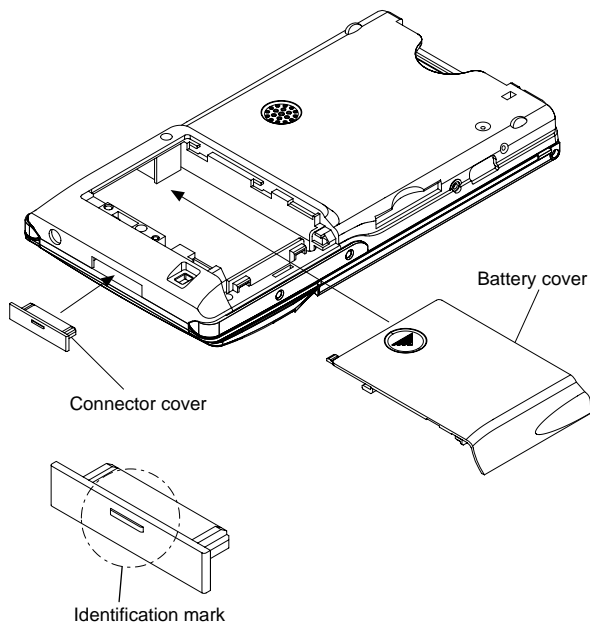


(c) Mounting the battery cover

- ① Set the battery cover lock knob on the rear side of the set to “REPLACE BATTERY”.
- ② Slide the battery cover leftward to mount it.
- ③ Set the battery cover lock knob to “NORMAL OPERATION”.

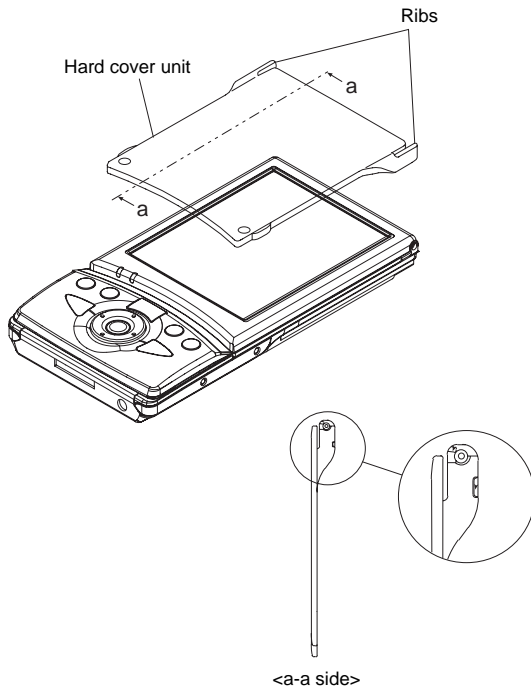
(d) Mounting the connector cover

- ① Insert the connector cover with its identification mark facing the bottom side of the set. (The mark faces upward in the figure.)
- ② Take care not to mount upside down because it can be mounted upside down.
- ③ Take care not to damage 16-pin connector terminal during insertion.

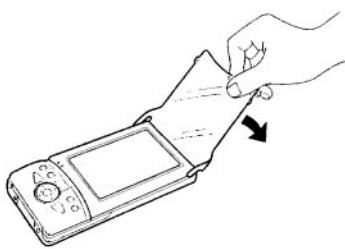


(e) Mounting the hard cover unit

- ① Check that there is no scratch, stain, dirt on the display and CAB around the display.
- ② Hitch the ribs of the hard cover unit to the depressed portions on the left and right side of the set one side at a time.
- ③ Take care not to damage the upper CAB.
- ④ Check that open/close lock works smoothly.

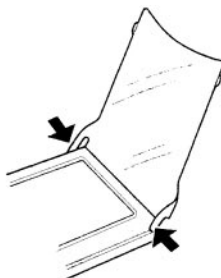


Removing



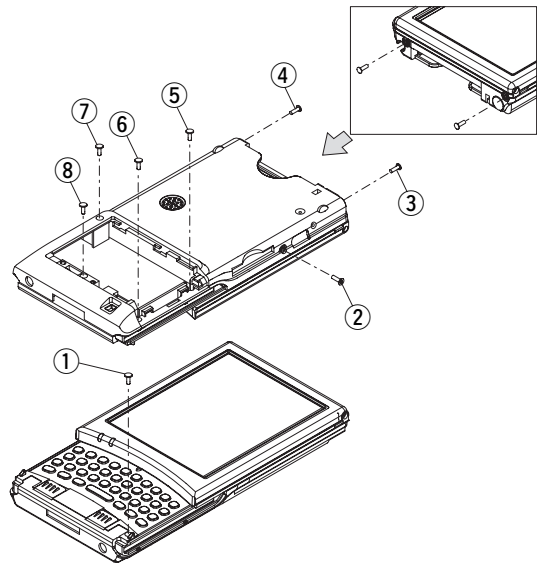
Pressing the LCD cover so that its angle is over 135 degrees to remove it.

Attaching



Attach the cover one side at a time.

2. To disassemble PRC-100, remove the movable key unit and then remove the 8 screws in numerical order of screw ①, ②-④, and ⑤-⑧.



• **Precautions for assembly**

To tighten screws, tighten them in the order shown below.

- (1) Tighten the screws ⑤-⑧.
- (2) Tighten the screws ②-④.
- (3) Tighten the screw ①.

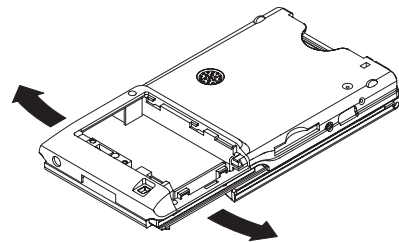
• **Precautions for tightening screws**

- (1) **Tighten the screws with enough care.**
- (2) Fit the upper and lower CABs so that no space is left between them when tightening the screws.

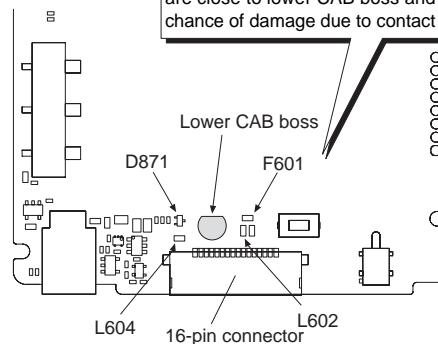
3. Remove the upper CAB.

Caution: Take care not to force the lock knobs loose by swinging the lower CAB unit as shown in the figure below.

(Be sure to follow the "Lower CAB removal procedures" or the bosses of the lower CAB may touch chip parts on the PWB, damaging the chip parts or making them removed from the PWB.)

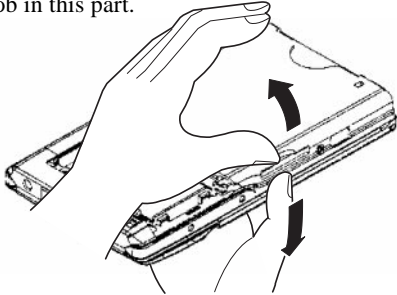


Take extra care because D871/F601/L602/L604 are close to lower CAB boss and there is a high chance of damage due to contact to the boss.

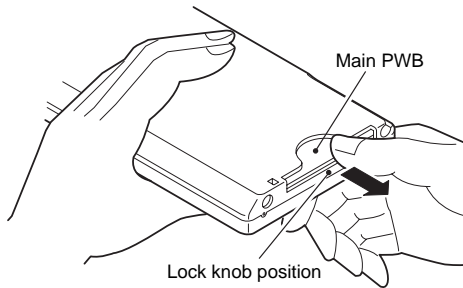


• Lower CAB removal procedures

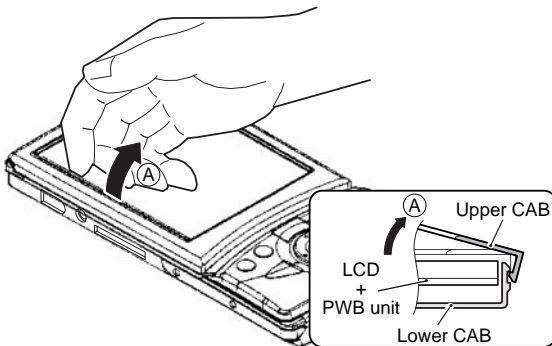
- (1) Remove the right joint (at the SD slot side) of the upper/lower CABs viewed from the rear side.
The removal should be easy because there is no lock knob in this part.



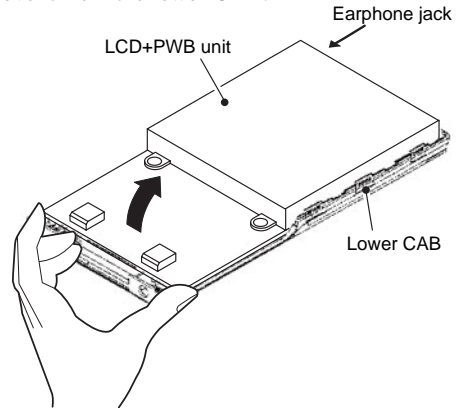
- (2) Hitch your fingernail on the groove between the main PWB and lower CAB and pull in the direction of the arrow to remove the lock knob.



- (3) Hitch your fingernail on the groove between the main upper CAB and LCD unit and turn the upper CAB slowly in the direction of the arrow "A" to remove it.

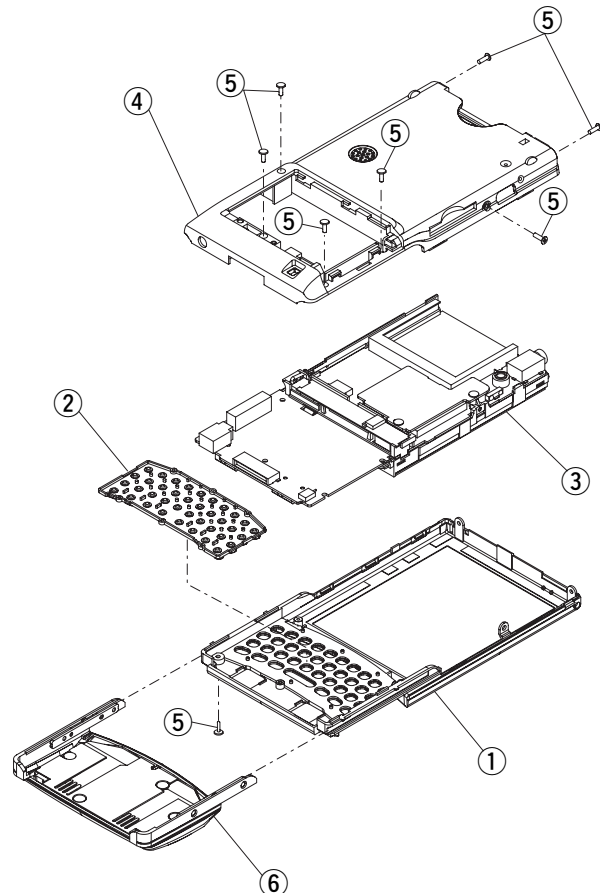


4. Remove the LCD + PWB unit from the lower CAB.
Take care not to apply too much force because earphone jack (mounted on the main PWB) is fit into the hole in the lower CAB at the position shown by the arrow. Hold the front side of the main PWB and pull it upward slowly to remove it from the lower CAB.



Basic assembly part structure

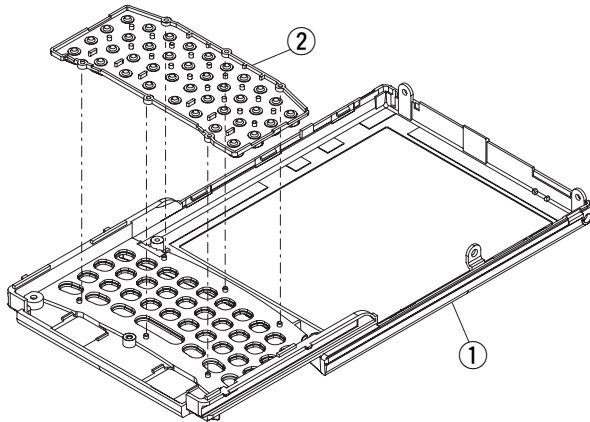
No.	Part name
①	Upper CAB unit
②	Key rubber A
③	LCD+PWB unit
④	Lower CAB unit
⑤	Screw C
⑥	Movable key unit



[Precautions for assembly]

1. Precautions for assembling the key rubber A

- (1) Fit the location holes of the key rubber A ② to the location ribs (6 pcs.) of the upper CAB unit ① to attach.
- (2) Take care against getting on the CAB holes.

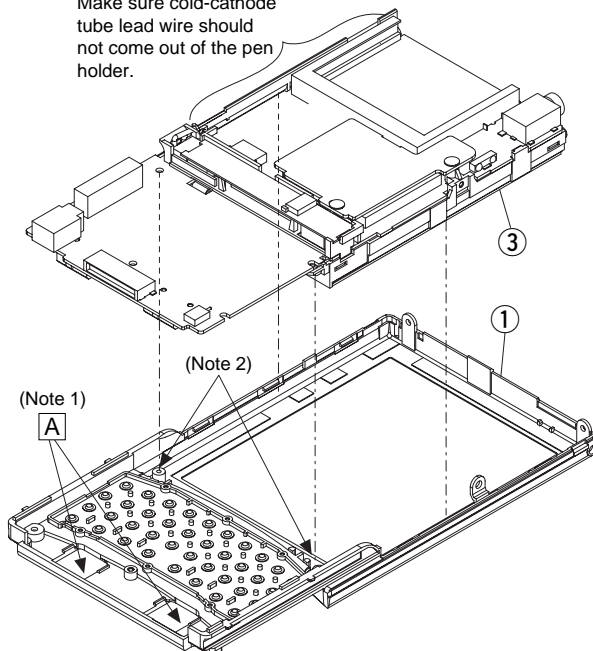


2. Precautions for assembling the LCD + PWB unit to the upper CAB unit

- (1) Attach the LCD + PWB unit ③ to the upper CAB unit ① from the pen holder side.
- (2) Take care so that cold-cathode tube lead wire (white) will not be caught in the upper CAB.

If it is caught, make sure that there is no damage to the coating of the lead wire. (Damaged or ripped parts must not be used under any circumstances.)

Make sure cold-cathode tube lead wire should not come out of the pen holder.



Pay attention to the following or the CABs will not fit well.

Note 1: When attaching the LCD + PWB unit, be sure to insert the contact spring unit into the upper CAB hole "A" properly.

Note 2: LCD holder hole should not get on the upper CAB boss.

3. Precautions for assembling the lower CAB unit

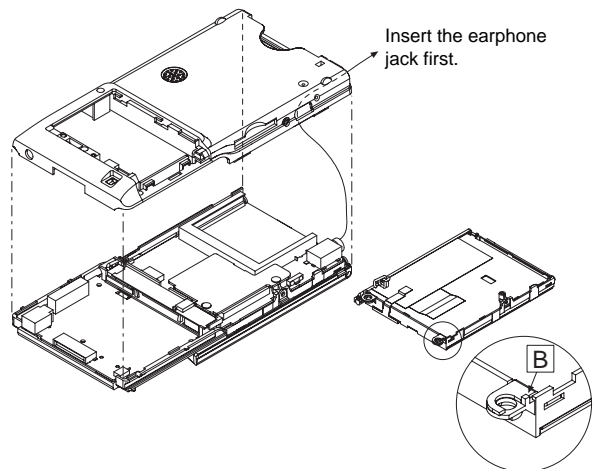
- (1) Make sure the following parts are attached to the lower CAB unit.
Speaker ⑥, IR filter ④, battery cover lock knob ②, nut cushion ③ (Refer to the figure in the [Lower CAB unit assembly] below)
- (2) Fit the earphone jack portion of the lower CAB unit first and then fit each outer claw.

• Precautions

- (1) The cold-cathode tube lead wire (white) should not be caught in the upper CAB.
If it is caught, make sure that there is no damage to the coating of the lead wire. (Damaged or ripped parts must not be used under any circumstances.)
- (2) Take care not to squeeze with too much force or the CAB claws will be broken.
- (3) Make sure that pins of the CF connector are not bent before fitting.

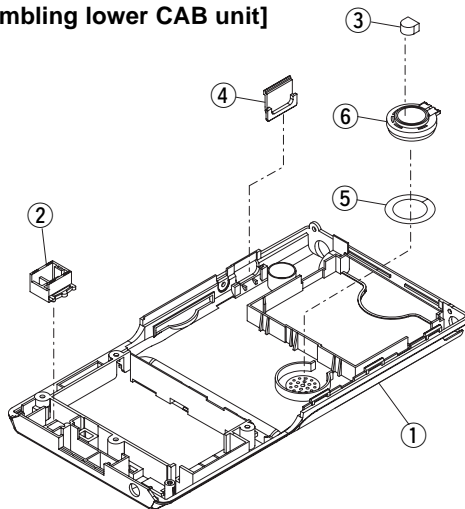
Make sure PWB does not get on the rib [B] of the LCD holder when fitting the lower CAB unit.

(If mounted with the PWB getting on the rib, it does not fit well.)



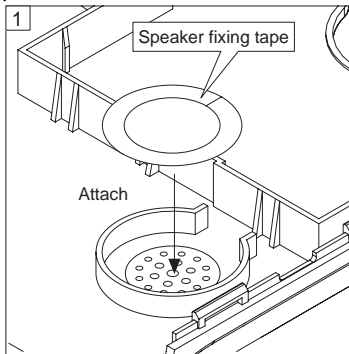
Make sure PWB does not get on the rib [B] of the LCD holder when fitting the lower CAB unit.
(If mounted with the PWB getting on the rib, it does not fit well.)

[Assembling lower CAB unit]

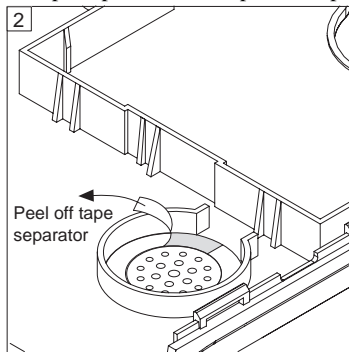


3-1. Attaching speaker fixing tape, speaker and nut cushion.

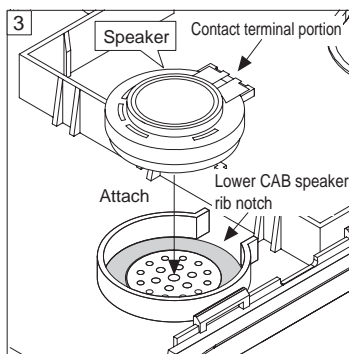
- (1) Peel off the speaker fixing tape from the release paper and attach to the speaker attaching portion of the lower CAB.



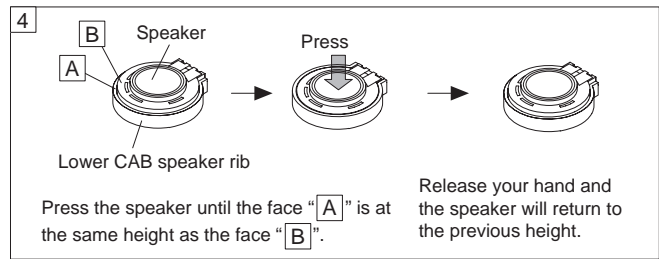
- (2) Peel off tape separator from split liner portion.



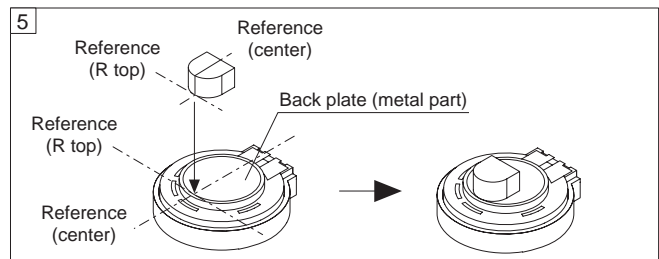
- (3) Fit the speaker contact terminal portion to the notch of the lower CAB speaker rib and attach the speaker to the lower CAB.



- (4) Press the speaker until the upper side of the speaker frame meets the upper side of the lower CAB speaker rib. (Press to make sure it is in position.)



- (5) Remove the nut cushion from the base sheet, align and attach the cushion on the back plate of the speaker with the "R top".

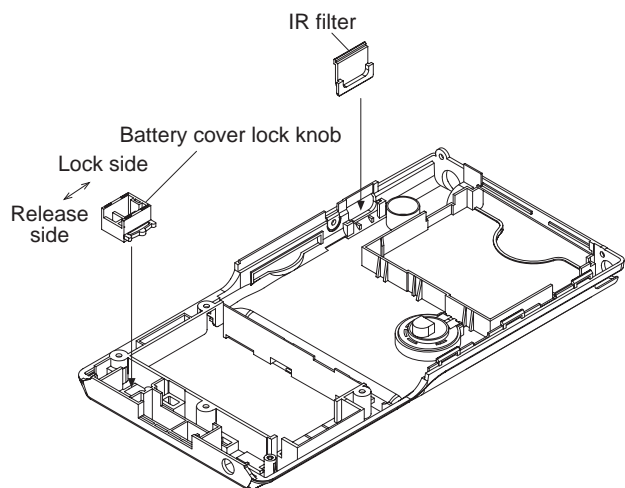


• Precautions

- (1) Attach the tape so as not to get on the sidewall of the speaker rib of the lower CAB.
- (2) Be careful not to make wrinkles/creases in the tape.
- (3) Be sure to press the speaker after attaching so that it is in position.

3-2. Attaching IR filter/battery cover lock knob

- (1) Attach the IR filter to the lower CAB.
- (2) Attach the battery cover lock knob to the lower CAB.

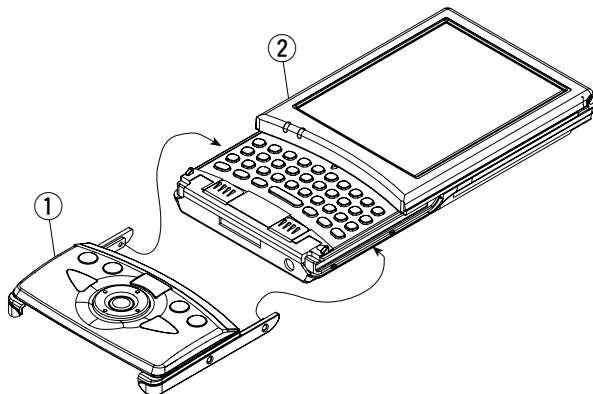


• Precautions

- (1) Be sure to set the lock knob to "locked (NORMAL OPERATION)" side when fitting the lower CAB or the battery replacement switch on the circuit will be damaged.

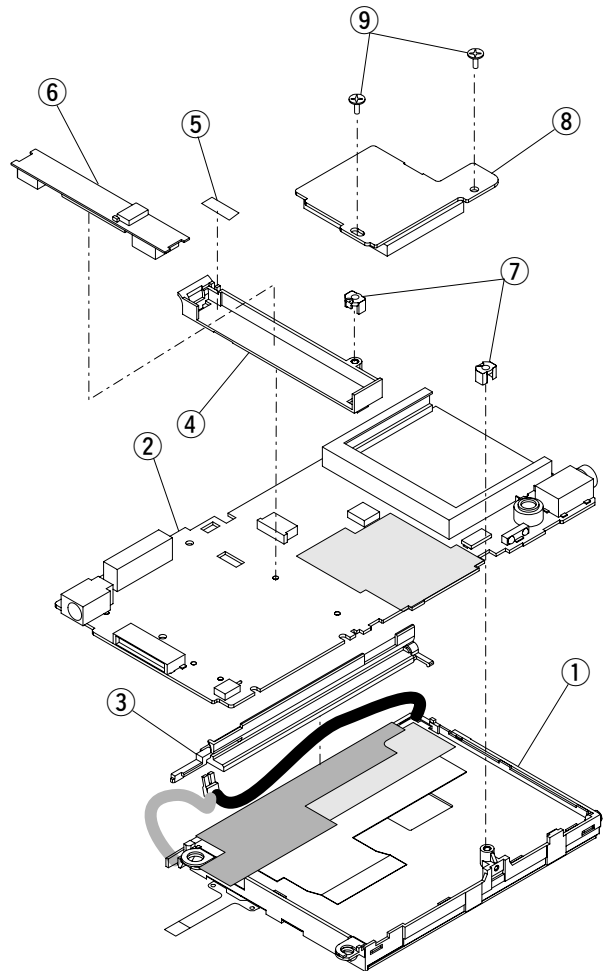
4. Attaching movable key unit

- (1) Defat/clean the key PWB contact terminal portion on the rear surface of the movable key unit ①/ key PWB concealing sheet surface with IPA (removing stain/fingerprint).
- (2) Fit only one side of the movable key fixing bracket of the movable key unit ① to the sliding groove of the upper CAB ②.
- (3) Fit the other side of the movable key fixing bracket to the sliding groove while extending the arm of the movable key unit ①.
- (4) Hold a side of the movable key unit ① and slide it open and close three times to apply grease. (Check also if it slides smoothly.)
- (5) Slide open the movable key unit ① fully and check from the side surfaces of the set or I/O port surface that there is no deformation in the contact spring.
- (6) Take care not to tear on the upper CAB or the upper CAB and fixed key panel may be damaged.
- (7) Take care not deform the contact spring during attachment.



2. Disassembly/assembly of the LCD + PWB unit

No.	Part name
①	LCD unit
②	Main PWB unit
③	Pen holder
④	Inverter holder
⑤	Inverter fixing tape
⑥	Inverter unit
⑦	Boss cap
⑧	Sub PWB unit
⑨	Screw D



[Disassembly procedure of the LCD + PWB unit and precautions on assembly]

Follow the procedures below to disassemble the LCD + PWB unit. Make sure to read the precautions described according to the procedures below.

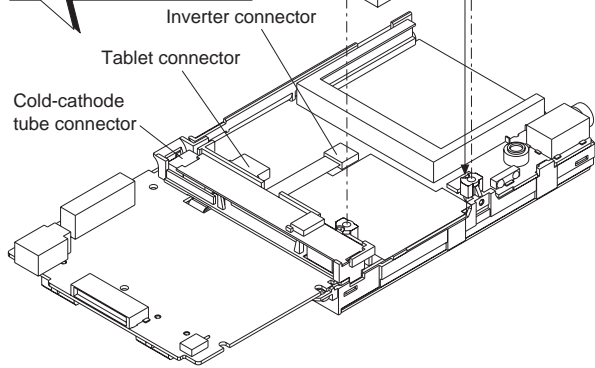
1. Removing the sub PWB unit
- ↓
2. Removing the inverter unit
- ↓
3. Removing the inverter holder
- ↓
4. Removing the pen holder
- ↓
5. Removing the LCD unit

1. Removing the sub PWB unit

Remove the screws ①, ② to remove the sub PWB unit.

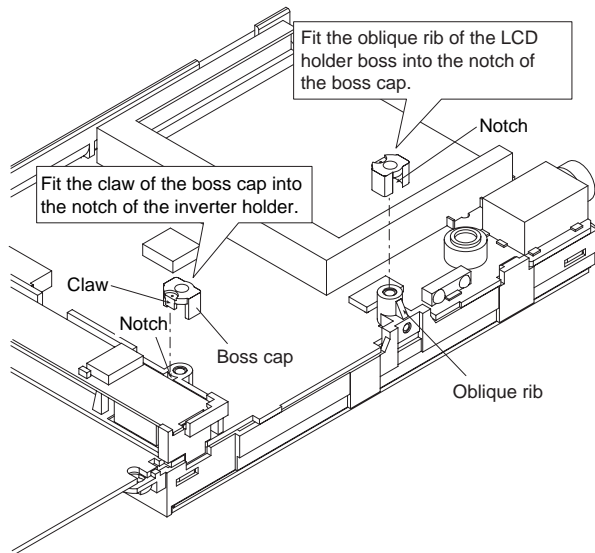
Hold this portion when tightening the screw ① or the sub PWB will turn.
 Hold this portion when tightening the screw ② or the sub PWB will turn.

Make sure that inverter connector, tablet connector, cold-cathode tube connector are inserted securely.



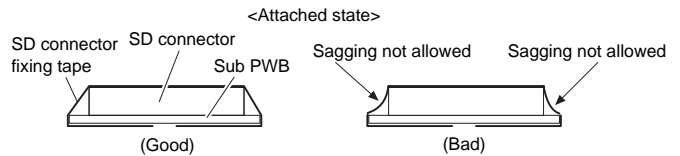
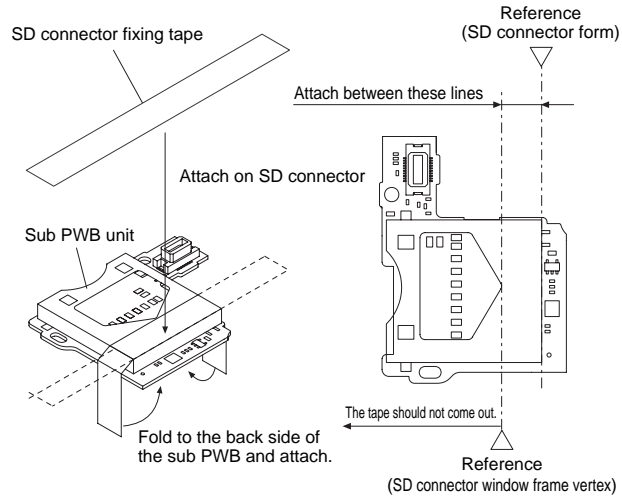
• Precautions on assembly

- Insert the two boss caps to the screw bosses for the LCD holder and inverter holder respectively. Take care not to attach the boss caps in the wrong directions.



- Insert the B to B connector straight and do not twist or overload it after insertion, which may cause poor connection.
- Tighten the screw ① and then screw ② when tightening.
- Attach SD connector fixing tape to the sub PWB unit at the position mentioned below.

<Attaching reference for SD connector fixing tape>



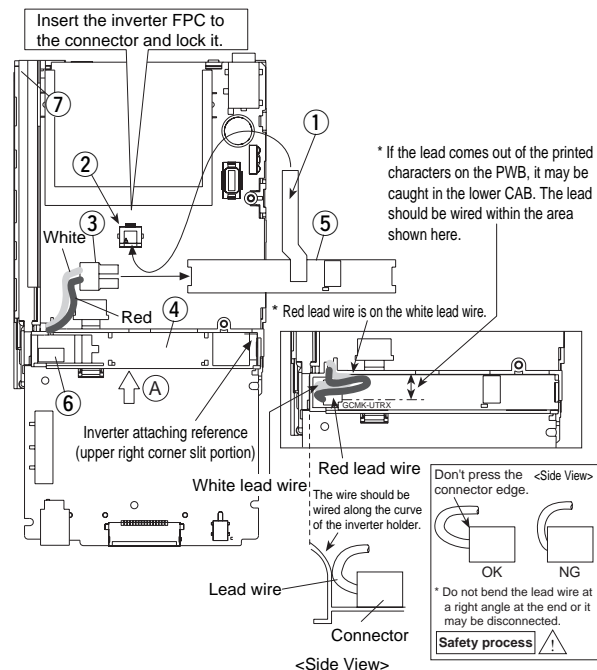
• Precautions

- (1) Attach the tape without slacking it.
- (2) Do not attach the tape to the window frame portion of the SD connector.
- (3) Do not make wrinkles to the tape or let foreign matter attached to the tape.

2. Removing the inverter unit

Follow the procedures below.

- Remove the inverter FPC ① from the connector ② for the inverter FPC.
- Lift and remove the inverter unit ⑤ from the direction ④ in the figure.
- Remove the cold-cathode tube lead connector ③ from the inverter unit ⑤.



● Precautions on assembly

- (1) Wire the two lead wires of the cold-cathode tube ③ to the notch of the inverter holder ④.
- (2) Couple the lead wire of the cold-cathode tube ③ to the inverter unit ⑤ with a connector.
- (3) Peel off the exfoliate paper of the inverter fixing tape ⑥. Do not make the two-sided tape bunch up together when releasing the exfoliate paper of the inverter fixing tape ⑥.
- (4) Hitch the PWB edge of the inverter unit ⑤ first to the upper right portion of the inverter holder ④ and then drop the opposite side of the unit in the holder.
- (5) Press the upper portion of the connector of the inverter unit ⑤ first (to attach the inverter unit to the inverter holder securely).
- (6) Release the lock of the inverter FRC connector ② of the main PWB unit.
- (7) Fully insert the inverter FPC ① to the back of the connector ② until it locks.
- (8) Check the connections.
Suggested connection:
Reinforcing plate of the FPC can be seen about 2.0 mm from the edge of the connector lock.
- (9) Fold the remaining lead wire of the cold-cathode tube ③ into the inverter holder ④ and wire the lead wire.
- (10) Wire the lead wire so that the lead wire of the cold-cathode tube ③ does not touch the pen lock portion of the pen holder ⑦ or the stylus pen may be hard to insert or remove.

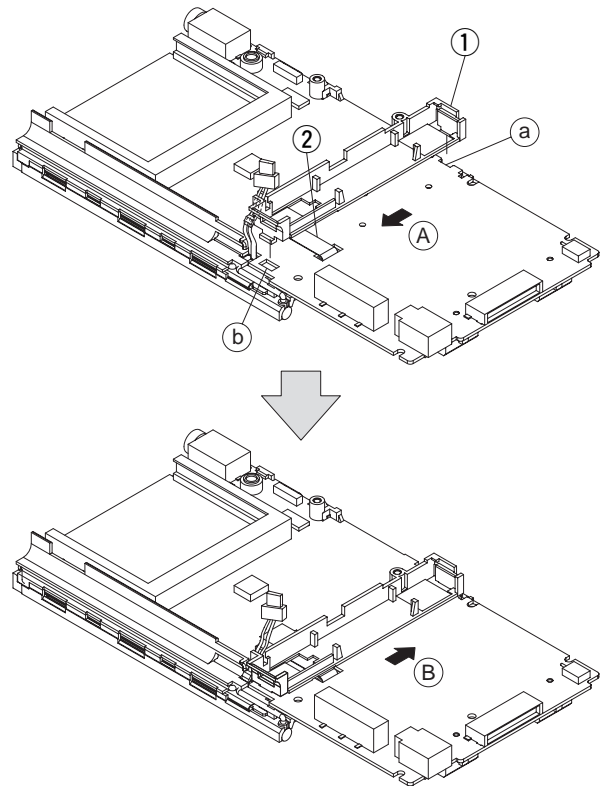
*** Warning**

Follow the instructions below strictly because the inverter unit produces high voltage and may produce too much heat or emit smoke when handled in the wrong way.

- (1) Do not damage the cover when wiring the lead wire of the cold-cathode tube.
 - Do not wire the lead wire with an aciform tool under any circumstances.
 - Do not use a cold-cathode tube with its cover damaged or broken under any circumstances.
- (2) PWB of the inverter unit ⑤ is thin and can be damaged easily: Make sure to hold each connector to connect the lead wire of the cold-cathode tube ③.

3. Removing the inverter holder

Slide the inverter holder in the direction ㊦ shown in the figure to remove it.

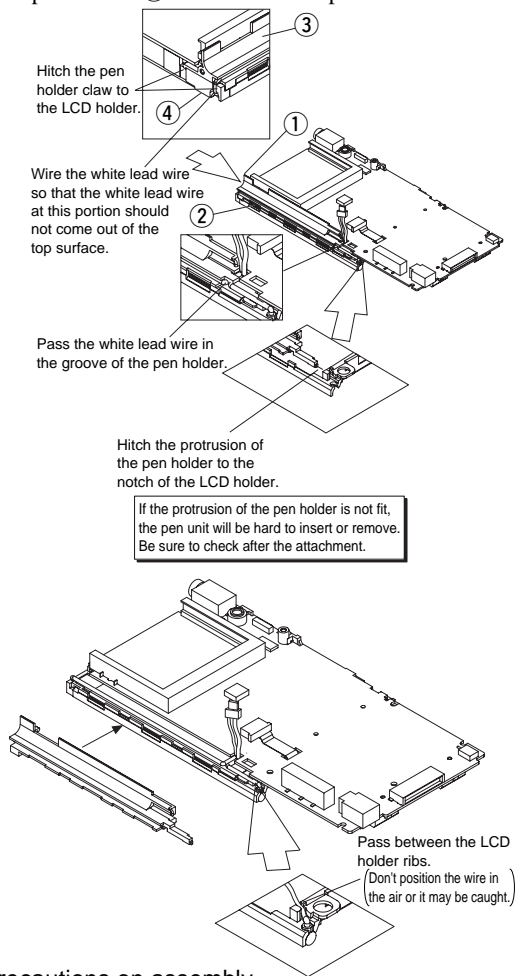


● Precautions on assembly

- (1) Insert claws (2 pcs.) of the back side of the inverter holder ① to the PWB hole ㊥ and notch ㊦ and slide the holder leftward (in the direction of ㊦) to fix it.
- (2) Be sure to check that tablet terminal ② is connected before attaching the inverter holder ①.
- (3) Take care not to damage the lead wire of the cold-cathode tube.

4. Removing the pen holder

Remove the white lead wire of the cold-cathode tube from the pen holder ① and remove the pen holder.



• Precautions on assembly

- (1) Insert the white lead wire ② of the cold-cathode tube in the wire process groove of the pen holder ① and tentatively wire the lead wire.
- (2) Tentatively wire the red lead wire of the cold-cathode tube to the notch of the PWB.
- (3) Insert the PWB fixing groove to the PWB and hitch the claws of the pen holder ③ (1 lower and 2 upper) to the LCD holder ④ to fix it (attach the lower claw first).
- (4) Pull the white and red lead wires of the cold-cathode tube to the connector side to eliminate the sagging.
- (5) Properly wire the lead wire because the pen holder cannot be attached to the upper CAB if there is sagging in the lead wire.
- (6) Do not pull the connectors to eliminate the sagging of the lead wire or the wire may be disconnected.

*** Warning**

Follow the instructions below strictly because the high voltage is applied to the cold-cathode tube and may produce too much heat or emit smoke when handled in the wrong way.

- (1) Do not damage the cover when wiring the lead wire.
 - Do not wire the lead wire with an aciform tool under any circumstances.
 - Do not use a cold-cathode tube with its cover damaged or broken under any circumstances.

5. Removing the LCD unit

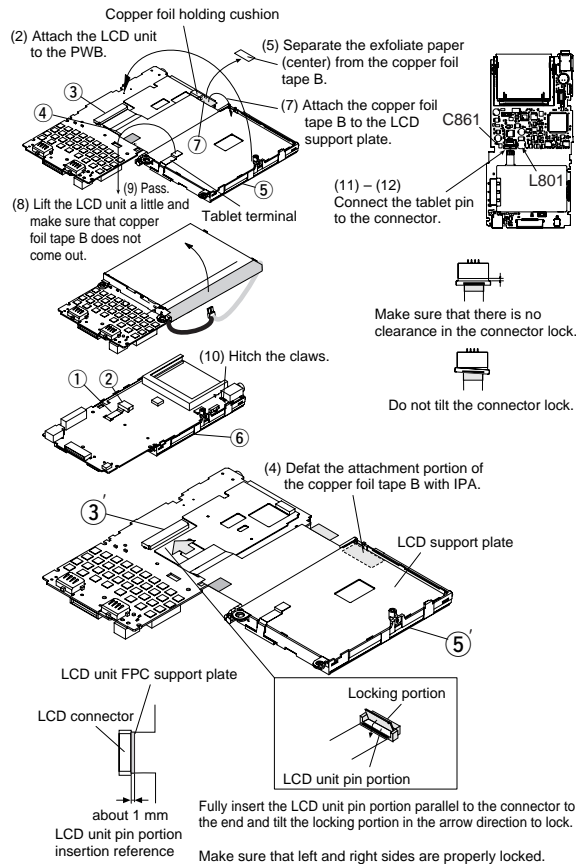
Remove the tablet terminal ① from the connector ②.

Remove the PWB from the LCD unit and reverse it.

Remove the LCD unit FPC ④ from the FPC connector ③.

*** Cautions during disassembly**

Do not use metal tweezers to unlock or lock the connector. (This is for preventing the C861 or L801 attached close to the connector from being damaged.)



• Precautions on assembly

- (1) Unlock the FPC connector ③' and fully insert the FPC of the LCD unit ⑤' to the back of the FPC in parallel.
- (2) Lock the FPC connector ③'.
- (3) Check the connections.

Connection reference:

Reinforcing plate of the FPC can be seen about 1.0 mm from the edge of the connector lock.

- (4) Defat the attachment portion of the copper foil tape B with IPA.

(Cautions on assembly)

1. Do not bend the PWB when locking the FPC connector.
2. Take care not to break the locking claw of the connector.
3. Work deliberately not to bend the PWB.
4. The copper foil tape B may be removed after the attachment. Do not touch the tape after cleaning the LCD support plate. Also, pay attention not to let foreign matter attached to the portion.
- (5) Separate the exfoliate paper (center) of the copper foil tape B ⑦.
- (6) Bend the FPC of the LCD unit ⑤ over the PWB unit.
- (7) Attach the copper foil tape B ⑦ to the LCD support plate, and press it again to make sure it is in position.

- (8) Lift the LCD unit ⑤ and check that the exfoliate paper of the copper foil tape B ⑦ is completely removed.
- (9) Pass the tablet pin into the slit of the PWB.
- (10) Hitch the claws of the LCD holder to the PWB unit to fix it.
- (11) Unlock the connector ② on the other side of the PWB and insert the tablet pin ①.
- (12) Lock the connector.
- (13) Check the connections.

Note: Make sure that the pattern (silver) of the tablet pin is completely hidden by the connector.

(Cautions on assembly)

1. Make sure that the copper foil support cushion is attached to the designated position before covering the PWB unit with the LCD unit ⑤.
2. Make sure that the PWB unit is securely fixed with the claws of the LCD holder.
3. Do not forget to connect the tablet pin ① because it cannot be connected after the inverter holder is attached.
4. Work deliberately not to bend the PWB.

3. Disassembly/assembly of the upper/lower CAB unit and others

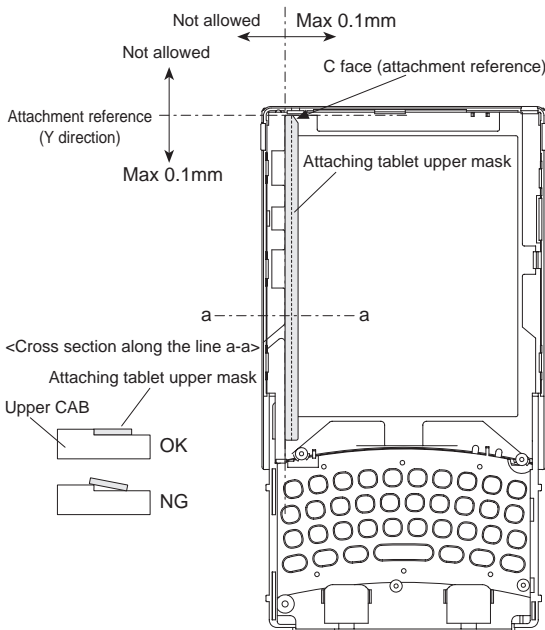
[Cautions on assembling upper CAB unit]

1. Attaching tablet upper mask

Defat the tablet upper mask attaching portion with IPA first. Then, turn the "C face" of the tablet upper mask to upper right and attach along the step on the rear surface of the upper CAB. After the attachment, press the tablet upper mask again to make sure it is in position.

• Precautions

- (1) Pay attention to the attaching direction because adhesive is printed on only half of the mask in width direction.
- (2) Attachment gap reference
 X direction: +0.1 mm
 -0.0 mm (Getting on CAB step is not allowed.)
 Y direction: +0.0 mm (Getting on CAB step is not allowed)
 -0.1 mm

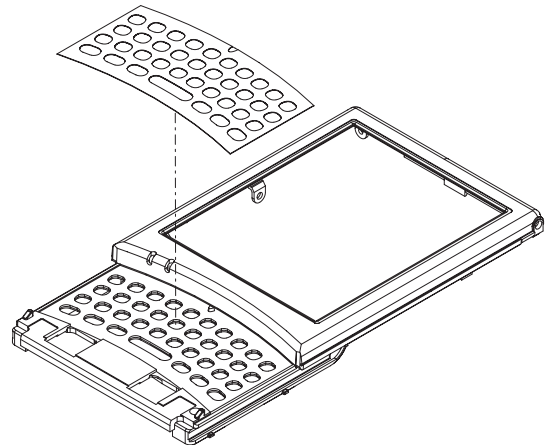


2. Attaching fixed key panel

Defat the fixed key panel attaching portion with IPA first, and then, attach so as not to get on the CAB.

• Precautions

- (1) Getting on CAB is not allowed.
- (2) Claws should not be broken when removing exfoliate paper of the fixed key panel.

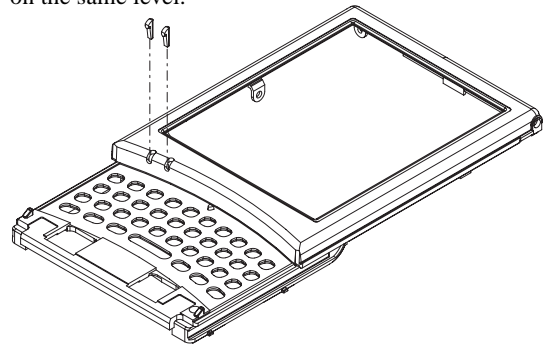


3. Attaching LED filters (2 pcs.)

Insert the LED filters (2 pcs.) from the upper side of the upper CAB.

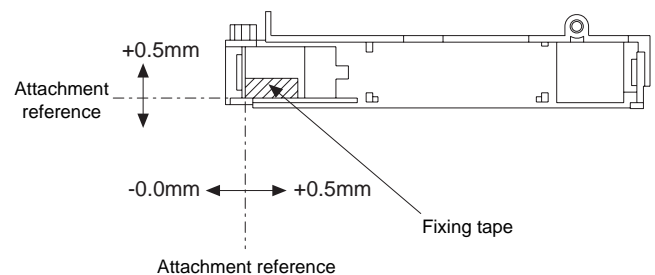
• Precautions

Press securely until the upper CAB and the LED filters are on the same level.



[Others]

1. Attachment reference for the inverter holder fixing tape
 - (1) Peel off the inverter fixing tape from the base sheet.
 - (2) Attach the inverter fixing tape within the attachment reference of the inverter holder.



E. Troubleshooting

(1) Contents

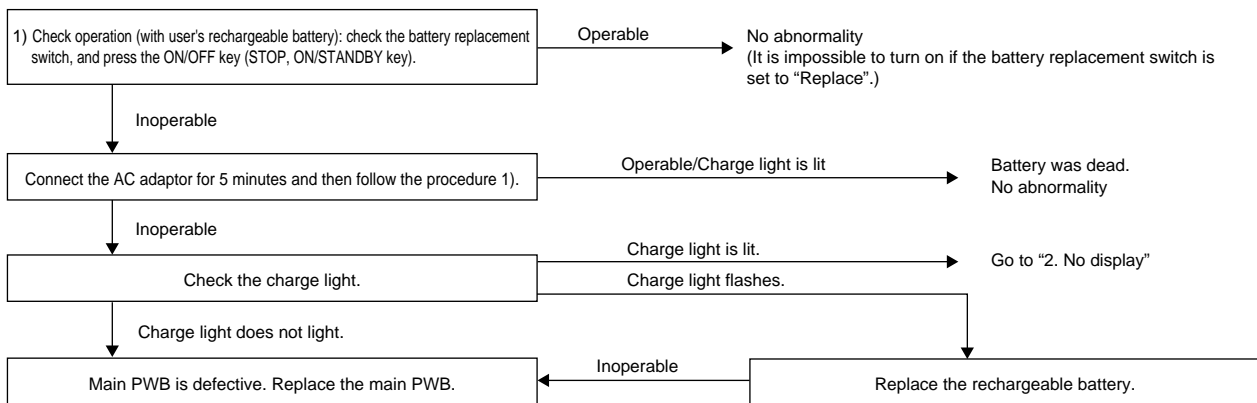
- | | |
|---|--|
| 1. Inoperable | 7. Abnormal display color/display flickers |
| 2. No display (key sound can be heard, but no screen is shown.) | 8. Battery operating time is short |
| 3. Front light does not light. | 9. CF card is not recognized/CF card does not work |
| 4. Tablet (touch panel) does not work. | 10. SD card is not recognized/SD card does not work |
| 5. Charging not operable. | 11. Earphone or speaker makes no sound/recording does not work |
| 6. Key input not operable | |

(2) Caution

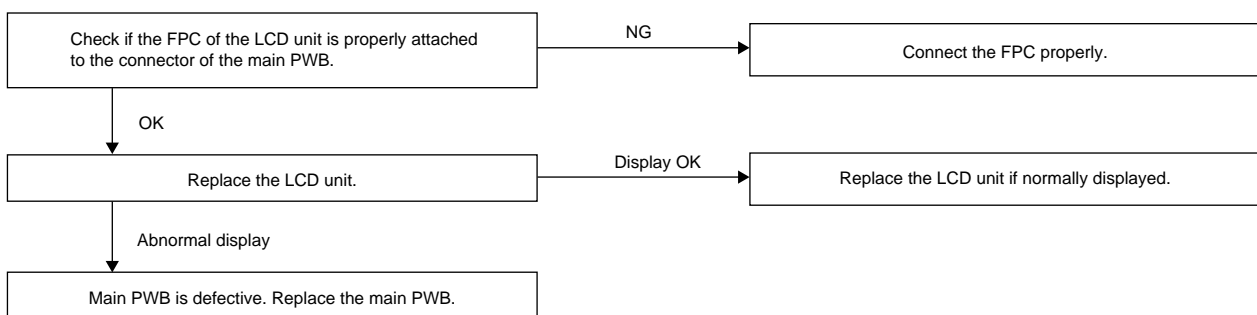
1. Check if the program written in the FLASH is the one officially released.
(If a user changed contents, it may not be covered by warranty.)
2. Back up data in advance if necessary because diagnosis may break user data.
However, user data are not covered by warranty or shall not be repaired

(3) Procedures

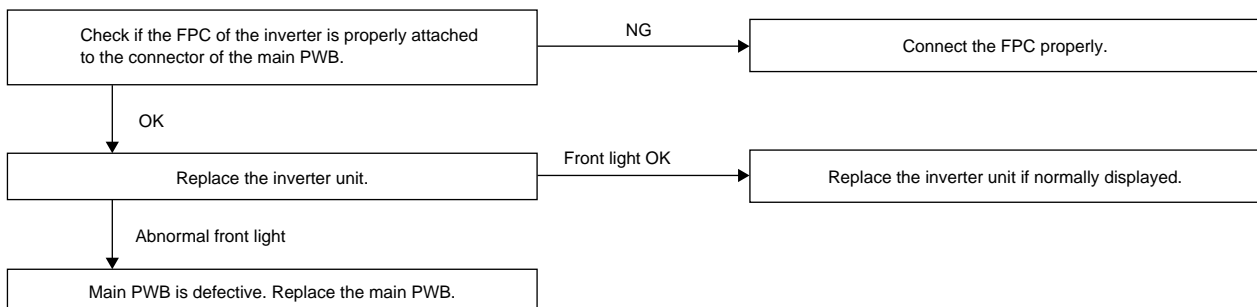
1. Inoperable



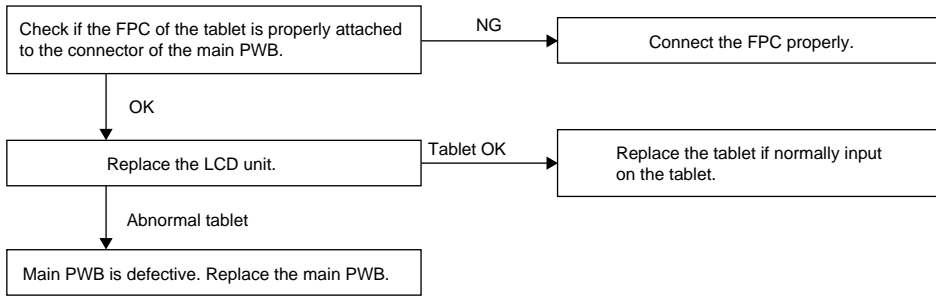
2. No display (key sound can be heard, but no screen is shown.)



3. Front light does not light.

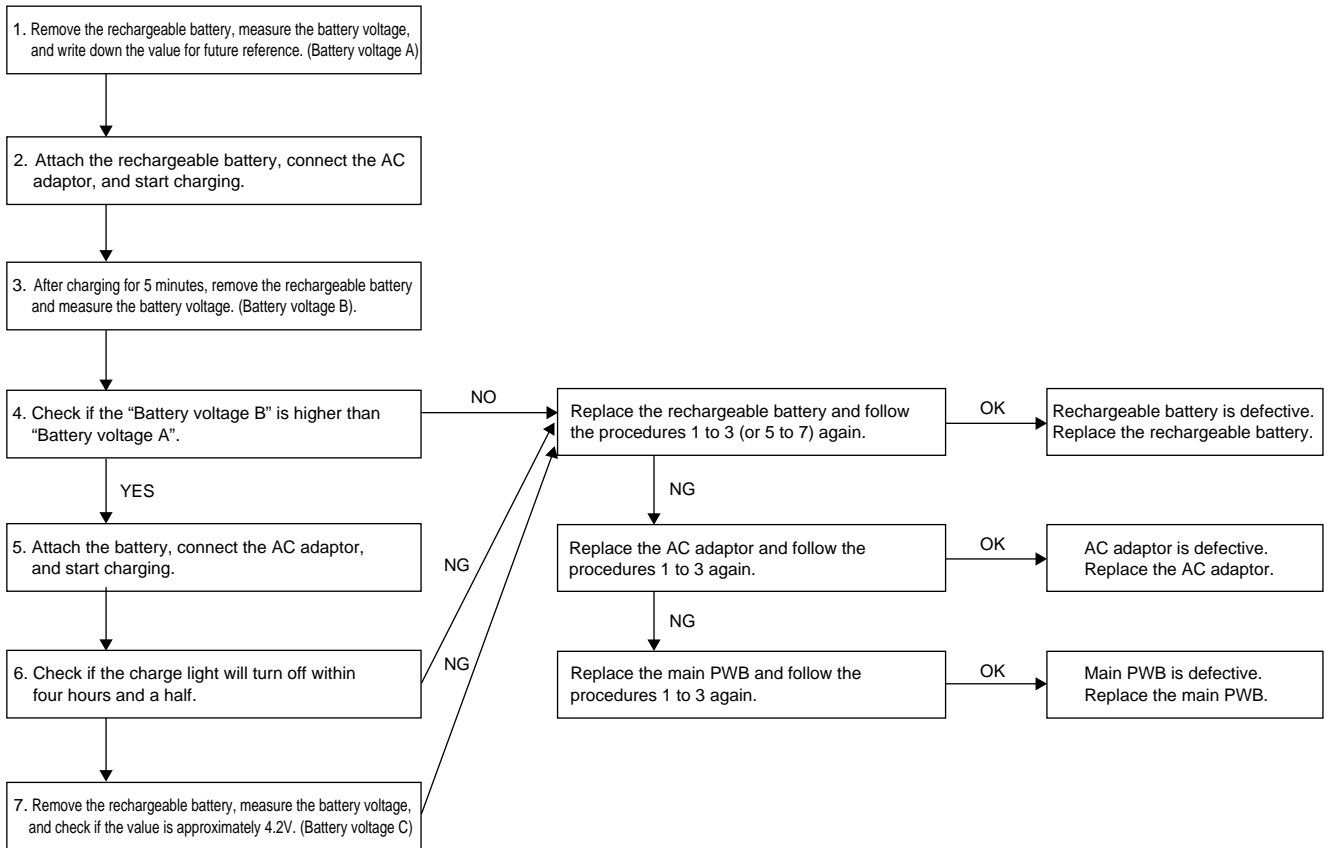


4. Tablet (touch panel) does not work.

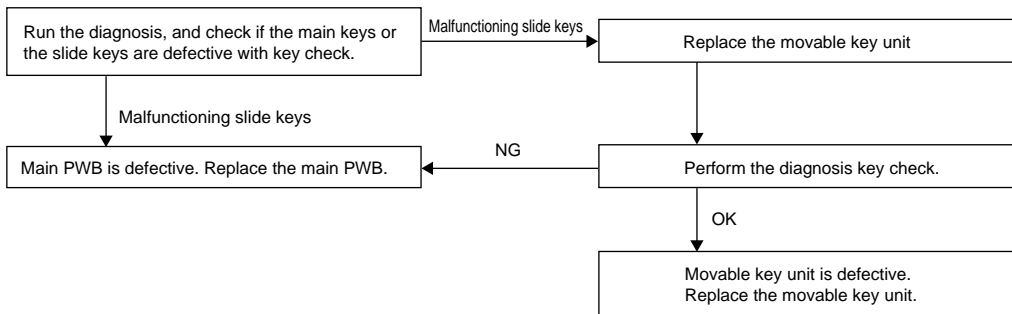


Run the diagnosis before checking the tablet (touch panel) input.

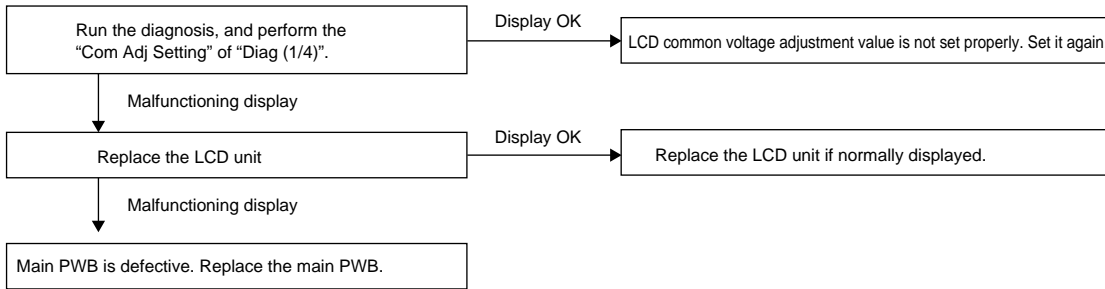
5. Charging not operable.



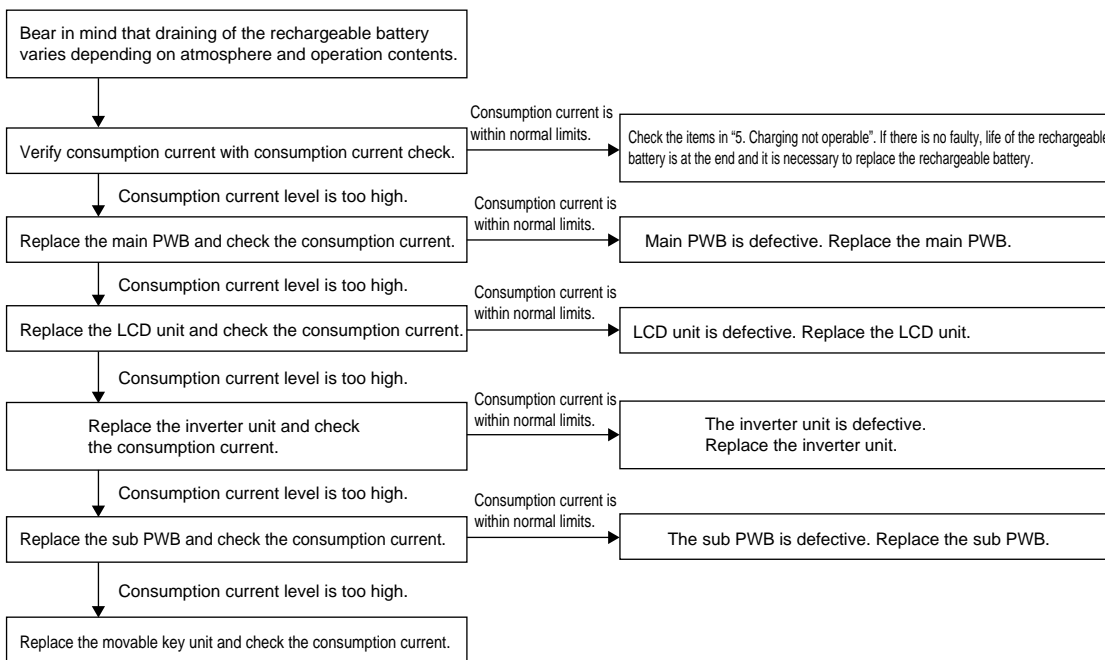
6. Key input not operable



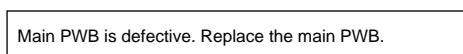
7. Abnormal display color/display flickers



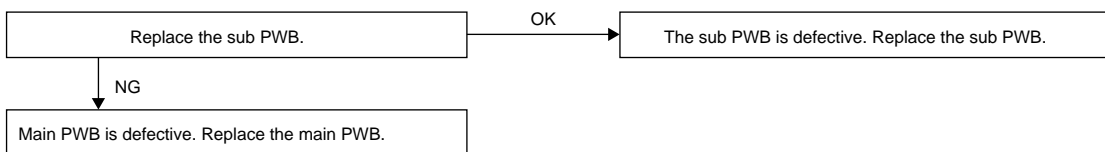
8. Battery operating time is short



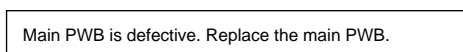
9. CF card is not recognized/CF card does not work



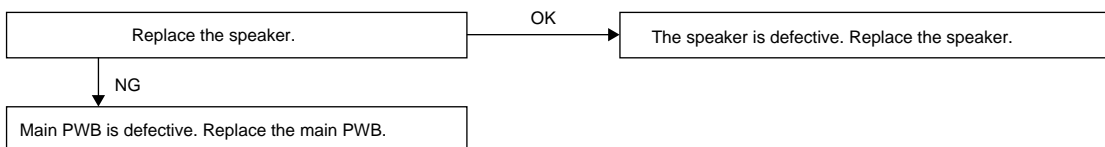
10. SD card is not recognized/SD card does not work



11. Headphone makes no sound.



12. Speaker makes no sound.



disklavier™ IV / Pro series

MAINTENANCE HANDBOOK

DA1M4
DGC1M4
DC1M4
DC2M4
DC3M4, DC3M4t
DC5M4, DC5M4t
DC6M4, DC6M4t
DC7M4, DC7M4t
DC3M4 PRO
DC5M4 PRO
DC6M4 PRO
DC7M4 PRO
DS4M4 PRO
DS6M4 PRO
DCFIIISM4 PRO



MHB23



Introduction

This manual is based on the initial production version of the Disklavier Mark IV / Pro series as follows.

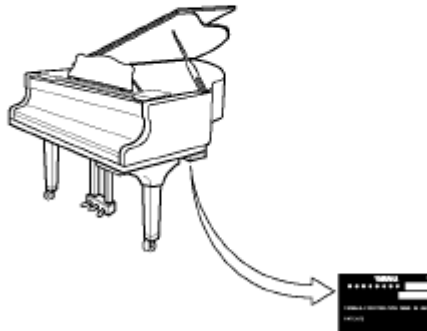
DIO-100 (I/O center) version 1.05 Nov. 2004 - Interface operation program
 Service center program version 1.01 Nov. 2004 - Post delivery and maintenance program

Updated information will be informed in the future with additional service news.

Service Manual
Maintenance hand book P/P 008607

NOTICE : Service charges incurred due to lack of knowledge relating to how a function or effect works (when the unit is operating as designed) are not covered by the manufacturer's warranty, and are therefore the owners responsibility. Please study this manual carefully and consult your dealer before requesting service.

NAME PLATE LOCATION: The graphic below indicates the location of the name plate. The model number, serial number, power requirements, etc., are located on this plate. You should record the model number, serial number, and the date of purchase in the spaces provided below and retain this manual as a permanent record of your purchase.



Model _____

Serial No. _____

Purchase Date _____

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2. MKIV/Pro model line-up

Mark IV series

Model Name	DKV type	Sensing quality	Servo system	Power Supply	Remote control	Others
DGC1M4	Rec/PB 16polyphony Model with speakers	Gray-scale Key Sensor	Key Sensor	180W	3.5" LCD Pocket Control (PRC-100) wireless LAN	Motor driven Silent Tone module AWM2 XG: DB51 (Play back only) AEM: 7 tones DSP serial BUS Video synchro- system Vocal harm ony
DC1M4						
DC2M4						
DC3M4						
DC5M4						
DC6M4		Gray-scale Key Sensor + Gray-scale Hammer Sensor			PRC-100 + 10.4" Tablet Control (TRC-100) wireless LAN	
DC7M4						
DC3M4t						
DC5M4t						
DC6M4t						
DC7M4t						

PRO series

DC3M4 PRO	Rec/PB 32polyphony Model	Gray-scale Key Sensor + Gray-scale Hammer Sensor	Key Sensor + MM Sensor	270W (MKIIIPro 250W)	3.5" LCD Pocket Control (PRC-100) wireless LAN	Karaoke SmartKey Interface MIDI USB
DC5M4 PRO						
DC6M4 PRO						
DC7M4 PRO						
DS4M4 PRO						
DS6M4 PRO						
DCFIIISM4 PRO						

Maintenance hand book P/P 008607

3. MKIV/Pro Features and New Functions

Enhancements made to the Disklavier operational and piano system, plus new technologies and functions are described below.

1) Gray-scale sensor system on hammer and key mechanisms provides continuous monitoring

A gray-scale sensor system installed on both the hammer and key mechanisms allow accurate monitoring of the movement of each hammer and key over the key's full stroke. As this advanced system offers greater accuracy in detecting the speed and timing of the key's down-stroke and release, it makes possible very fine continuous playback at a pianissimo level, which would be difficult under normal playing conditions. All recorded data by the Pro model is saved in XP Mode.

2) Improvements to the keyboard drive and pedal servo system

Precision control of the key position, including speed and timing of both the downstroke and release, is made possible by using feedback from the servo control's MM sensors in the key drive unit and key position data from the key sensors. This system offers greater playback accuracy, especially when playing repetitive mid-depth keystrokes. Servo calibration utilized on the pedal provides exceptional accuracy in detecting the pedal's halfway point.

3) Wi-fi (Wireless LAN) Pocket Controller

Two-way, Wi-fi (wireless LAN) allows for background music control from locations even outside of the room (operation may vary due to wall design). The system also incorporates a 3.5-inch color LCD touch screen for convenient user control. Its interface lets you jump playback to the middle of the song by simply tapping the slide bar on the screen. Also convenient is the slide out keypad which makes entering characters for song names, etc., an easy operation.

* 10.4-inch Tablet Controller enables further comfortable operation - North American market only.

4) CD-ROM drive, hard disk, and terminal for external connections

Like the Mark III Disklavier, the unit is equipped with both a floppy disk drive and a CD drive that allows playback of audio CDs or MIDI data recorded on a CD-ROM. Also included is a large capacity 80GB hard disk drive that lets you download and save data.

(Note: Data cannot be written directly to the floppy disk while recording.)

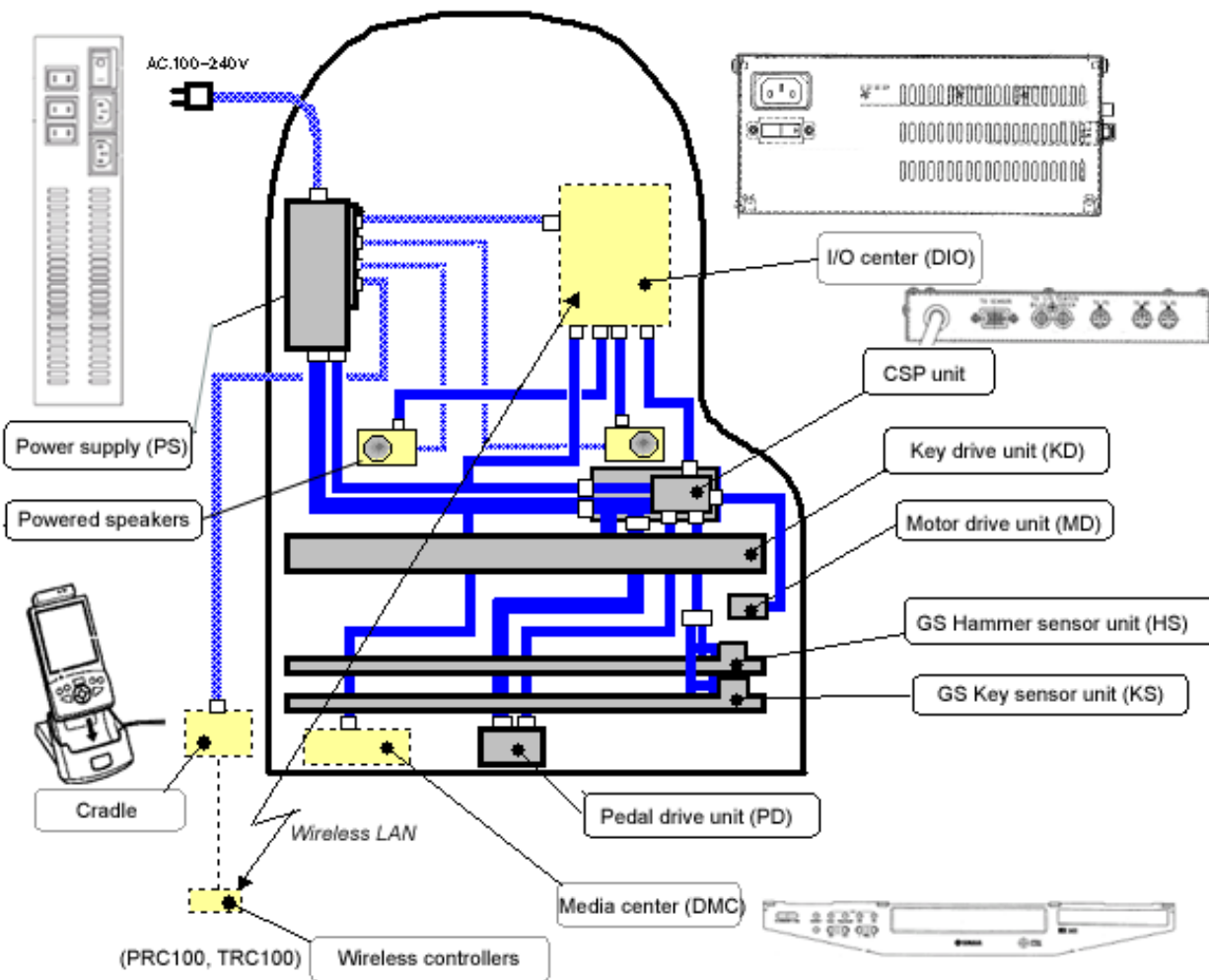
* Audio CD playback requires the use of a pair of headphones or external speakers.

In addition, the Media Center unit is equipped with a standard USB interface, and a video sync function that utilizes the I/O center sync connector to allow synchronized playback of video and performance data.

5) The Post-Delivery Checking diagnostic function-Improved maintenance

Functions used in servicing the programs are grouped into the Service Center program which includes two modes; the Post-delivery Checking Mode, which is used to check the cable connections and circuits in the device after installation; and the Maintenance Mode (formerly known as the Maintenance and Test Modes). Service LEDs included on each of the circuit boards let service personnel confirm electric current and operation by sight, eliminating the need for testers when checking the main components. This system is known as the Diagnostic System (self-diagnosing) and is the first such system to be incorporated on a musical instrument. Accessed through the remote controller, an overall system check function analyzes system communications-how the components in the system are communicating with each other-and provides the results on the controller's 3.5-inch screen. Also provided are test results for pedal and keyboard calibration that are required for maintenance.

4. System construction



OPERATION SYSTEM

I/O center / (DIO-100)

LINUX OS PC system with 80GB hard disk. Tone generator and audio processor cards are inside. The I/O center connects to the PRC-100/TRC-100 using wireless LAN card (WD05740).

Media center / (DMC-100)

The Media Center has both CD and FDD drives. It is connected to the I/O center with a D-sub cable similar to the cable that connected the Mark III control unit to the piano. The USB interface provides the user with an additional data source. The Media Center has 2 headphone inputs which will turn Quiet Mode on automatically when a jack is inserted. The Media Center also has a mic input.

Pocket controller (PRC-100)

Wireless LAN remoted controller with 3.5 inch display and key pad. (LAN card WD05740)

Tablet controller (TRC-100 - North American market only)

Wireless LAN remoted controller with 10.4 inch touch panel display.

PIANO SYSTEM

Power supply unit (PS unit)

Universal switching power supply (100-240V) with cradle and speaker outlets.

Central signal processor unit (CSP unit)

The control center of the piano system. Calibration data and piano type data is stored.

Gray scale key/hammer sensor unit (KS/HS)

Optical transmitted gray scale sensor enables full trace of key and hammer moving.

Key drive unit (KD unit)

MM (Moving magnet) servo system drive. Shorter solenoid but more powerful playback.

Pedal drive unit (PD unit)

Pulse modulation sensing servo drive system. Servo calibration has eliminated half point adjustment.

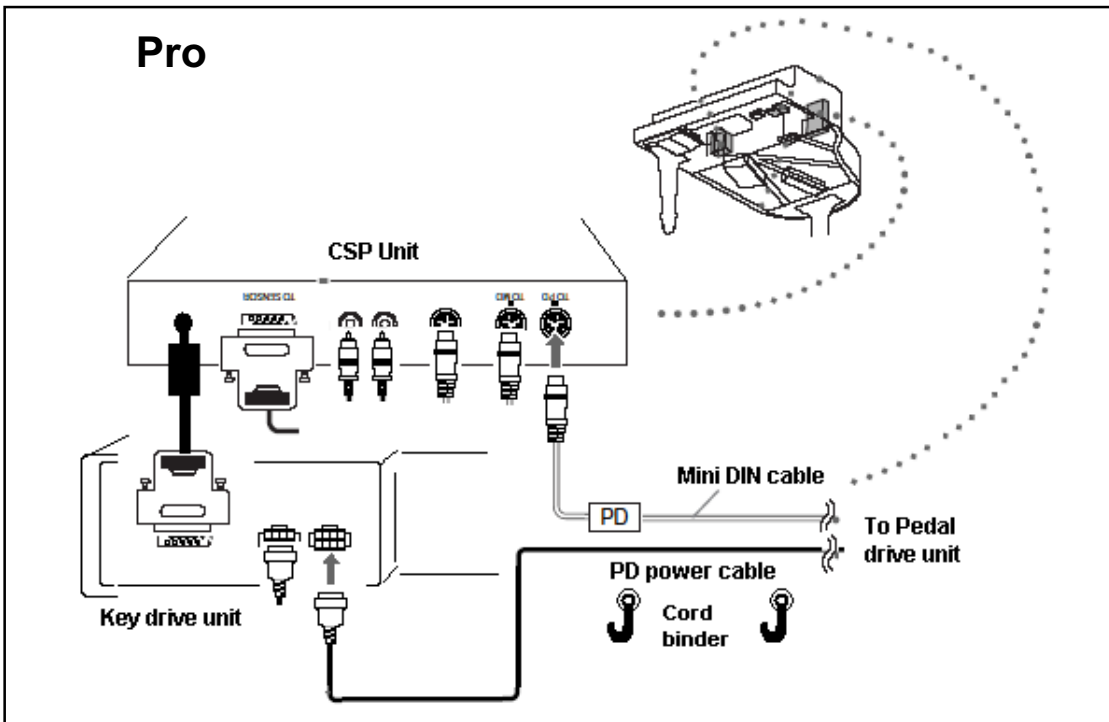
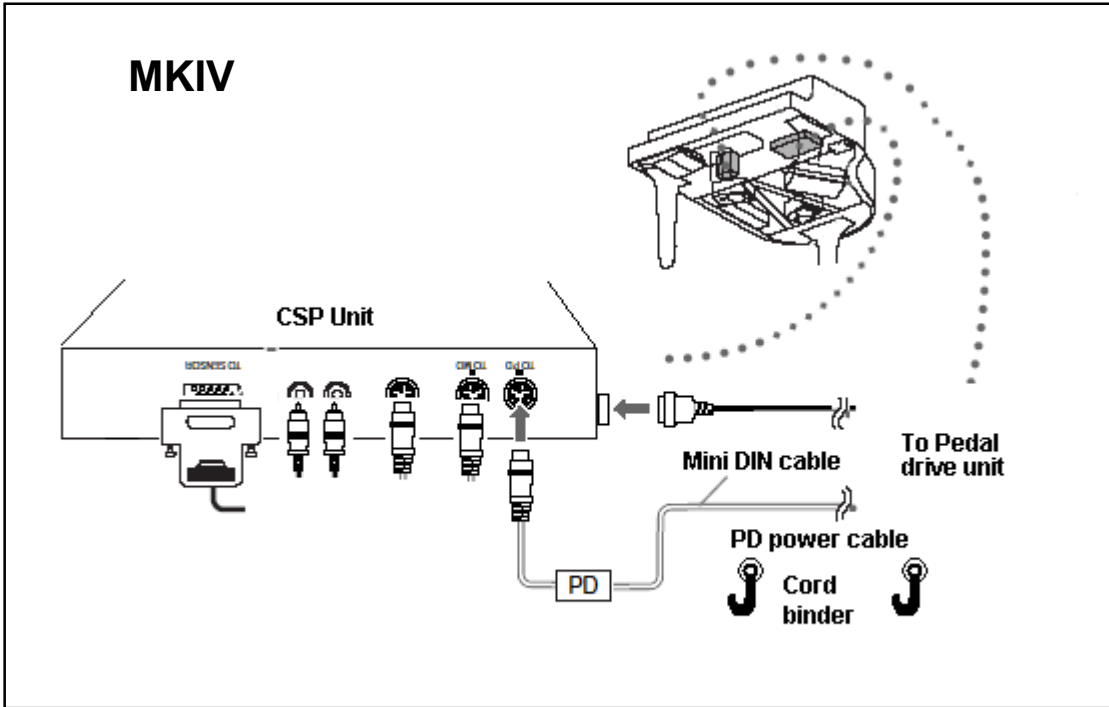
Motor drive unit (MD unit)

Quiet (silent) motor drive. Small chip is inside and tells its condition to CSP board.

5. MKIV/Pro installation manual

5 - 1. Pedal lyre installation

HINT! MKIV and Pro have the same pedal system with 2 connecting cables.



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5 - 2. Attaching Media Center Unit

HINT! Check all accesories before attaching

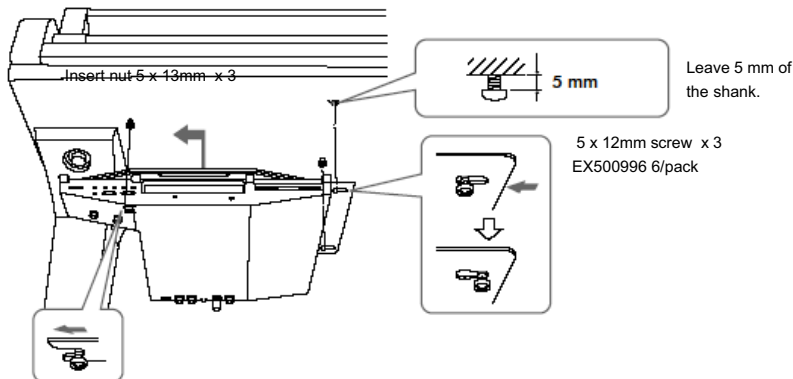
Make sure the following items are supplied with your Disklavier:

- . Media Center (1)
- . Installation kit for the Media Center (1 set)
- . Monitor speaker (2)*
- . Installation kit for the monitor speaker (1 set)*
- . Speaker cord (2)*
- . Pocket Controller PRC-100 (1)
- . CF wireless LAN card (2)**
- . Rechargeable battery EA-BL08 (1)
- . Cradle (1)
- . AC adaptor EA-70 (1)
- . AC power cord (1)
- . Advanced Operating manual (this book) (1)
- . Quick Guide (1)
- . Stereo headphones (1 set)

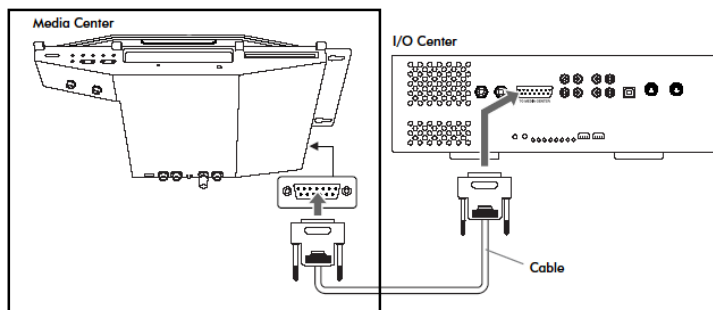
* Supplied only with the Mark IV Series.
 **One of two cards is attached to the I/O Center at the factory.

Installing the Media Center

1) Screw the supplied screws into the nuts. Hang the Media Center.

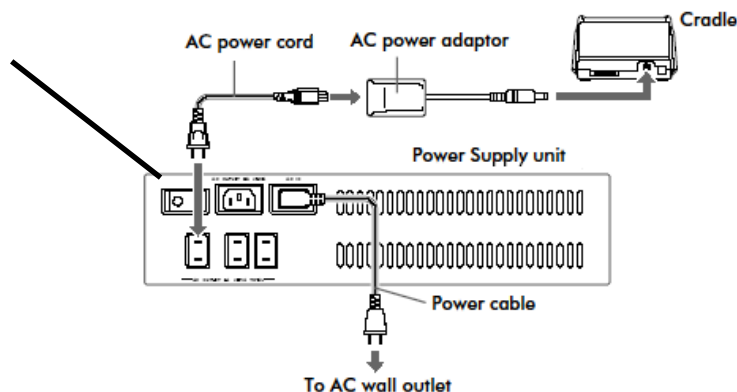


2) Tighten the screws to secure the Media Center.



3) Prepare PRC-100 cradle

Turn on the power switch to activate the cradle.

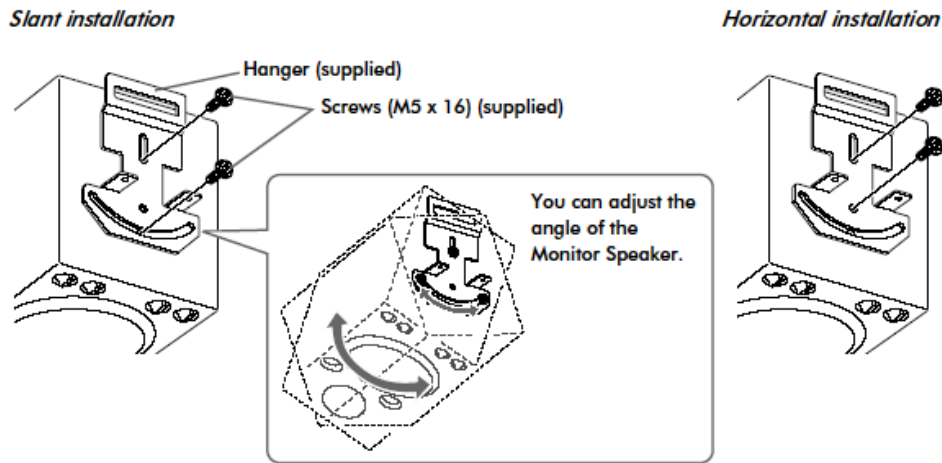


5. MKIV/Pro installation manual

5 - 3. Speaker Installation for MKIV

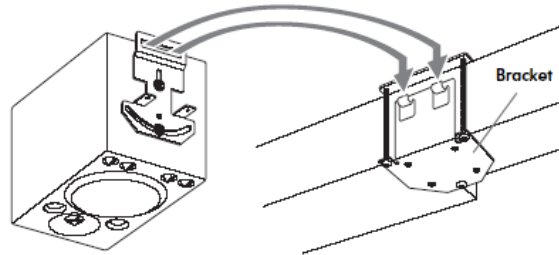
HINT! Pro series does not include speakers

1) Attach the hanger to the bottom.



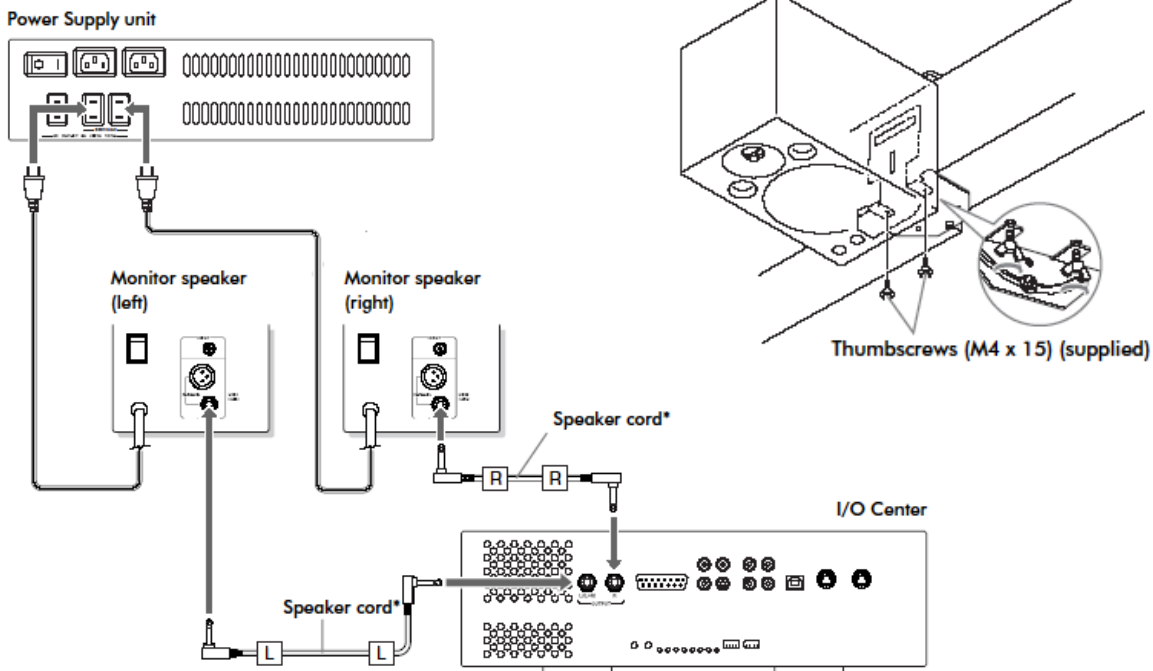
2) Connect the speaker cord to the INPUT LINE2 phone jack.

Hang the Monitor Speaker to the bracket.



Screw the thumbscrews to secure the Monitor Speaker.

3) Wiring the Speaker

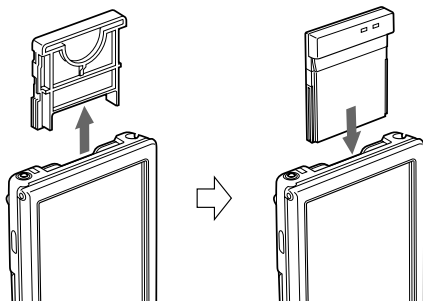


5. MKIV/Pro installation manual

5 - 4. Setting Up PRC-100 Pocket Controller

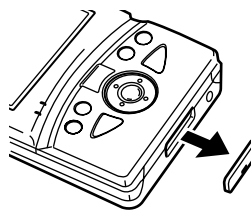
HINT! The battery is minimum charged before shipping. It takes approx. 4 hours to be charged fully.

1) Remove the card slot protector, and then insert the supplied CF wireless LAN card into the CF card slot.

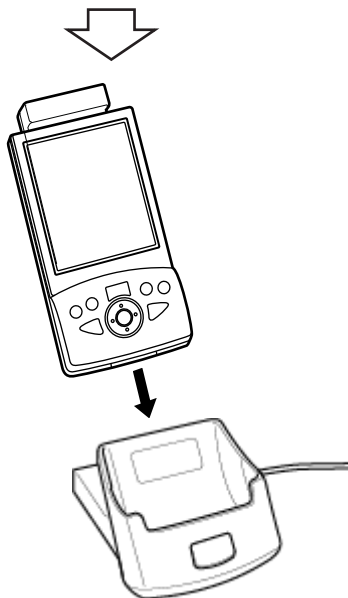
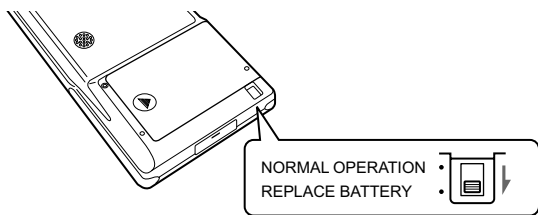


4) Set the battery replacement switch back to the [NORMAL OPERATION] position.

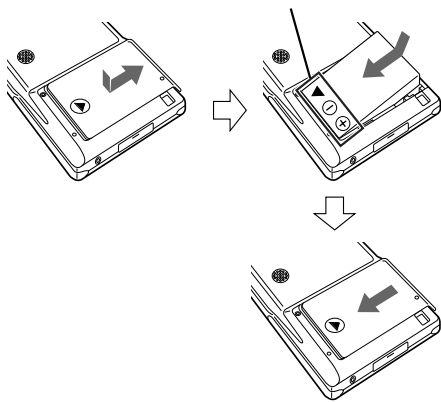
5) Remove the I/O port cover, and then set the Pocket Controller on the cradle.



2) Set the battery replacement switch to the [REPLACE BATTERY] position.



3) Put the rechargeable battery into the battery compartment.



Charging starts and the charge indicator lights amber. When the battery is fully charged, the indicator goes out.

Rechargeable battery: EA-BL08

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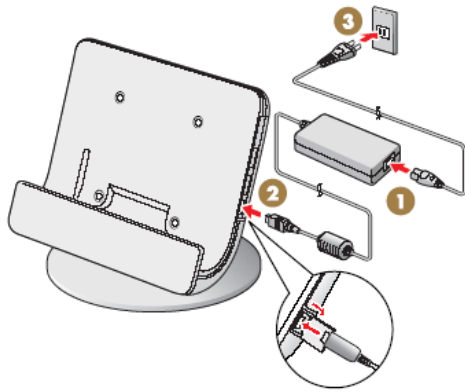
5. MKIV/Pro installation manual

North American model only

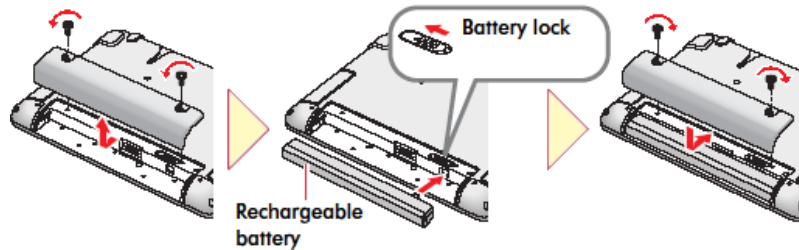
5 - 5. Preparing the Tablet Controller

HINT! Battery charge takes 4 hours

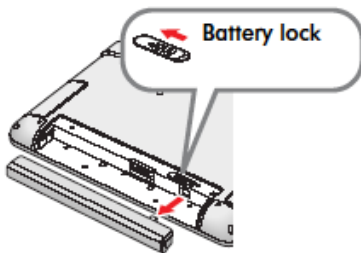
1) Set up the cradle.



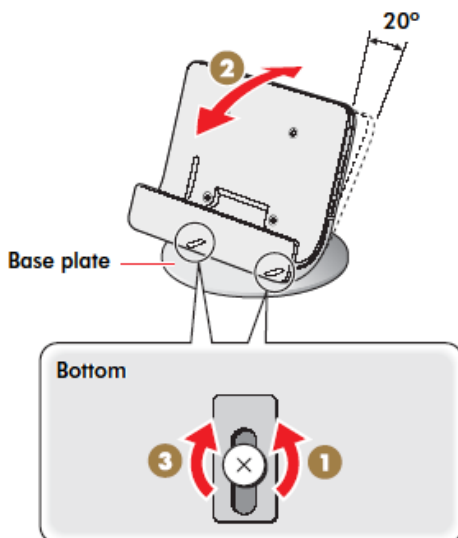
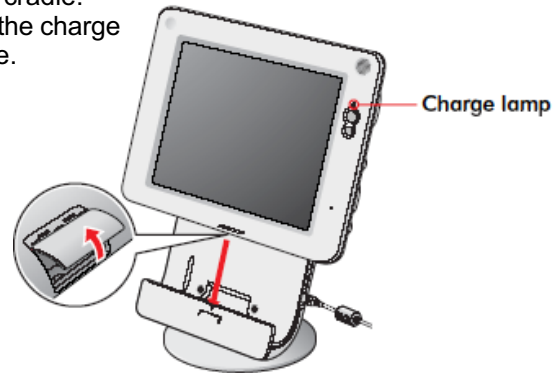
2) Put the rechargeable battery into the Tablet Controller.



Tip: Before removing the battery, move the battery lock to the direction of an arrow.



3) Open the cover of the cradle interface, and then set the Tablet Controller on the cradle. Charging starts and the charge lamp lights in orange.



Adjusting the angle of the cradle to your preference
Loosen the two screws on the bottom of the base plate, adjust the angle, and then tighten the screws.

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5 - 6. Taking out action and pedal check

HINT! You can take them out under power standby status --> Refer to 5-11

For removing the wood rail which holds hammer shanks

- 1) Remove fallboard, key blocks and key slip
You do not have to remove media center to remove key block screws.
- 2) Disconnect both key and hammer sensor connecters
Check HS and KS tags at each cable before you re-connect them.
- 3) Take out action and remove the wood rail.
Removed cables should be placed outside of the right arm.

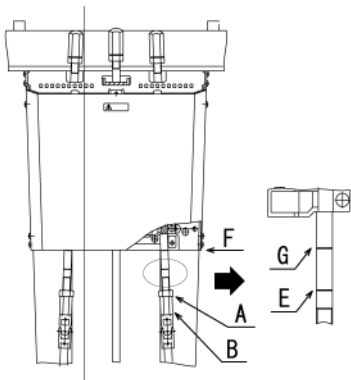


Useful information

a) < Hammer Sensor is not recognized !> will appear in the operation (interface) mode when hammer sensor is not correctly connected.

b) Keyboard test play will be played back extremely loud if the key sensor is not correctly connected.

HINT! Be sure to check the pedal rod position



Check to make sure the upper line G on the rod is the same height as edge line F for the damper (right) and Shift (left) pedals.

If not :
 --> **Disklavier pedal rod length adjustment procedure**
 Loosen lock nut A then rotate adjusting nut B until the upper line G on the rod is the same height as edge line F. Tighten nut A to lock it. When pedal adjustment is correct, line E never goes higher than edge line F when the pedal is fully depressed.

Sostenuto (middle)
 No service is necessary at delivery.

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5 - 7. Turning the Disklavier on


HINT! This procedure is similar to turning on a desk top PC


- 1) Confirm that the power cable of the Power Supply unit is connected to an AC wall outlet.
- 2) Press the [ON] side of the [POWER] switch on the Monitor speakers.

Note: The Monitor speakers are supplied only with the Mark IV Series.

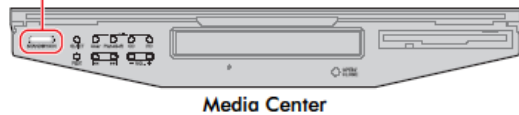
- 3) Press the [ON] side of the [MAINS] switch on the Power Supply unit.
- 4) Press the [ON] side of the [MAINS] switch on the I/O Center.

 on the Media Center starts flashing green.

Wait until  on the Media Center stops flashing and dimly lights green. After several minutes, go to step 5.

- 5) Press . The Disklavier is turned on and the [Main] screen appears. The touch screen changes as follows:

STANDBY/ON button





ON/STANDBY button



[Main] screen

Note: This may take approximately two minutes.

Note: When turning the Disklavier back on after shutting down, be sure to wait 10 seconds before doing so.

Tip: Pressing  on the Media Center also turns the Disklavier on. In such a case, be sure to press  to turn on the Pocket Controller as well.

PRC-100 wireless LAN Communication range

Around 30m (100 ft.) is the maximum range with no obstacles. Please refer to 5-13-2. (Show wireless communication status)

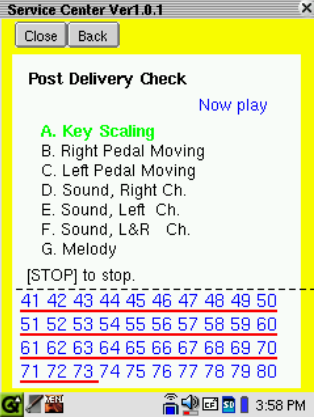
5. MKIV/Pro installation manual

5 - 8. Post delivery check - Service Center program

HINT! PRC-100 should be operated on the cradle since the battery is not fully charged.

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1, Post delivery checking




By pushing play button at this screen, all necessary tests at the delivery will be done automatically.

Since no speakers are provided, Pro needs to use headphones for checking the procedure from D to G.

2, Program versions

Current version checking screen

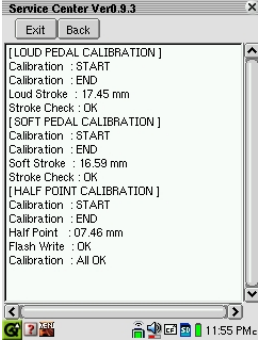


Blue: CSP detected Hammer sensor.

Green: No hammer sensor is detected.


Red: CSP found that PD,MD or PS has some connection error. (I2C)

3, Pedal calibration

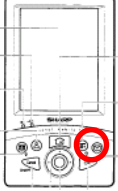


Pedal calibration is recommended after finishing the post delivery check

4, Piano odometer



Lifetime totals of power on



Select button

- * G. Melody
- Piano - AWM2
- Choir - XG
- Guitar - AWM
- Sax - AEM

How to enter the Service Center program menu

- 1) Tap icon of the screen menu
- 2) Tap Service Center icon

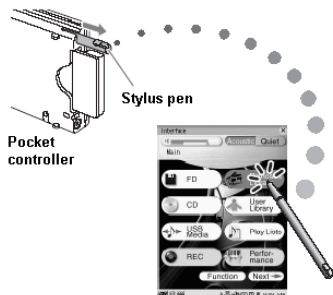


5. MKIV/Pro installation manual

5 - 9. Operating demo songs

Tapping with the stylus pen

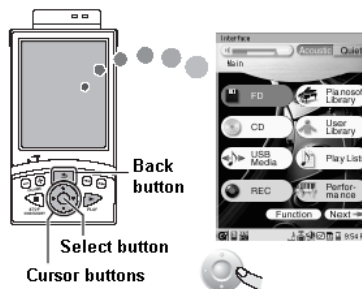
Touch an item (application icon, button, control, etc.) on the touch screen once to execute its function.



Pressing buttons

Press (cursor buttons) to move the focus on the desired icon, button, control, etc., and then press (select button) to execute its function.

Press (back button) to return to the previous screen.



Playing Back the Sample Songs in the Song Library

The following features are possible to demonstrate by using demo songs in the song library.

- 1) Incredible pianissimo playback
- 2) Quick fast forwarding by using slide bar on the screen
- 3) Introducing AEM modeling tone module
- 4) Keyboard display by using key servo positioning control



Select piano library button

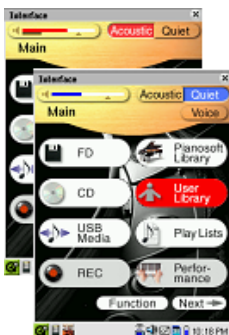


Select any demo song in the piano soft solo and press the play button to play it back. Cursor select by button is also possible.



1) Incredible pianissimo playback will be played back when you change the volume to the minimum by using (-) button.

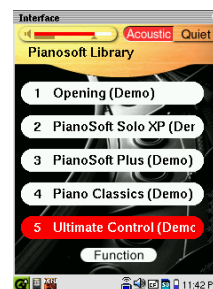
2) Quick fast forwarding by slide bar on the screen is possible by using stylus pen. Backward operation is quick as well.



Head phone indicator will be on the upper right of the screen and turn to the Quiet (Silent) mode automatically.



3) AEM sax modeling sound, XG and AWM piano sound can be checked by opening 1 demo song playback. Opening 2 demo shows you digital audio stream sound (wav).



4) Keyboard display by using key servo positioning control will be played back to select ultimate control demo.

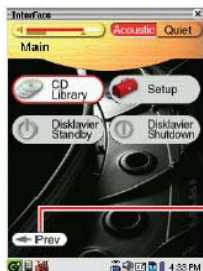
5. MKIV/Pro installation manual

5 - 10. Standby mode and shut down

HINT! Make sure that the system is completely off before unplugging.

Turning the Disklavier Off (Standby Mode)

After daily use, be sure to turn the Disklavier off by following the procedure below.



In Standby mode, the piano is in effect turned off. However, electrically it is in a state in which a small quantity of power is being consumed.

The [Main] screen consists of a couple of screens. Tap on [Next] or [Prev] to switch the screen.

Tip: To return to the [Main] screen, press [Next] repeatedly until the [Main] screen appears.

Tap on .

The Pocket Controller is turned off and on the Media Center lights dimly green.

Tip: Pressing on the Media Center also turns the Disklavier off.

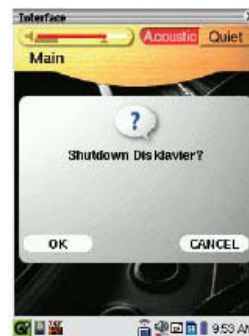
Note: Be sure NOT to disconnect the power cable from the AC wall outlet while in standby mode.

Shutting Down the Disklavier

Before disconnecting the power cable from the AC wall outlet, be sure to shut down the Disklavier by following the procedure below.

Tap on in the [Main] screen, if necessary.

Tap on .



Tap on .

The Pocket Controller turns off and on the Media Center goes out.

Tip: Holding down the button on the Media Center until the button starts flashing will also shut down the Disklavier.

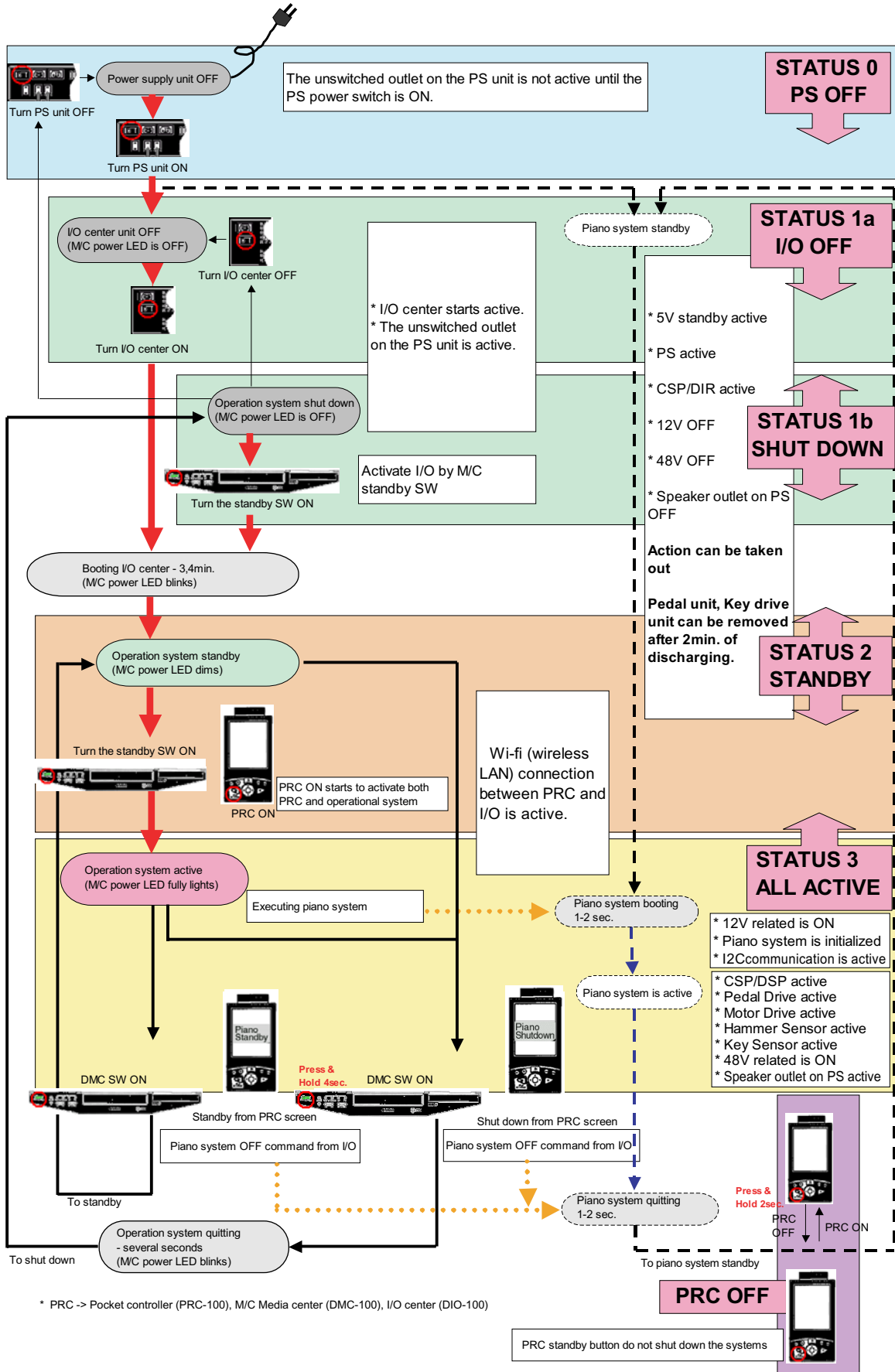
Note: When turning the Disklavier back on, be sure to wait for 10 seconds before doing so.

About the [MAINS] switches
The [MAINS] switches (on both the Power Supply unit and the I/O Center) only need to be switched off when you are not going to use the Disklavier for a long period of time. It is effectively the same as disconnecting the power cable from the AC wall outlet. For daily use, you can keep the [MAINS] switches on, and turn the Disklavier off by following the procedure "Turning the Disklavier Off (Standby mode)" above.

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5 - 11. MKIV/Pro power supplying status



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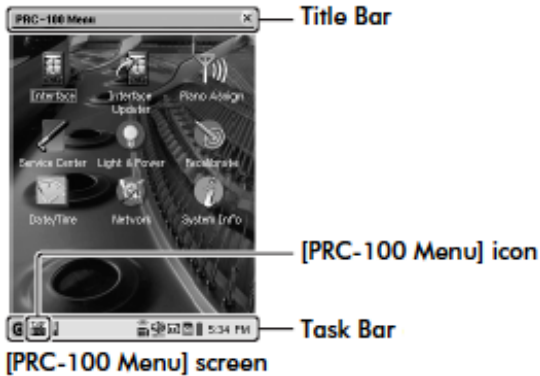
5. MKIV/Pro installation manual

5 - 12 - 1. PRC-100 initial setting

HINT! Please wait until each procedure completes, in order to avoid freezing screen

Initial Settings of the Pocket Controller

The following functions are available to control the Disklavier remotely. Set up a variety of useful functions to your preference.



Tap on ([PRC-100 Menu] icon) to return to the [PRC-100 Menu] screen.

[Interface]: Usually utilize this function to control the Disklavier remotely. The [Main] screen is the top menu of this function.

[Interface Updater]*: Updates the [Interface].

[Piano Assign]*: (--> Pairing the Pocket Controller and the Disklavier)

[Service Center]*:

[Light & Power]*: Makes energy conserving settings.

[Recalibrate]: (See --> Calibrating the Touch Screen on this page.)

[Date/Time]: (See Setting up the Current Date and Time below.)

[Network]*: Lists available network services.

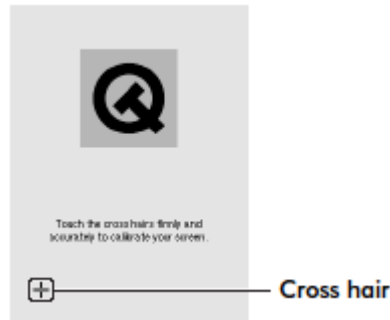
[System Info]*: Shows system information (memory, storage, version).

* For normal use, modification of these setups is not required.

Calibrating the Touch Screen

The following procedure calibrates the touch screen to improve the accuracy of the tapping operation.

Tap on [Recalibrate] in the [PRC-100 Menu] screen, and then firmly tap on the cross hairs that appear in sequence one by one.

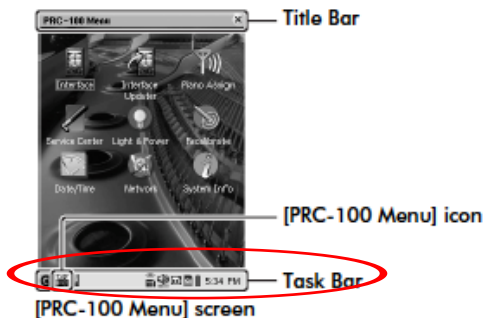


When the recalibration is completed, the [PRC-100 Menu] screen resumes.

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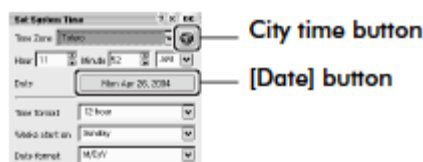
5 - 12 - 2. PRC-100 task bar and time zone

HINT! Wi-fi (wireless LAN) provides omnidirectional long distance communication



Initial Settings of the Pocket Controller

1) Tap on [Date/Time] in the [PRC-100 Menu] screen.



2) Tap on [Time Zone] , and then on your time zone in the drop down list.

Note: If your time zone does not appear in the drop down list, add the zone to the list by following the procedure in "Adding Your City to the [Time Zone] Drop Down List".

3) Tap on [Hour]/[Minutes] to set the time.

4) Tap on [Time format] , and then select the desired format.

5) Tap on , and then on [AM] or [PM], if necessary.

6) Tap on the [Date] button, and then tap on current date on the minicalendar that appears.

7) Tap on [Weeks start on] , and then tap on [Sunday] or [Monday] that is to be shown as the first day of the week in the mini-calendar.

8) Tap on [Date format] , and then on the desired format.

9) Tap on on **OK** the title bar.

10) Reboot the Pocket Controller. (--> Rebooting the Pocket Controller 5-12-3.)

Description of the Task Bar

The task bar is always displayed at the bottom of the screen to show various information and status of the Pocket Controller. Tapping on the icon shows the respective setup screen, etc.

- : Shows the function menus such as [Reboot], etc.
- : Shows the wireless connection status.
Blue: Excellent
Green: Good
Yellow: Average
Red: Poor
- : No connection (Tap to show the detailed Network screen.)
- : Shows the volume of the Pocket Controller itself. (Tap on it, and then move the slider up or down to adjust the volume.)
- : Tap on it, and then on [Eject card] before you remove the CF card.
- : Tap on it, and then on [Eject SD-card] before you remove the SD card.
- : Shows the battery status.
Blue: Good
Yellow: Low
Red: Very low
Green: Charging
- 1:46 PM** : Shows the current time. (Tap on it to open the [Set System Time] screen.)

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5 - 12 - 3. PRC-100 rebooting, resetting and pairing

HINT! Rebooting or resetting will be more effective countermeasure than Mark III systems

Rebooting the Pocket Controller

1) Tap on on the task bar.



2) Tap on [Reboot] on the menu that appears.

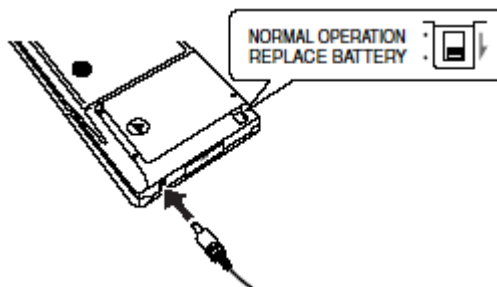
3) Tap on [Yes]. The [Main] screen appears after approximately three minutes.



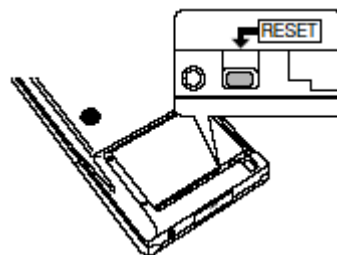
Resetting the Pocket Controller

When rebooting cannot be performed or the Pocket Controller does not work correctly even after rebooting, follow the procedure below.

1) Connect the AC adapter to the AC adaptor jack, and then set the battery replacement switch to the [REPLACE BATTERY] position.



2) Wait for five seconds, remove the battery compartment lid, and then press the [RESET] button with the stylus pen.



3) Replace the battery compartment lid, and then set the battery replacement switch back to the [NORMAL OPERATION] position.

4) Press to turn the Pocket Controller on. The [Main] screen appears after approximately two minutes.

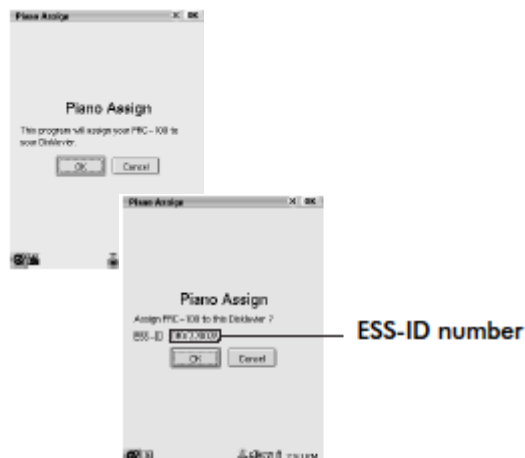
In case you change the PRC-100 to a new one for some reason, you need to pair the new PRC-100 and Disklavier as follows:

Pairing the Pocket Controller and the Disklavier

For normal use, this setup has been done in the factory.

- 1) Make sure that other wireless equipment is turned off.
- 2) Tap on [Piano Assign] in the [PRC-100 Menu] screen.
- 3) Move the Pocket Controller close to the Disklavier, and then tap on .
- 4) Tap on [OK] .
- 5) Tap on [OK] on the [Assigned successfully] screen. The [PRC-100 Menu] screen resumes.

Note: Do NOT abort the procedure before step 4. Otherwise you cannot control the Disklavier.



6. Regular field servicing

6 - 1. Pedal unit adjustment

Pedal rod adjustment

--> Please refer to 5-6. for the adjustment

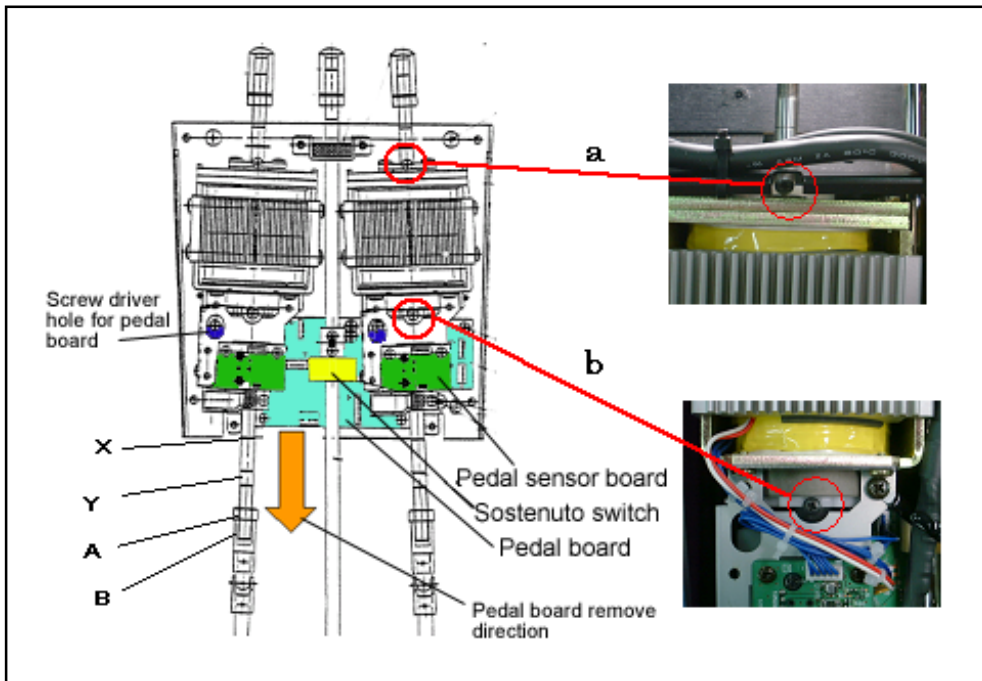
You can perform this adjustment in Stand-by mode.

* needs 2 min. discharging after putting in Stand-by mode

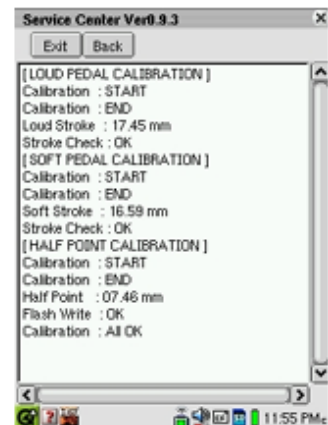
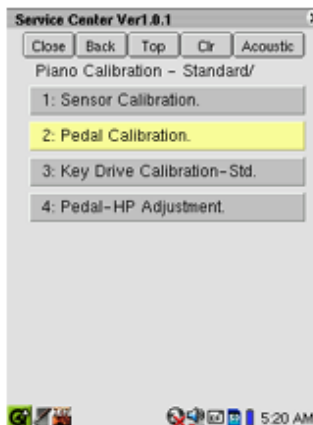
Pedal solenoid adjustment

When a pedal solenoid becomes noisy due to heavy use, the following procedure is recommended.

- 1, Loosen a and b screws a little until the solenoid moves without being tight.
- 2, Tighten a screw and feel by hand moving it until the solenoid gets a little tight feeling then turn the screw very little back to minimize the clearance between the solenoid and coil.
- 3, Repeat the same procedure also for the b screw.



- 4, Perform the pedal calibration by using PRC-100 controller.



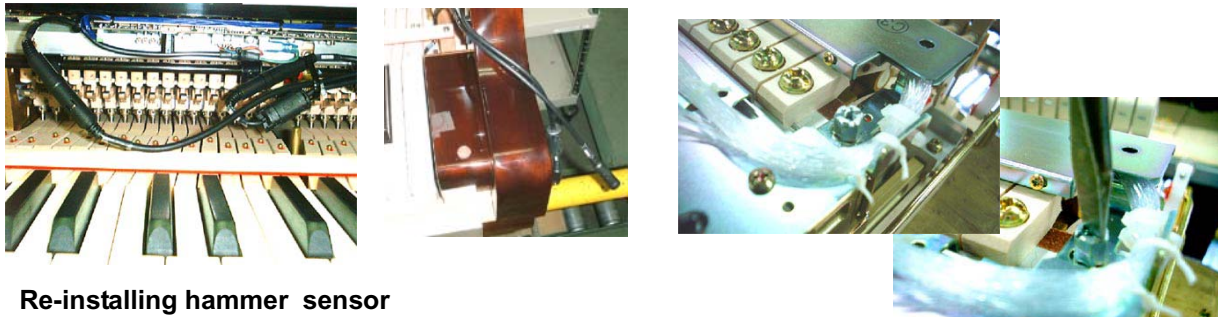
6. Regular field servicing

6 - 2. Removing / re-installing hammer sensor

You can work this adjustment under Stand-by mode.

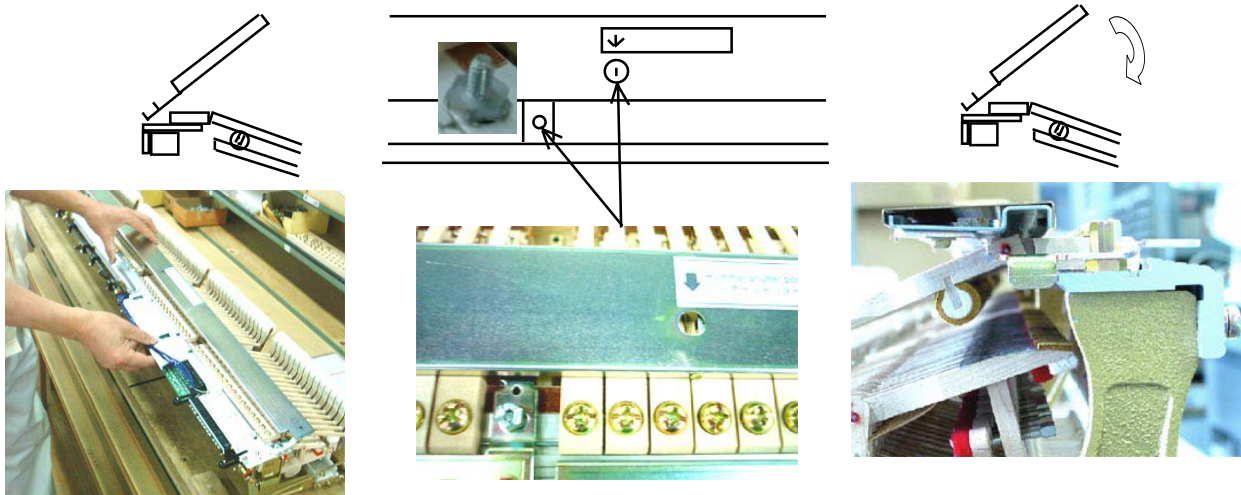
Removing hammer sensor

Remove the 2 mini DIN connectors. (for Hammer and key sensor)
Loosen and remove the hexagonal screws and hold up the sensor straight up slowly to avoid gray-scale shutter damage.



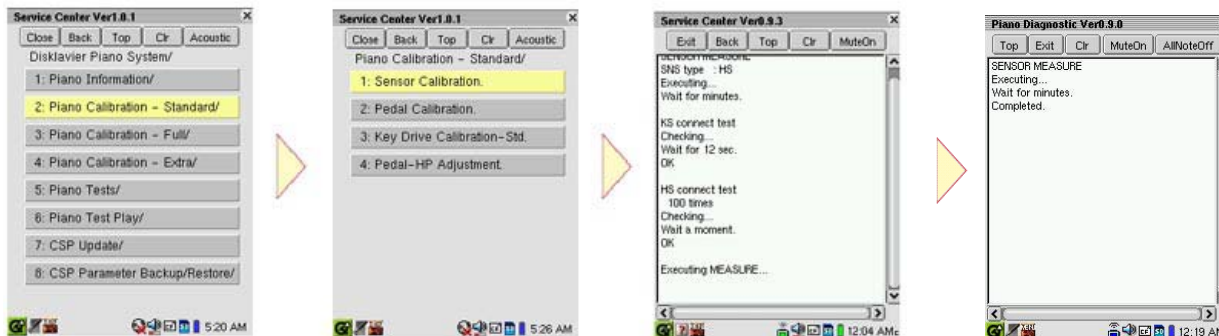
Re-installing hammer sensor

- 1, Put up the sensor above the action with a slant.
- 2, Check the both sensor attaching bolt in the middle and shutter checking hole together.
- 3, Put on the sensor slowly to the flat position.



- 4, Execute the sensor calibration, always after removing, by using PRC-100 controller.
(It takes around 3 minutes to complete.)

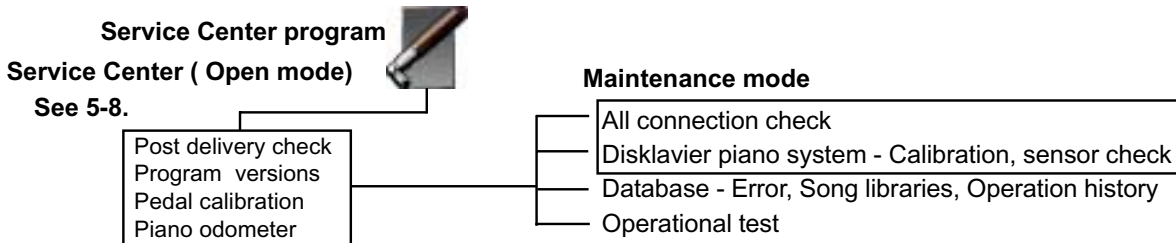
Note: No height adjustment is necessary but needs always calibration to get correct height information.



6. Regular field servicing

6 - 3. Maintenance Mode in the Service Center

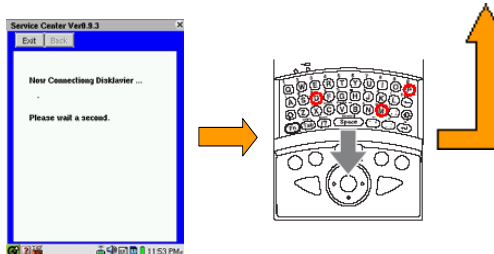
Service Center program consists on both for post delivery checking and for maintenance. Only one controller can be connected under Service Center program mode.



To enter Maintenance Mode from the Service Center, button pushing is TIME-SENSITIVE. In sequence, press and hold, [D], [M] and [P] within a 1 second time frame. (All three keys pressed within 1 second.)

Refer the menu contents by PRC100 stand alone

You can refer the all menu contents even there is no piano (active I/O center) together and no connection available. The dialog box will be all blank.



Necessary regular check

1) All connection check Press D,M,P as above

2) Piano calibration (Standard) -- minimum necessary full quality is recommendable and includes the gray scale quality check on sensors and strongest blow test on keyboard. --> See page 32 for more detail of the full calibration menu.

- Sensor calibration (5 minutes for HS models)
- Pedal calibration (1 minute for all MkIV and Pro incl. half point adj.)
- Keyboard calibration (7 minutes)
- Half pedal manual adjustment (Manual adj. when necessary)

- 1.5 sec. damping adj.
- [Play] Save data
- [Stop] Cancel
- [+] Slower damping
- [-] Quicker damping
- [Back] Auto cancel

GC1, C1 and C2 models have no hammer sensor. This check shows you " -- " at hammer sensor for these models.

Displaying results by sound
 Complete correctly - C major sound
 Error occurred - C minor sound
 Quit before completing - C diminish

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6. Regular field servicing

6 - 4. Calibration by using key board switch

1) The purpose of the function

In order to execute calibration procedure even if the PRC-100 control unit is not together with Disklavier.

2) Possible procedures

- a) Key sensor / hammer sensor calibration
- b) Key board calibration (Full) (15 minutes)
- c) Pedal calibration (incl.Pedal half point auto adjustment)
- d) Pedal half point manual adjustment -- When it is necessary.

3) Restrictions

- a) No display is available.
The results of each calibration will be informed by the type of harmony --> 7)
- b) No stop button is available. --> 8)
- c) Key board full calibration takes 15 minutes.

4) Operational procedure

- a) Turn to the Stand-by mode. (Refer to 5-11.)
- b) The light of standby button on the media center at the bottom of keybed dims.
- c) Select a key switch pattern --> 5)
- d) Hold the keys and turn the standby button of the Media Center on.
- e) Release the keys after 6-7 seconds after the clicking sound comes.
- f) The selected calibration will be executed in 10 seconds.
- g) Harmony tells you the result.
- h) Back to all active mode.

5) Key switching combinations

Depress and hold both C#(77key) + D#(79key) keys and press the following additionally .

- F# (82key) Key sensor / hammer sensor calibration
- G# (84key) Pedal calibration
- A# (86key) Key board calibration
- C (88key) Pedal half point manual adjustment

You can combine all the calibration procedures except half point adjustment.

(ex.) C# + D# + F# + G# + A# --> All calibration executes in sequence.

6) Pedal half point manual adjustment -- 1.5 sec. damping adj.

Adjust pedal mute timing to approx. 1.5 seconds after coming harmony by using 1second interval sound.

- Press [shift pedal] to save data
- Press [3key] for lower damping
- Press [1key] for quicker damping

7) Harmony display

- C major, C, E, G --> Complete calibration
- C minor, C, D#, G --> Error occurred

8) Forced termination

Press Stand-by button on the Media Center and back to the Stand-by mode before data writing.

NOTE ! : Calibrated data will be all deleted when you push the button during writing data.

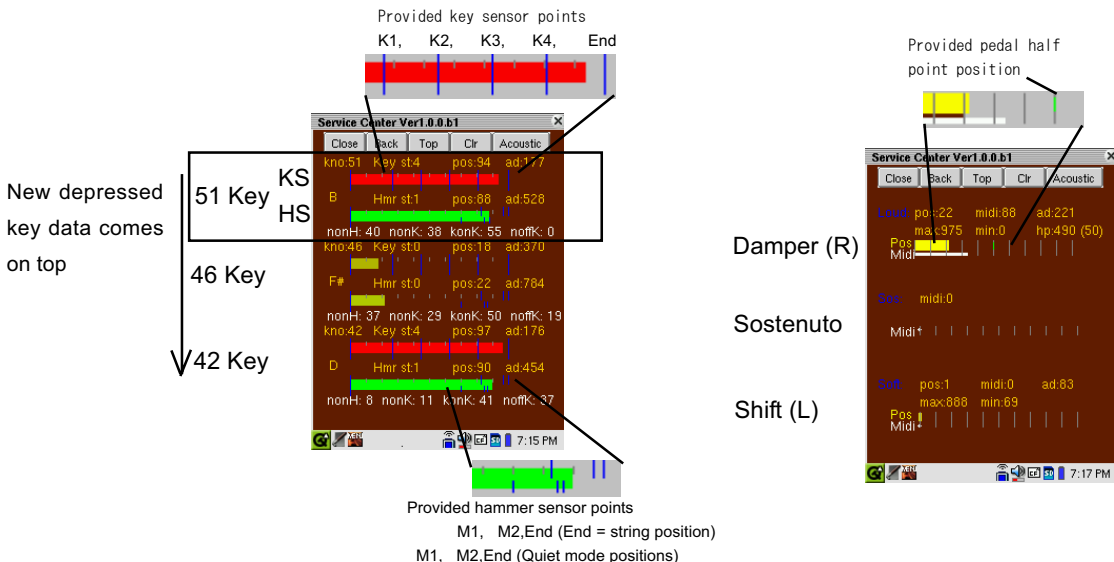
6. Regular field servicing

6 - 5. Electrical check by Maintenance mode

Hammer sensor height adjustment is not necessary on Mark IV models. Calibration compensates certain sensor height differences instead. Sensor positions are provided by software after the calibration was done and it will be shown graphically in the ' Piano test ' below. No beep tones sound.

Key sensor height adjustment is necessary only when you replace it (4.2mm space between sensor top and the bottom surface of black keys when they are depressed fully). The measurement is more important than former models. The 4 sensor points and its end will be provided of software after the calibration.

The following things will be observed when you check the graphical sensor positions of the test.



1) The bar graph starts from below zero or exceeds end value.

--> No calibration procedure was done after its mechanical / positional adjustment.

2) The bar graph does not reach to the end or the bar moving seems not linearly.

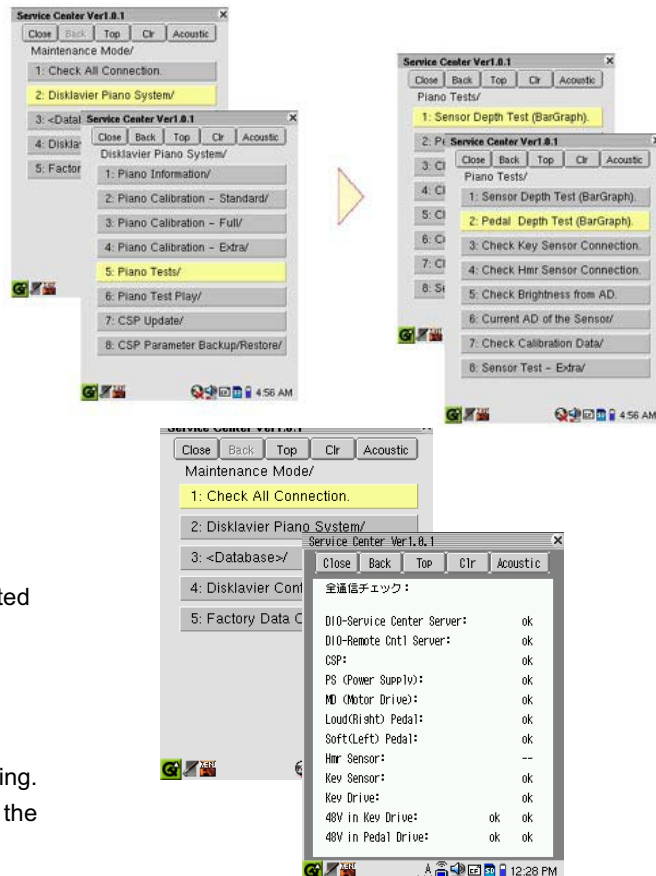
--> Shutter is dirty or broken. You will see the error message during sensor calibration full mode.

3) No signal (bar) appears.

--> Check All Connection check.

4) If one of damper or shift signal does not appear, small sensor board for each pedal might not be connected to the main pedal board or be damaged. Sostenuto sensor is a switching one and bar comes full or zero and it is on the main pedal board. --> See 6-2.

All connection check is not active while the system is working. CSP board collects new status for each connection when the system has been turned on from off or standby.



7. Replacing gray-scale hammer / key shutters

Gray scale shutters replacement

Since both gray scale hammer shutters and key shutters are optical transmission type, replacement might be necessary when there comes an error message with certain key numbers displayed during sensor calibration. Some of them might have optical transmission problem and they might be dusty or broken for some reason.

*** Key gray scale shutters**

Key shutter is the assembly of white shutter base block and gray scale shutter.
 Gray scale shutter is provided as service part WC368200 (1 / piece)

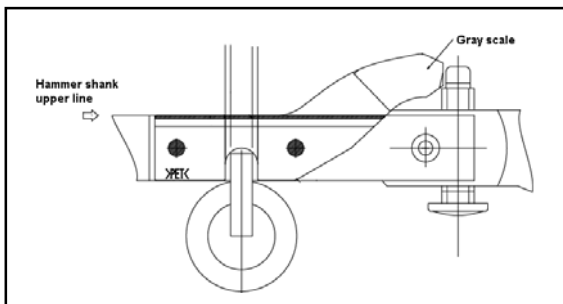
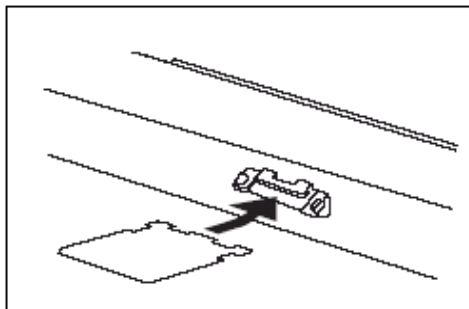
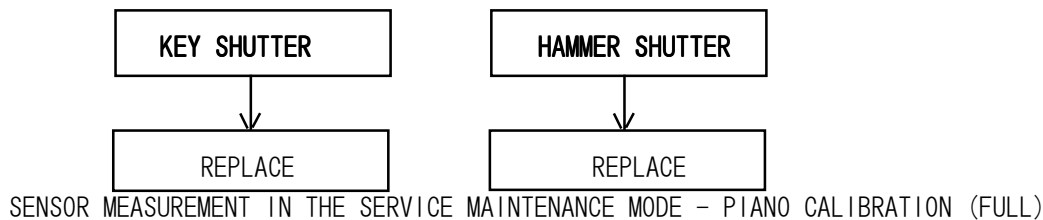
*** Hammer gray scale shutters**

Hammer shutter is glued on the side of the hammer shank. When you replace it, there are guide lines for both vertical - hammer roller butt plate, and horizontal - upper edge of hammer shank. See the drawing as shown at right bottom. Service part - WE105700 (4 / set)

Be careful to avoid getting fingerprints on the shutters !

Execute piano calibration (Full) after replacing shutters. See 6-4. bottom.

*** Shutter replacement procedure**



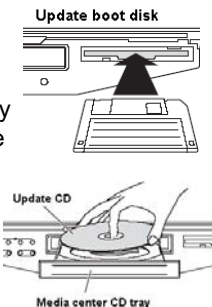
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8-1. Updating the Disklavier

First you need to update the Disklavier (I/O Center and Central Signal Processor), and then, update Pocket Controller and Tablet Controller.

Updating the I/O Center and Central Signal Processor

- 1) Turn the Disklavier on. (pg. 4 Turning the Disklavier On in Quick Guide)
- 2) Load the update CD and install floppy disk into their respective drives on the Media Center. (pg. 1 and 20 in Advanced Operating Manual)
- 3) Hold down on the Media Center until the button starts flashing. The Disklavier shuts down.
- 4) Wait for approximately 10 seconds or more, and then press on the Media Center. Update of the I/O Center starts. During update, the buttons on the Media Center light in turn.
- 5) Wait until the CD tray opens, and then remove the CD and the floppy disk. It takes approximately 10 minutes before the CD tray open.

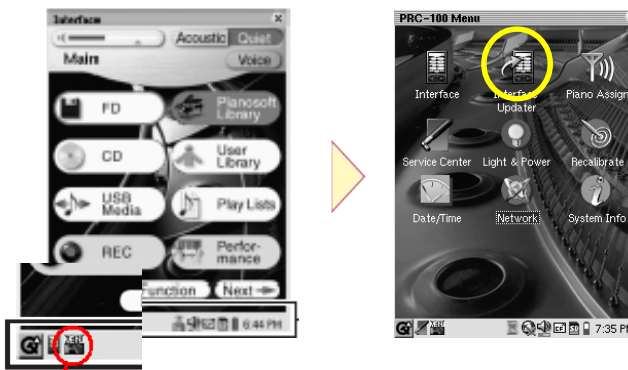


Making an Install Floppy Disk

- 1, Tap on in the [Main] screen, and then on .
- 2, Load a formatted floppy disk (2HD) to the drive.
- 3, Tap on .
- 4, Tap on the check boxes of all applications to check all the boxes.

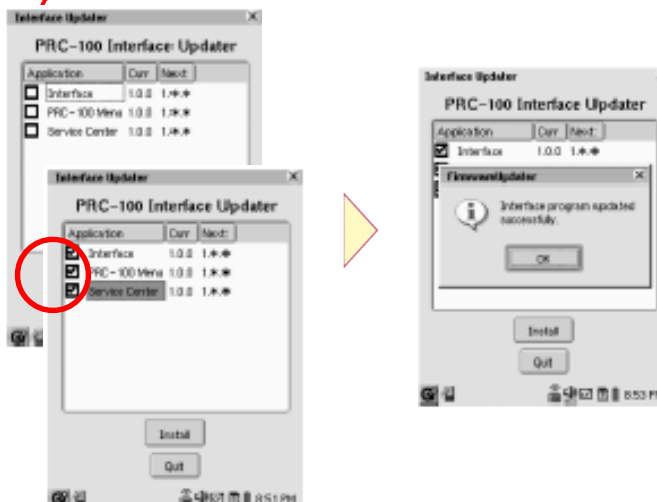
The Disklavier will start making a backup floppy disk.

- 6) Press on the Media Center to close the CD tray. Update of the Central Signal Processor starts. During update, the buttons on the Media Center light in turn.
- 7) Confirm that lights blue. Update process is completed.



Updating the Pocket Controller

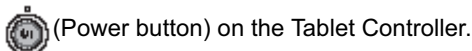
- 1) Confirm that the Disklavier is turned on, and then press .
- 2) Tap on ([PRC-100 Menu] icon) on the Task Bar.
- 3) Tap on .
- 4) Tap on the check boxes of all applications to check all the boxes.
- 5) Tap on (Install box). Update of the Pocket Controller starts, and the message [Updating] appears. After a few minutes, the following message appears.



8-2. Updating the Tablet Controller (for North America)

Updating the Tablet Controller

1) Confirm that the Disklavier is turned on, and then press



2) Press (P button) on the Tablet Controller.

The following configuration bar appears at the top of the touch screen.

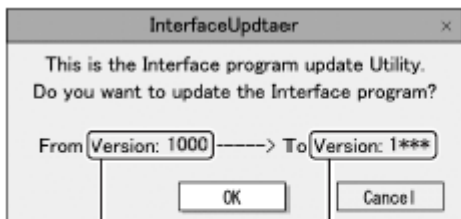


3) Tap on



4) Tap on

Ex.:



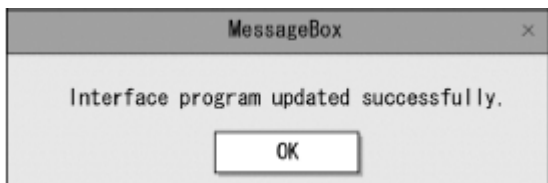
Current version

Version prepared in the I/O center

5) Tap on

Update of the Tablet Controller starts, and the message [Updating the Interface program...] appears.

After 10 seconds or more, the following message appears.



6) Tap on

The Tablet Controller automatically restarts.

Note: If the wireless LAN is outside the specified communication range or there is no update file, the following message appears.



In such a case, tap on , and then try the update procedure again close to the Disklavier.

Note: In the case where the update file was found, but the firmware was not updated successfully for some reason, the following message appears.



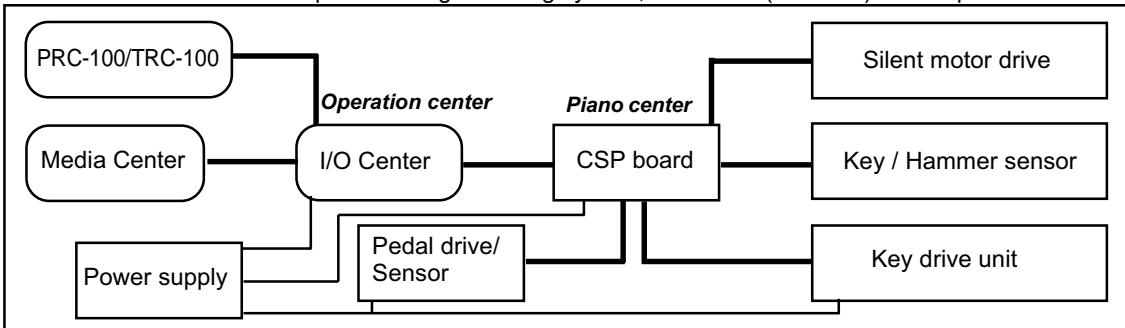
If you want to try again, tap on .

If the firmware cannot be updated even after several tries, tap on , exit Interface Updater, and try Interface Updater once again from the beginning.

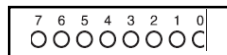
9. Trouble shooting and error logs

Specifying the cause and first aid

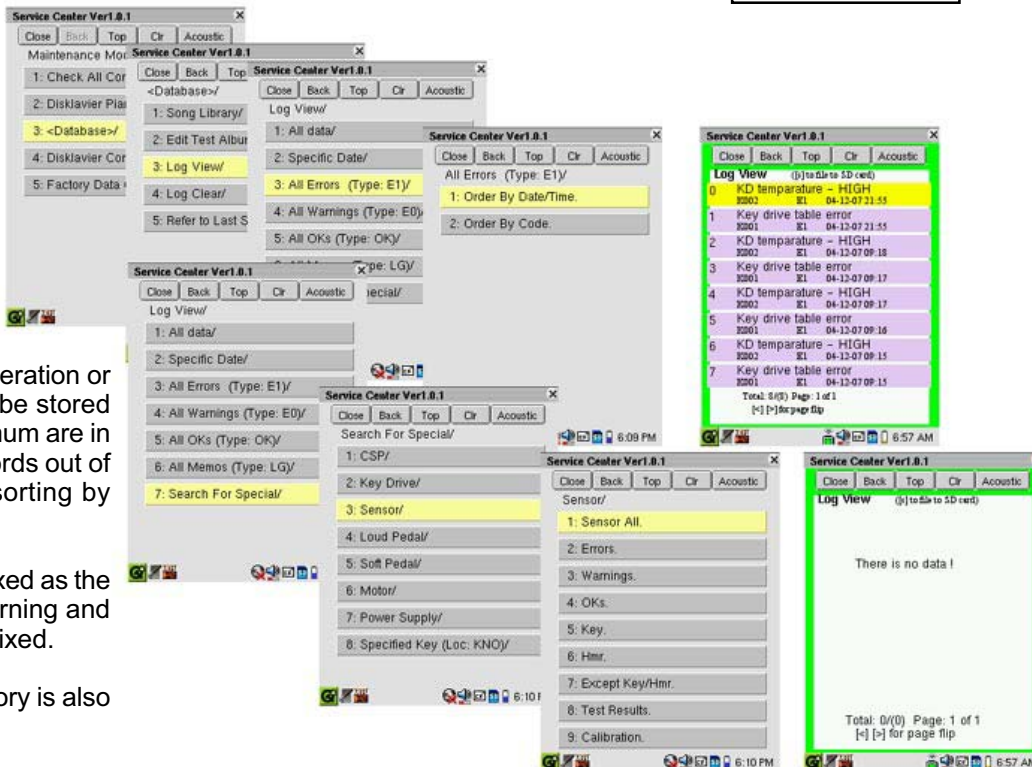
CSP board is the center of the piano driving / sensing system, I/O center (DIO-100) is the operation center.



- 1) Power supply related
 - > Check along the power turning procedure, see 5-11.
 - > Check if the AC cord unplugged before the system stops completely
- 2) Data communication related
 - > Wireless LAN connecting - check to see if LAN card is inserted for both PRC-100 & DIO-100
 - > Hang up the wireless communication due to the excess of sequential operation
 - Reboot or reset wireless control, see 5-12-3.
 - > Unit connections - Verify all connection check in the maintenance mode, see 6-4.
- 3) Piano system related
 - > Turn power to standby mode from active and turn it on again to reset CSP board.
- 4) Drive/sensor unit related of the piano system
 - > Certain key does not function well
 - Playback problem --> keyboard calibration
 - Recording problem --> sensor calibration
 - Silent (Quiet) play to find out key numbers which have sensor problem.
- 5) I/O center related
 - > AWM (piano), XG(playback only), AEM tone generators - post delivery check see 5-8.
 - > Hard disk problem - Check red LEDs on the side of I/O center (all stop blinking - Error)



Error log history



Not only error but also operation or maintenance history will be stored until 5,000 records maximum are in the data base. 2,000 records out of 5,000 can be listed up sorting by time or code.

E1 coded error must be fixed as the first priority. E0 is just warning and it is not necessary to be fixed.

The latest calibration history is also available to see.

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10. Main service parts

The following is a list of the main service parts for MarkIV and MarkIV Pro series.

Part No.	Parts name	Remarks
WC867700	HAMMER SENSOR UNIT GS C3 MARK4	For C3, C5, S4
WC867800	HAMMER SENSOR UNIT GS C6 MARK4	For C6, C7, S6
WC867900	HAMMER SENSOR UNIT GS CF MARK4	
WD220500	BOLT, HAMMER SENSOR MARK4	
WD216100	NUT, HAMMER SENSOR MARK4	7mm
WE105700	HAMMER SENSOR GRAY SCALE X4	
WC811100	CIRCUIT BOARD MK4-HS MARK4	
V8903200	CIRCUIT BOARD KEY EMISSION	DU1A compatible
WC858600	KEY SENSOR UNIT MARK4	For all MKIV and Pro
WC368200	KEY SHUTTER GRAY SCALE GP MARK4	1 / piece
V7977900	KEY SHUTTER GRAYSCALE BLOCK MARK4	1 / piece
WC811200	CIRCUIT BOARD MK4-KS MARK4	
WC872900	KEY DRIVE UNIT GS GC1 MARK4	For GC1
WC873000	KEY DRIVE UNIT GS C1 MARK4	For C1
WC869300	KEY DRIVE UNIT GS C3 MARK4	For C2, C3, C5, S4
WC873100	KEY DRIVE UNIT GS C6 MARK4	For C6, C7, S6
WC749500	KEY DRIVE UNIT BLACK C3 NEWPRO	For C3, C5, S4
WC872700	KEY DRIVE UNIT BLACK C6 NEWPRO	For C6, C7, S6
WC872800	KEY DRIVE UNIT BLACK CF NEWPRO	
WC874700	SOLENOID ASSEMBLY MARK4	1 / piece
WC753800	SOLENOID ASSEMBLY NEWPRO	1 / piece
WC851000	PEDAL UNIT BLACK BLACK MODEL MARK4	
WC851100	PEDAL UNIT BLACK CF NEWPRO	
WC755600	CIRCUIT BOARD CSP MARK4	
WC789000	CIRCUIT BOARD PD MARK4	Pedal main board
WC815300	CIRCUIT BOARD PD SENSOR MARK4	Shift/damper pedal sensor
WC808100	PS UNIT UL MARK4	Power supply unit for MKIV
WC808200	PS UNIT UL NEWPRO	Power supply unit for Pro
WD900300	PS BRACKET ASSEMBLY MARK4	
VP185200	AC CORD ASSY 10A U HQG	PS AC cord for NA
VP185300	AC CORD ASSY 10A E HQG	PS AC cord for Europe
VP185400	AC CORD ASSY 10A B HQG	PS AC cord for UK
WD424600	AC CORD SET AS 3P 10A L MARK4	PS AC cord for Austlaria
WC746400	I/O CENTER MARK4/PRO	
WE385700	OVERALL ASSEMBLY U,E,A PRC-100(MK4)	PRC-100 controller
WD057400	CF WIRELESS LAN CARD MBH2WL03 MARK4	For both PRC-100 and I/O center
WE294800	LITHIUM-ION BATTERY 3.7V 1700MAH UBATI10	For PRC-100
WE294900	CRADLE UNIT-1031YCZZ PRC-100	For PRC-100
WE295000	AC ADAPTOR U,E,A RADPA1020YCGZZ EA-70 PRC	PRC-100 AC adaptor
WC956300	AC CORD SET U 2P 2M 3A MARK4	PRC-100 AC cord for NA
WC978700	AC CORD SET CE 2P 2M 2.5A MARK4	PRC-100 AC cord for Europe
WC978800	AC CORD SET AS 2P 2M 2.5A MARK4	PRC-100 AC cord for Austlaria
WC616500	TABLET CONTROLLER TRC-100 MARK4	For North America only
WC850900	CABLE PDI2C MD6-PH6 1 MARK4	For North America only
X6197A00	PROGRAMMED HARD DISK MK4 U V1.05	

11. Video Synchronized Recording

By recording a song played on the Disklavier synchronized with the video recording, later on, you can enjoy piano playback with the video. First set up the camcorder and the Disklavier, and then start recording by following the procedures below.

Setting Up the Camcorder and the Disklavier

- 1, Hook up a camcorder to the I/O Center.
- 2, Tap (set up) on in the [Main] screen, and then (SYNC).
- 3, Tap on to turn the video synchronization on.
Each time you tap on , the video synchronization turns on and off alternately.
- 4, Tap on the desired option ([SyncLevel] or [Offset]), and then press to adjust its value.
To cancel the adjustment, press .
- 5, Press (select button) to set the value.

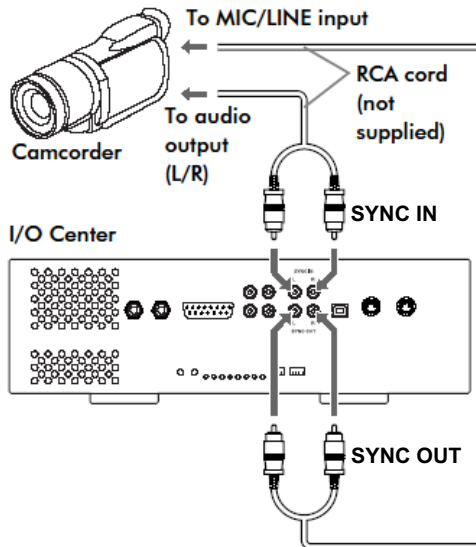
Starting Video Synchronized Recording

- 1, Press repeatedly until the [Main] screen appears, and then tap on in the [Main] screen.
- 2, Start recording on the camcorder.
- 3, Confirm that [Rec Wait] appears in the information area, and then press to start recording.
- 4, Start playing the Disklavier.
- 5, After playing the Disklavier, press to stop recording.
- 6, Stop recording on the camcorder.



For normal use, the adjustment of this option is not required.

Adjusts the length of the offset time that leads the actual playback of all recording.

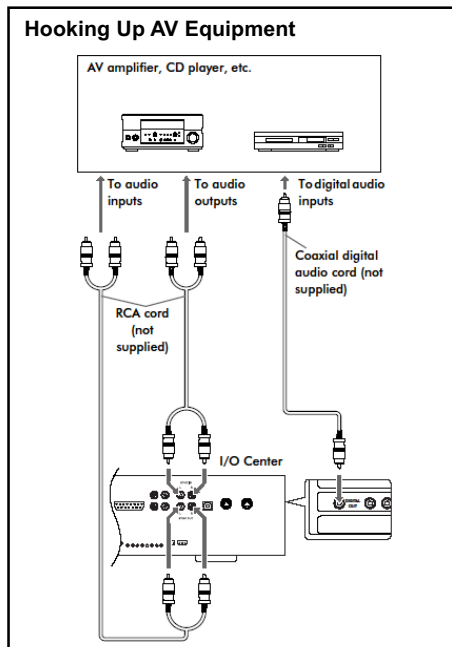


Video Synchronized Playback

- 1, Perform the video synchronized recording in advance.
Note: Be sure to rewind the video cassette to locate the beginning of the recording.
- 2, Make sure that the video synchronization is on.
- 3, Select the desired song corresponding to the video if necessary.
- 4, Turn down the volume completely on the camcorder.

Note: Although noises (synchronizing signal) are heard from the camcorder's speaker when the volume is not turned down completely, this is not a malfunction.

- 5, Start playback on the camcorder.
The Disklavier starts playback as well.
Note: You cannot change the playback tempo during video synchronized playback.



12. Checking wireless LAN network condition

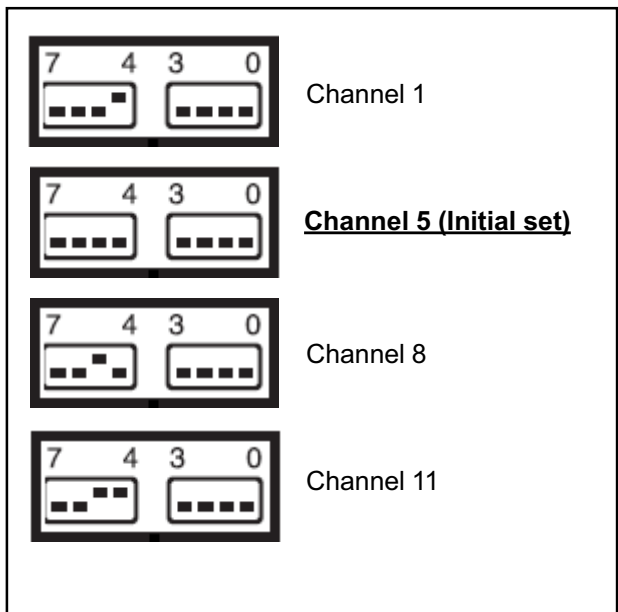
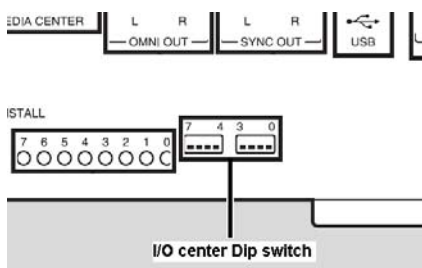
In case of a strong wireless LAN network (Wi-fi) is existing around the disklavier, PRC-100/TRC-100 controller might have connection problem with the Disklavier. Open the network program from the menu screen and check your LAN communication quality.



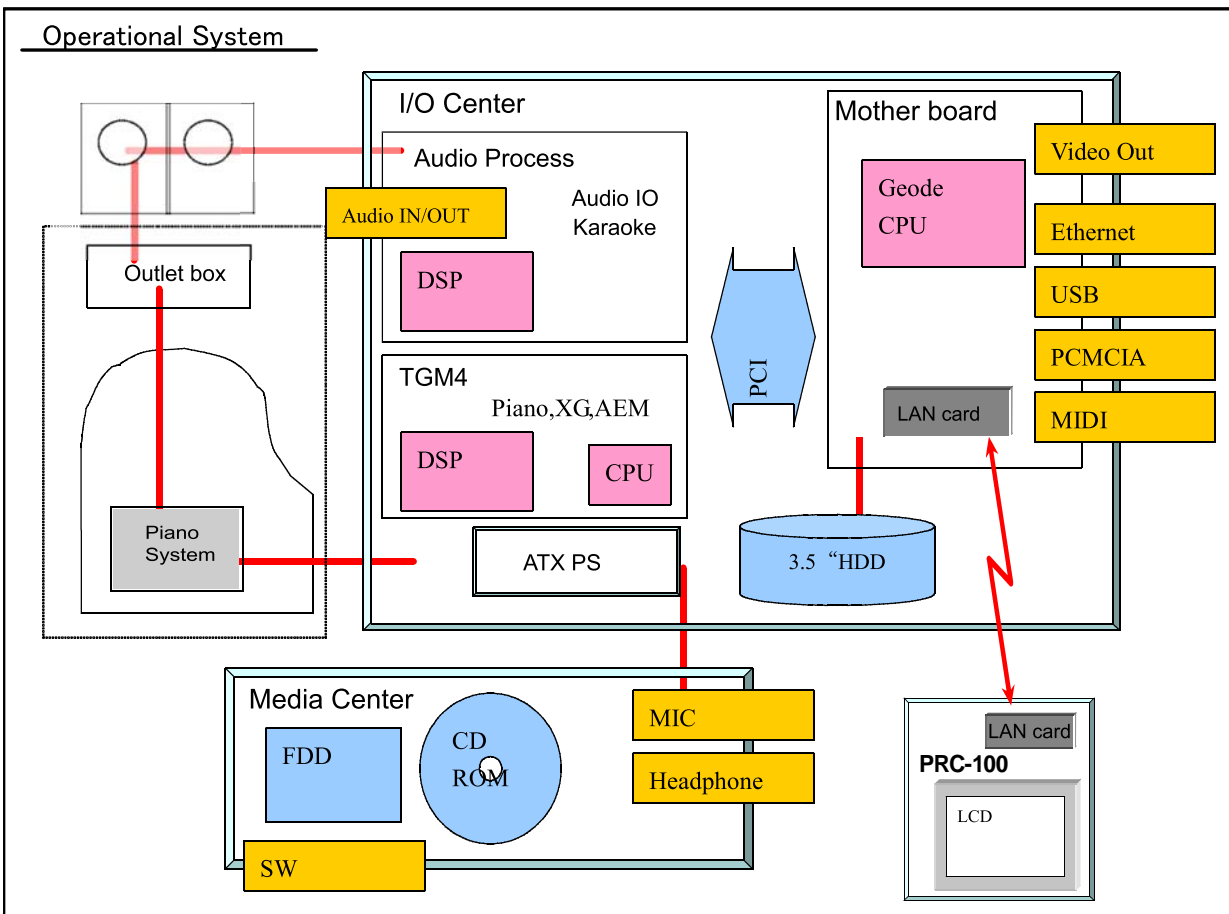
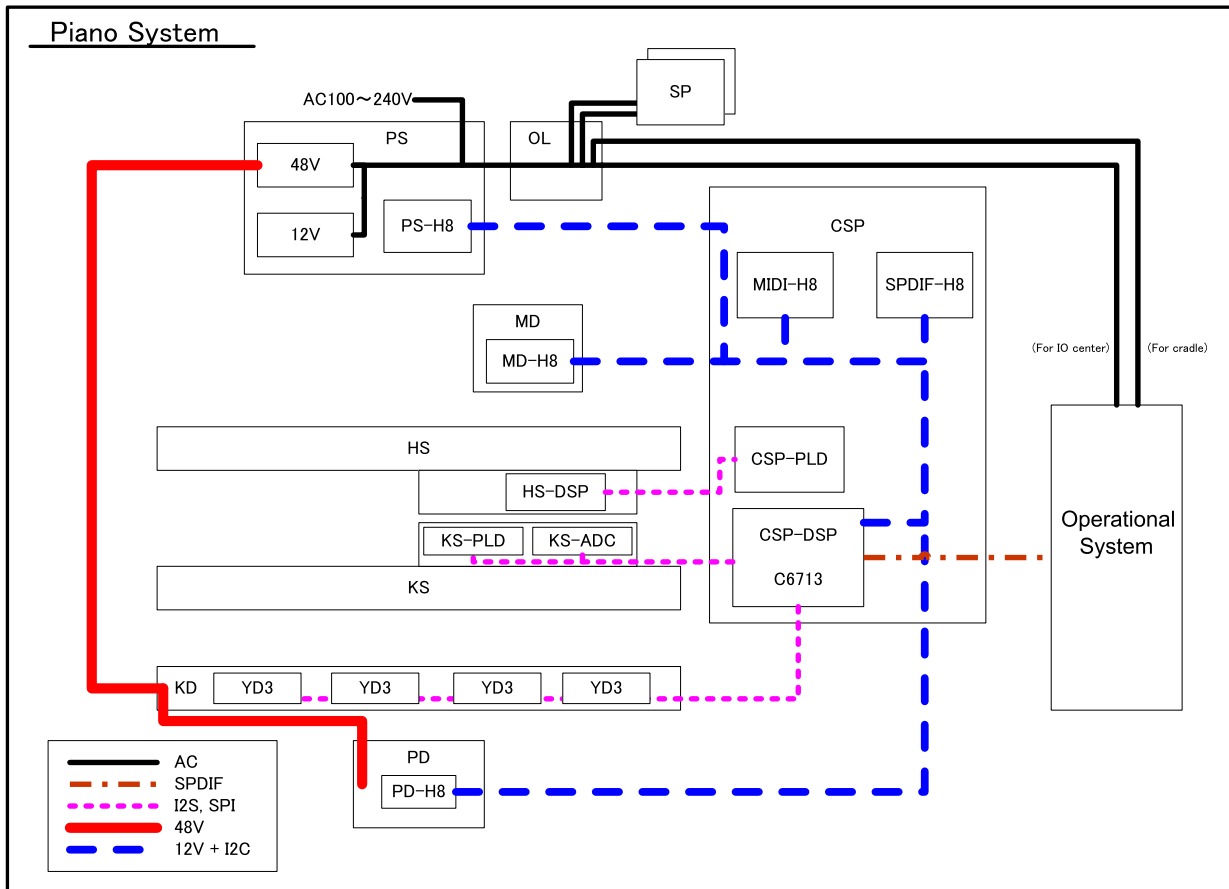
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Wi-fi channel change by using I/O center dip switch function.

The Disklavier's default wi-fi channel is set to 5. It is possible that even though the network signal is strong, the quality of the signal could be lower than 30%. If this is the case, change the channel to avoid frequency conflicts. Try changing to channel 1 first. After changing, check the quality of the signal again.



13. Block diagram



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14. Service Center program map

Service Center - Version 1.01 Menu Index

Service Center/

- 1: Post Delivery Check <Test playback> Page 12.
 - A: Key scaling
 - B: Right Pedal Moving
 - C: Left Pedal Moving
 - D: Sound, Right Ch. <Needs headphones for Pro>
 - E: Sound, Left Ch. <Needs headphones for Pro>
 - F: Sound, L&R Ch. <Needs headphones for Pro>
 - G: Melody <Needs headphones for Pro>
- 2: Program Versions <DIO, CSP>
- 3: Pedal Calibration < 1 min. >
- 4: Piano Odometer

To enter Maintenance Mode from the Service Center, button pushing is TIME-SENSITIVE. In sequence, press and hold, [D], [M] and [P] within a 1 second time frame. (All three keys pressed within 1 second.)

Maintenance Mode/

- 1: Check All Connection.
- 2: Disklavier Piano System/
 - 1: Piano Information/
 - 1: Program Versions - Piano.
 - 2: Model Info. < KD type, HS type, PD type >
 - 3: Key Drive Info. <Power supply, temp. >
 - 4: Pedal Info. <Power supply, temp. >
 - 5: Piano Odometer - Detail.
 - 6: Piano Type Setting(Pedal)/
 - 1: GC1(base damper).
 - 2: GC1(sostenute)A1/C1-C3/S4.
 - 3: C5.
 - 4: C6/C7/S6.
 - 5: CFIIIS.
 - 7: Clear Odometer/
 - 1: Clear all except for total time.
 - 2: Clear all.
 - 3: Clear time only.

2: Piano Calibration - Standard/ Page 21.

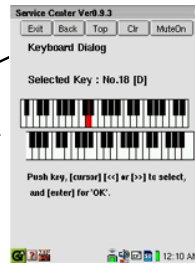
- 1: Sensor Calibration. <4' 40" HS model>
- 2: Pedal Calibration. < 1 mim. >
- 3: Key Drive Calibration-Std. <6'45" MkIV HS>
- 4: Pedal-HP Adjustment. < Extra adjustment >

3: Piano Calibration - Full/ Page 21.

- 1: Cals on serial w/ GS check. < 17 min.>
- 2: Cals on serial w/o GS check.
- 3: Sensor Calibration w/ GS check. <5'30">
- 4: Pedal Calibration. < 1 mim. >
- 5: Key Drive Calibration. <8'30" MkIV, 10'45" Pro>
- 6: Pedal-HP Adjustment. < Extra adjustment >

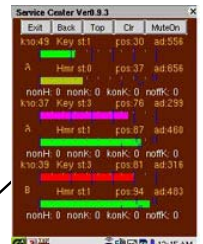
4: Piano Calibration - Extra/

- 1: Sensor -Extra/
 - 1: Sensor Auto(Overrides Errors).<4'30">
 - 2: Sensor Manual (Overrides Errors).
- 2: Key Drive -Extra (All Keys)/
 - 1: Key Drive MM.
 - 2: Key Drive ON,OFF,ACC,ON-P.
 - 3: Key Drive ON.
 - 4: Key Drive OFF.
 - 5: Key Drive ACC.
 - 6: Key Drive ON-P.
- 3: key Drive -Extra (One Key)/
 - 1: 1 Key Drive MM.
 - 2: 1 Key Drive ON,OFF,ACC,ON-P.
 - 3: 1 Key Drive ON.
 - 4: 1 Key Drive OFF.
 - 5: 1 Key Drive ACC.
 - 6: 1 Key Drive ON-P.



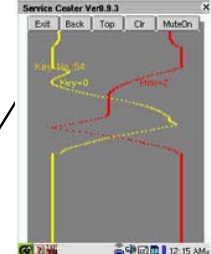
5: Piano Tests/

- 1: Sensor Depth Test (BarGraph).
- 2: Pedal Depth Test (BarGraph).
- 3: Check Key Sensor Connection.
- 4: Check Hmr Sensor Connection.
- 5: Check Brightness from AD.
- 6: Current AD of the Sensor/
 - 1: Key AD.
 - 2: Hmr AD.
- 7: Check Calibration Data/
 - 1: Check Key Sensor Cal Data.
 - 2: Check Hmr Sensor Cal Data.
 - 3: Check Hmr Sensor AD offset Data.
 - 4: Check Key Drive Cal Data.



8: Sensor Test - Extra/

- 1: Check Sensor AD Volatility.
- 2: Check Sensor Hmr GS Linearity/
 - 1: Excute Test.
 - 2: Results.
 - 3: Results -Graph.
- 3: Check Sensor Optical Step.
- 4: Rest Value Validity Check.
- 5: CSP-HS Data Direction check.
- 6: Sensor Test - Other Extra/
 - 1: Optical Matrix.
 - 2: Optical Step Adj - Auto/
 - 1: High S/N.
 - 2: Long Shelf Life.
 - 3: Refresh All the Rest.
 - 4: Sensor Draw Key Motion.



6: Piano Test Play/

- 1: Key Scaling.
- 2: Loud(Right) Pedal Hold.
- 3: Soft(Left) Pedal Hold.

7: CSP Update/

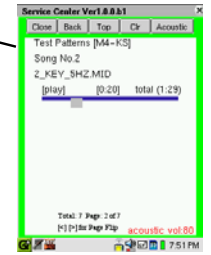
- 1: Set the update media. Ready?.

8: CSP Parameter Backup/Restore/

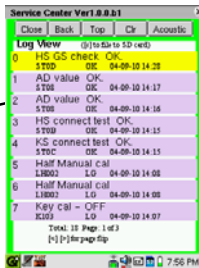
- 1: Backup CSP Param.- Execute.
- 2: Restore CSP Param.- Execute.
- 3: Copy CSP Param. fromHD toFD.
- 4: Copy CSP Param. fromFD toHD.

3: <Database>/

- 1: Song Library/ <Playback test w/o back to user mode>
 - 1: Test (Closed Area).
 - 2: PianoSoft.
 - 3: User.
 - 4: Audio.
 - 5: FD.
 - 6: CD.
 - 7: USB.
- 2: Edit Test Album/
 - 1: Copy from FD to HD/
 - 1: Are you sure? Yes.
 - 2: No, exit.
 - 2: Copy from CD to HD/
 - 1: Are you sure? Yes.
 - 2: No, exit.
 - 3: Rename Test Album.
 - 4: Remove Test Album.



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3: Log View/

1: All data/

- 1: Order By Date/Time.
- 2: Order By Code.
- 3: Order By Type(E0,E1,LG,OK-).

2: Specific Date/

- 1: Today.
- 2: Since Yesterday.
- 3: From 2 days before.
- 4: From 3 days before.
- 5: 1 week.
- 6: 2 weeks.
- 7: 3 weeks.
- 8: 1 month.

3: All Errors (Type: E1)/

- 1: Order By Date/Time.
- 2: Order By Code.

4: All Warnings (Type: E0)/

- 1: Order By Date/Time.
- 2: Order By Code.

5: All OKs (Type: OK)/

- 1: Order By Date/Time.
- 2: Order By Code.

6: All Memos (Type: LG)/

- 1: Order By Date/Time.
- 2: Order By Code.

7: Search For Special/

- 1: CSP/
 - 1: CSP ALL.
 - 2: Errors.
 - 3: Warnings.
 - 4: CSP boot/exit records.
 - 5: CSP boot records.
- 2: Key Drive/
 - 1: Key Drive ALL.
 - 2: Errors.
 - 3: Warnings.
 - 4: All Key Drive Momos.
 - 5: KD Temperature Memos.
 - 6: KD Voltage Memos.
 - 7: Calibration.

3: Sensor/

- 1: Sensor All.
- 2: Errors.
- 3: Warnings.
- 4: OKs.
- 5: Key.
- 6: Hmr.
- 7: Except Key/Hmr.
- 8: Test Results.
- 9: Calibration.

4: Loud Pedal/

- 1: Loud Pedal All.
- 2: Errors.
- 3: Warnings.
- 4: Temperature Memos.
- 5: Stroke cal.
- 6: Half Auto cal.
- 7: Half Manual cal.

5: Soft Pedal/

- 1: Soft Pedal All.
- 2: Errors.
- 3: Warnings.
- 4: Temperature Memos.
- 5: Stroke cal.

6: Motor/

- 1: Errors.
- 2: Warnings.

7: Power Supply/

- 1: Errors.
- 2: Warnings.

8: Specified Key(Loc: KNO)/

- 1: All.

4: Log Clear/

1: Clear All Data/

- 1: Are you sure? Yes.
- 2: No, exit.

2: Clear All Data Except Errors/

- 1: Are you sure? Yes.
- 2: No, exit.

3: Clear All Memos/

- 1: Are you sure? Yes.
- 2: No, exit.

4: Clear All OKs/

- 1: Are you sure? Yes.
- 2: No, exit.

5: Clear Today's Data Only/

- 1: Are you sure? Yes.
- 2: No, exit.

6: Clear All before Yesterday/

- 1: Are you sure? Yes.
- 2: No, exit.

7: Clear All before 1 Week/

- 1: Are you sure? Yes.
- 2: No, exit.

8: Clear All before 1 Month/

- 1: Are you sure? Yes.
- 2: No, exit.

9: Clear All before 1 Year/

- 1: Are you sure? Yes.
- 2: No, exit.

5: Refer to Last SQL.

4: Disklavier Control System/

- 1: Controller Testmode.
- 2: Controller I/O Check.
- 3: Controller Test Play.

5: Factory Data Cleaning.