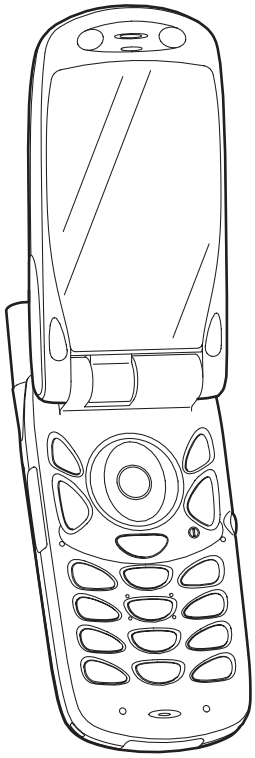
CONFIDENTIAL DRAFT

SHARP SERVICE MANUAL

CODE : 00ZTM150/SM/E



DIGITAL MOBILE PHONE

MODEL TM150

(INTERNAL MODEL NAME: TM150U)

- In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified should be used.

Caution:
Risk of explosion if battery is replaced by an incorrect type, dispose of used batteries according to the instruction.

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Parts Guide

Parts marked with "⚠" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

SERVICING CONCERNS

1. When requested, back up user's handset data using SPST (SHARP Program Support Tool). Otherwise, before servicing, warn the user that data in the memory may be lost during repairs.
2. Upgrade the firmware to the latest version using SPST before returning the handset to the customer.
3. After repairs, inspect the handset according to the following flowchart.

Repairs are completed.
(Fixed parts have been checked for proper operation.)

↓

Check IMEI No./Operator code (Destination)/
Firmware version by Identity function of SPST.

↓

Inspect each device using performance check adjustment function of SPST.

↓

Carry out RF performance check with SPST.

↓

All completed.

4. When storing or transporting a PWB, put it into a conductive bag or wrap it in aluminum foil.
   (C-MOS IC may be damaged by electrostatic charges.)
5. Do not leave fingerprints, etc. on ornamental parts including a cabinet, especially clear windows for main and sub displays.
   Wear fingerstalls to avoid this.
   Also, ensure not to leave fingerprints on the surface of main and external display panels.
6. To prevent oxidation which causes connection problems, do not touch any terminals on the electric board, microphone, vibrator, earpiece and speaker.
   When handling these parts, wear fingerstalls. Should you touch these parts, clean them with a soft dry cloth.
   Always wear fingerstalls when handling a shield case on the electric board.
   Otherwise oxidation may occur causing handset performance deterioration.
7. The FPC is a precision device. Handle it carefully to prevent any damages.
8. Do not expose the moisture sensor to liquids.
   If the sheet gets wet, red ink runs. In this case, replace the sheet with a new one.
   Be careful about your perspiration.
9. Before you disassemble or reassemble handset, make sure to remove the Li-Ion battery.
10. Be sufficiently careful with static electricity of integrated circuits and other circuits. Wear static electricity prevention bands while servicing.

CHAPTER 1. GENERAL DESCRIPTION

FOR A COMPLETE DESCRIPTION OF THE OPERATION OF THIS UNIT, PLEASE REFER TO THE OPERATION MANUAL.

1. SPECIFICATIONS

General:	Quad - band (GSM 900 MHz/DCS 1800 MHz/PCS 1900MHz) GPRS-enabled WAP, MMS, SMS
Dimensions (folded, excluding the aerial) (H x W x D):	27.1 x 49.2 x 94.8 mm
Weight:	112 g
Battery operating temperature:	0 °C - 40 °C
Main display:	Display dimensions: 240 x 320 pixels LCD display: CGS 262,144 colours with backlight LCD backlight: LED backlight white colour LEDs
External display:	Display dimensions: 64 x 96 pixels LCD display: STN 65,536 colours LCD with backlight
Camera:	CCD 1M pixels built-in camera Zoom: Wide and zoom mode [Supported 20 (when image size is 120 x 160 pixels) x zoom] Lens: F2.8, f = 3.7 mm
Sound:	16-polyphonic ring melodies
External DC supply voltage:	5.2 V
Battery:	3.7 V, 780 mAh, Li-Ion
Standby time:	100 ~ 250 hours
Talk time:	160 ~ 240 min.
Others:	Side key Connector for AC charger and data cable Standard hands free connector (Ø2.5)

Battery running time depends on the battery and SIM card as well as the network conditions and usage.

Specifications for this model are subject to change without prior notice.

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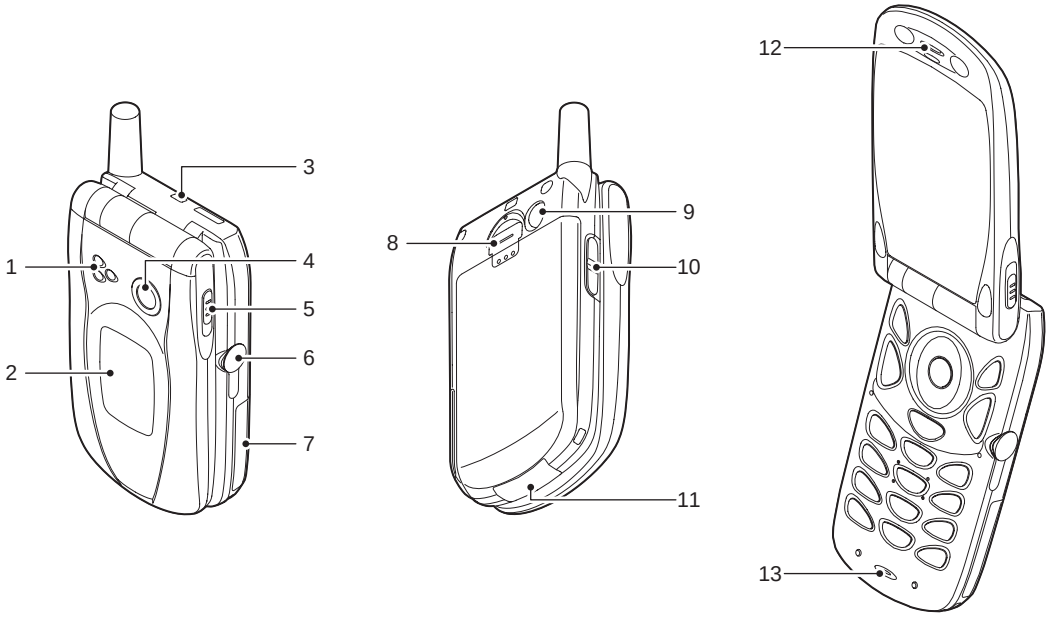
CP8 PATENT

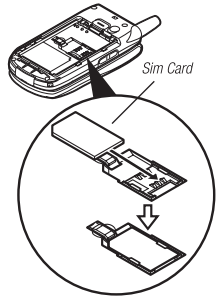
2. NAMES OF PARTS

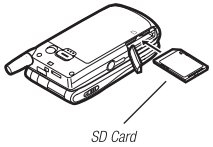


No.	PARTS NAME
1	SPEAKER
2	SUB LCD
3	STRAP
4	CAMERA
5	CLOSE-UP KNOB
6	PHONE JACK
7	SD CARD SLOT
8	BATTERY LOCK KNOB
9	EXT ANTENNA
10	SIDE KEY
11	I/O CONNECTER
12	RECEIVER
13	MIC

THE SHARP TM150 QUICK START GUIDE

In just a few minutes we'll show you how easy it is to use many of the new features of your Sharp TM150. You'll be able to take high-quality digital photos and video clips with its built-in zoom camera, and send them as MMS messages. You'll also find out how to connect to Vodafone live! and the mobile internet to download new polyphonic ringtones, games and background wallpapers!





Getting started

1. Insert your SIM card:
Slide off the back cover, and remove the battery. Slide your Vodafone SIM card (with the gold contacts facing downwards) into its holder, making sure that the cut-out corner is aligned. Replace the battery and cover.

2. Insert the SD memory card:
Open the side SD slot and slide the memory card in.

3. Turn it on:
Make sure the battery is charged (see the User Manual for details). Open the handset, then press and hold the red key. (You do the same to turn it off again.)

1. USING THE HANDSET

[In Standby mode.]

Keys & navigation

Centre key: Selects an item or confirms an action.
[In Standby mode] Takes you to the main Menu (shown in picture).
[In Camera mode] Captures a picture.

Navigation: Use the edge of the centre key to move around icons and item lists.
[In Standby mode] or for Contacts, for Pictures and for Applications.

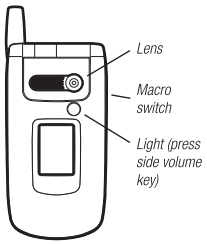
Soft keys: Select the icon or command shown in the bottom left or right of the screen. The key selects icons in the middle.
[In Standby mode] goes to Messages, connects to Vodafone live!

Call key: [When ringing] Answers a call.
[In Standby mode] Goes to Dialled numbers, then , for Missed calls, Received calls.

End key: [During a call] Ends a call.
[Press and hold] Turns handset on and off.
[In menus] Takes you back to Idle mode.

Camera key: [In Standby mode] Turns on the camera.

2. THE CAMERA



The TM150's camera with built-in zoom allows you to take digital photos and video clips. These can then be saved and sent via MMS to another mobile device or sent to a seperate email address.

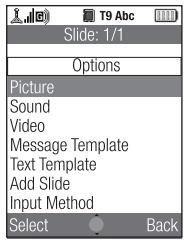
Take a photo or video clip

1. Take a photo:
Press the Camera key in Standby mode to turn on the camera. Press to take the photo. **Tips:** use for brightness, and for zoom. To change photo size or quality, press [Options]. For close-up shots, use the Macro switch.

2. Save your photo:
Press [Cancel] to try again, or press [Save] to save it (in **Menu/My Stuff/Pictures/ Memory Card**). Or press [ ] to save and send it as **Multimedia** (MMS message – see next page). High-quality photos will be automatically compressed for sending.

3. Take a video clip:
Press in Standby mode to go to the main Menu. Press again to select **Camera**, then select **Record Video**. Press [ ] to start, and again to stop. Choose **Save**, **Preview** or **Save and Send** (in an MMS message).

3. MMS (Picture Messaging)



Predictive text (T9)

To turn T9 off and on while entering text, press and hold the key. Use to cycle through the alternative words, then to select the one you want.

Life is more than just text – with MMS you can now send pictures, sounds and video clips as well!

Create a new MMS

1. Write your message:
Select **Messages** in the main Menu (or press the key in Standby mode). Select **Create Message**, then **Multimedia**. Now use the keypad to write your text. **Tips:** to enter punctuation or other characters, press the key and select the symbol you want. For a space, press . Press the key to cycle through capitals, numeric, etc. (shown at the top of the screen).

2. Add a photo or video clip:
Press [Options] and select **Picture** or **Video**. Choose **Memory Card**, and select the photo or video clip you want. Press to attach it, then press again to return to the Create screen. (**Note:** If you're sending a video clip you may not be able to attach anything else.)

3. Add a sound file:
Select [Options]/**Sound**. Follow the same procedure as adding a picture. **Tip:** If no sounds are available, you can go to **Menu/Applications/Voice Recorder** and record a new one.

3. OPERATION MANUAL
(Page numbers refer to the user guide)

[OPTIONAL ACCESSORIES]
• USB data cable
The above accessories may not be available in all regions. For details, please contact your dealer.

[QUICKSTART GUIDE]

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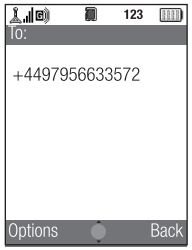


4. Add a new page:
To send more than one picture or sound, choose [Options]/**Add Slide**.

5. Preview your message:
Press [Options], and select **Preview Message**. Then select [Options]/**Done**.

Send your MMS

1. Add a Contact:
Choose [Options]/**Add Contact**. Enter a mobile number (if the receiving phone can't display MMS messages, they'll be sent a link to a web page they can view them on). Press , then choose **Send**. **Tip:** Try sending it to yourself, to see how it works!

2. Other Send options:
To send your MMS to an email address, choose **Add Contact/**[Options]**/Input E-mail address**. Enter the email address (press three times for the @ symbol). Or choose **Contacts list** from the options menu to use details from your Contacts list. Then press , and choose **Send**.

4. VODAFONE *live!*

Vodafone live! is a mobile internet portal which is a new world of information, downloads, games, music and sevices. Your GPRS connection can be 'always on' - which means no waiting for a dial-up connection. You only pay for data you send or get, not how long you're connected.

Connect to vodafone *live!*

Simply press the key (in Standby mode) to connect you to the Vodafone live! main menu. To exit, press the key. Or link directly to Vodafone live! services:

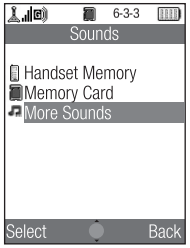
In the main Menu, select the **Vodafone live!** section, and choose your service:
Games: Online fun and games to download...
Ringtones: Download music, sounds and ringtones.
Pictures: Download images, animations and background wallpaper.
News: Get the latest news reports and weather forecasts...
Sport: News, results and latest scores (with pictures).
Find & Seek: Get the local information you need, wherever you are.
Chat: Chat with others on PCs, PDAs and mobiles.
Search: Find what you need in Vodafone live!

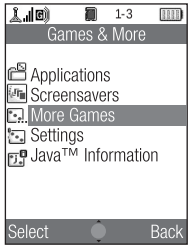
Tip: Vodafone live! is growing and changing all the time, so these options may vary. Keep checking it out to see what's new.

Browsing

Use the navigation keys to highlight the item you want to select, then press to open that page. Press [Back] to go back a page. Press [Options] for the Browser Option menu.

5. DOWNLOADS





*Personalise your new handset by downloading new ringtones, images and background wallpaper from Vodafone live!. You can download from the Vodafone live! portal or the handset shortcuts (see previous page), or use the **More** menus:*

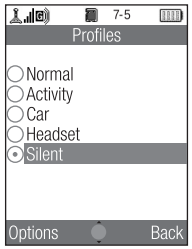
Download more

1. Download a new ringtone, video clip or background wallpaper:
Go main **Menu/My Stuff**, choose **Sounds**, **Videos** or **Pictures** and then **More Sounds**, **More Videos** or **More Pictures**. Choose a ringtone, video clip or wallpaper image and follow the instructions to download it.

To activate your ringtone, go to **Profiles** (in the main Menu), select **Normal**, then choose [Options]/**Personalise/Assign Ringtone/My Sounds**, then select your downloaded ringtone. To set your wallpaper, go to **My Stuff/Pictures**, select your downloaded image and choose [Options]/**Set as wallpaper**.

2. Download new games:
To add more arcade quality games to your handset, go to to **Menu/Games & More/More Games**. Choose a game to download, and you'll find it in **Games & More/Applications**.

6. OTHER FEATURES



Handset hints

1. Silent mode:
To go into Silent mode (if you're in a meeting, say), press and hold the key (in Standby mode) and select the **Silent** profile. Select **Normal** to restore your ring volume.

2. External light:
Press and hold the external Volume key up or down to switch the light on or off, and press again to change the colour. This works in both open and closed handset modes.

3. MP3 player:
Transfer MP3 files onto your SD card. Go to **Menu/Applications/MP3 Player/Memory Card**, and choose the files you wish to play. (See the User Guide for more details.).

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CHAPTER 2. ADJUSTMENTS, PERFORMANCE CHECK, AND FIRMWARE UPGRADE

SPST (SHARP Program Support Tool) allows you to adjust settings, conduct performance checks, and upgrade the firmware.

[1] SHARP PROGRAM SUPPORT TOOL (SPST)

1. SYSTEM REQUIREMENTS

- IBM PC compatible personal computer (standard COM1 115,200 bps serial port and USB required)
  Supported OS: Windows 98/98SE/2000/XP
  (except for Windows 95/ME/NT)
  (English, German, Italian, Spanish, French and Chinese versions)
- Data cable

<During RF adjustment>

- GSM tester: CMU200
- GPIB interface: National Instruments USB-GPIB cable
  (Model No.: NI GPIB-USB-B)

2. INTRODUCTION

2-1. FUNCTIONS

SPST offers seven key functions:

1) Firmware download
2) User data transfer (processes all data at once but not individually.)
3) RF calibration check and test
4) Default setting
5) Identification
6) Performance check and adjustment
7) User password reset

2-2. INSTALLATION

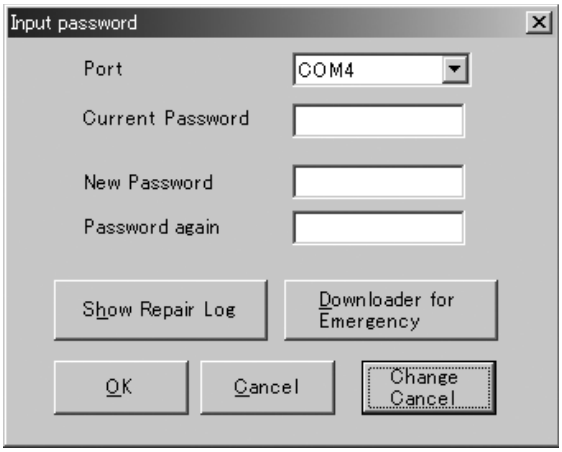
1. Use Windows Explorer to execute the "setup.exe" file on the CD-ROM.
2. The SPST TM150 setup wizard appears. Follow the installation instructions.
3. After the installation is complete, shortcuts to SPST are created on the desktop and under the "Start"-"Programs"-"TM150" menu. Start SPST from the shortcuts.

2-3. STARTING UP

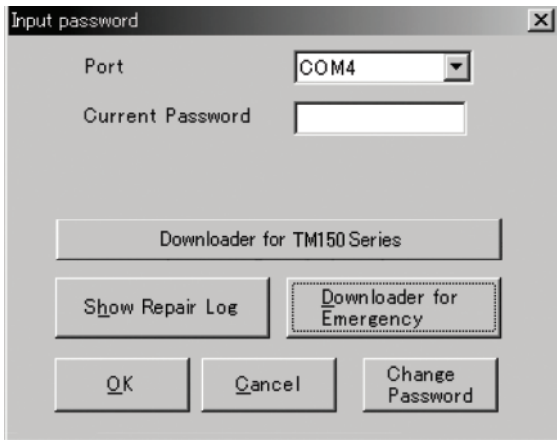
Connect TM150 to an operable serial port of the PC with the supplied data cable. Make sure that the battery is fully charged.
Start SPST from the desktop.

1. The Input password dialog box appears. Enter the password, select a port where TM150 is connected from the list box, and click "OK". If you do not know SPC, click “Cancel” to exit.

2. To change the password, enter the current password in procedure 1, and then click "Change Password".

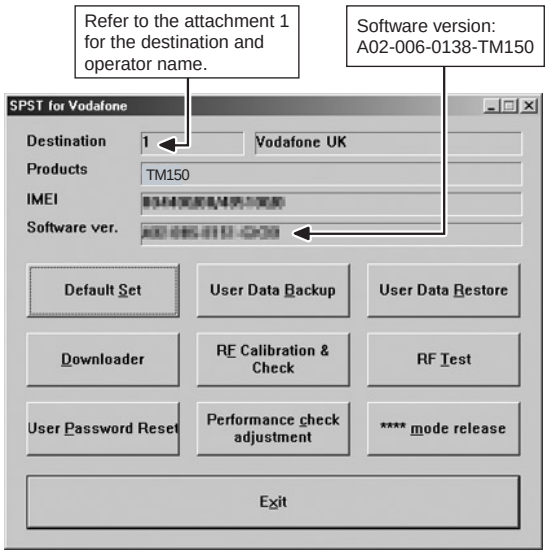


3. To check the usage status of tools, click "Show Repair Log" in procedure 1.
4. Click “Downloader for Emergency”.



The above screen appears. Select a model to use and execute the Downloader. (Use this to initialize the flash, etc.)

5. When the password is correct, a connection is established and the following screen appears.



■ Buttons

Default Set	Refer to "4-1. Default setting".
User Data Back-up	Refer to "4-2. User data back-up".
User Data Restore	Refer to "4-3. User data restore".
Downloader	Refer to "4-4. Downloader".
RF Calibration & Check	Refer to "4-5. RF calibration & check".
RF Test	Refer to "4-6. RF test tool".
User Password Reset	Refer to "4-7. Password reset".
Performance check adjustment	Refer to "4-8. Performance check and adjustment".
**** mode release	Refer to "4-9. ****mode release".
Exit	End SPST.

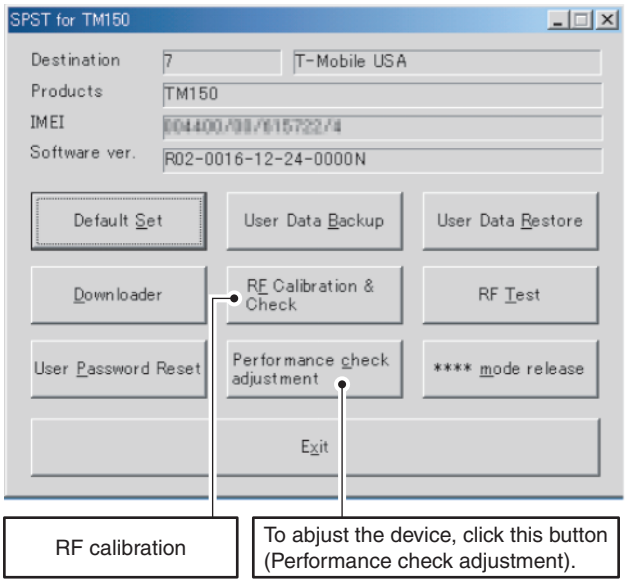
3. ADJUSTMENTS FOR TM150

1. Adjustments are required after replacing the following parts. (○)

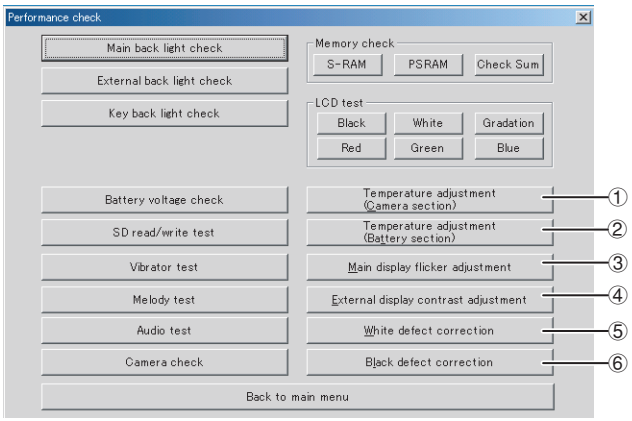
Parts	Temperature adjustment (Camera)	Temperature adjustment (Battery)	Main display flicker adjustment	White defect correction
TH101	×	○	×	×
TH701	○	×	×	×
Main display unit	×	×	○	×
Camera unit	×	×	×	○

When replacing other parts in the RF section, carry out RF calibration.

2. Click the buttons on the SPST screen for adjustments.



3. The following screen appears.



① Temperature adjustment (Camera section)
② Temperature adjustment (Battery section)
③ Main display flicker adjustment
④ External display contrast adjustment
⑤ White defect correction
⑥ Black defect correction

4. FUNCTIONS

4-1. DEFAULT SETTING

SPST can restore the factory settings.

This function

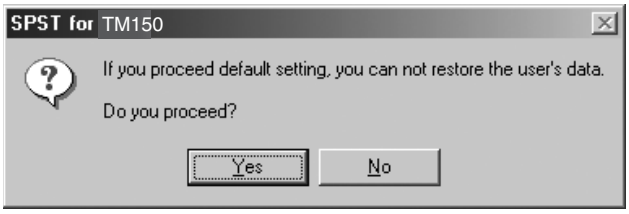
1. Deletes all user data in the file system;
2. Restores all WAP settings to default; and
3. Restores the values set by the user to default;

(MEP_LOCK settings and the destination and operator name do not change.)

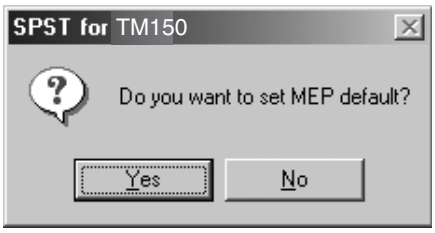
<Operation>

1) Set the COM port on the SPST initial screen and click "Default Set".

2) Click "Yes" to proceed. Click "No" to exit.

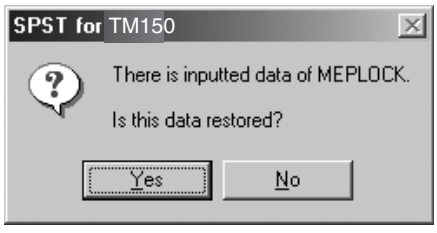


3) Click "Yes" to back-up the MEPLOCK data. Click "No" to restore default settings.

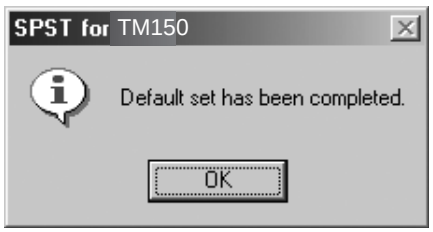


4) Communication starts.

5) The following appears when you select "Yes" in step 3 and MEPLOCK data exists. Click "Yes" to restore the data.



6) After the handset is turned on, the initialization is complete.

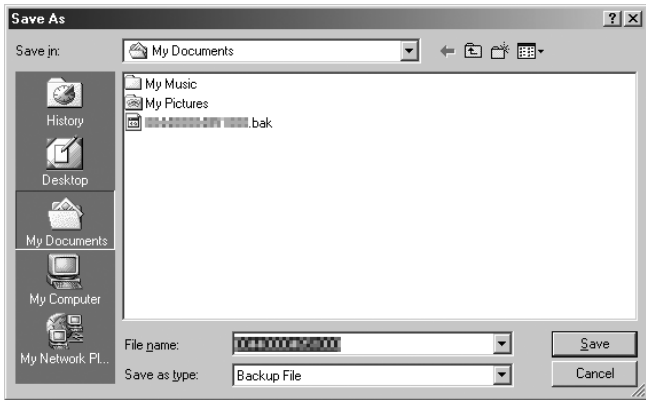


4-2. USER DATA BACK-UP

SPST saves all the data stored on the handset.

1. Set the COM port on the SPST initial screen and click "User Data Back-up".

2. Specify the file name in the following dialog box and click "Save"



3. The communicating dialog box appears while processing.

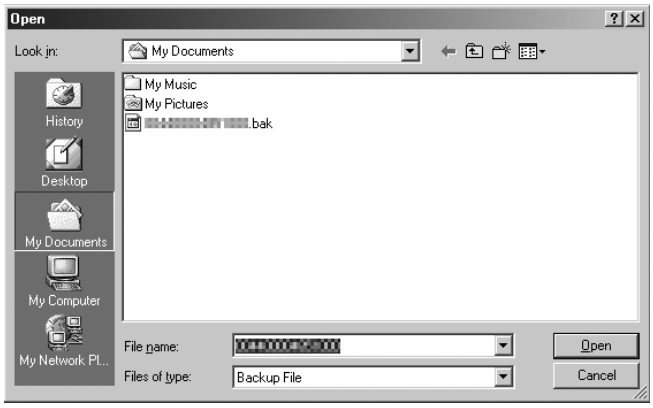
4. When completed, the following message appears. Click "OK".

4-3. USER DATA RESTORE

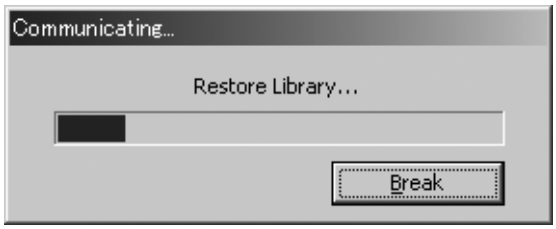
SPST completely restores the backed up data.

1. Set the COM port on the SPST initial screen and click "User Data Restore".

2. Specify the file name in the following dialog box and click "Save".



3. The communicating dialog box appears while processing.



4. When the restore is complete, click "OK".

4-4. DOWNLOADER

4-4-1. Introduction

Downloader allows you to upgrade the firmware.

1) System requirements

• Requirements for the upgrading tool:

OS	: Windows 98, 98 SE, 2000, or XP
Download file	: Only the Motorola format is supported.
Communication method	: Asynchronous mode
Data length	: 8 bits
Parity bit	: None
Stop bit length	: 1 bit

• Requirements for Loading loader

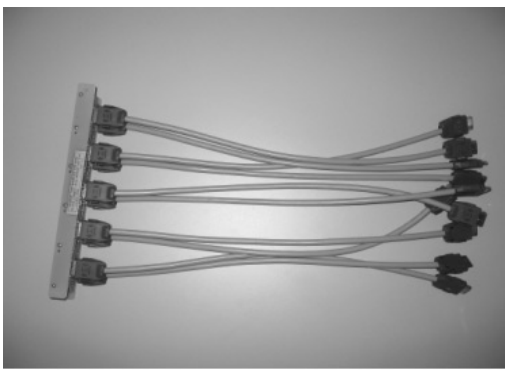
Handset	: TM150
Communication method	: Asynchronous mode
Data length	: 8 bits
Parity bit	: None
Stop bit length	: 1 bit

2) Required devices

The following devices are required to rewrite MOT files using Communication Box.

Conversion connector (16-pin → 10-pin)

This conversion connector is required to connect TM150 with Communication Box since the cable connector of Communication Box has 16 pins.



4-4-2. Getting started

This section describes how to install/uninstall the software and how to connect handset to a PC.

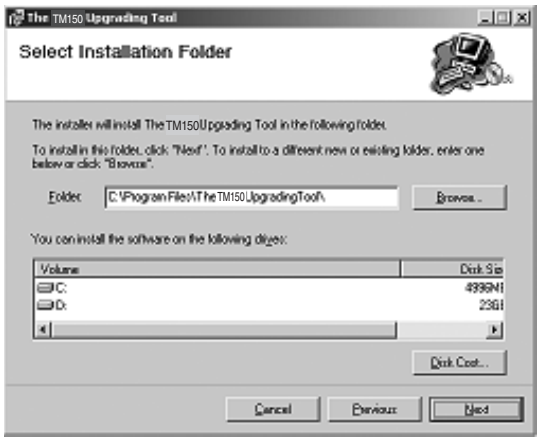
1) Installing/uninstalling the software

[Connecting handset to a PC]

1. Double click the “setup.exe” icon in TM150 Install-E folder.

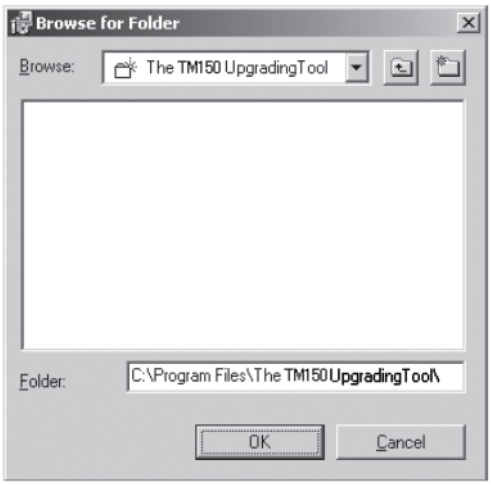
2. The Setup Wizard is activated.
   Click the "Next" button.

3. A location to install the software appears.
   To install in the default location, click the "Next" button.
   To change the location, click the "Browse" button, select a desired location and then click the "Next" button.
   (See the description in "*** Changing the install location**" below.)

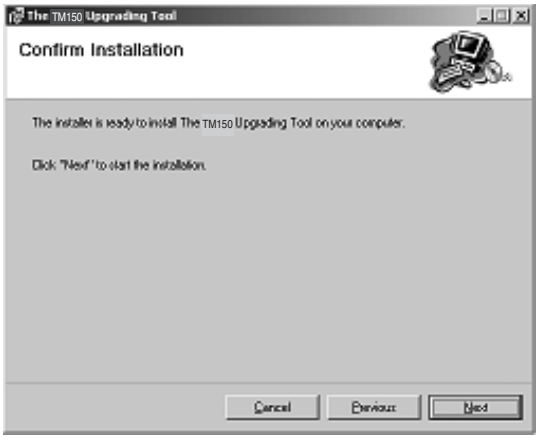


*** Changing the install location**

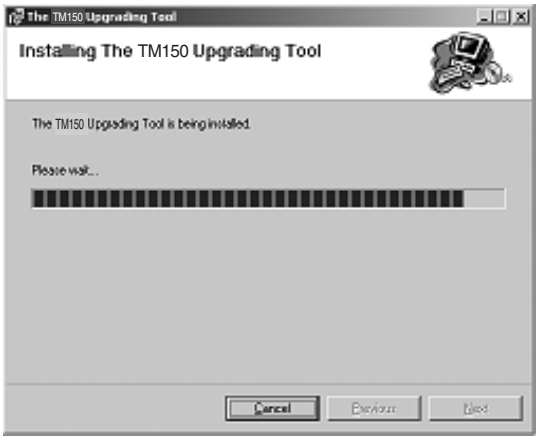
Click the "Browse" button in step 3 to browse folders.
Click the "▼" button, select a folder and click the "OK" button.



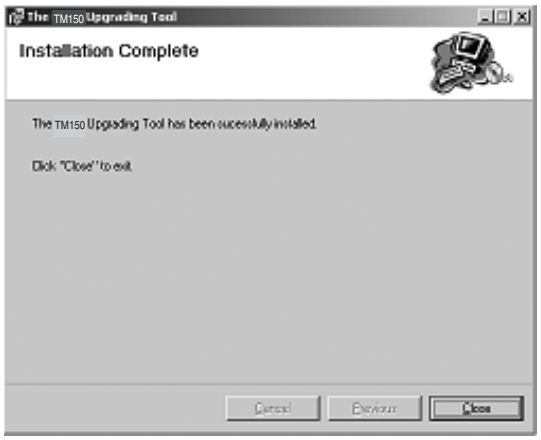
4. A confirmation message appears.
   Click the "Next" button.



5. Installtion starts. The progress is displayed.



6. The installation is completed.
   Click the "Close" button to close the Setup Wizard.



7. The shortcut icon shown left is created on your desktop when the installation is completed.

Note:

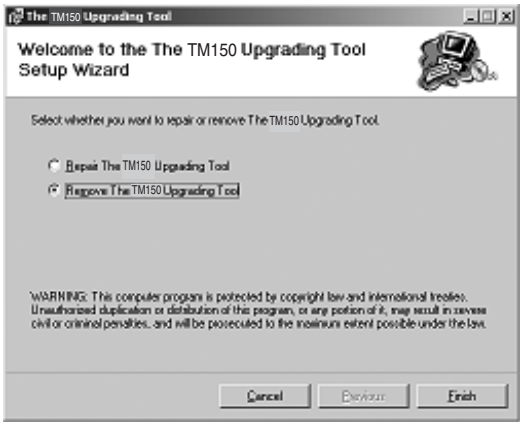
- After installing the upgrading tool in Windows 98 or 98 SE, restart the operating system.
  While installing the upgrading tool in Windows 98, 98 SE, or ME, a message may appear prompting to restart the operating system. In this case, restart your operating system follwoing the instruction. Even if the message does not appear, restart your operating system after the installation.
  On Windows 98, if you start the upgrading tool without restarting the operation system, the following message may appear. Restart the operating system to ensure the proper operation of the upgrading tool.

- Uninstall the upgrading tool before installing the latest version or reinstalling the current version.
  Otherwise, the upgrading tool may not function properly.
  To ensure the proper operation, uninstall and then reinstall the upgrading tool.

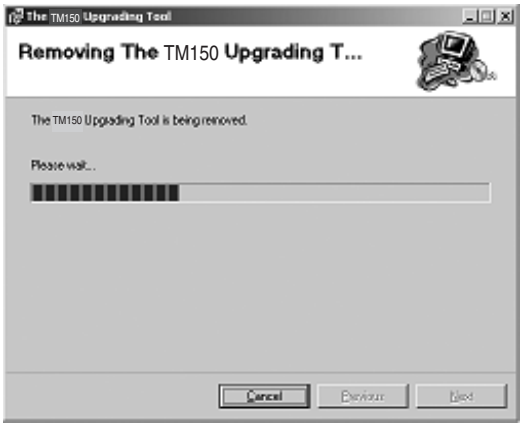
[Uninstalling the software]

1. Double click "setup.exe" in TM150 Install-E folder.

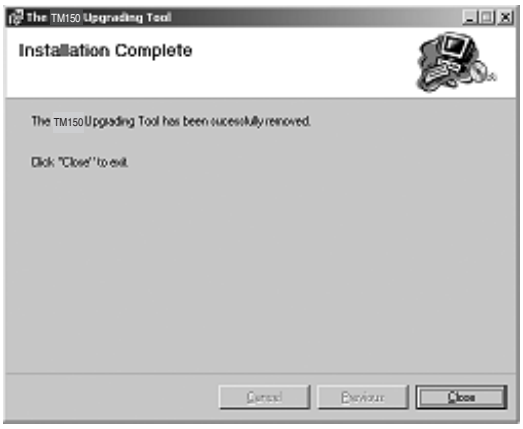
2. The Setup Wizard is activated. Select "Remove The TM150 Upgrading Tool" and click the "Finish" button.



3. Uninstalltion starts. The progress is displayed.



4. The uninstallation is completed. Click the "Close" button to close the Setup Wizard.



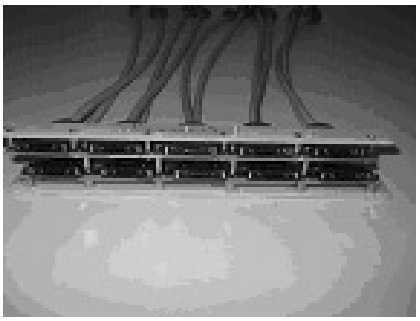
2) Connecting handset to a PC

A) Using a cable for upgrading

1. Connect the cable to a PC.
2. Connect the cable to handset.
3. The photo below shows handset connected to a PC.

B) Using Communication Box

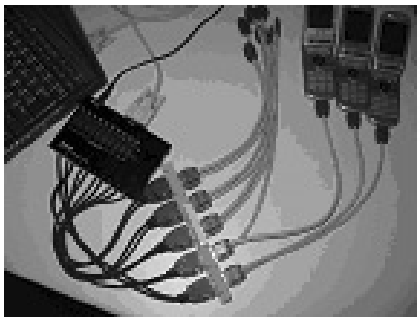
1. Connect a PC to Communication Box via a serial cable.
2. Connect the AC charger to Communication Box and then plug it into the outlet.
   All SET POWER SW on Communication Box must be turned off.
3. Connect the conversion connector to Communication Box Cables.
   Connect the conversion connector in the following order, label side up.
   From upper right end: Cable No. 1, 3, 5, 7, and 9.
   From lower right end: Cable No. 2, 4, 6, 8, and 10.



4. The photo below shows the conversion connector connected to Communication Box Cable 1.

5. Connect the other end of the conversion connector to handset.

6. The photo below shows handset, Communication Box and a PC (all connected).
   Make sure handset and Communication Box Cable 1 are connected via the conversion connector.



Note:

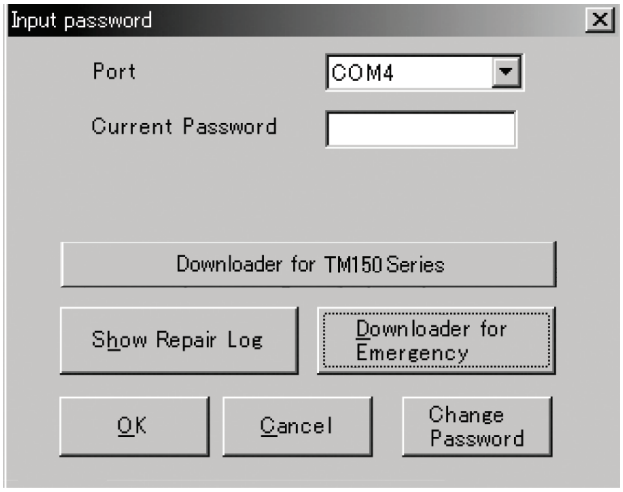
- **Handset must be turned off before making any connections.**
  Press and hold the Power key to turn off handset.
  Do not turn off in other ways. Malfunction may occur and the MOT file rewrite operation may fail.
- **Make sure the handset battery is sufficiently charged.**
  If the battery is low, the MOT file rewrite operation may fail.
  Charge the battery before the operation.
- **Disconnect the AC charger from a cable for upgrading.**
  When rewriting MOT files using the upgrading tool, do not connect the AC charger to the cable.
  If you connect the cable connected to the AC charger to handset, charging starts and the MOT file rewrite operation is interrupted.
- **All SET POWER SW on Communication Box must be turned off.**
  If handset is connected with SET POWER SW turned on, charging starts and the MOT file rewrite operation is interrupted.
- **Make sure handset and Communication Box Cable 1 are connected via the conversion connector.**
  (When using Communication Box, the only handset connected to Cable 1 can be operated on the PC.)

4-4-3. Rewriting MOT files

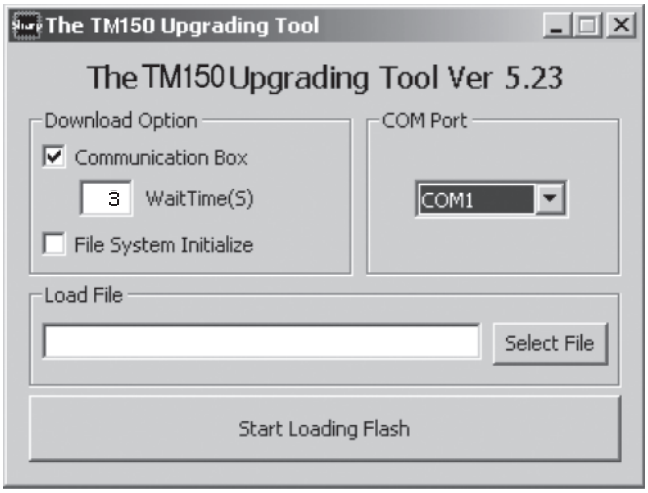
This section describes how to rewrite MOT files.

1) Downloader for Emergency

1. Click “Downloader for Emergency“.



2. The upgrading tool is activated.



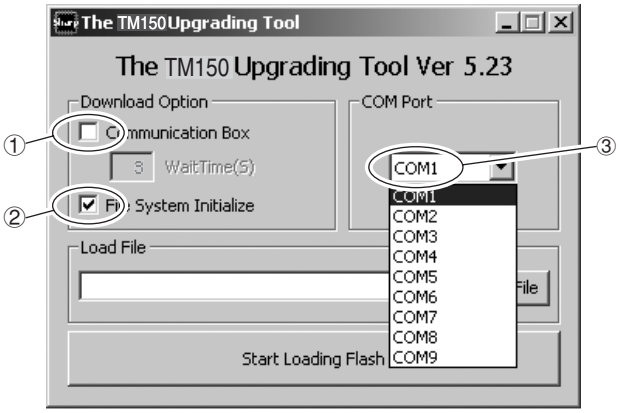
Note: Disable the power saving mode before rewriting MOT files.
If the power saving mode is active, the rewrite operation may fail depending on the PC.

2) Selecting options and COM port

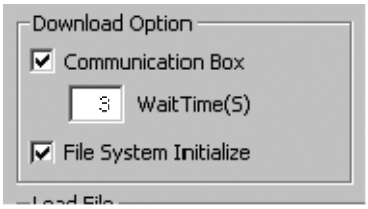
① Uncheck the check box when using a cable for upgrading. Leave it checked when using Communication Box.

② To initialize user area, check the File System Initialize check box. (User data will be deleted and the handset status will return to the default.)

③ Click here and in the pull-down list, select a communications port where the cable or Communication Box is connected.



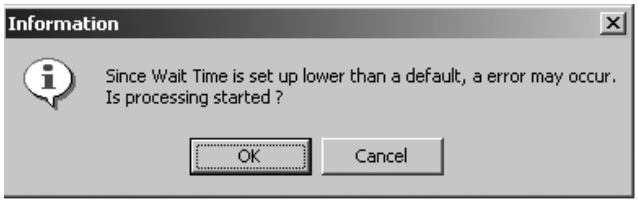
When using Communication Box, set Wait Time.
Check the Communication Box check box to adjust Wait Time (default: 3 seconds). The time to delete the program data varies between handsets. Handsets wait for the set Wait Time until the whole process is completed. If an error occurs, increase the value.



[Notes for the Wait Time setting]

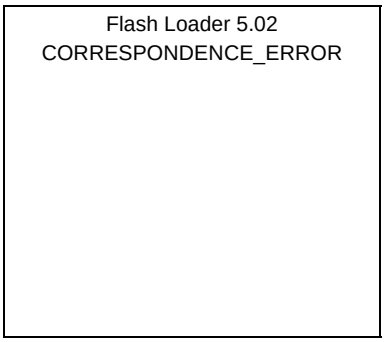
When the set value is smaller than the default (3), the message on the left appears alerting you a possible error.

Click the [OK] button to proceed, and click the [Cancel] button to change the value.

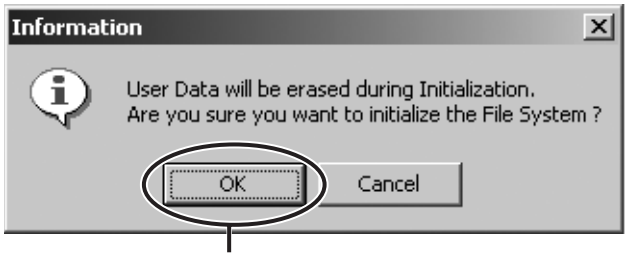


You can shorten time for the MOT rewrite operation by selecting a smaller value for Wait Time.
Example: Time to rewrite two MOT files at a time.
At the default setting (3 seconds), rewrite time is approximately 40 minutes.
If the value is set to 1, the rewrite time will be reduced to approximately 30 minutes.
If an error occurs at 1, increase the value.
The error screen will appear on handsets No. 2 to No.10.
If this screen appears, increase Wait Time and retry.

Error screen



When the File System Initialize check box is checked, a confirmation message appears.

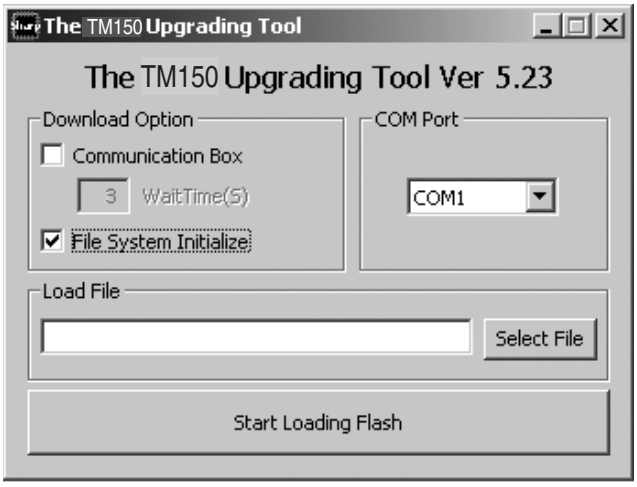


Click the [OK] button.

Note: When you check File System Initialize check box and click the [OK] button, handset status returns to the default.
In this case, user data is initialized after the MOT file rewrite operation. Uncheck the check box to avoid this.

3) Selecting a MOT file

1. Click the [Select File] button.
   The Open dialog box appears.

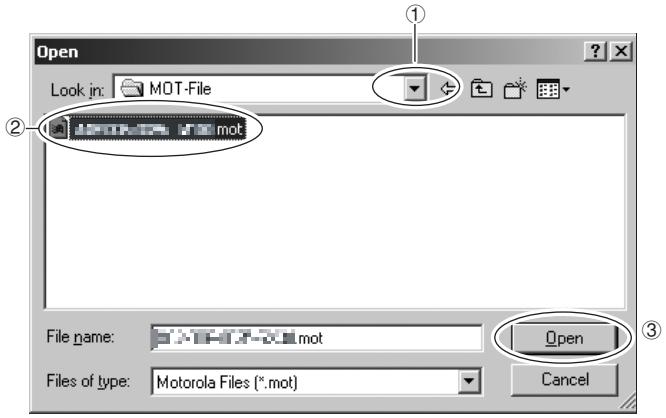


[Open dialog box]

① Click the [▼] button to open a desired folder.

② A Motorola file (.mot) in the folder appears. Click a file to write in.

③ Click the [Open] button to open the file.



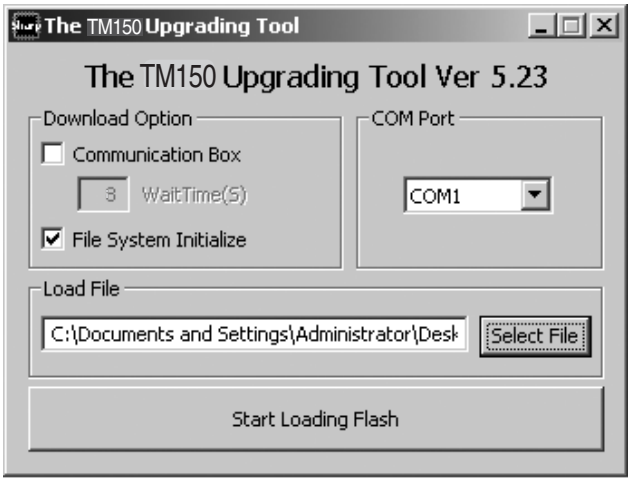
Note:

- **Make sure to select a MOT file.**
  If the File name field is blank, you cannot rewrite a MOT file.
- **Use MOT files in the hard disk.**
  If the selected MOT file is stored in other locations, an error message appears and you cannot complete the rewrite operation.

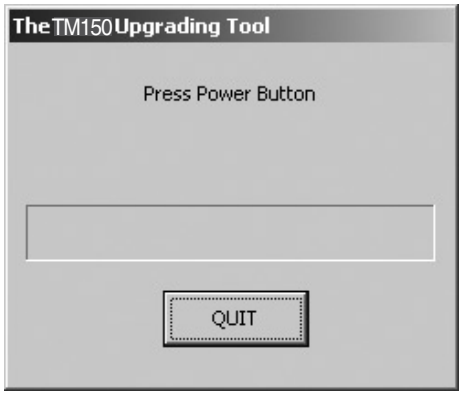
To use MOT files on CDs or on the network, copy or download them to the hard disk first.

4) Rewriting a MOT file

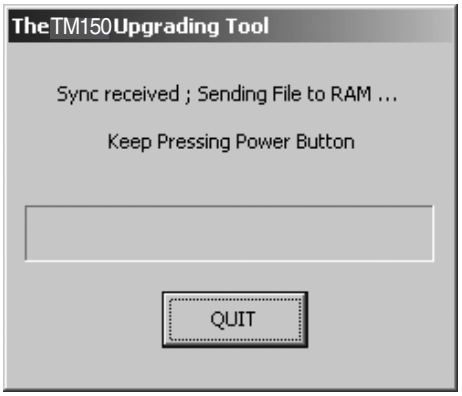
Click the [Start Loading Flash] button to start rewriting.



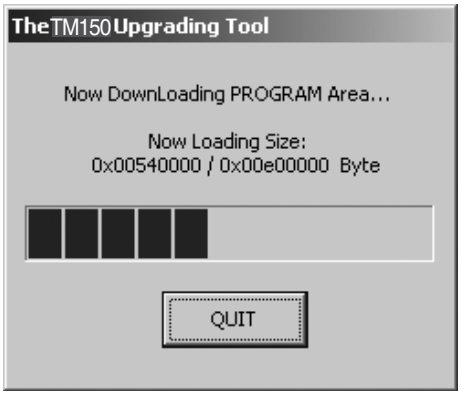
1. "Press Power Button" appears.
   <When using a cable for upgrading>
   Hold down the Power key.
   <When using the Communication Box>
   Turn on Communication Box SW from No.10 down to No.1 (turn on only the handsets you are using).



2. "Keep Pressing Power Button" appears.
   <When using a cable for upgrading>
   Hold down the Power key until the "Keep Pressing Power Button" disappears.
   <When using the Communication Box>
   Leave the Communication Box SW turned on.



3. The MOT file rewrite operation starts.
   <When using a cable for upgrading>
   When "Keep Pressing Power Button" disappears, release the Power key.
   <When using the Communication Box>
   Leave the Communication Box SW turned on.



4. When the rewrite operation starts, handset display screen shows the software version and process of communications with the PC.

Flash Loader 5.02 XXXXXXXCommand

Canceling the ongoing rewrite operation:
Click the [QUIT] button.
To rewrite MOT files later, remove and install the battery first.

[Notes for the use of a cable for upgrading]

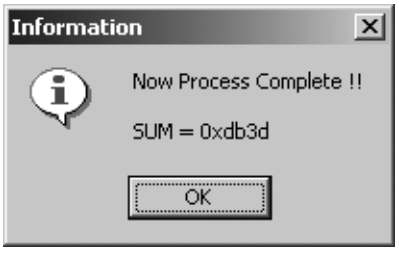
1. Disconnect the AC charger from the cable. Otherwise charging starts and the MOT file rewrite operation is interrupted.
2. Make sure the handset battery is sufficiently charged.
   If the battery is low, the rewrite operation may fail. Charge the battery before the operation.
3. If the ongoing rewrite operation is canceled, or interrupted by an error, remove and reinstall the battery and retry.

[Notes for the use of the Communication Box]

1. When "Press Power Button!" appears, turn on Communication Box SW from No.10 down to No.1. If the communication BoxSW No.1 is first turned on, the rewrite on communication BoxSW No. 2 to No. 10 operation will fail.
2. The time to delete the program data varies between handsets. If the process fails at the default Wait Time (3 seconds), increase the value.
   Consequently, this will increase the time to complete the rewrite operation.

5) Checking the value of SUM

When the rewrite operation is completed, a confirmation message appears with SUM.



SUM also appears on handset.
<When using a cable for upgrading>
After 8 seconds, SUM disappears.
<When using Communication Box>
When SET POWER SW is turned off, SUM disappears.

Flash Loader 5.02 SUM Check End SUM = 0xdb3d

Make sure SUM is the same between the PC and handset.

The same SUM means that the rewrite operation is completed properly. If the value is different, try again to ensure completion of the operation.

If the MOT file rewrite operation fails, an error message appears on handset.

∗The screen shot on the left shows an error in erasing Flash data.
[ADR] and [STR] appear only when an error occurs in the FLASH-related operation.
Start over the MOT file rewrite operation.
<When other error messages appear>
Find the message in 4-4-4. 2)Error messages for Loading loader, and follow the instructions.

Error screen

Flash Loader 5.02 FLASH_ERROR ERROR_ERASE ADR = 0x1000000 STR = 0xA0

6) After the operation

Disconnect the cable for upgrading from handset.
When using the Communication Box, turn off SET POWER SW and then disconnect the cable from handset.

7) Initializing only the file system

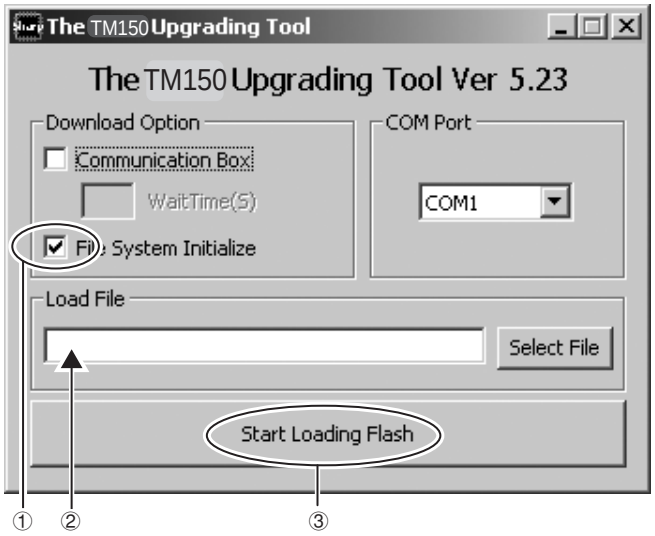
Follow the instructions below to initialize only the file system.
(User data will be deleted and the handset status will return to the default.)

∗Perform this procedure when the handset does not turn on.

① Check the File System Initialize check box.

② Leave the Load File text box blank.

③ Click the [Start Loading Flash] button.



For further operations, refer to [4-4-3. 4) Rewriting a MOT file] or [4-4-3. 5) Checking the value of SUM].

4-4-4. Error message list

Below is the list of error messages for the upgrading tool (on the PC side) and Loading loader (on the handset side).

1) Error messages for the upgrading tool (on the PC side)

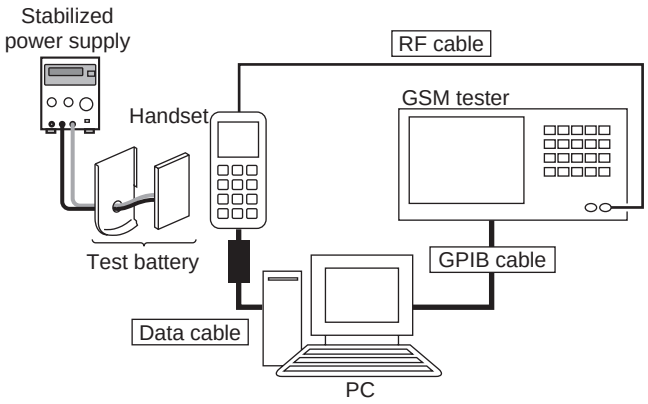
No.	Message	Descriptions/Instructions
1	Select a file for Downloading or check the box of Initializing.	Load File is not set. Select a MOT file.
2	Unable to open file.	Failed to open the MOT file. Start over the rewrite operation.
3	You need to set the Wait Time!	WaitTime (S) is not set. Set WaitTime (S) value.
4	The file you selected is unsuitable for Upgrading.	The selected file cannot be rewritten for upgrading. Select an appropriate MOT file.
5	Cannot Setup COM port.	The selected COM port does not exist or is used for other operations. Select a COM port connected to the PC cable.
6	RAM Loader not responding to Commands.	No response from Loading loader. Start over the rewrite operation.
7	RAM Loader responding Parameter Error.	Information sent from the PC is illegal. Reinstall the upgrading tool. Start over the rewrite operation.
8	RAM Loader responding Flash Error (XXXX).	Failed to initialize FLASH ROM in (XXXX). Start over the rewrite operation.
9	Correspondence Error.	Undefined response from Loading loader. Start over the rewrite operation.

2) Error messages for Loading loader (on the handset side)

No.	Message	Descriptions/Instructions
1	FLASH_ERROR	An error in Flash Rom. Start over the rewrite operation.
2	ERROR_PARAM	The upgrading tool is damaged. Uninstall and reinstall the upgrading tool, and start over the rewrite operation.
3	ERROR_WPROTECT	Flash Rom is protected. Battery may be too low. Use a sufficiently charged battery and start over the rewrite operation.
4	ERROR_READ	Failed to read Flash Rom data and the operation was aborted. Start over the rewrite operation.
5	ERROR_WRITE	Failed to write to Flash Rom and the operation was aborted. Start over the rewrite operation.
6	ERROR_ERASE	Failed to erase Flash Rom data and the operation was aborted. Start over the rewrite operation.
7	ERROR_VERIFY	The rewrite operation was aborted since there was a mismatch between data written to Flash Rom and that written to handset. Start over the rewrite operation.
8	ERROR_RWE_TMOUT	Communication was terminated since there was no response from Flash Rom for a certain period of time. Start over the rewrite operation.
9	CORRESPONDENCE _ERROR	Communication was terminated since serial data communication failed. Start over the rewrite operation.
10	ADR = XXXXXXXX	Indicates the address of Flash (the error source).
11	STR = XX	Indicates the status of Flash (the error source).

∗When No.1 occurs, handset screen shows error messages for No.2 to No.8 as well as the address (No.10) and status (No.11) of the error source at the same time.

4-5. RF CALIBRATION & CHECK

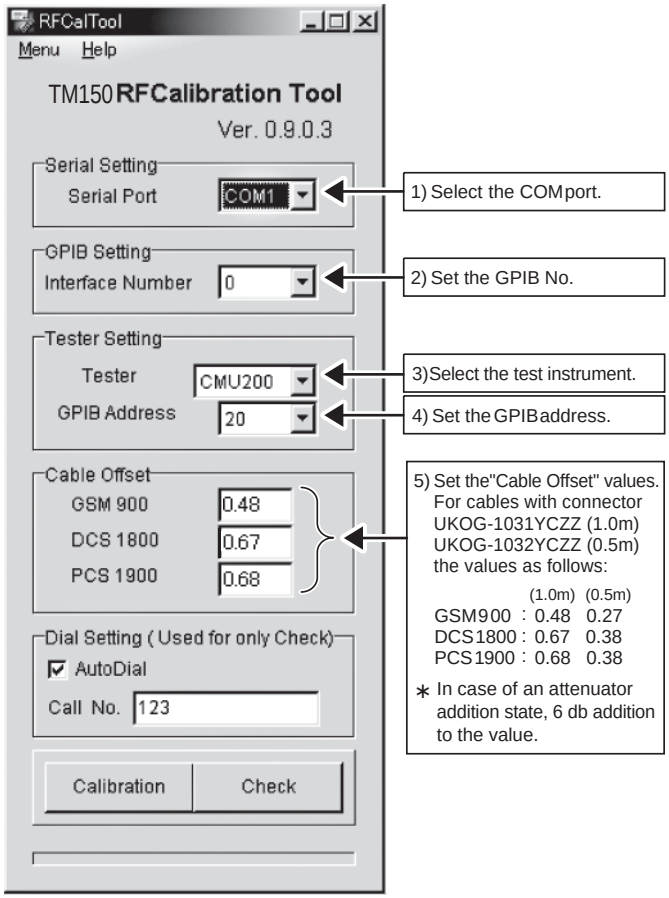


4-5-1. Preparation

- Connect PC and GSM tester with a GPIB cable.
- Connect PC and handset with a Data cable. (Use a test battery or one close.)
- Connect a RF cable of GSM tester to handset.

4-5-2. Default setting for the program.

• Activate the program and set defaults.



4-5-3. RF calibration (Remove SIM card)

1. Apply 4 V using a stabilized power supply and turn on the handset.
2. Start "RF calibration & check" on SPST and click "Calibration".
3. When initialization is complete, click "OK".

4. Apply 4 V using a stabilized power supply and turn on the handset. After the handset enters Standby mode, lower the voltage to 3.7 V.

5. Make sure the handset is on and click "OK". (Adjustment starts.)

6. Click "OK".

7. The initial screen returns.

4-5-4. RF performance check (Insert SIM card)

1. Apply 4 V using a stabilized power supply and turn on the handset.
2. Start "RF calibration & check" on SPST and click "Calibration".
3. When initialization is complete, click "OK".

4. Apply 4 V using a stabilized power supply and turn on the handset. After the handset enters Standby mode, lower the voltage to 3.7 V.

5.Make sure the handset is in the idle mode and click "OK"..

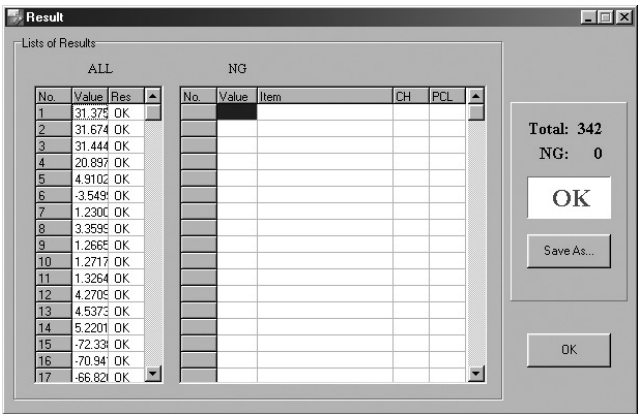
6. Press the keys 1, 2, 3 and Send and click "OK".

7. Make sure the terminal display is "In Call" and click "OK".
(RF performance check starts.)

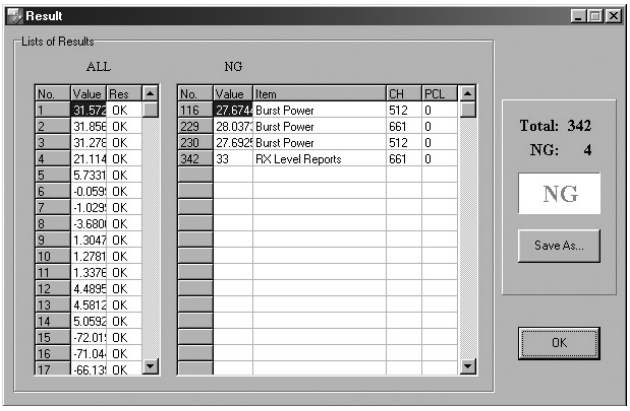
8. The following message appears during the check. Press the keys 1, 2, 3 and Send again and click "OK".

9. Make sure the terminal display is "In Call" and click "OK".

10. RF performance check is complete. Click "Save As..." and name the file to save the result. Click "OK" to exit.



The following will be displayed in case of failure.
See the attachment 2 for troubleshooting.



11. Click "OK".

12. The initial screen returns.

Attachment 2

Whole inspection list by RF performance check.

Band	Sending/ Receive	No.	Item to be inspected	Channel	PCL
GSM900	Tx	1	Burst Power	37CH	PCL5
		2	Burst Power	975CH	PCL5
		3	Burst Power	124CH	PCL5
		4	Burst Power	37CH	PCL11
		5	Burst Power	37CH	PCL19
		6	Frequency Error	37CH	PCL5
		7	Frequency Error	975CH	PCL5
		8	Frequency Error	124CH	PCL5
		9	Phase Error (RMS)	37CH	PCL5
		10	Phase Error (RMS)	975CH	PCL5
		11	Phase Error (RMS)	124CH	PCL5
		12	Phase Error (Peak)	37CH	PCL5
		13	Phase Error (Peak)	975CH	PCL5
		14	Phase Error (Peak)	124CH	PCL5
		15	Mod_spectrum -800	37CH	PCL5
		16	Mod_spectrum -600	37CH	PCL5
		17	Mod_spectrum -400	37CH	PCL5
		18	Mod_spectrum -250	37CH	PCL5
		19	Mod_spectrum -200	37CH	PCL5
		20	Mod_spectrum +200	37CH	PCL5
		21	Mod_spectrum +250	37CH	PCL5
		22	Mod_spectrum +400	37CH	PCL5
		23	Mod_spectrum +600	37CH	PCL5
		24	Mod_spectrum +800	37CH	PCL5
		25	Mod_spectrum -800	975CH	PCL5
		26	Mod_spectrum -600	975CH	PCL5
		27	Mod_spectrum -400	975CH	PCL5
		28	Mod_spectrum -250	975CH	PCL5
		29	Mod_spectrum -200	975CH	PCL5
		30	Mod_spectrum +200	975CH	PCL5
		31	Mod_spectrum +250	975CH	PCL5
		32	Mod_spectrum +400	975CH	PCL5
		33	Mod_spectrum +600	975CH	PCL5
		34	Mod_spectrum +800	975CH	PCL5
		35	Mod_spectrum -800	124CH	PCL5
		36	Mod_spectrum -600	124CH	PCL5
		37	Mod_spectrum -400	124CH	PCL5
		38	Mod_spectrum -250	124CH	PCL5
		39	Mod_spectrum -200	124CH	PCL5
		40	Mod_spectrum +200	124CH	PCL5
		41	Mod_spectrum +250	124CH	PCL5
		42	Mod_spectrum +400	124CH	PCL5
		43	Mod_spectrum +600	124CH	PCL5
		44	Mod_spectrum +800	124CH	PCL5
		45	Mod_spectrum -800	37CH	PCL11
		46	Mod_spectrum -600	37CH	PCL11
		47	Mod_spectrum -400	37CH	PCL11
		48	Mod_spectrum -250	37CH	PCL11
		49	Mod_spectrum -200	37CH	PCL11
		50	Mod_spectrum +200	37CH	PCL11
		51	Mod_spectrum +250	37CH	PCL11
		52	Mod_spectrum +400	37CH	PCL11
		53	Mod_spectrum +600	37CH	PCL11
		54	Mod_spectrum +800	37CH	PCL11
		55	Mod_spectrum -800	37CH	PCL19
		56	Mod_spectrum -600	37CH	PCL19
		57	Mod_spectrum -400	37CH	PCL19
		58	Mod_spectrum -250	37CH	PCL19
		59	Mod_spectrum -200	37CH	PCL19
		60	Mod_spectrum +200	37CH	PCL19
		61	Mod_spectrum +250	37CH	PCL19
		62	Mod_spectrum +400	37CH	PCL19
		63	Mod_spectrum +600	37CH	PCL19
		64	Mod_spectrum +800	37CH	PCL19
		65	Switch_Spectrum -1800	37CH	PCL5
		66	Switch_Spectrum -1200	37CH	PCL5
		67	Switch_Spectrum -600	37CH	PCL5
		68	Switch_Spectrum -400	37CH	PCL5
		69	Switch_Spectrum +400	37CH	PCL5
		70	Switch_Spectrum +600	37CH	PCL5
		71	Switch_Spectrum +1200	37CH	PCL5
		72	Switch_Spectrum +1800	37CH	PCL5
		73	Switch_Spectrum -1800	975CH	PCL5
		74	Switch_Spectrum -1200	975CH	PCL5
		75	Switch_Spectrum -600	975CH	PCL5
		76	Switch_Spectrum -400	975CH	PCL5
		77	Switch_Spectrum +400	975CH	PCL5
		78	Switch_Spectrum +600	975CH	PCL5
		79	Switch_Spectrum +1200	975CH	PCL5
		80	Switch_Spectrum +1800	975CH	PCL5
		81	Switch_Spectrum -1800	124CH	PCL5
		82	Switch_Spectrum -1200	124CH	PCL5
		83	Switch_Spectrum -600	124CH	PCL5
		84	Switch_Spectrum -400	124CH	PCL5
		85	Switch_Spectrum +400	124CH	PCL5
		86	Switch_Spectrum +600	124CH	PCL5
		87	Switch_Spectrum +1200	124CH	PCL5
		88	Switch_Spectrum +1800	124CH	PCL5
		89	Switch_Spectrum -1800	37CH	PCL11
		90	Switch_Spectrum -1200	37CH	PCL11
		91	Switch_Spectrum -600	37CH	PCL11
		92	Switch_Spectrum -400	37CH	PCL11

Band	Sending/ Receive	No.	Item to be inspected	Channel	PCL
GSM900	Tx	93	Switch_Spectrum +400	37CH	PCL11
		94	Switch_Spectrum +600	37CH	PCL11
		95	Switch_Spectrum +1200	37CH	PCL11
		96	Switch_Spectrum +1800	37CH	PCL11
		97	Switch_Spectrum -1800	37CH	PCL19
		98	Switch_Spectrum -1200	37CH	PCL19
		99	Switch_Spectrum -600	37CH	PCL19
		100	Switch_Spectrum -400	37CH	PCL19
		101	Switch_Spectrum +400	37CH	PCL19
		102	Switch_Spectrum +600	37CH	PCL19
		103	Switch_Spectrum +1200	37CH	PCL19
		104	Switch_Spectrum +1800	37CH	PCL19
		105	Burst Timing	37CH	PCL5
		106	Burst Timing	975CH	PCL5
		107	Burst Timing	124CH	PCL5
		108	Burst Timing	37CH	PCL11
		109	Burst Timing	37CH	PCL19
	Rx	110	Rx Sensitivity	37CH	PCL5
		111	Rx Sensitivity	975CH	PCL5
		112	Rx Sensitivity	124CH	PCL5
		113	Usable Receiver Level	37CH	PCL5
		114	Rx Level Reports	37CH	PCL5
DCS	Tx	115	Burst Power	699CH	PCL0
		116	Burst Power	512CH	PCL0
		117	Burst Power	855CH	PCL0
		118	Burst Power	699CH	PCL5
		119	Burst Power	699CH	PCL15
		120	Frequency Error	699CH	PCL0
		121	Frequency Error	512CH	PCL0
		122	Frequency Error	885CH	PCL0
		123	Phase Error (RMS)	699CH	PCL0
		124	Phase Error (RMS)	512CH	PCL0
		125	Phase Error (RMS)	885CH	PCL0
		126	Phase Error (Peak)	699CH	PCL0
		127	Phase Error (Peak)	512CH	PCL0
		128	Phase Error (Peak)	855CH	PCL0
		129	Mod_spectrum -800	699CH	PCL0
		130	Mod_spectrum -600	699CH	PCL0
		131	Mod_spectrum -400	699CH	PCL0
		132	Mod_spectrum -250	699CH	PCL0
		133	Mod_spectrum -200	699CH	PCL0
		134	Mod_spectrum +200	699CH	PCL0
		135	Mod_spectrum +250	699CH	PCL0
		136	Mod_spectrum +400	699CH	PCL0
		137	Mod_spectrum +600	699CH	PCL0
		138	Mod_spectrum +800	699CH	PCL0
		139	Mod_spectrum -800	512CH	PCL0

Band	Sending/ Receive	No.	Item to be inspected	Channel	PCL
DCS	Tx	140	Mod_spectrum -600	512CH	PCL0
		141	Mod_spectrum -400	512CH	PCL0
		142	Mod_spectrum -250	512CH	PCL0
		143	Mod_spectrum -200	512CH	PCL0
		144	Mod_spectrum +200	512CH	PCL0
		145	Mod_spectrum +250	512CH	PCL0
		146	Mod_spectrum +400	512CH	PCL0
		147	Mod_spectrum +600	512CH	PCL0
		148	Mod_spectrum +800	512CH	PCL0
		149	Mod_spectrum -800	885CH	PCL0
		150	Mod_spectrum -600	885CH	PCL0
		151	Mod_spectrum -400	885CH	PCL0
		152	Mod_spectrum -250	885CH	PCL0
		153	Mod_spectrum -200	885CH	PCL0
		154	Mod_spectrum +200	885CH	PCL0
		155	Mod_spectrum +250	885CH	PCL0
		156	Mod_spectrum +400	885CH	PCL0
		157	Mod_spectrum +600	885CH	PCL0
		158	Mod_spectrum +800	885CH	PCL0
		159	Mod_spectrum -800	699CH	PCL5
		160	Mod_spectrum -600	699CH	PCL5
		161	Mod_spectrum -400	699CH	PCL5
		162	Mod_spectrum -250	699CH	PCL5
		163	Mod_spectrum -200	699CH	PCL5
		164	Mod_spectrum +200	699CH	PCL5
		165	Mod_spectrum +250	699CH	PCL5
		166	Mod_spectrum +400	699CH	PCL5
		167	Mod_spectrum +600	699CH	PCL5
		168	Mod_spectrum +800	699CH	PCL5
		169	Mod_spectrum -800	699CH	PCL15
		170	Mod_spectrum -600	699CH	PCL15
		171	Mod_spectrum -400	699CH	PCL15
		172	Mod_spectrum -250	699CH	PCL15
		173	Mod_spectrum -200	699CH	PCL15
		174	Mod_spectrum +200	699CH	PCL15
		175	Mod_spectrum +250	699CH	PCL15
		176	Mod_spectrum +400	699CH	PCL15
		177	Mod_spectrum +600	699CH	PCL15
		178	Mod_spectrum +800	699CH	PCL15
		179	Switch_Spectrum -1800	699CH	PCL0
		180	Switch_Spectrum -1200	699CH	PCL0
		181	Switch_Spectrum -600	699CH	PCL0
		182	Switch_Spectrum -400	699CH	PCL0
		183	Switch_Spectrum +400	699CH	PCL0
		184	Switch_Spectrum +600	699CH	PCL0
		185	Switch_Spectrum +1200	699CH	PCL0
		186	Switch_Spectrum +1800	699CH	PCL0
		187	Switch_Spectrum -1800	512CH	PCL0

Band	Sending/ Receive	No.	Item to be inspected	Channel	PCL
DCS	Tx	188	Switch_Spectrum -1200	512CH	PCL0
		189	Switch_Spectrum -600	512CH	PCL0
		190	Switch_Spectrum -400	512CH	PCL0
		191	Switch_Spectrum +400	512CH	PCL0
		192	Switch_Spectrum +600	512CH	PCL0
		193	Switch_Spectrum +1200	512CH	PCL0
		194	Switch_Spectrum +1800	512CH	PCL0
		195	Switch_Spectrum -1800	885CH	PCL0
		196	Switch_Spectrum -1200	885CH	PCL0
		197	Switch_Spectrum -600	885CH	PCL0
		198	Switch_Spectrum -400	885CH	PCL0
		199	Switch_Spectrum +400	885CH	PCL0
		200	Switch_Spectrum +600	885CH	PCL0
		201	Switch_Spectrum +1200	885CH	PCL0
		202	Switch_Spectrum +1800	885CH	PCL0
		203	Switch_Spectrum -1800	699CH	PCL5
		204	Switch_Spectrum -1200	699CH	PCL5
		205	Switch_Spectrum -600	699CH	PCL5
		206	Switch_Spectrum -400	699CH	PCL5
		207	Switch_Spectrum +400	699CH	PCL5
		208	Switch_Spectrum +600	699CH	PCL5
		209	Switch_Spectrum +1200	699CH	PCL5
		210	Switch_Spectrum +1800	699CH	PCL5
		211	Switch_Spectrum -1800	699CH	PCL15
		212	Switch_Spectrum -1200	699CH	PCL15
		213	Switch_Spectrum -600	699CH	PCL15
		214	Switch_Spectrum -400	699CH	PCL15
		215	Switch_Spectrum +400	699CH	PCL15
		216	Switch_Spectrum +600	699CH	PCL15
		217	Switch_Spectrum +1200	699CH	PCL15
		218	Switch_Spectrum +1800	699CH	PCL15
		219	Burst Timing	699CH	PCL0
		220	Burst Timing	512CH	PCL0
		221	Burst Timing	885CH	PCL0
		222	Burst Timing	699CH	PCL5
		223	Burst Timing	699CH	PCL15
	Rx	224	Rx Sensitivity	699CH	PCL0
		225	Rx Sensitivity	512CH	PCL0
		226	Rx Sensitivity	885CH	PCL0
		227	Usable Receiver Level	699CH	PCL0
		228	Rx Level Reports	699CH	PCL0
PCS	Tx	229	Burst Power	661CH	PCL0
		230	Burst Power	512CH	PCL0
		231	Burst Power	810CH	PCL0

Band	Sending/ Receive	No.	Item to be inspected	Channel	PCL
PCS	Tx	232	Burst Power	661CH	PCL5
		233	Burst Power	661CH	PCL15
		234	Frequency Error	661CH	PCL0
		235	Frequency Error	512CH	PCL0
		236	Frequency Error	810CH	PCL0
		237	Phase Error (RMS)	661CH	PCL0
		238	Phase Error (RMS)	512CH	PCL0
		239	Phase Error (RMS)	810CH	PCL0
		240	Phase Error (Peak)	661CH	PCL0
		241	Phase Error (Peak)	512CH	PCL0
		242	Phase Error (Peak)	810CH	PCL0
		243	Mod_spectrum -800	661CH	PCL0
		244	Mod_spectrum -600	661CH	PCL0
		245	Mod_spectrum -400	661CH	PCL0
		246	Mod_spectrum -250	661CH	PCL0
		247	Mod_spectrum -200	661CH	PCL0
		248	Mod_spectrum +200	661CH	PCL0
		249	Mod_spectrum +250	661CH	PCL0
		250	Mod_spectrum +400	661CH	PCL0
		251	Mod_spectrum +600	661CH	PCL0
		252	Mod_spectrum +800	661CH	PCL0
		253	Mod_spectrum -800	512CH	PCL0
		254	Mod_spectrum -600	512CH	PCL0
		255	Mod_spectrum -400	512CH	PCL0
		256	Mod_spectrum -250	512CH	PCL0
		257	Mod_spectrum -200	512CH	PCL0
		258	Mod_spectrum +200	512CH	PCL0
		259	Mod_spectrum +250	512CH	PCL0
		260	Mod_spectrum +400	512CH	PCL0
		261	Mod_spectrum +600	512CH	PCL0
		262	Mod_spectrum +800	512CH	PCL0
		263	Mod_spectrum -800	810CH	PCL0
		264	Mod_spectrum -600	810CH	PCL0
		265	Mod_spectrum -400	810CH	PCL0
		266	Mod_spectrum -250	810CH	PCL0
		267	Mod_spectrum -200	810CH	PCL0
		268	Mod_spectrum +200	810CH	PCL0
		269	Mod_spectrum +250	810CH	PCL0
		270	Mod_spectrum +400	810CH	PCL0
		271	Mod_spectrum +600	810CH	PCL0
		272	Mod_spectrum +800	810CH	PCL0
		273	Mod_spectrum -800	661CH	PCL5
		274	Mod_spectrum -600	661CH	PCL5
		275	Mod_spectrum -400	661CH	PCL5
		276	Mod_spectrum -250	661CH	PCL5
		277	Mod_spectrum -200	661CH	PCL5
		278	Mod_spectrum +200	661CH	PCL5
		279	Mod_spectrum +250	661CH	PCL5
		280	Mod_spectrum +400	661CH	PCL5

Band	Sending/ Receive	No.	Item to be inspected	Channel	PCL
PCS	Tx	281	Mod_spectrum +600	661CH	PCL5
		282	Mod_spectrum +800	661CH	PCL5
		283	Mod_spectrum -800	661CH	PCL15
		284	Mod_spectrum -600	661CH	PCL15
		285	Mod_spectrum -400	661CH	PCL15
		286	Mod_spectrum -250	661CH	PCL15
		287	Mod_spectrum -200	661CH	PCL15
		288	Mod_spectrum +200	661CH	PCL15
		289	Mod_spectrum +250	661CH	PCL15
		290	Mod_spectrum +400	661CH	PCL15
		291	Mod_spectrum +600	661CH	PCL15
		292	Mod_spectrum +800	661CH	PCL15
		293	Switch_Spectrum -1800	661CH	PCL0
		294	Switch_Spectrum -1200	661CH	PCL0
		295	Switch_Spectrum -600	661CH	PCL0
		296	Switch_Spectrum -400	661CH	PCL0
		297	Switch_Spectrum +400	661CH	PCL0
		298	Switch_Spectrum +600	661CH	PCL0
		299	Switch_Spectrum +1200	661CH	PCL0
		300	Switch_Spectrum +1800	661CH	PCL0
		301	Switch_Spectrum -1800	512CH	PCL0
		302	Switch_Spectrum -1200	512CH	PCL0
		303	Switch_Spectrum -600	512CH	PCL0
		304	Switch_Spectrum -400	512CH	PCL0
		305	Switch_Spectrum +400	512CH	PCL0
		306	Switch_Spectrum +600	512CH	PCL0
		307	Switch_Spectrum +1200	512CH	PCL0
		308	Switch_Spectrum +1800	512CH	PCL0
		309	Switch_Spectrum -1800	810CH	PCL0
		310	Switch_Spectrum -1200	810CH	PCL0
		311	Switch_Spectrum -600	810CH	PCL0
		312	Switch_Spectrum -400	810CH	PCL0
		313	Switch_Spectrum +400	810CH	PCL0
		314	Switch_Spectrum +600	810CH	PCL0
		315	Switch_Spectrum +1200	810CH	PCL0
		316	Switch_Spectrum +1800	810CH	PCL0
		317	Switch_Spectrum -1800	661CH	PCL5
		318	Switch_Spectrum -1200	661CH	PCL5
		319	Switch_Spectrum -600	661CH	PCL5
		320	Switch_Spectrum -400	661CH	PCL5
		321	Switch_Spectrum +400	661CH	PCL5
		322	Switch_Spectrum +600	661CH	PCL5
		323	Switch_Spectrum +1200	661CH	PCL5
		324	Switch_Spectrum +1800	661CH	PCL5
		325	Switch_Spectrum -1800	661CH	PCL15
		326	Switch_Spectrum -1200	661CH	PCL15
		327	Switch_Spectrum -600	661CH	PCL15
		328	Switch_Spectrum -400	661CH	PCL15
		329	Switch_Spectrum +400	661CH	PCL15
		330	Switch_Spectrum +600	661CH	PCL15
		331	Switch_Spectrum +1200	661CH	PCL15
		332	Switch_Spectrum +1800	661CH	PCL15
		333	Burst Timing	661CH	PCL0
		334	Burst Timing	512CH	PCL0
		335	Burst Timing	810CH	PCL0
		336	Burst Timing	661CH	PCL5
		337	Burst Timing	661CH	PCL15
	Rx	338	Rx Sensitivity	661CH	PCL0
		339	Rx Sensitivity	512CH	PCL0
		340	Rx Sensitivity	810CH	PCL0
		341	Usable Receiver Level	661CH	PCL0
		342	Rx Level Reports	661CH	PCL0

■ Troubleshooting list

Test items	Check parts for GSM900	Check parts for DCS	Check parts for PCS
Tx			
Burst Power	IC802, IC803, FL905	IC802, IC803, FL905	IC802, IC803, FL905
Frequency Error	TCX801	TCX801	TCX801
Phase Error	IC801	IC801	IC801
Mod_spectrum	IC801, TCX801	IC801, TCX801	IC801, TCX801
Switch_Spectrum	IC801, IC802 IC803	IC801, IC802 IC803	IC801, IC802, IC803
Burst Timing	IC802	IC802	IC802
Rx			
Rx Sensitivity	IC801, IC803, FL902, FL905	IC801, IC803, FL902, FL905	IC801, IC803, FL903, FL905
Usable Receiver Level	IC801	IC801	IC801
Rx Level Reports	IC801, IC803, FL902, FL905	IC801, IC803, FL902, FL905	IC801, IC803, FL903, FL905

4-6. RF TEST TOOL

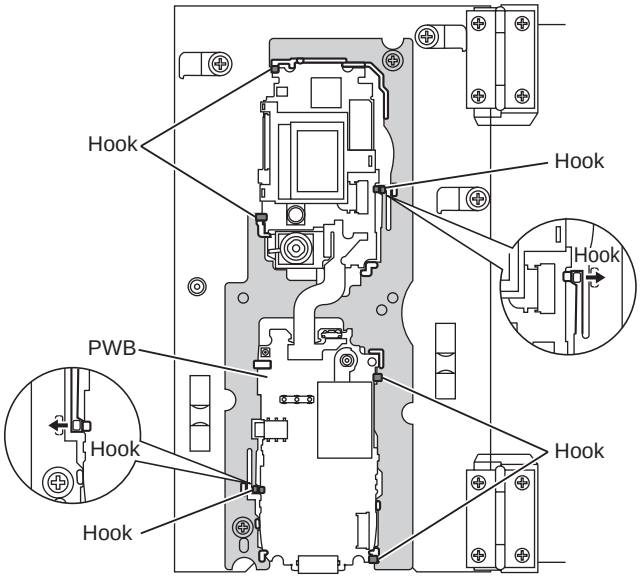
4-6-1. Requirements

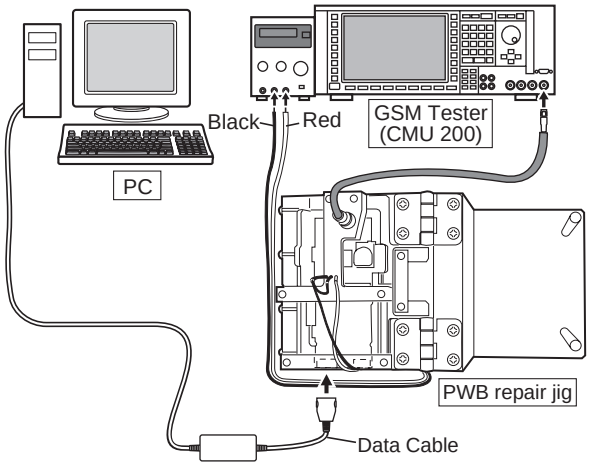
For repairs, this test checks the condition of an electric board (especially the RF section).

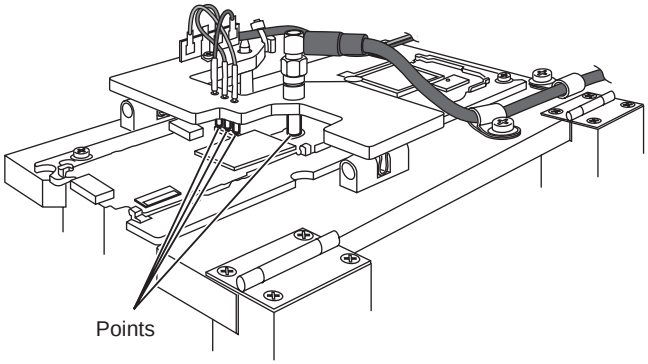
- PC with COM port
- TM150 Data Cable
- PWB repair jig
- GSM Tester (CMU200)

4-6-2. Setup

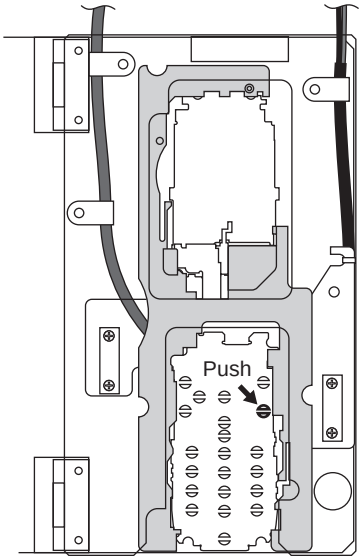
1. Set PWB and make connections as shown below.
   Make sure connections are correct at the points shown below.



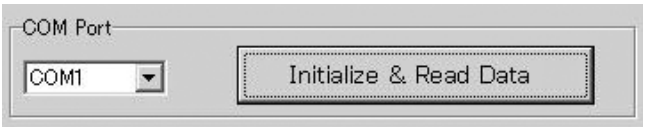




2. Apply 4 V using a stabilized power supply and turn on the handset.



3. Start RF test tool.
4. Select a COM port to which Data Cable is connected.
5. Press the "Initialize & Read Data" button.



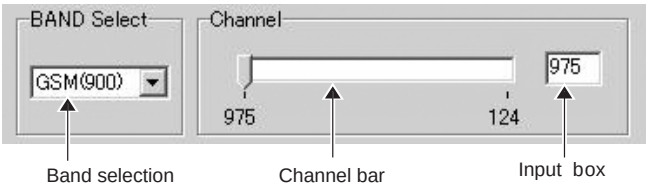
6. The figre shown below appears (wait a few seconds).

7. Click "OK" to proceed.

4-6-3. Tests

1) BAND Select & Channel

Select a band and a channel to test. Settings are applied to all tests.

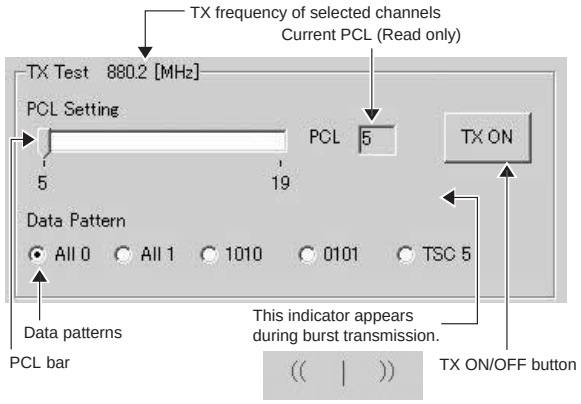


[Procedure]

1. Select a band. (GSM900, DCS or PCS)
2. Select or enter a channel using Channel bar or Input box.

2) TX test

Test burst transmission.



[Procedure]

1. Select a band and channel. [See 4-6-13. 1)]
2. Select PCL (Power Control Level) using PCL bar.
3. Select Data pattern.
4. Click TX ON to start burst transmission. (You can check each part in this state.)
5. Click TX OFF to end burst transmission.

∗Data pattern (TSC 5) includes Training Sequence GSM 5, and other part is pseudo random data.

TM150 TX power Table (25°C, voltage: 3.7[V])

■ GSM900 Band

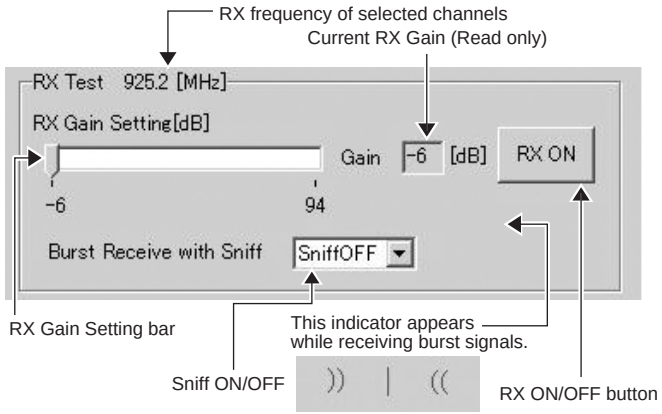
PCL	GSM900 [dBm]	Tolerance
5	33	+/- 2 dB
6	31	+/- 3 dB
7	29	+/- 3 dB
8	27	+/- 3 dB
9	25	+/- 3 dB
10	23	+/- 3 dB
11	21	+/- 3 dB
12	19	+/- 3 dB
13	17	+/- 3 dB
14	15	+/- 3 dB
15	13	+/- 3 dB
16	11	+/- 5 dB
17	9	+/- 5 dB
18	7	+/- 5 dB
19	5	+/- 5 dB

■ DCS/PCS Band

PCL	DCS/PCS [dBm]	Tolerance
0	30	+/– 2 dB
1	28	+/– 3 dB
2	26	+/– 3 dB
3	24	+/– 3 dB
4	22	+/– 3 dB
5	20	+/– 3 dB
6	18	+/– 3 dB
7	16	+/– 3 dB
8	14	+/– 3 dB
9	12	+/– 4 dB
10	10	+/– 4 dB
11	8	+/– 4 dB
12	6	+/– 4 dB
13	4	+/– 4 dB
14	2	+/– 5 dB
15	0	+/– 5 dB

3) RX test

The handset receives burst signals in this test.



[Procedure]

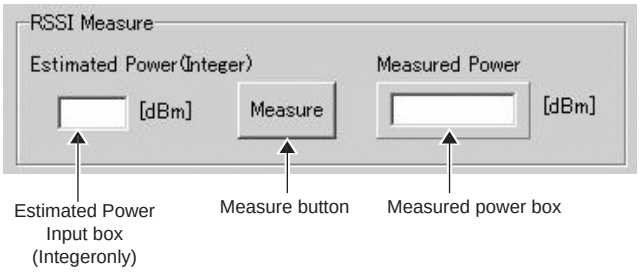
1. Select a channel and band. [see 4-6-3.1)]
2. Select RX Gain using RX Gain Setting bar.
3. Choose Sniff ON or OFF.
4. Click "RX ON" to start receiving burst signals.
5. From GSM tester, send burst signals in the specified channel.
   (You can check each part in this state.)
6. Click "RX OFF" to end receiving burst signals.

∗In this test, the reception timing cannot be synchronized with burst signals from Signal Generator or GSM tester.

∗The standard RX Gain Setting is:
(Input power at the aerial connector of the handset) + (RX Gain)
= -16 dBm
Excessive Input power or RX Gain may cause damage to the handset.

4) RSSI Measure

The handset notifies you of input power value at the aerial connector.



[Procedure]

1. Connect the handset and GSM tester (or Signal Generator) with RF cable.
2. Select a band and channel. [see 4-6-3. 1)]
3. Send signals (∗) from GSM tester.
4. Enter the value of input power from GSM tester in integers (from -10 to -110) considering RF cable loss.
5. Press the [Measure] button.
6. The result appears in Measured Power box.

∗The signal type from GSM tester must be either of two:

1. Continuous sine wave (without modulation) with the frequency as follows:
   (Frequency of the measured channel) + 67.708kHz.
   (Ex. channel: GSM 37ch → the result: 942.467708 MHz)
   Power: -110 to -10 dBm
2. BCCH signal of the measured channel
   Power: -110 to -10 dBm

Result
When the handset is properly calibrated, the error between "Estimated Power" and "Measured Power" is less than 3dB.

4-6-4. Termination

Turn off the handset to ensure proper operations.

4-6-5. Trouble information

When switching DCS and PCS, change the channel number as well. Or the band does not change properly.

Example: If you change DCS 512 CH to PCS 512 CH, the band remains DCS.

4-7. Password reset

SPST resets the password (handset code is set to “0000”).

<Operation>

1) Set the COM port on the SPST initial screen and click “User Password Reset”. Click “Yes” to reset. Click “No” to exit.

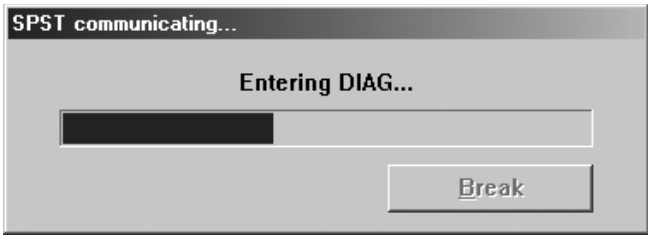
2) When completed, the following appears.

4-8. Performance check and adjustment

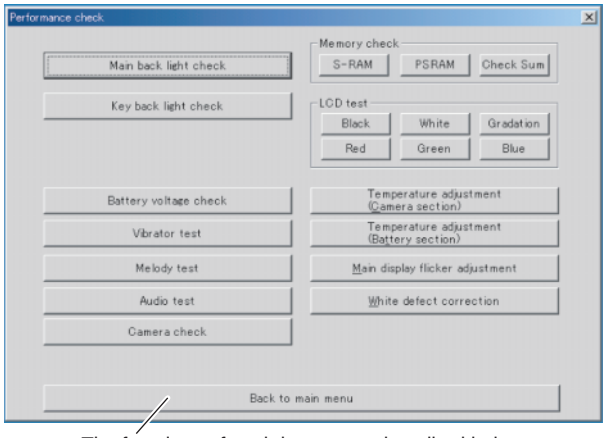
With this function, SPST checks the performance of the handset and makes adjustments.

<Operation>

1) Set the COM port on the SPST initial screen and click "Performance check and adjustment". The following dialog box appears while processing.



2) When completed, the following is displayed. Click "Back to main menu" to exit.



The functions of each button are described below.

4-8-1. Main back light check

The main display backlight turns on and the message appears on the PC.

Check the backlight and press "OK".

- If a failure occurs, see "10. Back Light does not turn on." in [3] Troubleshooting.

4-8-2. External back light check

The external display back light turns on and the message appears on the PC. Check the back light and press "OK".

- If a failure occurs, see "10. Back Light does not turn on." in [3] Troubleshooting.

4-8-3. Key back light check

The keypad back light turns on and the message appears on the PC. Check the back light and press "OK".

4-8-4. LED check

The LED lights up in a specified color and the message appears on the PC. Check the LED and press "OK".

- If a failure occurs, see "15. Flash light does not work." in [3] Troubleshooting.

4-8-5. Battery voltage check

Click to display the current battery voltage.

- If a failure occurs, see "1. Power is not turned on." in [3] Troubleshooting.

4-8-6. SD read/write test

Insert an SD card (otherwise a message prompts you to do so and click the button to perform the SD card read/write test.

- If a failure occurs, see "17. SD (Memory) card is not recognized." in [3] Troubleshooting.

4-8-7. Vibrator test

Click to vibrate the handset. Click "OK" to exit.

- If a failure occurs, see "5. Vibrator does not work." in [3] Troubleshooting.

4-8-8. Melody test

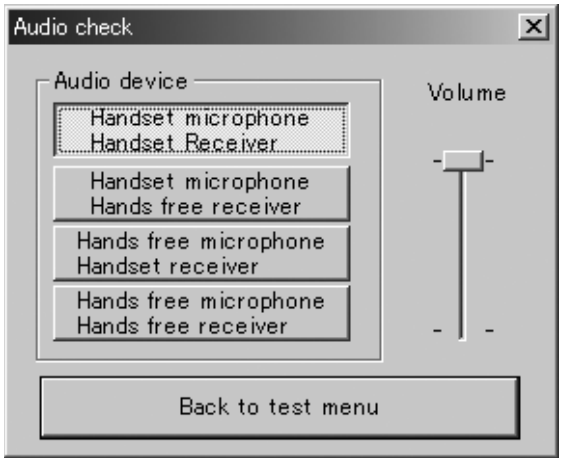
A message describes test items. Click "Yes" to proceed and "No" to exit.
The order of the test items:

speaker → hands free → hands free (stereo) → speaker (analog melody)

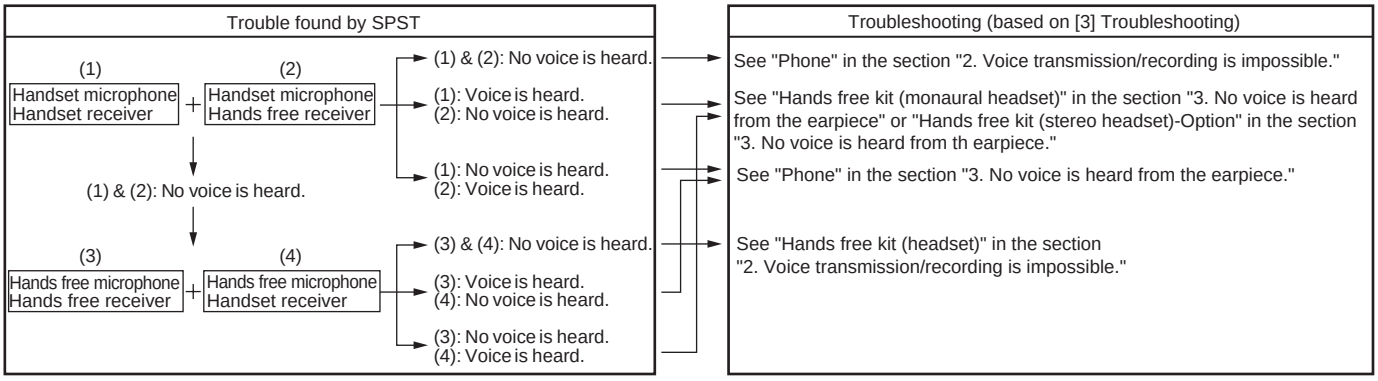
Trouble found by SPST		Troubleshooting (based on [3] Troubleshooting)
(1) Speaker		See "Speaker does not work."
(2) Hands free	Sound is heard in audio test.	Parts between IC105 pin 10 and IC103 pin 93 are defective, or IC103 is defective.
	No sound is heard in audio test.	See "Hands free kit (monaural headset)" in the section "3. No voice is heard from the earpiece."
(3) Hands free (stereo)	Sound is heard in audio test.	Parts between IC105 pin 10 and IC103 pin 93; IC105 pin 11 and IC103 pin 94 are defective. Otherwise IC103 is defective.
	No sound is heard in audio test.	See "Hands free kit (stereo headset) - Option" in the section " No voice is heard from the earpiece."
(4) Speaker (analog melody)		See "Video/Voice Recorder playback is impossible." Otherwise parts between IC105 pin 10 and IC103 pin 93 are defective, or IC103 is defective.

4-8-9. Audio test

The following appears.

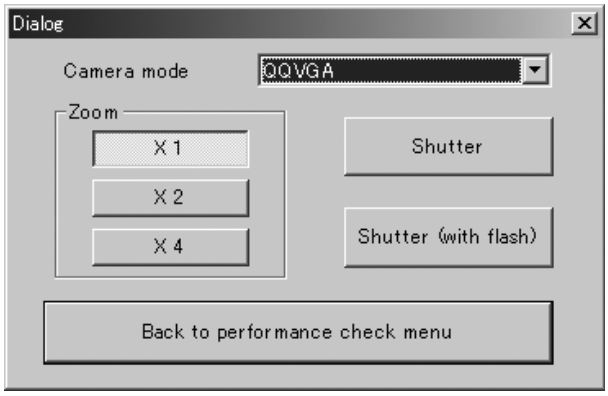


Select a test item from Audio device. Check the output sound from the receiver by speaking to the microphone, etc. Click "Back to test menu" to return to the previous screen.



4-8-10. Camera check

The following appears.



Select a Camera mode from the pull-down menu. Click "Shutter" to check that the camera operates properly. Click "Back to performance check menu" to return to the previous screen.

- If a failure occurs, see "10. Pictures cannot be taken." in [3] Troubleshooting.

4-8-11. Memory check

Click "S-RAM" and "PSRAM" to see each test result.
For "Check Sum", the calculation appears after the SPST communicating dialog box.

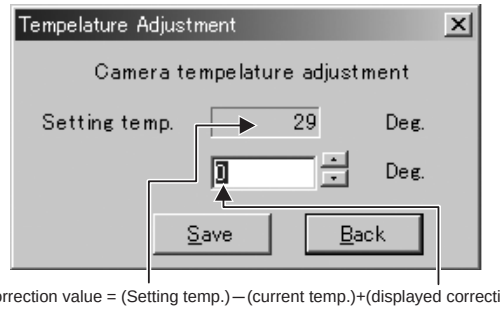
4-8-12. LCD test

Check that the specified color appears on the main display.

- If a failure occurs, see "12. The display does not appear on Main Display." and "13. The display does not appear on External Display (in 65K color mode)." in [3] Troubleshooting.

4-8-13. Temperature adjustment

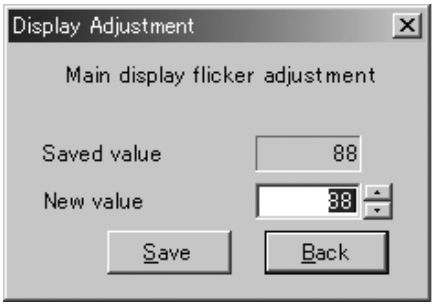
The following appears.
Setting temp. indicates the current temperature. The relative temperature is displayed in the text box below.
(Only the relative temperature is adjustable.)
If displayed Setting temp. value differs from the current temperature, click [▲] or [▼] to set a correction value in the range of -99 to +99 and click “Save”



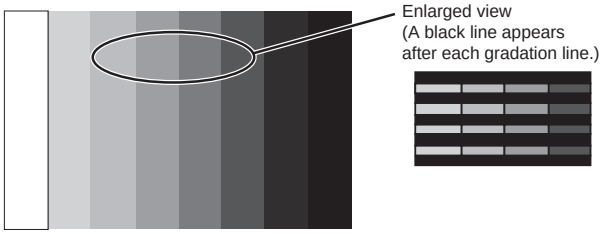
Correction value = (Setting temp.)−(current temp.)+(displayed correction value)

4-8-14. Main display flicker adjustment

The following is displayed.



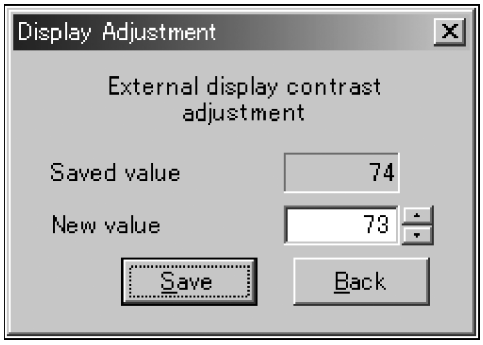
Check a main display visually within a distance of 20 cm from a fluorescent light, and adjust the value to minimize flicker on the display with the [▲] and [▼] buttons. Click "Save" and confirm that the main display does not flicker.
(Fine adjustment for DC voltage between display electrodes)

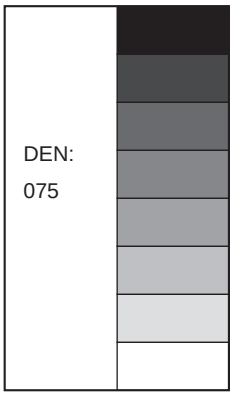


8-level graduation pattern with alternate black and gradation lines (black and white)

4-8-15. External display contrast adjustment

Click the “External display contrast adjustment” button. The following screen appears.





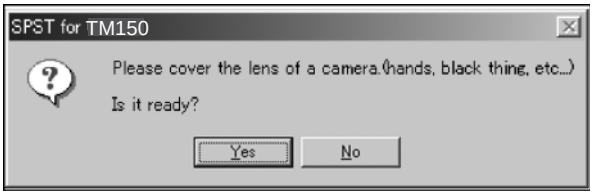
8-level gradation pattern (black & white pattern)

Comparing with an adjusted handset, click "▲" or "▼" to adjust the value so that the same gradation pattern is displayed. Click "Save" and confirm the pattern on the external display.

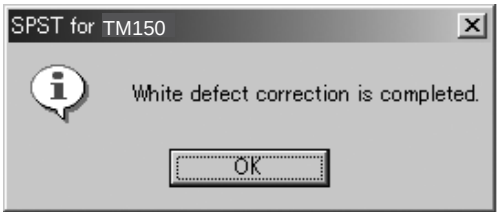
4-8-16. White defect correction

∗White defect correction:
Defective pixels in a camera light sensor appear as bright points in the display even when light is blocked completely (display is all black). Perform white defect correction to eliminate errors in these pixels.

1. Protect the handset camera from light completely with a black cover.
2. Click the "White defect correction" button. The following screen appears.



Click the "Yes" button and leave it for about 20 seconds. When completed, the following message appears.



When an error occurs, the corresponding message appears. Solve the problem according to "Solution".

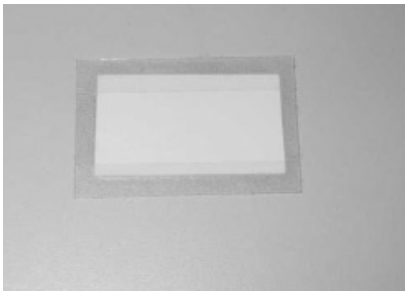
- Error 1
  - Error message : "There are too many white cracks."
  - Cause : The light is not sufficiently blocked.
  - Solution : Block the light completely and perform white defect correction again.
- Error 2
  - Error message : "There are many white cracks."
  - Cause : The light is not sufficiently blocked.
  - Solution : Block the light completely and perform white defect correction again.
- Error 3
  - Error message : "There are too many white cracks cannot be rectified."
  - Cause : There is a hardware error.
  - Solution : Replace the camera unit.

4-8-17. Black defect correction

∗Black defect correction:
Defective pixels in a camera light sensor appear as black points in the display even when a captured image is completely white (display is all white). Perform black defect correction to eliminate errors in these pixels.

1) Requirements

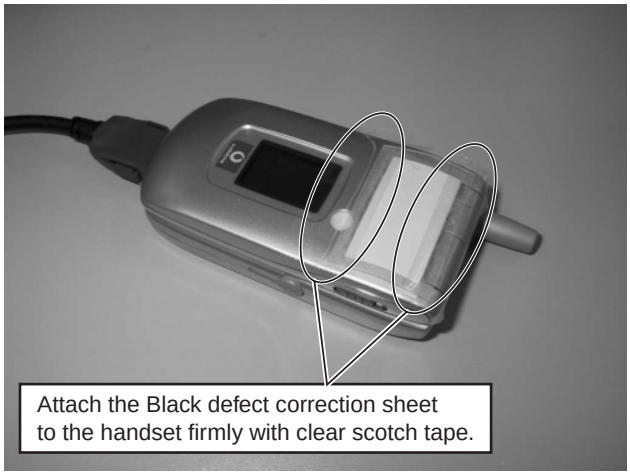
- Desk top type of fluorescent lamp
- Black defect correction sheet



- Illuminance meter

2) Procedure

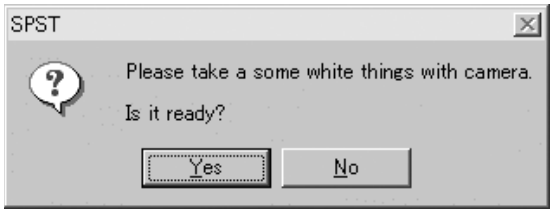
1. Cover the camera section with the black defect correction sheet as shown in Figure 96.



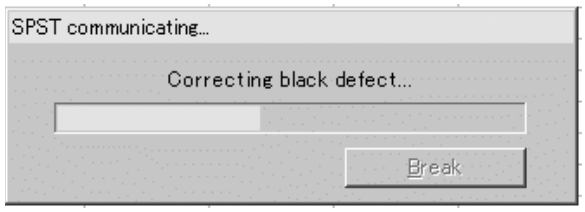
2. Check the distance from the fluorescent lamp by using an illuminance meter.
   In the proper position for black defect correction, illuminance is between 8,000 and 10,000 lux.

3. Hold the handset in the proper position.

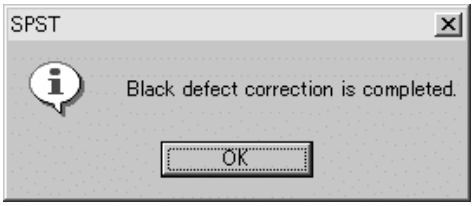
4. Click the "Black defect correction" button.
   The following message is displayed.



5. Click the "Yes" button. Communication starts.



6. The result is displayed within a minute as follows.



When an error occurs, the corresponding message appears. Solve the problem according to "Solution".

• Error 1

Error message	:	"There are too many black cracks."
Cause	:	The light is too weak or strong.
Solution	:	At the proper distance from the light source (8,000-10,000 lux), perform black defect correction again.

• Error 2

Error message	:	"There are many black cracks."
Cause	:	The light is too weak or strong.
Solution	:	At the proper distance from the light source (8,000 - 10,000 lux), perform black defect correction again.

• Error 3

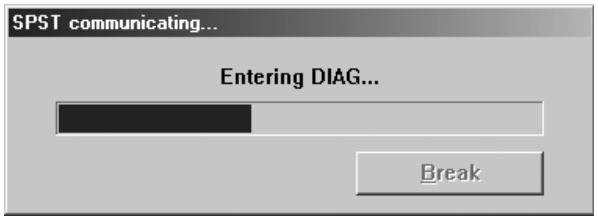
Error message	:	"There are too many black cracks cannot be rectified."
Cause	:	There is a hardware error.
Solution	:	Replace the camera unit.

4-9. ****MODE RELEASE

When the handset does not turn on and enter the normal mode, use this function to change ****mode to the normal mode.

<Operation>

1) Select the COM port on the SPST initial screen and click "****mode release". The following dialog box appears.



2) If SPST cannot communicate with the handset, the following message is displayed. Make sure the handset is turned on and click "Retry". To exit, click "Cancel".

3) When complete, the following message appears.

5. OTHER TESTS

SPST does not provide tests of Bluetooth/USB communication. Check them according to the following instructions.

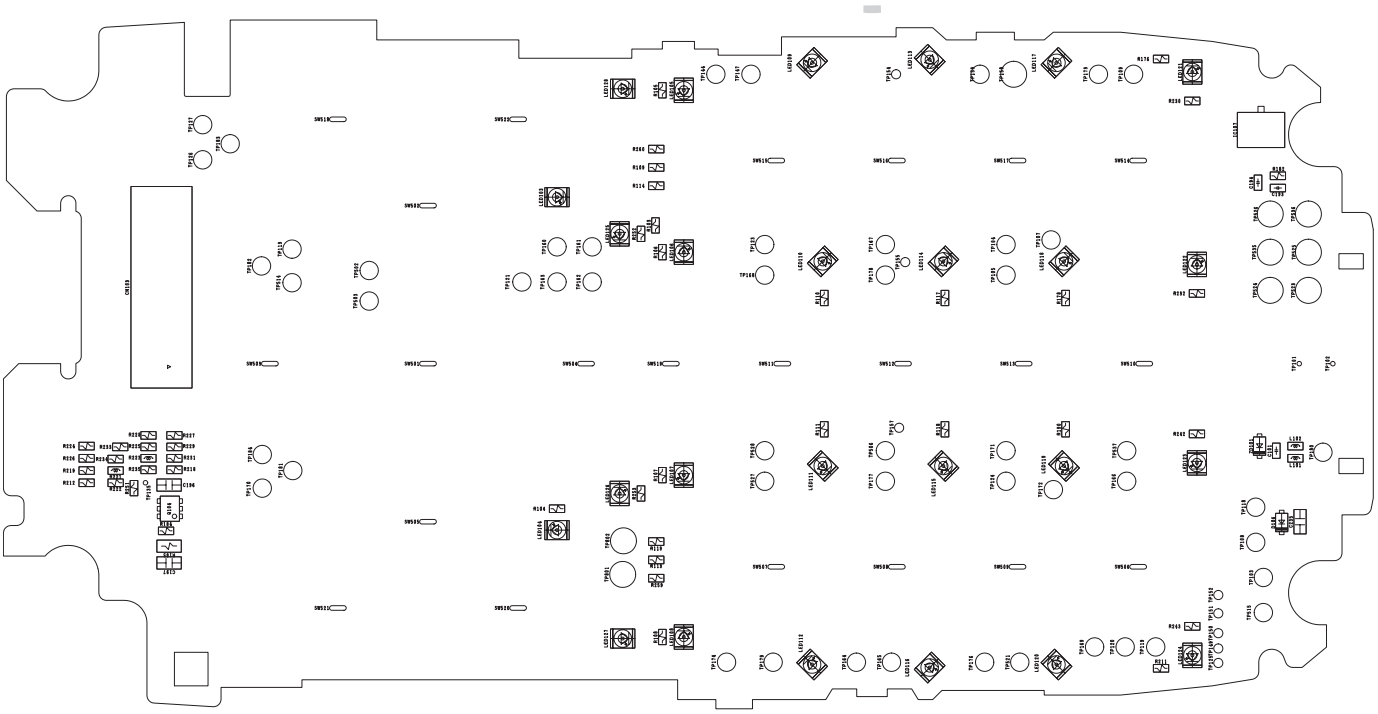
5-1. USB

Connect TM150 and a PC with a USB cable. Check that TM150 is recognized as a device.

If the USB driver for TM150 (SHARP GSM GPRS USB Driver) is not installed on the PC, “Found New Hardware” window appears and “Found New Hardware Wizard“ starts (the handset is recognized).

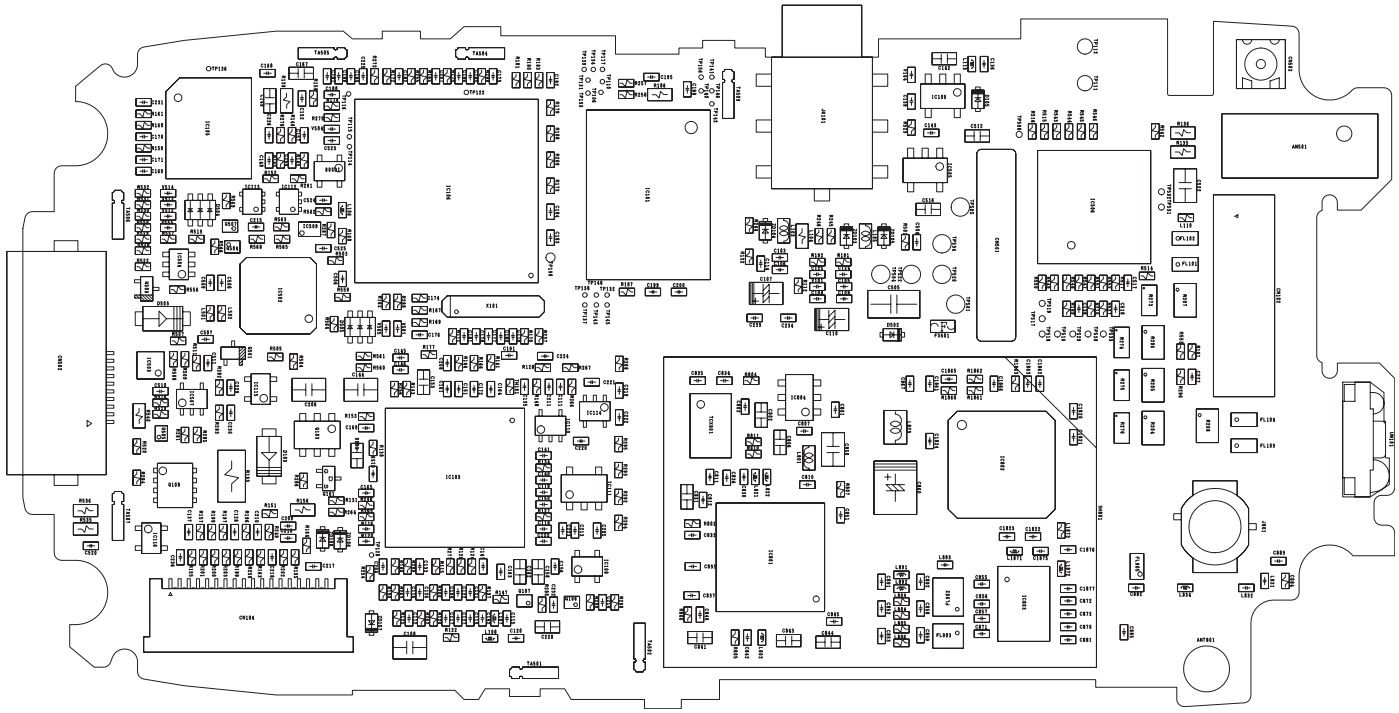
[2] TEST POINTS

MAIN PWB (FRONT SIDE)



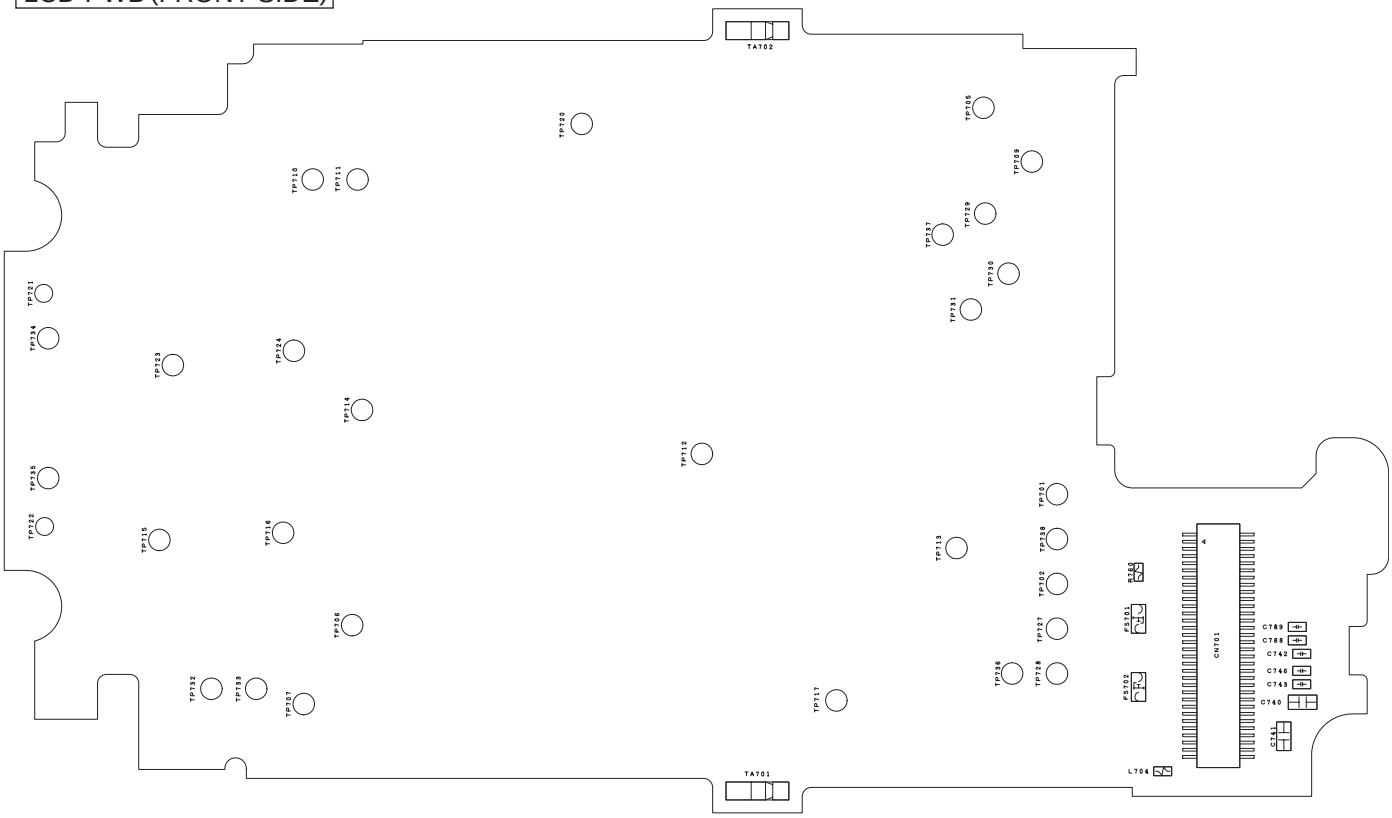
TP No.	Signal name	TP No.	Signal name
TP103	USC [0]	TP171	VCORE (1.8V)
TP104	USC [1]	TP172	VAPP
TP105	USC [2]	TP173	VINT (3V)
TP107	USC [4]	TP174	LIGHT3 (KEYLED)
TP108	USC [5]	TP176	VMIC
TP109	USC [6]	TP177	AUXADC1, 2
TP113	VVIB	TP178	TEMP
TP118	USC [3]	TP179	AUXADC1, 2
TP119	MIC	TP180	CHGIN_A (5.2V)
TP120	AUDIO_IN	TP181	Flexible PWB insert check terminal 1
TP121	JACK_L	TP182	Flexible PWB insert check terminal 2
TP123	RESET	TP183	Flexible PWB insert check terminal 3
TP124	PWRON	TP184	Flexible PWB insert check terminal 4
TP126	SP1	TP502	VBAT
TP127	SP2	TP503	VBAT
TP144	Terminal for STACK MEMORY adhesion check 1	TP506	BATT_SENSE
TP147	Terminal for STACK MEMORY adhesion check 2	TP514	BT_VCC (3.0V)
TP153	VPP Flash	TP515	VBUS_IN
TP157	Analog Power Supply IC INT	TP521	POWONKEY
TP158	VINT (3V)	TP523	USB D+
TP160	HEDSET_DET	TP524	USB D
TP161	STEREO_SW	TP525	RTS
TP162	REMOTE_SW	TP526	CTS
TP163	JACK_R	TP527	DGND
TP164	VABB	TP528	DGND
TP165	VT (2.75V)	TP535	Reserved
TP166	VUSB	TP536	ManufactUre Specific
TP167	VRTC (1.8V)	TP537	CHGIN
TP168	VBACK (3V)	TP801	VTCXO (2.9V)
TP169	VSIM (2.85V)	TP802	VRF (2.9V)
TP170	VMEM (2.8V)		

MAIN PWB-B (REAR SIDE)



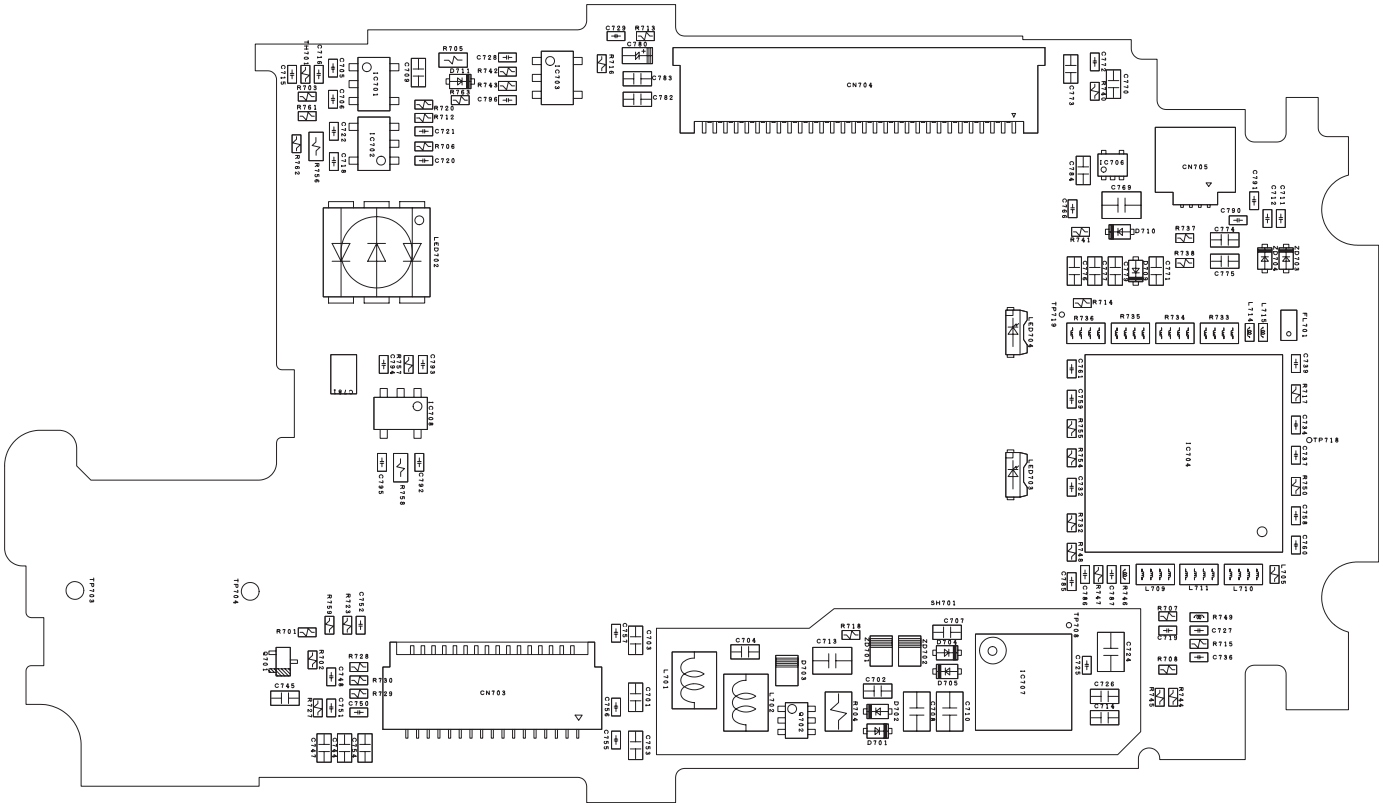
TP No.	Signal name	TP No.	Signal name
TP111	VVIB	TP505	DGND
TP112	DGND	TP520	BATT
TP501	BATT	TP522	POWONKEY
TP504	DGND	TP534	BATT_SENSE

LCD PWB (FRONT SIDE)



TP No.	Signal name	TP No.	Signal name
TP701	SP1	TP722	RECIVER_OUTP
TP702	SP2	TP723	Terminal for LCDC adhesion check 3
TP705	VCCD (2.5V)	TP724	Terminal for LCDC adhesion check 4
TP706	Terminal for APPLICATION POWER adhesion check 1	TP727	LIGHT1
TP707	Terminal for APPLICATION POWER adhesion check 2	TP728	LEDCTL
TP709	VDD6 (3.1V)	TP729	LEDR
TP710	Backlight (LED+)	TP730	LEDG
TP711	Backlight (LED−)	TP731	LEDB
TP712	CAMCLK	TP732	Power supply for camera (+15V)
TP713	13MHzCLK	TP733	Power supply for camera (−8V)
TP714	VLCD (1.8V)	TP734	RECIVER_OUTN
TP715	Terminal for LCDC adhesion check 1	TP735	RECIVER_OUTP
TP716	Terminal for LCDC adhesion check 2	TP736	AVDD (3.1V)
TP717	VOUT (External Display)	TP737	VPLUS2
TP720	VDD2	TP738	Connector connection check terminal
TP721	RECIVER_OUTN		

LCD PWB (REAR SIDE)

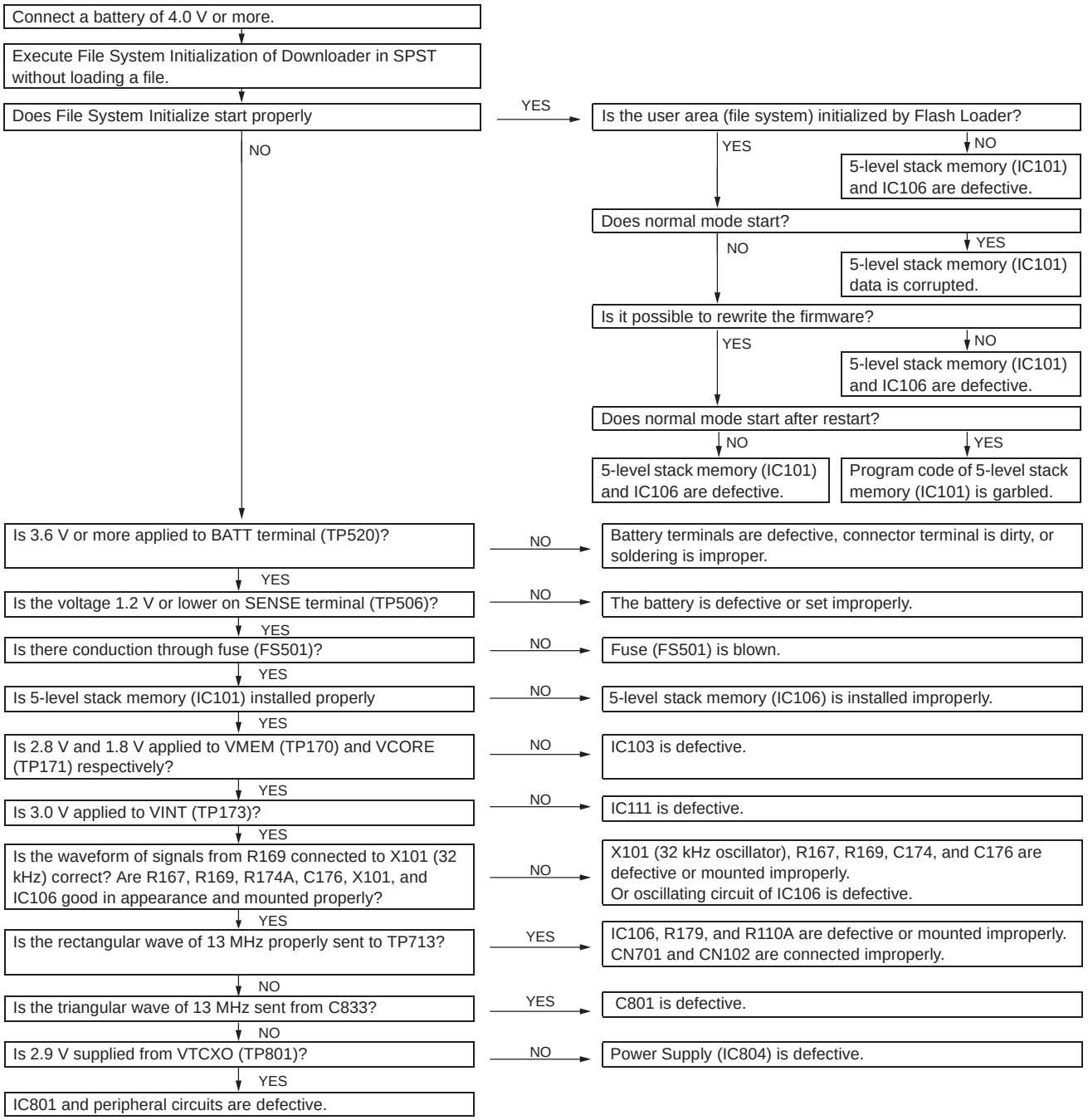


TP No.	Signal name	TP No.	Signal name
TP703	SP1	TP704	SP2

[3] TROUBLESHOOTING

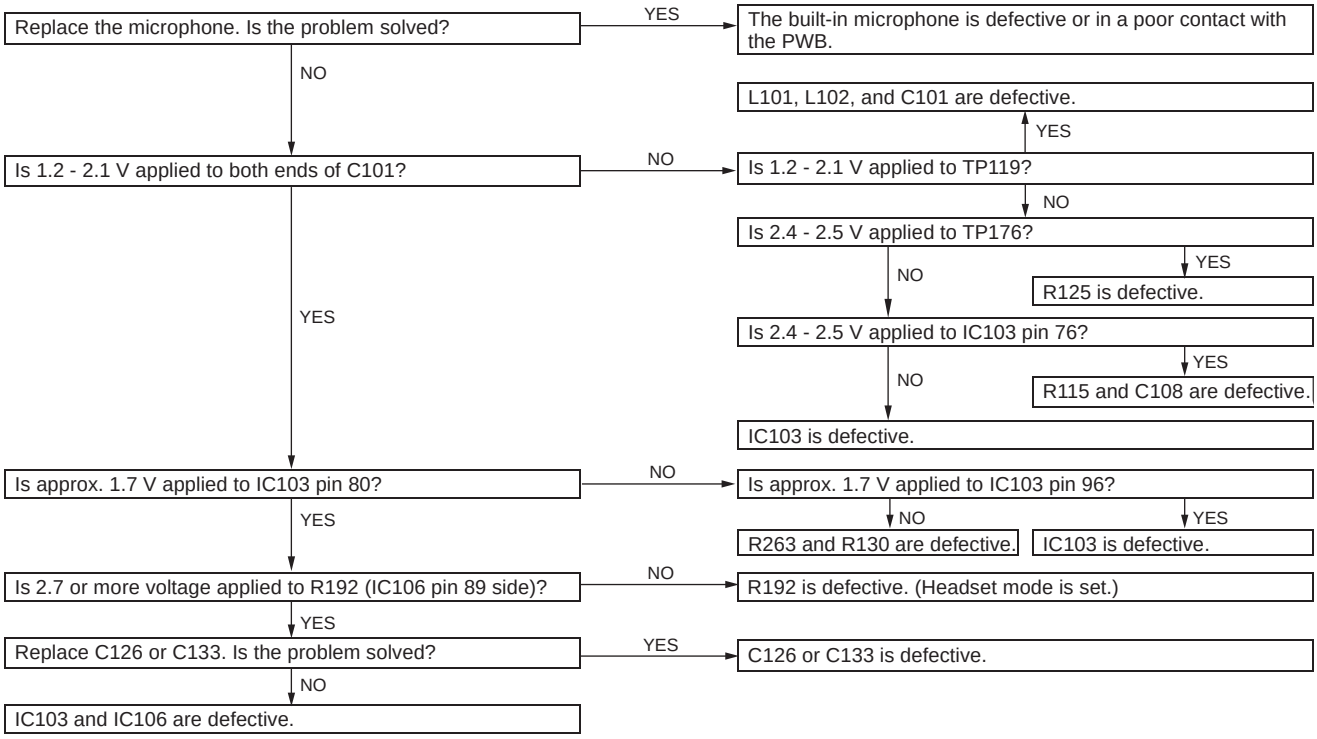
1. **Power is not turned on.**
2. **Voice transmission/recording is impossible.**
3. **No voice is heard from the earpiece.**
4. **Battery does not charge.**
5. **Vibrator does not work.**
6. **Clock Settings are reset.**
7. **Speaker does not work.**
8. **MP3 cannot be played.**
9. **Video/Voice Recorder playback is impossible.**
10. **Back Light does not turn on.**
11. **Out of range and incoming/outgoing calls are impossible.**
12. **The display does not appear on Main Display.**
13. **The display does not appear on External Display (in 65K color mode).**
14. **Pictures cannot be taken.**
15. **SIM card is not recognized.**
16. **SD (Memory) card is not recognized.**
17. **USB connection is impossible.**

1. POWER IS NOT TURNED ON.



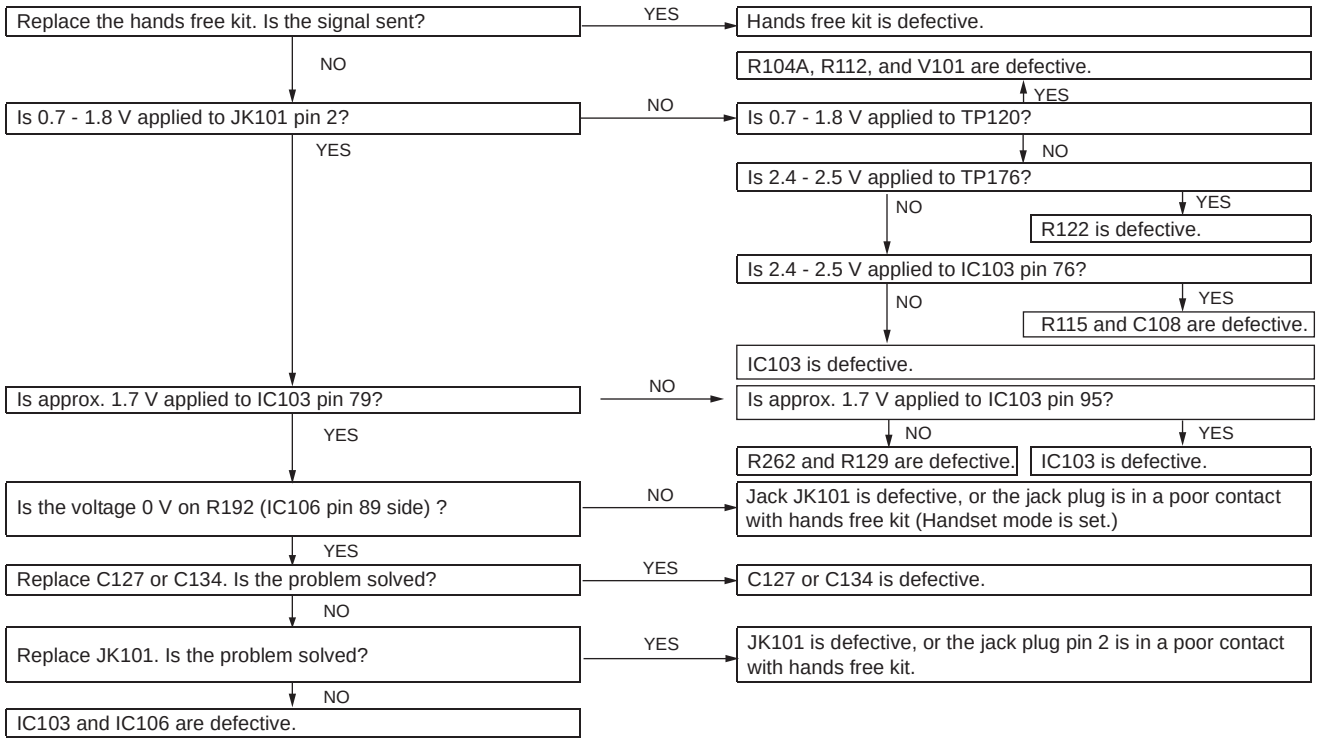
2. VOICE TRANSMISSION/RECORDING IS IMPOSSIBLE.

Phone



Hands free kit (headset)

(The following procedure applies to both monaural and stereo headsets.)



3. NO VOICE IS HEARD FROM THE EARPIECE.

Phone

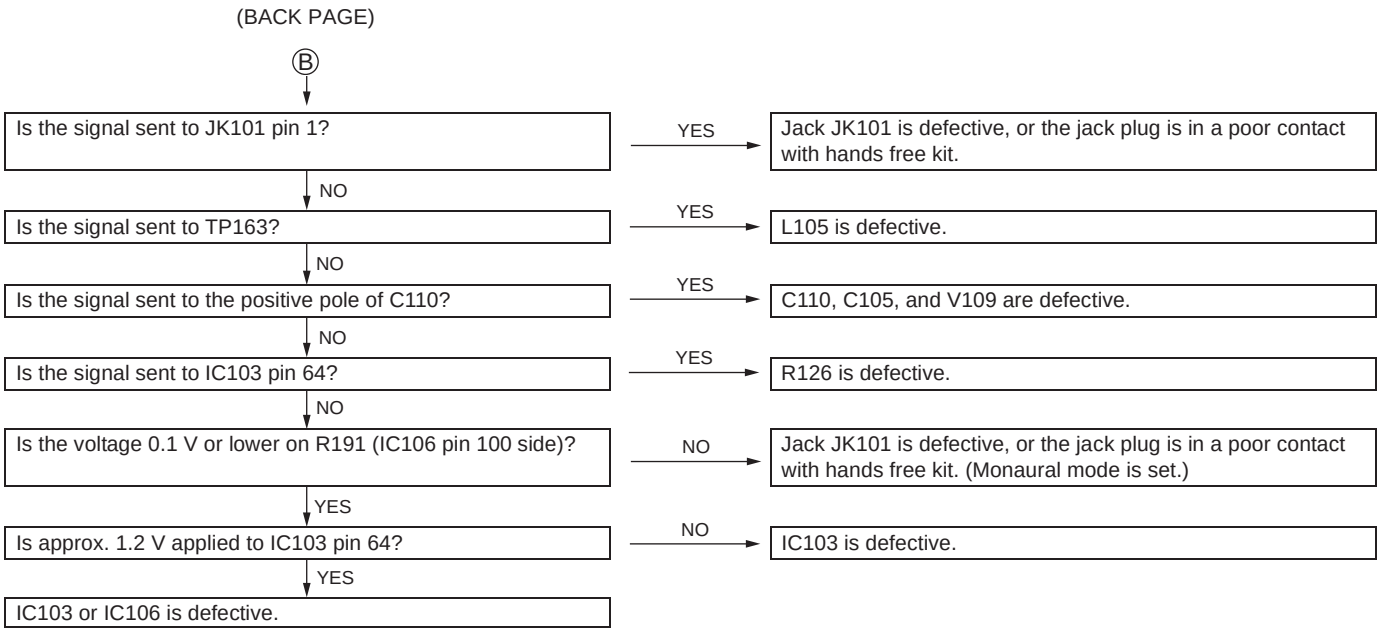
- Is the signal sent to the contact terminal of the earpiece?
  - YES → The built-in earpiece is defective, or in a poor contact with TP734 or TP735.
  - NO ↓
- Is the signal sent to CN103 pins 17 and 18?
  - YES → The camera relay FPC, CN103, or CN701 is defective. Or the camera is in a poor contact with CN103 and CN701.
  - NO ↓
- Is the signal sent to vsGNDs at both ends of C132?
  - YES → L107, L108, C115, and C120 are defective.
  - NO ↓
- Is 2.7 or more voltage applied to R192 (IC106 pin 89 side)?
  - NO → R192 is defective. (Headset mode is set.)
  - YES ↓
- Is approx. 1.2 V applied to IC103 pins 59 and 63?
  - NO → IC103 is defective.
  - YES ↓
- IC103 or IC106 is defective.

Hands free kit (monaural headset)

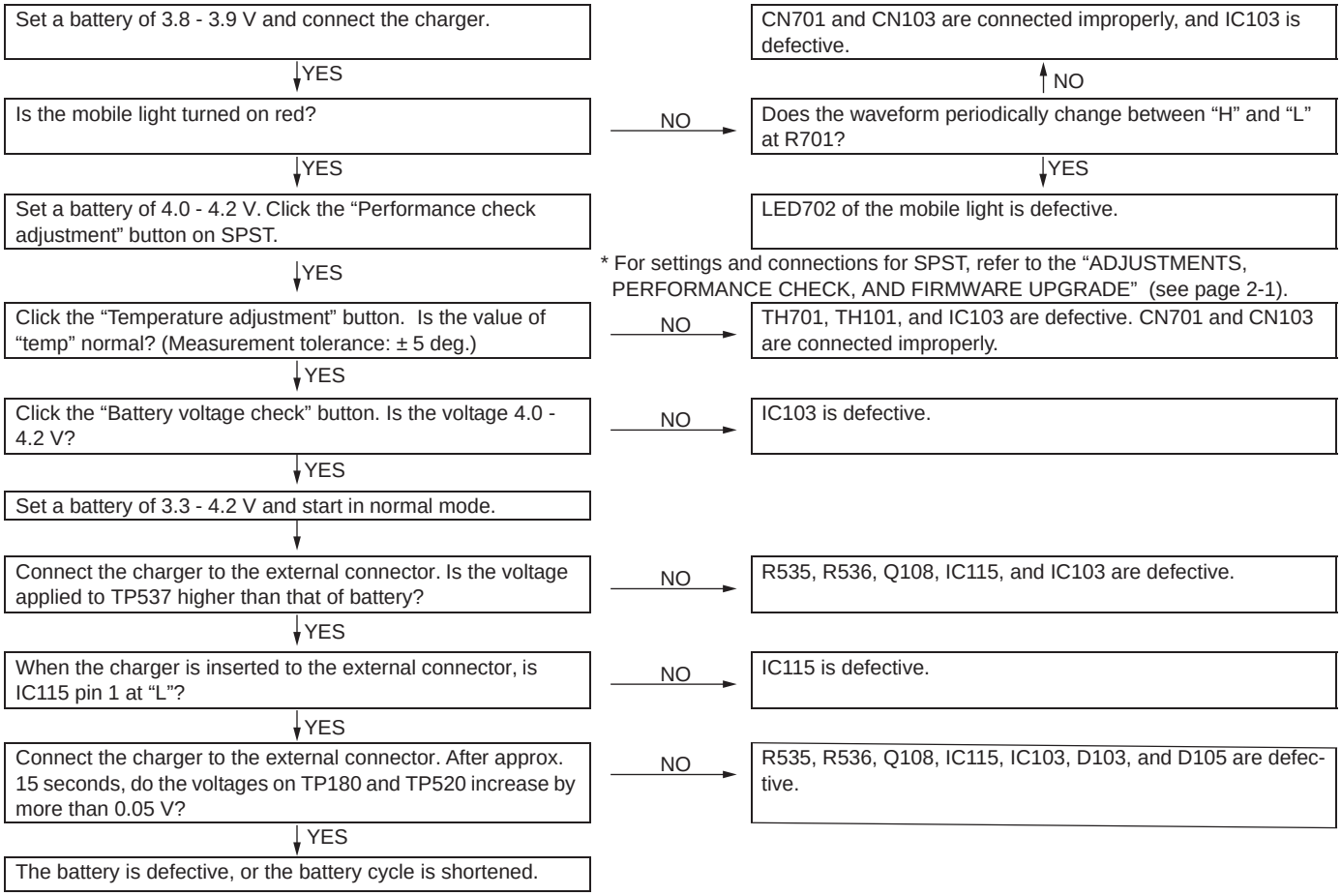
- Replace the hands free kit. Is the signal sent ?
  - YES → Hands free kit is defective.
  - NO ↓
- Is the signal sent to JK101 pin 3?
  - YES → Jack JK101 is defective, or the jack plug is in a poor contact with hands free kit.
  - NO ↓
- Is the signal sent to TP121?
  - YES → L103 is defective.
  - NO ↓
- Is the signal sent to the positive pole of C107?
  - YES → C107, C103, and V106 are defective.
  - NO ↓
- Is the signal sent to IC103 pin 60?
  - YES → R124 is defective.
  - NO ↓
- Is the voltage 0 V on R192 (IC106 pin 89 side) ?
  - NO → Jack JK 101 is defective, or the jack plug is in a poor contact with hands free kit. (Handset mode is set.)
  - YES ↓
- Is approx. 1.2 V applied to IC103 pin 60?
  - NO → IC103 is defective.
  - YES ↓
- IC103 or IC106 is defective.

Hands free kit (stereo headset) - Option

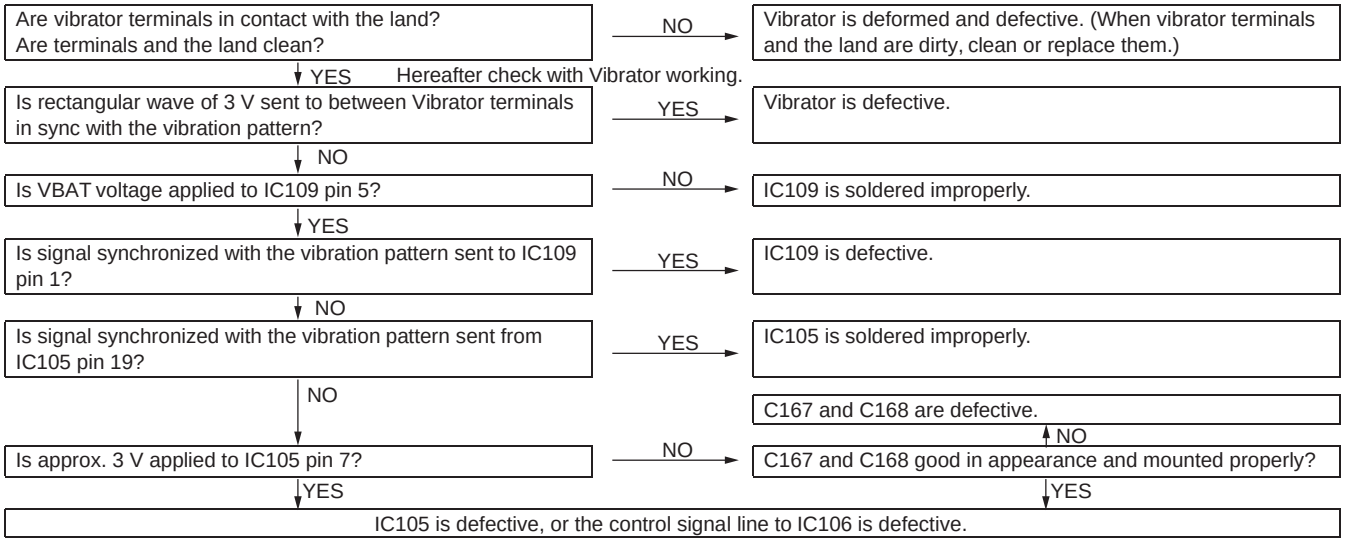
- Is the stereo headset the one specified by Sharp?
  - NO → Is the plug a 6 pole type with a ring?
    - NO ↑ The headset cannot be used. (It works as a monaural headset.)
    - YES → Ⓑ (NEXT PAGE)
  - YES ↓
- Is R-ch only the channel that does not send signals?
  - YES → Ⓑ (NEXT PAGE)
  - NO ↓
- Replace the hands free kit. Is the signal sent ?
  - YES → Hands free kit is defective.
  - NO ↓
- Is the signal sent to JK101 pin 3?
  - YES → Jack JK101 is defective, or the jack plug is in a poor contact with hands free kit.
  - NO ↓
- Is the signal sent to TP121?
  - YES → L103 is defective.
  - NO ↓
- Is the signal sent to the positive pole of C107?
  - YES → C107, C103, and V106 are defective.
  - NO ↓
- Is the signal sent to IC103 pin 60?
  - YES → R124 is defective.
  - NO ↓
- Is the voltage 0 V on R192 (IC106 pin 89 side)?
  - NO → Jack JK 101 is defective, or the jack plug is in a poor contact with hands free kit. (Handset mode is set.)
  - YES ↓
- Is approx. 1.2 V applied to IC103 pin 60?
  - NO → IC103 is defective.
  - YES ↓
- IC103 or IC106 is defective.



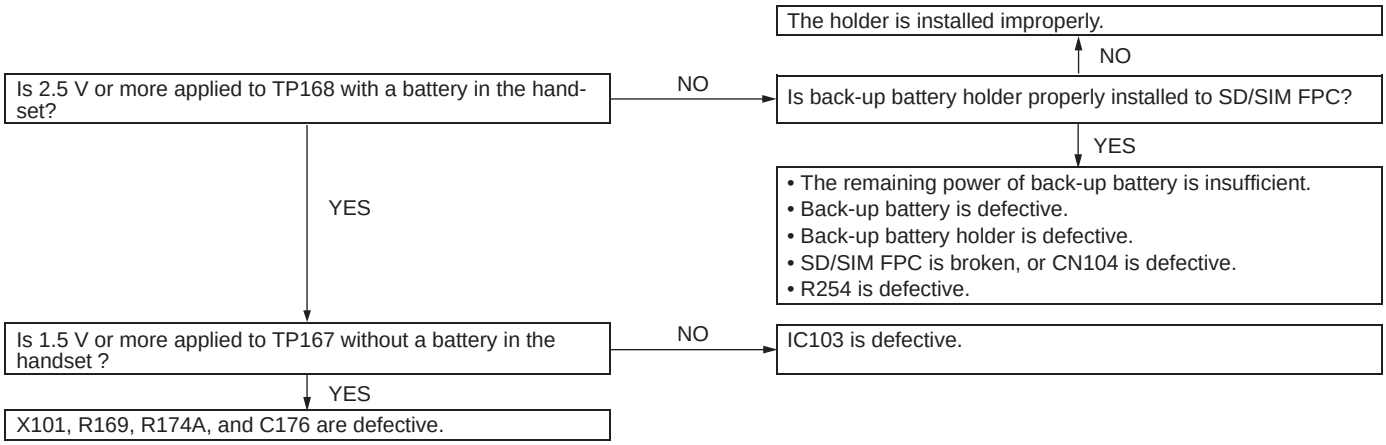
4. BATTERY DOSE NOT CHARGE.



5. VIBRATOR DOSE NOT WORK.

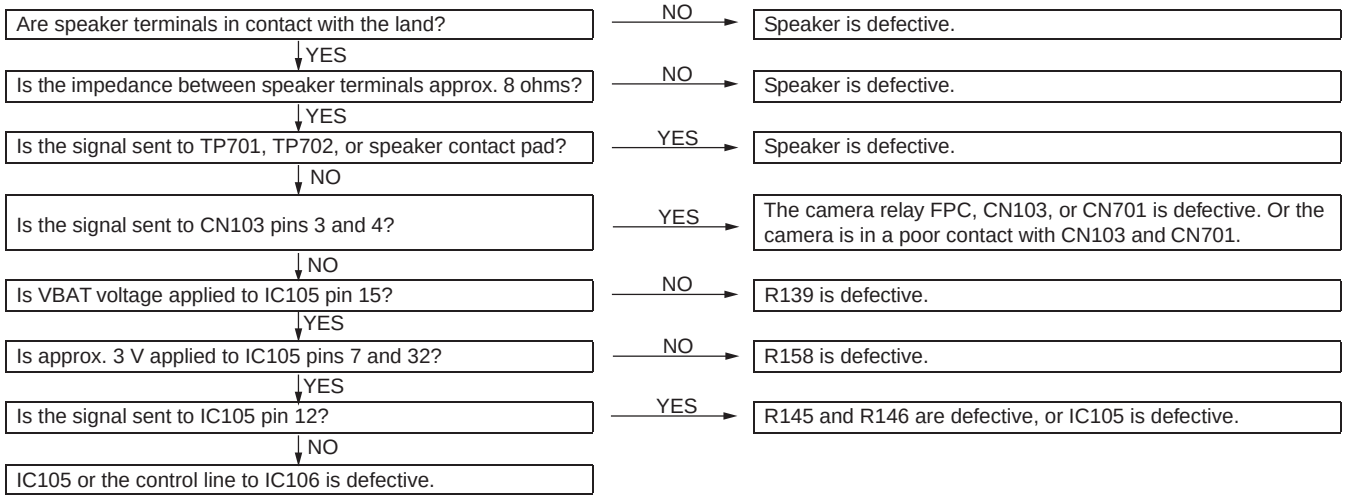


6. CLOCK SETTING ARE RESET.



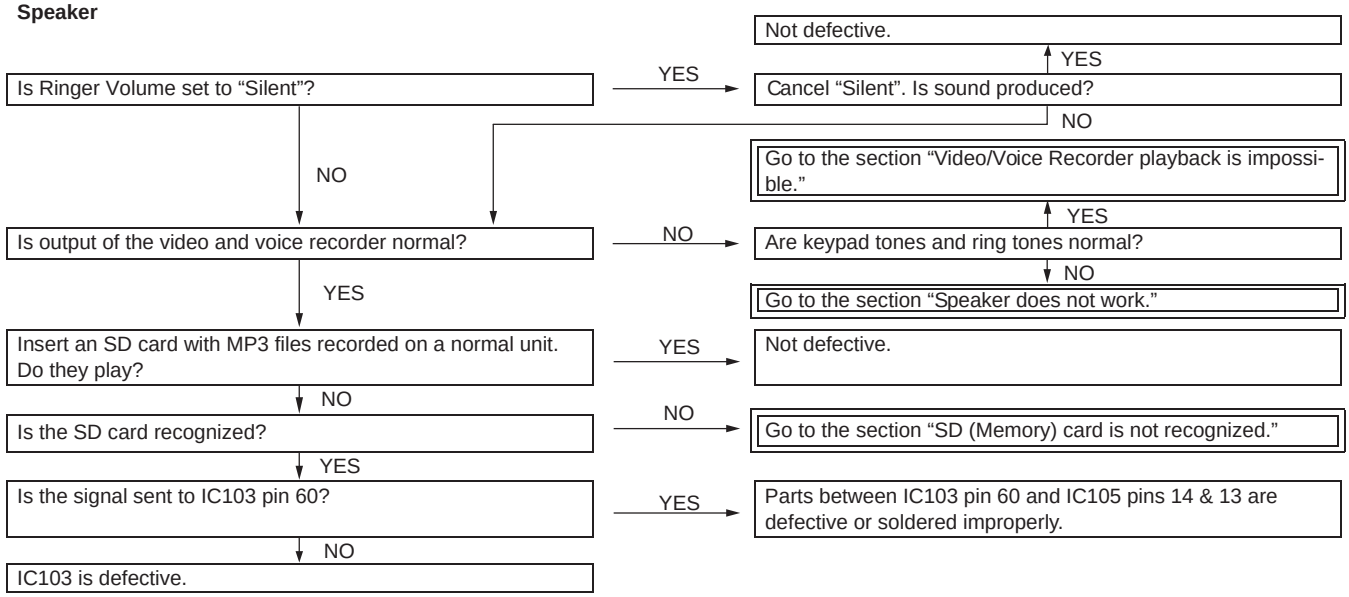
7. SPEAKER DOSE NOT WORK.

* When ring tones sound, but keypad tones do not, “Keypad Tones” is set to Off.
* When Ringer Volume is set to “Silent”:
  · Voice Recorder playback sound is not produced.
  · Playback sound of Video and MP3 can be heard by increasing the volume during playback.

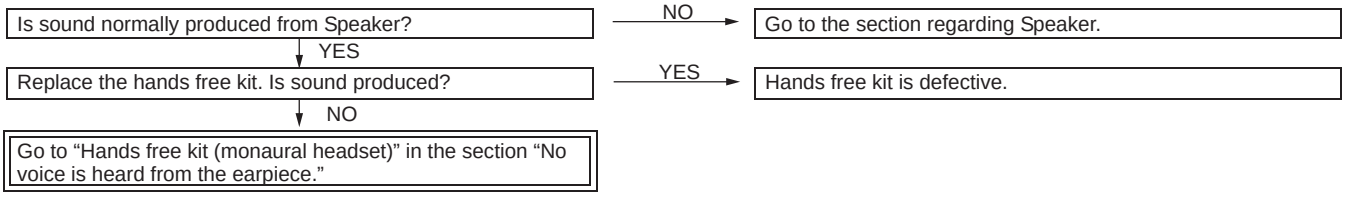


8. MP3 CANNOT BE PLAYED.

Speaker

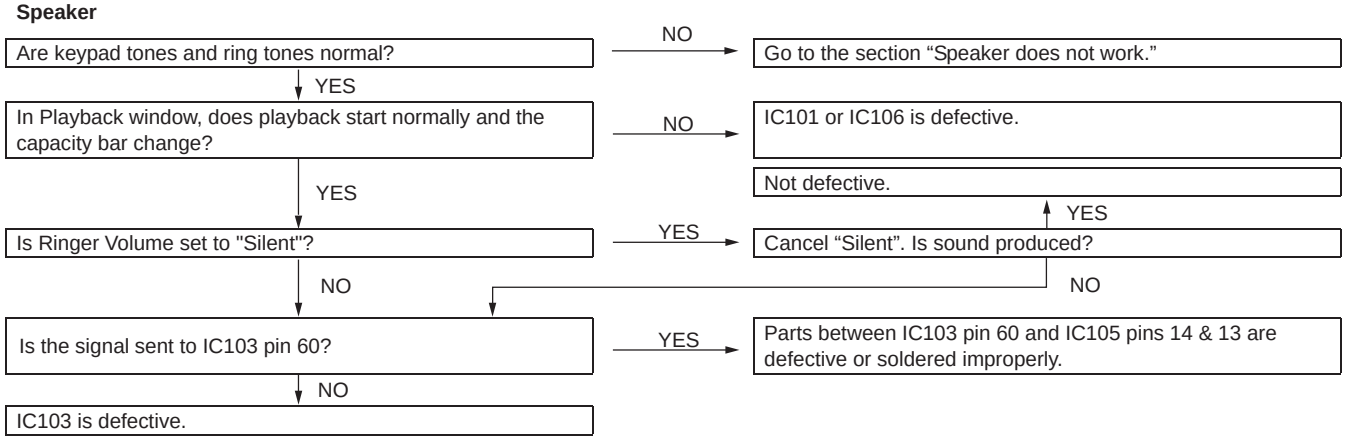


Hands free kit (headset)
(The following procedure applies to both monaural and stereo headsets.)



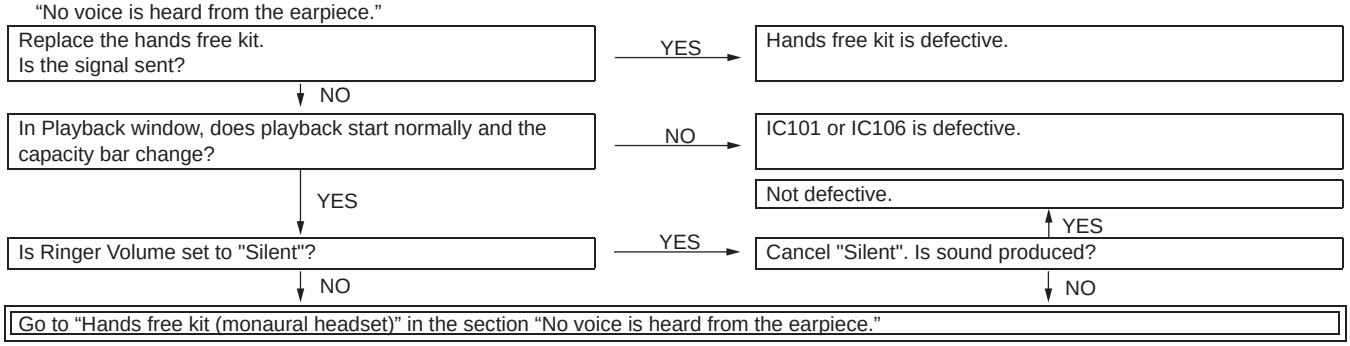
9. VIDEO/VOICE RECORDER PLAYBACK IS IMPOSSIBLE.

Speaker

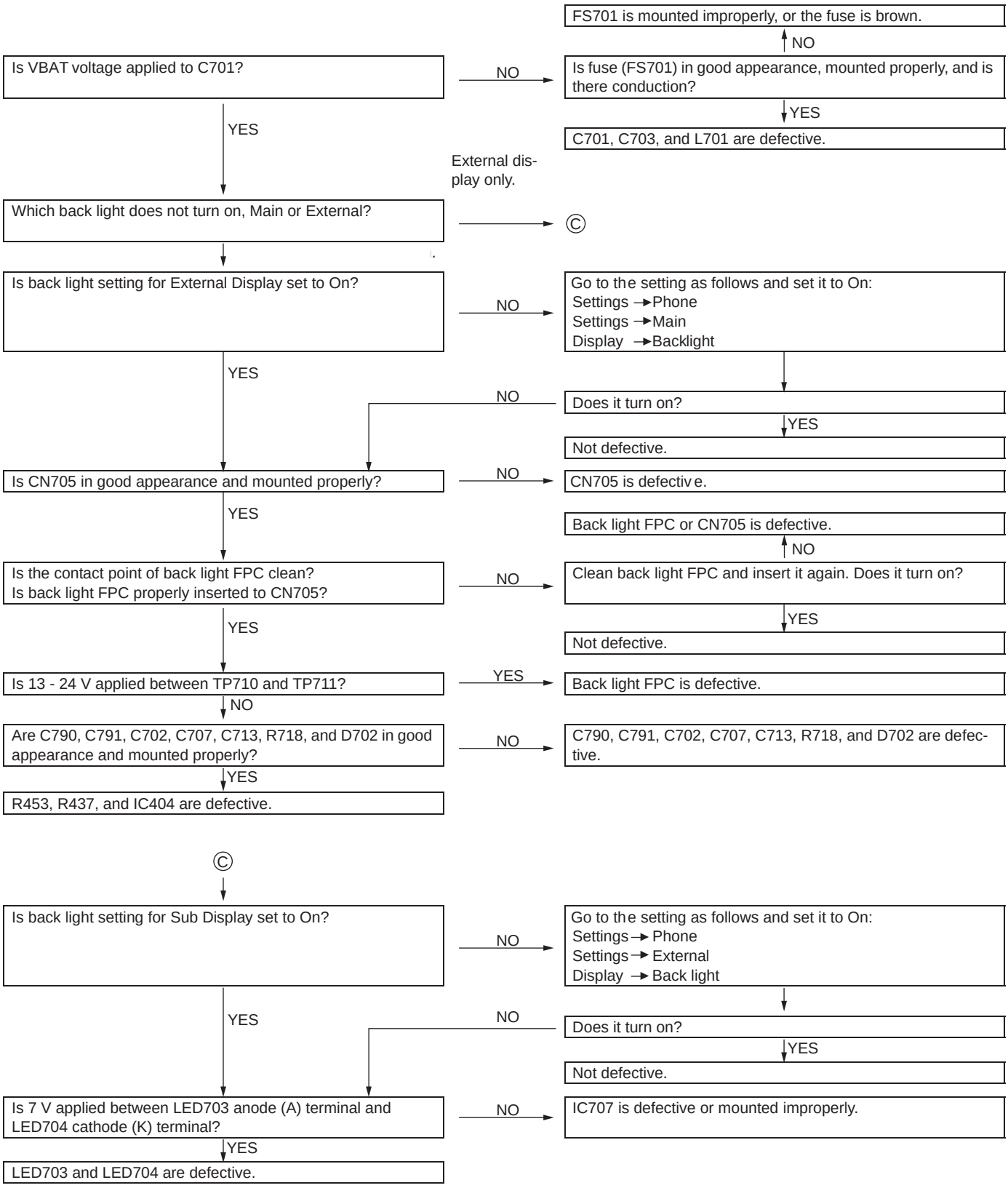


Hands free kit (headset)

* If R-ch is the only channel of stereo headset that does not send signals, see “Hands free kit (stereo headset)” in the section “No voice is heard from the earpiece.”

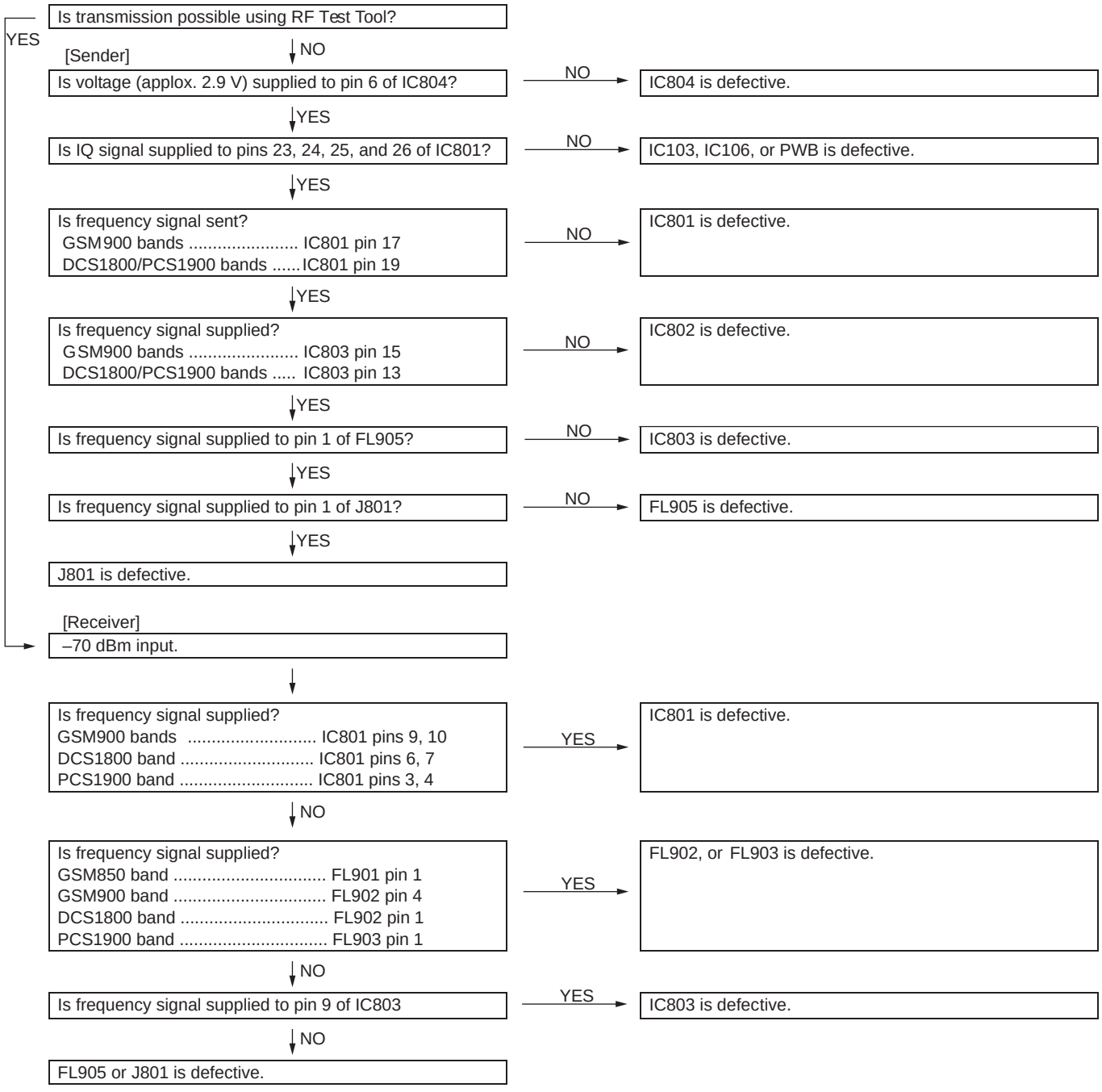


10. BACK LIGHT DOES NOT TURN ON.

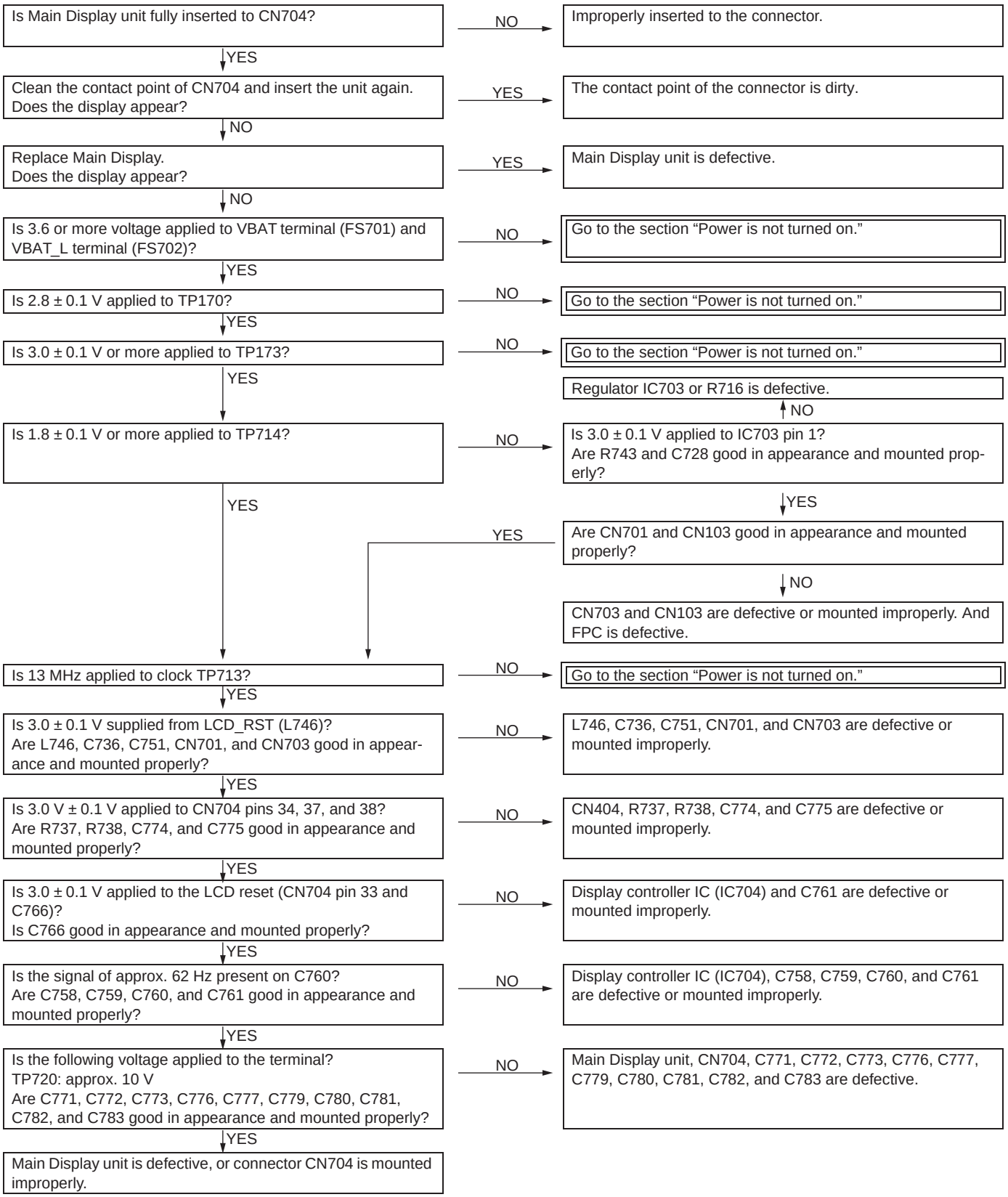


11. OUT OF RANGE AND INCOMING/OUTGOING CALLS ARE IMPOSSIBLE.

[Checkpoint s in RF Test Tool]



12. THE DISPAY DOES NOT APPEAR ON MAIN DISPLAY.



13 . THE DISPLAY DOES NOT APPEAR ON EXTERNAL DISPLAY (IN 65K COLOR MODE).

Does the display appear on Main Display?
- NO → Go to the section “Power is not turned on.”
- YES ↓

Is External Display On/Off setting set to On?
- NO → Go to the setting as follows and set it to On:
  Settings → Phone
  Settings → External
  Display → Display On/Off
- YES ↓

Is External Display unit fully inserted to CN703?
- NO → Improperly inserted to the connector.
- YES ↓

Clean the contact point of the connector CN703 and insert the unit again. Does the display appear?
- YES → The contact point of the connector is dirty.
- NO ↓

Is 3 ± 0.1 V applied to CN703 pin 9?
Is R723 good in appearance and mounted properly?
- NO → R723 is defective or mounted improperly.
- YES ↓

Are CN701 and CN103 good in appearance and mounted properly?
- NO → CN703 and CN103 are defective or mounted improperly. And FPC is defective.
- YES ↓

Is 3.0 ± 0.1 V supplied from LCD_RST (CN703 pin 27 and C751)?
- NO → IC707, C736, C751, and L749 are defective or mounted improperly.
- YES ↓

Is R222 good in appearance and mounted properly?
- NO → R222 is defective or mounted improperly.
- YES ↓

Are C755, C756, and C758 good in appearance and mounted properly?
Is electric potential normal at both ends of C755, C756, and C757? Are rectangular waves sent?
- C755: rectangular wave of approx. 3 V
- C756: rectangular wave of approx. 6 V
- C757: rectangular wave of approx. 9 V

- NO → C755, C756, C757, and CN703 are defective, or External Display unit is defective.
- YES ↓

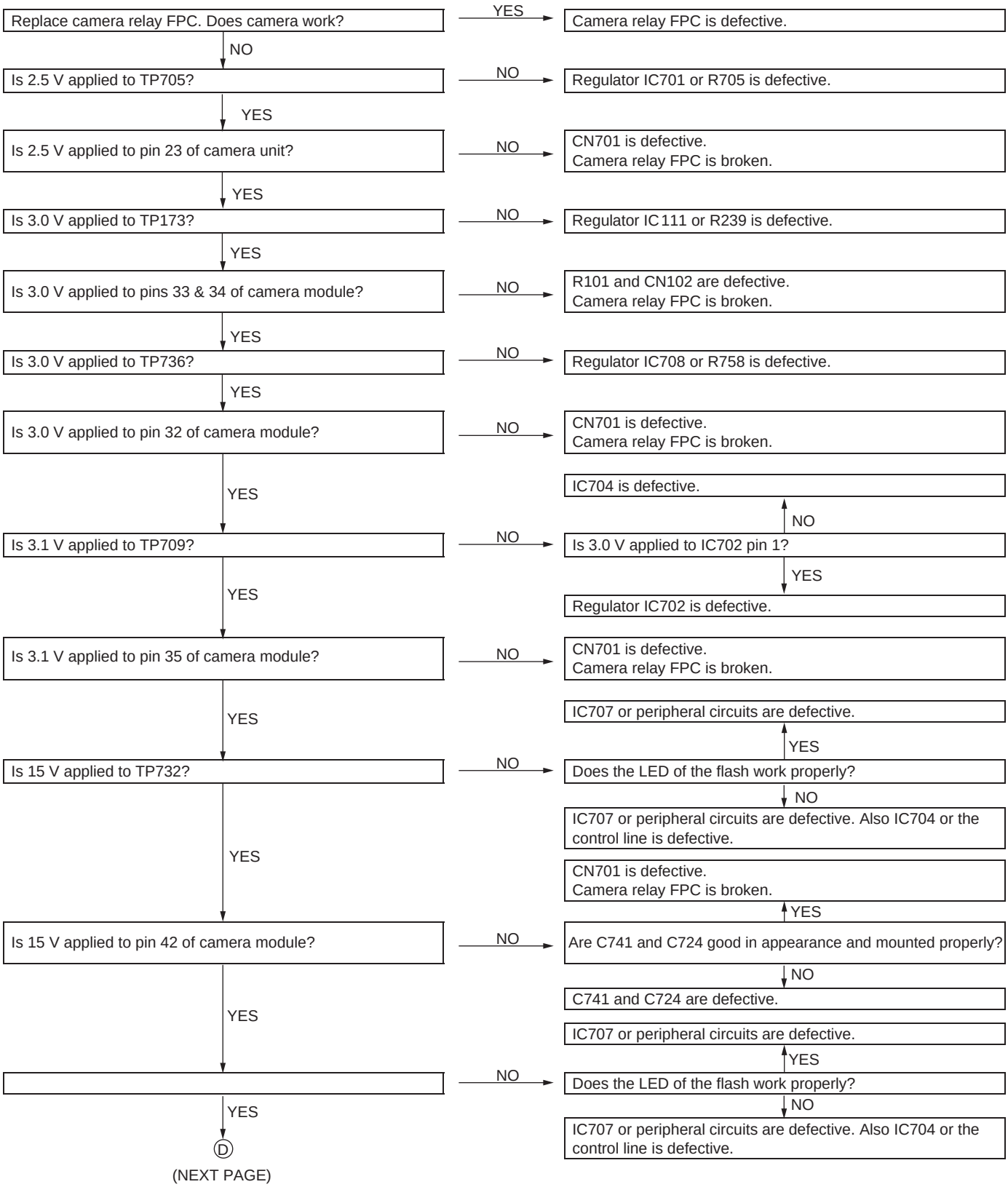
Is approx. 11.8 V applied to CN703 pin 7 (TP717)?
Are the following voltages applied to V0 - V4?
- V0 (C744): approx. 8.56 V
- V1 (C745): approx. 7.33 V
- V2 (C747): approx. 6.11 V
- V3 (C748): approx. 2.42 V
- V4 (C750): approx. 1.20 V

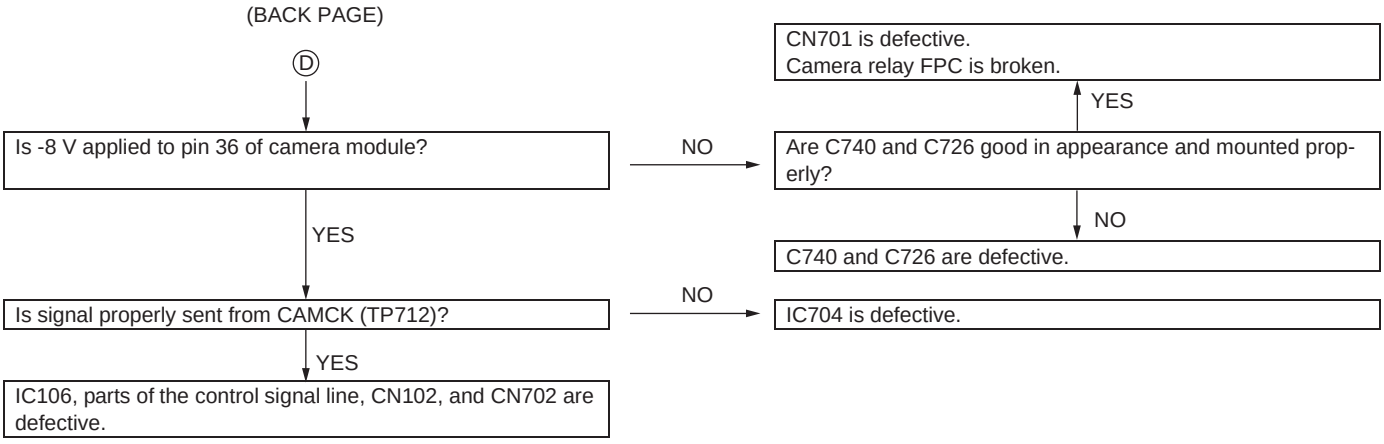
- NO → C744, C745, C747, C748, C750, CN703, and IC704 are defective. The control signal line to IC704 or External Display unit is defective.
- YES ↓

External Display unit is defective.

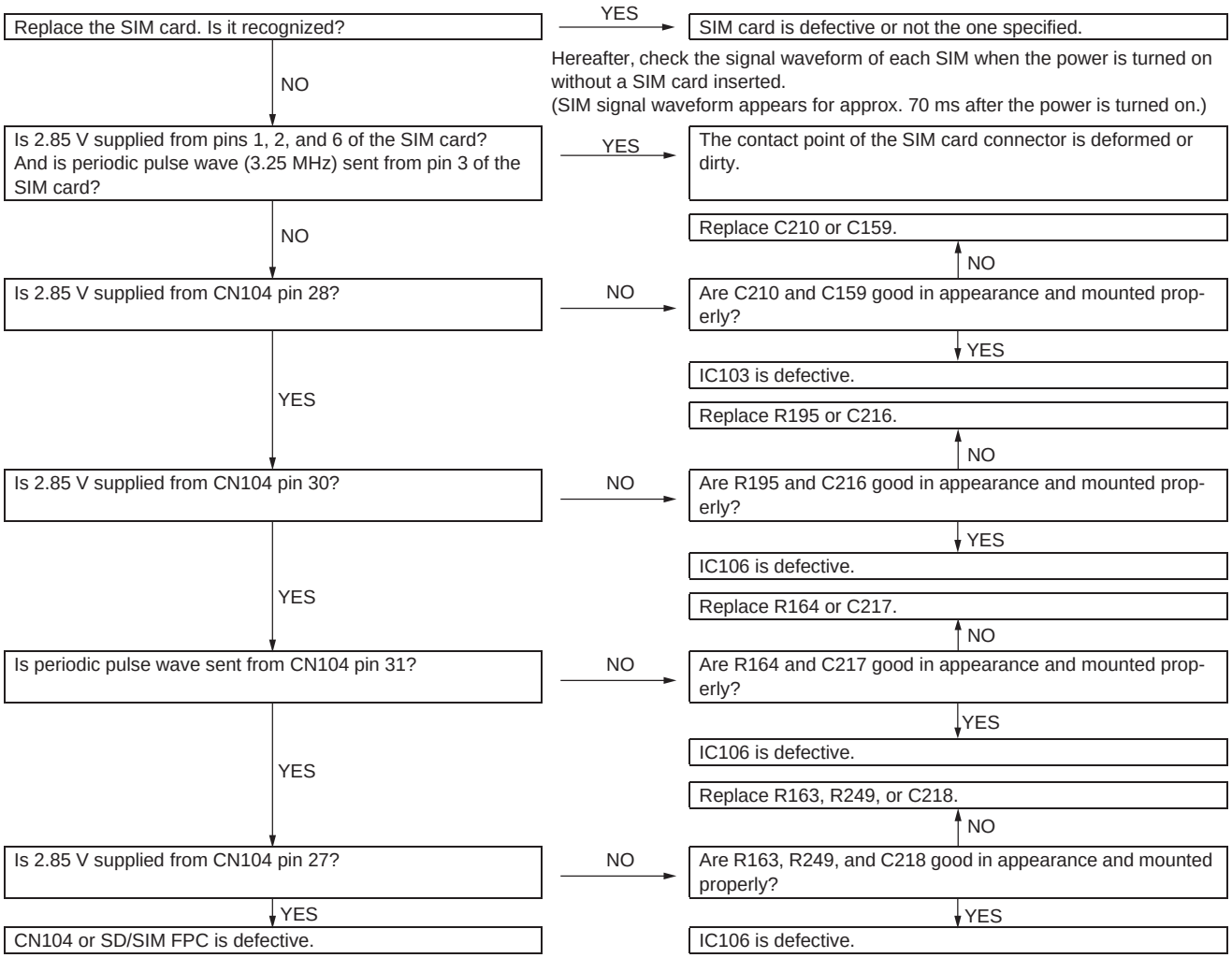
* After a period of time the back light turns off, the voltage on TP717 decreases to approx. 9 V.

14. PICTURES CANNOT BE TAKEN.

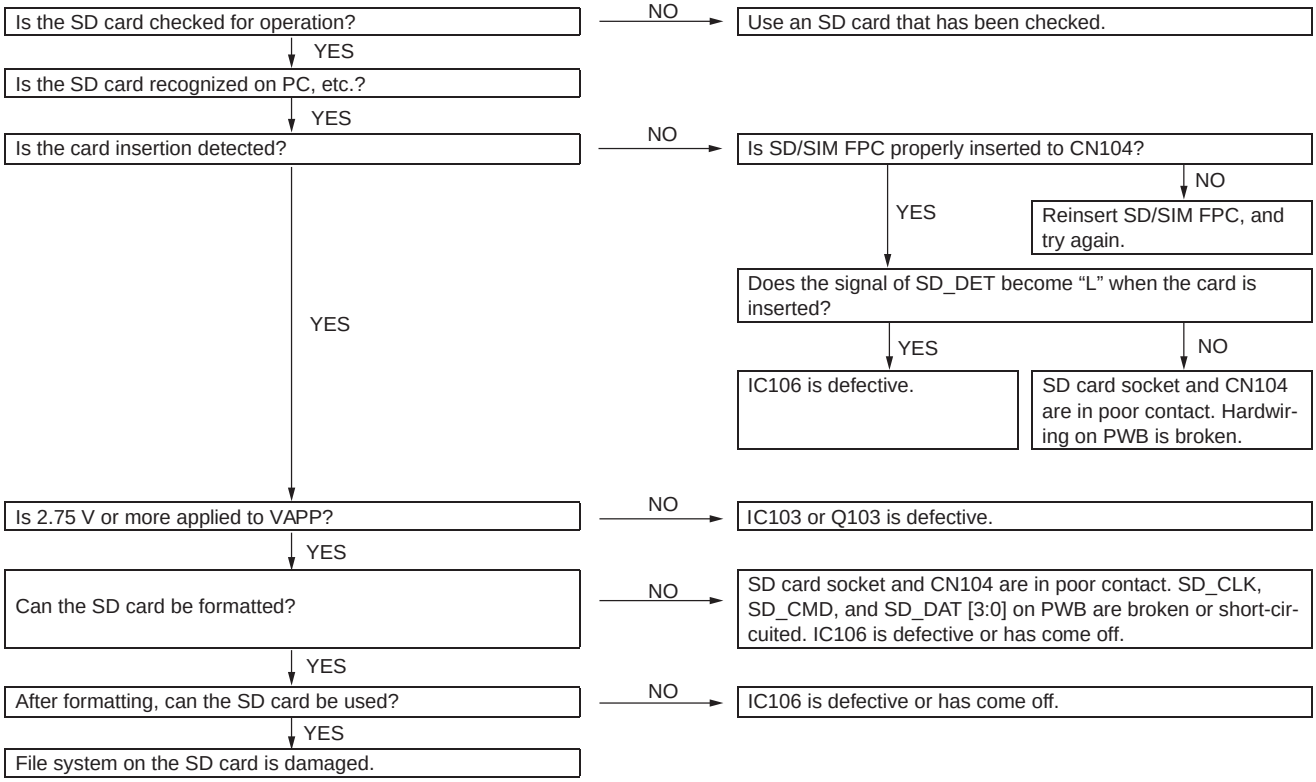




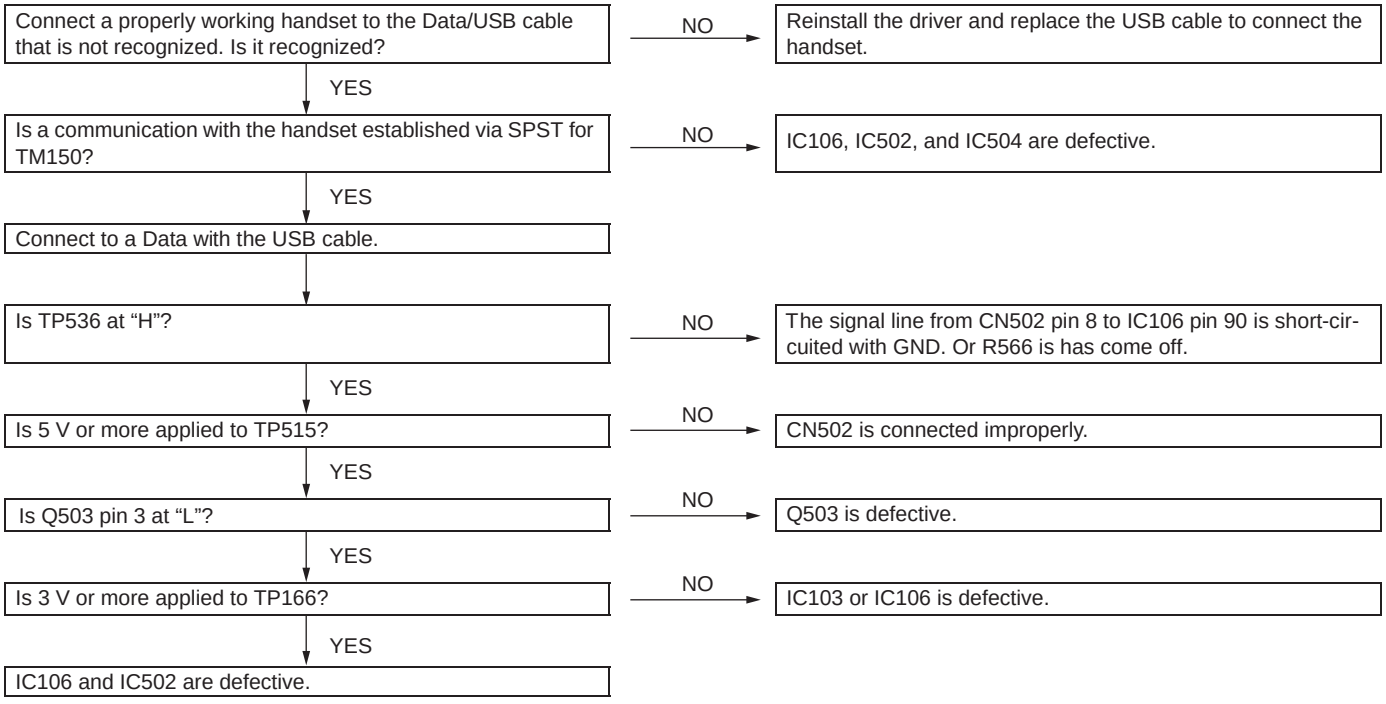
15. SIM CARD IS NOT RECOGNIZED.



16. SD (MEMORY) CARD IS NOT RECOGNIZED.



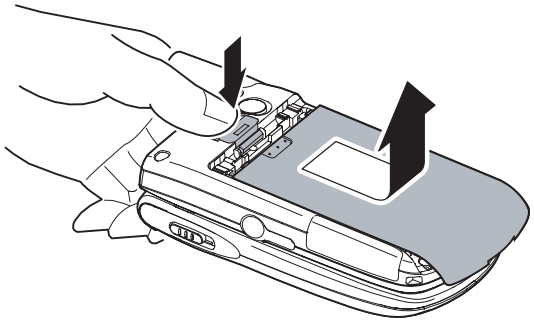
17. USB CONNECTION IS IMPOSSIBLE.



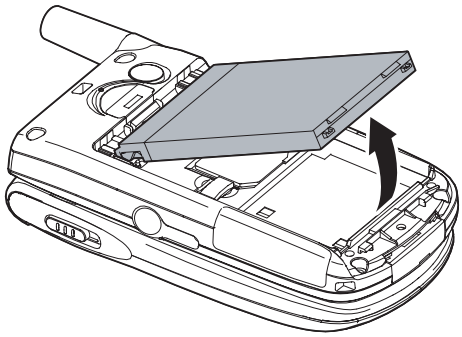
CHAPTER 3. DISASSEMBLY AND REASSEMBLY

A. BATTERY REMOVAL

1) Release lock, and remove the battery cover.



2) Remove the battery.

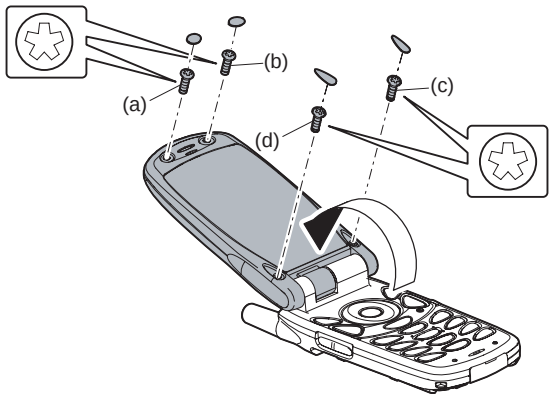


B. SPEAKER REMOVAL

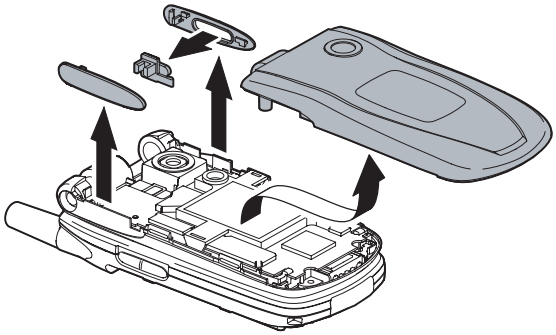
1) Open the display section. Remove the screw cover, and remove the special screw.

∗ When removing the special screw, use the exclusive tool.

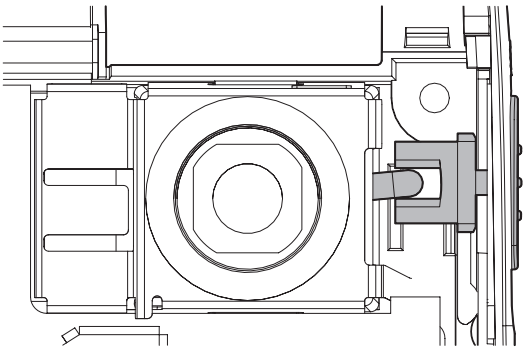
∗ When tightening the screws, follow the tightening sequence of (a), (b), (c), and (d).



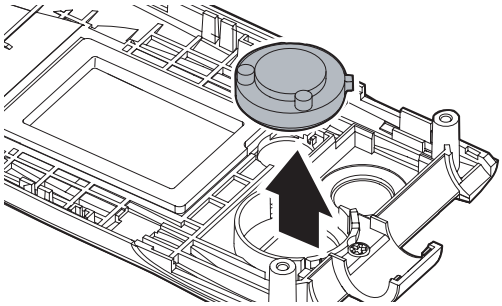
2) Close the display section, and remove the cabinet B unit. Remove the side frame L and R, and remove the closeup lever.



∗ When installing, squeeze the camera closeup lever.



3) Remove the speaker from the cabinet B unit.

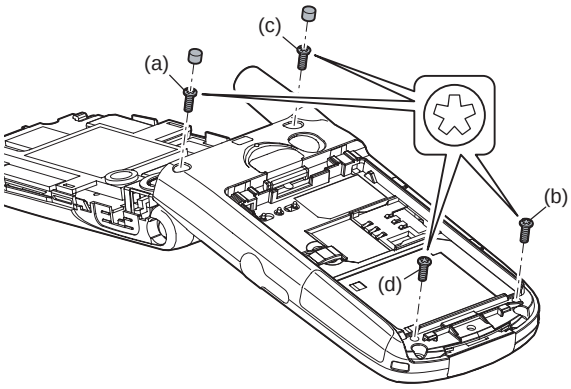


C. VIBRATING MOTOR REMOVAL

1) Open the display section. Remove the screw cover, and remove the special screw.

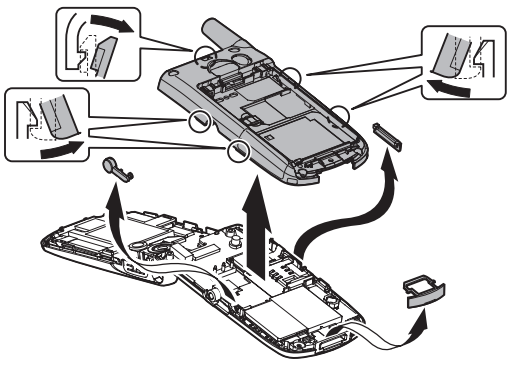
∗ When removing or installing the special screw, use the exclusive tool.

∗ When tightening the screws, follow the tightening sequence of (a), (b), (c), and (d).

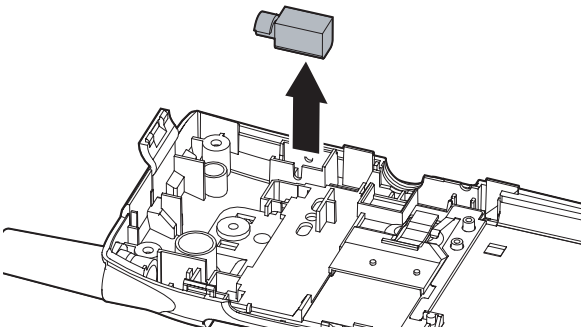


2) Disengage the pawls, and cabinet D unit. Remove the side key, the jack cover, and the external connector cover.

∗ Slightly open the cabinet D on the external connector side. Disengage two pawls on the external connector side, Disengage two pawls on the antenna side. Remove the cabinet D.



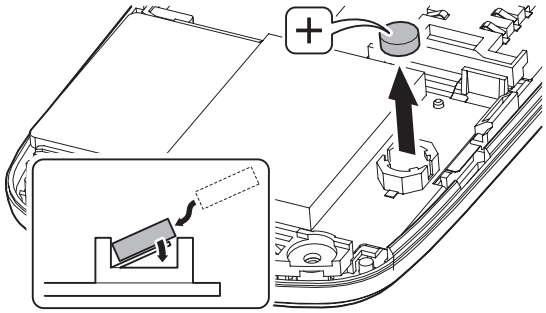
3) Remove the vibrating motor from the cabinet D unit.



D. BACKUP BATTERY REMOVAL

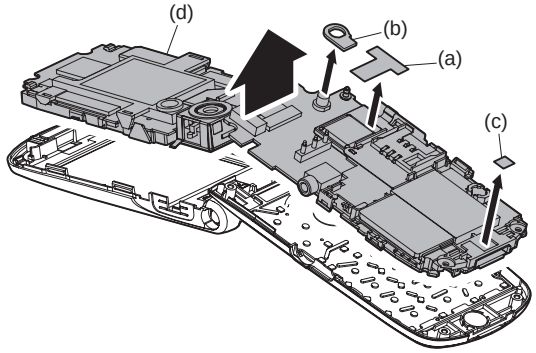
1) Remove the backup battery from the PWB unit.

∗ When installing the battery, be careful of the installing direction and install it diagonally from the lower side of the battery holder spring.



E. MAIN/LCD PWB UNIT REMOVAL

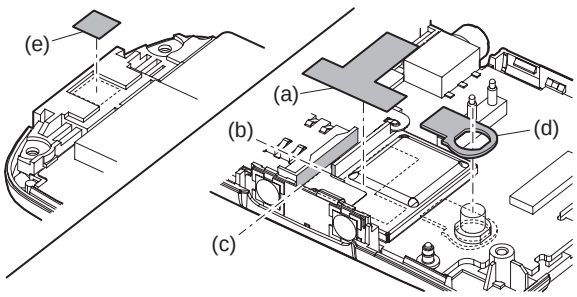
1) Remove the antenna characteristics countermeasure sheet (a), the ANT dust-prevention sheet (b), and the submersion sheet (c). Remove the PWB unit (d).



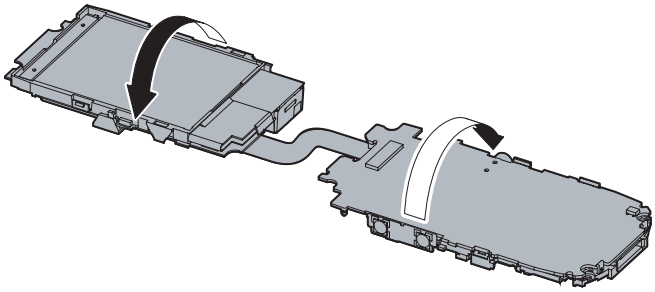
∗ When attaching the antenna characteristics countermeasure sheet (a), use the BB shield case end face (reference line (b)) and the SIM connector end face (reference line (c)) as the reference.

∗ Attach the ANT dust-prevention sheet (d) so that it is fit with the RF external antenna connector with the PWB silk section as the reference.

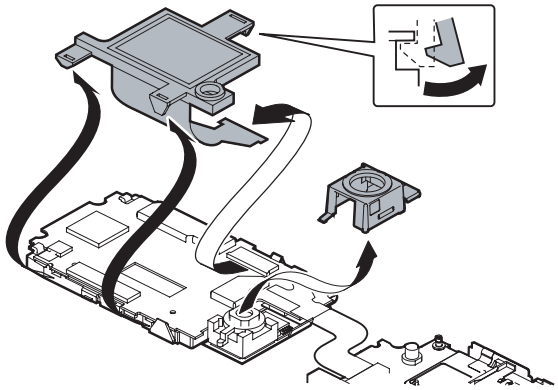
∗ Attach the submersion sheet (e) inside the bump area.



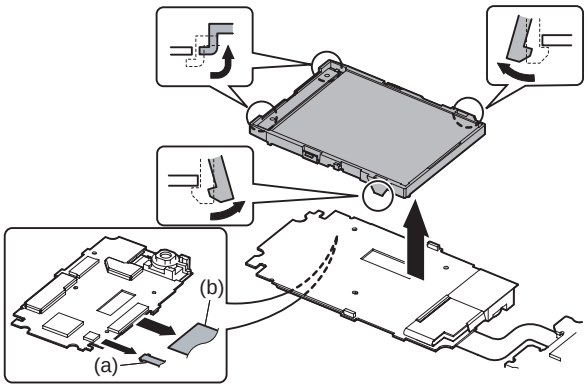
∗ When attaching the PWB unit, rotate the main PWB and the LCD PWB 180 degrees in the arrow direction to wind the flat cable.



2) Remove the camera shield case unit from the main/LCD PWB unit. Disengage the pawl, and remove the sub LCD unit. Disconnect the connector.



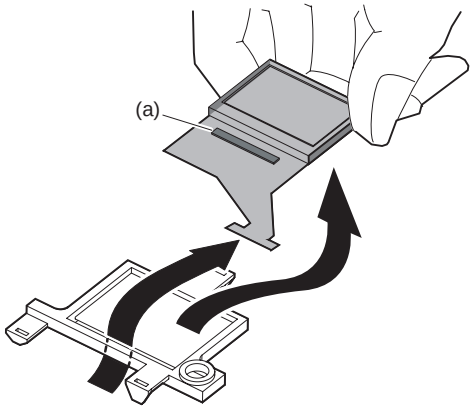
3) Remove the connector (a). Disengage the pawl, and remove the main LCD unit. Disconnect the connector (b).



F. SUB LCD REMOVAL

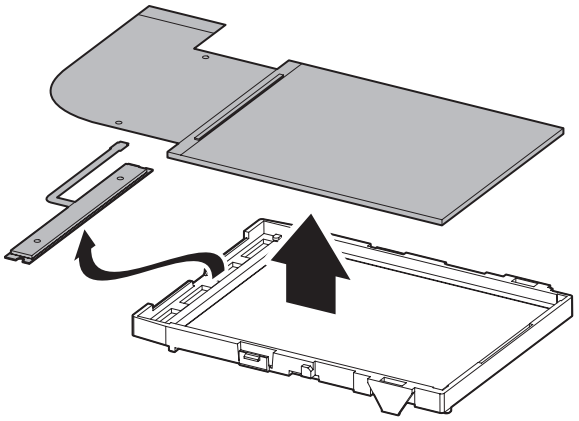
1) Remove the sub LCD from the sub LCD holder unit.

∗ Hold the both ends of the sub LCD as shown in the figure, and never press TAB (a).

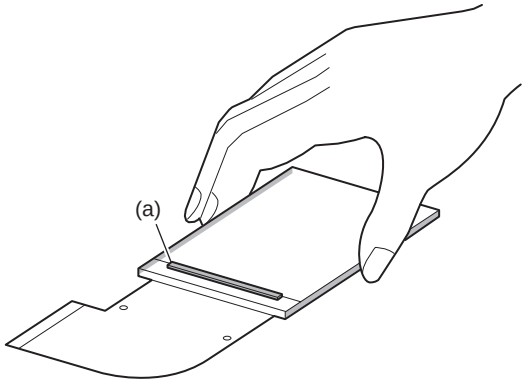


G. MAIN LCD, BL FLEXIBLE UNIT REMOVAL

1) Remove the main LCD from the main LCD holder unit.
Remove the BL flexible unit.

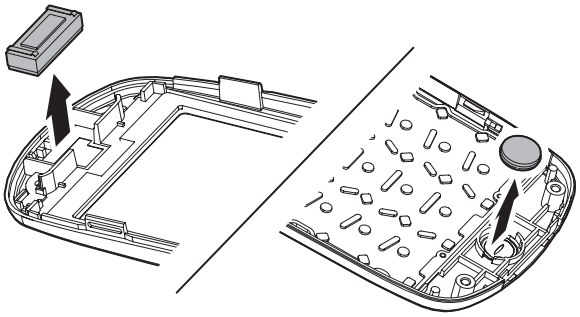


∗ Hold the both ends of the main LCD as shown in the figure, and never press TAB (a).

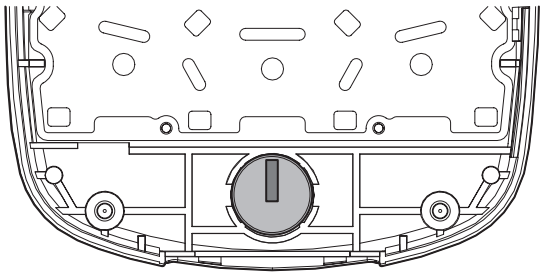


H. RECEIVER AND MIC REMOVAL

1) Remove the receiver and the mic from the cabinet A/C unit.



∗ When attaching the mic, use care to set so that the spring direction is vertical to the cabinet.

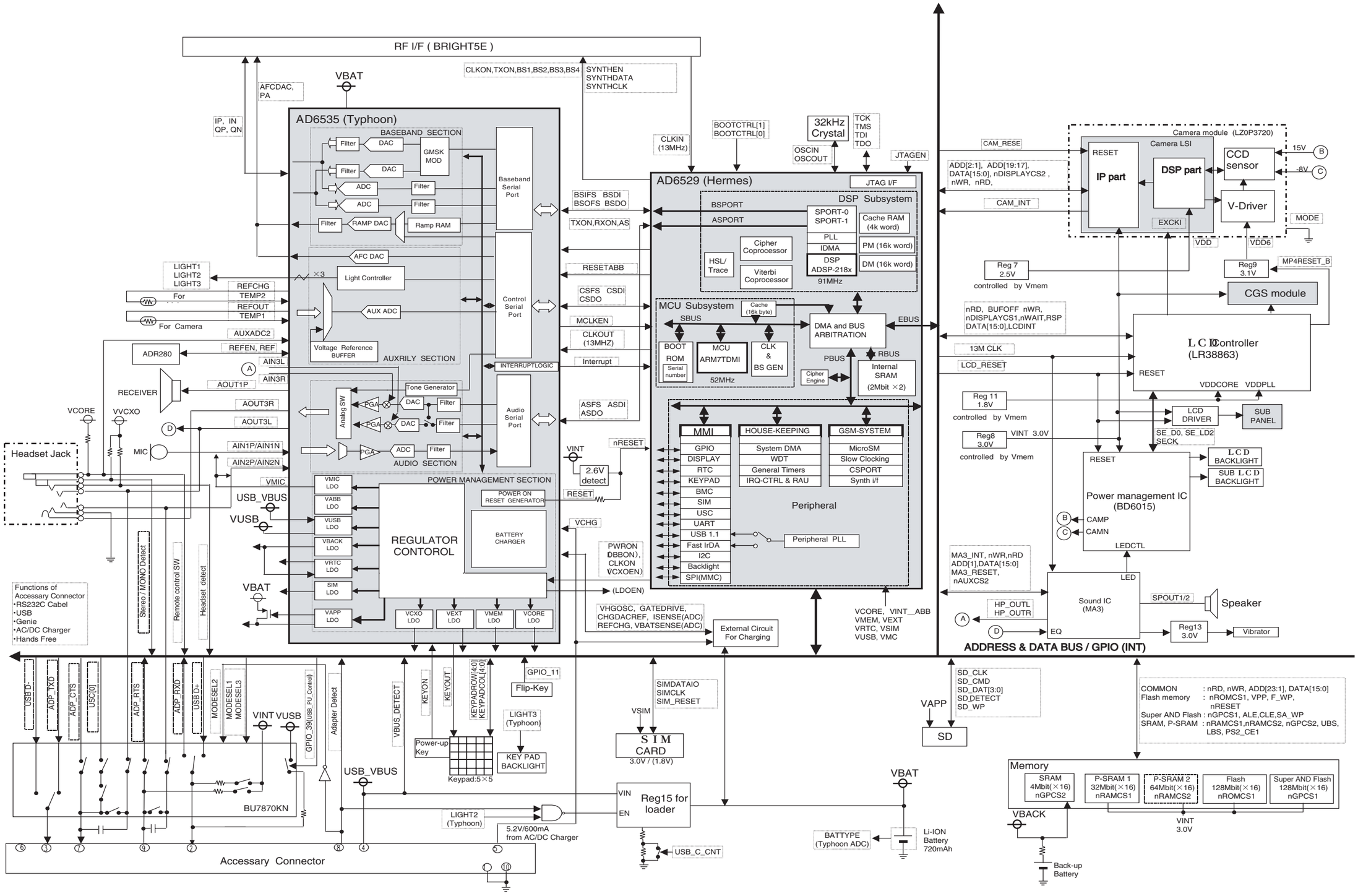


CONFIDENTIAL DRAFT

CHAPTER 4. DIAGRAMS

[1] Block diagram

[Main]



CONFIDENTIAL DRAFT

[RF]

RX Line
TX Line
Control Line
(D): Digital (A): Analog

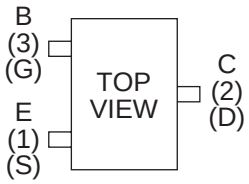
BS1 (D)
BS2 (D)
BS3 (D)
BS4 (D)
PA (A)
VBAT
IC804
Voltage Regulator
TCXOEN (D)
VRF
VTCXO
IP (A)
IN (A)
QP (A)
QN (A)
TCXOOUT (D)
TCX801
AFCDAC (A)
26MHz VCTCXO
Loop filter
I&Q MOD
1/2
90deg shift(1/2)
DPD
Loop filter
RF Synthesizer
IF Synthesizer
PGA Part
PGA
IC801
RFIC
(HD155155)
SYNTHEN (D)
SYNTHDATA (D)
SYNTHCLK (D)
Serial data interface
90 deg Shift(1/2)
LNA
VBAT
BS 2
BS 4
BS1
BS2
BS3
1800/ 1900
900
IC802
PA
(RF3146)
APC
1800/1900
900
IC803
Test Connector
J801
RFSW
Antenna
FL902
GSM900 RX
SAW Filter
DCS RX
FL903
PCS RX
SAW Filter

CHAPTER 5. SCHEMATIC DIAGRAM AND WIRING SIDE OF P.W.BOARD

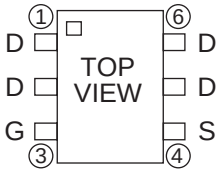
[1] NOTES ON SCHEMATIC DIAGRAM

- Resistor:
  To differentiate the units of resistors, the symbols K and M are used. The symbol K means 1000 ohm and the symbol M means 1000 kohm. The resistor without any symbol is an ohm resistor.
- Capacitor:
  To indicate the unit of capacitor, the symbol is used.
  The symbol P means pico-farad and the unit of the capacitor without such a symbol is microfarad. As to electrolytic capacitor, the expression “capacitance/withstand voltage” is used.
  (CH), (RH), (UJ) : Temperature compensation
  (ML) : Mylar type
  (S) : Styrol type
  (PP) : Polypropylene type
- The indicated voltage in each section is the one measured by Digital Multimeter between such a section and the chassis with no signal given.
- Conditions: SIM card inserted, power on, in stand-by mode (opened)
- Schematic diagram and Wiring Side of P.W. Board for this model are subject to change for improvement without prior notice.
- Parts marked with “⚠” are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

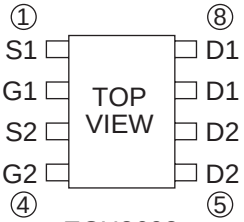
[2] TYPES OF TRANSISTOR AND LED



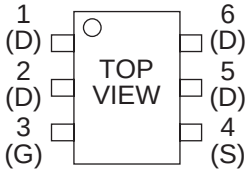
2SK3019
RT1N144 U



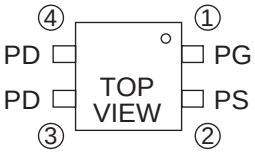
CPH6311



ECH8603



MCH6413

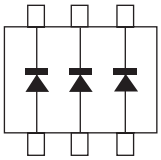


EC4301 C
EC4401 C

TOP VIEW

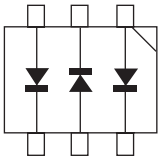
1SS388
1SS405
MA2SD31
MA2SD32
RB160M30
RB521S30
RB551V30

TOP VIEW



HN2S01FU

TOP VIEW

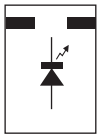


GM56271A

TOP VIEW

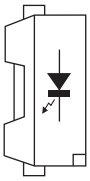
RSB6.8S

TOP VIEW



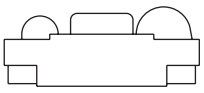
YPY1105C

TOP VIEW



NECW008A

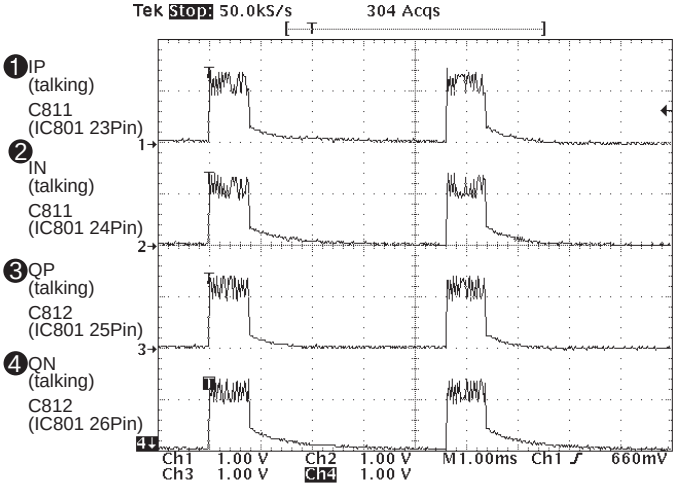
TOP VIEW



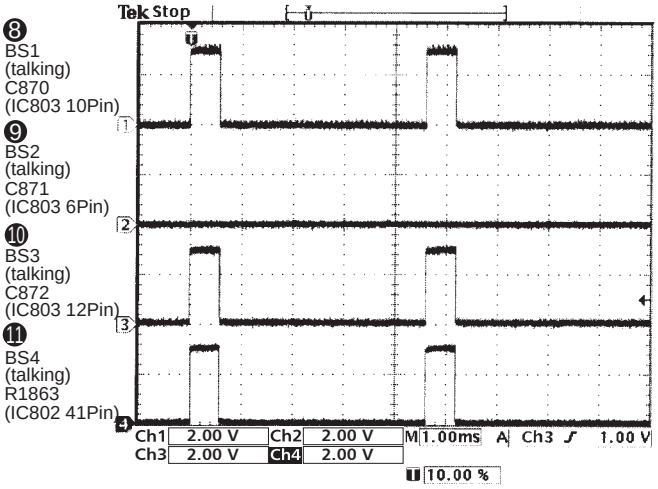
GP2W0116

[3] WAVEFORMS OF CIRCUIT

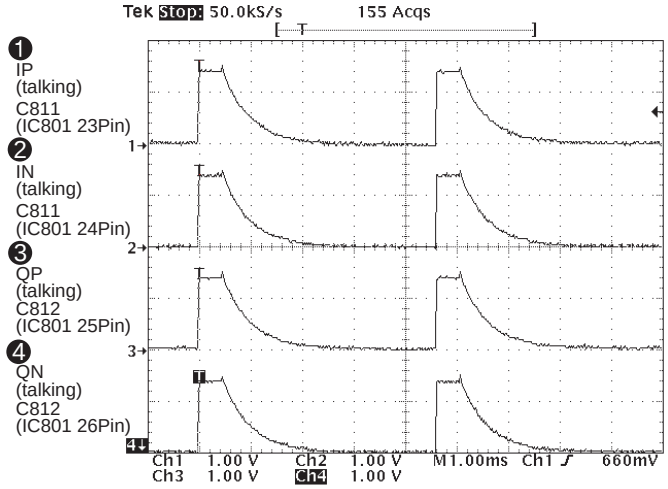
RF Test Tool
Tx test
Data pattern ··· TSC5



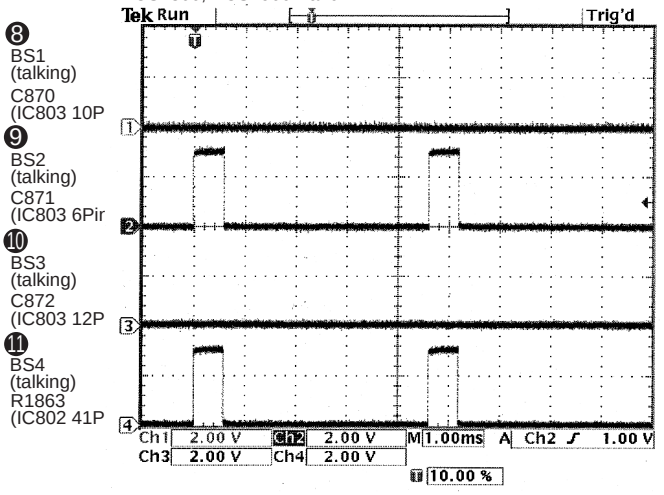
RF Test Tool
Tx test
GSM900 Band



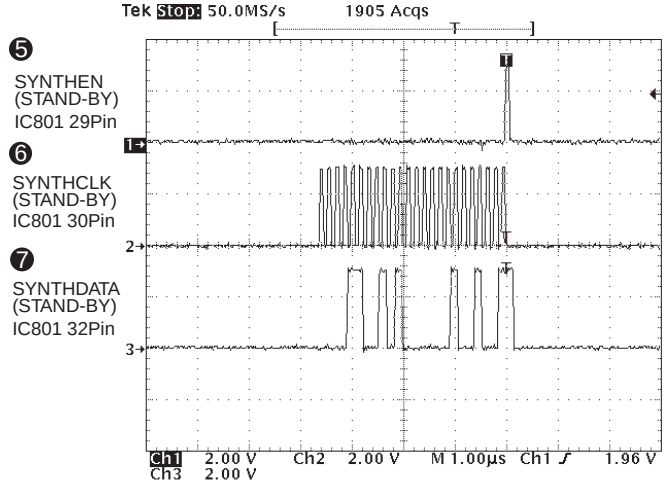
RF Test Tool
Rx test
channel_62, Gain 62dB, SniffOff



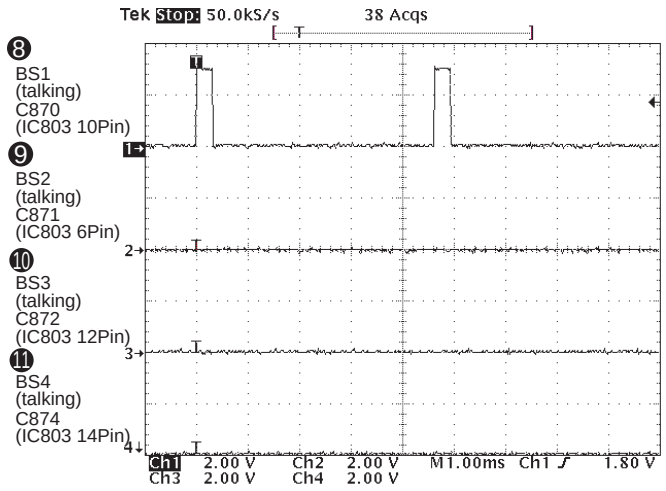
RF Test Tool
Tx test
DCS1800, PCS1900 Band



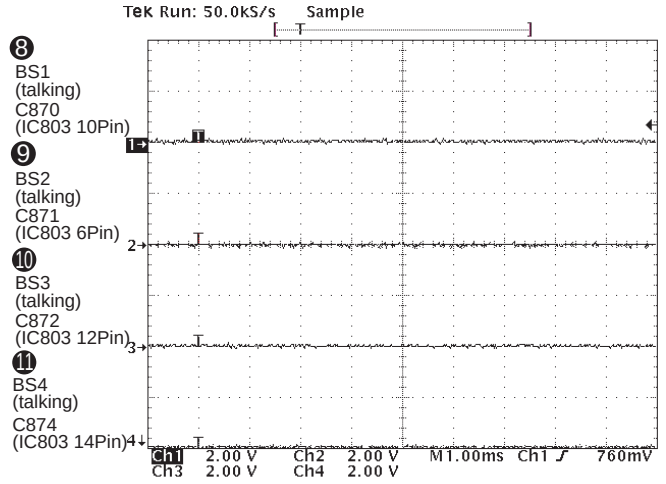
RF Test Tool
Rx test
GSM900 Band (channel 62)



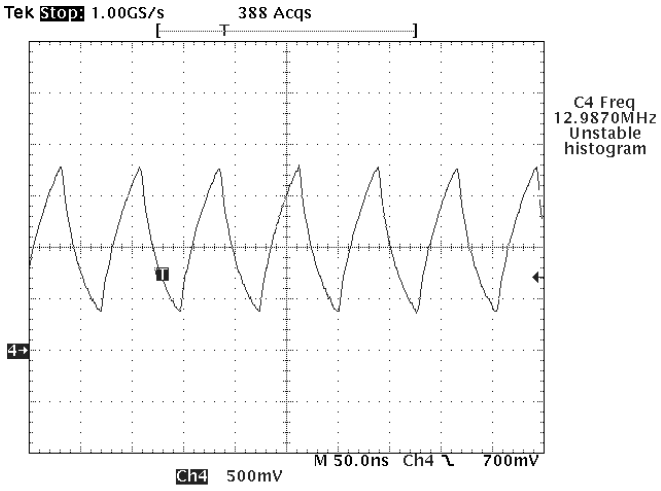
RF Test Tool
Rx test
GSM900, DCS1800 Band



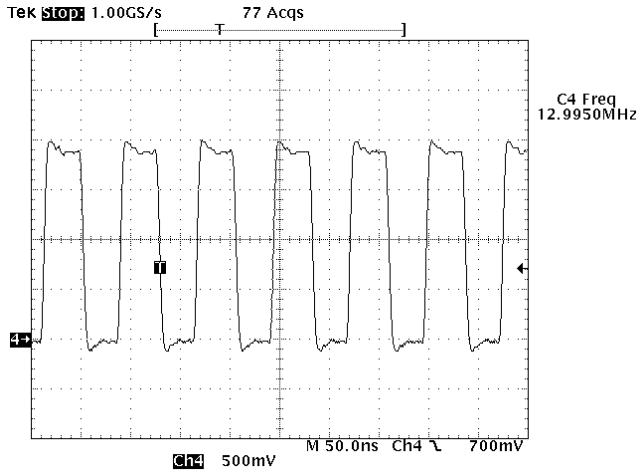
RF Test Tool
Rx test
PCS1900 Band



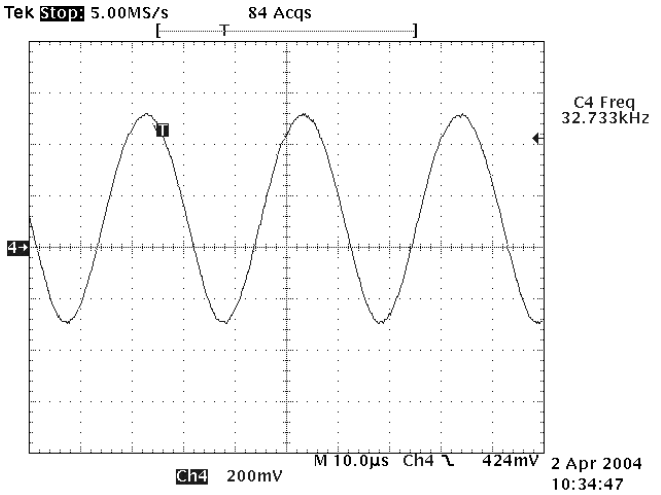
⑫ 13MHz IN (Point R261) To Digital Base Band LSI Pin142



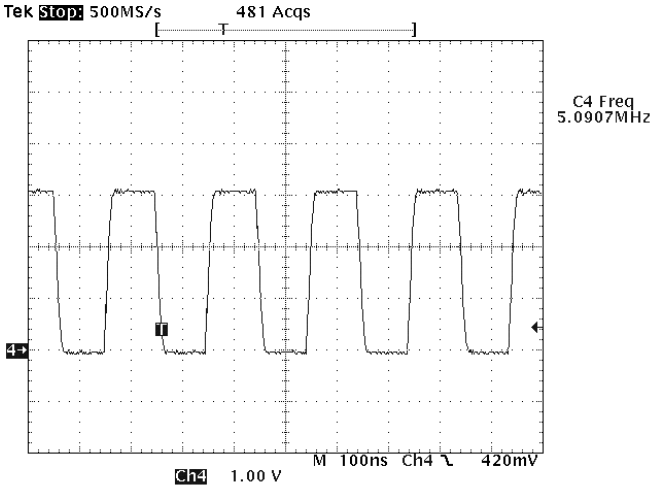
⑬ 13MHz OUT (Point R166) from Digital Base Band LSI Pin84



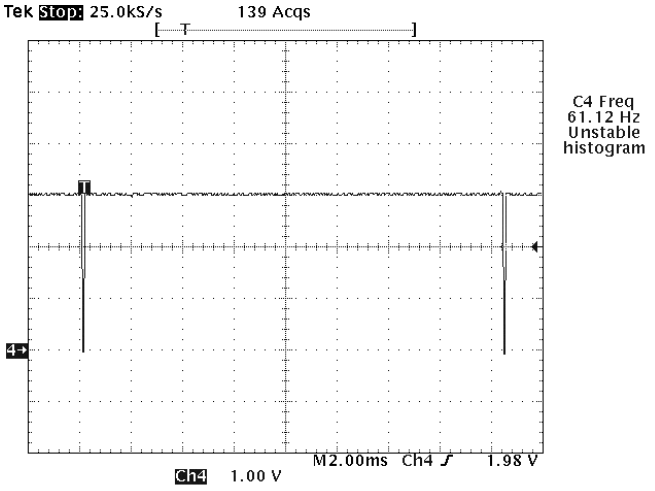
⑭ 32.768KHz IN (Point-R152) To Digtal Base Band LSI Pin49



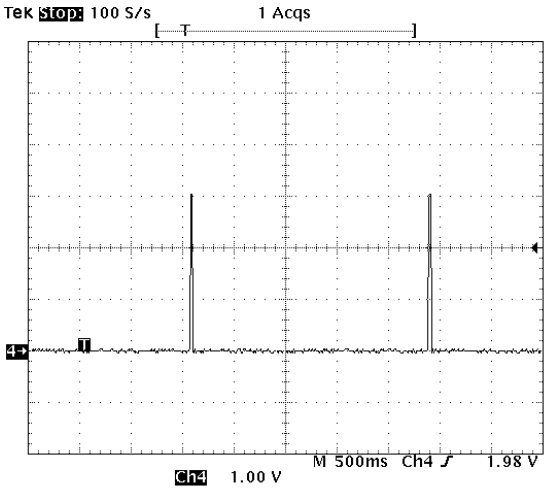
⑮ DCLK (Point-R759 on LCDC_PCB) To LCD Unit pin26



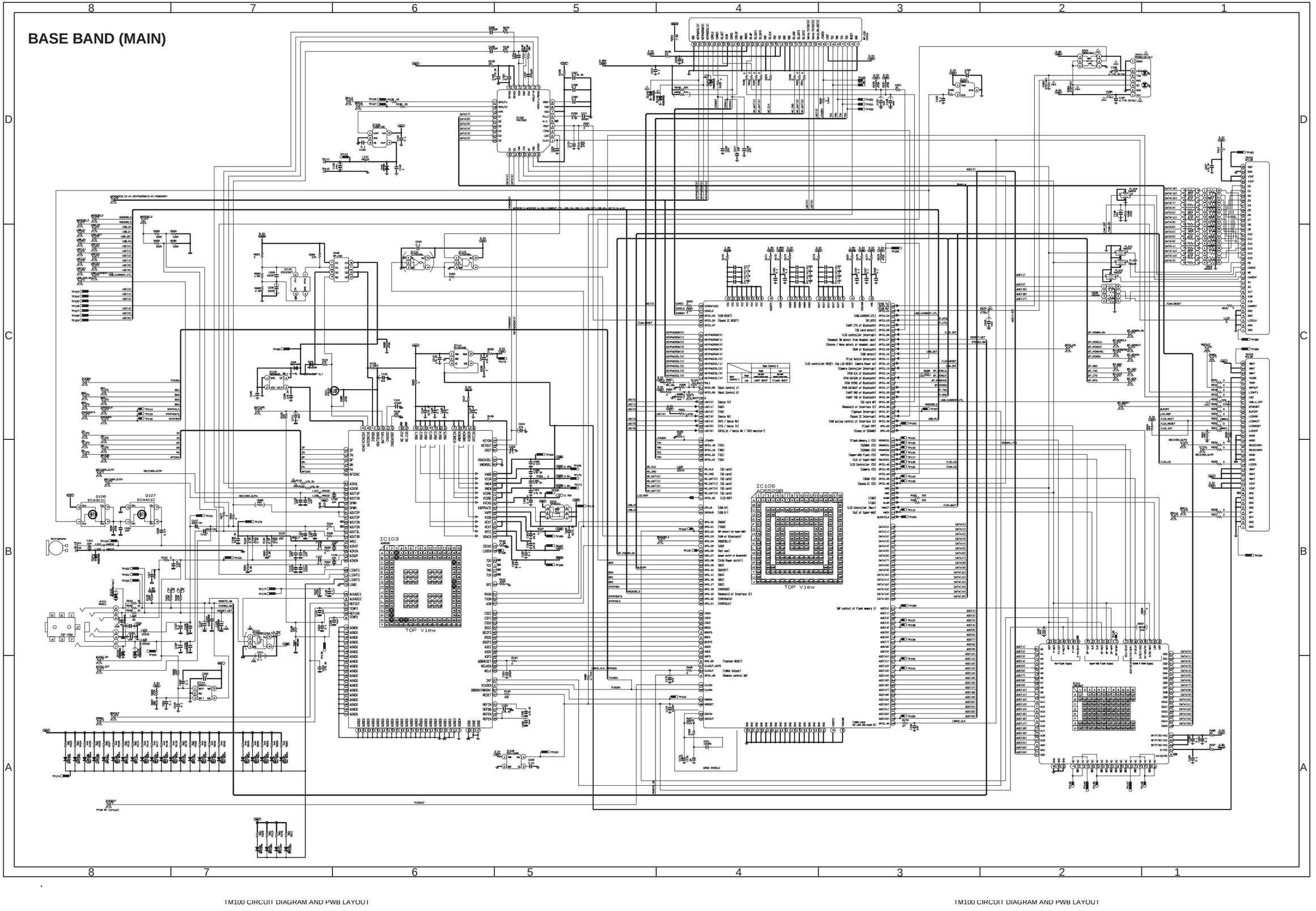
⑯ VSYNC (Point-C760 on LCDC_PCB) To LCD Unit pin28



⑰ TCXOEN (Point-IC804 pin 1) From Analog Base Band LSI Pin 2



BASE BAND (MAIN)



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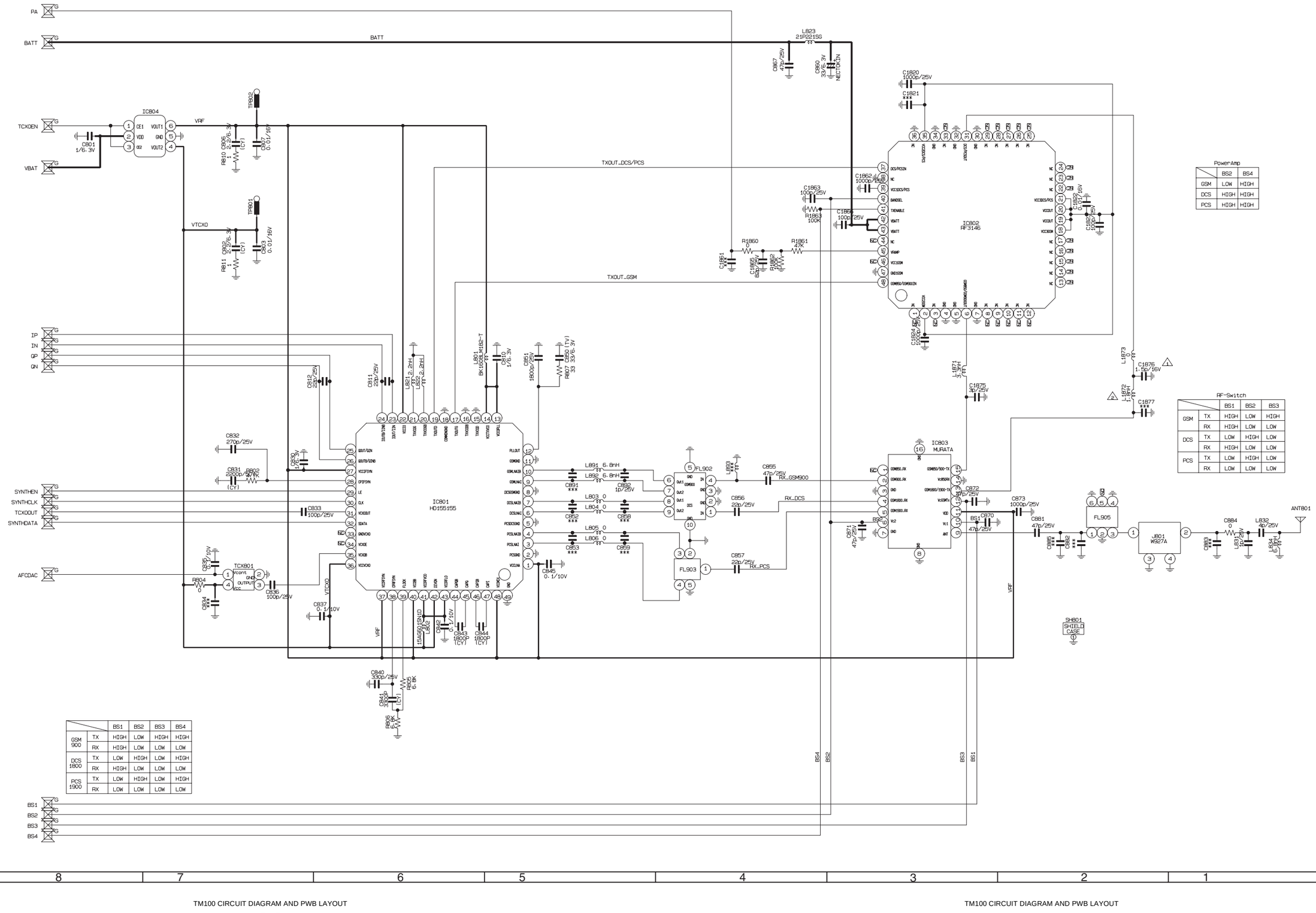
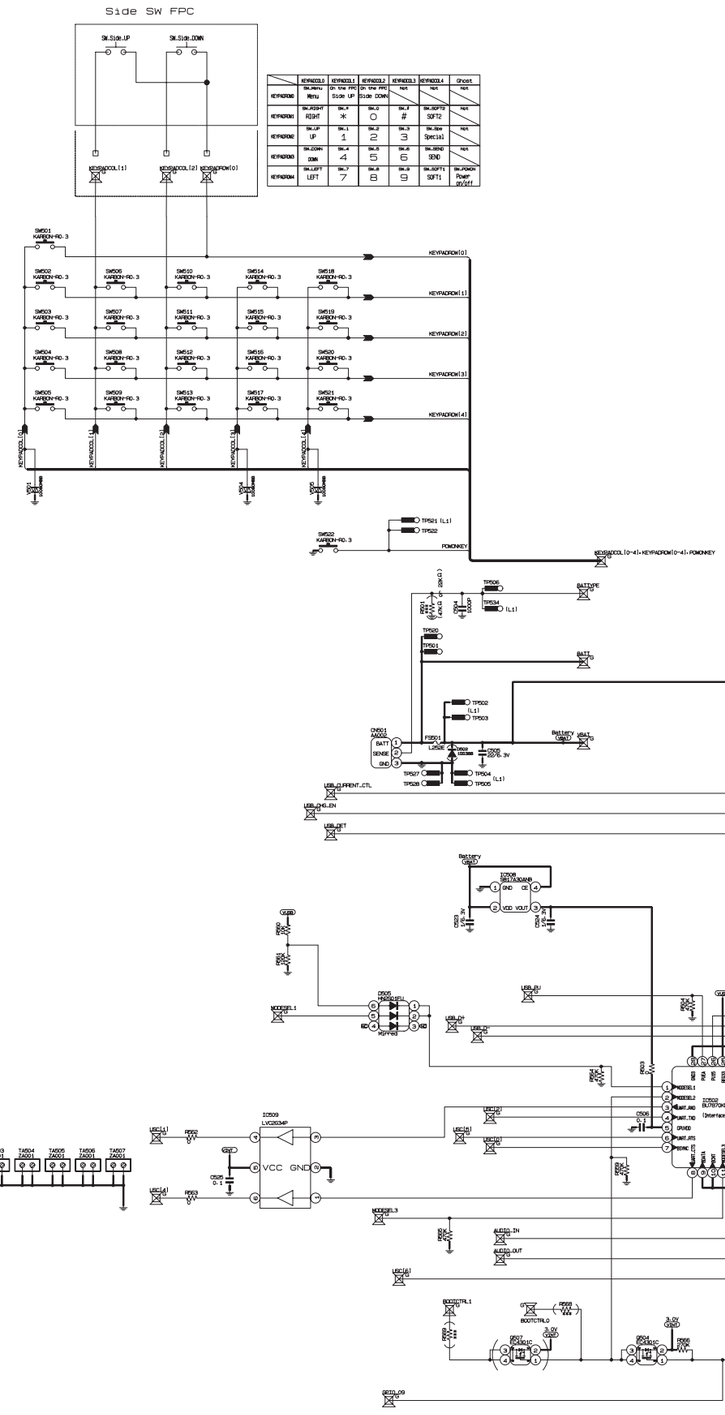
RF PORT (MAIN)

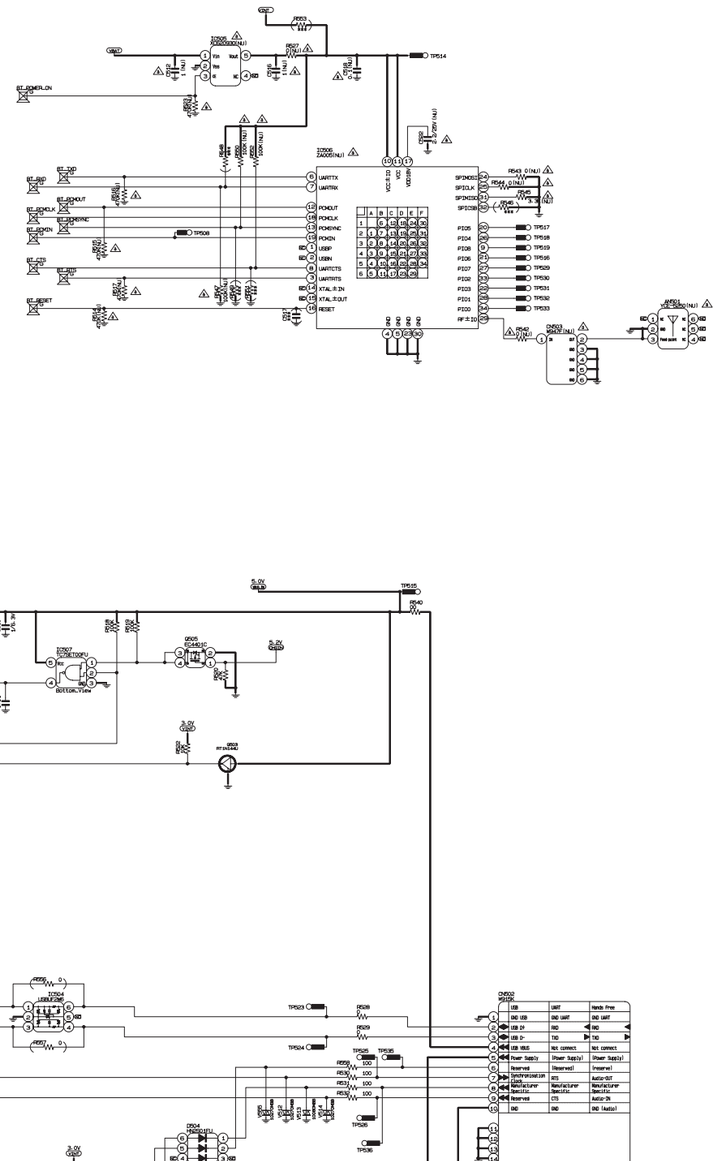


TM100 CIRCUIT DIAGRAM AND PWB LAYOUT
5 - 8

CONFIDENTIAL DRAFT

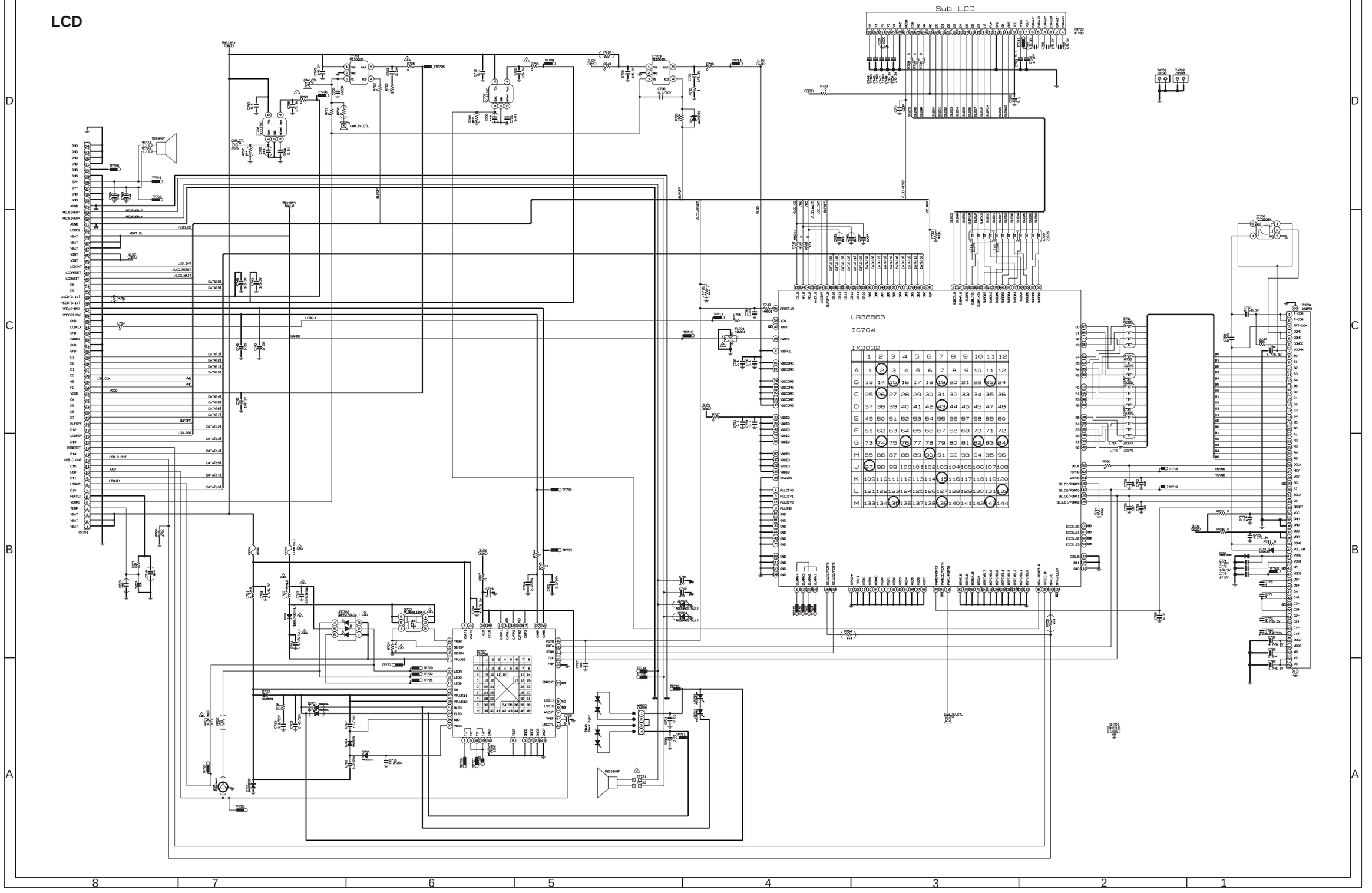
KEY (MAIN)



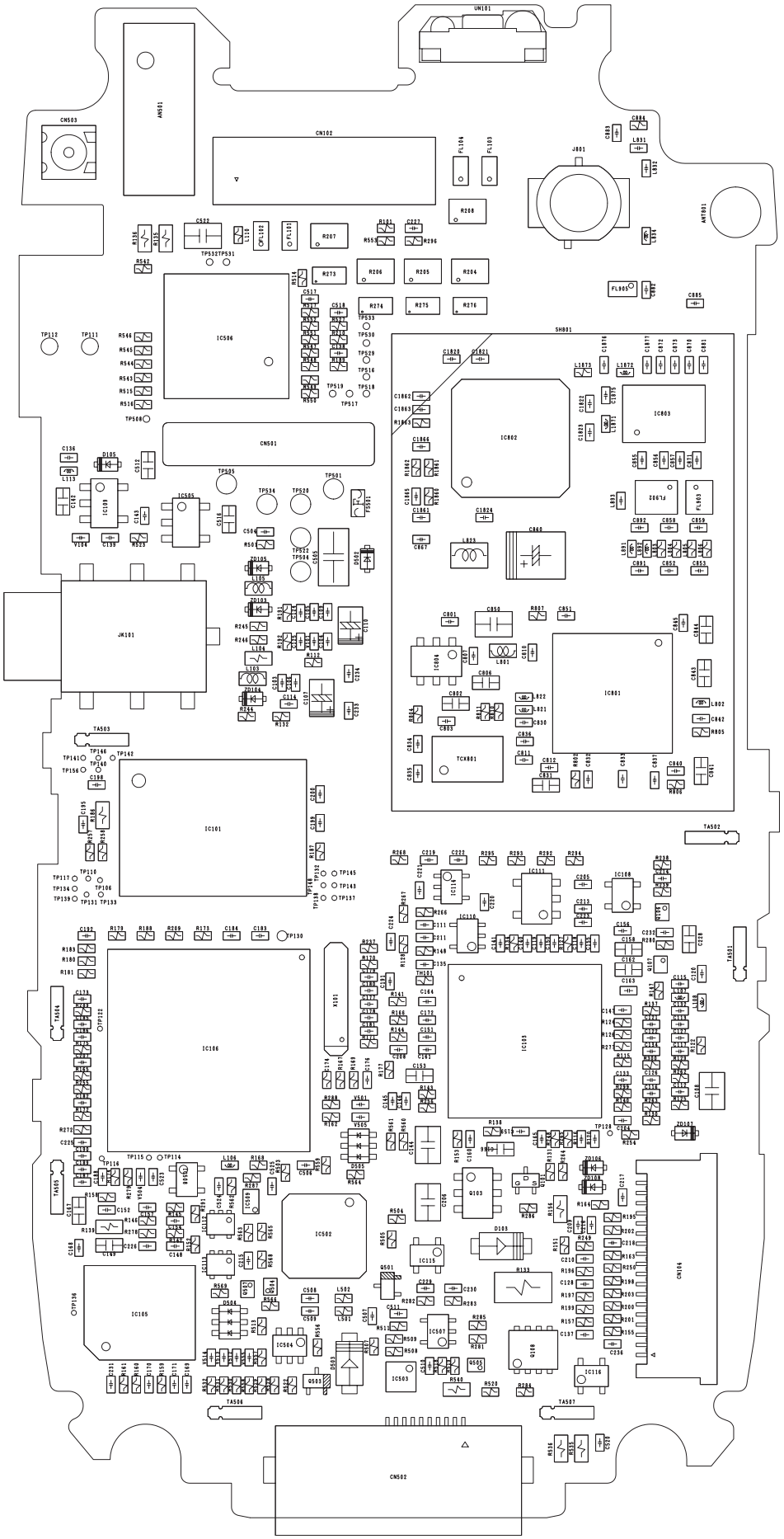


CONFIDENTIAL DRAFT

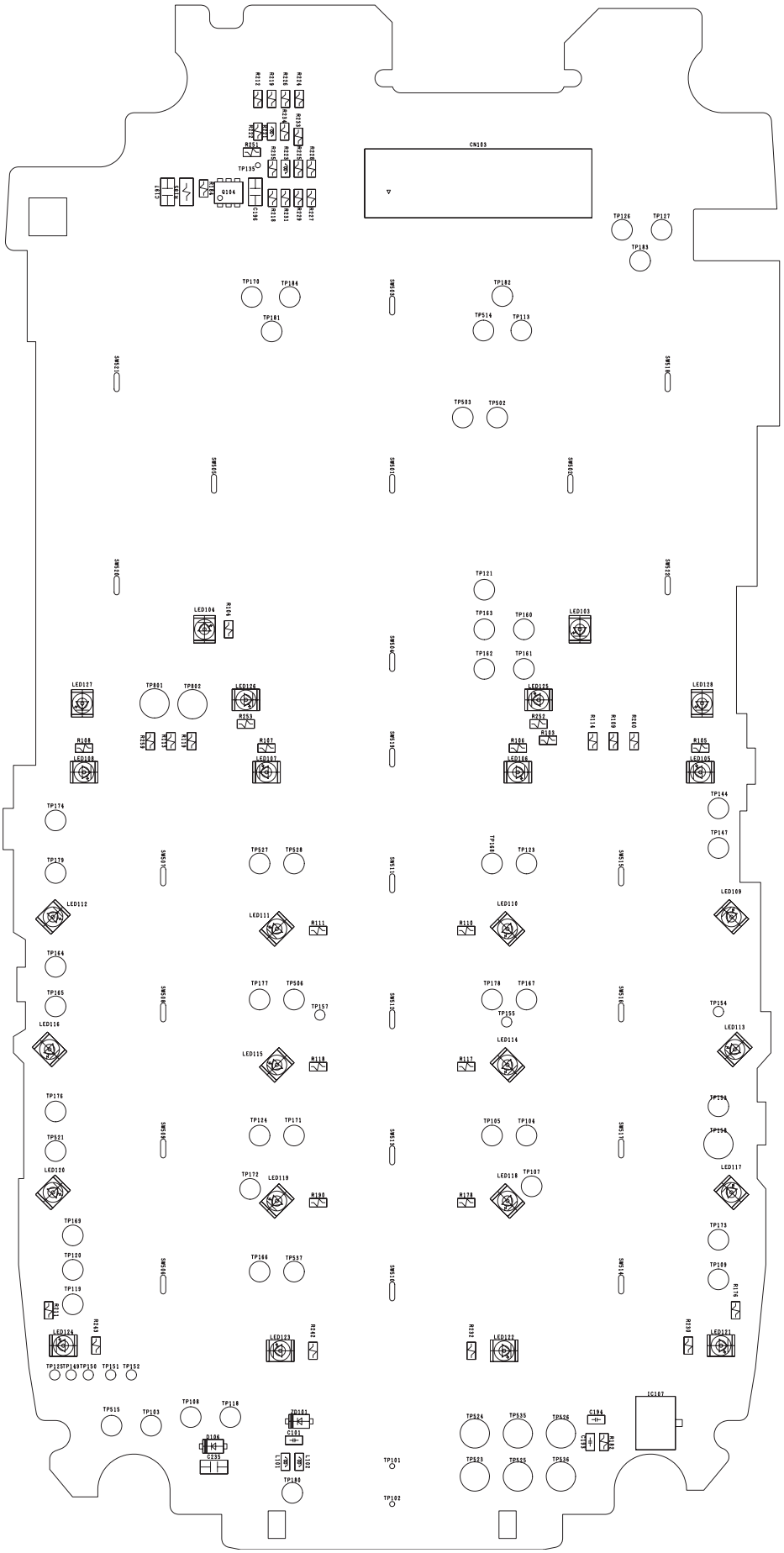
LCD



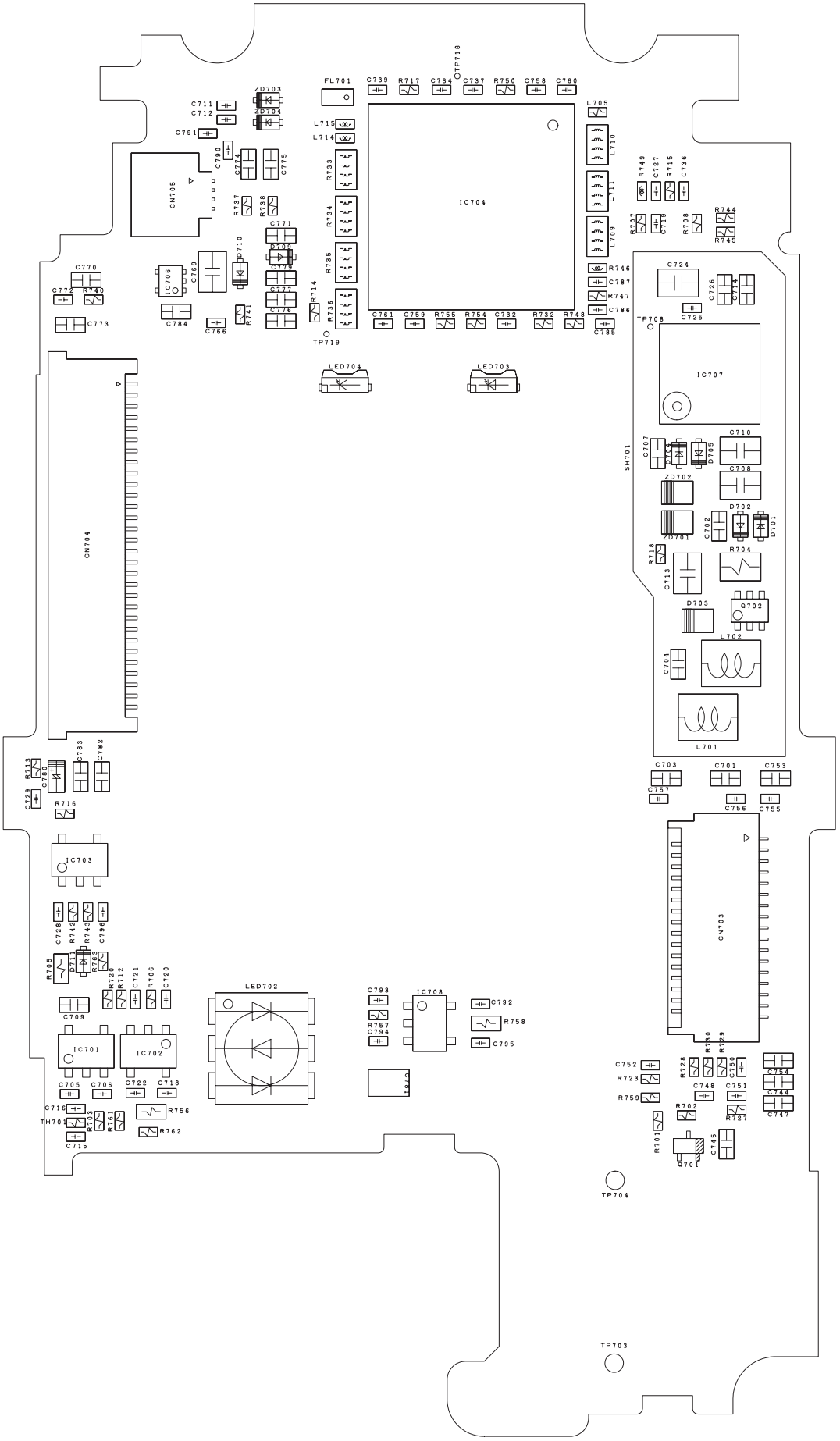
■ MAIN PWB_FRONT



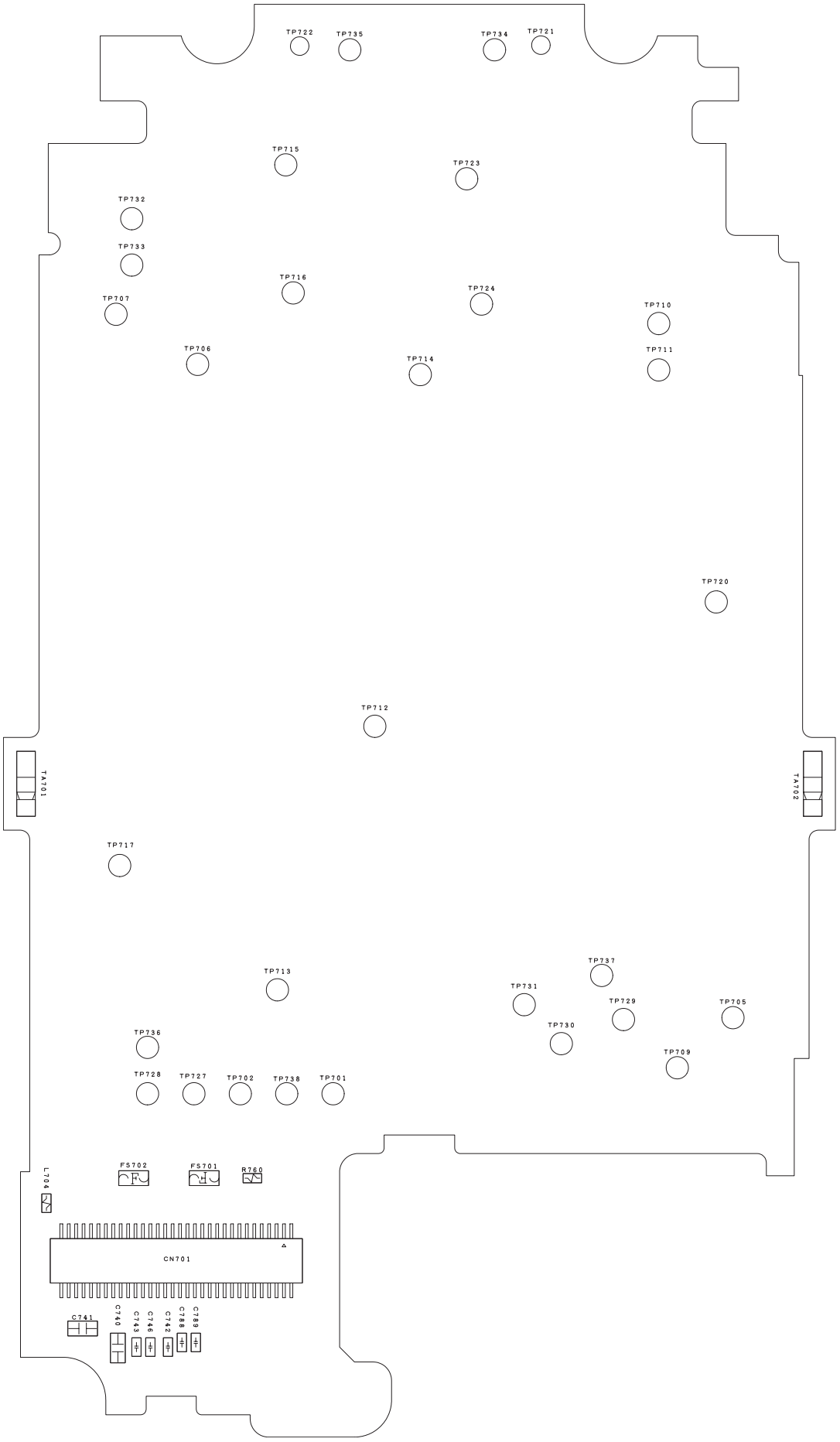
■ MAIN PWB_REAR

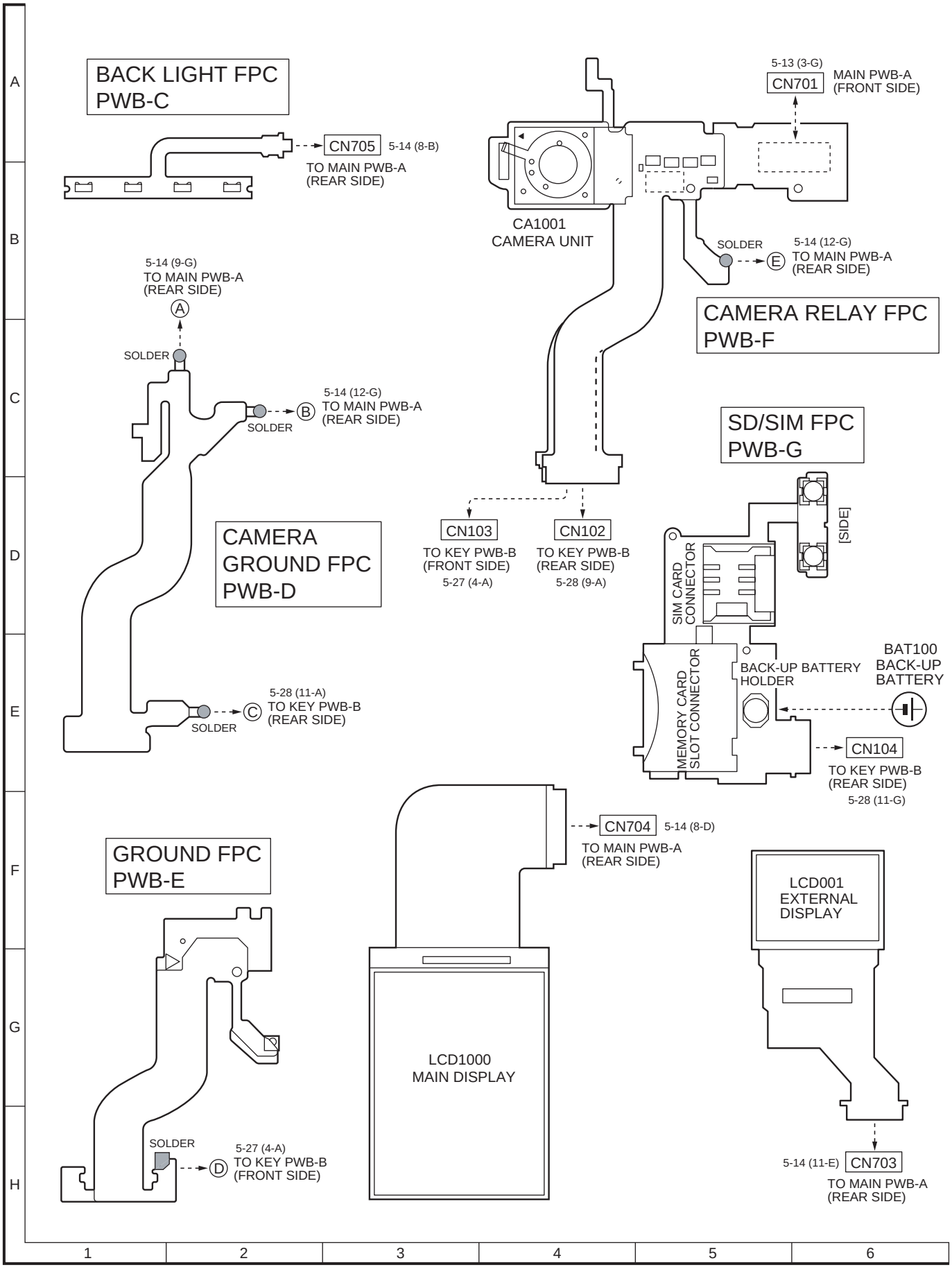


■ LCD PWB_FRONT



■ LCD PWB_REAR


TP722
TP735
TP734
TP721
TP715
TP723
TP732
TP733
TP716
TP724
TP707
TP710
TP706
TP714
TP711
TP720
TP712
TA701
TA702
TP717
TP713
TP737
TP731
TP729
TP705
TP730
TP736
TP709
TP728
TP727
TP702
TP738
TP701
L704
FS702
FS701
R760
CN701
C741
C740
C743
C746
C742
C788
C789


BACK LIGHT FPC
PWB-C
CN705
5-14 (8-B)
TO MAIN PWB-A
(REAR SIDE)
5-13 (3-G)
CN701
MAIN PWB-A
(FRONT SIDE)
CA1001
CAMERA UNIT
SOLDER
E
5-14 (12-G)
TO MAIN PWB-A
(REAR SIDE)
CAMERA RELAY FPC
PWB-F
5-14 (9-G)
TO MAIN PWB-A
(REAR SIDE)
A
SOLDER
B
5-14 (12-G)
TO MAIN PWB-A
(REAR SIDE)
SOLDER
SD/SIM FPC
PWB-G
CAMERA
GROUND FPC
PWB-D
CN103
TO KEY PWB-B
(FRONT SIDE)
5-27 (4-A)
CN102
TO KEY PWB-B
(REAR SIDE)
5-28 (9-A)
[SIDE]
SIM CARD
CONNECTOR
MEMORY CARD
SLOT CONNECTOR
BACK-UP BATTERY
HOLDER
BAT100
BACK-UP
BATTERY
C
5-28 (11-A)
TO KEY PWB-B
(REAR SIDE)
SOLDER
CN104
TO KEY PWB-B
(REAR SIDE)
5-28 (11-G)
CN704
5-14 (8-D)
TO MAIN PWB-A
(REAR SIDE)
GROUND FPC
PWB-E
LCD001
EXTERNAL
DISPLAY
LCD1000
MAIN DISPLAY
SOLDER
D
5-27 (4-A)
TO KEY PWB-B
(FRONT SIDE)
5-14 (11-E)
CN703
TO MAIN PWB-A
(REAR SIDE)
A
B
C
D
E
F
G
H
1
2
3
4
5
6

Conditions: SIM card inserted, power on (battery=3.7V), in stand-by mode (opened)
Measuring instrument: Digital multimeter
——: Unmeasurable

IC105	
PIN NO.	VOLTAGE
1	1.41V
2	0V
3	2.98V
4	2.98V
5	——
6	0V
7	2.98V
8	0V
9	0V
10	1.13V
11	0.27V
12	——
13	0V
14	0V
15	3.69V
16	0V
17	0V
18	0V
19	0V
20	0.49V
21	0.7V
22	0.91V
23	0.95V
24	1.01V
25	1.08V
26	0.73V
27	1.36V
28	2.39V
29	2.97V
30	1.79V
31	2.07V
32	2.98V

IC107	
PIN NO.	VOLTAGE
1	2.98V
2	0V
3	2.98V

IC108	
PIN NO.	VOLTAGE
1	——
2	——
3	——
4	——

IC109	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	3.69V

IC111	
PIN NO.	VOLTAGE
1	——
2	——
3	——
4	——
5	——

IC113	
PIN NO.	VOLTAGE
1	0V
2	2.98V
3	0V
4	0V
5	2.98V

IC114	
PIN NO.	VOLTAGE
1	——
2	——
3	——
4	——
5	——

IC115	
PIN NO.	VOLTAGE
1	0V
2	0V
3	Not used
4	0V

IC116	
PIN NO.	VOLTAGE
1	0V
2	0.14V
3	0V
4	0.14V

IC502	
PIN NO.	VOLTAGE
1	0V
2	0V
3	2.99V
4	2.97V
5	2.99V
6	2.97V
7	——
8	2.99V
9	0V
10	0V
11	0V
12	0.01V
13	1.31V
14	0V
15	——
16	——
17	Not used
18	——
19	——
20	——
21	0V
22	——
23	——
24	0.01V
25	0V
26	——
27	0V
28	0V

IC503	
PIN NO.	VOLTAGE
1	0V
2	0.03V
3	0.03V
4	0V
5	0V
6	0V
7	Not used
8	3.68V
9	2.25V

IC504	
PIN NO.	VOLTAGE
1	——
2	0V
3	——
4	——
5	Not used
6	——

IC505	
PIN NO.	VOLTAGE
1	3.69V
2	0V
3	0V
4	Not used
5	——

IC506	
PIN NO.	VOLTAGE
1	Not used
2	Not used
3	0V
4	0V
5	0V
6	0.01V
7	0V
8	0.01V
9	0V
10	0V
11	0V
12	0.01V
13	0V
14	Not used
15	Not used
16	0V
17	0V
18	0V
19	0V
20	1.87V
21	0V
22	1.8V
23	0V
24	0V
25	0V
26	1.8V
27	0V
28	2.78V
29	0V
30	0V
31	0V
32	1.7V
33	7.75V
34	1.75V

IC507	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	0V

IC508	
PIN NO.	VOLTAGE
1	0V
2	3.69V
3	2.99V
4	3.69V

IC509	
PIN NO.	VOLTAGE
1	2.97V
2	0V
3	2.99V
4	2.97V
5	2.97V
6	2.95V

IC701	
PIN NO.	VOLTAGE
1	3.69V
2	0V
3	1.81V
4	2.98V
5	2.51V

IC702	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	3.69V

IC703	
PIN NO.	VOLTAGE
1	2.96V
2	0V
3	1.81V
4	2.98V
5	1.79V

IC706	
PIN NO.	VOLTAGE
1	3.58V
2	1.82V
3	0V
4	1.78V
5	3.58V

IC708	
PIN NO.	VOLTAGE
1	1.81V
2	0V
3	1.3V
4	2.99V
5	3.69V

IC801	
PIN NO.	VOLTAGE
1	2.89V
2	0V
3	0V
4	0V
5	0V
6	0V
7	0V
8	0V
9	0V
10	0V
11	0V
12	0V
13	2.89V
14	2.89V
15	0V
16	0V
17	0V
18	0V
19	0V
20	0V
21	0V
22	2.89V
23	0.21V
24	0.21V
25	0.21V
26	0.21V
27	2.89V
28	0.27V
29	0V
30	0V
31	1.14V
32	0V
33	0V
34	0V
35	1.82V
36	2.89V
37	2.89V
38	0.26V
39	0V
40	2.89V
41	2.89V
42	2.89V
43	2.89V
44	2.87V
45	2.87V
46	2.87V
47	2.87V
48	2.89V
49	0V

IC802	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	0V
6	0V
7	0V
8	0V
9	0V
10	0V
11	0V
12	0V
13	0V
14	0V
15	0V
16	0V
17	0V
18	0V
19	0V
20	0V
21	0V
22	0V
23	0V
24	0V
25	0V
26	0V
27	0V
28	0V
29	0V
30	0V
31	2.47V
32	0V
33	0V
34	0V
35	0V
36	0V
37	0V
38	0V
39	0V
40	0V
41	0V
42	3.70V
43	3.70V
44	0V
45	0V
46	0V
47	0V
48	0V

IC804	
PIN NO.	VOLTAGE
1	2.96V
2	3.80V
3	2.96V
4	2.89V
5	0V
6	2.89V

• NOTES ON SCHEMATIC DIAGRAM can be found on page 5-1.

CHAPTER 6. OTHERS

[1] FUNCTION TABLE OF IC

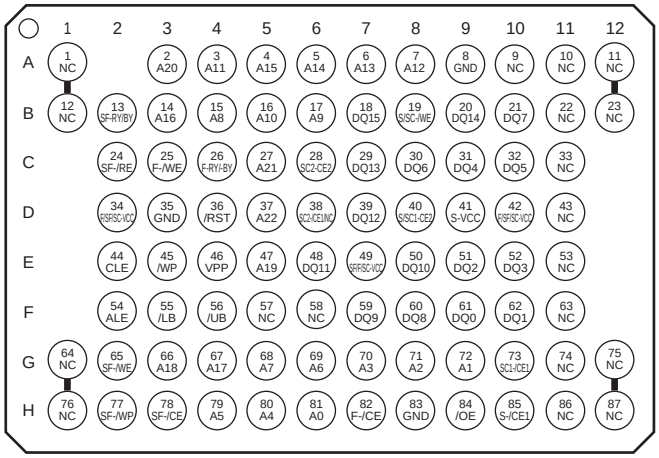
■ IC101 (LRS1B27): 5-LEVEL STACK MEMORY

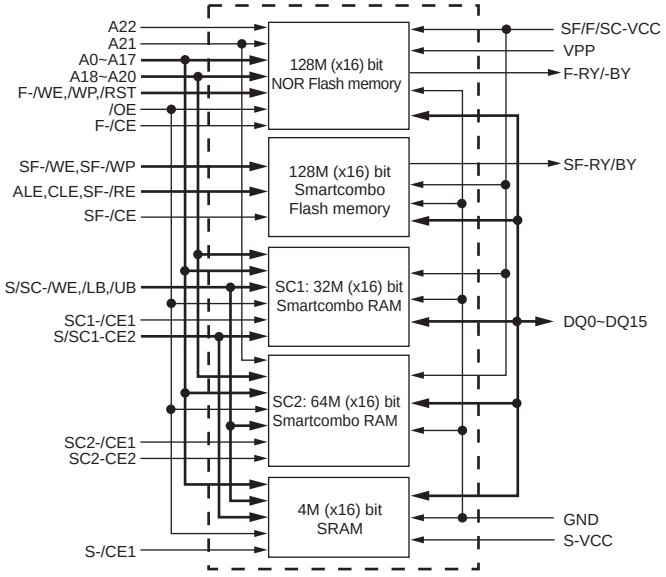
Pin No.	Terminal name	Input/Output	Description of terminal
1	NC	—	Not used
2*	A20	Input	Address input (NOR Flash, Smartcombo RAM)
3	A11	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
4	A15	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
5	A14	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
6	A13	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
7	A12	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
8	GND	—	Ground
9	NC	—	Not used (VCC IO/NC)
10*	NC	—	Not used
11*	NC	—	Not used
12*	NC	—	Not used
13*	SF-RY/BY	Output	Ready busy output (Smartcombo Flash)
14	A16	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
15	A8	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
16	A10	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
17	A9	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
18	DQ15	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
19	S/SC-/WE	Input	Write enable input (SRAM, Smartcombo RAM)
20	DQ14	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
21	DQ7	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
22	NC	—	Not used
23*	NC	—	Not used
24*	SF-/RE	Input	Read enable input (Smartcombo Flash)
25	F-/WE	Input	Write enable input (NOR Flash)
26*	F-RY/-BY	Output	Ready busy output (NOR Flash) When deleting/writing: VOL When interrupting block delete/ write: High-Z (High impedance)
27	A21	Input	Address input (NOR Flash, Smartcombo RAM 2)
28	SC2-CE2	Input	Sleep state input (Smartcombo RAM 2)
29	DQ13	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
30	DQ6	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
31	DQ4	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
32	DQ5	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
33*	NC	—	Not used
34	SF/F/SC-VCC	—	Power (NOR Flash ,Smartcombo Flash, Smartcombo RAM)
35	GND	—	Ground
36	/RST	Input	Reset input (NOR Flash) (F-/RST) When deleting block/writing: VIH When reading : VIH Reset : VIL
37	A22	Input	Address input (NOR Flash)
38	SC2-/CE1/NC (F2-/CE)	Input	Chip enable input (Smartcombo RAM 2)
39	DQ12	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
40	S/SC1-CE2	Input	Chip enable input (SRAM), sleep state input (Smartcombo RAM 1)
41	S-VCC	—	Power (SRAM)
42	SF/F/SC-VCC	—	Power (NOR Flash ,Smartcombo Flash, Smartcombo RAM)
43	NC	—	Not used
44*	CLE	Input	Command latch enable input (Smartcombo Flash)
45	/WP (F-/WP)	Input	Write protect input (NOR Flash)
46	VPP (F-VPP)	Input/-	Power voltage detect terminal (NOR Flash) When deleting/writing: VPP = VPPH When deleting/writing is prohibited: VPP < VPPLK
47	A19	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
48	DQ11	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
49	SF/F/SC-VCC	—	Power (Flash, Smartcombo RAM)

Pin No.	Terminal name	Input/Output	Description of terminal
50	DQ10	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
51	DQ2	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
52	DQ3	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
53*	NC	—	Not used
54	ALE	Input	Address latch enable input (Smartcombo Flash)
55	/LB	Input	Byte enable input (DQ0-DQ7) (Smartcombo RAM, SRAM)
56*	/UB	Input	Byte enable input (DQ8-DQ15) (Smartcombo RAM, SRAM)
57	NC	—	Not used
58*	NC	—	Not used
59	DQ9	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
60	DQ8	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
61	DQ0	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
62	DQ1	Input/Output	Data input/output (NOR Flash, Smartcombo RAM, SRAM) Command, Address, and Data input/output (Smartcombo Flash)
63*	NC	—	Not used
64*	NC	—	Not used
65	SF-/WE	Input	Write enable input (Smartcombo Flash)
66	A18	Input	Address input (NOR Flash, Smartcombo RAM)
67	A17	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
68	A7	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
69	A6	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
70	A3	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
71	A2	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
72	A1	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
73	SC1-/CE1	Input	Chip enable input (Smartcombo RAM 1)
74*	NC	—	Not used
75*	NC	—	Not used
76*	NC	—	Not used
77	SF-/WP	Input	Write protect input (Smartcombo Flash)
78	SF-/CE	Input	Chip enable input (Smartcombo Flash)
79	A5	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
80	A4	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
81	A0	Input	Address input (NOR Flash, Smartcombo RAM, SRAM)
82	F-/CE (F1-/CE)	Input	Chip enable input (NOR Flash)
83	GND	—	Ground
84	/OE	Input	Output enable input (NOR Flash, Smartcombo RAM, SRAM)
85	S-/CE1	Input	Chip enable input (SRAM)
86*	NC	—	Not used
87*	NC	—	Not used

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

(TOP VIEW)





■ IC103 (AD6535): ANALOG BASEBAND

Pin No.	Terminal name	Input/ Output	Description of terminal
1 *	TDI	Input	Not used
2	VCXOEN	Input	VCXO supply
3	VBAT3	Input	External interface regulator input
4 *	VEXT	Output	Not used
5	VCHG	Input	Charge supply
6	GATEDRIVE	Output	Charge DAC (FET) output control
7	ISENSE	Input	Charge current sense input
8	TEMP2	Input	Temp sensor input for battery
9 *	AUXADC2	Input	Not used
10	REFBB	Output	Baseband transmit & receive voltage reference
11	AGND2	—	Analog baseband ground
12	IP	Input/Output	I-channel positive input/output
13	IN	Input/Output	I-channel negative input/output
14	QN	Input/Output	Q-channel positive input/output
15	QP	Input/Output	Q-channel negative input/output
16 *	RSVD_A16	—	Not used
17 *	TMS	Input	Not used
18 *	TCK	Input	Not used
19	VBAT3	Input	External interface regulator input
20 *	VEXT	Output	Not used
21	CHGOSC	Input	Charge oscillator capacitor
22	BATTYPE	Input	Battery type identification input
23	CHGDACREF	Output	Charge DAC reference
24	VBATSENSE	Input	Battery voltage sense input
25	TEMP1	Inpsut	Temp sensor input for camera
26	AUXADC1	Input	Auxiliary ADC input for temp. sensor adjustment
27	REFOUT	Output	Voltage reference output
28	PA	Output	Power amplifier control output
29	AGND0	—	Analog ground
30	AFCDAC	Output	Automatic frequency control DAC output
31	REF	Output	Voltage reference
32	AGND1	—	Analog ground
33 *	TDO	Output	Not used
34 *	GPI	Input	Not used
35	VBAT1	Input	Voltage controlled crystal oscillator regulator input
36 *	RSVD_C16	—	Not used
37	INT	Output	Digital BB interrupt
38	ASDO	Output	Audio serial port data output
39	REFCHG	Output	Voltage reference output
40	VVCXO	Output	Voltage controlled crystal oscillator supply 2.71 - 2.79 V (VT)
41	ASDI	Input	Audio serial port data input
42	BSDO	Output	Baseband serial port data output
43	VUSB	Output	USB interface supply 3.0 - 3.6 V
44	VAPPGATE	Output	Application regulator pass device gate control
45	BSIFS	Input	Baseband serial port input framing signal
46	ASFS	Output	Audio serial port framing signal
47	VUSBIN	Input	USB interface regulator input
48	VAPP	Output	Application supply 2.75 - 3.3 V
49	BSOFS	Output	Baseband serial port output framing signal
50	BSDI	Input	Baseband serial port data input
51	VBAT2	Input	Analog baseband regulator input
52*	NC_G16	—	Not used
53	CSDO	Output	Control serial port data output
54	CSDI	Input	Control serial port data input
55	VBAT2	Input	Analog baseband regulator input
56	VABB	Output	Analog baseband supply
57	ASM	Input	Advanced state machine
58	MCLKEN	Output	Master clock enable
59	AOUT1P	Output	Receiver audio positive output
60	AOUT3L	Output	Headset receiver audio L-channel output
61	RXON	Input	Baseband receive section control
62	TXON	Input	Baseband transmit section control
63	AOUT1N	Output	Receiver audio negative output
64	AOUT3R	Output	Headset receiver audio R-channel output
65	MCLK	Input	Master clock
66	CSFS	Input	Control serial port framing signal
67	AGND3	—	Analog audio ground
68	LIGHT1	Output	Charge LED control
69	ABBRESET	Input	Reset input
70	DGND	—	Digital ground
71	LIGHT2	Output	USB charge enable
72	LIGHT3	Output	Key-pad LED control
73	VCORE	Output	Digital core supply 1.72 - 1.9 V
74	VCOREIN	Input	Digital core regulator input
75	LGND	—	Light driver ground
76	VMIC	Output	Microphone supply 2.4 - 2.6 V
77	VCORE	Output	Digital core supply 1.72 - 1.9 V
78	VMEMIN	Input	Memory interface regulator input
79	AIN2P	Input	Headset mic audio positive input
80	AIN1P	Input	Mic audio positive input
81	CRST	Output	Power-on reset capacitor
82	VMEMIN	Input	Memory interface regulator input
83	VMEMSEL	Input	Memory supply voltage selection
84	VBAT5	Input	Back-up battery regulator input
85	VBAT4	Input	SIM interface regulator input
86	VRTCIN	Input	Real-time clock regulator input
87	DBBON	Input	Digital BB supply regulator on signal
88	SGND	—	AOUT2P/N ground
89*	AOUT2N	Output	Not used
90*	SPWR	Input	Not used
91*	AOUT2P	Output	Not used
92*	NC_R12	—	Not used
93	AIN3L	Input	Sound IC audio L-channel input
94	AIN3R	Input	Sound IC audio R-channel input
95	AIN2N	Input	Headset mic audio negative input
96	AIN1N	Input	Mic audio negative input
97	RESET	Output	Reset output
98	VMEM	Output	Memory interface supply 2.75 - 3.05 V
99	VMEM	Output	Memory interface supply 2.75 - 3.05 V
100	VBACK	Output	Backup battery supply 2.72 - 3.05 V
101	VBACKSEL	Input	Backup battery supply voltage selection

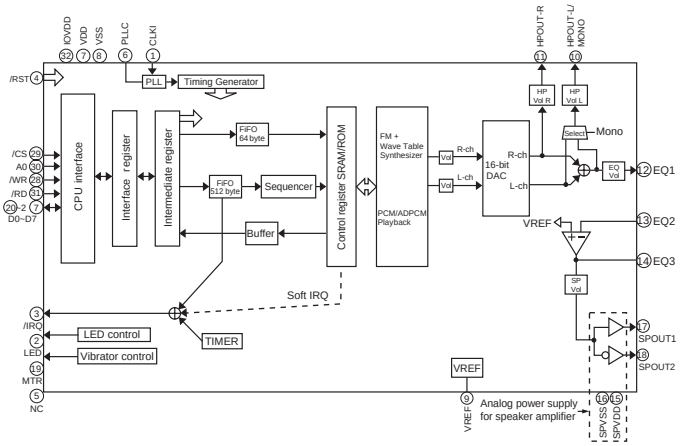
Pin No.	Terminal name	Input/ Output	Description of terminal
102	VSIM	Output	SIM interface supply 2.75 - 2.95 V
103	VRTC	Output	Real-time clock supply 1.6 - 2.0 V
104	SGND	—	AOUT2P/N ground
105*	AOUT2N	Output	Not used
106*	SPWR	Input	Not used
107*	AOUT2P	Output	Not used
108	LDOEN	Output	Regulator enable output
109	KEYOUT	Output	Power-on key output
110	KEYON	Input	Power-on key input
111	IBIAS	Output	Regulator bias current reference
112	AGND4	—	Power management analog ground
113	AGND0	—	Thermal ground for power supply
114	AGND0	—	Thermal ground for power supply
115	AGND0	—	Thermal ground for power supply
116	AGND0	—	Thermal ground for power supply
117	AGND0	—	Thermal ground for power supply
118	AGND0	—	Thermal ground for power supply
119	AGND0	—	Thermal ground for power supply
120	AGND0	—	Thermal ground for power supply
121	AGND0	—	Thermal ground for power supply
122	AGND0	—	Thermal ground for power supply
123	AGND0	—	Thermal ground for power supply
124	AGND0	—	Thermal ground for power supply
125	AGND0	—	Thermal ground for power supply
126	AGND0	—	Thermal ground for power supply
127	AGND0	—	Thermal ground for power supply
128	AGND0	—	Thermal ground for power supply
129	AGND0	—	Thermal ground for power supply
130	AGND0	—	Thermal ground for power supply
131	AGND0	—	Thermal ground for power supply
132	AGND0	—	Thermal ground for power supply
133	AGND0	—	Thermal ground for power supply
134	AGND0	—	Thermal ground for power supply
135	AGND0	—	Thermal ground for power supply
136	AGND0	—	Thermal ground for power supply
137	AGND0	—	Thermal ground for power supply
138	AGND0	—	Thermal ground for power supply
139	AGND0	—	Thermal ground for power supply
140	AGND0	—	Thermal ground for power supply
141	AGND0	—	Thermal ground for power supply
142	AGND0	—	Thermal ground for power supply
143	AGND0	—	Thermal ground for power supply
144	AGND0	—	Thermal ground for power supply
145	AGND0	—	Thermal ground for power supply
146	AGND0	—	Thermal ground for power supply
147	AGND0	—	Thermal ground for power supply
148	AGND0	—	Thermal ground for power supply

In this unit, the terminal with asterisk mark (∗) is (open) terminal which is not connected to the outside.

■ IC105 VHIYMU762C+-1L (YMU762C): SOUND

Pin No.	Terminal name	Input/Output	Description of terminal
1	CLKI	Input	Clock input terminal
2	LED	Output	External LED control terminal
3	/IRQ	Output	Interrupt output terminal
4	/RST	Input	Hardware reset input terminal
5*	NC	—	Not used
6	PLLC	—	Built-in PLL capacitor terminal
7	VDD	—	Power supply (Typ + 3.0 V)
8	VSS	—	Ground
9	VREF	—	Analog reference voltage terminal
10	HPOUT-L/MONO	Output	Headphone output L-ch
11	HPOUT-R	Output	Headphone output R-ch
12	EQ1	—	Equalizer terminal 1
13	EQ2	—	Equalizer terminal 2
14	EQ3	—	Equalizer terminal 3
15	SPVDD	—	Analog power supply for speaker amplifier (Typ + 3.6 V)
16	SPVSS	—	Analog ground for speaker amplifier
17	SPOUT1	Output	Speaker terminal 1
18	SPOUT2	Output	Speaker terminal 2
19	MTR	Output	External motor control terminal
20	D7	Input/Output	CPU I/F data bus 7
21	D6	Input/Output	CPU I/F data bus 6
22	D5	Input/Output	CPU I/F data bus 5
23	D4	Input/Output	CPU I/F data bus 4
24	D3	Input/Output	CPU I/F data bus 3
25	D2	Input/Output	CPU I/F data bus 2
26	D1	Input/Output	CPU I/F data bus 1
27	D0	Input/Output	CPU I/F data bus 0
28	/WR	Input	CPU I/F write enable
29	/CS	Input	CPU I/F chip select input
30	A0	Input	CPU I/F address signal
31	/RD	Input	CPU I/F read enable
32	IOVDD	—	Power supply for terminal

In this unit, the terminal withasterisk mark (∗) is (open) terminal which is not connected to the outside.



■ IC106 (AD6529B): DIGITAL BASEBAND

Pin No.	Terminal name	Input/ Output	Description of terminal
1	ASDO	Output	Audio serial port data output to analog BB
2	BSDI	Input	Baseband serial port data input from analog BB
3	BSOFS	Output	Baseband serial port output framing signal output to analog BB
4	GPIO_48	Input	Hook switch of hands free kit (earphone) detection
5	VINT	Input	Analog BB interface power supply 1.7 - 3.3 V (VCORE)
6	GPO_29	Output	Analog BB reset output (ABBRESET)
7	GPO_5	Output	Advanced state machine of analog BB
8	VDDRTC	Input	RTC power supply 1.0 - 1.9 V (VRTC)
9	VSSRTC	—	RTC ground
10	MC_DAT[0]	Input/ Output	SD interface data bus 0
11	GPIO_22	Output	RSP for main LCD controller
12	GPIO_56	Input	Boot control 2 (Hardware version select)
13	KEYPADCOL[4]	Output	KEYIN signal output 4
14	KEYPADCOL[1]	Output	KEYIN signal output 1
15	KEYPADROW[4]	Input	KEYIN signal input 4
16	KEYPADROW[2]	Input	KEYIN signal input 2
17	GPIO_38	Input	Interrupt input from sound generator IC
18	GPIO_36	Output	Mode select 2 for interface IC/ AOUT3 bias control
19	ASDI	Input	Audio serial port data input from analog BB
20	GPIO_35	Input	SD card interface write protect
21	ADD[0]	Output	Write protect control for flash memory 2
22	ASFS	Input	Audio serial port framing signal input from analog BB
23	BSIFS	Input	Baseband serial port input framing signal input from analog BB
24	BSDO	Output	Baseband serial port data output to analog BB
25	CSDI	Input	Control serial port data input from analog BB
26*	GPO_6	Output	Not used
27	GPO_0	Output	Analog baseband receive section control (RXON)
28	OSCOUT	Output	32.768 kHz crystal oscillator output
29	MC_DAT[2]	Input/ Output	SD interface data bus 2
30	VMC	Input	SD card interface power supply 1.7 - 3.3 V (VAPP)
31	VCC	Input	Core power supply 1.7 - 1.9 V (VCORE)
32	KEYPADCOL[3]	Output	KEYIN signal output 3
33	KEYPADCOL[2]	Output	KEYIN signal output 2
34	GPIO_39	Output	USB PU control for interface IC
35	GPIO_37	Input	Interrupt input from analog BB
36	GPIO_34	Output	UART_TXD for Bluetooth module
37	ADD[4]	Output	Processor address bus 4
38	ADD[2]	Output	Processor address bus 2
39	GND	—	Ground
40	KEYPADROW[0]	Input	KEYIN signal input 0
41	VEXT	Input	System interface power supply 2.4 - 3.3 V (VINT)
42	GPO_23	Output	SLEEP control for SRAM 2
43	ADD[7]	Output	Processor address bus 7
44	VMEM	Input	Memory power supply 2.7 - 3.3 V (VMEM)
45	ADD[1]	Output	Processor address bus 1
46	CSDO	Output	Control serial port data output to analog BB
47	CLKOUT_GATE	Input	Master clock enable from analog BB (MCLKEN)
48	GPO_1	Output	Analog baseband transmit section control (TXON)
49	OSCIN	Input	32.768 kHz crystal oscillator input
50	MC_CMD	Input/ Output	SD interface CMD (SD_CMD)
51	GPIO_55	Input	Boot control 1 (Hardware version select)
52	GND	—	Ground
53	KEYPADROW[3]	Input	KEYIN signal input 3
54	KEYPADROW[1]	Input	KEYIN signal input 1
55	GPIO_33	Input	UART_RXD for Bluetooth module
56	GPIO_17	Output	PCM data output for Bluetooth module
57	ADD[11]	Output	Processor address bus 11
58	ADD[9]	Output	Processor address bus 9
59	ADD[5]	Output	Processor address bus 5
60	ADD[3]	Output	Processor address bus 3
61	GND	—	Ground
62	VCC	Input	Core power supply 1.7 - 1.9 V (VCORE)
63	PWRON	Output	System power control for analog BB
64	MC_DAT[1]	Input/ Output	SD interface data bus 1
65	GND	—	Ground
66	VEXT	Input	SIM power supply 2.4 - 3.3 V (VINT)
67	KEYPADCOL[0]	Output	KEYIN signal output 0
68	VEXT	Input	SIM power supply 2.4 - 3.3 V (VINT)
69	GPIO_15	Input	PCM data input for Bluetooth module
70	GPIO_16	Output	PCM SYNC output for Bluetooth module
71	ADD[13]	Output	Processor address bus 13
72	ADD[12]	Output	Processor address bus 12
73	ADD[8]	Output	Processor address bus 8
74	ADD[6]	Output	Processor address bus 6

Pin No.	Terminal name	Input/ Output	Description of terminal
75	GPO_22	Output	VPP control for flash memory 1
76	GPIO_14	Output	PCM clock output for Bluetooth module
77	GPIO_10	Input	USB detection
78	GPIO_12	Output	Reset output for main LCD controller/ Sub LCD driver/Power management IC
79	VMEM	Input	Memory power supply 2.7 - 3.3 V (VMEM)
80	ADD[14]	Output	Processor address bus 14
81	GND	—	Ground
82	VCC	Input	Core power supply 1.7 - 1.9 V (VCORE)
83	ADD[10]	Output	Processor address bus 10
84	CLKOUT	Output	13 MHz clock output for analog BB (CLKOUT)
85	MC_DAT[3]	Input/ Output	SD interface data bus 3
86	GND	—	Ground
87	GND	—	Ground
88	GPIO_13	Input	Interrupt input from camera module
89	GPIO_7	Input	Hands free kit (earphone) detection
90	GPIO_9	Input	Manufacturer specific input from I/O connector
91	ADD[19]	Output	Processor address bus 19
92	ADD[17]	Output	Processor address bus 17
93	ADD[18]	Output	Processor address bus 18
94	ADD[15]	Output	Processor address bus 15
95	ADD[16]	Output	Processor address bus 16
96	CSFS	Output	Control serial port framing signal output to analog BB
97	MC_CLK	Input	SD interface clock (SD_CLK)
98	VCC	Input	Core power supply 1.7 - 1.9 V (VCORE)
99	GPIO_11	Input	Flip switch detection
100	GPIO_8	Input	Stereo/monaural detection for hands free kit (earphone)
101	GPIO_5	Input	SD card detection
102	GPIO_6	Input	Interrupt input from main LCD controller
103	ADD[22]	Output	Processor address bus 22
104	ADD[21]	Output	Processor address bus 21
105	GPIO_40	Output	13 MHz clock output for main LCD controller & Sound generator IC
106	ADD[20]	Output	Processor address bus 20
107	GND	—	Ground
108	ADD[23]	Output	Processor address bus 23
109	GND	—	Ground
110	VEXT	Input	SIM power supply 2.4 - 3.3 V (VINT)
111	GND	—	Ground
112	GPIO_4	Output	UART_CTS for Bluetooth module
113	GPIO_2	Output	USB charge current control
114	GPIO_3	Input	UART_RTS for Bluetooth module

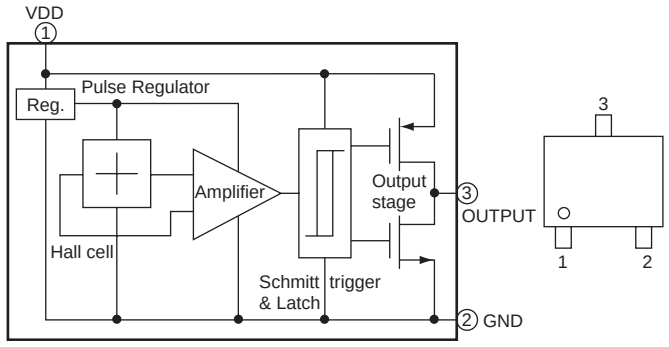
Pin No.	Terminal name	Input/ Output	Description of terminal
115	DATA[2]	Input/ Output	Processor data bus 2
116	DATA[0]	Input/ Output	Processor data bus 0
117	DATA[5]	Input/ Output	Processor data bus 5
118	DATA[1]	Input/ Output	Processor data bus 1
119	DATA[3]	Input/ Output	Processor data bus 3
120	VCC	Input	Core power supply 1.7 - 1.9 V (VCORE)
121	DMINUS	Input	USB D-
122	GPIO_18	Output	JTAG TCK
123	GND	—	Ground
124	GPIO_1	Input	IrDA receive data
125	USC[5]	Input	USC pin (CTS/Ginie_TX)
126	GPIO_0	Output	IrDA transmit data
127	DATA[4]	Input/ Output	Processor data bus 4
128	VMEM	Input	SIM power supply 2.7 - 3.3 V (VMEM)
129	GND	—	Ground
130	VCC	Input	Core power supply 1.7 - 1.9 V (VCORE)
131	USC[6]	Input	USC pin (GPIO_31/Ginie_RX)
132	VCC	Input	Core power supply 1.7 - 1.9 V (VCORE)
133	USC[2]	Input	USC pin (TXD)
134	USC[4]	Input	USC pin (RTS/Ginie_RX)
135	DATA[7]	Input/ Output	Processor data bus 7
136	DATA[6]	Input/ Output	Processor data bus 6
137	GND	—	Ground
138	DATA[9]	Input/ Output	Processor data bus 9
139	DATA[13]	Input/ Output	Processor data bus 13
140	NROMCS1	Output	Chip select for flash memory 1
141	GPIO_42	Output	Chip select for main LCD controller
142	CLKIN	Input	13 MHz clock input
143	VSIM	Input	SIM power supply 1.7 - 3.3 V (VSIM)
144	GND	—	Ground
145	USC[3]	Input	Pull up to VINT
146	USC[1]	Input	USC pin (RXD)
147	GND	—	Ground
148	USC[0]	Input	USC pin (Ginie_TX)
149	DATA[10]	Input/ Output	Processor data bus 10
150	DATA[8]	Input/ Output	Processor data bus 8
151	NRD	Output	Processor read strobe
152	DATA[14]	Input/ Output	Processor data bus 14

Pin No.	Terminal name	Input/ Output	Description of terminal
153	GND	—	Ground
154	NRAMCS2	Output	Chip select for SRAM 2
155	GPIO_44	Input	Wakeup mode select
156	VSSUSB	—	USB ground
157	GPIO_47	Output	Camera module reset
158	GPIO_20	Output	JTAG TDI
159	CLKON	Output	13 MHz oscillator power control signal (VCXOEN)
160	VCC	Input	Core power supply 1.7-1.9V (VCORE)
161	GPO_18	Output	SYNTH enable for RF (SYNTHEN)
162	GPO_21	Output	SYNTH clock output for RF (SYNTHCLK)
163	DATA[12]	Input/ Output	Processor data bus 12
164	DATA[11]	Input/ Output	Processor data bus 11
165	NWE	Output	Processor write strobe
166	VEXT	Input	SIM power supply 2.4 - 3.3 V (VINT)
167	GPO_11	Output	Band select 4 for RF (BS4)
168	GPO_20	Output	SYNTH data output for RF (SYNTHDATA)
169	DATA[15]	Input/ Output	Processor data bus 15
170	VMEM	Input	Memory power supply 2.7 - 3.3 V (VMEM)
171	NADV	Output	Address latch enable for flash memory 2
172	NGPCS1	Output	Chip select for flash memory 2
173	VMEM	Input	Memory power supply 2.7 - 3.3 V (VMEM)
174	GPIO_45	Output	Chip select for 4M SRAM
175	GPIO_46	Output	Chip select for sound generator IC
176	DPLUS	Input	USB D+
177	SIMCLK	Output	System interface clock output
178	JTAGEN	Input	JTAG enable
179	VEXT	Input	SIM power supply 2.4 - 3.3 V (VINT)
180	GPO_3	Output	Incoming LED OFF control
181	GPO_4	Output	Mode select 1 for interface IC
182	GPO_7	Output	Bluetooth module power ON/OFF control
183	GPO_16	Output	Band select 1 for RF (BS1)
184	GPO_17	Output	Band select 2 for RF (BS2)
185	NHWR/NUSB	Output	Processor high write strobe
186	GPO_19	Output	Mode select 3 for interface IC
187	NLWR/NLSB	Output	Processor low write strobe
188	NWAIT	Input	Processor wait input
189	NRESET	Input	System reset input
190*	BURSTCLK	Output	Not used
191	NRAMCS1	Output	Chip select for SRAM 1
192	NAUXCS1	Output	Command latch enable for flash memory 2
193	GPIO_43	Output	Chip select for Camera module
194	VDDUSB	Input	USB power supply 2.8 - 3.3 V (VUSB)
195	GPIO_23	Output	SIM interface reset
196	SIMDATAIO	Input/ Output	SIM interface data input/output
197	GPIO_24	Output	Sound generator IC reset
198	GPIO_19	Output	JTAG TMS
199	GPIO_21	Output	JTAG TDO
200	GPO_2	Output	Write protect control for flash memory 1
201	GND	—	Ground
202	GPO_8	Output	IrDA power ON/OFF control
203	GPO_9	Output	Band select 3 for RF (BS3)
204	GPO_10	Output	BUF OFF for main LCD controller

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

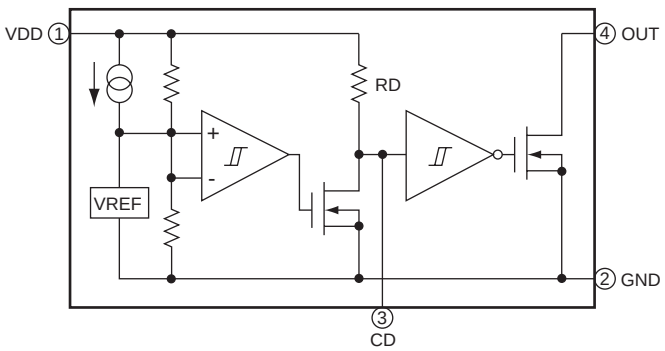
■ IC107 VHIEW6671++-1R (EW6671): HALL

Pin No.	Terminal name	Input/Output	Description of terminal
1	VDD	Input	Input
2	GND	—	Ground
3	OUT	Output	Output



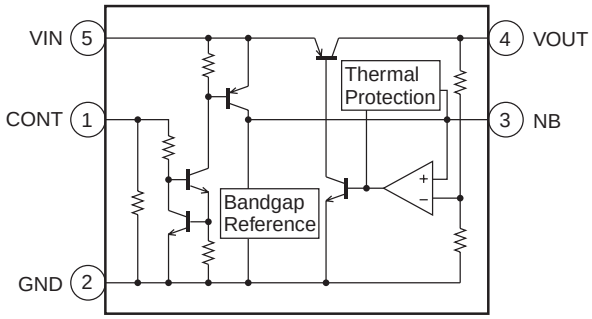
■ IC108 VHIR3112Q26-1L (R3112Q261A): VOLTAGE DETECTOR

Pin No.	Terminal name	Input/ Output	Description of terminal
1	VDD	—	Power supply
2	GND	—	Ground
3	CD	Input	External condenser connection terminal for delay
4	OUT	Output	Output terminal (L: when output is detected, H: when output is canceled)



■ IC109 VHINJ287130-1L (NJM2871F03): 3.0 V REGULATOR

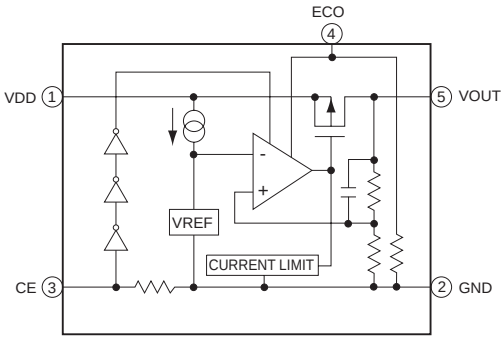
Pin No.	Terminal name	Input/ Output	Description of terminal
1	CONT	Input	Control
2	GND	—	Ground
3	NB	—	Noise bypass
4	VOUT	Output	Output
5	VIN	Input	Input



■ IC111 VHIR116030B-1L (R1160N301B): REGULATOR

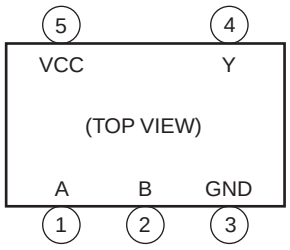
■ IC703 VHIR116018B-1L (R116018B): 1.8 V REGULATOR

Pin No.	Terminal name	Input/ Output	Description of terminal
1	VDD	Input	Input
2	GND	—	Ground
3	CE	Input	Chip enable
4	ECO	Input	High speed/low consumption selector switch
5	VOUT	Output	Output



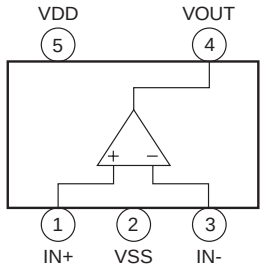
■ IC113, 706 VHITC7SZ08A-1L (TC7SZ08A): AND GATE/LOGIC

Pin No.	Terminal name	Input/ Output	Description of terminal
1	A	Input	Signal input
2	B	Input	Signal input
3	GND	—	Ground
4	Y	Output	Logic value output
5	VCC	Input	Power supply



■ IC114 RH-IXA007AFZZL (HA1631S03CME): COMPARATOR

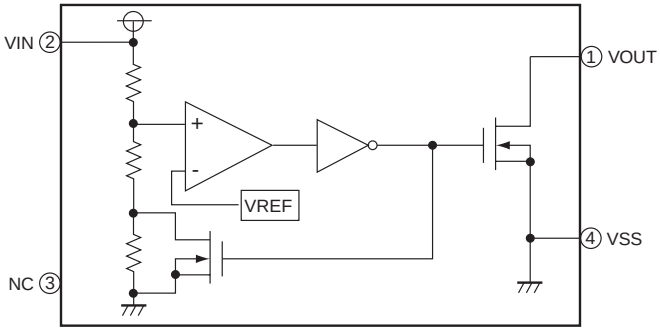
Pin No.	Terminal name	Input/ Output	Description of terminal
1	IN+	Input	Input
2	VSS	—	Ground
3	IN-	Input	Input
4	VOUT	Output	Output
5	VDD	—	Power supply



■ IC115 VHIXC61CN27-1L (XC61CN27): REGULATOR

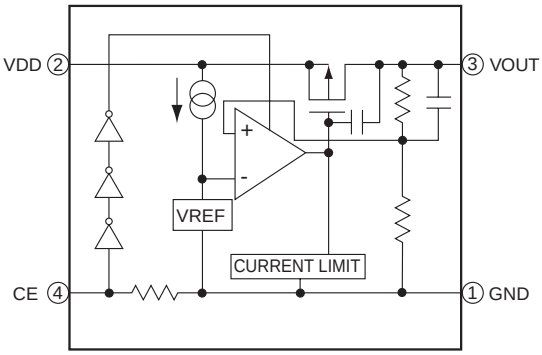
Pin No.	Terminal name	Input/ Output	Description of terminal
1	VOUT	Output	Output
2	VIN	Input	Supply voltage input
3*	NC	—	Not used
4	GND	—	Ground

In this unit, the terminal withasterisk mark (*) is (open) terminal which is not connected to the outside.



■ IC116 VHIRQ5RW45B-1L (RQ5RW45B): 4.5 V REGULATOR

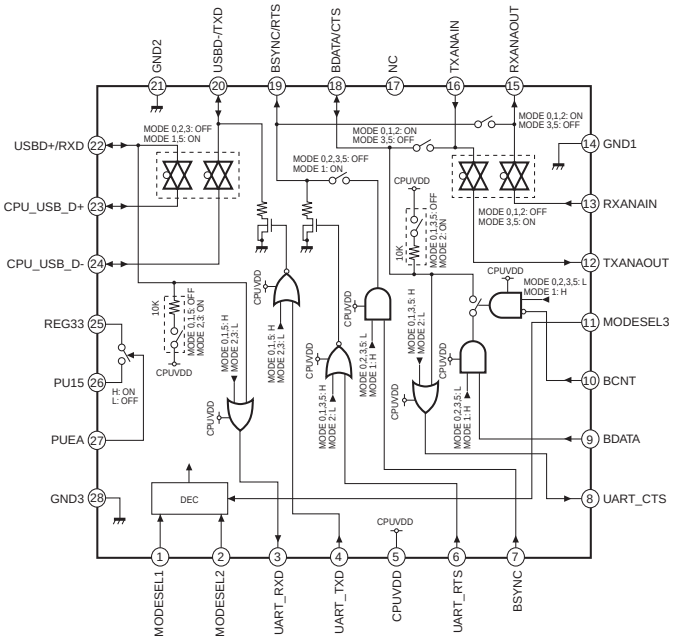
Pin No.	Terminal name	Input/ Output	Description of terminal
1	GND	—	Ground
2	VDD	—	Power supply
3	VOUT	Output	Output
4	CE	Input	Chip enable



■ IC502 VHIBU7870KN-1L (BU7870KN): USB CONTROLLER

Pin No.	Terminal name	Input/ Output	Description of terminal
1	MODESEL1	Input	Operation mode switching 1
2	MODESEL2	Input	Operation mode switching 2
3	UART_RXD	Output	UART_RXD output
4	UART_TXD	Input	UART_TXD input
5	CPUVDD	—	Digital power supply
6	UART_RTS	Input	UART_RTS input
7	BSYNC	Input	BSYNC input
8	UART_CTS	Output	UART_CTS output
9	BDATA	Input	BDATA input
10	BCNT	Input	BDATA input control
11	MODESEL3	Input	Operation mode switching 3
12	TXANAOUT	Output	Hands free sending external output
13	RXANAIN	Input	Hands free receiving external input
14	GND1	—	Ground
15	RXANAOUT	Output	Hands free receiving output
16	TXANAIN	Input	Hands free sending input
17*	NC	—	Not used
18	BDATA/CTS	Input/ Output	BDATA/CTS switching external input/output
19	BSYNC/RTS	Output	BSYNC/RTS switching external output
20	USBD-/TXD	Input/ Output	USBD-/TXD switching external input/output
21	GND2	—	Ground
22	USBD+/RXD	Input/ Output	USBD+/RXD switching external input/output
23	CPU_USB_D+	Input/ Output	CPU_USB_D+ input/output
24	CPU_USB_D-	Input/ Output	CPU_USB_D- input/output
25	REG33	—	Power supply voltage for USB
26	PU15	Output	PMOS open drain output
27	PUEA	Input	PU15 control input
28	GND3	—	Ground

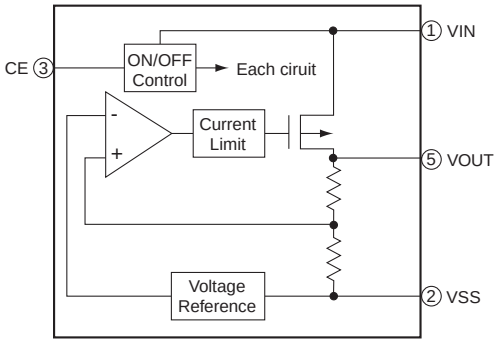
In this unit, the terminal withasterisk mark (*) is (open) terminal which is not connected to the outside.



■ IC505 VHIXC620930-1L (XC620930): REGULATOR

Pin No.	Terminal name	Input/ Output	Description of terminal
1	VIN	Input	Input
2	VSS	—	Ground
3	CE	Input	ON/OFF Control
4	NC	—	Not used
5	VOUT	Output	Output

In this unit, the terminal withasterisk mark (*) is (open) terminal which is not connected to the outside.



■ IC506 RUNTZA005AFZZL (UGNZ2): BLUETOOTH MODULE

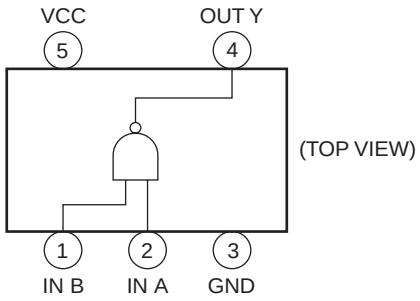
Pin No.	Terminal name	Input/ Output	Description of terminal
1*	USBP	Input/ Output	USB DATA+ (Not used)
2*	USBN	Input/ Output	USB DATA- (Not used)
3	UART_RTS	Output	UART/Ready to send to DTE
4	GND	—	Ground
5	GND	—	Ground
6	UART_TxD	Output	UART/TxD to DTE
7	UART_RxD	Input	UART/RxD from DTE
8	UART_CTS	Input	UART/Clear to send from DTE
9	PIO8	Input/ Output	General purpose I/O
10	VCC_IO	Input	Positive supply voltage for IO voltage Connect the VCC, if IO voltage is same as VCC
11	VCC	Input	Main supply voltage input 1 Regulated DC source recommended
12	PCM_OUT	Output	PCM data stream output
13	PCM_SYNC	Input/ Output	Connection to PCM frame sync Input/ output of 8 kHz
14*	XTAL_IN	Input	Ext clock in (Not used)
15*	XTAL_OUT	Input	Ext clock out (Not used)
16	RESETB	Input	System reset
17	VDD18V	Output	VDD_CORE decupling capacitor
18	PCMCLK	Input/ Output	Connction to PCM reference Clock input/output of 256 kHz
19	PCM_IN	Input	PCM data stream input
20	PIO5	Input/ Output	General purpose I/O

Pin No.	Terminal name	Input/ Output	Description of terminal
21	PIO6	Input/ Output	General purpose I/O
22	PIO3	Input/ Output	General purpose I/O
23	GND	—	Ground
24	SPIMOSI	Input/ Output	For factory use only
25	SPICLK	Input/ Output	For factory use only
26	PIO4	Input/ Output	General purpose I/O
27	PIO7	Input/ Output	General purpose I/O
28	PIO1	Input/ Output	General purpose I/O
29	RF_IO	Input/ Output	RF input/output
30	GND	—	Ground
31	SPIMISO	Input/ Output	For factory use only
32*	SPICSB	Input/ Output	For factory use only (Not used)
33	PIO2	Input/ Output	General purpose I/O
34	PIO0	Input/ Output	General purpose I/O

In this unit, the terminal withasterisk mark (*) is (open) terminal which is not connected to the outside.

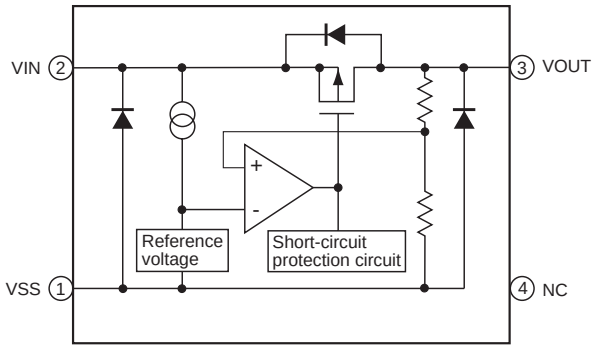
■ IC507 VHITC7SET00FU- (TC7SET00FU): LOGIC

Pin No.	Terminal name	Input/ Output	Description of terminal
1	INB	Input	Input B
2	INA	Input	Input A
3	GND	—	Ground
4	OUT Y	Output	Output Y
5	VCC	—	Power supply



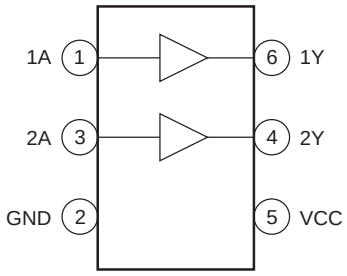
■ IC508 VHI817A30NB-1R (817A30NB): 3.0V REGULATOR

Pin No.	Terminal name	Input/ Output	Description of terminal
1	VSS	—	Ground (GND)
2	VIN	Input	Input voltage (VDD)
3	VOUT	Output	Output voltage
4	NC	—	Not used (CE)



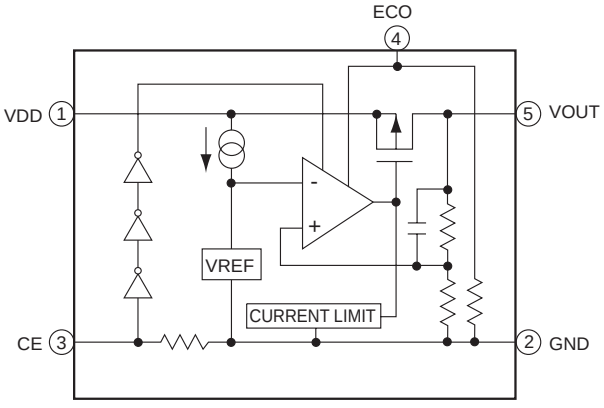
■ IC509 VHILVC2G34P-1R (LVC2G34P): BUFFER

Pin No.	Terminal name	Input/ Output	Description of terminal
1	1A	Input	Input
2	GND	—	Ground
3	2A	Input	Input
4	2Y	Output	Output
5	VCC	—	Power supply
6	1Y	Output	Output



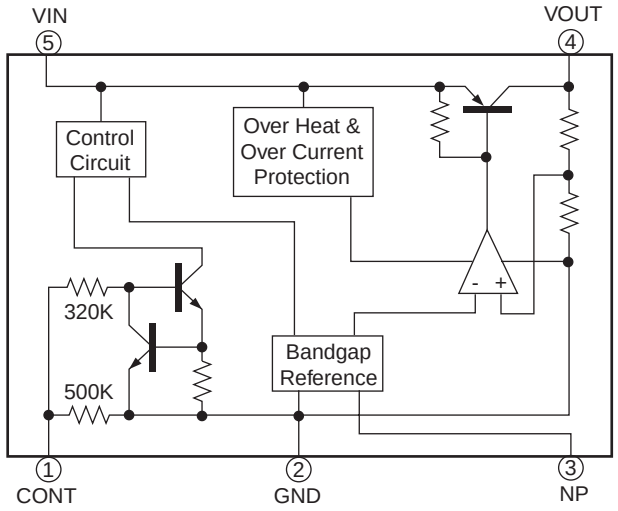
■ IC701 VHIR116025B-1L (R116025B): 2.5V REGULATOR

Pin No.	Terminal name	Input/ Output	Description of terminal
1	VDD	Input	Input
2	GND	—	Ground
3	CE	Input	Chip enable
4	ECO	Input	High speed/low consumption selector switch
5	VOUT	Output	Output



■ IC702 VHITK11131C-1R (TK11131C): REGULATOR

Pin No.	Terminal name	Input/ Output	Description of terminal
1	CONT	Input	Control
2	GND	—	Ground
3	NP	Input	Capacitor (Vref)
4	VOUT	Output	Output
5	VIN	Input	Input



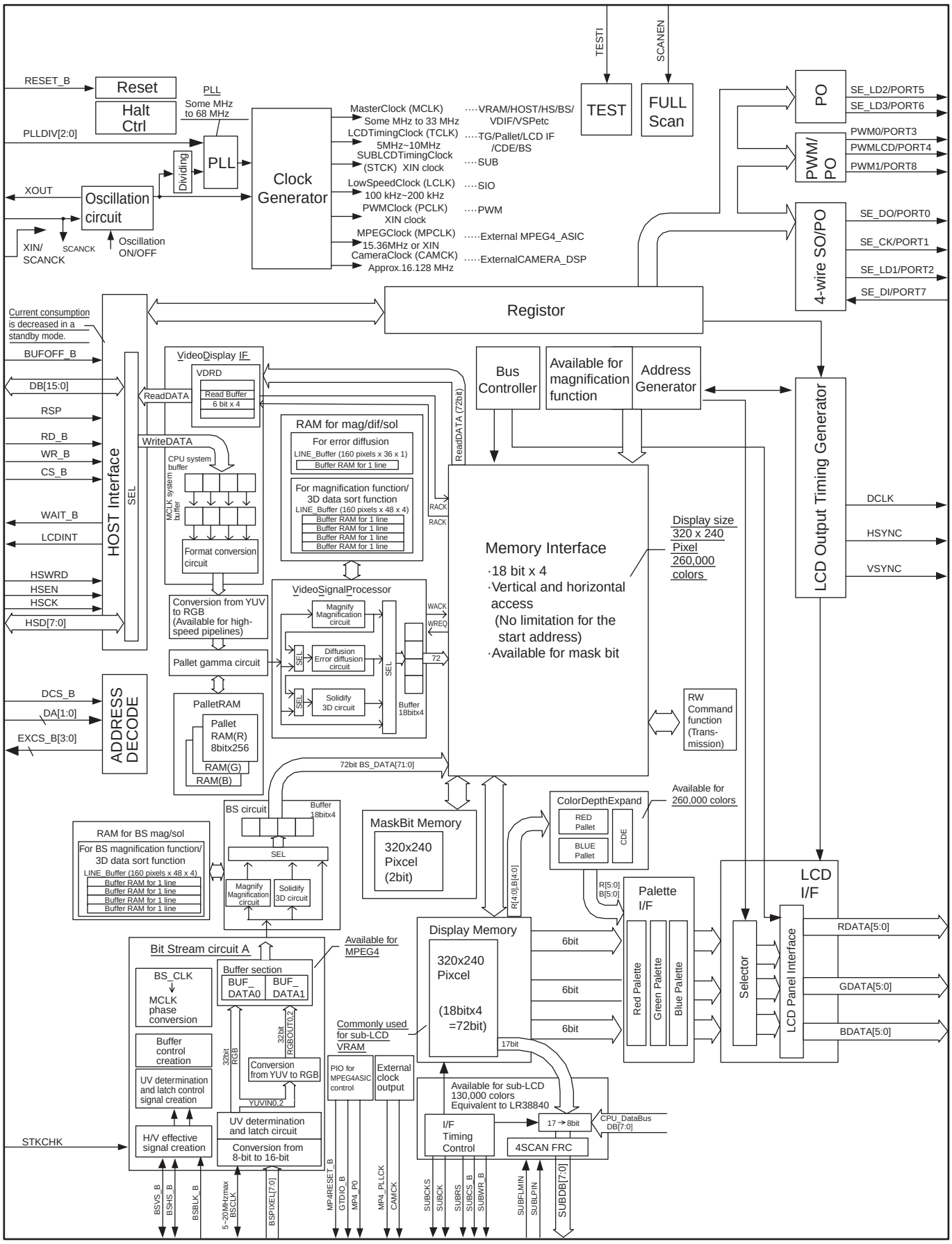
■ IC704 (LR38863): DISPLAY CONTROLLER

Pin No.	Terminal name	Input/ Output	Description of terminal
1	DUMMY4	—	Dummy 4
2	VDDPLL	—	PLL Power supply 1.8 V (1.6 V~ 2.0 V)
3	PLLGND	—	PLL Ground
4	PLLDIV0	Input	PLL multiply switching signal
5	PLLDIV1	Input	PLL multiply switching signal
6	HSD0	Input/ Output	Data bus for high-speed serial transfer
7	HSD1	Input/ Output	Data bus for high-speed serial transfer
8	HSD2	Input/ Output	Data bus for high-speed serial transfer
9	HSWRD	Input/ Output	Read/Write determination signal for high-speed serial transfer
10	HSEN	Input/ Output	High-speed serial data effective signal High is active
11	HSCK	Input/ Output	Standard clock for high-speed serial transfer (5 to 33 MHz)
12	DUMMY3	—	Dummy 3
13	PWM1/PORT8	Output	PWM output 1 General-purpose PORT output (default) (Not used)
14	PLLDIV2	Input	PLL multiply switching signal
15	VDDCORE	—	CORE Power supply 1.8 V (1.6 V~ 2.0 V)
16	GND	—	Logic ground
17	SUBWR_B	Input/ Output	Light signal for External display
18	GND	—	Logic ground
19	VDDCORE	—	CORE Power supply 1.8 V (1.6 V~ 2.0 V)
20	PWM0/PORT3	Output	PWM output 0 General-purpose PORT output (default)
21	SUBCS_B	Input/ Output	Chip select signal for External display
22	CS_B	Input/ Output	Device select signal (Display is active when CS_B is "Low")
23	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
24	LCDINT	Output	External interrupt signal (Starting varies when interruption occurs.)
25	GTDIO_B	Output	MPEG4ASIC internal core power-cut signal ("Low" is active.)
26	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
27	SUBDB1	Input/ Output	Data bus for External display
28	BDATA[5] (B5)	Output	Display panel B output signa
29	BDATA[5] (B4)	Output	Display panel B output signa
30	BDATA[5] (B3)	Output	Display panel B output signa
31	GND	—	Logic ground
32	TESTI	Input	Test terminal (Connected to GND normally)
33	BSHS_B	Input/ Output	External Bit Stream horizontal synchronization signal ("Low" is active)
34	WR_B	Input/ Output	Host write strobe signal
35	SUBRS	Input/ Output	Data determination signal for External display
36	MP4 RESET_B	Output	MPEG4ASIC reset control signal ("Low" is active)
37	HSD6	Input/ Output	Data bus for high-speed serial transfer
38	BDATA[2] (B2)	Output	Display panel B output signal
39	BDATA[2] (B1)	Output	Display panel B output signal
40	BDATA[2] (B0)	Output	Display panel B output signal
41*	EXCS_B1	Input/ Output	Chip select output 1 (internal decode output) (Not used)
42*	XOUT	Output	Oscillation circuit output (Not used)
43	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
44	GND	—	Logic ground
45	SCANEN	Input	Full scan effective signal "High" is active (Connected to GND normally)
46	RD_B	Input/ Output	Host read strobe signal
47	RSP	Input/ Output	Register selection signal HOST_IF section : RSP =Low...Display access RSP = High...Control access Hyper_Serial section : RSP = Low...Control acces RSP = High...Display access
48	GND	—	Logic ground
49	HSD3	Input/ Output	Data bus for high-speed serial transfer
50	DCLK	Input/ Output	Data sampling clock (display clock)

Pin No.	Terminal name	Input/ Output	Description of terminal
51	VSYNC	Input/ Output	Vertical synchronization signal
52	HSYNC	Input/ Output	Horizontal synchronization signal
53*	EXCS_B3	Input/ Output	Chip select output 3 (internal decode output) (Not used)
54	XIN	Input	Oscillation circuit input/External clock input signal Clock input for full scan
55	SUBDB6	Input/ Output	Data bus for External display
56	RESET_B	Input	Master reset (All registers are initialized when Low is activated)
57	SUBDB0	Input/ Output	Data bus for External display
58	SUBDB2	Input/ Output	Data bus for External display
59	HSD5	Input/ Output	Data bus for high-speed serial transfer
60	DB0	Input/ Output	Data bus
61	HSD4	Input/ Output	Data bus for high-speed serial transfer
62*	EXCS_B2	Input/ Output	Chip select output 2 (internal decode output) (Not used)
63	GDATA[5] (G5)	Output	Display panel G output signal
64	GDATA[4] (G4)	Output	Display panel G output signal
65	GDATA[3] (G3)	Output	Display panel G output signal
66	SUBDB3	Input/ Output	Data bus for External display
67	SUBDB4	Input/ Output	Data bus for External display
68	HSD7	Input/ Output	Data bus for high-speed serial transfer
69	DB1	Input/ Output	Data bus
70	DB2	Input/ Output	Data bus
71	DB3	Input/ Output	Data bus
72	DB4	Input/ Output	Data bus
73	STKCHK	Input	Setting BS-related output terminal to Hi-z when a stack is installed (Connected to GND normally)
74	VDDCORE	—	CORE Power supply 1.8 V (1.6 V~ 2.0 V)
75	GND	—	Logic ground
76	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
77	GDATA[2] (G2)	Output	Display panel G output signal
78	SUBDB5	Input/ Output	Data bus for External display
79	BSCLK	Input/ Output	External Bit Stream data clock
80	SUBCK	Output	Clock for External display
81	DB5	Input/ Output	Data bus
82	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
83	GND	—	Logic ground
84	VDDCORE	—	CORE Power supply 1.8 V (1.6 V~ 2.0 V)
85	CAMCK	Output	Clock for camera operation
86	GDATA[1] (G1)	Output	Display panel G output signal
87	GDATA[0] (G0)	Output	Display panel G output signal
88	RDATA[5] (R5)	Output	Display panel R output signal
89	RDATA[4] (R4)	Output	Display panel R output signal
90	VDDCORE	—	CORE Power supply 1.8 V (1.6 V~ 2.0 V)
91*	PWMLCD/ PORT4	Output	PWM LCD output General-purpose PORT output (default) (Not used)
92	BSBLK_B	Input/ Output	External Bit Stream data effective signal ("High" is active when transferring the data)
93	DB6	Input/ Output	Data bus
94	DB7	Input/ Output	Data bus
95	DB8	Input/ Output	Data bus
96	DB9	Input/ Output	Data bus
97	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
98	RDATA[3] (R3)	Output	Display panel R output signal
99	RDATA[2] (R2)	Output	Display panel R output signal
100	RDATA[1] (R1)	Output	Display panel R output signal
101	RDATA[0] (R0)	Output	Display panel R output signal
102*	MP4_P0	Output	MPEG4 control
103*	EXCS_B0	Input/ Output	Chip select output 0 (internal decode output) (Not used)
104	BSPIXEL7	Input/ Output	External Bit Stream data bus
105	BSVS_B	Input/ Output	External Bit Stream vertical synchronization signal ("Low" is active)
106	DB10	Input/ Output	Data bus
107	DB11	Input/ Output	Data bus
108	DB12	Input/ Output	Data bus
109*	MP4_PLLCK	Output	MPEG4ASIC clock 15.36 MHz/CPU supply XIN clock (Not used)
110	SUBDB7	Input/ Output	Data bus for External display
111	GND	—	Logic ground
112	DA0	Input/ Output	Address input for chip select decode
113	BSPIXEL0	Input/ Output	External Bit Stream data bus
114	DCS_B	Input	Chip select input dedicated for chip select decode
115	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
116	BSPIXEL6	Input/ Output	External Bit Stream data bus
117	SE_DO/PORT0	Output	Data output for 4-wire serial IF (default) General-purpose PORT output
118	DB13	Input/ Output	Data bus

Pin No.	Terminal name	Input/ Output	Description of terminal
119	DB14	Input/ Output	Data bus
120	DB15	Input/ Output	Data bus
121	WAIT_B	Output	External wait signal ("Low" is active)
122	SUBFLMIN	Input	Driver FLM signal input for External display
123	SUBCKS	Output	Clock switching signal for External display
124	DA1	Input/ Output	Address input for chip select decode
125	BSPIXEL1	Input/ Output	External Bit Stream data bus
126	BSPIXEL4	Input/ Output	External Bit Stream data bus
127	GND	—	Logic ground
128	BSPIXEL5	Input/ Output	External Bit Stream data bus
129	SE_CK/PORT1	Output	Control clock for 4-wire serial IF (default) General-purpose PORT output
130	SE_LD2/PORT5	Output	Load signal 2 for 4-wire serial IF General-purpose PORT output (default)
131	BUFOFF_B	Input	Buffer Gated switching signal for I/O through current prevention (High when Host_IF signal is activated)
132	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
133	DUMMY2	—	Dummy 2
134*	SE_LD3/PORT6	Output	Load signal 3 for 4-wire serial IF General-purpose PORT output (default) (Not used)
135	VDDIO	—	IO Power supply 3.0 V (2.7 V~ 3.3 V)
136	SUBLPIN	Input	Driver LP input External display
137	BSPIXEL2	Input/ Output	External Bit Stream data bus
138	BSPIXEL3	Input/ Output	External Bit Stream data bus
139	VDDCORE	—	CORE Power supply 1.8 V (1.6 V~ 2.0 V)
140	SE_DI/PORT7	Input/ Output	4-wire serial input (default) General-purpose PORT output
141	SE_LD1/PORT2	Output	Load signal 1 for 4-wire serial IF (default) General-purpose PORT output
142	GND	—	Logic ground
143	VDDCORE	—	CORE Power supply 1.8 V (1.6 V~ 2.0 V)
144	DUMMY1	—	Dummy 1Dummy 4

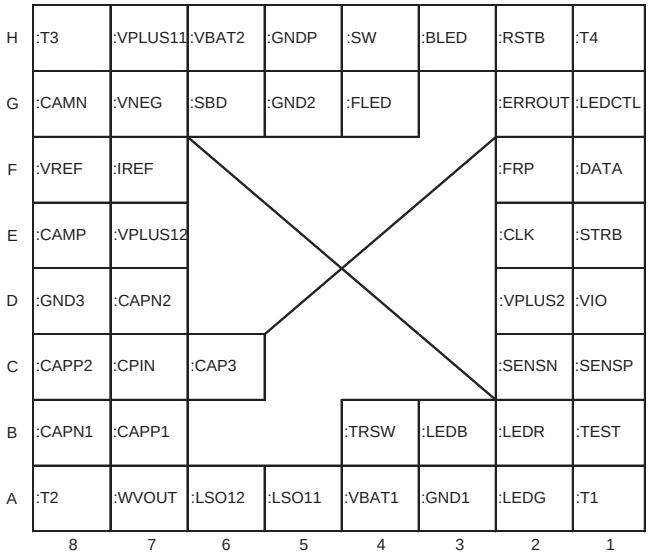
In this unit, the terminal with asteriskmark (*) is (open) terminal which is not connected to the outside.


RESET_B
Reset
Halt Ctrl
PLL
Some MHz to 68 MHz
PLLDIV[2:0]
PLL
Dividing
XOUT
Oscillation circuit
XIN/ SCANCK
SCANCK
Oscillation ON/OFF
Clock Generator
MasterClock (MCLK) Some MHz to 33 MHz ····VRAM/HOST/HS/BS/ VDIF/VSPetc
LCDTimingClock (TCLK) 5MHz~10MHz ····TG/Pallet/LCD IF /CDE/BS
SUBLCDTimingClock (STCK) XIN clock ····SUB
LowSpeedClock (LCLK) 100 kHz~200 kHz ····SIO
PWMClock (PCLK) XIN clock ····PWM
MPEGClock (MPCLK) 15.36MHz or XIN ·····External MPEG4_ASIC
CameraClock (CAMCK) Approx.16.128 MHz ·····ExternalCAMERA_DSP
TESTI
SCANEN
TEST
FULL Scan
PO
SE_LD2/PORT5
SE_LD3/PORT6
PWM/ PO
PWM0/PORT3
PWMLCD/PORT4
PWM1/PORT8
4-wire SO/PO
SE_DO/PORT0
SE_CK/PORT1
SE_LD1/PORT2
SE_DI/PORT7
Registor
Current consumption is decreased in a standby mode.
BUFOFF_B
DB[15:0]
RSP
RD_B
WR_B
CS_B
WAIT_B
LCDINT
HSWRD
HSEN
HSCK
HSD[7:0]
HOST Interface
SEL
VideoDisplay IF
VDRD
Read Buffer 6 bit x 4
ReadDATA
WriteDATA
CPU system buffer
MCLK system buffer
Format conversion circuit
ReadDATA (72bit)
RACK
RACK
RAM for mag/dif/sol
For error diffusion
LINE_Buffer (160 pixels x 36 x 1)
Buffer RAM for 1 line
For magnification function/ 3D data sort function
LINE_Buffer (160 pixels x 48 x 4)
Buffer RAM for 1 line
Bus Controller
Available for magnification function
Address Generator
LCD Output Timing Generator
DCLK
HSYNC
VSYNC
Memory Interface
·18 bit x 4
·Vertical and horizontal access
(No limitation for the start address)
·Available for mask bit
Display size 320 x 240 Pixel 260,000 colors
VideoSignalProcessor
Magnify Magnification circuit
Diffusion Error diffusion circuit
Solidify 3D circuit
WACK
WREQ
72
Buffer 18bitx4
Conversion from YUV to RGB (Available for high-speed pipelines)
Pallet gamma circuit
PalletRAM
Pallet RAM(R) 8bitx256
RAM(G)
RAM(B)
DCS_B
DA[1:0]
EXCS_B[3:0]
ADDRESS DECODE
RW Command function (Trans-mission)
72bit BS_DATA[71:0]
BS circuit
Buffer 18bitx4
RAM for BS mag/sol
For BS magnification function/ 3D data sort function
LINE_Buffer (160 pixels x 48 x 4)
Buffer RAM for 1 line
MaskBit Memory
320x240 Pixcel (2bit)
ColorDepthExpand
RED Pallet
BLUE Pallet
CDE
Available for 260,000 colors
R[4:0],B[4:0]
R[5:0] B[5:0]
Palette I/F
Red Palette
Green Palette
Blue Palette
LCD I/F
Selector
LCD Panel Interface
RDATA[5:0]
GDATA[5:0]
BDATA[5:0]
Display Memory
320x240 Pixcel
(18bitx4 =72bit)
6bit
6bit
6bit
17bit
Bit Stream circuit A
Available for MPEG4
BS_CLK
MCLK phase conversion
Buffer section
BUF_ DATA0
BUF_ DATA1
Buffer control creation
UV determination and latch control signal creation
H/V effective signal creation
32bit RGB
32bit RGBOUT0,2
Conversion from YUV to RGB
YUVIN0,2
UV determination and latch circuit
Conversion from 8-bit to 16-bit
Commonly used for sub-LCD VRAM
PIO for MPEG4ASIC control
External clock output
Available for sub-LCD 130,000 colors Equivalent to LR38840
I/F Timing Control
17 → 8bit
CPU_DataBus DB[7:0]
4SCAN FRC
STKCHK
BSVS_B
BSHS_B
BSBLK_B
5~20MHzmax BSCLK
BSPIXEL[7:0]
MP4RESET_B
GTDIO_B
MP4_PO
MP4_PLLCK
CAMCK
SUBCKS
SUBCK
SUBRS
SUBCS_B
SUBWR_B
SUBFLMIN
SUBLPIN
SUBDB[7:0]

■ **IC707 RH-IX3050AFZZL (BD6015): POWER MANAGEMENT**

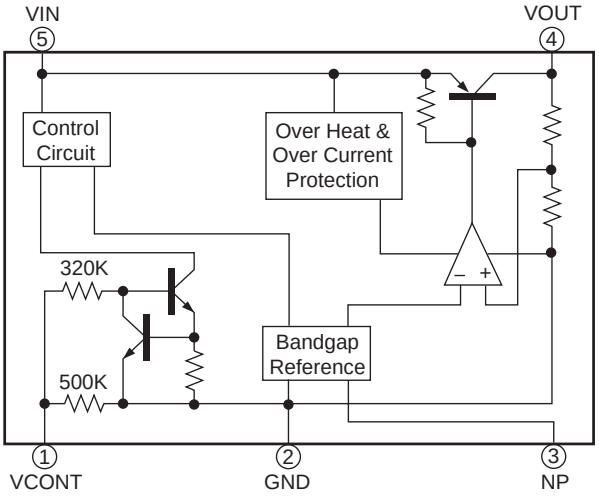
Pin No.	Terminal name	Input/ Output	Input level	ESD Diode		Description of terminal	Initial status
				Power side	GND side		
1	T1	—	—	—	GND1	Dummy terminal (internally connected with T2)	—
2	LEDG	Output	—	—	GND1	Green LED drive output terminal (constant current drive)	LED off
3	GND1	—	—	VBAT1	—	Ground	—
4	VBAT1	—	—	—	GND1	VBAT power supply terminal	—
5*	LSO11	O, CMOS output	—	WVOUT	GND3	Level shift output 1 (Not used)	0 V output
6*	LSO12	O, CMOS output	—	WVOUT	GND3	Level shift output 1 (Not used)	0 V output
7	WVOUT	Output	—	—	GND3	2/4 times step-up charge pump output	Step-up stop
8	T2	—	—	—	GND1	Dummy terminal (internally connected with T1)	—
9	TEST	I, CMOS input	—	VBAT1	GND1	Test terminal (pulldown with IC, inside)	—
10	LEDR	Output	—	VBAT1	GND1	Red LED drive output terminal (constant current drive)	LED off
11	LEDB	Output	—	—	GND1	Blue LED drive output terminal (constant current drive)	LED off
12	TRSW	Output	—	VBAT1	GND1	DC-DC switching Tr drive terminal for R/G/B LED	Step-up stop
13	CAPP1	Output	—	WVOUT	GND3	2/4 times step-up charge pump C1 connection terminal	Step-up stop
14*	CAPN1	Output	—	WVOUT	GND3	2/4 times step-up charge pump C1 connection terminal (Not used)	Step-up stop
15	SENSP	Input	—	VBAT1	GND1	DC-DC switching current sense terminal for R/G/B LED	Step-up stop
16	SENSN	Input	—	VBAT1	GND1	DC-DC switching current sense terminal for R/G/B LED	Step-up stop
17	CAP3	Output	—	—	GND3	2/4 times step-up charge pump output terminal	Step-up stop
18	CPIN	Input	—	—	GND3	2/4 times step-up charge pump input terminal	—
19	CAPP2	Output	—	WVOUT	GND3	2/4 times step-up charge pump C2 connection terminal	Step-up stop
20	VIO	—	—	—	GND2	Logic system power supply terminal	—
21	VPLUS2	Input	—	—	GND1	DC-DC step-up voltage feedback input for R/G/B LED	Step-up stop
22*	CAPN2	Output	—	CPIN	GND3	2/4 times step-up charge pump C2 connection terminal (Not used)	Step-up stop
23	GND3	—	—	VBAT1	—	Ground	—
24	STRB	I, CMOS input	VIO	VIO	GND2	Three-wire serial strobe input	—
25	CLK	I, CMOS input	VIO	VIO	GND2	Three-wire serial clock input	—
26	VPLUS12	Input	—	—	GND3	DC-DC step-up voltage feedback input for front/rear backlights	Step-up stop
27	CAMP	Output	—	VPLUS12	GND3	+15 V voltage output terminal for camera	0 V output
28	DATA	I, CMOS input	VIO	VIO	GND2	Three-wire serial data input	—
29	FRP	I, CMOS input	VIO	VIO	GND2	Level shift circuit, rectangular wave input terminal	—
30	IREF	Output	—	VBAT1	GND3	Resistor connection terminal for current reference	—
31	VREF	Output	—	VBAT1	GND3	Voltage reference terminal (connected with C)	—
32	LEDCTL	I, CMOS input	VIO	VIO	GND2	On/Off control terminal for R/G/B LED	—
33*	ERROUT	Output	—	VBAT2	GND2	SWREG1 error detection amplifier output (Not used)	No output
34	FLED	Output	—	—	GND2	White LED drive terminal for front backlight	LED off
35	GND2	—	—	VBAT2	—	Ground	—
36	SBD	Input	—	—	GND2	SBD input terminal	—
37	VNEG	Input	—	VBAT1	—	Negative power supply terminal for camera	—
38	CAMN	Output	—	VBAT1	—	−8 V voltage output terminal for camera	0 V output
39	T4	—	—	—	GND3	Dummy terminal (internally connected with T3)	—
40	RSTB	I, CMOS input	VIO	VIO	GND2	Reset input (reset by low input)	—
41	BLED	Output	—	—	GND2	White LED drive terminal for rear backlight	LED off
42	SW	Output	—	—	GNDP	DC-DC coil switching terminal for front/rear backlights	Step-up stop
43	GNDP	Output	—	VBAT2	—	Ground	—
44	VBAT2	—	—	—	GND2	VBAT power supply	—
45	VPLUS11	Input	—	—	GND2	DC-DC step-up voltage feedback input for front/rear backlights	Step-up stop
46	T3	-	—	—	GND3	Dummy terminal (internally connected with T4)	—

In thisunit, the terminal with asterisk mark (∗) is (open) terminal which is not connected to the outside.



■ IC708 VHITK11130C-1R (TK11130C): REGULATOR

Pin No.	Terminal name	Input/ Output	Description of terminal
1	VCONT	Input	Control
2	GND	—	Groun
3	NP	—	Capacitor (Vref)
4	VOUT	Output	Output
5	VIN	Input	Input



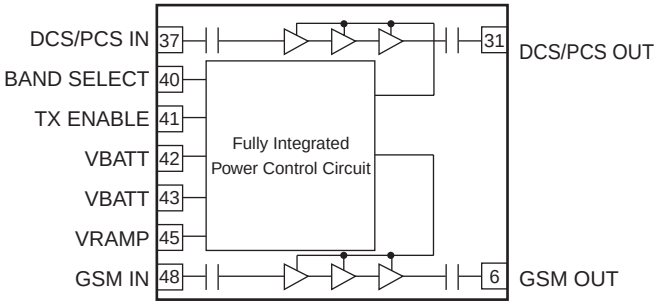
■ IC801 VHIHD155155-1L(HD155155NP): RF

Pin No.	Terminal name	Input/ Output	Description of terminal
1	VCCLNA	Input	VCC for LNA transistor and LNA Bias
2	PCSGND	—	GND for Emitter of LNA transistor (PCS)
3	PCSLNAI	Input	Positive input for LNA transistor (PCS)
4	PCSLNAIB	Input	Negative input for LNA transistor (PCS)
5	PCSDCSGND	—	GND for Emitter of LNA transistor (PCS,DCS)
6	DCSLNAI	Input	Positive input for LNA transistor (DCS)
7	DCSLNAIB	Input	Negative input for LNA transistor (DCS)
8	DCSGSMGND	—	GND for Emitter of LNA transistor (DCS,GSM)
9	GSMLNAI	Input	Positive input for LNA transistor (GSM)
10	GSMLNAIB	Input	Negative input for LNA transistor (GSM)
11	GSMGND	—	GND for Emitter of LNA transistor (GSM)
12	PLLOUT	Output	Current output to control and modulate TXVCO
13	VCCOPLL	Input	VCC for OPLL and Phase comparator
14	VCCTXVCO		VCC for TXVCO
15	GNDTXVCOD	—	GND for DCS/PCS TxVCO
16	GNDTXVCODB	—	GND for DCS/PCS TxVCO
17	TXOUTG	Output	Tx output for GSM
18	COMMONGND		GND for common
19	TXOUTD	Output	Tx output for DCS/PCS
20	TXVCOGB	Input	Negative TxVCO output for GSM
21	TXVCOG	Input	Positive TxVCO output for GSM
22	VCCIQ	Input	VCC for IQ modulator
23	IOUT/IIN	Input/ Output	Positive output/input of I channel/modulator
24	IOUTB/IINB	Input/ Output	Negative output/input of I channel/modulator
25	QOUT/QIN	Input/ Output	Positive output/input of Q channel/modulator
26	QOUTB/QIN	Input/ Output	Negative output/input of Q channel/modulator
27	VCCIFSYN	Input	VCC for IFVCO Buffer and Divider, and IF Synthesiser
28	CPIFSYN	Output	Charge Pump output of IF Synthesiser
29	LE	Input	Load enable for serial data
30	CLK	Input	Clock for serial data
31	VCXOOUT	Output	Output for VCXO
32	SDATA	Input	Serial Data
33*	GNDVCXO	—	GND for VCXO (Not used)
34*	VCXOE	—	Emitter of VCXO transistor (Not used)
35	VCXOB	Input	Base of VCXO transistor
36	VCCVCXO	Input	VCC for VCXO
37	VCCRFSYN	Input	VCC for RF Synthesiser
38	CPRFSYN	Output	Charge Pump output of RF Synthesise
39	FLOCK	Output	FLOCK,Output,Fast Lock control for RF Synthesiser
40	VCCBB	Input	VCC for Base band and State Logic
41	VCCRFVCO	Input	VCC for RF VCO
42	DIVON	Output	VCXOOUT divider control input
43	VCCRFLO	Input	VCC for RF Local Buffer and Divider
44	CAPQB	Output	Capacitor for Q channel LPF (Negative output)
45	CAPQ	Output	Capacitor for Q channel LPF (Positive output)
46	CAPIB	Output	Capacitor for I channel LPF (Negative output)
47	CAPI	Output	Capacitor for I channel LPF (Positive output)
48	VCCMIX	Input	VCC for Direct conversion Mixer
49	GNDLNA	—	GND for LNA Bias

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

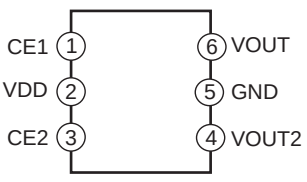
■ IC802 RF3146

Pin No.	Teminal name	Description of terminal
1	NC	Internal circuit node. Do not externally connect.
2	VCC2 GSM	Contorolled voltage input to the GSM driver stage. This voltage is part of the power control function for the module. This node must be connected to VCC OUT. This pin should be externally decoupled.
3	NC	Internal circuit node. Do not externally connect.
4	GND	Internally connected to the package base.
5	GND	Internally connected to the package base.
6	GSM900 OUT	RF output for the GSM bands. This is a 50Ω output. The output matching circuit and DC-block are internal to the package.
7	GND	Internally connected to the package base.
8	NC	Internal circuit node. Do not externally connect.
9	NC	Internal circuit node. Do not externally connect.
10	NC	Internal circuit node. Do not externally connect.
11	NC	Internal circuit node. Do not externally connect.
12	NC	Internal circuit node. Do not externally connect.
13	NC	No internal or external connection.
14	NC	Internal circuit node. Do not externally connect.
15	NC	Internal circuit node. Do not externally connect.
16	NC	Internal circuit node. Do not externally connect.
17	NC	Internal circuit node. Do not externally connect.
18	VCC3 GSM	Controlled voltage input to the GSM output stage. This voltage is part of the power control function for the module. This node must be connected to VCC OUT. This pin should be externally decoupled.
19	VCC OUT	Controlled voltage output to feed VCC2 and VCC3. This voltage is part of the power control function for the module. It cannot be connected to any pins other than VCC2 and VCC3.
20	VCC OUT	Controlled voltage output to feed VCC2 and VCC3. This voltage is part of the power control function for the module. It cannot be connected to any pins other than VCC2 and VCC3.
21	VCC3 DCS/PCS	Controlled voltage input to the DCS/PCS output stage. This voltage is part of the power control function for the module. This node must be connected to VCC OUT. This pin should be externally decoupled.
22	NC	Internal circuit node. Do not externally connect.
23	NC	Internal circuit node. Do not externally connect.
24	NC	No internal or external connection.
25	NC	Internal circuit node. Do not externally connect.
26	NC	Internal circuit node. Do not externally connect.
27	NC	Internal circuit node. Do not externally connect.
28	NC	Internal circuit node. Do not externally connect.
29	NC	Internal circuit node. Do not externally connect.
30	GND	Internally connected to the package base.
31	DCS/PCS OUT	RF output for the DCS/PCS bands. This is a 50Ω output.The output matching circuit and DC-block are internal to the package.
32	GND	Internally connected to the package base.
33	NC	Internal circuit node. Do not externally connect.
34	GND	Internally connected to the package base.
35	VCC2 DCS/PCS	Controlled voltage input to the DCS/PCS driver stage. This voltage is part of the power control function for the module. This node must be connected to VCC OUT. This pin should be externally decoupled.
36	NC	No internal connection. Connect to ground plane close to the package pin.
37	DCS/PCS IN	RF input for the DCS/PCS band. This is a 50Ω output.
38	NC	No internal connection. Connect to ground plane close to the package pin.
39	VCC1 DCS/PCS	Controlled voltage input to the DCS/PCS driver stage. This voltage is applied internal to the package. This pin should be externally decoupled.
40	BAND SEL	Allows external control to select the GSM or DSC/PCS bands with a logic high or low. A logic low enables the GSM bands, whereas a logic high enables the DCS/PCS bands.
41	TX ENABLE	This signal enables the PA module for operation with a logic high. Both bands are disabled with a logic low.
42	VBATT	Power supply for the module. This pin should be externally decoupled and connected to the battery.
43	VBATT	Power supply for the module. This pin should be externally decoupled and connected to the battery.
44	NC	Internal circuit node. Do not externally connect.
45	VRAMP	Ramping signal from DAC. A simple RC filter may be required depending on the selected baseband.
46	VCC1 GSM	Internally connected to VCC1 (pin39). No external connection required.
47	GND1 GSM	Ground connection for the GSM preamplifier stage. Connect to ground plane close to the package pin.
48	GSM900 IN	RF input to the GSM band. This is a 50Ω input.
Pkg base	GND	Connect to groung plane with mulitiple via holes. See revommended footprint.



■ IC804 VHIR5322N29-1L(R5322N002B): POWER SUPPLY

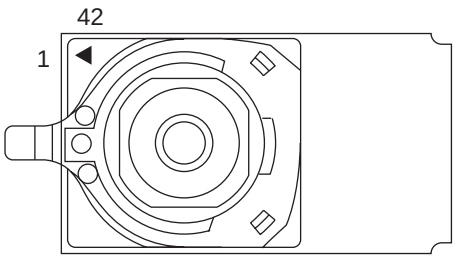
Pin No.	Terminal name	Input/ Output	Description of terminal
1	CE1	Input	Chip Enable1
2	VDD	Input	Power supply
3	CE2	Input	Chip Enable2
4	VOUT2	Output	VCC for VRF
5	GND	—	Ground
6	VOUT1	Output	VCC for VTCXO



[2] FUNCTION TABLE OF CAMERA

■ CA1001 DKENDW108AFSN: CAMERA UNIT

Pin No.	Terminal name	Input/ Output	Description of terminal
1	A1	Input	Address signal
2	A2	Input	Address signal
3	A17	Input	Address signal
4	A18	Input	Address signal
5	A19	Input	Address signal
6	OD15	Input/Output	Data bus signal 15
7	OD14	Input/Output	Data bus signal 14
8	OD13	Input/Output	Data bus signal 13
9	OD12	Input/Output	Data bus signal 12
10	OD11	Input/Output	Data bus signal 11
11	OD10	Input/Output	Data bus signal 10
12	OD9	Input/Output	Data bus signal 9
13	OD8	Input/Output	Data bus signal 8
14	OD7	Input/Output	Data bus signal 7
15	OD6	Input/Output	Data bus signal 6
16	OD5	Input/Output	Data bus signal 5
17	OD4	Input/Output	Data bus signal 4
18	OD3	Input/Output	Data bus signal 3
19	OD2	Input/Output	Data bus signal 2
20	OD1	Input/Output	Data bus signal 1
21	OD0	Input/Output	Data bus signal 0
22	RSTN	Input	Reset signal
23	VDD1	—	Power supply input (2.5V/DSP core)
24	GND	—	Ground
25	GND	—	Ground
26	GND	—	Ground
27	GND	—	Ground
28	GND	—	Ground
29	GND	—	Ground
30	GND	—	Ground
31	GND	—	Ground
32	AVDD	—	Power supply input (+3.1 V/DSP analog)
33	VDD5	—	Power supply input (+2.9 V/For YUV output buffer)
34	VDD2	—	Power supply input (+3.1 V/I/O)
35	VDD6	—	Power supply input (+3.3 V/V-Driver)
36	VDD4	—	Power supply input (8 V/Sensor)
37	RDB	Input	IP parameter read signal
38	EXCKI	Input	External clock input
39	CSB	Input	Chip select input
40	WRB	Input	IP parameter write signal
41	CINT	Output	Interruption signal
42	VDD3	—	Power supply input (+15 V/Sensor)



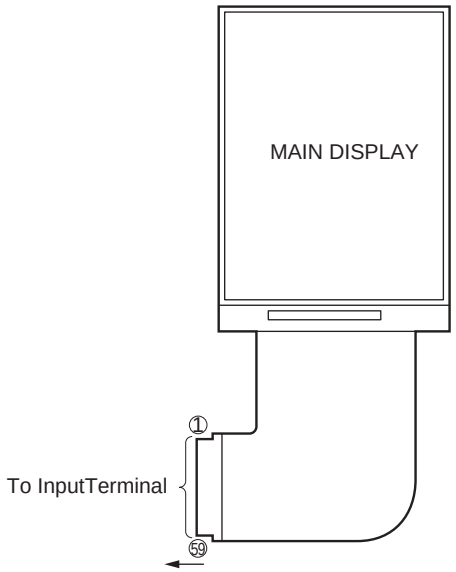
[3] FUNCTION TABLE OF DISPLAY

■ LCD1000 RLCUB0048AF03: MAIN DISPLAY

Pin No.	Terminal name	Input/ Output	Description of terminal
1	T-COM	Input	COM electric potential input for CS
2	T-COM	Input	COM electric potential input for CS
3	TFT-COM	Input	COM voltage input
4	COMC	Output	COM signal output
5	COMC	Output	COM signal output
6	COMDC	Output	COM center voltage output
7	VCOMH	Output	COM amplitude voltage output
8	B0	Input	Blue data signal (LSB)
9	B1	Input	Blue data signal
10	B2	Input	Blue data signal
11	B3	Input	Blue data signal
12	B4	Input	Blue data signal
13	B5	Input	Blue data signal (MSB)
14	G0	Input	Green data signal (LSB)
15	G1	Input	Green data signal
16	G2	Input	Green data signal
17	G3	Input	Green data signal
18	G4	Input	Green data signal
19	G5	Input	Green data signal (MSB)
20	R0	Input	Red data signal (LSB)
21	R1	Input	Red data signal
22	R2	Input	Red data signal
23	R3	Input	Red data signal
24	R4	Input	Red data signal
25	R5	Input	Red data signal (MSB)
26	DCLK	Input	Data sampling clock
27	HSY	Input	Horizontal sync signal
28	VSY	Input	Vertical sync signal
29	SO	Output	serial data output
30	SI	Input	serial data input
31	SCLK	Input	serial clock input
32	CS	Input	serial interface chip select
33	RESET	Input	Hardware reset
34	VCC	—	Logic power
35	GND	—	Ground
36	GND	—	Ground
37	VDC	—	Analog power
38	VDC	—	Analog power
39	COM2	—	COM control for CS
40	VCLAMP	Output	Voltage for CS output
41	VSS2	Output	DC/DC converter output
42	VSS1	Output	DC/DC converter output
43*	NC	—	Not used
44	VDD2	Output	DC/DC converter output
45	C5-	—	Booster capacitor connection terminal
46	C5+	—	Booster capacitor connection terminal

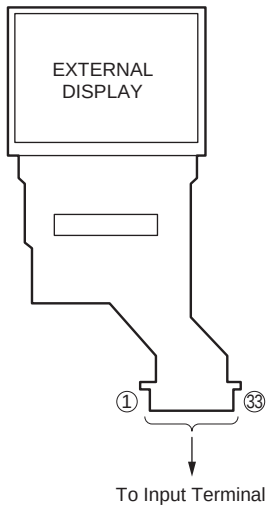
Pin No.	Terminal name	Input/ Output	Description of terminal
47	C4-	—	Booster capacitor connection terminal
48	C4+	—	Booster capacitor connection terminal
49	C3-	—	Booster capacitor connection terminal
50	C3+	—	Booster capacitor connection terminal
51	C2-	—	Booster capacitor connection terminal
52	C2+	—	Booster capacitor connection terminal
53	C1-	—	Booster capacitor connection terminal
54	C1+	—	Booster capacitor connection terminal
55	VDC2	Output	DC/DC converter output
56	VDC2	Output	DC/DC converter output
57	VR	Output	Reference power supply output
58	VS	Output	Source power supply output
59	VS	Output	Source power supply output

In this unit, the terminal with asterisk mark (∗) is (open) terminal which is not connected to the outside.



■ LCD001 RLCUB0049AFZZ : EXTERNAL DISPLAY

Pin No.	Terminal name	Input/ Output	Description of terminal	Notes
1	V0	—	Display drive power supply terminal	—
2	V1	—	Display drive power supply terminal	—
3	V2	—	Display drive power supply terminal	—
4	V3	—	Display drive power supply terminal	—
5	V4	—	Display drive power supply terminal	—
6	GND	—	Ground	—
7	RESB	Input	Reset signal	—
8	CSB	Input	Chip select signal	—
9	RS	Input	Register select signal	"0": Display RAM data "1": Command data
10	WRB	Input	Write signal	"L": Activated
11	RDB	Input	Read signal	"L": Activated
12	D0	Input/ Output	Data signal	—
13	D1	Input/ Output	Data signal	—
14	D2	Input/ Output	Data signal	—
15	D3	Input/ Output	Data signal	—
16	D4	Input/ Output	Data signal	—
17	D5	Input/ Output	Data signal	—
18	D6	Input/ Output	Data signal	—
19	D7	Input/ Output	Data signal	—
20	LP	Input/ Output	Latch signal	—
21	FLM	Output	Display sync signal	—
22	GND (VSS)	—	Ground	—
23	CK	Input	Master clock external input terminal	—
24	CKS	Input	Master clock input selection terminal	"L": Built-in oscillation
25	VDD/VEE	—	Logic system power supply terminal	—
26	VREG	Output	Output terminal for generating constant voltage	—
27	VOUT	Output	Built-in step-up circuit output terminal	—
28	CAP1−	Output	Booster capacitor connection terminal (−)	—
29	CAP1+	Output	Booster capacitor connection terminal (+)	—
30	CAP2−	Output	Booster capacitor connection terminal (−)	—
31	CAP2+	Output	Booster capacitor connection terminal (+)	—
32	CAP3−	Output	Booster capacitor connection terminal (−)	—
33	CAP3+	Output	Booster capacitor connection terminal (+)	—



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