

Service Manual

GD70 Personal Cellular Telephone

Handheld Portable
EB-GD70

Specification



	900 MHz	1800 MHz
Frequency range	Tx: 890 - 915 MHz Rx: 935 - 960 MHz	Tx: 1710 - 1785 MHz Rx: 1805 - 1880 MHz
Tx/Rx frequency separation	45 MHz	95 MHz
RF channel bandwidth	200 kHz	
Number of RF channels	124	374
Speech coding	Full rate/Half rate/Enhanced Full rate	Full rate/Half rate
Operating temperature	-10°C to +55°C	
Type	Class 4 Handheld	Class 1 Handheld
RF Output Power	2 W maximum	1 W maximum
Modulation	GMSK (BT = 0.3)	
Connection	8 ch/TDMA	
Voice digitizing	13 kbps RPE-LTP / 13 kbps ACLEP / 5.6 kbps CELP / VSLEP	
Transmission speed	270.3 kbps	
Diversity	Frequency hopping	
Signal Reception	Double superheterodyne	
Intermediate Frequency	Tx 890 - 915 MHz Rx 935 - 960 MHz	Tx 1710 - 1785 MHz Rx 1805 - 1880 MHz
Antenna Terminal Impedance	50 Ω	
Antenna VSWR	<2.1 : 1	
Dimensions	Height: 132 mm Width: 45.5 mm Depth: 19.5 mm	
Volume	125 cc	
Weight	134 g	
Display	Graphical chip on glass liquid crystal, Alphanumeric 16 x 3 characters, 5 icons and 6 x 1 characters	
Illumination	Green: 4 LEDs for the LCD 8 LEDs for the keyboards 1 LED Incoming call Red: 1 LED Charging indicator	
Keypad	17 keys, Navigation key	
SIM	Plug-in type only	
External DC Supply Voltage	5.8 V	
Battery	3.6 V	
Standby Battery Life DRX 9	Battery Pack (EB-BSD70): 100 hrs Battery Pack (EB-BMD70): 105 hrs Battery Pack (EB-BLD70): 180 hrs	
Conversation Battery Life PL 7, DTX 50%	Battery Pack (EB-BSD70): 240 mm Battery Pack (EB-BMD70): 250 mm Battery Pack (EB-BLD70): 430 mm	

Unless stated these specifications are with Battery Pack (EB-BSD70) fitted.
Battery life figures are dependent on network conditions.

WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service manual by anyone else could result in serious injury or death.

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WARNINGS AND CAUTIONS

WARNING

The equipment described in this manual contains polarized capacitors utilising liquid electrolyte. These devices are entirely safe provided that neither a short-circuit nor a reverse polarity connection is made across the capacitor terminals. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN DAMAGE TO THE EQUIPMENT OR, AT WORST, POSSIBLE INJURY TO PERSONNEL RESULTING FROM ELECTRIC SHOCK OR THE AFFECTED CAPACITOR EXPLODING. EXTREME CARE MUST BE EXERCISED AT ALL TIMES WHEN HANDLING THESE DEVICES.

Caution

The equipment described in this manual contains electrostatic sensitive devices (ESDs). Damage can occur to these devices if the appropriate handling procedure is not adhered to.

ESD Handling precautions

A working area where ESDs may be safely handled without undue risk of damage from electrostatic discharge, must be available. The area must be equipped as follows:

Working Surfaces - All working surfaces must have a dissipative bench mat, SAFE for use with live equipment, connected via a 1M2 resistor (usually built into the lead) to a common ground point.

Wrist Strap - A quick release skin contact device with a flexible cord, which has a built in safety resistor of between 5k2 and 1M2 shall be used. The flexible cord must be attached to a dissipative earth point.

Containers - All containers and storage must be of the conductive type.

Batteries

This equipment may contain an internal battery in addition to the external battery packs. These batteries are recyclable and should be disposed of in accordance with local legislation. They must not be incinerated, or disposed of as ordinary rubbish.

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1 INTRODUCTION

1.1 Purpose of this Manual

This Service Manual contains the information and procedures required for installing, operating and servicing the Panasonic GSM Personal Cellular Mobile Telephone system operating on the GSM Digital Cellular Network.

1.2 Structure of the Manual

The manual is structured to provide service engineering personnel with the following information and procedures:

1. General and technical information - provides a basic understanding of the equipment, kits and options, together with detailed information for each of the major component parts.
2. Installation and operating information - provides instructions for unpacking, installing and operating the equipment.
3. Servicing information - provides complete instructions for the testing, disassembly, repair and reassembly of each major component part. Step-by-step troubleshooting information is given to enable the isolation and identification of a malfunction, and thus determine what corrective action should be taken. The test information enables verification of the integrity of the equipment after any remedial action has been carried out.
4. Illustrated parts list - provided to enable the identification of all equipment components, for the ordering of spare/ replacement parts.

1.3 Servicing Responsibilities

The procedures described in this manual must be performed by qualified service engineering personnel, at an authorised service centre.

The service engineering personnel are responsible for fault diagnosis and repair of all equipment described in this manual.

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2 GENERAL DESCRIPTION

2.1 General

This section provides a general description and kit composition details for the GSM Handportable Telephone system and optional kits.

GD70 is a high performance, small, light, business GSM telephone. The following features are included as standard:

1. Triple Rate which includes Full Rate, Half Rate and enhanced Full Rate speech, codec.
2. Dual Band, GSM900 and GSM1800 operation.
3. Desktop Handsfree Function - comprised of integral echo cancellation and noise suppression.

2.2 Handportable Main Kit

The handportable main kit provides a standalone class 4 GSM telephone. The plug-in SIM contains the subscriber and network information necessary to operate the phone on a GSM network.

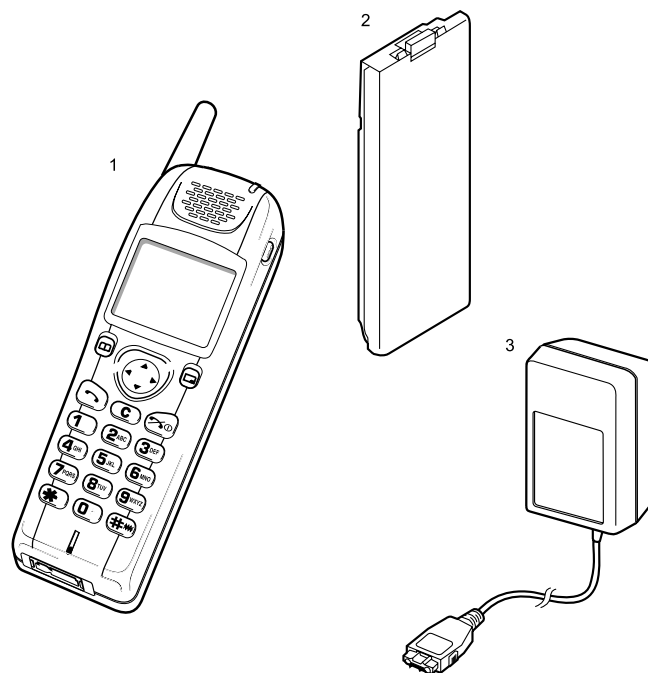


Figure:1 Handportable Main Unit Kit Contents

D70-0201

NUMBER	DESCRIPTION	PART NUMBER
1	Main unit	EB-GD70
2	Battery	EB-BS70
3	Adaptor	EB-CAD70
—	Documentation	See Section 2.13

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3 OPERATING INSTRUCTIONS

3.1 General

This section provides a brief guide to the operation and facilities available on the GD70 handportable unit. Refer to the Operating Instructions for full operational information.

3.2 LCD Display

The GD70 handportable unit has a graphical chip on glass liquid crystal display in conjunction with the following icons:

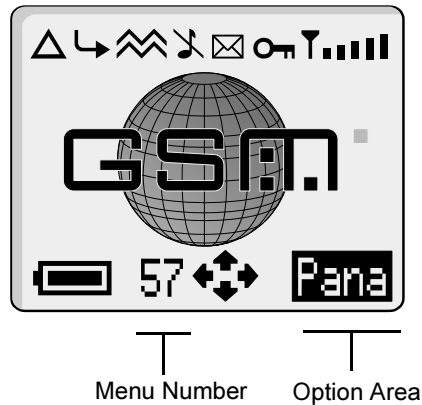


Figure:1 LCD display

D70-0301

	Indicates received signal strength: strong signal area; weak signal area.
	Indicates that it is possible to make an emergency call.
Menu Number	The number of the feature pointed to by the pointer. To access a feature enter the menu number on the keypad.
	Displays the battery charge level: Battery is at full charge; Battery requires recharging; The battery icon flashes during charging. During car mount use, when the battery is fully charged, the battery icon will not light.
Menu Icon	Displays a small icon related to the current status of the telephone: telephone is roaming on a none home network; using the "Call Divert" feature or the telephone has Call Divert set; shows that the vibration alert is switched on; shows that telephone is in silent mode - no tones; indicates there are unread Short Text Messages (SMS.). Lit when SMS area is full; the telephone is locked; ABC shows that normal character have been entered in Alpha Entry; ABΓ shows that Greek character have been entered in Alpha Entry; AAA shows that extended character have been entered in Alpha Entry; 0-9 shows that numbers have been entered in Alpha Entry.
	Indicates that the navigation key () can be pressed. Each arrow will light individually to indicate which direction is valid.
Option Area	Pressing the select key () will select the option displayed in the option area of the display.

Following some operations the display will automatically clear after three seconds or after pressing any key except

3.3 Location of Controls

Incoming/Charge indicator:

Green – incoming call.

Red – charging battery pack.

External connector:

Used to connect to external accessories or charging equipment.

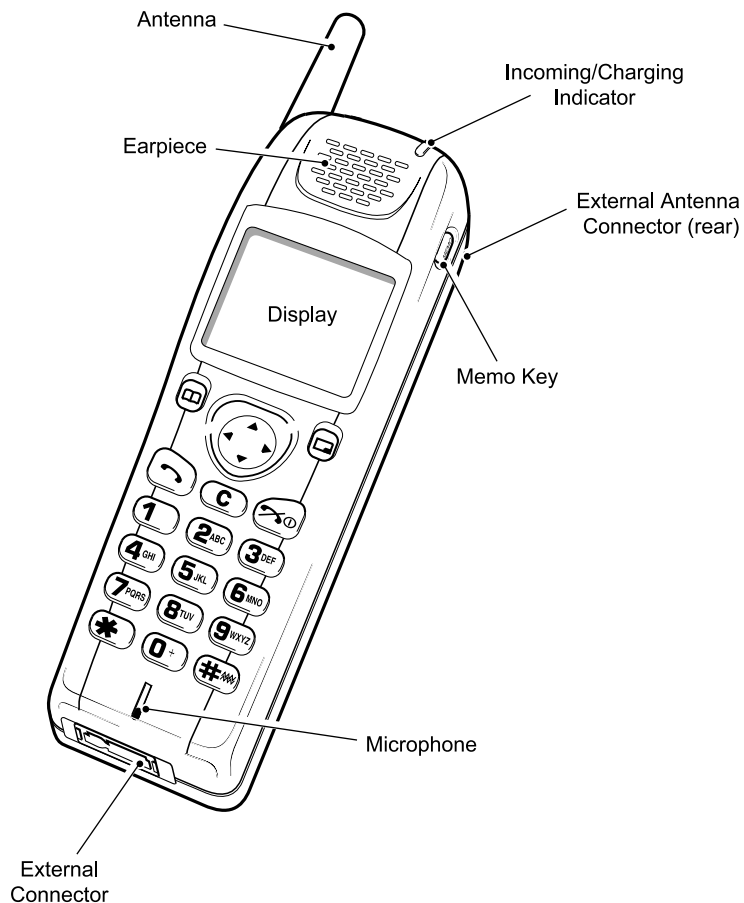


Figure:2 Location of controls for GD70

D70-0302

	Navigation Key. Scrolls through options or features menu and increases or decreases volume.
	Select Key. Selects option shown in the Option Area of the display.
	Phonebook Key. Browses through the Phonebook or stores a number in the Phonebook. Changes the type of characters entered during Alpha Entry.
	Send Key. Makes a call.
	Clear Key. Clears the last digit entered, clears all digits when pressed and held or returns to the previous display.
	End Key. Ends a call or switches the telephone on/off when pressed and held.
	Digit keys. Enter wild numbers or pauses when pressed and held. Where appropriate the key scrolls up or down through abbreviated control names and then select to reveal the international access code "+".
	Vibrator enable/disable Key. Press and hold to enable or disable the vibrator.

3.4 Concept of Operation

There is a close relationship between the Select Key, Navigation Key and display.

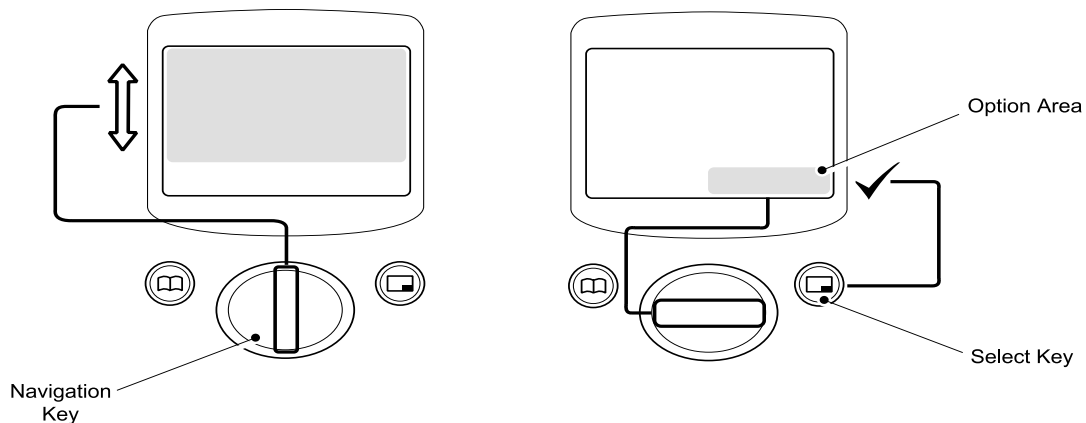


Figure:3 Concept of Operation

D70-0303

Pressing up and down (⬆️⬆️) will move the pointer up and down and scroll through more information in the main area of the display.

Pressing left and right (⬅️➡️) will scroll through options in the option area of the display. To choose the option press the Select Key (⬜️).

3.5 Alpha Entry

Alpha Entry is used to enter alphanumeric characters into Phonebook, Short Messages and the Greeting Message.

Key	Character/Operation			
	ABC	ABΓ	AAA	0-9
1	" @ _ . , : ; ! ? ' & % + - / < > = £ \$ ¥ ¢ §			1
2 ^{abc}	A B C a b c	A B Γ	A Ä Å Æ B C Ç a ä å b c	2
3 ^{def}	D E F d e f	Δ E Z	D E É F d e è é f	3
4 ^{ghi}	G H I g h i	H Θ I	G H I g h i i	4
5 ^{klm}	J K L j k l	K Λ M	J K L j k l	5
6 ^{nop}	M N O m n o	N Ξ O	M N Ñ O Ö ø m n ñ o ö ö	6
7 ^{pqr}	P Q R S p q r s	Π Ρ Σ	P Q R S p q r s ß	7
8 ^{tuv}	T U V t u v	T Υ Φ	T U Ü V t u ü ü v	8
9 ^{wxyz}	W X Y Z w x y z	Ξ Ψ Ω	W X Y Z w x y z	9
C	Deletes the character above the cursor, deletes the character to the left when at the end of the line or clears the entire entry when pressed and held.			

Each time a key is pressed it will display the next character. When another key is pressed or no key is pressed for a short time the cursor will move to the next position.

To cycle between Greek characters (ABΓ), extended characters (AÄÅ), numerals (0-9) and normal characters (ABC) press (⬜️).

3.5.1 Editing Alpha Entry

Pressing (⬆️) will move the cursor up or down one line. Pressing (⬅️) will move you left or right one character. When the cursor is moved over a character and another key pressed this will insert the new character.

Pressing (C) will delete the character to the left of the cursor.

3.6 Incoming Calling Line Identification (CLI)

When a call is received the last 6 digits of the CLI information is matched with the phonebook. Therefore an incoming call could match to the wrong phonebook entry.

3.7 Hot Key Dial Source List

The source for Hot Key Dial Numbrs is normally 'Phonebook' or 'Service Dial Numbers'. For some OEMs it may be a requirement to store these numbers in the EEPROM. When the source is the EEPROM and the telephone software is updated the source numbers may be lost. Also if the the user changes the source of the Hot Key Dial numbrs it will not be possible to redirect the source back to the EEPROM. However, in the event that an OEM would like the Hot Key Dial source to be stored in the EEPROM it is unlikely that the user will have the option to change the Hot Key Dial source.

3.8 Features Menu Structure

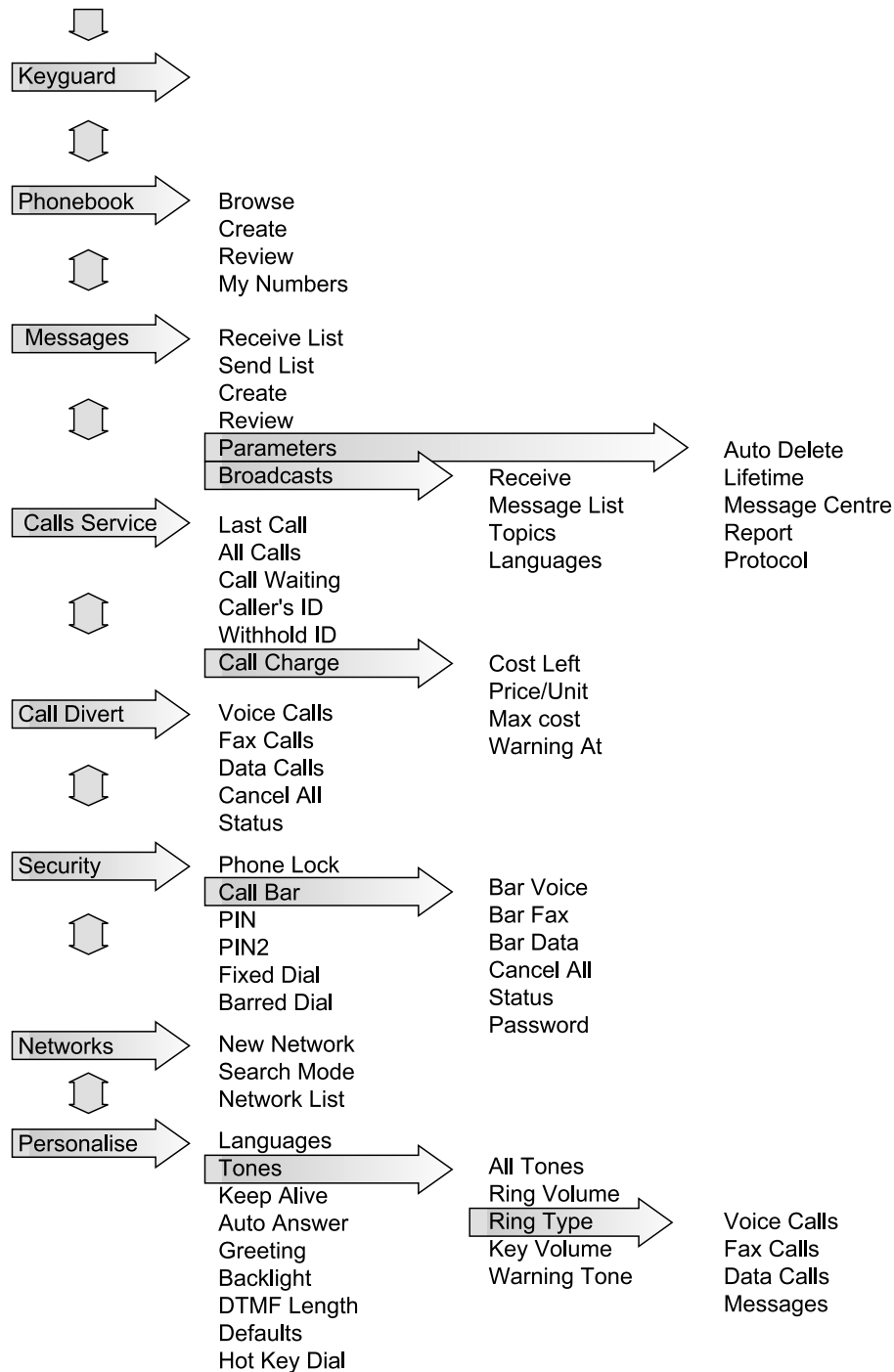


Figure:4 Feature Menu

D70-0304

3.9 Public Man Machine Interface (MMI)

It is possible to operate all GSM telephones in the same way using the Public MMI. The following operations will work with all GSM telephones. However, this information is restricted to those operations that are supported by GD70.

The * and # in the following procedures should be replaced by and , respectively. Also <SND> and <END> should be replaced with and keys.

3.9.1 Reading Phonebook Memory Location

<MEMORY LOCATION>

Leading zeros can be left out of the location number, e.g. 007 can be 7.

3.9.2 Presentation of IMEI

* # 0 6 #

3.9.3 Security

Change PIN * * 0 4 * <OLD PIN> * <NEW PIN> * <NEW PIN> #

Change PIN2 * * 0 4 2 * <OLD PIN2> * <NEW PIN2> * <NEW PIN2> #

Unblock PIN * * 0 5 * <PIN UNBLOCKING KEY> * <NEW PIN> * <NEW PIN> #

Unblock PIN2 * * 0 5 2 * <PIN2 UNBLOCKING KEY> * <NEW PIN2> * <NEW PIN2> #

3.9.4 Call Hold

Place a call on hold 2 <SND>

Recall a held call 2 <SND>

Make a second call <TELEPHONE NUMBER> <SND>

Swap between two held calls 2 <SND>

End held call O <SND>

End active call 1 <SND>

Reject incoming call	0 <SND>
----------------------	---------

3.9.5 Call Waiting

Enable Call Waiting * 4 3 * # <SND>

Disable Call Waiting # 4 3 * # <SND>

Call Waiting Status * # 4 3 * # <SND>

3.9.6 Calling Line Identification

Calling Line Identification Feature	Service Code
Calling Line Identification Presentation (CLIP)	30
Calling Line Identification Restriction (CLIR)	31
Connected Line Presentation (CLOP)	76
Connected Line Restriction (CLOR)	77

Enable * <SERVICE CODE> * # <SND>

Disable # <SERVICE CODE> * # <SND>

Temporary suppress identification # 3 1 # <TELEPHONE NUMBER> <SND>

Temporary display identification * 3 1 # <TELEPHONE NUMBER> <SND>

3.9.7 Telecommunication Services Used for Public MMI

Teleservice

Service	MMI Service Code
All teleservices	10
Telephony	11
All data teleservices	12
Facsimile services	13
Short Message Services (SMS)	16
All teleservices except SMS	19
Voice group services	17

Bearer Service

Service	MMI Service Code
All bearer services	20
All asynchronous services	21
All synchronous services	22
All data synchronous services	24
All data asynchronous services	25
All dedicated packet access	26
All dedicated PAD access	27

3.9.8 Call Divert

Call Divert Type	Service Code
Divert all calls	21
Divert calls if busy	67
Divert calls if no reply	61
Divert if not reachable	62

Set (except “No Reply” Call Bar

** <SERVICE CODE> * <FORWARD TELEPHONE NUMBER> * <TELECOMMUNICATION SERVICE> # <SND>

Set “No Reply” Call Bar

** <SERVICE CODE> * <FORWARD TELEPHONE NUMBER> * <TELECOMMUNICATION SERVICE> *
<TIME TO RING (seconds)> # <SND>

Clear

<SERVICE CODE> * <TELECOMMUNICATION SERVICE> * # <SND>

Status

* # <SERVICE CODE> * <TELECOMMUNICATION SERVICE> * # <SND>

Clear all Call Diverts

0 0 2

3.9.9 Call Bar

Call Bar Type	Service Code
All outgoing calls	33
Outgoing international calls	331
Outgoing international calls except those to your PLMN country	332
All incoming calls	35
Incoming international calls when roaming	351

Set * <PASSWORD> * <TELECOMMUNICATION SERVICE> # <SND>

Clear # <PASSWORD> * <TELECOMMUNICATION SERVICE> # <SND>

Status * # <TELECOMMUNICATION SERVICE> # <SND>

Clear all Call Bar Types # 3 3 0 * <PASSWORD> # <SND>

Change Call Bar Password * * 0 3 * * <OLD PASSWORD> * <NEW PASSWORD> * <NEW PASSWORD> # <SND>

3.10 Troubleshooting

The user is given the following information and advised to contact the dealer if the problems persist:

Problem	Cause	Remedy
Telephone will not switch on		Check that the battery pack is fully charged and correctly connected to the telephone.
Extremely short battery life for a new battery pack	The network you are using and the condition of the battery pack can affect battery life.	Avoid areas of poor reception. Ensure batteries are fully charged. Additionally, for NiMH batteries, ensure batteries are also discharged fully before recharging.
Short battery life for an old battery pack	The battery pack was worn out.	Replace with a new one.
Short battery life for Ni-MH battery pack	The life of the battery pack is affected by improper charging, this is inherent in all Ni-MH batteries.	To maintain maximum performance always use until the Low Battery Warning and then fully recharge the battery pack. To revive the Battery Pack use the telephone until the Low Battery Warning and then fully recharge three times. However, if the battery life still is short, the battery pack has eventually worn out. Replace with a new one.
The battery level indicator  does not light when charging	If a battery is deeply discharged it will take a short time before there is sufficient power in the telephone to light the battery level indicator  .	Leave to charge for several minutes in temperatures between +5°C and +35°C.
Calls cannot be made	The telephone is locked.	Unlock the telephone (Menu: Security: Phone Lock).
	Outgoing calls are barred.	Disable the outgoing call barring (Menu: Security: Call Bar).
	The telephone is not registered to a network.	Move to a coverage area and operate your telephone after it has registered with a network.
Calls cannot be made from Fixed Dial Store		Check your SIM supports Fixed Dial. Check if the Fixed Dial is switched on (Menu: Security: Fixed Dial). Check the telephone number is stored in the Fixed Dial.
Calls cannot be received	The telephone is not switched on.	Switch the telephone on.
	Incoming calls are barred.	Disable the incoming call barring (Menu: Security: Call Bar).
	The telephone is not registered to a network.	Move to a coverage area and operate your telephone after it has registered with a network.
Emergency calls cannot be made	You are not in a GSM coverage area.	Check that the antenna symbol  is displayed. Move to a coverage area and operate your telephone when the antenna symbol is displayed.
Telephone numbers cannot be recalled	The telephone is locked.	Unlock the telephone (Menu: Security: Phone Lock).
	Fixed Dial is switched on.	Switch off Fixed Dial (Menu: Security: Fixed Dial).

3.11 Important Error Messages

The following table is a list of error messages that may occur during use of the telephone, with a description and suggested course of action:

Area not Allowed	Roaming in the selected area is not allowed.
Network not Allowed	Roaming with the selected network is not allowed.
Security Failure	The network has detected authentication failure because your SIM is not registered with that network. Contact your Service Provider.
SIM Blocked	The SIM is blocked because the wrong PUK has been entered ten times. Contact your Service Provider.
SIM Error	The telephone has detected a problem with the SIM. Switch the telephone off and then back on. If the message does not disappear contact your Service Provider.
Message Rejected Store Full	A message has been received but the message store is full. To receive messages, delete some of the currently stored messages or set messages to automatically clear (Menu: Messages: Parameters: Auto Delete).
PIN2 Invalidated	The PIN2 is blocked permanently because the wrong PUK2 has been entered 10 times. Services controlled by PIN2 cannot be used. Contact your Service Provider.
Warning Store Full Continue?	The message area is full. Your messages cannot be stored until some of the currently stored messages are deleted.
Auto Redial List Full	Redial list of unsuccessfully dialled numbers is full. Switch the telephone off and then on again.

3.12 Security Codes

Code Type	Number of Digits	Description
Personal Identification Number (PIN)	4 to 8	Controls SIM security. Supplied by the service provider.
PIN 2	4 to 8	Controls memory security. Supplied by the service provider.
PIN/PIN 2 Unblocking Key (PUK/PUK 2)	8	Used to unblock PIN and PIN 2. A PIN or PIN 2 will become blocked if the wrong PIN or PIN 2 is entered three times. When the blocked PIN or PIN 2 is unblocked, a new PIN or PIN 2 must be entered. If the wrong PUK or PUK 2 is entered 10 times, your SIM will be unusable.
Supplied by the service provider.		
Password	4	Controls the call bar function. If the wrong password is entered three times, this service will be revoked. Supplied by the service provider.
Lock Code	4	Controls telephone security.
Factory set to "0000".		

3.13 SIM Personalisation

3.13.1 Introduction

SIM personalisation will limit the use of GD70 to a single SIM, a SIM supplied by one Network/Sub-network/Service Provider or a SIM purchased by a company (corporation). If a personalised GD70 contains a SIM that is from a different source it will display the message "SIM ERROR" when switched on. This personalisation of GD70 is sometimes referred to as SIM lock or SIM latch.

3.13.2 Testing

To test a personalised GD70, when the user has not supplied the SIM, a SIM configured for test purposes (e.g. test SIM or soft SIM) should be used. The mobile will recognise that the SIM is for testing purposes only and operate as normal.

3.13.3 Personalisation Function

Personalisation is activated during manufacture and then enabled at a later stage. Enabling/disabling is available by entering a special key sequence immediately after power on. Once the enable/disable menu is shown it is possible to select the type of personalisation. When personalisation is enabled it is only possible to disable it if the mobile contains an illegal SIM and the sixteen digit Control Key (CK) is known. When enabled the CK is withheld from the user and cannot be read, for security reasons.

There are two special key sequences to enter the enable/disable menu:

Key sequence

7 (P) **4** (S) **6** (M) **1** **1**

5 (K) **2** (A) **8** (T) **2** (A) **4** (S) **1** **1**

Notes

Can only disable personalisation.

Can both enable and disable personalisation.

3.13.4 Disabling Procedure

1. **7** (P) **4** (S) **6** (M) **1** **1** or **5** (K) **2** (A) **8** (T) **2** (A) **4** (S) **1** **1**.
2. to point at:
 "SIM" for SIM Personalisation
 "Network" for Network Personalisation
 "Subnetwork" for Subnetwork Personalisation
 "SP" for Service Provider Personalisation or
 "Corporate" for Company Personalisation.
3. .
4. the 16 digit Control Key.
5. .
6. the 16 digit Control Key.
7. .

The display will confirm which type of Personalisation has been disabled.



3.13.5 Enabling Procedure

1. .
2. to point at
 "SIM" for SIM Personalisation
 "Network" for Network Personalisation
 "Subnetwork" for Subnetwork Personalisation
 "SP" for Service Provider Personalisation or
 "Corporate" for Company Personalisation.
3. .
4. the 16 digit Control Key.
5. .
6. the 16 digit Control Key.
7. .



The display will confirm which type of Personalisation has been enabled.

3.14 GSM Services Supported by PC Card

Bearer Service Number	Bearer Service Rate	Access Structure	Access Rate	Information Transfer	Error Correction Options
21	Asynchronous 300 bps	Asynch	300 bps	UDI or modem	T or NT
22	Asynchronous 1.2 kbps	Asynch	1.2 kbps	UDI or modem	T or NT
23	Asynchronous 1200/75 bps	Asynch	1200/75 bps	UDI or modem	T or NT
24	Asynchronous 2.4 kbps	Asynch	2.4 kbps	UDI or modem	T or NT
25	Asynchronous 4.8 kbps	Asynch	4.8 kbps	UDI or modem	T or NT
26	Asynchronous 9.6 kbps	Asynch	9.6 kbps	UDI or modem	T or NT
41	Dedicated PAD Access 300 bps	Asynch	300 bps	UDI	T or NT
42	Dedicated PAD Access 1.2 kbps	Asynch	1.2 kbps	UDI	T or NT
44	Dedicated PAD Access 2.4 kbps	Asynch	2.4 kbps	UDI	T or NT
45	Dedicated PAD Access 4.8 kbps	Asynch	4.8 kbps	UDI	T or NT
46	Dedicated PAD Access 9.6 kbps	Asynch	9.6 kbps	UDI	T or NT

3.15 GSM Network Codes and Names

Country	Access Code	Network Operator	Network Code	
Albania	+355	AMC	276	01
Andorra	+376	STA -Mobiland	213	03
Armenia	+374	Armentel	283	01
Australia	+61	TELECOM Australia	505	01
		OPTUS Communications Pty Ltd.	505	02
		Vodafone PTY	505	03
Austria	+43	Mobilkom Austria	232	01
		max.mobil	232	03
Azerbaijan	+994	Azercell	400	01
Bahrain	+973	Batelco	426	01
Bangladesh	+880	Grameen Phone Ltd	470	01
Belgium	+32	Belgacom Mobile	206	01
		Mobistar	206	10
Bosnia & Herzegovina	+387	Cronet	218	01
	+068	PTT Bosnia	218	19
Bulgaria	+359	Citron	284	01
Brunei Darussalam	+673	DSTCom	528	11
		Jabatan Telekom	528	01
Cambodia	+855	CamGSM	456	01
Cameroon	+237	PTT Cameroon Cellnet	624	01

Country	Access Code	Network Operator	Network Code	
China	+86	Guangdong MCC	460	00
		China United Telecommuni-cations Corporation	460	01
		Liaoning PPTA	460	02
Croatia	+385	HR Cronet	219	01
Cyprus	+357	Cyprus Telecommunication Authority	280	01
Czech Republic	+42	Eurotel Praha	230	02
		Radio Mobil	230	01
Germany	+49	DeTeMobil GmbH	262	01
		Mannesmann Mobilfunk	262	02
Denmark	+45	TELE Danmark Mobile	238	01
		Sonofon	238	02
		Telia	238	20
		Mobilix	238	30
Egypt	+20	Arento	602	01
Estonia	+372	Eesti Mobiiltelefon	248	01
		Radiolinja Eesti AS	248	02
		Q GSM	248	03
Ethiopia	+251	ETA	636	01
Fiji	+679	Vodafone	542	01
Finland	+358	Sonera	244	91
		Finnet	244	09
		OY Radiolinja AB	244	05
		Telia	244	03
		Alands Mobiltelefon	244	05
France	+33	France Telecom	208	01
		SFR	208	10
		Bouygues Telekom	208	20
French Polynesia	+689	Tikiphone	547	20
French West Indies	+590	Ameris	340	01
Georgia	+995	Geocell	282	01
		Magticom	282	02
Germany	+49	D1, T-Mobil	262	01
		D2, Mannesmann	262	02
		E-Plus Mobilfunk	262	03
Ghana	+233	ScanCom	620	01
Gibraltar	+350	GibTel	266	01
Greece	+30	Cosmote	202	01
		Panafon S.A	202	05
		STET HELLAS	202	10
Guinea	+224	Sotelgui	611	02
Hungary	+36	Westel 900 GSM RT	216	30
		Pannon GSM RT	216	01
Hong Kong	+852	Hong Kong Telecom CSL Ltd.	454	00
		Hutchison Telephone Co. Ltd.	454	04
		Smartone Mobile Communications Ltd.	454	06
		P Plus Comm	454	22
		New World PCS	454	10
		Mandarin Comm	454	16
		Pacific Link	454	18
		Peoples Telephone	454	12
Hungary	+36	Pannon GSM	216	01
		Westel 900	216	30
Iceland	+354	Post & Simi	274	01
		Icelandic Mobile Phone	274	02

Country	Access Code	Network Operator	Network Code
India	+91	Bharti Cellular Limited	404 10
		BPL Mobile	404 21
		Skycell	404 40
		Airtel	404 10
		Essar	404 11
		Maxtouch	404 20
		Command	404 30
		Mobilenet	404 31
		RPG MAA	404 41
		Modi Telstra	404 14
		Sterling Cellular	404 11
		BPL USWest	404 27
		TATA	404 07
		Escotel	404 12
		Aircel Digilink	404 15
Indonesia	+62	PT Telekomunikasi Indonesia	510 10
		PT. Satelit Palapa Indonesia	510 01
		PT Excelcomindo Pratama	510 11
Iran (Islamic Republic of)	+98	T.C.I	432 11
Ireland	+353	Telecom Ireland	272 01
		Digifone	272 02
		Meteor	272 03
Italy	+39	Omnitel Pronto Italia	222 10
		Telecom Italia Mobile	222 01
Ivory Coast	+225	Comstar	612 01
		Ivoiris	612 03
		Loteny Telecom	612 05
Jordan	+962	JMTS	416 01
Kuwait	+965	MTCNet	419 02
Luxembourg	+352	P & T Luxembourg	270 01
Laos (People's Democratic Republic)	+856	Lao Shinawatra	457 01
Latvia	+371	Latvian Mobile Telephone Co. Ltd.	247 01
Lebanon	+961	Libancell	415 03
		Cellis	415 01
Lesotho	+266	Vodacom	651 01
Liechtenstein	+4175	Natel-D	228 01
Lithuania	+370	Bite GSM	246 02
		Omnitel	246 01
Luxembourg	+352	P&T LUXGSM	270 01
		Millicom Lux SA	270 77
Macau	+853	C.T.M.	455 01
Macedonia	+389	PTT Makedonija	294 01
Madagascar	+261	Sacel	646 03
		Madacom	646 01
Malawi	+265	TNL	650 01
Malaysia	+60	Celcom	502 19
		Maxis	502 12
		My BSB	502 02
		MRTEL	502 13
		Adam	502 17
		Mutiara Telecom	502 16
Malta	+356	Telecell	278 01
Mauritius	+230	Mauritius Telecom Ltd.	617 01
Monaco	+377	France Telecom	208 01
		SFR	208 10
Morocco	+212	ONPT Morocco	604 01
Mozambique	+258	Telecom de Mocambique	634 01

Country	Access Code	Network Operator	Network Code	
Myanmar	+95	HPT	219	01
Namibia	+264	MTC	649	01
Netherlands	+31	LIBERTEL	204	04
		PTT Telecom	204	08
New Caledonia	+687	Mobilis	546	01
New Zealand	+64	Bell South	530	01
Norway	+47	Telenor Mobil AS	242	01
		NetCom GSM A/S	242	02
Oman	+968	General Telecoms	422	02
Pakistan	+92	Mobilink	410	01
Papua New Guinea	+675	Pacific	310	01
Philippines	+63	Globe Telecom GMCR Inc	515	02
		IslaCom	515	01
Poland	+48	Plus GSM	260	01
		ERA GSM	260	02
		IDEA Centertel	260	03
Portugal	+351	Telecomunicações Moveis Nacionais (TMN)	268	06
		TELECEL	268	01
		Optimus	268	03
Qatar	+974	Q-Net	427	01
Reunion	+262	SRR	647	10
Romania	+40	MobiFon	226	01
		MobilRom	226	10
Russian Federation	+701	Mobile Telesystems	250	01
		North-West GSM	250	02
		KB Impuls		
San Marino	+378	Omnitel	222	10
		Telecom Italia Mobile	222	01
Saudi Arabia	+966	Al Jawal	420	01
		EAE	420	07
Senegal	+221	Sonatel	608	01
Seychelles	+248	SEZ SEYCEL	633	01
Singapore	+65	Singapore Telecom	525	01
		MobileOne	525	03
Slovak Republic	+42	Eurotel	231	02
		Globtel	231	01
Slovenia	+386	Mobitel	293	41
South Africa	+27	Vodacom	655	01
		MTN	655	10
Spain	+34	Movistar	214	07
		AIRTEL Spain	214	01
Sri Lanka	+94	MTN Networks (PVT) Sri Lanka	413	02
Sudan	+249	Mobitel	634	01
Sweden	+46	Telia Mobitel	240	01
		Comviq GSM AB	240	07
		Europolitan AB	240	08
Switzerland	+41	Swisscom 900	228	01
		Swisscom 1800	228	01
Syria	+963	Mobile Syria	417	09
Taiwan	+886	LDTA	466	92
Tanzania (United Republic of)	+255	Tritel	640	01
Thailand	+66	TH AIS GSM	520	01
		Total Access Comms	520	18
Tunisia	+216	Tunisian PTT	605	02
Turkey	+90	Turkcell	286	01
		Telsim	286	02
Uganda	+256	Celitel Cellular	641	01

Country	Access Code	Network Operator	Network Code
Ukraine	+380	Mobile comms	255 01
		Golden Telecom	255 05
United Arab Emirates	+971	UAE ETISALAT-G1	424 01
		UAE ETISALAT-G2	424 02
United Kingdom (Guernsey) (Jersey) (Isle of Man)	+44	Vodafone	234 15
		Cellnet	234 10
		Guernsey Telecoms	234 55
		Jersey Telecoms	234 50
		Manx Telecom	234 58
Uzbekistan	+7	Daewoo GSM	434 04
		Coscom	434 05
		Buztel	434 01
Vietnam	+84	MTSC	452 01
		DGPT	452 02
Yugoslavia	+381	Mobile Telekom	220 01
		Pro Monte	220 02
Zimbabwe	+263	NET ONE	648 01

3.16 Glossary of Terms

DTMF	Dual Tone Multiple Frequency tones. The numeric keys 0 to 9, and * and # will generate different DTMF tones when pressed during conversation. These are used to access voice mail, paging and computerised home banking.
GSM	Global System for Mobile communications. The name given to the advanced digital technology that your telephone uses.
Home country	The country where your home network operates.
Home network	The GSM network on which your subscription details are held.
Hot Key Dial	Hot Key Dial allows quick access to numbers stored in the Phonebook of Service Dial Number list. The source of the Hot Key Dial may be defined by the user or preprogrammed by the Service Provider. It is most likely to be preprogrammed to the Service Dial Numbers by the Service Provider.
Lock code	Used for security of your telephone. Factory set to "0000".
Message Centre	Where messages are sent before they are forwarded onto their destination. The Message Centre telephone number may be programmed into your SIM or supplied by your service provider.
Network operator	The organisation responsible for operating a GSM network. Each country will have at least one network operator.
Password	Used for the control of the call bar function. Supplied by your service provider.
PIN	Personal Identification Number used for SIM security. Supplied by your service provider.
PIN2	Personal Identification Number used for the control of Fixed Dial Memory and call charge metering. Supplied by your service provider.
PUK/ PUK2	PIN/PIN2 Unblocking Key. Used to unblock the PIN/PIN2. Supplied by your service provider.
Registration	The act of locking on to a GSM network. This is usually performed automatically by your telephone.
Roaming	The ability to use your telephone on networks other than your Home network.
Service Dial Numbers	Service Dial Numbers are predefined numbers that allow the user to access a set of special services provided by the Service Provider. For example billing information or access to Voice Mail.
Service provider	The organisation responsible for providing access to the GSM network.
SIM	Subscriber Identification Module. A small smart-card which stores unique subscriber and user-entered information such as Phone Book, Fixed Dial Memory and short messages. Supplied by your service provider.
Supplementary service	Network-controlled GSM functions which your telephone will support. Supplementary services may only be available on a subscription basis.
Wild numbers	Spaces in a stored telephone number. When the telephone number is recalled pressing a numeric key will fill in a space. This can be used to restrict dialling to a specific area.

4 DISASSEMBLY / REASSEMBLY INSTRUCTIONS

4.1 General

This section provides disassembly and reassembly procedures for the main components of the GD70 system.

These procedures **MUST** be performed by qualified service personnel, at an authorized service centre.

The following warnings and precautions **MUST** be observed during ALL disassembly/reassembly operations:

WARNING

The equipment described in this manual contains polarised capacitors utilising liquid electrolyte. These devices are entirely safe provided that neither a short-circuit nor a reverse polarity connection is made across the capacitor terminals. **FAILURE TO OBSERVE THIS WARNING COULD RESULT IN DAMAGE TO THE EQUIPMENT OR, AT WORST, POSSIBLE INJURY TO PERSONNEL RESULTING FROM ELECTRIC SHOCK OR THE AFFECTED CAPACITOR EXPLODING. EXTREME CARE MUST BE EXERCISED AT ALL TIMES WHEN HANDLING THESE DEVICES.**

Caution

The equipment described in this manual contains electrostatic sensitive devices (ESDs). Damage can occur to these devices if the appropriate handling procedure is not adhered to.

4.1.1 ESD Handling Precautions

A working area where ESDs may be safely handled without undue risk of damage from electrostatic discharge, must be available. The area must be equipped as follows:

Working Surfaces – All working surfaces must have a dissipative bench mat, **SAFE** for use with live equipment, connected via a 1M2 resistor (usually built into the lead) to a common ground point.

Wrist Strap – A quick release skin contact device with a flexible cord, which has a built in safety resistor of between 5k2 and 1M2 shall be used. The flexible cord must be attached to a dissipative earth point.

Containers – All containers and storage must be of the conductive type.

4.2 Handportable Unit

4.2.1 Disassembly

1. Remove the two rubber grommets from the back of the telephone by levering them upwards.

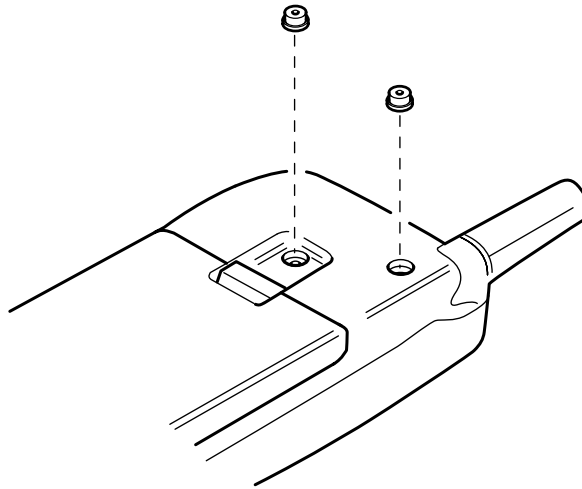


Figure:1 Grommet removal

D70-0401

2. Remove the five case screws.

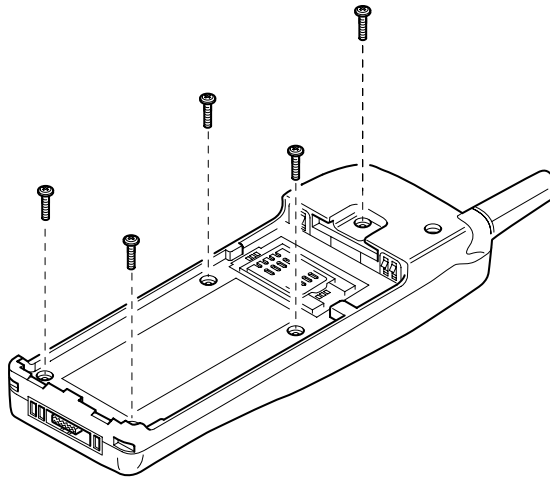


Figure:2 Screw removal

D70-0402

3. Remove the case by pulling from the connector end of the case/cover. Care must be taken when separating the case from the cover as the retaining clips may be very stiff – to give extra support to the case attach the battery.

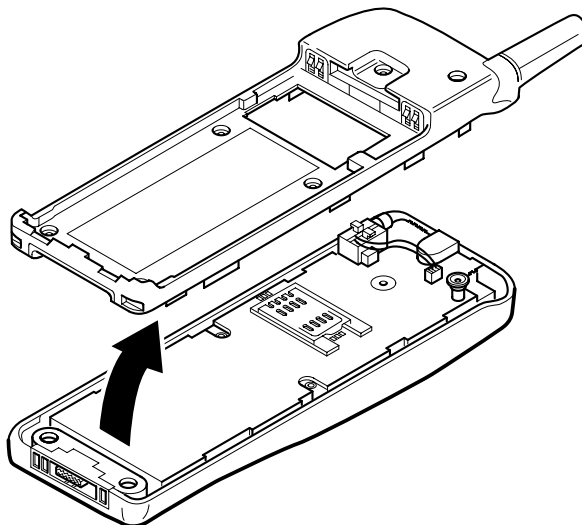


Figure:3 Case disassembly

D70-0403

4. Remove the battery compartment by pushing from outside the case.

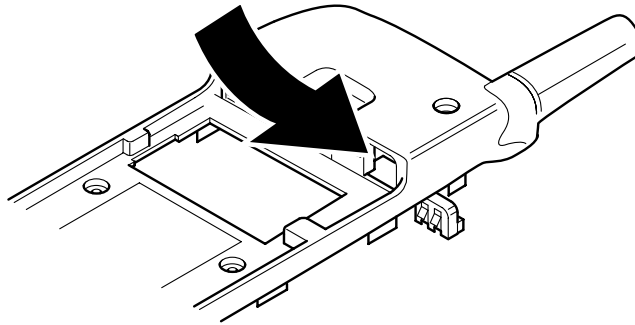


Figure:4 Battery compartment removal

D70-0404

5. Remove the PCB assembly from the cover.

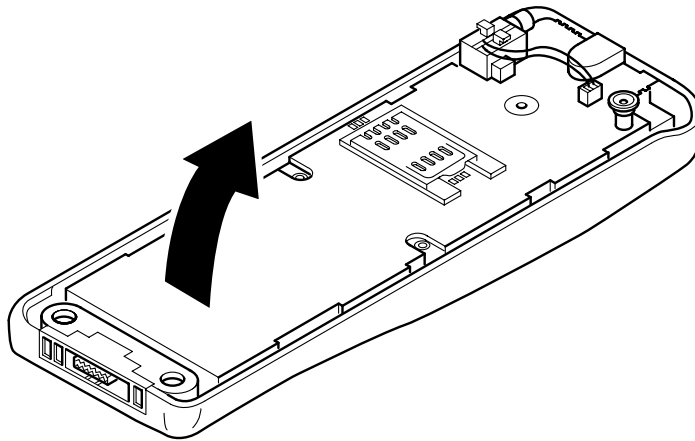


Figure:5 PCB assembly removal

D70-0405

6. Remove the keypad from the case.

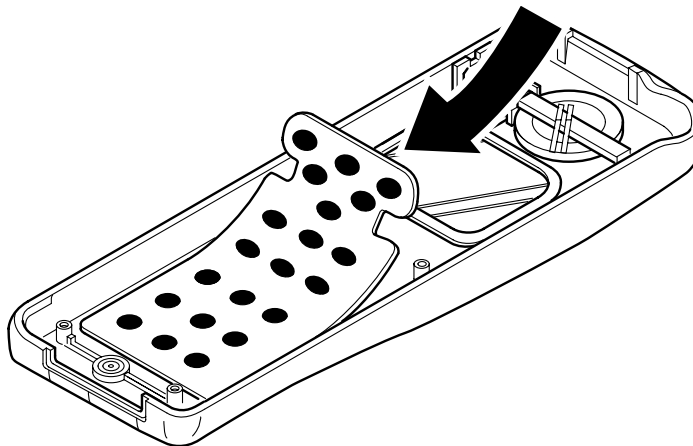


Figure:6 Removing the keypad

D70-0406

7. Unclip the speaker holder and lift out the speaker.

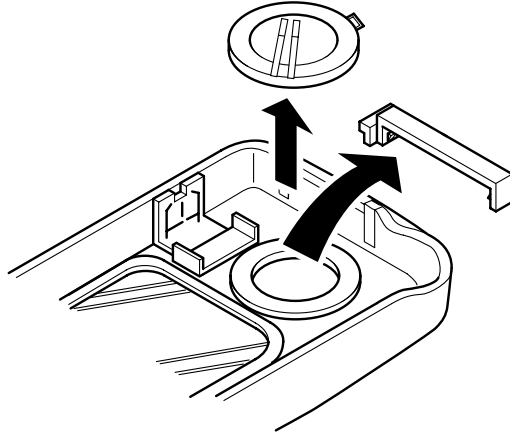


Figure:7 Speaker removal

D70-0407

8. Lift the logic PCB from the chassis assembly.

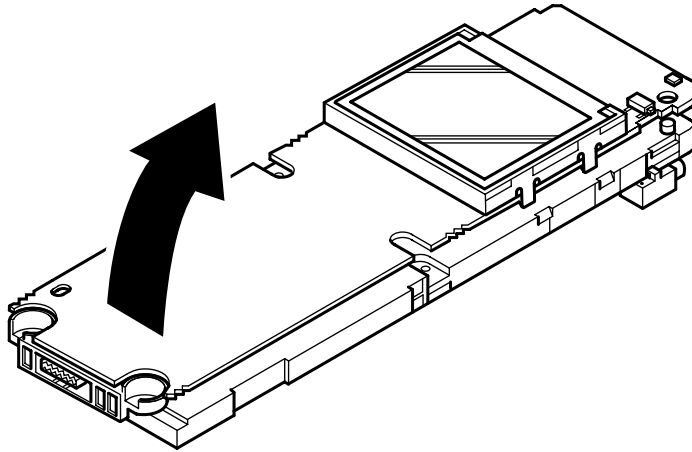


Figure:8 Logic PCB removal

D70-0408

9. Gently bend the four Display Assembly securing lugs out to allow removal from the Logic PCB.

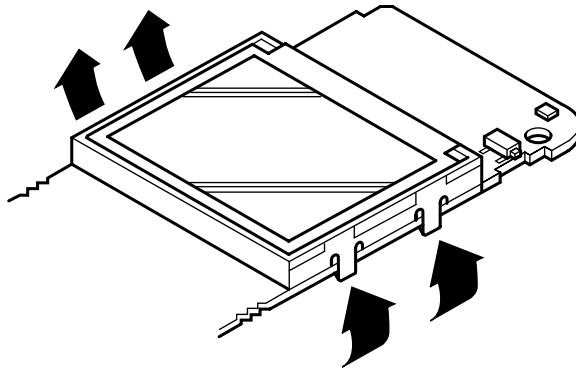


Figure:9 Display Assembly removal

D70-0409

10. Unscrew the RF PCB fixing screws.

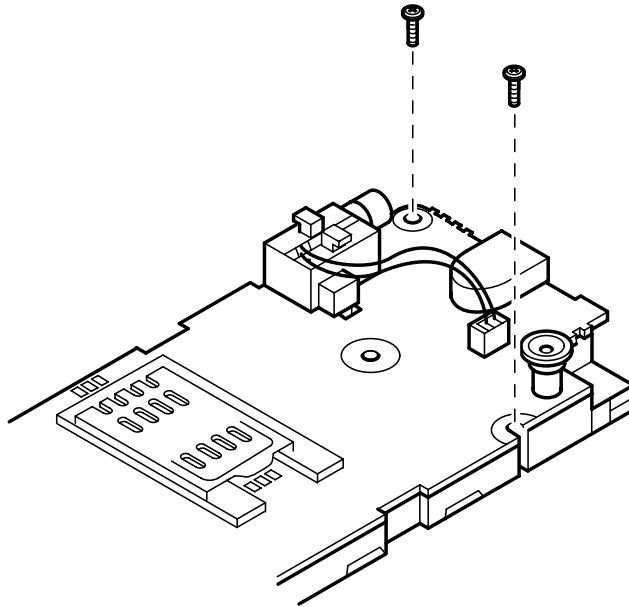


Figure:10 RF PCB screw removal

D70-0410

11. Lift out the RF PCB.

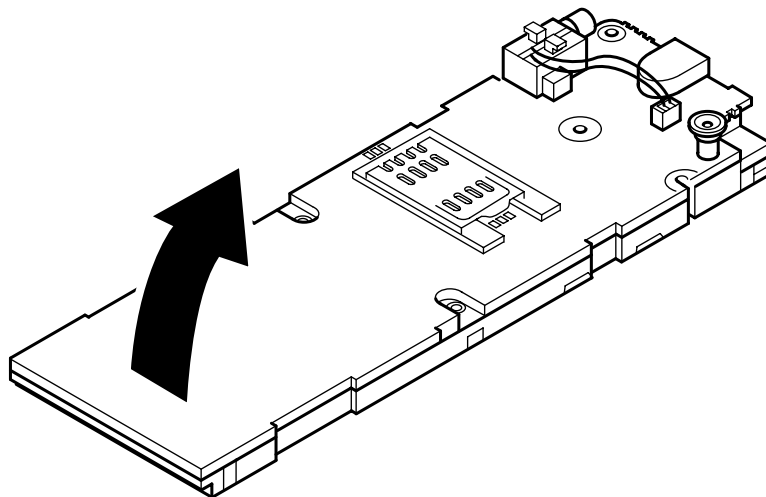


Figure:11 RF PCB removal

D70-0411

12. Unplug the vibrator motor from the RF PCB.

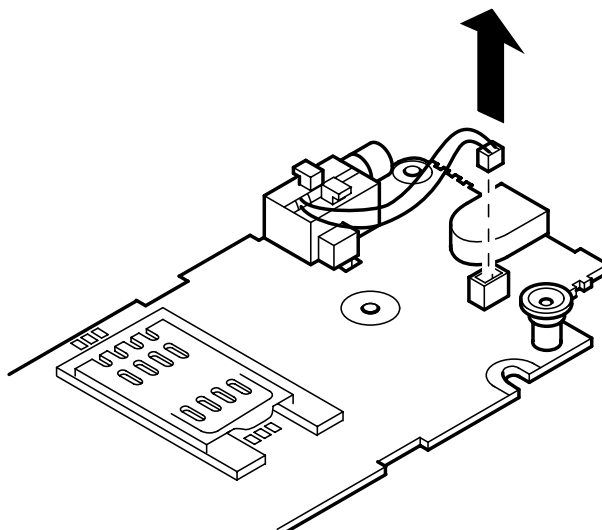


Figure:12 Unplugging the vibrator motor

D70-0412

13. Unclip the vibrator motor from the RF PCB.

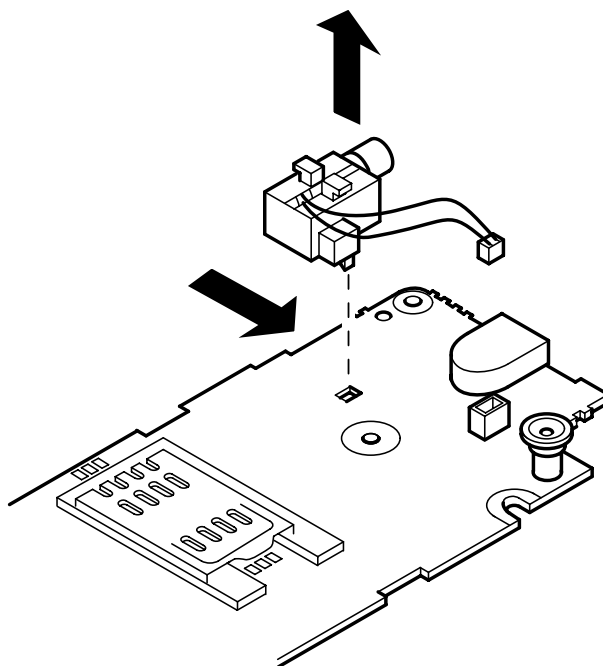


Figure:13 Vibrator motor removal

D70-0413

4.2.2 Reassembly

Care must be taken when reinstalling the back onto the telephone case. Ensure that the securing screws are not over-tightened as this may affect the operation of the keypad.

5 TECHNICAL SPECIFICATIONS

5.1 Tx Characteristics

All data is applicable to GSM 900 and GSM 1800 except where stated.

5.1.1 Frequency error

±0.1ppm max., relative to base station frequency.

5.1.2 Modulation phase error

RMS: ≤5°

Peak: ≤20°

5.1.3 Output RF Spectrum due to Modulation

Offset from Centre Frequency (kHz)	Maximum Level Relative to the Carrier (dB)
±100	+0.5
±200	-30
±250	-33
±600 to 1800	-60

5.1.4 Output RF Spectrum due to Switching Transients

Offset from Centre Frequency (kHz)	Maximum Level (dBm)	
	GSM 900	GSM 1800
±400	-19	-22
±600	-21	-24
±1200	-21	-24
±1800	-24	-27

Measurement conditions for output RF spectrum measurements:

Frequency Span: 0 Hz

Measurement Bandwidth: 30 kHz

Video Bandwidth: 100 kHz

Peak Hold

5.1.5 Spurious Emissions at the Antenna Connector

Frequency Range	Frequency Offset	Filter Bandwidth	Approximate Video Bandwidth	Limits (dBm)	
				GSM 900	GSM 1800
30 to 50 MHz	-	10 kHz	30 kHz	-36	-36
50 to 500 MHz	-	100 kHz	300 kHz	-36	-36
500 MHz to 1GHz	0 to 1MHz	100 kHz	300 kHz	-36	-36
1 GHz to 4GHz	0 to 10 MHz	100 kHz	300 kHz	-30	-36
Excl. relevant TX band:	≥ 10 MHz	300 kHz	1 MHz	-30	-36
P-GSM: 890 to 915 MHz;	≥ 20 MHz	1 MHz	3 MHz	-30	-36
DCS: 1710 to 1785 MHz	(offset from edge of relevant TX band)				
Relevant TX band:					
P-GSM: 890 to 915 MHz;	1.8 to 6.0 MHz	30 kHz	100 kHz	-30	-30
DCS: 1710 to 1785 MHz	(offset from carrier)				

Measurement conditions:

Peak Hold, Modulated Carrier

D Measurement averaged over a burst and then averaged again over 50 bursts.

E In each of the bands 925-960 MHz and 1805-1880 MHz up to 5 spurious measurements can fail these limits, in which case the limit ≤ -36 dBm shall apply.

5.1.6 Output Level, Dynamic Operation

* 60

Power Control Level	Transmitter Output Power (dBm)	Tolerance for Conditions (dB)	
		Normal	Extreme
5	33	±3	±4
6	31	±3	±4
7	29	±3	±4
8	27	±3	±4
9	25	±3	±4
10	23	±3	±4
11	21	±3	±4
12	19	±3	±4
13	17	±3	±4
14	15	±3	±4
15	13	±3	±4
16	11	±5	±6
17	9	±5	±6
18	7	±5	±6
19	5	±5	±6

* 60

Power Control Level	Transmitter Output Power (dBm)	Tolerance for Conditions (dB)	
		Normal	Extreme
0	30	±3	±4
1	28	±3	±4
2	26	±3	±4
3	24	±3	±4
4	22	±3	±4
5	20	±3	±4
6	18	±3	±4
7	16	±3	±4
8	14	±3	±4
9	12	±4	±5
10	10	±4	±5
11	8	±4	±5
12	6	±4	±5
13	4	±4	±5
14	2	±5	±6
15	0	±5	±6

5.1.7 Residual Peak Power

≤70 dBc (BW = 300 kHz)

5.2 Rx Characteristics

5.2.1 Sensitivity

*60)X00 UDWH VSHHFK

The reference sensitivity performance in terms of frame erasure, bit error, or residual bit error rates (whichever is appropriate) is specified in the following table, according to the propagation conditions.

Channels	Propagation Conditions TUhigh		Propagation Conditions RA		Propagation Conditions HT		Static Conditions	
	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples
TCH/FS FER	$6.742 \cdot \alpha$	8900					$0.122 \cdot \alpha$	164000
class Ib (RBER)	$0.42/\alpha$	1,000,000					$0.41/\alpha$	20,000,000
class II (RBER)	8.33	120,000	7.5	24000	9.333	60000	2.439	8200

The reference sensitivity level is <-102dBm.

NOTE:

$1 \leq \alpha \leq 1.6$. The value of α can be different for each channel condition but must remain the same for FER and class Ib RBER measurements for the same channel condition.

*60 +DOI UDWH VSHHFK

The reference sensitivity performance in terms of frame erasure, bit error, or residual bit error rates (whichever is appropriate) is specified in the following table, according to the propagation conditions.

Channels	Propagation Conditions TUhigh		Propagation Conditions RA		Propagation Conditions HT	
	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples
TCH/HS (FER)	4.598	13050				
TCH/HS class Ib (BFI=0)	0.404	148500				
TCH/HS class II (BFI=0)	7.725	25500	8500	20000	7600	20000
TCH/HS (UFR)	6.250	9600				
TCH/HSL class Ib ((BFI or UFI)=0)	0.269	227000				

*60)X00 UDWH VSHHFK

The reference sensitivity performance in terms of frame erasure, bit error, or residual bit error rates (whichever is appropriate) is specified in the following table, according to the propagation conditions.

Channels	Propagation Conditions TUhigh		Propagation Conditions RA		Propagation Conditions HT		Static Conditions	
	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples
TCH/FS FER	$4.478 \cdot \alpha$	13400					$0.122 \cdot \alpha$	164000
class Ib (RBER)	$0.32/\alpha$	1,500,000					$0.41/\alpha$	20,000,000
class II (RBER)	8.333	60,000	7.5	24000	9.333	30000	2.439	8200

The reference sensitivity level is <-102 dBm.

NOTE:

$1 \leq \alpha \leq 1.6$. The value of α can be different for each channel condition but must remain the same for FER and class Ib RBER measurements for the same channel condition.

*60 +DOI UDWH VSHHFK

The reference sensitivity performance in terms of frame erasure, bit error, or residual bit error rates (whichever is appropriate) is specified in the following table, according to the propagation conditions.

Channels	Propagation Conditions TUhigh		Propagation Conditions RA		Propagation Conditions HT	
	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples	Test limit error rate %	Minimum no. of samples
TCH/HS (FER)	4.706	12750				
TCH/HS class Ib (BFI=0)	0.426	141000				
TCH/HS class II (BFI=0)	7.725	25500	8735	20000	7600	20000
TCH/HS (UFR)	6.383	9400				
TCH/HSL class Ib ((BFI or UFI)=0)	0.291	206000				

%ORFNLQJ

Frequency	Small MS level in dBμVemf()	
	GSM 900	GSM 1800
FR ±600 kHz to FR ±800 kHz	70	70
FR ±800 kHz to FR ±1.6 MHz	70	70
FR ±1.6 MHz to FR ±3 MHz	80	80
915 MHz to FR -3 MHz	90	-
FR ±3 MHz to FR 980 MHz	90	-
FR ±600 kHz to FR ±800 kHz	-	87
1785 MHz to FR - 3 MHz	-	87
835 MHz to <915 MHz	113	-
>980 MHz to 1000 MHz	113	-
100 kHz to <835 MHz	90	-
>1000 MHz to 12.75 GHz	90	-
100 kHz to 1705 MHz	-	113
>1705 MHz to <1785 MHz	-	101
>1920 MHz to 1980 MHz	-	101
>1980 MHz to 12.75 GHz	-	90

Measurement Conditions:
Wanted carrier is 3dB above reference sensitivity.
Interferer is CW

Spurious response exceptions:
6 exceptions are permitted IN band 915 - 980MHz
24 exceptions are permitted OUTSIDE band 915 - 980MHz.

, QWHUPRGXODWLRQ & KDUDFWHULVWLFV

Interferer Level (f1 & f2) dBm	Interferer Frequencies (f1 & f2)
-49	Wanted frequency = 2f1 - f2, and f1 - f2 = 800 kHz

6 TEST AND MEASUREMENT

6.1 Introduction

This section provides information on testing the GD70 telephone. The layout is as follows:

1. Section 6.2 External testing: describes equipment requirements and general set up procedure.
2. Section 6.3 Channel box test commands: provides detailed explanation of the different commands available using the test equipment and channel-box software.
3. Section 6.4 Adjustment mode: describes adjustments available on the GD70 handheld unit.
4. Section 6.5 Lock code: describes the procedure to check or reset the lock code using the Channel box software.

6.2 External Testing

The GD70 unit can be connected to a compatible personal computer for electronic adjustment and fault diagnosis. This section provides a description of the equipment required to perform those tasks.

Testing and adjustment of the handheld unit can be performed with the outer case in place and the cradle connected. For in-depth fault finding the unit should be disassembled (section 4), and the jig and extender card used to connect the PCBs together externally as they would be found in normal use. Fault tracing can then be performed on the PCBs using suitable test equipment, such as spectrum analysers and oscilloscopes.

The unit must now be tested and calibrated for both frequencies (900 MHz and 1800 MHz) as well as for the two battery types.

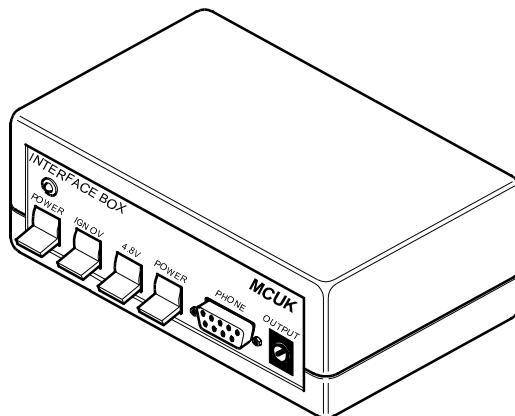
6.2.1 Jigs and Tools

Test Equipment Descriptions

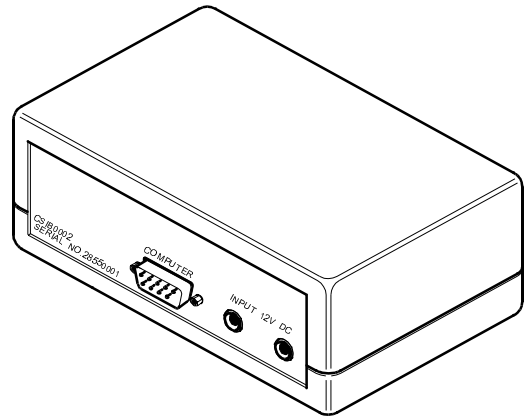
1. Interface box,
Part Number: IFB003

The IFB003 provides:

- a. Voltage regulation for +7.2 V, +5.6 V or 4.8V DC outputs. The +7.2 V switch setting is used as a supply to Li-Ion type batteries (compatible for other products), the 5.6 V switch setting is used for PCB testing and the 4.8 V switch setting is used for testing the complete unit
- b. RS 232 interface. Ensures that the Unit Under Test is supplied with the correct signal levels and format..



FRONT



REAR

Figure:1 Interface Box IFB003

600-0701

2. Personal Computer (PC)

The PC (IBM compatible) is used as a Unit Under Test controller. This in conjunction with the channel box software, allows all of the test facilities normally provided through the keypad of the Unit Under Test.

3. Power Supply

Provides 12 V DC supply to the Interface Box IFB003.

TEST AND MEASUREMENT

4. External Battery Supply Unit
Part Number: JT00005

Provides 3.6 V DC supply to the Interface Box IFB003 to compensate for the current drain when the Unit Under Test is used at full transmit power.

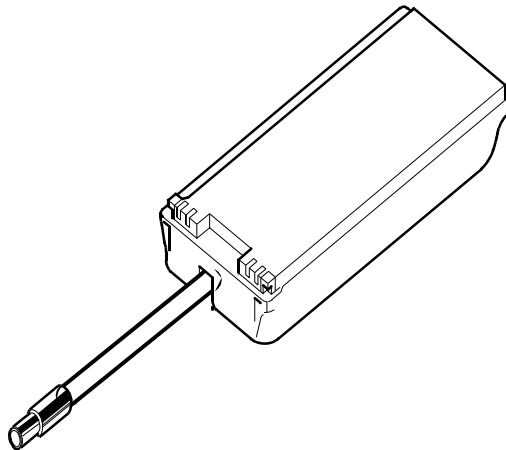


Figure:2 External Battery Supply Unit

600-0702

5. Extender PCB,
Part Number: GD70EXTPCB01

The extender PCB is provided to allow connection of the logic PCB to the RF PCB when the PCBs have been removed from the main unit.

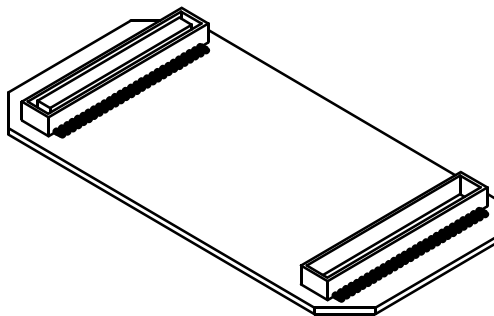


Figure:3 Extender PCB

500-0703

6. PCB Repair Jig
Part Number: JT00001

This unit, along with the extender PCB, allows connection of logic to the RF PCB for fault finding.

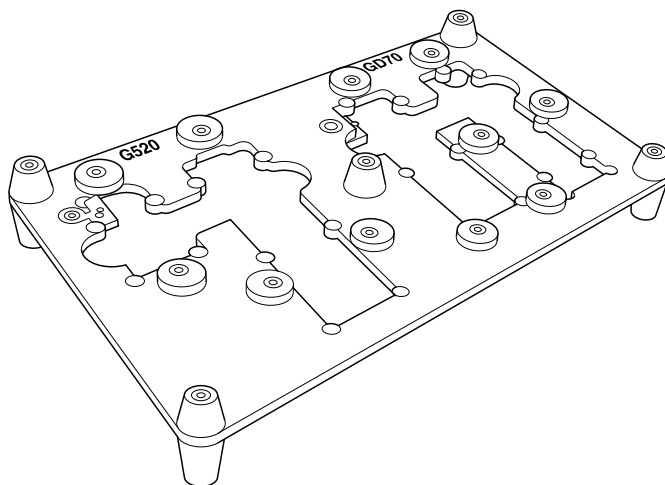


Figure:4 PCB Repair Jlg

D70-0604

7. RF Test Jig
Part Number: JT00003

This allows the unit to be tested with RF connection.

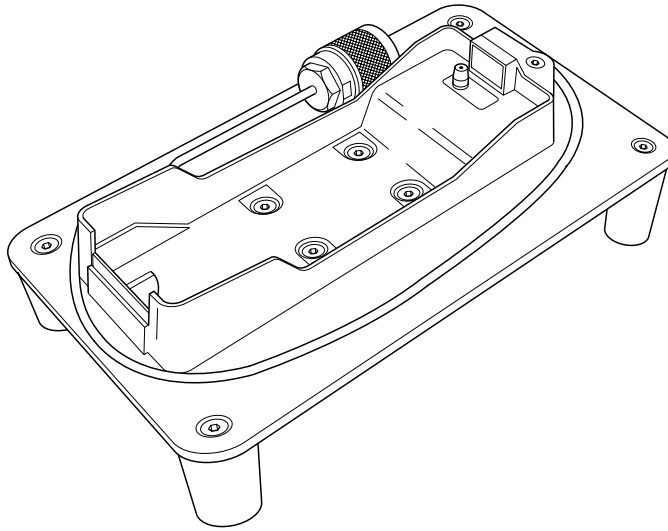


Figure:5 RF Test Jig

D70-0605

8. GSM Tester

This unit acts as a base station providing all the necessary GSM signalling requirements and also provides GSM signal measuring facilities.

9. Interface Cable
Part Number: JT00004

The interface cable allows connection between a computer and the telephone via IFB003.

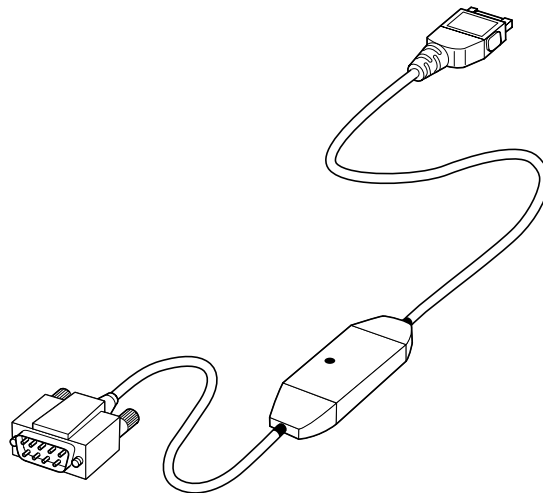


Figure:6 Interface Cable

D70-0606

10. Channel Box Software

This is the test software for the GD70 unit and should be installed onto the personal computer used for testing.

6.3 Complete Unit Test Setup

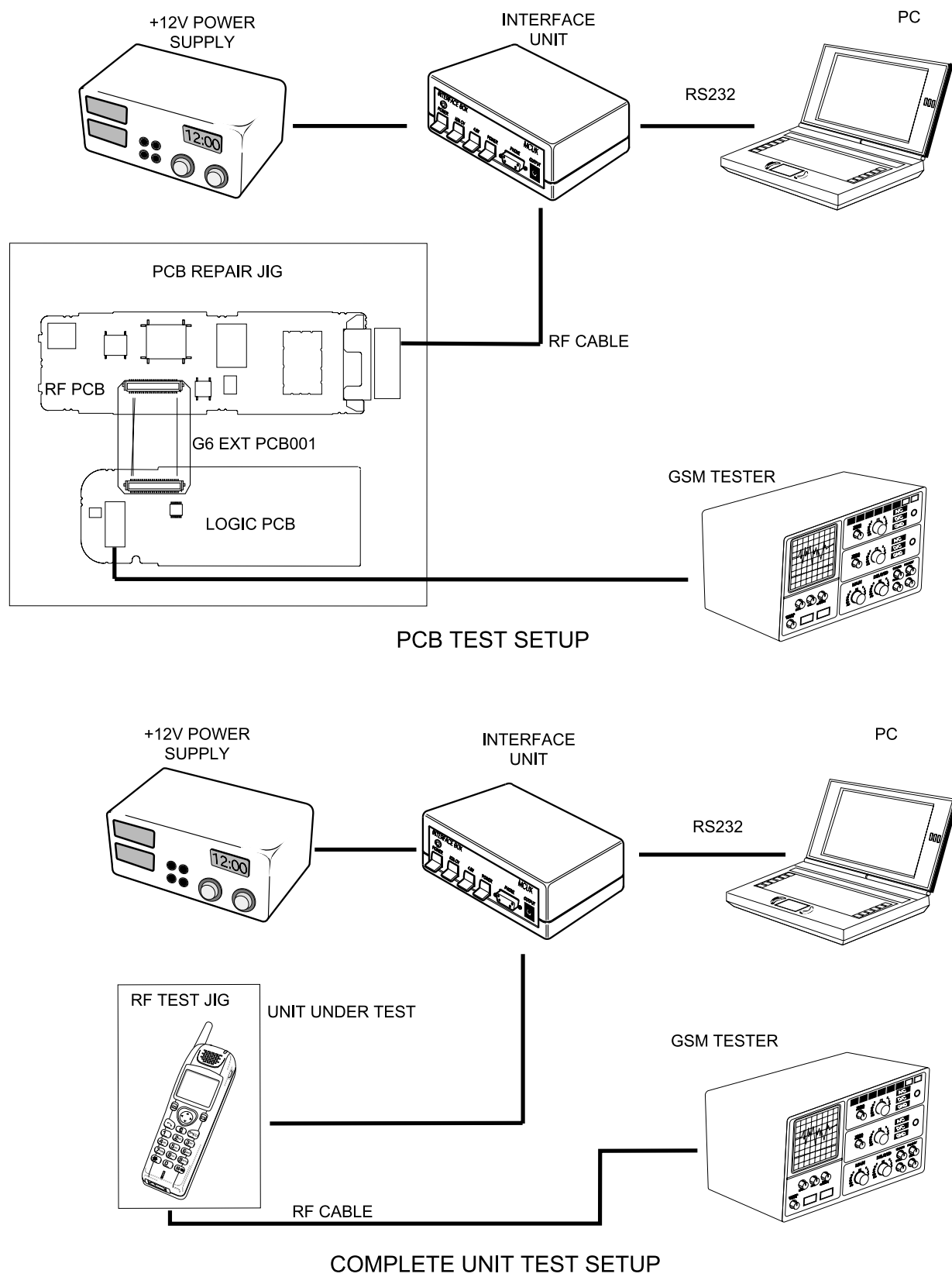


Figure:7 Complete unit test setup

D70-0606

6.3.1 External Testing Setup Procedure

IMPORTANT NOTE

To allow accurate measurement of the complete unit the test equipment must be connected as shown (figure 8). The PCB Test Setup must be used to enable repair to PCBs. Once repair/replacement is complete, the assembled unit must be tested and calibrated with the jigs and tools connected as shown in figure 5.

Full Test Equipment Requirements

For testing the handheld unit the following equipment is required:

1. Interface box
2. 12 V power supply
3. Personal computer (IBM compatible) with RS232 interface
4. RS232 interface cable (9 pin straight through connection)
5. GSM test station
6. RF Test Jig
7. Interface cable – JT00004

The channel box software (supplied on floppy disk) should be installed onto the main drive of the personal computer.

The RF cable is connected to the GSM test station via a suitable adapter. The 12 V supply is connected to the rear socket of the Interface box.

Two modes are available for testing the handheld unit:

1. Test Mode.

The Test Mode facility allows various sections of the handheld unit to be individually activated.

2. Normal Mode.

The Normal Mode facility allows the handheld unit to be powered externally for call origination/receiving operations.

NOTE: A suitable test SIM card will be required which is compatible with the GSM test station.

Power On into Test Mode

1. Connect the test equipment into test mode configuration.

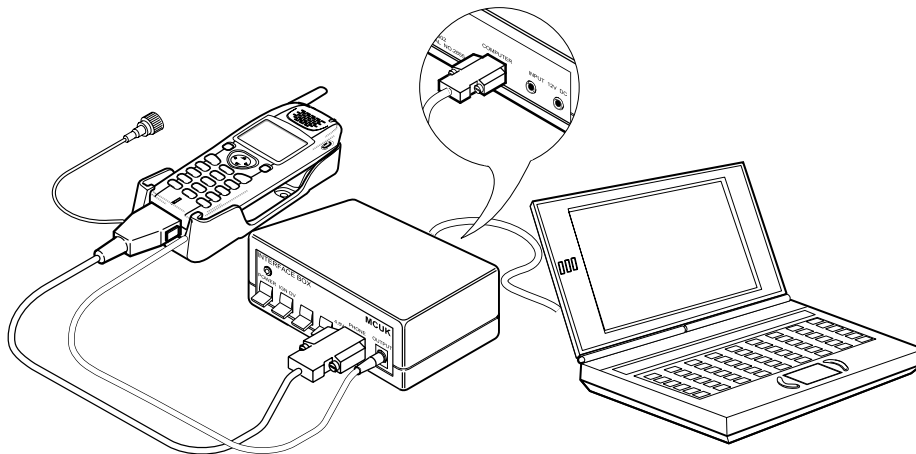


Figure:8 External test equipment setup

D70-0608

2. Ensure that the following settings are made:

- a. Interface box IFB003
 - Power: UP position
 - IGN: DOWN position
 - Mode UP position
 - Voltage Dependent upon operation:
 - 5.6 V for PCB testing
 - 4.8 V for Nickel Metal Hydride battery
- b. Power supply
 - +12V DC: OFF

c. PC

Channel box software loaded and the screen indicating as shown:

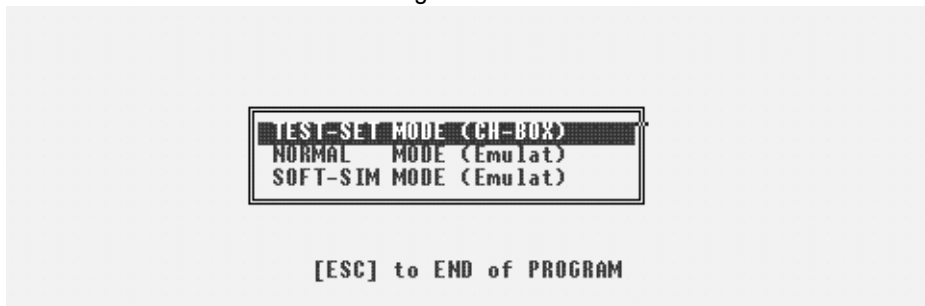


Figure:9 PC Screen (SCRN10)

600-0720

3. Press ENTER on the PC keyboard.
4. Switch on the +12 V supply.
5. At the PC press F10.
6. At the Interface box switch the power to ON.
7. Steps 5 and 6 above must be carried out within 1 second or power ON will time-out.

NOTE:

The display will read:

```
GET STATION
ADDRESS = __
INFO = __
```

The back light will be illuminated and all LEDs will be lit.

Go to section 7.4 (Channel Box Test Commands) for further testing information.

Power On in Normal Mode

1. Connect together the test equipment.

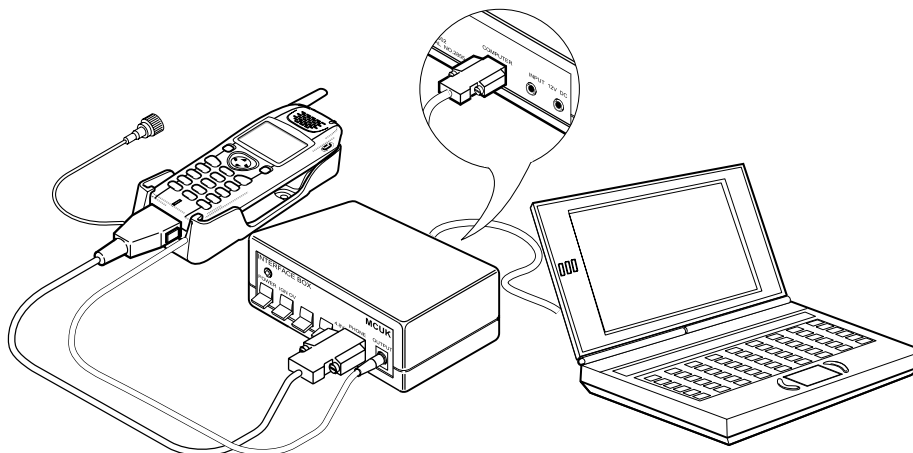


Figure:10 External test equipment setup

D70-0608

2. Ensure that the following settings are made:
 - a. Interface box IFB003
 - Power: DOWN position
 - IGN: DOWN position
 - HH/HF: DOWN HH position
 - MODE: UP position
 - b. Power supply
 - +12V DC: OFF
 - c. PC
 - Channel box software loaded and the screen indicating as shown:

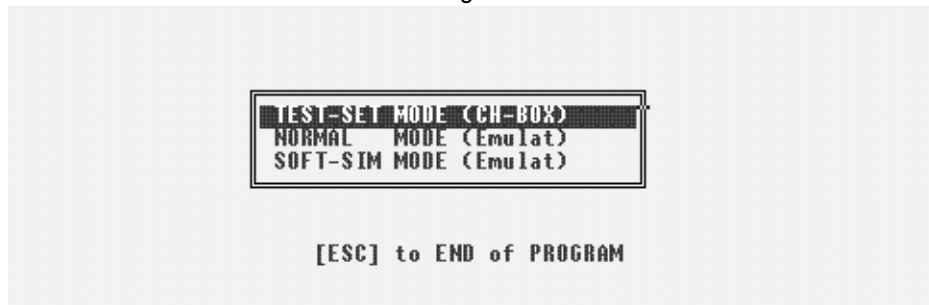


Figure:11 PC Screen (SCRN9)

600-0720

3. On the PC press ENTER.
4. Switch on the 12V supply.
5. At the PC press F10.
6. At the Interface box switch the POWER to ON.

Entering Call Mode from Test Mode

Ensure that a charged battery is attached to the telephone.

The screen of the PC will resemble the one shown:



Figure:12 PC Screen (SCRN11)

D70-0612

1. At the PC change the SOFT SIM field to read <ENB>. Press ENTER.
2. At the PC change the TEST field to read <TERM>. Press ENTER.
 The UUT will power down and up again. If the UUT is connected to a GSM test set, after a delay of approximately 5 seconds the UUT will register service.
3. To return to test mode, set SOFT SIM field to <DIS> and set TEST field to <Test>. Press ENTER.

6.4 Channel Box Test Commands

The following table outlines the commands available using the channel-box software.

After the handheld unit has been switched on (section 7.3), use the up/down scroll keys on the personal computer keyboard to select the channel-box command. Use the left/right scroll keys to display the required indication and press the ENTER key to select the displayed function.

CHANNEL BOX COMMAND	INDICATION	FUNCTION
TEST MODE	<TERM> <ReST>	Terminates test mode. Restarts test mode
INITIALIZE	<INIT>	When RETURN is pressed this will reset the default channel settings.
CHANGE CH GSM	<xxx>	Sets up predefined channel settings for GSM frequencies.
CHANGE CH DCS	<xxx>	Sets up predefined channel settings for DCS frequencies.
POWER LEVEL	<xxx>	Allows a specified power level to be set at the UUT.
TX DATA	<NRL 0> <NRL 1> <NRL R> <ACC R>	Sets TX Modulation to Normal burst DATA all 0s Normal burst DATA all 1s Normal burst DATA all random Access burst DATA random
RSSI (DBM)	<xxx>	Provides an RSSI reading on the User specified channel.
SET AGC 1 SET AGC 2 SET AGC 3	<xxx> <xxx> <xxx>	Allows changes to AGC levels on LOW, MIDDLE, HIGH channels.
SP LOOP BACK	<START> <STOP>	Provides an audio path for use with the GSM test station Sets audio loop-back from TX audio to RX audio without processing by the CODEC
PATH CONT	<MOSO> <MESI> <MESE> <MISI> <MISE>	Sets audio paths: MIC off speaker off MIC external speaker internal MIC external speaker external MIC internal speaker internal MIC internal speaker external
VOL. BUZZ	<xx>	Sets buzzer volume between values 0 to 3 (Min to Max)
VOL. SIDE	<xx>	Sets 4 side tone volume levels between 0dB and -18dB
VOL. MIC	<xx>	Sets 8 MIC volume levels between 26dB and 40dB
VOL. SP1	<xx>	Sets speaker pre-amp volume levels
VOL. SP2	<xx>	Sets speaker volume levels
GET KEY CODE	<ENABLE><DISABLE>	Displays the value of a key pressed on the keypad
CONTROL OUT	<LED R> <LED B> <CHARGE ON> <LED C> <HF ON> <ALL OFF> <ALL ON>	Switches on Incoming LED Switches on Backlight LEDs Switches charge sequence on LCD Switches on Charging LED Switches on handsfree mode Switches off all above Switches on all above
CHECK LCD1	<P1> <P2>	Provides 50% visual display of check pattern on the UUT LCD Provides 50% visual display of check pattern on the UUT LCD

CHANNEL BOX COMMAND	INDICATION	FUNCTION
SET ER.DISP	<ENABLE> <DISABLE>	Unit error codes will be displayed on the UUT display Unit error codes will not be displayed on the UUT display
SOFT SIM	<ENABLE> <DISABLE>	With ENABLE set and TEST MODE <TERM> the UUT is removed from test mode and can be placed into call mode
TEST MODE	<TERM>	With SOFT SIM <ENABLED> the UUT will be removed from test mode and can be placed into a call
SIM STATUS	<SHOW>	Checks and displays the SIM status
CHECK SUM	<SHOW>	Displays the software checksum

6.5 Adjustment Mode

NOTE:

See section 7.2.1 for a list of the equipment and setup procedures required to perform the following adjustment and calibration procedures.

The following procedures **MUST** be performed after replacement or repair of one or both of the PCBs in the handheld unit. Failure to do so may result in incorrect operation of the telephone.

The following adjustments **MUST** be made on BOARD PAIRS.

There are three distinct calibration procedures to adjust RF performance. These procedures are:

1. Ramping gain (Section 7.5.1)
2. RSSI (Section 7.5.2)
3. I and Q values (Section 7.5.3)

The adjustment data selected during calibration is stored in the telephone EEPROM.



Figure:13 Test software screen

D70-0612

6.5.1 Ramping Gain

The carrier power must be measured and calibrated for each power level at channel 62.

GSM 9000

Power Level	Peak Power (dBm)	Tolerance	Initial Calibration Value	Change per dB
PL5	33	±2	175	10.0
PL6	31	±3	159	5.0
PL7	29	±3	150	4.0
PL8	27	±3	141	4.0
PL9	25	±3	132	3.5
PL10	23	±3	125	3.5
PL11	21	±3	120	2.5
PL12	19	±3	115	2.5
PL13	17	±3	110	2.5
PL14	15	±3	105	2.5
PL15	13	±3	100	2.5
PL16	11	±5	95	2.5
PL17	9	±5	90	2.0
PL18	7	±5	85	2.0
PL19	5	±5	82	1.5

GSM 18000

Power Level	Peak Power (dBm)	Tolerance	Initial Calibration Value	Change per dB
PL0	30	±2	170	16.0
PL1	28	±3	150	8.0
PL2	26	±3	140	6.0
PL3	24	±3	127	5.0
PL4	22	±3	122	5.0
PL5	20	±3	115	4.0
PL6	18	±3	107	4.0
PL7	16	±3	102	3.5
PL8	14	±3	95	3.5
PL9	12	±4	87	3.5
PL10	10	±4	80	3.0
PL11	8	±4	75	3.0
PL12	6	±4	69	3.0
PL13	4	±4	62	3.0
PL14	2	±5	57	3.0
PL15	0	±5	53	3.0

Calibration of output power on each power level

To be able to calibrate the ramping gain it is first necessary to switch the unit into Test Mode (section 6.3).

This procedure must be followed for all power levels PL5 to PL19, for low, middle and high channels for GSM 900. GSM 1800 shall be calibrated for all power levels PL0 to PL15 for top middle and bottom channels.

1. Set the Channel box controls to Channel 62 at Power Level 5, normal burst modulated with random data as follows:
 - a. Press the down arrow until CHANGE CH <62> is highlighted and then press ENTER.
 - b. Press the down arrow until PL <5> is highlighted. Press the move left arrow until <5> appears in the highlighted field. Press ENTER.
 - c. Press the down arrow until TX DATA <OFF> is highlighted. Press the move arrow until <NRL R> appears in the highlighted field. Press ENTER.



Figure:14 Tx data field

D70-0614

2. At the GSM test unit measure the Peak Power.
3. If the measured power is in the range of the target power (see previous table), then proceed to step 10.
4. At the Channel box press F7 to view the TRIM for the mid-channel.



Figure:15 Power level view 1.

D70-0615

5. Select VIEW TRIM PL MCH, and make a note of this value.



Figure:16 Power level view 2

D70-0616

6. Perform the following calculation and make a note of the result:
- New Trim value = Old Trim Value + (Required Power - Measured Power) X Change per dB
(step 5) (table) (step2) (table)
- Make a note of the result.
7. At the Channel box press F6 to program the TRIM for the mid-channel.



Figure:17 Power level selection 1.

D70-0617

8. Select PROGRAM TRIM PL MCH GSM.



Figure:18 Power level selection 2.

D70-0618

9. Highlight the PL5 field and press ENTER.



Figure:19 Power level selection 3.

D70-0619

10. Enter the value calculated in step 6 into the data field and then press ENTER.
11. Press ESC.
12. At the GSM test unit re-measure the peak power.
13. Repeat steps 2 to 11 of this procedure for power levels PL6 to PL19 (PL0 to PL15 for GSM1800).
14. After calibrating at channel 62, the carrier power must be measured and calibrated at LOW and HIGH channels for power levels 5 to 19.
15. Repeat step 2 to 14 for the GSM 1800 settings at power levels 0 to 15 for middle top and bottom channels.

NOTE:

Cal data exists for GSM 1800 low and high channels, but is not used.

Channel	GSM900	GSM1800
Low/Bottom	1	512
Mid	62	698
High/Top	124	885

6.5.2 RSSI

This procedure describes the calibration of RSSI on the compensation channel (Mch = Ch 77). This process must be carried out for LOW/BOTTOM CHANNEL and HIGH/TOP CHANNEL. The following channel settings are used in this procedure:

1. Set up the test equipment as described in Section 7.3 and switch the unit into test mode as described.
2. Apply a carrier frequency of +68KHz to the UUT (for Ch 77 = 950.468 MHz) at an input level of -90 dBm.
3. At the Channel box highlight the CHANGE CH <77> field and press ENTER.
4. Highlight the SET AGC 1 field and change the set value to 60 dB and press ENTER.
5. Highlight the RSSI dBm <> field and press ENTER.



Figure:20 RSSI dB field

D70-0620

6. If the measured value is not -90 ± 1 then make the following calculation:

$$\text{RSSI offset value} = [-(90 + \text{MEASURED RSSI VALUE})] \times 2$$

$$= [-90 - \text{MEASURED RSSI VALUE}] \times 2,$$
 for example $[-(90 + (-95))] \times 2$

$$= [-90 - (-95)] \times 2$$

$$= 10$$

Record the result.

7. At the Channel box press F7 to view data.



Figure:21 RSSI reading 1

D70-0621

8. Select TRIM OTHER and make a note of the RSSI on the measured channel reading.



Figure:22 RSSI reading 2.

D70-0622

9. Press ESC.
10. At the Channel box press F6 to program data.



Figure:23 RSSI reading 3.

D70-0623

11. Select TRIM RSSI and press ENTER.
12. Make the following calculation:
RSSI offset value (from step 8) + reading noted in step 6. Enter the result into RSSI COMP field for example: 10+ 5 = 15



Figure:24 RSSI reading 4.

D70-0624

13. Press ENTER.
14. Press ESC.
15. Measure the RSSI level again by highlighting the RSSI dBm field and press ENTER.
16. Steps 6 to 15 must be repeated for both LOW/BOTTOM and HIGH/TOP channels and then for GSM1800.

Channel	GSM	GSM1800
Low/Bottom	33	586
Comp	77	736
High/Top	114	811

6.5.3 I and Q Values

NOTE:

With the I, Qch adjustment procedures the transmitter must be set to Power Level 5 (this presents the worst case of non-linearity) so care must be taken that the spectrum analyser used can accept a signal input of 33 dBm. If not an appropriate attenuator must be used.

I, Q ch Offsets

Spectrum Analyser setup

centre frequency = 902.4 MHz

RBW = 10 kHz

VBW = 10 kHz

span = 1 MHz

sweep time = 2 sec

1. Set the Channel box controls to channel 62 at power level 5, normal burst modulated with all 1's.
 - a. Press the down arrow until CHANGE CH > is highlighted and then press ENTER.
 - b. Press the down arrow until PL is highlighted. Press ENTER.
 - c. Press the down arrow until TX DATA is highlighted. Press the move arrow until "NRL 1" appears in the highlighted field.
 - d. Press ENTER.



Figure:25 Channel box setup

D70-0625

2. On the spectrum analyser measure the carrier leakage ratio. Carrier leakage ratio is measured as the ratio of peak power and the power at 68 kHz below peak frequency.

Example:

peak power (902.468 MHz) = 33 dBm

power at 68 kHz below peak power = 0 dBm

carrier leakage ratio = 33 dBm - 0 dBm = 33 dBm

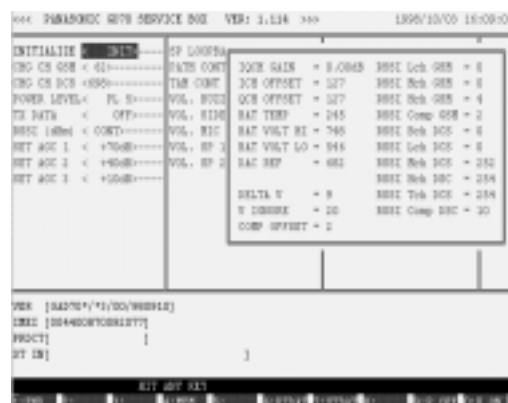


Figure:26 Carrier leakage ratio

D70-0626

TEST AND MEASUREMENT

- 3. If carrier leakage ratio is greater than 35 dBc then unit is OK. (offset calibration is complete).
- 4. If carrier leakage ratio less than 35 dBc then go to lch check.

lch check

- 1. At the Channel box check lch offset data by selecting F7 then VIEW TRIM OTHER.



Figure:27 I, Q data field selection 1.

D70-0627

- 2. At the Channel box set lch offset to 147, press F6 to program TRIM OTHER.



Figure:28 I, Q data field selection 2.

D70-0628

3. Select Ich OFFSET



Figure:29 I,Q data field selection 3.

D70-0629

4. Enter 147 for Ich OFFSET and press ENTER.



Figure:30 I,Q data field selection 4.

D70-0630

- Using the Spectrum Analyser, measure the new carrier leakage ratio.
- If the new carrier leakage ratio is greater than 30dBc then the unit is OK (offset calibration is complete).
- If the original carrier leakage ratio (see I,Q OFFSETS step 2) is greater than the new carrier leakage ratio go to I Dec Calibration.
- If the original carrier leakage ratio is less than the new carrier leakage ratio go to I Inc Calibration.

I Dec Calibration

- Set Ich offset to 107 (see Ich Check step 2).
- Using the spectrum analyser measure the new carrier leakage ratio.
- If the carrier leakage ratio is greater than 30dBc then unit is OK (offset calibration is complete).
- If not then repeat steps 1, 2 and 3 above for Ich offset values: 87, 67, 47, 27 and 7.
- If the carrier leakage ratio is still not greater than 30dBc then go to Qch Check.

I Inc Calibration

- Set Ich offset to 167 (see Ich check step 2).
- Using the spectrum analyser measure the carrier leakage ratio.
- If the carrier leakage ratio is greater than 30dBc then the unit is OK. (offset calibration is complete).

4. If not then repeat steps 1, 2 and 3 above for Ich offset values: 187, 207, 227, 247.
5. If the carrier leakage ratio is still not greater than 30dBc then go to Qch Check.

Qch Check

1. Set Ich offset to 127.
2. Set Qch offset to 147.
 - a. At the Channel box press F6.
 - b. Press move down arrow until QCH OFFSET appears in the field. Press ENTER.
 - c. Enter 3 into the data field and press enter.
3. Measure the new carrier leakage ratio.
4. If the carrier leakage ratio is greater than 35 dBc the unit is OK. (offset calibration is complete).
5. If the original carrier leakage ratio (see I, Q ch Offsets step 2) is greater than new carrier leakage ratio then go to Q Dec Calibration.
6. If the original carrier leakage ratio is less than new carrier leakage ratio then go to Q Inc Calibration.

Q Dec Calibration

1. Set Qch offset to 107 (see Qch Check step 2).
2. Measure carrier leakage ratio.
3. If the carrier leakage ratio is greater than 35 dBc then unit is OK. (offset calibration is complete).
4. If not then repeat steps 1, 2 and 3 above for Qch offset values: 87, 67, 47, 27, 7.
5. If the carrier leakage ratio is still less than 35 dBc then unit is a fail.

Q Inc Calibration

1. Set Qch offset to 167 (see Qch Check step 2).
2. Measure carrier leakage ratio.
3. If carrier leakage ratio is greater than 35 dBc then unit is OK. (offset calibration is complete).
4. If carrier leakage ratio is less than 35 dBc then repeat steps 1, 2 and 3 above for Qch offset values: 187, 207, 227, 247.
5. If carrier leakage ratio is less than 35 dBc then unit is a fail.

I, Qch Gain

IMPORTANT: I, Qch offset calibration should be done before this calibration.

Spectrum Analyser Setup.

centre frequency = 902.4 MHz

RBW = 10 kHz

VBW = 10 kHz

span = 1 MHz

sweep time = 2 sec

1. Set the Channel box controls to channel 62 at power level 5, normal burst modulated with all 1's.
 - a. Press the down arrow until CHANGE CH > is highlighted and then press ENTER.
 - b. Press the down arrow until PL is highlighted. Press ENTER.
 - c. Press the down arrow until TX DATA is highlighted. Press the move arrow until 1 appears in the highlighted field. Press ENTER.
2. Using the spectrum analyser measure the image leak ratio. Image leak ratio is the measured ratio of peak power and the power at 135 kHz below peak frequency.

Example:

peak power (902.468 Mhz) = 33 dBm

power at 135 kHz below peak power = -9 dBm

image leak ratio = 33 dBm - (-9 dBm) = 42 dBm



Figure:31 Image leak ratio

D70-0626

3. If image leak ratio is greater than 30 dBc then unit is OK. (offset calibration is complete).
4. If image leak ratio is less than 30 dBc then go to ICh gain calibration.

IQch Gain Calibration

1. Set IQch gain to -0.25 dB.
 - a. On the Channel box press F6.
 - b. Press move left arrow until IQCH GAIN field is highlighted. Press ENTER.
 - c. Enter 2 into the data field. Press ENTER.
2. Measure the image leak ratio.
3. If image leak ratio is greater than 30 dBc then unit is OK. (offset calibration is complete)
4. If image leak ratio is less than 30 dBc then repeat steps 1, 2 and 3 above with IQch gain values: -0.50 dB, -0.75 dB.
5. If image leak ratio is still less than 30 dBc then the unit is a fail.

6.5.4 Simple Receiver Test

The following procedure gives a method by which the Unit Under Test (UUT) can be placed into a condition allowing the service technician to probe the entire receive RF path. Input level and frequency can also be specified.

To perform the following procedure the UUT must first be placed into Test Mode. Perform the following steps:

1. At the Channel box highlight the CHG CH (GSM900 or GSM1800) field and set the required test channel. Press ENTER.
2. Highlight the SET AGC 1,2,3 field and enter the required gain value.
3. At the GSM test unit input an RF signal at the required frequency and level.

The unit has now been placed in a state which will allow the received signal path to be monitored.

6.5.5 Simple Transmitter Test

The following procedure gives a method by which the Unit Under Test (UUT) can be placed into a condition allowing the service technician to probe the entire transmit RF path. Input level and frequency can also be specified.

To perform the following procedure the UUT must first be placed into Test Mode. Perform the following steps:

1. At the Channel box highlight the CHG CH (GSM900 or GSM1800) field and set the required test channel.
2. Press ENTER.
3. Highlight the PL field and set the required test power level.
4. Press ENTER.
5. Highlight the TX_DATA field and select the required modulation type and data.
6. Press ENTER.

The UUT is now in the required state to allow probing of the transmit RF path.

6.5.6 Battery Charging & Calibration

There are three procedures to calibrating the battery, voltage, temperature and charging calibration. To perform this operation, two regulated power supplies are needed in addition to the power supply required for the IFB003. The d.c. output on the front of the IFB003 is unsuitable for use in the battery calibration procedure because of the voltages required. In addition, a dummy battery and an 82 ohm resistor are needed.

Voltage Calibration

1. Connect dummy battery to phone. Connect the dummy battery's power leads to a PSU (set to 3.7 V) . This is VBAT (PSU 1 o/p).
2. Select and run Channel Box software - in Test Mode. Press [F10] and power the phone on. "TEST SET TEST MODE" should be displayed in the phone display.
3. Set VBAT (PSU1 o/p) to 4.1 V $\pm$ 5 mV.
4. Press [F4] on the PC. Go to, and select : "VIEW ADC LINES".
5. Look at ADIN1 (BAT VOLT) reading. This reading is "BAT VOLT HIGH". If reading is outside the range 763 $\pm$ 67 then there is a fault, and further investigation is required. Otherwise, record the value for later use.
6. Set VBAT (PSU1 o/p) to 3.0 V $\pm$ 5 mV.
7. Press "[Y]" [enter] on the PC to re-read ADC Data.
8. Look at ADIN1 (BAT VOLT) reading again. This reading is "BAT VOLT LOW". If the reading is outside the range 558 $\pm$ 54 then there is a fault, and further investigation is required. Otherwise, record the value for later use.
9. Press [N] (in repeat yes/no box), then [enter].
10. Press [F6]. Go to, and select : "TRIM Other". Go to, and select: "BAT VOLT HIGH". Enter value from step 5 above.
11. Press [F6]. Go to, and select : "TRIM Other" again. Go to, and select: "BAT VOLT LOW". Enter value from step 8 above. Set PSU1 o/p to 3.7 volts.

Temperature Calibration

12. There is a 10 k Ω resistor in the test battery, between BAT_TEMP and Ground. Ensure that it is 10 k Ω $\pm$ 1% before proceeding. Ensure that PSU1 o/p is set to 3.7 volts.
13. If the ADC data are not already being displayed, press [F4], "VIEW ADC LINES", [enter].
14. Look at the value for ADIN3 (BAT TEMP). If the value is outside the range 365 -50/+57, then there is a fault, and further investigation is required. Otherwise, calculate the difference between the reading and the theoretical value of 365. Record this value for use below.
15. Press [N] (in repeat yes/no box), then [enter].

16. Press [F6]. Go to, and select : "TRIM Other" again. Go to, and select: "BAT TEMP". Enter value from step 14 above.

Charging Calibration

17. For this procedure, set up the equipment as follows.

- a. Connect $82\ \Omega$ 1 W resistor between VBAT and Ground.
- b. Connect PSU1 between VBAT and Ground, set to 3.7 volts and switch on. (Note, this gives 50 mA)
- c. Connect a second PSU (PSU2) to the phone via the phone's external connector. Set PSU2 to 5.8 volts - current limit set to 700 mA.

18. Press {shift}+[F4].

19. Go to, and select : "Set DAC Data". Type a value of 714, [enter].

20. Using arrows $\uparrow\downarrow$, highlight "Control out". Use $\leftarrow\rightarrow$ arrows to highlight and select "CRG ON".

21. Disconnect VBAT by switching PSU1 output OFF.

22. Measure VBAT voltage at test battery. If the voltage is inside the range $4.1\text{ V} \pm 5\text{ mV}$ then go to step 27 below. Otherwise, calculate the difference thus:- $(\text{measured voltage} - 4.1)/0.0057 = \text{difference}$.

23. Press {shift}+[F4].

24. Go to, and select : "Set DAC Data". Enter value of :- (previously set value (which you originally set to 714)) - result from step 22 above (integer only).

25. Repeat steps 22 to 24 until measured voltage is $4.1\text{ V} \pm 5\text{ mV}$

26. If the final value for DAC Data is outside the range 714 ± 100 then there is a fault, and further investigation is required. Otherwise store the value as described below.

27. Press [F6]; Go to, and select :- "Trim Other";

28. Go to, and select :- "DAC Reference"; Enter value.

29. Press {shift}+[F4].

30. Go to, and select :- "Set DAC Data".

31. Enter :- (value stored in step 28) - 200.

32. Press [F4].

33. Go to, and select :- View ADC lines.

34. Read value for ADIN1 ("BAT VOLT").

35. If ["BAT VOLT HIGH" (from step 5) - value read above], is inside the range 213 ± 42 then go to step 36 below to store value. Otherwise there is a fault, and further investigation is required.

36. Press [N] (in repeat yes/no box), then [enter]. Press [F6]; Highlight and select "Trim Other".

37. Highlight and select "DAC Step".

38. Enter value obtained in step 35, above.

39. Press {shift}+[F4].

40. Go to , and select :- "Set DAC Data".

41. Re-enter original value from step 26 (ie. present value +200).

42. Press [F4].

43. Highlight, and select :- "View ADC Lines".

44. Read ADIN5 (CRG CURRENT) value and record it as "Total current".

45. Disconnect the $82\ \Omega$ Resistor.

46. Press [Y], [enter] to read ADC value again, and record it as "Phone current".

47. "Charge current" = "Total current" - "Phone current". If this outside the range 43 ± 4 then there is a fault, and further investigation is required. Otherwise, calculate offset thus:- "Charging current" - 43 = Offset.

48. Press [N] (in repeat yes/no box), then [enter]. Press [F6]

49. Go to, and select :- "TRIM other".

50. Go to, and select :- "Complete offset".

51. Enter offset calculated above.

52. At the end of all tests, turn OFF power supplies and remove the phone.

6.6 Lock Code

NOTE:
See section 6.2.1 for a list of the equipment and setup procedures required to perform the following adjustment and calibration procedures.
To perform the following procedures the UUT must be placed into Test Mode.

6.6.1 Check current lock code

- 1. At the Channel box press F4 and highlight VIEW LOCK CONDITION. Press ENTER.



Figure:32 View lock code D70-0632

- 2. The display will show the current lock status and lock code for the UUT.

6.6.2 Change current lock code

1. At the Channel box press SHIFT and F4 and highlight PROG LOCK CONDITION. Press ENTER.
2. Press ENTER to unlock the UUT. The current lock code will be used.

```

<<< PANASONIC GD70 SERVICE BOX VER: 1.114 >>> 1996/10/03 16:05:00

INITIALIZE < INIT>ACK SP LOOPBACK< STOP>---- GET KEYCODE< ENABLE>----
CFG CH GSM < 62>----- PATH CONT < HES1>---- CONTROL OUT<ALL ON>----
CFG CH DCB <698>----- TAM CONT <PLAYOFF>---- CHECK LCD1 < P1>----
POWER LEVEL< PL 5>---- VOL. BUZZ < 1>---- SET ER DISP< ENABLE>----
TX DATA < OFF>---- VOL. SIDE < -8dB>---- SOFT SIN < ENABLE>----
RSSI (dBm) < CONT>---- VOL. HIC < 0dB>---- TEST MODE < TERM>----
SET AGC 1 < +70dB>---- VOL. SP 1 < 0dB>---- SIM STATUS < SHOW>----
SET AGC 2 < +40dB>---- VOL. SP 2 < 0dB>---- CHECKSUM < SHOW>----
SET AGC 3 < +10dB>----

VER [GAD70*/#3/DD/580910]
IMEI [00400870091077]
PRDCT[ ]
ST IN[ ]

LOCK = DISABLED
CODE = 0000

HIT ANY KEY
1:END 2: 3: 4:MEM 5: 6:PTDAT 7:VTRAT 8: 9:P:P OFF 0:P ON

```

Figure:33 Program lock code

D70-0633

3. Enter "0000" to reset the UUT to factory defaults. The UUT will be locked using the lock code "0000".

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Processor

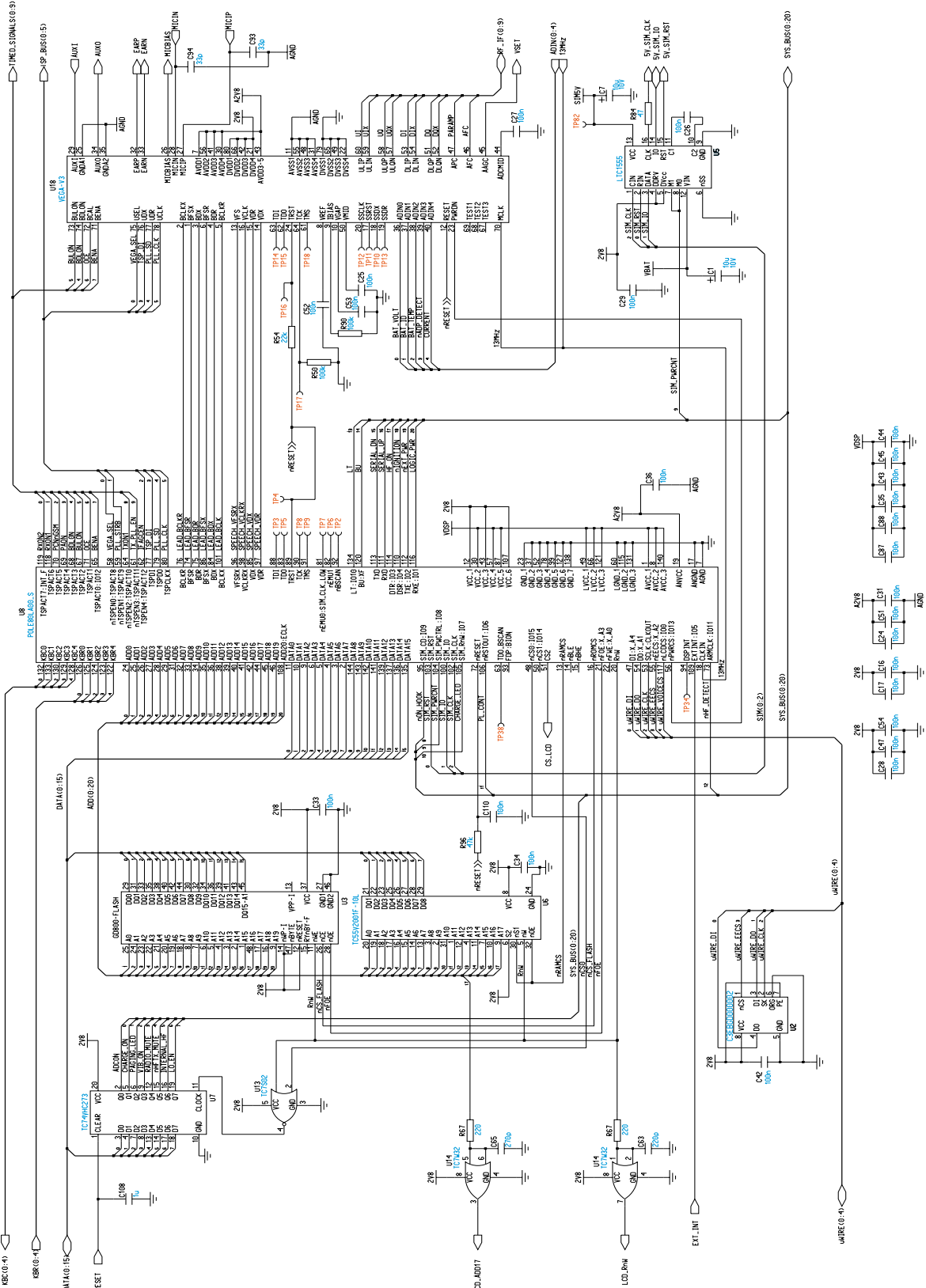
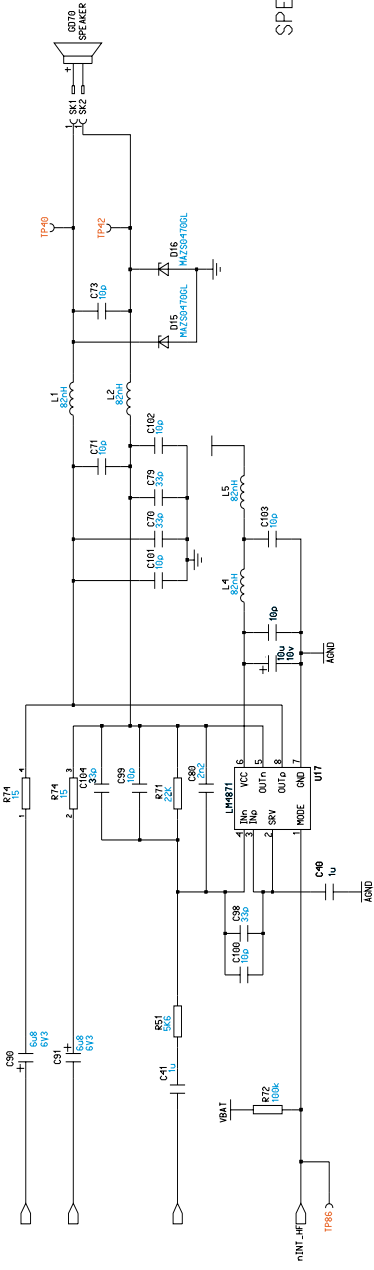
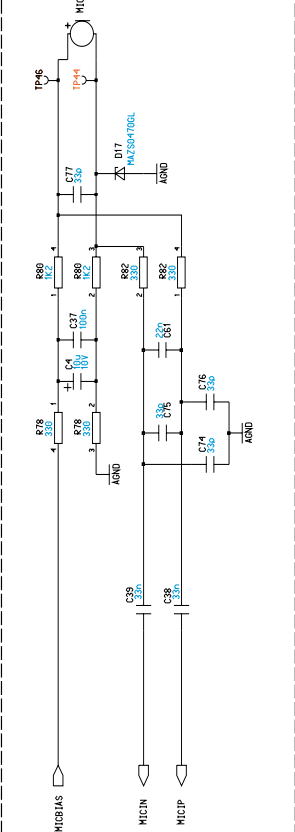


Figure.2 EG76056J-2.EPS

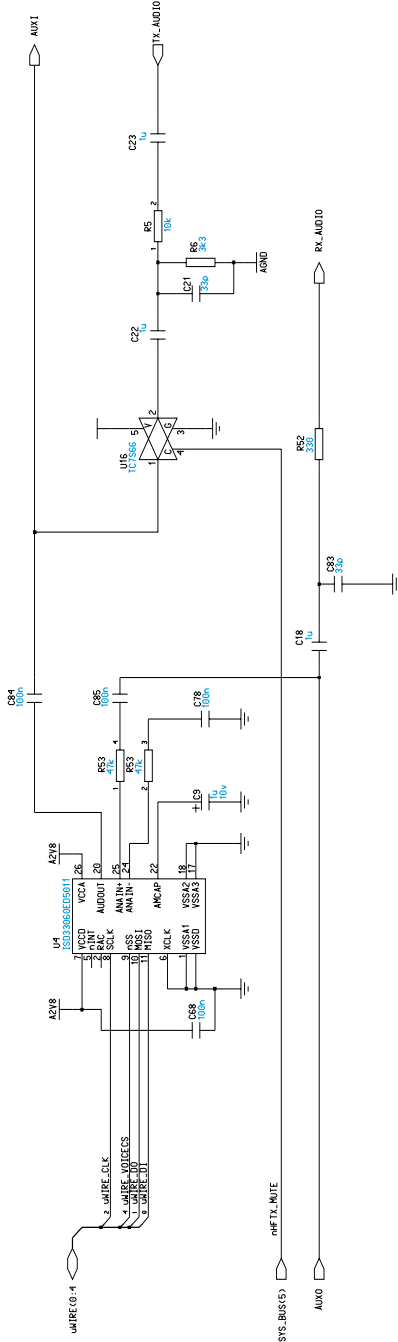
Powersupply



SPEAKER AND SPEAKER DRIVER



MICROPHONE



VOICE MEMO

Figure.3 EG76056J-3.EPS

Audio

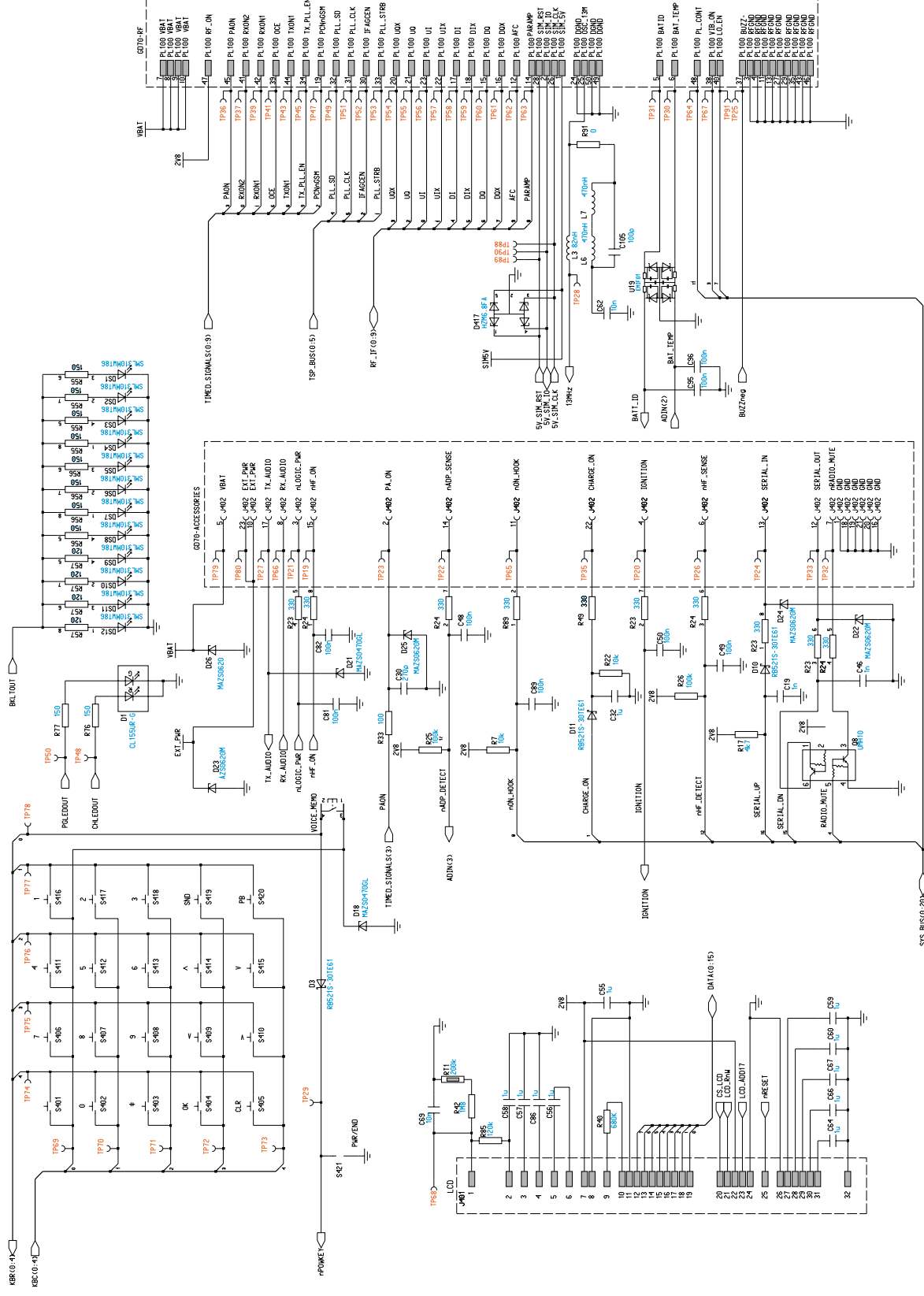
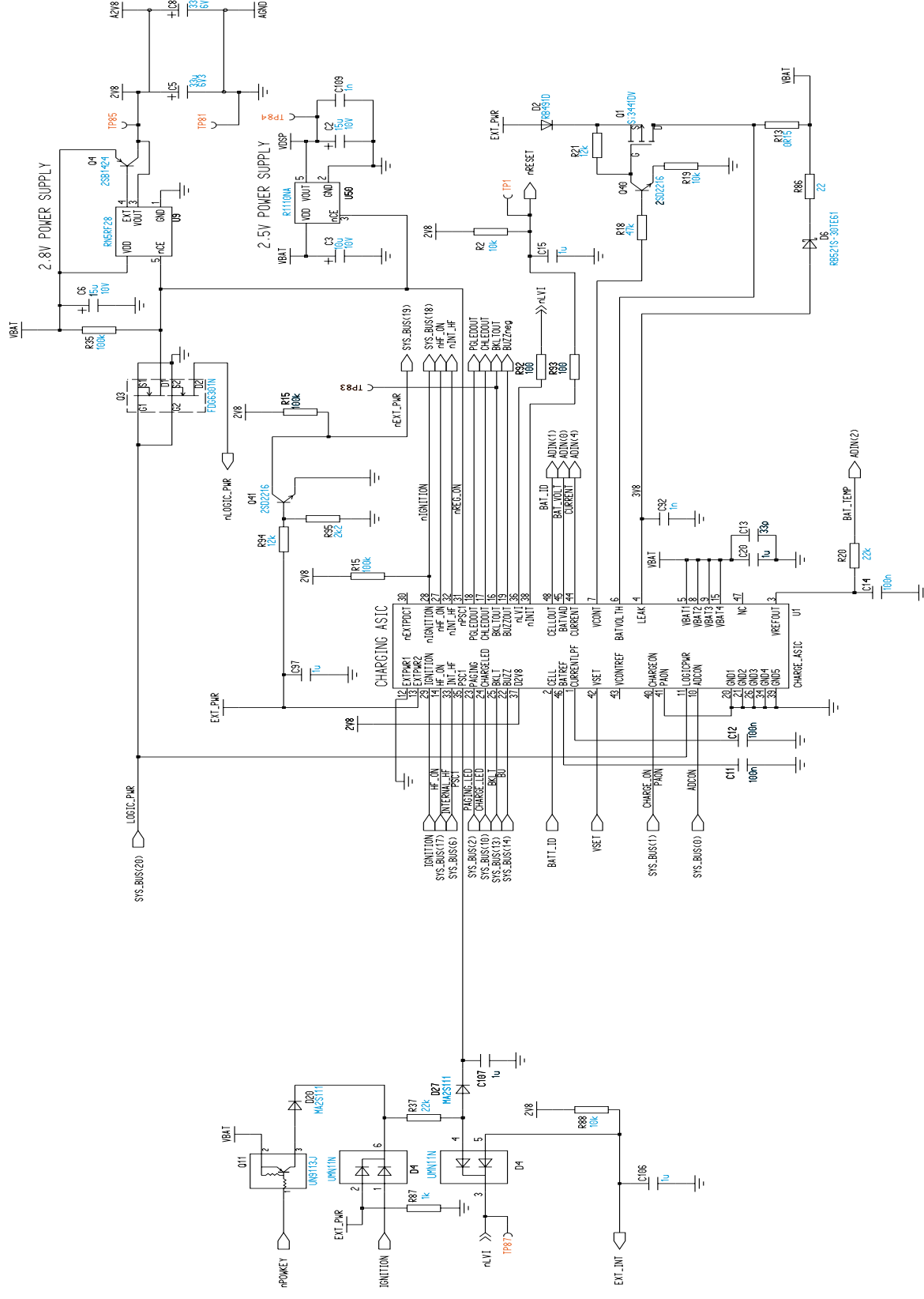


Figure 4 EG76056J-4.EPS



7.1.2 RF
Overview

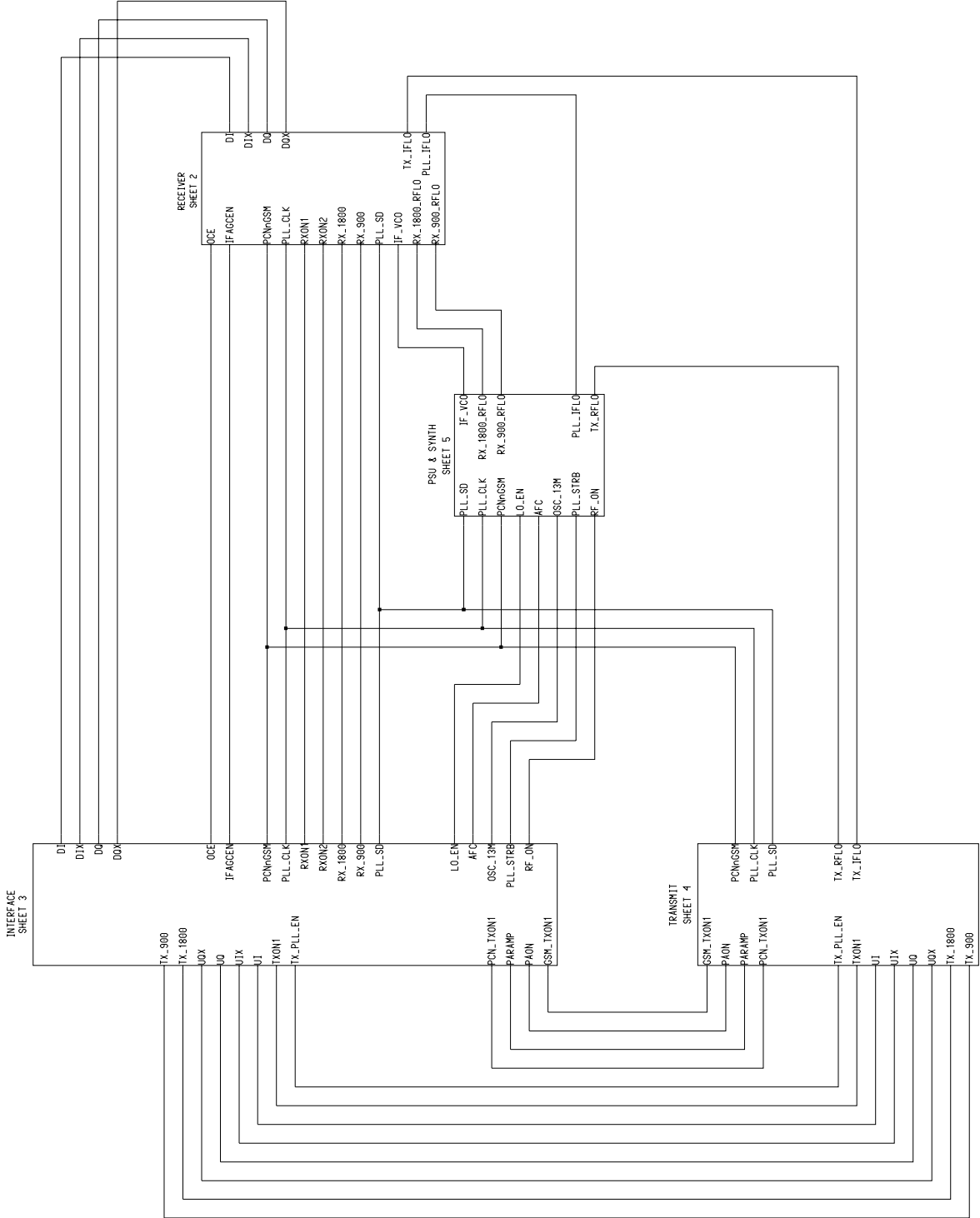


Figure.6 EG76055H-1.EPS

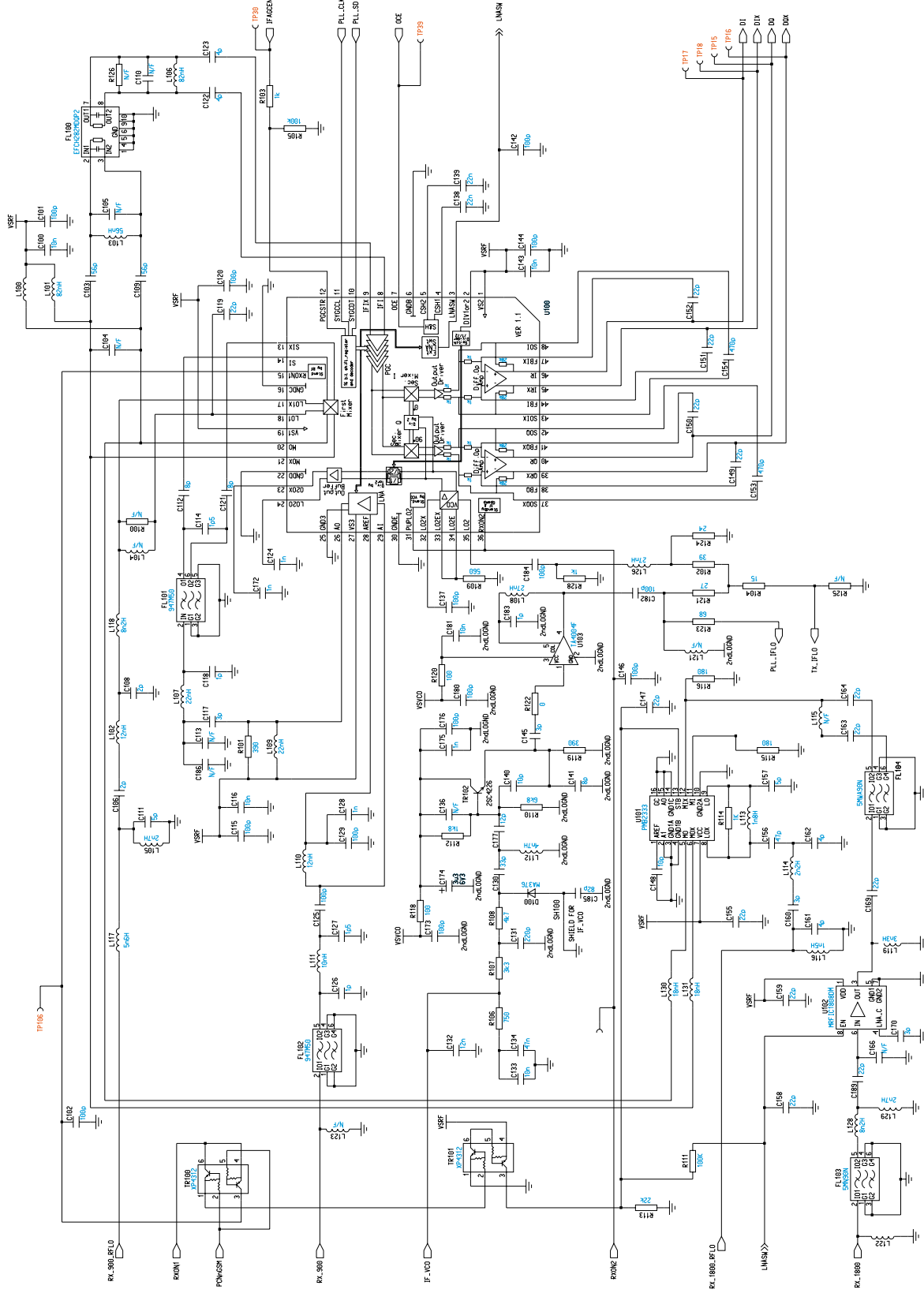


Figure:7 EG76055H-2.EPS

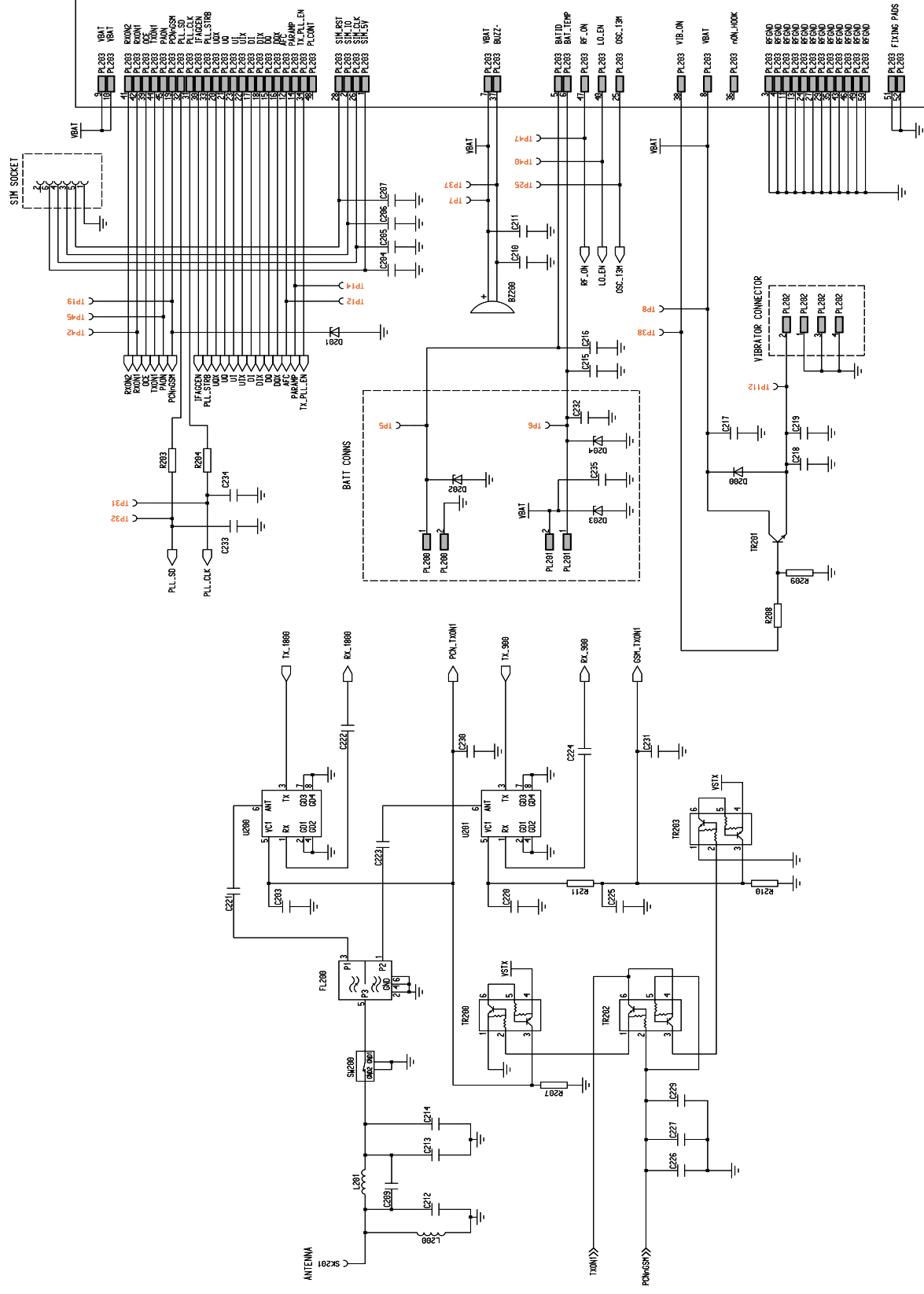


Figure:8 EG76055H-3.EPS

Transmitter

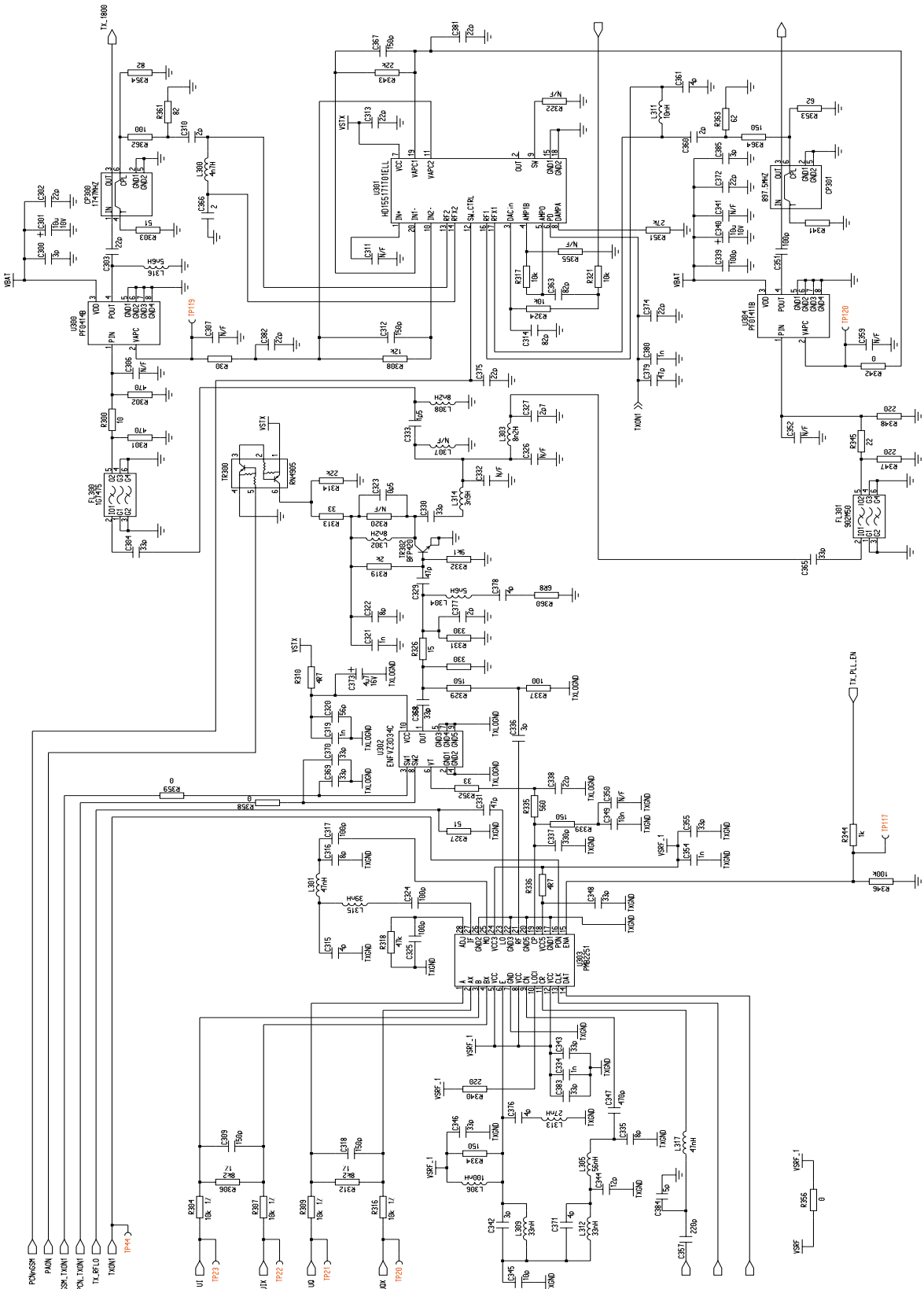
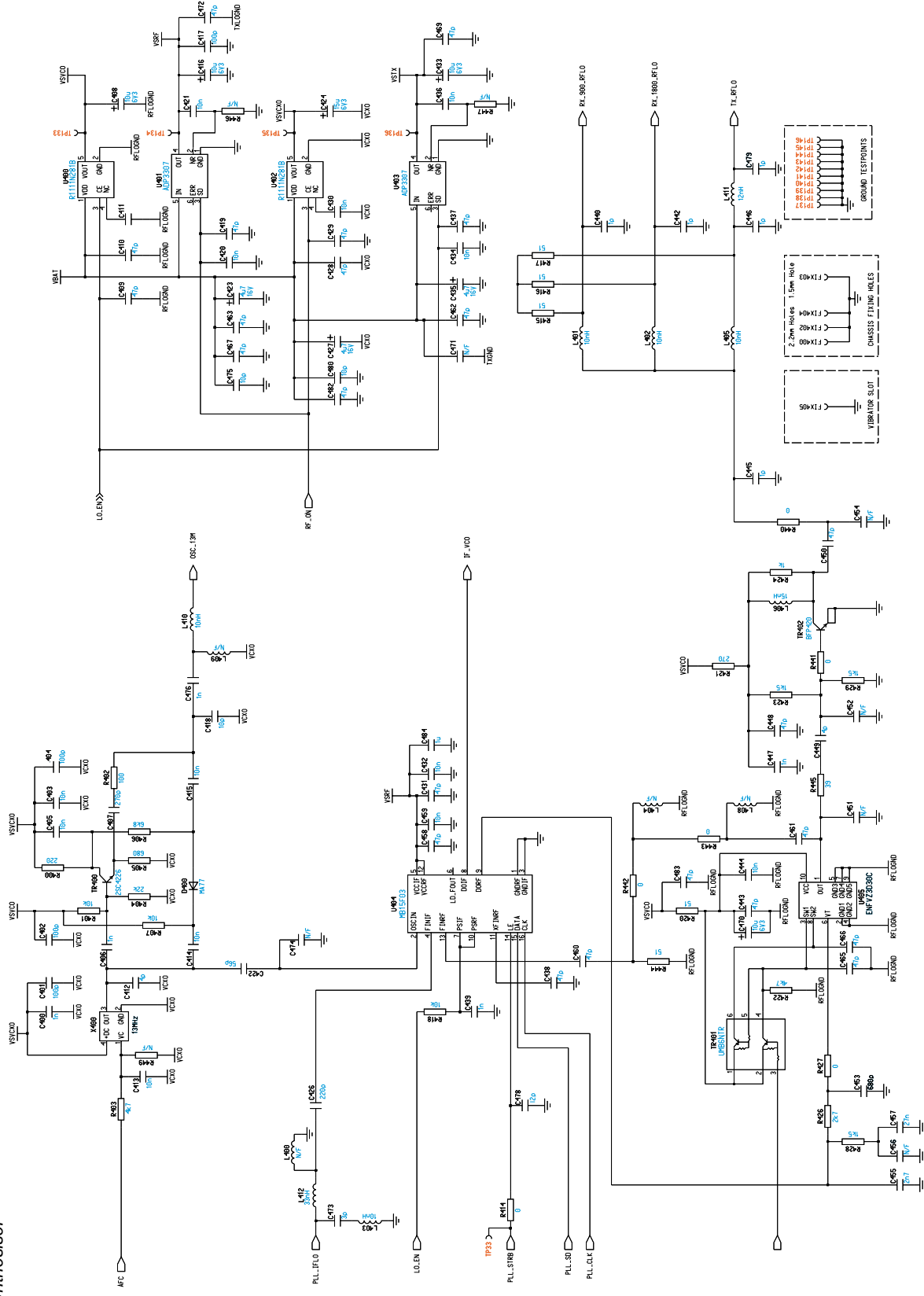


Figure.9 EG76055H-4.EPS



8 LAYOUT DIAGRAMS

8.1 Handheld Unit

8.1.1 Logic

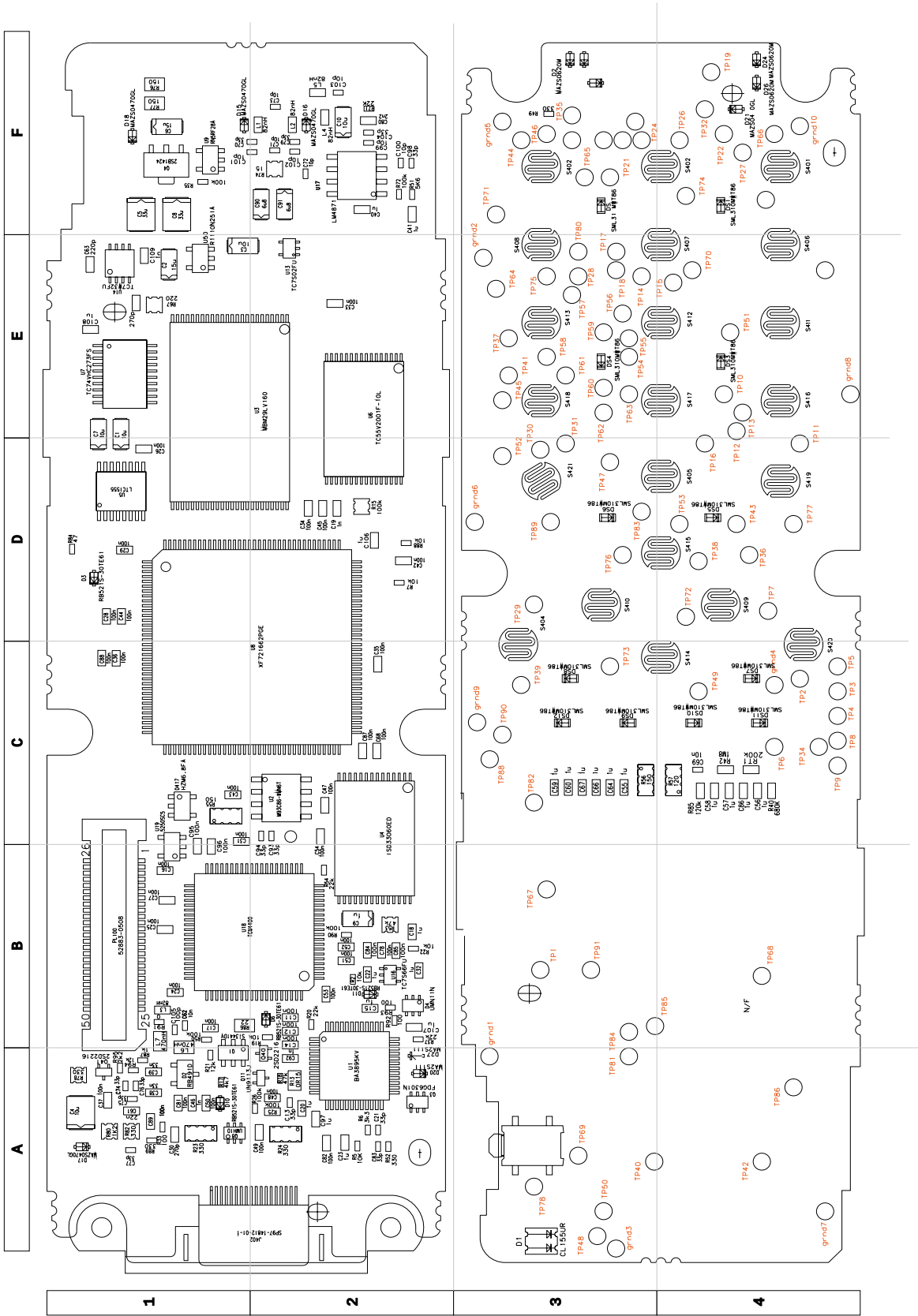


Figure 1 C2276078H.EPS

8.1.2 RF

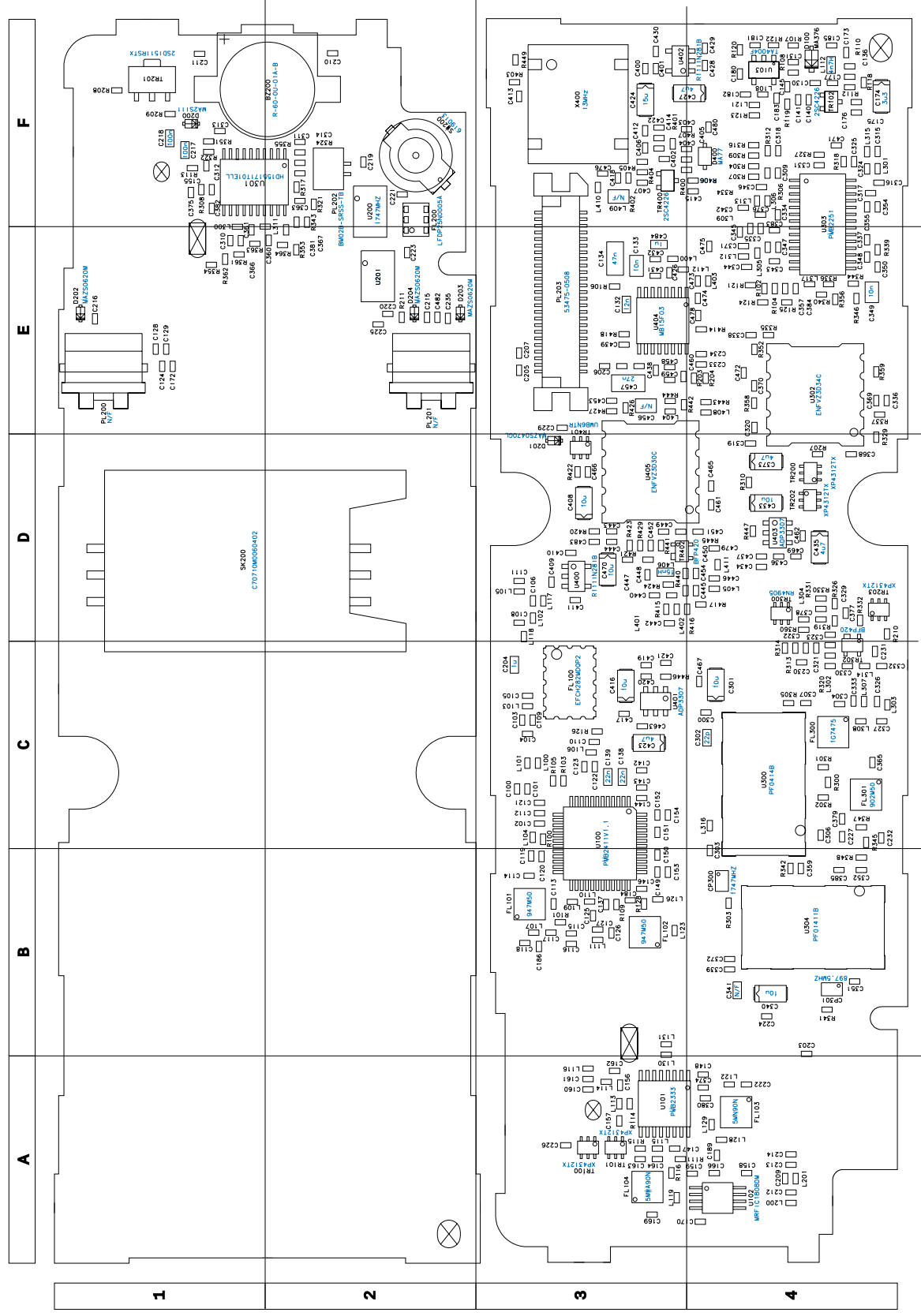
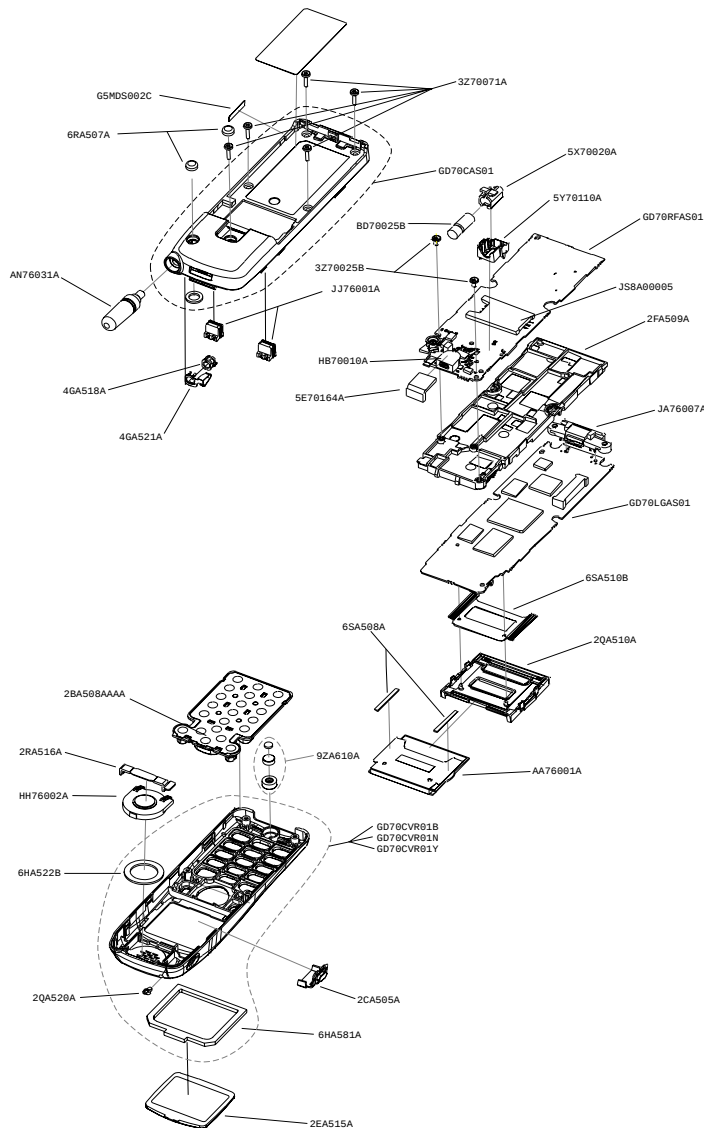


Figure:2 C2276077H.EPS

9 REPLACEMENT PARTS LIST

9.1 Handheld Unit



Part Number	Description
GD70CAS01	GD70 CASE ASSEMBLY
GD70CVR01B	GD70 BLUE COVER ASSEMBLY
GD70CVR01N	GD70 GREEN COVER ASSEMBLY
GD70CVR01Y	GD70 GREY COVER ASSEMBLY
AA76001A	LCD MODULE
HB70010A	BUZZER
JS8A00005	SIM HOLDER
JA76007A	CONNECTOR I/O (18-WAY)
AN76031A	ANTENNA FIXED 27.0mm
BD70025B	VIBRATOR MOTOR ASSEMBLY
6SA508A	LCD CONNECTOR
JJ76001A	BATTERY CONNECTOR A TYPE
HH76002A	RECEIVER SPEAKER 8 OHMS
9ZA610A	GD70 MIC ASSEMBLY
2EA515A	LCD PANEL
6HA522B	G520 REC CUSHION
2QA520A	GD70 INDICATOR
2BA508AAAA	GD70 KEYPAD
6RA507A	RF CAP
G5MDS002C	PATENT LABEL
6HA581A	G520 LCD CUSHION
2QA510A	LCD BACKLIGHT
2FA509B	GD70 CHASSIS
4GA518A	GD70 ANTENNA NUT
4GA521A	GD70 ANTENNA TERMINAL
3Z70071A	SCREW M1.6 X 8
3Z70025B	SCREW M1.6 X 4
2CA505A	GD70 MEMO KEY
5Y70110A	VIBRATOR MODULE
5X70020A	VIBRATOR CUSHION
5E70164A	BUZZER CUSHION
2RA516A	GD70 REC HOLDER
6SA510B	LCD TAB CUSHION
6HA567A	G520 RF CONNECTOR CUSHION

Figure:1 Handheld Unit

D70-1001

9.2 Handheld Replacement Parts List

9.2.1 Logic

Model: EB-GD70			Name: Logic		Name: Logic	
Ref.	Part Number	Description	Ref.	Part Number	Description	Grid
C034	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C034	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	D2
C035	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C035	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C2
C036	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C036	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C1
C037	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C037	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	A1
C038	ECUV1C333KBV	CAP 33nF +/-10% 16V X7R SM 0603	C038	ECUV1C333KBV	CAP 33nF +/-10% 16V X7R SM 0603	A1
C039	ECUV1C333KBV	CAP 33nF +/-10% 16V X7R SM 0603	C039	ECUV1C333KBV	CAP 33nF +/-10% 16V X7R SM 0603	A1
C040	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C040	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	F2
C041	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C041	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	F2
C042	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C042	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	D2
C043	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C043	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C1
C044	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C044	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	D1
C045	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C045	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	D2
C046	ECUV1H102KBV	CAP 1nF +/-10% 50V X7R SM 0603	C046	ECUV1H102KBV	CAP 1nF +/-10% 50V X7R SM 0603	A1
C047	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C047	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C2
C048	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C048	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	A2
C049	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C049	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	A2
C050	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C050	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	A1
C051	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C051	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B2
C052	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C052	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B2
C053	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C053	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B2
C054	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C054	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B2
C055	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C055	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C3
C056	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C056	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C4
C057	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C057	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C4
C058	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C058	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C4
C059	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C059	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C3
C060	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C060	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C3
C061	ECUV1E223KBV	CAP CER 22nF 10% 25V X7R SMD 1608	C061	ECUV1E223KBV	CAP CER 22nF 10% 25V X7R SMD 1608	A1
C062	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C062	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	B1
C063	ECUV1H221JCV	CAP 220pF +/-5% 50V NPO SM 0603	C063	ECUV1H221JCV	CAP 220pF +/-5% 50V NPO SM 0603	E1
C064	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C064	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C3
C065	ECUV1H271JCV	CAP 270pF +/-5% 50V NPO SM 0603	C065	ECUV1H271JCV	CAP 270pF +/-5% 50V NPO SM 0603	A2
C066	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C066	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C3
C067	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C067	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C3
C068	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C068	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C2
C069	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C069	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C4
C070	ECUE1H330JCQ	CAP CER 33pF 5% 50V NPO SMD 1005	C070	ECUE1H330JCQ	CAP CER 33pF 5% 50V NPO SMD 1005	F1
C071	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NPO SMD 1005	C071	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NPO SMD 1005	F2
C072	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NPO SMD 1005	C072	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NPO SMD 1005	F2

Model: EB-GD70			Name: Logic			Model: EB-GD70			Name: Logic		
Ref.	Part Number	Description	Grid	Ref.	Part Number	Description	Grid	Ref.	Part Number	Description	Grid
C073	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	F2	D010	YDRTU0005	30V 200mA DIODE	A1	D010	YDRTU0005	30V 200mA DIODE	A1
C074	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	A1	D011	YDRTU0005	30V 200mA DIODE	B2	D011	YDRTU0005	30V 200mA DIODE	B2
C075	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	A1	D015	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F1	D015	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F1
C076	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	A1	D016	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F2	D016	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F2
C077	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	A1	D017	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	A1	D017	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	A1
C078	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B2	D018	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F1	D018	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F1
C079	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	F2	D02	YRB491DT146	20V 1A DIODE	A1	D02	YRB491DT146	20V 1A DIODE	A1
C080	ECUV1H222KBV	CAP 2n2 10% 50V X7R	F2	D020	MA2S111TX	DIODE SM SS-M1W1 2 PIN	A2	D020	MA2S111TX	DIODE SM SS-M1W1 2 PIN	A2
C081	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	A1	D021	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F4	D021	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	F4
C082	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	A2	D027	MA2S111TX	DIODE SM SS-M1W1 2 PIN	A2	D027	MA2S111TX	DIODE SM SS-M1W1 2 PIN	A2
C083	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	A2	D0417	YHZM6.8FATR	6.8V 200mW DIODE	C1	D0417	YHZM6.8FATR	6.8V 200mW DIODE	C1
C084	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B2	FLASH	GD70RM01	GD70 FLASH ROM (PROGRAMMED)	E2	FLASH	GD70RM01	GD70 FLASH ROM (PROGRAMMED)	E2
C085	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B2	J0402	JA76007A	CONNECTOR I/O 18WAY SMD	A2	J0402	JA76007A	CONNECTOR I/O 18WAY SMD	A2
C086	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	C4	L001	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2	L001	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2
C087	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C2	L002	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2	L002	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2
C088	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C1	L003	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	B1	L003	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	B1
C089	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	A1	L004	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2	L004	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2
C090	YCSDU011M685	CAP 6u8F +/-20% 6V3 TANT CASE A	F2	L005	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2	L005	LL1608FH82NJ	INDUCTOR 82nH +/-5% SM1608	F2
C091	YCSDU011M685	CAP 6u8F +/-20% 6V3 TANT CASE A	F2	L006	LL2012FR47J	INDUCTOR CHIP 470nH +/-10% SM 2012	A1	L006	LL2012FR47J	INDUCTOR CHIP 470nH +/-10% SM 2012	A1
C092	ECUV1H102KBV	CAP 1nF +/-10% 50V X7R SM 0603	A2	L007	LL2012FR47J	INDUCTOR CHIP 470nH +/-10% SM 2012	B1	L007	LL2012FR47J	INDUCTOR CHIP 470nH +/-10% SM 2012	B1
C093	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	B2	M0124	2QA510C	G520 H/H LCD BACKLIGHT	B3	M0124	2QA510C	G520 H/H LCD BACKLIGHT	B3
C094	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	B2	PL0100	528830508	CONNECTOR BRD-BRD RECEPTACLE 50WAY SMD	B1	PL0100	528830508	CONNECTOR BRD-BRD RECEPTACLE 50WAY SMD	B1
C095	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	C1	Q003	B1CFJC000001	TRANSISTOR DUAL FET N-CH SMD SC70-66	A2?	Q003	B1CFJC000001	TRANSISTOR DUAL FET N-CH SMD SC70-66	A2?
C096	ECJ1VB1C104K	CAPACITOR 100nF +/-10% 16V X7R SM 0603	B1	Q004	2SB1424T100R	TRANSISTOR PNP LOW FREQUENCY SOT89	F1	Q004	2SB1424T100R	TRANSISTOR PNP LOW FREQUENCY SOT89	F1
C097	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	A2	Q01	YSI3441DVT1	TRANSISTOR PWR MOSFET -20V 2W	A1	Q01	YSI3441DVT1	TRANSISTOR PWR MOSFET -20V 2W	A1
C098	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	F2	Q011	UN9113JTX	150MHz 50V 125mW TRANSISTOR	A1	Q011	UN9113JTX	150MHz 50V 125mW TRANSISTOR	A1
C099	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	F2	Q040	2SD2216TX	150MHz 50V 125mW NPN TRANSISTOR	A2	Q040	2SD2216TX	150MHz 50V 125mW NPN TRANSISTOR	A2
C100	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	F2	Q041	2SD2216TX	150MHz 50V 125mW NPN TRANSISTOR	A1	Q041	2SD2216TX	150MHz 50V 125mW NPN TRANSISTOR	A1
C101	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	F1	Q08	YUMH101TN	TRANSISTOR	A1	Q08	YUMH101TN	TRANSISTOR	A1
C102	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	F2	R002	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	B2	R002	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	B2
C103	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	F2	R005	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	A2	R005	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	A2
C104	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	F2	R006	ERJ2GEJ332X	CHIP RESISTOR 3K3 OHM +/-5% 1/16W SM1005	A2	R006	ERJ2GEJ332X	CHIP RESISTOR 3K3 OHM +/-5% 1/16W SM1005	A2
C105	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1005	B1	R007	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	D2	R007	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	D2
C106	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	D2	R013	YRNHP001FR15	250mW 0.15 OHM RESISTOR	A2	R013	YRNHP001FR15	250mW 0.15 OHM RESISTOR	A2
C107	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	B2	R015	EXBV4V104JV	CHIP 2 RESISTOR ARRAY 100K OHM +/-5% 62.5MW 1608	D2	R015	EXBV4V104JV	CHIP 2 RESISTOR ARRAY 100K OHM +/-5% 62.5MW 1608	D2
C108	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	E1	R017	ERJ2GEJ472X	CHIP RESISTOR 4K7 OHM +/-5% 1/16W SM 1005	A1	R017	ERJ2GEJ472X	CHIP RESISTOR 4K7 OHM +/-5% 1/16W SM 1005	A1
C109	ECUV1H102KBV	CAP 1nF +/-10% 50V X7R SM 0603	E1	R018	ERJ2GEJ473X	CHIP RESISTOR 47K OHM +/-5% 1/16W SM 1005	A2	R018	ERJ2GEJ473X	CHIP RESISTOR 47K OHM +/-5% 1/16W SM 1005	A2
D003	YDRTU0005	30V 200mA DIODE	D1								
D006	YDRTU0005	30V 200mA DIODE	B2								

REPLACEMENT PARTS LIST

Model: EB-GD70		Name: Logic	
Ref.	Part Number	Description	Grid
R091	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	B1
R092	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005	B2
R093	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005	B2
R094	ERJ2GEJ123X	CHIP RESISTOR 12K OHM +/-5% 1/16W SM 1005	A1
R095	ERJ2GEJ222X	CHIP RESISTOR 2K2 OHM +/-5% 1/16W SM 1005	A1
U001	UY76035A	IC BA3895KV CHARGE CONTROL SMD VQFP48	A2
U002	C3EBGD000002	IC EEPROM 16K SMD SO8	C2
U004	YISD33060ED	CHIP/CORDER IC	C2
U005	YUYVZ0009	IC SIM LEVEL SHIFTER SMD SSOP16	D1
U006	C3BBJC000014	IC 2M SRAM 100nS SMD STSOP32	E2
U008	YF721662PGE	IC GEMINI DSP ASIC SMD TQFP144	C2
U009	C0DBAFA00001	IC REGULATOR 2V8 SMD SOT23-5	F1
U013	YULLW0039	NOR GATE	E2
U014	YULLW0060	IC DUAL 2/P OR GATE SMD SSOP8-P-0.65	E1
U016	YULLW0031	IC C2MOS BILATERAL SWITCH 200mW SSOP5-P-0.65A	B2
U017	C0ABAA0000030	IC AUDIO PA 1.1W SMD SO8	F2
U018	YTCM4400	GSM/DCS BASEBAND/RF IF (VEGA3) TQFP80	B1
U019	J0MAB00000039	IC EMI FILTER SMD SOT23-5L	C1
U050	YURTS0003	REGULATOR 2V5 POSITIVE	E1
U07	YULLW0150	OCTAL D-FLIP FLOP	E1

Model: EB-GD70		Name: Logic	
Ref.	Part Number	Description	Grid
R019	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	B2
R020	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	B2
R021	ERJ2GEJ123X	CHIP RESISTOR 12K OHM +/-5% 1/16W SM 1005	A1
R022	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	B2
R023	EXBV8V331JV	RESISTOR NET 330x4 5% 1/16W SMD 3216	A1
R024	EXBV8V331JV	RESISTOR NET 330x4 5% 1/16W SMD 3216	A2
R025	ERJ3GEYF104V	CHIP RESISTOR 100K OHM +/-1% 1/16W SM 1608	A2
R026	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005	A2
R033	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005	A1
R035	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005	F1
R037	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	B2
R042	YRDTU0061804	RES 1.8M OHM 1% 1/16W SMD 1608	C4
R049	ERJ2GEJ331X	CHIP RESISTOR 330 OHM +/-5% 1/16W SM 1005	F3
R050	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005	B1
R051	ERJ2GEJ562X	CHIP RESISTOR 5K6 OHM +/-5% 1/16W SM 1005	F2
R052	ERJ2GEJ331X	CHIP RESISTOR 330 OHM +/-5% 1/16W SM 1005	A2
R053	EXBV4V473JV	CHIP 2 RESISTOR ARRAY 47K OHM +/-5% 1/16W	B2
R054	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	B2
R055	EXBV8V151JV	RESISTOR NET 150x4 5% 1/16W SMD 3216	C1
R056	EXBV8V151JV	RESISTOR NET 150x4 5% 1/16W SMD 3216	C3
R067	EXBV4V221JV	CHIP 2 RESISTOR ARRAY 220 OHM +/-5% 62.6MW SM 1608	E1
R071	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	F2
R072	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005	F2
R074	EXBV4V150JV	CHIP 2 RESISTOR ARRAY 15 OHM +/-5% 62.5MW SM 1608	F2
R076	ERJ6GEYJ151V	CHIP RESISTOR 150 OHM +/-5% 1/10W SM 2012	F1
R077	ERJ6GEYJ151V	CHIP RESISTOR 150 OHM +/-5% 1/10W SM 2012	F1
R078	EXBV4V331JV	CHIP 2 RESISTOR ARRAY 330 OHM +/-5% 62.5MW 1608	A1
R080	EXBV4V122JV	CHIP 2 RESISTOR ARRAY 1K2 OHM +/-5% 62.5MW 1608	A1
R082	EXBV4V331JV	CHIP 2 RESISTOR ARRAY 330 OHM +/-5% 62.5MW 1608	A1
R084	ERJ2GEJ470X	CHIP RESISTOR 47 OHM +/-5% 1/16W SM 1005	D1
R086	ERJ6GEYJ220V	CHIP RESISTOR 22 OHM +/-5% 1/10W SM 2012	B1
R087	ERJ2GEJ102X	CHIP RESISTOR 1K OHM +/-5% 1/16 W SM 1005	A1
R088	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	D2
R089	ERJ2GEJ331X	CHIP RESISTOR 330 OHM +/-5% 1/16W SM 1005	A1
R090	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005	B2

9.2.2 RF

Model: EB-GD70			Name: RF	
Ref.	Part Number	Description	Ref.	Description
—	GD70RFAS01	ASSEMBLED RF PCB	C0141	ECUE1H080DCQ
BZ200	HB70010A	G6000 BUZZER	C0142	ECUE1H101JQC
C0100	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0143	ECUE1C103KBQ
C0101	ECUE1H101JQC	CAP CER 100pF 5% 50V NP0 SMD 1005	C0144	ECUE1H101JQC
C0102	ECUE1H101JQC	CAP CER 100pF 5% 50V NP0 SMD 1005	C0145	ECUE1H030CCQ
C0103	ECUE1H560JQC	CAP CER 56pF 5% 50V NP0 SMD 1005	C0146	ECUE1H101JQC
C0106	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0 SMD 1005	C0147	ECUE1H220JQC
C0108	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0 SMD 1005	C0148	ECUE1H100DCQ
C0109	ECUE1H560JQC	CAP CER 56pF 5% 50V NP0 SMD 1005	C0149	ECUE1H220JQC
C0111	ECUE1H050DCQ	CAP CER 5pF +/-0.5pF 50V NP0 SMD 1005	C0150	ECUE1H220JQC
C0112	ECUE1H080DCQ	CAP CER 8pF +/-0.5pF 50V NP0 SMD 1005	C0151	ECUE1H220JQC
C0114	ECUE1H1R5CCQ	CAP CER 1.5pF +/-0.25pF 50V NP0 SMD 1005	C0152	ECUE1H220JQC
C0115	ECUE1H101JQC	CAP CER 100pF 5% 50V NP0 SMD 1005	C0155	ECUE1H220JQC
C0116	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0156	ECUE1H470JQC
C0117	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0 SMD 1005	C0157	ECUE1H050DCQ
C0118	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0 SMD 1005	C0158	ECUE1H220JQC
C0119	ECUE1H220JQC	CAP CER 22pF 5% 50V NP0 SMD 1005	C0159	ECUE1H220JQC
C0120	ECUE1H101JQC	CAP CER 100pF 5% 50V NP0 SMD 1005	C0160	ECUE1H030CCQ
C0121	ECUE1H080DCQ	CAP CER 8pF +/-0.5pF 50V NP0 SMD 1005	C0161	ECUE1H040CCQ
C0122	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	C0162	ECUE1H040CCQ
C0123	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	C0163	ECUE1H220JQC
C0124	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	C0164	ECUE1H220JQC
C0125	ECUE1H101JQC	CAP CER 100pF 5% 50V NP0 SMD 1005	C0169	ECUE1H220JQC
C0126	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0 SMD 1005	C0170	ECUE1H030CCQ
C0127	ECUE1H1R5CCQ	CAP CER 1.5pF +/-0.25pF 50V NP0 SMD 1005	C0172	ECUE1H102KBQ
C0128	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	C0173	ECUE1H101JQC
C0129	ECUE1H101JQC	CAP CER 100pF 5% 50V NP0 SMD 1005	C0175	ECUE1H102KBQ
C0130	ECUE1H330JQC	CAP CER 33pF 5% 50V NP0 SMD 1005	C0176	ECUE1H101JQC
C0131	ECUE1H221JQC	CAP CER 220pF 5% 50V NP0 SMD 1005	C0177	ECUE1H120JQC
C0132	ECUV1H123KBV	CAP CER 12nF 10% 50V X7R SMD 1608	C0180	ECUE1H101JQC
C0133	ECHU1C103JB5	CAP FILM 10nF 5% 16V SMD 2012	C0181	ECUE1C103KBQ
C0134	ECHU1C473JB5	CAP FILM 47nF 5% 16V SMD 3216	C0182	ECUE1H101JQC
C0137	ECUE1H101JQC	CAP CER 100pF 5% 50V NP0 SMD 1005	C0183	ECUE1H010CCQ
C0138	ECUV1E223KBV	CAP CER 22nF 10% 25V X7R SMD 1608	C0184	ECUE1H101JQC
C0139	ECUV1E223KBV	CAP CER 22nF 10% 25V X7R SMD 1608	C0185	ECUE1H820JQC
C0140	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	C0189	ECUE1H220JQC
			C0203	ECUE1H220JQC
			C0204	YGM1F105Z1AT
			C0206	ECUE1H820JQC

REPLACEMENT PARTS LIST

Model: EB-GD70			Name: RF	
Ref.	Part Number	Description	Grid	
C0207	ECUE1H820J1CQ	CAP CER 82pF 5% 50V NP0 SMD 1005	E3	
C0209	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	A4	
C0210	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	F2	
C0211	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	F1	
C0212	F0Z1E1R50001	CAP THIN FILM HQ 1.5pF +/-0.1pF 25V NP0 SMD 1005	A4	
C0215	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	E2	
C0216	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	E1	
C0219	ECUE1H101J1CQ	CAP CER 100pF 5% 50V NP0 SMD 1005	F2	
C0220	ECUE1H101J1CQ	CAP CER 100pF 5% 50V NP0 SMD 1005	E2	
C0221	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	F2	
C0222	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	A4	
C0223	ECUE1H470J1CQ	CAP CER 47pF 5% 50V NP0 SMD 1005	E2	
C0224	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	B4	
C0225	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	E2	
C0226	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	A3	
C0227	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C4	
C0229	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	E3	
C0230	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C4	
C0231	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C4	
C0232	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C4	
C0233	ECUE1H120J1CQ	CAP CER 12pF 5% 50V NP0 SMD 1005	E4	
C0234	ECUE1H120J1CQ	CAP CER 12pF 5% 50V NP0 SMD 1005	E4	
C0235	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0 SMD 1005	E2	
C0300	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0 SMD 1005	C4	
C0301	YCSDU015M106	CAP TANT 10uF 20% 10V SMD CASE A	C4	
C0302	ECUV1H220JCV	CAP 22pF +/-5% 50V NPO SM0603	C4	
C0303	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	B4	
C0304	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	C4	
C0309	ECUE1H151J1CQ	CAP CER 150pF 5% 50V NP0 SMD 1005	F4	
C0310	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0 SMD 1005	E1	
C0312	ECUE1H151J1CQ	CAP CER 150pF 5% 50V NP0 SMD 1005	F1	
C0313	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	F1	
C0314	ECUE1H820J1CQ	CAP CER 82pF 5% 50V NP0 SMD 1005	F2	
C0315	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	F4	
C0316	ECUE1H080DCQ	CAP CER 8pF +/-0.5pF 50V NP0 SMD 1005	F4	
C0317	ECUE1H101J1CQ	CAP CER 100pF 5% 50V NP0 SMD 1005	F4	
C0318	ECUE1H151J1CQ	CAP CER 150pF 5% 50V NP0 SMD 1005	F4	
C0319	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	D4	

Model: EB-GD70		Name: RF	
Ref.	Part Number	Description	Grid
C0320	ECUE1H560J1CQ	CAP CER 56pF 5% 50V NP0 SMD 1005	D4
C0321	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	C4
C0322	ECUE1H080DCQ	CAP CER 8pF +/-0.5pF 50V NP0 SMD 1005	D4
C0323	ECUE1H0R5CCQ	CAP CER 0.5pF +/-0.25pF 50V NP0 SMD 1005	D4
C0324	ECUE1H101J1CQ	CAP CER 100pF 5% 50V NP0 SMD 1005	F4
C0325	ECUE1H101J1CQ	CAP CER 100pF 5% 50V NP0 SMD 1005	F4
C0327	ECUE1H2R7CCQ	CAP CER 2.7pF +/-0.25pF 50V NP0 SMD 1005	C4
C0329	ECUE1H470J1CQ	CAP CER 47pF 5% 50V NP0 SMD 1005	D4
C0330	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	C4
C0331	ECUE1H470J1CQ	CAP CER 47pF 5% 50V NP0 SMD 1005	F4
C0333	ECUE1H1R5CCQ	CAP CER 1.5pF +/-0.25pF 50V NP0 SMD 1005	C4
C0334	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	F4
C0335	ECUE1H080DCQ	CAP CER 8pF +/-0.5pF 50V NP0 SMD 1005	E4
C0336	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0 SMD 1005	E4
C0337	ECUE1H331J1CQ	CAP CER 330pF 5% 50V NP0 SMD 1005	E4
C0338	ECUE1H220J1CQ	CAP CER 22pF 5% 50V NP0 SMD 1005	E4
C0339	ECUE1H101J1CQ	CAP CER 100pF 5% 50V NP0 SMD 1005	B4
C0340	YCSDU015M106	CAP TANT 10uF 20% 10V SMD CASE A	B4
C0342	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0 SMD 1005	F4
C0343	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	E4
C0344	ECUE1H120J1CQ	CAP CER 12pF 5% 50V NP0 SMD 1005	E4
C0345	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	E4
C0346	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	F4
C0348	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	E4
C0349	ECU1C103JB5	CAP FILM 10nF 5% 16V SMD 2012	E4
C0351	ECUE1H101J1CQ	CAP CER 100pF 5% 50V NP0 SMD 1005	B4
C0354	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	F4
C0355	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	E4
C0357	ECUE1H221J1CQ	CAP CER 220pF 5% 50V NP0 SMD 1005	E4
C0360	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0 SMD 1005	E2
C0361	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	E1
C0363	ECUE1H820J1CQ	CAP CER 82pF 5% 50V NP0 SMD 1005	F2
C0365	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	C4
C0366	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0 SMD 1005	E1
C0367	ECUE1H151J1CQ	CAP CER 150pF 5% 50V NP0 SMD 1005	E2
C0368	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	D4
C0369	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	E4
C0370	ECUE1H330J1CQ	CAP CER 33pF 5% 50V NP0 SMD 1005	E4
C0371	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	E4

Model: EB-GD70			Name: RF		
Ref.	Part Number	Description	Ref.	Part Number	Description
C0372	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C0427	YCSDU009M475	CAP TANT 4.7uF 20% 16V SMD CASE A
C0373	YCSDU009M475	CAP TANT 4.7uF 20% 16V SMD CASE A	C0428	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0374	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C0429	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0375	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C0430	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005
C0376	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	C0431	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0377	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0 SMD 1005	C0432	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005
C0378	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	C0433	YCSDU011M106	CAP TANT 10uF 20% 6V3 SMD CASE A
C0379	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005	C0434	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005
C0380	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	C0435	YCSDU009M475	CAP TANT 4.7uF 20% 16V SMD CASE A
C0381	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C0436	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005
C0382	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 1005	C0437	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0383	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 1005	C0438	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0384	ECUE1H050DCQ	CAP CER 5pF +/-0.5pF 50V NP0 SMD 1005	C0439	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005
C0385	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0 SMD 1005	C0440	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0 SMD 1005
C0400	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	C0442	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0 SMD 1005
C0401	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1005	C0443	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0402	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1005	C0444	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005
C0403	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0445	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0 SMD 1005
C0404	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1005	C0446	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0 SMD 1005
C0405	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0447	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005
C0406	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	C0448	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0408	YCSDU011M106	CAP TANT 10uF 20% 6V3 SMD CASE A	C0449	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005
C0409	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005	C0450	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0410	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005	C0455	ECUE1H272KBQ	CAP CER 2.7nF 10% 50V X7R SMD 1005
C0411	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0457	ECU1C273JB5	CAP FILM 27nF 5% 16V SMD 3216
C0412	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0 SMD 1005	C0458	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0413	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0459	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005
C0414	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0460	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0415	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0461	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0416	YCSDU011M106	CAP TANT 10uF 20% 6V3 SMD CASE A	C0462	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0417	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1005	C0463	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0418	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	C0465	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0419	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005	C0466	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0420	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0467	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0421	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1005	C0469	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0422	ECUE1H560JCQ	CAP CER 56pF 5% 50V NP0 SMD 1005	C0470	YCSDU011M106	CAP TANT 10uF 20% 6V3 SMD CASE A
C0423	YCSDU009M475	CAP TANT 4.7uF 20% 16V SMD CASE A	C0472	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005
C0424	YCSDU011M156	CAP TANT 15uF 20% 6V3 SMD CASE A	C0473	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0 SMD 1005
C0426	ECUE1H221JCQ	CAP CER 220pF 5% 50V NP0 SMD 1005	C0475	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005

REPLACEMENT PARTS LIST

Model: EB-GD70			Name: RF		Model: EB-GD70		Name: RF	
Ref.	Part Number	Description	Ref.	Part Number	Description	Grid		
C0476	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 1005	L0126	HK100527NJT	CHIP INDUCTOR 27nH +/-5% SM1005	B3		
C0478	ECUE1H120JCQ	CAP CER 12pF 5% 50V NP0 SMD 1005	L0128	HK10058N2JT	CHIP INDUCTOR 8n2H 5% SM1005	A4		
C0479	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0 SMD 1005	L0129	HK10052N7ST	INDUCTOR 2n7H +/-0n3H SMD 1005	A4		
C0480	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0 SMD 1005	L0130	HK100518NJT	CHIP INDUCTOR 18nH 5% SM1005	A3		
C0482	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005	L0131	HK100518NJT	CHIP INDUCTOR 18nH 5% SM1005	B3		
C0483	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 1005	L0200	G1C10NJ00012	INDUCTOR 10nH 5% SMD 1005	A4		
C0484	YGM1F105Z1AT	CAP CER 1uF -20+80% 10V Y5V SMD 1608	L0301	HK100547NJT	CHIP INDUCTOR 47nH 5% SM1005	F4		
C407	ECUE1E271KBQ	CAP CER 270pF 10% 25V X7R SMD 1005	L0302	HK10058N2JT	CHIP INDUCTOR 8n2H 5% SM1005	C4		
C453	ECUE1H681KBQ	CAP CER 680pF 10% 50V X7R SMD 1005	L0303	HK10058N2JT	CHIP INDUCTOR 8n2H 5% SM1005	C4		
CP0300	B9Z000000019	COUPLER 1.747GHz SMD 2012 6PIN	L0304	HK10055N6ST	INDUCTOR 5n6H +/-0n3H SMD 1005	D4		
CP0301	B9Z000000018	COUPLER 897.5 MHz SMD 2012 6PIN	L0305	HK100556NJT	CHIP INDUCTOR 56nH 5% SM1005	E4		
D0100	MA376TX	VARI CAP DOIDE S-MINI 2 PINS	L0306	HK1005R10JT	CHIP INDUCTOR 100NH 5% SM1005	F4		
D0201	MAZS0470GL	ZENER DIODE 4V7 SS-MINI	L0308	HK10058N2JT	CHIP INDUCTOR 8n2H 5% SM1005	C4		
D0400	MA77TX	DIODE S-MINI 2 PINS	L0309	HK100533NJT	CHIP INDUCTOR 33nH 5% SM1005	F4		
FL0100	EFCH282MDQP2	SAW FILTER IF 282MHz SMD 7x5	L0311	HK100510NJT	CHIP INDUCTOR 10nH 5% SM1005	E2		
FL0101	J0C9476B0002	SAW FILTER RX BAL 947MHz SMD 3x3 6PIN	L0312	HK100533NJT	CHIP INDUCTOR 33nH 5% SM1005	E4		
FL0102	J0C9476B0001	SAW FILTER 947.5MHz SMD 3x3 6PIN	L0313	HK100527NJT	CHIP INDUCTOR 27nH +/-5% SM1005	F4		
FL0103	J0C1847B0001	FILTER SAW UNBAL 1.8GHz SMD 3x3x1.4 6PIN	L0314	HK10053N9ST	INDUCTOR 3n9H +/-0n3H SMD 1005	C4		
FL0104	J0C1847B0002	FILTER SAW BAL 1.8GHz SMD 3x3x1.4 6PIN	L0315	HK100539NJT	CHIP INDUCTOR 39nH 5% SM1005	F4		
FL0300	FLQI0008	SAW FILTER 1.7475GHz SMD 3x3 6PIN	L0316	HK100518NJT	CHIP INDUCTOR 18nH 5% SM1005	C4		
FL0301	J0C9026B0001	SAW FILTER 902.5MHz SMD 3x3 6PIN	L0317	HK100547NJT	CHIP INDUCTOR 47nH 5% SM1005	E4		
L0100	HK100582NJT	CHIP INDUCTOR 82nH 5% SM1005	L0401	G1C10NJ00012	INDUCTOR 10nH 5% SMD 1005	D3		
L0101	HK100582NJT	CHIP INDUCTOR 82nH 5% SM1005	L0402	G1C10NJ00012	INDUCTOR 10nH 5% SMD 1005	D3		
L0102	HK100512NJT	CHIP INDUCTOR 12nH 5% SM1005	L0403	G1C10NJ00012	INDUCTOR 10nH 5% SMD 1005	E4		
L0103	HK100556NJT	CHIP INDUCTOR 56nH 5% SM1005	L0405	G1C10NJ00012	INDUCTOR 10nH 5% SMD 1005	D4		
L0105	HK10052N7ST	INDUCTOR 2n7H +/-0n3H SMD 1005	L0406	ELJRE15NJF2	INDUCTOR 15nH +/-5% SM1608	D3		
L0106	HK100582NJT	CHIP INDUCTOR 82nH 5% SM1005	L0410	HK100510NJT	CHIP INDUCTOR 10nH 5% SM1005	F3		
L0107	HK100522NJT	CHIP INDUCTOR 22nH 5% SM1005	L0411	HK100512NJT	CHIP INDUCTOR 12nH 5% SM1005	D4		
L0108	HK100527NJT	CHIP INDUCTOR 27nH +/-5% SM1005	L0412	HK100533NJT	CHIP INDUCTOR 33nH 5% SM1005	E4		
L0109	HK100522NJT	CHIP INDUCTOR 22nH 5% SM1005	M0126	5E70164A	BUZZER CUSHION G600	F2		
L0110	HK100512NJT	CHIP INDUCTOR 12nH 5% SM1005	PL0203	534750508	CONNECTOR BRD-BRD PLUG 50WAY SMD	E3		
L0111	HK100510NJT	CHIP INDUCTOR 10nH 5% SM1005	R0101	ERJ2GEJ391X	CHIP RESISTOR 390 OHM +/-5% 1/16W SM1005	B3		
L0112	ELJRE4N7JF2	INDUCTOR 4n7H +/-5% SM1608	R0102	ERJ2GEJ390X	CHIP RESISTOR 39 OHM +/-5% 1/16W SM 1005	E4		
L0113	HK10051N8ST	INDUCTOR 1n8H +/-0n3H SMD 1005	R0103	ERJ2GEJ102X	CHIP RESISTOR 1K OHM +/-5% 1/16 W SM 1005	C3		
L0114	HK10052N2ST	INDUCTOR 2n2H +/-0n3H SMD 1005	R0104	ERJ2GEJ150X	CHIP RESISTOR 15 OHM +/-5% 1/16W SM 1005	E4		
L0116	HK10051N5ST	INDUCTOR 1n5H +/-0n3H SMD 1005	R0105	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005	C3		
L0117	HK10055N6ST	INDUCTOR 5n6H +/-0n3H SMD 1005	R0106	ERJ2GEJ751X	CHIP RESISTOR 750 OHM +/-5% 1/16W SM 1005	E3		
L0118	HK10058N2JT	CHIP INDUCTOR 8n2H 5% SM1005	R0107	ERJ2GEJ332X	CHIP RESISTOR 3K3 OHM +/-5% 1/16W SM1005	F4		
L0119	HK10053N3ST	INDUCTOR 3n3H +/-0n3H SMD 1005	R0108	ERJ2GEJ472X	CHIP RESISTOR 4K7 OHM +/-5% 1/16W SM 1005	F4		

Model: EB-GD70			Name: RF		
Ref.	Part Number	Description	Ref.	Part Number	Description
R0109	ERJ2GEJ561X	CHIP RESISTOR 560 OHM +/-5% 1/16W SM 1005	R0334	ERJ2GEJ151X	CHIP RESISTOR 150 OHM +/-5% 1/16W SM 1005
R0110	ERJ2GEJ682X	CHIP RESISTOR 68 OHM +/-5% 1/16W SM 1005	R0335	ERJ2GEJ561X	CHIP RESISTOR 560 OHM +/-5% 1/16W SM 1005
R0111	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005	R0336	ERJ2GEJ4R7X	CHIP RESISTOR 4R7 OHM +/-5% 1/16W SM 1005
R0112	ERJ2GEJ182X	CHIP RESISTOR 1K8 OHM +/-5% 1/16W SM 1005	R0337	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005
R0113	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	R0339	ERJ2GEJ151X	CHIP RESISTOR 150 OHM +/-5% 1/16W SM 1005
R0114	ERJ2GEJ102X	CHIP RESISTOR 1K OHM +/-5% 1/16 W SM 1005	R0340	ERJ2GEJ221X	CHIP RESISTOR 220 OHM +/-5% 1/16W SM 1005
R0115	ERJ2GEJ181X	CHIP RESISTOR 180 OHM +/-5% 1/16W SM 1005	R0341	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005
R0116	ERJ2GEJ181X	CHIP RESISTOR 180 OHM +/-5% 1/16W SM 1005	R0343	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005
R0118	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005	R0344	ERJ2GEJ102X	CHIP RESISTOR 1K OHM +/-5% 1/16 W SM 1005
R0119	ERJ2GEJ391X	CHIP RESISTOR 390 OHM +/-5% 1/16W SM1005	R0345	ERJ2GEJ220X	CHIP RESISTOR 22 OHM +/-5% 1/16W SM 1005
R0120	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005	R0346	ERJ2GEJ104X	CHIP RESISTOR 100K OHM +/-5% 1/16W SM 1005
R0121	ERJ2GEJ270X	CHIP RESISTOR 27 OHM +/-5% 1/16W SM 1005	R0347	ERJ2GEJ221X	CHIP RESISTOR 220 OHM +/-5% 1/16W SM 1005
R0123	ERJ2GEJ680X	CHIP RESISTOR 68 OHM +/-5% 1/16W SM 1005	R0348	ERJ2GEJ221X	CHIP RESISTOR 220 OHM +/-5% 1/16W SM 1005
R0124	ERJ2GEJ240X	CHIP RESISTOR 24 OHM +/-5% 1/16W SM 1005	R0352	ERJ2GEJ330X	CHIP RESISTOR 33 OHM +/-5% 1/16W SM 1005
R0128	ERJ2GEJ102X	CHIP RESISTOR 1K OHM +/-5% 1/16 W SM 1005	R0360	ERJ2GEJ6R8X	CHIP RESISTOR 6R8 OHM +/-5% 1/16W SM 1005
R0207	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	R0362	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005
R0208	ERJ2GEJ182X	CHIP RESISTOR 1K8 OHM +/-5% 1/16W SM 1005	R0364	ERJ2GEJ151X	CHIP RESISTOR 150 OHM +/-5% 1/16W SM 1005
R0210	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	R0400	ERJ2GEJ221X	CHIP RESISTOR 220 OHM +/-5% 1/16W SM 1005
R0211	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	R0401	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005
R0300	ERJ2GEJ100X	CHIP RESISTOR 10 OHM +/-5% 1/16W SM 1005	R0402	ERJ2GEJ101X	CHIP RESISTOR 100 OHM +/-5% 1/16W SM 1005
R0301	ERJ2GEJ471X	CHIP RESISTOR 470 OHM +/-5% 1/16W SM 1005	R0403	ERJ2GEJ472X	CHIP RESISTOR 4K7 OHM +/-5% 1/16W SM 1005
R0302	ERJ2GEJ471X	CHIP RESISTOR 470 OHM +/-5% 1/16W SM 1005	R0404	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005
R0303	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005	R0405	ERJ2GEJ681X	CHIP RESISTOR 680 OHM +/-5% 1/16W SM 1005
R0306	ERJ2GEF822X	CHIP RESISTOR 8K2 OHM +/-1% 1/16W SM 1005	R0406	ERJ2GEJ682X	CHIP RESISTOR 6K8 OHM +/-5% 1/16W SM 1005
R0310	ERJ2GEJ4R7X	CHIP RESISTOR 4R7 OHM +/-5% 1/16W SM 1005	R0407	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005
R0312	ERJ2GEF822X	CHIP RESISTOR 8K2 OHM +/-1% 1/16W SM 1005	R0415	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005
R0313	ERJ2GEJ330X	CHIP RESISTOR 33 OHM +/-5% 1/16W SM 1005	R0416	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005
R0314	ERJ2GEJ223X	CHIP RESISTOR 22K OHM +/-5% 1/16W SM 1005	R0417	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005
R0317	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	R0418	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005
R0318	ERJ2GEJ473X	CHIP RESISTOR 47K OHM +/-5% 1/16W SM 1005	R0420	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005
R0319	ERJ2GEJ202X	CHIP RESISTOR 2K OHM +/-5% 1/16W SM 1005	R0421	ERJ2GEJ271X	CHIP RESISTOR 270 OHM +/-5% 1/16W SM 1005
R0321	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	R0422	ERJ2GEJ472X	CHIP RESISTOR 4K7 OHM +/-5% 1/16W SM 1005
R0324	ERJ2GEJ103X	CHIP RESISTOR 10K OHM +/-5% 1/16W SM 1005	R0423	ERJ2GEJ152X	CHIP RESISTOR 1K5 OHM +/-5% 1/16W SM1005
R0326	ERJ2GEJ150X	CHIP RESISTOR 15 OHM +/-5% 1/16W SM 1005	R0424	ERJ2GEJ102X	CHIP RESISTOR 1K OHM +/-5% 1/16 W SM 1005
R0327	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005	R0426	ERJ2GEJ272X	CHIP RESISTOR 2K70HM +/-5% 1/16W SM 1005
R0329	ERJ2GEJ151X	CHIP RESISTOR 150 OHM +/-5% 1/16W SM 1005	R0428	ERJ2GEJ152X	CHIP RESISTOR 1K5 OHM +/-5% 1/16W SM1005
R0330	ERJ2GEJ331X	CHIP RESISTOR 330 OHM +/-5% 1/16W SM 1005	R0429	ERJ2GEJ152X	CHIP RESISTOR 1K5 OHM +/-5% 1/16W SM1005
R0331	ERJ2GEJ331X	CHIP RESISTOR 330 OHM +/-5% 1/16W SM 1005	R0444	ERJ2GEJ510X	CHIP RESISTOR 51 OHM +/-5% 1/16W SM 1005
R0332	ERJ2GEJ912X	CHIP RESISTOR 9K1 OHM +/-5% 1/16W SM 1005	R0445	ERJ2GEJ390X	CHIP RESISTOR 39 OHM +/-5% 1/16W SM 1005

REPLACEMENT PARTS LIST

Model: EB-GD70			Name: RF		Grid
Ref.	Part Number	Description			
R122	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			F4
R203	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
R204	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
R304	ERJ2GEF103X	CHIP RESISTOR 10K OHM +/-1% 1/16W SM 1005			F4
R305	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			C4
R307	ERJ2GEF103X	CHIP RESISTOR 10K OHM +/-1% 1/16W SM 1005			F4
R309	ERJ2GEF103X	CHIP RESISTOR 10K OHM +/-1% 1/16W SM 1005			F4
R316	ERJ2GEF103X	CHIP RESISTOR 10K OHM +/-1% 1/16W SM 1005			F4
R342	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			B4
R356	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
R358	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
R359	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
R414	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
R427	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E3
R440	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			D3
R441	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			D3
R442	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
R443	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005			E4
TR0100	XP4312TX	TRANSISTOR XP4312 DUAL NPN PNP SMD S MINI MOLD 6			A3
TR0101	XP4312TX	TRANSISTOR XP4312 DUAL NPN PNP SMD S MINI MOLD 6			A3
TR0102	2SC4226T1B01	TRANSISTOR NPN SOT323			F4
TR0200	XP4312TX	TRANSISTOR XP4312 DUAL NPN PNP SMD S MINI MOLD 6			D4
TR0202	XP4312TX	TRANSISTOR XP4312 DUAL NPN PNP SMD S MINI MOLD 6			D4
TR0203	XP4312TX	TRANSISTOR XP4312 DUAL NPN PNP SMD S MINI MOLD 6			D4
TR0300	B1ZBZ0000015	TRANSISTOR RN4905 DUAL NPN PNP SMD US6			D4
TR0302	YBFP420	TRANSISTOR RF BFP420 NPN SMD SOT343			C4
TR0400	2SC4226T1B01	TRANSISTOR NPN SOT323			F3
TR0401	B1GHCFFN0005	TRANSISTOR DIG DUAL PNP SMD UMT6			E3
TR0402	YBFP420	TRANSISTOR RF BFP420 NPN SMD SOT343			D3
U0100	C1CB00000681	IC DUAL BAND RX SMD TQFP48			C3
U0101	C1CB00000680	IC MIXER 1800MHz SMD TSSOP16			A3
U0102	YMRFC1808DM	IC LNA 1.8GHz SMD MICRO-8			A4
U0103	YUALW0008	IC TA4004F OP AMP SMD SSOP5-P 0.95			F4
U0300	C5CB00000019	PA MODULE 1.8GHz 3V5 SMD 13.75x8x1.8			C4
U0302	ENFVZ3D34C	TX VCO SM DUAL INLINE 10 PIN			E4

Model: EB-GD70			Name: RF		Grid
Ref.	Part Number	Description			
U0303	C1CB00000679	IC TX MODULATOR SMD TSSOP28			E4
U0304	C5CB00000018	PA MODULE 900MHz 3V5 SMD 13.75x8x1.8			B4
U0400	CODBAFC00004	I.C. R1111N281B			D3
U0401	YURAL0001	IC REG 2.75V 100mA LDO SMD RT6			C3
U0402	CODBAFC00004	I.C. R1111N281B			F3
U0403	YURAL0001	IC REG 2.75V 100mA LDO SMD RT6			D4
U0404	C1CB00000671	IC PLL DUAL SYNTH SSOP16			E3
U0405	ENFVZ3D30C	RX LO VCO SM DUAL INLINE 10 PIN			D3
X0400	H1A1305B0001	TCVCO 13MHz SMD 11.4x9.6x1.8 4PIN			F3
C153	ECUE1H471KBQ	CAP CER 470PF			B3
C154	ECUE1H471KBQ	CAP CER 470PF			C3
C347	ECUE1H471KBQ	CAP CER 470PF			E4
C174	F3F0J3350002	CAP. TANT. 3.3uF			F4

9.2.3 Mechanical

Model: EB-GD70		Name: Mechanical	Notes
Ref.	Part Number	Description	Notes
—	9R7000B	GD70 BLUE REFURB KIT	See note
—	9R7000N	GD70 GREEN REFURB KIT	See note
—	9R7000Y	GD70 GREY REFURB KIT	See note
—	GD70CAS01	GD70 CASE ASSEMBLY	
—	GD70CVR01B	GD70 BLUE COVER ASSEMBLY	
—	GD70CVR01N	GD70 GREEN COVER ASSEMBLY	
—	GD70CVR01Y	GD70 GREY COVER ASSEMBLY	
0001	AA76001A	LCD MODULE	
0003	HB70010A	BUZZER	
0004	JS8A00005	SIM HOLDER	
0010	JA76007A	CONNECTOR I/O (18-WAY)	
0012	AN76031A	ANTENNA FIXED 27.0mm	
0013	BD70025B	VIBRATOR MOTOR ASSEMBLY	
0006 –	6SA508A	LCD CONNECTOR	
0007			
0015 –	JJ76001A	BATTERY CONNECTOR A TYPE	
0016			
M0002	HH76002A	RECEIVER SPEAKER 8 OHMS	
M0005	9ZA610A	GD70 MIC ASSEMBLY	
M0103	2EA515A	LCD PANEL	
M0104	6HA522B	G520 REC CUSHION	
M0105	2QA520A	GD70 INDICATOR	
M0106	2BA508AAAA	GD70 KEYPAD	
M0107 –	6RA507A	RF CAP	
M0108			
M0109	G5MDS002C	PATENT LABEL	
M0110	6HA581A	G520 LCD CUSHION	
M0112	2QA510A	LCD BACKLIGHT	
M0113	2FA509B	GD70 CHASSIS	
M0114	4GA518A	GD70 ANTENNA NUT	
M0115	4GA521A	GD70 ANTENNA TERMINAL	
M0116 –	3Z70071A	SCREW M1.6 X 8	
M0120			
M0121 –	3Z70025B	SCREW M1.6 X 4	
M0122			
M0123	2CA505A	GD70 MEMO KEY	
M0124	5Y70110A	VIBRATOR MODULE	

Model: EB-GD70		Name: Mechanical	Notes
Ref.	Part Number	Description	Notes
M0125	5X70020A	VIBRATOR CUSHION	
M0126	5E70164A	BUZZER CUSHION	
M0127	2RA516A	GD70 REC HOLDER	
M0128	6SA510B	LCD TAB CUSHION	
M0129	6HA567A	G520 RF CONNECTOR CUSHION	

NOTE:

Each refurbishment kit includes: Coloured Cover Assembly, Case Assembly, Key Sheet, Memo Key, LCD Panel, Screw (x5), Cover Screw (x2), RF Cap, Antenna and Patent Label.

9.3 Repair Jigs and Tools

Model: EB-GD70		Name: Jigs and Tools	Notes
Ref.	Part Number	Description	Notes
	JT000001	G520/GD70 RF TEST JIG (PCB)	
	JT000003	GD70 RF TEST JIG (PHONE)	
	JT000004	GD70 INTERFACE CABLE	
	JT000005	GD70 DUMMY BATTERY	
	GD70EXTPCB01	GD70 EXTENSION PCB	

9.4 Printed Material

Model: EB-GD70		Name: Documentation	
Ref.	Part Number	Description	Notes
	GD70DPKAS	Austria	
	GD70DPKBE	Belgium	
	GD70DPKCZ	Czech Republic	
	GD70DPKDE	Denmark	
	GD70DPKFI	Finland	
	GD70DPKFR	France	
	GD70DPKGE	Germany	
	GD70DPKGR	Greece	
	GD70DPKIT	Italy	
	GD70DPKKU	Kuwait	
	GD70DPKLE	Lebanon	
	GD70DPKNL	Netherlands	
	GD70DPKPL	Poland	
	GD70DPKPO	Portugal	
	GD70DPKRU	Russia	
	GD70DPKSK	Slovak	
	GD70DPKES	Spain	
	GD70DPKSW	Sweden	
	GD70DPKCH	Switzerland	
	GD70DPKTU	Turkey	
	GD70DPKUK	United Kingdom	
	GD70DPKYU	Yugoslav Republic	

9.4.1 Identification of Individual Instructions

On the rear cover of each manual there is a part number. The suffix to this number is the issue level of the manual. For Example, the part number for the English GD70 instruction is 7LA797A where the final 'A' shows the manual is issue 'A'.

Beneath the part number there is a date code that shows the date of the last modification this is in the format YYMMDD. Where YY is the last two digits from the year, MM is the month and DD is the day of the month.

