

Service Manual

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Handheld Portable
EB-GD30
EB-GD50

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 kps ACLEP / 5.6 kps CELP / VSLEP	
Transmission speed	270.3 kbps	
Diversity	Frequency hopping	
Signal Reception	Double superheterodyne	
Intermediate Frequencies	282 MHz and 45 MHz	
Antenna Terminal Impedance	50 Ω	
Antenna VSWR	<2.1 : 1	
Dimensions	Height: 135 mm Width: 45 mm Depth: 20.5 mm (30 mm with EB-BLD30 Battery)	
Volume	123 cc (150 cc with EB-BLD30 Battery)	
Weight	GD30: 130 g (170 g with EB-BLD30 Battery) GD50: 115 g (170 g with EB-BLD30 Battery)	
Display	Graphical chip on glass liquid crystal, Alphanumeric, 16 x 3 characters, 5 icons and 6 x 1 characters	
Illumination	4 LEDs for the LCD (Green) 8 LEDs for the keypad (Green) 1 LED Incoming call (Green) 1 Charging LED (Red)	
Keypad	17 keys, Navigation key	
SIM	Plug-in type only	
External DC Supply Voltage	3.6 V	
Battery	EB-BSD30: 3.6 V nominal, 670mAh, Ni-MH EB-BSD50: 3.6 V nominal, 670mAh, Li-Ion EB-BLD30: 3.6V nominal, 1340mAh, Ni-MH	
Standby Battery Life DRX 9	EB-BSD30/EB-BSD50: 95 hrs maximum EB-BLD30: 190 hrs maximum	
Conversation Battery Life PL 7, DTX 50%	EB-BSD30/EB-BSD50: 180 minutes EB-BLD30: 360 minutes	

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.

Panasonic
GSM

Issue 1
Revision 0

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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 1M Ω 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 approximately 1M Ω 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.

Panasonic Model Numbers GD30 and GD50 are high performance, small, light, business GSM telephones. The following features are included as standard:

1. Triple Rate which includes Full Rate, Half Rate and Enhanced Full Rate (EFR) speech, codec.
2. Dual Band, GSM 900 and GSM 1800 operation.

In addition, GD50 has a Desktop Handsfree function comprising 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.

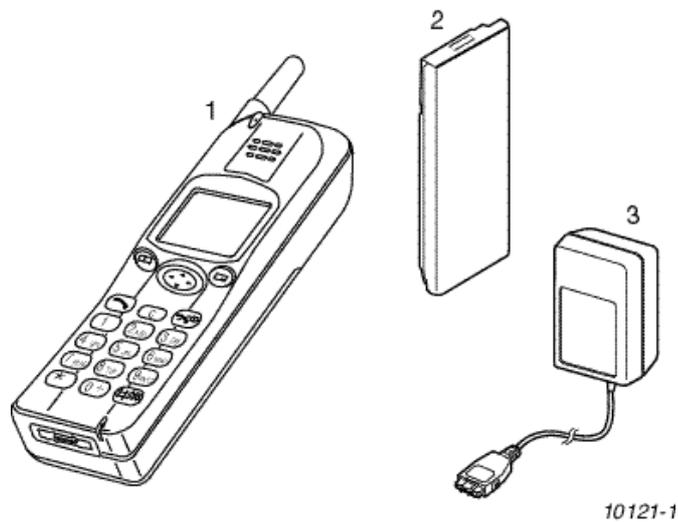


Figure 2.1: Handportable Main Unit Kit Contents

2.2.1 GD30 Contents

NUMBER	DESCRIPTION	PART NUMBER
1	Main unit GD30	EB-GD30
2	Battery, Standard or: Battery, Large	EB-BSD30 EB-BLD30
3	AC Adaptor	EB-CAD70
—	Documentation	See Section 9

2.2.2 GD50 Contents

NUMBER	DESCRIPTION	PART NUMBER
1	Main unit GD50	EB-GD50
2	Battery, Standard or: Battery, Large	EB-BSD50 EB-BLD30
3	AC Adaptor	EB-CAD70
—	Documentation	See Section 9

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3 OPERATING INSTRUCTIONS

3.1 General

This section provides a brief guide to the operation and facilities available on the GD30 and GD50 mobile telephones. Refer to the Operating Instructions supplied with the telephones for full operational information.

3.2 LCD Display

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

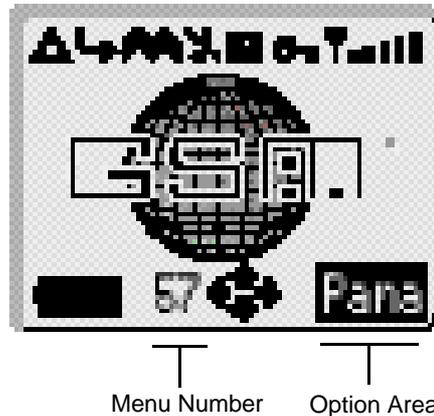


Figure 3.1: LCD display

T	Indicates received signal strength: T strong signal area; \ weak signal area.
S	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.
H	Displays the battery charge level: H Battery is at full charge; K Battery requires recharging; G 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: Y telephone is roaming on a non-home network; t 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; N indicates there are unread Short Text Messages (SMS). Lit when SMS area is full; O the telephone is locked; U shows that normal character have been entered in Alpha Entry; V shows that Greek character have been entered in Alpha Entry; W shows that extended character have been entered in Alpha Entry; X shows that numbers have been entered in Alpha Entry.
p	Indicates that the navigation key (g) can be pressed. Each arrow will light individually to indicate which direction is valid.
Option Area	Pressing the select key (B) 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 E .

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.

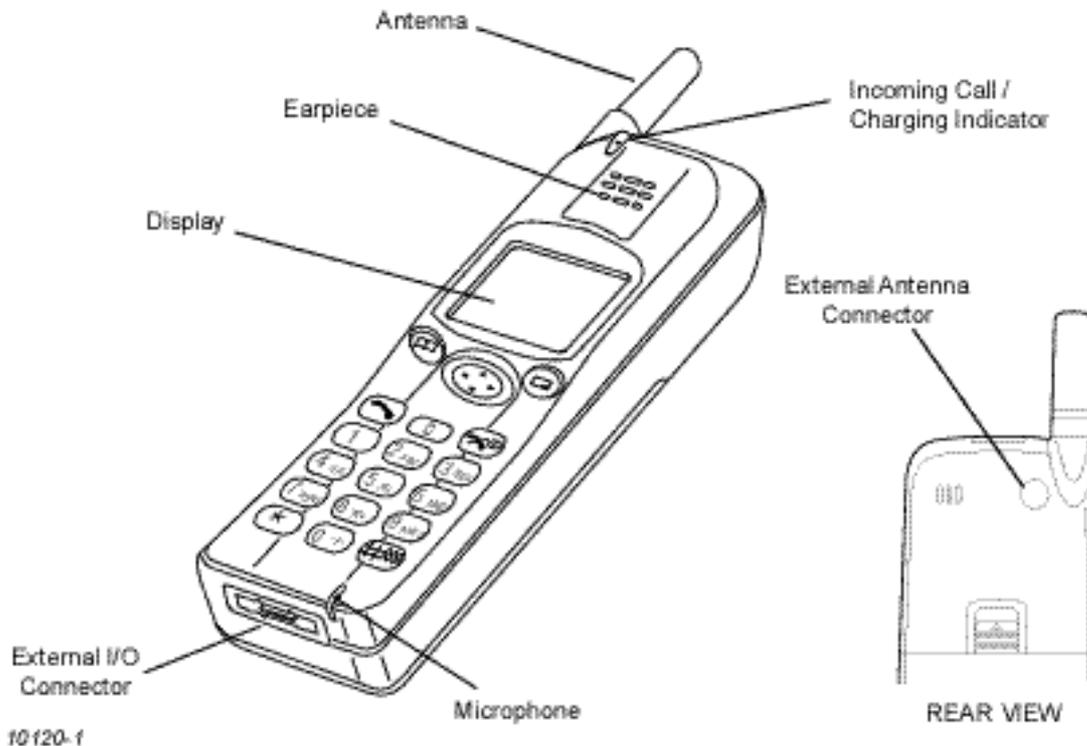


Figure 3.2: Location of controls for GD30/GD50

g	Navigation Key. Scrolls through options or features menu and increases or decreases volume.
B	Select Key. Selects option shown in the Option Area of the display.
A	Phonebook Key. Browses through the Phonebook or stores a number in the Phonebook. Changes the type of characters entered during Alpha Entry.
D	Send Key. Makes a call.
C	Clear Key. Clears the last digit entered, clears all digits when pressed and held or returns to the previous display.
E	End Key. Ends a call or switches the telephone on/off when pressed and held.
0 to 9	Digit keys. Enter wild numbers or pauses when pressed and held. Where appropriate the 0 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.

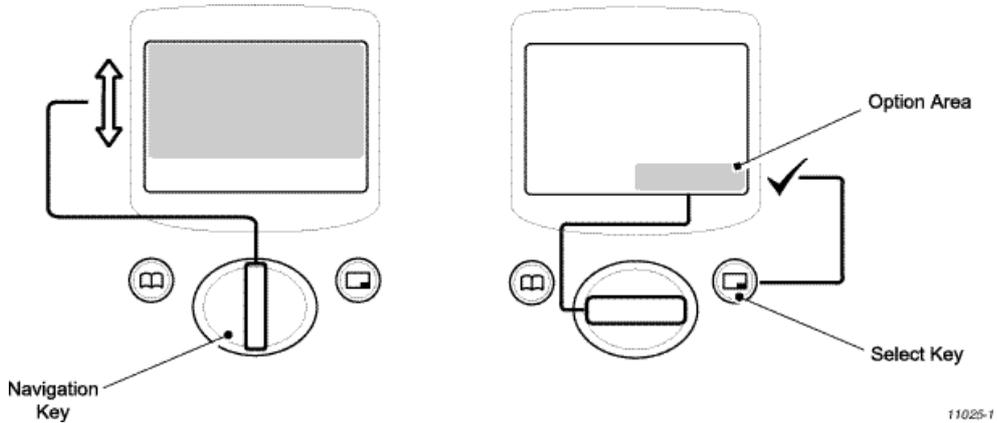


Figure 3.3: Concept of Operation

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

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

3.5 Alpha Entry

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

Key	Character/Operation			
	U	V	W	X
1	" @ - , . ; ! : j ? z () ' & % + - / < > = £ \$ ¥ ¢ ¤			1
2	A B C a b c	A B Γ	A A A Æ B C Ç a à b c	2
3	D E F d e f	Δ E Z	D E É F d e è é f	3
4	G H I g h i	H Θ I	G H I g h i i	4
5	J K L j k l	K Λ M	J K L j k l	5
6	M N O m n o	N Ξ O	M N Ñ O Ö ø m n ñ o ö ö	6
7	P Q R S p q r s	Π P Σ	P Q R S p q r s β	7
8	T U V t u v	T Υ Φ	T U Û V t u ü v	8
9	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 (V), extended characters (W), numerals (X) and normal characters (U) press A.

3.5.1 Editing Alpha Entry

Pressing e will move the cursor up or down one line. Pressing f will move the cursor 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 Numbers 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 user changes the source of the Hot Key Dial numbers, 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

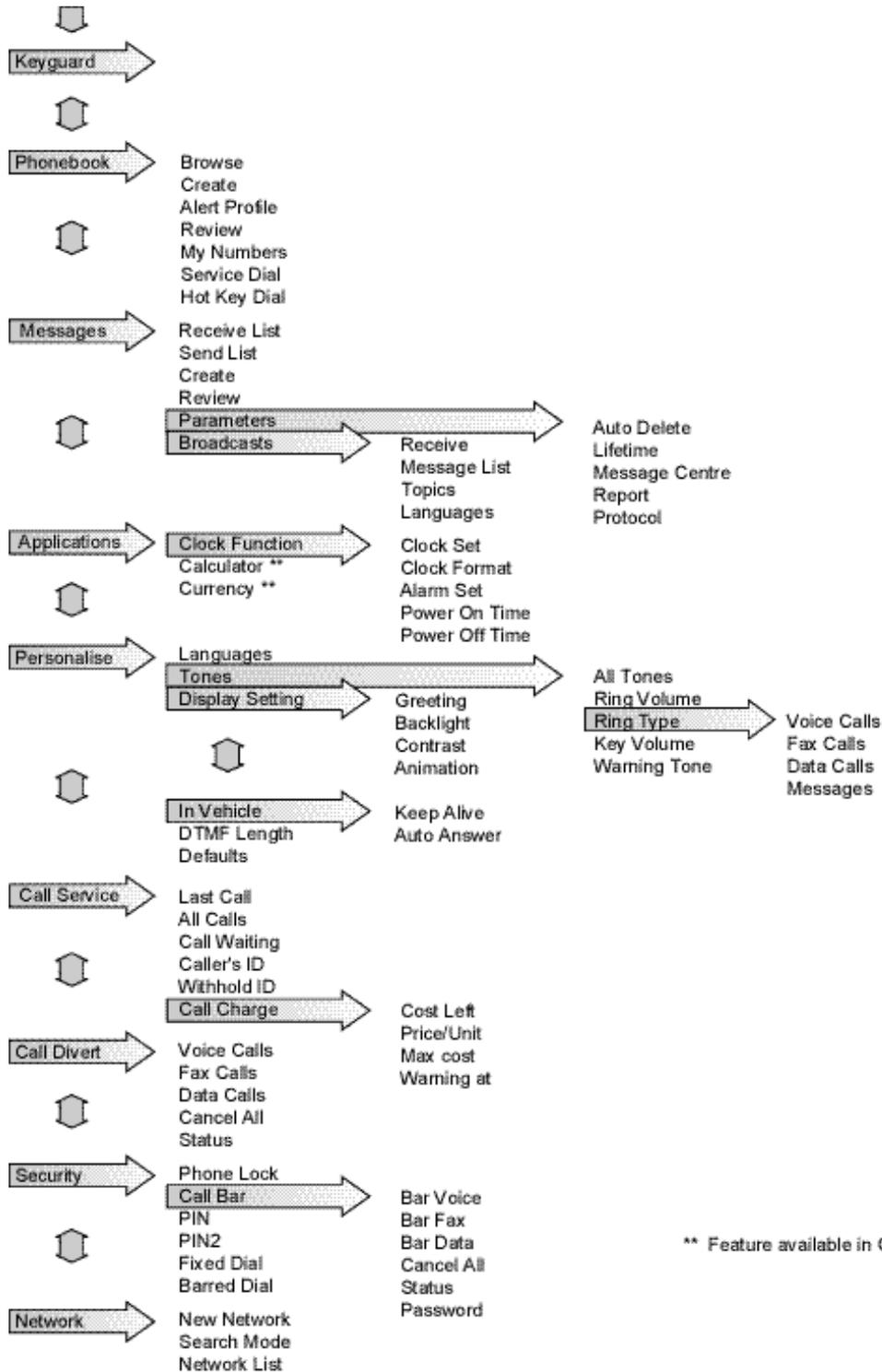


Figure 3.4: Features Menu Structure

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 the 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 in use 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 appears and then fully recharge the battery pack. To revive a Battery Pack, use the telephone until the Low Battery Warning appears 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 H 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 H .	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 the telephone after it has registered with a network.
Calls cannot be made from Fixed Dial Store		Check that 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 the telephone after it has registered with a network.
Emergency calls cannot be made	User's phone is not in a GSM coverage area.	Check that the antenna symbol S is displayed. Move to a coverage area and operate the 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 the SIM is not registered with that network. Contact the Service Provider.
SIM Blocked	The SIM is blocked because the wrong PUK has been entered ten times. Contact the 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 the 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 the Service Provider.
Warning Store Full Continue?	The message area is full. New 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, the cursorr 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 the telephone 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 GD30/GD50 contains a SIM that is from a different source it will display the message "SIM ERROR" when switched on. This personalisation of GD30/GD50 is sometimes referred to as SIM lock or SIM latch.

3.13.2 Testing

To test a personalised GD30/GD50, 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.

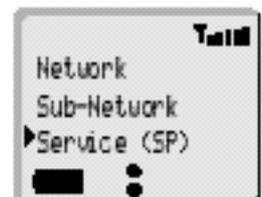
There are two special key sequences to enter the enable/disable menu:

Key sequence	Notes
7 4 6 B B	Can only disable personalisation.
5 2 8 2 4 B B	Can both enable and disable personalisation.

3.13.4 Disabling Procedure

1. F 7 4 6 B B or 5 2 8 2 4 B B.
2. F e 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. F B.
4. F the 16 digit Control Key.
5. F B.
6. F the 16 digit Control Key.
7. F B.

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



3.13.5 Enabling Procedure

1. 5 2 8 2 4 B B.
2. F e 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. F B.
4. F the 16 digit Control Key.
5. F B.
6. F the 16 digit Control Key.
7. F B.



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 Mobiltelefon	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

OPERATING INSTRUCTIONS

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	Celtel 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 the telephone uses.
Home country	The country in which the home network operates.
Home network	The GSM network on which 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 Provide. It is most likely to be preprogrammed to the Service Dial Numbers by the Service Provider.
Lock code	Used for security of the 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 the SIM or supplied by the 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 the service provider.
PIN	Personal Identification Number used for SIM security. Supplied by the service provider.
PIN2	Personal Identification Number used for the control of Fixed Dial Memory and call charge metering. Supplied by the service provider.
PUK/ PUK2	PIN/PIN2 Unblocking Key. Used to unblock the PIN/PIN2. Supplied by the service provider.
Registration	The act of locking on to a GSM network. This is usually performed automatically by the telephone.
Roaming	The ability to use the telephone on networks other than the 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 the service provider.
Supplementary service	Network-controlled GSM functions supported by the telephone. Supplementary services may only be available on a subscription bases.
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 GD30 and GD50 telephones.

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.

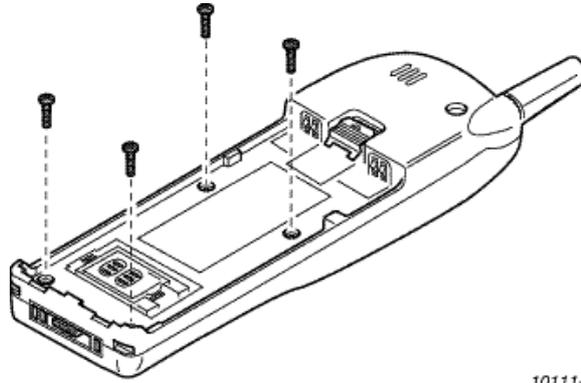
Wrist Strap – A quick release skin contact device with a flexible cord, which has a built in safety resistor of between 5k2 and 1M2 shall be used. The flexible cord must be attached to a dissipative earth point.

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

4.2 Disassembly

4.2.1 Case Removal

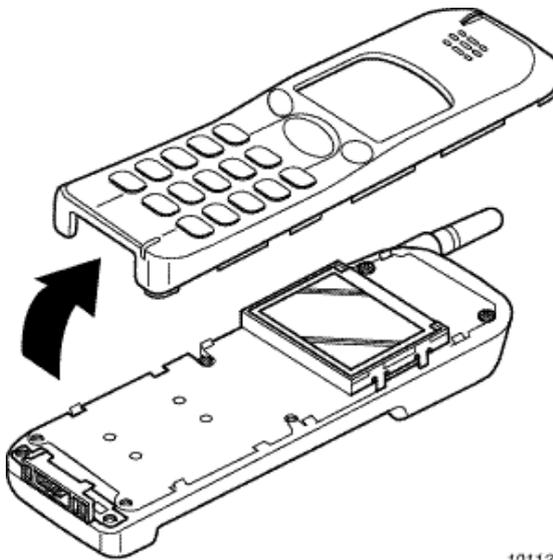
1. Remove the battery from the back of the telephone. Remove the four case screws located inside the battery compartment.



10111-1

Figure 4.1: Screw removal

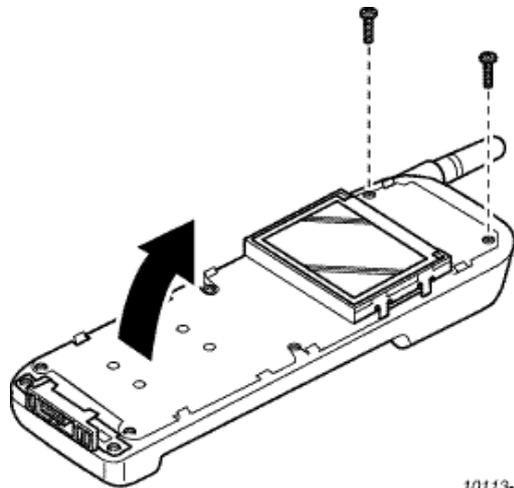
2. Remove the cover from the case by pulling from the connector end of the telephone. Care must be taken when separating the case from the cover as the retaining clips may be very stiff – if necessary, re-attach the battery to provide extra support for the case.



10112-1

Figure 4.2: Case Disassembly

3. Remove the two screws securing the PCB assembly to the case. Lift the PCB assembly away from the case.



10113-1

Figure 4.3: PCB Assembly Removal

4.2.2 Changing the Backup Battery

Remove the case as previously described. The backup battery is held in a retainer on the Main PCB. Observe polarity when replacing the battery.

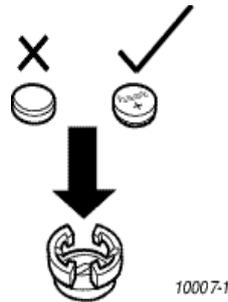


Figure 4.4: Battery Polarity

4.2.3 Access to Printed Circuit Boards

1. Remove the case as previously described. While applying slight pressure to the side retaining clips, lift the Main PCB away from the chassis.

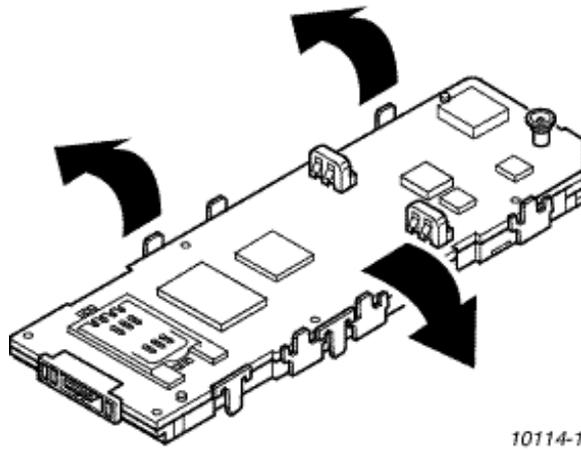


Figure 4.5: Main PCB removal

2. While applying slight pressure to the side retaining clips, lift the Keypad PCB away from the chassis.

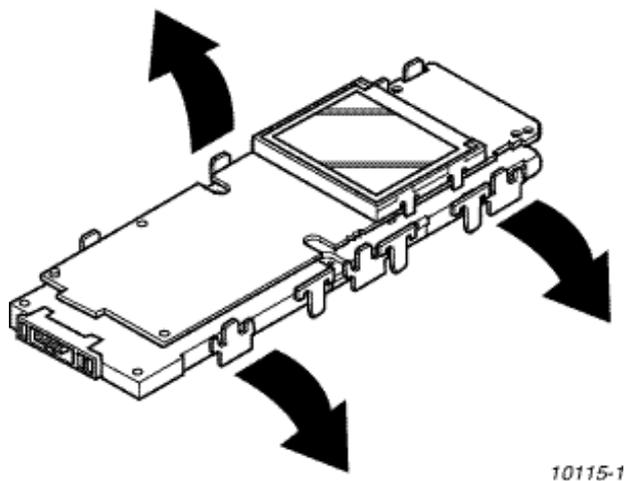


Figure 4.6: Keypad PCB removal

3. Gently bend the four Display Assembly lugs to allow removal from the Keypad PCB.

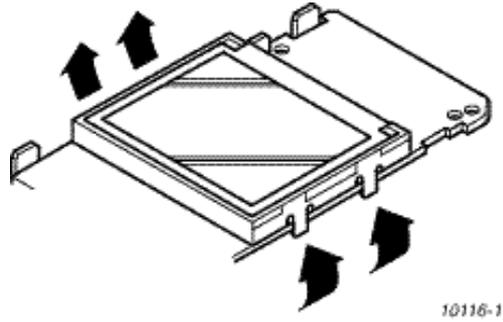


Figure 4.7: Display Assembly removal

4.2.4 Case-Mounted Components

1. Remove the keypad by peeling it away from the case front.

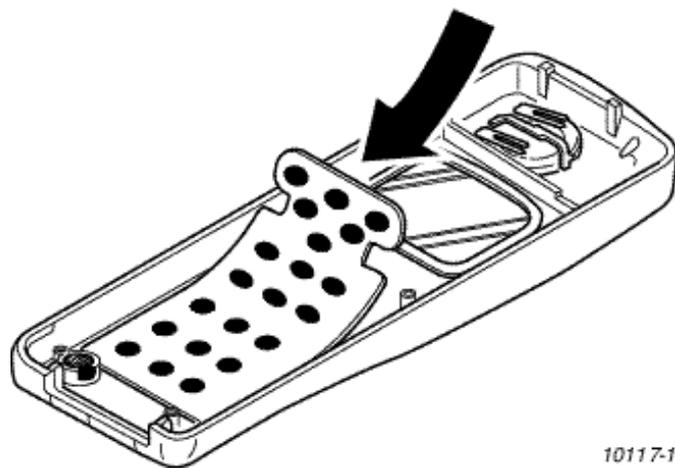


Figure 4.8: Removing the keypad

2. Remove the rubber boot which contains the microphone. When refitting, ensure contacts are oriented such that they make contact with the corresponding printed circuit pads on the Main PCB..

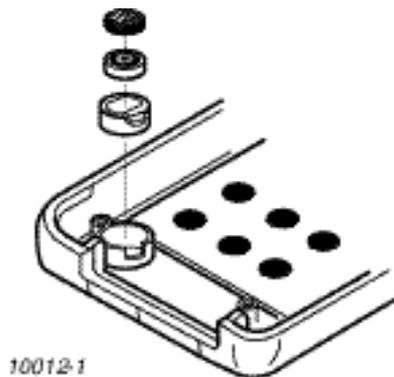


Figure 4.9: Microphone assembly removal

- Unclip the speaker holder and lift out the speaker. Note that the retainer clip should be released gently from one side to ensure that damage does not occur to the retainer barbs..

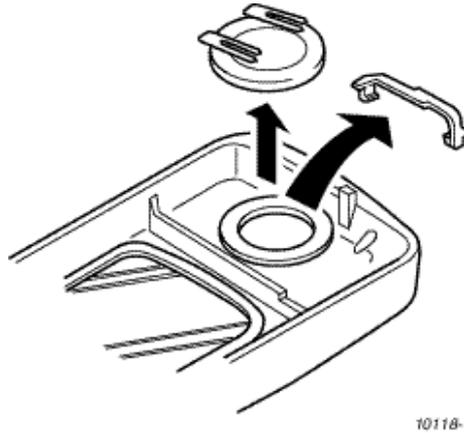


Figure 4.10: Speaker removal

- The Vibrate motor may be removed by gently applying pressure under the spindle/counterweight.

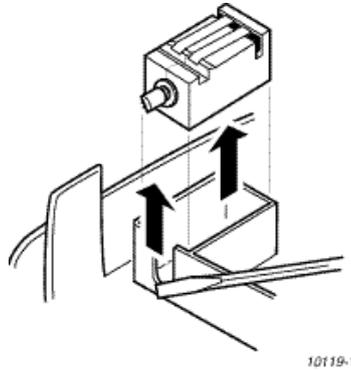


Figure 4.11: Vibrate motor removal

4.3 Reassembly

Care must be taken when reinstalling the back onto the telephone case. Ensure that the LCD module is oriented correctly, i.e. the ribbon connector is facing the top of the telephone. Also ensure that the securing screws are not over-tightened as this may affect the operation of the keypad.

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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 Excl. relevant TX band: P-GSM: 890 to 915 MHz; DCS: 1710 to 1785 MHz	0 to 10 MHz ≥ 10 MHz ≥ 20 MHz (offset from edge of relevant TX band)	100 kHz 300 kHz 1 MHz	300 kHz 1 MHz 3 MHz	-30 -30 -30	-36 -36 -36
Relevant TX band: P-GSM: 890 to 915 MHz; DCS: 1710 to 1785 MHz	1.8 to 6.0 MHz (offset from carrier)	30 kHz	100 kHz	-30	-30

Measurement conditions:

Peak Hold, Modulated Carrier

- a. Measurement averaged over a burst and then averaged again over 50 bursts.
- b. 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

GSM 900

Power Control Level	Transmitter Output Power (dBm)	Tolerance for Conditions (dB)	
		Normal	Extreme
PL5	32.4	+0.3, -0.6	+0.3, -0.6
PL6	30.7	±0.5	±0.5
PL7	29	±0.5	±0.5
PL8	27	±0.5	±0.5
PL9	25	±0.5	±0.5
PL10	23	±0.5	±0.5
PL11	21	±0.5	±0.5
PL12	19	±0.5	±0.5
PL13	17	±0.5	±0.5
PL14	15	±0.5	±0.5
PL15	13	±0.5	±0.5
PL16	11	±0.5	±0.5
PL17	9	±0.5	±0.5
PL18	7	±0.5	±0.5
PL19	5	±0.5	±0.5

GSM 1800

Power Control Level	Transmitter Output Power (dBm)	Tolerance for Conditions (dB)	
		Normal	Extreme
PL0	29.3	+0.4, -0.5	+0.4, -0.5
PL1	27.7	±0.5	±0.5
PL2	26	±0.5	±0.5
PL3	24	±0.5	±0.5
PL4	22	±0.5	±0.5
PL5	20	±0.5	±0.5
PL6	18	±0.5	±0.5
PL7	16	±0.5	±0.5
PL8	14	±0.5	±0.5
PL9	12	±0.5	±0.5
PL10	10	±0.5	±0.5
PL11	8	±0.5	±0.5
PL12	6	±0.5	±0.5
PL13	4	±0.5	±0.5
PL14	2	±0.5	±0.5
PL15	0	±0.5	±0.5

5.1.7 Residual Peak Power

≤70 dBc (BW = 300 kHz)

5.2 Rx Characteristics

5.2.1 Sensitivity

GSM 900 Full rate speech

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.

GSM 900 Half rate speech

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				

GSM 1800 Full rate speech

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.

GSM 1800 Half rate speech

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				

Blocking:

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.

Intermodulation Characteristics:

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 GD30 and GD50 telephones. The layout is as follows:

1. Section 6.2 External testing: describes equipment requirements and general set up procedure.
2. Section 6.3 Complete Unit Test Setup: describes how the items of test equipment are used together and general set up procedure.
3. Section 6.4 Channel box test commands: provides detailed explanation of the different commands available using the test equipment and channel-box software.
4. Section 6.5 Adjustment mode: describes adjustments available on the GD30/GD50 handheld unit.
5. Section 6.6 Lock code: describes the procedure to check or reset the lock code using the Channel box software.

6.2 External Testing

The GD30/GD50 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 first be disassembled, as detailed in Section 4, and then the PCB Repair Jig 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/IFB004

The Interface box provides:

- a. IFB003: Voltage regulation for +7.2 V, +5.6 V or 4.8 V 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

Interface Box IFB004 is a later version that provides +4.8 V, +7.2V and +8.2 V DC outputs. It also allows selection of external power via the Interface cable.

- b. RS 232 interface. Ensures that the Unit Under Test is supplied with the correct signal levels and format..

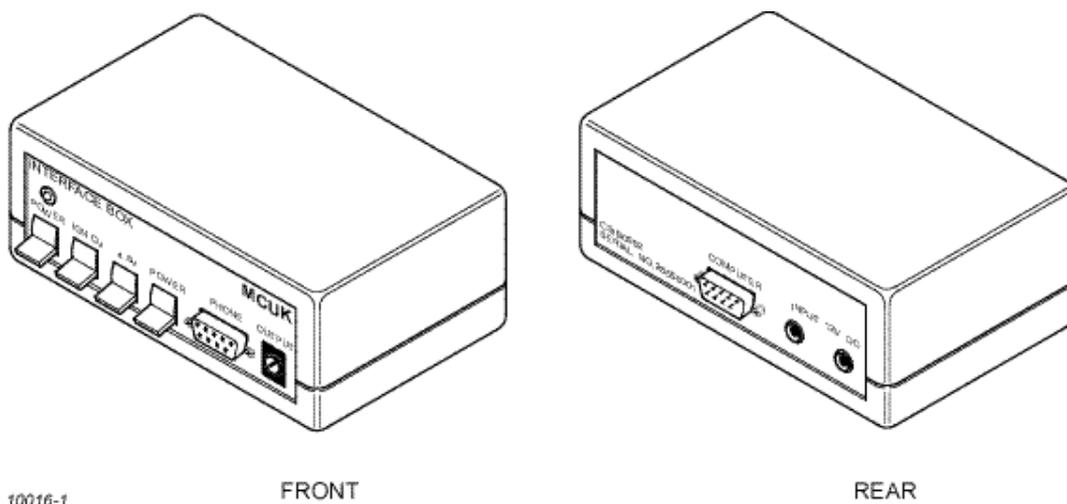


Figure 6.1: Interface Box IFB003 / IFB004

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.

TEST AND MEASUREMENT

3. Power Supply
Provides 12 V DC supply to Interface Box IFB003 or IFB004.

4. Test Battery
Part Number: JT00022
Provides 3.6 V DC supply to Interface Box IFB003 or IFB004 to compensate for the current drain when the Unit Under Test is used at full transmit power.

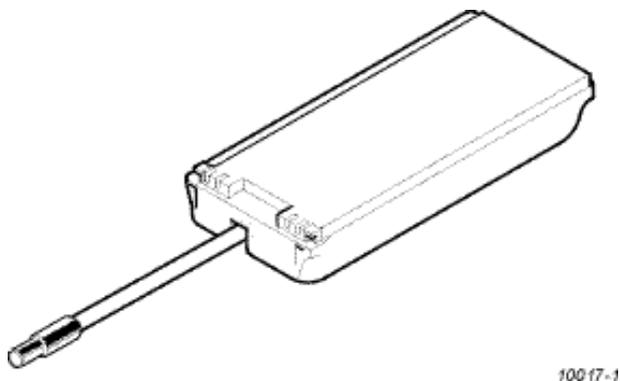


Figure 6.2: Test Battery

5. PCB Repair Jig
Part Number: JT00011
This unit provides the necessary connections between the Main and Key PCBs, and the connections between Main PCB and external test equipment.

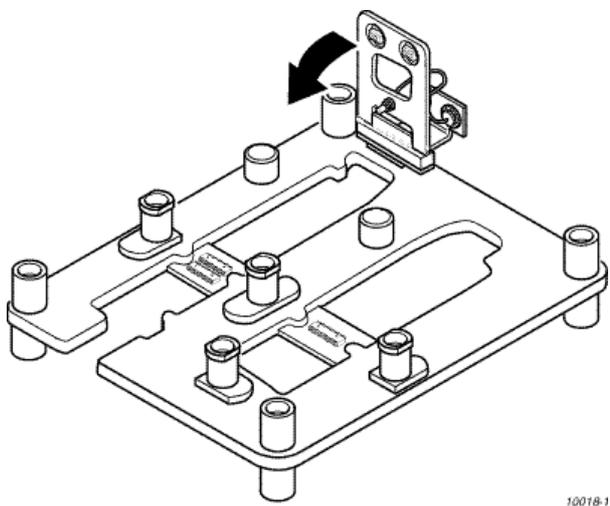


Figure 6.3: PCB Repair Jig

- 6. RF Adaptor
Part Number: JT00009

This unit provides an RF connection between the Unit Under Test and external test equipment. It has a lug on the back to allow both Adaptor and Unit Under Test to be suspended from a suitable rack or channel bracket, if required.

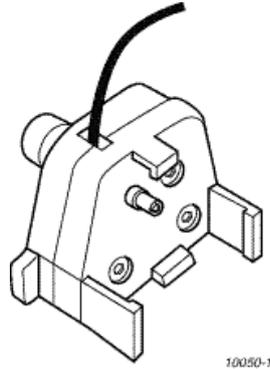


Figure 6.4: RF Adaptor

- 7. GSM Tester

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

- 8. Interface Cable
Part Number: JT00004

The interface cable allows connection between a computer and the Unit Under Test via IFB003. Connector (A) is available separately, if required, under part number DHS31-P18S-HL-BD.

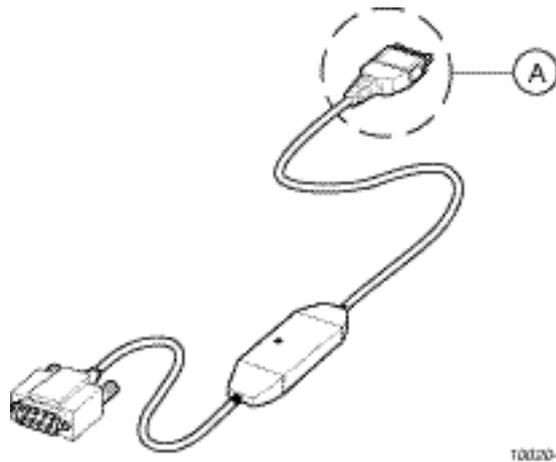


Figure 6.5: Interface Cable

- 9. Battery Calibration Voltage Control Unit (BCVCU)
Part Number: JT00010

This unit provides three voltage levels (3 V, 4.1 V and 0 V) to the Test Battery, and is used during battery calibration checks. It is powered from the Interface Box. .

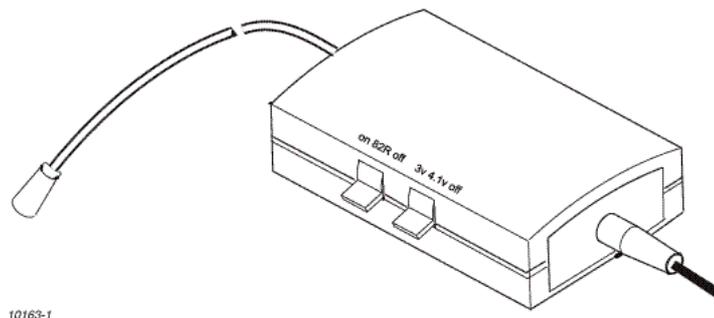
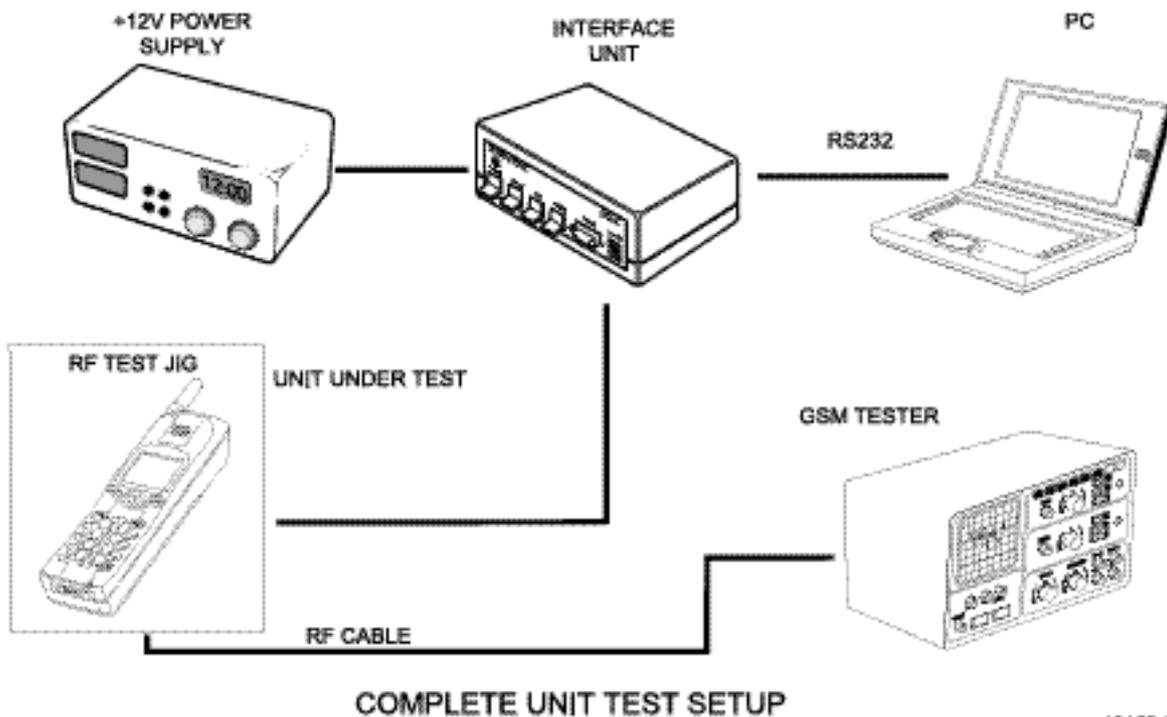
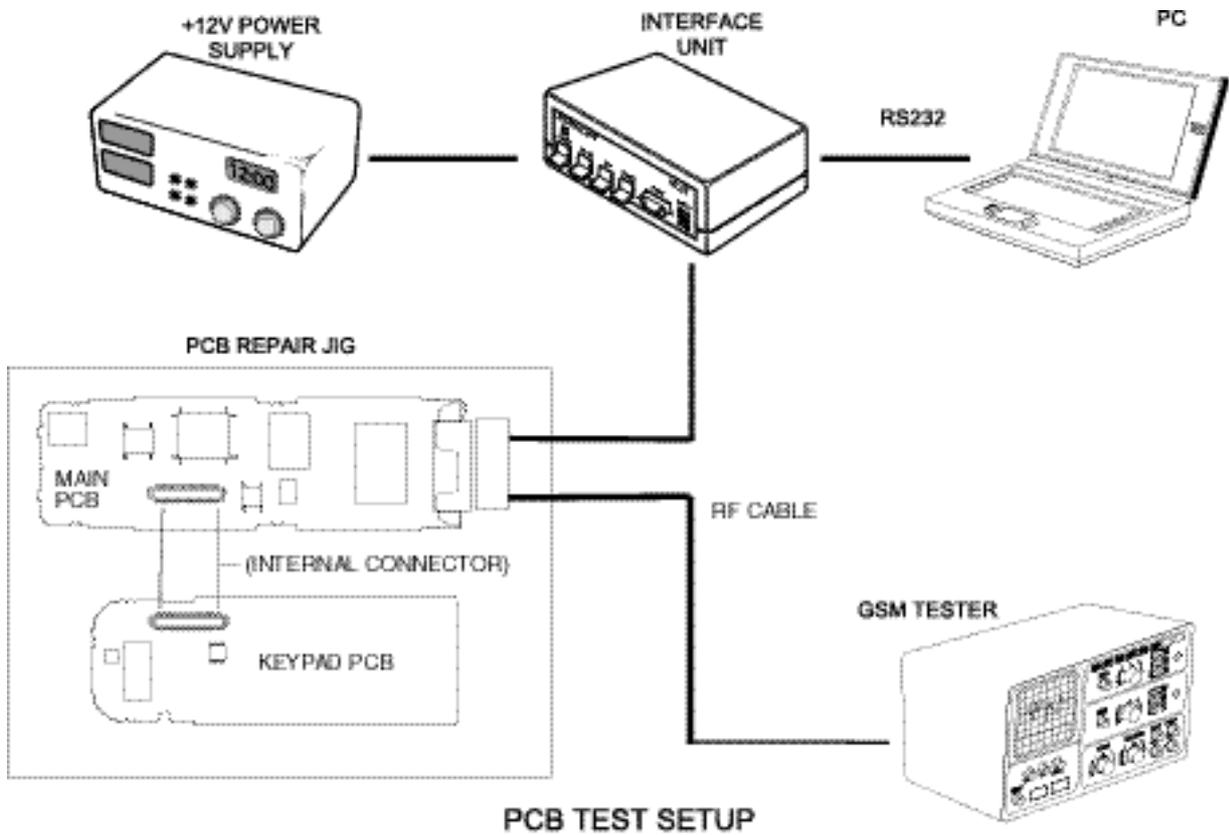


Figure 6.6: Battery Calibration Voltage Control Unit (BCVCU)

10. Channel Box Software

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

6.3 Complete Unit Test Setup



10122-1

Figure 6.7: Complete unit test setup

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 6.6). 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 6.7.

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 Adaptor
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.

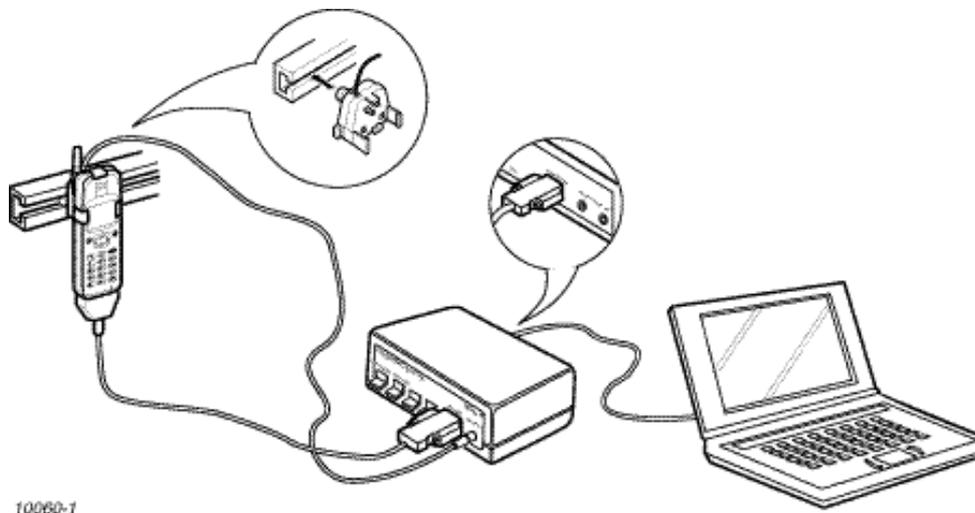


Figure 6.8: External test equipment setup

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

TEST AND MEASUREMENT

c. PC

Channel box software loaded and the screen indicating as shown:



[ESC] to END of PROGRAM

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Figure 6.9: PC Screen (SCRN10)

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.

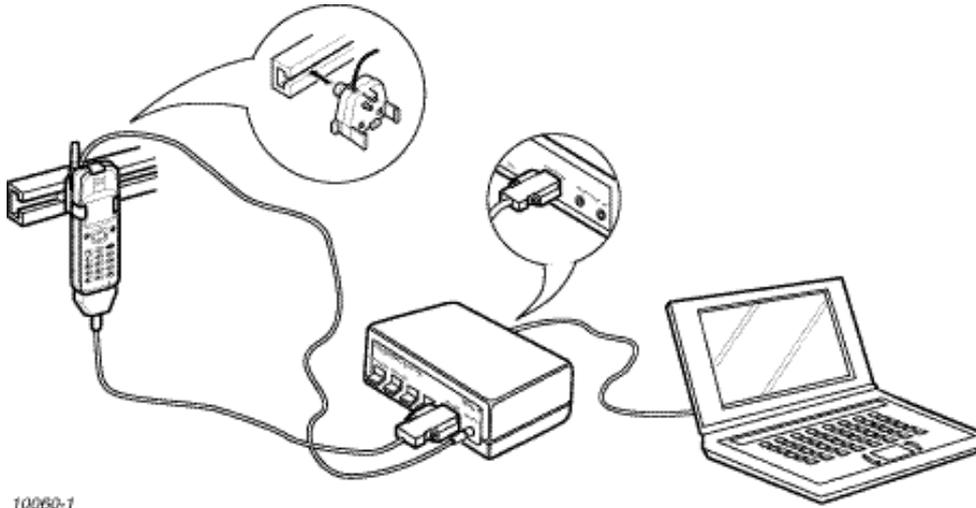
NOTE: The display will read:
GET STATION
ADDRESS = _ _
INFO = _ _

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.



10060-1

Figure 6.10: External test equipment setup

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



[ESC] to END of PROGRAM

10027-1

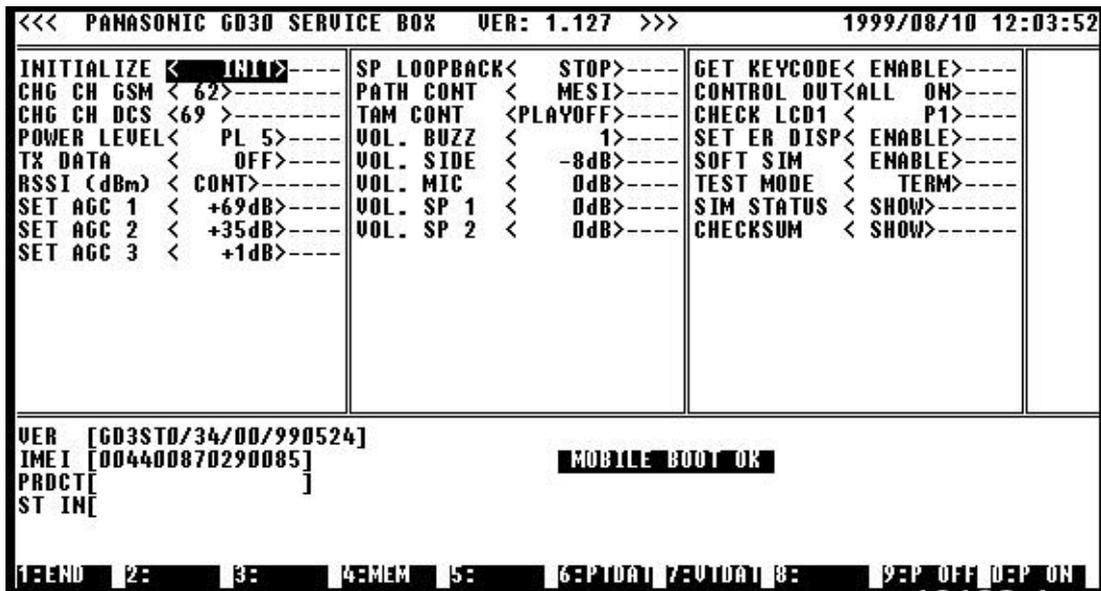
Figure 6.11: PC Screen (SCRN9)

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:



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Figure 6.12: PC Screen (SCRN11)

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 6.2.1 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 6.5.1)
2. RSSI (Section 6.5.2)
3. I and Q values (Section 6.5.3)

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

```

<<< PANASONIC GD30 SERVICE BOX  VER: 1.127  >>>          1999/08/10 12:03:52
INITIALIZE < [ ] >----- SP LOOPBACK<  STOP>----- GET KEYCODE< ENABLE>-----
CHG CH GSM < 62 >----- PATH CONT <  MESI>----- CONTROL OUT<ALL ON>-----
CHG CH DCS < 69 >----- TAM CONT <PLAYOFF>----- CHECK LCD1 <  P1>-----
POWER LEVEL<  PL 5>----- VOL. BUZZ <  1>----- SET ER DISP< ENABLE>-----
TX DATA <  OFF>----- VOL. SIDE < -8dB>----- SOFT SIM < ENABLE>-----
RSSI (dBm) < CONT>----- VOL. MIC <  0dB>----- TEST MODE <  TERM>-----
SET AGC 1 < +69dB>----- VOL. SP 1 <  0dB>----- SIM STATUS < SHOW>-----
SET AGC 2 < +35dB>----- VOL. SP 2 <  0dB>----- CHECKSUM < SHOW>-----
SET AGC 3 < +1dB>-----

VER [GD3ST0/34/00/990524]
IMEI [004400870290085]
PRDCT[ ]
ST IN[ ]

1:END 2: 3: 4:MEM 5: 6:PTOAT 7:OTOAT 8: 9:P OFF 0:P ON

```

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Figure 6.13: Test software screen

6.5.1 Ramping Gain

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

GSM 900

Power Level	Peak Power (dBm)	Tolerance (dBm)	Initial Calibration Value	Change per dB
PL5	32.4	+0.3, -0.6	214	7.0
PL6	30.7	±0.5	200	5.0
PL7	29	±0.5	190	4.5
PL8	27	±0.5	181	4.0
PL9	25	±0.5	173	5.0
PL10	23	±0.5	163	5.0
PL11	21	±0.5	153	4.5
PL12	19	±0.5	144	3.5
PL13	17	±0.5	137	3.5
PL14	15	±0.5	130	2.5
PL15	13	±0.5	125	2.5
PL16	11	±0.5	120	3.0
PL17	9	±0.5	114	3.5
PL18	7	±0.5	107	3.5
PL19	5	±0.5	100	3.5

GSM 1800

Power Level	Peak Power (dBm)	Tolerance (dBm)	Initial Calibration Value	Change per dB
PL0	29.3	+0.4, -0.5	194	5.0
PL1	27.7	±0.5	184	4.0
PL2	26	±0.5	176	4.0
PL3	24	±0.5	168	4.5
PL4	22	±0.5	159	4.0
PL5	20	±0.5	151	3.5
PL6	18	±0.5	144	3.5
PL7	16	±0.5	137	3.5
PL8	14	±0.5	130	2.5
PL9	12	±0.5	125	3.0
PL10	10	±0.5	119	2.5
PL11	8	±0.5	114	2.5
PL12	6	±0.5	109	3.0
PL13	4	±0.5	103	3.0
PL14	2	±0.5	97	2.5
PL15	0	±0.5	92	2.5

Calibration of output power on each power level

NOTE: To ensure that the telephone operates within set SAR margins, Panasonic recommends that a power meter capable of measurement to an accuracy of ± 0.2 dBm (Hewlett Packard HP8990 or equivalent) is used when calibrating power levels. Use of a less accurate power meter may result in the phone failing to meet SAR standards.

To calibrate the ramping gain, first 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 14, 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 <14> is highlighted. Press the move left arrow until <14> 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.

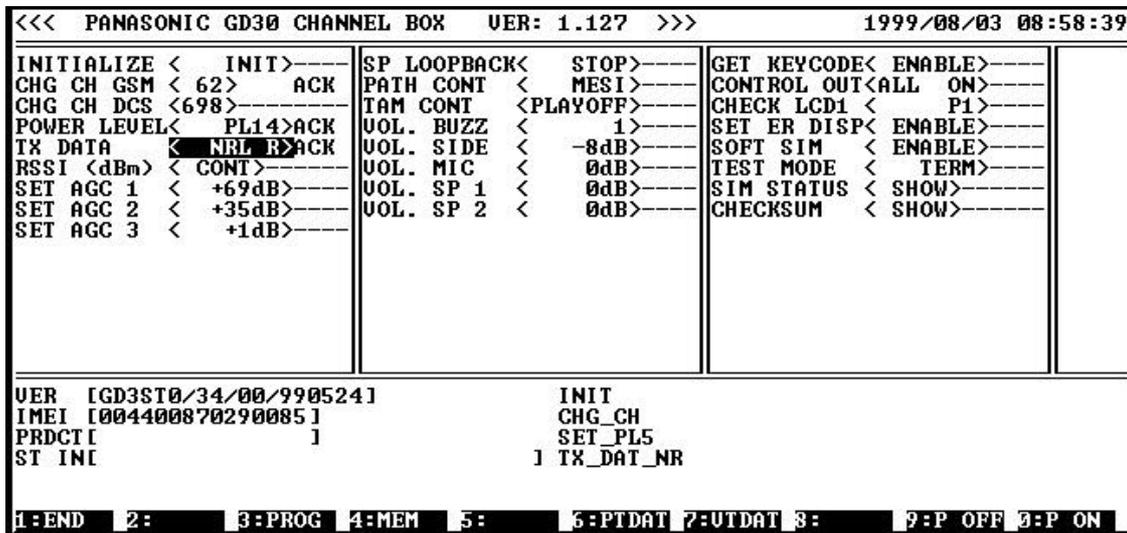


Figure 6.14: Tx data field

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.

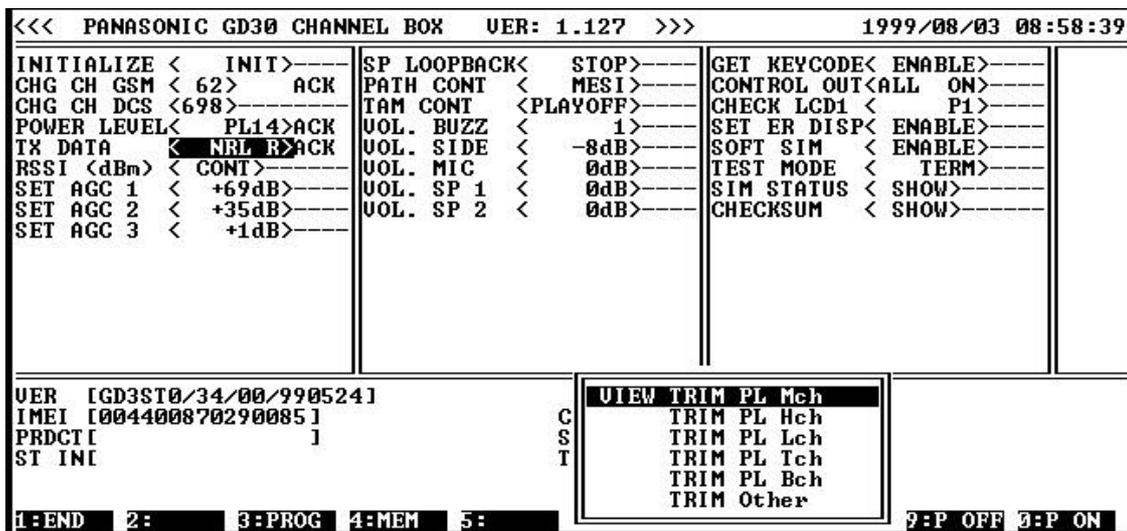


Figure 6.15: Power level view 1

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

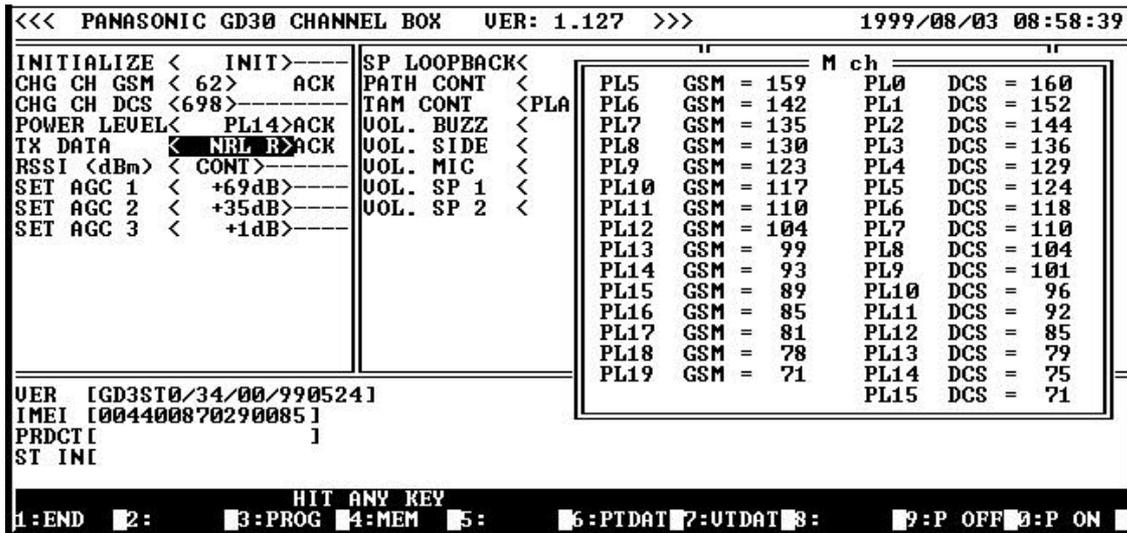


Figure 6.16: Power level view 2

6. Perform the following calculation and make a note of the result:

$$\text{New Trim value} = \text{Old Trim Value} + (\text{Required Power} - \text{Measured Power}) \times \text{Change per dB}$$

(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.

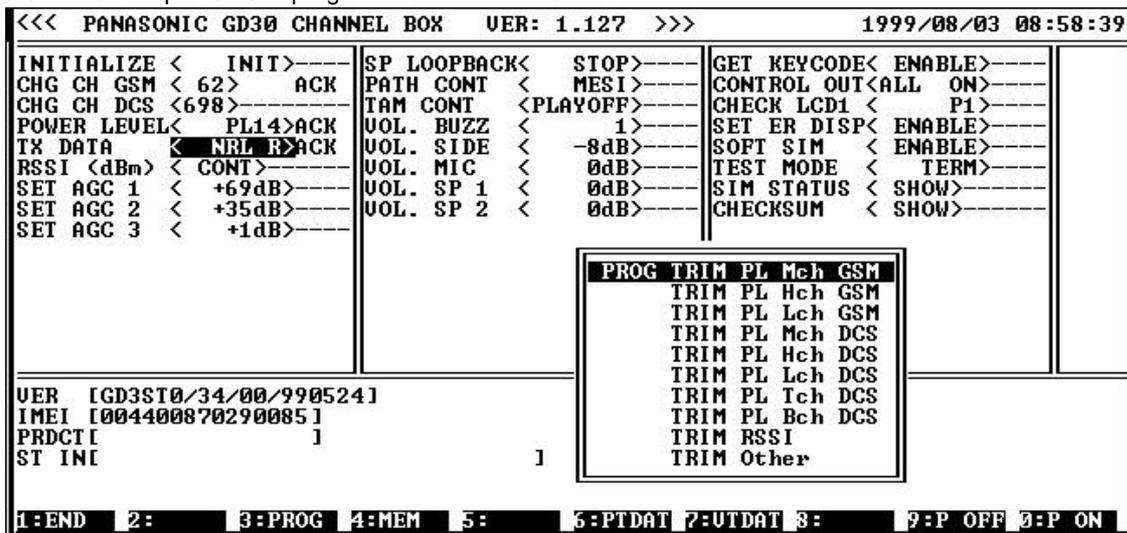


Figure 6.17: Power level selection 1

8. Select PROGRAM TRIM PL MCH GSM.

```

<<< PANASONIC GD30 CHANNEL BOX UER: 1.127 >>> 1999/08/03 08:58:39
INITIALIZE < INIT>----- SP LOOPBACK< STOP>----- GET
CHG CH GSM < 62> ACK PATH CONT < MESI>----- CONT
CHG CH DCS <698>----- TAM CONT <PLAYOFF>----- CHEC
POWER LEVEL< PL14>ACK UOL. BUZZ < 1>----- SET
TX DATA < NRL R>ACK UOL. SIDE < -8dB>----- SOFT
RSSI <dBm> < CONT>----- UOL. MIC < 0dB>----- TEST
SET AGC 1 < +69dB>----- UOL. SP 1 < 0dB>----- SIM
SET AGC 2 < +35dB>----- UOL. SP 2 < 0dB>----- CHEC
M ch
PL5 GAIN GSM
PL6 GAIN GSM
PL7 GAIN GSM
PL8 GAIN GSM
PL9 GAIN GSM
PL10 GAIN GSM
PL11 GAIN GSM
PL12 GAIN GSM
PL13 GAIN GSM
PL14 GAIN GSM
PL15 GAIN GSM
PL16 GAIN GSM
PL17 GAIN GSM
PL18 GAIN GSM
PL19 GAIN GSM

UER [GD3ST0/34/00/990524]
IMEI [004400870290085]
PRDCT [ ]
ST INI

1:END 2: 3:PROG 4:MEM 5: 6:PTDAT 7:UTDAT 8: 9:P OFF 0:P ON
    
```

Figure 6.18: Power level selection 2

9. Highlight the PL14 field and press ENTER.

```

<<< PANASONIC GD30 CHANNEL BOX UER: 1.127 >>> 1999/08/03 08:58:39
INITIALIZE < INIT>----- SP LOOPBACK< STOP>----- GET KEYCODE< ENABLE>-----
CHG CH GSM < 62> ACK PATH CONT < MESI>----- CONTROL OUT<ALL ON>-----
CHG CH DCS <698>----- TAM CONT <PLAYOFF>----- CHECK LCD1 < P1>-----
POWER LEVEL< PL14>ACK UOL. BUZZ < 1>----- SET ER DISP< ENABLE>-----
TX DATA < NRL R>ACK UOL. SIDE < -8dB>----- SOFT SIM < ENABLE>-----
RSSI <dBm> < CONT>----- UOL. MIC < 0dB>----- TEST MODE < TERM>-----
SET AGC 1 < +69dB>----- UOL. SP 1 < 0dB>----- SIM STATUS < SHOW>-----
SET AGC 2 < +35dB>----- UOL. SP 2 < 0dB>----- CHECKSUM < SHOW>-----
SET AGC 3 < +1dB>-----

UER [GD3ST0/34/00/990524]
IMEI [004400870290085]
PRDCT [ ]
ST INI
Mch PL5 GSM GAIN [0-255][_ ]

1:END 2: 3:PROG 4:MEM 5: 6:PTDAT 7:UTDAT 8: 9:P OFF 0:P ON
    
```

Figure 6.19: Power level selection 3

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 the remaining power levels, in the following order:
 - PL6, PL9 and PL19.
 - Power Levels between PL9 and PL6.
 - Power Levels between PL14 and PL9.
 - Power Levels between PL19 and PL14.
14. Calibrate PL5 (limits ± 0.2 dB).
15. After calibrating at channel 62, the carrier power must be measured and calibrated at LOW and HIGH channels as described in steps 2 to 14.
16. Repeat steps 2 to 14 for the GSM 1800 settings in the following order:
 - PL10 (limits ± 0.5 dB).
 - PL1, PL5 and PL15.
 - Power levels between PL5 and PL1.
 - Power levels between PL10 and PL5.

TEST AND MEASUREMENT

Power levels between PL15 and PL10.

Power level PL0 (limits ±0.2dB).

Channel	GSM900	GSM1800
Low/Bottom	10	544
Mid	62	699
High/Top	105	885

6.5.2 RSSI

This procedure describes the calibration of RSSI on the compensation channel (Mch = Ch 67). 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 6.3 and switch the unit into test mode as described.
2. Apply a carrier frequency of +68KHz to the UUT (for Ch 67 = 948.400 MHz) at an input level of -90 dBm.
3. At the Channel box highlight the CHANGE CH <67> field and press ENTER.
4. Highlight the SET AGC 1 field and change the set value to 45 dB and press ENTER.
5. Highlight the RSSI dBm <> field and press ENTER.

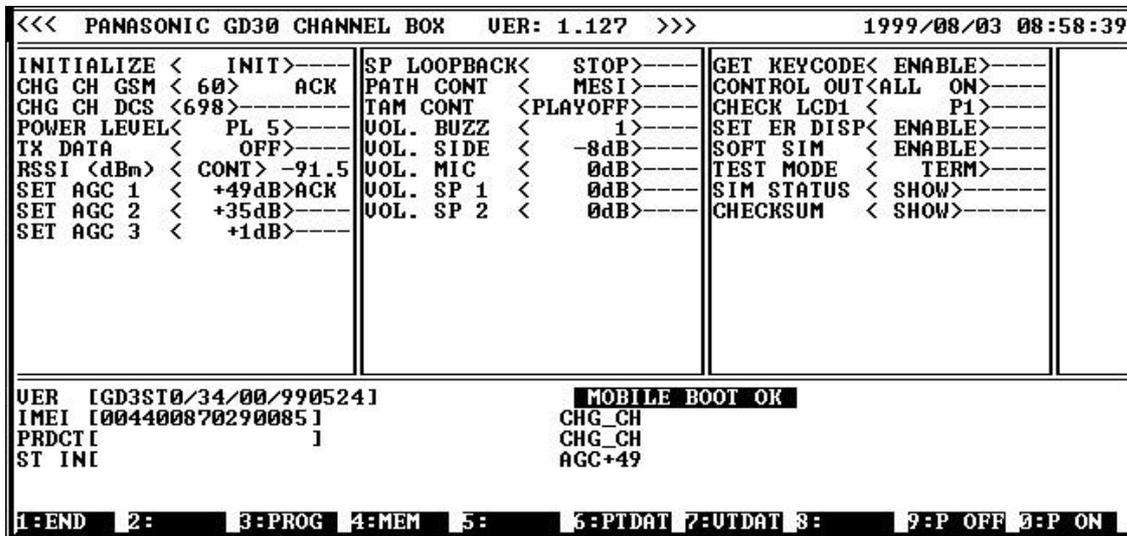


Figure 6.20: RSSI dB field

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

$$\begin{aligned} \text{RSSI offset value} &= [-(90+\text{MEASURED RSSI VALUE})] \times 2 \\ &= [-(90-\text{MEASURED RSSI VALUE})] \times 2, \\ \text{for example} \quad &[-(90+(-95))] \times 2 \\ &= [-(90-(-95))] \times 2 \\ &= 10 \end{aligned}$$

Record the result.

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

```

<<< PANASONIC GD30 CHANNEL BOX UER: 1.127 >>> 1999/08/03 08:58:39
INITIALIZE < INIT>----- SP LOOPBACK< STOP>----- GET KEYCODE< ENABLE>-----
CHG CH GSM < 60> ACK PATH CONT < MESI>----- CONTROL OUT<ALL ON>-----
CHG CH DCS <698>----- TAM CONT <PLAYOFF>----- CHECK LCD1 < P1>-----
POWER LEVEL< PL 5>----- UOL. BUZZ < 1>----- SET ER DISP< ENABLE>-----
TX DATA < OFF>----- UOL. SIDE < -8dB>----- SOFT SIM < ENABLE>-----
RSSI <dBm> < CONT> -91.5 UOL. MIC < 0dB>----- TEST MODE < TERM>-----
SET AGC 1 < +49dB>ACK UOL. SP 1 < 0dB>----- SIM STATUS < SHOW>-----
SET AGC 2 < +35dB>----- UOL. SP 2 < 0dB>----- CHECKSUM < SHOW>-----
SET AGC 3 < +1dB>-----

UER [GD3ST0/34/00/990524]
IMEI [004400870290085]
PRDCTI 1
ST INI

C UIEW TRIM PL Mch
G TRIM PL Hch
A TRIM PL Lch
TRIM PL Tch
TRIM PL Bch
TRIM Other

1:END 2: 3:PROG 4:MEM 5: 9:P OFF 0:P ON
    
```

Figure 6.21: RSSI reading 1

8. Select TRIM OTHER and make a note of the RSSI COMP GSM reading.

```

<<< PANASONIC GD30 CHANNEL BOX UER: 1.127 >>> 1999/08/03 08:58:39
INITIALIZE < INIT>----- SP LOOPBA ----- IQCH GAIN = 0.00dB RSSI Lch GSM = 248
CHG CH GSM < 60> ACK PATH CONT ICH OFFSET = 127 RSSI Mch GSM = 248
CHG CH DCS <698>----- TAM CONT QCH OFFSET = 127 RSSI Hch GSM = 250
POWER LEVEL< PL 5>----- UOL. BUZZ = 14 RSSI Comp GSM = 253
TX DATA < OFF>----- UOL. SIDE BAT UOLI HI = 803 RSSI Bch DCS = 244
RSSI <dBm> < CONT> -91.5 UOL. MIC BAT UOLI LO = 573 RSSI Lch DCS = 244
SET AGC 1 < +49dB>ACK UOL. SP 1 DAC REF = 716 RSSI Mch DCS = 246
SET AGC 2 < +35dB>----- UOL. SP 2 DELTA U = 6 RSSI Hch DSC = 246
SET AGC 3 < +1dB>----- U IGNORE = 12 RSSI Tch DCS = 248
TIMER OFFSET= 0 RSSI Comp DSC = 0
COMP OFFSET = 40
AFC OFFSET = 12
RTC COMP = 0
LCD CONTRAST= 42

UER [GD3ST0/34/00/990524]
IMEI [004400870290085]
PRDCTI 1
ST INI

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

Figure 6.22: RSSI reading 2

9. Press ESC.

TEST AND MEASUREMENT

10. At the Channel box press F6 to program data.

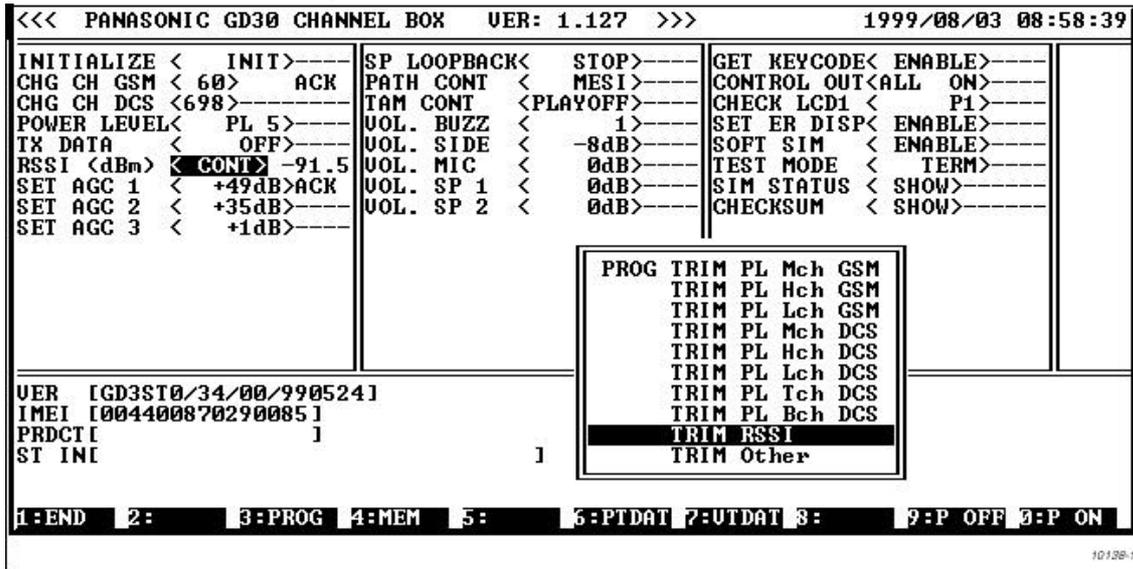


Figure 6.23: RSSI reading 3

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

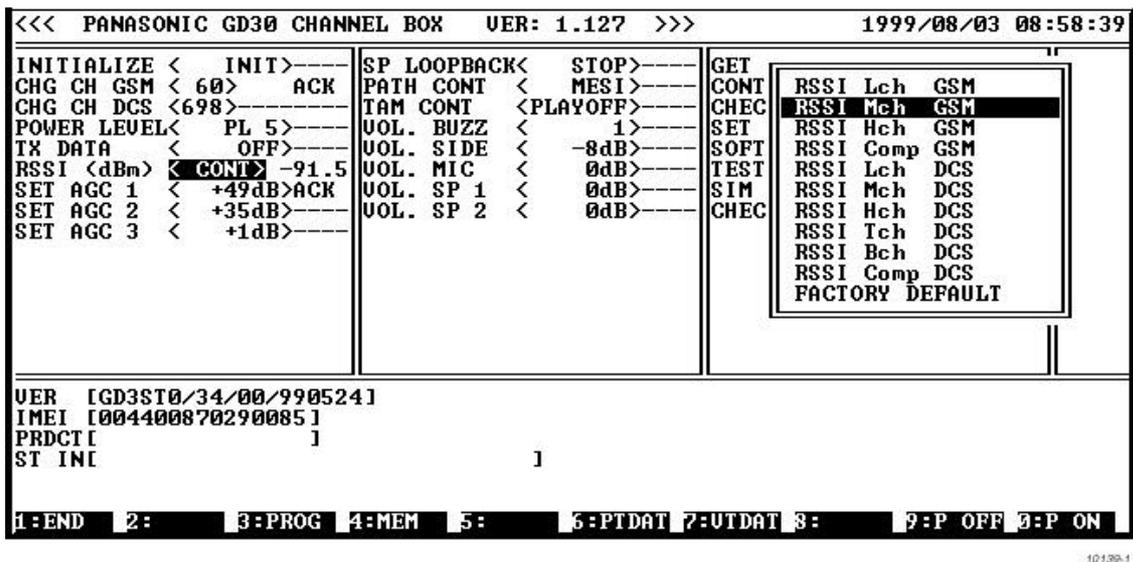


Figure 6.24: RSSI reading 4

13. Press ENTER.

14. Press ESC.

15. Measure the RSSI level again by highlighting the RSSI dBm field and press ENTER.

16. Repeat steps 6 to 15 for both LOW/BOTTOM and HIGH/TOP channels.

Channel	GSM 900
Low/Bottom	37
Comp	67
High/Top	95

17. Repeat steps 6 to 15 for GSM 1800 on the channels listed below:.

Channel	GSM 1800
Bch	586
Lch	681
Mch	731
Hch	861
Tch	878

NOTE: The AGC1 setting for GSM 1800 RSSI calibration should be 51 dBm.

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.

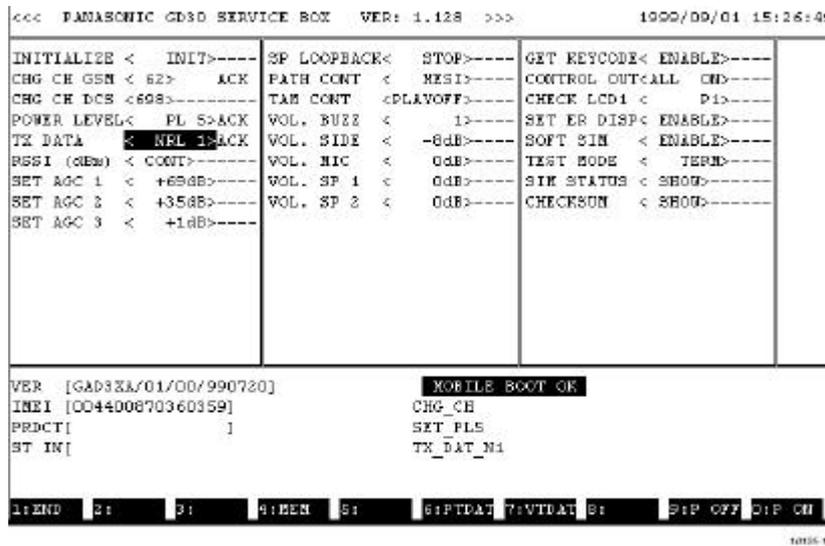


Figure 6.25: Channel box setup

TEST AND MEASUREMENT

- 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 135 kHz below peak power = -9 dBm

carrier leakage ratio = 33 dBm - (-9 dBm) = 42 dBm

```

<<< PANASONIC GDSO SERVICE BOX VER: 1.128 >>> 1000/09/01 15:31:33

INITIALIZE < INIT>---- SP LOO
CHG CH GSM < 62> ACK PATH C IQCH GAIN GSM = 0.00dB RSSI Leb GSM = 255
CHG CH DCS < 698>----- TAM CO ICH OFFSET GSM = 140 RSSI Meh GSM = 0
POWER LEVEL< PL 5>ACK VOL. B QCH OFFSET GSM = 182 RSSI Hch GSM = 4
TZ DATA < HPL 1>ACK VOL. S IQCH GAIN DCS = 0.00dB RSSI Comp GSM = 3
RSSI (dBm) < CONT>----- VOL. M ICH OFFSET DCS = 0 RSSI Beh DCS = 2
SET AGC 1 < +69dB>----- VOL. S QCH OFFSET DCS = 0 RSSI Leb DCS = 2
SET AGC 2 < +35dB>----- VOL. S BAT TEMP = 250 RSSI Meh DCS = 0
SET AGC 3 < +1dB>----- VOL. S BAT VOLT HI = 764 RSSI Hch DCS = 2
                                BAT VOLT LO = 562 RSSI Teh DCS = 2
                                DAC REF = 696 RSSI Comp DCS = 250
                                DELTA V = 0
                                V IGNORE = 0
                                COMP OFFSET = 1
                                DAC STEP = 196
                                AFC OFFSET = 12
                                RTC COMP = 0
                                LCD CONTRAST = 21

VER [GAD32A/01/00/990720]
IMEI [004400870360359]
PRDCT[ ]
ST IN[ ]

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

Figure 6.26: Carrier leakage ratio

- If carrier leakage ratio is greater than 30 dBc then unit is OK. (offset calibration is complete).
- If carrier leakage ratio less than 30 dBc then go to 'Ich Gain Calibration'.

Ich check

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

```

<<< PANASONIC GDSO SERVICE BOX VER: 1.128 >>> 1000/09/01 15:31:33

INITIALIZE < INIT>---- SP LOO
CHG CH GSM < 62> ACK PATH C IQCH GAIN GSM = 0.00dB RSSI Leb GSM = 255
CHG CH DCS < 698>----- TAM CO ICH OFFSET GSM = 140 RSSI Meh GSM = 0
POWER LEVEL< PL 5>ACK VOL. B QCH OFFSET GSM = 182 RSSI Hch GSM = 4
TZ DATA < HPL 1>ACK VOL. S IQCH GAIN DCS = 0.00dB RSSI Comp GSM = 3
RSSI (dBm) < CONT>----- VOL. M ICH OFFSET DCS = 0 RSSI Beh DCS = 2
SET AGC 1 < +69dB>----- VOL. S QCH OFFSET DCS = 0 RSSI Leb DCS = 2
SET AGC 2 < +35dB>----- VOL. S BAT TEMP = 250 RSSI Meh DCS = 0
SET AGC 3 < +1dB>----- VOL. S BAT VOLT HI = 764 RSSI Hch DCS = 2
                                BAT VOLT LO = 562 RSSI Teh DCS = 2
                                DAC REF = 696 RSSI Comp DCS = 250
                                DELTA V = 0
                                V IGNORE = 0
                                COMP OFFSET = 1
                                DAC STEP = 196
                                AFC OFFSET = 12
                                RTC COMP = 0
                                LCD CONTRAST = 21

VER [GAD32A/01/00/990720]
IMEI [004400870360359]
PRDCT[ ]
ST IN[ ]

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

Figure 6.27: I, Q data field selection 1

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

```

<<< PANASONIC GPRS SERVICE BOX VER: 1.128 >>> 1999/09/01 15:37:19
INITIALIZE < INIT>---- SP LOOPBACK< STOP>---- GET KEYCODE< ENABLE>----
CHG CH GSM < 62> ACK PATH CONT < MESI>---- CONTROL CUT<ALL ON>----
CHG CH DCS <698>---- TAM CONT <PLAYOFF>---- CHECK LCD1 < P1>----
POWER LEVEL< PL 5>ACK VOL. BUZZ < 1>---- SET ER DISP< ENABLE>----
TX DATA < NPL 1>ACK VOL. SIDE < -0dB>---- SOFT SIM < ENABLE>----
RSSI (dBm) < CONT>---- VOL. MIC < 0dB>---- TEST MODE < TERM>----
SET AGC 1 < +69dB>---- VOL. SP 1 < 0dB>---- SIM STATUS < SROU>----
SET AGC 2 < +35dB>---- VOL. SP 2 < 0dB>---- CHECKSUM < SROU>----
SET AGC 3 < +1dB>----

VER [GAD3XA/01/00/990720]
IMEI [004400870360359]
PRDCT[ ]
ST IN[ ]

PROG TRIM PL Ech GSM
TRIM PL Ech GSM
TRIM PL Ech GSM
TRIM PL Ech DCS
TRIM RSSI
TRIM Other

1:END 2: 3: 4:DEN 5: 6:PTDAT 7:VTDAT 8: 9:P OFF 0:P ON
    
```

Figure 6.28: I,Q data field selection 2

- Select Ich OFFSET

```

<<< PANASONIC GPRS SERVICE BOX VER: 1.128 >>> 1999/09/01 15:37:19
INITIALIZE < INIT>---- SP LOOPBACK< STOP>---- GET
CHG CH GSM < 62> ACK PATH CONT < MESI>---- CONT
CHG CH DCS <698>---- TAM CONT <PLAYOFF>---- CHEC
POWER LEVEL< PL 5>ACK VOL. BUZZ < 1>---- SET
TX DATA < NPL 1>ACK VOL. SIDE < -8dB>---- SOFT
RSSI (dBm) < CONT>---- VOL. MIC < 0dB>---- TEST
SET AGC 1 < +69dB>---- VOL. SP 1 < 0dB>---- SIM
SET AGC 2 < +35dB>---- VOL. SP 2 < 0dB>---- CHEC
SET AGC 3 < +1dB>----

VER [GAD3XA/01/00/990720]
IMEI [004400870360359]
PRDCT[ ]
ST IN[ ]

FACTORY DEFAULT
IQCH GAIN GSM
ICH OFFSET GSM
QCH OFFSET GSM
IQCH GAIN DCS
ICH OFFSET DCS
QCH OFFSET DCS
BAT TEMP
BAT VOLT HIGH
BAT VOLT LOW
DAC REFENCE
DELTA V
V IGNORE
COMPLETE OFFSET
DAC STEP
AFC OFFSET
RTC COMP
LCD CONTRAST

1:END 2: 3: 4:NEV 5: 6:PTDAT 7:VTDAT 8: 9:P OFF 0:P ON
    
```

Figure 6.29: I,Q data field selection 3

4. Enter 147 for Ich OFFSET and press ENTER.

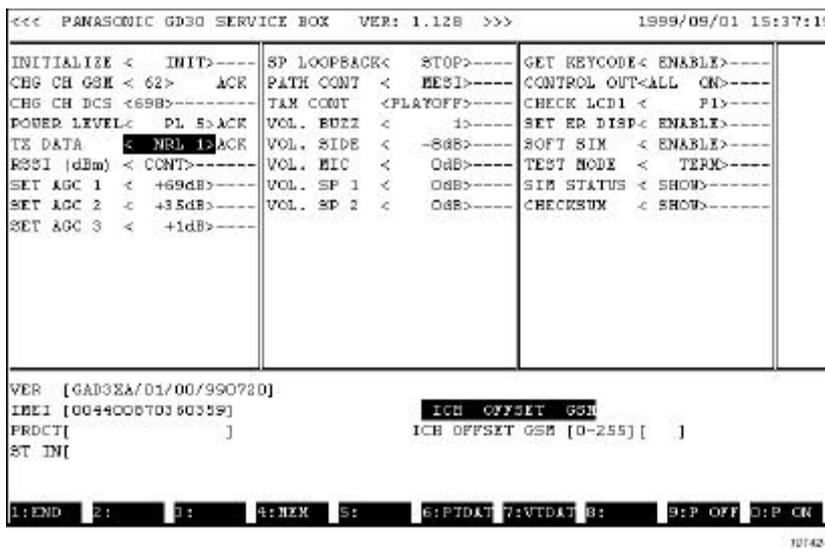


Figure 6.30: I,Q data field selection 4

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

Qch Check

- Set Ich offset to 127.
- Set Qch offset to 147.
 - At the Channel box press F6.
 - Press move down arrow until QCH OFFSET appears in the field. Press ENTER.
 - Enter 3 into the data field and press enter.
- Measure the new carrier leakage ratio.
- If the carrier leakage ratio is greater than 35 dBc the unit is OK. (offset calibration is complete).
- 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.
- If the original carrier leakage ratio is less than new carrier leakage ratio then go to Q Inc Calibration.

Q Dec Calibration

- Set Qch offset to 107 (see Qch Check step 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

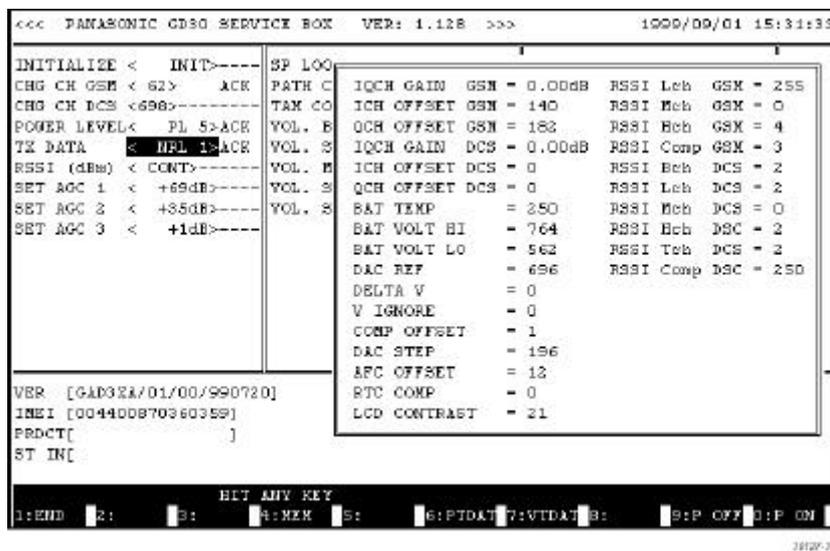


Figure 6.31: Image leak ratio

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 go to I ch gain calibration.

IQch Gain Calibration

1. Set IQch gain to -0.25 dB.
 - a. On the Channel box press F6, and select TRIM OTHER.
 - b. Press move left arrow until IQCH GAIN field is highlighted. Press ENTER.
 - c. Enter 1 (for -0.25 dB) 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 (enter '2'), and -0.75 dB (enter '3').
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. A Battery Calibration Voltage Control Unit (BCVCU) is used to provide the necessary voltage levels for these checks. The BCVCU replaces the two regulated power supplies and 82 Ohm resistor required to calibrate previous mobile phone products.

Preliminaries

1. Connect the mobile phone, test battery, BCVCU and Interface Box as shown in the diagram below.

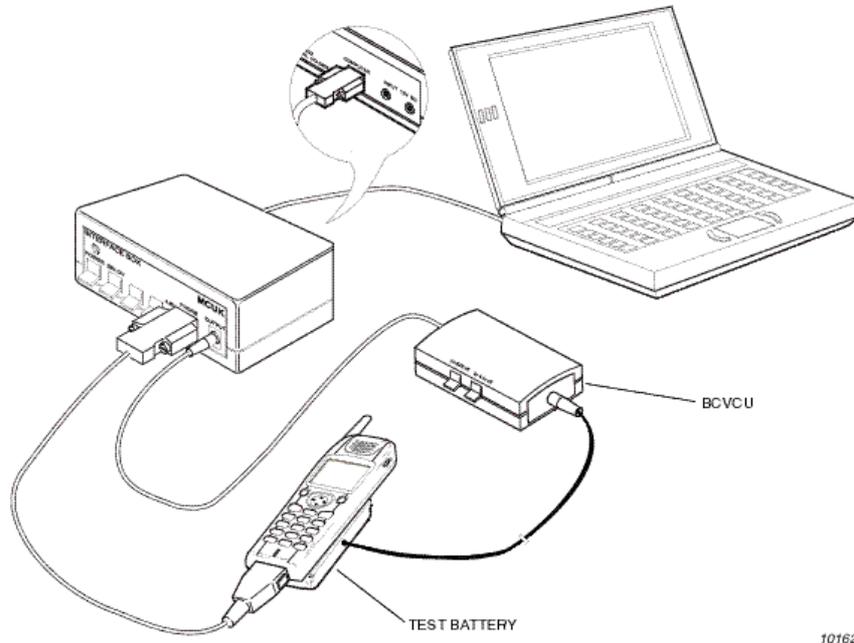


Figure 6.32: Battery Calibration Test Connections

2. Set the Interface Box to output to 7.2 V. Leave the power supply switched OFF and set the MODE or EXT PWR switch to OFF.

Voltage Calibration

1. Set the BCVCU to 4.1 V (centre position on switch) and set the 82 Ohm switch to OFF.
2. Select and run the Channel Box software in 'Test Mode'.
3. Press [F10] and power the phone on. "TEST SET TEST MODE" should be displayed in the phone display.
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 803 and 723, then there is a fault and further investigation is required. Otherwise, record the value for later use.
6. Set the BCVCU output to 3.0 V.
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 not within the range 518 and 598, 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 the BCVCU output to 4.1 volts.

Temperature Calibration

1. Ensure that the BCVCU output is set to 4.1 V.
2. If the ADC data is not already being displayed, press [F4], "VIEW ADC LINES", [enter].
3. Look at the value for ADIN3 (BAT TEMP). If the value is outside the range 390 and 428, then there is a fault and further investigation is required. Otherwise, calculate the difference between the reading and the theoretical value of 409. Record this value for use below.
4. Press [N] (in repeat yes/no box), then [enter].
5. Press [F6]. Go to, and select: "TRIM Other" again.
6. Go to, and select: "BAT TEMP". Enter the value recorded in step 3.

Charging Calibration

NOTE: The charging calibration procedure requires an interface cable (part number JT00004), modified as shown in the diagram below, to allow EXT_PWR to be fed via pin 9 of the D-Type connector to the phone connector.

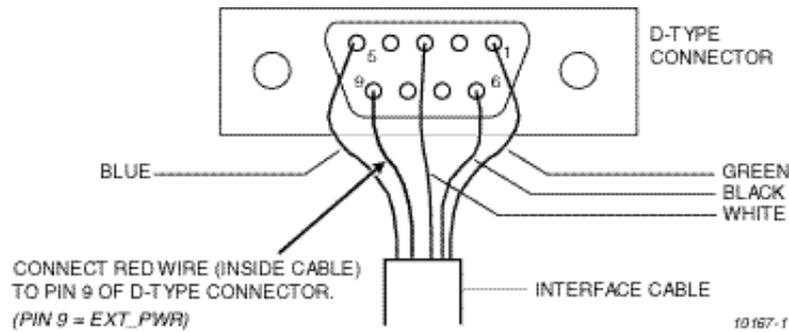


Figure 6.33: Modification to Interface Cable JT00004

1. Ensure that the BCVCU output is set to 4.1 V output and the MODE or EXT_PWR switch set to ON. Set the 82 Ohms switch ON.
2. Press {shift}+[F4].
3. Go to, and select: "Set DAC Data". Type a value of 714, [enter].
4. Using arrows $\uparrow\downarrow$, highlight "Control out". Use $\leftarrow\rightarrow$ arrows to highlight and select "CRG ON". ("ACK" should be displayed on the PC screen. If it is not displayed, then it may be necessary to re-power the telephone and start the Charging Calibration procedure again from step 1.)
5. Disconnect VBAT by switching the BCVCU output to OFF.
6. Measure VBAT voltage at the test battery. If the voltage is inside the range $4.1\text{ V} \pm 5\text{ mV}$ then go to step 11 below. Otherwise, calculate the difference thus:- $(\text{measured voltage} - 4.1)/0.0057 = \text{difference}$.
For example, for a measured voltage of 4.08 V the difference will be: $(4.08 - 4.1) / 0.0057 = -3.5$
7. Press {shift} + [F4].
8. Go to, and select: "Set DAC Data". Enter the value calculated by subtracting the difference value recorded in step 6 from the DAC Data value (714). This value must be an integer.
As an example, the example from step 6 would produce a value of: $714 - (-3.5) = 717.5$ or 718 .
9. Repeat steps 6 to 8 until the measured voltage is $4.1\text{ V} \pm 5\text{ mV}$
10. If the final value for DAC Data is outside the range 614 ± 814 , then there is a fault and further investigation is required. Otherwise store the value as described below.
11. Press [F6]; Go to, and select:- "Trim Other";
12. Go to, and select:- "DAC Reference"; Enter the final DAC data value from step 10.
13. Press {shift}+[F4].
14. Go to, and select:- "Set DAC Data".
15. Enter:- (value stored in step 12) - 200.
16. Press [F4].
17. Go to, and select:- View ADC lines.
18. Read value for ADIN1 ("BAT VOLT").
19. If ["BAT VOLT HIGH" (from Voltage Calibration, step 5) - value read above], is inside the range 255 - 171, then go to step 20 (below) to store value. Otherwise there is a fault and further investigation is required.
20. Press [N] (in repeat yes/no box), then [enter]. Press [F6]; Highlight and select "Trim Other".
21. Highlight and select "DAC Step".
22. Enter value obtained in step 19.
23. Press {shift}+[F4].
24. Select: "Set DAC Data".
25. Re-enter original value from step 10 (i.e. present value +200).
26. Press [F4].
27. Highlight, and select:- "View ADC Lines".
28. Read ADIN5 (CRG CURRENT) value and record it as "Total current".
29. On the BCVCU, set the 82 Ohm switch to OFF.

30. Press [Y], [enter] to read ADC value again, and record it as "Phone current".
31. Calculate the Charge current ("Total current" - "Phone current"). If this outside the range 37 and 49, then there is a fault and further investigation is required. Otherwise, calculate the offset thus:- "Charging current" - 43.
32. Press [N] (in repeat yes/no box), then [enter]. Press [F6]
33. Go to, and select:- "TRIM other".
34. Go to, and select:- "Complete offset". Enter the offset value calculated in step 31.
35. Press [F9], wait for the prompt "Saving EV Trim Data" to disappear, turn OFF power supplies and remove the telephone.

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.

```

<<< PANASONIC GD30 SERVICE BOX VER: 1.127 >>> 1999/08/07 11:19:31
INITIALIZE < [HLD] >----- SP LOOPBACK< STOP>----- GET KEYCODE< ENABLE>-----
CHG CH GSM < 62>----- PATH CONT < MESI>----- CONTROL OUT<ALL ON>-----
CHG CH DCS <698>----- TAM CONT <PLA P1>-----
POWER LEVEL< PL 5>----- VOL. BUZZ <          >----- ENABLE>-----
TX DATA < OFF>----- VOL. SIDE <          >----- ENABLE>-----
RSSI (dBm) < CONT>----- VOL. MIC <          >----- TERM>-----
SET AGC 1 < +69dB>----- VOL. SP 1 <          >----- SHOW>-----
SET AGC 2 < +35dB>----- VOL. SP 2 <          >----- SHOW>-----
SET AGC 3 < +1dB>-----
VIEW  ADC LINES
MOBILE STATUS
LOCK CONDITION
ERROR CODE FLAG
LANGUAGES
CHIPSET VERSION
MOBILE VARIANT
NETWORK RATE ENTRY
HRD STATUS
EEPROM STATE
CALL LIMIT
PRODUCT TYPE
CONFIG STATUS
CLOCK TIME

VER [GD3STD/34/00/990524]
IMEI [004400870290085]
PRDCT [
ST IN[

1:END 2: 3: 4:MEM 5: 6:PTDAT 7:UTDAT 8: 9:P OFF 0:P ON
    
```

10143-1

Figure 6.34: View lock code 1

2. The display will show the current lock status and lock code for the Unit Under Test.

```

<<< PANASONIC GD30 SERVICE BOX VER: 1.127 >>> 1999/08/07 11:19:31
INITIALIZE < [HLD] >----- SP LOOPBACK< STOP>----- GET KEYCODE< ENABLE>-----
CHG CH GSM < 62>----- PATH CONT < MESI>----- CONTROL OUT<ALL ON>-----
CHG CH DCS <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 SIM < ENABLE>-----
RSSI (dBm) < CONT>----- VOL. MIC < 0dB>----- TEST MODE < TERM>-----
SET AGC 1 < +69dB>----- VOL. SP 1 < 0dB>----- SIM STATUS < SHOW>-----
SET AGC 2 < +35dB>----- VOL. SP 2 < 0dB>----- CHECKSUM < SHOW>-----
SET AGC 3 < +1dB>-----

VER [GD3STD/34/00/990524]
IMEI [004400870290085]
PRDCT [
ST IN[

LOCK = DISABLED
CODE = 0000

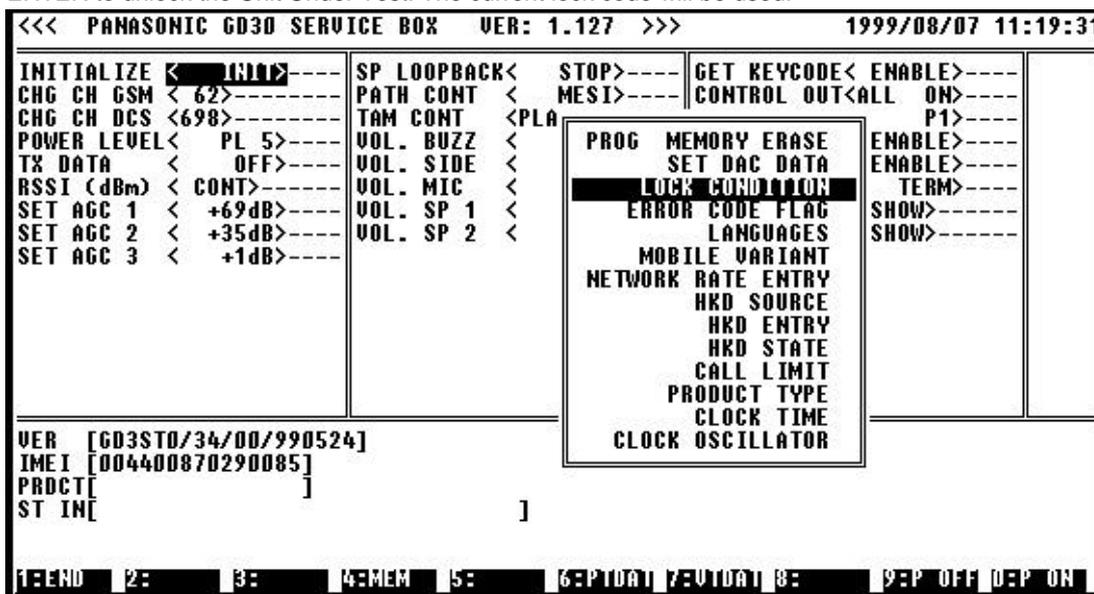
HIT ANY KEY
1:END 2: 3: 4:MEM 5: 6:PTDAT 7:UTDAT 8: 9:P OFF 0:P ON
    
```

10144-1

Figure 6.35: View lock code 2

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 Unit Under Test. The current lock code will be used.



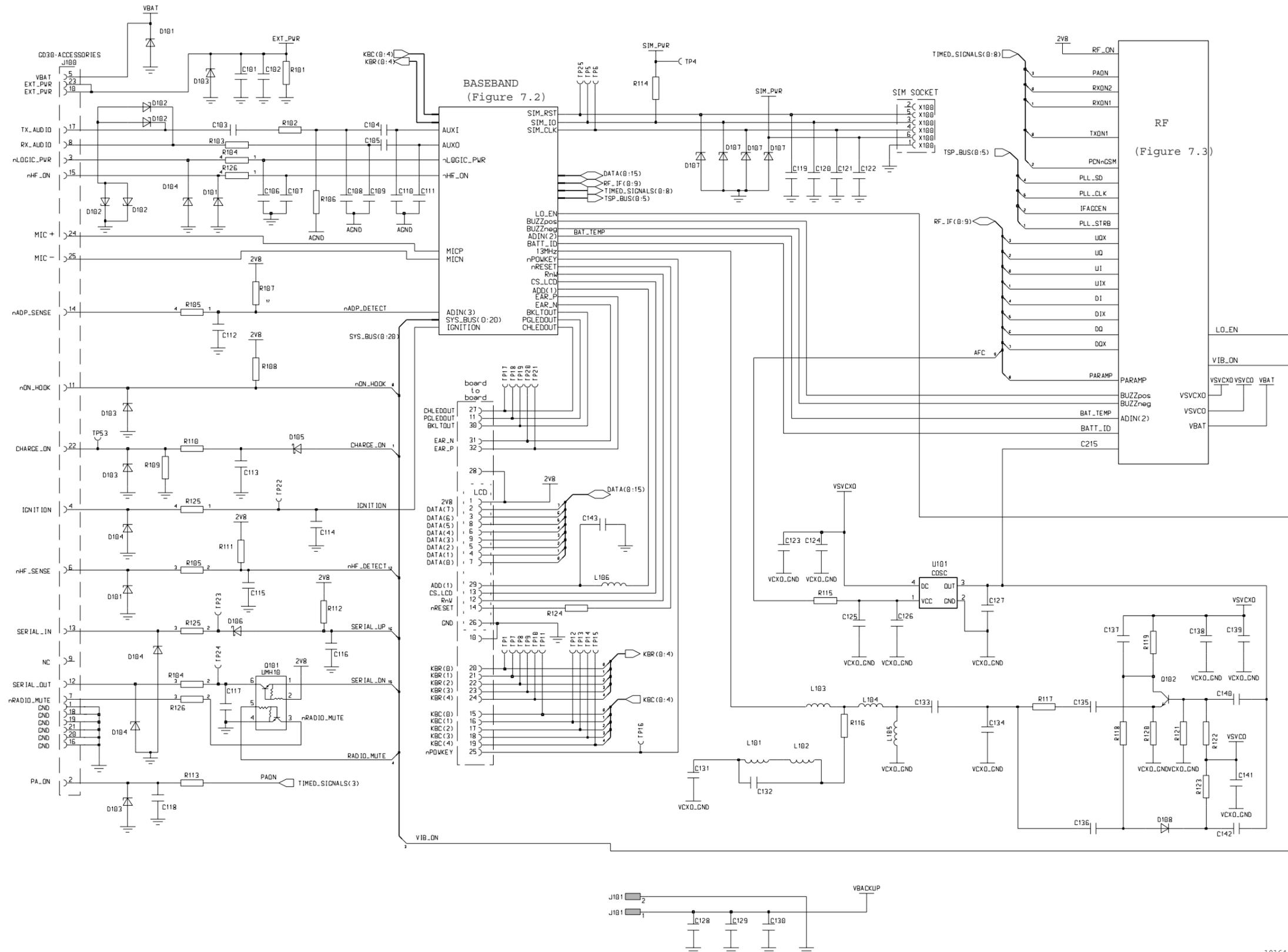
10145-1

Figure 6.36: Change program lock code

3. Enter "0000" to reset and lock the Unit Under Test to the factory default lock code "0000".

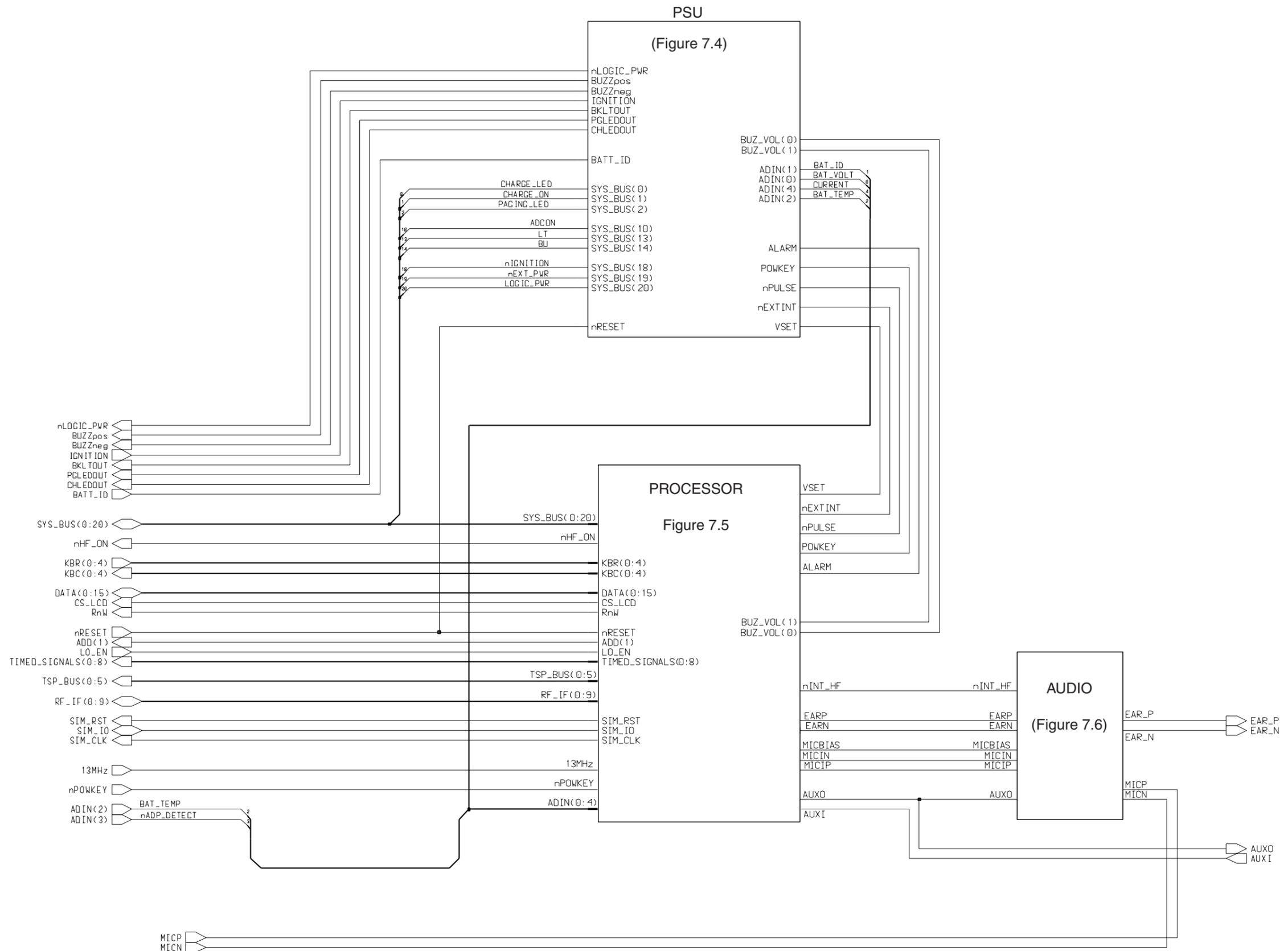
7 CIRCUIT DIAGRAMS

7.1 Main PCB: Top Level Diagram



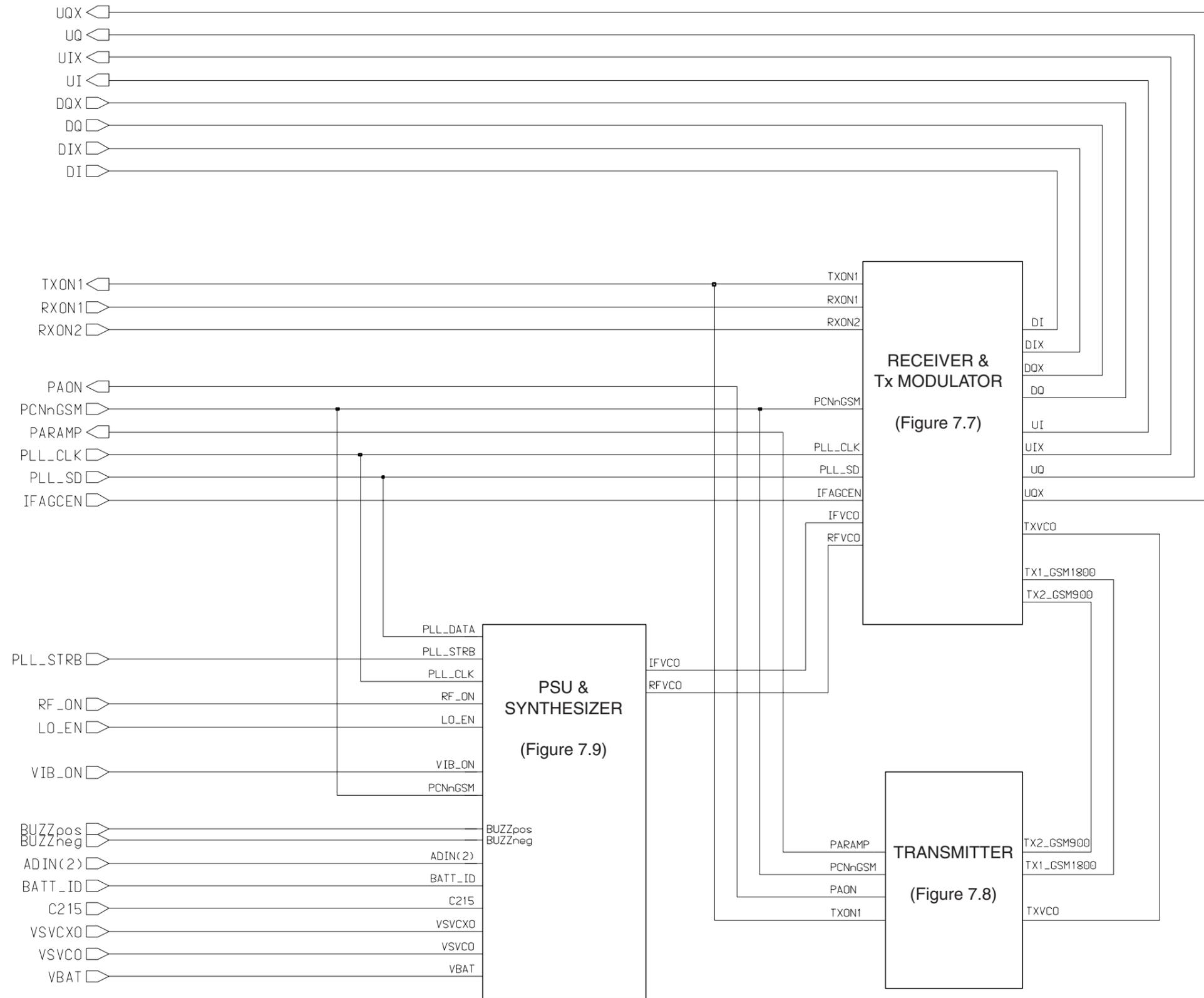
10164-1

7.2 Main PCB: Baseband Overview



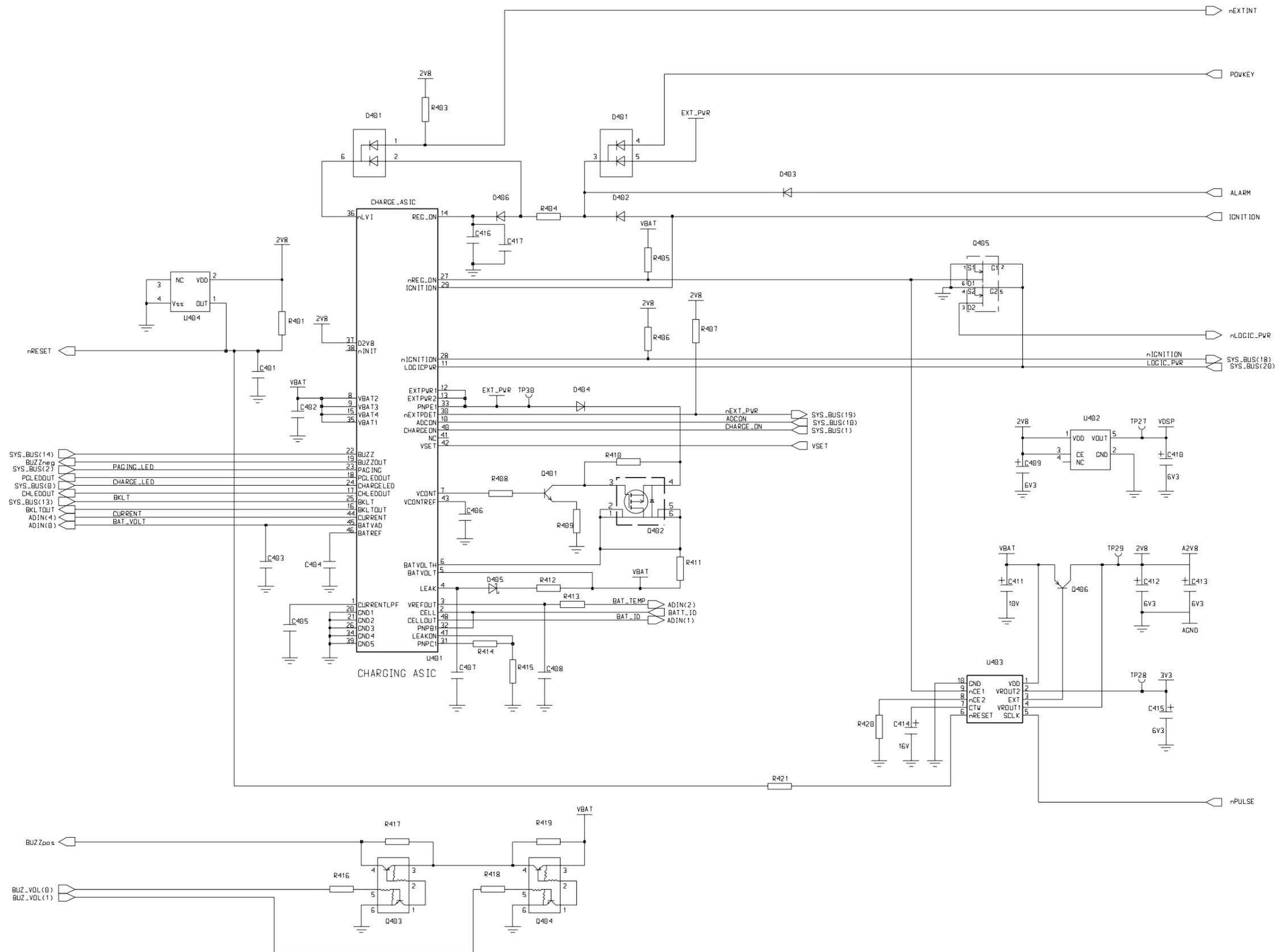
10165-1

7.3 Main PCB: RF Overview

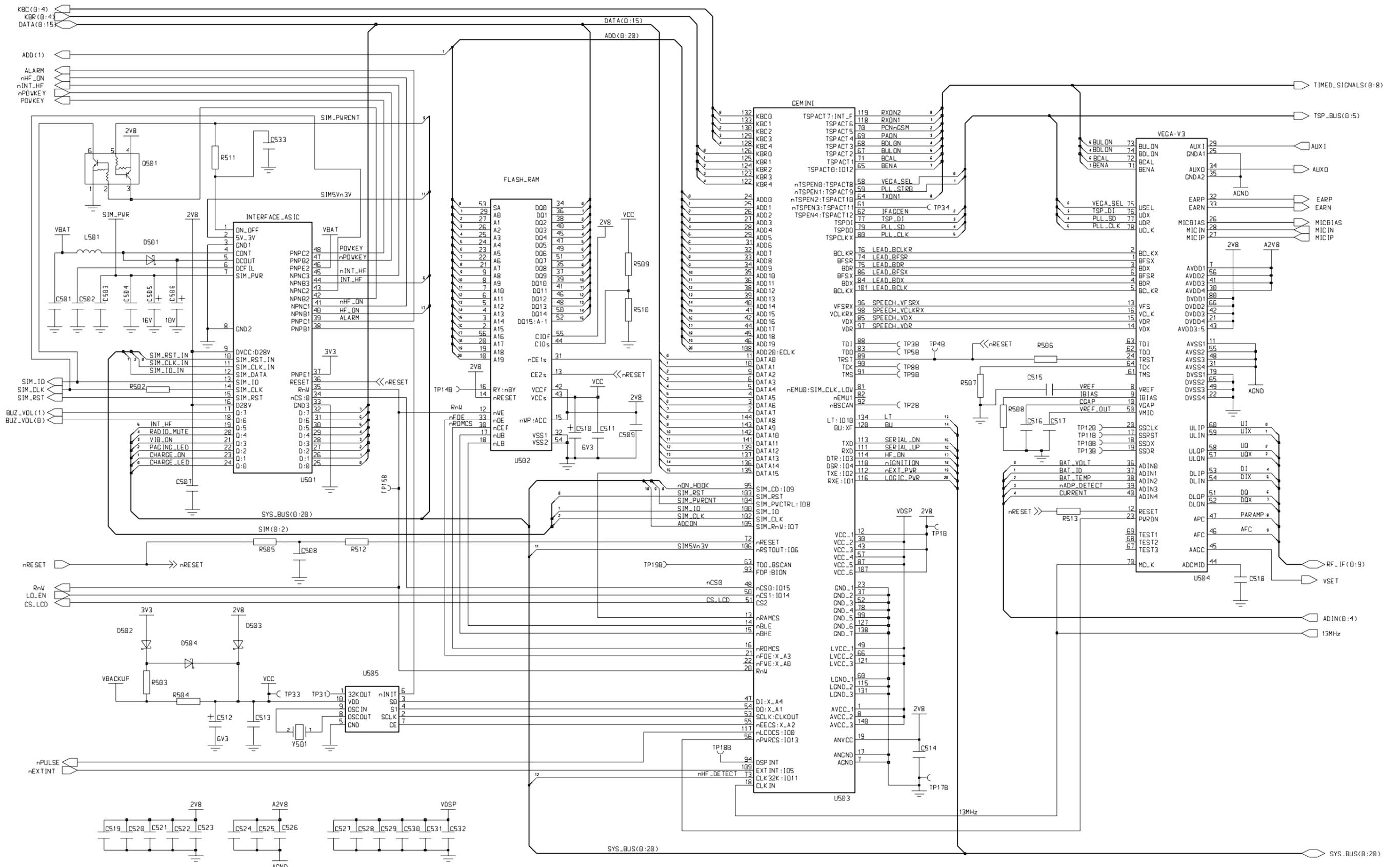


10166-1

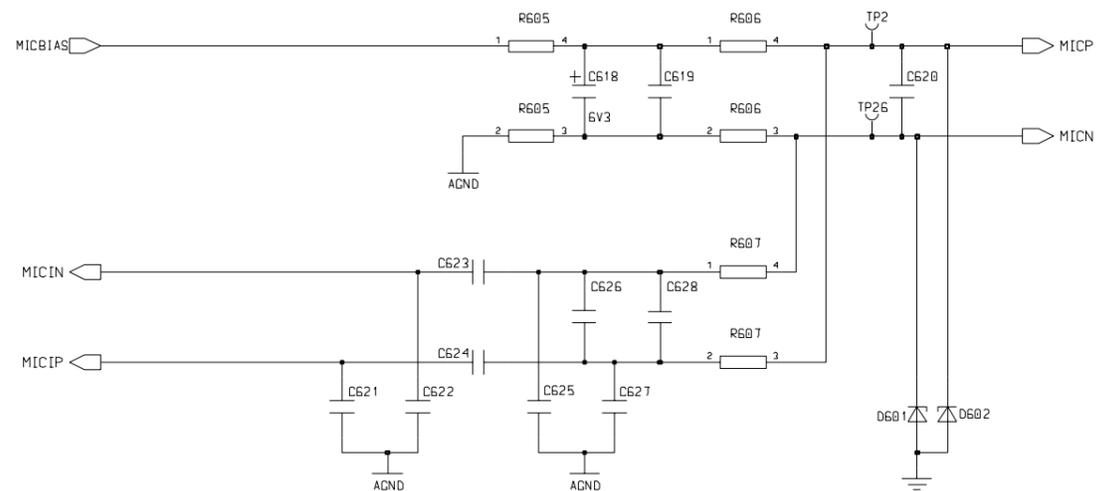
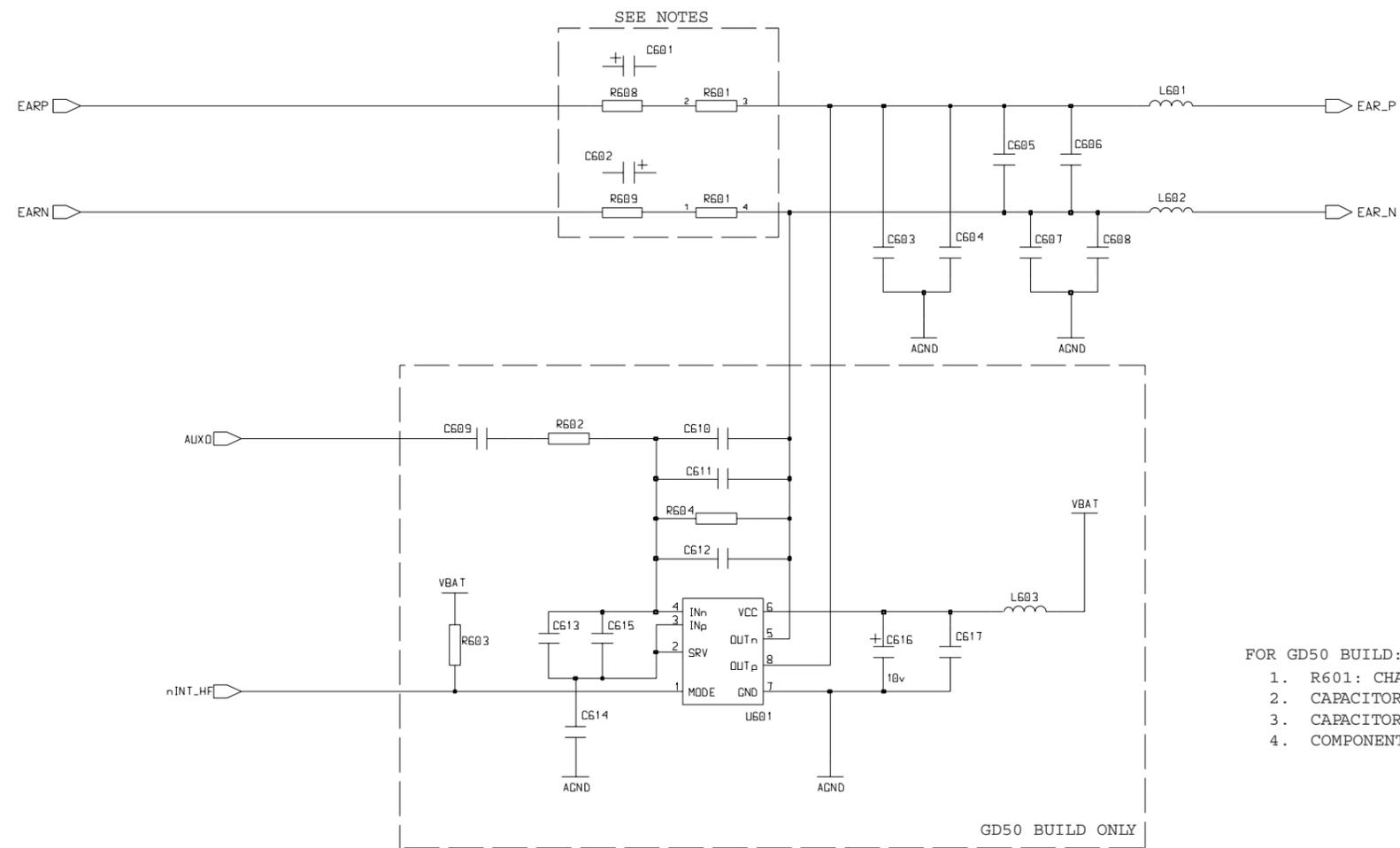
7.4 Main PCB: PSU



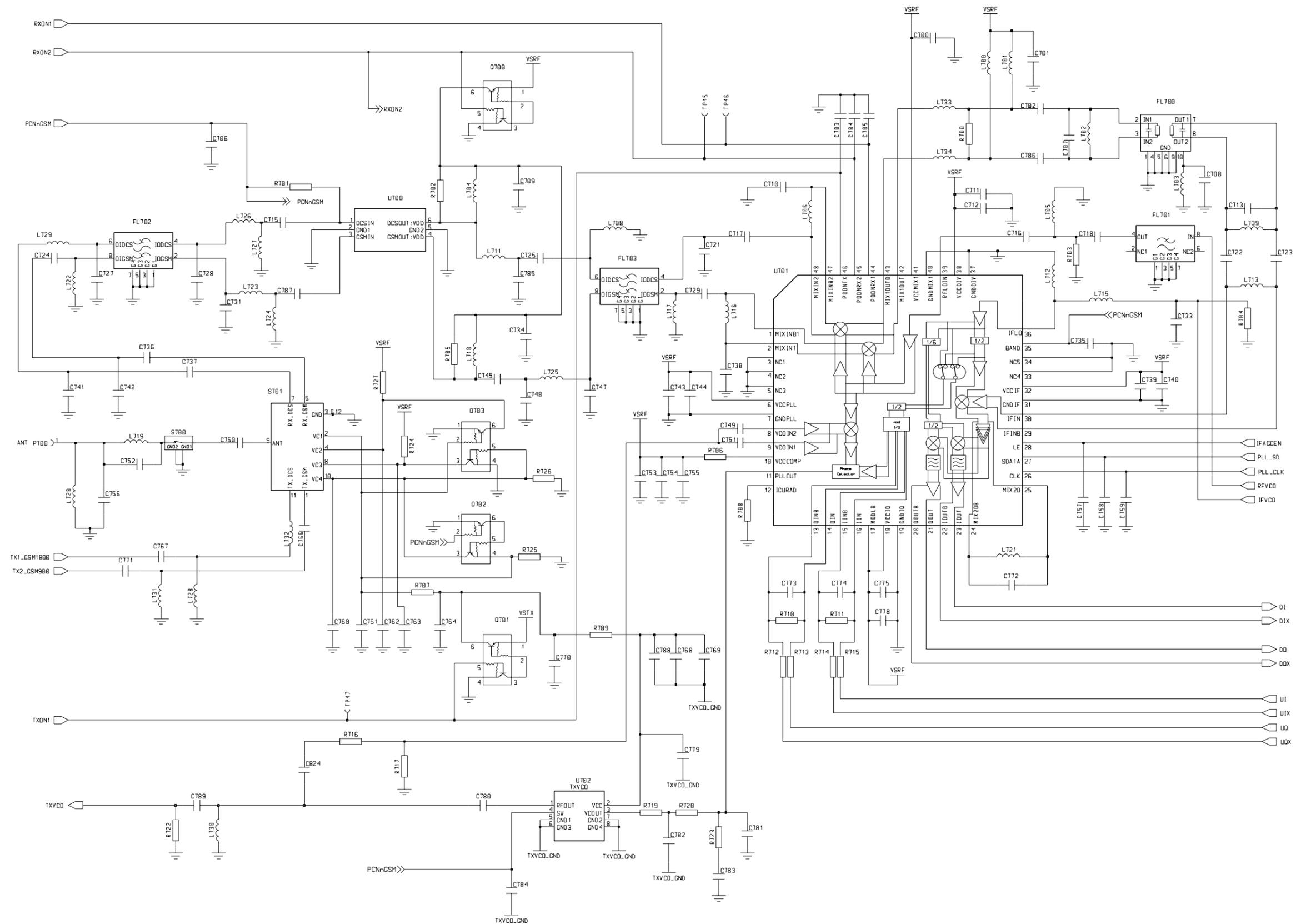
7.5 Main PCB: Processor



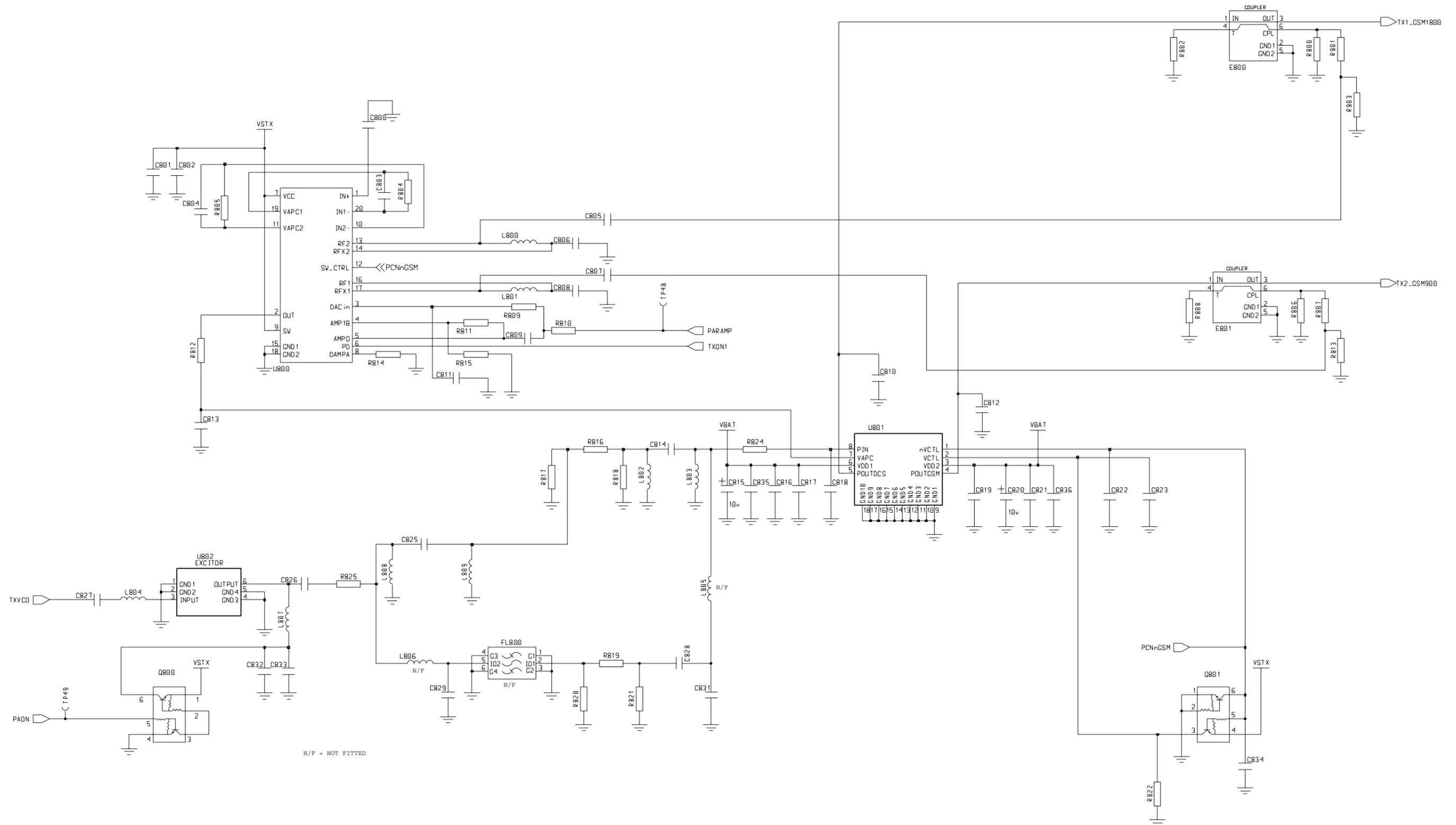
7.6 Main PCB: Audio



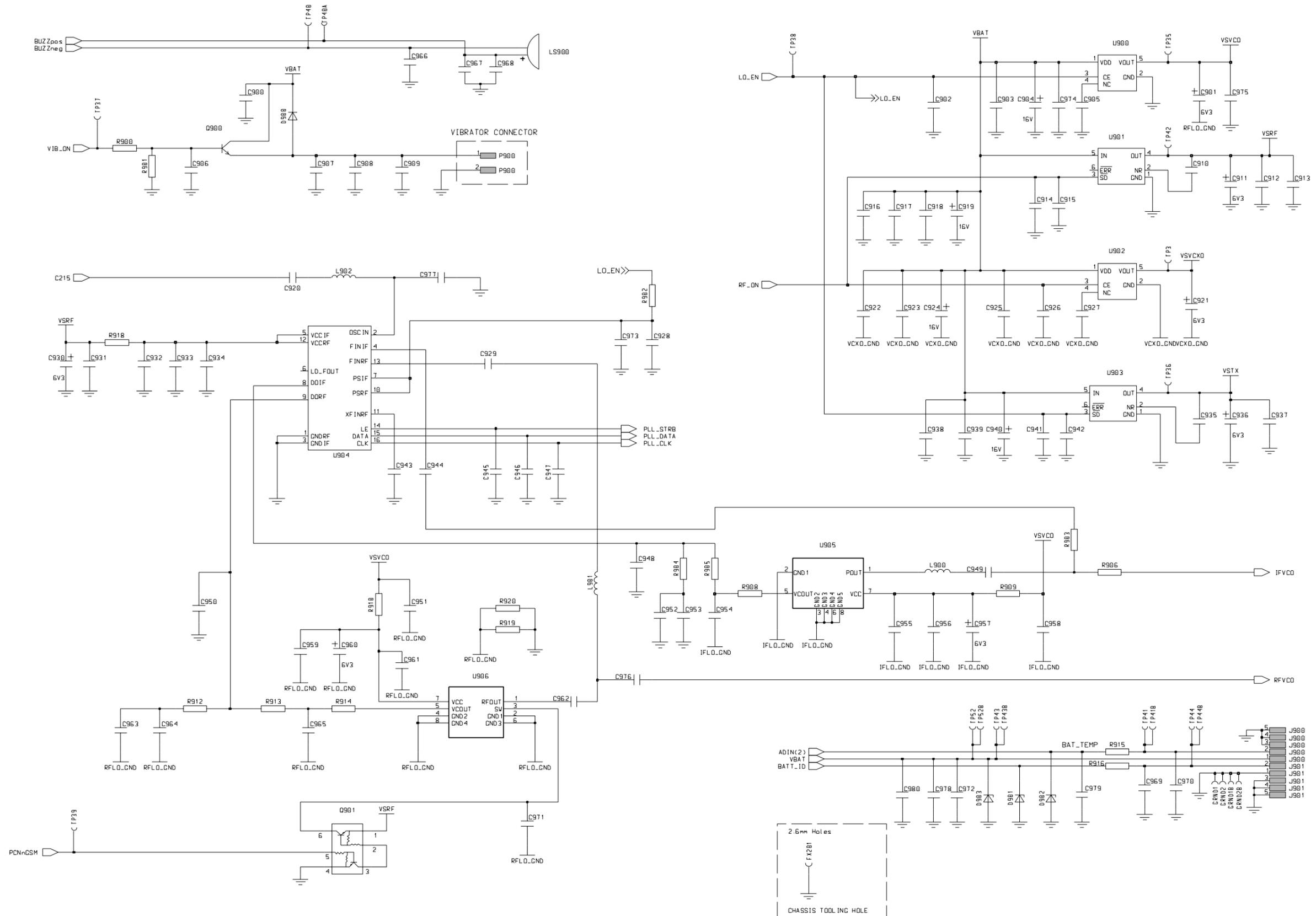
7.7 Main PCB: Receiver and Tx Modulator



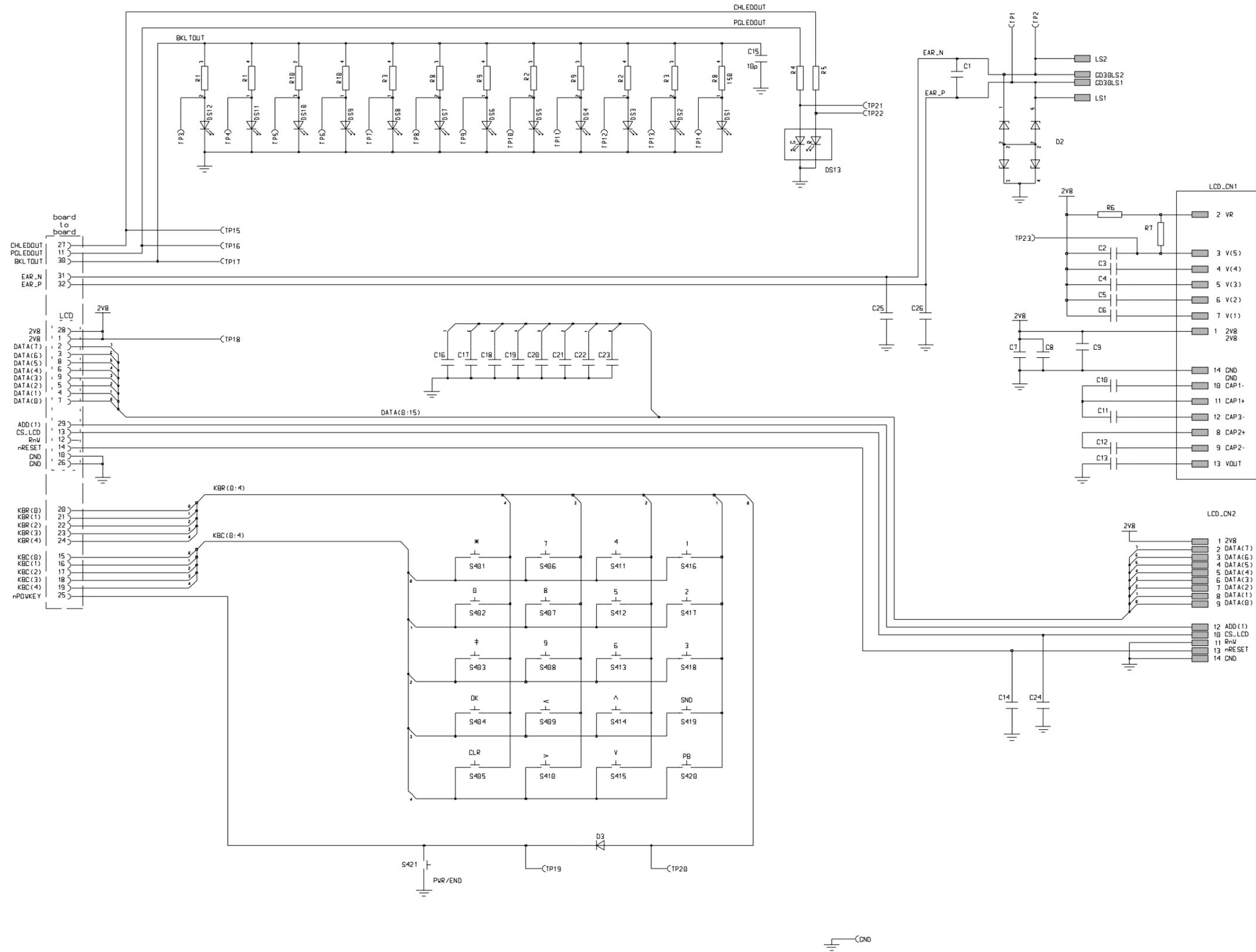
7.8 Main PCB: Transmitter



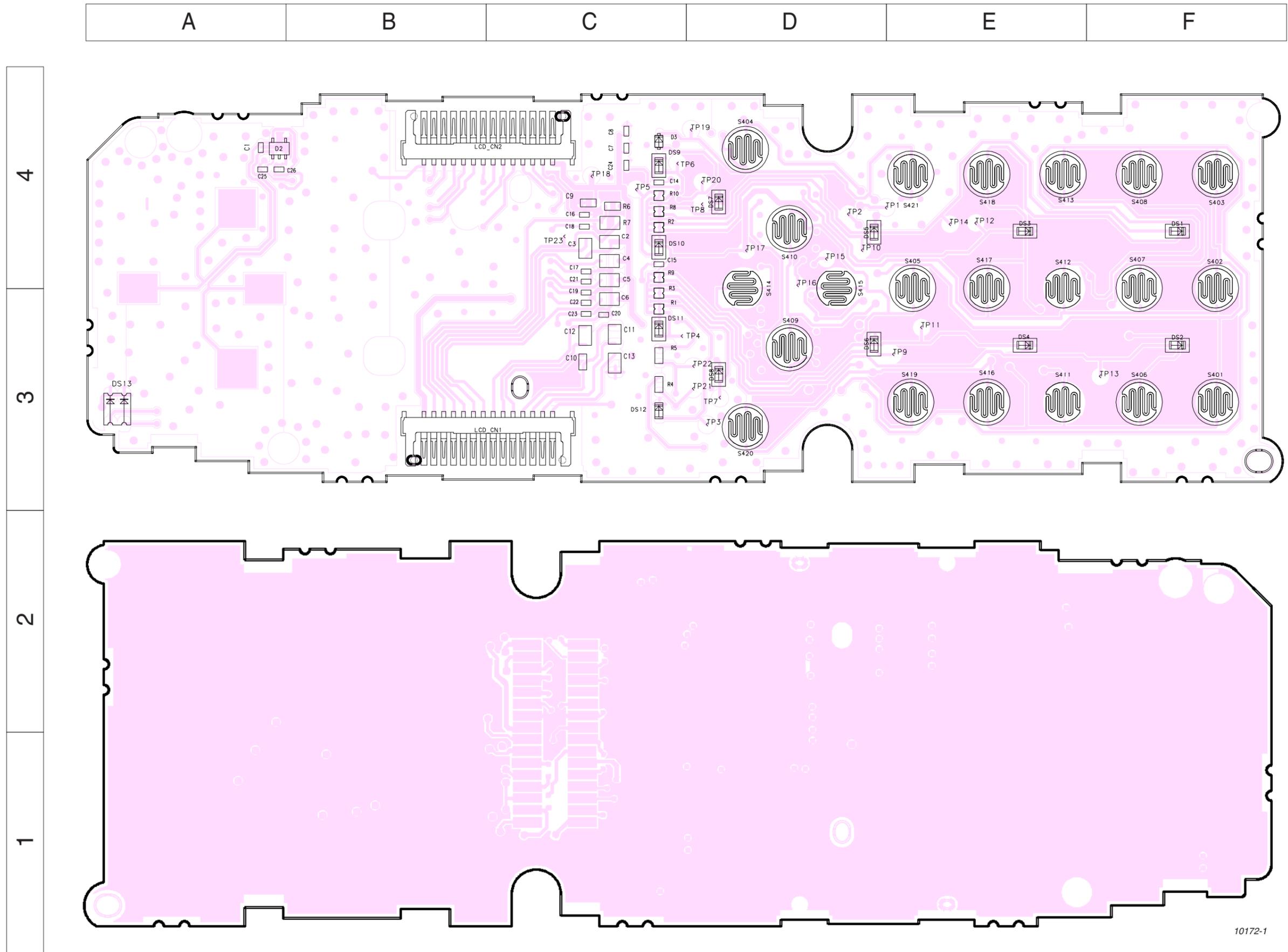
7.9 Main PCB: PSU and Synthesizer



7.10 Keypad PCB



8.2 Keypad PCB

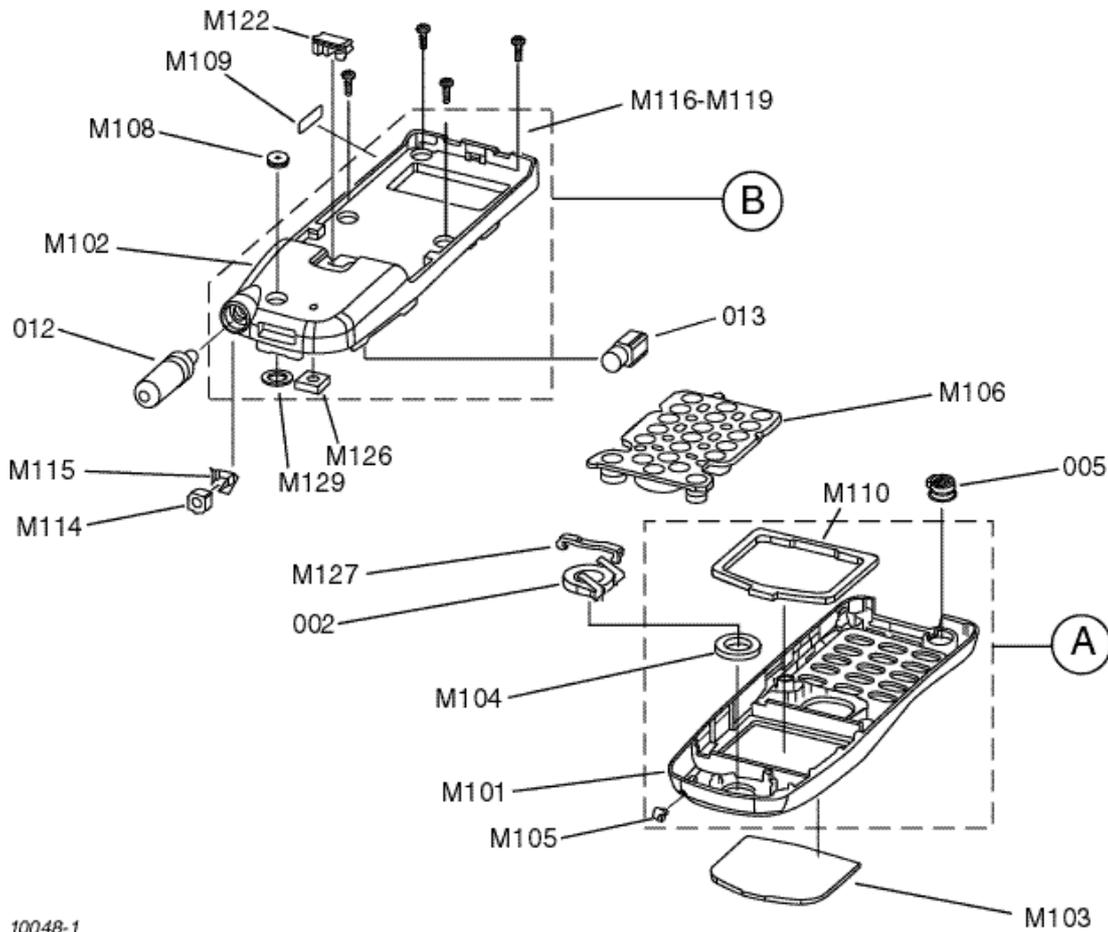


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9 REPLACEMENT PARTS LIST

9.1 Case Parts and Sub-Assemblies

9.1.1 GD30 Case Parts



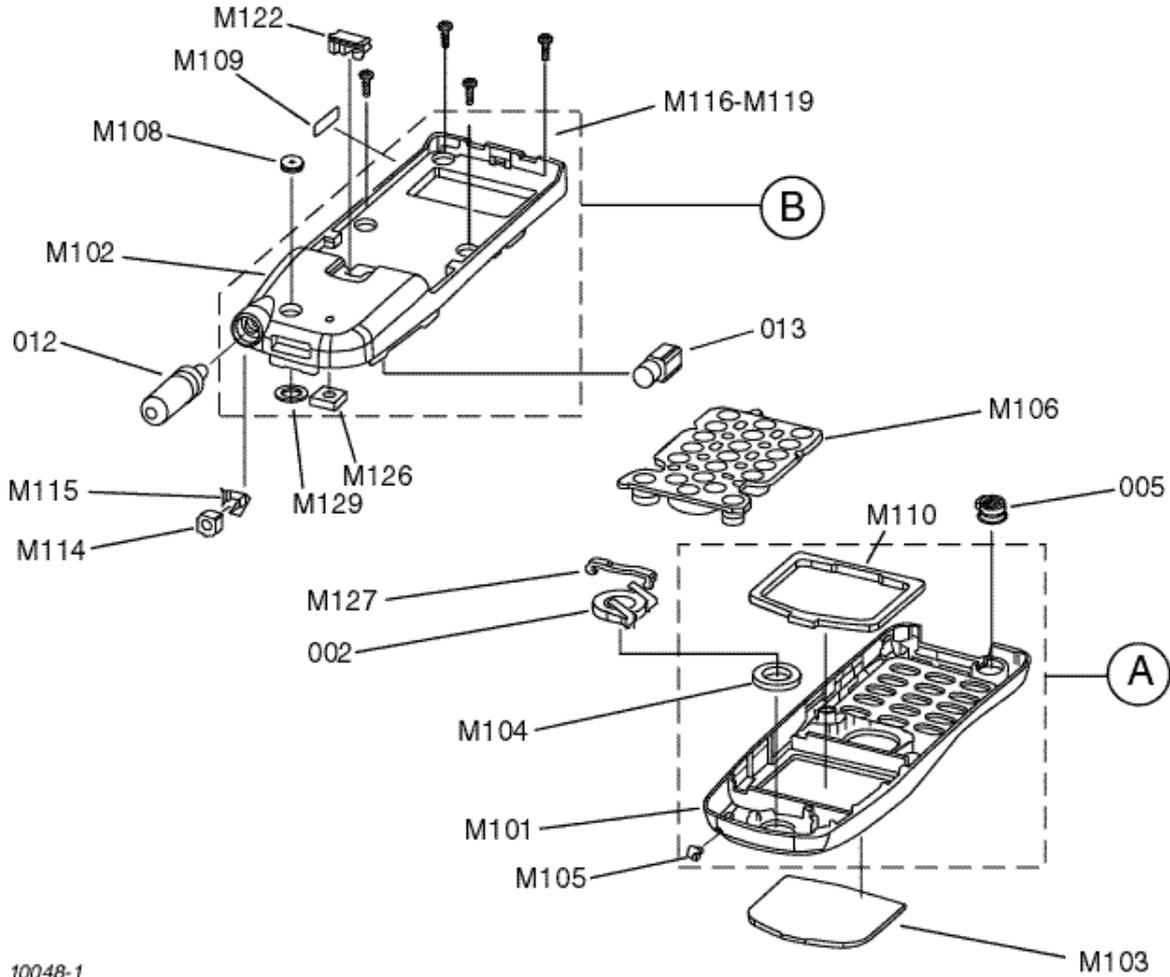
10048-1

Figure 9.1: GD30 Case Parts

Ref	Part Number	Description
M103	2EA551AA	LCD PANEL, STD PANASONIC
M106	2BA517BAAA	KEYPAD
M108	6RA507A	CAP
M109	G5MDS002C	PATENT LABEL
M114	4GA545A	ANTENNA NUT
M115	4GA543A	ANTENNA TERMINAL
M116	3Z70054B	SCREW, M1.6 x 6mm
M117	"	" "
M118	"	" "
M119	"	" "
M122	2AA502A	BATTERY HOOK
M123	4N70042A	BATTERY SPRING
M127	2RA506AACA	RECEIVER RETAINER
002	HH76009A	RECEIVER
005	9ZA652A	MICROPHONE ASSEMBLY
012	AN76031A	ANTENNA
013	BD76013A	VIBRATE MOTOR ASSEMBLY

Ref	Part Number	Description
A	GD30CVR01B	GD30 Cover (Service) Blue
A	GD30CVR01K	GD30 Cover (Service) Black
A	GD30CVR01S	GD30 Cover (Service) Silver
consists of:		
M101	1GA532AA**	GD30 COVER, COLOURED
M104	6HA623A	RECEIVER CUSHION
M105	2QA543A	INDICATOR
M110	6HA617A	LCD CUSHION
B	GD30CAS01	Case Assembly (Service)
consists of:		
M102	1HA519B	GD30/GD50 CASE BACK
M126	6HA661A	BUZZER CUSHION
M129	6HA567A	CUSHION (EXT. ANT. CONN.)

9.1.2 GD50 Case Parts



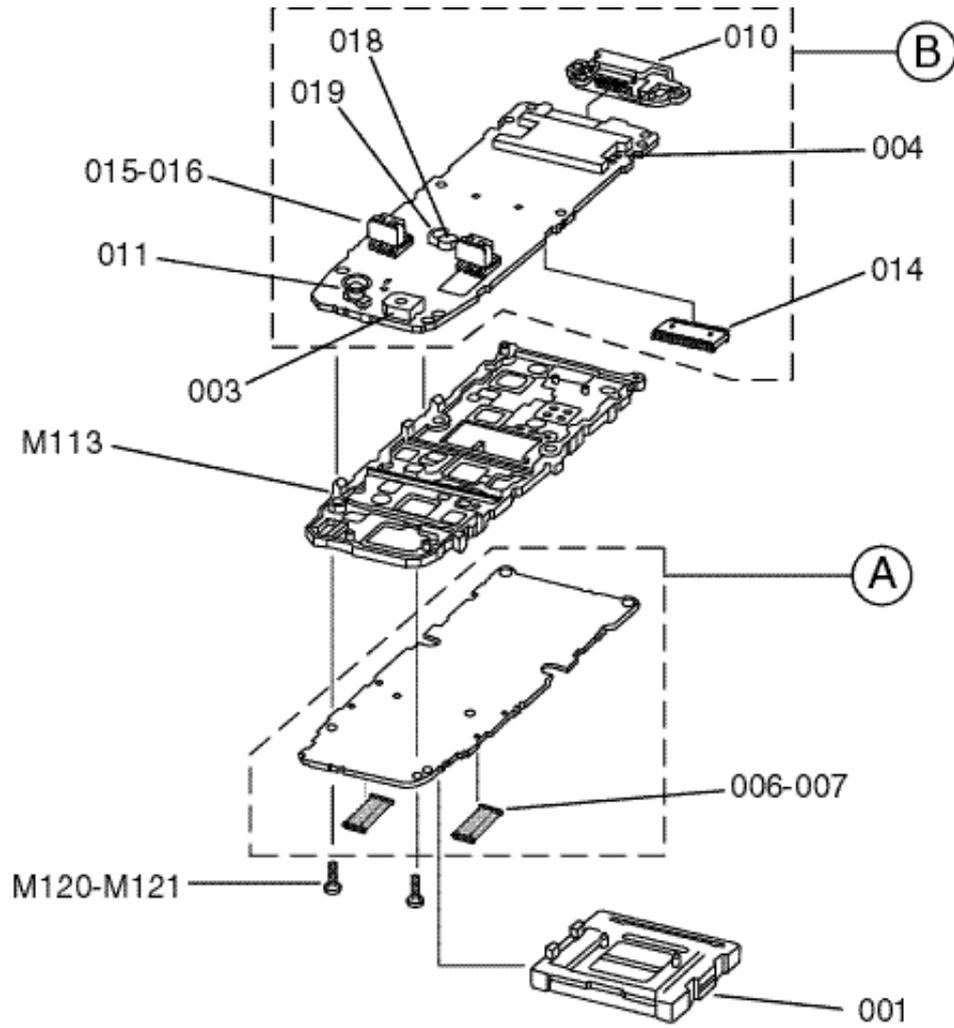
10048-1

Figure 9.2: GD50 Case Parts

Ref	Part Number	Description
M103	2EA563AA	LCD PANEL, STD PANASONIC
M106	2BA518AA	KEYPAD
M108	6RA507A	CAP
M109	G5MDS002C	PATENT LABEL
M114	4GA545A	ANTENNA NUT
M115	4GA543A	ANTENNA TERMINAL
M116	6FA513A	SCREW, M1.6 x 6mm
M117	"	" "
M118	"	" "
M119	"	" "
M122	2AA502A	BATTERY HOOK
M123	4N70042A	BATTERY SPRING
M127	2RA516B	RECEIVER RETAINER
002	HH76002A	RECEIVER
005	9ZA652A	MICROPHONE ASSEMBLY
012	AN76031A	ANTENNA
013	BD76013A	VIBRATE MOTOR ASSEMBLY

Ref	Part Number	Description
A	GD50CVR01B	GD50 Cover (Service) Blue
	GD50CVR01K	GD50 Cover (Service) Black
	GD50CVR01N	GD50 Cover (Service) Green
	GD50CVR01Y	GD50 Cover (Service) Grey
consists of:		
M101	1GA539AA**	GD50 COVER, COLOURED
M104	6HA654A	RECEIVER CUSHION
M105	2QA555A	INDICATOR
M110	6HA617A	LCD CUSHION
B	GD30CAS01	Case Assembly (Service)
	consists of:	
M102	1HA519B	GD30/GD50 CASE BACK
M126	6HA622A	BUZZER CUSHION
M129	6HA567A	CUSHION (EXT. ANT. CONN.)

9.1.3 GD30 and GD50 Sub-Assemblies



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Figure 9.3: GD30/GD50 Sub-Assemblies

Ref	Part Number	Description	Ref	Part Number	Description
M113	2FA525A	CHASSIS	B	(see Sect. 7.2.2)	Main PCB Assembly
M120	3Z70054B (GD30)	SCREW M1.6 x 6mm			
M121	6FA513A (GD50)	" "	includes:		
001	EB-QB03D30UK	LCD MODULE	003	HB76004B	BUZZER
A	GD30KPCB01	Keypad PCB Assembly	004	JS8A00005	SIM HOLDER
			010	JA76020B	I/O CONNECTOR
includes:			011	PY76011B	RF CONNECTOR
006	K1MZ14A00001	LCD CONNECTOR	014	PY76018A	MAIN PCB-TO-KEYBOARD PCB CONNECTOR
007			015	JJ76002A	BATTERY CONTACT
			016		
			018	ML616S	BACKUP BATTERY
			019	K3ZZ00200009	HOLDER, BACKUP BATTERY

9.2 Printed Circuit Boards (PCBs)

9.2.1 Main PCB: Variants

Model: EB-GD30 & EB-GD50			Name: Main PCB (Variants)
Ref.	Part Number		Description
	GD30	GD50	
003	GD30BRD001	GD50BRD001	MAIN PCB STANDARD PROGRAM
003	GD30BRD002	GD50BRD002	MAIN PCB BINARING PROGRAM
003	GD30BRD003	GD50BRD003	MAIN PCB CELCOM PROGRAM
003	GD30BRD004	GD50BRD004	MAIN PCB AIRTEL PROGRAM
003	GD30BRD005	GD50BRD005	MAIN PCB EUROTEL PROGRAM
003	GD30BRD006	GD50BRD006	MAIN PCB MOVISTAR PROGRAM
003	GD30BRD007	GD50BRD007	MAIN PCB S.F.R PROGRAM
003	GD30BRD008	GD50BRD008	MAIN PCB WESTEL PROGRAM
003	GD30BRD009	GD50BRD009	MAIN PCB HUTCHISON PROGRAM
003	GD30BRD010	GD50BRD010	MAIN PCB PLUS GSM PROGRAM
003	GD30BRD011	GD50BRD011	MAIN PCB TURKCELL PROGRAM
003	GD30BRD012	GD50BRD012	MAIN PCB FRANCETEL PROGRAM
003	GD30BRD013	GD50BRD013	MAIN PCB FT FTMS PROGRAM
003	GD30BRD014	GD50BRD014	MAIN PCB TELESTET PROGRAM
003	GD30BRD015	GD50BRD015	MAIN PCB ACTIVA PROGRAM
003	GD30BRD016	GD50BRD016	MAIN PCB TMN PROGRAM
003	GD30BRD017	GD50BRD017	MAIN PCB PANNON PROGRAM
003	GD30BRD018	GD50BRD018	MAIN PCB VODACOM PROGRAM
003	GD30BRD019	GD50BRD019	MAIN PCB NETCOM PROGRAM
003	GD30BRD020	GD50BRD020	MAIN PCB K.P.N PROGRAM
003	GD30BRD021	GD50BRD021	MAIN PCB MOBILCOM PROGRAM
003	GD30BRD022	GD50BRD022	MAIN PCB TELSTRA PROGRAM
003	GD30BRD023	GD50BRD023	MAIN PCB E.R.A PROGRAM
003	GD30BRD024	GD50BRD024	MAIN PCB PAYT VODAFONE PROGRAM
003	GD30BRD025	GD50BRD025	MAIN PCB CHINESE ENABLED PROGRAM

9.2.2 Main PCB: Common Items

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
C101	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F2
C102	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F2
C103	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F2
C104	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	E2
C105	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F2
C106	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	F2
C107	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	F1
C108	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F2
C109	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F2
C110	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E2
C111	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F2
C112	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	F1
C113	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F2
C114	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F2
C115	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F1
C116	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	F1
C117	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	F2
C118	ECUE1H331KBQ	CAP CER 330pF 10% 50V X7R SMD	
C119	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E2
C120	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E2
C122	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	E2
C123	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	C2
C124	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	C2
C125	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	C2
C127	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0	C2
C128	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	D4
C129	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4
C130	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0	D4
C131	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	C4
C132	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	C4

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
C133	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	C4
C135	ECUE1E271KBQ	CAP CER 270pF 10% 25V X7R SMD	C4
C136	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	
C137	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	D2
C138	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	D2
C139	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	D2
C140	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	C4
C141	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	D4
C142	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	
C401	ECJ1VB1C104K	CAP CER 100nF 10% 16V X7R SMD	D1
C402	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	D1
C403	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	E2
C404	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	D1
C405	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	D1
C407	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	D1
C408	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	D1
C409	F3E0J1060006	CAP TANT 10uF 20% 6.3V SMD CAS	B3
C410	F3E0J1060006	CAP TANT 10uF 20% 6.3V SMD CAS	B3
C411	F3F1A1060002	CAP TANT 10uF 20% 10V SMD CASE	E1
C412	YTAJB336M006	CAP TANT 33uF 20% 6V3 SMD CASE	E1
C413	YTAJB336M006	CAP TANT 33uF 20% 6V3 SMD CASE	E1
C414	ECST1CZ474R	CAP TANT 0.47uF 20% 16V SMD CA	E1
C415	F3E0J1060006	CAP TANT 10uF 20% 6.3V SMD CAS	E1
C416	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F1
C417	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	F1
C501	ECJ1VB1C104K	CAP CER 100nF 10% 16V X7R SMD	E1
C502	ECJ1VB1C104K	CAP CER 100nF 10% 16V X7R SMD	F1
C503	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E2
C505	ECST1CZ474R	CAP TANT 0.47uF 20% 16V SMD CA	E2
C506	F3F1A1060002	CAP TANT 10uF 20% 10V SMD CASE	F1
C507	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E1

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
C508	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	B4
C509	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	C4
C510	F3E0J1060006	CAP TANT 10uF 20% 6.3V SMD CAS	C3
C511	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	C3
C512	F3E0J1060006	CAP TANT 10uF 20% 6.3V SMD CAS	B4
C513	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	B4
C514	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	C3
C515	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C516	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C517	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C518	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	E2
C519	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C520	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C521	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E1
C522	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	D2
C523	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E1
C524	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C525	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C526	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E2
C527	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	B3
C528	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	E1
C529	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	B4
C530	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	C3
C531	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	C3
C532	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	
C533	ECJ1VB1C104K	CAP CER 100nF 10% 16V X7R SMD	F1
C603	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C2
C604	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C2
C605	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C2
C606	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C2
C607	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C2

Model: EB-GD30 & EB-GD50				Model: EB-GD30 & EB-GD50			
Name: Main PCB (Common Items)				Name: Main PCB (Common Items)			
Ref.	Part Number	Description	Grid	Ref.	Part Number	Description	Grid
C608	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C2	C723	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0	E3
C618	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	F2	C724	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	A1
C619	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	F2	C725	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B1
C620	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10		C728	ECUE1H0R5CCQ	CAP CER 0.5pF +/-0.25pF 50V NP	B1
C621	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	A4	C729	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0	B1
C622	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E2	C733	ECUE1H080DCQ	CAP CER 8pF +/-0.5pF 50V NP0 S	B1
C623	YCCIX024K333	CAP CER 33nF 10% 10V X5R SMD 1	E2	C734	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	B1
C624	YCCIX024K333	CAP CER 33nF 10% 10V X5R SMD 1	E2	C735	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1
C625	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F2	C736	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	F3
C626	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F2	C737	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	F3
C627	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F2	C738	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	B1
C628	YCCIX027K223	CAP CER 22nF 10% 16V X7R SMD 1	F2	C739	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	B1
C700	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1	C740	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1
C701	ECUE1H391KBQ	CAP CER 390pF 10% 50V X7R SMD	B1	C743	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	B1
C702	ECUE1H471KBQ	CAP CER 470pF 10% 50V X7R SMD	E3	C744	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1
C703	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1	C745	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	B1
C704	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1	C748	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	B1
C705	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1	C749	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	E4
C706	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	B1	C750	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F3
C707	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	E3	C751	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	E4
C708	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0	E3	C752	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	A1
C709	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B1	C753	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	B2
C710	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	B1	C754	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B1
C711	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B1	C755	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	B1
C712	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	B1	C760	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F3
C715	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	B1	C761	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	A1
C716	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	B1	C762	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	A1
C717	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B1	C763	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F3
C718	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B1	C764	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B2
C721	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0	B1	C766	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	F3
C722	ECUE1H040CCQ	CAP CER 4pF +/-0.25pF 50V NP0	E3	C767	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	A1

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
C768	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	E4
C769	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	E4
C770	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E4
C771	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	A1
C772	ECUE1H390JCQ	CAP CER 39pF 5% 50V NP0 SMD 10	B2
C773	ECUE1H181JCQ	CAP CER 180pF 5% 50V X7R SMD 1	B2
C774	ECUE1H181JCQ	CAP CER 180pF 5% 50V X7R SMD 1	B2
C775	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	B2
C778	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B2
C779	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E4
C780	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E4
C781	ECUE1H471KBQ	CAP CER 470pF 10% 50V X7R SMD	B1
C782	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	E3
C783	ECJ1VB1E273K	CAP CER 27nF 10% 25V X7R SMD 1	B2
C784	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	E3
C785	ECUE1H010CCQ	CAP CER 1pF +/-0.25pF 50V NP0	B1
C786	ECUE1H471KBQ	CAP CER 470pF 10% 50V X7R SMD	E3
C787	ECUE1H090DCQ	CAP CER 9pF +/-0.5pF 50V NP0 S	B1
C788	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	E4
C789	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	E4
C801	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	F4
C802	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	F4
C803	ECUE1H151JCQ	CAP CER 150pF 5% 50V NP0 SMD 1	F3
C804	ECUE1H151JCQ	CAP CER 150pF 5% 50V NP0 SMD 1	F4
C805	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	F3
C806	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	F3
C807	ECUE1H2R7CCQ	CAP CER 2.7pF +/-0.25pF 50V NP	F3
C808	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0	F3
C809	ECUE1H820JCQ	CAP CER 82pF 5% 50V NP0 SMD 10	F4
C811	ECUE1H820JCQ	CAP CER 82pF 5% 50V NP0 SMD 10	F4
C814	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B2

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
C815	F3F1A1060002	CAP TANT 10uF 20% 10V SMD CASE	B2
C816	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	A1
C820	F3F1A1060002	CAP TANT 10uF 20% 10V SMD CASE	A1
C821	ECUE1H120JCQ	CAP CER 12pF 5% 50V NP0 SMD 10	A1
C822	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	A2
C823	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	A2
C824	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E4
C825	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0	B2
C826	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B2
C827	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	E4
C832	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	E4
C833	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	E4
C834	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F3
C835	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	B2
C900	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1
C901	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	C2
C902	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4
C903	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4
C904	F3F1C475A004	CAP TANT 4.7uF 20% 16V SMD CAS	C2
C906	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1
C907	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	C1
C908	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	B2
C909	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0	C1
C910	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	C1
C911	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	C1
C912	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B1
C913	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1
C914	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	C1
C915	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1
C916	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1
C917	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	C1

Model: EB-GD30 & EB-GD50				Model: EB-GD30 & EB-GD50			
Name: Main PCB (Common Items)				Name: Main PCB (Common Items)			
Ref.	Part Number	Description	Grid	Ref.	Part Number	Description	Grid
C918	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	C1	C951	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	C2
C919	F3F1C475A004	CAP TANT 4.7uF 20% 16V SMD CAS	C1	C952	ECJ1VB1H103K	CAP CER 10nF 10% 50V X7R SMD 1	C2
C920	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	D4	C953	F1G1A4730003	CAP CER 47nF 10% 16V X7R SMD 1	C2
C921	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	C1	C954	ECUE1H221JCQ	CAP CER 220pF 5% 50V NP0 SMD 1	C2
C922	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	C1	C955	ECUE1H391KBQ	CAP CER 390pF 10% 50V X7R SMD	C2
C923	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	C1	C956	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	C2
C924	F3F1C475A004	CAP TANT 4.7uF 20% 16V SMD CAS	C1	C957	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	C2
C925	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1	C959	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	C2
C926	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1	C960	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	C2
C928	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	D4	C961	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C2
C929	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C2	C962	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1
C930	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	D4	C964	ECHU1C333JB5	CAP FILM 33nF 5% 16V SMD 3216	C2
C931	F1G1A104A012	CAP CER 100nF 10% 10V X5R SMD	D4	C965	ECUE1H681KBQ	CAP CER 680pF 10% 50V X7R SMD	C2
C932	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4	C966	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	F4
C933	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	D4	C967	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	F4
C934	ECUE1H030CCQ	CAP CER 3pF +/-0.25pF 50V NP0	D4	C968	ECUE1H101JCQ	CAP CER 100pF 5% 50V NP0 SMD 1	F4
C935	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	B2	C969	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E4
C936	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	B2	C970	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E3
C937	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B2	C971	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	C1
C938	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	B2	C972	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	E3
C939	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	B2	C973	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	D4
C940	F3F1C475A004	CAP TANT 4.7uF 20% 16V SMD CAS	B2	C974	ECUE1H060DCQ	CAP CER 6pF +/-0.5pF 50V NP0 S	E4
C941	ECUE1C103KBQ	CAP CER 10nF 10% 16V X7R SMD 1	B2	C975	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4
C942	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	B2	C976	ECUE1H020CCQ	CAP CER 2pF +/-0.25pF 50V NP0	C1
C944	ECUE1H121JCQ	CAP CER 120pF 5% 50V NP0 SMD 1	D4	C977	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	D4
C945	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4	C978	ECUE1H120JCQ	CAP CER 12pF 5% 50V NP0 SMD 10	E3
C946	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4	C979	ECUE1H102KBQ	CAP CER 1nF 10% 50V X7R SMD 10	E3
C947	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D4	C980	ECUE1H120JCQ	CAP CER 12pF 5% 50V NP0 SMD 10	E3
C948	ECUE1C682KBQ	CAP CER 6.8nF 10% 16V X7R SMD	C2	D101	B0KB00000010	SUPPRESSOR ESD 4 ELEMENTS SMD	A3
C949	ECUE1H121JCQ	CAP CER 120pF 5% 50V NP0 SMD 1	C2	D102	B0KB00000010	SUPPRESSOR ESD 4 ELEMENTS SMD	A4
C950	ECUE1E332KBQ	CAP CER 3.3nF 10% 25V X7R SMD	C2	D103	B0KB00000010	SUPPRESSOR ESD 4 ELEMENTS SMD	A3

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
D104	B0KB00000010	SUPPRESSOR ESD 4 ELEMENTS SMD	A3
D105	B0JCDD000001	DIODE RB521S-30 SCHOTTKY 30V 2	F2
D106	B0JCDD000001	DIODE RB521S-30 SCHOTTKY 30V 2	F1
D107	B0KB00000010	SUPPRESSOR ESD 4 ELEMENTS SMD	F2
D108	MA2Z07700L	DIODE MA77 100mA SMD S-MINI 2	C4
D401	B0ADEJ000010	DIODE ARRAY QUAD SW SMD UMD6	F1
D402	MA2S111TX	DIODE MA2S111 80V 100mA SMD SS	F1
D403	MA2S111TX	DIODE MA2S111 80V 100mA SMD SS	F1
D404	B0JCMC000004	DIODE SHOTTKY 20V 1A SMD SC-59	E1
D405	B0JCDD000001	DIODE RB521S-30 SCHOTTKY 30V 2	D1
D406	MA2S111TX	DIODE MA2S111 80V 100mA SMD SS	F1
D501	B0JCDD000001	DIODE RB521S-30 SCHOTTKY 30V 2	F1
D502	B0JCDD000001	DIODE RB521S-30 SCHOTTKY 30V 2	B4
D503	B0JCDD000001	DIODE RB521S-30 SCHOTTKY 30V 2	B4
D504	B0JCDD000001	DIODE RB521S-30 SCHOTTKY 30V 2	B4
D601	MAZS0470GL	DIODE MAZS0470G ZENER 4.7V SMD	A4
D602	MAZS0470GL	DIODE MAZS0470G ZENER 4.7V SMD	A4
D900	MA2S111TX	DIODE MA2S111 80V 100mA SMD SS	C1
D901	MAZS0620ML	DIODE ZENER 6V2 SMD SS-MINI 2P	D4
D902	MAZS0620ML	DIODE ZENER 6V2 SMD SS-MINI 2P	E3
D903	MAZS0620ML	DIODE ZENER 6V2 SMD SS-MINI 2P	D3
E800	B9Z000000019	COUPLER 1.747GHz SMD 2012 6PIN	A1
E801	B9Z000000018	COUPLER 897.5 MHz SMD 2012 6PI	A1
FL700	EFCH225MDQP1	FILTER IF SAW 225MHz SMD 7.2x5	E3
FL701	J0E1417B0001	FILTER LC 1412.5MHz SMD 2012	C1
FL702	EFCH9418MTY2	FILTER SAW RX GSM/PCN SMD 3.8x	A1
FL703	EFCH9418MTY2	FILTER SAW RX GSM/PCN SMD 3.8x	B1
J100	JA76020B	CONNECTOR SKT I/O 18 WAY SMD	F1
J101	K3ZZ00200009	HOLDER FOR BATTERY CELL	D4
J900	JJ76002A	CONNECTOR BATTERY 2 WAY SMD	E3
J901	JJ76002A	CONNECTOR BATTERY 2 WAY SMD	E4

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
L101	G1CR47J00006	INDUCTOR 470nH 5% SMD 2012	C4
L102	G1CR47J00006	INDUCTOR 470nH 5% SMD 2012	C4
L103	G1C82NJ00010	INDUCTOR 82nH 5% SMD 1005	C4
L104	G1C10NJ00008	INDUCTOR 10nH 5% SMD 1005	C4
L106	ELJRF47NJF2	INDUCTOR 47nH 5% SMD 1005	C4
L501	G1A101C00002	INDUCTOR 100uH 30% 1.73 OHM 0.	E1
L601	G1C82NJ00008	INDUCTOR 82nH 5% SMD 1608	D2
L602	G1C82NJ00008	INDUCTOR 82nH 5% SMD 1608	D2
L700	G1CR10J00010	INDUCTOR 100nH 5% SMD 1005	B2
L701	G1CR10J00010	INDUCTOR 100nH 5% SMD 1005	B1
L702	G1CR12J00003	INDUCTOR 120nH 5% SMD 1608	E3
L703	G1C82NJ00009	INDUCTOR 82nH 5% SMD 1608	E3
L704	ELJRF18NJF2	INDUCTOR 18nH 5% SMD 1005	B2
L705	G1C4N7Z00004	INDUCTOR 4.7nH +/-0.3nH SMD 10	B1
L706	G1C2N7Z00007	INDUCTOR 2.7nH +/-0.3nH SMD 10	B2
L709	G1C68NJ00007	INDUCTOR 68nH 5% SMD 1608	E3
L711	ELJRF12NJF2	INDUCTOR 12nH 5% SMD 1005	B1
L713	G1CR10J00010	INDUCTOR 100nH 5% SMD 1005	E3
L715	ELJRF33NJF2	INDUCTOR 33nH 5% SMD 1005	B1
L716	ELJRF12NJF2	INDUCTOR 12nH 5% SMD 1005	B1
L717	ELJRF22NJF2	INDUCTOR 22nH 5% SMD 1005	B1
L718	ELJRF12NJF2	INDUCTOR 12nH 5% SMD 1005	B1
L720	G1C10NJ00008	INDUCTOR 10nH 5% SMD 1005	A1
L721	G1CR22J00006	INDUCTOR 220nH 5% SMD 1608	B2
L722	ELJRF18NJF2	INDUCTOR 18nH 5% SMD 1005	A1
L723	ELJRF39NJF2	INDUCTOR 39nH 5% SMD 1005	B2
L724	ELJRF39NJF2	INDUCTOR 39nH 5% SMD 1005	B2
L725	ELJRF18NJF2	INDUCTOR 18nH 5% SMD 1005	B1
L726	ELJRF6N8JF2	INDUCTOR 6.8nH 5% SMD 1005	B2
L727	ELJRF8N2JF2	INDUCTOR 8.2nH 5% SMD 1005	B2
L729	ELJRF2N2DF2	INDUCTOR 2.2nH +/-0.3nH SMD 10	A1

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
Q900	2SD1511RSTX	TRANSISTOR 2SD1511RSTX NPN HFE	C1
Q901	B1GKCFNE0001	TRANSISTOR RN4905 DUAL NPN PNP	
R101	ERJ2GEJ102X	RES 1K OHM 5% 1/16W SMD 1005	F2
R102	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	F2
R103	ERJ2GEJ331X	RES 330 OHM 5% 1/16W SMD 1005	F2
R104	EXB24V331JX	RES NETWORK 330 OHMx2 5% 1/16W	F2
R105	EXB24V331JX	RES NETWORK 330 OHMx2 5% 1/16W	F1
R106	ERJ2GEJ332X	RES 3.3K OHM 5% 1/16W SMD 1005	F2
R107	ERJ3GEYF104V	RES 100K OHM 1% 1/16W SMD 1608	F1
R108	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	E1
R109	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	F2
R110	ERJ2GEJ331X	RES 330 OHM 5% 1/16W SMD 1005	F2
R111	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	
R112	ERJ2GEJ472X	RES 4.7K OHM 5% 1/16W SMD 1005	E1
R113	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	A4
R114	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	B2
R115	ERJ2GEJ472X	RES 4.7K OHM 5% 1/16W SMD 1005	D2
R116	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	C4
R117	ERJ2GEJ101X	RES 100 OHM 5% 1/16W SMD 1005	C4
R118	ERJ2GEJ682X	RES 6.8K OHM 5% 1/16W SMD 1005	C4
R119	ERJ2GEJ221X	RES 220 OHM 5% 1/16W SMD 1005	D2
R120	ERJ2GEJ681X	RES 680 OHM 5% 1/16W SMD 1005	D2
R121	ERJ2GEJ223X	RES 22K OHM 5% 1/16W SMD 1005	C2
R122	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	C4
R123	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	D4
R124	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	D4
R125	EXB24V331JX	RES NETWORK 330 OHMx2 5% 1/16W	F2
R126	EXB24V331JX	RES NETWORK 330 OHMx2 5% 1/16W	F1
R401	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	D1
R403	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	B3
R404	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	F1

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
L730	ELJRF8N2JF2	INDUCTOR 8.2nH 5% SMD 1005	E4
L731	ELJRF18NJF2	INDUCTOR 18nH 5% SMD 1005	F3
L732	G1C5N6Z00005	INDUCTOR 5.6nH +/-0.3nH SMD 10	F3
L733	ELJRF18NJF2	INDUCTOR 18nH 5% SMD 1005	B2
L734	ELJRF18NJF2	INDUCTOR 18nH 5% SMD 1005	B1
L800	G1C4N7Z00004	INDUCTOR 4.7nH +/-0.3nH SMD 10	F3
L801	G1C15NJ00008	INDUCTOR 15nH 5% SMD 1005	F3
L804	G1C5N6Z00005	INDUCTOR 5.6nH +/-0.3nH SMD 10	E4
L807	ELJRF22NJF2	INDUCTOR 22nH 5% SMD 1005	E4
L808	G1C15NJ00008	INDUCTOR 15nH 5% SMD 1005	B2
L809	G1C15NJ00008	INDUCTOR 15nH 5% SMD 1005	B2
L900	ELJRF6N8JF2	INDUCTOR 6.8nH 5% SMD 1005	C2
L901	ELJRF8N2JF2	INDUCTOR 8.2nH 5% SMD 1005	C2
L902	ELJRF22NJF2	INDUCTOR 22nH 5% SMD 1005	D4
LS900	HB76004B	BUZZER GD90	F4
P100	PY76018A	CONNECTOR BOARD TO BOARD 2x16	D1
Q101	B1GFCFEM0001	TRANSISTOR UMH10TN DUAL NPN WI	F2
Q102	B1ABCB000024	TRANSISTOR 2SC4226 NPN SMD SOT	C2
Q401	2SD2216TX	TRANSISTOR 2SD2216TX NPN SMD S	E1
Q402	B1DHCC000012	TRANSISTOR SI3441DV MOSFET -20	E1
Q403	B1GKGFBJ0001	TRANSISTOR IMD14 DUAL SMD SMT6	C1
Q404	B1GKGFBJ0001	TRANSISTOR IMD14 DUAL SMD SMT6	C1
Q405	B1CFJC000001	TRANSISTOR FDG6301N DUAL N-CH	E1
Q406	B1ADPC000003	TRANSISTOR 2SB1424T100R PNP SM	E1
Q501	B1GKCFLL0006	TRANSISTOR UMD2N DUAL SMD UMT6	F2
Q700	B1GKCFNE0001	TRANSISTOR RN4905 DUAL NPN PNP	B1
Q701	B1GKCFNE0001	TRANSISTOR RN4905 DUAL NPN PNP	B2
Q702	B1GKCFLL0006	TRANSISTOR UMD2N DUAL SMD UMT6	F3
Q703	B1GFCFEM0001	TRANSISTOR UMH10TN DUAL NPN WI	
Q800	B1GKCFNE0001	TRANSISTOR RN4905 DUAL NPN PNP	E4
Q801	XP0431200L	TRANSISTOR XP4312 DUAL NPN PNP	A2

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
R405	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	E1
R406	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	D1
R407	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	D1
R408	ERJ2GEJ473X	RES 47K OHM 5% 1/16W SMD 1005	E1
R409	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	E1
R410	ERJ2GEJ123X	RES 12K OHM 5% 1/16W SMD 1005	E1
R411	D1BDR1500001	RESISTOR 0.15 OHM 1% 1/4W SMD	D1
R412	ERJ6GEYJ330V	RES 33 OHM 5% 1/10W SMD 2012	D1
R413	ERJ2GEJ153X	RES 15K OHM 5% 1/16W SMD 1005	D1
R414	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	D1
R415	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	D1
R416	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	D1
R417	ERJ6GEYJ270V	RES 27 OHM 5% 1/10W SMD 2012	C1
R418	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	D1
R419	ERJ6GEYJ560V	RES 56 OHM 5% 1/10W SMD 2012	C1
R420	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	E1
R421	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	E1
R502	ERJ2GEJ470X	RES 47 OHM 5% 1/16W SMD 1005	E1
R503	ERJ2GEJ222X	RES 2.2K OHM 5% 1/16W SMD 1005	B4
R504	ERJ2GEJ472X	RES 4.7K OHM 5% 1/16W SMD 1005	B4
R505	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	B4
R506	ERJ2GEJ223X	RES 22K OHM 5% 1/16W SMD 1005	B4
R507	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	E1
R508	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	E2
R510	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	C3
R511	ERJ2GEJ102X	RES 1K OHM 5% 1/16W SMD 1005	E1
R512	ERJ2GEJ102X	RES 1K OHM 5% 1/16W SMD 1005	B4
R513	ERJ2GEJ102X	RES 1K OHM 5% 1/16W SMD 1005	E2
R604	ERJ2GEJ223X	RES 22K OHM 5% 1/16W SMD 1005	D2
R605	EXB24V331JX	RES NETWORK 330 OHMx2 5% 1/16W	F2
R606	EXB24V122JX	RES NETWORK 1.2K OHMx2 5% 1/16	F2

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
R607	EXB24V331JX	RES NETWORK 330 OHMx2 5% 1/16W	F2
R701	ERJ2GEJ393X	RES 39K OHM 5% 1/16W SMD 1005	B1
R702	ERJ2GEJ392X	RES 3.9K OHM 5% 1/16W SMD 1005	B1
R703	ERJ2GEJ510X	RES 51 OHM 5% 1/16W SMD 1005	B1
R705	ERJ2GEJ392X	RES 3.9K OHM 5% 1/16W SMD 1005	B1
R706	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	B2
R707	ERJ2GEJ100X	RES 10 OHM 5% 1/16W SMD 1005	B2
R708	ERJ2GEF223X	RES 22K OHM 1% 1/16W SMD 1005	B2
R709	ERJ2GEJ4R7X	RES 4.7 OHM 5% 1/16W SMD 1005	E4
R710	ERJ2GEF682X	RES 6.8K OHM 1% 1/16W SMD 1005	B2
R711	ERJ2GEF682X	RES 6.8K OHM 1% 1/16W SMD 1005	B2
R712	ERJ2GEF222X	RES 2.2K OHM 1% 1/16W SMD 1005	B2
R713	ERJ2GEF222X	RES 2.2K OHM 1% 1/16W SMD 1005	B2
R714	ERJ2GEF222X	RES 2.2K OHM 1% 1/16W SMD 1005	B2
R715	ERJ2GEF222X	RES 2.2K OHM 1% 1/16W SMD 1005	B2
R716	ERJ2GEJ391X	RES 390 OHM 5% 1/16W SMD 1005	E4
R719	ERJ2GEJ100X	RES 10 OHM 5% 1/16W SMD 1005	E3
R720	ERJ2GEJ471X	RES 470 OHM 5% 1/16W SMD 1005	E3
R723	ERJ2GEJ470X	RES 47 OHM 5% 1/16W SMD 1005	B2
R724	ERJ2GEJ122X	RES 1.2K OHM 5% 1/16W SMD 1005	F3
R725	ERJ2GEJ122X	RES 1.2K OHM 5% 1/16W SMD 1005	F3
R726	ERJ2GEJ122X	RES 1.2K OHM 5% 1/16W SMD 1005	F3
R727	ERJ2GEJ122X	RES 1.2K OHM 5% 1/16W SMD 1005	F3
R800	ERJ2GEJ820X	RES 82 OHM 5% 1/16W SMD 1005	A1
R801	ERJ2GEJ101X	RES 100 OHM 5% 1/16W SMD 1005	A1
R802	ERJ2GEJ510X	RES 51 OHM 5% 1/16W SMD 1005	A1
R803	ERJ2GEJ820X	RES 82 OHM 5% 1/16W SMD 1005	A1
R804	ERJ2GEJ223X	RES 22K OHM 5% 1/16W SMD 1005	F3
R805	ERJ2GEJ123X	RES 12K OHM 5% 1/16W SMD 1005	F3
R806	ERJ2GEJ750X	RES 75 OHM 5% 1/16W SMD 1005	A1
R807	ERJ2GEJ101X	RES 100 OHM 5% 1/16W SMD 1005	A1

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
U101	TX76001A	TCVCXO 13MHz SMD 7.0x5.0x1.7 4	D2
U401	UY76051A	IC BA3891KV CHARGE ASIC SMD QF	D1
U402	C0DBAFC00007	IC R1111N181B REG 1.8V SMD SOT	B3
U403	C0DBFGG00001	IC R5102V001A-E2 REG WDT SMD S	E1
U404	C0EBD0000030	IC S-80824ANNP-EDM-T2 VOL DET	D4
U501	UY76046A	IC BH6107KV INTERFACE ASIC SMD	E1
U503	UY76102A	IC F731741B GEMINI 0.18u SMD 0	B4
U504	C1CB00000746	IC TCM4400E BB/RF VEGA 3E 0.4m	E2
U505	YRS5C348A	IC RS5C348A REAL TIME CLOCK SM	C4
U700	GN01073B01MC	LNA DUAL GSM/DCS SMD 0.65mm PI	B1
U701	C1CB00000803	IC HD155123FEB RF BRIGHT 2 GSM	B1
U702	UY76044A	VCO TX SMD 9.3x7.2x2.0	E3
U800	C1CB00000711	IC DUAL BAND APC TSSOP20	F4
U801	C5CB00000023	PA PF08103B-02-TB DUAL GSM/DCS	A2
U802	C1CB00000794	IC MGA-81563-1HA MMIC AMP SMD	E4
U900	C0DBAFC00004	IC R1111N281B REG 2.8V SMD SOT	D4
U901	C0DBZFC00006	IC ADP3307ART REG 2.75V 100mA	C1
U902	C0DBAFC00004	IC R1111N281B REG 2.8V SMD SOT	C1
U903	C0DBZFC00006	IC ADP3307ART REG 2.75V 100mA	B2
U904	C1CB00000795	IC MB15F03SLPFV1-G-BND-ER DUAL	D4
U905	UY76084A	VCO IF DUAL 520/540MHz SMD 5.3	C2
U906	UY76043A	VCO RF SMD 9.3x7.2x2.0	C2
X100	K1ZZ00001018	SIMLOCK 12V 10uA 6 PIN SMD DEV	A4
Y501	H0J327200022	CRYSTAL 32.768KHz SMD 7.0x1.5x	B4

Model: EB-GD30 & EB-GD50		Name: Main PCB (Common Items)	
Ref.	Part Number	Description	Grid
R808	ERJ2GEJ510X	RES 51 OHM 5% 1/16W SMD 1005	A1
R809	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	F4
R810	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	F4
R811	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	
R812	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	B2
R813	ERJ2GEJ750X	RES 75 OHM 5% 1/16W SMD 1005	A1
R814	ERJ2GEJ223X	RES 22K OHM 5% 1/16W SMD 1005	F4
R816	ERJ2GEJ150X	RES 15 OHM 5% 1/16W SMD 1005	B2
R817	ERJ2GEJ391X	RES 390 OHM 5% 1/16W SMD 1005	B2
R818	ERJ2GEJ391X	RES 390 OHM 5% 1/16W SMD 1005	B2
R822	ERJ2GEJ223X	RES 22K OHM 5% 1/16W SMD 1005	A2
R824	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	B2
R825	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	B2
R900	ERJ2GEJ182X	RES 1.8K OHM 5% 1/16W SMD 1005	C1
R902	ERJ2GEJ103X	RES 10K OHM 5% 1/16W SMD 1005	D4
R903	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	D4
R904	ERJ2GEJ751X	RES 750 OHM 5% 1/16W SMD 1005	C2
R905	ERJ2GEJ332X	RES 3.3K OHM 5% 1/16W SMD 1005	C2
R906	ERJ2GEJ220X	RES 22 OHM 5% 1/16W SMD 1005	B1
R908	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	C2
R909	ERJ2GEJ4R7X	RES 4.7 OHM 5% 1/16W SMD 1005	C2
R910	ERJ2GEJ150X	RES 15 OHM 5% 1/16W SMD 1005	C2
R912	ERJ2GEJ152X	RES 1.5K OHM 5% 1/16W SMD 1005	C2
R913	ERJ2GEJ272X	RES 2.7K OHM 5% 1/16W SMD 1005	B2
R914	ERJ2GE0R00X	RES JUMPER 0 OHM 1A SMD 1005	B2
R915	ERJ2GEJ331X	RES 330 OHM 5% 1/16W SMD 1005	E3
R916	ERJ2GEJ331X	RES 330 OHM 5% 1/16W SMD 1005	D4
R918	ERJ2GEJ100X	RES 10 OHM 5% 1/16W SMD 1005	D4
S700	PY76011B	CONNECTOR RF COAXIAL	F3
S701	SY76003A	DIPLEXER ANTENNA SWITCH GSM/DS	F3

9.2.3 Main PCB: GD30-Specific Items

Model: EB-GD30		Name: Main PCB (GD30-Specific Items)	
Ref.	Part Number	Description	Grid
R601	EXB24V180JX	RES NETWORK 18 OHMx2 5% 1/16W SMD 1010	D2
R608	ERJ6GEY0R00V	RES JUMPER 0 OHM 2A SMD 2012	E2
R609	ERJ6GEY0R00V	RES JUMPER 0 OHM 2A SMD 2012	E2

9.2.4 Main PCB: GD50-Specific Items

Model: EB-GD50		Name: Main PCB (GD50-Specific Items)	
Ref.	Part Number	Description	Grid
C601	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	E2
C602	ECST0JZ106R	CAP TANT 10uF 20% 6.3V SMD CAS	E2
C609	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	D2
C610	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D2
C611	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	D2
C612	ECUE1H222KBQ	CAP CER 2.2nF 10% 50V X7R SMD	D2
C613	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	D1
C614	F1H1A4740005	CAP CER 470nF 10% 10V X5R SMD	D1
C615	ECUE1H330JCQ	CAP CER 33pF 5% 50V NP0 SMD 10	D1
C616	F3F1A1060002	CAP TANT 10uF 20% 10V SMD CASE	D2
C617	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	D2
L603	G1C82NJ00008	INDUCTOR 82nH 5% SMD 1608	D2
R601	EXB24V120JX	RES NETWORK 12 OHMx2 5% 1/16W	D2
R602	ERJ2GEJ562X	CHIP RESISTOR 5K6 OHM +/-5% 1/	D2
R603	ERJ2GEJ104X	RES 100K OHM 5% 1/16W SMD 1005	D2
U601	COABAA000030	IC LM4871M AUDIO PA 1.1W SMD S	D2

9.2.5 Keypad PCB

Model: EB-GD30 & EB-DG50		Name: Keypad PCB	
Ref.	Part Number	Description	Grid
C001	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	A4
C002	F1J1C6840003	CAP CER 680nF 10% 16V X7R SMD	C4
C003	F1J1C6840003	CAP CER 680nF 10% 16V X7R SMD	C4
C004	F1J1C6840003	CAP CER 680nF 10% 16V X7R SMD	C4
C005	F1J1C6840003	CAP CER 680nF 10% 16V X7R SMD	C4
C006	F1J1C6840003	CAP CER 680nF 10% 16V X7R SMD	C3
C007	ECUE1H470JCQ	CAP CER 47pF 5% 50V NP0 SMD 10	C4
C008	ECUE1H220JCQ	CAP CER 22pF 5% 50V NP0 SMD 10	C4
C009	F1H0J1050013	CAP CER 1uF 10% 6.3V X5R SMD 1	C4
C010	F1H0J1050013	CAP CER 1uF 10% 6.3V X5R SMD 1	C3
C011	F1J1C6840003	CAP CER 680nF 10% 16V X7R SMD	C3
C012	F1J1A1050011	CAP CER 1uF 10% 10V X5R SMD 20	C3
C013	F1J1C6840003	CAP CER 680nF 10% 16V X7R SMD	C3
C014	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C4
C015	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C4
C016	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C4
C017	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C3
C018	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C4
C019	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C3
C020	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C3
C021	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C3
C022	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C3
C023	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C3
C024	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	C3
C025	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	A4
C026	ECUE1H100DCQ	CAP CER 10pF +/-0.5pF 50V NP0	A4
CN001	K1MZ14A00001	CONNECTOR LCD 14 WAY SMD	C3
CN002	K1MZ14A00001	CONNECTOR LCD 14 WAY SMD	C4
D002	B0KB00000010	SUPPRESSOR ESD 4 ELEMENTS SMD	A4

Model: EB-GD30 & EB-DG50		Name: Keypad PCB	
Ref.	Part Number	Description	Grid
D003	MA2S111TX	DIODE MA2S111 80V 100mA SMD SS	C4
DS001	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	F4
DS002	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	F3
DS003	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	E4
DS004	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	E3
DS005	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	D4
DS006	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	D3
DS007	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	D4
DS008	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	D3
DS009	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	C4
DS010	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	C4
DS011	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	C3
DS012	B3ABB0000066	DIODE LED GREEN 16-28mcd 2.2V	C3
DS013	CL155URGDT	2 COLOUR LED 5V 25mA 3.2Lx2.7W	A3
R001	EXB24V121JX	RES NETWORK 120 OHMx2 5% 1/16W	C3
R002	EXB24V151JX	RES NETWORK 150 OHMx2 5% 1/16W	C4
R003	EXB24V151JX	RES NETWORK 150 OHMx2 5% 1/16W	C3
R004	D0GB151JA002	RES 150 OHM 5% 1/10W SMD 1608	C3
R005	D0GB151JA002	RES 150 OHM 5% 1/10W SMD 1608	C3
R006	ERJ3EKF3003V	RES 300K OHM 1% 1/16W SMD 1608	C4
R007	ERJ6ENF1204V	RES 1.2M OHM 1% 1/10W SMD 2012	C4
R008	EXB24V151JX	RES NETWORK 150 OHMx2 5% 1/16W	C4
R009	EXB24V151JX	RES NETWORK 150 OHMx2 5% 1/16W	C4
R010	EXB24V121JX	RES NETWORK 120 OHMx2 5% 1/16W	C4
SHIELD	GD30MDS030B	GD30 RECEIVER SHIELD	

9.3 Refurbishment Kits

9.3.1 GD30

Model: EB-GD30		Name: Jigs and Tools	
Ref.	Part Number	Description	Notes
	9R3000B	REFURBISHMENT KIT, BLUE	
	9R3000K	REFURBISHMENT KIT, BLACK	
	9R3000S	REFURBISHMENT KIT, SILVER	

9.3.2 GD50

Model: EB-GD50		Name: Jigs and Tools	
Ref.	Part Number	Description	Notes
	9RD500B	REFURBISHMENT KIT, BLUE	
	9RD500K	REFURBISHMENT KIT, BLACK	
	9RD500N	REFURBISHMENT KIT, GREEN	
	9RD500Y	REFURBISHMENT KIT, GREY	

NOTE: Each refurbishment kit includes: Coloured Cover Assembly, Case Assembly, Key Sheet, Memo Key, LCD Panel, PCB Screw (x2), Cover Screw (x4), RF Cap, Antenna and Patent Label.

9.4 Repair Jigs and Tools

Model: EB-GD30		Name: Jigs and Tools	
Ref.	Part Number	Description	Notes
	IFB004	INTERFACE BOX	
	JT00009	GD30/GD50 RF ADAPTOR	
	JT00010	BATTERY CALIBRATION VOLT. CONTROL UNIT	
	JT00011	GD30/GD50 PCB REPAIR JIG	
	JT00022	TEST BATTERY	
	JT00004	INTERFACE CABLE	

9.5 Printed Material

9.5.1 Document Packs

NOTE: Document Packs consist of language-specific User Guide, Quick Start and Warranty Card where applicable.

Model: EB-GD30 & EB-GD50		Name: Documentation	
Ref.	Part Number		Description
	GD30	GD50	
	GD30DPKAR	GD50DPKAR	ARABIC, ENGLISH
	GD30DPKCH	GD50DPKCH	FRENCH, GERMAN, ITALIAN, EUROPEAN WARRANTY
	GD30DPKCZ	GD50DPKCZ	CZECH
	GD30DPKDN	GD50DPKDN	DUTCH/TONE
	GD30DPKES	GD50DPKES	SPANISH
	GD30DPKEUA	GD50DPKEUA	DANISH, GERMAN, EUROPEAN WARRANTY
	GD30DPKEUB	GD50DPKEUB	FRENCH, GERMAN, EUROPEAN WARRANTY
	GD30DPKFN	GD50DPKFN	FINNISH, EUROPEAN WARRANTY
	GD30DPKFR	GD50DPKFR	FRENCH, EUROPEAN WARRANTY
	GD30DPKFT	GD50DPKFT	FRANCE TELECOM, EUROPEAN WARRANTY
	GD30DPKGE	GD50DPKGE	GERMAN, EUROPEAN WARRANTY
	GD30DPKGR	GD50DPKGR	GREEK, ENGLISH, EUROPEAN WARRANTY
	GD30DPKHU	GD50DPKHU	HUNGARIAN
	GD30DPKKPN	GD50DPKKPN	DUTCH PTT/KPN
	GD30DPKKU	GD50DPKKU	ENGLISH, FRENCH, ARABIC
	GD30DPKLE	GD50DPKLE	ENGLISH,FRENCH
	GD30DPKMT	GD50DPKMT	ITALIAN, ENGLISH, ITALIAN WARRANTY CARD, EUROPEAN WARRANTY CARD
	GD30DPKNL	GD50DPKNL	DUTCH, EUROPEAN WARRANTY
	GD30DPKNW	GD50DPKNW	NORWEGIAN, EUROPEAN WARRANTY
	GD30DPKPL	GD50DPKPL	POLISH
	GD30DPKPR	GD50DPKPR	PORTUGUESE, EUROPEAN WARRANTY
	GD30DPKPUK	GD50DPKPUK	PANASONIC UK
	GD30DPKRM	GD50DPKRM	ROMANIAN
	GD30DPKRU	GD50DPKRU	RUSSIAN
	GD30DPKSK	GD50DPKSK	SLOVAKIAN

Model: EB-GD30 & EB-GD50		Name: Documentation	
Ref.	Part Number		Description
	GD30	GD50	
	GD30DPKSL	GD50DPKSL	SLOVENIAN
	GD30DPKSW	GD50DPKSW	SWEDISH, EUROPEAN WARRANTY
	GD30DPKTA	GD50DPKTA	TAIWAN, ENGLISH
	GD30DPKTL	GD50DPKTL	ITALIAN, EUROPEAN WARRANTY
	GD30DPKTU	GD50DPKTU	TURKISH, EUROPEAN WARRANTY
	GD30DPKUK	GD50DPKUK	ENGLISH, EUROPEAN WARRANTY
	GD30DPKYU	GD50DPKYU	ENGLISH
	7QA959AAAA	7QA959AABA	BOX, PRINTED

9.5.2 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 GD30 instruction is 7LB270A where the final 'A' shows the manual is issue 'A'.

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