Order Number: MCUK960901C8

Service Manual

G500 Personal Cellular Telephone

Handheld portable
EB-G500
Car mount kit
EB-HF500Z
Dual charger
EB-CR500
DC Adaptor
EB-CD400

Panasonic
GSM

Issue 1
Revision 0

Other patents applying to material contained in this publication:
BULL CP8 PATENT
INNOVATRON PATENTS

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ENGLAND

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WARNINGS AND CAUTIONS

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.

ESD Handling precautions:

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

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

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

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

Batteries

This equipment contains an internal battery in addition to the external battery packs. These batteries are re-cyclable 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.

The GSM handportable may be configured as:

1. Handportable unit.
2. Vehicle-powered (DC adaptor) handportable unit.
3. Handsfree vehicle-mounted unit.
4. PC fax: send and receive (via PCMCIA Interface card).

2.2 Handportable Main Kit

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

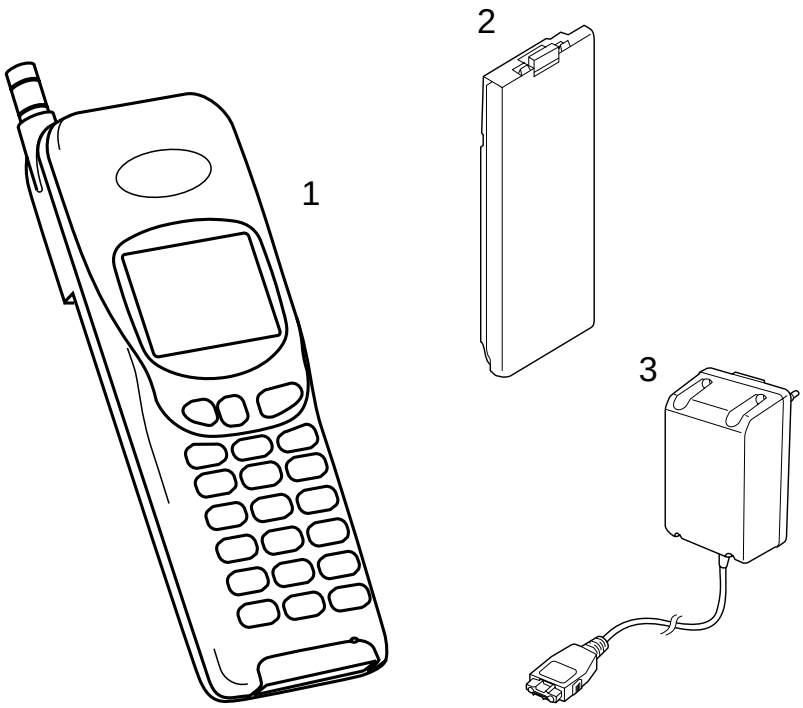


Figure 1: Handportable Main Unit Kit 500-0201

IDENTIFICATION NUMBER	DESCRIPTION	PART NUMBER
1	Main unit	EB-G500
2	Battery	EB-BM500
3	Adaptor	EB-CA400 UK/EU/SA/TH
—	Operating instructions	ZD71348A

2.3 Handsfree Car Mount Kit

The handsfree car mount kit enables the handportable to be mounted in a vehicle, and to operate in handsfree mode.

The handsfree unit contains a speaker, with separate volume control. Speech is via a microphone mounted on the dashboard or the sun visor.

The handsfree unit also provides external power for the handheld internal charger.

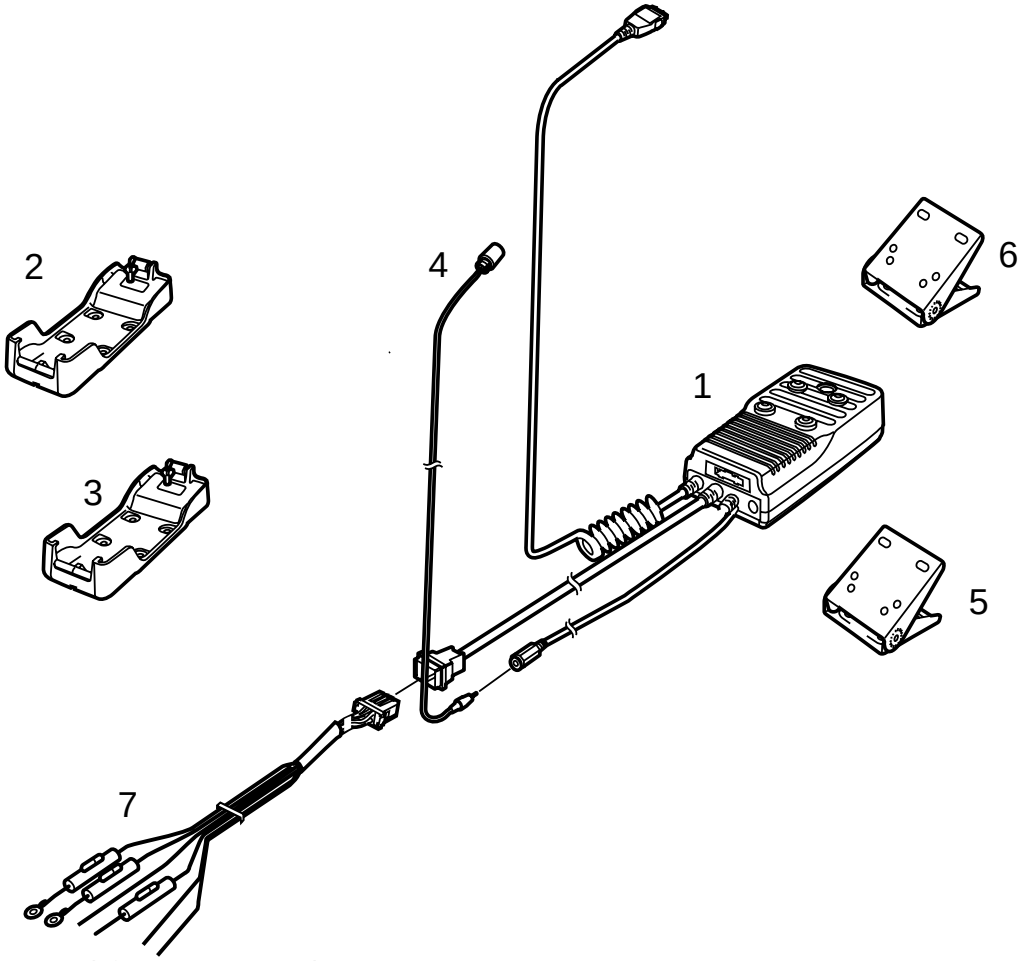


Figure 2: Handsfree Car Mount Kit 500-0202

IDENTIFICATION NUMBER	DESCRIPTION	PART NUMBER
1	Handsfree unit	EB-HF400
2	Holder – G350/G400	EB-KA400
3	Holder – G500	EB-KA500
4	Handsfree microphone	EBM1177
5	Adjustable angle bracket	EBN0001
6	Adjustable angle bracket	EBN0002
7	Power supply cable	EBW70090

2.4 Holder Kit

The holder kit allows convenient mounting of the telephone in a vehicle. In conjunction with the DC adaptor this can make a simple car mount kit. The adjustable angle bracket and telephone holder are attached to a convenient fixing point in the vehicle.

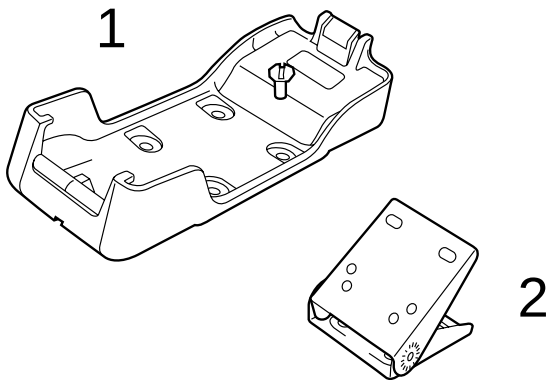


Figure 3: Holder Kit 500-0204

IDENTIFICATION NUMBER	DESCRIPTION	PART NUMBER
1	Holder	EB-KA500
2	Adjustable angle bracket	EBN0002

2.5 DC Adaptor

The DC adaptor kit enables the handportable unit to be powered from a vehicle battery, provided that the vehicle has a cigar lighter socket.

One end of the DC adaptor plugs into the handportable with the telephone battery connected. The other end of the adaptor is pushed into the cigar lighter socket.

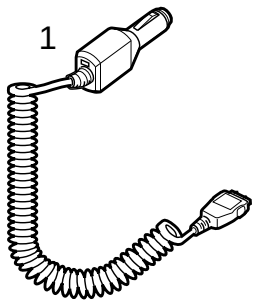


Figure 4: DC Adaptor 500-0203

IDENTIFICATION NUMBER	DESCRIPTION	PART NUMBER
1	DC Adaptor unit	EB-CD400A

2.6 Dual Charger and Carry Case

The dual charger has two charging slots, enabling the telephone battery to be charged individually or as a part of the whole telephone assembly.

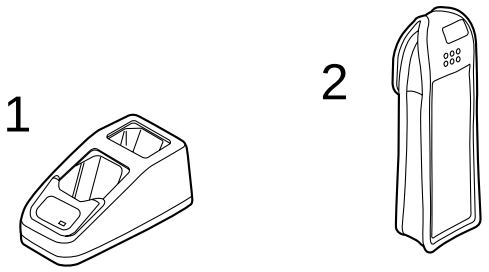


Figure 5: Dual Charger and Carry Case 500-0205

IDENTIFICATION NUMBER	DESCRIPTION	PART NUMBER
1	Dual charger	EB-CR500
2	Carry case	EB-YK400

2.7 Battery Packs

There are three battery packs, all of which use Ni-MH. The Battery Pack (S) is 600mAh; the Battery Pack (M) is 850mAh and the Battery Pack (XL) is 1600mAh.

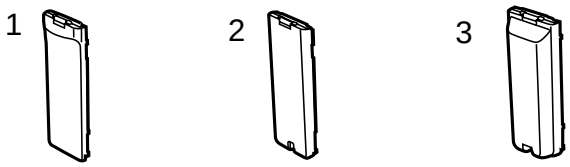


Figure 6: Battery Packs 500-0206

IDENTIFICATION NUMBER	DESCRIPTION	PART NUMBER
1	Battery Pack (S)	EB-BS500
2	Battery Pack (M)	EB-BM500
3	Battery Pack (XL)	EB-BX500

2.8 PCMCIA Interface Card

The PCMCIA interface card is used with the handportable and a laptop personal computer to provide a PC fax and modem facility.

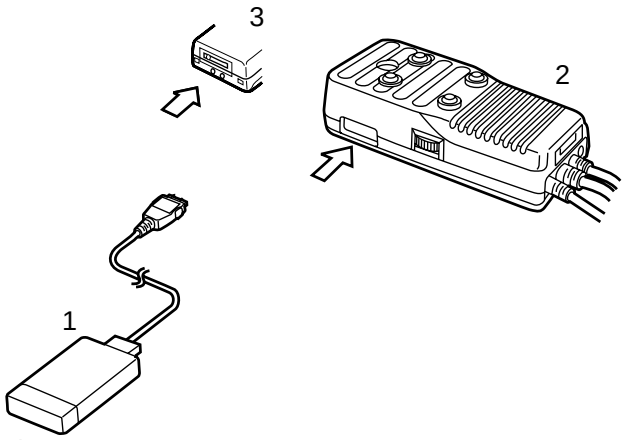


Figure 7: PCMCIA Card 500-0207

IDENTIFICATION NUMBER	DESCRIPTION	PART NUMBER
1	PCMCIA Interface card	EB-PA400
2	Handsfree unit – connection	—
3	Telephone – connection	—

2.8 Kit Composition

UNIT NAME AND NUMBER	KIT CONTENTS
Main Unit Kit	EB-G500 Main Unit EB-BM500 Battery Pack (M) EB-CA400 AC Adaptor (‘EU’, ‘SA’, ‘TH’ or ‘UK’) ZD70052C GSM Network Codes and Names and at least one operating instruction, quick reference and quick start from below.
Operating Instructions	Arabic ZD71411A, Chinese ZD71412A Czech ZD71496A, Danish ZD71349A Dutch ZD71350A, English ZD71348A Finnish ZD71351A, French ZD71352A German ZD71353A, Greek ZD71354A Hungarian ZD71497A, Italian ZD71355A Norwegian ZD71356A, Polish ZD71498A Portuguese ZD71357A, Russian ZD71495A Spanish ZD71358A, Swedish ZD71359A Turkish ZD71360A
Quick Reference	Arabic ZD71413A, Chinese ZD71414A Czech ZD71500A, Danish ZD71362A Dutch ZD71363A, English ZD71361A Finnish ZD71364A, French ZD71365A German ZD71366A, Greek ZD71367A Hungarian ZD71501A, Italian ZD71368A Norwegian ZD71369A, Polish ZD71502A Portuguese ZD71370A, Russian ZD71499A Spanish ZD71371A, Swedish ZD71372A Turkish ZD71373A
Quick Start	Arabic ZD71428A, Chinese ZD71429A Czech ZD71504A, Danish ZD71416A Dutch ZD71417A, English ZD71415A Finnish ZD71419A, French ZD71418A German ZD71420A, Greek ZD71421A Hungarian ZD71505A, Italian ZD71422A Norwegian ZD71423A, Polish ZD71506A Portuguese ZD71424A, Russian ZD71503A Spanish ZD71425A, Swedish ZD71426A Turkish ZD71427A
Car Mount Kit EB-HF400Z	EB-HF400 H/F Unit EB-KA400 Holder – G350/G400 EB-KA500 Holder – G500 EBM1177 Microphone EBN0001 AA Bracket EBN0002 AA Bracket 2 EBW70090 Power Supply Cable
Holder Kit EB-KA500Z	EB-KA500 Holder EBN0002 AA Bracket 2
Other Optional Accessories	EB-CD400A DC Adaptor EB-CR500 Dual Charger EB-YK400 Carry Case EB-BS500 Battery Pack (S) EB-BM500 Battery Pack (M) EB-BX500 Battery Pack (XL) EB-PA400 PCMCIA Data Interface Card EB-CA400 AC Adaptor

3 OPERATING INSTRUCTIONS

3.1 General

This section provides a brief guide to the operation and facilities available on the G500 handportable unit. Refer to the Operating Instructions for full operational information.

3.2 LCD Display

The G500 handportable unit has a 3 line by 12 character chip on glass liquid crystal display in conjunction with the following icons:

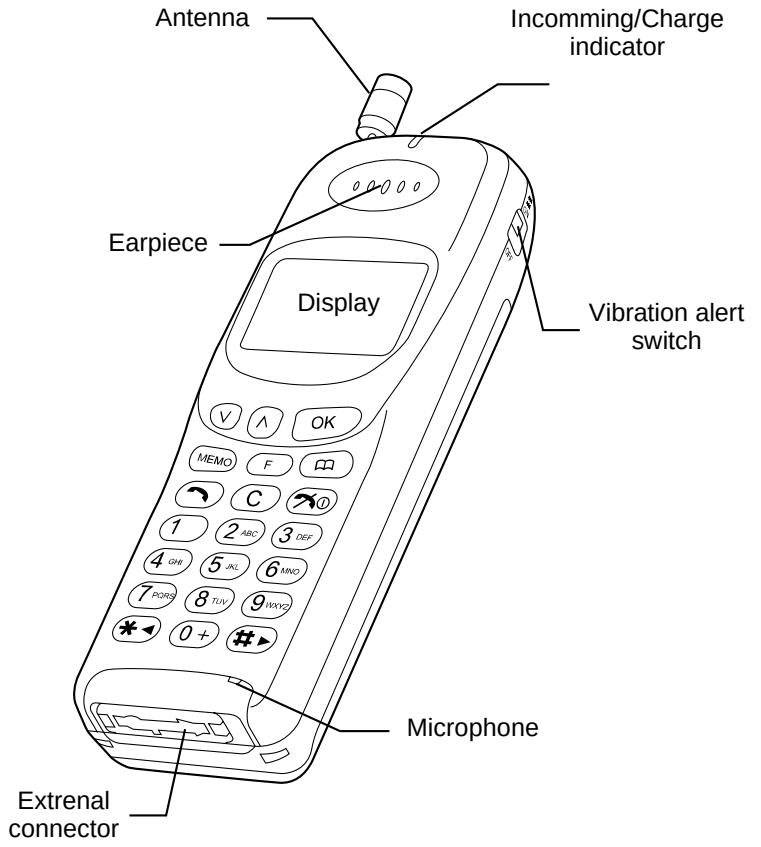
Figure 1: LCD display 500-0301

	Displays the battery charge level: Battery is at full charge. Battery requires recharging. The battery icon flashes during charging. During car mount use, when the battery is fully charged, the battery icon will not light.
△	Indicates that you are registered on a non-home network.
	Indicates that a call is in progress or flashes when a call is on hold.
✉	Indicates the reception of a short text message from the Short Message Service (SMS). This icon will flash when a message has not been read.
	Indicates that it is possible to make an emergency call.
	Indicates received signal strength: Strong signal area. Weak signal area.
	Indicates that the ⓥ and ⓐ keys can be pressed.
OK	Indicates that the OK key can be pressed.

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

The display will also show other symbols that will indicate which key can be pressed next or the current setting of a function:
The key can be pressed or this is the active call when there are two calls.
This is the held call when there are two calls.
This is the current setting for the chosen function.
The key can be pressed.
Pressing the F key will toggle between upper and lower case.

3.3 Location of Controls



Incoming/Charge indicator:
Green – incoming call.
Red – charging battery pack.

Vibration alert switch:
ON – telephone will vibrate with an incoming call.
OFF – telephone will ring with an incoming call.

External connector:
Used to connect to external accessories or charging equipment.

Figure 2: Location of controls for G500 500-0302

ⓥ and ⓐ	Increases or decreases volume, scrolls through options or function menu.
OK	Enters data, selects an option or confirms an action.
MEMO	Records or plays back voice memo.
F	Enters function menu or changes between upper and lower case letters.
	Recalls memory, accesses short messages, displays the rest of a telephone number or name tag when pressed and held.
	Makes a call.
C	Clears the last digit entered, clears all digits when pressed and held or returns to the previous display.
	Ends a call or switches the telephone on/off when pressed and held.
Digit keys 0+ to 9WXYZ, *◄ and #►. Where appropriate the 0+ key will enter the international access code “+”, wild numbers or pauses when pressed and held.	

3.4 G500 Function Menu Structure

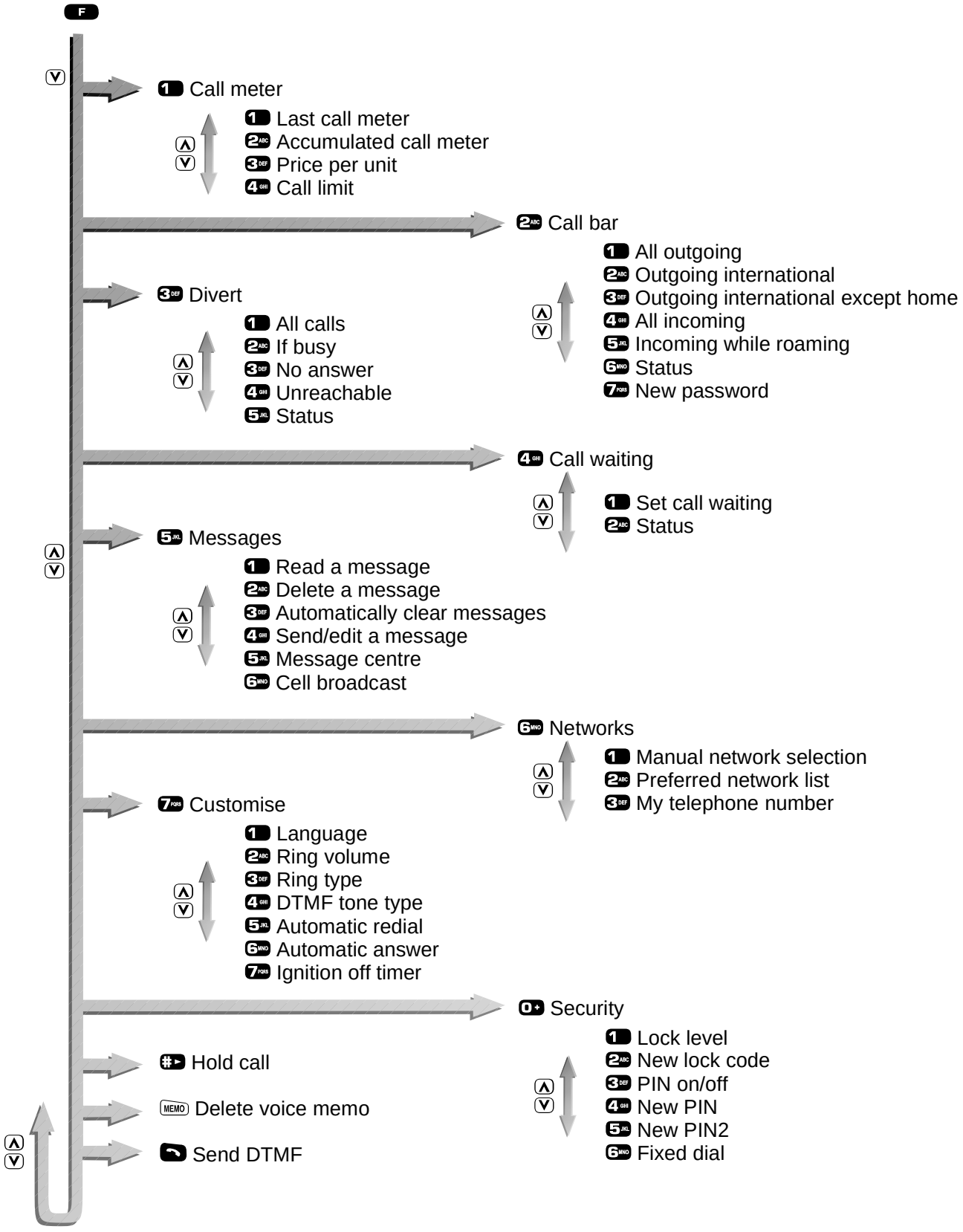


Figure 3: Function menu 400-0640

3.5 Basic Operation

FUNCTION	KEY OPERATION
To switch ON/OFF	and hold
To receive a telephone call	Any key except
To make a telephone call: Manually From memory	 Telephone number + followed by phone book number +
To clear misdialled digit(s): Last digit All digits	 and hold
To check overflow digits	and hold
To redial last number: Last dialled number Other number in last dialled number list	 Ⓥ or Ⓐ
To adjust volume: Key volume – during standby Ear volume – during a call Ring volume	 Ⓐ to increase, Ⓥ to decrease Ⓐ to increase, Ⓥ to decrease , Ⓐ to increase, Ⓥ to decrease
To end a telephone call	
Emergency calls	+
Store a telephone number in memory	telephone number +
Recall a number from memory	– the display must not show any numbers

3.6 Troubleshooting

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

Problem	**Causes and Solutions**
Telephone will not switch on	Check that the battery pack is fully charged and correctly connected to the telephone.
Short battery life	Battery life is affected by the network you are using and the condition of the battery pack. The life of the battery pack is affected by improper charging, this is inherent in all Ni-MH and Ni-Cd batteries. To maintain maximum performance always use until the low battery warning and then fully recharge the battery pack. To revive the battery pack use the telephone until it switches off and then fully recharge three times. However, the battery pack will eventually wear out and must be replaced with a new one.
Battery level indicator ( ) does not light when charging	If a battery is deeply discharged it will take a short time before there is sufficient power in the telephone to display the battery level indicator ( ). The battery pack must be charged in a temperature no lower than +5°C and no higher than +35°C.
Calls cannot be made	Calls cannot be made when the telephone is locked or outgoing calls are barred. Check that the telephone is registered to a network. Move to a coverage area and operate your telephone after it has registered with a network.
Calls cannot be made from Fixed Dial Memory	Check the telephone number is stored in Fixed Dial Memory or your SIM supports Fixed Dial Memory.
Calls cannot be received	To receive a call the telephone must be switched on. Calls cannot be received when incoming calls are barred.
Emergency calls cannot be made	Check that the antenna symbol Y is displayed. Move to a coverage area and operate your telephone when the antenna symbol is displayed.
Telephone numbers cannot be recalled	Memory cannot be recalled when the telephone is fully locked or “Fixed Dial” is switched on.

3.7 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.
BLACKLIST FULL	Blacklist of unsuccessfully dialled numbers is full. Switch the telephone off and then on again. Telephone numbers are removed from the blacklist after twenty-four hours.
INVALID SIM	Your SIM cannot be used in the telephone. The telephone may be personalised to a particular SIM or network. Contact your service provider.
LOCK CODE INVALID	A wrong lock code has been entered. Re-enter the correct lock code.
LOW BATTERY	The battery power is low. Replace with a fully recharged battery pack or recharge the battery pack.
MESSAGE REJECTED	A message has been received but the message area is full. To receive messages delete some of the currently stored messages or set messages to automatically clear.

NETWORK ERROR	The message sent has failed because of a network error. Check that the Message Centre number is correct or wait for a short while and retry.
NETWORK NOT ALLOWED	Roaming with the selected network is not allowed.
NETWORK REJECTED	The supplementary service requested has been rejected by the network because of a system failure. Wait for a short while and retry.
NO SIM PRESENT	The telephone has not detected a SIM. If a SIM is present remove and then replace it and make sure that the SIM holder is locked shut.
NOT ALLOWED	The entered security code is too short. Enter an appropriate security code.
TEL. NUMBER TOO LONG MAX = 20	The memory capacity for storing overflow digits in your SIM is full. You cannot enter more than twenty digits until some of the overflow telephone numbers stored in memory are deleted.
PASSWORD INVALID	A wrong password has been entered. Enter the correct password.
PIN BLOCKED/ PIN2 BLOCKED	The PIN/PIN2 is blocked because the wrong number has been entered three times. The telephone will ask you to enter the PUK/PUK2 then you will have to enter a new PIN/PIN2. The PUK/PUK2 is supplied by your service provider.
PIN INVALID/ PIN2 INVALID	A wrong PIN/PIN2 has been entered. Enter the correct PIN/PIN2.
PIN2 INVALIDATED	The PIN2 is blocked permanently because the wrong PUK2 has been entered ten times. Supplementary services controlled by PIN2 cannot be used. Contact your service provider.
PLEASE RETRY	The supplementary service requested has failed. Wait for a short while and retry.
PUK INVALID/ PUK2 INVALID	A wrong PUK/PUK2 has been entered. Enter the correct PUK/PUK2.
SECURITY FAILURE	The network has detected authentication failure because your SIM is not registered with that network. Contact your service provider.
SIM BLOCKED	The SIM is blocked because the wrong PUK has been entered ten times. Contact your service provider.
SIM ERROR	The telephone has detected a problem with the SIM. Switch the telephone off and then back on. If the message does not disappear contact your service provider.
STORE FULL	Phone Book/Fixed Dial Memory is full. Delete an entry or overwrite old information.
SUBSCRIPTION REVOKED	The supplementary service requested has been revoked because the wrong password has been entered four times. Contact your service provider.
VACANT	There is no information in the memory location that you selected. To clear this display press C.
XX XXXXX X XXXX	There is a permanent error in the telephone. Switch the telephone off and then back on. If the message re-appears, contact your dealer.

3.8 Security Codes

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

3.9 GSM Services Supported by PCMCIA 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

UDI = Unrestricted Digital Information
T = Transparent (non-error corrected)
NT = Non-Transparent (error corrected)

AT commands to select these services are: +CBST, /N and +CIWF.

3.10 GSM Network Codes and Names

Country	Access Code	Network			
		Operator	Name	Abbreviation	Code
AND	+37	STA ANDORRA	MOBILAND	M-AND	213 03
AUS	+61	TELECOM Australia	MOBILENET	M-NET	505 01
AUS	+61	OPTUS Communications Pty Ltd.	OPTUS Mobile	OPTUS	505 02
AUS	+61	Vodafone PTY	VODAFONE	VFONE	505 03
A	+43	PTV Austria	A1	A1	232 01
BEL	+32	Belgacom Mobile	PROXIMUS	PROXI	206 01
BG	+359	MOBILTEL AD	CITRON GSM	CITRON	284 01
BHR	+973	BAHREIN Telecommunications Co.	MOBILE PLUS	M.PLUS	426 01
CH	+41	Swiss Telecom PTT	NATEL D GSM	NAT D	228 01
CHN	+86	China United Telecommuni-cations Corporation	CHINA UNICOM	CU-GSM	460 01
CY	+357	Cyprus Telecommunication Authority	CYTAGSM	CY-GSM	280 01
D	+49	DeTeMobil GmbH	Mobilfunk D1	D1	262 01
D	+49	Mannesmann Mobilfunk	D2 PRIVAT	D2	262 02
E	+34	TELEFONICA MOVILES	MOVISTAR	MSTAR	214 07
E	+34	AIRTEL SPAIN	AIRTEL	AIRTL	214 01
EE	+372	Eesti Mobiiltelefon	EMT GSM	EMT	248 01
EE	+372	RADIOLINJA EESTI AS	EESTI	RLE	248 02
DK	+45	TELE Danmark Mobile	TDK-MOBIL	TD MOB	238 01
DK	+45	Dansk Mobil Telefon DMT	SONOFON	SONO	238 02
F	+33	France Telecom	Itineris	Itine	208 01
F	+33	SFR	SFR	SFR	208 10
F	+33	SRR	SFR REUNION	SFR RU	647 10
F	+33	TIKIPHONE	VINI	VINI	547 20
FI	+358	Telecom Finland	TELECOM FIN	TELE	244 91
FI	+358	OY Radiolinja AB	RADIOLINJA	RL	244 05
GIB	+350	GIBTEL	GIBTEL	GIBTEL	266 01
GR	+30	Panafon S.A	PANAFON	PAN	202 05
GR	+30	STET HELLAS	TELESTET	TLSTET	202 10
H	+36	Westel 900 GSM RT	WESTEL 900	W-900	216 30

Country	Access Code	Network			
		Operator	**Name**	**Abbreviation**	**Code**
H	+36	Pannon GSM RT	PANNON GSM	PANNON	216 01
HK	+852	Hong Kong Telecom CSL Ltd.	TCSL GSM	TCSL	454 00
HK	+852	Hutchison Telephone Co. Ltd.	HTCLGSM	HTCL	454 04
HK	+852	SmarTone Mobile Communications Ltd.	SMARTONE	HKSMC	454 06
HR	+95	HPT	CRONET	CRON	219 01
I	+39	OMNITEL PRONTO ITALIA	OMNITEL	OMNI	222 10
I	+39	TELECOM ITALIA MOBILE	ITALIA MOBILE	TIM	222 01
INA	+91	Bharti Cellular Limited	AirTel	AIRTL	404 10
INA	+91	BPL SYSTEMS & PROJECTS LTD. INDIA	BPL - MOBILE	BPL	404 21
IND	+62	PT Telekomunikasi Indonesia	TELKOMSEL	T-SEL	510 10
IND	+62	PT. SATELIT PALAPA INDONESIA	SATELINDOCEL	SAT-C	510 01
IND	+62	PT EXCELCOMINDO PRATAMA	EXCELCOM	EX-CEL	510 11
IRL	+353	Telecom Ireland	EIRCELL-GSM	E-GSM	272 01
KSA	+966	ELECTRONIC APPLICATIONS ESTABLISHMENT	EAE-ALJAWWAL	EAE	420 07
KT	+96	Mobile Telecommunications Co.	MTC*N*et	MTC	419 02
L	+352	P & T Luxembourg	LUXGSM	P&T L	270 01
LV	+371	Latvian Mobile Telephone Co.Ltd.	LMT GSM	LMT	247 01
MAC	+853	C.T.M.	TELEMOVEL+	CTMGSM	455 01
MOR	+212	ONPT MOROCCO	ONPT	ONPT	604 01
MRU	+60	MAURITIUS TELECOM LTD.	CELLPLUS	CELL +	617 01
MY	+60	BINARIANG COMMUNICATIONS SDN BHD.	maxis mobile	maxis	502 12
N	+47	Telenor Mobil AS	Telenor Mobil	Tele N	242 01
N	+47	NetCom GSM A/S	NetCom GSM	N COM	242 02
NL	+31	LIBERTEL	LIBERTEL	LIBTEL	204 04
NL	+31	PTT Telecom	PTT TELECOM	NL PTT	204 08
NZ	+64	BELLSOUTH	BELLSOUTH	BSNZ	530 01
P	+351	Telecomunicaçoes Moveis Nacionais (TMN)	TMN	TMN	268 06
P	+351	TELECEL	TELECEL	TLCL	268 01
PH	+63	Globe Telecom GMCR Inc	Globe Telecom	GLOBE	515 02

Country	Access Code	Network			
		Operator	**Name**	**Abbreviation**	**Code**
PH	+63	Isla Communications Co. Inc.	Islacom	ISLA	515 01
QAT	+974	Q-TEL	QATARNET	Q-NET	427 01
ROC	+886	LDTA	LDTA GSM	LDGSM	466 92
RL	+961	Telecom Finland International	LibanCell	LibCL	415 03
RUS	+701	Mobile Telesystems	MTS	MTS	250 01
RUS	+701	North-West GSM	North-West GSM	NWGSM	250 02
S	+46	Telia Mobitel	TELIA MOBITEL	TELIA	240 01
S	+46	COMVIQ GSM AB	COMVIQ	IQ	240 07
S	+46	EUROPOLITAN AB	EUROPOLITAN	EURO	240 08
SA	+27	VODACOM	VodaCom	VODA	655 01
SA	+27	Mobile Telephone Networks	MTN	MTN	655 10
SGP	+65	Singapore Telecom	ST-GSM	STGSM	525 01
SRI	+94	MTN NETWORKS (PVT) SRI LANKA	DIALOG	DALOG	413 02
SYR	+963	Mobile Syria	MOBILE SYRIA	SYR MOB	417 09
TH	+66	Advanced Info Service Public Company Limited	AIS GSM	TH AIS	520 01
TR	+90	PTT Turkey	TURKCELL GSM	TCELL	286 01
TR	+90	PTT Turkey	PTT TELSIM GSM	TLSIM	286 02
UAE	+971	ETISALAT	ETISALAT	ETSLT	424 02
UK	+44	Cellnet	CELLNET	CLNET	234 10
UK	+44	GUERNSEY TELECOMS	GUERNSEY TEL	GSY-TEL	234 55
UK	+44	Jersey Telecoms	Jersey Tele	JER1	234 50
UK	+44	MANX TELECOM	PRONTO GSM	MANX	234 58
UK	+44	Vodafone	VODAFONE	VODA	234 15

3.11 Glossary of Terms

DTMF	Dual Tone Multiple Frequency tones. The numeric keys 0 to 9, and ∗ and # will generate different DTMF tones when pressed during conversation. These are used to access voice mail, paging and computerised home banking.
GSM	Global System for Mobile communications. The name given to the advanced digital technology that your telephone uses.
Home country	The country where your home network operates.
Home network	The GSM network on which your subscription details are held.
Lock code	Used for security of your telephone. Factory set to “0000”.
Message Centre	Where messages are sent before they are forwarded onto their destination. The Message Centre telephone number may be programmed into your SIM or supplied by your service provider.
Network operator	The organisation responsible for operating a GSM network. Each country will have at least one network operator.
Password	Used for the control of the call bar function. Supplied by your service provider.
PIN	Personal Identification Number used for SIM security. Supplied by your service provider.
PIN2	Personal Identification Number used for the control of Fixed Dial Memory and call charge metering. Supplied by your service provider.
PUK/ PUK2	PIN/PIN2 Unblocking Key. Used to unblock the PIN/PIN2. Supplied by your service provider.
Registration	The act of locking on to a GSM network. This is usually performed automatically by your telephone.
Roaming	The ability to use your telephone on networks other than your Home network.
Service provider	The organisation responsible for providing access to the GSM network.
SIM	Subscriber Identification Module. A small smart-card which stores unique subscriber and user-entered information such as Phone Book, Fixed Dial Memory and short messages. Supplied by your service provider.
Supplementary service	Network-controlled GSM functions which your telephone will support. Supplementary services may only be available on a subscription 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 INSTALLATION GUIDE

4.1 General

This section describes the procedure used to install the GSM handportable unit into a negative-grounded vehicle.

> **Caution:**
>
> Do not attempt to install this equipment into a positive-grounded vehicle.
>
> Do not attempt to supply power to the equipment from a positive-grounded vehicle.

Installation will be performed using either of the following kits:

1. Handsfree car mount kit
2. DC adaptor.

4.2 Handsfree Car Mount Kit

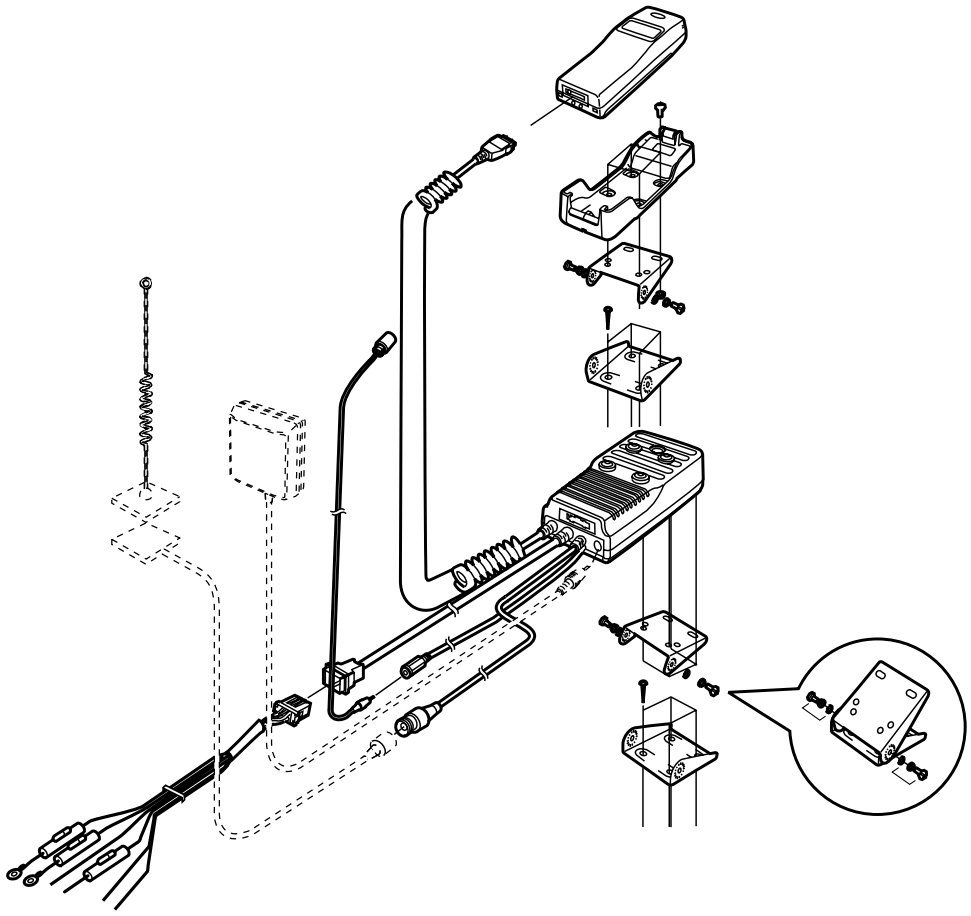


Figure 1: Handsfree Car Mount Kit 500-0401

4.2.1 Selecting the Location for the Handsfree Unit

The following points should be considered when choosing a location for the handsfree unit:

Ensure that the location does not obstruct normal operation/functioning of the vehicle.

Ensure that the location does not affect passenger accommodation, or is subject to excessive shocks.

Ensure that the location will allow easy operation of the unit.

Ensure that the location provides a secure fixing for the unit.

Avoid direct exposure to the sun’s rays, or to rain.

Ensure that the location takes due consideration of cable routing requirements.

Considering the points listed above, the recommended locations for mounting the handsfree unit are the Dashboard, Arm Rest Storage Compartment or the Centre Console.

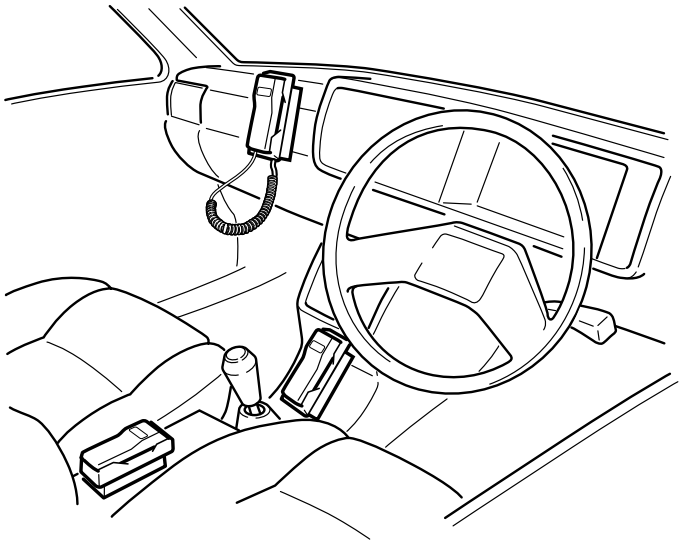


Figure 2: Handsfree Cradle Unit Locations 500-0402

4.2.2 Wiring

Locations for the handsfree unit will vary according to the type of vehicle, as will the routing of power and interconnecting cables. The following precautions should be observed:

DO NOT install or connect the unit into a positive (+) grounded vehicle. This equipment must be installed into a 12V negative (-) ground vehicle.

Mount cables to the vehicle so that they are not prone to displacement or disconnection through vibration.

Route cables through existing holes in the dashboard, bulkheads etc. where possible.

Site cables so that contact with moving parts (brake/clutch pedals, seat mechanisms etc.) is avoided.

Site cables as far away as possible from existing cabling, to avoid electrical induction.

Shield cables to protect interference with the vehicle electronics.

When connecting cables to the vehicle circuitry, ensure that the vehicle functions are not affected.

A typical car installation is illustrated below, the actual location of units may vary according to vehicle type.:

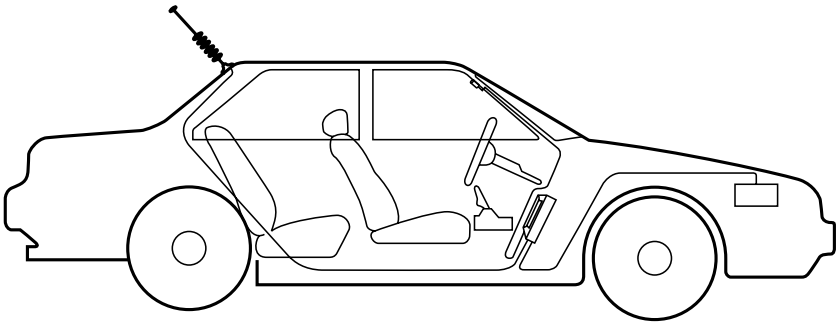


Figure 3: Car installation 500-0403

Wiring guide

Colour	**Connection**	**Fuse**
Black	Ground	4A
Blue	Ignition	3A
Red	Battery (+)	3A
Yellow	Radio Mute	—
White Black	Logic power Battery (+)	—

NOTE:
The black and white paired wires are designed for use with an antenna compensator. Panasonic do not manufacture an antenna compensator and do not recommend the use of any third party antenna compensator.

4.2.3 Installation with the Adjustable Angle Bracket

The Adjustable Angle Bracket can be used to install the Handsfree Unit in the following configurations:

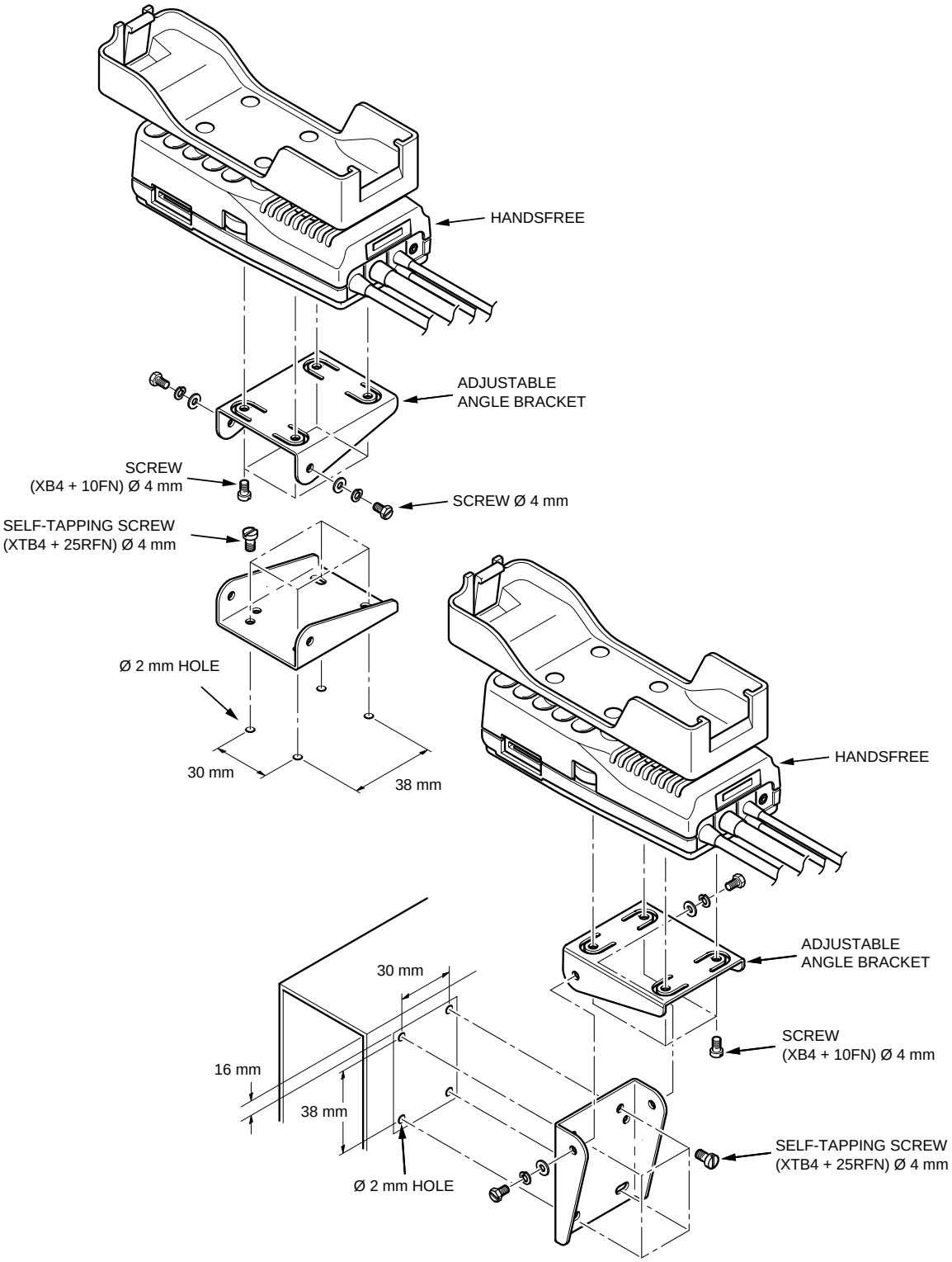


Figure 4: Adjustable angle bracket configurations 500-0404

4.2.4 Installing the Handsfree Microphone

The following points should be considered when installing the handsfree microphone:

That it does not obstruct the operation of the vehicle.

That it does not affect the normal passenger accommodation.

That the microphone should face the driver's mouth, at a distance of approximately 30cm.

Mounting the Microphone to the Sun Visor

1. Mount the microphone onto the sun visor clip by inserting the projection of the clip into the hole of the microphone base.
2. Mount the microphone onto the sun visor as shown in figure 5.
3. Connect the microphone to the flying lead from the handsfree cradle.

Mounting the Microphone to the Dashboard

1. Attach the adhesive pad to the dashboard clip.
2. Drill a 1mm hole at the mounting location and mount the clip using a M2.5 self-tapping screw.
3. Insert the projection of the clip into the microphone base, ensuring that it points towards the driver mouth.
4. Connect the handsfree microphone to the handsfree cradle.

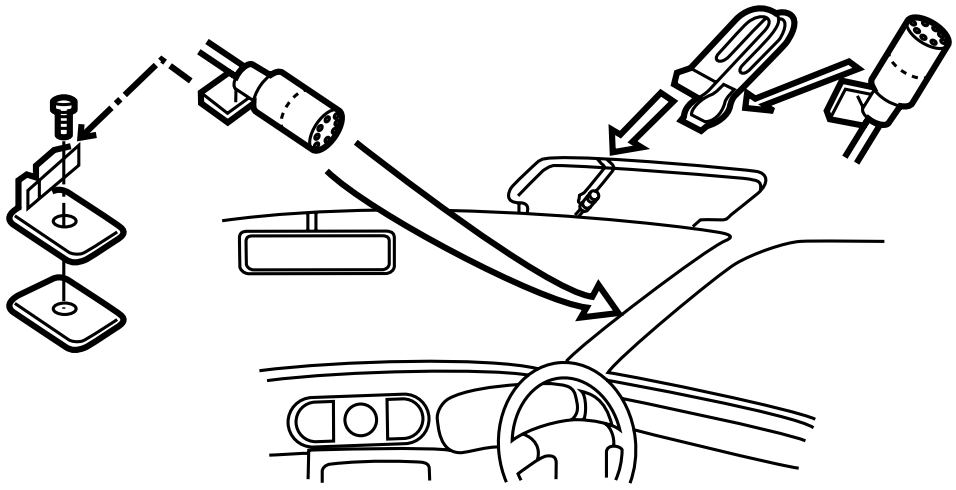


Figure 5: Microphone Installation 500-0405

4.3 DC Adaptor

The telephone is powered directly from the +12V cigar lighter socket. Switch the telephone power off and fit the DC power cable.

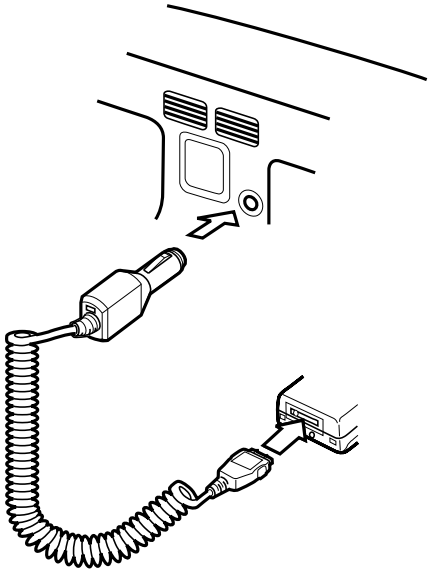


Figure 6: DC Adaptor Installation 500-0406

5 DISASSEMBLY/REASSEMBLY INSTRUCTIONS

5.1 General

This section provides disassembly and reassembly procedures for the main components of the G500 system.

These procedures MUST be performed by qualified service personnel, at an authorised 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.

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.

5.2 Handportable Unit

5.2.1 Disassembly

1. (Figure 1) Press the release clip, then tilt upwards to remove the battery from the telephone.

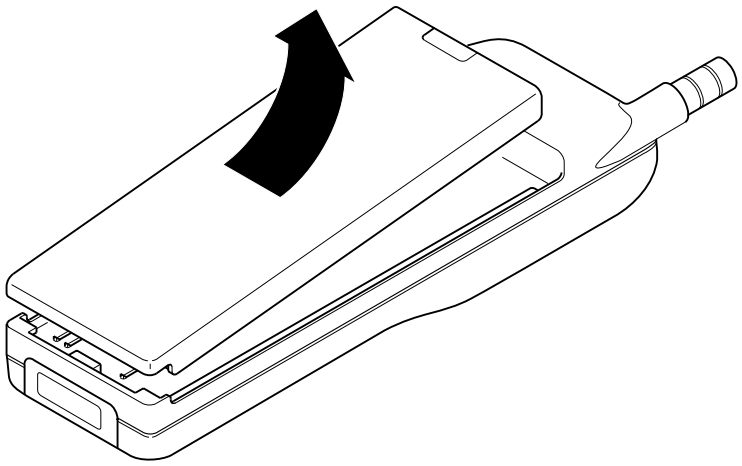


Figure 1: Battery removal 500-0501

2. (Figure 2) Remove the back from the telephone case (4 screws).

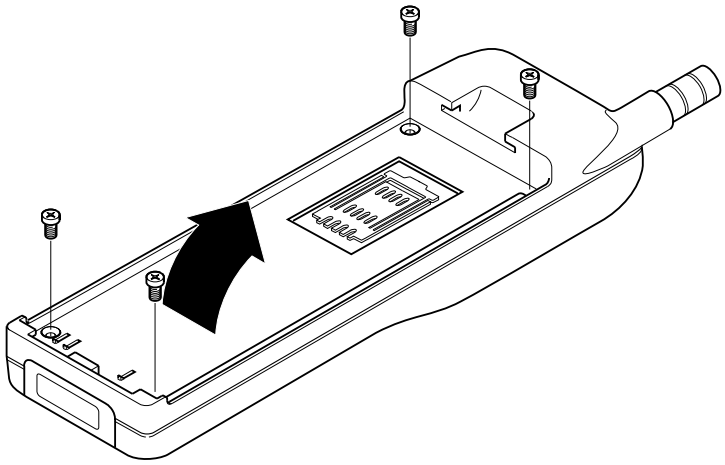


Figure 2: Case disassembly 500-0502

3. (Figure 3) To remove the PCB assembly, gently lift the lower end of the PCB assembly whilst pulling apart the sides of the telephone case. Place the PCB assembly onto a flat work surface.

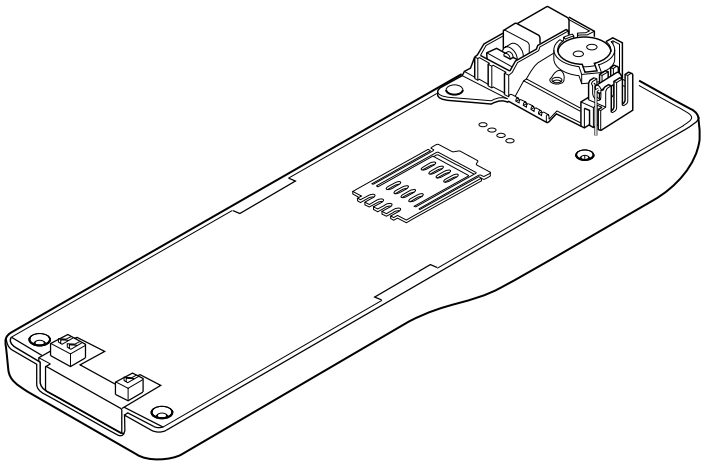


Figure 3: PCB assembly removal 500-0503

4. (Figure 4) Remove the vibrator/buzzer retaining screw from the RF PCB.

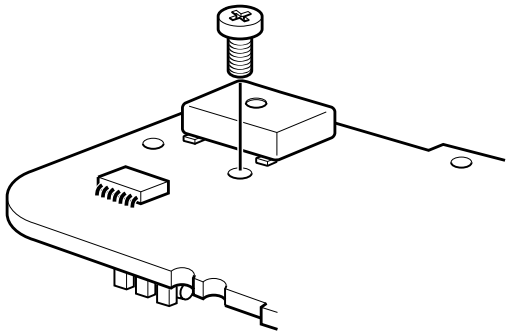


Figure 4: vibrator/buzzer screw removal 500-0504

5. (Figure 5) Unsolder and then remove the reed-switch from the vibrator/buzzer assembly.

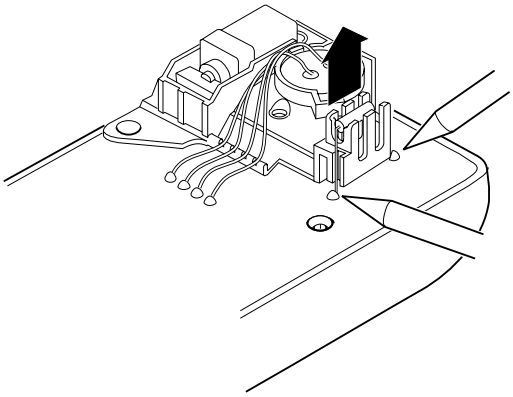


Figure 5: Reed-switch removal 500-0505

6. (Figure 6) Lift the vibrator/buzzer assembly from the RF PCB.

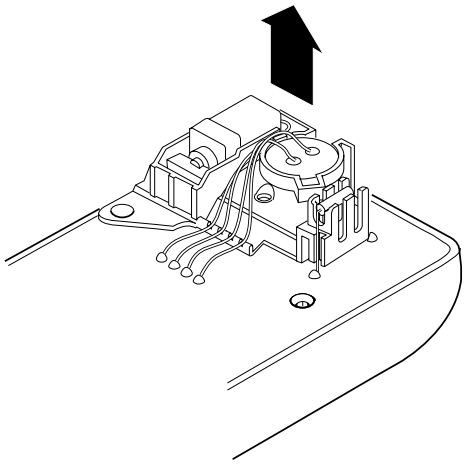


Figure 6: buzzer/vibrator removal 500-0506

7. (Figure 7) Remove the RF board from the PCB chassis.

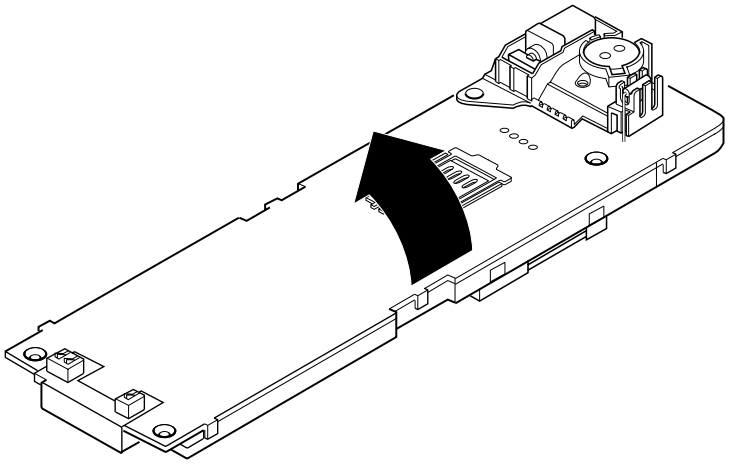


Figure 7: RF PCB removal 500-0507

8. (Figure 8) Remove the microphone from the PCB assembly.

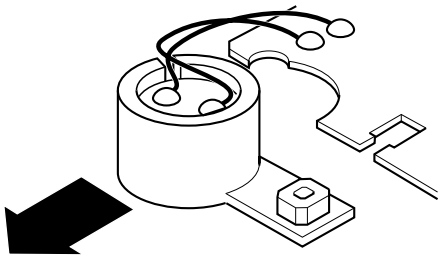


Figure 8: Microphone removal 500-0508

9. (Figure 9) Remove the logic board from the PCB chassis.

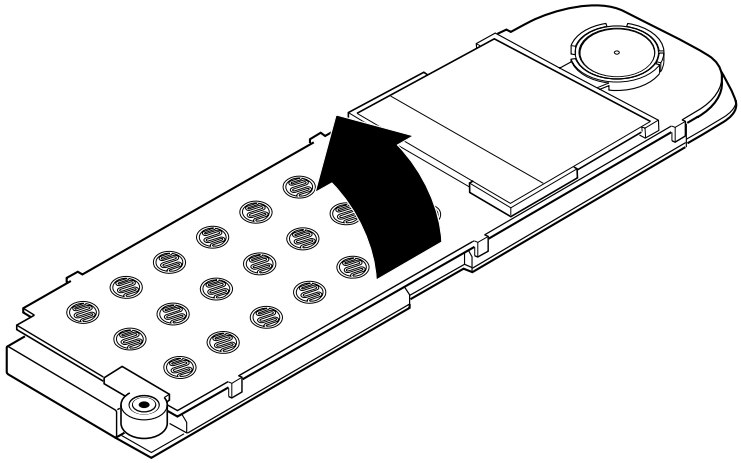


Figure 9: Logic PCB removal 500-0509

10. (Figure 10) Remove the earpiece from the logic PCB by pushing the earpiece down against the two locating lugs to disengage the case tabs. Lift the assembly upwards.

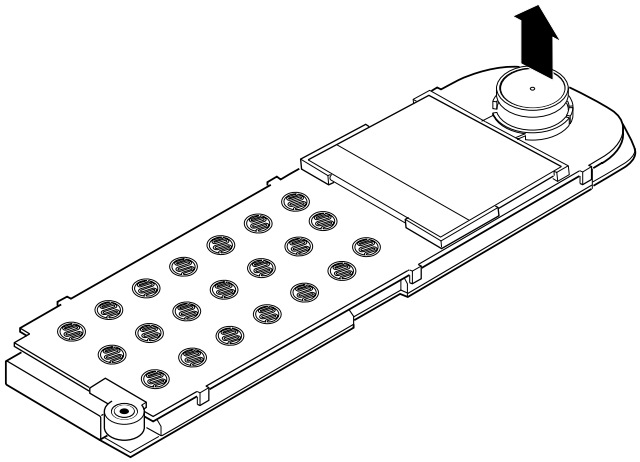


Figure 10: Earpiece removal 500-0510

11.(Figure 11) Gently push the two LCD locating lugs upwards to enable removal of the LCD assembly.

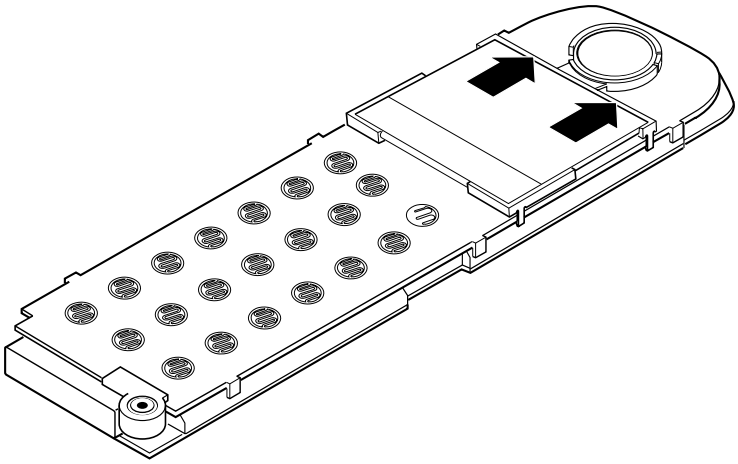


Figure 11: LCD removal (1) 500-0511

12. (Figure 12) Tip the LCD forward to allow the removal of the LCD/earpiece holder.

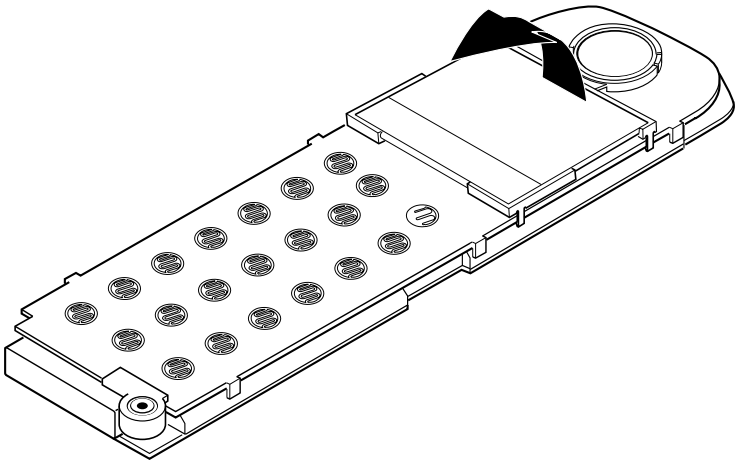


Figure 12: LCD removal (2) 500-0512

13. (Figure 13) Gently bend the lugs on the LCD/earpiece holder outwards and lift from the logic PCB.

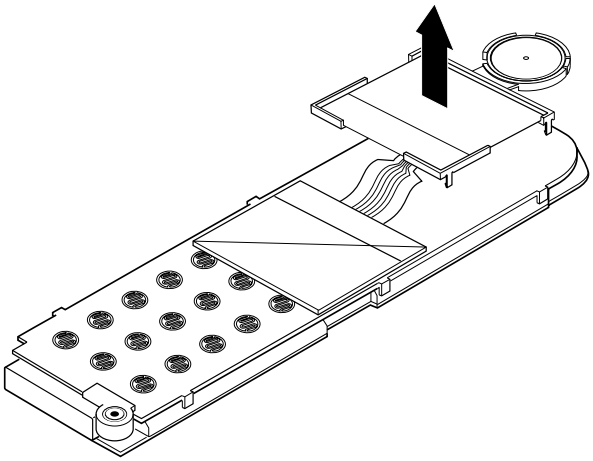


Figure 13: LCD/earpiece holder removal 500-0513

14. (Figure 14) Disconnect the LCD from the logic PCB.

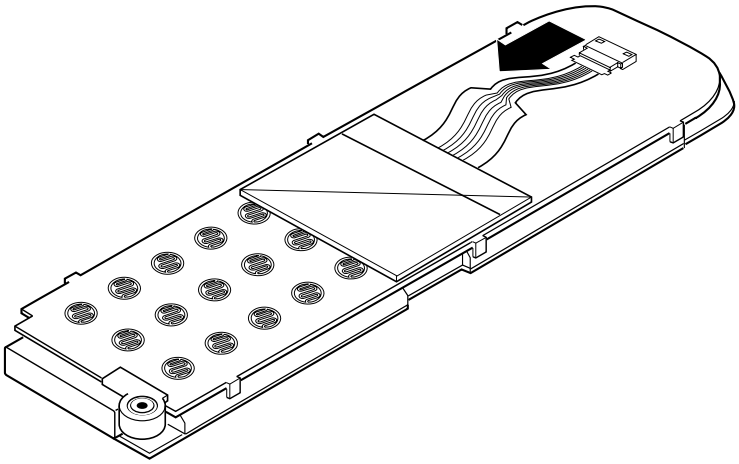


Figure 14: LCD disassembly (2) 500-0514

5.2.2 Antenna Removal

1. (Figure 15) Unscrew and remove the antenna from the cover using the antenna removal tool.

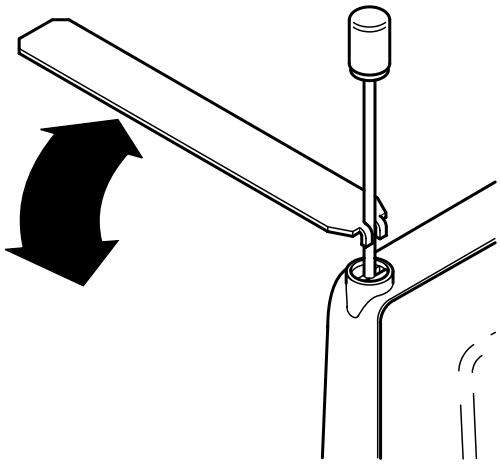


Figure 15: Antenna removal 500-0515

5.2.3 Reassembly

1. (Figure 16) When reassembling the vibrator switch ensure that it is located correctly before completing reassembly.

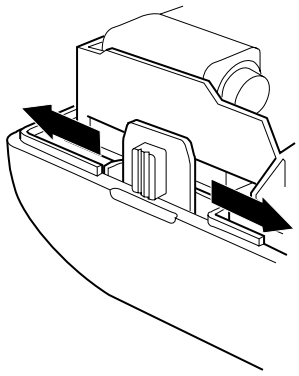


Figure 16: Vibrator switch testing 500-0516

2. (Figure 17) Care must be taken when reinstalling the back onto the telephone case. Ensure that the four securing screws are not over-tightened as this may affect the operation of the keypad.

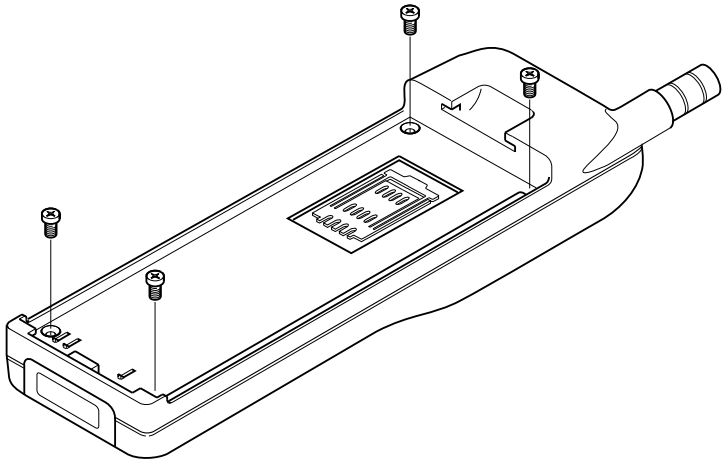


Figure 17: Case reassembly 500-0517

5.3 Dual Charger

5.3.1 Disassembly

1. (Figure 18) Place the Dual Charger upside-down on a flat work surface. Remove the two case screws.

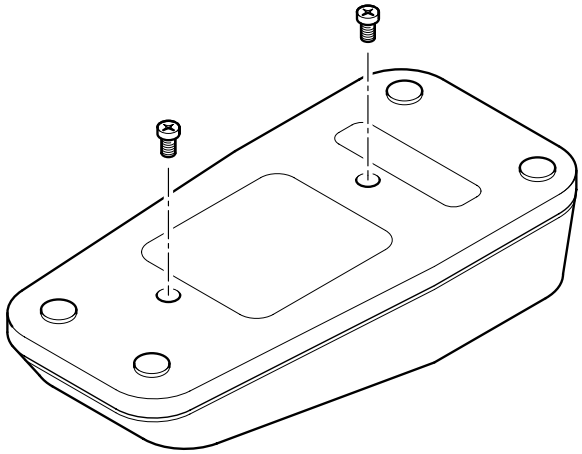


Figure 18: Case screw removal 500-0518

2. (Figure 19) Remove the case from the cover assembly.

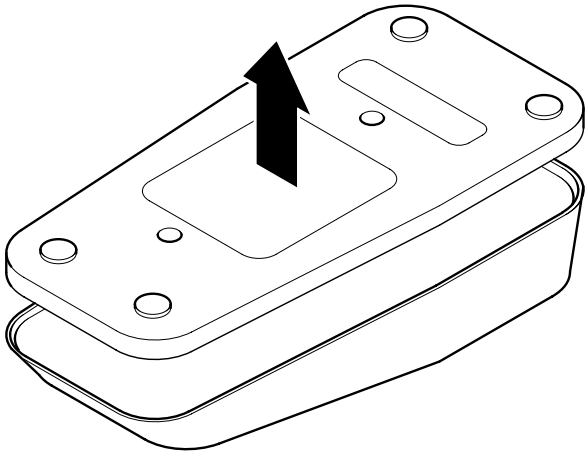


Figure 19: Case removal 500-0519

3. (Figure 20) Remove the PCB assembly fixing screws.

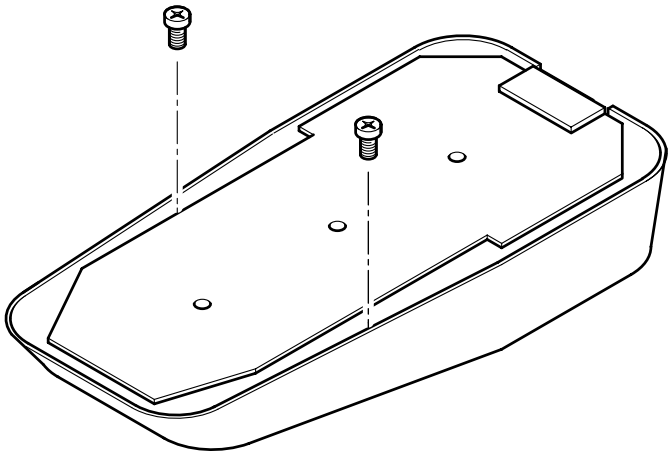


Figure 20: Screw removal 500-0520

4. (Figure 21) Raise and tilt the charger PCB to expose the connector cable.

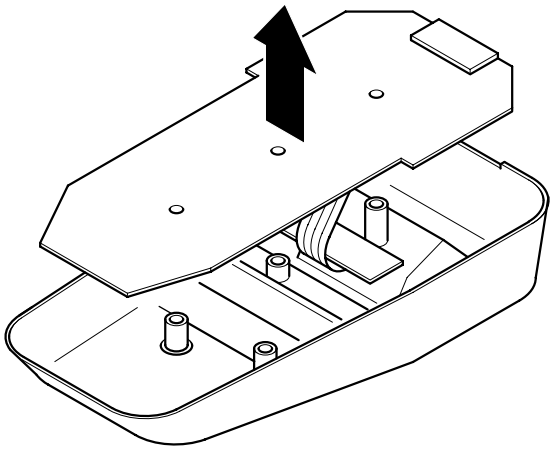


Figure 21: Charger PCB removal (1) 500-0521

5. (Figure 22) Disconnect and remove the charger PCB.

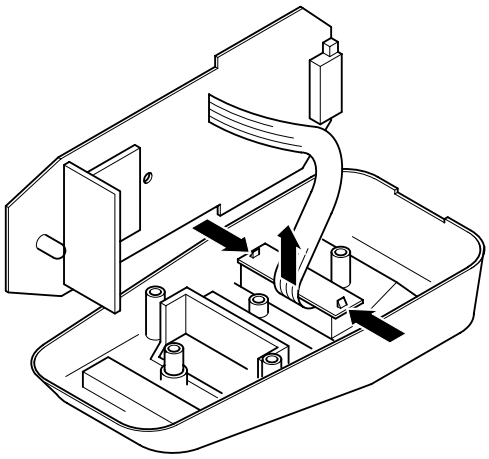


Figure 22: Charger PCB removal (2) 500-0522

5.4 Handsfree Unit

5.4.1 Disassembly

1. (Figure 23) Remove the holder from the handsfree unit (4 screws).

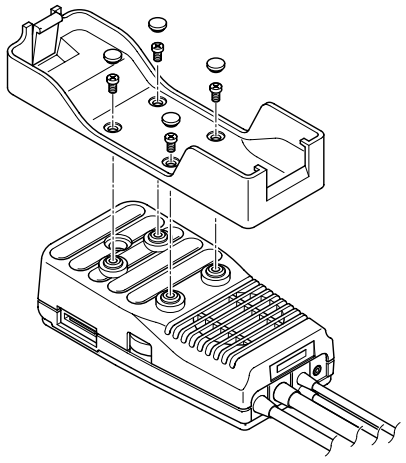


Figure 23: Holder removal 500-0523

2. (Figure 24) Remove the front cover from the handsfree assembly by removing the cover securing screw and disconnecting the speaker lead from the handsfree PCB.

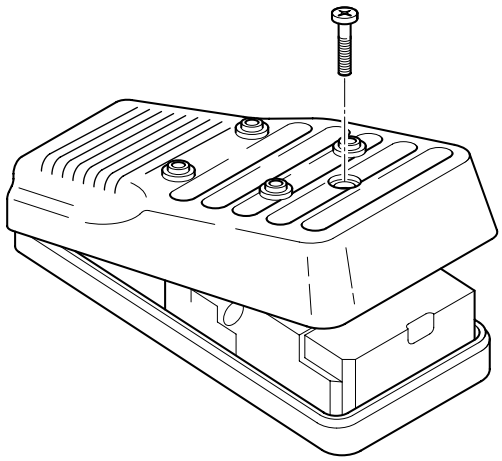


Figure 24: Handsfree cover removal 500-0524

3. (Figure 25) Remove the handsfree PCB (3 screws).

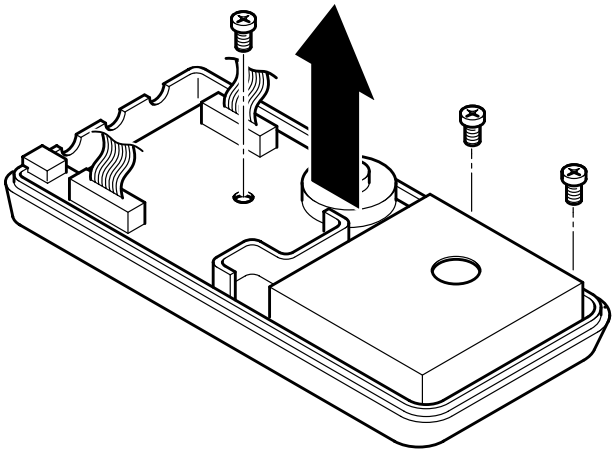


Figure 25: Handsfree PCB removal 500-0525

5.4.2 Reassembly

1. (Figure 26) Reinstall the handsfree PCB into the case (3 screws).

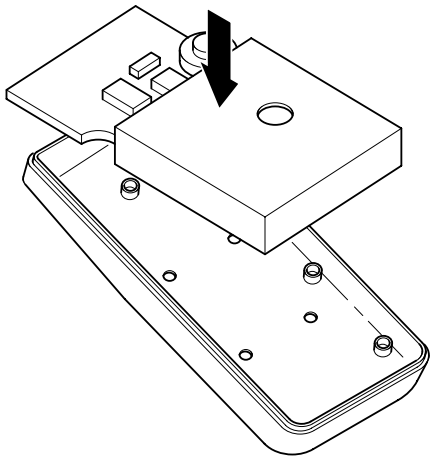


Figure 26: Handsfree PCB reinstallation 500-0526

2. (Figure 27) Position the cables into the case moulding.

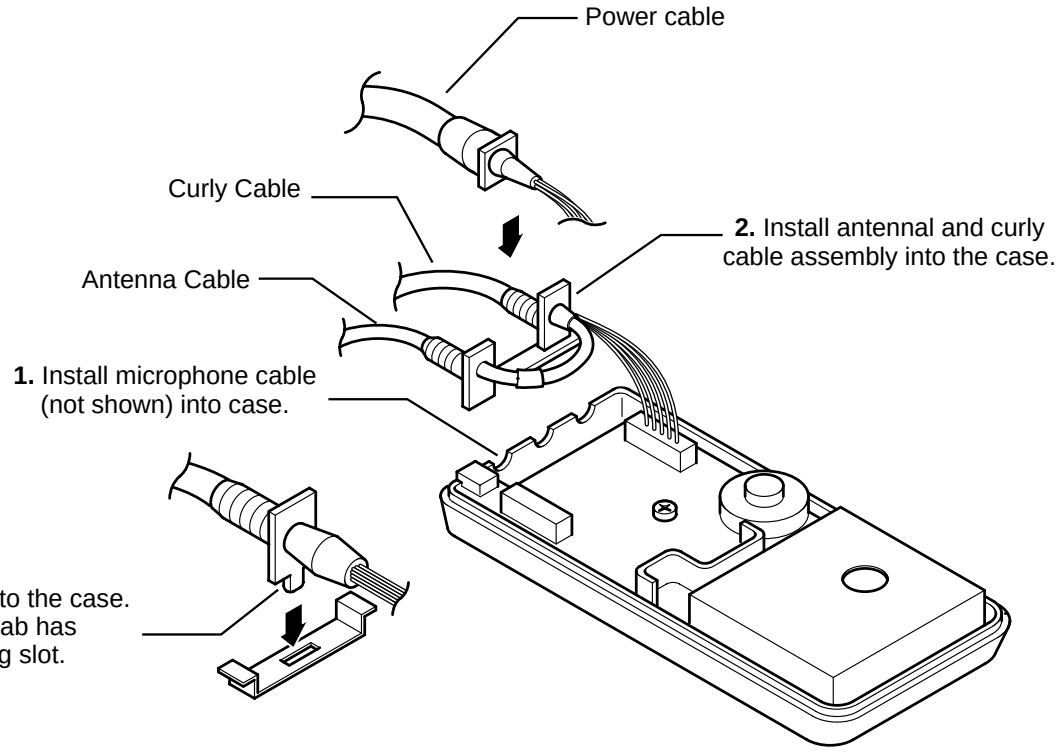


Figure 27: Handsfree cable positioning 500-0527

3. (Figure 28) Reinstall the front cover onto the handsfree assembly by reconnecting the speaker lead onto the handsfree PCB and reinstalling the cover securing screw.

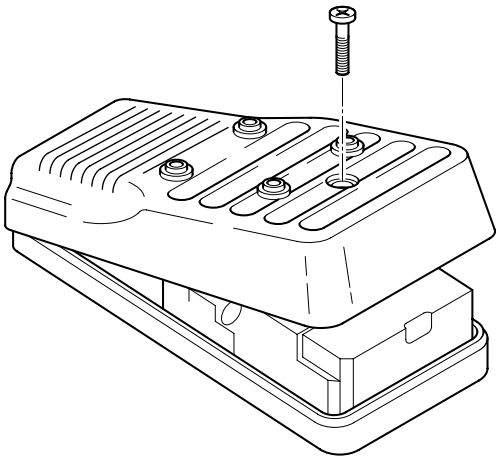


Figure 28: Handsfree cover removal 500-0524

4. (Figure 29) Reinstall the holder onto the handsfree unit (4 screws).

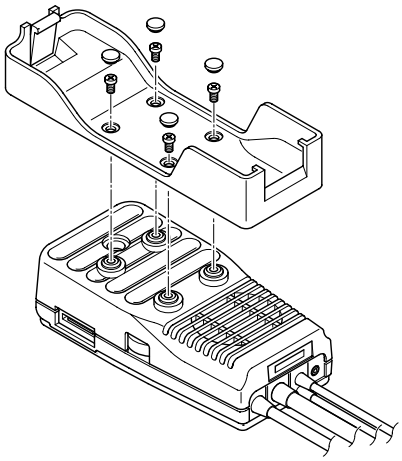


Figure 29: Holder removal 500-0523

6 TECHNICAL SPECIFICATIONS

6.1 General

1	Frequency range	Tx: 890 - 915MHz Rx: 935 - 960MHz
2	Tx/Rx frequency separation	45MHz
3	RF channel bandwidth	200kHz
4	Number of RF channels	124
5	Speech coding	Full rate
6	Operating temperature	-20°C to +55°C

6.2 Handportable Unit

6.2.1 General

Unless stated these specifications are with Battery Pack (M) fitted.
Battery life figures are dependant on network conditions.

1	Type	Class 4 Handheld (GSM Phase 1)
2	Dimensions	Height: 141mm Width: 46mm Depth: 23mm
3	Volume	149cc
4	Weight	215g
5	Display	Chip on glass liquid crystal, Alphanumeric 12 x 3 characters, 8 icons
6	Illumination	Green: 4 LEDs for the LCD 10 LEDs for the keyboards 1 LED Incomming call Red: 1 LED Charging indicator
7	Keypad	21 keys
8	SIM	Plug-in type only
9	Battery	4.8V
10	Battery Life (standby)	Battery Pack (S): ≈ 35 hrs (DRX 6) Battery Pack (M): ≈ 50 hrs (DRX 6) Battery Pack (XL): ≈ 90 hrs (DRX 6)
11	Battery Life (conversation)	Battery Pack (S): ≈ 100 minutes Battery Pack (M): ≈ 150 minutes Battery Pack (L): ≈ 260 minutes
12	External DC Supply Voltage	6.7V

13	Antenna Terminal Impedance	50Ω
14	Antenna VSWR	<2.1 : 1
15	RF Output Power	2W maximum (GSM class 4)
16	Modulation	GMSK (BT = 0.3)
17	Connection	8 ch/TDMA
18	Voice digitizing	13kbps RPE-LTP
19	Transmission speed	270.3 kbps
20	Diversity	Frequency hopping
21	Signal Reception	Double superheterodyne
22	Intermediate Frequency	1st: 1136 - 1161 MHz 2nd: Tx 246 MHz, Rx 201 MHz

6.2.2 Tx Characteristics

1 Frequency error: ±0.1ppm max., relative to base station frequency.

2 Modulation phase error: RMS: ≤5°
Peak: ≤20°

3 Output RF Spectrum due to Modulation:

Offset from Centre Frequency (kHz)	**Maximum Level Relative to the Carrier (dB)**
±100 ±200 ±250 ±400 to 1800	+0.5 -30 -33 -54 (Integral antenna)

4 Output RF Spectrum due to Switching Transients:

Offset from Centre Frequency (kHz)	**Maximum Level (dBm)**
±400 ±600 ±1200 ±1800	-23 -26 -32 -36

Measurement conditions for output RF spectrum measurements:

Frequency Span: 0Hz
Measurement Bandwidth: 30kHz
Video Bandwidth: 100kHz
Peak Hold

5 Spurious Emissions at the Antenna Connector:

Frequency (MHz)	**Limits (dBm)**		**Measurement BW (kHz)**	**Video BW (kHz)**
	Active Mode	**Idle Mode**		
Offset from carrier (in Tx band) ≥1.8 ≥6.0	 ≤ -36 ≤ -36	 — —	 30 100	 100 300
Offset from Tx band edge ≥2.0 ≥5.0 ≥10.0 ≥20.0 ≥30.0	 ≤ -36 ≤ -36 ≤ -36 ≤ -36 ≤ -36	 — — — — —	 30 100 300 1MHz 3MHz	 100 300 1MHz 3MHz 10MHz
Frequency bands 935 - 960 925 - 935 1805 - 1880 0.009 - 1000 1710 - 1785 1805 - 1880 1000 - 12750	 ≤ -79 (a&b) ≤ -67 (a&b) ≤ -71 (a&b)	 — — — ≤ -57 ≤ -57 ≤ -57 ≤ -47	 100 100 100 100 100 100 100	 100 100 100 100 100 100 100

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 spurii measurements can fail these limits, in which case the limit ≤ -36dBm shall apply.

6 Output Level, Dynamic Operation:

Power Control Level (defined by GSM 05.05)	**Peak Power (dBm)**	**Tolerance for Conditions (dB)**	
		Normal	**Extreme**
5	33	±2	±2.5
6	31	±3	±4
7	29	±3	±4
8	27	±3	±4
9	25	±3	±4
10	23	±3	±4
11	21	±3	±4
12	19	±3	±4
13	17	±3	±4
14	15	±3	±4
15	13	±3	±4

7 Residual Peak Power: ≤70dBc (BW = 300kHz)

6.2.3 Rx Characteristics

1 Sensitivity

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 condition.

PROPAGATION CONDITIONS					
Type of Channel	Static	TU50 (no FH)	TU50 (ideal FH)	RA250 (no FH)	HT100 (no FH)
TCH/FS (FER) Class Ib (RBER) Class II (RBER)	0.1α% 0.4/α% 2%	6α% 0.4/α% 8%	3α% 0.3/α% 8%	2α% 0.2/α% 7%	7α% 0.5/α% 9%

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.

2 Blocking:

Interferer Frequency (MHz)	Interferer Level (dBm)
Offset from wanted carrier (in band 915 - 980MHz) ≥600kHz ≥800kHz ≥1.6MHz	 -43 -33 -23
Out of band frequency bands 0.1 - 915 980 - 12750	 0 0

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.

3 Intermodulation Characteristics:

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

6.3 Handsfree Unit

Input voltage	13.8V ± 20%
Over voltage protection	18 ± 1.0V
Current consumption	Operation: 2.0A max (normal sound) Idle mode: 150mA max (no sound) Standby: 1mA max (logic power off)
Ignition signal	H Level: ON L Level: OFF
Speaker output power	1.5W
Speaker impedance	8Ω
Antenna (H/F mode)	External antenna
Operating temperature range	-10 to +55 °C
Storage temperature range	-20 to +60 °C
Charging temperature range	-5 to +35 °C

6.4 Dual Charger

Input voltage	8V maximum
Input current	700mA
Charging slots	2 slots Front: Main unit Rear: Battery pack only
Charge time (front slot)	Battery Pack (S): ≈ 120 minutes Battery Pack (M) ≈ 150 minutes Battery Pack (XL) ≈ 300 minutes
Charge time (rear slot)	Battery Pack (S): ≈ 4 hours Battery Pack (M) ≈ 4 hours Battery Pack (XL) ≈ 10 hours
Charge indicator (front slot)	Telephone display: : Charging : End of charge – telephone ON OFF: End of charge – telephone OFF
Charge indicator (rear slot)	Red LED: Charging Green LED: End of charge
Charge current	210 ±10 mA
Operating temperature range	+5 to +35 °C
Storage temperature range	-20 to +60 °C
Charging temperature range	+5 to +35 °C

6.5 AC Adaptor

Input voltage	UK, EU: 230VAC ±10% TW: 110VAC ±10% CH: 100VAC ±10%
Input current	20mA maximum
Input plug type	UK: Type BF EU: Type C-4/C-7 Other: Country specific
Output voltage	6.7VDC
Output current	600mA maximum
Ripple voltage	50mV peak to peak, at 600mAh
Charge time	Battery Pack (S): ≈ 80 minutes Battery Pack (M) ≈ 130 minutes Battery Pack (XL) ≈ 240 minutes
Output connector	MQ138-MA75-165-CVL
Operating temperature range	+5 to +40 °C
Storage temperature range	-20 to +60 °C
Charging temperature range	+5 to +35 °C

6.6 DC Adaptor

Input voltage	DC 10.5 to 32.0VDC Negative earth only
Output voltage	7.2VDC $^{+0}$ / $_{-10}$%
Current consumption	Operation: 500mA Standby: 34mA max (no load)
Charge time	Battery Pack (S): ≈ 120 minutes Battery Pack (M) ≈ 150 minutes Battery Pack (XL) ≈ 270 minutes
Display	Red LED (power status)
Reverse voltage protection	Didode across input
Short circuit protection	Input: 2A fuse Output: 8.2V zener diode
Operating temperature range	+5 to +60 °C
Storage temperature range	-20 to +80 °C
Charging temperature range	+5 to +35 °C

6.7 Battery Pack (S)

Type	Ni-MH (4 cells)
Weight	90 ±2g
Voltage	4.8V
Capacity	600mAh
Storage temperature range	-20 to +40 °C (6 months)

6.8 Battery Pack (M)

Type	Ni-MH (4 cells)
Weight	115 ±2g
Voltage	4.8V
Capacity	850mAh
Storage temperature range	-20 to +40 °C (6 months)

6.9 Battery Pack (XL)

Type	Ni-MH (4 cells)
Weight	145 ±2g
Voltage	4.8V
Capacity	1600mAh
Storage temperature range	-20 to +40 °C (6 months)

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7 TEST AND MEASUREMENT

7.1 Introduction

This section provides information on testing the G500 telephone. The layout is as follows:

1. Section 7.2 Test command mode: describes the manual entry of test commands using the telephone keypad.
2. Section 7.3 External testing: describes equipment requirements and general set up procedure.
3. Section 7.4 External test commands: provides detailed explanation of the different commands available using the test equipment and channel-box software.
4. Section 7.5 Adjustment guide: describes adjustments available on the G500 handheld unit.

7.2 Test Command Mode

The telephone can be tested by test commands input from the keypad. The telephone receives test commands from the keypad and then performs the tests.

To use Test Command Mode “Set Handset Testmode” must be enabled. Set Handset Testmode can be enabled using channel box software.

Command	Key Operation	Function
Test mode	F *	Enter test mode
Terminate handset test	7	End test mode
Init	0 0	Initializes logic section into test mode and the following state: 1) Stops RF function 2) Set channel to 62 3) Receiver/transmit audio muted 4) Voice memorandum function interrupted 5) Set power level to minimum (15) 6) DTMF and audio tones off
Change channel number	1 0 [x] [x] x	Sets the Tx/Rx synthesizer to a specified channel. xxx = Channel number (0 to 124) Note: if channel 0 is selected, the execution of all RF sequences (Rx, Tx, Mon) will be stopped.
Change Rx, Tx, MON channel number	1 1 [x] [x] x [y] [y] y [z] [z] z	Sets the Tx/Rx synthesizer to a specified channel. xxx = Rx channel number (0 to 124) yyy = Tx channel number (0 to 124) zzz = MON channel number (0 to 124) **Note:** if channel 0 is selected, the execution of all RF sequences (Rx, Tx, Mon) will be stopped.
Set transmit power level	2 0 [x] x	Sets the RF transmitting power level xx = Power level (5 to 15) **Note:** 5 = maximum, 15 = minimum
Tx data	2 1 x	Transmits modulation data by normal burst or access burst. x values: 0 = transmission stop 1 = normal burst, modulation data 0 2 = normal burst, modulation data 1 3 = normal burst, random modulation 4 = access burst, modulation data 0 5 = access burst, modulation data 1 6 = access burst, random modulation
Program PA ramping data	2 2 [x] x [y] y [z] [z] z	Sets PA ramping low and high voltage data xx = transmitting power level (5 to 15) yy = changed data position designation (rising 0-15, falling 16-31) zz = ramping data (0 to 255) **Note:** the ramping data changed by this function is only effective in Test Mode.
Measure RSSI	3 0 [x] [x] x	Measures the RSSI of a selected channel xxx = channel number (1 to 124) Display format is: xxx yyy where yyy = RSSI (dBm)

Command	Key Operation	Function
Set AGC	3 1 x1 x2 x3 x4 x5 x6 x7	External AGC gain setting. Values entered into GF register of EPOCH. x (bit value) = logical 0 or 1 as follows: x1 = (IF AGC, G/dB PGC stage 1) x2 = (IF AGC, G/dB PGC stage 2) x3 = (IF AGC, G/dB PGC stage 3) x4 = (IF AGC, G/dB PGC stage 4) x5 = (IF AGC, G/dB PGC stage 5) x6 = (RF AGC, G/dB LNA) x7 = (DIVIDER CONTROL) Display format is: xxxx where xxxx is the EPOCH set value.
Fixed channel Rx	3 2 x	Sets continual Rx with current channel x = 0 (continuous reception stop), or x = 1 (continuous reception start)
DTMF tones	4 0 x	Sounds the DTMF tone corresponding to the key code selected x = numeric key (123456789*0#)
Single tones	4 1 [x] x	Sounds the signal tones x values: 0 = silence 1 = dial tone 2 = subscriber busy 3 = congestion 4 = radio path acknowledgement 5 = radio path not available 6 = error/special information 7 = ringing tone 8 = call waiting tone 9 = far end ringing Display format is: xxxxxxxxxx where xxxxxxxxxx = signal tone name
Tone off	4 2	Deactivates the speech processor tones (DTMF and signal tones) and the buzzer tone.
SP loopback	4 3 x	Selects the loopback mode of the speech processor x values: 0 = End of loopback test 1 = AD loop 2 = TCH erase 3 = TCH loop 4 = GSM loop Display format is: xxxxxxxx where xxxxxxxx = selected function
Rx/Tx mute/unmute	4 4 x	Mute/unmute the Rx/Tx audio x values: 0 = Rx unmute 1 = Rx mute 2 = Tx unmute 3 = Tx mute Display format is: xxxxxxxx where xxxxxxxx = selected function

Command	**Key Operation**	**Function**
Path control	4 5 x	Selects the path x values: 0 = mic external, speaker internal 1 = mic external, speaker external 2 = mic internal, speaker internal 3 = mic internal, speaker external Display format is: xxxxxxxxxxx where xxxxxxxxxxx = selected function
Buzzer tones	4 6 x	Selects buzzer tone x values: 0 = buzzer off 1 = 0.8kHz for 960ms, or 1kHz for 960ms 2 = 2.7kHz Display format is: xxxxxxxx where xxxxxxxx = selected function
Volume control	4 7 x [y] y	Controls tone and receiver volume x values: 0 = tone volume 1 = speech volume 2 = sidetone volume y values: 0 = tone 0dB, speech +6dB, sidetone 0dB 1 = tone -0.5dB, speech +3dB, sidetone -6dB 2 = tone -1dB, speech +2dB, sidetone -12dB 3 = tone -1.5dB, speech 0dB, sidetone -18dB 4 = tone -2dB, speech -1.5dB 5 = tone -3dB, speech -3dB 6 = tone -6dB, speech -4.5dB 7 = tone -9dB, speech -6dB 8 = tone -12dB, speech -9dB 9 = tone -15dB, speech -12dB 10 = tone -18dB, speech -15dB 11 = tone -24dB, speech -18dB 12 = tone -30dB, speech -24dB 13 = tone -36dB, speech -30dB 14 = tone -42dB, speech -36dB 15 = tone -inf dB, speech -42dB Display format is: xxxxx yyyy where xxxxx = selected volume and yyyy = volume level
Buzzer volume	4 8 [x] x	Controls buzzer volume x = 0 to 15 0 = volume LOW, and 15 = volume HIGH
Output volume	4 9 x [y] y	Controls output volume x values: 0 = internal speaker selection 1 = external speaker selection y values: 0 = 0dB 1 = -2dB and so on in -2dB increments to 14 = -28dB 15 = -30dB Display format is: xxx yy where xxx = selected speaker and yy = volume level (dB)

Command	**Key Operation**	**Function**
Input volume	4 * [x] x	Controls input volume xx values: 0 = 26dB 1 = 28dB 2 = 30dB 3 = 32dB 4 = 34dB 5 = 36dB 6 = 38dB 7 = 40dB
Get version	5 0	Reads the model name, software revision and PROM sum check. Display format is: wwwwwwx yyzz where: wwwwww = software version (external ROM) x = software version (internal ROM) yy = even-numbered address sum check for PROM zz = odd-numbered address sum check for PROM
Get IMEI	5 1	Reads the IMEI Display format is: xxxxxxxxxxxxxxx where xxxxxxxxxxxxxxx = IMEI (15 digits)
Get IMSI	5 2 [x] [x] [x] [x] xxxx	Reads the IMSI from the SIM xxxxxxxx = pin number Display format is: xxxxxxxxxxxxxxx where xxxxxxxxxxxxxxx = IMSI (15 digits maximum)
Get product number	5 3	Displays the product serial number. The display will show: xxxxxxxxxxxxxxx where xxxxxxxxxxxxxxx = product serial number
Set mode control flag	7 1 x	Determines whether to enable or disable the handset test mode. This setting is stored even when the power supply is switched off. x values: 0 = handset test mode disabled 1 = handset test mode enabled
Back light control	8 0 x y	Back light and incoming LED on/off control. x values: 0 = back light 1 = incoming LED y values: 0 = unlit 1 = lit Display format is: xxxx yyy where xxxx = LAMP or PAGE and yyy = ON or OFF
Check LCD	8 1 x	Displays the LCD check pattern x values: 0 = displays check pattern 1 1 = displays check pattern 2
Get key code	8 2 x	Output key code from the serial port. While this function is activated the KEY_CODE command (going-down serial command) is output from the serial port every key operation. The power key is disabled during the use of this function. x values: 0 = stop output 1 = start output

Command	Key Operation	Function
Discrete output	8 3 [x] x	Discrete control of output ports of the CPU and EPOCH devices. x values: 0 = LOGIC PWR OFF 1 = LOGIC PWR2 OFF 2 = LOGIC PWR2 ON 3 = CHARGE OFF 4 = CHARGE ON 5 = RADIO MUTE OFF 6 = RADIO MUTE ON 7 = HF OFF 8 = HF ON 9 = RF_ON2 OFF 10 = RF_ON2 ON 11 = AUDIO DISABLE 12 = AUDIO ENABLE 13 = RCVR_MUTE OFF 14 = RCVR_MUTE ON 15 = TAM PLAY OFF 16 = TAM PLAY ON 17 = TAM RECORD OFF 18 = TAM RECORD ON 19 = unused 20 = unused 21 = unused 22 = P07 OFF 23 = P07 ON 24 = P08 OFF 25 = P08 ON 26 = P09 OFF 27 = P09 ON 28 = P010 OFF 29 = P010 ON 30 = P011 OFF 31 = P011 ON Note: 0 to 21 = CPU output port control, 22 onwards = EPOCH output control.
Get ADC data	8 4	Reads battery voltage and temperature. The display will show: www xxx yy where www = battery voltage (hex), xxx = battery temperature (hex) and yy = unused

Command	**Key Operation**	**Function**
Get mobile status	8 5	Displays the status of the mobile station equipment. The display will show: tt uu vv ww xxxx yy zz where: tt = Tx channel number uu = Rx channel number vv = monitor channel number ww = power level xxxx = AGC setting yy = miscellaneous (1) bit 0 = Rx mute status (unmute = 0,mute = 1) bit 1 = Tx mute status (unmute = 0,mute = 1) bit 2 = internal/external power source (internal = 0, external = 1) bit 3 to 4 = battery ID (NiMH = 01, battery not connected = 10) bit 5 = hook status (off hook = 0, on hook = 1) bit 6 = ignition status (off = 0, on = 1) bit 7 = unused zz = miscellaneous (2) bit 0 = RF_ON2 (off = 0, on = 1) bit 1 = ANA_EN (off = 0, on = 1) bit 2 = handsfree (ABSENT = 0, PRESENT = 1) bit 3 = LOGIC PWR2 (off = 0, on = 1) bit 4 = data adaptor (ABSENT = 0, PRESENT = 1) bit 5 to 7 = unused

7.3 External Testing

The G500 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. For in-depth fault finding the unit should be disassembled (section 5), and the extended card used to connect the PCBs together externally as they would be found in normal use. Fault tracing can then be performed on the PCBs using suitable test equipment, such as spectrum analysers and oscilloscopes.

7.3.1 Jigs and Tools

Test Equipment Descriptions

1. Interface Unit, Part No. IFB001 (Figure 1)

The IFB001 provides:

a) Voltage regulation. From +12V DC input (from power supply) to +7V DC output.

b) RS 232 interface. Ensures that the Unit Under Test is supplied with the correct signalling level and format.

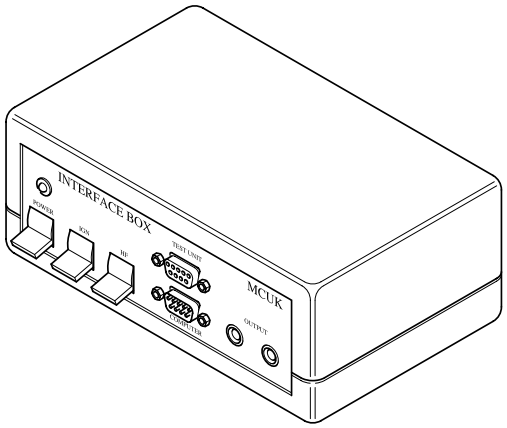


Figure 1: Interface Box IFB001 500-0701

2. Personal Computer (PC)

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

3. Regulator Unit, Part No. G5INT 001 (Figure 2)

The Regulator Unit provides:

a) Voltage regulation. From +7V DC input (from IFB001) to +5.6V or 4.8V DC output. The 5.6V switch setting is used for PCB testing and the 4.8V switch setting is used for testing the complete unit.

b) Connection between IFB001 and the Unit Under Test.

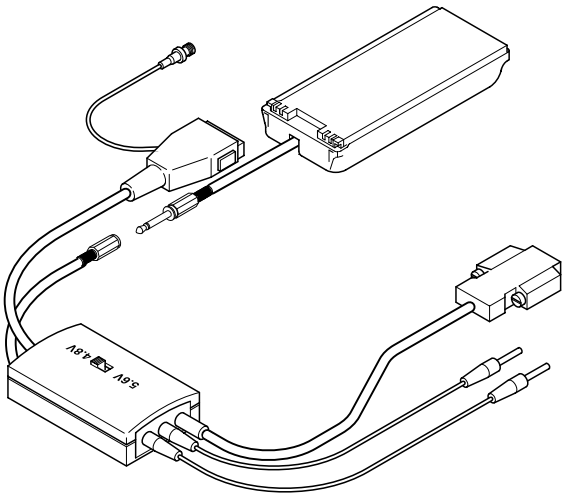


Figure 2: Regulator Unit 500-0702

4. Power Supply

Provides 12V DC supply to the Interface Box IFB001.

5. Extender PCB, Part No. G5EXT PCB 001 (Figure 3).

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

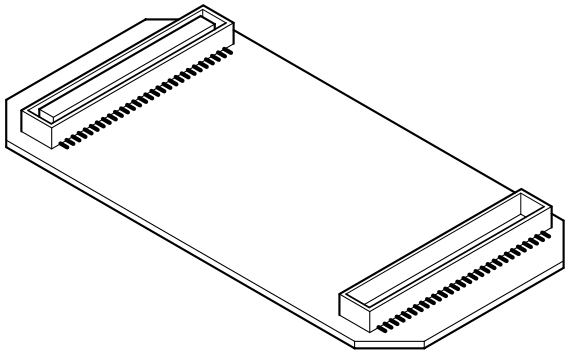


Figure 3: Extender PCB 500-0703

6. Antenna Key, Part No. G4ANT KEY (Figure 4)

This is provided to allow removal and replacement of the antenna (see disassembly instructions, Section 5).

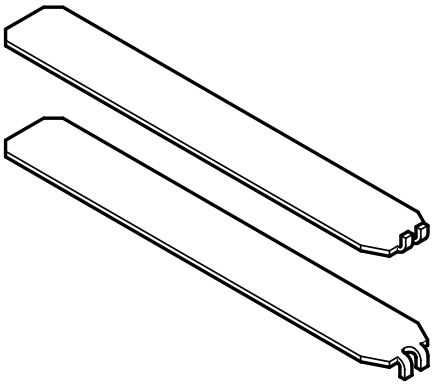


Figure 4: Antenna Key 500-0704

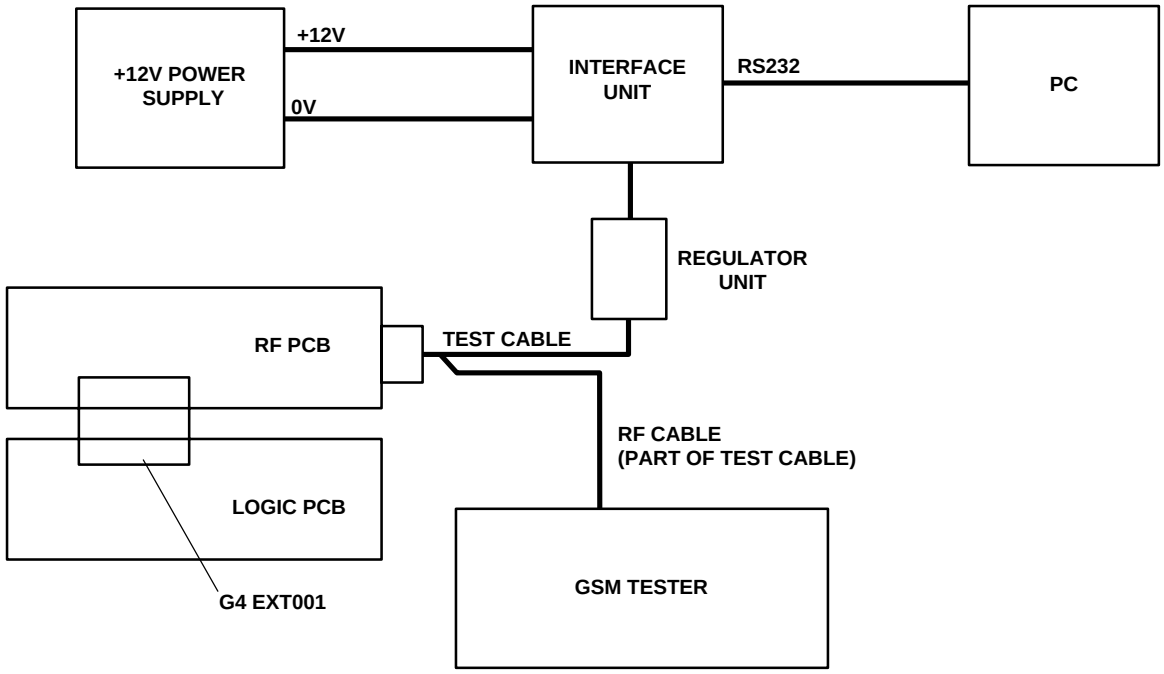
7. GSM Tester

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

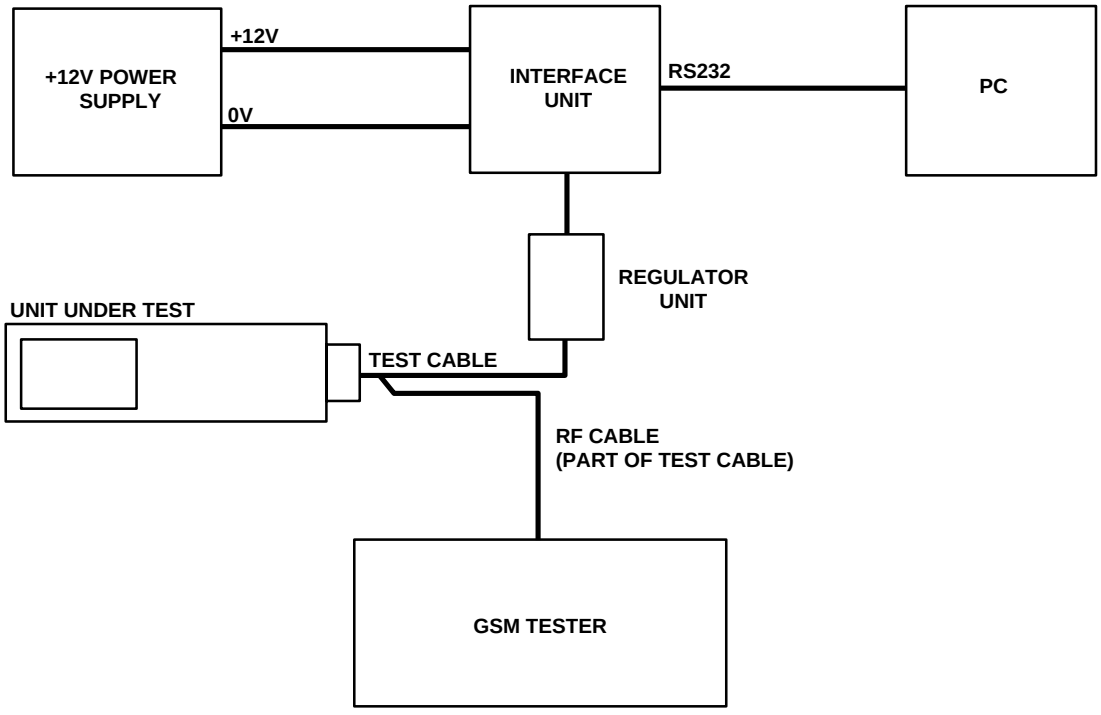
8. Channel Box Software

This is the test software for the G500 unit and should be installed onto the personal computer used for testing.

Complete Unit Test Setup



PCB TEST SETUP



COMPLETE UNIT TEST SETUP

Figure 5: Complete unit test setup 500-0705

7.3.2 External Testing Setup Procedure

IMPORTANT NOTE:
To allow accurate measurement of the complete unit the test equipment must be connected as shown (figure 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.

Full Test Equipment Requirements

For testing the handheld unit the following equipment is required:

1. Interface unit
2. Regulator unit
3. 12V power supply
4. Personal computer (IBM compatible) with RS232 interface
5. RS232 interface cable (9 pin straight through connection)
6. GSM test station

Figure 6 shows a typical setup for testing the G500 unit. The channel box software (supplied on floppy disk) should be installed onto the main drive of the personal computer.
The RF cable on the regulator unit is connected to the GSM test station via a suitable adaptor. The 12V supply is connected to the rear socket of the interface unit.
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. (Figure 6) Connect the test equipment into test mode configuration.

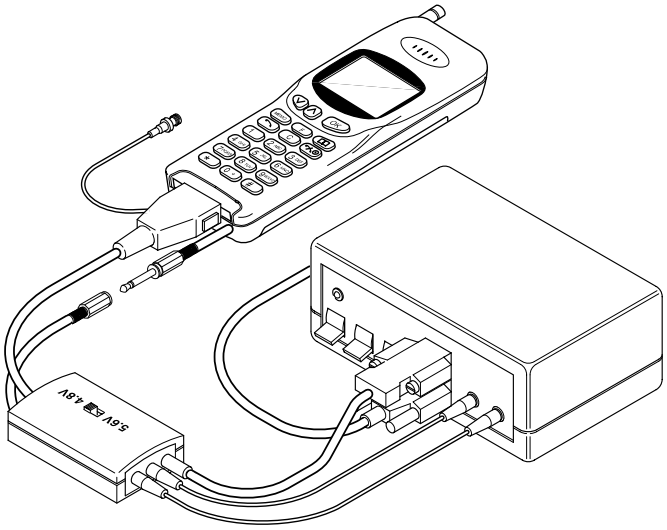


Figure 6: Interface Unit 500-0706

2. Ensure that the following settings are made:

a) Interface Unit IFB001
Power: UP position
IGN: DOWN position
HH/HF: HH

b) Power supply
+12V DC: OFF

c) PC
Channel box software loaded and the screen indicating as shown (figure 7):

Figure 7: PC Screen (SCRN10) 500-0707

3. Press ENTER on the PC keyboard.

4. Switch on the +12V supply.

5. At the PC press F10.

6. At the Interface Unit switch the power to ON.

NOTE:
The UUT will switch ON, OFF and back ON again. The display will read STAT INFO. The back light will be illuminated and all LEDs will be lit.

Go to section 7.4 (external test commands) for further testing information.

Power On in Normal Mode

1. (Figure 8) Connect together the test equipment.

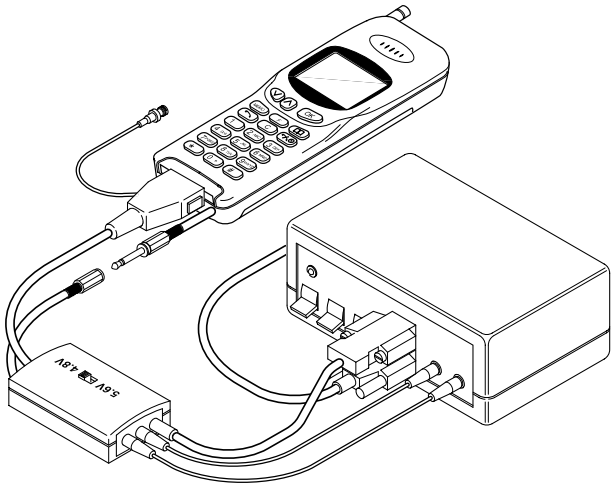


Figure 8: Interface Unit 500-0706

2. Ensure that the following settings are made:

a) Interface Unit IFB001

Power:	UP position
IGN:	UP position
HH/HF:	HH

b) Power supply

+12V DC:	OFF

c) PC

Channel box software loaded and the screen indicating as shown (figure 9):

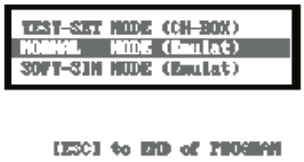


Figure 9: PC Screen (SCRN9) 500-0709

3. On the PC press ENTER.

4. Switch on the 12V supply.

5. At the Interface Unit switch the power to ON and HH/HF to HH.

6. At the PC press F10.

7. At the Interface Unit switch IGN ON.

Entering Call Mode from Test Mode

The screen of the PC will resemble the one shown in figure 10:

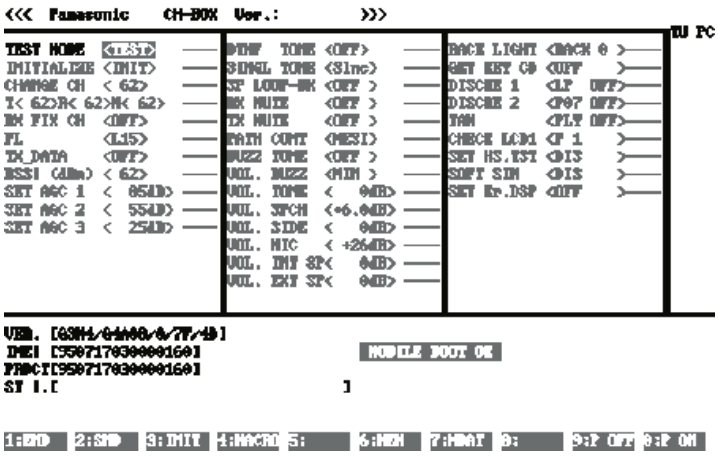


Figure 10: PC Screen (SCRN11) 500-0710

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.

7.4 External 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	<xxx>	Sets up pre-defined channel settings.
T<xxx>R<xxx>M<xxx>		Sets user defined channels for transmit, Receive and monitor.
RX FIX CH	<ON>	Prevents Receive signal from pulsing, providing accurate test environment for the Receive signal. Allows RSSI measurement to be made.
PL	<xxx>	Allows a specified power level to be set at the UUT.
TX_DATA	<N0> <N1> <NR> <A0> <A1> <AR>	Sets TX Modulation to: Normal burst DATA all 0s Normal burst DATA all 1s Normal burst DATA all random Access burst DATA all 0s Access burst DATA all 1s Access burst DATA random
RSSI RX_LVL	<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.
DTMF TONE	<x>	Provides facility to input key No so that the DTMF tone associated with that Key can be monitored.
SINGL TONE	<SLNC> <DIAL> <BUSY> <CONG> <PACK> <PNOT <ERR> <RING> <CALL>	 Dial tone Busy tone Congested tone Path acknowledge tone Path N\G tone Ring tone Call tone

CHANNEL BOX COMMAND	INDICATION	FUNCTION
SP LOOP-BK	<ADLP>	Sets audio loop-back from TX audio to RX audio without processing by the CODEC
	<TCHE>	NOT USED
	<TCHL>	NOT USED
	<GSML>	Provides an audio path for use with the GSM test station.
RX MUTE	<ON>	Mutes the receiver
TX MUTE	<ON>	Mutes the transmitter
PATH CONT	<MESI> <MESE> <MISI> <MISE>	Sets audio paths: MIC external speaker internal MIC external speaker external MIC internal speaker internal MIC internal speaker external
BUZZ TONE	<0.8K> <2.7K>	Sets buzzer tone to 0.8 KHz Sets buzzer tone to 2.7 KHz
VOL. BUZZ	<xx>	Sets buzzer volume between values 0 to 14 Min to Max
VOL. TONE	<xx>	Sets DTMF tone volumes between 0dB and infinity
VOL. SPCH	<xx>	Sets 16 speech volumes between 6dB and -42dB
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. INTSP	<xx>	Sets 15 receiver volume levels between 0dB and -30dB
VOL. EXTSP	<xx>	Sets 15 Handsfree speaker volume levels between 0dB and -30dB
BACK LIGHT	<BACK0> <BACK1> <PAGE0> <PAGE1>	Back light and LED off Back light and LED on Page light off Page light on
GET KEY CD	NOT USED	
DISCRE1	<AUD ENB><AUD DIS>	Used in conjunction with the MEMO function
DISCRE2	NOT USED	

CHANNEL BOX COMMAND	INDICATION	FUNCTION
TAM	<REC ON>	Allows voice recording when memo is pressed on UUT
	<REC OFF>	Disables voice recording
	<PLY ON>	Provides memo playback facility
	<PLY OFF>	Switches playback off
CHECK LCD1	<P1>	Provides 50% visual display of check pattern on the UUT LCD
	<P2>	Provides 50% visual display of check pattern on the UUT LCD
TEST HS.TST	<ENB>	With ENB set and TEST MODE, <TERM> test commands can be entered from the key pad of the UUT
SOFT SIM	<ENB>	With ENB set and TEST MODE <TERM> UUT is removed from test mode and can be placed into call mode
SET ER.DISP	<DISPLAY>	Unit error codes will be displayed on the UUT display
	<OFF>	Unit error codes will not be displayed on the UUT display

7.5 Adjustment Mode

NOTE:
See section 7.3.1 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 four distinct calibration procedures to adjust RF performance. These procedures are:
1. Ramping gain (Section 7.5.1)
2. RSSI (Section 7.5.2)
3. Frequency error (Section 7.5.3)
4. I and Q values (Section 7.5.4)

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

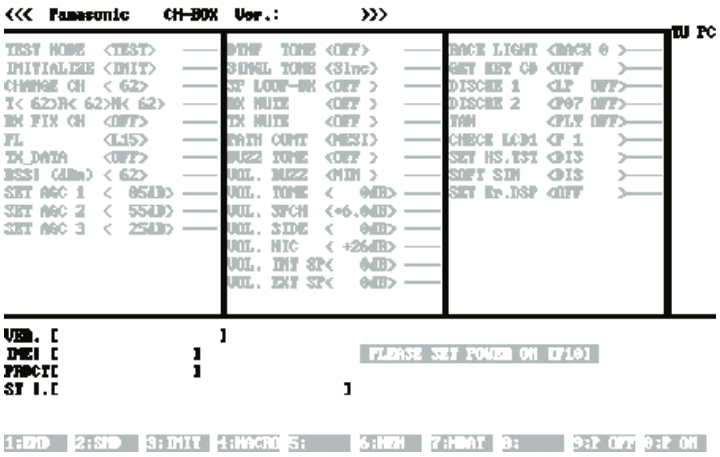


Figure 11: Test software screen 500-0711

7.5.1 Ramping Gain

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

Target Power Level	Tolerance (dB)	Initial Calibration Value	Peak Power (dBm)	Change per dB
PL5	±2	128	33	11
PL6	±3	128	31	14
PL7	±3	128	29	13
PL8	±3	128	27	11
PL9	±3	128	25	13
PL10	±3	128	23	7
PL11	±3	128	21	8
PL12	±3	128	19	10
PL13	±3	128	17	11
PL14	±3	128	15	13
PL15	±3	128	13	15

Calibration of output power on each power level

To be able to calibrate the ramping gain it is first necessary to switch the unit into Test Mode (section 7.3).

This procedure must be followed for all power levels PL5-PL15:

1. Set the CH BOX controls to Channel 62 at Power Level 5, normal burst modulated with random data as follows:

a) Press the down arrow until CHANGE CH <62> is highlighted and then press ENTER.

b) Press the down arrow until PL <L15> is highlighted. Press the move left arrow until <5> appears in the highlighted field. Press ENTER.

c) (Figure 12) Press the down arrow until TX DATA <OFF> is highlighted. Press the move arrow until <NR> appears in the highlighted field. Press ENTER.

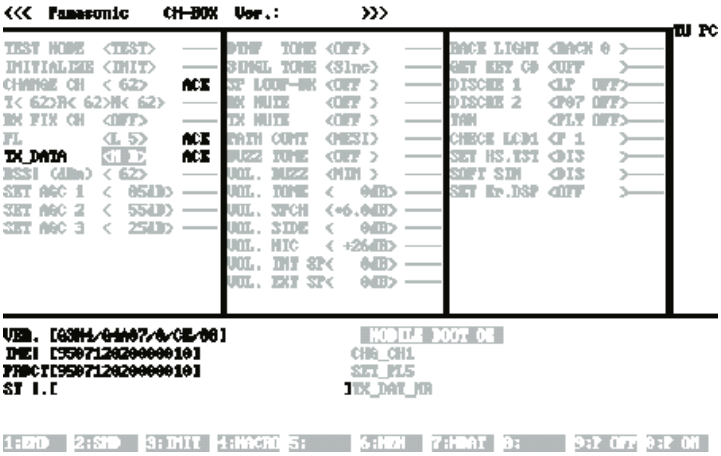


Figure 12: Tx data field 500-0712

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. Perform the following calculation:

Set Rgain_PL5 = 128 ± (required change in PL to meet specified value for Change per dB).

Make a note of the answer.

5. Press F7 and take note of the present value.

6. (Figure 13) At the CHBOX press CTRL and F7 simultaneously.

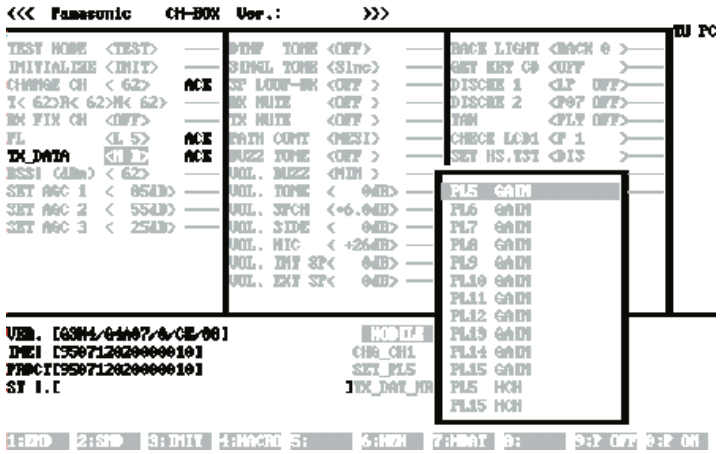


Figure 13: Power level selection 1 500-0713

7. (Figure 14) Highlight the PL5 field and press ENTER.

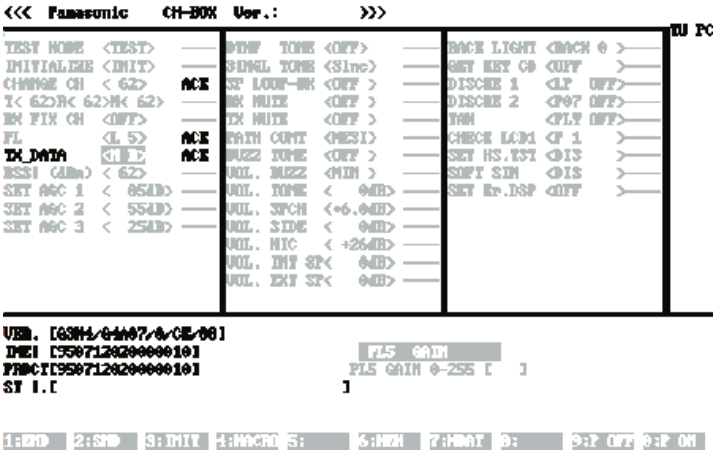


Figure 14: Power level selection 2 500-0714

8. Enter the value calculated in step 4 into the data field and then press ENTER.

9. Press ESC.

10. At the GSM test unit re-measure the Peak Power.

11. Repeat steps 2-9 of this procedure for power levels PL6 to PL15.

12. After calibrating at channel 62, the carrier power must be measured and calibrated for the combinations of power level 5 and 15 at channel 1 and channel 120.

7.5.2 RSSI

This procedure describes the calibration of RSSI on the mid channel (Mch = Ch 62). This process must be carried out for Low Channel, Mid Channel and High Channel. The following channel settings are used in this procedure:

1. Set up the test equipment as described in 7.3 and switch the unit into test mode as described.

2. Apply a carrier frequency of +68KHz to the UUT (for Ch 62 = 947.468MHz) at an input level of -60dBm.

3. At the CH BOX highlight the CHANGE CH <62> field and press ENTER.

4. Press ENTER.

5. Highlight the SET AGC 2 field and change the set value to 35dB and press ENTER.

6. (Figure 15) Highlight the RSSI dBm <> field and press ENTER.

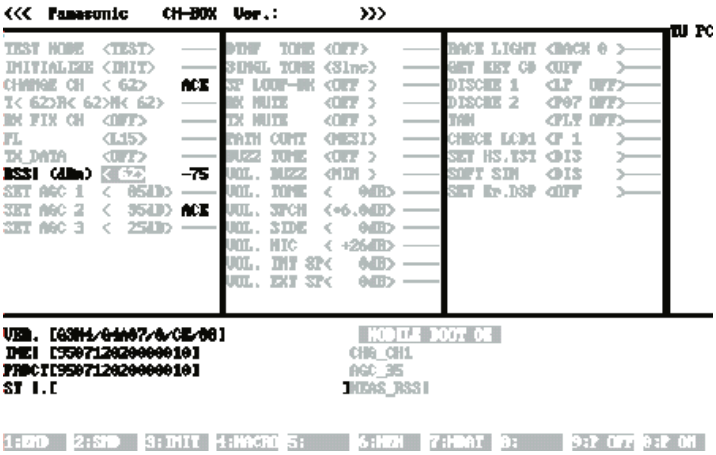


Figure 15: RSSI dB field 500-0715

7. If the measured value is not 60 ±2 then make the following calculation:
RSSI offset value = -(60+MEASURED RSSI VALUE) for example -(60+(-75)) = 15
Record the result.

8. (Figure 16) At the CH BOX press F7. Make a note of the RSSI 42-83 reading. Press ESC.

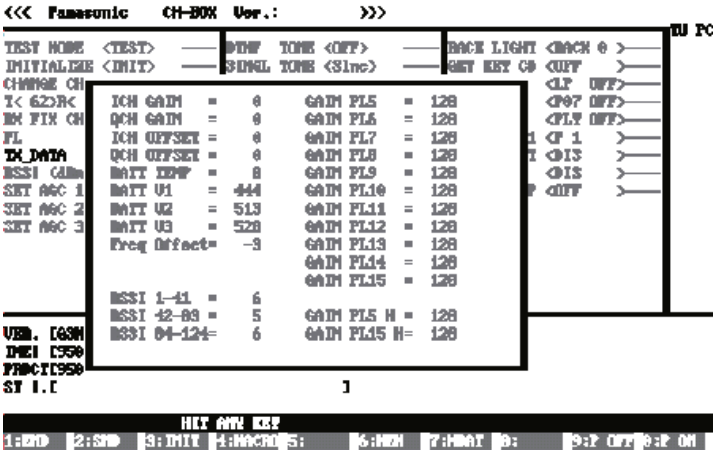


Figure 16: RSSI reading 1 500-0716

9. (Figure 17) At the CH BOX press SHIFT F7 and highlight the RSSI M 42-83 field. Press ENTER.

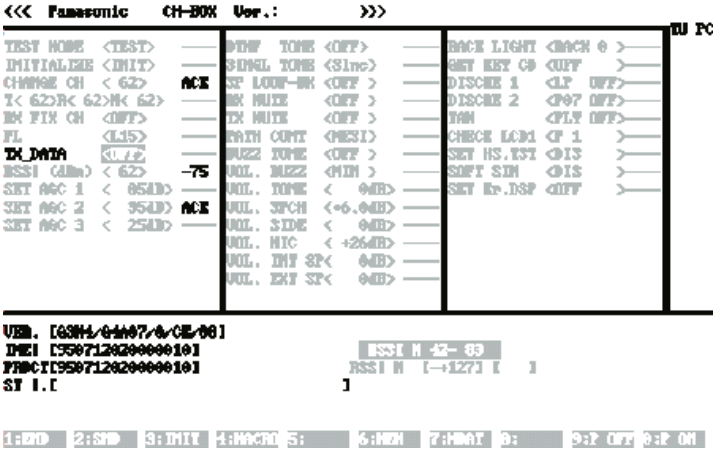


Figure 17: RSSI reading 2 500-0717

10. Make the following calculation: RSSI OFFSET VALUE (from step 8) + READING NOTED IN STEP 9. Enter the result into the RSSI M field for example 15 + 5 = 20.

11. Press ENTER.

12. Press ESC.

13. Measure the RSSI level again by highlighting the RSSI dBm field and pressing ENTER.

Repeat this procedure for the calibration of both Low (12) and Hi (112) channels.

7.5.3 Frequency Error

To enable the calibration of automatic frequency control the unit must first be set up in a call. This procedure is described in section 7.3.2.

1. Measure the frequency error of the unit under test.
2. If the frequency error exceeds ±90 Hz then steps 3 to 9 must be performed.
3. Switch the unit to Test Mode.
4. At the CH BOX press SHIFT F7.
5. (Figure 18) Highlight the FREQU OFFSET field.

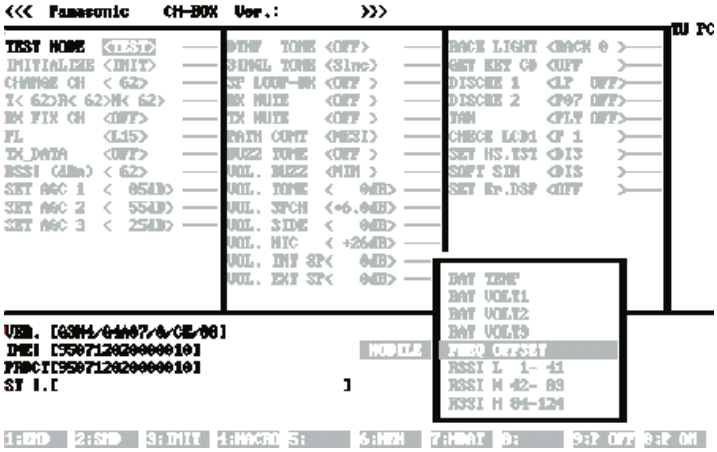


Figure 18: Test mode selection 500-0718

6. Press ENTER.
7. Enter 0 into the data field.
8. Press ENTER.
9. Press ESC.
10. Set the unit into call mode.
11. Set up a call on the GSM test unit PL5, Channel 62.
12. At the GSM test unit measure the frequency error 5 times, making one reading every 5 seconds and taking note of the sign.
13. Make the following calculation:
    -(Average measured value/35Hz)
    Record the result.
14. End the call.
15. Set the unit to Test Mode.
16. At the CHBOX press SHIFT F7.
17. Highlight the Frequ offset field.
18. Press ENTER.
19. Enter the result of the calculation carried out in step 13 into the data field.
20. Press ENTER, press ESC.
21. Set the unit into call mode.
22. Check the frequency error once every 5 seconds for a total of 10 times, recording the results.
23. Determine the result as follows:
    If (highest reading <70Hz) and (lowest reading >-70Hz), then the UUT has calibrated successfully.
    If not, then the unit is deemed to have a component failure.

7.5.4 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 33dBm. If not an appropriate attenuator must be used.

I, Q ch Offsets

Spectrum Analyzer setup
centre frequency = 902.4MHz
RBW = 10kHz
VBW= 1kHz
span = 1MHz
sweep time = 2sec

1. Set the CH BOX controls to channel 62 at power level 5, normal burst modulated with all 0'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 the move left arrow until appears in the highlighted field. Press ENTER.

c) (Figure 19) Press the down arrow until TX DATA is highlighted. Press the move arrow until "O" appears in the highlighted field. Press ENTER.

Figure 19: CHBOX setup 500-0719

2. (Figure 20) On the spectrum analyser measure the carrier leakage ratio. Carrier leakage ratio is measured as the ratio of peak power and the power at 68kHz below peak frequency.
Example:
peak power (902.468MHz) = 33dBm
power at 68kHz below peak power = 0dBm
carrier leakage ratio = 33dBm - 0dBm = 33dBm

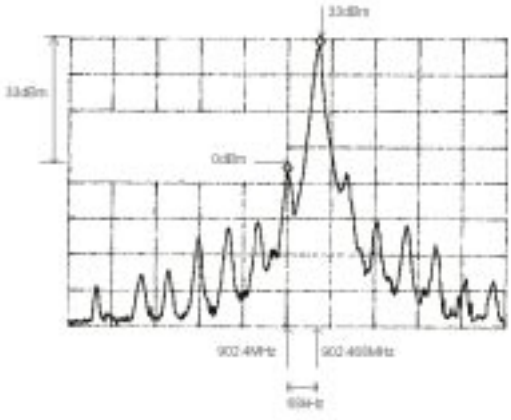


Figure 20: Carrier leakage ratio 500-0720

3. If carrier leakage ratio is greater than 30dBc then unit is OK. (offset calibration is complete).

4. If carrier leakage ratio less than 30dBc then go to Ich check.

Ich check

1. Set Ich offset to 3

a) At the CHBOX press ALT and F7 simultaneously.

b) (Figure 21) Press move down arrow until ICH OFFSET appears in the field. Press ENTER.

Figure 21: I, Q data field selection 500-0721

c) (Figure 22) Enter 3 into the data field and press ENTER.

Figure 22: I, Q data field 500-0722

2. Using the spectrum analyser measure the new carrier leakage ratio.

3. If the carrier leakage ratio is greater than 30dBc then the unit is OK. (offset calibration is complete).

4. If the original carrier leakage ratio (see I, Q ch Offests step 2) is greater than the new carrier leakage ratio go to I Dec Calibration.

5. If the original carrier leakage ratio is less than the new carrier leakage ratio go to I Inc Calibration.

I Dec Calibration

1. Set Ich offset to 61 (see Ich Check step 1).

2. Using the spectrum analyser measure the new carrier leakage ratio.

3. If the carrier leakage ratio is greater than 30dBc then unit is OK. (offset calibration is complete).

4. If not then repeat steps 1, 2 and 3 above for Ich offset values: 58, 55, 52, 49, 46, 43.

5. If the carrier leakage ratio is still not greater than 30dBc then go to Qch Check.

I Inc Calibration

1. Set Ich offset to 3 (see Ich check step 1).

2. Using the spectrum analyser measure the carrier leakage ratio.

3. If the carrier leakage ratio is greater than 30dBc then the unit is OK. (offset calibration is complete).

4. If not then repeat steps 1, 2 and 3 above for Ich offset values: 9, 12, 15, 18, 21.

5. If the carrier leakage ratio is still not greater than 30dBc then go to Qch Check.

Qch Check

1. Set Ich offset to 0.

2. Set Qch offset to 3.

a) At the CHBOX press ALT and F7 simultaneously.

b) (Figure 21) Press move down arrow until QCH OFFSET appears in the field. Press ENTER.

c) (Figure 22) Enter 3 into the data field and press enter.

3. Measure the new carrier leakage ratio.

4. If the carrier leakage ratio is greater than 30dBc the unit is OK. (offset calibration is complete).

5. If the original carrier leakage ratio (see I, Q ch Offsets step 2) is greater than new carrier leakage ratio then go to Q Dec Calibration.

6. If the original carrier leakage ratio is less than new carrier leakage ratio then go to Q Inc Calibration.

Q Dec Calibration

1. Set Qch offset to 61 (see Qch Check step 2).

2. Measure carrier leakage ratio.

3. If the carrier leakage ratio is greater than 30dBc then unit is OK. (offset calibration is complete).

4. If not then repeat steps 1, 2 and 3 above for Qch offset values: 58, 55, 52, 49, 46, 43.

5. If the carrier leakage ratio is still less than 30dBc then unit is a fail.

Q Inc Calibration

1. Set Qch offset to 6 (see Qch Check step 2).

2. Measure carrier leakage ratio.

3. If carrier leakage ratio is greater than 30dBc then unit is OK. (offset calibration is complete).

4. If carrier leakage ratio is less than 30dBc then repeat steps 1, 2 and 3 above for Qch offset values: 9, 12, 15, 18, 21.

5. If carrier leakage ratio is less than 30dBc then unit is a fail.

I, Qch Gain

IMPORTANT: I, Qch offset calibration should be done before this calibration.
Spectrum Analyser Setup.
centre frequency = 902.4MHz
RBW = 10kHz
VBW = 1kHz
span = 1MHz
sweep time = 2sec

1. Set the CH BOX controls to channel 62 at power level 5, normal burst modulated with all 0'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 the move left arrow until appears in the highlighted field. Press ENTER.

c) Press the down arrow until TX DATA is highlighted. Press the move arrow until O appears in the highlighted field. Press ENTER

2. (Figure 23) Using the spectrum analyser measure the image leak ratio. Image leak ratio is the measured ratio of peak power and the power at 135kHz below peak frequency.
Example:
peak power (902.468mhz) = 33dBm
power at 135kHz belowpeak power = -9dBm
image leak ratio = 33dBm - (-9dBm) = 42dBm

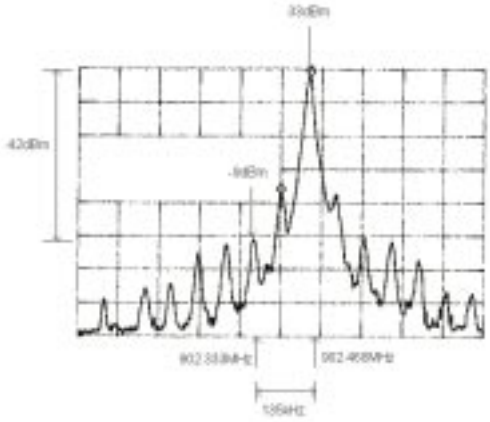


Figure 23: Image leak ratio 500-0723

3. If image leak ratio is greater than 30dBc then unit is OK. (offset calibration is complete).

4. If image leak ratio is less than 30dBc then go to Ich gain calibration.

Ich Gain Calibration

1. Set Ich gain to 2
   a) On the CHBOX press ALT and F7 simultaneously.
   b) (Figure 21) Press move left arrow until ICH GAIN field is highlighted. Press ENTER.
   c) (Figure 22) Enter 2 into the data field. Press ENTER.

2. Measure the image leak ratio.

3. If image leak ratio is greater than 30dBc then unit is OK. (offset calibration is complete)

4. If image leak ratio is less than 30dBc then repeat steps 1, 2 and 3 above with Ich gain values: 4, 6, 8, 10, 12, 14.

5. If image leak ratio is still less than 30dBc then go to Qch gain calibration.

Qch Gain Calibration

1. Set Qch gain to 2
   a) On the CHBOX press ALT and F7 simultaneously.
   b) (Figure 21) Press move left arrow until QCH GAIN field is highlighted. Press ENTER.
   c) (Figure 22) Enter 2 into the data field. Press ENTER.

2. Measure the image leak ratio.

3. If image leak ratio is greater than 30dBc then unit is OK. (offset calibration is complete)

4. If image leak ratio is less than 30dBc then repeat steps 1, 2, and 3 above with Qch gain values: 4, 6, 8, 10, 12, 14.

5. If image leak ratio is still less than 30dBc then unit is a fail.

7.5.5 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 CHBOX highlight the CHANGE CH field and set the required test channel. Press ENTER.

2. Highlight the RX FIX CH field and set the field to ON by pressing the move arrow left or right once.

3. Press ENTER.

4. Highlight the SET AGC 1,2,3 field and enter the required gain value.

5. At the GSM test unit input an RF signal at the required frequency and level.

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

7.5.6 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. Highlight the CHANGE CH 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.

7.6 SIM Personalisation

Introduction

SIM personalisation will limit the use of G500 to a SIM supplied by a network (network personalisation) or service provider (service provider personalisation). If a personalised G500 contains a SIM that is from a different network or service provider it will display the message “NO SIM PRESENT” when switched on. This personalisation of G500 is sometimes referred to as SIM lock or SIM latch.

Testing

To test a personalised G500, 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.

Personalisation Function

Personalisation is activated during manufacture and then enabled at a later stage. Enabling/disabling is available by entering 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 Network Control Key (NCK) or Service Provider Control Key (SPCK) is known. When enabled by the network or service provider the NCK and SPCK are 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 F F	Can only disable personalisation
5 2 8 2 4 F F	Can both enable and disable personalisation

Disabling Procedure

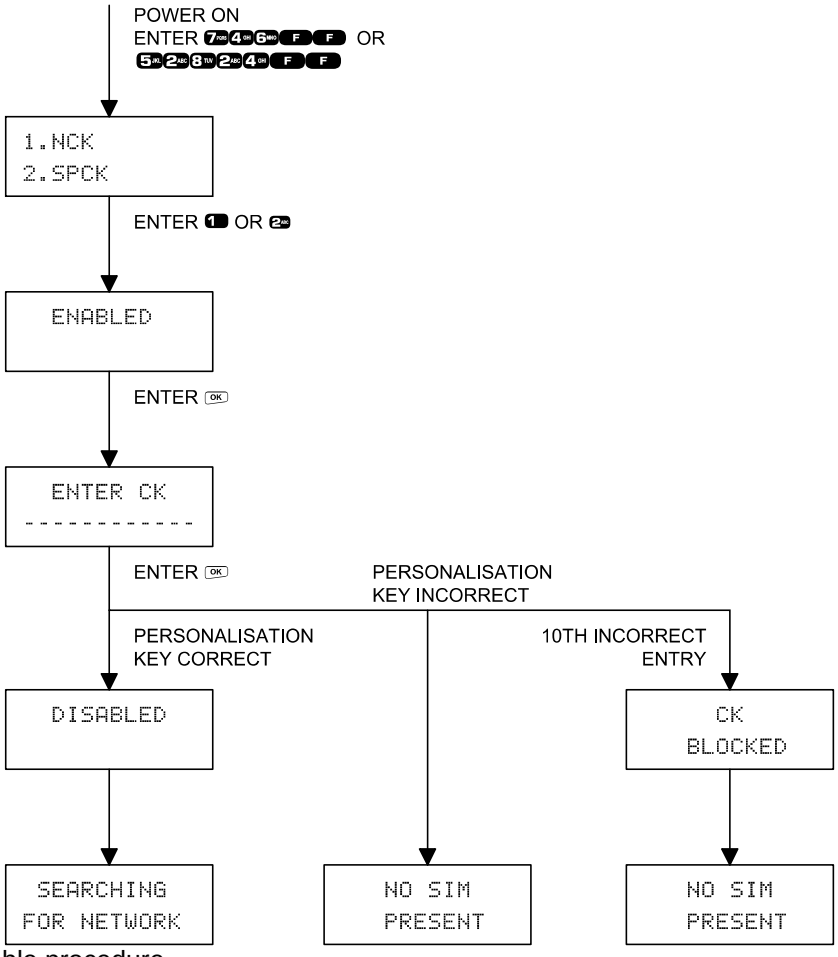


Figure 24: Disable procedure 500-0724

Enabling Procedure

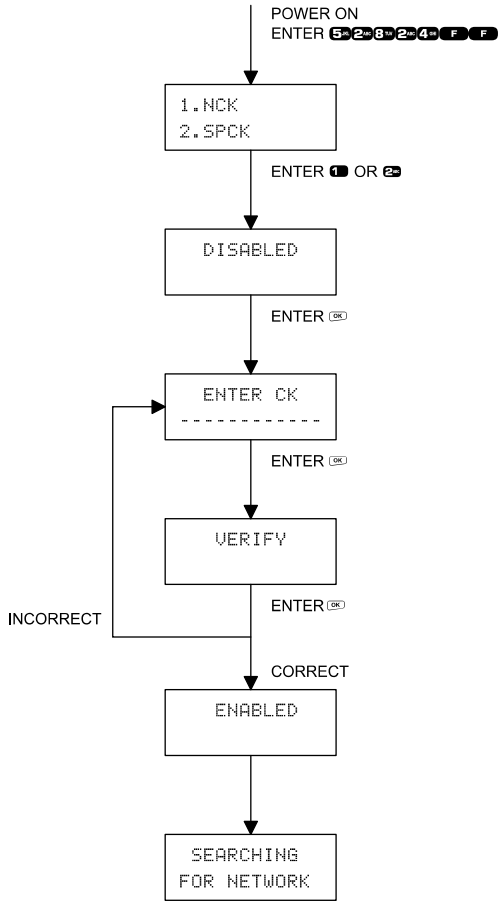
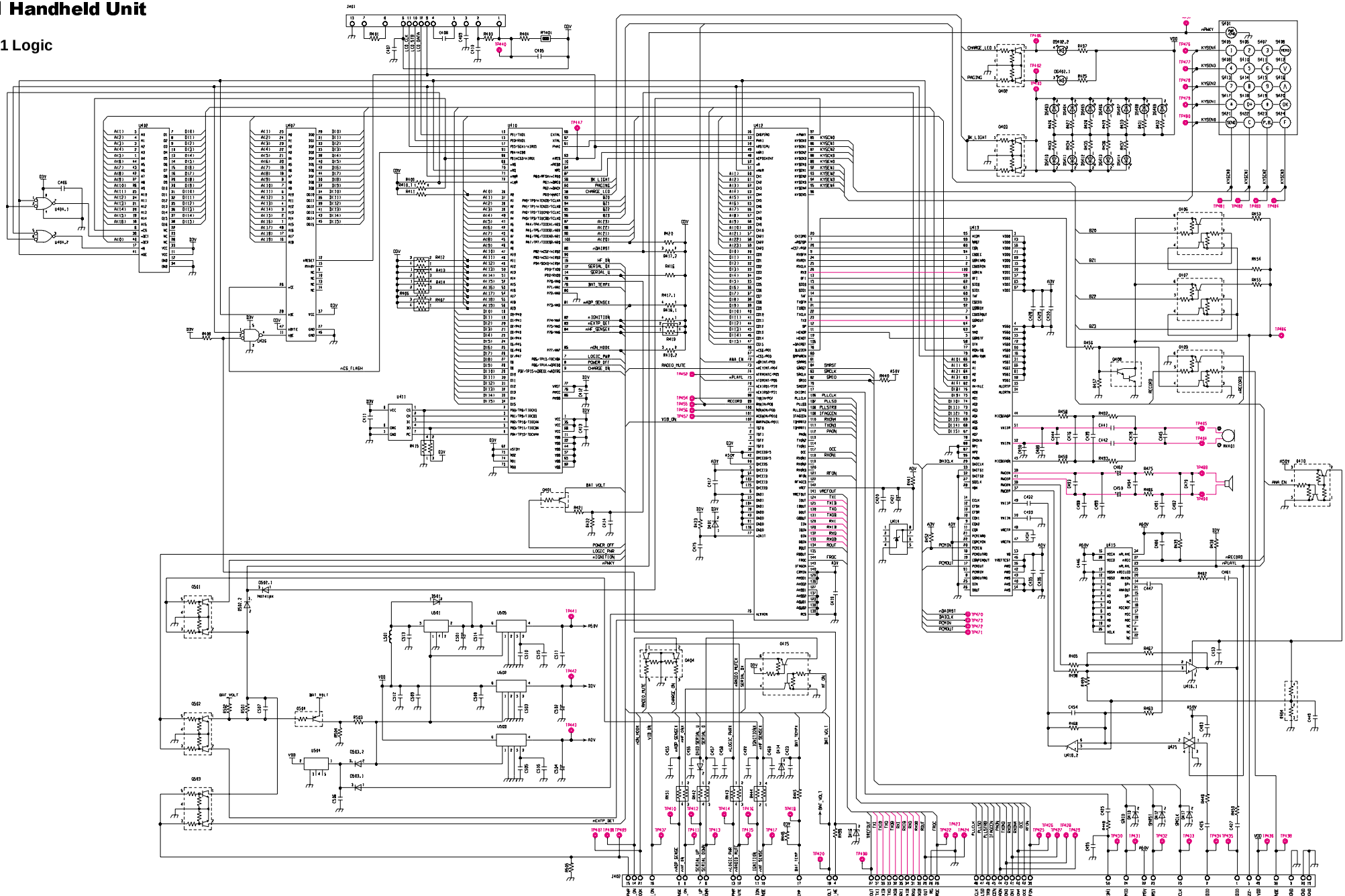


Figure 25: Enable procedure 500-0725

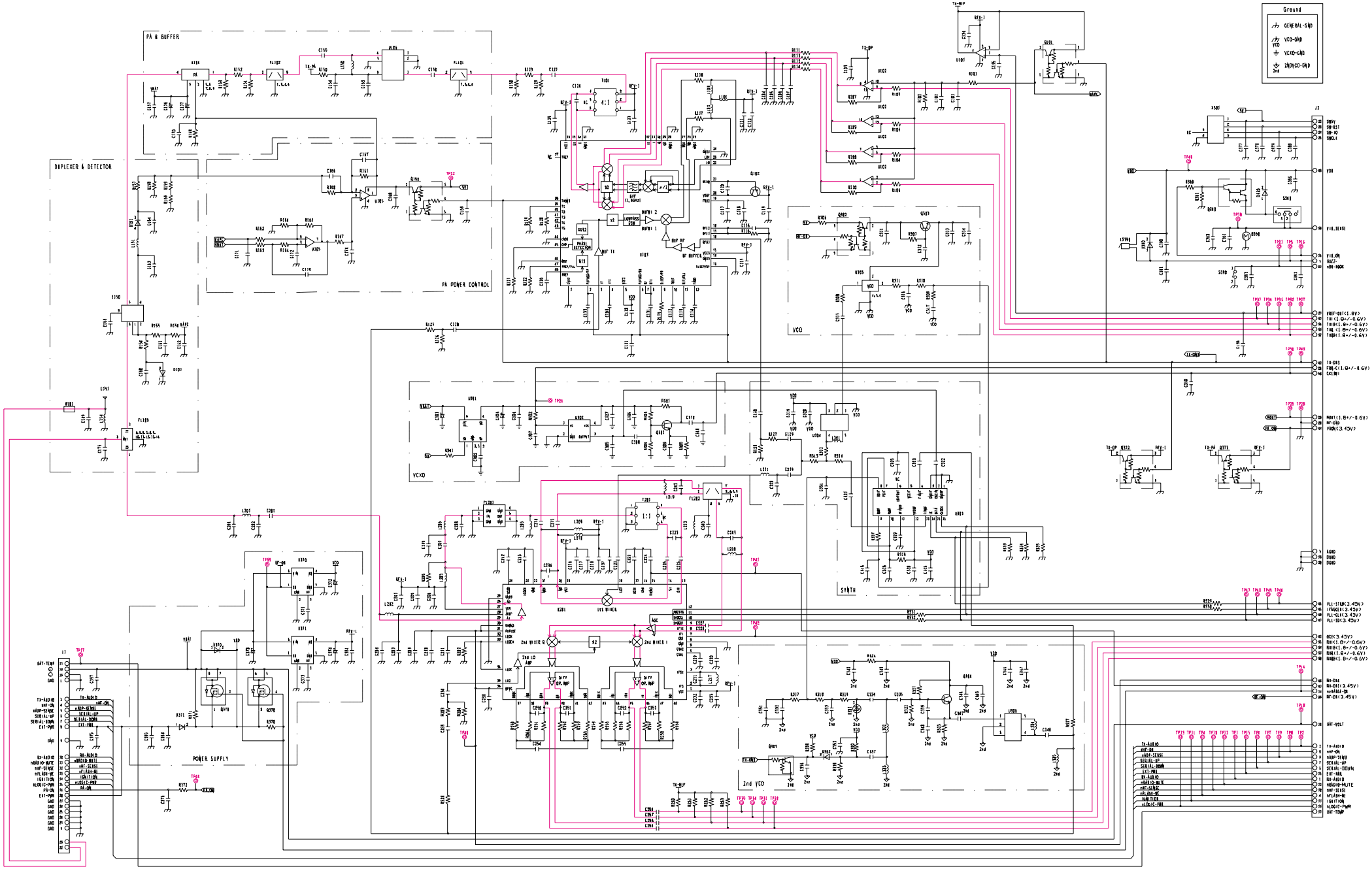
8 CIRCUIT DIAGRAMS

8.1 Handheld Unit

8.1.1 Logic

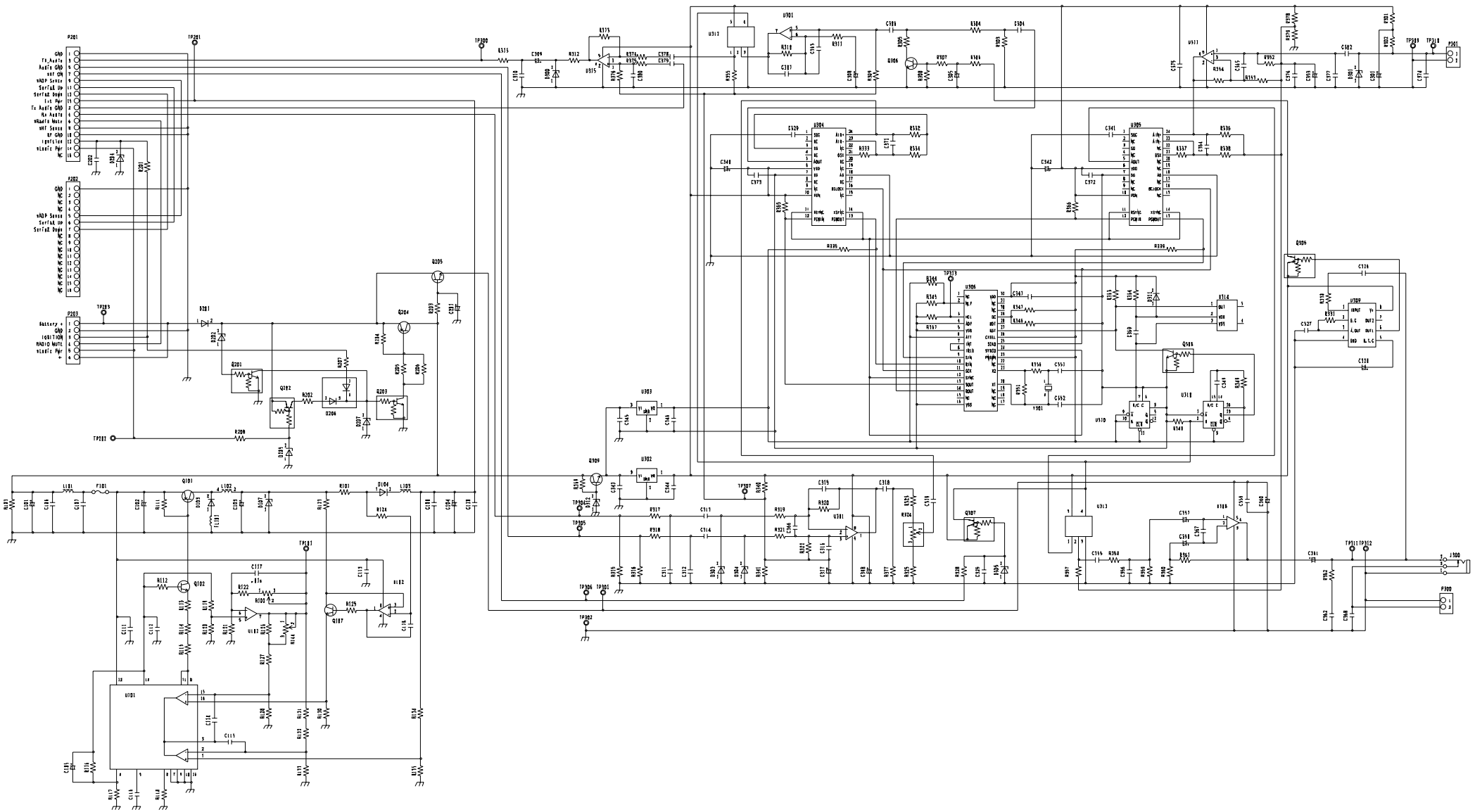


8.1.2 RF



SC70435H

8.2 Handsfree Unit



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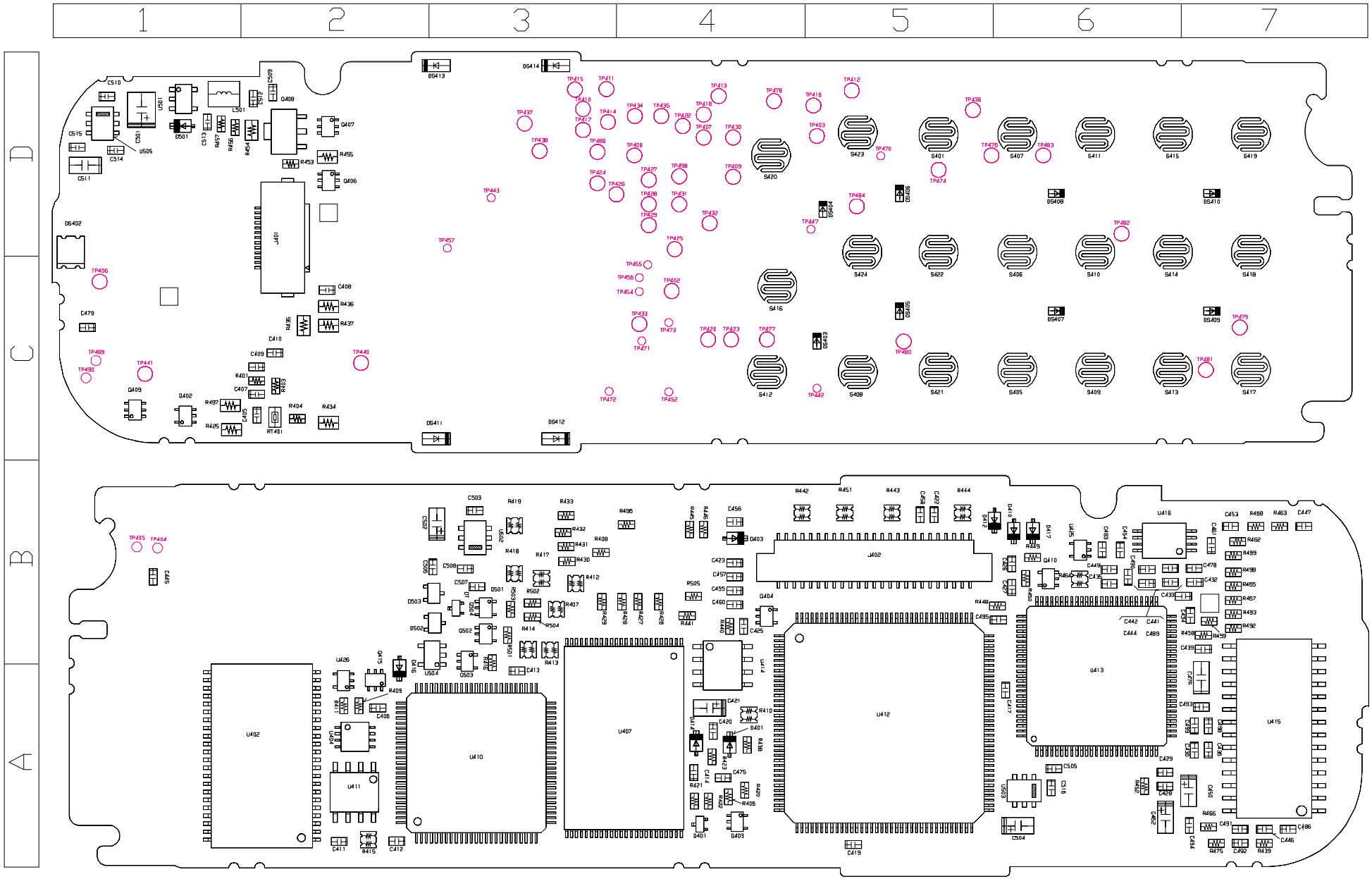
9 PCB LAYOUT DIAGRAMS

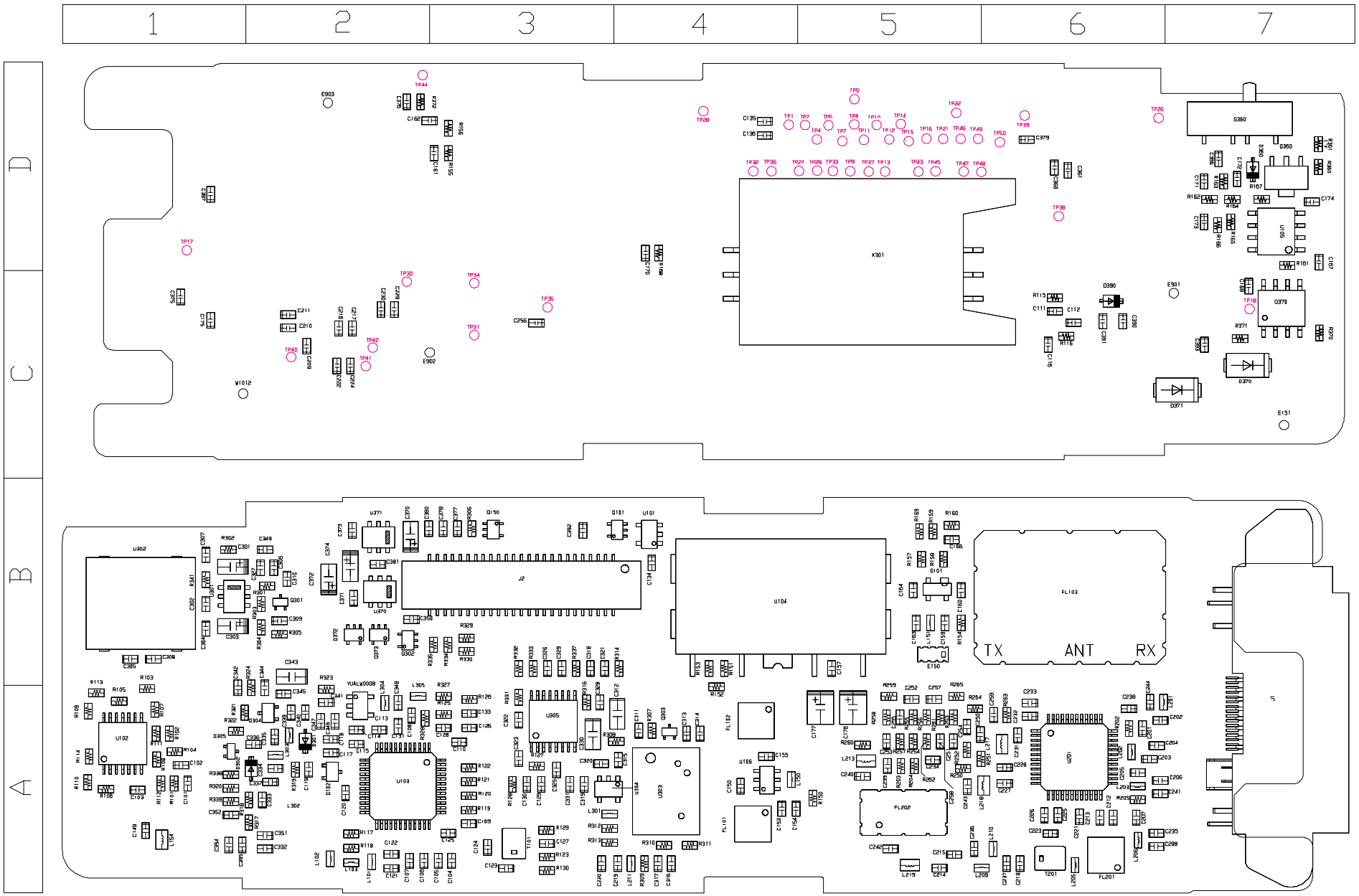
9.1 Handheld Unit

9.1.1 Logic

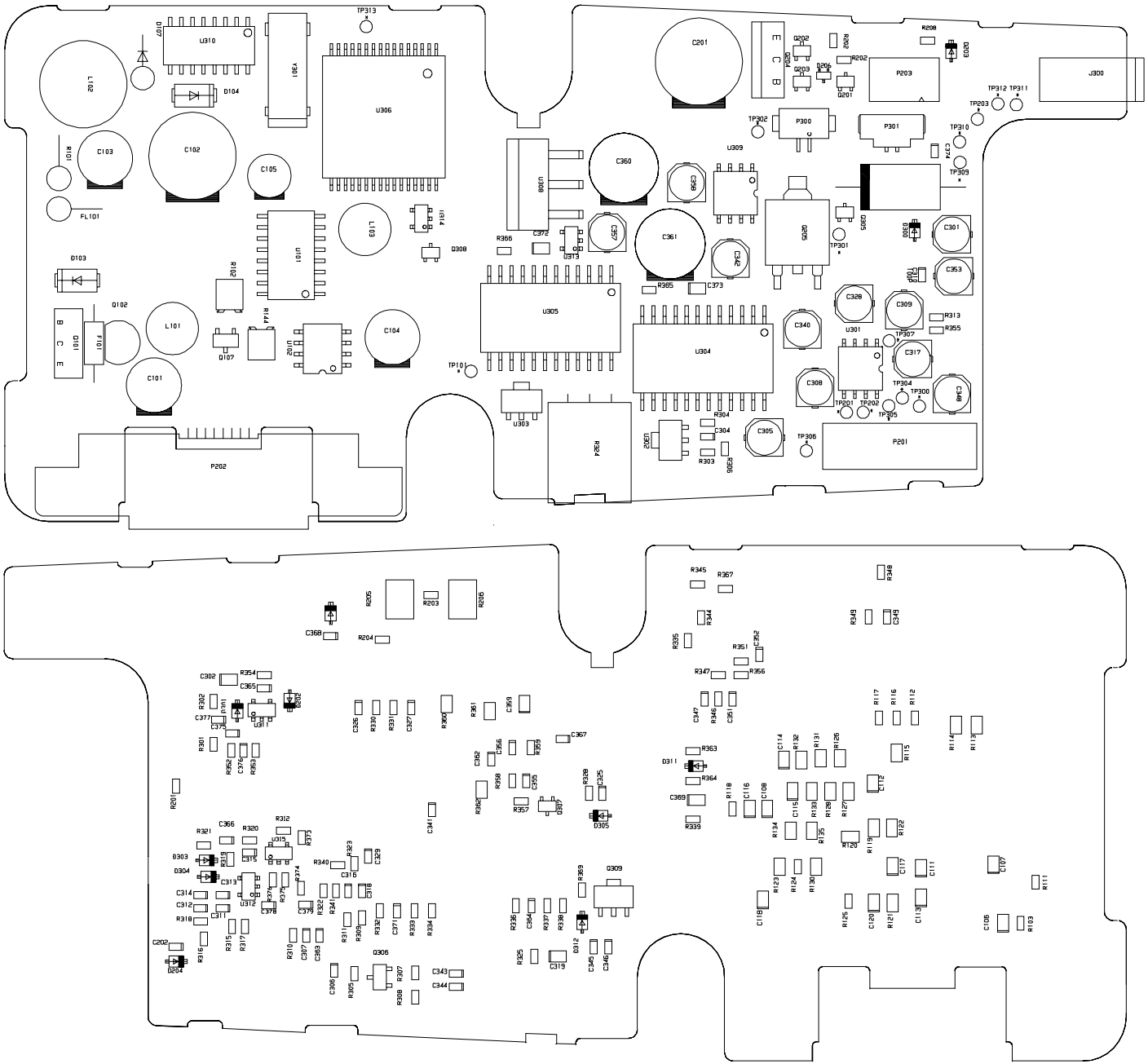


LA70437F

9.1.2 RF



9.2 Handsfree Unit



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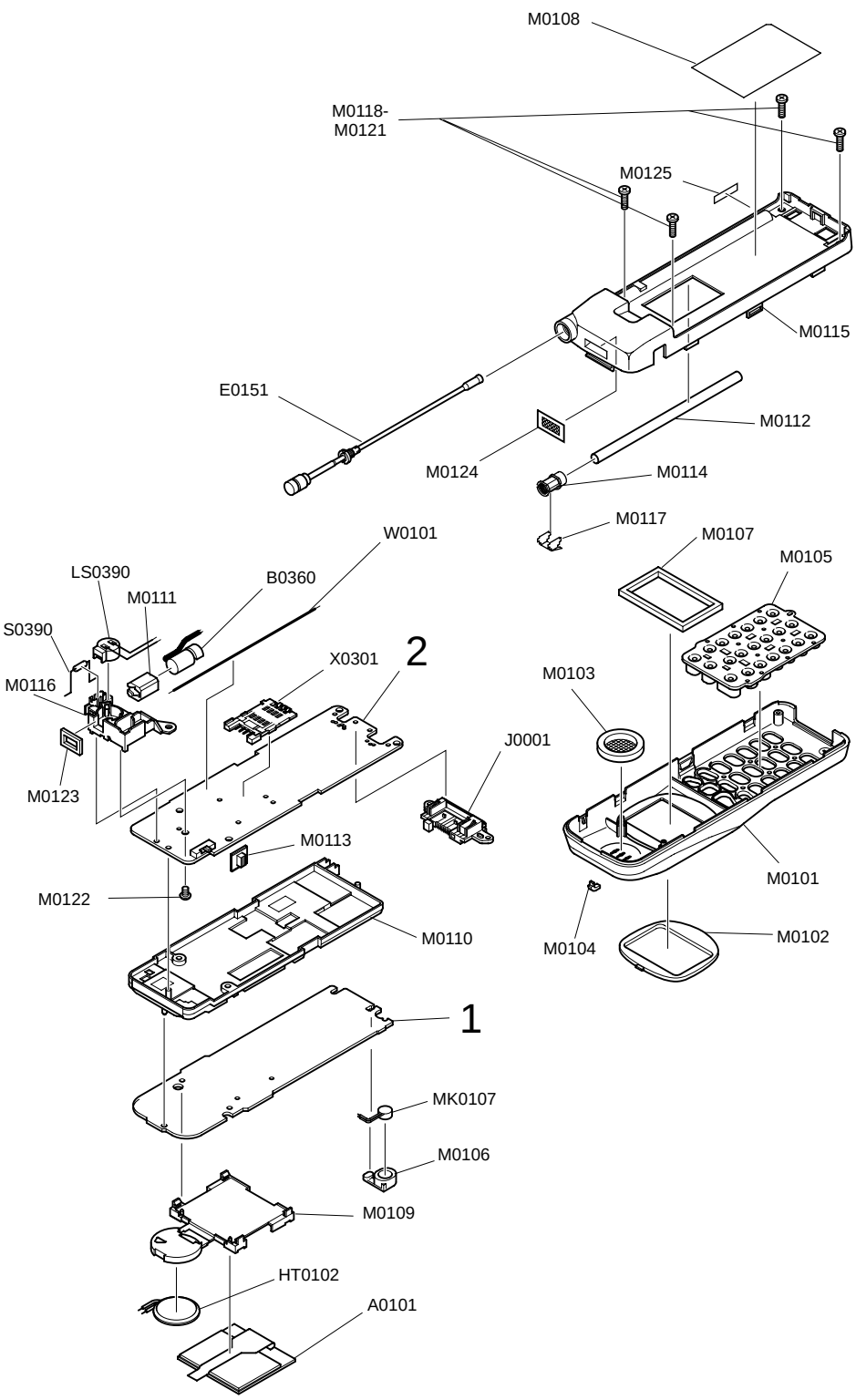
10 PARTS LIST

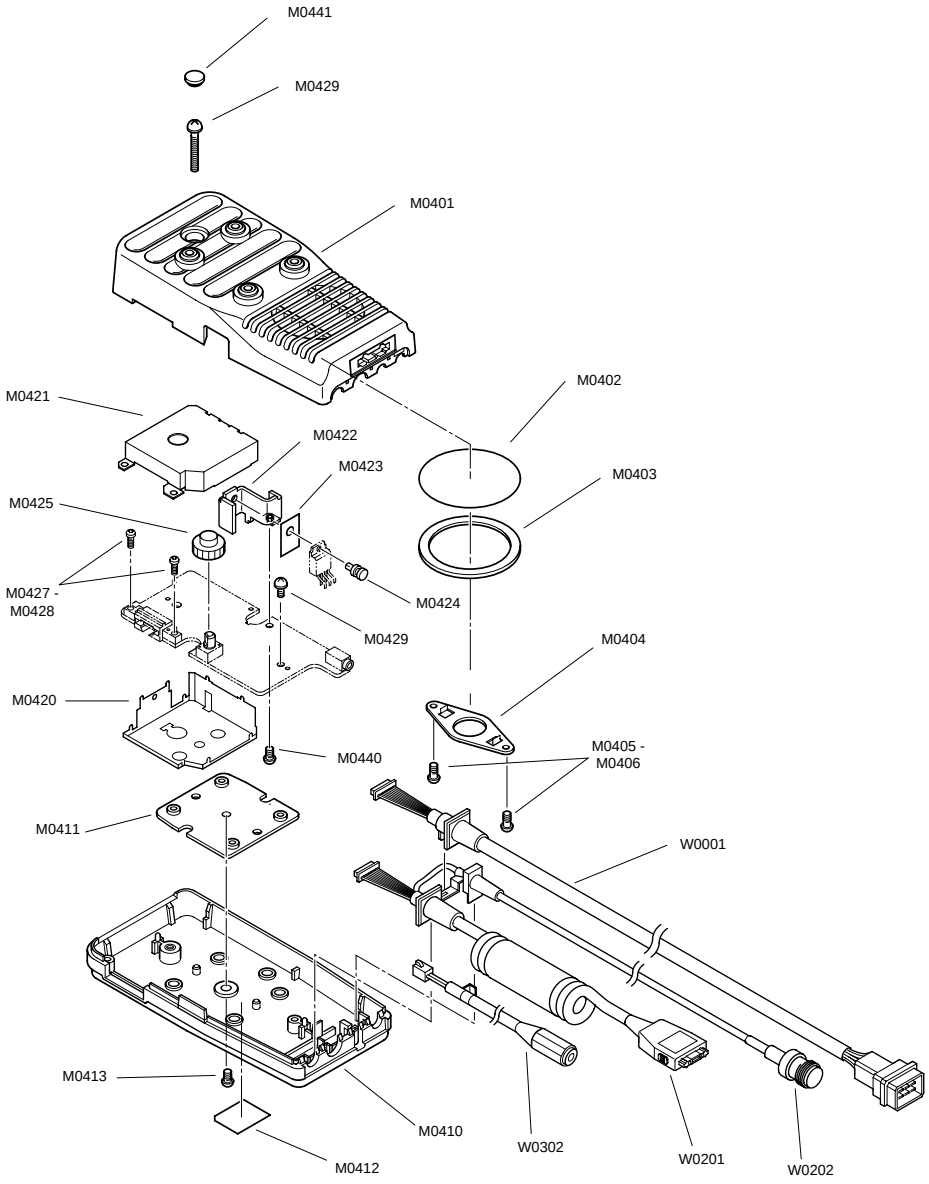
10.1 Handheld Unit



Ref.	Parts No	Name
1	G570437A	Logic PCB
2	G570435A	RF PCB
A0101	AA70032B	LCD Module
B0360	BD70020A	Vib. Motor
E0151	AN70053A	Antenna
HT0102	HH70006A	Receiver
J0001	JA70024B	Connector
LS390	HB70007A	Buzzer
M0101	5E70140BA 5N70140BB	Cover – Gold Cover – Blue
M0102	5P70074AA	LCD Panel
M0103	5E70145A	Receiver Cus.
M0104	5S70056A	Indicator
M0105	5V70089AA	Keysheet
M0106	5X70018A	Mic Bushing
M0107	5E70146A	LCD Cushion
M0108	5E70145A	Rec. Cushion
M0109	5S70057B	LCD Backlight
M0110	5Q70042A	Chassis
M0111	5Q70071AB	Vib. Cushion
M0112	5K70062A	Antenna Tube
M0113	5R70042A	Slide Knob
M0114	G470003A	Antenna Holder
M0115	5M70113B	Case
M0116	5Y70092A	Holder
M0117	1D70188A	Antenna Term.
M0118 –M121	3Z70027A	Screw (x4)
M0122	3Z70025A	Screw
M0123	5E70147A	Buzzer Cushion
M0124	6V70030A	Buzzer Net
M0125	G2MDS038	Patent Label
MK0107	WM62CT532	Microphone
S0390	SY70037A	Reed Switch
W0101	WH70057B	Semi Rigid Cable
X0301	JS70004A	SIM Holder

Figure 1: Handheld Unit 500-1001

10.2 Handsfree Unit



Ref.	Parts No	Name
M0401	5N70086A	Cover
M0402	6V10031A	Speaker net
M0403	4R8209B	Speaker packing
M0404	1B70071A	Speaker bracket
M0405 –M0406	XTB256GFX	Screw (x2)
M0410	5M70076A	Case
M0411	1BC5819A	Plate
M0412	7X70119A	Name plate
M0413	XSB35FX	Screw
M0420	1C70128A	Sheild Case 1
M0421	1C70129A	Sheild Case 2
M0422	1E70008A	Radiator
M0423	5G10500A	Insulator
M0424	1M270900102	Clamp
M0425	5FJ5129AB	Volume knob
M0426	XYN3J6FX	Screw
M0427 –M0428	XTB2510GFX	Screw (x2)
M0429	XTB256GFX	Screw
M0440	XYN3F30FN	Screw
M0441	5U70008B	Top cushion
W0001	WP70005AZ	Power Supply Cable
W0201	WC70109A	Curly Cord
W0202	WC70110A	Interconnecting Cable
W0302	WG70003A	External Microphone Cable

Figure 2: Handsfree Unit 500-1002

10.3 Handheld Replacement Parts List

10.3.1 Logic

MODEL	EB-G500	NAME			Logic	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
—	G570437A	ASSEMBLED LOGIC PCB				
C0403	ECUV1C104KBV	CAPACITOR	0.01µF	16V		
C0404	ECUV1C104KBV	CAPACITOR	0.01µF	16V		
C0405	YGM1F105Z1AT	CAPACITOR	1µF	10V	C2	
C0406	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A2	
C0407	YGM1F105Z1AT	CAPACITOR	1µF	10V	C2	
C0408	YGM1F105Z1AT	CAPACITOR	1µF	10V	C2	
C0409	YGM1F105Z1AT	CAPACITOR	1µF	10V	C2	
C0410	YGM1F105Z1AT	CAPACITOR	1µF	10V	C2	
C0411	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A2	
C0412	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A2	
C0413	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B3	
C0414	YGM1F105Z1AT	CAPACITOR	1µF	10V	A4	
C0417	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A6	
C0419	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A5	
C0420	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A4	
C0421	YCSDU011M156	CAPACITOR	15µF	6V	A4	
C0422	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B5	
C0423	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B4	
C0425	YGM1C101J1HT	CAPACITOR	100pF	50V	B4	
C0426	YGM1F105Z1AT	CAPACITOR	1µF	10V	B6	
C0427	YGM1F105Z1AT	CAPACITOR	1µF	10V	B6	

MODEL	EB-G500	NAME			Logic	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0428	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A6	
C0429	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A6	
C0430	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A7	
C0432	YGM1F334Z1CT	CAPACITOR	0.33µF	16V	B7	
C0433	YGM1F334Z1CT	CAPACITOR	0.33µF	16V	B6	
C0434	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B7	
C0435	YGM1F105Z1AT	CAPACITOR	1µF	10V	B6	
C0436	YGM1F105Z1AT	CAPACITOR	1µF	10V	A7	
C0439	YGM1F105Z1AT	CAPACITOR	1µF	10V	B6	
C0441	YGM1F334Z1CT	CAPACITOR	0.33µF	16V	B6	
C0442	YGM1F334Z1CT	CAPACITOR	0.33µF	16V	B6	
C0444	YGM1C101J1HT	CAPACITOR	100pF	50V	B6	
C0445	YGM1C101J1HT	CAPACITOR	100pF	50V	B1	
C0446	YGM1F105Z1AT	CAPACITOR	1µF	10V	A7	
C0447	YGM1F105Z1AT	CAPACITOR	1µF	10V	B7	
C0449	YGM1F105Z1AT	CAPACITOR	1µF	10V	B6	
C0450	YCSDU011M156	CAPACITOR	15µF	6V	B7	
C0453	YGM1F105Z1AT	CAPACITOR	1µF	10V	B7	
C0454	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B6	
C0455	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B4	
C0456	ECUV1H102KBV	CAPACITOR	1nF	50V	B4	
C0457	ECUV1H102KBV	CAPACITOR	1nF	50V	B4	
C0458	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B5	
C0460	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B4	
C0461	YGM1F105Z1AT	CAPACITOR	1µF	10V	B7	
C0462	YCSDU011M156	CAPACITOR	15µF	6V	A6	
C0475	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A4	

MODEL	EB-G500	NAME			Logic	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0476	YGM3F475Z1AT	CAPACITOR	4.7µF	10V	A7	
C0478	YGM1C101J1HT	CAPACITOR	100pF	50V	B7	
C0479	YGM1C101J1HT	CAPACITOR	100pF	50V	C1	
C0483	YGM1F105Z1AT	CAPACITOR	1µF	10V	B6	
C0486	ECUV1H102KBV	CAPACITOR	1nF	50V	A7	
C0489	YGM1C101J1HT	CAPACITOR	100pF	50V	B6	
C0490	YGM1C101J1HT	CAPACITOR	100pF	50V	B6	
C0491	YGM1C101J1HT	CAPACITOR	100pF	50V	A7	
C0492	YGM1C101J1HT	CAPACITOR	100pF	50V	A7	
C0493	YGM1C101J1HT	CAPACITOR	100pF	50V	A7	
C0494	YGM1C101J1HT	CAPACITOR	100pF	50V	A7	
C0496	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0497	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0498	YGM1C101J1HT	CAPACITOR	100pF	50V	A7	
C0499	YGM1C101J1HT	CAPACITOR	100pF	50V	A7	
C0501	YCSDU014M226	CAPACITOR	22µF	10V	D1	
C0502	YCSDU011M156	CAPACITOR	15µF	6V	B3	
C0503	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B3	
C0504	YCSDU011M156	CAPACITOR	15µF	6V	A6	
C0505	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A6	
C0506	ECUV1C104KBV	CAPACITOR	0.1µF	16V		
C0507	YGM1F105Z1AT	CAPACITOR	1µF	10V	B3	
C0508	ECUV1C104KBV	CAPACITOR	0.1µF	16V	B6	
C0509	ECUV1C104KBV	CAPACITOR	0.01µF	16V	D2	
C0510	ECUV1H103KBV	CAPACITOR	0.01µF	50V	D1	
C0511	YCCSM028Z106	CAPACITOR	10µF	10V	D1	
C0512	YGM1C101J1HT	CAPACITOR	100pF	50V	D2	

MODEL	EB-G500	NAME			Logic	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0513	YGM1C101J1HT	CAPACITOR	100pF	50V	D1	
C0514	YGM1C101J1HT	CAPACITOR	100pF	50V	D1	
C0515	YGM1C101J1HT	CAPACITOR	100pF	50V	D1	
C0516	YGM1C101J1HT	CAPACITOR	100pF	50V	A6	
D0401	MA112TX	DIODE	40V	200mA	A4	
D0403	MA112TX	DIODE	40V	200mA	B4	
D0410	MA8062MTX	DIODE	6.36V	150mW	B6	
D0412	MA8062MTX	DIODE	6.36V	150mW	B6	
D0414	MA8062MTX	DIODE	6.36V	150mW	A4	
D0416	MA8062MTX	DIODE	6.36V	150mW	A2	
D0417	MA8062MTX	DIODE	6.36V	150mW	B6	
D0501	MA729TX	DIODE			D1	
D0502	MA741WKTX	DIODE	30V	20mA	B3	
D0503	MA741WKTX	DIODE	30V	20mA	B3	
DS0402	CL155URGDT	LED			D1	
DS0403	PY1111C650TR	LED YELLOW			C5	
DS0404	PY1111C650TR	LED YELLOW			D5	
DS0405	PY1111C650TR	LED YELLOW			C5	
DS0406	PY1111C650TR	LED YELLOW			D5	
DS0407	PY1111C650TR	LED YELLOW			C6	
DS0408	PY1111C650TR	LED YELLOW			D6	
DS0409	PY1111C650TR	LED YELLOW			C7	
DS0410	PY1111C650TR	LED YELLOW			D7	
DS0411	L1650YG	LED GREEN			C3	
DS0412	L1650YG	LED GREEN			C3	
DS0413	L1650YG	LED GREEN			D3	

MODEL	EB-G500	NAME		Logic	
Ref.	**Part No.**	**Description**		**Grid**	**Remarks**
DS0414	L1650YG	LED GREEN		D3	
J0401	528931590	CONNECTOR	15 PIN	D2	
J0402	JANB00118	CONNECTOR	50 PIN	B5	
L0501	LQH3C101KT	COIL	100µH	D1	
Q0401	YDTA144TETL	TRANSISTOR		A4	
Q0402	YUMG8TR	TRANSISTOR		C1	
Q0403	YUMG8TR	TRANSISTOR		A4	
Q0404	YUMG2TR	TRANSISTOR		B4	
Q0406	YUMH10TN	TRANSISTOR		D2	
Q0407	YUMH10TN	TRANSISTOR		D2	
Q0408	2SD1483TX	TRANSISTOR		D2	
Q0409	YUMH10TN	TRANSISTOR		C1	
Q0410	YUMC2TR	TRANSISTOR		B6	
Q0415	YUMH10TN	TRANSISTOR		A2	
Q0501	YUMG8TR	TRANSISTOR		B3	
Q0502	YUMG2TR	TRANSISTOR		B3	
Q0503	YUMG8TR	TRANSISTOR		B3	
Q0504	YDTA144TETL	TRANSISTOR		B3	
R0401	ERJ3GEYJ753V	RESISTOR	75kΩ	C2	
R0403	ERJ3GEYJ222V	RESISTOR	2.2kΩ	C2	
R0404	ERJ3GEYJ563V	RESISTOR	56kΩ	C2	
R0406	ERJ3GEYJ104V	RESISTOR	100kΩ	A4	
R0407	EXBV4V104JV	RESISTOR	100kΩ	B3	
R0408	ERJ3GEYJ104V	RESISTOR	100kΩ	B3	

MODEL	EB-G500	NAME		Logic	
Ref.	**Part No.**	**Description**		**Grid**	**Remarks**
R0409	ERJ3GEYJ104V	RESISTOR	100kΩ	A2	
R0410	EXBV4V104JV	RESISTOR	100kΩ	A4	
R0411	ERJ3GEYJ104V	RESISTOR	100kΩ	A2	
R0412	EXBV4V104JV	RESISTOR	100kΩ	B3	
R0413	EXBV4V104JV	RESISTOR	100kΩ	B3	
R0414	EXBV4V104JV	RESISTOR	100kΩ	B3	
R0415	EXBV4V104JV	RESISTOR	100kΩ	A2	
R0416	ERJ3GEYJ103V	RESISTOR	10kΩ	B3	
R0417	EXBV4V104JV	RESISTOR	100kΩ	B3	
R0418	EXBV4V104JV	RESISTOR	100kΩ	B3	
R0419	EXBV4V104JV	RESISTOR	100kΩ	B3	
R0420	ERJ3GEYJ104V	RESISTOR	100kΩ	A4	
R0421	ERJ3GEYJ154V	RESISTOR	150kΩ	A4	
R0422	ERJ3GEYJ104V	RESISTOR	100kΩ	A4	
R0423	ERJ3GEYJ104V	RESISTOR	100kΩ	A4	
R0425	ERJ6GEYJ151V	RESISTOR	150 Ω	C1	
R0426	ERJ3GEYJ391V	RESISTOR	390Ω	B4	
R0427	ERJ3GEYJ391V	RESISTOR	390Ω	B4	
R0428	ERJ3GEYJ391V	RESISTOR	390Ω	B4	
R0429	ERJ3GEYJ391V	RESISTOR	390Ω	B3	
R0430	ERJ3GEYJ391V	RESISTOR	390Ω	B3	
R0431	ERJ3GEYJ391V	RESISTOR	390Ω	B3	
R0432	ERJ3GEYJ391V	RESISTOR	390Ω	B3	
R0433	ERJ3GEYJ391V	RESISTOR	390Ω	B3	
R0434	ERJ6GEYJ181V	RESISTOR	180 Ω	C2	
R0435	ERJ6GEYJ181V	RESISTOR	180 Ω	C2	
R0436	ERJ6GEYJ181V	RESISTOR	180 Ω	C2	

MODEL	EB-G500	NAME		Logic	
Ref.	**Part No.**	**Description**		**Grid**	**Remarks**
R0437	ERJ6GEYJ181V	RESISTOR	180 Ω	C2	
R0438	ERJ3GEYJ104V	RESISTOR	100kΩ	A4	
R0439	ERJ3GEYJ104V	RESISTOR	100kΩ	A7	
R0440	ERJ3GEYJ822V	RESISTOR	8.2KΩ	B4	
R0441	ERJ3GEYJ104V	RESISTOR	100kΩ	B4	
R0442	EXBV4V331JV	RESISTOR	330Ω	B5	
R0443	EXBV4V331JV	RESISTOR	330Ω	B5	
R0444	EXBV4V331JV	RESISTOR	330Ω	B4	
R0445	ERJ3GEYJ331V	RESISTOR	330Ω	B4	
R0446	ERJ3GEYJ103V	RESISTOR	10kΩ	B4	
R0448	ERJ3GEYJ102V	RESISTOR	1kΩ	B6	
R0449	ERJ3GEYJ103V	RESISTOR	10kΩ	B6	
R0450	ERJ3GEYJ561V	RESISTOR	560Ω	B6	
R0451	EXBV4V331JV	RESISTOR	330Ω	B5	
R0452	ERJ3GEYJ104V	RESISTOR	100kΩ	A6	
R0453	ERJ3GEYJ331V	RESISTOR	330Ω	D2	
R0454	ERJ6GEYJ181V	RESISTOR	180 Ω	D2	
R0455	ERJ6GEYJ560V	RESISTOR	56 Ω	D2	
R0456	ERJ3GEYJ222V	RESISTOR	2.2kΩ	D1	
R0457	ERJ3GEYJ104V	RESISTOR	100kΩ	D1	
R0458	ERJ3GEYJ331V	RESISTOR	330Ω	B7	
R0459	ERJ3GEYJ331V	RESISTOR	330Ω	B7	
R0462	ERJ3GEYJ473V	RESISTOR	47kΩ	B7	
R0463	ERJ3GEYJ332V	RESISTOR	3.3kΩ	B7	
R0464	EXBV4V103JV	RESISTOR	10kΩ	B6	
R0465	ERJ3GEYJ104V	RESISTOR	100kΩ	B7	
R0466	ERJ3GEYJ4R7V	RESISTOR	4.7Ω	A7	

MODEL	EB-G500	NAME		Logic	
Ref.	**Part No.**	**Description**		**Grid**	**Remarks**
R0467	ERJ3GEYJ104V	RESISTOR	100kΩ	B7	
R0468	ERJ3GEYJ332V	RESISTOR	3.3kΩ	B7	
R0475	ERJ3GEYJ4R7V	RESISTOR	4.7Ω	A7	
R0492	ERJ3GEYJ152V	RESISTOR	1.5kΩ	B7	
R0493	ERJ3GEYJ152V	RESISTOR	1.5kΩ	B7	
R0496	ERJ3GEYJ331V	RESISTOR	330Ω	B4	
R0497	ERJ3GEYJ152V	RESISTOR	1.5kΩ	C1	
R0498	ERJ3GEYJ104V	RESISTOR	100kΩ	B7	
R0499	ERJ3GEYJ104V	RESISTOR	100kΩ	B7	
R0501	ERJ3GEYJ105V	RESISTOR	1MΩ	B3	
R0502	ERJ3GEYJ473V	RESISTOR	47kΩ	B3	
R0503	ERJ3GEYJ103V	RESISTOR	10kΩ	B3	
R0504	ERJ3GEYJ104V	RESISTOR	100kΩ	B3	
R0505	ERJ3GEYJ102V	RESISTOR	1kΩ	B4	
RT0401	YRTSM021J104	THERMISTOR		C2	
U0402	YUMIL0015	SRAM	1MB	A2	
U0404	YULLW0079	AND GATE IC		A2	
U0407	YUMQI0047	FLASH MEMORY	8MB	A4	
U0410	YUCPP0038	MICROPROCESSOR		A3	
U0411	UM70023B	EEPROM	8 PIN	A2	
U0412	YHG51D289FE	BASEBAND LSI		A5	
U0413	YVP40506A	VOCODER		A6	
U0414	YURVZ0001	VOLTAGE REFERENCE		A4	
U0415	YISD1420S	VOICE MEMO IC		B6	
U0416	YUAHH0005	DUAL OP AMP		B6	

MODEL	EB-G500	NAME			Logic	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
U0425	YULLW0031	BILATERAL SWITCH IC			B6	
U0426	YULLW0051	OR GATE IC			A2	
U0501	YURIH0022	REGULATOR			D1	
U0502	YTK11235AMTL	REGULATOR	3.5V		B3	
U0503	YTK11235AMTL	REGULATOR	3.5V		A6	
U0504	YRN5VL36AATL	IC				
U0505	YTK11250AMTL	REGULATOR			D1	

10.3.2 RF

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
—	G570435A	ASSEMBLED RF PCB				
C0101	ECUV1H221JCV	CAPACITOR	220pF	50V	A1	
C0102	ECUV1C333KBV	CAPACITOR	0.033µF	16V	A1	
C0103	ECUV1H101JCV	CAPACITOR	100pF	50V	A1	
C0104	ECUV1H562KBV	CAPACITOR	.0056nF	50V	A2	
C0105	ECUV1H562KBV	CAPACITOR	.0056nF	50V	A2	
C0106	ECUV1H562KBV	CAPACITOR	.0056nF	50V	A2	
C0107	ECUV1H562KBV	CAPACITOR	.0056nF	50V	A2	
C0108	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0110	ECUV1H101JCV	CAPACITOR	100pF	50V	A3	
C0111	ECUV1H103KBV	CAPACITOR	0.01µF	50V	C6	
C0112	ECUV1H101JCV	CAPACITOR	100pF	50V	C6	
C0113	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0114	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0115	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0116	ECUV1H101JCV	CAPACITOR	100pF	50V	C6	
C0118	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0119	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A2	
C0120	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0121	YGM1C390J1HT	CAPACITOR	39pF	50V	A2	
C0122	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A2	
C0123	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A3	
C0125	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0126	ECUV1H103KBV	CAPACITOR	0.01µF	50V		
C0127	YGM1C030C1HT	CAPACITOR	3pF	50V	A3	
C0128	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0129	ECUV1H101JCV	CAPACITOR	100pF	50V	A3	
C0130	ECUV1H101JCV	CAPACITOR	100pF	50V	A3	
C0131	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0133	ECUV1H101JCV	CAPACITOR	100pF	50V	A3	
C0134	ECUV1H101JCV	CAPACITOR	100pF	50V	B4	
C0135	ECUV1H101JCV	CAPACITOR	100pF	50V	D4	
C0136	ECUV1H101JCV	CAPACITOR	100pF	50V	D4	
C0149	YGM1C020C1HT	CAPACITOR	2pF	50V	A1	
C0150	ECUV1H101JCV	CAPACITOR	100pF	50V	A4	
C0153	ECUV1H101JCV	CAPACITOR	100pF	50V	A4	
C0154	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A4	
C0155	ECUV1H101JCV	CAPACITOR	100pF	50V	A4	
C0157	ECUV1H101JCV	CAPACITOR	100pF	50V	B5	
C0159	ECUV1H101JCV	CAPACITOR	100pF	50V	B5	
C0160	ECUV1H101JCV	CAPACITOR	100pF	50V	B5	

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0161	ECUV1H221JVC	CAPACITOR	220pF	50V	D3	
C0162	ECUV1C333KBV	CAPACITOR	.033µF	16V	D3	
C0163	YGM1C040C1HT	CAPACITOR	4pF	50V	B5	
C0164	ECUV1H101JCV	CAPACITOR	100pF	50V	B5	
C0166	ECUV1H271JCV	CAPACITOR	27pF	50V	B5	
C0167	ECUV1H331JVC	CAPACITOR	330pF	50V	C7	
C0168	ECUV1H103KBV	CAPACITOR	0.01µF	50V	C7	
C0169	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A3	
C0171	ECUV1C333KBV	CAPACITOR	.033µF	16V	D7	
C0172	ECUV1H271JVC	CAPACITOR	270pF	50V	D7	
C0173	ECUV1H101JCV	CAPACITOR	100pF	50V	D7	
C0174	ECUV1H331JVC	CAPACITOR	330pF	50V	D7	
C0175	YGM1C010C1HT	CAPACITOR	1pF	50V	C1	
C0176	YCSDU012M106	CAPACITOR	10µF	16V	A5	
C0177	YCSDU012M106	CAPACITOR	10µF	16V	A5	
C0201	YGM1C040C1HT	CAPACITOR	4pF	50V	A6	
C0202	YGM1C010C1HT	CAPACITOR	1pF	50V	A6	
C0203	ECUV1H101JCV	CAPACITOR	100pF	50V	A6	
C0204	ECUV1H102KBV	CAPACITOR	1nF	50V	A6	
C0205	ECUV1H101JCV	CAPACITOR	100pF	50V	A6	
C0206	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A6	
C0207	ECUV1H101JCV	CAPACITOR	100pF	50V	A6	
C0208	YGM1C020C1HT	CAPACITOR	2pF	50V	A6	
C0210	ECUV1H101JCV	CAPACITOR	100pF	50V	C2	
C0211	ECUV1H102KBV	CAPACITOR	1nF	50V	C2	
C0212	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A6	
C0213	ECUV1H102KBV	CAPACITOR	1nF	50V	A6	
C0214	YGM1C020C1HT	CAPACITOR	2pF	50V	A5	

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0215	YGM1C020C1HT	CAPACITOR	2pF	50V	A5	
C0216	ECUV1H101JCV	CAPACITOR	100pF	50V	C2	
C0217	ECUV1H103KBV	CAPACITOR	0.01µF	50V	C2	
C0218	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A6	
C0219	ECUV1H102KBV	CAPACITOR	1nF	50V	A4	
C0220	YGM1C030C1HT	CAPACITOR	3pF	50V	A3	
C0221	YGM1C100D1HT	CAPACITOR	10pF	50V	A6	
C0222	ECUV1H101JCV	CAPACITOR	100pF	50V	C2	
C0223	YGM1C020C1HT	CAPACITOR	2pF	50V	A6	
C0224	ECUV1H101JCV	CAPACITOR	100pF	50V	C2	
C0225	ECUV1H101JCV	CAPACITOR	100pF	50V	A6	
C0226	ECUV1H101JCV	CAPACITOR	100pF	50V	A6	
C0227	YGM1C060D1HT	CAPACITOR	6pF	50V	A6	
C0228	YGM1C060D1HT	CAPACITOR	6pF	50V	A6	
C0229	ECUV1C333KBV	CAPACITOR	.033µF	16V	C2	
C0230	ECUV1C333KBV	CAPACITOR	.033µF	16V	C2	
C0231	YGM1C030C1HT	CAPACITOR	3pF	50V	A6	
C0232	ECUV1H101JCV	CAPACITOR	100pF	50V	A6	
C0233	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B6	
C0234	ECUV1H101JCV	CAPACITOR	100pF	50V	A5	
C0237	ECUV1H101JCV	CAPACITOR	100pF	50V	A6	
C0238	ECUV1H101JCV	CAPACITOR	100pF	50V	B6	
C0239	ECUV1H101JCV	CAPACITOR	100pF	50V	A5	
C0240	YGM1C050C1HT	CAPACITOR	5pF	50V	A5	
C0242	YGM1C010C1HT	CAPACITOR	1pF	50V	A5	
C0244	YGM1C020C1HT	CAPACITOR	2pF	50V	B6	
C0250	YGM1C070D1HT	CAPACITOR	7pF	50V	A6	
C0251	YGM1C070D1HT	CAPACITOR	7pF	50V	A5	

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0252	YGM1C070D1HT	CAPACITOR	7pF	50V	B5	
C0253	YGM1C070D1HT	CAPACITOR	7pF	50V	A5	
C0254	ECUV1H471JCV	CAPACITOR	470pF	50V	A5	
C0255	ECUV1H471JCV	CAPACITOR	470pF	50V	A5	
C0256	ECUV1H562KBV	CAPACITOR	5.6pF	50V	C3	
C0257	ECUV1H562KBV	CAPACITOR	.0056nF	50V	B5	
C0258	ECUV1H562KBV	CAPACITOR	.0056nF	50V	A5	
C0259	ECUV1H562KBV	CAPACITOR	.0056nF	50V	A6	
C0301	YCSDU009M335	CAPACITOR	3.3µF	16V	B1	
C0302	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B1	
C0303	YCSDU011M156	CAPACITOR	15µF	6V	B1	
C0304	ECUV1H101JCV	CAPACITOR	100pF	50V	B1	
C0305	YGM1C040C1HT	CAPACITOR	4pF	50V	B1	
C0306	ECUV1H102KBV	CAPACITOR	1nF	50V	B2	
C0307	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B1	
C0308	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B1	
C0309	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B2	
C0310	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B2	
C0311	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A4	
C0312	YCCSM028Z106	CAPACITOR	10µF	10V	A4	
C0313	ECUV1H101JCV	CAPACITOR	100pF	50V	A4	
C0314	ECUV1H103KBV	CAPACITOR	0.01µF	50V	A4	
C0315	ECUV1H101JCV	CAPACITOR	100pF	50V	A4	
C0316	ECUV1H271JCV	CAPACITOR	27pF	50V	A4	
C0317	ECUV1C473KBV	CAPACITOR	47nF	16V	A4	
C0318	ECUV1H472KBV	CAPACITOR	4700pF	50V	B3	
C0319	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A3	

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0320	ECUV1H101JCV	CAPACITOR	100pF	50V	A3	
C0321	ECUV1H101JCV	CAPACITOR	100pF	50V	B3	
C0322	YGM1C220J1HT	CAPACITOR	22pF	50V	A3	
C0323	ECUV1H101JCV	CAPACITOR	100pF	50V	A3	
C0325	ECUV1H101JCV	CAPACITOR	100pF	50V	A3	
C0326	ECUV1H101JCV	CAPACITOR	100pF	50V	B3	
C0327	ECUV1H101JCV	CAPACITOR	100pF	50V	B2	
C0328	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A3	
C0329	ECUV1H101JCV	CAPACITOR	100pF	50V	B3	
C0330	YCCSM028Z106	CAPACITOR	10µF	10V	A3	
C0331	ECUV1C333KBV	CAPACITOR	0.033µF	16V	A3	
C0332	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A2	
C0333	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0334	YGM1C100D1HT	CAPACITOR	10pF	50V	A2	
C0335	YGM1C100D1HT	CAPACITOR	10pF	50V	A2	
C0336	ECUV1H101JCV	CAPACITOR	100pF	50V	A1	
C0337	ECUV1H102KBV	CAPACITOR	1nF	50V	A2	
C0339	YGM1C100D1HT	CAPACITOR	10pF	50V	A2	
C0340	YGM1C080D1HT	CAPACITOR	8pF	50V	A2	
C0341	YGM1C030C1HT	CAPACITOR	3pF	50V	A2	
C0342	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B1	
C0343	YCCSM028Z106	CAPACITOR	10µF	10V	B2	
C0344	ECUV1H101JCV	CAPACITOR	100pF	50V	B2	
C0345	ECUV1H102KBV	CAPACITOR	1nF	50V	A2	
C0346	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0347	ECUV1C104KBV	CAPACITOR	0.1µF	16V	A2	
C0348	ECUV1H101JCV	CAPACITOR	100pF	50V	A2	
C0349	YGM1C100D1HT	CAPACITOR	10pF	50V	B2	

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
C0350	YGM1C100D1HT	CAPACITOR	10pF	50V	B2	
C0351	ECUV1C333KBV	CAPACITOR	0.033µF	16V	A2	
C0353	YGM1C050C1HT	CAPACITOR	5pF	50V		
C0354	YGM1C470J1HT	CAPACITOR	47pF	50V		
C0360	ECUV1C104KBV	CAPACITOR	0.1µF	16V	D6	
C0361	ECUV1H101JCV	CAPACITOR	100pF	50V	D6	
C0370	YCSDU009M335	CAPACITOR	3.3µF	16V	B2	
C0371	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B2	
C0372	YCSDU015M106	CAPACITOR	10µF	10V	B2	
C0373	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B2	
C0374	YCSDU015M106	CAPACITOR	10µF	10V	B2	
C0375	ECUV1H101JCV	CAPACITOR	100pF	50V	C1	
C0376	YGM1C150JIHT	CAPACITOR	15pF	50V	D2	
C0377	ECUV1H103KBV	CAPACITOR	0.01µF	50V	B3	
C0378	ECUV1H102KBV	CAPACITOR	1nF	50V	B2	
C0379	YGM1C820J1HT	CAPACITOR	82pF	50V	D6	
C0380	YGM1C150J1HT	CAPACITOR	15pF	50V	B2	
C0381	ECUV1H101JCV	CAPACITOR	100pF	50V	B2	
C0382	YGM1C470J1HT	CAPACITOR	47pF	50V		
C0383	YGM1C470J1HT	CAPACITOR	47pF	50V		
C0390	ECUV1H101JCV	CAPACITOR	100pF	50V	C6	
C0391	YGM1C390J1HT	CAPACITOR	39pF	50V	C6	
C0393	ECUV1H101JCV	CAPACITOR	100pF	50V	C7	
C0394	YGM1C390J1HT	CAPACITOR	39pF	50V	A1	
C0395	ECUV1H101JCV	CAPACITOR	100pF	50V	A1	
C0396	ECUV1H101JCV	CAPACITOR	100pF	50V	D7	
C0397	ECUV1H101JCV	CAPACITOR	100pF	50V	D1	
C0398	YGM1C470J1HT	CAPACITOR	47pF	50V		

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
D0101	YHSMS2805L31	DIODE			B5	
D0301	MA376TX	DIODE			A2	
D0302	MA77TX	DIODE			A1	
D0360	MA112TX	DIODE	200mA	40V	D7	
D0370	MA738TX	DIODE	1.5A	40V	C7	
D0371	MA738TX	DIODE	1.5A	40V	C7	
D0390	MA112TX	DIODE	200mA	40V	C6	
E0150	EHDFD1556	COUPLER			B5	
FL0101	EFCH902MMTY	SAW FILTER			A4	
FL0102	EFCH902MMTY	SAW FILTER			A4	
FL0103	FLSM00023	DUPLEXER			B6	
FL0201	EFCH947MMTY	SAW FILTER			A6	
FL0202	EFCH201MDQT1	SAW FILTER			A5	
J0001	JA70024B	CONNECTOR			A7	
J0002	JANB00106	CONNECTOR	50 PIN		B3	
L0101	ELJRE39NJF2	INDUCTOR	39nH		A2	
L0102	ELJRE4N7JF2	INDUCTOR	4.7nH		A2	
L0103	ELJRE6N8ZF2	INDUCTOR	6.8nH		A2	
L0150	ELJRE6N8ZF2	INDUCTOR	6.8nH		A4	
L0151	ELJRE15NJF2	INDUCTOR	15nH	5%	B5	
L0154	LL2012F4N7S	INDUCTOR	12nH		A1	
L0201	ELJRE3N9JF2	INDUCTOR	3.9nH		B6	
L0202	ELJRE5N6ZF2	INDUCTOR	5.6nH		A6	

MODEL	EB-G500	NAME			RF	
Ref.	**Part No.**	**Description**			**Grid**	**Remarks**
L0203	ELJRE22NJF2	INDUCTOR	22nH		A6	
L0206	ELJRE22NJF2	INDUCTOR	22nH		A6	
L0209	ELJRE68NGF3	INDUCTOR	68nH		A6	
L0210	ELJRE68NGF3	INDUCTOR	68nH		A6	
L0211	ELJRE3N3DF2	INDUCTOR	3.3nH		A4	
L0213	ELJND56NJF	INDUCTOR	56nH	5%	A5	
L0217	ELJNDR15JF	INDUCTOR			A6	
L0218	ELJNDR10JF	INDUCTOR			A6	
L0219	ELJNDR10JF	INDUCTOR			A5	
L0301	ELJRE8N2JF2	INDUCTOR	8.2nH		A3	
L0302	ELJRE6N8ZF2	INDUCTOR	6.8nH			
L0303	ELJRE5N6ZF2	INDUCTOR	5.6nH		A2	
L0304	ELJRE56NJF3	INDUCTOR	56nH		A2	
L0305	ELJRE47NJF2	INDUCTOR	47nH		A2	
Q0101	YUMC2TR	TRANSISTOR			B4	
Q0102	2SB1219ARSTX	TRANSISTOR			A2	
Q0150	YUMC2TR	TRANSISTOR			B3	
Q0301	2SC4617TLR	TRANSISTOR			B2	
Q0302	YUMC2TR	TRANSISTOR			B2	
Q0303	2SD2345STTX	TRANSISTOR			A4	
Q0304	2SC4226T1B01	TRANSISTOR			A2	
Q0305	YDTC144EETL	TRANSISTOR			A1	
Q0307	YSI9953DYT1	TRANSISTOR				
Q0360	2SD1511TX	TRANSISTOR			D7	
Q0370	7619953DY-T1				C7	
Q0372	YUMC2TR	TRANSISTOR			B2	
Q0373	YUMC3TR	TRANSISTOR			B2	

MODEL	EB-G500	NAME		RF	
Ref.	**Part No.**	**Description**		**Grid**	**Remarks**
R0101	ERJ3GEYJ182V	RESISTOR	1.8kΩ	A1	
R0102	ERJ3GEYJ822V	RESISTOR	8.2kΩ	A1	
R0103	ERJ3GEYJ153V	RESISTOR	15kΩ	B1	
R0104	ERJ3GEYJ153V	RESISTOR	15kΩ	A1	
R0105	ERJ3GEYJ153V	RESISTOR	15kΩ	A1	
R0106	ERJ3GEYJ153V	RESISTOR	15kΩ	A1	
R0107	ERJ3GEYJ272V	RESISTOR	2.7kΩ	A1	
R0108	ERJ3GEYJ272V	RESISTOR	2.7kΩ	A1	
R0109	ERJ3GEYJ272V	RESISTOR	2.7kΩ	A1	
R0110	ERJ3GEYJ272V	RESISTOR	2.7kΩ	A1	
R0111	ERJ3GEYJ101V	RESISTOR	100Ω	A1	
R0112	ERJ3GEYJ101V	RESISTOR	100Ω	A1	
R0113	ERJ3GEYJ101V	RESISTOR	100Ω	A1	
R0114	ERJ3GEYJ101V	RESISTOR	100Ω	A1	
R0115	ERJ3GEYJ222V	RESISTOR	2.2kΩ	C6	
R0116	ERJ3GEYJ151V	RESISTOR	150Ω	C6	
R0117	ERJ3GEY0R00V	RESISTOR	0Ω	A2	
R0118	ERJ3GEY0R00V	RESISTOR	0Ω	A2	
R0119	ERJ3GEY0R00V	RESISTOR	0Ω	A3	
R0120	ERJ3GEYJ331V	RESISTOR	330Ω	A3	
R0121	ERJ3GEYJ222V	RESISTOR	2.2kΩ	A3	
R0122	ERJ3GEYJ222V	RESISTOR	2.2kΩ	A3	
R0123	ERJ3GEYJ180V	RESISTOR	18Ω	A3	
R0125	ERJ3GEYJ560V	RESISTOR	56Ω	A2	
R0126	ERJ3GEYJ121V	RESISTOR	120Ω	A3	
R0127	ERJ3GEYJ820V	RESISTOR	82Ω	A3	

MODEL	EB-G500	NAME		RF	
Ref.	**Part No.**	**Description**		**Grid**	**Remarks**
R0128	ERJ3GEYJ391V	RESISTOR	390Ω	A3	
R0129	ERJ3GEYJ331V	RESISTOR	330Ω	A3	
R0130	ERJ3GEYJ331V	RESISTOR	330Ω	A3	
R0150	ERJ3GEYJ220V	RESISTOR	22Ω	A5	
R0151	ERJ3GEYJ471V	RESISTOR	470Ω	B4	
R0152	ERJ3GEYJ120V	RESISTOR	12Ω	B4	
R0153	ERJ3GEYJ471V	RESISTOR	470Ω	B4	
R0154	ERJ3GEYJ472V	RESISTOR	4.7kΩ	B5	
R0155	ERJ3GEYJ151V	RESISTOR	150Ω	D3	
R0156	ERJ3GEYJ331V	RESISTOR	330Ω	D3	
R0157	ERJ3GEYJ562V	RESISTOR	5.6kΩ	B5	
R0158	ERJ3GEYJ123V	RESISTOR	12 kΩ	B5	
R0159	ERJ3GEYJ392V	RESISTOR	3.9kΩ	B5	
R0160	ERJ3GEYJ332V	RESISTOR	3.3kΩ	B5	
R0161	ERJ3GEYJ153V	RESISTOR	15kΩ	C7	
R0162	ERJ3GEYJ103V	RESISTOR	10kΩ	D7	
R0163	ERJ3GEYJ103V	RESISTOR	10kΩ	D7	
R0164	ERJ3GEYJ103V	RESISTOR	10kΩ	D7	
R0165	ERJ3GEYJ223V	RESISTOR	22kΩ	D7	
R0166	ERJ3GEYJ334V	RESISTOR	330kΩ	D7	
R0167	ERJ3GEYJ102V	RESISTOR	1kΩ	D7	
R0169	ERJ3GEY0R00V	RESISTOR	0Ω	B5	
R0202	ERJ3GEYJ121V	RESISTOR	120Ω	A6	
R0203	ERJ3GEYJ470V	RESISTOR	47Ω	A5	
R0204	ERJ3GEYJ102V	RESISTOR	1kΩ	A5	
R0205	ERJ3GEYJ102V	RESISTOR	1kΩ	A6	
R0250	ERJ3GEYJ122V	RESISTOR	1.2 kΩ	A5	

MODEL	EB-G500	NAME		RF	
Ref.	**Part No.**	**Description**		**Grid**	**Remarks**
R0251	ERJ3GEYJ393V	RESISTOR	39kΩ	A6	
R0252	ERJ3GEYJ393V	RESISTOR	39kΩ	A5	
R0253	ERJ3GEYJ182V	RESISTOR	1.8kΩ	A5	
R0254	ERJ3GEYJ122V	RESISTOR	1.2 kΩ	A5	
R0255	ERJ3GEYJ182V	RESISTOR	1.8kΩ	A5	
R0256	ERJ3GEYJ393V	RESISTOR	39kΩ	A5	
R0257	ERJ3GEYJ393V	RESISTOR	39kΩ	A5	
R0258	ERJ3GEYJ182V	RESISTOR	1.8kΩ	A5	
R0259	ERJ3GEYJ122V	RESISTOR	1.2 kΩ	B5	
R0260	ERJ3GEYJ334V	RESISTOR	330kΩ	A5	
R0261	ERJ3GEYJ334V	RESISTOR	330kΩ	A5	
R0262	ERJ3GEYJ334V	RESISTOR	330kΩ	A5	
R0263	ERJ3GEYJ334V	RESISTOR	330kΩ	A6	
R0264	ERJ3GEYJ182V	RESISTOR	1.8kΩ	A6	
R0265	ERJ3GEYJ122V	RESISTOR	1.2 kΩ	B5	
R0301	ERJ3GEYJ331V	RESISTOR	330Ω	B2	
R0302	ERJ3GEYJ472V	RESISTOR	4.7kΩ	B1	
R0303	ERJ3GEYJ153V	RESISTOR	15kΩ	B2	
R0304	ERJ3GEYJ183V	RESISTOR	18kΩ	B2	
R0305	ERJ3GEYJ152V	RESISTOR	1.5kΩ	B2	
R0306	ERJ3GEYJ101V	RESISTOR	100Ω	B3	
R0307	ERJ3GEYJ151V	RESISTOR	150Ω	A4	
R0308	ERJ3GEYJ150V	RESISTOR	15Ω	A4	
R0309	ERJ3GEYJ821V	RESISTOR	820Ω	A4	
R0310	ERJ3GEYJ123V	RESISTOR	12 kΩ	A4	
R0311	ERJ3GEYJ472V	RESISTOR	4.7kΩ	A4	
R0312	ERJ3GEYJ150V	RESISTOR	15Ω	A3	

MODEL	EB-G500	NAME	RF	
Ref.	**Part No.**	**Description**	**Grid**	**Remarks**
R0313	ERJ3GEYJ150V	RESISTOR 15Ω	A3	
R0314	ERJ3GEYJ150V	RESISTOR 15Ω	B4	
R0316	ERJ3GEYJ103V	RESISTOR 10kΩ	A3	
R0317	ERJ3GEYJ151V	RESISTOR 150Ω	A1	
R0318	ERJ3GEYJ822V	RESISTOR 8.2kΩ	A1	
R0319	ERJ3GEYJ472V	RESISTOR 4.7kΩ	A2	
R0320	ERJ3GEYJ392V	RESISTOR 3.9kΩ	A1	
R0321	ERJ3GEYJ562V	RESISTOR 5.6kΩ	A1	
R0322	ERJ3GEYJ392V	RESISTOR 3.9kΩ	A1	
R0323	ERJ3GEYJ121V	RESISTOR 120Ω	B2	
R0324	ERJ3GEYJ151V	RESISTOR 150Ω	B1	
R0327	ERJ3GEYJ270V	RESISTOR 27Ω	A2	
R0328	ERJ3GEYJ181V	RESISTOR 180Ω	A2	
R0329	ERJ3GEY0R00V	RESISTOR 0Ω	B3	
R0330	ERJ3GEYJ103V	RESISTOR 10kΩ	B3	
R0331	ERJ3GEYJ103V	RESISTOR 10kΩ	A3	
R0332	ERJ3GEYJ103V	RESISTOR 10kΩ	B3	
R0333	ERJ3GEYJ104V	RESISTOR 100kΩ	B3	
R0334	ERJ3GEYJ104V	RESISTOR 100kΩ	B2	
R0335	ERJ3GEYJ104V	RESISTOR 100kΩ	B2	
R0337	ERJ3GEY0R00V	RESISTOR 0Ω	B3	
R0338	ERJ3GEYJ393V	RESISTOR 39kΩ	A1	
R0339	ERJ3GEYJ392V	RESISTOR 3.9kΩ	A1	
R0341	ERJ3GEYJ472V	RESISTOR 4.7kΩ	B1	
R0360	ERJ3GEYJ182V	RESISTOR 1.8kΩ	D7	
R0361	ERJ3GEYJ103V	RESISTOR 10kΩ	D7	
R0370	ERJ3GEYJ104V	RESISTOR 100kΩ	C7	

MODEL	EB-G500	NAME	RF	
Ref.	**Part No.**	**Description**	**Grid**	**Remarks**
R0371	ERJ3GEYJ471V	RESISTOR 470Ω	C7	
R0372	ERJ3GEYJ103V	RESISTOR 10kΩ	D2	
S0360	ESD165205	SLIDE SWITCH	D7	
T0101	THSM00003	BALUN 200Ω 900MHz	A3	
T0201	THSM00004	BALUN 500Ω 850MHz	A6	
U0101	YUALW0001	OP AMP	B4	
U0102	YUAKL0004	OP AMP	A1	
U0103	YPMB2240F	IC	A2	
U0104	YPF0145MTB	PA MODULE	B4	
U0105	YMC33072D	OP AMPS	D7	
U0106	YUPC2763T	IC	A4	
U0201	YUYGJ0002	IC	A6	
U0301	YTK11238AMTL	REGULATOR	B1	
U0302	UY70032A	TCVCXO	B1	
U0303	ENFVF1B3S72	VCO	A4	
U0304	YUALW0008	OP AMP	A3	
U0305	YUYQI0005	IC	A3	
U0306	YUALW0008	OP AMP	A2	
U0370	YTK11238AMTL	REGULATOR	B2	
U0371	YTK11238AMTL	REGULATOR	B2	
W0101	WH70057B	SEMI RIGID CABLE		
X0301	JS70004A	SIM HOLDER		

10.3.3 Mechanical

MODEL	EB-G500	NAME	Mechanical	
Ref.	**Part No.**	**Description**	Grid	Remarks
A0101	AA70032B	LCD MODULE		
B0360	BD70020A	VIB MOTOR ASSEMBLY		
E0151	AN70053A	ANTENNA		
HT0102	HH70006A	RECEIVER		
LS0390	HB70007A	BUZZER		
M0101	5E70140BA	COVER (CHAMPAGNE GOLD)		
M0101	5N70140BB	COVER (METALIC BLUE)		
M0102	5P70074AA	LCD PANEL		
M0103	5E70145A	RECEIVER CUSHION		
M0104	5S70056A	INDICATOR		
M0105	5V70089AA	KEYSHEET		
M0106	5X70018A	MIC BUSHING		
M0107	5E70146A	LCD CUSHION		
M0108	—	NAME PLATE		NOT SUPPLIED
M0109	5S70057B	LCD BACKLIGHT		
M0110	5Q70042A	CHASSIS		
M0111	5U70071AB	VIBRATOR CUSHION		
M0112	5K70062A	ANTENNA TUBE		
M0113	5R70042A	SLIDE KNOB		
M0114	4G70003A	ANTENNA HOLDER		
M0115	5M70113B	CASE		

MODEL	EB-G500	NAME	Mechanical	
Ref.	**Part No.**	**Description**	Grid	Remarks
M0116	5Y70092A	HOLDER		
M0117	1D70188A	ANTENNA TERMINAL		
M0118	3Z70027A	SCREW		
M0119	3Z70027A	SCREW		
M0120	3Z70027A	SCREW		
M0121	3Z70027A	SCREW		
M0122	3Z70025A	SCREW		
M0123	5E70147A	BUZZER CUSHION		
M0124	6V70030A	BUZZER NET		
M0125	G2MDS038	PATENT LABEL		
MK0107	WM62CT532	MICROPHONE		
S0390	SY70037A	REED SWITCH		

10.3.4 Printed Material

MODEL	EB-G500	NAME	Printed Material	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
	ZD71348A	INSTRUCTIONS - ENGLISH		
	ZD71349A	INSTRUCTIONS - DANISH		
	ZD71350A	INSTRUCTIONS - DUTCH		
	ZD71351A	INSTRUCTIONS - FINNISH		
	ZD71352A	INSTRUCTIONS - FRENCH		
	ZD71353A	INSTRUCTIONS - GERMAN		
	ZD71354A	INSTRUCTIONS - GREEK		
	ZD71354A	INSTRUCTIONS - ITALIAN		
	ZD71356A	INSTRUCTIONS - NORWEGIAN		
	ZD71357A	INSTRUCTIONS - PORTUGUESE		
	ZD71358A	INSTRUCTIONS - SPANISH		
	ZD71359A	INSTRUCTIONS - SWEDISH		
	ZD71360A	INSTRUCTIONS - TURKISH		
	ZD71411A	INSTRUCTIONS - ARABIC		
	ZD71412A	INSTRUCTIONS - CHINESE		
	ZD71495A	INSTRUCTIONS - RUSSIAN		
	ZD71496A	INSTRUCTIONS - CZECH		
	ZD71497A	INSTRUCTIONS - HUNGARIAN		
	ZD71498A	INSTRUCTIONS - POLISH		

10.4 Handsfree Replacement Parts List

10.4.1 Handsfree Unit

MODEL	EB-HF500	NAME			Handsfree Unit	
REF	**PART NUMBER**	**DESCRIPTION**			**GRID**	**REMARKS**
C0101	ECA1HFQ330	CAPACITOR	33µF	50V		
C0102	EEUFA1H121E	CAPACITOR	120µF	50V		
C0103	ECA1CFQ121	CAPACITOR	120nF	16V		
C0104	ECA1CFQ121	CAPACITOR	120nF	16V		
C0105	ECEA0JKG330	CAPACITOR	33µF	6.3V		
C0106	YGM2B103K1HT	CAPACITOR	10nF	50V		
C0107	YGM2B103K1HT	CAPACITOR	10nF	50V		
C0108	YGM2B103K1HT	CAPACITOR	10nF	50V		
C0111	YGM2F104Z1HT	CAPACITOR	100nF	50V		
C0112	YGM2F104Z1HT	CAPACITOR	100nF	50V		
C0113	YGM2F104Z1HT	CAPACITOR	100nF	50V		
C0114	YGM2B104K1ET	CAPACITOR	0.1µF	25V		
C0115	YGM2B104K1ET	CAPACITOR	0.1µF	25V		
C0116	YGM2B102K1HT	CAPACITOR	1nF	50V		
C0117	YGM2B103K1HT	CAPACITOR	10nF	50V		
C0118	YGM2B103K1HT	CAPACITOR	10nF	50V		
C0120	YGM2F104Z1HT	CAPACITOR	100nF	50V		
C0201	ECEA1EGE331	CAPACITOR	330µF	25V		
C0202	YGM1B103K1HT	CAPACITOR	10nF	50V		
C0301	ECEV1CG100GR	CAPACITOR	10µF	16V		
C0302	ECUV1H472KBV	CAPACITOR	0.47µF	50V		
C0304	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0305	ECEV1HG010GR	CAPACITOR	1µF	50V		
C0306	YGM1B222K1HT	CAPACITOR	2.2nF	50V		

MODEL	EB-HF500	NAME			Handsfree Unit	
REF	PART NUMBER	DESCRIPTION			GRID	REMARKS
C0307	YGM1B821K1HT	CAPACITOR	820pF	50V		
C0308	ECEV1CG100GR	CAPACITOR	10µF	16V		
C0309	ECEV1HG010GR	CAPACITOR	1µF	50V		
C0310	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0311	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0312	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0313	YGM1B103K1HT	CAPACITOR	0.01µF	50V		
C0314	YGM1B103K1HT	CAPACITOR	0.01µF	50V		
C0315	YGM1B332K1HT	CAPACITOR	3.3nF	50V		
C0316	YGM1B332K1HT	CAPACITOR	3.3nF	50V		
C0317	ECEV1CG100GR	CAPACITOR	10µF	16V		
C0318	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0319	YGM2B474K1CT	CAPACITOR	0.47µF	25V		
C0325	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0326	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0327	YGM1B102K1HT	CAPACITOR	1nF	50V		
C0328	ECEV1HGR33GR	CAPACITOR	0.33µF	50V		
C0329	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0340	ECEV1CG100GR	CAPACITOR	10µF	16V		
C0341	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0342	ECEV1CG100GR	CAPACITOR	10µF	16V		
C0343	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0344	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0345	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0346	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0347	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0348	ECEV1CG100GR	CAPACITOR	10µF	16V		

MODEL	EB-HF500	NAME			Handsfree Unit	
REF	PART NUMBER	DESCRIPTION			GRID	REMARKS
C0349	YGM1B102K1HT	CAPACITOR	1nF	50V		
C0351	YGM1C100D1HT	CAPACITOR	10pF	50V		
C0352	YGM1C100D1HT	CAPACITOR	10pF	50V		
C0353	ECEV1CG100GR	CAPACITOR	10µF	16V		
C0355	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0356	YGM1B183K1CT	CAPACITOR	0.018µF	16V		
C0357	ECEV1HG010GR	CAPACITOR	1µF	50V		
C0358	ECEV0JG220GR	CAPACITOR	22µF	6.3V		
C0359	YGM2F104Z1HT	CAPACITOR	100nF	50V		
C0360	ECEA1EGE221	CAPACITOR	220µF	25V		
C0361	ECEA1EGE221	CAPACITOR	220µF	25V		
C0362	YGM1B104K1CT	CAPACITOR	0.1µF	25V		
C0363	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0364	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0365	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0366	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0367	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0368	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0369	YGM2B474K1CT	CAPACITOR	0.47µF	25V		
C0371	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0372	YGM2B474K1CT	CAPACITOR	0.47µF	25V		
C0373	YGM2B474K1CT	CAPACITOR	0.47µF	25V		
C0374	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0375	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0376	YGM1C220J1HT	CAPACITOR	22pF	50V		
C0377	YGM1C101J1HT	CAPACITOR	100pF	50V		
C0378	YGM1B104K1CT	CAPACITOR	0.1µF	16V		

MODEL	EB-HF500	NAME			Handsfree Unit	
REF	PART NUMBER	DESCRIPTION			GRID	REMARKS
C0379	YGM1B104K1CT	CAPACITOR	0.1µF	16V		
C0380	YGM1C101J1HT	CAPACITOR	100pF	50V		
D0103	YSFPB64V	DIODE				
D0104	YSFPB64V	DIODE				
D0107	MA7100ATR	DIODE				
D0201	YRM3LF014102	DIODE				
D0202	MA8160MTX	ZENER DIODE				
D0204	MA8120TX	DIODE				
D0205	MA8330TX	DIODE				
D0206	MA132WKTX	DIODE				
D0207	MA8330TX	DIODE				
D0300	MA8120TX	DIODE				
D0301	MA8120TX	DIODE				
D0303	MA8120TX	DIODE				
D0304	MA8120TX	DIODE				
D0305	MA8120TX	DIODE				
D0311	MA732TX	DIODE				
D0312	MA8120TX	DIODE				
F0101	U25	FUSE	2.5A			
FL0101	BL02RN1R62	OCTAL BUS DRV				
J0300	HSJ1080110	FILTER				
L0101	RCH664470K	INDUCTOR	47µH	12MHz		
L0102	RCR110D221L	INDUCTOR	220µH	3.1MHz		
L0103	RCH664470K	INDUCTOR	47µH	12MHz		

MODEL	EB-HF500	NAME			Handsfree Unit	
REF	PART NUMBER	DESCRIPTION			GRID	REMARKS
LS0301	VS45U0208	SPEAKER				
P0201	LY2016PDT1P1	PLUG	16P	3A		
P0202	JA70028A	CONNECTOR				
P0203	DF116DP2DSA	CONNECTOR	6P			
P0300	PAPS00218	CONNECTOR				
P0301	533980290	CONNECTOR				
Q0101	2SB1142RS	TRANSISTOR				
Q0102	2SD1835ST	TRANSISTOR				
Q0107	2SD601AQSTX	TRANSISTOR				
Q0201	YDTC144EUTX	TRANSISTOR				
Q0202	YDTA144EUTX	TRANSISTOR				
Q0203	YDTC114EUTX	TRANSISTOR				
Q0204	2SB931PQR	TRANSISTOR				
Q0205	2SD1755PYTX	TRANSISTOR				
Q0305	YDTA144EUTX	TRANSISTOR				
Q0306	2SD602ATX	TRANSISTOR				
Q0307	YDTA144EUTX	TRANSISTOR				
Q0308	YDTC144EUTX	TRANSISTOR				
Q0309	2SD874AQSTX	TRANSISTOR				
R0101	ERX1SGR68U	RESISTOR	0.68Ω			
R0102	EVM7LSX00B53	RESISTOR	5kΩ			
R0103	ERJ3GEYJ334V	RESISTOR	330kΩ			
R0111	ERJ3GEYJ102V	RESISTOR	1kΩ			
R0112	ERJ3GEYJ102V	RESISTOR	1kΩ			
R0113	ERJ6GEYJ390V	RESISTOR	30Ω			

MODEL	EB-HF500	NAME		Handsfree Unit	
REF	PART NUMBER	DESCRIPTION		GRID	REMARKS
R0114	ERJ6GEYJ390V	RESISTOR	30Ω		
R0115	ERJ6GEYJ390V	RESISTOR	30Ω		
R0116	ERJ3GEYJ473V	RESISTOR	47kΩ		
R0117	ERJ3GEYJ102V	RESISTOR	1kΩ		
R0118	ERJ3GEYJ223V	RESISTOR	22kΩ		
R0119	YRR1220P103D	RESISTOR	10kΩ		
R0120	YRR1220P103D	RESISTOR	10kΩ		
R0121	YRR1220P123D	RESISTOR	12kΩ		
R0122	YRR1220P103D	RESISTOR	10kΩ		
R0123	YRR1220P103D	RESISTOR	10kΩ		
R0124	ERJ3GEYJ472V	RESISTOR	4.7kΩ		
R0125	ERJ3GEYJ334V	RESISTOR	330kΩ		
R0127	YRR1220P243D	RESISTOR	24kΩ		
R0128	YRR1220P242D	RESISTOR	2k4Ω		
R0130	YRR1220P103D	RESISTOR	10kΩ		
R0131	YRR1220P183D	RESISTOR	18kΩ		
R0132	YRR1220P122D	RESISTOR	10kΩ		
R0133	YRR1220P683D	RESISTOR	68kΩ		
R0134	YRR1220P153D	RESISTOR	15kΩ		
R0135	YRR1220P153D	RESISTOR	15kΩ		
R0144	EVM7LSX00B14	RESISTOR	10KΩ		
R0201	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0202	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0203	ERJ3GEYJ221V	RESISTOR	220Ω		
R0204	ERJ3GEYJ471V	RESISTOR	470Ω		
R0205	ERJ12YJ102H	RESISTOR	1kΩ		
R0206	ERJ12YJ102H	RESISTOR	1kΩ		

MODEL	EB-HF500	NAME		Handsfree Unit	
REF	PART NUMBER	DESCRIPTION		GRID	REMARKS
R0207	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0208	ERJ3GEYJ222V	RESISTOR	2.2kΩ		
R0301	ERJ3GEYJ392V	RESISTOR	3.9kΩ		
R0302	ERJ3GEYJ681V	RESISTOR	680Ω		
R0303	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0304	ERJ3GEYJ223V	RESISTOR	22kΩ		
R0305	ERJ3GEYJ472V	RESISTOR	4.7kΩ		
R0306	ERJ3GEYJ472V	RESISTOR	4.7kΩ		
R0307	ERJ3GEYJ472V	RESISTOR	4.7kΩ		
R0308	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0309	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0310	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0311	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0312	ERJ3GEYJ471V	RESISTOR	470Ω		
R0313	ERJ3GEYJ101V	RESISTOR	100Ω		
R0315	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0316	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0317	ERJ3GEYJ101V	RESISTOR	100Ω		
R0318	ERJ3GEYJ101V	RESISTOR	100Ω		
R0319	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0320	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0321	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0322	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0323	ERJ3GEYJ102V	RESISTOR	1kΩ		
R0324	EVUF2AF15B54	RESISTOR	50kΩ		
R0325	ERJ3GEYJ682V	RESISTOR	6.8kΩ		
R0328	ERJ3GEYJ101V	RESISTOR	100Ω		

MODEL	EB-HF500	NAME		Handsfree Unit	
REF	PART NUMBER	DESCRIPTION		GRID	REMARKS
R0330	ERJ3GEYJ824V	RESISTOR	820kΩ		
R0331	ERJ3GEYJ153V	RESISTOR	15kΩ		
R0332	ERJ3GEYJ563V	RESISTOR	56kΩ		
R0333	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0334	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0335	ERJ3GEYJ222V	RESISTOR	2.2kΩ		
R0336	ERJ3GEYJ563V	RESISTOR	56kΩ		
R0337	ERJ3GEYJ683V	RESISTOR	68kΩ		
R0338	ERJ3GEYJ333V	RESISTOR	33kΩ		
R0339	ERJ3GEYJ222V	RESISTOR	2.2kΩ		
R0340	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0341	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0345	ERJ3GEY0R00V	RESISTOR	0Ω		
R0346	ERJ3GEY0R00V	RESISTOR	0Ω		
R0348	ERJ3GEYJ473V	RESISTOR	47kΩ		
R0349	ERJ3GEYJ472V	RESISTOR	4.7kΩ		
R0351	ERJ3GEYJ105V	RESISTOR	1MΩ		
R0352	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0353	ERJ3GEYJ682V	RESISTOR	6.8kΩ		
R0354	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0355	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0356	ERJ3GEY0R00V	RESISTOR	0Ω		
R0357	ERJ3GEYJ104V	RESISTOR	100kΩ		
R0358	ERJ3GEYJ223V	RESISTOR	22kΩ		
R0359	ERJ3GEYJ682V	RESISTOR	6.8kΩ		
R0360	ERJ6GEYJ100V	RESISTOR	10Ω		
R0361	ERJ6GEYJ471V	RESISTOR	470Ω		

MODEL	EB-HF500	NAME		Handsfree Unit	
REF	PART NUMBER	DESCRIPTION		GRID	REMARKS
R0362	ERJ6GEYJ2R2V	RESISTOR	2.2Ω		
R0363	ERJ3GEYJ473V	RESISTOR	47kΩ		
R0364	ERJ3GEYJ223V	RESISTOR	22kΩ		
R0365	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0366	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0367	ERJ3GEYJ472V	RESISTOR	4.7kΩ		
R0369	ERJ3GEYJ102V	RESISTOR	1kΩ		
R0373	ERJ3GEYJ473V	RESISTOR	47kΩ		
R0374	ERJ3GEYJ473V	RESISTOR	47kΩ		
R0375	ERJ3GEYJ473V	RESISTOR	47kΩ		
R0376	ERJ3GEYJ473V	RESISTOR	47kΩ		
R0377	ERJ3GEYJ562V	RESISTOR	5.6kΩ		
R0378	ERJ3GEYJ103V	RESISTOR	10kΩ		
R0379	ERJ3GEYJ103V	RESISTOR	10kΩ		
U0101	YUPC494GSE2	IC			
U0102	YNJM3404AMT1	IC			
U0301	YNJM3404AMT1	IC			
U0302	YURHH0002	REGULATOR			
U0303	YURHH0002	REGULATOR			
U0304	YULCS0003	IC			
U0305	YULCS0003	IC			
U0306	YULCS0004	IC			
U0308	YTDA2003V	IC			
U0309	YNJM2072MTE1	IC			
U0310	YUPD74HC123G	IC			
U0311	YNJM2107FTE1	IC			

MODEL	EB-HF500	NAME	Handsfree Unit	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
U0312	YSC14S66FEL	ANALOGUE SWITCH		
U0313	YSC14S66FEL	ANALOGUE SWITCH		
U0314	YRN5VL45AATL	REGULATOR		
U0315	YNJM2107FTE1	IC		
W0001	WP70005AZ	POWER SUPPLY CABLE		
W0201	WC70109A	CURLY CORD		
W0202	WC70110A	INTERCONNECTING CABLE		
W0301	WC70152A	SPEAKER CABLE		
W0302	WG70003A	EXTERNAL MIC CABLE		
Y0301	CM30918MHZ	CRYSTAL		

10.4.2 Mechanical

MODEL	EB-HF500	NAME	Mechanical	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
M0401	5N70086A	HANDSFREE COVER		
M0402	6V10031A	SPEAKER NET		
M0403	4R8209B	SPEAKER PACKING		
M0404	1B70071A	SPEAKER BRACKET		
M0405	XTB256GFX	SCREW		
M0406	XTB256GFX	SCREW		
M0410	5M70076A	HANDSFREE CASE		
M0411	1BC5819A	PLATE		
M0412	7X70119A	HANDSFREE NAME PLATE		
M0413	XSB35FX	SCREW		
M0420	1C70128A	SHIELD CASE 1		
M0421	1C70129A	SHIELD CASE 2		
M0422	1E70008A	RADIATOR		
M0423	5G10500A	INSULATOR		
M0424	1M270900102	CLAMP		
M0425	5FJ5129AB	VOLUME KNOB		
M0426	XYN3J6FX	SCREW		
M0427	XTB2510GFX	SCREW		
M0428	XTB2510GFX	SCREW		
M0429	XTB256GFX	SCREW		
M0440	XYN3F30FN	SCREW		
M0441	5U70008B	TOP COVER		

10.4.3 Holder

MODEL	EB-HF500/KA500	NAME	Holder	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
M0501	5M70115A	HOLDER CASE		
M0502	FM6X6X12	MAGNET		
M0503	4Z70016A	HOOK SPRING		
M0504	5Y70066A	HOOK		
M0505	XTB256GFX	SCREW		
M0506	XTB256GFX	SCREW		
M0507	XTB256GFX	SCREW		
M0508	5U70049B	HOLDER CUSHION 1		
M0509	7D70164A	HOLDER NAME PLATE		
M0510	7D70120A	HOLDER CAUTION LABEL		

10.4.4 Microphone

MODEL	EB-HF500	NAME	Microphone	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
M0101	4G31674B	MIC HOLDER		
M0102	4G32105	MIC HOLDER		
M0103	4R13358	MIC CUSHION		
M0104	7C10096A	MIC NAME PLATE		
M0105	7C10096A	MIC NAME PLATE		
M0107	XTB2510AFN	SCREW		
MK0101	WM4108D	MICROPHONE		

10.4.5 Adjustable Angle Bracket 1

MODEL	EB-HF500	NAME	Adjustable Angle Bracket	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
M0701	3G24152B	BRACKET		
M0702	XVG4X8FZ	SCREW		
M0703	XWA4FXK	SPRING WASHER		
M0704	XWG4FXK	WASHER		
M0705	XVG4X8FZ	SCREW		
M0706	XWA4FXK	SPRING WASHER		
M0707	XWG4FXK	WASHER		
M0708	3G24157B	BRACKET		
M0709	XSB410FXK	SCREW		
M0710	XSB410FXK	SCREW		
M0711	XSB410FXK	SCREW		
M0712	XSB410FXK	SCREW		
M0713	XTB425RFXK	SCREW		
M0714	XTB425RFXK	SCREW		
M0715	XTB425RFXK	SCREW		
M0716	XTB425RFXK	SCREW		

10.4.6 Adjustable Angle Bracket 2

MODEL	EB-HF500	NAME	Adjustable Angle Bracket	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
M0701	3G24152B	BRACKET		
M0702	XVG4X8FZ	SCREW		
M0703	XWA4FXK	SPRING WASHER		
M0704	XWG4FXK	WASHER		
M0705	XVG4X8FZ	SCREW		
M0706	XWA4FXK	SPRING WASHER		
M0707	XWG4FXK	WASHER		
M0708	3G24157B	BRACKET		
M0709	XSB410FXK	SCREW		
M0710	XSB410FXK	SCREW		
M0711	XSB410FXK	SCREW		
M0712	XSB410FXK	SCREW		
M0713	XTB425RFXK	SCREW		
M0714	XTB425RFXK	SCREW		
M0715	XTB425RFXK	SCREW		
M0716	XTB425RFXK	SCREW		
M0718	XNG4AFXK	NUT		
M0719	XNG4AFXK	NUT		
M0720	XNG4AFXK	NUT		
M0721	XNG4AFXK	NUT		

10.4.7 Printed Material

MODEL	EB-G500	NAME	Printed Material	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
	ZD70746B	OPERATING INSTRUCTIONS		

10.5 Dual Charger

The Dual Charger is not a serviceable item.

10.6 DC Adaptor

The DC Adaptor is not a serviceable item.

10.7 PCMCIA Data Interface Card

MODEL	EB-PA400	NAME	PCMCIA Data Interface	
REF	**PART NUMBER**	**DESCRIPTION**	**GRID**	**REMARKS**
-	WW70067A	INTERFACE CABLE		For card with 2 peice cover
-	WW700674B	INTERFACE CABE		For card with single piece wraparound cover