

LEVEL 3 SERVICE

by Toko

Trium

GALAXY
ASTRAL
GEO
GEO WAP
(DUAL BAND)

R E V I S I O N S	V E R S I O N S	A : Création P. LE SIGNOR	05/99	Rédigé par	Verifié par	Approuvé par
		B : Modif MTS 2.0 english	06/99	<i>Written by</i>	<i>Checked by</i>	<i>Approved by</i>
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		D : Modif Testmode software	02/00			
		E : Ajout GEO WAP	04/00			

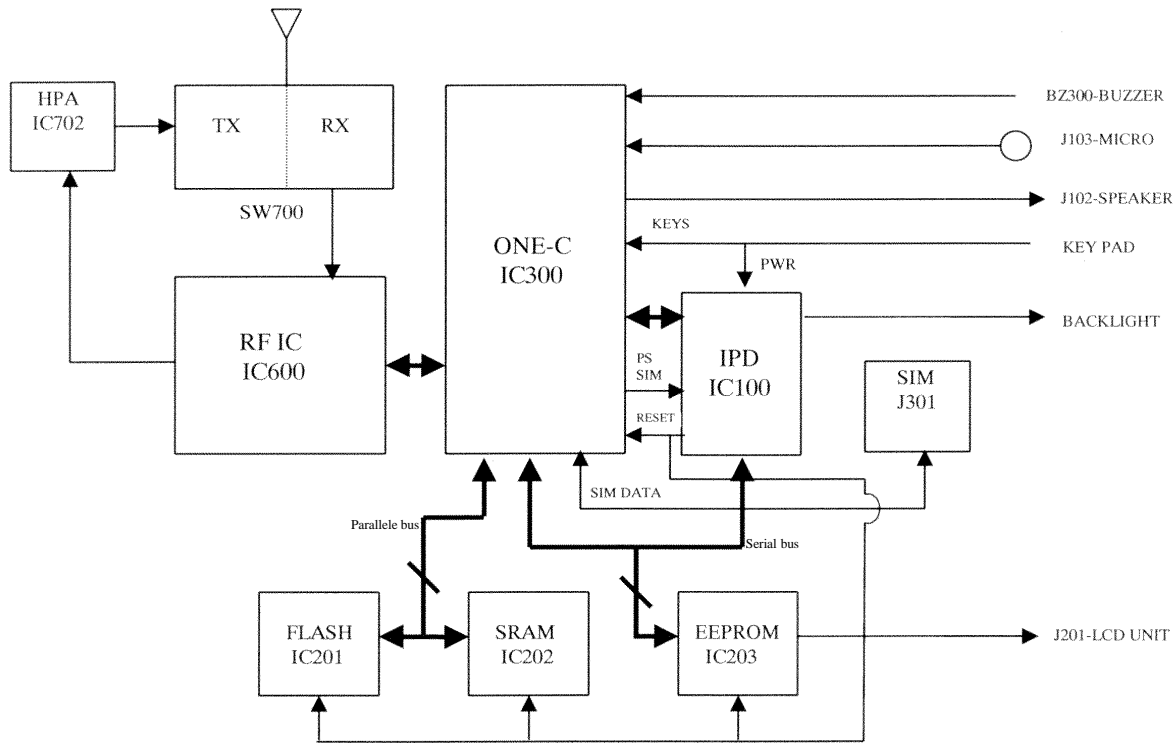
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1 Block Diagram

1.1 Schematic



1.2 Description of Block Diagram.

1.2.1 IC300 One-C (VWS22100).

IC300 includes in one same chipset Base Band part, DSP, CPU, A/D, D/A converters, TDMA framecounters, a TX GMSK modulator, a TX power ramping circuit, RX filters. **IC300** carries out the management of the battery charging, and of the audio part. It interfaces with the radio frequency part.

1.2.2 IC100 IPD (Rohm BH6070KU).

IC100 provides the different powers supplies to RFBB board : 2.8RTC, PSTCXO, 2.8VANA, PSSYN, 2.8VAUD, VBAT, 3.6VB, 2.8VD, 5VSIM. The management of the battery charging is carried out by internal circuit of **IC100**.

1.2.3 IC600 RF-IC (Hitachi HD155121FEB).

Transceiver IC for E-GSM and DCS Dual Band cellular systems.

1.2.4 Memory system.

Location	Type	Data	Size	
			Galaxy Astral Geo	Geo WAP
IC201	Flash ROM	CPU program code	1 MB	2MB
IC202	RAM	Data for CPU work	128 kB	128 kB
IC203	EEPROM	Data user, RF adj.	64 kB	128 kB

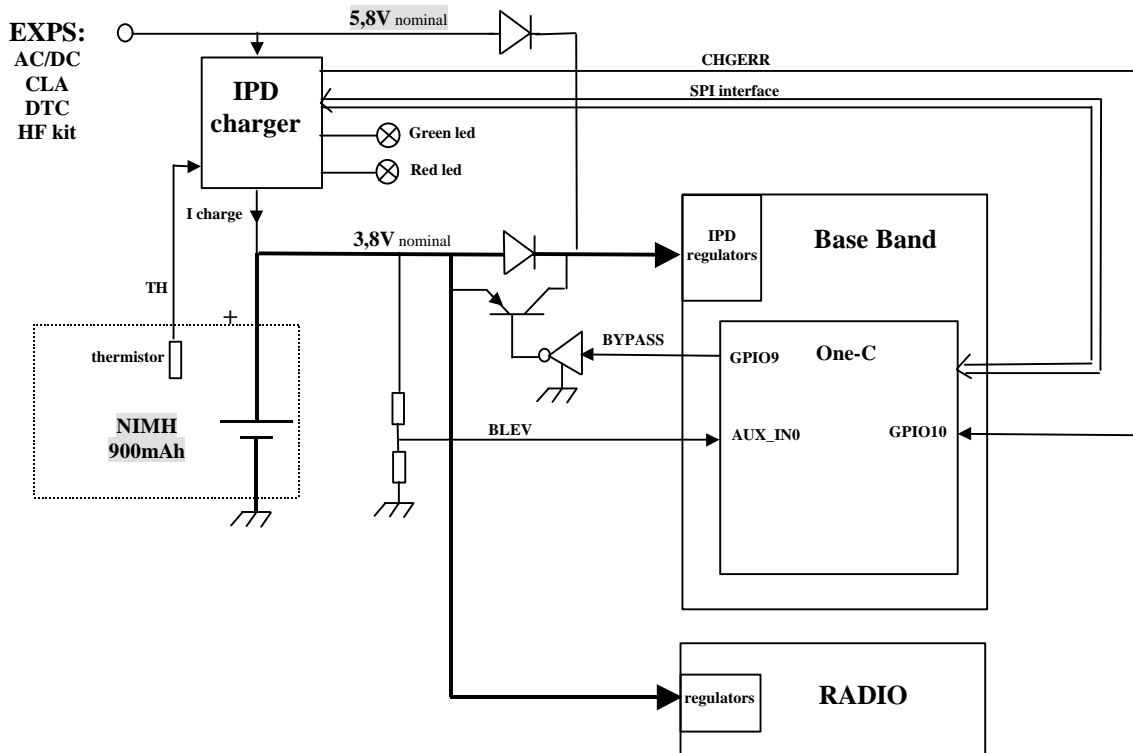
1.2.5 System Clock.

The system clock for the telephone is 13 MHz TCXO, generated by X600. It is processed in IC300 to provide serial clock for LCD, EEPROM, and IC100. The clock is buffered in IC300 One-C, and then fed to IC100 IPD as "CPU CLK". It is available on pin 56 of IC100.

During Stand-By mode, the system clock is not managed from X600 TCXO but from X300 ("slow clock" at 32.768 kHz).

2. Battery management.

2.1 Block Diagram.



2.2 Description.

The battery is NiMH 900mAh, 3.8 V nominal for Galaxy, Astral and Geo

External power supply for charging (EXPS) comes from the DC jack at the bottom side of the mobile (AC/DC, CLA, DTC or H/F Kit). This power supply is 5.8 V nominal. Battery presence and battery type information are accessible in CHGM IPD register. If a Li-ion battery is detect, the software considers that the battery is absent.

The battery temperature information (TH) is given by thresholds in IPD CHGM register. This information are used only for charge control.

The battery level information is accessible in an A/D converter in One-C. It is also available in CHGM IPD register , these information are given by range only for range control.

External power supply (EXPS) presence information are accessible in CHGD IPD register. As described in the drawing above, the power supply for Base Band (IC300) comes from EXPS when it is present because EXPS level (5.8 V) is always greater than battery voltage. On the contrary, power supply for radio always comes from the battery.

The serial diode between battery and One-C (IC300) can be bypassed by software to reduce voltage headroom. Bypass is Activated when battery is less than 3.45 V.

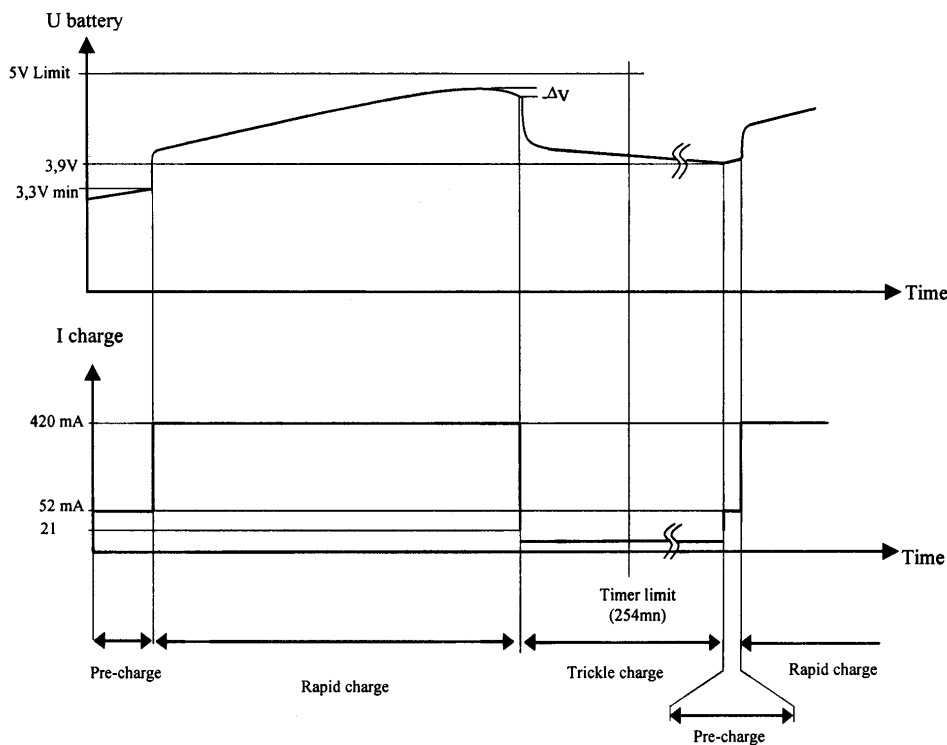
2.3 Charging process.

Charging process follows these successive phases :

Pre charge : This phase is mandatory before the rapid charge to verify that battery operation is normal (normal battery voltage and temperature). Charge current during this phase is 52 mA. If the battery voltage is higher than 3.3 Volts, the S/W launch IPD charger in rapid charge except if the temperature is not between 0°C and 55°C.

2) **Rapid charge** : Charge current during this phase is 420mA. If battery temperature becomes abnormal IPD charger start at low current charge (21 mA), while temperature comes back normal (between 0°C and +55°C) during 15 mn. Full charge detection ends Rapid charge. Full charge is detected by S/W when charge current decreases under 50 mA (full charge convergence current).

3) **Trickle mode** : This phase is necessary to complete the charge and to avoid battery auto discharge. Charge current during this phase is 21 mA. Trickle charge is automatically stopped after 24 hours duration.



2.4 Main characteristics.

The phone transmits only if the battery is attached to it, in any configuration of power supply. When the phone is connected to H/F adapter, DTC, AC/DC, or CLA, the battery charging circuit operates. Battery voltage (+3.8 V) is applied via D118 or from TESTPS (J103 pin1) through D124 when using Hand Free.

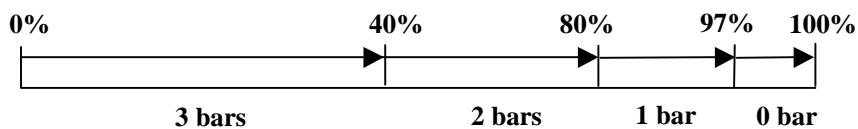
The main power supply is fed to the phone either from the attached battery via the connector J101, or from accessories :

- H/F adapter,
- Desk Top Charger DTC,
- AC/DC adapter and CLA via the external connector J103.

R120 and R121 give an internal voltage reference. If the battery voltage VBAT falls down, then BYPASS shorts out the diode D118 through TR103 to reduce voltage drop.

2.5 Autonomy Control.

The battery energy is displayed on the LCD by a 3 bars "battery icon" . Voltage thresholds for each bars are calculated to have this autonomy time share out:

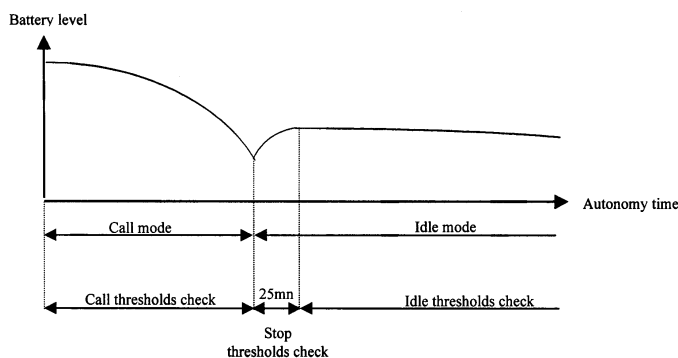


A 3 times 33% time shares out is not possible because of the very stable battery level between 20% to 50% autonomy time. In addition with these bars, a " low battery alarm" is displayed between "1 bar" and the mobile off.

All these thresholds are programmed in EEprom by the factory and given in following thresholds table.

	Idle Mode	Call Mode
Initial thresholds	Battery level	Battery level
3 bars → 2 bars	3.86V	3.77V
2 bars → 1 bars	3.71V	3.60V
1 bar → low battery alarm	3.57V	3.40V
Power off	3.46V	3.30V

Thresholds are different according to the mode, Idle mode or Call mode. Idle mode threshold are checked by software 25 min after the end of the call.



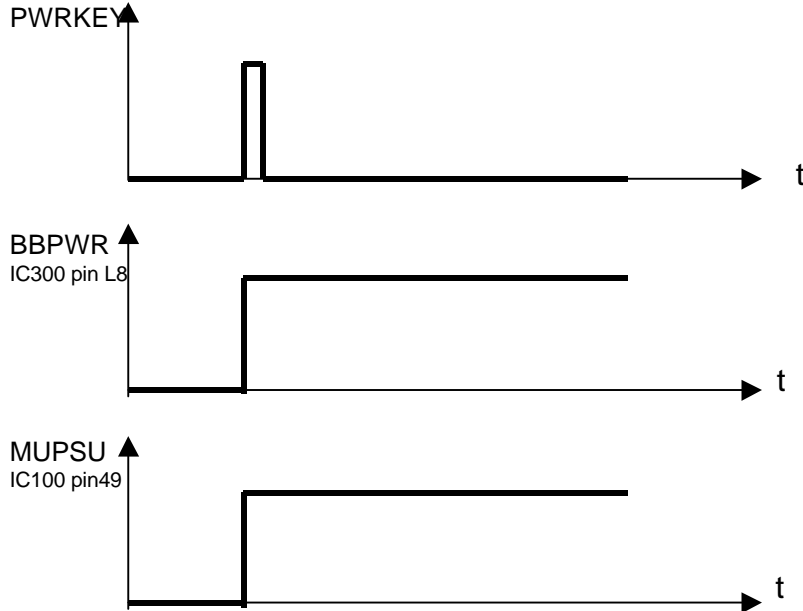
When battery voltage is less than the threshold given in the table above, BAT_EMPTY is true.

The mobile is then powered off by Power Control.

2.6 Power on.

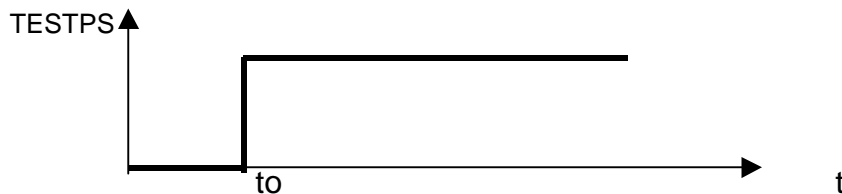
To switch on the mobile, three possibilities exist :

With a battery :



During these mode TESTPS and EXPS = low voltage level.
 A high voltage level on MUPSU implies regulators REG 4, REG 5, REG 6, REG 7 are active.

- With Interface and I/O connector (Testmode M.T.S) :

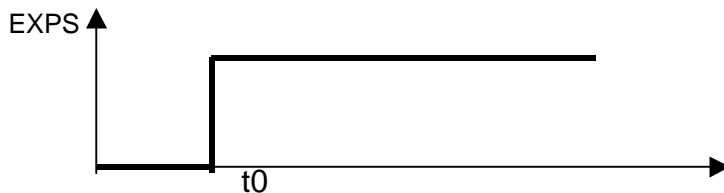


t0= connexion I/O cable

When you connect I/O connector, MUPSU and BBPWR signals have the same waveform at TESTPS.

During this condition PWRKEY and EXPS = low voltage level.

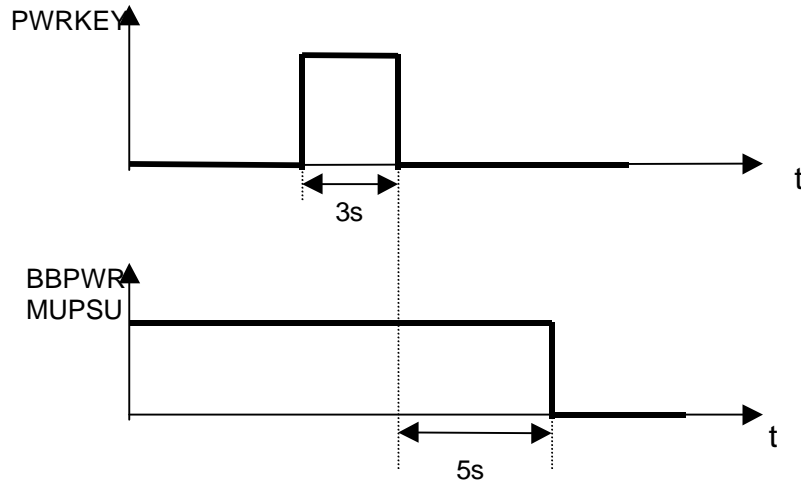
- With AC/DC Charger, Cigar Light Adapter and DeskTop Charger.



t0= connection by external power.

When an accessory is connect, MUPSU and BBPWR signals have the same waveform that TESTPS.
 During this condition PWRKEY and TESTPS = low voltage level

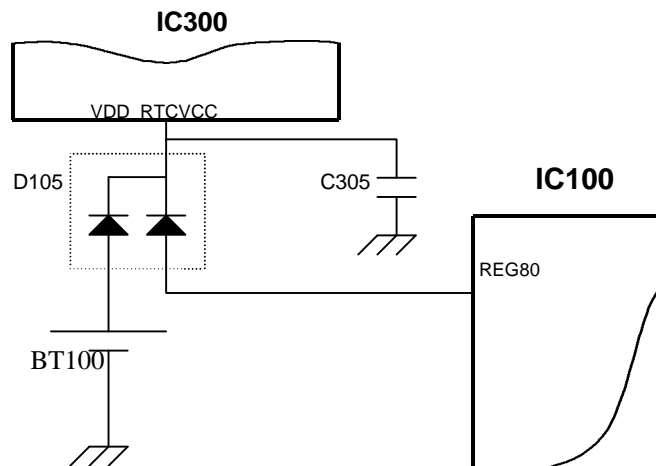
2.7 Power off.



2.8 Real Time Clock (Geo and Geo WAP)

Real time clock lives in ONE C (IC300) and energy is provided :

- By IC100 (pin 48) via D105, when the main battery is connected.
- By BT100 (back up battery) via D105, when the main battery is empty or not connected



3. RF Section.

3.1 Frequency range.

3.1.1 E-GSM Frequency :

124 Channels. $1 \leq N \leq 124$ and 48 Channels. $975 \leq N \leq 1023$

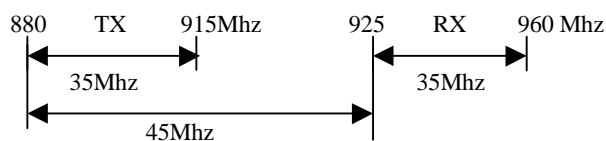
Receive frequency : 925.2~959.8 MHz

RX frequency = $935.0 + 0.2 * N$ for ($1 \leq N \leq 124$) and $935.0 + 0.2 * (N - 1024)$ for ($975 \leq N \leq 1023$)

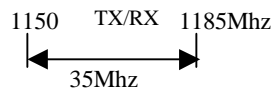
Transmit frequency : 880.2~914.8 MHz

TX frequency = $890.0 + 0.2 * N$ for ($1 \leq N \leq 124$) and $890.0 + 0.2 * N$ for ($975 \leq N \leq 1023$)

E-GSM BAND



RF-PLL E-GSM BAND



RX 1st IF is 225MHz

RX 2nd IF is 45MHz

3.1.2 DCS Frequency :

374 Channels. $512 \leq N \leq 885$

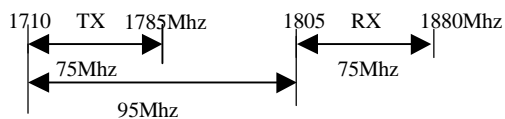
Receive frequency : 1805.2~1879.2 MHz

RX frequency = $1805.2 + 0.2 * (N - 512)$.

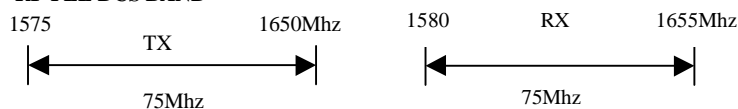
Transmit frequency 1710.2~1784.8 MHz

TX frequency = $1710.2 + 0.2 * (N - 512)$.

DCS BAND



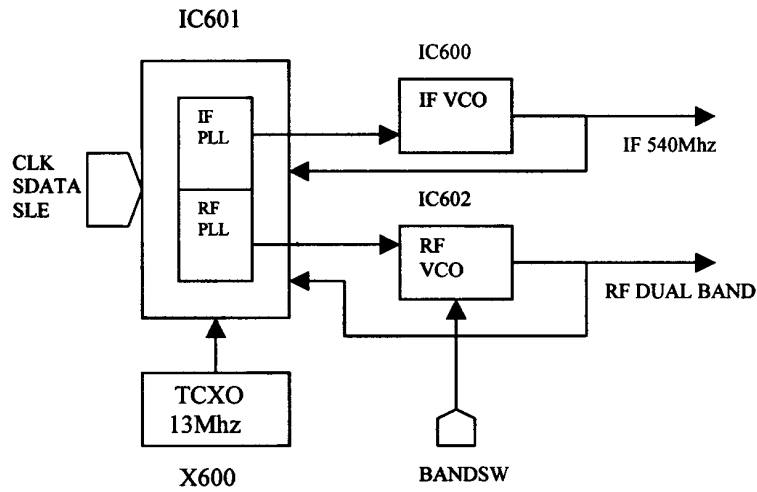
RF-PLL DCS BAND



RX 1st IF is 225MHz

RX 2nd IF is 45MHz

3.2 Synthetiser Circuit Description.



Switching between GSM and DCS band is performed by programming the LMX2331LTM (IC601) with the serial data in BBE from CPU. The serial data lines are connected directly to the serial input pin of the PLL IC (IC 601), and are used to program the 2 PLLs of the IC.

The LMX2331LTM has two PLLs : one is variable frequency (RF PLL), and the other is fixed frequency (IF PLL).

RF-PLL : variable frequency PLL for RX and TX for both GSM and DCS bands.

- Oscillation Frequency Ranges :
- For E-GSM Band / 1150 - 1185MHz
 - For DCS TX / 1575 - 1650MHz
 - For DCS RX / 1580 - 1655MHz

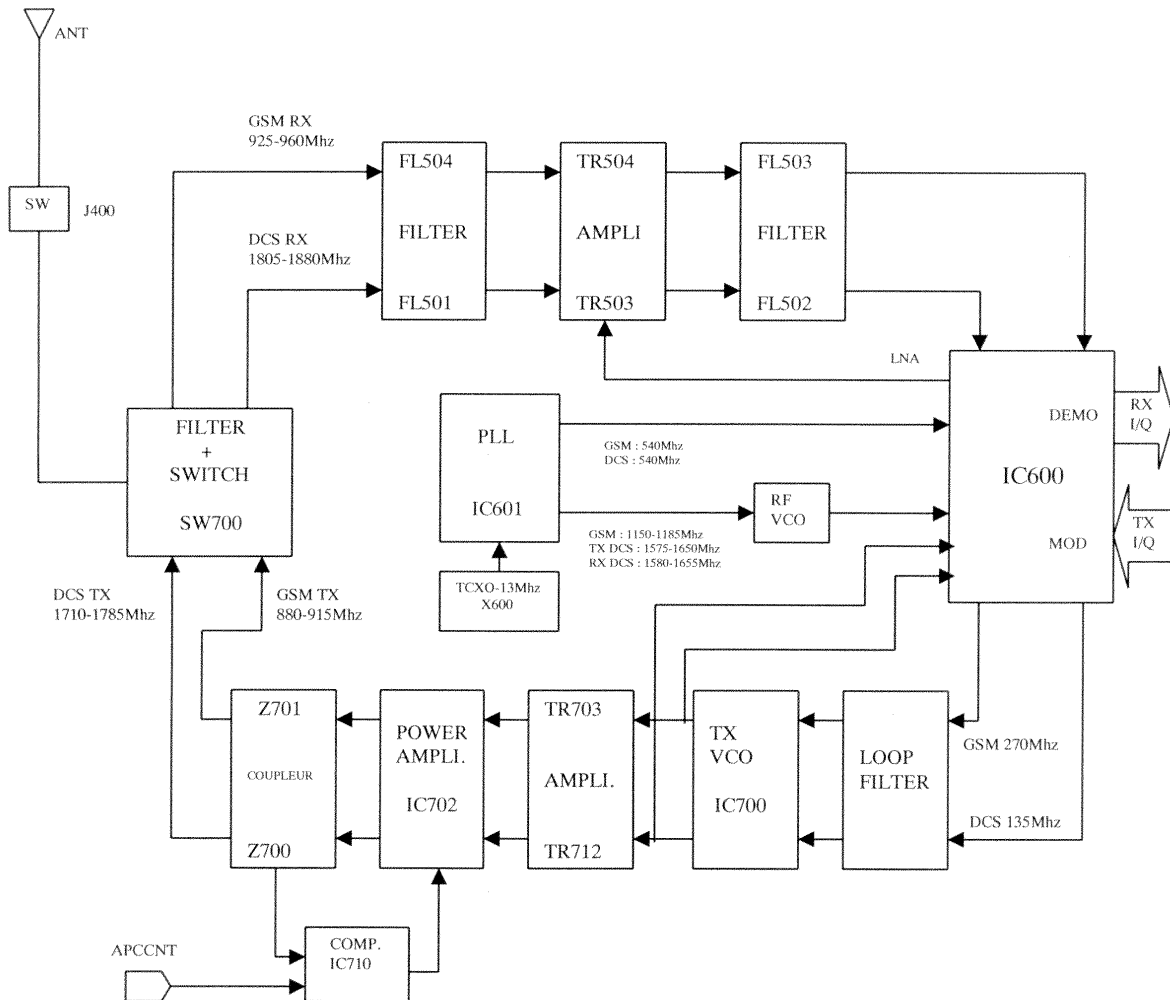
IF-PLL : Fixed frequency 540 MHz for IF of TX and RX for both E-GSM and DCS bands.

The signal BANDSW controls the E-GSM/DCS Band switching.

BANDSW	RF BAND
0	E-GSM
1	DCS

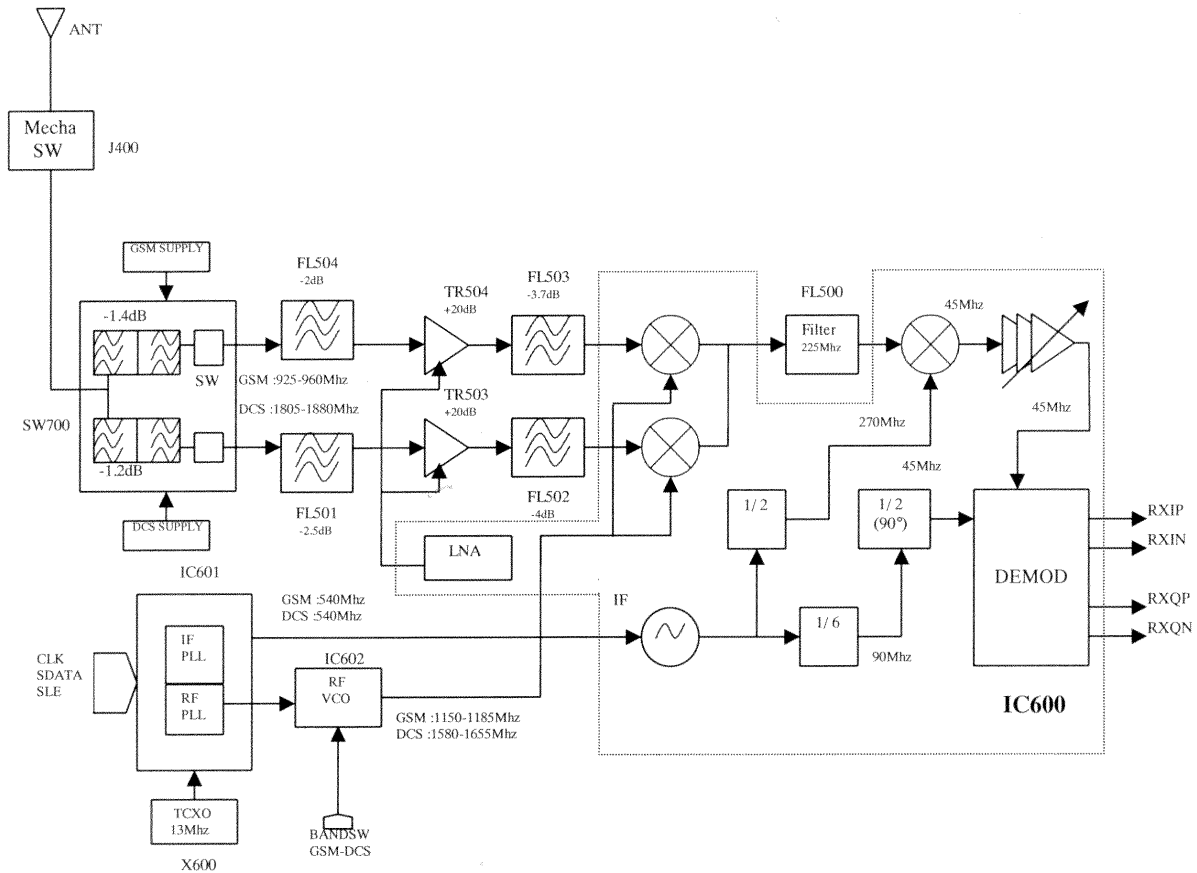
In order to achieve the channel spacing, the reference frequency is set to 200 kHz.

3.3 RF Block Diagram.



3.4 Reception

3.4.1 Reception Block Diagram.



3.4.2 Description of Reception Block Diagram

E-GSM band (925-960MHz).

Incoming RF signal from aerial is filtered and switched to the RX GSM path through SW700 . The signal is filtered by FL504 , before to be amplified by TR504 , and is further filtered by FL503. Then, the signal input to RF-IC (IC600) in a first mixer stage. The RF signal (925-960 MHz) is mixed with the RF-PLL Frequency (1150-1185 MHz) coming from IC601 (PLL) via IC602 (RF-VCO). For the channel 1, the output signal of the mixer is 225 MHz (1150 MHz-925 MHz =225 MHz), and is filtered by FL500.

DSC band (1805-1880MHz).

Incoming RF signal from aerial is filtered and is switched to the RX DCS path through SW700 . The signal is filtered by FL501 , before to be amplified by TR503 , and is further filtered by FL502. Then, the signal input to RF-IC (IC600) in a first mixer stage. The RF signal (1805-1880 MHz) is mixed with the RF-PLL Frequency (1580-1655 MHz) coming from IC601 (PLL) via IC602 (RF-VCO). For the channel 1, the output signal of the mixer is 225 MHz (1805 MHz-1575 MHz =225 MHz), and is filtered by FL500.

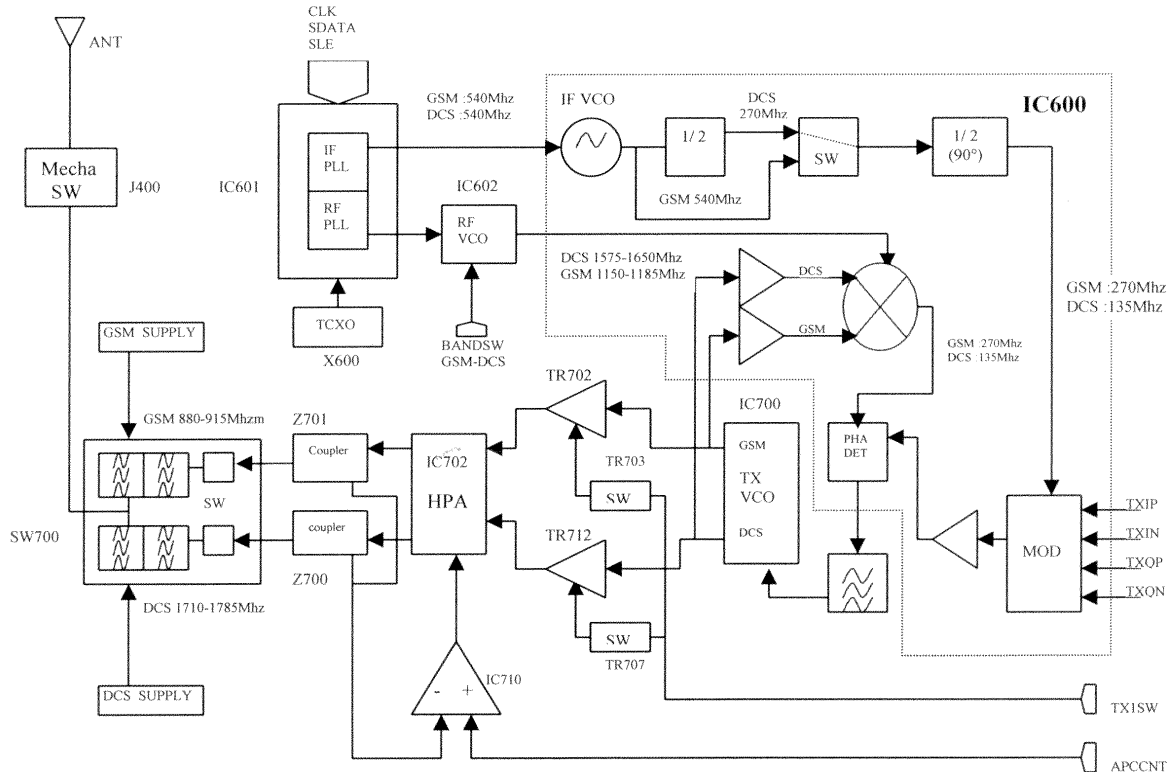
For the E-GSM and DCS bands.

The first intermediate frequency is 225 MHz, these frequency is filtered by FL 500 before input to the second mixer stage. The first IF (225 MHz) is mixed with the 270 MHz (Fixed Frequency PLL 540 MHz/2=270 MHz), to a second IF : 45 MHz. The 2nd IF is demodulated to Base Band (IC300) I/Q phase demodulated signals. RF-IC (IC600) provides automatic gain control.

IC600 includes a quadrature demodulator using a divide by four technique for 90° phase splitter. The 2nd IF signal (45 MHz) is demodulated to I, Q balanced signals for BBE.

3.5 Transmission.

3.5.1 Transmission Block Diagram.



3.5.2 Description of Transmission Block Diagram.

The direct and phase shifted signals are then fed to I and Q modulators inside the IC600. I and Q data components are fed into the IC600. The output from the two modulators is summed and fed out of pin 11. The GMSK signal leaves the modulator of IC600, and is amplified also inside IC600.

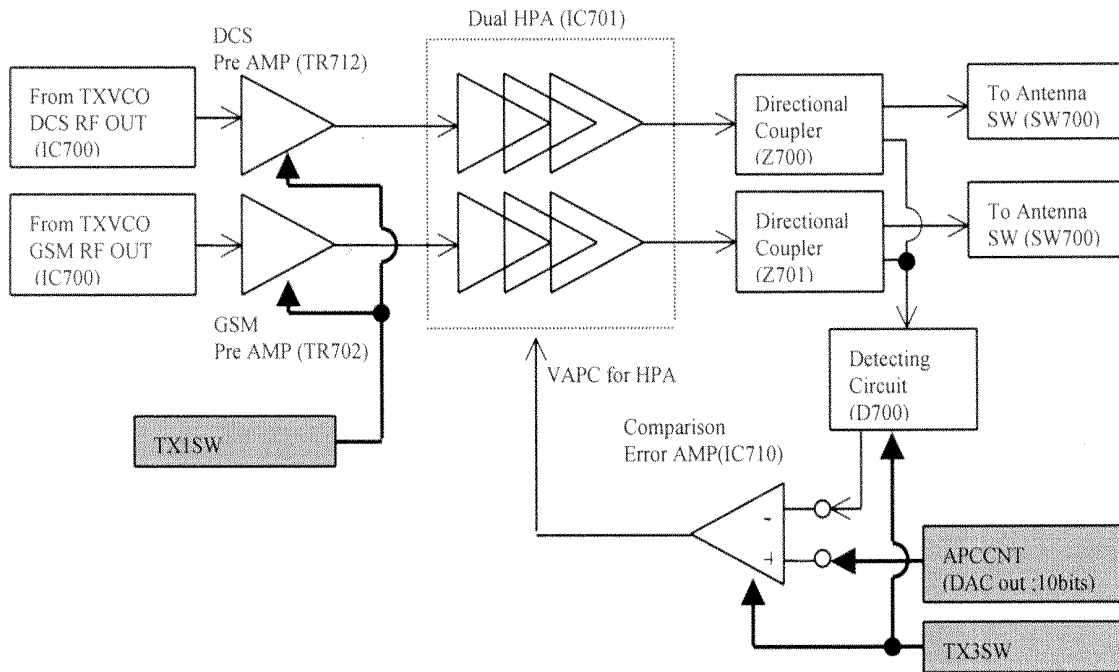
E-GSM Band (880-915MHz).

A phase locked loop is created around the TXVCO IC700. The output is fed into IC600 and converted to 270 MHz (135MHz on DCS) by mixing with RFVCO at 1150-1185 MHz (1575 – 1650 MHz DCS). This 270 MHz signal is compared with the 270MHz signal from the modulators, and the error signal is used to control the TXVCO. Note that the error signal on TP700 will have a DC component to control frequency, and an AC component at approx 270 kHz to control phase changes. Then the signal is filtered, amplified by TR702, and further filtered before to input to the power amplifier (IC702). From the PA, the output goes through coupler Z701, is switched to the TX path and is filtered by SW700. The signal then goes up to the antenna.

DCS Band (1710-1785MHz).

A phase locked loop is created around the TXVCO IC700. The output is fed into IC600 and converted to 135 MHz (270 MHz on GSM) by mixing with RFVCO at 1575 – 1650 MHz. This 135 MHz signal is compared with the 135MHz signal from the modulators, and the error signal is used to control the TXVCO. Note that the error signal on TP700 will have a DC component to control frequency, and an AC component at approx 270 kHz to control phase changes. Then the signal is filtered, amplified by TR712, and further filtered before to input to the power amplifier (IC702). From the PA, the output goes through coupler Z700, is switched to the TX path and is filtered by SW700. The signal then goes up to the antenna.

3.5.3 Power Control.



APCCNT is the reference waveform voltage for a TX burst (provided by IC300).

TX1SW : This control signal is used to switch on/off the preamplifiers. (TR702 and TR712)
 H.Level : Pre Amp is active.
 L.Level : Pre Amp is not active.

TX3SW :This control signal is used to switch on/off the operational amplifier of the APC Loop (IC710).
 H. Level : Detecting Circuit and comparison Error AMP is active.
 L. Level : Detecting Circuit and comparison Error AMP is not active.

RF signal is rectified by voltage doubler Schottky barrier diodes D700. This level is compared with APCCNT. The result of the comparison is used to vary the gain of the HPA IC702.

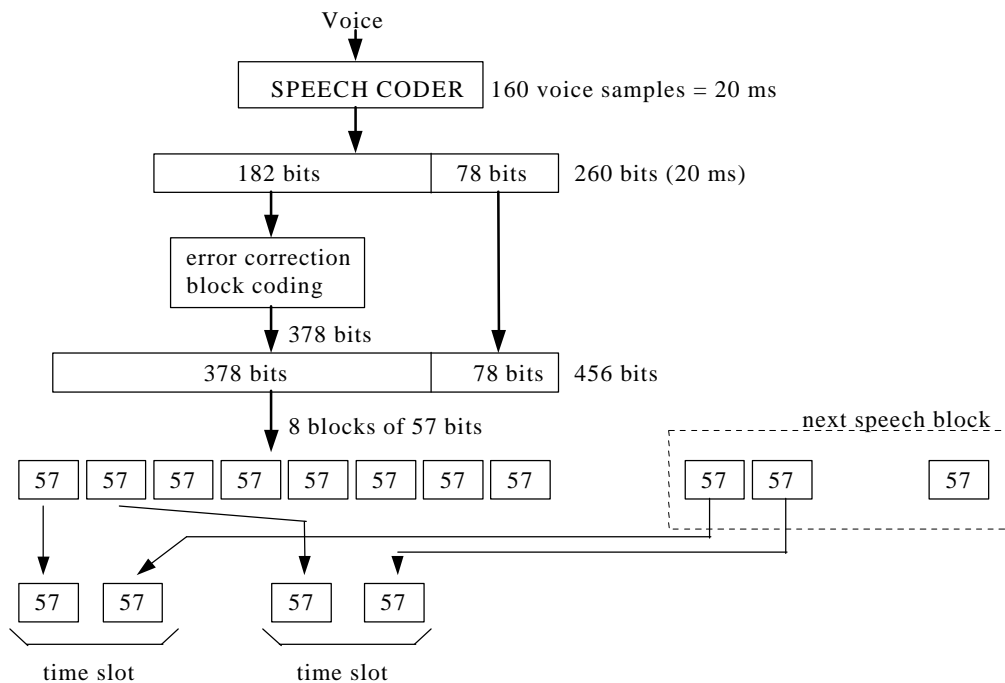
The APCCNT signal input from the base band circuit (IC300) contains the burst shaping information and the power level to be set among the 15 power levels defined by the GSM, or the 16 power levels defined by the DCS specifications. It controls the output power level by a feed-back loop (Automatic Power Control).

E-GSM	DCS
PCL 5 → +33 dBm	PCL 0 → +30 dBm
PCL 19 → +5 dBm	PCL15 → +0 dBm

4. Speech coder.

Audio is sampled at 8 kHz rate, and divided into 20 ms blocks of 160 samples per block. Each 20 ms block is characterised by 260 bits i.e. 13 kbits/sec. The resulting signal is processed by a regular pulse excitation - long term predictor (RPE - LTP) codec. This yields a digital representation of vocal chord vibrations, together with the filter characteristics which must be applied to them to make voice sounds.

The most significant 182 bits will go through error correction and become 378 bits. The less critical group of 78 bits will not go through error correction and will just be summed with the 378 bits which will yield 456 bits.



These 456 bits are then separated in 8 blocks of 57 data bits.

These blocks are interleaved with adjacent blocks to guard against burst errors and broken up into blocks of 114 bits for transmission. This block of 114 bits are the data bits of the timeslot.

Timing data is added, and the resulting bit stream is fed to the Gaussian Minimum Shift Keying (GMSK) modulator, where the bits are taken two at a time and used to smoothly change the phase of an RF carrier according to bit combination.

4.1 Full rate / Half rate / Enhanced full rate.

The data rate of 13 kbit/sec (**full rate**) is considerably lower than for direct speech digitising as in PCM. Now more advanced voice coders cut this to 5.6 kbit/sec (**half rate coding**).

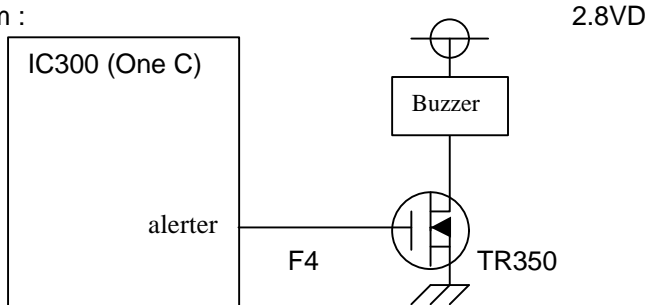
The **enhanced full rate**, is just a full rate with a different speech coder which improves the transmission quality.

5. Analogue Audio.

The audio part is managed by the One-C circuit (IC300).

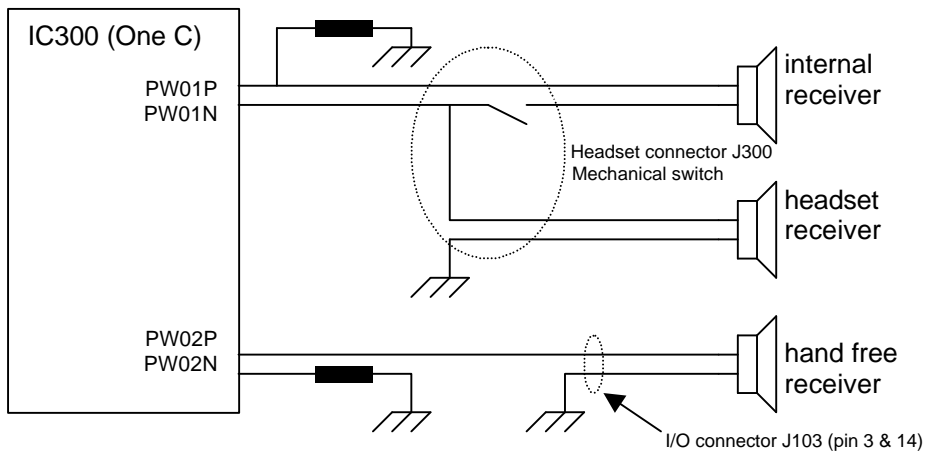
5.1 Buzzer.

Diagram :



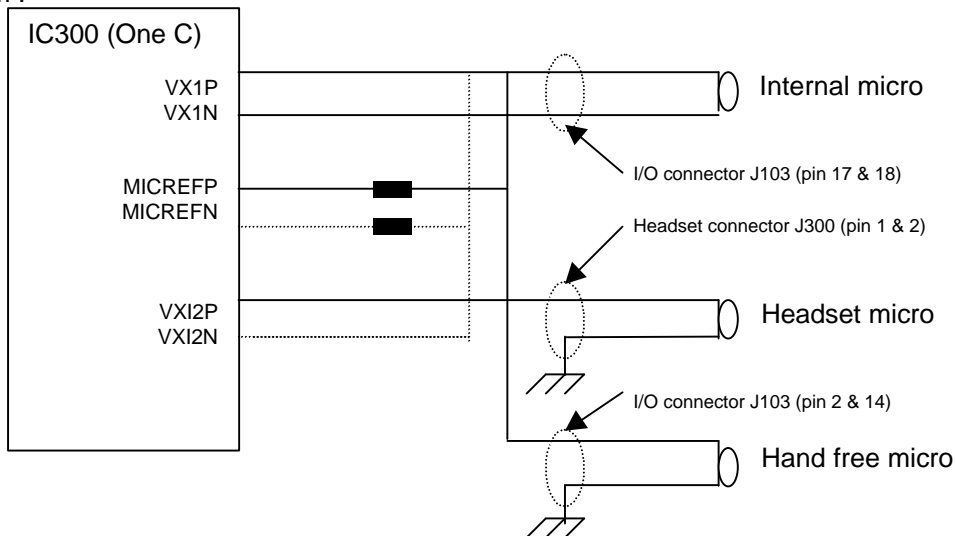
5.2 Speaker (RX audio).

Diagram :



5.3 Micro (TX audio).

Diagram :



When Handfree Kit is used there is a high level on HFDETL (J103 pin 5).

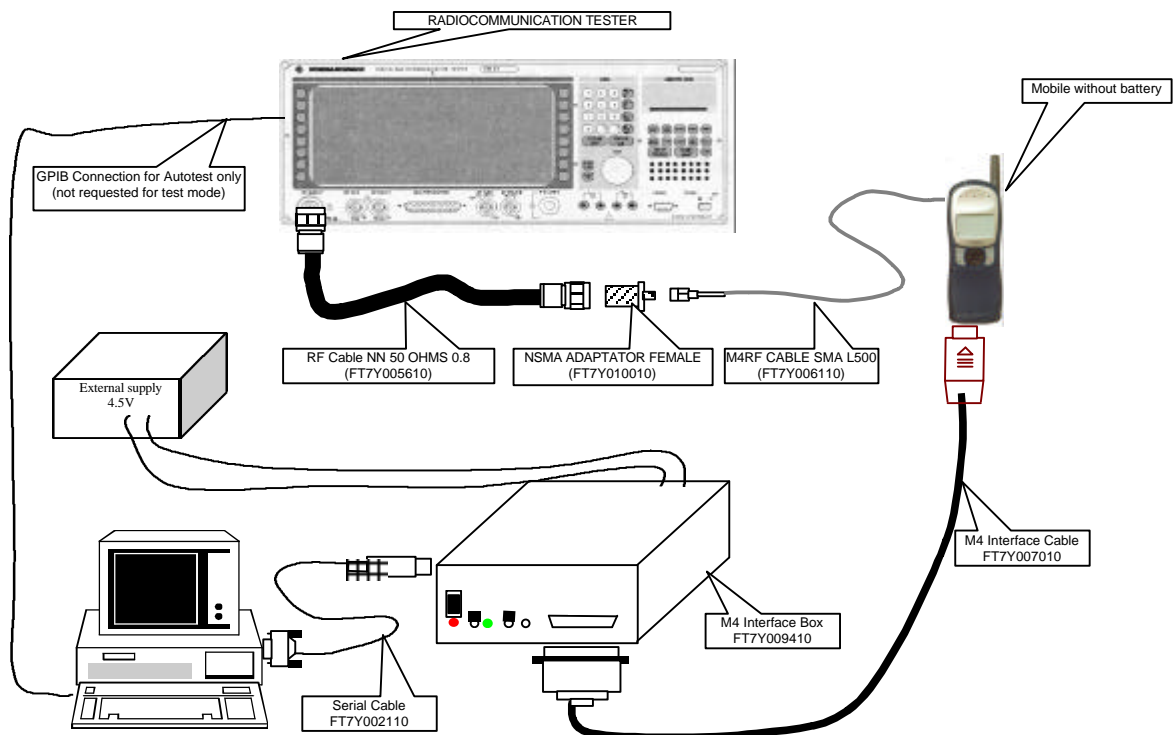
6. Testmode Software.

For M4 family test mode is not directly possible from the mobile indeed relevant software is available on PC only.

- Basic test mode functions (delete data user, print labels, download of settings) are available in MStools software (see level 2 service manual),
- Download of mobile software is available with IPLTrium software (see level 2 service manual).
- More advanced testmode functions to test the mobile are available in MTS software. This software can be used only with a runtime engine TEST STAND.

When making measurement on the board itself, it is possible to power the board from the M4 interface box.

6.1 Equipment installation



The test mode is used to control or adjust mobile parameters.
You must have the following requirements :

- Radio-communication tester
- M4 RF cable SMA L500
- M4 Interface cable
- M4 Interface Box
- Serial Cable
- Computer under Windows 95 (PII 350 MHz 64 Mb recommended)

If you want to use autotest function which is included in MTS, then your Radio-communication tester must be a CMD55 (with firmware 3.6 and GPIB interface) and your computer must have GPIB interface. The result of autotest (measurement values) is displayed as HTML file.

6.2 Software (MTS) installation

This part describes how to install the different components of MTS depending of the functions of MTS you want to use.

6.2.1 Simple Setup :

If you want to have only the test mode functions (control and adjust RF parameters), follow this procedure:

- Launch Setup.exe on MTS CD ROM root.
- Select the **Custom** Setup Type in Setup Type selection window and click on
- Select the component as follow :

Next >

- | | |
|-------------------------------------|-------------------|
| <input checked="" type="checkbox"/> | MTS Application |
| <input checked="" type="checkbox"/> | TestStand Engine |
| <input type="checkbox"/> | GPIB Software |
| <input type="checkbox"/> | NI-VISA Software |
| <input type="checkbox"/> | Internet Explorer |

Then continue the setup program until Reboot information window and reboot.

MTS after sale service is now available in  Start,  Program,  MTS After Sale Service

6.2.2 Complete Setup :

If you want to have all the function of MTS (control and adjust the RF parameters, execute and parameter the autotests), follow this procedure :

- Launch Setup.exe on MTS CD ROM root.
- Select the **Typical** Setup Type in Setup Type selection window and click on
- Then continue the setup program until Reboot information window and reboot.

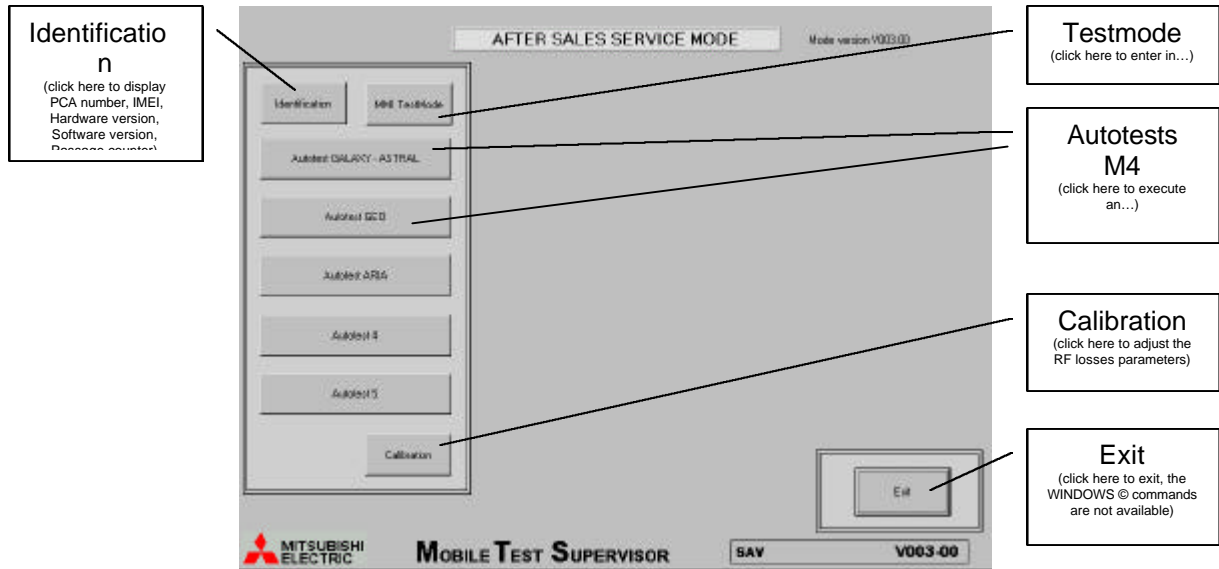
Next >

MTS after sale service is now available in  Start,  Program,  MTS After Sale Service

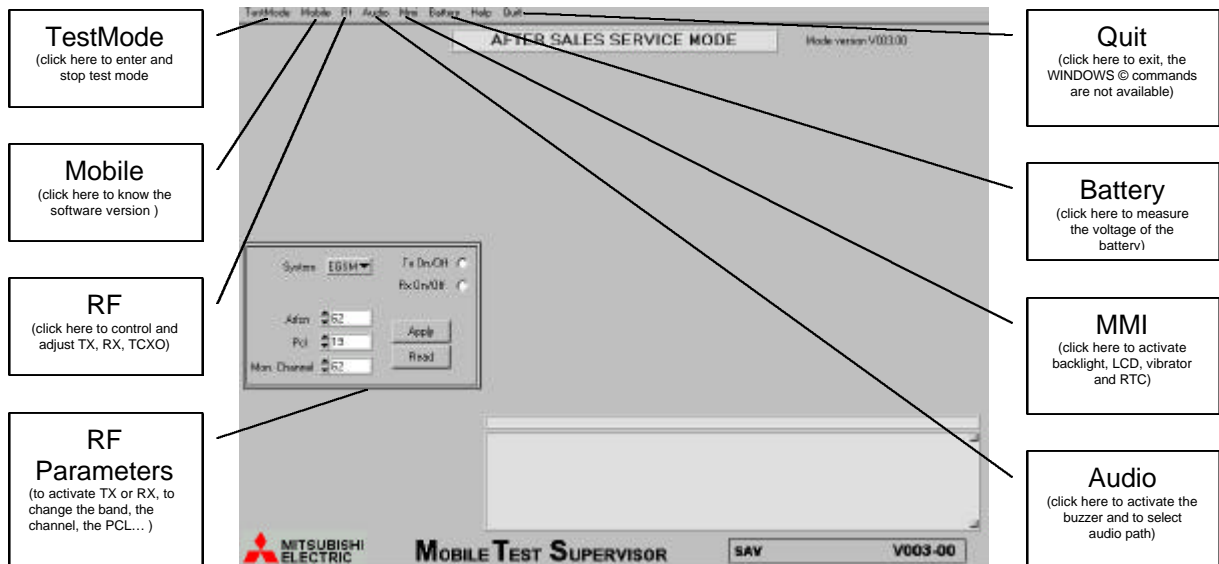
Before you launch an autotest, you must unvalid the step : **4301 DIO initialisation**
For that you have to turn the **Execution mode** switch on **run selected step** in the autotest page.

6.3 Software (MTS) description

When you launch MTS from start menu you the main screen is displayed :



6.3.1 MMI Testmode interface : description of functions

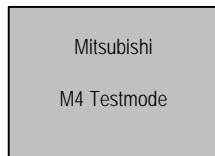


How to enter in test mode ?

The mobile can be turned in test mode from two different ways :

- Using test mode code (hold the * and enter 5472) and PC cable S1&D (FK8L010910) or
- Using the M4 interface box (FT7Y009410) and M4 interface cable (FT7Y007010)

When the mobile displays :



You can enter in Testmode, for that, choose **Enter** in **Testmode** menu as follow.

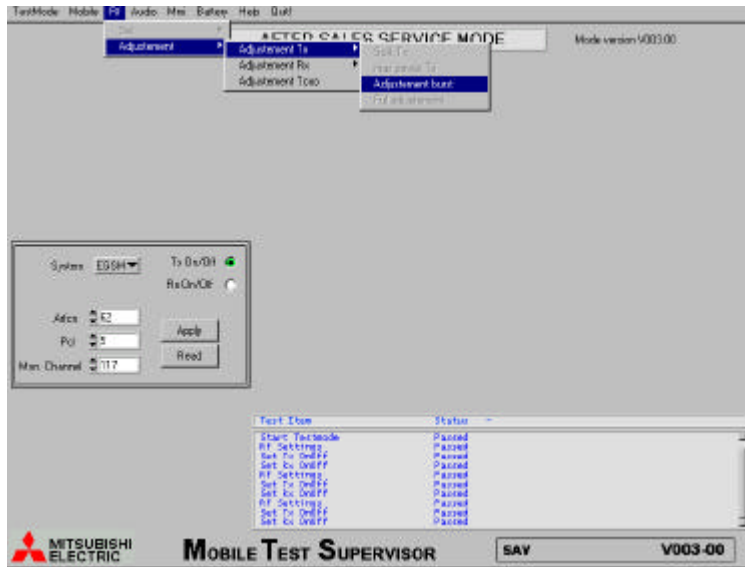


When the communication is established between mobile and computer the information window displays :

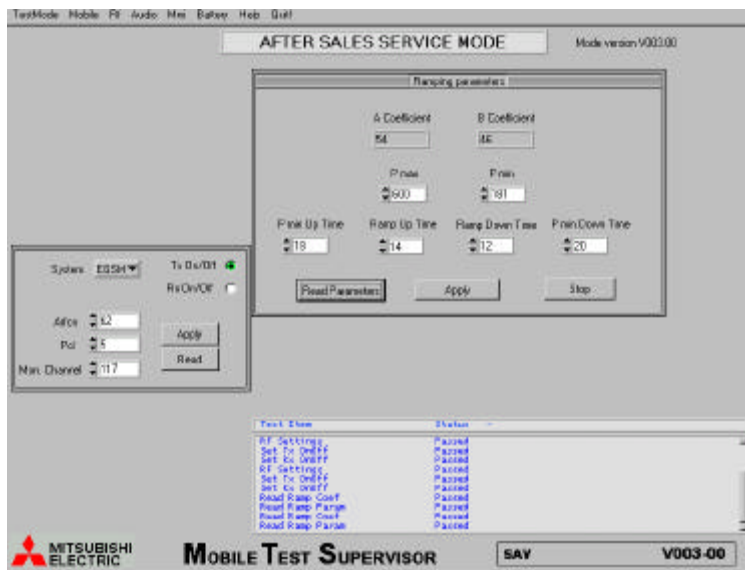


Power adjustment :

To enter in Power adjustments, choose **RF** menu, **Adjustment**, **Adjustment TX**, **Adjustment burst** as follow :

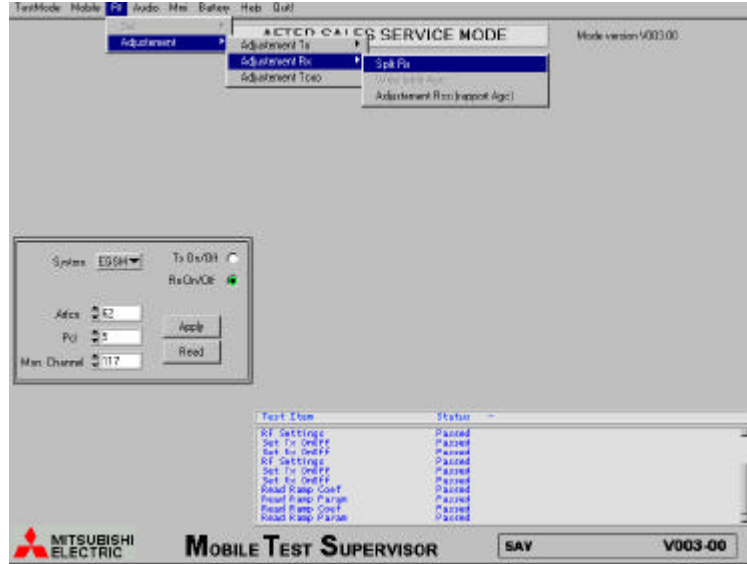


Then, the Ramping parameters Window is displayed as follow :



To adjust RSSI (if RX level is not good, for example), you have to process to different steps :
RX SPLIT and **RSSI ADJUSTMENT**

- For RX Split we choose :
RF menu, Adjustment, Adjustment RX, Split RX as follow :



Then we fix RX split at the right value :
 For the E-GSM band the number of sub-bands is 1 (no split)
 For the DCS band the number of sub-bands is 3
 We split the DCS band as follow :

L range : 512 to 539
 M range : 540 to 850
 H range : 851 to 885

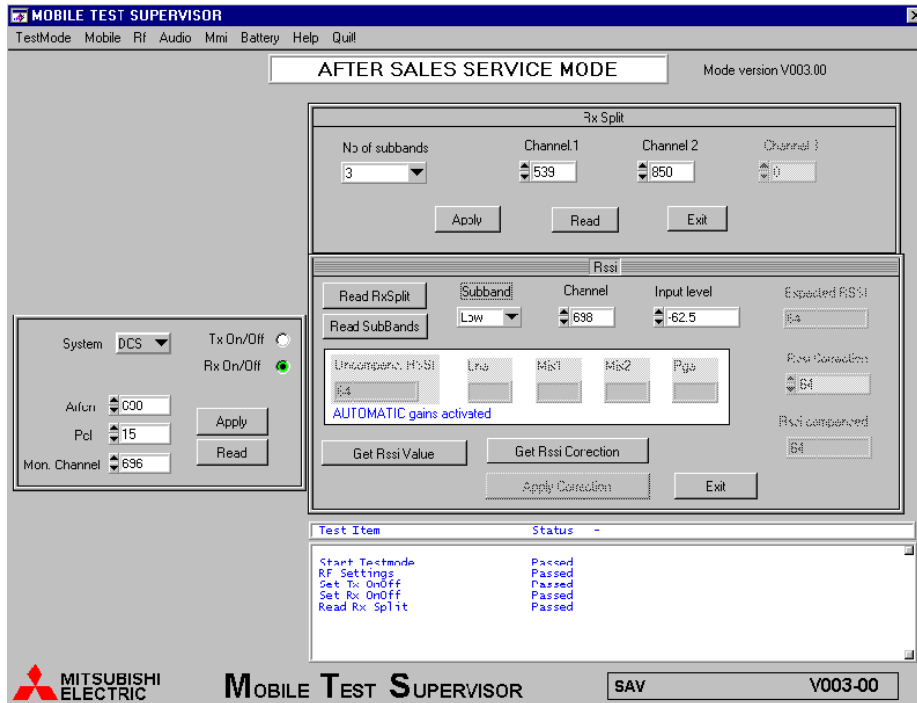
The RX split window should be as follow :



Now you can adjust RSSI for each sub-band.

- For RSSI ADJUSTMENT, we choose :
RF menu, Adjustment, Adjustment RX, Adjustment RSSI (rapport AGC).

Then we get the RSSI window :



To adjust RSSI ,we input a GMSK modulated signal (67.7 kHz shifted) at level and channel as follow :

Step	Channel	Level (dBm)
1	37	-82.5
2	37	-31.5
3	525	-82.5
4	525	-31.5
5	695	-82.5
6	695	-31.5
7	868	-82.5
8	868	-31.5

If the RX level measurement is not good in E-GSM we adjust only the E-GSM band (step 1 and 2)
If the RX level measurement is not good in DCS we adjust only the DCS band (step 3 to 8).

7. Basic Adjustment.

7.1 Power Adjustment.

For the M4 Family Mobiles, Mitsubishi uses only MELCO HPA (IC701). Each mobile is adjusted in the factory and the TX parameters (Power Control Level values and ramping values) are stored in the EEPROM (IC202).

About the adjustment value of TX Power, see the following table.

E-GSM			DCS		
Ch-62 PCL	Power Level (dBm)	tolerance	Ch-698 PCL	Power Level (dBm)	tolerance
5	33	+/-2dB	0	30	+/-2dB
6	31	+/-3dB	1	28	+/-3dB
7	29	+/-3dB	2	26	+/-3dB
8	27	+/-3dB	3	24	+/-3dB
9	25	+/-3dB	4	22	+/-3dB
10	23	+/-3dB	5	20	+/-3dB
11	21	+/-3dB	6	18	+/-3dB
12	19	+/-3dB	7	16	+/-3dB
13	17	+/-3dB	8	14	+/-3dB
14	15	+/-3dB	9	12	+/-4dB
15	13	+/-3dB	10	10	+/-4dB
16	11	+/-5dB	11	8	+/-4dB
17	9	+/-5dB	12	6	+/-4dB
18	7	+/-5dB	13	4	+/-4dB
19	5	+/-5dB	14	2	+/-5dB
			15	0	+/-5dB

Example of adjustment value table with MELCO HPA.

E-GSM Table:

E-GSM							
Ch-62 PCL	Power Level (dBm)	Pmax (DEC)	Pmin (DEC)	Pmin UP Time	Ramp UP Time	Pmin DN Time	Ramp DN Time
5	32.1	567	152	16	16	16	16
6	30.7	502	152	16	16	16	16
7	28.7	429	147	16	16	12	19
8	26.7	373	147	14	16	12	19
9	24.7	329	142	14	18	12	19
10	22.8	294	142	14	18	12	19
11	20.3	262	142	14	18	12	19
12	18.5	243	142	17	18	12	19
13	16.6	225	142	16	14	12	19
14	14.4	210	132	16	14	12	19
15	12.4	199	132	16	14	12	19
16	10.1	189	132	15	14	12	19
17	8	182	132	15	12	12	19
18	6.1	177	132	13	12	12	19

19	3.8	172	122	11	12	12	19
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DCS Table:

DCS							
Ch-698 PCL	Power Level (dBm)	Pmax (DEC)	Pmin (DEC)	Pmin UP Time	Ramp UP Time	Pmin DN Time	Ramp DN Time
0	29	731	183	18	14	12	20
1	27.6	647	183	18	14	12	19
2	25.7	551	183	18	14	12	19
3	23.8	481	178	18	14	12	19
4	21.7	414	173	18	14	12	19
5	19.9	368	173	18	14	12	19
6	17.9	328	168	18	14	12	19
7	15.9	296	168	18	14	12	19
8	13.9	269	168	18	14	12	19
9	12	251	168	17	14	12	19
10	10.6	237	108	15	12	12	19
11	9.3	227	108	15	12	12	19
12	7.8	218	108	15	12	14	17
13	5.8	208	108	15	12	14	17
14	3.6	200	108	13	12	14	17
15	1.2	194	108	9	12	14	17

7.2 RSSI control.

To control RSSI go back to page 24 of the manual.

Set your radiocommunication tester at a given reference and check RSSI :

REF Gene	RSSI
-83.5 dBm	27 +/- 4
-60.5 dBm	50 +/- 4

8. Software Version .

The software version is coded with 8 digits, evolving in the following order : 0, 1, 2, ...,9, A, B, ...,Z, a, b, ...,z.

F	H	S	V	E	Vf	Ef	Vc
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F : Family ex : 1 M3, 2 M4,

H : Hardware ex : 1 GALAXY, 5 GEO, 3 ARIA, e GEO WAP, j COSMO, c GEO GPRS....

S : Software ex :

V : Version ex :

E, Vf, Ef, Vc are Mitsubishi Code.

9. Trouble Shooting help guide

Defects observed	Mesure/Investigation	Test report	Component no good correctives action
CHARGING PROBLEM			
Consumption in charge: begin at 125 mA, red led light up, displayed "Charging", increase between 520 and 580 mA with backlight switch on and decrease between 450 to 500 mA			
Charging problem	60 < I _{ch} < 100 mA + no charging display-V _{bat} =4,8 V instead of 1,04v with charge cable, without battery	xg001	IC100
Charging problem	70 < I _{ch} < 76 mA, V _{th} =2.5 V (j101 pin2)		IC100
No charging	visual check : connector J103 broken	xg003	J103
Charging no good	Displayed Charging, consumption at 72mA increase to 155 mA		checks TR106, TR107, R128, R129
Charging no good	Displayed Charging, consumption at 123mA increase to mA and decrease to 80mA	175	check the power BLEV
Charging no good	Displayed Charging, consumption at 850mA (V _{th} =1.1 V instead of 2.5 V)		TR106, TR103,D118
Charging no good	Displayed Low Battery, Consumption at 180mA		R120, R121, TR104
Charging no good	Displayed "TestMode", Consumption at 25mA		D125, TR106
Charging no good	Displayed Full Battery after few secondes		R121, TR106
Charging no good	3.6VB=3.7 V instead of 5 V in charging	xg013	D117 (resoldering only)
AUDIO PROBLEM			
Noisy audio	Noisy audio during DCS real call but audio good with DCS tester with speaker no good	xg002	IC300
Noisy audio	Noisy audio during DCS real call but audio good with DCS tester with speaker good	xg022	IC300
Low audio	HSDET voltage no good(not equal to 0v) and J300 already changed	xg024	IC300(L3)
Low speaker	visual check : C333 missing (0.1 μF)	xg010	C333
Low buzzer	check audio path		R327, R328
No buzzer	check audio path		TR350, D300,IC300
No speaker	check audio path	xg005	IC300
No speaker	visual check on audio path	xg023	J300 (resoldering only)
LOCATION UPDATE			
RX level DCS no good	check the RX DCS path : 15 dbm loses instead of 2 in the SW700	xg006	SW700
No Service DCS	Switiching + 400 kHz no good	xg008	adjust each PCL in DCS band
No Service EGSM	check the RX GSM path : LNA output level at -75 instead of -27	xg009	TR504
No Service EGSM	Check the RX path (command on SW700 pin4 no good)	xg017	SW700
No Service EGSM & DCS	TX good in testmode (TX I/Q and RF) + RSSI good in test mode (RX I/Q and level)	xg014	IC600

No Service EGSM & DCS	check TP700, in GSM Vpp=1.7 V, in DCS Vpp=1.3 V in TX		IC700
Defects observed	Mesure/Investigation	Test report	Component no good correctives action
LOCATION UPDATE			
No Service EGSM & DCS	TX good in testmode (TX I/Q and RF) + RSSI good in testmode (RX I/Q and level) + IC 600 replaced	xg014	IC300
No Service EGSM & DCS	TCXO frequency no good and impossible to adjust with TCXO adj val in testmode	xg015	X600
No Service EGSM & DCS	TX no good in testmode, consumption > 300 mA, IC701 hot	xg021	IC701
POWER ON PROBLEM			
Normal consumption in TestMode : 45mA to 49mA			
Power on no good	Displayed Test Mode when battery connected on mobile PS=4,5 V instead 0 V and HFDETL=0 V	xg007	R148
No power on	Consumption at 15 mA		X600
No power on	Consumption at 30 mA		download or change IC201
No power on	check PS TCXO-check L603-PSTCXO=2.8 V	xg012	L603 (resoldering only)
No power on	Power on OK with EXPS and TESTPS & visual check : dirty battery contacts.No power on with batt.	xg016	cleaning the battery contacts
No power on	No 13 MHz and Fadj voltage no good, consumption at 60mA	xg018	IC300
Short autonomy	800 mA < I _{ch} < 1.5 A		IC701
No power on	and no "check battery" displayed when ACDC connected on mobile without battery	xg020	download SW
No power on	2.8 VD no good on C114 and 3.6VBat is very low	xg026	TR100
No power on	Displayed Contact Provider	xg011	download SW
No power on	Displayed Contact Provider	xg011	IC201, IC203
Turn on in Testmode	TESTPS voltage is 1 volt instead of 0 (R148 is broken: value is 68kohms instead of 1 kohms)	xg025	R148, R147, IC203, IC201
DOWNLOAD PROBLEM			
No download	Short cut on FL100 (2/4 and 3/4 = TXD and RXD). Displayed Test Mode	xg019	FL100 (resoldering only)
MS Protect	Initlatch	xg004	download SW
MS Protect	Initlatch	xg004	IC201
SIM PROBLEM			
Check SIM	DISPLAYED CHECK SIM		Change J600
Check SIM	DISPLAYED CHECK SIM		Change IC300
BIT Error / PHASE Error			
Bit Error 5.5% GSM	Measurement test no good		Change L511
Bit Error 12%	Measurement test no good		Change FL504
Phase Error DCS	Measurement test no good		IC700, IC600

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