

Nokia Customer Care

Service Manual

SU-18 (Nokia 770)

Internet Tablet

Part No: 9242409 (Issue 1)

COMPANY CONFIDENTIAL

NOKIA

Amendment Record Sheet

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IMPORTANT

This document is intended for use by qualified service personnel only.

Warnings and cautions

Warnings

- IF THE DEVICE CAN BE INSTALLED IN A VEHICLE, CARE MUST BE TAKEN ON INSTALLATION IN VEHICLES FITTED WITH ELECTRONIC ENGINE MANAGEMENT SYSTEMS AND ANTI-SKID BRAKING SYSTEMS. UNDER CERTAIN FAULT CONDITIONS, EMITTED RF ENERGY CAN AFFECT THEIR OPERATION. IF NECESSARY, CONSULT THE VEHICLE DEALER/ MANUFACTURER TO DETERMINE THE IMMUNITY OF VEHICLE ELECTRONIC SYSTEMS TO RF ENERGY.
- THE PRODUCT MUST NOT BE OPERATED IN AREAS LIKELY TO CONTAIN POTENTIALLY EXPLOSIVE ATMOSPHERES, FOR EXAMPLE, PETROL STATIONS (SERVICE STATIONS), BLASTING AREAS ETC.
- OPERATION OF ANY RADIO TRANSMITTING EQUIPMENT, INCLUDING CELLULAR TELEPHONES, MAY INTERFERE WITH THE FUNCTIONALITY OF INADEQUATELY PROTECTED MEDICAL DEVICES. CONSULT A PHYSICIAN OR THE MANUFACTURER OF THE MEDICAL DEVICE IF YOU HAVE ANY QUESTIONS. OTHER ELECTRONIC EQUIPMENT MAY ALSO BE SUBJECT TO INTERFERENCE.
- BEFORE MAKING ANY TEST CONNECTIONS, MAKE SURE YOU HAVE SWITCHED OFF ALL EQUIPMENT.

Cautions

- Servicing and alignment must be undertaken by qualified personnel only.
- Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.
- Ensure solder, wire, or foreign matter does not enter the telephone as damage may result.
- Use only approved components as specified in the parts list.
- Ensure all components, modules, screws and insulators are correctly re-fitted after servicing and alignment.
- Ensure all cables and wires are repositioned correctly.
- Never test a mobile phone WCDMA transmitter with full Tx power, if there is no possibility to perform the measurements in a good performance RF-shielded room. Even low power WCDMA transmitters may disturb nearby WCDMA networks and cause problems to 3G cellular phone communication in a wide area.
- During testing never activate the GSM or WCDMA transmitter without a proper antenna load, otherwise GSM or WCDMA PA may be damaged.

ESD protection

Nokia requires that service points have sufficient ESD protection (against static electricity) when servicing the phone.

Any product of which the covers are removed must be handled with ESD protection. The SIM card can be replaced without ESD protection if the product is otherwise ready for use.

To replace the covers ESD protection must be applied.

All electronic parts of the product are susceptible to ESD. Resistors, too, can be damaged by static electricity discharge.

All ESD sensitive parts must be packed in metallized protective bags during shipping and handling outside any ESD Protected Area (EPA).

Every repair action involving opening the product or handling the product components must be done under ESD protection.

ESD protected spare part packages MUST NOT be opened/closed out of an ESD Protected Area.

For more information and local requirements about ESD protection and ESD Protected Area, contact your local Nokia After Market Services representative.

Care and maintenance

This product is of superior design and craftsmanship and should be treated with care. The suggestions below will help you to fulfil any warranty obligations and to enjoy this product for many years.

- Keep the phone and all its parts and accessories out of the reach of small children.
- Keep the phone dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the phone in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the phone in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the phone in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- Do not drop, knock or shake the phone. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the phone.
- Do not paint the phone. Paint can clog the moving parts and prevent proper operation.
- Use only the supplied or an approved replacement antenna. Unauthorised antennas, modifications or attachments could damage the phone and may violate regulations governing radio devices.

All of the above suggestions apply equally to the product, battery, charger or any accessory.

Company Policy

Our policy is of continuous development; details of all technical modifications will be included with service bulletins.

While every endeavour has been made to ensure the accuracy of this document, some errors may exist. If any errors are found by the reader, NOKIA MOBILE PHONES Business Group should be notified in writing/e-mail.

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Battery information

Note: A new battery's full performance is achieved only after two or three complete charge and discharge cycles!

The battery can be charged and discharged hundreds of times but it will eventually wear out. When the operating time (talk-time and standby time) is noticeably shorter than normal, it is time to buy a new battery.

Use only batteries approved by the phone manufacturer and recharge the battery only with the chargers approved by the manufacturer. Unplug the charger when not in use. Do not leave the battery connected to a charger for longer than a week, since overcharging may shorten its lifetime. If left unused a fully charged battery will discharge itself over time.

Temperature extremes can affect the ability of your battery to charge.

For good operation times with Ni-Cd/NiMh batteries, discharge the battery from time to time by leaving the product switched on until it turns itself off (or by using the battery discharge facility of any approved accessory available for the product). Do not attempt to discharge the battery by any other means.

Use the battery only for its intended purpose.

Never use any charger or battery which is damaged.

Do not short-circuit the battery. Accidental short-circuiting can occur when a metallic object (coin, clip or pen) causes direct connection of the + and - terminals of the battery (metal strips on the battery) for example when you carry a spare battery in your pocket or purse. Short-circuiting the terminals may damage the battery or the connecting object.

Leaving the battery in hot or cold places, such as in a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery. Always try to keep the battery between 15°C and 25°C (59°F and 77°F). A phone with a hot or cold battery may temporarily not work, even when the battery is fully charged.

Batteries' performance is particularly limited in temperatures well below freezing.

Do not dispose of batteries in a fire!

Dispose of batteries according to local regulations (e.g. recycling). Do not dispose as household waste.

Nokia 770 Service Manual Structure

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Nokia Customer Care

1 — General Information



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■ SU-18 product selection

The Nokia 770 Internet Tablet offers an easy broadband access to the World Wide Web over WLAN on a portable-size tablet. The product has an outstanding widescreen display that is optimal for viewing online content. The mechanics, user interface as well as the application selection of the Nokia 770 Internet Tablet have been designed to ensure a pleasant Internet browsing experience. One of the key features is the 4.13-inch display with 800x480 resolution. Functionalities such as zooming, full screen and panning ensure that the Internet browsing is smooth. Panning allows the user to move the content of the website on the screen just by dragging the content with the stylus pen.

Nokia 770 is the first product built on Nokia distributed handheld Linux OS.

There are two ways of creating the Internet connection; via WLAN or via Bluetooth using a mobile phone as a modem.



Figure 1 View of SU-18

■ SU-18 transceiver features

Display and keypad features

- Color display, 16 bit (800x480, 65 536 colours), transmissive with backlight
- Display brightness Control bar with nine steps
- Graphical user interface with selectable themes
- Keys: 5 way scroll key (with select), Menu, Home, Esc, Full Screen, Zoom In and Out, Power

Hardware and software characteristics

- Monoblock, BB5.0
- Display protective cover

- Touch screen (stylus input)
- Connectors: 3.5mm headphone, mini-USB, Charger (2mm)
- RS-MMC slot
- Integrated WLAN, standard 802.11b/g
- Interated Bluetooth, specification 1.2
- Supported profiles: SAP, DUN, FTP, GAP, SPP
- Loudspeaker

SW features

Memory

- 128 MB flash memory (64 MB for user)
- 64 MB RS-MMC in sales package

Applications

- Internet Browser; Access to internet via WLAN or using a Bluetooth phone as a modem.
- Email client ; Protocol interoperability: POP3, IMAP4, SMTP, SSL, TLS, MIME, S/MIME
- News Reader
- Internet radio
- Video Player
- Music Player
- Image Viewer
- Local and remote file manager
- Notes and Sketch
- World Clock
- Calculator
- Search
- Back-up
- Games: Chess, Marbles, Mahjong
- PDF Viewer
- Application installer

Supported file formats

Containers

- AVI
- WAV
- MPEG
- Real Media
- 3GP
- Macromedia Flash 6

Audio

- MP3
- MPEG4

- AAC
- WAV
- AMR
- MP2

Image

- JPEG
- ICO
- GIF
- BMP
- TIFF
- PNG
- Animated GIF format
- SVG-tiny

Video

- MPEG1
- MPEG4
- Real Video 8, 9 and 10
- H.263
- AVI
- 3GPP

UI features

- One hand use for easy operability
- Task navigator
- Zoom in and Zoom out functionality
- Full Screen functionality
- Panning
- Personalisation: background images, home screen, themes
- On-screen keyboard
- Hand writing recognition
- Start-up wizard for easy configuration

Sales package

- SU-18 transceiver
- 2 stylus input pens
- Travel charger AC-4
- Battery BP-5L
- User guide
- Quick Guide
- RS -MMC 64MB memory card
- Adapter for MMC

- Mini-USB cable DKE-2
- Pouch
- Desk stand DT-7
- Connect to the Internet-leaflet

■ Product and module list

Module name	Type code	Notes
A-cover assembly		
B-cover assembly		
C-cover assembly		
Battery cover		
Display module		
Electronic assembly	1GJ	Main PWB with components
Frame and chassis assembly		Keyboard flex, IHF speaker
SW Module		

■ Mobile enhancements

Table 1 Batteries

Battery	Type
Battery 1500mAh Li-Po	BP-5L

Table 2 Chargers

Chargers	Type
Fast travel charger (Euro plug), 100- 240 Vac	AC-4E
Fast travel charger (US plug), 100- 240 Vac	AC-4U
Travel charger (multi-voltage), Brazil/Portugal	AC-12EB
Fast travel charger (UK plug), multi-voltage	AC-4X

Table 3 Car accessories

Car accessories	Type
Mobile charger (EA, APAC, Americas)	DC-4

Table 4 Pop-Port™ accessories

Pop Port™ accessories	Type
Mini-USB data cable	DKE-2

Table 5 Other accessories

Other accessories	Type
RS multimedia card 64 MB	MU-1
Pouch	N/A
3.5 mm headphones	standard

■ Technical specifications

SU-18 transceiver general specifications

Unit	Dimensions (L x W x T)	Weight (g)	Volume (cm ³)
Browser	78 x 135 x 14	182	133cc
With protective cover	79 x 141 x 19	230	165cc

Battery endurance

Battery	Capacity (mAh)	Talk time	Stand-by
BP-5L	1500	3 hours	7 days

Environmental conditions

Table 6 Environmental conditions

Environmental condition	Ambient temperature	Notes
Normal operation	-10°C...+55°C	Specifications fulfilled
Reduced performance	-20°C...-10°C +55°C...+70°C	Operational for shorts periods only
No operation or storage	<-40°C...>+85°C	No storage or operation: an attempt may damage the phone.
Charging allowed	-25°C...+50°C	
Long term storage conditions	0°C...+85°C	

Table 7 Absolute maximum ratings

Signal	Min	Nom	Max	Unit	Notes
Battery voltage (idle)	-0.3		+5.4	V	Battery voltage maximum value is specified during charging is active
Battery voltage (active)			+5.4	V	Battery voltage maximum value is specified during charging is active

Signal	Min	Nom	Max	Unit	Notes
Charger input voltage	-0.3		+16V	V	

Table 8 DC characteristics

Signal	Min	Nom	Max	Unit	Notes
VBAT	3.2	3.6	4.2	V	3.2V is cut off voltage

Temperature conditions

The Baseband module complies with the SPR4 Operating Conditions.

1) Operational temperature range (all specifications met within this range) -10°C...+55°C

(2) Functional temperature range (Reduced performance) -25°C... -10°C and +55°C...+70°C

(3) Storage temperature range: -40°C...+85°C

Humidity

Relative humidity range is 5...95%. The BB module is not protected against water. Condensed or splashed water might cause malfunction. Any submerge of the phone will cause permanent damage. Long-term high humidity, with condensation, will cause permanent damage because of corrosion.

ESD immunity

ESD limits are +-8kV for galvanic contact and +-15kV for air discharge.

2 — Parts Lists and Component Layouts

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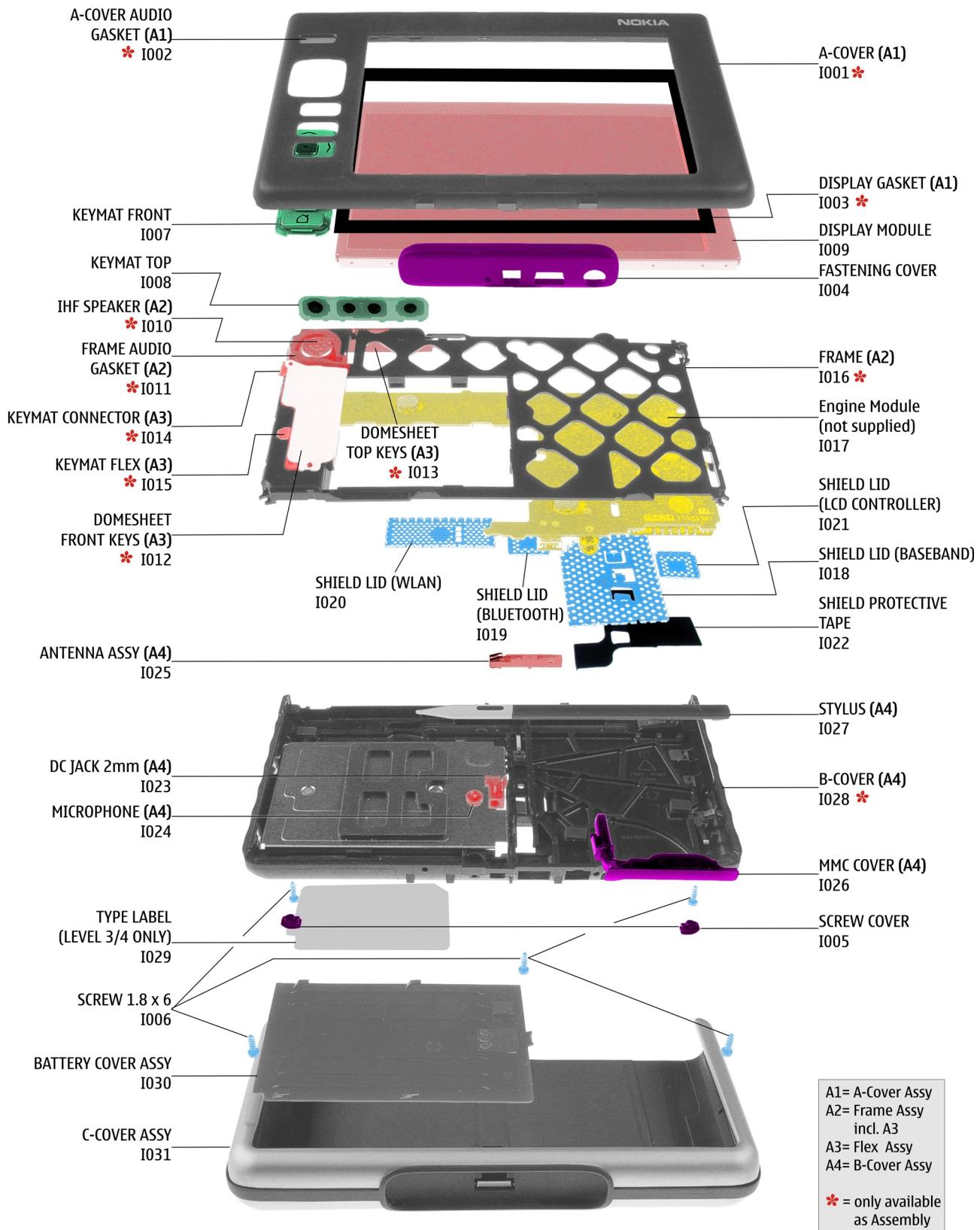
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■ Exploded view

SU-18 exploded view



ELECTRO SILICONE METAL PLASTIC PWB COVER

Mechanical spare parts overview

A1 = A-COVER ASSY



FASTENING COVER
I004

SCREW COVER
I005

SCREW 1.8 x 6
I006

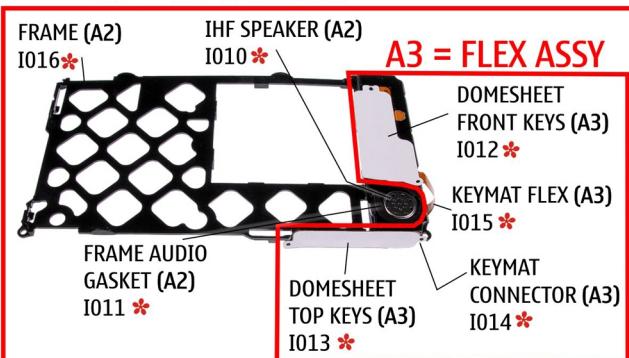
KEYMAT TOP
I008

KEYMAT FRONT
I007

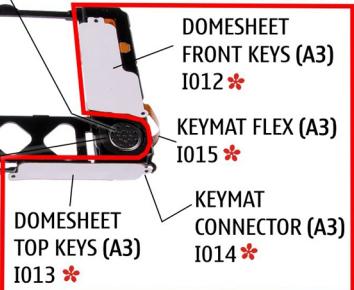


DISPLAY MODULE
I009

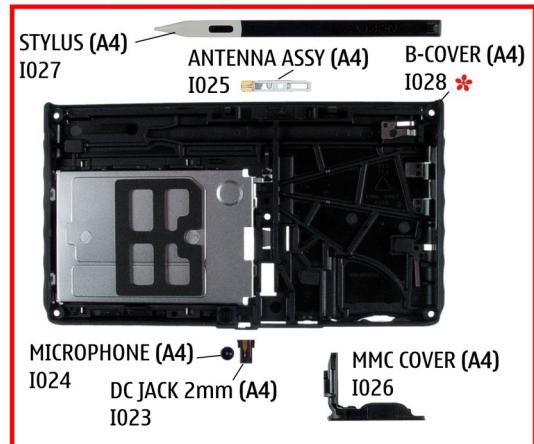
A2 = FRAME ASSY



A3 = FLEX ASSY



A4 = B-COVER ASSY



C-COVER ASSY
I031



Engine Module
(not supplied)
I017

SHIELD LID
(WLAN)
I020



SHIELD LID
(BLUETOOTH)
I019



SHIELD LID
(BASEBAND)
I018



SHIELD PROTECTIVE
TAPE
I022

TYPE LABEL
(LEVEL 3/4 ONLY)
I029



BATTERY COVER ASSY
I030

A1= A-Cover Assy
A2= Frame Assy
incl. A3
A3= Flex Assy
A4= B-Cover Assy

* = only available
as Assembly

Figure 2 SU-18 spare parts overview

■ Parts lists**Mechanical spare parts list**

- Bold = assembly (assy)
 - "-" = Not available
 - XXXXXX = variants
 - ??????? = available but not yet known
 - I0xx = ITEM codes for upper or mono block
 - I1xx = ITEM codes for hinge block
 - I2xx = ITEM codes for lower block
 - I3xx = ITEM codes for soldered spare parts in the upper hinge or lower block and not exchangeable
- Note:** For Nokia product codes, please refer to the latest Service Bulletins on the Partner Website (PWS). To ensure you are always using the latest codes, please check the PWS on a daily basis.

ITEM/CIRCUIT REF.	QTY	PART NO	PART NAME
	1	???????	A-COVER ASSY
I001	1	-	A-COVER
I002	1	-	A-COVER AUDIO GASKET
I003	1	-	DISPLAY GASKET
I004	1	???????	FASTENING COVER
I005	2	???????	SCREW COVER
I006	5	???????	SCREW 1.8x6
I007	1	???????	KEYMAT FRONT
I008	1	???????	KEYMAT TOP
I009	1	???????	DISPLAY MODULE
	1	???????	FRAME ASSY
I010	1	-	IHF SPEAKER
I011	1	-	FRAME AUDIO GASKET
	1	-	FLEX ASSY (I012-I015)
I012	1	-	DOMESHEET FRONT KEYS
I013	1	-	DOMESHEET TOP KEYS
I014	1	-	KEYMAT CONNECTOR
I015	1	-	KEYMAT FLEX
I016	1	-	FRAME
I017	1	-	ENGINE MODULE

ITEM/CIRCUIT REF.	QTY	PART NO	PART NAME
I018	1	???????	SHIELD LID (BASEBAND)
I019	1	???????	SHIELD LID (BLUETOOTH)
I020	1	???????	SHIELD LID (WLAN)
I021	1	???????	SHIELD LID (LCD CONTROLLER)
I022	1	???????	SHIELD PROTECTIVE TAPE (BASEBAND)
	1	-	B-COVER ASSY
I023	1	???????	DC JACK 2mm
I024	1	???????	MICROPHONE
I025	1	???????	ANTENNA ASSY
I026	1	???????	MMC COVER
I027	1	???????	STYLUS
I028	1	-	B-COVER
I029	1	???????	TYPE LABEL
I030	1	???????	BATTERY COVER ASSY
I031	1	???????	C-COVER ASSY

SU-18 component parts list

Component parts list (1GJ-16a)

Item	Side	Grid	Description and Values			
A1500	Bottom	X	9	SHIELD_040_008877	SHIELD CAN ASSY BT 040-008877 P2102	~
A4800	Bottom	T	10	SHIELD_040_008874	SHIELD CAN BB 040-008874 P2102	~
A6100	Bottom	N	13	SHIELD_040_008877	SHIELD CAN ASSY BT 040-008877 P2102	~
A6300	Bottom	G	14	SHIELD_0264101	SHIELD ASSEMBLY 39X15.7X2.3 P2102	~
B1420	Bottom	R	9	CRYSTAL_3.3X1.6_H0.9	CRYSTAL 32.768KHZ +-30PPM 12.5PF	32.76 8kHz
B4850	Bottom	V	8	CRYSTAL_NX4025DA	CRYSTAL 12.0MHZ +-15PPM 10PF	12MHz
C1102	Bottom	Q	5	0402C	Chipcap X7R 10% 50V 0402	1n0
C1103	Bottom	Q	5	0402C	Chipcap 5% NPO	27p
C1104	Bottom	Q	6	0603C_H0.95	CHIPCAP X5R 1U K 25V 0603	1u0
C1110	Bottom	O	8	0402C	Chipcap 5% NPO	27p
C1111	Bottom	Q	6	0402C	Chipcap 5% NPO	27p

Item	Side	Grid	Description and Values			
C1112	Bottom	0	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1113	Bottom	L	14	TANT_TPSY	CHIPTCAP 220U M 10V 7.3X4.3X2.0	220u_10V
C1310	Bottom	R	8	0805C	CHIPCAP X5R 22U M 6V3 0805	22u
C1311	Bottom	Q	8	0402C	Chipcap X7R 10% 16V 0402	10n
C1312	Bottom	Q	8	0805C	CHIPCAP X5R 10U M 6V3 0805	10U
C1313	Bottom	Q	7	0402C	Chipcap X7R 10% 16V 0402	10n
C1314	Bottom	Q	7	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1315	Bottom	Q	7	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1318	Bottom	R	6	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1319	Bottom	R	6	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1320	Bottom	Q	6	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1323	Bottom	R	8	0402C	Chipcap X7R 10% 16V 0402	10n
C1330	Bottom	S	7	0805C	CHIPCAP X5R 4U7 K 25V 0805	4u7
C1331	Bottom	T	7	0805C	CHIPCAP X5R 4U7 K 25V 0805	4u7
C1336	Bottom	S	6	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C1401	Bottom	S	9	0402C	Chipcap 5% NPO	27p
C1420	Bottom	S	10	0402C	Chipcap X7R 10% 16V 0402	10n
C1421	Bottom	S	11	0402C	Chipcap X7R 10% 16V 0402	10n
C1422	Bottom	S	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1424	Bottom	R	10	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1425	Bottom	Q	10	0402C	Chipcap X7R 10% 50V 0402	1n0
C1426	Bottom	S	10	0402C	Chipcap X7R 10% 50V 0402	1n0
C1427	Bottom	S	10	0402C	Chipcap X7R 10% 50V 0402	1n0
C1428	Bottom	S	10	0402C	Chipcap X7R 10% 50V 0402	1n0
C1429	Bottom	S	10	0402C	Chipcap X7R 10% 50V 0402	1n0
C1430	Bottom	S	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1431	Bottom	R	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1432	Bottom	R	10	0402C	Chipcap 5% NPO	22p
C1433	Bottom	R	10	0402C	Chipcap 5% NPO	27p
C1434	Bottom	R	12	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1435	Bottom	S	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1436	Bottom	S	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1441	Bottom	Q	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1442	Bottom	S	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0

Item	Side	Grid	Description and Values			
C1443	Bottom	Q	10	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1444	Bottom	Q	9	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1445	Bottom	Q	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1446	Bottom	Q	10	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1447	Bottom	Q	12	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1448	Bottom	S	11	0805C	CHIPCAP X5R 10U M 6V3 0805	10U
C1450	Bottom	R	11	0805C	CHIPCAP X5R 4U7 K 25V 0805	4u7
C1451	Bottom	R	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1452	Bottom	R	12	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1453	Bottom	S	12	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1454	Bottom	S	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1455	Bottom	R	10	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1456	Bottom	Q	10	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1457	Bottom	R	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1460	Bottom	Q	10	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1463	Bottom	R	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1464	Bottom	R	10	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1480	Bottom	S	14	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C1481	Bottom	S	13	0402C	Chipcap X7R 10% 16V 0402	10n
C1482	Bottom	S	14	0603C	CHIPCAP X5R 2U2 K 6V3 0603	2u2
C1501	Bottom	Y	6	0402C	Chipcap X7R 10% 16V 0402	10n
C1502	Bottom	Y	6	0402C	Chipcap 5% NPO	47p
C1507	Bottom	W	10	0402C	Chipcap 5% NPO	47p
C1509	Bottom	W	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1510	Bottom	X	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1513	Bottom	W	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1514	Bottom	X	9	0402C	Chipcap X7R 10% 50V 0402	1n0
C1517	Bottom	X	10	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C1519	Bottom	X	8	0402C	Chipcap 5% NPO	47p
C1520	Bottom	X	8	0805C	CHIPCAP X5R 22U M 6V3 0805	22u
C1530	Bottom	X	10	0603C	CHIPCAP X5R 2U2 K 6V3 0603	2u2
C1531	Bottom	Y	10	0402C	CHIPCAP X5R 1U5 K 4V 0402	1u5
C1532	Bottom	Y	10	0402C	CHIPCAP X5R 1U5 K 4V 0402	1u5
C1533	Bottom	Y	10	0402C	CHIPCAP X5R 1U5 K 4V 0402	1u5

Item	Side	Grid	Description and Values			
C1534	Bottom	Y	10	0402C	CHIPCAP X5R 1U5 K 4V 0402	1u5
C1535	Bottom	Z	6	0402C	Chipcap X7R 10% 16V 0402	10n
C1536	Bottom	Y	10	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C1537	Bottom	Y	10	0402C	Chipcap 5% NPO	100p
C1550	Bottom	X	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C1551	Bottom	Y	7	0402C	Chipcap 5% NPO	47p
C1552	Bottom	X	7	0402C	CHIPCAP X5R 1U5 K 4V 0402	1u5
C4100	Bottom	U	7	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4101	Bottom	U	7	0402C	Chipcap 5% NPO	22p
C4104	Bottom	U	7	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4105	Bottom	U	7	0805C	CHIPCAP X5R 10U M 6V3 0805	10U
C4110	Bottom	U	8	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4111	Bottom	U	8	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4120	Bottom	S	5	TANT_TPSY	CHIPTCAP 220U M 10V 7.3X4.3X2.0	220u_10V
C4121	Bottom	R	5	TANT_TPSY	CHIPTCAP 220U M 10V 7.3X4.3X2.0	220u_10V
C4122	Bottom	S	4	0402C	Chipcap X7R 10% 50V 0402	1n0
C4123	Bottom	R	4	0402C	Chipcap X7R 10% 50V 0402	1n0
C4130	Bottom	U	7	0402C	CHIPCAP X7R 33N K 10V 0402	33n
C4131	Bottom	U	7	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4132	Bottom	U	7	0402C	Chipcap X7R 10% 50V 0402	1n0
C4133	Bottom	O	2	0402C	Chipcap 5% NPO	22p
C4140	Bottom	R	12	0402C	Chipcap 5% X7R	3n3
C4141	Bottom	R	12	0402C	Chipcap 5% X7R	3n3
C4142	Bottom	Q	13	0805C	CHIPCAP X5R 10U M 6V3 0805	10U
C4143	Bottom	R	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4144	Bottom	C	14	0402C	Chipcap 5% NPO	22p
C4730	Bottom	W	8	0402C	Chipcap X7R 10% 16V 0402	10n
C4731	Bottom	W	7	0805C	CHIPCAP X5R 22U M 6V3 0805	22u
C4732	Bottom	W	6	0805C	CHIPCAP X5R 22U M 6V3 0805	22u
C4750	Bottom	X	6	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4801	Bottom	V	11	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C4810	Bottom	T	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4811	Bottom	V	10	0402C	CHIPCAP X5R 100N K 10V 0402	100n

Item	Side	Grid	Description and Values			
C4812	Bottom	U	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4813	Bottom	V	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4814	Bottom	T	10	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4820	Bottom	U	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4821	Bottom	T	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4822	Bottom	T	10	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4823	Bottom	T	10	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4824	Bottom	T	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4825	Bottom	V	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4826	Bottom	U	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4827	Bottom	V	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4828	Bottom	V	10	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4830	Bottom	U	9	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4831	Bottom	U	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4832	Bottom	U	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C4850	Bottom	V	9	0402C	Chipcap 5% NPO	10p
C4851	Bottom	V	9	0402C	Chipcap 5% NPO	10p
C5002	Bottom	S	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C5003	Bottom	S	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C5004	Bottom	S	14	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C5005	Bottom	S	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C5083	Bottom	S	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C5084	Bottom	S	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C6130	Bottom	M	13	0402C	Chipcap 5% NPO	15p
C6133	Bottom	M	14	0603C	CHIPCAP X5R 4U7 K 6V3 0603	4u7
C6136	Bottom	N	14	0402C	CHIPCAP X5R 0U47 K 6.3V 0402	0u47
C6137	Bottom	M	13	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C6138	Bottom	O	13	0402C	CHIPCAP X5R 0U47 K 6.3V 0402	0u47
C6139	Bottom	N	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C6140	Bottom	N	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C6141	Bottom	O	13	0603C	CHIPCAP X5R 2U2 K 6V3 0603	2u2
C6142	Bottom	M	14	0603C	CHIPCAP X5R 2U2 K 6V3 0603	2u2
C6143	Bottom	N	14	0603C	CHIPCAP X5R 2U2 K 6V3 0603	2u2
C6145	Bottom	N	13	0402C	Chipcap 5% NPO	100p

Item	Side	Grid	Description and Values				
C6146	Bottom	0	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n	
C6300	Bottom	E	14	0805C	CHIPCAP X5R 22U M 6V3 0805	22u	
C6301	Bottom	E	14	0603C	CHIPCAP X5R 1U K 16V 0603	1u0	
C6302	Bottom	E	13	0603C	CHIPCAP X5R 2U2 K 6V3 0603	2u2	
C6303	Bottom	E	14	0603C	CHIPCAP X5R 1U K 16V 0603	1u0	
C6305	Bottom	E	14	0402C	CHIPCAP X5R 100N K 10V 0402	100n	
C6306	Bottom	E	14	0402C	CHIPCAP X5R 100N K 10V 0402	100n	
C6307	Bottom	E	13	0603C	CHIPCAP X5R 1U K 16V 0603	1u0	
C6308	Bottom	H	15	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6309	Bottom	H	15	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6310	Bottom	H	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n	
C6311	Bottom	E	13	0402C	CHIPCAP NPO 220P J 25V 0402	220p	
C6312	Bottom	G	15	0402C	CHIPCAP X5R 1U5 K 4V 0402	1u5	
C6313	Bottom	G	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n	
C6314	Bottom	G	13	0402C	CHIPCAP X5R 100N K 10V 0402	100n	
C6315	Bottom	H	14	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6317	Bottom	F	15	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6318	Bottom	G	13	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6319	Bottom	E	15	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6320	Bottom	F	13	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6321	Bottom	G	15	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6322	Bottom	F	15	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6323	Bottom	F	13	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6324	Bottom	E	15	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6325	Bottom	E	13	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6326	Bottom	E	14	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6327	Bottom	E	15	0402C	CHIPCAP X5R 100N K 10V 0402	100n	
C6328	Bottom	J	12	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6329	Bottom	J	12	0402C	Chipcap +-0.25pF NPO	6p8	
C6330	Bottom	J	12	0603C	CHIPCAP X5R 4U7 K 6V3 0603	4u7	
C6331	Bottom	I	13	0402C	Chipcap +-0.25pF NPO	2p7	
C6332	Bottom	I	13	0402C	Chipcap +-0.25pF NPO	1p0	
C6333	Bottom	I	13	0402C	Chipcap X7R 10% 50V 0402	1n0	
C6334	Bottom	J	13	0402C	Chipcap 5% NPO	12p	

Item	Side	Grid	Description and Values			
C6335	Bottom	I	14	0402C	CHIPCAP NPO 220P J 25V 0402	220p
C6336	Bottom	J	14	0402C	Chipcap +-0.25pF NPO	3p9
C6337	Bottom	K	13	0402C	Chipcap +-0.25pF NPO	1p0
C6338	Bottom	J	14	0402C	Chipcap 5% NPO	47p
C6339	Bottom	K	12	0402C	Chipcap +-0.25pF NPO	6p8
C6340	Bottom	K	13	0402C	Chipcap +-0.25pF NPO	6p8
C6341	Bottom	K	13	0402C	Chipcap +-0.25pF NPO	6p8
C6342	Bottom	K	14	0402C	Chipcap +-0.25pF NPO	6p8
C6343	Bottom	K	14	0402C	Chipcap +-0.25pF NPO	6p8
C6344	Bottom	H	14	0402C	Chipcap +-0.25pF NPO	2p7
C6345	Bottom	H	14	0402C	Chipcap +-0.25pF NPO	2p7
C6346	Bottom	F	15	0402C	Chipcap X7R 10% 50V 0402	1n0
C6347	Bottom	F	15	0402C	Chipcap 5% NPO	82p
C6348	Bottom	G	15	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C6351	Bottom	D	15	0402C	Chipcap X7R 10% 50V 0402	1n0
C6352	Bottom	G	13	0402C	Chipcap 5% NPO	100p
C6353	Bottom	G	13	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C6354	Bottom	H	13	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C6355	Bottom	F	12	0402C	Chipcap X7R 10% 16V 0402	10n
C6356	Bottom	G	12	0402C	CHIPCAP X5R 100N K 10V 0402	100n
C6358	Bottom	H	15	0402C	CHIPCAP X7R 47N K 10V 0402	47n
C6359	Bottom	H	15	0402C	Chipcap 5% NPO	150p
C6360	Bottom	H	15	0402C	Chipcap +-0.25pF NPO	6p8
C6361	Bottom	J	14	0402C	Chipcap +-0.25pF NPO	6p8
C6362	Bottom	J	14	0402C	Chipcap +-0.25pF NPO	6p8
C6363	Bottom	K	13	0402C	Chipcap +-0.25pF NPO	6p8
C6364	Bottom	K	12	0402C	Chipcap +-0.25pF NPO	6p8
C6365	Bottom	D	13	0603C	CHIPCAP X5R 4U7 K 6V3 0603	4u7
C6366	Bottom	D	14	0603C	CHIPCAP X5R 1U K 16V 0603	1u0
C6367	Bottom	H	13	0402C	CHIPCAP X5R 1U5 K 4V 0402	1u5
D1420	Bottom	S	10	TFBGA_108	RETU 3.02 TSA1GJWE TFBGA108	~
D1510	Bottom	Y	9	FCBGA121	LCD CONTROLLER FCBGA121	~
D4111	Bottom	S	9	PDSO_G5	OR-GATE 2INPUT 74LVC1G32 SC70-5	~

Item	Side	Grid	Description and Values			
D4112	Bottom	V	7	PDSO_G5	OR-GATE 2INPUT 74LVC1G32 SC70-5	~
D4800	Bottom	U	10	uBGA_289	HELEN3 GP2.0 SS C27 UBGA289	~
D4821	Bottom	U	8	PDSO_G5	OR-GATE 2INPUT 74LVC1G32 SC70-5	~
D5001	Bottom	U	13	FBGA133_11.6X13.1	COMBO 512M DDR+1G NAND FBGA133 PBFREE	32Mx1 6/128 Mx8
D6304	Bottom	N	12	PDSO_G5	OR-GATE 2INPUT 74LVC1G32 SC70-5	~
F1100	Bottom	Q	4	0603_FUSE_AVX2MATS	SM FUSE F 2.0A 32V	2A
G1401	Bottom	X	13	BATTER_EECEP	RTC BACUP CAPAC 311 SIZE FOR 2.6V 4UAH	2.6V
G6300	Bottom	F	13	NKG3176B_H1.0	VCTCX0 38.4MHZ 2.5V	38.4M Hz
L1100	Bottom	Q	4	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603	220R/ 100M Hz
L1220	Bottom	Q	3	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L1310	Bottom	Q	7	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603	220R/ 100M Hz
L1312	Bottom	R	8	CHOKE_SER400	CHOKE 10U 0.8A 0R24 4X4X1.8	10uH
L1330	Bottom	S	8	CHOKE_SER300	CHOKE 22U M 1R5 0.35A	22uH
L1440	Bottom	Q	12	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603	220R/ 100M Hz
L1441	Bottom	Q	9	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L1442	Bottom	Q	11	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L1443	Bottom	Q	12	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L1444	Bottom	S	12	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603	220R/ 100M Hz

Item	Side	Grid	Description and Values			
L1506	Bottom	X	8	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L1508	Bottom	Y	8	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L1530	Bottom	Y	10	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L1531	Bottom	Y	10	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MHZ 0402	600R/ 100M Hz
L4100	Bottom	U	8	FERRITE_BK1608	FERRITE BEAD 0R35 68R/100MHZ 0603	68R/ 100M Hz
L4120	Bottom	S	3	0402L_XL	FERRITE BEAD 220R 0R45 0.3A 0402	220R/ 100M Hz
L4121	Bottom	Q	3	0402L_XL	FERRITE BEAD 220R 0R45 0.3A 0402	220R/ 100M Hz
L4144	Bottom	Q	12	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603	220R/ 100M Hz
L4145	Bottom	Q	12	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603	220R/ 100M Hz
L6130	Bottom	M	14	0402L	CHIP COIL 22N J Q28/800M 0402	22nH
L6131	Bottom	N	13	0402L_H0.45	CHIP COIL 2N2 +-0N1 Q40/1GHZ 0402	2n2H
L6301	Bottom	I	13	0402L_H0.45	CHIP COIL 1N8 +-0N1 Q40/1GHZ 0402	1n8H
L6302	Bottom	I	13	0402L_H0.45	CHIP COIL 2N7 +-0N1 Q35/1GHZ 0402	2n7H
L6303	Bottom	J	13	0402L_H0.45	CHIP COIL 2N2 +-0N1 Q40/1GHZ 0402	2n2H
L6304	Bottom	J	13	0402L_POL2	CHIP COIL 12N J Q30/250MHZ 0402	12nH
L6305	Bottom	I	14	0402L	CHIP COIL 10N J Q30/800M 0402	10nH
L6306	Bottom	H	14	0402L	CHIP COIL 4N7 +-0N3 Q28/800M 0402	4n7H
N1120	Bottom	P	10	SH248CSP	HALL IC SWITCH SH248CSP VCC	~
N1310	Bottom	R	7	TFBGA_84_6.15X6.15	TAHVO v5.2 LF TFBGA84	~

Item	Side	Grid	Description and Values			
N1330	Bottom	T	7	USMD8_1.95X1.95	DC/DC CONV LM3500/ TK65600 USMD8	~
N1336	Bottom	T	6	SC70_5	1XOP AMP 2.7-5.5V LMV321 SC70-5	~
N1480	Bottom	S	13	USMD5_1.442X1.087_H 0.675	REG 1.8V/150MA LP2985ITLX USMD5 NOPB	~
N1500	Bottom	X	9	S_PBGA_N48	TOUCH SCREEN CONT TSC2046 BGA48	~
N1510	Bottom	X	10	FC_4_0.99X0.99	LI VREG TK63115B 1.5V WLCSP4	~
N1520	Bottom	X	8	FC_4_0.99X0.99	LI VREG TK63128B 2.8V WLCSP4	~
N4100	Bottom	V	7	PBGA_N80_MIRROR	ANALOG SN0404109ZQER 2.7-3.6V BGA80	~
N4110	Bottom	V	8	FLIP_CHIP_20L	8XLEVEL SHIFTER ST2378E CSP20	~
N4140	Bottom	Q	12	uBGA9_1.55X1.55	PW AMP TPA2010D1YZF 250KHZ	~
N4730	Bottom	W	7	USMD16_2.03X2.03	VREG & LEVEL SHIFT LP3928 USMD16	~
N6130	Bottom	N	13	uBGA63_4.6X4.6	BRF6150	~
N6300	Bottom	F	14	LFBGA_228	WLAN MCM STLC4370 F3 LINEAR EM LFBGA228	~
N6301	Bottom	I	14	QFN3X3_16	PW AMP RF5191 2.4-2.5GHZ WLAN	~
N6302	Bottom	I	14	SOT_666	TRX2+RX4 PEMD9 N&P 10K/47K SOT666	~
N6303	Bottom	K	13	MINI_MOLD6_H0.6	L/S BAND SPDT SWITCH uPG2030TK 1.6X1.4	~
N6304	Bottom	K	14	MINI_MOLD6_H0.6	L/S BAND SPDT SWITCH uPG2030TK 1.6X1.4	~
N6305	Bottom	G	12	FC_4_0.99X0.99	LI VREG TK63128B 2.8V WLCSP4	~
N6306	Bottom	D	14	FC_4_0.99X0.99	LI VREG TK63128B 2.8V WLCSP4	~
R1110	Bottom	O	9	0402_NTH5	NTC RES 47K J B=4050+-3% 0402	47k
R1111	Bottom	Q	6	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402	14V/ 50V
R1112	Bottom	O	8	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402	14V/ 50V
R1113	Bottom	P	8	0402R	Resistor 5% 63mW	150R
R1212	Bottom	Q	3	0402R	Resistor 5% 63mW	220k
R1213	Bottom	Q	3	uBGA11_1.6X2.15	ASIP SILIC USB OTG / ESD BGA11	~
R1312	Bottom	S	8	0402R	Resistor 5% 63mW	10k
R1315	Bottom	S	7	0402R	Resistor 5% 63mW	10k

Item	Side	Grid	Description and Values			
R1332	Bottom	T	7	0402R	Resistor 5% 63mW	56R
R1333	Bottom	T	7	0402R	Resistor 5% 63mW	33R
R1334	Bottom	T	7	0402R	Resistor 5% 63mW	100k
R1335	Bottom	T	6	0402R	Resistor 5% 63mW	1k0
R1336	Bottom	T	7	0402R	Resistor 5% 63mW	33R
R1411	Bottom	R	9	0402R	Chipres 0W06 jumper 0402	0R
R1421	Bottom	R	9	0402R	Resistor 5% 63mW	120k
R1422	Bottom	S	10	0402R	Resistor 5% 63mW	100k
R1424	Bottom	R	9	0402R	Resistor 5% 63mW	120k
R1500	Bottom	X	10	0402R	Resistor 5% 63mW	100k
R1501	Bottom	X	6	0405_2	VARISTOR ARRAY 2XVWM16V VC50 0405	2XVW M16V
R1503	Bottom	X	6	0405_2	VARISTOR ARRAY 2XVWM16V VC50 0405	2XVW M16V
R1510	Bottom	X	8	0402R	Resistor 5% 63mW	10R
R1511	Bottom	W	8	0402R	Resistor 5% 63mW	10R
R1512	Bottom	X	8	0402R	Resistor 5% 63mW	10R
R1513	Bottom	W	8	0402R	Resistor 5% 63mW	10R
R1514	Bottom	X	8	0402R	Resistor 5% 63mW	1M0
R1515	Bottom	W	8	0402R	Resistor 5% 63mW	1M0
R1520	Bottom	X	7	uBGA5	ASIP 4XESD **PB-FREE** BGA5	~
R1527	Bottom	Z	6	0402R	Resistor 5% 63mW	100k
R1528	Bottom	Y	6	uBGA5	ASIP 4XESD **PB-FREE** BGA5	~
R1529	Bottom	X	7	uBGA5	ASIP 4XESD **PB-FREE** BGA5	~
R1531	Bottom	Z	10	0402R	Chipres 0W06 jumper 0402	0R
R1532	Bottom	Z	7	uBGA5	ASIP 4XESD **PB-FREE** BGA5	~
R1534	Bottom	W	10	0402R	Resistor 5% 63mW	4k7
R1535	Bottom	Z	8	0402R	Resistor 5% 63mW	150R
R2000	Bottom	Q	4	uBGA5	ASIP 4XESD **PB-FREE** BGA5	~
R2001	Bottom	P	4	0402R	Resistor 5% 63mW	1k0
R4120	Bottom	S	4	0402R	Resistor 5% 63mW	22k
R4121	Bottom	Q	4	0402R	Resistor 5% 63mW	22k
R4122	Bottom	S	3	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402	14V/ 50V
R4123	Bottom	Q	3	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402	14V/ 50V

Item	Side	Grid	Description and Values			
R4124	Bottom	S	3	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402	14V/ 50V
R4125	Bottom	T	5	0402R	Resistor 5% 63mW	1k0
R4130	Bottom	U	7	0402R	Resistor 5% 63mW	2k2
R4131	Bottom	U	7	0402R	Resistor 5% 63mW	1k0
R4132	Bottom	O	2	0405_2	VARISTOR ARRAY 2XVWM16V VC50 0405	2XVW M16V
R4133	Bottom	U	7	0402R	Resistor 5% 63mW	10R
R4140	Bottom	Q	12	0402R	Resistor 5% 63mW	1k0
R4141	Bottom	R	12	0402R	CHIPRES 0W06 150K J 0402	150k
R4142	Bottom	R	12	0402R	CHIPRES 0W06 150K J 0402	150k
R4148	Bottom	C	14	0405_2	VARISTOR ARRAY 2XVWM16V VC50 0405	2XVW M16V
R4300	Bottom	C	12	0402R	Resistor 5% 63mW	1k0
R4301	Bottom	B	12	0402R	Resistor 5% 63mW	10R
R4730	Bottom	V	8	0402R	Resistor 5% 63mW	10k
R4741	Bottom	V	8	0402R	Resistor 5% 63mW	100k
R4742	Bottom	V	8	0402R	Resistor 5% 63mW	100k
R4750	Bottom	W	6	uBGA11_1.62X2.12	ASIP EMIF04-MMC02F2**PB- FREE**	~
R4760	Bottom	T	5	0402R	Resistor 5% 63mW	10k
R4800	Bottom	T	9	0402R	Resistor 5% 63mW	10k
R4801	Bottom	T	10	0402R	Chipres 0W06 jumper 0402	0R
R4805	Bottom	U	8	0402R	Resistor 5% 63mW	1k0
R4807	Bottom	T	10	0402R	Resistor 5% 63mW	10k
R4821	Bottom	U	8	0402R	Resistor 5% 63mW	10k
R4822	Bottom	V	10	0402R	Resistor 5% 63mW	10k
R4830	Bottom	V	10	0402R	Chipres 0W06 jumper 0402	0R
R4831	Bottom	U	12	0402R	Resistor 5% 63mW	10R
R4846	Bottom	T	9	0402R	Chipres 0W06 jumper 0402	0R
R5000	Bottom	S	13	0402R	Resistor 5% 63mW	4k7
R6300	Bottom	E	13	0402R	CHIPRES 0W06 1M F 100PPM 0402	1M0
R6301	Bottom	F	15	0402R	Resistor 5% 63mW	1k2
R6304	Bottom	G	12	0402R	Resistor 5% 63mW	180R
R6305	Bottom	F	13	0402R	Resistor 5% 63mW	22k
R6306	Bottom	F	12	0402R	Resistor 5% 63mW	22k

Item	Side	Grid	Description and Values			
R6310	Bottom	I	14	0402R	Resistor 5% 63mW	4k7
R6311	Bottom	I	14	0402R	Resistor 5% 63mW	220R
R6312	Bottom	J	13	0402R	Resistor 5% 63mW	47R
R6313	Bottom	H	15	0402R	CHIPRES 0W06 5K1 J 0402	5k1
R6314	Bottom	M	12	0402R	Resistor 5% 63mW	100k
R6315	Bottom	N	12	0402R	Resistor 5% 63mW	100k
R6317	Bottom	G	13	0402R	Resistor 5% 63mW	330R
R6410	Bottom	E	13	0402R	Chipres 0W06 jumper 0402	0R
R6411	Bottom	D	15	0402R	Chipres 0W06 jumper 0402	0R
S4760	Bottom	T	5	SWITCH_JPS1110_4301 F	SM SW DETECTOR 5VDC 0.01A	~
T6100	Bottom	M	13	TRANS_LDB213	TRANSF BALUN 2400+-100MHZ	~
T6300	Bottom	H	14	LDB18DM	CER FILT 2450+-50MHZ 1DB 1.7X0.9	~
V1101	Bottom	Q	5	CASE_457	TVS DI 1PMT16AT3 16V 175W PWRMITE	~
V1336	Bottom	T	7	VMT3	TR 2SC5658QRS N 50V 0A1 0W15 VMT3	~
X1110	Bottom	O	7	CNO_5025_3087H	SM BATT CONN 3POLE POGO	~
X1220	Bottom	P	2	CONN_QX946_SS2	SM CONN USB MINI-B P0.8 90DEG	~
X1503	Bottom	Y	7	CONN_DF18C_50DS	SM CONN BTB 2X25F P0.4 30V/0.3A	~
X2000	Bottom	C	14	TRACEABILITY_PAD	MODULE ID COMPONENT 2.8X1.8X0.3	~
X4120	Bottom	R	2	SMK_LGY2209_0101F	CONN AUDIO JACK 3POL 3.5MM DIA	~
X4300	Bottom	B	13	CON_DF23C_14DS	SM CONN 2X7 M P0.5 50V 0.3A	~
X4750	Bottom	W	4	MOLEX_MMC_P03_3D05 45_001	CONN SMC RS-MMC 6POL P2.5	~
X5681	Bottom	X	15	MOLEX_54722_0407	SM CONN 2X20 F P0.5 PWB/PWB	~
Z1502	Bottom	Y	7	BGA24_P0.4	ASIP 10-CH LCD FILTER W/ESD BGA24	~
Z1503	Bottom	Y	7	BGA24_P0.4	ASIP 10-CH LCD FILTER W/ESD BGA24	~
Z4300	Bottom	B	12	BGA24_P0.4	ASIP 10-CH LCD FILTER W/ESD BGA24	~
Z6300	Bottom	K	14	FILTER_LFB322G	CER FILT 2450+-50MHZ 3.2X2.5	2450M Hz
Z6301	Bottom	H	14	LFSG15	CER FILT 2450+-50MHZ/3.0DB 2.0X1.2	2450M Hz

■ Component layouts

SU-18 component layout - bottom

For component layouts with a component finder chart, refer to section in Schematics.

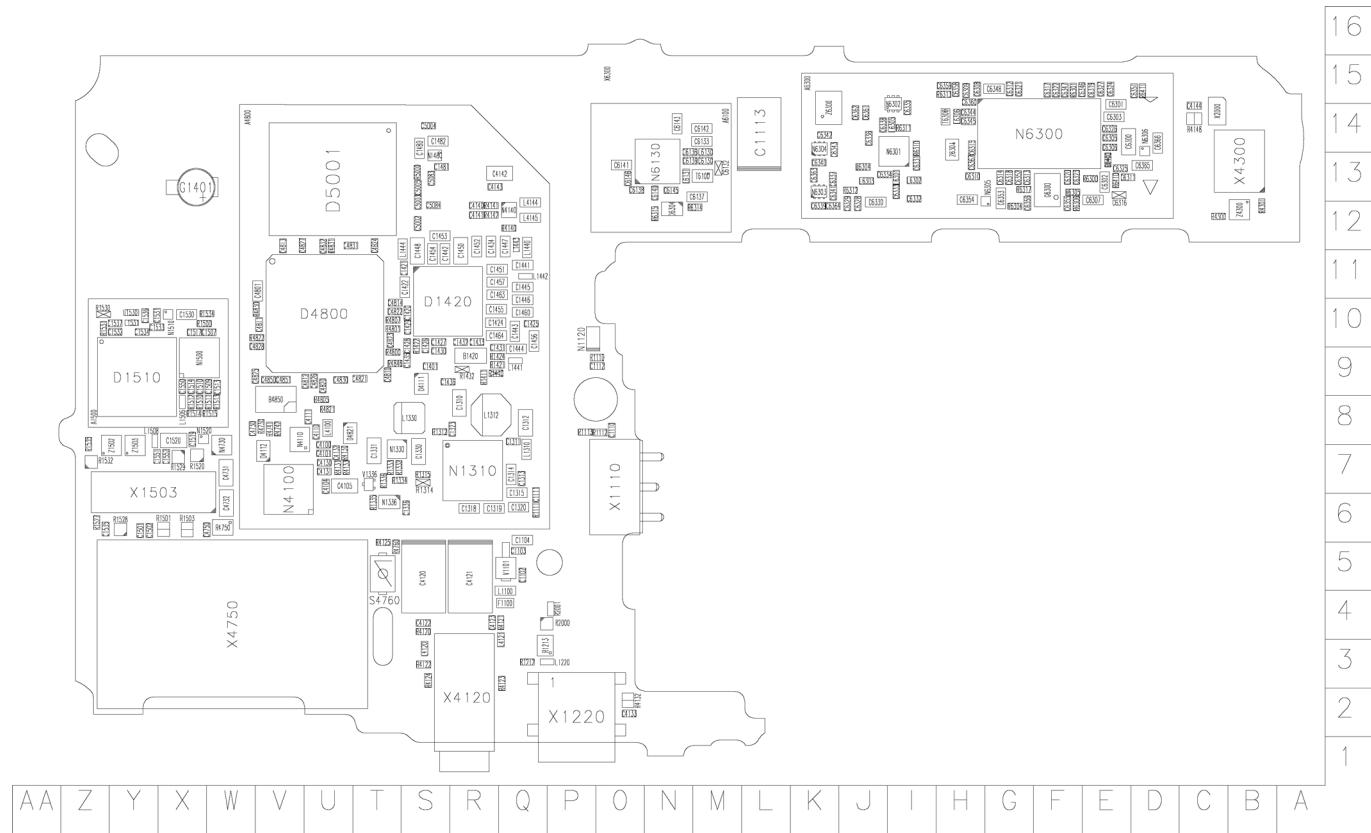


Figure 3 Component layout-bottom

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3 — Service Software Instructions

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■ Phoenix installation steps in brief

Phoenix is the service software for reprogramming, testing and tuning the phone.

Recommended PC HW requirements:

- Computer Processor: Pentium 700 MHz or higher
- RAM 256 MB
- Disk space 100-200 MB

Supported operating systems:

- Windows 2000 Service Pack 3 or higher
- Windows XP Service Pack 1 or higher

To install Phoenix, you need to:

- Connect a DK2 Dongle,
- Install the Phoenix Service SW,
- Install the Data Package for Phoenix,
- Configure users,
- Manage connection settings (depends on the tools you are using).

Note: If you use FPS-10:

- Update FPS-10 SW,
- Activate SX-4 Smart Card if you need tuning and testing functions in service software.

Note: When FPS-10 is used only for product SW updates, SX-4 Smart card is not needed.

Phoenix is now ready to be used with FPS-10 flash prommer and other tools as well.

The Phoenix Service Software installation contains:

- Service software support for all phone models included in the package
- Flash update package files for programming devices
- All needed drivers for:
 - DK2 dongle
 - DKU-2 USB cable

Note: Separate installation packages for flash update files and drivers are also available, but it is not necessary to use them unless updates appear between Phoenix Service SW releases. If separate update packages are used, they should be used after Phoenix and data packages have been installed.

The phone model specific data package includes all changing product specific data:

- Product software binary files
- Files for type label printing
- Validation file for the Faultlog repair data reporting system
- All product specific configuration files for Phoenix software components

Note: Phoenix Service SW and phone data packages should only be used as complete installation packages. Uninstallation should be made from the Windows Control Panel.

■ Installing Phoenix

Before you begin

- Check that a dongle is attached to the parallel port of your computer.

- Download the installation package (for example, *phoenix_service_sw_2004_39_x_xx.exe*) to your computer (in *C:\TEMP*, for instance).
- Close all other programs.
- Run the application file (for example, *phoenix_service_sw_2004_39_x_xx.exe*) and follow the instructions on the screen.
- Administrator rights may be required to be able to install Phoenix depending on the operating system.
- If uninstalling or rebooting is needed at any point, you will be prompted by the Install Shield program.

Context

If at any point during installation you get the following message, the dongle is not found and installation cannot continue:

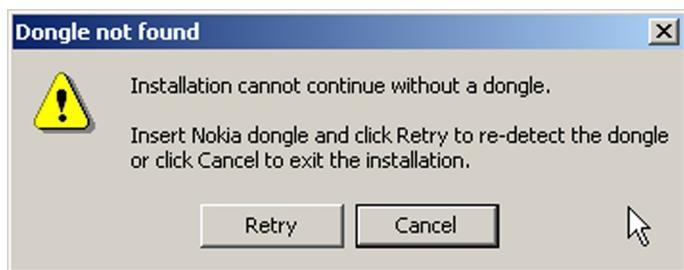


Figure 4 Dongle not found

One possible reason may be a defective or too old PKD-1 Dongle (five digit serial number Dongle when used with FPS-10 prommers).

Check the parallel port used for PKD-1. After correcting the problem, restart installation application.

For more detailed information, please refer to Phoenix Help files. Each feature in Phoenix has its own Help function, which can be activated while running the program. Press the **F1** key or the feature's **Help** button to activate a Help file.

Steps

1. To start installation, run *phoenix_service_sw_2004_39_x_xx.exe*.
2. In the Welcome dialogue, click **Next**.

3. Read the disclaimer carefully.

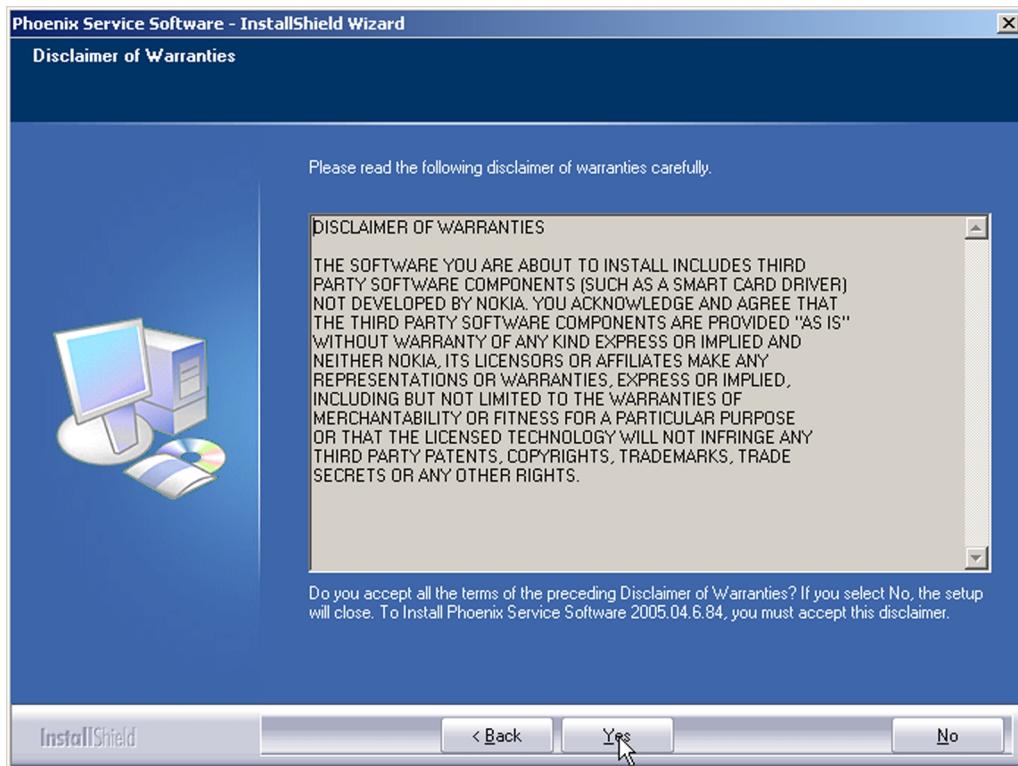


Figure 5 Disclaimer text

4. Choose destination folder.

The default folder *C:\ProgramFiles\Nokia\Phoenix* is recommended.

5. To continue, click **Next**.

You may choose another location by selecting **Browse** (not recommended).

6. Wait for the components to be copied.

Progress of the setup is shown in the *Setup Status* window.

7. Wait for the drivers to be installed and updated.

The process may take several minutes to complete.

If the operating system does not require rebooting, the PC components are registered right away.

If the operating system used requires restarting your computer, the Install Shield Wizard will tell you about it. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

After the reboot, components are registered and Phoenix is ready for use.

Note: Phoenix does not work, if components have not been registered.



Figure 6 Registering components

8. To end installation, click **Finish**.

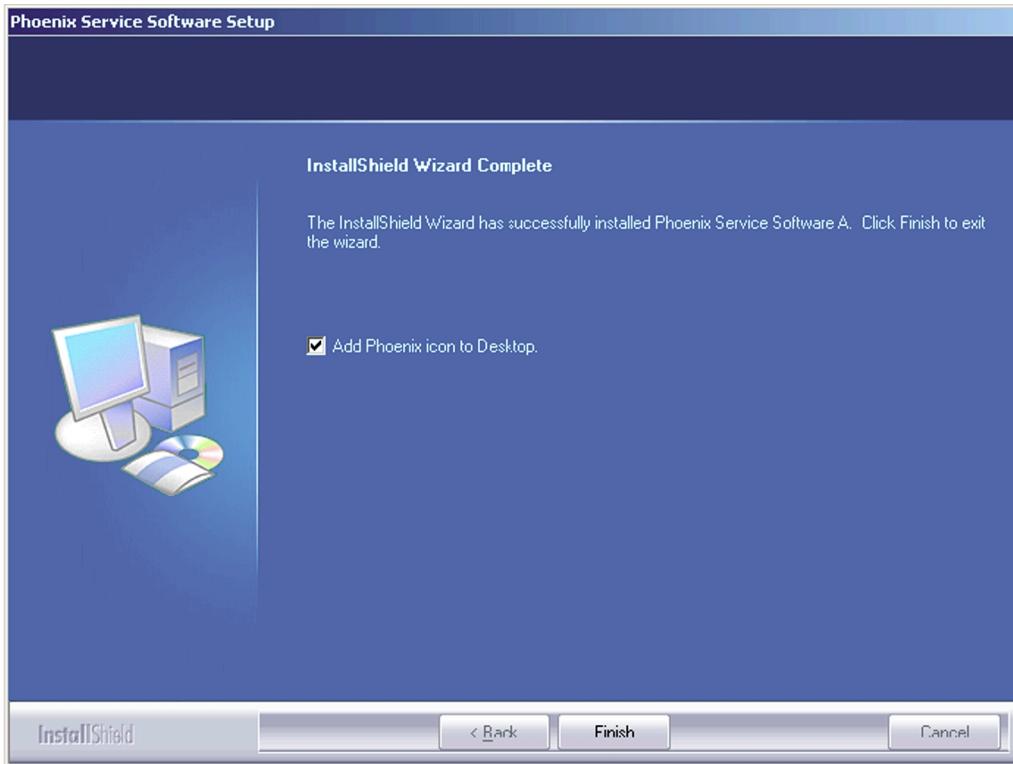


Figure 7 Finish installation

Phoenix is now ready for use.

Next action

After the installation, Phoenix service software can be used after:

- installing phone model specific data package for Phoenix
- configuring users and connections

FPS-10 flash prommers can be used after updating their Flash Update Package files.

■ **Updating Phoenix installation**

Context

- If you already have the *Phoenix* service software installed on your computer, you need to update the software when new versions are released.
- To update *Phoenix*, you need to follow the same steps as when installing it for the first time.
- When you are updating, for example, from version **a14_2004_16_4_47** to **a15_2004_24_7_55**, the update will take place automatically without uninstallation.
- Always use the latest available versions of both *Phoenix* and the phone-specific data package. Instructions can be found in the phone model specific Technical Bulletins and phone data package *readme.txt* files (shown during installation).
- If you try to update *Phoenix* with the same version you already have (for example, **a15_2004_24_7_55** to **a15_2004_24_7_55**), you are asked if you want to uninstall the existing version. In this case you can choose between a total uninstallation or a repair installation in a similar way when choosing to uninstall the application from the *Windows* Control Panel.

- If you try to install an older version (for example, downgrade from **a15_2004_24_7_55** to **a14_2004_16_4_47**), installation will be interrupted.

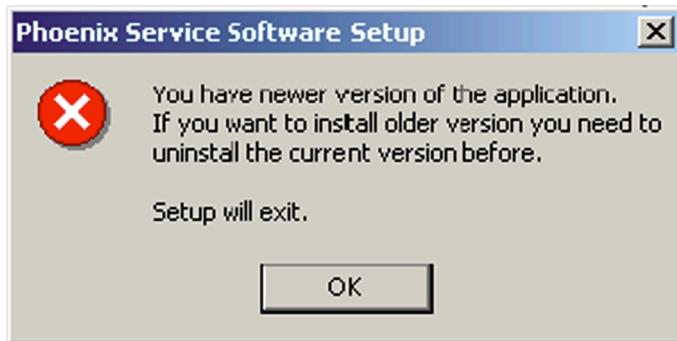


Figure 8 Installation interrupted

- Always follow the instructions on the screen.

Steps

1. Download the installation package to your computer hard disk.
2. Close all other programs.
3. Run the application file (for example, *phoenix_service_sw_2004_39_x_xx.exe*).

Results

A new *Phoenix* version is installed and driver versions are checked and updated.

■ Uninstalling *Phoenix*

Context

You can uninstall *Phoenix* service software manually from the *Windows* Control Panel.

Steps

1. Open the **Windows Control Panel**, and choose **Add/Remove Programs**.

2. To uninstall *Phoenix*, choose **Phoenix Service Software**→**Change/Remove**→**Remove**.

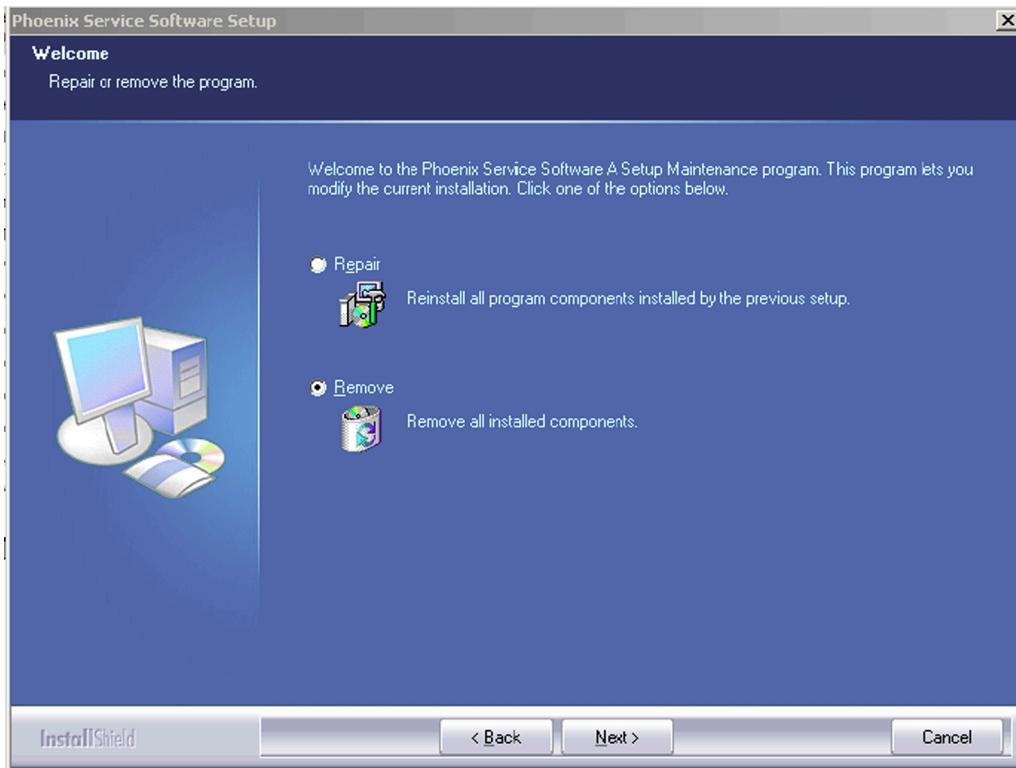


Figure 9 Remove program

The progress of the uninstallation is shown.

3. If the operating system does not require rebooting, click **Finish** to complete.

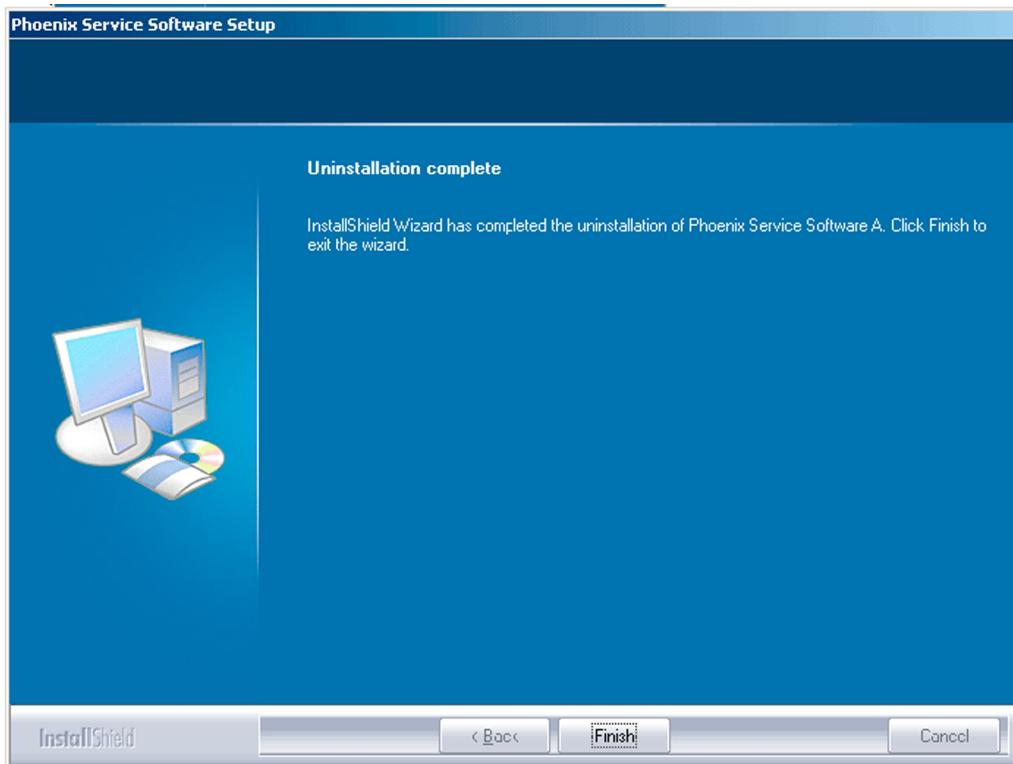


Figure 10 Finish uninstallation

If the operating system requires rebooting, InstallShield Wizard will notify you. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

■ Repairing *Phoenix* installation

Context

If you experience any problems with the service software or suspect that files have been lost, use the repair function before completely reinstalling *Phoenix*.

Note: The original installation package (for example, *phoenix_service_sw_a15_2004_24_7_55.exe*) must be found on your PC when you run the repair setup.

Steps

1. Open **Windows Control Panel**→**Add/Remove Programs** .
2. Choose **Phoenix Service Software**→**Change/Remove** .

3. In the following view, select **Repair**.

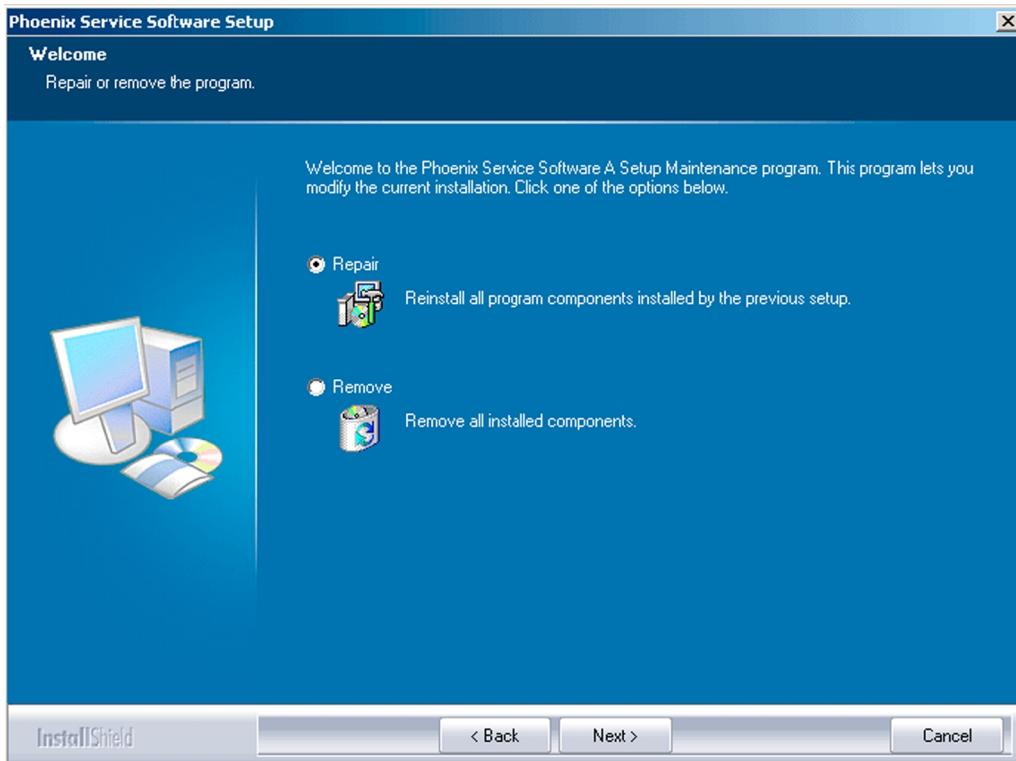


Figure 11 Repair program

Phoenix reinstalls components and registers them.

The procedure is the same as when updating *Phoenix*.

4. To complete the repair, click **Finish**.

■ Phone data package overview

Each product has its own data package (DP). The product data package contains all product-specific data files to make the Phoenix service software and tools usable with a certain phone model.

The phone data package contains the following:

- Product software binary files
- Files for type label printing
- Validation file for the fault log repair data reporting system
- All product-specific configuration files for Phoenix software components

Data files are stored in **C:\Program Files\Nokia\Phoenix** (default).

■ Installing Phoenix data package

Before you begin

- Product data package contains all product-specific data to make the Phoenix Service Software and tools usable with a certain phone model.
- Check that the dongle is attached to the parallel port of your computer.
- Install Phoenix Service SW.

- Download the installation package (for example, *RM-25_dp_EA_v_1_0.exe*) to your computer (for example, in *C:\TEMP*).

- Close all other programs.

- Run the application file (for example, *RM-25_dp_EA_v_1_0.exe*) and follow the instructions on the screen.

If you already have the Phoenix Service SW installed on your computer, you will need to update it when a new version is released.

Note: Very often the Phoenix Service SW and the phone-specific data package for Phoenix come in pairs, meaning that a certain version of Phoenix can only be used with a certain version of the data package. Always use the latest available versions of both. Instructions can be found in phone model specific Technical Bulletins and *readme.txt* files of the data packages.

Steps

1. To start installation, run the application file (for example, *RM-25_dp_EA_v_1_0.exe*).
2. Click **Next**, and wait for the installation files to be extracted.
3. To continue, click **Next**.

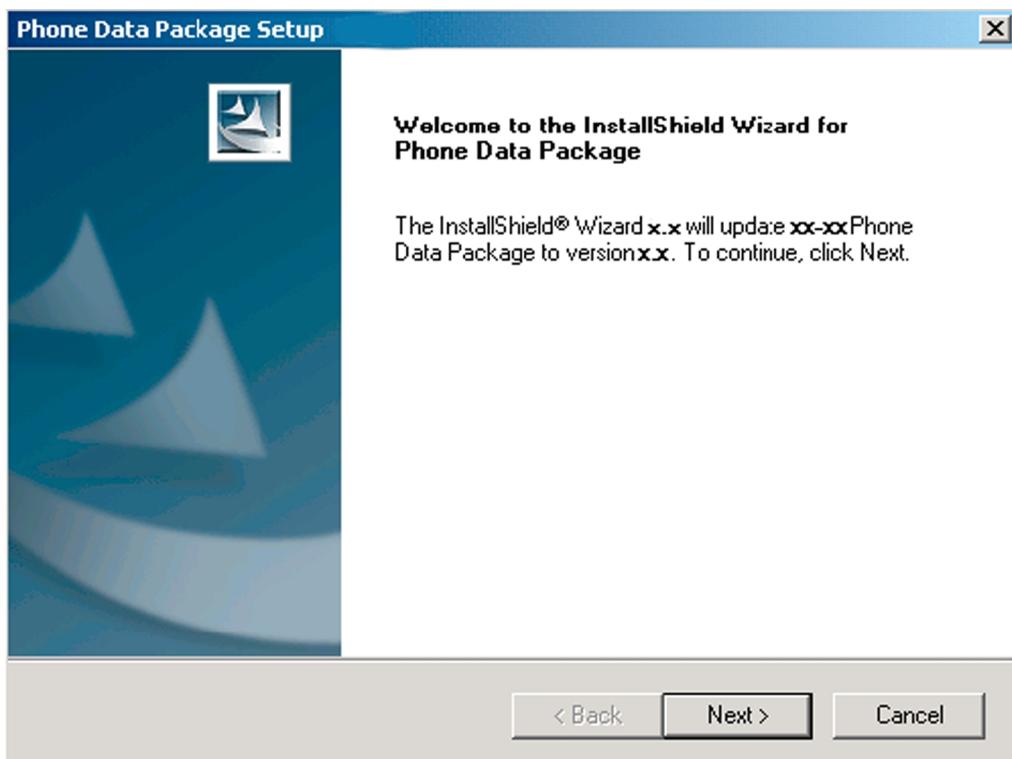


Figure 12 Continue data package installation

In this view you can see the contents of the data package. Read the text carefully. There should be information about the Phoenix version required with this data package.

4. To continue, click **Next**.

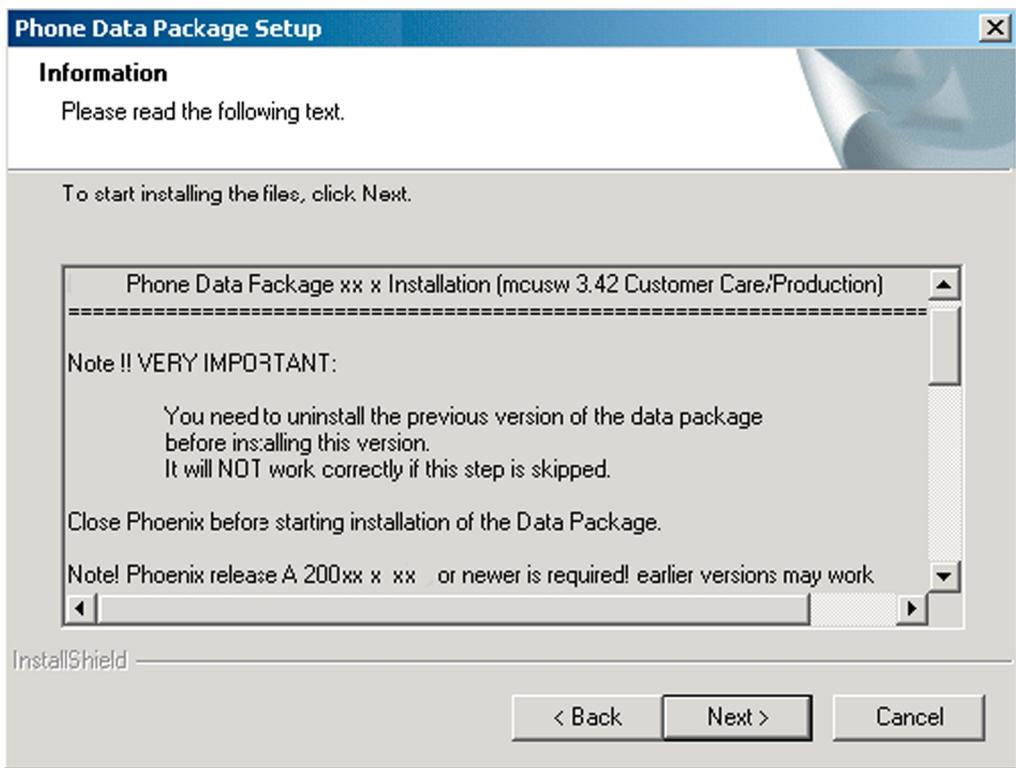


Figure 13 Data package setup information

5. Confirm location and click **Next** to continue.

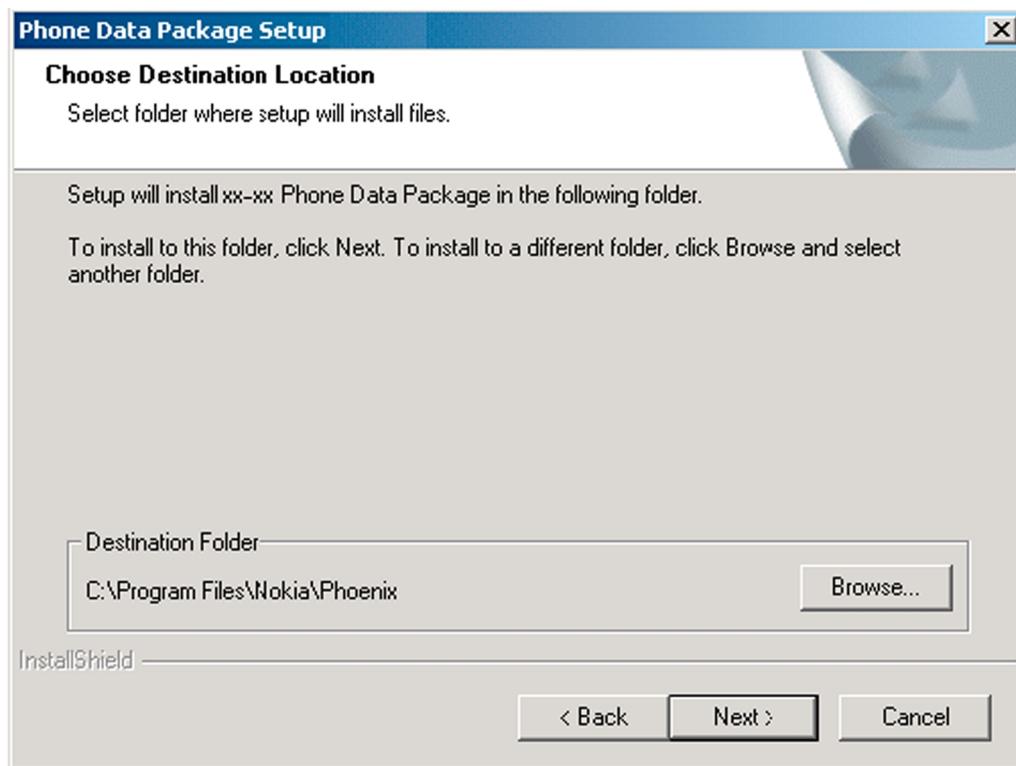


Figure 14 Data package destination folder

The install shield checks where the Phoenix application is installed and the directory is shown.

6. To start copying the files, click **Next**.

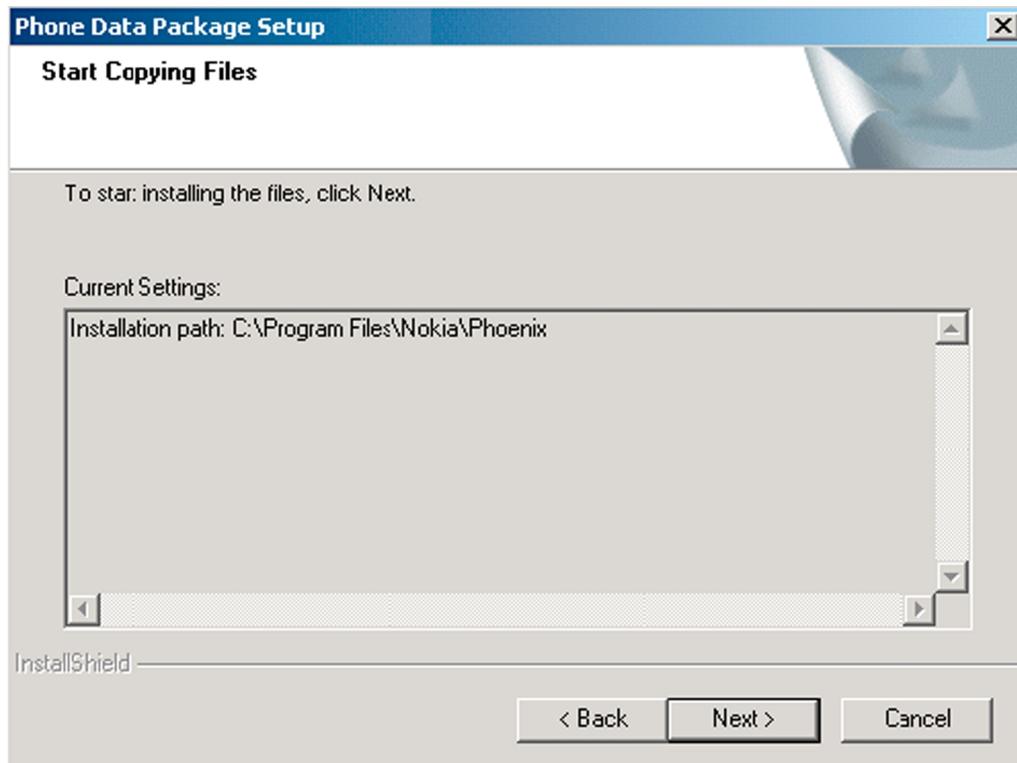


Figure 15 Start copying files

Phone model specific files will be installed. Please wait.

7. To complete the installation, click **Finish**.

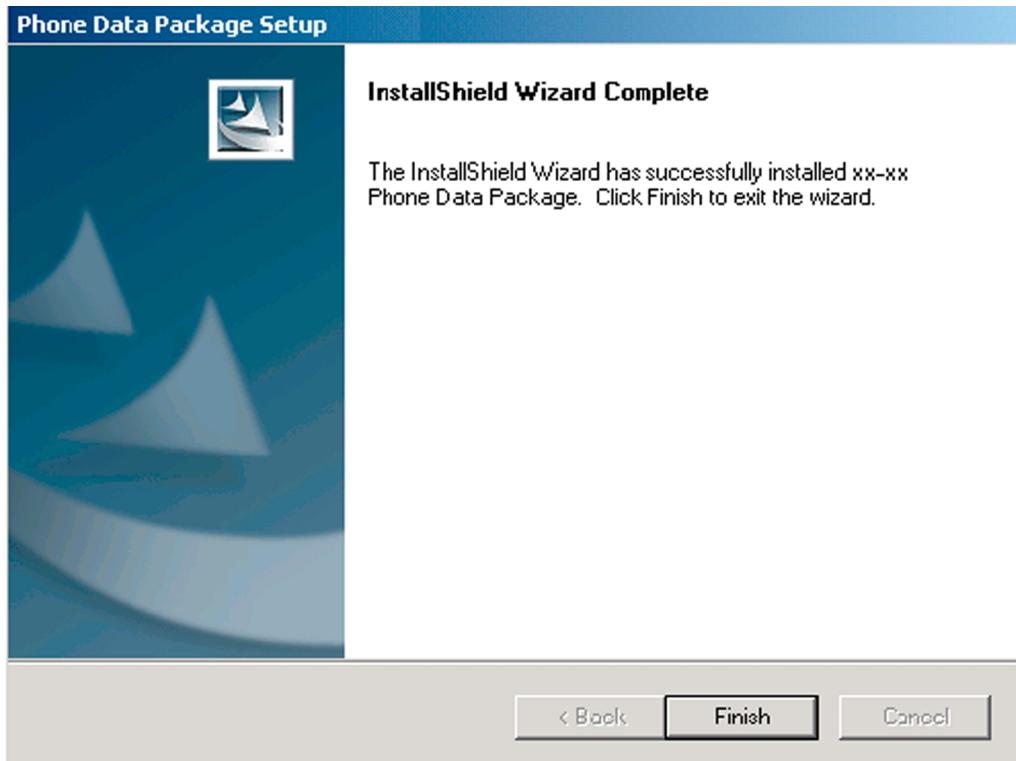


Figure 16 Finish data package installation

You now have all phone model specific files installed in your Phoenix Service SW.

Next action

Phoenix can be used, for example, for flashing phones and printing type labels after:

- configuring users
- managing connections

FPS-10 can be used after updating their Flash Update Package files.

■ Uninstalling Phoenix data package

Context

If you try to install the same version of Phoenix data package that you already have, you are asked if you want to uninstall the version you have on your PC. Older versions of data packages don't need to be uninstalled unless instructions to do so are given in the *readme.txt* file of the data package and bulletins concerning the release.

Please read all related documents carefully.

Steps

1. Click OK to uninstall, Cancel if you don't want to uninstall.

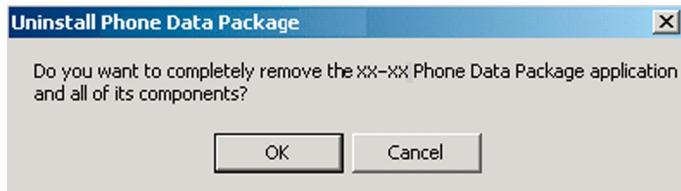


Figure 17 Uninstalling Phoenix data package

2. Once the previously installed data package is uninstalled, click **Finish**.

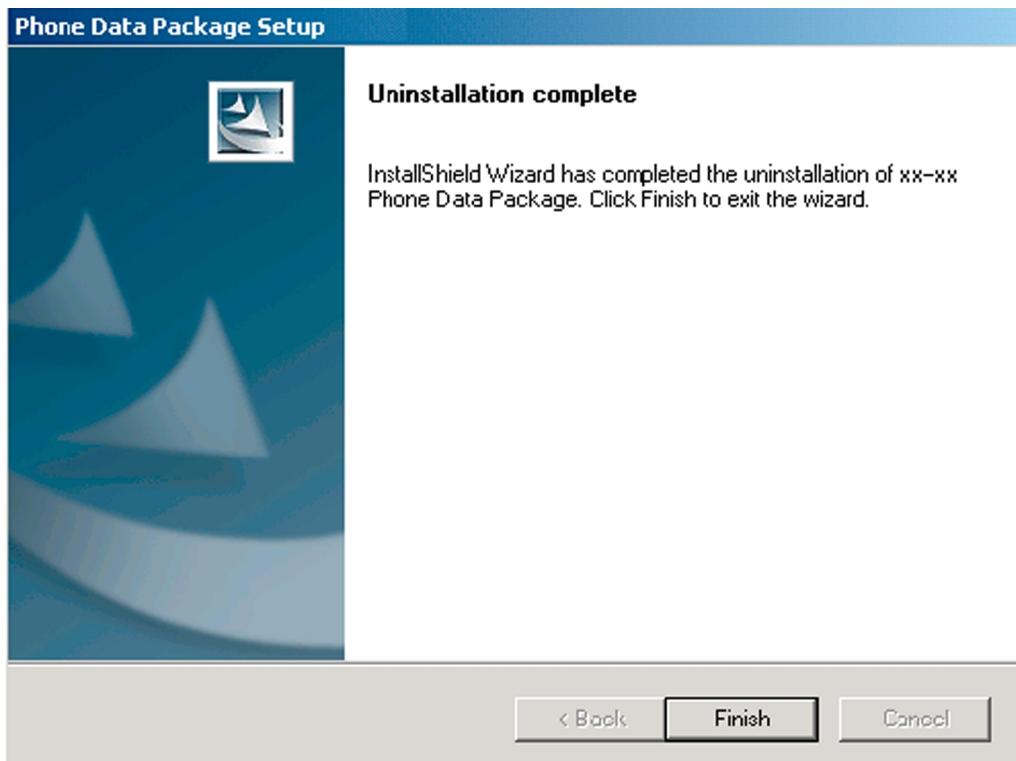


Figure 18 Finishing data package uninstallation

Alternative steps

- You can also uninstall the data package manually from **Windows Control Panel→Add/Remove Programs→xx-xx * Phone Data Package**. (*= type designator of the phone)

Next action

Reinstall the datapackage by running the product specific application file.

■ Configuring users in *Phoenix*

Steps

1. Start *Phoenix* service software, and log in.

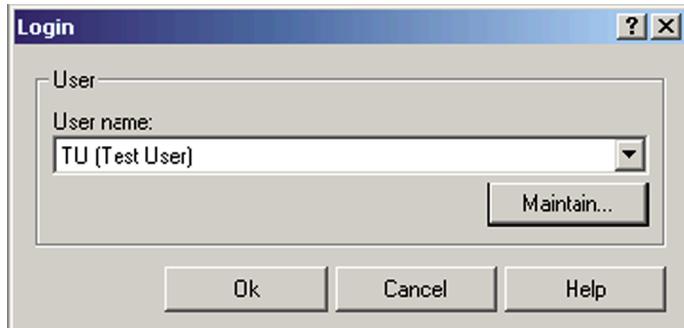


Figure 19 Phoenix login

If the user ID is already configured, select s/he from the *User name* drop-down list, and click **OK**.

2. To add a new user, or to edit existing ones, click **Maintain**.
3. To add a new user, click **New**.
4. Type in the name and initials of the user, and click **OK**.
The user is added to the user name list.
5. Select the desired user from the *User name* drop-down list, and click **OK**.

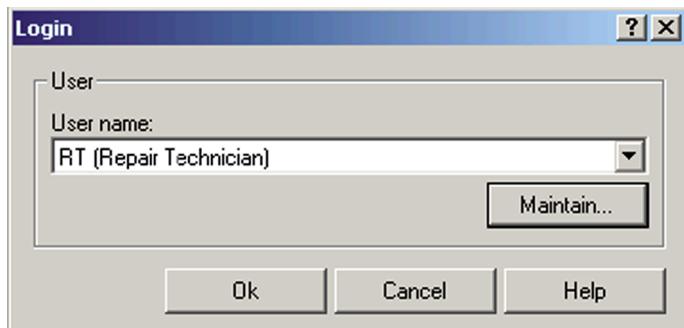


Figure 20 New user configured

■ Managing connections in Phoenix

Steps

1. Start *Phoenix Service SW* and log in.



Figure 21 Phoenix icon

2. Choose **File→Manage Connections**.

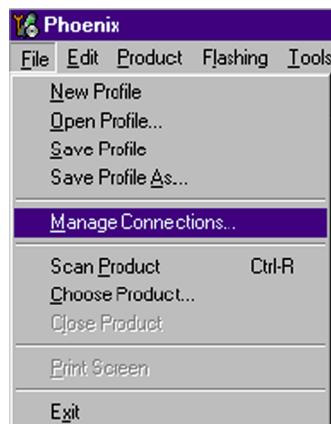


Figure 22 Manage connections

Existing connections can be selected, edited, deleted, and new ones created by using this dialog.

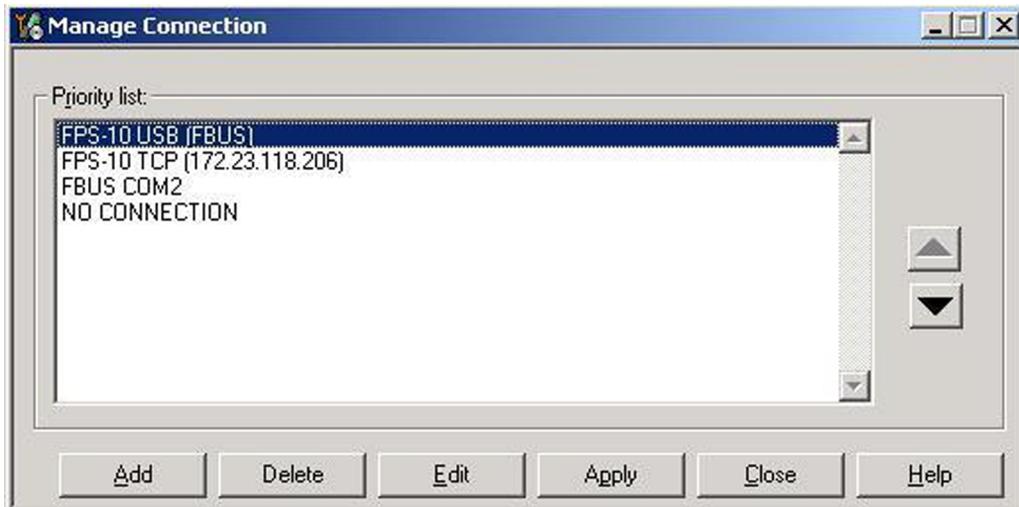


Figure 23 Connections list

3. Click **Add** to add a new connection, and select if you want to create it manually or by using the Connection Wizard.

In the following dialogs you will be asked to select settings for the connection. If you use the Wizard, connect the tools and a phone to your PC and the wizard will automatically try to configure the correct connection.

4. Select **Manual** mode, and click **Next** to continue.

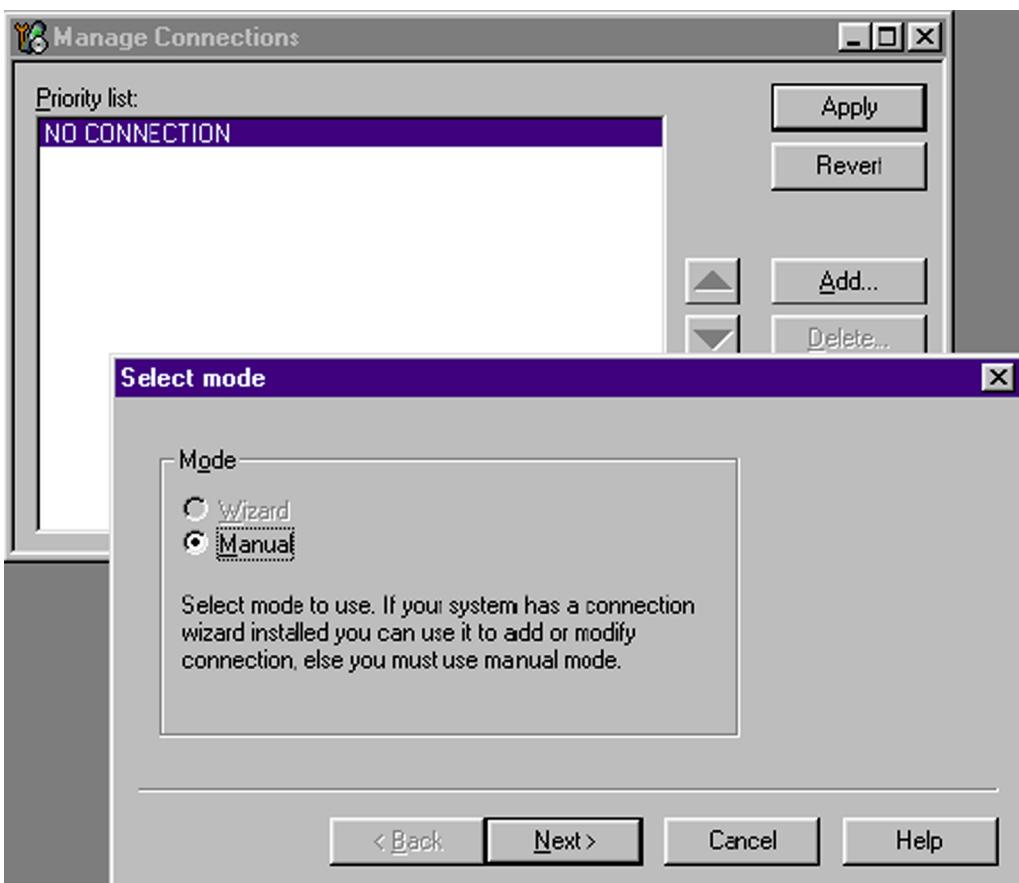


Figure 24 Select mode: Manual

- i For FPS-10 Flash Prommer with **USB Connection** choose following connection settings:
 - Media: FPS-10 USB
 - Device Index: 0
 - Serial Num: See Serial No from the label attached to the bottom of your FPS-10
 - Active Media: FBUS
 - When product is connected to PC for the first time, allow PC to install USB device drivers. Please note that this may take some time to complete.
- ii For FPS-10 Flash Prommer with **LAN connection** choose the following connection settings:
 - Media: FPS-10 TCP/IP
 - Net Serv Name: Select "Scan". Choose your own FPS-10 device based on the correct MAC address. See Serial No from the label attached to the bottom of your FPS-10.
 - Port Num: Use default value, click "Next"
 - Protocol Family: Use default value, click "Next"
 - Socket Type: Use default value, click "Next"
 - TX Buffer Size: Use default value, click "Next"
 - RX Buffer Size: Use default value, click "Next"
 - The default name for this connection is FPS-10 TCP (IP address)
- iii For a plain **FBUS** connection choose following connection settings:
 - Media: FBUS
 - Select the communication port number you are using

5. Click **Finish** to complete the configuration.

If you are using the Wizard, connect the tools and a phone to your PC and the wizard will automatically try to configure the correct connection. Please note that this may take a considerable amount of time because Phoenix will go through all connections on the PC.

6. Activate the connection you want to use by clicking it, use up/down arrows to move it on top of the list, and click **Apply**.

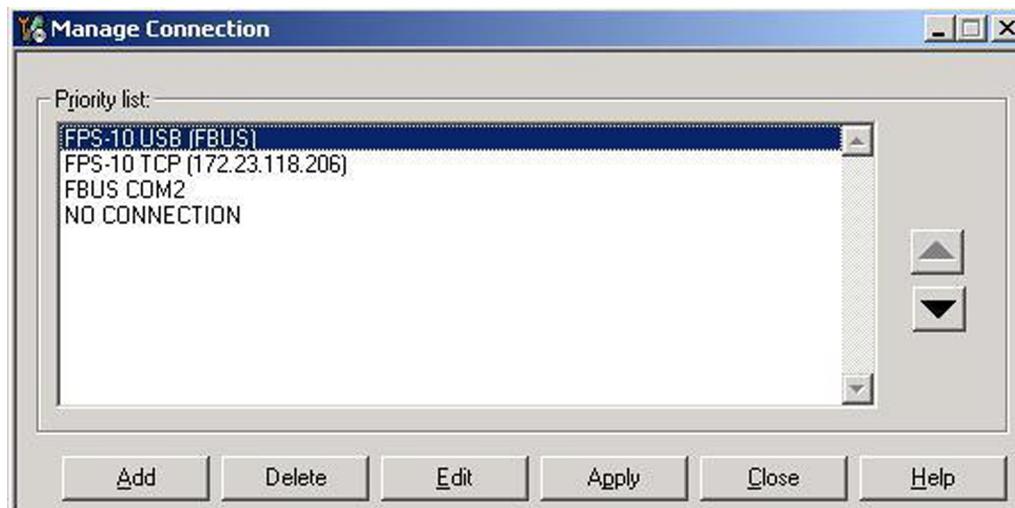


Figure 25 Connections list

The connection is now selected and can be used after closing the *Manage Connections* window.

Selected connection will be shown on the right hand bottom corner of the screen.



Figure 26 Connection information

- To use the selected connection, connect the phone to Phoenix with correct service tools, make sure that it is switched on and select **Scan Product**.

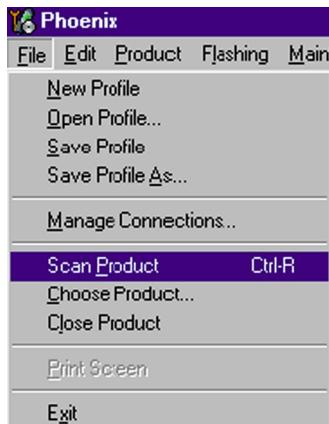


Figure 27 Scan product

When a product is found, Phoenix will load product support. Name of the loaded product support module and its version information will be shown on the bottom of the screen.

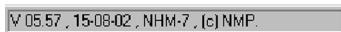


Figure 28 Product support module information

■ **Installing flash support files for FPS-10**

Before you begin

Note: You need to install flash support files for FPS-10 only, if you don't have the latest Phoenix available or the flash support files have changed after the latest Phoenix release.

- Flash support files are installed automatically, when you install Phoenix. Use Phoenix packages later than June 2005.
- Normally it is enough to install Phoenix and the phone-specific data package because the Phoenix installation always includes the latest flash update package files for FPS-10.
- A separate installation package for flash support files is available, and the files can be updated according to this instruction, if updates appear between new Phoenix / data package releases

Context

If you are not using a separate installation package, you can skip this section and continue with "["Updating FPS-10 flash prommer software,, \(page 3-25\)](#)" after installing a new phone data package.

Steps

1. To begin installation, double- click *flash_update_x_yy.exe*.

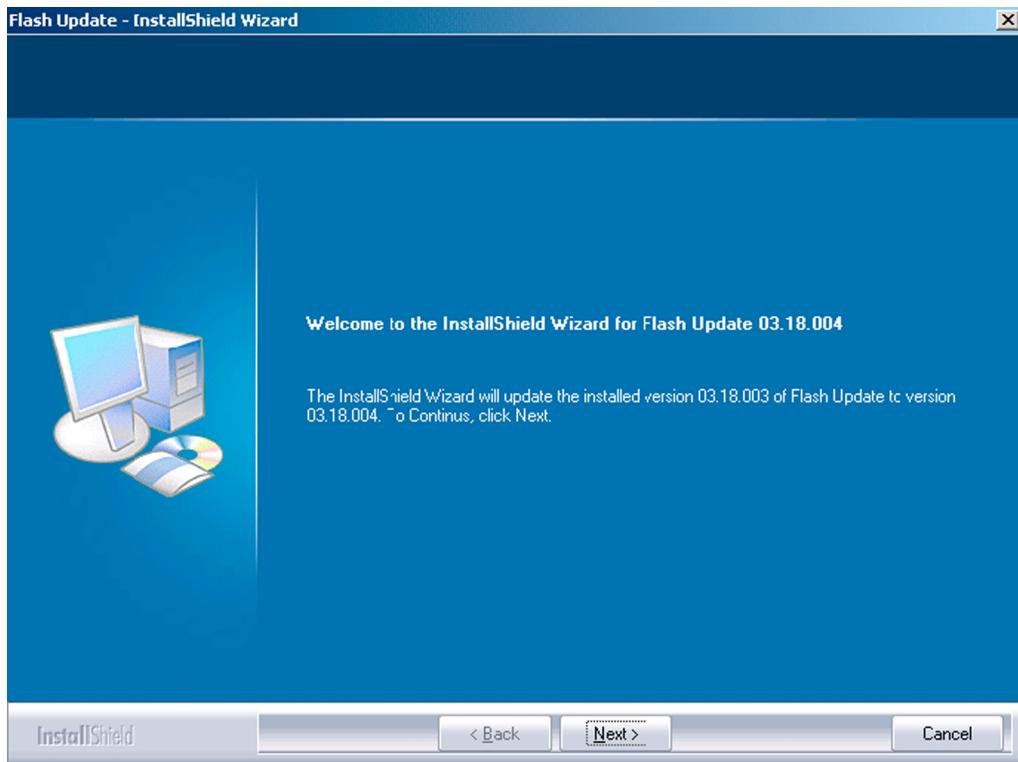


Figure 29 Flash update welcome dialog

If the same version of Flash Update package already exists, and you want to reinstall it, the previous package is first uninstalled. Restart installation again after that.

2. If you try to downgrade the existing version to older ones, the setup will be aborted. If you really want to downgrade, uninstall newer files manually from **Control Panel** and then rerun the installation again.



Figure 30 Flash installation interrupted

If an older version exists on your PC and it needs to be updated, click **Next** to continue installation.

3. It is highly recommended to install the files to the default destination folder *C:\Program Files\Nokia\Phoenix*. Click **Next** to continue.

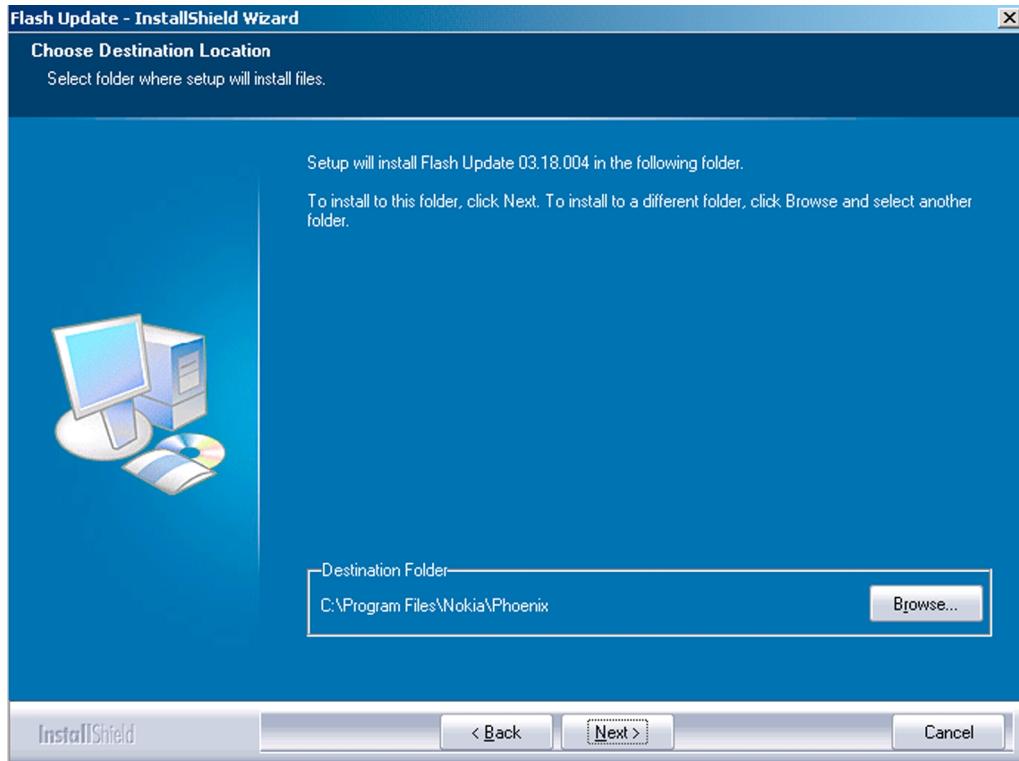


Figure 31 Flash destination folder

When installing the flash update files for the first time you may choose another location by selecting **Browse**. However, this is not recommended.

4. To complete the installation procedure, click **Finish**.

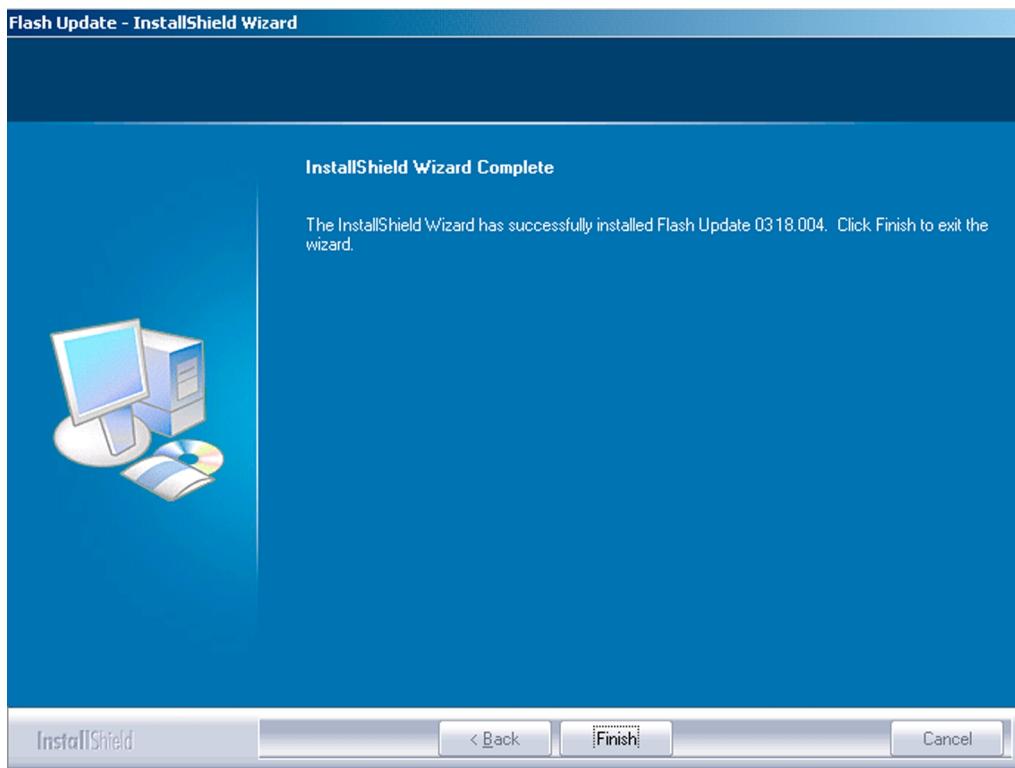


Figure 32 Finish flash update

Next action

FPS-10 flash prommers must be updated using Phoenix!

■ Updating FPS-10 flash prommer software

Steps

1. Start *Phoenix Service Software* and log in, manage connection correctly for your flash prommer.
2. Choose **Flashing→Prommer maintenance**.



Figure 33 Choosing Prommer maintenance

3. When the new flash update package is installed to the computer you will be asked to update the files to your Prommer. To update the files, click **Yes**. Click **OK** if the computer informs you about an unsafe removal of the device.
4. Alternatively you can update the FPS-10 flash prommer software by clicking the **Update** button.

5. Wait until you are notified that update has been successful; the procedure will take a couple of minutes. Click **OK** to close the *Update Done* window.

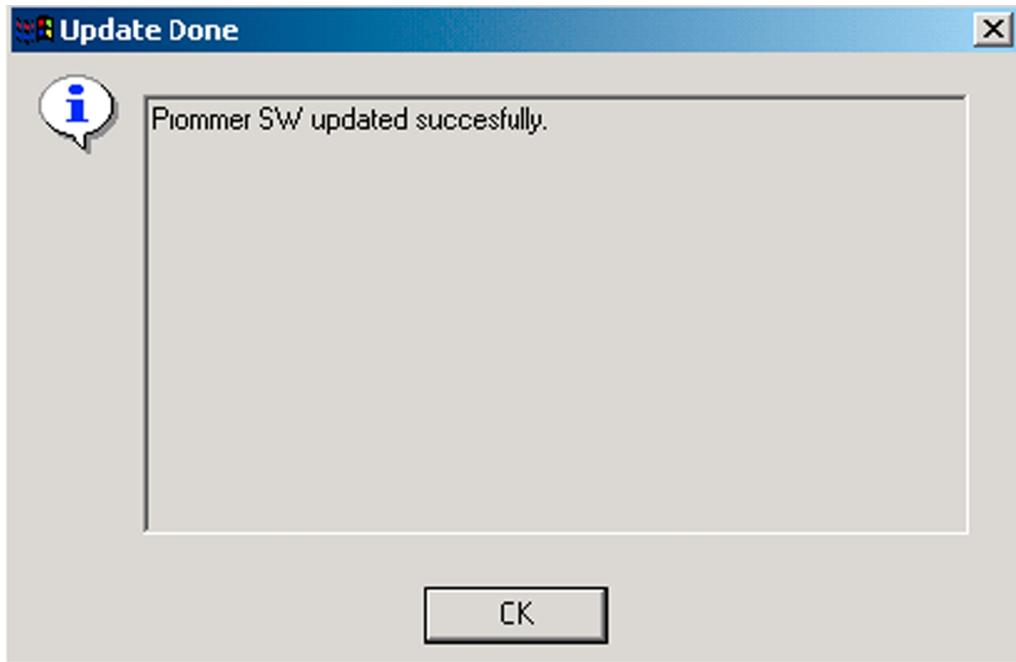


Figure 34 Prommer SW update finished

- If you are using the FPS-10 flash prommer, check that it is detected from the progress info. Check also the status leds in the FPS-10. The MODE2 led (green), VBAT and POWER leds (red) should be lit. If you are using LAN connection, the LAN led (yellow) should be blinking.
- Check that your FPS-10 flash prommer has enough memory. Flashing the SU-18 with FPS-10 needs at least 128 MB of SRAM memory in the prommer.

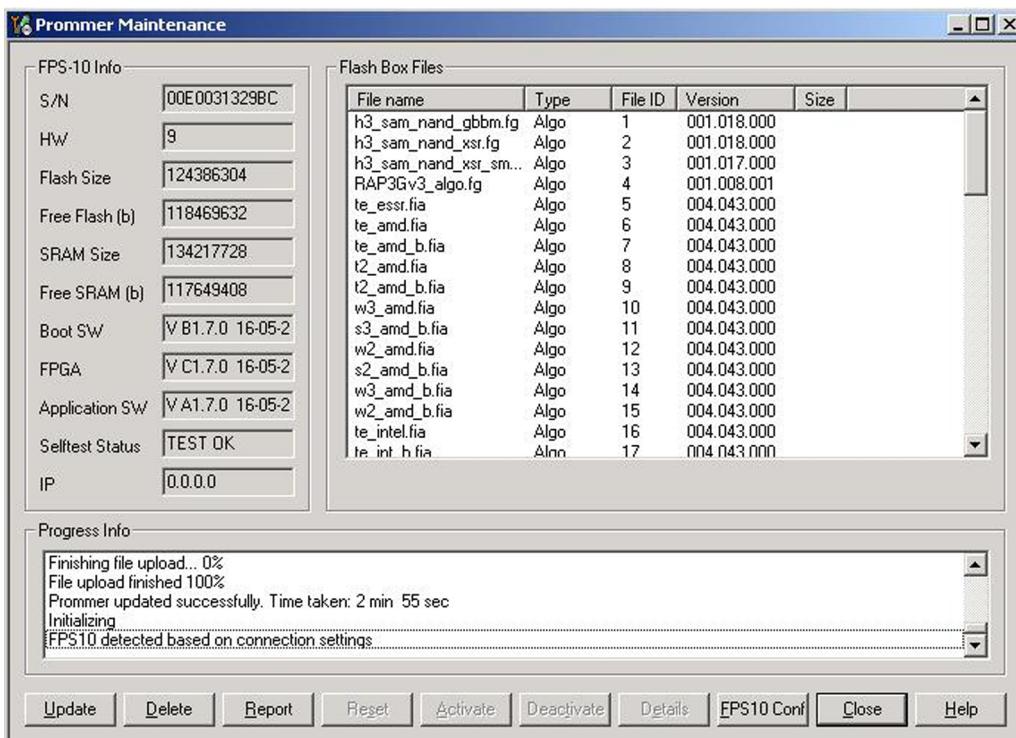


Figure 35 Prommer maintenance window

Alternative steps

- You can update FPS-10 SW by clicking the **Update** button and selecting the appropriate fpsupd.ini file in *C:\Program Files\Nokia\Phoenix\Flash*.

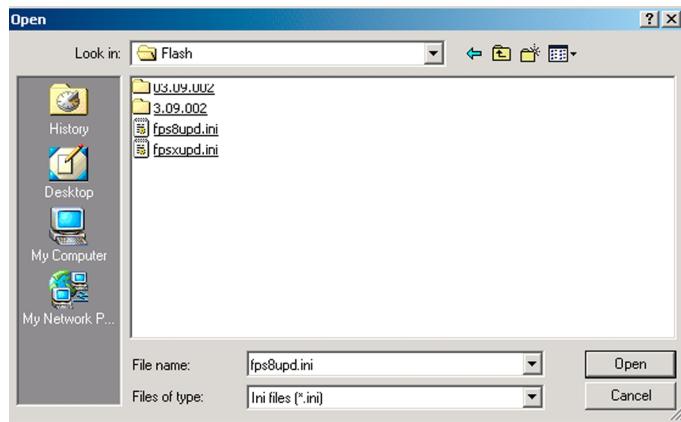


Figure 36 Flash directory window

- All files can be loaded separately to the prommer used. To do this, click the right mouse button in the *Flash box files* window and select the file type to be loaded.
- More information can be found in Phoenix **Help**.

■ Flashing with FPS-10 Flash Prommer

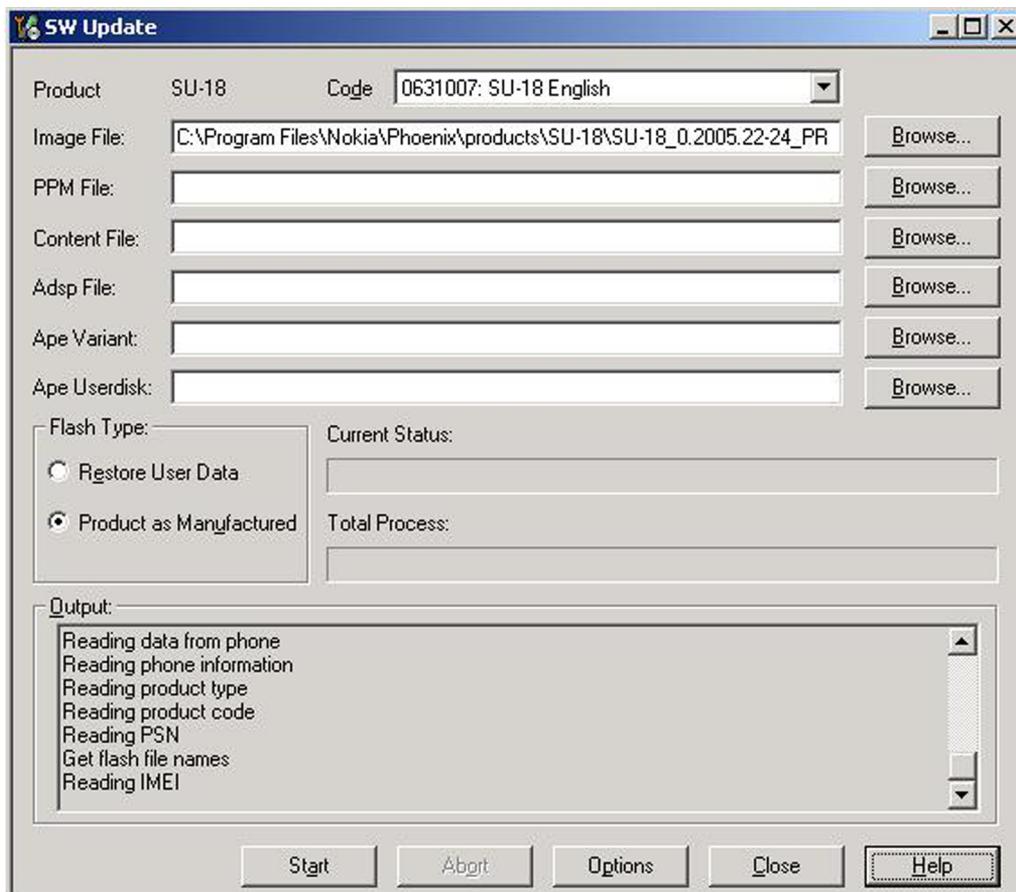
Steps

- First setup flashing like described in the SS-46 flash concept or in the CU-4 flash concept.
Remember to connect the DKE-2 cable from the FPS-10 to the product.
- Start *Phoenix Service Software*. Log in and manage connection for the FPS-10. Create and select **USB Connection** or **LAN connection** depending on the flashing setup.
- Check that FPS-10 is detected. Check also the status leds in the FPS-10. The MODE2 led (green), VBAT and POWER leds (red) should be lit. If you are using a LAN connection, the LAN led (yellow) should be blinking.
- Choose **Flashing ->SW Update**.



Figure 37 Choosing SW Update

- The SW Update dialog reads product code and sets flash file name to a default name, if you have installed the datapackage. Click **Browse** button and select another file to be flashed, if you want.
- Click **Start** to flash the product. Wait until you are notified that the flashing has been successful. The procedure will take a couple of minutes. The USB led (green) should be blinking during flashing. The MODE2 is blinking when the file is loaded to the FPS-10 flash prommer. See the flash progress also from the *SW Update* window.
- After a successful flashing, click the **Close** button to close the *SW Update* window.

**Figure 38 SW Update window**

4 — Service Tools and Service Concepts

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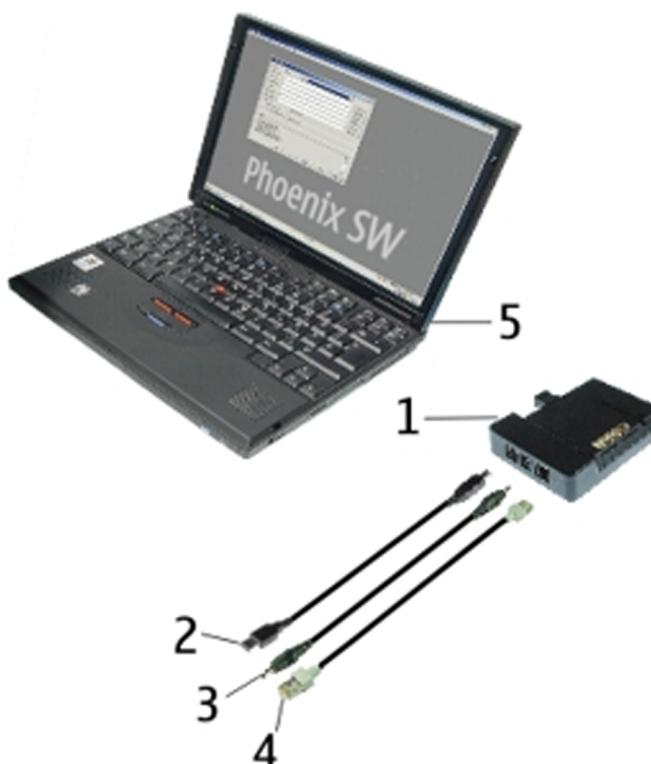
■ Service tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product SU-18, refer to various concepts.

	AC-33	Power supply	
	Universal power supply for FPS-10; included in the FPS-10 sales package.		
	AD-25FS	Flash adapter	
	AD-25FS has the following features: <ul style="list-style-type: none">• Provides galvanic connection to terminal test pads• Provides standardized interface towards Control Unit• Provides RF connection using galvanic connector or coupler		
	CA-31D	USB cable	
	The CA-31D USB cable is used to connect FPS-10 or FPS-11 to a PC. It is included in the FPS-10 and FPS-11 sales packages.		

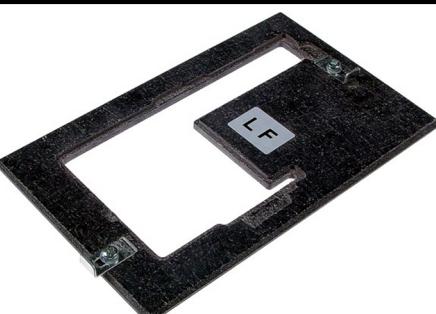


CA-35S	Power cable	
CA-35S is a power cable for connecting, for example, the FPS-10 flash prommer to the Point-Of-Sales (POS) flash adapter.		

	CU-4 Control unit	
	<p>CU-4 is a general service tool used with a module jig and/or a flash adapter. It requires an external 12 V power supply.</p> <p>The unit has the following features:</p> <ul style="list-style-type: none"> • software controlled via USB • EM calibration function • Forwards FBUS/Flashbus traffic to/from terminal • Forwards USB traffic to/from terminal • software controlled BSI values • regulated VBATT voltage • 2 x USB2.0 connector (Hub) • FBUS and USB connections supported <p>When using CU-4, note the special order of connecting cables and other service equipment:</p> <p>Instructions</p> <ol style="list-style-type: none"> 1 Connect a service tool (jig, flash adapter) to CU-4. 2 Connect CU-4 to your PC with a USB cable. 3 Connect supply voltage (12 V) 4 Connect an FBUS cable (if necessary). 5 Start Phoenix service software.  <p>Note: Phoenix enables CU-4 regulators via USB when it is started. Reconnecting the power supply requires a Phoenix restart.</p>	

 A photograph of the DAU-9S MBUS cable. It features a black modular connector at one end and a blue RJ-45 connector at the other. A coiled green cable connects the two connectors.	DAU-9S	MBUS cable	
		The MBUS cable DAU-9S has a modular connector and is used, for example, between the PC's serial port and module jigs, flash adapters or docking station adapters.	Note: Docking station adapters valid for DCT4 products.
 A photograph of the DKE-2 Mini-USB cable. It consists of a black cable with a standard USB A connector on one end and a smaller Mini-USB connector on the other.	DKE-2	Mini-USB cable	
 A photograph of the FLS-4S flash device. It is a dark grey rectangular unit with various ports and connectors, including a serial port, a network port, and a power input.	FLS-4S	Flash device	FLS-4S is a dongle and flash device incorporated into one package, developed specifically for POS use.

	FPS-10	Flash prommer	
<p>FPS-10 interfaces with:</p> <ul style="list-style-type: none"> • PC • Control unit • Flash adapter • Smart card <p>FPS-10 flash prommer features:</p> <ul style="list-style-type: none"> • Flash functionality for BB5 and DCT-4 terminals • Smart Card reader for SX-2 or SX-4 • USB traffic forwarding • USB to FBUS/Flashbus conversion • LAN to FBUS/Flashbus and USB conversion • Vusb output switchable by PC command <p>FPS-10 sales package includes:</p> <ul style="list-style-type: none"> • FPS-10 prommer • Power Supply with 5 country specific cords • USB cable 			
	JBT-9	Bluetooth test and interface box (sales package)	
<p>The JBT-9 test box is a generic service device used to perform Bluetooth bit error rate (BER) testing, and establishing cordless FBUS connection via Bluetooth. An ACP-8x charger is needed for BER testing and an AXS-4 cable in case of cordless interface usage testing .</p> <p>Sales package includes:</p> <ul style="list-style-type: none"> • JBT-9 test box • Installation and warranty information 			
	MJ-53	Module jig	
<p>MJ-53 is meant for component level troubleshooting.</p> <p>The jig includes an RF interface for WLAN and Bluetooth. In addition, it has the following features:</p> <ul style="list-style-type: none"> • Provides mechanical interface with Engine module • Provides galvanic connection to all needed test pads in module • Multiplexing between USB and FBUS media, controlled by Vusb • UI test interface • MMC interface • Audio components: IHF, MIC, earpiece • Connector for control unit • Access for USB connector 			

	PCS-1	Power cable	
The PCS-1 power cable (DC) is used with a docking station, a module jig or a control unit to supply a controlled operating voltage.			
	PKD-1	SW security device	
SW security device is a piece of hardware enabling the use of the service software when connected to the parallel (LPT) port of the PC. Without the device, it is not possible to use the service software. Printer or any such device can be connected to the PC through the device if needed.			
	RJ-78	Rework jig	
RJ-78 is a soldering jig used for soldering and as a rework jig for the engine module.			
	SA-85	Bluetooth coupler	
SA-85 is a coupler for WLAN (BT) testing. It is used together with AD-25FS flash adapter.			

	SB-7	WLAN test box	
WLAN test requires defined position for the device.			
	SPS-1	Soldering Paste Spreader	
	SPS-2	Soldering paste spreader	
	SRT-6	Opening tool	

	SS-46	Interface adapter	
	SS-46 acts as an interface adapter between a product-specific flash adapter and FPS-10.		
	XCS-4	Modular cable	
	XCS-4 is a shielded (one specially shielded conductor) modular cable for flashing and service purposes.		
	XRS-6	RF cable	
	<p>The RF cable is used to connect, for example, a module repair jig to the RF measurement equipment. SMA to N-Connector ca. 610mm.</p> <p>Attenuation for:</p> <ul style="list-style-type: none">• GSM850/900: 0.3+-0.1 dB• GSM1800/1900: 0.5+-0.1 dB• WLAN: 0.6+-0.1dB		

■ Service concepts

MJ-53 module jig concept

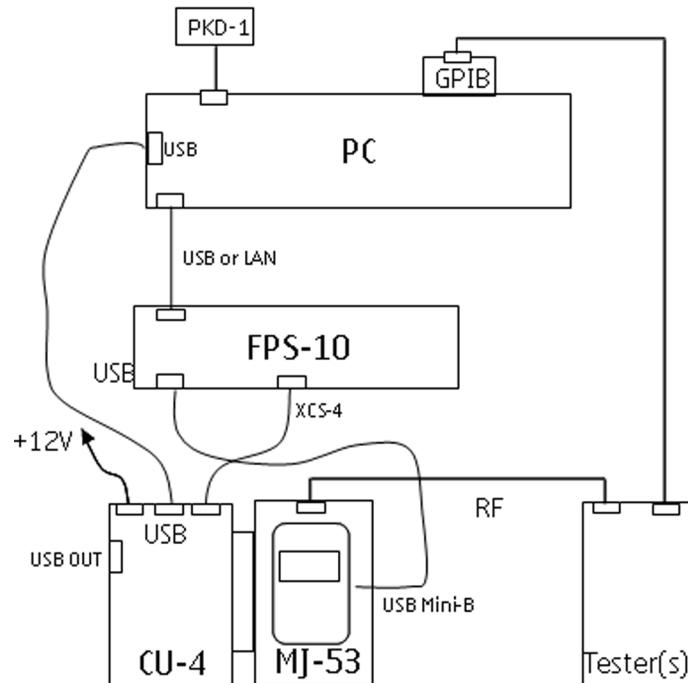
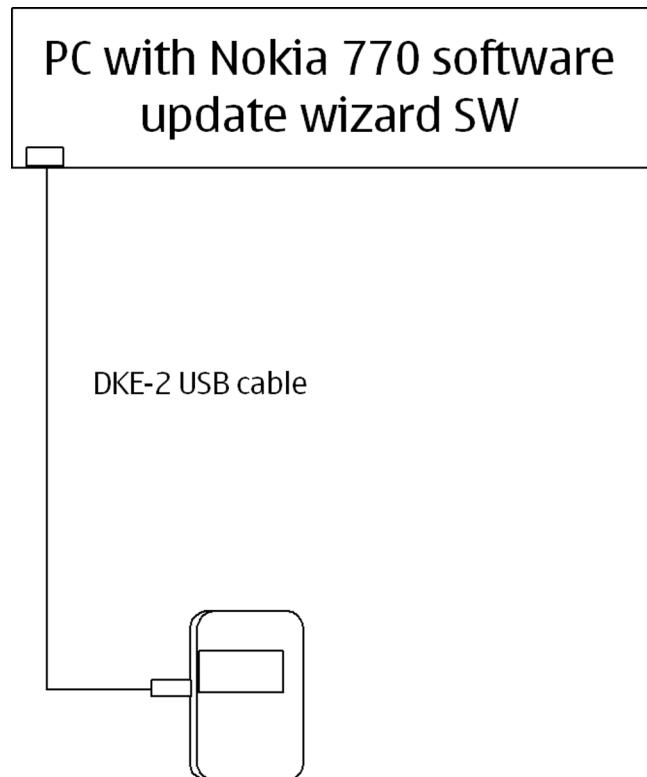


Figure 39 MJ-53 module jig service concept

Item	Type	Description
1	MJ-53	Module jig
2	CU-4	Control unit
3	FPS-10	Flash prommer box
4	XCS-4	Modular cable
5	PCS-1	DC power cable
6		Standard USB cable
7		Standard USB cable
8	DKE-2	Mini-USB cable
9	GPIB	Control cable
10	XRS-6	RF cable
11	PKD-1	SW security device

POS flash concept

SU-18
Figure 40 POS flash concept

Item	Type	Description
1	PC	PC with Nokia 770 software update wizard SW
2	DKE-2	Mini-USB cable

Bluetooth test concept with JBT-9

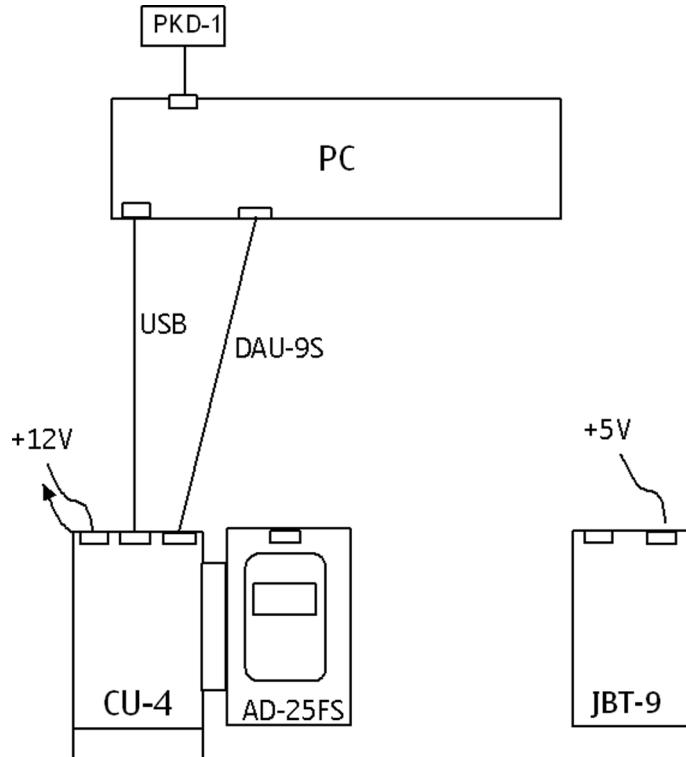


Figure 41 Bluetooth test concept with JBT-9

Item	Type	Description
1	AD-25FS	Flash adapter
2	CU-4	Control unit
3		Standard USB cable
4	PCS-1	DC power cable
5	DAU-9S	Cable
6	PKD-1	SW security device
7	ACP-8	Charger for JBT-9

WLAN functionality testing concept with SB-7

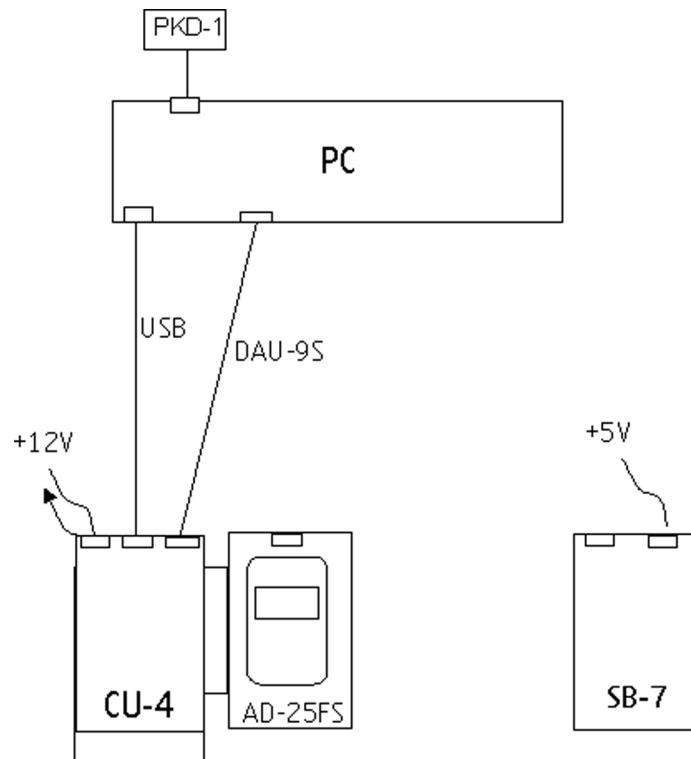


Figure 42 WLAN functionality testing concept with SB-7

Item	Type	Description
1	AD-25FS	Flash adapter
2	CU-4	Control unit
3		Standard USB cable
4	PCS-1	DC power cable
5	DAU-9S	Cable
6	PKD-1	SW security device

Service concept for RF testing and RF/BB tuning

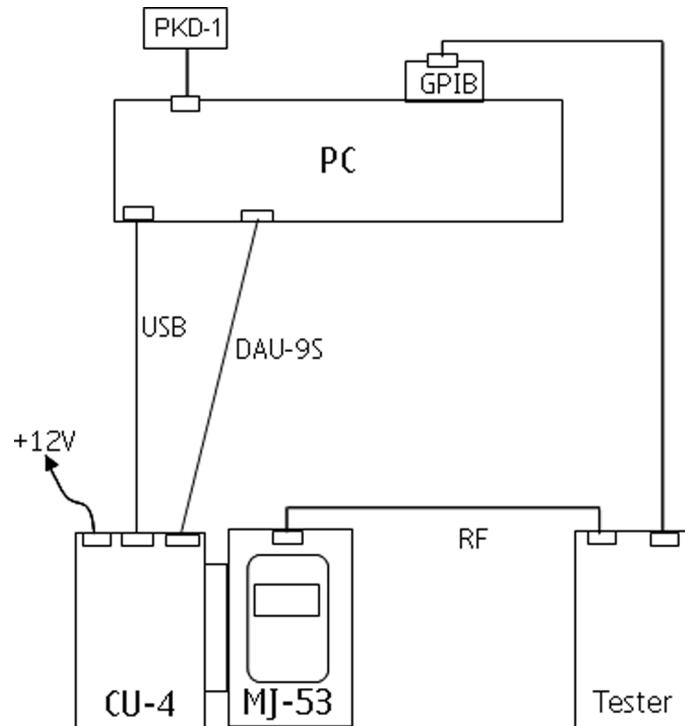


Figure 43 Service concept for RF testing and BB tuning

Item	Description	Type
1	MJ-53	Module jig
2	CU-4	Control unit
3		Standard USB cable
4	PCS-1	DC power cable
5	DAU-9S	Cable
6	XRS-6	RF cable
7		GPIB control cable
8	PKD-1	SW security device

CU-4 flash concept with FPS-10

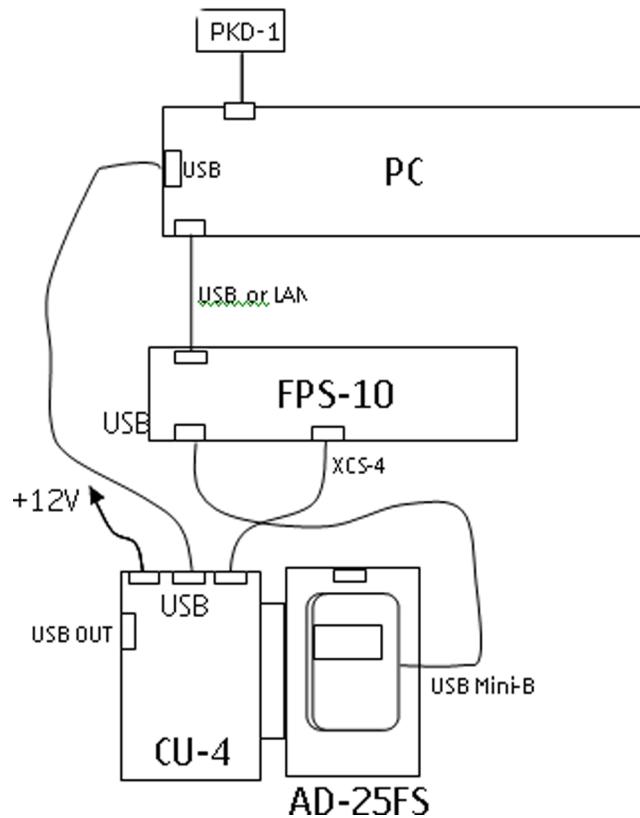


Figure 44 CU-4 flash concept with FPS-10

Item	Description	Type
1	AD-25FS	Flash adapter
2	CU-4	Control unit
3	PCS-1	Power cable
4	XCS-4	Modular cable
5	FPS-10	Flash prommer box
6		Standard USB cable
7		Standard USB cable
8	DKE-2	Mini-USB cable
9	PKD-1	SW security device

RF and BB testing concept with coupler

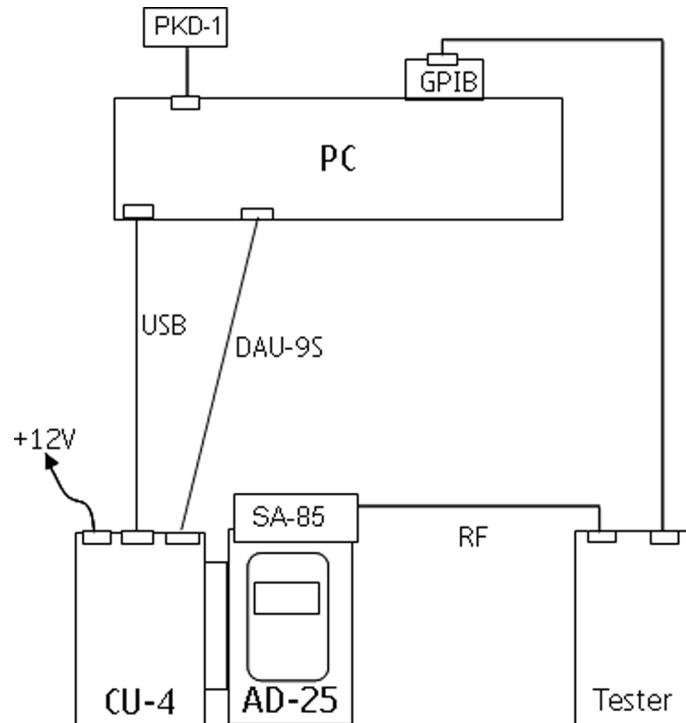
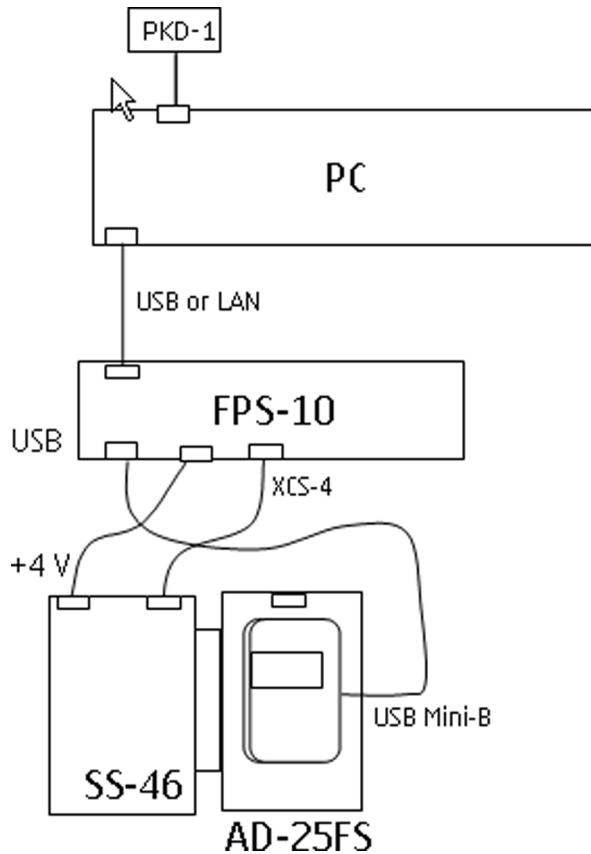


Figure 45 RF and BB testing concept with coupler

Item	Type	Description
1	AD-25FS	Flash adapter
2	CU-4	Control unit
3	SA-85	BT coupler
4	PCS-1	Power cable
5		Standard USB cable
6		Standard USB cable
7	DAU-9S	Cable
8	GPIB	Control cable
9	XRS-6	RF antenna cable
10	PKD-1	SW security device

SS-46 flash concept with FPS-10**Figure 46 SS-46 flash concept with FPS-10**

Item	Type	Description
1	AD-25FS	Flash adapter
2	SS-46	Interface adapter
3	CA-35S	Power cable
4	XCS-4	Modular cable
5	FPS-10	Flash prommer box
6		Standard USB cable
7	DKE-2	Mini-USB cable
8	PKD-1	SW security device

5 — Disassembly / Reassembly Instructions

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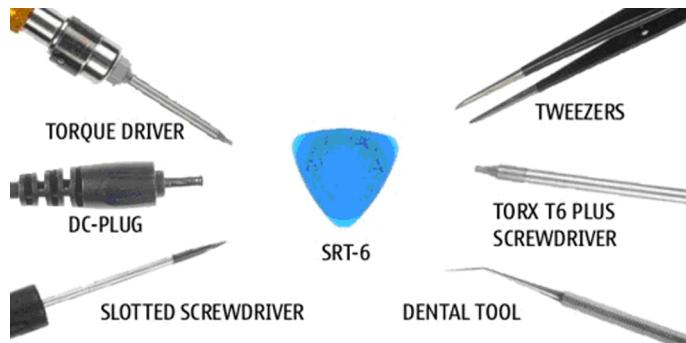
■ Disassembly / reassembly instructions

Before you begin

- Reassembly takes place in the reverse order.

Steps

1. Use these tools for disassembly and assembly.



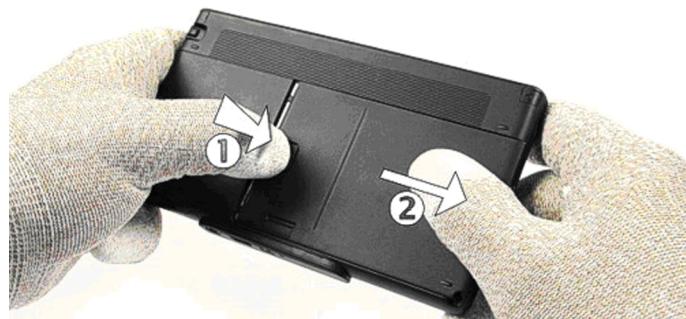
2. Remove the C-Cover Assy.



3. Do not use protection foil, as removing of the foil may damage the touchpad. Take special care to the **Display Module** during disassembly and assembly.



4. Push down the **Battery Cover Release Button** and remove the **Battery Cover**. Always remove the battery before continuing disassembly.



5. Remove the **Stylus**.



6. Two of five screws are covered with the **Screw Covers**.



7. Remove the **Screw Covers** by using the dental tool. Always use new **Screw Covers** when reassembling the device.



8. Unscrew the five, Torx Plus® size 6 screws in the shown order. For assembly, use the reverse order and a Torx Plus® size 6 driver with a torque setting of 30Ncm.



9. Use a clean cloth when opening the A-Cover and B-Cover.



10. Remove the **A-Cover Assy** by twisting it from the **Fastening Cover**.



11. Remove the **Keymat Front** and the **Keymat Top**. **Display Module** needs to be supported all the time when turning over the device!

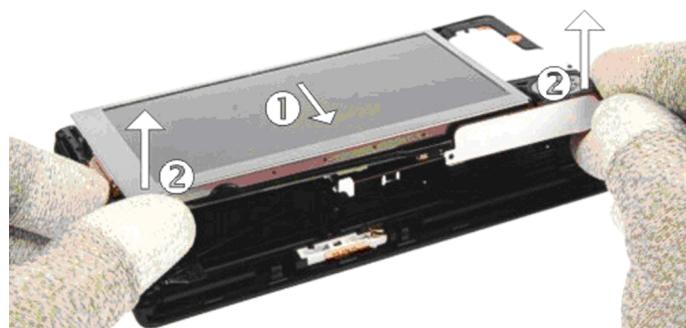


12. Release the clips of the **Battery Holder** carefully.

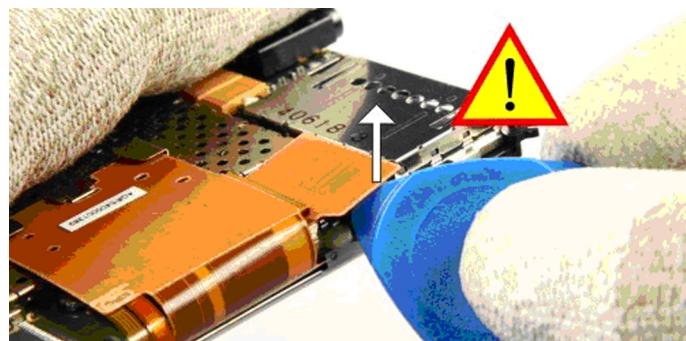
Note: Note! It is not allowed to bend the **Battery Holder Metals**.



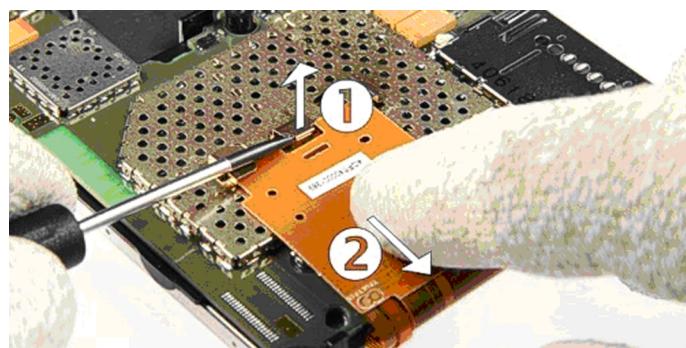
13. Remove the **Frame Assy** with the **Engine Module** and the **Display Module** from the **B-Cover**.



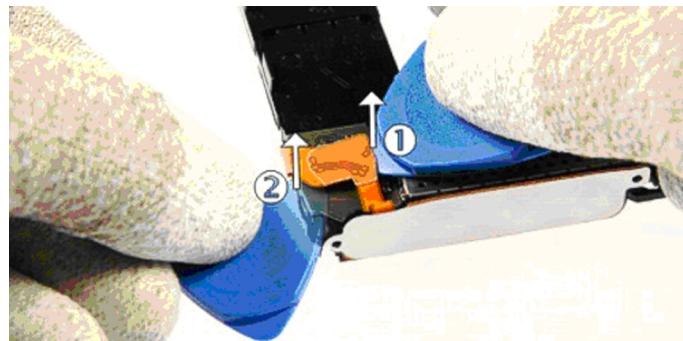
14. Unplug the **Display Connector** carefully with the SRT-6.



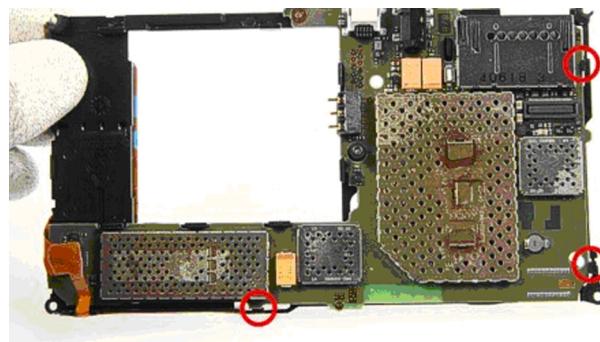
15. Release the Flex of the **Display** using a slotted screwdriver.



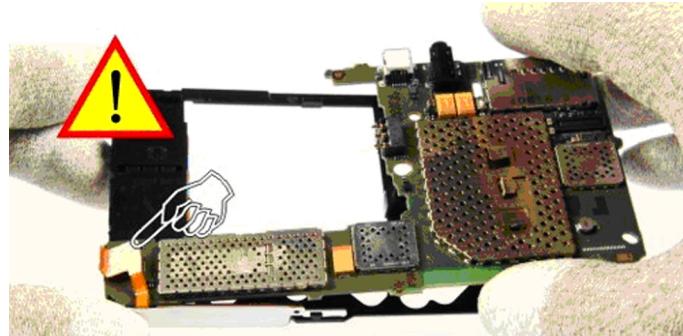
16. Unplug the **Keymat Flex Connector** carefully by using the SRT-6.



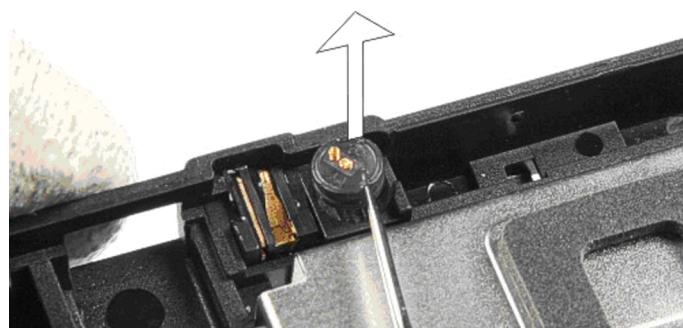
17. The **Engine Module** is secured with three snaps to the **Frame Assy**. Release the snaps carefully.



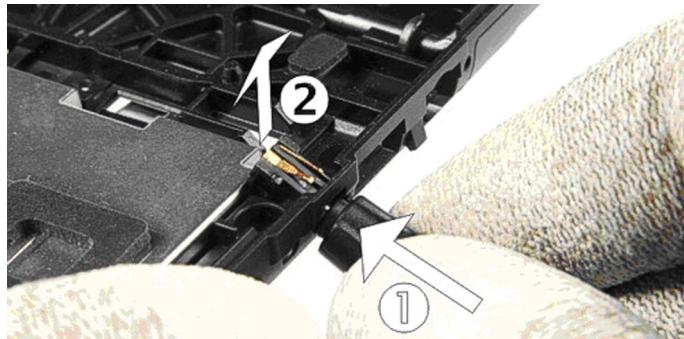
18. Remove the **Engine Module** paying attention to the **Keymat Flex Connector**.



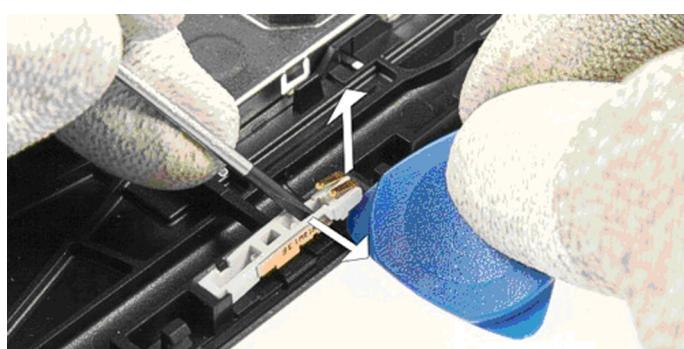
19. Remove the **Microphone** with the dental tool.



20. Press out the **DC-Jack** by using **DC-plug**.



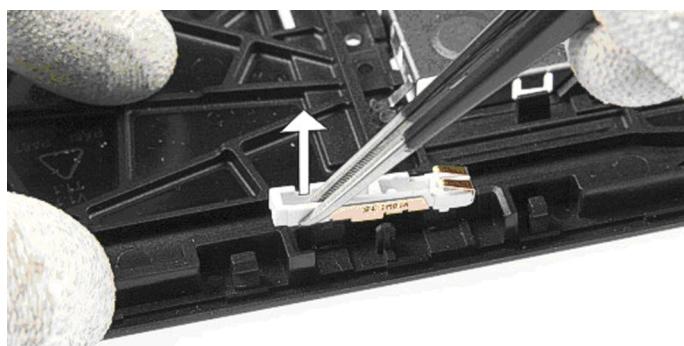
21. Unlock the first snap. Push the **Antenna Assy** with a slotted screwdriver and lift it using the SRT-6 as a lever.



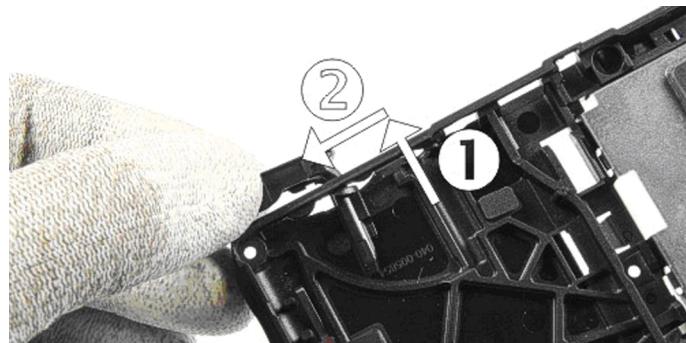
22. Now, unlock the other side of the **Antenna Assy**.



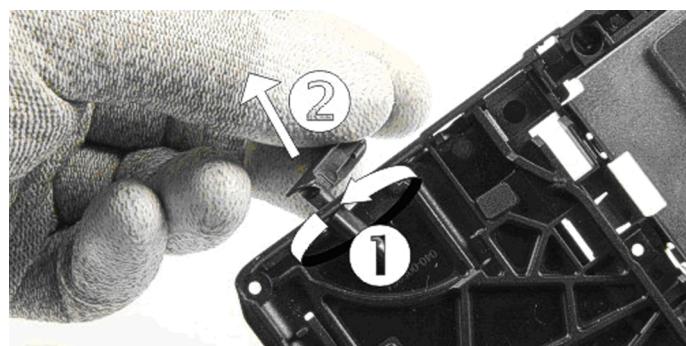
23. Remove the **Antenna Assy** carefully with tweezers.



24. Remove the **MMC Cover** by pushing it out and position it in the middle of its guidance.



25. Turn over the **MMC Cover** to 180° and remove it.



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6 — BB Troubleshooting and Manual Tuning Guide

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■ Baseband troubleshooting

Context

This section is intended to be a guide for localising and repairing electrical faults. The fault repairing is divided into troubleshooting paths.

The following main troubleshooting tree describes the different baseband troubleshooting paths to be followed in fault situations.

Troubleshooting flow

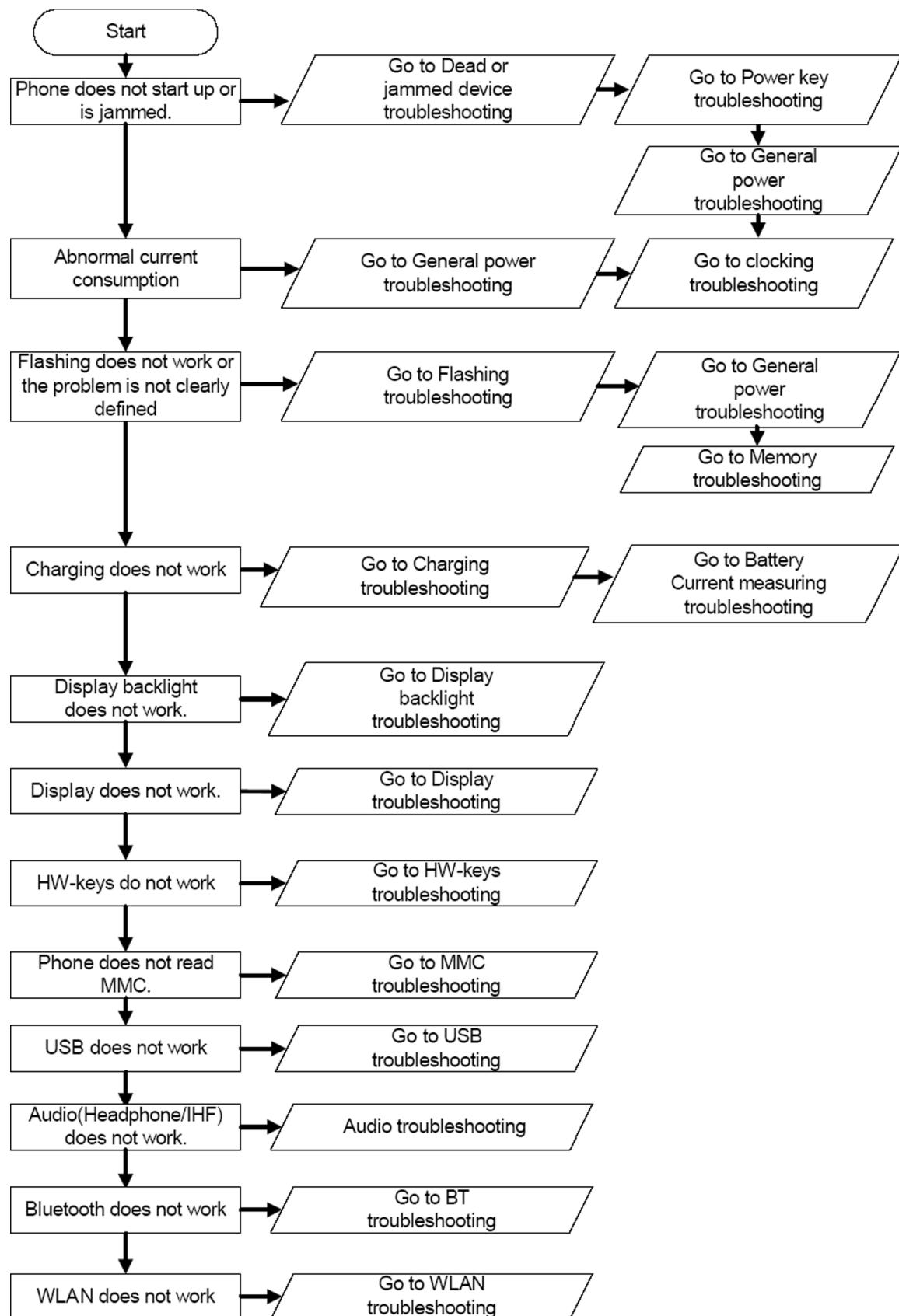
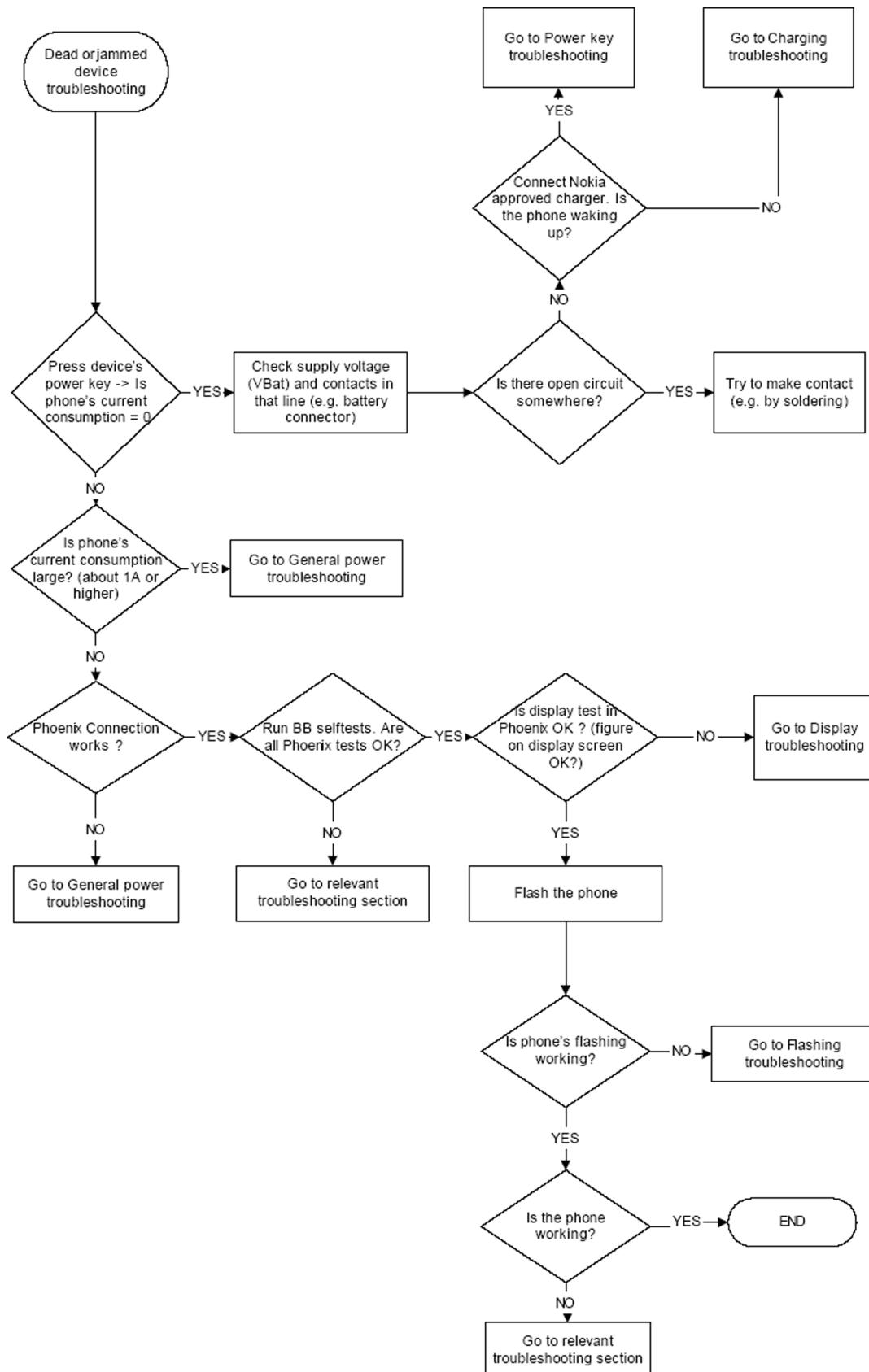


Figure 47 Main troubleshooting tree

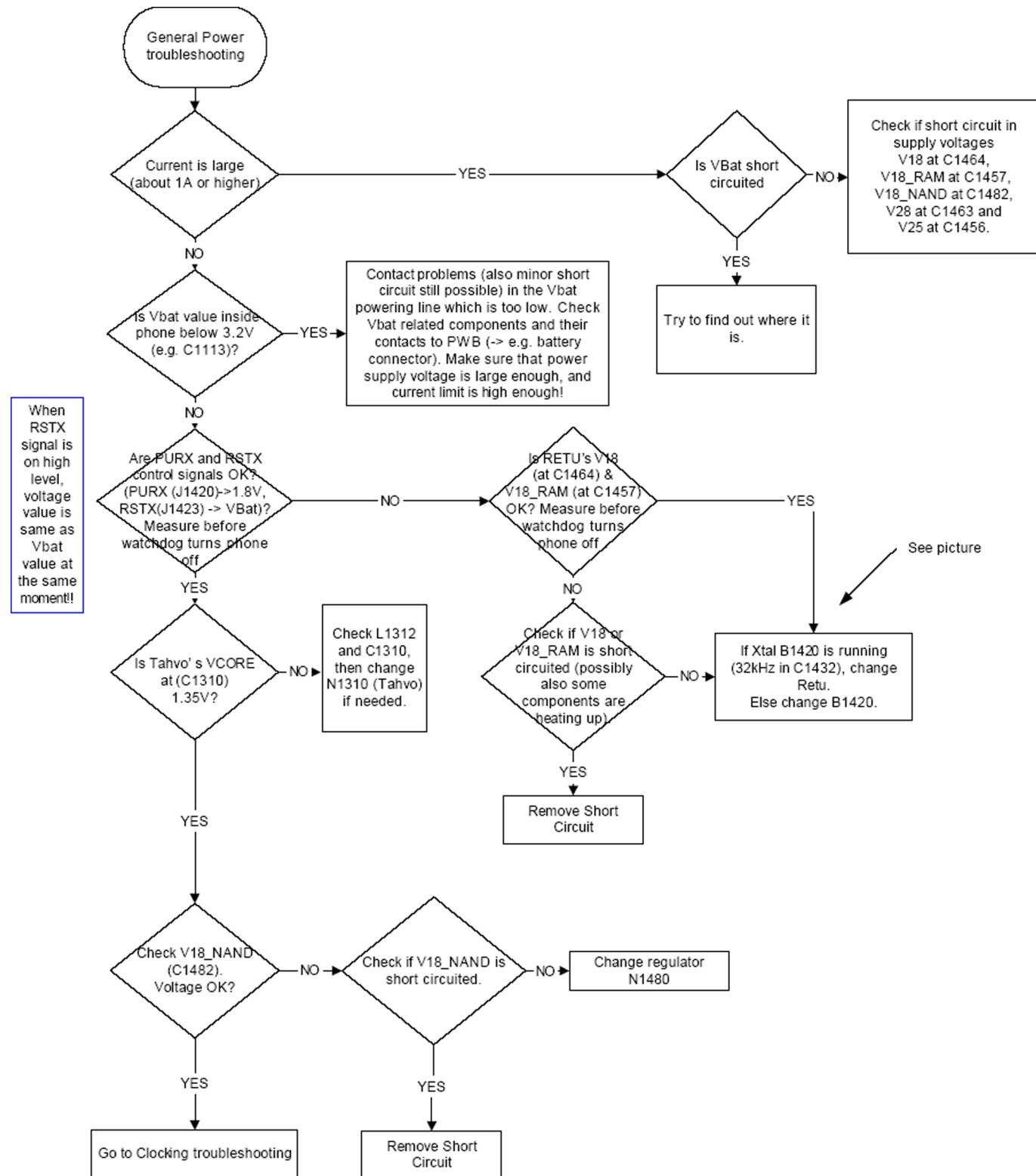
■ Dead or jammed device troubleshooting

Troubleshooting flow



■ General power troubleshooting

Troubleshooting flow



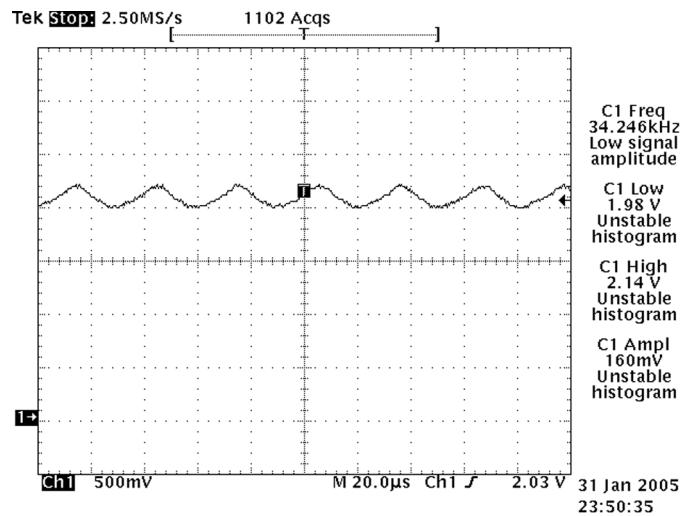
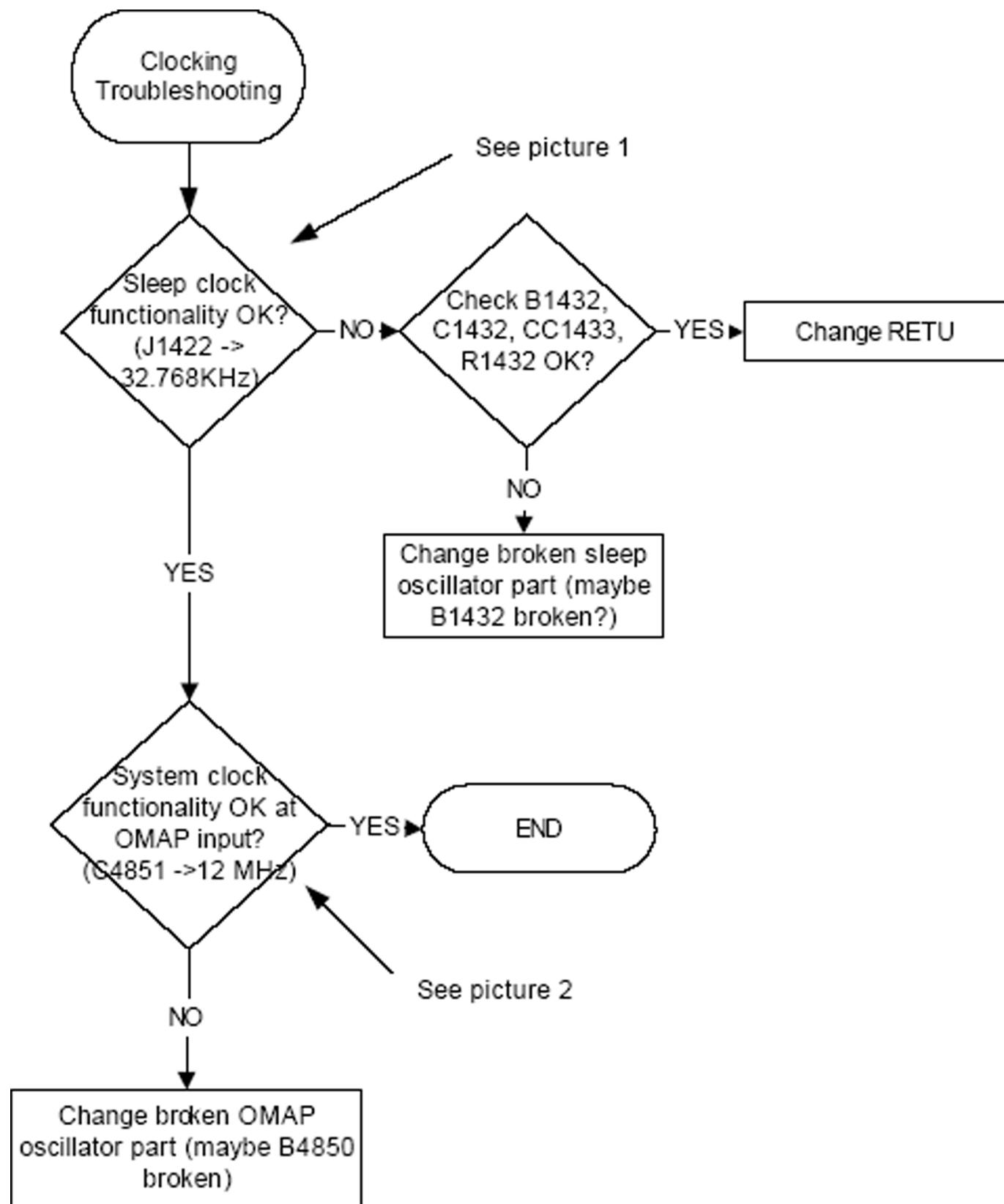
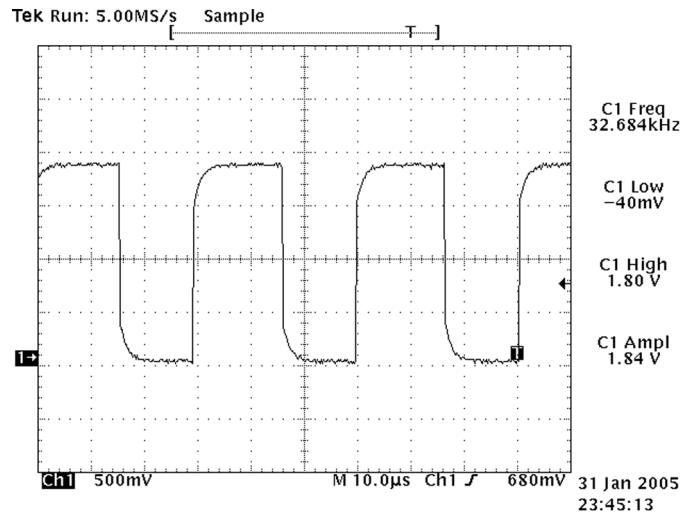
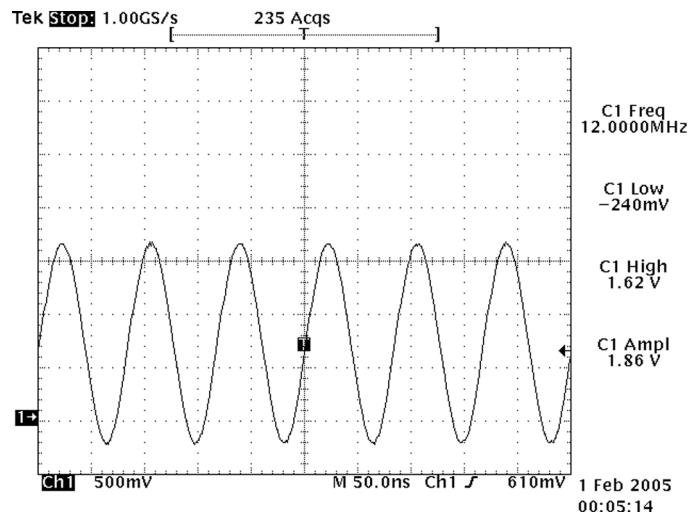


Figure 48 General power troubleshooting

Clocking troubleshooting

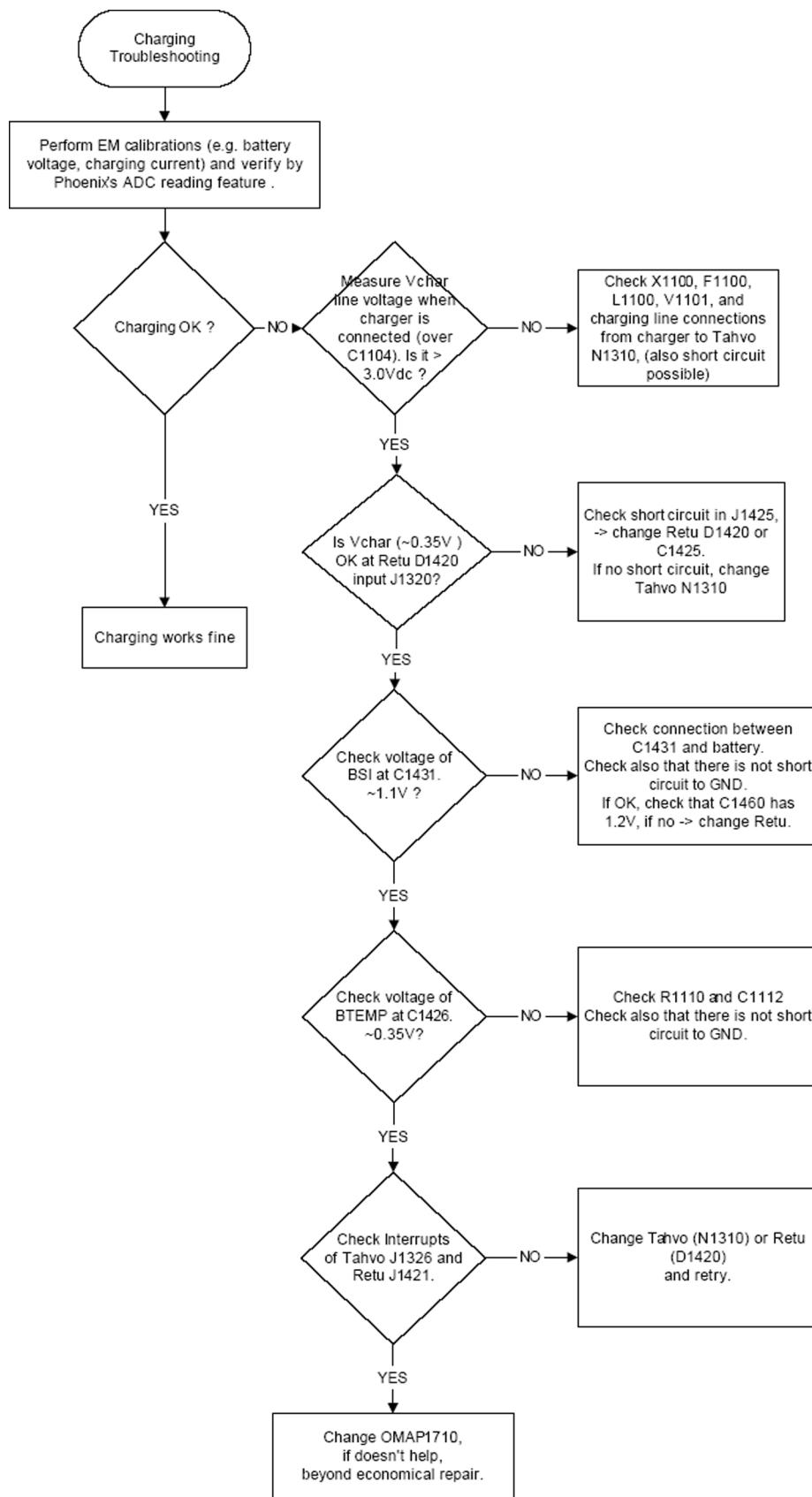
Troubleshooting flow



**Figure 49 Clocking troubleshooting 1****Figure 50 Clocking troubleshooting 2**

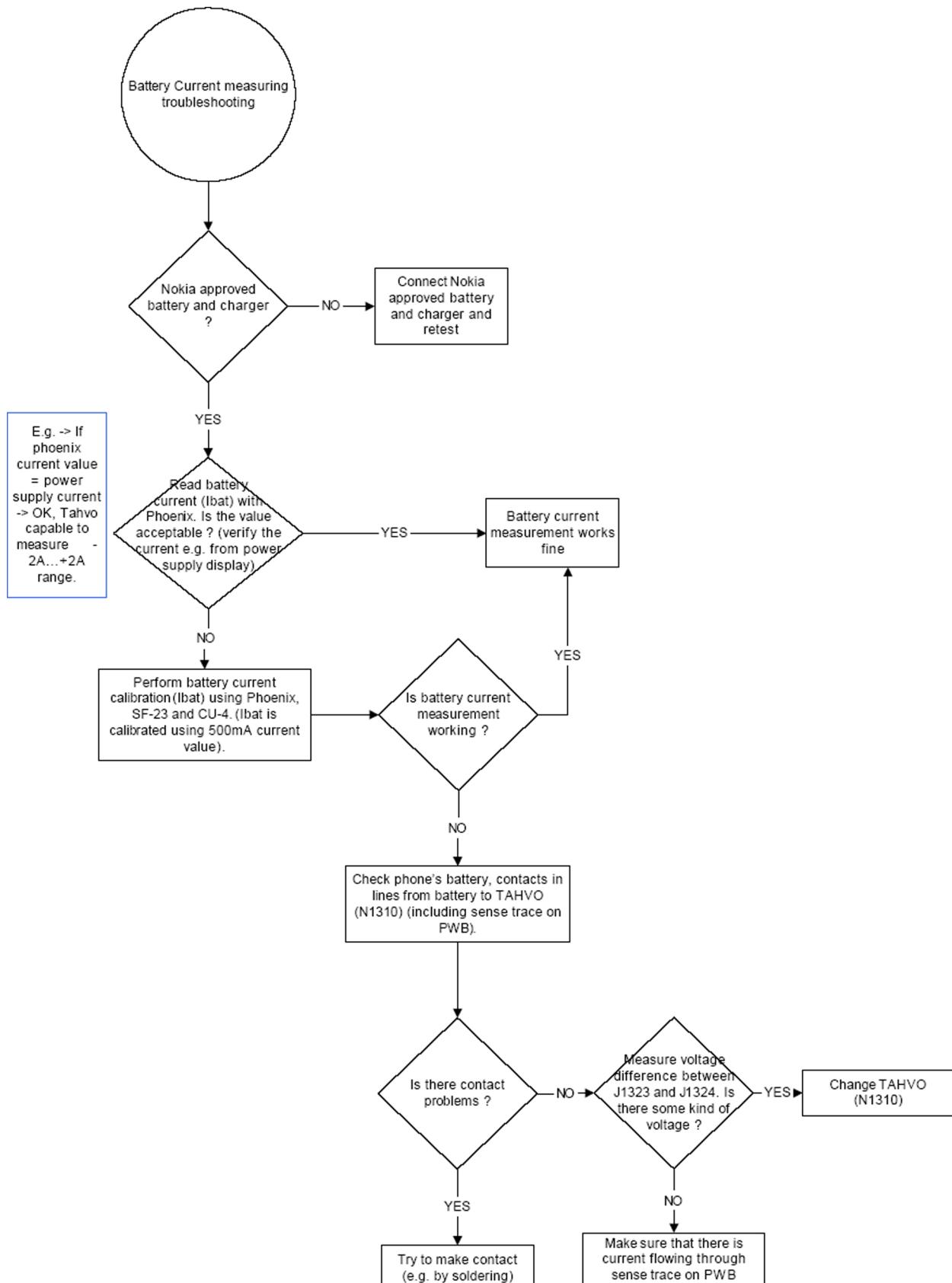
■ Charging troubleshooting

Troubleshooting flow



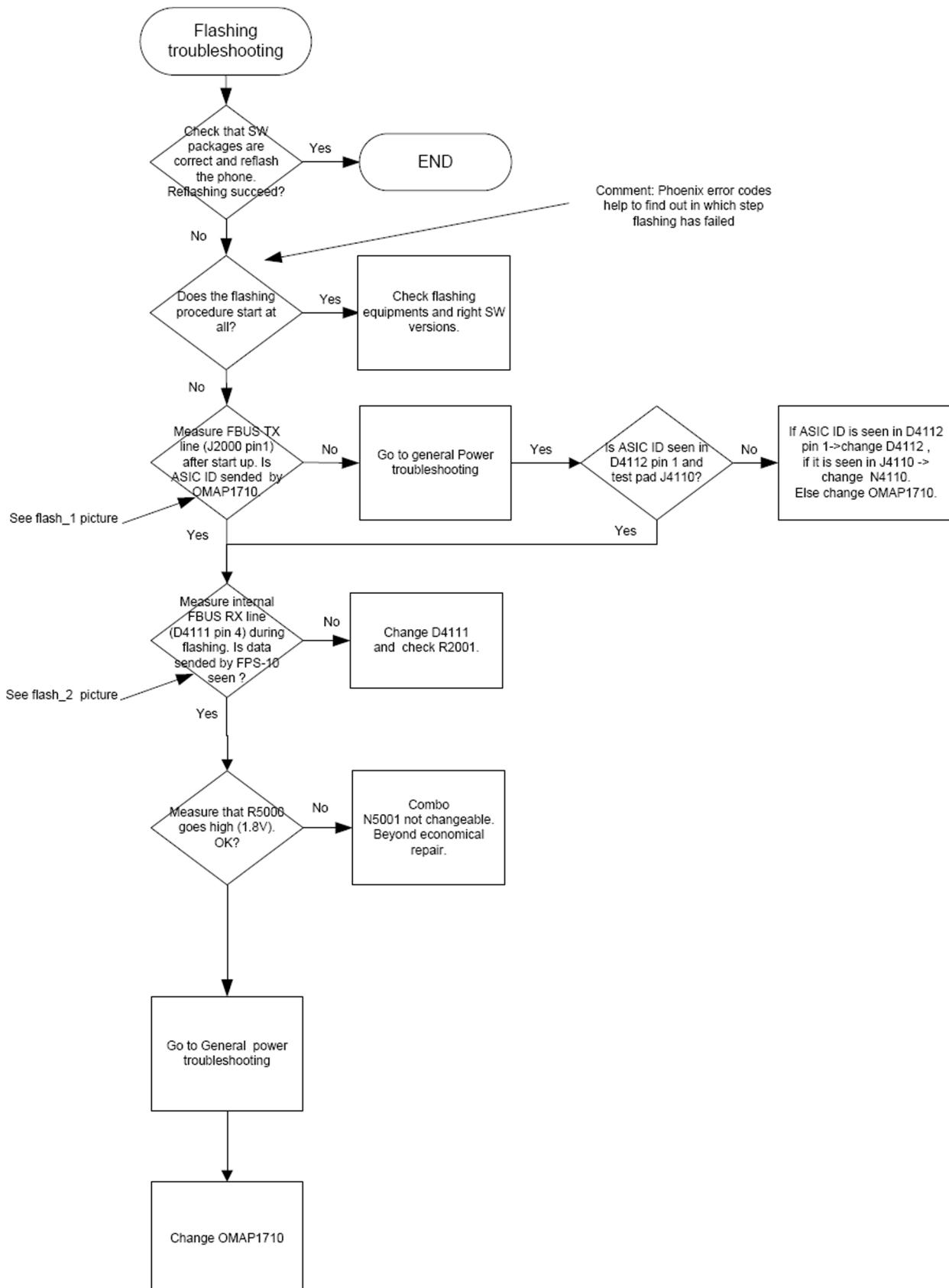
■ Battery current measuring fault troubleshooting

Troubleshooting flow



Flash programming fault troubleshooting

Troubleshooting flow



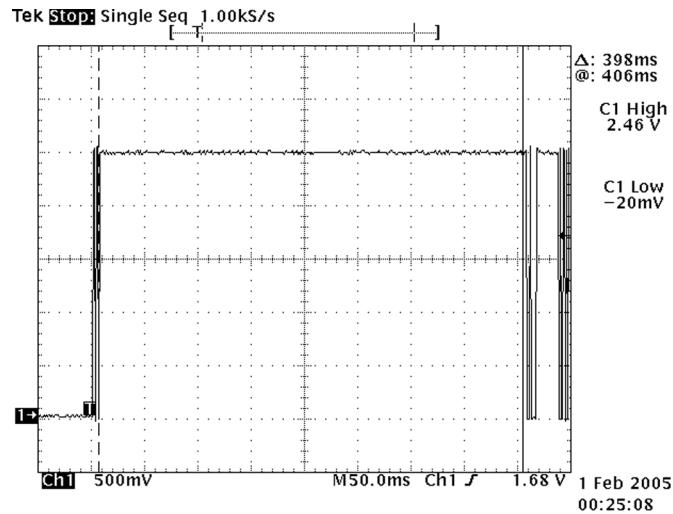


Figure 51 Flash programming fault troubleshooting 1

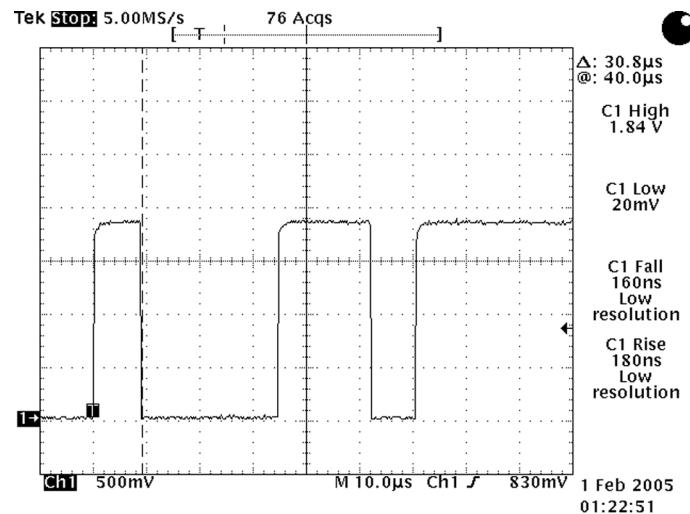
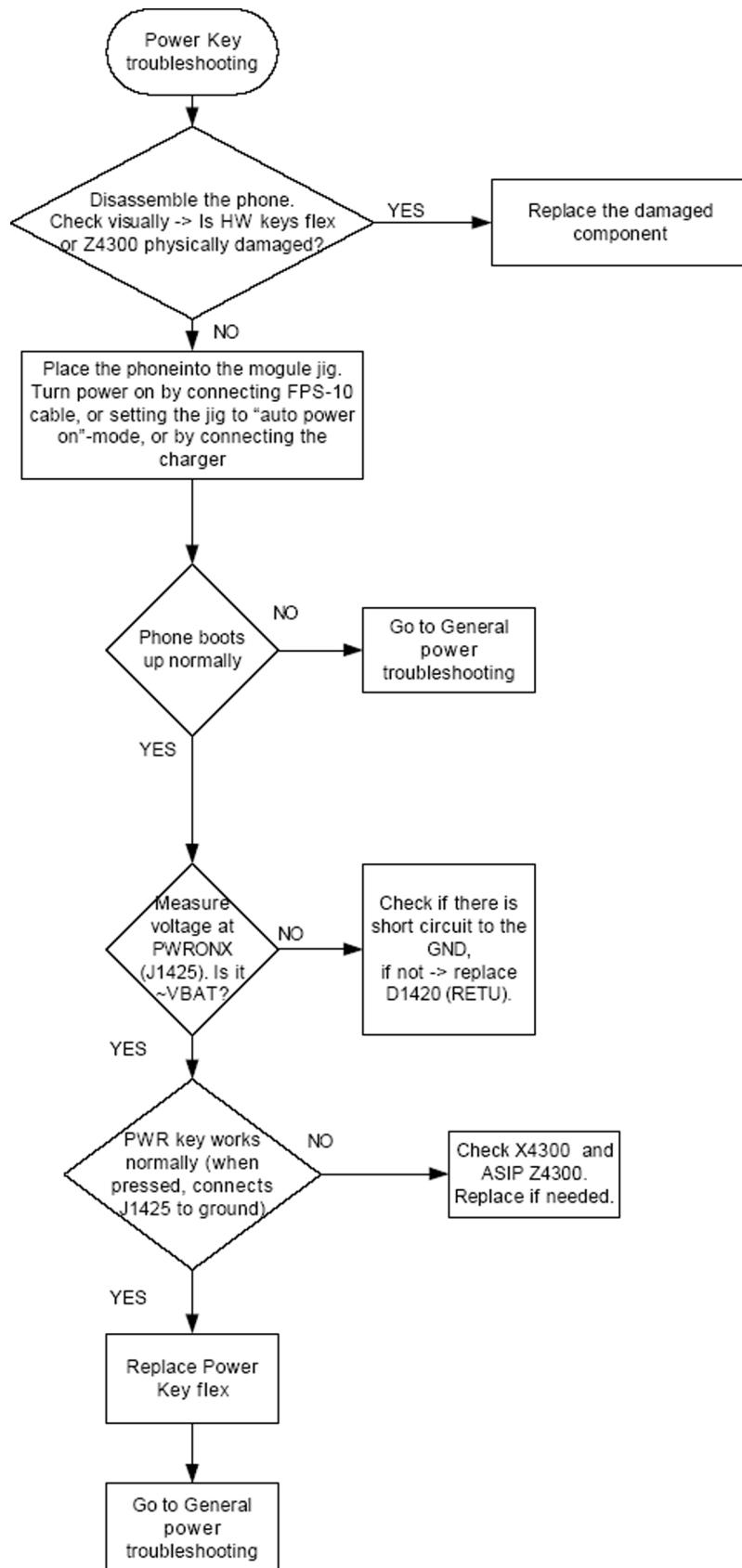


Figure 52 Flash programming fault troubleshooting 2

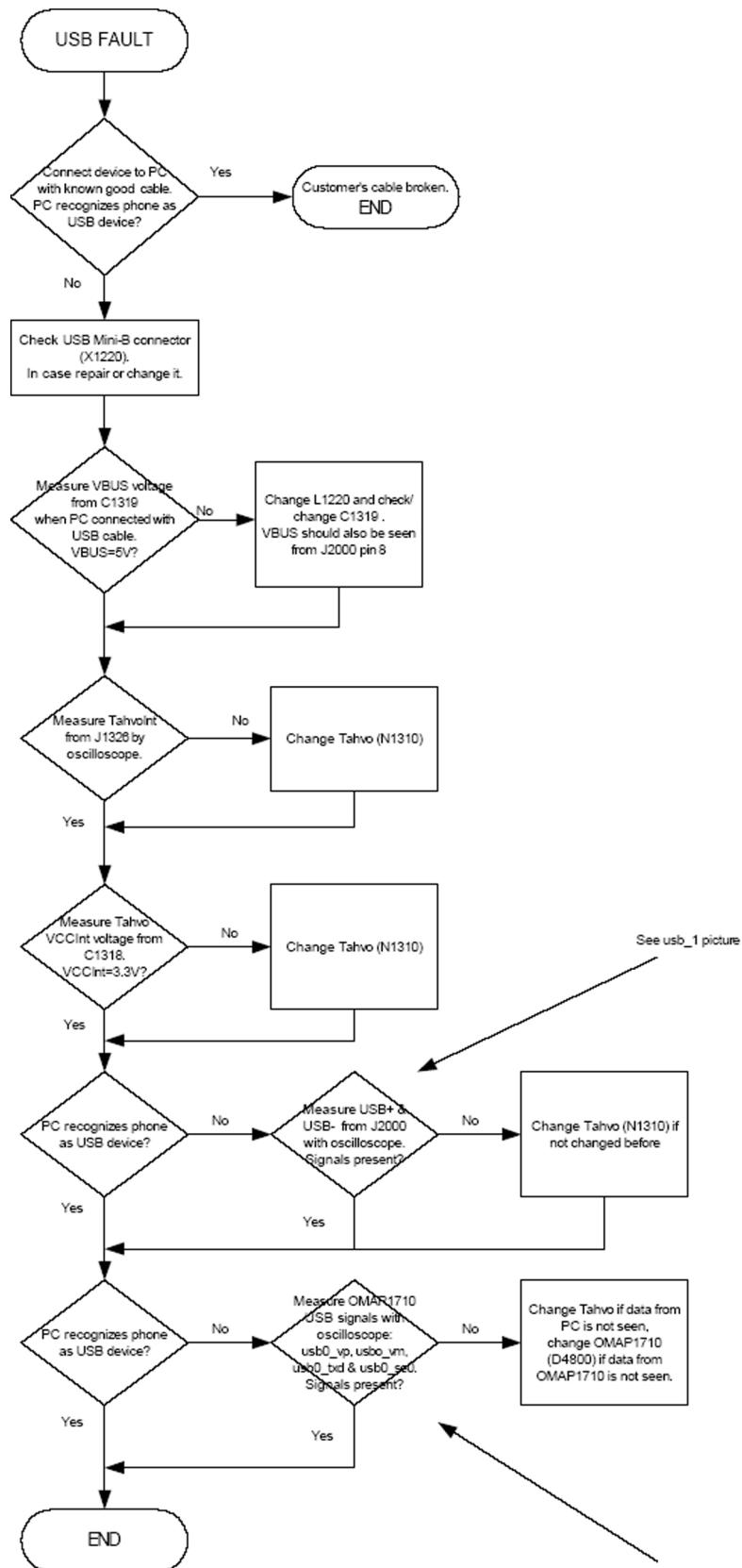
■ Power key troubleshooting

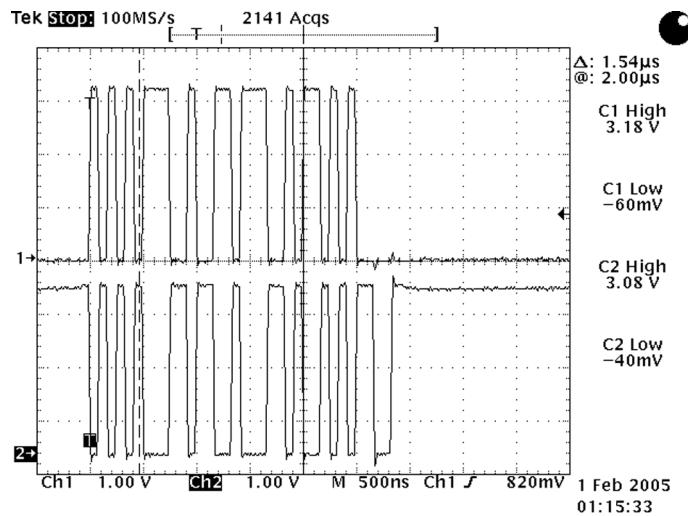
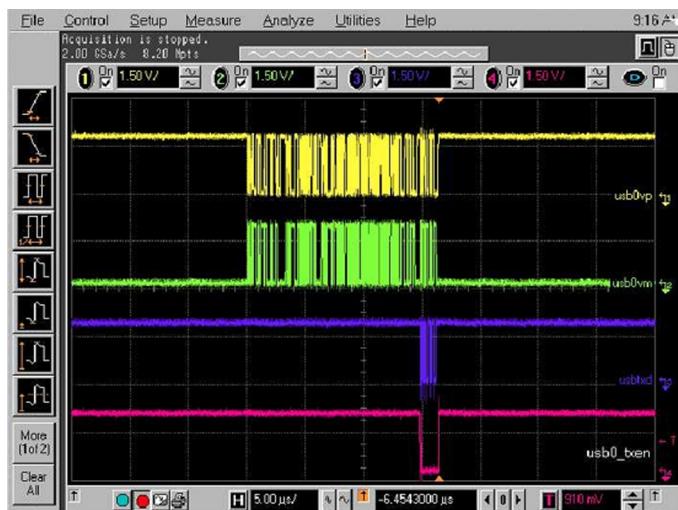
Troubleshooting flow



■ USB interface troubleshooting

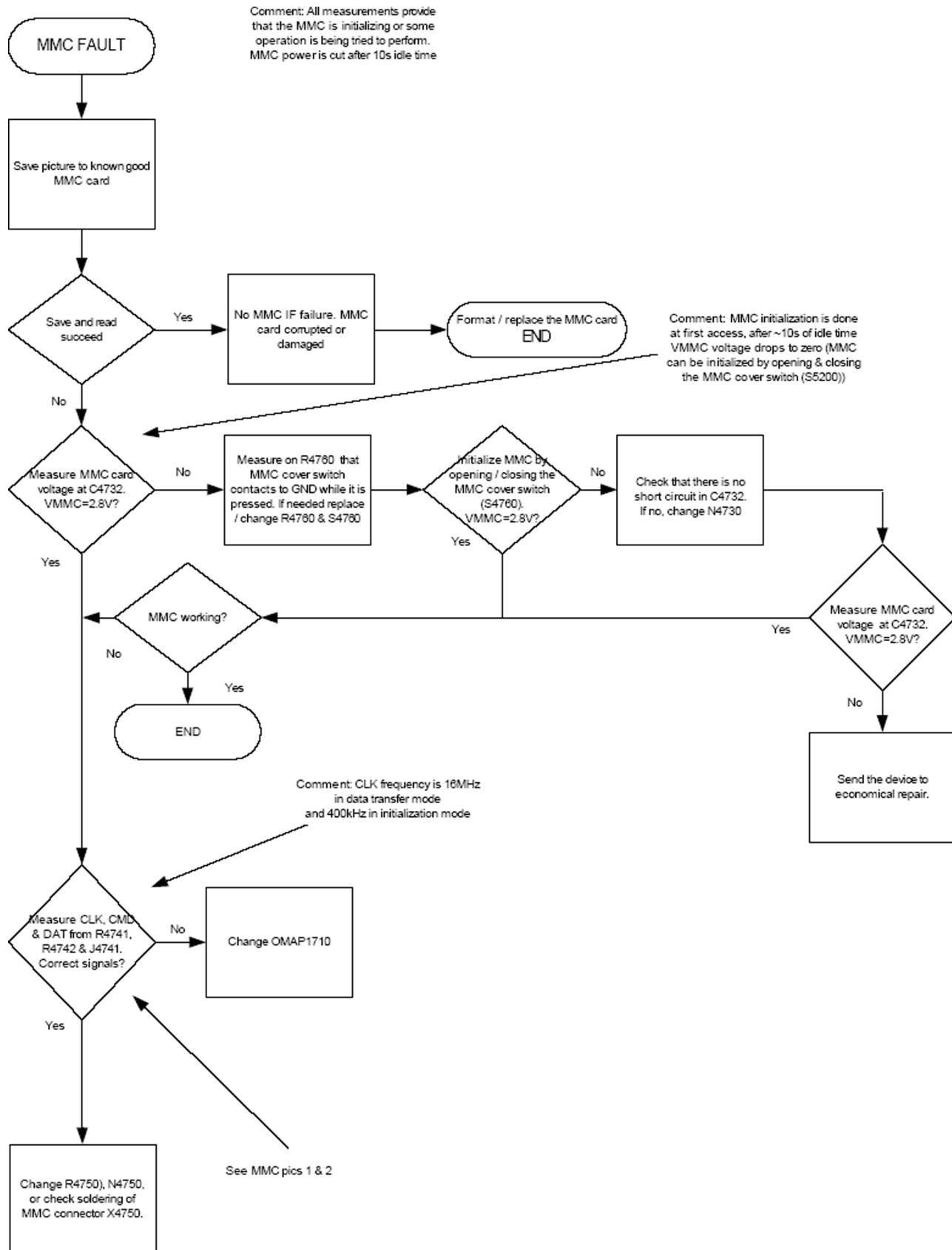
Troubleshooting flow

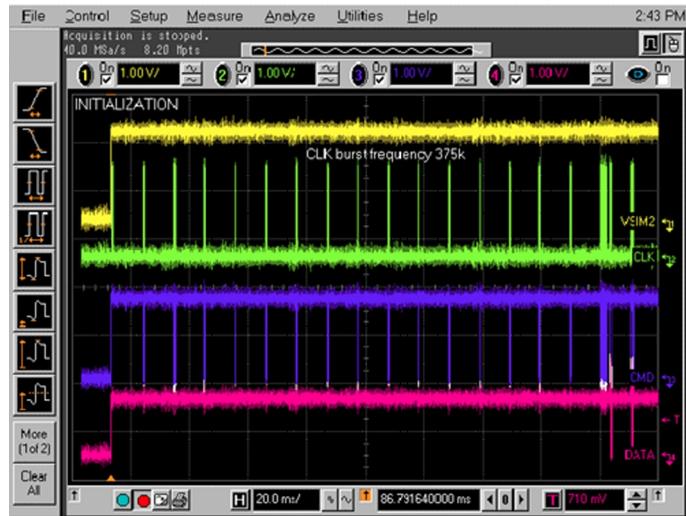
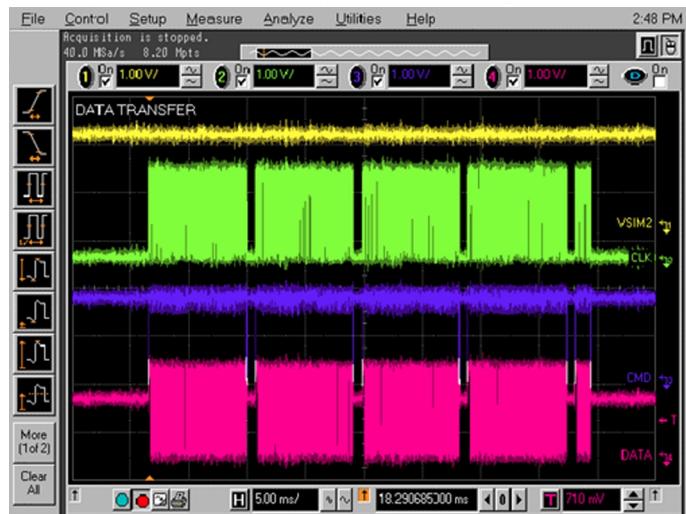


**Figure 53 USB troubleshooting 1****Figure 54 USB troubleshooting 2**

■ MMC troubleshooting

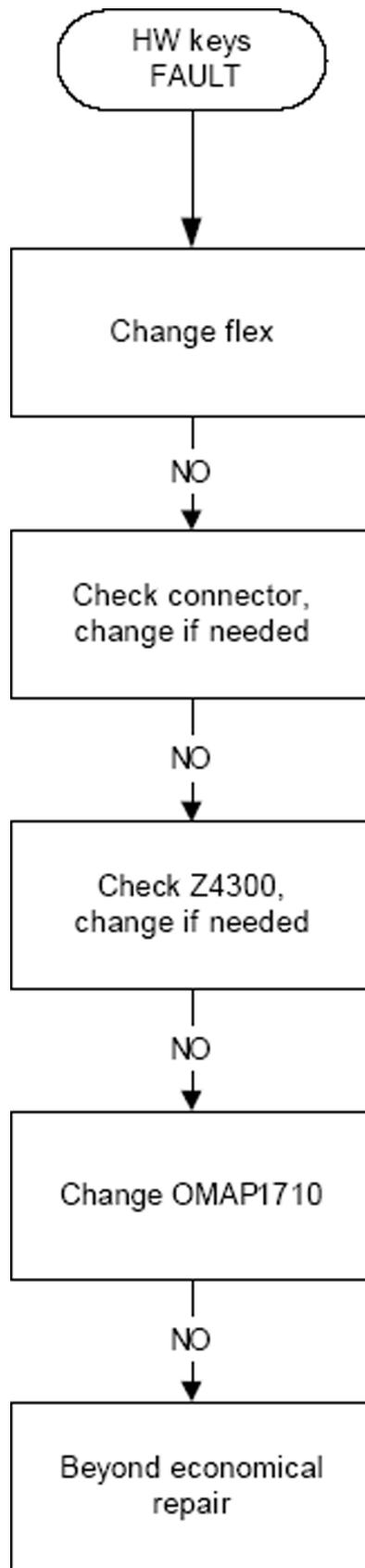
Troubleshooting flow



**Figure 55 MMC troubleshooting 1****Figure 56 MMC troubleshooting 2**

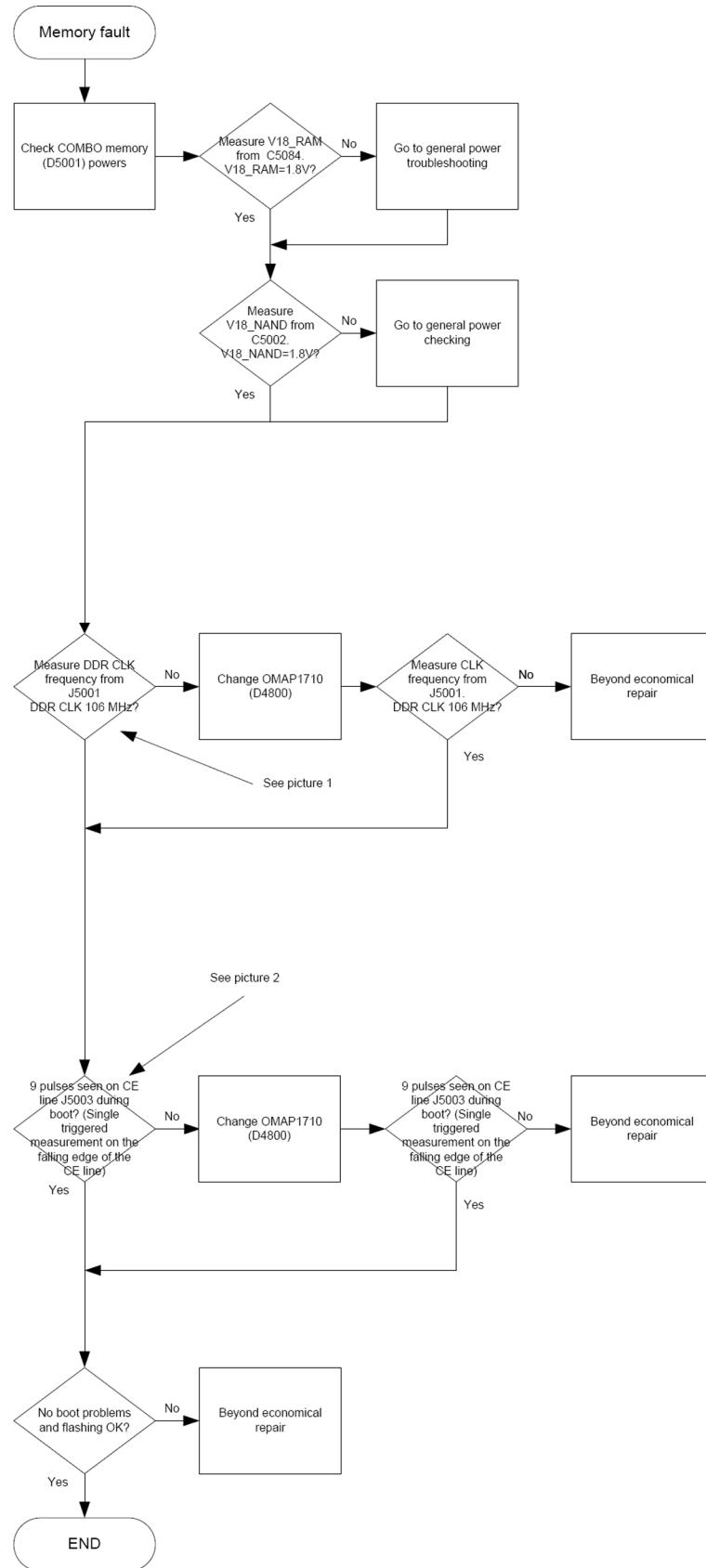
■ HW keys troubleshooting

Troubleshooting flow



Memory troubleshooting

Troubleshooting flow



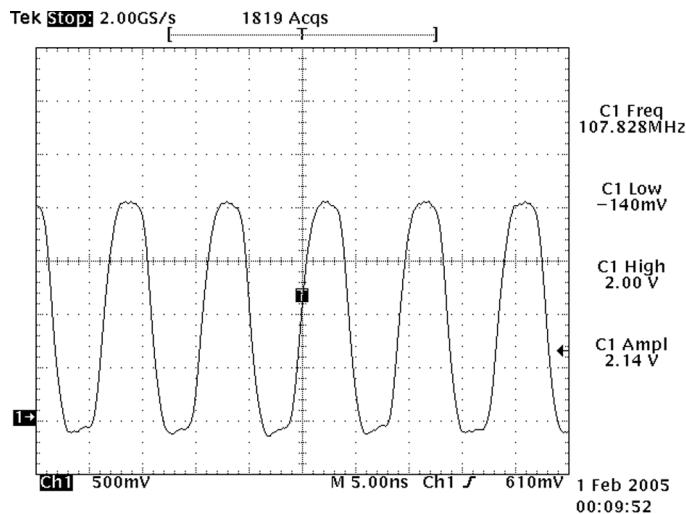


Figure 57 Memory troubleshooting diagram 1

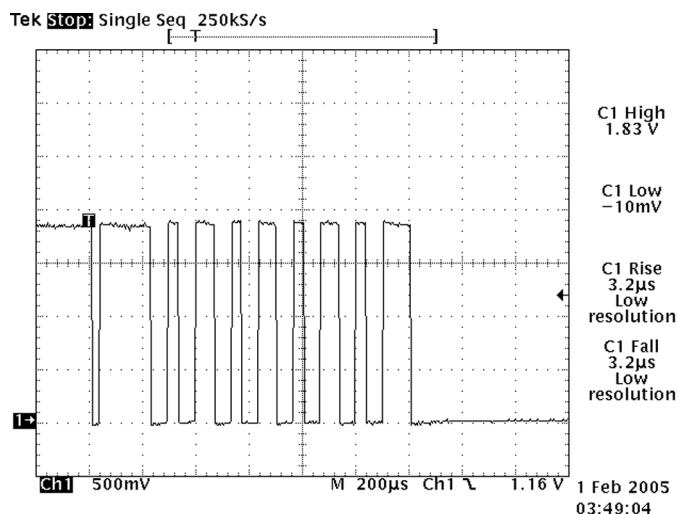


Figure 58 Memory troubleshooting diagram 2

■ Display module troubleshooting

General instructions for display troubleshooting

The first step is to verify with a working display that the fault is not on the display module itself. The display module cannot be repaired.

The second step is to check that the engine is working normally. This can be done by connecting the phone to a docking station and starting Phoenix service software. With the help of Phoenix read the phone information to check that also the application engine is functioning normally (you should be able to read the APE ID).

After these checks proceed to the display troubleshooting flowcharts. Use the Display Test tool in Phoenix to find the detailed fault mode.

Pixel defects

Table 9 Display module troubleshooting cases

Display blank	There is no image on the display. The display looks the same when the phone is on as it does when the phone is off. The backlight can be on in some cases.
Image on the display not correct	Image on the display can be corrupted or a part of the image can be missing. If a part of the image is missing, change the display module. If the image is otherwise corrupted, follow the appropriate troubleshooting diagram.
Backlight dim or not working at all	Backlight LED components are inside the display module. Backlight failure can also be in the connector or in the backlight power source in the main engine of the phone. Backlight is also controlled automatically by the ambient light sensor. This means that in case the display is working (image OK), the backlight is faulty.
Visual defects (pixel)	Pixel defects can be checked by controlling the display with Phoenix. Use both colours, black and white, on a full screen. The display may have some random pixel defects that are acceptable for this type of display. The criteria when pixel defects are regarded as a display failure, resulting in a replacement of the display, are presented in the following table.

Table 10 Pixel defects

Bright sub-pixels	(sometimes called on-pixels or stuck-on) are characterized by the appearance of bright/colored pixels in, for example, black full screen picture.
Dark sub-pixels	(sometimes called off-pixels, stuck-off, or black pixels) are characterized by the appearance of dark pixels in white, red, green, or blue full-screen picture.
Combined sub-pixel	defects are characterized by at least two sub-pixels (bright or dim) being closer than 5 mm to each other.
Temporal sub-pixels	(sometimes called blinking defects) exhibit temporal variations not related to any steady-state video input. Temporal sub-pixel defects may be intermittent, exhibit a sudden change of state, or be flickering.

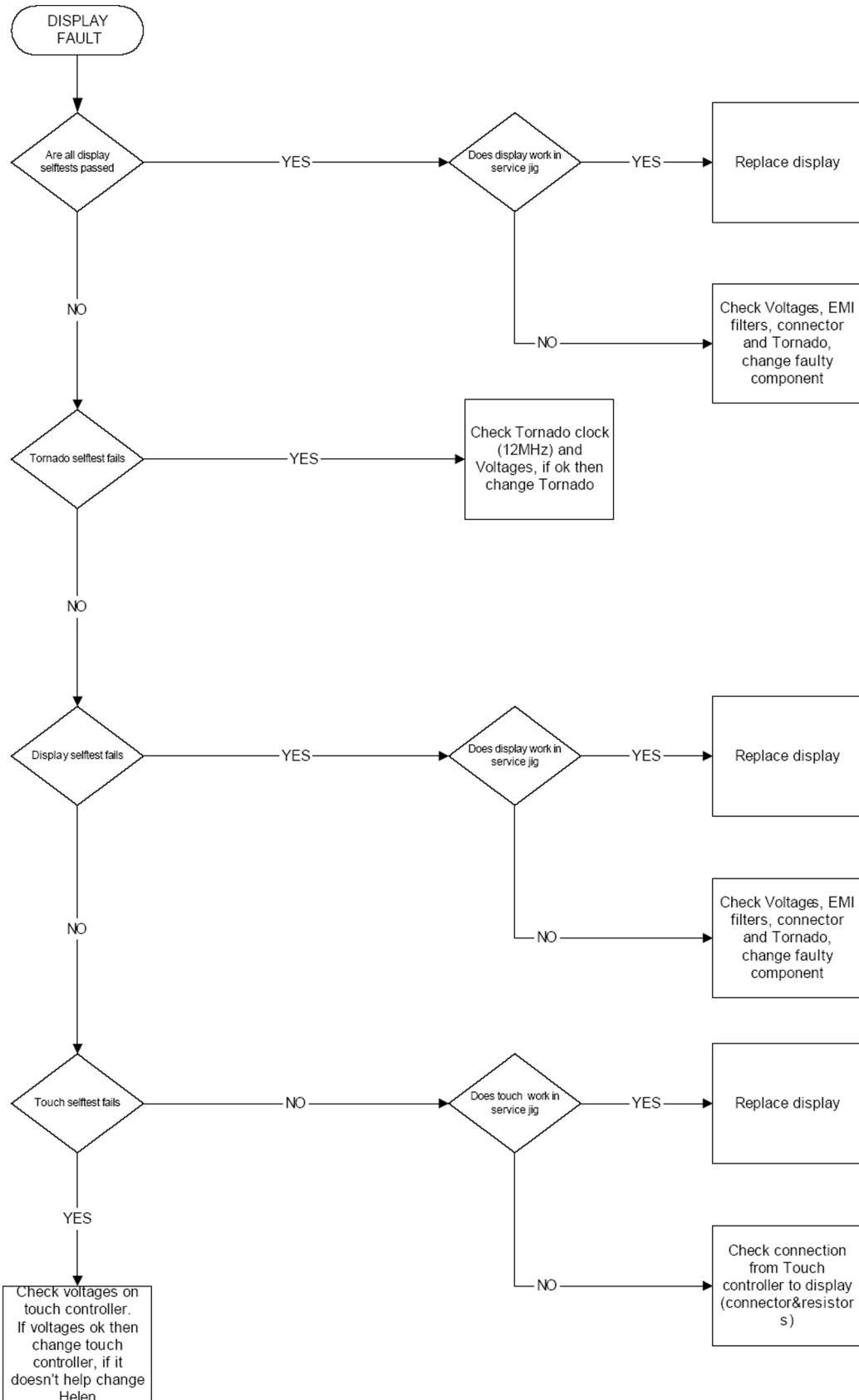
Table 11 Defects table

Item		Bright dot (sub-pixel) defect	Dark dot (sub-pixel) defect	Total
1	Defect counts	2	0	2
2	Combined sub-pixel defect	Not allowed		
3	Temporal sub-pixel defect	Not allowed		

Note: Blinking pixels are not allowed in normal operating temperatures and light conditions.

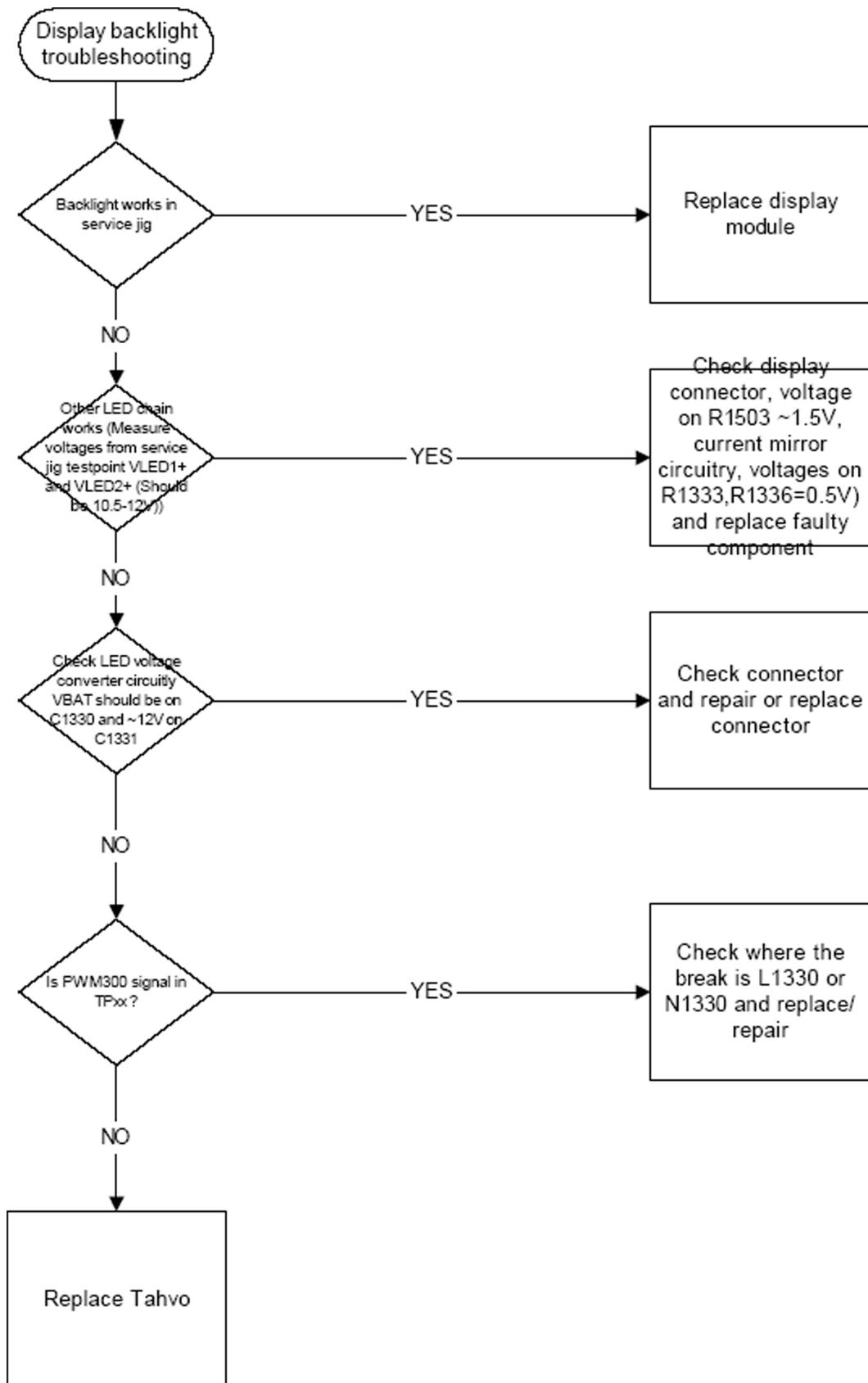
Display fault troubleshooting

Troubleshooting flow



Display backlight troubleshooting

Troubleshooting flow



■ Bluetooth troubleshooting

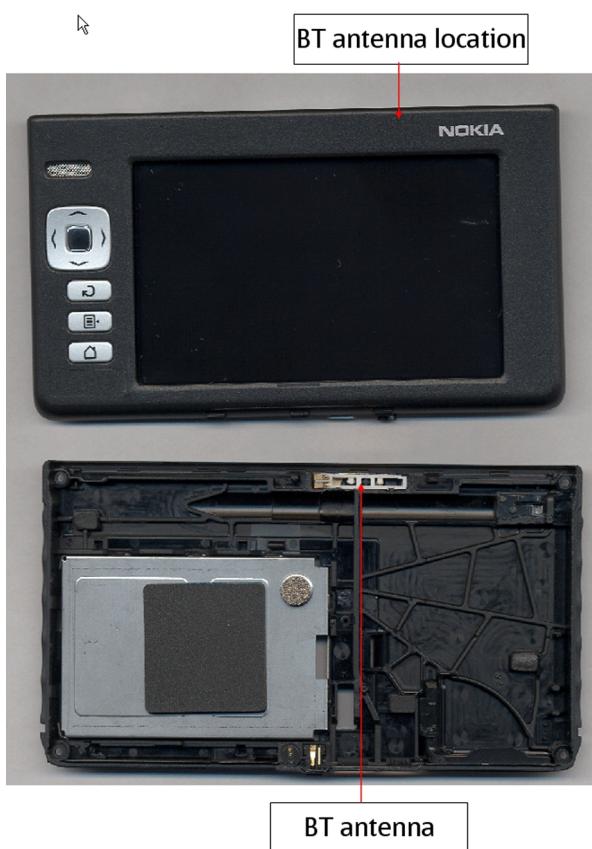
Introduction to Bluetooth troubleshooting

There are two main Bluetooth problems that can occur:

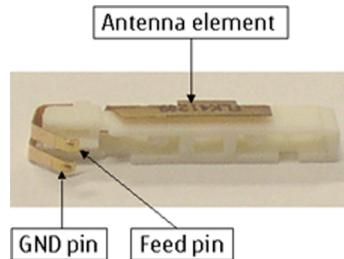
Problem	Description
Detachment of the BT antenna.	This would most likely happen if the device has been dropped repeatedly to the ground. It could cause the BT antenna to become loose or partially detached from the PWB. (see next page for details about BT antenna HW and Mechanics)
A malfunction in the BT ASIC, BB ASICs or Phone's BT SMD components.	This is unpredictable and could have many causes i.e. SW or HW related.

The main issue is to find out if the problem is related to the BT antenna or related to the BT system or the phone's BB and then replace/fix the faulty component.

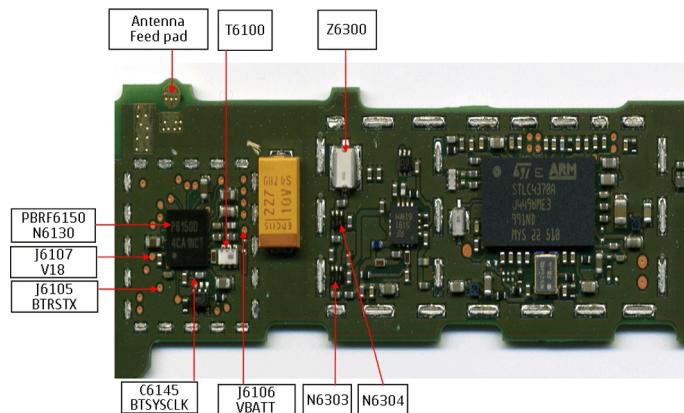
Location of the BT antenna



Bluetooth antenna element



Bluetooth component layout



Bluetooth settings for Phoenix

Steps

1. Start *Phoenix* service software.
2. From the **File** menu, choose **Open Product**, and then choose the correct type designator from the **Product** list.
3. Connect the phone to a docking station in the local mode.
4. Choose **Testing→Bluetooth LOCALS**.
5. Locate JBT-9's serial number (12 digits) found in the type label on the back of JBT-9.
6. In the *Bluetooth LOCALS* window, write the 12-digit serial number on the **Counterpart BT Device Address** line.
This needs to be done only once provided that JBT-9 is not changed.
7. Place the JBT-9 box near (within 10 cm) the BT antenna and click **Run BER Test**.

Results

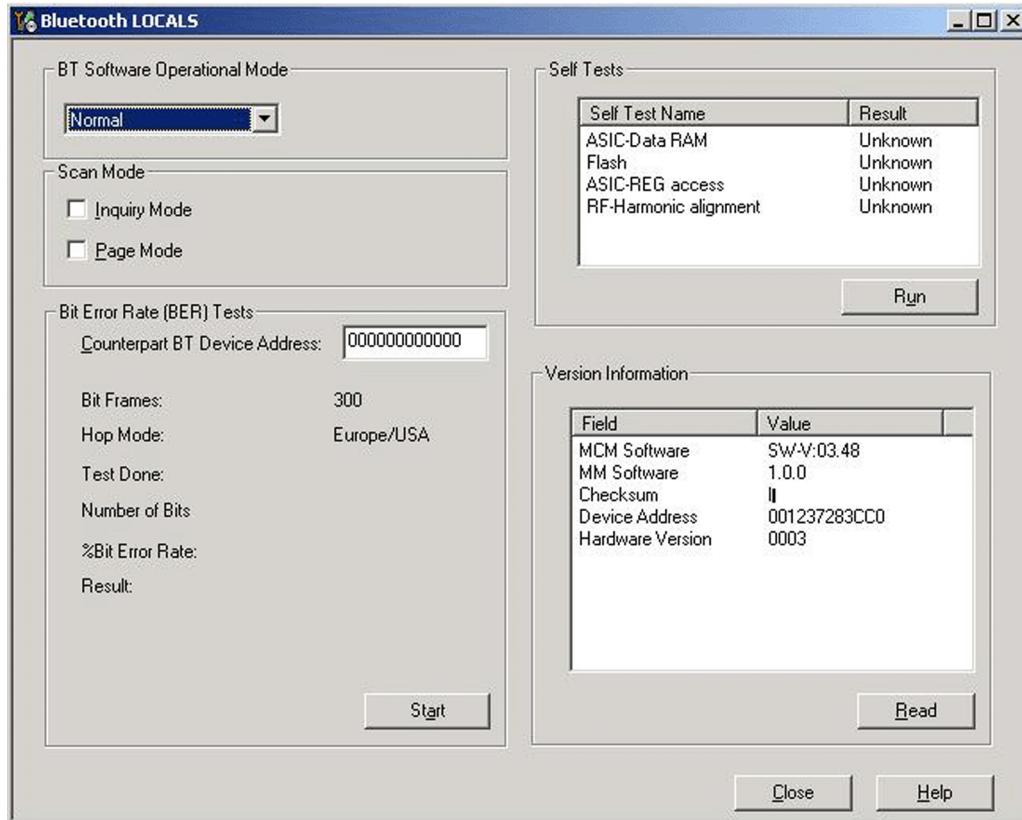


Figure 59 *Phoenix* settings for Bluetooth troubleshooting

Bluetooth self tests in Phoenix

Steps

1. Start *Phoenix* service software.
2. From the **File** menu, choose **Open Product**, and then choose the correct type designator from the **Product** list.
3. Connect the phone to a docking station in the local mode.
4. Choose **Testing→Self Tests**.
5. Choose the following Bluetooth related tests:
 - Bluetooth
6. To run the tests, click **Start**.

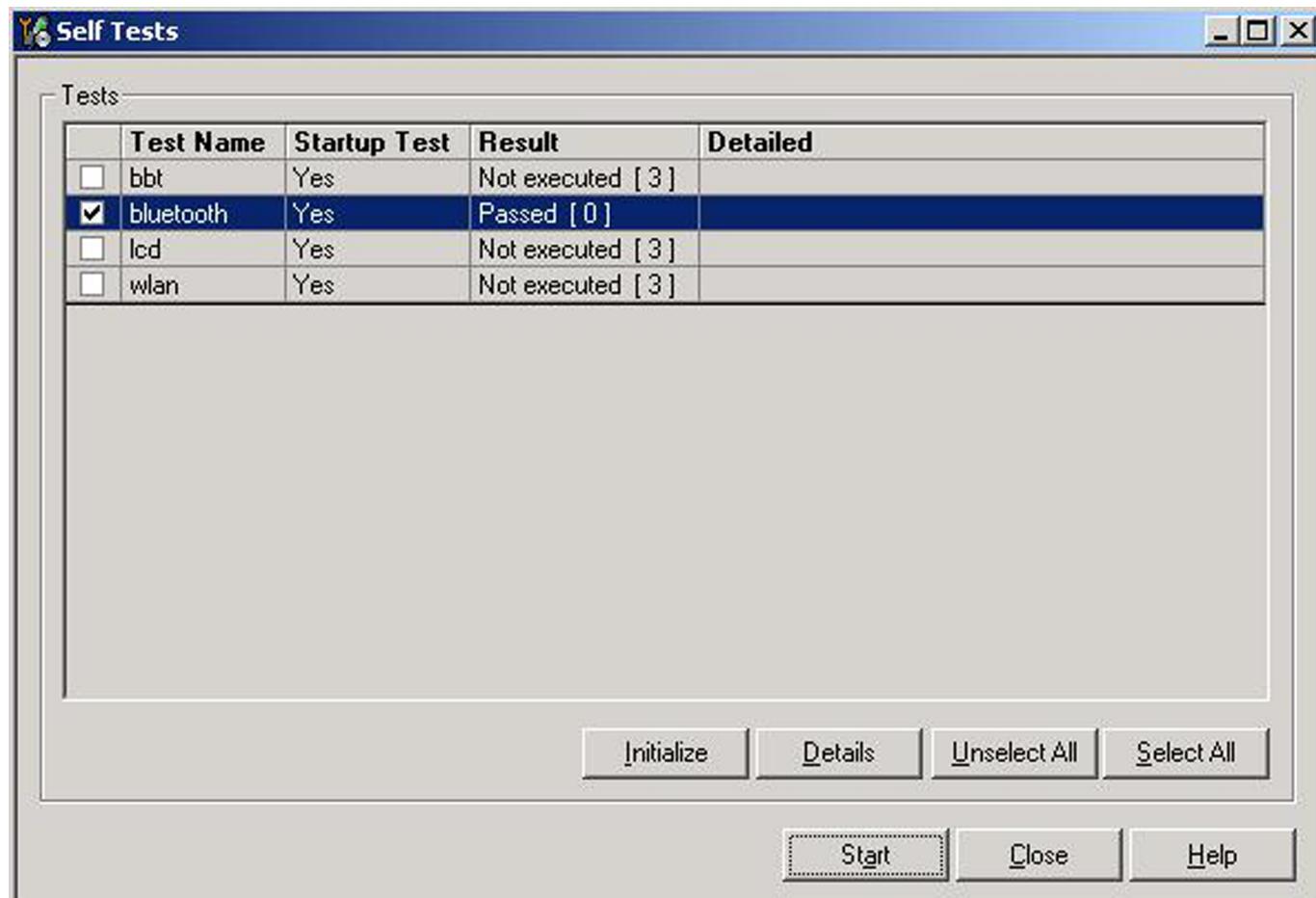
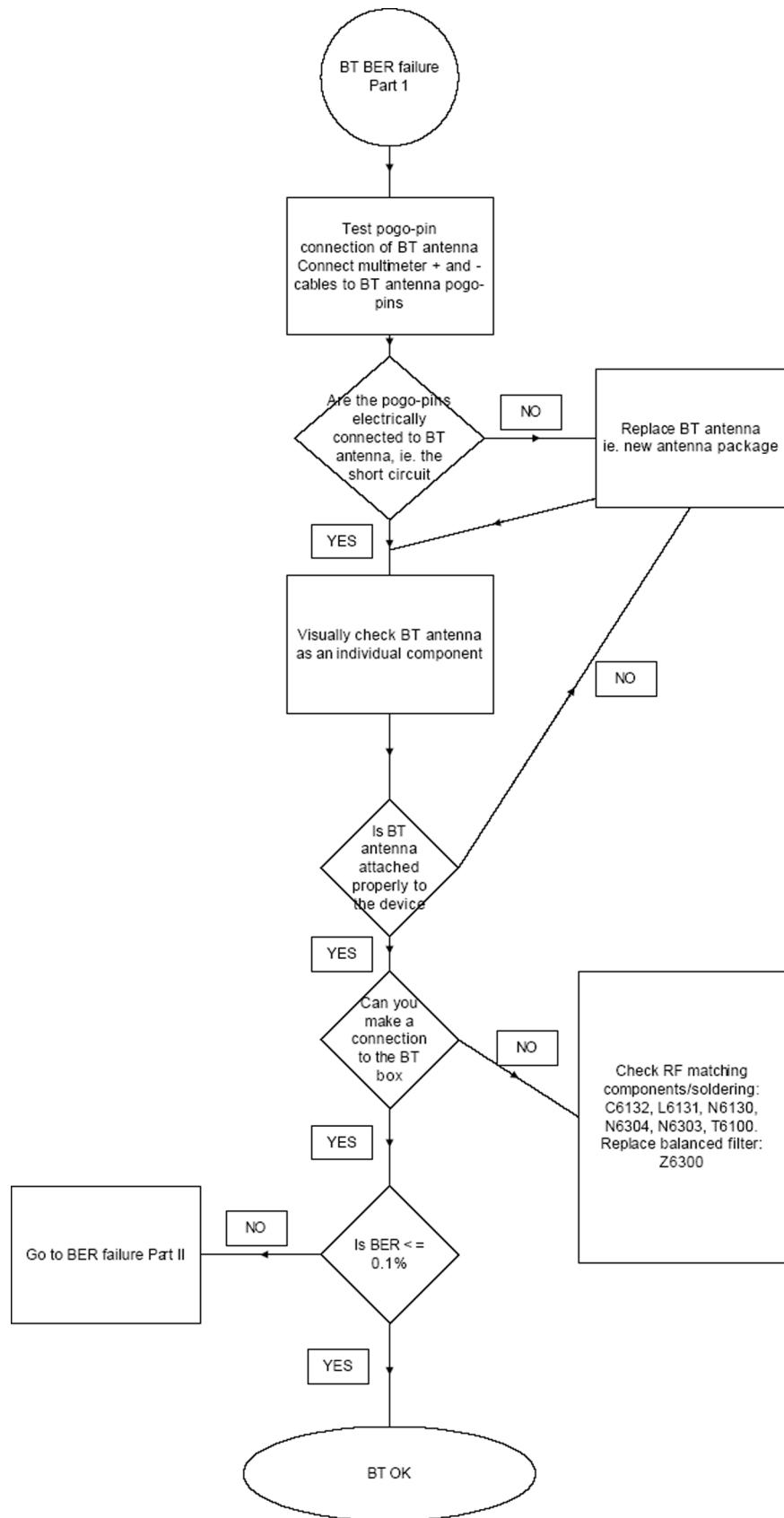
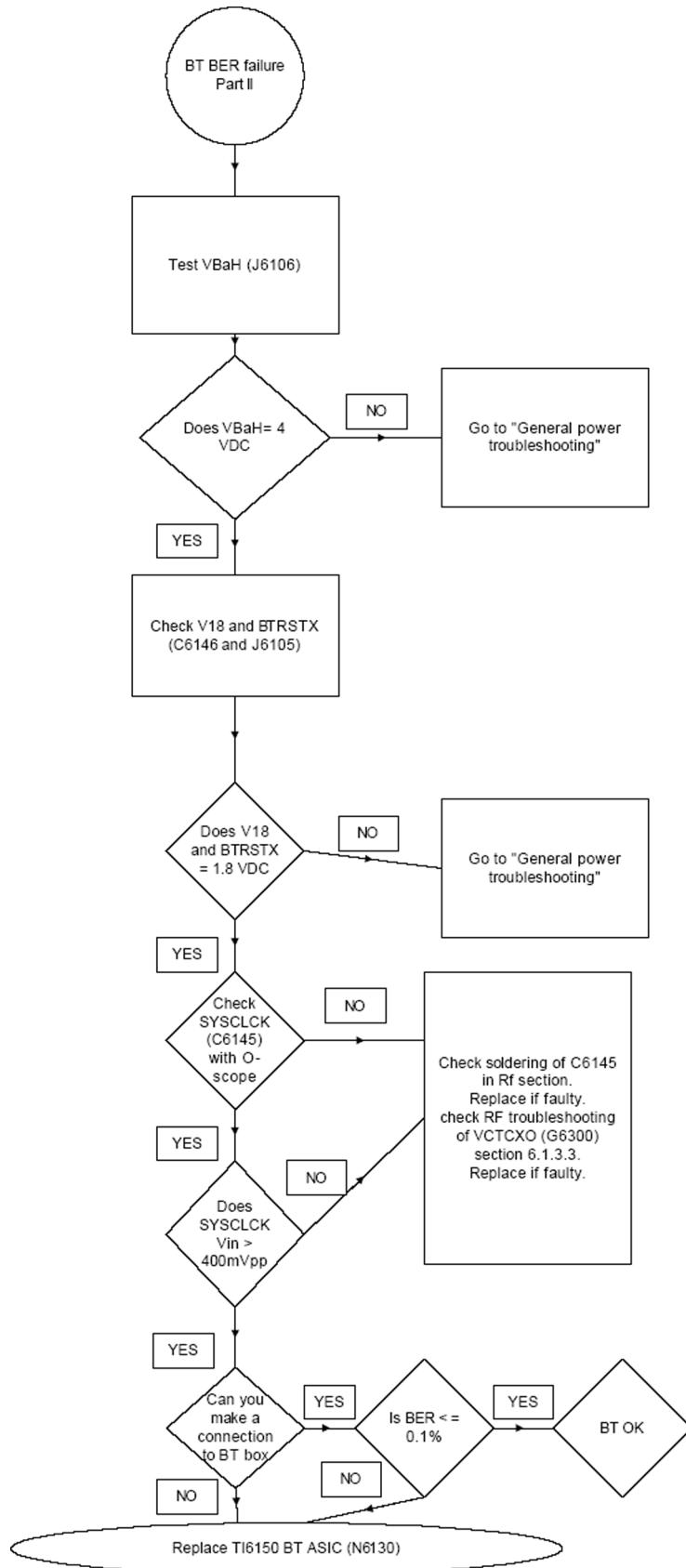


Figure 60 Bluetooth self tests in *Phoenix*

Bluetooth BER failure troubleshooting 1 and 2

Troubleshooting flow





■ Audio troubleshooting

Audio troubleshooting test instructions

Differential headphone outputs can be measured either with a single-ended or a differential probe. Measurement is done against the ground.

Internal loudspeaker output is measured using a current probe, if a special low-pass filter designed for measuring a digital amplifier is not available. Note also that when using a current probe, the input signal frequency must be set to 1kHz..

Required equipment

The following equipment is needed for the tests:

- Oscilloscope
- Current probe (Internal handsfree DPMA output measurement)
- Phoenix service software
- Battery voltage 3.7V

Test procedure

Audio can be tested using the Phoenix audio routings option. Three different audio loop paths can be activated:

- Headphone left channel
- Headphone right channel
- Internal loudspeaker

Each audio output configuration sets the internal test signal generator routing to the specified output. Test signal path gains are fixed and they cannot be changed using Phoenix. Correct pins and signals for each test are presented in the table below.

Phoenix audio loop tests and test results

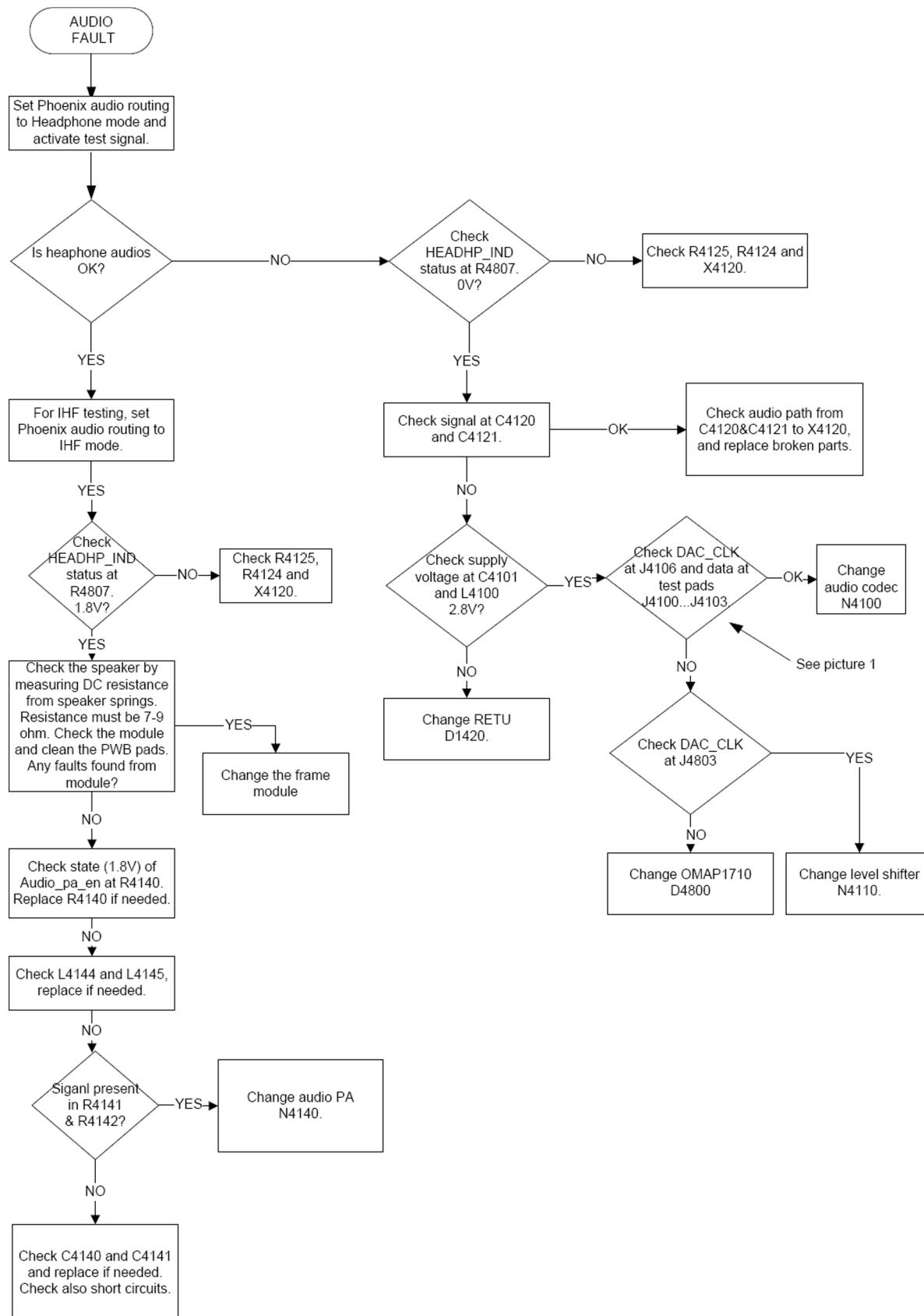
The results presented in the table apply when no accessory is connected and battery voltage is set to 3.7V.

Internal loudspeaker is in place during measurement. Applying a headset during measurement causes a significant drop in measured quantities.

Output device	Output terminals	Output voltage (mVpp)	Differential output DC level (mV)	Output current (mA)
Loudspeaker	C4144 pins 1 and 2	2828 (differential)	1800	44 (calc.)
Headphone left channel	X4120 pin 4 and GND	1782 (single-ended)	NA	NA
Headphone right channel	X4120 pin 3 and GND	2300	NA	NA

Audio troubleshooting

Troubleshooting flow



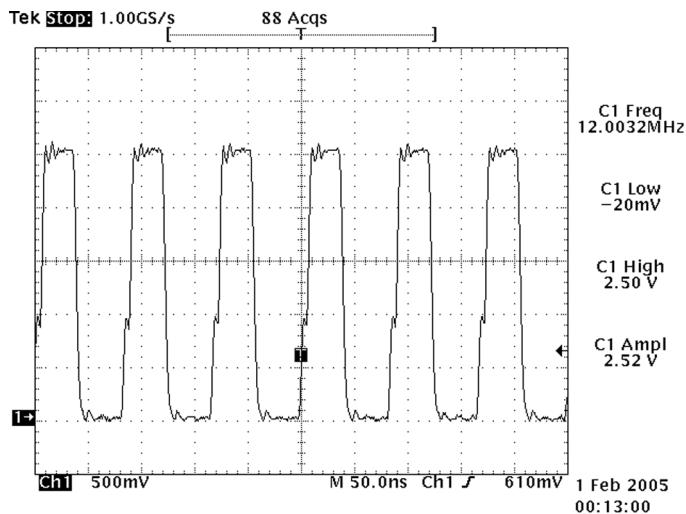


Figure 61 Audio troubleshooting diagram

■ Baseband manual tuning guide

Energy management calibration

Before you begin

Energy Management (EM) calibration is performed to calibrate the setting (gain and offset) of AD converters in several channels (that is, **battery voltage**, **BSI**, **battery current**) to get an accurate AD conversion result.

Hardware setup:

- An external power supply is needed.
- Supply 12V DC from an external power supply to CU-4 to power up the phone.
- The phone must be connected to a CU-4 control unit with a product-specific flash adapter.

Steps

1. Place the phone to the docking station adapter (CU-4 is connected to the adapter).
2. Start *Phoenix* service software.
3. Choose **File**→**Scan Product**.
4. Choose **Tuning**→**Energy Management Calibration**.
5. To show the current values in the phone memory, click **Read**, and check that communication between the phone and CU-4 works.
6. Check that the **CU-4 used** check box is checked.
7. Select the item(s) to be calibrated.

Note: ADC calibration has to be performed before other item(s). However, if all calibrations are selected at the same time, there is no need to perform the ADC calibration first.

8. Click **Calibrate**.

The calibration of the selected item(s) is carried out automatically.

The candidates for the new calibration values are shown in the *Calculated values* column. If the new calibration values seem to be acceptable (please refer to the following "Calibration value limits" table), click **Write** to store the new calibration values to the phone permanent memory.

Table 12 Calibration value limits

Parameter	Min.	Max.
ADC Offset	-20	30
ADC Gain	12000	14000
BSI Gain	1100	1300
VBAT Offset	2400	2650
VBAT Gain	19000	23000
VCHAR Gain	N/A	N/A
IBAT (ICal) Gain	7750	12250

9. Click **Read** and confirm that the new calibration values are stored in the phone memory correctly. If the values are not stored to the phone memory, click **Write** and/or repeat the procedure again.
10. To end the procedure, close the *Energy Management Calibration* window.

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7 — RF Troubleshooting

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■ RF troubleshooting

WLAN RF troubleshooting

Introduction to WLAN RF troubleshooting

Measurements should be done using Spectrum analyzer with high-frequency high impedance passive probe (LO-/reference frequencies and RF power levels) and Oscilloscope with a 10:1 probe (DC-voltages and low frequency signals).

The RF-section is build around one RF-ASIC (STLC4370 N6300). For easier troubleshooting, this RF troubleshooting document is divided in to sections.

Before changing STLC4370, please check following things: Supply voltages are OK and serial communication coming from baseband to STLC4370.

Note: Most RF semiconductors are static discharge sensitive!

So ESD protection must be taken care of during repair (ground straps and ESD soldering irons).

STLC4370 and PA are moisture sensitive so parts must be pre-baked prior to soldering.

Apart from key components described in this document here are a lot of discrete components (resistors, inductors and capacitors) which troubleshooting is done by checking if soldering of the component is done properly (for factory repairs checking if it is missing from PWB).

Capacitor can be checked for shortening and resistors for value by means of an ohmmeter, but be aware in-circuit measurements should be evaluated carefully.

Note: Please be aware that all measured voltages or RF levels in this document are rough figures. Especially RF levels varies due to different measuring equipment or different grounding of the used probe. When using RF probe usually a good way is to use metallic tweezers to connect probe ground to PWB ground as close to measurement point as possible.

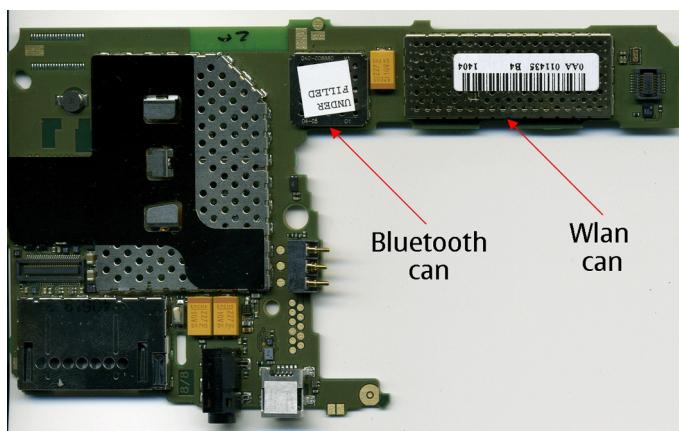


Figure 62 WLAN and Bluetooth placement

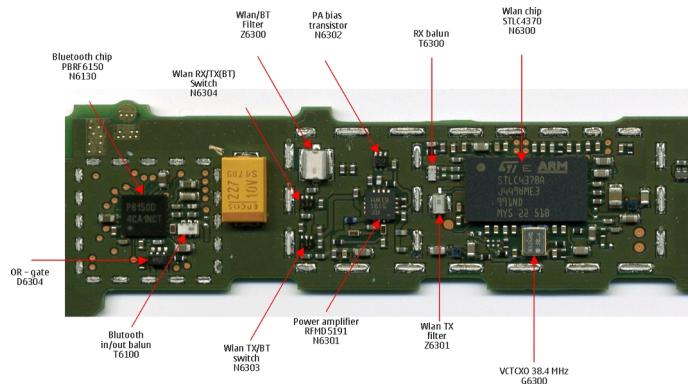


Figure 63 RF key component placement

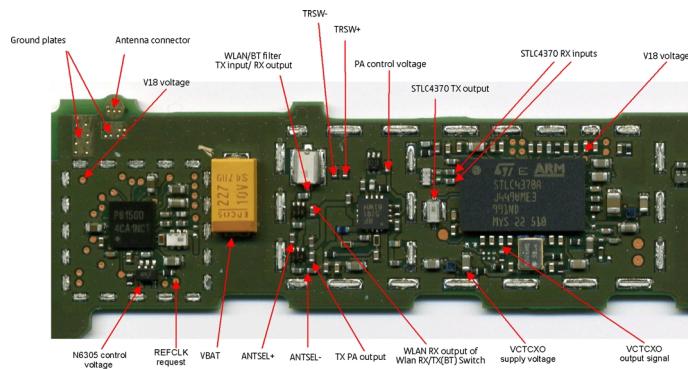


Figure 64 WLAN RF measurement points

General instructions for TX troubleshooting

Context

To start TX troubleshooting

Steps

1. Connect the test jig MJ-53 to a computer with a DAU-9S cable or to an FPS-8 flash prommer with an XCS-4 modular cable and USB cable. Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect a DC power supply to the module test jig (MJ-19) with an FLC-2 cable.

Note: When repairing or tuning the transmitter use external DC supply with at least 3A current capability. Set the DC supply voltage to 12V and set the jumper connector on test jig to "bypass" position.

3. Connect an RF cable to the RF connector of the module test jig (MJ-53) and measurement equipment; or at least a 10dB attenuator, otherwise the PA may be damaged. Use a spectrum analyzer as measurement equipment.

Note: The maximum input power of a spectrum analyzer is +30dBm. It is recommended to use 10dB attenuator on the spectrum analyzer input to prevent any damage.

4. Set the phone module to test jig and start Phoenix service software.
5. Initialize connection to the phone. (Use FBUS driver when using DAU-9S).
6. To choose a product in Phoenix: From the File menu, choose "Choose Product" and select SU-18 from the list or from the File menu, choose "Scan Product".
7. From the toolbar, set operating mode to "Local".

8. From the Testing menu, choose "WLAN TX tests".

9. In the "WLAN TX tests" window:

- Test mode "Per TX"
- Data rate "11 MBit/s (Clk)"
- Channel "6 (2.437 GHz)"
- Power loop "Calibrated"
- All other items use defaults"
- Press "Start" button"
- Power level(dBm) "17"
- Press "Set" button

WLAN TX and STLC4370 troubleshooting

Transmitter troubleshooting diagram

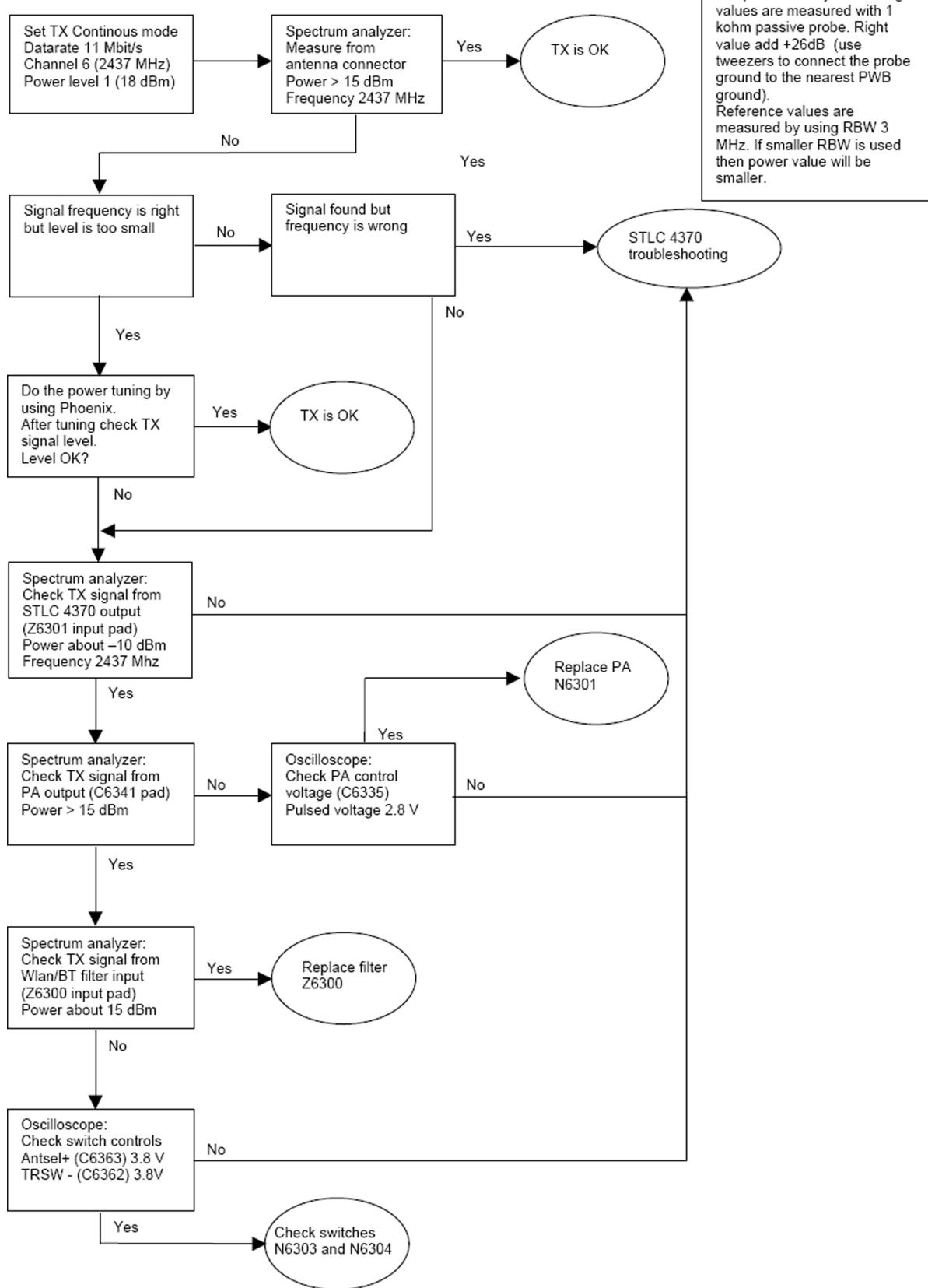


Figure 65 WLAN TX troubleshooting

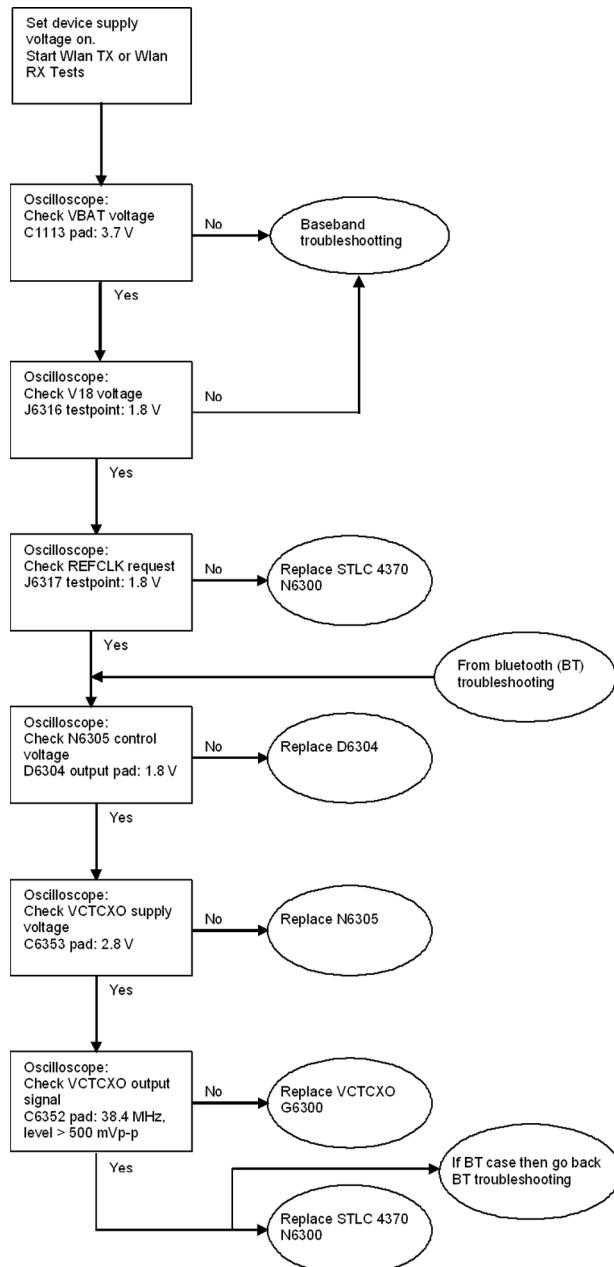


Figure 66 WLAN STLC4370 troubleshooting

General instructions for WLAN RX troubleshooting

Context

To start RX troubleshooting

Steps

1. Connect the test jig MJ-53 to a computer with a DAU-9S cable or to an FPS-8 flash prommer with an XCS-4 modular cable and USB cable. Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect a DC power supply to the module test jig (MJ-19) with an FLC-2 cable.

Note: When repairing or tuning the receiver use external DC supply with at least 3A current capability. Set the DC supply voltage to 12V and set the jumper connector on test jig to "bypass" position.

3. Connect an RF cable to the RF connector of the module test jig (MJ-53) and RF signal generator;
4. Set the phone module to test jig and start Phoenix service software.
5. Initialize connection to the phone. (Use FBUS driver when using DAU-9S).
6. To choose a product in Phoenix: From the File menu, choose "Choose Product" and select SU-18 from the list or from the File menu, choose "Scan Product".
7. From the toolbar, set operating mode to "Local".
8. From the Testing menu, choose "WLAN RX tests".
9. In the "WLAN RX tests" window:
 - Test mode "Generator mode"
 - Channel "6" (2.437 GHz)
 - Press "Start" button"

WLAN RX troubleshooting

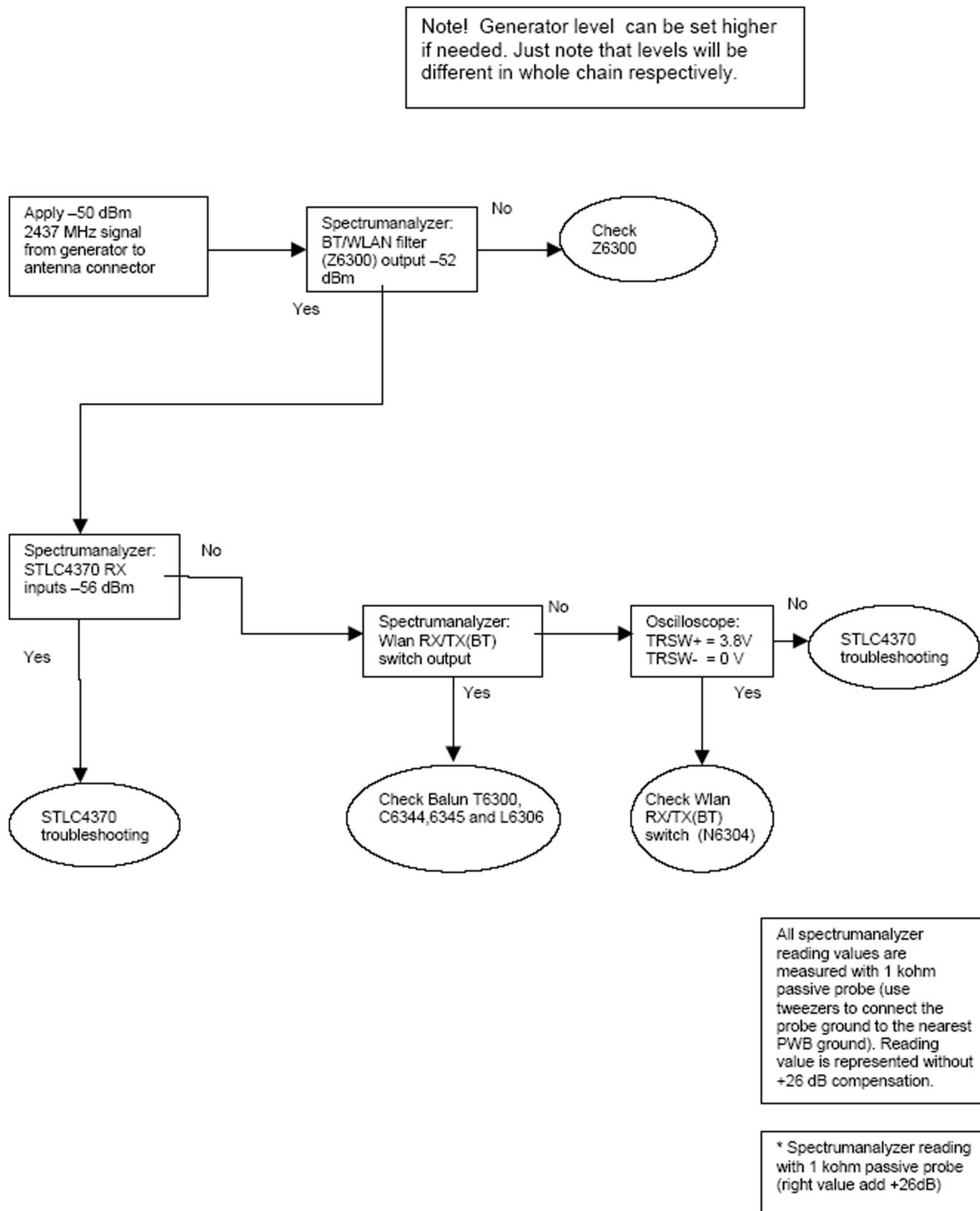


Figure 67 WLAN RX troubleshooting

Antenna troubleshooting

The device uses a common antenna for Bluetooth and WLAN. If fault is not found after TX and/or RX troubleshooting then check antenna by doing SB-7 test.

If it does not work check detailed instructions for antenna troubleshooting from Bluetooth troubleshooting in BB Troubleshooting and Manual Tuning Guide.

8 — System Module

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■ Baseband description

System module block diagram

The device consists of three different main modules: engine (1GJ), flex (1KQ) and LCD module. The engine board consists of baseband and RF components.

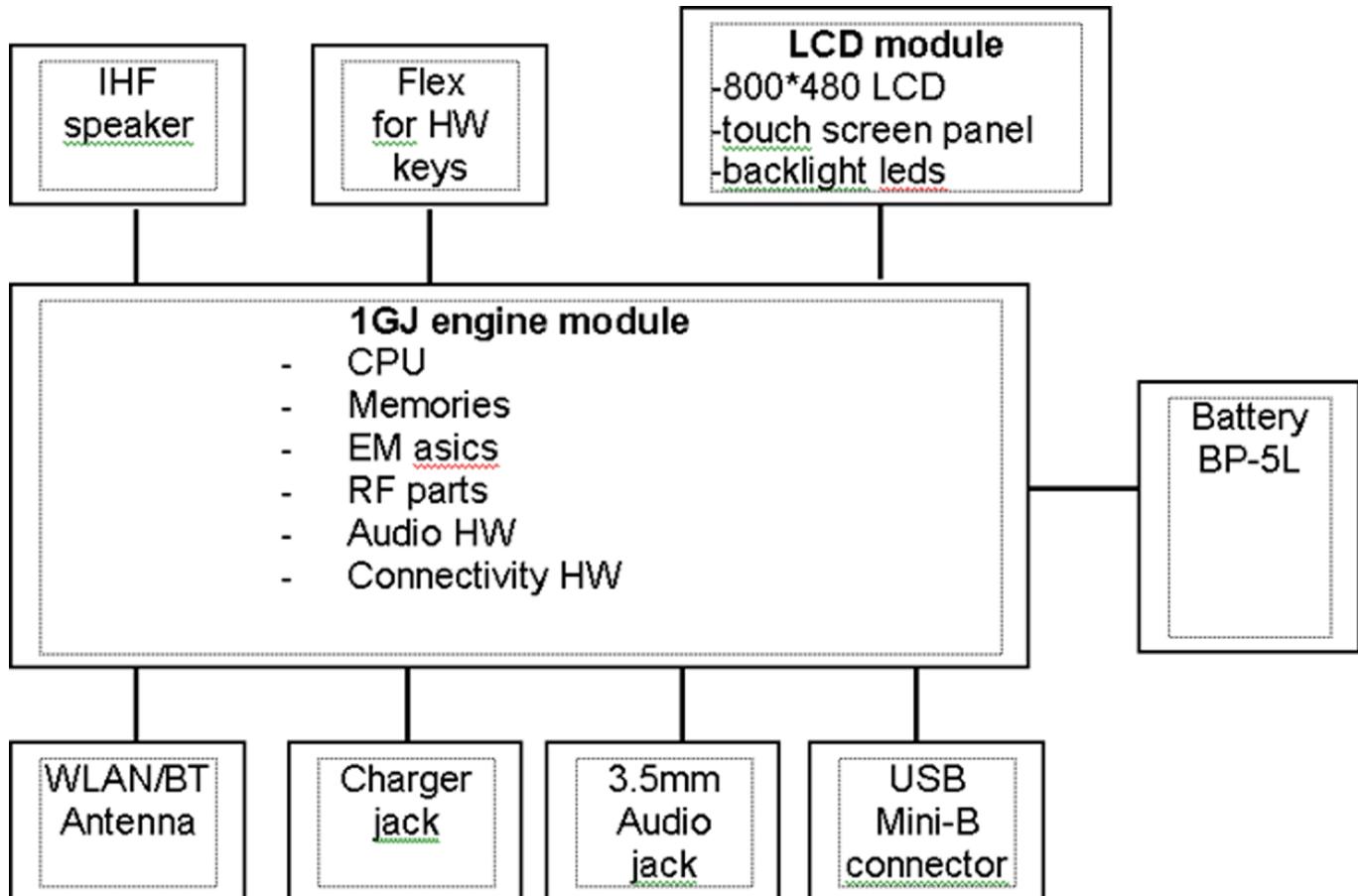


Figure 68 System module block diagram

Baseband functional description

The device includes Helen3 ASIC with DDR/NAND combo memory, Tahvo and Retu power management ASICs and external audio codec and IHF PA. 800*480 LCD has external LCD controller, which includes frame buffer for LCD..

High level block diagram of the device is shown in the Figure 2.

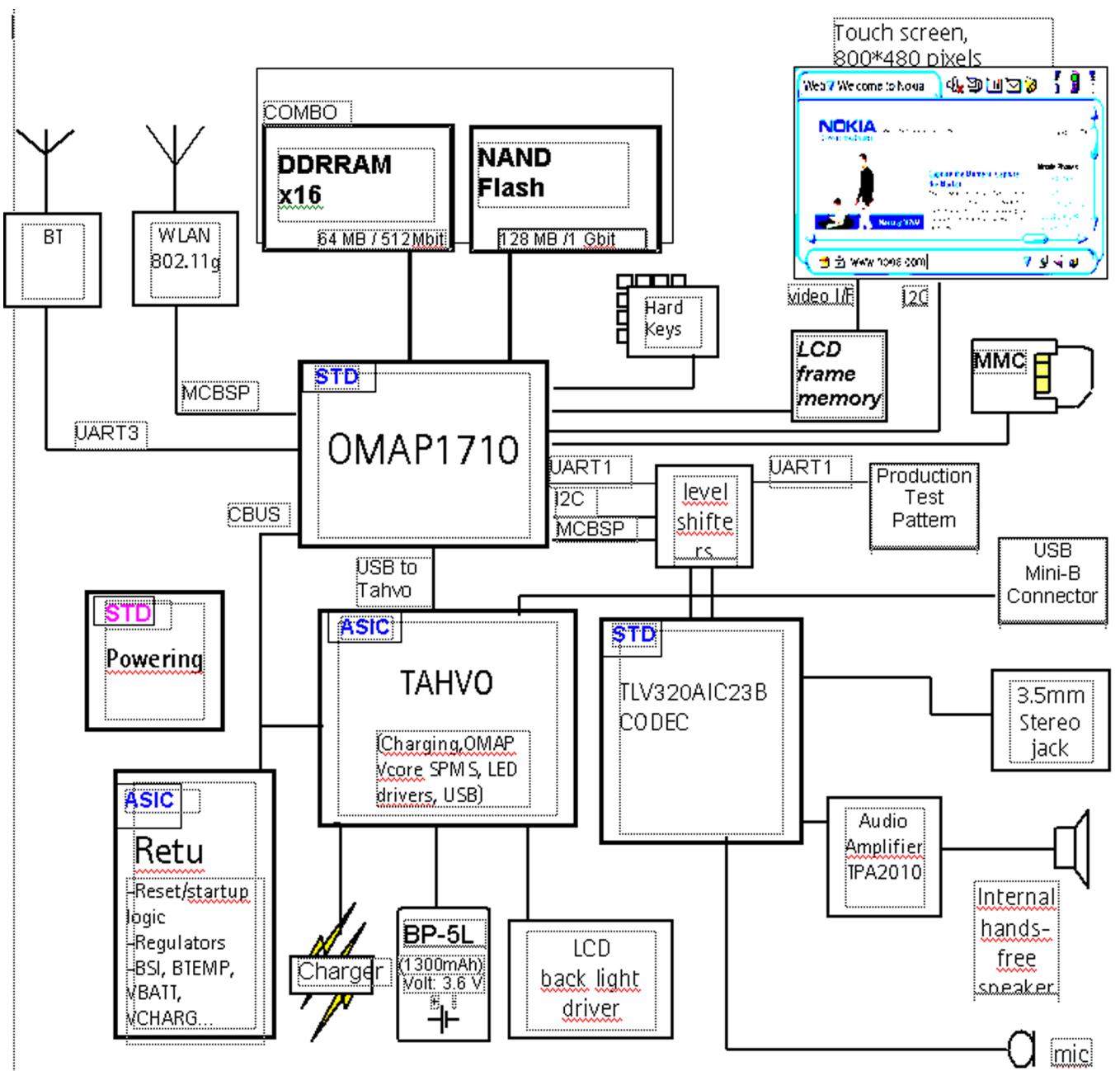


Figure 69 High level block diagram

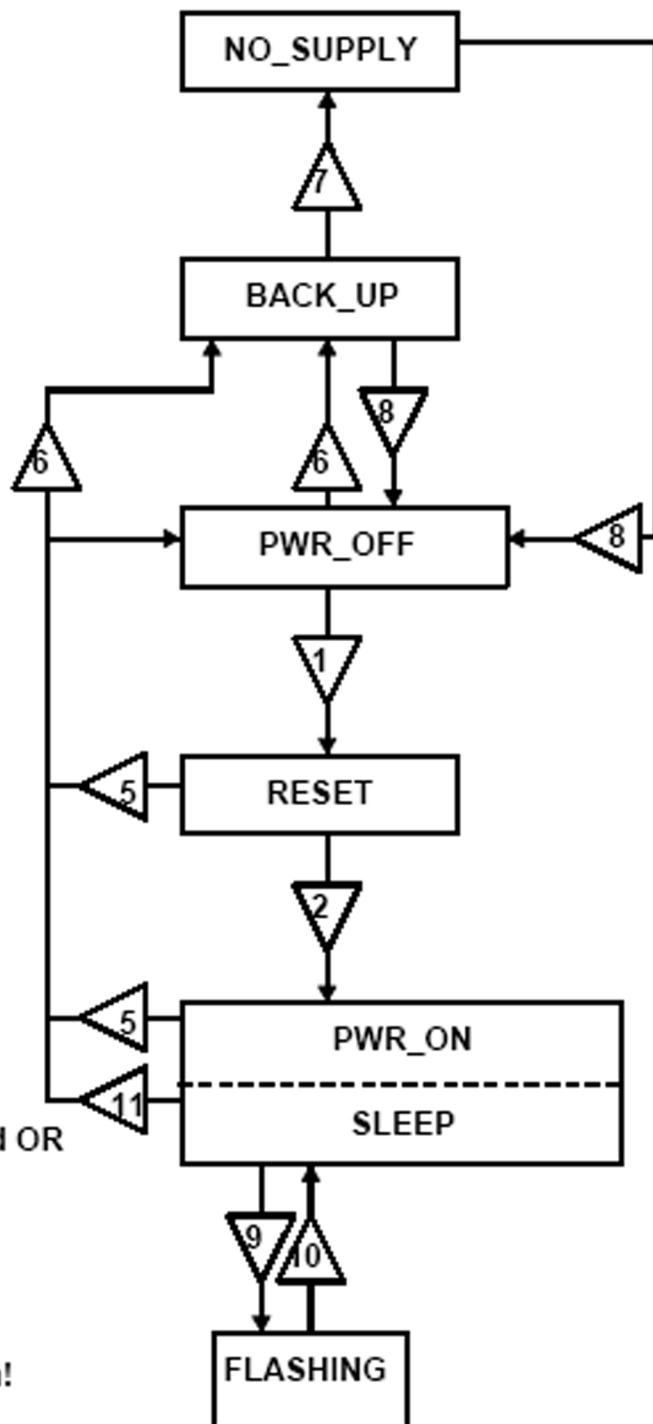
Modes of operation

Mode	Description
NO_SUPPLY	(dead) mode means that the main battery is not present or its voltage is too low (below RETU master reset threshold) and that the back-up battery voltage is too low.
BACK_UP	Main battery is disconnected or empty, back-up battery has sufficient charge in it and back-up time has not elapsed. RTC is running and it is supplied by back-up battery directly.
PWR_OFF	When RETU is in (warm) PWR_OFF mode, the main battery voltage level > VCOFF-, the RTC is on and the oscillator is on. In (cold) PWR_OFF mode the RTC and the oscillator are off.

Mode	Description
RESET	RESET mode is a synonym for start-up sequence. RESET mode uses 32kHz clock to count the REST mode delay (typically 16ms).
ACTING DEAD	If the device is off when the charger is connected, the device is powered on but enters a state called "Acting Dead". To the user, the device acts as if it was switched off. A battery charging alert is given and/or a battery charging indication is shown to acknowledge the user that the battery is being charged.
ACTIVE	In the active mode the device is in normal operation.
IDLE	Helen enters idle as wait-for-interrupt instruction is executed. Retu and Tahvo are in normal power on mode. WLAN and BT are sleeping independently.
BIG SLEEP	Helen is in Big sleep mode but Retu and Tahvo are in normal power on mode. WLAN and BT are sleeping independently.
DEEP SLEEP	Helen is in Deep sleep mode and also Retu and Tahvo are in sleep mode. WLAN and BT are sleeping independently.
CHARGING	Charging can be performed in any operating mode. If power is switched off during charging the device enters to the Acting Dead mode.
FLASHING	Flashing mode is for SW downloading.

State transitions:

- 1 -PwrOnX low OR
-Charger connected OR
-IBI pulse on BTEMP OR
-RTC alarm occurred OR
-MBUS high AND
-VBAT>VCOFF+
- 2 -VBAT is and stays over VCOFF- AND
-RETU state machine delay elapses
- 5 -PwrOnX high during RESET OR
-VBAT falls below VCOFF- OR
-Thermal shutdown OR
-oscillator fails OR
-VCHAR goes low during RESET
- 6 -VBAT falls below
- 7 -Back-uptime
- 8 -Battery voltage rises over
(fresh battery inserted or battery)
- 9 -Flashing mode requested by
prommer
- 10 -Flashing
- 11 -PwrOnX high after WD time has elapsed OR
-PwrOnXMASK-bit='1'



All possible transitions are not shown!

Figure 70 State diagram

Voltage limits

Parameter	Description	Value
VMSTR	Master reset threshold (RETU)	2.2V (typ.)
VMSTR+	Threshold for charging, rising (TAHVO)	2.1V (typ.)

Parameter	Description	Value
VMSTR-	Threshold for charging, falling (TAHVO)	1.9V (typ.)
VCOFF+	Hardware cutoff (rising)	2.9V (typ.)
VCOFF-	Hardware cutoff (falling)	2.6V (typ.)
SWCOFF	SW cutoff limit	~3.2V

The master reset threshold controls the internal reset of Retu / (Tahvo). If battery voltage is above VMSTR, UEME's charging control logic is alive. Also, RTC is active and supplied from the main battery. SW can also consider battery voltage too low for operation and power down the system.

Power key

The system boots up when power key is pressed (adequate battery voltage, VBAT, present).

Power down can be initiated by pressing the power key again (the system is powered down with the aid of SW). Power on key is connected to Retu ASIC via PWRONX signal.

Power distribution

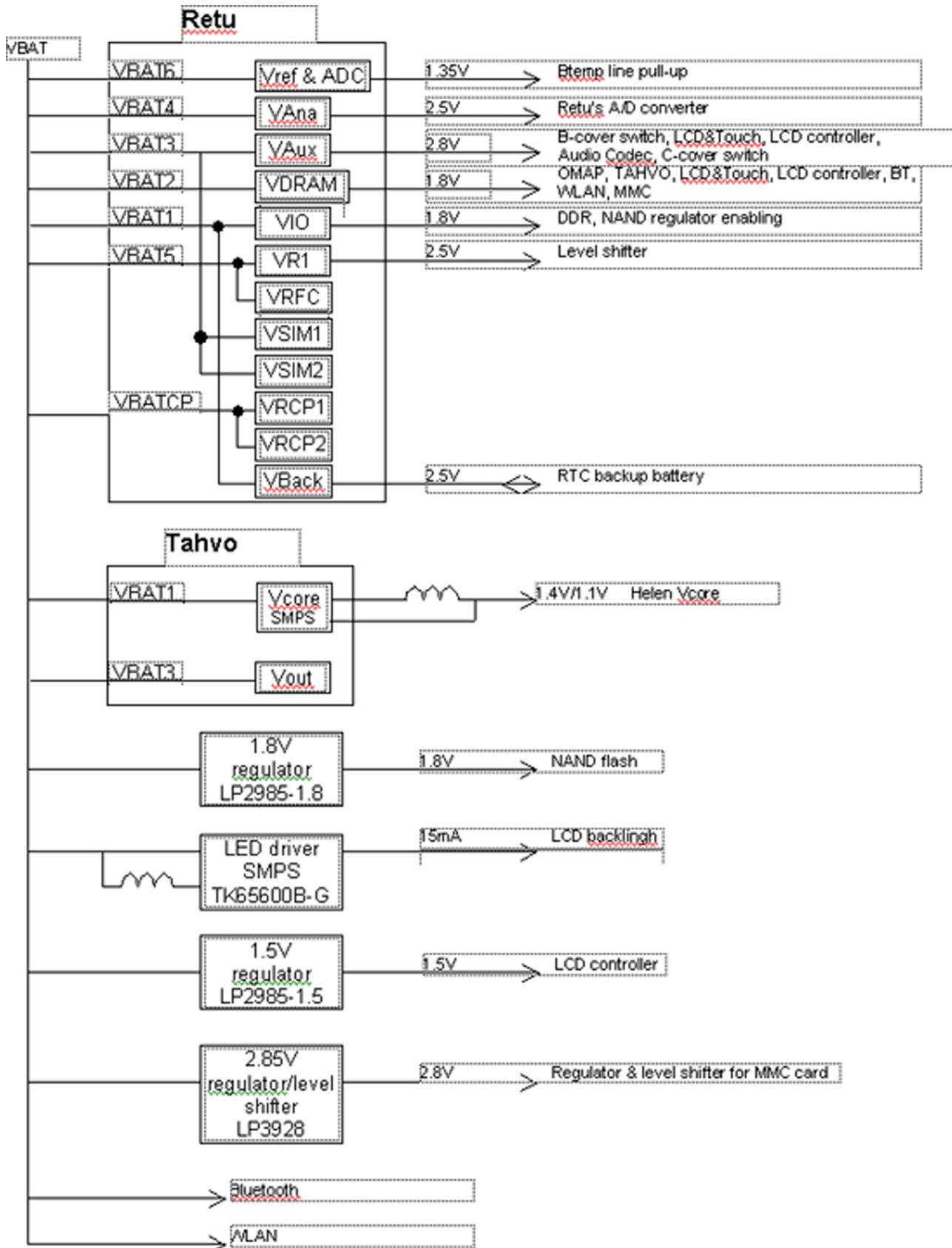


Figure 71 Power distribution diagram

System power-up

After inserting the main battery, regulators started by HW are enabled. SW checks, if there is some reason to keep the power on. If not, the system is set to power off state by watchdog. Power up can be caused by the following reasons:

- Power key is pressed
- Charger is connected
- RTC alarm occurs
- MBUS wake-up

After that:

- Retu activates sleep clock and VANA, VDRAM, VIO and VR1 regulators.
- Voltage appearing at Retu's RSTX pin is used for enabling Tahvo ASIC.
- Tahvo enables VCORE regulator to 1.35V mode and its internal RC-oscillator (600kHz).
- Retu will release PURX ~ 16ms after power up is enabled (the RF clock is then stable enough).
- After Helen 12 MHz system clock is stabilized, Helen starts using it instead of sleep clock.
- HW start-up procedure has been finalized and the system is up and running. Now it is possible for SW to switch ON other needed regulators.
- VCORE of Tahvo is set to 1.4V before Helen system clock can be set to 216 MHz.

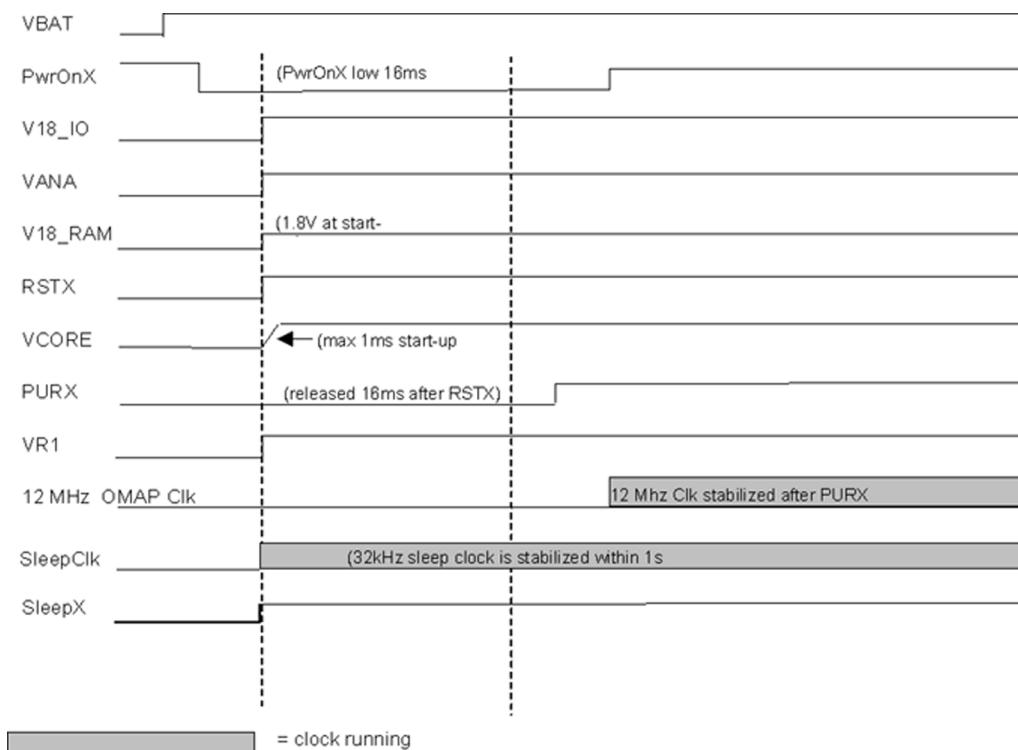


Figure 72 Power up diagram

Clocking scheme

Two main clocks are provided to the BB system: 12 MHz clock produced by crystal for Helen3 and 32.768kHz sleep clock produced by RETU with an external crystal for sleeping functionality. Helen3 has internal PLLs, which then create clock signals for other peripheral devices/interfaces like USB and RS MMC, LCD and memories.

WLAN and BT have independent Sysclk, which is generated by VCTCXO.

32k Sleep Clock is always powered on after startup.

SleepX Signal is used for indicating Deep Sleep -mode.

LCD clock is 12 MHz clock, which is buffered from Helen internal system clock. It is disabled in Deep Sleep mode.

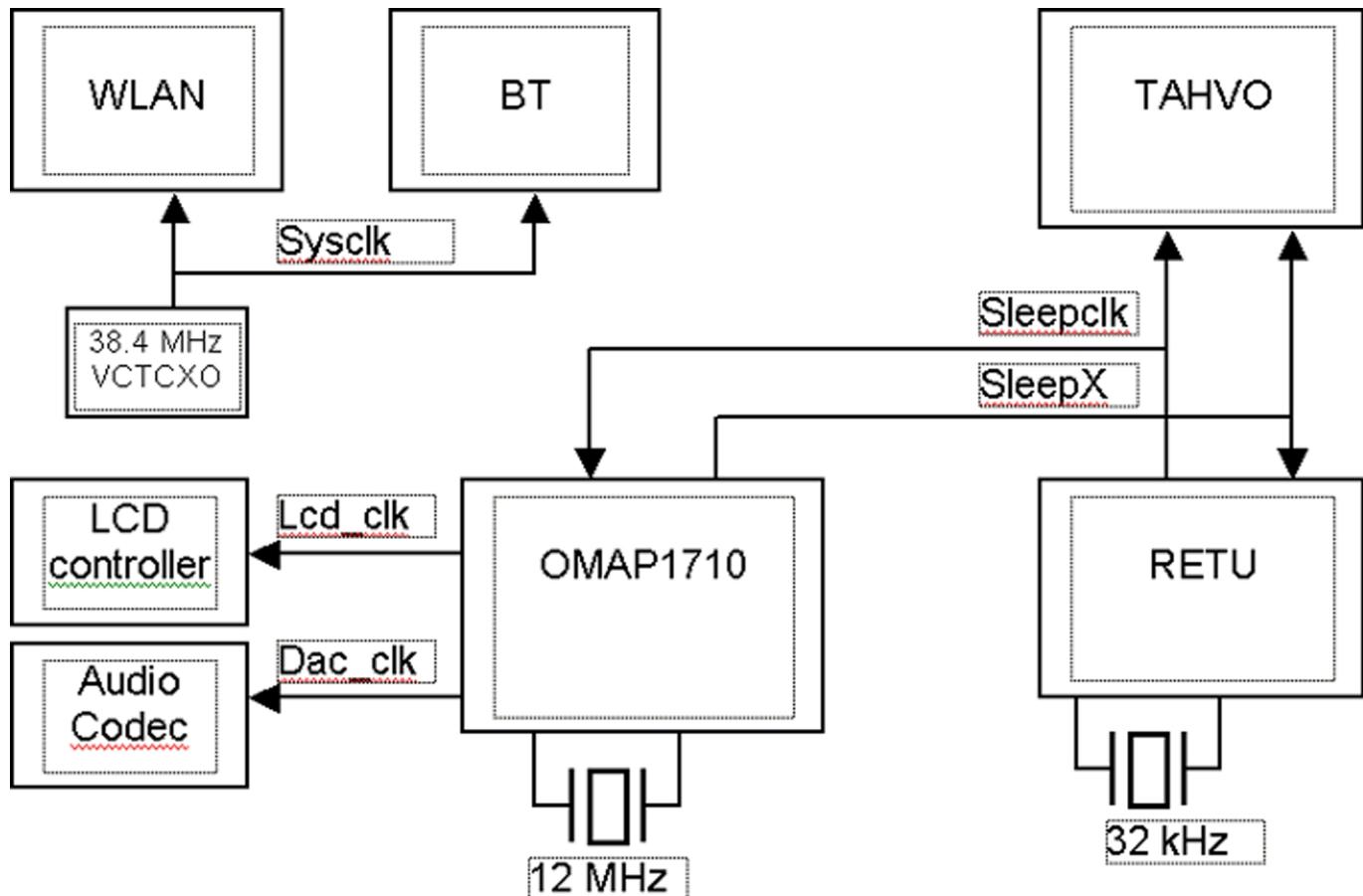


Figure 73 Clocking scheme

Signal name	From	To	Min	Typ	Max	Unit	Notes
OMAP SYSCLK	OMAP	-	-	12	-	MHz	Active when OMAP is awake
SLEEPCLK	RETU	TAHVO, OMAP	-	32.768	-	MHz	Sleep clock
LCD_CLK	OMAP	LCD controller		12	-	MHz	Active when OMAP is awake
DAC_CLK	OMAP	Audio codec	-	12		MHz	Only active when audio codec is activated

Signal name	From	To	Min	Typ	Max	Unit	Notes
SYSCLK	WLAN RF	WLAN RF BT		38.4		MHz	Active when WLAN or BT is awake

Bluetooth

Bluetooth provides a fully digital link for communication between a master unit and one or more slave units. The system provides a radio link that offers a high degree of flexibility to support various applications and product scenarios. Data and control interface for a low power RF module is provided. Data rate is regulated between the master and the slave.

The device Bluetooth is based on TI 6150 BT ASIC.

The UART3 interface handles the transfer of control and data information between OMAP and the BT system (TI 6150).

USB

USB (Universal Serial Bus) provides a wired connectivity between host PC and peripheral devices. USB is a differential serial bus for USB devices. USB controller (HELEN) supports USB specification revision 2.0 with full speed USB (12Mbps).

The device is connected to the USB host through the USB Mini-B connector. The USB bus is hot plugged capable, which means that USB devices may be plugged in/out at any time.

RS MMC interface

The device has slot for reduced size (24mm x 18mm x 1.4mm) multimedia card. It supports RS MMC hot insertion so it is possible to remove/insert the card when the phone is powered on.

RS MMC card is connected to the Helen3 processor MMC (1.8V) interface. Level shifter enables to use 1.8 and/or 3V RS MMC cards. MMC interface is shown in the following figure:

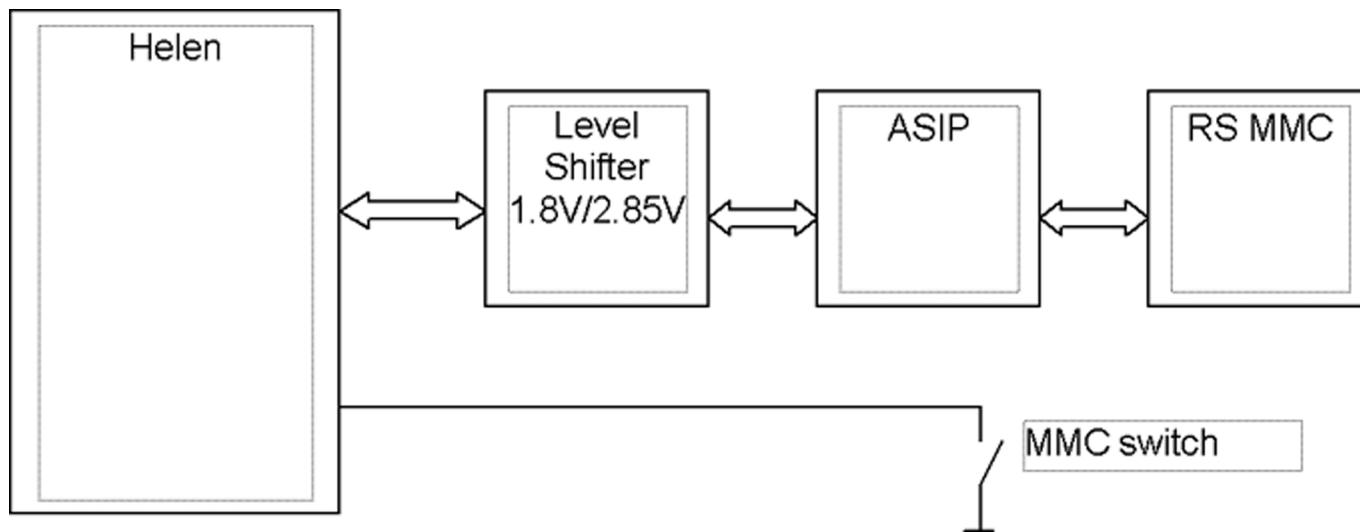


Figure 74 MMC interface

The basic multimedia card concept is based on the following communication signals CLK, CMD and DAT. With each cycle of the CLK signal one bit transfer on the DAT and CMD line is done. The maximum CLK frequency is 20MHz (specified in multimedia card specification). Maximum used CLK frequency at the time is 16MHz. CMD is a bi-directional command channel used for card initialization and data transfer commands. CMD signal has

two operational modes open-drain and push-pull mode. Open-drain mode is used for card initialization and pushpull mode for fast command transfer. CMD commands are sent by the host and CMD responses are sent by the card. DAT is a bi-directional data channel, which operates at push-pull mode.

The detection of RS MMC card removal/insertion is done via RS MMC cover switch. Removing RS MMC while writing to RS MMC may corrupt data in RS MMC. RS MMC cover switch gives an interrupt to the SW while the cover is opened or closed. After RS MMC cover lid opening (RS MMC SW signal is connected to GND via cover switch) the SW power down the RS MMC card and switches off the RS MMC power supply (VSIM2). When the RS MMC cover lid is closed the card is identified if card exists.

Battery interface

The battery interface supports NMP Lynx battery interface for the BL-5C battery. This interface consists of three connectors: VBAT, BSI and GND. BSI line is used to recognize battery capacity by a battery internal pull down resistor.

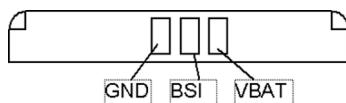


Figure 75 Battery pin order

Battery temperature is estimated by measuring separate battery temperature NTC via BTEMP line, which is located on the transceiver PWB, in a place where phone temperature is most stable.

For service purposes the device SW can be forced into local mode by using pull down resistors connected to the BSI line.

Display backlight

There are 6 white LEDs for illumination built in display module. It is designed in a way that there are two LED chains connected in parallel. Each of these chains consists of three LEDs in series. Since the forward voltage drop, V_f , of each white LED is typically about 3.6 to 4V; a white LED driver is required to drive the LEDs for the desired performance. Common TK65600B driver is used and matching current for both LED chains is ensured using current mirror circuitry with OP-amp and transistor in second LED chain.

HW keys

The device HW keys are located in flex, which is connected to the main PWB with a board-to-board connector. The key matrix has three rows and five columns, which is connected to the Helen's integrated keyboard block. Power button is connected directly to Retu.

Audio

The device's audio block consists of two chips; TLV320AIC audio codec and LM4890IBLX Audio Power amplifier. Headphone has detection line to control audio routing.

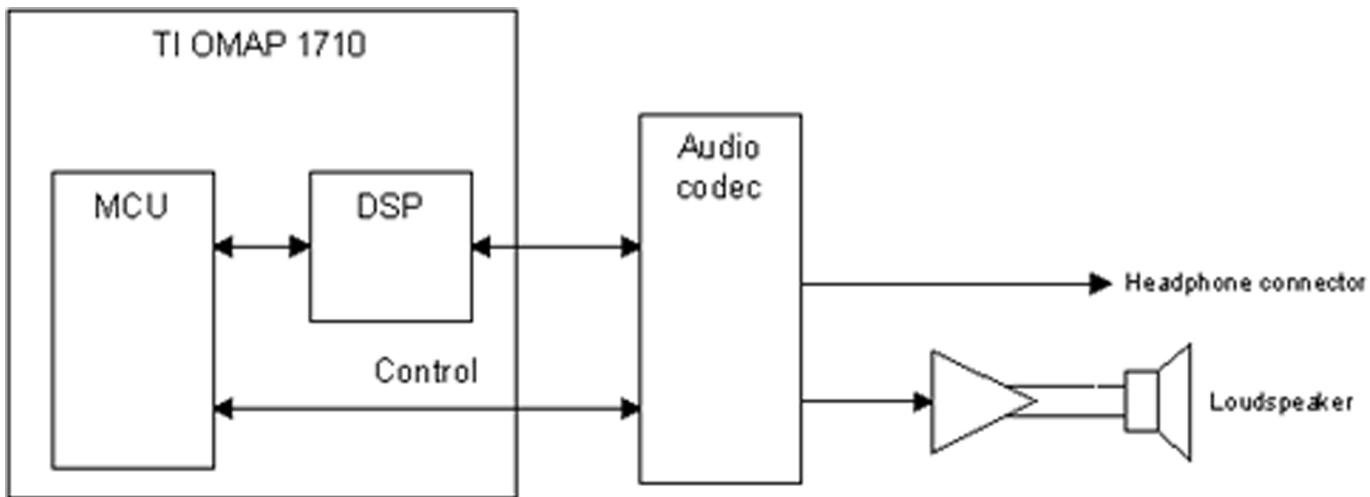


Figure 76 Audio block diagram

User interface

Display interface

Display module mechanical concept

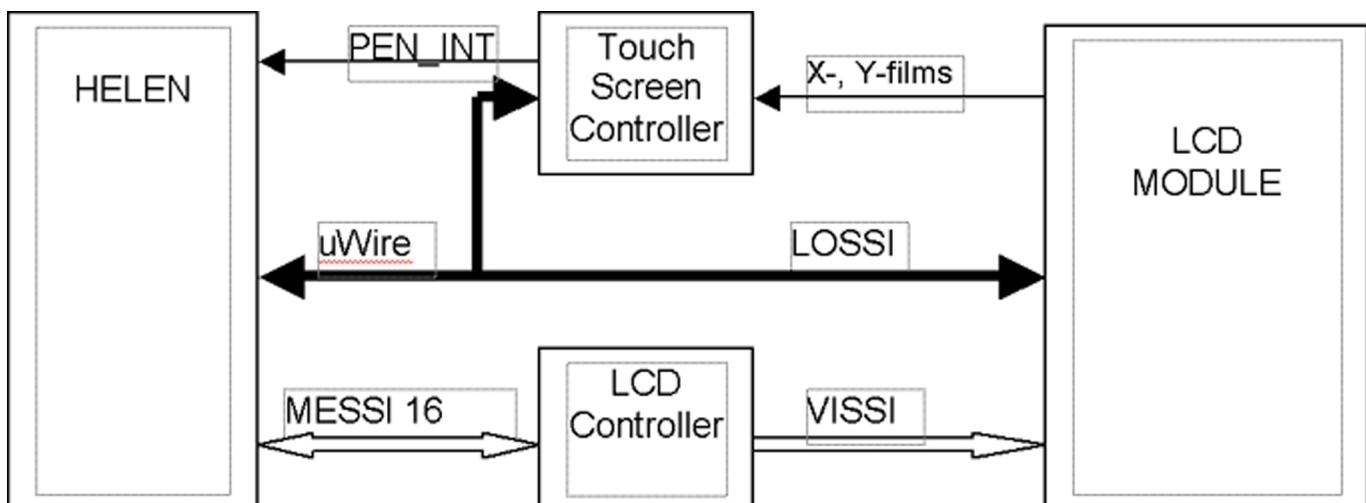


Figure 77 Display interface

Display features:

- 800x480 transmissive LTPS LCD display
- 262k color. Only 65k used in Sputnik (LCD controller supports only 65k)
- a backlight incorporating 6 white LED's to illuminate the display
- a touch screen
- Video interface (VISSI) and serial interface (LOSSI) for commands

The display has two different operating modes:

- 1 Normal mode
 - 2 Sleep mode
- Touchscreen FF:

- Interface to main flexfoil
 - Assembled main flex foil
 - Discrete components to support LTPS panel
 - Application interface connection via BTB
 - Interface to touchscreen
 - Interface to backlight
- Backlight Unit
- White casing with integrated lightguide
 - Optical foils for LTPS panel
 - LED flex including 6 Leds
 - Interface to main flex
- Stainless steel top cover
- Stainless steel bottom cover
- Dust seal
- Protective tape

The interconnection between the LCD module and the PWB engine is implemented with a 50-pin board-to-board connector.

Display is controlled via LCD controller using VISSI interface (video interface). All VISSI signals go through the EMC filtering ASIPs. The display module does not require any tunings.

LCD controller

The S1D13742 (Tornado) is a color LCD graphics controller with an embedded 800x480x16bit single display buffer. It supports a MESSI16 interface while providing high performance bandwidth into display memory allowing for fast screen updates. Output is 16 bit RGB video interface (VISSI.)

LCD controller updates LCD module using constant 55Hz frame rate from embedded display buffer. HELEN updates display buffer only when needed (changes appear).

Touch screen controller

The touch screen is implemented using TSC2046 Touch screen controller and resistive touch panel on LCD module. Touch screen controller communicates with HELEN with serial 9 bit interface. Main function of the controller is to take care of the analog signal processing and panel voltages switching parts of touch point coordinate acquisition process according to commands received from HELEN.

Touching the screen activates pin interrupt signal (PENIRQ). After this HELEN checks if panel is pressed using high enough force so that the right point coordinate can be accurately retrieved. If the force is adequate, several coordinate readings are acquired and the stylus position is calculated using software

ASICs

Retu EM ASIC

Retu EM ASIC includes the following functional blocks:

- Start up logic and reset control
- Charger detection
- Battery voltage monitoring
- 32.768kHz clock with external crystal
- Real time clock with external backup battery

- Stereo audio codecs and amplifiers (not used)
- A/D converter
- Regulators
- SIM card interface (not used)
- Vibra interface (not used)
- Digital interface (CBUS)

Tahvo EM ASIC

Tahvo EM ASIC includes the following functional blocks:

- Core supply generation
- Charge control circuitry
- Level shifter and regulator for USB/FBUS
- Current gauge for battery current measuring
- External LED driver control interface
- Digital interface (CBUS)

Device memories

Device memories

The memory of the device consists of NAND/DDR combo memory. Stacked DDR/NAND application memory has 512 Mbit of DDR memory and 1 Gbit of flash memory. DDR DRAM memory is stacked above the NAND flash. OMAP1710 includes a 16-bit dedicated memory interface called external memory interface fast (EMIFF). This is used to support interface for DDR memory. OMAP1610 provides also NAND flash controller located on the shared peripheral bus, providing support for 8-bit NAND flash.

Helen

OMAP1710 processor top block diagram is shown in the below figure. The OMAP gigacell (revision 3.3, called as OMAP3.3) includes MPU subsystem, DSP subsystem, system DMA and part of the L3 and L4 interconnects. All other components of OMAP1710 are associated with the OMAP gigacell.

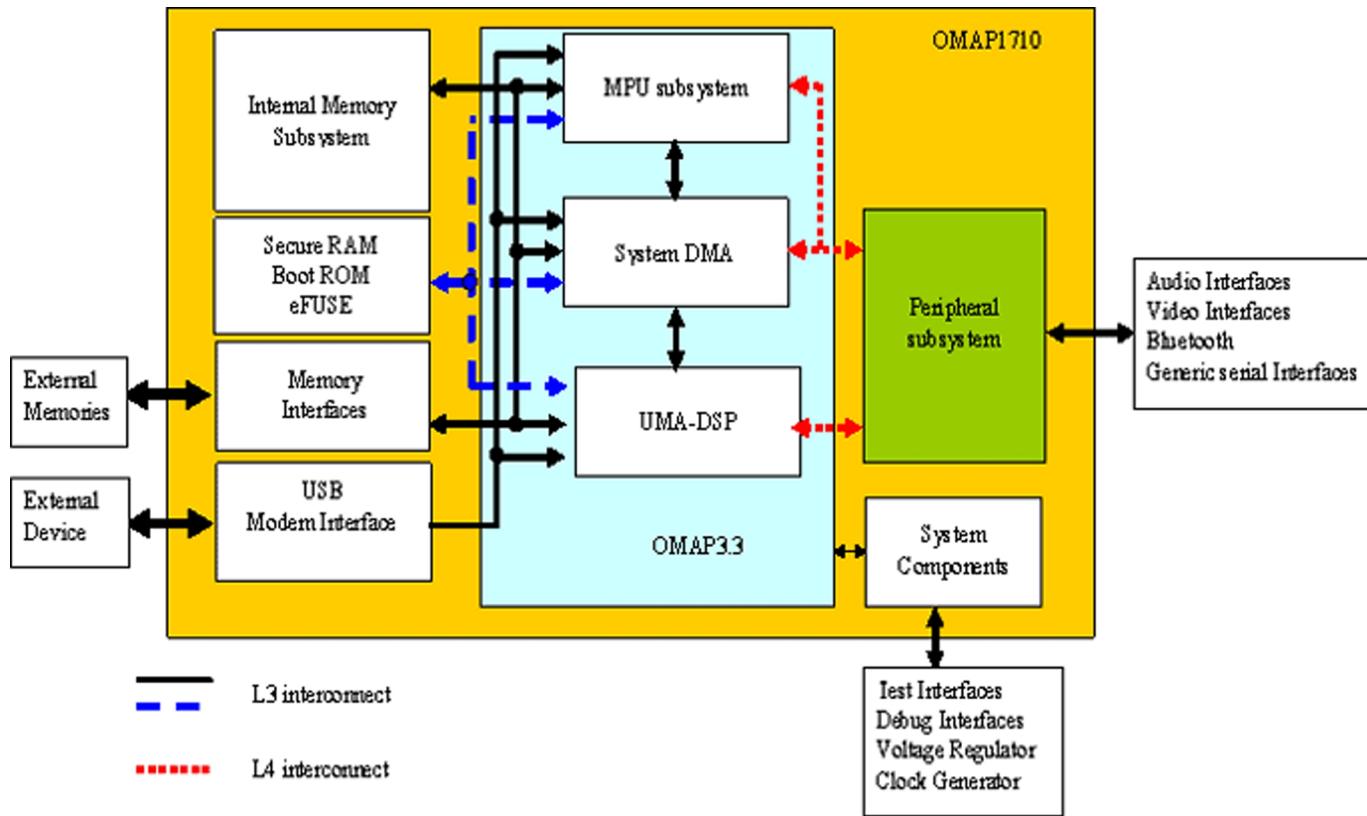


Figure 78 OMAP1710 top block diagram

■ Audio concept

Audio HW architecture

The functional core of the audio hardware is built around three ICs: OMAP 1710 engine ASIC, mixed signal audio codec TLV320AIC23B and the loudspeaker power amplifier LM4667.

Audio codec provides an interface for the loudspeaker and headphone connector. LM4667 is used to amplify the loudspeaker signal.

Because analog audio functions are integrated into audio codec and power amplifier, the only discrete electronics components needed for audio paths are audio filtering components and EMC/ESD components.

The internal loudspeaker is a 16mm dynamic speaker. There are no other audio transducers in the device. Headphones are connected to the 3.5mm stereo audio connector.

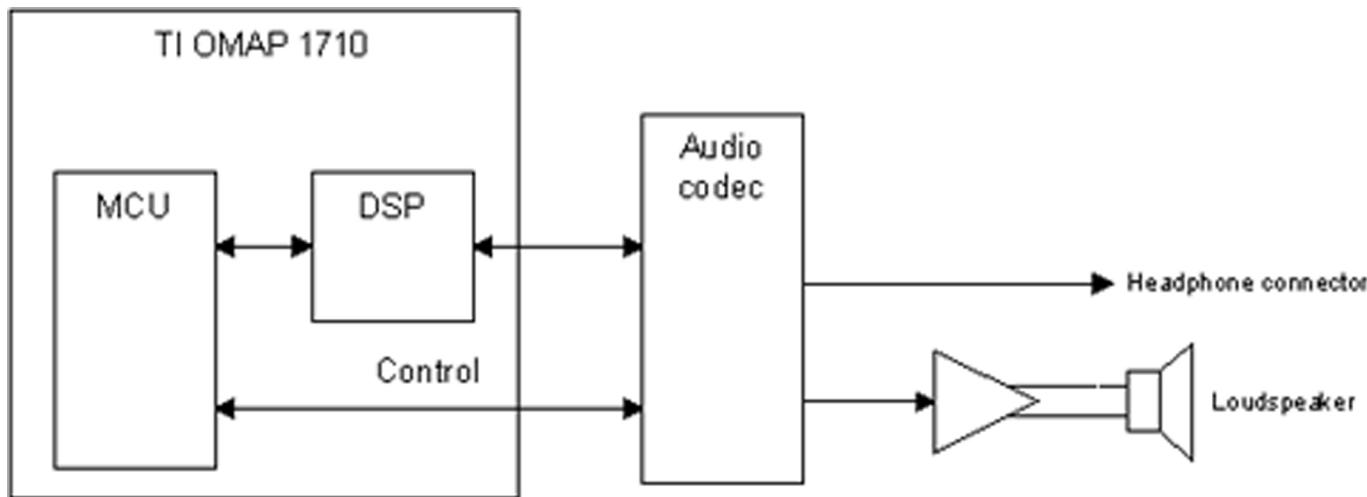


Figure 79 Audio block diagram

Internal speaker

Internal speaker is used for music and user interface sound playback. A dynamic 16mm speaker is connected to power amplifier LM4667's outputs Vo1 and Vo2. Amplifier LM4667 is a digital pulse modulated amplifier.

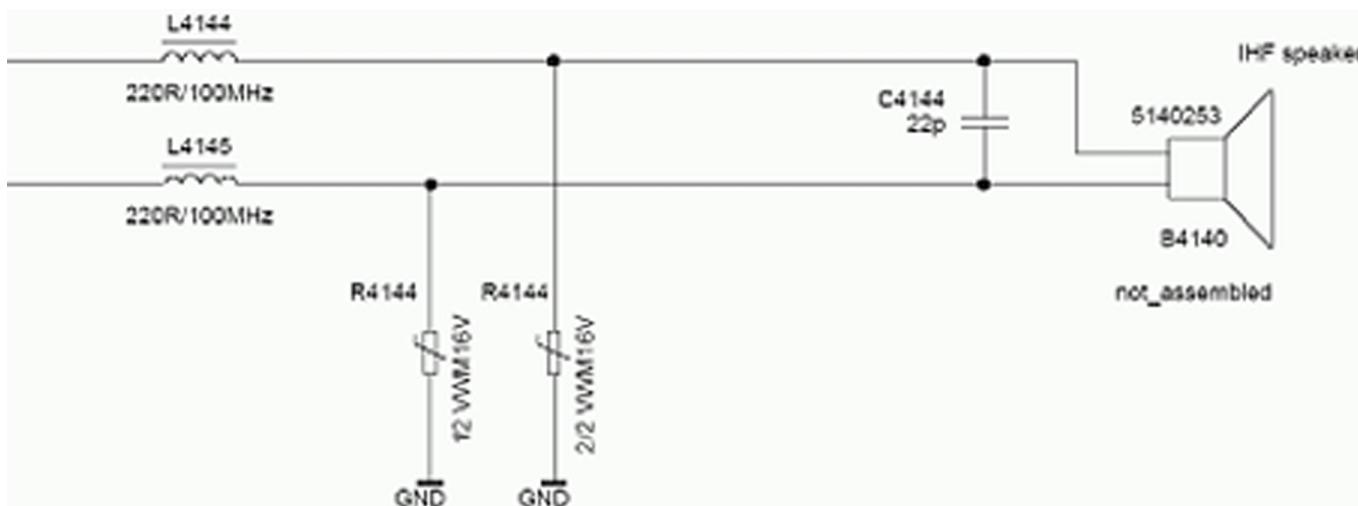


Figure 80 Internal speaker circuitry

Headphone interface

Headphones are connected to the 3.5mm stereo headphone connector. Headphone audio mode is automatically enabled/disabled during connection/disconnection of headphones.

Headphone connection/disconnection is detected using HEADPH_IND signal, that is grounded when headphones are connected.

Audio codec TLV320AIC23B provides two output channels in single-ended format for headphone audio use. Audio codec LHPOUT and RHPOUT outputs form the left and right headphone audio signals.

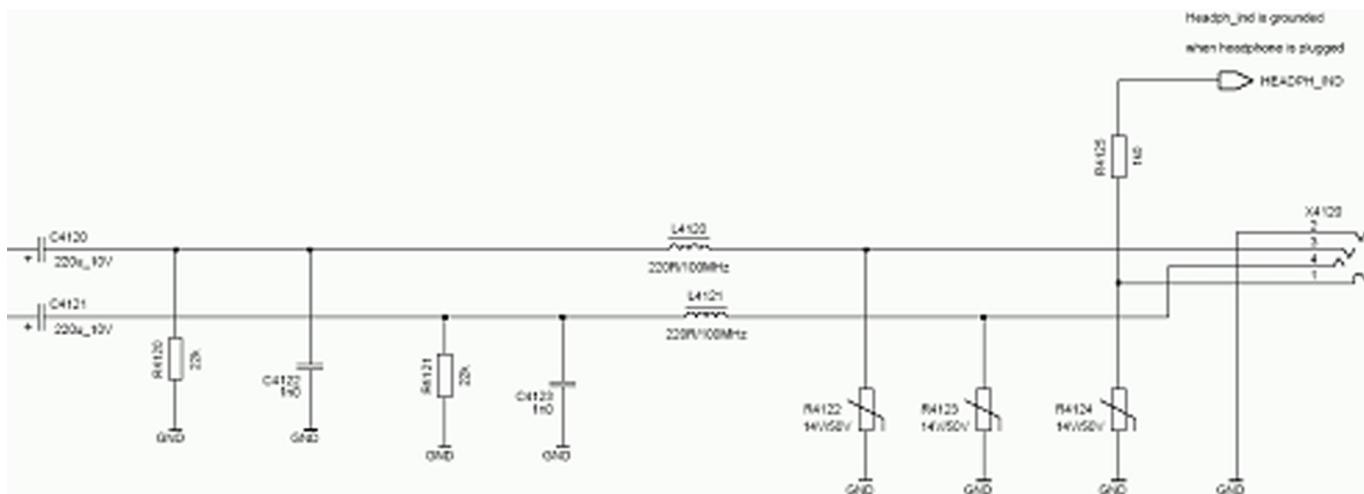


Figure 81 Headphone interface circuitry

Pin (headphone's male connector)	Signal function	Corresponding X4120 pin number
Tip (1)	Left channel	4
Ring (2)	Right channel	3
Sleeve (3)	Ground	2



Figure 82 Headphone connector

■ Baseband technical specifications

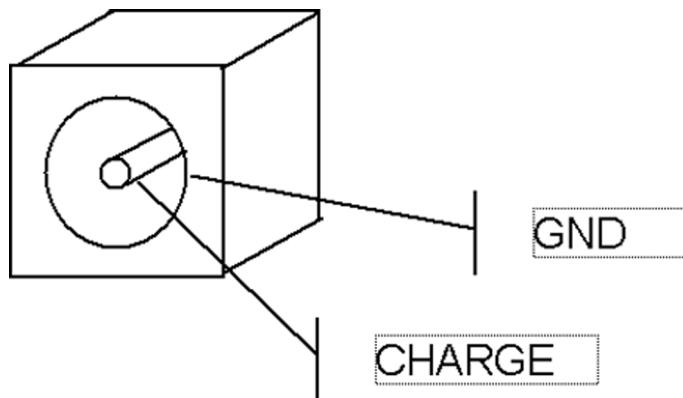
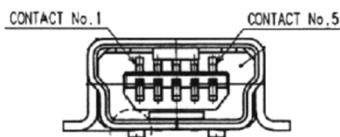
External interfaces

Table 13 Battery connection

Pin	Signal	Notes
1	VBAT	Battery voltage
2	BSI	Battery size indication (fixed resistor inside the battery pack)
3	GND	Ground

Table 14 Charging connector

Pin No	Pin Name	Description	Voltage levels, current	Comment
1	CHARGE	Charger input	0-9V, 0.85A	Center pin
2	GND	Ground	0.85A	

**Figure 83 Charger connector****USB IF electrical characteristics****Figure 84 USB Mini-B connector****Table 15 USB Mini-B connector**

Pin No	Pin Name	Description	Voltage levels, current	Comment
1	VBUS	USB power	4.375-5.25V	USB Spec
2	USB D-	USB Data transmission		USB Spec
3	USB D+	USB Data transmission		USB Spec
4	ID			V
5	GND	GDN for Power		USB Spec

Table 16 MMC connector

Pin	Signal	Description	Voltage levels	Comment
1	RSV	Reserved for future use		
2	CMD	Command/ Response		
3	Vss1	Ground		
4	VDD	Supply voltage 1.8 (Max 70mA)		
5	CLK	External clock for the MMC card, Max 20 MHz		

Pin	Signal	Description	Voltage levels	Comment
6	Vss2	Ground		
7	DAT	Bi-directional data bus		
-	MMCDET	MMC card detect		

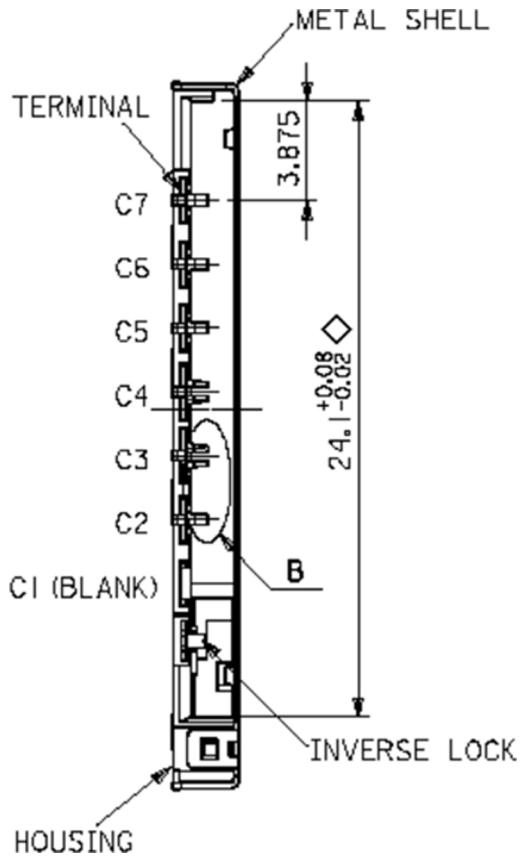


Figure 85 RS MMC connector

MMC cover switch

A detector switch is used for MMC cover opening detection. Switch gives early warning to prevent data loss or corruption when writing to MMC card.

Stereo Audio Jack

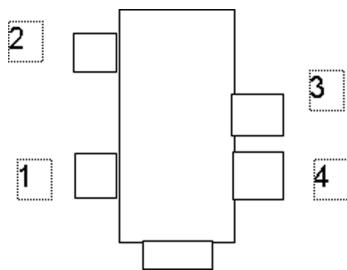


Figure 86 3.5 stereo audio Jack

Table 17 Stereo Audio Jack

Pin	Signal	Voltage levels	Notes
1	GND		Ground
2	LOUT	1Vrms	Left output for headphone 0dB full-scale output voltage
3	ROUT	1 Vrms	Right output for headphone 0dB full-scale output voltage
4	Indicator	0-1.8V	Headphone indicator (grounded when headphone is connected)

Test pattern

Test pattern is placed on the transceiver PWB on the battery side for service purposes

Battery cover switch

A hall switch is used for battery cover removal detection. Magnet is attached to battery cover. Sensor gives early warning to prevent data loss or corruption when battery is removed.

Protection cover (C-cover switch)

A hall switch is used for protection cover removal detection. Magnet is attached to protection cover. Sensor gives indication when cover is placed in. This enables device's sleeping functionality.

Internal interfaces**LCD interface****Table 18 LCD connector**

Pin Number	Signal Pin(s)	Signal Pin(s)	Levels	Description
1	VLED2-	VLED2-	0 1.5V	Return path of LED current
2	VLED2+	VLED2+	0 - 12V	Display illumination LED current supply (15mA)
3	VLED1+	VLED1+	0 -12V	Display illumination LED current supply (15mA)
4	VLED1-	VLED1-	0 1.5V	Return path of LED current
5,8,11,14,17,28 ,31,34,41,43,45	GND	DGND	0V	Ground
6	D8	G2	0 1.8V	Green
7	D7	G1	0 1.8V	Green
9	D6	G0	0 1.8V	Green
10	D5	B5	0 1.8V	Blue
12	D4	B4	0 1.8V	Blue
13	D3	B3	0 1.8V	Blue
15	D2	B2	0 1.8V	Blue

Pin Number	Signal Pin(s)	Signal Pin(s)	Levels	Description
16	D1	B1	0 1.8V	Blue
18	D0	B0	0 1.8V	16 bit colour is used -> connected to GND
19	SCLK	U-WIRE_DCLK	0 1.8V	Serial Clock
21	DOUT	U-WIRE_DIN	0 1.8V	Serial Data
22	DIN	U-WIRE_DOUT	0 1.8V	Serial Data
23	CSX	U-WIRE_CS3	0 1.8V	Chip Select
24	RESX	LCD_RST	0 1.8V	LCD Reset
25	2D-3D		0 1.8V	Not used, connected to GND
26	D9	G3	0 1.8V	Green
27	D10	G4	0 1.8V	Green
29	D11	G5	0 1.8V	Green
30	D12	R0	0 1.8V	16 bit colour is used -> connected to GND
32	D13	R1	0 1.8V	Red
33	D14	R2	0 1.8V	Red
35	D15	R3	0 1.8V	Red
36	D16	R4	0 1.8V	Red
37	D17	R5	0 1.8V	Red
38	DE	LCD_DE	0 1.8V	Data Enable
39	HS	LCD_Hsync	0 1.8V	Horizontal Sync.
40	VS	LCD_Vsync	0 1.8V	Vertical Sync.
42	PCLK	LCD_OClk	0 1.8V	LCD Pixel Clock
44	VDDI	V18	1.8V	IO Supply Voltage
46	VDD	V28	2.8V	Power Supply Voltage
47	TSU	Y+	0 2.8V	Touch panel signal
48	TSR	X-	0 2.8V	Touch panel signal
49	TSD	Y-	0 2.8V	Touch panel signal
50	TSL	X+	0 2.8V	Touch panel signal

HW keys connector

Table 19 HW keys connector

Pin Number	Pin Name	Levels	Description
1	V28	0 2.8V	Power supply for Hall sensor

Pin Number	Pin Name	Levels	Description
2	PROT_SHELL	0 1.8V	Protection shell state indicator form Hall sensor
3	GND	0V	Ground
4	KBR_0	0 1.8V	Keypad row 0
6	KBR_1	0 1.8V	Keypad row 1
5	KBR_2	0 1.8V	Keypad row 2
7	KBC_2	0 1.8V	Keypad column 2
8	KBC_1	0 1.8V	Keypad column 1
9	KBC_0	0 1.8V	Keypad column 0
10	KBC_3	0 1.8V	Keypad column 3
11	GND	0V	Ground
12	GND	0V	Ground
13	PWRONX	0-4.2V	Power on switch
14	GND	0V	Ground

■ RF description

WLAN RF description

Transceiver

Wlan RF implements 802.11b/g WLAN radio for embedded, low-power and small form factor mobile applications. It conforms to the IEEE 802.11b/g protocols operating in 2.4 GHz band supporting OFDM data rates of 54, 48, 36, 24, 18, 12, 9, and 6 Mbps as well as CCK data rates of 11 and 5.5 Mbps and legacy data rates of 2 and 1 Mbps. IEEE802.11e/i protocol extensions are included to implement quality of service (QoS) and security functions.

Parameter	Value
Frequency range	2412-2472MHz
Channel spacing	5 MHz
Number of channels	11 in US 13 in EU 13 in France
Frequency accuracy	-+25 ppm

Parameter	Value
Data rates and modulations	<p>IEEE802.11b:</p> <ul style="list-style-type: none"> 1 Mb/s BPSK, Barker spreading 2 Mb/s QPSK, Barker spreading 5.5 and 11 Mb/s QPSK, CCK coding <p>IEEE802.11g:</p> <ul style="list-style-type: none"> 6 and 9 Mb/s BPSK 12 and 18 Mb/s QPSK 24 and 36 Mb/s 16QAM 48 and 54 Mb/s 64QAM

The RF block diagram is shown below:

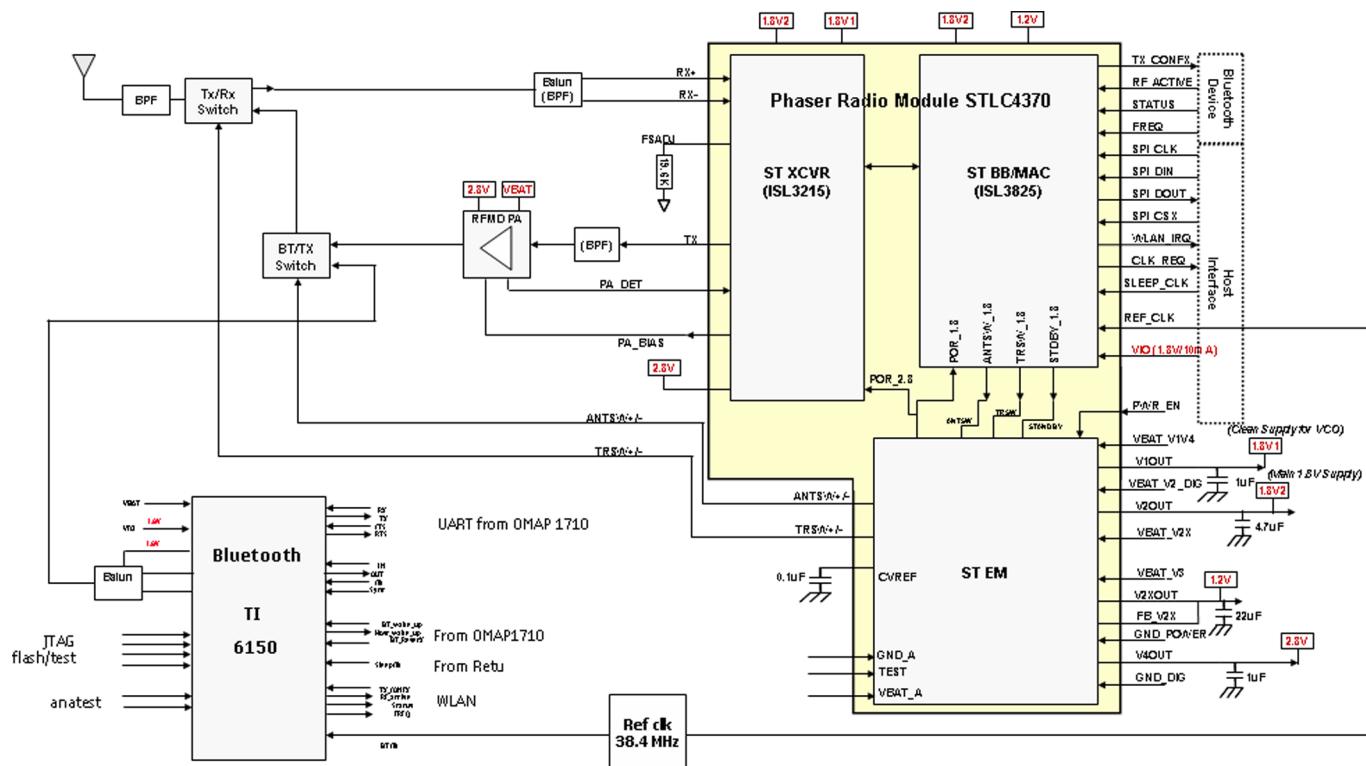


Figure 87 WLAN RF block diagram

STLC4370 has a fully integrated radio chip including a direct-conversion transceiver, RF synthesizer and VCO, and high-speed data converters. Digital interface is used for transferring the sampled data between radio and baseband chip. The baseband chip implements OFDM/CCK digital baseband processor and ARM9-based MAC with internal SRAM memories. The baseband includes required logic and interfaces to enable time-shared simultaneous use of BT and WLAN.

The energy management unit integrates required power management functions to operate the system from VBAT (3.0 – 5.5 V). The EM unit generates 1.2 V digital core voltage, two 1.8 V supplies for RF and 2.8 V LDO for PA bias supply. The EM unit also integrates power-on reset circuitry and level-shifters for RF front-end GaAs switches.

Host interface is provided by a flexible serial interface (SPI) supporting clock frequency up to 48 MHz. The maximum usable SPI clock rate depends on the host side clocking options and timing requirements. Typically rates of 14 – 24 MHz are achieved.

The system uses 38.4 MHz reference clock. Low-power sleep mode operation is enabled by low-speed 32 kHz clock (32768 Hz) and energy management unit low-current stand-by mode.

RFMD RF5191 power amplifier implements amplification of the transmit signal to required power levels. RF5191 amplifier is connected to VBAT. The PA includes power detector for closed-loop power control purposes. Other parts in discrete front-end include RF switches, baluns and band filters.

The Tx/Rx switch, BT/WLAN switch, RF filter and antenna are common to BT and WLAN in this device.

Parameter	Value
Typical output power (mean power)	18.0 dBm (conducted, Maximum output power 100mW (EIRP))
Minimum output power (mean power)	3 dBm
Output spectrum	ACPR1_-33dBc, ACPR2_-53 dBc
Modulation accuracy (EVM)	IEEE802.11b: All data rates <35% IEEE802.11g: 6 Mb/s <56% 9 Mb/s <40% 12 Mb/s <33 % 18 Mb/s <22 % 24 Mb/s <16% 36 Mb/s <11% 48 Mb/s <7.9% 54 Mb/s <5.6%
Carrier suppression	>15 dBc

Parameter	Value
Typical 3dB bandwidth	7.5 MHz (I and Qchannels)
Sensitivity	IEEE802.11b: 1 Mb/s -93 dBm 2 Mb/s -88 dBm 5.5 Mb/s -87 dBm 11 Mb/s -83 dBm IEEE802.11g: 6 Mb/s -87 dBm 9 Mb/s -85 dBm 12 Mb/s -84 dBm 18 Mb/s -81 dBm 24 Mb/s -77 dBm 36 Mb/s -73 dBm 48 Mb/s -70 dBm 54 Mb/s -68 dBm

Parameter	Value
Maximum Rx voltage gain (from antenna to Rx ADC)	102 dB
Typical AGC dynamic range	100 dB
Usable input dynamic range	-10 dBm...-92 dBm
RF gain step	30 dB, typical

Synthesizer

The PLL synthesizer with VCO is integrated into RFIC, only the loop filter is needed outside the RFIC.

Antenna

Antenna is located in the upper part of the engine PWB. antenna interface is single ended 50 Ω

WLAN TX description

Transmitter characteristics

The transmitter consists of:

- final frequency IQ-modulators
- power amplifier, for the lower and upper bands separately
- power control loop.

The IQ-modulator is integrated in STLC4370, as well as the operational amplifiers of the power control loop. The power amplifier is located in a single module with a power detector.

Item	Values
Type	Direct conversion
LO frequency range	4824...4944 MHz
Output power	802.11b: 17 dBm 802.11g: 14/15/16/17 dBm
Gain control range	60 dB

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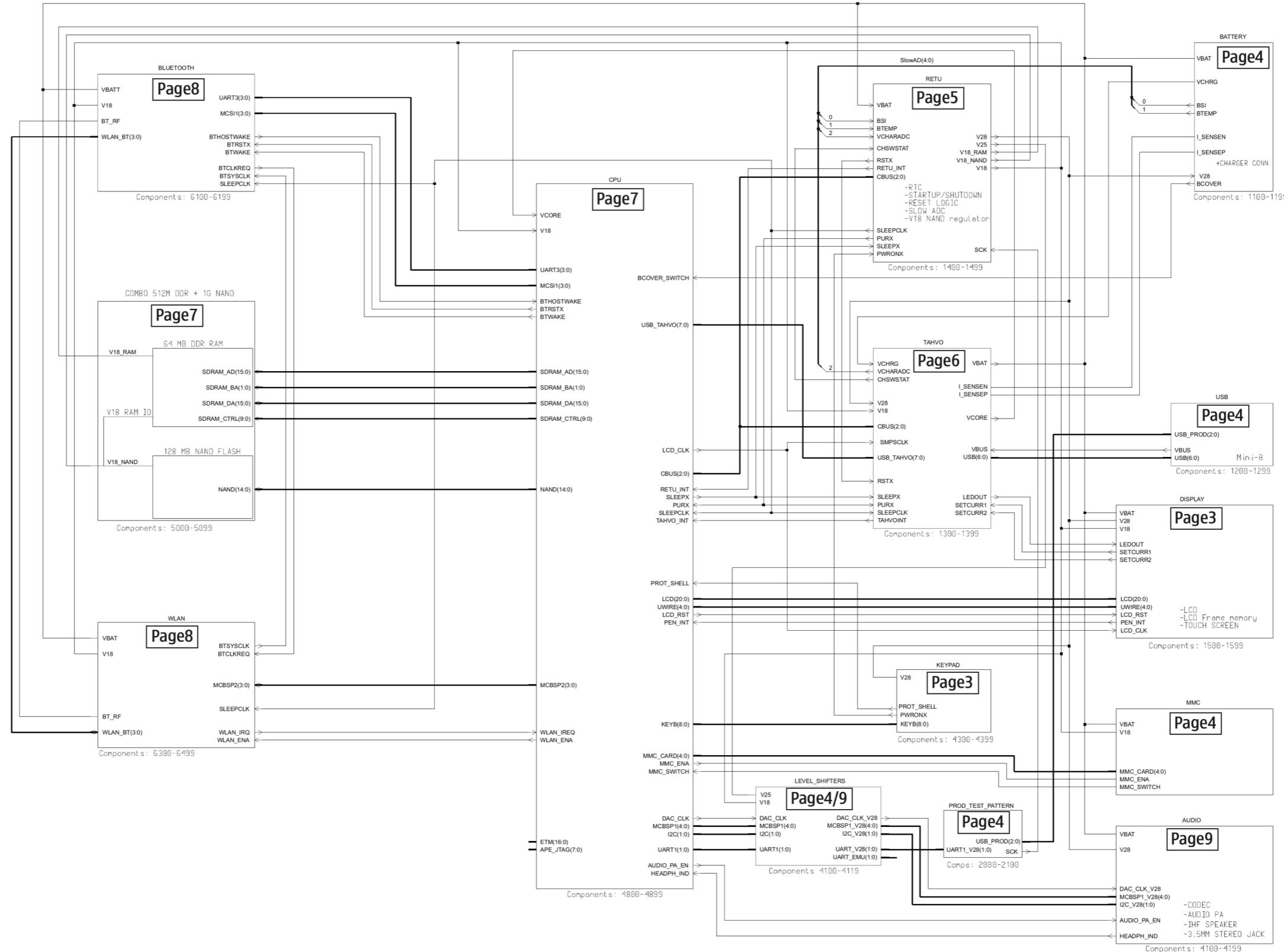
9 — Schematics

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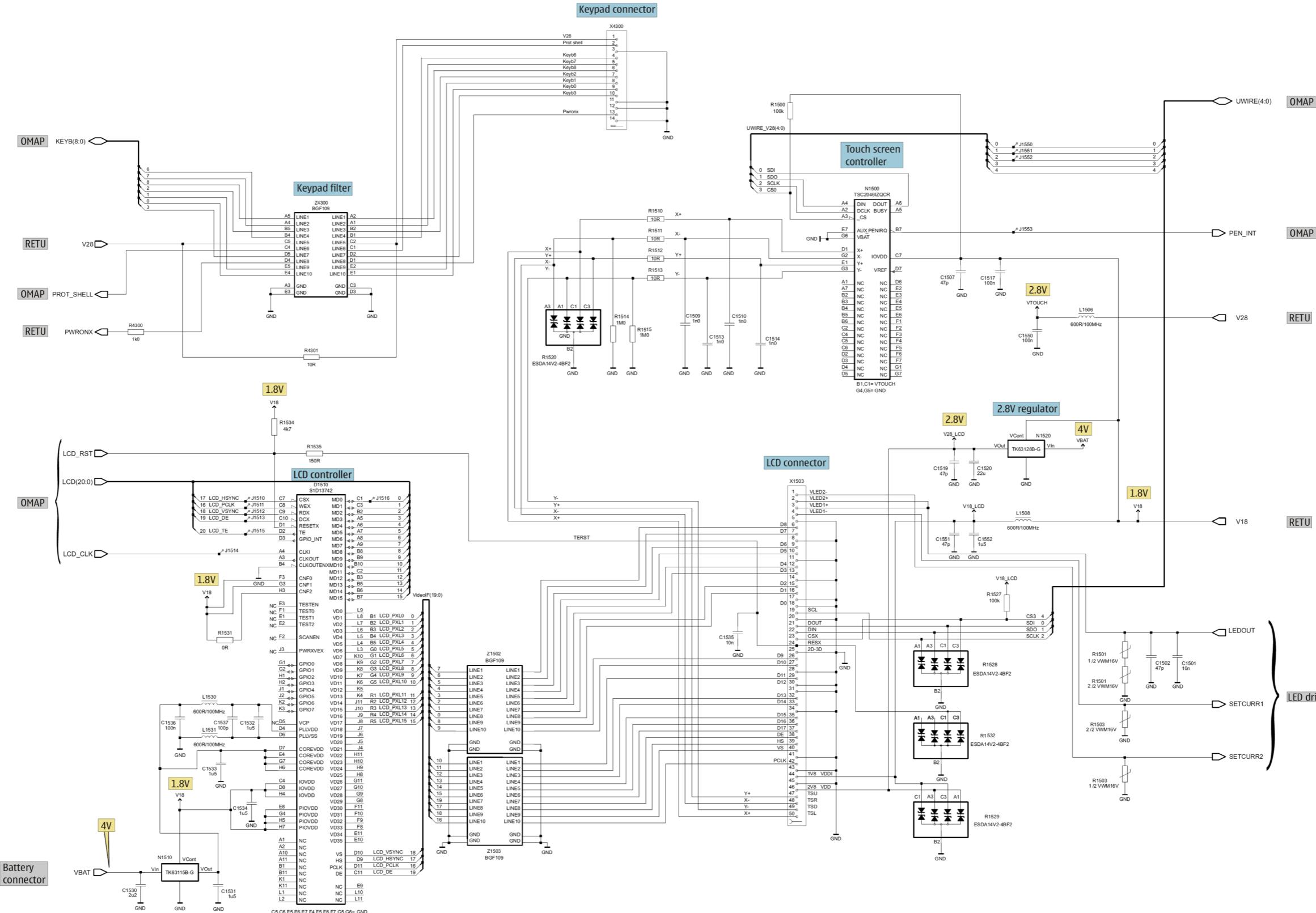
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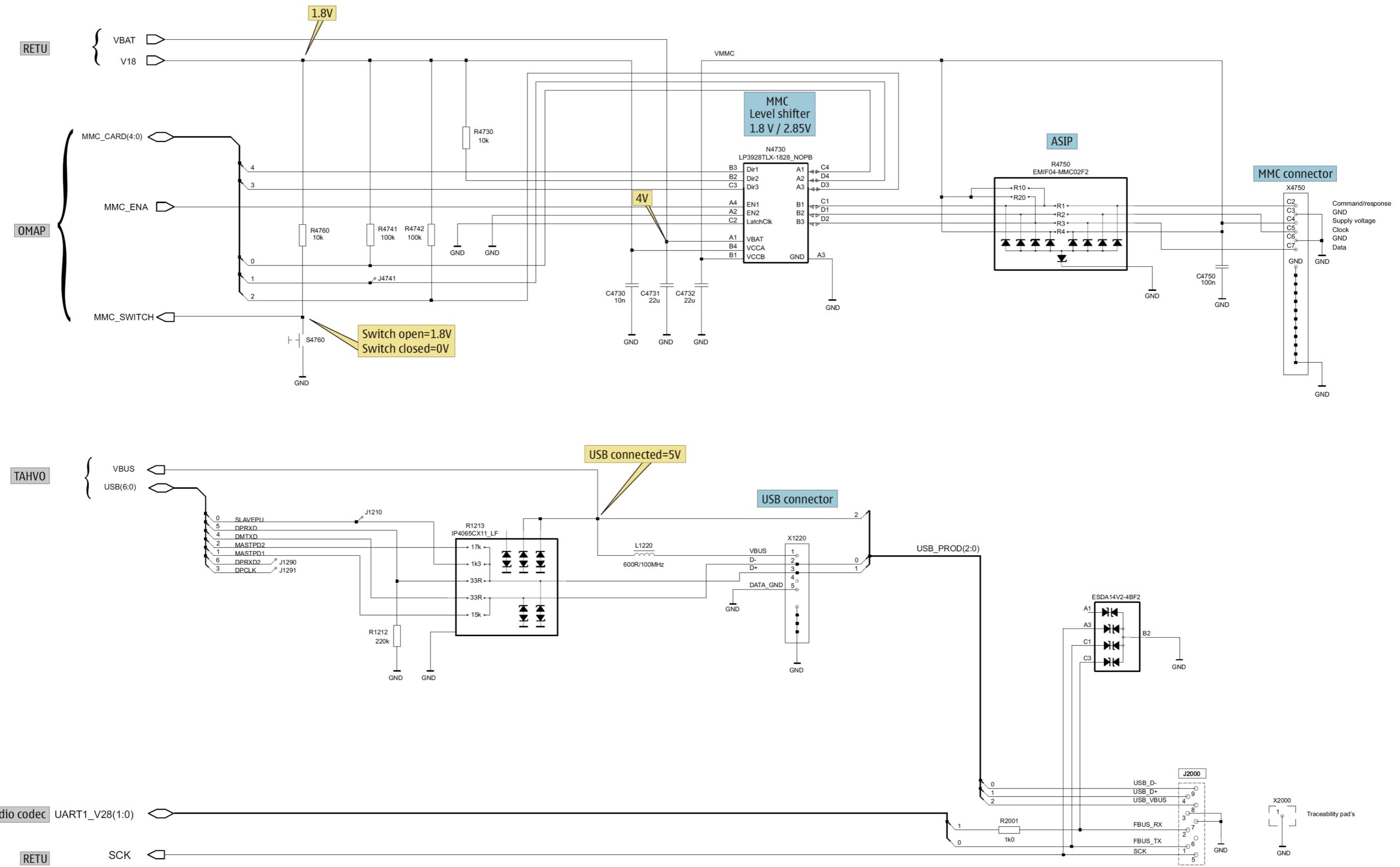
■ BB connections overview



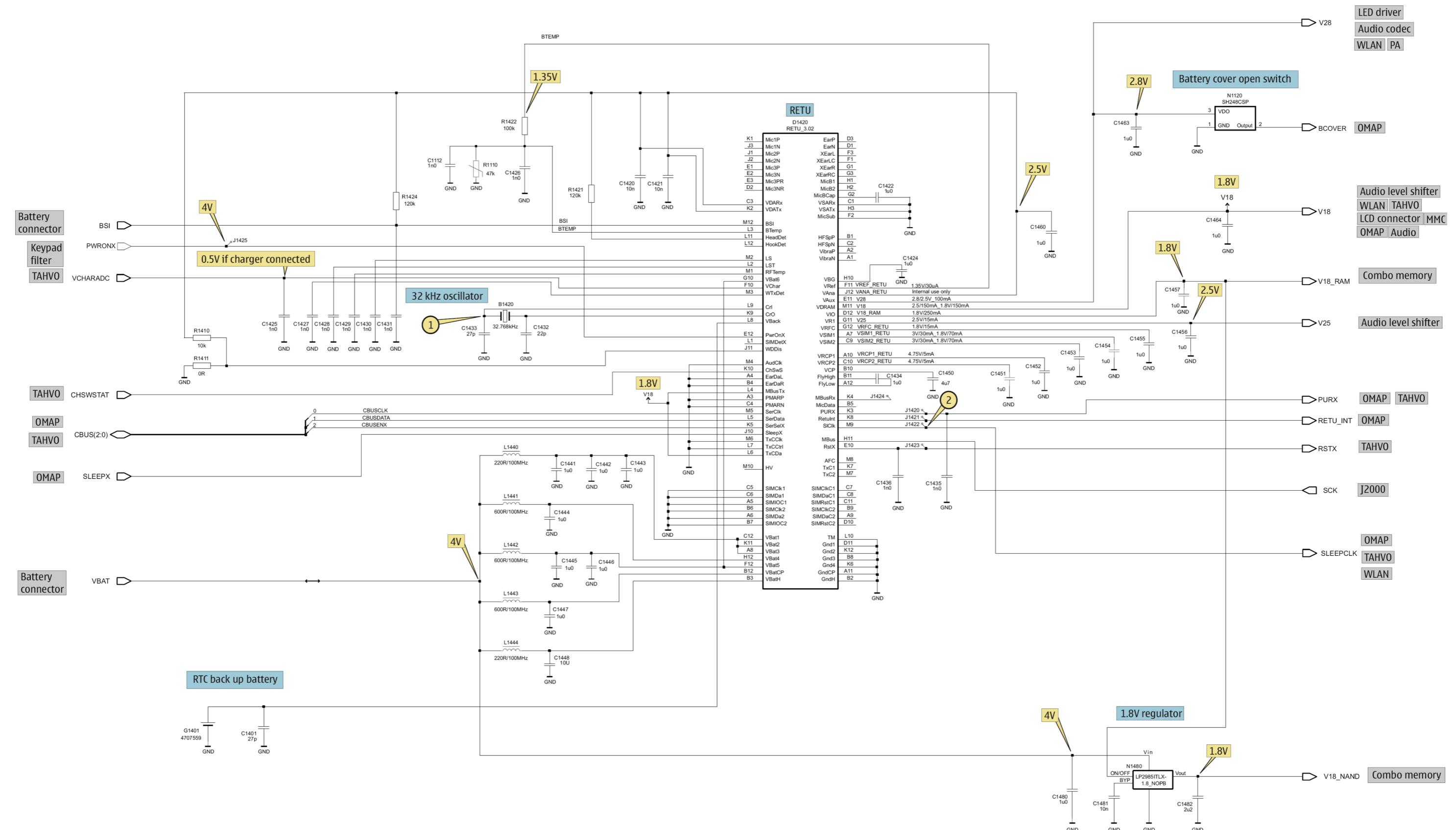
 UI



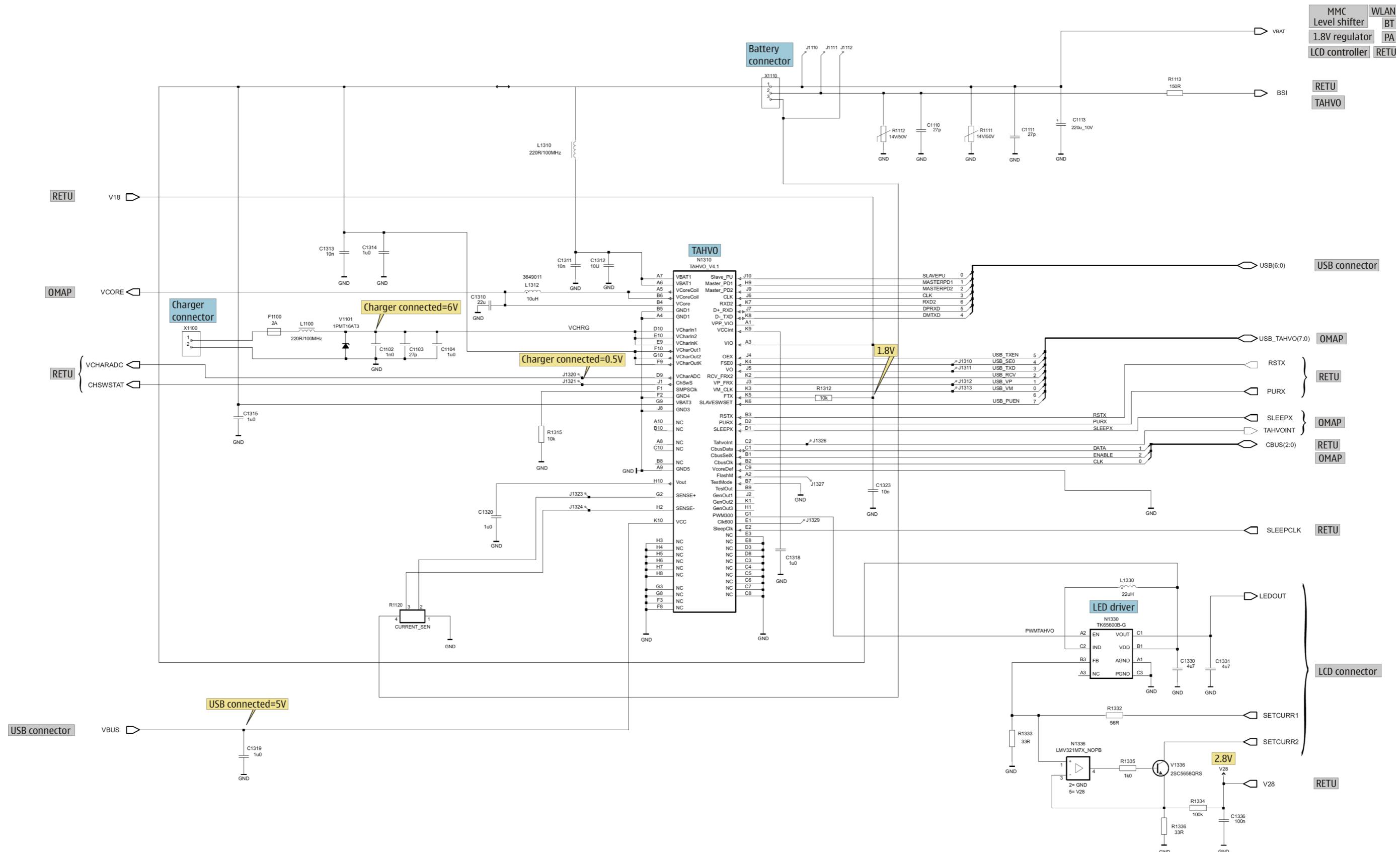
■ USB, MMC



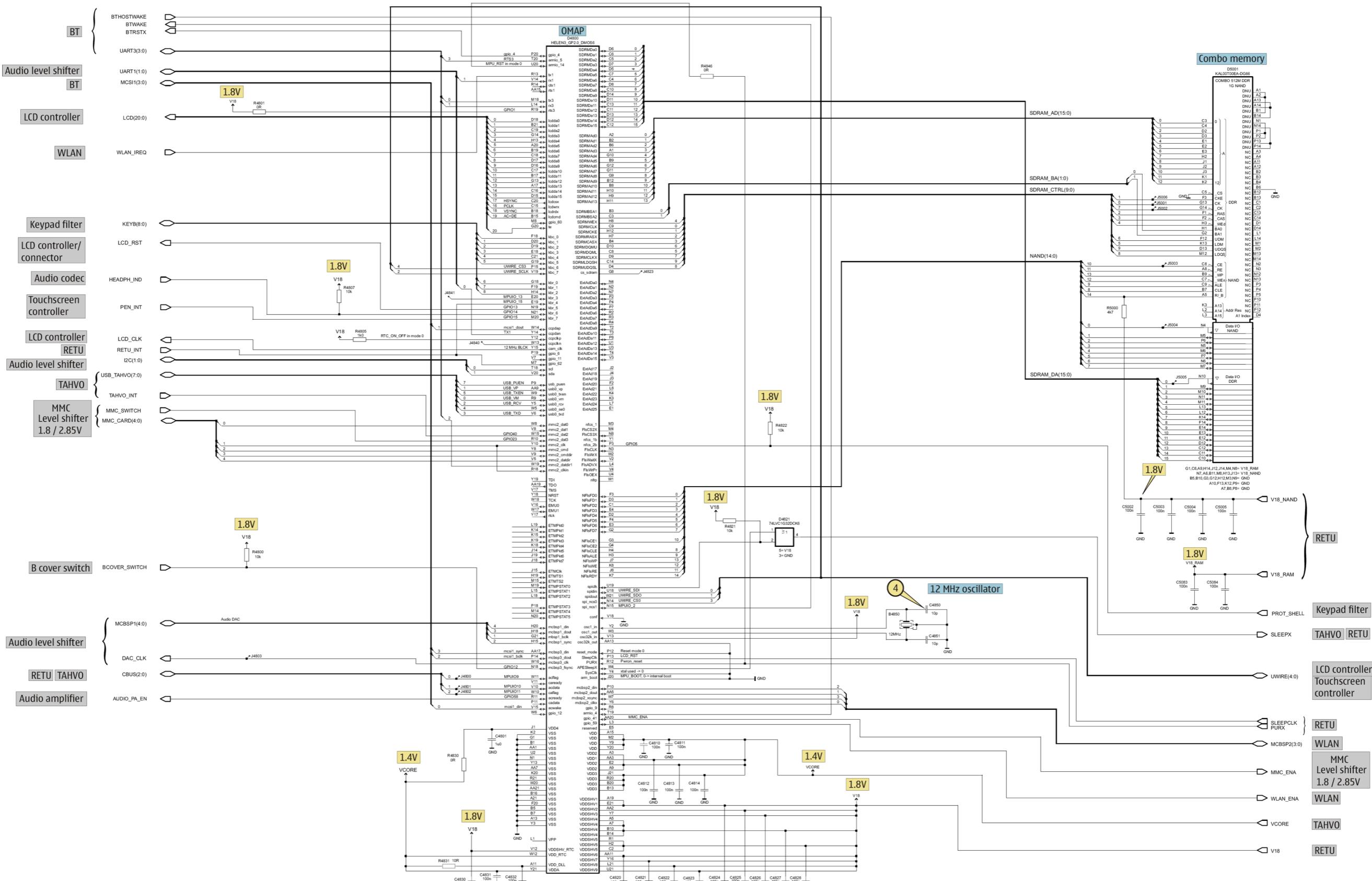
■ RETU



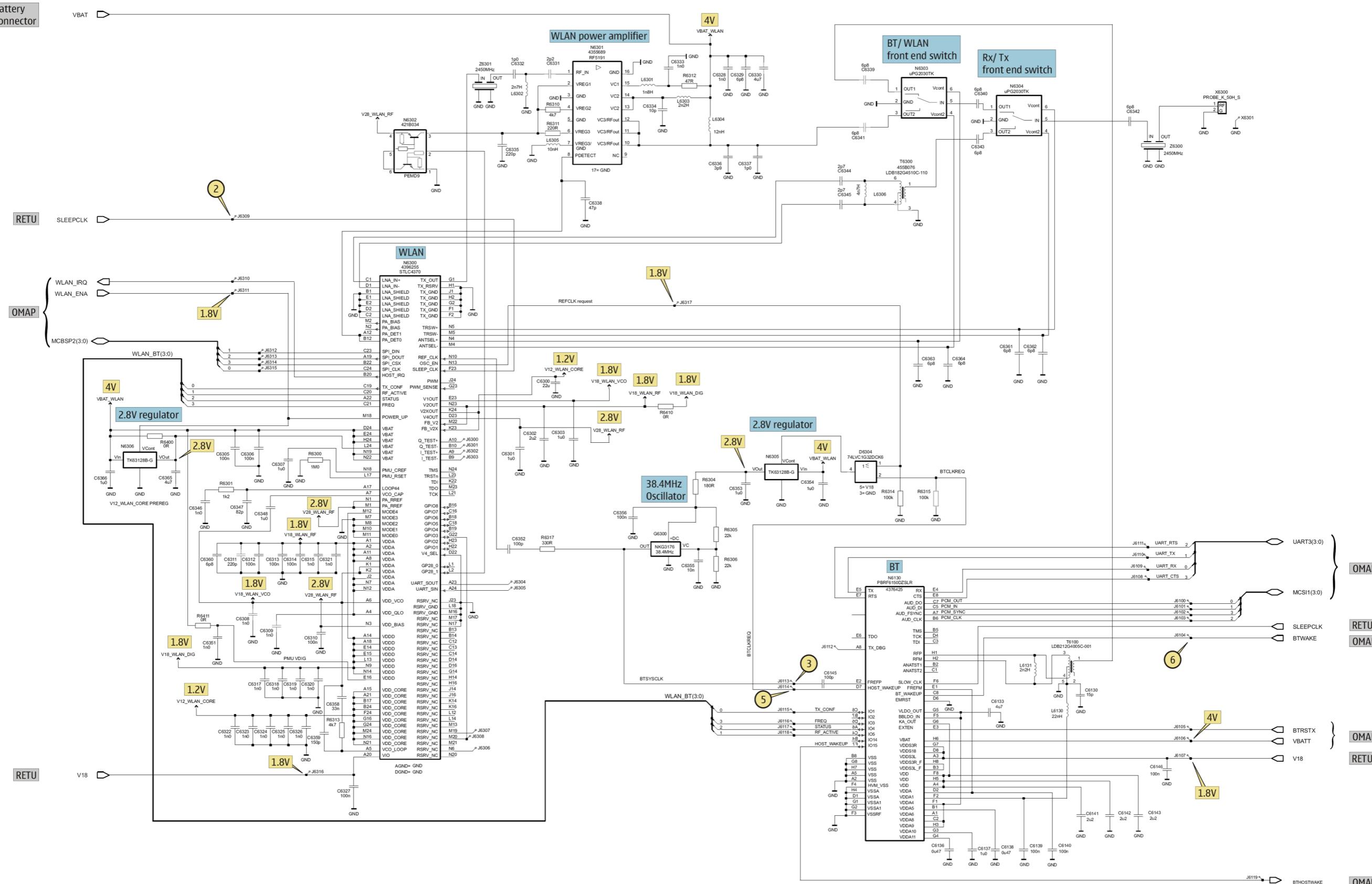
 TAHVO



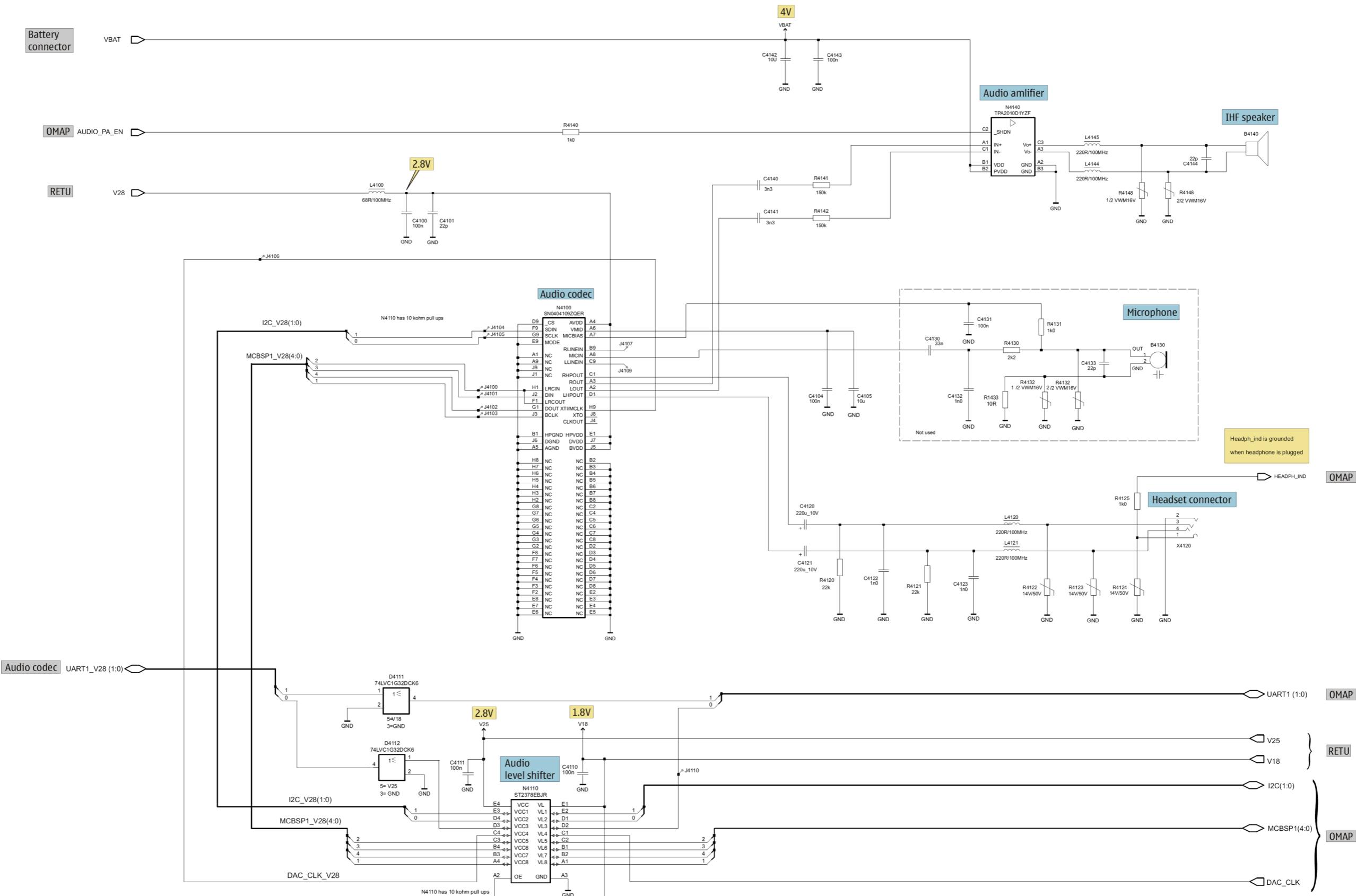
■ OMAP, combo memory



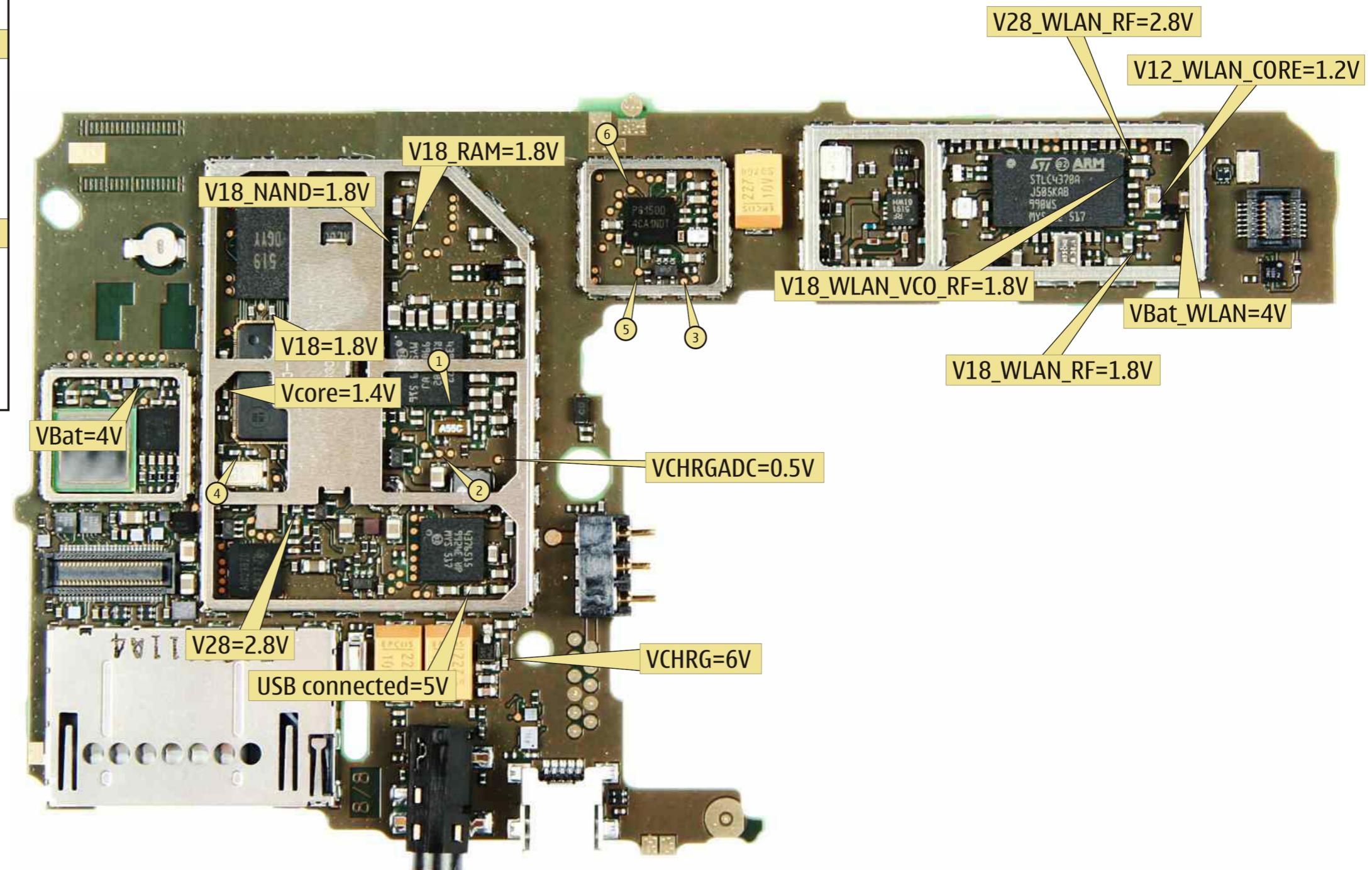
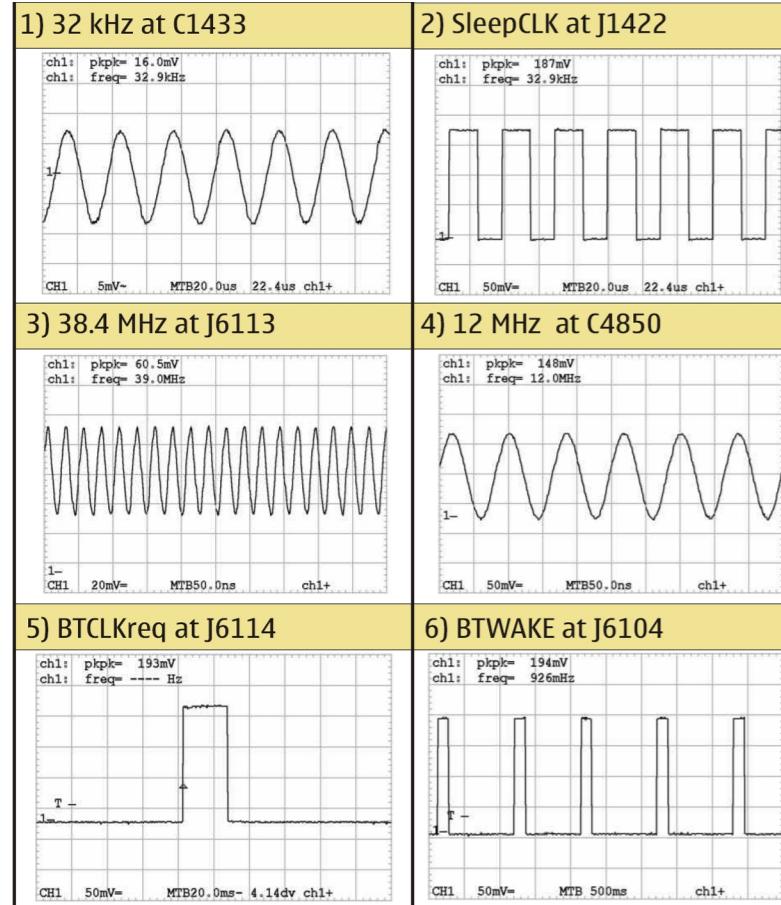
■ WLAN, BT



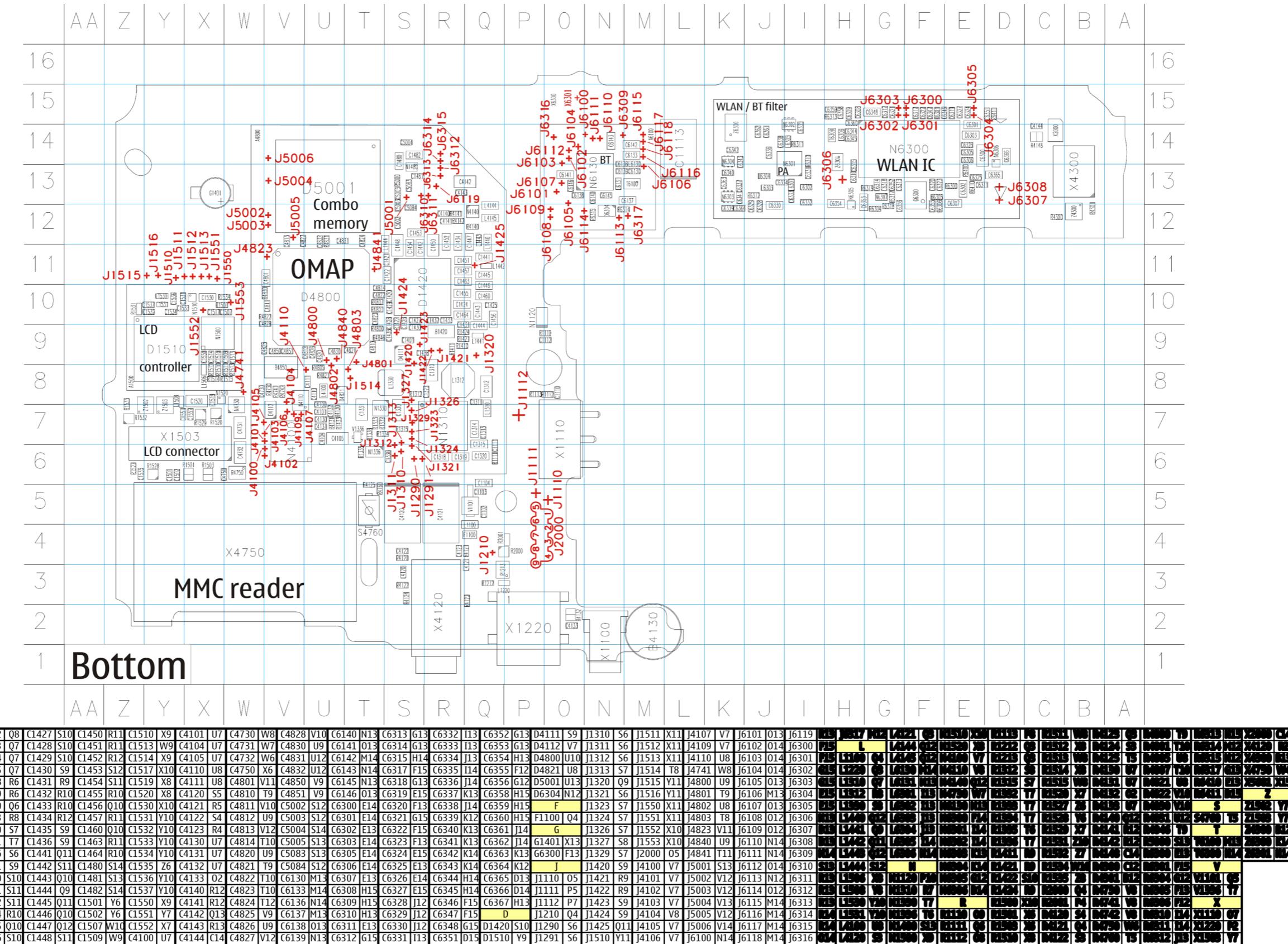
Audio



■ Signal overview



■ Component finder



Nokia Customer Care

Glossary

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A/D-converter	Analog-to-digital converter
ACI	Accessory Control Interface
ADC	Analog-to-digital converter
ADSP	Application DPS (expected to run high level tasks)
AGC	Automatic gain control (maintains volume)
ALS	Ambient light sensor
AMSL	After Market Service Leader
ARM	Advanced RISC Machines
ARPU	Average revenue per user (per month or per year)
ASIC	Application Specific Integrated Circuit
ASIP	Application Specific Interface Protector
B2B	Board to board, connector between PWB and UI board
BB	Baseband
BC02	Bluetooth module made by CSR
BIQUAD	Bi-quadratic ,type of filter function)
BSI	Battery Size Indicator
BT	Bluetooth
CBus	MCU controlled serial bus connected to UPP_WD2,UEME and Zocus
CCP	Compact Camera Port
CDSP	Cellular DSP (expected to run at low levels)
CLDC	Connected limited device configuration
CMOS	Complimentary metal-oxide semiconductor circuit (low power consumption)
COF	Chip on Foil
COG	Chip on Glass
CPU	Central Processing Unit
CSR	cambridge silicon radio
CSTN	Color Super Twisted Nematic
CTSI	Clock Timing Sleep and interrupt block of Tiku
CW	Continuous wave
D/A-converter	Digital-to-analouge converter
DAC	Digital-to-analouge converter
DBI	Digital Battery Interface
DBus	DSP controlled serial bus connected between UPP_WD2 and Helgo
DCT-4	Digital Core Technology
DMA	Direct memory access
DP	Data Package

DPLL	Digital Phase Locked Loop
DSP	Digital Signal Processor
DtoS	Differential to Single ended
EDGE	Enhanced data rates for global/GSM evaluation
EGSM	Extended GSM
EM	Energy management
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
ESD	Electrostatic discharge
FCI	Functional cover interface
FPS	Flash Programming Tool
FR	Full rate
FSTN	Film compensated super twisted nematic
GND	Ground, conductive mass
GPIB	General-purpose interface bus
GPRS	General Packet Radio Service
GSM	Group Special Mobile/Global System for Mobile communication
HF	Hands free
HFCM	Handsfree Common
HS	Handset
HSCSD	High speed circuit switched data (data transmission connection faster than GSM)
HW	Hardware
I/O	Input/Output
IBAT	Battery current
IC	Integrated circuit
ICHAR	Charger current
IF	Interface
IHF	Integrated hands free
IMEI	International Mobile Equipment Identity
IR	Infrared
IrDA	Infrared Data Association
ISA	Intelligent software architecture
JPEG/JPG	Joint Photographic Experts Group
LCD	Liquid Crystal Display
LDO	Low Drop Out
LED	Light-emitting diode

LPRF	Low Power Radio Frequency
MCU	Micro Controller Unit (microprocessor)
MCU	Multiport control unit
MIC, mic	Microphone
MIDP	Mobile Information Device Profile
MIN	Mobile identification number
MIPS	Million instructions per second
MMC	Multimedia card
MMS	Multimedia messaging service
NTC	Negative temperature coefficient, temperature sensitive resistor used as a temperature sensor
OMA	Object management architecture
OMAP	Operations, maintenance, and administration part
Opamp	Operational Amplifier
PA	Power amplifier
PDA	Pocket Data Application
PDA	Personal digital assistant
PDRAM	Program/Data RAM (on chip in Tiku)
Phoenix	Software tool of DCT4.x
PIM	Personal Information Management
PLL	Phase locked loop
PM	(Phone) Permanent memory
PUP	General Purpose IO (PIO), USARTS and Pulse Width Modulators
PURX	Power-up reset
PWB	Printed Wiring Board
PWM	Pulse width modulation
RC-filter	Resistance-Capacitance filter
RF	Radio Frequency
RF PopPort TM	Reduced function PopPortTM interface
RFBUS	Serial control Bus For RF
RSK	Right Soft Key
RS-MMC	Reduced size Multi Media Card
RSSI	Receiving signal strength indicator
RST	Reset Switch
RTC	Real Time Clock (provides date and time)
RX	Radio Receiver

SARAM	Single Access RAM
SAW filter	Surface Acoustic Wave filter
SDRAM	Synchronous Dynamic Random Access Memory
SID	Security ID
SIM	Subscriber Identity Module
SMPS	Switched Mode Power Supply
SNR	Signal-to-noice ratio
SPR	Standard Product requirements
SRAM	Static random access memory
STI	Serial Trace Interface
SW	Software
SWIM	Subscriber/Wallet Identification Module
TCXO	Temperature controlled Oscillator
Tiku	Finnish for Chip, Successor of the UPP, Official Tiku3G
TX	Radio Transmitter
UART	Universal asynchronous receiver/transmitter
UEME	Universal Energy Management chip (Enhanced version)
UEMEK	See UEIME
UI	User Interface
UPP	Universal Phone Processor
UPP_WD2	Communicator version of DCT4 system ASIC
USB	Universal Serial Bus
VBAT	Battery voltage
VCHAR	Charger voltage
VCO	Voltage controlled oscillator
VCTCXO	Voltage Controlled Temperature Compensated Crystal Oscillator
VCXO	Voltage Controlled Crystal Oscillator
V _{p-p}	Peak-to-peak voltage
VSIM	SIM voltage
WAP	Wireless application protocol
WD	Watchdog
XHTML	Extensible hypertext markup language
Zocus	Current sensor, (used to monitor the current flow to and from the battery)