Nokia Customer Care

Service Manual

RM-25 (Nokia 6260)

Mobile Terminal

Part No: (9235618 (Issue 2))

Company Confidential

Amendment Record Sheet

Amendment No	Date	Inserted By	Comments
Original issue	08/2004	MHa, TSa	MODE Service Information Pilot Project
Issue 2	02/2005	J Bryman	**01 General information:**Variants (product and modules) corrected **02 Parts and layouts:** Exploded view corrected, lists and layouts updated, SWAP units added **04 Service tools and concepts:** Prommers FPS-10&11 added, RJ-24 and ST-5 added. **06 Baseband:** Tuning baseband updated **07 RF troubleshooting:** Baseband and digital IQs, RF key components, RX Calibration, Tuning TX power level, Test points main board updated. **10 Schematics:** 1fsa_11 schematics added

Introduction to Issue 2

This is the updated issue of the RM-25 service manual. The parts of the manual that have been changed are presented on the Amendment record sheet. However, some major hardware updates worth mentioning are:

- Latest build is 1fsa_11a
- UEMEK is used instead of UEME (though the name has not been updated in this manual)
- Helgo 85G is used instead of Helgo 86LB

For the latest version of the parts lists, please refer to the Service bulletins.

Copyright

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.

  Use only approved components as specified in the parts list.
- 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.

For your safety

QUALIFIED SERVICE

Only qualified personnel may install or repair phone equipment.

ACCESSORIES AND BATTERIES

Use only approved accessories and batteries. Do not connect incompatible products.

CONNECTING TO OTHER DEVICES

When connecting to any other device, read its user’s guide for detailed safety instructions. Do not connect incompatible products.

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.

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.

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.

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.

Please state:

- Title of the Document + Issue Number/Date of publication
- Latest Amendment Number (if applicable)
- Page(s) and/or Figure(s) in error

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Nokia 6260 Service Manual Structure

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1 — General information

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Product selection

The RM-25 is a triple band transceiver unit designed for the GSM900 (including EGSM), GSM1800 and GSM1900 networks.

Figure 1 RM-25

Display and keypad features

- Large high resolution TFT color display (176x208 pixels) with 65,536 colors.
- 4-way navigation key, 3 selection keys, Application key, Edit key and Clear key.
- State-of-the-art ribless numeric keymat, ITU layout.
- Three side keys: Vol Up, Vol Down and PoC (Push To Talk).
- The PoC key is also the camera capture key

Features

Hardware features

- Three side keys: Vol up, Vol down and PoC (Push To Talk)
- Tri-band GSM E900/1800/1900
- Internal antenna
- Speech codecs: HR, FR, EFR, AMR
- HSCSD: Multiclass 6.
- GPRS: Multislot Class 6, 1+1, 2+2, 2+1, 3+1, class B. Max DL=43.2kbps UL=28.8kbps
- VGA Camera
- 5 MByte internal user memory

- Memory card slot for additional user memory (1.8V/3V Reduced Size MMC)
- Bluetooth and USB through PopPort™ connector
- Internal vibrator
- Integrated handsfree speaker
- Plug-in SIM (1.8 and 3.0 V)
- Real time clock
- FM Radio
- IrDA

Software features

- Symbian OS 7.0s Platform
- Nokia Series 60 UI : C++ and Java SDKs

UI features

Table 1 Imaging

Capture	• Camera with 2 modes (Standard/Night) and x2 Digital Zoom • Video Recorder supporting QCIF(176x144) and subQCIF(128x96) sizes
Share	• Sending via Bluetooth, USB, MMS, e-mail, IrDA • Media Player
Organize	• Media Gallery • Uploader

Table 2 Messaging

Messaging	• Multimedia Messaging with Presentations • Concatenated SMS (MO/MT) • Picture Messaging • E-mail (SMTP, IMAP4, POP3) • Instant Messaging (Wireless Village) • T9 predictive text input

Table 3 Personal Information Management (PIM)

PIM	• Contacts with thumbnail images • Presence Enhanced Contact • Calendar • To-do list • Notes • Voice Recorder • Calculator • Clock • Converter

Table 4 Synchronization

Local (using PC Suite)	• Data: Calendar, Contacts • PC Applications: Microsoft Outlook (97, 98, 2000, 2002), Lotus Organizer (5.0, 6.0), Lotus Notes (5.0/5.02/6.0)
Remote (with SyncML server)	Data: Calendar, Contacts

Table 5 Phone

Phone	• GSM phase 2+ features • Voice dialling • Voice commands • CPHS spec. (version 4.2)

Table 6 Games

Games	None

Table 7 Java

Midp 2.0	• Mobile Media API (JSR 135) • Bluetooth API (JSR 82) • Wireless Messaging API (JSR 120)

Table 8 Browser

Browser	WAP 2.0 HTML and xHTML browser

Table 9 Personalization

Personalization	• Themes • SP-MIDI, True Tones

Table 10 Location Based Services

Location Based Services	Cell broadcast

Table 11 M-Commerce

M-Commerce	Mobile Wallet 2.0

Variants (product and modules)

Name	Material code/module type	Module code
Basic Transceiver, EMEA, silver	0516711	
Basic Transceiver, EMEA, black	0518060	
Basic Transceiver, Chinese, silver	0518059	

Name	Material code/module type	Module code
Basic Transceiver, Chinese, black	0518061	
UI flex assy	0264017	
A2 Cover Assembly, silver	0266026	
A2 Cover Assembly, black	0266239	
B1 Cover Assembly, silver	0266027	
B1 Cover Assembly, black	0266241	
RM-25 Mechanical sub-assembly, silver	0267016	
RM-25 Mechanical sub-assembly, black	0267030	
Assembled PWB	0202282	1FS-A
SW Module (basic SW), English	8459669	
SW Module (basic SW), Chinese	8459671	
Top UI PWB	0202408	1fs-f

Mobile enhancements

Power	Type	Product code
Battery 760 mAh Li-Ion	BL-4C	0670386
Retractable charger	AC-1	027xxxx (variants)
Charger	ACP-7	0675144
Charger	ACP-8	0675195
Charger	ACP-9	0675149
Charger	ACP-12	0675294
Mobile charger	LCH-8	0675231
Mobile charger	LCH-9	0675120
Mobile charger	LCH-12	0675328

Car accessories	Type	Product code
Headrest handsfree	BHF-1	0694102
Headrest handsfree	BHF-3	0694158
Wireless car kit	CK-1W	0080774
Wireless car kit	CARK112	0085112
Car kit	CARK126	008xxxx (variants)
Universal car kit	CK-7	008xxxx (variants)
Mobile charger	LCH-12	0675328

Audio	Type	Product code
Boom Headset	HDB-4	0694094
Fashion stereo headset	HS-3	0694156
Stereo headset (APAC)	HDS-3	0694153 (APAC)
Activity headset	HS-8	06941xx (variants)
Headset	HS-5	0694121
Retractable headset	HS-10	0694126 (EMEA) / 0694125 (APAC)
Inductive loopset	LPS-4	0630443
Wireless headset	HDW-2	0274141
Wireless clip-on headset	HS-3W	0694135
Wireless boom headset	HS-4W	0694160

Data accessories	Type	Product code
Connectivity Cable	DKU-2	0730238
Reduced size MMC		4346053

Imaging and lifestyle accessories	Type	Product code
Image viewer	SU-2	0263167
Image viewer	SU-5	0710003
Image frame	SU-4	0710001
Image frame	SU-7	0710002
Image Album	RX-15	00808xx (variants)
Medallion I	RX-3	0630702
Medallion II	RX-4	0710008
Kaleidoscope I	RX-11	0710009

Messaging accessories	Type	Product code
Nokia digital pen	SU-1B	0710000
Wireless keyboard	SU-8	0xxxxxx (variants, codes not ready before manual deadline)

Technical specifications

General specifications

Unit	Dimension (mm)	Weight (g)	Volume (cc)
Transceiver with BL-4C 760mAh Li-Ion battery pack	102x493x21/23	125	109

Main RF characteristics for triple-band phones (Europe)

Parameter	Unit
Cellular system	GSM/EGSM900,GSM1800/1900
Rx frequency band	EGSM900: 925 - 935 MHz
	GSM900: 935 - 960MHz
	GSM1800: 1805 - 1880 MHz
	GSM1900: 1930 - 1990 MHz
Tx frequency band	EGSM900: 880 - 890MHz
	GSM900: 890 - 915MHz
	GSM1800: 1710 - 1785 MHz
	GSM1900: 1850 - 1910 MHz
Output power	GSM900: +5 ... +33dBm/3.2mW ... 2W
	GSM1800: +0 ... +30dBm/1.0mW ... 1W
	GSM1900: +0 ... +30dBm/1.0mW ... 1W
Number of RF channels	GSM900: 125
	GSM1800: 375
	GSM1900: 300
Channel spacing	200KHz
Number of Tx power levels	GSM900: 15
	GSM1800: 16
	GSM1900: 16

Battery endurance

Nokia measurements of operation times in GSM900/1800

Talk time	
Battery: BL-4C 760mAh	Up to 2-4 hours

Standby time	
Battery: BL-4C 760mAh	Up to 100-150 hours

Note: Variation in operation times will occur depending on SIM card, network settings and usage. Talk time is increased by up to 30% if half rate is active and reduced by 5% if enhanced full rate is active.

Environmental conditions

Environmental condition	Ambient temperature	Notes
Normal operation	15 ºC ... +55 ºC	Specifications fulfilled
Reduced performance	55 ºC ... +70 ºC	Operational only for short periods
Intermittent or no operation	-40 ºC ... -15 ºC and +70 ºC ... +85ºC	Operation not guaranteed but an attempt to operate will not damage the phone
No operation or storage	<-40 ºC and >+85 ºC	No storage. An attempt to operate may cause permanent damage
Charging allowed	-15 ºC ... +55 ºC	
Long term storage conditions	0 ºC ... +85 ºC	
Humidity and water resistance		Relative humidity range is 5 to 95%. Condensed or dripping water may cause intermittent malfunctions. Protection against dripping water has to be implemented in (enclosure) mechanics. Continuous dampness will cause permanent damage to the module.

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2 — Parts and layouts

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Exploded view

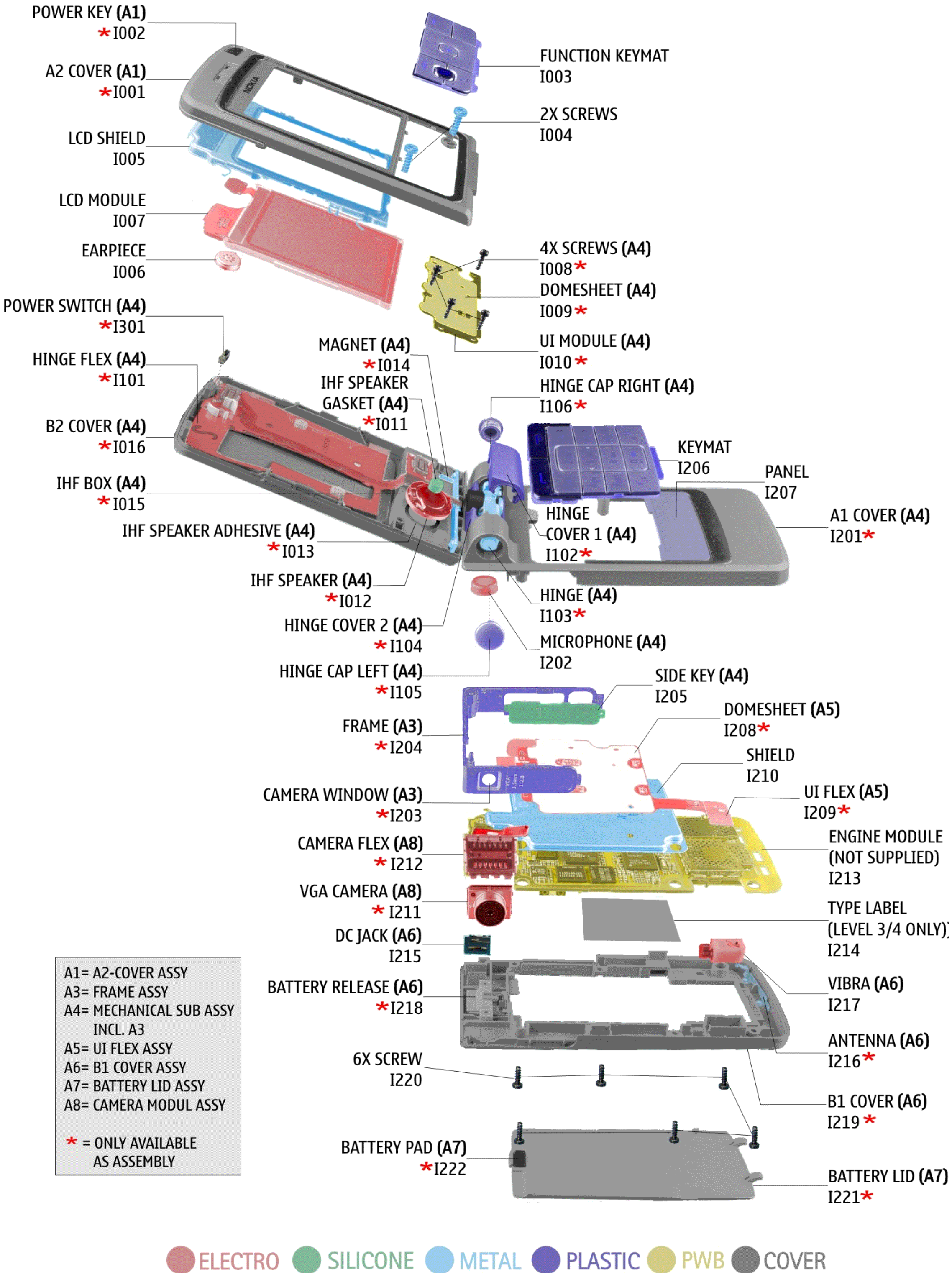

Figure 2 Exploded view of RM-25

Mechanical parts

Table 12 List of all mechanical parts

* = Not available as spare part

ITEM/CIRCUIT REF.	QTY	PART NAME
	1	A2 COVER ASSY
I001*	1	A2 COVER
I002*	1	POWER KEY
I003	1	FUNCTION KEY MAT
I004	2	SCREW 1.8X5
I005	1	LCD SHIELD
I006	1	EARPIECE
I007	1	LCD MODULE
		MECHANICAL SUB ASSY
I008	4	SCREW 1.0X4
I009*	1	DOMESHEET
I010*	1	UI MODULE
I011*	1	IHF SPEAKER GASKET
I012*	1	IHF SPEAKER
I013*	1	IHF SPEAKER ADHESIVE
I014*	1	MAGNET
I015*	1	IHF BOX
I016*	1	B2 COVER
I101*	1	HINGE FLEX
I102*	1	HINGE COVER 1
I103*	1	HINGE
I104*	1	HINGE COVER 2
I105*	1	HINGE CAP LEFT
I106*	1	HINGE CAP RIGHT
I201*	1	A1 COVER
I202	1	MICROPHONE
	1	FRAME ASSY (I0203 - I204)
I203*	1	CAMERA WINDOW
I204*	1	FRAME

ITEM/CIRCUIT REF.	QTY	PART NAME
I205	1	SIDE KEY
I301*	1	POWER SWITCH
I206	1	KEYMAT
I207	1	PANEL
	1	UI FLEX ASSY
I208*	1	DOMESHEET
I209*	1	UI FLEX
I210	1	SHIELD
		CAMERA MODULE ASSY
I211*	1	VGA CAMERA
I212*	1	CAMERA FLEX
I213*	1	ENGINE MODULE
I214	1	TYPE LABEL
	1	B1 COVER ASSY
I215	1	DC JACK
I216*	1	ANTENNA
I217	1	VIBRA
I218*	1	BATTERY RELEASE
I219*	1	B1 COVER
I220	6	SCREW 1.8X7
	1	Battery LID ASSY
I221*	1	Battery LID
I222*	1	Battery PAD

Table 13 Mechanical spare parts list

Refs	Description	EMEA	APAC	CHINA	LTA	NAM
A300	HELGO SHIELD ASSY DMC06934 R1024	x	x	x	x	
A400	PA SHIELD ASSY DMC06935 R1024	x	x	x	x	
I003	FUNC KEYMAT HARD TOP SILVER	x	x	x	x	
I003	FUNC KEYMAT HARD BLACK	x	x	x	x	

Refs	Description	EMEA	APAC	CHINA	LTA	NAM
I004	Screw 1.8x5.0 DIN8015 FH FeZn black	x	x	x	x	
I005	LCD Shield	x	x	x	x	
I006	EARPIECE 105+-3DB 32R D8.1X2.25	x	x	x	x	
I007	LCD MOD 176X208 AM 64KCO GDAF6007 Halti2	x	x	x	x	
I202	MIC+BOOT ASSY -42+-3DB D7.7X3MM	x	x	x	x	
I205	Sidekey Hard Top Silver	x	x	x	x	
I205	Sidekey Hard Top Black P2103	x	x	x	x	
I206	NUM KEYMAT HARD TOP LATIN SILVER	x	x		x	
I206	NUM KEYMAT HARD TOP LATIN BLACK	x	x		x	
I206	NUM KEYMAT HARD TOP ARABIC SILVER	x				
I206	NUM KEYMAT HARD TOP ARABIC BLACK	x				
I206	NUM KEYMAT HARD TOP GREEK SILVER	x				
I206	NUM KEYMAT HARD TOP GREEK BLACK	x				
I206	NUM KEYMAT HARD TOP RUSSIA SILVER	x				
I206	NUM KEYMAT HARD TOP RUSSIA BLACK	x				
I206	NUM KEYMAT HARD TOP HEBREW SILVER	x				
I206	NUM KEYMAT HARD TOP HEBREW BLACK	x				
I206	NUM KEYMAT HARD TOP BoPo SILVER			x		
I206	NUM KEYMAT HARD TOP BoPo BLACK			x		
I206	NUM KEYMAT HARD TOP STROKE SILVER		x	x		
I206	NUM KEYMAT HARD TOP STROKE BLACK		x	x		
I207	Panel painted Silver P2103	x	x	x	x	
I207	Panel painted Black P2103	x	x	x	x	
I210	BB Shield DNS09299 P2103	x	x	x	x	
I214	BLANK LABEL 32.5X50.5 BRADY	x	x	x	x	
I215	DC-Jack Low Profile P2103	x	x	x	x	
I217	VIBRA ASSY 1.0V 80MA 9000RPM	x	x	x	x	
I220	Screw 1.8x7.0 DIN8015 FH FeZn black	x	x	x	x	
	UI flex assy 040-000388 P2103	x	x	x	x	
	Frame Service Assembly P2103	x	x	x	x	
	A2 cover assembly Silver Sand P2103	x	x	x	x	
	B1 cover assembly Silver Sand	x	x	x	x	

Refs	Description	EMEA	APAC	CHINA	LTA	NAM
	A2 cover assembly Black Coffee	x	x	x	x	
	B1 cover assembly Black Coffee	x	x	x	x	
	RM-25 Mech sub-assembly Silver SandP2103	x	x	x	x	
	RM-25 Mech sub-assembly Black CoffeP2103	x	x	x	x	
	Camera Service Assembly	x	x	x	x	
	Battery lid assy Silver Sand P2103	x	x	x	x	
	Battery lid assy Black Coffee P2103	x	x	x	x	
	HELGO LID DMD11312 R1024	x	x	x	x	
	PA LID DMD11314 R1024	x	x	x	x	

Swap units

Table 14 SWAP units

SWAP units
N6260 RM-25 SWAP ENGINE E&A BLACK
N6260 RM-25 SWAP ENGINE E&A SILVER
N6260 RM-25 SWAP ENGINE FRANCE BLACK
N6260 RM-25 SWAP ENGINE FRANCE SILVER
N6260 RM-25 SWAP ENGINE RUSSIA BLACK
N6260 RM-25 SWAP ENGINE RUSSIA SILVER
N6260 RM-25 SWAP ENGINE S-AFRICA BLACK
N6260 RM-25 SWAP ENGINE S-AFRICA SILVER
N6260 RM-25 SWAP ENGINE TURKEY BLACK
N6260 RM-25 SWAP ENGINE TURKEY SILVER
N6260 RM-25 SWAP ENGINE UKRAINA BLACK
N6260 RM-25 SWAP ENGINE UKRAINA SILVER
N6260 RM-25 SWAP ENGINE E&A BLACK
N6260 RM-25 SWAP ENGINE E&A SILVER
N6260 RM-25 SWAP ENGINE FRANCE BLACK
N6260 RM-25 SWAP ENGINE FRANCE SILVER
N6260 RM-25 SWAP ENGINE RUSSIA BLACK
N6260 RM-25 SWAP ENGINE RUSSIA SILVER

SWAP units
N6260 RM-25 SWAP ENGINE S-AFRICA BLACK
N6260 RM-25 SWAP ENGINE S-AFRICA SILVER

Component parts

Note: For the latest Component parts list, please refer to the Service bulletin.

Table 15 Component parts list for build 1fsa_09a

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
	Earpiece	EARPIECE 105+-3DB 32R D8.1X2.25		
	Shield Assembly	UI flex assy 040-000388 P2103		
	Shield	LCD Shield 040-000237 P2103		
	Cover Assembly	B1 cover assembly Black Coffee P2103		
X816	Board To Board Connector	SM CONN B2B 2X8 F P0.4, camera connector on main PWB		
R313, R371, R642, R861	Fixed Resistor	CHIPRES 0W06 18K J 0402		
C659, C662, C664, C671, C673, C673, C698, C862	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402		
	Cover Assembly	A2 cover assembly Black Coffee		
	Cover Assembly	A2 cover assembly Silver Sand P2103		
	Plate	Panel painted Silver P2103		
	Cover	Battery lid assy Black Coffee P2103		
	Label And Sticker	BLANK LABEL 30.0X22.0 DMD07217		
	Cover	Battery lid assy Silver Sand P2103		
	Cover	B2 bezel printed Black 040-002071 P2103		
	Tape And Foil And Film	UI adhesive 040-000074 P2103		
	Tape And Foil And Film	B2 bezel adhesive DMD12641 P2103		

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
	Gasket And Seal	IHF net 040-000076 P2103		
	Frame	B2 bezel printed Silver 040-002071 P2103		
	Speaker	SPEAKER IHF 77.3DB 7R D16X4.40		
	Tape And Foil And Film	IHF speaker adhesive 040-001415 P2103		
	Gasket And Seal	IHF gasket with net 040-000071 P2103		
	Dome Sheet	Top UI domesheet 040-0000176 P2103		
	Vibrator	VIBRA ASSY 1.0V 80MA 9000RPM		
	Cover Assembly	B1 cover assembly Silver Sand P2103		
	Service Device	SA-38 RF COUPLER		
	Service Device	RJ-33 SOLDERING JIG		
	Service Device	MJ-30 MODULE JIG P2103		
	Service Device	DA-25 DOCKING ADAPTER P2103		
	Service Device	SF-27 FLASH ADAPTER		
	After Sales Kit	SK-8 LGA COMPONENT REWORK KIT		
	After Sales Kit	SK-9 PA COMPONENT REWORK KIT		
	Service Device	SS-34 OPENING TOOL		
	Production Device	SK-5 LGA COMPONENT REWORK KIT		
	Service Device	RJ-46 REWORK JIG HDJ12		
	Service Device	ST-15 REWORK STENCIL		
	Cover	Panel painted Black P2103		
	Keymat And Key	NUM KEYMAT HARD TOP LATIN BLACK		
	Keymat And Key	NUM KEYMAT HARD TOP ARABIC SILVER		
	Keymat And Key	NUM KEYMAT HARD TOP LATIN SILVER		
	Keymat And Key	NUM KEYMAT HARD TOP ARABIC BLACK		
	Keymat And Key	NUM KEYMAT HARD TOP GREEK SILVER		
	Keymat And Key	NUM KEYMAT HARD TOP GREEK BLACK		
	Keymat And Key	NUM KEYMAT HARD TOP RUSS SILVER		
	Keymat And Key	NUM KEYMAT HARD TOP RUSSIA BLACK		
	Keymat And Key	NUM KEYMAT HARD TOP HEBREW SILVER		
	Keymat And Key	NUM KEYMAT HARD TOP HEBREW BLACK		
	Keymat And Key	NUM KEYMAT HARD TOP BoPo SILVER		
	Keymat And Key	NUM KEYMAT HARD TOP BoPo BLACK		
	Keymat And Key	NUM KEYMAT HARD TOP STROKE SILVER		

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
	Keymat And Key	NUM KEYMAT HARD TOP STROKE BLACK		
	Keymat And Key	FUNC KEYMAT HARD TOP SILVER		
	Keymat And Key	FUNC KEYMAT HARD BLACK		
	Display	LCD MOD 176X208 AM 64KCO GDAF6007		
D460	Combo Memory	NOR 128M + 128M 1.8/1.8V FGBA44 PBFREE		
	Shield	BB Shield DNS09299 P2103		
	Other Assembly	RM-25 Mech sub-assembly Black CoffeP2103		
	Other Assembly	RM-25 Mech sub-assembly Silver SandP2103		
G502	Battery And Battery Cell	CELL CAPACITOR 0.015MAH 3V3		
	Screw	Screw 1.8x7.0 DIN8015 FH FeZn black, B1 cover screws		
	Screw	Screw 1.8x5.0 DIN8015 FH FeZn black, A2 cover screws		
	Screw	Screw 1.0x4.0, Top UI board screws		
	Electronic Assembly	1FS-F TOP-UI		
	Speaker	SPEAKER HF 69+-2DB 8R D16X4.36		
	Gasket And Seal	IHF speaker gasket P2103		
	Fixed Resistor	CHIPRES 0W06 22R J 0402		
	Ceramic Capacitor	CHIPCAP X5R 1U0 K 25V T 1.0 1206		
R873, R402, R492, R864, R871	Fixed Resistor	CHIPRES 0W06 100R J 0402		
R315	Integrated Discretes	ASIP MMC-INTERFACE ESD FILT BGA11		
R644, R675	Fixed Resistor	CHIPRES 0W06 27K J 0402		
R513, R514	Fixed Resistor	CHIPRES 0W06 15K J 0402		
V402	Diode	SCH DIODE 30V 200MA VF 0V5 SOD523		
R806	Resistor Network	RES NETWORK 0W06 2X100R J 0404		
	LED	LED WHITE 90-345MCD 10MA 90DEG		

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
C406, C407, C501	Ceramic Capacitor	CHIPCAP NP0 3P3 C 50V 0402		
A300	Shield Assembly	HELGO SHIELD ASSY DMC06934 R1024	F7	TOP
A400	Shield Assembly	PA SHIELD ASSY DMC06935 R1024	F3	TOP
B250	Crystal	CRYSTAL 32.768KHZ+-20PPM 12.5PF	I8	TOP
B440	Crystal	CER.RESON 6MHZ+0.11%-0.09% 4.5X2.0	Q8	TOP
C132	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	P2	BOTTOM
C133	Electrolytic Capacitor	CHIPTCAP 100U M 10V 6.0X3.2X1.5	L3	TOP
C134	Ceramic Capacitor	CHIPCAP X7R 10N K 50V 0603	S5	BOTTOM
C135	Ceramic Capacitor	CHIPCAP NP0 27P J 50V 0402	T5	BOTTOM
C138	Ceramic Capacitor	CHIPCAP X7R 10N K 16V 0402	L7	TOP
C190	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	H4	TOP
C191	Ceramic Capacitor	CHIPCAP NP0 2P2 C 50V 0402	I3	TOP
C193	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	K2	TOP
C199	Ceramic Capacitor	CHIPCAP X5R 2U2 K 6V3 0603		TOP
C200	Ceramic Capacitor	CHIPCAP X7R 330P J 50V 0402	I3	TOP
C222	Ceramic Capacitor	CHIPCAP X5R 10U M 6V3 0805	I5	TOP
C231	Ceramic Capacitor	CHIPCAP NP0 47P J 50V 0402	P5	TOP
C241	Ceramic Capacitor	CHIPCAP X5R 100N K 10V 0402	L9	TOP
C253	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	I7	TOP
C260	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	J8	TOP
C270	Ceramic Capacitor	CHIPCAP NP0 270P J 50V 0402	L8	TOP
C315	Ceramic Capacitor	CHIPCAP X5R 2U2 K 10V 0805	D3	BOTTOM
C405	Ceramic Capacitor	CHIPCAP X5R 4U7 K 6V3 0805	P3	TOP
C444	Ceramic Capacitor	CHIPCAP X5R 1U K 16V 0603	R8	TOP
C460	Ceramic Capacitor	CHIPCAP X7R 100N K 16V 0603	Q9	TOP
C463	Ceramic Capacitor	CHIPCAP X5R 470N K 10V 0603	P7	TOP
C502	Ceramic Capacitor	CHIPCAP NP0 180P J 25V 0402	D7	TOP
C503	Ceramic Capacitor	CHIPCAP NP0 2N7 J 25V 0805	D7	TOP
C505	Ceramic Capacitor	CHIPCAP NP0 2N2 J 16V 0603	G8	TOP
C510	Ceramic Capacitor	CHIPCAP NP0 56P J 50V 0402	F8	TOP
C511	Ceramic Capacitor	CHIPCAP NP0 1P2 C 50V 0402	F7	TOP

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
C512	Ceramic Capacitor	CHIPCAP NP0 18P J 50V 0402	F8	TOP
C523	Ceramic Capacitor	CHIP ARRAY NP0 4X470P J 16V 0612	E5	TOP
C528	Ceramic Capacitor	CHIPCAP NP0 82P J 50V 0402	G6	TOP
C617	Ceramic Capacitor	CHIPCAP X7R 3N3 J 50V 0402	T7	BOTTOM
C620	Ceramic Capacitor	CHIPCAP X7R 560P J 50V 0402	Q2	TOP
C621	Ceramic Capacitor	CHIPCAP NP0 68P J 50V 0402	Q3	TOP
C657	Ceramic Capacitor	CHIPCAP X7R 10N J 16V 0402	M4	TOP
C658	Ceramic Capacitor	CHIPCAP X7R 47N K 10V 0402	M4	TOP
C663	Other Capacitor	CHIP ARRAY X5R 2X47N K 10V 0405	O4	TOP
C665	Other Capacitor	CHIP ARRAY X5R 2X33N M 10V 0405	O3	TOP
C670	Ceramic Capacitor	CHIPCAP X7R 4N7 K 25V 0402	M4	TOP
C701	Ceramic Capacitor	CHIPCAP X7R 1N0 J 50V 0402	G3	TOP
C937	Fixed Resistor	CHIPRES 0W06 33K J 0402		TOP
D190	Mixed Signal ASIC	TJA4 BLUETOOTH DEVICE	J4	TOP
D191	Logic IC	1XINV 1.8-5.5V SC70-5	J3	TOP
D400	Power Management IC	DC/DC CONV 350MA(TK11851)SOP8	P3	TOP
D440	Interface IC	KAEDE V1.0 ISP1182 HVQFN32	Q9	TOP
D461	DRAM Memory	SDRAM 8MX16 1.8V/1.8V WBGA60 PBFREE	P6	TOP
D462	FLASH Memory	FLASH 4MX16 1.8/1.8V FBGA44 PBFREE	M9	TOP
F130	Fuse And Protector	SM FUSE F 1.5A 32V ROHS-FREE 0603	T4	BOTTOM
G500	VCO	VCO 3296-3980MHZ 4-BAND Matsushita	D6	TOP
G501	VCTCXO	VCTCXO 26MHZ+-3PPM 2.7V 1.3MA GSM	E8	TOP
L131	EMC Component	FERR.BEAD 240R/100M 0.4A 0R3 0402	S5	BOTTOM
L190	Fixed Inductor	CHIP COIL 22N J Q28/800MHZ 0402	I4	TOP
L191	Fixed Inductor	CHIP COIL 2N7 +-0N3 Q29/800M 0402	I4	TOP
L222	EMC Component	FERRITE BEAD 0R5 600R/100MHZ 0603	I5	TOP
L230	Fixed Inductor	CHOKE 10uH M 0.53A 0R48 4.8x4.8x1.2	Q5	TOP
L401	Fixed Inductor	CHOKE 22U M 0.33A 1R5 3.3X3.3X1.3	P4	TOP
L441	Fixed Inductor	CHIP COIL 56N J Q21/800MHZ 0402	T6	BOTTOM
L500	Fixed Inductor	CHIP COIL 5N6 +-0N3 Q7/100M 0402	F8	TOP
L502	Fixed Inductor	CHIP COIL 3N3 +-0N1 Q30/1GHZ 0402	F8	TOP
L504	Fixed Inductor	CHIP COIL 3N9 +-0N1 Q28/1GHZ 0402	F7	TOP

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
L622	Fixed Inductor	CHIP COIL 68NH J Q12/100MHZ 0603	S7	BOTTOM
L656	Fixed Inductor	CHIP COIL 33N G Q40/250MHZ 0603	M3	TOP
L658	Fixed Inductor	CHIP COIL 120N G Q32/150MHZ 0603	N4	TOP
L677	EMC Component	CHIP BEAD ARRAY 2X1000R 0405	T6	BOTTOM
L700	EMC Component	FERR.BEAD 0R03 42R/100MHZ 3A 0805	G4	TOP
L702	Fixed Inductor	CHIP COIL 33N J Q23/800MHZ 0402	G7	TOP
L800	Fixed Inductor	CHIP COIL 3N3 +-0N3 Q28/800M 0402	D3	TOP
L802	Fixed Inductor	CHIP COIL 4N7 +-0N1 Q29/1GHZ 0402	F6	TOP
L804	Fixed Inductor	CHIP COIL 18N J Q29/800MHZ 0402	F6	TOP
L807	Fixed Inductor	CHIP COIL 8N2 J Q28/800MHZ 0402	G6	TOP
N130	Power Management IC	CURRNT SENS LM3820 USMD10 PB-FREE	P2	BOTTOM
N230	Power Management IC	DC/DC 1.8V/1.5V(LM2608-1.8)USMD10	P4	TOP
N233	Power Management IC	REG+MAS9161B2GB06 2.8V 80MA TSOT5	O4	TOP
N500	RF ASIC	HELGO85G PBFREE TFBGA88	F7	TOP
N656	Other IC	FM RECEIVER(TEA5767HN) LQFP40	N3	TOP
N661	Other IC	VREG & LEVELSHIFT(LP3928)USMD16	L5	TOP
N662	Analog IC	AF AMP 0.4W LM4890/NCP2890 PBFREE	Q3	TOP
N700	Power Amplifier	PW AMP RF9250E4.1 Micro GSM/EDGE	F3	TOP
N750	Infrared	IRDA CIM-50M5A **** RESERVED ****	P10	BOTTOM
R130	Fixed Resistor	CHIPRES 0W06 2K2 J 0402	Q2	BOTTOM
R132	Variable Resistor	NTC RES 0W1 47K J B 4050+-3% 0402	K10	BOTTOM
R133	Fixed Resistor	CHIPRES 0W06 100K J 0402	L7	TOP
R192	Fixed Resistor	CHIPRES 0W06 2K7 J 0402	I3	TOP
R193	Fixed Resistor	CHIPRES 0W06 10K J 0402	J3	TOP
R194	Fixed Resistor	CHIPRES 0W06 2R2 J 0402	I3	TOP
R253	Fixed Resistor	CHIPRES 0W06 100K F 200PPM 0402	L8	TOP
R257	Fixed Resistor	CHIPRES 0W06 220R J 0402	L7	TOP
R259	Fixed Resistor	CHIPRES 0W25 0R22 J 0805	I6	TOP
R260	Fixed Resistor	CHIPRES 0W06 27K F 0402	K6	TOP
R261	Integrated Discretes	ASIP 4XESD *** PB-FREE *** BGA5	L10	BOTTOM

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
R265	Fixed Resistor	CHIPRES JUMPER 0R0 0603	K8	TOP
R270	Fixed Resistor	CHIPRES 0W06 4K7 J 0402	I8	TOP
R310	Integrated Discretes	ASIP SIM INTERFACE ** PB-FREE **	E4	BOTTOM
R315	Integrated Discretes	ASIP MMC FILTER *** PB-FREE ***	E5	BOTTOM
R403	Variable Resistor	CHIP VARISTOR VWM15V VC50V 0402	S2	TOP
R420	Fixed Resistor	CHIPRES 0W06 3K9 J 0402	M5	TOP
R422	Fixed Resistor	CHIPRES 0W06 100R F 200PPM 0402	M8	TOP
R446	Fixed Resistor	CHIPRES 0W06 33R J 0402	T5	BOTTOM
R448	Fixed Resistor	CHIPRES 0W06 68R J 0402	R8	TOP
R451	Integrated Discretes	ASIP USB2 FILTER BGA10 PBFREE	S5	BOTTOM
R452	Fixed Resistor	CHIPRES 0W06 220K J 0402	R9	TOP
R491	Fixed Resistor	CHIPRES 0W06 680R J 0402	O5	TOP
R501	Fixed Resistor	CHIPRES 0W06 5K6 J 0402	D7	TOP
R502	Fixed Resistor	CHIPRES 0W06 6K8 F 0402	D7	TOP
R503	Resistor Network	RES NETWORK 0W04 2DB ATT 0404	D7	TOP
R506	Fixed Resistor	CHIPRES 0W06 22K J 0402	G8	TOP
R512	Fixed Resistor	CHIPRES 0W06 5K6 F 0402	E6	TOP
R515	Resistor Network	RES NETWORK 0W06 4X5K6 J 0804	E7	TOP
R516	Fixed Resistor	CHIPRES 0W06 10R J 0402	F8	TOP
R602	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	K9	TOP
R604	Fixed Resistor	CHIPRES 0W06 470R J 0402	J9	TOP
R634	Resistor Network	RES NETWORK 0W06 2X10R J 0404	S7	BOTTOM
R635	Integrated Discretes	ASIP MIC W/ESD RES+CAP+ZDI BGA11	S6	BOTTOM
R645	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	T4	TOP
R650	Resistor Network	RES NETWORK 0W06 2X220R J 0404	T4	TOP
R651	Resistor Network	RES NETWORK 0W03 4X22R J 0804	L10	BOTTOM
R656	Fixed Resistor	CHIPRES 0W06 12R J 0402	M2	TOP
R658	Fixed Resistor	CHIPRES 0W06 47R J 0402	M3	TOP
R662	Fixed Resistor	CHIPRES 0W06 5R6 J 0402	N4	TOP
R667	Fixed Resistor	CHIPRES 0W06 18K F 100PPM 0603	N4	TOP

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
R693	Fixed Resistor	CHIPRES 0W06 1M0 J 0402	J3	TOP
R717	Resistor Network	RES NETWORK 0W04 1DB ATT 0404	G3	TOP
R750	Fixed Resistor	CHIPRES 0W5 4R7 J 200PPM 1210	O10	BOTTOM
R800	Fixed Resistor	CHIPRES 0W06 3K3 J 0402	D4	TOP
R802	Fixed Resistor	CHIPRES 0W06 560R J 0402	E4	TOP
R862	Ceramic Capacitor	CHIPCAP X7R 33N K 10V 0402		TOP
S001	Switch And Knob	MMC Switch	E2	BOTTOM
T500	Balun	TRANSF BALUN 3290-3980MHZ	D7	TOP
T700	Balun	TRANSF BALUN 1800+-100MHZ 2X1.25	G7	TOP
T800	Transformer	TRANSF BALUN 1.9GHZ+-100MHZ2X1.25	G5	TOP
V130	Diode	TVS DI 1PMT16AT3 16V 175W PWRMITE	T4	BOTTOM
V400	Integrated Discretes	ASIP EMI/ESD FILTER BGA6	T2	TOP
V800	Bipolar Transistor BJT	TR BGA428 LNA1.8GHZ 19.5DB SOT363	D4	TOP
V801	Bipolar Transistor BJT	TR 2SC5658QRS N 50V 0A1 0W15 VMT3	Q4	TOP
X131	Battery Connector	SM BATTERY CONN 3POLE SPR	S4	BOTTOM
X132	System Connector	SM SYSTEM CONNECTOR 14POL	U6	BOTTOM
X400	Board To Board Connector	SM CONN 2X11 SPR 50V 0.5A PCB/PCB	S5	TOP
X816	Fixed Resistor	CHIPRES JUMPER 0R0 0201	S7	TOP
X817	Board To Board Connector	SM CONN B2B 2X25 M P0.4	T3	TOP
X820	Other Customized Connector	SIM/MMC combo reader P2103	F6	BOTTOM
X822	Coaxial Connector	SM CONN RF JACK 50R 2W 6GHZ	E2	TOP
X823	Other Customized Connector	SM CONN VIBRA SPACER PAD 2.8X1.8	C2	BOTTOM
X825	Spring	UI SPRING	T2	TOP
Z191	Ceramic Filter	CER FILT 2441+-41.75MHZ 2.7X2.2	I3	TOP
Z192	Balun	TRANSF BALUN 2400+/-100MHZ	I4	TOP
Z401	Integrated Discretes	ASIP 10-CH ESD EMI FILTER BGA25	Q3	TOP
Z700	SAW Filter	SAW FILT 897.5+-17.5MHZ/3DB 2X1.6	G7	TOP
Z800	Antenna Switch	DIPL+3SW824-960/1710-1990MHZ5.4*4	E3	TOP

Refs	Type	Object Name	PWB Position, X/Y	Assy Side
Z801	SAW Filter	SAW FILT 1960+-30MHZ/3.5DB 2X1.6	D3	TOP
Z802	SAW Filter	SAW FILT 1842.5+-37.5MHZ 2X1.6	F5	TOP
Z803	SAW Filter	SAW FILT 942.5+-17.5MHZ/3DB 2X1.6	F5	TOP

Table 16 Component parts for 1fsa_11a

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
A300	Shield Assembly	HELGO SHIELD ASSY DMC06934 R1024	T	F7	x	x	x	x	
A400	Shield Assembly	PA SHIELD ASSY DMC06935 R1024	T	F3	x	x	x	x	
B250	Crystal	CRYSTAL 32.768KHZ+-20PPM 12.5PF	T	I8	x	x	x	x	
B440	Crystal	CER.RESON 6MHZ+0.11%-0.09% 4.5X2.0	T	Q8	x	x	x	x	
C1	Ceramic Capacitor	CHIPCAP X7R 10N K 16V 0402			x	x	x	x	
C100	Ceramic Capacitor	CHIPCAP X7R 33N K 10V 0402			x	x	x	x	
C101	Ceramic Capacitor	CHIPCAP X7R 33N K 10V 0402			x	x	x	x	
C102	Ceramic Capacitor	CHIPCAP X7R 33N K 10V 0402			x	x	x	x	
C103	Ceramic Capacitor	CHIPCAP X7R 33N K 10V 0402			x	x	x	x	
C132	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	B	P2	x	x	x	x	
C133	Electrolytic Capacitor	CHIPTCAP 100U M 10V 6.0X3.2X1.5	T	L3	x	x	x	x	
C134	Ceramic Capacitor	CHIPCAP X7R 10N K 50V 0603	B	S5	x	x	x	x	
C135	Ceramic Capacitor	CHIPCAP NP0 27P J 50V 0402	B	T5	x	x	x	x	
C190	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	T	H4	x	x	x	x	
C191	Ceramic Capacitor	CHIPCAP NP0 2P2 C 50V 0402	T	I3	x	x	x	x	
C192	Ceramic Capacitor	CHIPCAP NP0 2P2 C 50V 0402	T	I4	x	x	x	x	
C193	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	K2	x	x	x	x	
C194	Ceramic Capacitor	CHIPCAP NP0 2P2 C 50V 0402	T	J3	x	x	x	x	
C197	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	T	I4	x	x	x	x	
C199	Ceramic Capacitor	CHIPCAP X5R 2U2 K 6V3 0603	T	K4	x	x	x	x	
C200	Ceramic Capacitor	CHIPCAP X7R 330P J 50V 0402	T	I3	x	x	x	x	
C203	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K3	x	x	x	x	
C220	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I5	x	x	x	x	
C221	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I5	x	x	x	x	
C222	Ceramic Capacitor	CHIPCAP X5R 10U M 6V3 0805	T	I5	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
C230	Ceramic Capacitor	CHIPCAP X5R 10U M 6V3 0805	T	P4	x	x	x	x	
C231	Ceramic Capacitor	CHIPCAP NP0 47P J 50V 0402	T	P5	x	x	x	x	
C232	Ceramic Capacitor	CHIPCAP X5R 10U M 6V3 0805	T	P5	x	x	x	x	
C233	Ceramic Capacitor	CHIPCAP X5R 10U M 6V3 0805	T	P5	x	x	x	x	
C239	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	O5	x	x	x	x	
C240	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	O4	x	x	x	x	
C250	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I6	x	x	x	x	
C251	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	J6	x	x	x	x	
C252	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	L8	x	x	x	x	
C253	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	T	I7	x	x	x	x	
C254	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	T	I8	x	x	x	x	
C255	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	H8	x	x	x	x	
C256	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I7	x	x	x	x	
C257	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I8	x	x	x	x	
C259	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	J9	x	x	x	x	
C260	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	J8	x	x	x	x	
C261	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	K9	x	x	x	x	
C262	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	K9	x	x	x	x	
C263	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	I8	x	x	x	x	
C264	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	J9	x	x	x	x	
C265	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	J9	x	x	x	x	
C270	Ceramic Capacitor	CHIPCAP NP0 270P J 50V 0402	T	L8	x	x	x	x	
C272	Ceramic Capacitor	CHIPCAP X7R 1N0 K 50V 0402	T	H8	x	x	x	x	
C273	Ceramic Capacitor	CHIPCAP X7R 1N0 K 50V 0402	T	H8	x	x	x	x	
C274	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I6	x	x	x	x	
C276	Ceramic Capacitor	CHIPCAP X7R 1N0 K 50V 0402	T	I6	x	x	x	x	
C278	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I7	x	x	x	x	
C279	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	I6	x	x	x	x	
C280	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	H6	x	x	x	x	
C281	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	J5	x	x	x	x	
C282	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K8	x	x	x	x	
C284	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	L8	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
C287	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K5	x	x	x	x	
C288	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K5	x	x	x	x	
C289	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K6	x	x	x	x	
C290	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K5	x	x	x	x	
C291	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	L5	x	x	x	x	
C294	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	J5	x	x	x	x	
C295	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	J6	x	x	x	x	
C296	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	J6	x	x	x	x	
C297	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K6	x	x	x	x	
C298	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K5	x	x	x	x	
C299	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K5	x	x	x	x	
C3	Ceramic Capacitor	CHIPCAP X5R 100N K 10V 0402			x	x	x	x	
C300	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	J5	x	x	x	x	
C301	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K6	x	x	x	x	
C302	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	K5	x	x	x	x	
C314	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	B	E3	x	x	x	x	
C315	Ceramic Capacitor	CHIPCAP X5R 2U2 K 10V 0805	B	D3	x	x	x	x	
C340	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	Q2	x	x	x	x	
C341	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	Q2	x	x	x	x	
C354	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	T2	x	x	x	x	
C355	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	S2	x	x	x	x	
C356	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	T2	x	x	x	x	
C4	Ceramic Capacitor	CHIPCAP X5R 100N K 10V 0402			x	x	x	x	
C404	Ceramic Capacitor	CHIPCAP NP0 47P J 50V 0402	T	P2	x	x	x	x	
C405	Ceramic Capacitor	CHIPCAP X5R 4U7 K 6V3 0805	T	P3	x	x	x	x	
C406	Ceramic Capacitor	CHIPCAP X5R 1U0 K 25V T 1.0 1206	T	O3	x	x	x	x	
C407	Ceramic Capacitor	CHIPCAP X5R 1U0 K 25V T 1.0 1206	T	O2	x	x	x	x	
C444	Ceramic Capacitor	CHIPCAP X5R 1U K 16V 0603	T	R8	x	x	x	x	
C445	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	B	T5	x	x	x	x	
C446	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	B	T5	x	x	x	x	
C447	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	B	T5	x	x	x	x	
C450		CHIPCAP NP0 12P J 50V 0402	T	Q7	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
C451	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	U2	x	x	x	x	
C460	Ceramic Capacitor	CHIPCAP X7R 100N K 16V 0603	T	Q9	x	x	x	x	
C463	Ceramic Capacitor	CHIPCAP X5R 470N K 10V 0603	T	P7	x	x	x	x	
C464	Ceramic Capacitor	CHIPCAP X7R 10N K 50V 0603	T	P7	x	x	x	x	
C465	Ceramic Capacitor	CHIPCAP X5R 470N K 10V 0603	T	Q7	x	x	x	x	
C466	Ceramic Capacitor	CHIPCAP X7R 10N K 50V 0603	T	Q7	x	x	x	x	
C470	Ceramic Capacitor	CHIPCAP X7R 100N K 16V 0603	T	Q9	x	x	x	x	
C490	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	L6	x	x	x	x	
C491	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	T	O5	x	x	x	x	
C500	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	D6	x	x	x	x	
C501	Ceramic Capacitor	CHIPCAP NP0 3P3 C 50V 0402	T	D6	x	x	x	x	
C502	Ceramic Capacitor	CHIPCAP NP0 180P J 25V 0402	T	D7	x	x	x	x	
C503	Ceramic Capacitor	CHIPCAP NP0 2N7 J 25V 0805	T	D7	x	x	x	x	
C504	Ceramic Capacitor	CHIPCAP NP0 270P J 50V 0402	T	D7	x	x	x	x	
C505	Ceramic Capacitor	CHIPCAP NP0 2N2 J 16V 0603	T	G8	x	x	x	x	
C506	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	G8	x	x	x	x	
C510	Ceramic Capacitor	CHIPCAP NP0 56P J 50V 0402	T	F8	x	x	x	x	
C511	Ceramic Capacitor	CHIPCAP NP0 1P2 C 50V 0402	T	F7	x	x	x	x	
C512	Ceramic Capacitor	CHIPCAP NP0 18P J 50V 0402	T	F8	x	x	x	x	
C516	Ceramic Capacitor	CHIPCAP NP0 27P J 50V 0402	T	F8	x	x	x	x	
C518	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	T	E6	x	x	x	x	
C520	Ceramic Capacitor	CHIPCAP NP0 56P J 50V 0402	T	G6	x	x	x	x	
C523	Ceramic Capacitor	CHIP ARRAY NP0 4X470P J 16V 0612	T	E5	x	x	x	x	
C525	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	E7	x	x	x	x	
C528	Ceramic Capacitor	CHIPCAP NP0 82P J 50V 0402	T	G6	x	x	x	x	
C529	Ceramic Capacitor	CHIPCAP NP0 47P J 50V 0402	T	E7	x	x	x	x	
C530	Ceramic Capacitor	CHIPCAP NP0 47P J 50V 0402	T	E7	x	x	x	x	
C531	Ceramic Capacitor	CHIPCAP NP0 18P J 50V 0402	T	G6	x	x	x	x	
C532	Ceramic Capacitor	CHIPCAP NP0 27P J 50V 0402	T	G6	x	x	x	x	
C600	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	L9	x	x	x	x	
C605	Ceramic Capacitor	CHIPCAP X5R 10U M 6V3 0805	T	J9	x	x	x	x	
C608	Ceramic Capacitor	CHIPCAP X7R 1N0 K 50V 0402	T	K9	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
C609	Ceramic Capacitor	CHIPCAP X7R 1N0 K 50V 0402	T	K9	x	x	x	x	
C611	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	B	T7	x	x	x	x	
C612	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	B	T7	x	x	x	x	
C613	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	B	T7	x	x	x	x	
C614	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	B	T7	x	x	x	x	
C617	Ceramic Capacitor	CHIPCAP X7R 3N3 J 50V 0402	B	T7	x	x	x	x	
C620	Ceramic Capacitor	CHIPCAP X7R 560P J 50V 0402	T	Q2	x	x	x	x	
C621	Ceramic Capacitor	CHIPCAP NP0 68P J 50V 0402	T	Q3	x	x	x	x	
C622	Ceramic Capacitor	CHIPCAP X5R 470N K 10V 0603	T	Q2	x	x	x	x	
C625	Ceramic Capacitor	CHIPCAP X7R 560P J 50V 0402	T	Q3	x	x	x	x	
C629	Ceramic Capacitor	CHIPCAP X7R 3N3 J 50V 0402	B	S6	x	x	x	x	
C630	Ceramic Capacitor	CHIPCAP X7R 3N3 J 50V 0402	B	T6	x	x	x	x	
C632	Ceramic Capacitor	CHIPCAP X5R 10U M 6V3 0805	T	J9	x	x	x	x	
C638	Ceramic Capacitor	CHIPCAP X7R 3N3 J 50V 0402	B	T6	x	x	x	x	
C639	Ceramic Capacitor	CHIPCAP X7R 3N3 J 50V 0402	B	T6	x	x	x	x	
C657	Ceramic Capacitor	CHIPCAP X7R 10N J 16V 0402	T	M4	x	x	x	x	
C658	Ceramic Capacitor	CHIPCAP X7R 47N K 10V 0402	T	M4	x	x	x	x	
C659	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402	T	M2	x	x	x	x	
C661	Ceramic Capacitor	CHIPCAP X7R 1N0 K 50V 0402	T	O2	x	x	x	x	
C662	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402	T	M3	x	x	x	x	
C663	Other Capacitor	CHIP ARRAY X5R 2X47N K 10V 0405	T	O4	x	x	x	x	
C664	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402	T	N2	x	x	x	x	
C665	Other Capacitor	CHIP ARRAY X5R 2X33N M 10V 0405	T	O3	x	x	x	x	
C666	Ceramic Capacitor	CHIPCAP X7R 47N K 10V 0402	T	O4	x	x	x	x	
C667	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	N4	x	x	x	x	
C670	Ceramic Capacitor	CHIPCAP X7R 4N7 K 25V 0402	T	M4	x	x	x	x	
C671	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402	T	N4	x	x	x	x	
C672	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	N4	x	x	x	x	
C673	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402	T	O2	x	x	x	x	
C674	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	N2	x	x	x	x	
C678	Ceramic Capacitor	CHIPCAP NP0 27P J 50V 0402	T	N4	x	x	x	x	
C679	Ceramic Capacitor	CHIPCAP NP0 47P J 50V 0402	T	M4	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
C693	Ceramic Capacitor	CHIPCAP X7R 3N3 J 50V 0402	B	T7	x	x	x	x	
C696	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	B	E5	x	x	x	x	
C698	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402	T	Q3	x	x	x	x	
C701	Ceramic Capacitor	CHIPCAP X7R 1N0 J 50V 0402	T	G3	x	x	x	x	
C702	Ceramic Capacitor	CHIPCAP X7R 1N0 J 50V 0402	T	F3	x	x	x	x	
C705	Ceramic Capacitor	CHIPCAP X5R 4U7 K 6V3 0805	T	G3	x	x	x	x	
C706	Ceramic Capacitor	CHIPCAP NP0 27P J 50V 0402	T	G4	x	x	x	x	
C707	Ceramic Capacitor	CHIPCAP NP0 1P2 C 50V 0402	T	G3	x	x	x	x	
C709	Ceramic Capacitor	CHIPCAP X7R 1N0 J 50V 0402	T	G4	x	x	x	x	
C710	Ceramic Capacitor	CHIPCAP X7R 1N0 J 50V 0402	T	F4	x	x	x	x	
C713	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	T	G7	x	x	x	x	
C714	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	T	G7	x	x	x	x	
C750	Ceramic Capacitor	CHIPCAP X5R 4U7 K 6V3 0805	B	O10	x	x	x	x	
C751	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	B	Q10	x	x	x	x	
C800	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	D4	x	x	x	x	
C801	Ceramic Capacitor	CHIPCAP NP0 2P2 C 50V 0402	T	D3	x	x	x	x	
C803	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	T	D4	x	x	x	x	
C804	Ceramic Capacitor	CHIPCAP NP0 1P2 C 50V 0402	T	E4	x	x	x	x	
C805	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	T	G6	x	x	x	x	
C806	Ceramic Capacitor	CHIPCAP NP0 15P J 50V 0402	T	G6	x	x	x	x	
C862	Ceramic Capacitor	CHIPCAP X7R 22N K 16V 0402			x	x	x	x	
C863	Ceramic Capacitor	CHIPCAP NP0 100P J 50V 0402	T	Q2	x	x	x	x	
C905	Ceramic Capacitor	CHIPCAP NP0 10P J 50V 0402	T	M7	x	x	x	x	
C933	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	T4	x	x	x	x	
C934	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	U4	x	x	x	x	
C935	Ceramic Capacitor	CHIPCAP NP0 22P J 50V 0402	T	Q9	x	x	x	x	
C936	Ceramic Capacitor	CHIPCAP NP0 270P J 50V 0402	B	S5	x	x	x	x	
C940	Ceramic Capacitor	CHIPCAP X5R 1U K 6V3 0603	T	L7	x	x	x	x	
D190	Mixed Signal ASIC	TJA4 BLUETOOTH DEVICE	T	J4	x	x	x	x	
D191	Logic IC	1XINV 1.8-5.5V SC70-5	T	J3	x	x	x	x	
D400	Power Management IC	DC/DC CONV 350MA(TK11851)SOP8	T	P3	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
D440	Interface IC	KAEDE V1.0 ISP1182 HVQFN32	T	Q9	x	x	x	x	
D460	Combo Memory	NOR 128M + 128M 1.8/1.8V FGBA44 PBFREE	T	O9	x	x	x	x	
D460		NOR 128M + 128M 1.8/1.8V FGBA44 PBFREE	T	O9	x	x	x	x	
D461	DRAM Memory	SDRAM 8MX16 1.8V/1.8V FBGA60 PBFREE	T	P6	x	x	x	x	
D462	FLASH Memory	FLASH 4MX16 1.8/1.8V FBGA44 PBFREE	T	M9	x	x	x	x	
D462		FLASH 4MX16 1.8/1.8V VFBGA44 PBFREE	T	M9	x	x	x	x	
F130	Fuse And Protector	SM FUSE F 1.5A 32V ROHS-FREE 0603	B	T4	x	x	x	x	
G500	VCO	VCO 3296-3980MHZ 4-BAND Matsushita	T	D6	x	x	x	x	
G501	VCTCXO	VCTCXO 26MHZ+-3PPM 2.7V 1.3MA GSM	T	E8	x	x	x	x	
G502	Battery And Battery Cell	CELL CAPACITOR 0.015MAH 3V3	B	T8	x	x	x	x	
I003	Keymat And Key	FUNC KEYMAT HARD BLACK			x	x	x	x	
I003	Keymat And Key	FUNC KEYMAT HARD TOP SILVER			x	x	x	x	
I004	Screw	Screw 1.8x5.0 DIN8015 FH FeZn black			x	x	x	x	
I005	Shield	LCD Shield			x	x	x	x	
I006	Earpiece	EARPIECE 105+-3DB 32R D8.1X2.25			x	x	x	x	
I007	Display	LCD MOD 176X208 AM 64KCO GDAF6007 Halti2			x	x	x	x	
I202	Microphone Assembly	MIC+BOOT ASSY -42+-3DB D7.7X3MM			x	x	x	x	
I205	Keymat And Key	Sidekey Hard Top Black P2103			x	x	x	x	
I205	Keymat And Key	Sidekey Hard Top Silver			x	x	x	x	
I206	Keymat And Key	NUM KEYMAT HARD TOP LATIN BLACK			x	x		x	
I206	Keymat And Key	NUM KEYMAT HARD TOP STROKE BLACK				x	x		
I206	Keymat And Key	NUM KEYMAT HARD TOP STROKE SILVER				x	x		
I206	Keymat And Key	NUM KEYMAT HARD TOP BoPo BLACK					x		
I206	Keymat And Key	NUM KEYMAT HARD TOP BoPo SILVER					x		
I206	Keymat And Key	NUM KEYMAT HARD TOP HEBREW BLACK			x				
I206	Keymat And Key	NUM KEYMAT HARD TOP HEBREW SILVER			x				
I206	Keymat And Key	NUM KEYMAT HARD TOP RUSSIA BLACK			x				
I206	Keymat And Key	NUM KEYMAT HARD TOP RUSSIA SILVER			x				
I206	Keymat And Key	NUM KEYMAT HARD TOP GREEK BLACK			x				
I206	Keymat And Key	NUM KEYMAT HARD TOP GREEK SILVER			x				

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
I206	Keymat And Key	NUM KEYMAT HARD TOP ARABIC SILVER			x				
I206	Keymat And Key	NUM KEYMAT HARD TOP ARABIC BLACK			x				
I206	Keymat And Key	NUM KEYMAT HARD TOP LATIN SILVER			x	x		x	
I207	Plate	Panel painted Black P2103			x	x	x	x	
I207	Plate	Panel painted Silver P2103			x	x	x	x	
I210	Shield	BB Shield DNS09299 P2103			x	x	x	x	
I214	Label And Sticker	BLANK LABEL 32.5X50.5 BRADY			x	x	x	x	
I215	Charger Connector	DC-Jack Low Profile P2103			x	x	x	x	
I217	Vibrator	VIBRA ASSY 1.0V 80MA 9000RPM			x	x	x	x	
I220	Screw	Screw 1.8x7.0 DIN8015 FH FeZn black			x	x	x	x	
L130	EMC Component	FERR.BEAD 0R03 42R/100MHZ 3A 0805	B	T4	x	x	x	x	
L131	EMC Component	FERR.BEAD 240R/100M 0.4A 0R3 0402	B	S5	x	x	x	x	
L133	EMC Component	FERR.BEAD 240R/100M 0.4A 0R3 0402	B	S5	x	x	x	x	
L190	Fixed Inductor	CHIP COIL 22N J Q28/800MHZ 0402	T	I4	x	x	x	x	
L191	Fixed Inductor	CHIP COIL 2N7 +-0N3 Q29/800M 0402	T	I4	x	x	x	x	
L192	Fixed Inductor	CHIP COIL 2N7 +-0N3 Q29/800M 0402	T	I4	x	x	x	x	
L193	Fixed Inductor	CHIP COIL 22N J Q28/800MHZ 0402	T	I3	x	x	x	x	
L194	Fixed Inductor	CHIP COIL 22N J Q28/800MHZ 0402	T	I3	x	x	x	x	
L222	EMC Component	FERRITE BEAD 0R5 600R/100MHZ 0603	T	I5	x	x	x	x	
L230	Fixed Inductor	CHOKE 10uH M 0.53A 0R48 4.8x4.8x1.2	T	Q5	x	x	x	x	
L400	EMC Component	FERRITE BEAD 0R5 600R/100MHZ 0603	T	P3	x	x	x	x	
L401	Fixed Inductor	CHOKE 22U M 0.33A 1R5 3.3X3.3X1.3	T	P4	x	x	x	x	
L440	EMC Component	FERR.BEAD 240R/100M 0.4A 0R3 0402	B	T5	x	x	x	x	
L441	Fixed Inductor	CHIP COIL 56N J Q21/800MHZ 0402	B	T6	x	x	x	x	
L442	Fixed Inductor	CHIP COIL 56N J Q21/800MHZ 0402	B	T5	x	x	x	x	
L500	Fixed Inductor	CHIP COIL 5N6 +-0N3 Q7/100M 0402	T	F8	x	x	x	x	
L501	Fixed Inductor	CHIP COIL 5N6 +-0N3 Q7/100M 0402	T	F8	x	x	x	x	
L502	Fixed Inductor	CHIP COIL 3N3 +-0N1 Q30/1GHZ 0402	T	F8	x	x	x	x	
L503	Fixed Inductor	CHIP COIL 3N3 +-0N1 Q30/1GHZ 0402	T	F8	x	x	x	x	
L504	Fixed Inductor	CHIP COIL 3N9 +-0N1 Q28/1GHZ 0402	T	F7	x	x	x	x	
L622	Fixed Inductor	CHIP COIL 68NH J Q12/100MHZ 0603	B	S7	x	x	x	x	
L656	Fixed Inductor	CHIP COIL 33N G Q40/250MHZ 0603	T	M3	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
L657	Fixed Inductor	CHIP COIL 33N G Q40/250MHZ 0603	T	M3	x	x	x	x	
L658	Fixed Inductor	CHIP COIL 120N J Q16/100MHZ 0603	T	N4	x	x	x	x	
L677	EMC Component	CHIP BEAD ARRAY 2X1000R 0405	B	T6	x	x	x	x	
L678	EMC Component	CHIP BEAD ARRAY 2X1000R 0405	B	T7	x	x	x	x	
L679	EMC Component	CHIP BEAD ARRAY 2X1000R 0405	B	T6	x	x	x	x	
L700	EMC Component	FERR.BEAD 0R03 42R/100MHZ 3A 0805	T	G4	x	x	x	x	
L702	Fixed Inductor	CHIP COIL 33N J Q23/800MHZ 0402	T	G7	x	x	x	x	
L800	Fixed Inductor	CHIP COIL 3N3 +-0N3 Q28/800M 0402	T	D3	x	x	x	x	
L801	Fixed Inductor	CHIP COIL 3N3 +-0N3 Q28/800M 0402	T	E4	x	x	x	x	
L802	Fixed Inductor	CHIP COIL 4N7 +-0N1 Q29/1GHZ 0402	T	F6	x	x	x	x	
L803	Fixed Inductor	CHIP COIL 4N7 +-0N1 Q29/1GHZ 0402	T	F6	x	x	x	x	
L804	Fixed Inductor	CHIP COIL 18N J Q29/800MHZ 0402	T	F6	x	x	x	x	
L805	Fixed Inductor	CHIP COIL 18N J Q29/800MHZ 0402	T	F6	x	x	x	x	
L807	Fixed Inductor	CHIP COIL 8N2 J Q28/800MHZ 0402	T	G6	x	x	x	x	
L825	Fixed Inductor	CHIP COIL 33N G Q40/250MHZ 0603	T	S2	x	x	x	x	
L836	EMC Component	CHIP BEAD ARRAY 2X1000R 0405	T	T2	x	x	x	x	
N100	Magnetic Sensor	HALL IC SWITCH SH248CSP VCC			x	x	x	x	
N101	Magnetic Sensor	HALL IC SWITCH SH248CSP VCC			x	x	x	x	
N130	Power Management IC	CURRNT SENS LM3820 USMD10 PB-FREE	B	P2	x	x	x	x	
N230	Power Management IC	DC/DC 1.8V/1.5V(LM2608-1.8)USMD10	T	P4	x	x	x	x	
N233	Power Management IC	REG+MAS9161B2GB06 2.8V 80MA TSOT5	T	04	x	x	x	x	
N310	Other IC	VREG & LEVELSHIFT(LP3928)USMD16	B	D3	x	x	x	x	
N500	RF ASIC	HELGO86 LB	T	F7	x	x	x	x	
N656	Other IC	FM RECEIVER(TEA5767HN) LQFP40	T	N3	x	x	x	x	
N661	Other IC	VREG & LEVELSHIFT(LP3928)USMD16	T	L5	x	x	x	x	
N662	Analog IC	AF AMP 0.4W LM4890/NCP2890 PBFREE	T	Q3	x	x	x	x	
N700	Power Amplifier	PW AMP RF9250E4.1 Micro GSM/EDGE	T	F3	x	x	x	x	
N750	Infrared	IRDA CIM-50M5A **** RESERVED ****	B	P10	x	x	x	x	
R1	Fixed Resistor	CHIPRES 0W06 10K J 0402			x	x	x	x	
R105	Variable Resistor	CHIP VARISTOR VWM15V VC50V 0402			x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
R106	Variable Resistor	CHIP VARISTOR VWM15V VC50V 0402			x	x	x	x	
R130	Fixed Resistor	CHIPRES 0W06 2K2 J 0402	B	Q2	x	x	x	x	
R131	Fixed Resistor	CHIPRES 0W06 2K2 J 0402	B	Q2	x	x	x	x	
R132	Variable Resistor	NTC RES 0W1 47K J B 4050+-3% 0402	B	K10	x	x	x	x	
R133	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	L7	x	x	x	x	
R134	Fixed Resistor	CHIPRES 0W06 100K J 0402	B	S5	x	x	x	x	
R192	Fixed Resistor	CHIPRES 0W06 2K7 J 0402	T	I3	x	x	x	x	
R194	Fixed Resistor	CHIPRES 0W06 2R2 J 0402	T	I3	x	x	x	x	
R200	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	K3	x	x	x	x	
R252	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	L8	x	x	x	x	
R253	Fixed Resistor	CHIPRES 0W06 100K F 200PPM 0402	T	L8	x	x	x	x	
R254	Fixed Resistor	CHIPRES 0W06 100K F 200PPM 0402	T	I8	x	x	x	x	
R255	Variable Resistor	NTC RES 0W1 47K J B 4050+-3% 0402	T	H8	x	x	x	x	
R257	Fixed Resistor	CHIPRES 0W06 220R J 0402	T	L7	x	x	x	x	
R259	Fixed Resistor	CHIPRES 0W25 0R22 J 0805	T	I6	x	x	x	x	
R260	Fixed Resistor	CHIPRES 0W06 27K F 0402	T	K6	x	x	x	x	
R261	Integrated Discretes	ASIP 4XESD *** PB-FREE *** BGA5	B	L10	x	x	x	x	
R265	Fixed Resistor	CHIPRES JUMPER 0R0 0603	T	K8	x	x	x	x	
R270	Fixed Resistor	CHIPRES 0W06 4K7 J 0402	T	I8	x	x	x	x	
R310	Integrated Discretes	ASIP SIM INTERFACE ** PB-FREE **	B	E4	x	x	x	x	
R313	Fixed Resistor	CHIPRES 0W06 18K J 0402	B	E4	x	x	x	x	
R315	Integrated Discretes	ASIP MMC FILTER *** PB-FREE ***	B	E5	x	x	x	x	
R371	Fixed Resistor	CHIPRES 0W06 18K J 0402	T	M7	x	x	x	x	
R402	Fixed Resistor	CHIPRES 0W06 100R J 0402	T	T2	x	x	x	x	
R419	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	Q3	x	x	x	x	
R420	Fixed Resistor	CHIPRES 0W06 3K9 J 0402	T	M5	x	x	x	x	
R421	Fixed Resistor	CHIPRES 0W06 3K9 J 0402	T	M5	x	x	x	x	
R422	Fixed Resistor	CHIPRES 0W06 100R F 200PPM 0402	T	M8	x	x	x	x	
R423	Fixed Resistor	CHIPRES 0W06 100R F 200PPM 0402	T	M8	x	x	x	x	
R426	Fixed Resistor	CHIPRES 0W06 2K7 J 0402	T	M7	x	x	x	x	
R436	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	R7	x	x	x	x	
R440	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	R8	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
R442	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	P9	x	x	x	x	
R446	Fixed Resistor	CHIPRES 0W06 33R J 0402	B	T5	x	x	x	x	
R447	Fixed Resistor	CHIPRES 0W06 68R J 0402	T	R8	x	x	x	x	
R448	Fixed Resistor	CHIPRES 0W06 68R J 0402	T	R8	x	x	x	x	
R451	Integrated Discretes	ASIP USB2 FILTER BGA10 PBFREE	B	S5	x	x	x	x	
R452	Fixed Resistor	CHIPRES 0W06 220K J 0402	T	R9	x	x	x	x	
R465	Fixed Resistor	CHIPRES 0W06 4K7 J 0402	T	N5	x	x	x	x	
R470	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	L8	x	x	x	x	
R471	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	P9	x	x	x	x	
R491	Fixed Resistor	CHIPRES 0W06 680R J 0402	T	O5	x	x	x	x	
R492	Fixed Resistor	CHIPRES 0W06 100R J 0402	T	O5	x	x	x	x	
R500	Fixed Inductor	CHIP COIL 3N3 +-0N1 Q30/1GHZ 0402	T	D6	x	x	x	x	
R501	Fixed Resistor	CHIPRES 0W06 5K6 J 0402	T	D7	x	x	x	x	
R502	Fixed Resistor	CHIPRES 0W06 6K8 F 0402	T	D7	x	x	x	x	
R503	Resistor Network	RES NETWORK 0W04 2DB ATT 0404	T	D7	x	x	x	x	
R504	Fixed Resistor	CHIPRES 0W06 4K7 J 0402	T	G8	x	x	x	x	
R505	Fixed Resistor	CHIPRES 0W06 4K7 J 0402	T	G8	x	x	x	x	
R506	Fixed Resistor	CHIPRES 0W06 22K J 0402	T	G8	x	x	x	x	
R511	Fixed Resistor	CHIPRES 0W06 4K7 J 0402	T	E5	x	x	x	x	
R512	Fixed Resistor	CHIPRES 0W06 5K6 F 0402	T	E6	x	x	x	x	
R513	Fixed Resistor	CHIPRES 0W06 15K J 0402	T	D8	x	x	x	x	
R514	Fixed Resistor	CHIPRES 0W06 15K J 0402	T	G6	x	x	x	x	
R515	Resistor Network	RES NETWORK 0W06 4X5K6 J 0804	T	E7	x	x	x	x	
R516	Fixed Resistor	CHIPRES 0W06 10R J 0402	T	F8	x	x	x	x	
R519	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	F8	x	x	x	x	
R600	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	L9	x	x	x	x	
R601	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	L9	x	x	x	x	
R602	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	K9	x	x	x	x	
R603	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	K9	x	x	x	x	
R604	Fixed Resistor	CHIPRES 0W06 470R J 0402	T	J9	x	x	x	x	
R605	Fixed Resistor	CHIPRES 0W06 2K2 J 0402	T	K9	x	x	x	x	
R606	Fixed Resistor	CHIPRES 0W06 2K2 J 0402	T	K9	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
R607	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	K9	x	x	x	x	
R608	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	J9	x	x	x	x	
R627	Fixed Resistor	CHIPRES JUMPER 0R0 0402	B	S6	x	x	x	x	
R628	Fixed Resistor	CHIPRES 0W06 470R J 0402	T	I8	x	x	x	x	
R629	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	J9	x	x	x	x	
R630	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	J9	x	x	x	x	
R631	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	I9	x	x	x	x	
R634	Resistor Network	RES NETWORK 0W06 2X10R J 0404	B	S7	x	x	x	x	
R635	Integrated Discretes	ASIP MIC W/ESD RES+CAP+ZDI BGA11	B	S6	x	x	x	x	
R640	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	K3	x	x	x	x	
R642	Fixed Resistor	CHIPRES 0W06 18K J 0402	T	Q3	x	x	x	x	
R644	Fixed Resistor	CHIPRES 0W06 27K J 0402	T	R3	x	x	x	x	
R645	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	T	T4	x	x	x	x	
R646	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	T	T2	x	x	x	x	
R648	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	B	S7	x	x	x	x	
R649	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	B	S6	x	x	x	x	
R650	Resistor Network	RES NETWORK 0W06 2X220R J 0404	T	T4	x	x	x	x	
R651	Resistor Network	RES NETWORK 0W03 4X22R J 0804	B	L10	x	x	x	x	
R652	Fixed Resistor	CHIPRES 0W06 220R J 0402	B	K10	x	x	x	x	
R653	Resistor Network	RES NETWORK 0W06 2X10R J 0404	B	S6	x	x	x	x	
R654	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	T	S2	x	x	x	x	
R655	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	T	T5	x	x	x	x	
R656	Fixed Resistor	CHIPRES 0W06 12R J 0402	T	M2	x	x	x	x	
R657	Fixed Resistor	CHIPRES 0W06 33K J 0402	T	M3	x	x	x	x	
R658	Fixed Resistor	CHIPRES 0W06 47R J 0402	T	M3	x	x	x	x	
R660	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	M4	x	x	x	x	
R662	Fixed Resistor	CHIPRES 0W06 5R6 J 0402	T	N4	x	x	x	x	
R664	Fixed Resistor	CHIPRES 0W06 220K J 0402	T	N2	x	x	x	x	
R665	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	N2	x	x	x	x	
R667	Fixed Resistor	CHIPRES 0W06 18K F 100PPM 0603	T	N4	x	x	x	x	
R669	Fixed Resistor	CHIPRES 0W06 33K J 0402	T	N2	x	x	x	x	
R671	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	O5	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
R672	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	O4	x	x	x	x	
R673	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	N5	x	x	x	x	
R675	Fixed Resistor	CHIPRES 0W06 27K J 0402	T	Q3	x	x	x	x	
R676	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	N5	x	x	x	x	
R677	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	O5	x	x	x	x	
R689	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	L4	x	x	x	x	
R690	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	L4	x	x	x	x	
R691	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	L4	x	x	x	x	
R692	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	L4	x	x	x	x	
R693	Fixed Resistor	CHIPRES 0W06 1M0 J 0402	T	J3	x	x	x	x	
R695	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	K5	x	x	x	x	
R697	Resistor Network	RES NETWORK 0W06 2X10R J 0404	T	S2	x	x	x	x	
R701	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	F3	x	x	x	x	
R702	Fixed Resistor	CHIPRES 0W06 4K7 J 0402	T	F4	x	x	x	x	
R703	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	F4	x	x	x	x	
R711	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	G7	x	x	x	x	
R712	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	G7	x	x	x	x	
R713	Fixed Resistor	CHIPRES 0W06 33R J 0402	T	G3	x	x	x	x	
R715	Fixed Resistor	CHIPRES 0W06 33R J 0402	T	G3	x	x	x	x	
R717	Resistor Network	RES NETWORK 0W04 1DB ATT 0404	T	G3	x	x	x	x	
R718	Resistor Network	RES NETWORK 0W04 1DB ATT 0404	T	G4	x	x	x	x	
R750	Fixed Resistor	CHIPRES 0W5 4R7 J 200PPM 1210	B	O10	x	x	x	x	
R800	Fixed Resistor	CHIPRES 0W06 3K3 J 0402	T	D4	x	x	x	x	
R801	Fixed Resistor	CHIPRES 0W06 10R J 0402	T	E4	x	x	x	x	
R802	Fixed Resistor	CHIPRES 0W06 560R J 0402	T	E4	x	x	x	x	
R803	Fixed Resistor	CHIPRES JUMPER 0R0 0402	T	R7	x	x	x	x	
R804	Fixed Resistor	CHIPRES 0W06 1K0 J 0402	T	P4	x	x	x	x	
R806	Resistor Network	RES NETWORK 0W06 2X100R J 0404	T	T5	x	x	x	x	
R807	Fixed Resistor	CHIPRES 0W06 1M0 J 0402	T	Q6	x	x	x	x	
R808	Fixed Resistor	CHIPRES 0W06 100K J 0402	T	Q6	x	x	x	x	
R809	Variable Resistor	VAR.ARRAY 2X16V 824-915MHZ 0405	T	U5	x	x	x	x	
R859	Fixed Resistor	CHIPRES 0W06 33K J 0402	T	J9	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
R861	Fixed Resistor	CHIPRES 0W06 18K J 0402	T	Q3	x	x	x	x	
R864	Fixed Resistor	CHIPRES 0W06 47R J 0402	T	Q4	x	x	x	x	
R865	Fixed Resistor	CHIPRES 0W06 220R J 0402	T	Q4	x	x	x	x	
R866	Fixed Resistor	CHIPRES 0W06 100K J 0402	B	E3	x	x	x	x	
R867	Fixed Resistor	CHIPRES JUMPER 0R0 0603	T	I6	x	x	x	x	
R870	Fixed Resistor	CHIPRES 0W06 220R J 0402	B	K10	x	x	x	x	
R871	Fixed Resistor	CHIPRES 0W06 100R J 0402	B	S5	x	x	x	x	
R872	Fixed Resistor	CHIPRES 0W06 470R J 0402	T	J9	x	x	x	x	
R873	Fixed Resistor	CHIPRES 0W06 22R J 0402	T	T5	x	x	x	x	
R937	Fixed Resistor	CHIPRES 0W06 33K J 0402	T	K9	x	x	x	x	
S001	Switch And Knob	MMC Switch	B	E2	x	x	x	x	
T500	Balun	TRANSF BALUN 3290-3980MHZ	T	D7	x	x	x	x	
T700	Balun	TRANSF BALUN 1800+-100MHZ 2X1.25	T	G7	x	x	x	x	
T800	Transformer	TRANSF BALUN 1.9GHZ+-100MHZ2X1.25	T	G5	x	x	x	x	
V100	LED	LED WHITE 90-345MCD 10MA 90DEG	?	?		x	x	x	
V101	LED	LED WHITE 90-345MCD 10MA 90DEG	?	?		x	x	x	
V130	Diode	TVS DI 1PMT16AT3 16V 175W PWRMITE	B	T4	x	x	x	x	
V400	Integrated Discretes	ASIP EMI/ESD FILTER BGA6	T	T2	x	x	x	x	
V402	Diode	SCH DIODE 30V 200MA VF 0V5 SOD523	T	P3	x	x	x	x	
V656	Diode	CAP.DI BB202 CT 2.5 FM 0R8 SOD523	T	M4	x	x	x	x	
V657	Diode	CAP.DI BB202 CT 2.5 FM 0R8 SOD523	T	M4	x	x	x	x	
V800	Bipolar Transistor BJT	TR BGA428 LNA1.8GHZ 19.5DB SOT363	T	D4	x	x	x	x	
V801	Bipolar Transistor BJT	TR 2SC5658QRS N 50V 0A1 0W15 VMT3	T	Q4	x	x	x	x	
X131	Battery Connector	SM BATTERY CONN 3POLE SPR	B	S4	x	x	x	x	
X132	System Connector	SM SYSTEM CONNECTOR 14POL	B	U6	x	x	x	x	
X400	Board To Board Connector	SM CONN 2X11 SPR 50V 0.5A PCB/PCB	T	S5	x	x	x	x	
X816	Board To Board Connector	SM CONN B2B 2X8 F P0.4	T	S7	x	x	x	x	
X817	Board To Board Connector	SM CONN B2B 2X25 M P0.4	T	T3	x	x	x	x	
X820	Other Customized Connector	SIM/MMC combo reader P2103	B	F6	x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
X822	Coaxial Connector	SM CONN RF JACK 50R 2W 6GHZ	T	E2	x	x	x	x	
X823	Other Customized Connector	SM CONN VIBRA SPACER PAD 2.8X1.8	B	C2	x	x	x	x	
X825	Spring	UI SPRING	T	T2	x	x	x	x	
Z191	Ceramic Filter	CER FILT 2441+-41.75MHZ 2.7X2.2	T	I3	x	x	x	x	
Z192	Balun	TRANSF BALUN 2400+/-100MHZ	T	I4	x	x	x	x	
Z200	EMC Component	FERRITE BEAD 0R5 600R/100MHZ 0603	T	I5	x	x	x	x	
Z221	EMC Component	FERRITE BEAD 0R5 600R/100MHZ 0603	T	I5	x	x	x	x	
Z401	Integrated Discretes	ASIP 10-CH ESD EMI FILTER BGA25	T	Q3	x	x	x	x	
Z402	Integrated Discretes	ASIP 10-CH ESD EMI FILTER BGA25	T	Q4	x	x	x	x	
Z700	SAW Filter	SAW FILT 897.5+-17.5MHZ/3DB 2X1.6	T	G7	x	x	x	x	
Z800	Antenna Switch	DIPL+3SW824-960/1710-1990MHZ5.4*4	T	E3	x	x	x	x	
Z801	SAW Filter	SAW FILT 1960+-30MHZ/3.5DB 2X1.6	T	D3	x	x	x	x	
Z802	SAW Filter	SAW FILT 1842.5+-37.5MHZ 2X1.6	T	F5	x	x	x	x	
Z803	SAW Filter	SAW FILT 942.5+-17.5MHZ/3DB 2X1.6	T	F5	x	x	x	x	
Z814	Integrated Discretes	ASIP 10-CH ESD EMI FILTER BGA25	T	Q6	x	x	x	x	
	After Sales Kit	N6260 RM-25 SWAP ENGINE E&A BLACK			x				
	Shield	PA LID DMD11314 R1024			x	x	x	x	
	Shield	HELGO LID DMD11312 R1024			x	x	x	x	
	Other Assembly	Camera Service Assembly			x	x	x	x	
	Other Assembly	RM-25 Mech sub-assembly Black CoffeP2103			x	x	x	x	
	Cover Assembly	B1 cover assembly Black Coffee			x	x	x	x	
	Cover Assembly	B1 cover assembly Silver Sand			x	x	x	x	
	Cover	Battery lid assy Black Coffee P2103			x	x	x	x	
	Cover	Battery lid assy Silver Sand P2103			x	x	x	x	
	Shield Assembly	UI flex assy 040-000388 P2103			x	x	x	x	
	Frame And Chassis Assembly	Frame Service Assembly P2103			x	x	x	x	
	Cover Assembly	A2 cover assembly Silver Sand P2103			x	x	x	x	
	Cover Assembly	A2 cover assembly Black Coffee			x	x	x	x	
	Other Assembly	RM-25 Mech sub-assembly Silver SandP2103			x	x	x	x	

Ref	Type	Name	Side	XY	EMEA	APAC	China	LTA	NAM
		32MB DV-RS-Multi Media Card			x				

Component layouts

Note: See also A3 size layouts in Schematics chapter.

Component layout, bottom

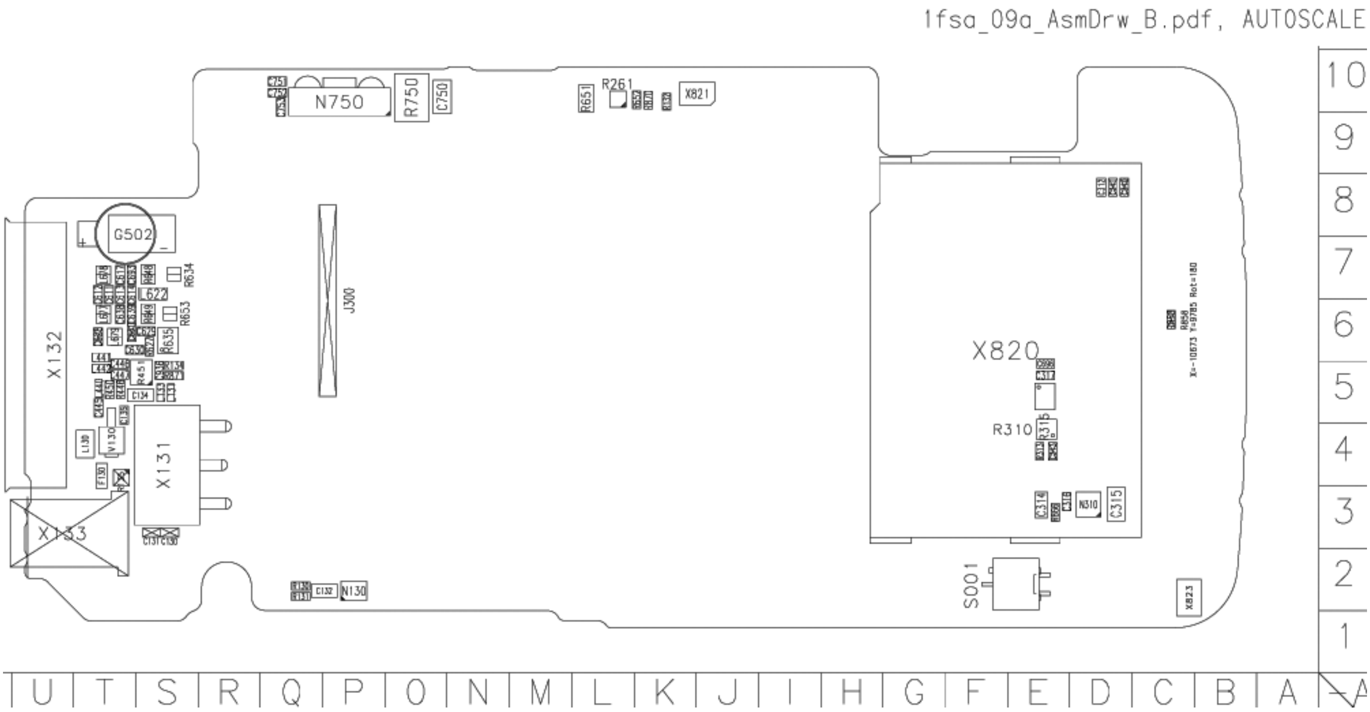

Figure 3 Component layout for 1fsa_09a, bottom

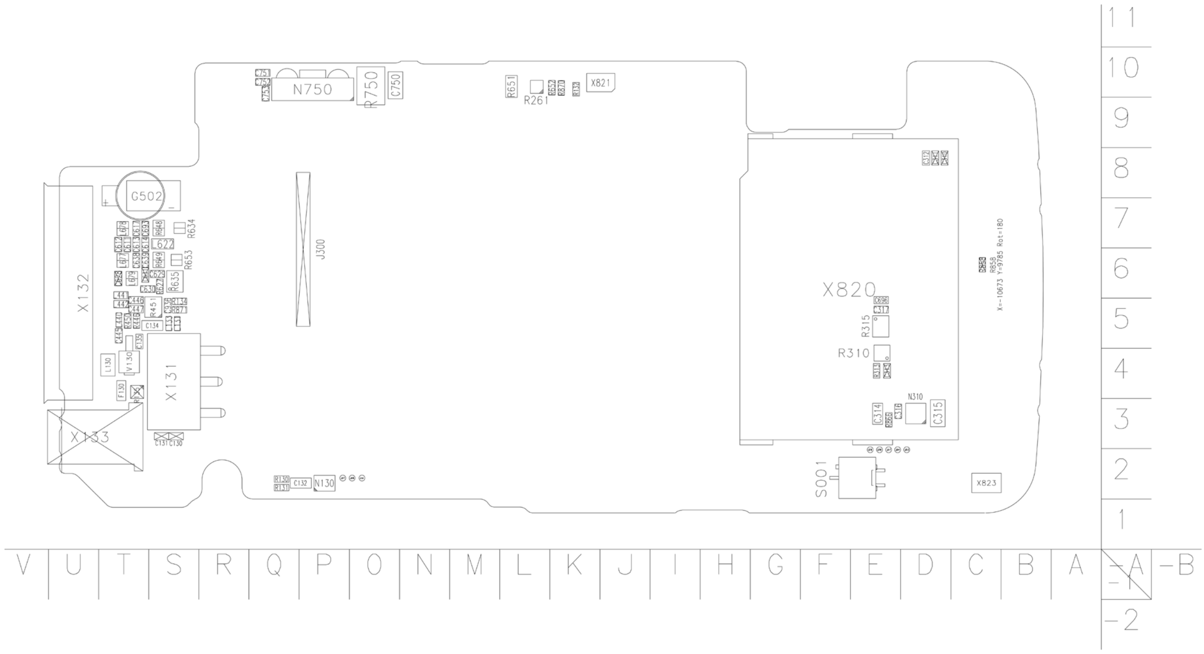

Figure 4 Component layout for 1fsa_11a, bottom

Component layout, top

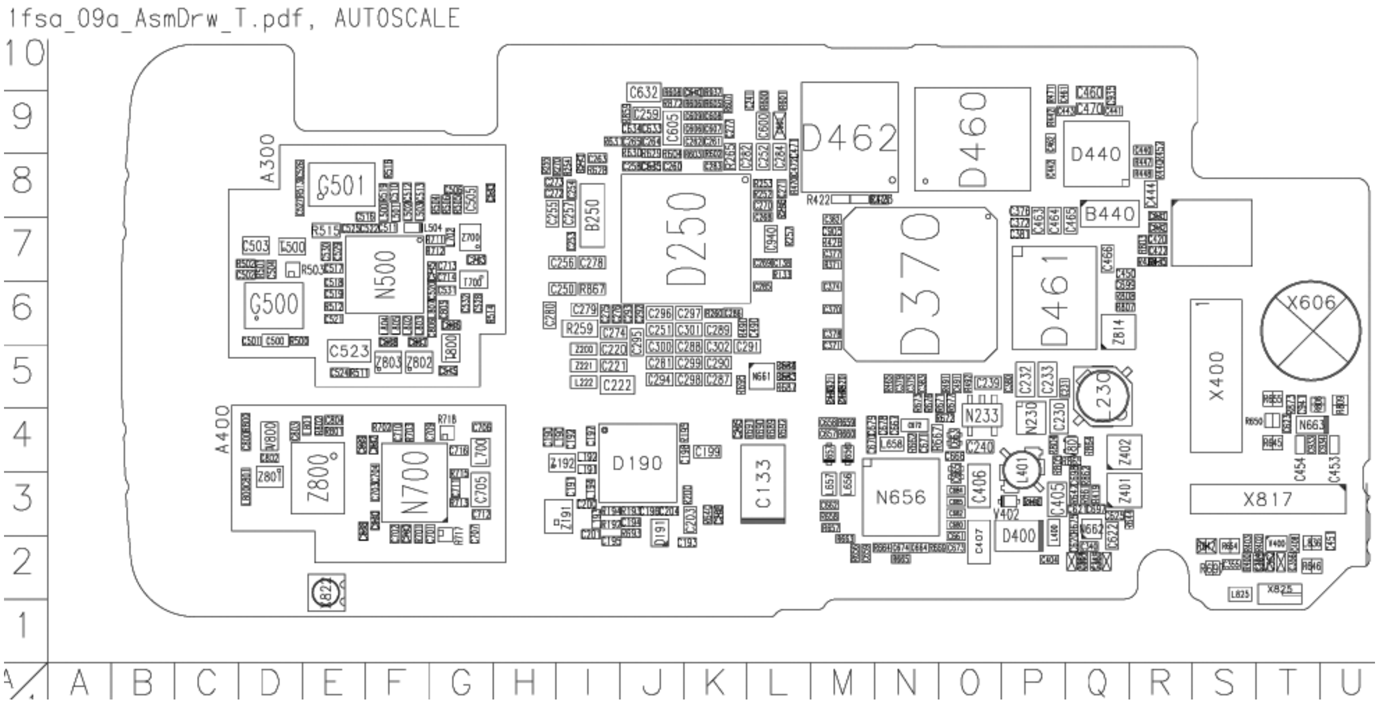

Figure 5 Component layout for 1fsa_09a, top

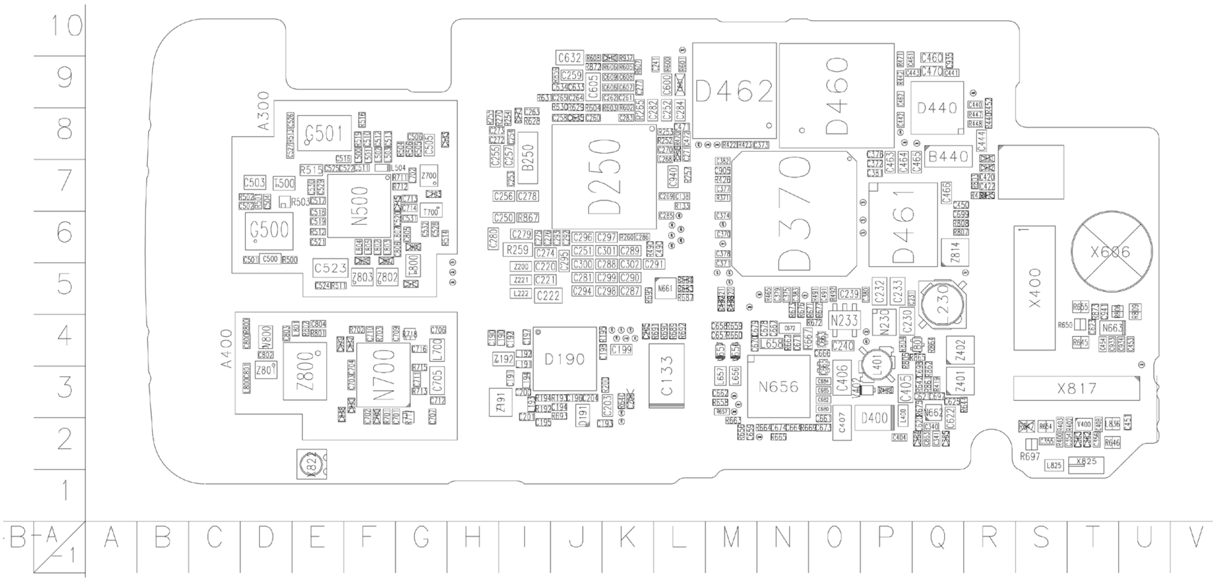

Figure 6 Component layout for 1fsa_11a, top

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3 — Phoenix service software

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Table of Contents

List of Figures

Service software installation

Phoenix installation steps in brief

Phoenix is the DCT-4 generation service software for reprogramming, testing and tuning the phone.

To install Phoenix, you need to:

- Connect a DK2 Dongle or FLS-4S POS Flash Device
- Install the Phoenix Service SW
- Install the Data Package for Phoenix
- Configure users
- Manage connection settings (depends on the tools you are using)

Phoenix is now ready for FLS-4S Point Of Sales Flash Device use.

If you use FPS-8:

- Update FPS-8 SW
- Activate FPS-8
- Update JBV-1 Docking Station SW (only when needed)

Phoenix is now ready to be used with FPS-8 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 FPS-8* and FLS-4S programming devices
- All needed drivers for:
  - DK2 dongle
  - FLS-4S point of sales flash device
  - USB devices

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.

Supported operating systems

- Windows 2000 and XP.

Hardware requirements for using Phoenix

- Minimum: Processor 300 MHz, RAM memory 64 MB, disk space 100 MB.
- Recommended for Windows 2000: Processor 700 MHz, RAM memory 256 MB, disk space 150 MB.

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_a15_2004_24_7_55.exe*) to your computer (in *C:\TEMP*, for instance).
- Close all other programs.
- Run the application file (for example, *phoenix_service_sw_a15_2004_24_7_55.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 this message, Dongle is not found and installation cannot continue:

Figure 7 Dongle not found

Possible reasons may be defective or too old PKD-1 Dongle (five digit serial number Dongle when used with FPS-8 Prommer) or that the FLS-4S POS Flash Dongle is defective or power to it is not supplied by external charger.

Check the COM/parallel ports used first! After correcting the problem Installation can be restarted.

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. Run the *phoenix_service_sw_a15_2004_24_7_55.exe* to start installation.

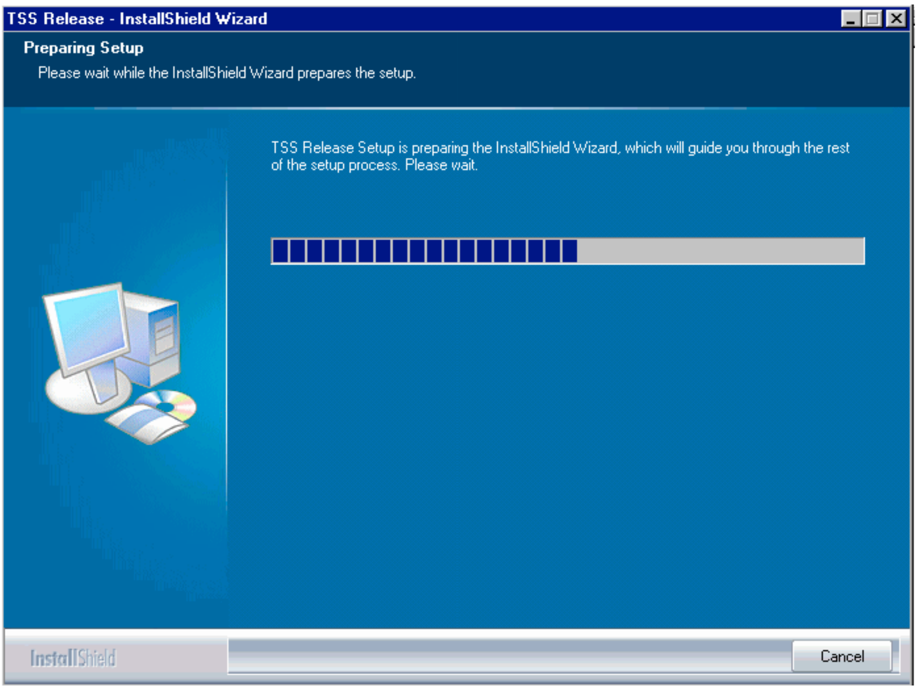

Figure 8 Preparing setup

Install Shield will prepare.

2. Click *Next* in Welcome dialog to continue.

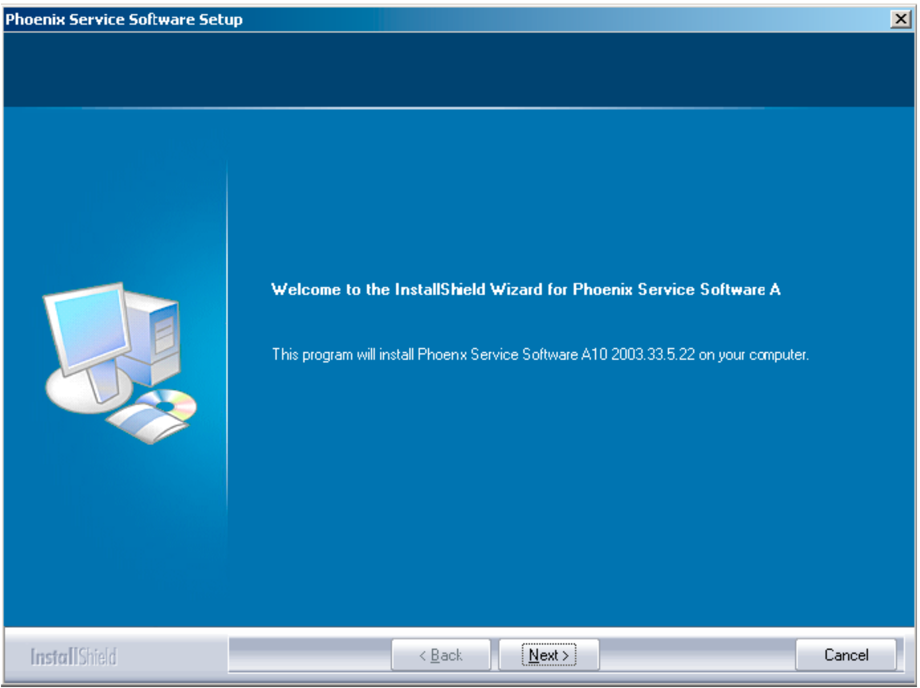

Figure 9 Welcome dialogue

3. Read the disclaimer carefully.

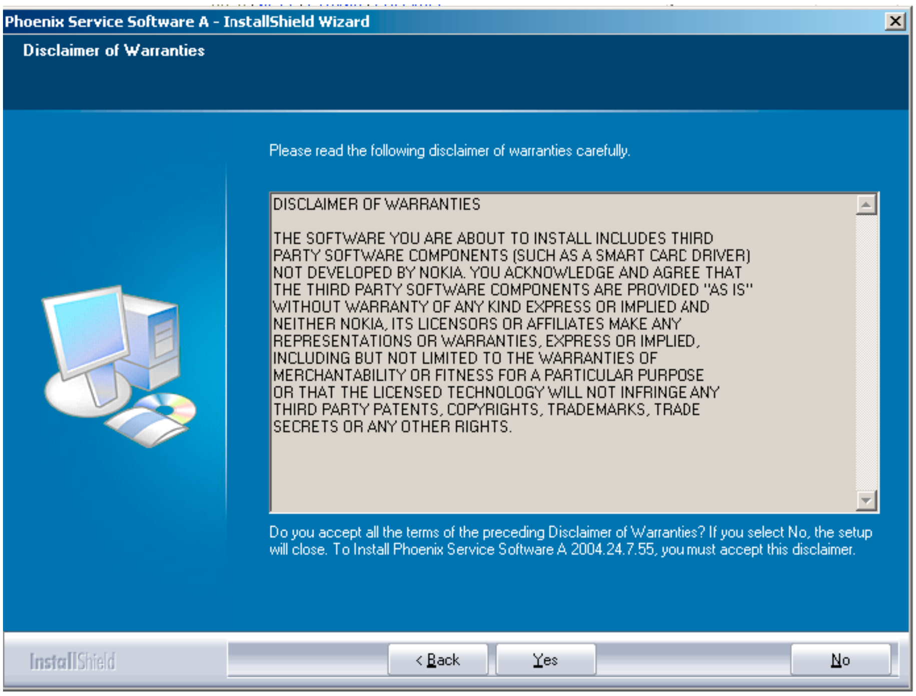

Figure 10 Disclaimer text

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

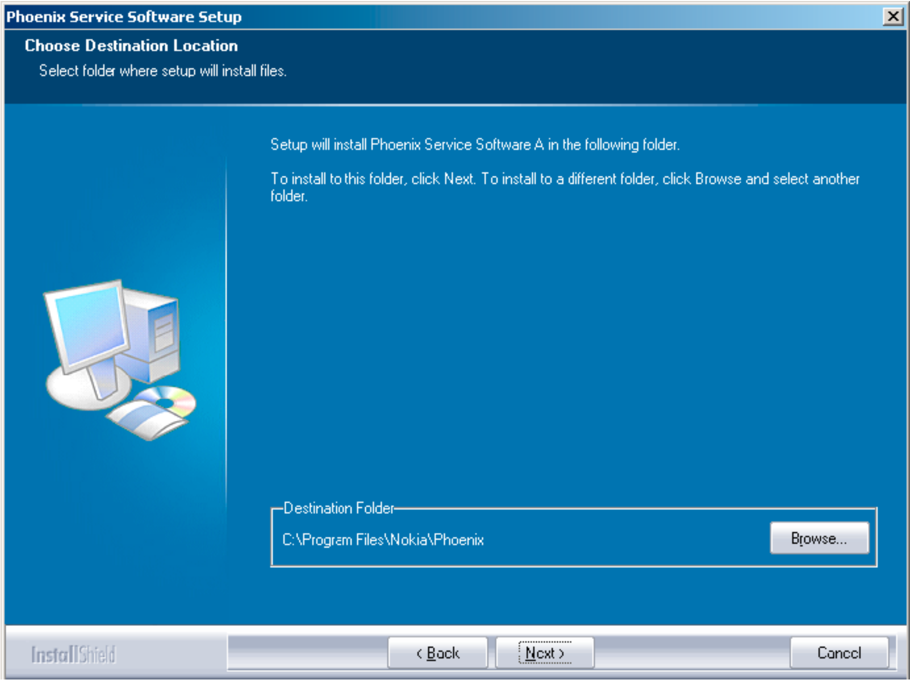

Figure 11 Destination folder

Click *Next* to continue. You may choose another location by selecting *Browse* (not recommended).

5. Wait for the components to be copied.

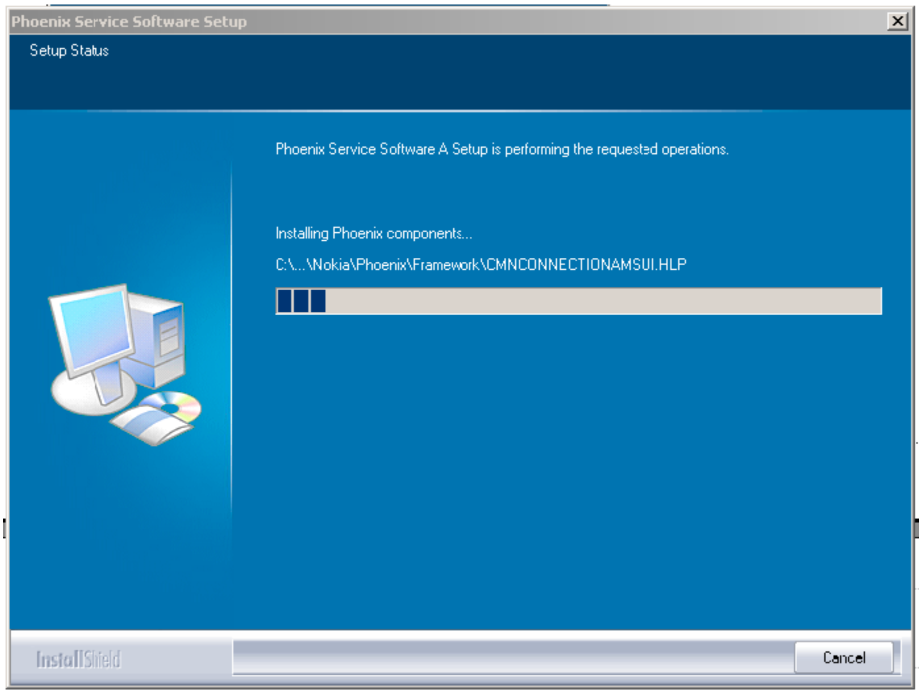

Figure 12 Installation status 1

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

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

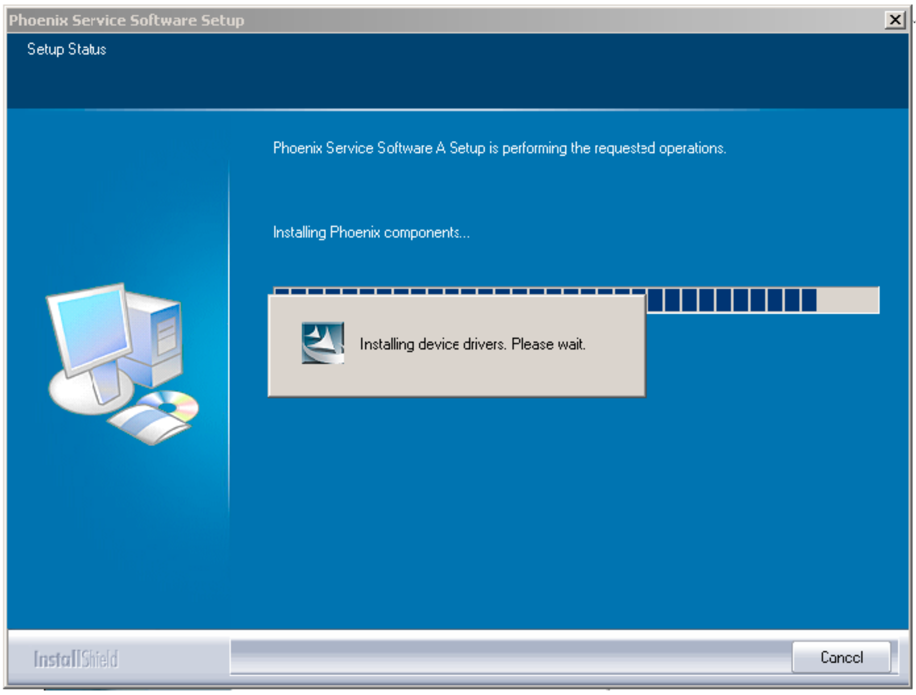

Figure 13 Installation status 2

The process may take several minutes to complete.

If the operating system does not require rebooting (Windows 2000, XP) the PC components are registered right away.

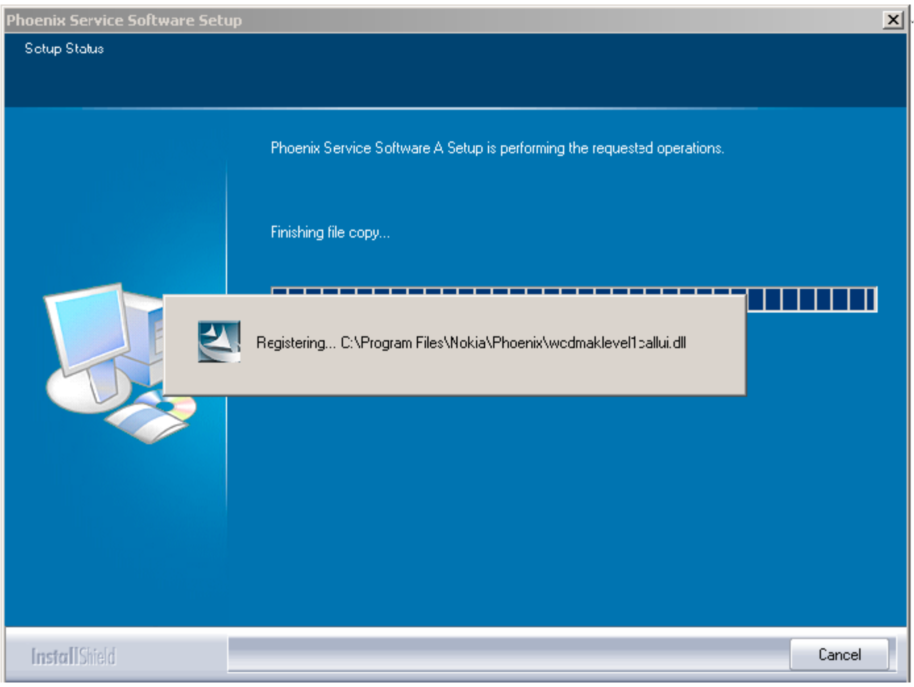

Figure 14 Registering components 1

If the operating system used requires restarting your computer (Windows 98, SE, ME) the Install Shield Wizard will tell you about it. Select *Yes...* to reboot the PC immediately and *No...* to reboot the PC manually afterwards.

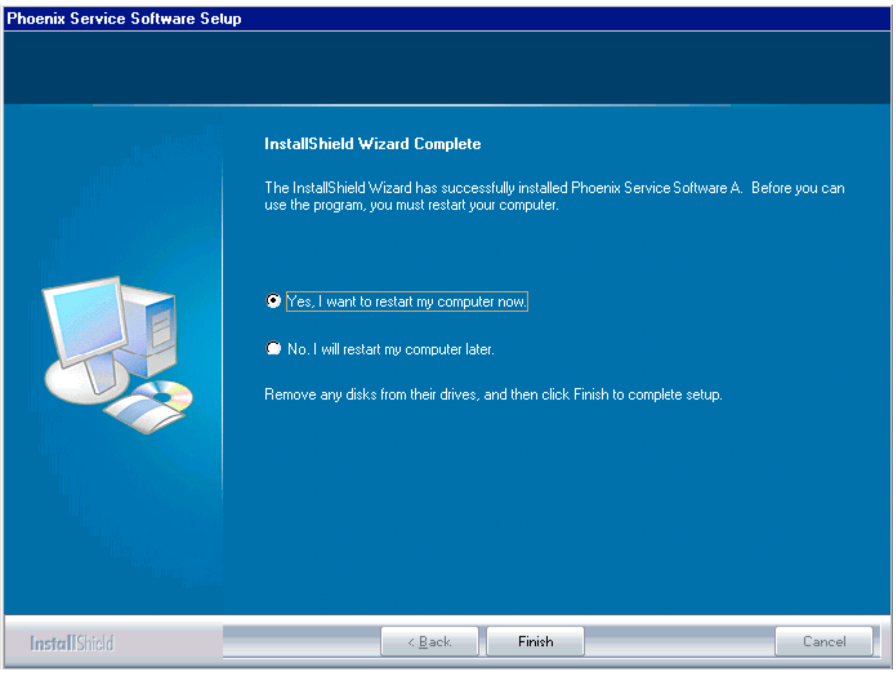

Figure 15 Restart computer

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

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

Figure 16 Registering components 2

7. Click *Finish* to end installation.

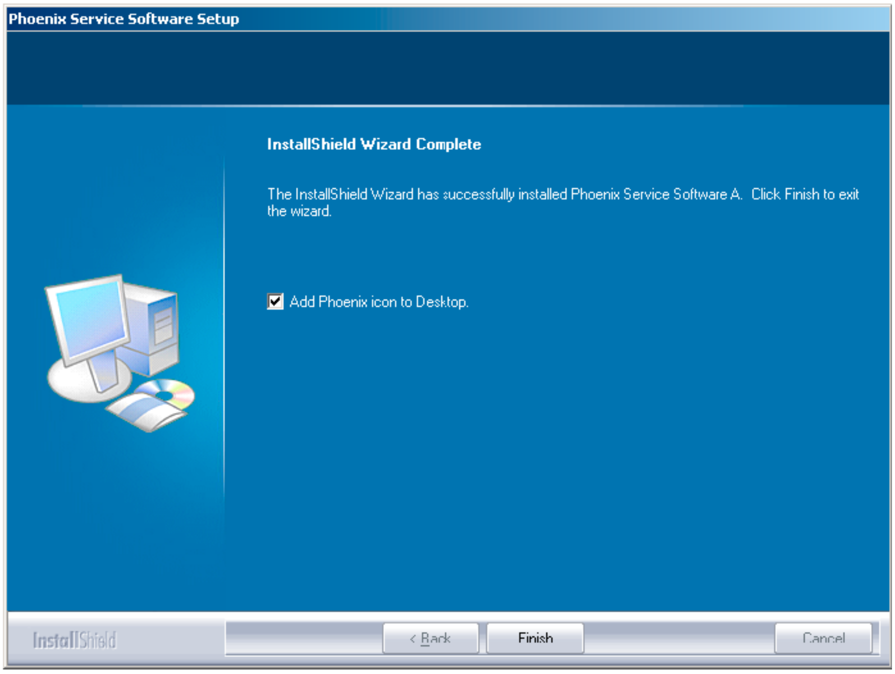

Figure 17 Finish installation

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, and
- configuring users and connections.

FLS-4S can be used right away.

FPS-8* can be used after updating its Flash Update Package files.

Phoenix update installation

If you already have the Phoenix Service SW installed on your computer, sooner or later there will be need to update it when new versions are released.

Always use the latest available versions of both the Phoenix Service SW and the phone-specific Data Package. Instructions can be found in phone model specific Technical Bulletins and Phone Data Package readme.txt files (shown during installation).

To update the Phoenix you need to take exactly the same steps as when installing it for the first time:

- Download the installation package to your computer hard disk.
- Close all other programs.
- Run the application file (for example, phoenix_service_sw_a15_2004_24_7_55.exe).
- New version of Phoenix will be installed.
- Driver versions will be checked and updated.

When you update the Phoenix from old to new version (for example, a14_2004_16_4_47 to a15_2004_24_7_55), the update will take place automatically without uninstallation.

If you try to update the Phoenix with the same version that 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 version of Phoenix you have on your PC. In this case you can choose between total uninstallation and repair just like when you choose to uninstall Phoenix service software 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.

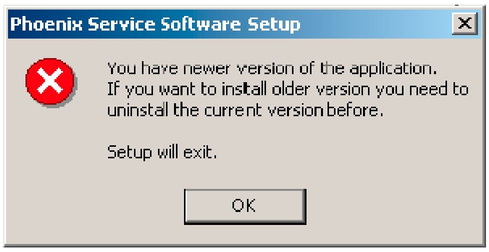

Figure 18 Installation interrupted

Always follow the instructions on the screen.

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*.

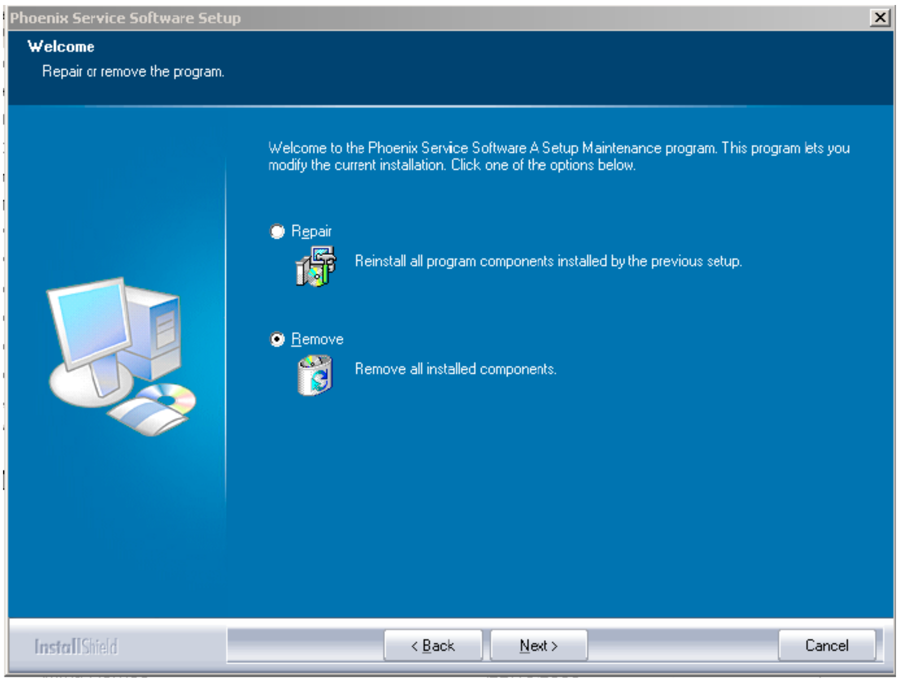

Figure 19 Remove program

The progress of the uninstallation is shown.

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

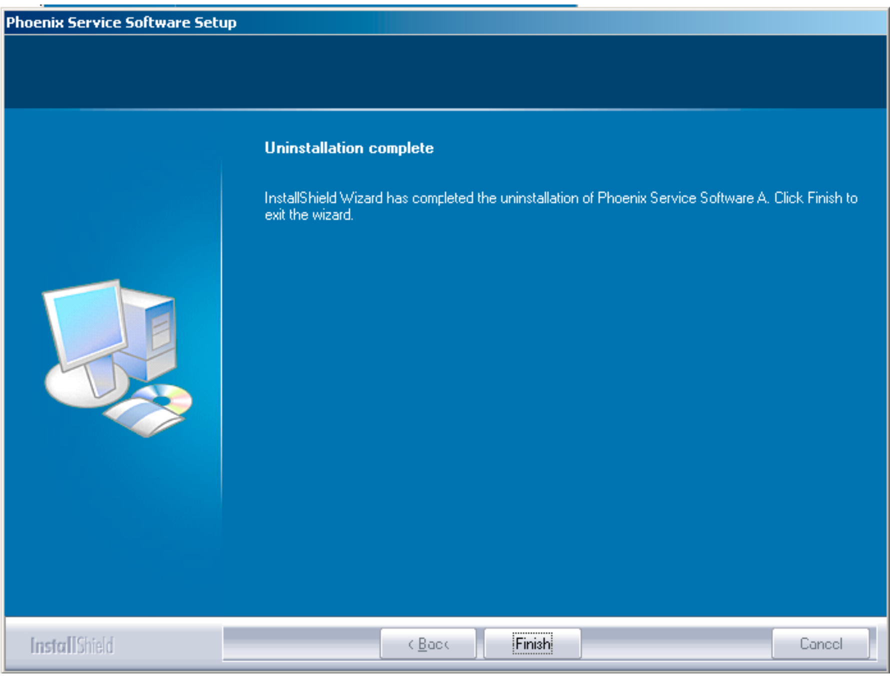

Figure 20 Finish uninstallation

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, you can 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. Select *Phoenix Service Software -> Change/Remove*.

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

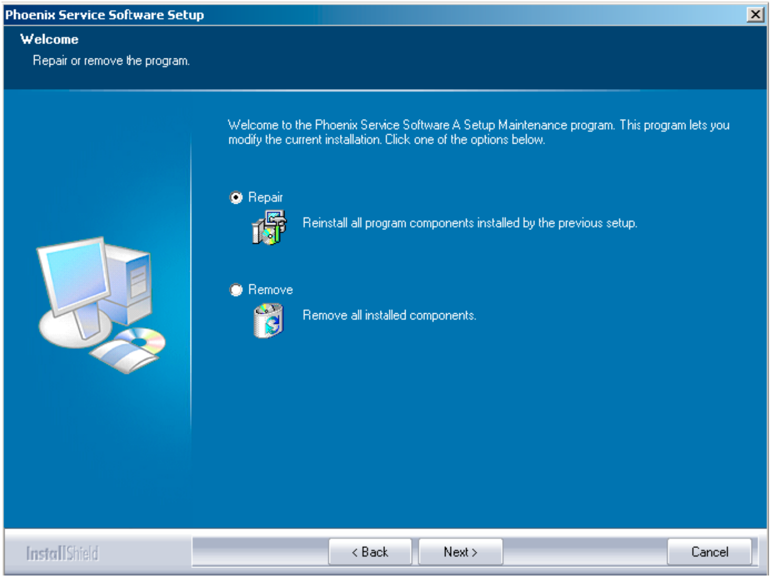

Figure 21 Repair program

Phoenix will now reinstall components and register them.

The procedure is the same as when updating Phoenix.

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

Phoenix service software 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 data package contains the following:

- 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

Data files are stored under **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.

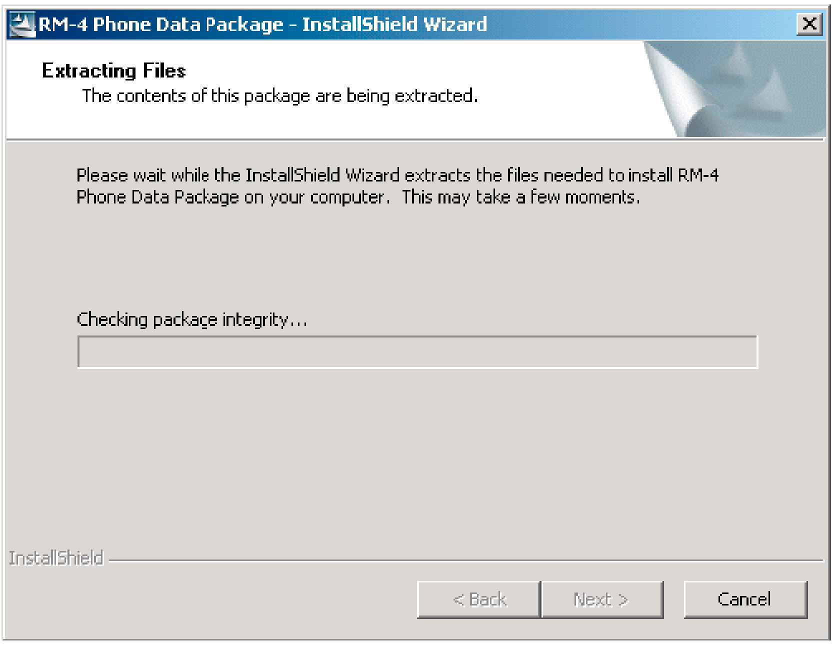

Figure 22 Extracting files

3. Click *Next* to continue.

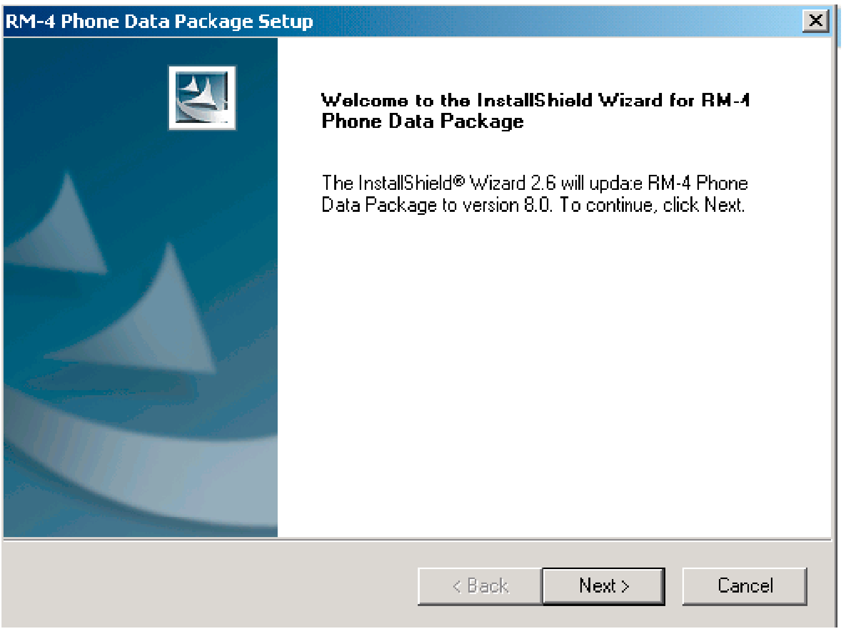

Figure 23 Continue data package installation

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.

Click *Next* to continue.

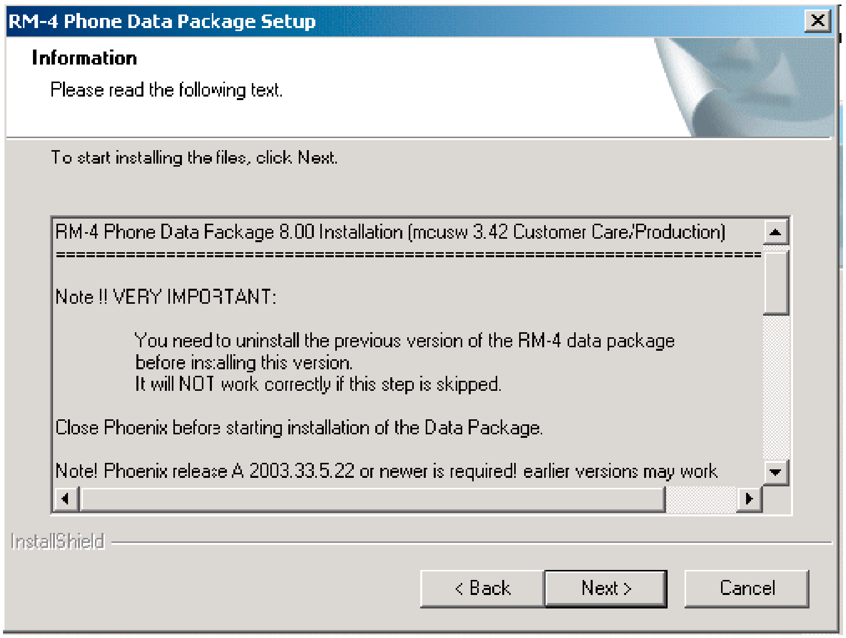

Figure 24 Data package setup information

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

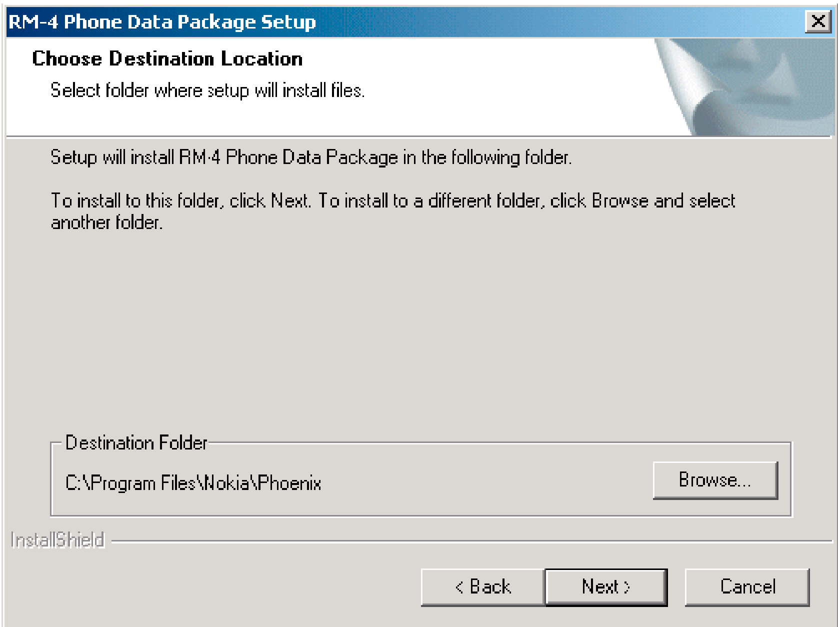

Figure 25 Data package destination folder

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

Click *Next* to continue.

5. Click *Next* to start copying the files.

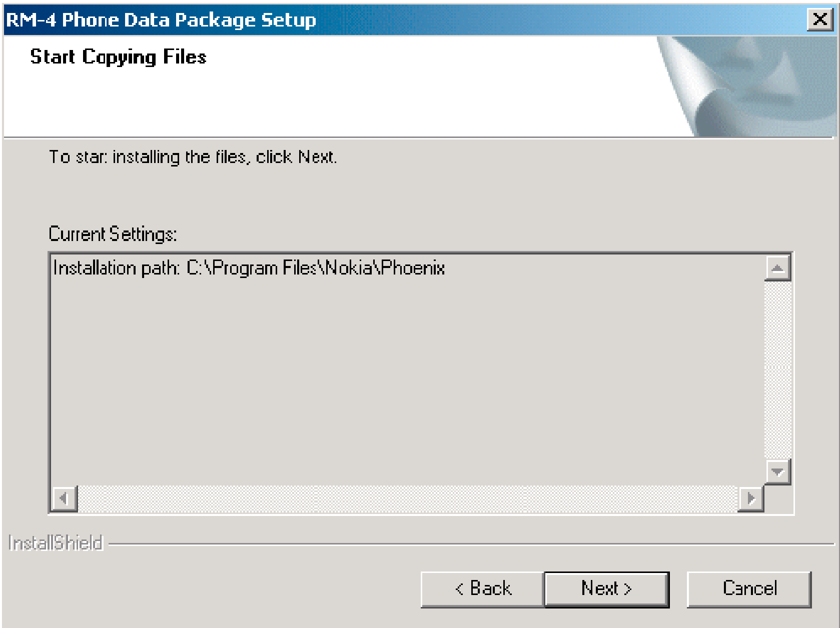

Figure 26 Start copying files

Phone model specific files will be installed. Please wait.

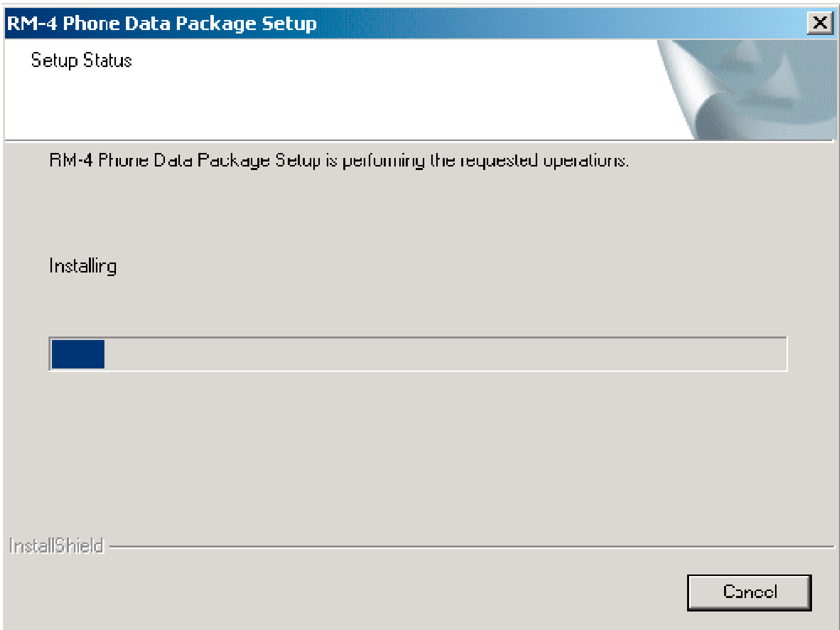

Figure 27 Data package installation status

6. Click *Finish* to complete the installation.

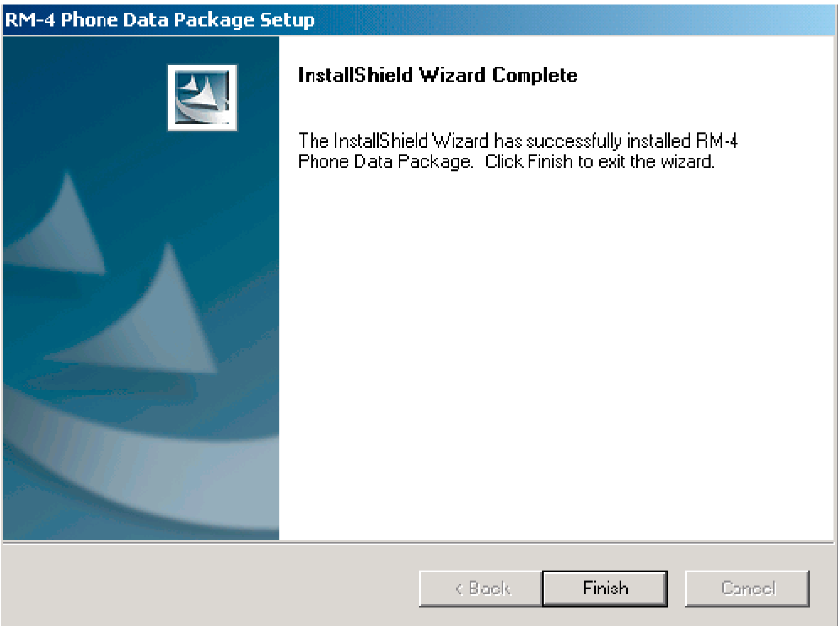

Figure 28 Finish data package installation

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, and
- managing connections.

FLS-4S can be used right away.

FPS-8* can be used after updating Flash Update Package files.

Uninstalling Phoenix data package

Context

If you try to install the same version of the Phoenix data package that you already have, you are asked if you want to uninstall the existing version.

There is no need to uninstall the older version of a data package, unless instructions to do so are given in the *readme.txt* file of the data package and bulletins related to the release.

Please read all related documents carefully.

Steps

1. To uninstall the data package, click OK Cancel to interrupt the uninstallation.

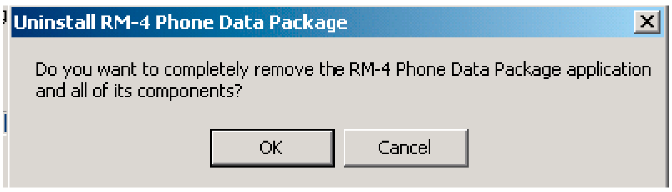

Figure 29 Uninstalling Phoenix data package

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

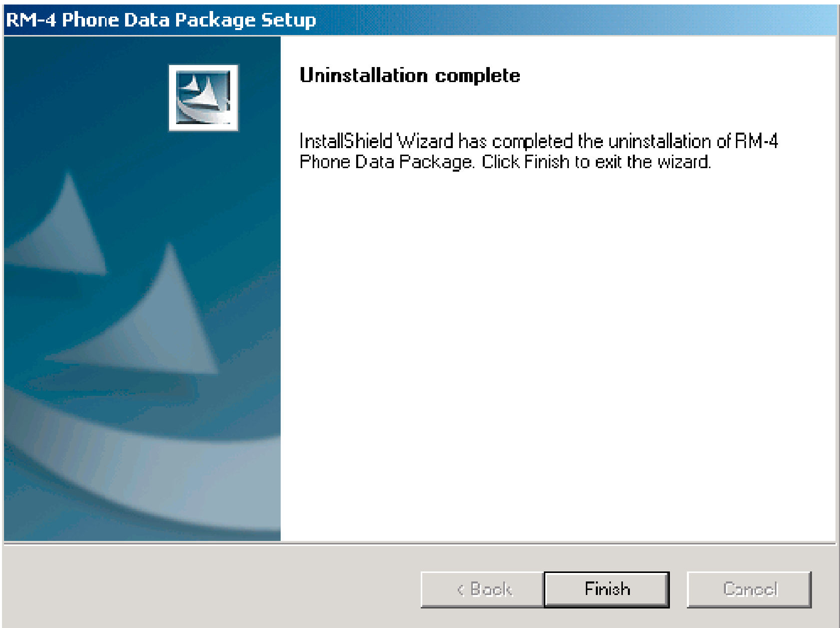

Figure 30 Finishing data package uninstallation

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

Run the installation package again to continue installation from the beginning.

Service software instructions

Configuring users in Phoenix

Steps

1. Start Phoenix Service SW and log in.

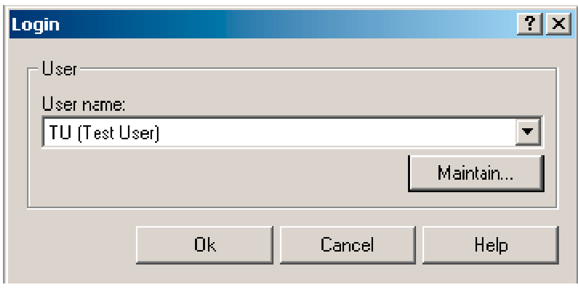

Figure 31 Login

   If the user ID is already configured, choose it from the dropdown list and click OK.

   To add a new user or edit existing ones, click *Maintain*.

2. To add information for a new user, click *New*.

3. Type in the name and initials of the user and click *OK*.

   A new user is now created.

4. Click *OK*.

   You are now able to login with the user name created.

5. Click *OK*.

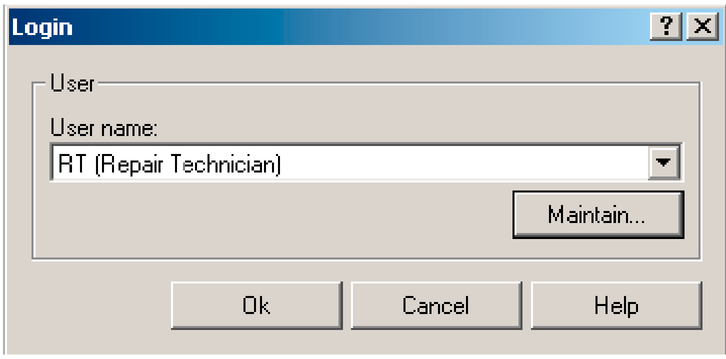

Figure 32 Login, user configured

Managing connections in Phoenix

Steps

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

Figure 33 Phoenix icon

2. Choose *File -> Manage Connections*.

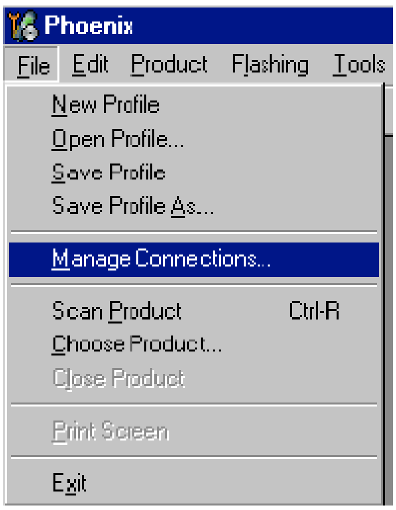

Figure 34 Manage connections

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

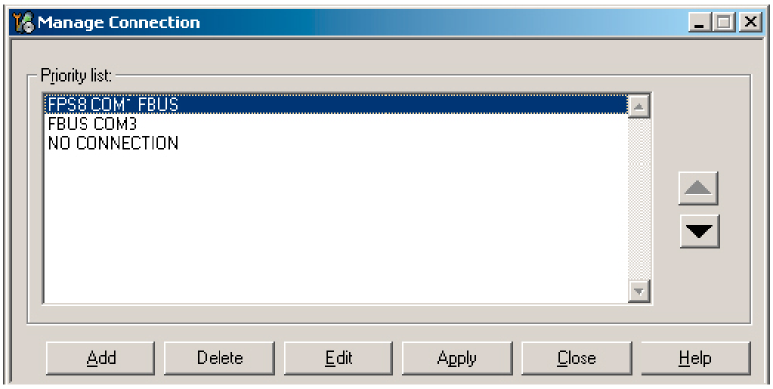

Figure 35 Connections list

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.

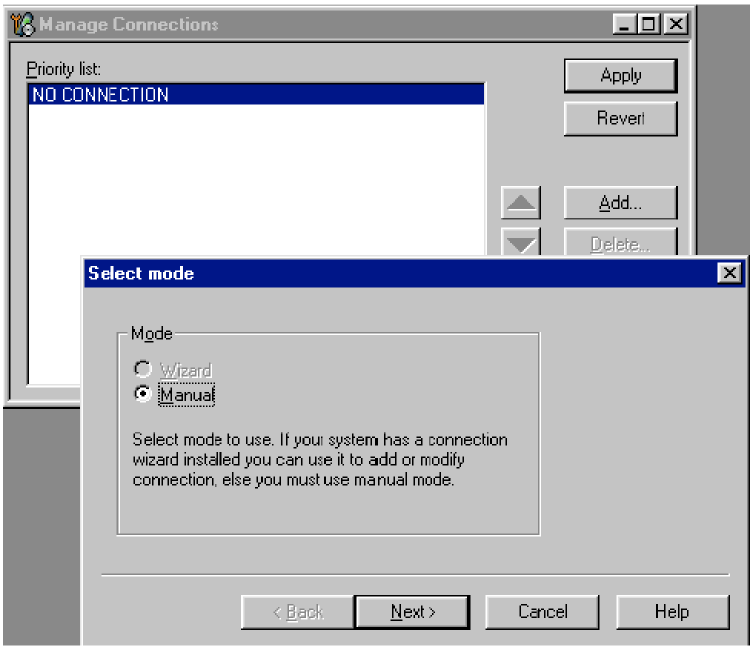

Figure 36 Select mode: Manual

i For FLS-4S POS Flash Device, choose the following connection settings:

- Media: FBUS
- COM Port: Virtual COM Port used by FLS-4

  Note: ALWAYS check this. Go to *Windows -> Control Panel -> FLS Virtual Port -> Configuration*.

Figure 37 FLS virtual port icon

ii For FPS-8 Flash Prommer, choose the following connection settings:

- Media: FPS-8
- Port Num: COM Port where FPS-8 is connected
- COMBOX_DEF_MEDIA: FBUS

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

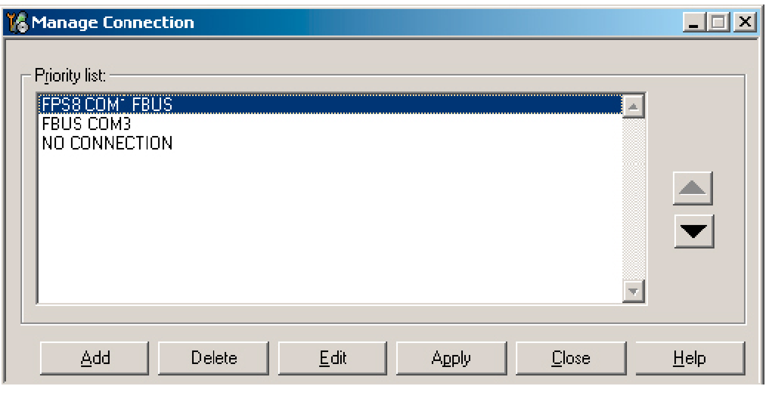

Figure 38 Connections list

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 39 Connection information

7. 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*.

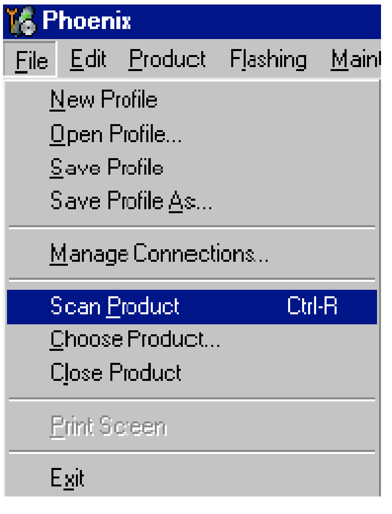

Figure 40 Scan product

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.

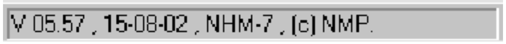

Figure 41 Product support module information

Installing Flash support files for FPS-8* and FLS-4*

Before you begin

Note: Only separate installation package.

- Install Phoenix Service SW.
- Install phone model specific data package for Phoenix.
- The flash support files are delivered in the same installation package with Phoenix data packages or newer Phoenix packages beginning from September 2003.
- 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 FLS-4S/FPS-8*.
- A separate installation package for flash support files is available, and the files can be updated according to this instruction if updates appear between Phoenix/data package releases.

Context

If you are not using a separate installation package, you can skip this section and continue with FPS-8 Flash prommer SW update (Page 3–26) after installing a new phone data package.

Steps

1. Start by double clicking *flash_update_03_13_001.exe* to begin installation.

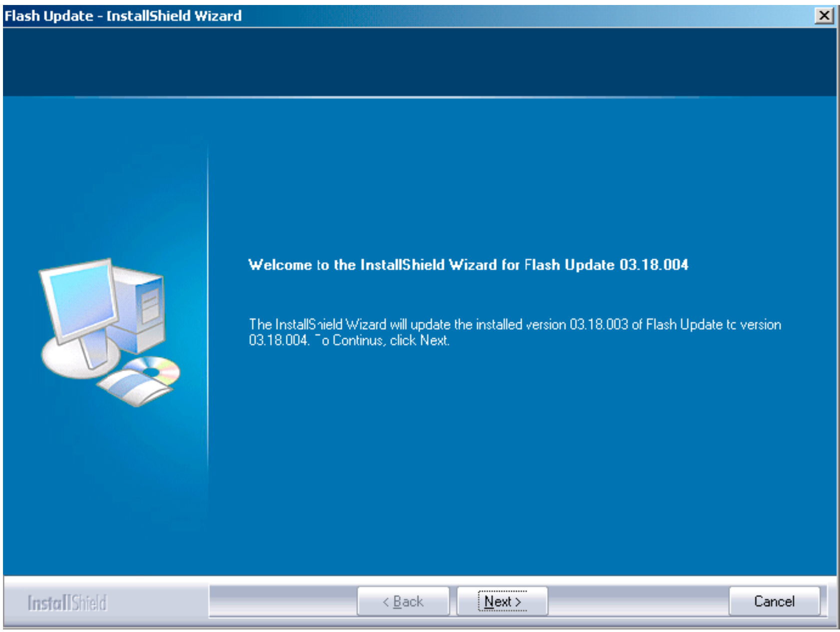

Figure 42 Flash update welcome dialog

2. 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.

Figure 43 Uninstall flash update package

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 44 Flash installation interrupted

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

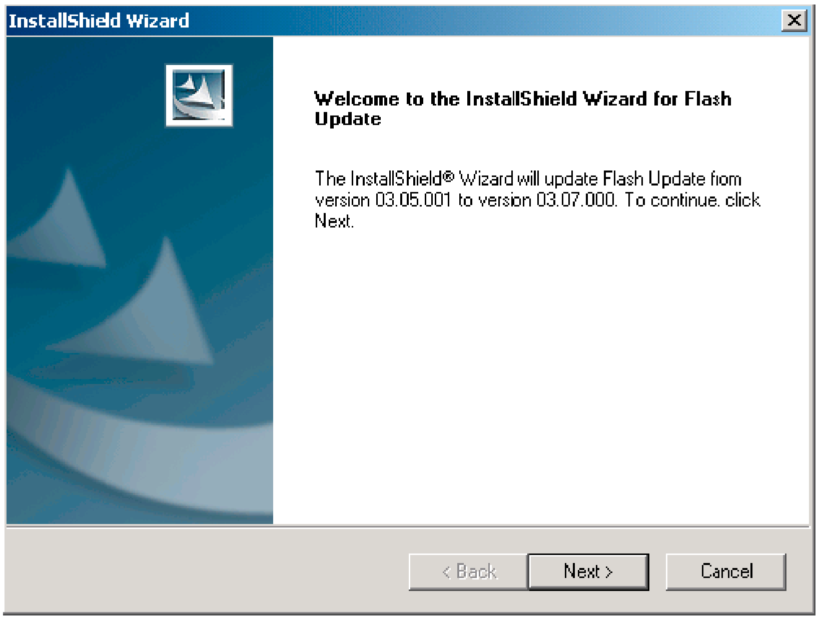

Figure 45 Continue flash update

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

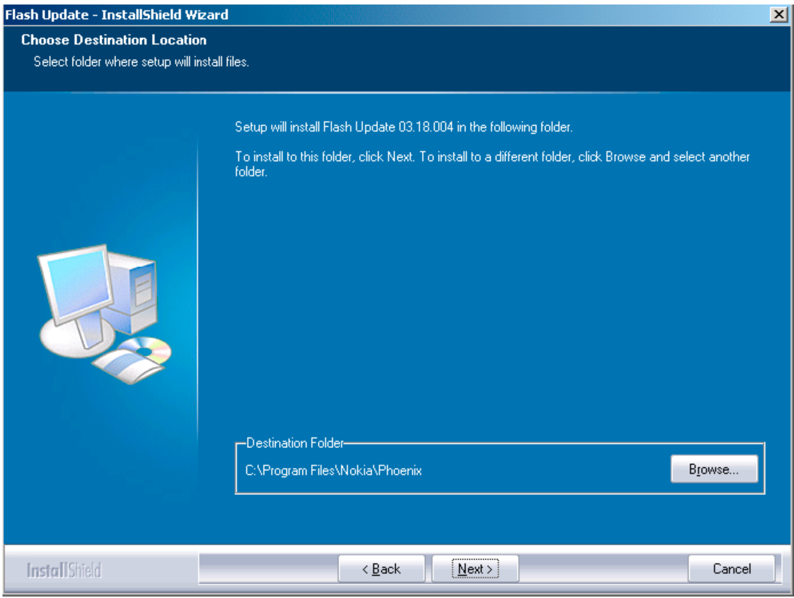

Figure 46 Flash destination folder

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

Installation will continue.

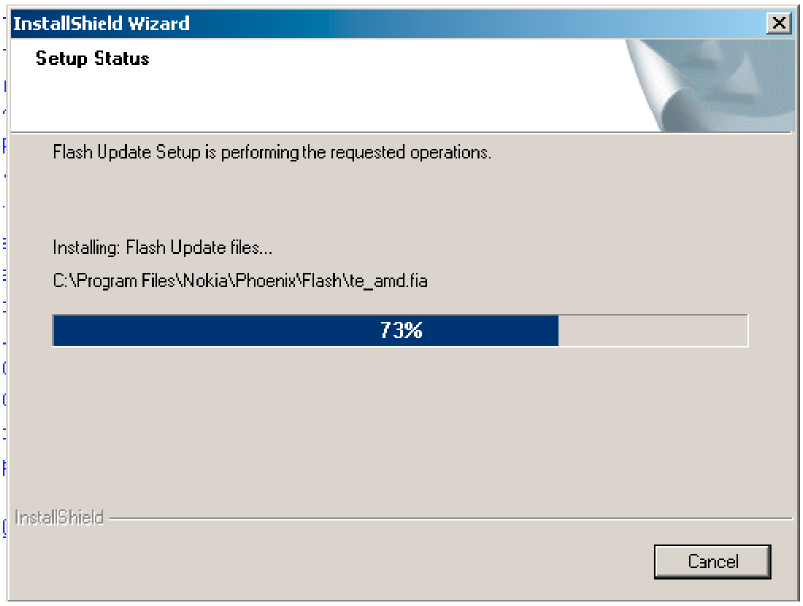

Figure 47 Flash installation status

4. Choose *Finish* to complete the installation procedure.

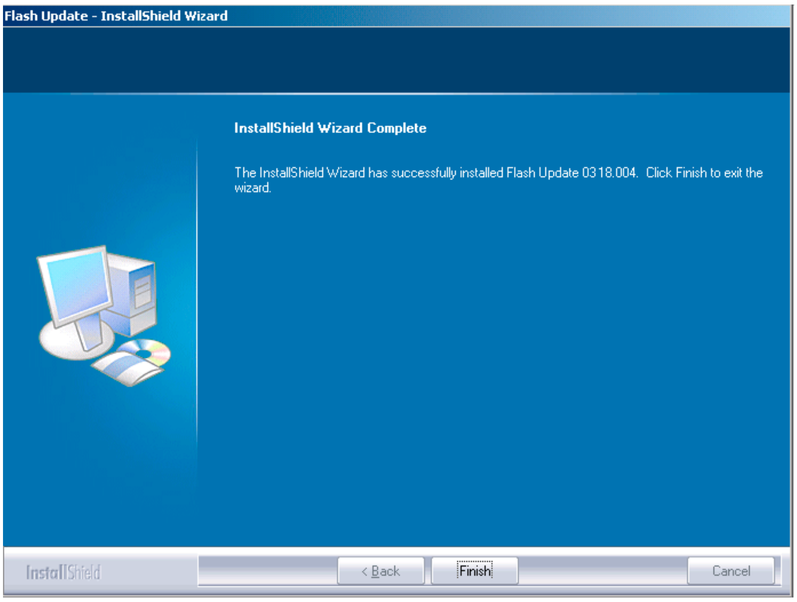

Figure 48 Finish flash update

Next action

FLS-4 can be used right after the Flash Update Package is installed.

FPS-8* flash prommer must be updated using Phoenix!

Updating FPS-8 Flash prommer software

Steps

1. Start *Phoenix Service Software* and log in, manage connection correctly for the FPS-8* flash prommer.

Figure 49 Phoenix icon

2. Choose *Flashing -> FPS-8 maintenance*.

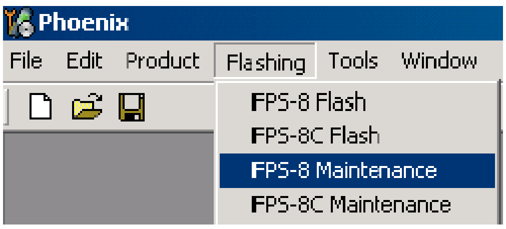

Figure 50 FPS-8 maintenance

3. When the new FPS-8 flash update package is installed to computer you will be asked to update the files to your FPS-8 Prommer. Select *Yes* to update files.

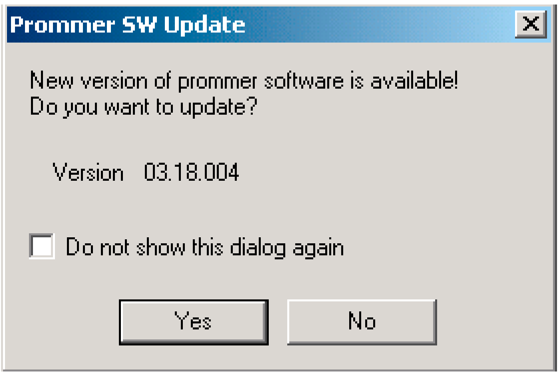

Figure 51 Prommer SW update

4. Wait until you are notified that update has been successful; the procedure will take a couple of minutes. Click *OK* to close the *FPS-8 Maintenance* window.

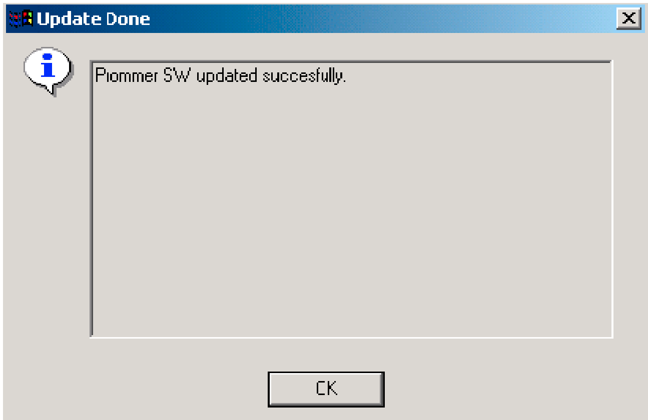

Figure 52 Prommer SW update done

View after successful prommer software update:

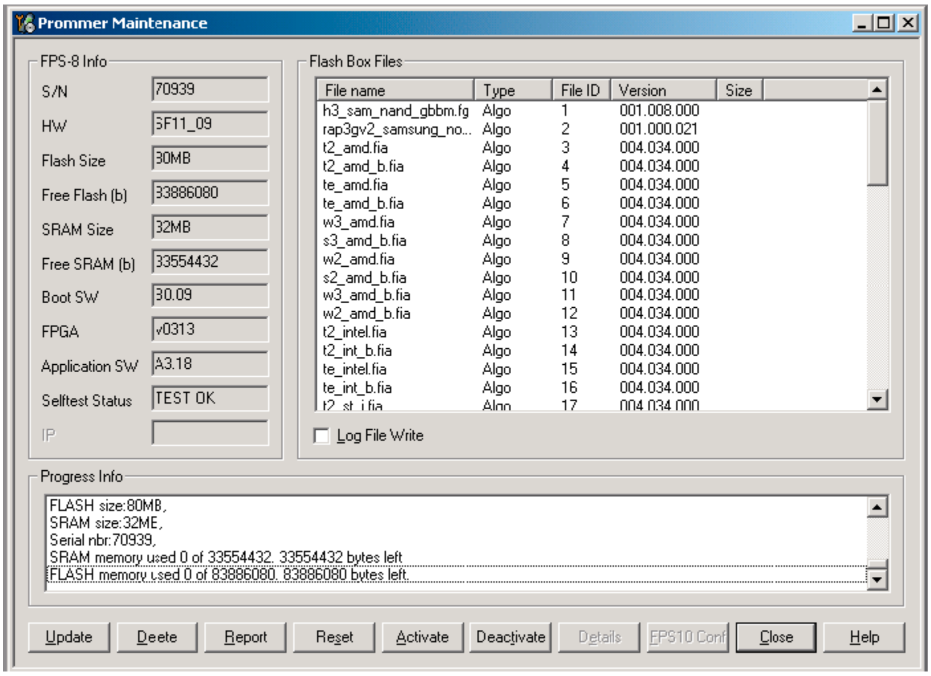

Figure 53 FPS-8 info window

Alternative steps

- FPS-8 SW can also be updated by pressing *Update* button and selecting appropriate *fps8upd.ini* file in *C:\Program Files\Nokia\Phoenix\Flash*.

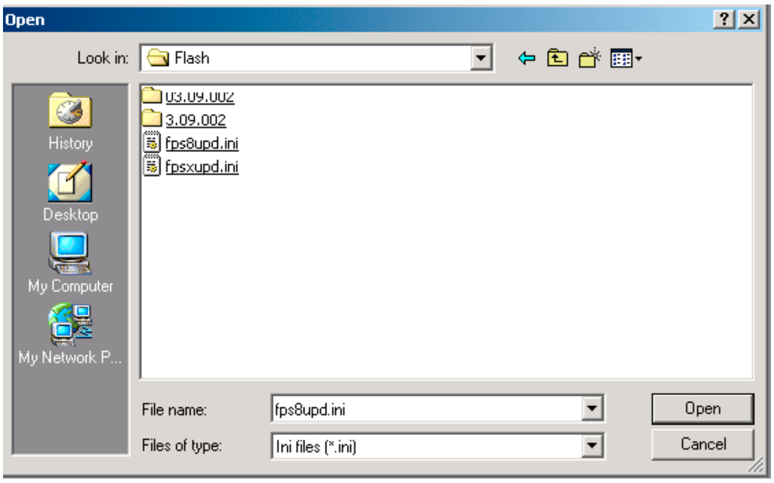

Figure 54 Flash directory window

- All files can be loaded separately to FPS-8. To do this, just press 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*.

Activating FPS-8

Context

Before FPS-8 can be successfully used for phone programming, it must first be activated.

First fill in the *FPS-8 activation request* sheet in the FPS-8 sales package and follow the instructions given.

When activation file is received (for example, *00000.in*), copy it to the *C:\ProgramFiles\Nokia\Phoenix\BoxActivation* directory on your computer (this directory is created when Phoenix is installed).

Steps

1. Start *Phoenix Service Software*.
2. Choose *Maintenance -> Prommer Maintenance*.

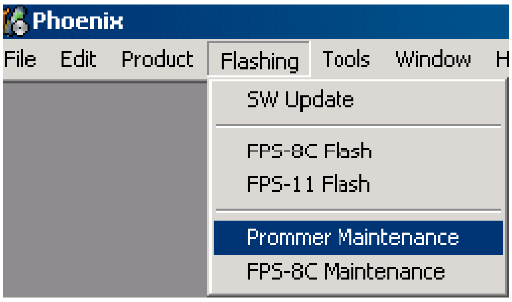

Figure 55 Prommer maintenance

3. In the *Prommer Maintenance* window, click *Activate*.
4. To find the activation file if you saved it to some other directory on your PC, click *Browse*.
5. To activate the prommer, select the activation file and click *Open*.

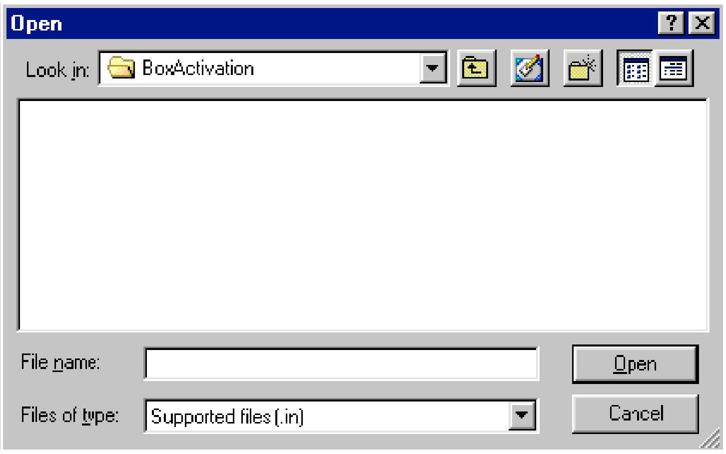

Figure 56 Box activation

6. To complete the activation, restart FPS-8.

Deactivating FPS-8

Context

If there is, for example, a need to send the FPS-8 box for repair, it must be deactivated first.

Steps

1. Start *Phoenix Service Software*.
2. Choose *Maintenance -> Prommer Maintenance*.
3. In the *Prommer Maintenance* window, click *Deactivate*.

4. To confirm the deactivation, click *Yes*.

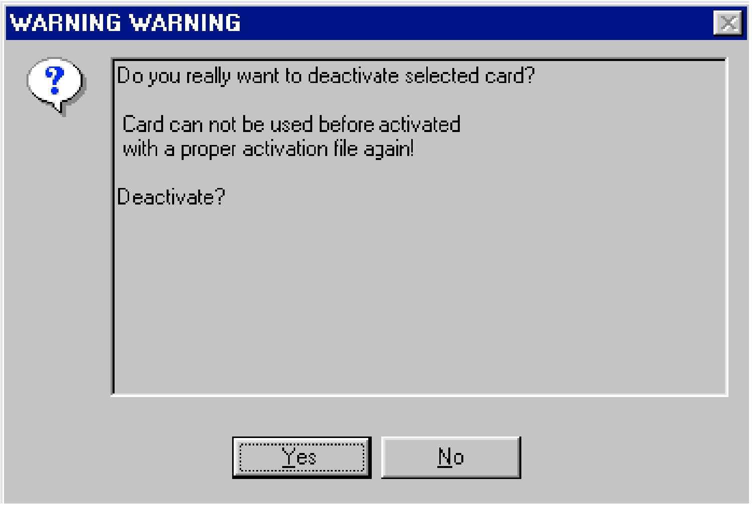

Figure 57 Deactivation warning

The box is deactivated.

5. To complete the deactivation, restart FPS-8.

Updating JBV-1 docking station software

Before you begin

The JBV-1 docking station contains software (firmware) which can be updated. You need the following equipment to update the software:

- PC with USB connection
- operating system supporting USB (Not Win 95 or NT)
- USB Cable (can be purchased from shops or suppliers providing PC hardware and accessories)
- JBV-1 docking station
- external power supply (11-16V)

Before installation:

- Download *Jbv1_18_update.zip* file to your computer (in *C:\TEMP* for example) from your download web site.
- Close all other programs.
- Follow instructions on the screen.

Context

The JBV-1 docking station is a common tool for all DCT-4 generation products. In order to make the JBV-1 usable with different phone models, a phone-specific docking station adapter is used.

Steps

1. Run *Jbv1_18_update.zip* file and start software installation by double clicking *Setup.exe*.

    Note: DO NOT CONNECT THE USB CABLE/JBV-1 TO YOUR COMPUTER YET!

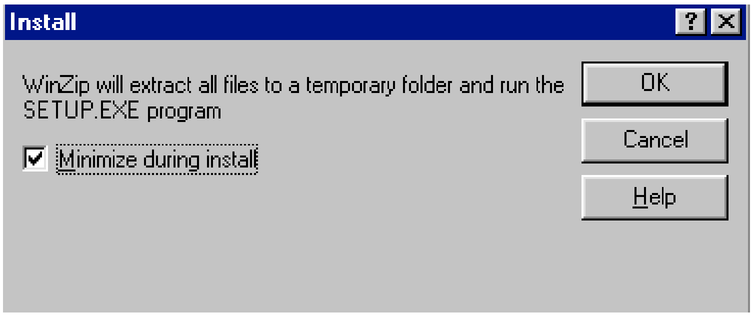

Figure 58 Extracting JBV-1 update files

Files needed for JBV-1 package setup program will be extracted.

2. Read the instructions in the dialog box and click *Next* to continue.

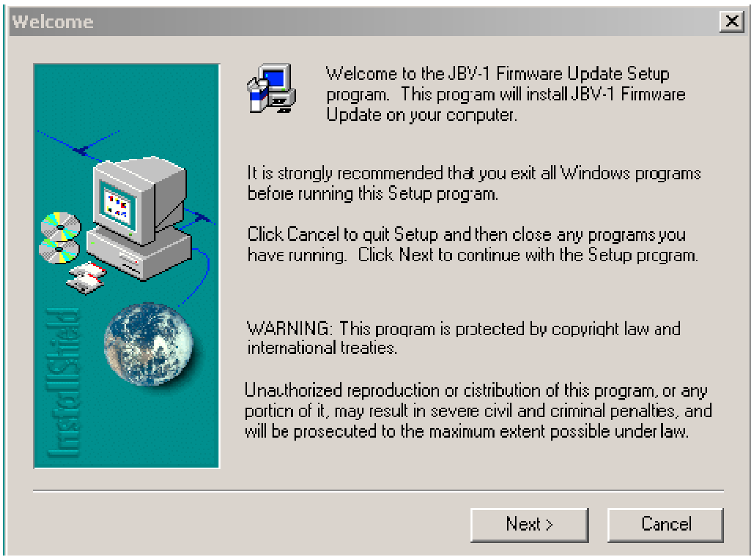

Figure 59 JBV-1 update information

3. Accept the suggested destination folder for installing the JBV-1 SW Package, and click *Next* to continue.

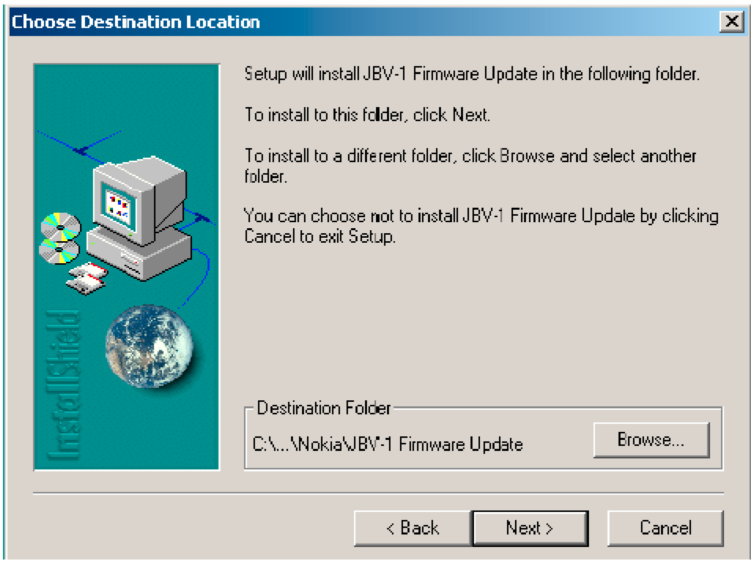

Figure 60 JBV-1 update destination folder

4. Select *Full installation* and click *Next* to continue.

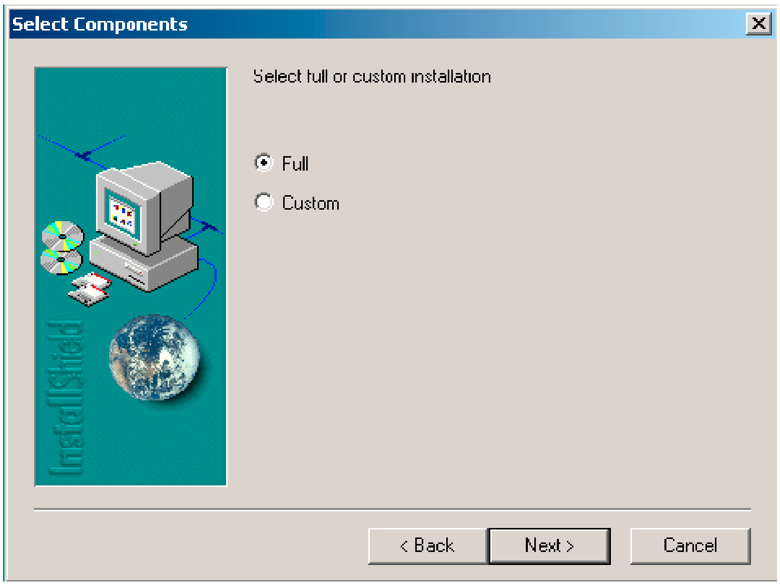

Figure 61 Select installation: Full

5. A program folder is created and the software files are installed there. Click *Next* to continue.

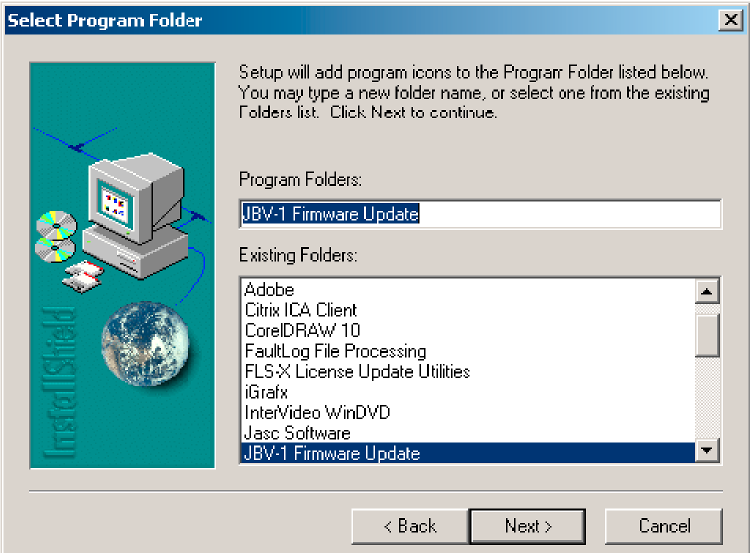

Figure 62 Select program folder

6. Click *Finish* to complete the installation.

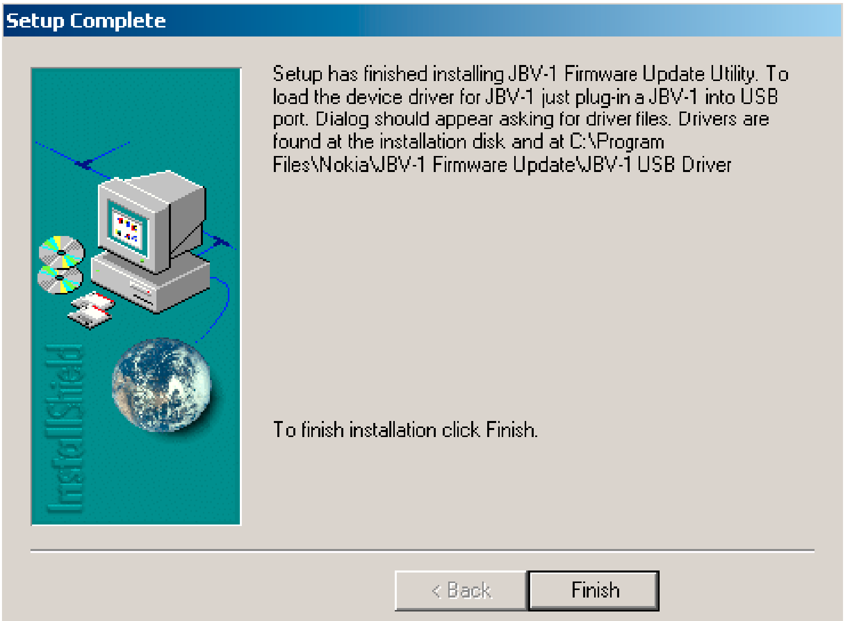

Figure 63 Finish JBV-1 update installation

7. Connect the USB cable/JBV-1 to your computer. Connect power to JBV-1 (11-16V DC) from an external power supply, then connect the USB Cable between the JBV-1 USB connector and the PC.
8. Install or update the JBV-1 USB drivers which are delivered with the JBV-1 SW installation package.

   The drivers can be found in *C:\Program Files\Nokia\ JBV-1 Firmware Update\JBV-1USB driver*

   - If there is no previously installed JBV-1 Firmware update package installed on your computer, Windows will detect connected USB cable and detect drivers for new HW. You will be prompted about this, please follow the instructions and allow Windows to search and install the best drivers available.
   - If there is a previously installed JBV-1 Firmware update package (v.17 or older) on your computer, please update the JBV-1 USB driver. Please see the *readme.txt* file in *C:\Program Files\Nokia\JBV-1 Firmware Update\JBV-1USB driver* folder for instructions on how to update the JBV-1 USB Driver.

   After you have installed or updated the JBV-1 USB driver, the actual JBV-1 SW update can begin.
9. Go to folder *C:\Program Files\Nokia\JBV-1 Firmware Update\JBV-1 Firmware Update* and start JBV-1 Update SW by double clicking *fwup.exe*.

   JBV-1 Firmware update starts and shows current status of the connected JBV-1. If firmware version read from your JBV-1 is not the latest one available (v.17 or older), it needs to be updated to version 18 by clicking *Update Firmware*.
10. Choose *Refresh Status* to check the SW version.

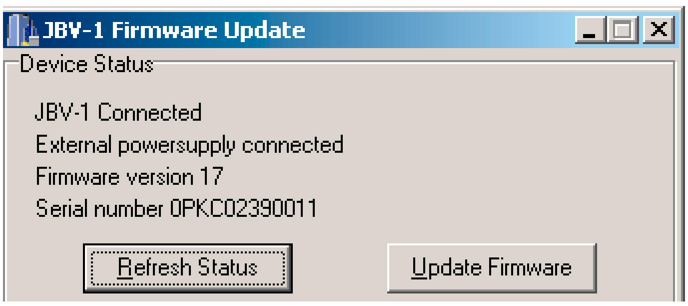

Figure 64 Checking JBV-1 SW version

11. Choose file *JBV1v18.CDE* and click *Open* to update your JBV-1 to a new version (v.18).

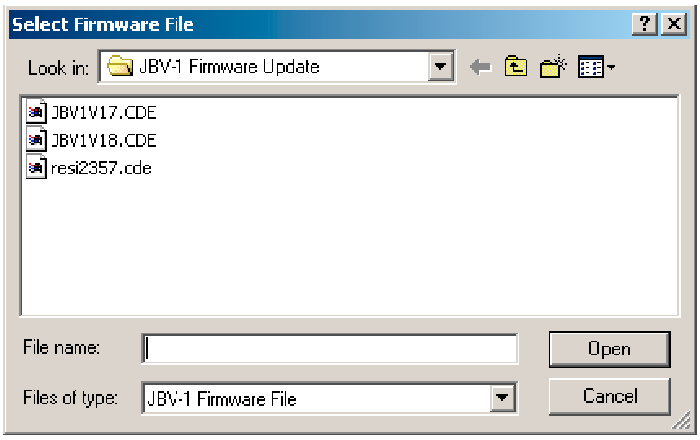

Figure 65 JBV-1 update directory window

Wait until you hear a "click" from the JBV-1.

The older SW file *JBV1v17.CDE* is visible in this view only if the previous JBV-1 SW package has been installed on your computer.

12. Click OK to see the current JBV-1 status (after a successful update).

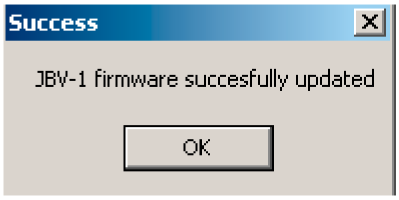

Figure 66 JBV-1 SW update done

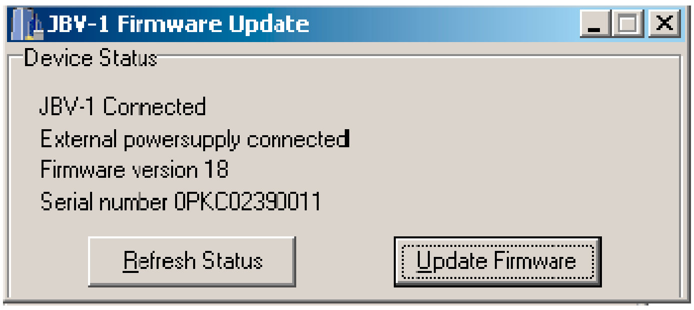

Figure 67 JBV-1 SW status

You have now updated the software of your JBV-1 docking station and it is ready for use.

Next action

If you have several docking stations you need to update, disconnect the power and USB cables from the previous one and connect them to the next docking station. First, click *Refresh Status* to see the current SW version and then *Update Firmware* to update the software.

After you have updated all docking stations, close the *JBV-1 Firmware Update* dialog box.

Service software concepts

Flash concept

Figure 68 Flash concept

Item	Description	Type	Code
1	Point of Sales flash loading adapter	SF-27	0780375
2	Power cable	FLC-2	0730185
3	Modular cable	XCS-4	0730178
4	Flash prommer box sales pack	FPS-8	0080321
5	Printer cable	AXP-8, included in FPS-8 sales pack	Not available as spare part
6	D9 – D9 cable	AXS-4, included in FPS-8 sales pack	0730090
7	Software protection key	PKD-1	0750018
8	AC Charger	ACF-8, included in FPS-8 sales pack	0680032
9	SRAM Module (3 pcs needed inside FPS-8)	SF12	0080346 (Code includes one SRAM module)

Note: More than 32MB SRAM required in FPS-8.

POS flash concept

Figure 69 POS flash concept

Item	Description	Type	Code
1	Point of Sales flash loading adapter	SF-27	0780375
2	Service cable	XCS-1	0730218
3a	FLS-4S sales pack for EMEA	FLS-4S	0080541
3b	FLS-4S sales pack for APAC	FLS-4S	0080542

JBV-1 flash concept

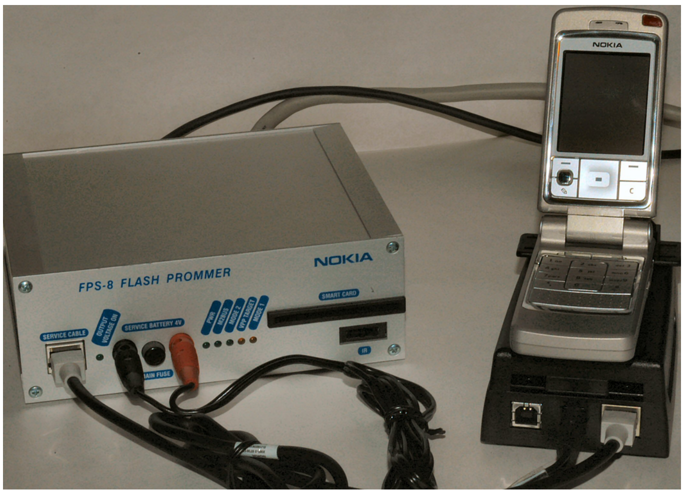

Figure 70 JBV-1 flash concept

Item	Description	Type	Code
1	Docking station adapter	DA-25	0780373
2	Docking station	JBV-1	0770298
3	Power cable	PCS-1	0730012
4	Modular cable	XCS-4	0730178
5	Flash prommer box sales pack	FPS-8	0080321
6	Printer cable	AXP-8, included in FPS-8 sales pack	Not available as spare part
7	D9 – D9 cable	AXS-4, included in FPS-8 sales pack	0730090
8	Software protection key	PKD-1	0750018
9	AC Charger	ACF-8, included in FPS-8 sales pack	0680032
10	SRAM Module (3 pcs needed inside FPS-8)	SF12	0080346 (Code includes one SRAM module)

Note: More than 32MB SRAM required in FPS-8.

Module jig flash concept

Flashing with MJ-30 is recommended in local mode.

The following equipment is required for RM-25 AMS SW update when the system module is placed in the module jig MJ-30 and connected through an FPS-8 set-up:

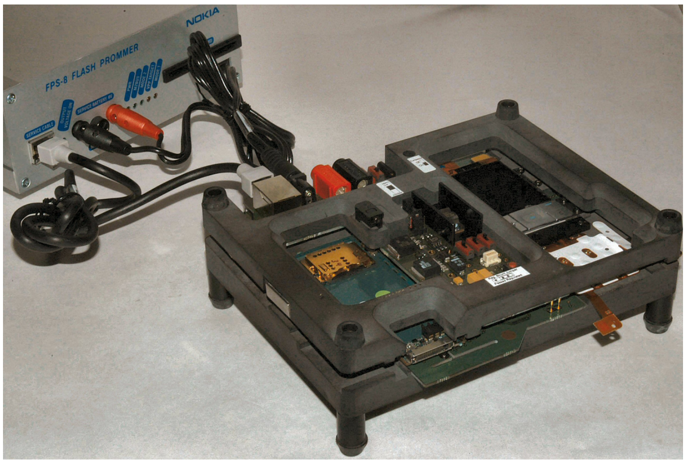

Figure 71 Module jig flash concept

Item	Description	Type	Code
1	Module jig	MJ-30	0780376
2	Power cable	PCS-1	0730012
3	Modular cable	XCS-4	0730178

Item	Description	Type	Code
4	Flash prommer box sales pack	FPS-8	0080321
5	Printer cable	AXP-8, included in FPS-8 sales pack	Not available as spare part
6	D9 – D9 cable	AXS-4, included in FPS-8 sales pack	0730090
7	Software protection key	PKD-1	0750018
8	AC Charger	ACF-8, included in FPS-8 sales pack	0680032
9	SRAM Module (3 pcs needed inside FPS-8)	SF12	0080346 (Code includes one SRAM module)

Note: More than 32MB SRAM required in FPS-8.

Module jig service concept

This concept is for troubleshooting and RF calibration.

MJ-30 is intended for use with an external power supply.

MJ-30 input voltage: normal +6V, maximum +12V.

Ensure that the jumper is set open for voltage regulation before the external power supply is connected.

When FPS-8 is used as the power supply (4V), the jumper should be set close to bypass regulator.

EM calibrations including Zocus are only done with JBV-1. Module jig MJ-30 does not support Zocus calibration in RM-25.

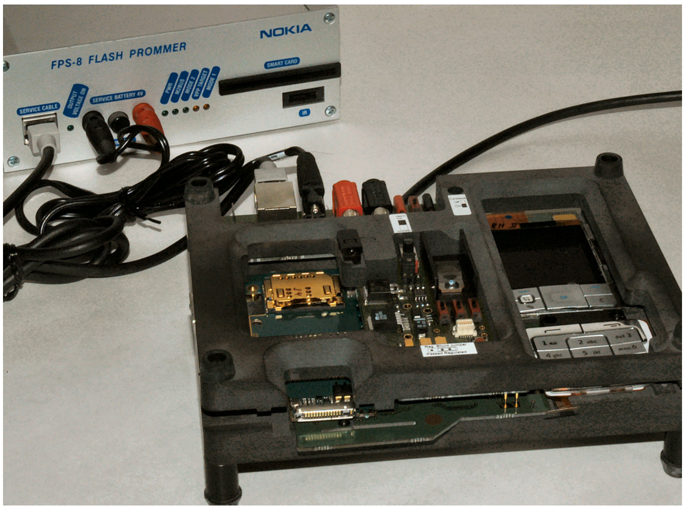

Figure 72 Module jig service concept

Item	Description	Type	Code
1	Module jig	MJ-30	0780376
2	RF cable	XRF-1	0730085
3	Power cable	PCS-1	0730012

Item	Description	Type	Code
4	MBUS cable	DAU-9S	0730108
5	Software protection key	PKD-1	0750018
6	External DC power supply		

JBV-1 service concept

This concept is for BB and RF calibration.
EM calibration including Zocus should be carried out in JBV-1 and DA-25.
Power to JBV-1 should be supplied from an external DC power supply, NOT FPS-8.
JBV-1 input voltage: normal +12V, maximum +16V.
A-cover and RF antenna module need to be removed from the phone when SA-38 is attached.

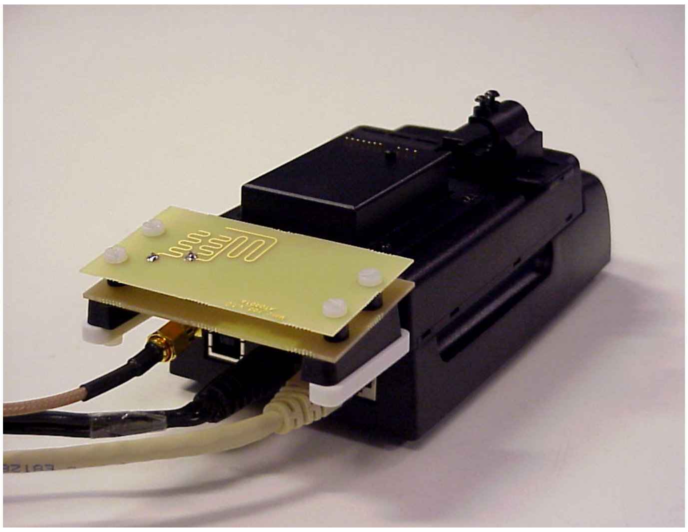

Figure 73 JBV-1 service concept

Item	Description	Type	Code
1	Docking station adapter	DA-25	0780373
2	Docking station	JBV-1	0770298
3	RF coupler	SA-38	0780405
4	RF cable	XRF-1	0730085
5	Power cable	PCS-1	0730012
6	DC cable	SCB-3	0730114
7	MBUS cable	DAU-9S	0730108
8	Software protection key	PKD-1	0750018
9	External DC power supply		
10	Soldering jig for uBGA components	RJ-33	0780406
11	LGA rework kit for Kaede	SK-8	0274550

Item	Description	Type	Code
12	LGA rework kit for microPA	SK-9	0274819
13	Flex opening tool	SS-34	0780396

4 — Service tools

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Table of Contents

List of Tables

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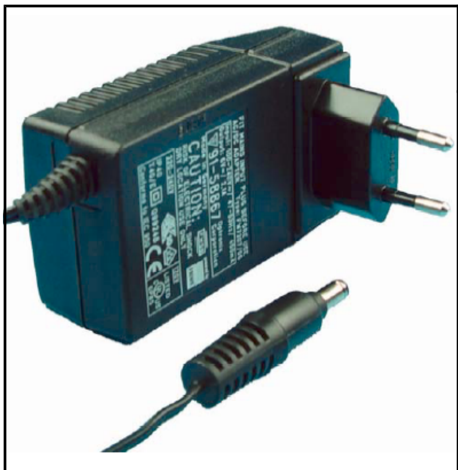
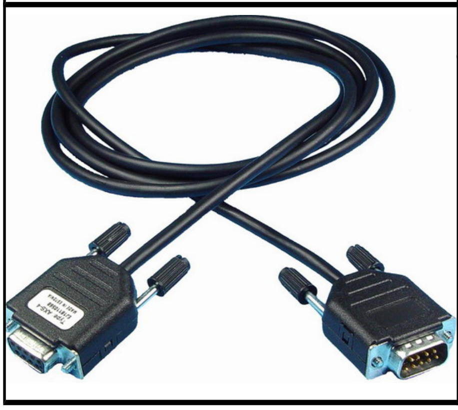
List of Service Tools

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

<table>
<tr><td rowspan="2"></td><td>ACF-8</td><td>Universal power supply</td><td>0680032</td></tr>
<tr><td colspan="3">ACF-8 universal power supply is used to power FPS-8. ACF-8 has 6V DC and 2.1A output.</td></tr>
<tr><td rowspan="2"></td><td>AXP-8</td><td>Parallel bi-directional printer cable</td><td>0730298</td></tr>
<tr><td colspan="3">This cable is used to connect the PC to a flash prommer.
The cable is part of the FPS-8 sales package.</td></tr>
<tr><td rowspan="2"></td><td>AXS-4</td><td>Service cable</td><td>0730090</td></tr>
<tr><td colspan="3">The AXS-4 D9-D9 service cable is used to connect two 9 pin D connectors for example between PC and FPS-8.
The cable length is 2 meters.</td></tr>
</table>

<table>
<tr><td rowspan="2"></td><td>CA-5S</td><td>DC cable</td><td>0730283</td></tr>
<tr><td colspan="3">The DC cable CA-5S is used to connect JBV-1 to the phone charger jack for ADC/VCHAR/ICHAR calibration
Note: Old SCB-3 can be used as well.</td></tr>
<tr><td rowspan="2"></td><td>DA-25</td><td>Docking station adapter</td><td>0780373</td></tr>
<tr><td colspan="3">The DA-25 docking station adapter makes signal connections to the phone. JBV-1 and DA-25 are used as one unit.</td></tr>
<tr><td rowspan="2"></td><td>DAU-9S</td><td>MBUS cable</td><td>0730108</td></tr>
<tr><td colspan="3">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.</td></tr>
<tr><td rowspan="2"></td><td>FLC-2</td><td>DC cable</td><td>0730185</td></tr>
<tr><td colspan="3">FLC-2 is used with a flash adapter to supply a controlled operating voltage.</td></tr>
</table>

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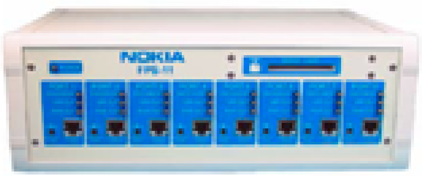
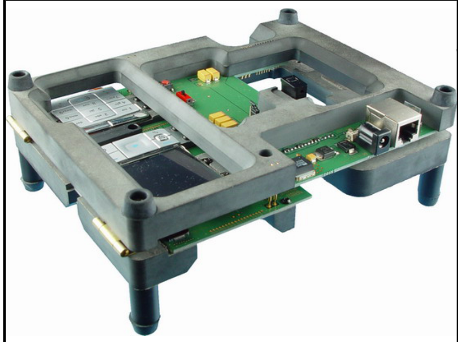
<table>
<tr><td rowspan="2">
</td><td>FLS-4S</td><td>Flash device</td><td>FLS-4S sales pack – Europe/ Africa:0080541, APAC:0080542, Americas:0080543</td></tr>
<tr><td colspan="3">FLS-4S is a dongle and flash device incorporated into one package, developed specifically for POS use.</td></tr>
<tr><td rowspan="2"></td><td>FPS-10</td><td>Flash prommer</td><td>0086189</td></tr>
<tr><td colspan="3">FPS-10 interfaces with:
PC
Control unit
Flash adapter
Smart card
FPS-10 flash prommer features:
Provides flash functionality for BB5 terminals
Smart Card reader for SX-2 or SX-4
Forwards USB traffic through it
Provides USB to FBUS/Flashbus conversion
Provides LAN to FBUS/Flashbus and USB conversion
Vusb output switchable by PC command
FPS-10 sales package includes:
FPS-10 prommer (0770503)
Power Supply with 5 country specific cords (0675525)
USB cable (0730322)</td></tr>
<tr><td rowspan="2">
</td><td>FPS-11</td><td>Parallel flash prommer</td><td>0770758</td></tr>
<tr><td colspan="3">FPS-11 interfaces with:
PC
Control unit
Flash adapter
Smart card
FPS-11 flash prommer features:
Can flash up to 8 phones at a time, controlled by one PC
Communication method between PC and FPS-11 is single USB2.0
No need for external power for powering up phones
Smart Card reader for SX-2 and SX-4
Updates software
Future feature: will support all DCT-4 protocols and models
FPS-11 sales package includes:
FPS-11
Power Supply for FPS-11
EUR, UK, USA Power cords
USB2.0 cable</td></tr>
</table>

<table>
<tr><td rowspan="2">
</td><td>FPS-8</td><td>FLASH prommer</td><td>0080321</td></tr>
<tr><td colspan="3">The flash prommer FPS-8 is used for example with flash adapters, docking station adapters and flash/docking stations. Power is supplied to FPS-8 from the universal power supply, ACF-8.
The sales pack includes:
• FPS-8 flash prommer (0750123)
• FPS-8 activation sheet (9359289)
• ACF-8 universal power supply (0680032)
• AXS-4 service cable (D9-D9) (0730090)
• Printer cable (0730029)</td></tr>
<tr><td></td><td></td><td>Fuse and protector</td><td>0770622</td></tr>
<tr><td rowspan="2">
</td><td>JBT-9</td><td>Bluetooth test and interface box (sales pack)</td><td>0081490</td></tr>
<tr><td colspan="3">The JBT-9 testbox is a generic device to perform Bluetooth bit error rate testing and doing cordless FBUS connection via Bluetooth. An ACP-8x charger is needed for BER testing and AXS-4 cable in case of cordless testing interface usage.
• JBT-9 testbox (0770336)
• Installation and warranty information (9360613)</td></tr>
<tr><td rowspan="2">
</td><td>JBV-1</td><td>Docking station</td><td>0770298</td></tr>
<tr><td colspan="3">The JBV-1 docking station has been designed for calibration and software update use.
The docking station is used together with the DA-25 docking station adapter.
JBV-1 main electric functions are:
• adjustable VBAT calibration voltage, current measurement limit voltage “VCHAR”, current measurement calibration current “ICHAR”
• adjustable ADC calibration voltage via BSI signal
• BSI calibration resistor
• signals from FBUS to the phone via parallel jig
• control via FBUS or USB
• Flash OK/FAIL indication
In calibration mode JBV-1 is powered by external power supply 11-16V DC. In flashing, power for the phone can be taken from FPS-8 or external power supply 11-16V DC.</td></tr>
</table>



MJ-30	Module jig	0780376

The MJ-30 module jig is used for testing the following modules:

- User interface
- Baseband and RF on system module

Note: The nominal supply voltage for MJ-25 is +6.0 V. The supply voltage must not exceed +12.0 V (min. 5.0 V).

Supply the power to jig only when the jumper is open = regulated.

- **Table 17 Display test pin list**

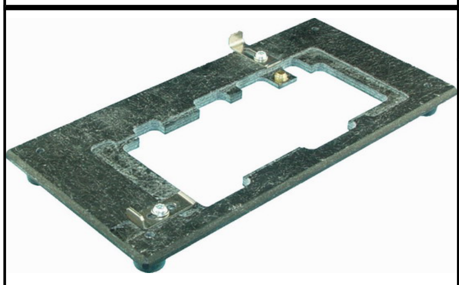
Pin	Signal name	Pin	Signal name	Pin	Signal name
1	GND	9	VDDI	17	
2	WRX	10	VDD	18	D7
3		11		19	D6
4	D0	12	LED IN	20	D5
5	D1	13	LED OUT	21	D4
6	D2	14		22	
7	D3	15	CSX	23	RDX
8		16	D/CX	24	RESX

- **Table 18 Upper keypad signals**

Pin	Signal name	Pin	Signal name	Pin	Signal name
7	ROW2	17	Key LED -	22	Rocker3
8	ROW0	18	ROW1	23	Rocker2
9	COL1	19	COL0	24	Rocker1
11	GND	20	Rocker5		
15	Key LED +	21	Rocker4		

- **Table 19 Lower keypad signals**

Pin	Signal name	Pin	Signal name	Pin	Signal name
5	COL2	9	ROW3	17	COL5
6	COL4	13	ROW2	18	COL3
7	LED SUPPLY	14	COL0	19	ROW4
8	LED SUPPLY	15	ROW5	20	GND

	PCS-1	Power cable	0730012
	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	0750018
	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-24	Rework jig	0770688
	RJ-24 is a soldering jig used for soldering and as a rework jig for the engine module.		
	RJ-33	Soldering jig	0780406
	The soldering jig RJ-33 is used for soldering and as a rework jig for system module. It is made of lead-free rework compatible material.		
	RJ-46	Antenna switch rework jig	0780374

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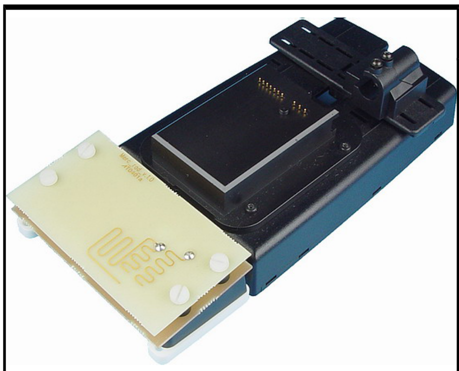


SA-38	RF Coupler	0780405

SA-38 RF Coupler is used for Go/No-Go test after changing components in the RF part of the phone.

The SA-38 is mounted on the docking station adapter, after which the phone can be placed in the docking station adapter.

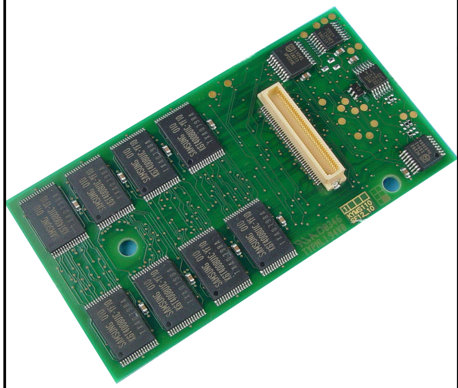
RF attenuations:

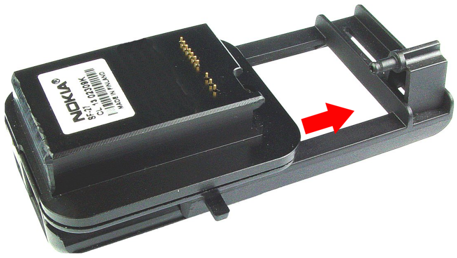
- **Table 20 TX (db)**

Band	Channel	New coupler
900	955	(-8.5 +/- 0.5)
	39	(-8,9 +/- 0,5)
	124	(-10,0 +/- 0,5)
1800	512	(-8,3 +/- 1,1)
	690	(7,3 +/- 1,3)
	885	(-7,5 +/- 0,8)
1900	535*	(-8,1 +/- 1,3)
	711*	(-8,2 +/- 1,2)
	810*	(-8,4 +/- 1,3)

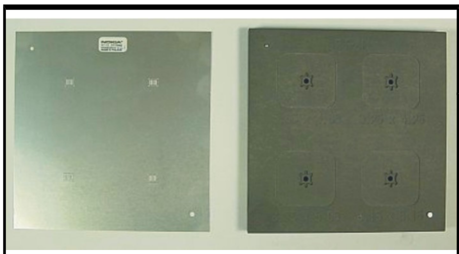
Table 21 RX (db)

Band	Channel	New coupler
900	955	(-13,2 +/- 0,2)
	39	(-11,7 +/- 0,7)
	124	(-13,0 +/- 0,8)
1800	512	(-12,1 +/- 0,6)
	690	(-12,3 +/- 0,3)
	885	(-12,5 +/- 0,5)
1900	535*	(-15,4 +/- 2,3)
	711*	(-16,3 +/- 1,8)
	810*	(-17,5 +/- 1,2)

<table>
<tr><td rowspan="2"></td><td>SF-12</td><td>SRAM Module for FPS-8</td><td>0080346</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="2"></td><td>SF-27</td><td>POS (point of sales) flash adapter</td><td>0780375</td></tr>
<tr><td colspan="3">The POS flash adapter SF-27 is used in the place of phone’s normal battery during service to supply a controlled operating voltage and to connect to flash pads.

Instructions
1 Open the locking slide.

2 Insert the adapter to the phone from the battery connector side.

3 Lock the adapter with DC jack.
</td></tr>
</table>

<table>
<tr><td rowspan="2"></td><td>SK-8</td><td>LGA rework kit for Kaede</td><td>0274550</td></tr>
<tr><td colspan="3">

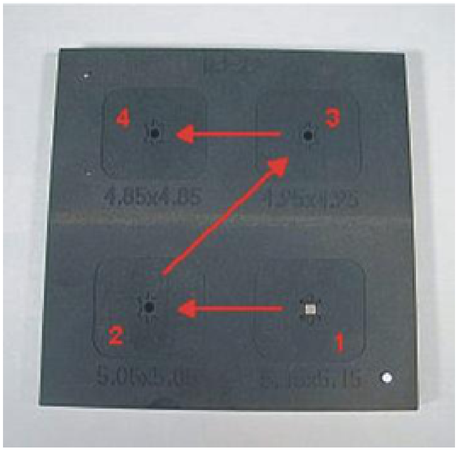
SK-8 is used to print solder paste on Kaede USB component (NMP code: 4342163) when the component is reworked.

SK-8 consists of ST-9 (NMP code: 0770727) Stencil and RJ-29 (NMP code: 0770728) rework jig.

Due to the large mechanical tolerance of the component, the following procedure is necessary:

Instructions

1 Put the component into the rework jig. The component should be placed in the best fit location which is determined by placing the component in the largest location first, and if this is too large, re-position it to the next location. This should be carried out until the best fit location is found.



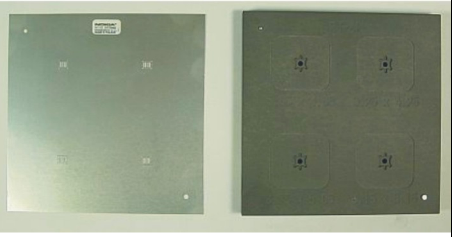
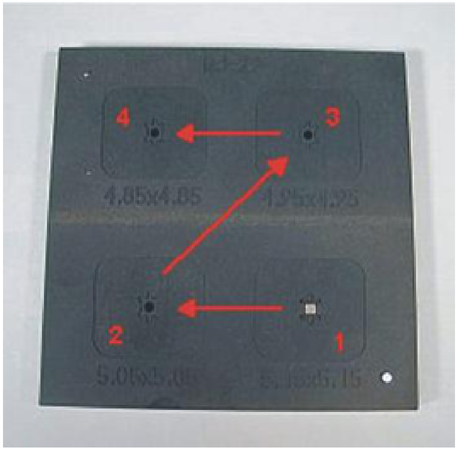
2 Once the best fit location has been found, leave the component there and put the stencil on top of the jig and the component.

3 Put soldering paste on the component properly.

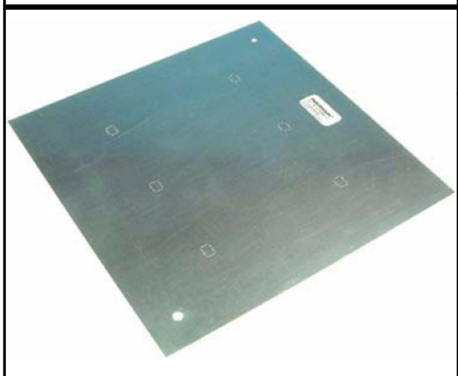
4 Remove the stencil and the component from the jig.

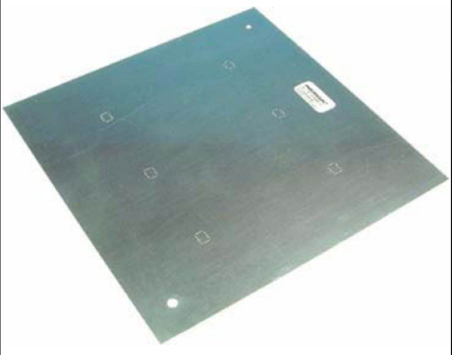
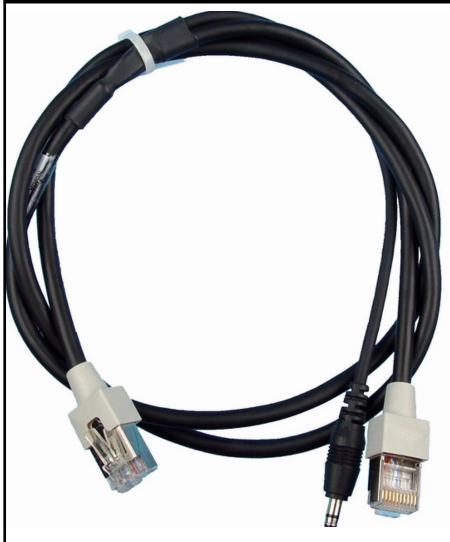
5 Start the soldering process.

</td></tr>
</table>

<table>
<tr><td rowspan="2"></td><td>SK-9</td><td>LGA rework kit for MicroPA</td><td>0274819</td></tr>
<tr><td colspan="3">
SK-9 is used to print solder paste on MicroPA component (NMP code: 4355641) when the component is reworked.
SK-9 consists of ST-13 (NMP code: 0770848) stencil and RJ-21 (NMP code: 0770849) rework jig.
Due to the large mechanical tolerance of the component, the following procedure is necessary:
Instructions
1 Put the component into the rework jig. The component should be placed in the best fit location which is determined by placing the component in the largest location first, and if this is too large, re-position it to the next location. This should be carried out until the best fit location is found.


2 Once the best fit location has been found, leave the component there and put the stencil on top of the jig and the component.
3 Put soldering paste on the component properly.
4 Remove the stencil and the component from the jig.
5 Start the soldering process.
</td></tr>
<tr><td></td><td>Spare part for SF-27</td><td>Test pin module</td><td>0780357</td></tr>
<tr><td></td><td></td><td>Spare part module (LCD-UIB PWB)</td><td>0780356</td></tr>
<tr><td rowspan="2"></td><td>Spare part for SF-27</td><td>Test pins</td><td>0770754</td></tr>
<tr><td colspan="3">Soldering required</td></tr>
<tr><td></td><td></td><td>Spare part module (KeyPad-UIB PWB)</td><td>0780355</td></tr>
</table>

	SPS-1	Soldering Paste Spreader	0770381
	SRT-6	Opening tool	0770431
	SS-34	Flex opening tool	0780396
	ST-15	Antenna switch rework stencil	0780412

	ST-5	Antenna switch rework stencil	0770691
		Test pins	0770879
		Test pins (RF pogo)	077876
		Test pins (SC-0-J-3.2-DG) for DA-25 (10pcs/bag)	0770617
	XCS-1	Service cable	0730218
	The XCS-1 service cable is used to connect FLS-4S to the POS flash adapter for supplying a controlled operating voltage and data connection.		
	XCS-4	Modular cable	0730178
	XCS-4 is a shielded (one specially shielded conductor) modular cable for flashing and service purposes.		

 Company Confidential

	XRF-1	RF cable	0730085
	The RF cable is used to connect, for example, a module repair jig to the RF measurement equipment. SMA to N-Connector ca. 610mm. Attenuation for: • GSM850/900: 0.3+-0.1 dB • GSM1800/1900: 0.5+-0.1 dB • WLAN: 0.6+-0.1dB		

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5 — Disassembly and reassembly instructions

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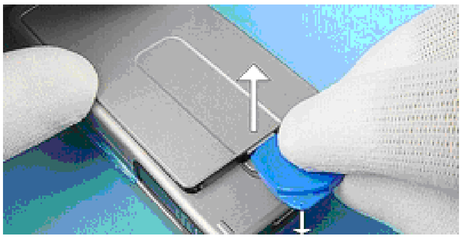
Disassembly instructions lower block (see the video clips on care point also)

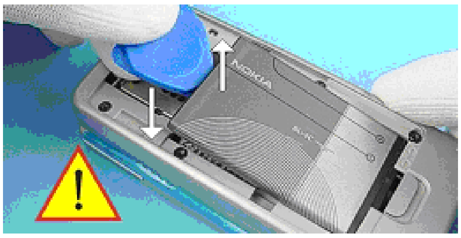
Steps

1. Protect the window with a film to avoid dust and scratches.

2. Remove the battery cover.

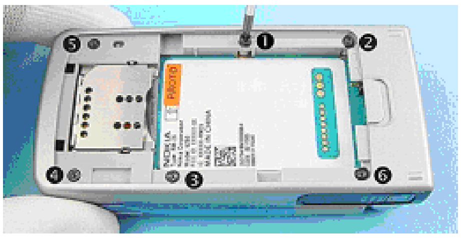


3. Always remove the battery before continuing disassembly.

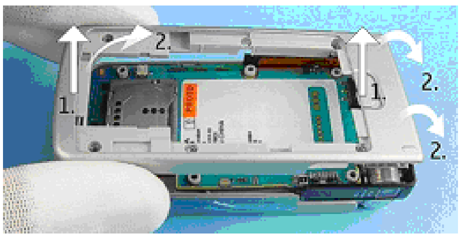


4. Unscrew the six Torx Plus® size 6 screws.

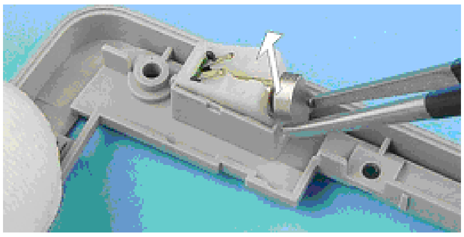
   Note: For assembly, the reverse order and a Torx Plus® driver with a torque of 20 Ncm has to be used.



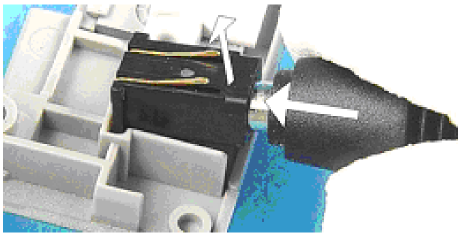
5. Remove the B1 cover and place it upside down on the table like shown in the picture.



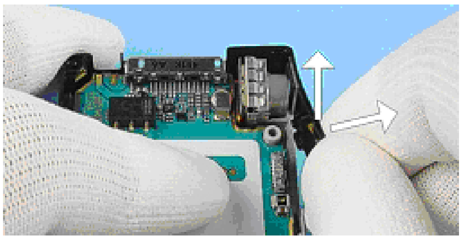
6. Remove the vibra motor with tweezers.



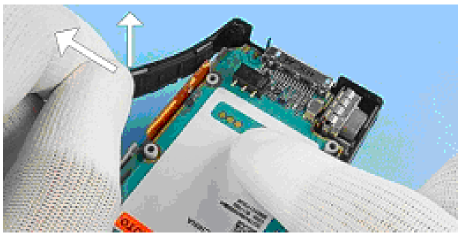
7. Remove the DC jack with a charger plug.



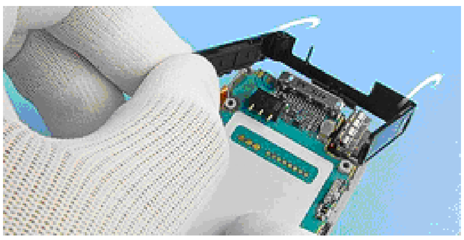
8. For disassembling the frame, move the right side slightly up and to the right.



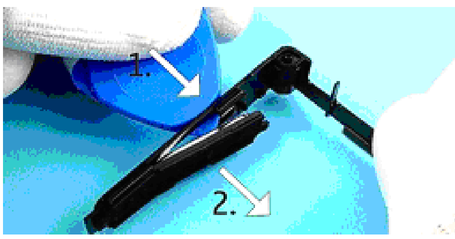
9. Move the left side of the frame up and to the left.



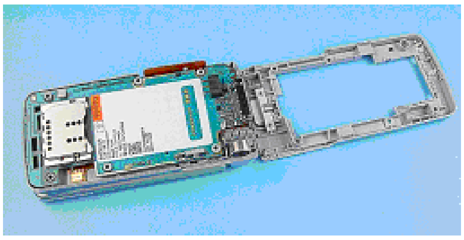
10. Now remove the frame.



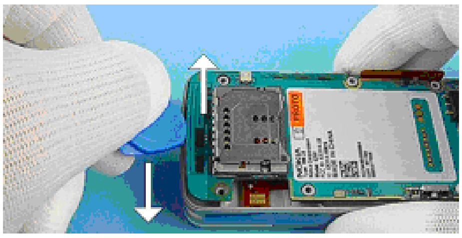
11. Disassemble the side key with, for example, SRT-6 tool.



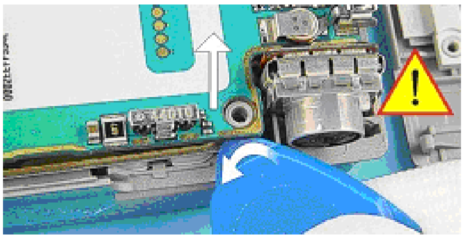
12. Use the B1 cover as a support for engine module to avoid damaging the hinge flex.



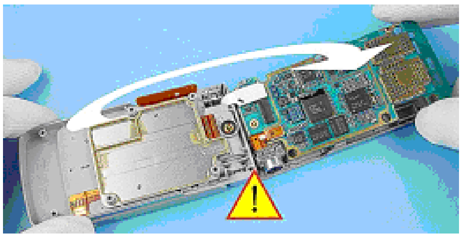
13. Now remove the engine module. First lift up the left side (near SIM, MMC connector) with SRT-6 and then...



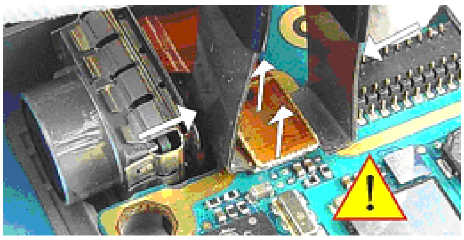
14. ...the right side nearby the camera module. Be careful with the camera module.



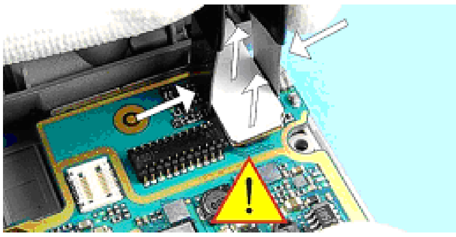
15. The engine module is connected to the lower block via hinge flex connector. Be careful when placing the engine module on the B1 cover.



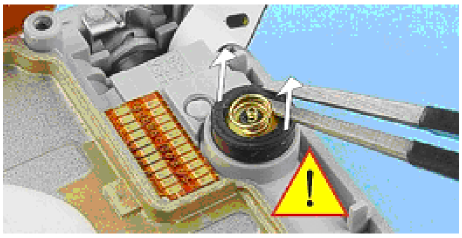
16. Open the camera connector by using the SS-34 tool and remove the camera module.



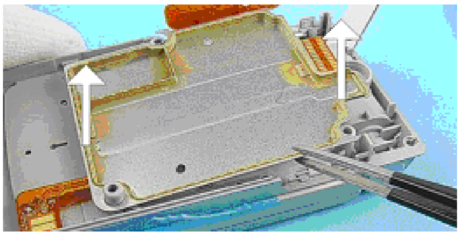
17. Open the hinge flex connector by using the SS-34 and take away the B1 cover with engine module.



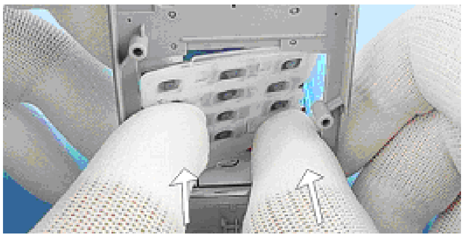
18. Remove the microphone with tweezers. Be careful not to damage the spring contacts.



19. Remove the UI flex assy by using tweezers like shown in the picture.



20. Finally, disassemble the keymat by pressing it slightly from the inside to the outside.

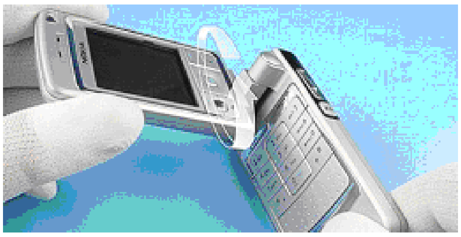


Disassembly instructions upper block (see the video clips on care point also)

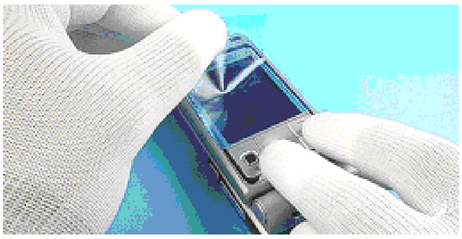
Steps

1. Remove the battery before disassembling the upper block.

2. Open the phone and turn around the upper block 180 degrees.

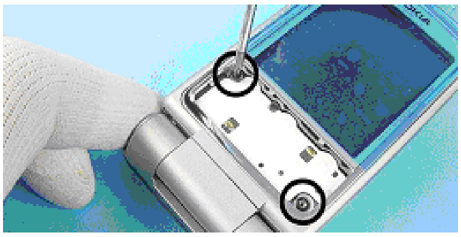


3. Protect the window with a film to avoid dust and scratches.



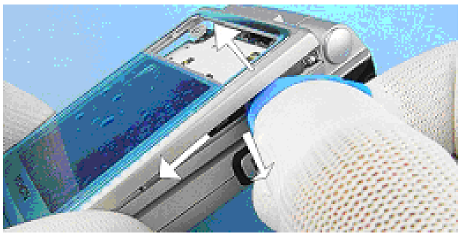
4. Remove the function keymat.

5. Unscrew the two Torx Plus® size 6 screws. For assembly, a Torx Plus® driver with a torque of 15Ncm has to be used.

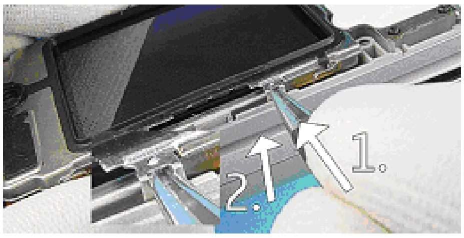


6. Open the A2 cover at one side first and then...

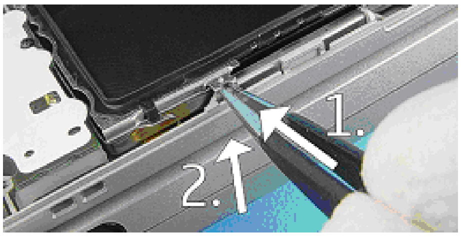
7. ...at the other side. Remove the A2 cover.



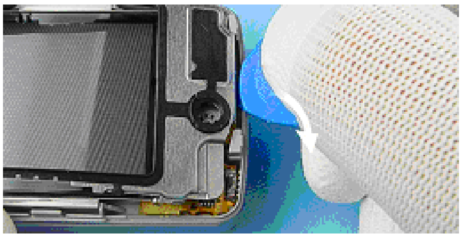
8. Use tweezers to remove the LCD shield. Start at one side and then...



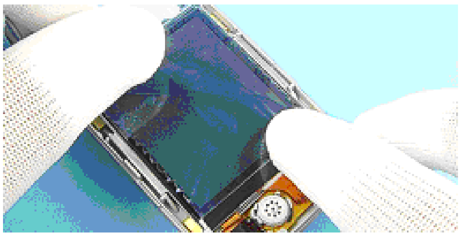
9. ...on the other side.



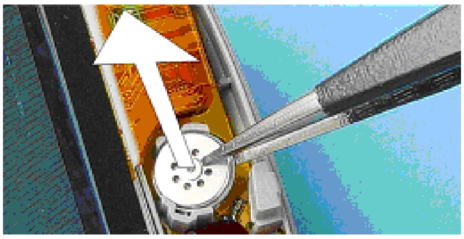
10. Now remove the LCD shield with the SRT-6 tool.



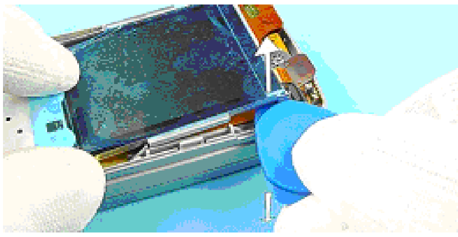
11. Protect the LCD with a film to avoid dust and scratches.



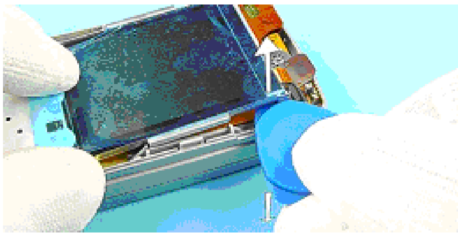
12. Remove the earpiece with tweezers.



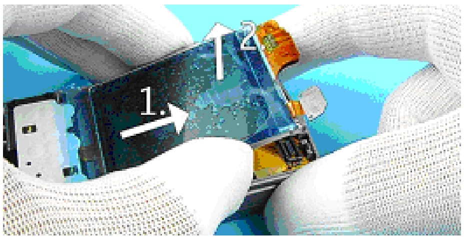
13. To open the LCD connector, hold the flex foil down with the Torx driver and lever up the LCD connector with a slotted screwdriver carefully. Be careful not to damage the flex foil, connector or surrounding components.



14. Lever up the right corner of the LCD with SRT-6.



15. Remove the LCD like shown in the picture.



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6 — Baseband troubleshooting

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List of Tables

List of Figures

Troubleshooting baseband

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 diagram describes the different baseband troubleshooting paths to be followed in fault situations.

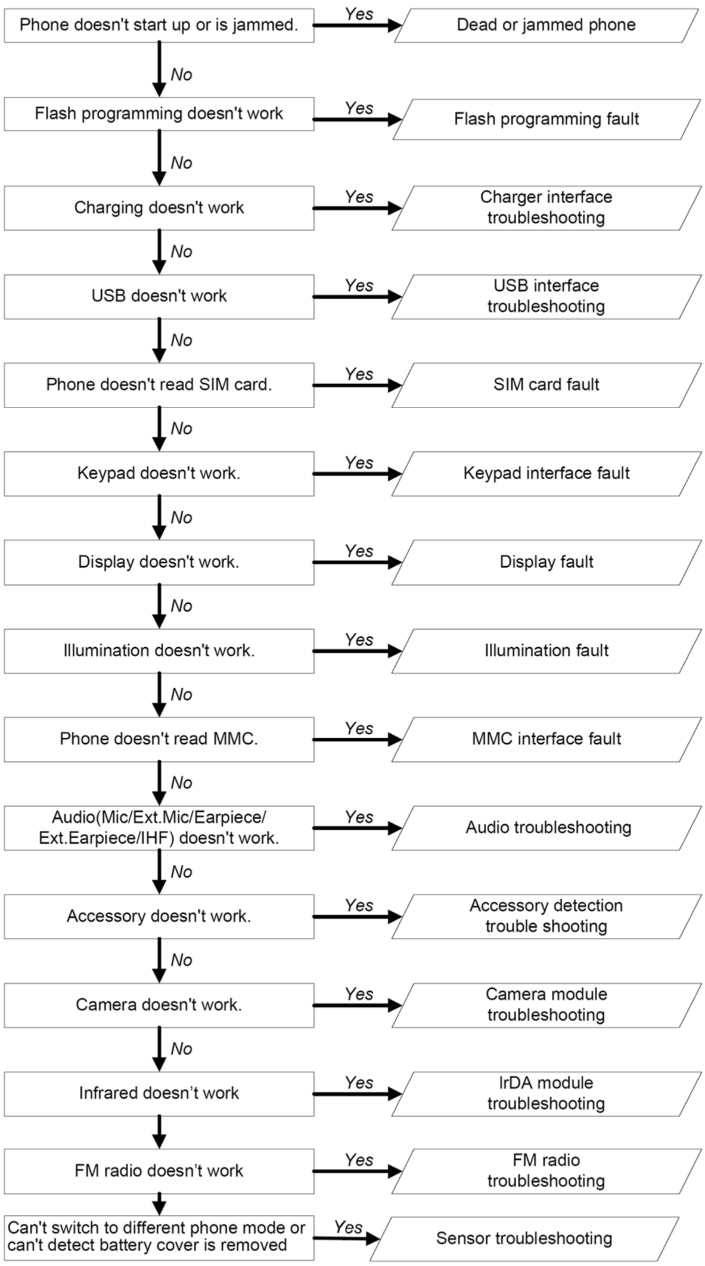

Figure 74 Main troubleshooting diagram

Troubleshooting dead or jammed phone

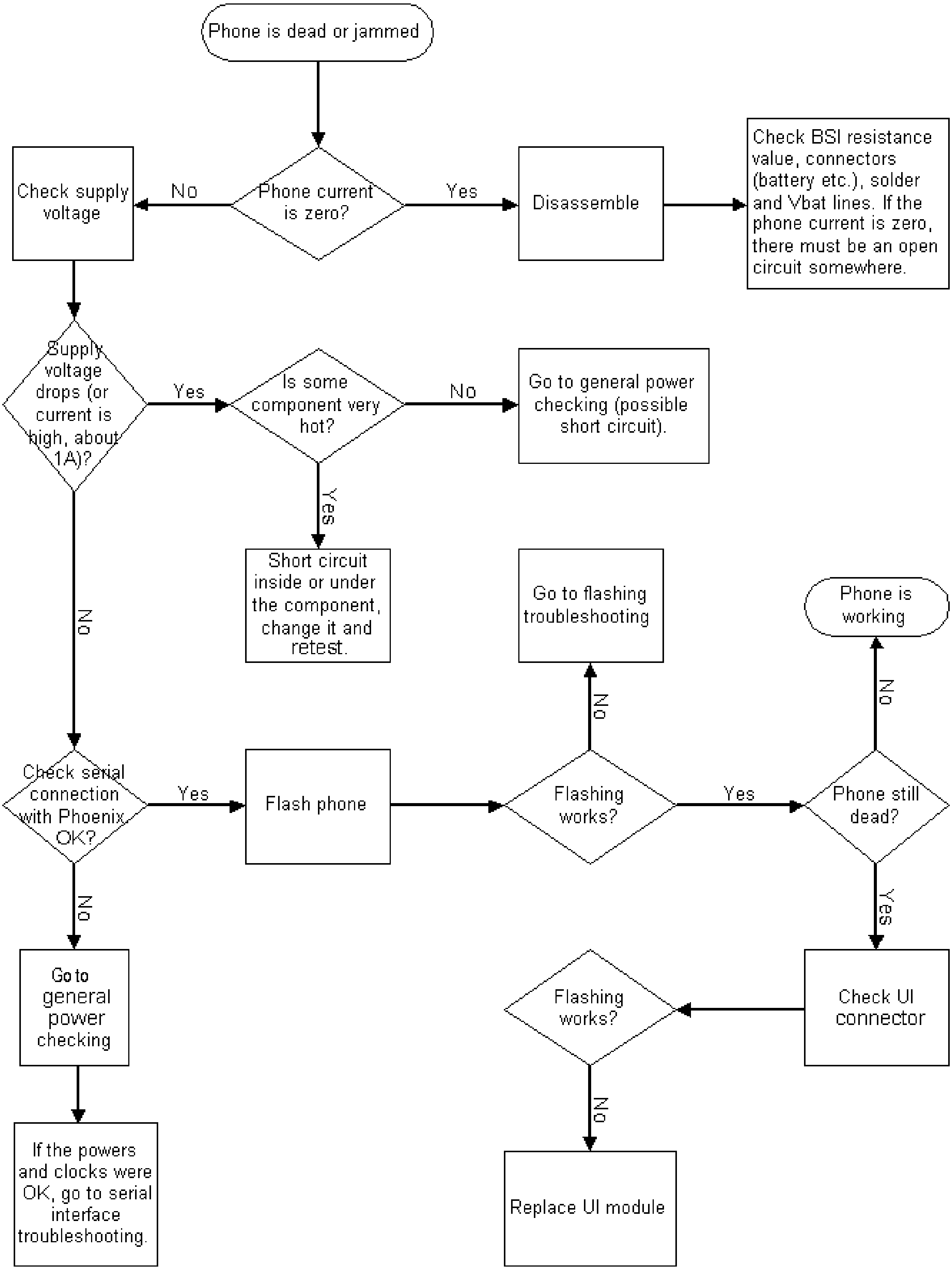

Figure 75 Dead or jammed phone troubleshooting

BB self test tools

Self test functions are executed when the phone is powered on, and if one or more self test functions fail, the message “Self test failed. Contact Service.” is displayed. However, in this kind of situation the software is able to run and thus the watchdog of UEME can be served.

The MCU selftest case can be split into two categories: the ones that are executed during power up and the ones that are executed only with a PC connected.

These tests and the items included are as follows:

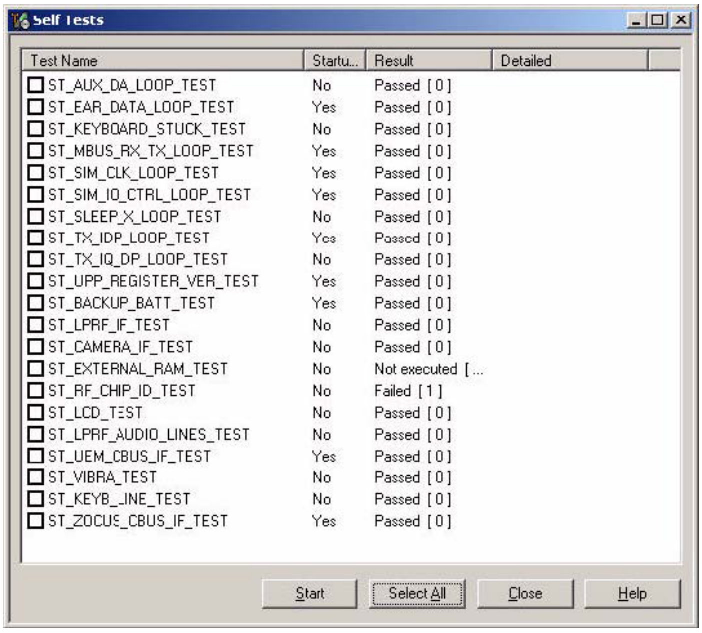

Figure 76 BB self tests

Troubleshooting flash programming

Context

Note: The Phoenix error message *C101 Boot timeout* in the flowchart refers to a message that is shown when there are problems in the phone flash programming when using FPS-8.

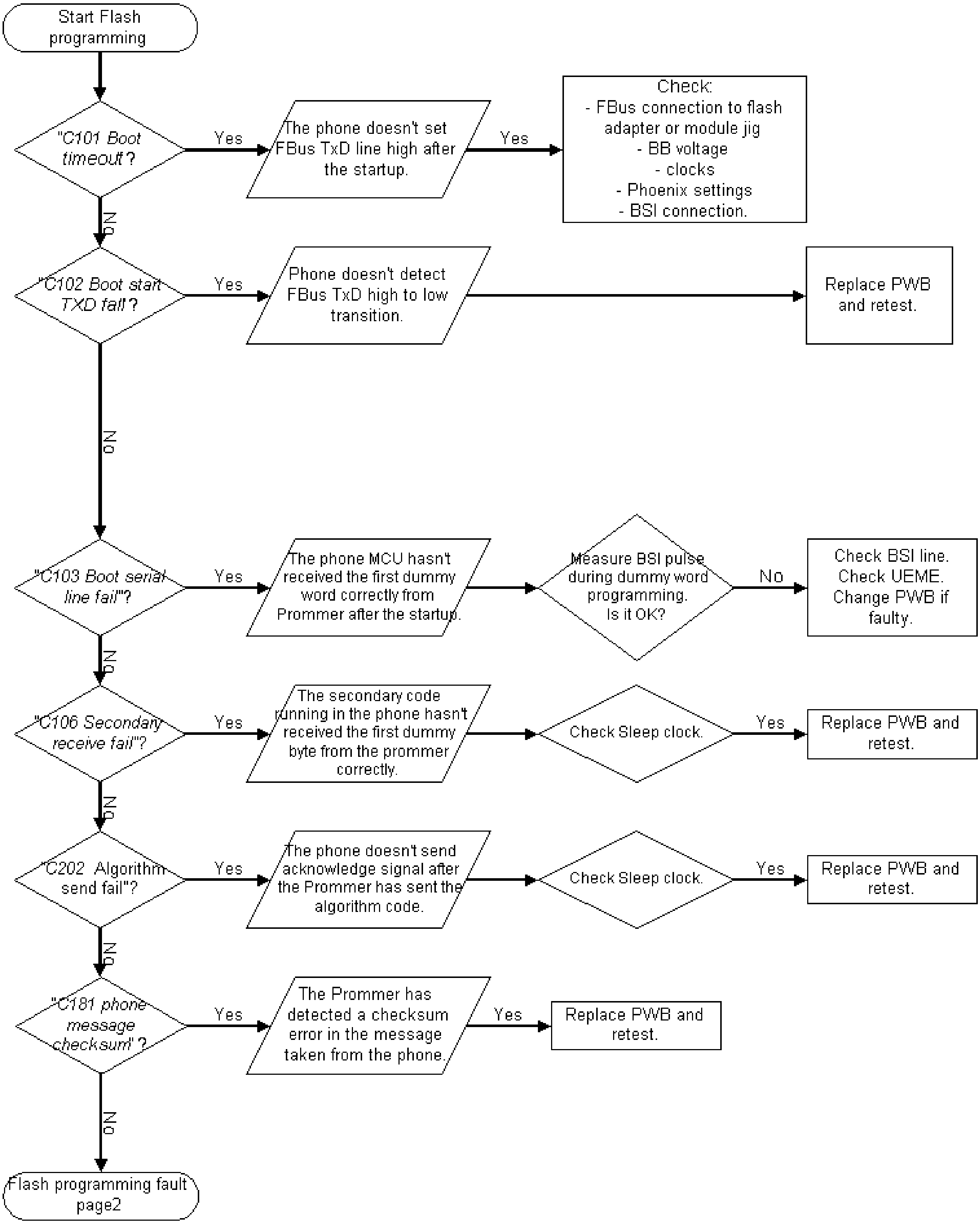

Figure 77 Flash programming troubleshooting, part 1

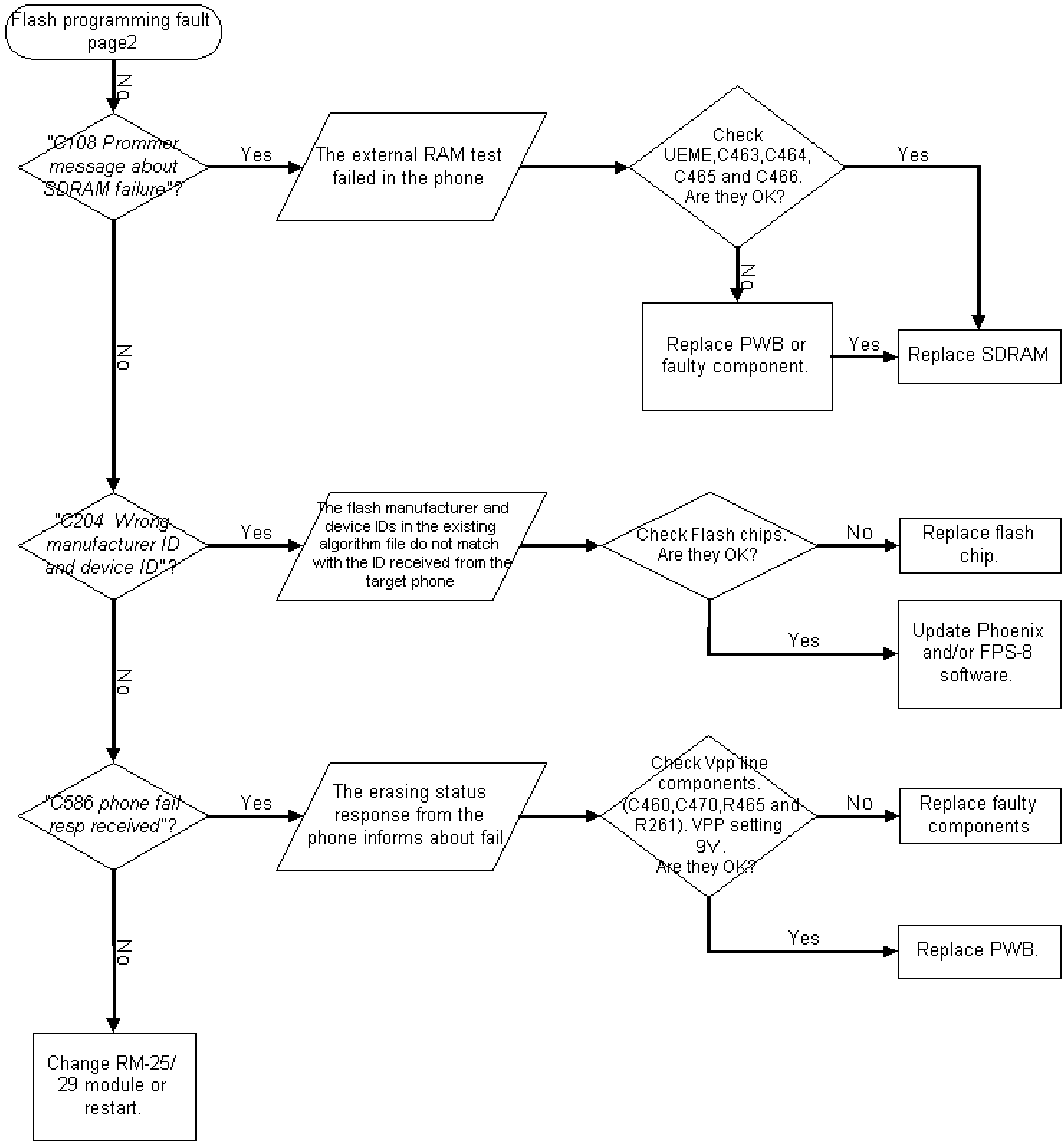

Figure 78 Flash programming troubleshooting, part 2

General power troubleshooting

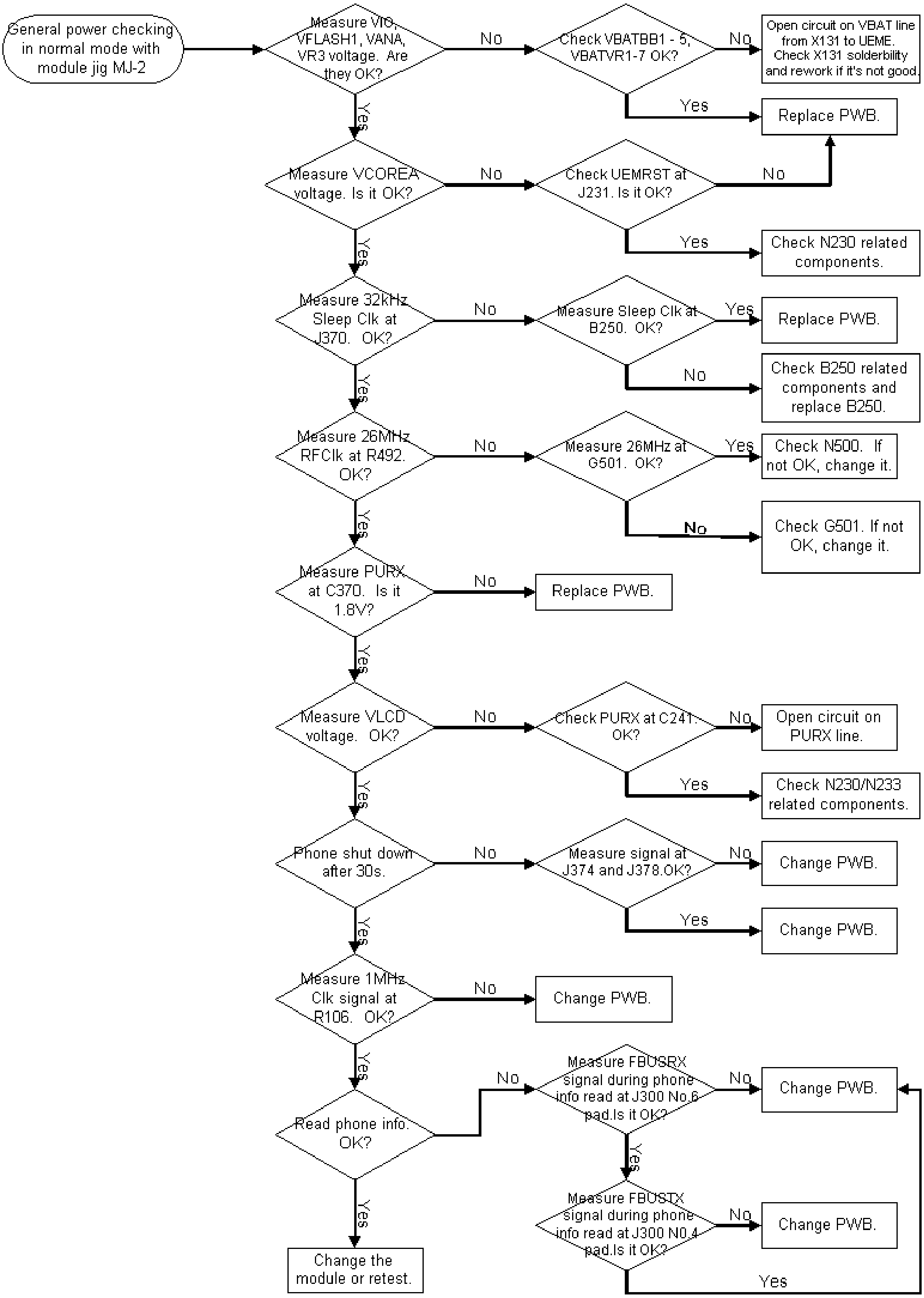

Figure 79 General power troubleshooting

Baseband serial interface troubleshooting

CBUS interface

CBUS is a three-wire serial interface between the main baseband components.

The bus consists of data, clock and bus_enable signals. The bus is connected between UPP_WD2, UEME and ZOCUS. UPP_WD2 takes care of controlling the traffic on the bus.

If the interface is faulty from the UPP_WD2's end, the phone does not boot properly as powering configurations do not work.

Traffic on the bus can be monitored at the following test point and pins.

- R640 (test point J193 side)
- CBusEN1X J378 Pad
- CBusDA J377 Pad

The pads and pins are shown in the figures below.

CBUS test points

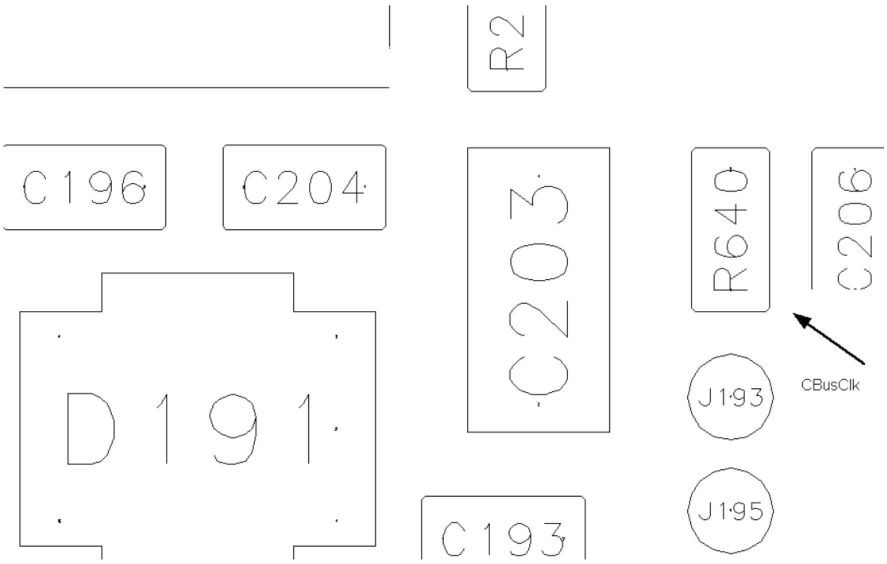

Figure 80 CBusClk test point

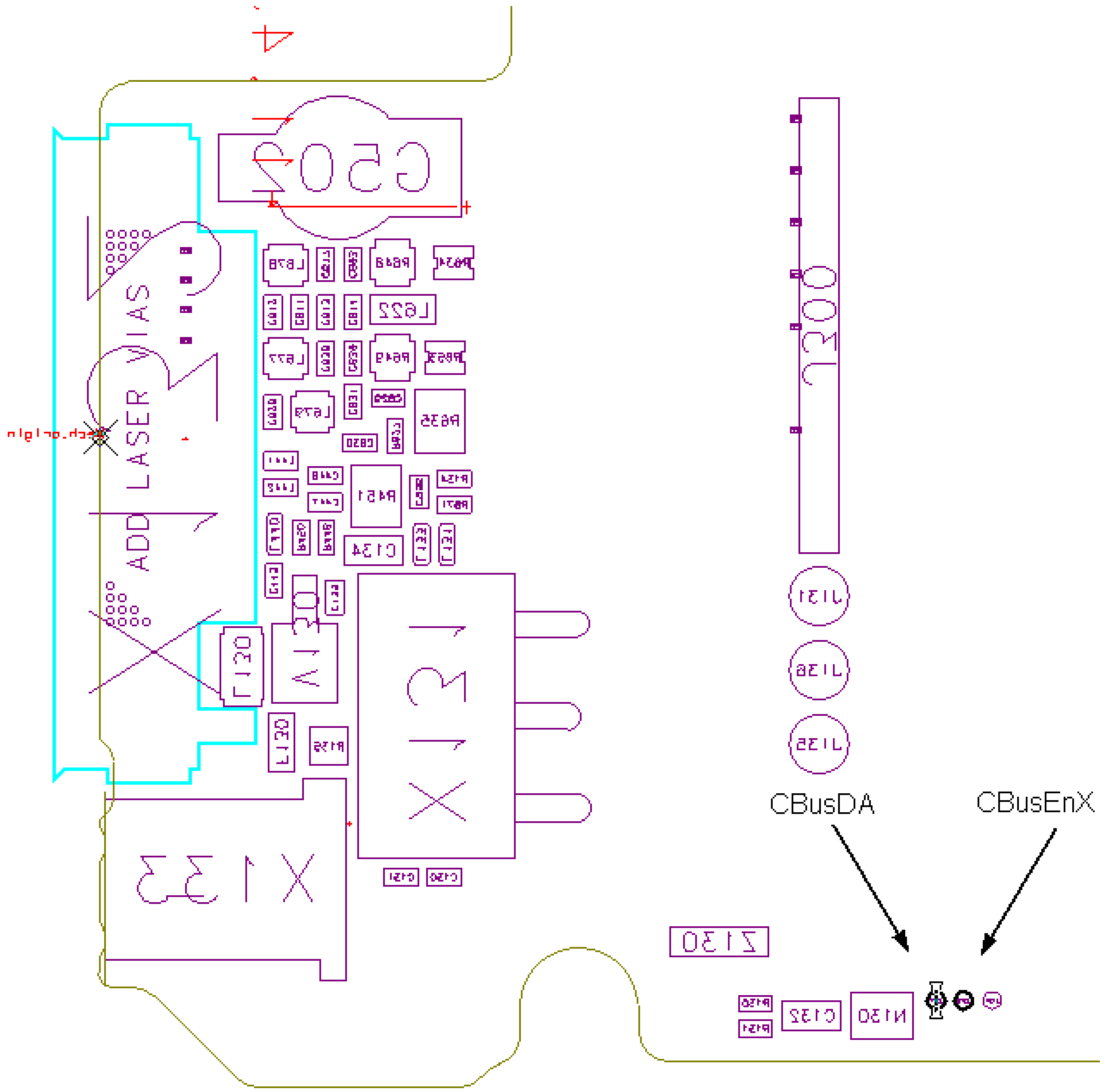

Figure 81 CBUS test points

The CBUS traffic is shown in the figure below (read command to ZOCUS, LM3820, N130).

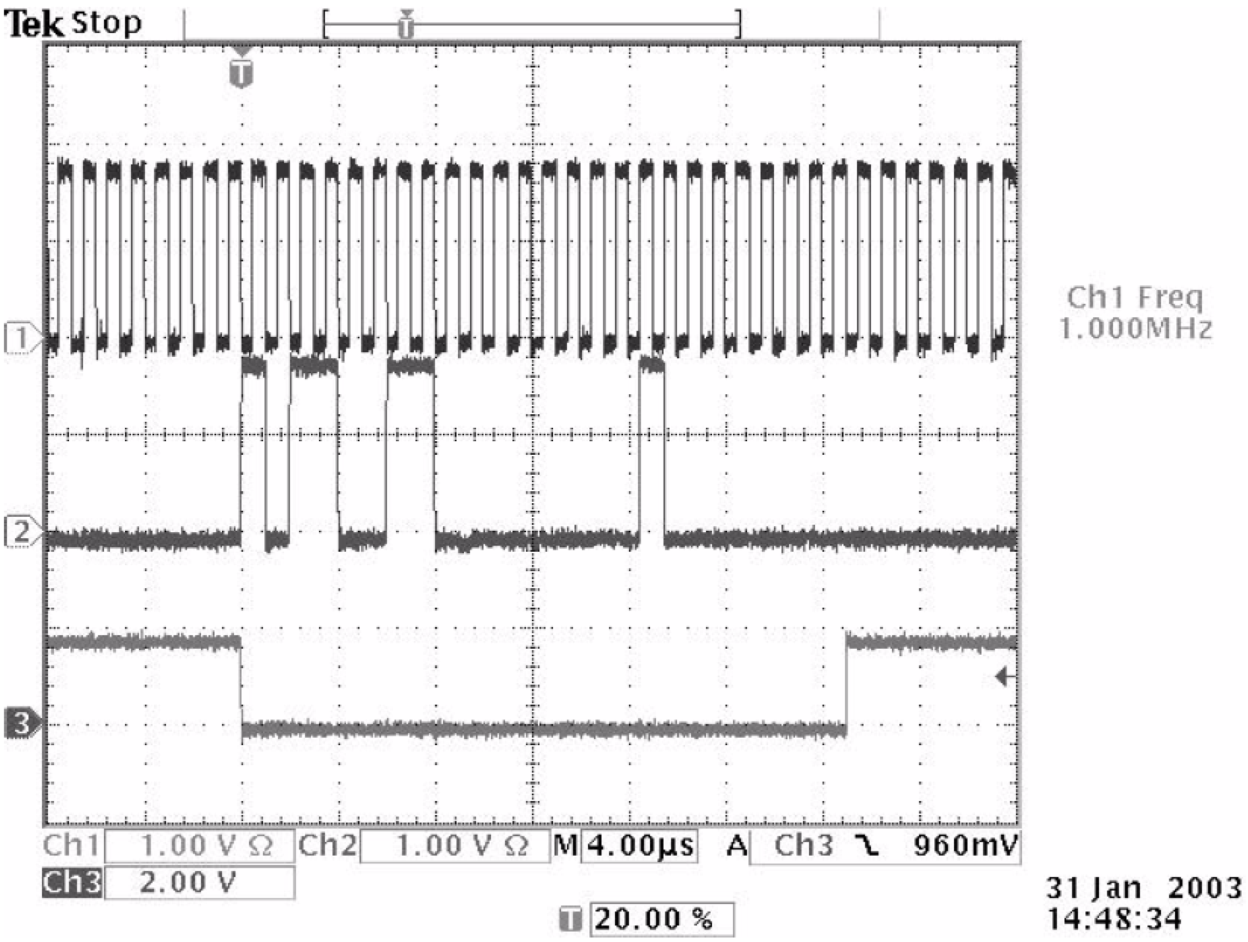

Figure 82 CBUS waveform

CBusCLk is connected to Ch1, CBusDa to CH2 and CBusEnx to Ch3.

If you are able to get the phone to boot up and can reach Phoenix BB self test feature, it is possible to test the functionality of each component attached to CBus. Use:

- ST_UEM_CBUS_IF_TEST to test the UEME CBus interface
- ST_ZOCUS_CBUS_IF_TEST to test the ZOCUS CBus interface.

If an error is found in testing any of the above components, you should replace or re-solder the failed component.

FBUS interface

FBUS is a two-wire Rx and Tx interface between UPP_WD2 and flash/test interface. The bus goes through UEME, which adjusts the voltage levels to suit UPP_WD2.

The interface voltage level on the phone flash/test pad pattern is 2.7V and on the UPP_WD2 end it is 1.8V.

The functionality of this interface should not affect the device boot into NORMAL, LOCAL or TEST modes.

Phoenix tests can be performed through the MBUS interface in the case of a failure in the FBUS interface. Flashing is not possible if there is a problem in the FBUS interface. Fbus signals located in the flashing test pads and the pad layout is shown in the figure below.

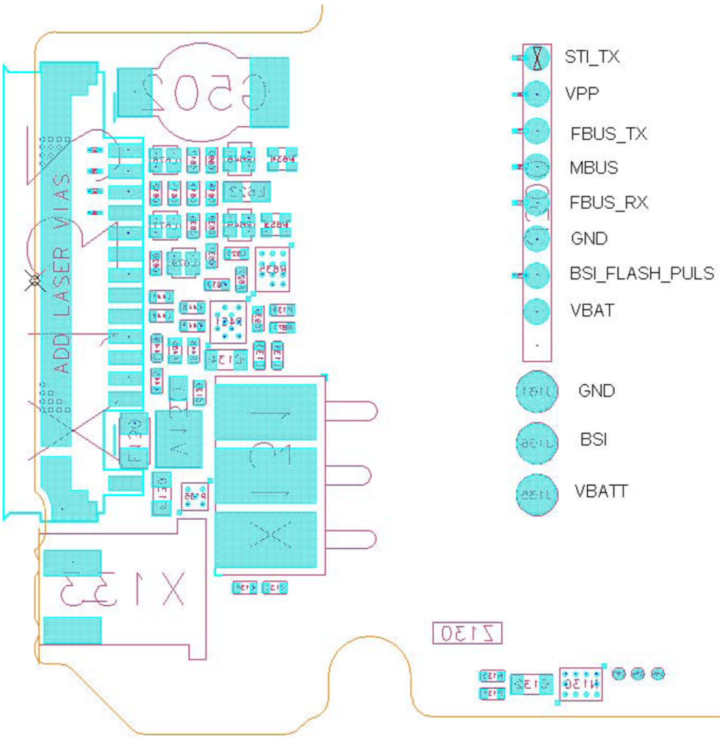

Figure 83 Flash interface layout (FBUS/MBUS test pads layout)

MBUS interface

MBUS is a two-wire RX and TX interface between UPP_WD2 and UEME. From UEME the interface continues to flash/test interface as one-wire interface. UEME adjusts the voltage levels.

The interface voltage level on the phone flash/test pad pattern is 2.78V and on the UPP_WD2 end it is 1.8V.

MBUS traffic between UPP_WD2 and UEME can be tested with Phoenix (**ST_MBUS_RX_TX_LOOP_TEST**).

Flashing is not possible if there is a problem in MBUS. For the location of the MBUS signal in the test pads and the pad layout, see figure Flash interface layout (Page 6–14).

Troubleshooting charger interface

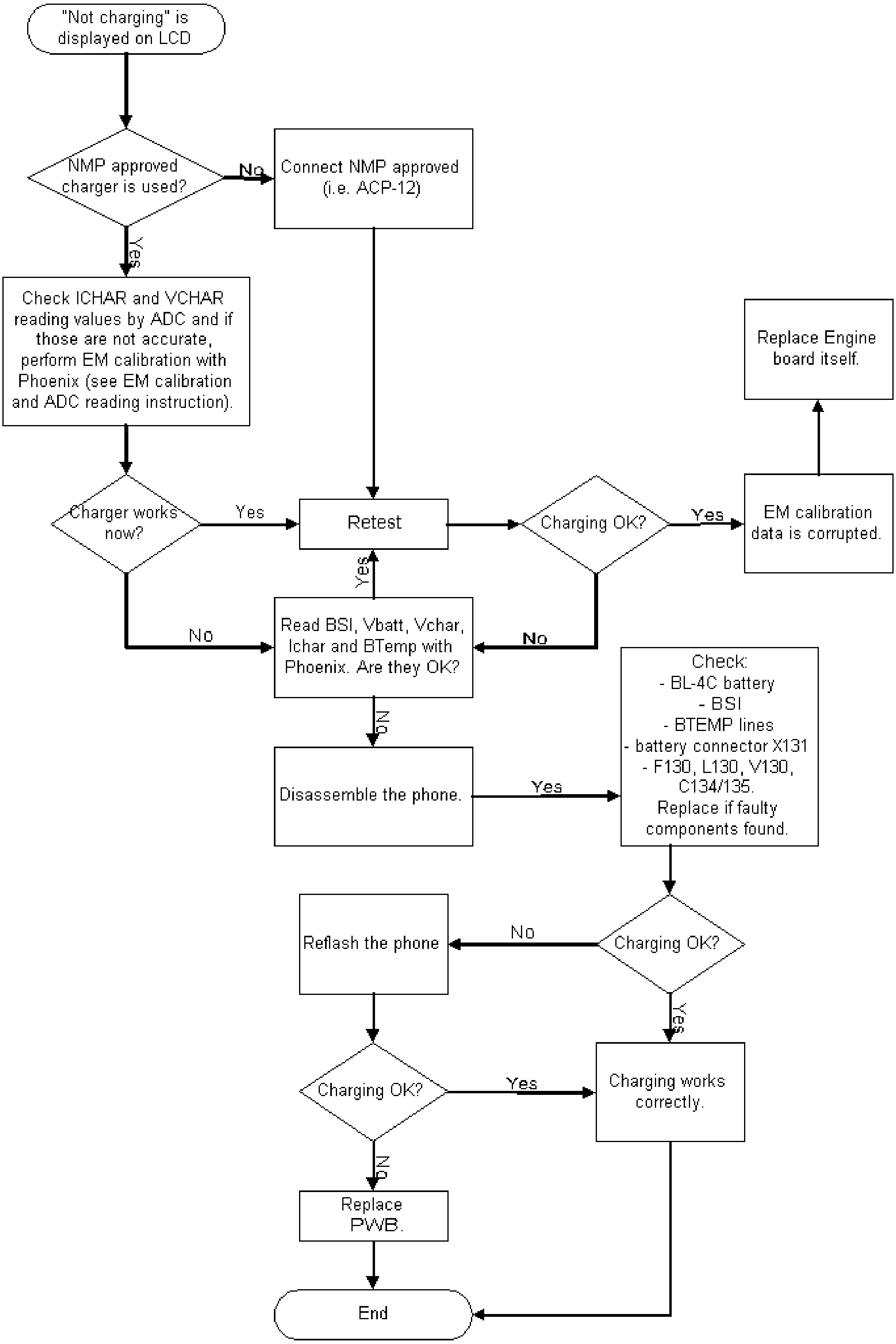

Figure 84 "Not charging" on display

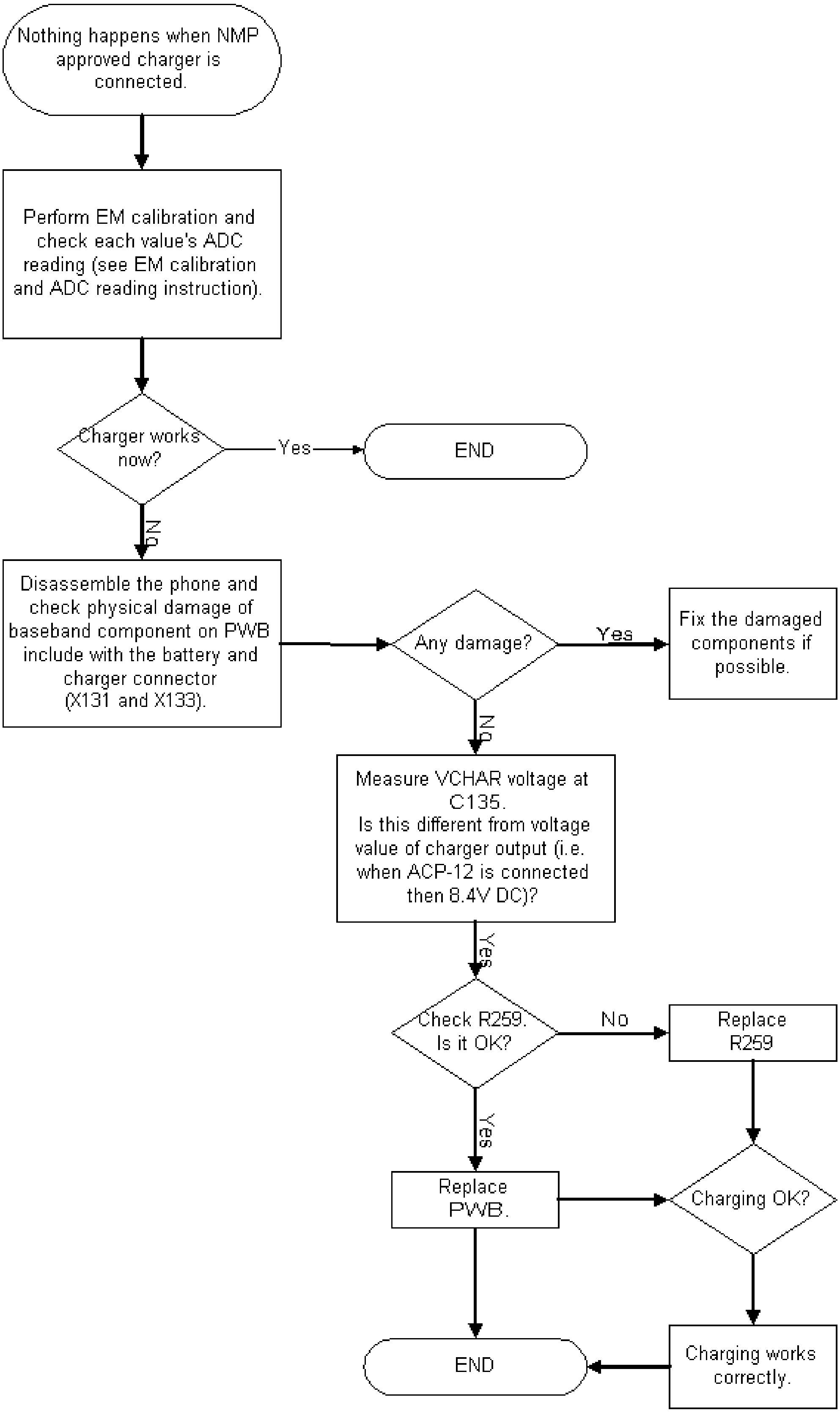

Figure 85 No charging

Energy management calibration

EM calibrations should be carried out with a JBV-1 docking station attached to a DA-25 docking station adapter.

Power to JBV-1 should be supplied from an external DC power supply. JBV-1 input voltages: nominal + 12 VDC, maximum +16VDC.

On the JBV-1, A/D converter, BSI, BTEMP, battery voltage (VBAT), charger voltage (VCHAR), charger current (ICHAR) and battery current (IBAT) are calibrated.

For detailed information and instructions, see energy management calibration instructions (Page 6–39).

Baseband troubleshooting tips

ADC-offset over limits

Inspect the BSI line and its components. Note that the BSI resistance line of the battery is connected to the AD input of the UEME labelled LS (not the BSI input). If these are OK, change PWB.

BSI gain over limits

Inspect the BSI line and its components. Note that the BSI resistance line of the battery is connected to the AD input of the UEME labelled LS (not the BSI input). If these are OK, change PWB.

Vbatt offset and gain

Inspect Vbatt lines and its components.

VCHAR over limits

Inspect components that are connected to VCHAR line: filtering capacitors C134, C135, TVS V130, L130 and fuse F130. If those are OK, change PWB.

ICHAR over limits

Inspect components that are connected to VCHAR line: filtering capacitors C134, C135, TVS V130, L130 and fuse F130. If those are OK, change the current sense resistor R259 first. If calibration is still not successful, change PWB.

Calibration can be checked using the ADC reading. Known voltages, currents and resistances are fed to and read by the ADC reading. The read values can then be compared with the known values.

ADC reading

Divided and scaled battery voltage, battery current, charger voltage, charger current and BSI values can be read by this tool. Read values a few times until you can be sure that results are accurate.

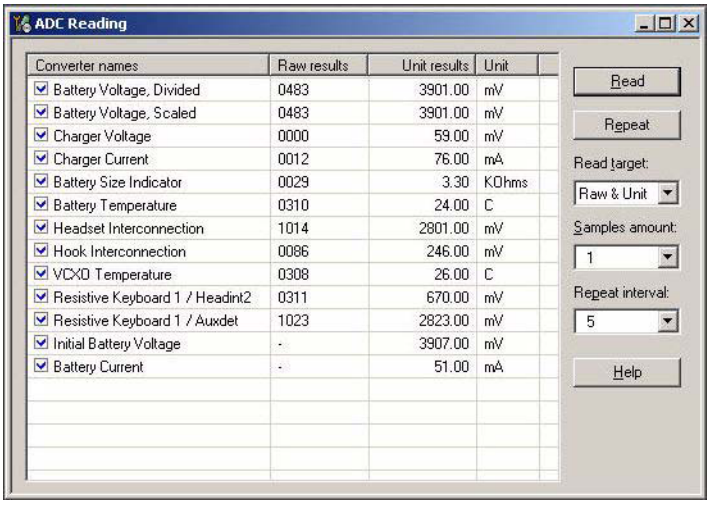

Figure 86 ADC reading window in Phoenix

Table 22 Maximum tolerances

Reading	Check point	Tolerance
Vbatt SCAL	4.2V	±25mV
Vchar	8.4V	±40mV
Ichar	500mA	±20mV
BSI	75k (BL-4C)	±1.3kohm
Btemp	273K (47k)	+5K

Backup battery troubleshooting

A symptom of a backup battery fault is that Real Time Clock loses the correct time during short battery removal. The same symptom can also be seen when the backup battery is empty. About 30 minutes is needed to fully charge the backup battery in the device.

> **Note:** The backup battery is only charged at the same time as the main battery or when the device is in the LOCAL or TEST mode.

Always check the backup battery visually for any leakage or any other visual defect.

Check that the backup battery is correctly mounted in the device before closing the cover.

Check with Phoenix that the backup battery is OK.

Measure the voltage of the backup battery.

- Normal operation when the voltage is > 2.0V.
- Fully charged when the voltage is about 3.2V.

Enable the backup battery charging (start to charge the main battery or boot the device to LOCAL or TEST mode).

Measure the voltage of the backup battery during charging, it should rise if it is not 3.2V yet.

When the voltage is over 2.0V for certain, check the backup battery with Phoenix.

Troubleshooting USB interface

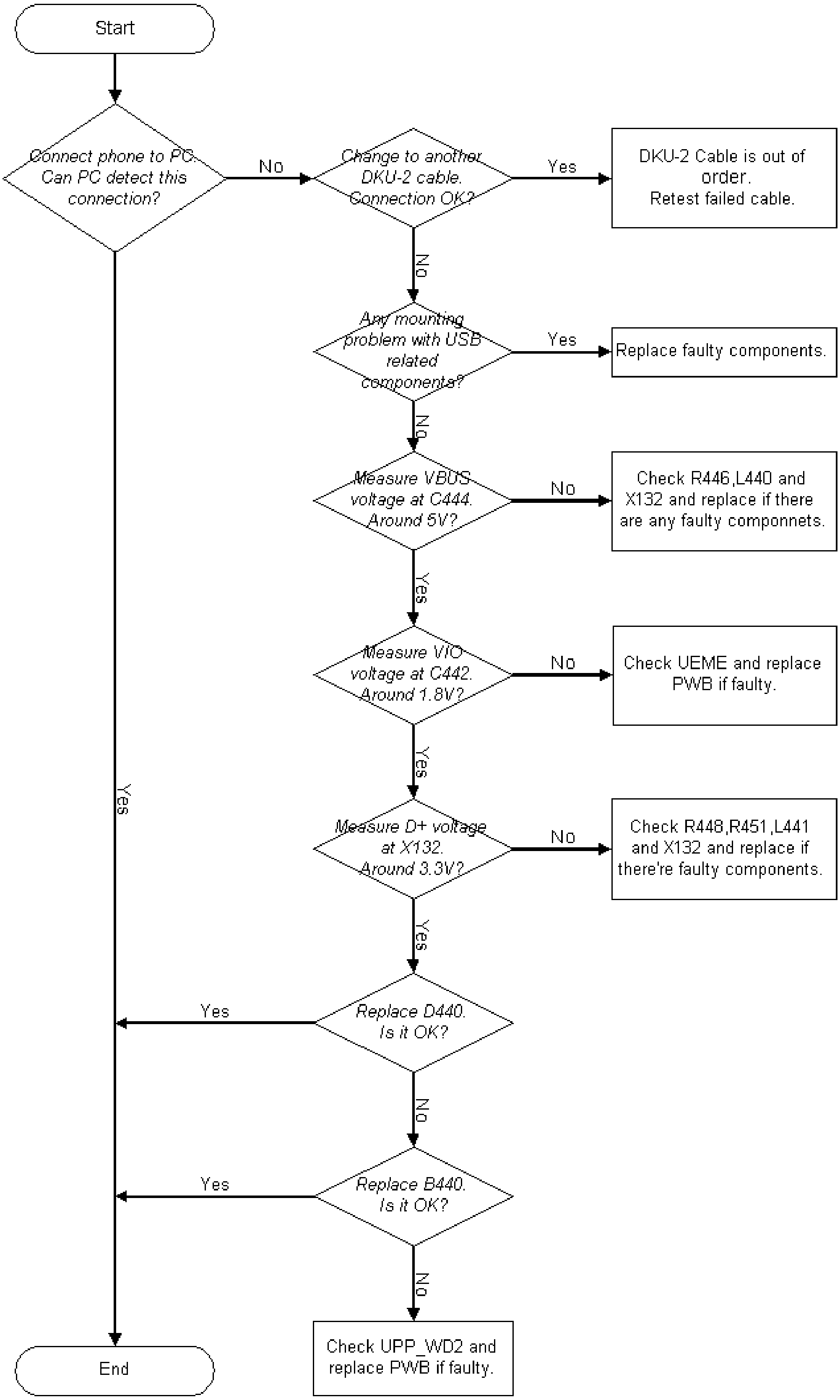

Figure 87 USB interface troubleshooting

SIM card fault

The whole SIM interface is located in two chips: UPP_WD2 and UEME. UEME contains the SIM interface logic level shifting. UPP_WD2 provides SIMClk through UEME to the SIM. The SIM interface supports both 3V and 1.8V SIMs. There is an EMIF component (3 lines EMI filter) between the SIM card and the UEME which isn't shown in the figure below.

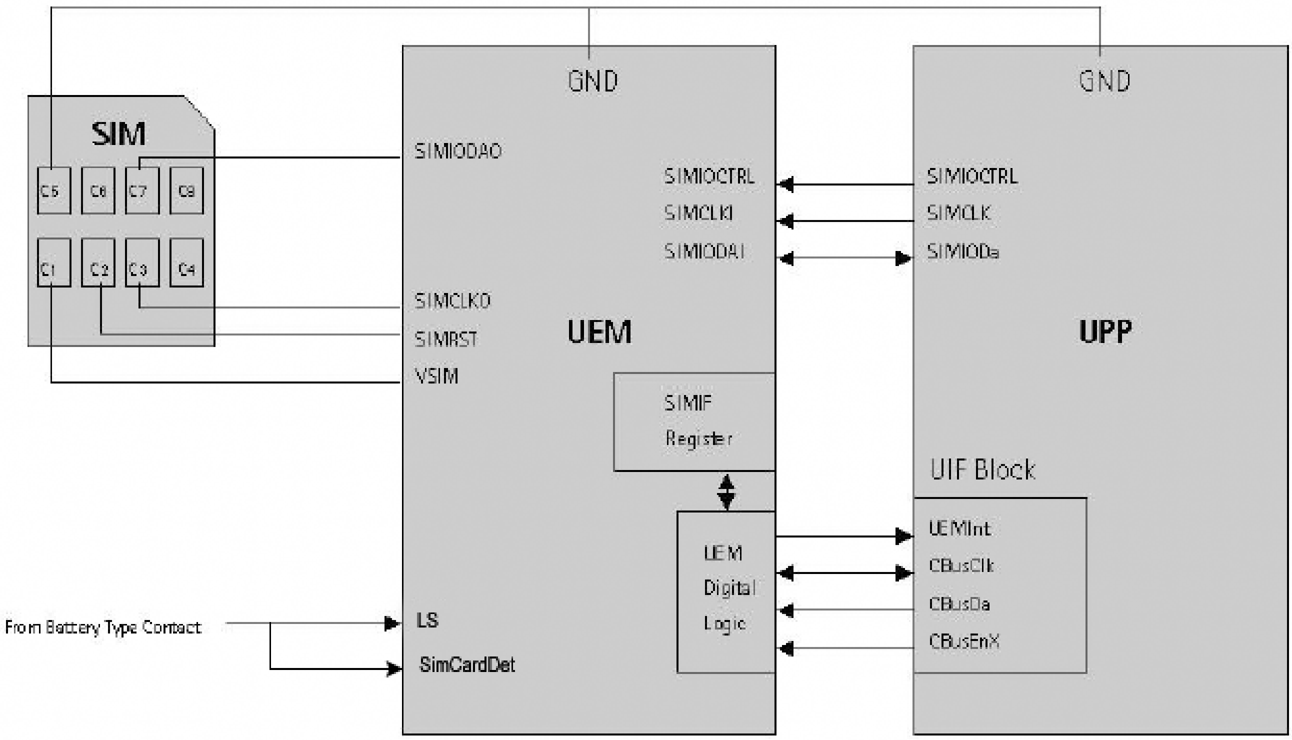

Figure 88 UPP_WD2 and UEME SIM connections (simplified)

The SIM power up/down sequence is generated in the UEME. This means that the UEME generates the RST signal to the SIM. The card detection is taken from the BSI signal, which detects the removal of the battery. A comparator inside the UEME monitors the BSI signal from the SimCardDet input. The threshold voltage is calculated from the battery size specifications.

First, the SW attempts to power up the SIM with 1.8V. If this does not succeed, power up is repeated with VSIM switched to 3V.

The data communication between the card and the phone is asynchronous half duplex. The clock supplied to the card is in GSM system 1.083MHz or 3.25MHz. The data baud rate is SIM card clock frequency divided by 372 (by default), 64, 32, or 16.

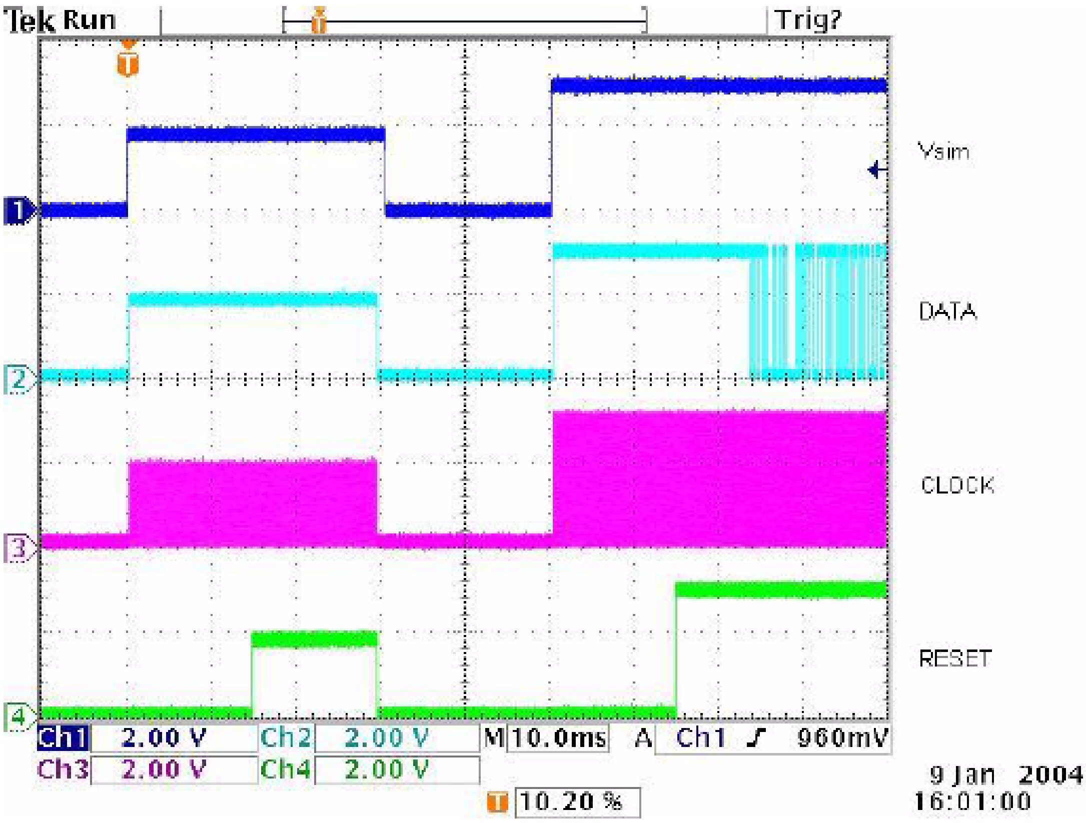

Figure 89 SIM power up waveform

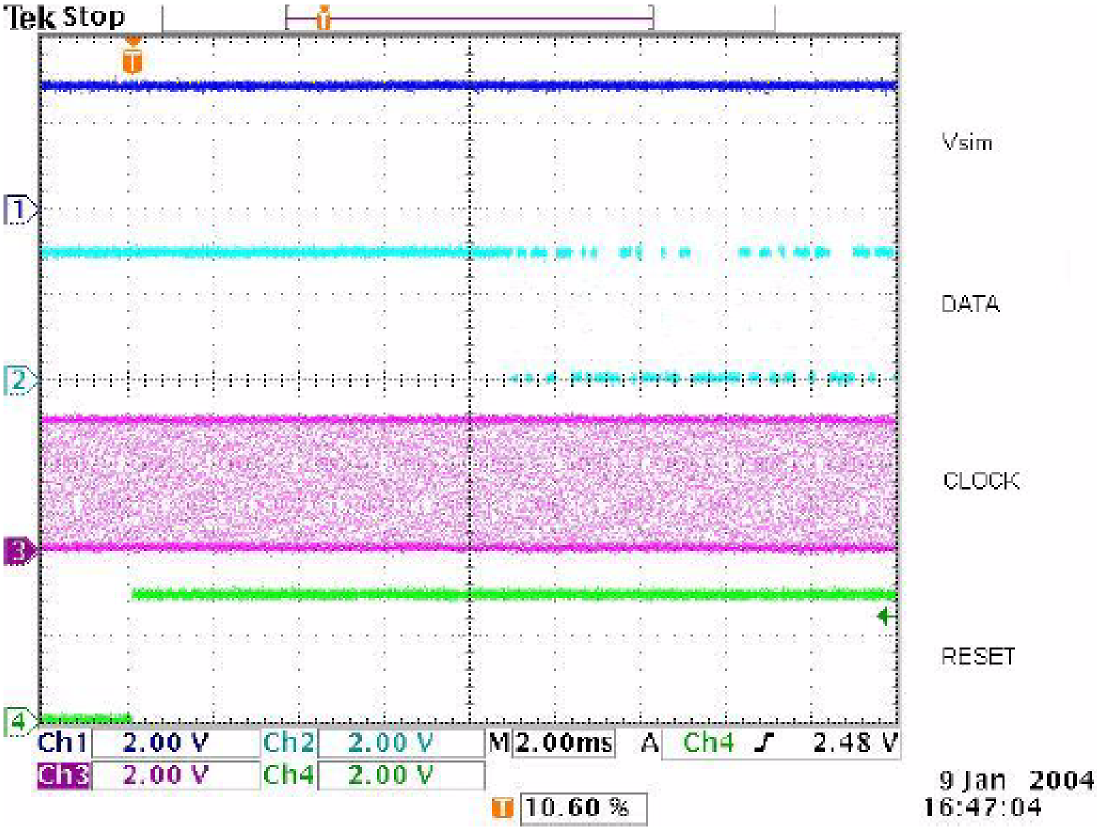

Figure 90 SIM answer to reset waveform

"Insert SIM Card" in device display although card is inserted

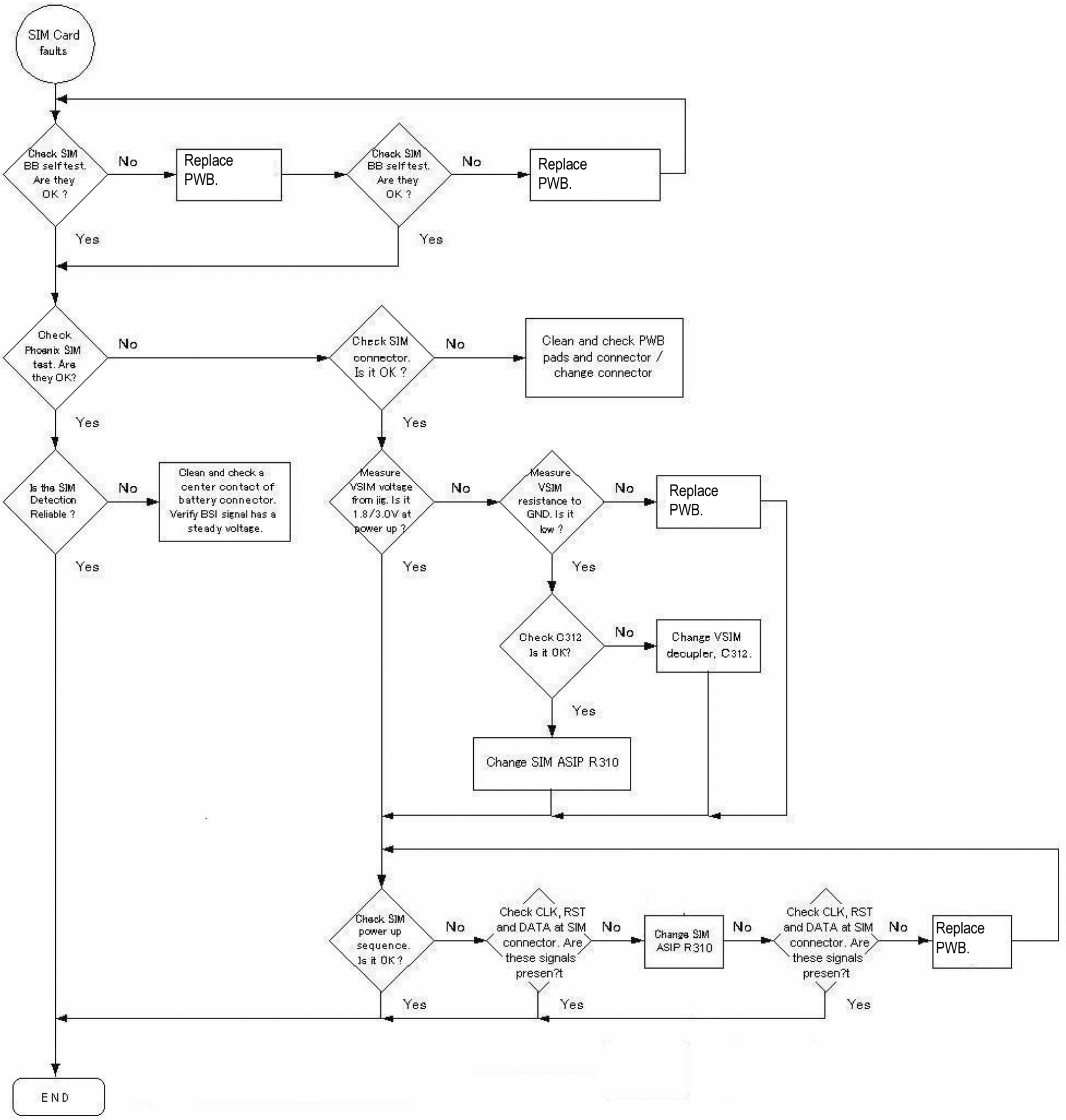

Figure 91 “Insert SIM Card” in device display although card is inserted

Troubleshooting keypad interface

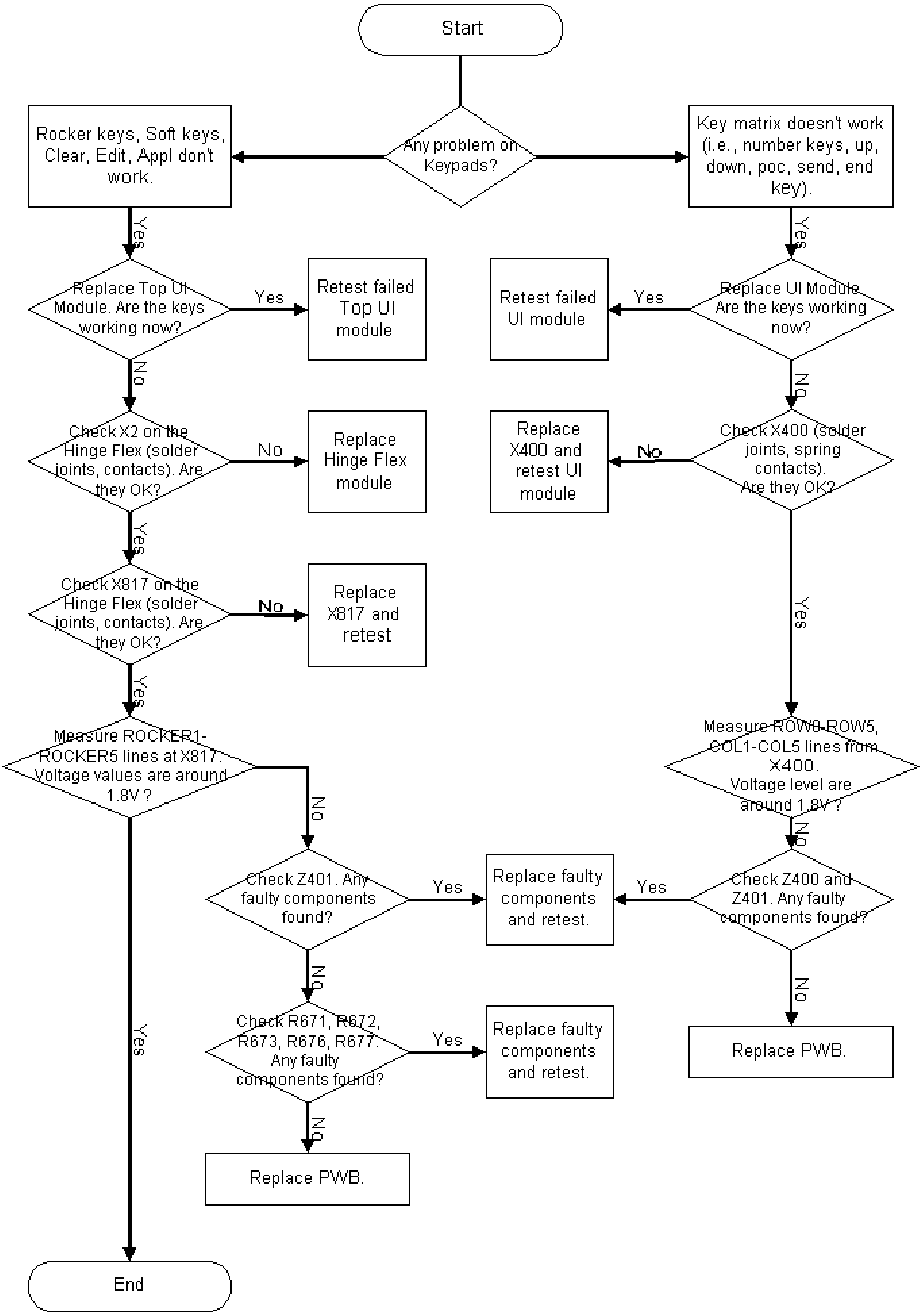

Figure 92 Troubleshooting keypad interface

Troubleshooting the display

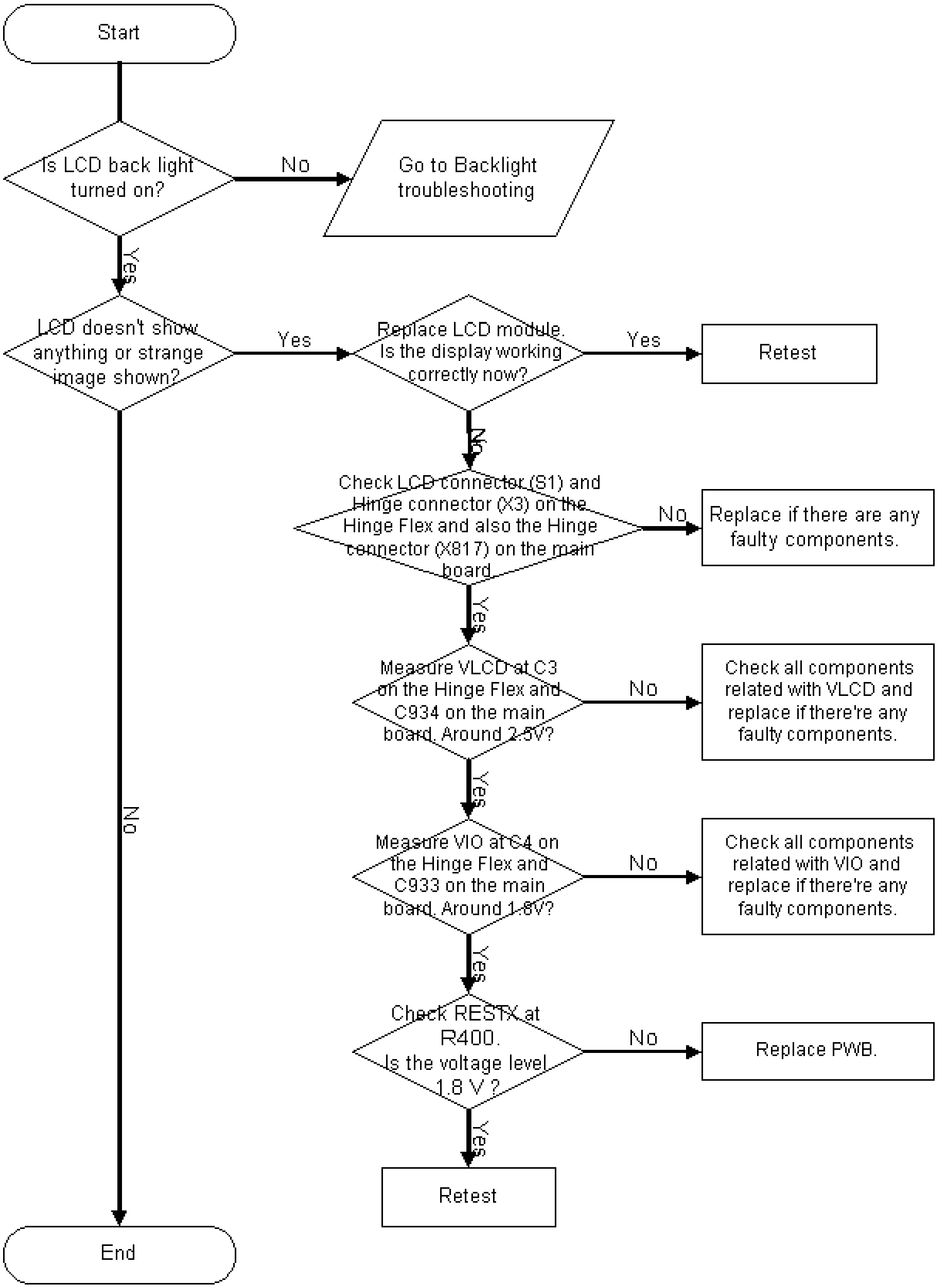

Figure 93 Display troubleshooting

Troubleshooting display and keyboard backlight

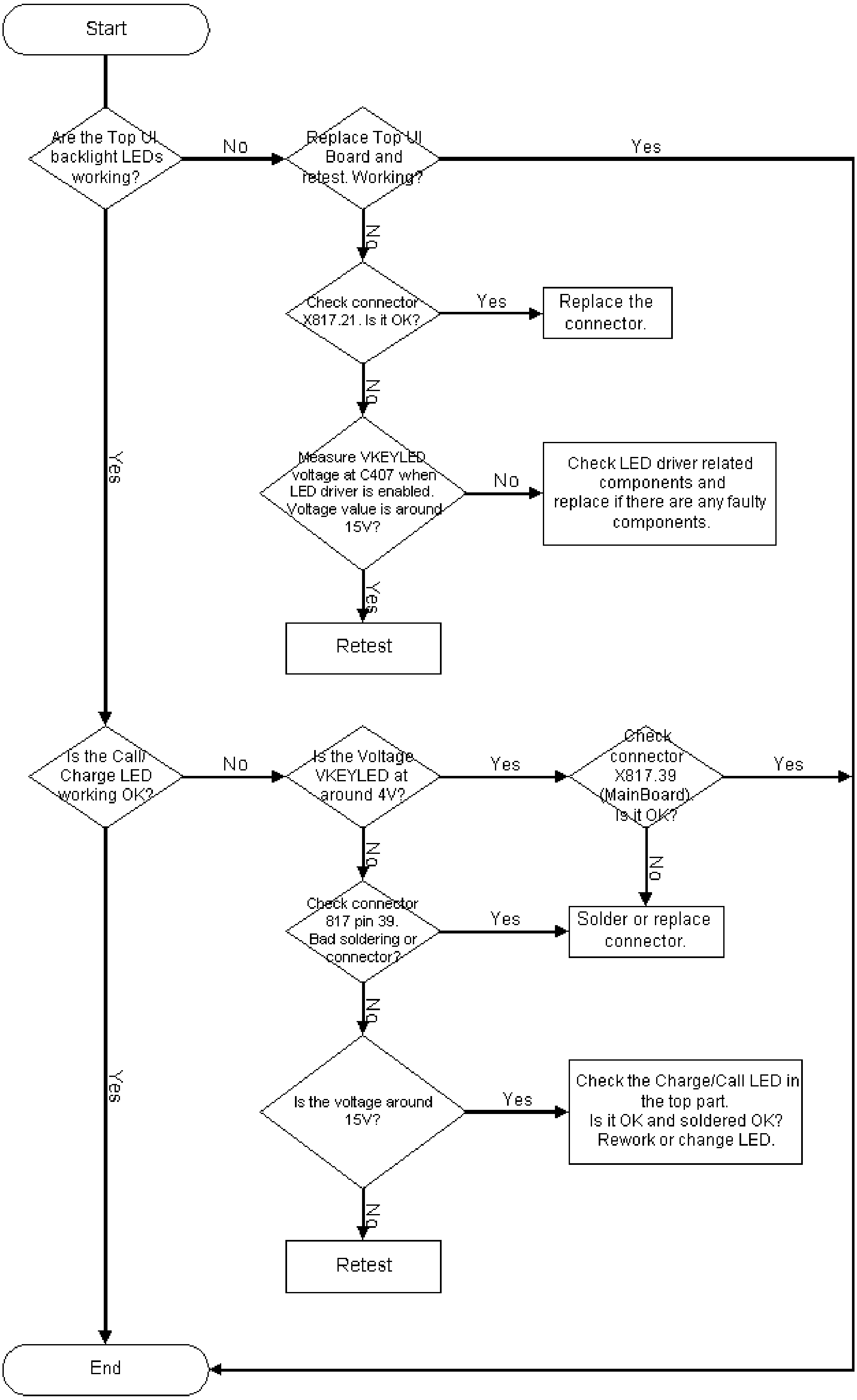

Figure 94 Troubleshooting display and keyboard backlight

Troubleshooting MMC interface

Context

Use a known working MMC to save the photo test. Target devices to replace are N310 Lester, R315 ASIP and X820 MMC connector. The MMC card itself might be broken, and it should be checked as well.

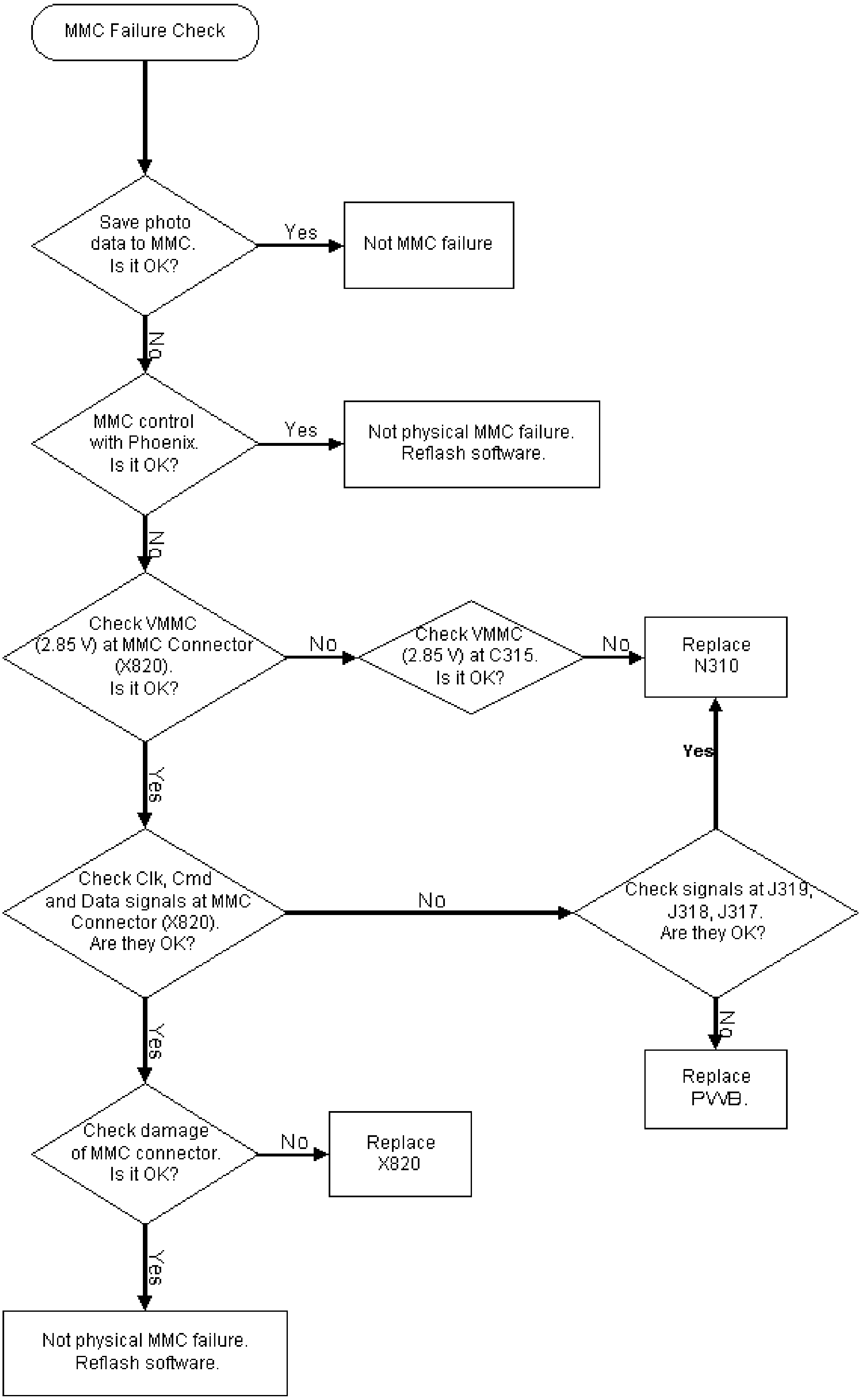

Figure 95 Troubleshooting MMC interface

Audio troubleshooting

Troubleshooting internal microphone

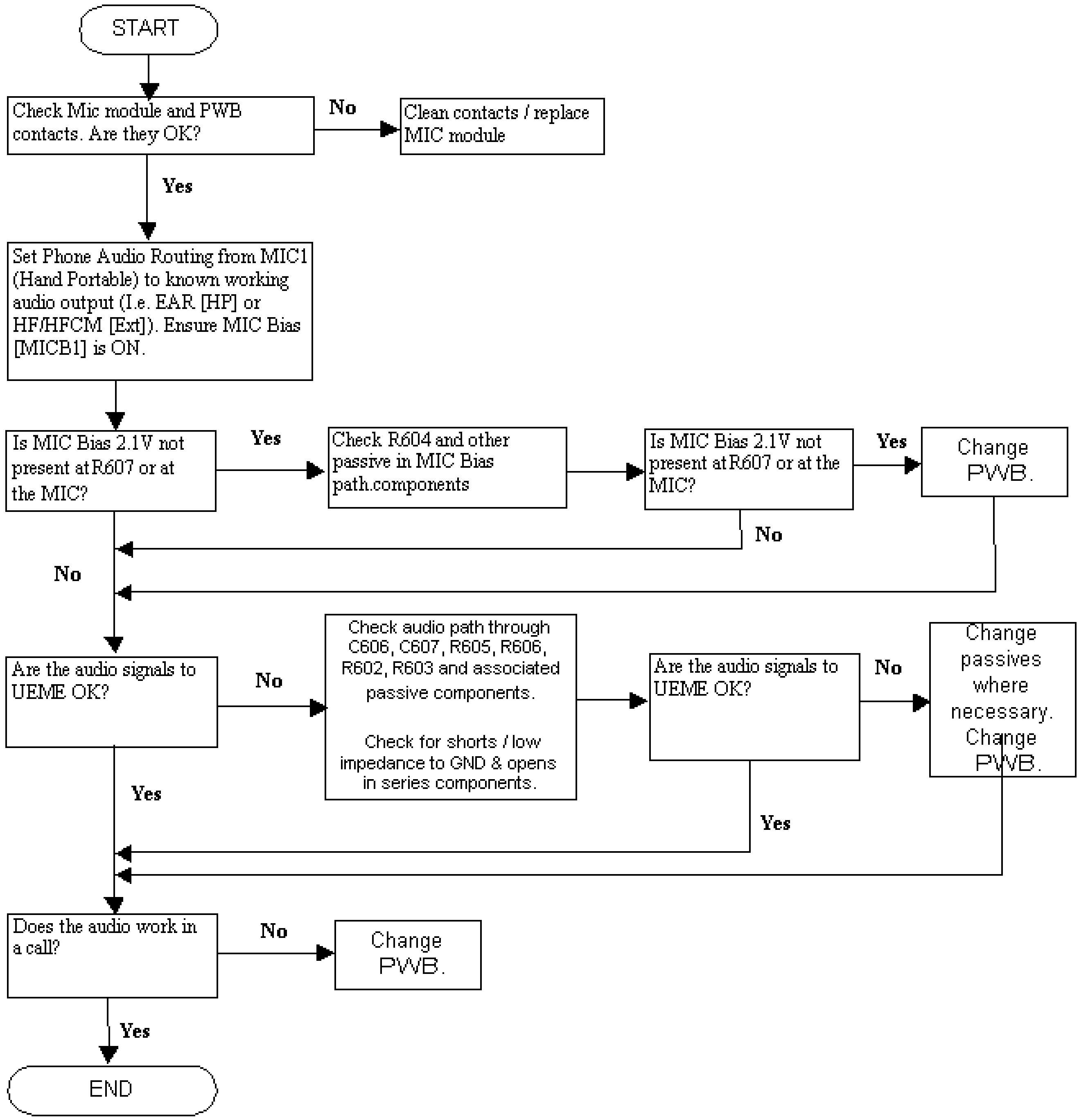

Figure 96 Troubleshooting internal microphone

Troubleshooting external microphone

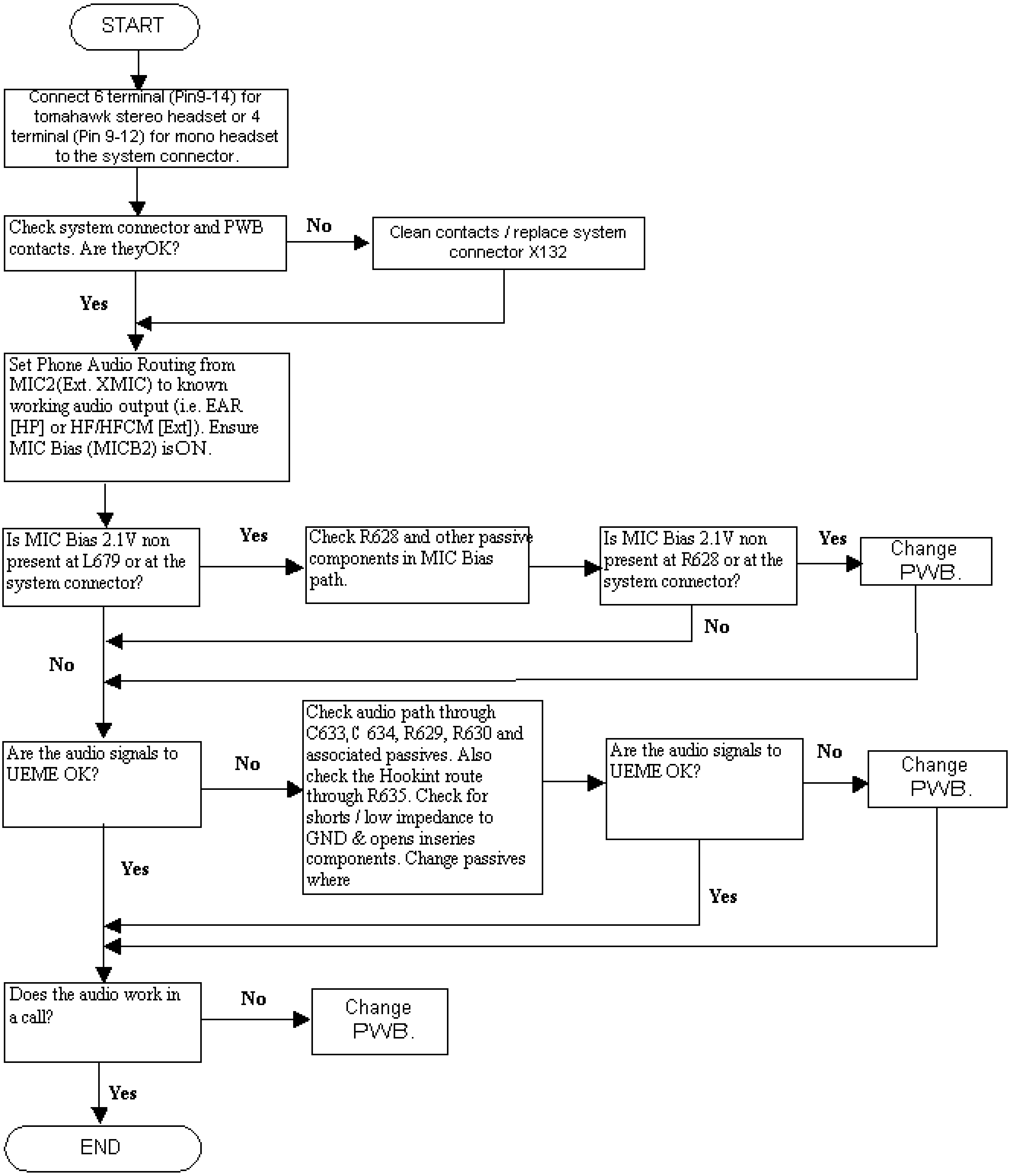

Figure 97 Troubleshooting external microphone

Troubleshooting internal earpiece

Before you begin

Check that holes in earpiece are not coated or covered.

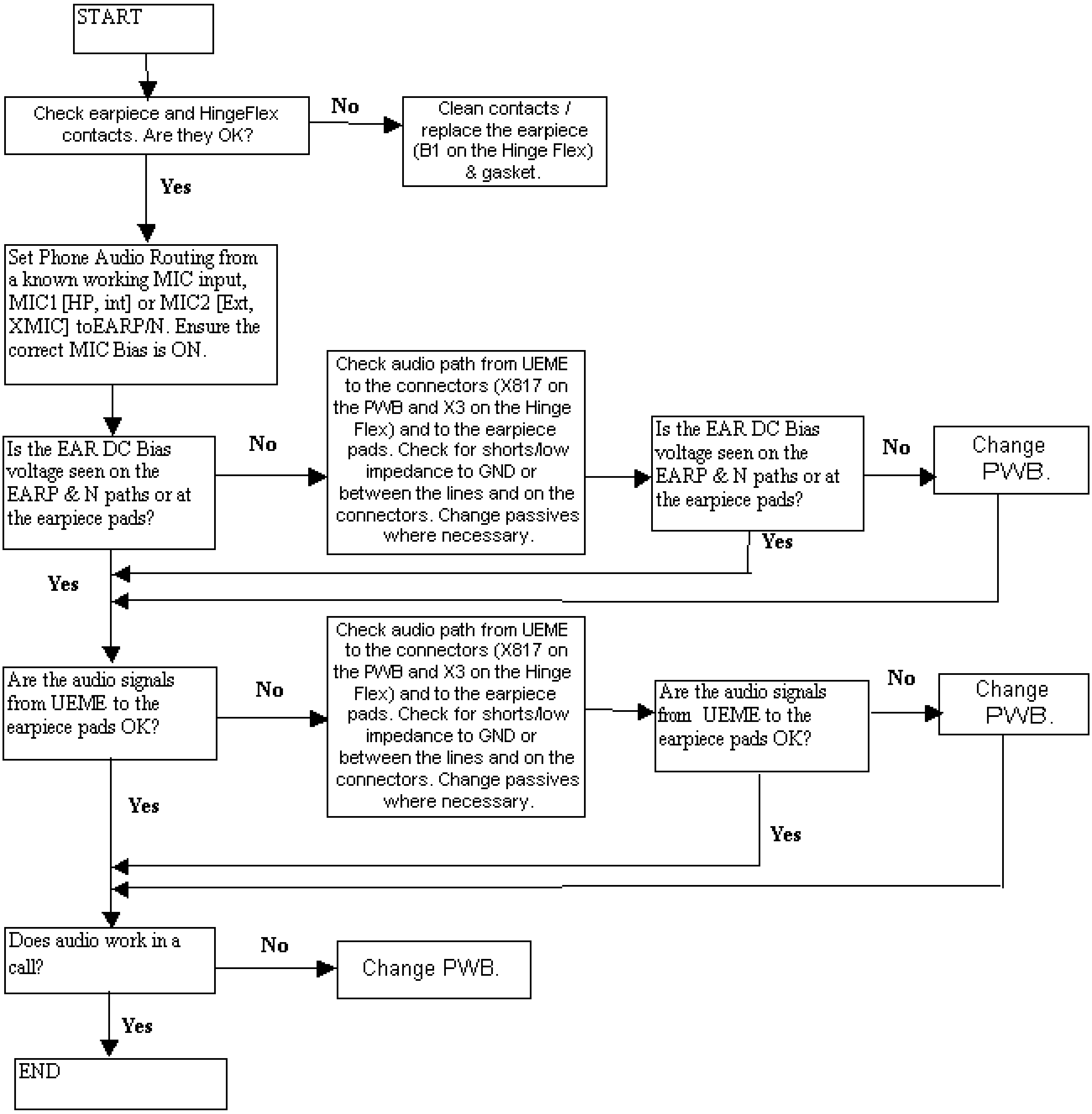

Figure 98 Troubleshooting internal earpiece

Troubleshooting external earpiece

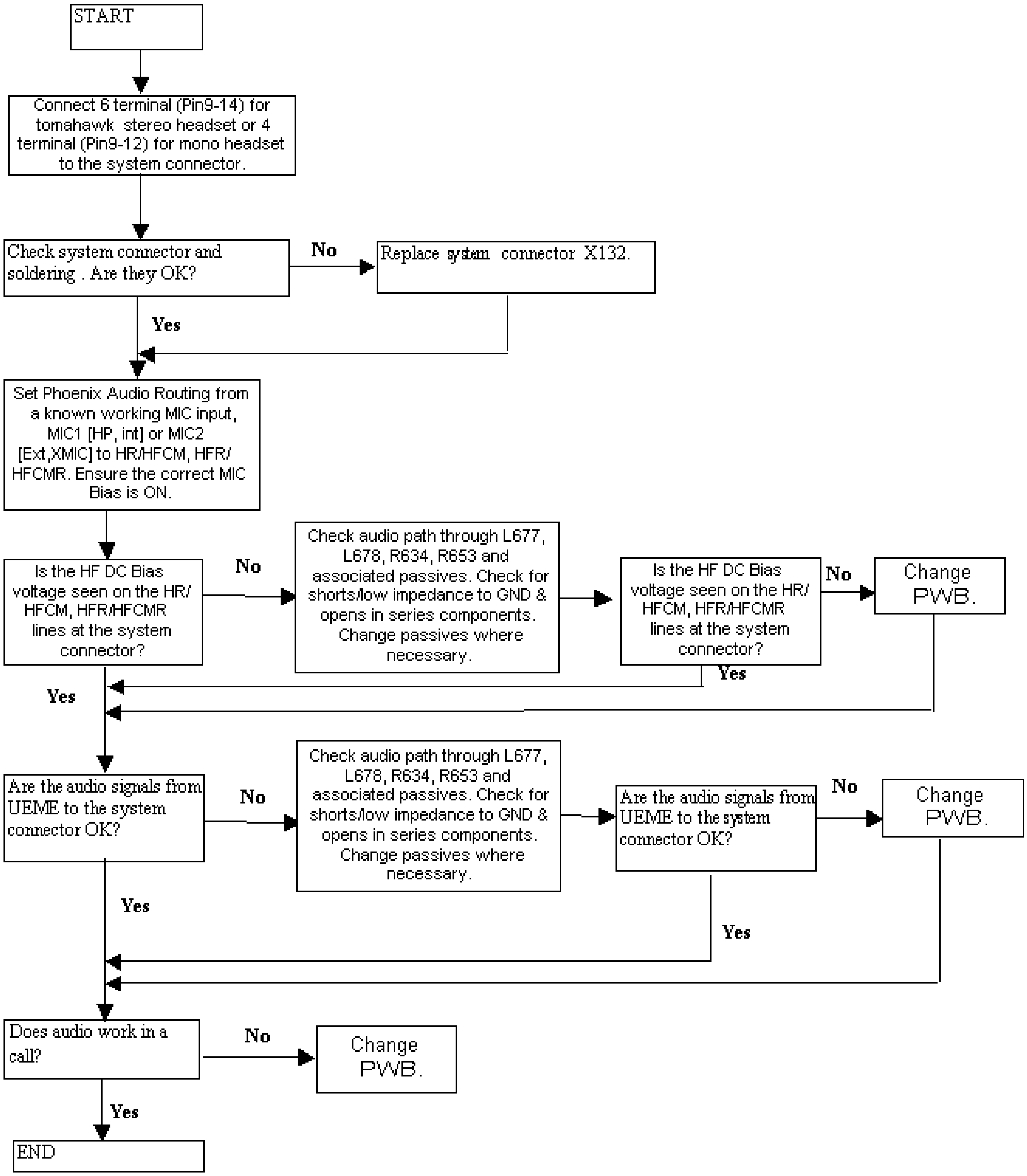

Figure 99 Troubleshooting external earpiece

Troubleshooting IHF

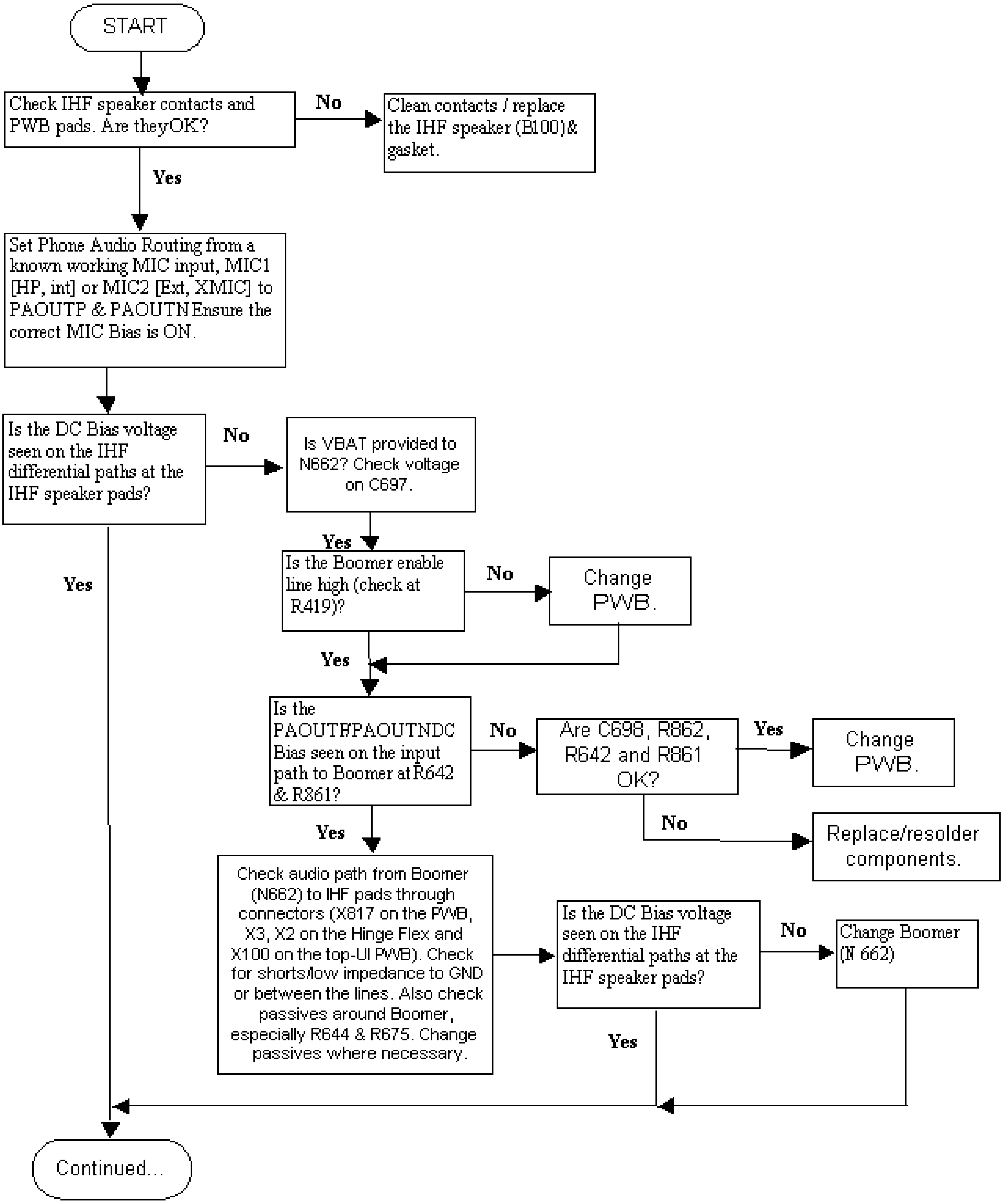

Figure 100 Troubleshooting IHF

See also the following chart.

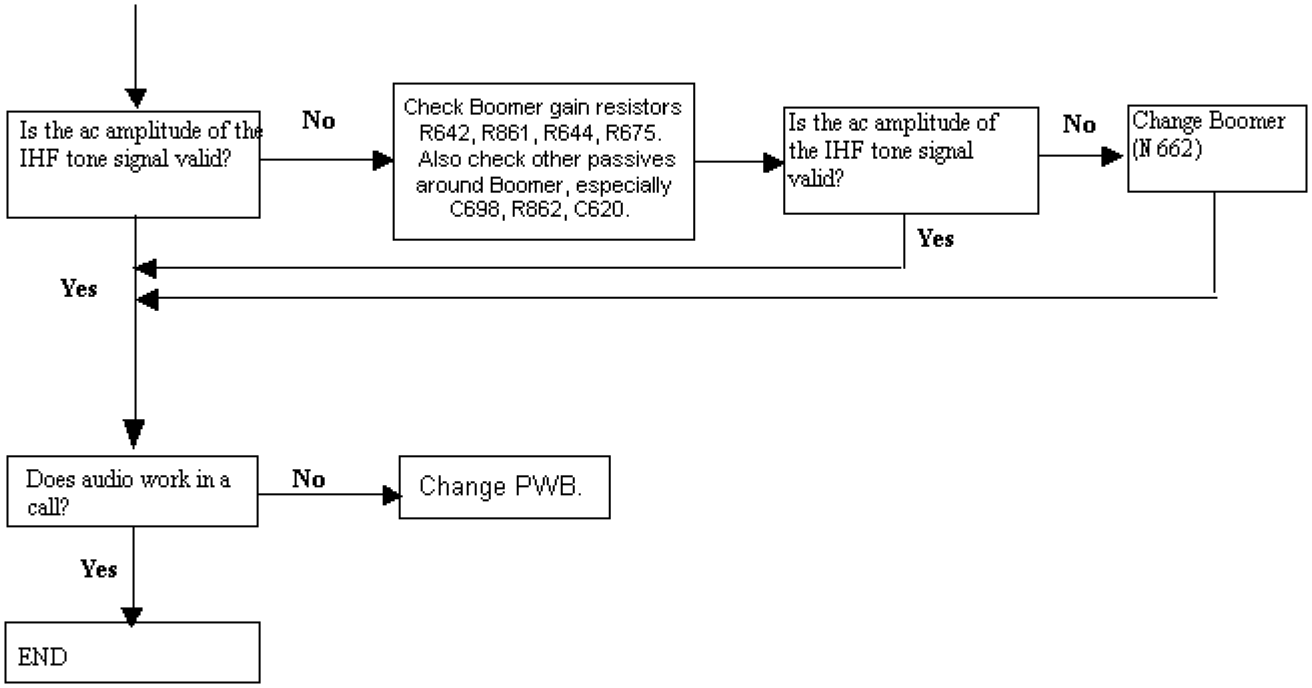

Figure 101 Troubleshooting IHF (continued)

Troubleshooting accessory detection

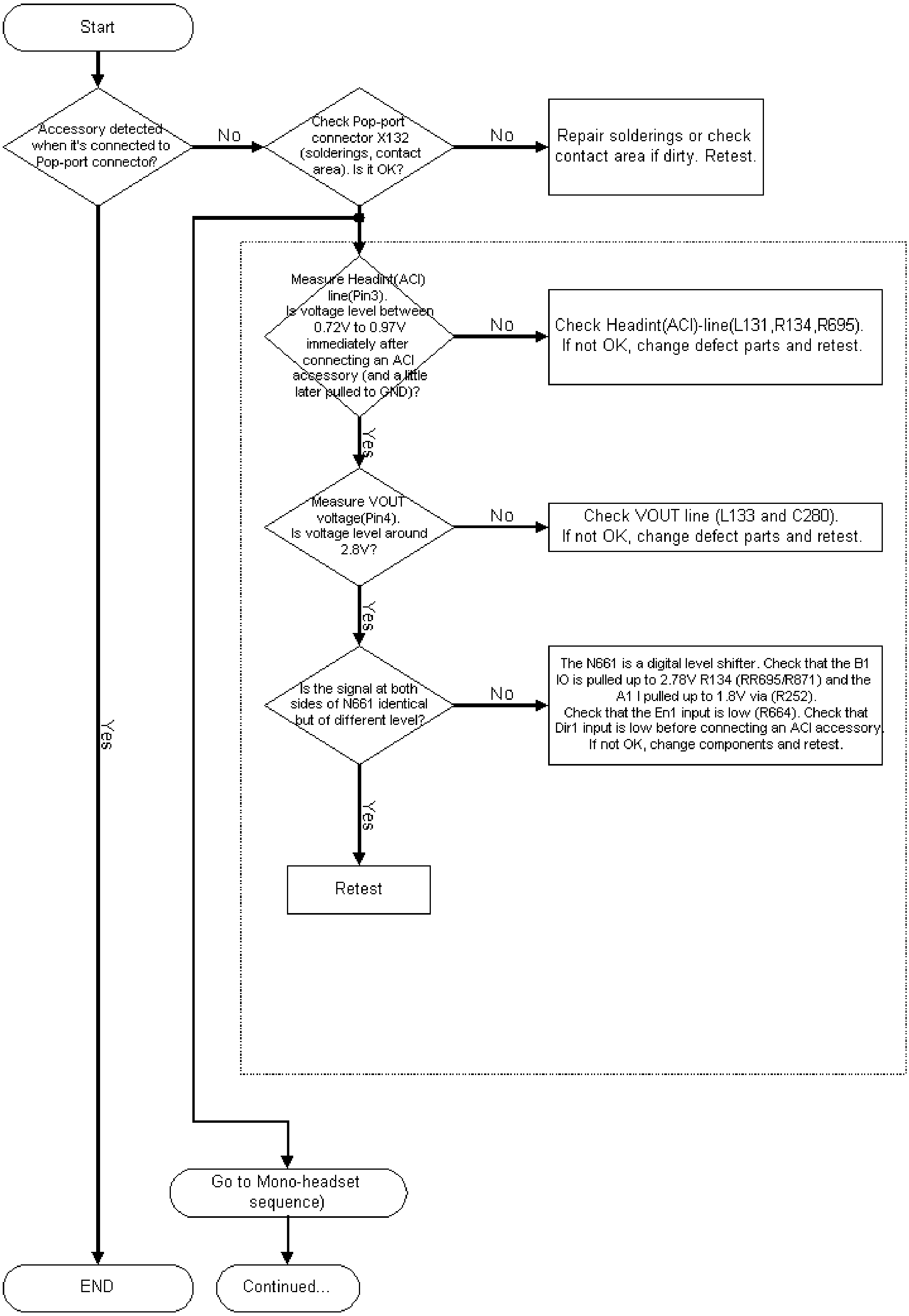

Figure 102 Troubleshooting accessory detection

See also the following flow chart.

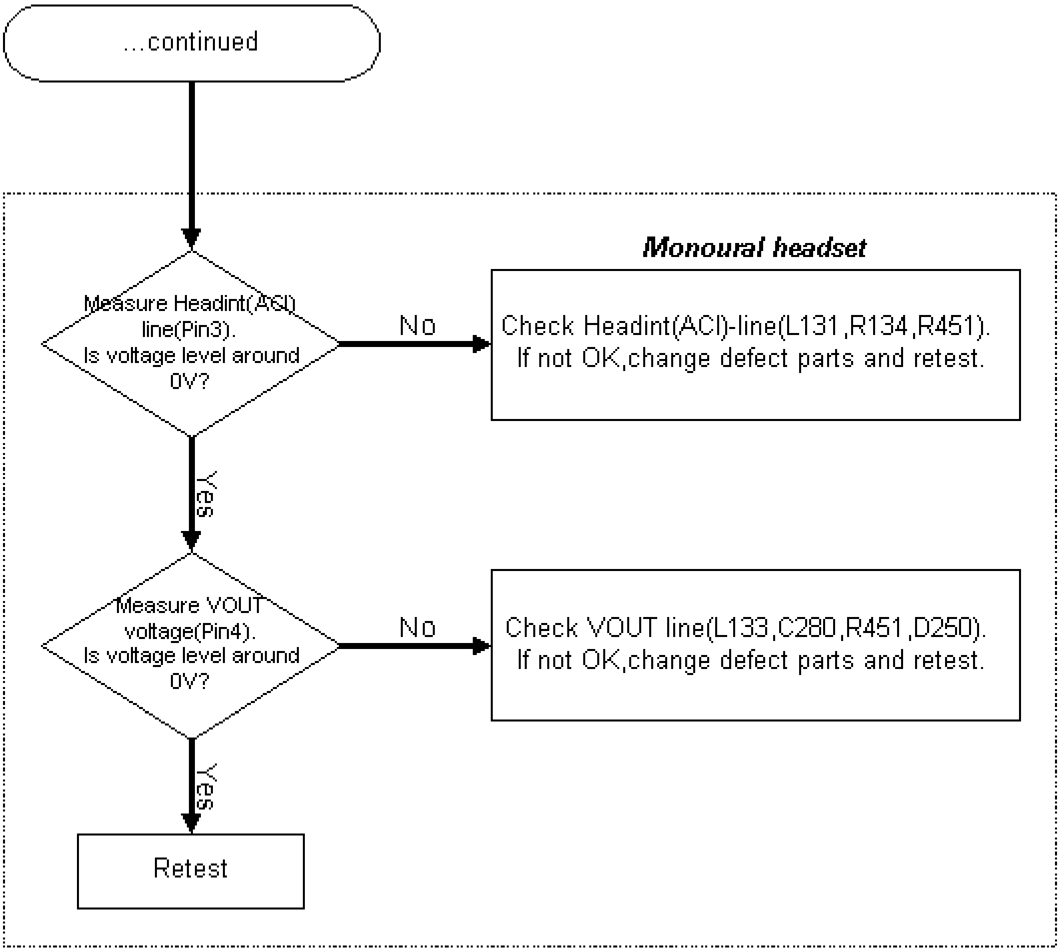

Figure 103 Troubleshooting accessory detection (continued)

Troubleshooting IrDA

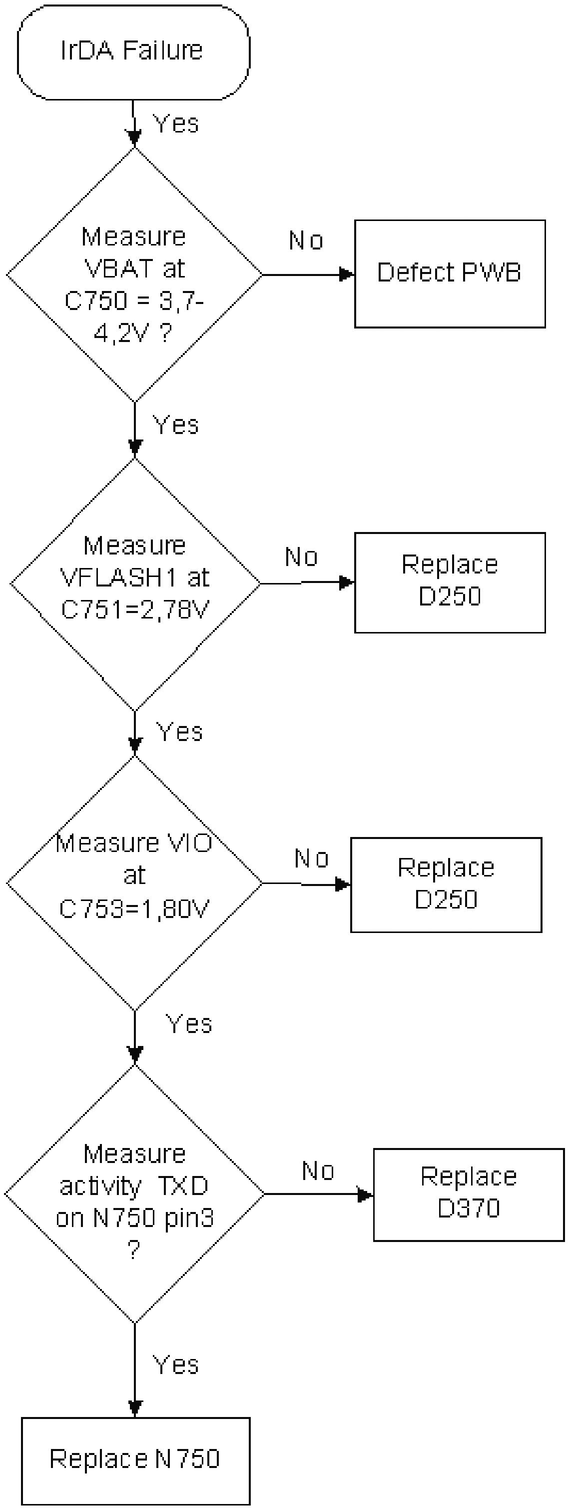

Figure 104 Troubleshooting IrDA

Troubleshooting FM radio

Before you begin

In Phoenix: choose *Testing -> FM radio -> Power on*.

For FM signal:

- Use FM signal received by headset,

  or
- use FM signal generator: Frequency = 100MHz, frequency deviation = 67.5kHz, modulation frequency = 1kHz, R = L, pilot tone on and RF level = -67dBm.

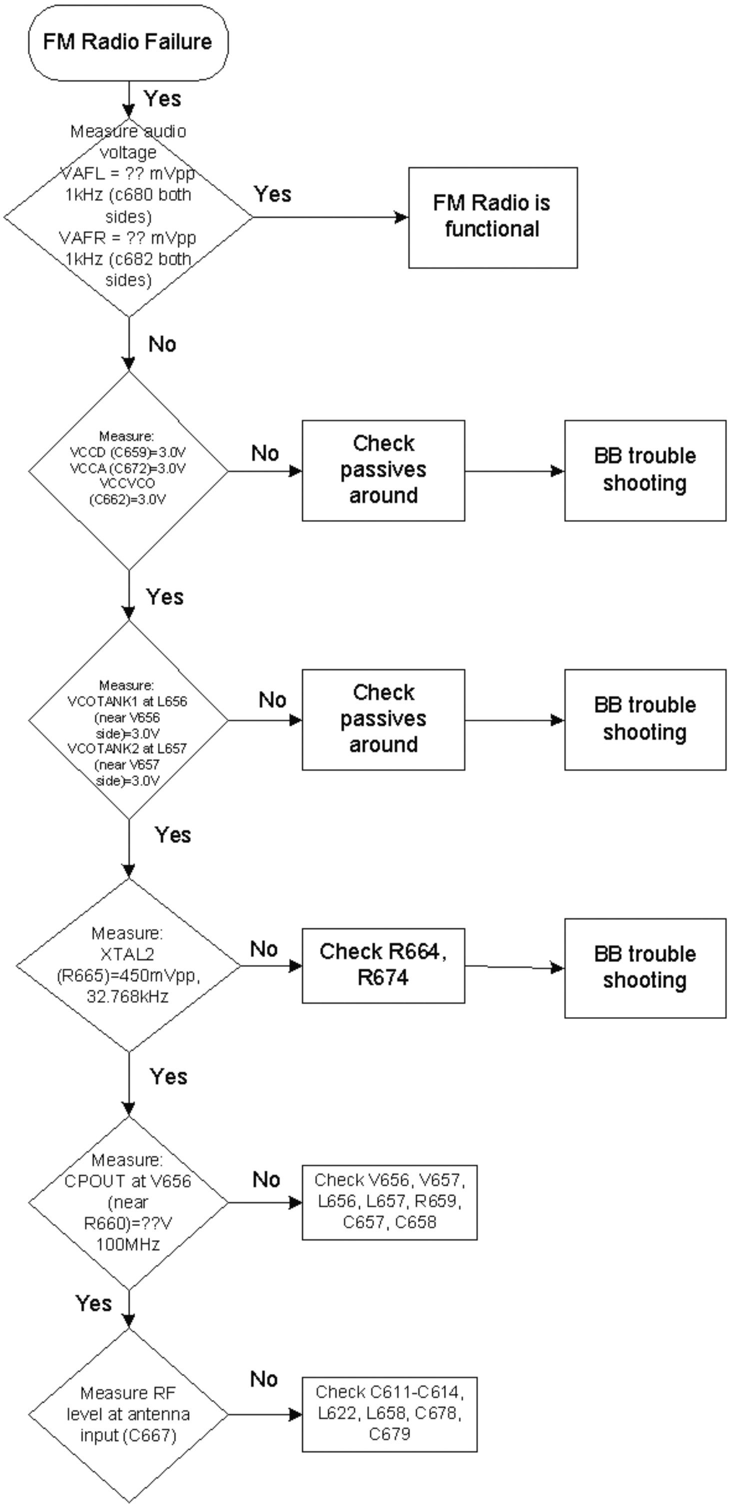

Figure 105 Troubleshooting FM radio

Tuning baseband

Before you begin

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

HW setup:

- An external power supply is needed.
- The RM-25 phone must be connected to JBV-1 (docking station) with DA-25 (docking station adapter).
  - a Connect SCB-3 (DC-DC cable) between JBV-1 and charger connector of phone for charger channel calibration.
  - b Supply 11-16V DC from an external power supply to JBV-1 to power up phone.

Phoenix SW setup:

- Start Phoenix service software.
- Select *FBUS connection*.
- Choose: *Main -> Product -> RM-25*.
- Choose: *Tuning -> Energy Management Calibration*.

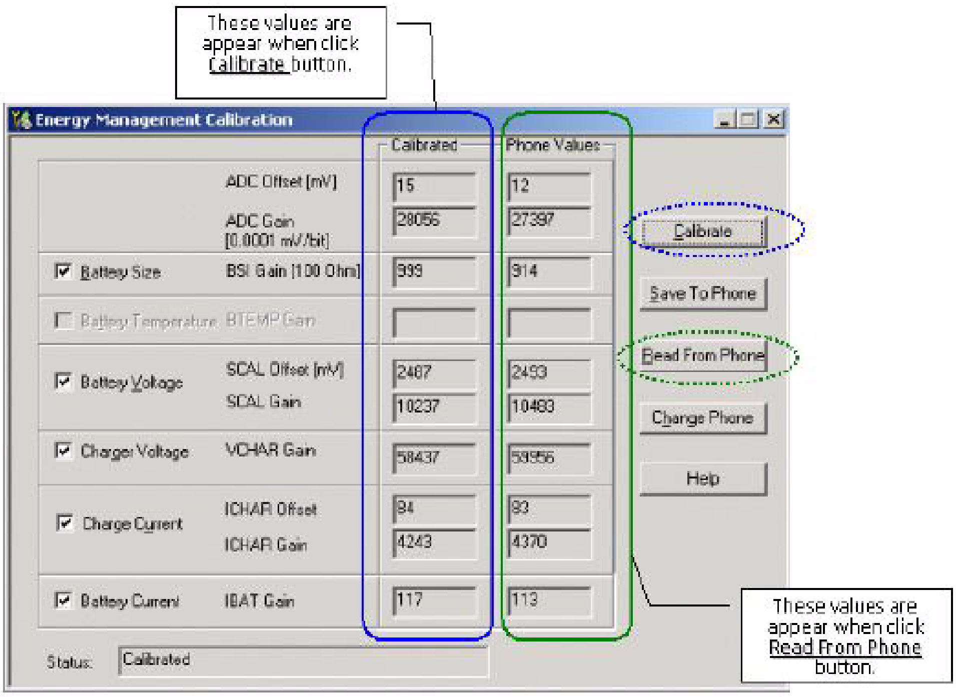

Figure 106 EM calibration window

Steps

1. Select “Read from phone” to show the current values in the phone memory, and then check that the communication with the phone works.
2. Select “JBV-1 used” check box.
3. Select the item(s) you try to calibrate.

   Note: ADC has to be calibrated before other item(s). If the ADC value is correct or you calibrate ADC and other items at the same time, that’s OK.
4. Select “Calibrate”.

   Calibration is carried out automatically regarding the calibration item(s) that you selected.
5. The candidate of the new calibration values is shown in the “calculated” field. If the new calibration values seem to be reasonable (please refer to the calibration value limit table), select *Write to PM* to store the new calibration value in the phone permanent memory.

Table 23 Calibration value limits

Parameter	Min.	Max.
ADC Gain	26500	28500
ADC Offset	-50	50
BSI Gain	600	1100
VBAT Gain	10000	11000
VBAT Offset	2300	2900
VCHAR Gain	58000	62000
ICHAR Gain	3500	4400
ICHAR Offset	-80	+80
IBAT Gain	50	160

6. Select “Read from phone” and confirm that the new calibration values are stored in the phone memory correctly. If not, please try to store by selecting “Write to PM” again.
7. Close the Energy Management Calibration window.

Testing and tuning BB after component replacement

Context

The replacement of certain components which influences the energy management in the phone should be followed by a calibration.

Steps

1. Calibrate R133, the UEME - D250, the ZOCUS - N130 and R259.

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7 — RF troubleshooting

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Table of Contents

List of Tables

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Company Confidential

Introduction to RF troubleshooting

This document describes RF troubleshooting and tuning. In general, two types of measurements have to be done during troubleshooting and repair of phones:

- RF measurements shall be done with a spectrum analyzer, either connected directly to the RF connector of the RF adapter board SA-38, or used together with a high-frequency probe to measure RF signals at points along the TX or RX chain.
- LF (Low-Frequency) and DC measurements shall be done either with a multimeter, or with an oscilloscope together with a 10:1 probe.

All tuning must be done with Phoenix Service Software _a15_2004_7_55.exe, or later.

Always make sure that the measurement set-up has been calibrated when measuring RF parameters at the RF connector. Remember to include the correct losses in the module repair jig and the connecting cable when realigning the phone.

Most RF semiconductors are static discharge sensitive. ESD protection must be taken into account during repair (ground straps and ESD soldering irons).

RF calibration done via Phoenix software is temperature sensitive because of calibration of 26MHz reference oscillator (VCXO). According to the Helgo specification, the ambient temperature has to be in the range of 22 to 38C.

> **Note:** In this text the following terms are used interchangeably:
>
> - GSM900 = EGSM900 = EGSM
> - GSM1800 = DCS band = PCN band
> - GSM1900 = PCS band

The first step of fault-finding should always be a visual inspection. Carefully inspect the RF area using a microscope and look for solder bridges, missing components, short circuits, components that have partially come off and other anomalies. Capacitors can be checked to see that they are not short-circuited, and inductors that they are not open circuits. Also check that power supply lines are not short-circuited, i.e. not 0Ω to ground.

Instruments needed for troubleshooting (minimum requirement):

- oscilloscope
- multimeter
- spectrum analyzer (SA)

> **Note:** Always use an attenuator at the spectrum analyzer input to ensure that the SA will not become damaged by excessive input power from the phone. Check the spectrum analyzer for maximum allowable input power.
>
> For example, when transmitting in the EGSM band at max power level, the output power will be around +33dBm. By using a 10dB attenuator the actual input to the SA will then be +23dBm. Also adjust the internal attenuator so that the transmitted signal is reduced to less than around -10dBm in order to avoid saturation of SA input stage.

- power supply that can deliver at least 2Adc
- Nokia MJ-30 module jig (also called test jig)
- RF adapter SA-38
- PC with Phoenix installed
- PKD-1 deskey dongle for Phoenix

RF key component placement

The following figure shows the key components of the RF section:

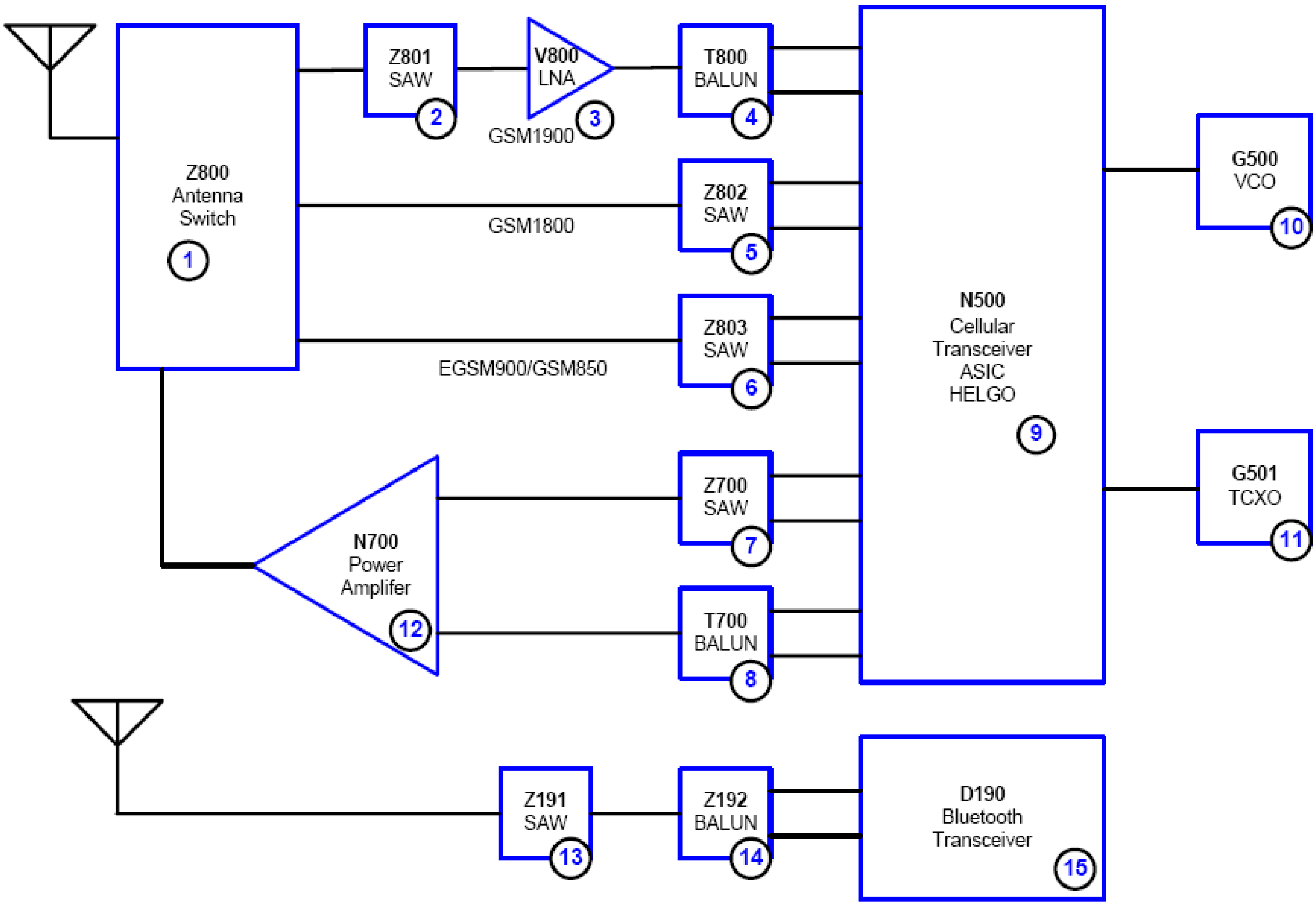


Figure 107 RF key component placement

- Adjust the RX chain after repairing or changing the parts marked RX.
- Adjust the TX chain after repair or changing the parts marked TX.
- The numbering refers to the RF-overview and non-RF-overview pictures.

Table 24 RF retuning after changing a component

1	N500	Helgo RF ASIC	RX	TX
2	G500	VCO	RX	TX
3	G501	VCTCXO	RX	
4	Z800	RX/TX Switch	RX	TX
5	N700	PA		TX
6	V800	LNA1900	RX	
7	Z803	RX SAW 900	RX	
8	Z802	RX SAW 1800	RX	
9	Z801	RX SAW 1900	RX	
10	T800	RX Balun 1900	RX	
11	Z700	TX SAW 900		TX

12	T700	TX Balun 1800/ 1900		TX

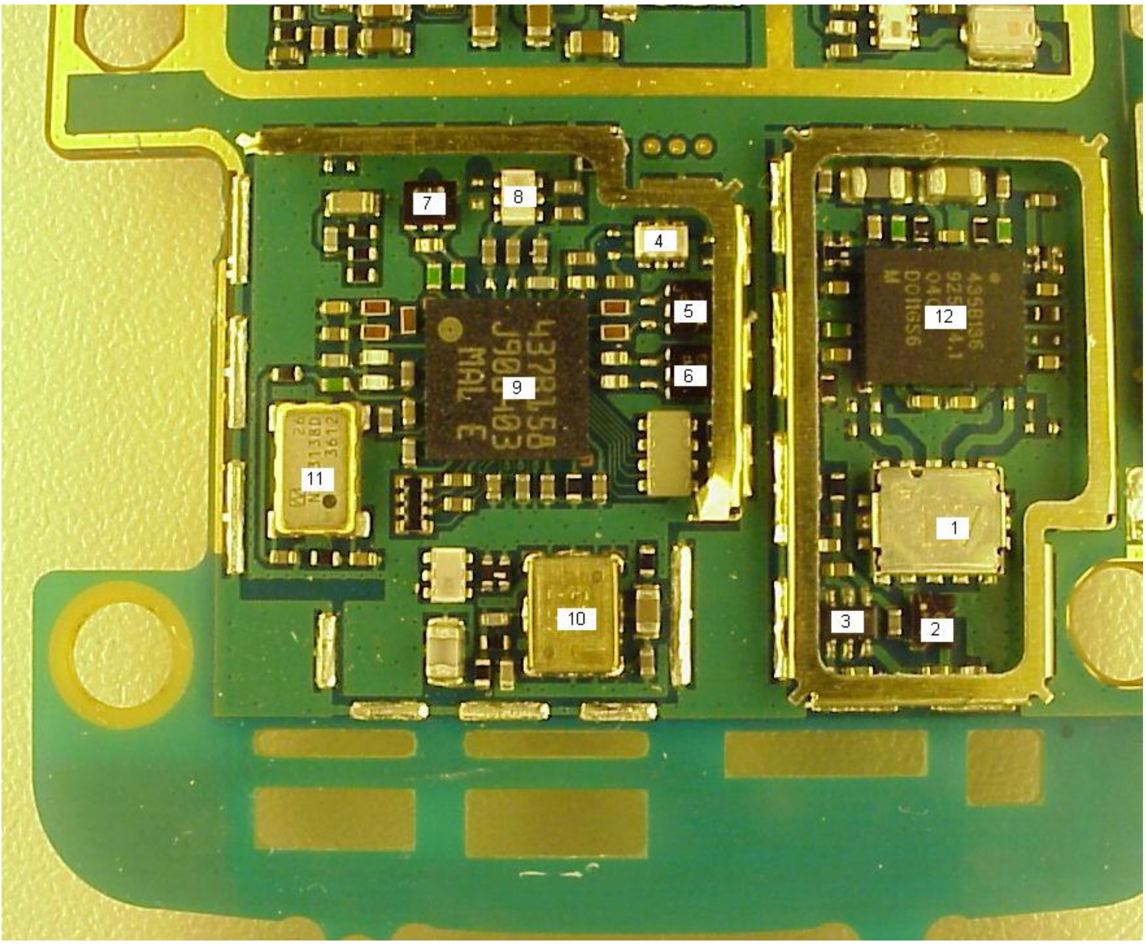


Figure 108 RF key components (left)

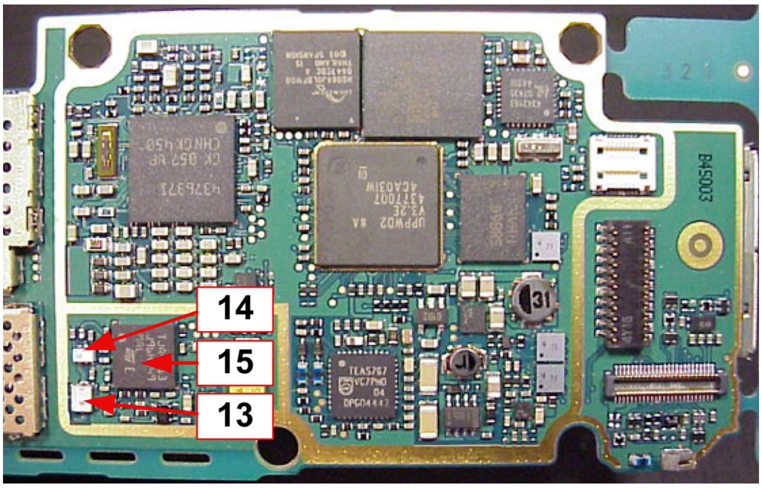


Figure 109 RF key components (right)

Receiver

Receiver troubleshooting

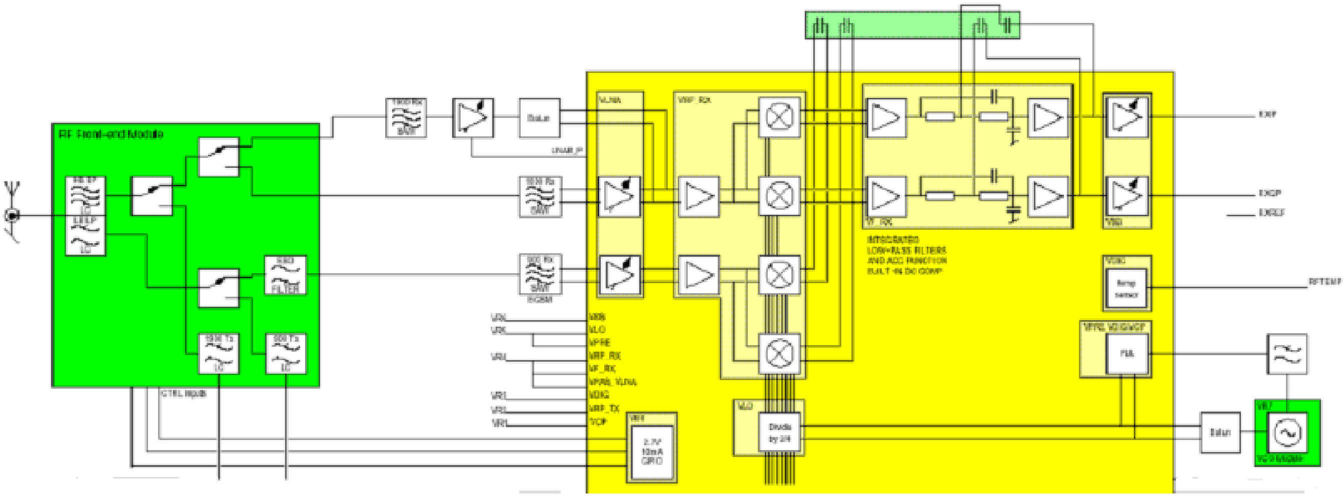


Figure 110 Receiver signal paths

Each receiver path is a direct conversion linear receiver. From the antenna, the received RF signal is fed to a front end module where a diplexer first divides the signal to two separate paths according to the band of operation: either lower, EGSM900 or upper, GSM1800/1900 path.

At each of the paths follows a pin-diode switch, which is used to select either a receive- or transmit mode. At the upper band in the receive mode either GSM1800 or 1900 path is further selected by another pin-diode switch. The selections are controlled by Helgo, which obtains the mode/band and timing information through the RFBus.

After the switches an external bandpass filter follows each receiver paths. Thereafter, the signal is fed to the LNA's. EGSM900 and GSM1800 LNA's are integrated in Helgo, while the GSM1900 LNA is a discrete component placed between SAW filter and balun. In GSM1900, the amplified signal is fed to a pre-gain stage of the mixer. EGSM900 and GSM1800 LNA's are connected directly to the pregain stages. The pregain stages as well as all the following receiver blocks are integrated in Helgo. The LNA's have three gain levels. The first one is the maximum gain, the second one is about 30 dB below the maximum, and the last one is the off state.

After the pregain stages there are demodulator mixers at each signal path to convert the RF signal directly down to baseband I and Q signals. Local oscillator signals for the mixers are generated by an external VCO. The frequency is divided by two in GSM1800 and GSM1900 and by four in EGSM900. Those frequency dividers are integrated in Helgo and in addition to the division they also provide accurate phase shifting by 90 degrees which is needed for the demodulator mixers.

The demodulator output signals are all differential. After the demodulators there are amplifiers called DtoS (differential to single ended) which convert the differential signals to single ended. Before that, they combine the signals from the three demodulators to a single path which means that from the output of the demodulators to the baseband interface are just two signal paths (I and Q), which are common to all the frequency bands of operation. In addition, the DtoS amplifiers perform the first part of the channel filtering and AGC (automatic gain control). They have two gain stages, the first one with a constant gain of 12 dB and -3 dB bandwidth of 85 kHz and the second one with a switchable gain of ±6 dB. The filters in the DtoS blocks are active RC filters. The rest of the analog channel filtering is provided by blocks called BIQUAD which include modified Sallen-Key biquad filters.

After the DtoS and BIQUAD blocks, there is another AGC-amplifier which provides a gain control range of 42 dB in 6 dB steps. The correlation between the gain steps and the absolute received power levels is found by a calibration routine in the production for each assembled phone.

In addition to the AGC steps, the last AGC stage also performs the real time DC offset compensation, which is needed in a direct conversion receiver to cancel out the effect of the local oscillator leakage. DC offset compensation is performed during an operation called DCN1. DCN1 is carried out by charging capacitors at the input of the last AGC stages to a voltage, which causes a zero DC offset. To improve the accuracy a DC level alignment possibility has been added to Helgo.

After the last AGC stages the single ended and filtered I- and Q-signals are fed to the RX ADCs. The maximum peak-to-peak voltage swing for the ADCs is 1.45 V.

Measuring Rx/IQ signals using RSSI

Context

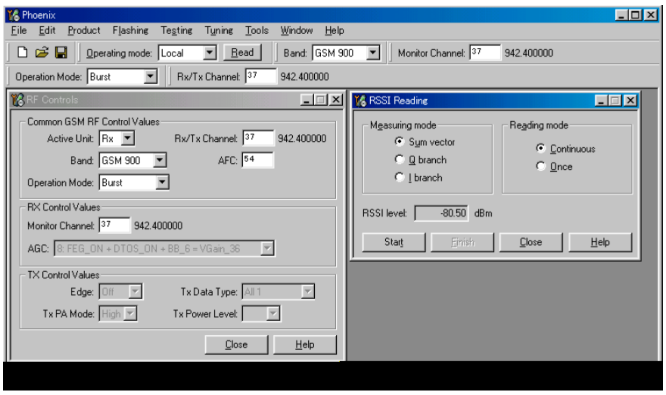
Steps

1. Start Phoenix service software.
2. Establish a connection to the phone.

   From the File menu, choose "Open Product".

   From the list, select RM-25.
3. From the Testing menu, choose RF Controls.
4. In the RF Controls window:
   - Select Band: GSM900/GSM1800/GSM1900.
   - Set Active unit to Rx.
   - Set Operation mode to Burst.
   - Set Rx/Tx channel in the following way: EGSM900: 37, GSM1800: 700 and GSM1900:661.
5. From the Testing menu, choose RSSI Reading.

   The setup now looks like this:



6. Apply a signal frequency of:
   - EGSM900: 942.4677MHz (channel 37 + 67.7KHz offset)
   - GSM1800: 1842.8677MHz (channel 700 + 67.7KHz offset)
   - GSM1900: 1960.0677MHz (channel 661 + 67.7 KHz)
7. In RSSI reading, click Read now.

Results

The resulting RSSI level should be -80dBm in each band.

Measuring RX performance using SNR measurement

Context

Note: This measurement also provides an indication of the conducted sensitivity.

Steps

1. Start Phoenix Service Software
2. Establish connection to the phone.

   From the File menu, choose "Open Product".

   From the list, select RM-25.
3. From the Testing menu, choose RF Controls.
4. In the RF Controls window:
   - i Select Band: GSM900/GSM1800/GSM1900
   - ii Set Active unit to RX.
   - iii Set Operation mode to Burst
   - iv Set Rx/Tx channel in the following way: EGSM900: 37, GSM1800: 700 and GSM1900: 661
5. From the testing menu (T) select SNR measurement (M). Then select Both.
6. Choose respective band, EGSM900, GSM1800 or GSM1900.

   Press Start.
7. Follow the instructions for Signal generator set-up in the pop-up window.

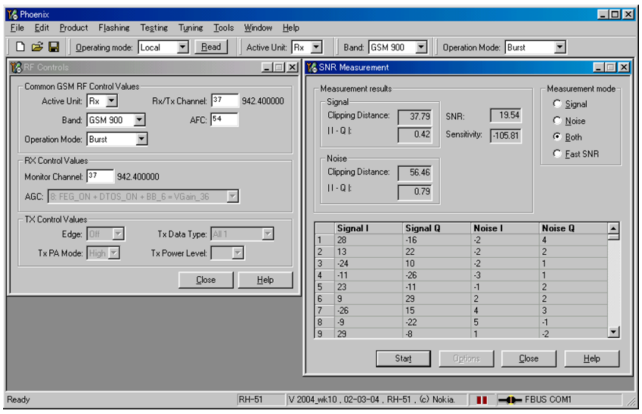
   Press OK.

Results

Read the SNR result. SNR should be > 18dB.

Check the sensitivity value.

The set-up should now look like this (the pop-up window also included in the picture for reference):



Measuring Rx module manually using oscilloscope and spectrum analyzer (EGSM900)

Context

Spectrum analyzer level values depend on the probe type and should be validated using a known good sample. The levels that are given here are measured using a high frequency probe.

Measuring with an oscilloscope at test points RXI (J730) or RXQ (J731)) and RXID (J261) or RXQD (J262) is recommended only if RSSI reading does not provide enough information.

Steps

1. Start Phoenix Service software.
2. Establish connection to the phone.

   From the File menu, choose Open Product.

   From the list, choose RM-25.
3. From the Testing menu, choose RF Controls.
4. In the RF Controls window:

   i Select Band EGSM900.

   ii Set Active unit to RX.

   iii Set Operation mode to Continuous.

   iv Set RX/TX channel to 37.

   v Set AGC to 12.

   Set the frequency and level of the signal generator to 942.4677MHz and -60dBm.

   Note: Because DC compensation does not work during continuous mode, DC offset level at RXI and RXQ will gradually shift from the optimized level.

   To have the most reliable result, it is highly advisable to set the operation mode from burst to continuous just before measuring values and complete measurement within no longer than 30 seconds.

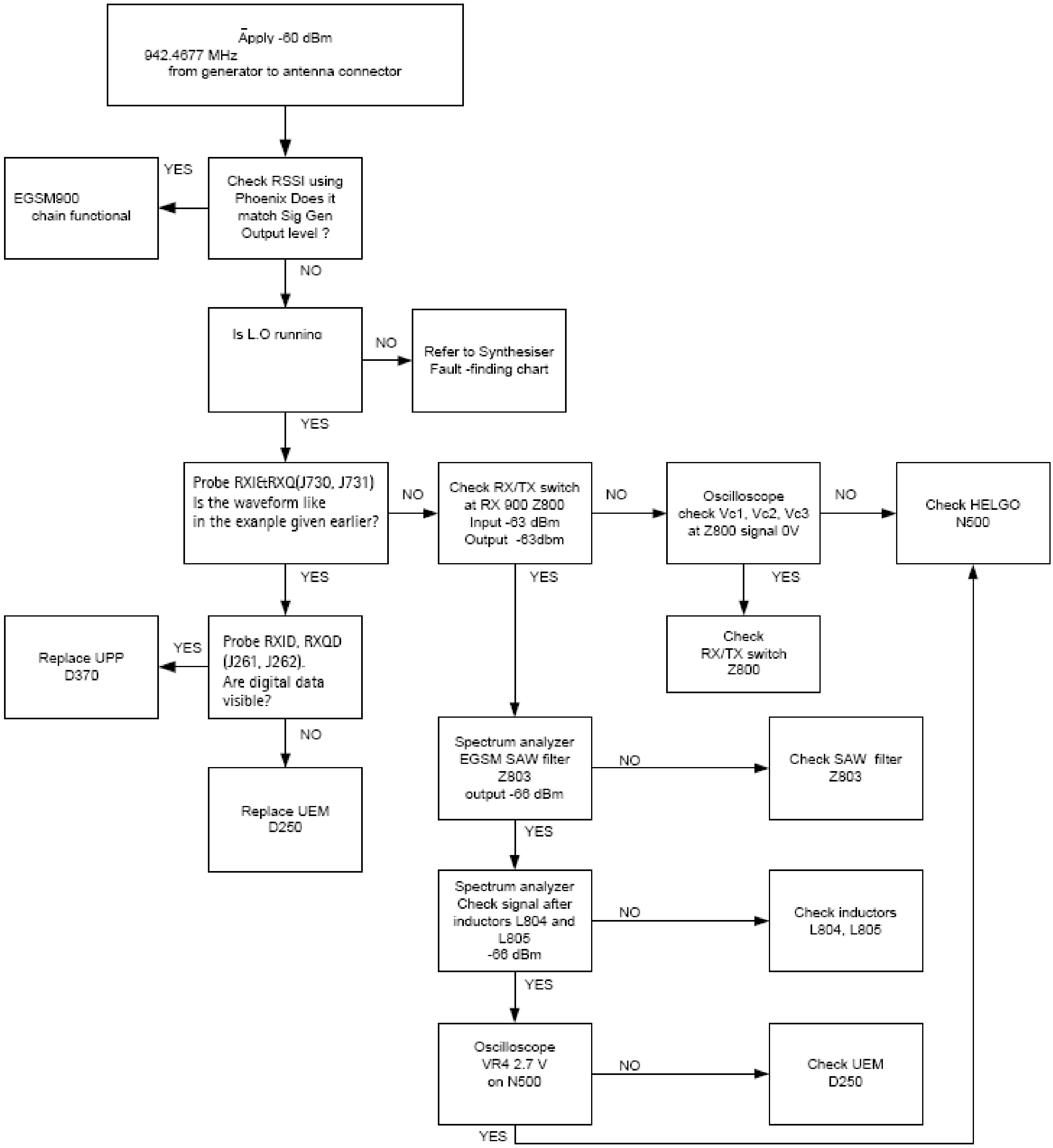


Figure 111 Troubleshooting flowchart for EGSM900

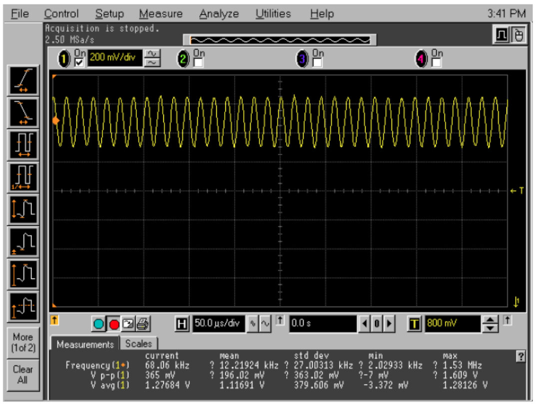


Figure 112 Probed Rx I/Q signals J730, J731

- Signal amplitude: 180 ~ 600mVpp
- DC offset: 1.2 ~ 1.4V
- Frequency: approximately 67KHz

Measuring Rx module manually using oscilloscope and spectrum analyzer (GSM1800)

Context

Spectrum analyzer level values depend on the probe type and should be validated using a known good sample. The levels that are given here are measured using a high frequency probe.

Measuring with an oscilloscope at test points RXI (730) or RXQ (J731)) and RXID (J261) or RXQD (J262) is recommended only if RSSI reading does not provide enough information.

Steps

1. Start Phoenix Service software.
2. Establish connection to the phone.

   From the File menu, choose Open Product.

   From the list, choose RM-25.
3. From the Testing menu, choose RF Controls.
4. In the RF Controls window:

   i Select Band GSM1800.

   ii Set Active unit to Rx.

   iii Set Operation mode to Continuous.

   iv Set RX/TX channel to 700.

   v Set AGC to 12.

   The frequency or level of signal generator is 1842.8677MHz, -60dBm.

   Note: Because DC compensation does not work during continuous mode, DC offset level at RXI and RXQ will gradually shift from the optimized level.

   To have the most reliable result, it is highly advisable to set the operation mode from burst to continuous just before measuring values and complete measurement within no longer than 30 seconds.

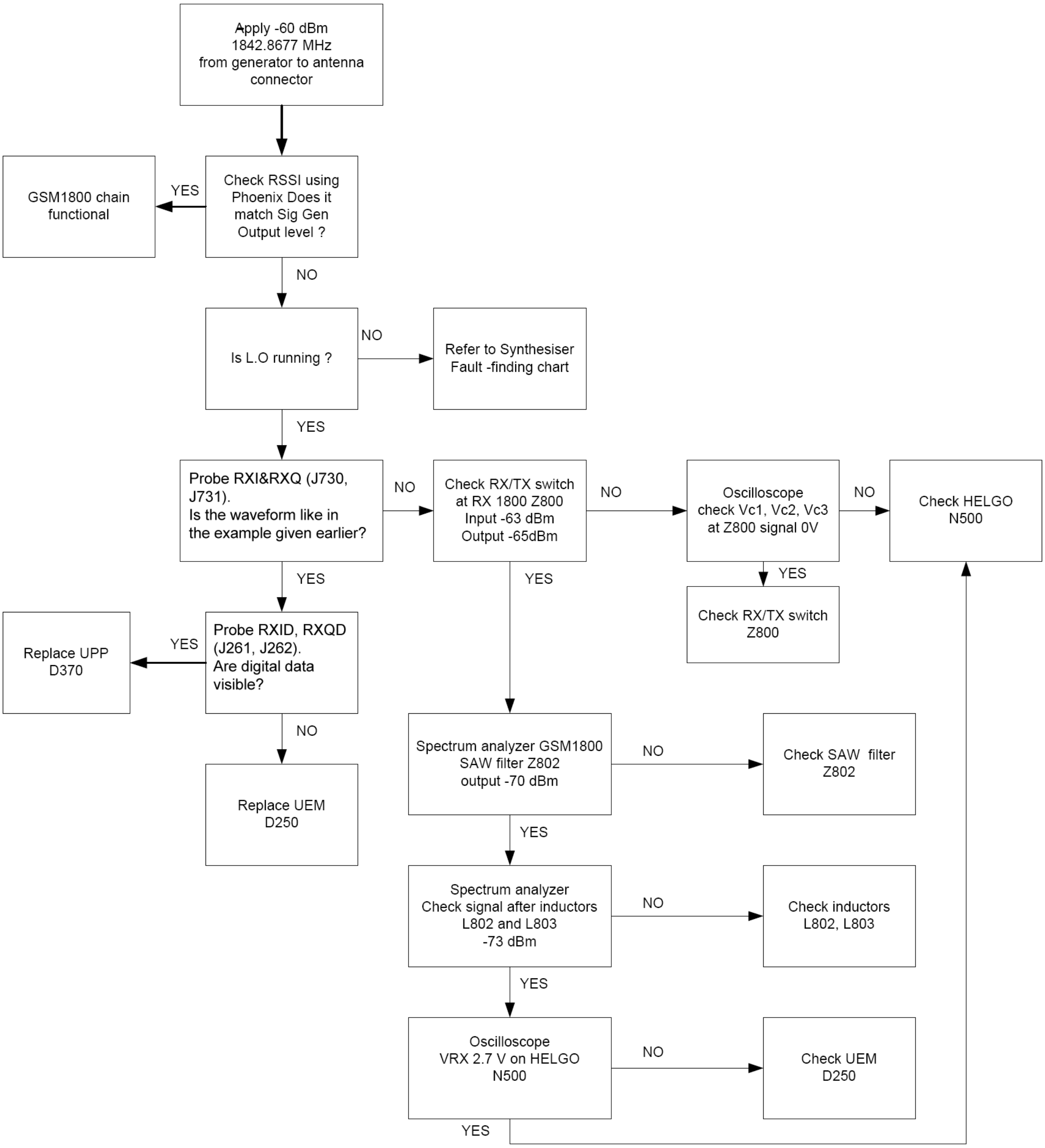


Figure 113 Troubleshooting flowchart for EGSM1800

Measuring Rx module manually using oscilloscope and spectrum analyzer (GSM1900)

Context

Spectrum analyzer level values depend on the probe type and should be validated using a known good sample. The levels that are given here are measured using a high frequency probe.

Measuring with an oscilloscope at test points RXI (J827) or RXQ (J828)) and RXID (J261) or RXQD (J262) is recommended only if RSSI reading does not provide enough information.

Steps

1. Start Phoenix Service software.
2. Establish connection to the phone.

   From the File menu, choose Open Product.

   From the list, choose RM-25.
3. From the Testing menu, choose RF Controls.
4. In the RF Controls window:

   i Select Band GSM1900.

   ii Set Active unit to Rx.

   iii Set Operation mode to Continuous.

   iv Set RX/TX channel to 661.

   v Set AGC to 12.

   The frequency or level of signal generator is 1960.0677MHz, -60dBm.

   Note: Because DC compensation does not work during continuous mode, DC offset level at RXI and RXQ will gradually shift from the optimized level.

   To have the most reliable result, it is highly advisable to set the operation mode from burst to continuous just before measuring values and complete measurement within no longer than 30 seconds.

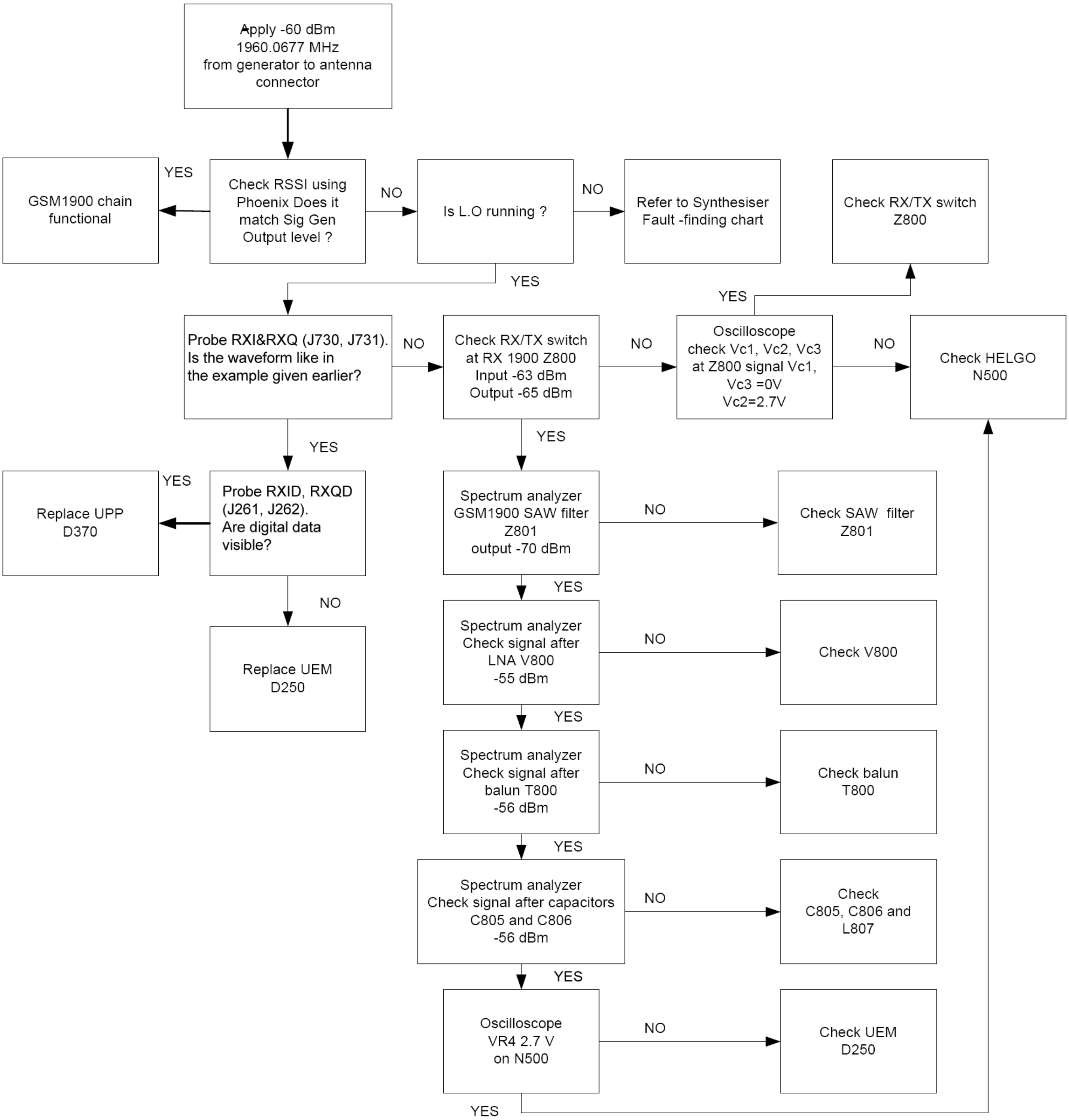


Figure 114 Troubleshooting flowchart for EGSM1900

RM-25 measurement points in the receiver

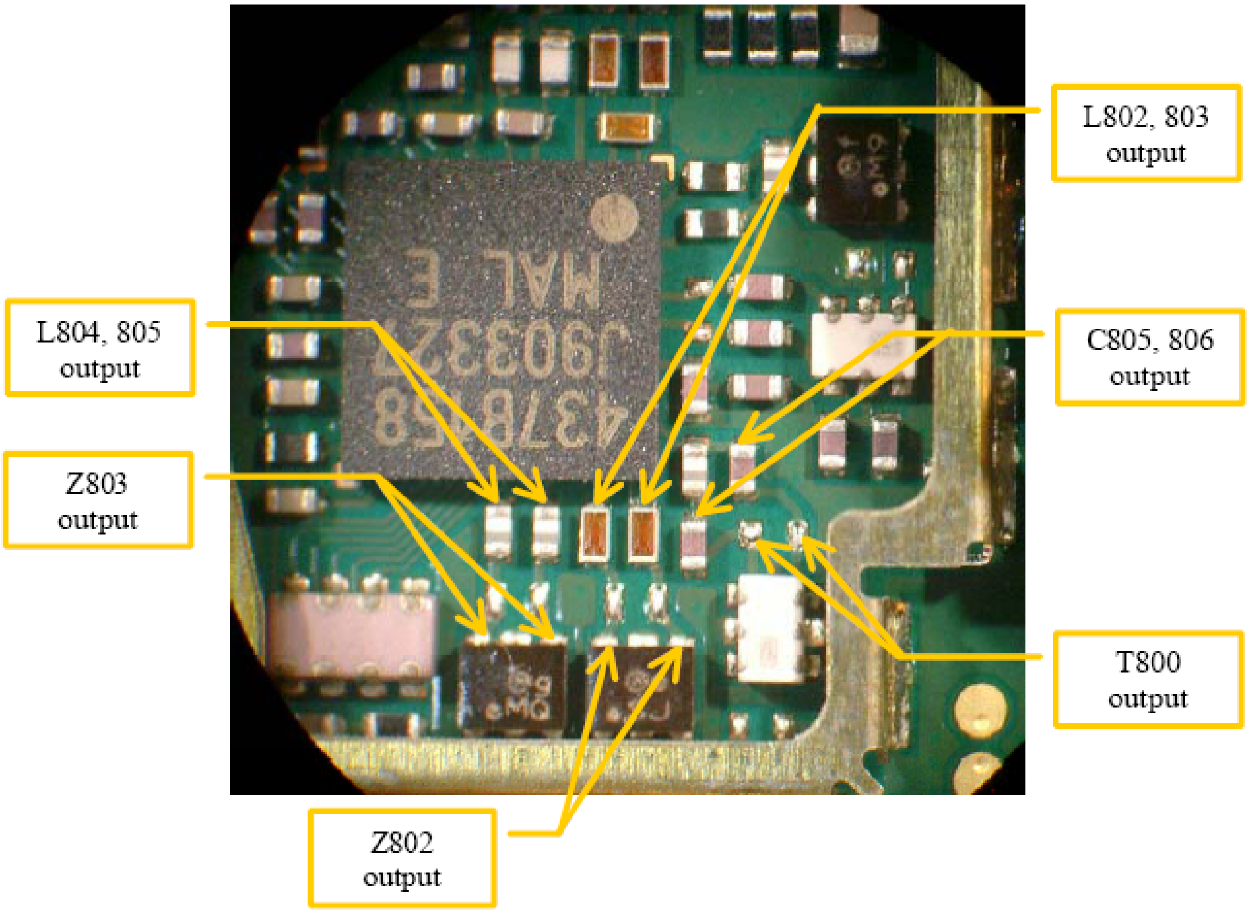


Figure 115 Measurement points at RX frontend - part 1

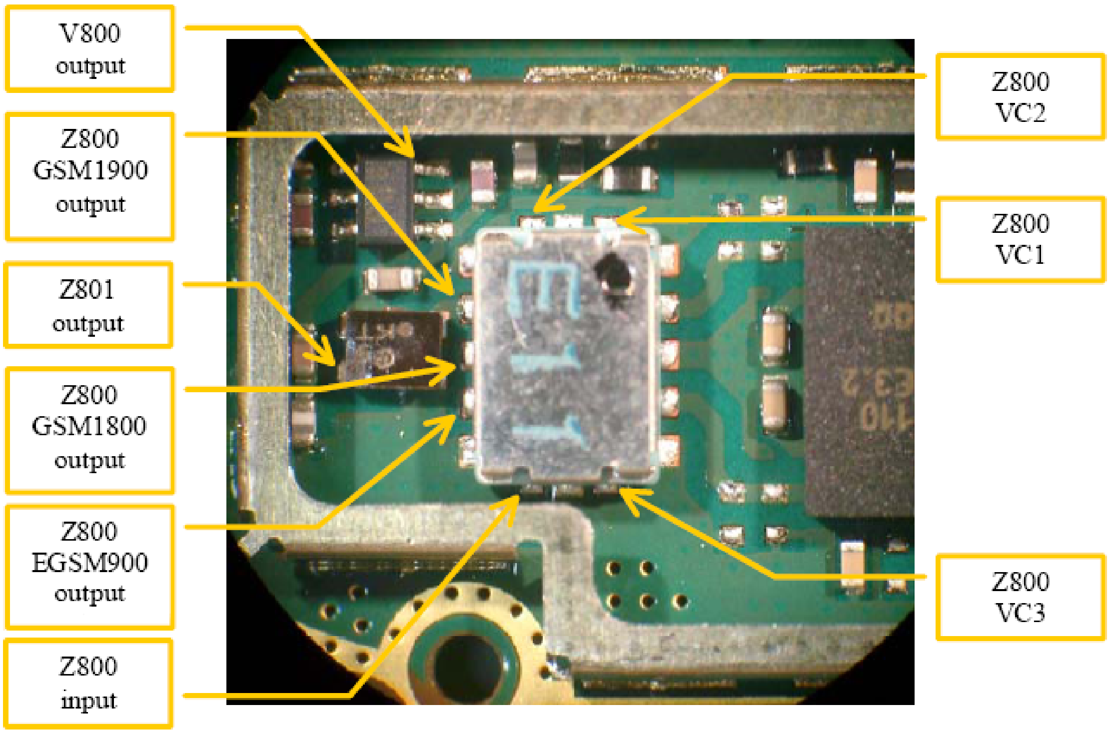


Figure 116 Measurement points at RX frontend - part 2

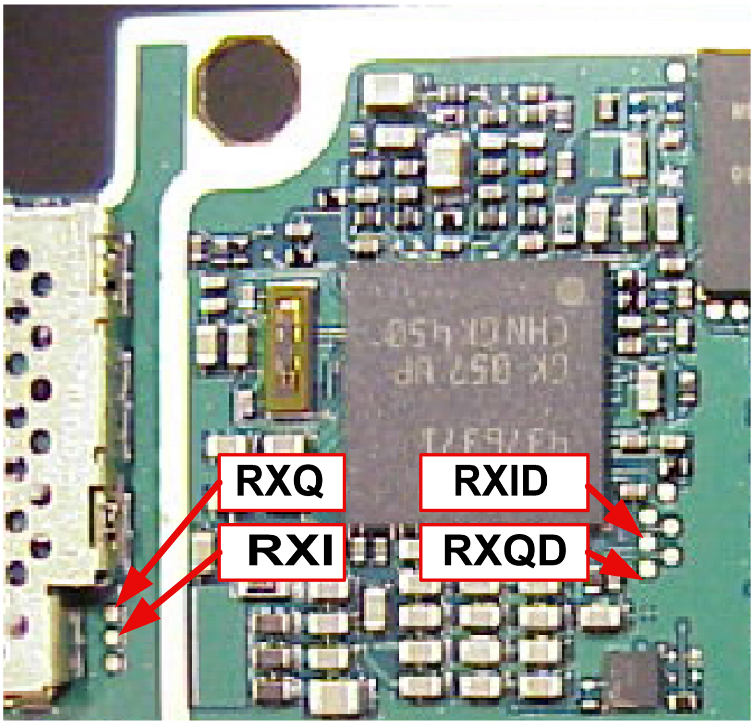


Figure 117 Measurement points at baseband and digital IQs

Calibrating RX Channel Select Filter

Context

This calibration is for the baseband filter inside Helgo ASIC. The calibration is done by internally measuring a prototype filter. For this reason, the calibration is done only once, not separately for 3 bands.

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This tuning doesn't require RF input from an external signal generator.

Steps

1. Select *Tuning -> RX Channel Select Filter Calibration*

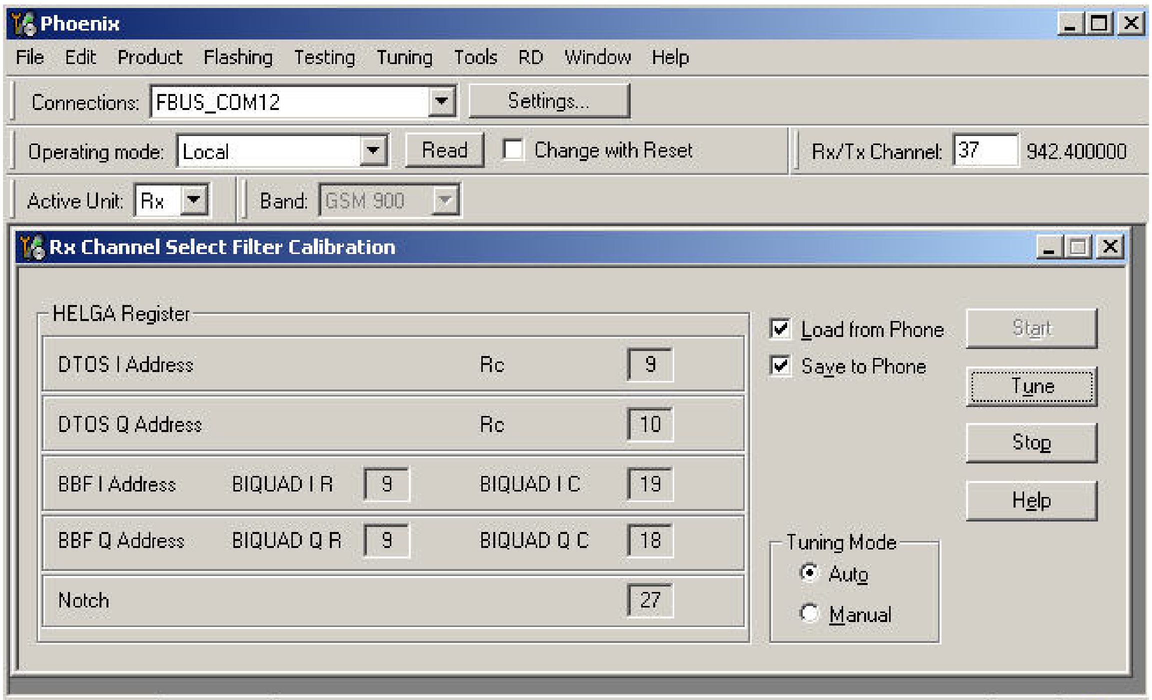

Figure 118 RX Channel Select Filter Calibration

- i Check *Save to Phone*
- ii Press *Tune*
- iii Press *Stop* to store the data to the phone

Results

RX channel select filter calibration is finished.

Calibrating RX

Context

RX calibration is used to determine gain at different gain settings for front-end and the Helgo ASIC and it needs to be done in all three bands.

RX calibration requires an external signal generator.

Steps

1. Select *Tuning -> RX calibration*

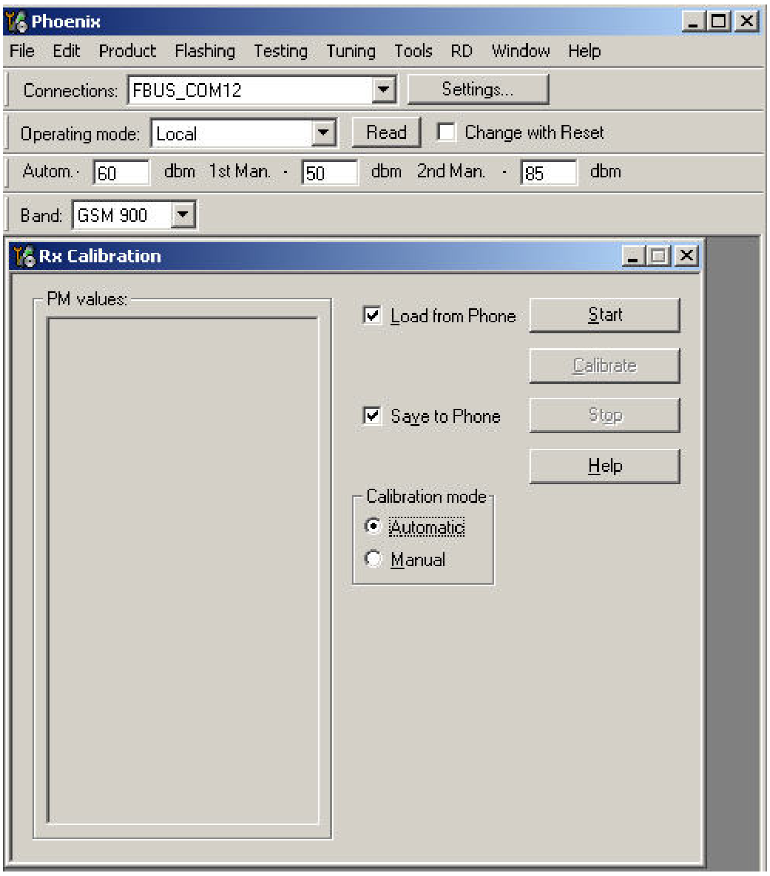

Figure 119 RX calibration (Example)

i Make sure you have made the following settings:

Table 25 RX calibration settings

Band	Calibration mode	1st Manual [dbm]	2nd Manual [dbm]
GSM 900	Automatic	-50	-85
GSM 1800/1900	Automatic	-50	-85

ii Check *Load from phone* and *Save to phone*.

iii Press *Start*

Initial data will be loaded from the phone and calibration starts.

The following banner pops up:

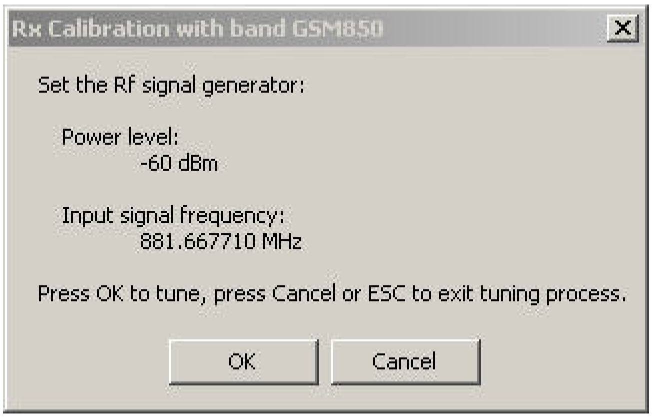

Figure 120 RX calibration with band EGSM900 (Example)

iv Follow the instructions in the pop-up window and set frequency and level of the signal generator.

v Press OK

vi Press “Save & Continue”

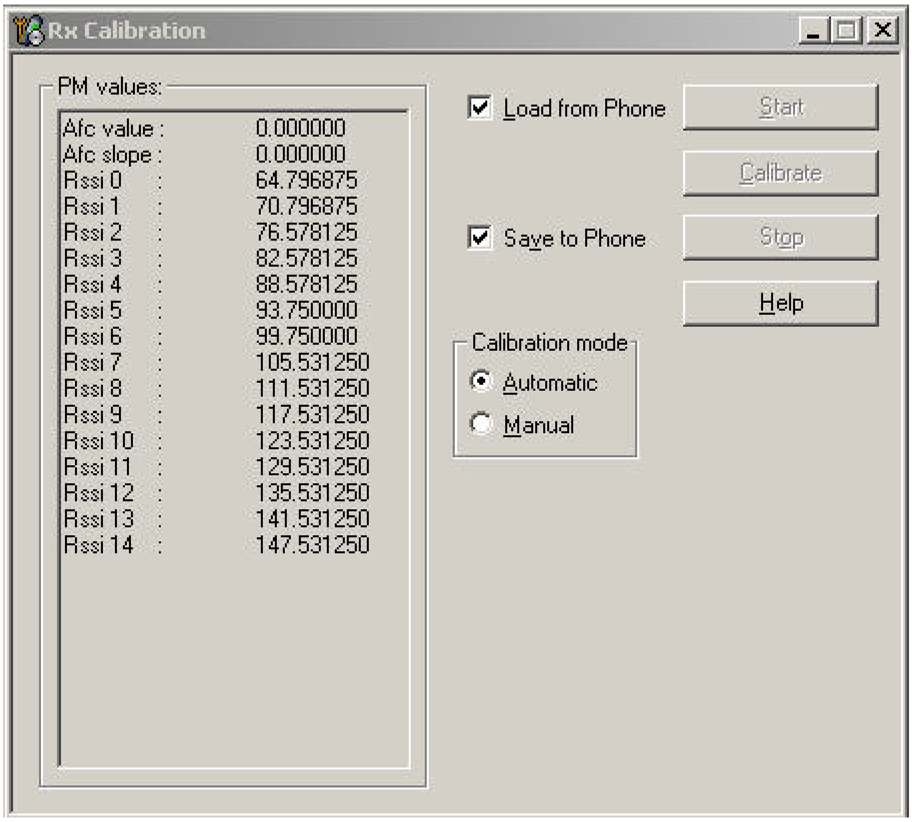

Figure 121 RX calibration values (Example)

Results

Calibration data will be stored to the phone.

Next action

Continue to next band.

Transmitter

Introduction to RM-25 transmitter troubleshooting

A simple block diagram of the TX part of the phone is shown in the following figure. The voice or data signals to be transmitted come from the UEME IC in the BB (baseband) area, and go to the Helgo IC, where they are up-converted to RF. The TX signals going from UEME to Helgo are called the IQ-signals, and consist of two balanced signals {TXIN, TXIP} and {TXQN, TXQP}, i.e. a total of four signal lines. In addition to the IQ signals, there are also control signals going between BB and RF.

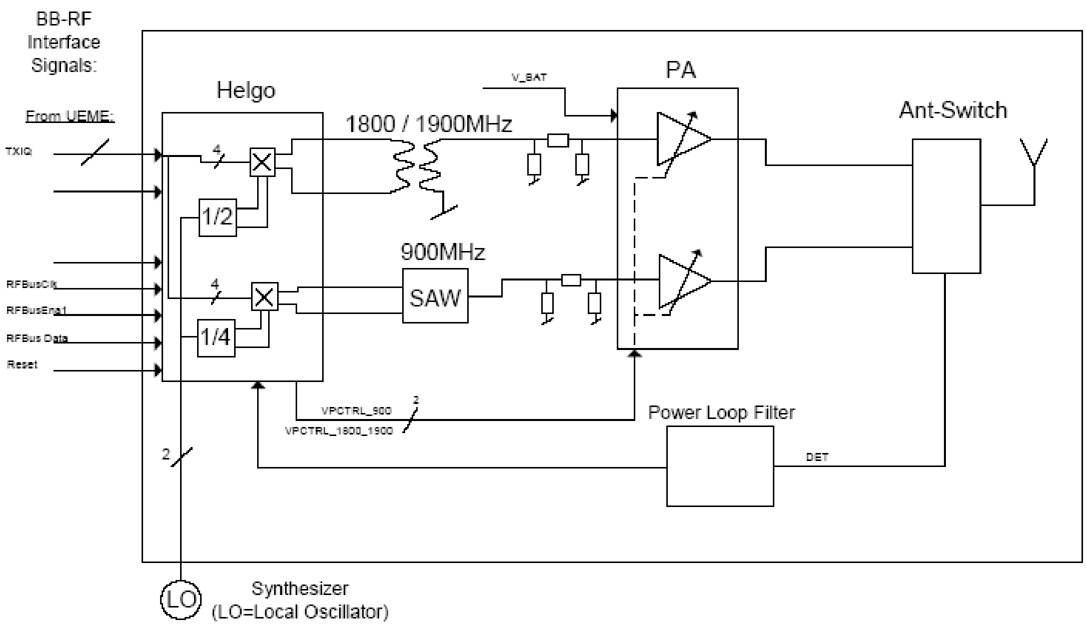

Figure 122 TX RF block diagram

The following picture shows the two shielding cans where the TX circuitry is located (the lids have been removed). The upper shielding can contains BB-RF interface circuitry, the Helgo RF system IC, a SAW filter for the GSM/EGSM band, and a balun for the DCS/PCS band. The lower shielding can contains the power amplifier (PA) and the antenna switch module (ASM).

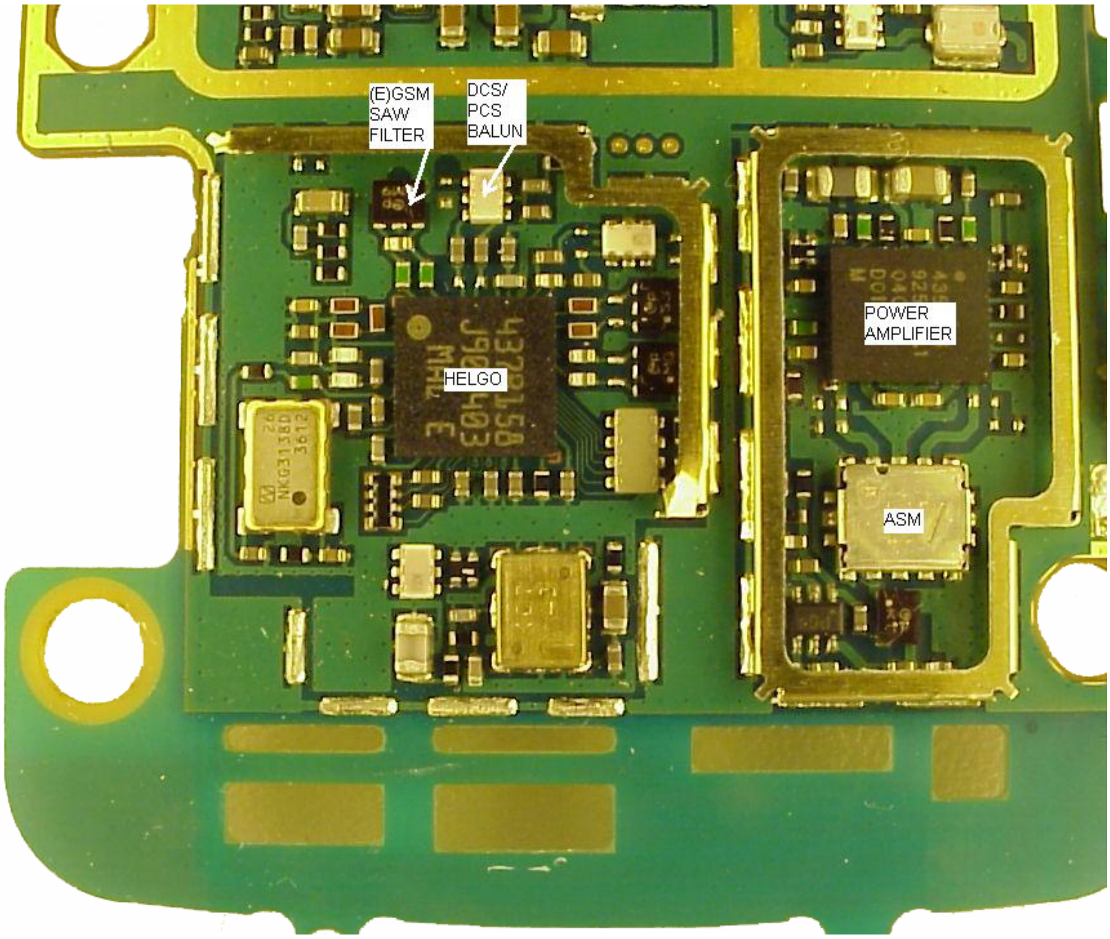

Figure 123 Upper and lower shielding cans

Preparing for transmitter troubleshooting

Steps

1. Place the phone (mechanics removed) on module jig.
2. Connect the module jig to PC via a DAU-9P cable.
3. Connect the module jig to a power supply (4.2V).
4. Connect the RF output to a spectrum analyzer or another measurement instrument. Use a 10dB attenuator at the input to spectrum analyzer to avoid damaging it.
5. Make sure the dongle is connected and start Phoenix.
6. In Phoenix, choose: *File -> Open Product -> RM-25 Product Menu*.
7. Select *Testing -> RF Controls*.
8. In the toolbar: set *Operating Mode* to *Local*.
9. Select *Band*: GSM900, GSM1800 or GSM1900.
10. Set *Operation Mode* to *Burst*.
11. Set *Active Unit* to *Tx*.
12. Set *Tx Data Type* to *All 1*.
13. Set *Rx/Tx Channel* to *37* for GSM900, *700* for GSM1800, or *661* for GSM1900.
14. Set *Tx PA Mode* to *Free*.
15. Set *Tx Power Level* to *5* for GSM900, otherwise to *0*.

Results

Phoenix should now look like this:

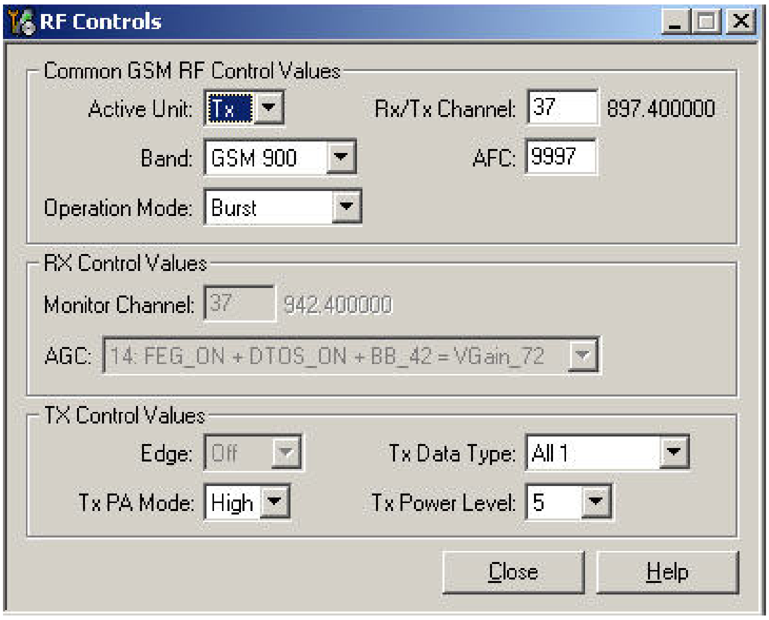

Figure 124 Preparing for transmitter troubleshooting

Troubleshooting TX-BB interface and control signals

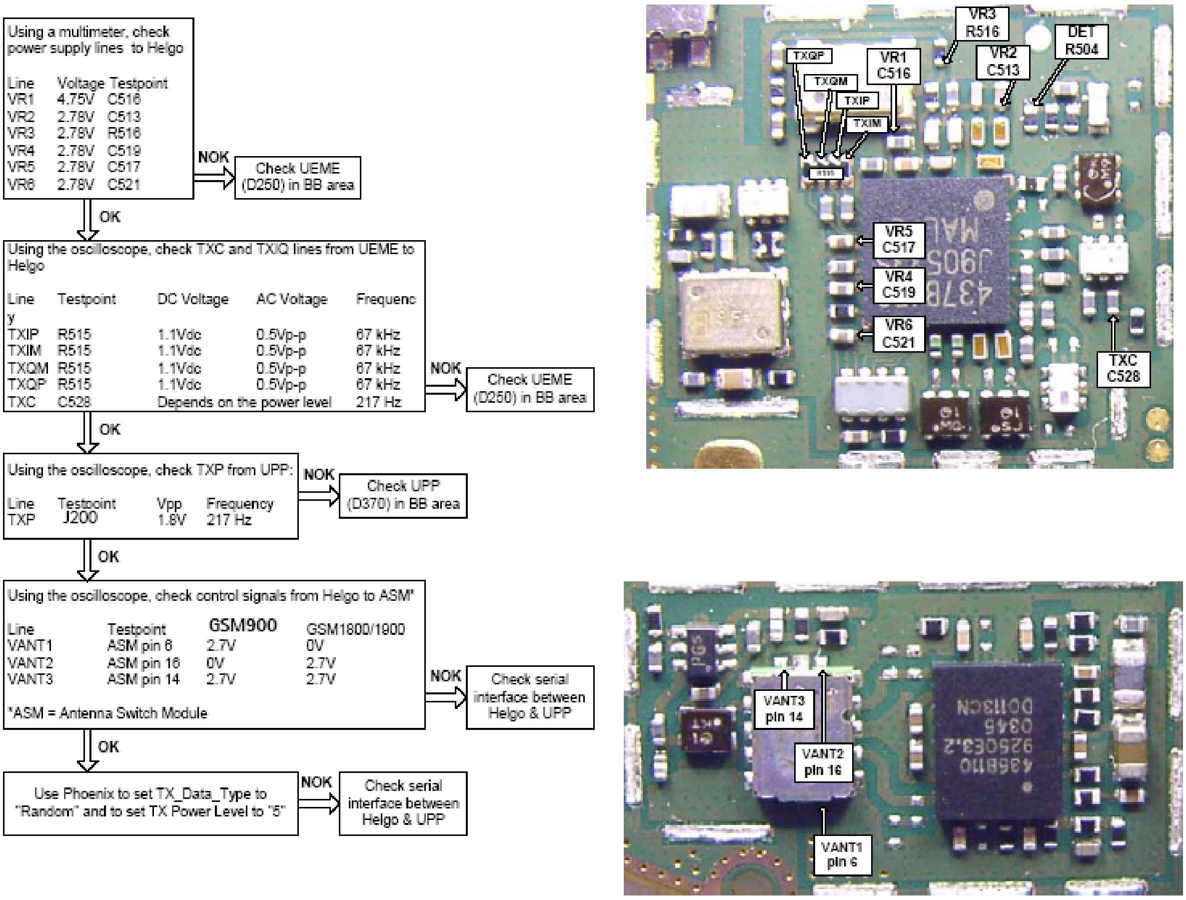

Figure 125 TX-BB interface troubleshooting and control signals

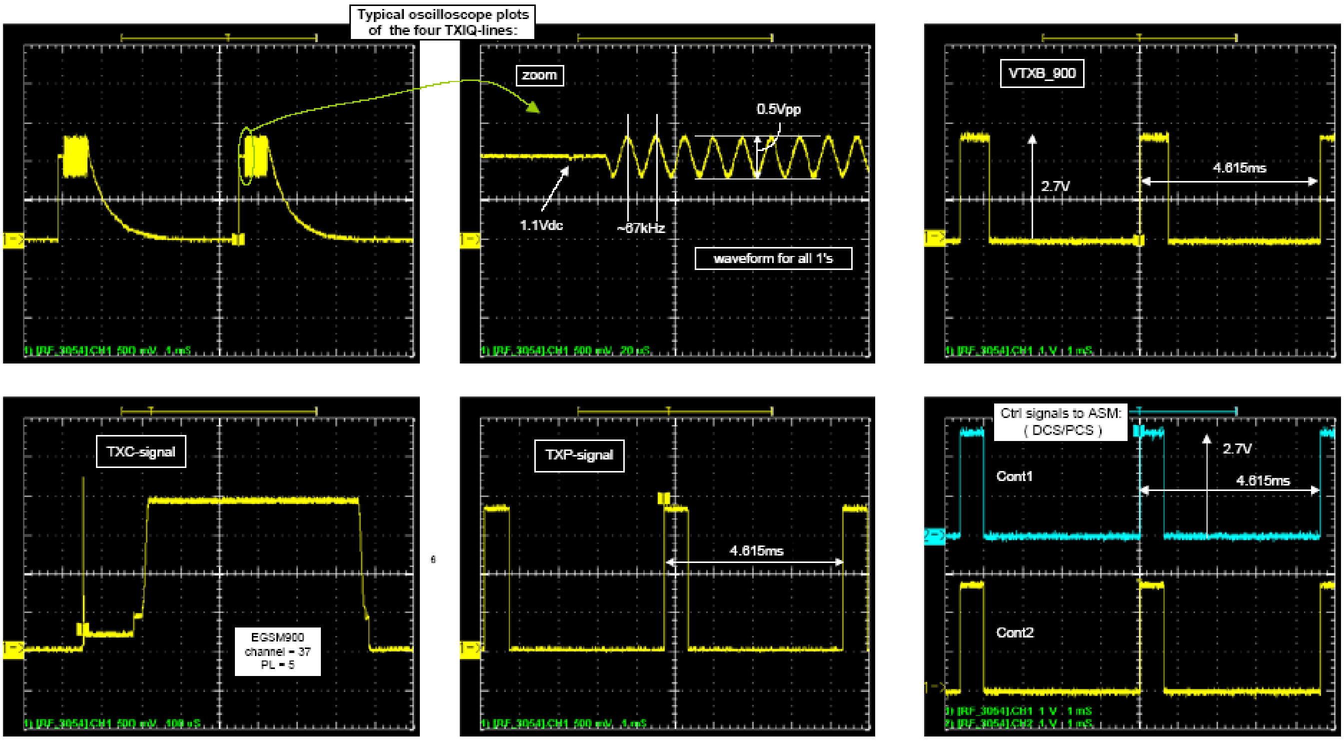

Figure 126 Oscilloscope screen shots

Troubleshooting RF side of transmitter

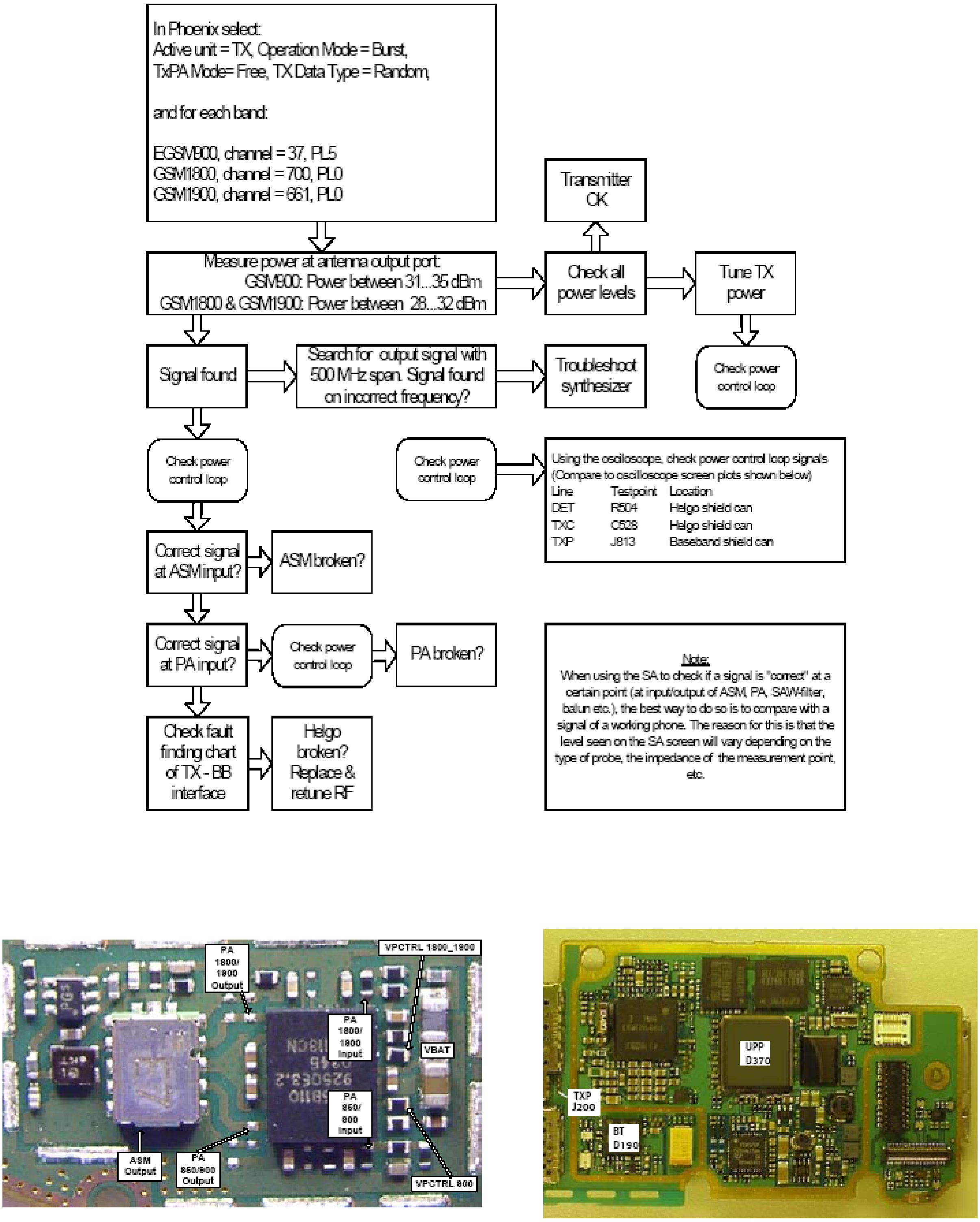

Figure 127 RF side of transmitter troubleshooting

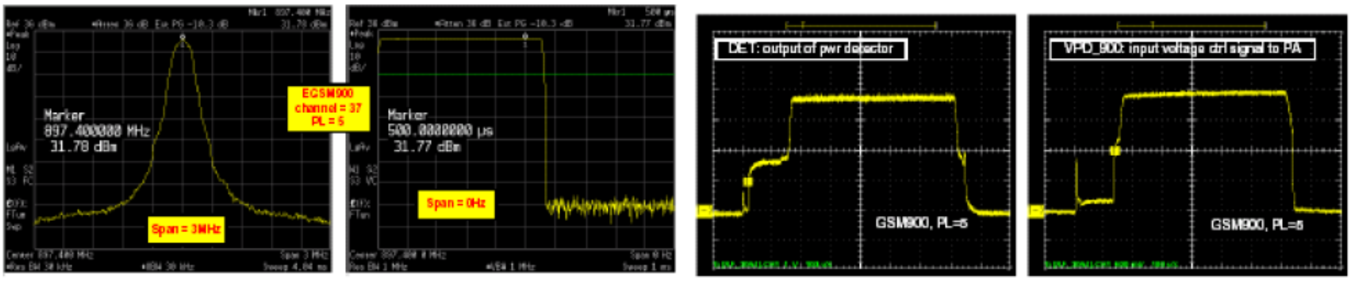

Figure 128 Oscilloscope screen shots (RF)

Introduction to transmitter tuning

In the transmitter, there are two kinds of tunings that can be done: IQ tuning and power level tuning. In general, different repairs require different tunings. In order to decide which tuning is necessary after a repair, it is important to understand the functionality of the repaired circuit. In general, it is recommended that if any TX component is changed, both these tunings be done. All tunings are done in local mode using Phoenix to control the phone.

As the RM-25 doesn't support the EDGE feature, you don't need to consider operating/tuning the phones in EDGE mode although Phoenix sometimes has a control selection box to enable EDGE.

Tuning TX/IQ

Context

The tuning must be carried out in all three bands. In addition to Phoenix, a spectrum analyzer (SA) is needed.

Steps

1. Connect the spectrum analyzer (SA) to the RF connector of the module jig. The settings of the SA will depend on the band to be tuned. The following table summarizes the settings for each of the three bands.

Table 26 Spectrum analyzer settings

	GSM900	GSM1800	GSM1900
Center frequency	897.4MHz	1747.8MHz	1880MHz
Frequency span	300kHz	300kHz	300kHz
Resolution Bandwidth	3kHz	3kHz	3kHz
Video Bandwidth	3kHz	3kHz	3kHz
Sweep Time	3 sec	3 sec	3 sec
Trace Type	Clear/Write	Clear/Write	Clear/Write
Detector Type	Max Peak	Max Peak	Max Peak
Reference Level	35dBm	35dBm	35dBm
Marker 1	897.33229 MHz	1747.73229 MHz	1879.93229 MHz
Marker 2	897.4MHz	1747.8MHz	1880MHz
Marker 3	897.46771MHz	1747.86771MHz	1880.06771MHz

2. Open the following two windows in Phoenix:

i select *Testing -> RF Controls*

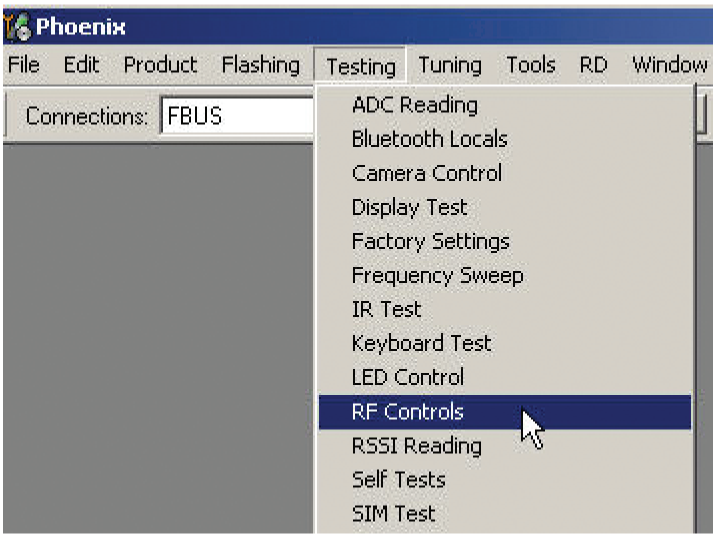

Figure 129 RF controls

ii select *Tuning -> TX IQ Tuning*.

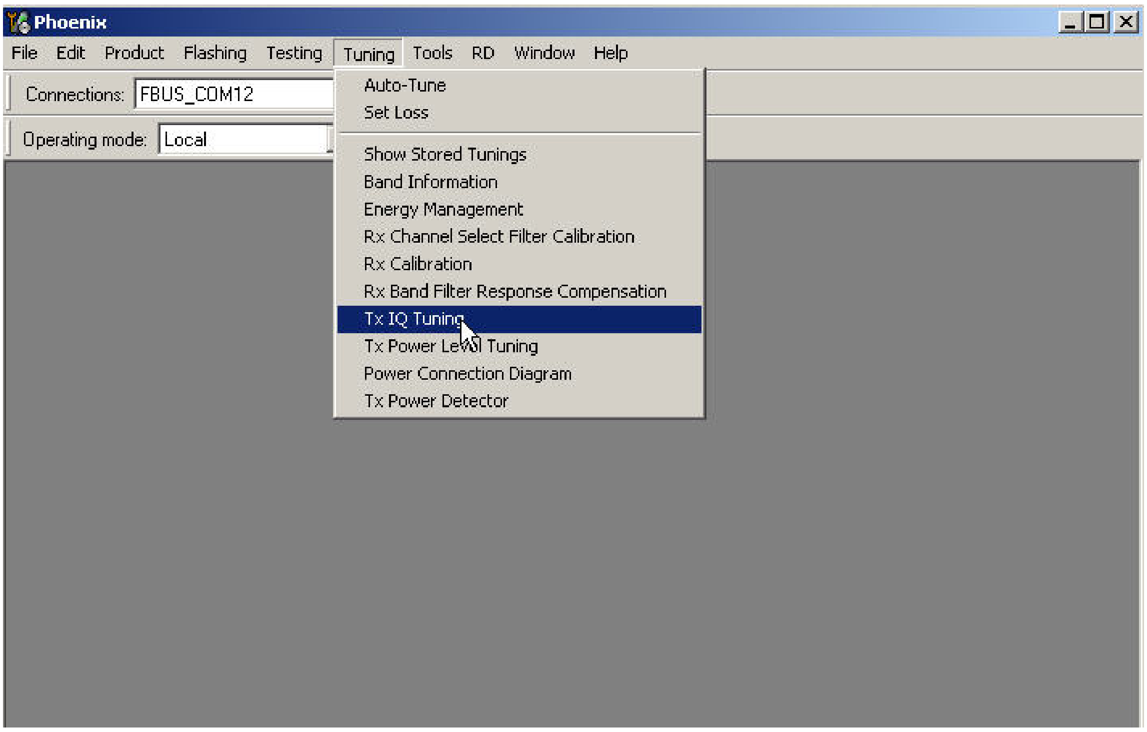

Figure 130 Tx IQ tuning

After opening the two windows, Phoenix should look like this:

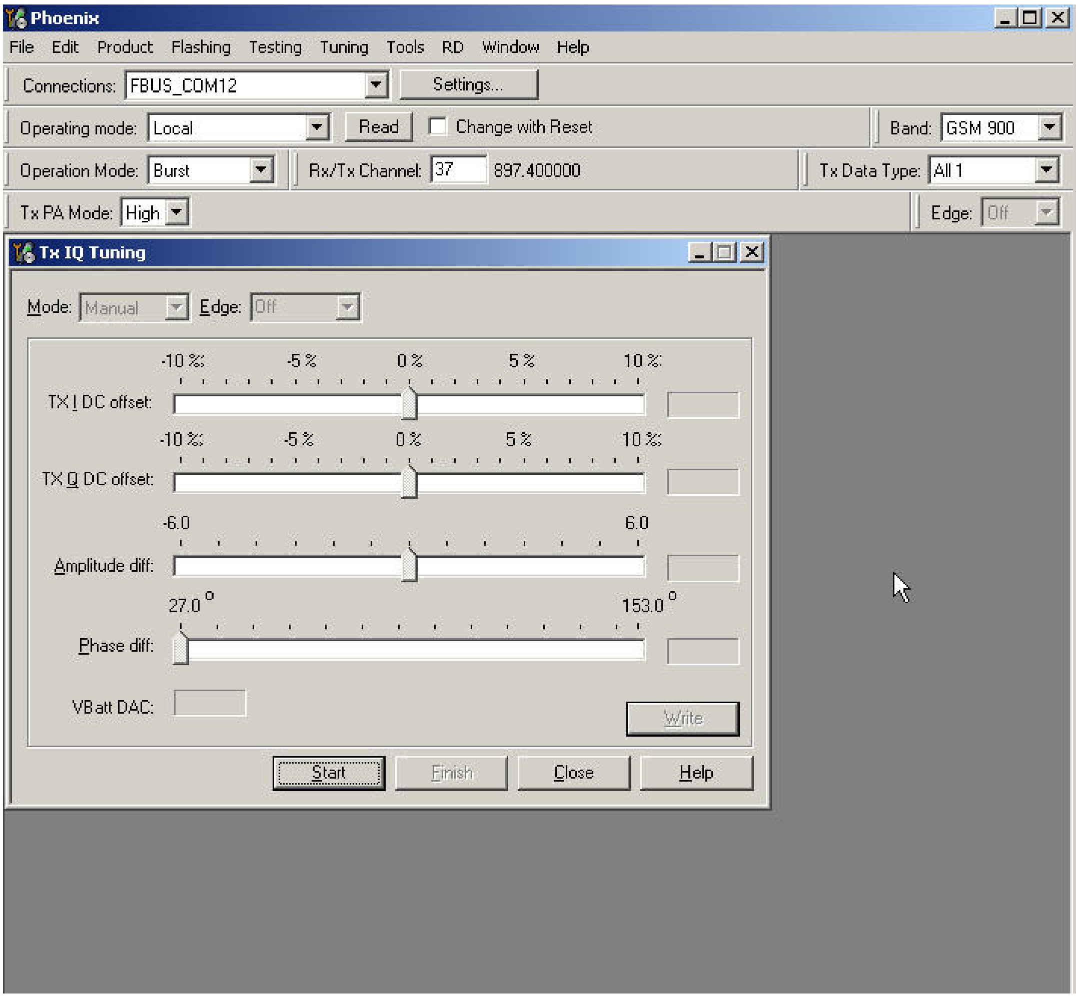

Figure 131 Phoenix set-up (Tx IQ Tuning windows)

3. Select correct settings for the band you are tuning. The following table summarises the settings of the RF control window for IQ tuning of the three bands.

Table 27 RF Control window settings

Band	TX Data Type	TX Power Level	RX/TX Channel
GSM900	All 1	5	37
GSM1800	All 1	0	700
GSM1900	All 1	0	661

4. Start IQ tuning by pressing *Start* button in the *TX IQ Tuning* window.

   The purpose of this tuning is to reduce the frequency components at marker 2 (carrier leakage) and marker 3 (+67kHz/upper sideband) as much as possible.

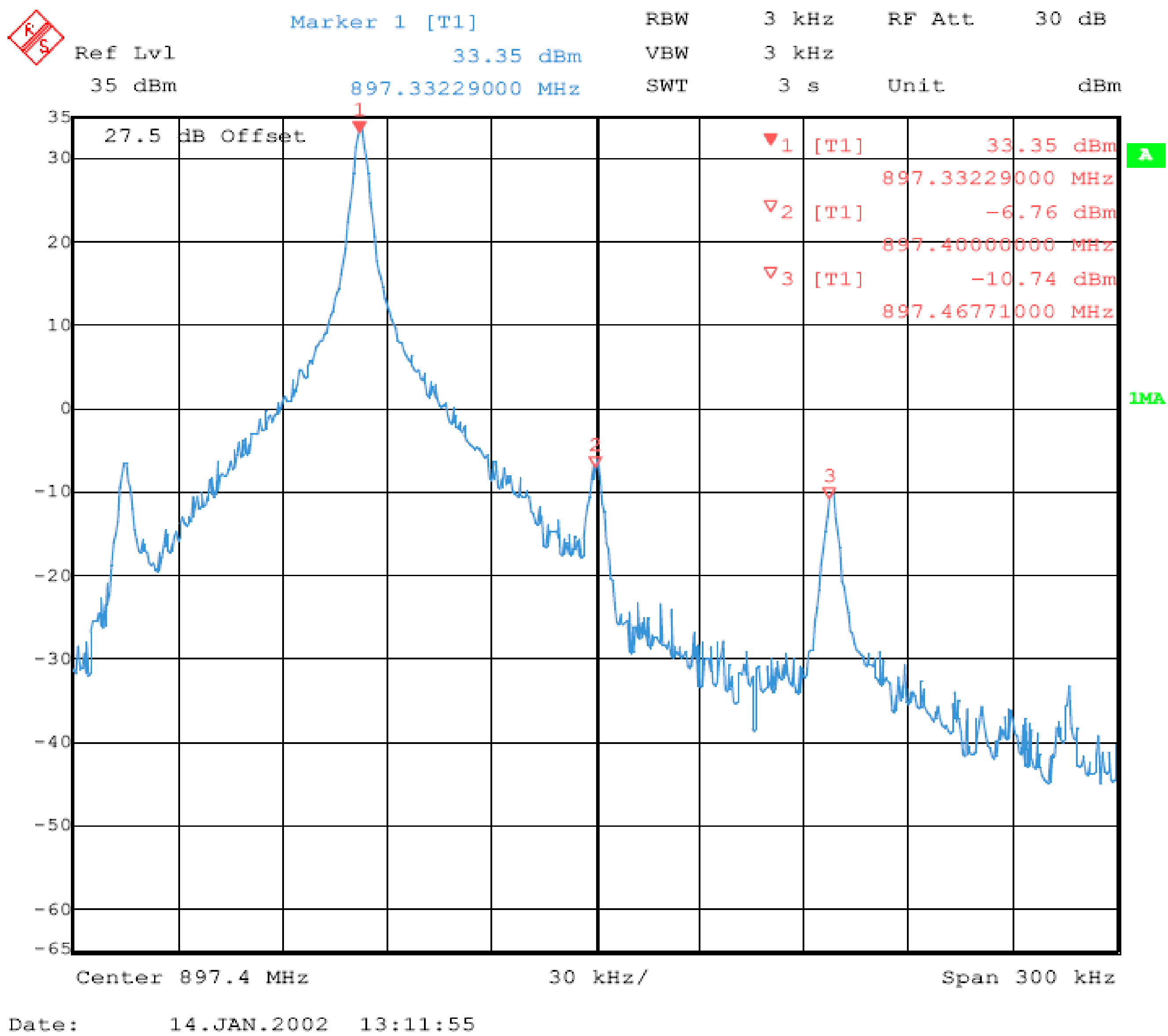

Figure 132 Spectrum analyzer screen shot when performing IQ tuning, part 1

5. Adjust the ‘TXI DC Offset’ and the ‘TXQ DC Offset’ buttons in the *TX IQ Tuning* window so that the carrier level (marker 2) reaches a minimum.

   After this adjustment is done, the carrier (marker 2) should be at least 40dB below the lower side band (marker 1).

6. Use the ‘Amplitude difference’ and the ‘Phase difference’ buttons in the *TX IQ Tuning* window to adjust the upper side band (marker 3) to a minimum.

   Now, marker 3 should also be at least 40dB below marker 1.

   At this point, the spectrum analyzer screen should look similar to that of the figure below.

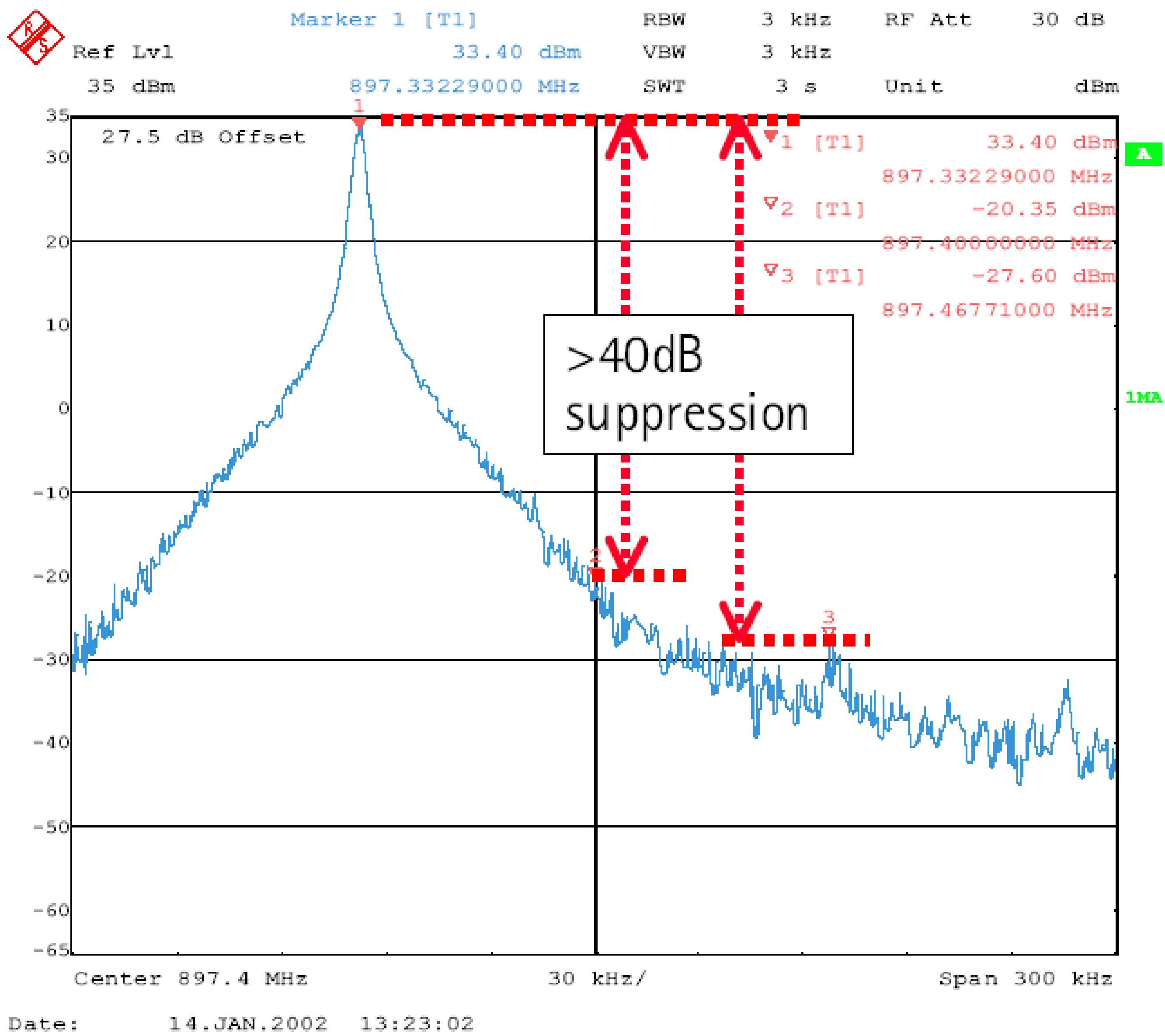

Figure 133 Spectrum analyzer screen shot when performing IQ tuning, part 2

7. After reducing the amplitude of the frequency components at marker 2 and 3 to a minimum, press *Save & Continue*.

   The EGSM tuning has now been completed.

Next action

Now, using the spectrum analyzer settings listed in Table "Spectrum analyzer settings" and the RF control settings listed in Table "RF Control window settings", follow exactly the same procedure to perform IQ tuning in the GSM1800 and GSM1900 bands.

Tuning TX power level

Context

This tuning is done separately in all three bands, and requires a spectrum analyzer to measure the burst power of the GSM RF signal. When measuring the RF output (burst) power on a spectrum analyzer, use the settings found in the following table:

Table 28 Spectrum analyzer settings for Tx power level tuning

	GSM900	GSM1800	GSM1900
Center frequency	897.4MHz	1747.8MHz	1880MHz
Frequency span	Zero-span	Zero-span	Zero-span
Resolution Bandwidth	1MHz	1MHz	1MHz
Video Bandwidth	1MHz	1MHz	1MHz
Sweep Time	1ms	1ms	1ms
Trigger Type	Video	Video	Video
Video trigger level	Target pwr – 10dB	Target pwr – 10dB	Target pwr – 10dB
Trace Type	Clear/Write	Clear/Write	Clear/Write
Detector Type	Max Peak	Max Peak	Max Peak
Reference Level	Target power level + 10dB	Target power level + 10dB	Target power level + 10dB
Internal Attenuation	Target power level + 10dB	Target power level + 10dB	Target power level + 10dB

Steps

1. In Phoenix, select *Tuning -> TX Power Level Tuning*.

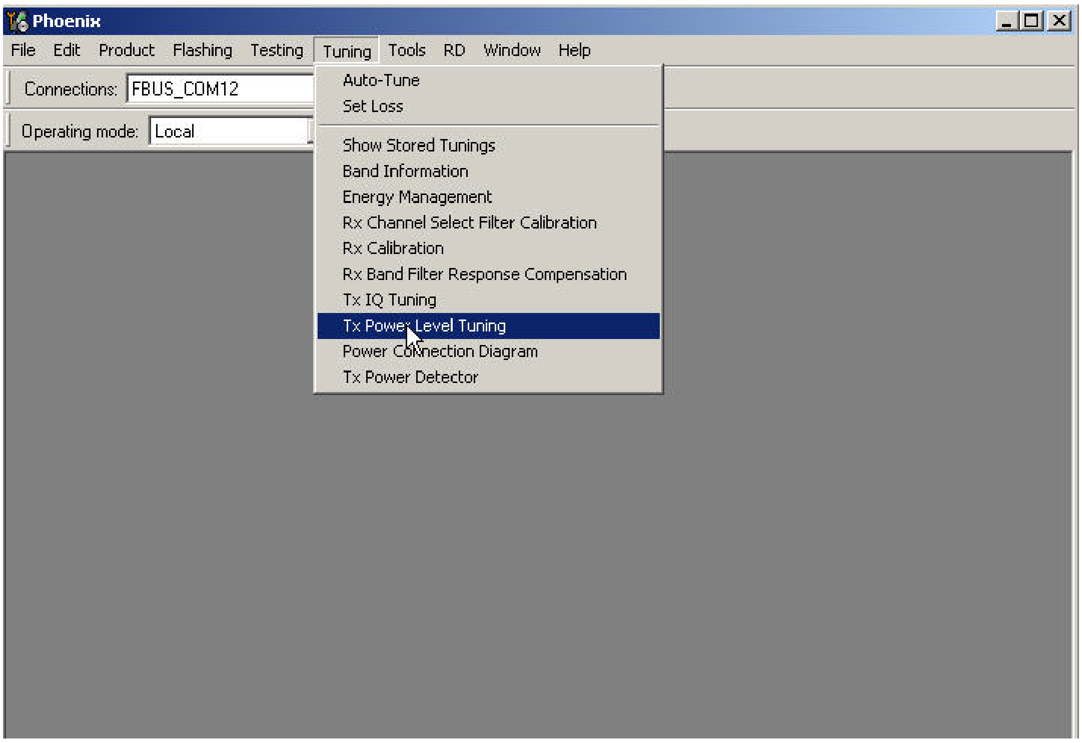

Figure 134 Phoenix menu select (Tx Power Level Tuning menu)

Phoenix should now look similar to the figure below.

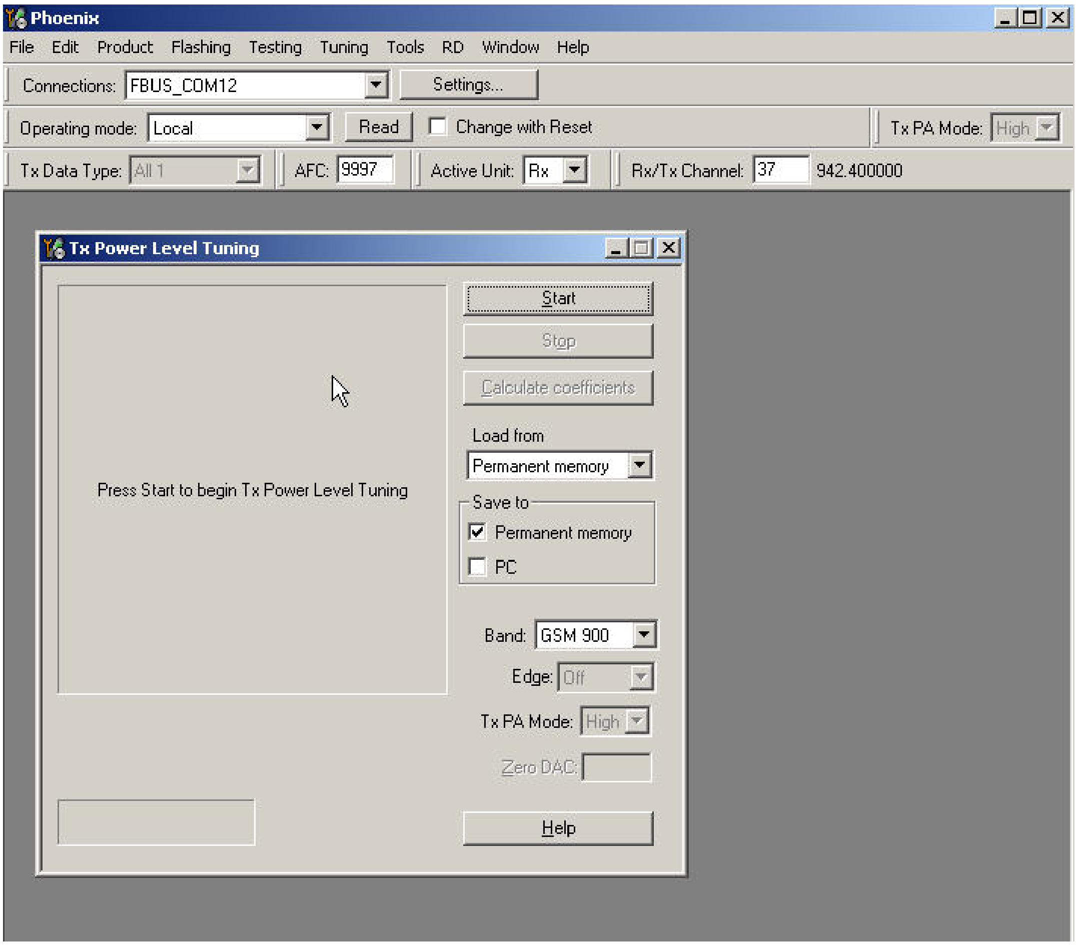

Figure 135 Phoenix Power Level Tuning menu

2. Select data source and band, then press *Start*. It is recommended to have saved data from a known good phone to the PC.
3. Connect the module jig RF output to the measurement instrument. The power must be tuned in only high TX PA mode in all bands of GSM900, GSM1800 and GSM1900.
4. For each band, tune the power by adjusting the coefficient in the *Tx Power Level Tuning* window in Phoenix until the target level is reached (measured on the spectrum analyzer). Remember to take into account the external power loss, that is, the loss of the cable and the external attenuator at the spectrum analyzer input.

   The coefficient must be tuned for the base level and other power levels (PL) marked with bold letters in Phoenix (GSM900: PL19 / 15 / 5, GSM1800/1900: PL15, 11, 0). The target power levels are specified as listed in the following table:

Table 29 Spectrum analyzer settings for Tx level tuning

GSM900		GSM1800		GSM1900	
PL 5	32.5 dBm	PL 0	29.5 dBm	PL 0	29.5 dBm
PL 15	13.0 dBm	PL 11	8.0 dBm	PL 11	8. 0dBm
PL 19	5.0 dBm	PL 15	0.0 dBm	PL 15	0.0 dBm
Base PL	-30.0 dBm	Base PL	-30.0 dBm	Base PL	-30.0 dBm

5. When the tuning for the levels marked with bold letters has been completed, press *Calculate coefficients* to calculate the other power levels with non-bold letters.

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6. When the coefficient calculation has been successfully done, press *Save & Continue* to save the new tuning values into the phone memory.

   The following figure shows the power level tuning at the GSM900 band.

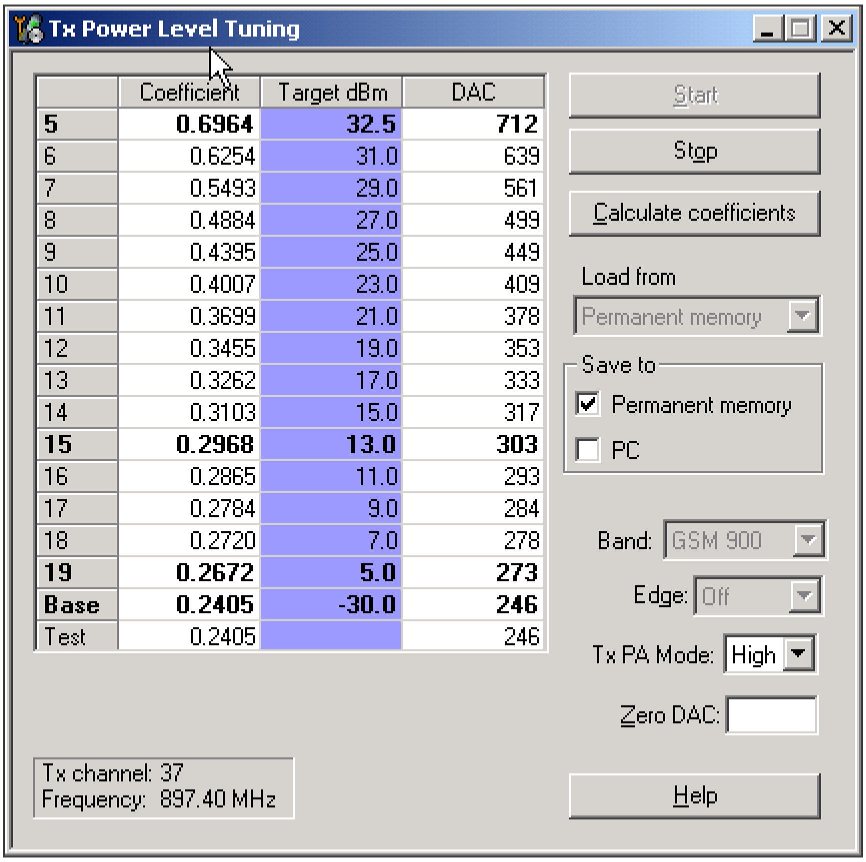

Figure 136 Phoenix screen shot (Tx Power Level Tuning)

The figure below shows one example from the spectrum analyzer screen during measuring the Tx power level.

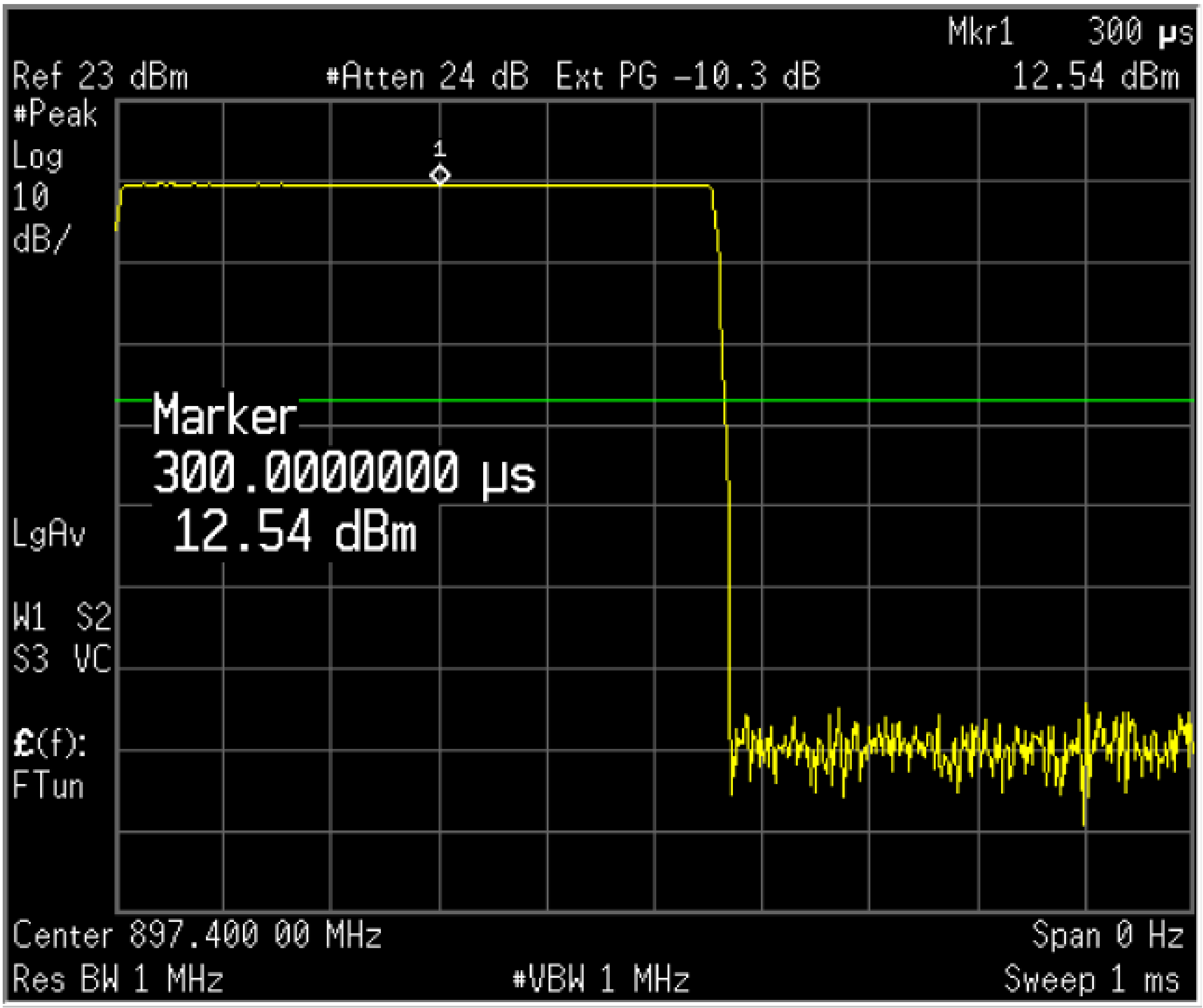

Figure 137 Spectrum analyzer screen shot during power level tuning

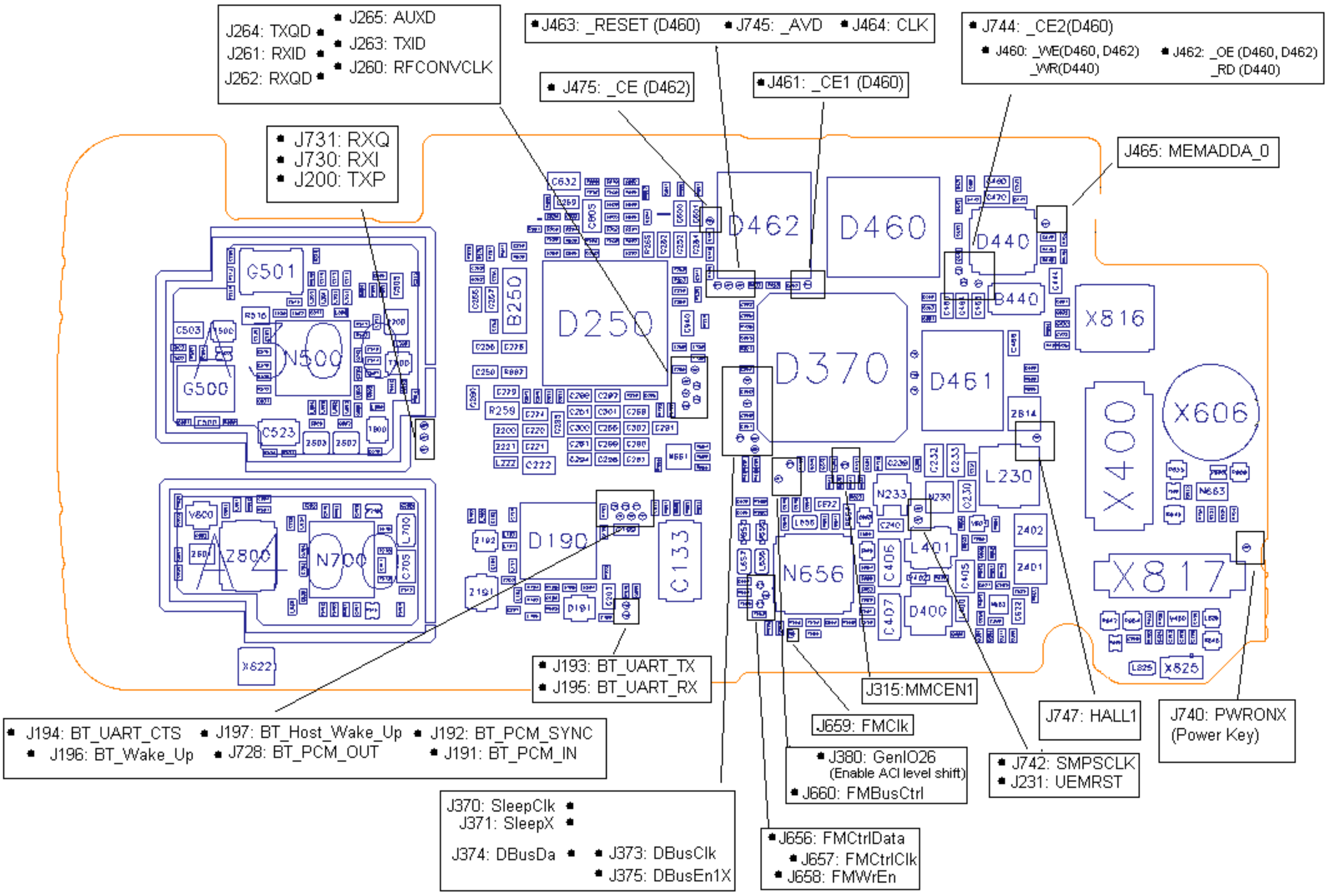

Figure 138 Testpoints of the main board 1fsa_09a, top part

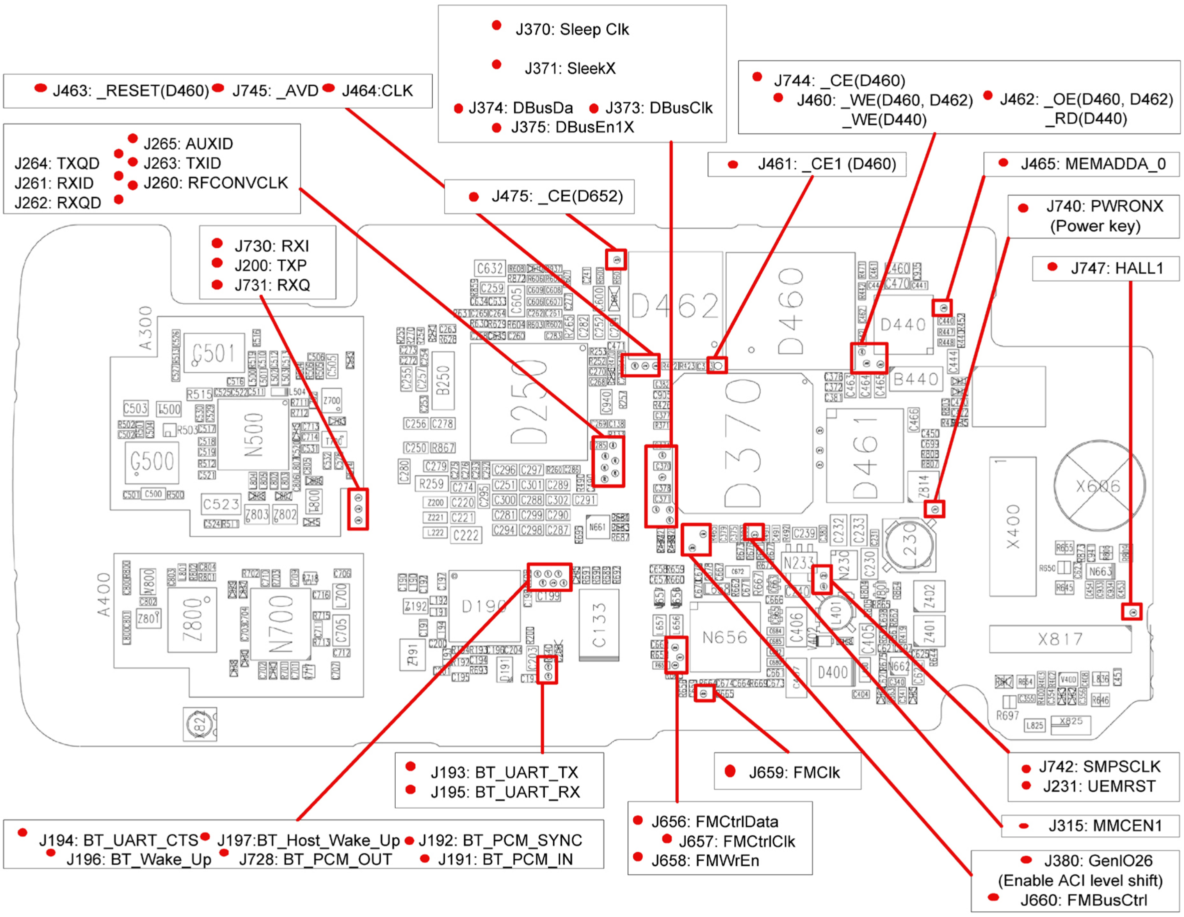

Figure 139 Testpoints of the main board 1fsa_11a, top part

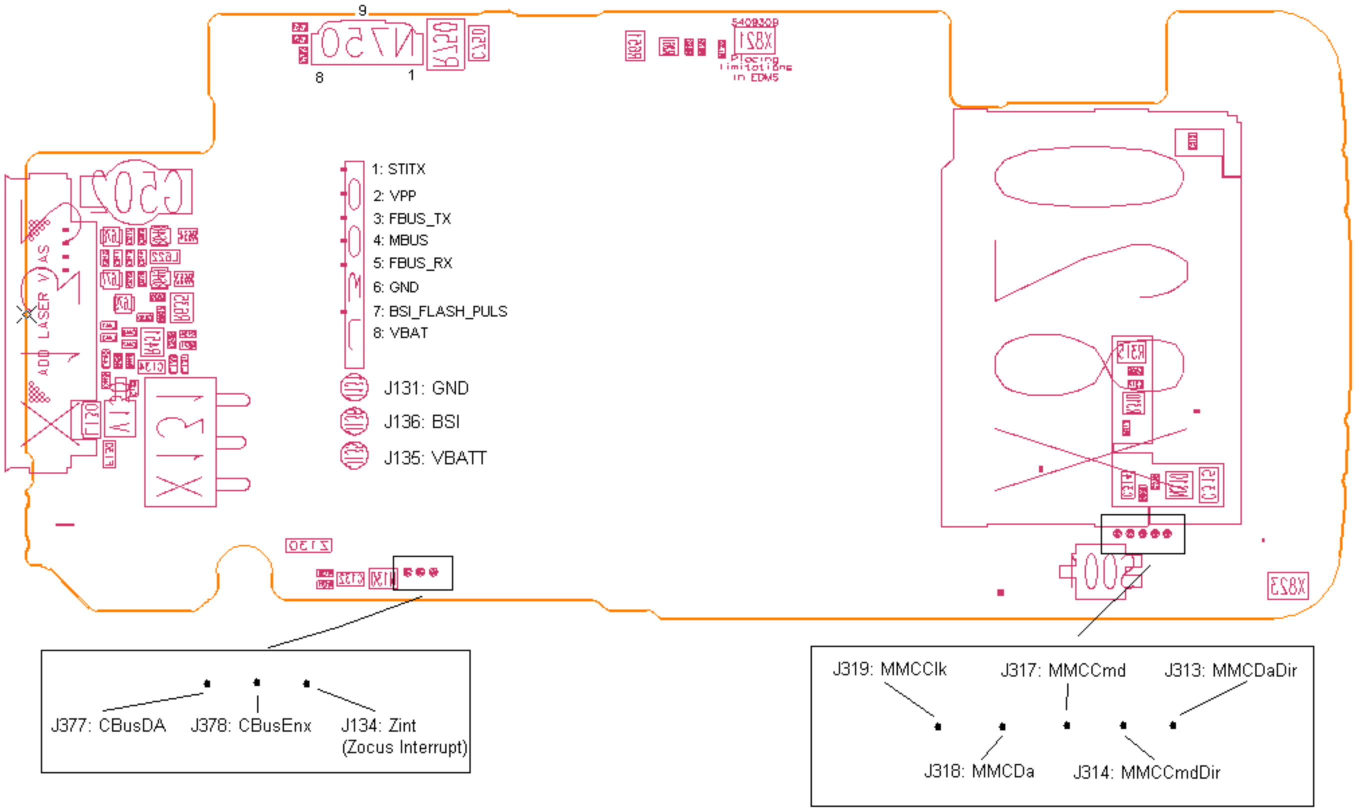

Figure 140 Testpoints of the main board, bottom part

Introduction to synthesizer troubleshooting

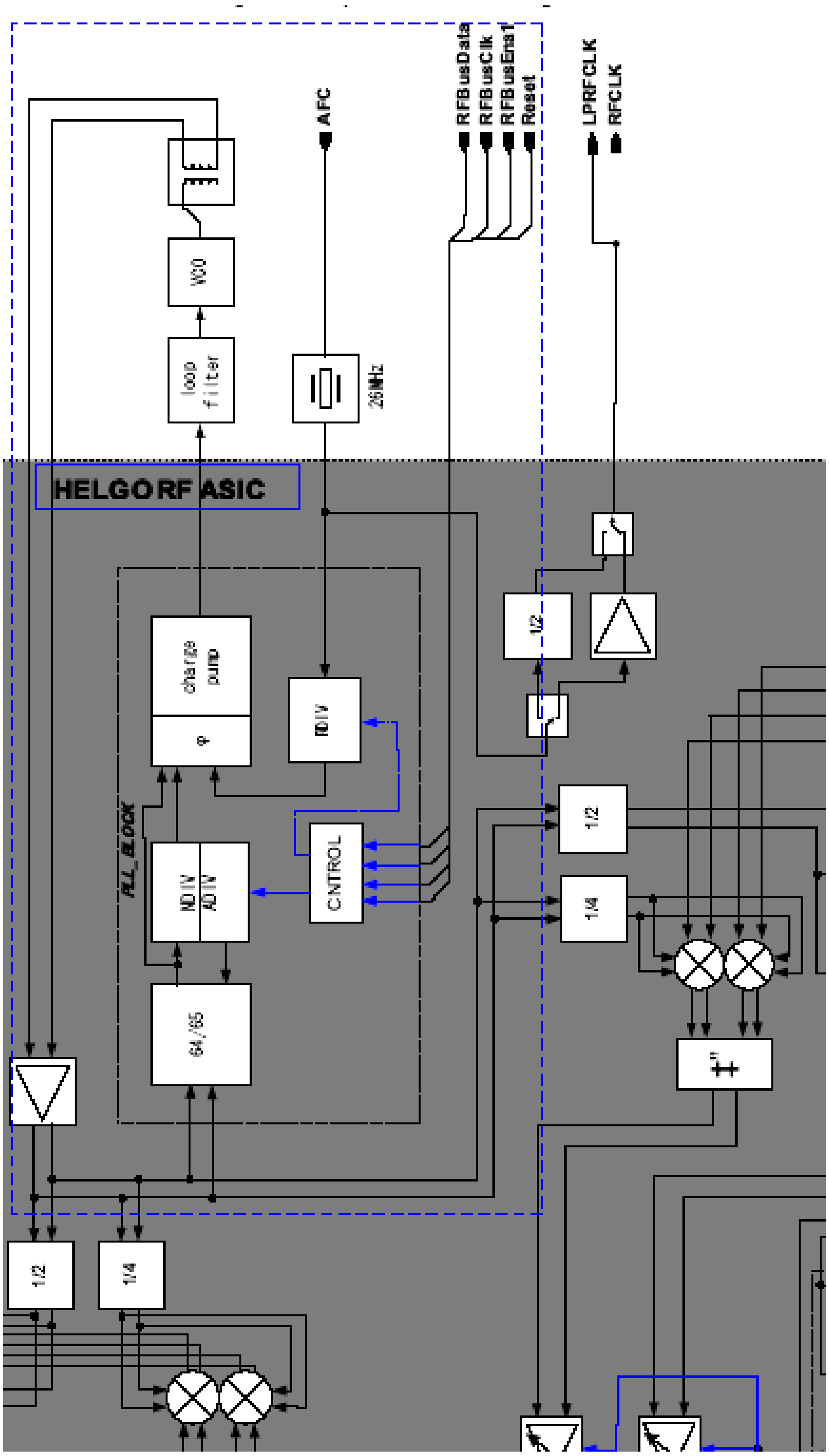

Figure 141 Synthesizer block diagram

The VCO frequency is locked by a PLL (phase locked loop) into a stable frequency source given by a VCTCXO, which is running at 26 MHz. The frequency of the VCTCXO is in turn locked into the frequency of the base station with the help of an AFC (automatic frequency control) voltage, which is generated in UEME by an 11-bit D/A (digital-to-analog) converter.

The PLL is capable of tuning frequency range for GSM bands 900/1800/1900. It is integrated in Helgo and controlled through the RFBus. The PLL consists of a 64/65 (P/P+1) prescaler, N- and A-divider, reference divider, phase detector and a charge pump for the external loop filter.

The 4 GHz oscillator signal, generated by the VCO, is fed through a 180 degrees balanced phase shifter to the prescaler and the output of the prescaler is fed to the N- and A-divider, which produces the input to the phase detector. The phase detector compares this signal to the reference signal, which is divided by the reference divider from the VCTCXO frequency.

The frequency of the reference signal is 400 kHz. The output of the phase detector is connected to the charge pump, which charges or discharges the integrator capacitor in the loop filter depending on the phase of the measured frequency compared to the reference frequency.

The integrator output voltage is finally connected to the control input of the VCO. The VCO operates at the channel frequency multiplied by two in GSM1800/1900 and by four in EGSM900.

The required frequency dividers for modulator and demodulator mixers are integrated in Helgo.

Loop filter filters out the comparison pulses of the phase detector and generates a DC control voltage to the VCO. The loop filter determines the step response of the PLL (settling time) and contributes to the stability of the loop.

Other filter components are for sideband rejection.

The dividers are controlled via the RFBus. RFBusData is for the data, RFBusClk is a serial clock for the bus and RFBusEna1X is a latch enable, which stores the new data into the dividers.

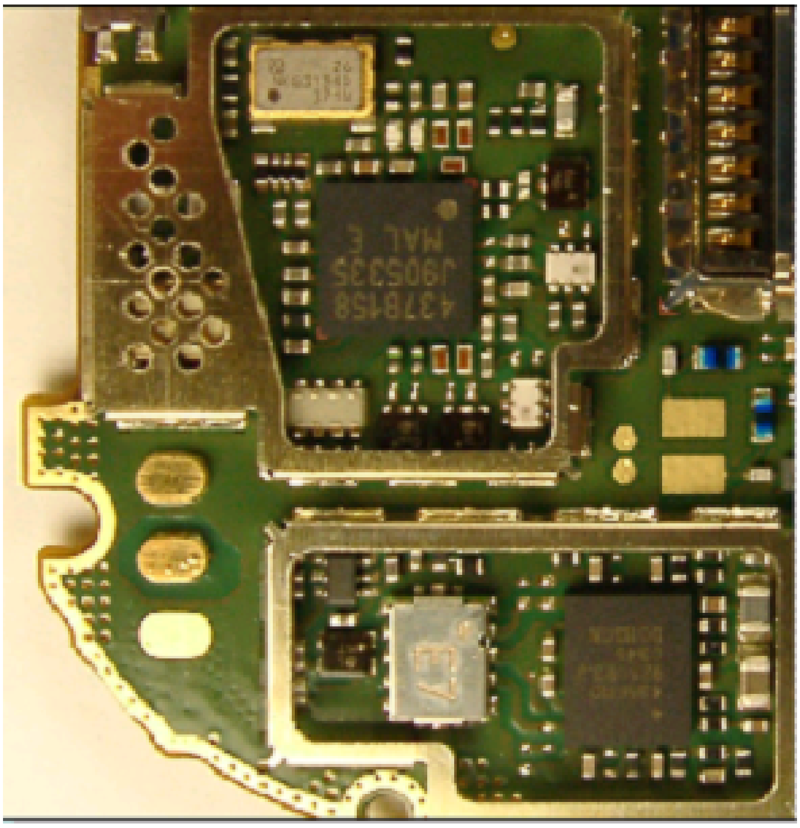

Figure 142 Rf key component

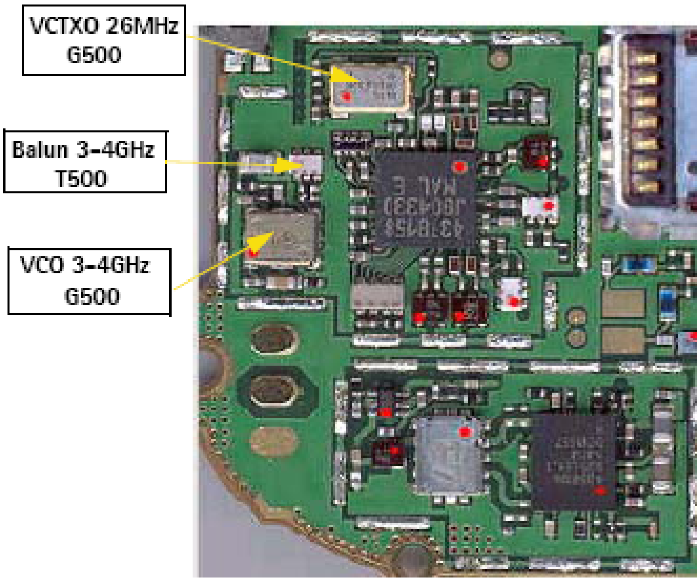

Figure 143 Synthesizer key components without shielding frames

Assumption

- No soldering or component failure for simple SMD components such as resistors, inductors and capacitors
- Failure in one particular operating GSM channel, whether Tx or Rx, in which the synthesizer is the cause of the failure, causes failure in all other GSM channels in Tx/Rx.

Preparing for synthesizer troubleshooting

Steps

1. Place the phone (mechanics removed) on module jig.
2. Connect the module jig to the PC via a DAU-9P cable.
3. Connect the module jig to a power supply (4.2V).
4. Connect the RF output to a spectrum analyzer or another measurement instrument.
5. Use a 10dB attenuator at the input to spectrum analyzer to avoid damage.
6. Make sure the dongle is connected and start Phoenix.
7. In Phoenix, select *File -> Open Product -> RM-25 (Nokia 6260) Product Menu*.
8. Select *Testing -> RF Controls*.
9. In the toolbar: set *Operating Mode -> Local*.
10. Select *Band -> GSM 1800*.
11. Set *Operation Mode -> Continuous*.
12. Set *Active Unit -> Rx*.

13. Set *Rx/Tx Channel -> 700*.

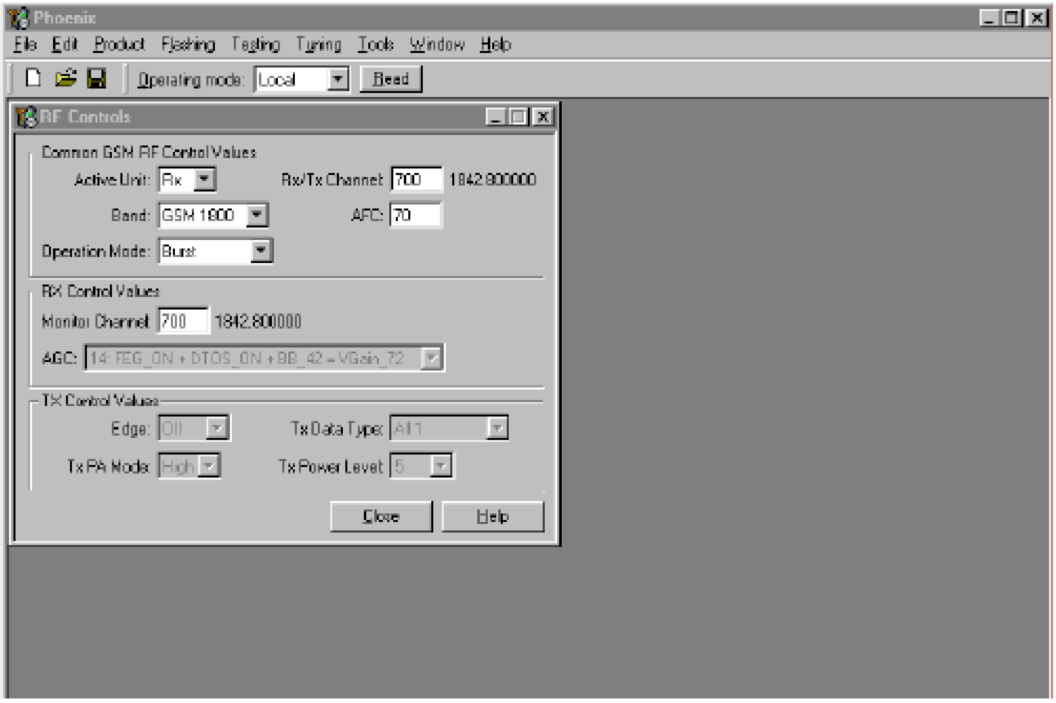

Figure 144 Preparation for troubleshooting using Phoenix RF control setup

Measuring the synthesizer manually using spectrum analyzer

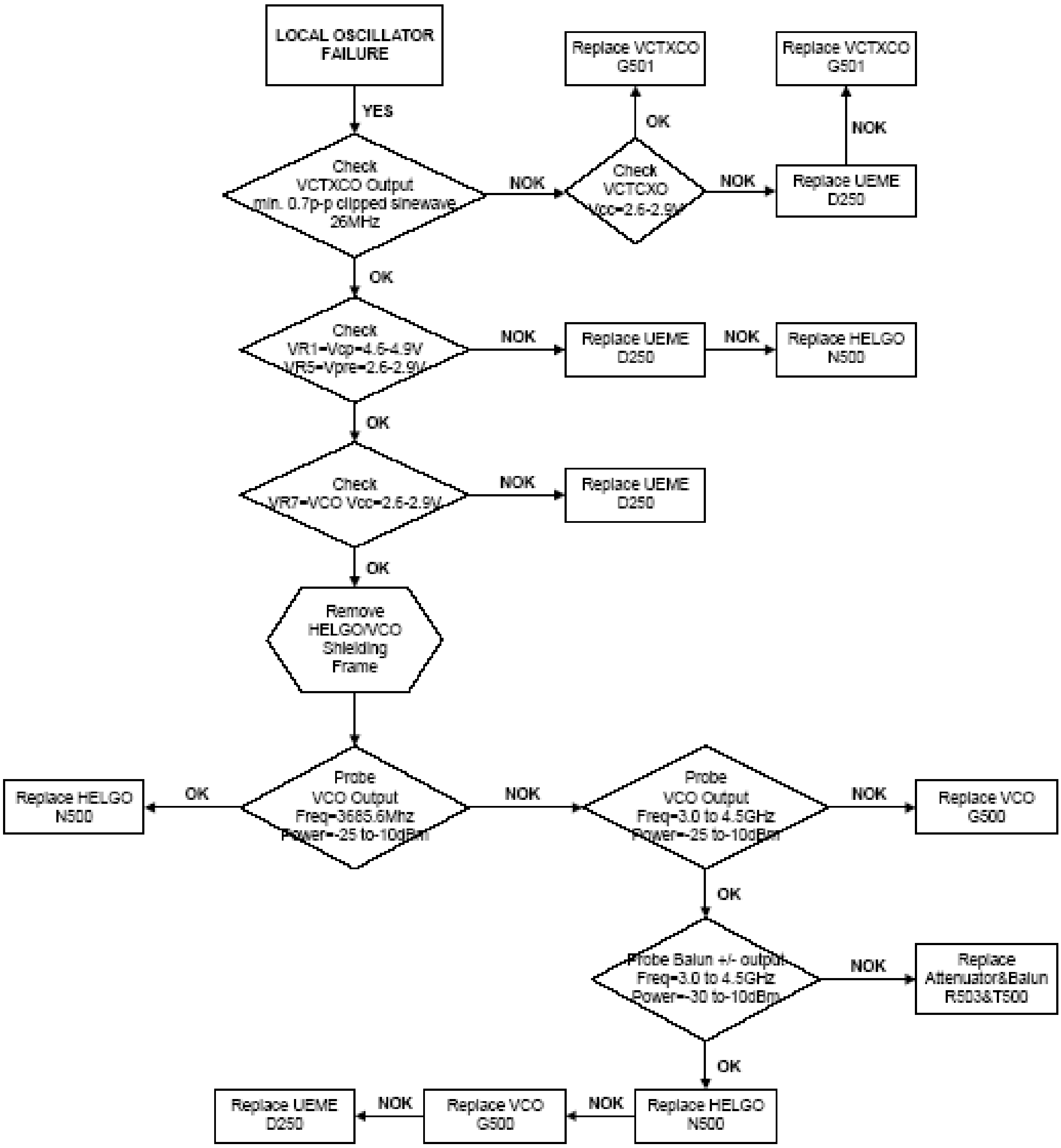

Figure 145 Troubleshooting chart for synthesizer

Spectrum analyzer level values depend on the probe type and should be validated using a known good sample. The levels that are given here are measured using a high frequency probe. Spectrum analyzer should be at least capable of measuring signal upto 4.5 GHz.

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Bluetooth

Bluetooth component placement

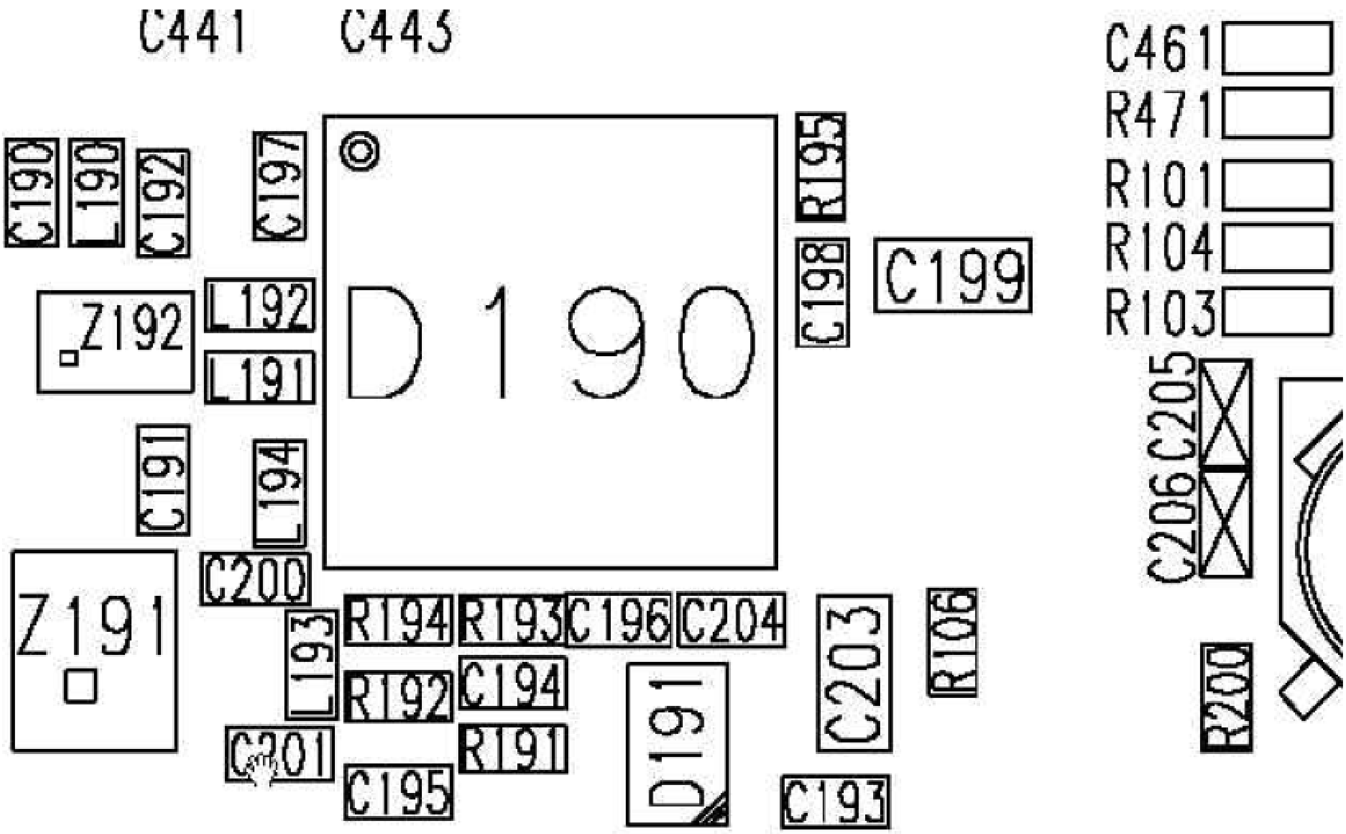

Figure 146 Bluetooth component placement

Note: This component placement is taken from a B3 prototype and is subject to change in the future.

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. From the Testing menu, choose 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

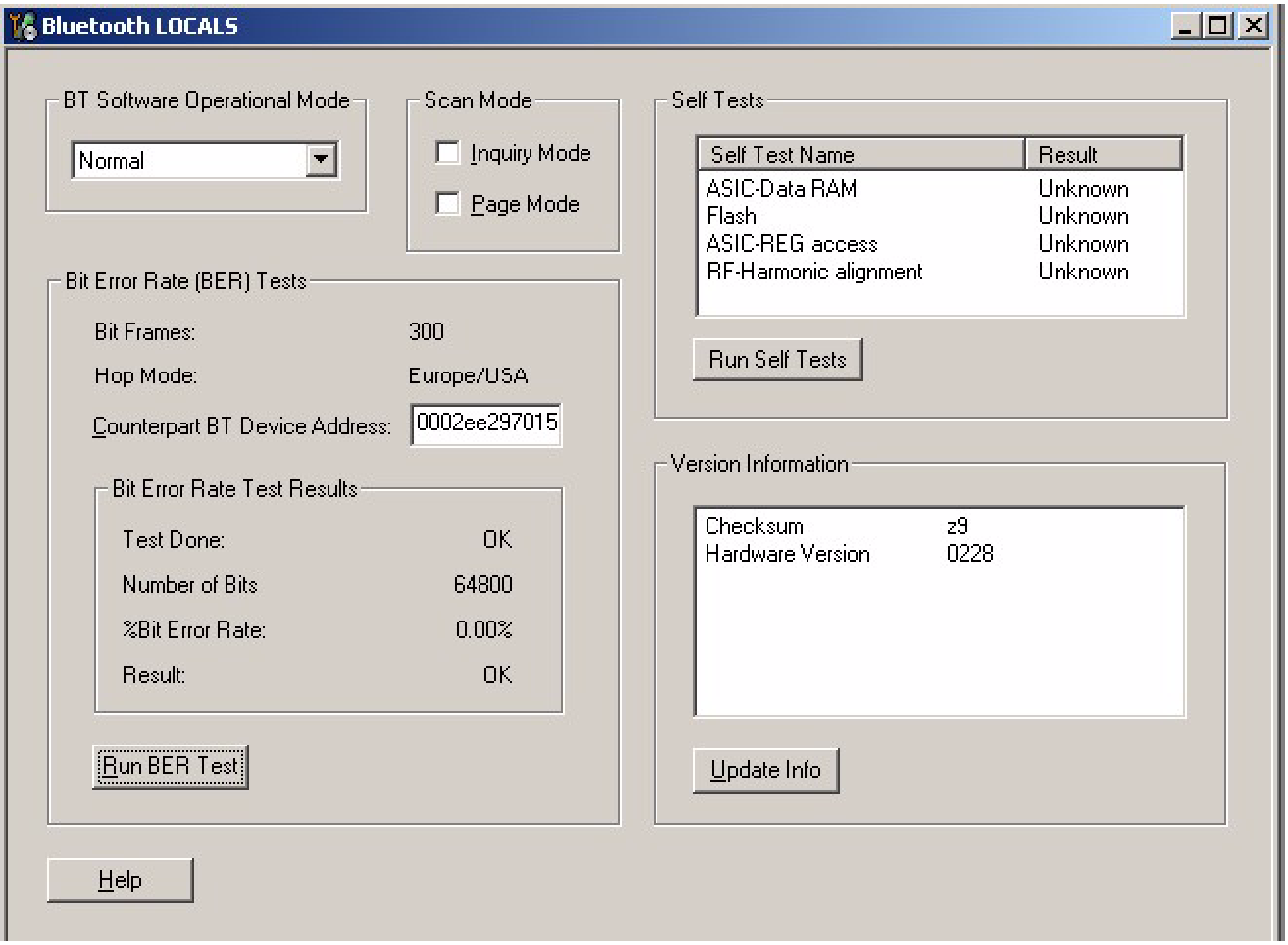

Figure 147 Phoenix settings for Bluetooth troubleshooting

Troubleshooting Bluetooth

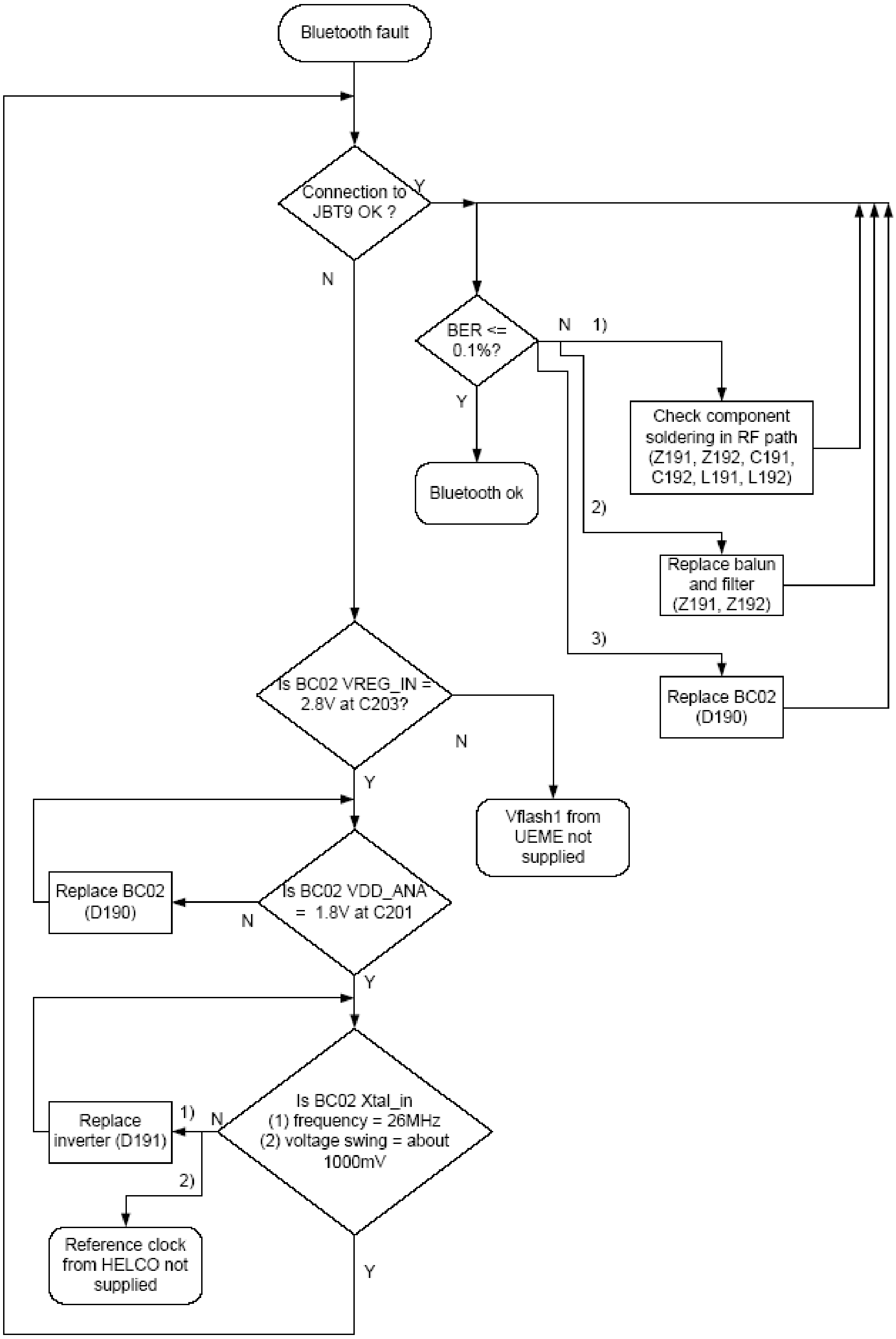

Figure 148 Bluetooth troubleshooting

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8 — Camera module troubleshooting

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Introduction to camera module troubleshooting

Background, tools and terminology

Faults or complaints in camera operation can be roughly categorised into three subgroups:

1 Camera is not functional at all; no image can be taken.

2 Images can be taken but there is nothing recognizable in them.

3 Images can be taken and they are recognizable but for some reason the quality of images is seriously degraded.

Image quality is very hard to measure quantitatively, and even comparative measurements are difficult (comparing two images) to do, if the difference is small. Especially if the user is not satisfied with his/her device's image quality, and tells, for example, that the images are not sharp, it is fairly difficult to accurately test the device and get an exact figure which would tell whether the device is functioning properly.

Often subjective evaluation has to be used for finding out if a certain property of the camera is acceptable or not. Some training or experience of a correctly operating reference device may be needed in order to detect what actually is wrong.

It is easy for the user to take bad images in bad conditions. Therefore the camera operation has to be checked always in constant conditions (lighting, temperature) or by using a second, known-to-be good device as reference.

When checking for possible errors in camera functionality, knowing what error is suspected significantly helps the testing by narrowing down the amount of test cases. The following types of image quality problems may be expected to appear:

- Dust (black spots)
- Lack of sharpness
- Bit errors

Terms

Dynamic range	Camera's ability to capture details in dark and bright areas of the scene simultaneously.
Exposure time	Camera modules use silicon sensor to collect light and for forming an image. The imaging process roughly corresponds to traditional film photography, in which exposure time means the time during which the film is exposed to light coming through optics. Increasing the time will allow for more light hitting the film and thus results in brighter image. The operation principle is exactly the same with silicon sensor, but the shutter functionality is handled electronically i.e. there is no mechanical moving parts like in film cameras.
Flicker	Phenomenon, which is caused by pulsating in scene lighting, typically appearing as wide horizontal stripes in an image.
Noise	Variation of response between pixels with same level of input illumination.
Resolution	Usually the amount of pixels in the camera sensor; for example, RM-1 has a 1280 x 960 pixel sensor resolution. In some occasions the term resolution is used for describing the sharpness of the images.
Sensitivity	Camera module's sensitivity to light. In equivalent illumination conditions, a less sensitive camera needs a longer exposure time to gather enough light in forming a good image. Analogous to ISO speed in photographic film.

Sharpness	Good quality images are 'sharp' or 'crisp', meaning that image details are well visible in the picture. However, certain issues, such as non-idealities in optics, cause image blurring, making objects in picture to appear 'soft'. Each camera type typically has its own level of performance.

The effect of image taking conditions on image quality

There are some factors, which may cause poor image quality, if not taken into account by the end user when shooting images, and thus may result in complaints. The items listed are normal to camera operation and are not a reason for changing the camera module.

Distance to target

The lens in the module is specified to operate satisfactorily from 40 cm to infinite distance of scene objects. In practice, the operation is such that close objects may be noticed to get more blurred when distance to them is shorter than 40 cm. The lack of sharpness is first visible in full resolution images. If observing just the viewfinder, even very close objects may seem to appear sharp.

Sharpness of picture edges

The lens performance degrades in image edges, and generally the image is sharpest in the center part. Particularly this applies to distant objects (> 1 meter).

See the following figure.

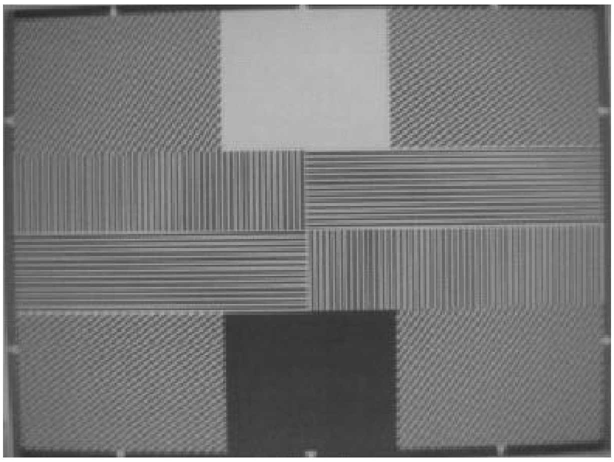


Figure 149 Sharpness of the picture is worse on the edges than in the center

Geometrical distortion

The camera lens causes some amount of so called barrel distortion in images.

In practice, this appears as bending of straight objects on the edges of an image. See figure Blurring caused by shaking hands (Page 8–7) (wall in the background).

The amount of light available

In dim conditions camera runs out of sensitivity. The exposure time is long (especially in the night mode) and the risk of getting shaken (= blurred) images increases. In addition, image noise level grows. The maximum exposure time in the night mode is ¼ seconds. Therefore, images need to be taken with extreme care and by supporting the phone when the amount of light reflected from the target is low. Because of the longer exposure time and larger gain value, noise level increases in low light conditions. Sometimes blurring may even occur in daytime, if the image is taken very carelessly. See the figure below for an example.

Figure 150 Blurring caused by shaking hands. Geometrical barrel distortion in the background.

Movement in bright light

If an image is taken of moving objects or if the device is used in a moving vehicle, object 'skewing' or 'tilting' may occur. This phenomenon is fundamental to most CMOS camera types, and usually cannot be avoided. The movement of camera or object sometimes cause blurring indoors or in dim lighting conditions because of long exposure time.

Figure 151 Near objects get skewed when taking images from a moving vehicle

Temperature

High temperatures inside the mobile phone cause more noise to appear in images. For example, in +70 degrees (Celsius), the noise level may be very high, and it further grows if the conditions are dim. If the phone processor has been heavily loaded for a long time before taking an image, the phone might have considerably higher temperature inside than in the surrounding environment. This is also normal to camera operation; do not change the camera module.

Figure 152 Noisy image taken in +70 degrees Celsius

Phone display

If the display contrast is set too dark, the image quality degrades: the images may be very dark depending on the setting. If the display contrast is set too bright, image contrast appears bad and "faint". This problem is solved by setting the display contrast correctly.

Basic rules of photography (especially shooting against light)

Because of dynamic range limitations, taking images against bright light might cause either saturated image or the actual target appear too dark. In practice, this means that when taking an image indoors and having, for example, a window behind the object, the result is usually poor.

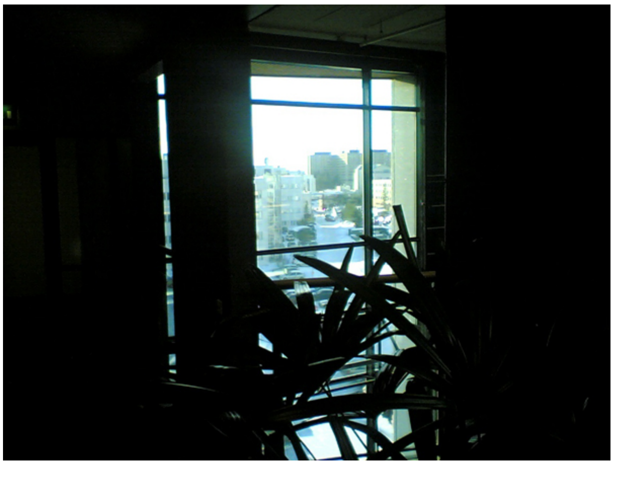


Figure 153 Image taken against light

Flicker

In some occasions a bright fluorescent light may cause flicker in the viewfinder and captured image. This phenomenon may also be a result, if images are taken indoors under the mismatch of 50/60 Hz electricity network frequency. The electricity frequency used is automatically detected by the camera module. In some very few countries, both 50 and 60 Hz networks are present and thus probability for the phenomenon increases. Flickering occurs also under high artificial illumination level.

Figure 154 Flicker in an image; object illuminated by strong fluorescent light

Bright light outside of image view

Especially the sun can cause clearly visible lens glare phenomenon and poor contrast in images. This happens because of undesired reflections inside the camera optics. Generally this kind of reflections are common in all optical systems.

Figure 155 A lens reflection effect caused by sunshine

Examples of good quality images

Figure 156 Good image taken indoors

Figure 157 Good image taken outdoors

Image quality analysis

Testing for dust in camera module

Context

For detecting these kinds of problems, take an image of a uniform white surface and analyse it in full resolution. A good quality PC monitor is preferred for analysis. Search carefully, since finding these defects is not always easy. Figure "Effects of dust on optical path" is an example image containing easily detectable dust problems.

When taking a white image, use uniformly lightened white paper or white wall. One possibility is to use uniform light but in this case make sure that the camera image is not flickering when taking the test image. In case flickering happens, try to reduce illumination level. Use JPEG image format for analysing, and set the image quality parameter to ‘High Quality’.

Black spots in an image are caused by dirt particles trapped inside the optical system. Clearly visible and sharp edged black dots in an image are typically dust particles on the image sensor. These spots are searched for in the manufacturing phase, but it is possible that the camera body cavity contains a particle, which may move onto the image sensor active surface, for example, when the phone is dropped. Thus it is also possible that the problem will disappear before the phone is brought to service. The camera should be replaced if the problem is present when the service technician analyses the phone.

If a dust particle is lying on the infrared filter surface on either side, they are hard to locate because they are out of focus, and appear in the image as large, grayish and fading-edge 'blobs'. Sometimes they are invisible to the eye, and thus the user probably does not notice them at all. However, it is possible that a larger particle disturbs the user, causing need for service.

Figure 158 Effects of dust on optical path

If large dust particles get trapped on top of the lens surface in the cavity between camera window and lens, they will cause image blurring and poor contrast. The dust gasket between the window and lens should prevent any particles from getting into the cavity after the manufacturing phase.

If dust particles are found on the sensor, this is classified as a manufacturing error of the module and the camera should be replaced. Any particles inside the cavity between the protection window and lens have most probably been trapped there in the assembly phase at a Nokia factory. Unauthorized disassembling of the product can also be the root of the problem. However, in most cases it should be possible to remove the particle(s) by using clean compressed air. Never wipe the lens surface before trying compressed air; the possibility of damaging the lens is substantial. Always check the image sharpness after removing dust.

See Also

- Testing camera image sharpness (Page 8–11)

Testing camera image sharpness

Context

If pictures taken with a device are claimed to be blurry, there are six possible sources for the problem:

1 The protection window is fingerprinted, soiled, dirty, visibly scratched or broken.

2 The photographed object is too close – the camera lens operates with distances from 40 cm to infinity. This is no cause to replace camera module.

3 User has tried to take pictures in too dark conditions, and images are blurred due to handshake or movement. This is no cause to replace camera module.

4 There is dirt between the protection window and camera lens.

5 The protection window is defective. This can be either a manufacturing failure or caused by the user. The window should be changed.

6 The camera lens is misfocused because of a manufacturing error.

A quantitative analysis of sharpness is very difficult to conduct in any other environment than optics laboratory. Therefore, subjective analysis should be used.

If no visible defects (items 1-4) are found, a couple of test images should be taken. Generally, a well-illuminated typical indoor scene can be used as a target. The main considerations are:

- The protection window has to be clean.
- The amount of light (300 – 600 lux (bright office lighting)) is sufficient.
- The scene should contain, for example, small objects for checking sharpness. Their distance should be 1 – 2 meters.
- If possible, compare the image to another image of the same scene, taken with a different device. Note that the reference device has to be a similar Nokia phone.

Steps

1. Take several images of small objects in the distance of 1-2 metres.
2. Analyse the images on a PC screen at 100% scaling with the reference images.

   Pay attention to the computer display settings: at least 65000 colors (16-bit) have to be used. True colour (24-bit, 16 million colours) or 32-bit (full colour) setting is recommended.

Next action

If there appears to be a clearly noticeable difference between the reference image and the test images, the module might have a misfocused lens -> change the module.

Re-check the resolution after changing the camera module.

If the changed module produces the same result, the fault is probably in the camera window. Check the window by looking carefully through it when replacing the module.

See Also

- Testing for dust in camera module (Page 8–10)
- Dirty camera protection window (Page)

Image bit errors

Bit errors are image defects caused by data transmission errors between the camera module and the phone baseband and/or errors inside the module.

Usually bit errors can be easily detected in images, and they are best visible in full resolution images. A good practice is to use a uniform white test target when analysing these errors. The errors are clearly visible, colourful sharp dots or lines in camera images. See the following figure.

Figure 159 Bit errors caused by JPEG compression

One type of bit error is a lack of bit depth. In this case, the image is almost totally black under normal conditions, and only senses something in very highly illuminated environments. Typically this is a contact problem between the camera module and the phone main PWB. You should check the camera assembly and connector contacts.

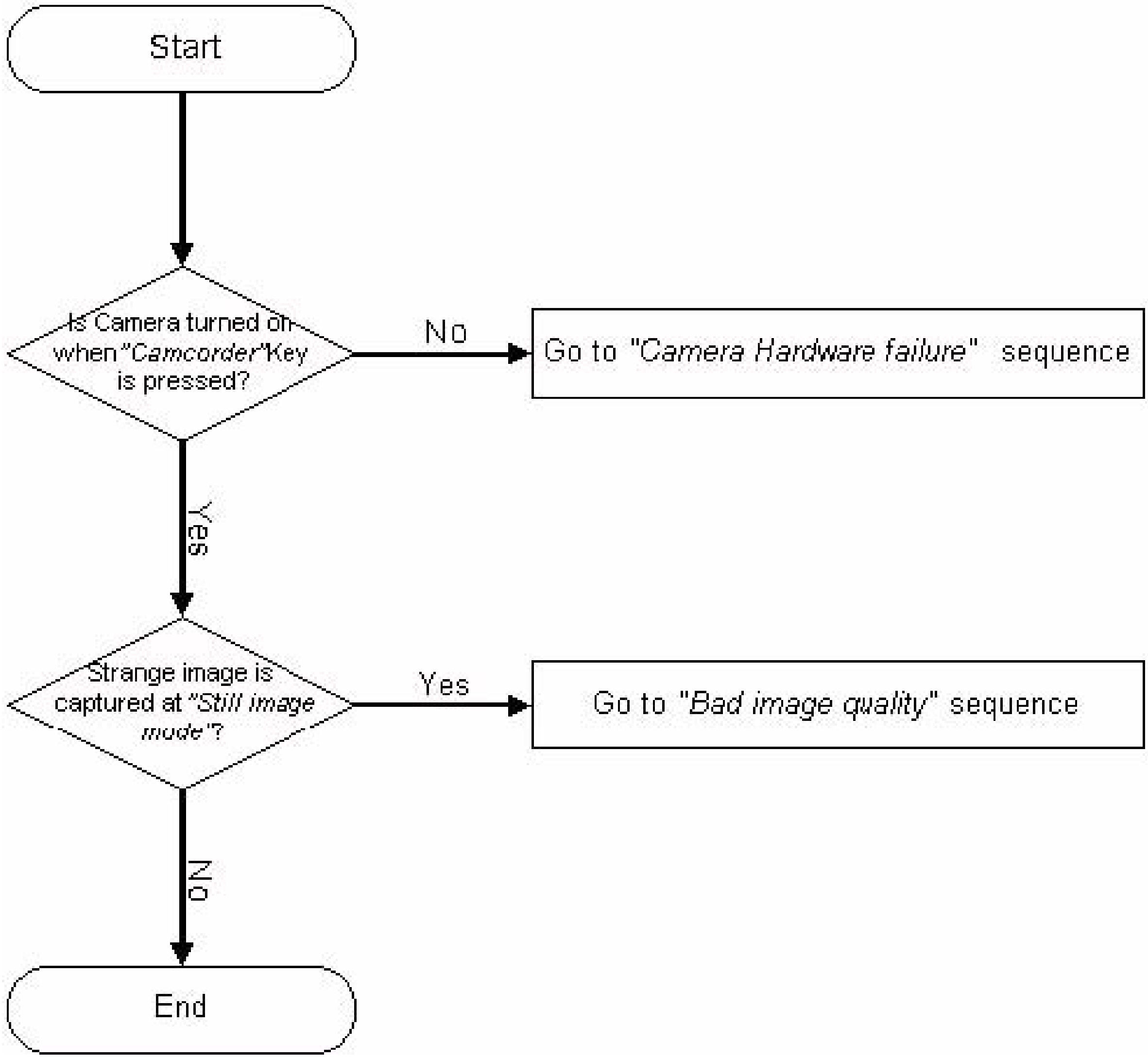
If the fault is in the camera module, bit errors are typically visible only when using some specific image resolution. For example, in case of a viewfinder fault, the error might exist but is not visible in a full size image.

Camera troubleshooting flowcharts

Camera hardware troubleshooting

Context

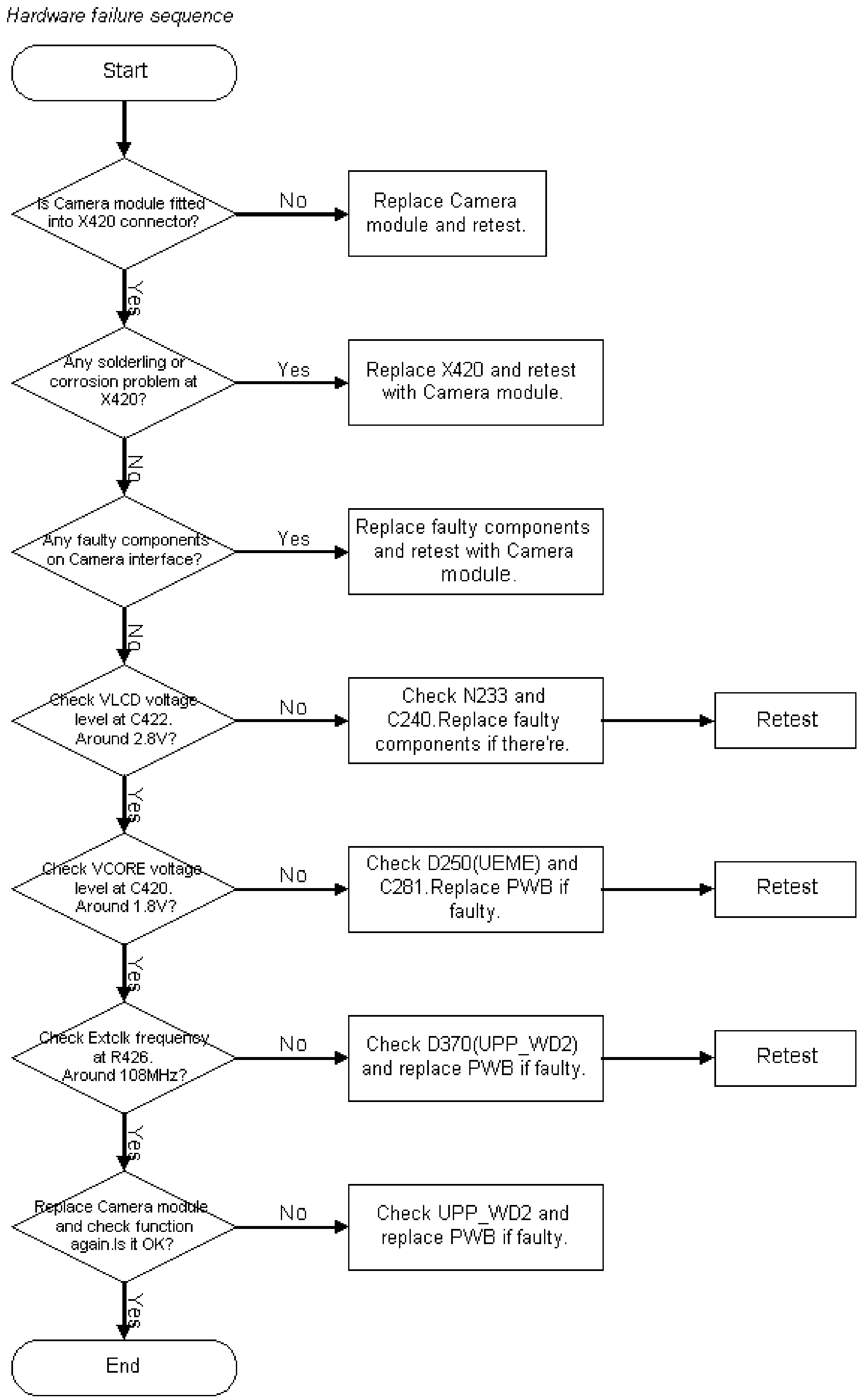
If camera related hardware is faulty, follow the troubleshooting flowchart below.



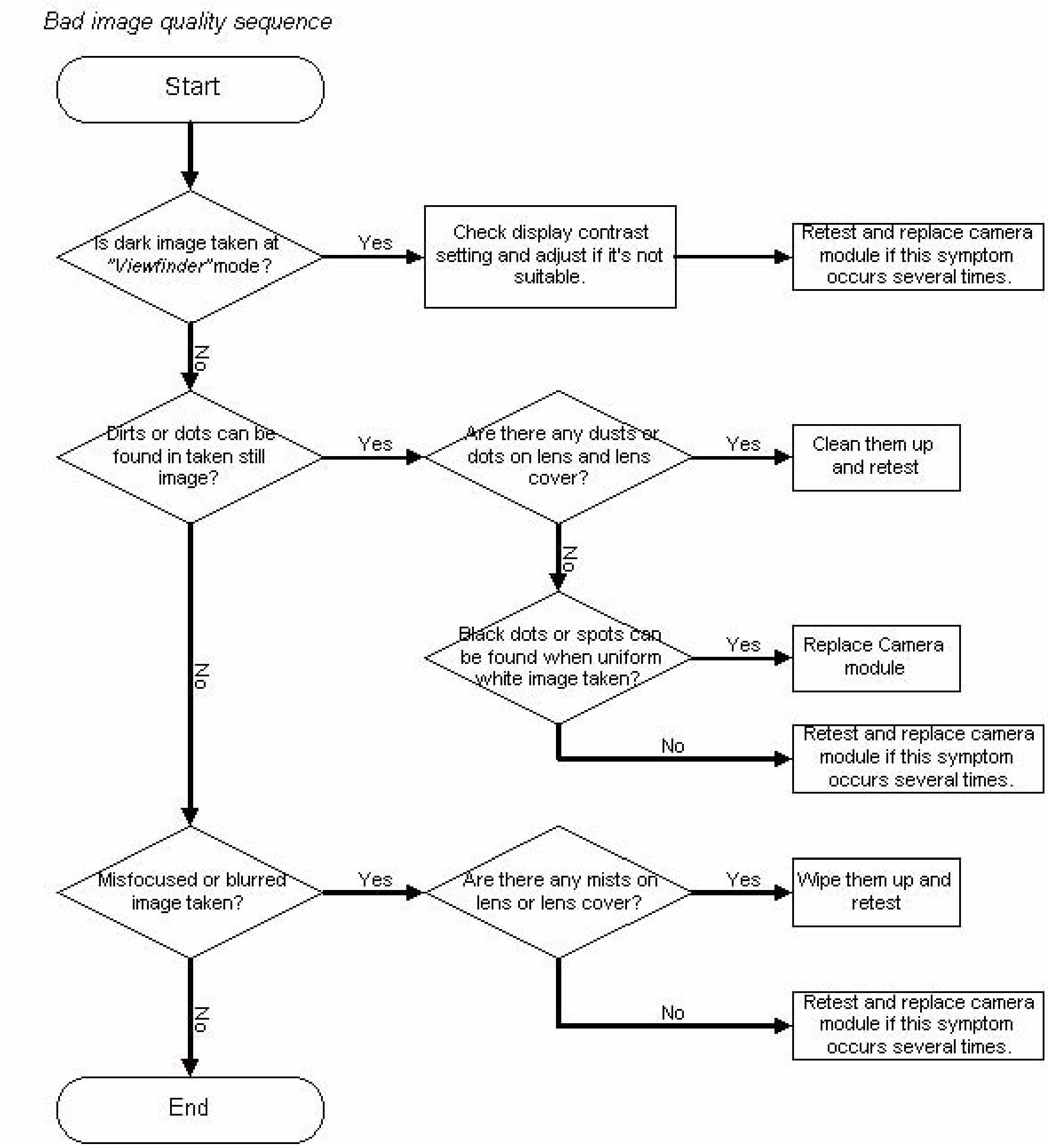
See Also

- Camera hardware failure troubleshooting (Page 8–15)
- Bad image quality troubleshooting (Page 8–16)

Camera hardware failure troubleshooting



Bad image quality troubleshooting



9 — System module

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System module block diagram

The main board, 1FSA, consists of a radio frequency part and a baseband part. The User Interface parts are mainly situated at the UI flex, 1FSE, and the Top UI part, 1FSF. The UI flex is connected to the main board through a connector. The Top UI part is connected to the main board through the Hinge Flex part, 1FSD.

The 1FSA is the system module of the RM-25 phone.

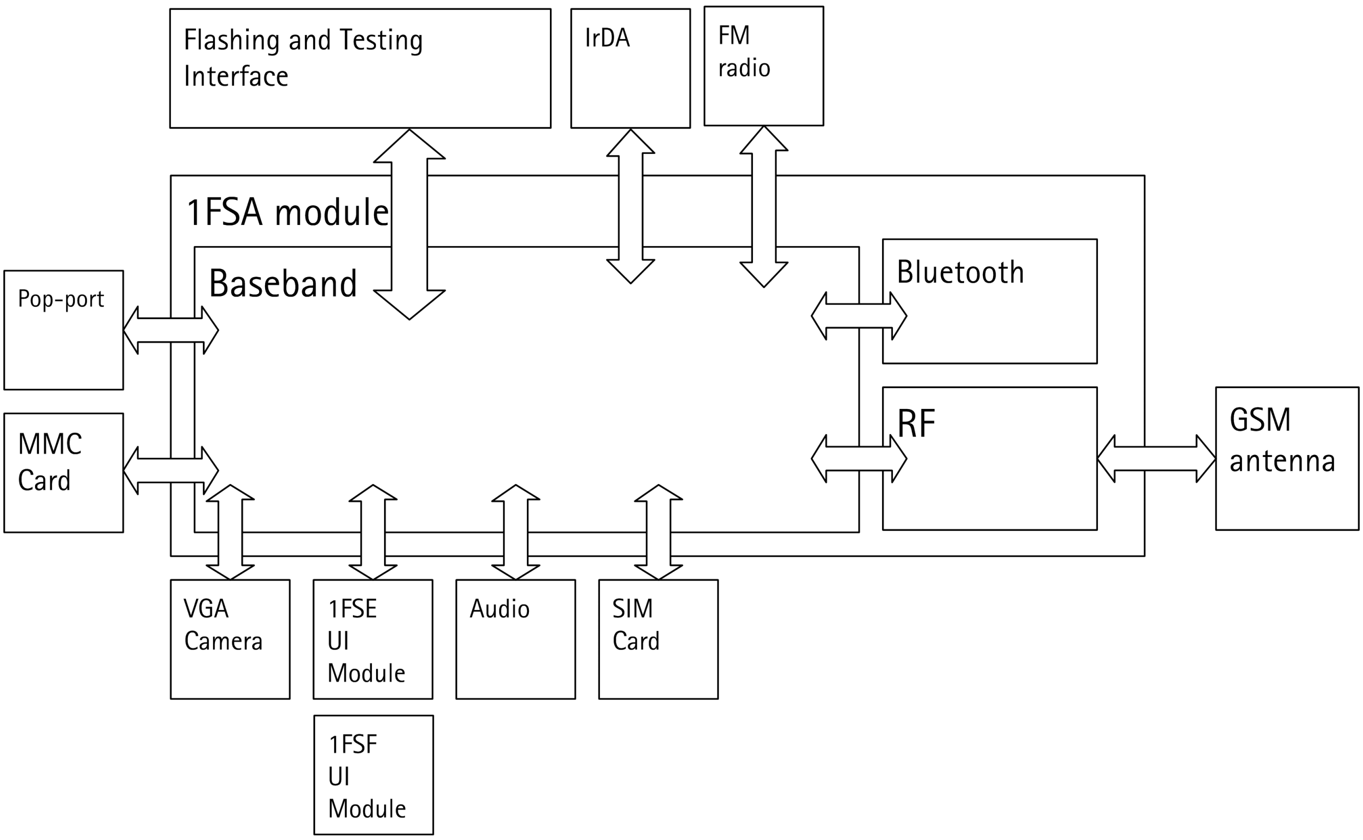

Figure 160 Module block diagram

The RM-25 has IrDA and Bluetooth wireless local interfaces. It features a full function PopPort™ implementation. The port includes stereo audio interface and ACI bus support. The HW will communicate with ACI accessories. The SW may not support all ACI accessories.

The PopPort™ supports USB but does not support FBUS.

The implementation of the ACI bus in RM-25 has been made possible by implementing the BSI, Battery Size Indication, a little different from most Nokia phones.

Functional description

The heart of the BB is UPP_WD2, which includes the MCU, DSP and Digital Control Logic. Power is supplied by the UEME ASIC and a number of discrete regulators. Memory comprises of 2 x 128Mbit Stacked and 64Mbit flash memory devices and 128 Mbit (16 Mbytes) SDRAM.

There are two audio transducers (earpiece 8 mm and IHF speaker 16 mm) and external galvanic headset (PopPort™) interface. The IHF speaker is also used to handle the ring tone. The IHF speaker is driven by a discrete audio amplifier. In RM-25, there is only one microphone for both HS and IHF modes.

For data connectivity there is USB v2.0 full-speed, Bluetooth and RS-MMC card.

The display is an TFT type colour display with 65536 colours and 176x208 pixels with backlighting. The UI module features a function keymat with a 4-way navigation key with a centre selection key.

For imaging purposes, BB supports a VGA camera via the CCP interface, which is integrated in UPP_WD2.

BB description

The BB core is based on UPP_WD2 CPU, which is a PDA version of the DCT4 UPP ASIC. UPP_WD2 takes care of all the signal processing and operation controlling tasks of the phone as well as all PDA tasks.

For power management, there is one main ASIC for controlling charging and supplying power UEME plus some discrete power supplies. The main reset for the system is generated by the UEME.

The interface to the RF and audio sections is also handled by the UEME. This ASIC provides A/D and D/A conversion of the in-phase and quadrature receive and transmit signal paths and also A/D and D/A conversions of received and transmitted audio signals. Data transmission between UEME and RF and the UPP_WD2 is implemented using different serial connections (CBUS, DBUS and RFBUS). Digital speech processing is handled by UPP_WD2 ASIC.

A real time clock function is integrated into UEME, which utilizes the same 32kHz-clock source as the sleep clock. A rechargeable battery provides backup power to run the RTC when the main battery is removed. Backup time is approximately 5 Hours.

Memory configuration

RM-25 uses two kinds of memories, Flash and SDRAM. These memories have their own dedicated bus interfaces to UPP_WD2.

Synchronous DRAM is used as the working memory. Interface is 16 bit wide data and 14 bit address. Memory clocking speed is 123.5 MHz. The SDRAM size is 128Mbits.

SDRAM I/O is 1.8 V and core 1.8 V supplied by UEME regulator VIO. All memory contents are lost if the supply voltage is switched off.

Multiplexed flash memory interface is used to store the MCU program code and user data. The memory interface is a burst type FLASH with multiplexed address/data bus, running at 123.5/3MHz.

Configuration of flash memory is a 2x128Mbit stacked flash memory and a 64Mbit flash memory.

Both flash I/O and core voltage are 1.8 V supplied by UEME’s VIO.

Energy management

The master of EM control is UEME and with SW it has the main control of the system voltages and operating modes.

Modes of operation

RM-25 employs several hardware and software controlled operation modes. Main modes are described below.

- NO_SUPPLY mode means that the main battery is not present or its voltage is too low (below UEME master reset threshold) and back-up battery voltage is too low.
- In BACK_UP mode the main battery is not present or its voltage is too low but the back-up battery has sufficient charge in it.
- In PWR_OFF mode the main battery is present and its voltage is over the UEME master reset threshold. All regulators are disabled.
- RESET mode is a synonym for start-up sequence and contains in fact several modes. In this mode, regulators and oscillators are enabled and after they have stabilized system reset is released and PWR_ON mode entered.
- In PWR_ON mode SW is running and controlling the system.
- SLEEP mode is entered from PWR_ON mode when the system’s activity is low (SLEEPX controlled by SW).
- FLASHING mode is for production SW download.

Voltage limits

The voltage limits of the system are listed in the following table. These are also controlling system states.

Parameter	Description	Value
VMSTR+	Master reset threshold (rising)	2.1 V (typ.)
VMSTR-	Master reset threshold (falling)	1.9 V (typ.)
VCOFF+	Hardware cutoff (rising)	3.1 V (typ.)
VCOFF-	Hardware cutoff (falling)	2.8 V (typ.)
V_BUCOFF+	Back-up battery cutoff (rising)	2.1 V (typ.)
V_BUCOFF-	Back-up battery cutoff (falling)	2.0 V (typ.)
SWCOFF	SW cutoff limit (> regulator drop-out limit) MIN!	3.4 V SW changeable

The master reset threshold controls the internal reset of UEME. If battery voltage is above VMSTR, UEME's charging control logic is alive. Also, RTC is active and supplied from the main battery. Above VMSTR UEME allows the system to be powered on although this may not succeed due to voltage drops during start-up. SW can also consider battery voltage too low for operation and power down the system.

Clocking scheme

A 26 MHz VCXO is used as system clock generator in GSM. During the system start-up, UEME RC-oscillators generate timing for state machines. All clock signals of the engine are illustrated in following figure.

Bluetooth uses a 26 MHz clock.

FM radio uses 32kHz, the SleepClk.

In SLEEP mode, the VCXO is off. UEME generates low frequency clock signal (32.768 kHz) that is fed to UPP_WD2, Bluetooth and ZOCUS.

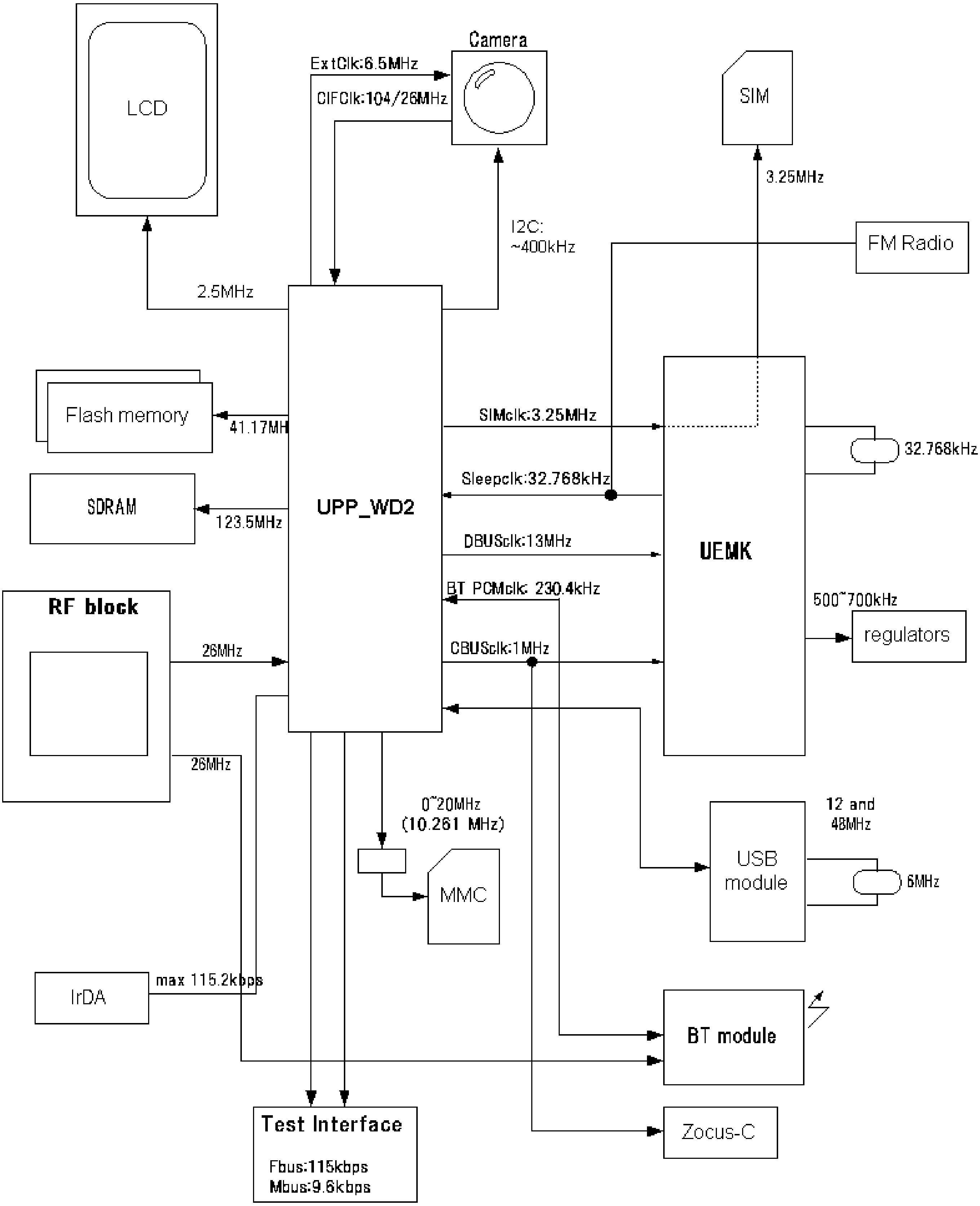

Figure 161 RM-25 clocking

UPP_WD2 voltage/clock frequency adjusting

No external clock is available for UPP_WD2 before VCXO starts. As reset is released, the VCXO is running and MCU uses the 26 MHz clock while DSP is in reset. There are three identical DPLL's, for MCU, for DSP and for accessory interfaces, which can be controlled independently. The clock for MCU can be up to 130 MHz and 156 MHz is maximum clock frequency for the DSP. These clock signals are used either directly (SDRAM IF) or divided down for the interfaces (e.g. flash IF).

Power distribution, control and reset

All power (except backup battery power) is drawn from the BL-4C Li-Ion battery located in the B cover. Current flows through ZOCUS current sense resister which is used for current measurement by ZOCUS and thus for remaining operating time estimation.

1FSA board contains one power ASIC, UEME and discrete regulators needed for generating the different operating voltages. The discrete regulators consist of an SMPS to power UPP_WD2 voltage core. In addition, there is a SMPS in 1FSA generating the operating voltage for display module backlighting. In 1FSA, the keyboard backlight is powered with a charge pump regulator.

There is also a “soft watchdog” in UPP_WD2. It is used to reset the chip in case software gets stuck for any reason.

Power-up sequence (reset mode)

RESET mode can be entered in four ways: by inserting the battery or charger, by RTC alarm or by pressing the power key. The VCXO is powered by UEME. After a 220 ms delay, regulators are configured and UEME enters PWR_ON mode and system reset PURX is released.

During the system start-up, in RESET state, the regulators are enabled, and each regulator charges the capacitor (s) at the output with the maximum current (short circuit current) it can deliver. This results in battery voltage dropping during start-up. When a battery with a voltage level just above the hardware cutoff limit is inserted, the system may not start due to excessive voltage dipping. Dropping below 2.8 V for longer than 5 us forces the system to PWR_OFF state.

Powering off

Controlled powering off is done when the user requests it by pressing the power-key or when the battery voltage falls too low. Uncontrolled powering off happens when the battery is suddenly removed or if over-temperature condition is detected in regulator block while in RESET mode. Then all UEME’s regulators are disabled immediately and discrete regulators are disabled as Vbat supply disappears.

Controlled powering off

For RM-25, powering off is initiated by pressing the power key and power off sequence is activated in UEME and SW. Basically, the power key causes UEME interrupt to UPP_WD2 and SW sets watchdog time value to zero and as this happens, PURX is forced low and all regulators are disabled.

If the battery voltage falls below the very last SW-cutoff level, SW will power off the system by letting the UEME’s watchdog elapse.

If thermal shutdown limit in the UEME regulator block is exceeded, the system is powered off. System reset PURX is forced low.

Uncontrolled powering off

This happens when the battery is suddenly removed. UEME’s state machine notices battery removal after the battery voltage has been below VCOFF- for 5 us and enters PWR_OFF mode. PURX is set low and all UEME’s regulators are disabled.

Watchdogs

There are three watchdogs in UEME. The first one is for controlling system power-on and power-down sequences. The initial time for this watchdog after reset is 32 s and the watchdog can not be disabled. The time can be set using a register. This watchdog is used for powering the system off in a controlled manner. The other one is for security block and is used during IMEI code setting. The third one is a power key watchdog. It is used to power off the system in case SW is stuck and the user presses the power key. This WD is SW configurable.

Charging

Charging control and charge switch is in UEME. There are two different charging modes; charging an empty battery (start-up charge mode), and SW controlled charging.

UEME digital part takes care of charger detection (generates interrupt to UPP_WD2), pulse width modulated charging control (for internal charge switch) and over voltage and current detection. SW using registers controls all these.

Chargers

RM-25 BB supports a standard charger (two wires); ACP-12 and cigarette charger LCH-12 officially.

Battery

RM-25 battery is a detachable, semi-fixed lithium-Ion BL-4C battery. The nominal voltage is thus 3.7 V (max charging voltage 4.2 V).

The interface consists of three pins: VBAT, GND and BSI. A pull-down resistor inside the batteries (BSI signal) recognizes the battery types. The voltage level at BSI line is measured using UEME's AD-converter.

Back-up battery and real time clock

The real time clock (RTC), crystal oscillator and back-up battery circuitry reside in UEME. A register in UEME controls back-up battery charging and charging is possible only in POWER_ON State.

Baseband measurement A/D converter

UEME contains an 11 channels A/D converter, which is used for different baseband measurement purposes. The resolution of the A/D converter is 10 bits. The converter uses the CBUS interface clock signal for the conversion. An interrupt will be given to the MCU at the end of the measurements. The converter is used for following purposes.

- VBATADC, battery voltage
- BSI, in RM-25 this input is connected to ACI bus and the BSI_PULS. The BSI_PULS is delivered by the flashing equipment when flashing the phone.
- BTEMP, battery temp
- PATEMP, power amplifier temp
- VCXOTEMP, oscilaotor temp
- Headint
- Hookint
- ALCO/LS, in RM-25 this input is used to determine the value of the BSI resisor of the Battery and thus the battery type (and local, test modes)
- Headint2, not supported by SW, not used
- AuxDet, not used
- VBACK, test the voltage of backup battery

ZOCUS

The ZOCUS device is a current sensor used for the battery bar display and for determining whether the phone is in a high current consuming mode. The ZOCUS device measures the voltage drop across a sense resistor in the battery voltage line. This sense resistor is formed from a PWB track and is on an internal layer of the PWB. The sense resistor must be located close to the battery terminals so that all of the phones current flow through it. The nominal value of the sense resistor is 3.0m-ohm. ZOCUS reports the current measurement to UPP_WD2 via the Cbus interface.

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.

USB

USB provides a wired connectivity between host PC and peripheral devices. RM-25 complies with USB 2.0, supporting data transfer at full-speed (max. 12Mbps). The USB functionality of RM-25 is implemented by a newly developed USB interface device, Kaede (B440), which is connected to UPP_WD2 via flash memory interfaces. A 6MHz ceramic resonator, Ceralock (D440), is used for USB clock generation.

SIM interface

The SIM interface is located in two chips (UPP_WD2 and UEME). In UEME there is support only for one SIM card. The interfaces support both 1.8 V and 3 V SIM cards. Adjustable SIM regulator (1.8V/3.0V) is located in UEME and can be controlled by SW.

The data communication between the card and the phone is asynchronous half duplex. The clock supplied to the card is 3.25 MHz. The data baudrate is SIM card clock frequency divided by 372 (by default), 64, 32 or 16.

IrDA interface

RM-25 supports data connectivity via the Infra Red link. The IR interface is integrated into the UPP_WD2 and the main external component is the IR module. The data rates supported are up to 115.2 kbits/s.

The logics section is powered by 1V8, VIO while the transmitter LED is powered directly by the battery via a power limiting resistor.

The maximum distance in the Lightning configuration is approximately 20 centimetres (30 cm used with an accompanying 1 m device).

MMC interface

The MMC interface consists of a block in UPP_WD2 plus a level shifting device known as “Lester” and an EMC protection ASIP. The MMC interface comprises 3 lines clock, data and command and runs at 10.26 MHz. The Lester device also incorporates a 2.85V regulator to power the MMC card.

Pop-Port^{TM}

The ACI bus is level-shifted between the accessory part and the BSI/DBI port of the UEME.

Parallel to this pin of the UEME is connected the Test/Flash pad BSI_PULS used when the phone is flashed.

The BSI connection of the battery, BSI_BATT pad of the Flsh/Test interface, is connected to the LS/ALCO AD input of the UEME. Via this AD converter the Battery Size Indication resistor value is determined.

The BSI connection of the battery is also connected to the SIMCardDet input of the UEME. When the BSI of the battery is disconnected the UEME will close the SIM bus down immediately, in a well-controlled manner.

Audio concept

RM-25 audio includes an earpiece, a microphone, and a Pop-Port™ connector for headset and integrated handsfree (IHF). Audio is based on ASIC's UPP_WD2, UEME and a discrete amplifier for the handsfree speaker known as “boomer”.

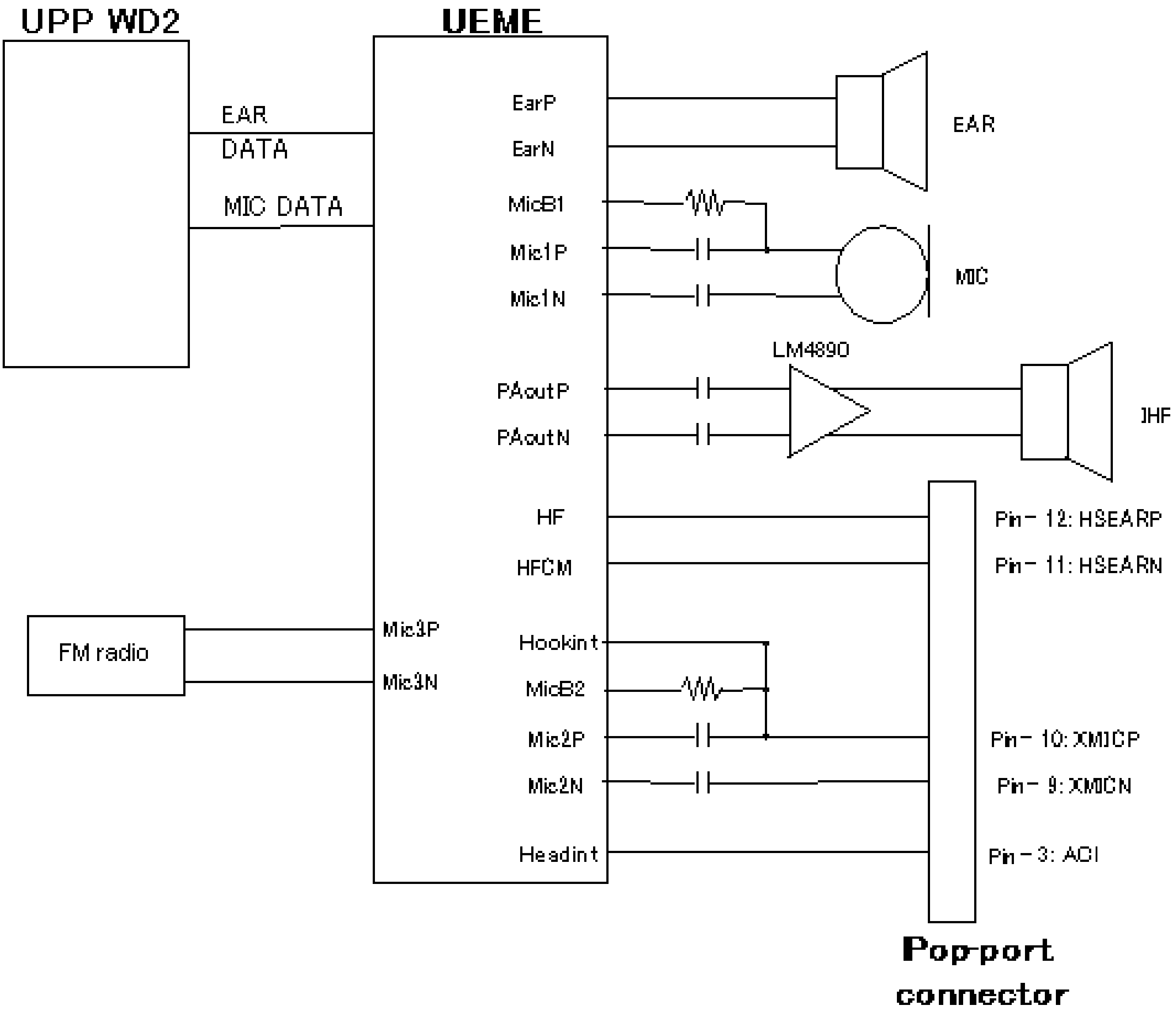

Figure 162 RM-25 audio blocks

Between UPP_WD2 and UEME, the audio signals are transferred in digital format using signals MICDATA and EARDATA. Ringing tones and warning/info tones are to be produced to the IHF speaker.

Earpiece

The earpiece to be used in RM-25 is an 8-mm Pico earpiece produced by Philips Speaker Systems. It has 32ohm continuous impedance and continuous power 8 mWatts. It is driven by differential signals from UEME (EARP & EARN). It makes contact with the PWB via spring contacts.

Microphone

The microphone module for RM-25 is used Pop-Port™ microphone module. Its sensitivity is -42dB Nominal. Contacts are done by springs.

Two inputs are used from UEME, one for the normal internal microphone and the other for the headset. The third microphone input is not used, so it is connected to ground via capacitors. Microphone bias block in UEME generates bias voltages for handportable and handsfree/headset microphones. For both microphone bias outputs (MICB1 & MICB2), the minimum output voltage is 2.0 Volts and maximum output current is 600 mA. Microphone bias block also includes a low pass filter for the reference voltage used as an input for the MICB1&2 amplifiers.

IHF amplifier and speaker

The speaker to be used in RM-25 is a 16mm 8ohm speaker. It can handle 0.3 Watts nominal power and short trem peak power of 0.8 Watts. The component is housed in the antenna housing and connects to the PWB via spring contacts.

PAOUTP and PAOUTN lines of UEME are use to drive Boomer IHF amplifier.

Power amplifier is a differential opamp. The differential output drives the HandsFree speaker. HandsFree amplifier load impedance is 8 ohm.

The outputs go into a high impedance state when powered down. The amplifier can be enabled and shut down using a GENIO line from UPP_WD2.

SW controls IHF, headset and earpiece volume via UEME. Gain setting can be done in 2 dB steps, from –40 to +6 dB. The output sound pressure level of the internal HandsFree speaker is controlled by SW (CBus is used for controlling).

The schematic around the Boomer IHF amplifier is presented in RM-25 schematics. The schematic shows all the filtering needed and also protection components against ESD and EMC. The EMC and ESD filtering component must be as near as possible to the earphone pads of the phone.

The supply voltage for the IHF amplifier is taken directly from the battery voltage.

External audio interface

In RM-25 there is a Pop-Port™ connector which is fully differential 4–wire connection.

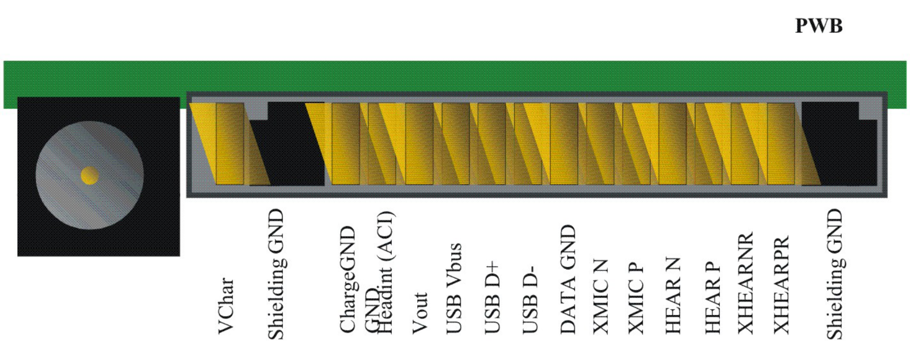

Figure 163 External audio connector

The handsfree (HF) driver in UEME is meant for the headset. In RM-25, the output is driven in fully differential mode. In the fully differential mode, the HF pin is the negative output and the HFCM pin is the positive output. The gain of the handsfree driver in the differential mode is 6 dB. The earpiece (EARP, EARN) and headset (HF, HFCM) signals are multiplexed so that the outputs can not be used simultaneously. The HF and HFCM amplifiers include a transient suppression circuitry, which prevents unwanted spikes in HF and HFCM outputs when switching on and off the amplifiers.

The HeadInt line will be pulled up to 2.7V by the internal resistor when the accessory is connected. When not having the accessory inserted the voltage in the HeadInt line will be <0.8 V caused by internal pull down resistor in the HF line.

Camera interface

RM-25 has a digital camera with viewfinder function. The camera resolution is VGA (640 x 480 pixels) . The camera module is connected by means of a soldered on connector to the PWB.

The camera interface is a serial CCP, which is an unidirectional interface; the control information to camera is transmitted through I2C bus. The I2C bus is implemented purely by the SW using general purpose I/Os.

The CCP interface consists of differential clock and data signals. The CCP enables the use of high data rates with low EMI; maximum transfer capacity is 104Mbit/s, which means that transferring YUV VGA(640 x 480) images at 15fps is possible.

The camera needs two power sources, 2.8V for analog circuit voltage VDD and 1.8V for digital circuit voltage VDDI. VDD is provided from same discrete regulator as LCD and VDDI is fed from UEME's Vcore.

FM radio

FM radio circuitry is implemented using the highly integrated FM radio ASIC, TEA5767. The MCU SW controls the FM radio circuitry through a proprietary 3-wire bus.

The stereo output is fed to the UEME via one of the microphone inputs, MIC3.

The antenna of the FM Radio is created with the headset. The wires of the headset are used as antenna.

The data bus on the radio will be disabled when not used, in order to save current (BUSENABLE).

The VAUX1 regulator of the UEME will power the FM radio at nominal 3V.

The reference clock for the FM radio is the SleepClk signal picked up through a resistive divider.

Flashing

SW download in service is implemented by custom tools and SW; kindly refer to Phoenix service software instructions (Page 3–5) and Service Tools (Page) sections of the manual.

Mode sensing

The RM-25 has different operational modes depending on the positions of the top and bottom parts.

There are five switches to sense the mechanical position of the two parts. A cam disk in the swivel activates a pair of switches, and three Hall switches activated by magnets sense the position of the hinge.

The actual phone mode is interpreted from the position sensors and the phone is controlled accordingly.

Testing interfaces

RM-25 has a testing interface that is easy to access by service battery. The following signals are allocated on test pads.

Table 30 Testing and flashing interface electrical specifications

Pad No	Name	Dir	Parameter	Min	Typ	Max	Unit	Notes
1	STI_Tx	->	Vo			0.22*VIO	V	
			Voh	0.8*VIO			V	
2	VPP		To Phone	0 / 2.8 / 9 +/-3%			V	Prommer Select
3	FBusTx	->	Vol	0	2.7	0.3*VFlash1	V	
			Voh	0.7*VFlash1	2.7	VFlash1	V	
4	MBUS	<->	Vol	0	0.2	0.3*VFlash1	V	
			Vil (From prommer)	0	0.2	0.3*VFlash1	V	
			Voh	0.7*VFlash1	2.7	0.7*VFlash1	V	
			Vih(From prommer)	0.7*VFlash1	2.7	VFlash1	V	
5	FBusRx	<-	Vil (From prommer)	0	2.7	0.3*VFlash1	V	
			Vih(From prommer)	1.89	2.7	VFlash1	V	
			Abs. Max. Voltage to Test Pad Referenced to GND	-0.3V		3.0	V	Absolute Max Voltage limits to MBUS/FBUS
6	GND				0		V	VBAT GROUND
7	BSI_PULS		Vol	0	2.7	0.3*VFlash1	V	Supplied from the flash programming device
			Voh	0.7*VFlash1	2.7	VFlash1	V	
8	ZOCUS							Used for manufacturing

Note: VFlash1 = 2.78 +/-3%, VIO = 1.8 +/-4.5%

Pin	Name	Min	Typ	Max	Unit	Notes
	VBAT	0	3.6	5.1	V	
	BSI_BATT	0	2.78	VFlash1	V	Internal pullup
	GND	0			V	

Extreme voltages

Lithium-Ion battery BL-4C (1 cell):

- Nominal voltage is 3.7V
- Lower extreme voltage is 2.8V (cut off voltage)
- Higher extreme voltage is 4.2V (charging high limit voltage)

RF description

The BC02 solution is used for Bluetooth. The ASIC and components are placed on the bottom side of the 1FSA system module, underneath the shield can with UPP_WD2.

The RF module of RM-25 has 2 SAW filters, a capacitor on the 1FSA system module, and an antenna module.

The main ASIC of RF is Helgo 85G, and power amplifier is RFMD RF9250, a so called microPA. RM-25 does not support EDGE, even though the RF module itself has the capacity for it.

For more information, see Introduction to RF Troubleshooting (Page 7–5).

10 — Schematics

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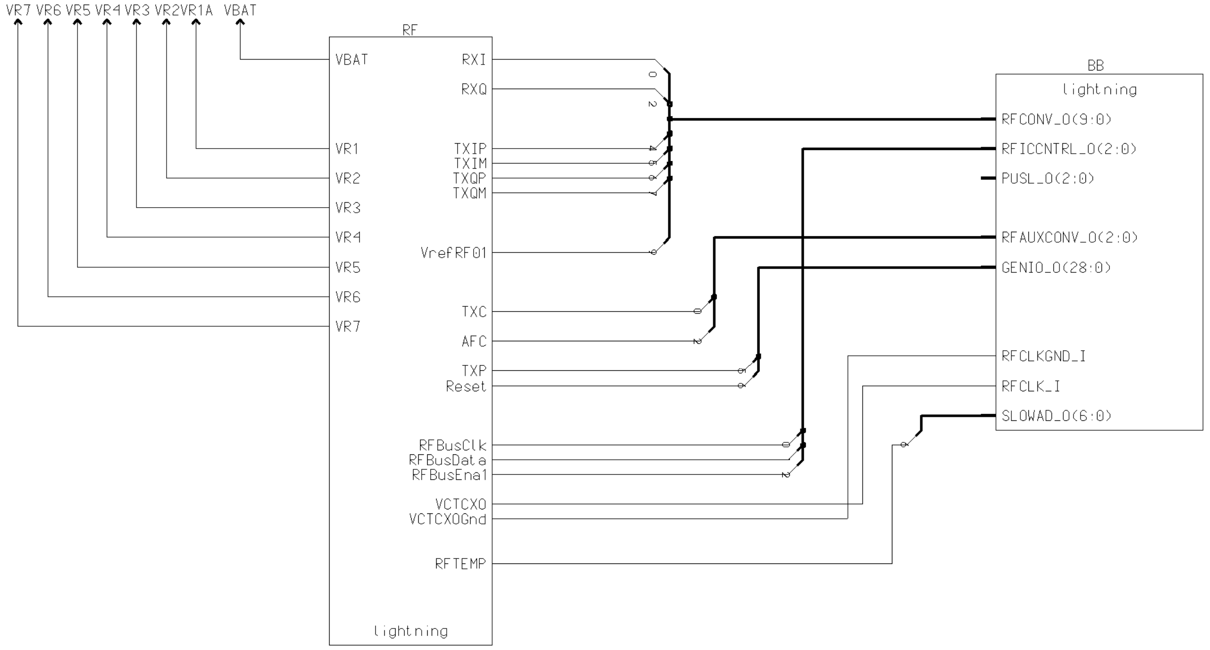
List of Figures

■ RF BB module top level

Figure 164 1fsa_09a, v.1.1, ed. 54



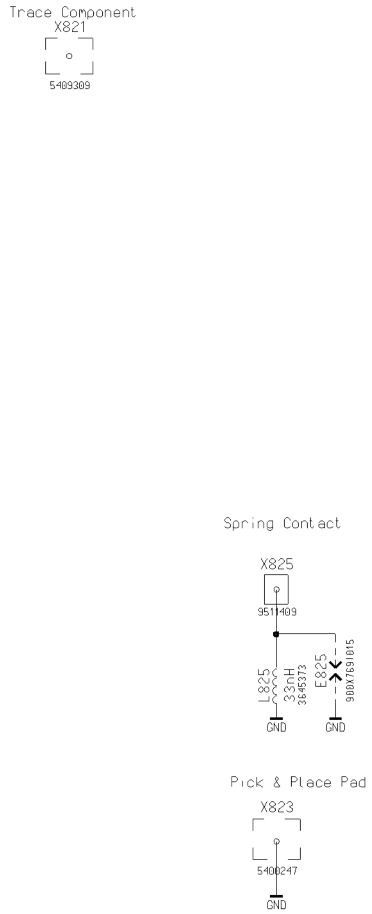
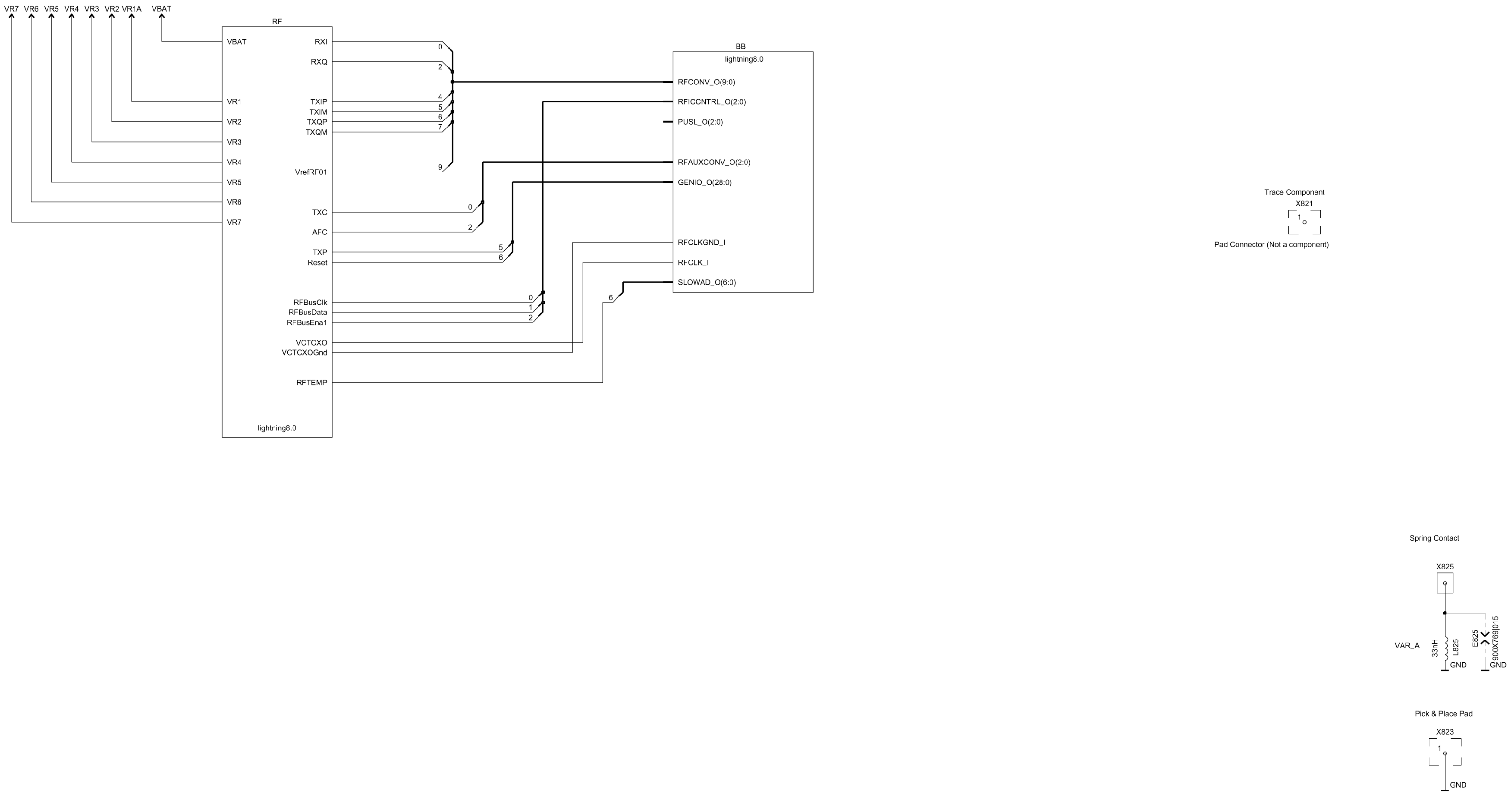


Figure 165 1fsa_11a, v.1.1, ed. 57



■ BB top level

Figure 166 1fsa_09a, v. 8.0, ed. 138

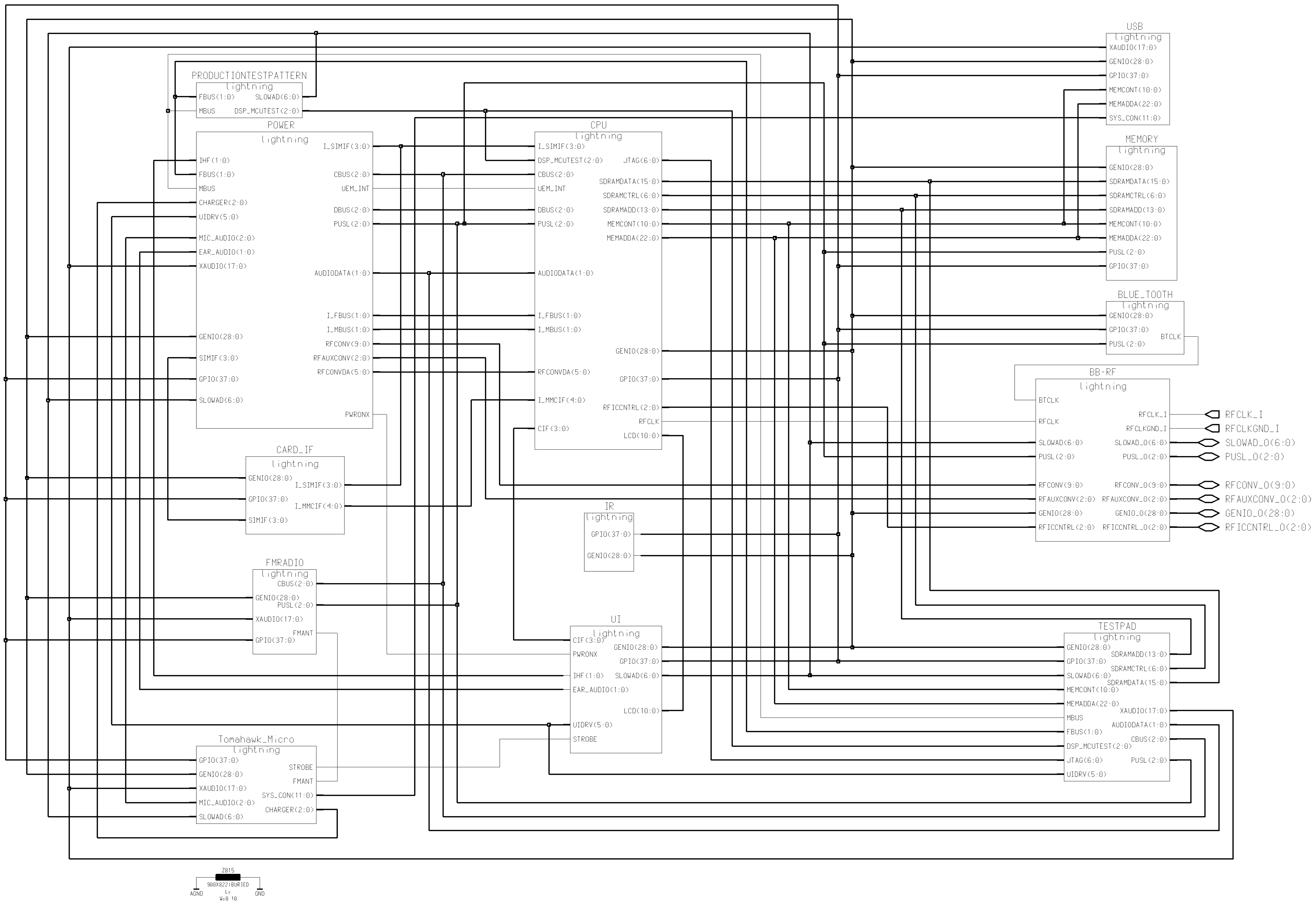
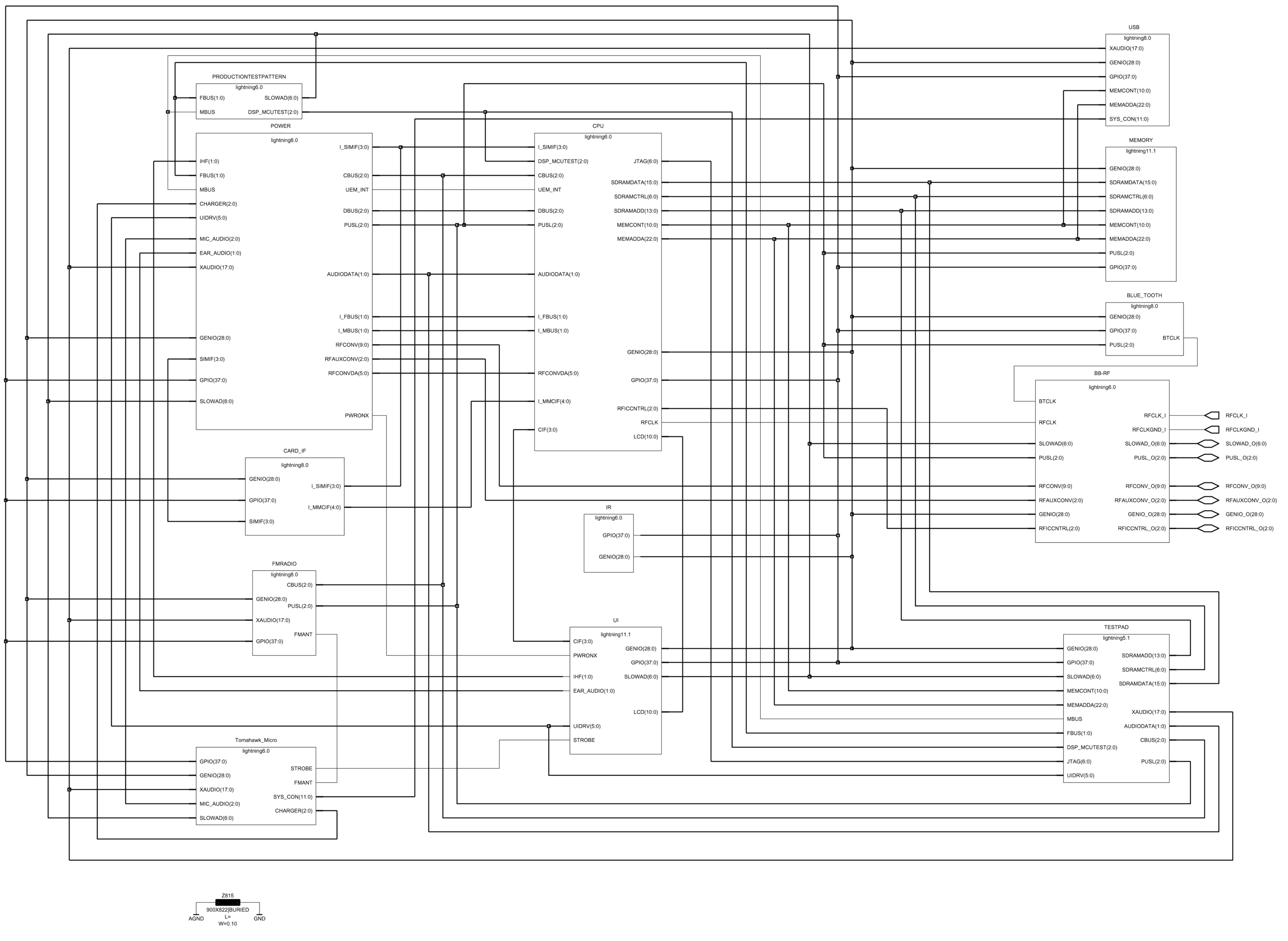


Figure 167 1fsa_11a, v. 8.0, ed. 142



Production test pattern

Figure 168 1fsa_09a. v. 6.0, ed. 39

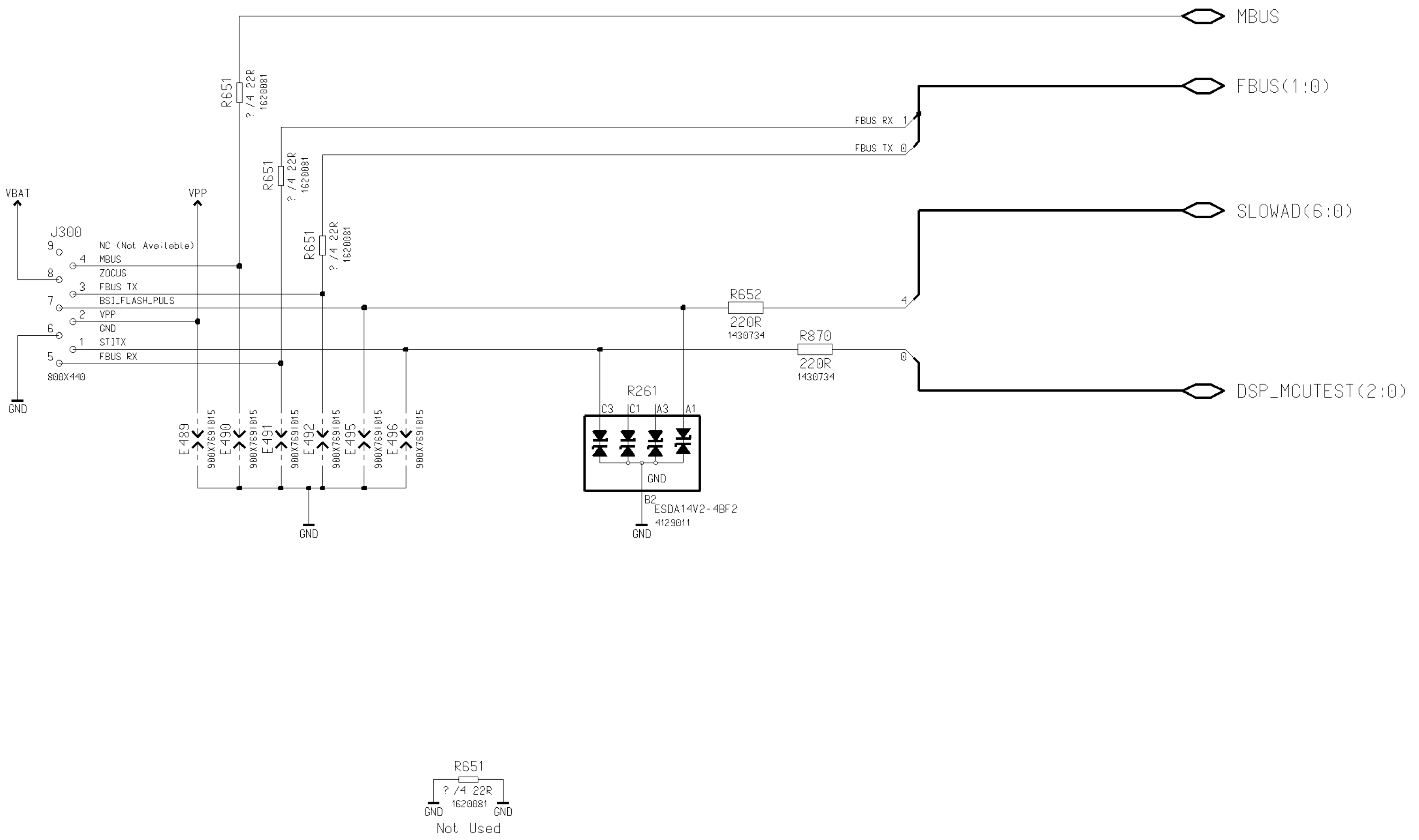
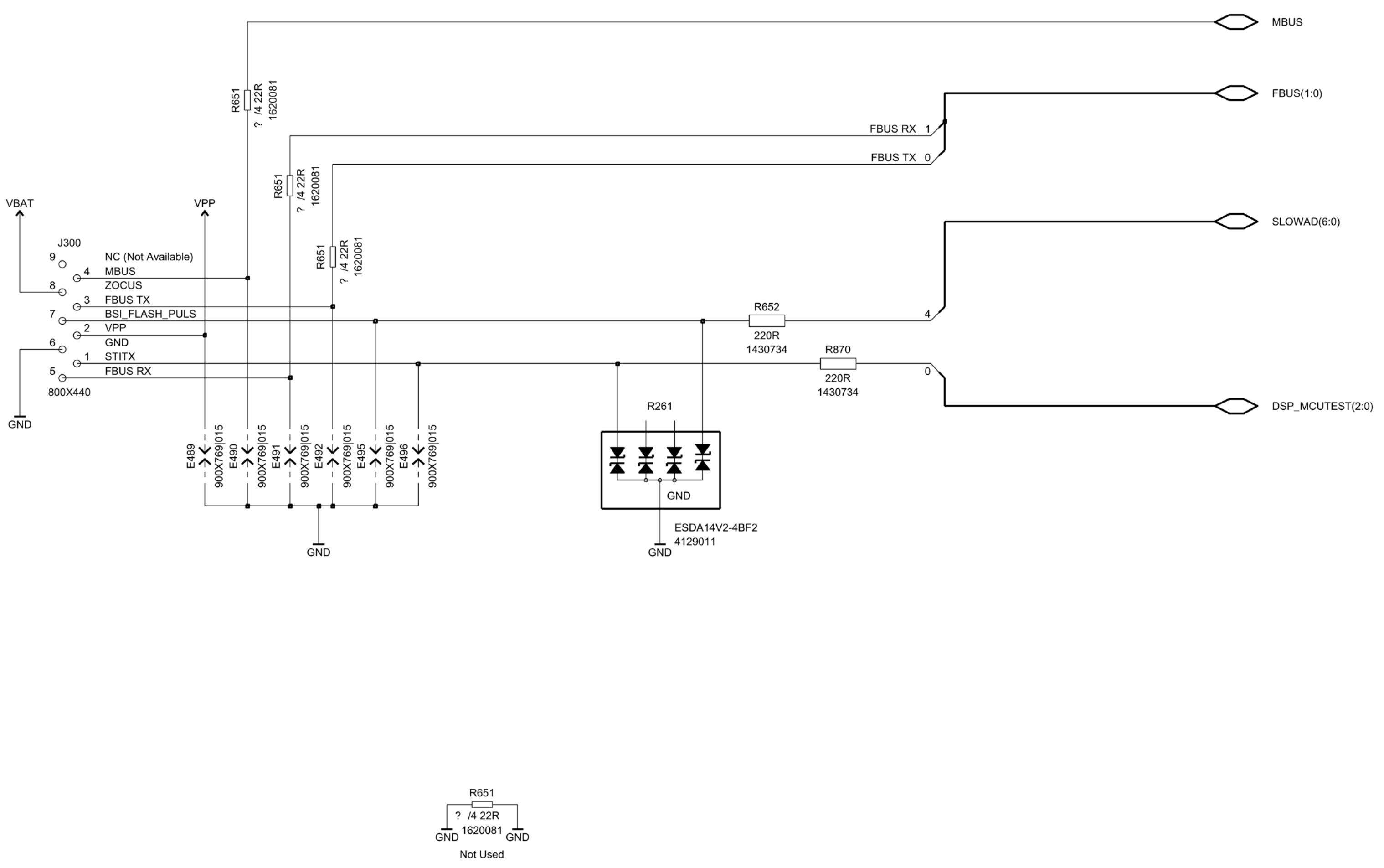


Figure 169 1fsa_11a. v. 6.0, ed. 41



Power supplier top level

Figure 170 1fsa_09a, v. 8.0, ed. 79

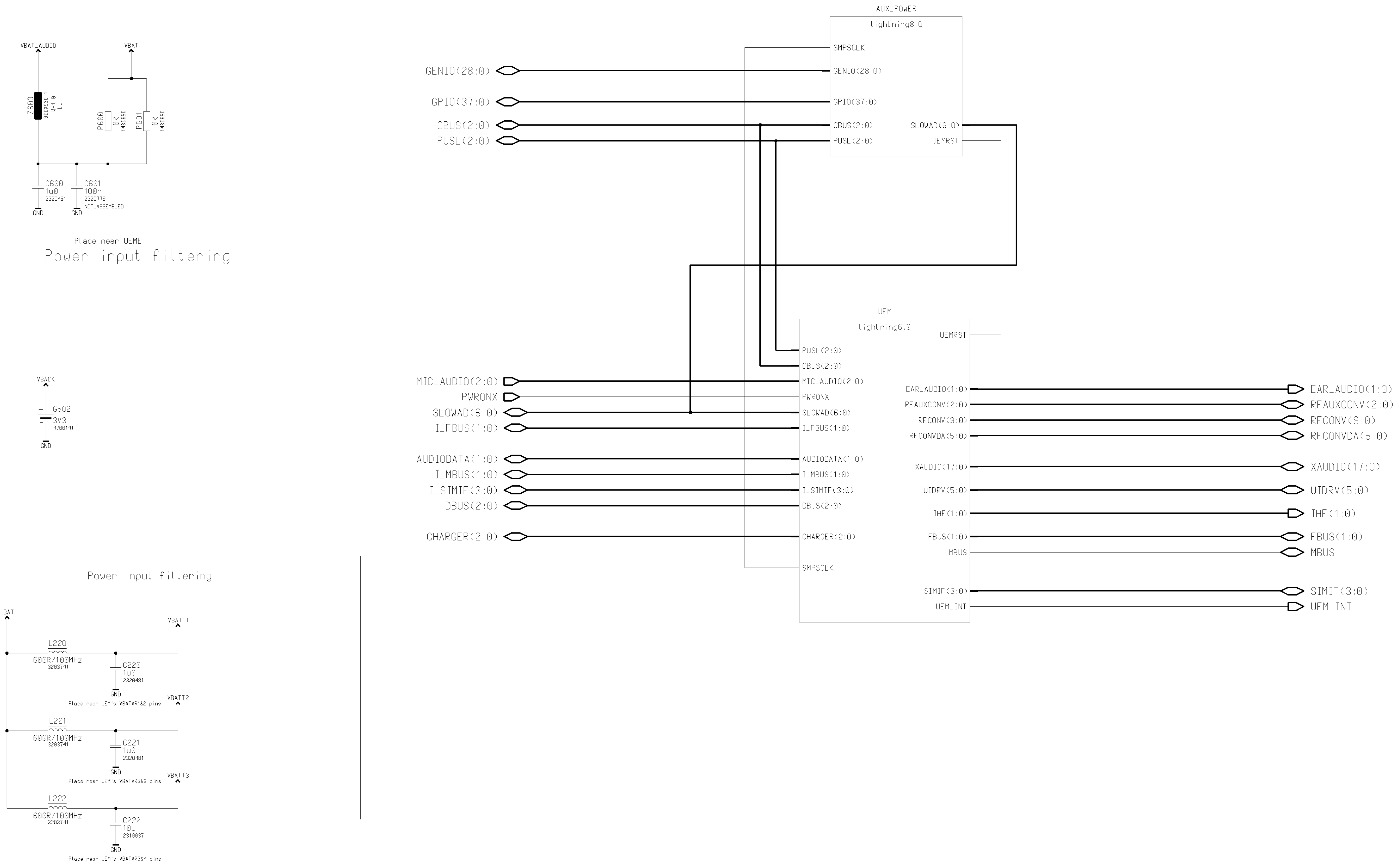
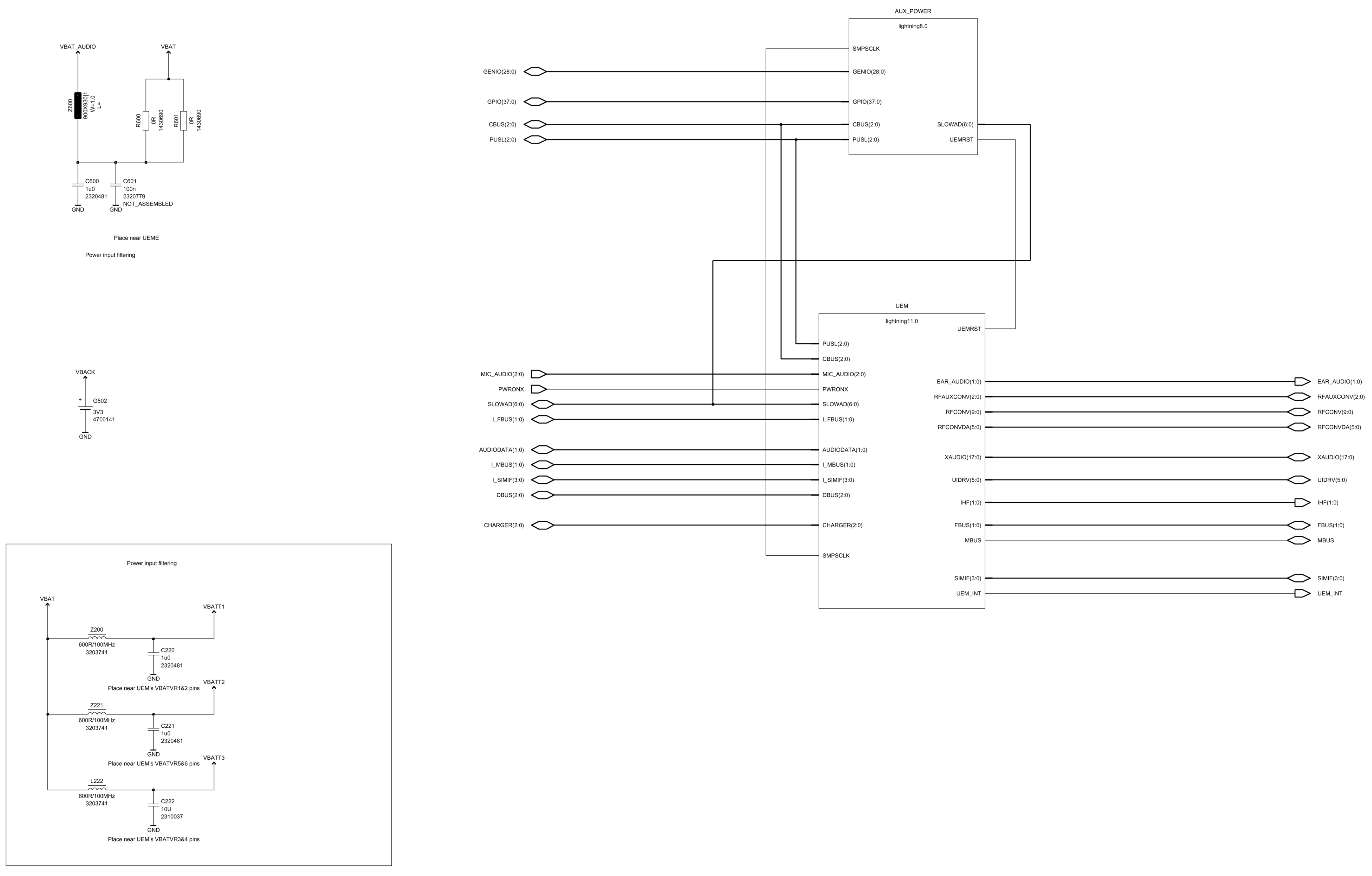


Figure 171 1fsa_11a, v. 8.0, ed. 82


VBAT_AUDIO
VBAT
Z600
900R/800Mhz
W=1.0
L=
R600
0R
1430690
R601
0R
1430690
C600
1u0
2320481
C601
100n
2320779
NOT_ASSEMBLED
GND
Place near UEME
Power input filtering
VBACK
G502
3V3
4700141
GND
Power input filtering
VBAT
VBATT1
Z200
600R/100MHz
3203741
C220
1u0
2320481
Place near UEM's VBATVR1&2 pins
VBATT2
Z221
600R/100MHz
3203741
C221
1u0
2320481
Place near UEM's VBATVR5&6 pins
VBATT3
L222
600R/100MHz
3203741
C222
10U
2310037
Place near UEM's VBATVR3&4 pins
AUX_POWER
lightning8.0
SMPSCLK
GENIO(28:0)
GPIO(37:0)
CBUS(2:0)
PUSL(2:0)
SLOWAD(6:0)
UEMRST
UEM
lightning11.0
UEMRST
PUSL(2:0)
CBUS(2:0)
MIC_AUDIO(2:0)
PWRONX
SLOWAD(6:0)
I_FBUS(1:0)
AUDIODATA(1:0)
I_MBUS(1:0)
I_SIMIF(3:0)
DBUS(2:0)
CHARGER(2:0)
SMPSCLK
EAR_AUDIO(1:0)
RFAUXCONV(2:0)
RFCONV(9:0)
RFCONVDA(5:0)
XAUDIO(17:0)
UIDRV(5:0)
IHF(1:0)
FBUS(1:0)
MBUS
SIMIF(3:0)
UEM_INT

Aux_power

Figure 172 1fsa_09a, v. 8.0, ed. 84

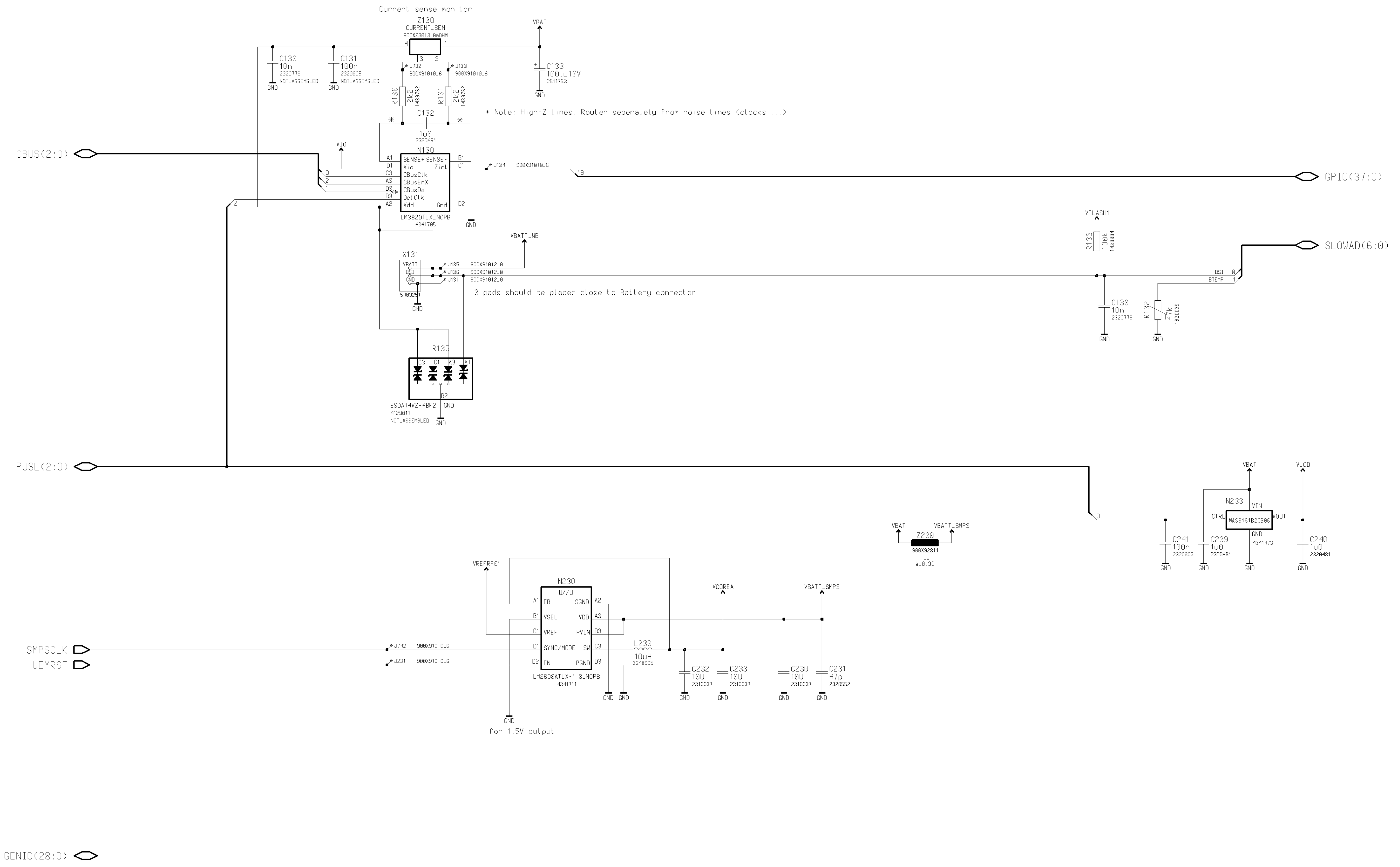
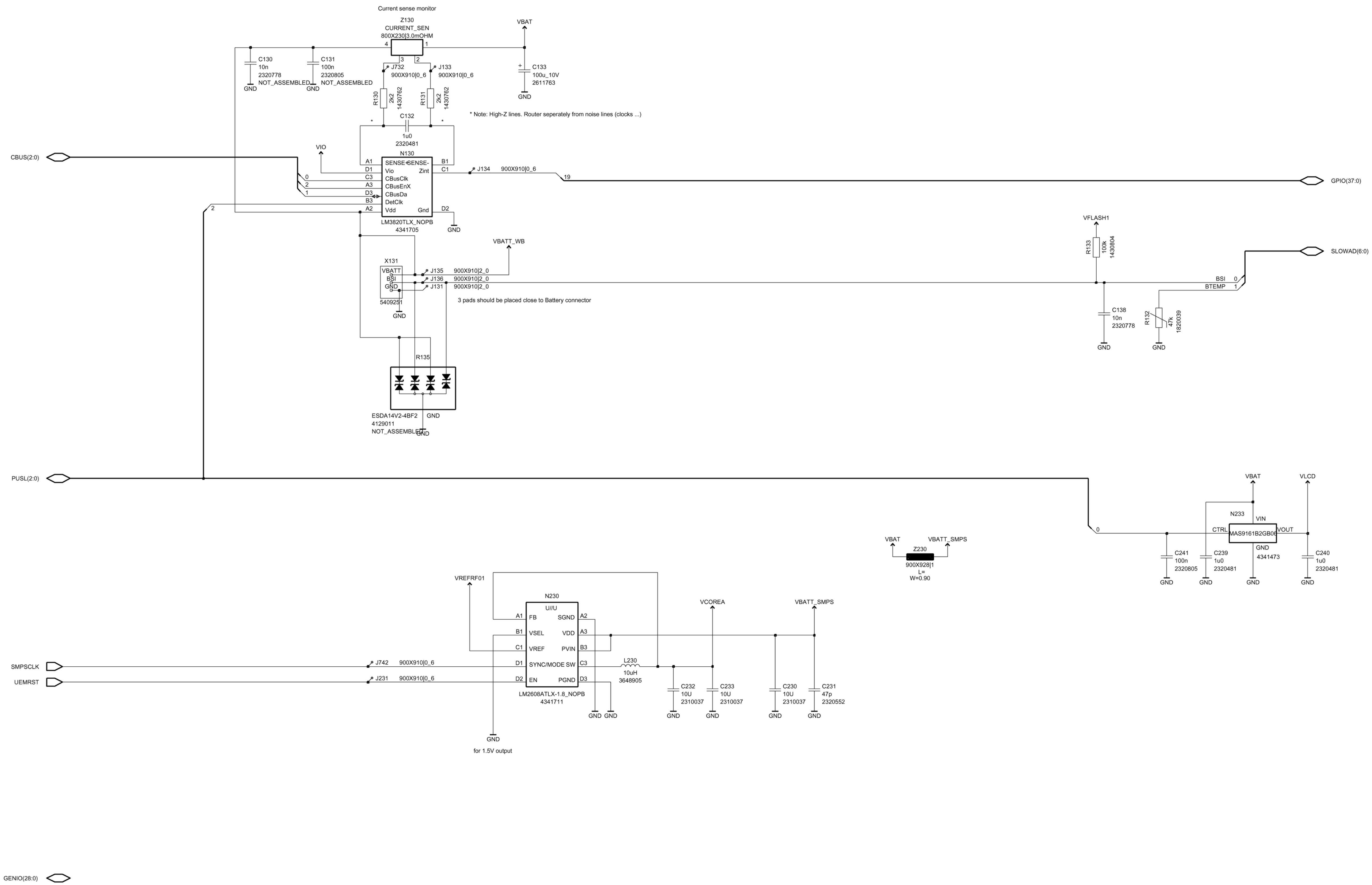


Figure 173 1fsa_11a, v. 8.0, ed. 86



UEME/UEMEK

Figure 174 1fsa_09a, v. 6.0, ed. 96

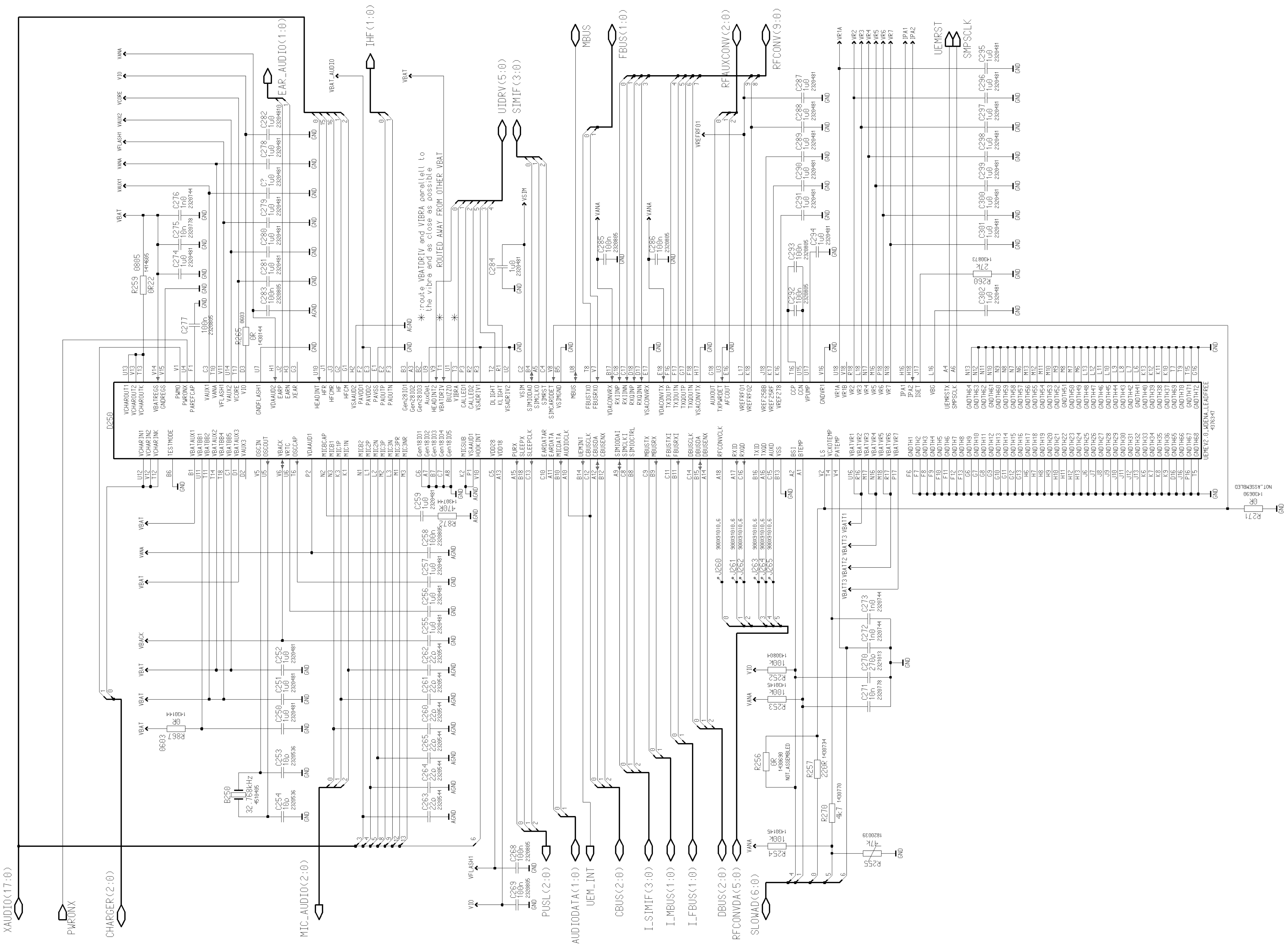
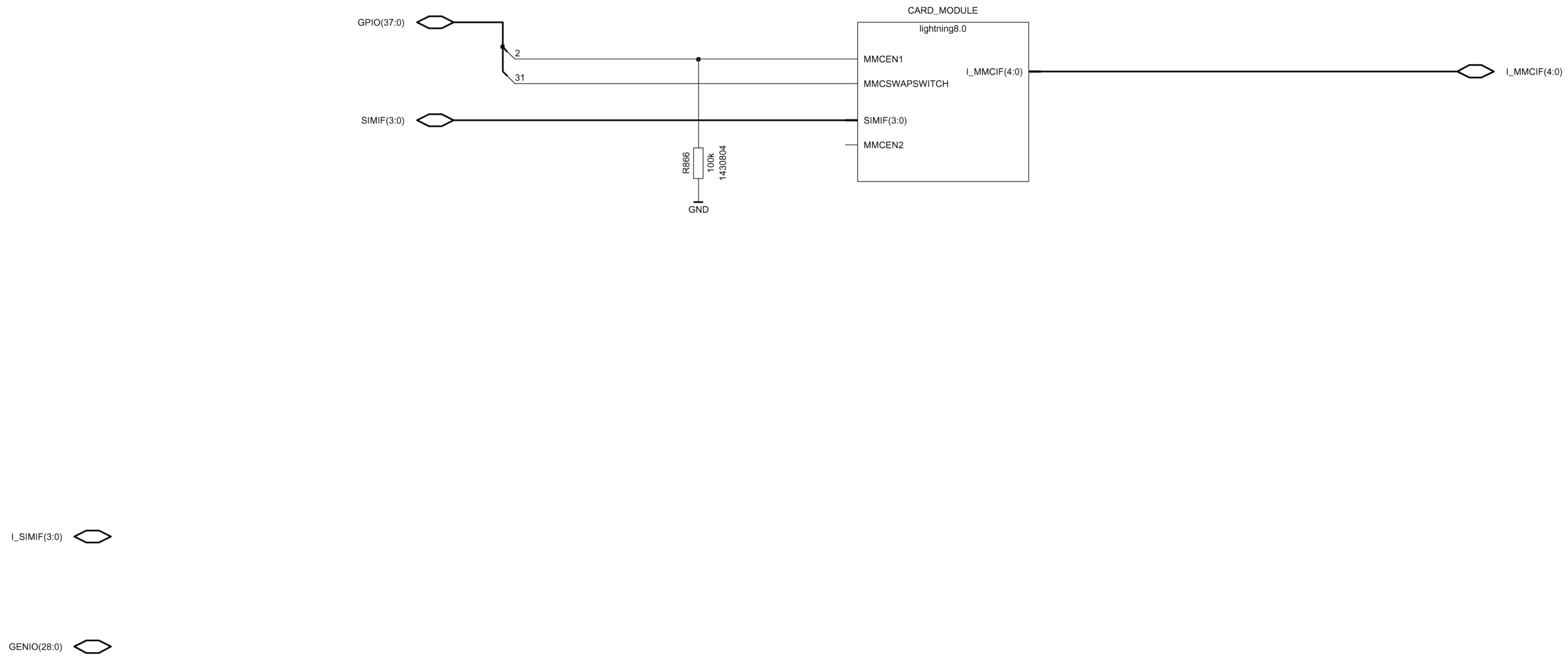


Figure 175 1fsa_11a, v. 11.0, ed. 100



Card interface

Figure 176 1fsa_09a, v. 8.0, ed. 73

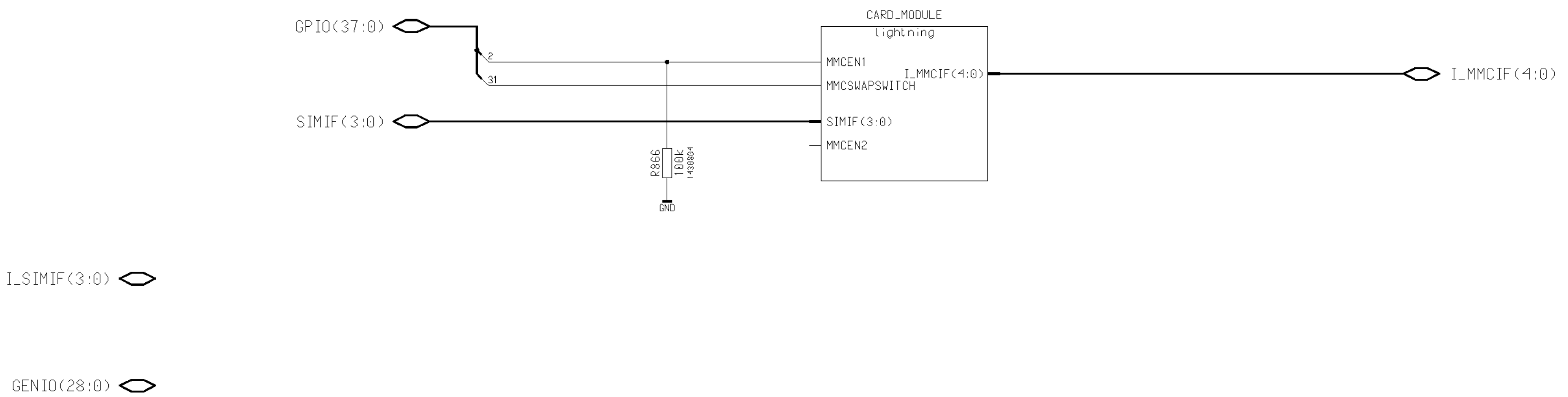
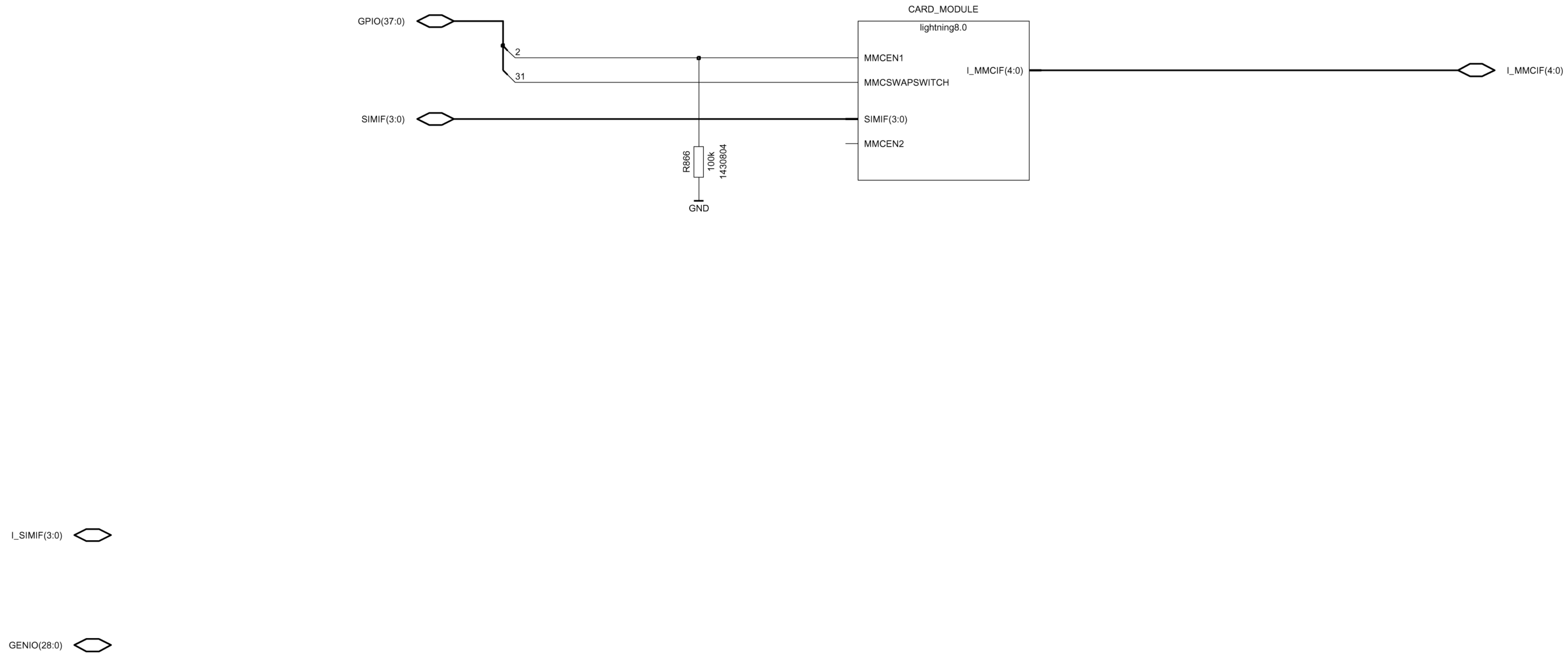


Figure 177 1fsa_11a, v. 8.0, ed. 76



Card interface module

Figure 178 1fsa_09a, v. 8.0, ed. 88

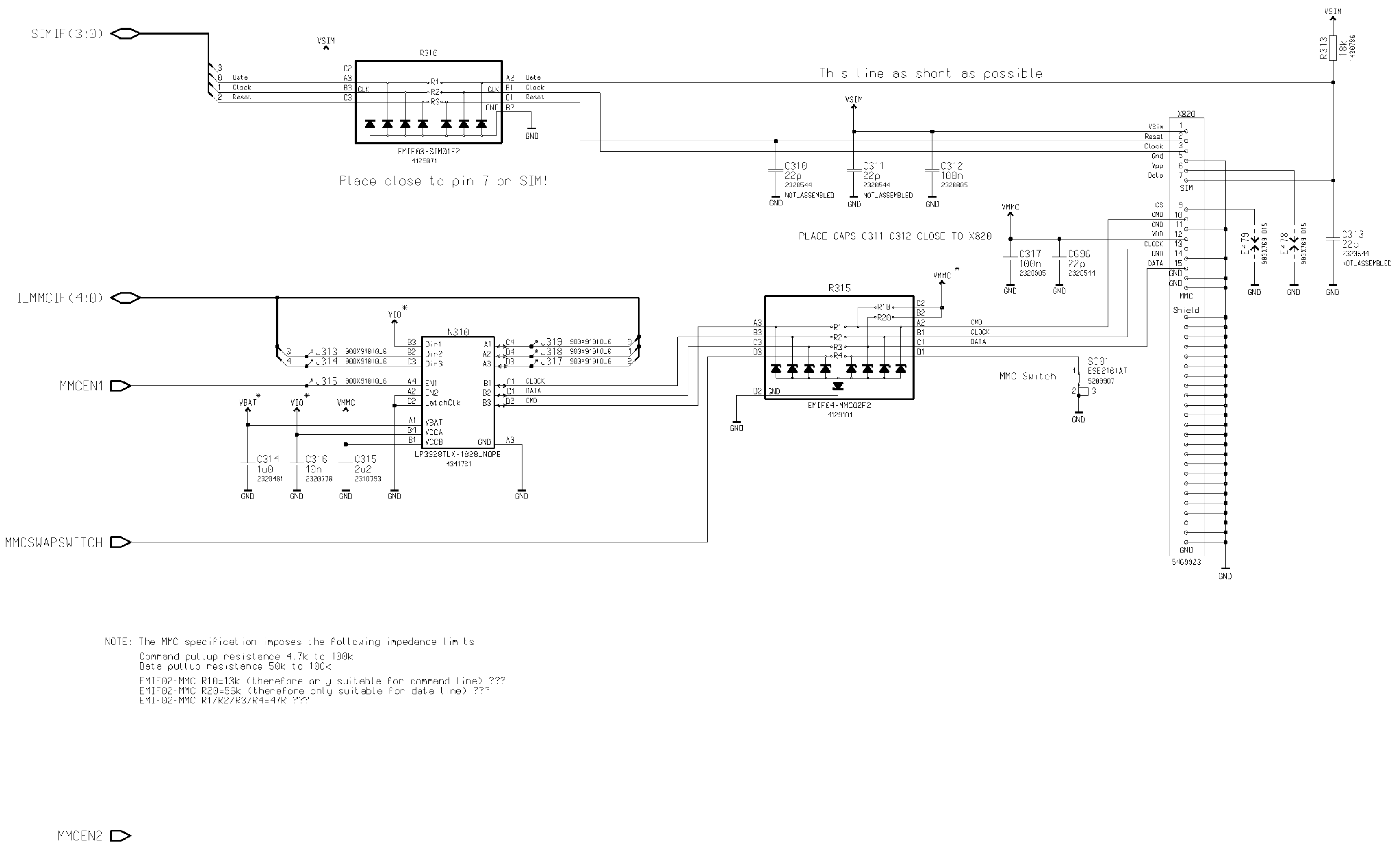
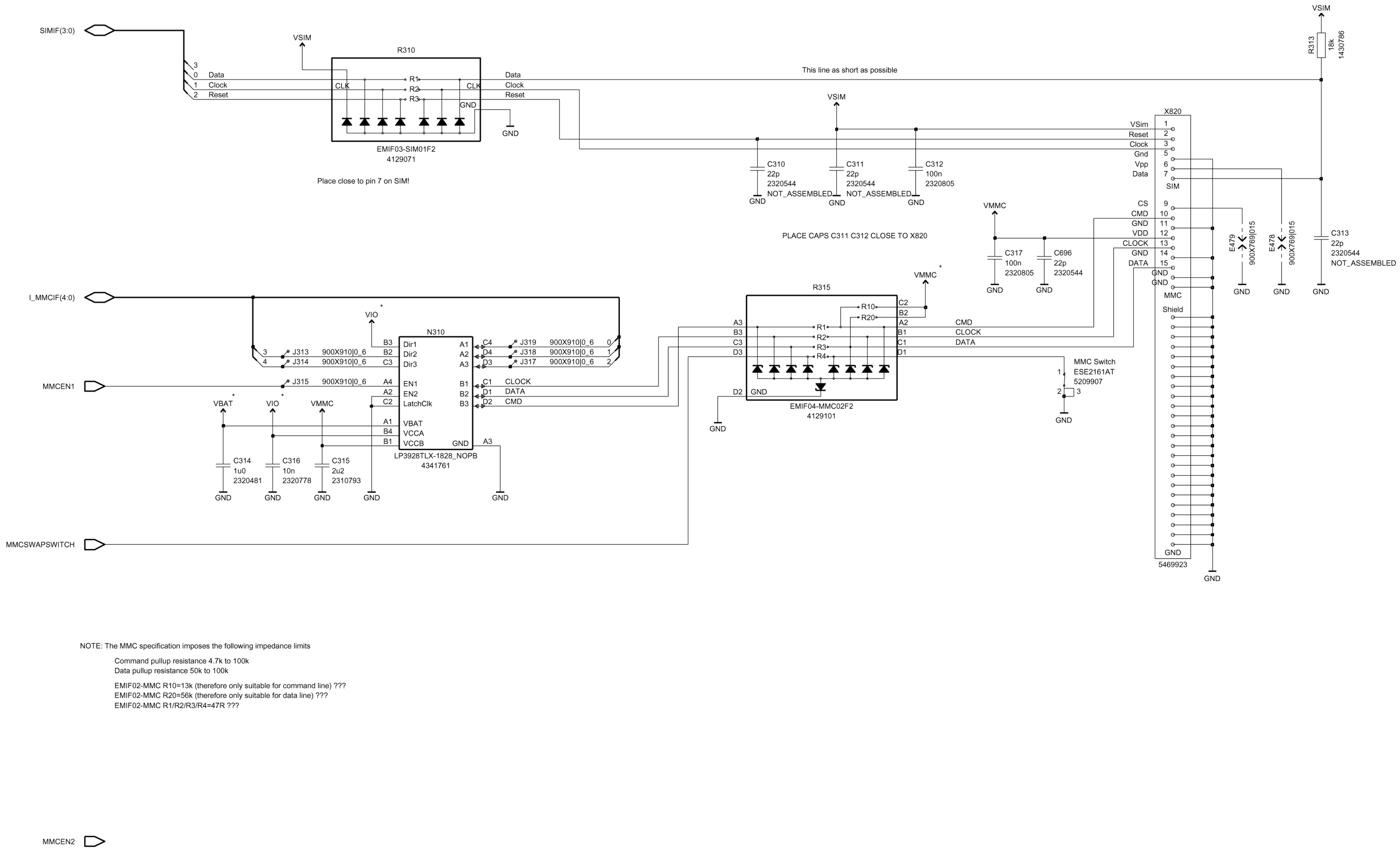


Figure 179 1fsa_11a, v. 8.0, ed. 92



FM radio top level

Figure 180 1fsa_09a, v.8.0, ed. 19

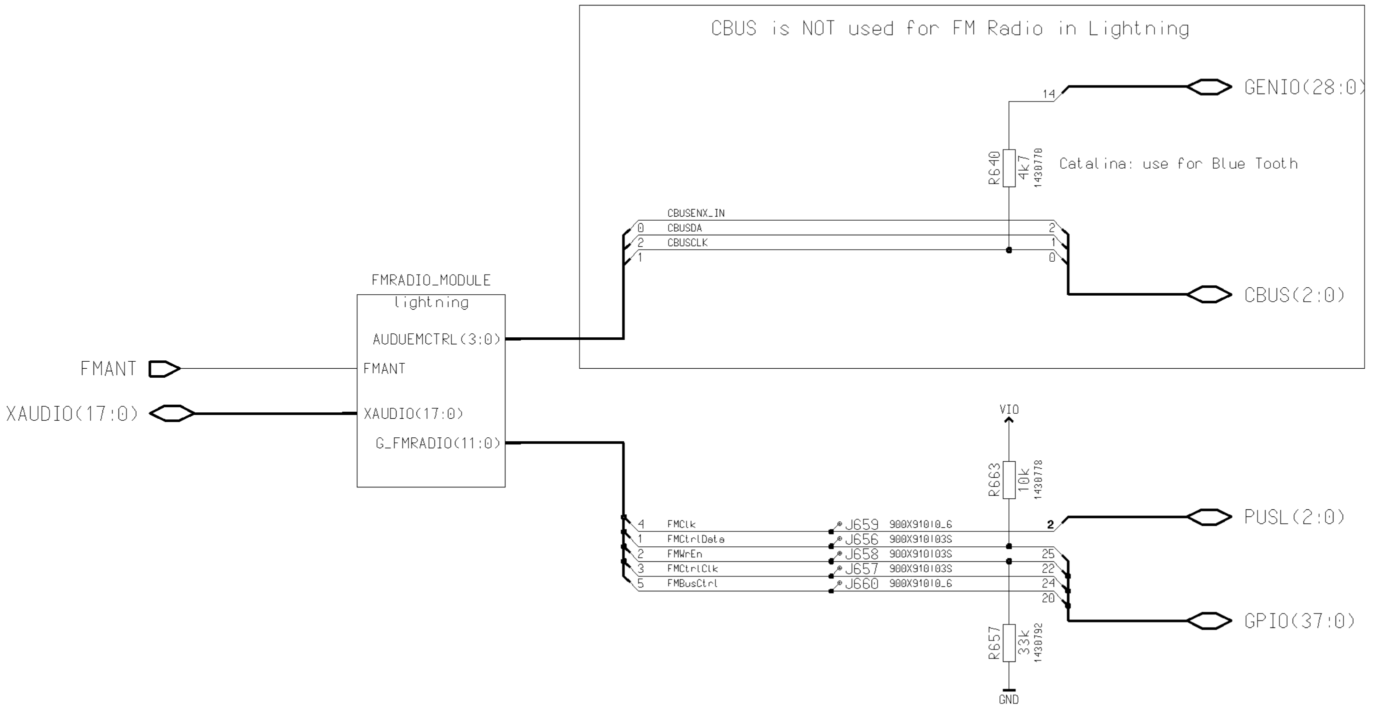
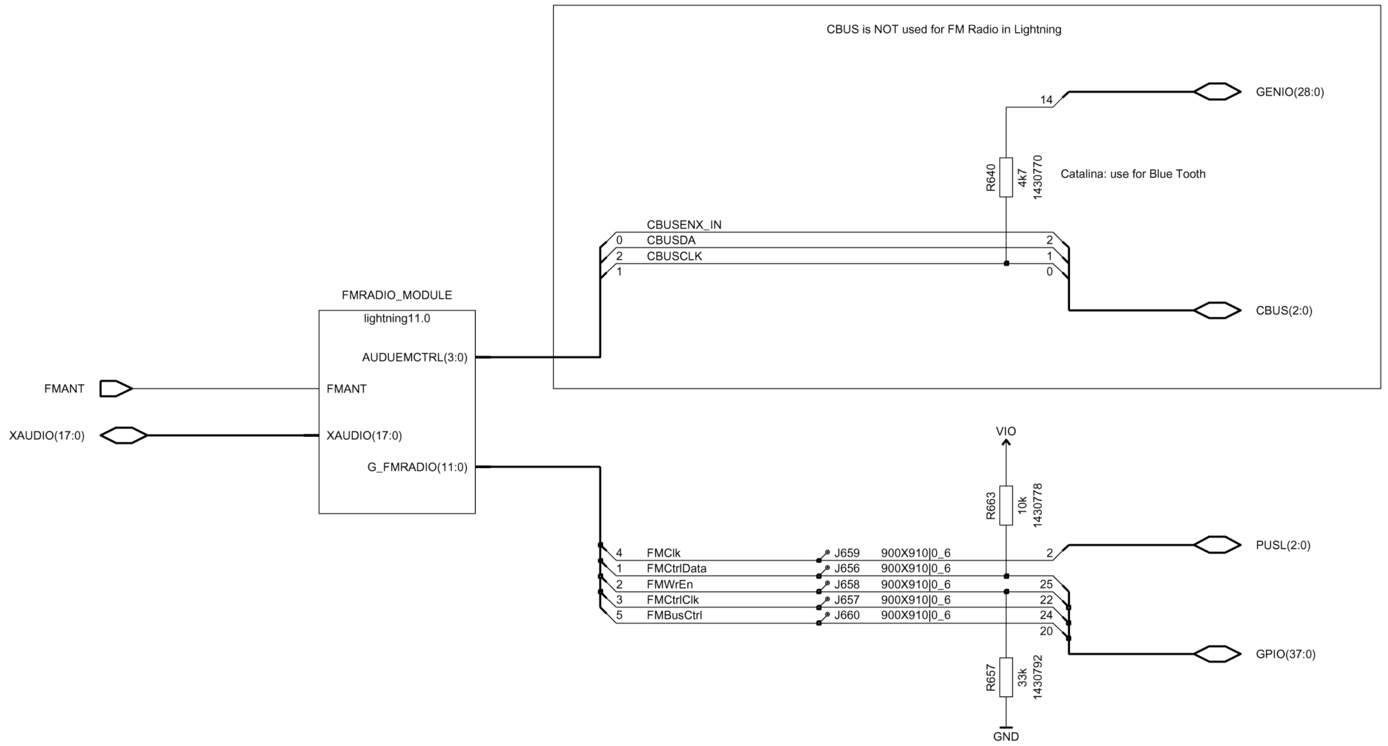


Figure 181 1fsa_11a, v.8.0, ed. 21



FM radio module

Figure 182 1fsa_09a, v. 6.0, ed. 25

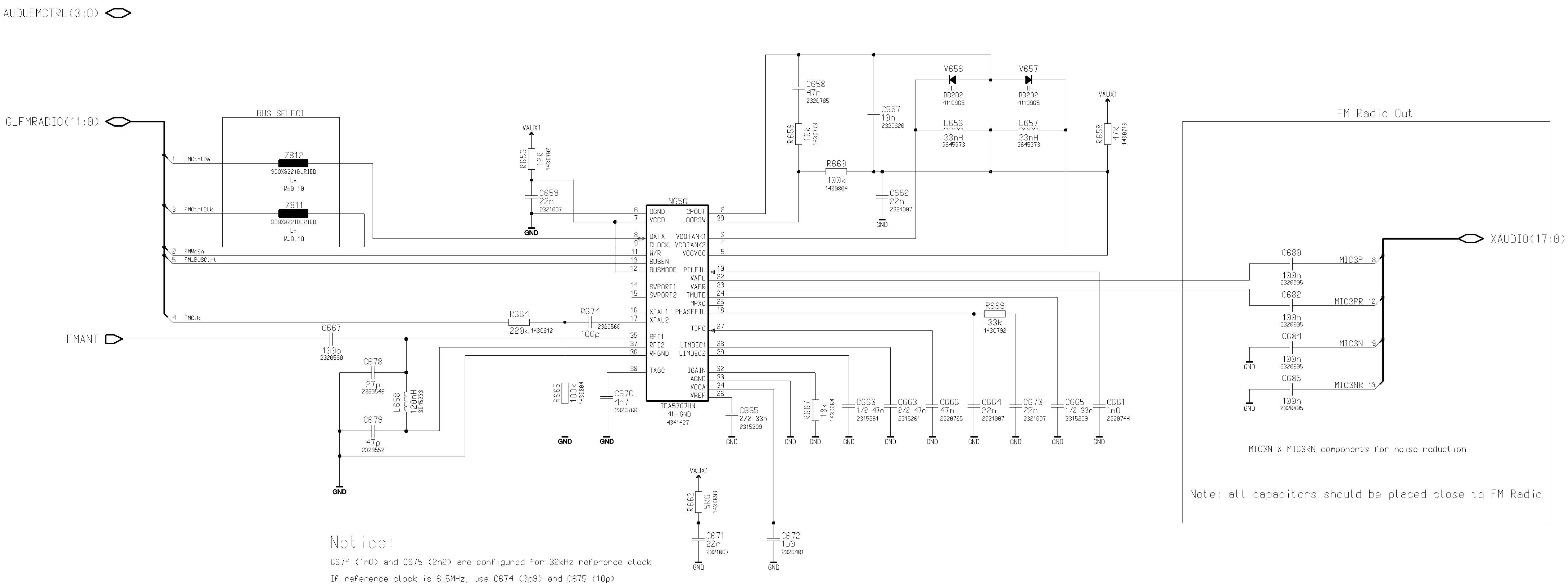
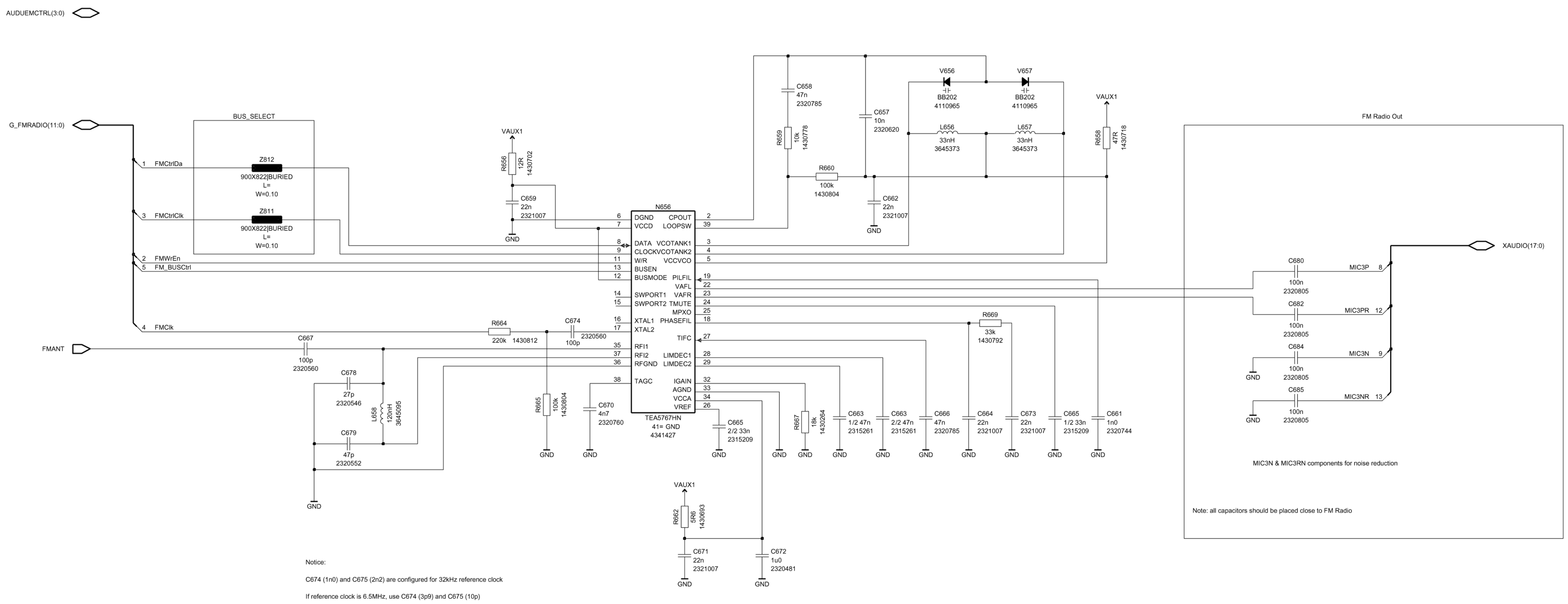


Figure 183 1fsa_11a, v. 11.0, ed. 30



Pop-port^{TM} and microphone

Figure 184 1fsa_09a, v. 6.0, ed. 110

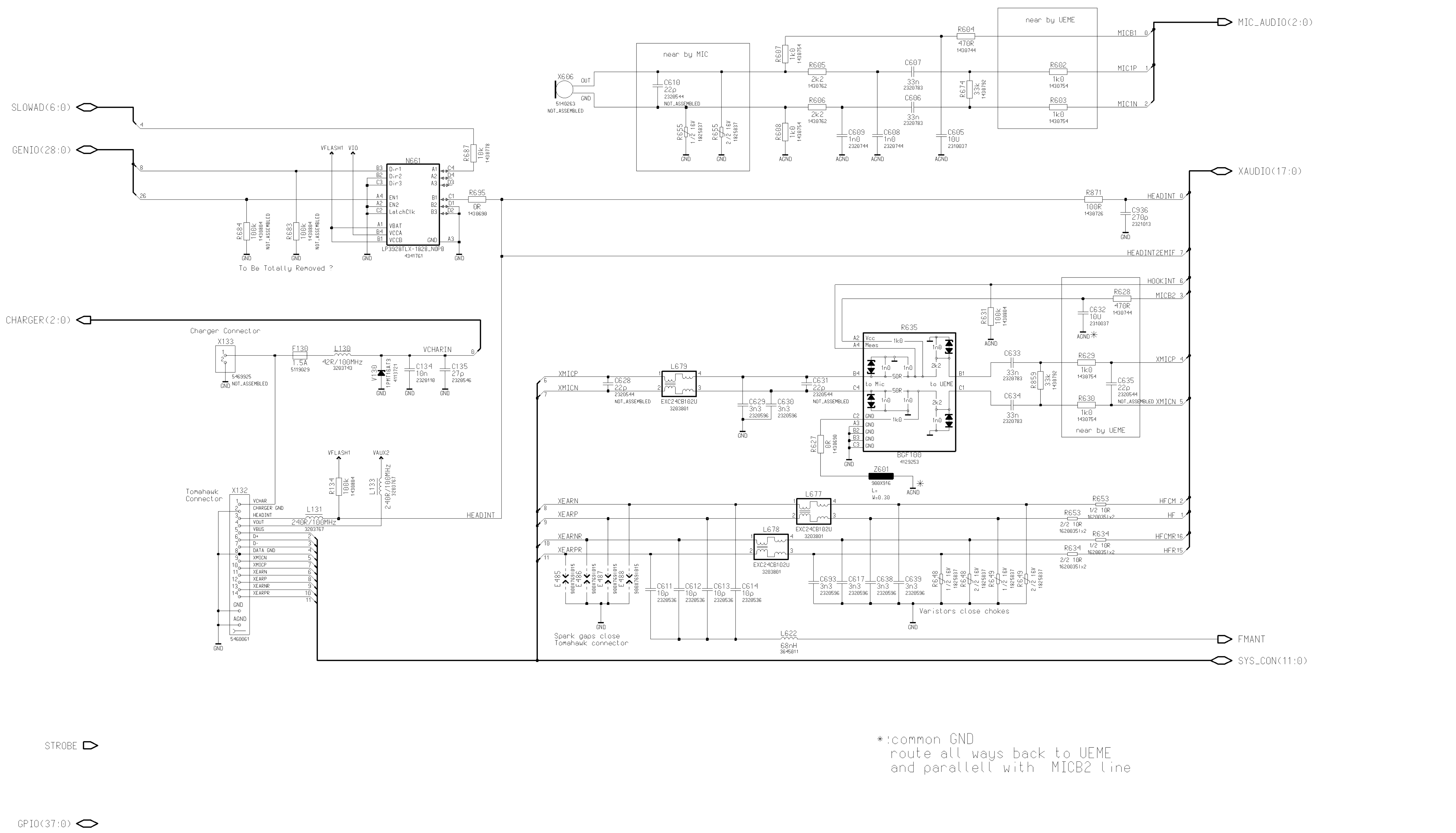
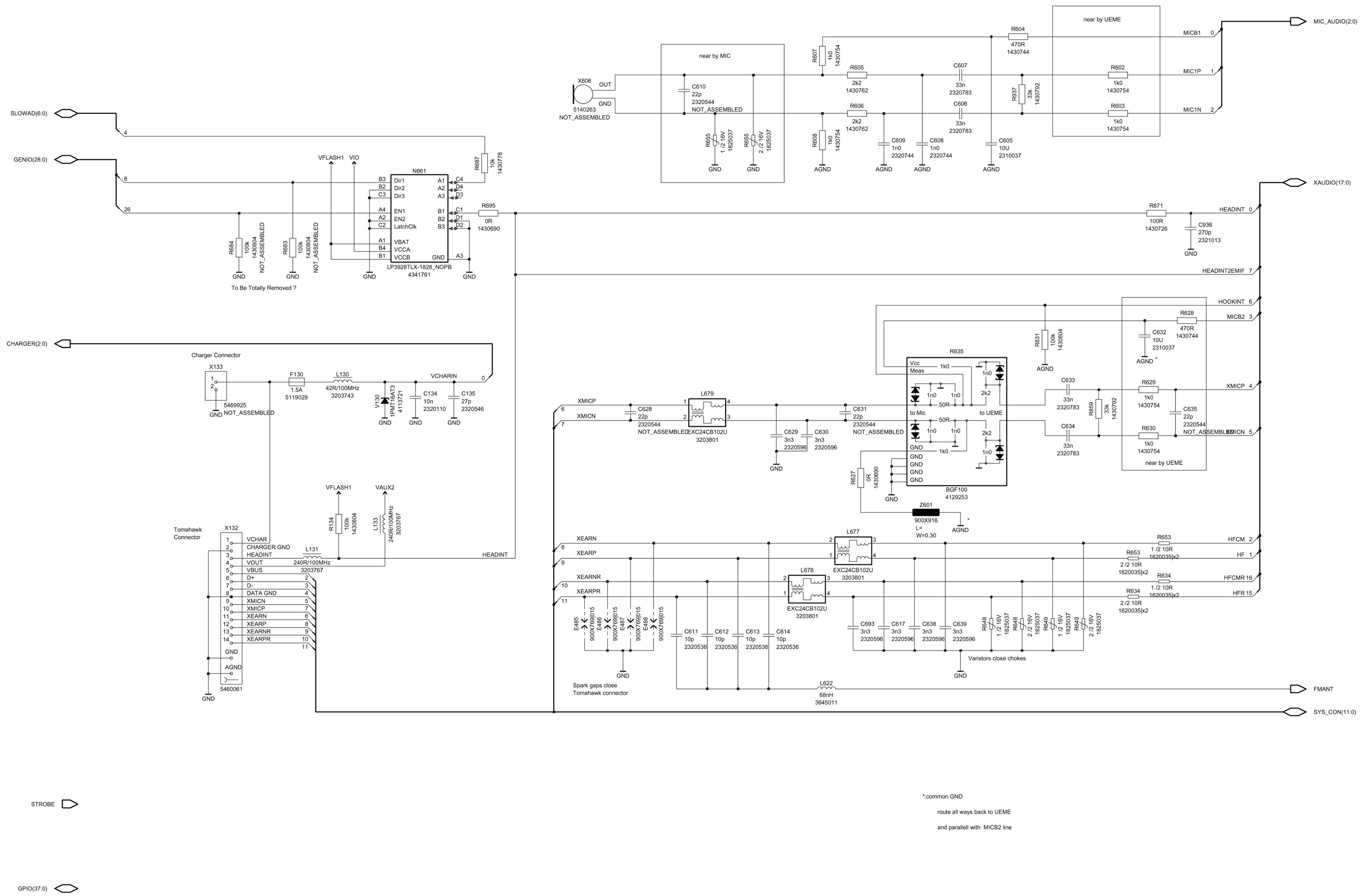


Figure 185 1fsa_11a, v. 6.0, ed. 113


MIC_AUDIO(2:0)
near by UEME
near by MIC
X606
5140263
NOT_ASSEMBLED
OUT
GND
C610
22p
2320544
NOT_ASSEMBLED
R604
470R
1430744
R607
1k0
1430754
R605
2k2
1430762
R606
2k2
1430762
R608
1k0
1430754
C607
33n
2320783
C606
33n
2320783
R937
33k
1430792
R602
1k0
1430754
R603
1k0
1430754
C609
1n0
2320744
C608
1n0
2320744
C605
10U
2310037
MICB1
MIC1P
MIC1N
AGND
SLOWAD(6:0)
GENIO(28:0)
VFLASH1
VIO
N661
R687
10k
1430778
Dir1
Dir2
Dir3
EN1
EN2
LatchClk
VBAT
VCCA
VCCB
LP3928TLX-1828_NOPB
4341761
R695
0R
1430690
R684
100k
1430804
NOT_ASSEMBLED
R683
100k
1430804
NOT_ASSEMBLED
To Be Totally Removed ?
XAUDIO(17:0)
R871
100R
1430726
C936
270p
2321013
HEADINT
HEADINT2EMIF
HOOKINT
MICB2
R628
470R
1430744
C632
10U
2310037
R631
100k
1430804
R635
Vcc
Meas
to Mic
to UEME
BGF100
4129253
C633
33n
2320783
C634
33n
2320783
R859
33k
1430792
R629
1k0
1430754
R630
1k0
1430754
C635
22p
2320544
NOT_ASSEMBLED
near by UEME
XMICP
XMICN
CHARGER(2:0)
Charger Connector
X133
5469925
NOT_ASSEMBLED
F130
1.5A
5119029
L130
42R/100MHz
3203743
V130
1PMT16AT3
4113721
C134
10n
2320110
C135
27p
2320546
VCHARIN
L679
EXC24CB102U
3203801
C628
22p
2320544
NOT_ASSEMBLED
C629
3n3
2320596
C630
3n3
2320596
C631
22p
2320544
NOT_ASSEMBLED
R627
0R
1430690
Z601
900X916
L=
W=0.30
VFLASH1
VAUX2
R134
100k
1430804
L133
240R/100MHz
3203767
Tomahawk Connector
X132
VCHAR
CHARGER GND
HEADINT
VOUT
VBUS
D+
D-
DATA GND
XMICN
XMICP
XEARN
XEARP
XEARNR
XEARPR
AGND
5460061
L131
240R/100MHz
3203767
L677
EXC24CB102U
3203801
L678
EXC24CB102U
3203801
R653
1 /2 10R
1620035|x2
R634
1 /2 10R
1620035|x2
HFCM
HF
HFCMR
HFR
E485
E486
E487
E488
900X769|015
C611
10p
2320536
C612
10p
2320536
C613
10p
2320536
C614
10p
2320536
C693
3n3
2320596
C617
3n3
2320596
C638
3n3
2320596
C639
3n3
2320596
R648
R649
1 /2 16V
2 /2 16V
1825037
Varistors close chokes
Spark gaps close
Tomahawk connector
L622
68nH
3645011
FMANT
SYS_CON(11:0)
*:common GND
route all ways back to UEME
and parallell with MICB2 line
STROBE
GPIO(37:0)

UPP_WD2

Figure 186 1fsa_09a, v. 6.0, ed. 49

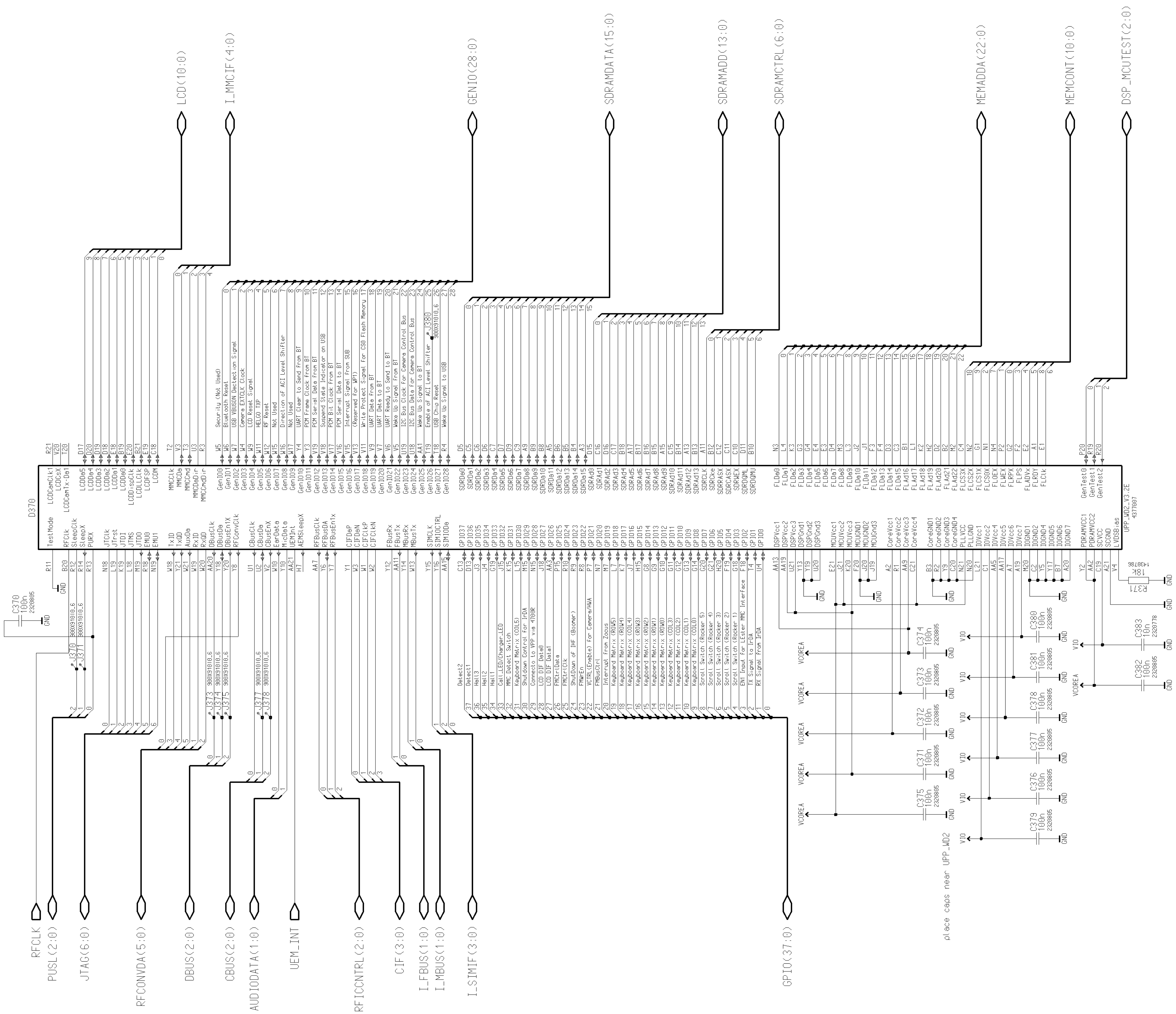
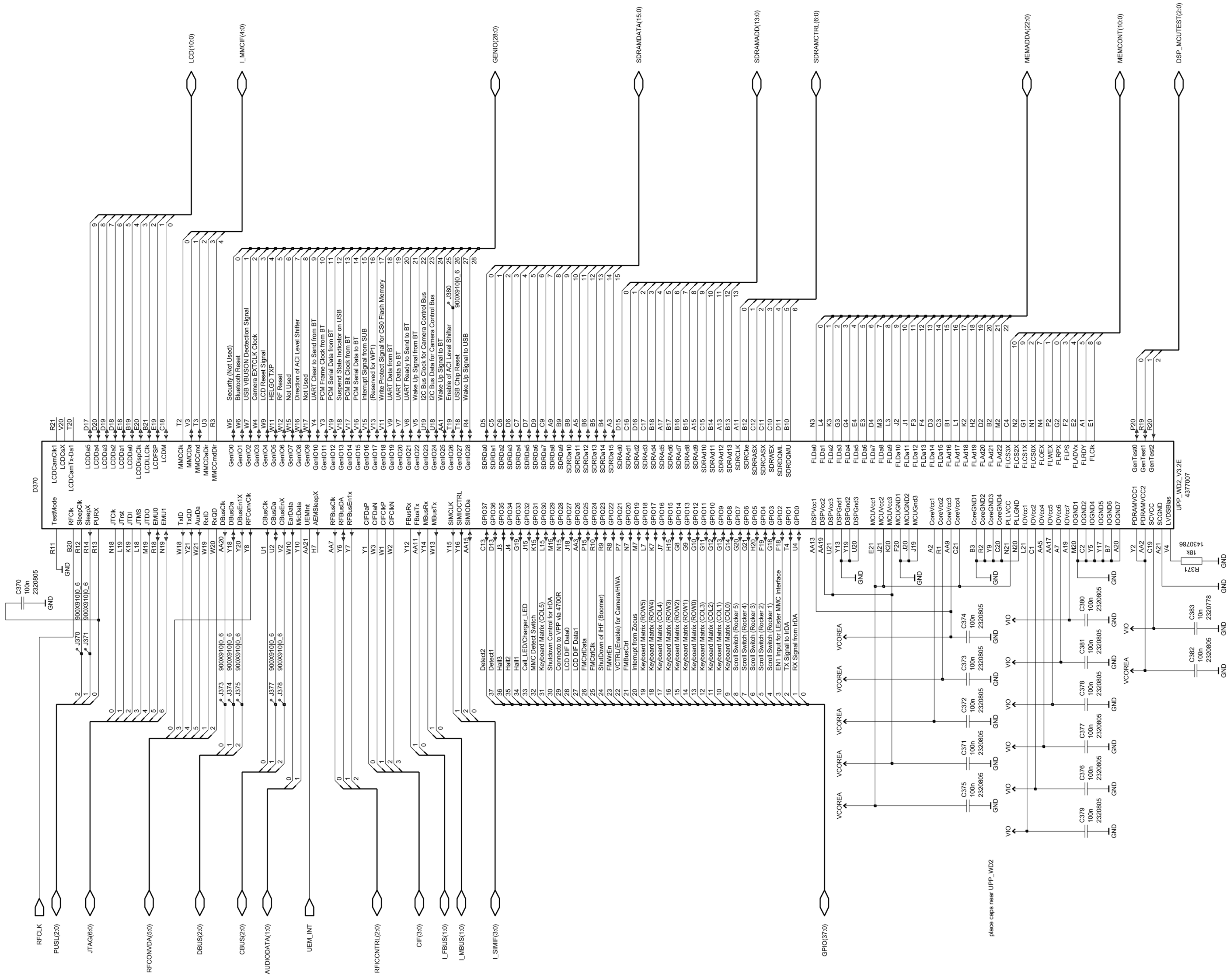


Figure 187 1fsa_11a, v. 6.0, ed. 52



IR module

Figure 188 1fsa_09a, v. 6.0, ed. 93

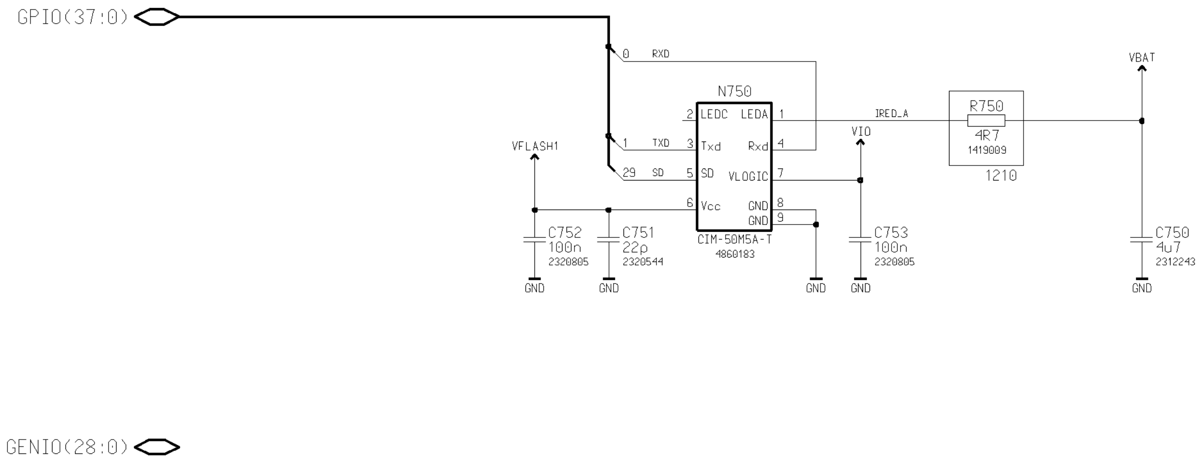
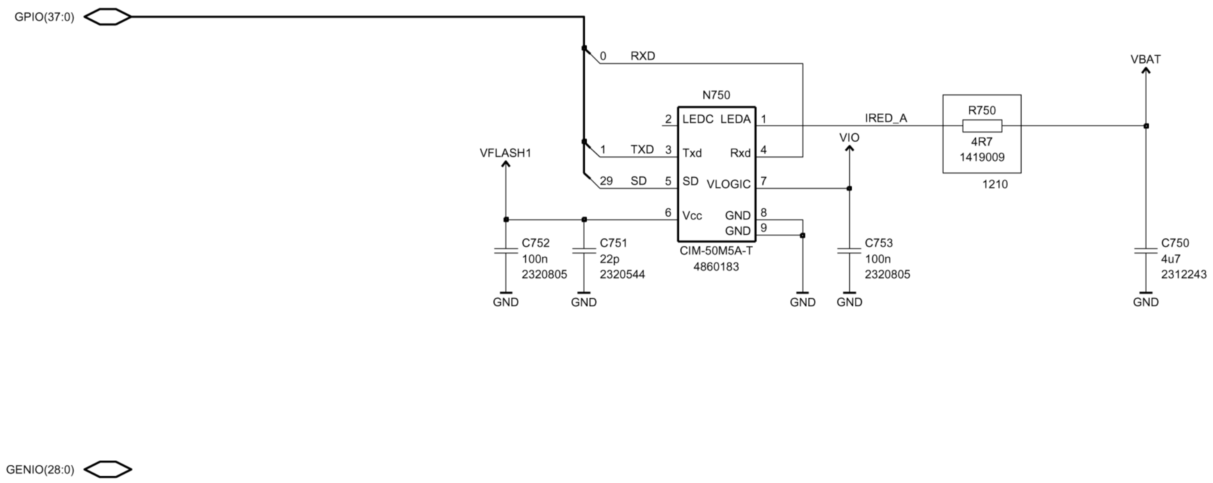


Figure 189 1fsa_11a, v. 6.0, ed. 96



User interface (top part and keyboard)

Figure 190 1fsa_09a, v. 8.1, ed. 140

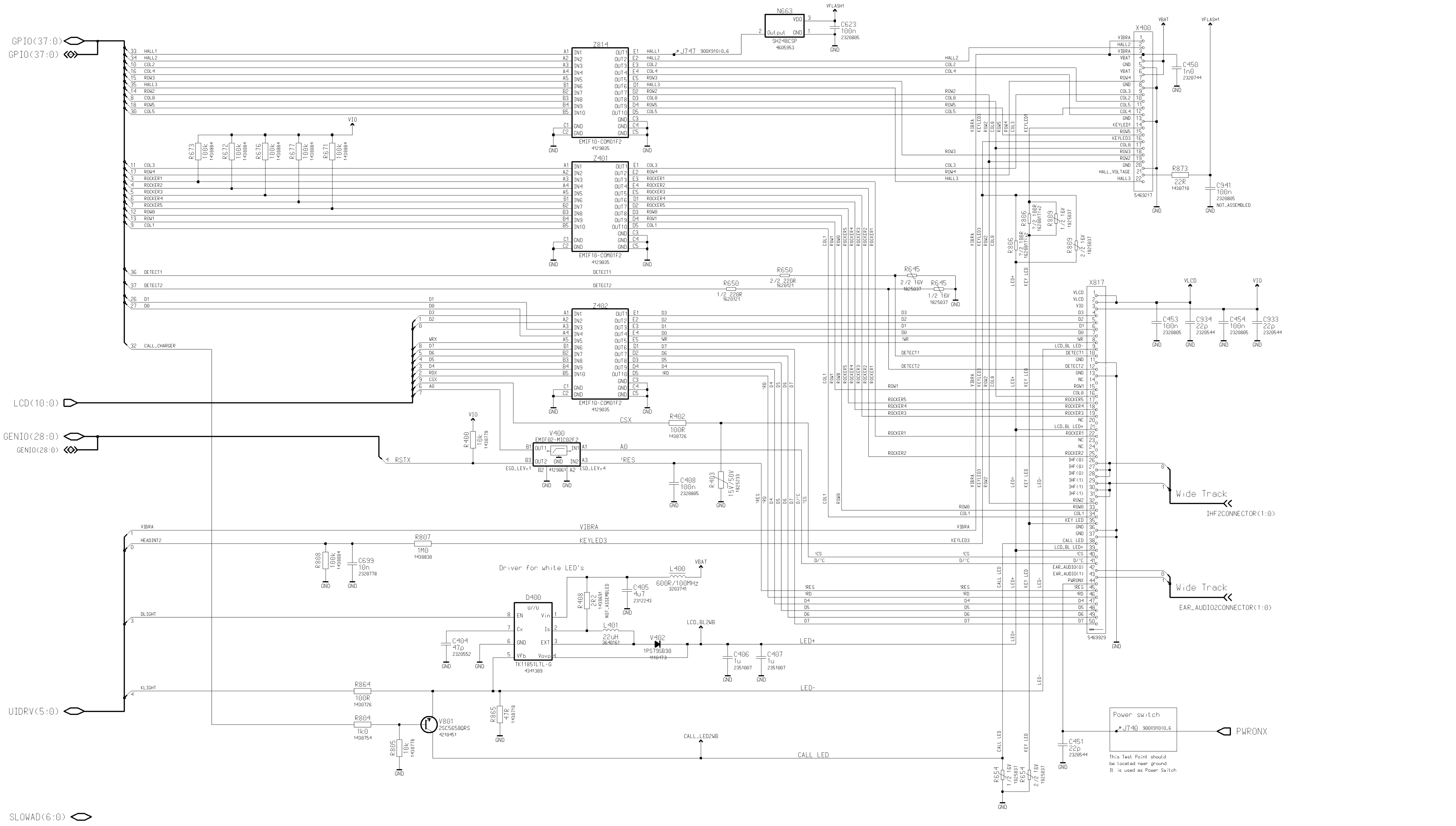
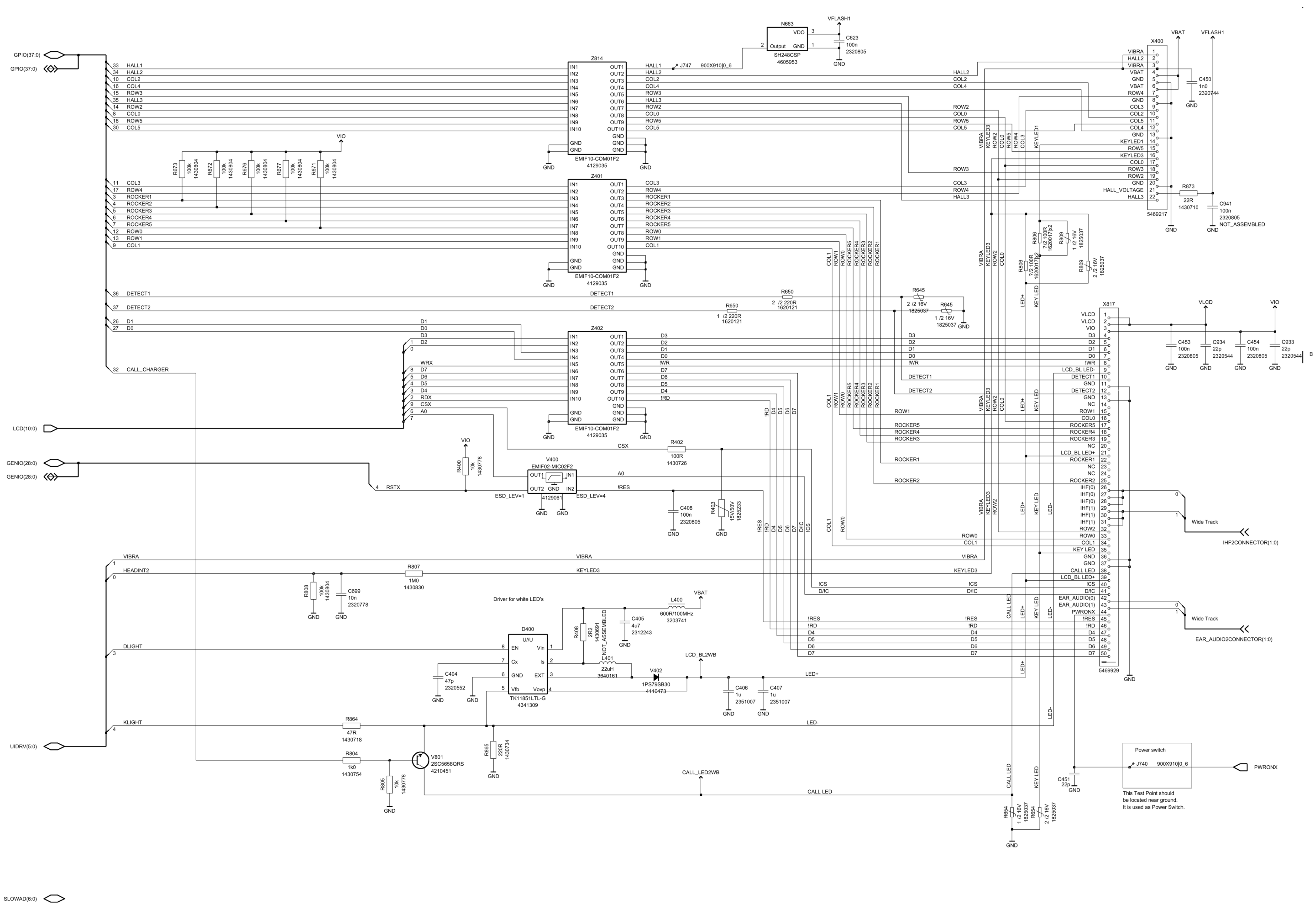
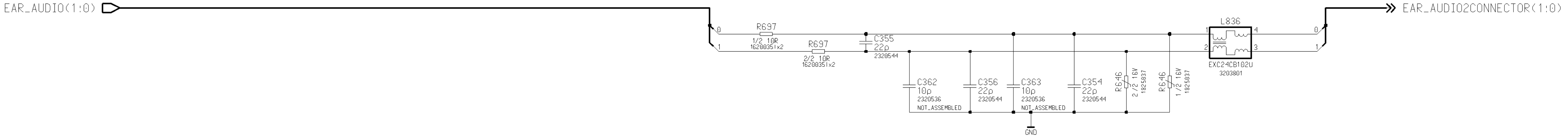


Figure 191 1fsa_11a, v. 11.1, ed. 147



User interface (camera)

Figure 192 1fsa_09a, v. 8.0, ed. 74



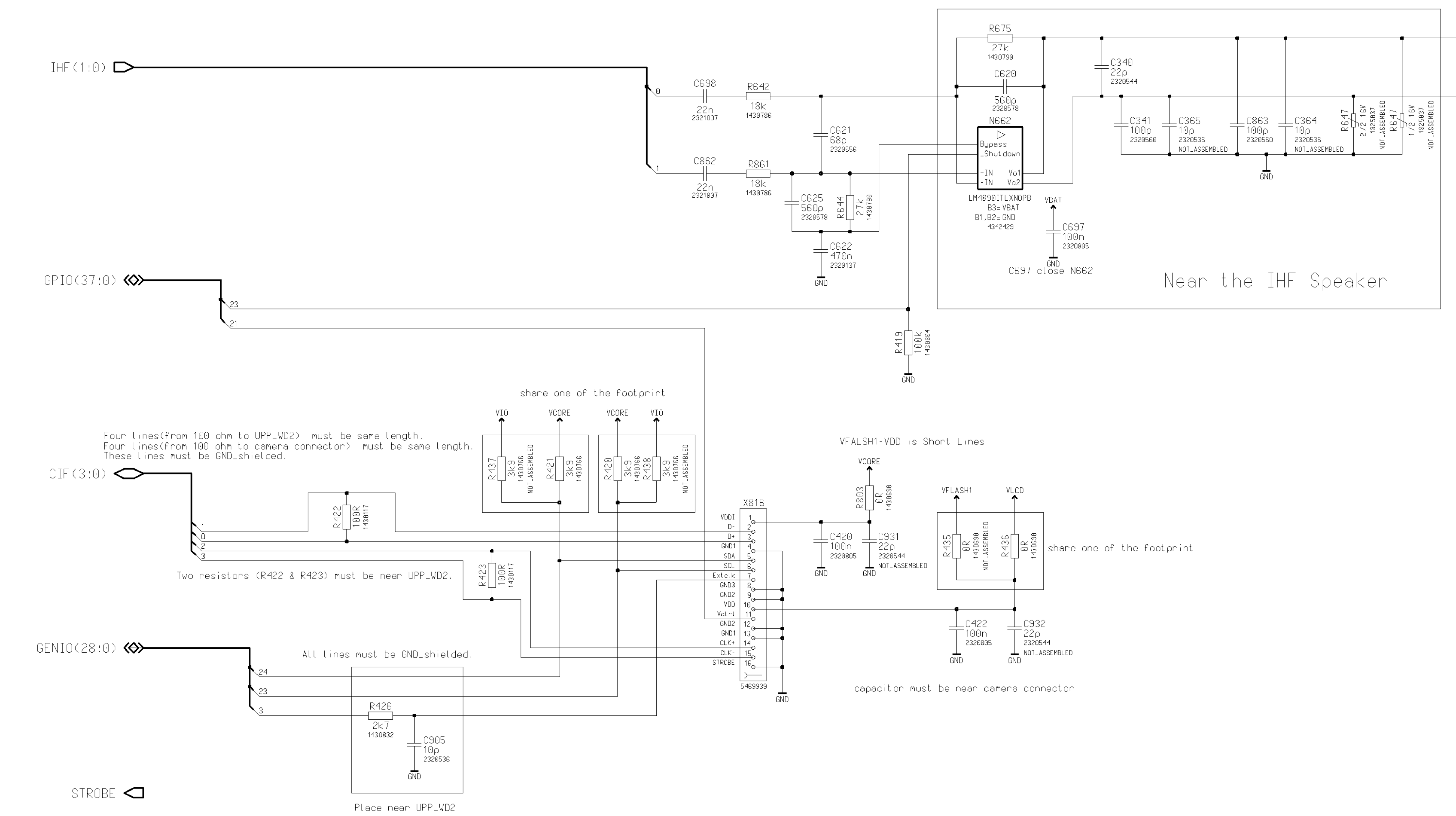
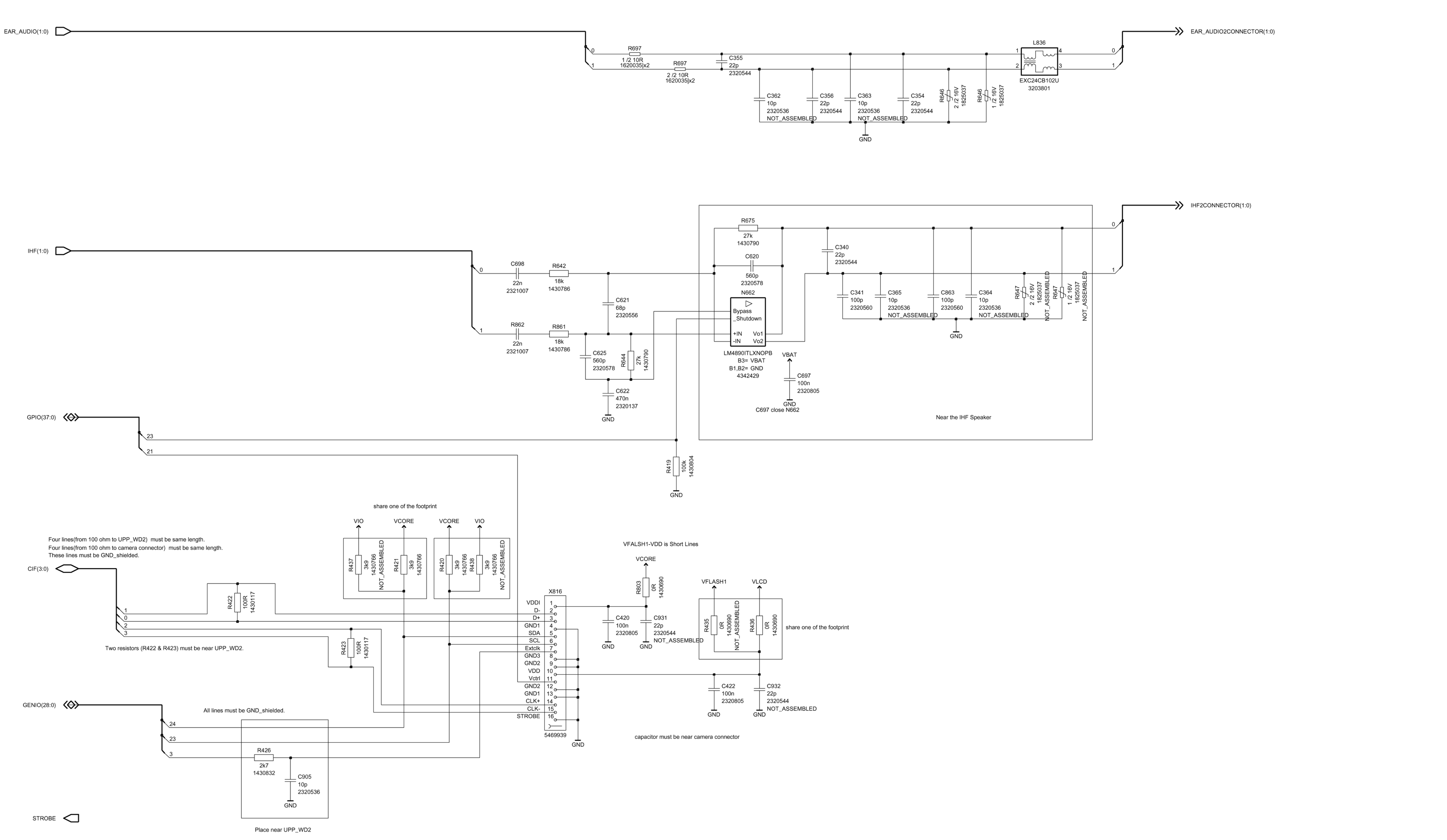


Figure 193 1fsa_11a, v. 11.1, ed. 79


EAR_AUDIO(1:0)
EAR_AUDIO2CONNECTOR(1:0)
IHF(1:0)
IHF2CONNECTOR(1:0)
GPIO(37:0)
CIF(3:0)
GENIO(28:0)
STROBE
L836
EXC24CB102U
3203801
N662
LM4890ITLXNOPB
B3= VBAT
B1,B2= GND
4342429
C697 close N662
Near the IHF Speaker
share one of the footprint
Four lines(from 100 ohm to UPP_WD2) must be same length.
Four lines(from 100 ohm to camera connector) must be same length.
These lines must be GND_shielded.
Two resistors (R422 & R423) must be near UPP_WD2.
All lines must be GND_shielded.
Place near UPP_WD2
VFALSH1-VDD is Short Lines
capacitor must be near camera connector
X816
5469939

User interface (empty)

Figure 194 1fsa_09a, v. 8.0, ed. 84

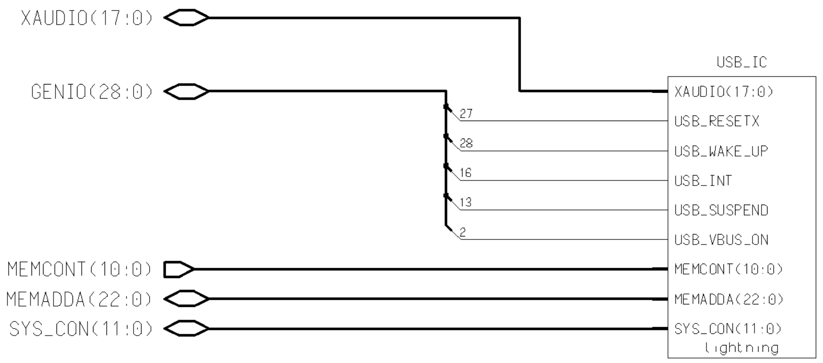
This empty sheet is used for Main Board, NOT for Wing Board

Figure 195 1fsa_11a, v. 11.1, ed. 88

This empty sheet is used for Main Board, NOT for Wing Board

USB

Figure 196 1fsa_09a, v. 8.0, ed. 44



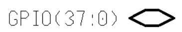
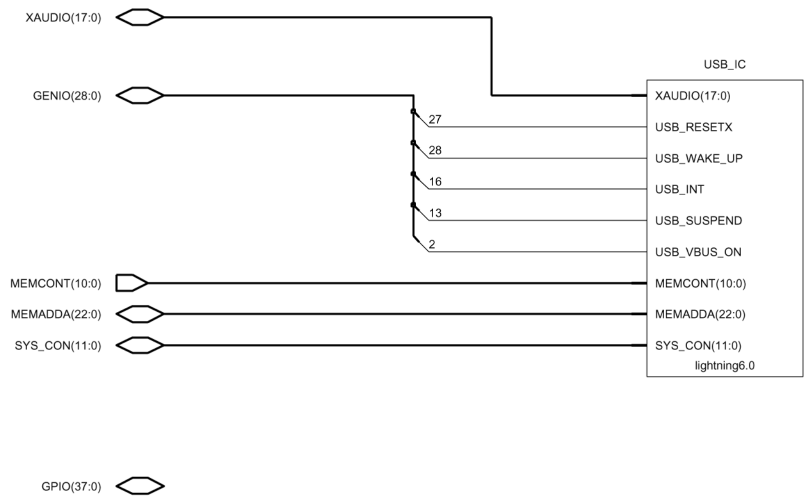


Figure 197 1fsa_11a, v. 8.0, ed. 47



USB module

Figure 198 1fsa_09a, v. 6.0, ed. 57

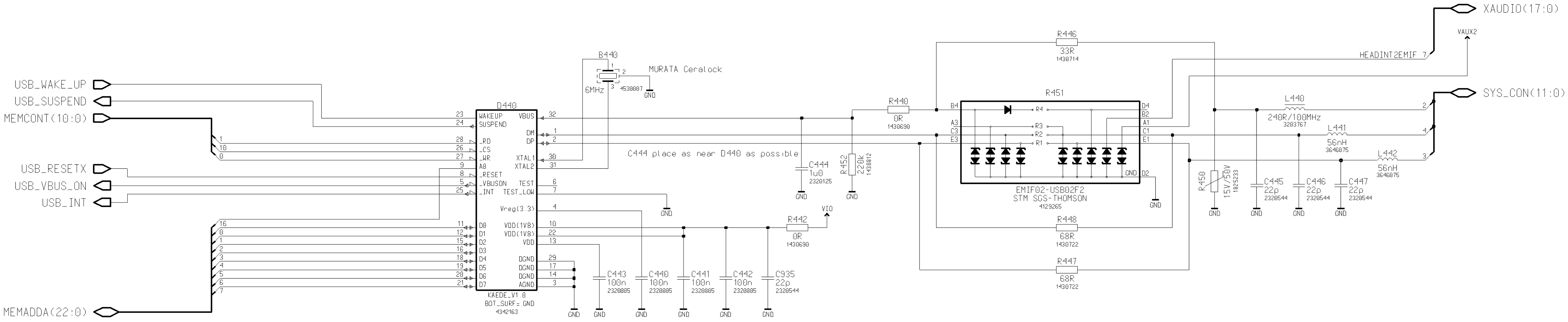
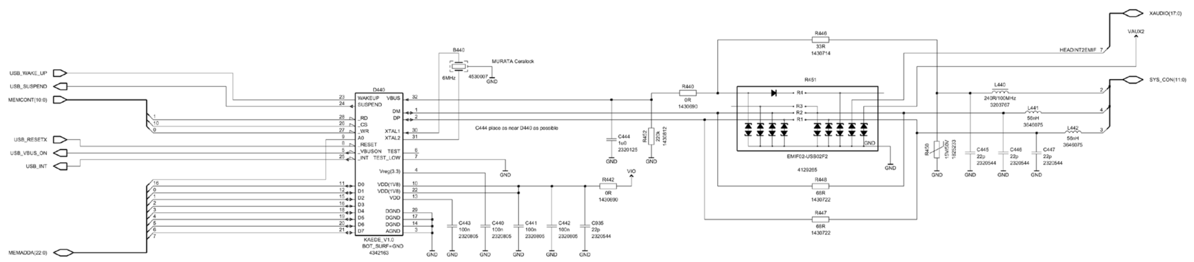


Figure 199 1fsa_11a, v. 6.0, ed. 60



Memory

Figure 200 1fsa_09a, v. 8.0, ed. 68

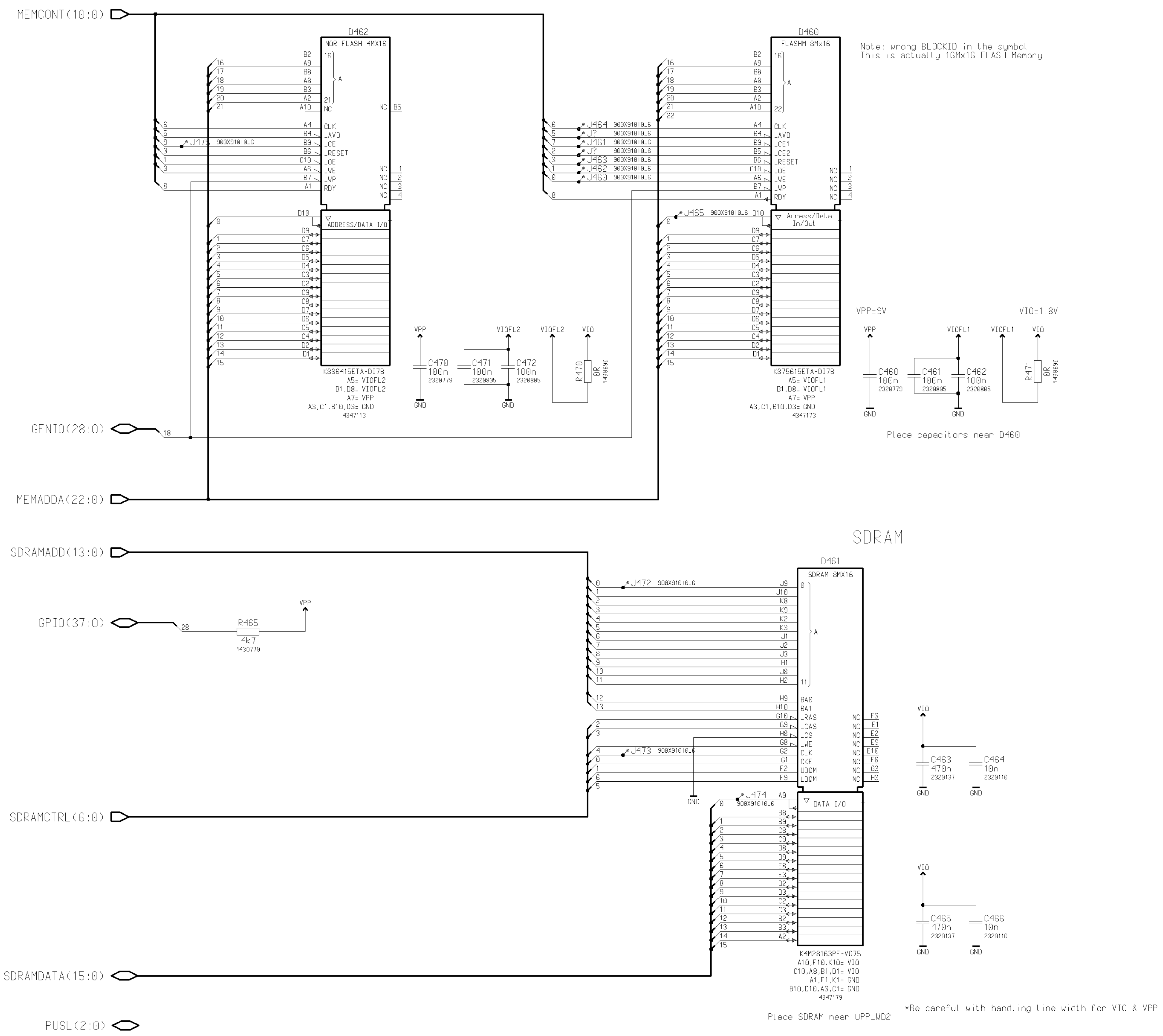
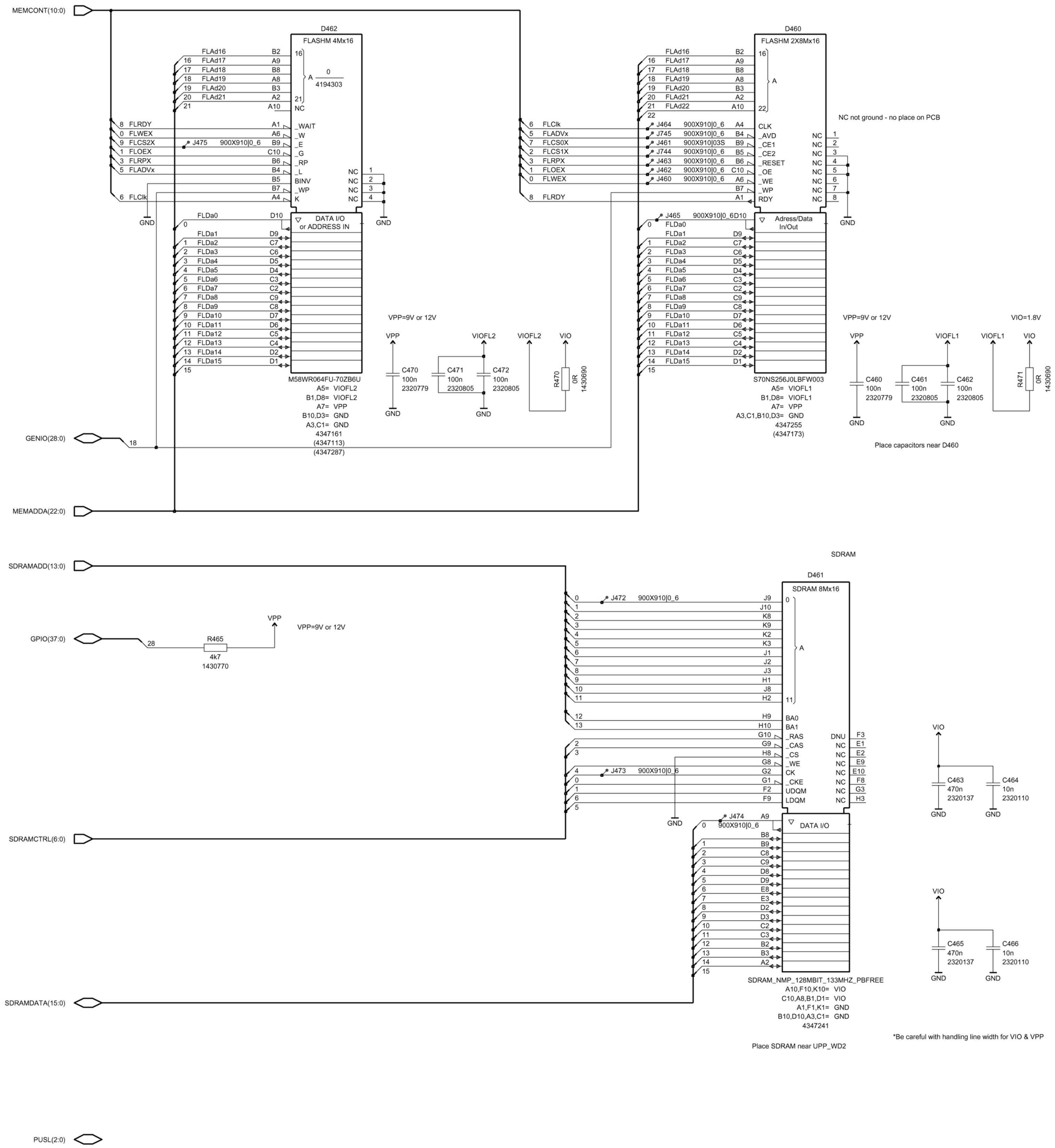


Figure 201 1fsa_11a, v. 11.1, ed. 96



VPP	D462	D460
9V	4347113	4347173
12V	4347287 4347161	4347255

■ Bluetooth

Figure 202 1fsa_09a, v. 8.0, ed. 49

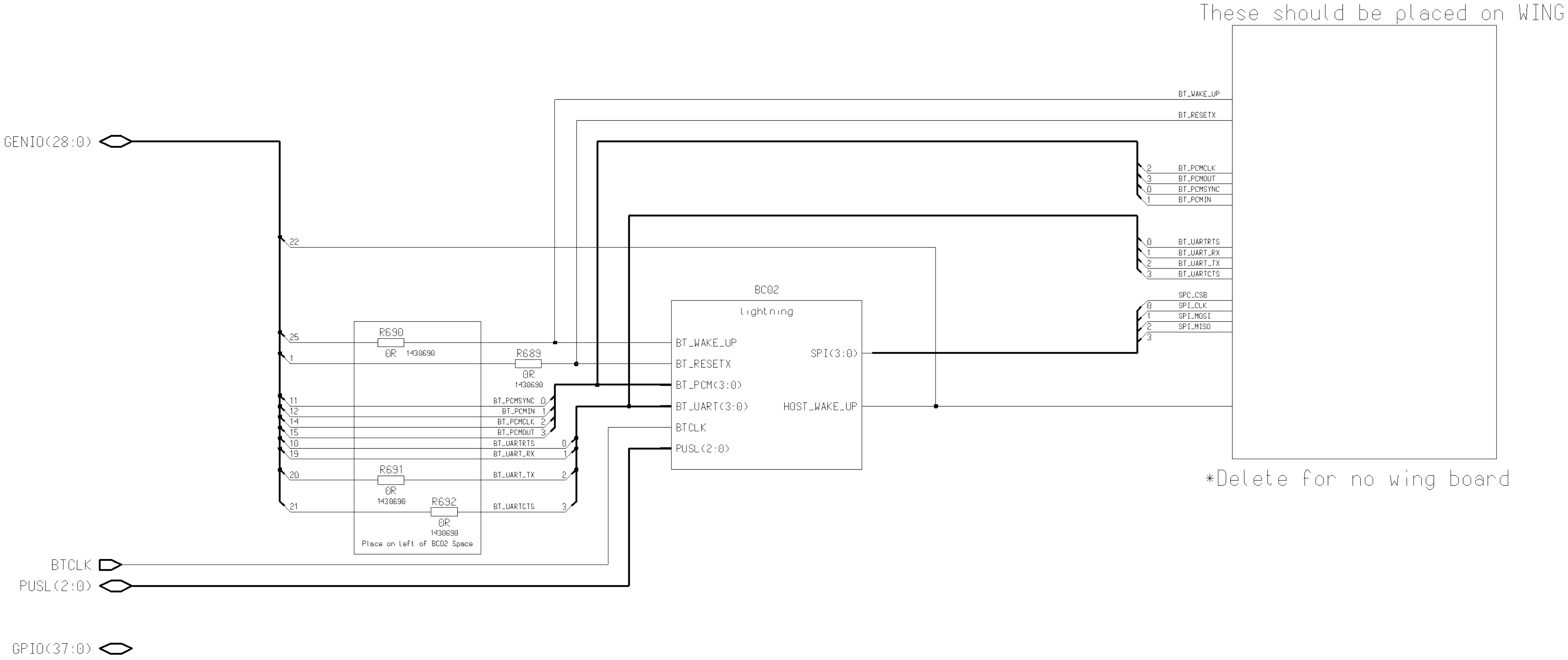
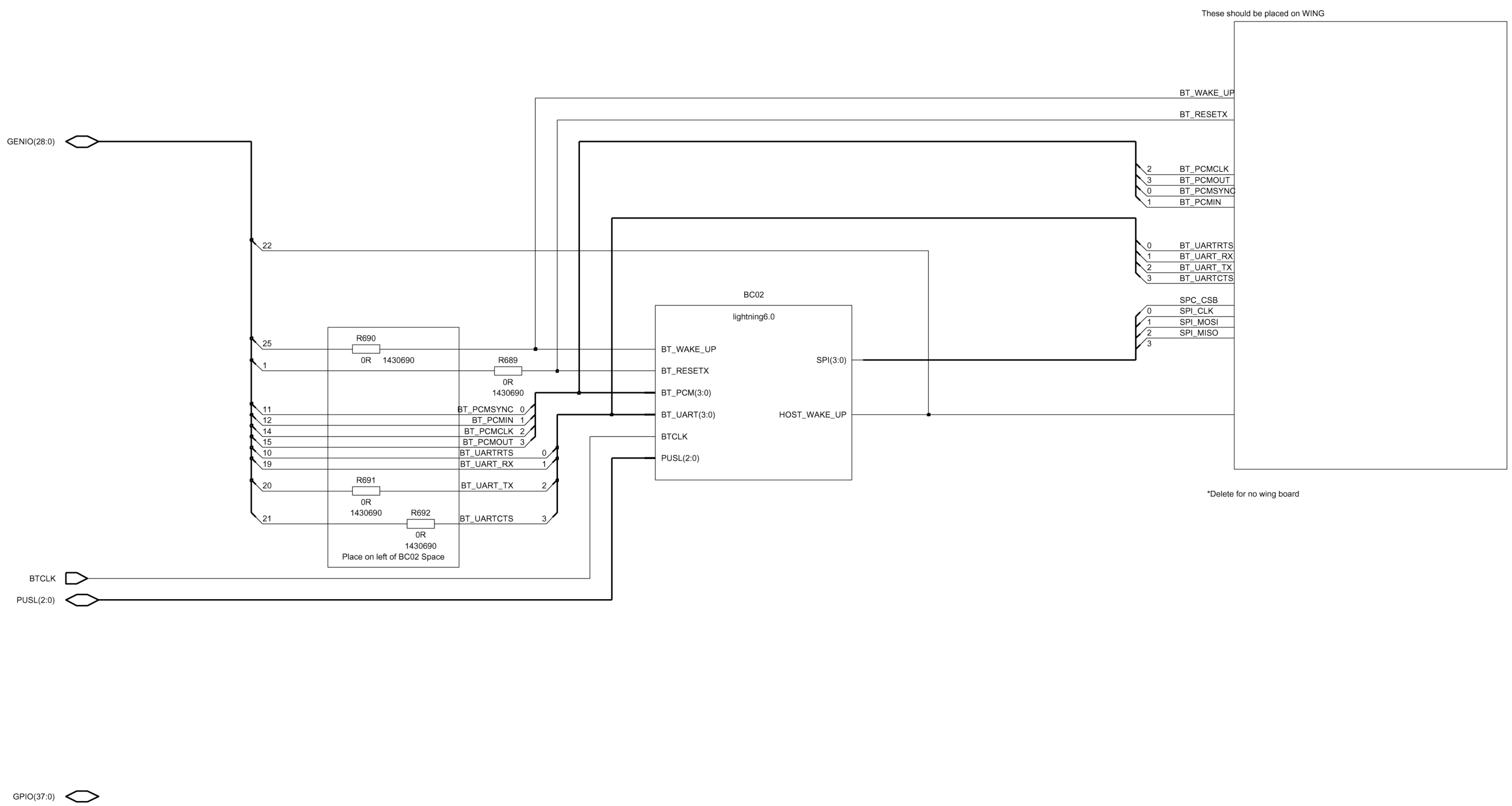


Figure 203 1fsa_11a, v. 8.0, ed. 52



■ Bluetooth module

Figure 204 1fsa_09a, v. 6.0, ed. 71

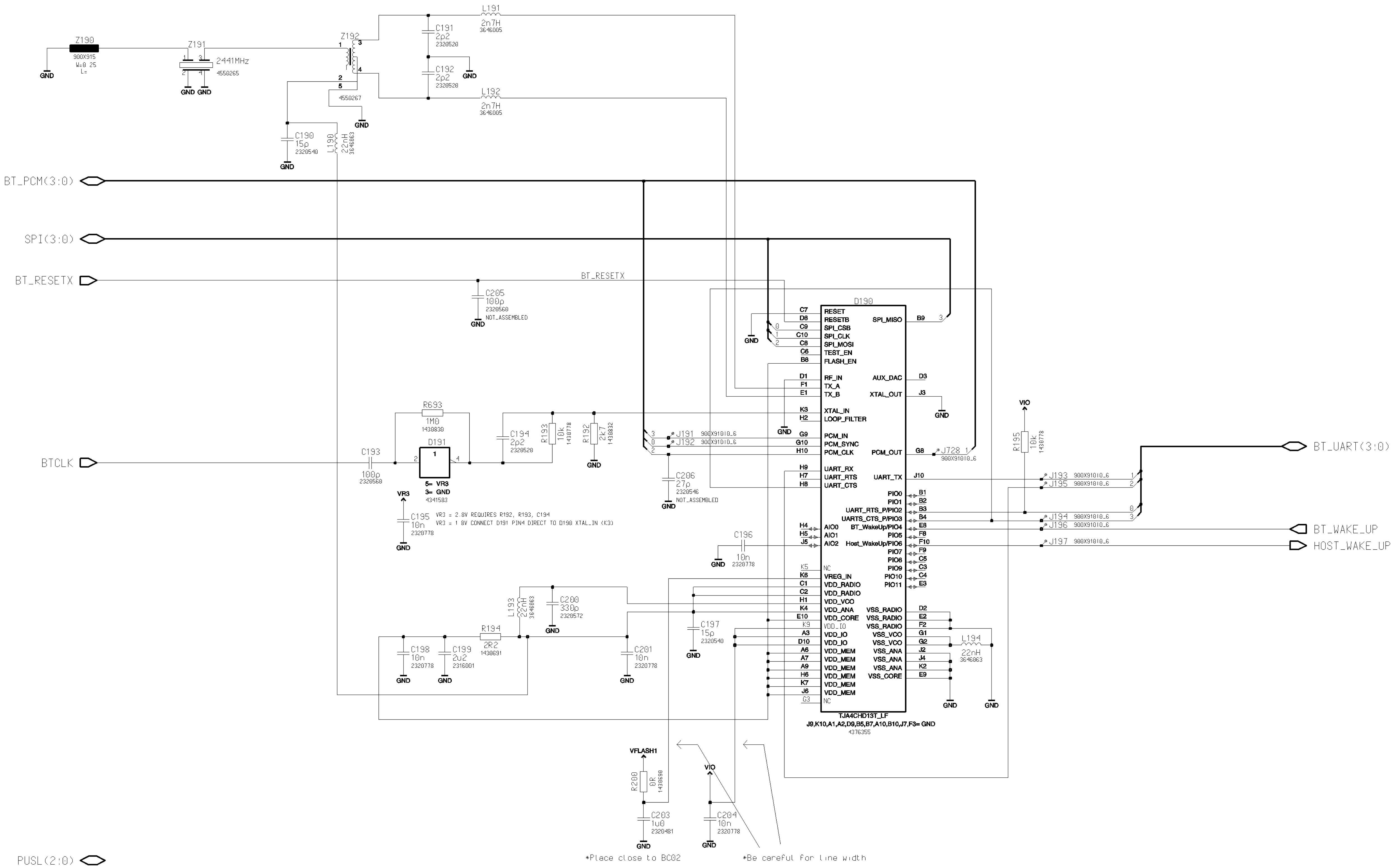
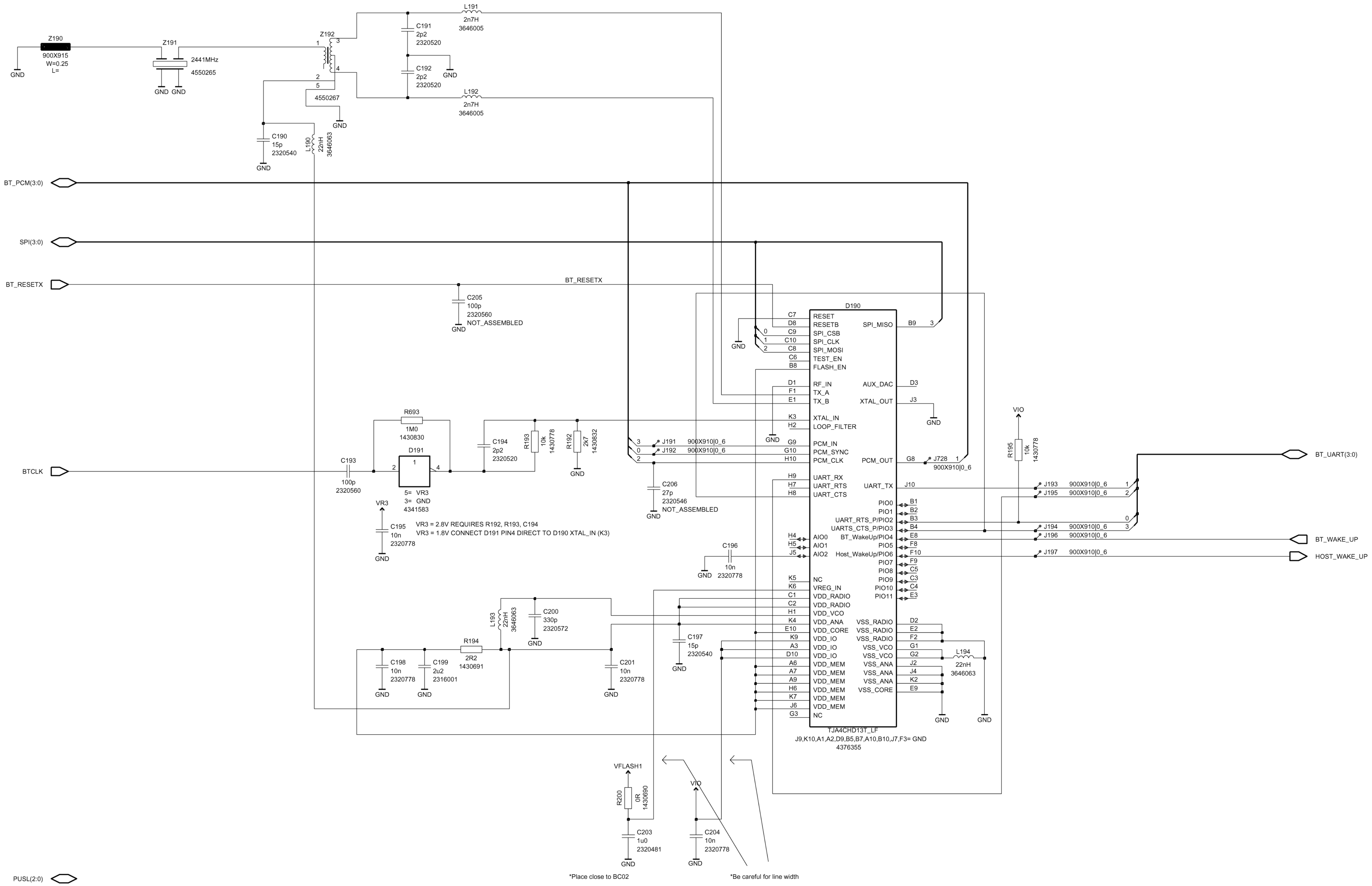


Figure 205 1fsa_11a, v. 6.0, ed. 76



■ BB-RF Interface

Figure 206 1fsa_09a, v. 6.0, ed. 9

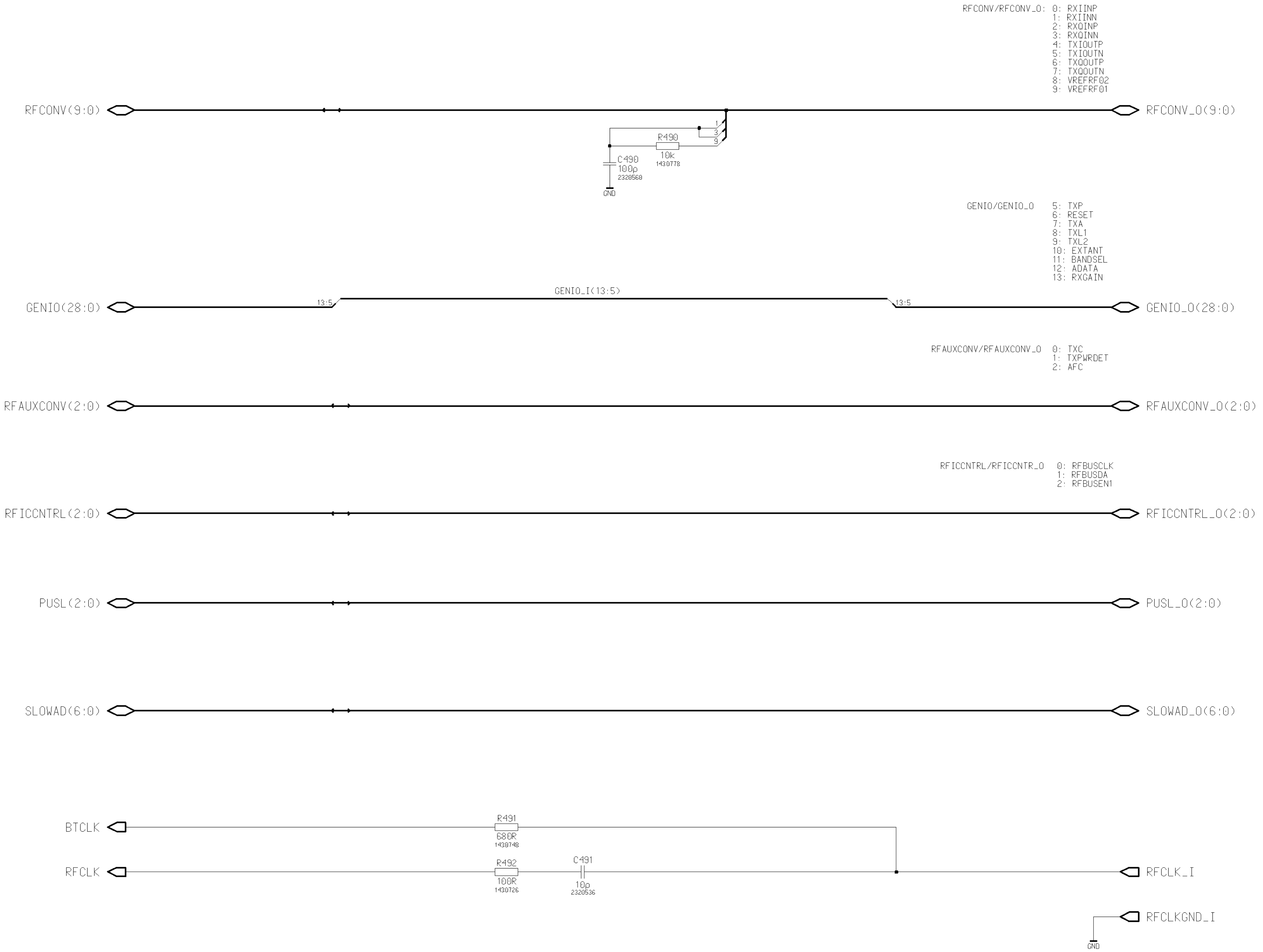
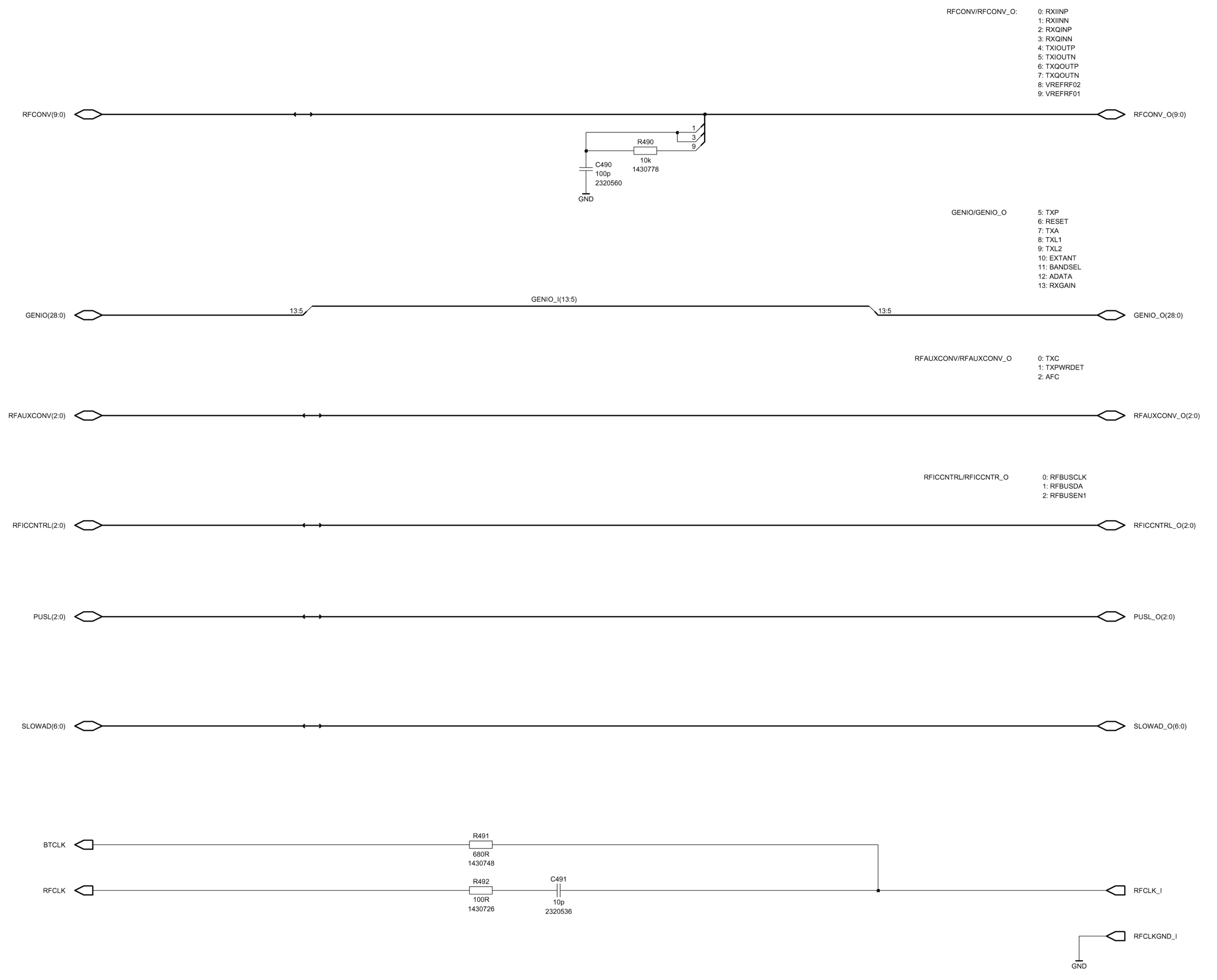


Figure 207 1fsa_11a, v. 6.0, ed. 12



Company Confidential

Testpad

Figure 208 1fsa_09a, v. 5.1, ed. 49

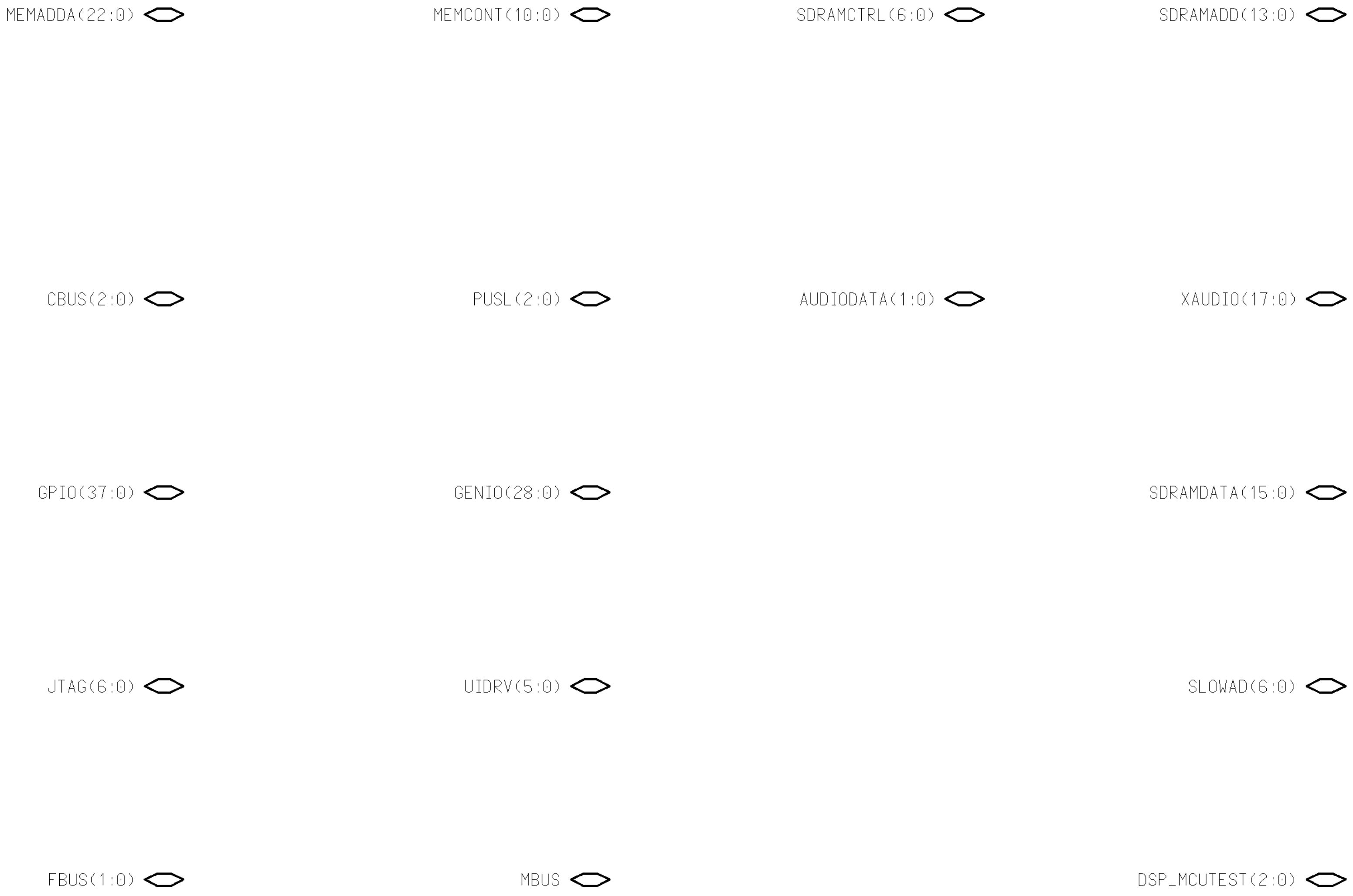
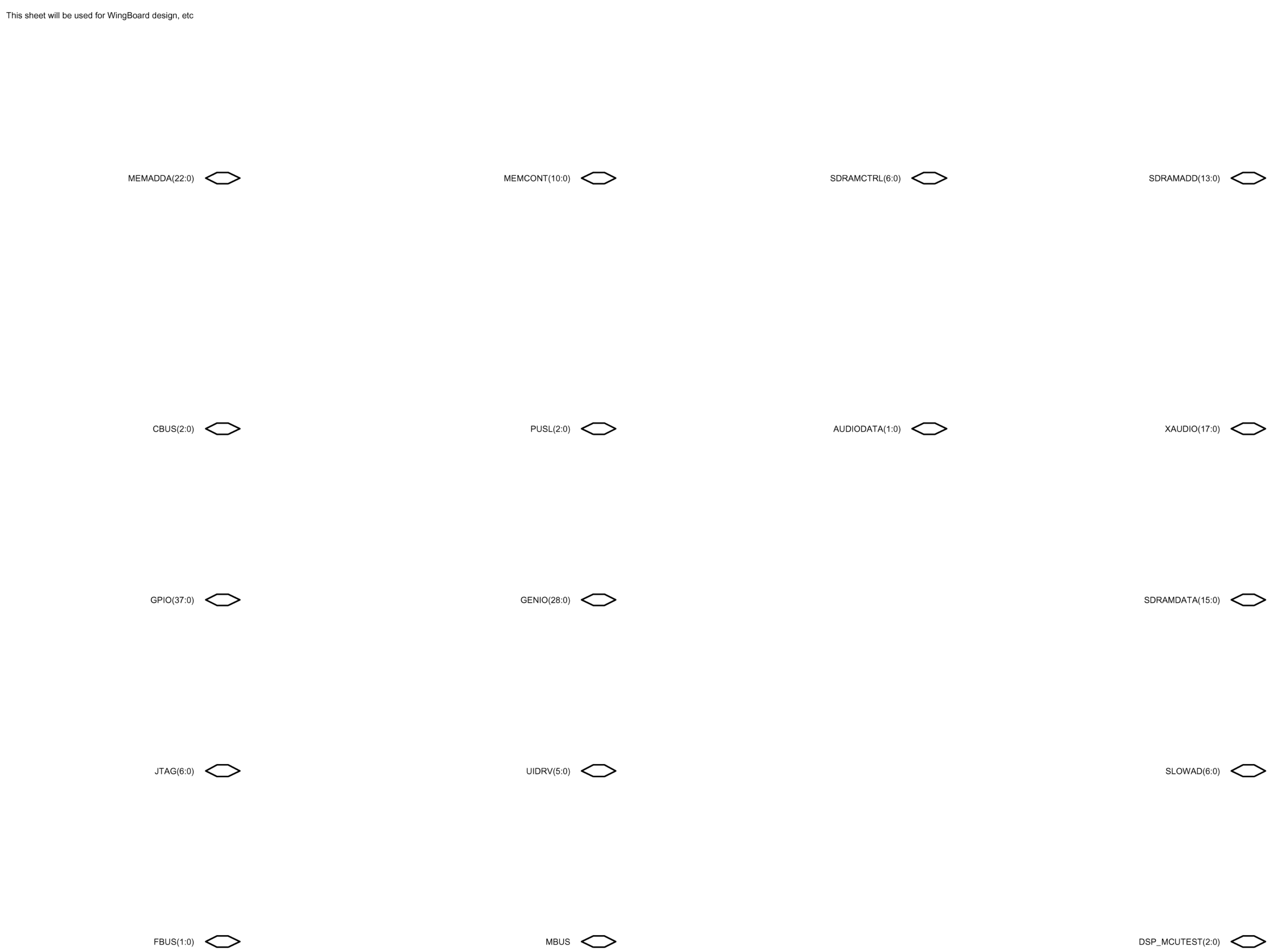
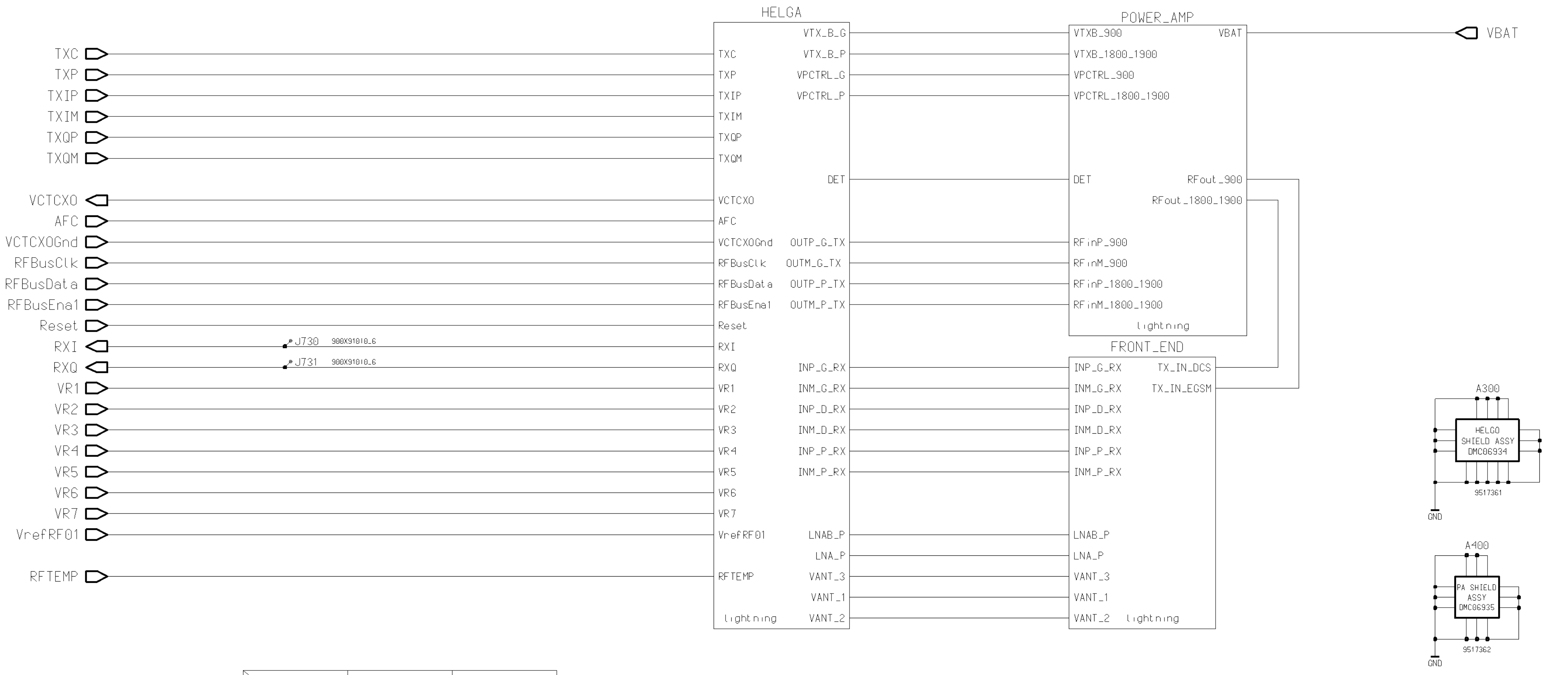


Figure 209 1fsa_11a, v. 5.1, ed. 52



RF top level

Figure 210 1fsa_09a, v. 8.0, ed. 63



	850	900
Z803 (RX)	4511449	4511455
Z700 (TX)	4511445	4511443

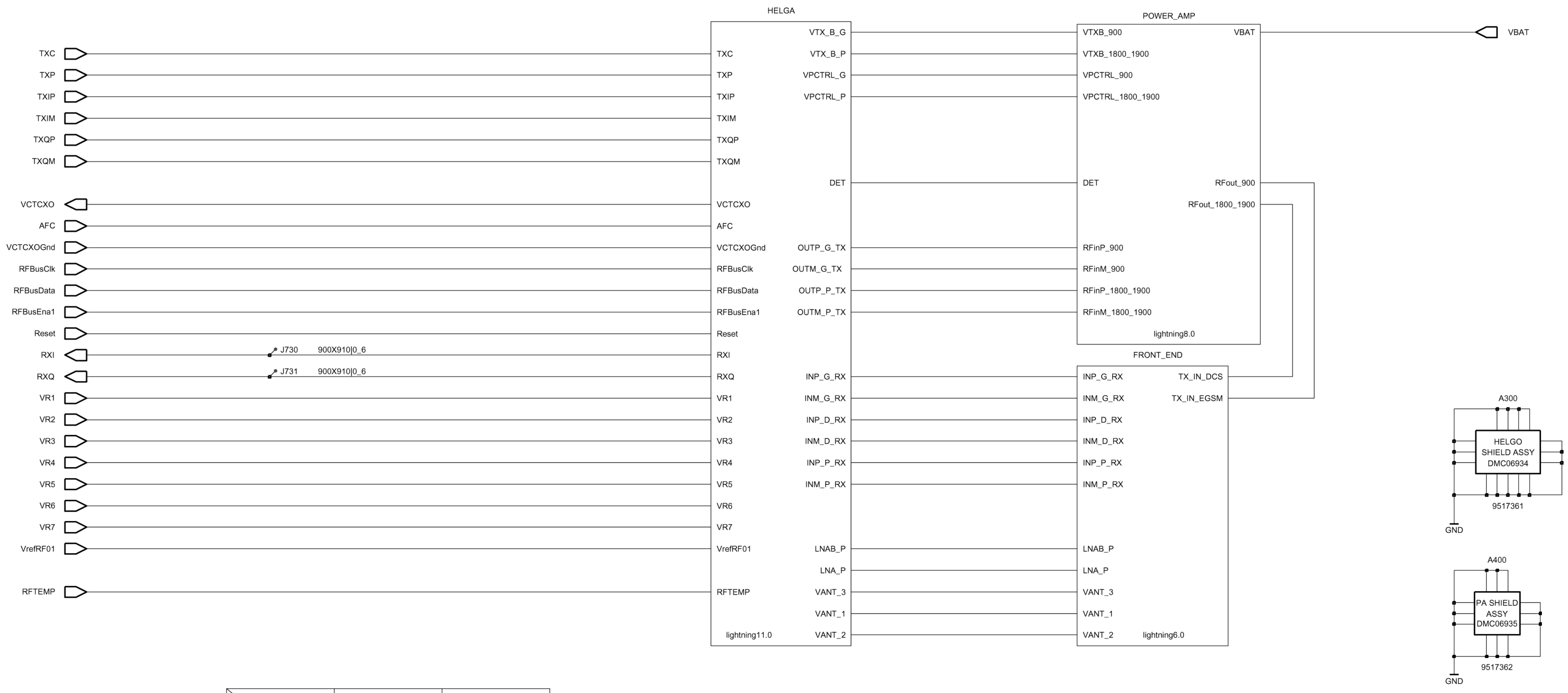
About C511(Default "EU" version)

EU	1P2 (2320514)
US	1p5 (2320516)

About R858(Default "EU" version)

EU	NA
US	0R

Figure 211 1fsa_11a, v. 8.0, ed. 67



	850	900
Z803 (RX)	4511449	4511455
Z700 (TX)	4511445	4511443

About C511 (Default "EU" version)

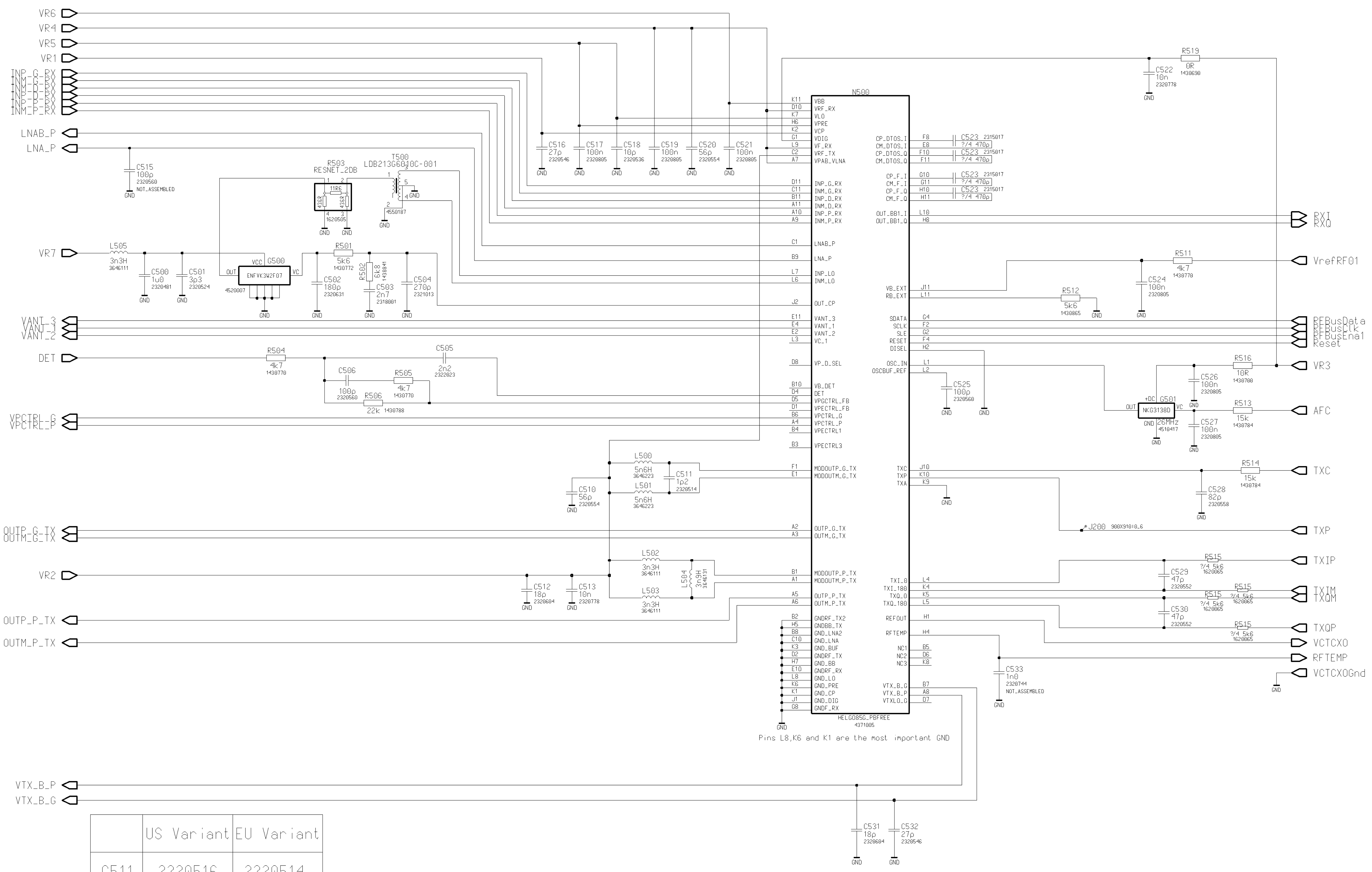
EU	1P2 (2320514)
US	1p5 (2320516)

About R858 (Default "EU" version)

EU	NA
US	0R

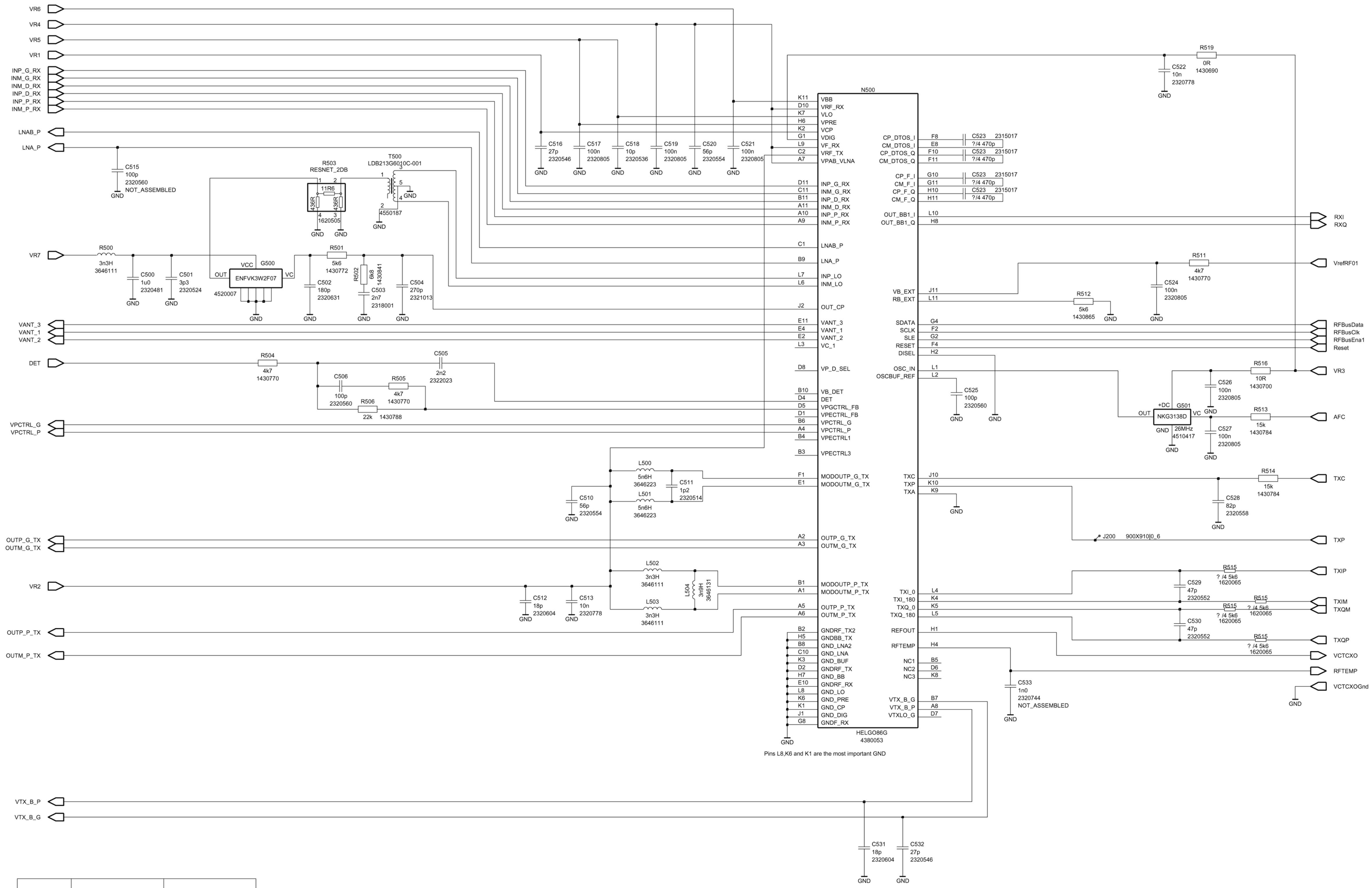
HELGO

Figure 212 1fsa_09a, v. 8.0, ed. 57



	US Variant	EU Variant
C511	2320516	2320514

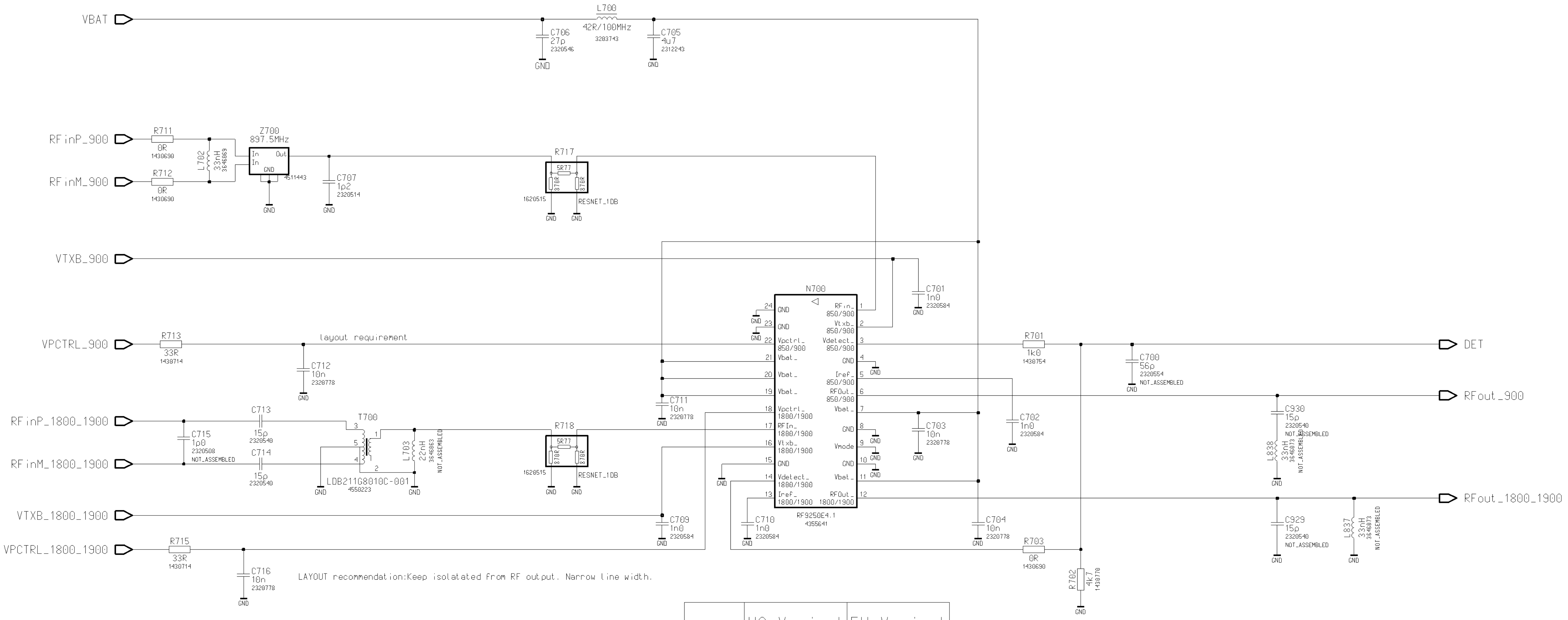
Figure 213 1fsa_11a, v. 11.0, ed. 64



	US Variant	EU Variant
C511	2320516	2320514

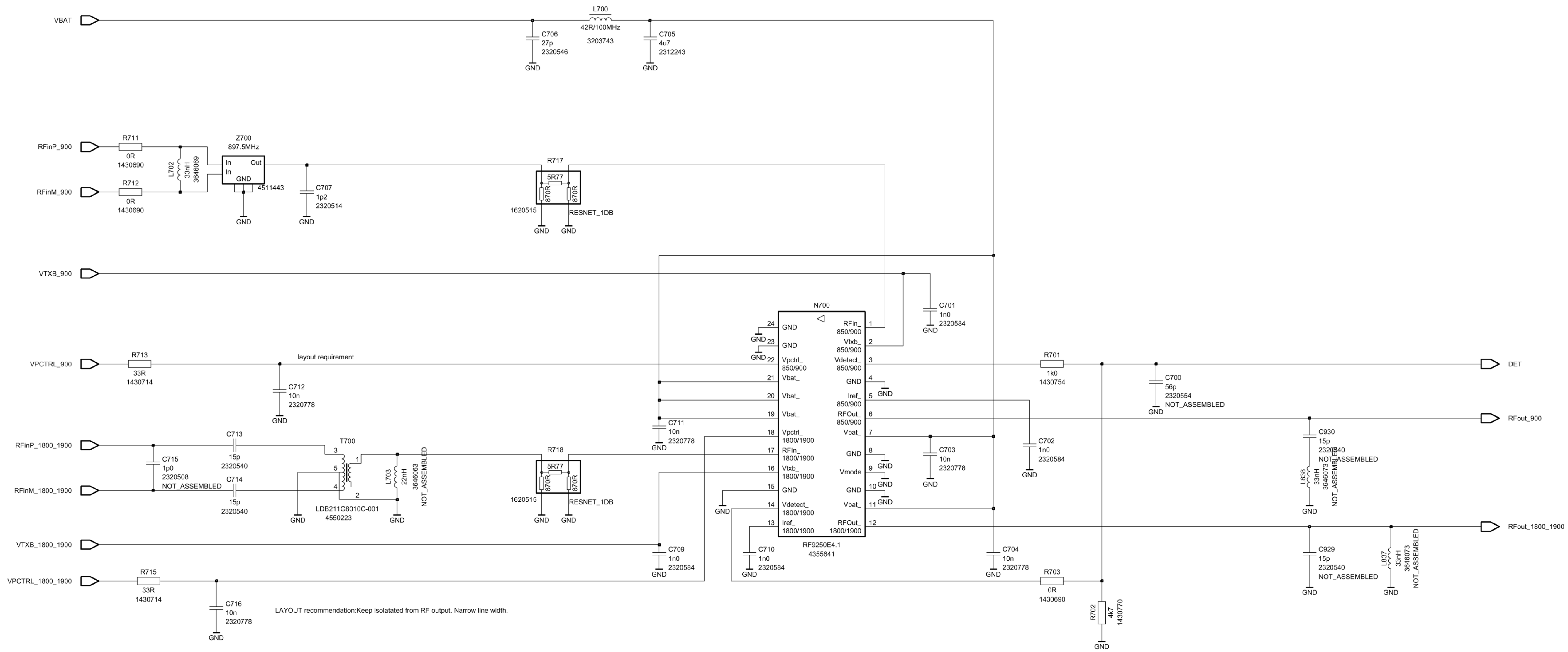
■ RF9204 power amplifier and power detection

Figure 214 1fsa_09a, v. 8.0, ed. 63



	US Variant	EU Variant
Z700 TX	4511445	4511443

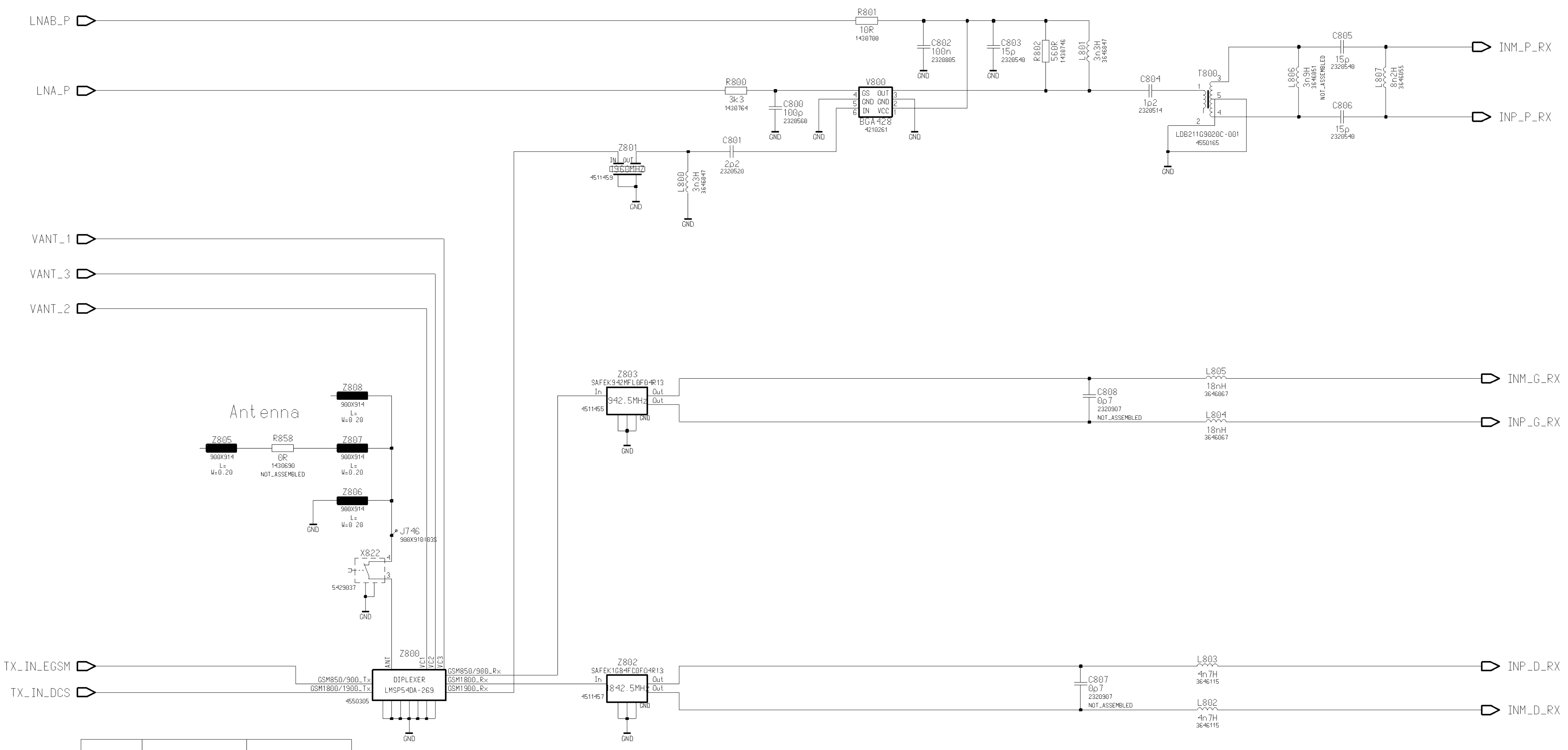
Figure 215 1fsa_11a, v. 8.0, ed. 66



	US Variant	EU Variant
Z700 TX	4511445	4511443

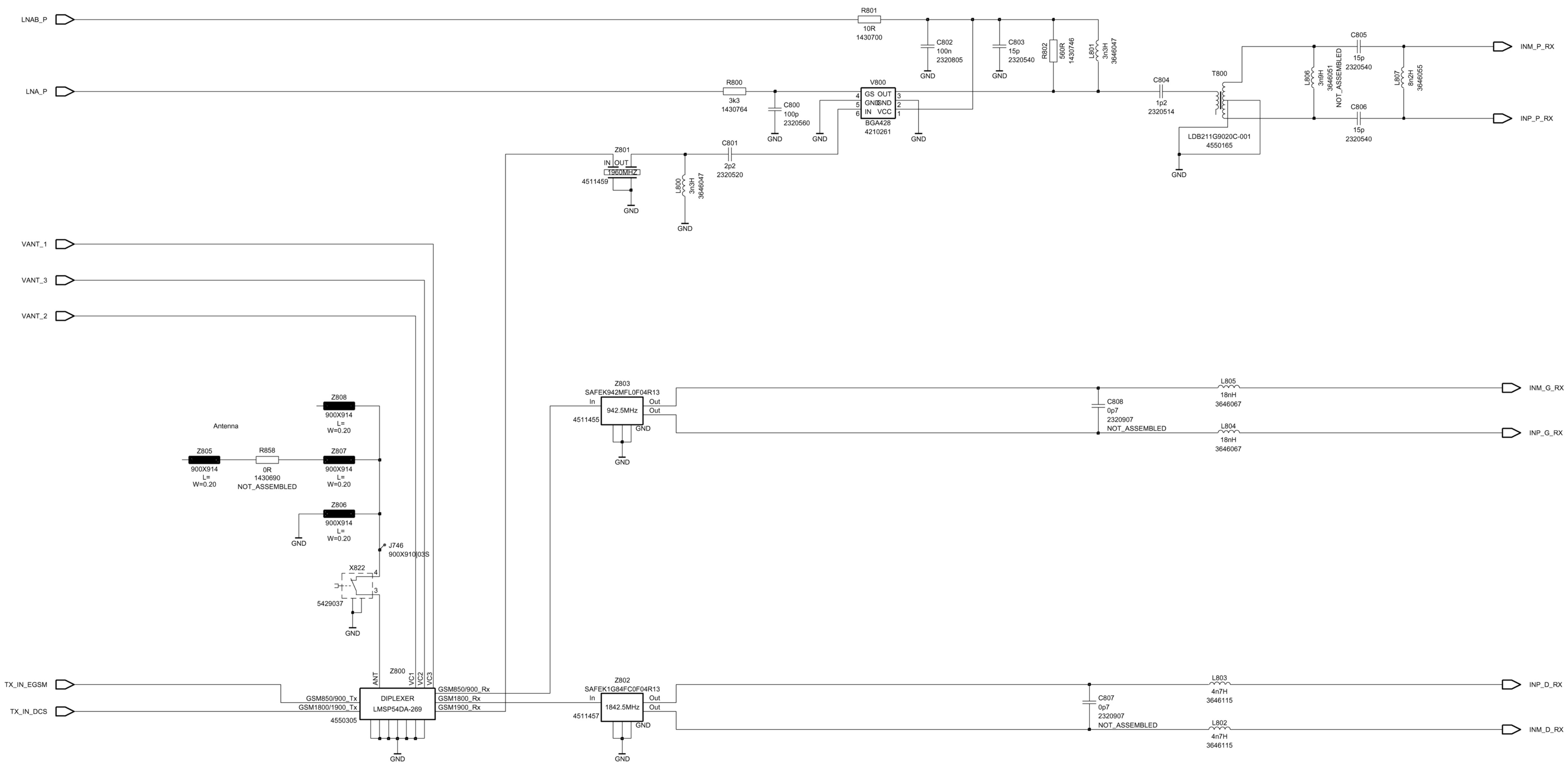
■ RX front end and antenna switch

Figure 216 1fsa_09a, v. 6.0, ed. 60



	US Variant	EU Variant
Z803 (RX)	4511449	4511455
R858	0R	NF

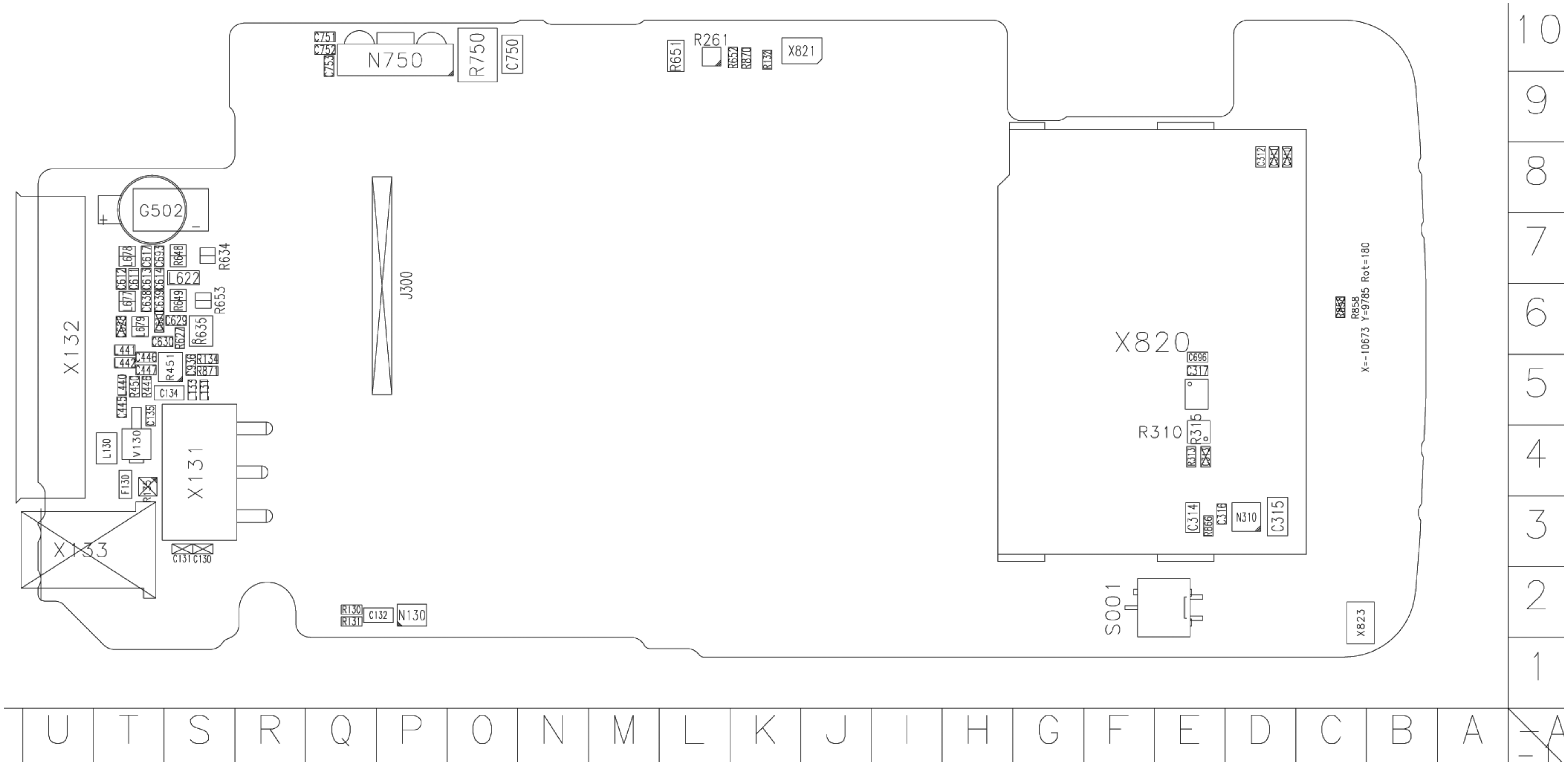
Figure 217 1fsa_11a, v. 6.0, ed. 63



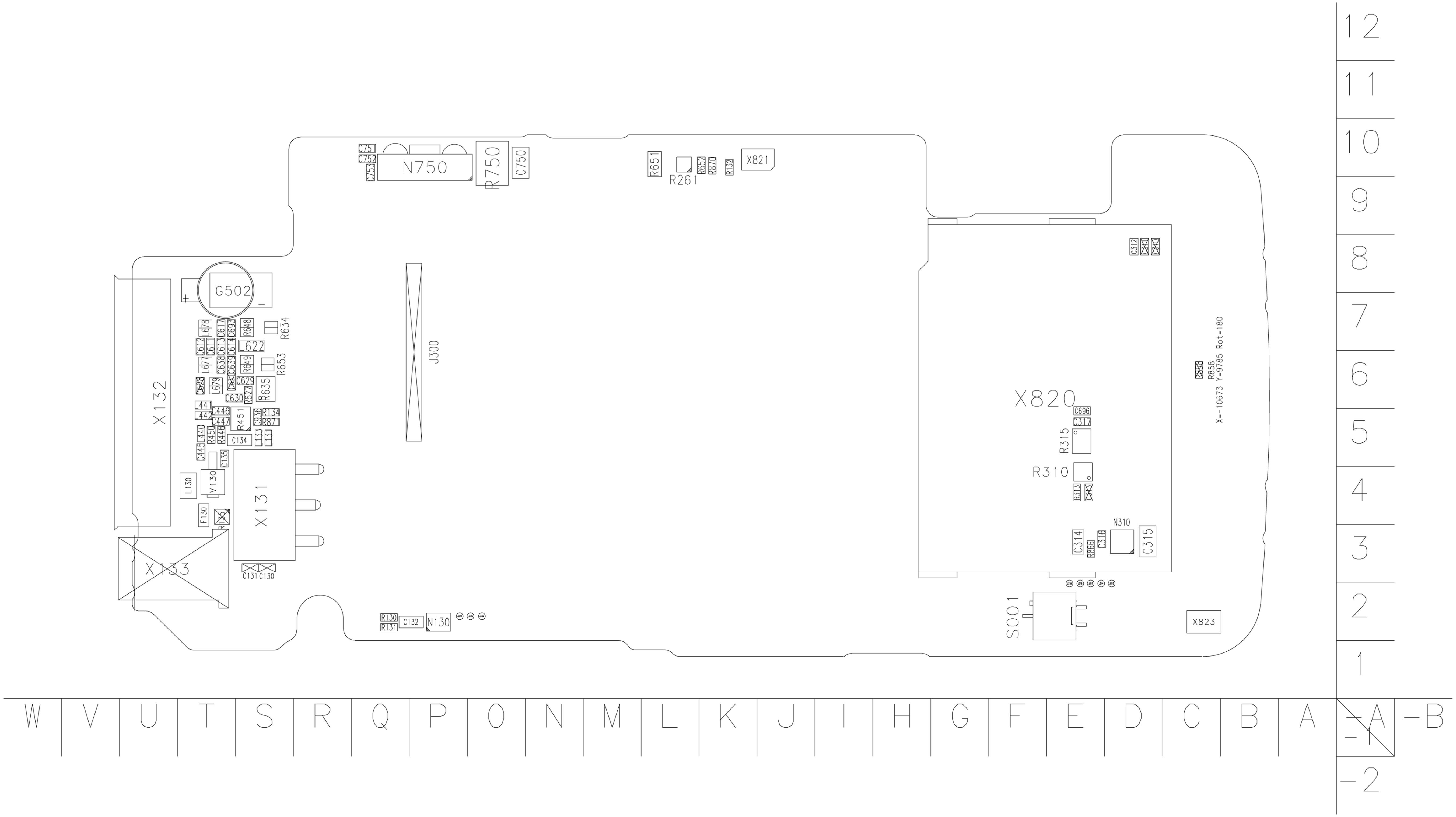
	US Variant	EU Variant
Z803 (RX)	4511449	4511455
R858	0R	NF

Component layout, bottom

1fsa_09a

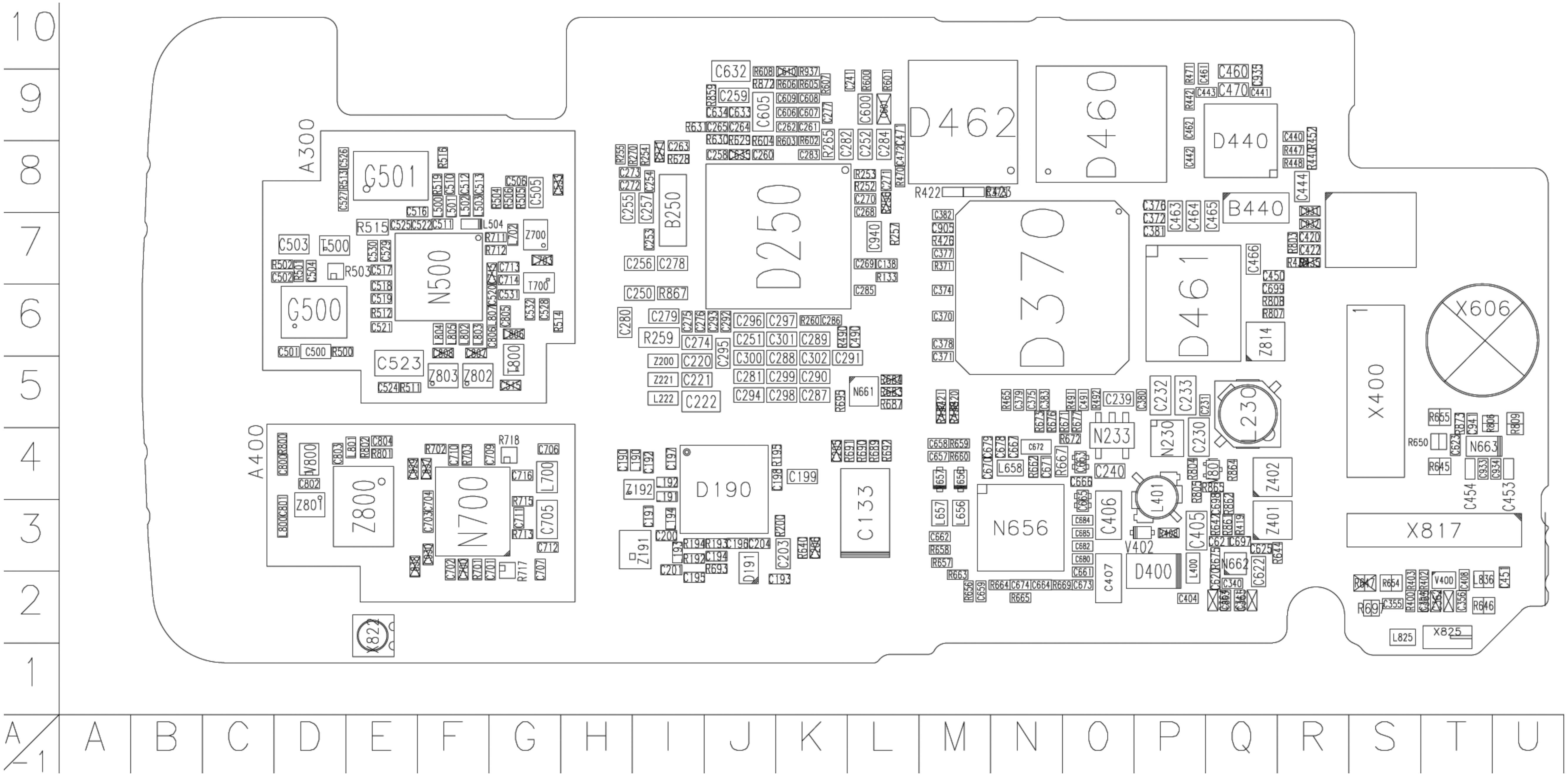


1fsa_11a

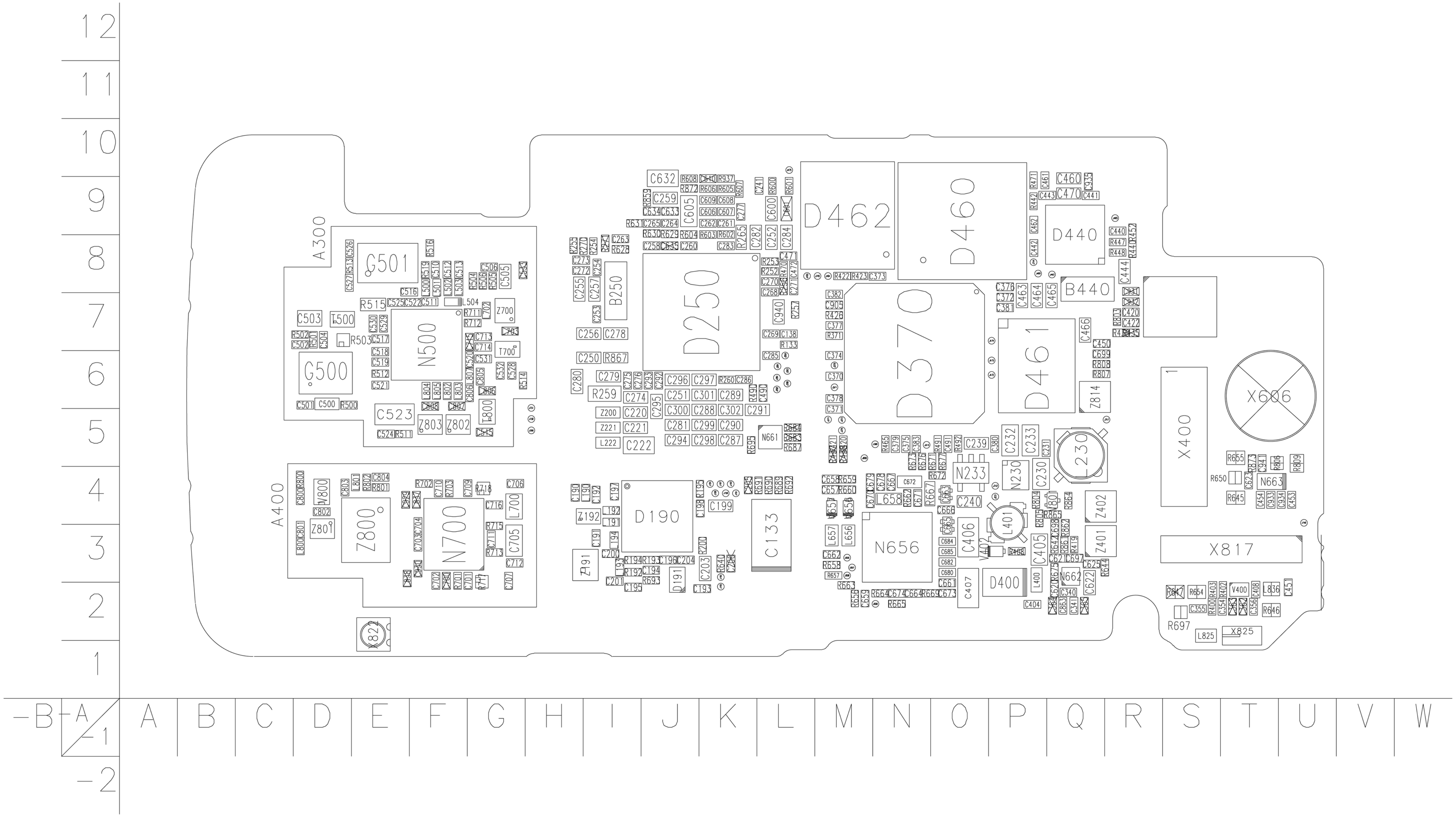

N750
R750
C750
C751
C752
C753
R651
R261
X821
G502
X132
J300
R634
R653
L622
R635
R451
C134
C135
L130
V130
F130
X131
X133
C131
C130
R130
R131
C132
N130
X820
R315
R310
N310
C314
C315
S001
X823
R858
X=-10673 Y=9785 Rot=180
12
11
10
9
8
7
6
5
4
3
2
1
-1
-2
W
V
U
T
S
R
Q
P
O
N
M
L
K
J
I
H
G
F
E
D
C
B
A
-A
-B

Component layout, top

1fsa_09a



1fsa_11a



Glossary

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Table 31

A/D-converter	Analog-to-digital converter
ACI	Accessory control interface
ACI	Adjacent channel interference
ADC	Analog-to-digital converter
ADSP	Application DSP (expected to run high level task, see also CDSP)
AGC	Automatic gain control (maintains volume)
ARM	Advanced RISC machines
ARPU	Average revenue per user (per month or per year)
ASIC	Application specific integrated circuit
ASIP	Application specific interface protector
BB	Baseband
BC02	Bluetooth module made by CSR
BIQUAD	Bi-quadratic (filter function)
BSI	Battery size indicator
BT	Bluetooth
CBus	MCU controlled serial bus connected to UPP, UEME and Zocus
CCP	Compact camera port
CDSP	Cellular DSP (expected to run at low levels, see also ADSP)
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, see also FSTN
CTSI	Clock timing sleep and interrupt block of Tiku
DBI	Digital battery interface
DBus	DSP controlled serial bus connected between UPP and Helgo
DCT-4	Digital core technology
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 compability
EMI	Electromagnetic interference
ESD	Electrostatic discharge
FBUS	Nokia specific serial bus
FCI	Functional cover interface
FPS	Flash programming tool
FR	Full rate
FSTN	Film compensated super twisted nematic, see also CSTN
GND	Ground, conductive mass
GPRS	General packet radio service
GSM	Global system for mobile communication
Helgo	RF ASIC, small signal RX, TX and synthesizer blocks
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 (Function: IR)
JPEG	Joint photographic experts group (image file format)
LCD	Liquid crystal display
LDO	Low drop out
LED	Light-emitting diode
LPRF	Low power radio frequency (Bluetooth)
MBUS	Nokia specific serial bus
MCU	Micro controller unit

MIC, mic	Microphone
MMC	Multimedia card
NTC	Negative temperature coefficient (temperature sensitive resistor used as a temperature sensor)
OMA	Object management architecture
Opamp	Operational amplifier
PA	Power amplifier
PDA	Pocket data application
PDRAM	Program/Data RAM
Phoenix	Service software tool
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 (Printed circuit board)
RC-filter	Resistance-Capacitance filter
RF	Radio frequency
RFBUS	Serial control bus For RF
RISC	Reduced instruction-set computer
RSK	Right soft key
RS-MMC	Reduced size multimedia card
RSSI	Receiving signal strength indicator
RST	Reset switch
RTC	Real time clock (provides date and time)
RX	Radio receiver
SARAM	Single access random access memory
SDRAM	Synchronous dynamic random access memory
SIM	Subscriber identity module
SMPS	Switched mode power supply
SNR	Signal-to-noice ratio
SPR	Standard product requirements
STI	Serial trace interface
SW	Software
SWIM	Subscriber/Wallet identification module
TCXO	Temperature controlled oscillator
Tiku	See ASIC

TX	Radio transmitter
UEME	Universal energy management chip (enhanced version)
UEMEK	See UEME
UI	User interface
UPP	Universal phone processor
UPP_WD2	Communicator version of DCT-4 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
VSIM	SIM voltage
WD	Watchdog
Zocus	Current sensor (used to monitor the current flow to and from the battery)