Troubleshooting Manual

G705 - W705 - W715

ABOUT

General information

The purpose of this document is to provide enhanced technical information for Sony Ericsson repair technicians in order to assist during service, repair and troubleshooting operations on Sony Ericsson mobile phones. It should be used as a complement to other repair instructions and tools as notified by the local Sony Ericsson representative.

To search for components throughout the entire document use the “search” function in Adobe Acrobat Reader 7.0 (or later version) and enter the component name or other word. Use zoom to enlarge.

For easier navigation of the document you can use the bookmarks that appear in the Bookmarks tab on the left side of the Adobe Acrobat Reader window. Each bookmark jumps to a page in the document.

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Note

When disassembling and reassembling the phone the instructions and processes described in the Mechanical Working Instructions, the Generic Repair Manual and the Repair Center Handbook must be followed.

Revision History

Rev.	Date	Changes / Comments
1	04/01/2009	Initital revision.

G705, W705, W715 Equipment List

Info: More information about the equipment used for TRS can be found on the following location: *CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf or matris.xls – G and W Model Tab.*

Troubleshooting Fixture

Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
Part number: 1222-1854

Note! *More information about the TRS Fixture Kit can be found in the Trouble Shooting Fixtures Setup Instructions document at the end of this manual.*

Dummy Battery

Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
Part number: NTZ 112 533

Note! *The resistance between GND and BDATA should be approximately 120K Ohm.*

Instruments

Power Supply Channel 1 (VBATT)
Agilent 6632B or similar
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Instrument Settings:
Voltage: **3.8 Volt**
Limiter: **2.0 A**

Note! *The Maximal cable length between the Power Supply Channel 1 VBATT and the dummy battery cannot be more than 1m. The cable must have a capacity for at least 16A.*

Power Supply Channel 2 (DCIO/SEPI)
Agilent 6632B or similar
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Instrument Settings:
Voltage: **5.0 Volt**
Limiter: **2.0 A**

Oscilloscope
Agilent DSO7052A or similar
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Digital Multimeter (DMM)
Fluke 83 or similar
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Note! *The 0, 64 mm Test Probes are recommended by Sony Ericsson when the DMM is in use, please see Picture 1.*

Picture 1

Spectrum Analyzer
R&S FSL 9 kHz – 3 GHz or similar
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

RF probe
HP 85024A or similar
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Mobile Phone Tester
Yokogawa VC200 or similar
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

FM Signal Generator
R&S SMC100A or similar
Location: -

RF Adaptor

Adaptor 33 N-BNC-50-1
Adaptor to Signal Generator RF Output
See Picture 2
Location: -

Picture 2

PC Package & PC Software

PC Package (Computer)
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Urquell Fault Trace SW with project file
Location: CSPN – Repair Instructions – Electrical – *G705, W705, W715* – Trouble Shooting
Application – Project File: *G705, W705, W715* Project_R1A

Drivers
SEPI BOX Drivers
Location: http://emma.extranet.sonyericsson.com /– Drivers – DSS / SEPI / SEMUTS

SE Communication Interface SEPI BOX
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
Part number: LTN 214 1484
See Picture 3.

Picture 3

Cables

USB Computer Cable
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
See Picture 4.

Picture 4

DSU-60 / USB Cable
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
Part number: KRY 101 1413

RF Test Cable Flexible
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
Part number: RPM 119 885
See Picture 5.

Picture 5

SEPI Interface Cable – A1
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
Part number: KRY 101 1119/1
See Picture 6.

Picture 6

Power Cable RED to Power Supply Channel 1 (VBATT)
Maximum Length: 1m
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Power Cable BLACK to Power Supply Channel 1 (VBATT)
Maximum Length: 1m
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Customized Power Supply Channel 2 Cable (DCIO/SEPI)
Customize the cable according to following instructions below:
(*Step 1, Step 2, Step 3 and Step 4)*

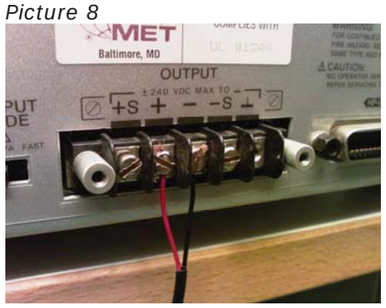
Step 1:
Take the CST-75 battery charger and cut off the charger according to Picture 7.

Picture 7

Note! *The Cable length must be exactly 1.3m.*

Step 2:
Connect the CST-75 charger Red or White wire to the Plus Output and the Black wire to the Minus (GND) Output at backside of the Power Supply Channel 2 (DCIO/SEPI) according to Picture 8.

Picture 8



Step 3:
Cut off insulating material from the inside of the charger plug according to Picture 9.

Picture 9

Step 4:
Connect DCIO Cable and SEPI Interface Cable – A1 according to Picture 10.

Picture 10

Picture 11

Note! *This setup is wrong.*

Connection Instructions for the Dummy Battery

This is the correct setup when a Dummy Battery is in use.
See Pictures 12 and 13.

Picture 12

Picture 13

Customized FM Radio Cable

Step 1:
Use the Test lead BNC-4mm 1,5m Cable, see Picture 14.

Picture 14

Product Name: Test lead BNC-4mm 1,5m
Product Description: Test lead with 4 mm lab plugs at one end and a BNC plug at the other.
Manufacturer: PMK Germany

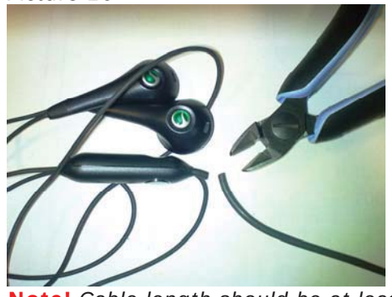
Location: http://www.elfa.se/en/ or other supplier.
Part number: 46-310-40
Note! *This is the ELFA part number.*

Step 2:
Cut the Red Lab Plug connector according to Picture 15.

Picture 15

Step 3:
Use any Hands-Free (PHF) Cable and cut it according to Picture 16.

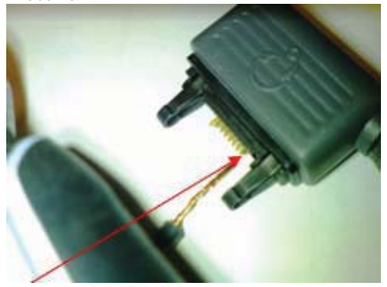
Picture 16



Note! *Cable length should be at least 40cm.*

Step 4:
Use only the Wire that is connected to PIN2 and cut out all the others according to Picture 17.

Picture 17



Note! *Use DMM instrument to ensure which of the wires are connected to PIN2 at Hands-Free (PHF) system connector plug.*

Step 5:
Connect the Cable from the Picture 15 and Cable from the Picture 17 according to Picture 18.

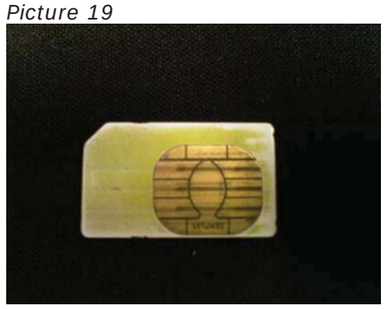
Note! *Use a soldering iron for this action and after that use insulating material to protect the contact point.*

Picture 18

Test Cards

Local SIM
Any functional Local SIM Card
See Picture 19.

Picture 19



Test SIM GSM/UMTS
One Test SIM GSM/UMTS is needed to perform Current Consumption Test, see Picture 20.
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf

Note! *To buy a Test SIM GSM/UMTS, please contact your supplier of test equipment.*

Picture 20

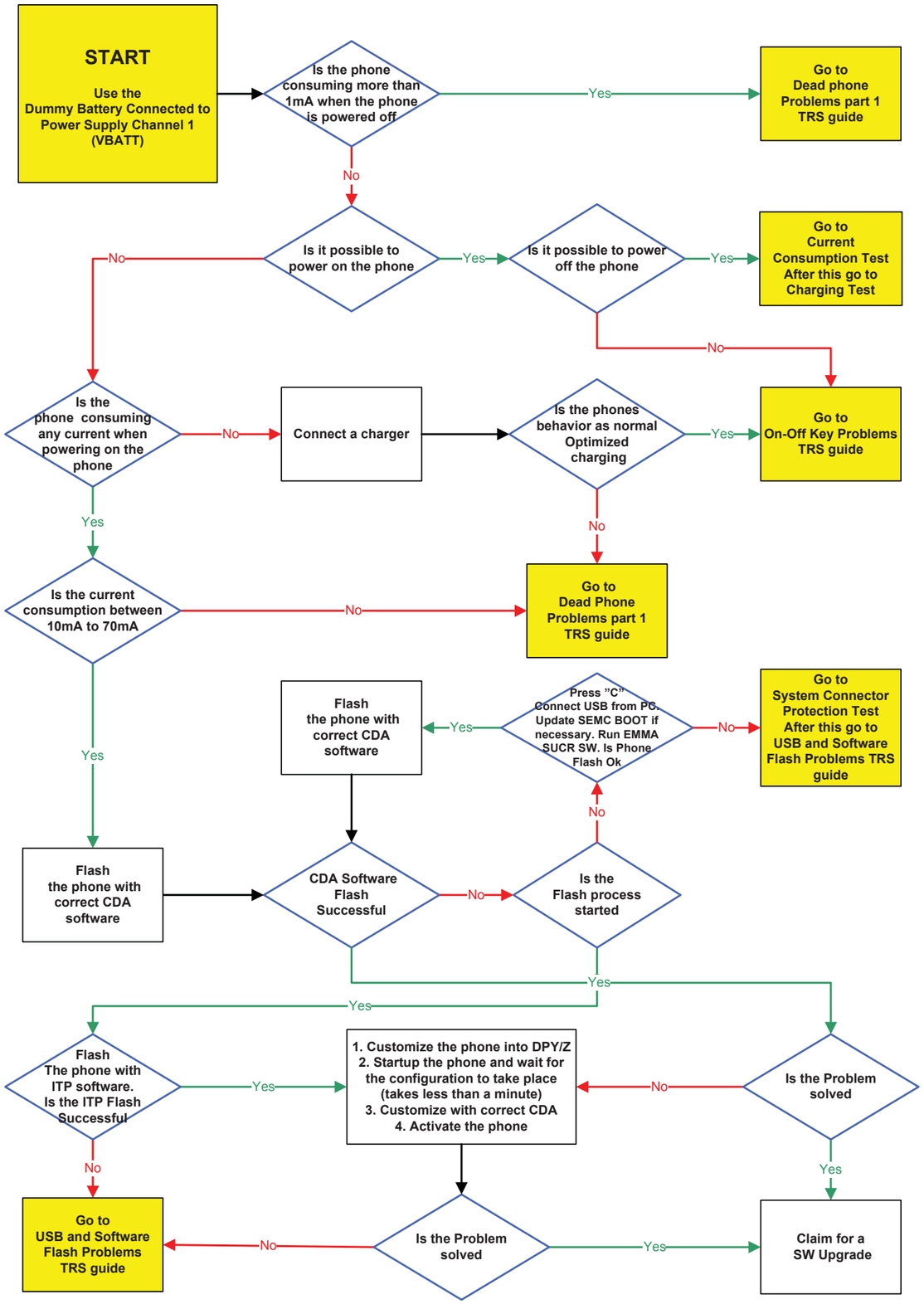
Sony Memory Stick M2
Any functional Memory Stick Micro M2 Card
See Picture 21.

Picture 21

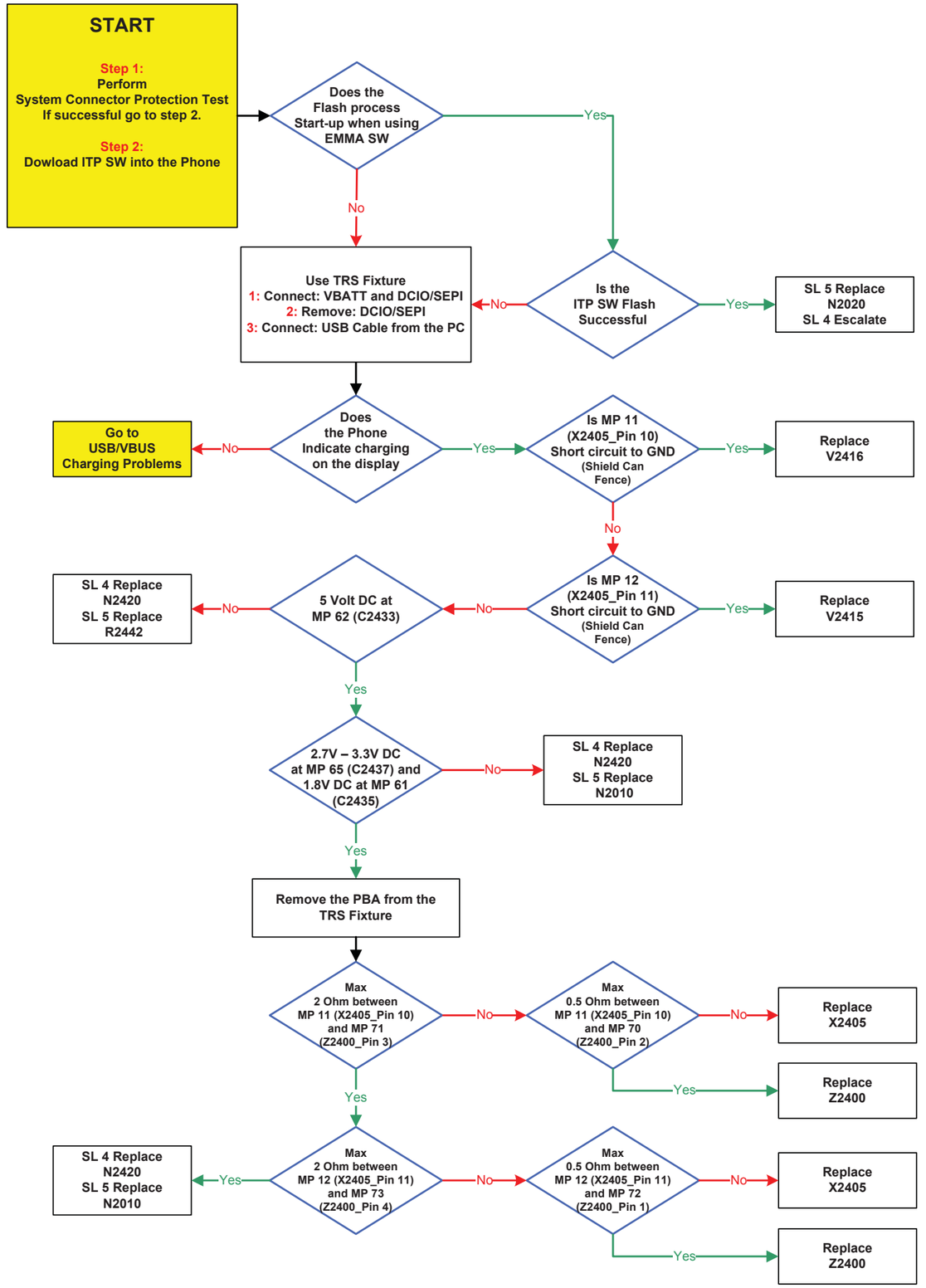
SMK RF Probe
Location: CSPN – Repair Instructions – Mechanical – Tool Catalogue – RepairToolsCatalogue.pdf
Part number: SXA 109 6356
See Picture 22.

Picture 22

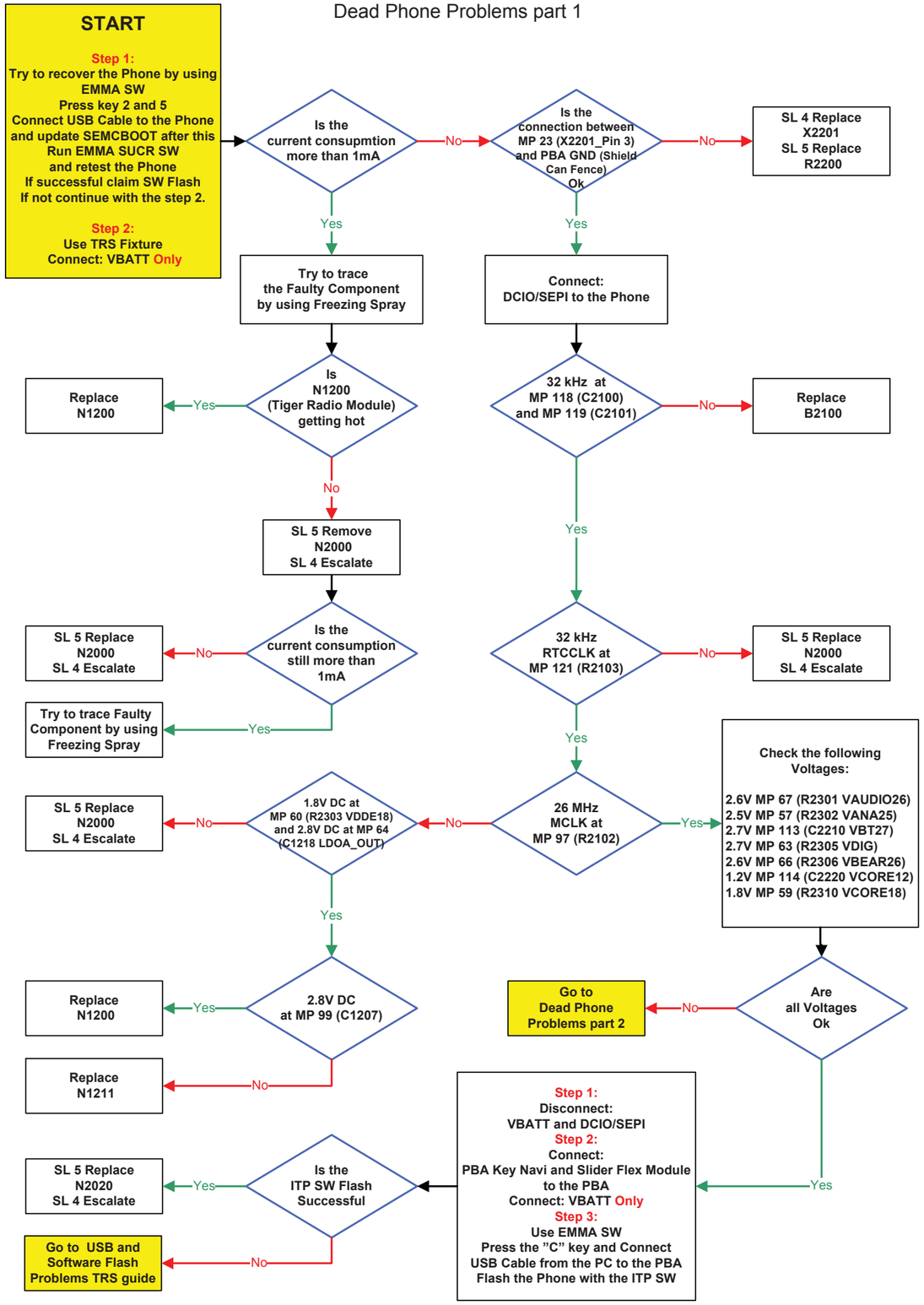
Power On/Off Problems



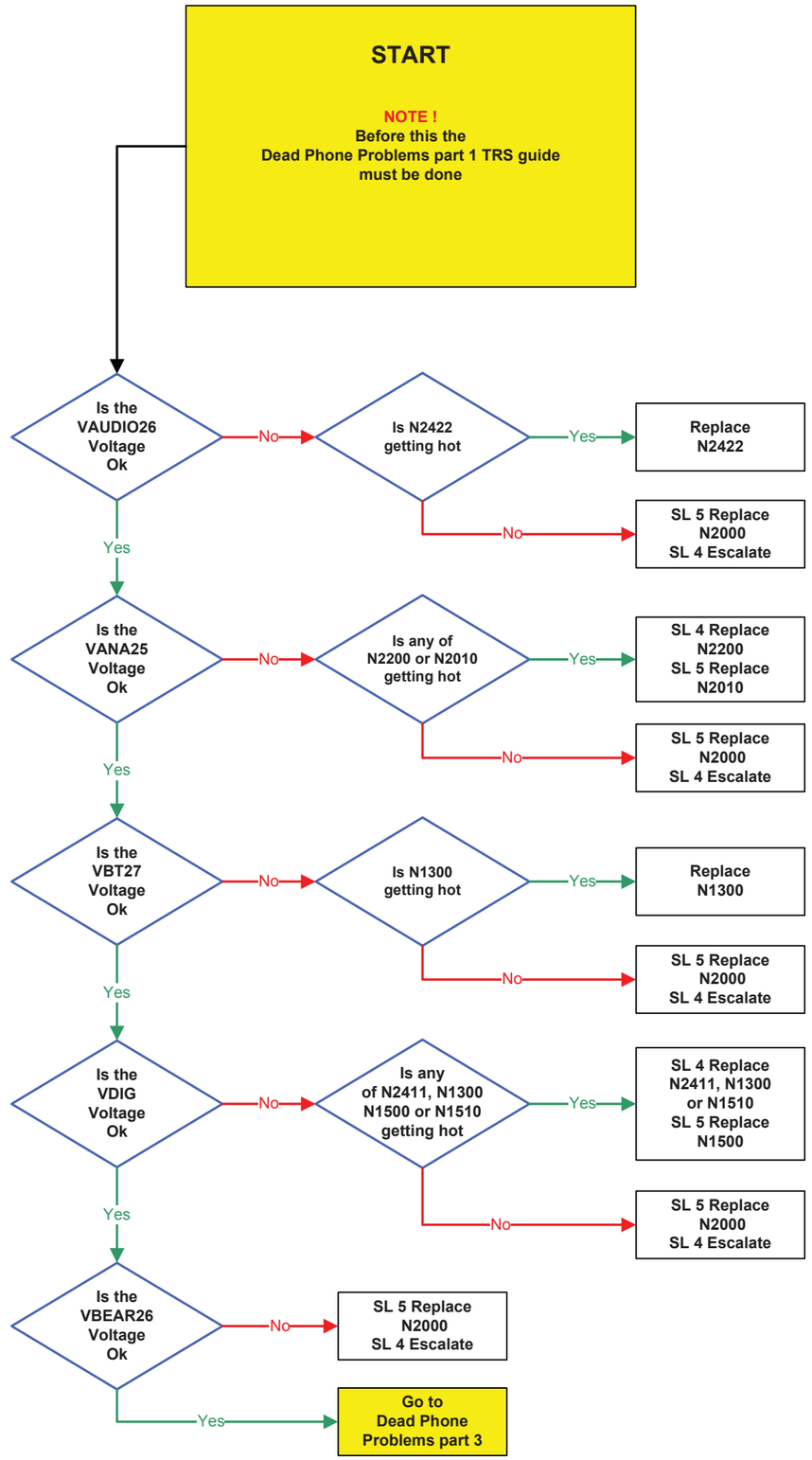
USB and Software Flash Problems



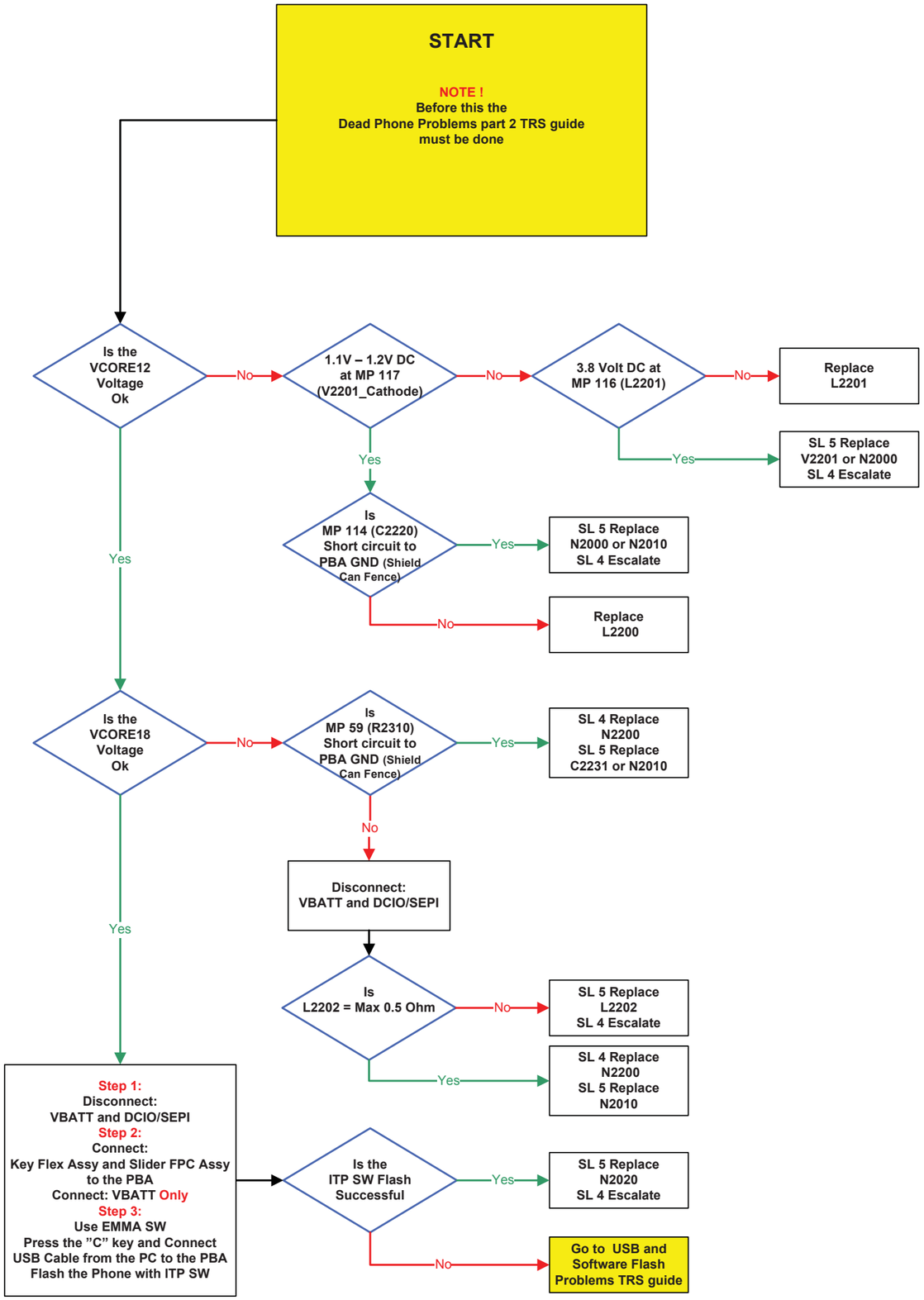
Dead Phone Problems part 1



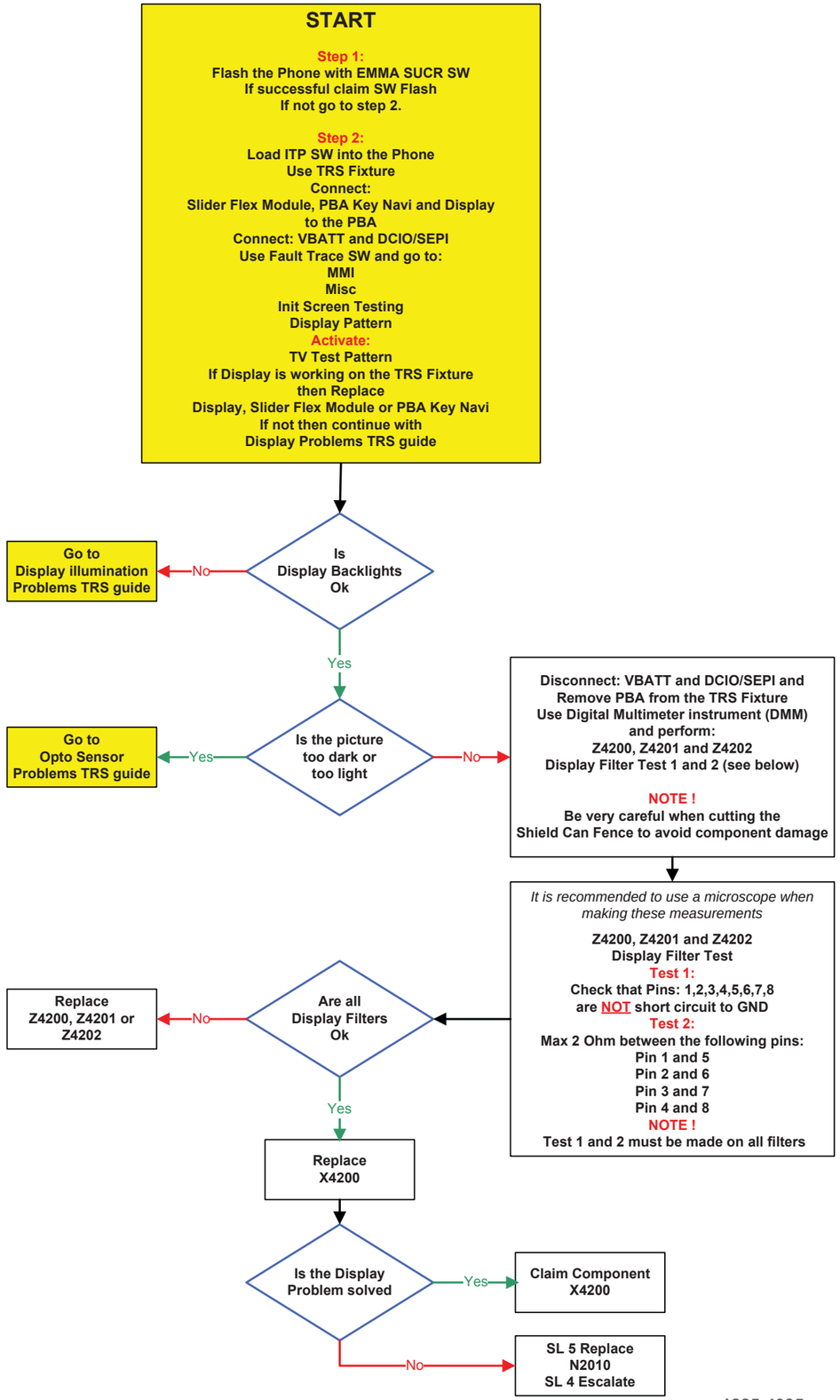
Dead Phone Problems part 2



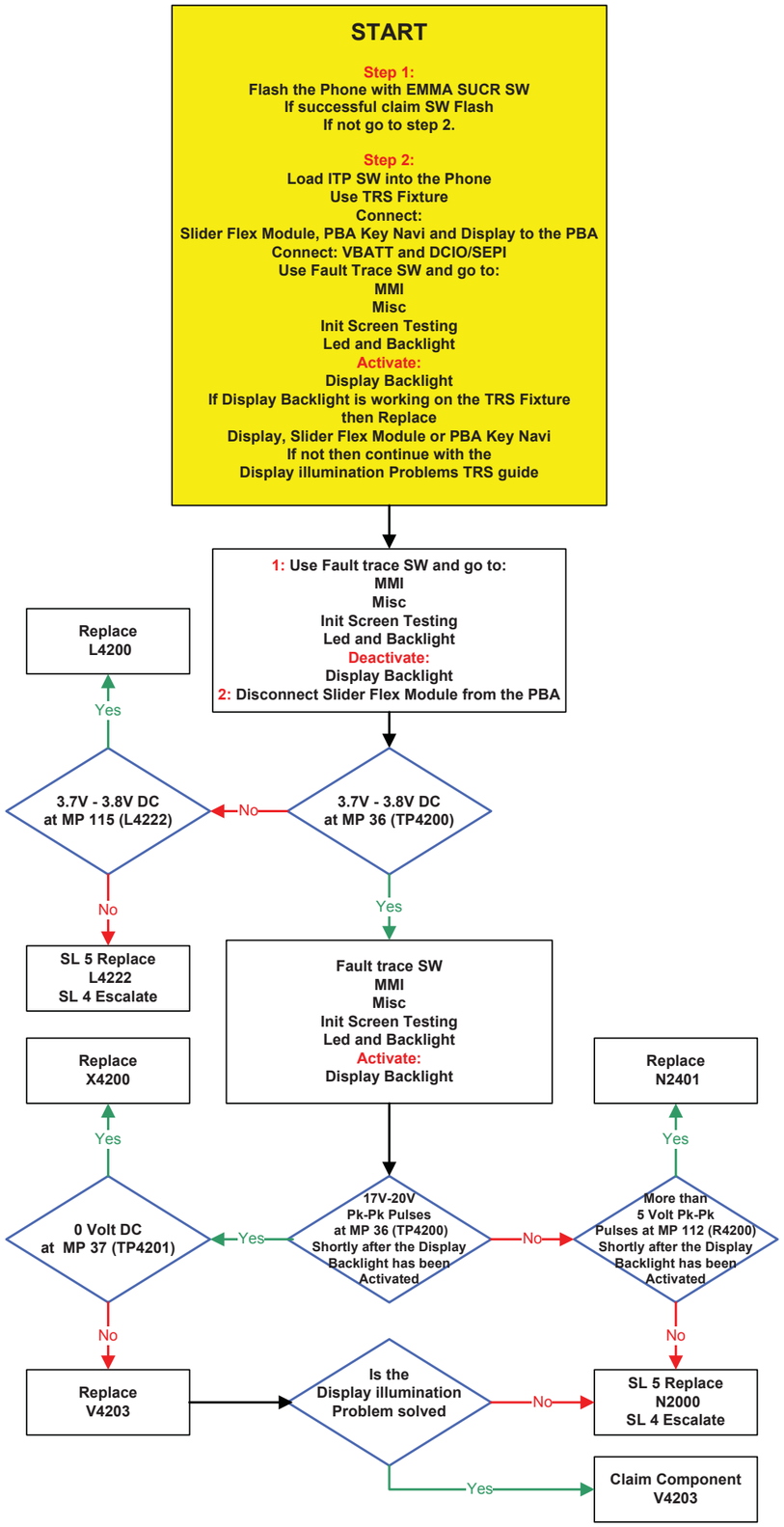
Dead Phone Problems part 3



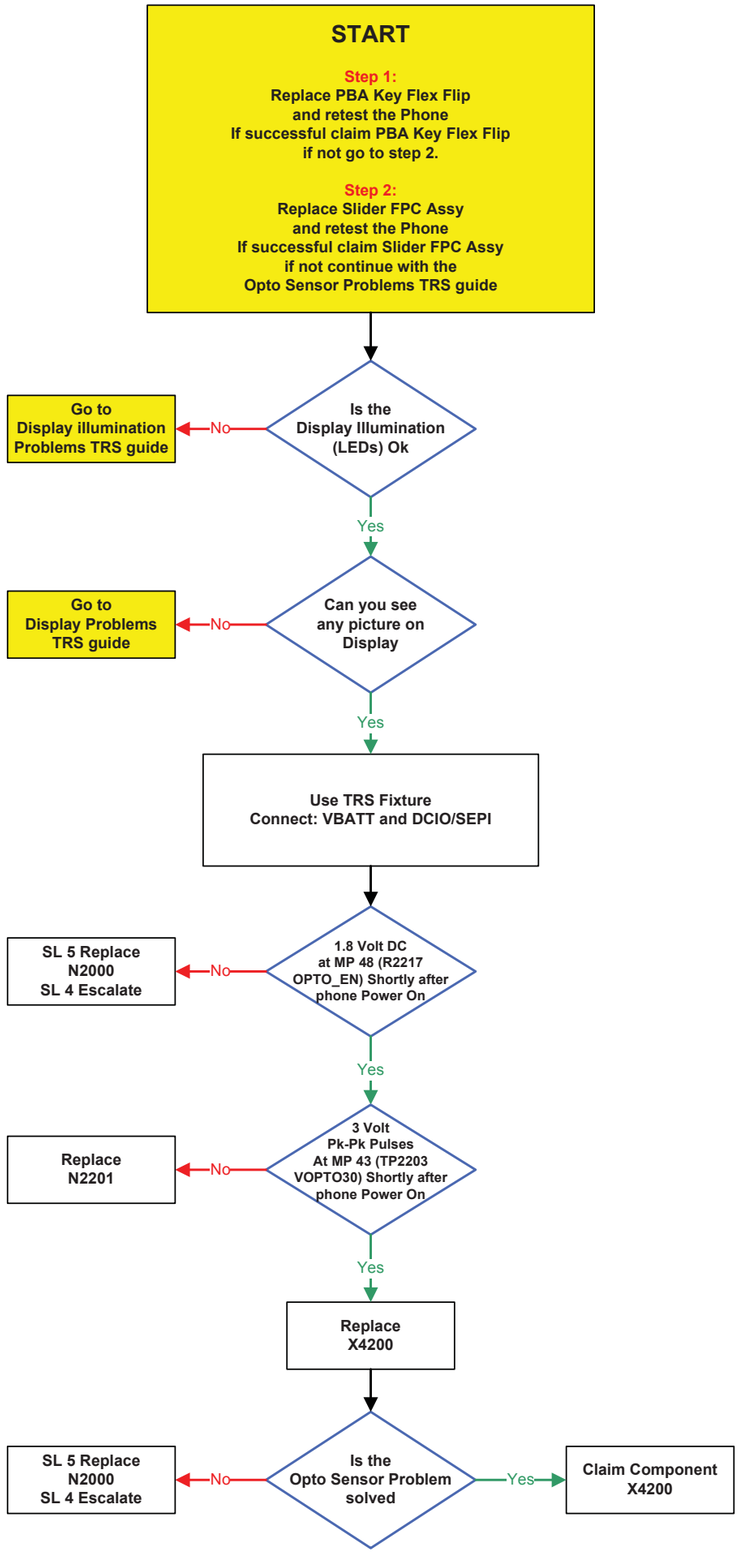
Display Problems



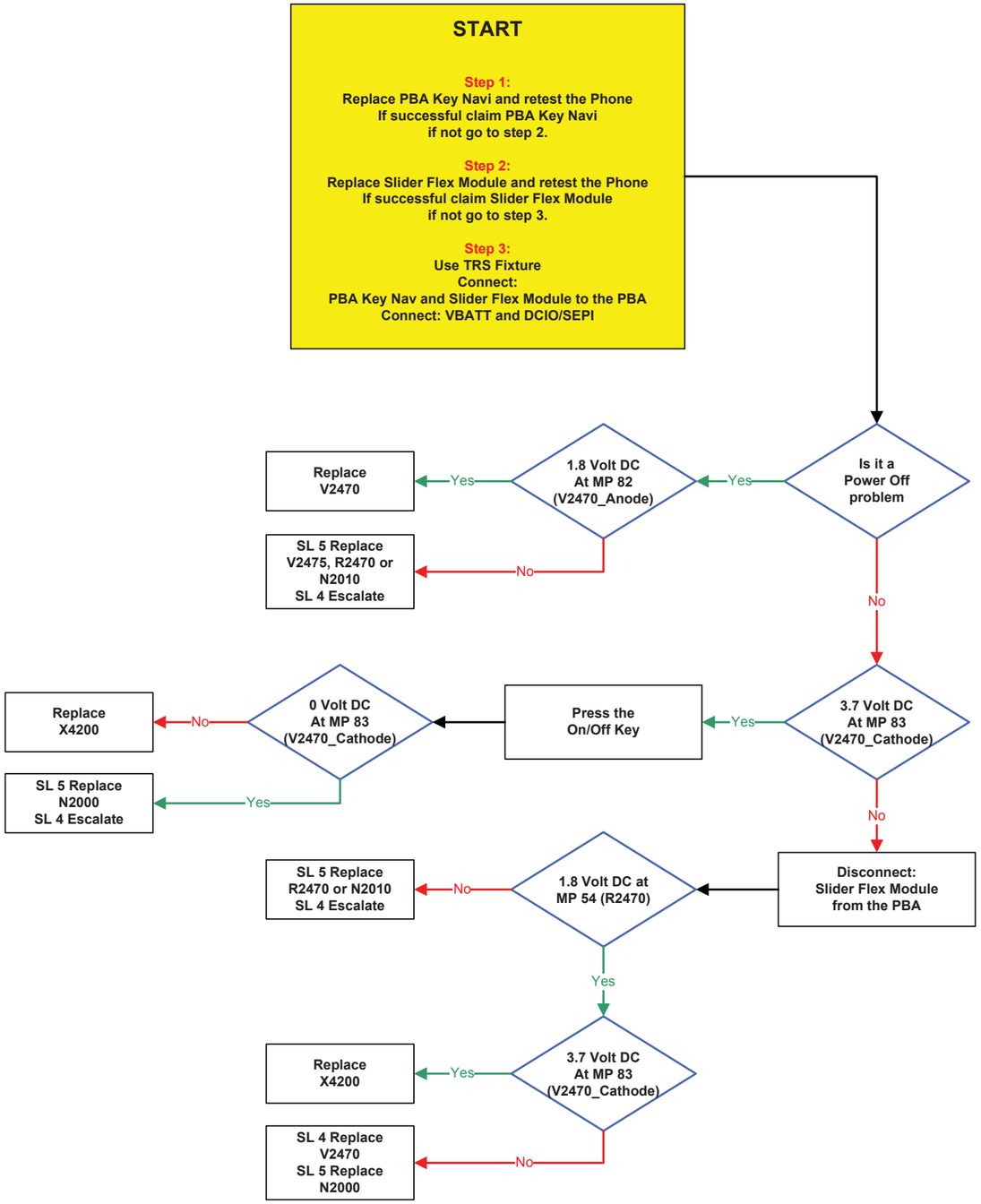
Display Illumination Problems



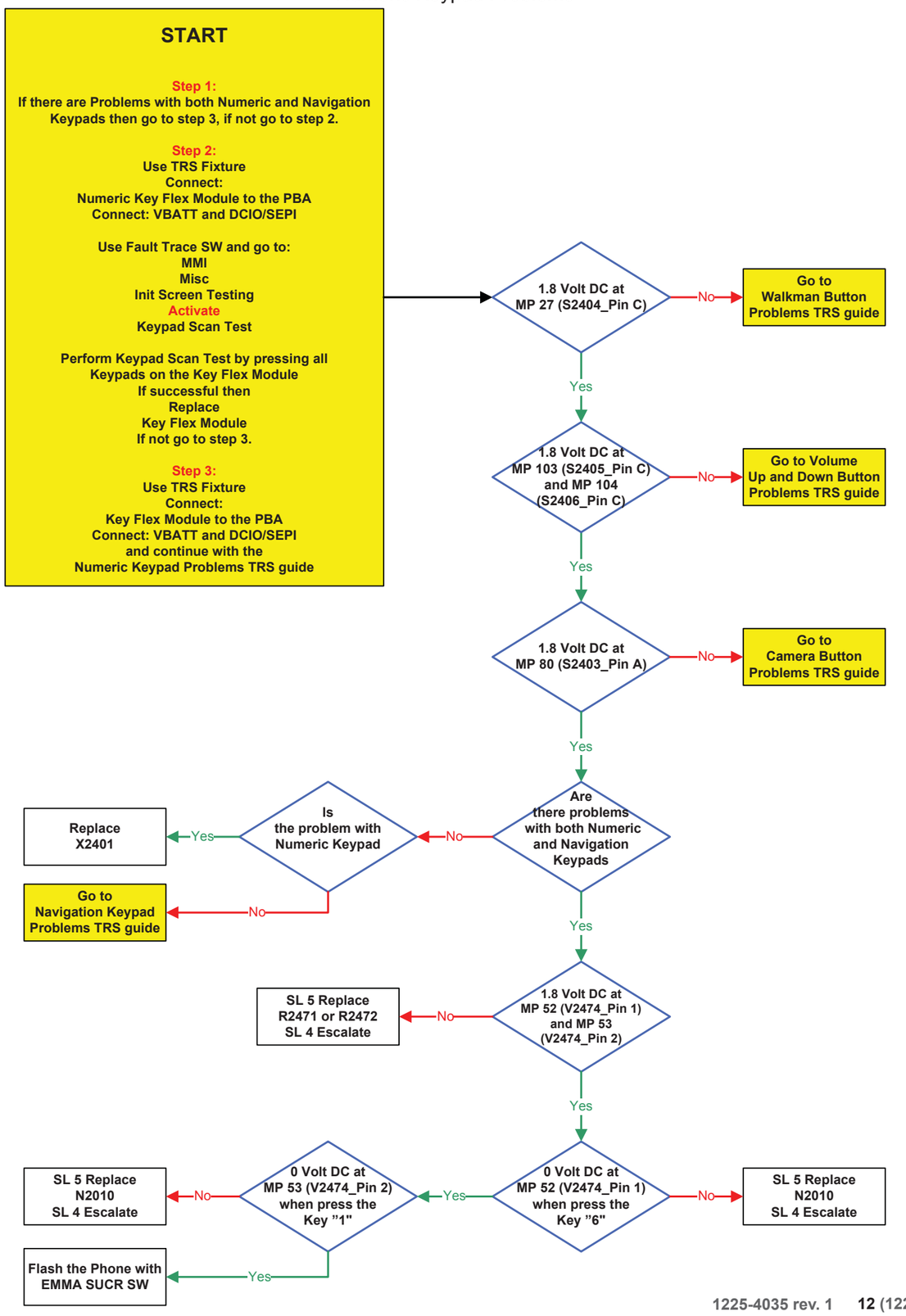
Opto Sensor Problems



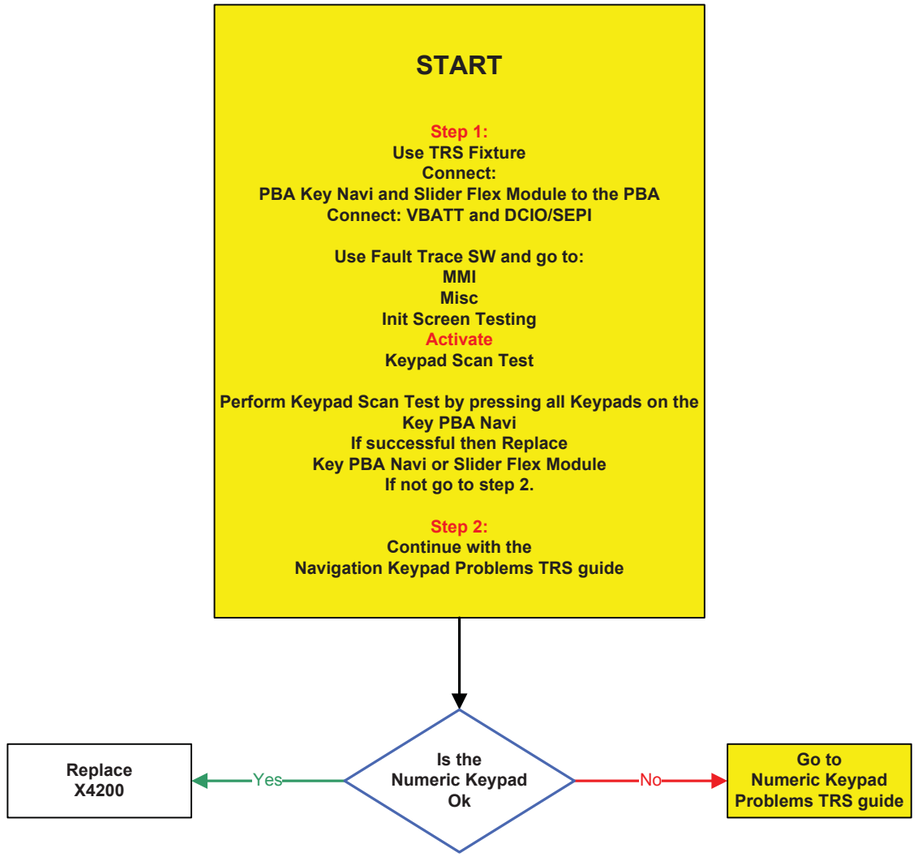
On-Off Key Problems



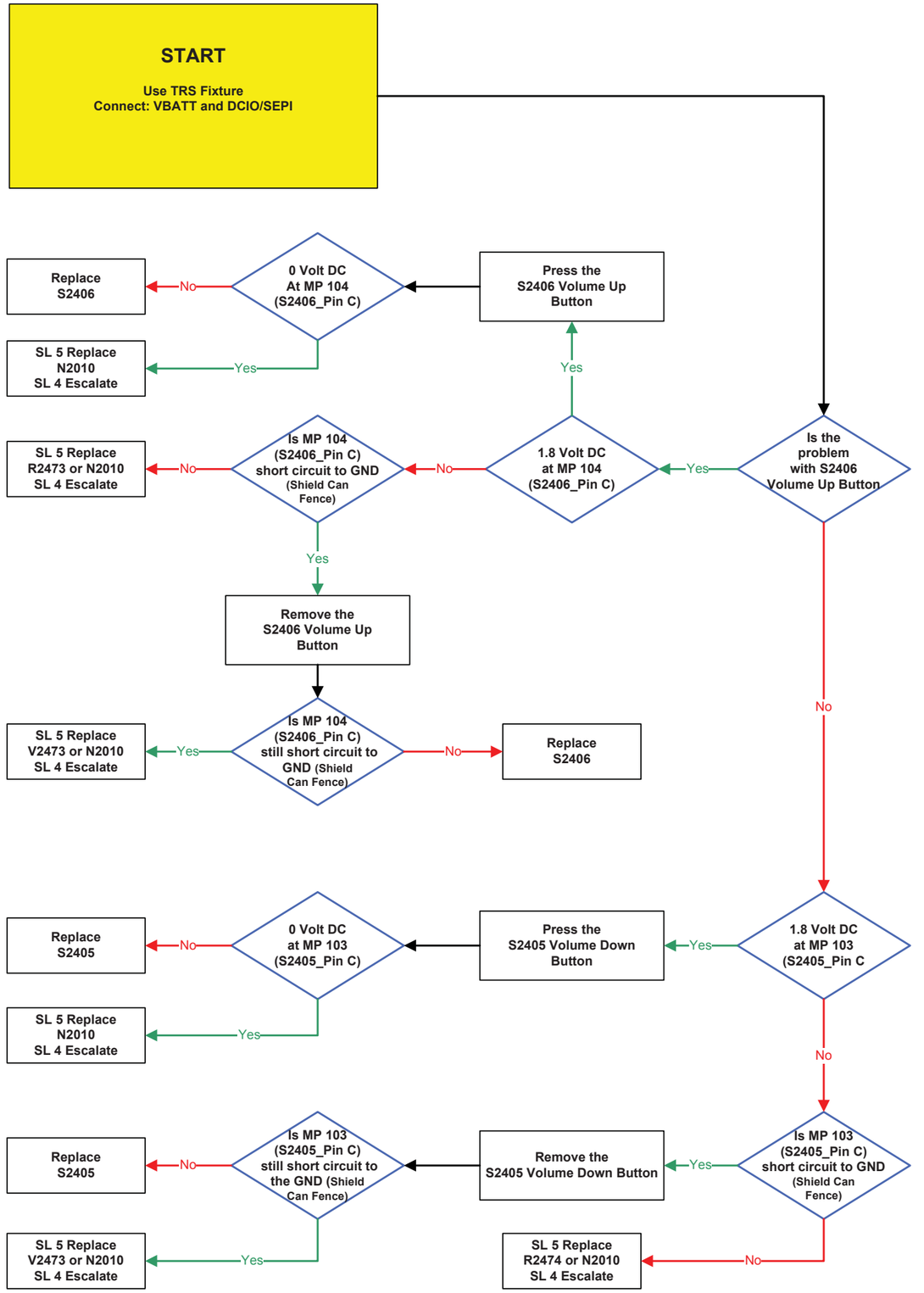
Numeric Keypad Problems



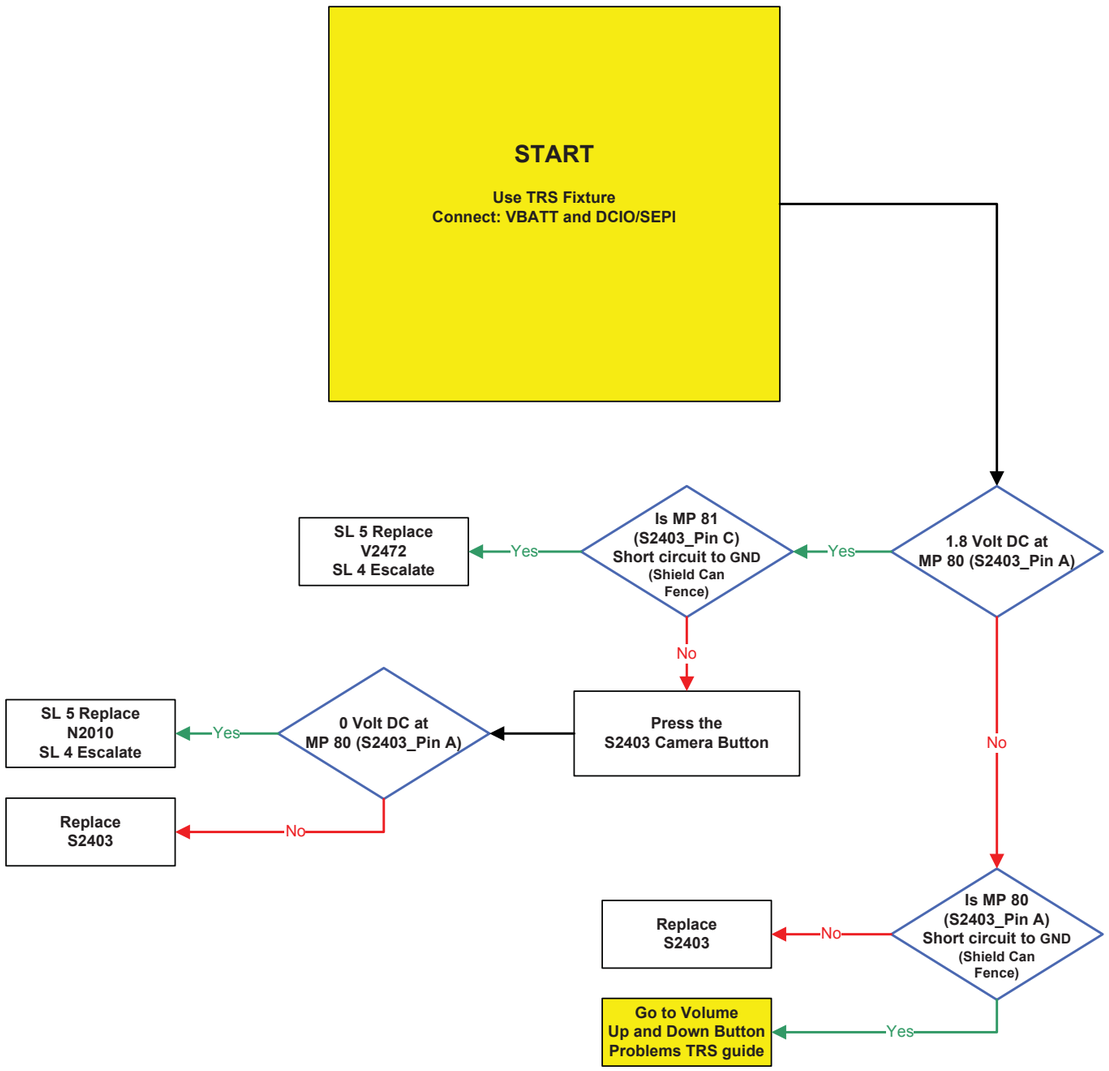
Navigation Keypad Problems



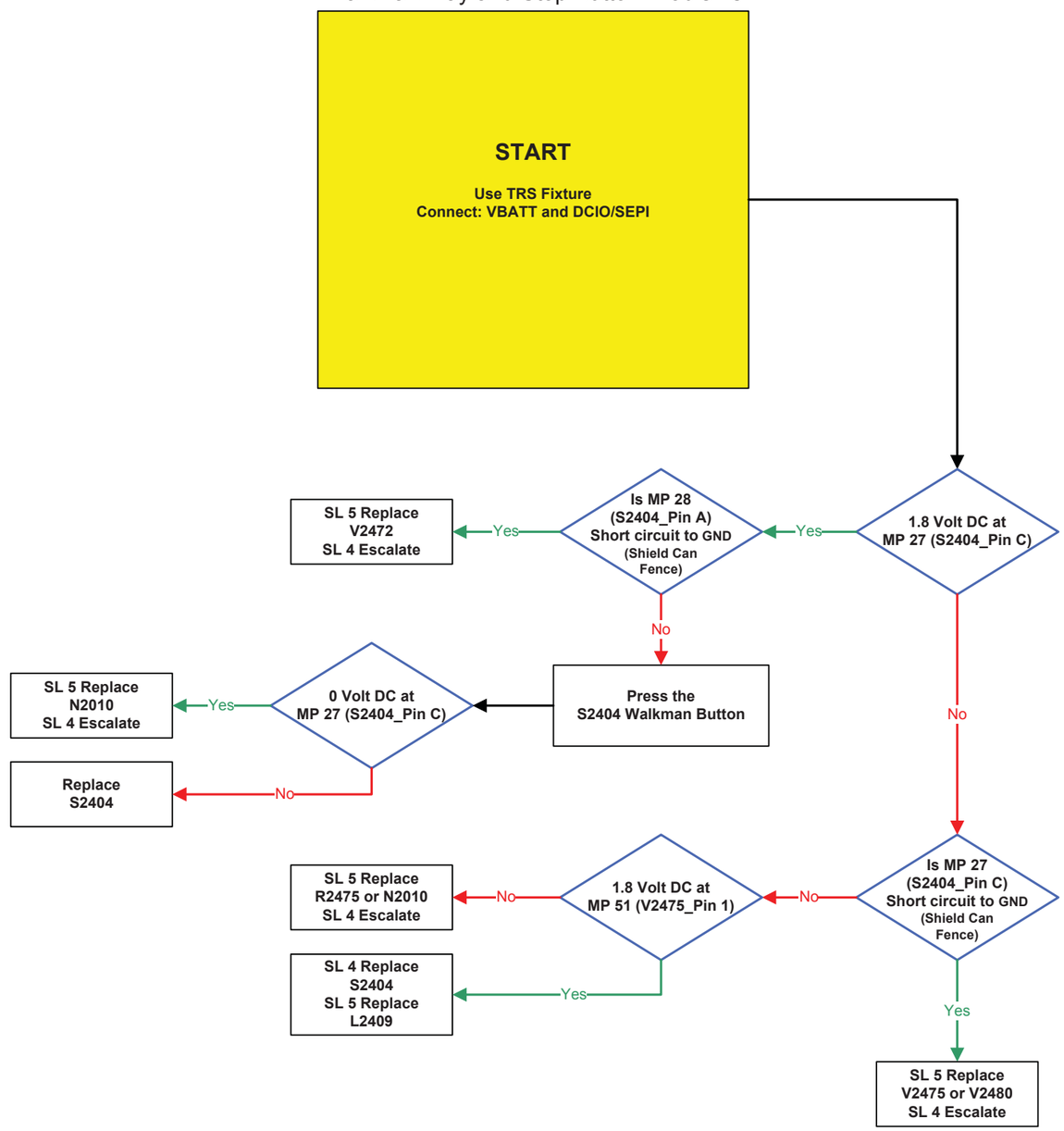
Volume Up and Down Button Problems



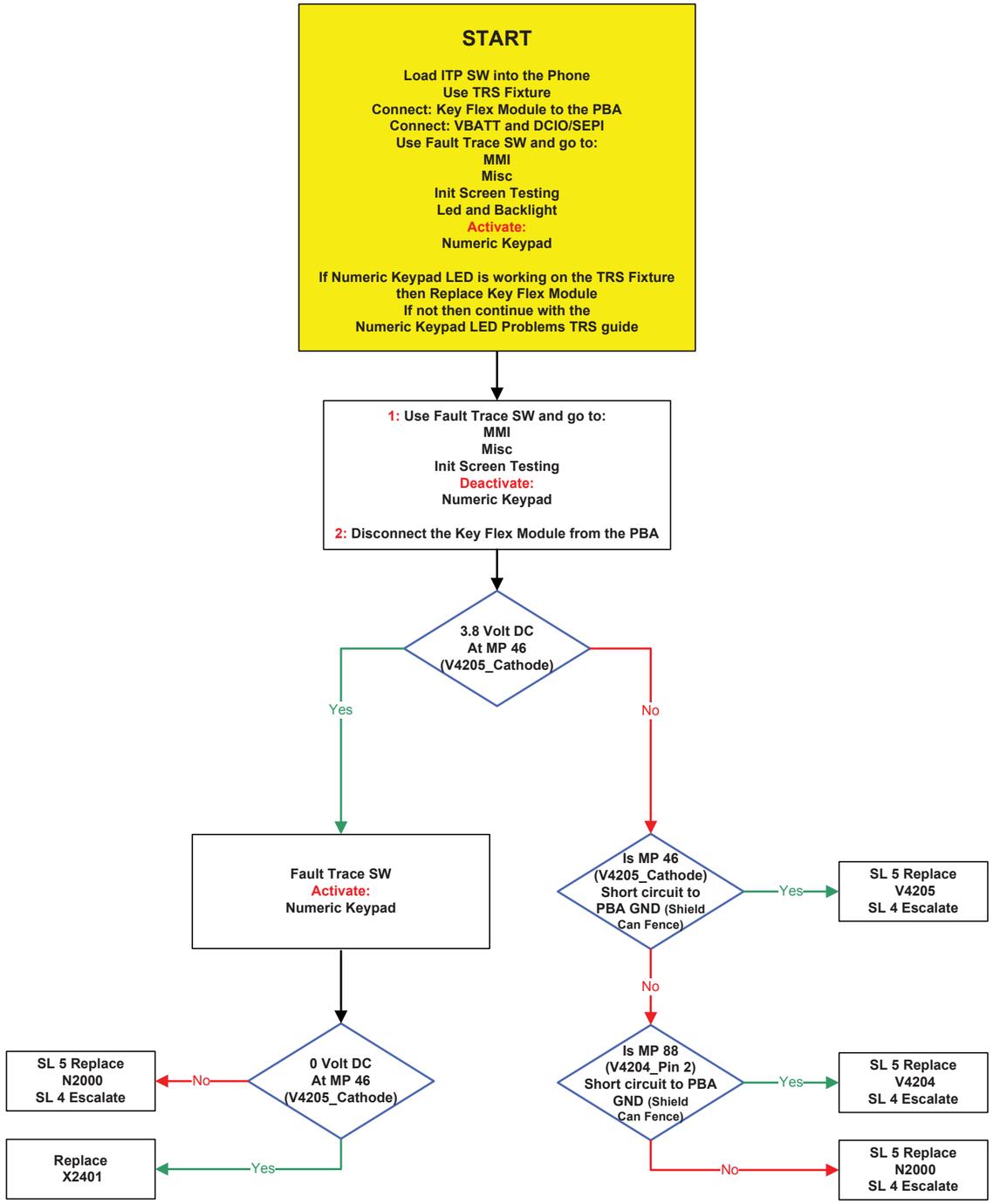
Camera Button Problems



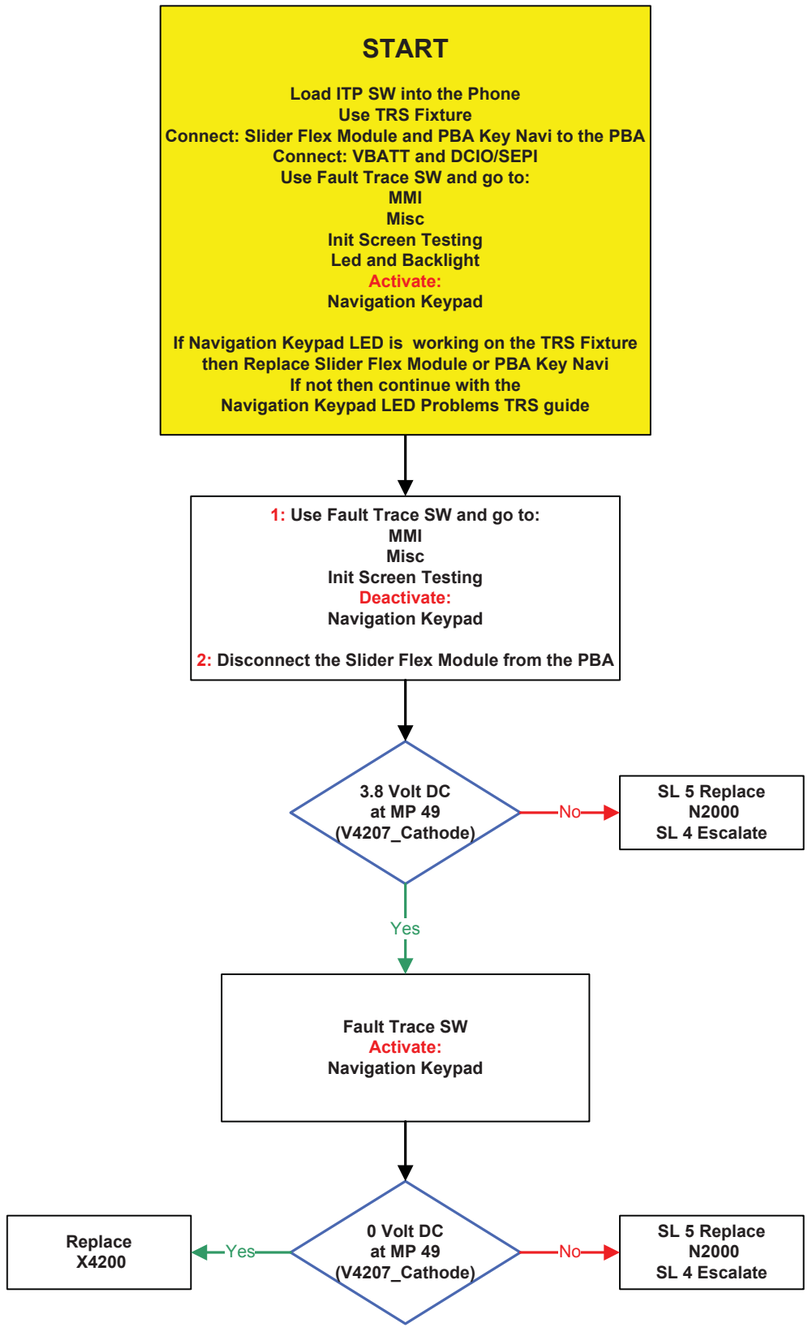
Walkman/Play and Stop Button Problems



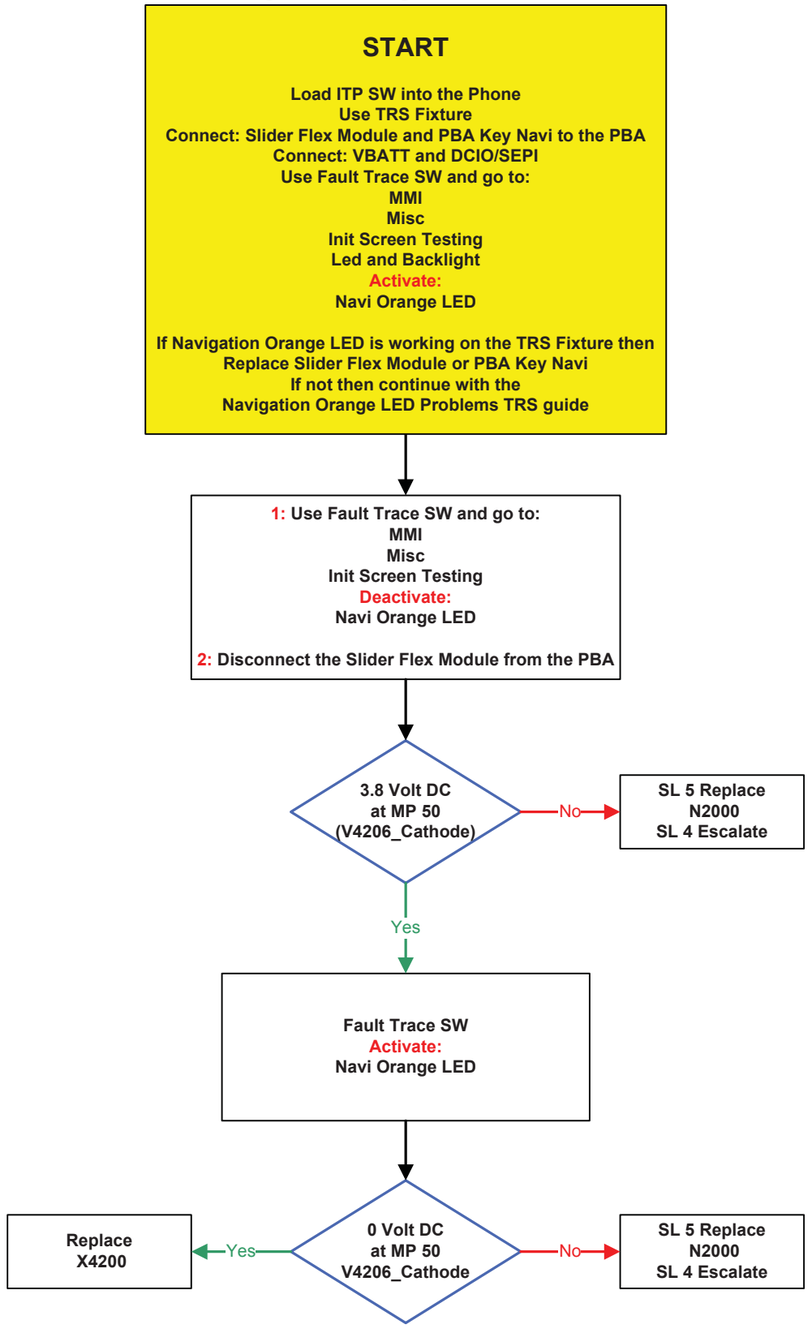
Numeric Keypad LED Problems



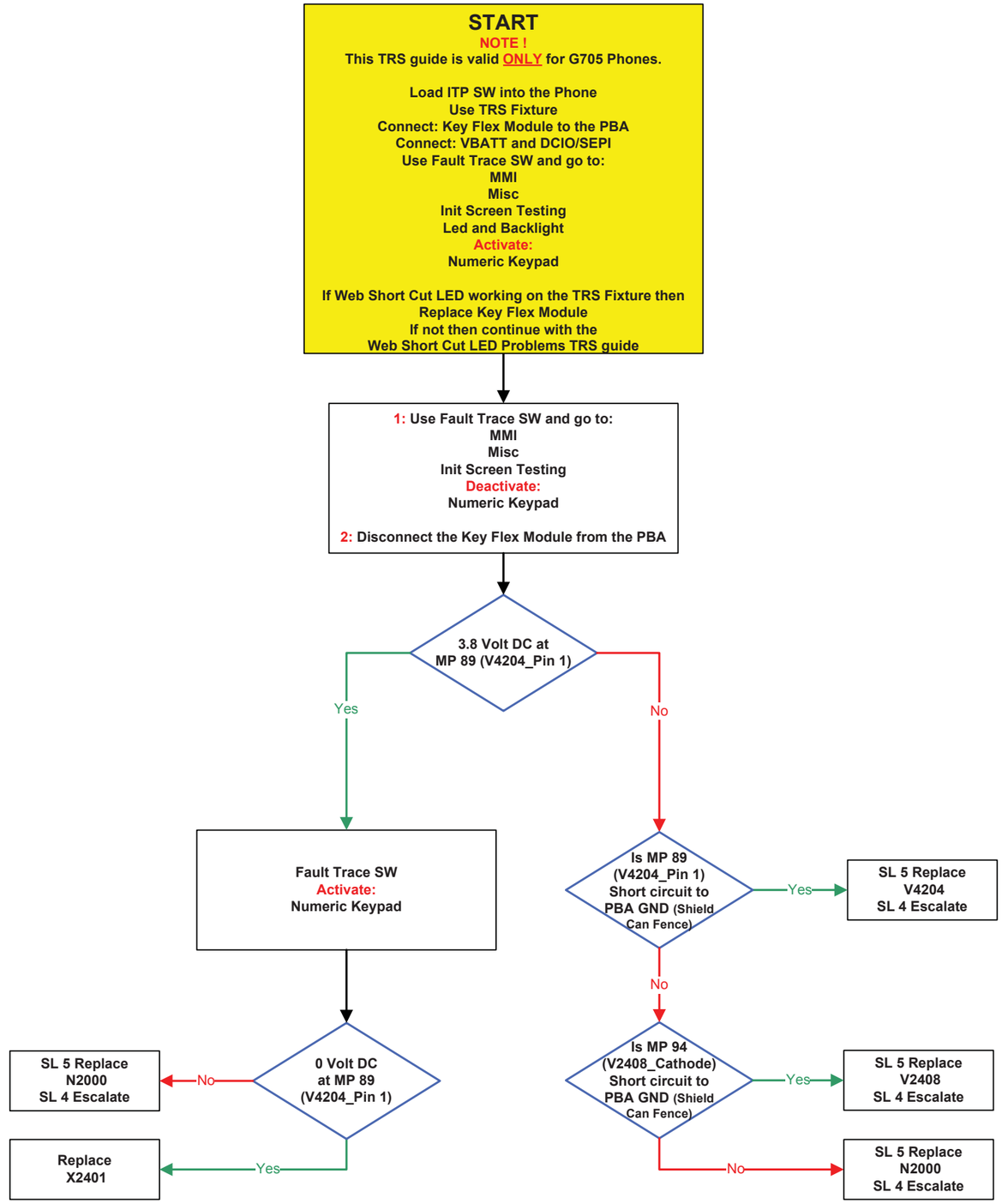
Navigation Keypad LED Problems



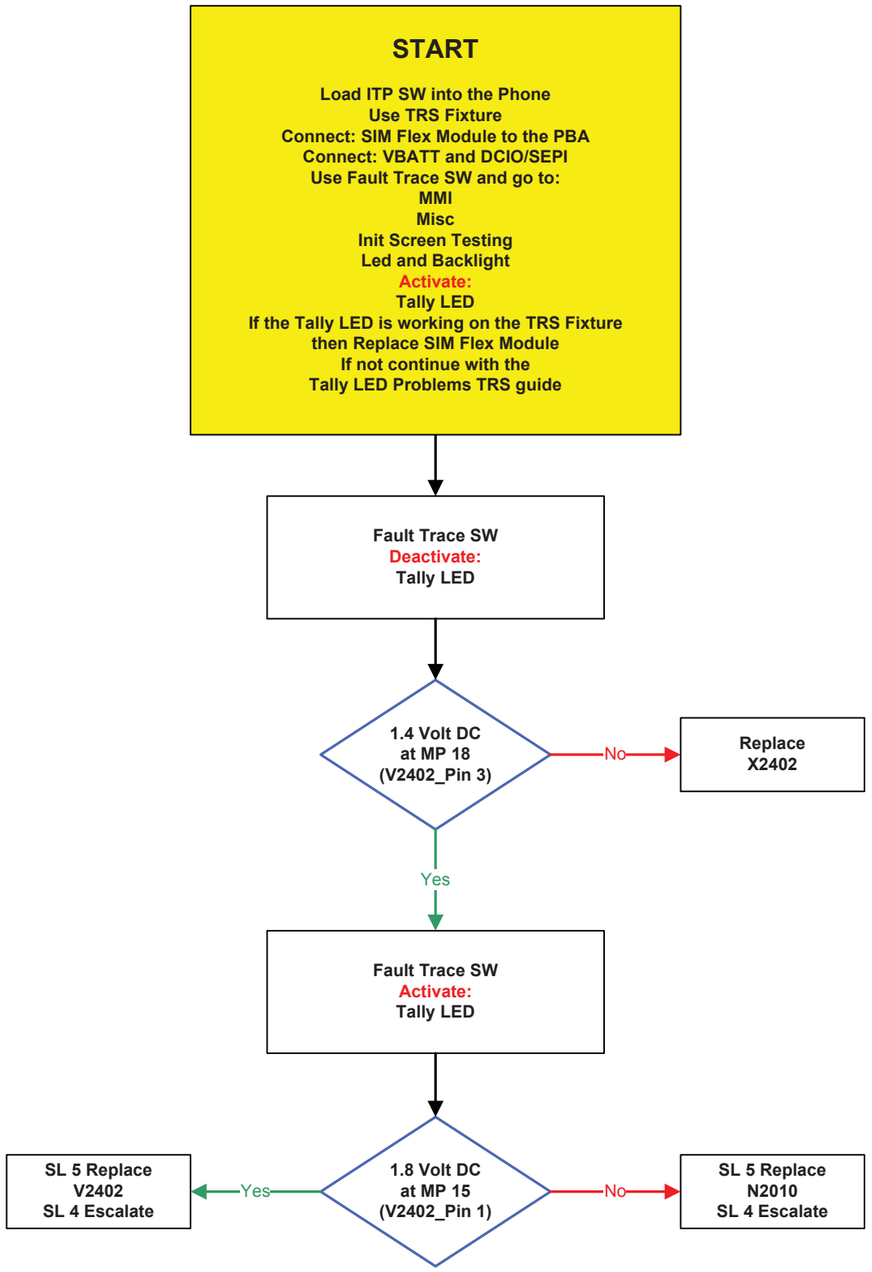
Navigation Orange LED Problems



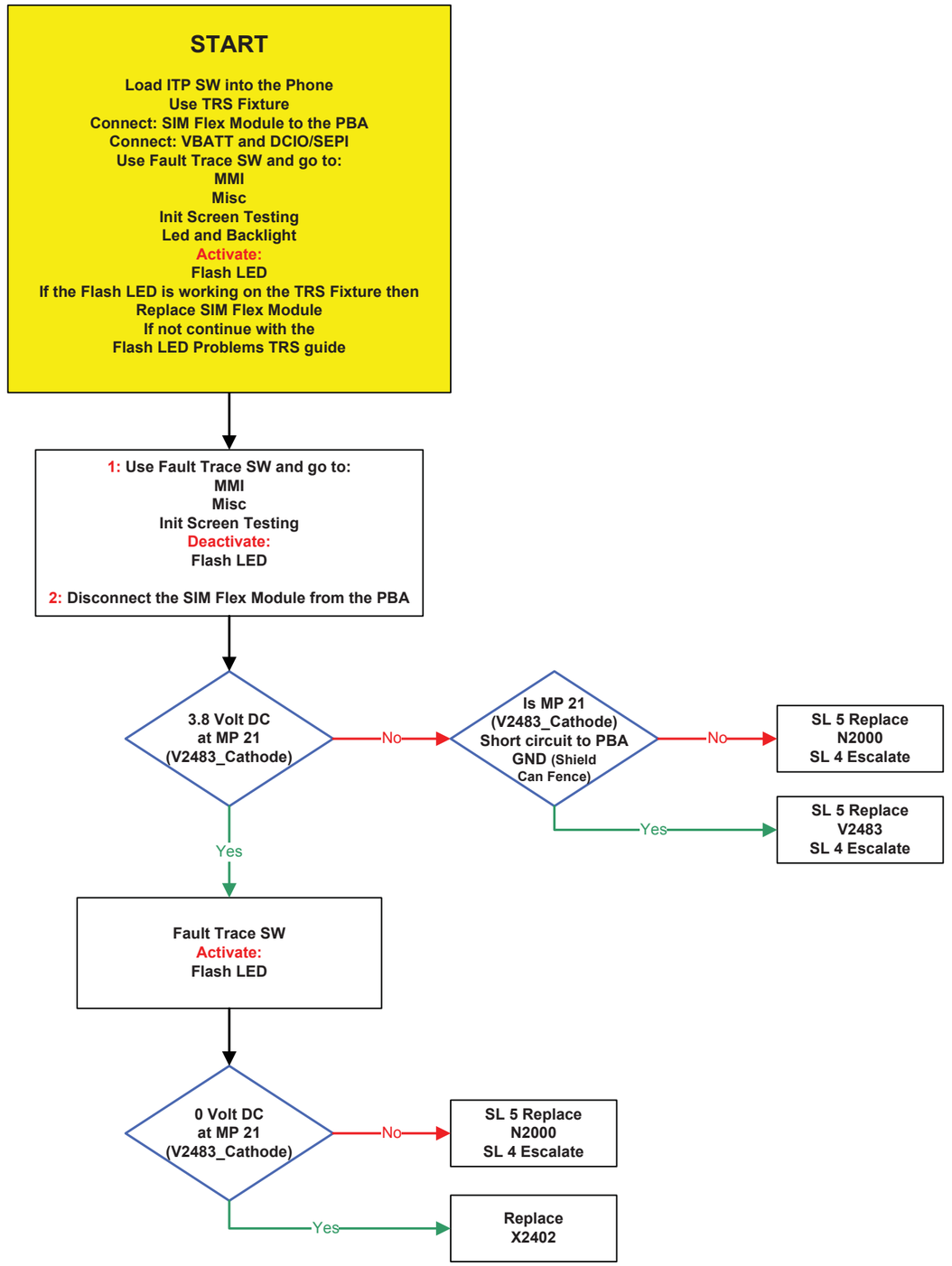
Web Short Cut LED Problems



Tally LED Problems



Flash LED Problems



Trickle Charge LED Problems

START

Load ITP SW into the Phone
Use TRS Fixture
Connect: PBA Key Navi and Slider Flex Module to the PBA
Connect: VBATT and DCIO/SEPI
Use Fault Trace SW and go to:
MMI
Misc
Init Screen Testing
Led and Backlight
Activate:
Charge LED
If the Trickle Charge LED is working on the TRS Fixture then Replace PBA Key Navi or Slider Flex Module
If not continue with the Trickle Charge LED Problems TRS guide

↓

SL 4 Replace X4200
SL 5 Replace N2000

Main Camera Problems

START

Flash the Phone with EMMA SUCR SW and go to
Service Tests Menu
Perform Main and VGA Camera Tests
If both tests are successful then claim SW Flash
If not then continue with the Main Camera Problems TRS guide

Info:
The Main Camera is the same as Camera
The VGA Camera is the same as Video call camera

Is the Problem with both Main and VGA Camera
- No → Is the VGA Camera Ok
  - No → Go to VGA Camera Problems TRS guide
  - Yes → Is X4300 Damaged / Bad connection
    - Yes → Replace X4300
    - No → Replace Main Camera 3.2 Mpixel CMOS → Is the Main Camera Ok
      - Yes → Claim Main Camera 3.2 Mpixel CMOS
      - No → Replace N2203
- Yes → 1: Load ITP SW into the Phone
2: Use TRS Fixture
Connect: VBATT and DCIO/SEPI
3: Use Fault Trace SW and go to:
MMI
Misc
Init Screen Testing
Activate:
Main Camera Test

NOTE !
The Main Camera 3.2 Mpixel CMOS must be mounted inside the X4300 when performing this TRS guide.

NOTE !
Ignore this messages if they appear in the Trace window (In the right corner of the Fault Trace SW)
"...timeout when reading" and
"Error_CommandFailed, ERR"

→ 1.8 Volt DC at MP 40 (TP2214)
- Yes → Replace N2203
- No → 2.8 Volt DC at MP 38 (TP2213) And 1.8 Volt DC at MP 26 (TP2215)
  - Yes → Replace N2204
  - No → Use Fault Trace SW and Repeat the Main Camera Test → More than 2 Volt Pk-Pk Pulses at MP 31 (R2282) Shortly after the Main Camera Test has been activated
    - No → SL 5 Replace N2010 SL 4 Escalate
    - Yes → 13 MHz CAMSYSCLK at MP 32 (R4303) Shortly after the Main Camera Test has been activated
      - Yes → SL 4 Replace N2203 or N2204 SL 5 Replace N2010
      - No → SL 5 Replace L2100 or N2010 SL 4 Escalate

VGA Camera Problems

START

Step 1:
Flash the Phone with EMMA SUCR SW and go to Service Tests Menu
Perform the: Main and VGA Camera Tests
If the tests are successful then claim SW Flash
if not go to step 2.

Step 2:
Load ITP SW into the Phone and go to step 3.

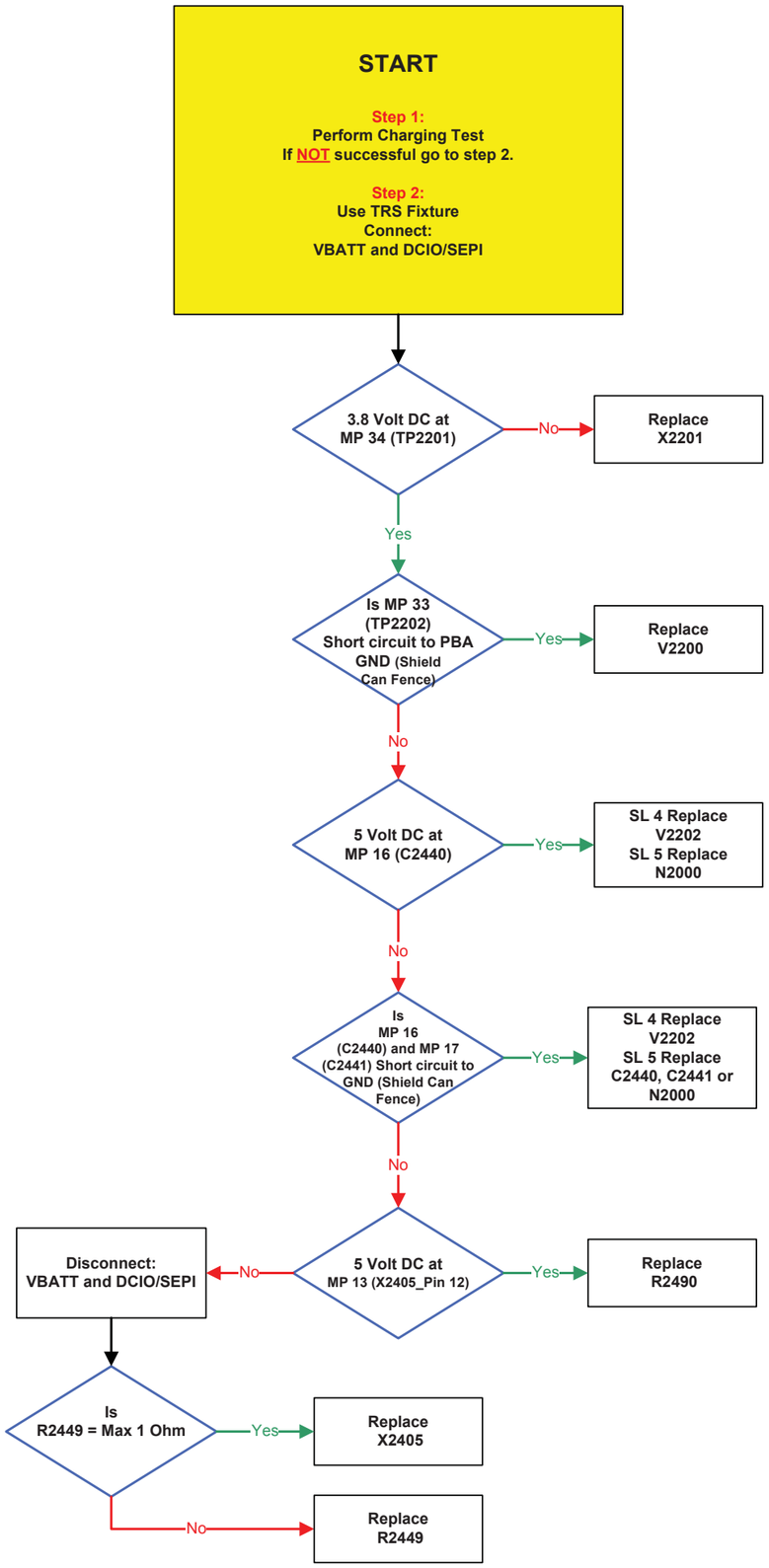
Step 3:
Use TRS Fixture
Connect: Slider Flex Module, PBA Key Navi and Display to the PBA
Connect: VBATT and DCIO/SEPI
Use Fault Trace SW and go to:
MMI
Misc
Init Screen Testing
Activate:
VGA Camera Test

If the VGA Camera is working properly on the TRS Fixture then Replace Slider Flex Module
If not then continue with the VGA Camera Problems TRS guide

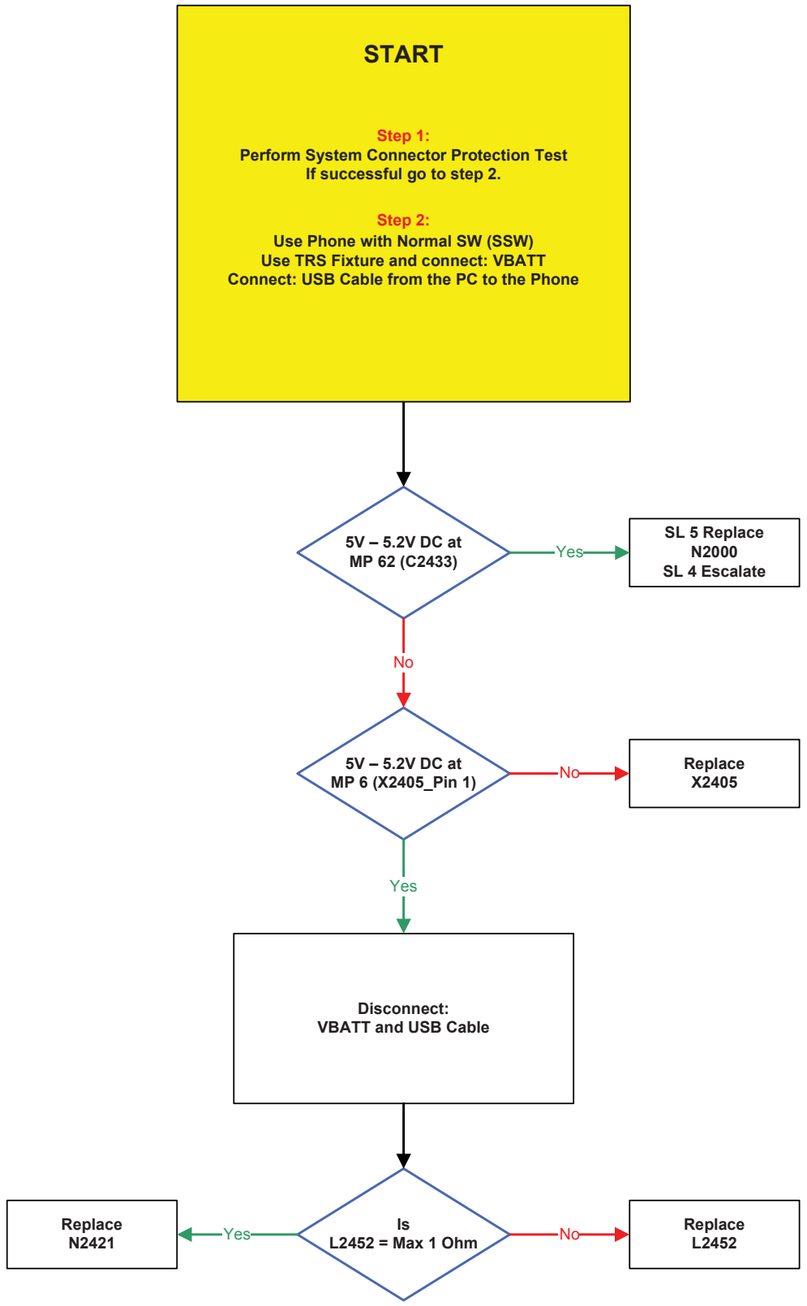
(Info: The Main Camera is the same as Camera
The VGA Camera is the same as Video call camera)

Is the Main Camera Ok
- Yes → SL 4 Replace X4200 SL 5 Replace N2600 or N2010
- No → Go to Main Camera Problems TRS guide

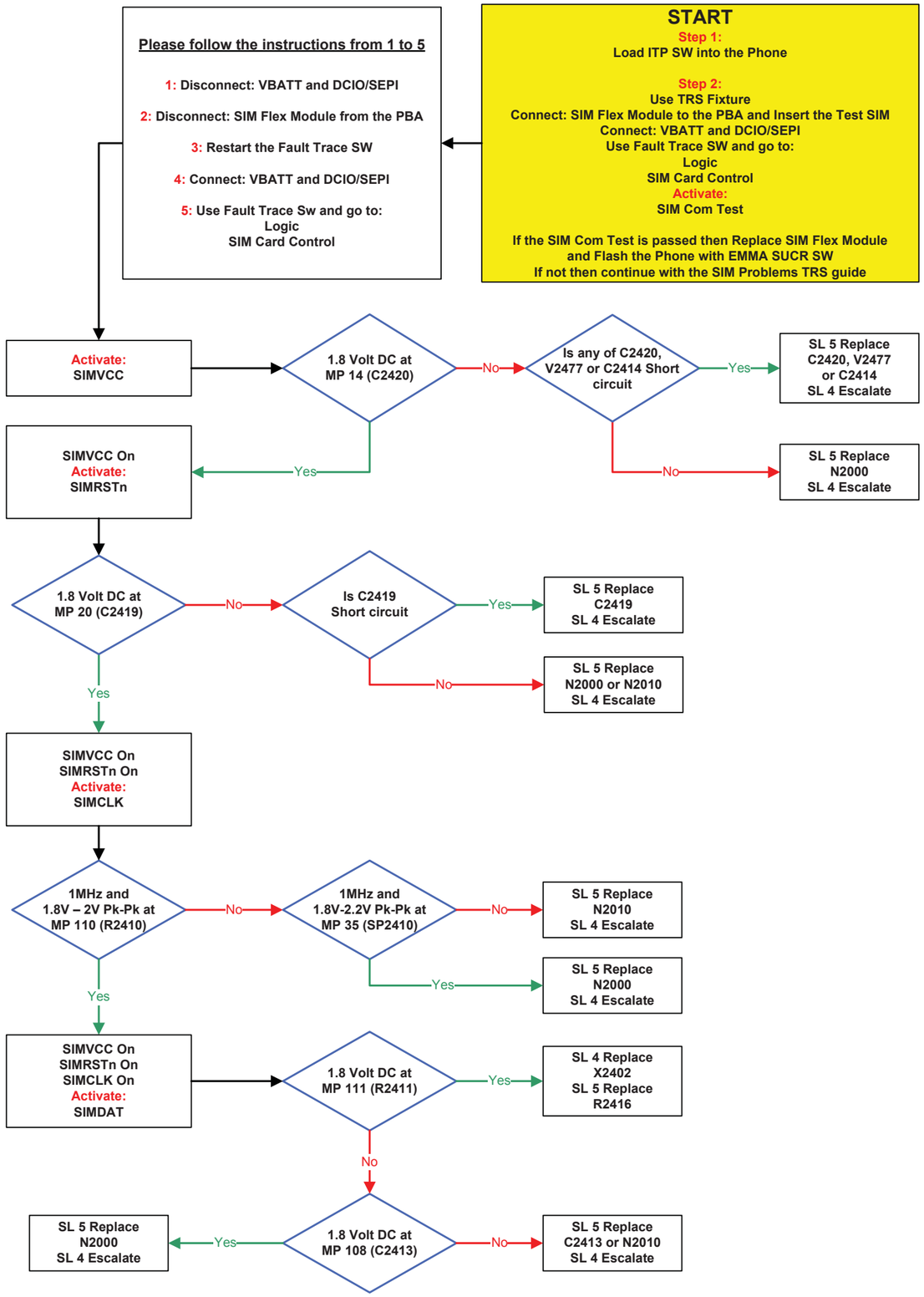
Charging Problems



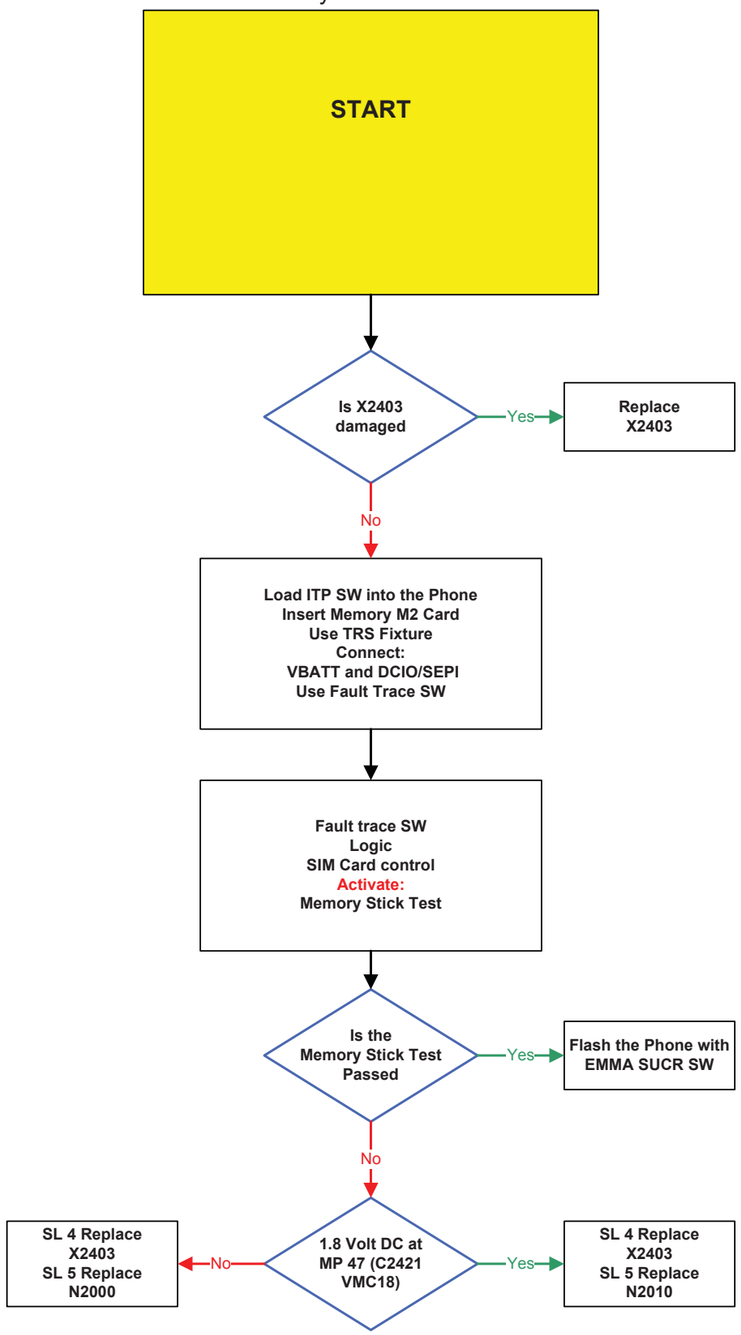
USB/VBUS Charging Problems



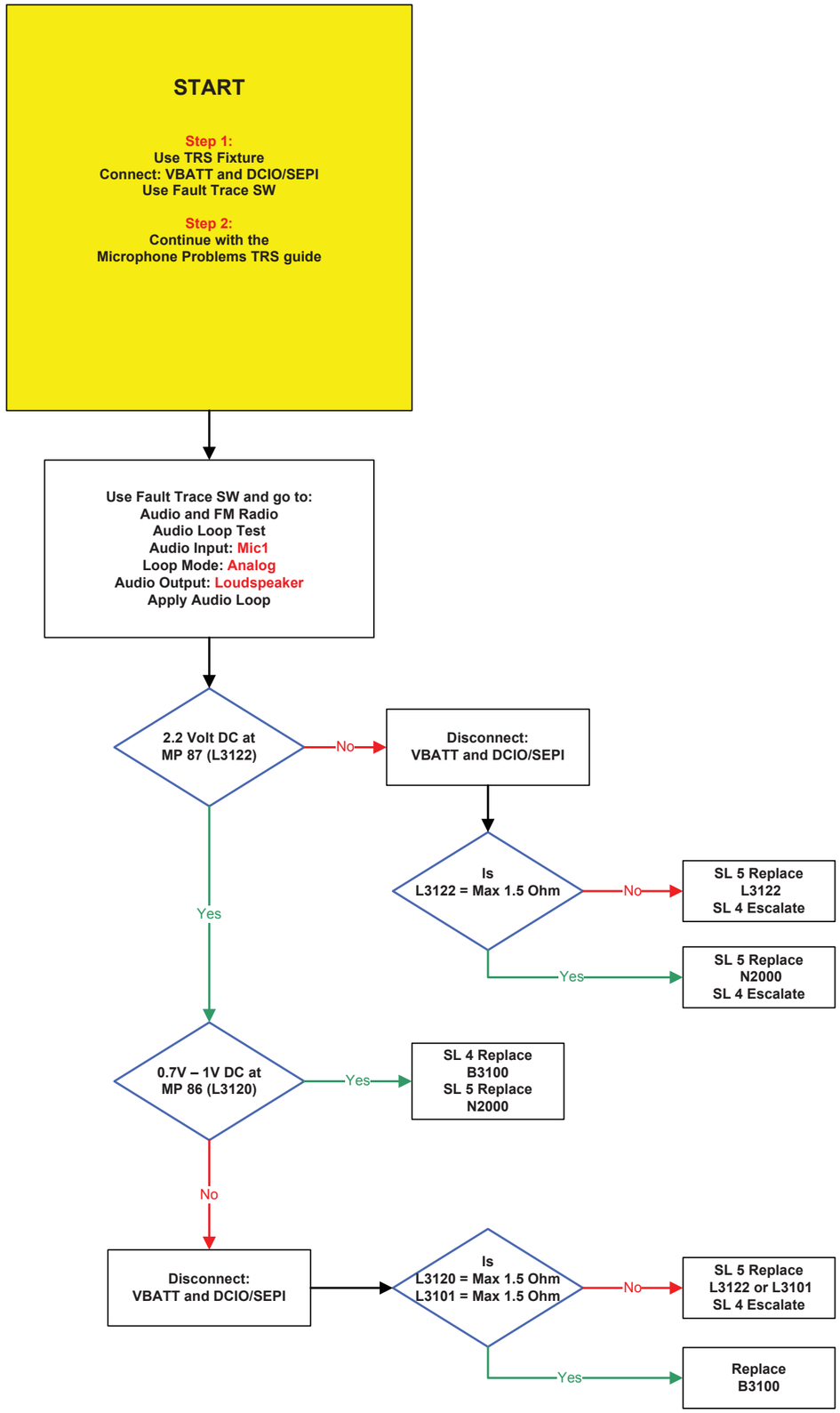
SIM Problems



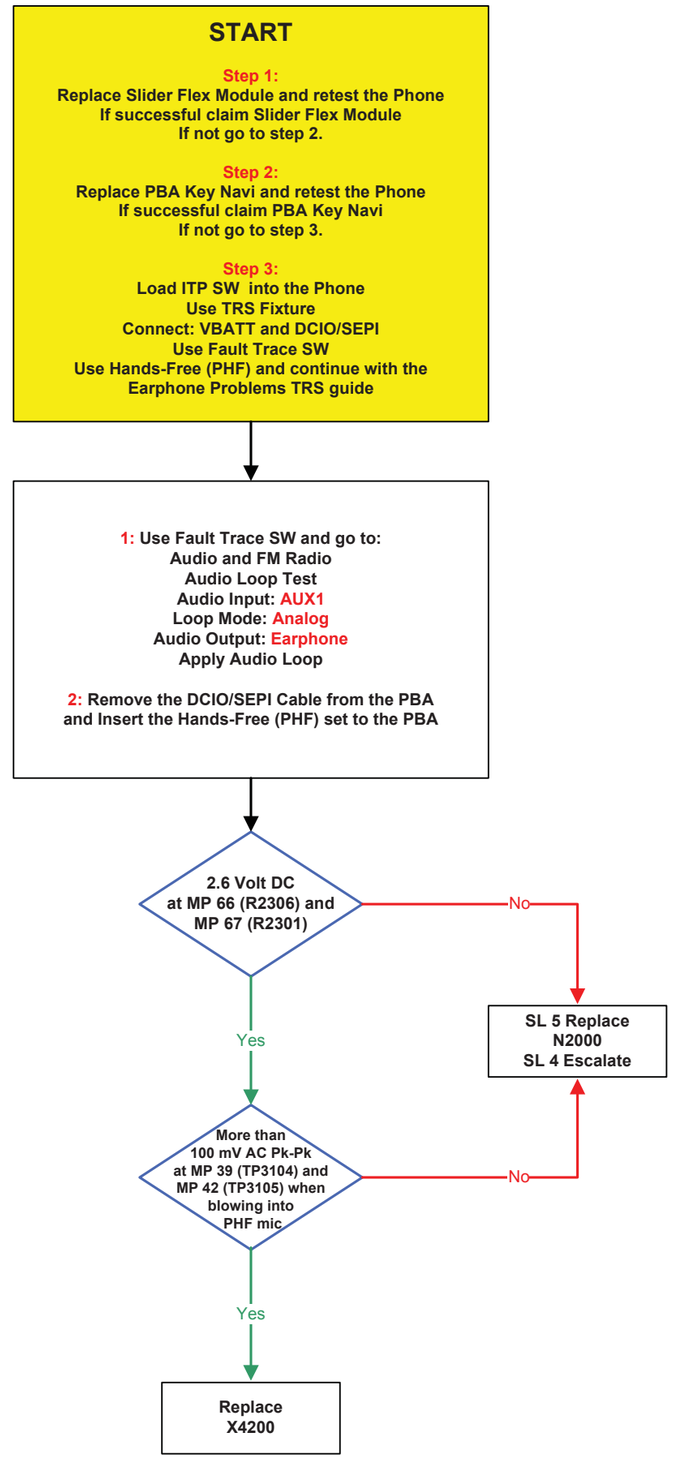
Memory Stick Problems



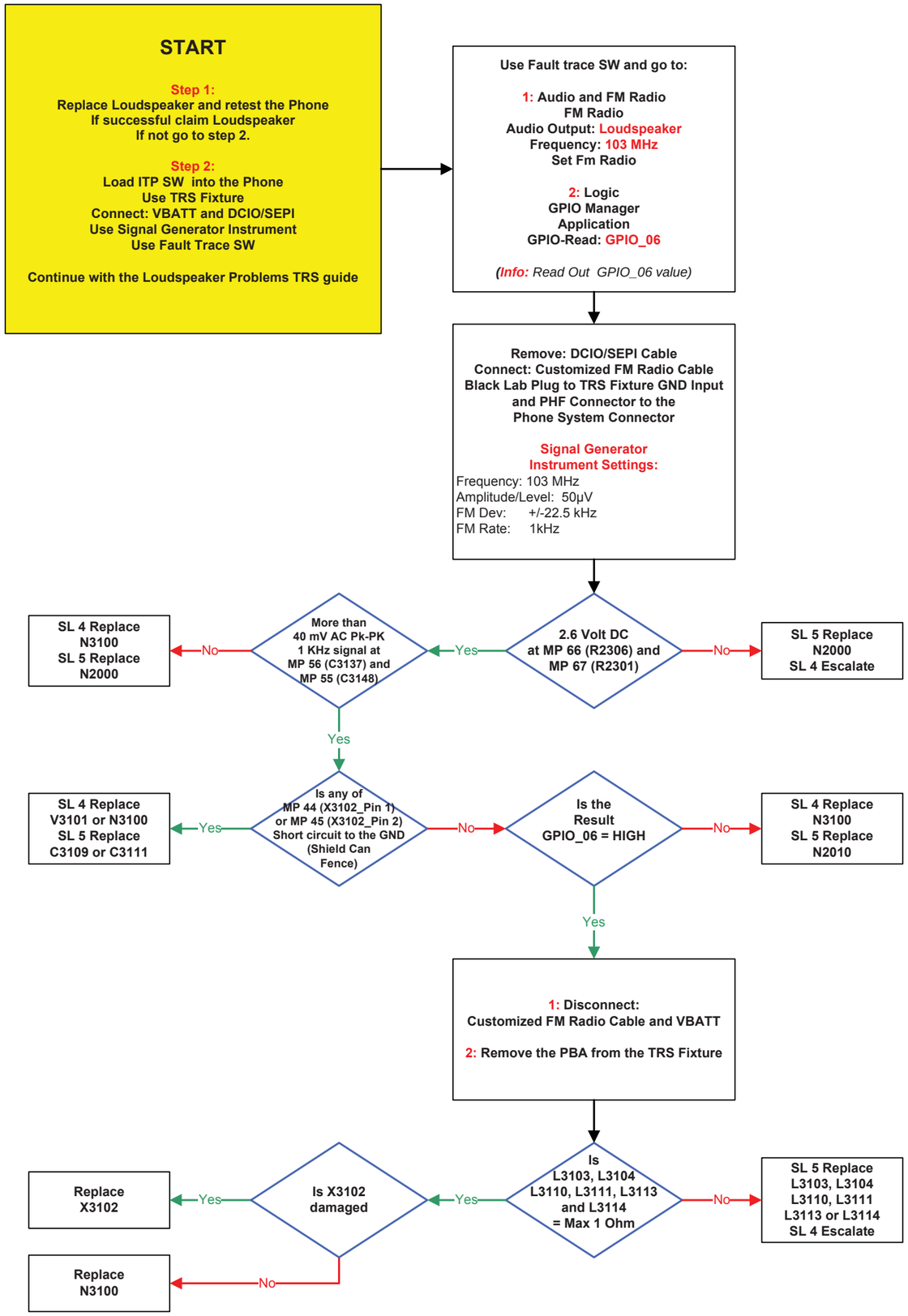
Microphone Problems



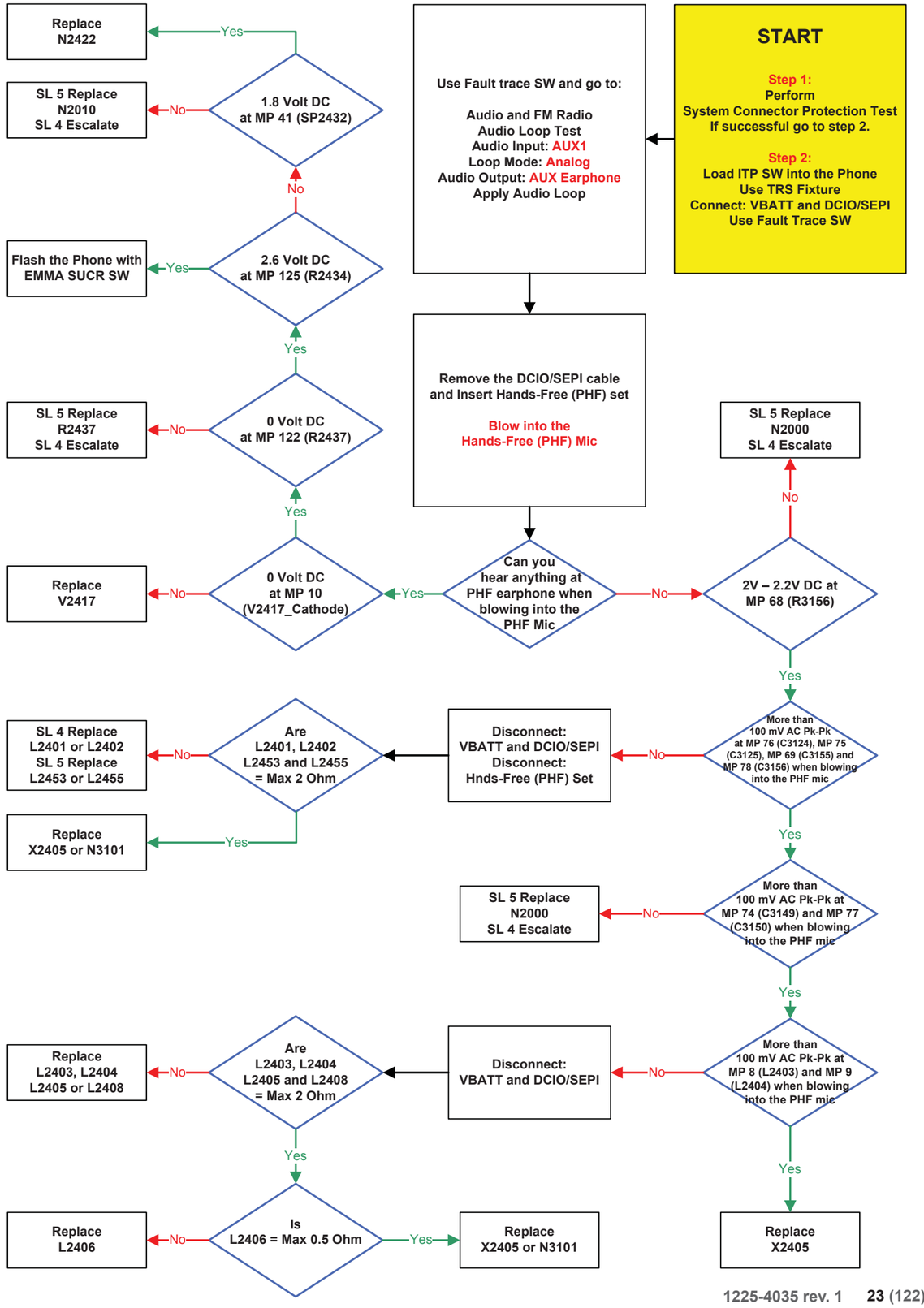
Earphone Problems



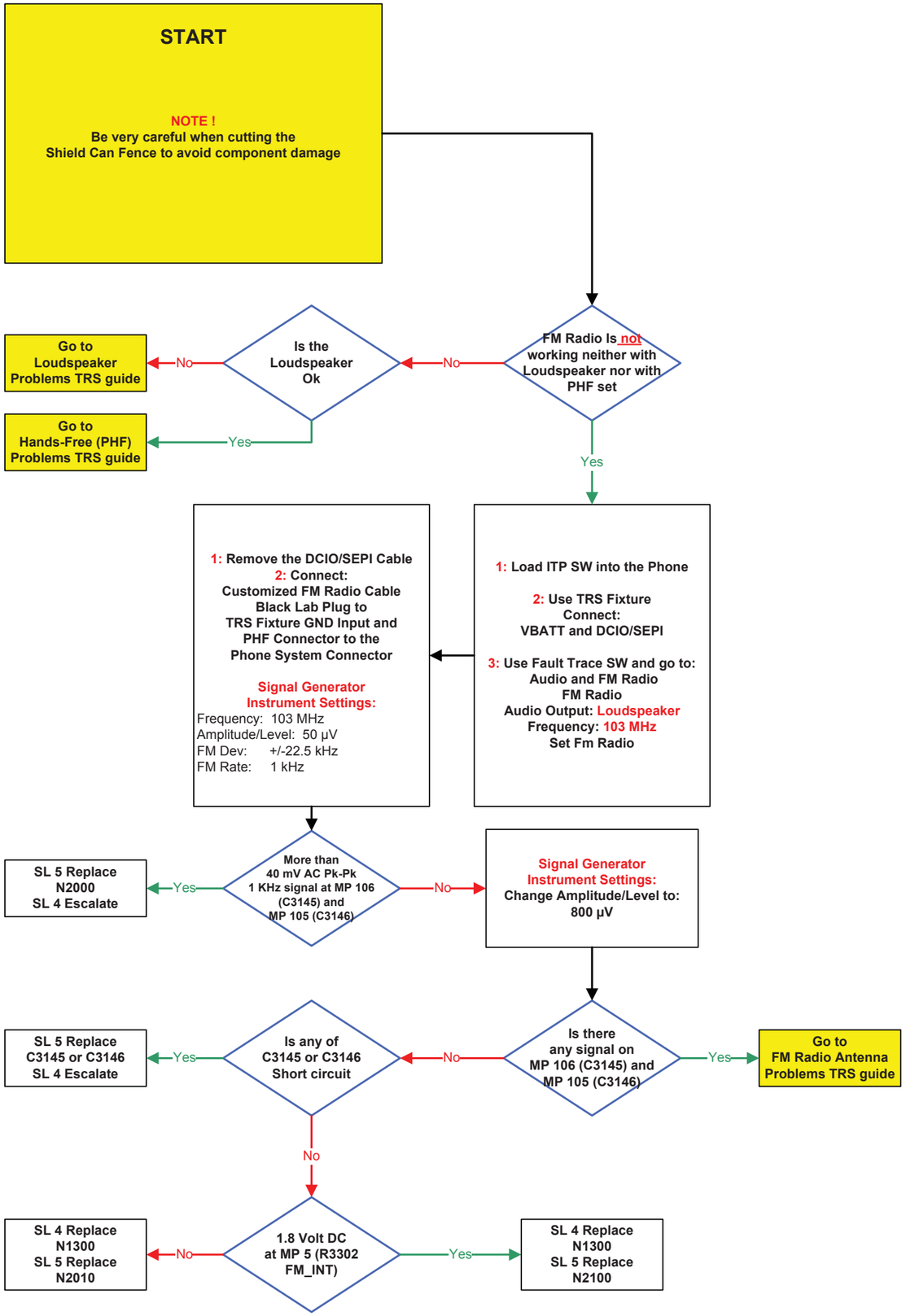
Loudspeaker Problems



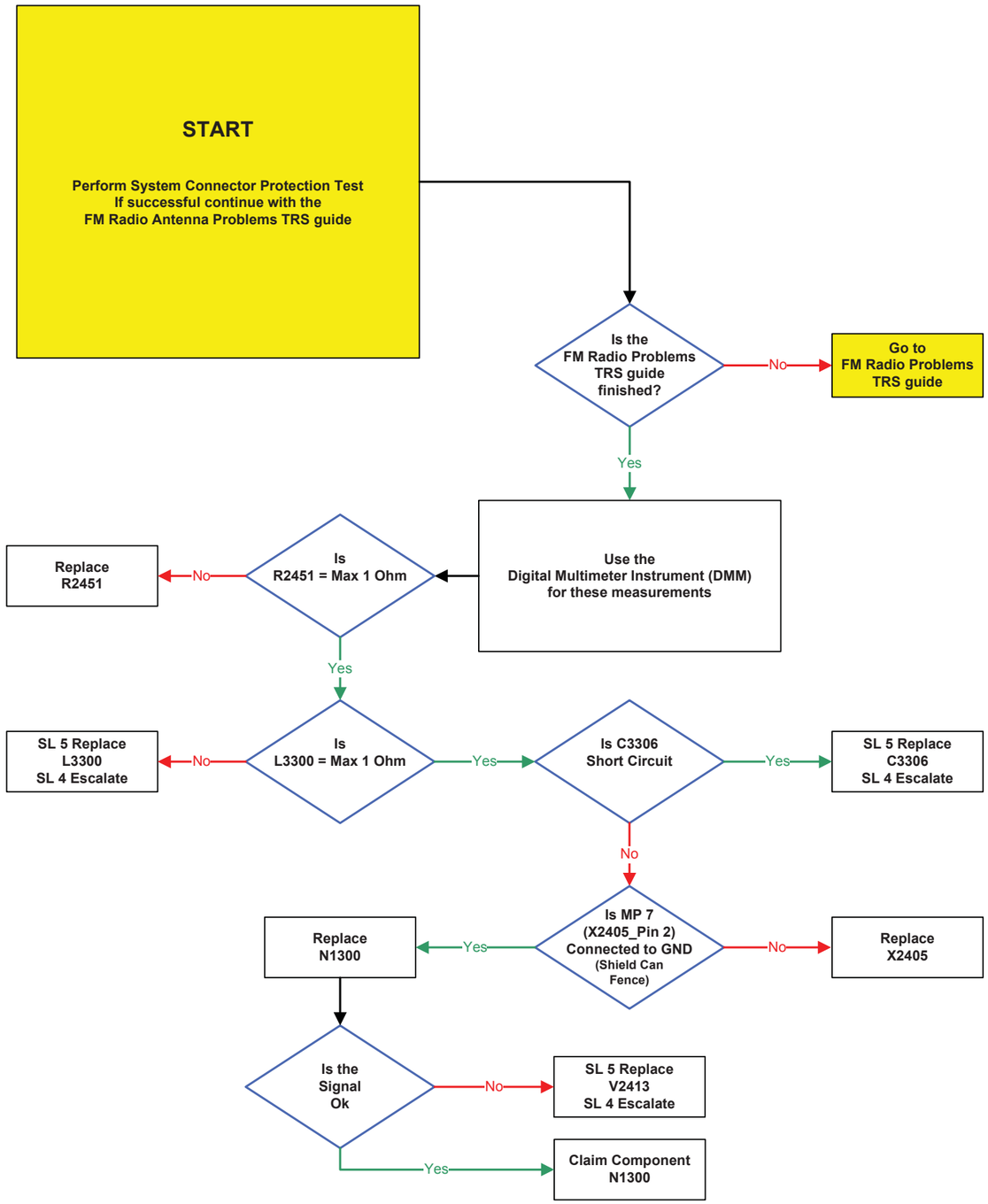
Hands-Free (PHF) Problems



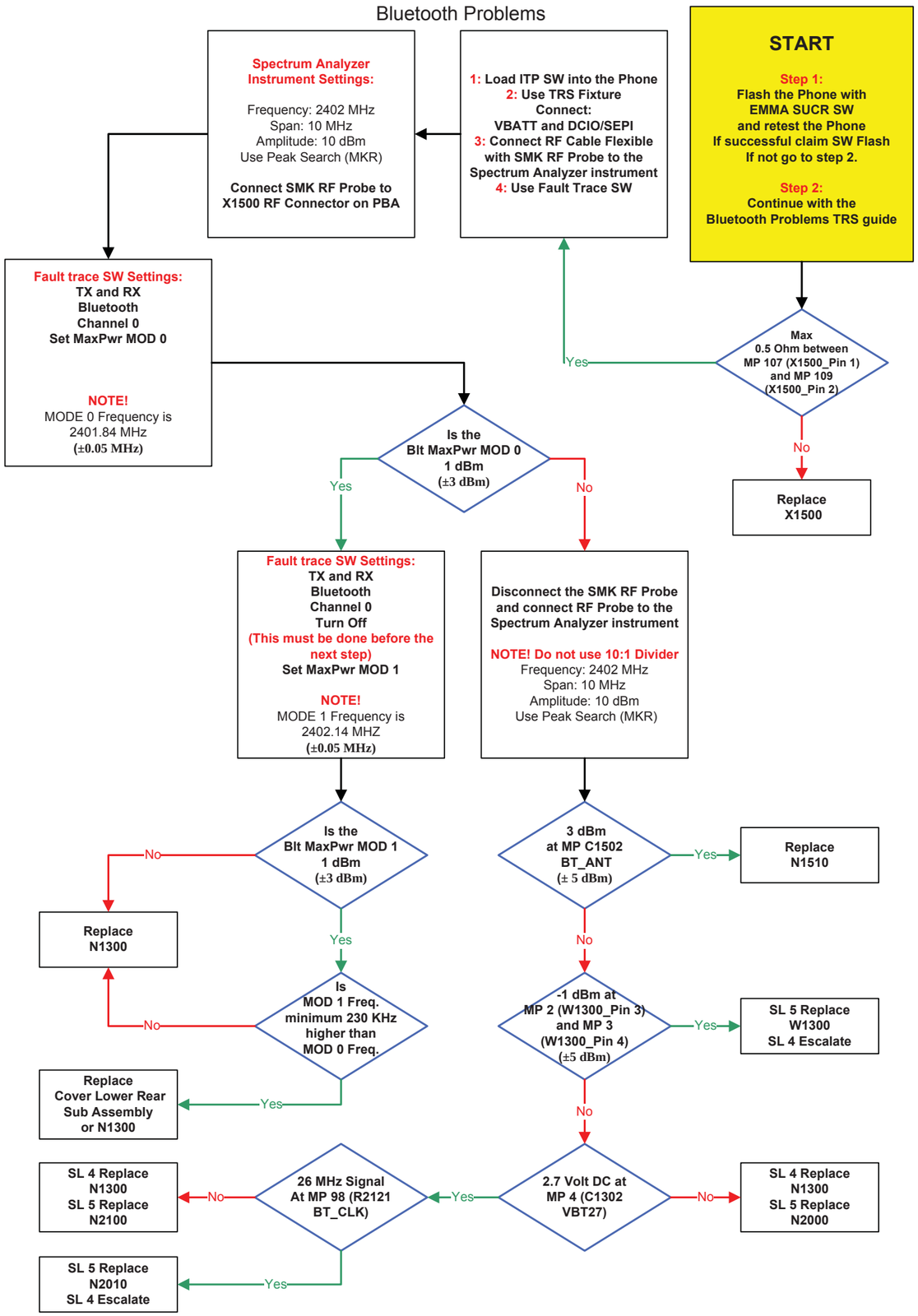
FM Radio Problems



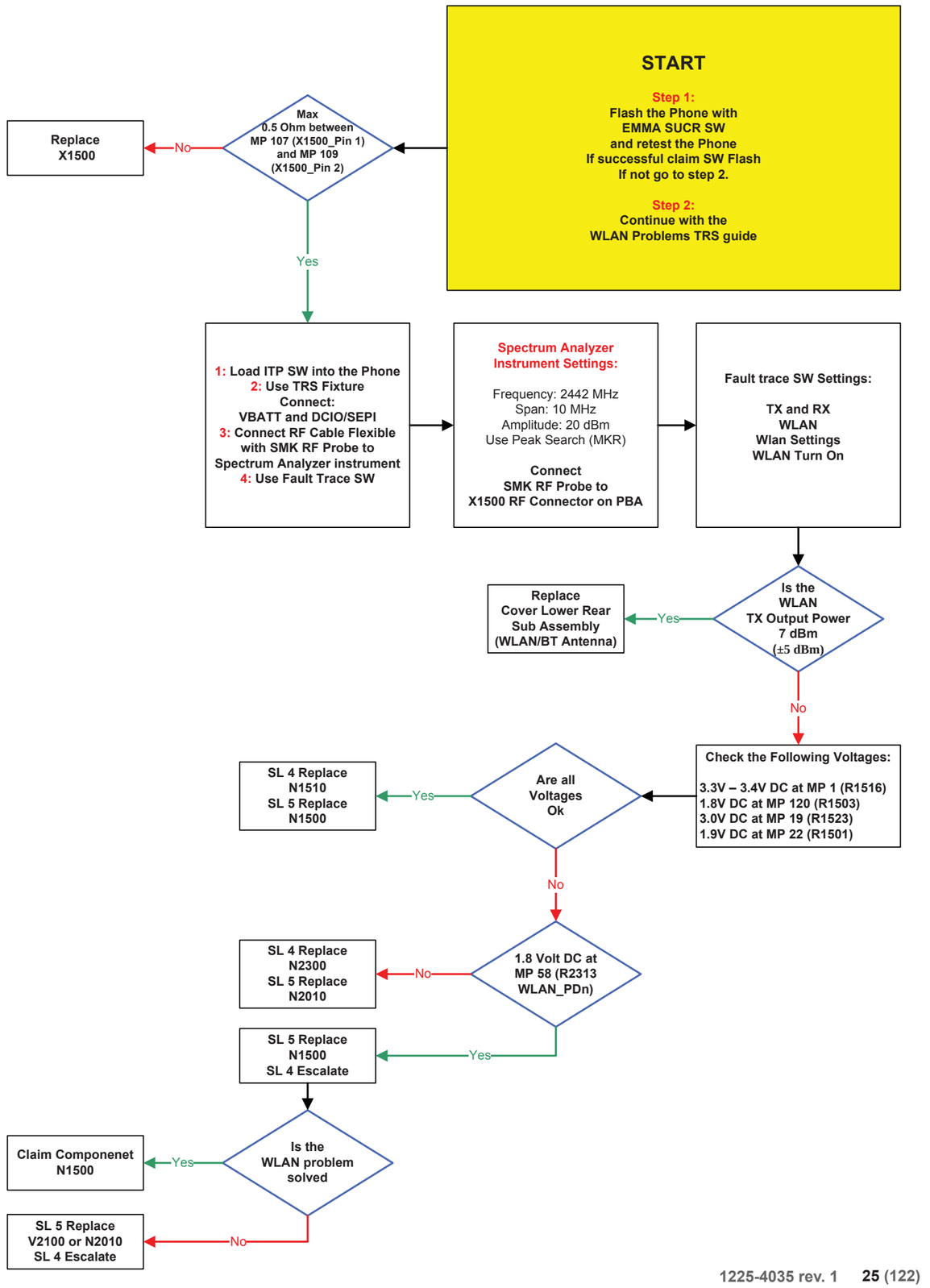
FM Radio Antenna Problems



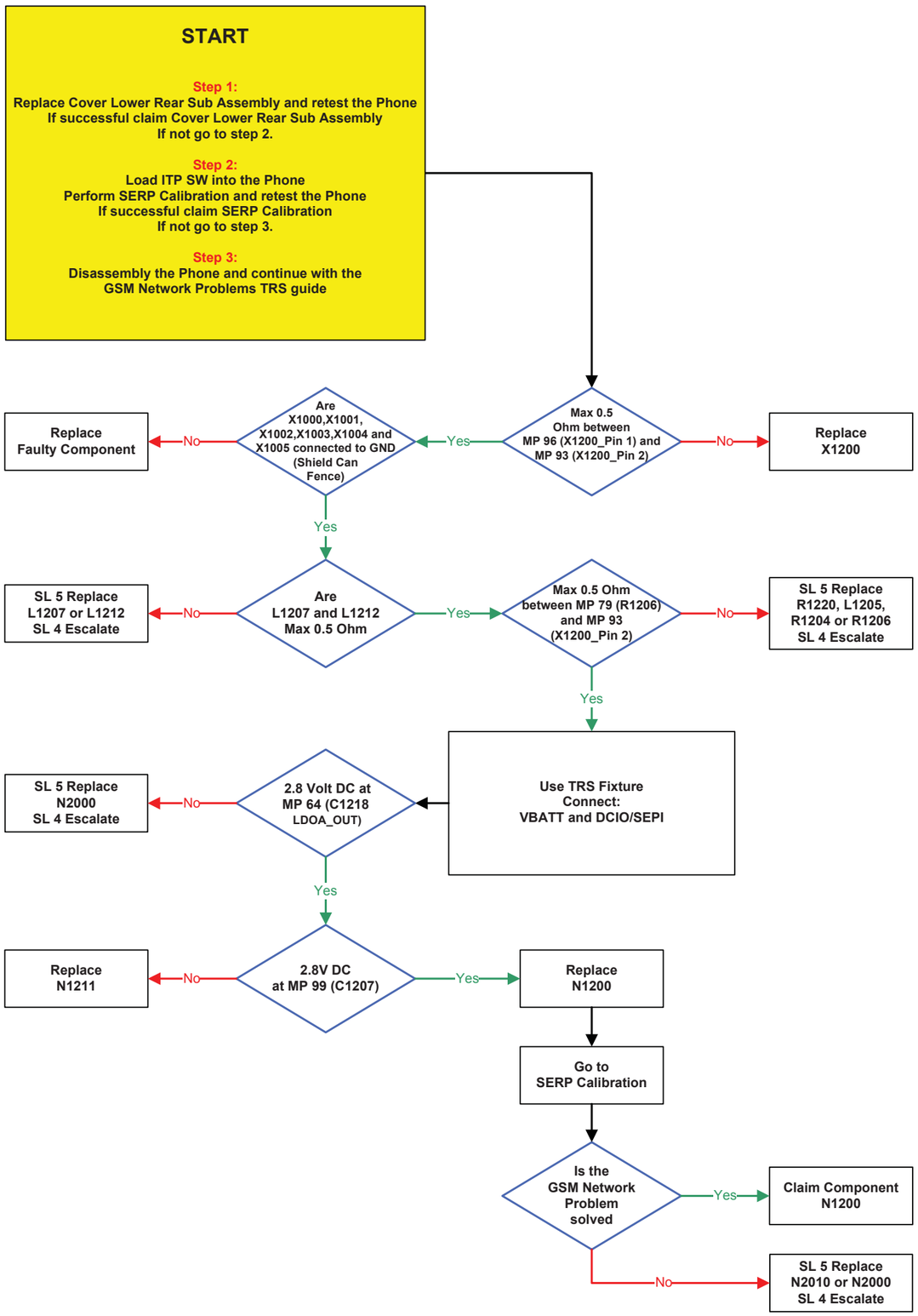
Bluetooth Problems



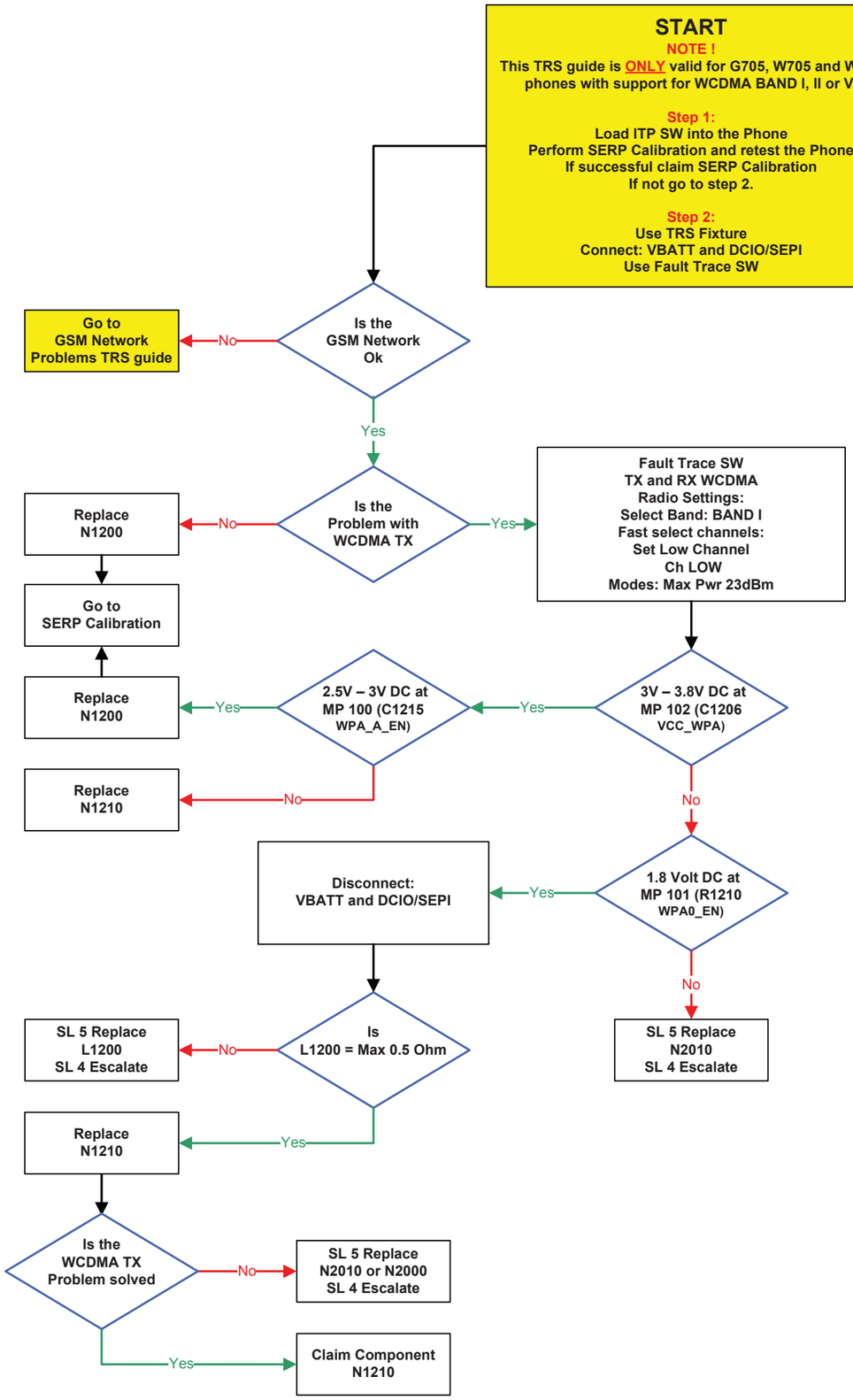
WLAN Problems



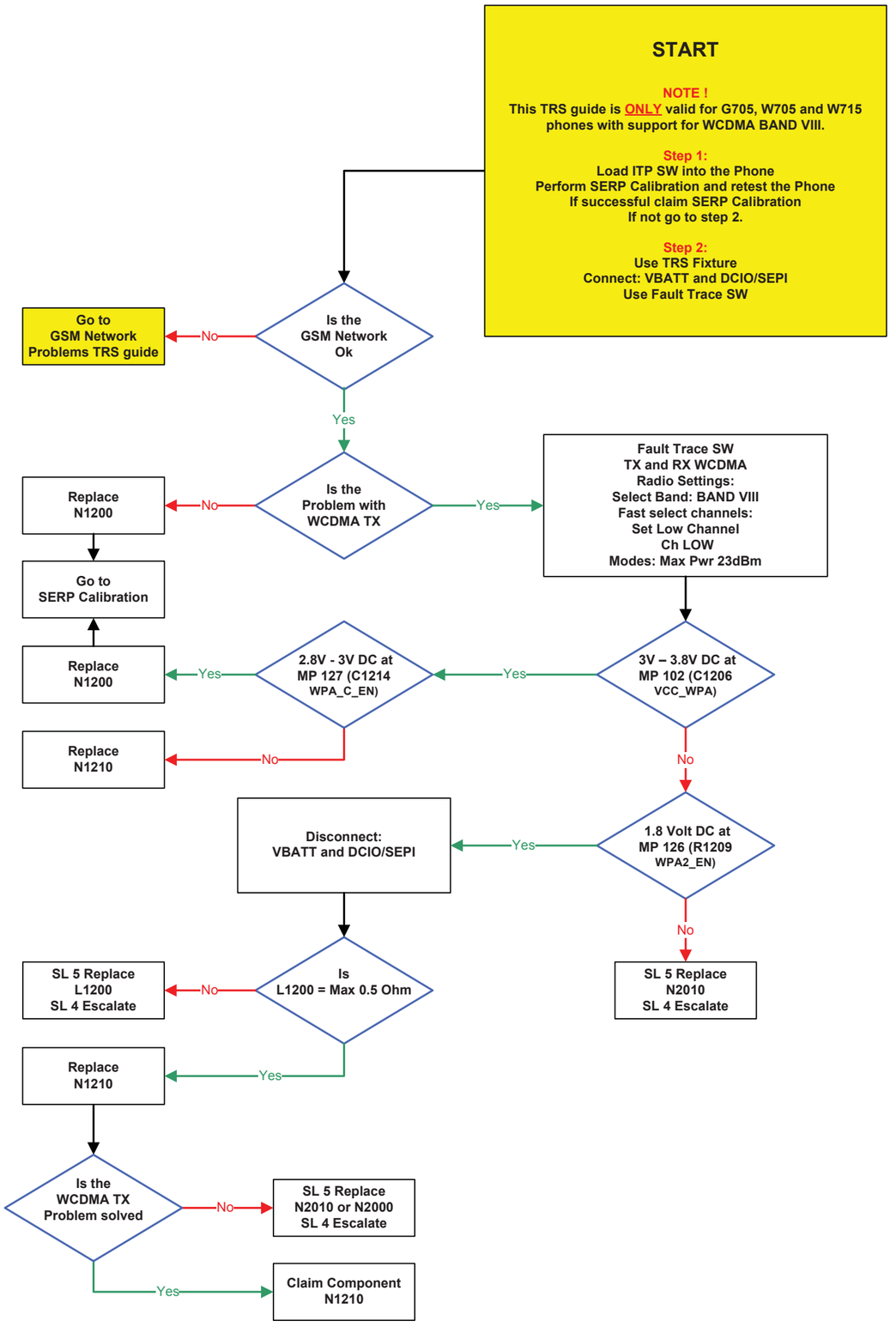
GSM Network Problems



WCDMA BAND I,II,V Network Problems



WCDMA BAND VIII Network Problems



A-GPS Problems part 1

START
NOTE !
This TRS guide is NOT valid for W705 Phones.

Step 1:
Flash the Phone with EMMA SUCR SW and retest the Phone
If successful claim SW Flash
if not go to step 2.

Step 2:
Replace Cover Lower Rear Sub Assembly and retest the Phone
If successful claim Cover Lower Rear Sub Assembly
if not go to step 3.

Step 3:
Load ITP SW into the Phone
Use TRS Fixture
Connect: VBATT and DCIO/SEPI
Use Fault Trace SW and go to:
General
Asic Revisions
Read All

Is the A-GPS (N1400) Asic Revision Test Ok
- Yes → Go to A-GPS Problems part 2
- No →

1.8 Volt DC at MP 92 (R2315 AGPS_LDO_EN)
- No → SL 5 Replace N2010 SL 4 Escalate
- Yes →

2 Volt DC at MP 91 (R1418 VAGPS20)
- No → SL 5 Replace N2310 SL 4 Escalate
- Yes →

2.8 Volt DC at MP 95 (R1419 VAGPS28)
- No → SL 5 Replace N2311 SL 4 Escalate
- Yes →

26 MHz at MP 84 (R1414 AGPS_CLK)
- No → SL 5 Replace N2101 or N2010 SL 4 Escalate
- Yes →

27 MHz at MP 85 (R1404)
- No → Replace B1400
- Yes → SL 4 Replace N1400 SL 5 Replace N2010

A-GPS Problems part 2

START
NOTE !
This TRS guide is NOT valid for W705 Phones.

NOTE !
Before following this guide the A-GPS Problems part 1 TRS guide must be finished!

Use Fault Trace SW and go to:
Tx and Rx
GPS
GPS Settings
Turn On GPS

Use Spectrum Analyzer Instrument

Spectrum Analyzer Instrument Settings:
Frequency: 1574.2 MHz
Span: 10 MHz
Amplitude: -20 dBm
Use Peak Search (MKR)

NOTE !
Do not use 10:1 Divider

1577.4 MHz -67 dBm signal at MP 90 (L1403) (±0.2 MHz) (±10 dBm)
- Yes →

1: Use Signal Generator Instrument

2: Connect RF Cable Flexible from the Signal Generator Instrument to the GPS Antenna RF Switch on the TRS Fixture

Signal Generator Instrument Settings:

Frequency: 1574.2 MHz
Amplitude/Level: -70 dBm

- No → Replace N1400

Use Spectrum Analyzer Instrument

Spectrum Analyzer Instrument Settings:
Frequency: 1574.2 MHz
Span: 10 MHz
Amplitude: -20 dBm
Use Peak Search (MKR)

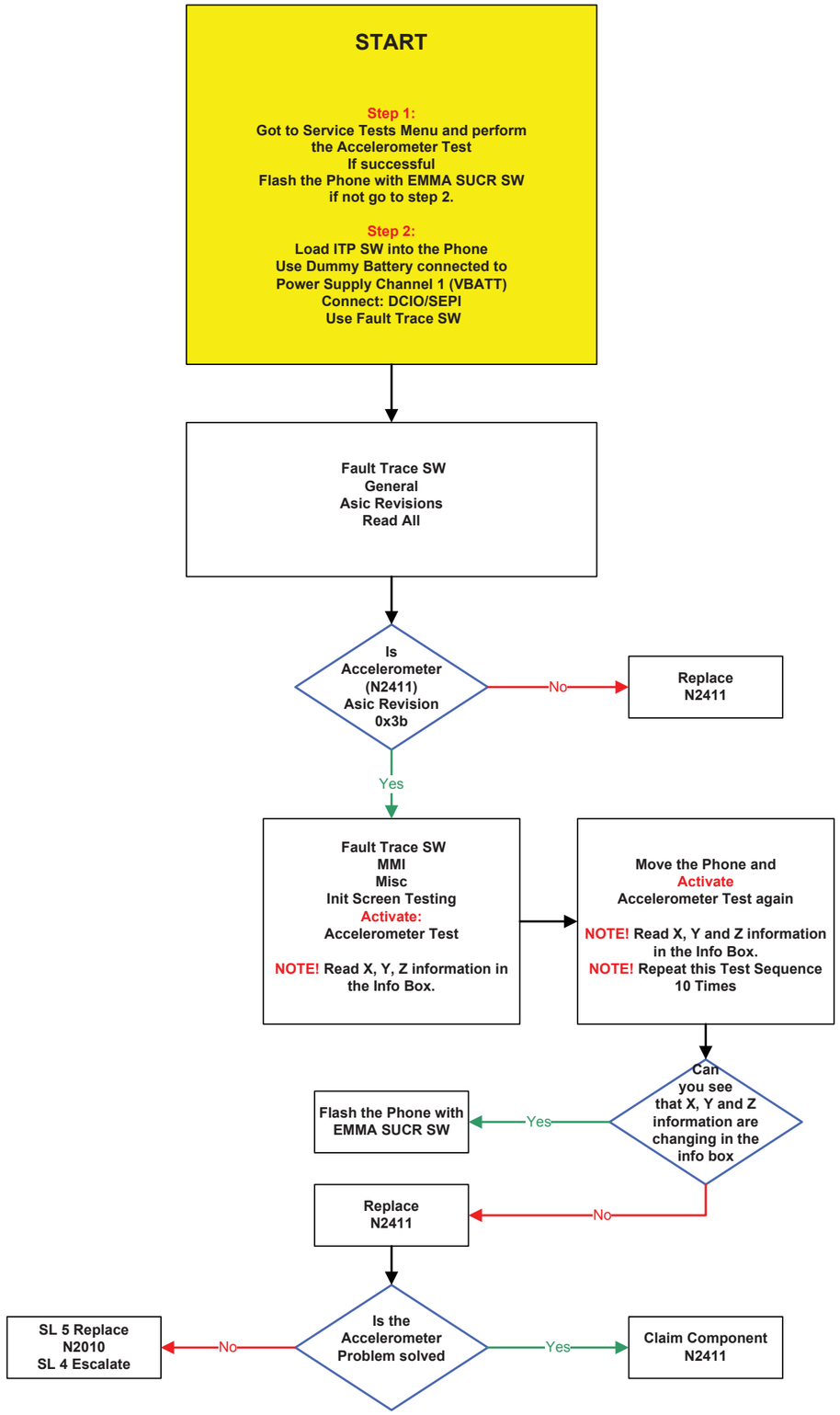
NOTE !
Do not use 10:1 Divider

1574.2 MHz -63 dBm signal at MP 90 (L1403) (±3 dBm)
- Yes → SL 4 Replace N1400 SL 5 Replace N2010
- No →

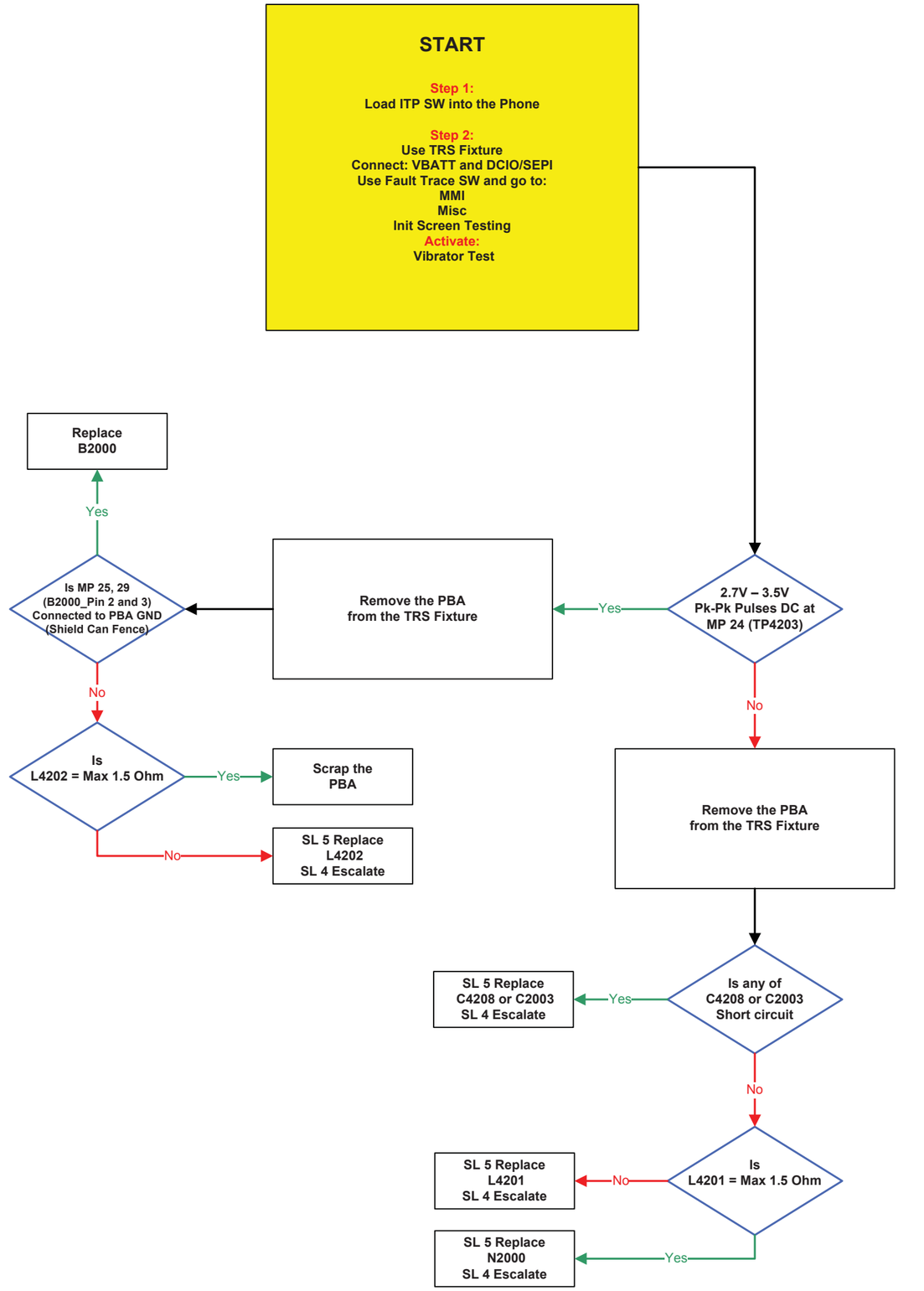
1.6V – 1.8V DC at MP 123 (C1407 POWER_ON_CONTROL)
- No → Replace N1400
- Yes →

1574.2 MHz -70 dBm signal at MP 124 (C1402) (±3 dBm)
- Yes → SL 4 Replace N1410 SL 5 Replace Z1401
- No → SL 5 Replace Z1400 SL 4 Escalate

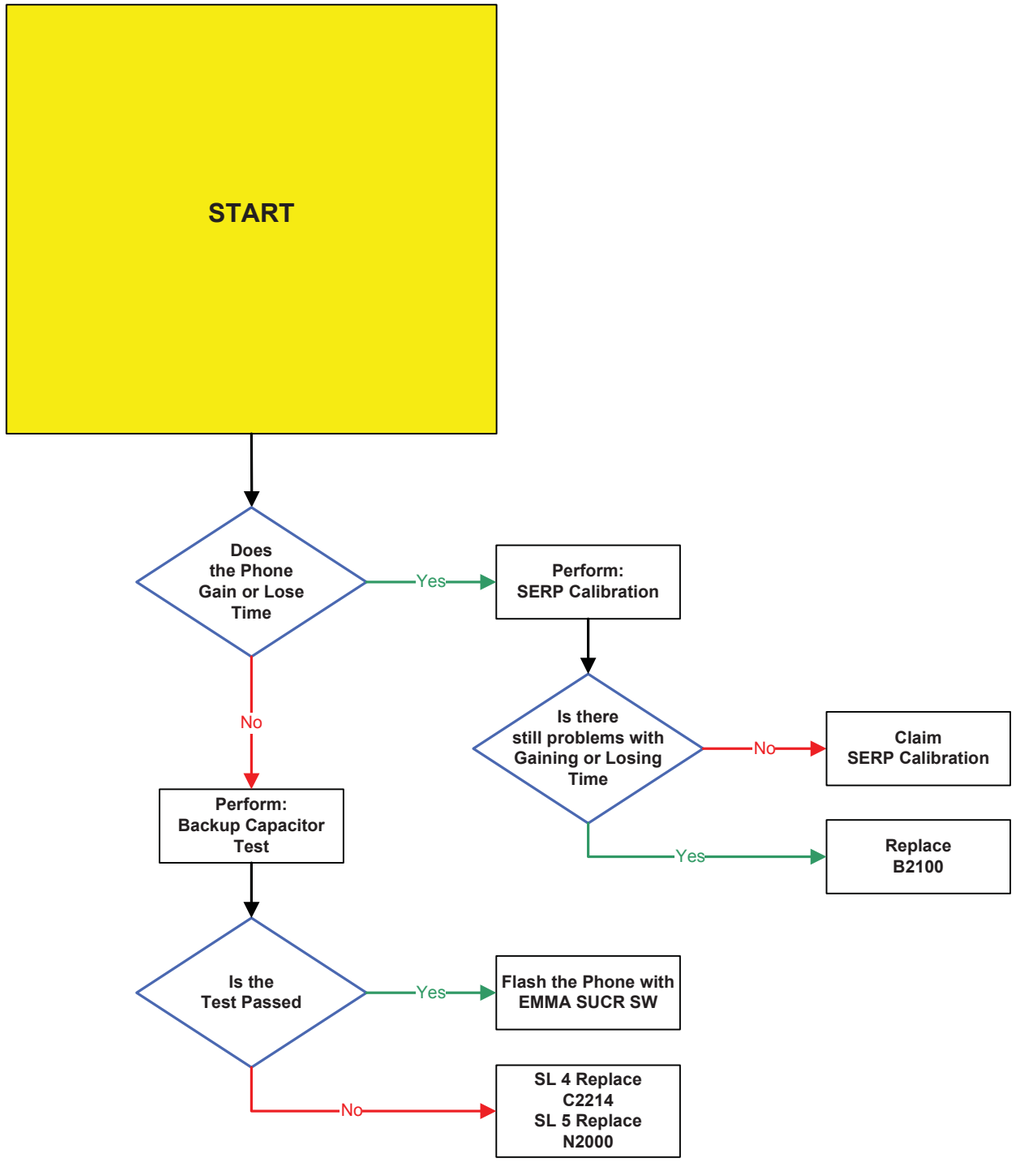
Accelerometer Problems



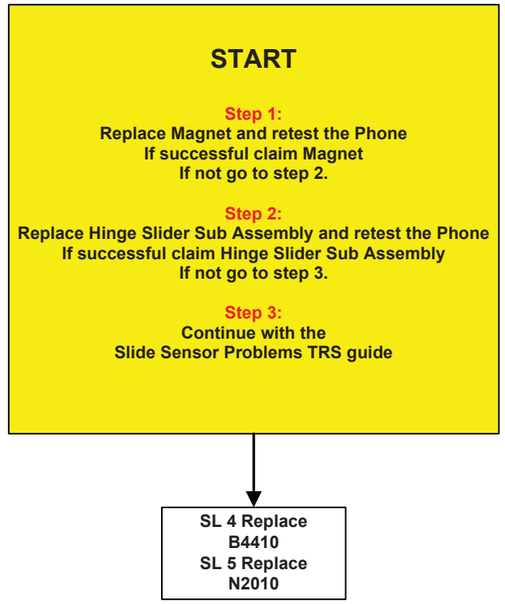
Vibrator Problems



Real Time Clock Problems



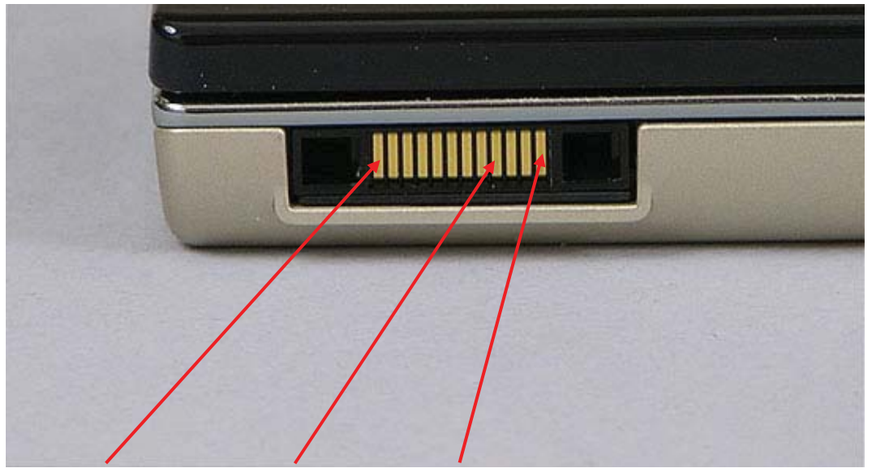
Slide Sensor Problems



System Connector Protection Test

Perform the Ohm measurements by using the DMM instrument (Fluke).

Note! *The Battery must be removed from the Phone during this test.*
Note! *Connect the Black probe to the X2405_PIN 9 (GND).*



System Conn. X2405 *(PIN Position)*	Ohm Measurements *(Ohm)*	SL 4 *(Repair Action)*	SL 5 *(Repair Action)*
1	0L	X2405 L2452 N2421 if lower	C2439 if lower
2	0	X2405 if higher L2406 if higher	No Action
3	10k - 12k	X2405 if higher L2401 if higher N3101 if lower or higher	L2453 if higher C2443 if lower
4	0.9k – 1.1k	X2405 if higher L2402 if higher N3101 if lower or higher	L2455 if higher C2442 if lower
5	0.9k – 1.1k	X2405 if higher L2403 if higher L2408 if higher N3101 if lower or higher	C2448 if lower
6	0.9k – 1.1k	X2405 if higher L2404 if higher L2405 if higher N3101 if lower or higher	C2447 if lower
7	0L	**Not Connected**	**Not Connected**
8	400k – 700k	X2405 if higher V2417 if lower N2422 if lower or higher	R2434 if higher R2437 if higher
9	**GND**	X2405 if higher R2449 if higher	No Action
10	35k – 0L	X2405 Z2400 V2416 if lower N2420 if lower	R2445
11	250k – 360k	X2405 if higher Z2400 if higher V2415 if lower N2420 if lower or higher	R2446 if higher
12	85k – 110k	R2490 if higher V2202 if lower	C2440 if lower C2441 if lower

Current Consumption Test

Step 1:

Insert a Local SIM Card and use the phone with the Normal SW (SSW).
Use Dummy Battery connected to Power Supply Channel 1 (VBATT).
Instrument settings: Voltage: 3.8 Volt, Limiter 3A.

Note! *The Dummy Battery should have approximately 120K Ohm resistance between GND and BDATA.*

Measure the current consumption when Phone is turned off.
Take a note of the current consumption at Power Supply Channel 1 (VBATT).

The Current consumption in off mode should be less than 1mA.
If more than 1mA go to **Dead Phone Problems part 1 TRS guide.**

Step 2:

Turn the Phone On:

Measure the deep sleep current max 6mA typical between **0-3mA.** Make sure that the operator is running with deep sleep mode.

Note! *This operation can be switched off by operator if network is busy or heavily loaded.*

If the phone is using more than 6mA, then go to EMMA and run Software Update Contents Refresh (SUCR SW).

Step 3 with Fault Trace SW application:

- Flash the phone with ITP SW
- Use Dummy Battery connected to the Power Supply Channel 1 (VBATT)
- Use Fault Trace SW

- Connect Dummy Battery connected to the Power Supply Channel 1 (VBATT):
  Instrument settings: Voltage: 3.8 Volt, Limiter 3 A

- Connect DCIO/SEPI to the phone:
  Instrument settings: Voltage: 5 Volt, Limiter 2 A

Perform the following tests:

- **Max TX Power GSM 850 MHz**

  Fault Trace SW settings:
  TX and RX GSM
  GSM Mode Settings:
  TX Switched
  GSM Radio Settings:
  Select Band: GSM 850
  Channel: 128
  Power Level: 5

  Limits GSM 850 MHz
- Transmitter Current Limits: **200mA - 270mA**
- **Tolerance: ±20%**

- **Max TX Power GSM 900 MHz**

  Fault Trace SW settings:
  TX and RX GSM
  GSM Mode Settings:
  TX Switched
  GSM Radio Settings:
  Select Band: GSM 900
  Channel: 1
  Power Level: 5

  Limits GSM 900 MHz
- Transmitter Current Limits: **250mA - 330mA**
- **Tolerance: ±20%**

- **Max TX Power DCS 1800 MHz**

  Fault Trace SW settings:
  TX and RX GSM
  GSM Mode Settings:
  TX Switched
  GSM Radio Settings:
  Select Band: DCS 1800
  Channel: 512
  Power Level: 0

  Limits DCS 1800 MHz
- Transmitter Current Limits: **190mA – 240mA**
- **Tolerance: ±20%**

- **Max TX Power PCS 1900 MHz**

  Fault Trace SW settings:
  TX and RX GSM
  GSM Mode Settings:
  TX Switched
  GSM Radio Settings:
  Select Band: PCS 1900
  Channel: 512
  Power Level: 0

  Limits PCS 1900 MHz
- Transmitter Current Limits: **170mA – 240mA**
- **Tolerance: ±20%**

- **Max TX Power WCDMA BAND I**
  Note! *Applies only for G705, W705 and W715 that has WCDMA BAND I support.*

  Fault Trace SW settings:
  TX and RX WCDMA
  Radio Settings:
  Select Band: BAND I
  Fast Select Channels: Ch LOW
  Modes: Max Pwr 23dBm

  Limits WCDMA BAND I
- Transmitter Current Limits: **600mA – 700mA**
- **Tolerance: ±20%**

- **Max TX Power WCDMA BAND II**
  Note! *Applies only for G705, W705 and W715 that has WCDMA BAND I support.*

  Fault Trace SW settings:
  TX and RX WCDMA
  Radio Settings:
  Select Band: BAND I
  Fast Select Channels: Ch LOW
  Modes: Max Pwr 23dBm

  Limits WCDMA BAND I
- Transmitter Current Limits: **450mA – 500mA**
- **Tolerance: ±20%**

- **Max TX Power WCDMA BAND V**
  Note! *Applies only for G705, W705 and W715 that has WCDMA BAND I support.*

  Fault Trace SW settings:
  TX and RX WCDMA
  Radio Settings:
  Select Band: BAND I
  Fast Select Channels: Ch LOW
  Modes: Max Pwr 23dBm

  Limits WCDMA BAND I
- Transmitter current: **500mA - 550mA**
- **Tolerance: ±20%**

- **Max TX Power WCDMA BAND VIII**
  Note! *Applies only for G705, W705 and W715 that has WCDMA BAND I support.*

  Fault Trace SW settings:
  TX and RX WCDMA
  Radio Settings:
  Select Band: BAND I
  Fast Select Channels: Ch LOW
  Modes: Max Pwr 23dBm

  Limits WCDMA BAND I
- Transmitter current: **550mA – 1000mA**
- **Tolerance: ±20%**

If the current consumption is out of the test limits then try to solve the problem by running SERP Calibration.

If there are still problems with the current consumption then go to the following TRS guides:

GSM Network problems,
WCDMA I, II, V Network Problems or
WCDMA VIII Network Problems

If the current consumption is within the test limits then go to: **Charging Test**.

Backup Capacitor Test

To perform this test use:

- Phone with the ITP SW
- Power Supply Channel 1 VBATT: Instrument settings: Voltage: 3.8V, Limiter: 2A
- Power Supply Channel 2 DCIO/SEPI: Instrument settings Voltage: 5V, Limiter: 2A

This test should be performed in 3 steps:

Step1:

Measure the voltage at the Backup capacitor by using **Fault Trace SW - Logic** - **ADC Values – Read ADC Value** (Reading 1).

Step2:

This step should be made **30 seconds** after Step 1. Measure the voltage at the Backup capacitor by using **Fault Trace SW - Logic – ADC Values - ADC Channels – Read ADC Value** (Reading 2).

Step3:

Compare the difference between Reading 1 and Reading 2 with the reference table below. If the Reading 1 value is between 50 and 680 go to Interval 1, if between 681 and 800 go to Interval 2, if between 801 and 880 go to Interval 3 and compare with the Reading 2 – Reading 1 Min and Max Limits.

Reference Table:

Reference Table:

	Min	Max	Unit
Absolute readout Reading 1	50	880	Dec

Reading 1 (Dec)	**Reading 2 – Reading 1 (Dec)**	
	Min	Max
Interval 1 (50 – 680)	20	210
Interval 2 (681 – 800)	5	30
Interval 3 (801 – 880)	0	10

Note! *The upper table contains the absolute limits for the readouts. The lower table contains the allowed delta between the first and the second readout, separated in time with 30 seconds.*

Note! *If the readings are out of limits then replace the **C2214** (Backup Capacitor). If the problem is not solved then SL 5 Replace **N2000** SL 4 Escalate.*

Charging Test

To perform this test use:

- Phone with the Normal SW (SSW)
- Dummy Battery connected to Power Supply Channel 1 (VBATT)
  Note! *The Dummy Battery should have approximately 120K Ohm resistance between GND and BDATA.*
- Power Supply Channel 1 (VBATT)
  Instrument settings:
  Voltage: from 3.0 Volt to 4.2 Volt, according to the VBATT row in the Reference Table below.
  Limiter: 2A
- Power Supply Channel 2 (DCIO/SEPI)
  Instrument settings:
  Voltage: 5V
  Limiter: 2A

Test instructions:

- Disconnect the DCIO/SEPI Cable between each measurement and wait for phone shutdown when changing VBATT voltage.
- Take a note of the Current measurements at Power Supply Channel 2 DCIO/SEPI and Display charging indicator X seconds after DCIO/SEPI cable has been inserted according to the Test Time row in the reference table below.
- Compare the test results with the reference table below, tolerance +/-20%.

Reference Table

VBATT x Volt	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2
Test Time x sec.	15s	15s	25s	25s	30s	30s	30s	30s	30s	30s	30s	30s	25s-45s
DCIO/SEPI Current mA	250	250	250-500	500	600	600-700	750-1200	800-1200	800-1200	800-1200	700-1000	400-900	0
Display indicate charging	Nothing	Nothing	Yes or Nothing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes or Fully Charged	Fully Charged

Note! *The Power Supply Channel 1 (VBATT) must allow reverse current.*

If the charging current is NOT equal to the reference table then go to:
Charging Problems TRS Guide.

If the charging current is equal to reference table then insert the normal battery and test the charging current to define if the phone battery is working properly.

Measure the voltage at the battery to define the current level.
If the battery is receiving the right current, then the phone and the battery are working properly.

ASIC Revision Test

Note! *The Keypad Scan Test may not be activated when performing this test.*

Purpose:

- Verify that the ASICs are correctly mounted, that the communication works and that the revisions are correct.

The tested ASICs are:

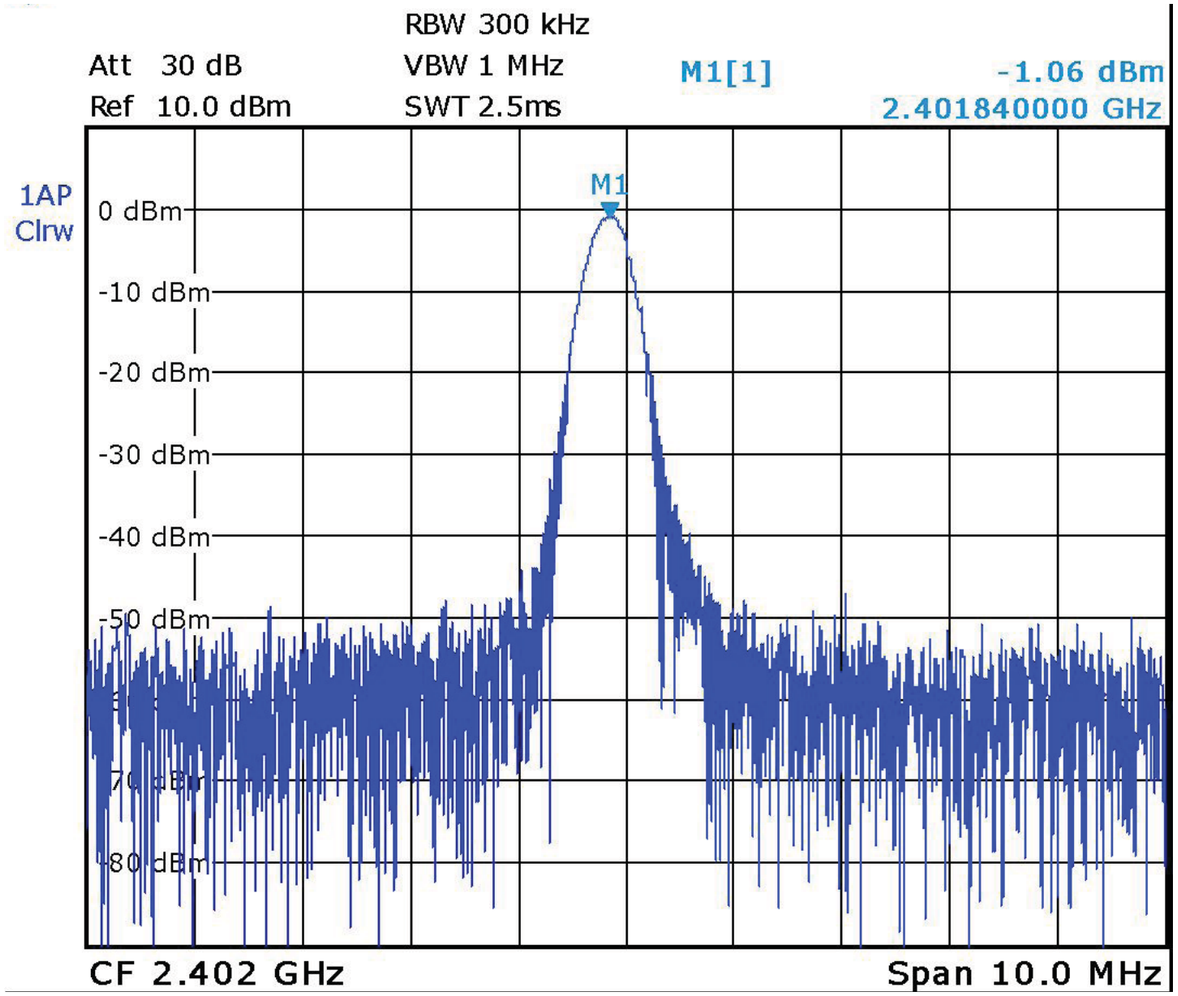
- D2010 (Kajsa)
- N2000 (Vera)
- N1300 (Bluetooth and FM Radio ASIC)
- N2411 (Accelerometer)
- N1400 (A-GPS Module)

To perform this test use:

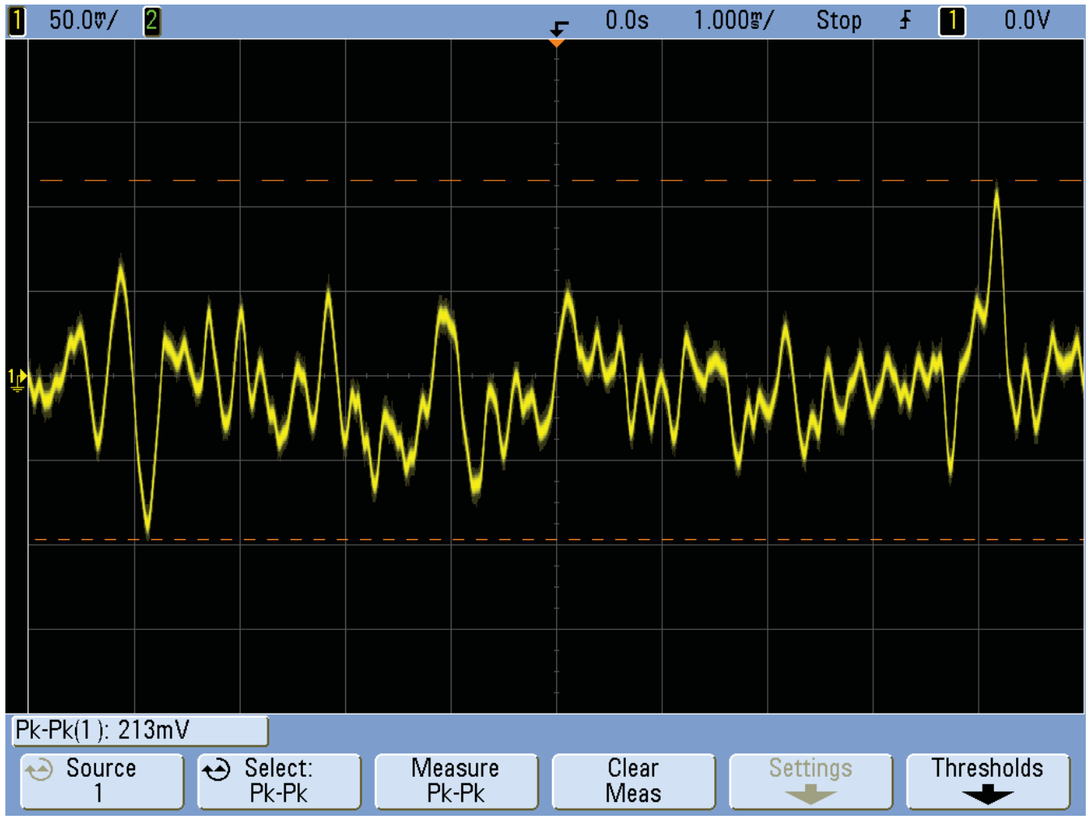
- Phone with the ITP SW
- TRS Fixture
- Power Supply Channel 1 VBATT (Voltage: 3.8V, Limiter: 2A)
- Power supply Channel 2 DCIO/SEPI (Voltage: 5V, Limiter: 2A)
- Fault Trace SW and go to: General – Asic Revisions – Read All

Reference Table:

ASIC	Part number	Description	Return value (hex)
N2010	1208-3871	CPU (Kajsa)	0xE8
N2000	1202-0639	Power Management (Vera)	0xC8
N1300	1200-6182	Bluetooth	
		Firmware Revision	Ox5,0x3
		Chip ID	0x0,0x0,0x0,0x0,0x0 Will always return 0 on STLC because Chip ID is not supported.
N2411	1202-1676	Accelerometer	0x3b
N1400	1200-0700	A-GPS Module	254,0,253,192,0,242,113,9,16,252 **Note!** *This test is not valid for the W705 Phone.*
N1300	1200-6182	FM Radio	When FM Radio is **On:** Ox1253 When FM Radio is **Off:** Ox1200

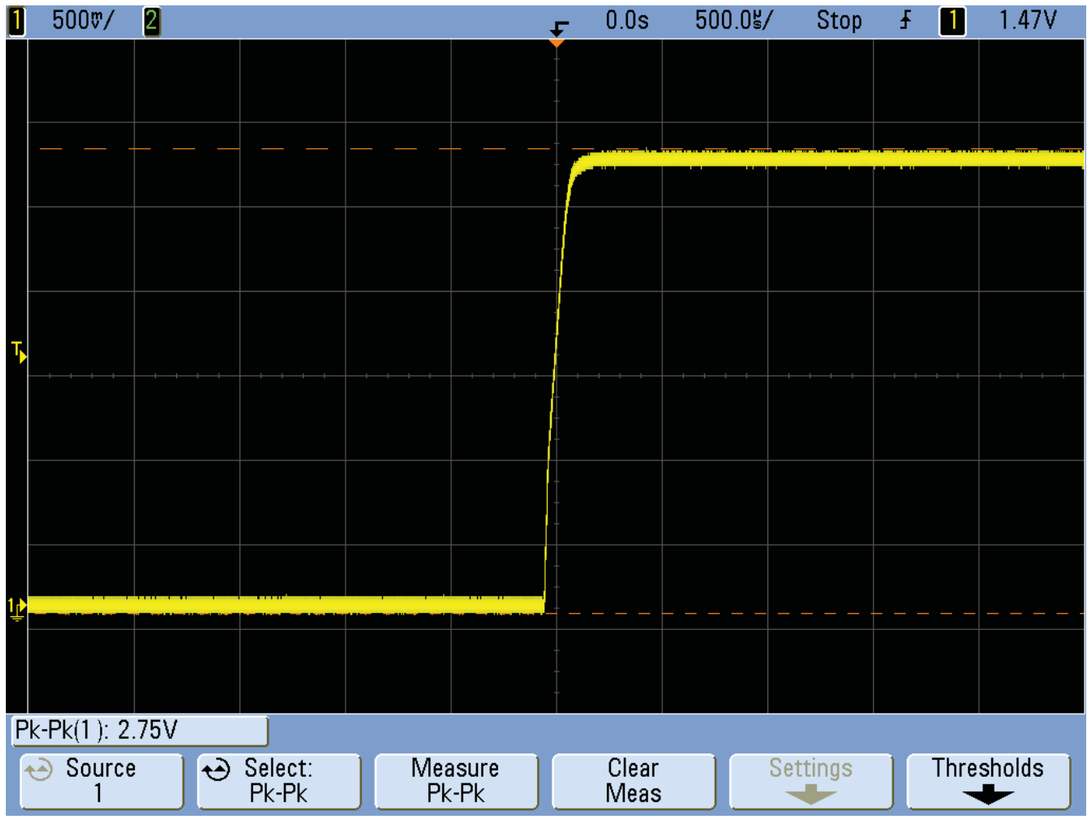


MP 2, 3 (W1300 Pind 3 and 4)

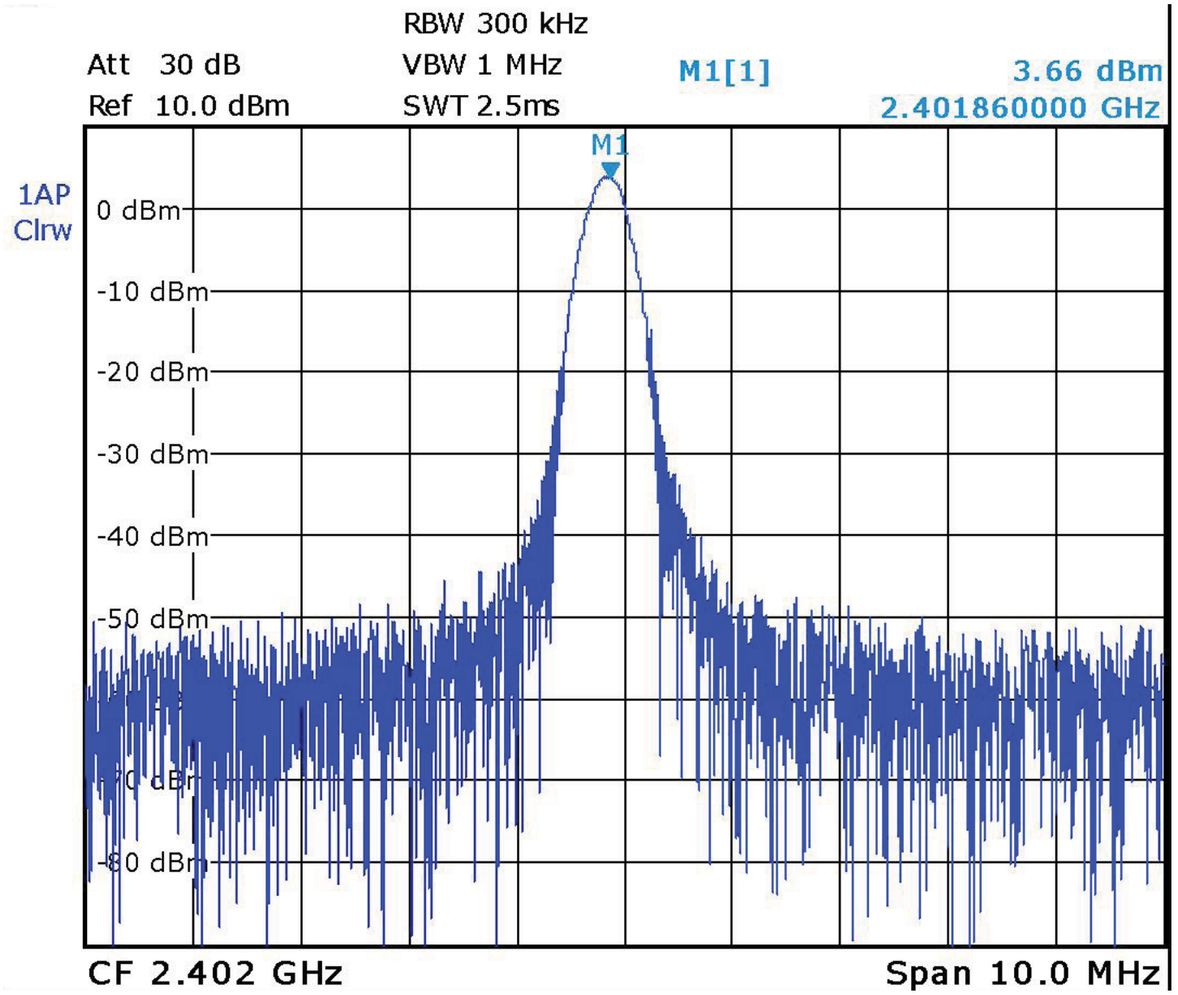


MP 8 (L2403), MP 9 (L2404), MP 69 (C3155), MP 74 (C3149), MP 75 (C3125), MP 76 (C3124), MP 77 (C3150) and MP 78 (C3156)

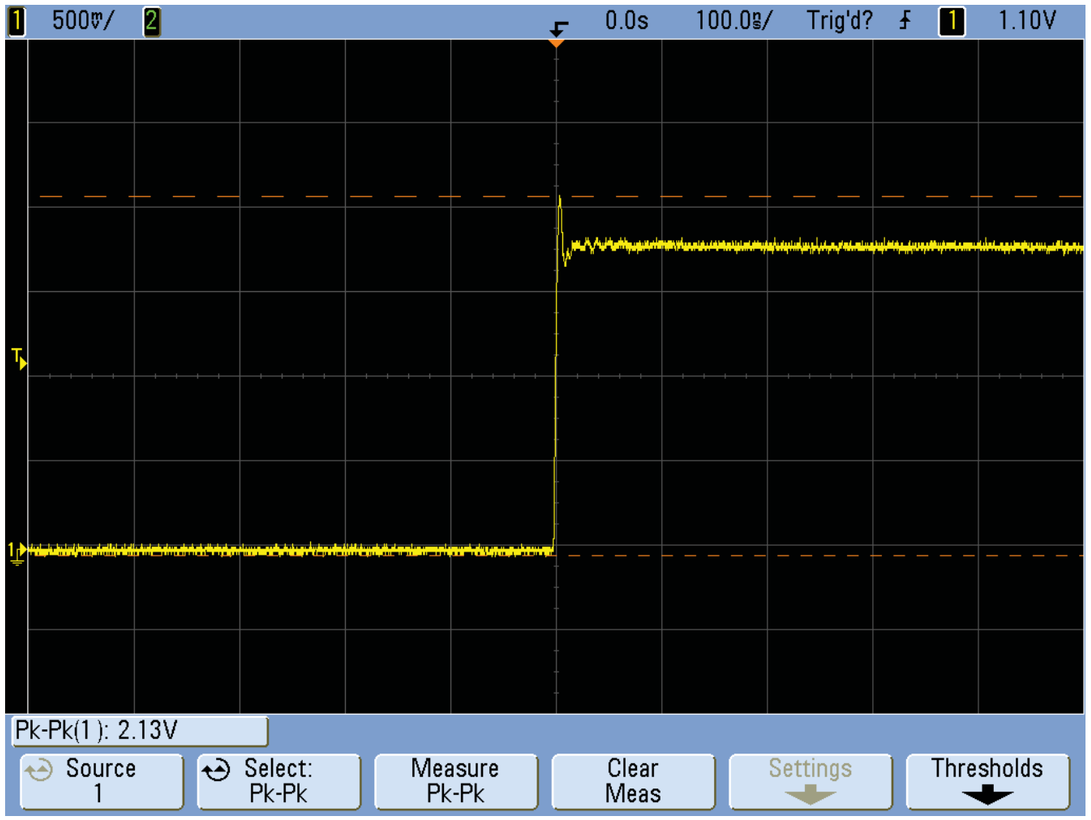
Note: This is an example! The shape of the signal can be different.



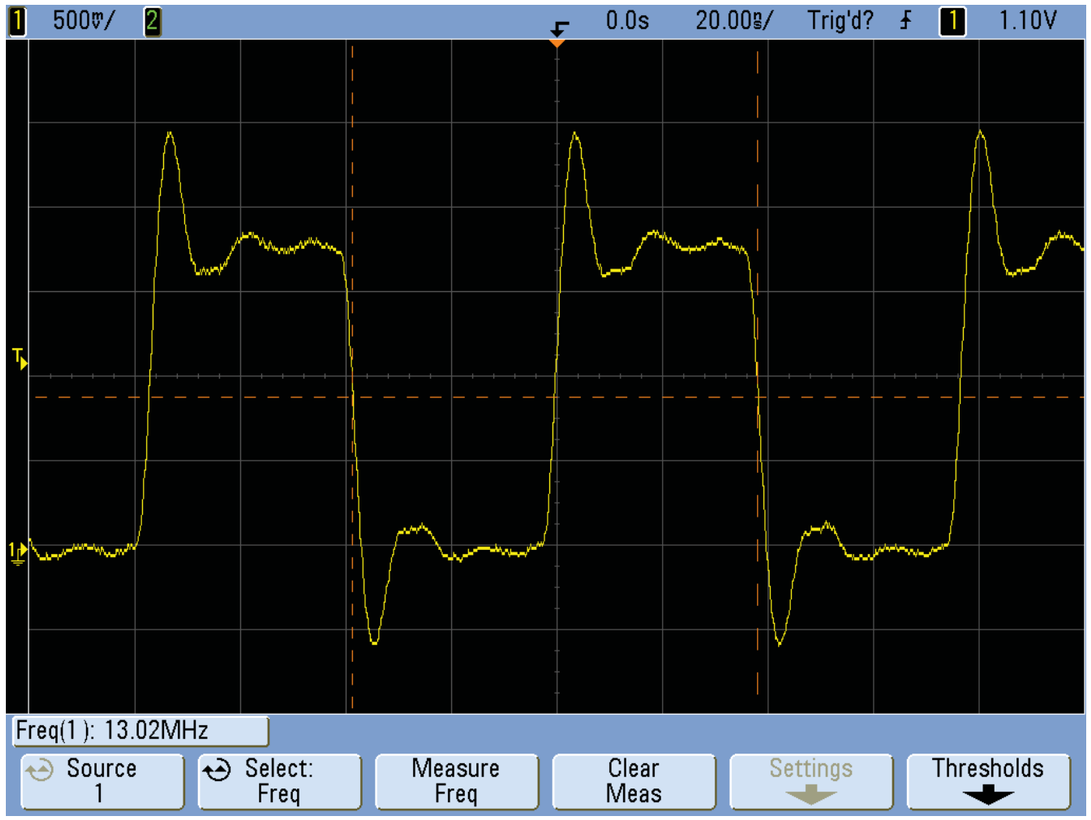
MP 24 (TP4203)



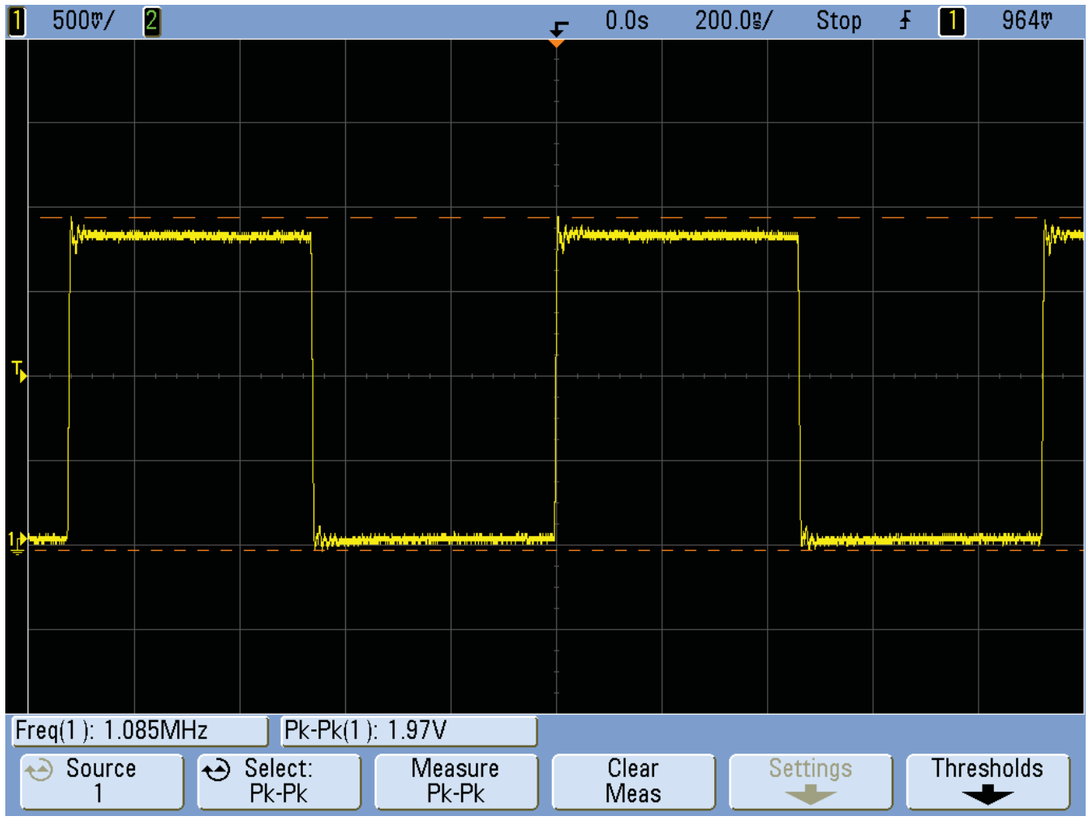
MP 30 (C1502 BT_ANT)



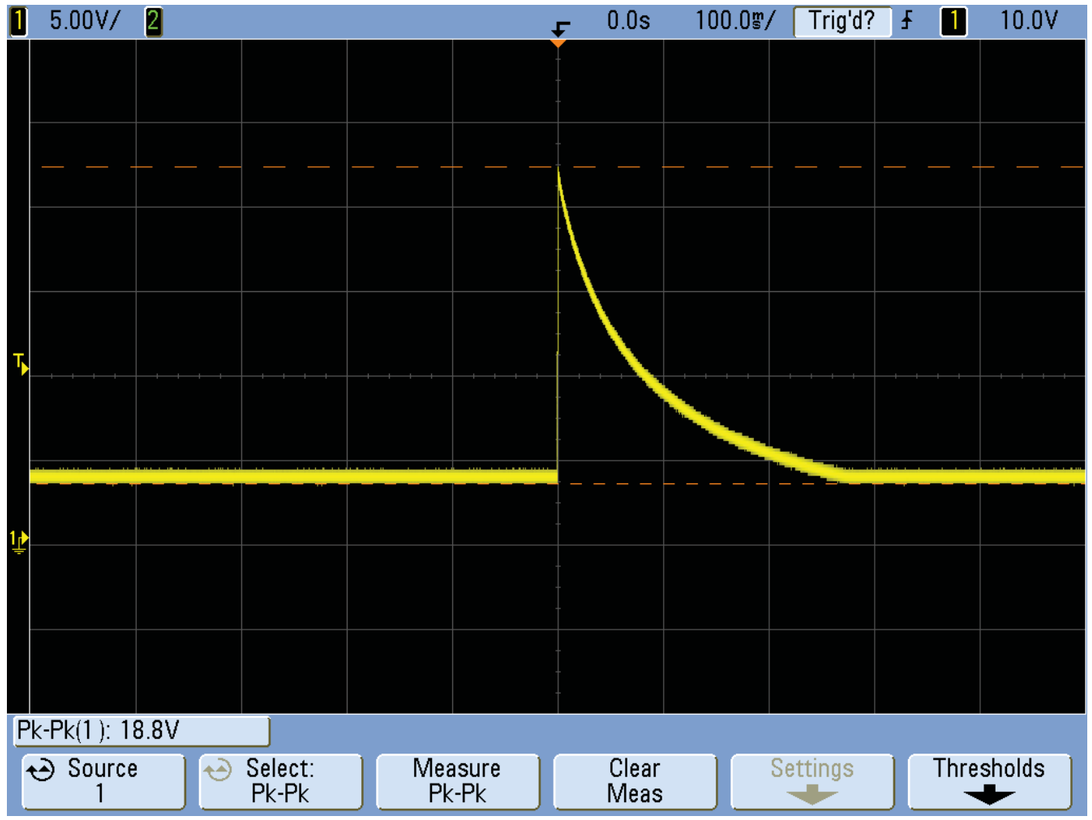
MP 31 (R2282 CAM_LDO_EN)



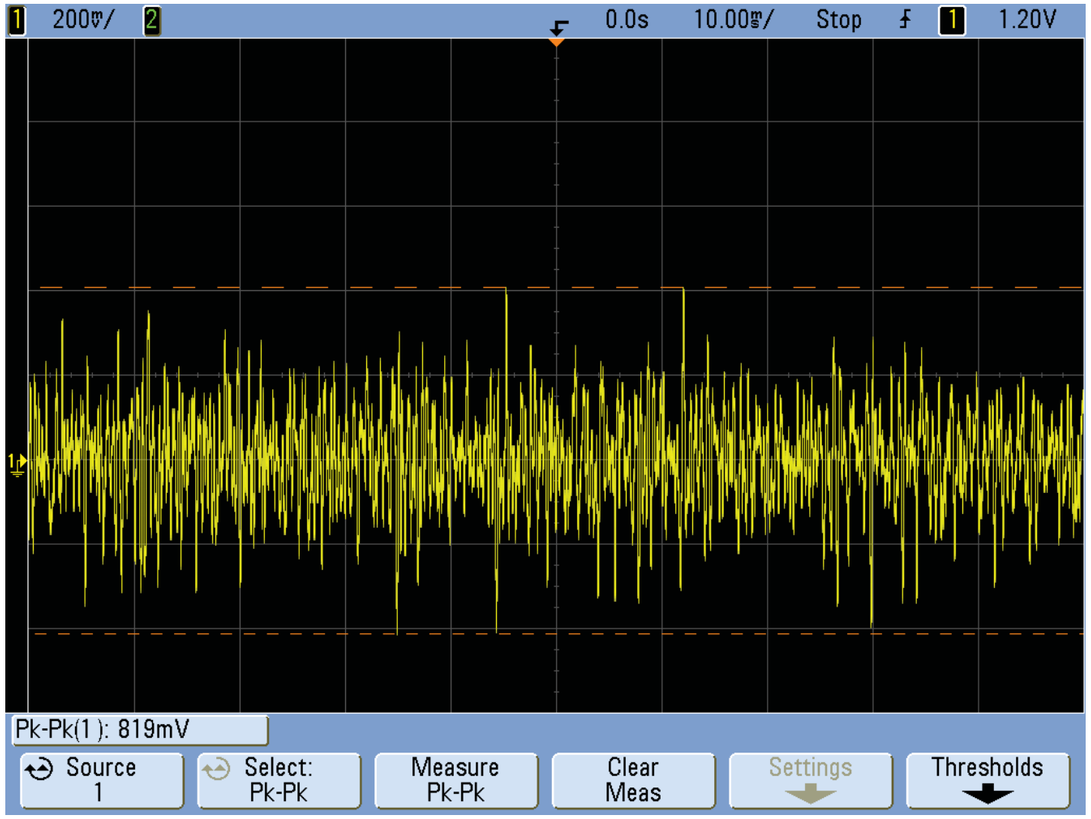
MP 32 (R4303 CAMSYSCLK)



MP 35 (SP2410)

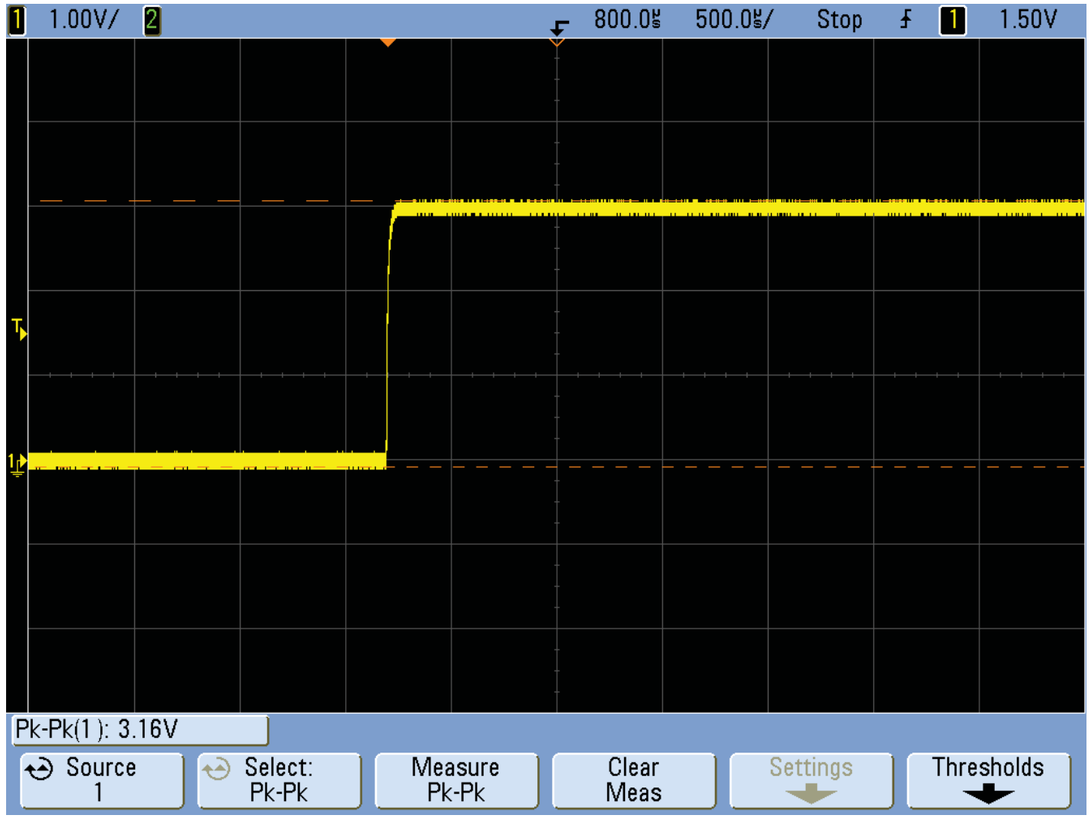


MP 36 (TP4200)

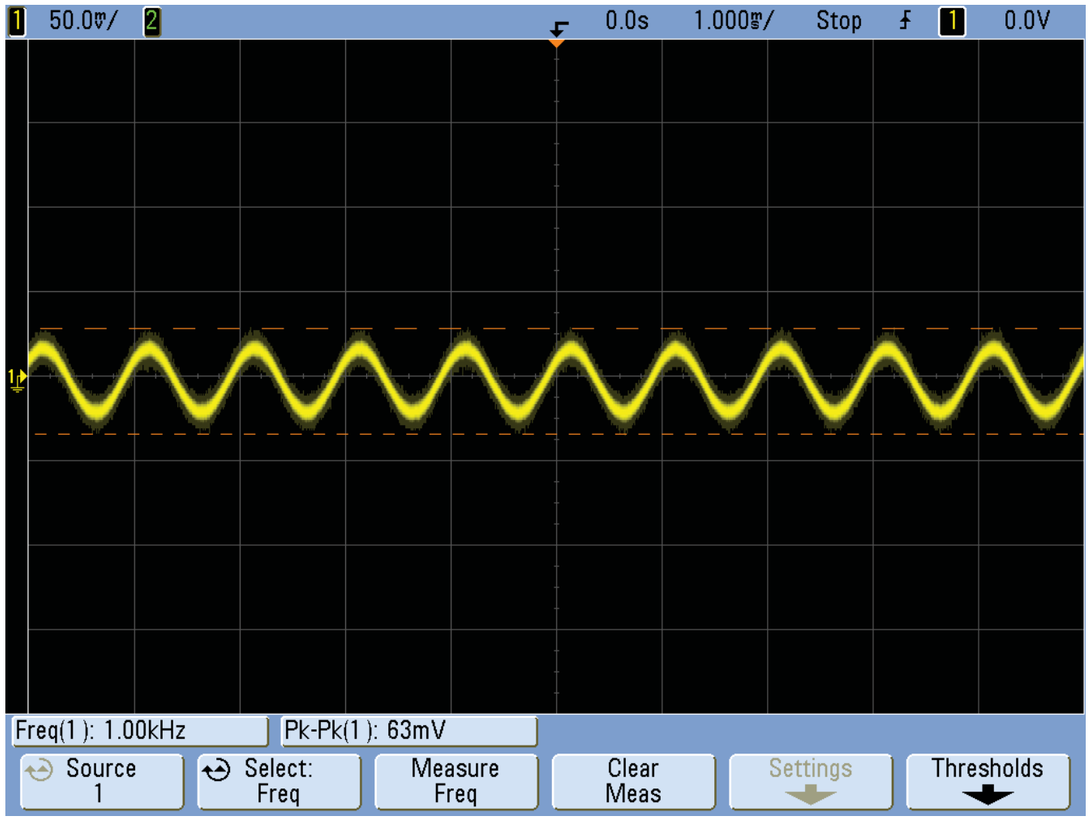


MP 39 (TP3104) and MP 42 (TP3105)

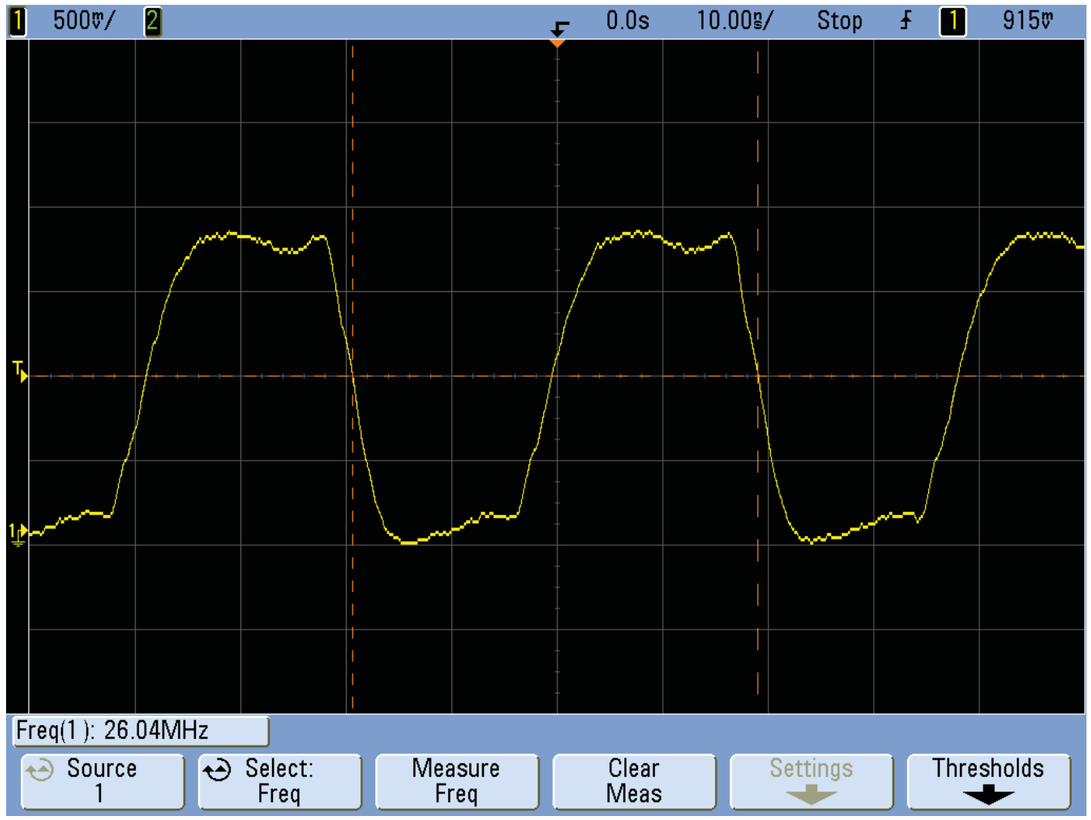
Note: This is an example! The shape of the signal can be different.



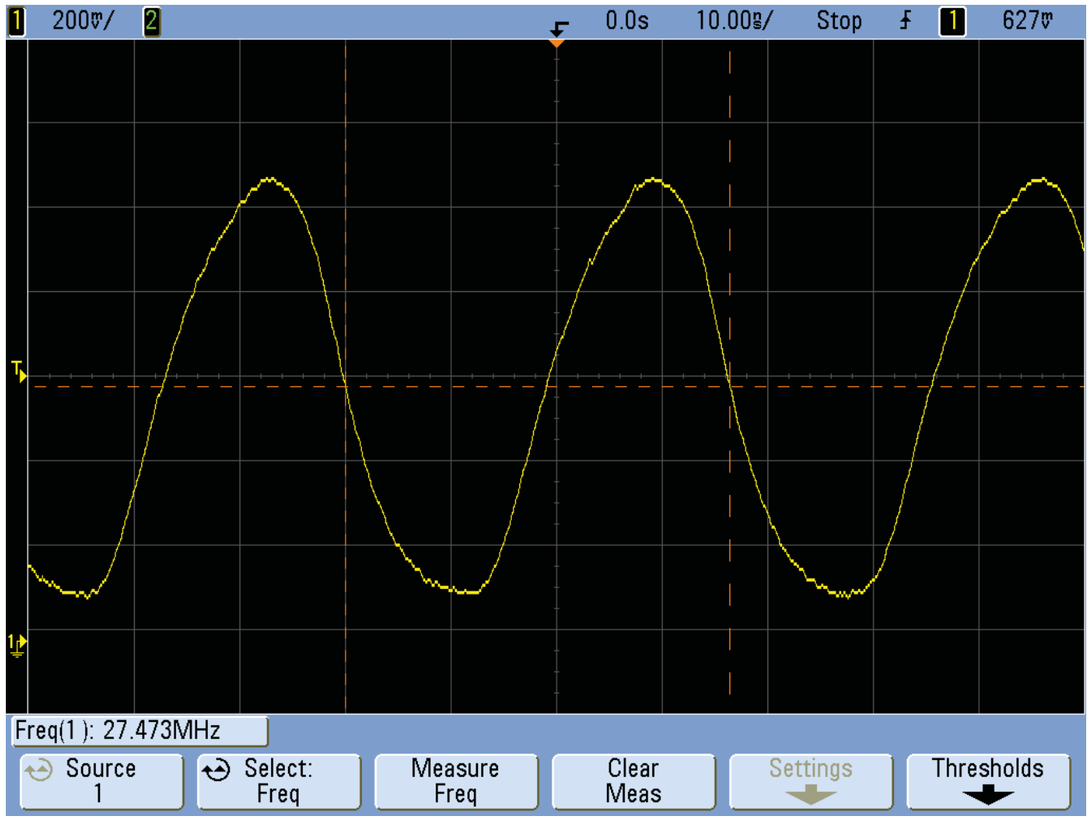
MP 43 (TP2203 VOPTO30)



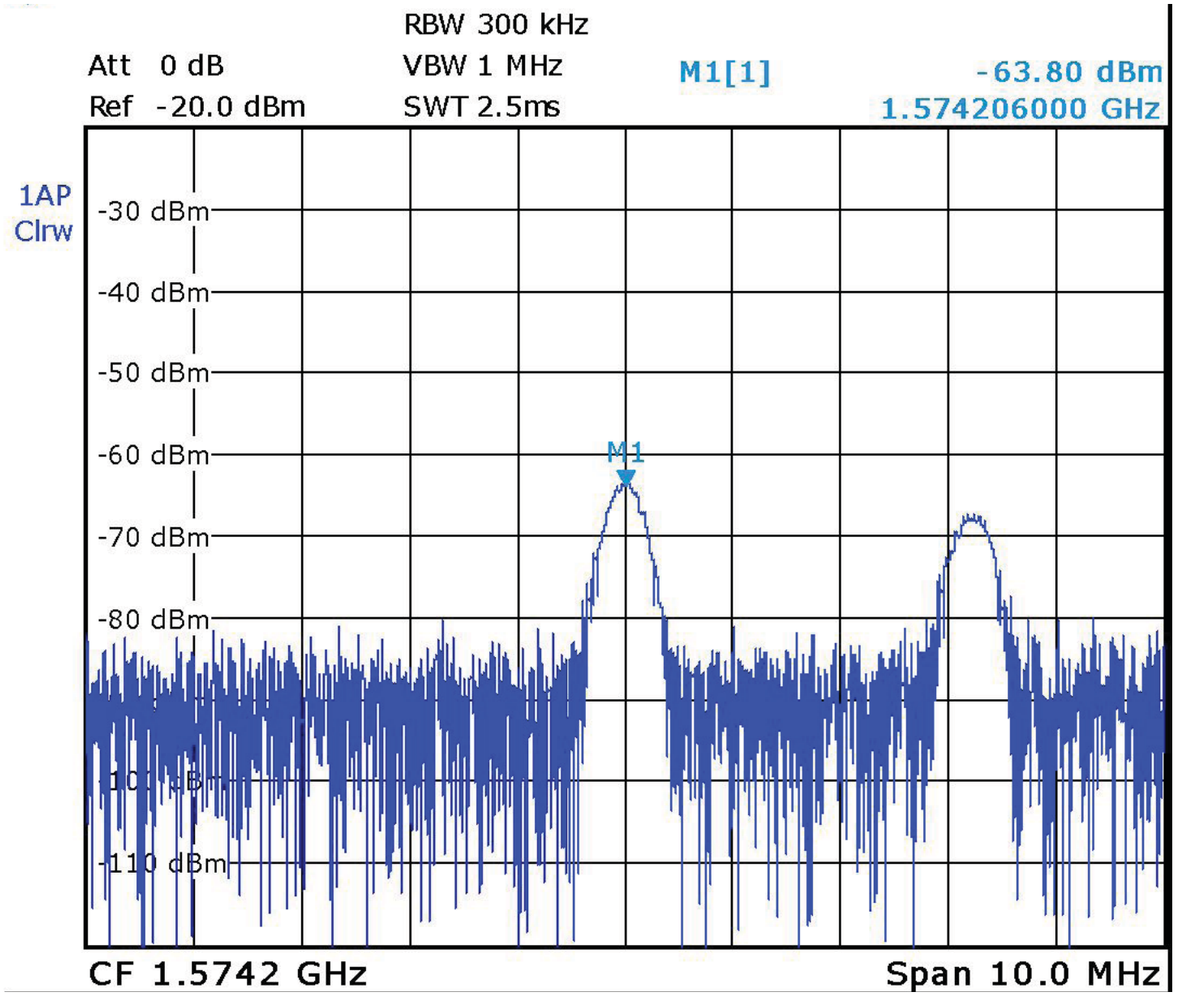
MP 55 (C3148) and MP 56 (C3137)



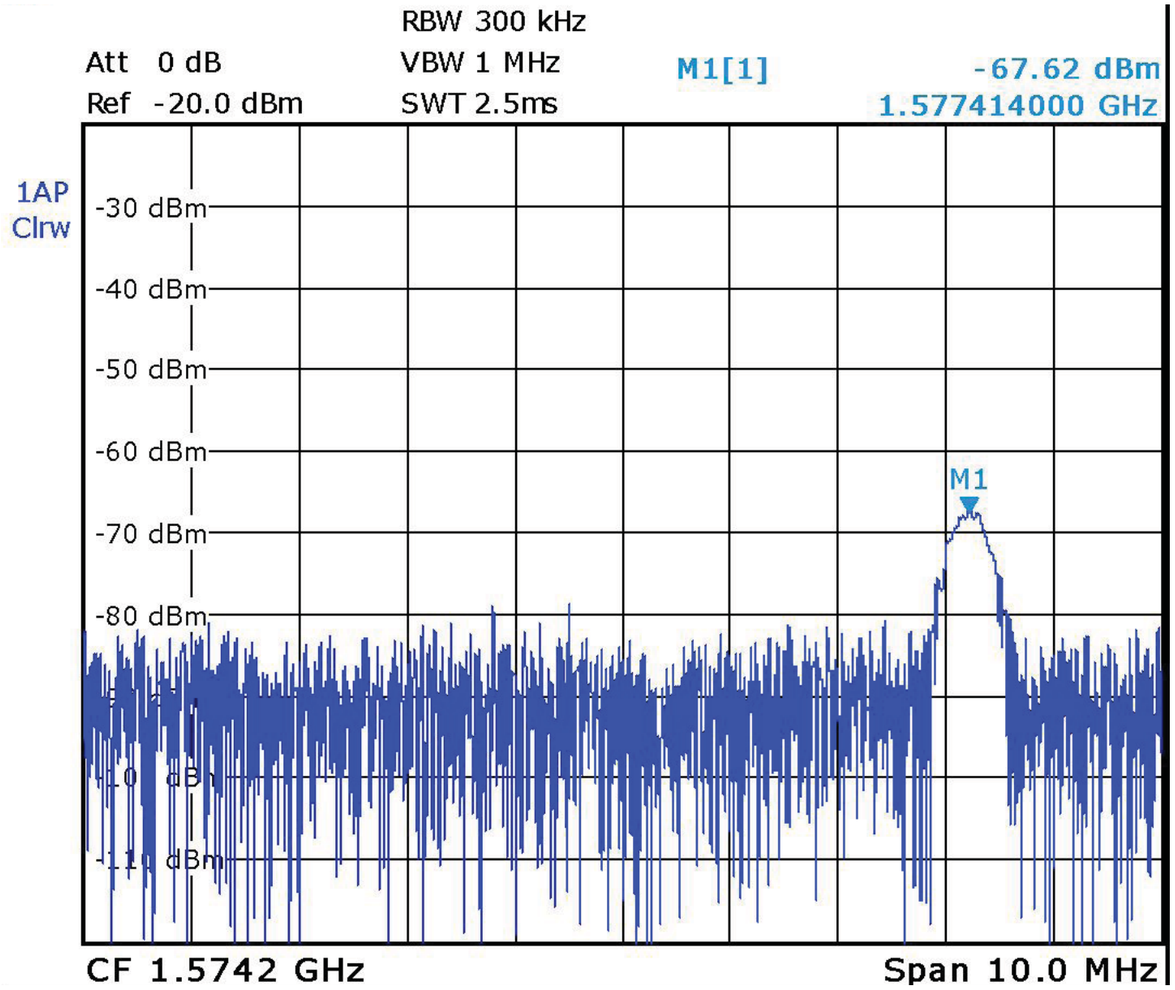
MP 84 (R1414 AGPS_CLK)



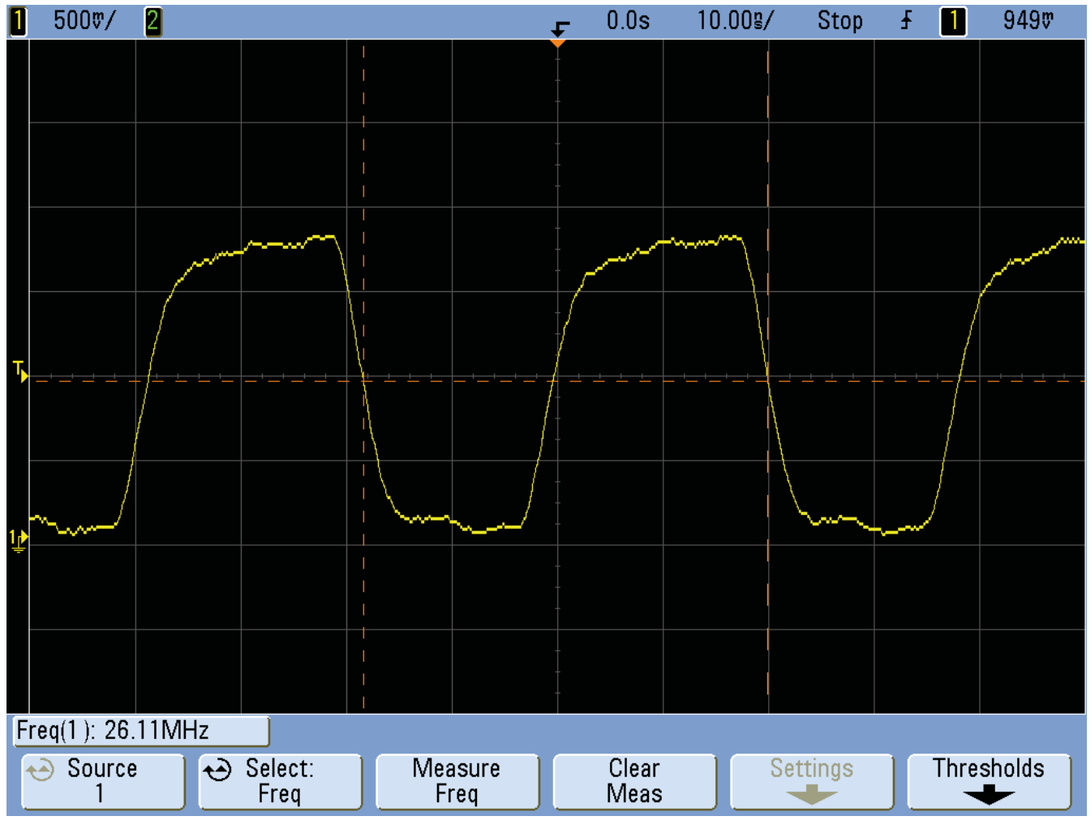
MP 85 (R1404) 27 MHz



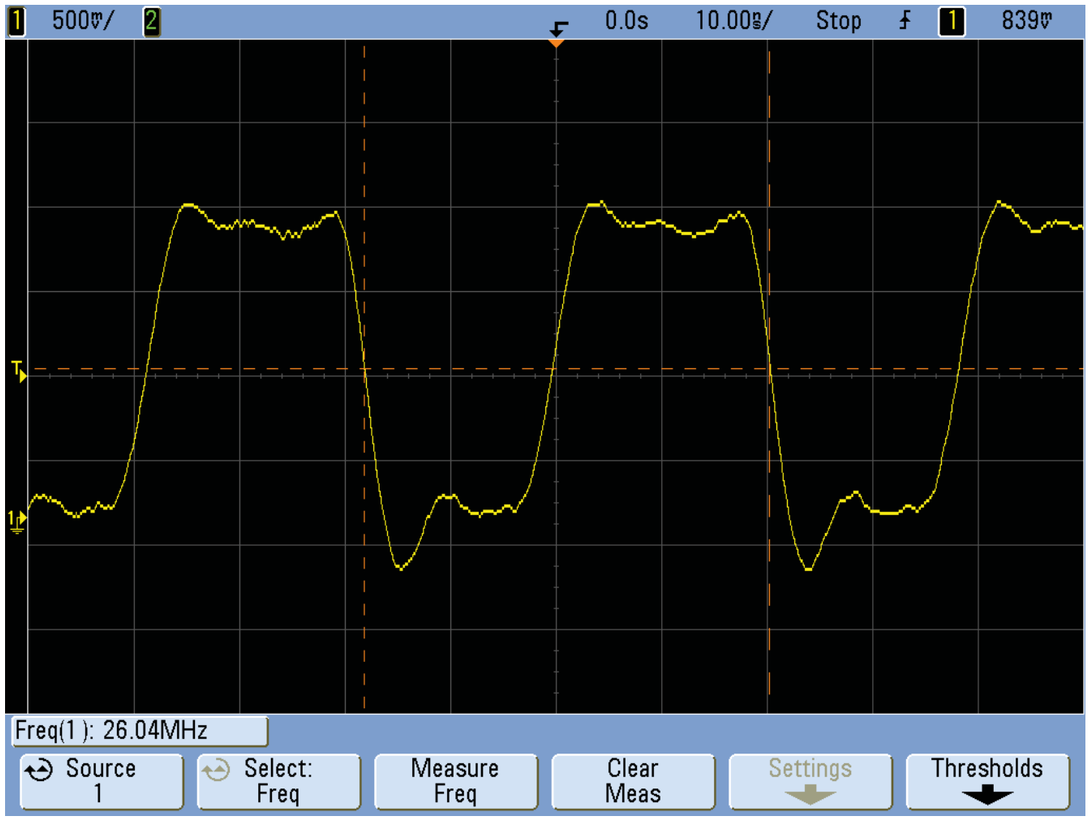
MP 90 (L1403) 1574.2 MHz, -63 dBm



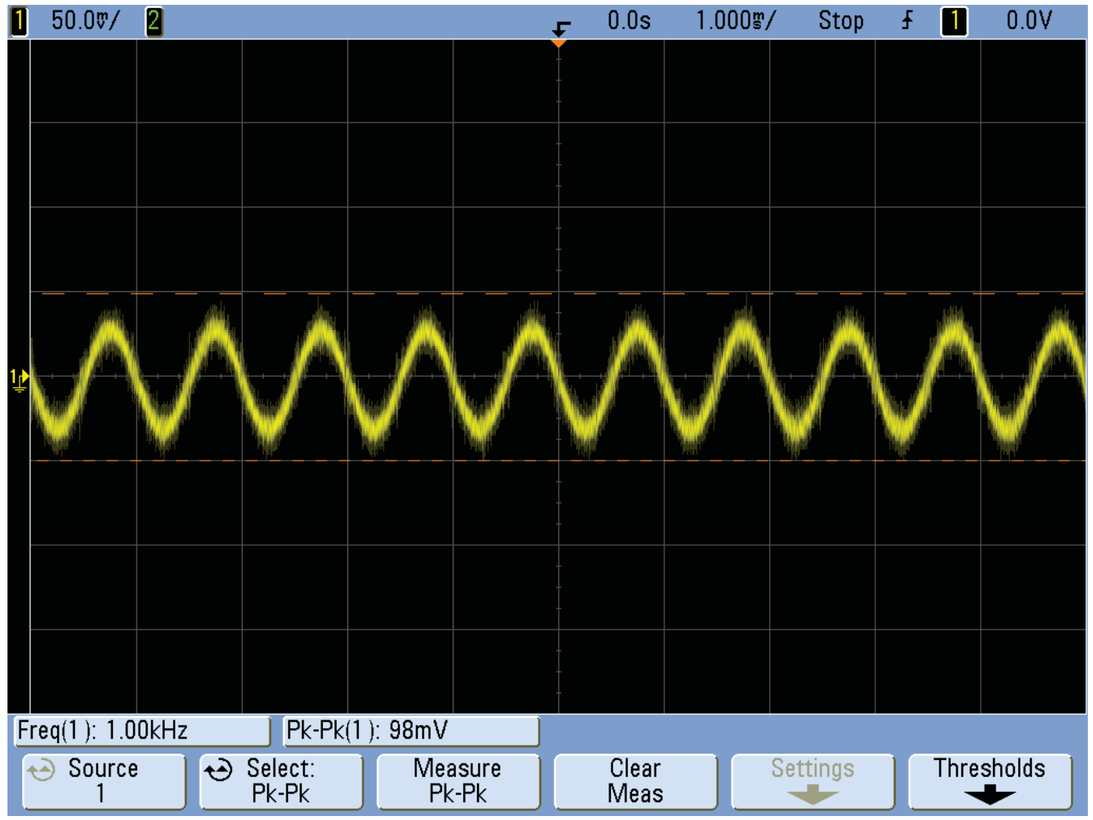
MP 90 (L1403) 1577.4 MHz, -67 dBm



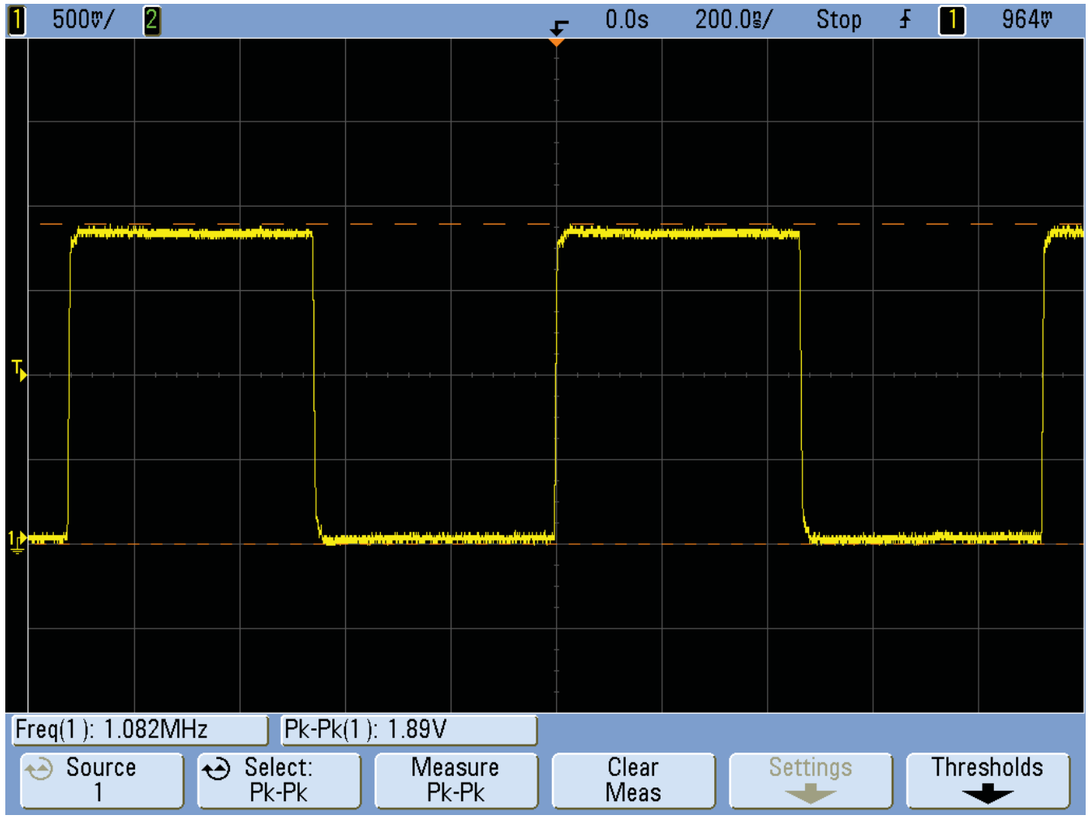
MP 97 (R2102 MCLK)



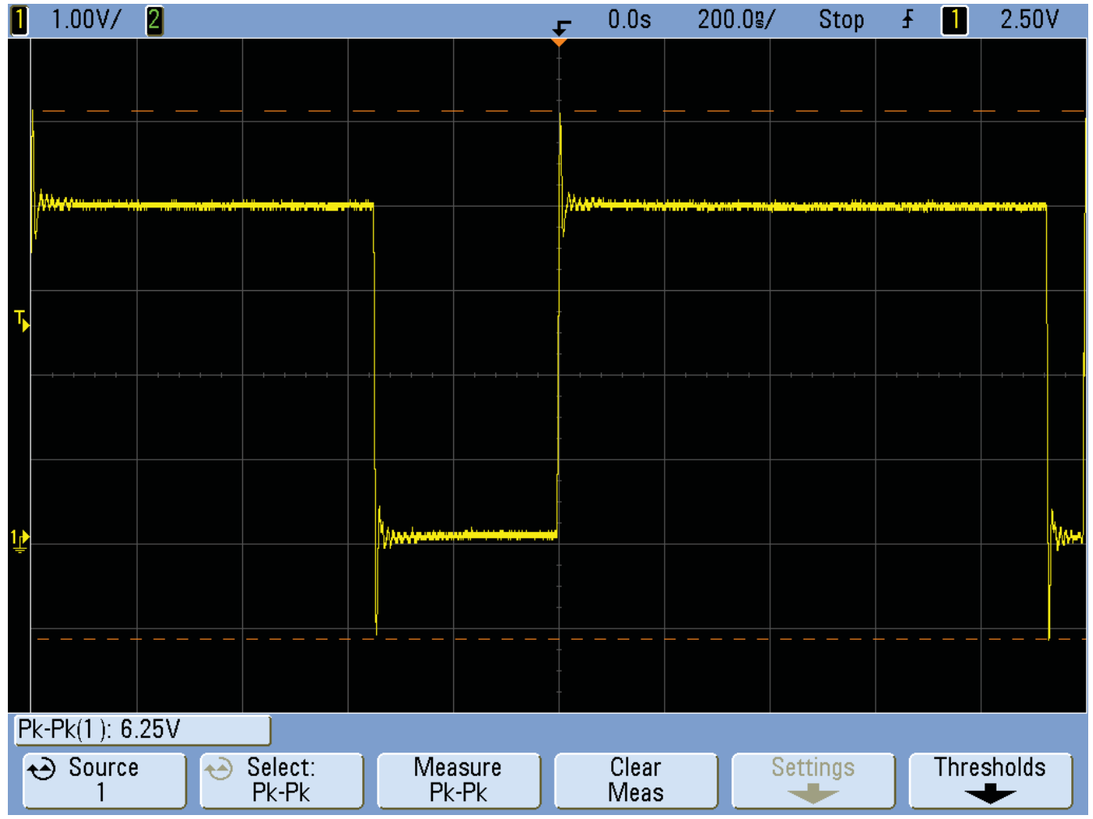
MP 98 (R2121 BT_CLK)



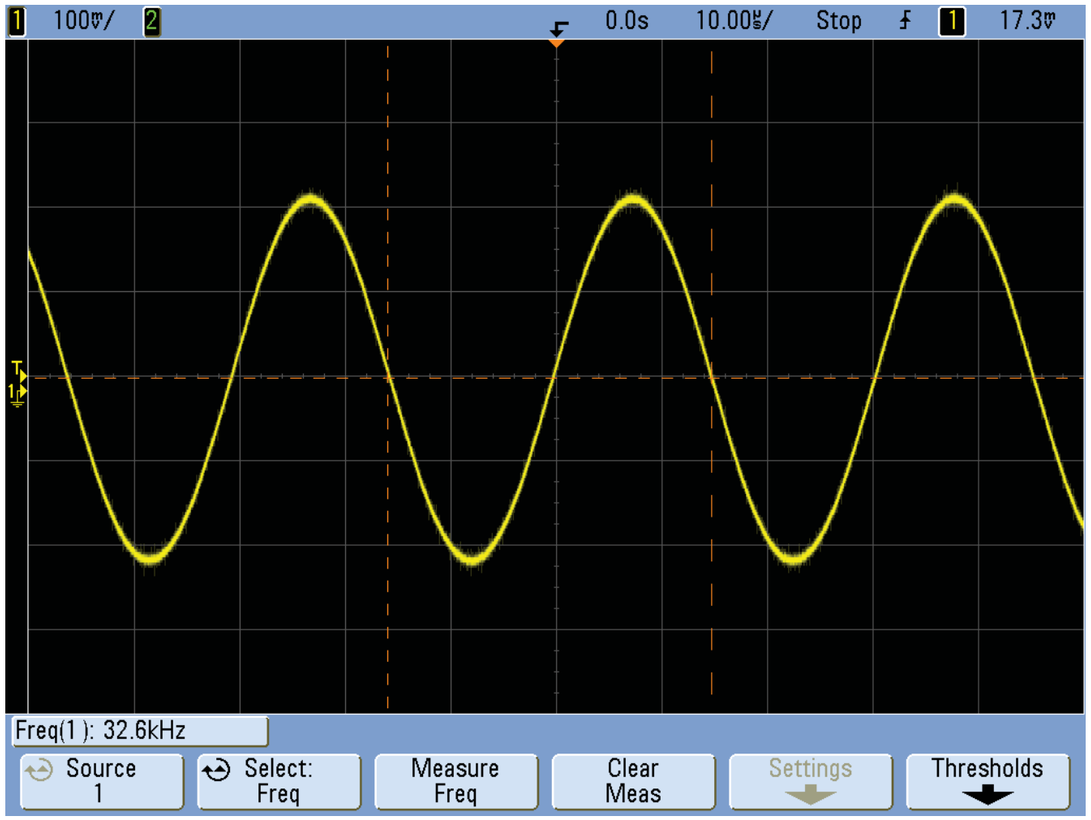
MP 105 (C3146) and MP 106 (C3145)



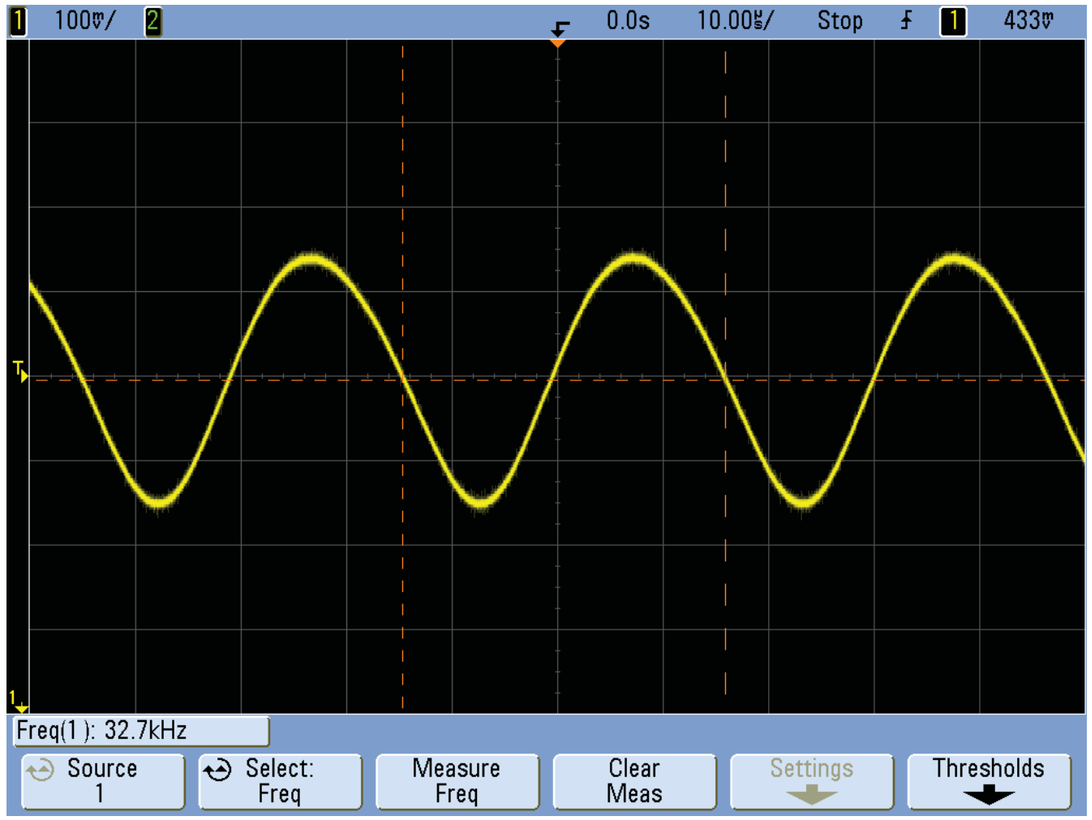
MP 110 (R2410 SIMCLK)



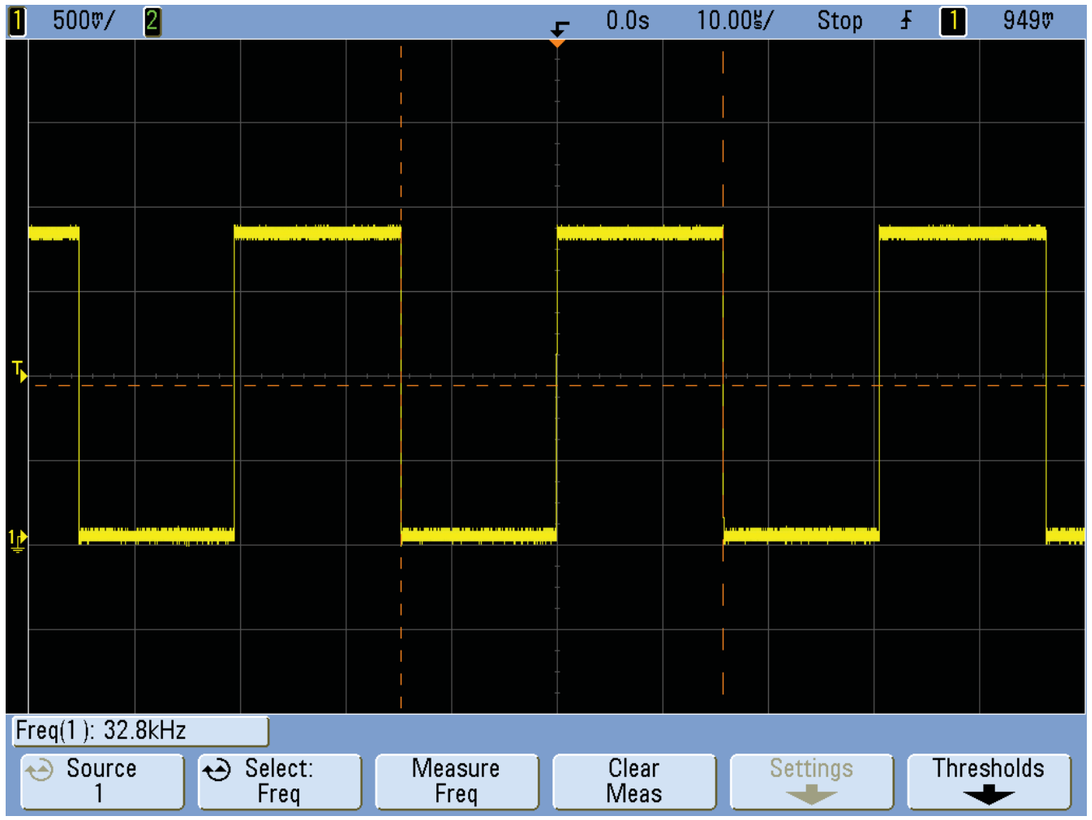
MP 112 (R4200)



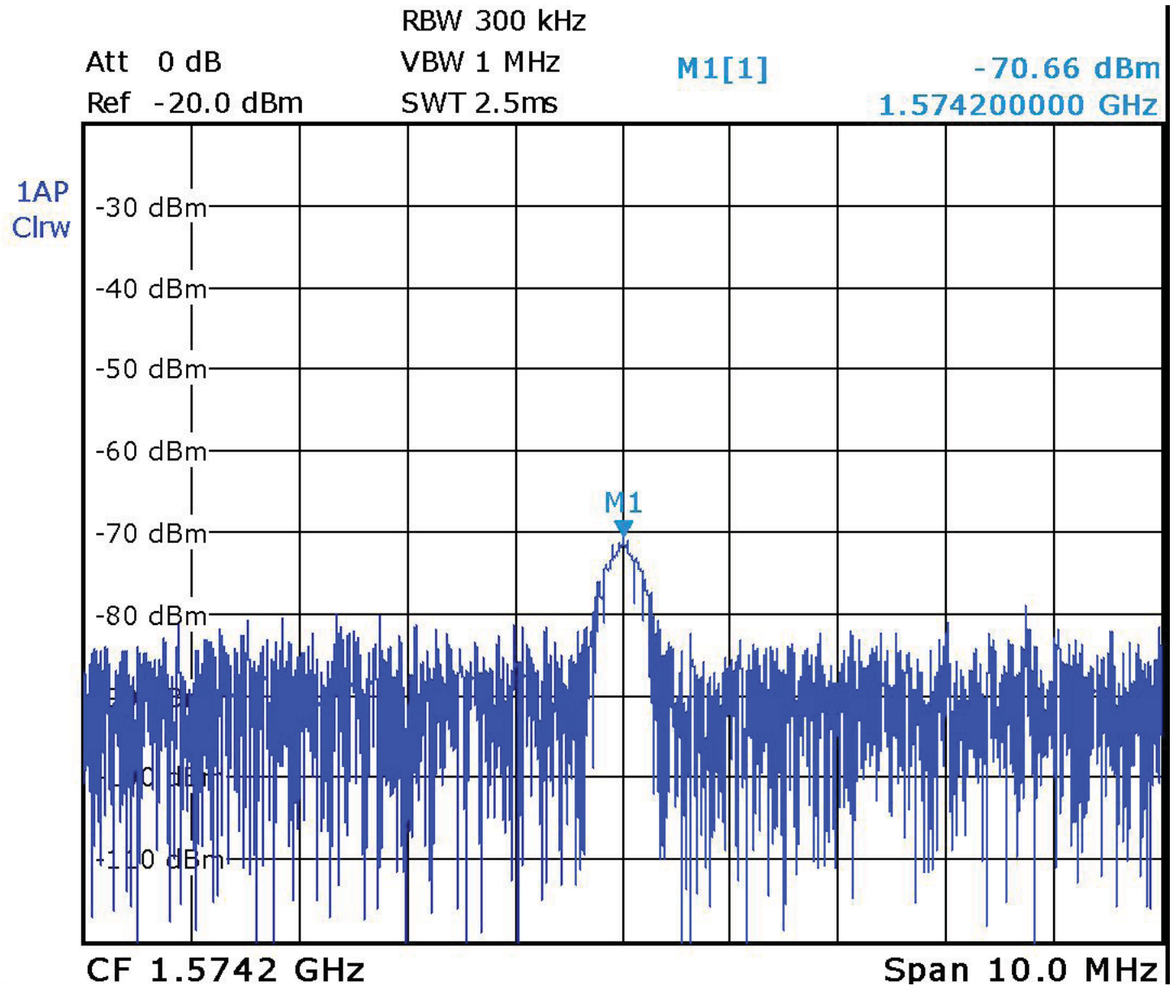
MP 118 (C2100)



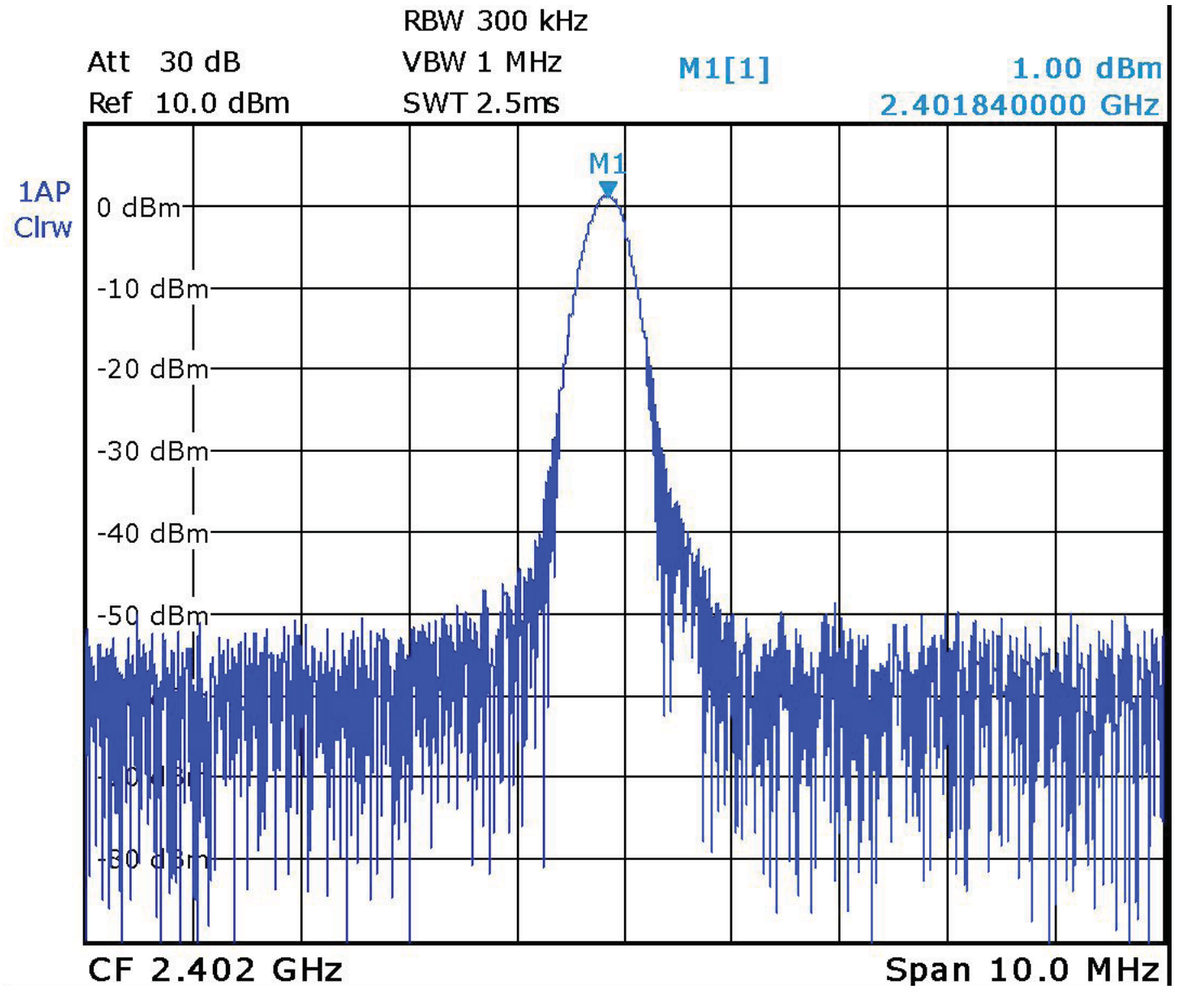
MP 119 (C2101)



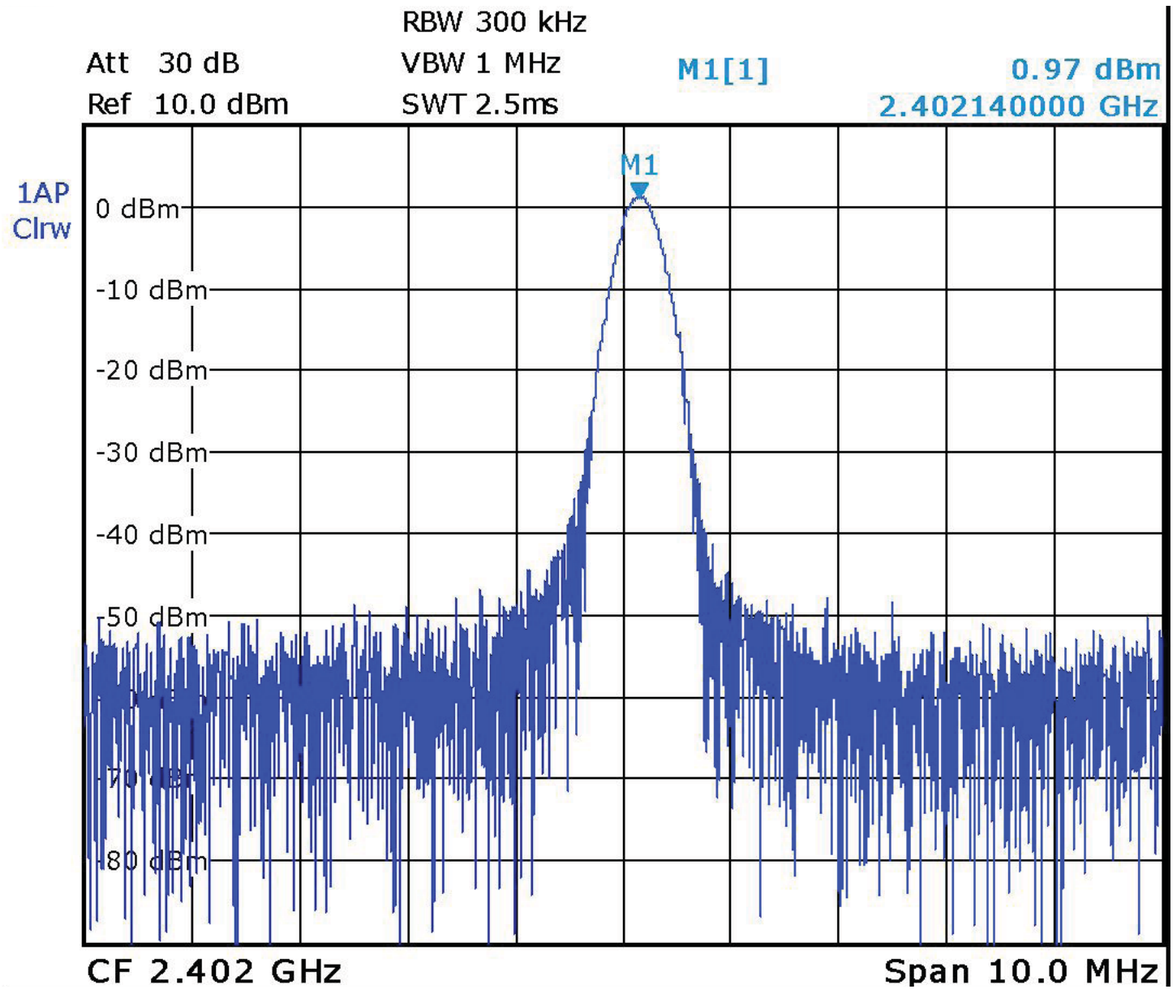
MP 121 (R2103 RTCCLK)



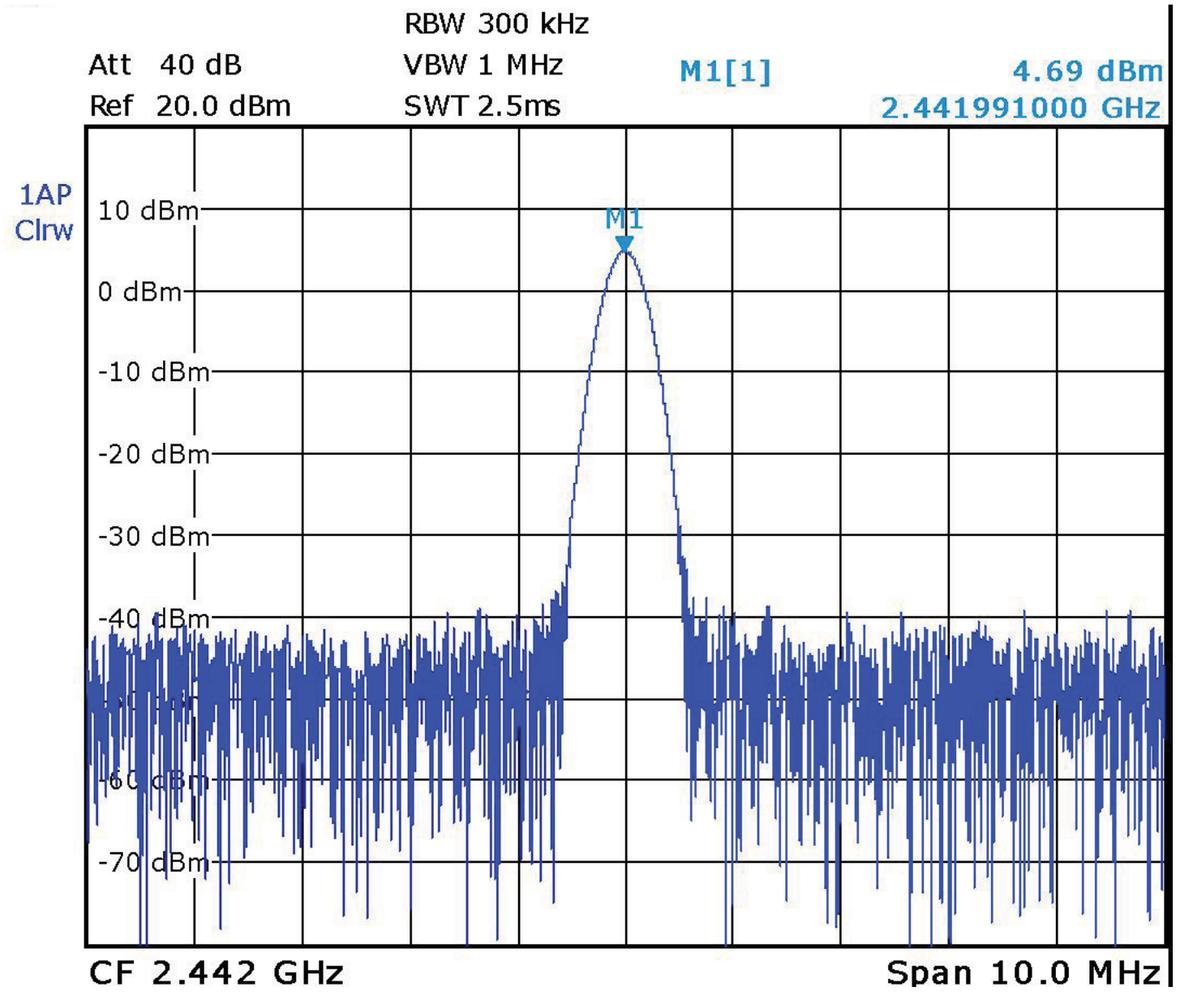
MP 124 (C1402) 1574.2 MHz, -70 dBm



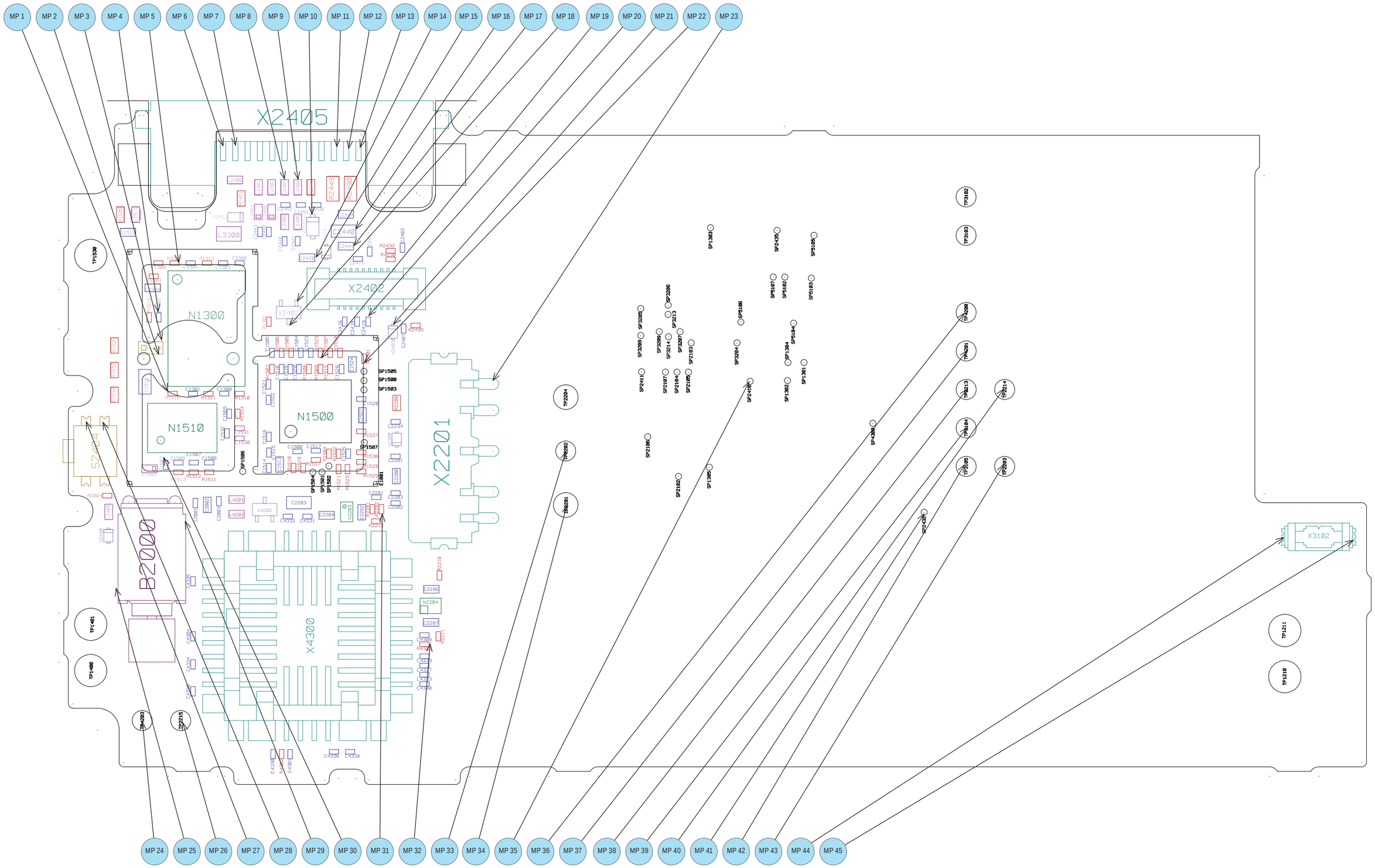
Blt MaxPwr MOD 0



Blt MaxPwr MOD 1



WLAN TX Output Power


MP 1
MP 2
MP 3
MP 4
MP 5
MP 6
MP 7
MP 8
MP 9
MP 10
MP 11
MP 12
MP 13
MP 14
MP 15
MP 16
MP 17
MP 18
MP 19
MP 20
MP 21
MP 22
MP 23
X2405
X2402
N1300
N1510
N1500
S2404
B2000
X4300
X2201
X3102
MP 24
MP 25
MP 26
MP 27
MP 28
MP 29
MP 30
MP 31
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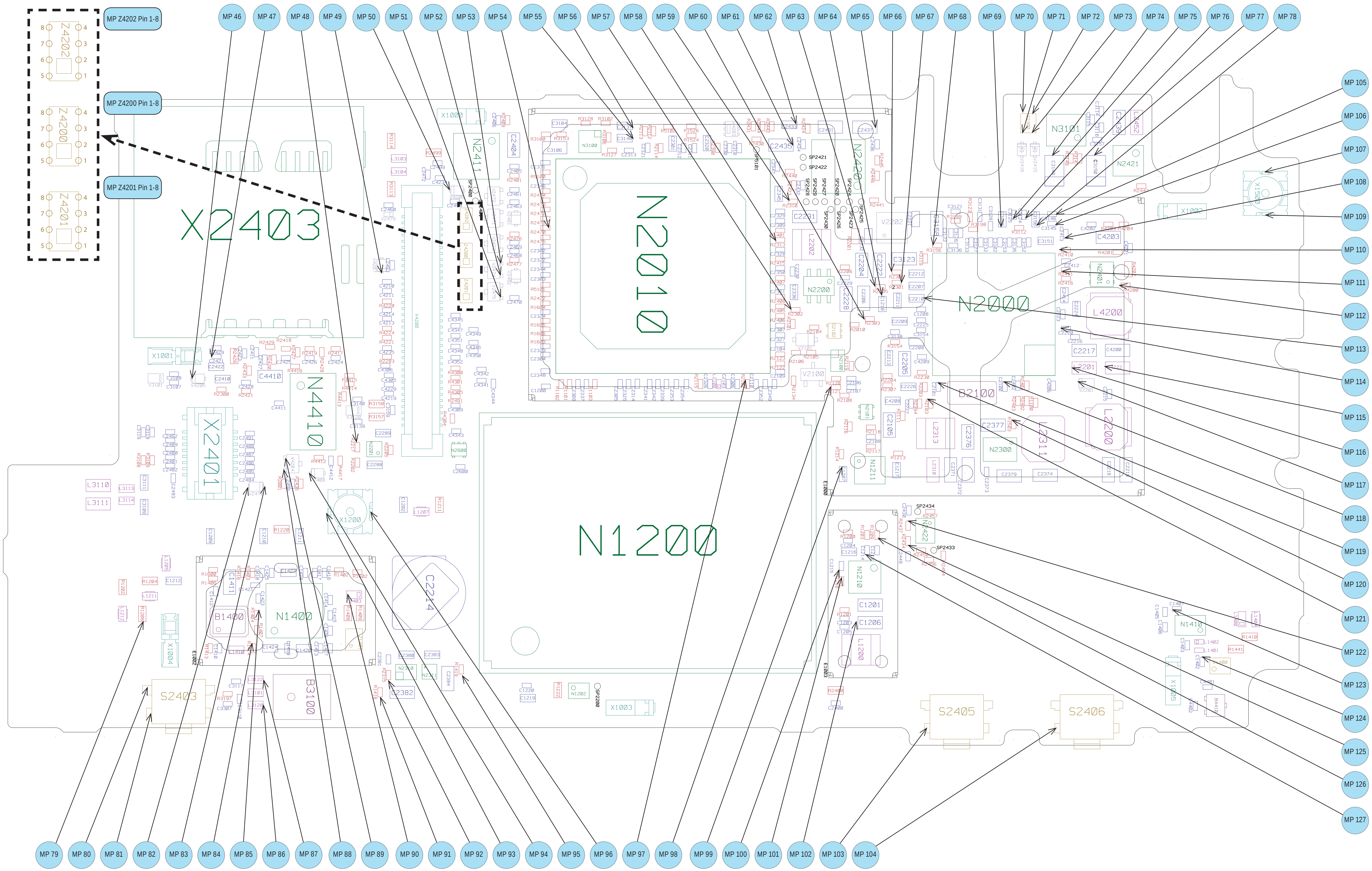
MP 40
MP 41
MP 42
MP 43
MP 44
MP 45


MP Z4202 Pin 1-8
MP Z4200 Pin 1-8
MP Z4201 Pin 1-8
MP 46
MP 47
MP 48
MP 49
MP 50
MP 51
MP 52
MP 53
MP 54
MP 55
MP 56
MP 57
MP 58
MP 59
MP 60
MP 61
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MP 91
MP 92
MP 93
MP 94
MP 95
MP 96
MP 97
MP 98
MP 99
MP 100
MP 101
MP 102
MP 103
MP 104
X2403
N2010
N2000
N1200
N4410
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B1400
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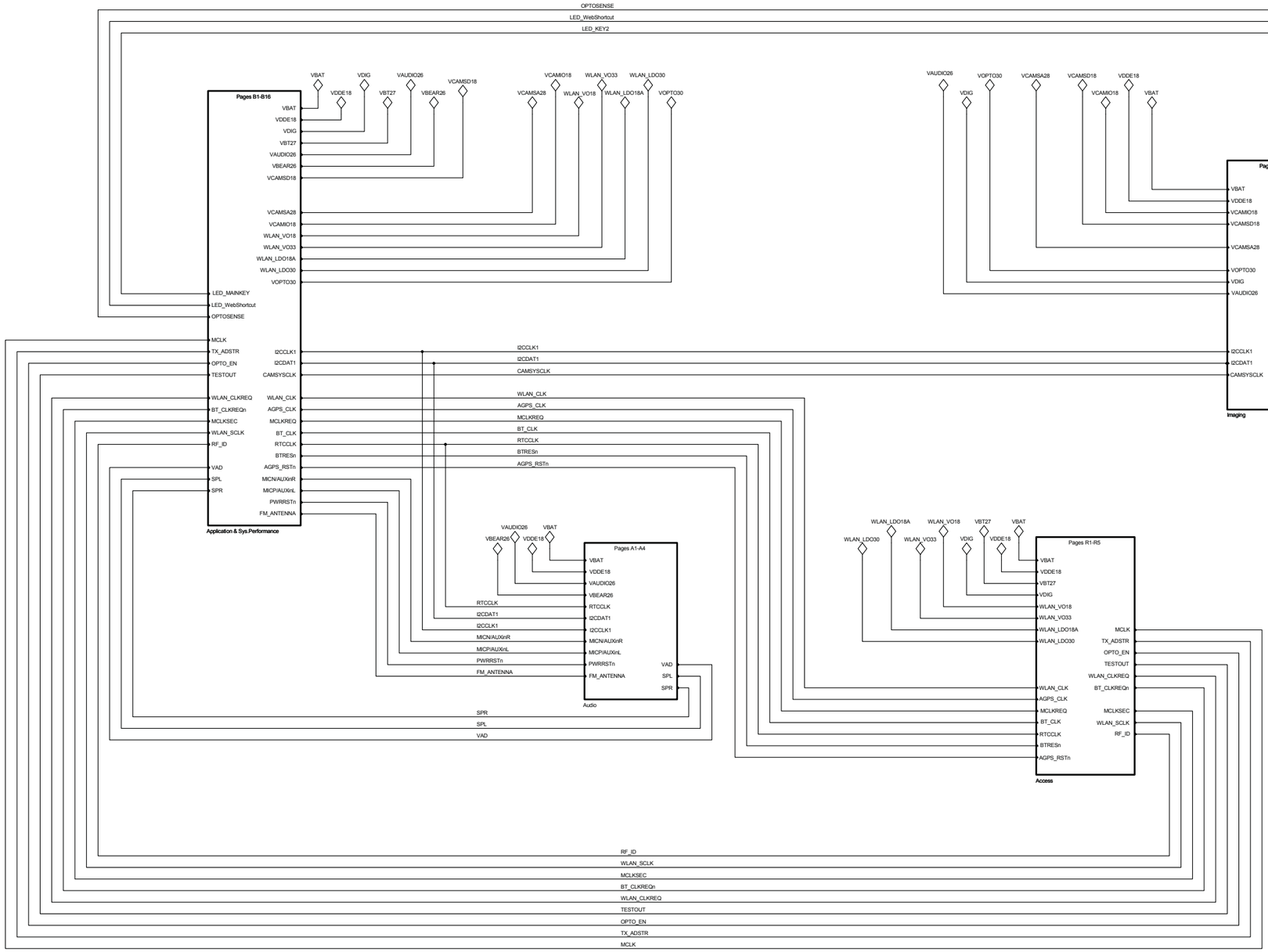
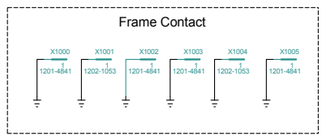
S2405
S2406
B3100
C2214
L4200
L2200
B2100

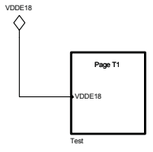


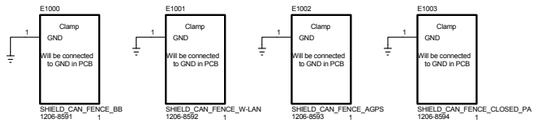
Access side GPIO mapping		
Port	Usage	Page
AccGPIO00	USB_HSSTP	B14
AccGPIO01	USB_HSDIR	B14
AccGPIO02	CTMS	B14
AccGPIO03	CFMS	B14
AccGPIO04	USB_HSINCLK	B14
AccGPIO05	USB_HSNXT	B14
AccGPIO06	USB_HSDATA4	B14
AccGPIO07	USB_HSDATA5	B14
AccGPIO08	USB_HSDATA6	B14
AccGPIO09	USB_HSDATA7	B14
AccGPIO10	UART3_RX	R04
AccGPIO11	UART3_TX	R04
AccGPIO12	UART3_CTS	R04
AccGPIO13	UART3_RTS	R04
AccGPIO14	CH_DET_DP	B14
AccGPIO15	CH_DET_DM	B14
AccGPIO16	USB_HSCHIP_SEL	B14
AccGPIO17	AGPS_SYNC	R04
AccGPIO18	USB_HSDATA3	B14
AccGPIO19	WLAN_SPI_CSn	R05
AccGPIO20	ACC_SPI_DI	R03
AccGPIO21	ACC_SPI_DO	R03
AccGPIO22	ACC_SPI_CLK	R03
AccGPIO23	OVP_FLAG	B14
AccGPIO24	not used	T01
AccGPIO25	WLAN_SPI_IRQ	R05
AccGPIO26	BT_SPI_CSn	R03
AccGPIO27	BT_SPI_INT	R03

BT-chip GPIO mapping		
Port	Usage	Page
BTGPIO0	WLAN_CONFIRMn	R03
BTGPIO8	WLAN_BT_STATE	R03
BTGPIO9	not used	R03
BTGPIO10	not used	R03
BTGPIO11	WLAN_BT_PRIORITY	R03
BTGPIO16	not used	R03

Application side GPIO mapping		
Port	Usage	Page
AppGPIO00	FM_INT	A04
AppGPIO01	APP_LOG	B14
AppGPIO02	Tally_LED_C	I03
AppGPIO03	not used	I03
AppGPIO04	SLIDE_SENSE	B15
AppGPIO05	not used	B16
AppGPIO06	AMPCTRL	B08
AppGPIO07	AGPS_PWRON	B16
AppGPIO08	AGPS_LDO_EN	B16
AppGPIO09	AGPS_CLK_REQn	B16
AppGPIO10	AGPS_CLK_EN	B03
AppGPIO11	not used	I04
AppGPIO12	MSDETECT	B13
AppGPIO13	CAM_PWDN	I02
AppGPIO14	CIF_STANDBY	I02
AppGPIO15	DCON	xxx
AppGPIO16	CAM_LDO_EN	B16
AppGPIO17	WLAN_PDn	A02
AppGPIO18	WLAN_RSTn_PDn	B16
AppGPIO19	not used	I04







Made for	
Top Schematic	
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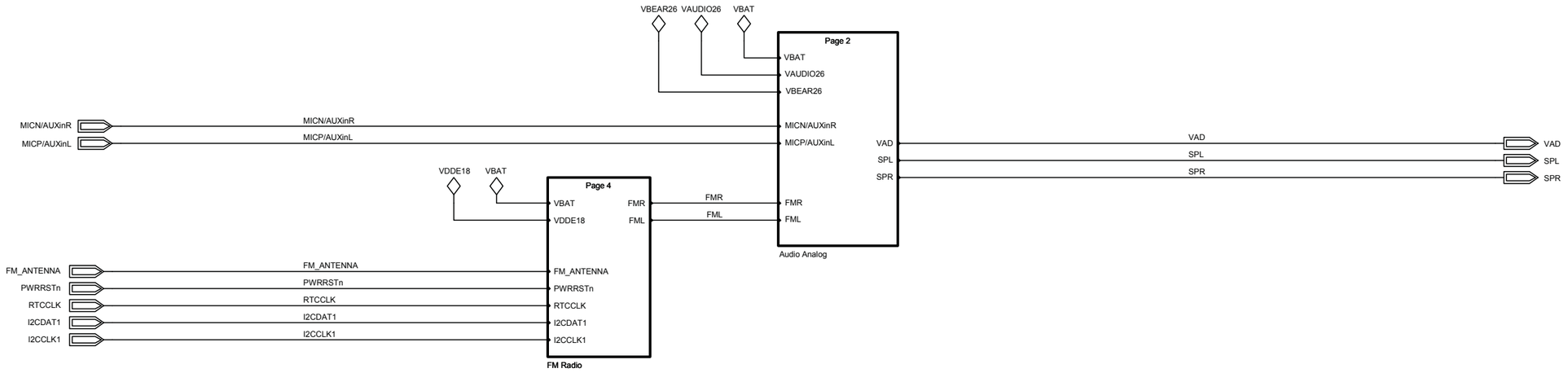

Made for	
Audio **Audio Top**	
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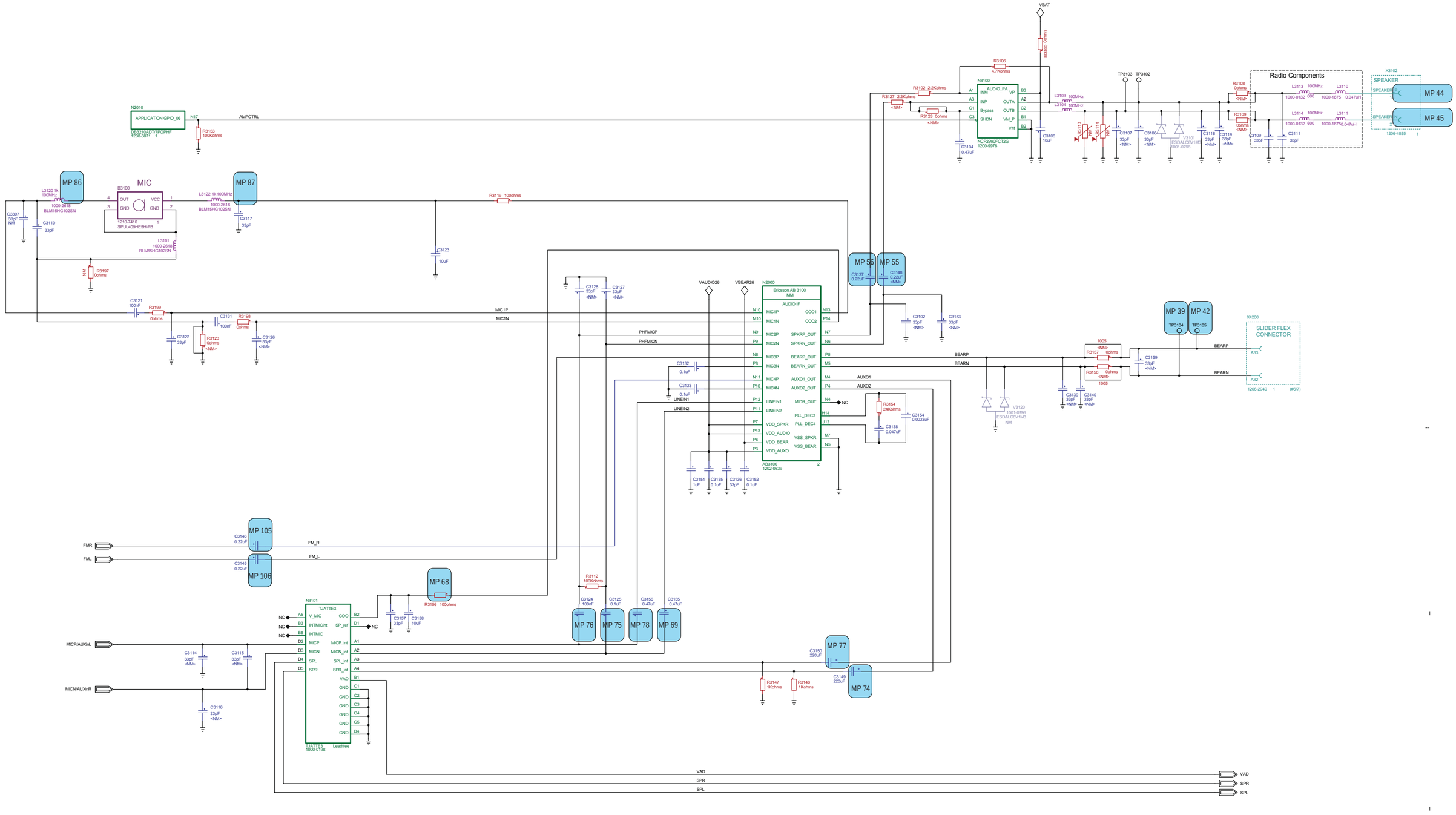

Made for	
Audio **Audio Analog**	
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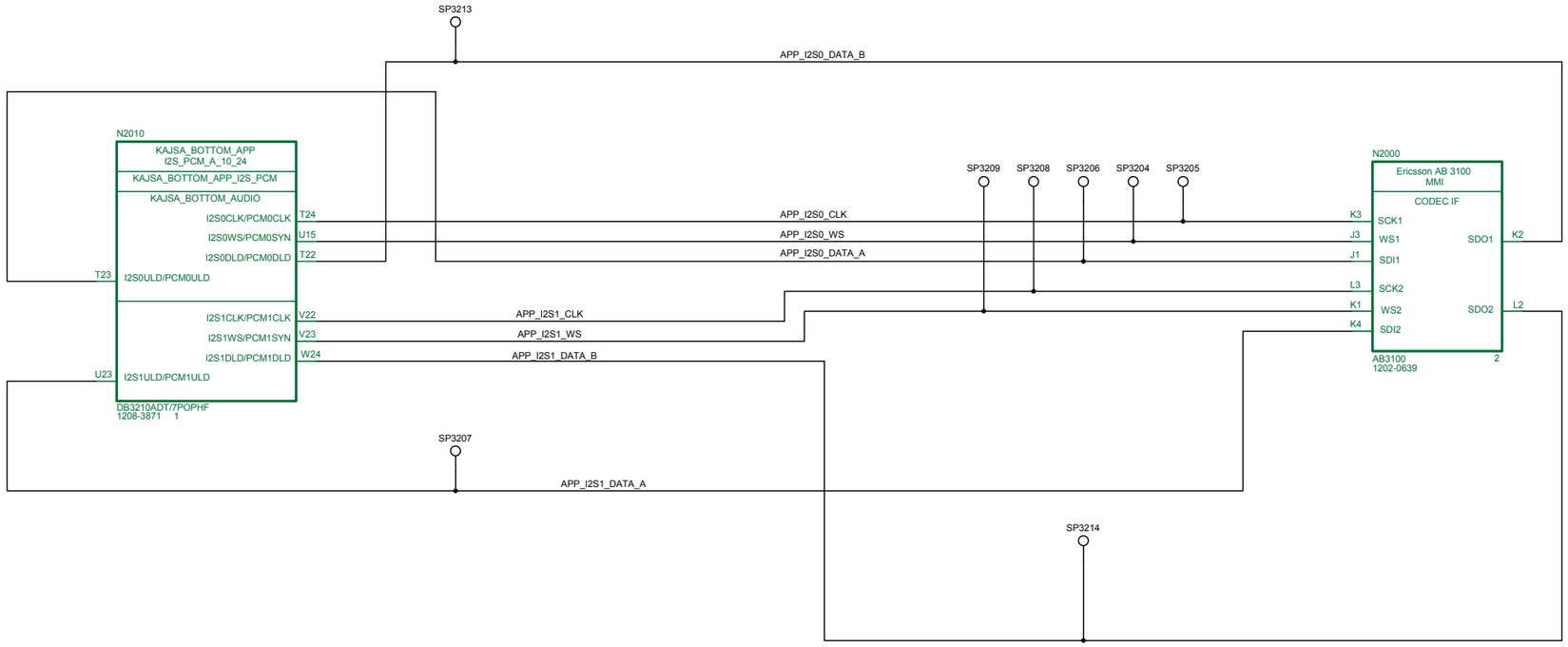

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Audio **Audio Digital**	
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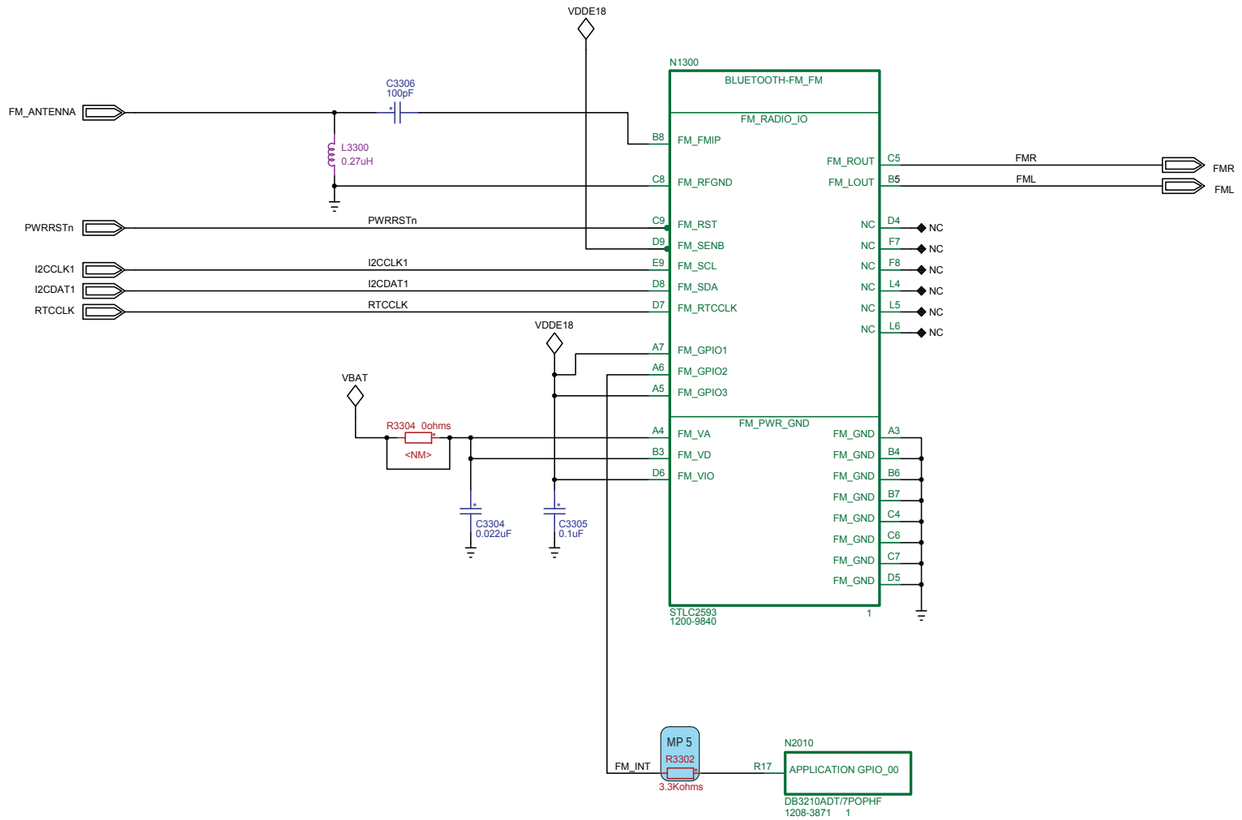

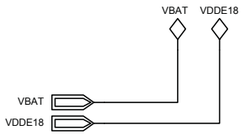

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Audio **FM Radio**	
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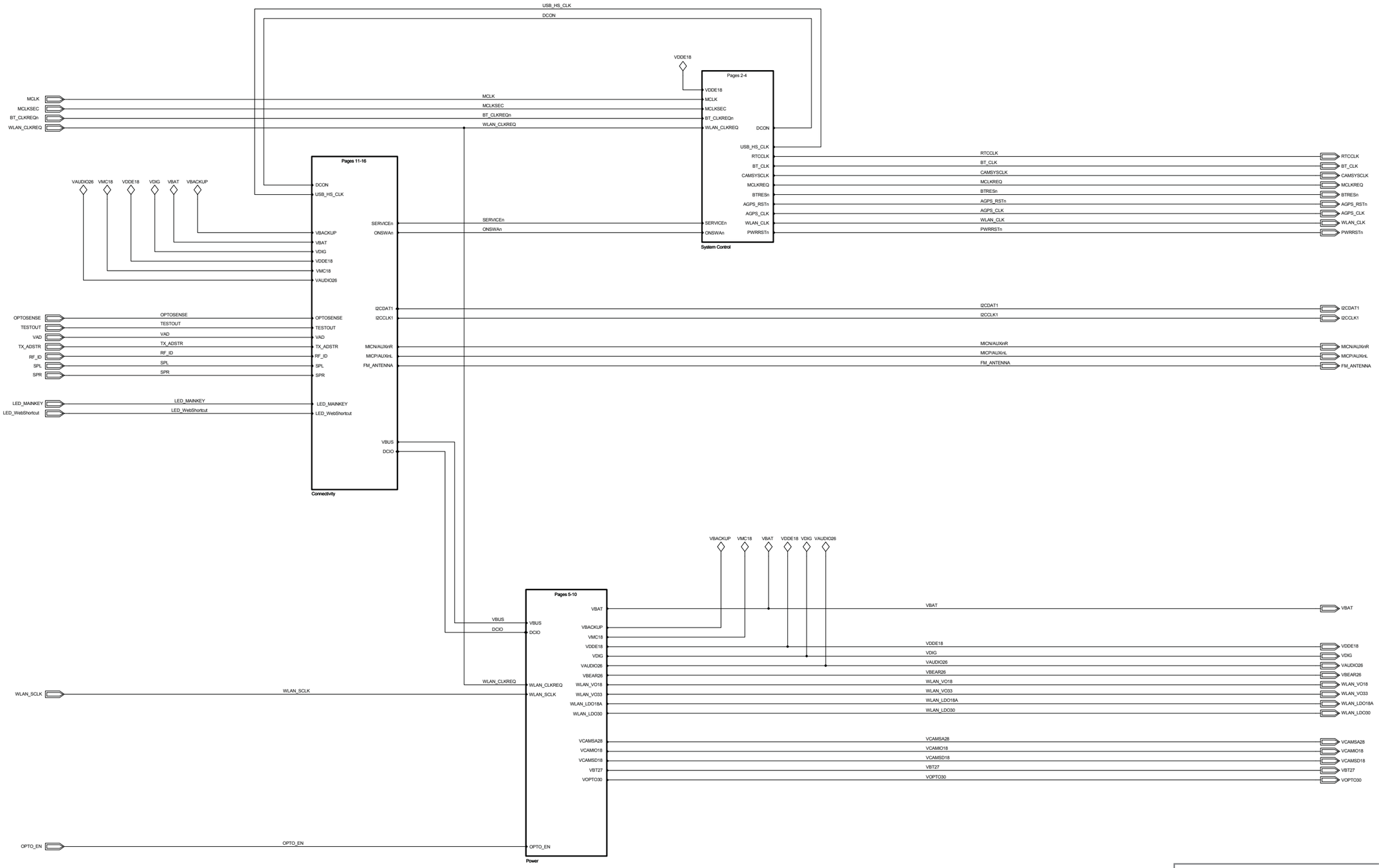

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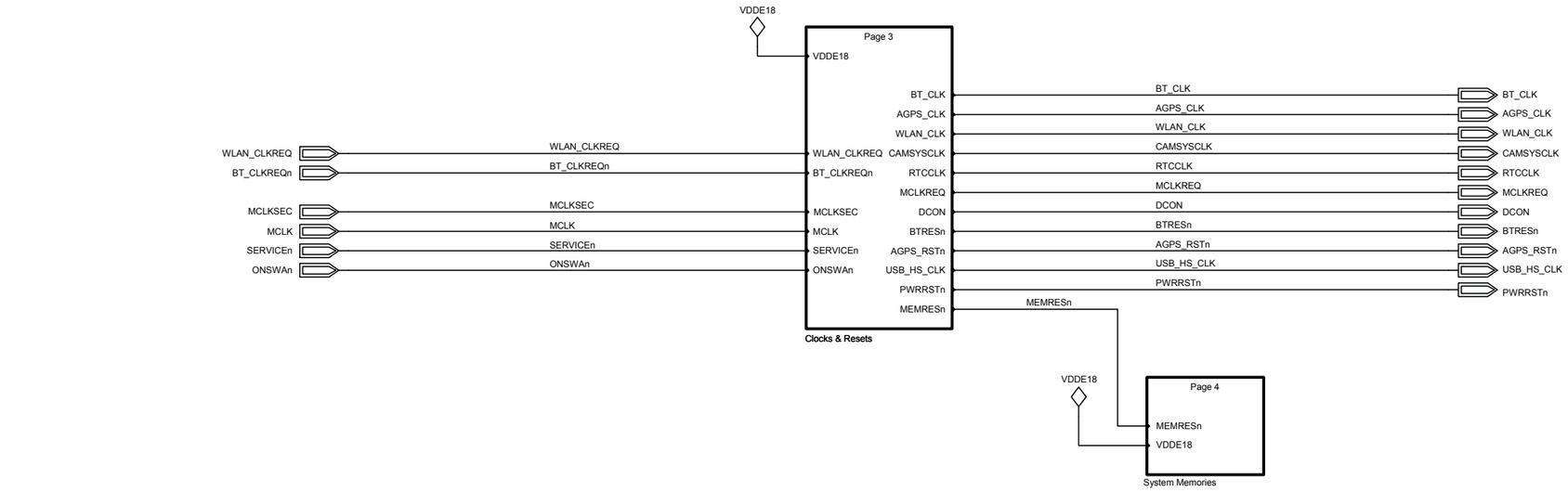

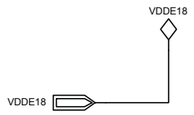

Made for	
Application & System Performance **System Top**	
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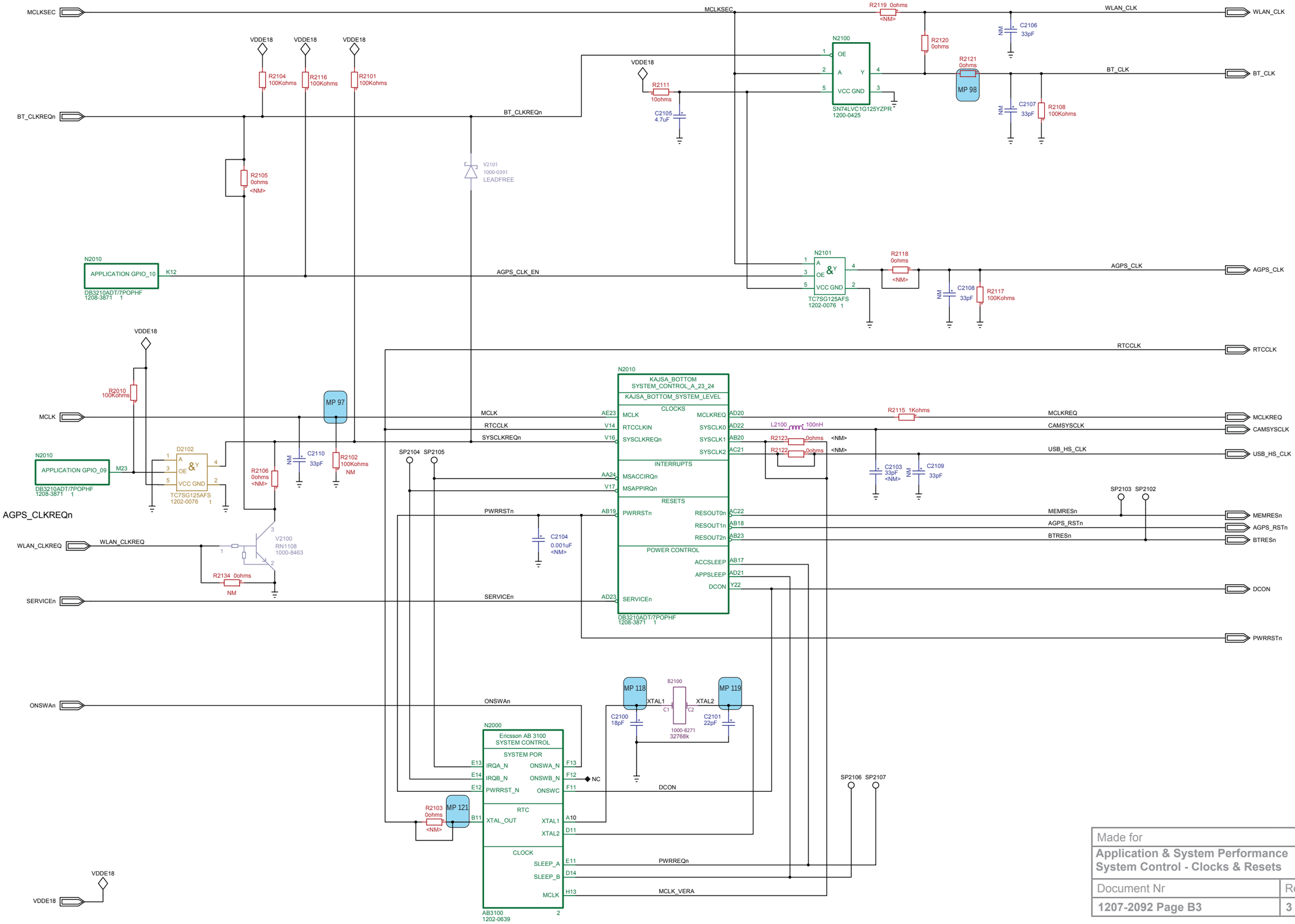

Made for	
Application & System Performance System Control - Clocks & Resets	
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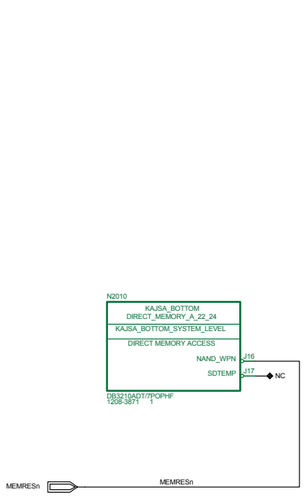

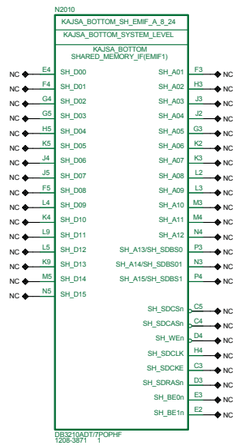

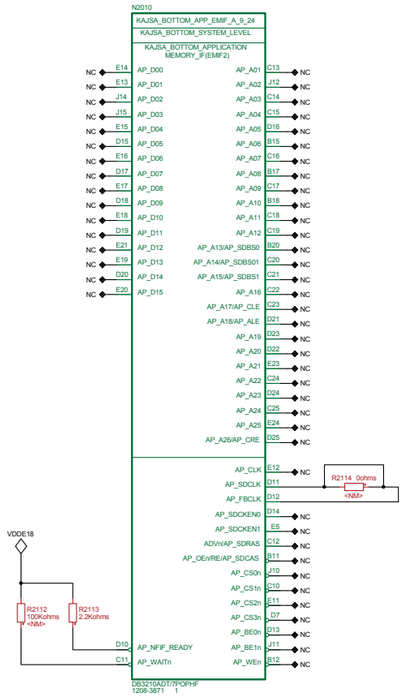

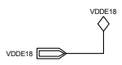

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Application & System Performance **System Memories**	
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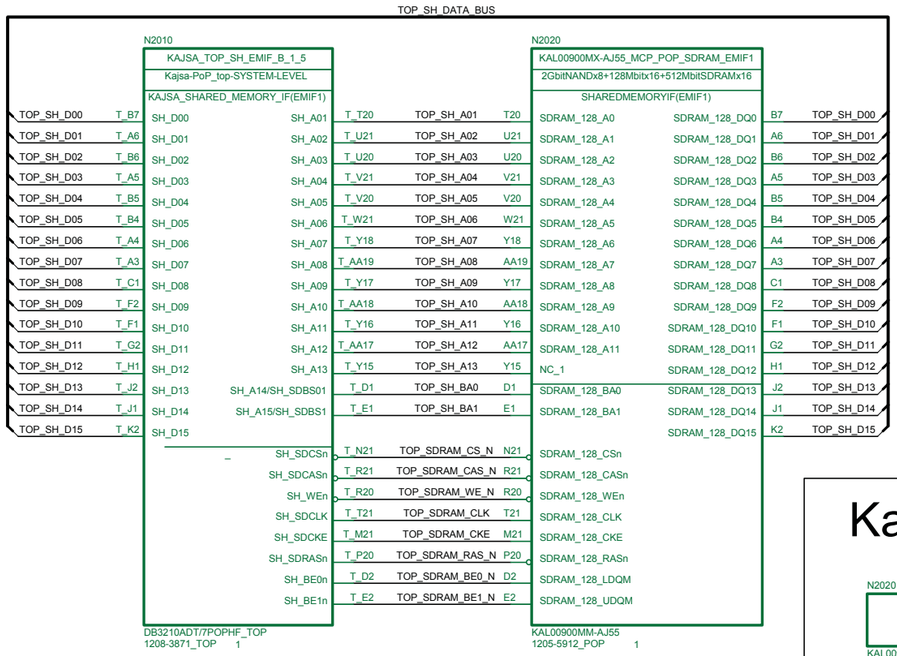

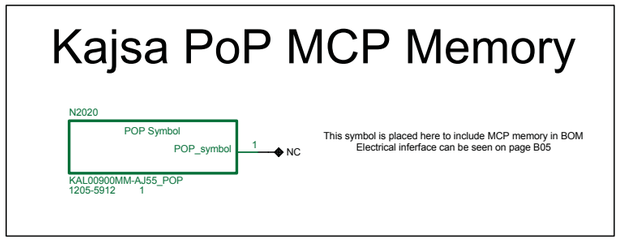

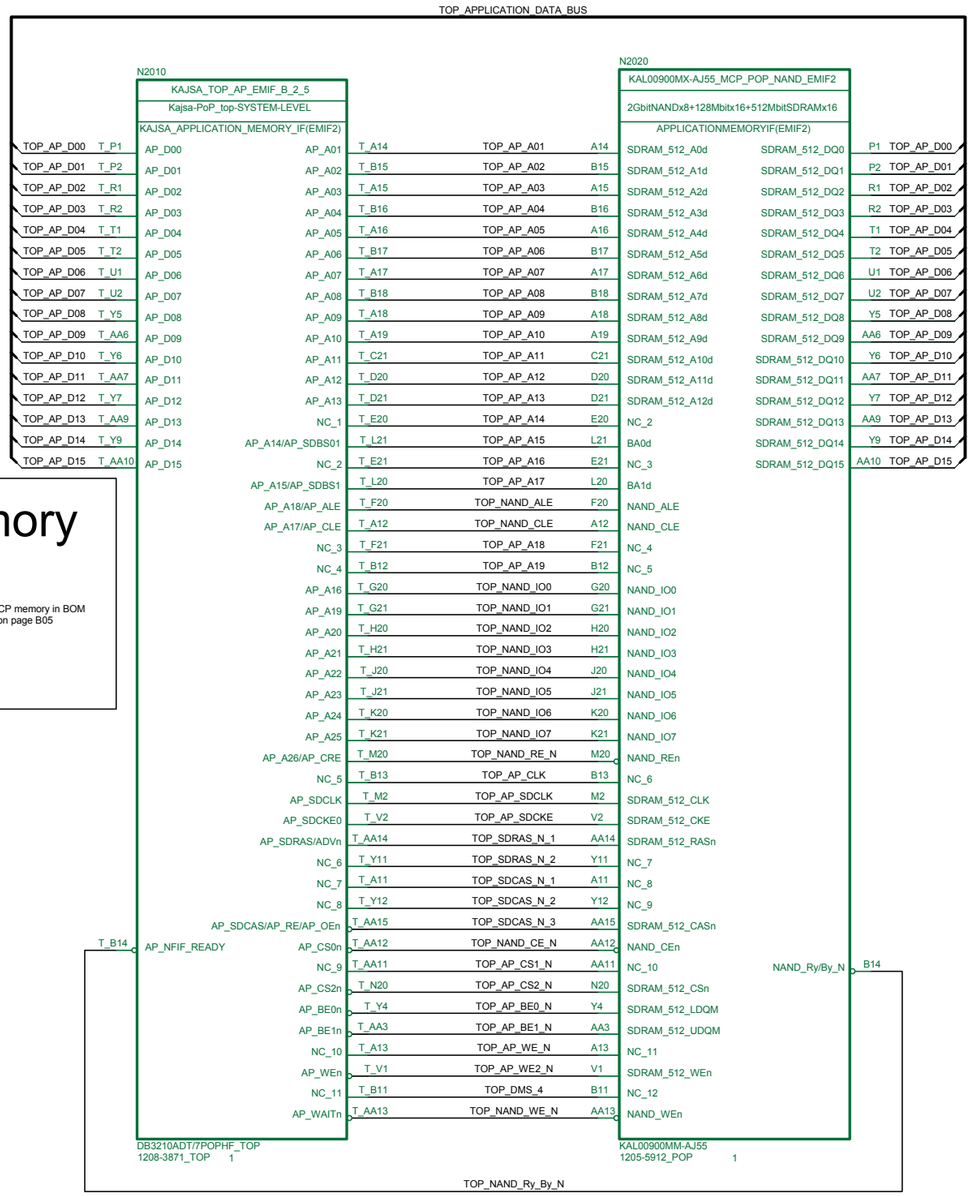

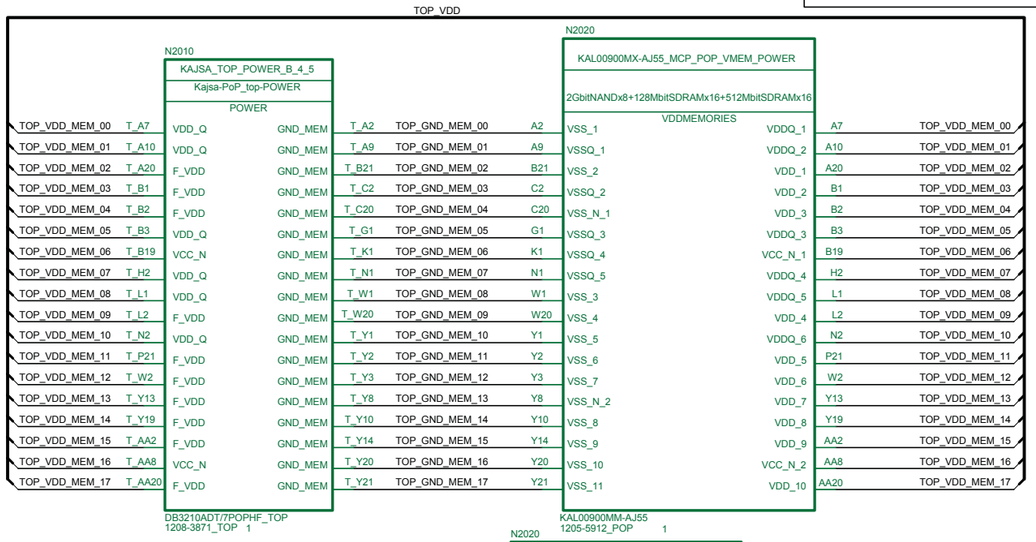

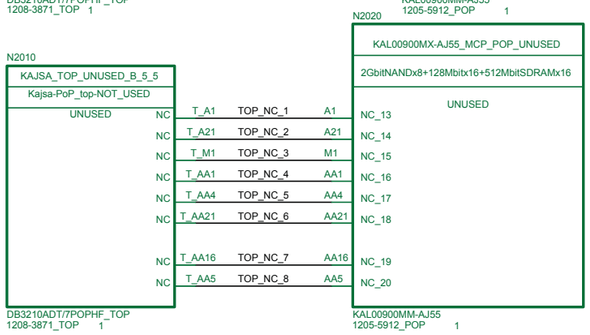

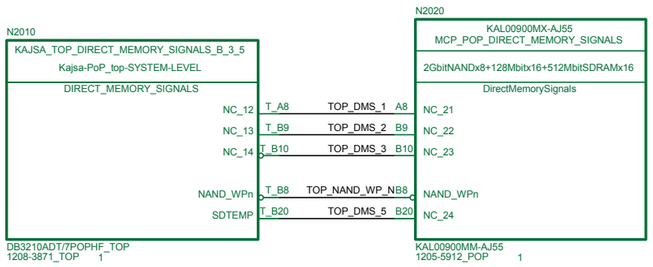

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Application & System Performance System PoP IF	
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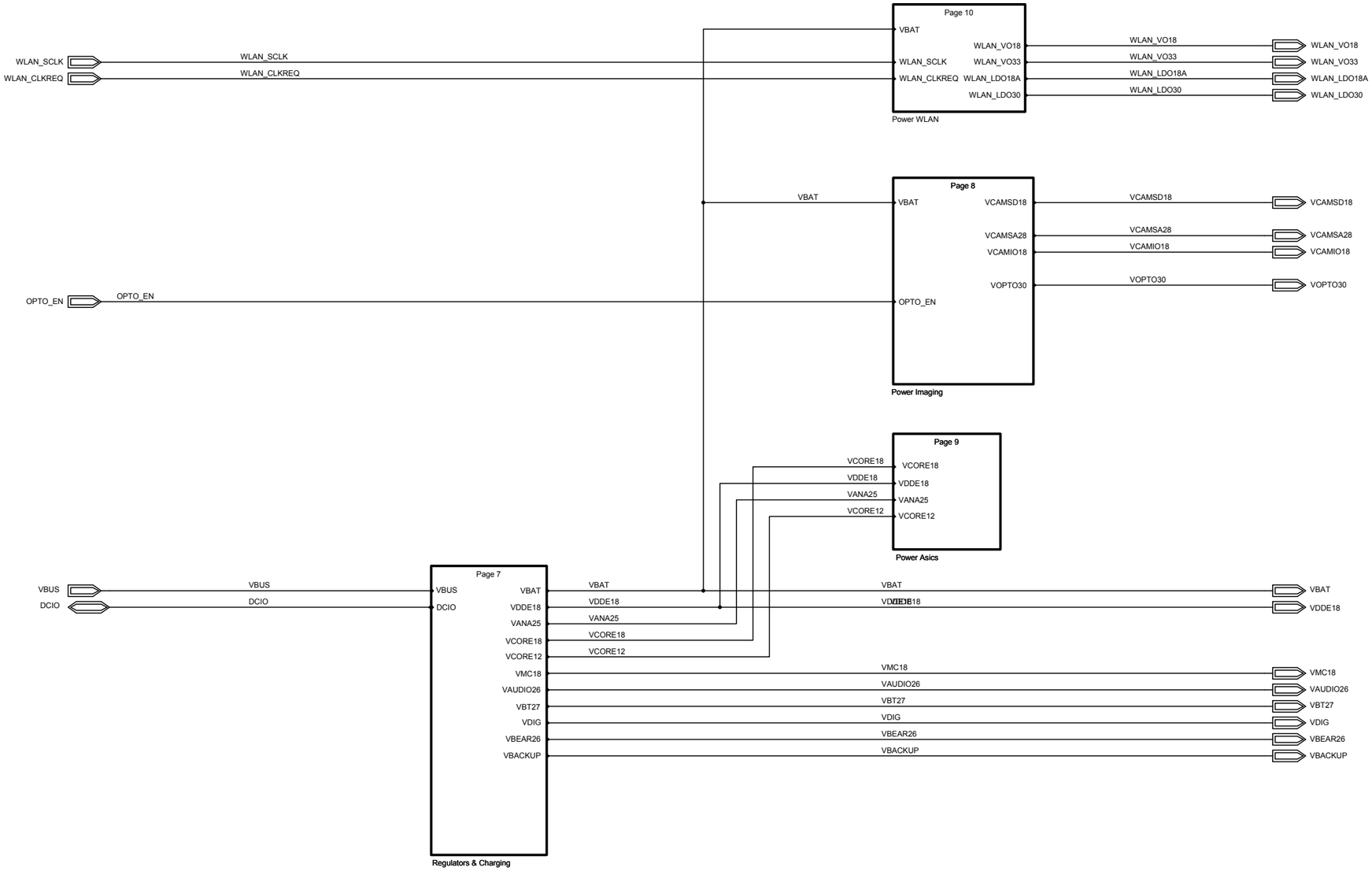

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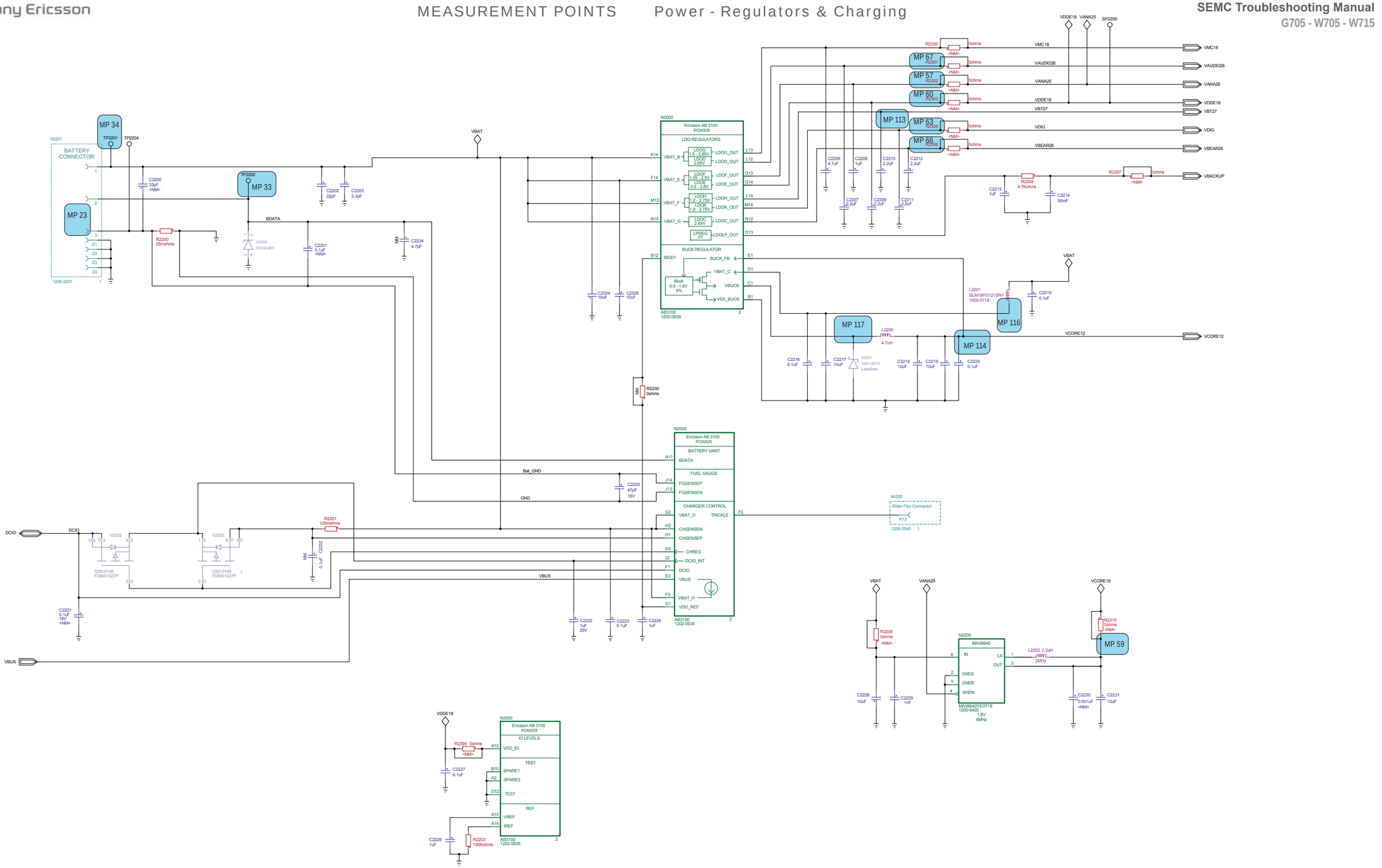

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Application & System Performance Power - Regulators & Charging	
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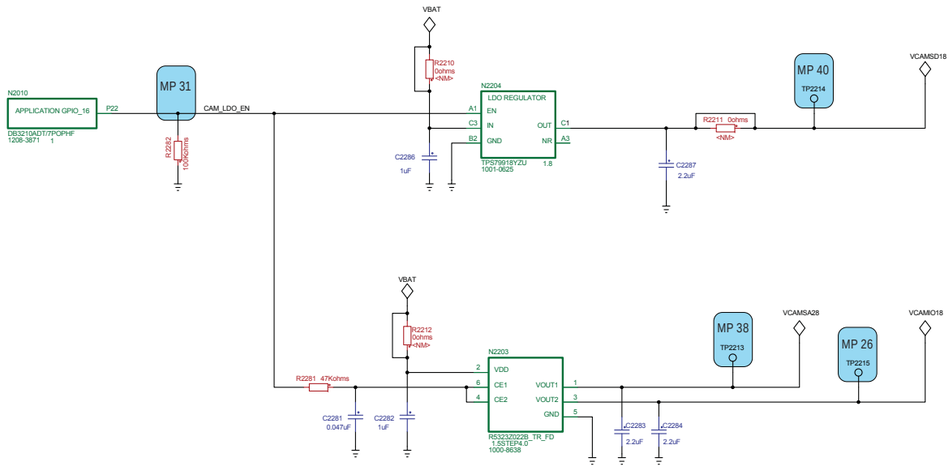

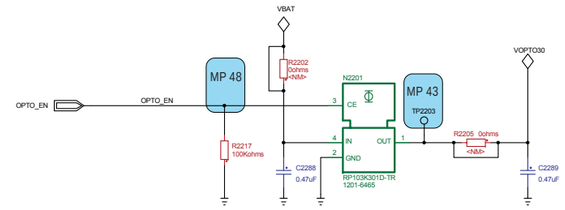

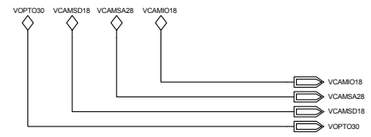

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Application & System Performance **Power - Imaging**	
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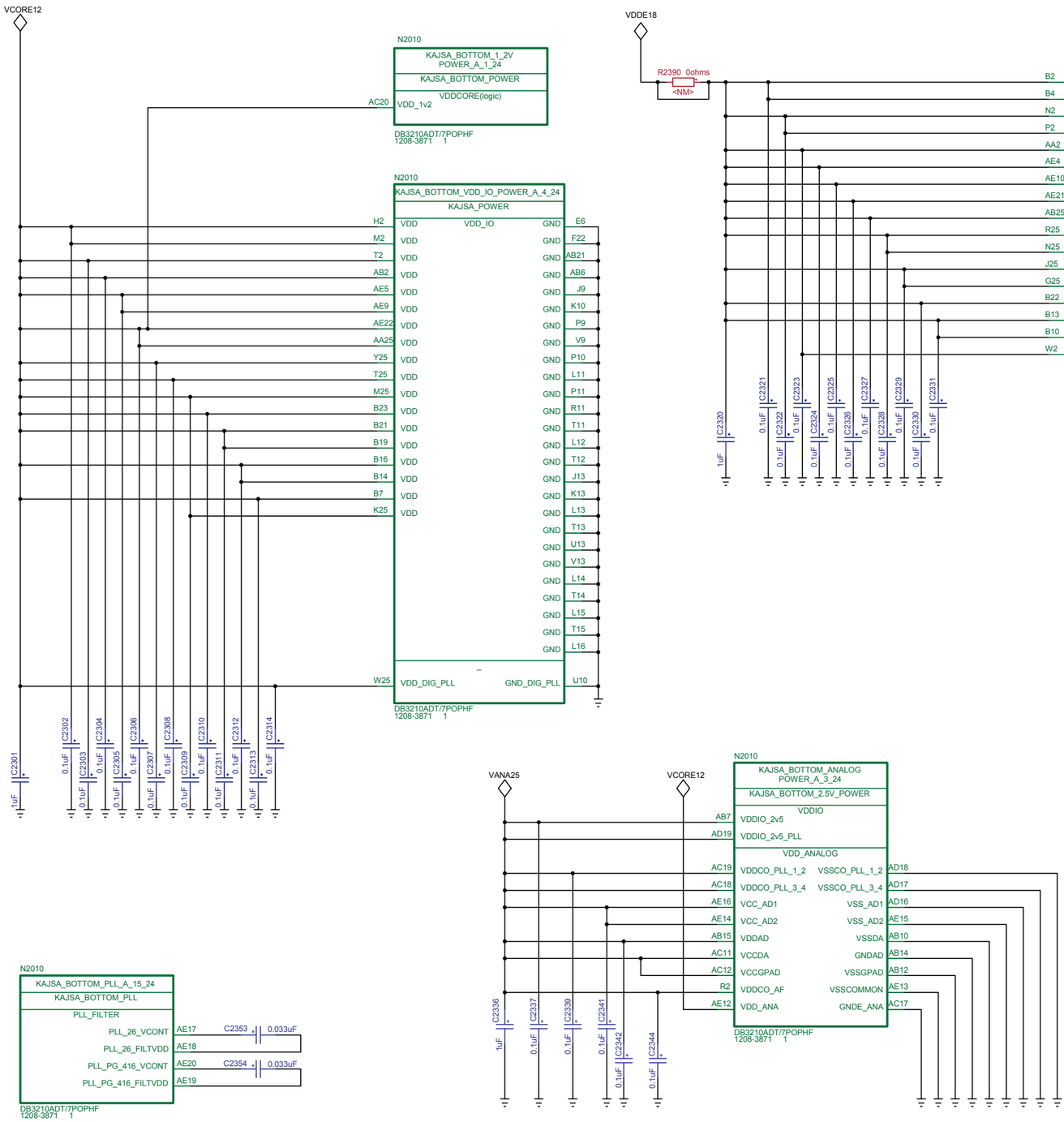

Made for	
Application & System Performance Power ASICs	
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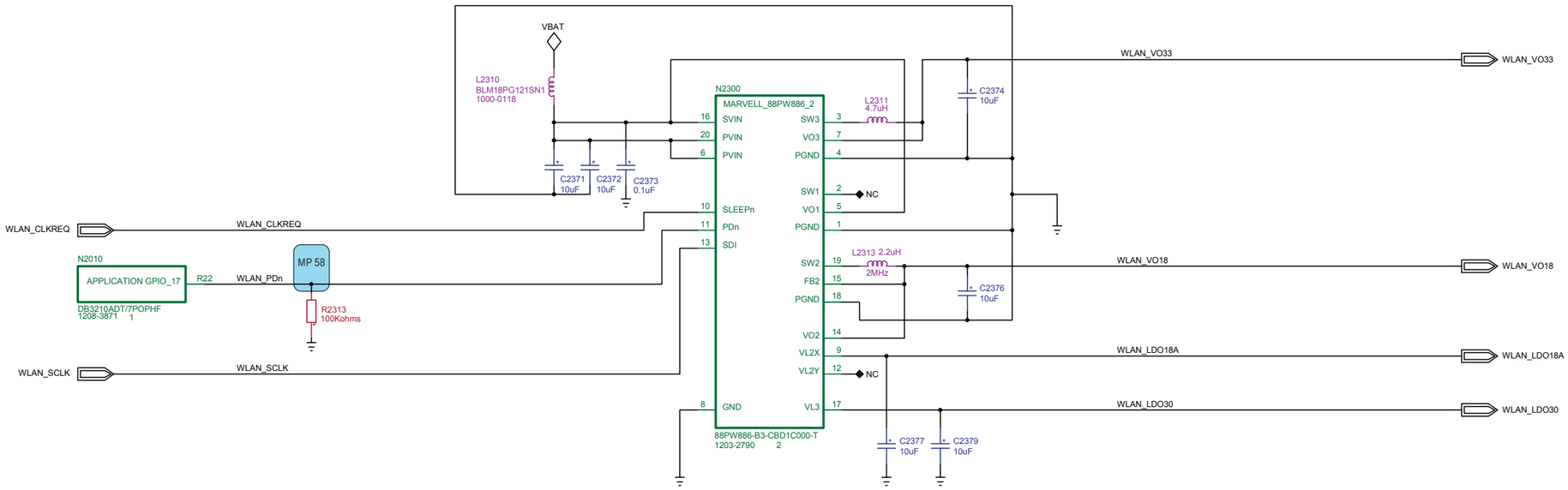

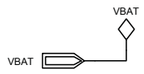

Made for	
Application & System Performance **Power - WLAN**	
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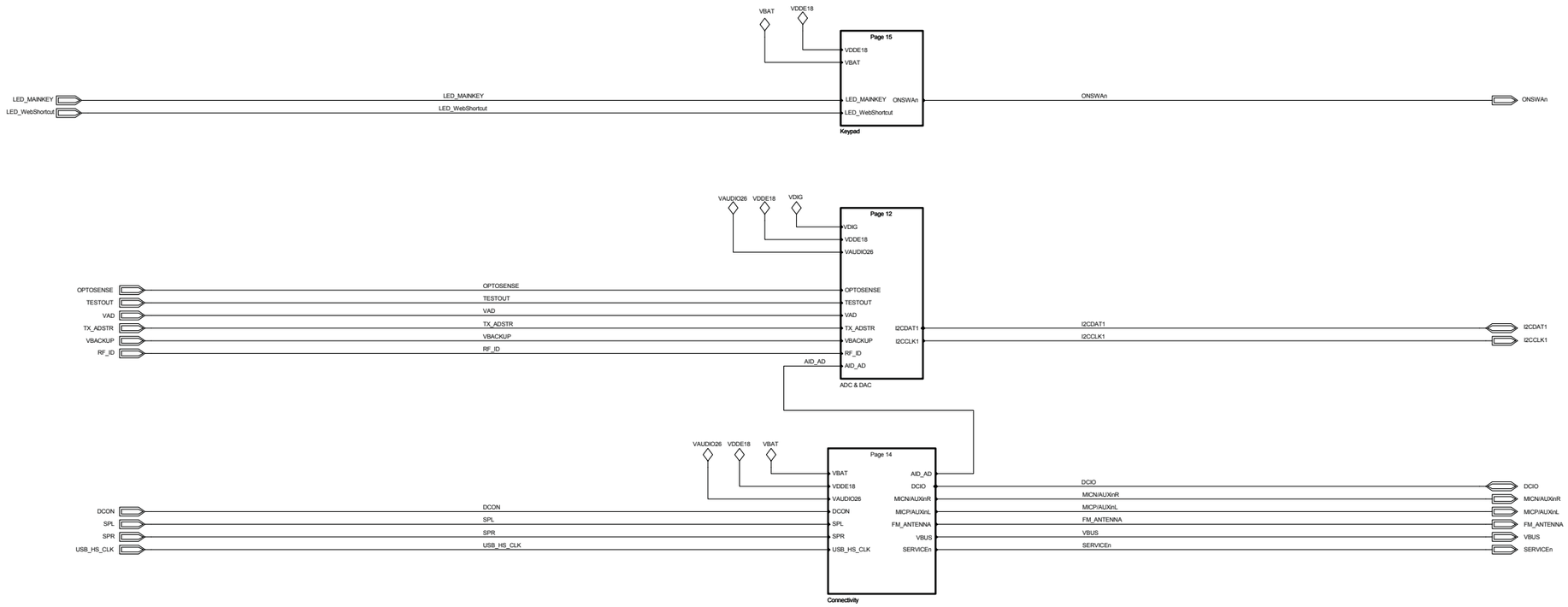

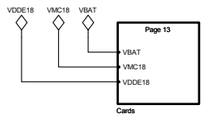

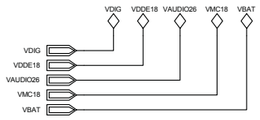

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Application & System Performance Connectivity Top	
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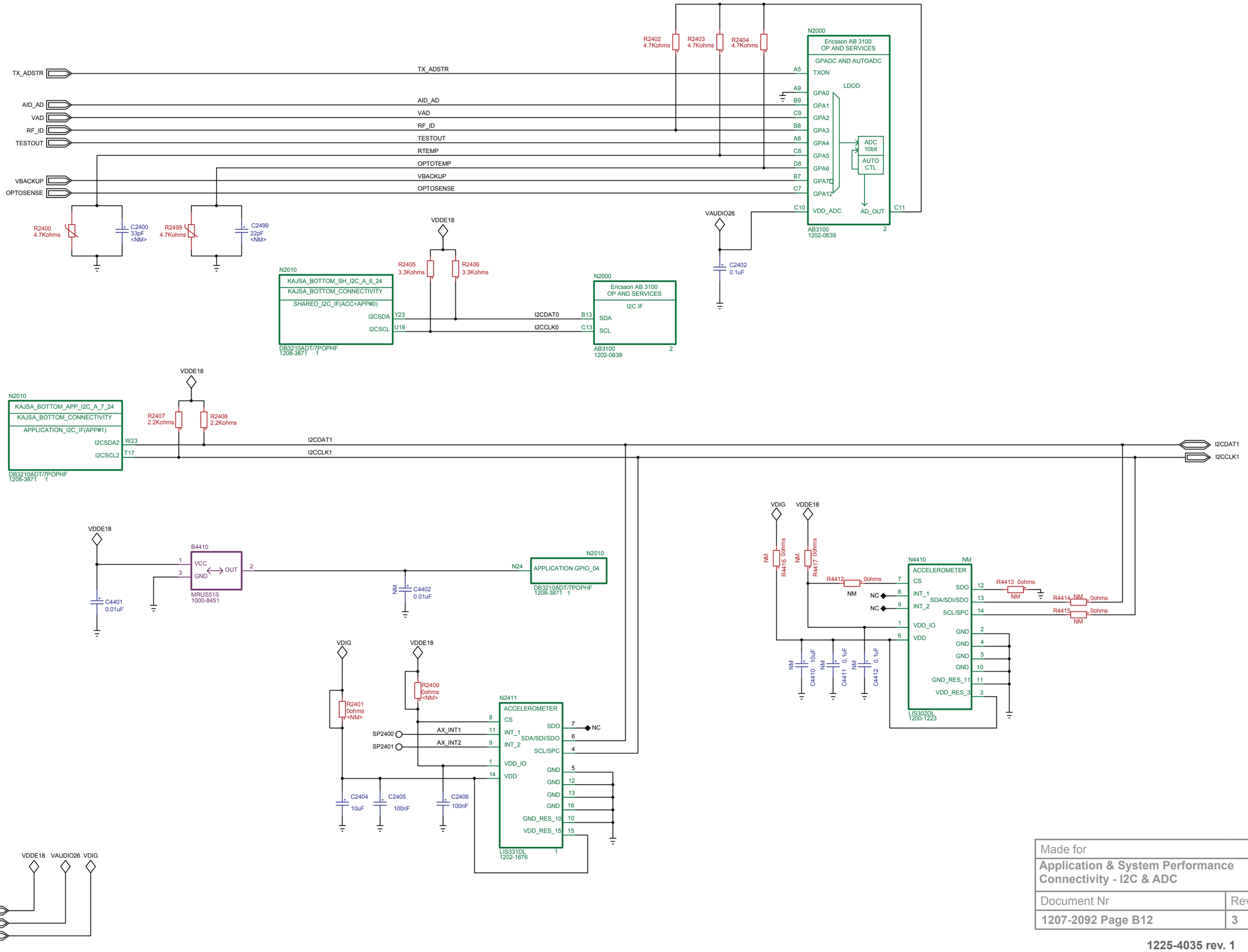

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Application & System Performance Connectivity - I2C & ADC	
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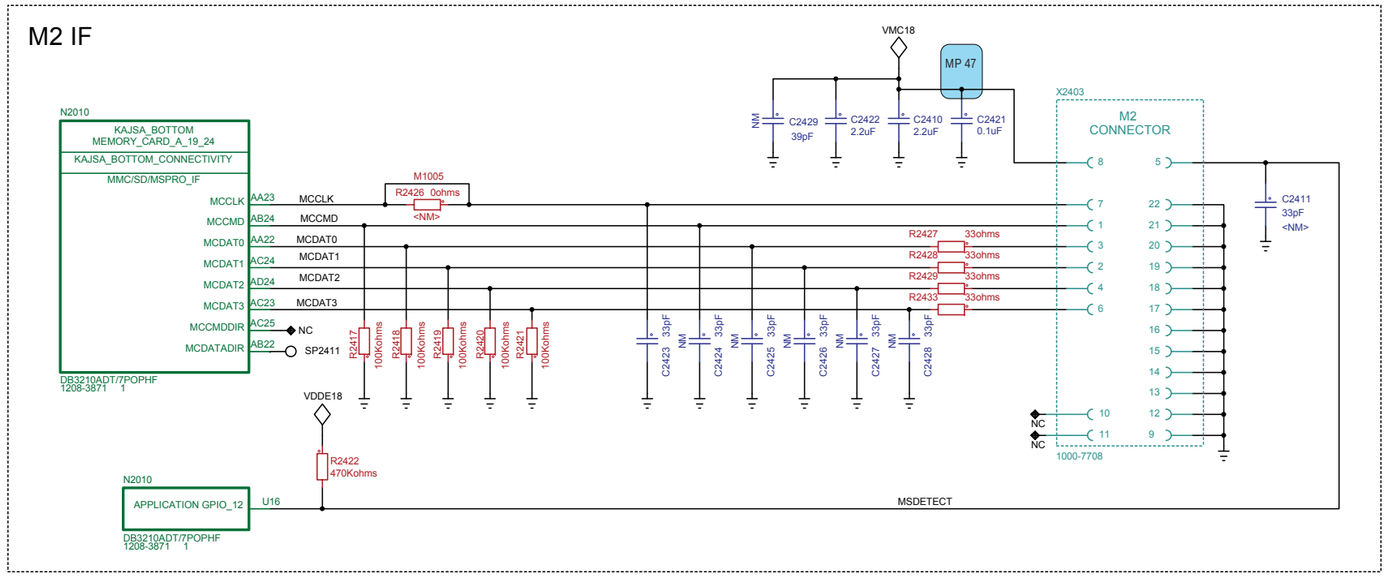

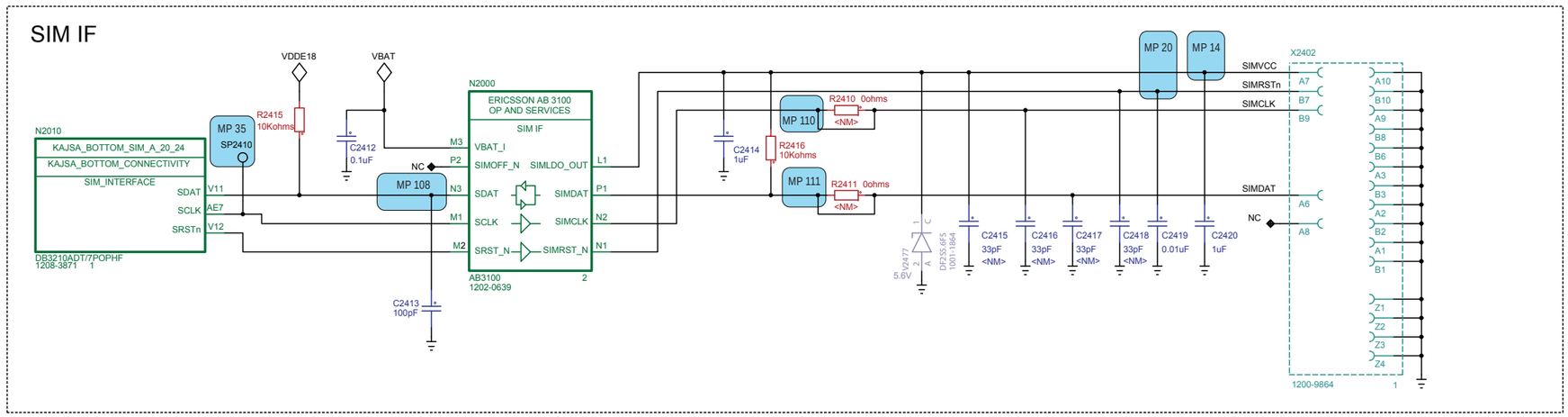

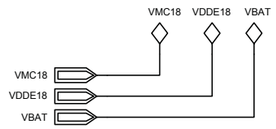

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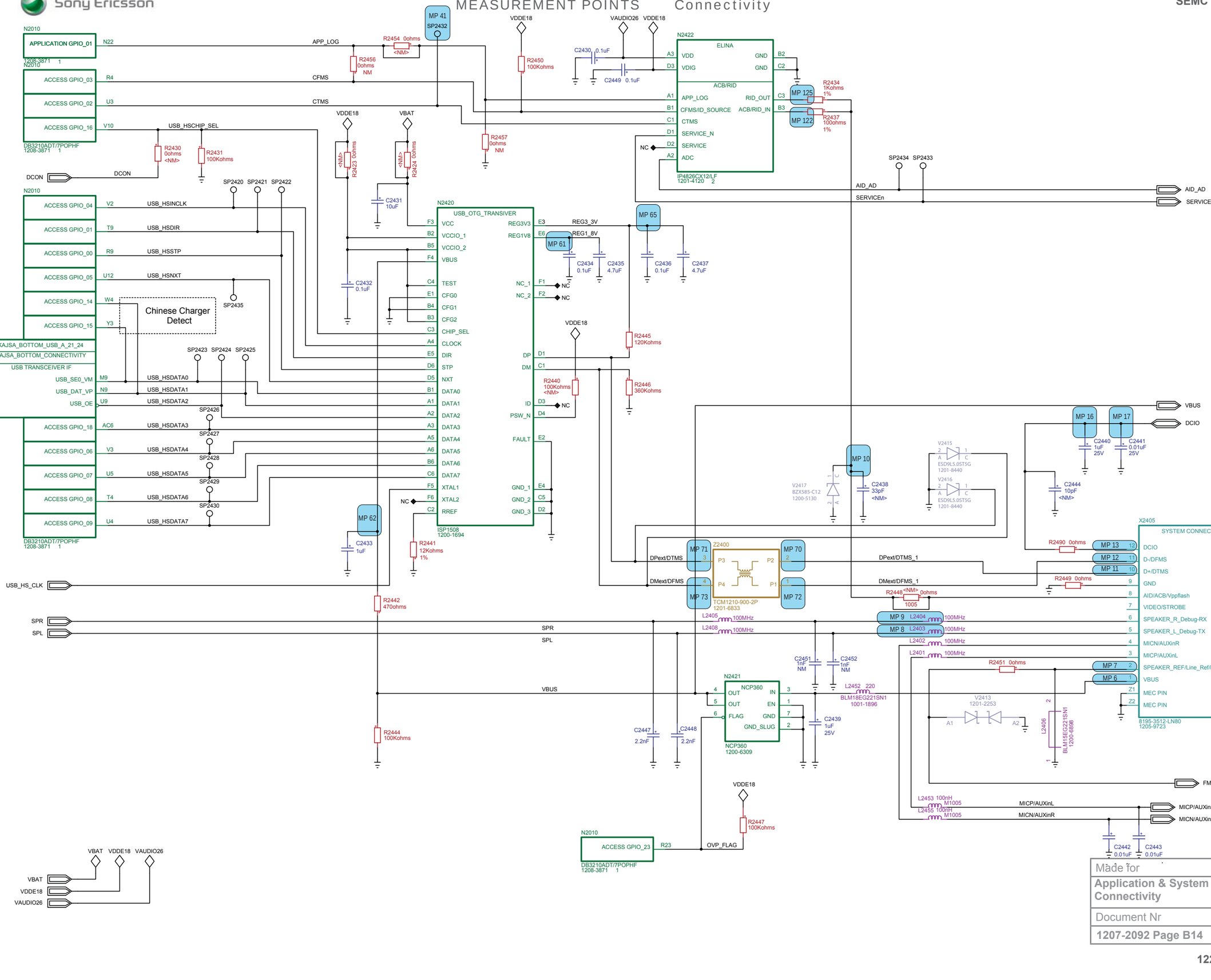

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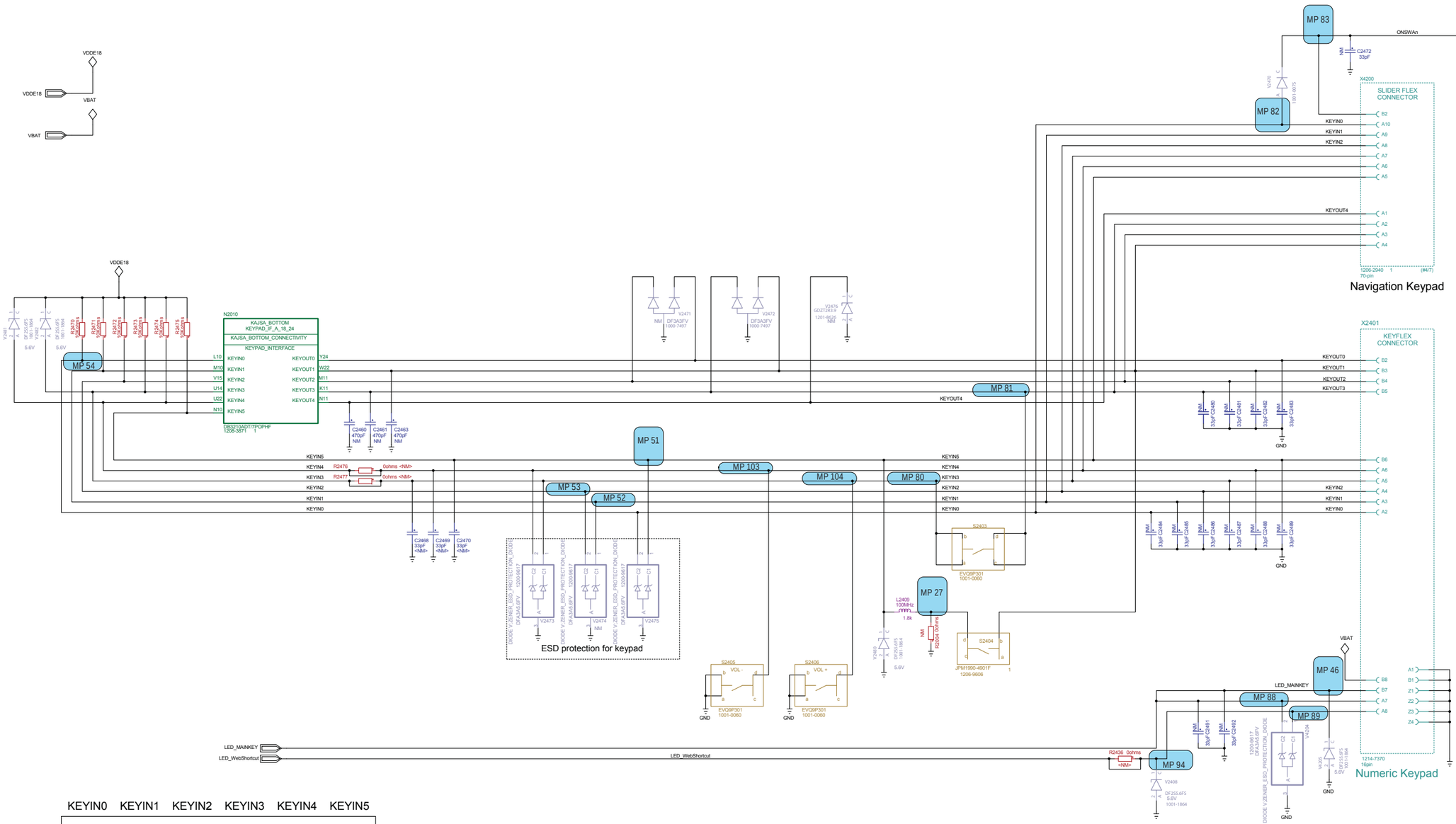

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KEYOUT0	3 Num	6 Num	1 Num	-	-	-
KEYOUT1	Green Nav	-	- Nav	CLR	9 Num	Walk man
KEYOUT2	2 Num	0 Num	Soft Left Nav	5 Num	-	8 Num
KEYOUT3	Active Menu Nav	4 Num	7 Num	Cam Snap Main	# Num	* Num
KEYOUT4	Rock Down Nav	Rock Left Nav	Rock Up Nav	Rock Push Nav	Rock Right Nav	Soft Right Nav
GND	Red ON/OFF Nav	-	-	Vol+ Main	Vol- Main	-

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Application & System Performance Connectivity - Keypad	
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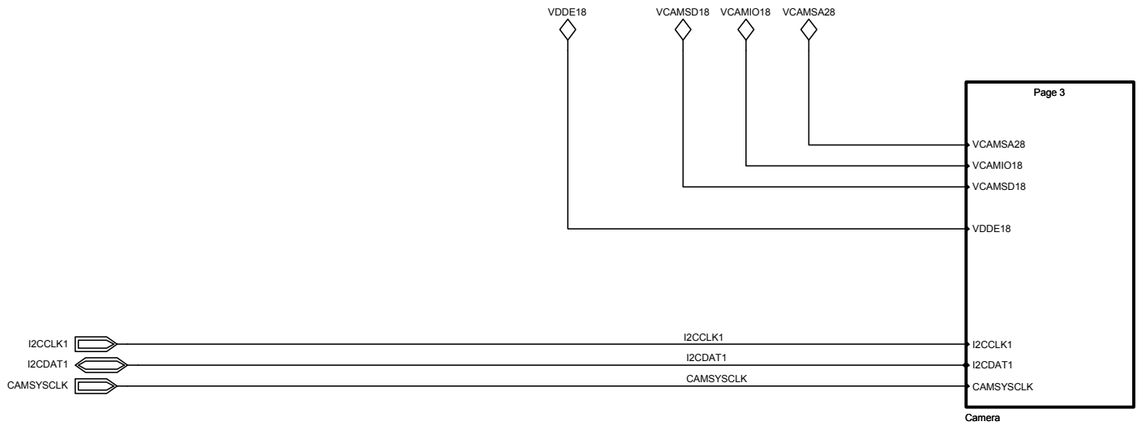

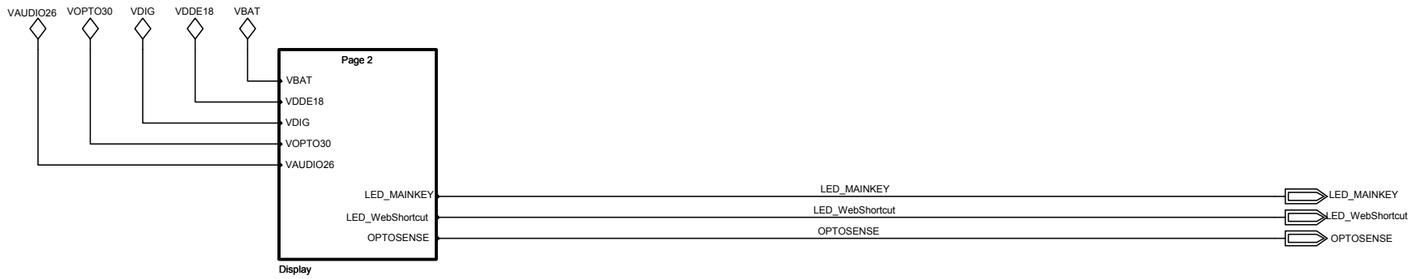

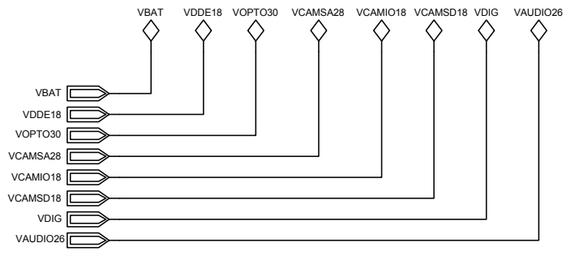

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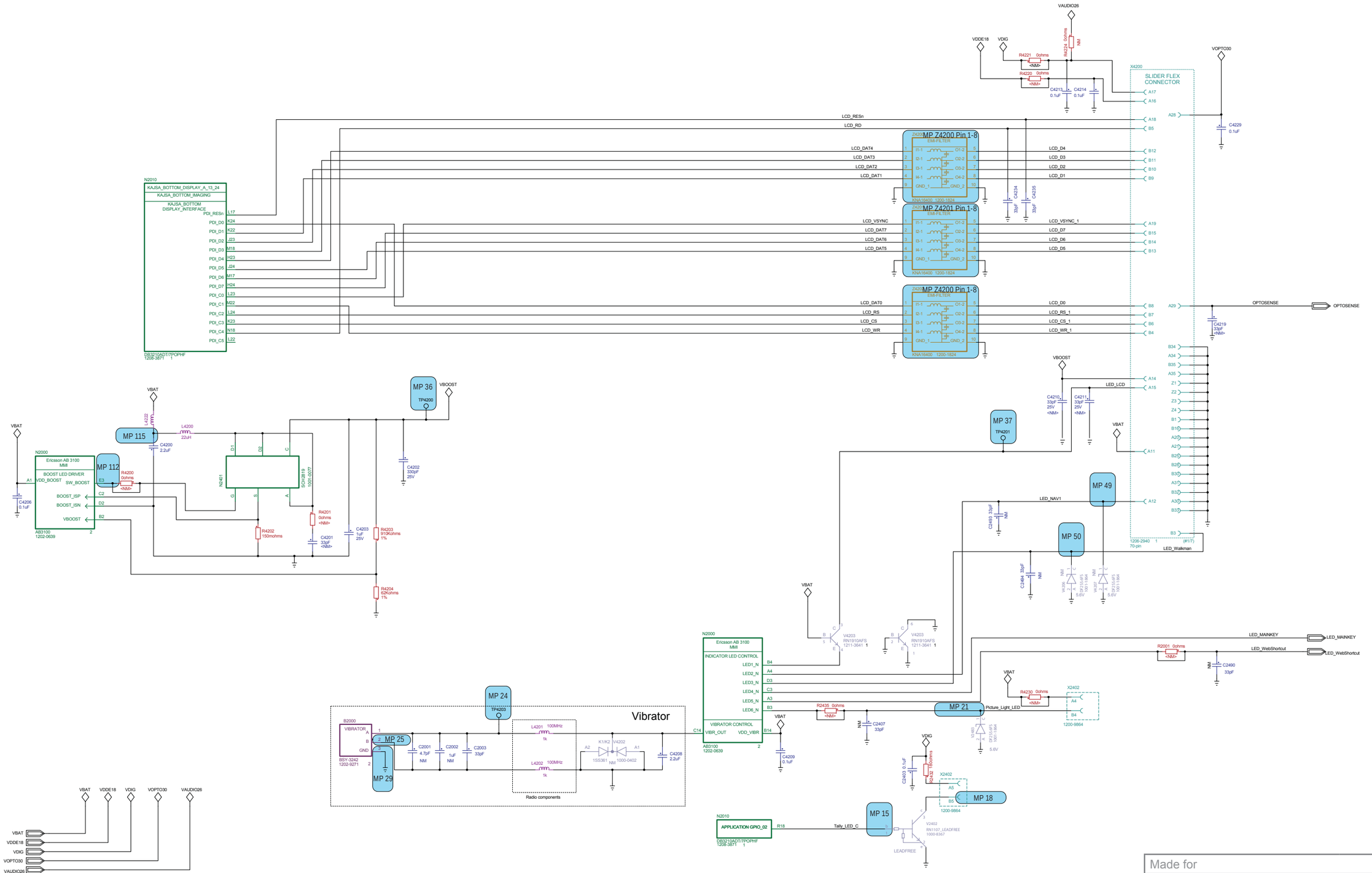

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Document Nr	Revision
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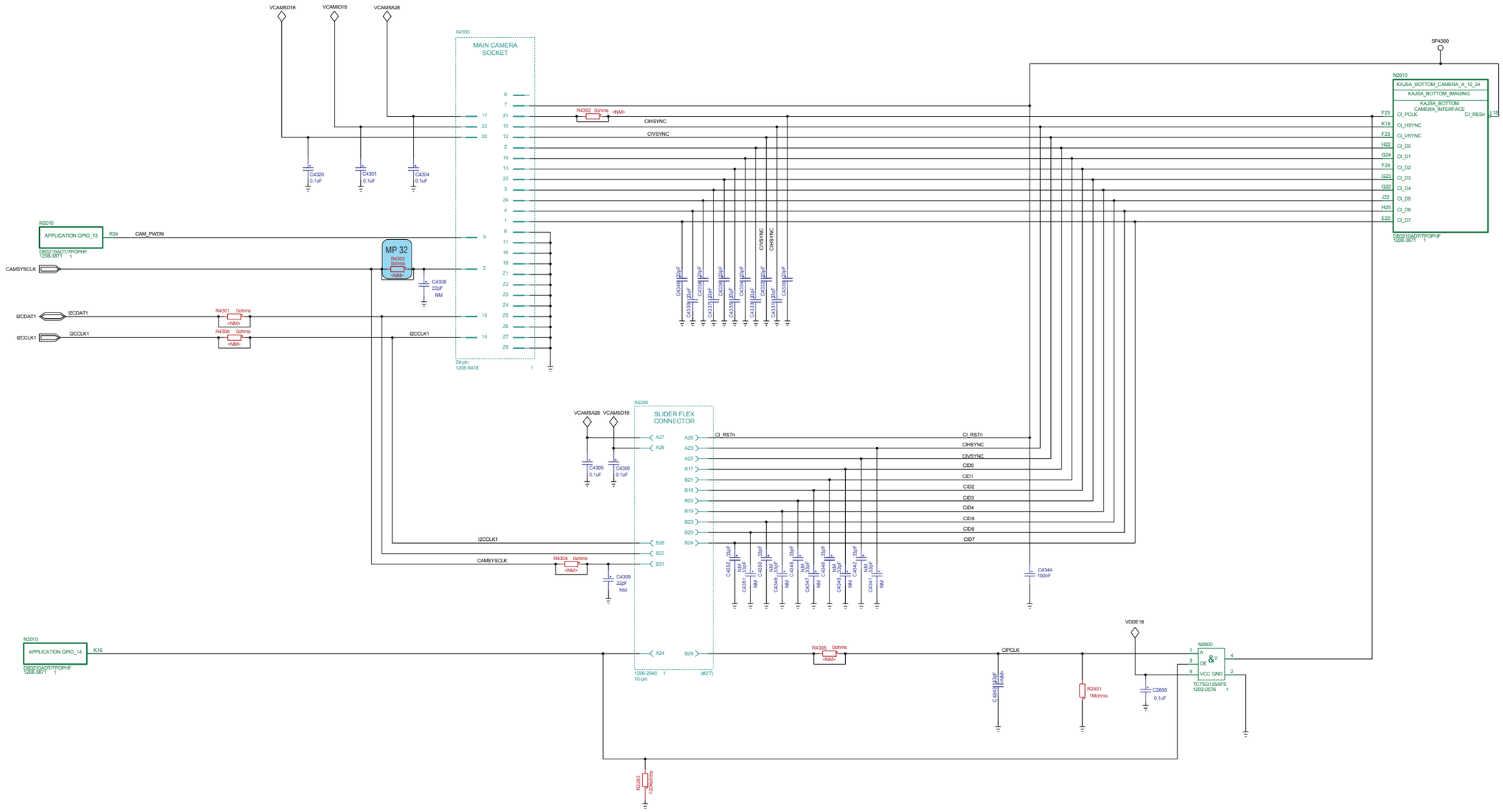

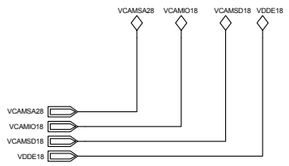

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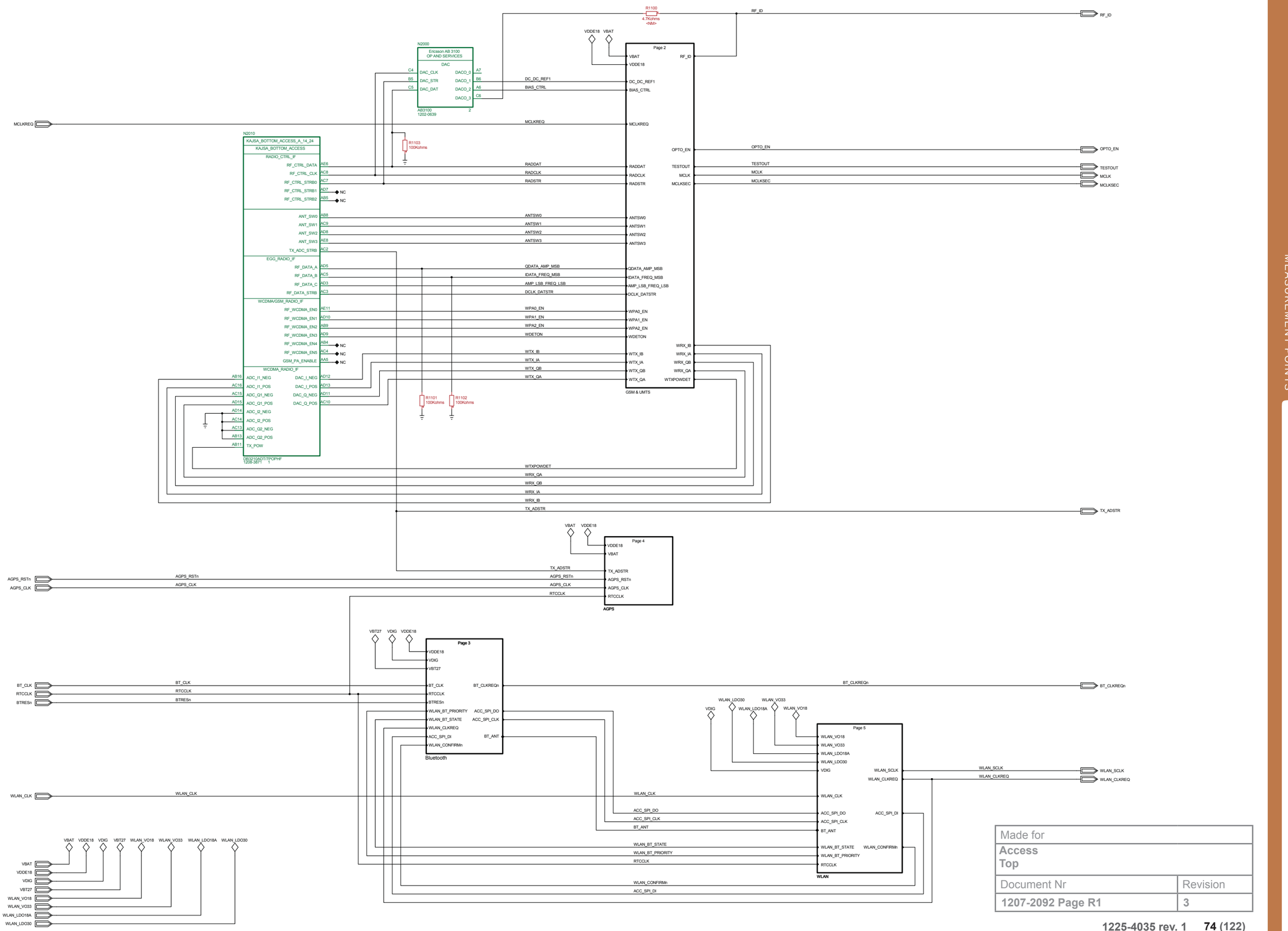

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Document Nr	Revision
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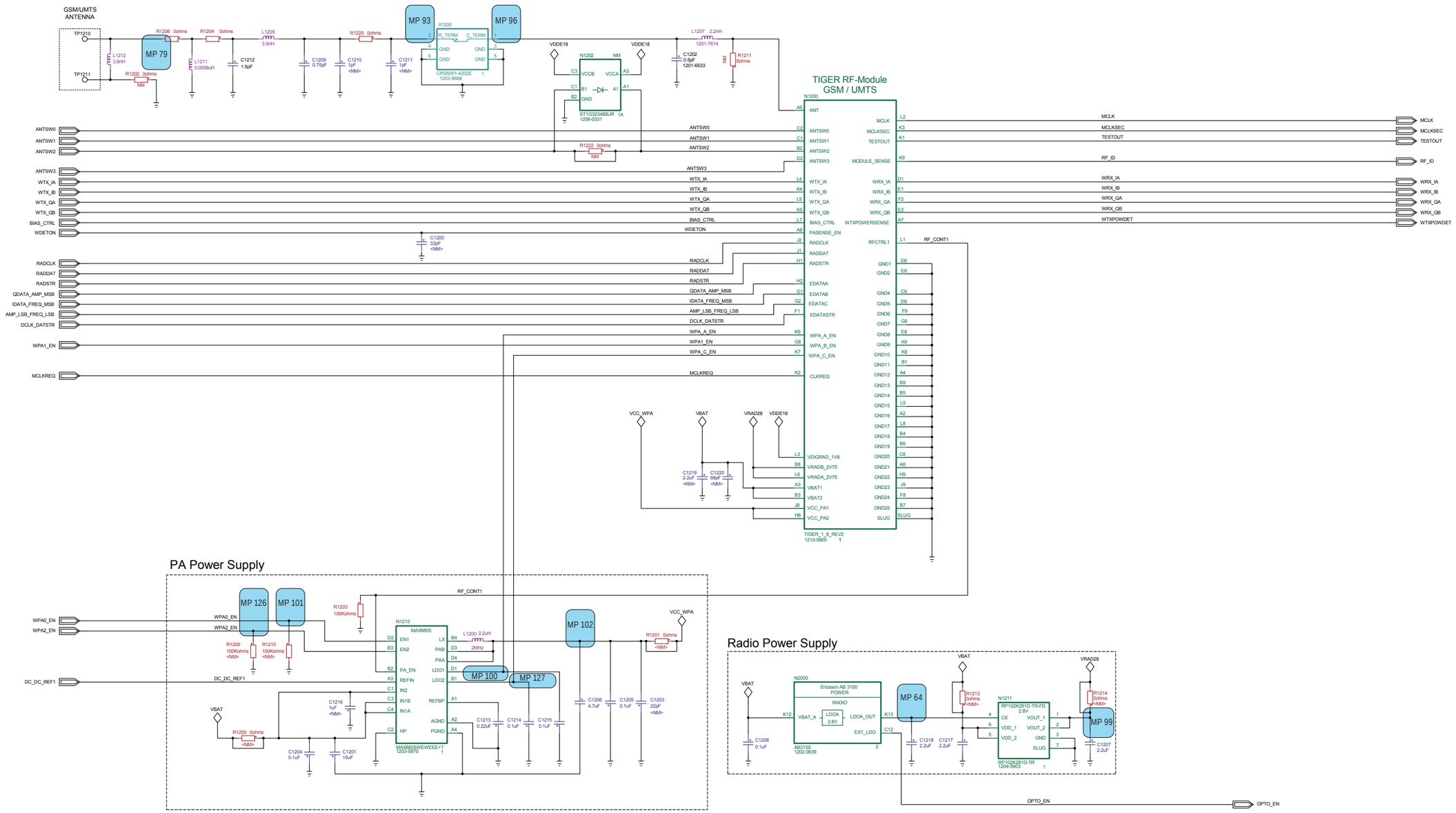

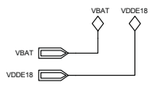

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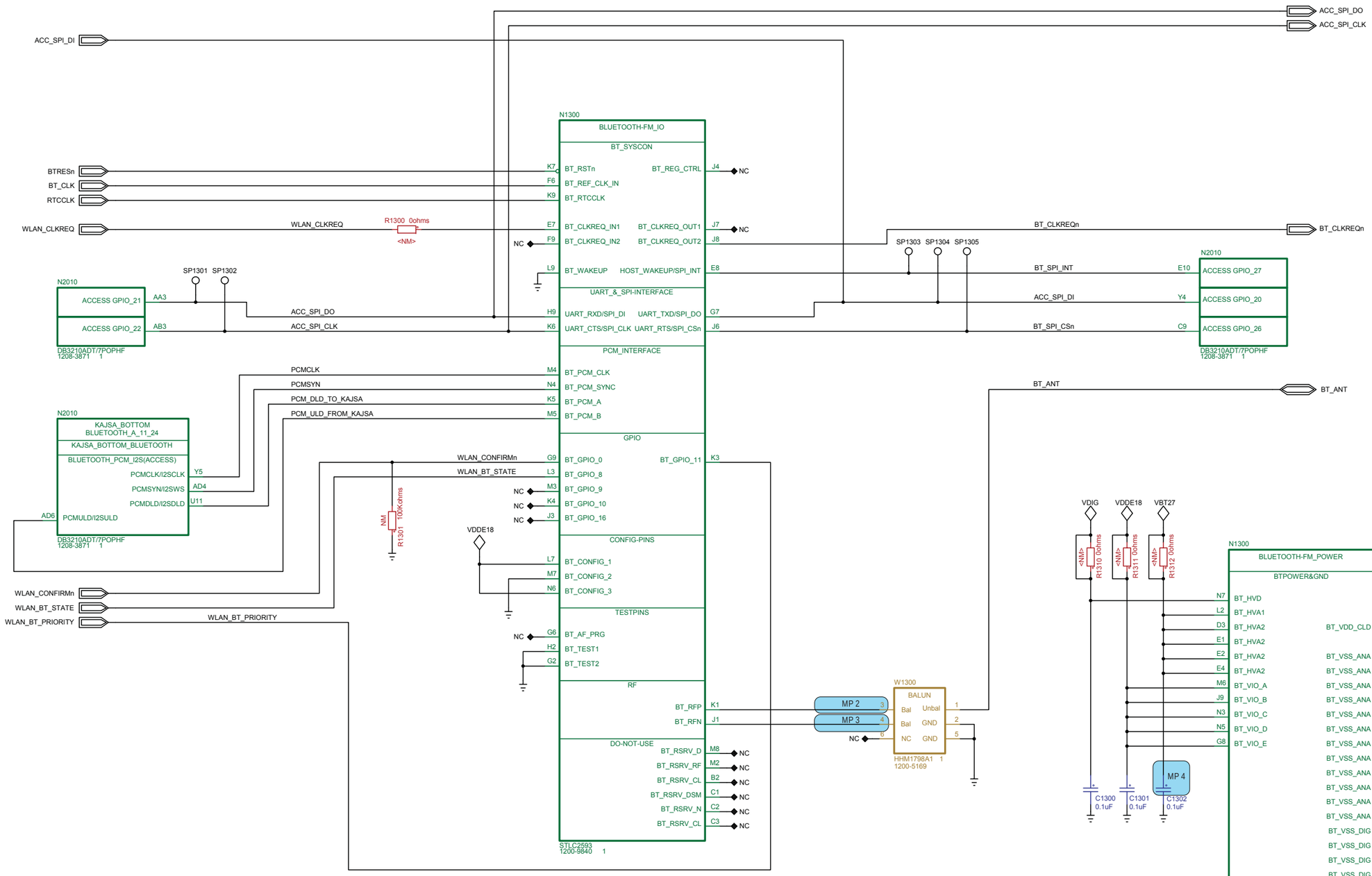

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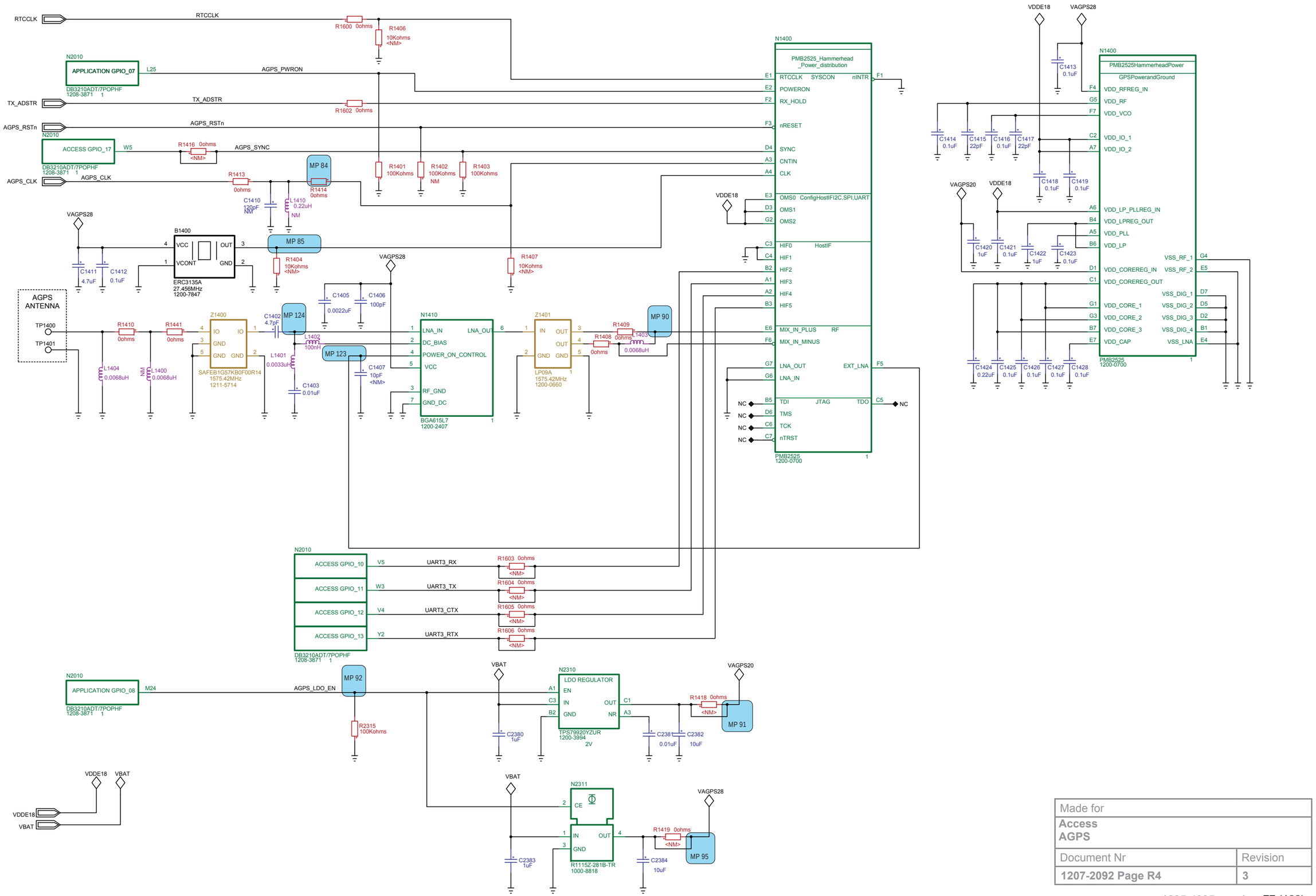

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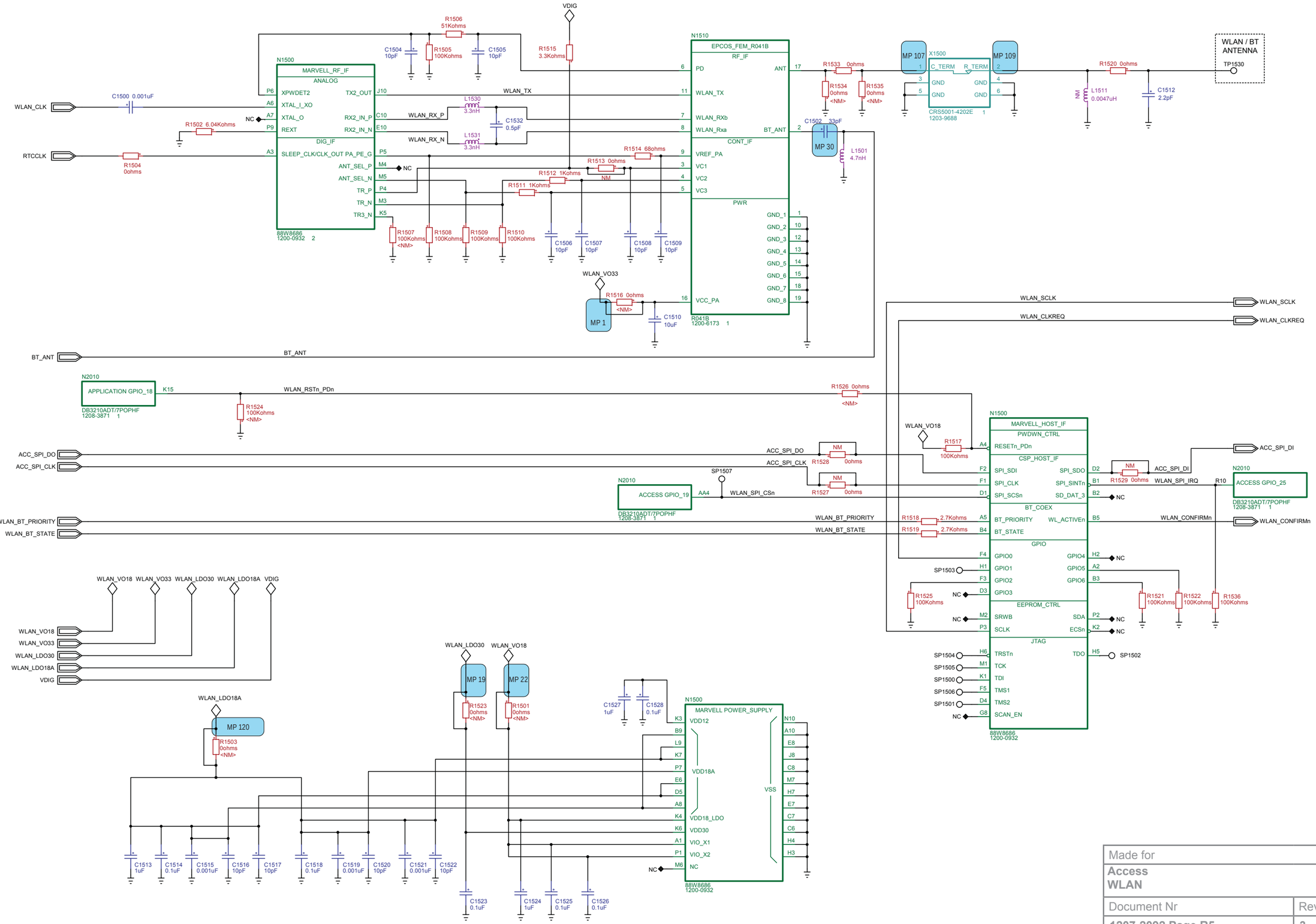

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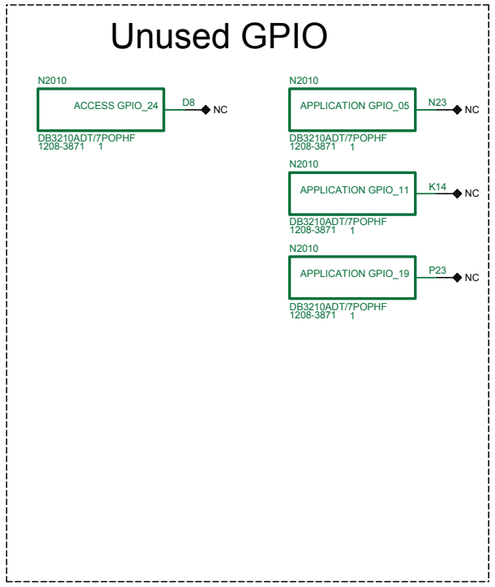

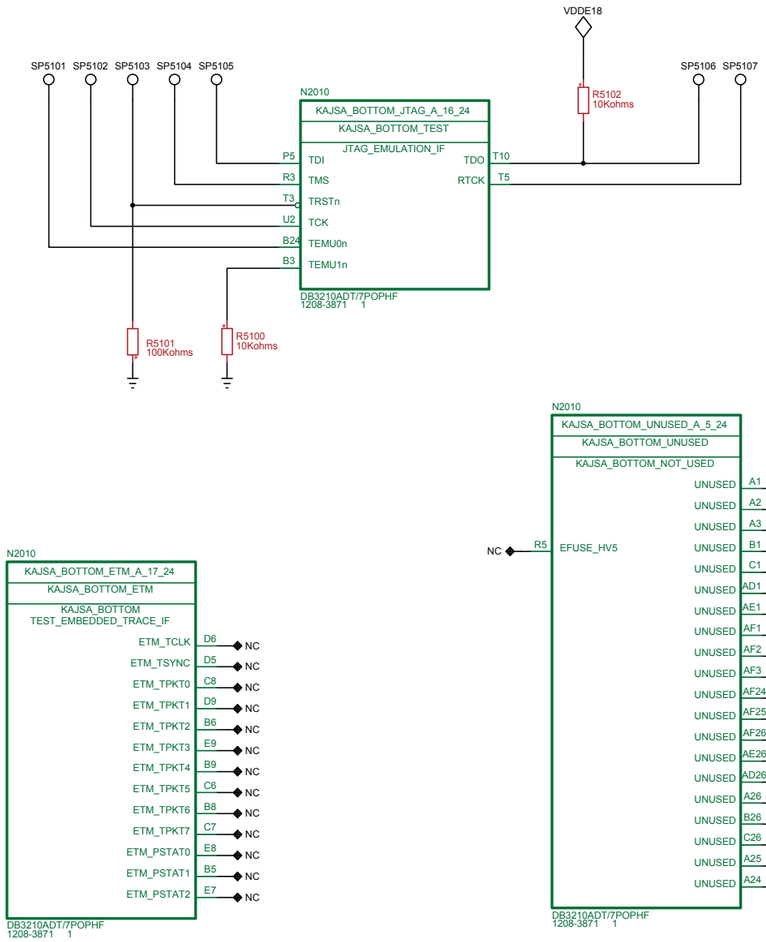

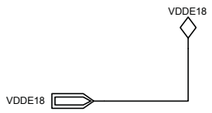

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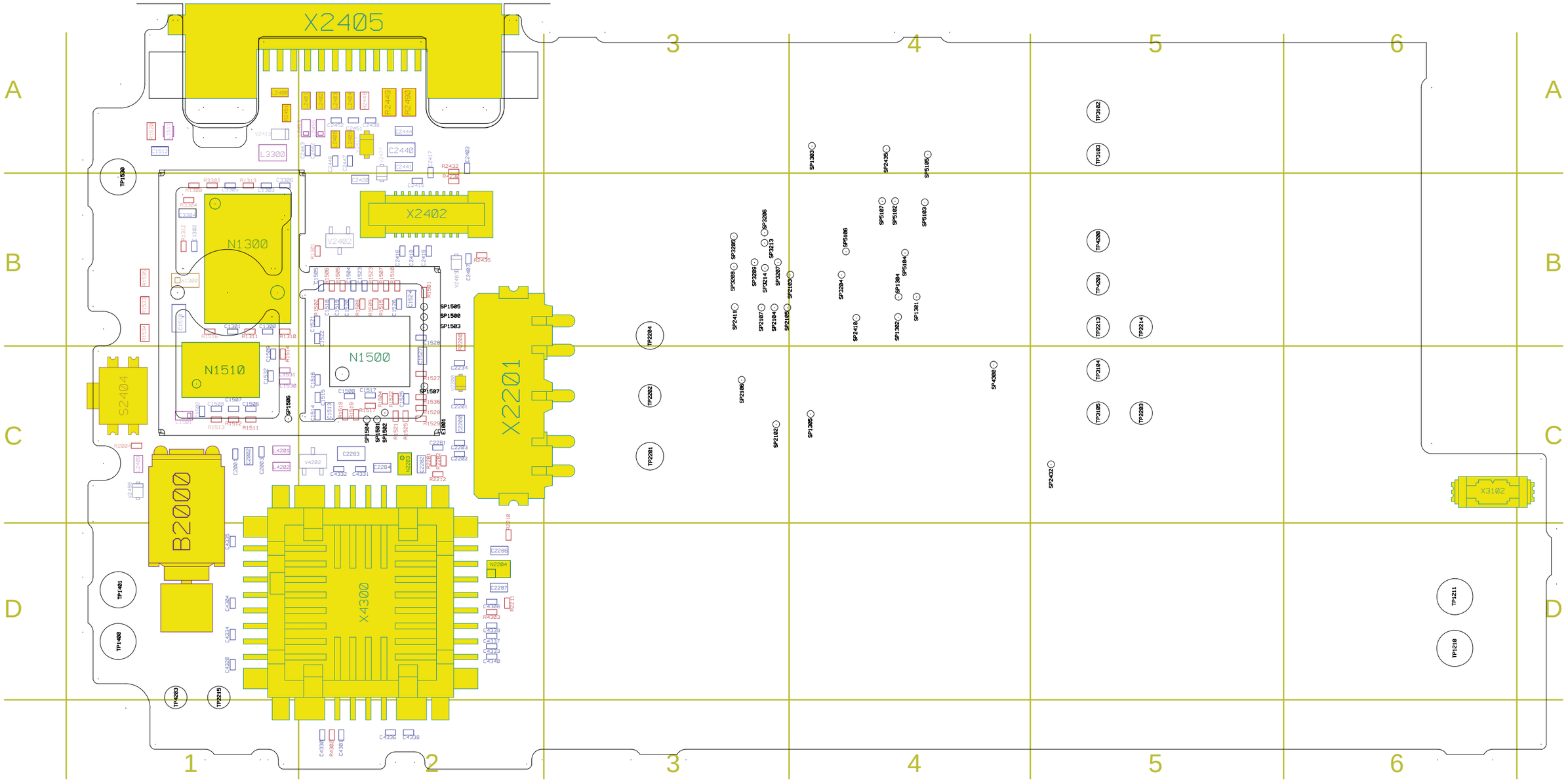

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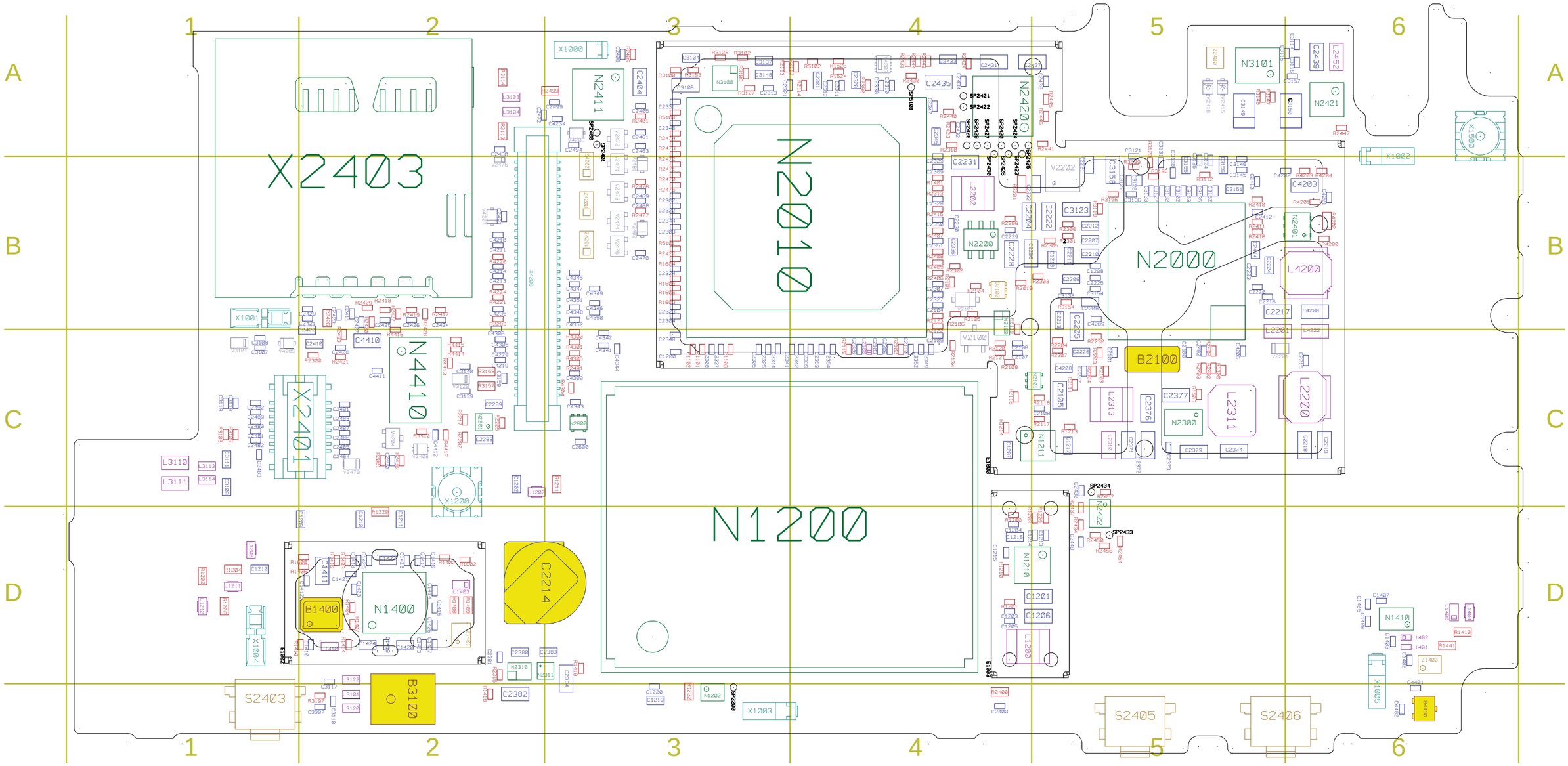
R - Replaceable
See Appendix for more information.



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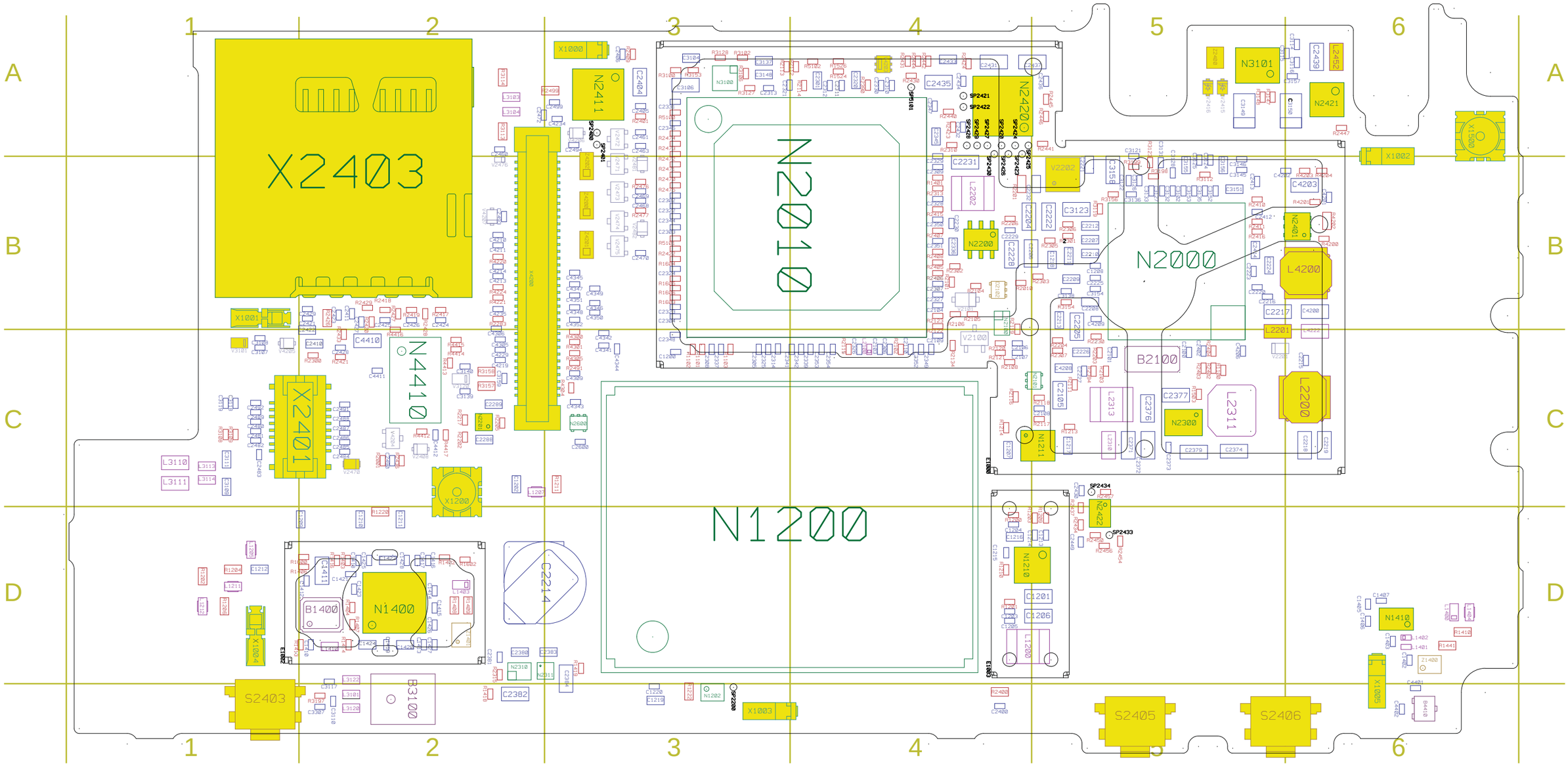
R - Replaceable
See Appendix for more information.



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L1212	1211-1435	D1	L3110	1000-1875	C1	N2100	1200-0425	B4	R1102	1000-0231	C3	R2010	1000-0231	B4	R2313	1000-0231	B4	R2421	1000-0231	C2	R2470	1000-0175	B3
L1401	1200-2414	D6	L3111	1000-1875	C1	N2101	1202-0076	C5	R1103	1000-0231	C3	R2101	1000-0231	B4	R2315	1000-0231	D2	R2422	1000-4063	B3	R2471	1000-0175	B3
L1402	1001-5311	D6	L3113	1000-0132	C1	N2200	1200-6420	B4	R1203	1000-0231	D5	R2104	1000-0231	B4	R2400	1000-5865	E4	R2427	1000-4035	B2	R2472	1000-0175	B3
L1403	1000-3612	D2	L3114	1000-0132	C1	N2201	1201-6465	C2	R1204	1000-0179	D1	R2108	1000-0231	C4	R2402	1000-0226	C5	R2428	1000-4035	B2	R2473	1000-0175	A3
L1404	1205-6617	D6	L3120	1000-2618	E2	N2300	1203-2790	C5	R1206	1000-0179	D1	R2111	1000-0378	C5	R2403	1000-0226	C5	R2429	1000-4035	B2	R2474	1000-0175	A3
L2100	1001-5311	C4	L3122	1000-2618	D2	N2310	1200-3994	D2	R1220	1000-0179	D2	R2113	1000-0388	A3	R2404	1000-0226	C5	R2431	1000-0231	A4	R2475	1000-0175	B3
L2200	1200-2214	C6	L4200	1000-3334	B6	N2311	1000-8818	D3	R1401	1000-0231	B4	R2115	1000-0230	C4	R2405	1000-0243	B4	R2433	1000-4035	C2	R2491	1000-0265	C3
L2201	1000-0118	C5	L4222	1000-0118	C6	N2401	1001-0077	B6	R1403	1000-0231	D2	R2116	1000-0231	C4	R2406	1000-0243	B4	R2434	1000-0230	D5	R2499	1000-5865	A3
L2202	1200-2913	B4	N1200	1210-9905	D3	N2411	1202-1676	A3	R1408	1000-0179	D2	R2117	1000-0231	C5	R2407	1000-0388	B4	R2437	1000-0377	D5	R3100	1000-0181	A3
L2310	1000-0118	C5	N1210	1203-5870	D4	N2420	1200-1694	A4	R1409	1000-0179	D2	R2120	1000-0181	C4	R2408	1000-0388	B4	R2441	1000-4147	A5	R3102	1000-0388	A3
L2311	1200-0119	C5	N1211	1204-5903	C5	N2421	1200-6309	A6	R1410	1000-0179	D6	R2121	1000-0181	C4	R2415	1000-0175	B4	R2442	1000-0240	A4	R3106	1000-0249	A3

R3112	1000-0231	B5	S2405	1001-0060	E5	V4203	1211-3641	A4	Z1401	1200-0660	D2
R3119	1000-0377	B5	S2406	1001-0060	E5	V4204	1200-9617	C2	Z2400	1201-6833	A5
R3147	1000-0172	A5	V2100	1000-8463	C4	V4205	1001-1864	C1	Z4200	1200-1824	B3
R3148	1000-0172	A5	V2101	1000-0391	B4	V4206	0000-0000	A3	Z4201	1200-1824	B3
R3153	1000-0231	A3	V2201	1001-0073	C5	X1000	1201-4841	A3	Z4202	1200-1824	B3
R3154	1000-4152	B5	V2202	1200-0145	B5	X1001	1202-1053	B1			
R3156	1000-0254	B5	V2408	1001-1864	C2	X1002	1201-4841	B6			
R3198	1000-0181	B5	V2415	1201-8440	A5	X1003	1201-4841	E3			
R3199	1000-0181	B5	V2416	1201-8440	A5	X1004	1202-1053	D1			
R4202	1000-0264	B6	V2470	1001-0075	C2	X1005	1201-4841	E6			
R4203	1200-1061	B6	V2472	1000-7497	A3	X1200	1203-9688	C2			
R4204	1000-4160	B6	V2473	1200-9617	B3	X1500	1203-9688	A6			
R5100	1000-0175	A3	V2475	1200-9617	B3	X2401	1214-7370	C2			
R5101	1000-0231	B3	V2481	1001-1864	B3	X2403	1000-7708	B2			
R5102	1000-0175	A4	V2482	1001-1864	B3	X4200	1206-2940	B2			
S2403	1001-0060	E1	V3101	1001-0796	C1	Z1400	1211-5714	D6			

R - Replaceable
See Appendix for more information.

G705, W705, W715 Function Overview

General Information

Size
98 x 47.5 x 14.3 mm

Weight
98 grams

Colors
G705: Silky Gold, Majestic Black
W705: Luxury Silver, Passionate Red
W715: Galactic Black, Luxury Silver

Screen
262,144 color TFT, Resolution 240 x 320 pixels, Size: 2.4 inches

Phone memory
Up to 120 MB
Memory Stick Micro™ (M2™) support

Talk time
GSM/GPRS: Up to 10 hrs
UMTS: Up to 4 hrs

Standby time
GSM/GPRS: Up to 400 hrs
UMTS: Up to 350 hrs

Video call time:
Up to 3 hrs

Music listening time:
Up to 20 hrs

Networks
G705:
GSM/GPRS/EDGE 850/900/1800/1900
UMTS/HSDPA 850/1900/2100

W705:
GSM/GPRS/EDGE 850/900/1800/1900
UMTS/HSDPA 850/900/1900/2100

W715:
GSM/GPRS/EDGE 850/900/1800/1900
UMTS/HSDPA 900/2100

Note! *Network support depends on variant and market.*

Features

Camera
3.2 megapixel camera
Up to 3.2x digital zoom
Photo fix
Photo light
Video light
Picture blogging
Video blogging
Video recording

Music
G705
Media player, Mega Bass™, Album art, PlayNow™, TrackID™, Bluetooth™ stereo (A2DP)
Music tones (MP3/AAC)

W705
Walkman™ player, Clear Stereo, Clear Bass, Album art, PlayNow™, TrackID™, Bluetooth™ stereo (A2DP), Music tones (MP3/AAC), Shake control, SensMe™

W715
Walkman™, Vodafone Music, Clear Stereo, Clear Bass, Album art, TrackID™,
Stereo Bluetooth™ (A2DP), Music tones (MP3/AAC), Shake Control, SensMe™

Internet/Web
G705
Access NetFront™ Web browser, Web feeds, Photo feeds, Web shortcut keys

W705 and W715
Access NetFront™ Web browser, Web feeds, Photo feeds

Communication
Video calling, Speaker phone, Polyphonic ringtones, Vibrating alert

Messaging
Email, Text messaging (SMS), Chat view (W705 and W715 Only), Picture messaging (MMS), Exchange ActiveSync®, Microsoft® Exchange (W715 Only), Instant messaging, Predictive text input, Sound recorder

Design
Navigation key, Auto rotate, Picture wallpaper, Wallpaper animation

Entertainment
G705
YouTube™, 3D games, Java, FM radio, Video streaming, Video viewing

W705 and W715
Media, YouTube™, 3D games, Motion gaming, Java, FM radio with RDS, Video streaming
Video viewing

Organizer
Alarm clock, Calculator,Calendar, Flight mode, Notes, Phone book, Stopwatch, Tasks
Timer

Location-based services
G705
AGPS, Geo-tagging of photos, Google Maps™, Wayfinder Navigator™ (3 month trial version)

W705
Geo-tagging of photos (cell-id), Google Maps™

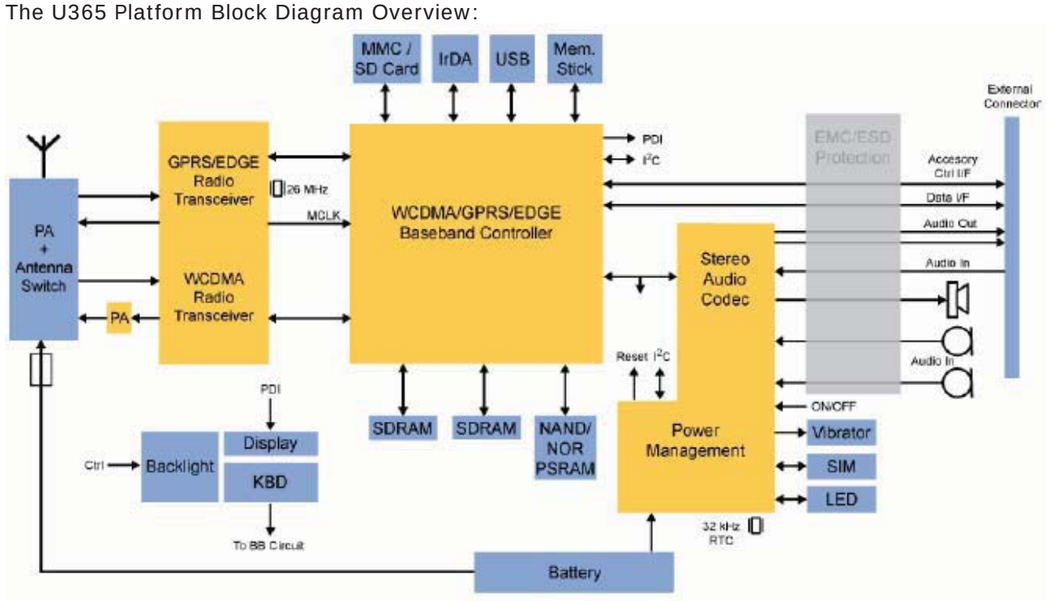
W715
AGPS, Vodafone Find&Go, Geotagging of photos, Google Maps™

Connectivity
DLNA Certified™, Bluetooth™ technology, Modem, Synchronization, USB mass storage
USB support, Wi-Fi™, PictBridge printing

Hardware Overview

Platform Information
The G705, W705 and W715 are using the U365 platform provided by Ericsson Mobile Platform (EMP).

The U365 Platform Block Diagram Overview:



Baseband Part

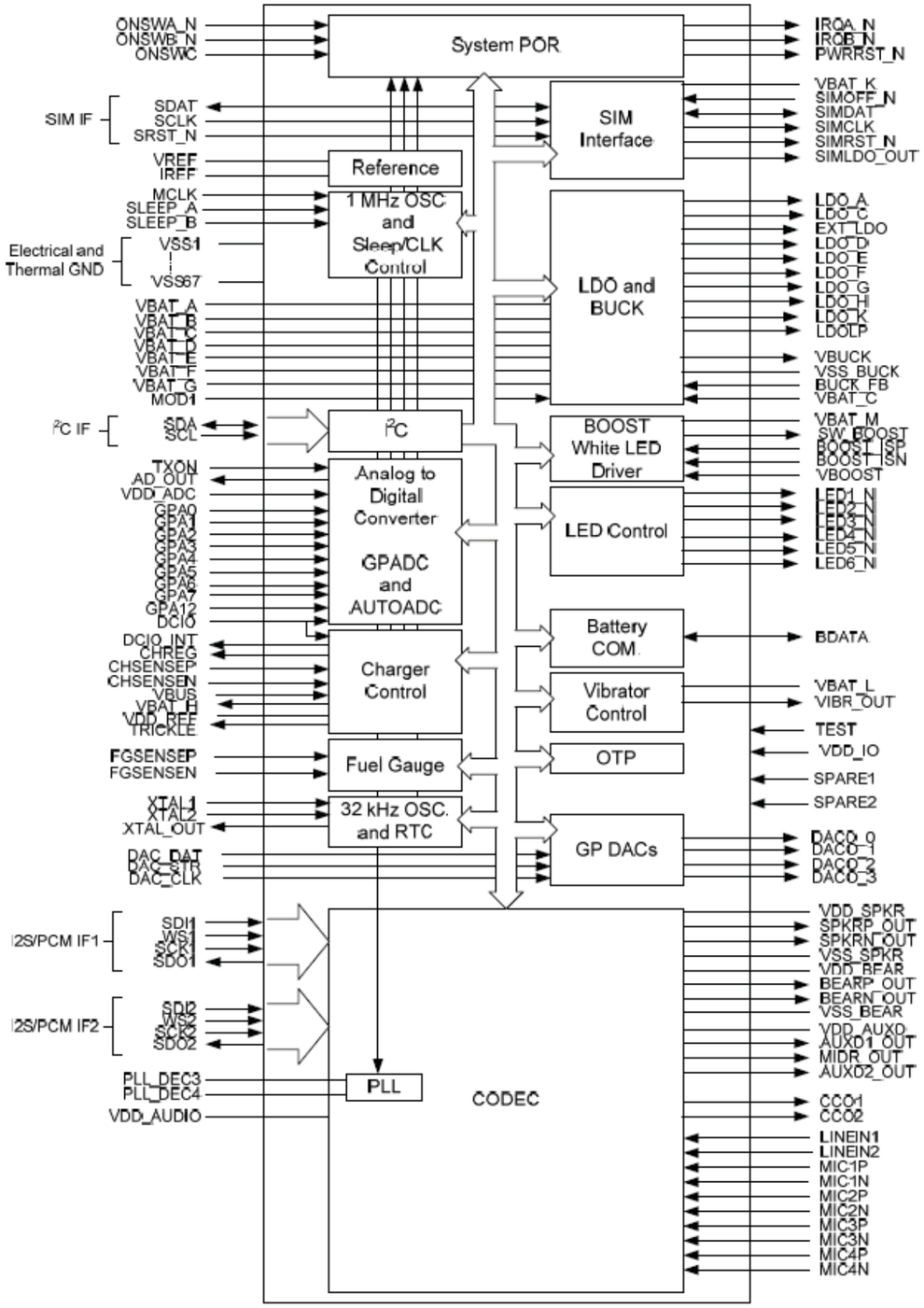
Analog Baseband Controller N2000 (Vera)
This component is not replaceable on SL 4 because Baseband calibration is required. The analog baseband controller is the main power management circuit. It has converters and regulators that generate a number of supply voltages, each optimized for its load.

The analog baseband controller is a mixed digital and analog device that supports the following circuitry:
- Power management circuitry
- Voltage regulation circuitry
- Eight Low Dropout (LDO) regulators and low power regulator
- 600 mA integrated Buck regulator
- Boost step-up DC/DC converter for White Light Emitting Diode (WLED) driving
- Battery charging and communication circuitry
- Battery fuel gauging circuitry
- Analog-to-Digital Converter (ADC)
- Digital-to-Analog Converter (DAC)
- SIM interface
- Six programmable LED drivers
- Accurate band gap reference
- Vibrator driver
- Real Time Clock (RTC)
- 8-byte One-Time Programmable (OTP) memory
- Pulse Code Modulation (PCM) voice coder/decoder
- PCM audio coder/decoder
- Microphone interface
- Stereo line input
- Earphone driver
- Earpiece driver
- 8-Ω speaker driver / Stereo line output

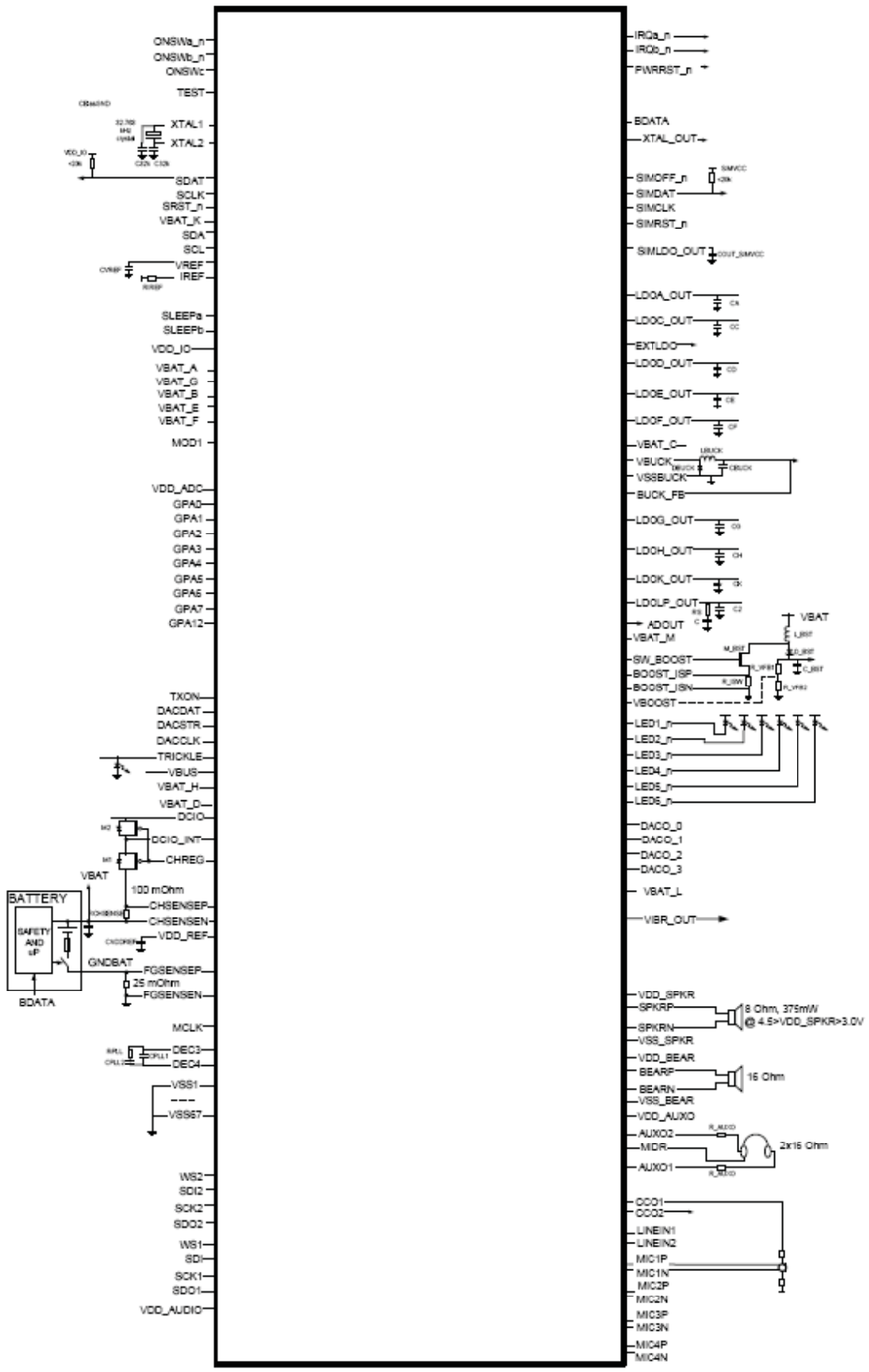
The analog baseband controller is controlled by an I2C™ interface. It also comprises the main power management circuits, equipped with a number of converters and regulators for generating the required supply voltages.
The analog baseband controller supports the following features:

- Lithium battery
- Full audio CODEC functionality
- Supports stereo audio sampling rates of 8/16 kHz voice coding/decoding and 44.1/48 kHz for high quality audio recording/playback (for example MIDI and MP3 applications)
- Double CODEC I2S/PCM interfaces
- Flexible microphone interface
- Integrated headphone amplifiers
- Integrated earpiece amplifiers
- Integrated speaker amplifier
- Integrated flexible audio mixing functionality
- Boost driver capable of driving up to four WLEDs in series, supplying 50 mA
- Designed to meet power management demands of GSM and WCDMA
- Automated power management ADC to relieve CPU
- Battery identification and communication
- Single-terminal charger and accessory power interface for compact connector design
- Integrated USB charging
- OTP memory
- Integrated hardware fuel gauge to accurately monitor battery capacity
- Reduced number of external components as a result of integrated programmable LED and vibrator drivers
- 32 kHz real time clock with alarm wake up capability
- Designed to support two host controllers.

Functional Blocks of the Analog Baseband Controller:



Connection Diagram of the Analog Baseband Controller:



Charger Control

A programmable charger is used for battery charging. Limits can be set for the output voltage at CHSENSE- and the output current from DCIO through the sense resistor to CHSENSE-. The programmable charger is enabled or disabled by the assertion/negation of the external signal DCIO. Parts of the programmable charger are activated and deactivated depending on the level of VBAT. The rest of the programmable charger is activated and deactivated through I2C.

The programmable charger supports the following functions:

- Constant current charging
- Constant voltage charging
- Trickle charging
- PWM controlled charging
- Over-voltage and over current detection
- Watchdog termination
- DCIO assertion/removal detection
- Voltage and current measure functions
- Low resistive path (reverse mode)

The programmable charger is able to control the voltage and limit the current to a load seen at CHSENSE-. The programmable charger can also be run in PWM mode to turn the charging on and off in accordance with the particular period and duty cycle. When the charging is on, it is set to the current and voltage selected by I2C.
A low resistive path from VBAT to DCIO can be formed when DCIO is not detected. When this setting is done in the appropriate registers, a lowering of CHREG to 0 V turns on the external pass device. The pass device is automatically turned off when an external source is detected on DCIO, or when the watchdog termination block times out. The watchdog termination block must be active when the external switch is enabled, both in normal charging mode and in the low resistive path mode. The watchdog is set through the serial interface, and if it has not been set again before timeout, the watchdog turns off the external switch. The watchdog is disregarded during trickle charging. When no battery is present, the system can be booted and supplied from DCIO by applying the correct voltage on DCIO.

USB Charger

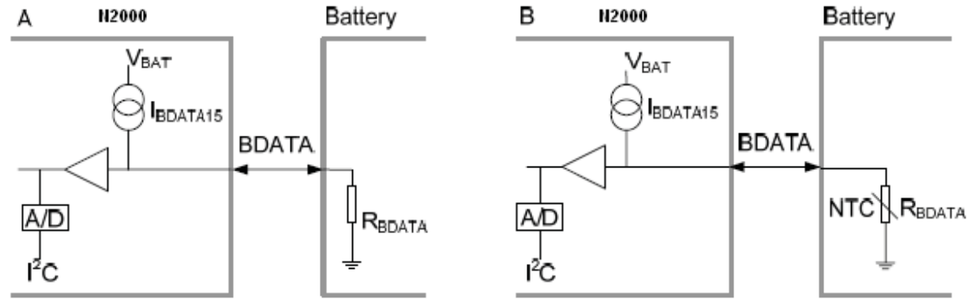
The analog baseband controller contains a standalone USB charger.
The USB charger has a separate input and incorporates full functionality during low VBAT.

The programmable charger supports the following functions:
- Trickle charging
- Constant current charging
- Watchdog termination
- Trickle LED indication
- VBUS assertion/removal detection

Resistance Identification and Temperature Measurement

The resistance identification mode utilizes the constant current source to feed the battery data output while monitoring the voltage at the battery data node with general purpose ADC the conversion is started through I2C.

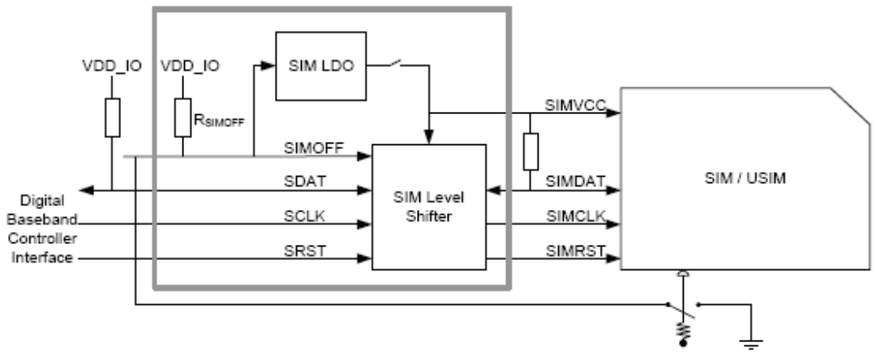
Resistance Identification (A) and Temperature Measurement (B):



SIM Interface

The SIM interface supplies level is shifting between the digital baseband controller and the SIM/USIM card. Moreover, hard-wired SIM deactivation functionality manages removal of a SIM card that has not been powered down.

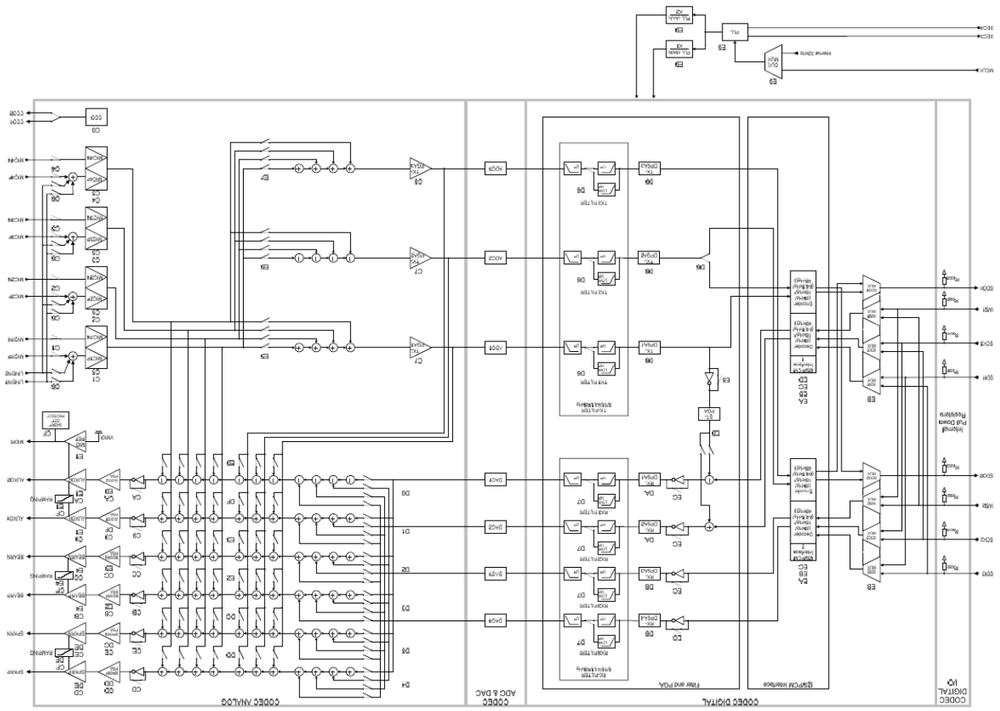
Block Diagram of the SIM Interface:



CODEC Overview

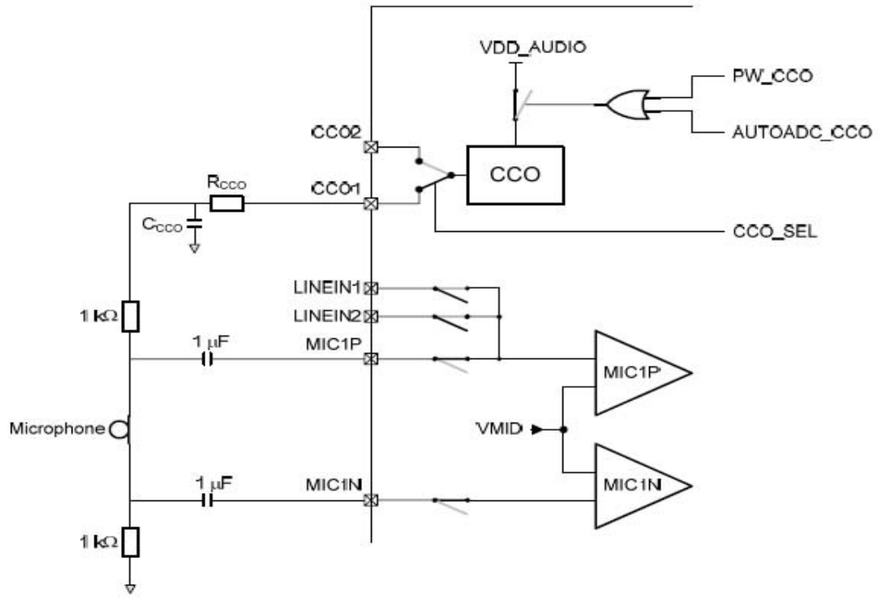
The CODEC is encoding analog audio signals and analog voice signals into digital signals using Analog to Digital converters (ADCs). This is done in the coder section of the CODEC, also named the TX path (transfer section). The CODEC is also decoding digital audio signals and digital voice signals into analog signals using DACs. This is done in the decoder section of the CODEC, also named the RX path (receiver section).

CODEC Block Schematic:



CODEC CCO Voltage Source

There is an internal voltage source CCO that provides the necessary drive current for electret microphones. The voltage source is I²C programmable to 2.2 V or 2.4 V. The source can be disabled during standby. A typical use case with a microphone connected to MIC1 and the CCO is shown in picture below.



Earphone Amplifier

The earphone amplifiers (BEARP and BEARN) are mainly intended to be differentially configured and drive a low impedance dynamic transducer (earpiece) but they can also be single ended configured. The BEARP and BEARN amplifiers can be powered down by the I2C. The amplifiers can exhibit high impedance to 1.4V or low impedance to ground when powered-down. Fifty-one gains are available for BEARP and BEARN: from +15dB down to –60dB in 1.5dB steps. When the BEARP and BEARN outputs are operating in differential mode, an I²C selectable bit must invert one of the inputs.

Speaker Amplifier

The speaker amplifiers, SPKRP and SPKRN, are intended to drive a low impedance (8Ω) speaker in a differential mode or to be used as a stereo configured line output amplifier supporting external high power amplifiers. The output buffer shall exhibit low impedance to ground when powered-down and the current consumption shall be minimal. When the SPKRP and SPKRN outputs are operating in differential mode, an I²C selectable bit must invert one of the inputs.

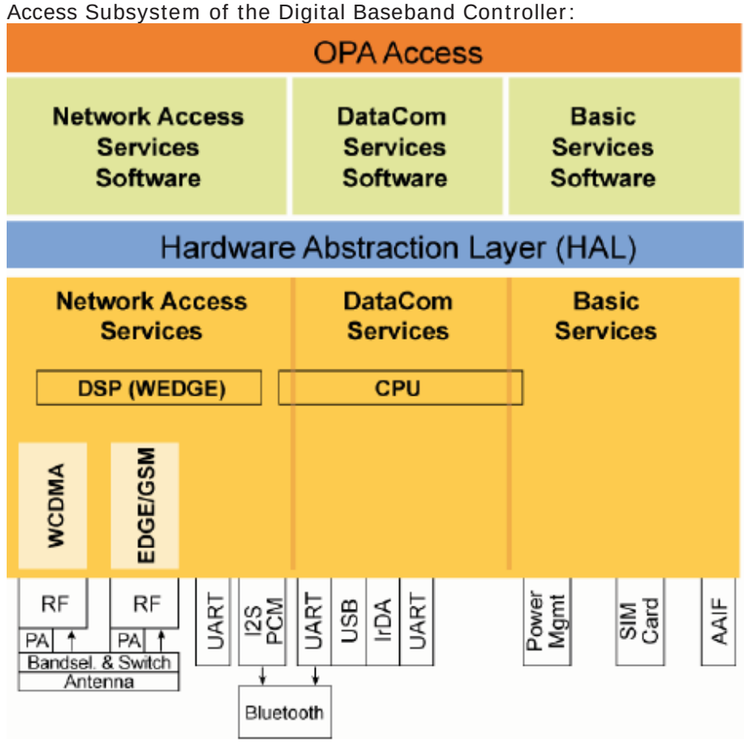
Digital Baseband Controller (CPU)
N2010 (Kajsa)

This component is not replaceable on SL 4 because Baseband calibration is required.
The Digital Baseband Controller is divided in two subsystems: Access and Application

Access Subsystem

All modem functionality in the digital baseband controller resides in the Access subsystem. This includes EDGE/GPRS/GSM interface, WCDMA interface, USB, IrDA, and other peripheral modules. The control CPU is an ARM926 and a DSP is used for signal processing and layer one control code.
The main communication between the blocks in the Access subsystem is done through the Advanced High-performance Bus (AHB) matrix, which is a set of control buses connecting the different parts together. A block called Syscon is responsible for distributing clocks and resets to all parts of the Access subsystem. This block is under SW control. The Access subsystem is connected to the Shared EMIF, an interface for communication with an external SDRAM. The Shared EMIF is shared between the Access subsystem and the Application subsystem.

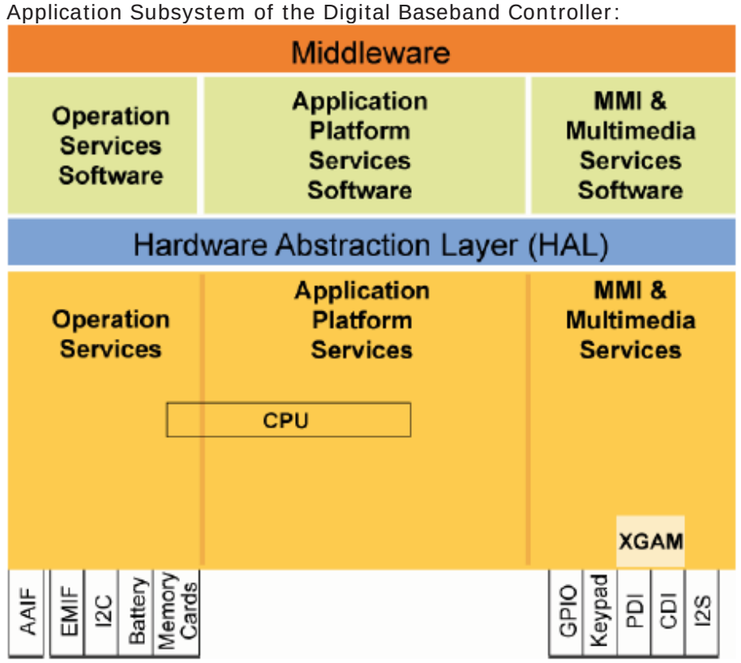
Access Subsystem of the Digital Baseband Controller:



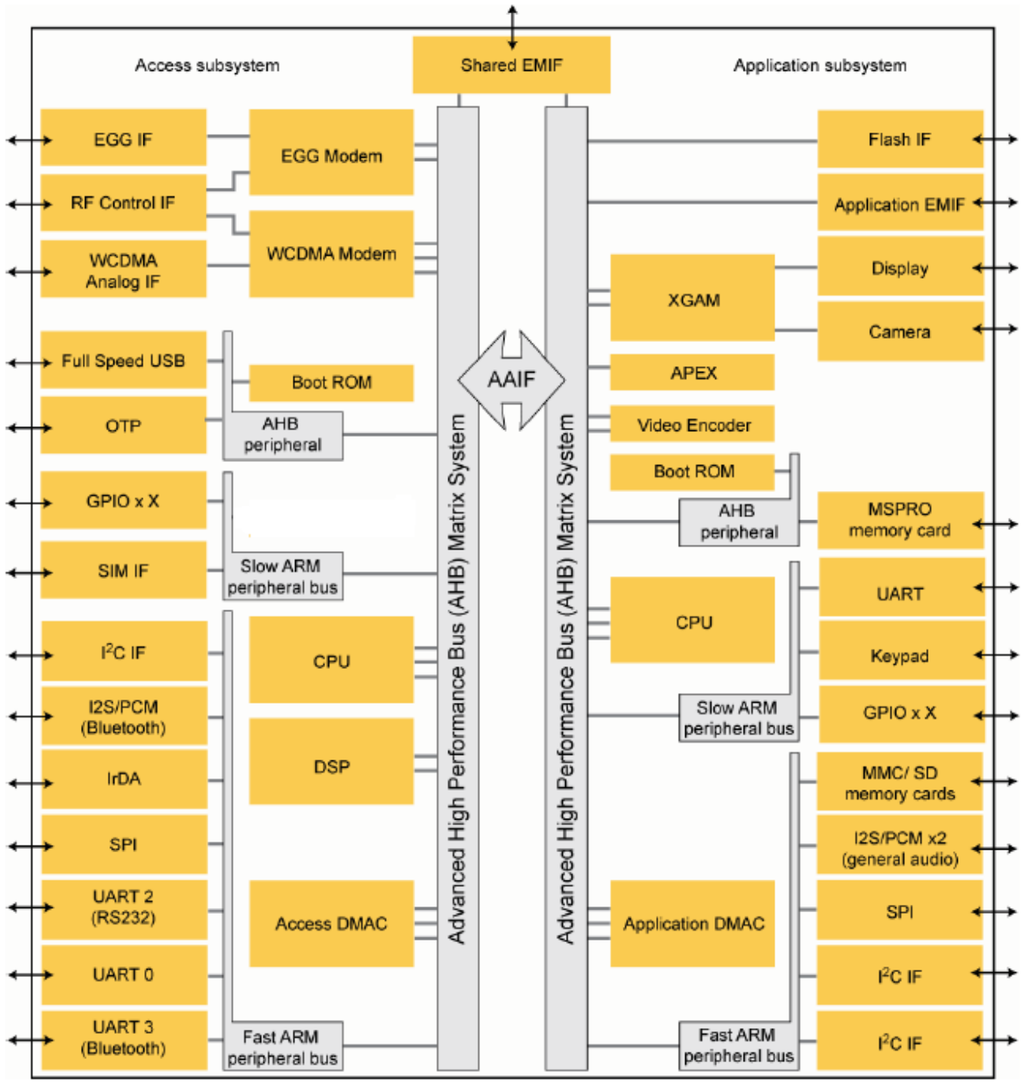
Application Subsystem

The Application subsystem contains functionality related to functions such as MMI, graphics, audio and memory media. The control CPU is an ARM926 with three external memory interfaces, one shared with the Access subsystem and two dedicated for the Application subsystem. The Application subsystem contains several blocks. The main communication between the blocks is done through the Advanced High performance bus (AHB) matrix, which is a set of control buses connecting the different parts. A block called Syscon is responsible for distributing clocks and resets to all parts of the Application subsystem. This block is under SW control. The Application subsystem is connected to the Shared EMIF that is used for code execution or data storage. In addition, a dedicated EMIF that support SDRAM or static memory like NOR, PsRAM or NAND are also available. The Application EMIF is a general interface for communication with, for example external SDRAM, PSRAM, NOR flash, NAND flash and companion chips

Application Subsystem of the Digital Baseband Controller:



The functional blocks of the Digital Baseband Controller:



Keypad

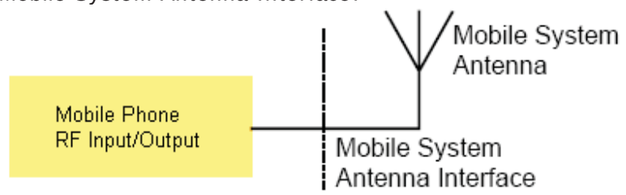
The keypad interface block supports up to 30 keys with 65 columns and 6 rows and operates in both scan and idle mode. The keypad scan is performed by software. Any transition in the state of the column inputs is written directly to the register. The keypad interface differentiates between single key presses, simultaneous presses of any keys with a function key, and any key releases. The period between successive scans is programmable over the range 5 ms to 80 ms, in 5 ms steps. During scan mode, the keypad generates an interrupt whenever a valid keypad state change occurs (including a release of any pressed keys). The scan function is disabled during system power-up. The keypad is able to detect at least four simultaneous key presses. Not all combinations are supported.

Radio Part

Antenna

The mobile system antenna interface connects the Wideband Code Division Multiple Access (WCDMA) and Global System for Mobile Communication (GSM) input/output to the antenna of the Mobile Phone. It is a bi-directional RF interface containing signals in the range 800 MHz to 2.2 GHz. The mobile system antenna interface is the interface between the Mobile Phone Radio Frequency (RF) input/output and the mobile system antenna. The interface handles the GSM 850, EGSM 900, GSM 1800, GSM 1900 and WCDMA Band I, II and V, RF inputs/outputs.

Mobile System Antenna Interface:



Radio Module N1200 (Tiger)

Front End

The Front End block connects the proper block in the radio system to the antenna. The Front End has two inputs for EDGE/GSM/GPRS, one for low band (850/900 MHz) and one for high band (1800/1900 MHz). The EDGE/GSM/GPRS power amplifier output is filtered by the low pass filter in the Front End and then connected to the antenna through a switch. In receive mode, the EDGE/GSM/GPRS signal from the antenna passes through the switch to one of the four receive SAW filters. The SAW filter provides receive band selectivity. In GSM/GRPS/EDGE systems, transmit and receive operations are divided in time and the switch connects the proper block in accordance with the mode of operation (that is, transmit or receive; one at a time).

In WCDMA the transmit outputs from the WCDMA transceiver are filtered by an external SAW filter that cleans up the spectrum. The SAW filter output is connected to the power amplifier, one for each band. For power control, a sample of the transmit output is taken by a directional coupler and converted to a DC level by the power detection circuit. This signal is used to control the transmitter output power. The transmit signal passes through an isolator and then a duplexer. The duplexer output is selected by the switch in the Front End for connection to the antenna. In WCDMA receive mode the signal from the antenna is switched by the Front End to the correct duplexer. The output from the duplexer is connected to the LNA input in the WCDMA receiver.

Transceiver

The transceiver is a multi-mode transceiver for WCDMA/EGDE/GPRS/GSM. The EDGE/GPRS/GSM part of the transceiver use a digital baseband interface that is shared between received and transmitted data. The receive interface is based on I and Q data and the transmitter interface is based on envelope and frequency data. The WCDMA part of the transceiver use differential analog in-phase and quadrature-phase interfaces, which is an IQ-interface, in the receiver and the transmitter data paths.

Frequency Generation

The 26 MHz reference signal is used as the reference for the on-chip synthesizers. To cover the required frequency range, the integrated Voltage Controlled Oscillator (VCO) operates at twice the frequency for band 1800/1900/2100, and at four times the desired frequency for band 800/900. The two synthesizers are controlled through the serial bus from the access side of the digital baseband controller.

EDGE/GPRS/GSM Transmitter Part

Polar modulation transmitter architecture based on the direct phase/frequency modulation/synthesizer architecture is implemented for GSM, GPRS and EDGE. This architecture has the capability of generating both the GSM/GPRS constant envelope GMSK modulation and the linear EDGE 8-PSK modulation in a very cost efficient way. The motivation for a polar modulation transmitter architecture compared to traditionally linear architectures is to reduce the output noise (thus eliminating the need for off-chip filters) reduce the power consumption by utilizing non-linear switching analog signal processing blocks, and to eliminate the need for an RF isolator.

In brief, the phase/frequency modulator in this polar modulation architecture is a sigma-delta controlled fractional-N frequency synthesizer with an additional frequency insertion point after the loop filter at the input of the VCO. The Phase-locked Loop (PLL) has two information inputs: the divider ratio in the feedback path and a direct path to the VCO. The phase locked loop generates the radio frequency carrier including the phase modulation information at the desired channel frequency.

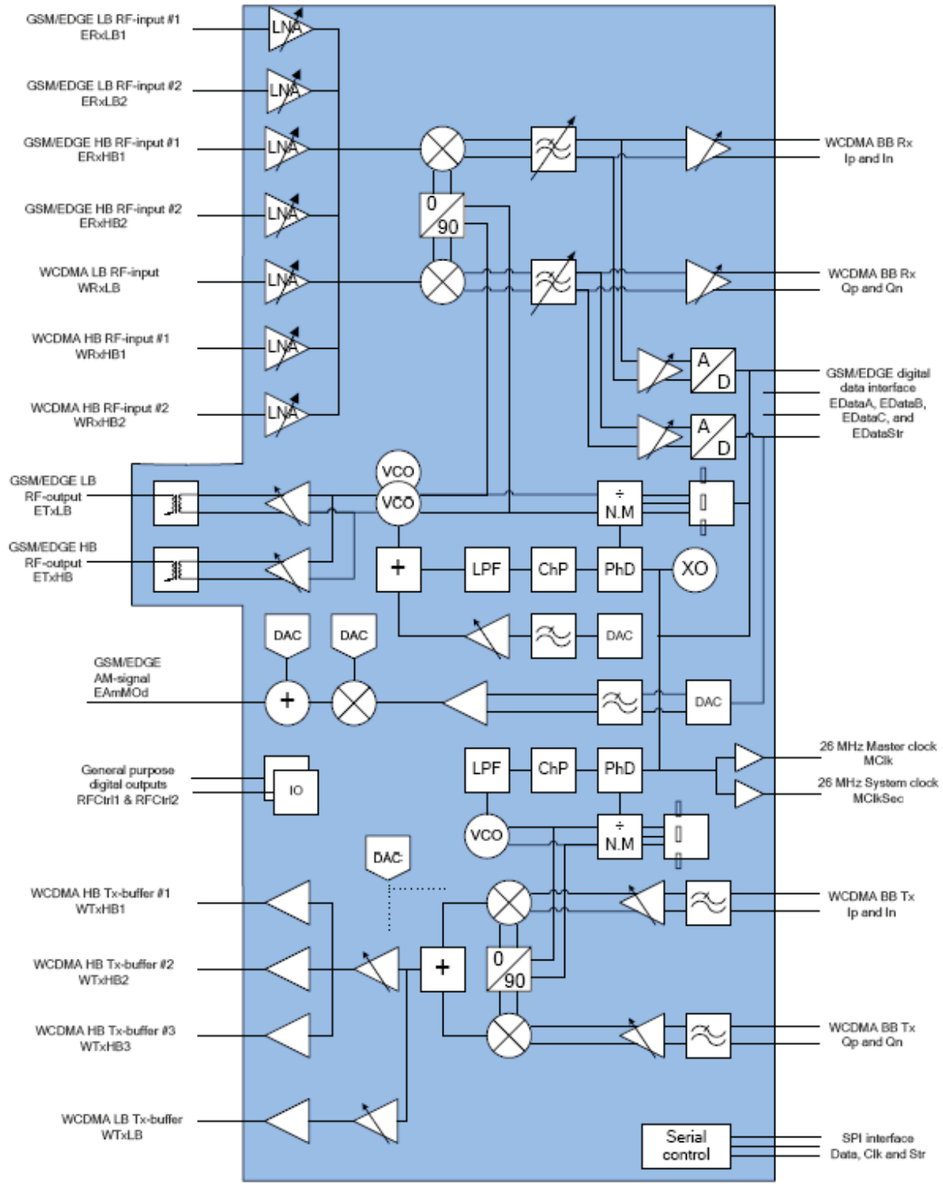
WCDMA Transmitter Part

The WCDMA transmitter architecture is an on frequency linear direct up-conversion IQ-modulator. The in-phase and quadrature-phase reconstruction filters are fully integrated and a programmable gain amplifier implements the gain control. An external SAW filter between the WCDMA circuit and the power amplifier is used to improve noise performance. After the power amplifier, the signal is sent through an isolator and through the duplex filter, which directs the transmit signal to the antenna connector through the antenna switch. The supply voltage and bias of the power amplifier are adapted depending on the output power to achieve high efficiency at every transmitter power level. A high efficiency DC/DC converter regulates the supply voltage and the bias operation point is controlled by a D/A-converter in the WCDMA radio circuit.

Receiver Part

The receiver architecture is a direct down-conversion zero-IF receiver with integrated low-pass filters. The complete receiver with seven Low Noise Amplifiers (LNAs), one for each supported band, is integrated on chip. After the down-conversion, the in-phase and quadrature-phase components are low pass filtered and if the receiver is in EDGE/GPRS/GSM mode the signals are fed to the integrated high dynamic range sigma-delta A/D-converters.

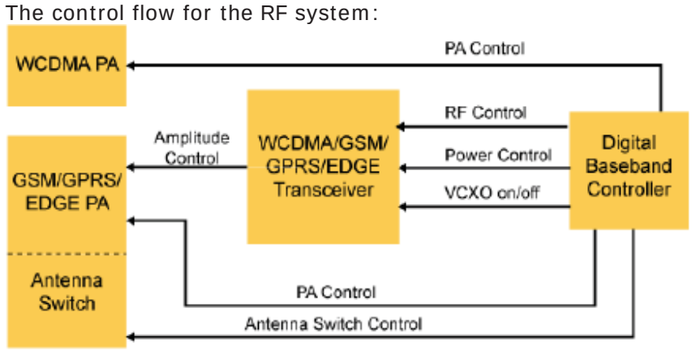
Ericsson RF 3300 Block Diagram:



RF System Control

The access side of the digital baseband controller controls the overall radio system.
In both EDGE/GSM/GPRS and WCDMA air interface mode, the digital baseband controller controls the radio system through a three-wire serial bus. The digital baseband controller also manages PA band control and the antenna switch mechanism in the front end module. The 26 MHz VCXO clock residing in the transceiver is turned on only when required and initiated by the digital baseband controller.

The control flow for the RF system:



EDGE / GPRS / GSM

TX Frequency, Channel and Power Level Range:

GSM 850:
TX Frequency Range: 824,2 MHZ – 848,8 MHZ
Channel Range TX: 128 – 251
Power Level: Min 19 – Max 5

GSM 900:
TX Frequency Range: 890,2 MHZ – 914,8 MHZ
Channel Range TX: 1 - 124
Power Level: Min 19 – Max 5

EGSM 900:
TX Frequency Range: 880,2 MHZ – 889,8 MHZ
Channel Range TX: 975 - 1023
Power Level: Min 19 – Max 5

DCS 1800:
TX Frequency Range: 1710,2 MHZ – 1784,8 MHZ
Channel Range TX: 512 – 885
Power Level: Min 15 – Max 0

PCS 1900:
TX Frequency Range: 1850,2 MHZ – 1909,8 MHZ
Channel Range TX: 512 - 810
Power Level: Min 15 – Max 0

RX Frequency and Channel Range:

GSM 850:
RX Frequency Range: 869,2 MHZ – 893,8 MHZ
Channel Range RX: 128 – 251

GSM 900:
Frequency Range: 935,2 MHZ – 959,8 MHZ
Channel Range RX: 1 - 124

EGSM 900:
RX Frequency Range: 925,2 MHZ – 934,8 MHZ
Channel Range RX: 975 – 1023

DCS 1800:
RX Frequency Range: 1805,2 MHZ – 1879,8 MHZ
Channel Range RX: 512 – 885

PCS 1900:
RX Frequency Range: 1930,2 MHZ – 1989,8 MHZ
Channel Range RX: 512 - 810

WCDMA

Note! *The WCDMA Network support depends on variant and market.*

TX and RX Frequency and Channel Range

Band I:
Channel Range TX: 9612 - 9888
TX Frequency Range: 1920 – 1980 MHz
Channel Range RX: 10562 - 10838
RX Frequency Range: 2110 – 2170 MHz

Band II:
Channel Range TX: 9262 - 9538
TX Frequency Range: 1850 – 1910 MHz
Channel Range RX: 9662 - 9938
RX Frequency Range: 1930 – 1990 MHz

Band V:
Channel Range TX: 4132 – 4233
TX Frequency Range: 824 –849 MHz
Channel Range RX: 4357 – 4458
RX Frequency Range: 869 –894 MHz

Band VIII
Channel Range TX: 2712 – 2863
TX Frequency Range: 880 –915 MHz
Channel Range RX: 2937 – 3088
RX Frequency Range: 925 – 960 MHz

Bluetooth and FM Radio

The Blt/FM Radio circuit combines Bluetooth and FM tuner functionality into one.

Bluetooth

The Bluetooth implementation is compliant with Bluetooth specification 2.1 + EDR.
The Bluetooth™ transceiver has frequency channels with 1 MHz separation from 2402 to 2480 MHz. The same band is used for both transmission and reception. This gives 79 frequency channels.

Receiver

The Bluetooth section implements a low-IF receiver for Bluetooth modulated input signals. The radio signal is taken from a balanced RF input and amplified by an LNA. The mixers are driven by two quadrature LO signals, which are locally generated from a VCO signal running at twice the frequency. The I and Q mixer output signals are band pass filtered by a poly-phase filter for channel filtering and image rejection. The output of the band pass filter is amplified by a VGA to the optimal input range for the A/D converter. Further channel filtering is done in the digital part. The digital part demodulates the GFSK, π/4-DQPSK or 8-DPSK coded bit stream by evaluating the phase information. RSSI data is extracted. Overall automatic gain amplification in the receive path is controlled digitally. The RC time constants for the analog filters are automatically calibrated on chip.

Transmitter
The transmitter uses the serial transmit data from the Bluetooth Controller. The transmitter modulator converts this data into GFSK, π/4-DQPSK or 8-DPSK modulated I and Q digital signals for respectively 1, 2 and 3 Mbps transmission speed. These signals are then converted to analog signals that are low pass filtered before up-conversion. The carrier frequency drift is limited by a closed loop PLL.

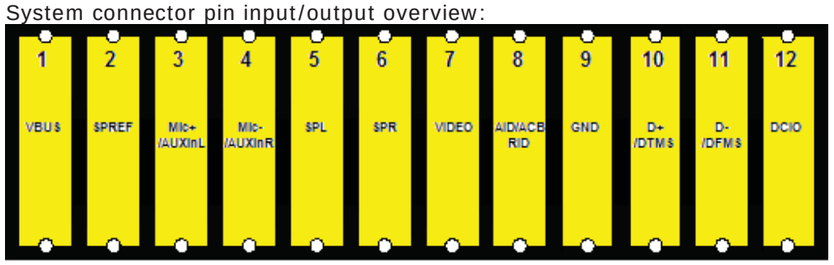
FM Radio

FM Receiver
The receiver uses a digital low-IF architecture. The receive (RX) section integrates a low noise amplifier (LNA) supporting the worldwide FM broadcast band (76 to 108 MHz). An automatic gain control (AGC) circuit controls the gain of the LNA to optimize sensitivity and rejection of strong interferers. An image-reject mixer down converts the RF signal to low-IF. The quadrature mixer output is amplified, filtered and digitized with high resolution analog-to-digital converters (ADCs). This advanced architecture allows the use of digital signal processing (DSP) to perform channel selection, FM demodulation and stereo audio processing.

Tuning
The receiver uses frequency synthesizer technology including a completely integrated VCO. The frequency synthesizer generates the quadrature local oscillator signal used to downconvert the RF input to a low intermediate frequency. The VCO frequency is locked to the reference clock and adjusted with an automatic frequency control (AFC) servo loop during reception. The tuning frequency is defined as: Freq (MHz) = Spacing (kHz) × Channel + Bottom of Band (MHz)

External Connectors
External units are connected to the transceiver by means of a 12-pin connector on the phone.

System connector pin input/output overview:



Clocks

Clock Distribution
The clocking for the access and application subsystems is separated. This means that the subsystems can wake up or go to sleep mode independently. The access subsystem is clocked by the 26 MHz Voltage Controlled Crystal Oscillator (VCXO) located in the GSM/EDGE circuit. When the access subsystem has a job to do, the Master Clock (MCLK) signal is requested from the RF part. Most other clocks needed within the access subsystem are generated from the MCLK. Some minor parts like sleep timer and cable detect use the 32 kHz real-time clock. The 32 kHz real-time clock clocks the application subsystem, and all other internal clocks needed within the application subsystem are generated from this clock. However, when audio is transferred between the application and the access subsystems, the MCLK is used.

Master Clock (26 MHz)
The 26.00 MHz VCXO-based MCLK is distributed as a square wave signal from the GSM/EDGE circuit. In order to have full control over the load on the MCLK, only the access side of the digital baseband controller is allowed to request the MCLK. However, by indirect means also the application side CPU can issue the request. A VCXO-based square wave is also distributed to the WCDMA circuit, but is turned on only upon a command from the digital baseband controller.

Real-time Clock (32. 768 kHz)
A 32.768 kHz crystal oscillator provides a low frequency clock whenever the platform has power. This clock is used to keep the Real-Time Clock (RTC) block functioning, so that the platform can keep track of the time and date. The low frequency clock is generated in the analog baseband controller and distributed to the digital baseband controller, and if necessary to external devices like Bluetooth, FM radio and A-GPS.

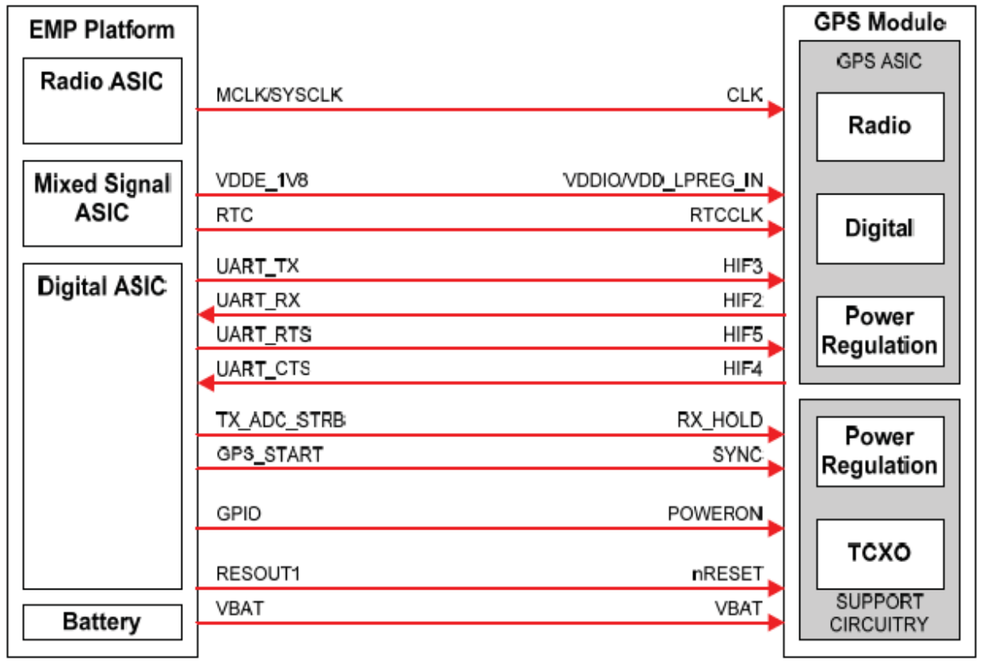
A-GPS
The Assisted GPS functionality in the phone is realized with the Global Locate Hammerhead GPS module. The Global Locate Hammerhead belongs to the Type 2 GPS solutions. The PMB 2525 Hammerhead II GPS IC is a GPS single chip device containing a complete radio frequency front-end as well as the signal processing functionality in a single die. The device allows the usage of assistance data by supporting A-GPS (assisted GPS) standards (RRLP, RRC, OMA SUPL). One of three serial interfaces, UART, I²C or SPI, is used for communication with the host system.

Clock Reference Frequency
The platform provides two reference frequencies, a 32.768 kHz clock (RTCCLK) from the Analog Baseband Controller, and a 26 MHz reference clock (SYSCLK) from the Digital Baseband Controller. The RTCCLK is used by the phone real time clock function. The RTCCLK is distributed to the A-GPS module as a logical square wave. SYSCLK is derived from the reference modulation clock MCLK to the platform access system and is distributed from the Digital Baseband Controller to the A-GPS module. This 26 MHz clock is synchronized with the cellular network to an accuracy of ±0.1 ppm. Automatic frequency updates can also cause large frequency corrections, with associated phase discontinuities. In order to isolate the A-GPS module for the unstable effects of SYSCLK, an external reference clock is required. This external reference frequency provided by a TCXO is required to provide a clock with very high short term stability. The frequency of the TCXO is calibrated against the cellular reference clock by the A-GPS module enabling the use of a more economical less accurate TCXO.

Interface and Control
The Interface and control consists of system timing and control. The control interface includes a communication link where both data and control information are transferred between platform and the A-GPS module. Data and command information is transferred using a full-duplex Universal Asynchronous Receiver Transmitter (UART) interface.

Other control signals include the following:
- A GPIO or platform reset used as a reset signal (nRESET) to the GPS module.
- A Transmission On signal (TXON/ RX_HOLD), is used to indicate to the A-GPS module when the ME is transmitting. The A-GPS modules receiver is disabled whilst the ME is transmitting.
- A hardware timing pulse (GPSSTART/SYNC) providing the A-GPS module with a highly accurate timing reference. The A-GPS is able to accurately synchronize its GPS time to this reference pulse.
- A GPIO used as an enable (POWERON) signal to the GPS module.
- A GPIO used for power control for the GPS module.

A-GPS Block Diagram:



WLAN (Wi-Fi)

This WLAN module is based on the new Marvell 88W8686 chipset. WLAN module is designed to support IEEE 802.11a or 802.11g payload data rates of 6, 9, 12, 18, 24, 36, 48 and 54 Mbps, as well as 802.11b data rates of 1, 2, 5.5 and 11 Mbps. For security the WLAN module supports the IEEE 802.11i security standard through implementation of the Advanced Encryption Standard (AES)/Counter Mode CBC-MAC Protocol (CCMP), and Wired Equivalent Privacy (WEP) with Temporal Key Integrity Protocol (TKIP) security mechanism. For video, voice and multimedia applications the WLAN module supports 802.11e Quality of Service (QoS). The 3-wire Bluetooth / Wi-Fi co-existence interface is also supported. The WLAN module has a fully integrated RF to baseband transceiver that operates in both the 2.4 GHz ISM radio band for 802.11g/b WLAN applications and 5 GHz UNII radio band for 802.11a WLAN applications. It contains all the circuitry to support both transmit and receive operations. The integrated LNA and AGC on the receive path is seamlessly controlled by baseband functions. Integrated transmitters up-convert the quadrature baseband signal and the deliver the RF signals to external power amplifiers for 2.4 GHz and 5 GHz radio band transmission. Local oscillator frequencies are generated by a fully integrated programmable frequency synthesizer. The loop bandwith is optimized for phase noise and dynamic performance and quadrature signals are generated on-chip.

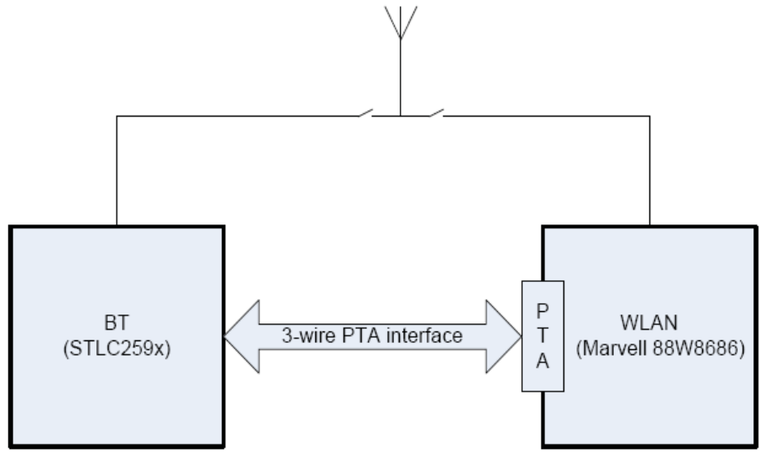
BT / WLAN Co-existence

Standards bodies did not fully anticipate the range of scenarios in which WLAN and Bluetooth would compete for the same spectrum therefore IEEE 802.11 (WLAN) and Bluetooth use the same 2.4 GHz ISM frequency band (although they use different access mechanisms). They also did not include comprehensive, robust, and cooperative mechanisms in their respective standards to mitigate interference. Since no mechanism for exchanging signal status information has been built into the two standards, the task of minimizing interference must be accomplished by other means. Co-location refers to the situation where both Bluetooth and WLAN are in functional mode, that is, they are both fully radio operational, performing either transmission or reception activities (or ready to do so immediately). They also either share an antenna or each module has its own antenna, on the same device. Because both Bluetooth and WLAN operate in the same unlicensed ISM band (2.4GHz), steps are required to avoid disturbances and allow coexistence. The HW solution is a single antenna controlled by an Antenna Switch with 3-wired lines between WLAN Device and BT Device. The used algorithm to decision whether WLAN device or BT device gets the antenna is Packet Traffic Arbitration (PTA). WLAN LD configures the PTA during startup of the WLAN device. All PTA parameters are stored in GDFS. The PTA is configured to prioritize BT traffic if it is a BT high request. All WLAN traffic should have priority before any BT traffic that is categorized as BT low requests.

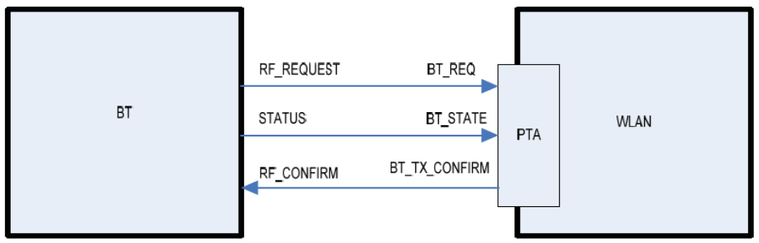
WLAN Driver sends status events to BT Driver to inform about:
- WLAN startup and shutdown
- WLAN association and disassociation
- The current WLAN channel in use

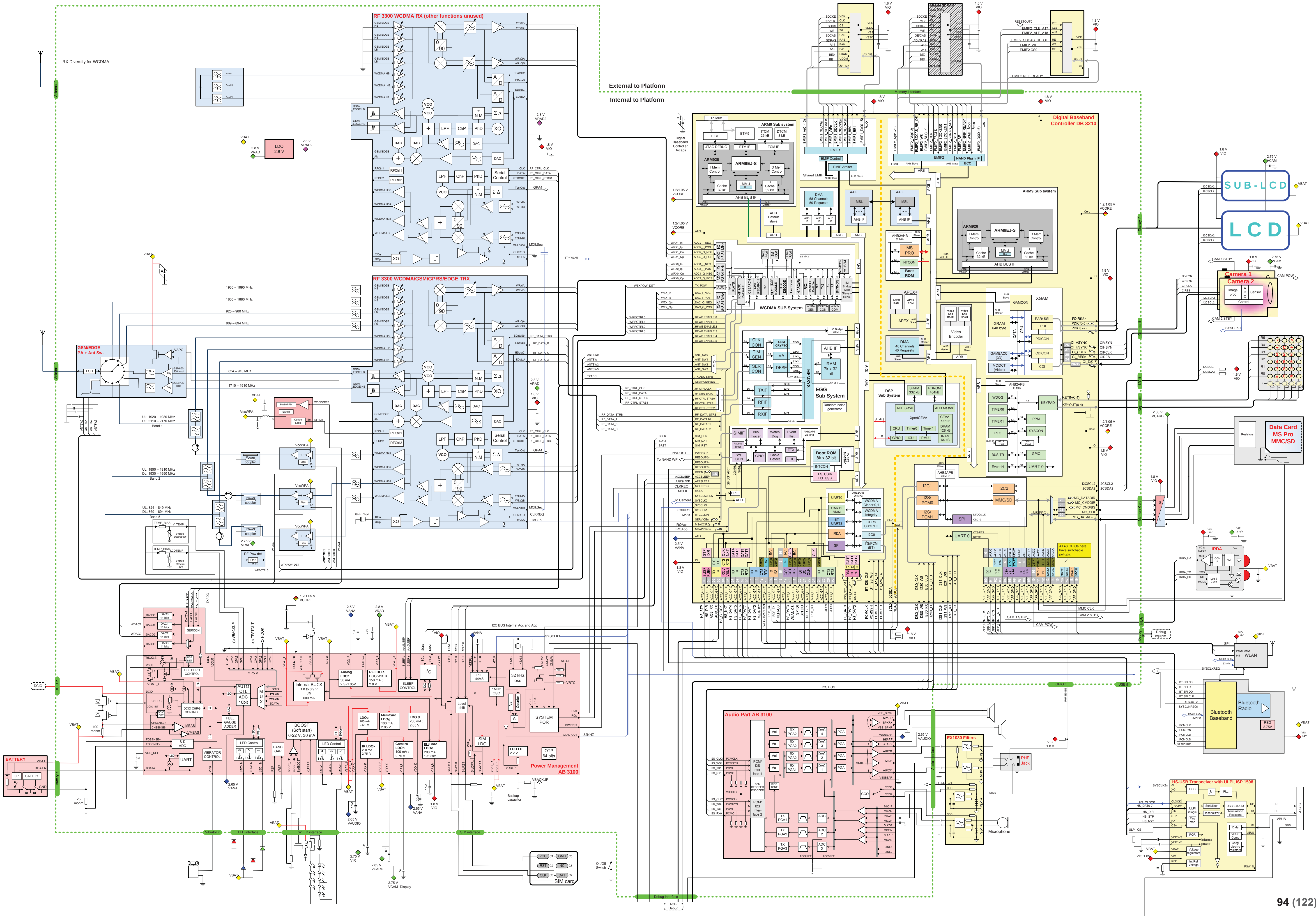
In the cases of WLAN startup and shutdown the BT Logical Driver configures the BT Device to request the antenna from PTA or not. BT LD also monitors if WLAN have any connection running. In that case, BT avoids the BT frequencies mapping to the WLAN channel. WLAN monitors if BT has started any BT Inquiry or page. If this happens any link loss mechanisms should be temporary turned off for the BT Inquiry or page period.

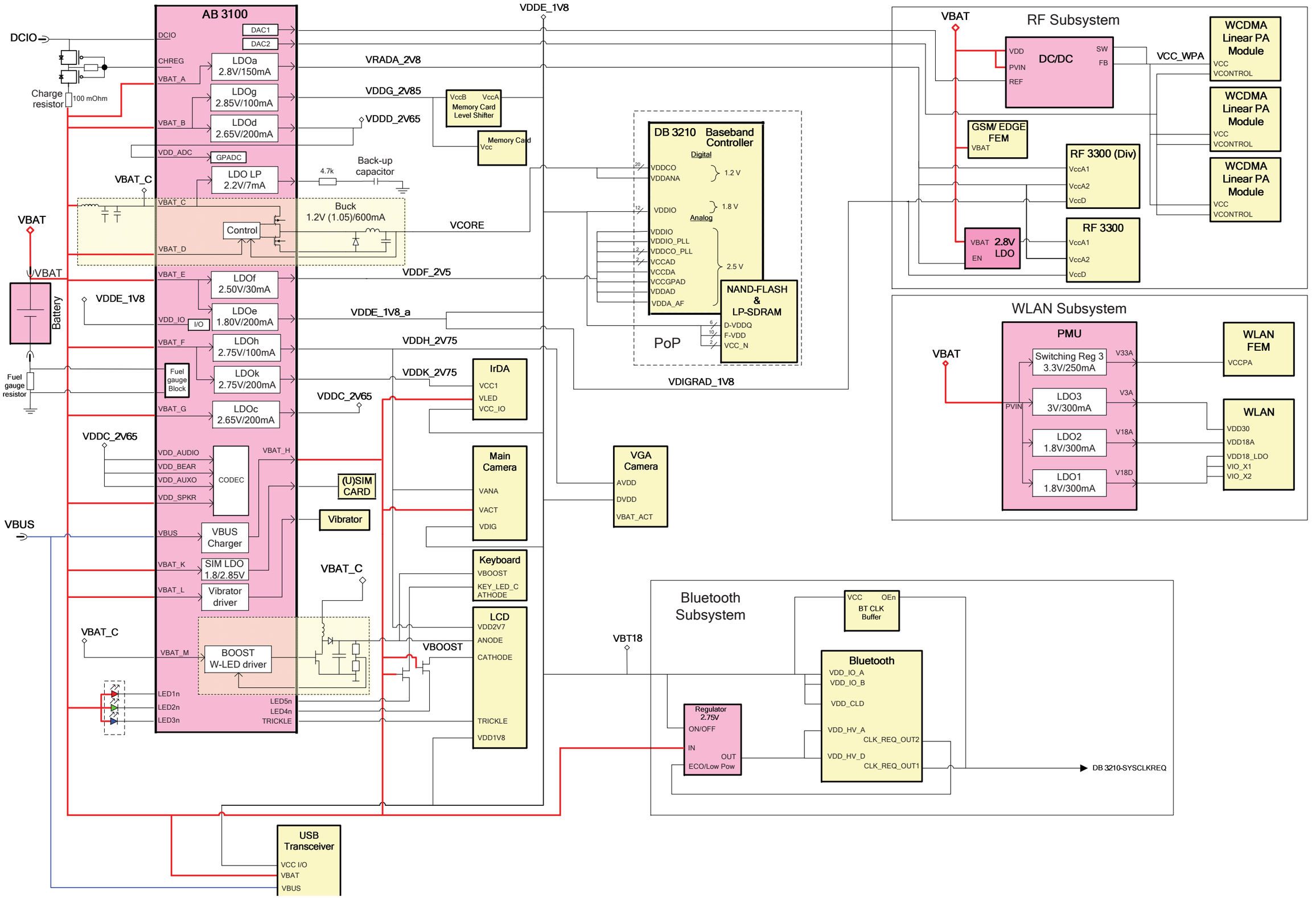
Bluetooth and WLAN PTA Mechanism:

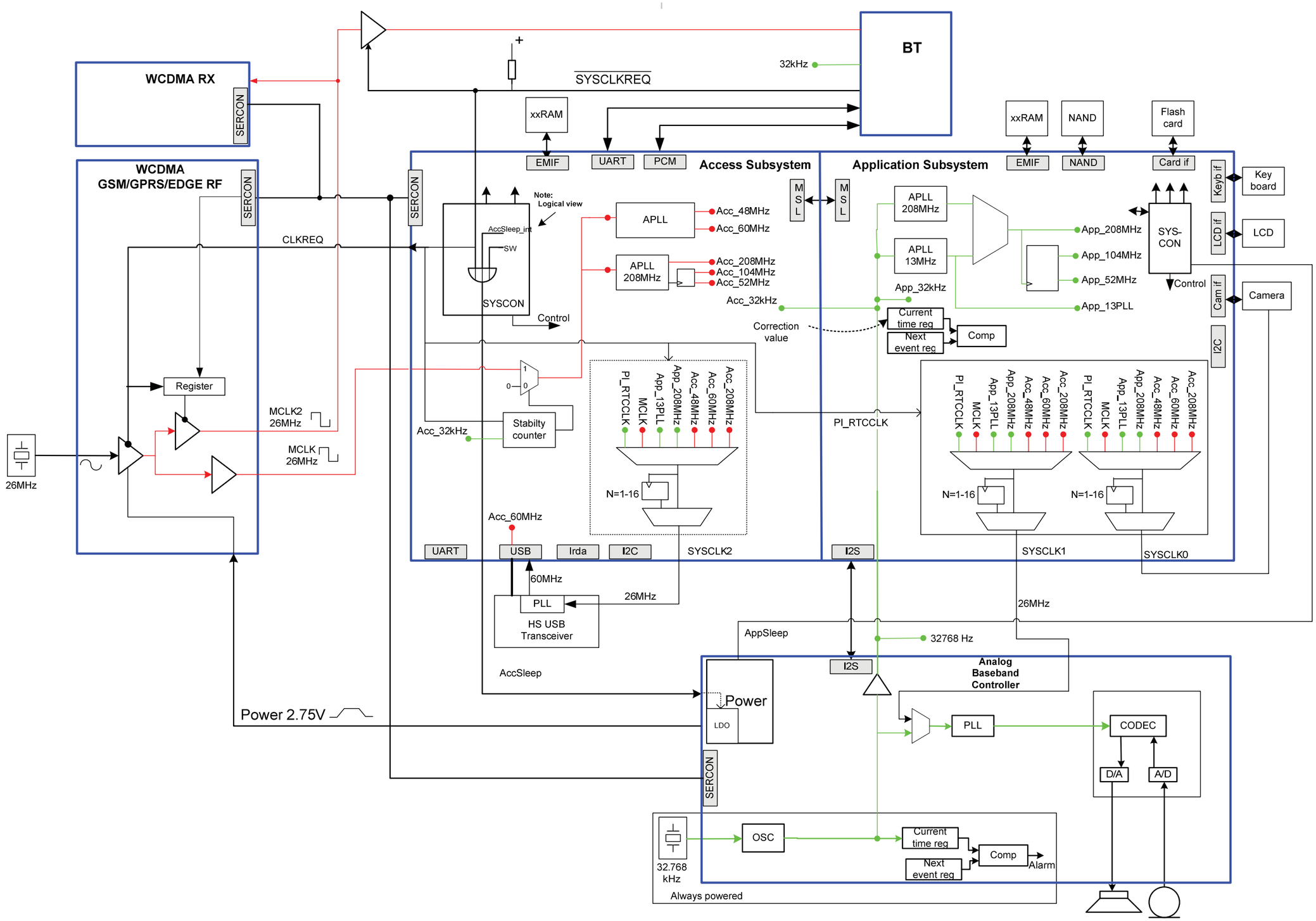


Bluetooth and WLAN Chip 3-wire Interface:




RF 3300 WCDMA RX (other functions unused)
RX Diversity for WCDMA
RF 3300 WCDMA/GSM/GPRS/EDGE TRX
GSM/EDGE PA + Ant Sw.
External to Platform
Internal to Platform
Digital Baseband Controller DB 3210
ARM9 Sub system
WCDMA SUB System
EGG Sub System
DSP Sub System
XGAM
SUB-LCD
LCD
Camera 1
Camera 2
Data Card MS Pro MMC/SD
IRDA
WLAN
Bluetooth Baseband
Bluetooth Radio
HS-USB Transceiver with ULPI, ISP 1508
Audio Part AB 3100
EX1030 Filters
Power Management AB 3100
BATTERY
SIM card
Microphone
LDO 2.8 V


AB 3100
DCIO
DAC1
DAC2
CHREG
LDOa 2.8V/150mA
VBAT_A
LDOg 2.85V/100mA
VBAT_B
LDOd 2.65V/200mA
VDD_ADC
GPADC
LDO LP 2.2V/7mA
VBAT_C
Buck 1.2V (1.05)/600mA
Control
VBAT_D
VBAT_E
LDOf 2.50V/30mA
VDD_IO
I/O
LDOe 1.80V/200mA
VBAT_F
LDOh 2.75V/100mA
Fuel gauge Block
LDOk 2.75V/200mA
VBAT_G
LDOc 2.65V/200mA
VDD_AUDIO
VDD_BEAR
VDD_AUXO
VDD_SPKR
CODEC
VBAT_H
VBUS
VBUS Charger
VBAT_K
SIM LDO 1.8/2.85V
VBAT_L
Vibrator driver
VBAT_M
BOOST W-LED driver
LED1n
LED2n
LED3n
LED5n
LED4n
TRICKLE
DCIO
Charge resistor
100 mOhm
VBAT
Battery
Fuel gauge resistor
VBUS
VDDE_1V8
VDDC_2V65
VBAT_C
VRADA_2V8
VDDG_2V85
VDDD_2V65
VccB VccA
Memory Card Level Shifter
Memory Card Vcc
4.7k
Back-up capacitor
VCORE
VDDF_2V5
VDDE_1V8_a
VDDH_2V75
VDDK_2V75
IrDA
VCC1
VLED
VCC_IO
VDDC_2V65
Main Camera
VANA
VACT
VDIG
VGA Camera
AVDD
DVDD
VBAT_ACT
(U)SIM CARD
Vibrator
Keyboard
VBOOST
KEY_LED_CATHODE
VBOOST
LCD
VDD2V7
ANODE
CATHODE
TRICKLE
VDD1V8
USB Transceiver
VCC I/O
VBAT
VBUS
VDIGRAD_1V8
DB 3210 Baseband Controller
Digital
VDDCO
VDDANA
1.2 V
VDDIO
1.8 V
Analog
VDDIO
VDDIO_PLL
VDDCO_PLL
VCCAD
VCCDA
VCCGPAD
VDDAD
VDDA_AF
2.5 V
PoP
NAND-FLASH & LP-SDRAM
D-VDDQ
F-VDD
VCC_N
VBT18
VBAT
RF Subsystem
DC/DC
VDD
PVIN
REF
SW
FB
VCC_WPA
WCDMA Linear PA Module
VCC
VCONTROL
GSM/ EDGE FEM
VBAT
RF 3300 (Div)
VccA1
VccA2
VccD
VBAT 2.8V LDO
EN
RF 3300
WLAN Subsystem
PMU
Switching Reg 3 3.3V/250mA
V33A
LDO3 3V/300mA
V3A
LDO2 1.8V/300mA
V18A
LDO1 1.8V/300mA
V18D
WLAN FEM
VCCPA
WLAN
VDD30
VDD18A
VDD18_LDO
VIO_X1
VIO_X2
Bluetooth Subsystem
VCC OEn
BT CLK Buffer
Bluetooth
VDD_IO_A
VDD_IO_B
VDD_CLD
VDD_HV_A
CLK_REQ_OUT2
VDD_HV_D
CLK_REQ_OUT1
DB 3210-SYSCLKREQ
Regulator 2.75V
ON/OFF
IN
OUT
ECO/Low Pow


WCDMA RX
SERCON
WCDMA
GSM/GPRS/EDGE RF
SERCON
CLKREQ
Register
MCLK2
26MHz
MCLK
26MHz
26MHz
SERCON
BT
32kHz
SYSCLKREQ
xxRAM
EMIF
UART
PCM
Access Subsystem
Note:
Logical view
AccSleep_int
SW
SYSCON
Control
APLL
Acc_48MHz
Acc_60MHz
APLL
208MHz
Acc_208MHz
Acc_104MHz
Acc_52MHz
Acc_32kHz
Correction
value
1
0
0
Stabilty
counter
Acc_32kHz
PI_RTCCLK
MCLK
App_13PLL
App_208MHz
Acc_48MHz
Acc_60MHz
Acc_208MHz
N=1-16
Acc_60MHz
UART
USB
Irda
I2C
SYSCLK2
60MHz
PLL
HS USB
Transceiver
26MHz
AccSleep
Power 2.75V
MSL
MSL
Application Subsystem
xxRAM
NAND
Flash
card
EMIF
NAND
Card if
APLL
208MHz
APLL
13MHz
App_32kHz
App_208MHz
App_104MHz
App_52MHz
App_13PLL
SYS-
CON
Control
Current
time reg
Next
event reg
Comp
PI_RTCCLK
PI_RTCCLK
MCLK
App_13PLL
App_208MHz
Acc_48MHz
Acc_60MHz
Acc_208MHz
N=1-16
SYSCLK1
SYSCLK0
26MHz
I2S
I2S
AppSleep
32768 Hz
Analog
Baseband
Controller
Power
LDO
SERCON
PLL
CODEC
D/A
A/D
OSC
32.768
kHz
Current
time reg
Next
event reg
Comp
Alarm
Always powered
Keyb if
Key
board
LCD if
LCD
Cam if
Camera
I2C

Replaceable Components

EXPLANATION OF ABBREVIATIONS USED IN THE COLUMN 'COMMENTS' BELOW

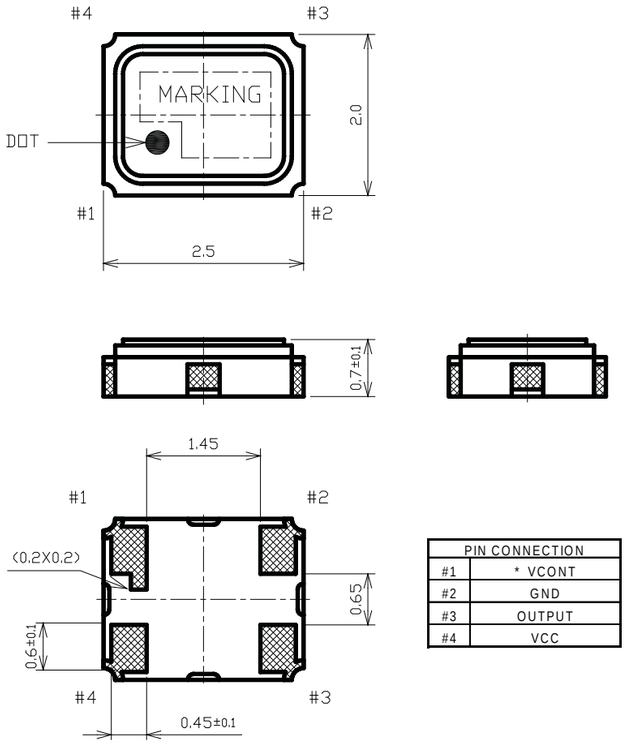
COMPONENT LOCATION
A = Side A
B = Side B

REPAIR METHOD
HA = Hot Air (removal & mounting)
HA/ST = Hot Air for removal - Soldering Tool for mounting
BGA = BGA Station

CALIBRATION
C = Calibration of the phone is required after replacing the component

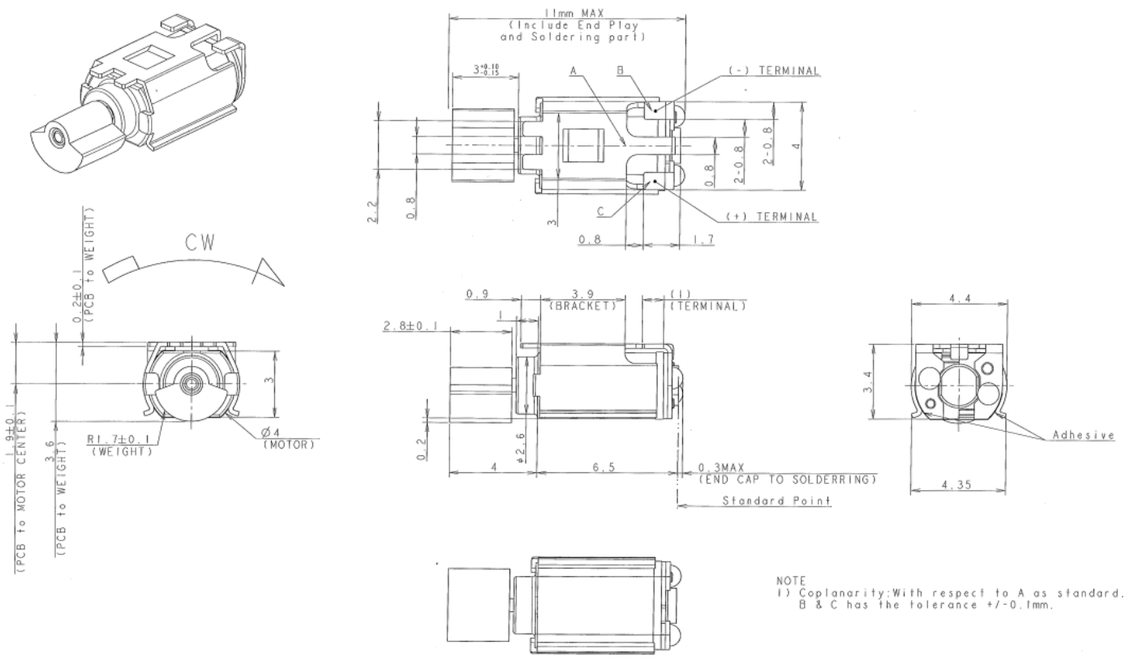
Position	Designation	Part no.	Comments	Page
B1400	Osc TCXO 27,456 MHz	1200-7847	A HA	98
B2000	Vibrator	1202-9271	B HA/ST	98
B2100	Crystal 32,768 kHz	RTM501911/2R1A	A HA C	98
B3100	Microphone	1210-7410	A BGA	98
B4410	IC	RYN901920/1	A HA	99
C2214	Capacitor Electrolytic 70.0 mF None 3.3 V	1203-3900	A HA	99
E1003	Shield Can Fence	1206-8594	A HA	
L2200	Ind WW 4.7 uH K3012	1200-2214	A HA	99
L2201	120ohm 0603 2A 50mohm Bead	REG70605/15	A HA	
L2401	Inductor 0.0 H ±25%	REG70618/20	B HA	99
L2402	Inductor 0.0 H ±25%	REG70618/20	B HA	99
L2403	Inductor 0.0 H ±25%	REG70618/20	B HA	99
L2404	Inductor 0.0 H ±25%	REG70618/20	B HA	99
L2405	Inductor 0.0 H ±25%	REG70618/20	B HA	99
L2406	Ind Chip 0, H	1200-6898	B HA	99
L2408	Inductor 0.0 H ±25%	REG70618/20	B HA	99
L2452	220ohm 0603 2A 0.05ohm Bead	REG70605/24	A HA	100
L4200	22uH 20% 3x3x1.2mm 0.375A 0.63ohm	REG7245512/22M	A HA	100
N1210	IC Lin WLP-16	1203-5870	A HA	100
N1211	IC Vreg PLP1820-6	1204-5903	A HA	100
N1300	Module Bluetooth + FM WFBGA100	1200-9840	B BGA	101
N1400	A-GPS	1200-0700	A HA	101
N1410	IC Amp P-TSLP-1-1	1200-2407	A HA	102
N1510	Mod Radio WLAN R041	1200-6173	B HA	102
N2200	IC Vreg SC70	1200-6420	A HA	102
N2201	IC Vreg PLP1010-4	1201-6465	A HA	102
N2203	IC Vreg	RYT113997/4	B HA	102
N2204	IC	RYT1137816/4	B HA	102
N2300	ASIC PM WLAN PMU	1203-2790	A HA	103
N2401	Trans N-ch FET	RYN901936/1	A HA	103
N2411	ASIC Accelerometer	1202-1676	A HA	103
N2420	IC IF 3.5X3.5X0.8	1200-1694	A HA	104
N2421	IC ESD Prot UDFN 6 2x2 mm	1200-6309	A HA	104
N2422	ASIC BB Elina	1201-4120	A HA	104
N3101	ASIC Tjatte3 CSP20	ROP1013074/1R1A	A HA	104
R2449	Resistor 0, Ohm +/-50m 63 mW K0603	REP623001/0	B HA	105
R2451	Resistor 0.0 Ohm +/-5% NA mW K0402	REP622001/0	B HA	
R2490	Resistor 0, Ohm +/-50m 63 mW K0603	REP623001/0	B HA	105
S2403	Input Switch side push	RMD10116/9R1A	A HA/ST	105
S2404	Input Switch Side Push	1206-9606	B HA/ST	105
S2405	Input Switch side push	RMD10116/9R1A	A HA/ST	105
S2406	Input Switch side push	RMD10116/9R1A	A HA/ST	105
V2200	Diode Protection 0,	RKZ223911/1	B HA	105
V2202	Trans P-ch FET	RYN122910/1	A HA	106
V2415	Diode Protection 5, V SOD-923	1201-8440	A HA	106
V2416	Diode Protection 5, V SOD-923	1201-8440	A HA	106
V2417	Diode Protection 12, V SOD523	1200-5130	B HA	106
V2470	Diode 0,	RKZ323916/1	A HA	106
V3101	Zenner Diode, ESD protection, 6.1V	RKZ223922/1	A HA	106
V4203	Trans NPN	1211-3641	A HA	106
X1000	Conn Leaf Spring	1201-4841	A HA/ST	106
X1001	Conn Leaf Spring 1p	1202-1053	A HA/ST	107
X1002	Conn Leaf Spring	1201-4841	A HA/ST	106
X1003	Conn Leaf Spring	1201-4841	A HA/ST	106
X1004	Conn Leaf Spring 1p	1202-1053	A HA/ST	107
X1005	Conn Leaf Spring	1201-4841	A HA/ST	105
X1200	Conn Coax Plug 6p RF-probe contact	1203-9688	A HA/ST	107
X1500	Conn Coax Plug 6p RF-probe contact	1203-9688	A HA/ST	107
X2201	Conn Pogopin 5p	1206-2937	B BGA	107
X2401	Conn BtB Receptacle 16p	1214-7370	A HA	107
X2402	Conn BtB	1200-9864	B HA	108
X2403	Card Conn	RNK87147/2	A BGA	108
X2405	System connector	1205-9723	B HA/ST	108
X3102	Conn WtB Receptacle 2p	1206-4855	B HA	108
X4200	Conn BtB Receptacle 70p	1206-2940	A BGA	109
X4300	Conn Camera Socket 0p	1206-5418	B HA/SI	109
Z2400	Filter 100, MHz K1210	1201-6833	A HA	109
Z4200	Filter 400.0 MHz KNA16400 – W5 1608 (1.6x0.8x0.5mm)	REV50146/1	A HA	109
Z4201	Filter 400.0 MHz KNA16400 – W5 1608 (1.6x0.8x0.5mm)	REV50146/1	A HA	109
Z4202	Filter 400.0 MHz KNA16400 – W5 1608 (1.6x0.8x0.5mm)	REV50146/1	A HA	109

B1400 Osc TCXO 27,456 MHz 1200-7847

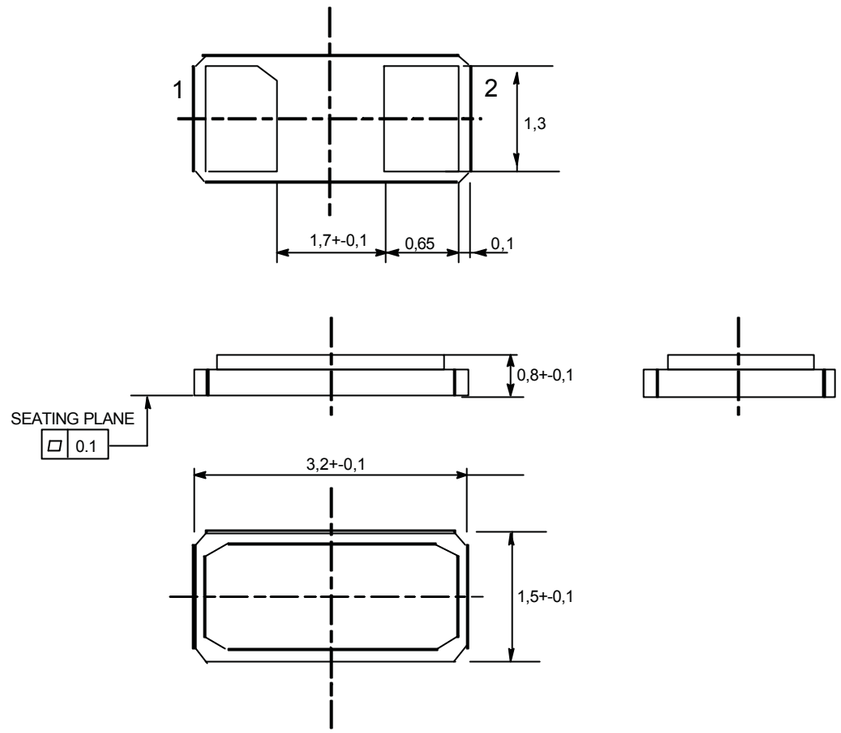


PIN CONNECTION	
#1	* VCONT
#2	GND
#3	OUTPUT
#4	VCC

B2000 Vibrator 1202-9271

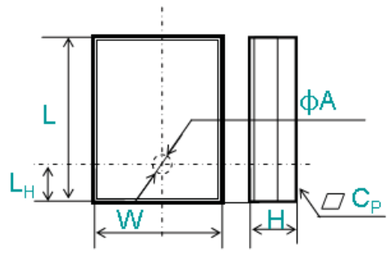


B2100 Chrystal 32,768 kHz RTM501911/2R1A



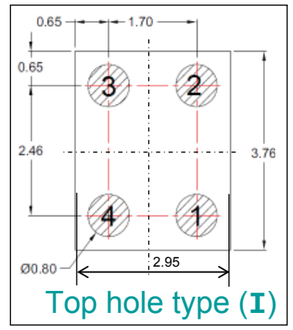
B3100 Microphone 1210-7410

Package outline



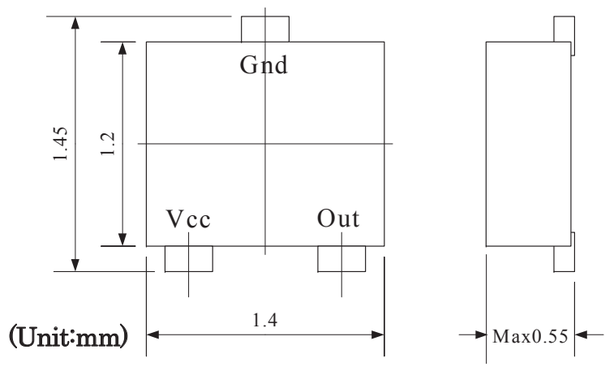
Item	Dimension	Tolerance (+/-)	Units
Length (L)	3.76	0.10	mm
Width (W)	2.95	0.10	mm
Height (H)	1.10	0.10	mm
Hole height (L_H)	1.18	0.10	mm
Acoustic Port Diameter (φA)	0.50	0.10	mm
Co-planarity (Cp)	<0.05	-	mm

Pad design

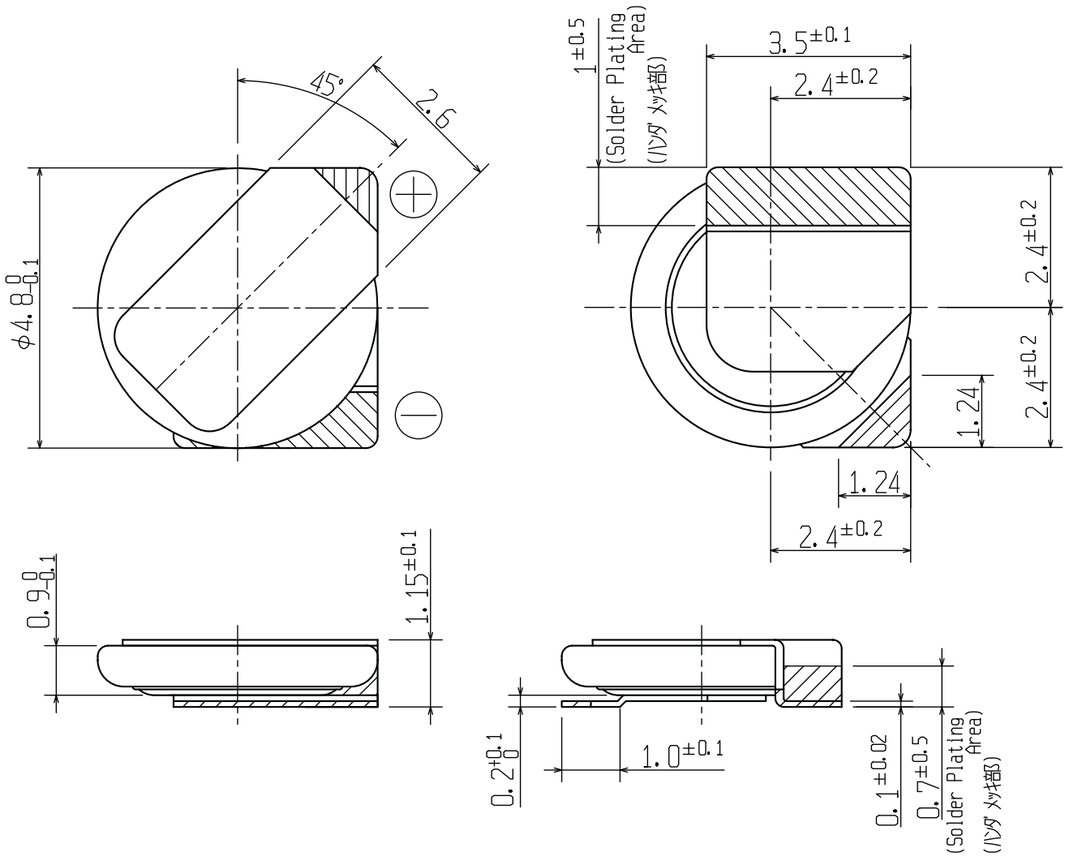


PIN Designation	
Pin #	Function
1	Power
2	Ground
3	Ground
4	Output

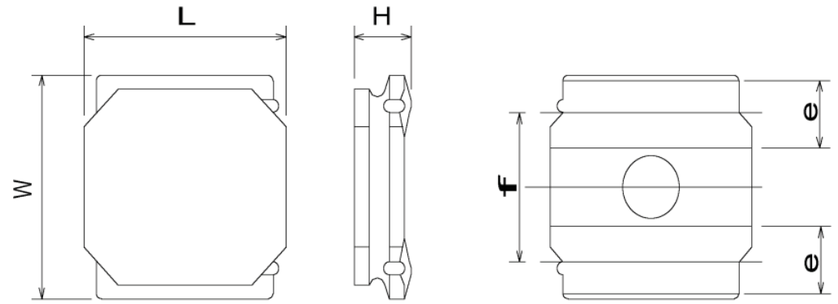
B4410 IC RYN901920/1



C2214 Capacitor Electrolytic 70.0 mF None 3.3 V 1203-3900



L2200 ind WW 4.7 uH K3012 1200-2214

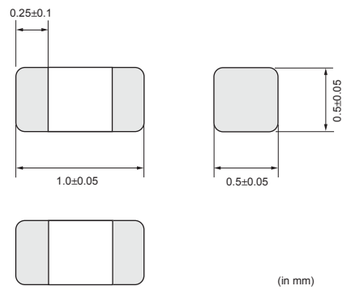


Description	Mark	Dimensions
Length	L	3.0±0.1
Width	W	3.0±0.1
Height	H	1.2Max.
Width of Electrode	e	0.9±0.2
Space between electrodes	f	1.9±0.2

(Unit: mm)

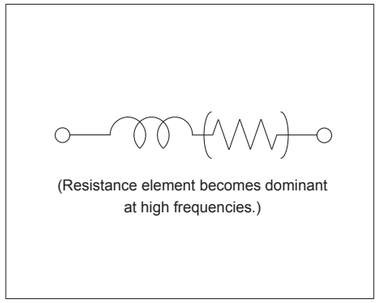
L2401-05, L2408 Inductor 0.0 H +/-25% REG70618/20

■ Dimension



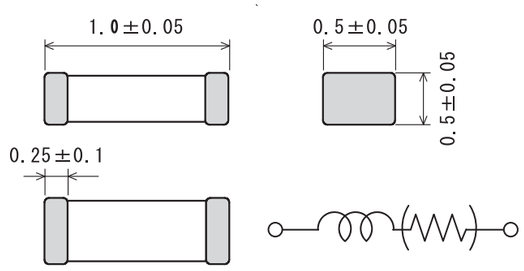
(in mm)

■ Equivalent Circuit

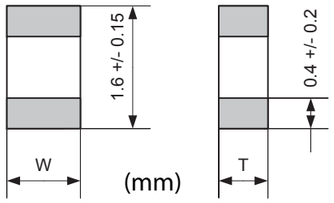


(Resistance element becomes dominant at high frequencies.)

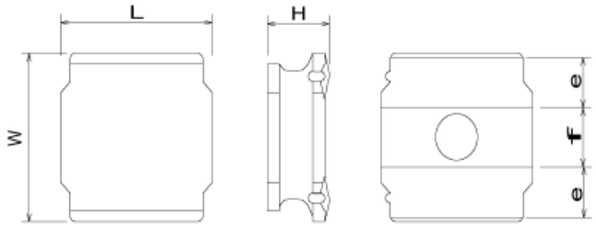
L2406 Ind Chip 0, H 1200-6898



L2452 220ohm 0603 2A 0.05ohm Bead REG70605/24



L4200 22uH 20% 3x3x1.2mm 0.375A 0.63ohm REG7245512/22M



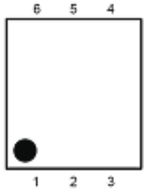
Size (mm)	3012
L	3.0+/-0.1
W	3.0+/-0.1
H	1.2 max
e (width of electrode)	0.9+/-0.2
f (space between electrodes)	1.0+/-0.2

N1211 IC Vreg PLP1820-6 1204-5903

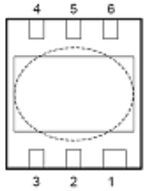
PIN CONFIGURATIONS

• PLP1820-6

Top View



Bottom View



• PLP1820-6*

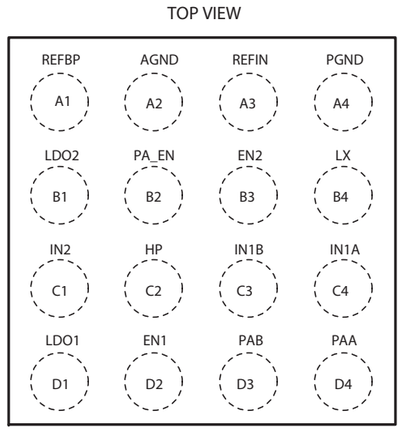
Pin No.	Symbol	Description
1	V_{OUT}	Output Pin
2	V_{OUT}	Output Pin
3	GND	Ground Pin
4	CE	Chip Enable Pin
5	V_{DD}	Input Pin
6	V_{DD}	Input Pin

* Tab in the ◌ parts have GND level.
(They are connected to the back side of this IC.)
Do not connect to other wires or land patterns.

N1210 IC Lin WLP-16 1203-5870

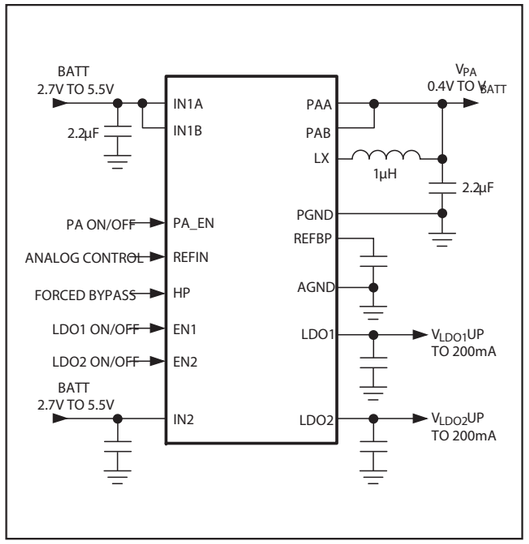
Pin Configuration

TOP VIEW



(BUMP IN BOTTOM)
16-Bump, 2mm ×2mm WLP

Typical Operating Circuit

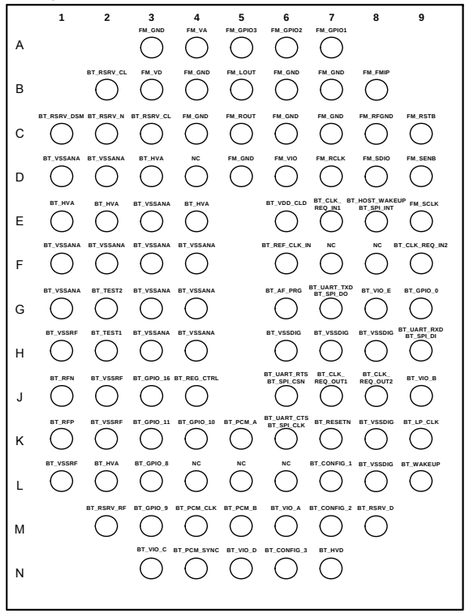


Pin Description

PIN	NAME	FUNCTION
A1	REFBP	Reference Noise Bypass. Bypass REFBP to AGND with a 0.22µF ceramic capacitor to reduce noise on the LDO outputs. REFBP is internally pulled down through a 1k Ω resistor during shutdown.
A2	AGND	Low-Noise Analog Ground
A3	REFIN	DAC-Controlled Input. The output of the PA step-down converter is regulated to 2 x V REFIN . When V REFIN reaches 0.465 x V IN2, bypass mode is enabled.
A4	PGND	Power Ground for PA Step-Down Converter
B1	LDO2	200mA LDO Regulator 2 Output. Bypass LDO2 with a 1µF ceramic capacitor as close as possible to LDO2 and AGND. LDO2 is internally pulled down through a 1k Ω resistor when this regulator is disabled.
B2	PA_EN	PA Step-Down Converter Enable Input. Connect to IN_ or logic-high for normal operation. Connect to GND or logic-low for shutdown mode.
B3	EN2	LDO2 Enable Input. Connect to IN2 or logic-high for normal operation. Connect to AGND or logic-low for shutdown mode.
B4	LX	Inductor Connection. Connect an inductor from LX to the output of the PA step-down converter.
C1	IN2	Supply Voltage Input for LDO1, LDO2, and Internal Reference. Connect IN2 to a battery or supply voltage from 2.7V to 5.5V. Bypass IN2 with a 2.2µF ceramic capacitor as close as possible to IN2 and AGND. Connect IN2 to the same source as IN1A and IN1B.
C2	HP	High-Power Mode Set Input. Drive HP high to invoke forced bypass mode. Bypass mode connects the input of the PA step-down converter directly to its output through the internal bypass MOSFET. Drive HP low to disable the forced bypass mode.
C3, C4	IN1B, IN1A	Supply Voltage Input for PA Step-Down Converter. Connect IN1_ to a battery or supply voltage from 2.7V to 5.5V. Bypass the connection of IN1_ with a 2.2µF ceramic capacitor as close as possible to IN1_, and PGND. IN1A and IN1B are internally connected together. Connect IN1_ to the same source as IN2.
D1	LDO1	200mA LDO Regulator 1 Output. Bypass LDO1 with a 1µF ceramic capacitor as close as possible to LDO1 and AGND. LDO1 is internally pulled down through a 1k Ω resistor when this regulator is disabled.
D2	EN1	LDO1 Enable Input. Connect to IN2 or logic-high for normal operation. Connect to AGND or logic-low for shutdown mode.
D3, D4	PAB, PAA	PA Connection for Bypass Mode. Internally connected to IN1_ using the internal bypass MOSFET during bypass mode. PA_ is connected to the internal feedback network. Bypass PA_ with a 2.2 µF ceramic capacitor as close as possible to PA_ and PGND.

N1300 Module Bluetooth + FM WFBGA100 1200-9840

Pinout Top View



Pin Description and Assignment

The table shows the pin list of the STLC2593.

In columns "Reset" and "Default after reset", the "PD/PU" shows the pads implementing an internal pull-down/up for the internal Bluetooth section.

The column "Reset" shows the state of the pins during hardware reset; the column "Default after reset" shows the state of the pins after the hardware reset state is left, but before any software parameter download.

The column "Type" describes the pin directions:

- I for Input (All inputs have a Schmitt trigger function.)
- O for Output
- I/O for Input/Output
- O/t for tri-state output

For the output pin the default drive capability is 2 mA, except for pin K3 (BT_GPIO_11) and pin L3 (BT_GPIO_8) where it is 8 mA such that when used for Class 1, these 2 pins can be used for a switch control in a cheaper way.

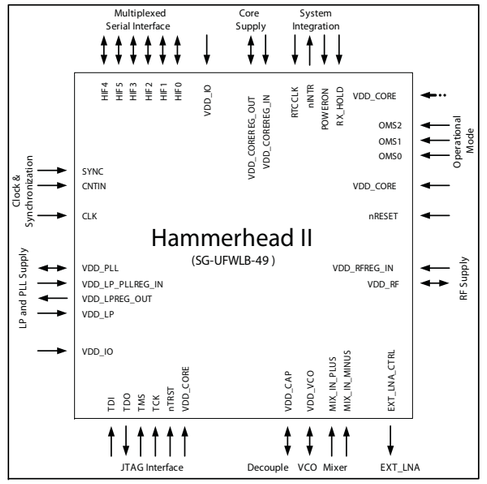
The STLC2593 Pin List (Functional and Supply)

Name	Pin #	Description	Type	Reset(1)	Default(2) after reset
Bluetooth Section					
Clock and Reset Pins					
BT_RESETN	K7	Global reset - active low	I	Input	Input
BT_REF_CLK_IN	F6	Reference clock input(3)			
BT_LP_CLK	K9	Low power clock input			
SW Initiated Low Power mode					
BT_CLK_REQ_OUT_1	J7	Wake-up signal to Host (Active high or Active low, depending on configuration pins)	I/O(4)	Input PD/PU, depends on config	Output depends on config
BT_CLK_REQ_OUT_2	J8	Wake-up signal to Host. Active low (SPI mode only)		Input PU	I/O depends on config
BT_CLK_REQ_IN_1	E7	Clock request input (Active high)		Input PD	Input PD
BT_CLK_REQ_IN_2	F9	Clock request input (Active low)		Input PU	Input PU
BT_HOST_WAKEUP/ BT_SPI_INT	E8	Wake-up signal to Host or SPI interrupt		Input PD	Output
BT_WAKEUP	L9	Wake-up signal to Bluetooth (Active high)	I/O	Input (5)	Input
UART Interface					
BT_UART_RXD/ BT_SPI_DI	H9	UART receive data	I/O(4)	Input PD	Input PD
		SPI data in			Input PD
BT_UART_TXD/ BT_SPI_DO	G7	UART transmit data			Output high
		SPI data out			Input PD
BT_UART_CTS/ BT_SPI_CLK	K6	UART clear to send		Input PU	Input PU
		SPI clock			Input PD
BT_UART_RTS/ BT_SPI_CSN	J6	UART request to send			Output low
		SPI chip select			Input PU
PCM Interface					

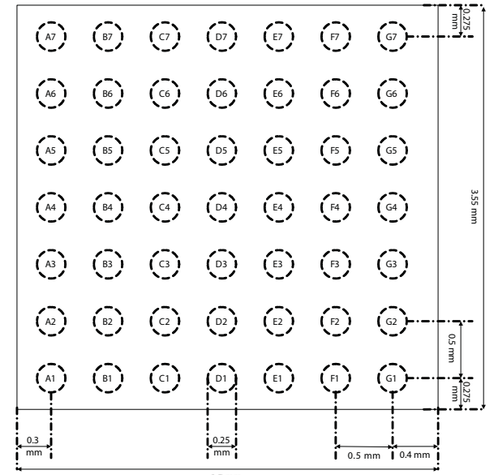
Name	Pin #	Description	Type	Reset(1)	Default(2) after reset
Bluetooth Section					
JTAG Interface					
BT_GPIO_9	M3	JTAG_TDI or GPIO	I/O(4)	Input PU(6)	Input PU(6)
BT_GPIO_11	K3	JTAG_TDO or GPIO		Input PD(6)	Input PD(6)
BT_GPIO_10	K4	JTAG_TMS or GPIO		Input PU(6)	Input PU(6)
BT_GPIO_16	J3	JTAG_NTRST (Active low) or Alternate function		Input PD(6)	Input PD(6)
BT_GPIO_8	L3	JTAG_TCK or GPIO		Input PD(6)	Input PD(6)
General Purpose Input/Output Pins					
BT_GPIO_0	G9	General purpose I/O	I/O(4)	Input PD	Input PD
Configuration Pins					
BT_CONFIG_1	L7	Configuration signal	I	Input	Input
BT_CONFIG_2	M7				
BT_CONFIG_3	N6				
RF Signals					
BT_RFP	K1	Differential RF port	I/O		
BT_RFN	J1				
Power Supply					
BT_HVA	L2	Power supply (Connect to 2.75 V)			
	D3				
	E1				
	E2				
	E4				
BT_HVD	N7				
BT_VIO_A	M6	1.65 V to 2.85 V I/Os supply(7)			
BT_VIO_C	N3				
BT_VIO_D	N5				
BT_VIO_E	G8				
BT_VIO_B	J9	1.17 V to 2.85 V I/Os supply(7)			
BT_VDD_CLD	E6	System clock supply 1.65 V to 2.85 V (Connect to BT_VIO_A in case of a digital reference clock input, to BT_VSSANA in case of an analog reference clock input.)			
Bluetooth Section					
BT_VSSDIG	H6	Digital ground			
	H7				
	H8				
	K8				
	L8				
BT_VSSANA	D1	Analog ground			
	D2				
	E3				
	F1				
	F2				
	F3				
	F4				
	G1				
	G3				
	G4				
	H3				
	H4				
BT_VSSRF	H1	RF ground			
	L1				
	J2	RF regulator ground			
	K2				
BT_TEST1	H2				
BT_TEST2	G2	Test pin	I/O	Input (8)	Input (8)
BT_AF_PRG	G6	Test pin (Leave unconnected)(9)	I/O	Open	Open
FM Radio Section					
FM_GND	A3	FM ground (connect to ground plane on PCB)			
	B4				
	B6				
	B7				
	C4				
	C6				
	C7				
	D5				
FM_VA	A4	Analog supply voltage (may be connected directly to battery)			
FM_VD	B3	Digital supply voltage (may be connected directly to battery)			
FM_GPIO1	A7	General purpose FM input/output	I/O	Input/Output	Input/Output
FM_GPIO2	A6				
FM_GPIO3	A5				
FM_FMIP	B8	FM RF input			
FM_ROUT	C5	FM right audio output			
FM_LOUT	B5	FM left audio output			
FM_RFGND	C8	FM RF ground (connect to ground plane on PCB)			
FM_RSTB	C9	FM reset (Active low) input	I	Input low	Input high
FM_VIO	D6	FM I/O supply voltage			
FM_RCLK	D7	FM External reference oscillator input	I	Input	Input
FM_SDIO	D8	FM Serial data input / output	I/O	Input/Output	Input/Output
FM_SENB	D9	FM Serial enable input (active low)	I	Input	Input
FM_SCLK	E9	FM Serial clock input	I	Input	Input
Other Pins					
BT_RSRV_CL	B2	Test pin (Leave unconnected)(9)			
BT_RSRV_D	C3				
BT_RSRV_DSM	M8				
BT_RSRV_N	C1				
BT_RSRV_RF	C2				
BT_REG_CTRL	M2				
NC	J4	Regulator control pin(10)	I/O	Input PD	Output high
	D4	Any use(11)			
	F7				
	F8				
	L4				
	L5				
	L6				

1. Pin behaviour during HW reset (BT_RESETN low).
2. Pin behaviour immediately after HW reset and internal chip initialization, but before SW parameter download.
3. See also pin BT_VDD_CLD.
4. Reconfigurable I/O pin.The functionality of these I/Os can be configured through software parameter download
5. Should be strapped to BT_VSSDIG if not used.
6. JTAG mode.
7. Described in section 4.3.
8. To be strapped to BT_VSSANA.
9. Pin is ST - reserved for test function and it must be soldered to an isolated pad (not connected to anything, just floating)
10. Described in section 5.8.
11. Pin is not connected internally in the package; any connection can be done on board, in order to ease the board layout.

N1400 A-GPS 1200-0700



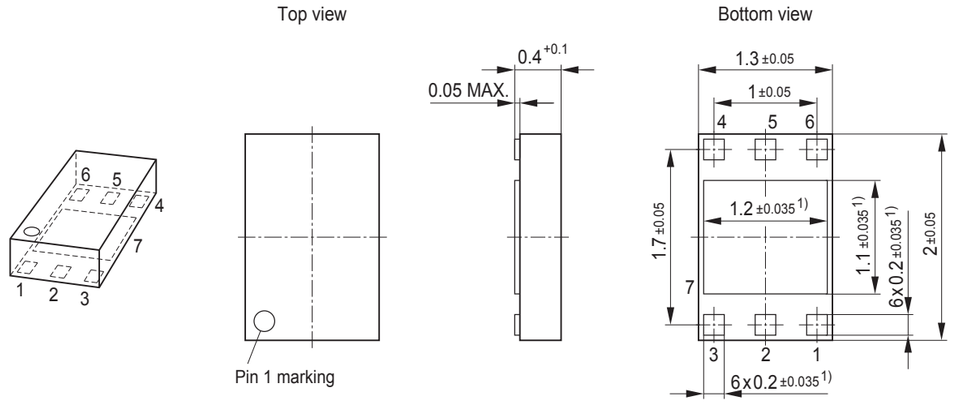
Top view (PCB footprint)



Pin No.	Pin Name	Pad Type	Pad Usage: Direction	Pad Usage: Additional	O/P State: Reset	O/P State: Standby	Pad Functional Description
A1	HIF3 UART_RXD / UART_RXD / I²C_GROUP1 / SPI_nSCS	I/O	I (I) I I	- - - -	- - - -	- - - -	Host Interface OMS[2:0]=[1,1,1]: UART Interface: Data Input OMS[2:0]=[1,1,0]: UART Interface: Data Input (Ignored) OMS[2:0]=[1,0,1]: Selection of I²C group address OMS[2:0]=[1,0,0]: SPI chip select
A2	HIF4 UART_nRTS / UART_nRTS / I²C_A0 / SPI_SI	I/O	O Z I I	- - - -	0 Z - -	0 Z - -	Host Interface OMS[2:0]=[1,1,1]: UART Interface: hardware flow control OMS[2:0]=[1,1,0]: UART Interface: hardware flow control (Tristated) OMS[2:0]=[1,0,1]: Selection of I²C group address bit 0 OMS[2:0]=[1,0,0]: SPI serial data input
A3	CNTIN	I	I	-	-	-	Digital high accuracy frequency reference
A4	CLK	I/AI	I	-	-	-	Clock signal input. Selectable as digital or analog input
A5	VDD_PLL	PI/PO	-	-	-	-	Digital PLL supply Decoupling
A6	VDD_LP_PLLREG_IN	PI	-	-	-	-	PLL voltage and Low Power core regulator input
A7	VDD_IO	PI	-	-	-	-	Digital I/O supply
B1	VSS_DIG	GND	-	-	-	-	
B2	HIF2 UART_TXD / UART_TXD / I²C_GROUP0 / SPI_SCK	I/O	O Z I I	- - - -	0 Z - -	0 Z - -	Host Interface OMS[2:0]=[1,1,1]: UART Interface: Data Output OMS[2:0]=[1,1,0]: UART Interface: Data Output (Tristated) OMS[2:0]=[1,0,1]: Selection of I²C group address OMS[2:0]=[1,0,0]: SPI clock
B3	HIF5 UART_nCTS / UART_nCTS / - / SPI_SO	I/O	- I (I) I O/Z	- - - - -	- - - - Z	- - - - Z	Host Interface OMS[2:0]=[1,1,1]: UART Interface: hardware flow control OMS[2:0]=[1,1,0]: UART Interface: hardware flow control (Ignored) OMS[2:0]=[1,0,1]: not used (tie to "0") OMS[2:0]=[1,0,0]: SPI serial data output
B4	VDD_LPREG_OUT	PO	-	-	-	-	Low Power core regulator output
B5	TDI	I/O	I	PU "C"	1	1	Serial Data Input (JTAG, IEEE 1149.1)
B6	VDD_LP	PI	-	-	-	-	Low Power supply
B7	VDD_CORE	PI	-	-	-	-	Digital core supply
C1	VDD_COREREG_OUT	PO	-	-	-	-	Digital core voltage regulator output
C2	VDD_IO	PI	-	-	-	-	Digital I/O supply
C3	HIF0 - / - / I²C_SCL /	I/O	I I I²C I I	- - - -	- - - -	- - - -	Host Interface OMS[2:0]=[1,1,1]: not used (tie to "0") OMS[2:0]=[1,1,0]: not used (tie to "0") OMS[2:0]=[1,0,1]: I²C clock OMS[2:0]=[1,0,0]: not used (tie to "0")
C4	HIF1 - / - / I²C_SDA /	I/O	I I I²C I/O I	- - OD -	- - Z -	- - Z -	Host Interface OMS[2:0]=[1,1,1]: not used (tie to "0") OMS[2:0]=[1,1,0]: not used (tie to "0") OMS[2:0]=[1,0,1]: I²C data OMS[2:0]=[1,0,0]: not used (tie to "0")
C5	TDO	I/O	O	-	Z	Z	Serial Data Output (JTAG, IEEE 1149.1)
C6	TCK	I/O	I	PD "C"	0	0	Clock (JTAG, IEEE 1149.1)
C7	nTRST	I/O	I	PD "A"	0	0	Reset Input (JTAG, IEEE 1149.1)
D1	VDD_COREREG_IN	PI	-	-	-	-	Digital core voltage regulator supply
D2	VSS_DIG	GND	-	-	-	-	
D3	OMS1	I/O	I	-	-	-	Operational mode select / Bus interface select
D4	SYNC	I	I	-	-	-	Digital reference time pulse
D5	VSS_DIG	GND	-	-	-	-	
D6	TMS	I/O	I	PU "C"	1	1	State Machine Control Signal (JTAG, IEEE 1149.1)
D7	VSS_DIG	GND	-	-	-	-	
E1	RTCCLK	I/O	I	Hyst	-	-	32.768kHz clock signal input
E2	POWERON	I/O	I	-	0	0	Power On signal to chip
E3	OMS0	I/O	I	-	-	-	Operational mode select / Bus interface select
E4	VSS_LNA	GND	-	-	-	-	
E5	VSS_RF	GND	-	-	-	-	
E6	MIX_IN_PLUS	AI	AI	-	-	-	Differential mixer input
E7	VDD_CAP	PI/O	PI/O	-	(Z)	(Z)	RF Digital Supply Decoupling
F1	nINTR	I/O	O	OD	Z	Z	Interrupt request signal to host
F2	RX_HOLD	I/O	I	-	-	-	RX_HOLD signal (From host to indicate that the host is transmitting)
F3	nRESET	I/O	I	Hyst	0	I	Chip reset signal
F4	VDD_RFREG_IN	PI	-	-	-	-	RF voltage regulator input
F5	EXT_LNA_CTRL0	AI/O	O	-	-	-	External LNA control
F6	MIX_IN_MINUS	AI	AI	-	-	-	Differential mixer input
F7	VDD_VCO	PI/O	PI/O	-	(Z)	(Z)	Buffer capacito r for VCO supply
G1	VDD_CORE	PI	-	-	-	-	Digital core supply
G2	OMS2	I/O	I	-	-	-	Operational mode select
G3	VDD_CORE	PI	-	-	-	-	Digital core supply
G4	VSS_RF	GND	-	-	-	-	
G5	VDD_RF	PI/O	-	-	-	-	RF Analog Supply Decoupling
G6	VSS	AI	AI	-	-	-	
G7	N.C.	AO	AO	-	-	-	This ball should be left unconnected

Pad Type	Description	Comments
GND	Chip Ground	All signals are referred to this
P I	Power In	Supply to a voltage domain
P O	Power Out	Regulator Output
P I/O	Power Out	Supply to a voltage domain and regulator Output
I/O	Digital Signal Pad	All Digital Pads are I /O Pads which are configured internally as required. - All are configured as Push-Pull e xcept those marked as OD (open drain) - All have hysteresis by default, but is onl y mentioned when it is required for correct system operation.
A I	Analog Input	
A O	Analog Output	
AI/O	Analog Input/ Output	Bidirectional analog pad.
PU	Internal Pull Up	
PD	Internal Pull Down	

N1410 IC Amp P-TSLP-1-1 1200-2407

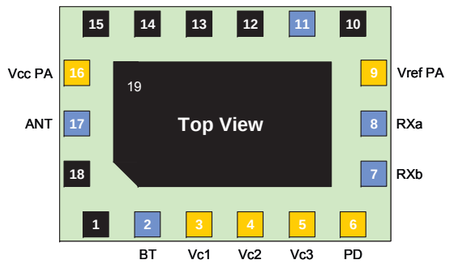


Pin Definition and Function

Pin No.	Symbol	Function
1	AI	LNA Input
2	BIAS	DC Bias
3	GND	RF Ground
4	PON	Power On Control
5	VCC	Supply Control
6	AO	LNA Output
7	VSS	DC Ground

N1510 Mod Radio WLAN R041 1200-6173

Pin configuration

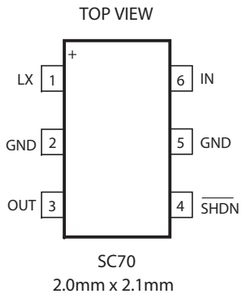


Pin assignment:

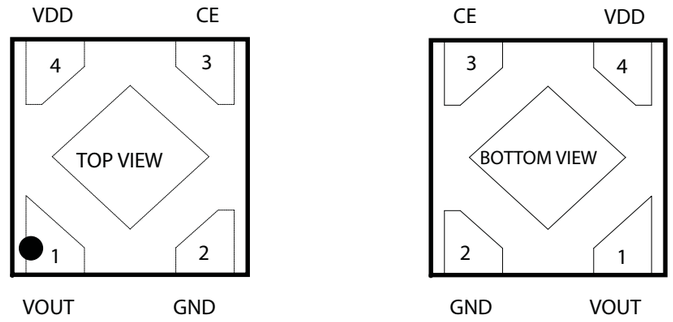
1 - GND
2 - Bluetooth
3 - Vc1 (switch control)
4 - Vc2 (switch control)
5 - Vc3 (switch control)
6 - Power detector output
7 - RXb (balanced)
8 - RXa (balanced)
9 - Vref PA
10 - GND
11 - TX
12 - GND
13 - GND
14 - GND
15 - GND
16 - Vcc PA
17 - ANT
18 - GND
19 - GND (center ground pad)

N2200 IC Vreg SC70 1200-6420

Pin Configurations



N2201 IC Vreg PLP1010-4 1201-6465



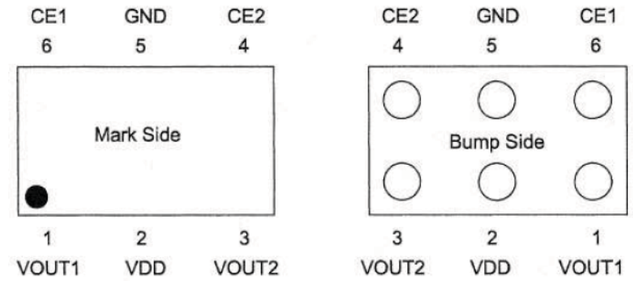
Pin No.	Symbol	Description
1	V_{OUT}	Output Pin
2	GND	Ground Pin
3	CE	Chip Enable Pin ("H" Active)
4	V_{DD}	Input Pin

Tab is GND level. (They are connected to the reverse side of this IC.)

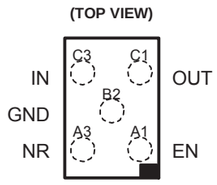
N2203 IC Vreg RYT113997/4

Pin Description

Pin No.	Symbol	Pin description
1	V_{OUT1}	Output Pin of Voltage Regulator 1 (VR1)
2	V_{DD}	Power Supply Pin
3	V_{OUT2}	Output Pin of Voltage Regulator 2 (VR2)
4	CE2	Chip Enable Pin for Voltage Regulator 2(VR2)
5	GND	Ground Pin
6	CE1	Chip Enable Pin for Voltage Regulator 1(VR1)

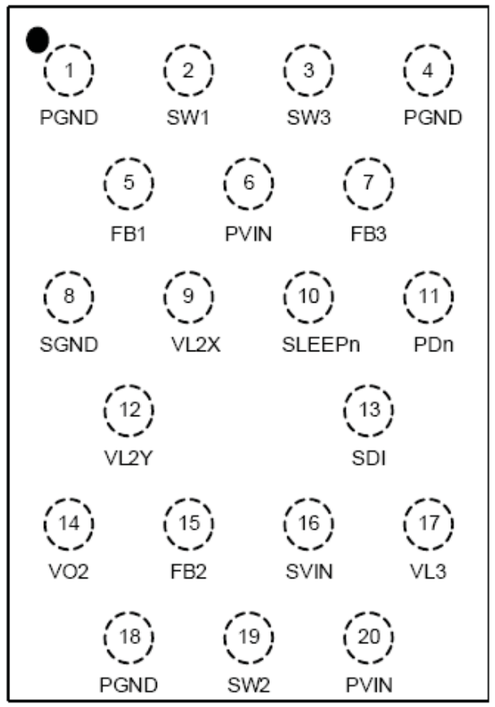


N2204 IC RYT1137816/4

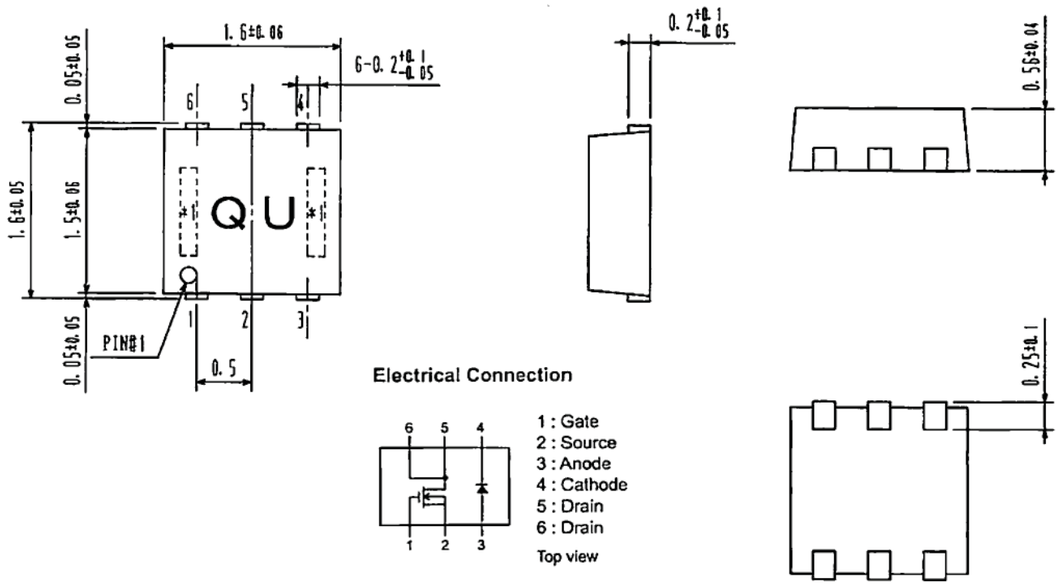


N2300 ASIC PM WLAN PMU 1203-2790

Top View



N2401 Trans N-ch FET RYN901936/1



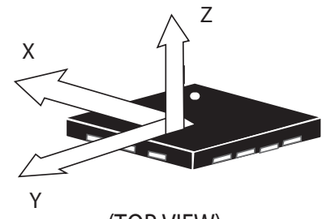
Electrical Connection

1 : Gate
2 : Source
3 : Anode
4 : Cathode
5 : Drain
6 : Drain

Top view

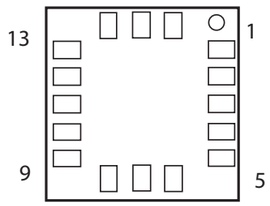
N2411 ASIC Accelerometer 1202-1676

Pin connection



(TOP VIEW)

DIRECTION OF THE DETECTABLE ACCELERATIONS



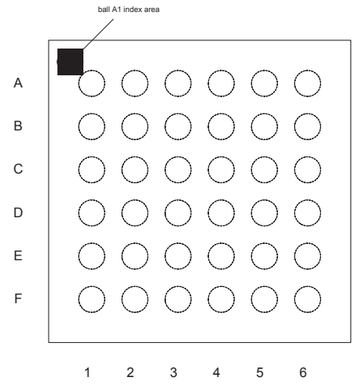
(BOTTOM VIEW)

Pin description

Pin#	Name	Function
1	Vdd_IO	Power supply for I/O pins
2	NC	Not Connected
3	NC	Not Connected
4	SCL SPC	I^2C Serial Clock (SCL) SPI Serial Port Clock (SPC)
5	GND	0V supply
6	SDA SDI SDO	I^2C Serial Data (SDA) SPI Serial Data Input (SDI) 3-wire Interface Serial Data Output (SDO)
7	SDO	SPI Serial Data Output I^2C less significant bit of the device address
8	CS	SPI enable I^2C/SPI mode selection (1: I ^{2}C mode; 0: SPI enabled)
9	INT 2	Inertial interrupt 2
10	Reserved	Connect to Gnd
11	INT 1	Inertial interrupt 1
12	GND	0V supply
13	GND	0V supply
14	Vdd	Power supply
15	Reserved	Connect to Vdd
16	GND	0V supply

N2420 IC IF 3.5x3.5x0.8 1200-1694

Pin Diagram



ISP1508 TFBGA36 pinout (top view)

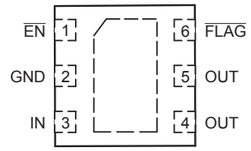
Pin Description

Symbol[1]	Ball No	Type[2]	Description
RREF	C2	AI/O	Resistor reference. Connect through 12kΩ ±1% to GND.
DM	C1	AI/O	Connect to D- pin of the USB connector • USB mode: D- input/output • UART mode: TXD output
DP	D1	AI/O	Connect to D+ pin of the USB connector • USB mode: D+ input/output • UART mode: RXD input
FAULT	E2	I	Input for Vbus digital over-current or fault detector signal. If this pin is not in use, connect it to GND Plain input, 5V tolerant
ID	D3	I	identification (ID) pin of the mini-USB cable. If this pin is not in use, leave this pin open(there's internal pull-up). Plain input, TTL
VBUS	F4	AI/O	Connect to VBUS pin of the USB connector.
VCC	F3	P	Input supply voltage or battery source. Nominally 3.0V to 4.5V. Note: Below 3.0V, USB FS and LS transactions are not guaranteed to work though some devices may work with ISP1508 at these voltages.
PSW_N	D4	OD	Controls an external, active low VBUS power switch or charge pump. An external pull up resistor is required. Open drain,output, 5V tolerant.
REG3V3	E3	P	3.3V regulator output for USB mode or 2.7V regulator output for UART mode; requiring parallel 0.1 uF and 4.7 uF capacitors. Internally powers ATX and other analog circuits. Should not be used to power external circuits.
XTAL1	F5	AI/O	Crystal/clock input. 1.8V peak input allowed. Frequency depends on status on CFG1 and CFG2 pins.
XTAL2	F6	AI/O	Crystal output. If crystal is not in use, leave this pin open
CHIP_SEL	C3	I	Active HIGH chip select input. • When this pin is none-active, ULPI pins will be in 3-state and the chip

[1] Symbol names ending with underscore N (for example, NAME_N) indicate active low signals
[2] I=input; O=output; I/O = Digital Input/Output; OD = Open Drain Output; AI/O = Analog Input/Output; P = Power or Ground pin

N2421 IC ESD Prot UDFN 6 2x2 mm 1200-6309

PIN CONNECTIONS

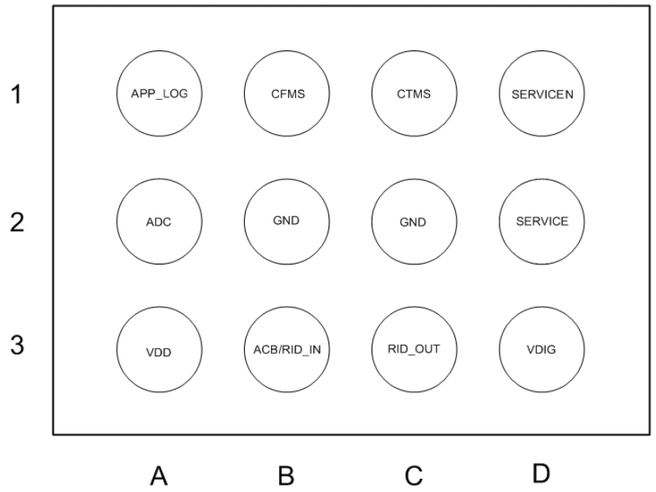


PIN FUNCTION DESCRIPTION

Pin No.	Name	Type	Description
1	$\overline{EN}$	INPUT	Enable Pin. The device enters in shutdown mode when this pin is tied to a high level. In this case the output is disconnected from the input. To allow normal functionality, the $\overline{EN}$ pin shall be connected to GND to a pull down or to a I/O pin. This pin does not have an impact on the fault detection.
2	GND	POWER	Ground
3	IN	POWER	Input Voltage Pin. This pin is connected to the VBUS. A 1 μF low ESR ceramic capacitor, or larger, must be connected between this pin and GND.
4, 5	OUT	OUTPUT	Output Voltage Pin. The output is disconnected from the VBUS power supply when the input voltage is above OVLO threshold or below UVLO threshold. A 1 μF capacitor must be connected to these pins. The two OUT pins must be hardwired to common supply.
6	$\overline{FLAG}$	OUTPUT	Fault Indication Pin. This pin allows an external system to detect a fault on VBUS pin. The $\overline{FLAG}$ pin goes low when input voltage exceeds OVLO threshold. Since the $\overline{FLAG}$ pin is open drain functionality, an external pull up resistor to V_{CC} must be added.

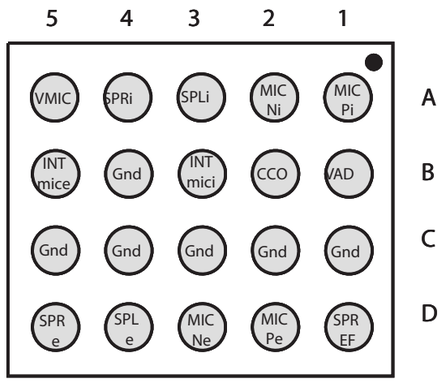
N2422 ASIC BB Elina 1201-4120

Pin-out, top view; bumps down.

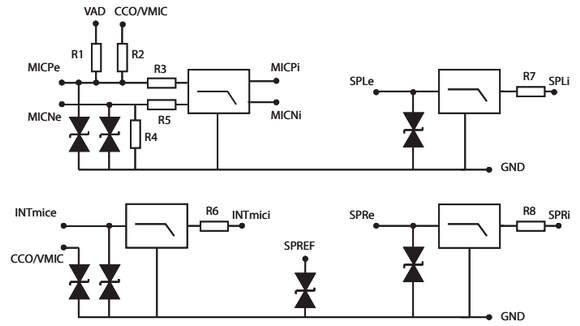


N3101 ASIC Tjatte3 CSP20 ROP1013074/1R1A

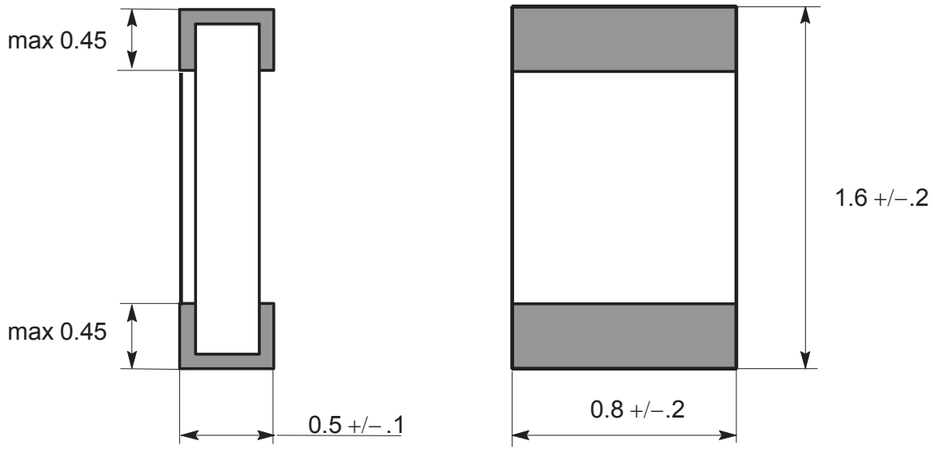
Pin configuration (Bump side)



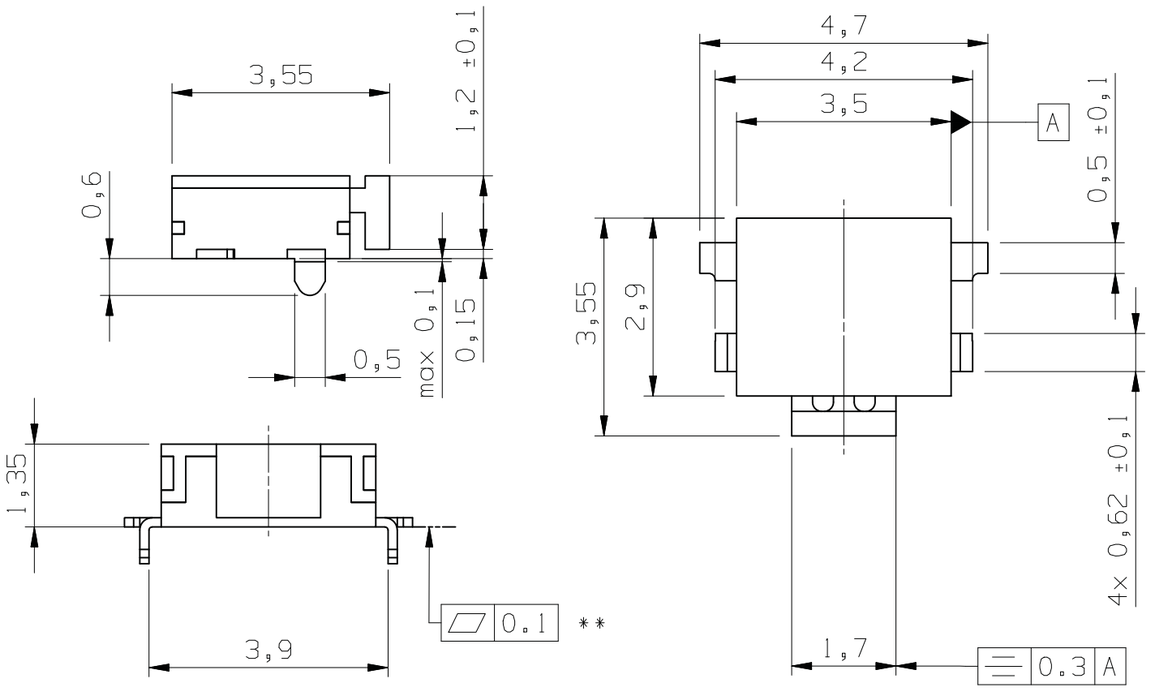
Electrical diagram



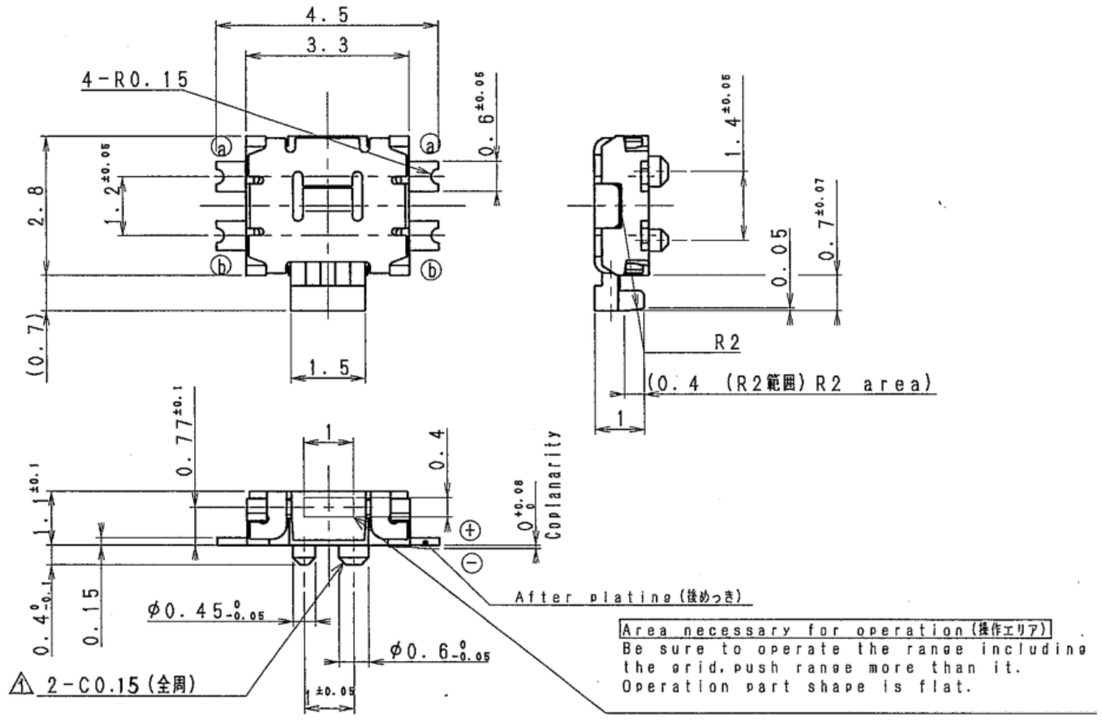
R2449, R2490 Resistor 0, Ohm +/- 50m 63 mW K0603 REP623001/0



S2403, S2405-06 Input Switch Side Push RMD10116/9R1A

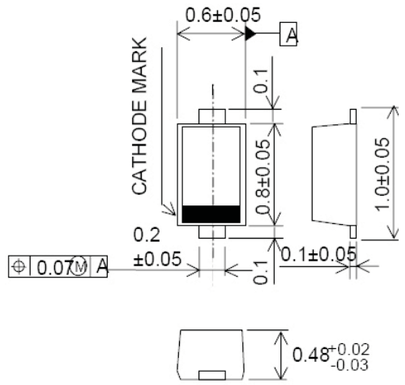


S2404 Input Switch Side Push 1206-9606

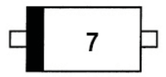


V2200 Diode Protection 0, RKZ223911/1

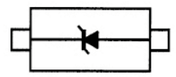
Unit in mm



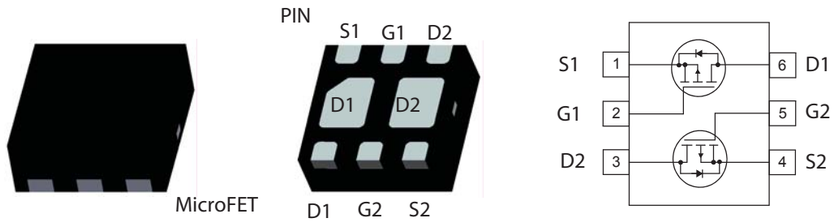
Marking



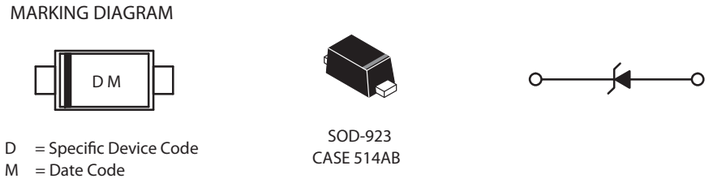
Equivalent Circuit (Top View)



V2202 Trans P-ch FET RYN122910/1



V2415-16 Diode Protection 5, V SOD-923 1201-8440

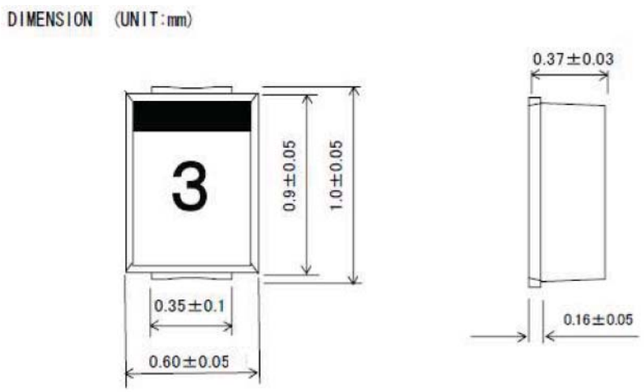


V2417 Diode Protection 12, V SOD523 1200-5130

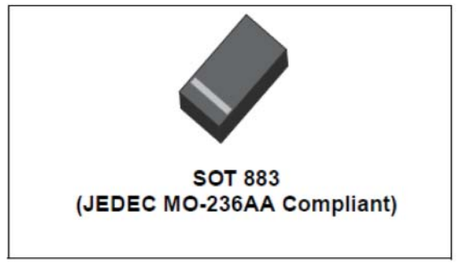
Pin	Description	Simplified outline	Symbol
1	cathode [1]	1 2	1 2
2	anode	Top view	sym035

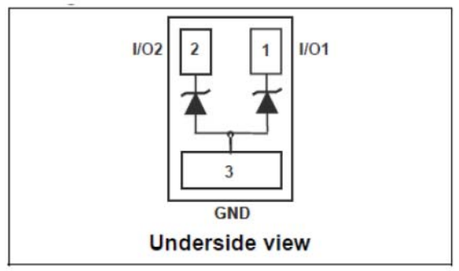
[1] The marking bar indicates the cathode.

V2470 Diode 0, RKZ323916/1

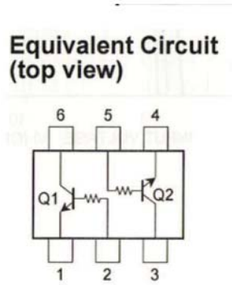


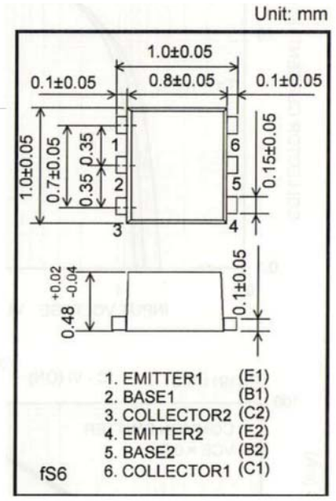
V3101 Zener Diode, ESD Protection, 6.1V RKZ223922/1



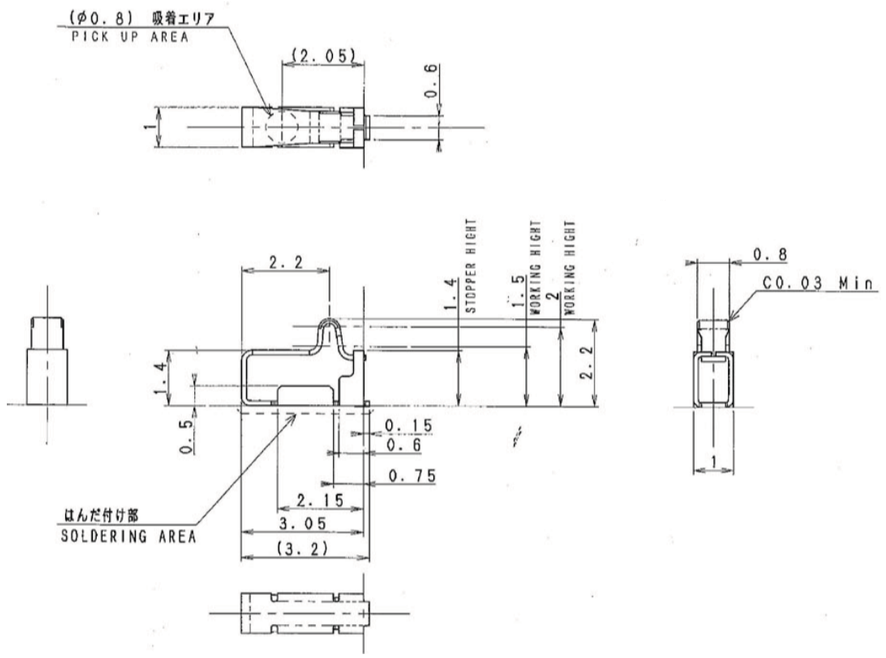


V4203 Trans NPN 1211-3641

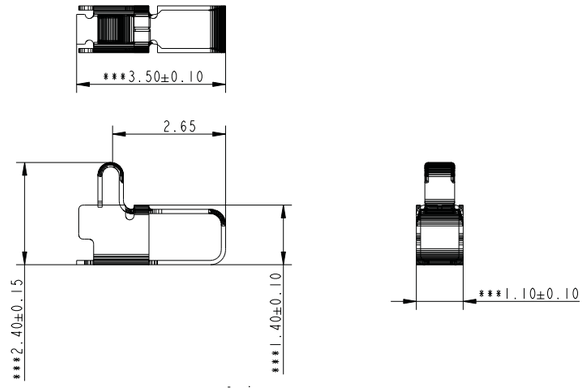




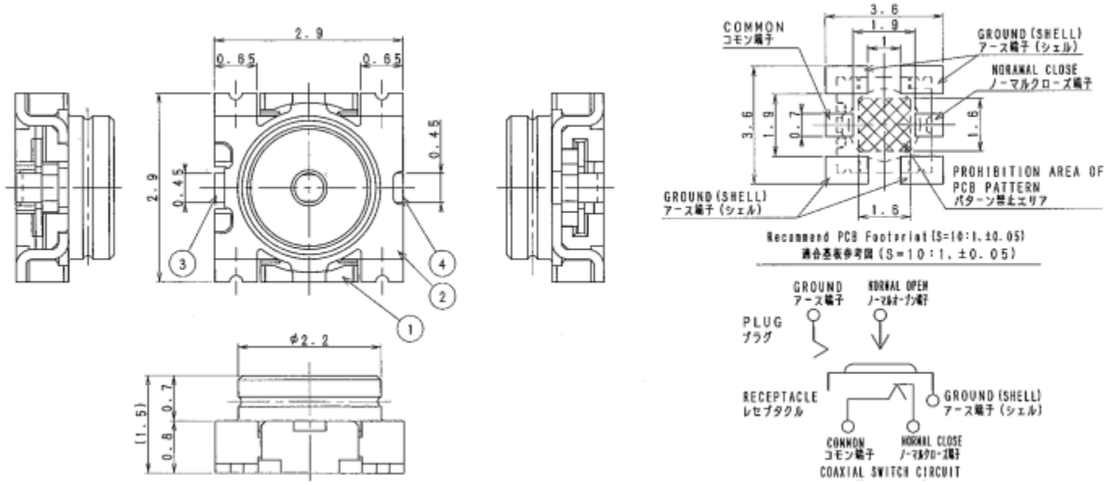
X1000, X1002-03, X1005 Conn Leaf Spring 1201-4841



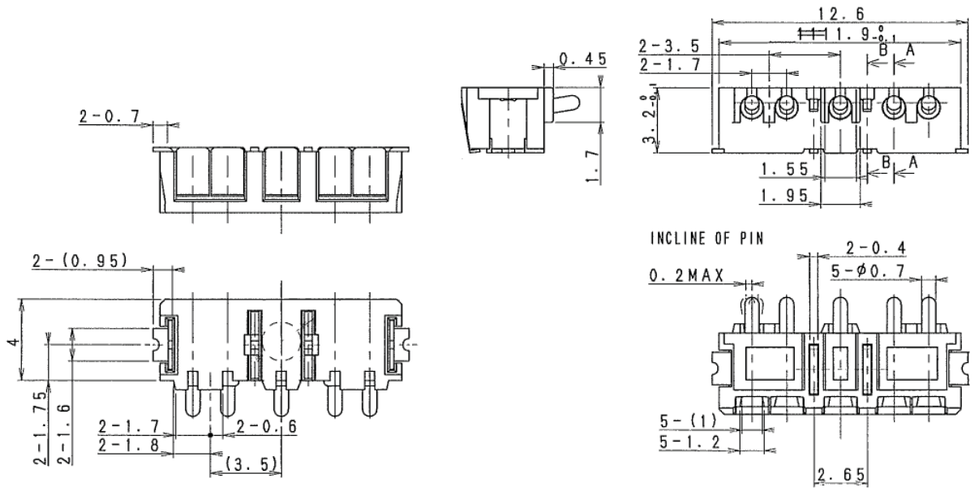
X1001, X1004 Con Leaf Spring 1p 1202-1053



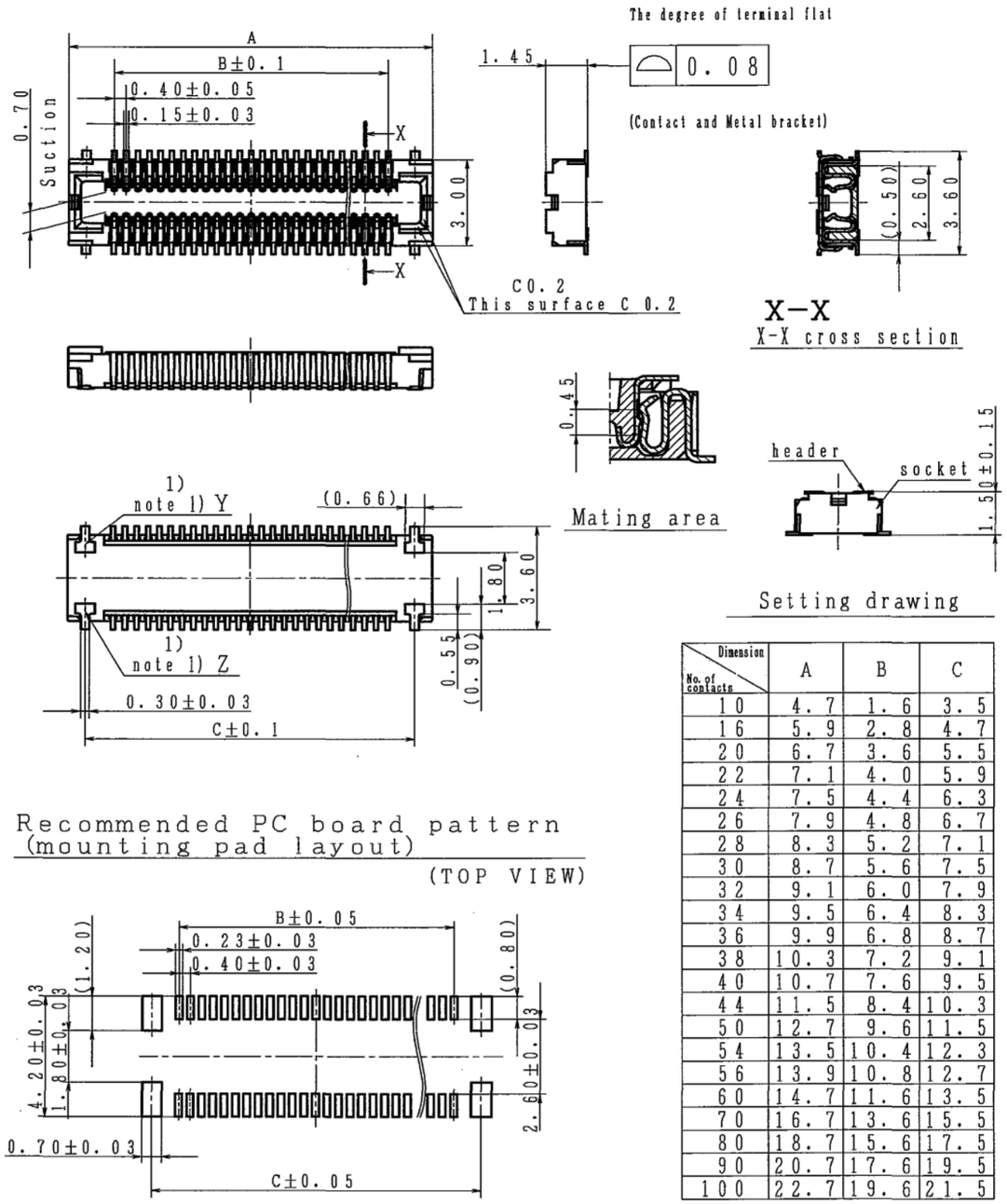
X1200, X1500 Conn Coax Plug 6p RF-probe contact 1203-9688



X2201 Conn Pogopin 5p 1206-2937

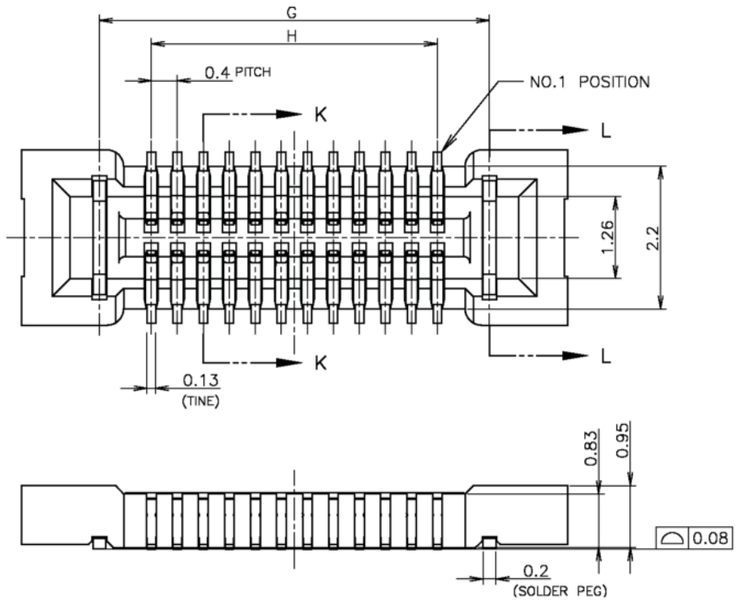


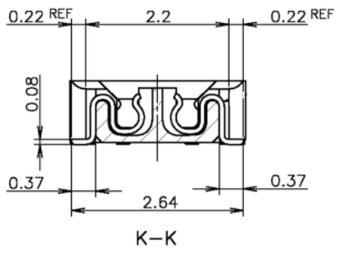
X2401 Conn BtB Receptacle 16p 1214-7370

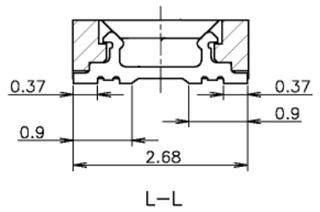


No. of contacts \ Dimension	A	B	C
10	4.7	1.6	3.5
16	5.9	2.8	4.7
20	6.7	3.6	5.5
22	7.1	4.0	5.9
24	7.5	4.4	6.3
26	7.9	4.8	6.7
28	8.3	5.2	7.1
30	8.7	5.6	7.5
32	9.1	6.0	7.9
34	9.5	6.4	8.3
36	9.9	6.8	8.7
38	10.3	7.2	9.1
40	10.7	7.6	9.5
44	11.5	8.4	10.3
50	12.7	9.6	11.5
54	13.5	10.4	12.3
56	13.9	10.8	12.7
60	14.7	11.6	13.5
70	16.7	13.6	15.5
80	18.7	15.6	17.5
90	20.7	17.6	19.5
100	22.7	19.6	21.5

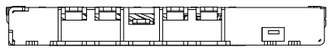
X2402 Conn BtB 1200-9864

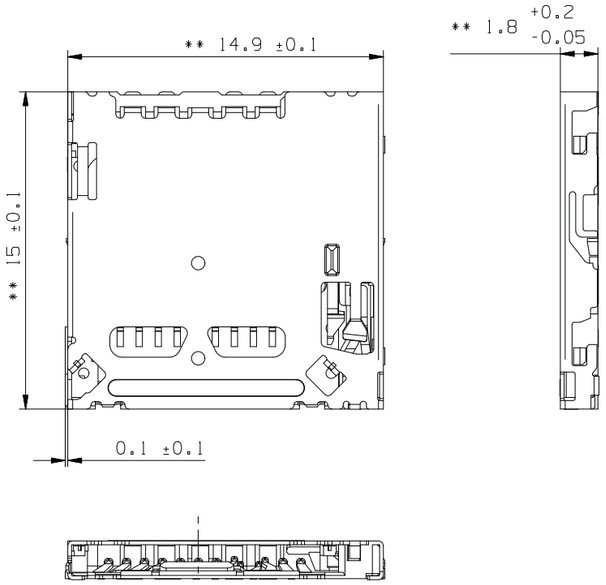


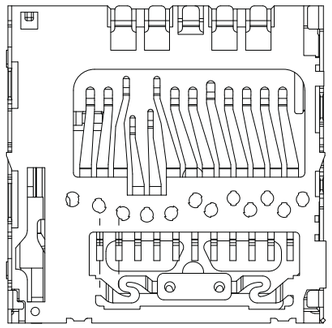




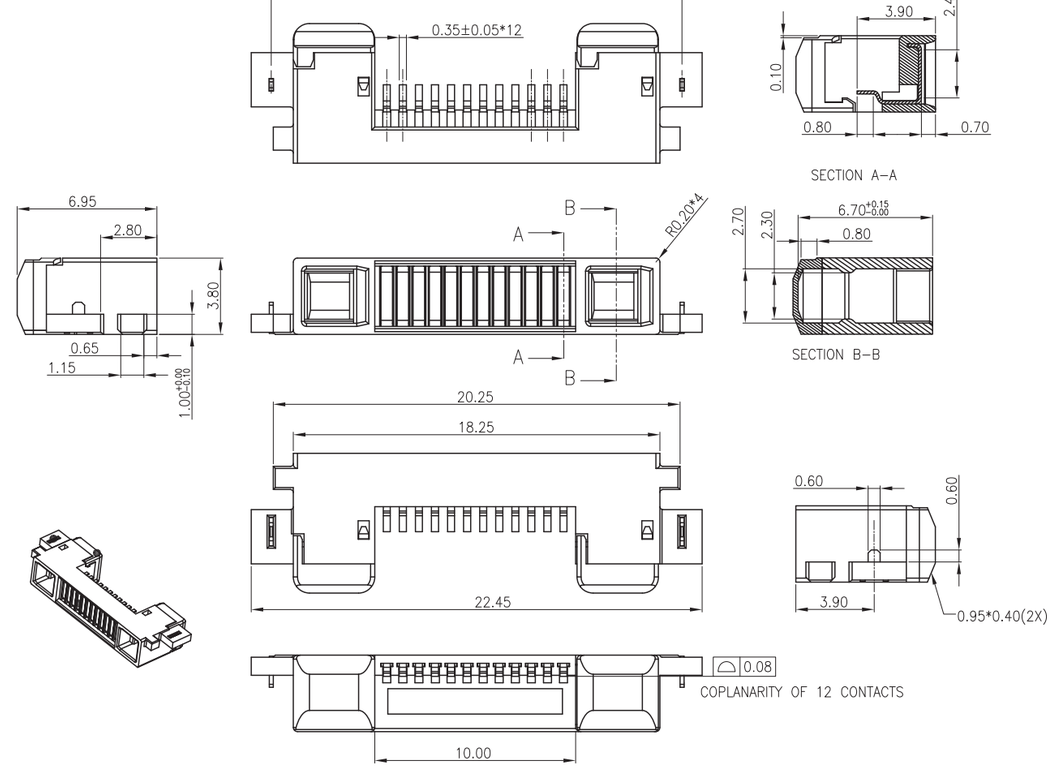
X2403 Card Conn RNK87147/2



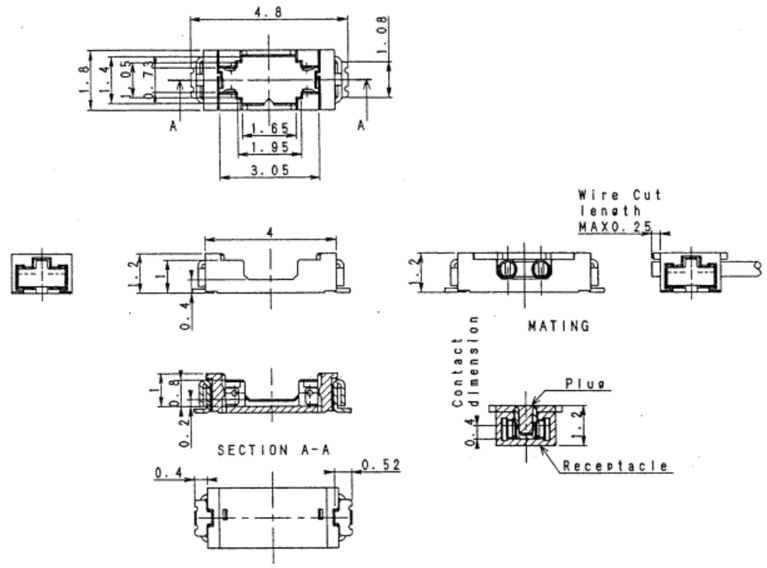




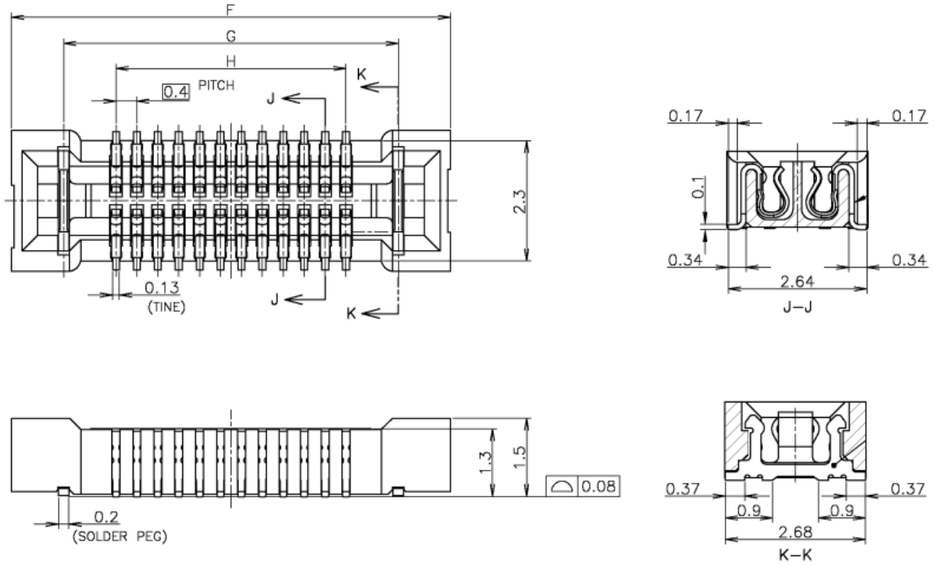
X2405 System Connector 1205-9723



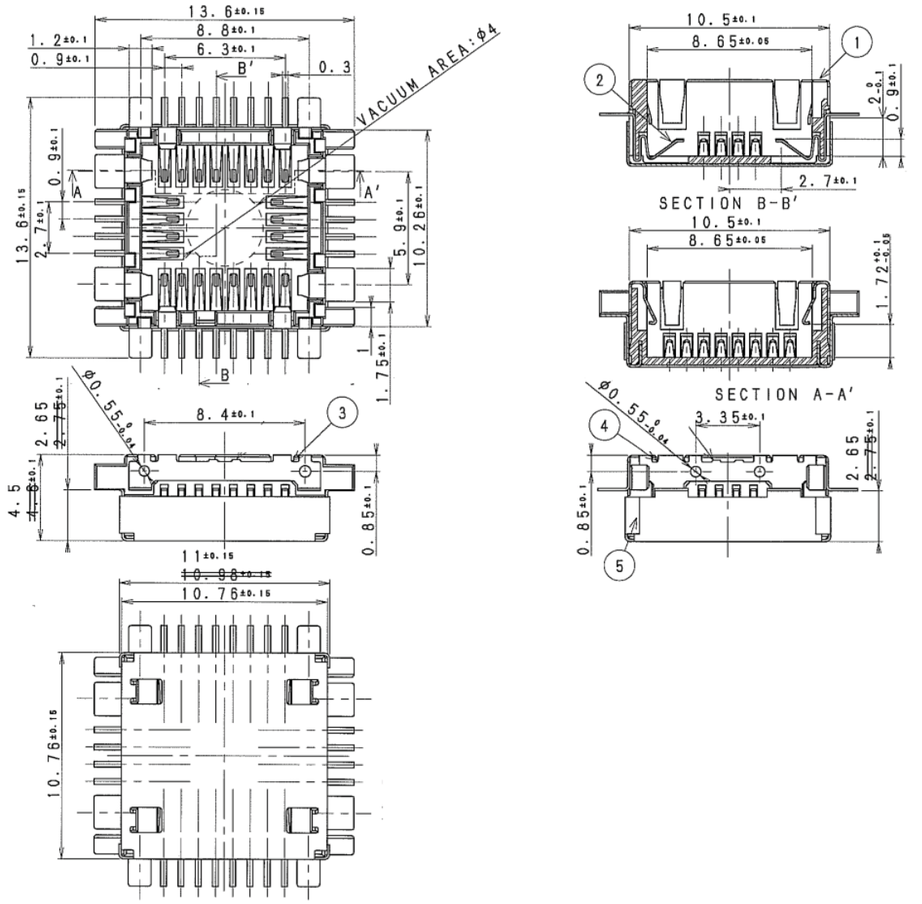
X3102 Conn WtB Receptacle 2p 1206-4855



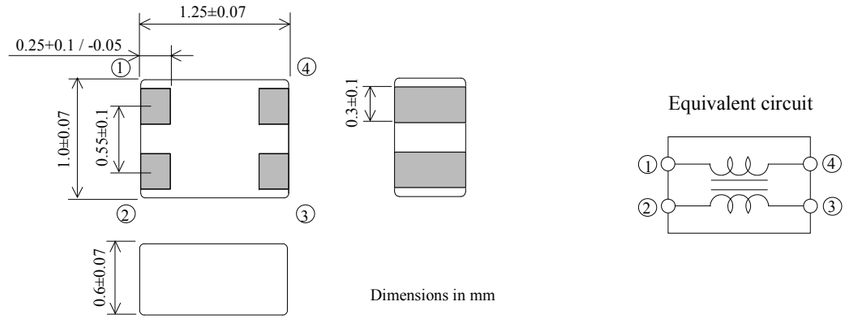
X4200 Conn BtB Receptacle 70p 1206-2940



X4300 Conn camera Socket 0p 1206-5418

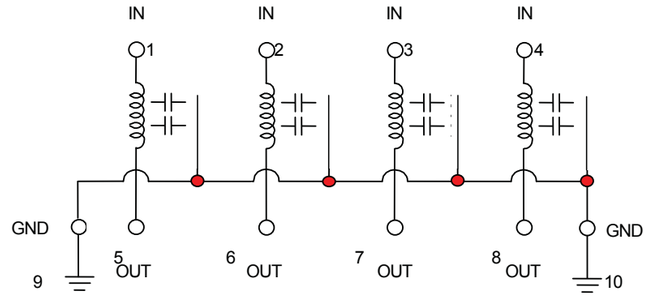


Z2400 Filter 100, MHz K1210 1201-6833



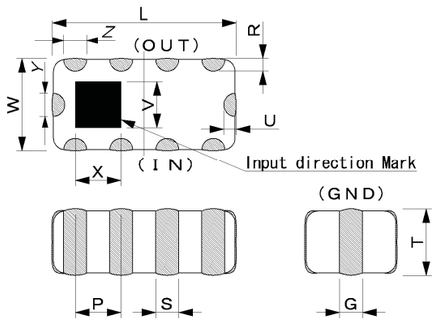
Z4200-02 Filter 400.0 MHz KNA16400 - W5 1608 REV50146/1

Equivalent circuit

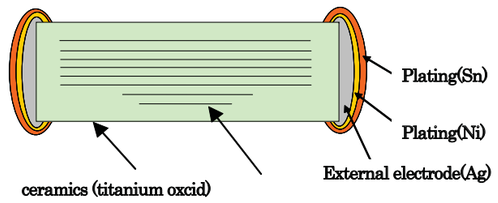


Size, Dimensions

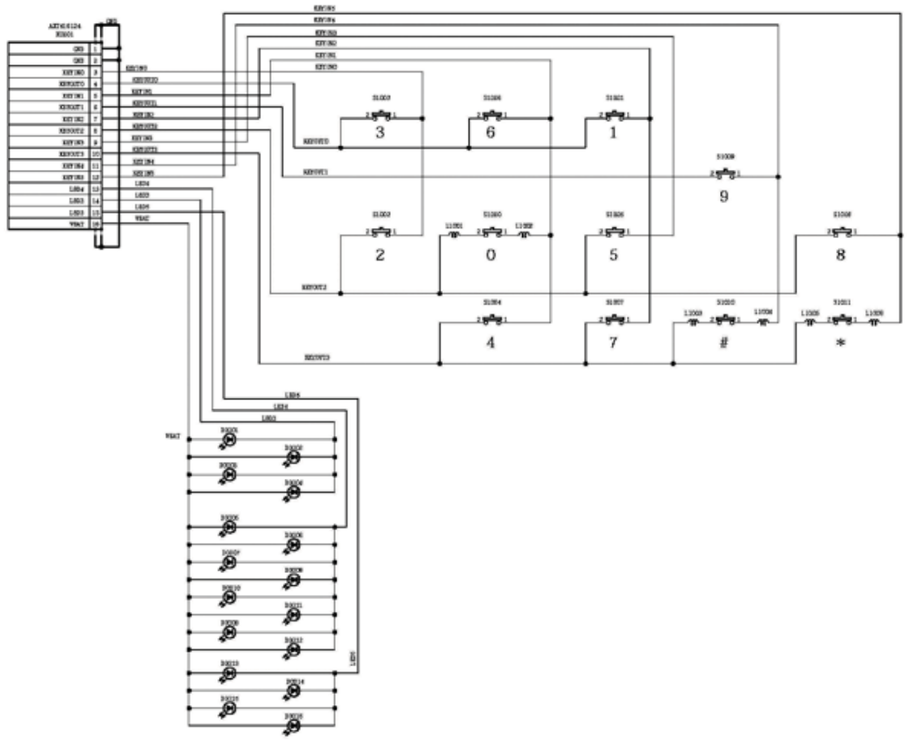
(Unit;mm)

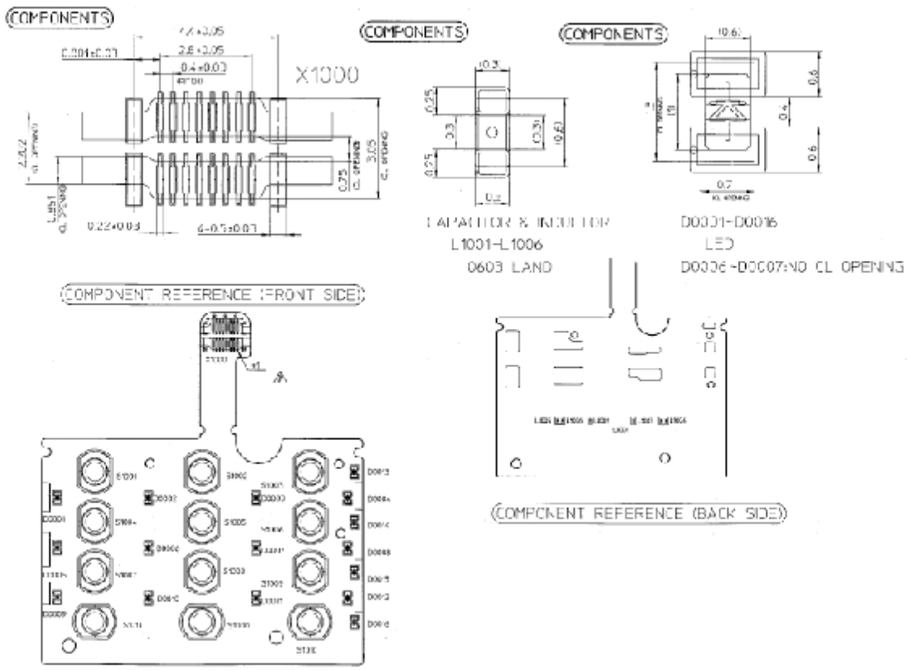


Symbol	Dimmentions
L	1.60 +/- 0.08
W	0.80 +/- 0.08
T	0.50 +/- 0.10
P	0.40
S	0.20 +/- 0.075
G	0.20 +/- 0.075
R	0.01< ,(0.10 type)
U	0.01< ,(0.10 type)
V	0.40 type
X	0.40 type
Y	0.23 +/-0.075
Z	0.23 +/-0.075

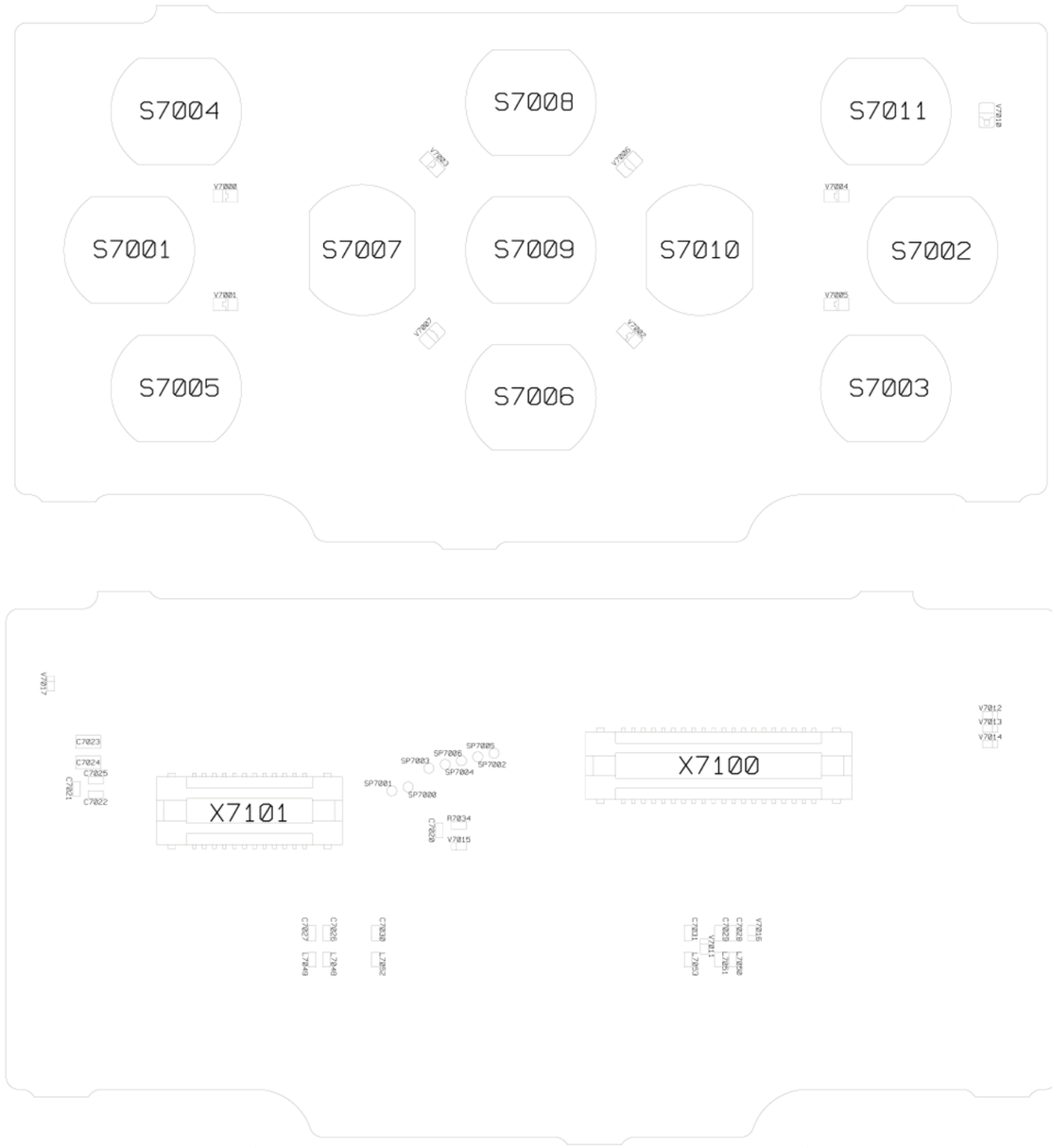


Keypad Flex Module

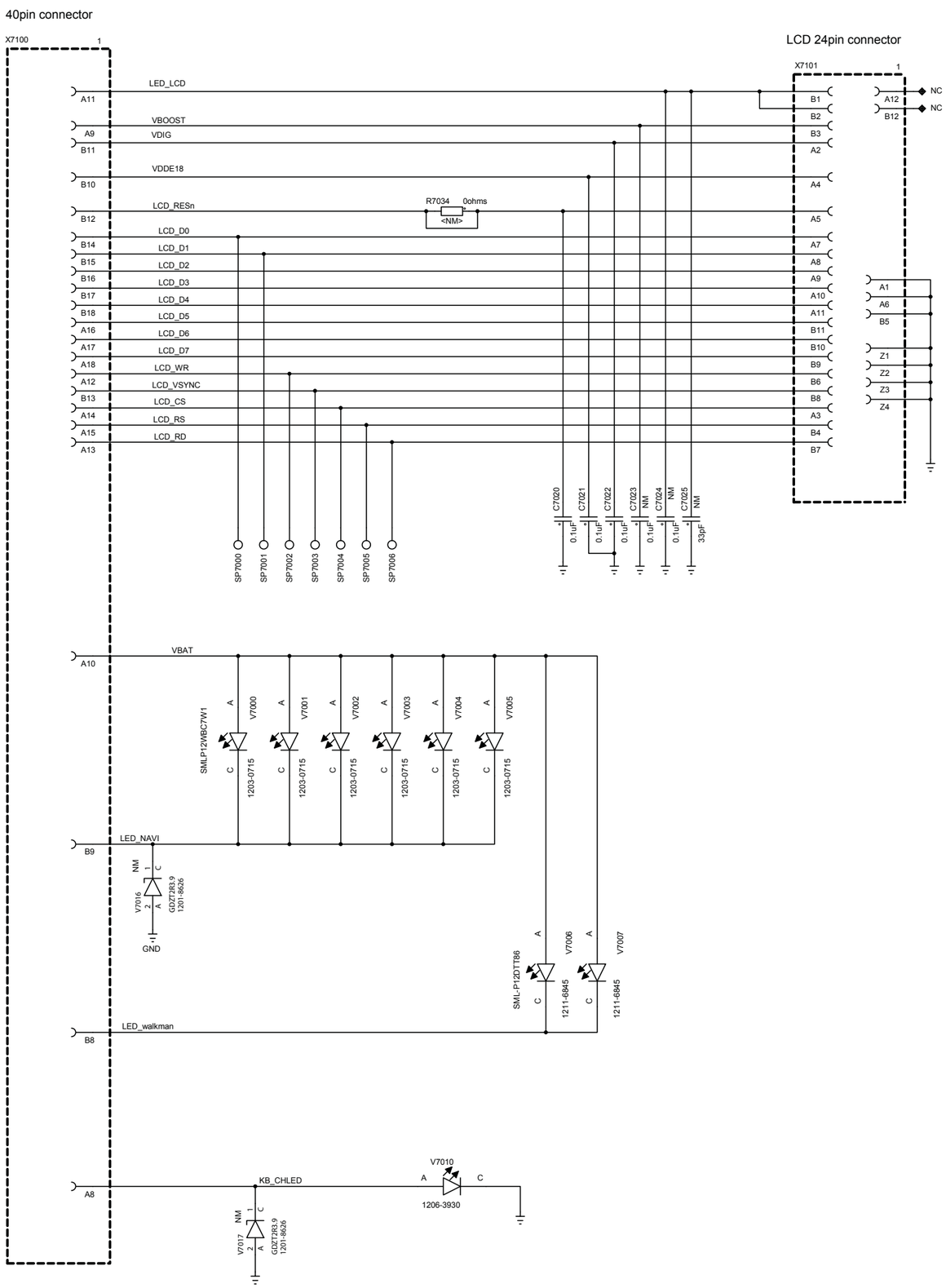


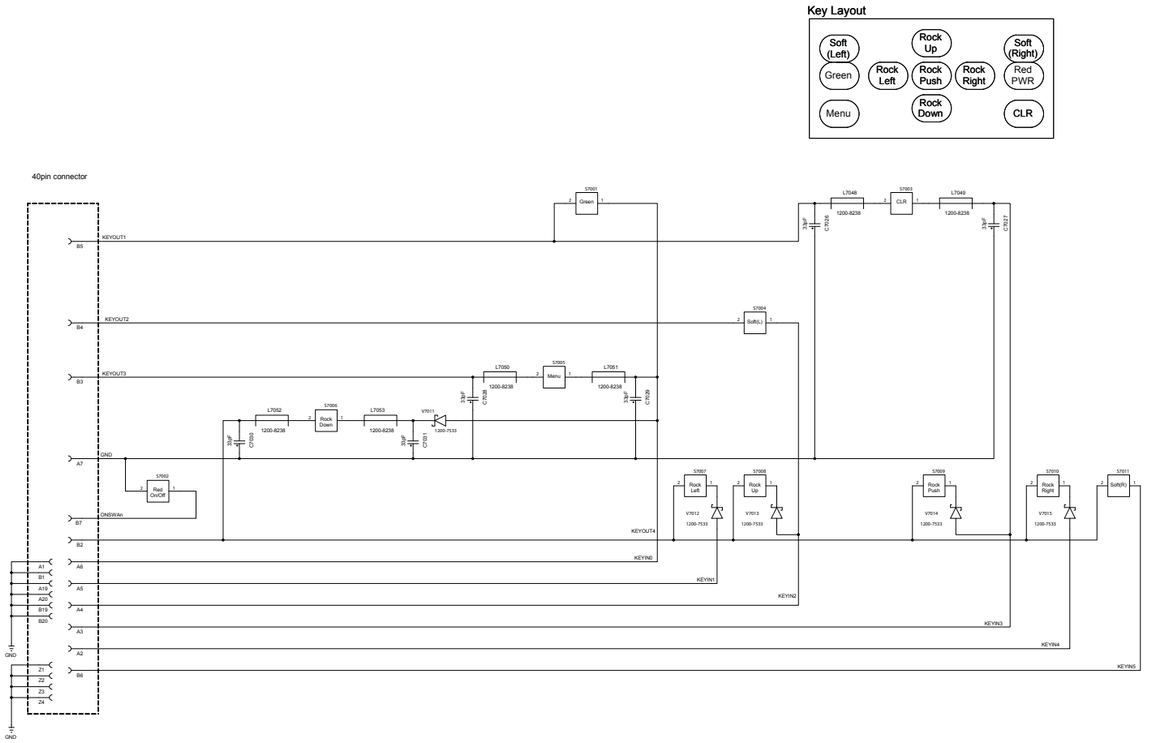


Navigation Keypad PBA



Upper Board Schematics



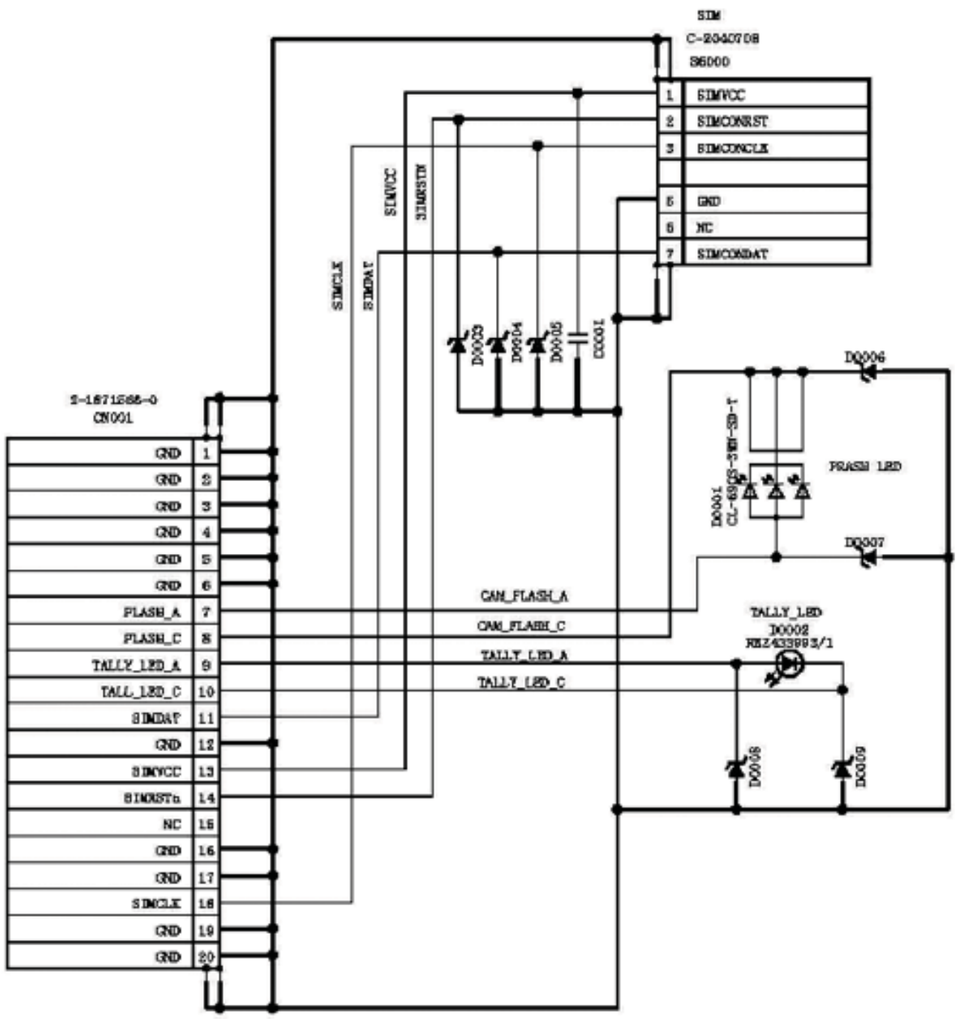


LCD Assembly

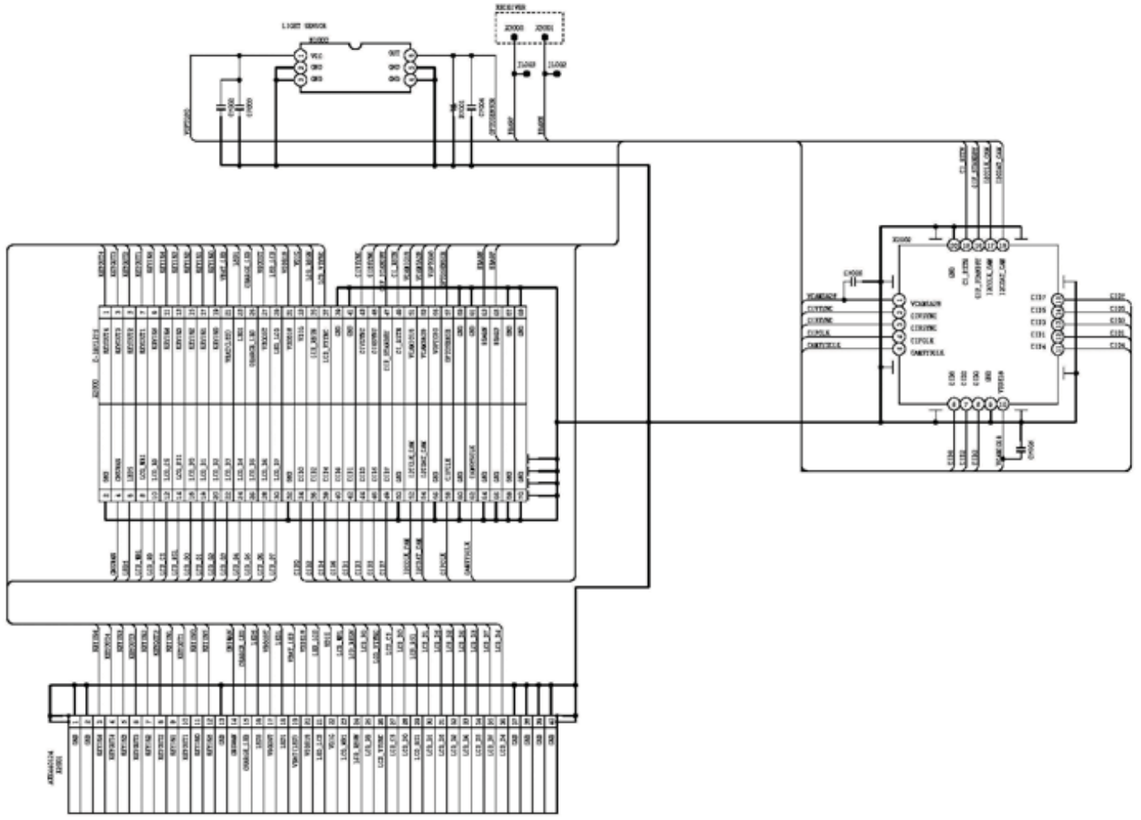
Mating Connector: AXE424124 (Matsushita Electric Works, Ltd.)

PIN	Symbol	Signal	PIN	Symbol	Signal
1	LED-	LED cathode	2	VSS	GND
3	LED-	LED cathode	4	VDD	2.75V typ
5	LED+	LED anode	6	CS	CS For display
7	D/C	Data/Control	8	VDDI	1.8 V typ
9	VSS	GND	10	RES	Reset
11	WR	Write	12	VSS	GND
13	RD	Read	14	DB0	Data
15	FSYNC	Output	16	DB1	Data
17	DB7	Data	18	DB2	Data
19	DB6	Data	20	DB3	Data
21	DB5	Data	22	DB4	Data
23	DBC1	Dynamic BL	24	DBC 2	Dynamic BL

SIM Flex Module



Slider Flex Module



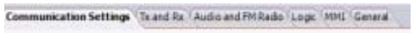
Troubleshooting Software Documentation

Introduction

Using this software you can control most parts and functions of all Sony Ericsson mobile phones. It is a GUI (**G**raphical **U**ser **I**nterface) for the commands implemented in the ITP (**I**ntegrated **T**est **P**rogram). The software communicates with the phone through standard serial communication over a USB/RS232 interface (SEPI).

Note: *The Troubleshooting Software application is to be used with the Troubleshooting Manual and the Troubleshooting fixture kit.*

The functions in the Troubleshooting Software application are divided into three main sections: **Communication Settings**, **Radio Control** and **Base Band Controls**. These main sections are presented under six different tabs.



All settings and functions are collected under these six main tabs.

Communication Settings

All settings for the communication between the Troubleshooting Software application and the phone are presented under the Communication Settings Tab.

Radio Controls

Note: *Some parts of Radio Control functions may not be implemented since they are not supported by the ITP SW.*

Note: *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

All Radio Control Functions implemented in the Troubleshooting Software are presented under the **Tx and Rx** tab. The main radio functions of the mobile phone presented in this tab are:

- GSM radio part
- WCDMA radio part
- Bluetooth radio part

In the GSM and the WCDMA radio control part the following radio functions can be controlled: Transmitter (TX) and Receiver (RX)

In the Bluetooth radio control part only the Transmitter (TX) function is supported.

Base Band Controls

Note: *Some parts of Base Band Control functions may not be implemented since they are not supported by the ITP SW.*

Note: *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available for all products.*

The functions for Base Band Control are presented under the following four different tabs:

Audio and FM Radio
Used for setting Audio Loop mode and test the functionality of the FM Radio.

Logic
Used to:

- Read out of the ADC channels
- Control or Test of SIM and Memory Stick Card
- Perform of Battery and Current Calibration
- Check Radio and Display temperature
- Etc.

GPIO Manager

Used to control GPIO ports at the Access and Application CPU.

Note: *It is very important to follow the GPIO activation sequence according to the Troubleshooting Guide instructions when the GPIO manager is used to avoid Hardware or SW function interruption.*

MMI
Used for:

- Main and VGA Camera Tests
- Camera Door Test
- Keyboard Scan Test
- Vibrator Test
- LED and Backlight Tests
- Xenon Flash Test
- Display Test
- Etc.

General

Used to:

- Read out Software and Product Data Information flashed into the phone
- Perform ASIC Revision test
- Perform available Self tests

Equipment Setup

Note: *During calibration the accurate voltage from VBATT must be within ±0.015 V. If this is not fulfilled it will cause a faulty calibration. For more information about recommended power supply units, see the Repair Tool Catalogue in CSPN under the Mechanical level. The Power Supply Channel 1 VBATT must allow reverse current.*

Note: Before starting calibration test, the *phone must be flashed with ITP Software.*

Instructions for Customization of Power Supply Channel 2 DCIO/SEPI Cable

To perform Current Calibration the phone must be powered directly through the system connector. Customize the cable according to following instructions: Take the CST-75 battery charger and cut off the charger according to picture 1. **Length of the cable must be exact 1.3m**. Connect the CST-75 charger **Red** or **White** cable to the **Positive (+) Output** at Power Supply and the **Black** cable to the **Negative (GND) Output** at the Power Supply according to picture 2. Cut off isolation material from inside of the charger plug according to picture 3.

Picture 1

Picture 2

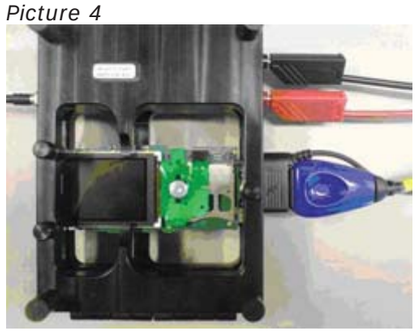
Picture 3

Power Supply Channel 2 DCIO/SEPI Cable Connection Setup

Note: *The Power Supply Channel 1 (VBATT) must allow reverse current.*

Note: *The maximal cable length between the Power Supply Channel 1 VBATT and the dummy battery must not exceed 1m. The cable must have a capacity for at least 16A.*

Picture 4

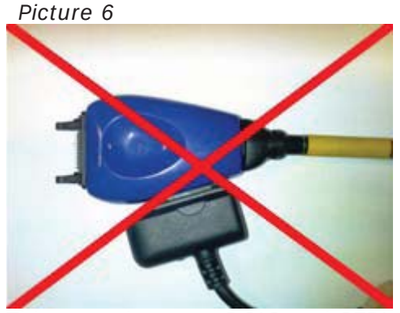


Correct DCIO and SEPI A1 Cable setup when the Troubleshooting Fixture is used.

Picture 5

Correct DCIO and SEPI A1 Cable setup when a Dummy Battery is used.

Picture 6



This setup between DCIO and SEPI A1 Cable is WRONG!

Note: *Voltage and Current settings for the Power Supply Channel 1 VBATT and 2 DCIO/SEPI can be found in the Equipment List included in the Product Specific Troubleshooting Manual.*

Note: *Instructions about the Troubleshooting fixture connections with the External RF connector, Display, SIM Card, Memory Stick Card, Keyboard etc. can be found in Troubleshooting Fixture Connection Instruction included in the Product Specific Troubleshooting Manual.*

System Requirements

Note: *Before start using the Troubleshooting Software, the phone must be flashed with ITP SW.*

The system requirements for running the application are:

- At least a Pentium III 500 MHz, with 128 MB of RAM
- Win2000 or Win XP
- One free USB connector
- USB Computer Cable
- At least 1024x768 display resolution. (1152x864 is recommended.)
- SEPI Drivers must be installed
- SEPI BOX
- SEPI A1 Cable
- Phone Specific Dummy Battery
- Phone Specific TRS Fixture
- CST-75 Charger cable
- One Dual or Two Single Channel Power Supplies

TX and RX - Tab

Communication Functions

Note: *Some parts of the Communications functions may not be implemented since they are not supported by ITP Software.*

Note: *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

GSM

GSM Mode Settings

Used for selecting of the GSM radio mode. The following Radio Modes are available:

- TX and RX Switched
- TX and RX Static

Note: *In the TX Switched mode all parameters are available (Band, Channel and Power Level). In the TX Static mode the control of Power Level is hidden and the transmitter works with a predefined DAC value. This is done to protect the power amplifier against overheating.*

GSM Radio Settings

Used for Channel and Power Level control of the selected GSM Band. The TX and RX frequency value for selected band and channel will be presented in the TX and RX frequency box.

1. Select the desired GSM band. Available options are **GSM 850** (Ch 128…251), **GSM 900** (Ch 1…124), **EGSM 900** (Ch 975…1023), **DCS 1800** (Ch 512…885) and **PCS 1900** (Ch 512…810).
2. Use default value or select desired channel.
3. Use default value or select desired power level.

Note: *Any GSM band not used by the Mobile Phone will be unavailable in the GSM Radio Settings.*

GSM RSSI measurements

This measurement is only possible to perform when RX Switched mode is selected. Use the Mobile Phone Tester instrument for feeding a signal to the mobile phone's receiver. For Instrument and Phone's settings go to Troubleshooting Manual – GSM Network problems.

1. Select RX Switched Mode.
2. Select desired GSM band and Channel.
3. Go to GSM RSSI Measurements and Start RSSI Test.

Note: *The RSSI Test can be performed differently from product to product due to the limited ITP Software support.*

WCDMA

Note: *Unused WCDMA Bands will not be available in the WCDMA Radio Settings.*

Note: *For some products the TX and RX WCDMA Channels range can be reduced due to the limited product functionality or Test Instrument limitation. This is done to avoid wrong and incorrect measurement results.*

Radio Settings

Used for TX and RX Channels control of the selected WCDMA Band. The TX and RX Channels frequency for selected band will be presented in the TX and RX frequency box.

1. Select the desired WCDMA band. Available options are **Band I** (TX Ch 9612…9888, RX Ch 10562…10838), **BAND II** (TX Ch 9262…9538, RX Ch 9662…9938), **BAND IV** (TX Ch 1312…1513, RX Ch 1537…1738), **BAND V** (TX Ch 4132…4233, RX Ch 4357…4458) and **BAND VIII** (TX Ch 2712…2863, RX Ch 2937…3088)
2. Use default value or select desired TX or RX channel.

Fast select channels

Set High Channel: The High Channel for selected WCDMA Band will be set by the Troubleshooting SW.

Set Mid Channel: The Mid Channel for selected WCDMA Band will be set by the Troubleshooting SW.

Set Low Channel: The Low Channel for selected WCDMA Band will be set by the Troubleshooting SW.

Modes

Max Pwr 23dBm set the Phone to transmit with maximum power at the selected Band and TX Channel. The limit is 23dBm.

Min Pwr Max -50dBm set the Phone to transmit with minimum power at the selected Band and TX Channel. The limit is -50dBm.

Read RSSI set the Phone in RX mode at the selected Band and RX Channel.

Out Pwr level x dBm set the Phone in TX mode at the desired power level value at the selected Band and TX Channel (Power level range to choose is: from -50dBm to 23dBm).

INP/OUT Pwr check set the Phone to transmit with maximum power and switch the receiver On at the selected Band and TX/RX Channel

Reset output set the Phone in WCDMA Off mode.

Rx on

Read measurement read the RSSI and report the result at Phone reported power. This function can only be used when the Receiver is On.

Note: *The RSSI Measurement can be performed differently from product to product due to the limited ITP Software support.*

VCO and VCXO Functions

Note: *These calibrations are only possible to perform when RX static mode is selected.*

Note: *These calibrations may not be possible to implement for all products due to limitations in ITP Software.*

VCO Calibration (TX)

Uses the default values in the TP to adjust the varactor diode to a pre-determined operating point, so that the loop voltage of the TXVCO (measured with an ADC) is within the valid range and the optimal value is chosen. The optimal value is defined as: The CVCO value that gives loop voltages within the limits for both high and low channel and that has the lowest maximum loop voltage.

The optimum value is stored in GDFS.

VCXO Control

Used to fine tune the VCXO to **MCLK** frequency by calibrating the DAC that sets the VCXO control voltage. It is also used to verify the VCXO tuning range. When transmission is in Switched TX mode you are allowed to calibrate the VCXO oscillator controlling the DAC value on the AFC pin.

1. Switch the GSM tester to GSM900, Ch1.
2. Read the stored VCXO value from the GDFS by clicking the "**Read from GD**" button.
3. Start transmitting by clicking the "**TX Switched**" mode button.
4. To apply the VCXO DAC value you set, click the "**Set VCXO**" button.
5. Check your GSM tester.
6. Set the frequency error as close to 0 Hz as possible by using the up/down arrows and then click the "**Set VCXO**" button again.
7. The button "**Mean Value**" sets the value to 1024.
8. When the procedure is finished, click on "**Save VCXO**" button to store the calibrated value in GDFS.

VCO Calibration (RX)

Uses the default values in the TP to adjust the varactor diode to a pre-determined operating point, so that the loop voltage of the RXVCO (measured with an ADC) is within the valid range, and the optimal value is chosen. The optimal value is defined as: The CVCO value that gives loop voltages within the limits for both high and low channel and that has the lowest maximum loop voltage.

The optimum value is stored in GDFS.

Audio and FM Radio - Tab

Audio & Radio Functions

Note: *Some parts of Audio and FM Radio may not be possible to implement for all products due to limitations in ITP Software.*

Note: *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

Audio Loop Test

1. Select desired Audio Loop Test
2. Click "**Apply Audio Loop**" to start the test.
3. To switch off the loop, select **OFF** from **Audio Output** and click "**Apply Audio Loop**".

Audio input:

- **Mic1** is the internal microphone.
- **Aux1** is the input from the system connector.

Loop mode:

- **Analogue**, where the loop is set before and after the AD/DA conversions.
- **Digital/DSP** loop, where the DSP signal processing also affects to the audio signal.
- **CPU/PCM** loop, where the loop is set between the PCM audio signals.
- **Dictaphone** loop.

Audio output:

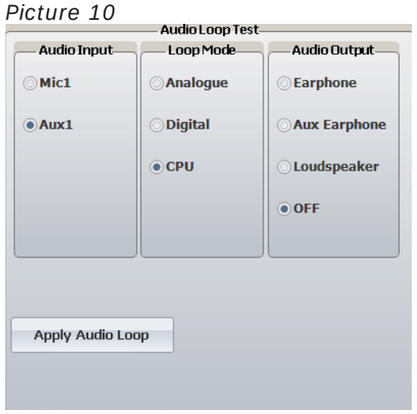
- **Earphone** is the internal Earpiece speaker of the unit.
- **AUX earphone** connected to the system connector.
- **Loudspeaker** is the internal loudspeaker of the unit.
- **OFF** is used to switch off the currently used Audio Loop.

Examples of different Audio Loop Test setups in Fault Trace SW.

Picture 9

K800 Project Setup

Picture 10



K850 Project Setup

Note: *Audio output and input pins can be used by disconnecting the blue SEPI connector from the phone after the audio loop has been applied. Now the Portable Handsfree can be connected to the System Connector. After function test operation, disconnect the PHF or external audio device from the System Connector and connect the SEPI cable to proceed with other Audio Loop Tests.*

FM Radio

- To activate the FM radio, click at the **Set FM Radio** button.
- To turn off the FM radio, click at the **Turn OFF FM Radio** button.

Audio output
Used for selecting Audio Output from the FM Radio. Most common Audio Outputs for all projects are AUX Stereo (Portable Handsfree, PHF) or Loudspeaker.

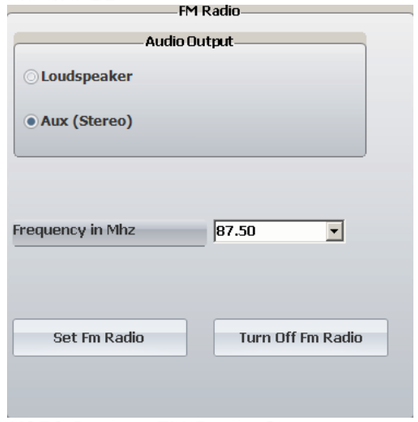
Frequency in MHz
Frequency range box for the FM Radio. The frequency value can be selected in two different ways:

- The first one is with up/down spin buttons
- The second one is to type it directly into the Frequency field.

When typing directly into the Frequency field, the Frequency Span should be 100 KHz when changing from one frequency to another. The Frequency Range used in the Troubleshooting Software is from 87.50 MHz to 108.00 MHz.

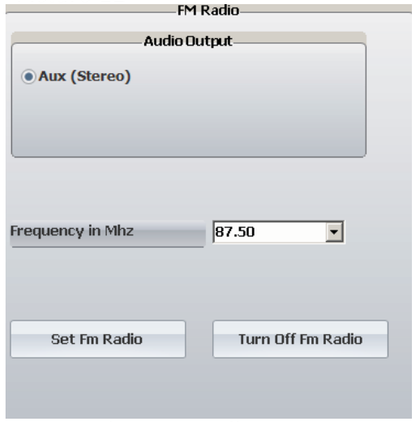
Examples of different FM Radio Test setups in the Troubleshooting Software

Picture 11



K850 Project FM Radio Setup

Picture 12



K800 Project FM Radio Setup

Logic – Tab

Logic Functions

Note: *Some of the Logic functions may not be possible to implement for all products due to limitations in the ITP Software.*

Note: *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

Battery Calibration

Note: *To perform this test only Power Supply channel 1 is needed. Make sure that the correct voltage values are set for each test step, otherwise the test will fail.*

The Battery Calibration test is similar to the Battery Calibration test performed in the factory environment.

1. Click **1. Battery Calibration**.
2. Click **SET VBATT to 3.2 Volt**.
3. Adjust Power Supply channel 1 (the dummy battery) to 3.2 V.
4. Click **VBAT1**.
5. Click **SET VBATT to 4.1 Volt**.
6. Adjust Power Supply channel 1 to 4.1 V and click **VBAT2.**
7. Adjust Power Supply channel 1 to 3.8 V and click **SET VBATT to 3.8 Volt**.
8. The test result (**Passed** or **Failed**) will now be displayed.

When the measured values are within the limits the calibration will be passed otherwise the test will be failed. The compensation factor will be calculated and stored in the GDFS.

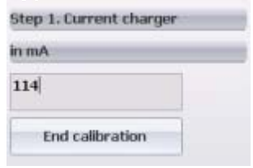
More information about the test limits can be found in the product specific Troubleshooting Manual and in the **Read Limits Table** in the **Battery and Current Calibration Test** document.

Current Calibration

The Current Calibration test is similar to the Current Test for the charging algorithm in the factory environment.

Note: *For a correct and accurate result, perform the* **Battery Calibration Test** *before current calibration. To perform this test you will need both channel 1 and 2 from the Power Supply.*

1. Click **2. Current Calibration.**
2. Adjust channel 1 (the dummy battery) to 3.8 V.
3. Click button **SET VBATT to 3.8 Volt**.
4. Note the measured current for channel 2 (the customized charger with SEPI).
5. Type in the measured current (in mA) in the text box.



In this example the current is measured to 114 mA.

6. Press **Enter**.
7. The phone will switch to charging with 800mA. Note the measured current value result at Power Supply Channel 2 DCIO/SEPI.
8. Type the new value in the text box.
9. Press **Enter**.
10. The test result (**Passed** or **Failed**) will now be displayed.

When the measured values are within the limits the calibration will be passed otherwise the test will be failed. The compensation factor will be calculated and stored in the GDFS.

More information about the test limits can be found in the product specific Troubleshooting Manual and in the **Read Limits Table** in the **Battery and Current Calibration Test** document.

ADC Values

1. Select the desired ADC Channel.
2. Click **Read ADC value**.

- The measured value will be presented in both hex and decimal info boxes.
- N/A means that the General Purpose port is not used by this phone or this port is not supported by ITP.
- If a port is missing in the Troubleshooting SW that port is not supported by the ITP SW.

SIM Card Control

This section controls the SIM interface in the phone.

SIM VCC: Voltage for the SIM Card will be activated.
SIM RESET, **SIM DATA** and **SIM CLOCK**: Activate the Reset, Data and Clock signals for the SIM Card.
SIM Com Test: Checks the communication with the SIM Card.

The test result (**Passed** or **Failed**) will be displayed in the info box.

Note: *A SIM card must be inserted and a card reader connected to run this test.*

Memory stick test checks the communication with the Memory stick card.

The test result (**Passed** or **Failed**) will be displayed in the info box.

Note: *A Memory stick card must be inserted and a Memory card reader connected to run this test.*

End Calibration

Ends the calibration and no data will be stored.

Go Idle for 2 sec

The unit will be set to IDLE mode for 2 seconds.

Reboot Phone

IPT command **KILL** will be send and the phone will restart.

Radio Temperature

The value of the Radio Temperature will be displayed in the info box.

Display Temperature

The value of the Display Temperature will be displayed in the info box.

GPIO Manager Functions

Set GPIO port at Access and/or Application CPU to High or Low and Read Out status of the port.

MMI – Tab

Functions

Note: *Some parts of MMI functions may not be possible to implement for all products due to limitations in the ITP Software.*

Note: *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

Display Pattern

Activate different test patterns on the display.

LED and Backlight

Activate/Deactivate LEDs and Backlights on the phone.

Misc

Activate/Deactivate tests such as:

- Main Camera Test
- VGA Camera Test

- Camera Door Test
- Vibrator Test
- Keyboard Scan Test
- Etc.

Note: *When one test has been deactivated the phone will be restarted.*

General – Tab

Functions

Note: *Some parts of General functions may not be possible to implement for all products due to limitations in ITP Software.*

Note: *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

Software Information

This function is used to display the following information stored into the phone:

- ITP version
- IMEI number
- OTP number
- CID number
- PAF status
- Lock Status
- Etc.

Note: *The OTP number must match the IMEI number otherwise the IMEI has been changed.*

Note: *Some of these functions may not be available for all products due to security reasons.*

Product Data

This function displays production data stored in the phone, such as:

- First Identification (Serial Nr.)
- PBA Nr.
- PBA Rev.
- DPY Nr. (Sales Unit)
- Etc.

ASIC Revisions

This function displays the types and revisions of the different ASICs. To find out more information about which components are included in this test go to the **ASIC Revision Test** document **included in** the product specific **Troubleshooting Manual**.

Self Test

This function runs available self tests on the Phone.

Fault Trace SW Error Messages

1.

...timeout when reading

Check the following items:

- Connection between Power Supply Channel 2 (DCIO) and SEPI A1 cable (Se picture 4, 5 and 6).
- If the SEPI BOX works properly (The Green LED at the SEPI BOX must be on).
- If the USB cable between SEPI BOX and PC is connected properly.
- If the phone has been flashed with the correct ITP version.
- If VBATT and DCIO Power Supply instruments are on.

2.

...timeout when writing
...timeout when reading

Check if the correct COM Port is selected in Troubleshooting Software - Communication Settings Tab

3.

...Port has not been succesfully opened timeout

- Check if COM Port is connected
- Check if the correct Phone Project File is loaded
- Restart the Troubleshootinge Software application and try again

4.

Command failed due to:

.... Error_NotValidParameter, ERR

or

CERR: Error_CommandDoesNotExist, ERR

- Check if the correct Phone Project File is loaded
- Check if the phone has been flashed with the correct ITP version.

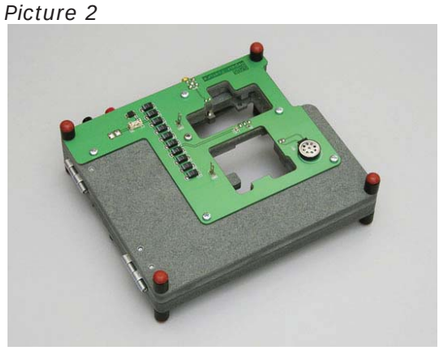
Troubleshooting Fixture Setup Instructions

Top-part overview of the TRS Fixture, see picture 1.

Picture 1

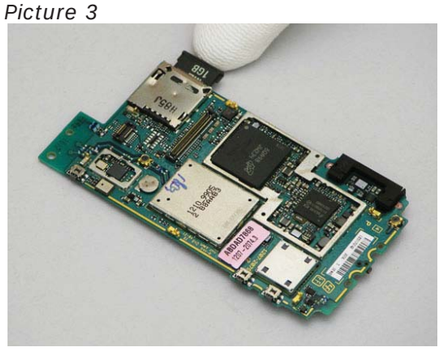
Bottom-part overview of the TRS Fixture, see picture 2.

Picture 2



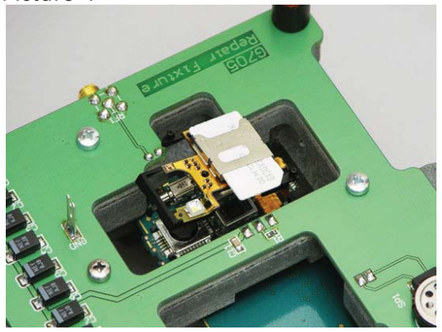
Insert Memory Card if needed according to picture 3.

Picture 3



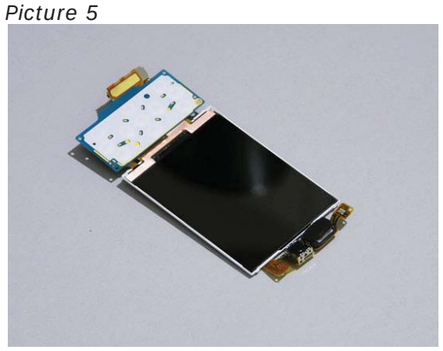
When the SIM Flex Module and SIM Card are needed then connect SIM Flex Module directly to the PBA according to picture 4.

Picture 4

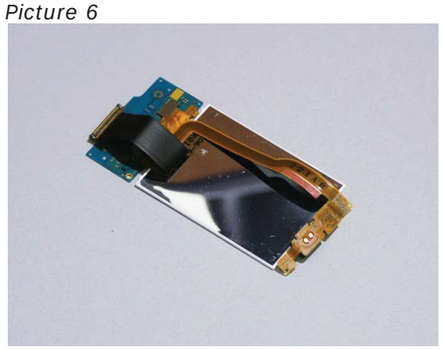


Connect Display, PBA Key Navi and Slide Flex Module according to pictures 5 and 6.

Picture 5

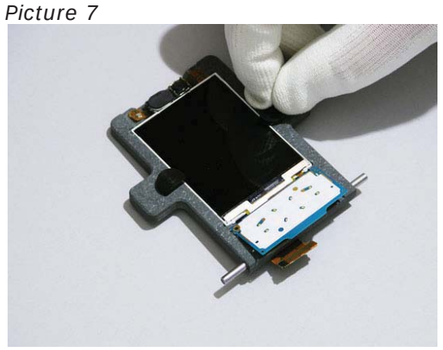


Picture 6

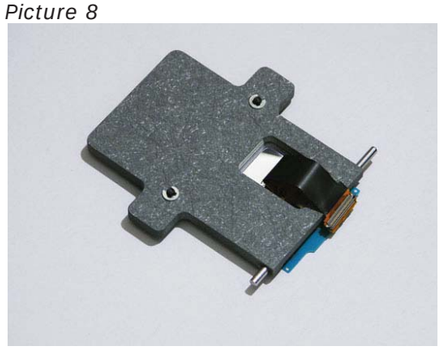


Place Display Assembly into the TRS Fixture Display Holder and secure by using the locking screws, see pictures 7 and 8.

Picture 7

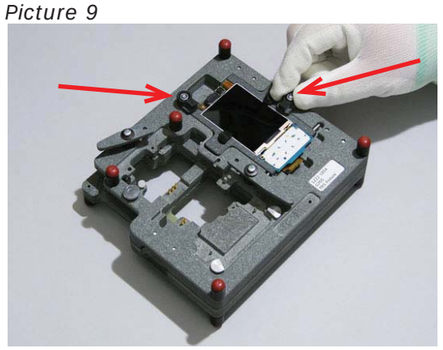


Picture 8



Place the TRS Fixture Display Holder into TRS Fixture and secure by using the locking screws according to picture 9.

Picture 9

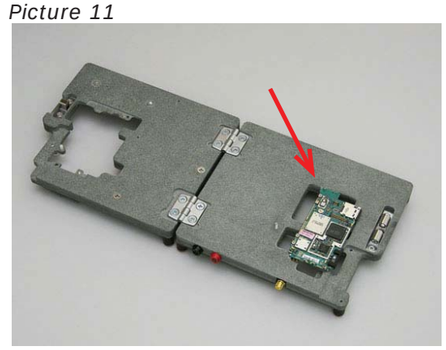


Open the TRS Fixture according to picture 10.

Picture 10

Place the PBA by using the Guide Pin mounted inside the TRS Fixture according to picture 11.

Picture 11

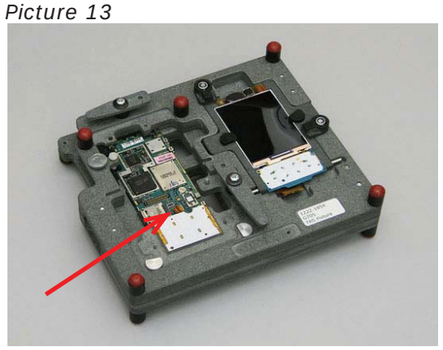


Close the TRS Fixture according to picture 12.

Picture 12

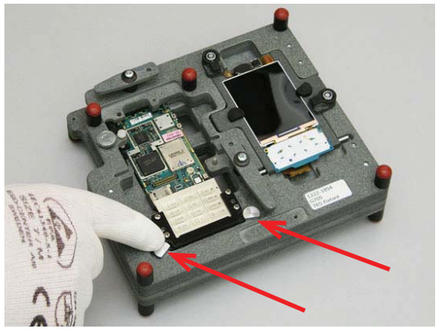
Connect the Numeric Key Flex Module directly to the PBA when Keyboard is in use according to picture 13.

Picture 13



Mount the Keypad Holder on top of the Numeric Key Flex Module and secure it by using the locking screws according to picture 14.

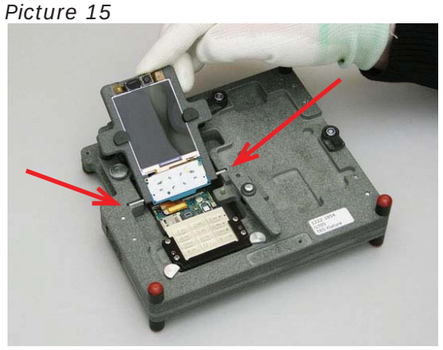
Picture 14



Note! *There is a difference between the G705 and W705, W715 Numeric Key Flex Module and the Keyboard. Make sure that the right Part is used!*

When using the Display, Navigation Keypad, Earphone or VGA Camera then use the TRS Fixture Display Holder and connect the Slider Flex Module directly to the PBA according to picture 15.

Picture 15



Connect Power Supply Channel 1 (VBATT) Black and Red Lab Plugs to the TRS Fixture according to picture 16.

Picture 16

Connect the Power Supply Channel 2 Cable (DCIO/SEPI) according to picture 17.

Picture 17

Secure the DCIO/SEPI Cable by using the locking screw according to picture 18.

Picture 18

Connect the Customized FM Radio Cable according to Step 1 and 2, see picture 19.

Step 1:
Connect the Black Lab Plug to the TRS Fixture GND input.

Step 2:
Connect the Hands-Free (PHF) connector to the Phone system connector (X2405).

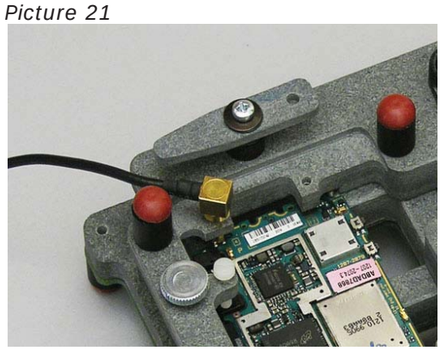
Picture 19

Connect the RF Cable Flexible to the A-GPS Antenna RF Switch on the TRS Fixture according to picture 20.

Picture 20

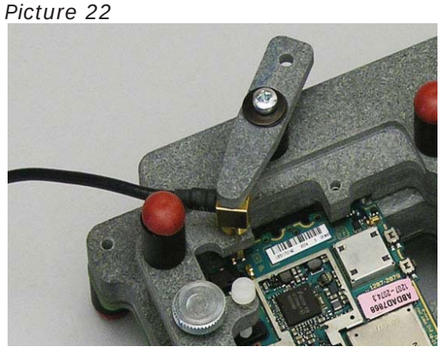
Connect SMK RF Probe to the X1500 RF Switch if needed according to picture 21.

Picture 21



Secure the SMK RF Probe with the RF Probe locking device according to picture 22.

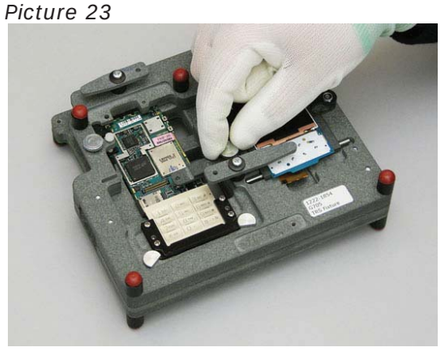
Picture 22



Connect SMK RF Probe to the X1200 RF Switch according to the following steps:

Step 1:
Connect the TRS Fixture RF Holder to the TRS Fixture according to picture 23.

Picture 23

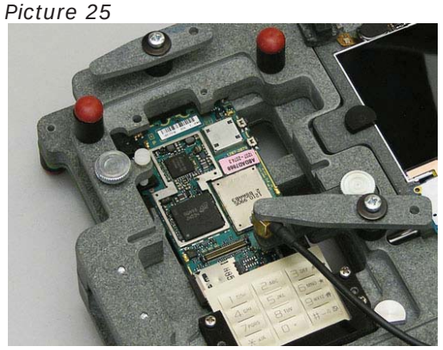


Step 2:
Connect SMK RF Probe to the X1200 RF Switch according to picture 24.

Picture 24

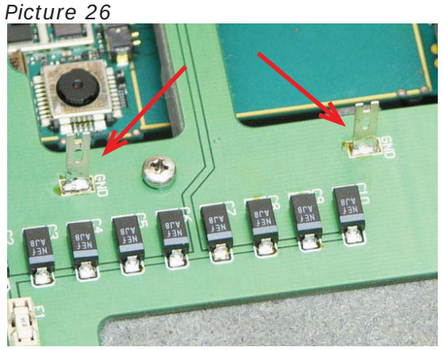
Step 3:
Secure the SMK RF Probe with the RF Probe locking device according to picture 25.

Picture 25



The PINs marked with GND on the Bottom-part of the TRS Fixture can be used as an MP TRS Fixture GND or grounding for the oscilloscope probe, see picture 26.

Picture 26



The PIN mounted inside TRS Fixture can be used as an MP TRS Fixture GND or grounding for the oscilloscope probe see picture 27.

Picture 27