

# Troubleshooting Manual

## K850



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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Revision History

Rev.	Date	Changes / Comments
1	2/14/2008	Initial revision.

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K850 Equipment List

**Note:** More additional information about the equipment used for TRS can be found in Repair Tools Catalogue on CSPN or on the following location: CSPN – Repair Instructions – Electrical – K850 – Equipment List.

TRS Fixture Kit

Location: CSPN-Repair Instructions-Electrical-K850-Equipment List

Dummy Battery

Location: CSPN-Repair Instructions-Electrical-K850-Equipment List  
Part number: 1200-0725

Instruments

Power Supply Channel 1 VBATT

Agilent 6632B or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

Instrument Settings:  
Voltage: 3.8 Volt  
Limiter: 2A

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

**Note:** 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.

**Note:** It is very important to follow instrument settings instructions when performing the Battery Calibration Test.

Power Supply Channel 2 DCIO/SEPI

Agilent 6632B or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

Instrument Settings:  
Voltage: 5.0 Volt  
Limiter: 2A

**Note:** It is very important to follow instrument setting instructions when performing the Current Calibration Test.

Oscilloscope

Tektronix TDS 2012 or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

Digital Multimeter (DMM)

Fluke 83 or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

Spectrum Analyzer

HP 8595E or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

RF probe

HP 85024A or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

Mobile Phone Tester

Yokogawa VC230 or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

FM Signal Generator

Agilent E4433B or similar  
Location: -

RF Connectors

Adaptor 33 N-BNC-50-1

Adaptor to Signal Generator RF Output  
Se Picture 1  
Location: -

Picture 1



PC Package & PC Software

PC Package (Computer)

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

### Urquell Fault Trace SW with project file

Location: CSPN-Repair Instructions-Electrical-Trouble Shooting Application  
Project File: K850Project\_R1A

### Drivers

SEPI BOX Drivers  
Location: EMMA III-Drivers-SEPI

### SE Communication Interface SEPI BOX

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: LTN 214 1484  
Se Picture 2.

Picture 2



### Cables

#### USB Computer Cable

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Se Picture 3.

Picture 3



#### DSU-60/USB Cable

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: KRY 101 1413

### RF Test Cable Flexible

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: RPM 119 885  
Se Picture 4.

Picture 4



### SEPI Interface Cable – A1

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: KRY 101 1119/1  
Se Picture 5.

Picture 5



### Power Cable RED to Power Supply Channel 1 VBATT

Maximum Length: 1m  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

### Power Cable BLACK to Power Supply Channel 1 VBATT

Maximum Length: 1m  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

### Customized Power Supply Channel 2 DCIO/SEPI Cable

To perform Current Calibration the phone must be supplied directly through the system connector.  
Customize the cable according to following instructions:



**STEP 1:**

Take the CST-75 battery charger and cut of the charger according to Picture 6.

Picture 6



**Note:** Cable length must be exact 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 Power Supply Channel 2 DCIO/SEPI according to Picture 7.

Picture 7



**STEP 3:**

Trim the flex protection material from inside of the charger plug according to Picture 8.

Picture 8



**STEP 4:**

Connect DCIO and SEPI Interface Cable – A1 cables according to Picture 9.

Picture 9



The setup in Picture 10 is WRONG!

Picture 10



**Power Supply Channel 2 DCIO/SEPI Cable Connection Setups**

Correct DCIO/SEPI Cable setup when TRS Fixture is used.

Picture 11



**Note:** Example of DCIO/SEPI and K750 TRS Fixture Setup.

Correct DCIO/SEPI Cable setup without the TRS Fixture.

Picture 12



Picture 13



### Customized FM Radio Cable

#### STEP 1:

Use Cable according to 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 ELFA part number)

#### STEP 2:

Cut the Red lab plug according to Picture 15

Picture 15



#### STEP 3:

Use any Hands free (PHF) Cable and cut according to Picture 16

Picture 16



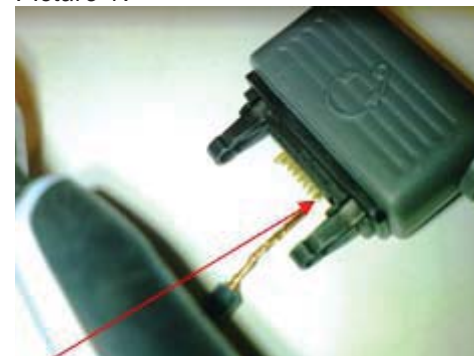
**Note:** Minimum Cable length 40 cm.

#### STEP 4:

Use only wire connected to Pin2 and cut all rest wires according to Picture 17.

Use digital multimeter instrument (DMM) and perform diode measurement to select wire connected to Pin2 at hands free system connector plug.

Picture 17



Pin2 (**Note:** Pin1 is not mounted)

#### STEP 5:

Connect by soldering cable from Picture 15 and cable from Picture 17 according to Picture 18.

Picture 18



### Test Cards

#### Dummy SIM

Customize SIM Card according to Picture 19.

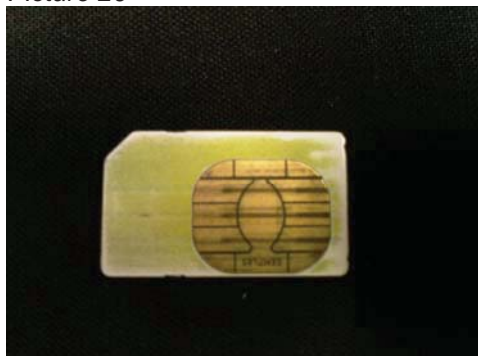
Picture 19



#### Local SIM

Any functional Local SIM Card, se Picture 20

Picture 20



#### Test SIM GSM/UMTS

One Test SIM GSM/UMTS is needed to perform Current Consumption Test, se Picture 21.  
Location: To buy a Test SIM GSM/UMTS, please contact your supplier of test equipment.

Picture 21



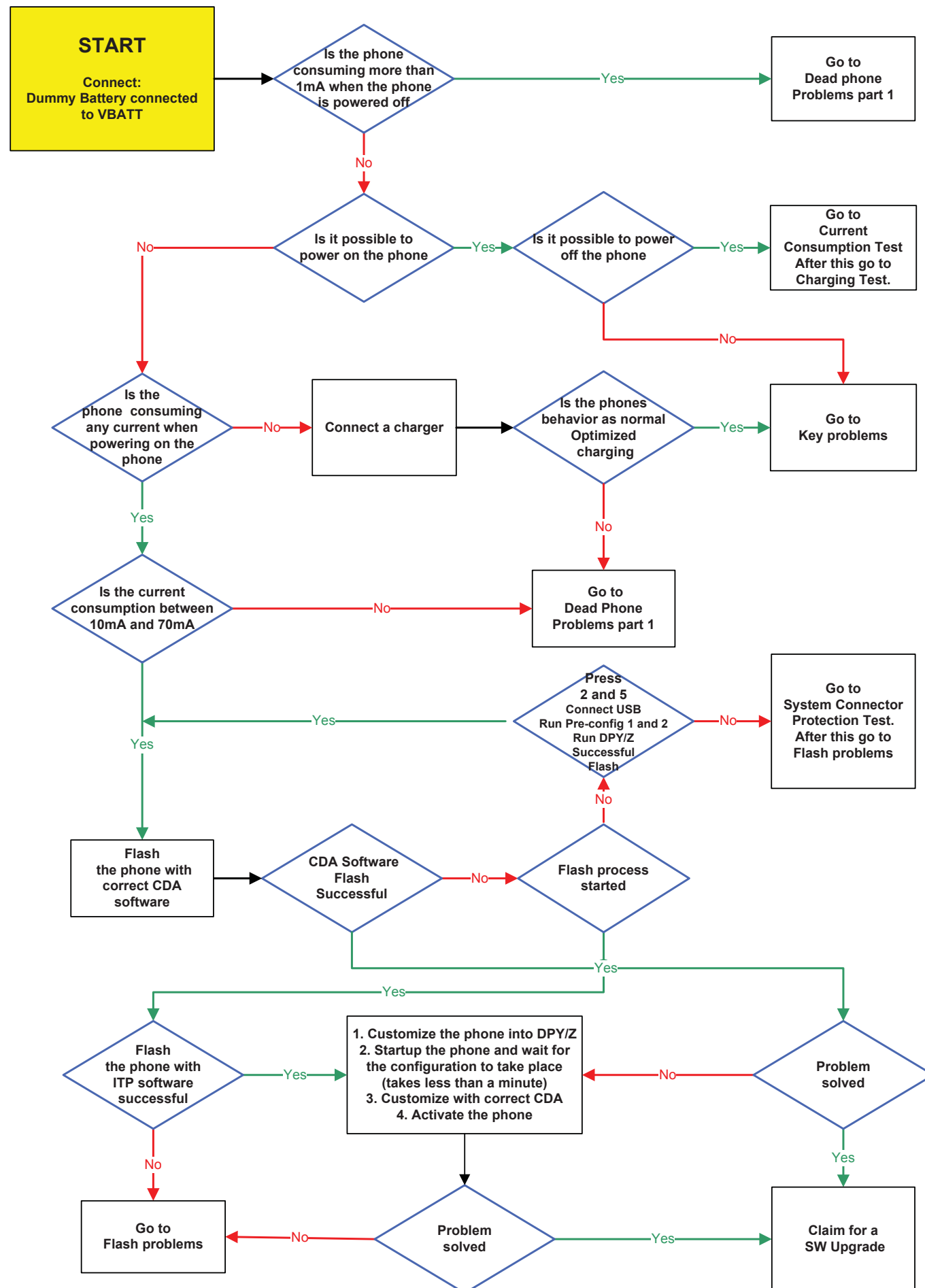
#### Sony Memory Stick Micro Card M2

Any functional Memory Stick Micro M2 Card, se Picture 22

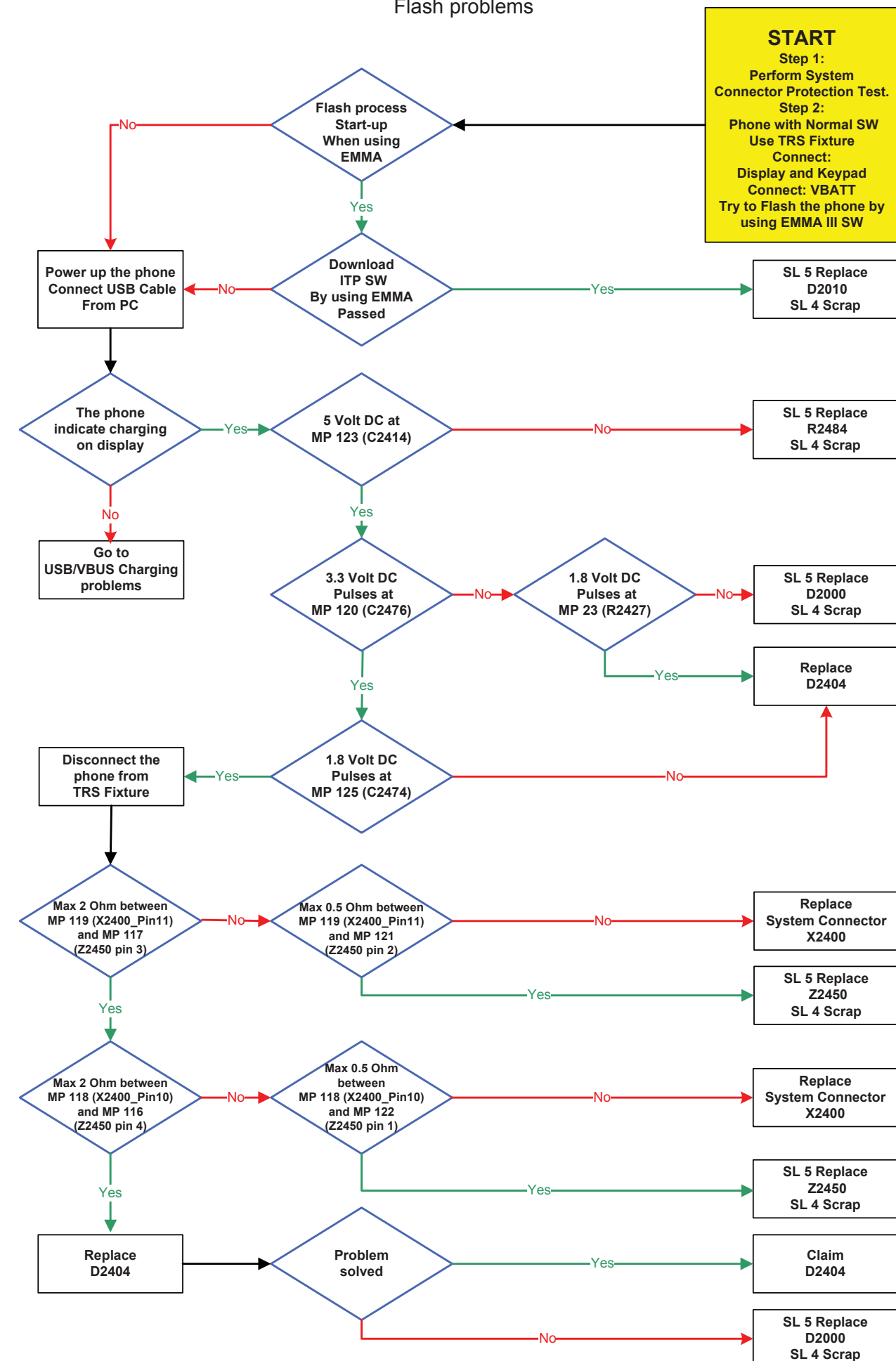
Picture 22



# On/Off problems

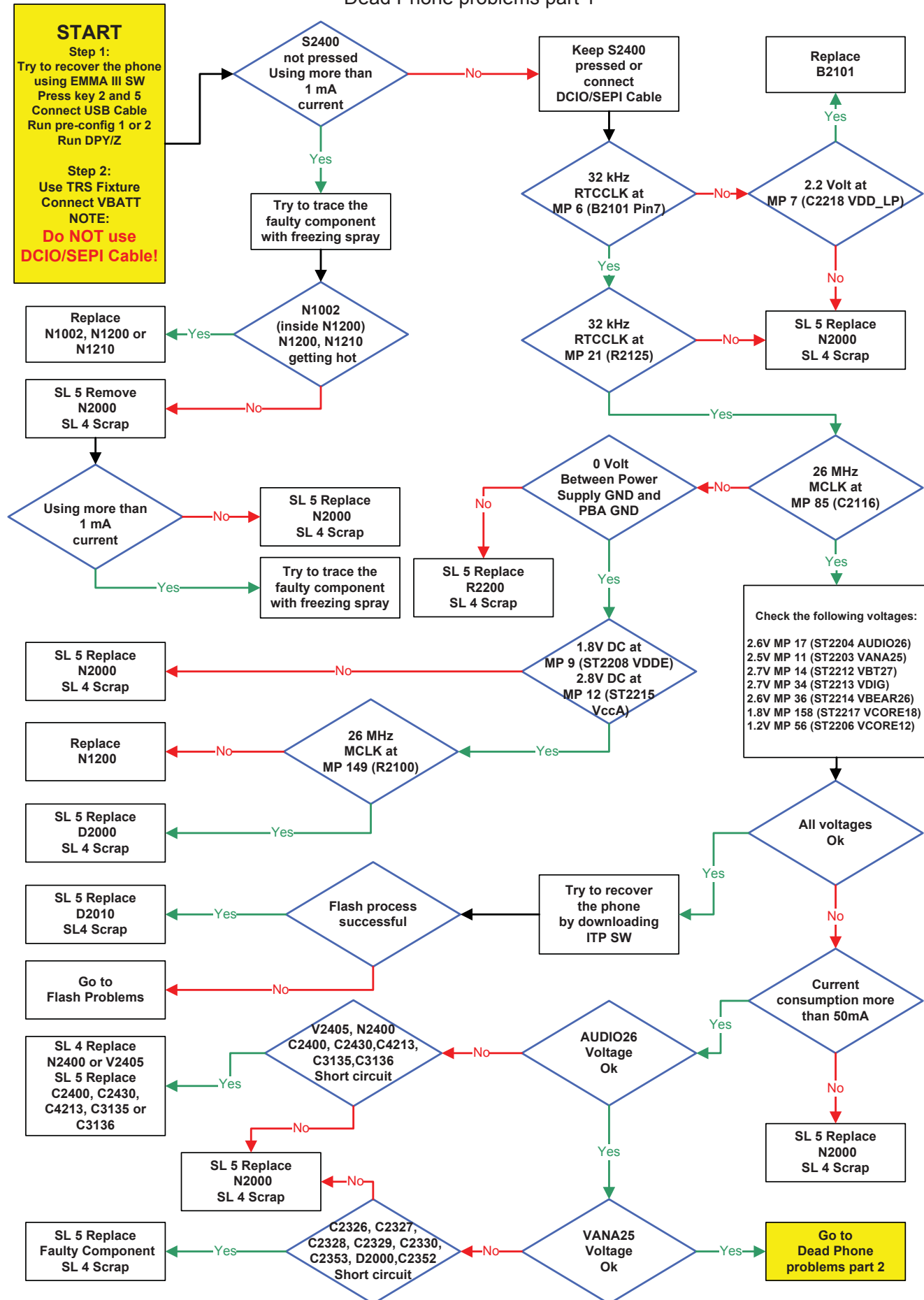


# Flash problems

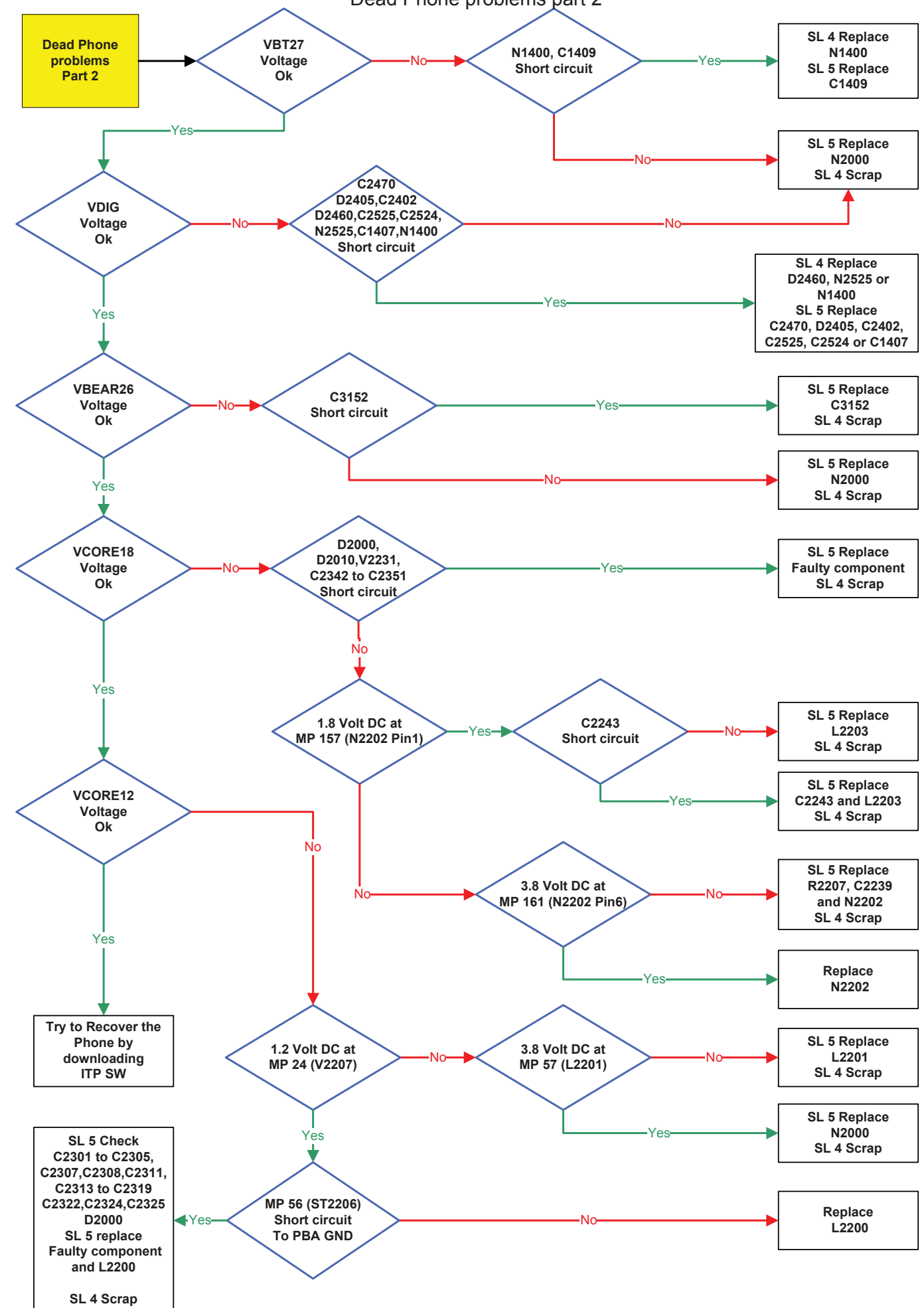




Dead Phone problems part 1

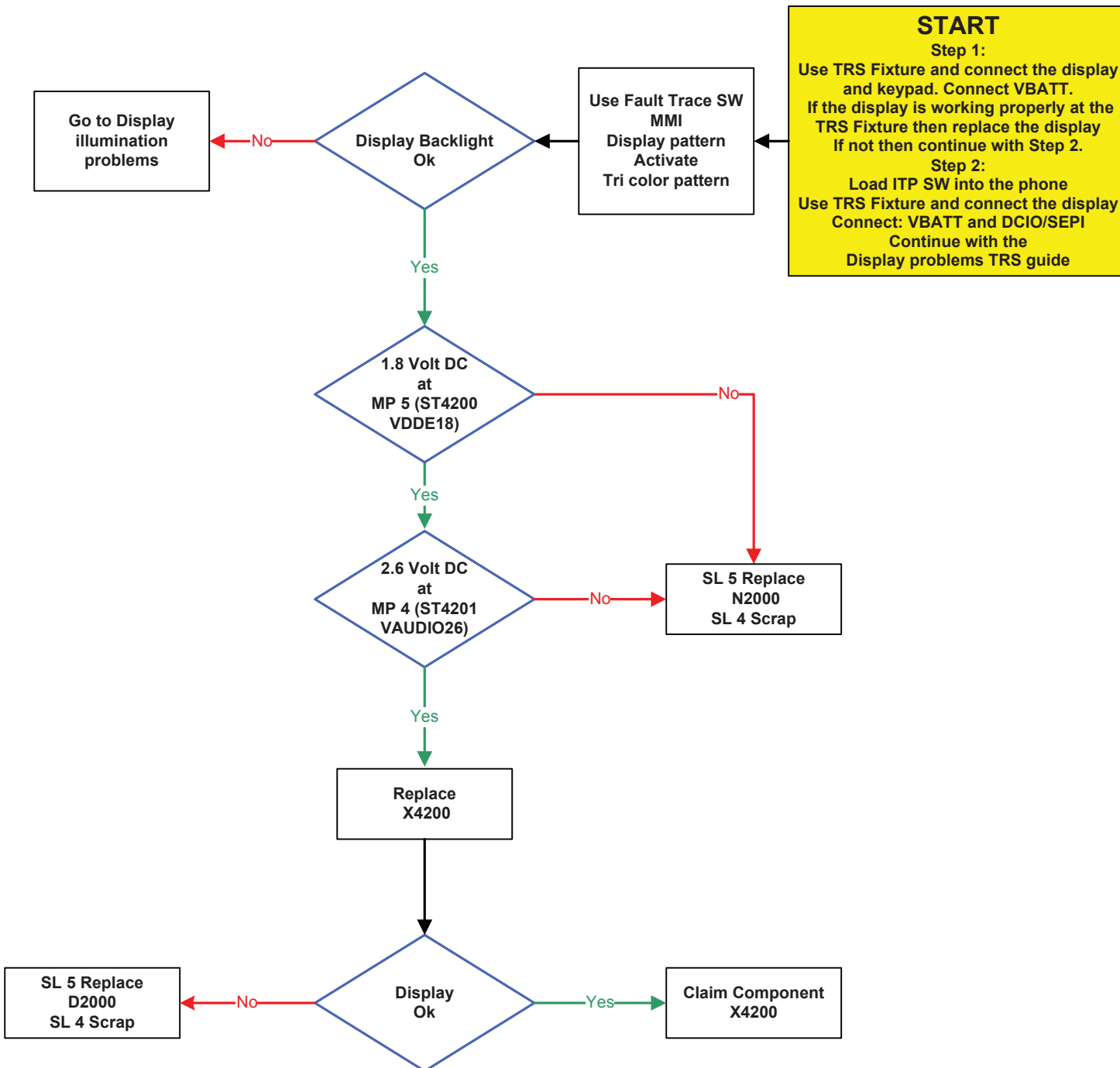


Dead Phone problems part 2

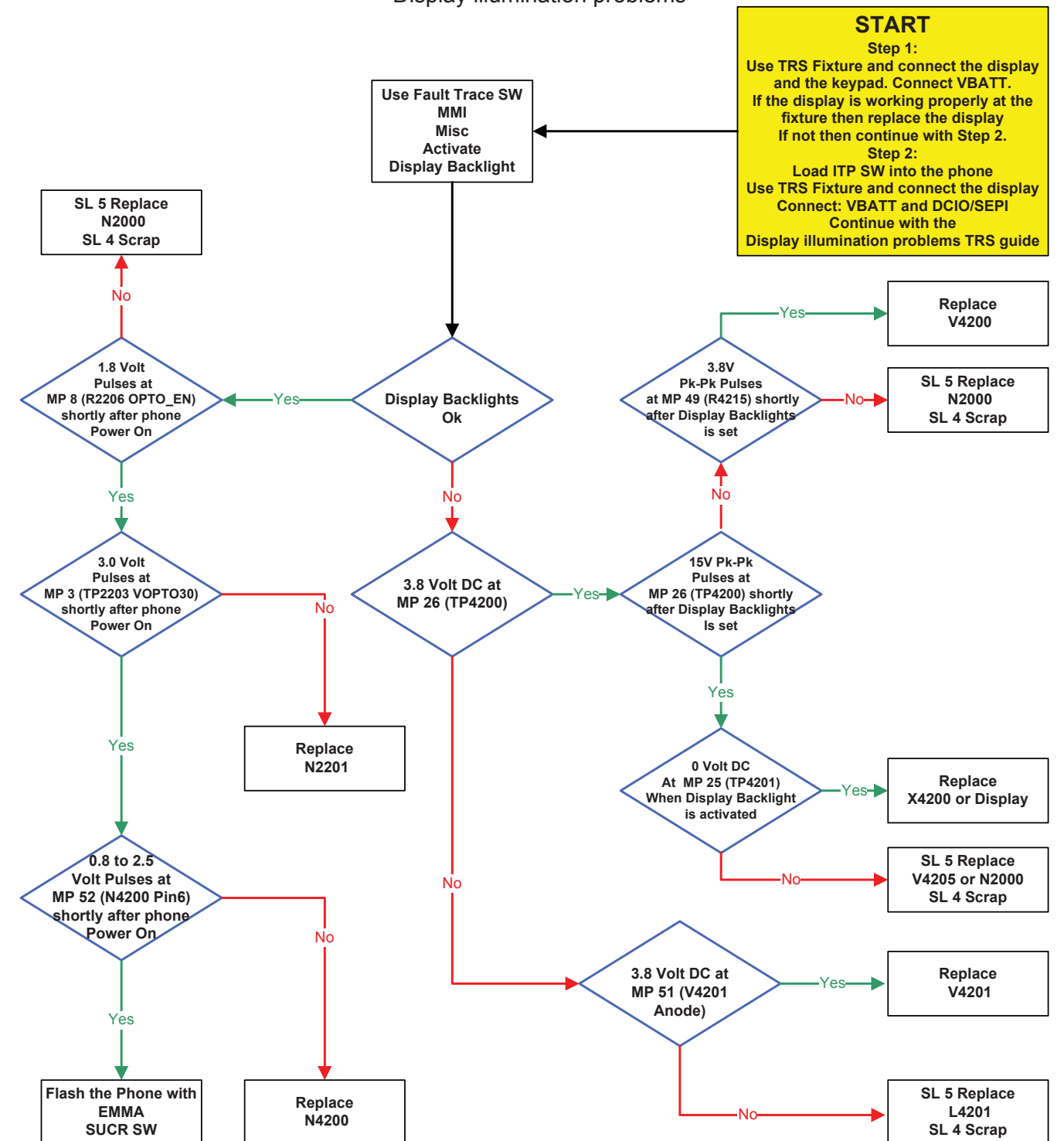




# Display problems



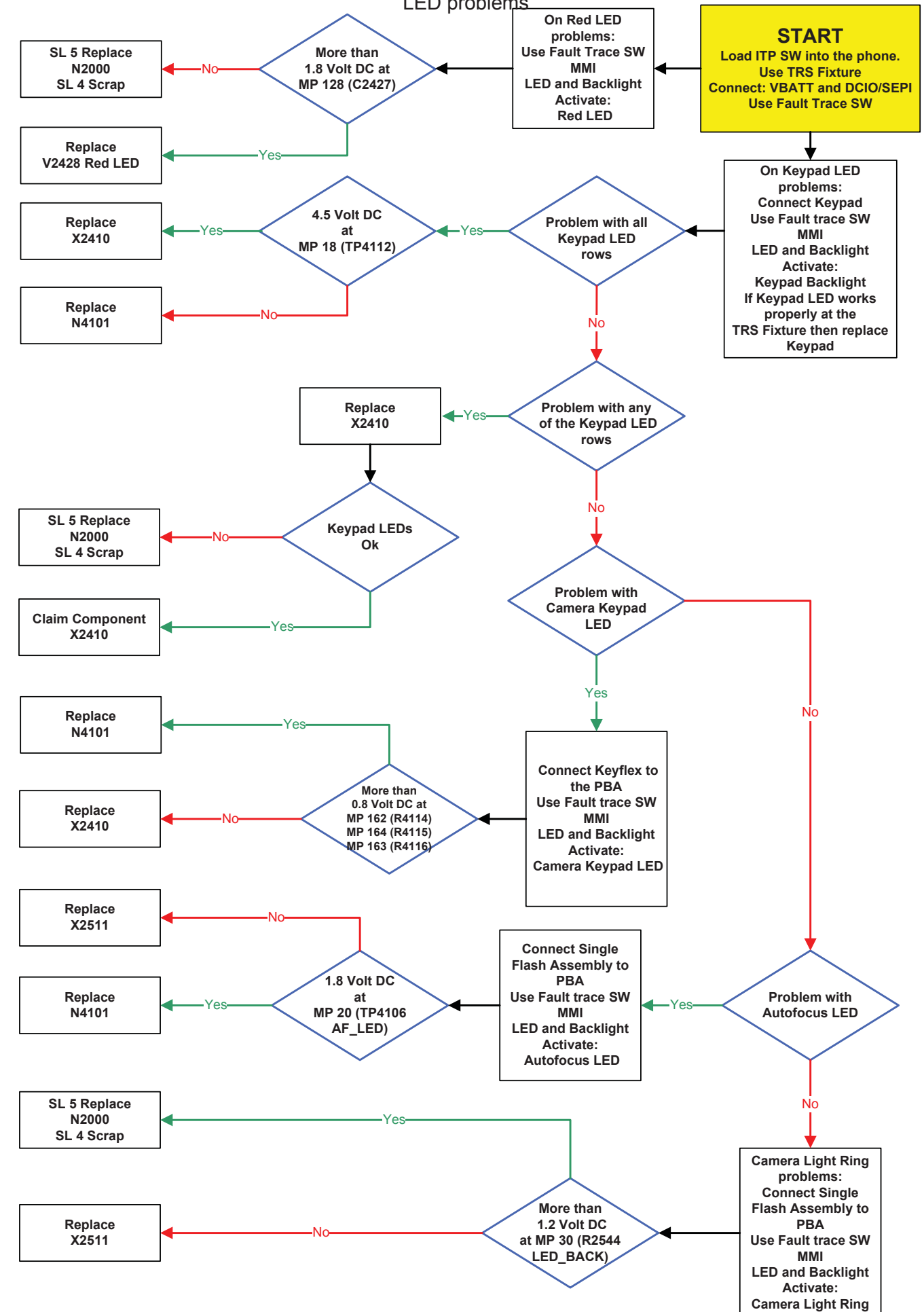
# Display illumination problems



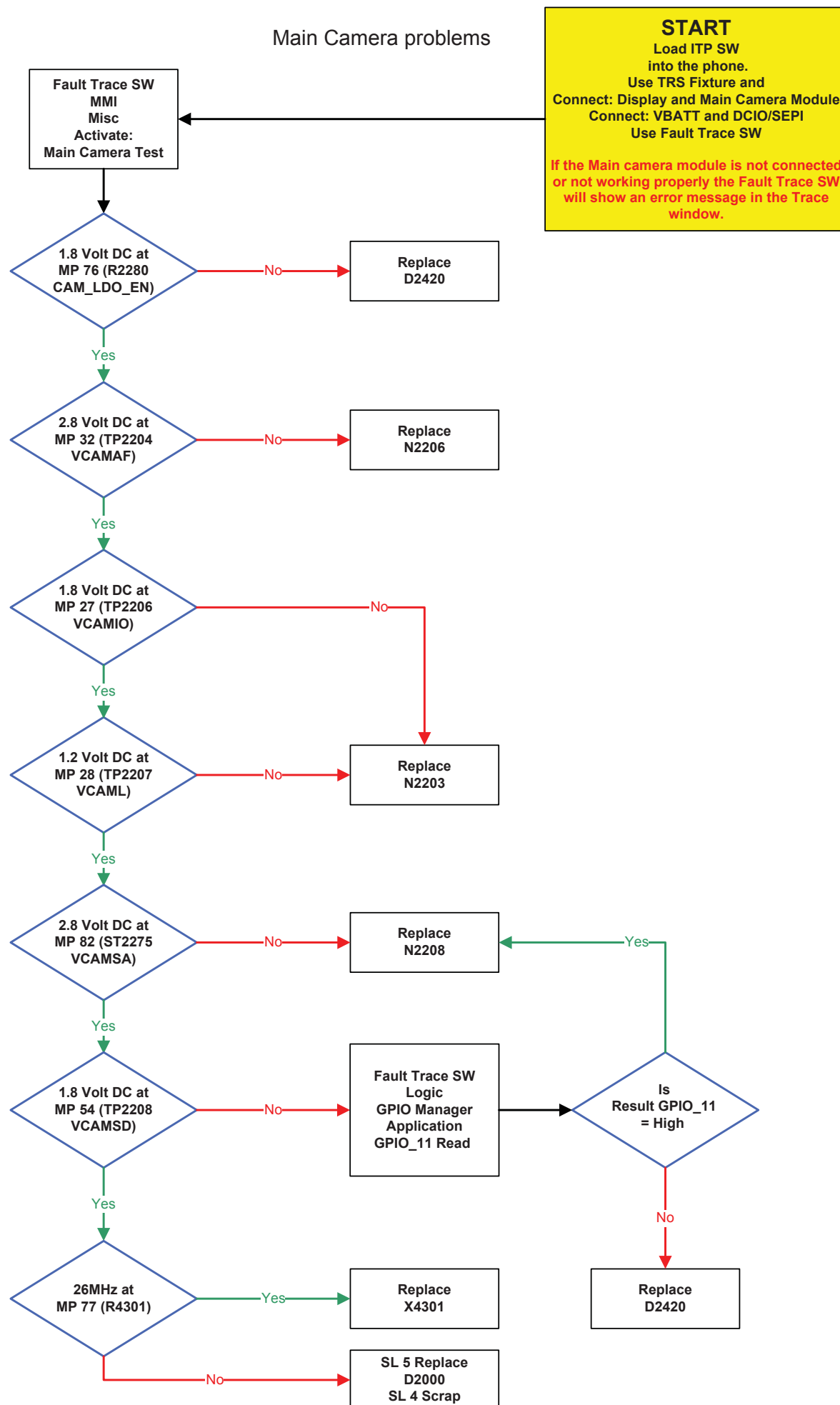
### Key problems



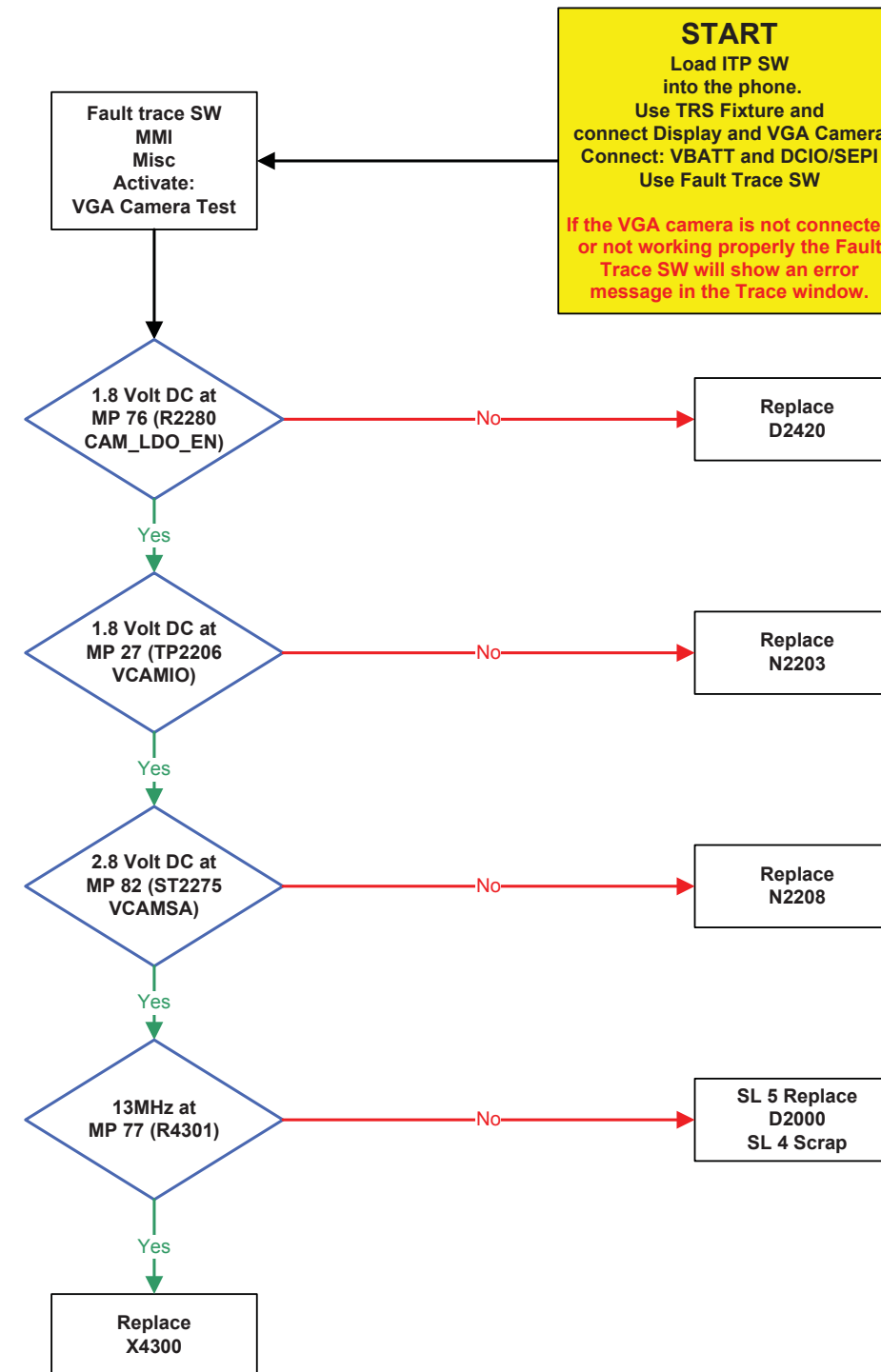
### LED problems



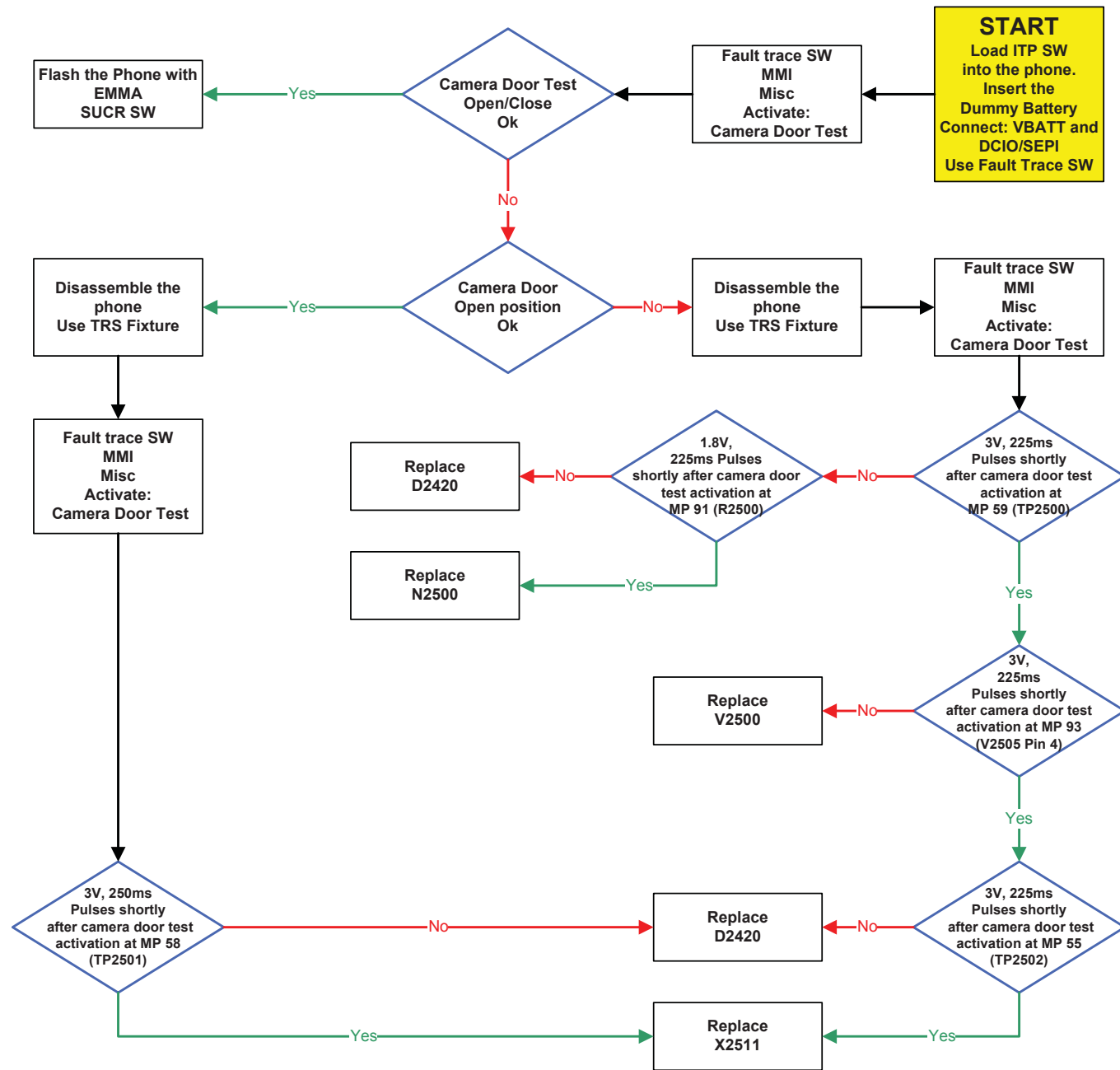
### Main Camera problems



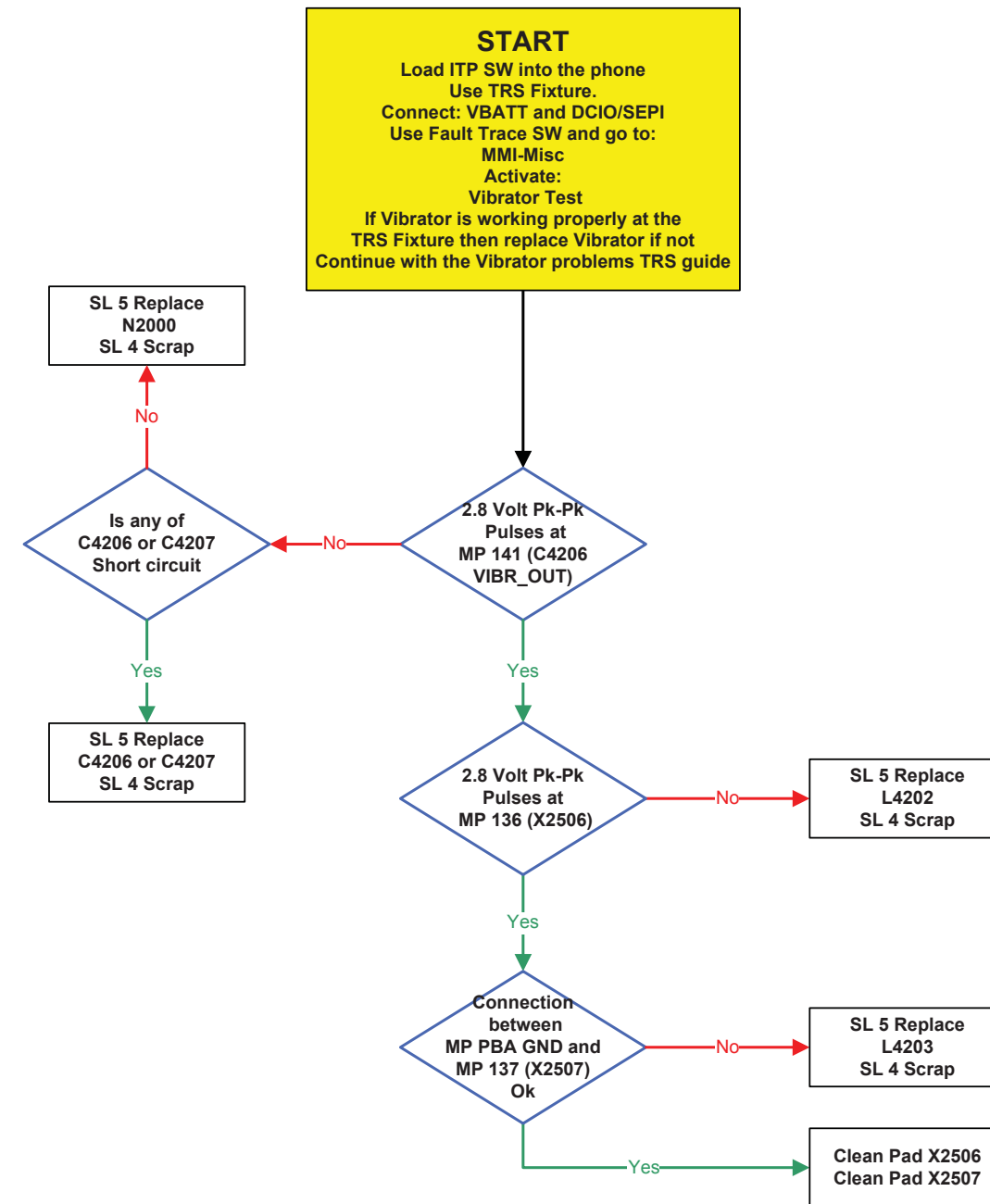
### VGA Camera problems



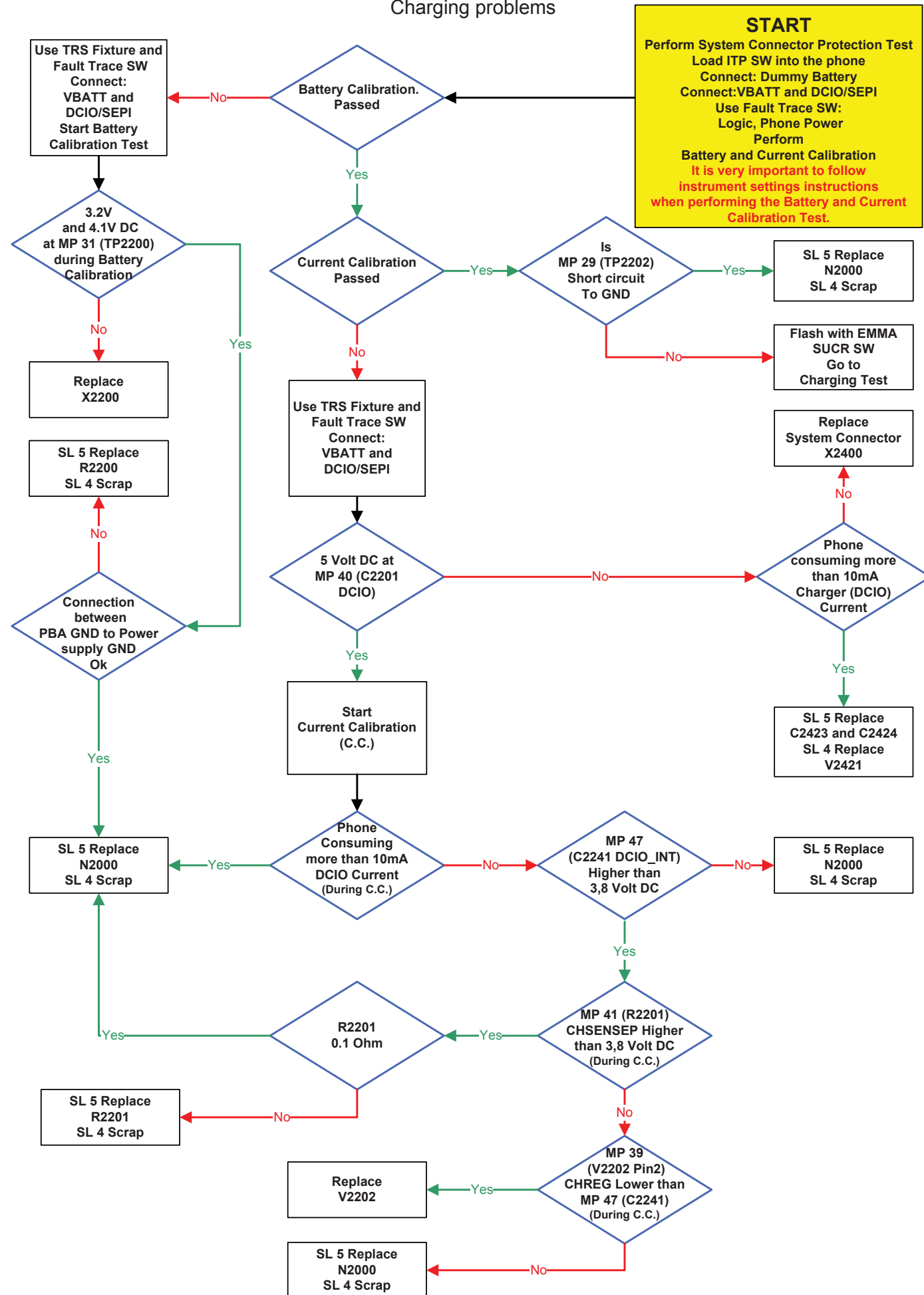
Camera Door problems



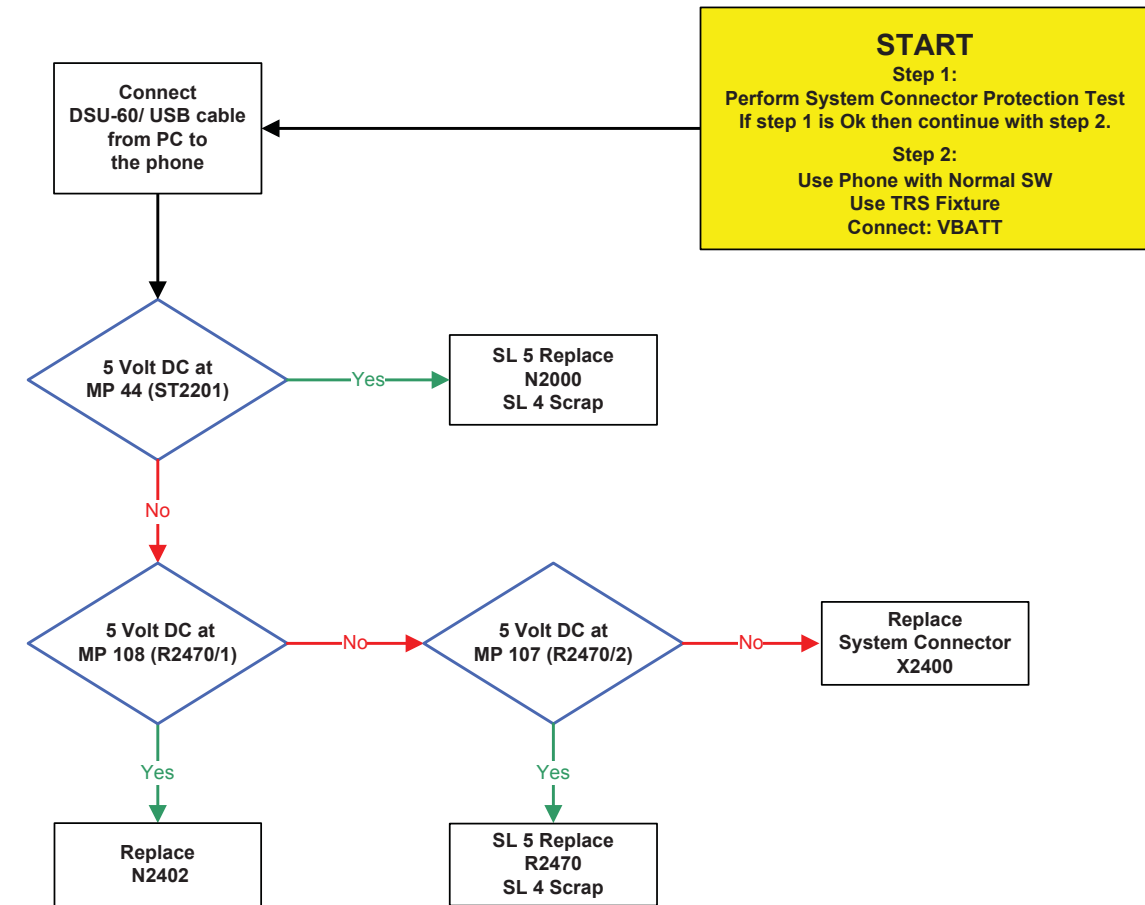
Vibrator problems



# Charging problems

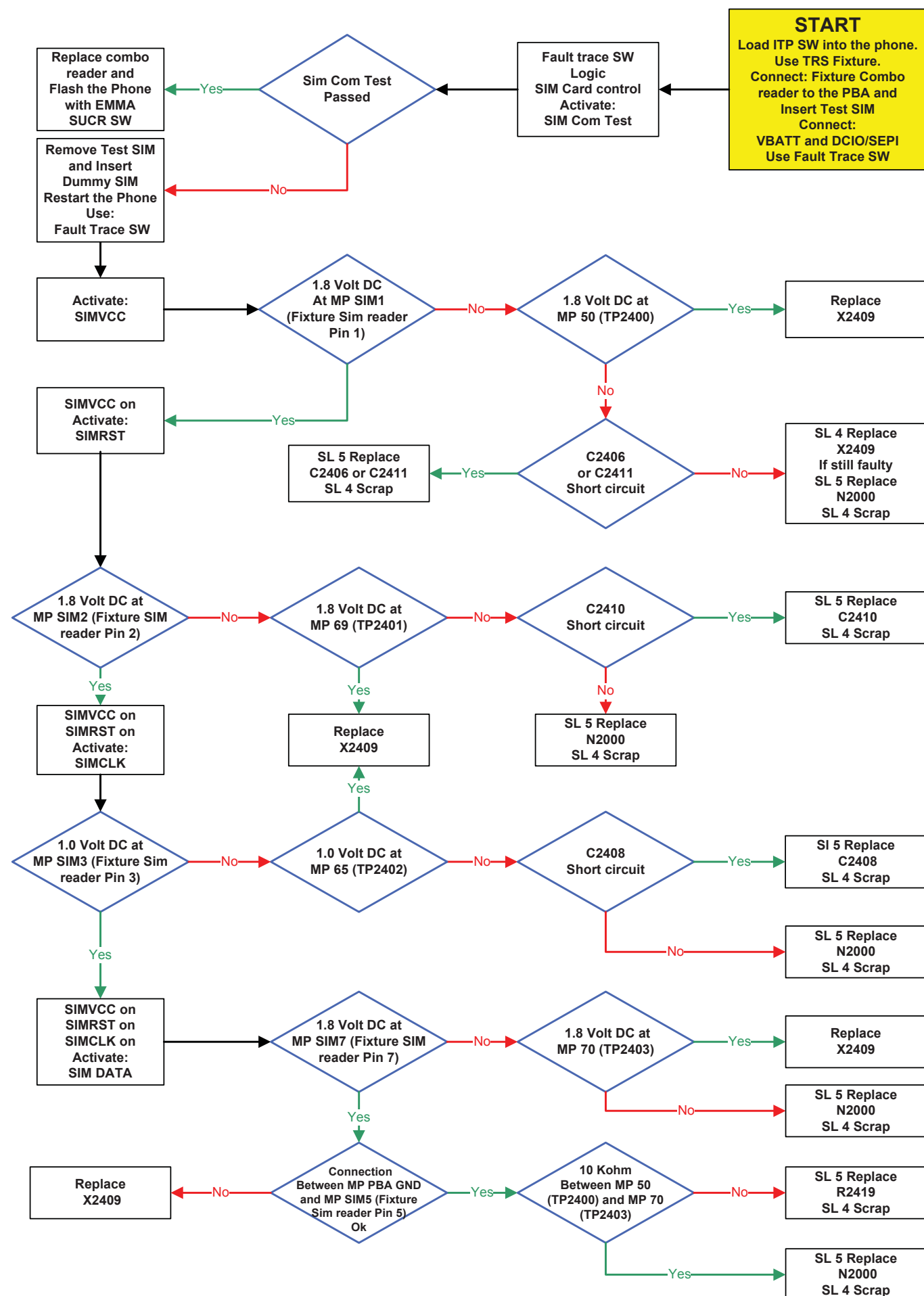


# USB/VBUS Charging problems

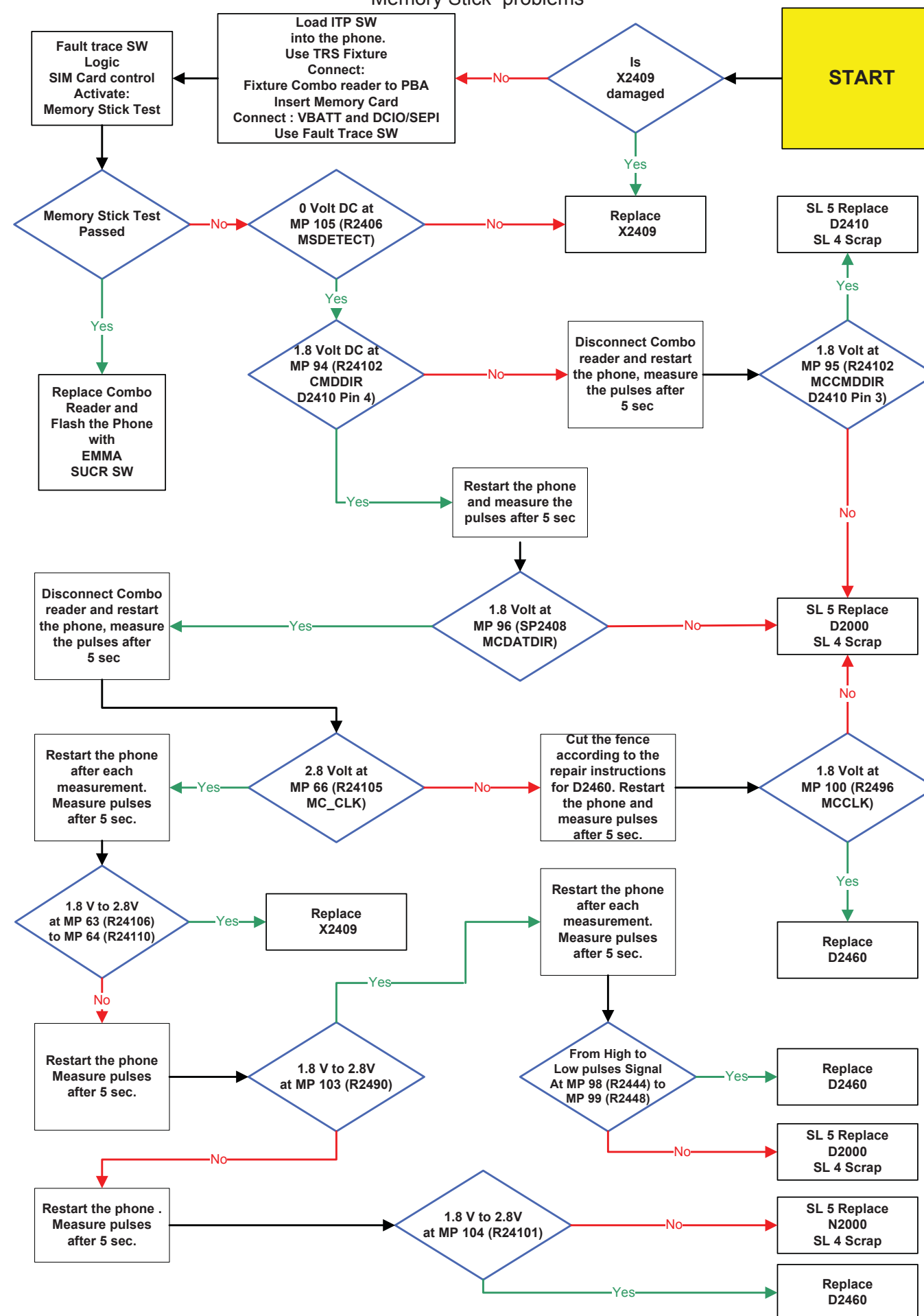




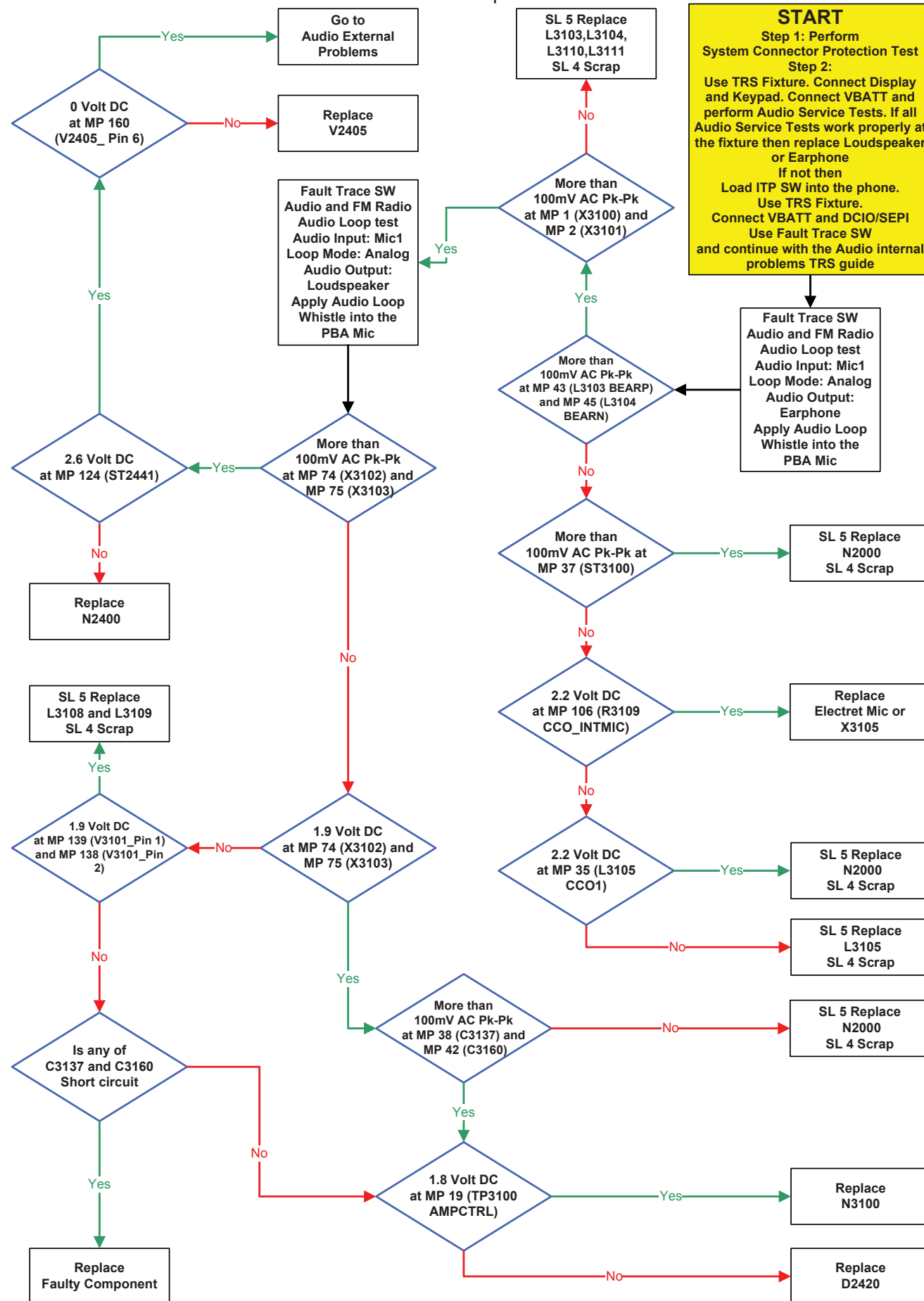
## SIM problems



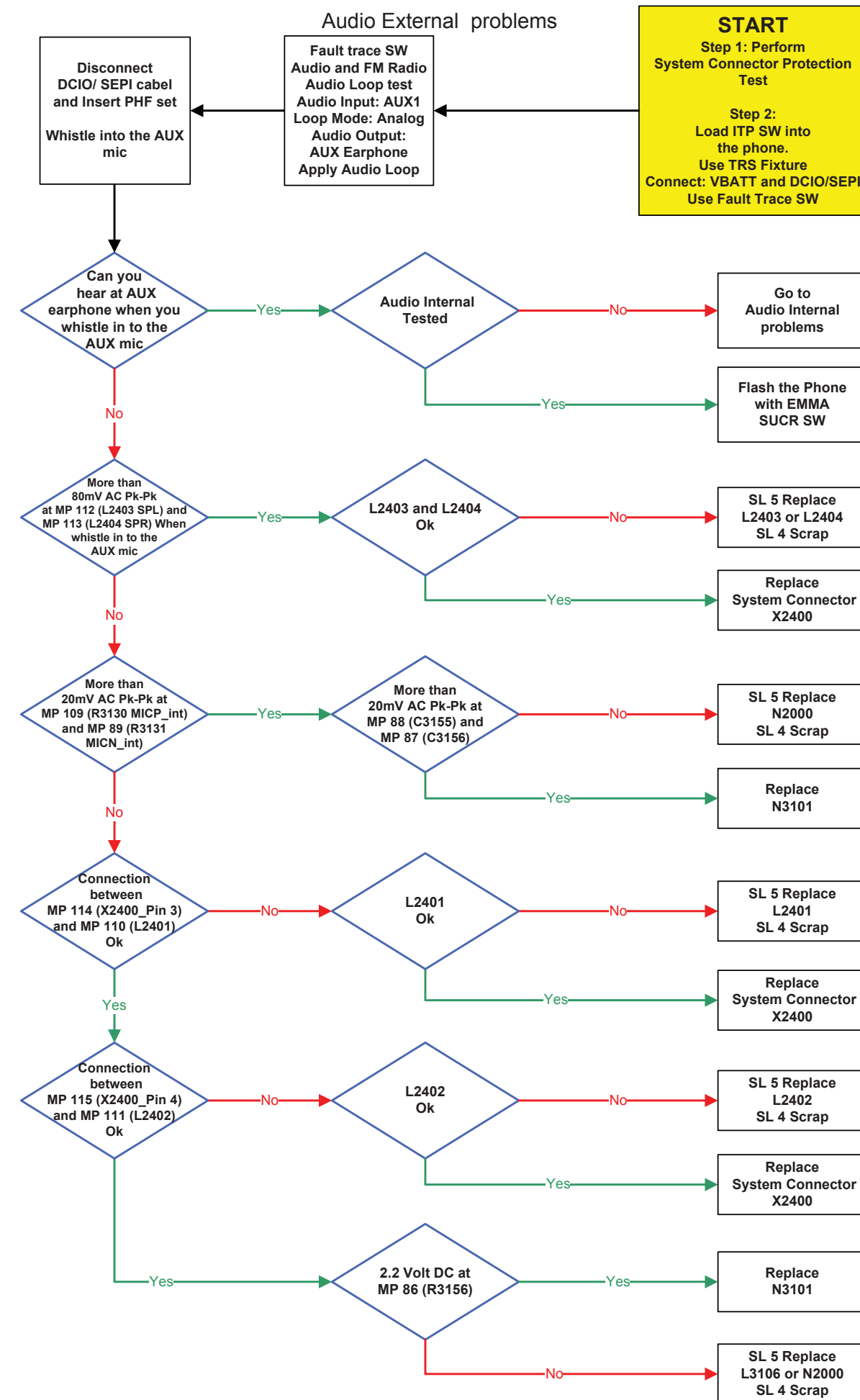
## Memory Stick problems



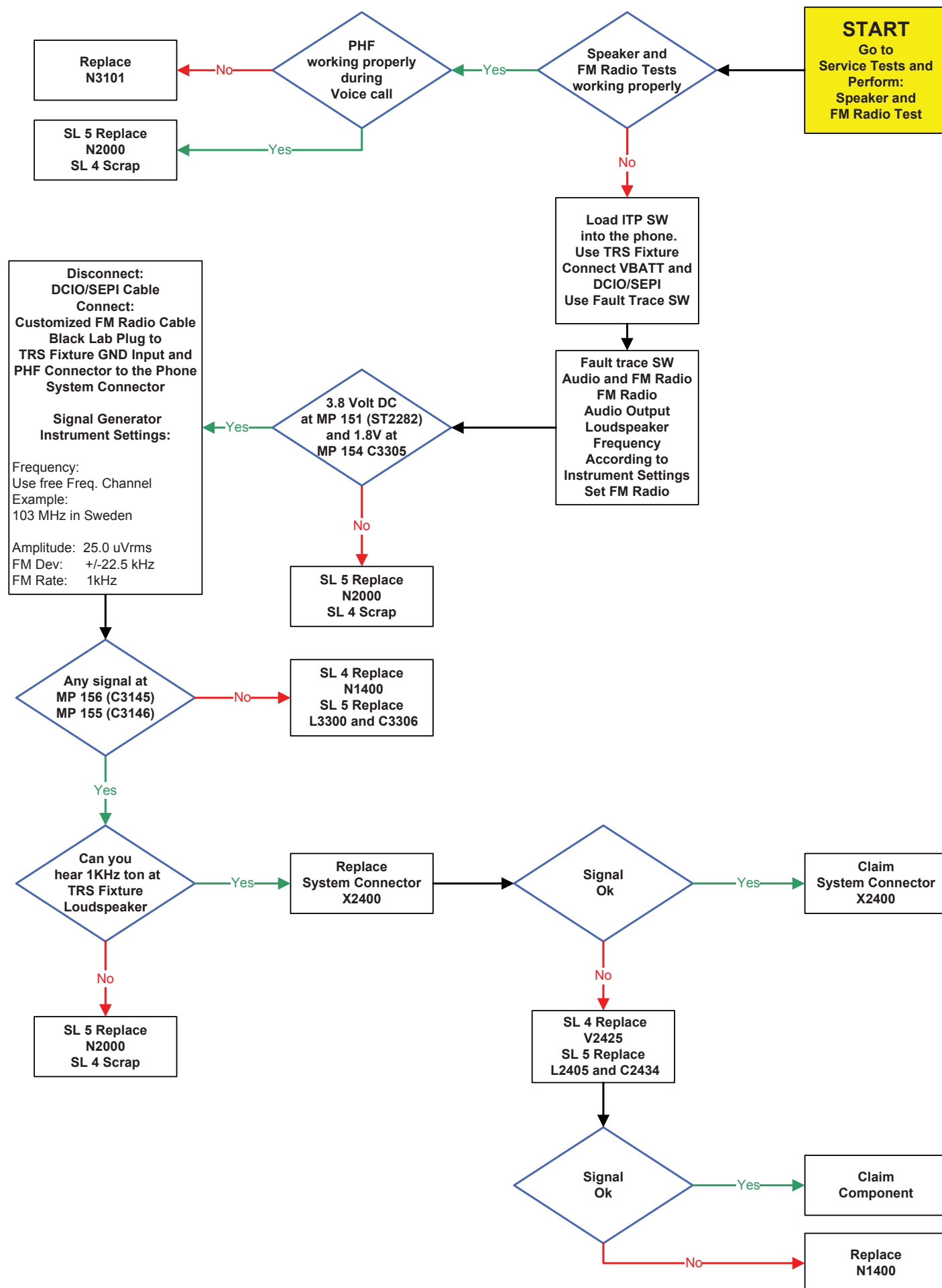
### Audio Internal problems



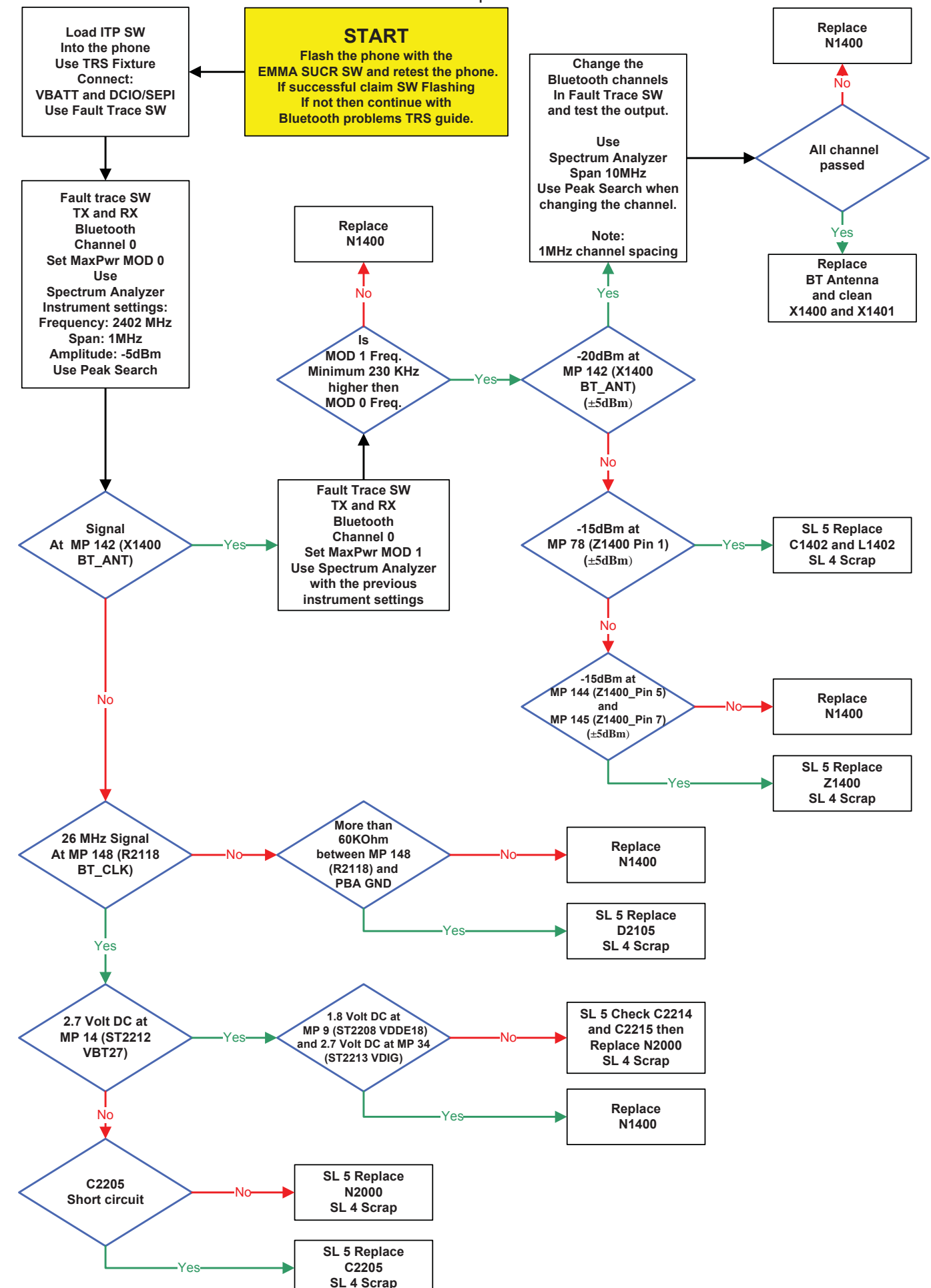
### Audio External problems



### FM Radio problems

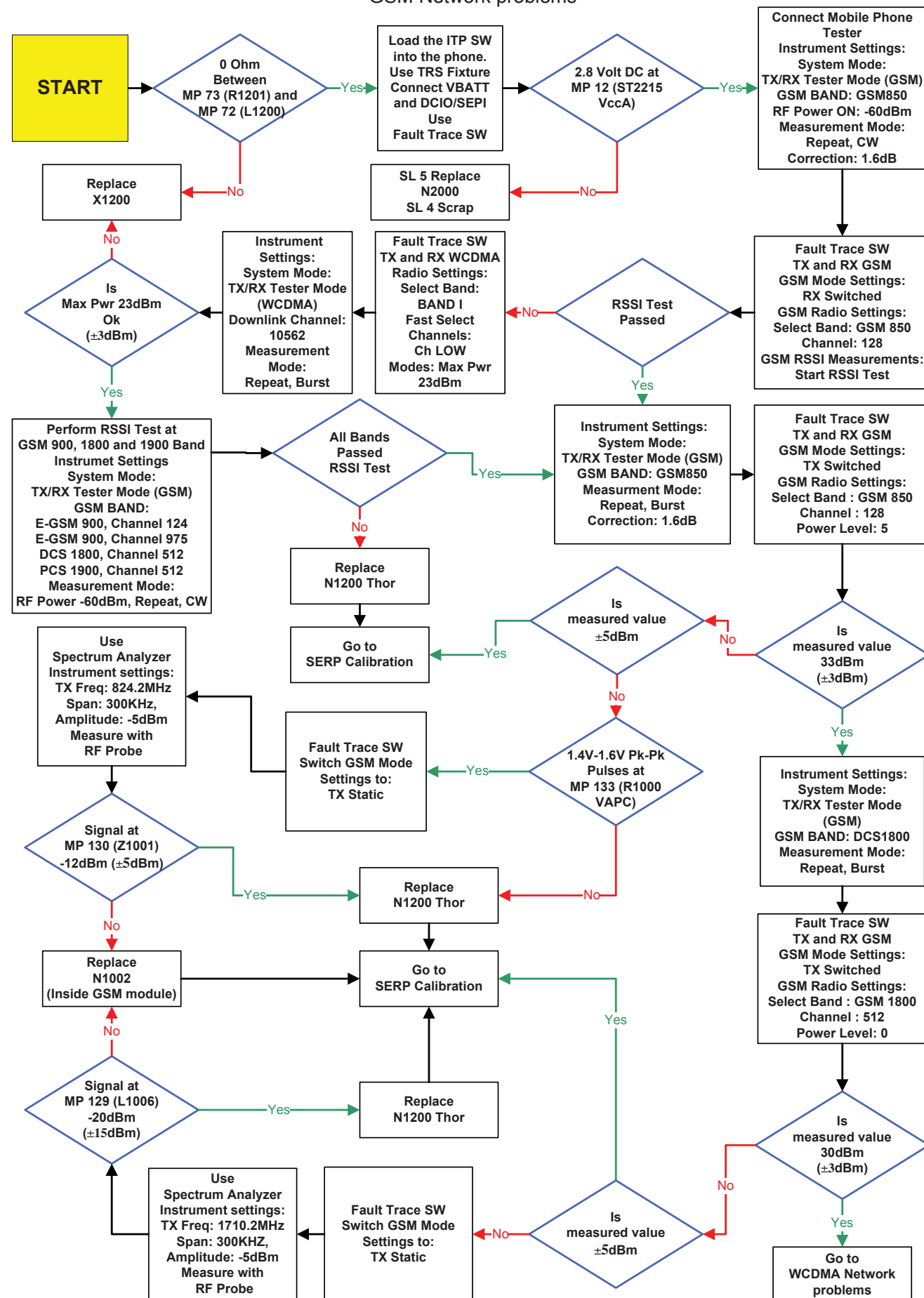


### Bluetooth problems

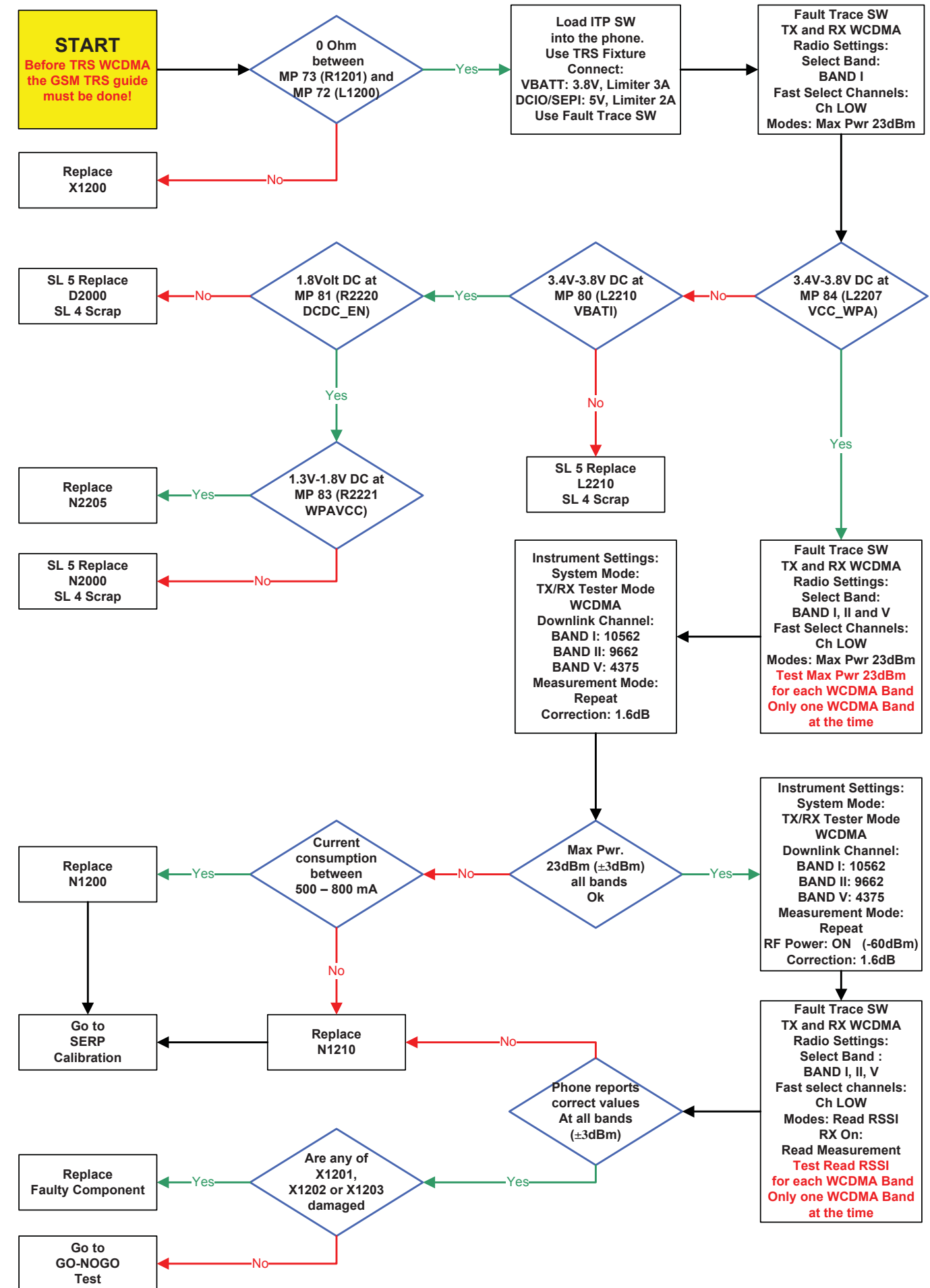




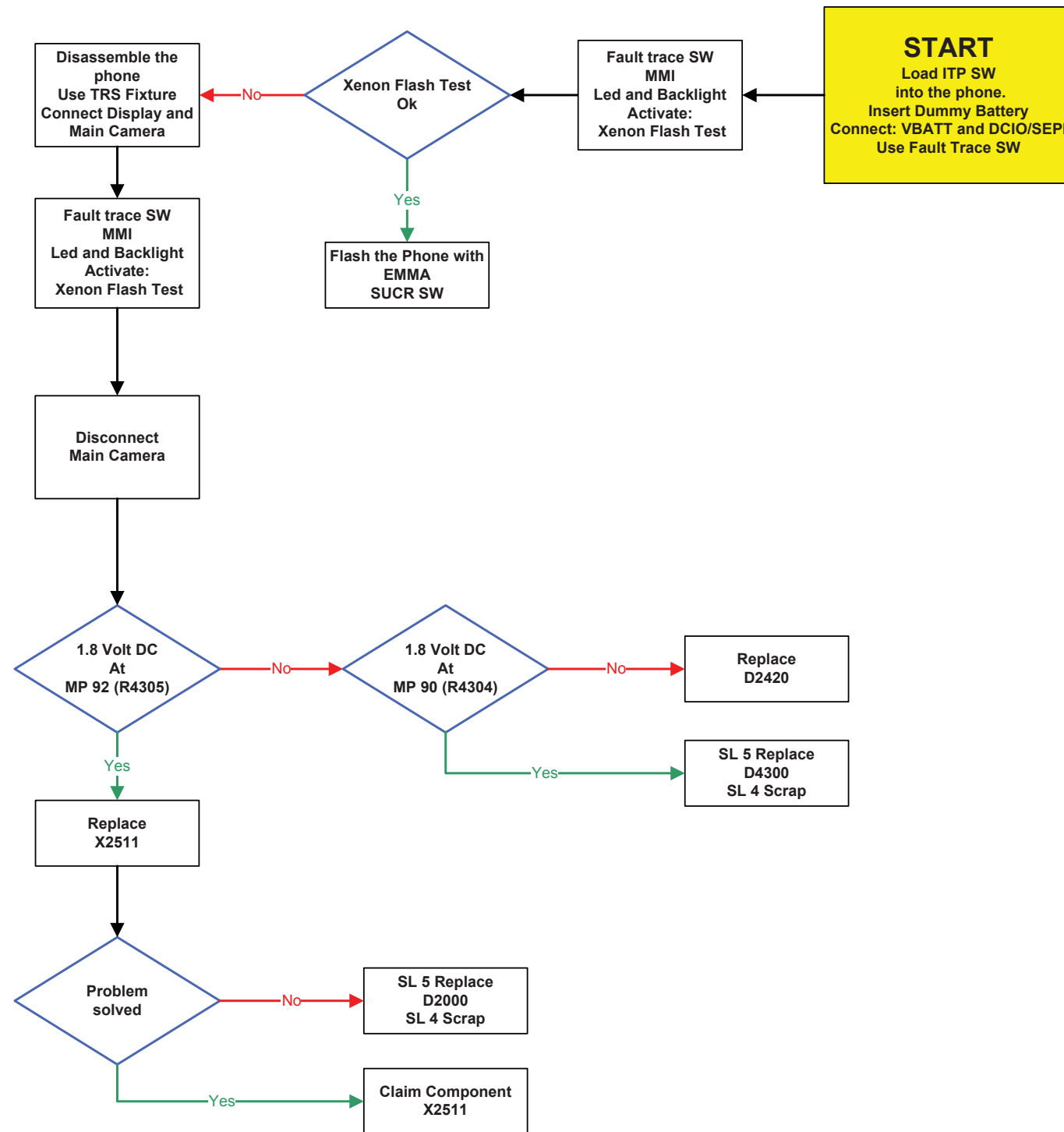
# GSM Network problems



# WCDMA Network problems



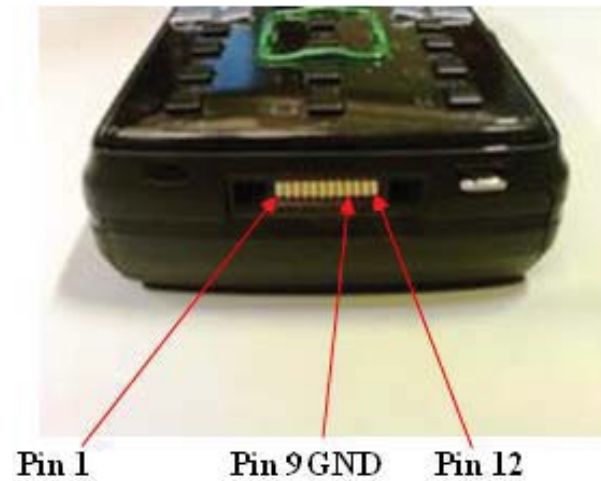
Xenon Flash problems





## System Connector Protection Test

Perform Diode and Ohm measurements with DMM  
Connect the black probe at ground (Pin 9 system connector)



Pin 1 Pin 9 GND Pin 12

Pin at X2400	Diode Measurement / Volt	Ohm Measurement / Ohm	SL 4 Action	SL 5 Action
1	0L	0L	N2402 if Not 0L	C2422 if Not 0L
2	0.0	1.4	No Action	L2405 If higher than 1.4Ω
3	2.0	12K	N3101 if lower than 12KΩ L2401 if higher than 12KΩ	C2421 If lower than 12KΩ
4	1.0	1K	N3101 if lower than 1KΩ L2402 if higher than 1KΩ	C2420 if lower than 1KΩ
5	2.0	9K	N3101 if lower than 9KΩ L2403 if higher than 9KΩ	C2416 if lower than 9KΩ
6	2.0	9K	N3101 if lower than 9KΩ L2404 if higher than 9KΩ	C2415 if lower than 9KΩ
7	0L	0L	Not connected	Not connected
8	1.4	1.5K	V2420 if lower than 1.5KΩ	R2451, R2440, R2436 if higher than 1.5KΩ
9	0	0	No Action	R2455 if Not 0Ω between X2400_Pin9 and PBA GND
10	0.7	200K-470K	N2401if lower than 200KΩ	D2450 if lower than 200KΩ R2465 if higher than 470KΩ
11	1.0	200K-470K	N2401if lower than 200KΩ	D2450 if lower than 200KΩ R2466 if higher than 470KΩ
12	0L	80K	V2421 if lower than 80KΩ	C2423, C2424 if lower than 80KΩ

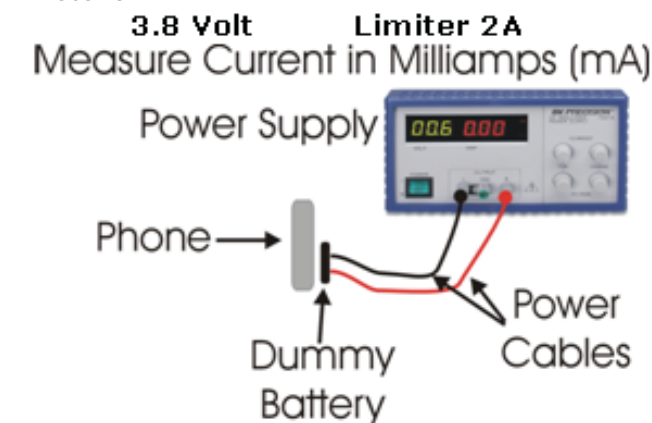
## Current Consumption Test

### Step 1:

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

Measure the current when Phone is off. Check the current consumption at Power Supply Channel 1 VBATT.

Picture 1



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:

Start the phone:

Measure the deep sleep current max 6mA typical between **0-3mA**.  
Make sure that the operator is running with deep sleep. (This operation can be switched off by operator if the network is busy).

If phone using more than 6mA, then go to EMMA III and perform Software Update Contents Refresh (SUCR).

### Step 3 with Mobile Phone Tester Instrument

Insert Test SIM Card and use the phone with the Normal SW (SSW) and dummy battery connected to Power Supply Channel 1 VBATT according to Picture 1.  
Instrument settings: Voltage: 3.8 Volt, Limiter 3A.

Use Mobile Phone Tester Instrument in signalling mode direct connected to the phone with RF Connector or use Shield Box if not possible. **Phone Display** must be **on** during these tests to get correct current measurements.

Perform Radio TX measurements at GSM and WCDMA Band and compare with limits according to text below.

- Transmitter current **850 MHz** at Ch: 128 power level 5. Typical **400mA**
- Transmitter current **900 MHz** at Ch: 1 power level 5. Typical **400mA**
- Transmitter current **1800 MHz** at Ch: 512 power level 0. Typical **400mA**
- Transmitter current **1900 MHz** at Ch: 512 power level 0. Typical **400mA**
- Transmitter current **WCDMA BAND I** Low RX Ch: 10562 at 23dBm output power. Max **750mA**

If current consumption is not correct, the fault could be fixed by running SERP calibration if not then go to **GSM and WCDMA Network problems TRS guides**.  
If the current consumptions are equal to test limits then go to **Charging Test**.

#### Step 4 with Fault Trace SW application:

- Flash the phone with ITP SW
- Use TRS Fixture
- Connect the:

Power Supply Channel 1 VBATT:  
Instrument settings: Voltage: 3.8 Volt, Limiter 3A

Power Supply Channel 2 DCIO/SEPI  
Instrument settings: Voltage: 5 Volt, Limiter 2A

- Connect DCIO/SEPI Cable to the phone

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

- **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

- **Max TX Power GSM 1800 MHz**

Fault Trace SW settings:

TX and RX GSM  
GSM Mode Settings:  
TX Switched  
GSM Radio Settings:  
Select Band: GSM 900  
Channel: 512  
Power Level: 0

- **Max TX Power GSM 1900 MHz**

Fault Trace SW settings:

TX and RX GSM  
GSM Mode Settings:  
TX Switched  
GSM Radio Settings:  
Select Band: GSM 900  
Channel: 512  
Power Level: 0

- **Max TX Power WCDMA BAND I**

Fault Trace SW settings:

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

Compare current consumption during Max TX Power Tests with the current consumption limits below.

- Transmitter current **850 MHz** at Ch: 128 power level 5. Typical **255mA**
- Transmitter current **900 MHz** at Ch: 1 power level 5. Typical **240mA**
- Transmitter current **1800 MHz** at Ch: 512 power level 0. Typical **200mA**
- Transmitter current **1900 MHz** at Ch: 512 power level 0. Typical **220mA**
- Transmitter current in **WCDMA BAND I** Low RX Ch: 10562 mode at max power level 23 dBm and Rx on. Typical **600mA**

**Tolerance: ±10%**

If current consumption is not correct, the fault could be fixed by running SERP calibration if not then go to **GSM and WCDMA Network problems TRS guides**.

If the current consumptions are equal to the sheet then go to **Charging Test**.

## Battery and Current Calibration Test

### Instrument settings for the Battery Calibration Test

#### Power Supply Channel 1 VBATT:

X Volt according to the Fault Trace SW Test Instructions:

Fault Trace SW-Logic-Phone Power-Battery Calibration and follow test instructions.  
Limiter: 2A.

If test is performed at the Core Level then use dummy battery according to the K850 Equipment List for this test. If using TRS Fixture no dummy battery is needed.

**Note:** Maximal cable length between Power Supply Channel 1 VBATT and the dummy battery or TRS Fixture must be 1m. The cable must have a capacity for at least 16A.

Limits Table for the Battery Calibration Test

Voltage Level on VBATT	Min	Max	UNIT
3.2 Volt	202	338	mV
3.2 Volt	CA	152	HEX
4.1 Volt	743	886	mV
4.1 Volt	2E7	376	HEX

### Instrument settings for the Current Calibration Test

If test is performed at the Core Level then use dummy battery according to the K850 Equipment List for this test. If using TRS Fixture no dummy battery is needed.

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

**Note:** Maximal cable length between Power Supply Channel 1 VBATT and the dummy battery or TRS Fixture must be 1m. The cable must have a capacity for at least 16A.

**Note:** Length of the Power Supply Channel 2 DCIO/SEPI customized cable must be exact 1,3m.

#### Power Supply Channel 1 VBATT:

3.8 Volt

Limiter 2A

#### Power Supply Channel 2 DCIO/SEPI:

5.0 Volt

Limiter: 2A

Limits Table for the Current Calibration Test

Measured Current	Name	Min	Max	Unit
100mA	DCIO Current	50	150	mA
800mA	DCIO Current	725	875	mA

## 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 preformed in 3 steps:

#### Step1:

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

#### Step2:

This step should be done **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:

	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.

If the readings is out of limits replace **C2217** Backup capacitor.

If problem is not solved then SL 5 Replace N2000 SL 4 Scrap.

## Test Charging

To perform this test use:

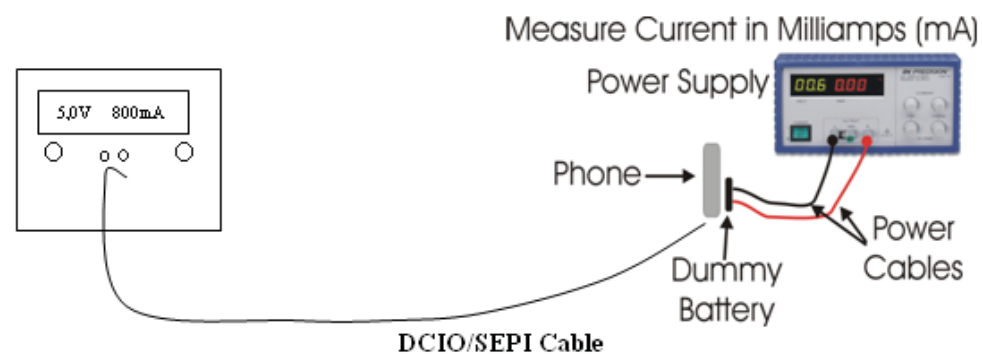
- Phone with the Normal SW (SSW)
- Dummy Battery connected to Power Supply Channel 1 VBATT
- Power Supply Channel 1 VBATT instrument settings:  
Voltage: 3.0 to 4.2 Volts, according to VBATT row in the Reference Table.  
Limiter: 2A
- Power Supply Channel 2 DCIO/SEPI instrument settings:  
Voltage: 5V  
Limiter: 2A

Test instructions:

- Disconnect the DCIO/SEPI Cable between each measurement and wait phone to shutdown when changing VBATT voltage.
- Take a note of Current measurements at Power Supply Channel 2 DCIO/SEPI and Display charging indicator status, X seconds after DCIO/SEPI cable has been inserted according to Test Time row in the reference table below.
- Compare test results with 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	25s	25s	25s	25s	25s	25s	25s	25s	35s
DCIO/SEPI Current mA	200	200	200-400	200	200	200	200	750	750	750	650	380	0
Display indicate charging	Nothing	Nothing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Fully Charged



**Power Supply Channel 1 VBATT must allow reverse current.**

If the charging current is **Not** equal to the reference table 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

Purpose with this test is to check following items:

- that ASIC-s Revision State is correct
- Check if communication to and from the ASIC-s is Ok

The following ASIC-s is tested:

- D2000 (Anja)
- N2000 (Vera)
- N1400 (Bluetooth and FM Radio ASIC)
- N2525 (Accelerometer)
- Touchpad ASIC

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 choose General – Asic Revisions – Read All

Reference returned value can be found in the table below.

ASIC	Description	Product number	Return value (hex)
D2000	Anja	1200-0795	0x2C8
N2000	Vera	1000-8142	0xC5
N1400	Bluetooth: Firmware Revision Chip ID	1200-6182	0x5,0x1 0x0,0x0,0x0,0x0 Will always return 0 on STLC because Chip ID is not supported.
N1400	FM Radio	1200-6182	0x800
N2525	Accelerometer	1200-1223	0x3B
Touchpad ASIC	Touchpad	1200-1603	0x1975 Will always return 0xFFFF on PBA level



#### Voltages to N2000

MP	MP PBA GND	MP 79 (X2200 Pin 3)	MP 31 (TP2200)	MP 29 (TP2202)	MP 48 (C2242)	Power sup 3.80 V
	GND	VBAT	VBATI	BDATA	VDD_REF	
Phone Off	0.00V	3.8V	3.8V	0.00V	3.8V	
Phone On	0.00V	3.8V	3.8V	0.00V	3.8V	

#### Voltages from N2000

MP	MP 17 (ST2204)	MP 11 (ST2203)	MP 9 (ST2208)	MP 14 (ST2212)	MP 34 (ST2213)	MP 36 (ST2214)	
	VAUDIO26	VANA25	VDDE18	VB T27	VDIG	VBEAR26	
	0.00V	0.00V	0.00V	0.00V	0.00V	0.00V	Power sup 0.00 Volt
Phone Off	0.00V	0.00V	0.00V	0.00V	0.00V	0.00V	Power sup 3.80 Volt
Phone On	2.6V	2.5V	1.8V	2.7V	2.7V	2.6V	Power sup 3.80 Volt

#### Voltages from N2000

MP	MP 56 (ST2206)	MP 12 (ST2215)	MP 7 (C2218)	MP 22 (ST2210)	
	VCORE12	VccA	VDD_LP	VBACKUP	
	0.00V	0.00V	2.2V	2.2V	Power sup 0.00 Volt
Phone Off	0.00V	0.00V	2.2V	2.2V	Power sup 3.80 Volt
Phone On	1.2V	2.8V	2.2V	2.2V	Power sup 3.80 Volt
			C2217	Completely charged	

#### WCDMA N1210

##### Use Fault Trace SW to activate and deactivate WCDMA Radio

MP	MP 84 (L2207)	MP 83 (R2221)	MP 81 (R2220)	MP 12 (ST2215)	MP 9 (ST2208)	Power sup 3.80 Volt
	VCC_WPA	WPAVCC	DCDC_EN	VccA	VDDE18	
WCDMA Radio Off	0.00V	0.00V	0.00V	2.8V	1.8V	
WCDMA Radio On	3.4V	1.4V	1.8V	2.8V	1.8V	

#### Bluetooth N1400

##### Use Fault Trace SW to activate and deactivate Bluetooth

MP	MP 147 (ST1404)	MP 143 (C1408)	MP 146 (C1409)	MP150 (C1412)	MP 148 (R2118)	MP 21 (R2125)	Power sup 3.80 Volt
	VDIG	VDDE18	VB T27	VDDE18	BT_CLK	RTCCLK	
Bluetooth Off	2.7V	1.8V	2.7V	1.8V	26MHz	32.768kHz	
Bluetooth On	2.7V	1.8V	2.7V	1.8V	26MHz	32.768kHz	

#### Main Camera

##### Use Fault Trace SW to activate and deactivate Main Camera. Display and Main Camera module must be connected to the PBA

MP	MP 76 (R2280)	MP 27 (TP2206)	MP 28 (TP2207)	MP 32 (TP2204)	MP 82 (ST2275)	MP 54 (TP2208)	MP 77 (R4301)	Power sup 3.80 Volt
	CAM_LDO_EN	VCAMIO	VCAML	VCAMAF	VCAMSA	VCAMSD	CAMSYSCLK/MCLK	
Main Camera Off	0.00V	0.00V	0.00V	0.00V	0.00V	0.00V	0Hz	
Main Camera On	1.8V	1.8V	1.2V	2.8V	2.8V	1.8V	26MHz	

#### VGA Camera

##### Use Fault Trace SW to activate and deactivate VGA Camera. Display and VGA Camera must be connected to the PBA

MP	MP 27 (TP2206)	MP 82 (ST2275)	MP 77 (R4301)	Power sup 3.80 Volt
	VCAMIO	VCAMSA	CAMSYSCLK/MCLK	
VGA Camera Off	0.00V	0.00V	0Hz	
VGA Camera On	1.8V	2.8V	13MHz	

#### Charging

##### Charging off 1:

DCIO/SEPI not connected.

##### Charging off 2:

DCIO/SEPI connected.

##### Charging 100mA:

##### Use Fault Trace SW:

Start Current Calibration - Start Current Calibration ->

> Set VBATT to 3.8

**Note:** The Current Calibration Test must be repeated if current consumption goes below 50mA at Power Supply Channel 2 when you are performing this measurements.

##### Charging 800mA:

##### Use Fault Trace SW:

Start Current Calibration - Start Current Calibration ->

Set VBATT to 3.8V ->

Perform Step1 **Note:** The Current Calibration Test must be repeated if current consumption goes below 725mA at Power Supply Channel 2 when you are performing this measurements.

MP	MP 40 (C2201)	MP 47 (C2241)	MP 39 (V2202 Pin2)	MP 41 (R2201)	Power sup 3.8 Volt
	DCIO	DCIO_INT	CHREG	CHSENSEP	
Charging off 1	0.00V	3.6V	3.2V	3.8V	Charger voltage 0.0 Volt
Charging off 2	5.0V	4.7V	4.7V	3.8V	Charger voltage 5.0 Volt
Charging 100mA	5.0V	4.7V	4.7V	3.8V	Charger voltage 5.0 Volt
Charging 800mA	4.5V	4.4V	2.8V	4.2V	Charger voltage 5.0 Volt

#### VBUS

##### USB cable connected to PC

MP	MP 44 (ST2201)	Power sup 3.80 Volt
	VBUS	
USB Cable disconnected from the phone		
	0.00V	
USB Cable connected to the phone	5.0V	

#### MCLK 26MHz from N1200

MP	MP 149 (R2100)	Power sup 3.80 Volt
	MCLK	
Phone Off	0Hz	
Phone On	26MHz	

#### Clocks to N2000

MP	MP 85 (C2116)	MP 6 (B2101_Pin7)	Power sup 0.00 Volt
	SYCLK1/MCLK	RTCCLK	
Phone Off	0Hz	32.768kHz	
Phone On	26MHz	32.768kHz	

#### Clocks from N2000

MP	MP 21 (R2125)	Power sup 3.80 Volt
	RTCCLK	
Phone Off	0Hz	
Phone On	32.768kHz	

#### VCORE18 from N2202

MP	MP 158 (ST2217)	Power sup 0.00 Volt
	VCORE18	
Phone Off	0.00V	
Phone On	1.8V	

#### Memory Card

##### Memory Card inserted and Combo Reader connected to the PBA

MP	MP 16 (ST2202)	Power sup 3.80 Volt
	VMC28	
Phone Off	0.00V	
Phone On	2.8V	

#### Red LED V2428

##### Use Fault Trace SW to activate and deactivate Red LED

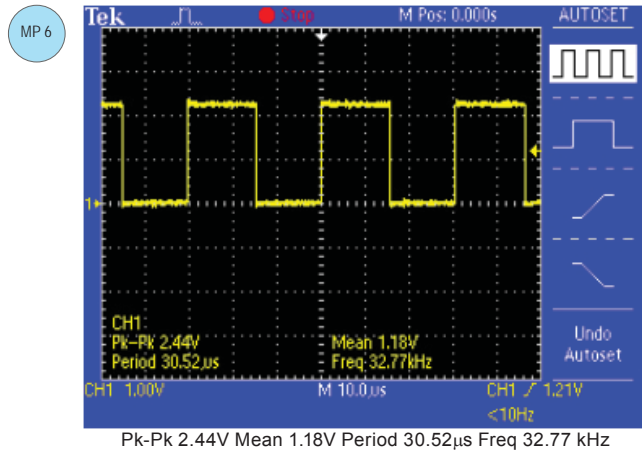
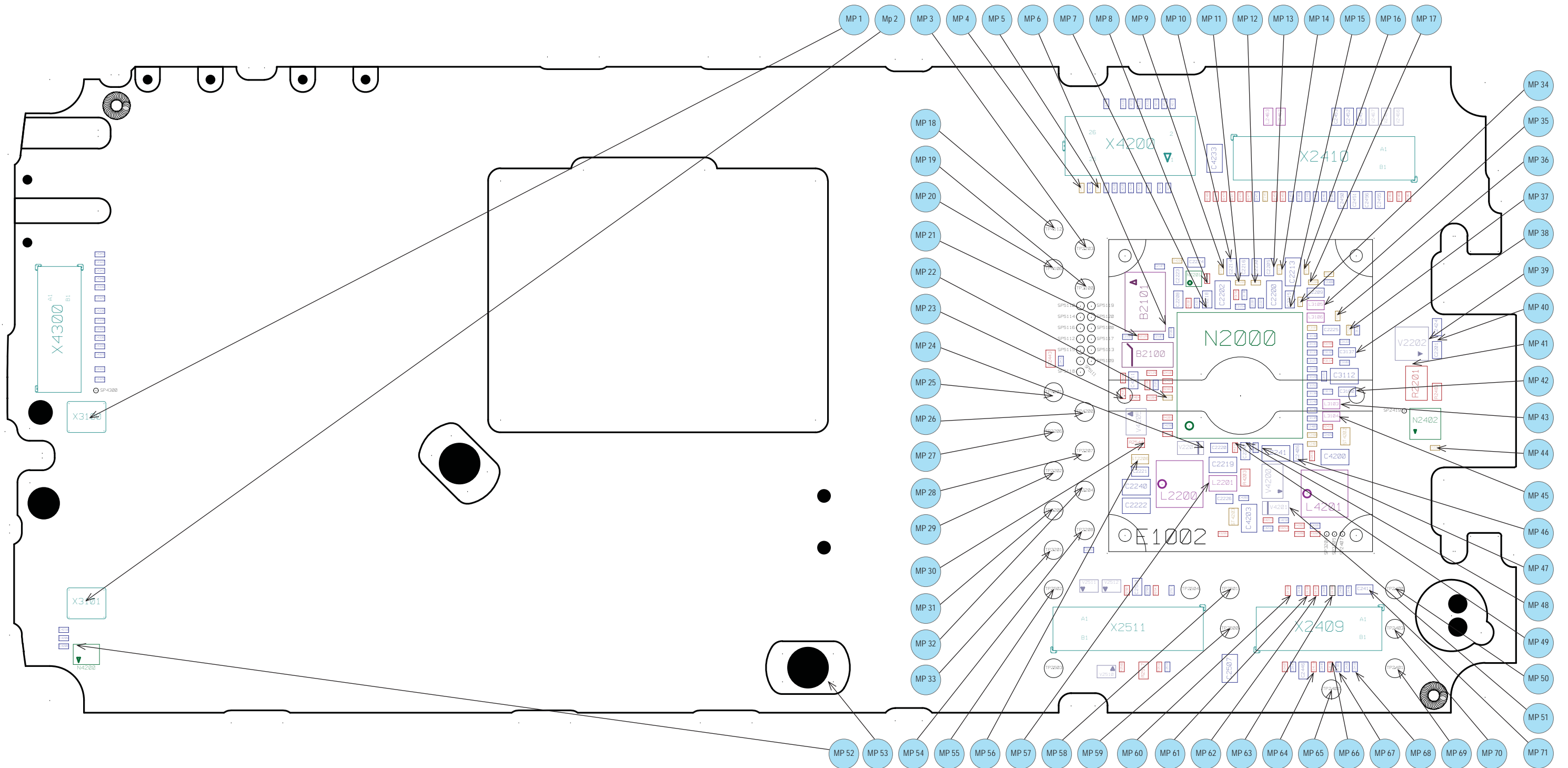
MP	MP 128 (C2427)	Power sup 3.80 Volt
	REDLED	
REDLED Off	0.00V	
REDLED On	1.8V	

#### FM Radio N1400

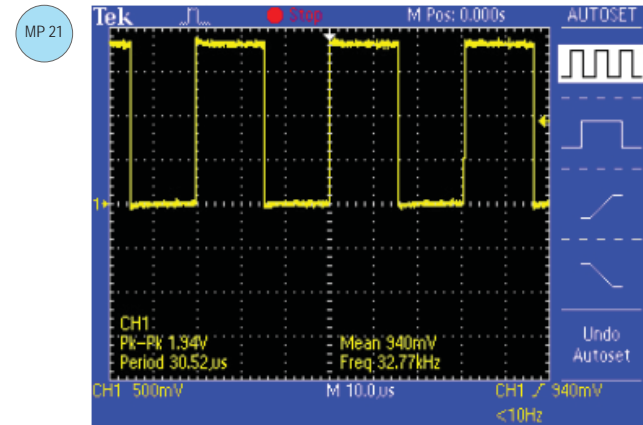
##### Use Fault Trace SW to activate and deactivate FM Radio

MP	MP 151 (ST2282)	MP 154 (C3305)	MP 152 (R3301)	Power sup 3.80 Volt
	VBATI	VDDE18	RTCCLK	
FM Radio Off	3.8V	1.8V	32.768kHz	
FM Radio On	3.8V	1.8V	32.768kHz	





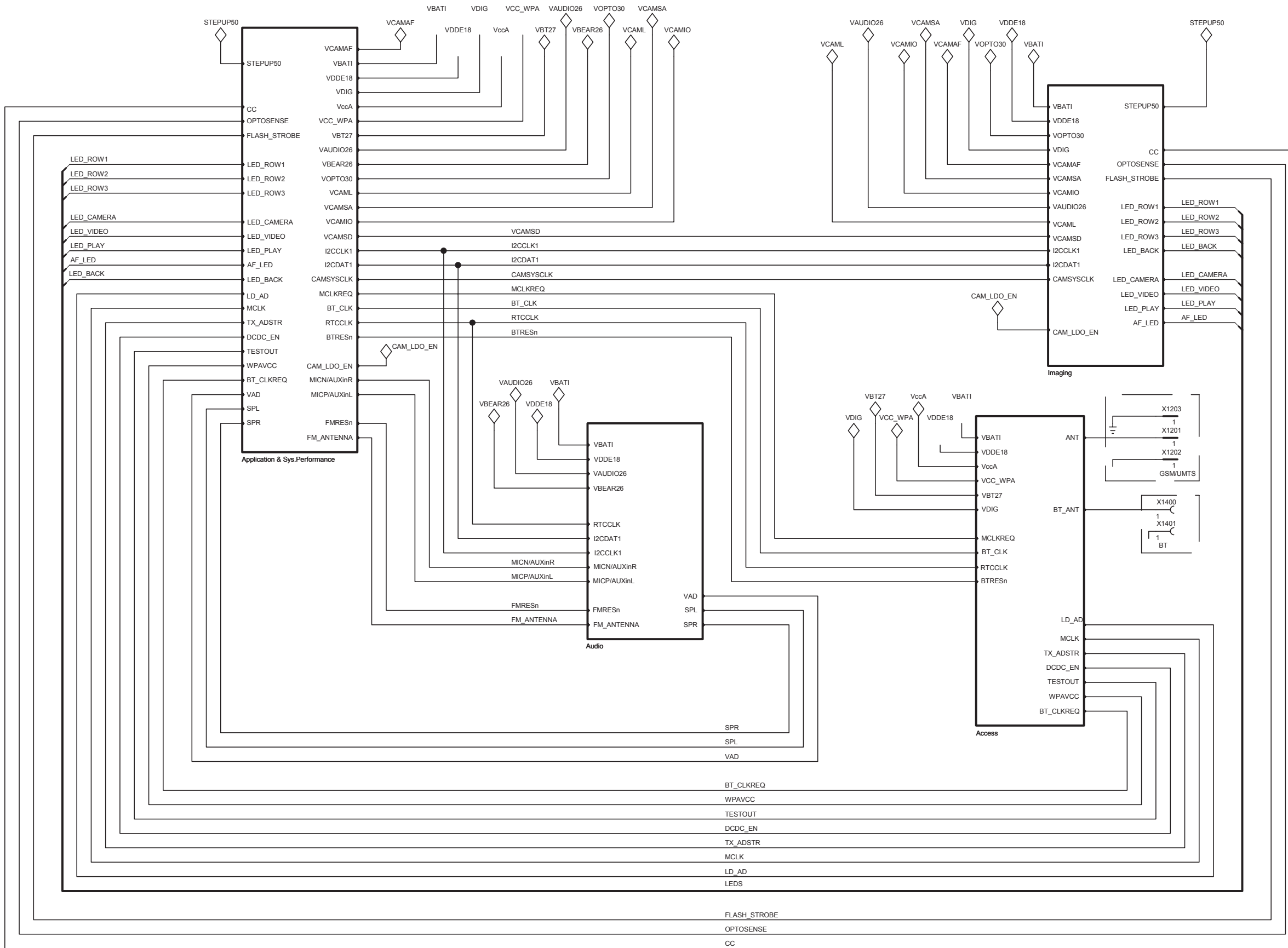
Pk-Pk 2.44V Mean 1.18V Period 30.52μs Freq 32.77 kHz



Pk-Pk 1.94V Mean 940mV Period 30.52μs Freq 32.77 kHz







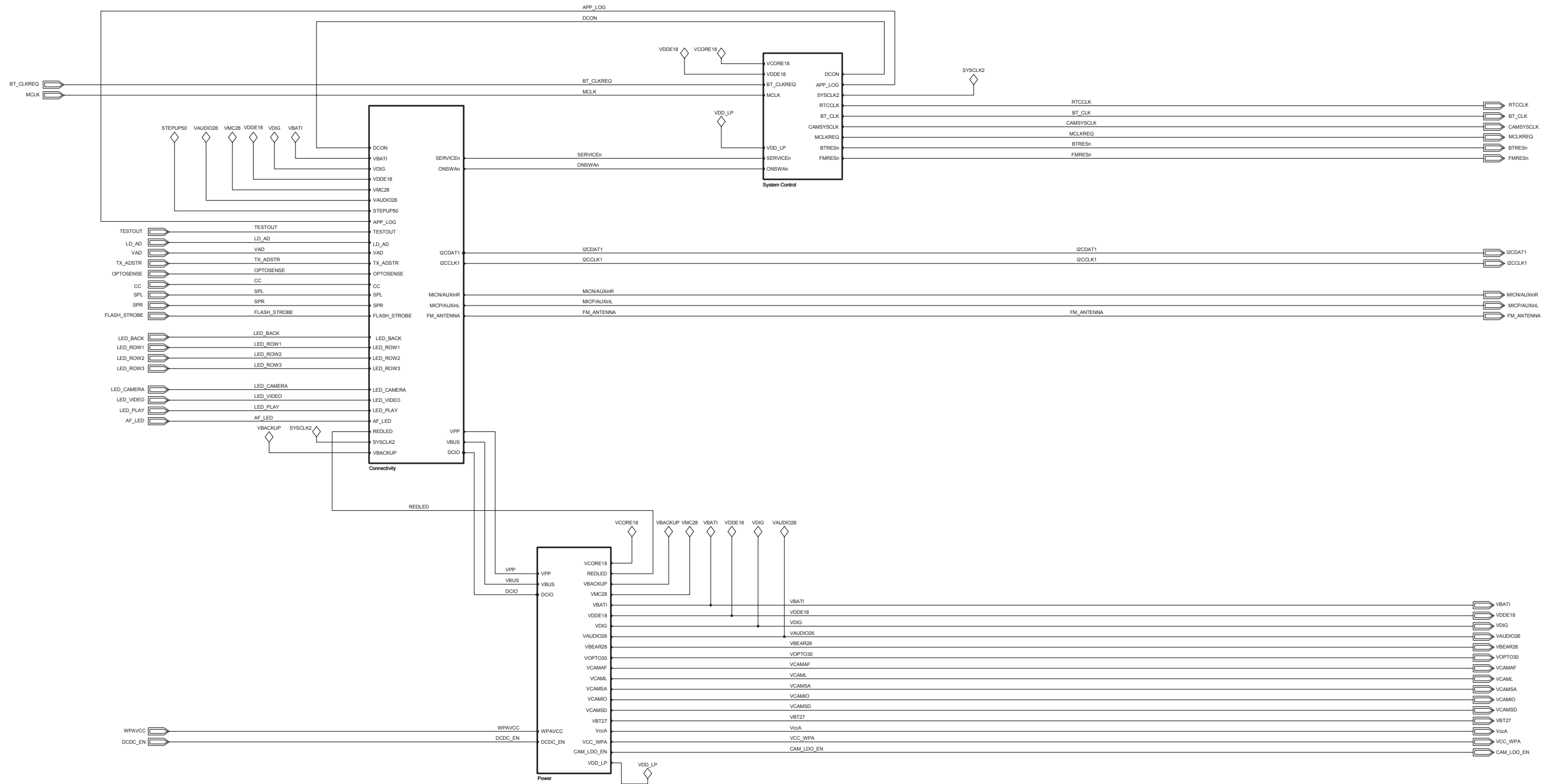
Access side GPIO mapping		
Port	Usage	
AccGPIO00	USB_HSSTP	
AccGPIO01	USB_HSDIR	
AccGPIO02	CTMS	
AccGPIO03	CFMS	
AccGPIO04	USB_HS_INCLK	
AccGPIO05	USB_HSNXT	
AccGPIO06	USB_HSDATA4	
AccGPIO07	USB_HSDATA5	
AccGPIO08	USB_HSDATA6	
AccGPIO09	USB_HSDATA7	
AccGPIO10	not used	
AccGPIO11	not used	
AccGPIO12	not used	
AccGPIO13	ResetAC	
AccGPIO14	ModeKey1	
AccGPIO15	ModeKey2	
AccGPIO16	USB_HSCHIP_SEL	
AccGPIO17	ModeKey3	
AccGPIO18	USB_HSDATA3	
AccGPIO19	BT_SPI_CS0n	
AccGPIO20	BT_SPI_DI	
AccGPIO21	BT_SPI_DO	
AccGPIO22	BT_SPI_CLK	
AccGPIO23	USB_HSOUTCLK	

Application side GPIO mapping		
Port	Usage	
AppGPIO00	FM_INT	
AppGPIO01	AP110_INT	
AppGPIO02	CAMIRQ	
AppGPIO03	PSoC_INT	
AppGPIO04	PSoC_RES	
AppGPIO05	CARDDETECT	
AppGPIO06	not used	
AppGPIO07	GPIO_RST	
AppGPIO08	not used	
AppGPIO09	not used	
AppGPIO10	X_CHARGE_RDY	
AppGPIO11	MC_CLK_RET	
AppGPIO12	MSDETECT	
AppGPIO13	AX_INT1	
AppGPIO14	AX_INT2	
AppGPIO15	DCON	

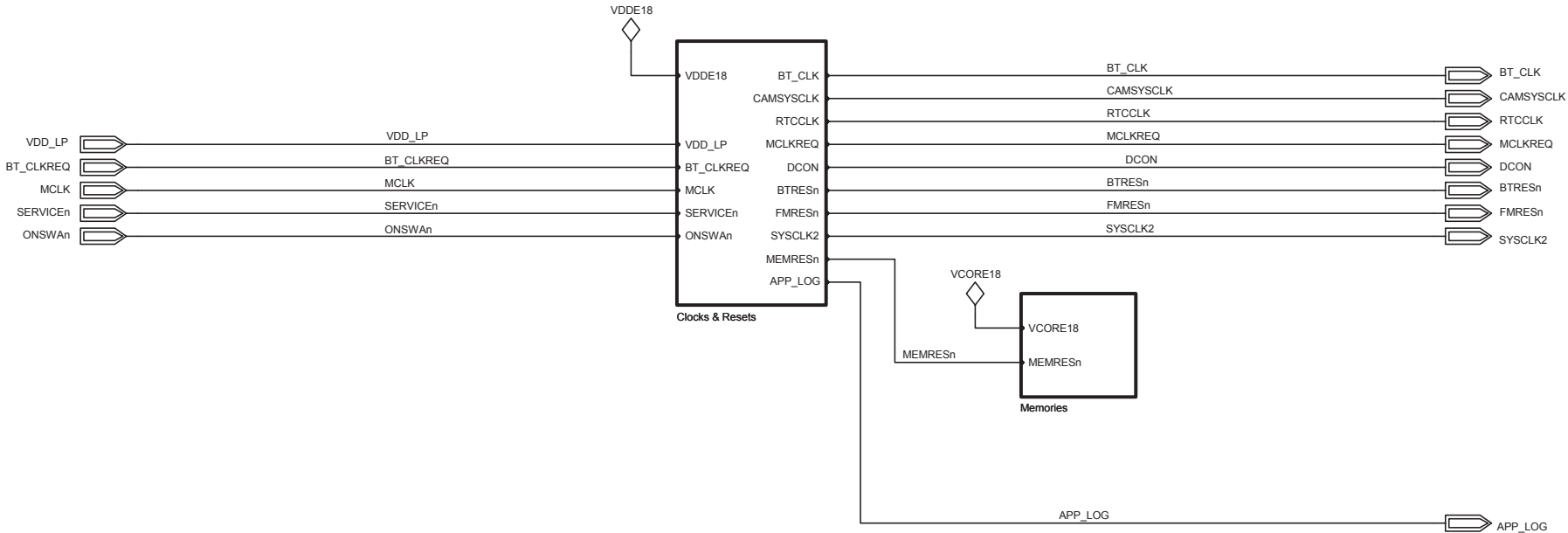
GPIO expander mapping		
Port	Usage	
GPIO_O0	CIF_STANDBY	
GPIO_O1	AFLEDEnable	
GPIO_O6	AMPCTRL	
GPIO_O7	MOTOR_LDO	
GPIO_O8	CAM_LDO_EN	
GPIO_O9	CAMRESn	
GPIO_O10	uSD_bypass_option	
GPIO_O11	CAM_LDO2_EN	
GPIO_O12	X_CHARE_EN	
GPIO_O13	SPD1	
GPIO_O14	SB	
GPIO_O15	SPD0	
GPIO_P2	MOTOR_DOOR1	
GPIO_P3	MOTOR_DOOR2	
GPIO_P4	MOTOR_CW	
GPIO_P5	MOTOR_CW	

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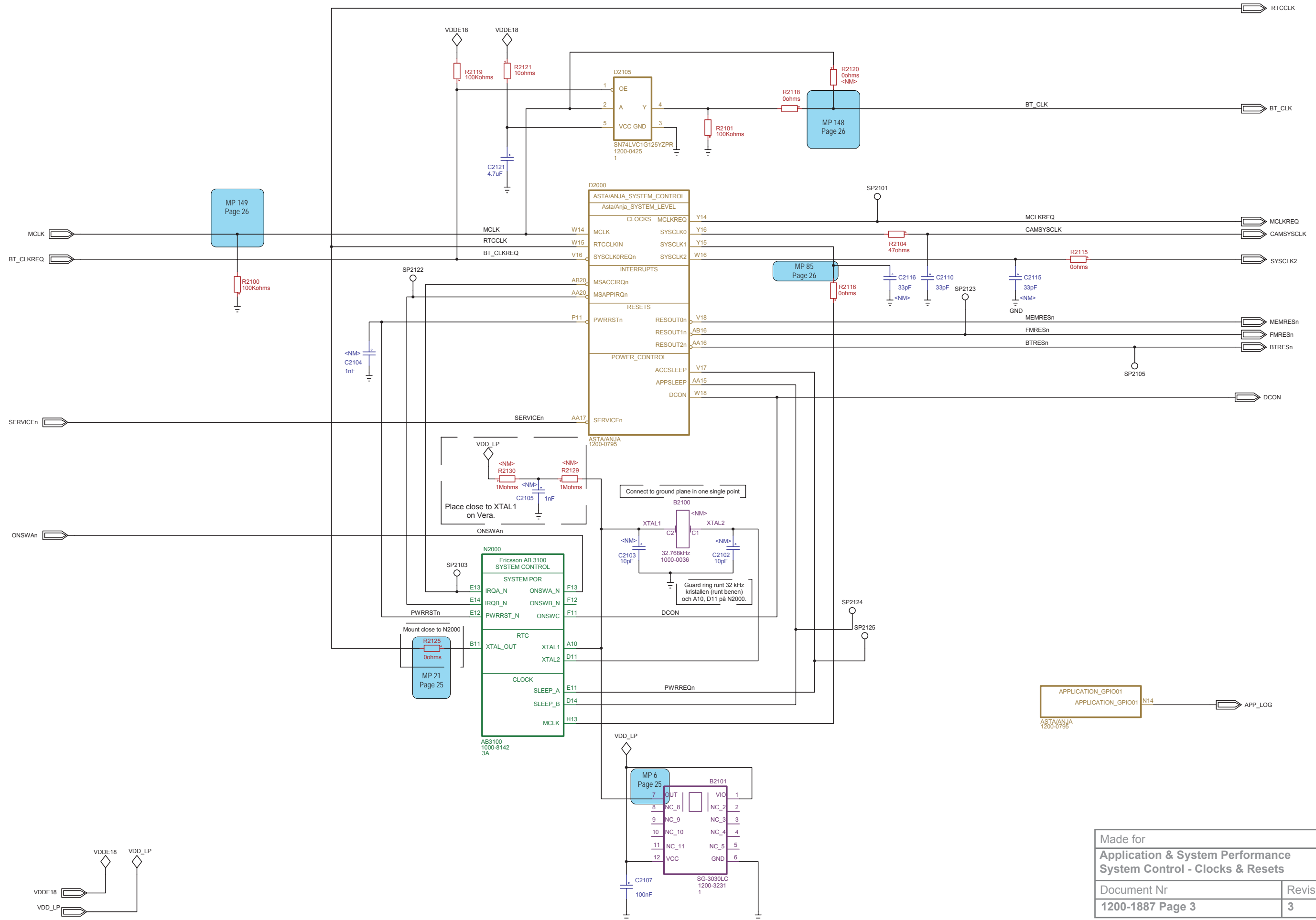




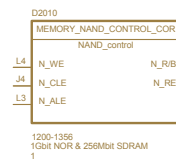
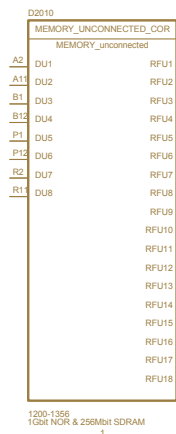
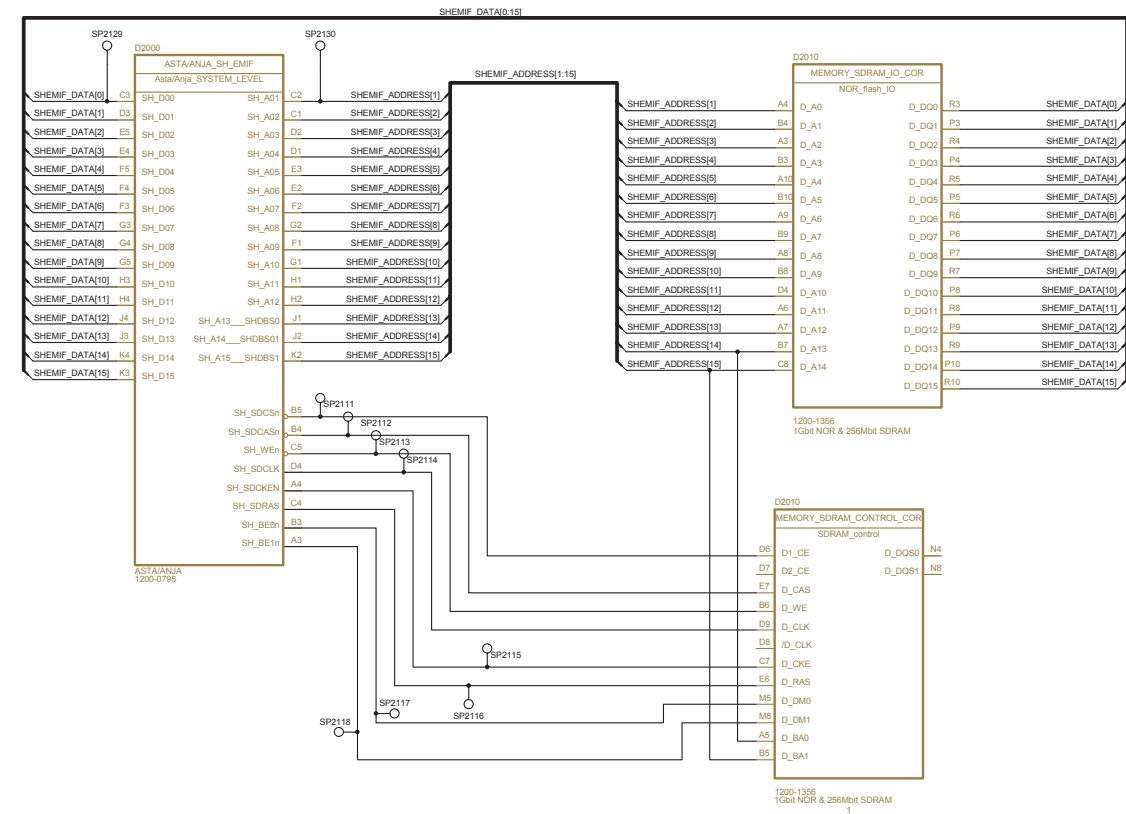
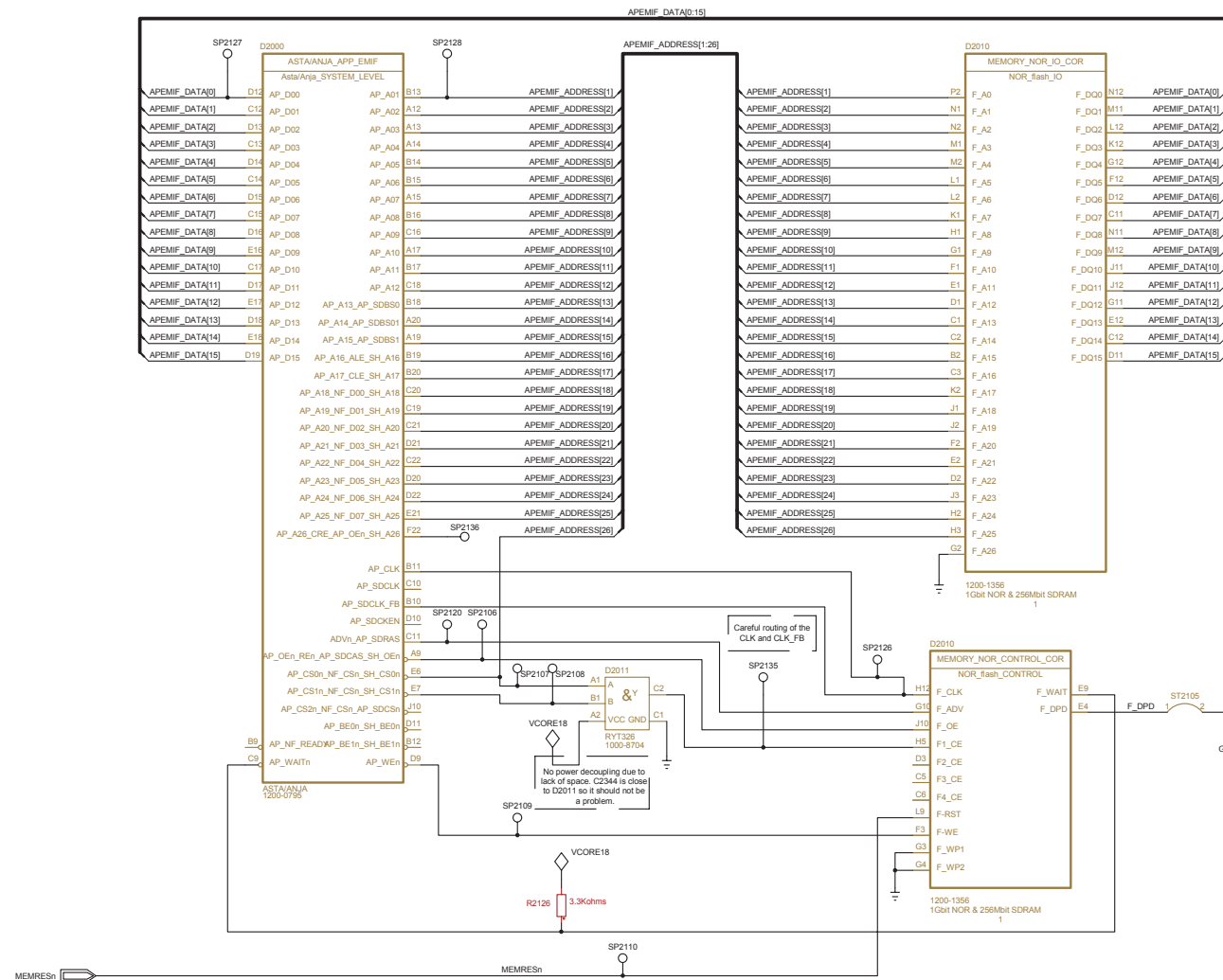
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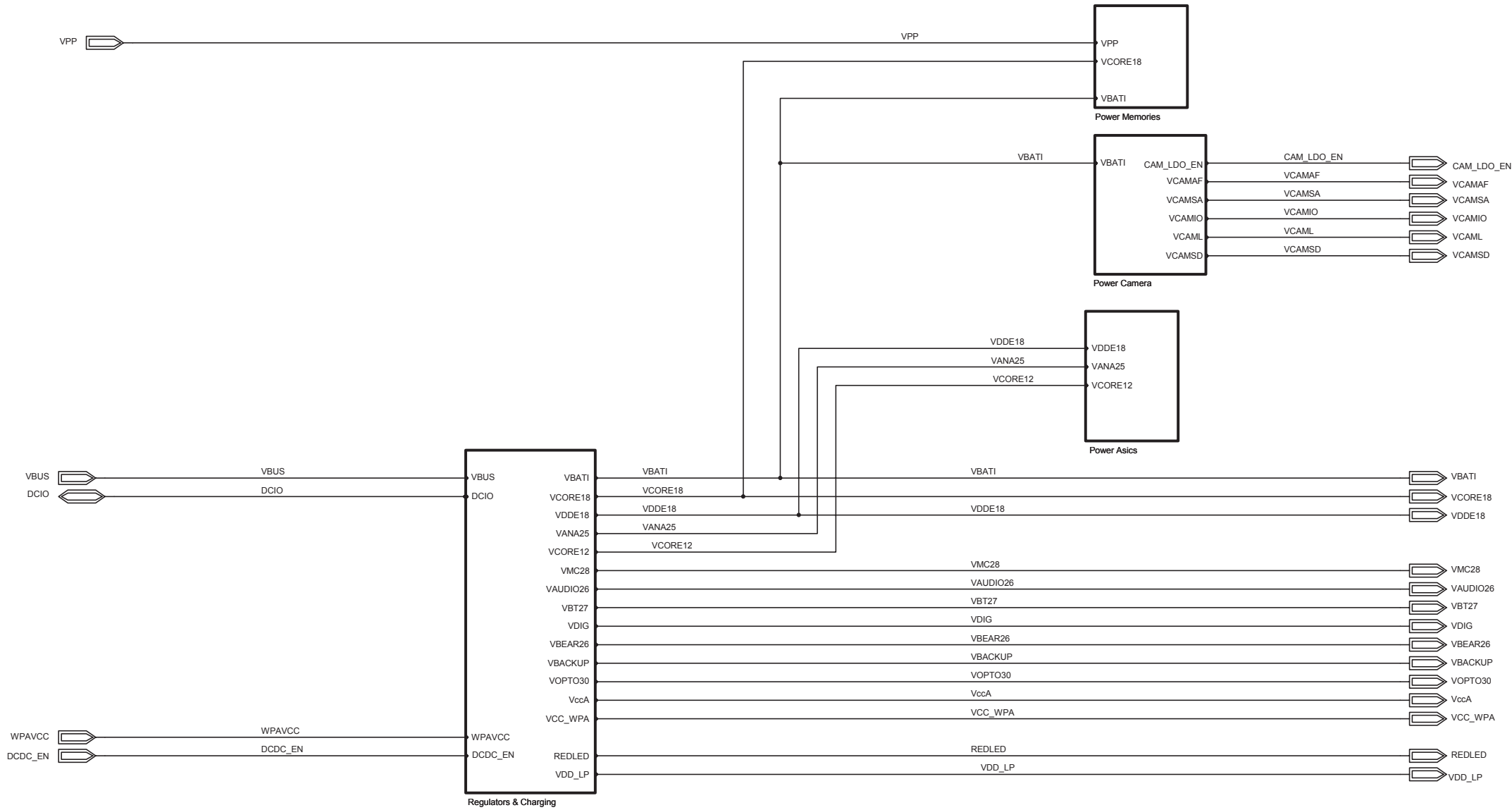


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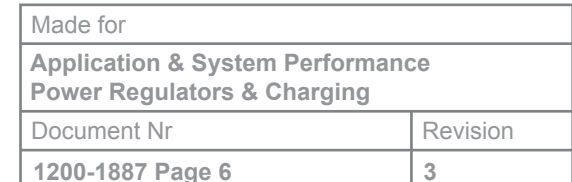


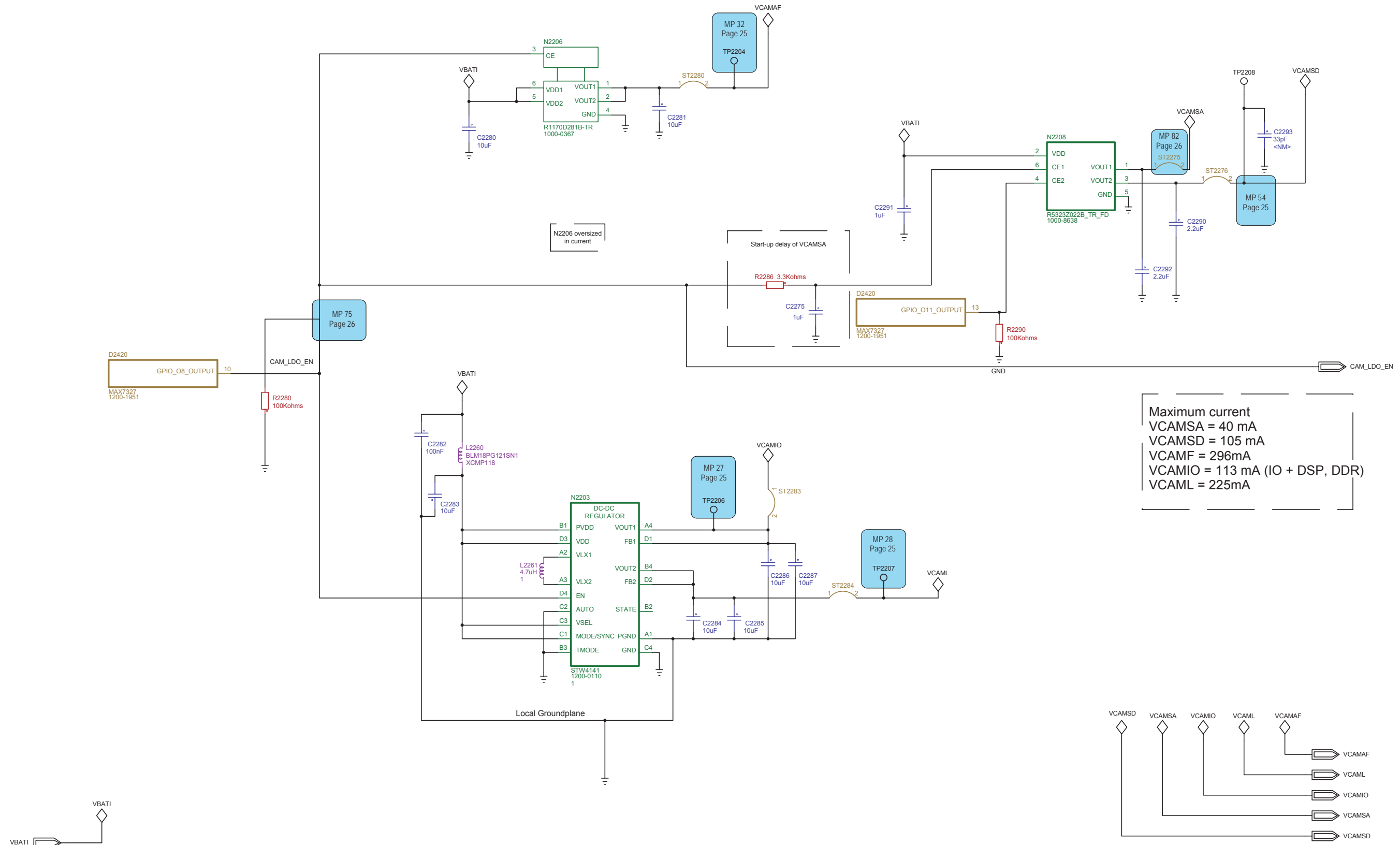
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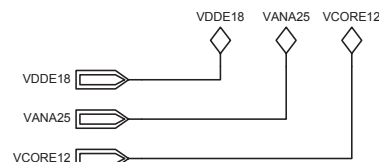
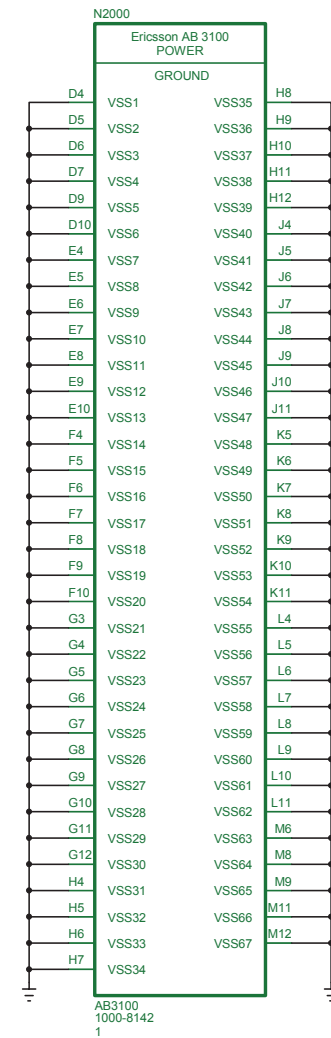


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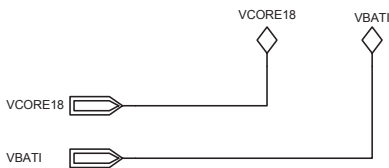
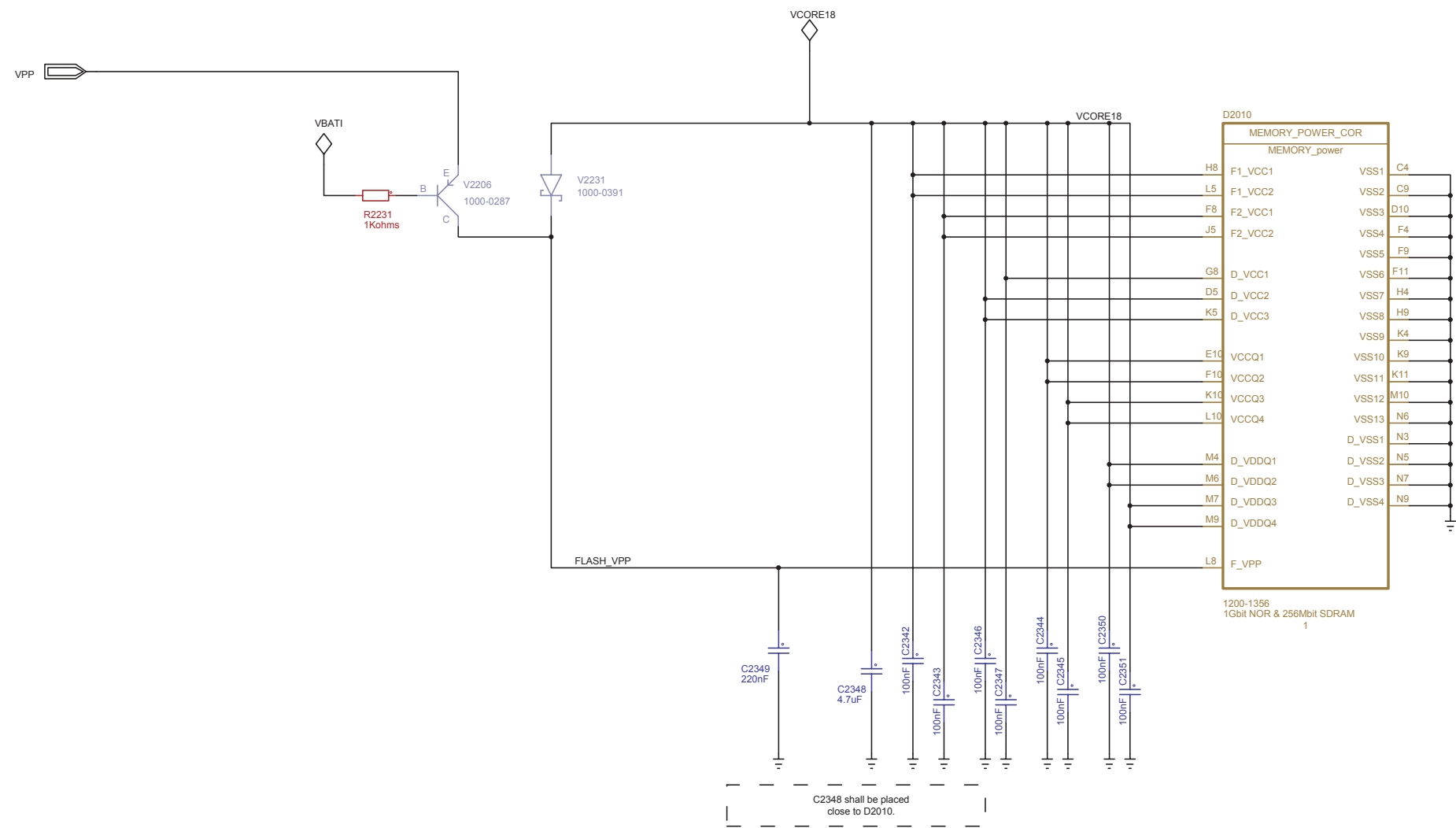




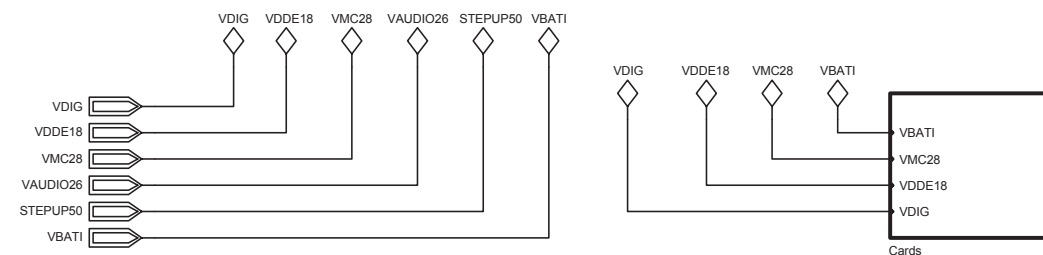
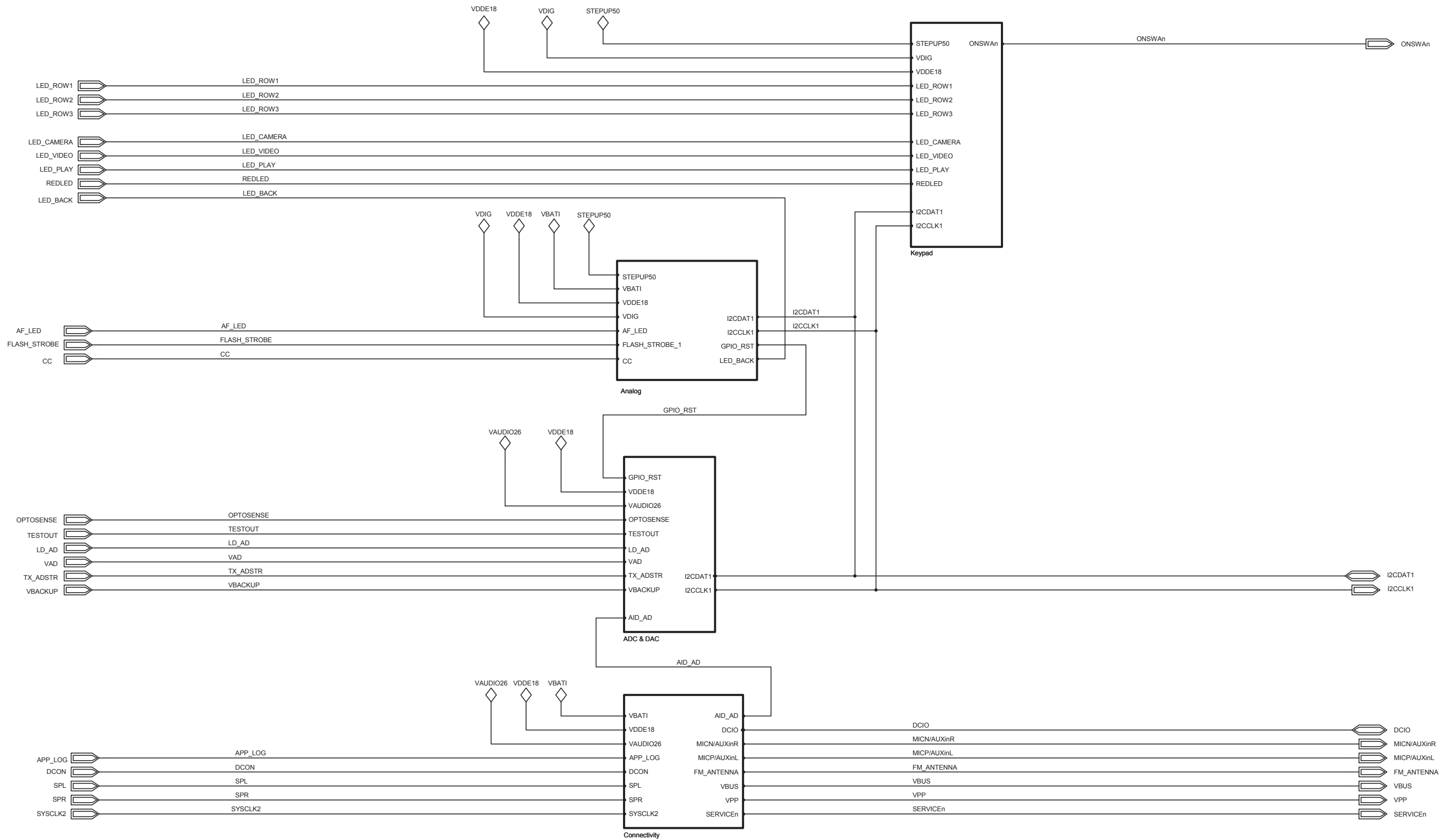
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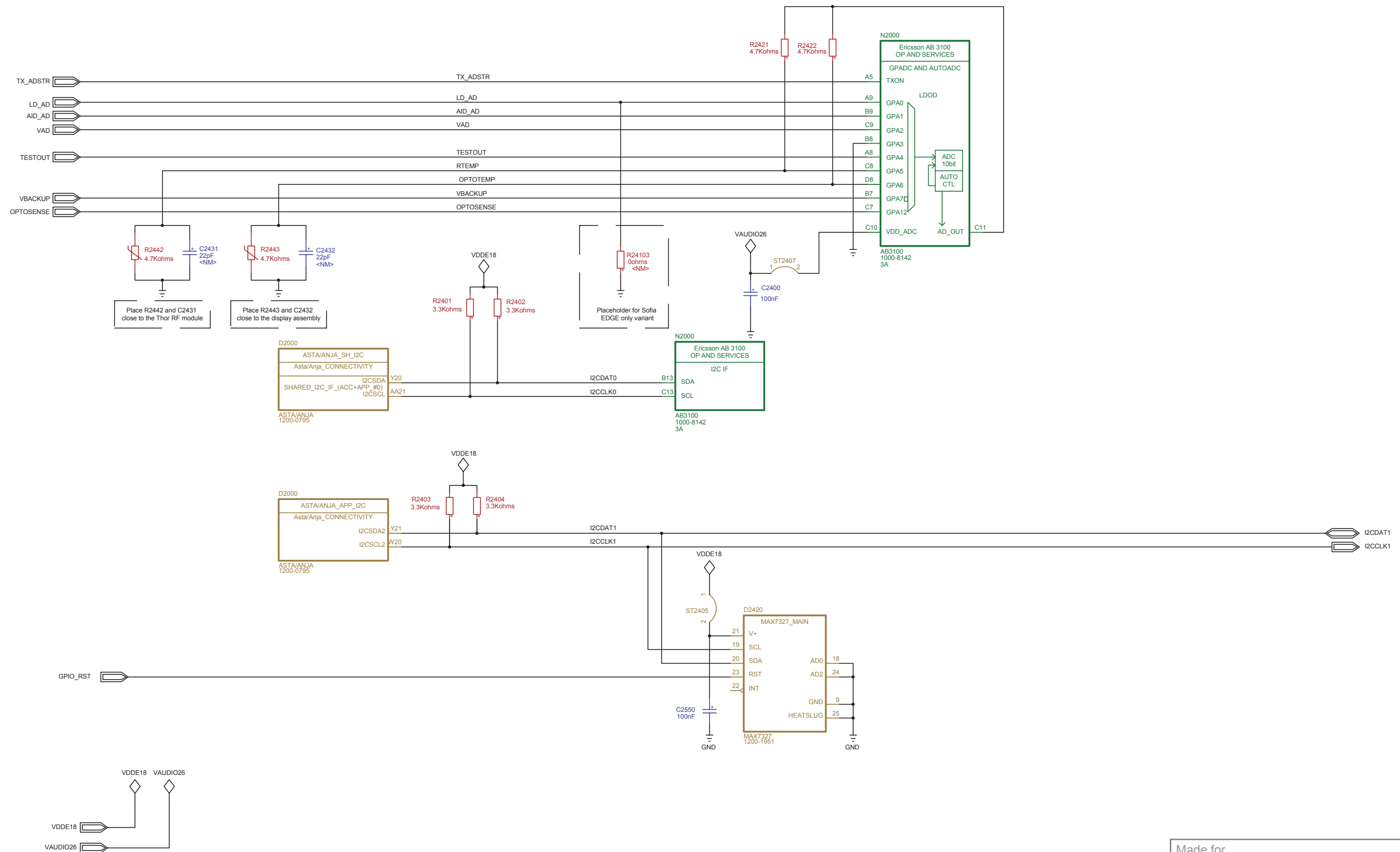




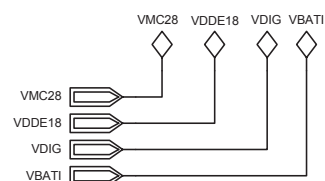
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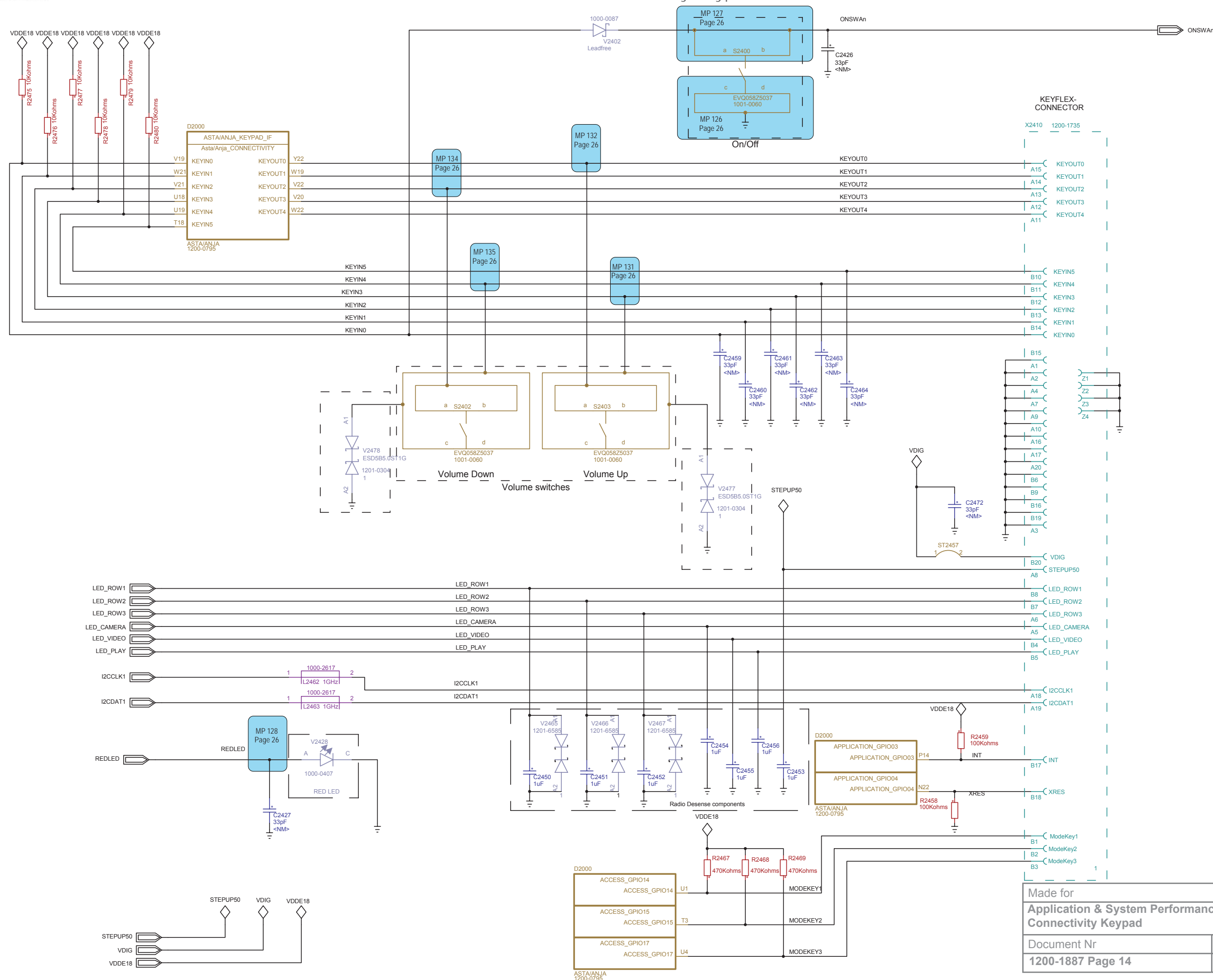


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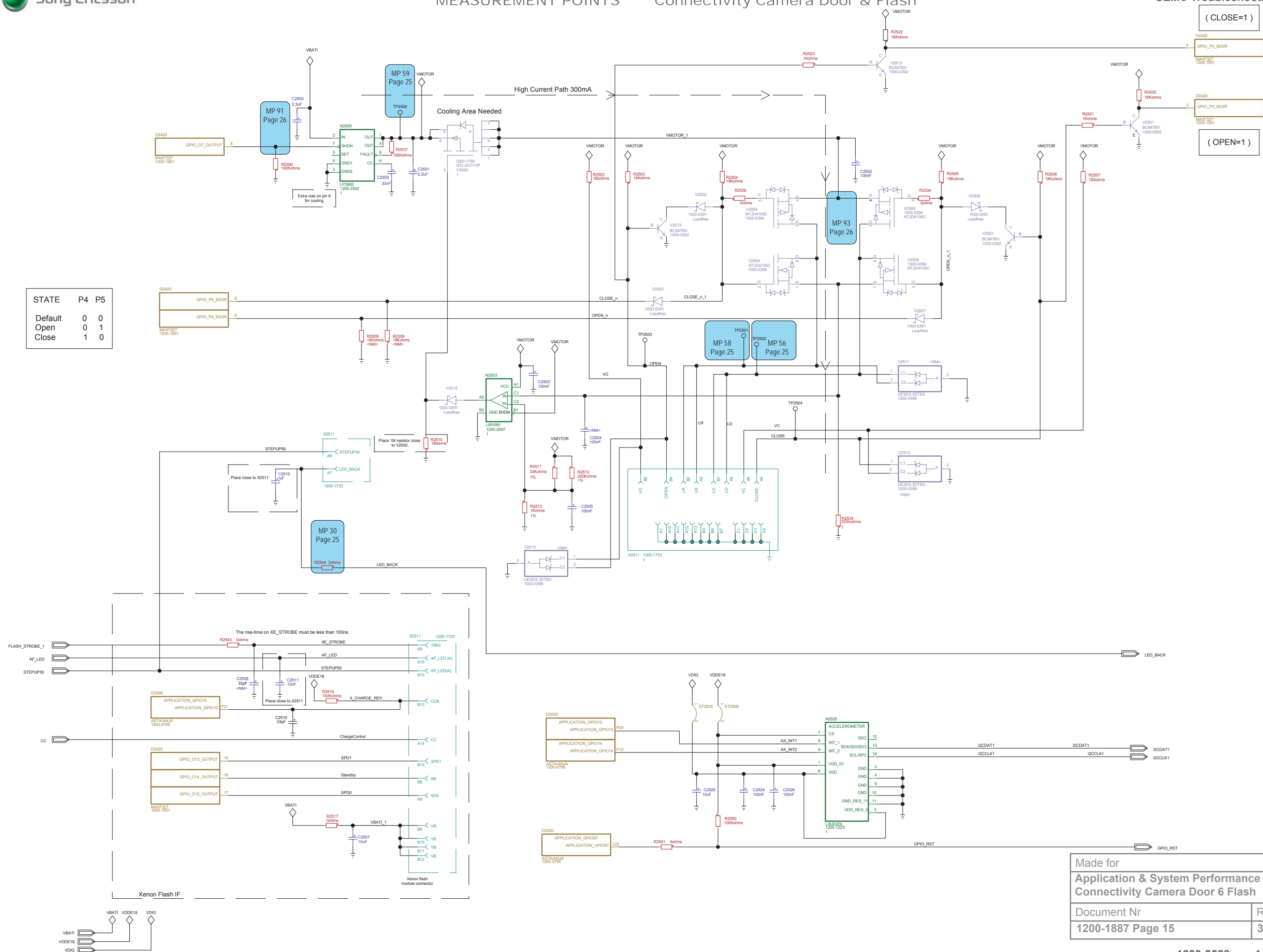


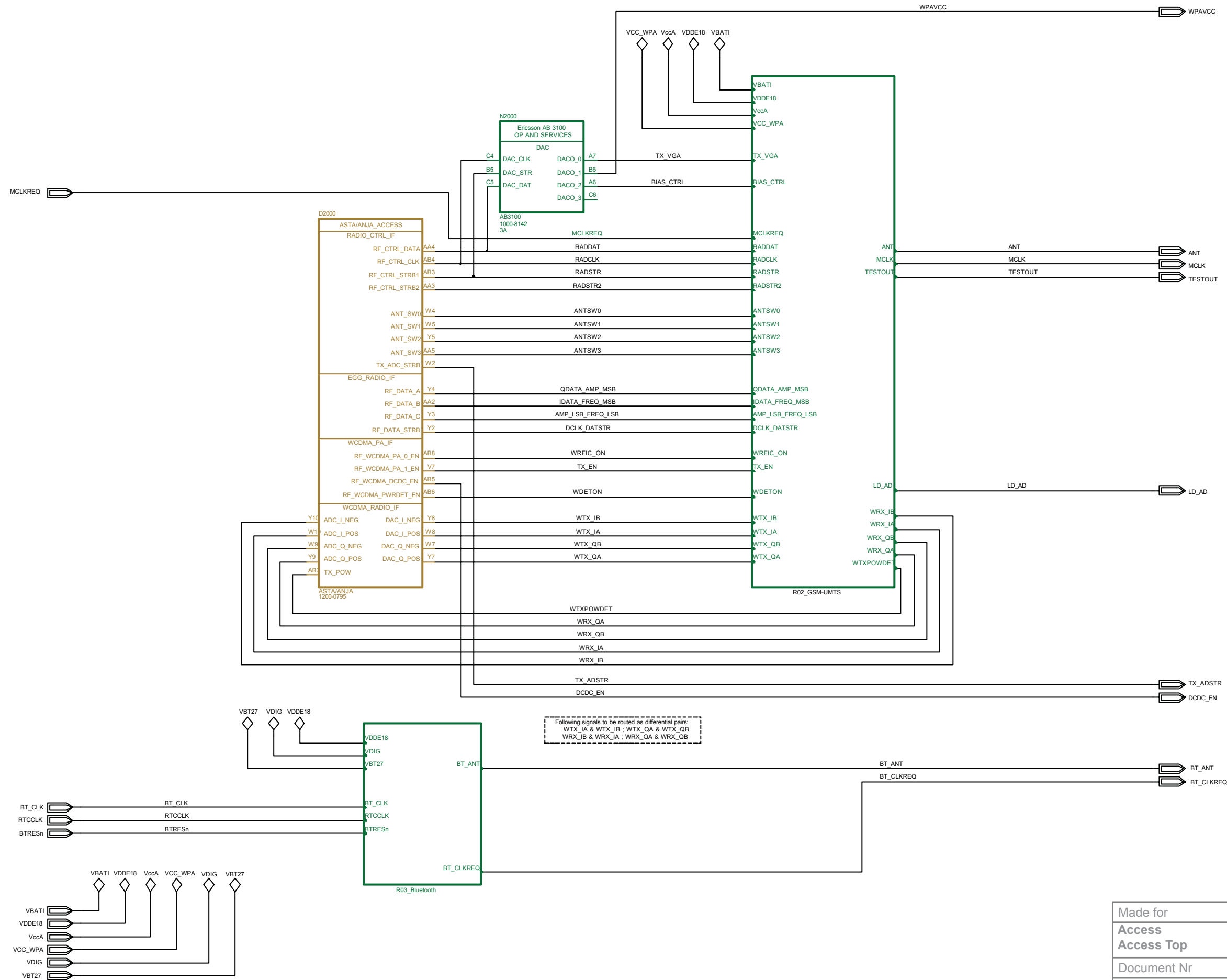




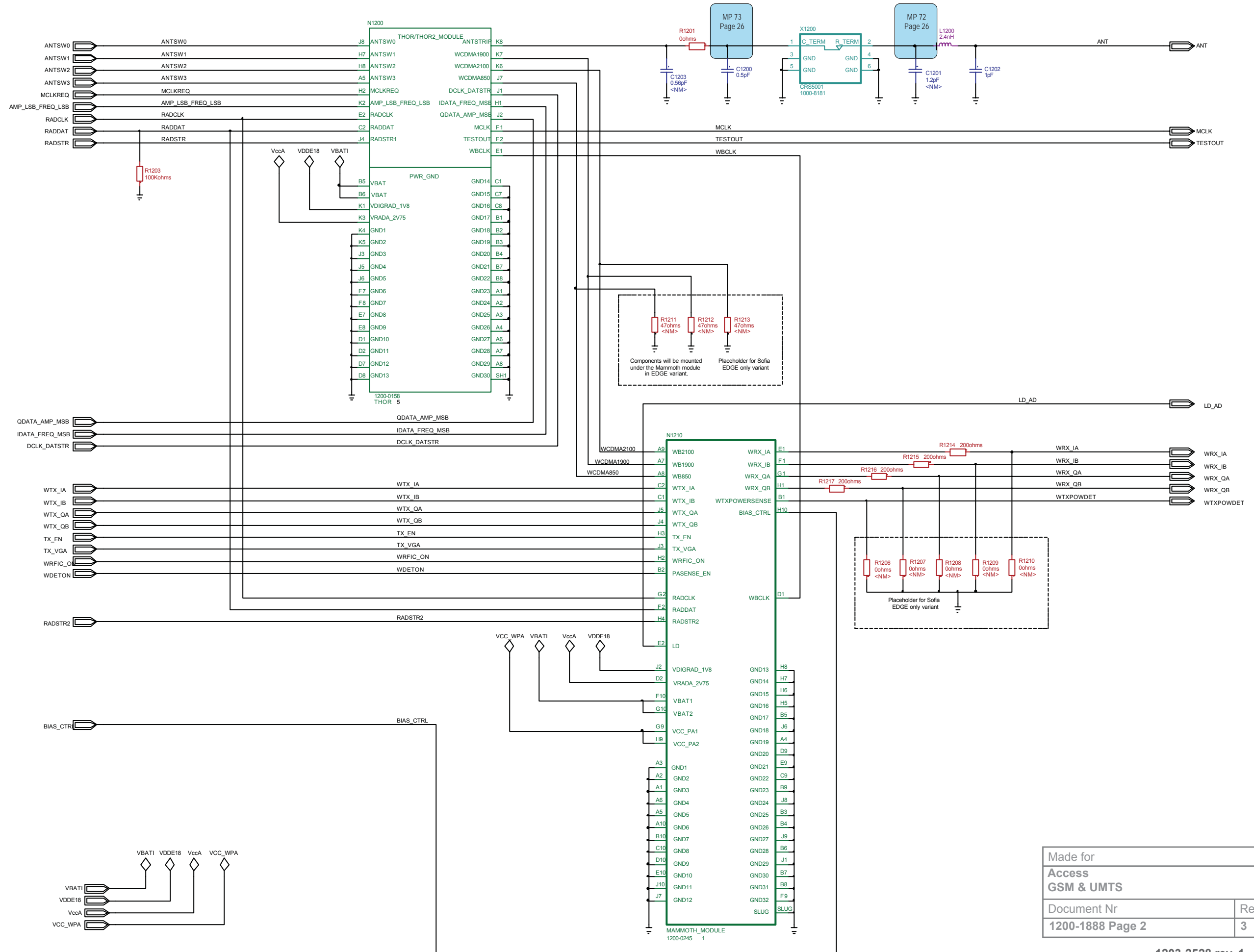


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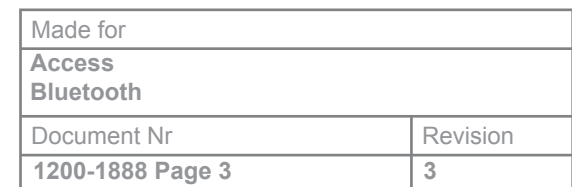


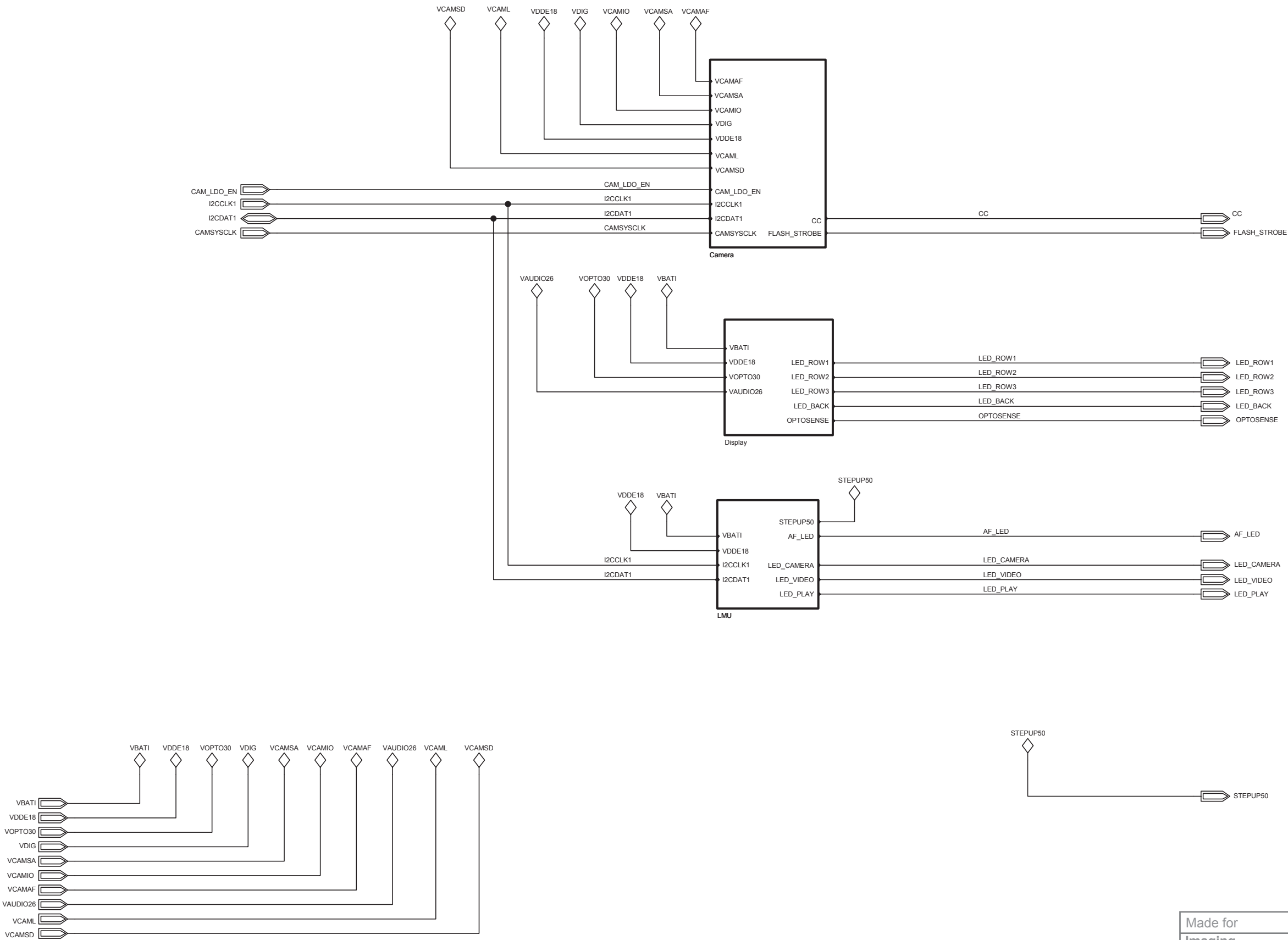
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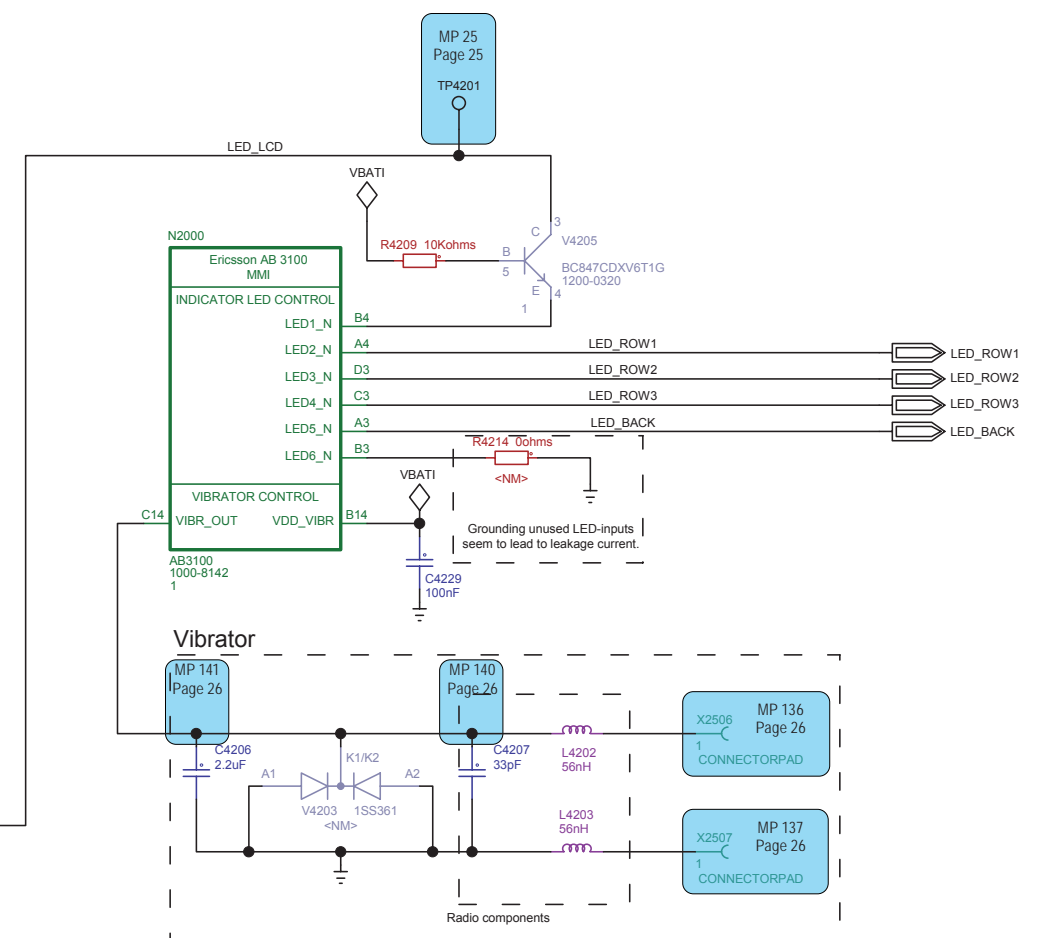
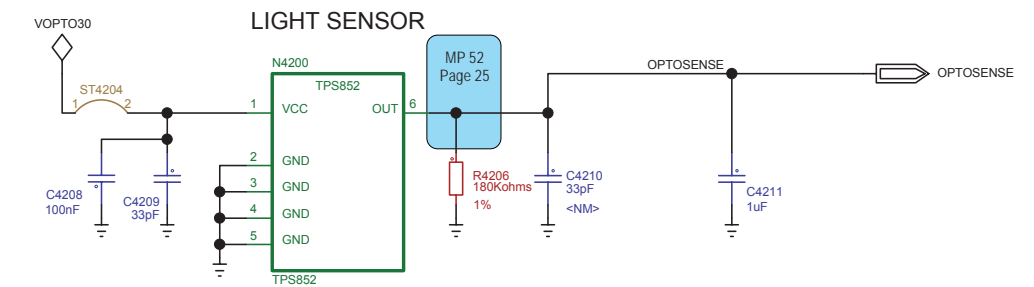
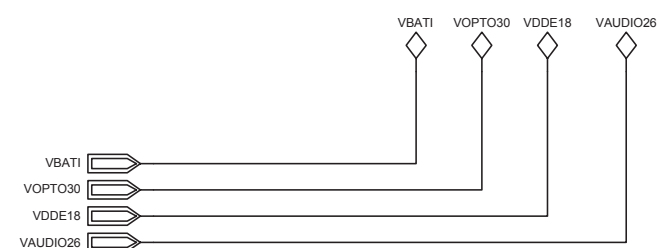
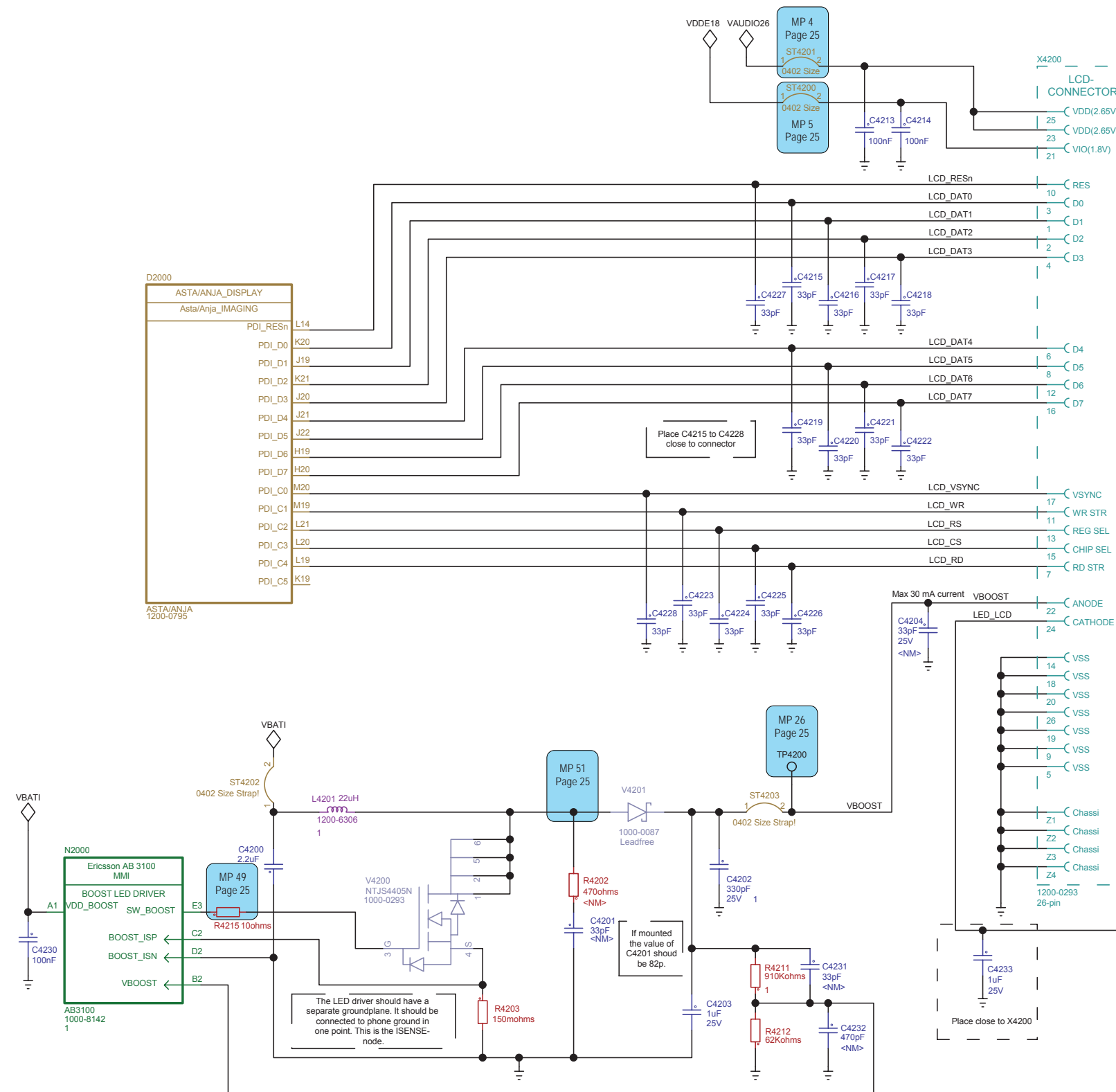
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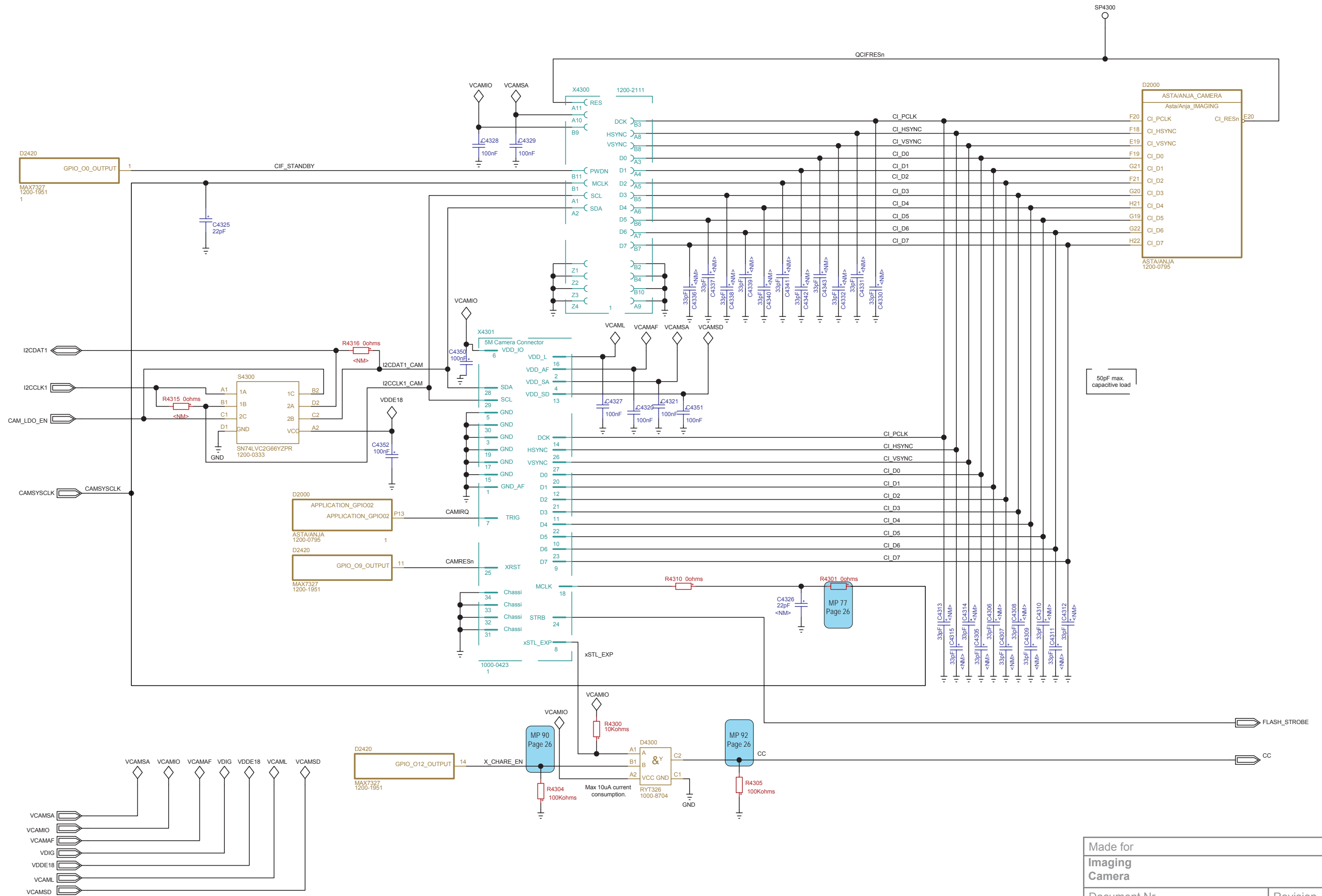




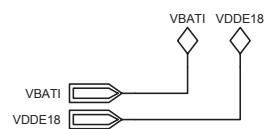
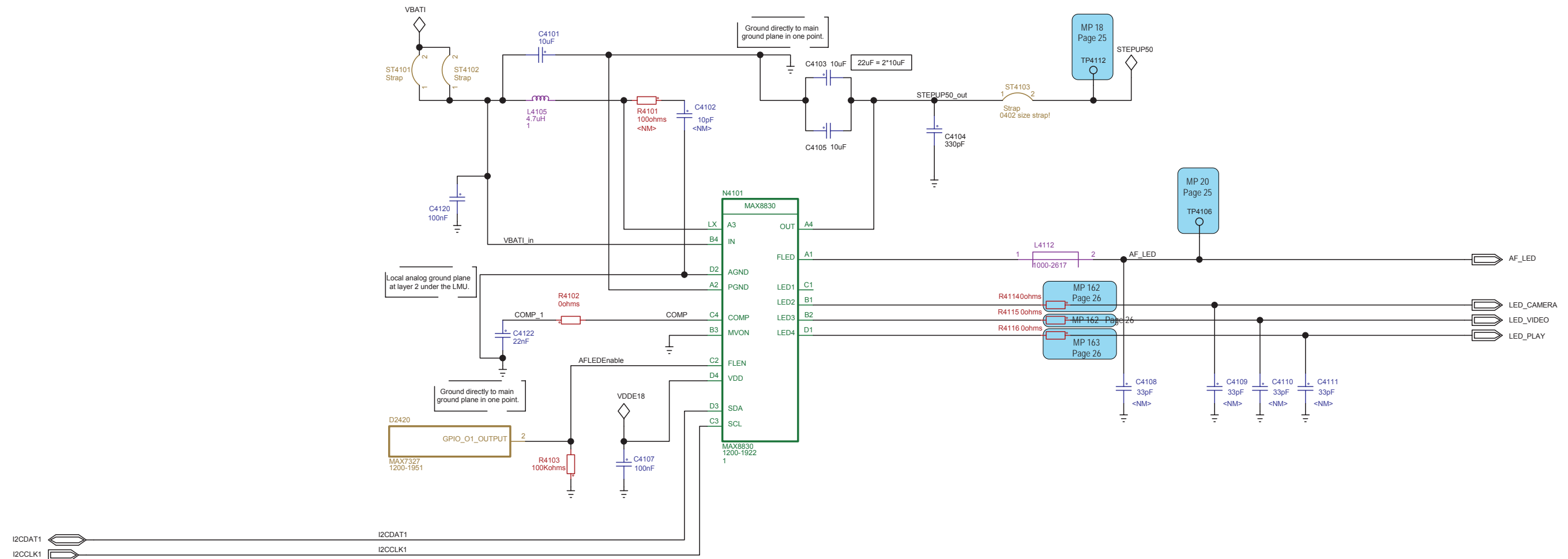
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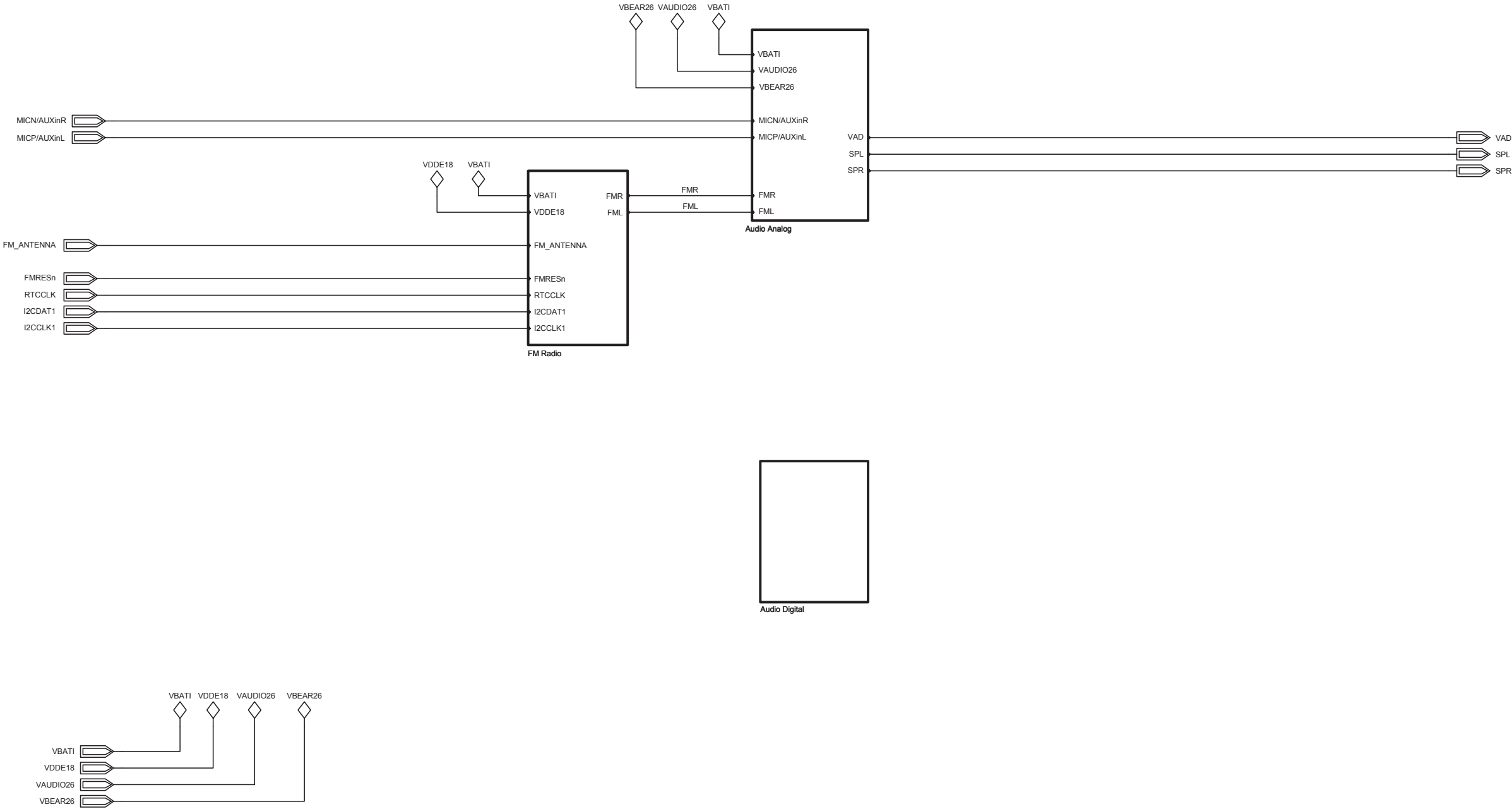


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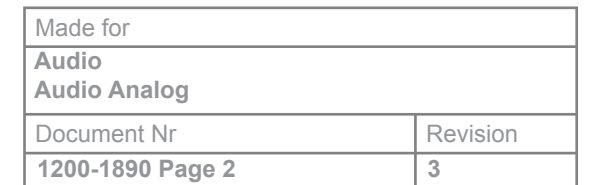


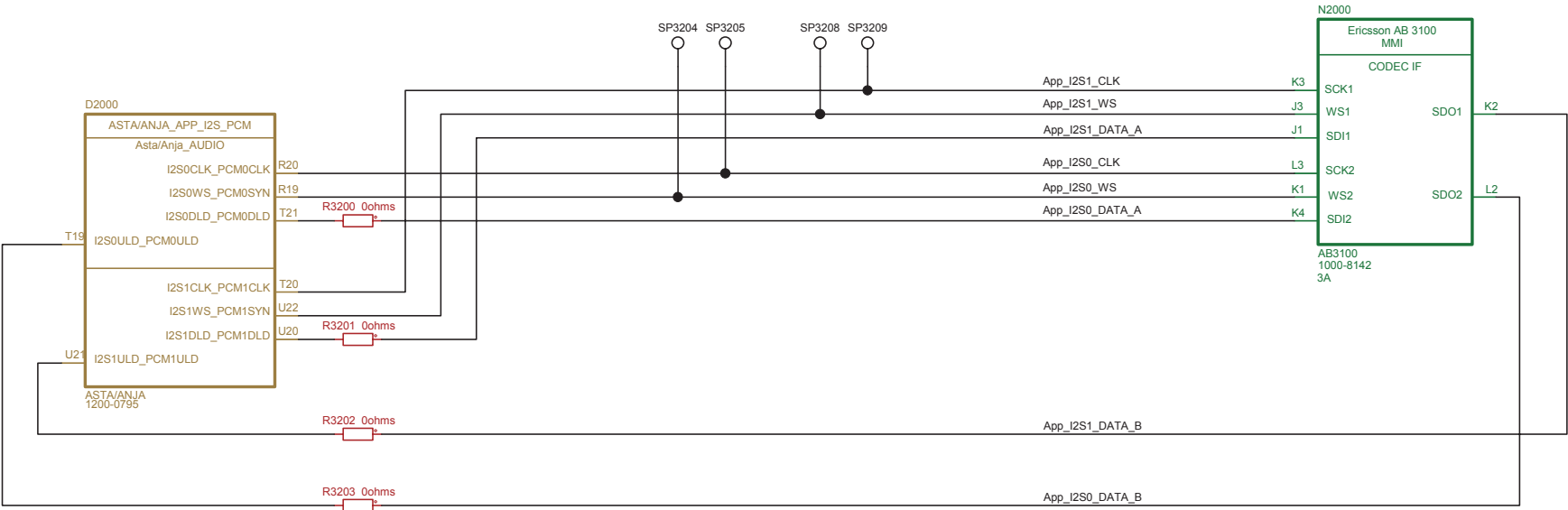
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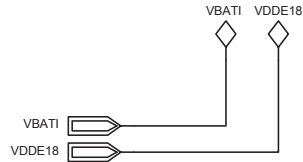
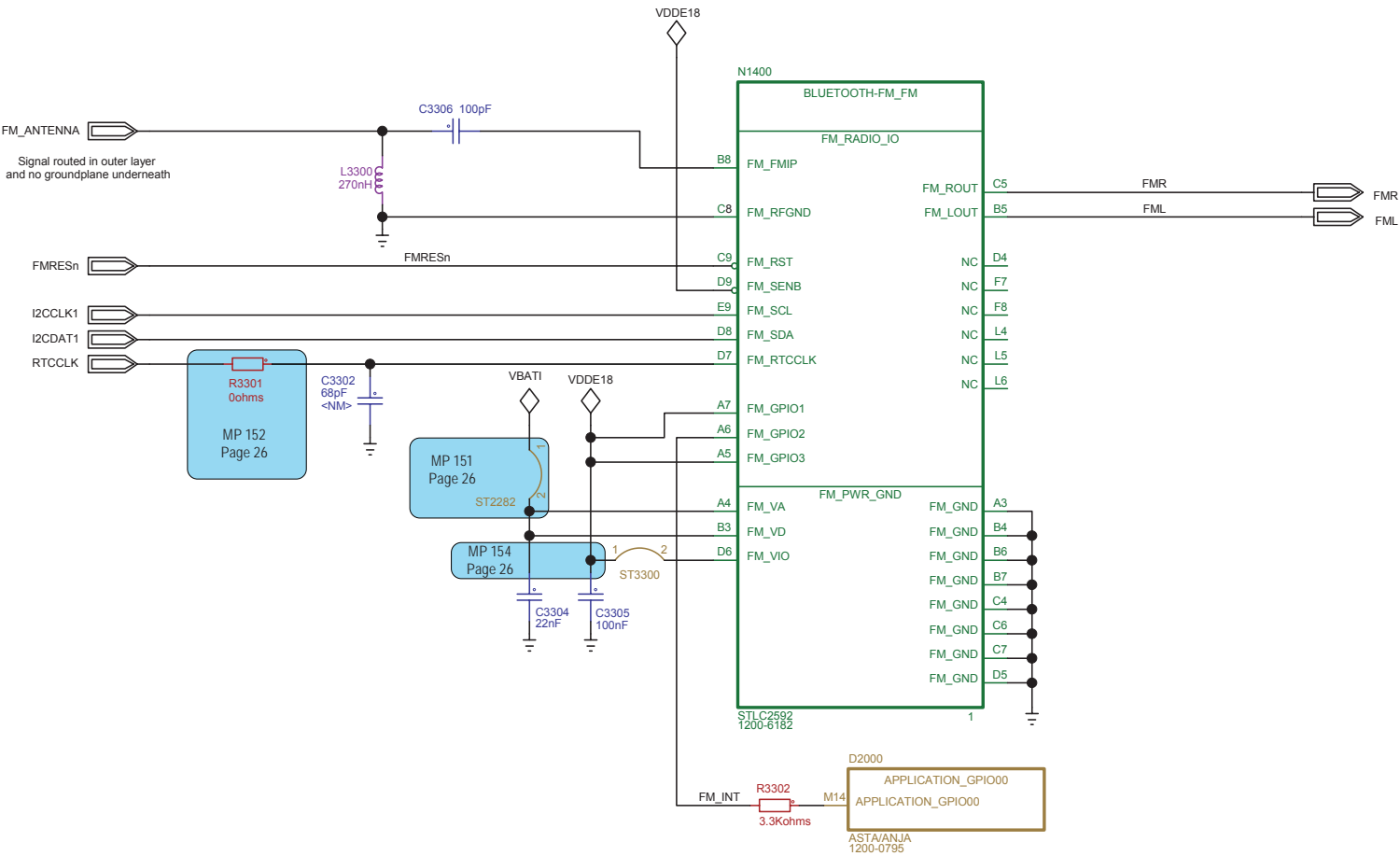


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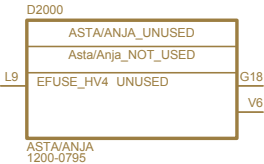
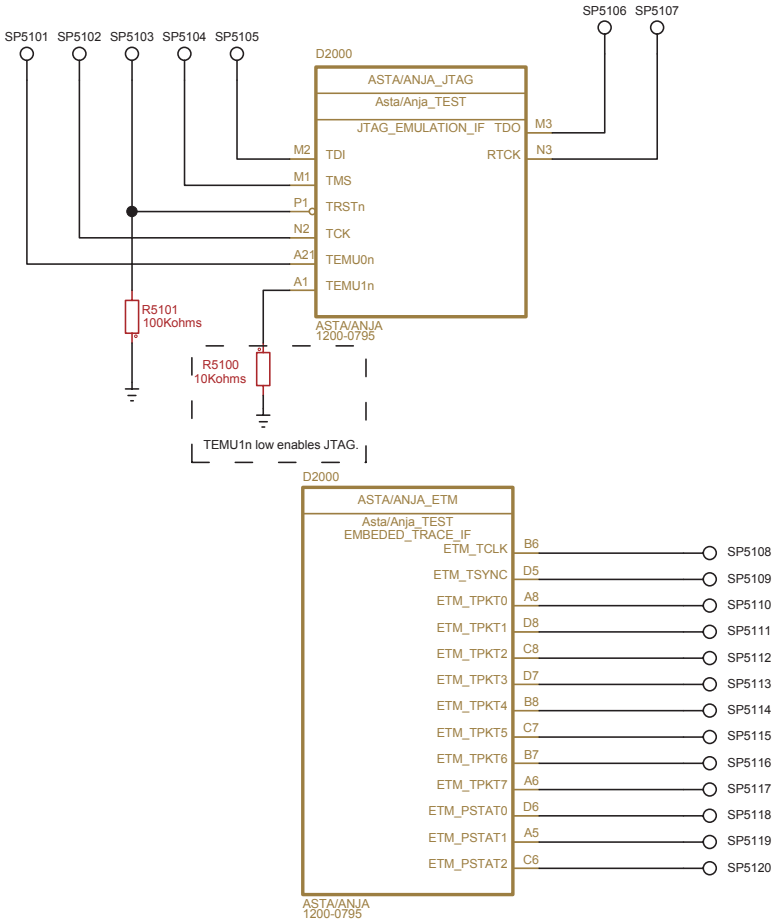




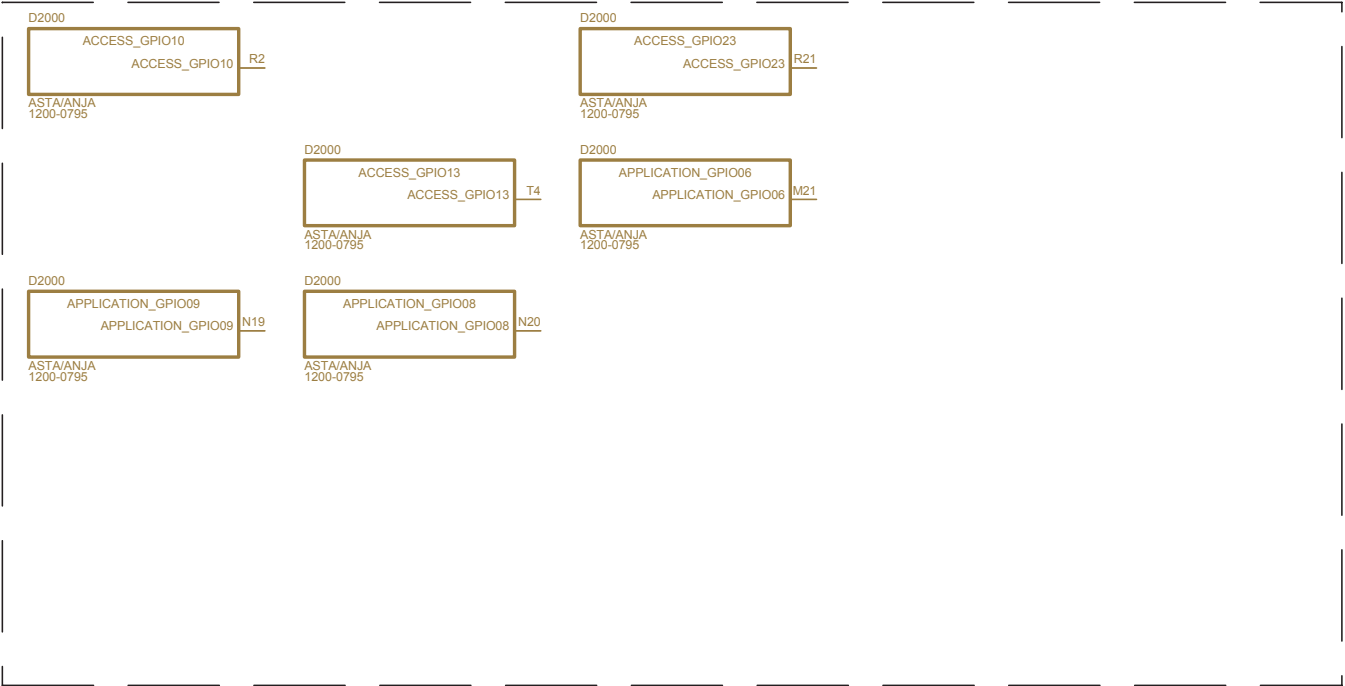
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Unused GPIO

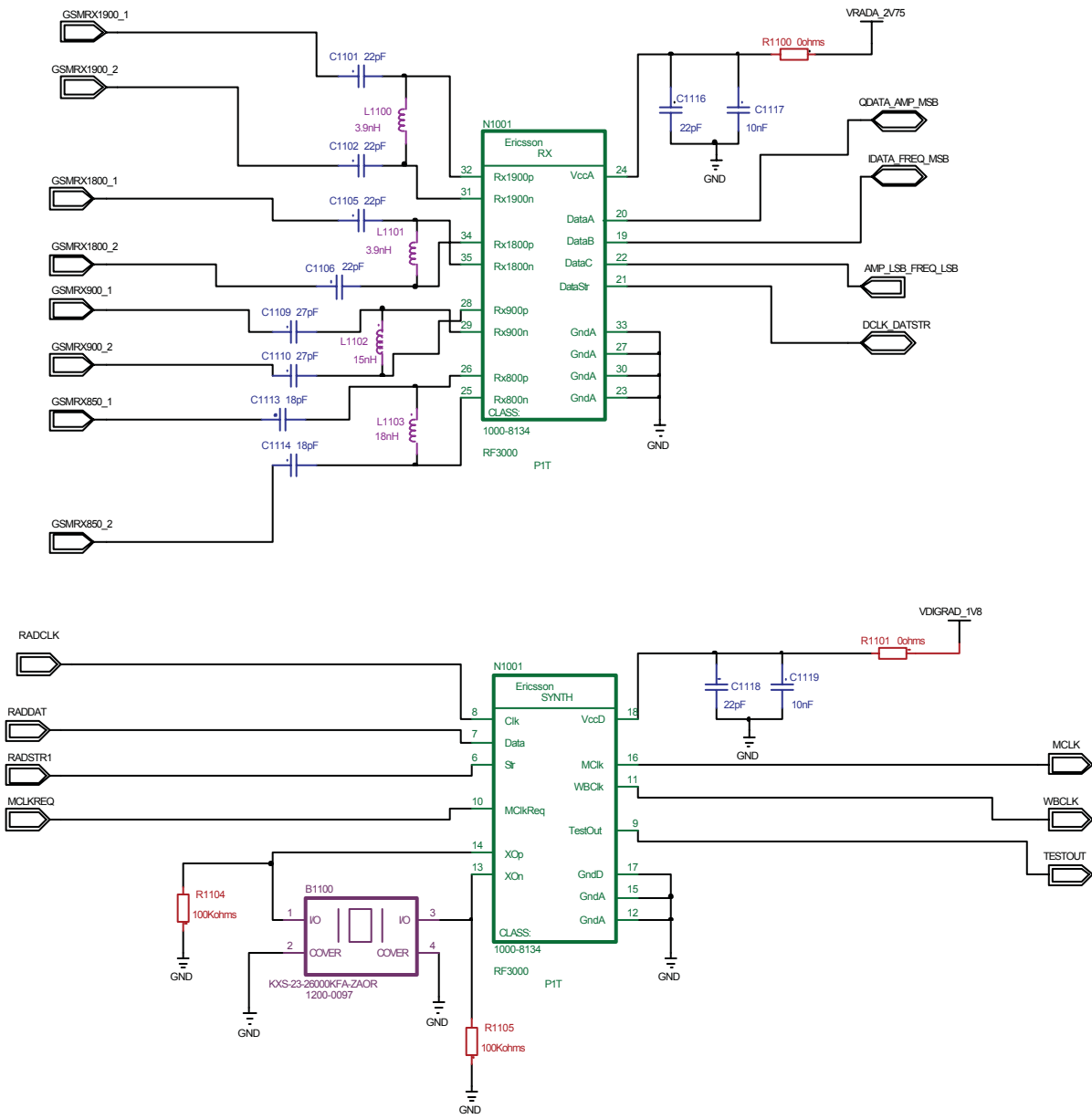


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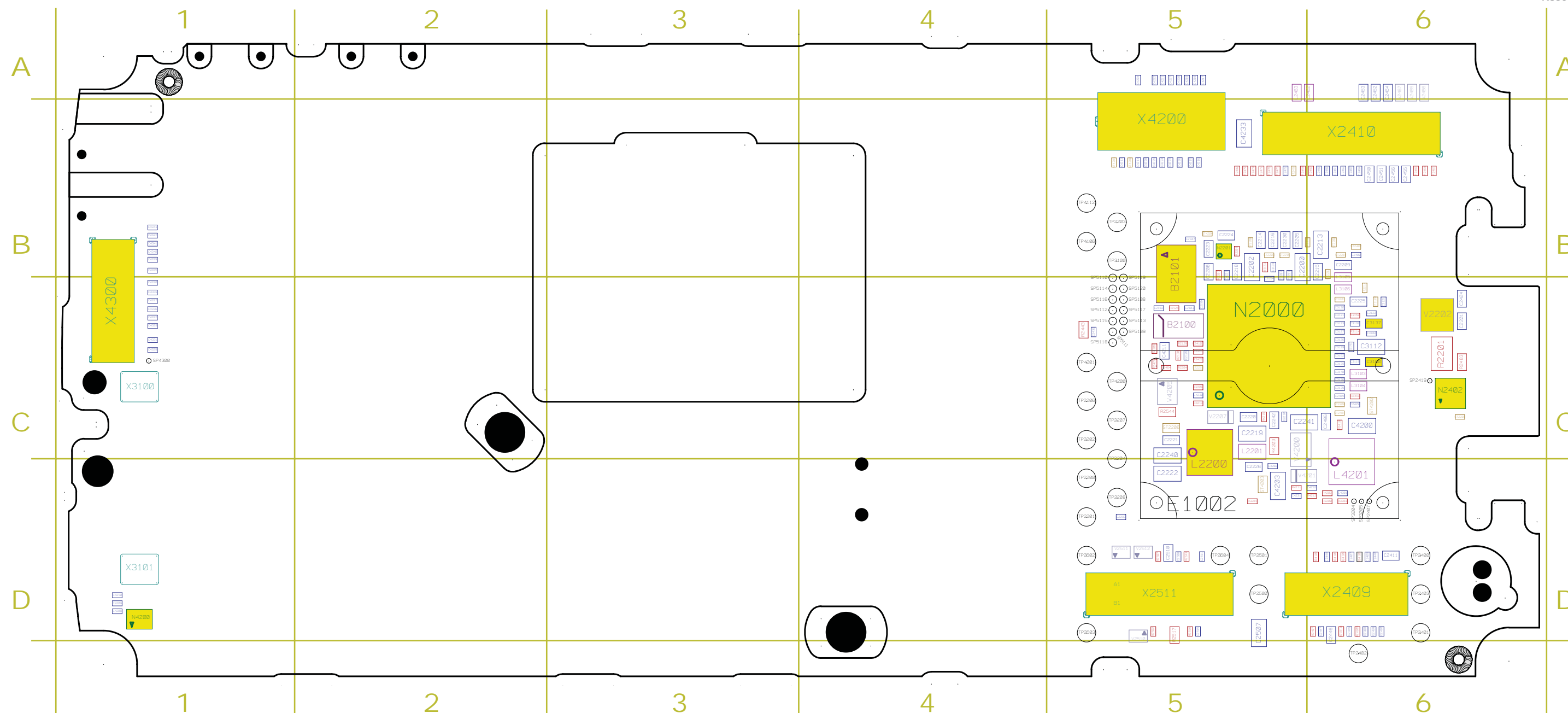


1203-2528 rev. 1 56 (101)

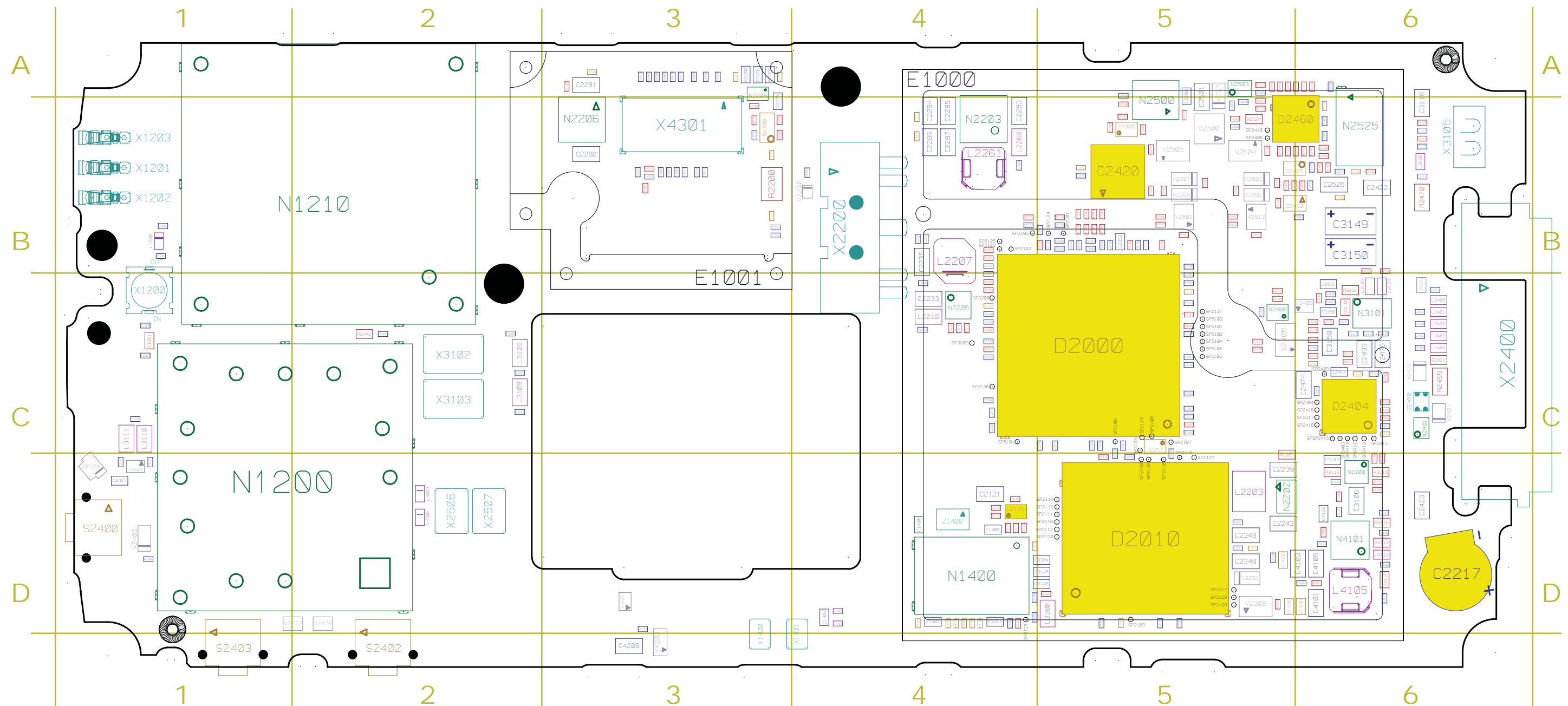
1203-2528 rev. 1 57 (101)



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Thor RF Module GSM/EDGE Rx + Synth	
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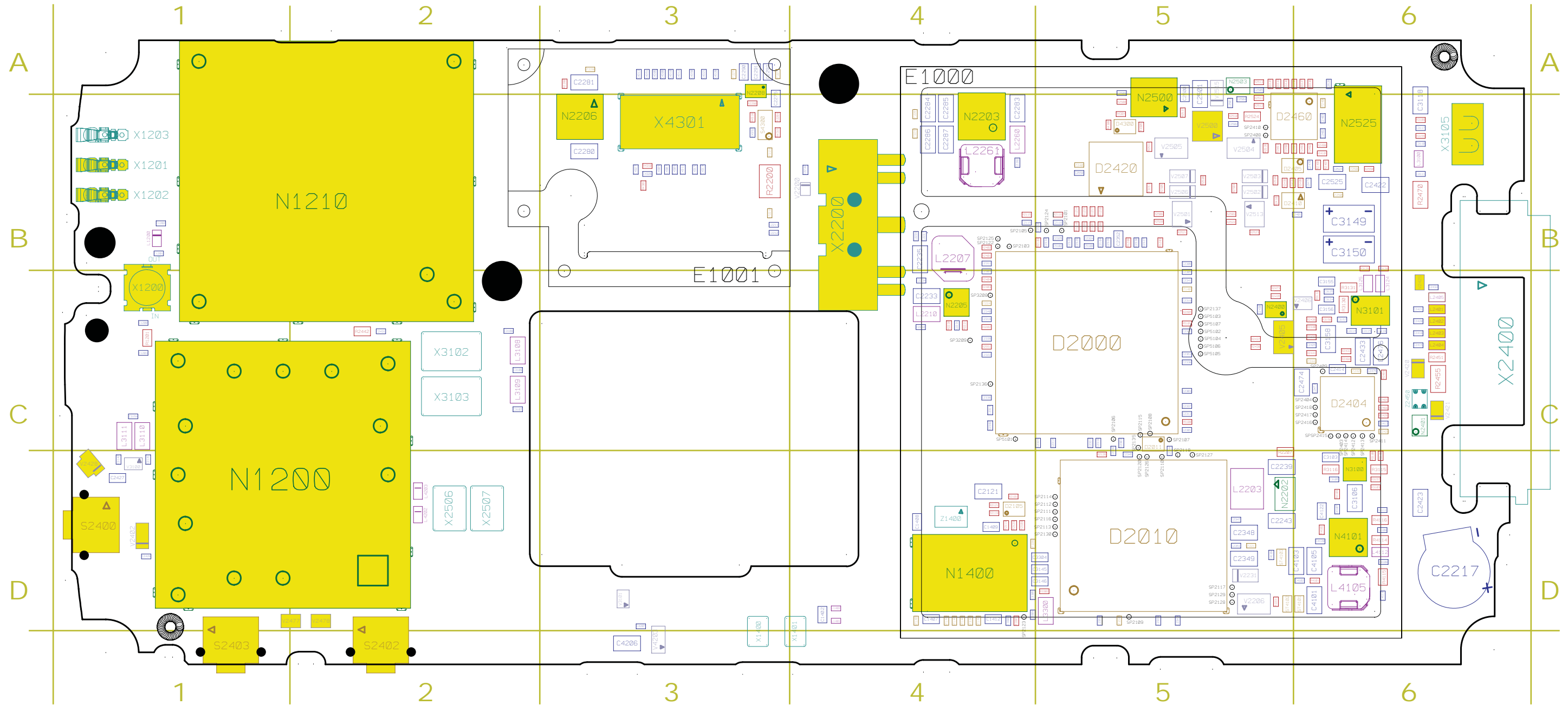


B2101	B5	R	C2221	RJC 516 3526/1	C5	C2424	RJC 464 3025/1	C6	C3122	RJC 463 3012/33	C6	C4208	RJC 516 4016/1	D1	C4227	RJC 463 3012/33	A5	L4201		D6	R2416	REP 621 005/1	C6	R2502	REP 621 003/18	D5	V2200	RYN 123 910/1	C6		
C2107	RJC 516 4016/1	B5	C2222	RJC 516 4038/1	D5	C2429	RJC 516 4016/1	C6	C3131	RJC 516 4016/1	C6	C4209	RJC 463 3012/33	D1	C4228	RJC 463 3012/33	B5	N2000	ROP 101 3106/1 R1A	C5	R	R2419	REP 621 005/1	C6	R2507	REP 621 003/18	D5	V2207	RKZ 123 905/2	C5	
C2200	RJC 516 3037/47	B5	C2223	RJC 516 3027/1	B5	C2440	RJC 516 4016/1	D6	C3132	RJC 516 4016/1	C6	C4211	RJC 516 3027/1	C5	C4229	RJC 516 4016/1	B5	N2201	RYT 113 955/7	B5	R	R2421	REP 621 004/47	C5	R2516	REP 621 006/1	D5	V2465		A6	
C2202	RJC 516 3037/47	B5	C2224	RJC 516 4027/22	B5	C2446	RJC 516 3027/22	D6	C3133	RJC 516 4016/1	C6	C4213	RJC 516 4016/1	B5	C4230	RJC 516 4016/1	C5	N2402		C6	R	R2422	REP 621 004/47	C5	R2517	REP 622 001/0	D5	V2466		A6	
C2204	RJC 516 4016/1	C5	C2225	RJC 516 4027/22	C6	C2450	RJC 516 4027/1	B6	C3135	RJC 516 4016/1	C6	C4214	RJC 516 4016/1	B5	C4233	RJC 516 3237/1	B5	N4200	RKZ 433 938/1		D1	R	R2427	REP 621 006/1	C5	R2543	REP 621 001/0	D5	V2467		A6
C2205	RJC 516 4027/22	C5	C2226	RJC 516 3526/1	D5	C2451	RJC 516 4027/1	B6	C3136	RJC 463 3012/33	C6	C4215	RJC 463 3012/33	B5	C4325	RJC 463 3012/22	B1	R2125	REP 621 001/0	C5	R2443	REZ 401 0094/47A	C5	R2544	REP 622 001/0	C5	V4200	RYN 123 915/1	C5		
C2207	RJC 463 3012/47	B5	C2229	RJC 516 4016/1	B5	C2452	RJC 516 4027/1	A6	C3137	RJC 516 3026/47	C6	R	C4216	RJC 463 3012/33	B5	C4328	RJC 516 4016/1	C1	R2201	REP 624 650/1	C6	R2458	REP 621 006/1	B5	R3158	REP 621 001/0	C6	V4201	RKZ 123 905/2	D5	
C2208	RJC 516 3027/1	B5	C2230	RJC 516 4027/22	B5	C2453	RJC 516 4027/1	A6	C3138	RJC 516 3015/47	B5	C4217	RJC 463 3012/33	A5	C4329	RJC 516 4016/1	C1	R2203	REP 621 106/1	B5	R2459	REP 621 006/1	B6	R3200	REP 621 001/0	D6	V4205		C5		
C2209	RJC 516 4027/22	B6	C2240	RJC 516 4038/1	C5	C2454	RJC 516 4027/1	A6	C3139	RJC 463 3012/33	C6	C4218	RJC 463 3012/33	A5	E1002		D5	R	R2204	REP 621 004/47	C5	R2467	REP 621 006/47	B6	R3201	REP 621 001/0	D5	X4200	RYN 123 905/2 R1A	D6	
C2210	RJC 516 4016/1	C5	C2241	RJC 516 3237/1	C5	C2455	RJC 516 4027/1	B6	C3140	RJC 463 3012/33	C6	C4219	RJC 463 3012/33	A5	L2200		C5	R	R2206	REP 621 006/1	B5	R2468	REP 621 006/47	B6	R3202	REP 621 001/0	D6	X4210		B6	
C2213	RJC 516 3037/47	B6	C2242	RJC 516 3027/1	C5	C2456	RJC 516 4027/1	B6	C3151	RJC 463 3012/33	C6	C4220	RJC 463 3012/33	A5	L2201	REG 706 05/15	C5	R2407	REP 621 006/47	D6	R2469	REP 621 006/47	B6	R3203	REP 621 001/0	D6	X4211		D6		
C2214	RJC 516 4027/22	B5	C2400	RJC 516 4016/1	B6	C2507	RJC 516 4038/1	D5	C3152	RJC 463 3012/33	C6	C4221	RJC 463 3012/33	A5	L2462	REG 706 18/18	A6	R24105	REP 621 002/27	D6	R2475	REP 621 005/1	B5	R4203	REP 622 450/15	C5	X4200		B5		
C2215	RJC 516 3027/1	B6	C2405	RJC 516 3613/1	C6	C2510	RJC 516 3027/1	D5	C3154	RJC 516 3014/33	C5	C4222	RJC 463 3012/33	A5	L2463	REG 706 18/18	A5	R24106	REP 621 001/0	D6	R2476	REP 621 005/1	B5	R4206	REP 621 106/18	C5	X4200	RYN 123 905/2 R1A	C1		
C2216	RJC 516 3027/1	B5	C2406	RJC 516 3027/1	C6	C2511	RJC 516 3015/1	D5	C3160	RJC 516 3026/47	C6	R	C4223	RJC 463 3012/33	B5	L3103	REG 706 18/2	C6	R24107	REP 621 001/0	D6	R2477	REP 621 005/1	B5	R4209	REP 621 005/1	C5				
C2218	RJC 516 3027/1	B5	C2408	RJC 463 3012/33	D6	C2515	RJC 463 3012/33	D5	C4200	RJC 516 3037/22	C6	C4224	RJC 463 3012/33	B5	L3104	REG 706 18/2	C6	R24108	REP 621 001/0	D6	R2478	REP 621 005/1	B5	R4211		D5					
C2219	RJC 516 4038/1	C5	C2410	RJC 516 3015/1	D6	C3112	RJC 516 4038/1	C6	C4202		D5	C4225	RJC 463 3012/33	B5	L3105	REG 706 18/2	C6	R24109	REP 621 001/0	D6	R2479	REP 621 005/1	B5	R4212	REP 621 105/62	D6					
C2220	RJC 516 3526/1	C5	C2411	RJC 516 3027/1	D6	C3121	RJC 516 4016/1	C6	C4203	RJC 516 3237/1	D5	C4226	RJC 463 3012/33	B5	L3106	REG 706 18/2	C6	R24110	REP 621 001/0	D6	R2480	REP 621 005/1	B5	R4215	REP 621 002/1	C5					
<div>R - Replaceable See Appendix for more information.</div>																															



C1200	RJCUA552 3200/05	C1	C2236	RJC 516 4016/1	B4	C2301	RJC 516 4016/1	C5	C2324	RJC 516 4016/1	B5	C2342	RJC 516 4016/1	C5	C2414	RJC 516 4027/1	C6	C2500	RJC 516 4027/22	A5	C3141	RJC 463 3012/33	D1	C4105	RJC 516 4038/1	D6	D2011	RYT 326 912/1	C5			
C1202		B1	C2239	RJC 516 4038/1	D5	C2302	RJC 516 4016/1	C4	C2325	RJC 516 4016/1	B5	C2343	RJC 516 4016/1	D5	C2415	RJC 516 3214/1	C6	C2501	RJC 516 4037/22	A5	C3142	RJC 463 3012/33	D1	C4107	RJC 516 4016/1	D6	E2100			D4	R	
C1402	RJC 463 3021/15	D4	C2243	RJC 516 4038/1	D5	C2303	RJC 516 4016/1	C5	C2326	RJC 516 4016/1	B5	C2344	RJC 516 4016/1	C5	C2416	RJC 516 3214/1	C6	C2502	RJC 516 4016/1	B5	C3145	RJC 516 3026/47	D5	C4120	RJC 516 4016/1	D6	E2401			C6		
C1407	RJC 516 3526/1	D4	C2244	RJC 516 4016/1	B4	C2304	RJC 516 4016/1	C5	C2327	RJC 516 4016/1	B5	C2345	RJC 516 4016/1	D5	C2420	RJC 516 3015/1	C6	C2503	RJC 516 4016/1	B5	C3146	RJC 516 3026/47	D5	C4122	RJC 464 3025/22	D6	D2405			B5		
C1408	RJC 516 3526/1	D4	C2275	RJC 516 3027/1	B3	C2305	RJC 516 4016/1	C5	C2328	RJC 516 4016/1	B5	C2346	RJC 516 4016/1	D5	C2421	RJC 516 3015/1	C6	C2505	RJC 516 4016/1	B5	C3149		B6	C4206	RJC 516 3037/22	E3	D2410	RYT 326 910/1	B5			
C1409	RJC 516 3526/1	D4	C2280	RJC 516 4038/1	B3	C2307	RJC 516 4016/1	C4	C2329	RJC 516 4016/1	B5	C2347	RJC 516 4016/1	D5	C2422	RJC 516 3237/1	B6	C2509	RJC 516 3015/33	A5	C3150		B6	C4207	RJC 463 3012/33	D3	E2420			D6	R	
C2110	RJC 463 3012/33	B5	C2281	RJC 516 4038/1	A3	C2308	RJC 516 4016/1	B5	C2330	RJC 516 4016/1	B5	C2348	RJC 516 3037/47	D5	C2423	RJC 496 2137/1	D6	C2524	RJC 516 4016/1	B6	C3155	RJC 516 3026/47	C6	C4320	RJC 516 4016/1	A3	E2430			RYT 326 912/1	D6	R
C2121	RJC 516 3037/47	D4	C2282	RJC 516 4016/1	B4	C2311	RJC 516 4016/1	B4	C2333	RJC 516 4016/1	C5	C2349	RJC 464 3036/22	D5	C2430	RJC 516 4016/1	C5	C2525	RJC 516 4038/1	B6	C3156	RJC 516 3026/47	C6	C4321	RJC 516 4016/1	A3	D4300			RYT 326 912/1	B5	
C2211	RJC 463 3012/22	B3	C2283	RJC 516 4038/1	B4	C2313	RJC 516 4016/1	C5	C2334	RJC 516 4016/1	B5	C2350	RJC 516 4016/1	D5	C2433	RJC 516 4038/1	C6	C2526	RJC 516 4016/1	A6	C3157	RJC 463 3012/33	C6	C4327	RJC 516 4016/1	B3	E1000			A4	R	
C2212	RJC 463 3011/33	B3	C2284	RJC 516 4038/1	B4	C2314	RJC 516 4016/1	C5	C2335	RJC 516 4016/1	C5	C2351	RJC 516 4016/1	D5	C2434	RJC 516 4016/1	C6	C2550	RJC 516 4016/1	B5	C3158	RJC 516 4038/1	C6	C4350	RJC 516 4016/1	A3	E1001			C3	R	
C2217	RJE 355 1335/1	D6	R	C2285	RJC 516 4038/1	B4	C2315	RJC 516 4016/1	C4	C2336	RJC 516 4016/1	C4	C2352	RJC 516 3027/1	B5	C2470	RJC 516 4016/1	B6	C3103	RJC 516 4027/1	D6	C3304	RJC 464 3025/22	D5	C4351	RJC 516 4016/1	A3					
C2231	RJC 463 3012/22	C4	C2286	RJC 516 4038/1	B4	C2316	RJC 516 4016/1	C5	C2337	RJC 516 4016/1	C5	C2353	RJC 516 4016/1	C5	C2471	RJC 516 4016/1	B6	C3106	RJC 516 4038/1	D6	C3305	RJC 516 4016/1	D4	C4352	RJC 516 4016/1	B3						
C2232	RJC 516 4016/1	C4	C2287	RJC 516 4038/1	B4	C2317	RJC 516 4016/1	C5	C2338	RJC 516 4016/1	C5	C2401	RJC 516 4016/1	B6	C2473	RJC 516 4016/1	C6	C3117	RJC 463 3012/33	B6	C3306	RJC 463 3013/1	D4	C5100	RJC 516 3015/33	B5						
C2233	RJC 516 4038/1	C4	C2290	RJC 516 3027/22	A3	C2318	RJC 516 4016/1	C4	C2339	RJC 516 4016/1	C4	C2402	RJC 516 4016/1	B6	C2474	RJC 516 3037/47	C6	C3118	RJC 516 4038/1	B6	C4101	RJC 516 4038/1	D6	C5102	RJC 516 3015/33	B5						
C2234	RJC 516 4016/1	C4	C2291	RJC 516 3027/1	A3	C2319	RJC 516 4016/1	C5	C2340	RJC 516 4016/1	C4	C2403	RJC 516 4016/1	B6	C2475	RJC 516 4016/1	C6	C3124	RJC 516 4016/1	C6	C4103	RJC 516 4038/1	D6	E2500			C5	R				
C2235	RJC 516 3037/47	B4	C2292	RJC 516 3027/22	A3	C2322	RJC 516 4016/1	C4	C2341	RJC 516 4016/1	C5	C2413	RJC 516 4016/1	C6	C2476	RJC 516 3037/47	C6	C3125	RJC 516 4016/1	C6	C4104	RJC 516 3613/33	D5	E2510			C5	R				
<div>R - Replaceable See Appendix for more information.</div>																																





L1200		B1	L3300	REG 704 4243/27	D5	N3101	ROP 101 3074/1 R1A	C6	R	R2220	REP 621 006/1	C4	R2439	REP 621 004/1	C6	R2491	REP 621 006/1	B5	R2534	REP 621 001/0	B5	R3156	REP 621 103/1	C6	S4300	RYT 109 933/1	B3	V2507	RKZ 123 905/1	B5		
L1402	REG 724 5182/18NH	D4	L4105		D6	N4101		D6	R	R2221	REP 621 001/0	C4	R2440	REP 621 104/1	C6	R2492	REP 621 006/1	B6	R2535	REP 621 001/0	B5	R3157	REP 621 004/47	C6	V2206	RYN 120 903/1	D5	V2513	RYN 121 929/1	B5		
L2203	REG 903 0049/22	D5	L4112	REG 706 18/18	D6	R1201	REP 622 001/0	C1		R2231	REP 621 004/1	D5	R2441	REP 621 105/47	C6	R2493	REP 621 006/1	B6	R2537	REP 621 006/1	B5	R3301	REP 621 001/0	E4	V2231	RKZ 123 905/1	D5	V2515	RKZ 123 905/1	A5		
L2207		B4	L4202	REG 724 9342/56	D2	R1203	REP 621 006/1	B5		R2280	REP 621 006/1	A3	R2442	REZ 401 0094/47A	C2	R2494	REP 621 006/1	B6	R2550	REP 621 006/1	B6	R3302	REP 621 004/33	D5	V2402	RKZ 123 905/2	D1	R	X1300	REP 109 41 00A	C1	
L2210	REG 706 05/24	C4	L4203	REG 724 9342/56	D2	R1214	REP 621 103/2	B5		R2286	REP 621 004/33	B3	R2444	REP 621 006/1	A5	R2498	REP 621 001/0	B6	R2551	REP 621 001/0	C4	R4102	REP 621 001/0	D6	V2405	RYN 901 910/2	C6	R	X1301	SDW 901 61 R1A	B1	
L2260	REG 706 05/15	B4	N1200		D1	R	R1215	REP 621 103/2	B5	R2290	REP 621 006/1	B3	R2445	REP 621 006/1	A5	R2500	REP 621 006/1	B5	R3102	REP 621 004/47	D6	R4103	REP 621 006/1	D6	V2406	RYN 121 931/1	C6		X1302	SDW 901 61 R1A	B1	
L2261		B4	N1210		B2	R	R1216	REP 621 103/2	B5	R2401	REP 621 004/33	B4	R2446	REP 621 006/1	A6	R2503	REP 621 005/18	B5	R3103	REP 621 005/1	D6	R4114	REP 622 001/0	D6	V2408	RKZ 123 905/2	C6	R	X1303	SDW 901 61 R1A	B1	
L2401	REG 706 18/20	C6	R	N1400	D4	R	R1217	REP 621 103/2	B5	R2402	REP 621 004/33	B4	R2447	REP 621 006/1	A6	R2504	REP 621 005/18	B5	R3106	REP 621 005/1	D6	R4115	REP 622 001/0	D6	V2409	RKZ 123 905/2	C6	R	X2200	SDW 106 22 R1A	B1	
L2402	REG 706 18/20	C6	R	N2202	D5	R	R2100	REP 621 006/1	D4	R2403	REP 621 004/33	C4	R2448	REP 621 006/1	A5	R2505	REP 621 005/18	B5	R3109	REP 621 103/1	B6	R4116	REP 622 001/0	D6	V2405		C6	R	X1305		B6	
L2403	REG 706 18/20	C6	R	N2203	B4	R	R2101	REP 621 006/1	D4	R2404	REP 621 004/33	C4	R2451	REP 622 001/0	C6	R2506	REP 621 005/18	B5	R3112	REP 621 006/1	C6	R4300	REP 621 005/1	B5	V2408	RKZ 123 905/2	D1	R	X4301	SDW 109 92 R1A	B1	
L2404	REG 706 18/20	C6	R	N2205	RYT 113 7838/1	C4	R	R2104	REP 621 002/47	B5	R2406	REP 621 106/22	B6	R2455	REP 623 001/0	C6	R2510	REP 621 007/1	B5	R3115	REP 622 001/0	D6	R4301	REP 621 001/0	B3	V2407		D2	R	Z1400	RTN 202 941/1	D4
L2405	REG 706 18/20	C6		N2206	RYT 113 7822/1	B3	R	R2115	REP 621 001/0	B4	R24100	REP 621 001/0	B5	R2465	REP 621 006/47	C6	R2511	REP 621 105/33	B5	R3116	REP 622 001/0	D6	R4304	REP 621 006/1	B5	V2409		D2	R	Z2450		C6
L3100	REG 706 18/2	B6		N2208	RYT 113 997/4	A3	R	R2116	REP 621 001/0	B5	R24101	REP 621 001/0	B6	R2466	REP 621 006/47	C6	R2512	REP 621 106/22	B5	R3128	REP 621 005/1	B6	R4305	REP 621 006/1	B5	V2500		D2	R			
L3108		C2		N2400	RYT 109 914/1	C5	R	R2118	REP 621 001/0	D4	R2426	REP 621 105/12	C6	R2470	REP 623 001/0	B6	R2513	REP 621 104/1	A5	R3129	REP 621 005/1	B6	R4310	REP 621 001/0	B3	V2501	RYN 121 929/1	B5				
L3109		C2		N2401	RKZ 923 926/1	C6		R2119	REP 621 006/1	D4	R2433	REP 621 006/1	C6	R2473	REP 621 001/0	C5	R2520	REP 621 005/18	B5	R3130	REP 622 001/0	C6	R5100	REP 621 005/1	C5	V2502	RKZ 123 905/1	B5				
L3110	REG 704 4242/56	C1		N2500		B5	R	R2121	REP 621 002/1	D4	R2435	REP 621 005/1	C5	R2484	REP 621 003/47	C6	R2521	REP 621 004/1	B5	R3131	REP 622 001/0	C6	R5101	REP 621 006/1	C5	V2503	RKZ 123 905/1	B5				
L3111	REG 704 4242/56	C1		N2503		A5		R2126	REP 621 004/33	D4	R2436	REP 621 003/56	C6	R2485	REP 621 006/1	C5	R2522	REP 621 005/18	B5	R3153	REP 621 006/1	B5			S4300	REG 706 18/20	C6	R	V2504	RYN 123 919/1	B5	
L3124	REG 724 5533/1	C6		N2525		B6	R	R2200	REP 624 650/025	B3	R2437	REP 621 004/47	C5	R2486	REP 621 006/1	B6	R2523	REP 621 004/1	B5	R3154	REP 621 105/24	B5			S4302	REG 706 18/20	C6	R	V2505	RYN 123 919/1	B5	
L3125	REG 724 5533/1	C6		N3100	RYT 101 947/2	D6	R	R2207	REP 622 001/0	D5	R2438	REP 621 003/47	C5	R2490	REP 621 006/1	B5	R2524		B5	R3155	REP 621 004/22	D6			S4303	REG 706 18/20	C6	R	V2506	RKZ 123 905/1	B5	
<div>R - Replaceable See Appendix for more information.</div>																																

R - Replaceable  
See Appendix for  
more information.

## K850 Technical Overview

### General

5 megapixel Cyber-shot™ phone with auto focus  
Automatic lens cover  
Xenon flash with red-eye reduction  
Auto rotation of photos  
BestPic™, Photo fix and picture blogging  
PictBridge support  
x-Pict Story™  
Media player, FM radio with RDS and TrackID™  
Memory Stick Micro™ (M2™)  
Bluetooth™ technology incl. stereo (A2DP)  
Push email  
Access NetFront™ Web Browser  
Video call

Size: 102 x 48 x 17 mm  
Weight: 118 grams

Networks  
K850i: UMTS/HSDPA 850/1900/2100-GSM/GPRS/EDGE 850/900/1800/1900

Colors:  
Luminous Green  
Velvet Blue

Type of screen: 262,144 color TFT  
Screen resolution: 240 x 320 pixels

Talk time GSM/UMTS: Up to 9 hrs/3 hrs 30 min  
Standby time GSM/UMTS: Up to 400/350 hrs  
Video call time: Up to 3 hrs 20 min

### Hardware Overview

The K850 is using the U360 platform provided by Ericsson Mobile Platform (EMP)

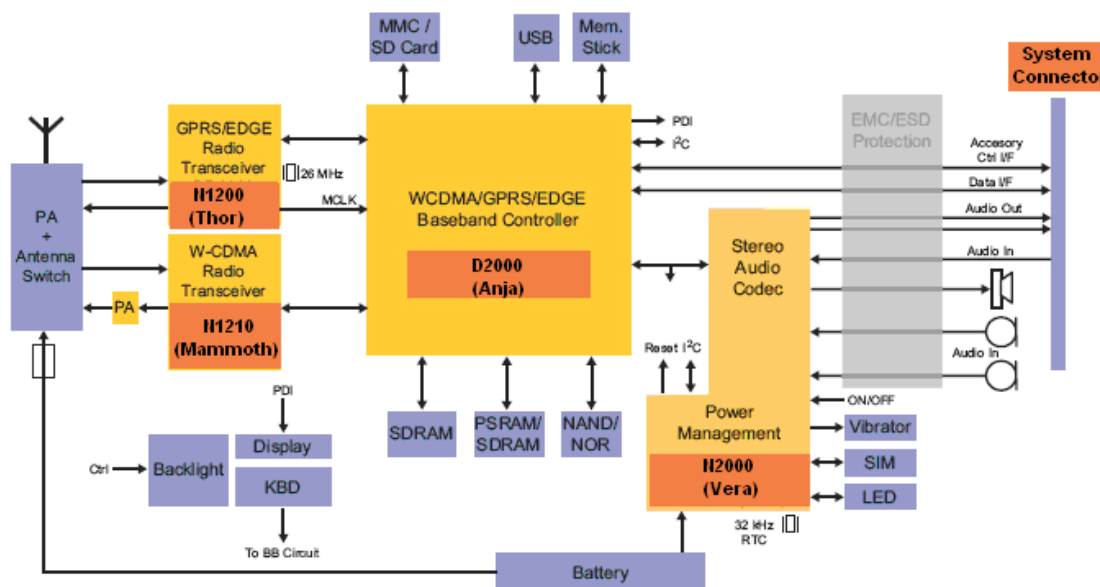
### Baseband Part

#### Analog Baseband Controller Power Management N2000 (Vera)

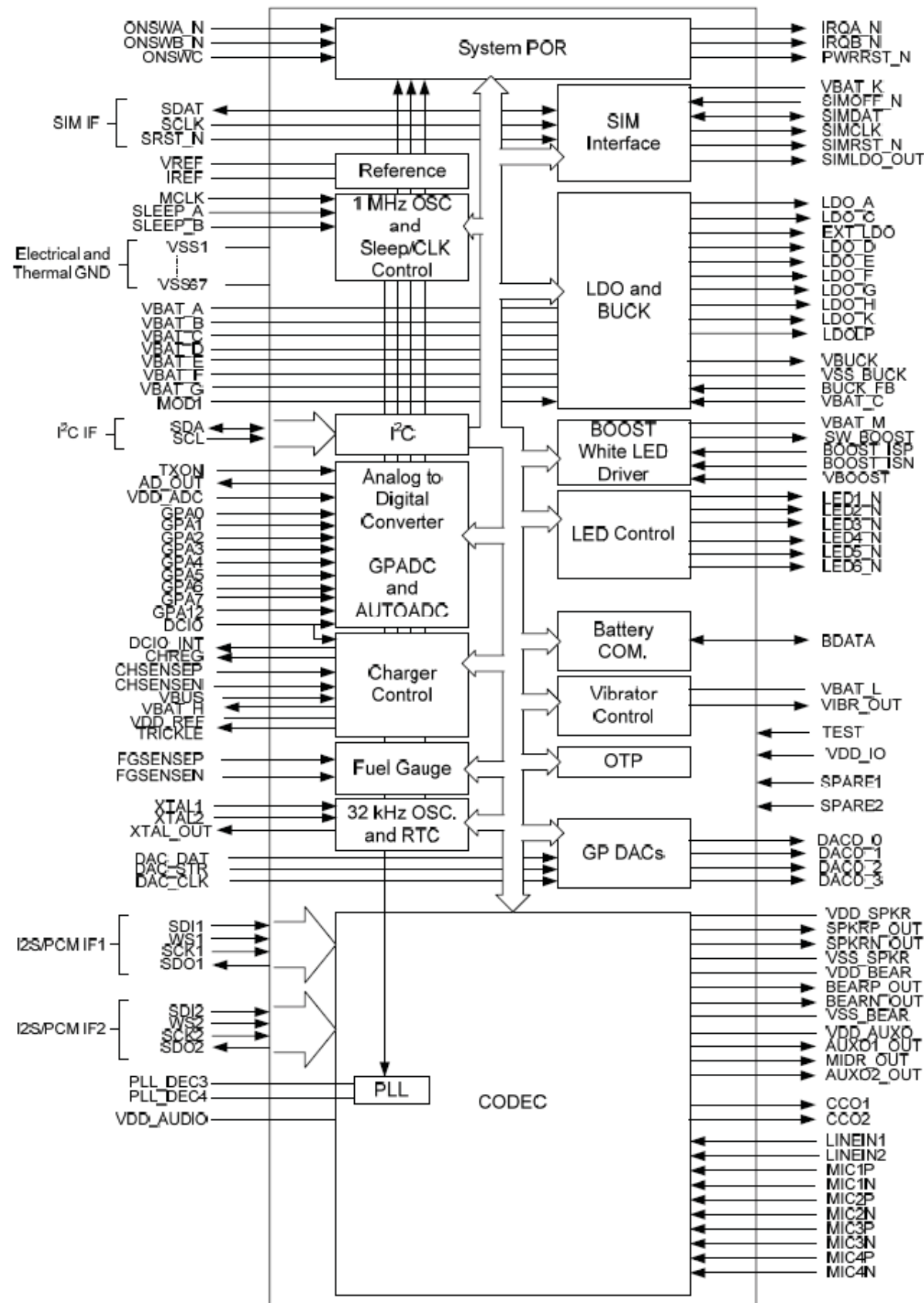
This component is not replaceable on SL 4 because Baseband calibration is required.  
The analog baseband controller is a mixed digital and analog device that supports the following circuitry:

- 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 driving White Light Emitting Diode (WLED)
- Battery charging and communication circuitry
- Battery fuel gauging circuitry
- Analog-to-Digital Converter (ADC)
- SIM interface
- Six programmable LED drivers
- Accurate band gap reference
- Vibrator driver
- Real Time Clock (RTC)
- Eight-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

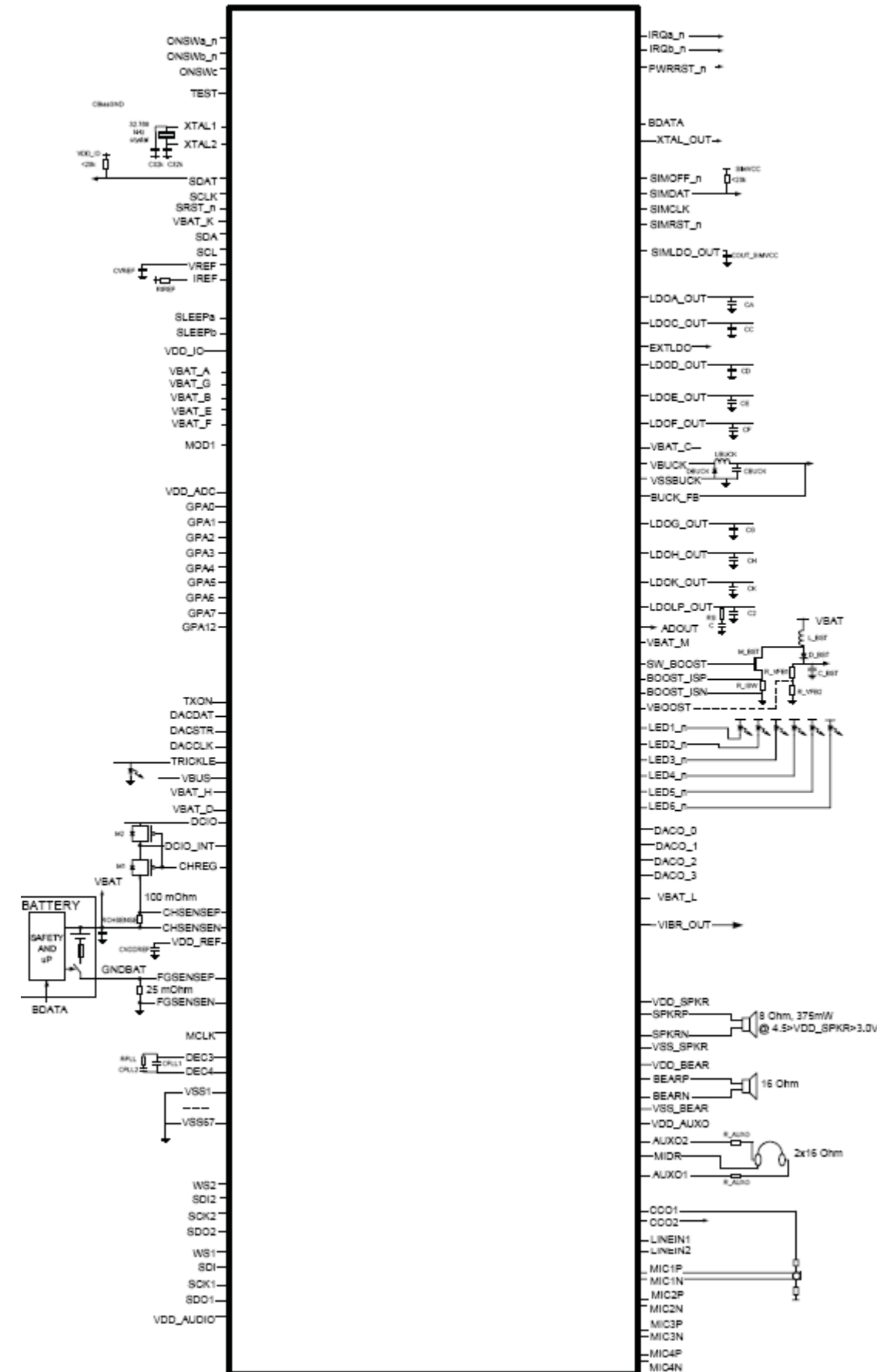
The analog baseband controller is controlled by an I2C™ interface. It also comprises the main power management circuits, equipped with a number of converters and regulators for generating the required supply voltages.



Functional Blocks of the Analog Baseband Controller.



Connection Diagram



## 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

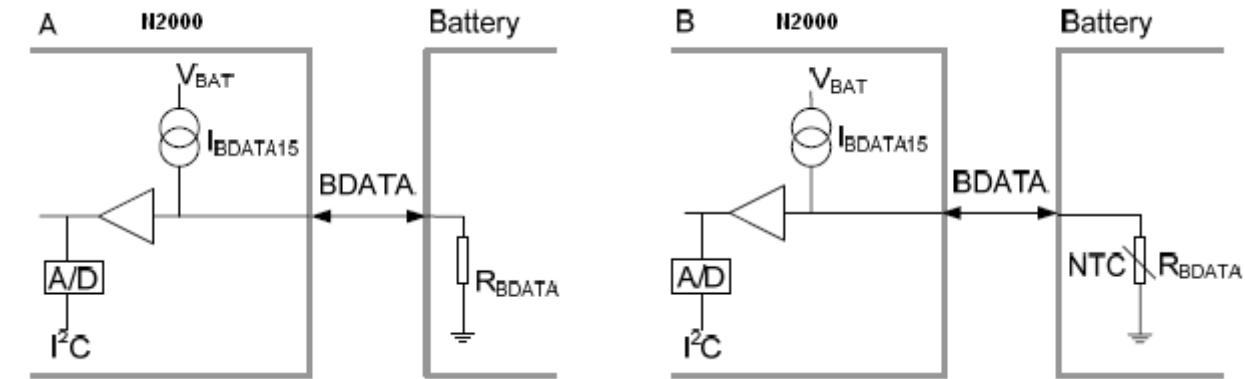
The analog baseband controller contains a standalone USB charger. The USB charger has a separate input and incorporates full functionality during low VBAT.

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.

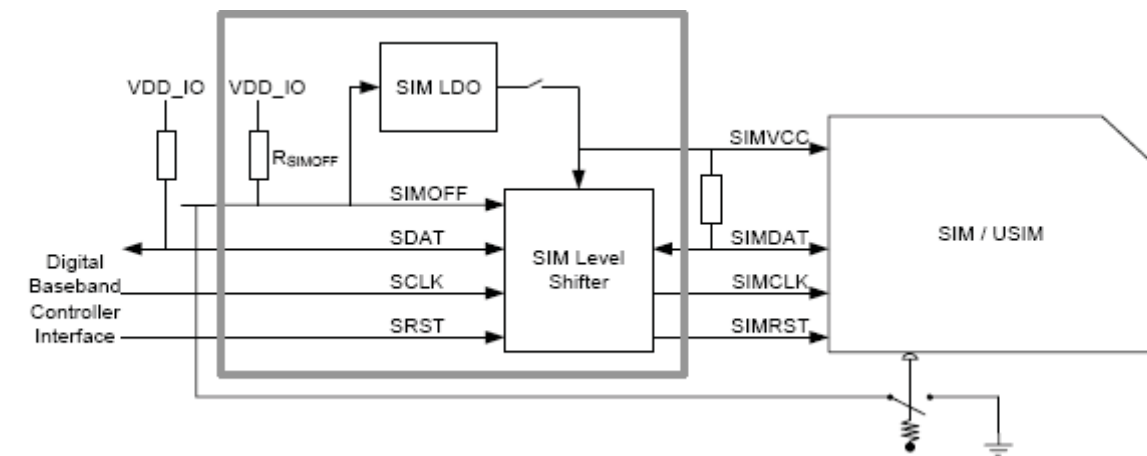


Resistance Identification (A) and Temperature Measurement (B)

## SIM Interface

The SIM interface supplies level 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.

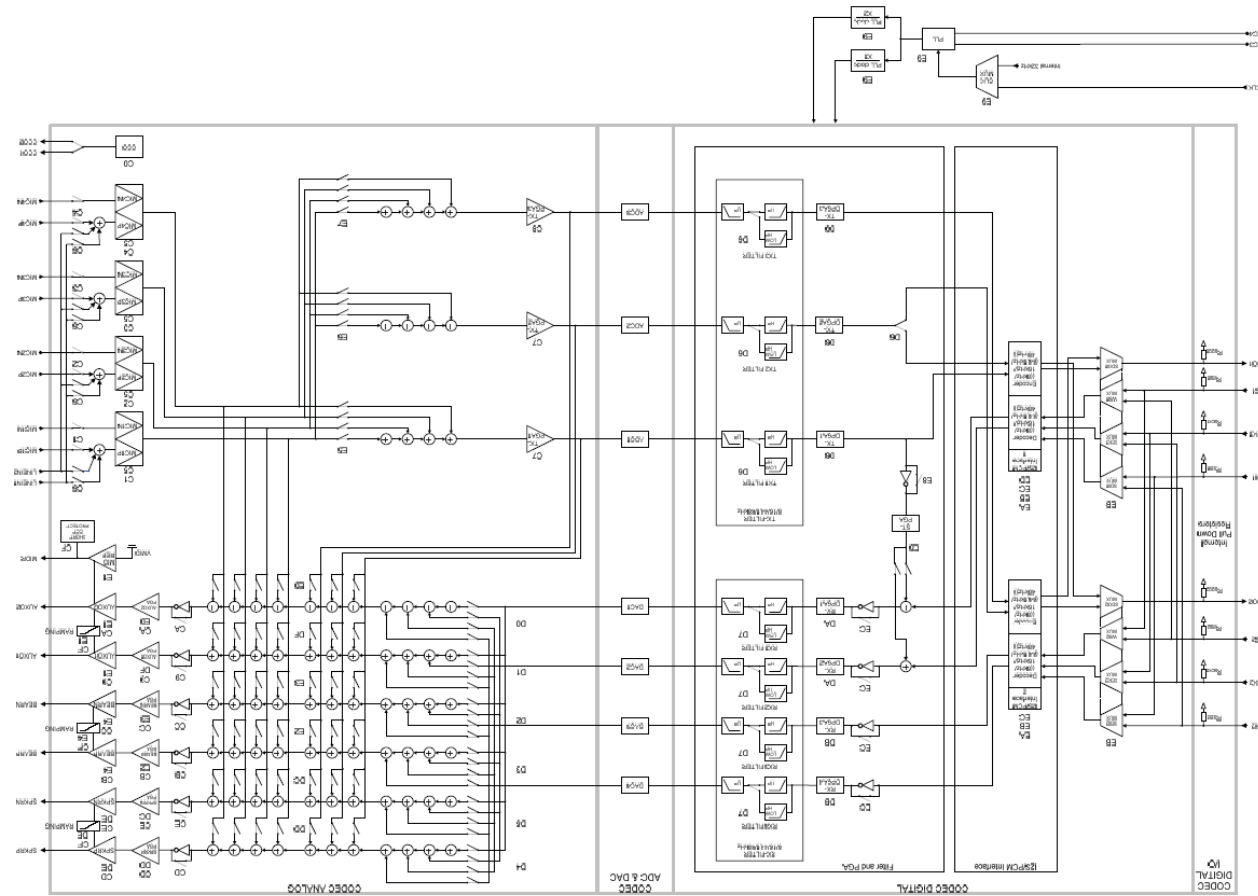


## CODEC Overview

The CODEC is encoding analog audio signals and analog voice signals into digital signals using 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).

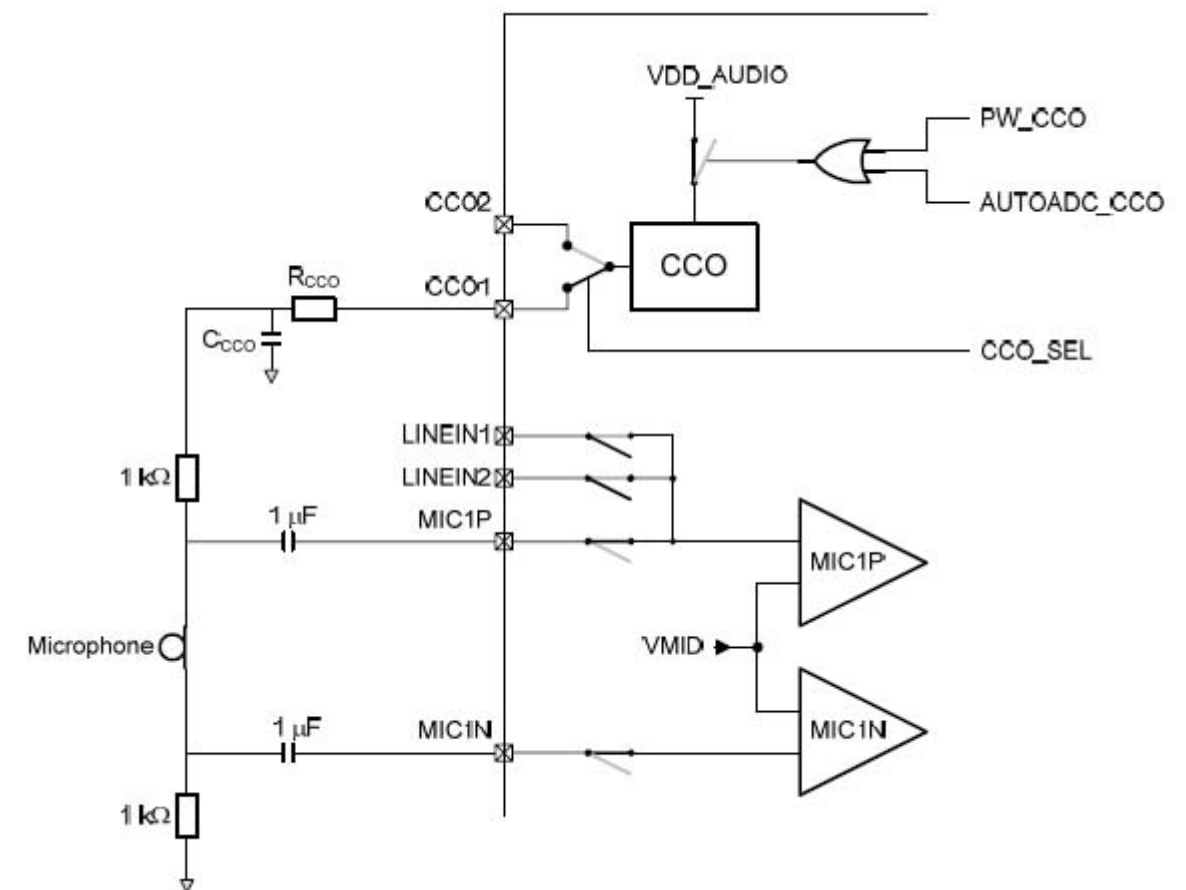


## CODEC Block Schematic



## CODEC CCO Voltage Source

There is an internal voltage source CCO that provides the necessary drive current for electret microphones. The voltage source is I<sup>2</sup>C 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 I<sup>2</sup>C. The amplifiers can exhibit high impedance to 1.4 V or low impedance to ground when powered-down. Fifty-one gains are available for BEARP and BEARN: from +15 dB down to -60 dB in 1.5 dB steps. When the BEARP and BEARN outputs are operating in differential mode, an I<sup>2</sup>C selectable bit must invert one of the inputs.

## Digital Baseband Controller (CPU) D2000 (Anja)

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

- Application
- Access

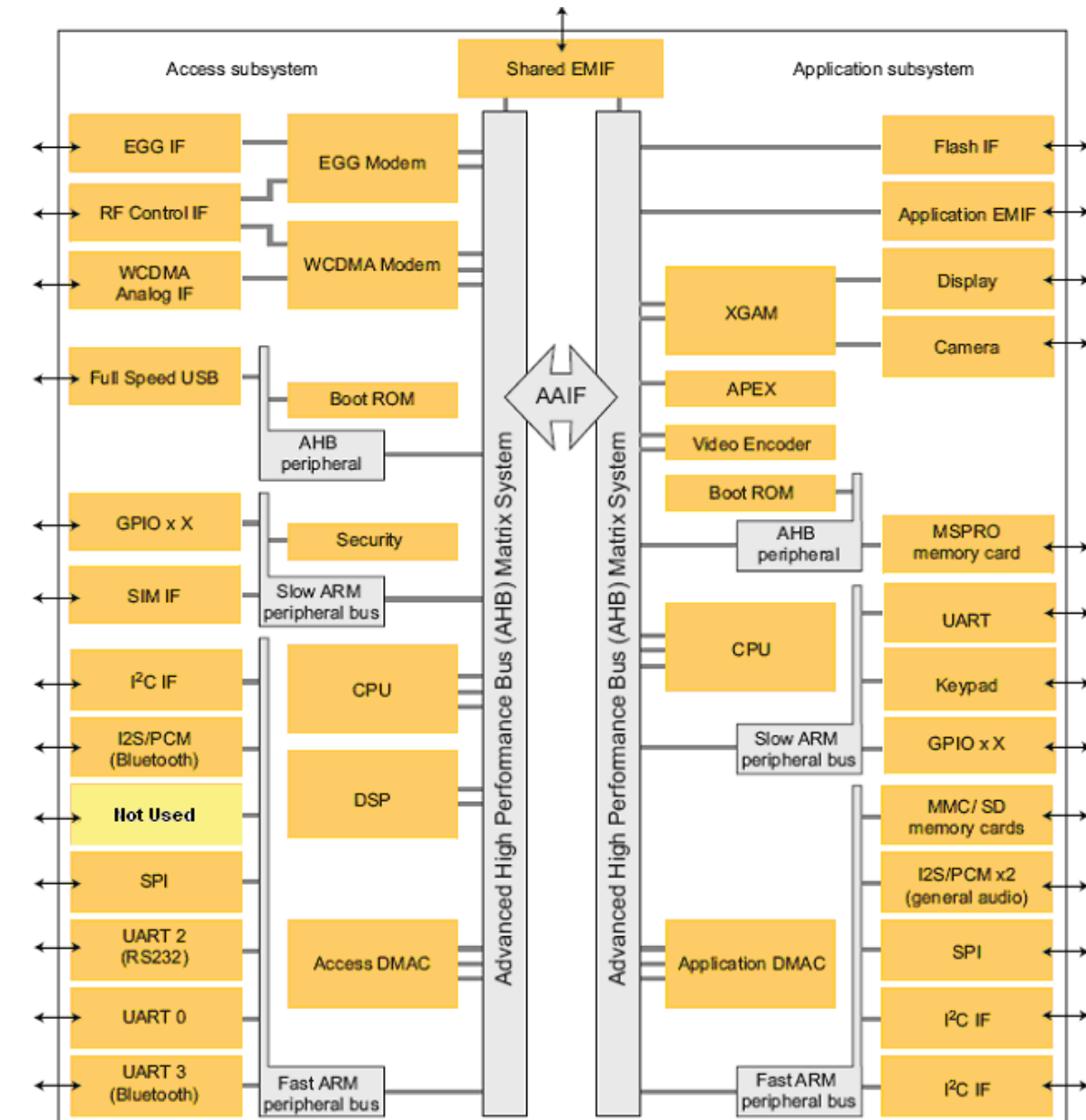
### Access Subsystem

All modem functionality in the digital baseband controller resides in the Access subsystem. This includes EDGE/GPRS/GSM interface, WCDMA interface, USB, 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 interface has 39 signals (including one chip select) and supports memory sizes up to 512 Mbit. The Shared EMIF is shared between the Access subsystem and the Application subsystem.

### 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 and a Flash IF 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. The Application EMIF has a total of 56 signals (including a maximum of 7 chip selects if GPIO is used) and can be set in several different modes to support different types of memory combinations.

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.

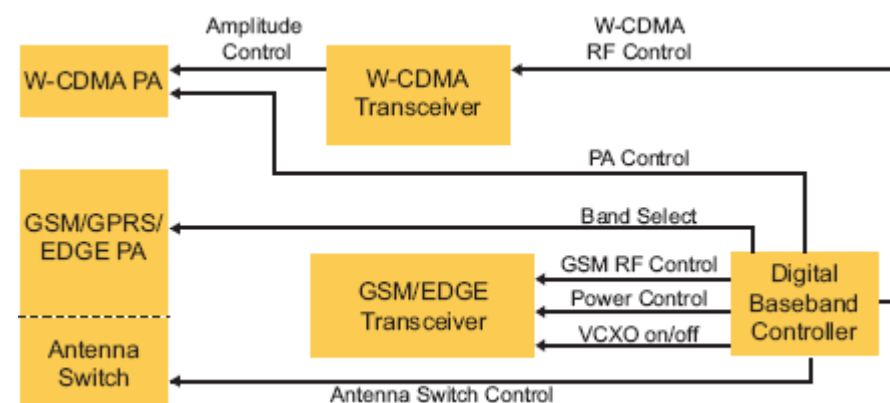


## RF System Control

The access subsystem 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 3-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 GSM/EDGE transceiver is turned on only when required. The digital baseband controller initiates turning on of the clock. The EDGE/GSM/GPRS RF system requires control, which is temperature dependent. The temperature within the RF system is estimated by a voltage measurement performed by the analog baseband controller N2000 (Vera).

The control flow for the RF system.

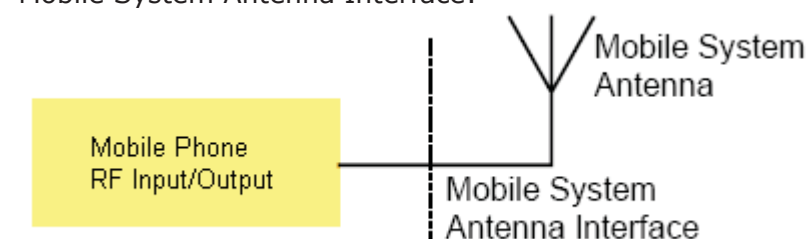


## Radio Part

### 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 Modules

### GSM/GPRS/EDGE Radio Module N1200 (Thor)

The Front End module block connects the proper block in the radio system to the antenna. The Front End module has two inputs for GSM/GPRS/EDGE, one for low band and one for high band. The GSM/GPRS/EDGE power amplifier output is filtered by the low pass filter in the Front End module and then connected to the antenna through a switch and diplexer. In receive mode, the GSM/GPRS/EDGE signal from the antenna passes through the diplexer and switch to one of the four internal receive SAW filters. The SAW filter provides receive band selectivity and converts the unbalanced receive signal to a differential signal required by the GSM/GPRS/EDGE receiver. In GSM/GPRS/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 the GSM, DCS, and PCS bands. The module is shielded using fence and lid technology. The main components contained are transceiver ASIC, PA module, Front End Module and X-tal.

### Frequency Generation

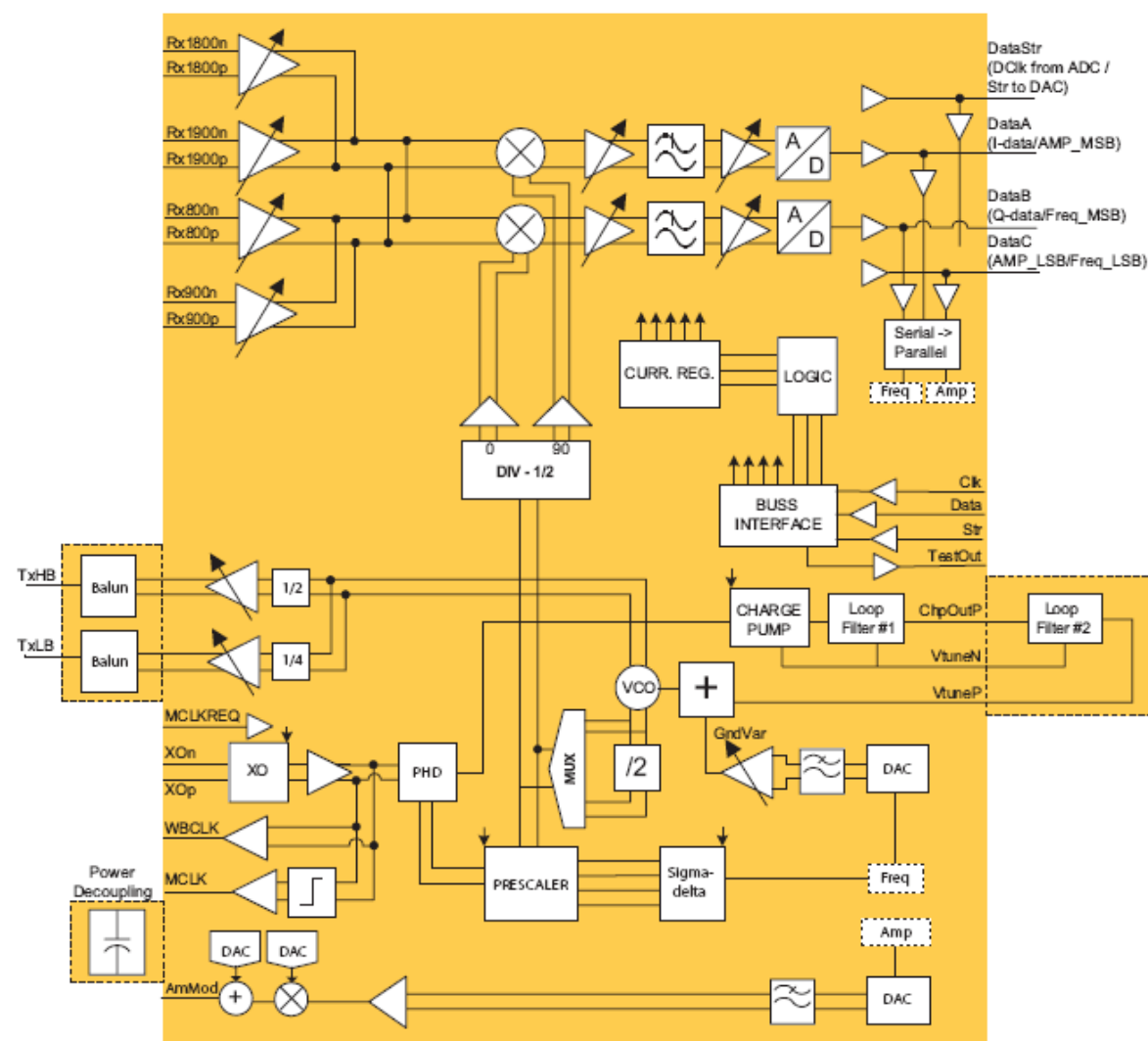
The 26 MHz reference signal is used as the reference for the on-chip synthesizer. To cover the required frequency range, the integrated Voltage Controlled Oscillator (VCO) operates at twice the frequency for band 1800/1900, and at four times the desired frequency for band 850/900.

### GSM/GPRS/EDGE Transceiver

The GSM/GPRS/EDGE transceiver use a digital interface that is shared between receive and transmit data. The receive interface is based on I and Q data and the transmitter interface is based on envelope and frequency data. The quad band GSM/GPRS/EDGE transceiver has the following general features:

- Individual low-noise amplifiers for the 850, 900, 1800 and 1900 MHz frequency bands with a common quadrature mixer
- Fully integrated VCO with dividers to generate both receive and transmit frequencies
- I and Q baseband receive channel amplifiers with on-chip antialiasing filtering
- I and Q receiver sigma-delta A to D converters
- Digital interface for the receive I and Q channel
- Multi modulus prescaler for direct VCO modulation in transmit mode
- Integrated phase detector with programmable charge pump
- Transmit output buffer with controllable output power level
- Transmit baluns integrated
- Digital interface for the transmit frequency and amplitude modulation
- 3-wire serial bus interface for control, configuration, and test
- Deep power down function
- Programmable power level to power amplifier (PA)

### Block diagram of the GSM/EDGE Transceiver



## Transmitter

The transmitter block consists of the following sub-blocks:

A separate block is used to convert the digital bit streams from the baseband into parallel words to be used in the DAC and the Sigma Delta modulator. This block also includes programmable delays for optimizing delays between the different modulation paths. The combined DAC and LP-filter is used to convert the digital words of the digital block into analog signals. The second FM-path is used to add the high frequency part of the FM to the VCO. It also includes an auto-tuning block that compensates VCO gain variations. The AM-block converts the differential voltage from the DAC to a single-ended output that drives the PA. The output is scaled according to the desired output power, and an offset can be added for PA linearization. The TX-buffer is used to drive the PA with the correct power level. A divide by 2 or 4 block is used to generate the correct output frequency from the 4 GHz VCO.

## TX Frequency, Channel and Power Level Range:

**GSM 850:**

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

### GSM 900:

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

**EGSM 900:**

Frequency Range: 880,2 MHz – 889,8 MHz  
Channel Range: 975 - 1023  
Power Level: Min: 19 – Max 5

**DCS 1800:**

Frequency Range: 1710,2 MHz – 1784,8 MHz  
Channel Range: 512 – 885  
Power Level: Min: 15 – Max 0

**PCS 1900:**

Frequency Range: 1850,2 MHz – 1909,8 MHz  
Channel Range: 512 – 810  
Power Level: Min: 15 – Max 0

## Receiver

The receiver is a homodyne receiver with direct conversion of the received radio channel to baseband I and Q channels. The analog signals are converted to digital bit streams in a sigma delta A/D converter. The receiver block consists of a front-end with separate LNAs for each band and a common quadrature mixer. The front-end block is followed by a baseband block with active antialiasing filters that also suppress blocking signals and interferers. After the baseband block is a fully integrated Analog to Digital Converter of sigma delta structure with high dynamic range. The digital output signals are sent over a serial interface to the digital base-band circuit for further processing and detection.

### RX Frequency and Channel Range

### GSM 850:

Frequency Range: 869,2 MHz – 893,8 MHz  
Channel Range: 128 – 251

### GSM 900:

Frequency Range: 935,2 MHz – 959,8 MHz  
Channel Range: 1 - 124

**EGSM 900:**

Frequency Range: 925,2 MHz – 934,8 MHz  
Channel Range: 975 – 1023





The front-end zero IF I and Q outputs are applied to the integrated low-pass channel filter. The filter is self-calibrated with a cut-off frequency around 2.15 MHz. The filter may be configured in the normal mode as an all-pole configuration or in the hybrid mode as a pole/stopband zero configuration. The hybrid mode is used in Bands II and V for suppression of narrowband blocking signals. Gain in the N300 may be programmed over the serial bus, with up to approximately 85 dB typical range. A zero IF output buffer provides close rail-to-rail outputs signal.

### Bluetooth and FM Radio

The STLC2592 circuit N1400 combines Bluetooth and FM tuner functionality into one unit.

#### 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 first stage of the receiver is an external antenna filter, which suppresses unwanted frequencies. The receiver is of a “near-zero” IF receiver architecture. The local oscillator is generated by a frequency synthesizer, which allows the receiver to be set at frequencies in intervals of 1 MHz. The synthesizer is controlled from the logic part. The received signal is sampled in the logic for later signal processing.

##### Transmitter

The synthesizer generates the TX frequency which modulated by the BT baseband block. It is then amplified. The BT system is a class 1 device with maximum of +4 dBm output power (minimum setting is about -50 dBm).

### 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.

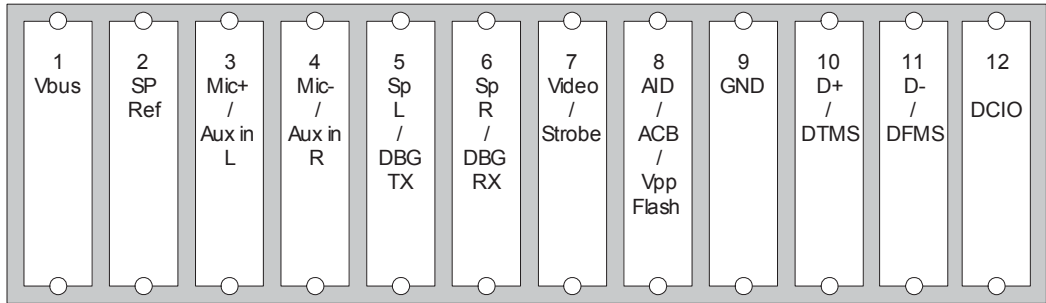
#### Tuning

The receiver uses frequency synthesizer technology including a completely integrated VCO. The frequency synthesizer generates the quadrature local oscillator signal used to convert the RF input down 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:

$$\text{Freq (MHz)} = \text{Spacing (kHz)} \times \text{Channel} + \text{Bottom of Band (MHz)}$$

External units are connected to the transceiver by means of a 12-pin connector on the bottom of the phone. The pin numbering is starting from the right when looking at the system connector with the front up.

System connector pin out:



### Clocks

#### Clock Distribution

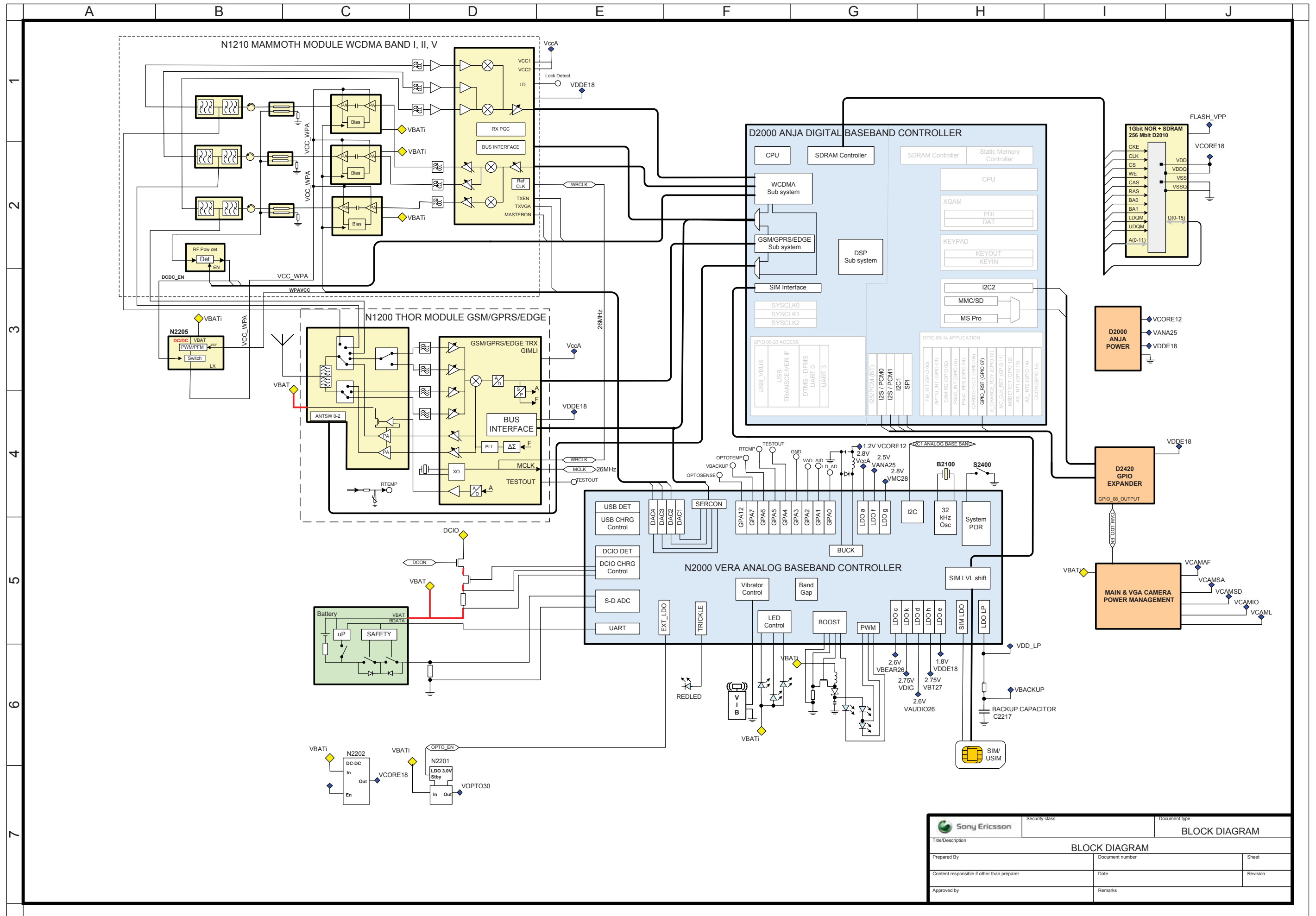
The clocking for the access and application subsystems is separated. This means that they can wake up or go to sleep mode independently. The access subsystem is clocked by the 26 MHz Voltage Controlled Crystal Oscillator (VCXO) located in the GSM/EDGE module N1200 (Thor). When the access subsystem has 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.

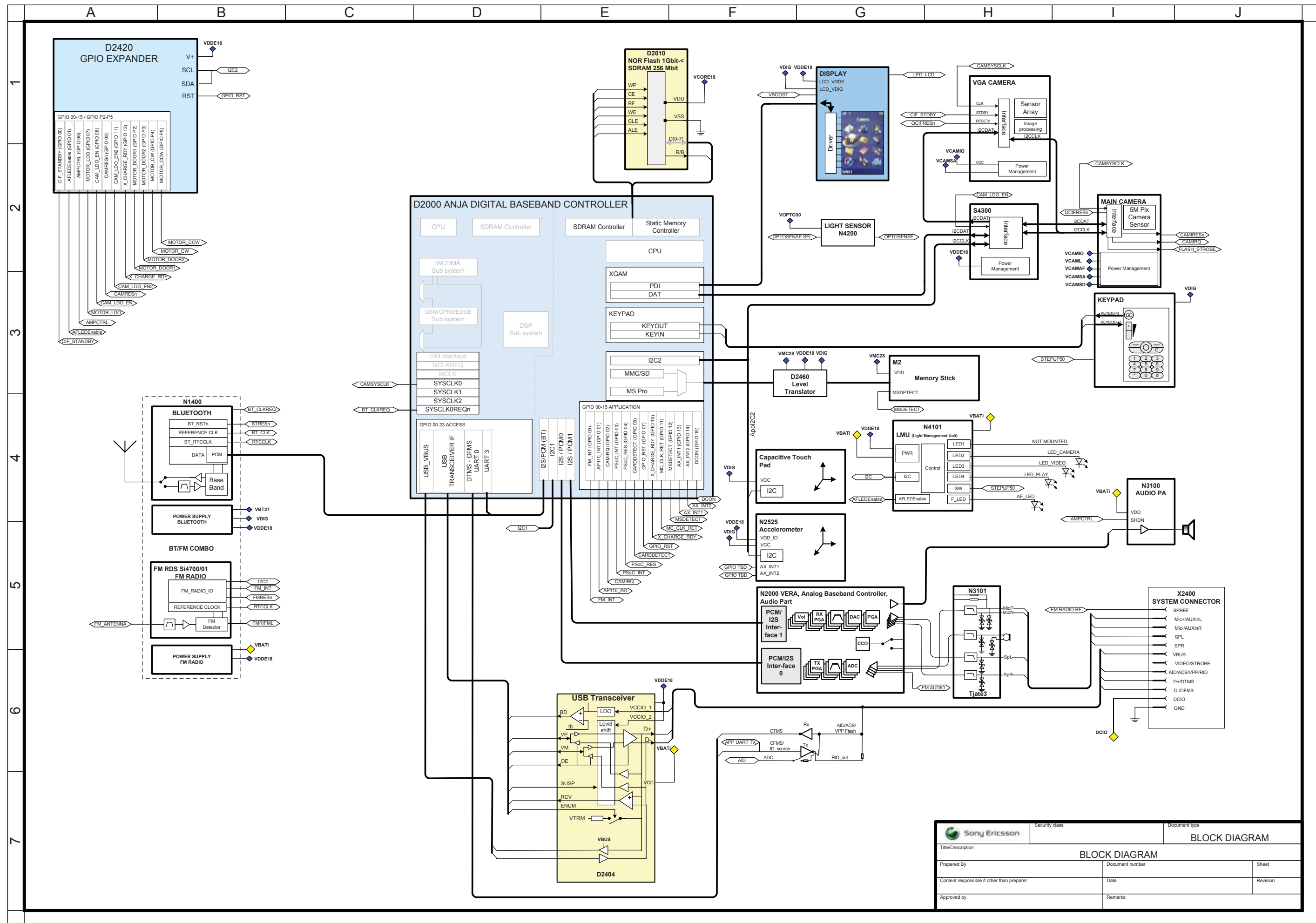
##### Master Clock (26 MHz)

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)

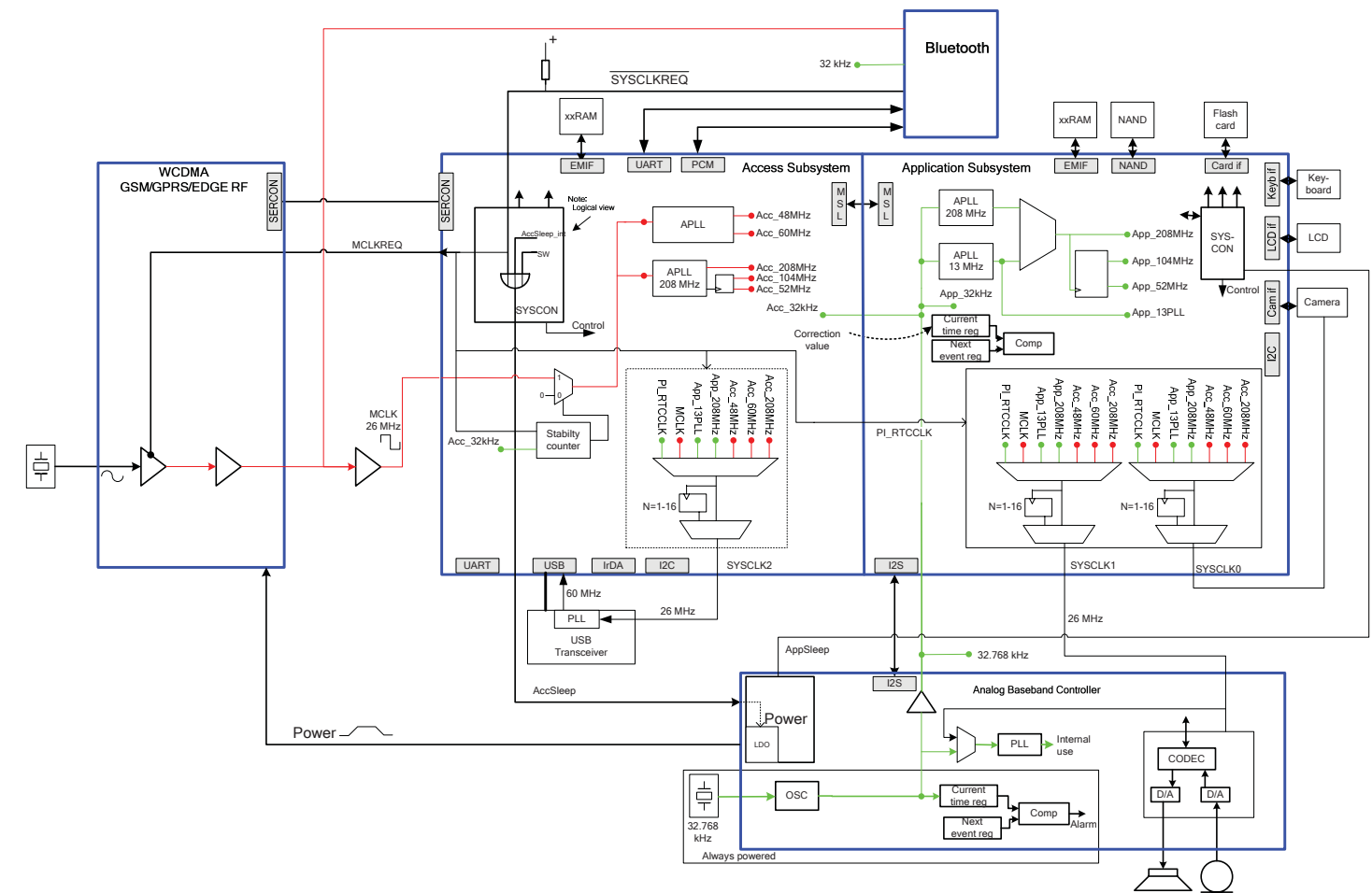
A 32.768 kHz crystal oscillator provides a low frequency clock whenever the phone has power. This clock is used to keep the Real-Time Clock (RTC) block operational, so that the phone can keep track of the time and date. The low frequency clock is generated in the analog baseband controller N2000 (Vera) and distributed to the digital baseband controller D2000 (Anja), and if necessary to external devices like Bluetooth, FM radio and A-GPS.







## FUNCTIONAL OVERVIEW



## Part List Main Board

Contains only components that are possible to replace on the main board.

Pos. number refers to the components position number on the board.

Some components are noted as MSL X. These components are moisture-sensitive and are rated at various levels (MSL):

- Level 1:** Unlimited floor life; does not require dry pack or re-baking.  
**Level 2:** 1 year floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.  
**Level 2A:** 4 week floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.  
**Level 3:** 168 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.  
**Level 4:** 72 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.  
**Level 5:** 48 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.  
**Level 5A:** 24 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.  
**Level 6:** 6 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.

Component placing can be found in document 1078/FEA 209 544/129.

**NOTE!** RF Calibration by using SERP can only be done by authorized repair centres.  
 Fence modification should be performed according to the Working Instruction Electrical.

Side	Pos.	Description	Part Number	Comments	Page
F	B2101	Osc XO 32.768 kHz LC	1200-3231	SL4	75
B	C2217	Capacitor 70.0 mF 3.3 V	RJE 355 1335/7	MSL1	
F	C3137	Capacitor Ceramic 470,0 nF +/- 10% 6,3 V K0402	RJC5163026/47	MSL1	
F	C3160	Capacitor Ceramic 470,0 nF +/- 10% 6,3 V K0402	RJC5163026/47	MSL1	
B	D2000	ASIC BB Anja	1200-0795	SL5, MSL3	75
B	D2010	Mem MCP 1 Gbit + 256 Mbit 108.0 MHz 1.8 V	1200-1356	SL5	76
B	D2105	IC Single bus buffer gate	1200-0425		76
B	D2404	IC IF ISP1508 ES3 (3.5*3.5*0.8)	1200-1694		76
B	D2420	IC IF 3.5x3.5x0.8 thin QFN	1200-1951		77
B	D2460	Leveltranslator	RYT109932/3		77
B	E1000	Shield Can Fence	1200-2903		
B	E1001	Shield Can Fence	1200-2905		
F	E1002	Shield Can Fence	1200-2902		
F	L2200	Ind WW 4.7 uH +/-20% 2,95x2,95x0,9	1201-2245		78
B	L2401, L2402, L2403, L2404	Filter 0.0 Hz 0402	REG70618/20	MSL1	
B	N1200	Mod Radio EDGE Thor GSM/EDGE	1203-6579	Require calibration (SERP) MSL R5A Special Soldering Process Required - Authorized Repair Centers Only	78

Side	Pos.	Description	Part Number	Comments	Page
B	N1210	Mammoth WCDMA Radio Module	1204-1670	Require calibration (SERP) MSL R5A Special Soldering Process Required - Authorized Repair Centers Only	79
B	N1400	Module Bluetooth + FM STLC2592	1200-6182	MSL3	79
F	N2000	ASIC Vera	ROP1013106/1	SL5	80
F	N2201	LDO 3.0 V 150 mA CS-4	RYT113955/7		80
B	N2202	IC Vreg MAX8640, 1.8V	1200-6420		81
B	N2203	IC Vreg	1200-0110		81
B	N2205	IC Vreg	1200-0107		82
B	N2206	Voltage regulator 2,8V	RYT1137822/1		
B	N2208	2ch-LDO, Vout1=2.8V, Vout2=1.8V, WL-CSP6	RYT113997/4		82
B	N2400	1-Bit Level Translator	RYT109914/1		83
F	N2402	IC ESD Prot UDFN 6 2x2 mm	1200-6309	MSL1	83
B	N2500	IC Vreg 8-pin LLP	1200-2552		83
B	N2525	ASIC 3-axis accelerometer	1200-1223		84
B	N3100	OPAMP 1W Pb-Free	RYT101947/2		84
B	N3101	ASIC Tjatte3 CSP20	ROP1013074/1	MSL1	84
B	N4101	IC Dri MAX8830 ES3 4x4 UCSP	1200-1922		85
F	N4200	Light Sensor	RKZ433938/1		85
B	S2400, S2402, S2403	Side Push Switch	1200-2079		86
F	V2202	Trans V; Dual_P MOSFET; BYX101603_A; REQ318	RYN122910/1		86
B	V2402	Diode Schottky 0,0	RKZ3236025/2	MSL1	86
B	V2405	MOSFET Complementary N P 20 V (D S)	RYN901918/2		86
B	V2420, V2421	Zener Diode voltage regulator 15V 5%	RKZ223905/2	MSL1	87
B	V2425	Diode Protection 0.7 V SOD-882	1201-2253		87
B	V2428	LED Red	RKZ433924/1		87
B	V2477, V2478	Diode Protection 5.0 V SOD-523	1201-0304	MSL1	87
B	V2500	Trans P-ch FET WDFN6	1200-1780	MSL1	87
B	X1200	Conn Antenna	RPT79947		88
B	X1201, X1202, X1203	Antenna connector	SND90161		88
B	X2200	Conn Leaf Spring Battery	SND10622		88
F	X2409, X4300	Conn BtB 22 pin	RNV799045/22		89
F	X2410	Conn BtB 40 pin	1200-1735		89
F	X2511	Conn BtB 30 pin	1200-1733		89
B	X3105	Microphone connector	1200-2112		89
F	X4200	Conn BtB 26 pin	1200-0293		90
B	X4301	30 Pin BtB, male, (Camera)	RNV79992		

## B2101 Oscillator XO 32.768 kHz LC 1200-3231

## Crystal oscillator

CRYSTAL OSCILLATOR  
32.768 kHz

**SG-3030LC / JF / JC**  
**SG-3040LC / JC**  
**SG-3032JC**

- Built-in 32.768 kHz crystal unit allows adjustment-free efficient operation.
- Use of C-MOS IC enables reduction of current consumption.
- VIO controls swing amplitude (SG-3030 / SG-3040).



Actual size

LC Type.

JF Type.

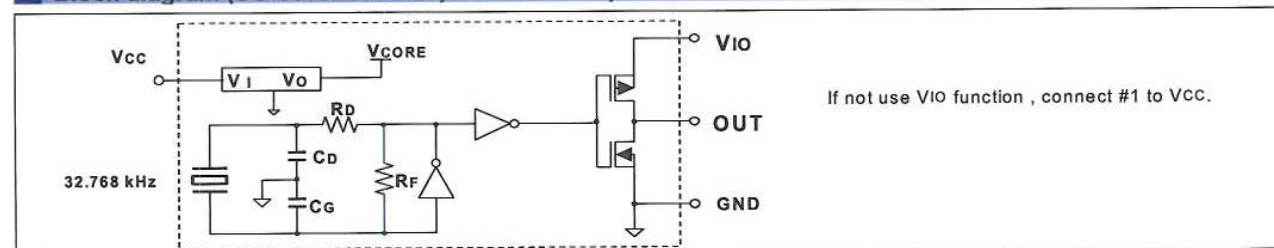
JC Type.

## Specifications (characteristics)

Item		Symbol	Specifications			Remarks
			SG-3030LC / JF / JC	SG-3040LC / JC	SG-3032JC	
Output frequency range		f <sub>o</sub>	32.768 kHz			
Supply voltage		V <sub>cc</sub>	1.5 V to 5.5 V	0.9 V to 3.6 V	1.8 V to 3.6 V	
Interface power supply voltage		V <sub>io</sub>	1.5 V to 5.5 V	0.9 V to 3.6 V	—	
Temperature range	Storage temperature	T <sub>stg</sub>	-55 °C to +125 °C			Store as bare product after unpacking
	Operating temperature	T <sub>use</sub>	-40 °C to +85 °C		-20 °C to +70 °C	
Frequency tolerance		F <sub>tol(osc)</sub>	5 ±23 × 10 <sup>-6</sup>			+25 °C, V <sub>cc</sub> =3.3 V (SG-3040: V <sub>cc</sub> =1.2 V)
Frequency temperature coefficient		Fo-Tc	+10 × 10 <sup>-6</sup> / -120 × 10 <sup>-6</sup>			-20 °C to +70 °C (-25 °C is reference)
Frequency / voltage coefficient		Fo-V <sub>cc</sub>	±2 × 10 <sup>-6</sup> / V Max.	±5 × 10 <sup>-6</sup> / V Max.	±2 × 10 <sup>-6</sup> / V Max.	+25 °C
Current consumption		I <sub>cc</sub>	2 μA Max.	3.1 μA Max.	5 μA Max.	3.3 V, No load condition
Symmetry		SYM	45 % to 55 %	40 % to 60 %	40 % to 60 %	1/2 V <sub>cc</sub> (V <sub>io</sub> )level (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V)
High output voltage		V <sub>OH</sub>	V <sub>io</sub> -0.4 V Min.		V <sub>cc</sub> -0.4 V Min.	I <sub>OH</sub> =0.4 mA (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V)
Low output voltage		V <sub>OL</sub>	0.4 V Max.			I <sub>OL</sub> = 0.4 mA (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V)
Output load condition (CMOS)		L <sub>CMOS</sub>	15 pF Max.			CMOS load
Output rise and fall time		t <sub>r</sub> / t <sub>f</sub>	200 ns Max.	100 ns Max.		CMOS load:20 % V <sub>cc</sub> (V <sub>io</sub> ) to 80 % V <sub>cc</sub> (V <sub>io</sub> )level (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V)
Oscillation start up time		t <sub>osc</sub>	1 s Max.	3 s Max.		Time at minimum Supply voltage to be 0 s
Frequency aging		F <sub>aging</sub>	±5 × 10 <sup>-6</sup> / year Max.			+25 °C, V <sub>cc</sub> = 3.3 V, First year

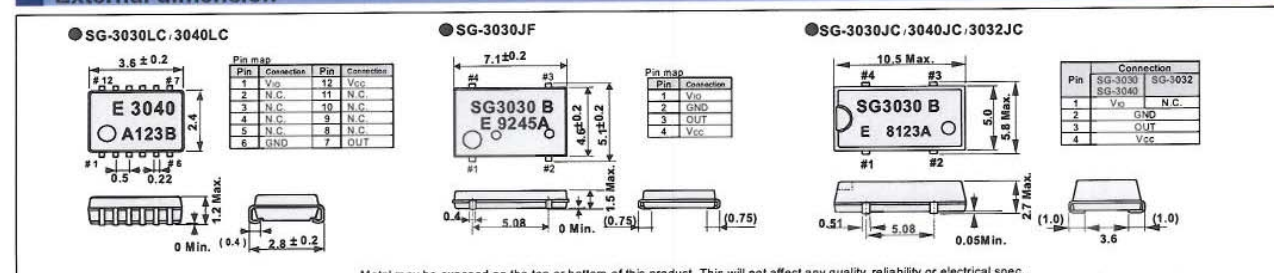
Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.

## Block diagram (SG-3030LC/JC, JF, SG3040JC/LC)



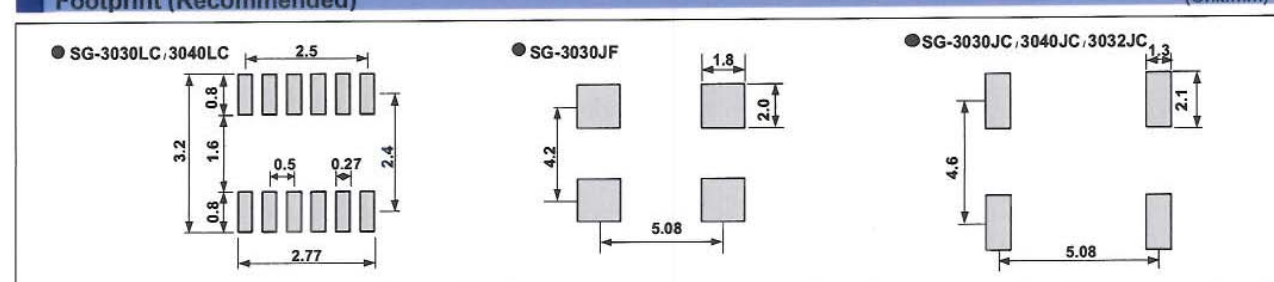
## External dimension

(Unit:mm)



## Footprint (Recommended)

(Unit:mm)

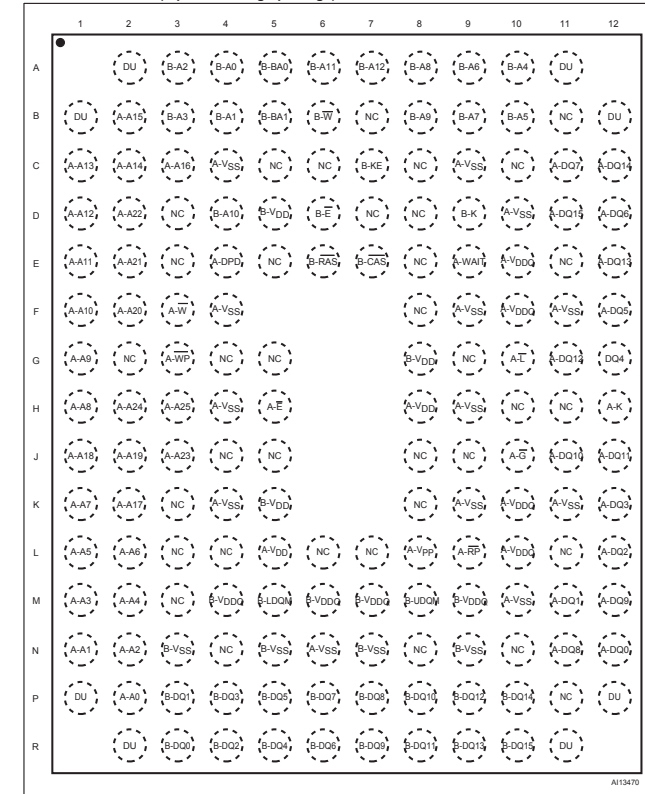


## D2000 ASIC Baseband Anja 1200-0795

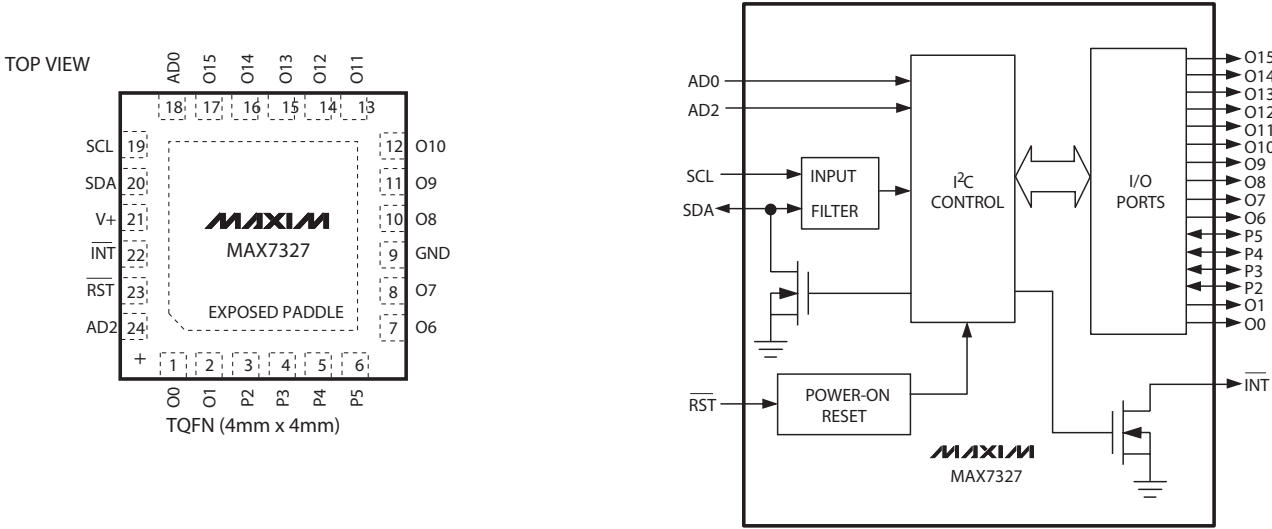
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22												
A	EMU_MODE_1	VDDCO_1V2	EMIF1_BE1n	EMIF1_SDCEN	ETM_PSTAT1	ETM_TPKT7	VDDCO_1V2	ETM_TPKT0	EMIF2_SDCA_S_RE_OEn	VDDCO_1V2	VDDIO_1V8	EMIF2_A02	EMIF2_A03	EMIF2_A04	EMIF2_A07	VDDCO_1V2	EMIF2_A10	VDDIO_1V8	EMIF2_SDBS_1_A15	EMIF2_SDBS_01_A14	EMU_MODE_0	VDDCO_1V2												
B	VDDCO_1V2	VDDIO_1V8	EMIF1_BE0n	EMIF1_SDCSn	EMIF1_SDCSn	ETM_TCLK	ETM_TPKT6	ETM_TPKT4	EMIF2_NFIF_READY	EMIF2_FBCLK	EMIF2_CLK	EMIF2_BE1n	EMIF2_A01	EMIF2_A05	EMIF2_A06	EMIF2_A08	EMIF2_A11	EMIF2_SDBS_0_A13	EMIF2_A16	EMIF2_A17	VDDCO_1V2	VDDCO_1V2												
C	EMIF1_A02	EMIF1_A01	EMIF1_D00	EMIF1_SDRASn	EMIF1_WEn	ETM_PSTAT2	ETM_TPKT5	ETM_TPKT2	EMIF2_WAITn	EMIF2_SCLK	EMIF2_SDRAS_ADVn	EMIF2_D01	EMIF2_D03	EMIF2_D05	EMIF2_D07	EMIF2_A09	EMIF2_D10	EMIF2_A12	EMIF2_A19	EMIF2_A18	EMIF2_A20	EMIF2_A22												
D	EMIF1_A04	EMIF1_A03	EMIF1_D01	EMIF1_SCLK	ETM_TSYNC	ETM_PSTAT0	ETM_TPKT3	ETM_TPKT1	EMIF2_WEn	EMIF2_SDCEN	EMIF2_BE0n	EMIF2_D00	EMIF2_D02	EMIF2_D04	EMIF2_D06	EMIF2_D08	EMIF2_D11	EMIF2_D13	EMIF2_D15	EMIF2_A23	EMIF2_A21	EMIF2_A24												
E	VDDCO_1V2	EMIF1_A06	EMIF1_A05	EMIF1_D03	EMIF1_D02	EMIF2_CS0n	EMIF2_CS1n									EMIF2_D09	EMIF2_D12	EMIF2_D14	CL_VSYNC	CL_RES_N	EMIF2_A25	VDDIO_1V8												
F	EMIF1_A09	EMIF1_A07	EMIF1_D06	EMIF1_D05	EMIF1_D04																	CL_HSYNC	CL_D0	CL_PCLK	CL_D2	EMIF2_CRE_A26								
G	EMIF1_A10	EMIF1_A08	EMIF1_D07	EMIF1_D08	EMIF1_D09																	IN/A	CL_D5	CL_D3	CL_D1	CL_D6								
H	EMIF1_A11	EMIF1_A12	EMIF1_D10	EMIF1_D11																			PDI_D6	PDI_D7	CL_D4	CL_D7								
J	EMIF1_SDBS_0_A13	EMIF1_SDBS_01_A14	EMIF1_D13	EMIF1_D12																			PDI_D1	PDI_D3	PDI_D4	PDI_D5								
K	VDDIO_1V8	EMIF1_SDBS_1_A15	EMIF1_D15	EMIF1_D14																			PDI_C5	PDI_D0	PDI_D2	VDDCO_1V2								
L	VDDIO_1V8	VDDCO_AF	USB_SE0_VM	USB_DAT_VP																	EFUSE_HV4	GND	GND	GND	PDI_RES_N	PDI_C4	PDI_C3	PDI_C2	APP_GPIO_7					
M	TMS	TDI	TDO	USB_OE																	ACC_GPIO_4	GND	GND	GND	GND	APP_GPIO_0	PDI_C1	PDI_C0	APP_GPIO_6	VDDIO_1V8				
N	VDDCO_1V2	TCK	RTCK	ACC_GPIO_5																	ACC_GPIO_3	GND1	GND	GND	GND	APP_GPIO_1	APP_GPIO_9	APP_GPIO_8	APP_GPIO_5	APP_GPIO_4				
P	TRST_N	ACC_GPIO_2	ACC_GPIO_6	ACC_GPIO_7																	SDAT	SRSTn	PWRRSTn	APP_GPIO_14	APP_GPIO_2	APP_GPIO_3	APP_GPIO_12	APP_GPIO_13	APP_GPIO_10	APP_GPIO_11				
R	ACC_GPIO_1_1	ACC_GPIO_1_0	ACC_GPIO_9	ACC_GPIO_8																							I2S0WS	I2S0CLK	ACC_GPIO_2_3	VDDCO_1V2				
T	VDDCO_1V2	ACC_GPIO_1_2	ACC_GPIO_1_5	ACC_GPIO_1_3	ACC_GPIO_1_6																							KEYIN5	I2S0SLD	I2S1CLK	I2S0ULD	VDDIO_1V8		
U	ACC_GPIO_1_4	ACC_GPIO_2_0	ACC_GPIO_2_1	ACC_GPIO_1_7	SCLK																							KEYIN3	KEYIN4	I2S1ULD	I2S1SLD	I2S1WS		
V	ACC_GPIO_1_9	ACC_GPIO_2_2	ACC_GPIO_1_8	PCCLK	PCMLD	IN/A	RF_WCDMA_PA_1_EN																					SYSCLKREQn	ACCSLEEP	RESOUTn	KEYIN0	KEYOUT3	KEYIN2	KEYOUT2
W	VDDIO_1V8	TX_ADC_STRB	PCMSYN	ANT_SW0	ANT_SW1	VDDIO_2V5	DAC_Q_NEG	DAC_I_POS	ADC_Q_NEG	ADC_I_POS	VDDAD	GND1	GND1	MCLK	RTCLKIN	SYSCLK2	MCDATADR	DCON	KEYOUT1	I2CSCL2	KEYIN1	KEYOUT4												
Y	PCMLD	RF_DATA_STRB	RF_DATA_C	RF_DATA_A	ANT_SW2	VSSPAD	DAC_Q_POS	DAC_I_NEG	ADC_Q_POS	ADC_I_NEG	VDDCO_1V2	VSSCO_PLL	VDDIO_2V5	MCLKREQ	SYSCLK1	SYSCLK0	MCDAT0	MCCMDIR	MCLK	I2CSDA	I2CSDA2	KEYOUT5												
AA	VDDCO_1V2	RF_DATA_B	RF_CTRL_STRB2	RF_CTRL_DATA	ANT_SW3	VCCDA	VSSDA	VSSCOMMON	VCCPAD	VCCAD	VDDCO_1V2	VDDCO_PLL	VSSCO_PLL	VDDCO_1V2	APPSLEEP	RESOUT2n	SERVICEn	MCDAT3	MCCMD	MSAPPIRON	I2CSCL	VDDCO_1V2												
AB	VDDCO_1V2	VDDCO_1V2	RF_CTRL_STRB1	RF_CTRL_CLK	RF_WCDMA_DCCEN	RF_WCDMA_PRRDET_EN	TX_POW	RF_WCDMA_PA_0_EN	VSSAD	GNDAD	PLL_26_VCON	PLL_26_FILT_VDD	VDDCO_PLL	PLL_PG_416_VCONT	PLL_PG_416_FILT_VDD	RESOUT1n	VDDIO_1V8	MCDAT2	MCDAT1	MSACCIRON	VDDCO_1V2	VDDCO_1V2												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22												

## Pin Configuration of the Digital Baseband Controller





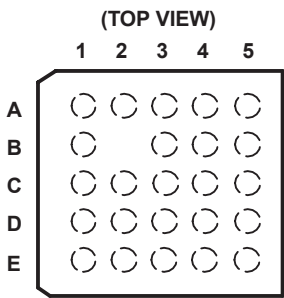
D2420 IC IF 3.5x3.5x0.8 Thin QFN 1200-1951



Pin Description

PIN		NAME	FUNCTION
QSOP	TQFN		
1	22	INT	Active-Low Interrupt Output. INT is an open-drain output.
2	23	RST	Active-Low Reset Input. Drive RST low to clear the 2-wire interface.
3, 21	24, 18	AD2, AD0	Address Inputs. Select device slave address with AD0 and AD2. Connect AD0 and AD2 to either GND, V+, SCL, or SDA to give four logic combinations (see Tables 2 and 3).
4, 5, 10, 11, 13–20	1, 2, 7, 8, 10–17	O0, O1, O6–O15	Output Ports. O0, O1, O6–O15 are push-pull outputs rated at 20mA.
6–9	3–6	P2–P5	P2–P5 Open-Drain I/Os
12	9	GND	Ground
22	19	SCL	<sup>2</sup> C-Compatible Serial Clock Input
23	20	SDA	<sup>2</sup> C-Compatible Serial Data I/O
24	21	V+	Positive Supply Voltage. Bypass V+ to GND with a 0.047μF ceramic capacitor.
—	EP	EP	Exposed Pad. Connect exposed pad to GND.

D2460 Leveltranslator RYT109932/3



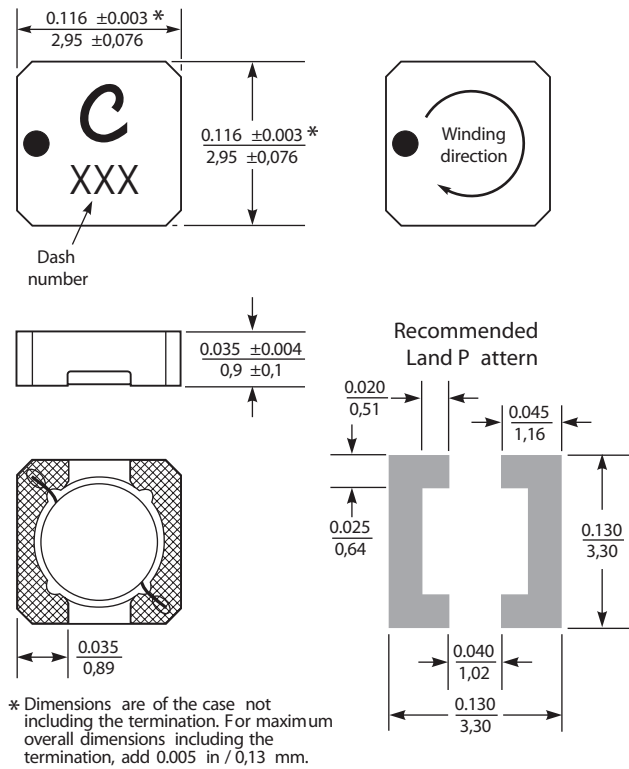
Terminal Assignments

	1	2	3	4	5
A	DAT2A	CMD-dir	DAT0-dir	RSV	DAT2B
B	DAT3A		V <sub>CCA</sub>	V <sub>CCB</sub>	DAT3B
C	CLKA	RSV	GND	GND	CLKB
D	DAT0A	CMDA	RSV	CMDB	DAT0B
E	DAT1A	CLK-f	DAT123-dir	RSV	DAT1B

Pin Description

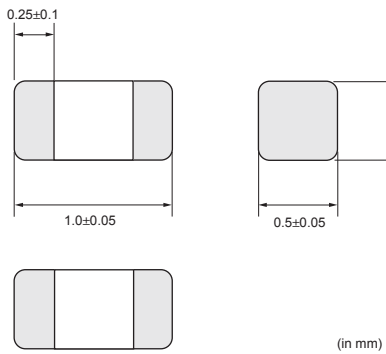
GXY/ZXY NO.	GQS/ZQS NO.	NAME	FUNCTION	TYPE
A1	E2	CLK-f	Clock feedback to host for resynchronizing data. Used in OMAP processors. Leave unconnected if not used.	Output
A2	E1	DAT1A	Data bit 2 connected to host. Referenced to V <sub>CCA</sub> .	I/O
A3	C1	CLKA	Clock signal connected to host. Referenced to V <sub>CCA</sub> .	Input
A4	B1	DAT3A	Data bit 4 connected to host. Referenced to V <sub>CCA</sub> .	I/O
A5	B3	V <sub>CCA</sub>	A-port supply voltage. V <sub>CCA</sub> powers all A-port I/Os and control inputs.	Power
B1	D2	CMDA	Command bit connected to host. Referenced to V <sub>CCA</sub> .	I/O
B2	D1	DAT0A	Data bit 1 connected to host. Referenced to V <sub>CCA</sub> .	I/O
B3	C4	GND	Ground	
B4	A1	DAT2A	Data bit 3 connected to host. Referenced to V <sub>CCA</sub> .	I/O
B5	A2	CMD-dir	Direction control for command bit (CMDA/CMDB)	Input
C1	E3	DAT123-dir	Direction control for DAT1A/B, DAT2A/B, and DAT3A/B	Input
C2	D4	CMDB	Command bit connected to memory card. Referenced to V <sub>CCB</sub> .	I/O
C3	C3	GND	Ground	
C4	A5	DAT2B	Data bit 3 connected to memory card. Referenced to V <sub>CCB</sub> .	I/O
C5	A3	DAT0-dir	Direction control for DAT0A/DAT0B	Input
D1	E5	DAT1B	Data bit 2 connected to memory card. Referenced to V <sub>CCB</sub> .	I/O
D2	D5	DAT0B	Data bit 1 connected to memory card. Referenced to V <sub>CCB</sub> .	I/O
D3	C5	CLKB	Clock signal connected to memory card. Referenced to V <sub>CCB</sub> .	Output
D4	B5	DAT3B	Data bit 4 connected to memory card. Referenced to V <sub>CCB</sub> .	I/O
D5	B4	V <sub>CCB</sub>	B-port supply voltage. V <sub>CCB</sub> powers all B-port I/Os.	Power
NA	B2		Depopulated ball	
NA	A4, C2, D3, E4	RSV	Reserved (for possible future functionality). Leave unconnected.	

L2200 Inductor WW 4.7uH +/-20% 1201-2245

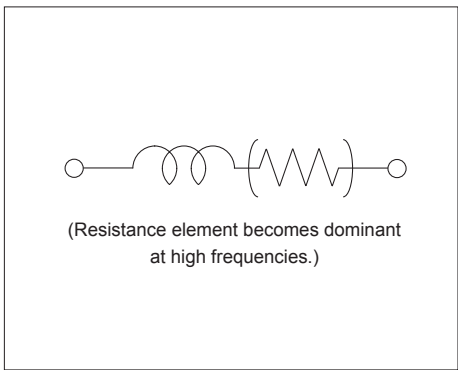


L2401-04 Filter 0.0 Hz 0402 REG70618/20

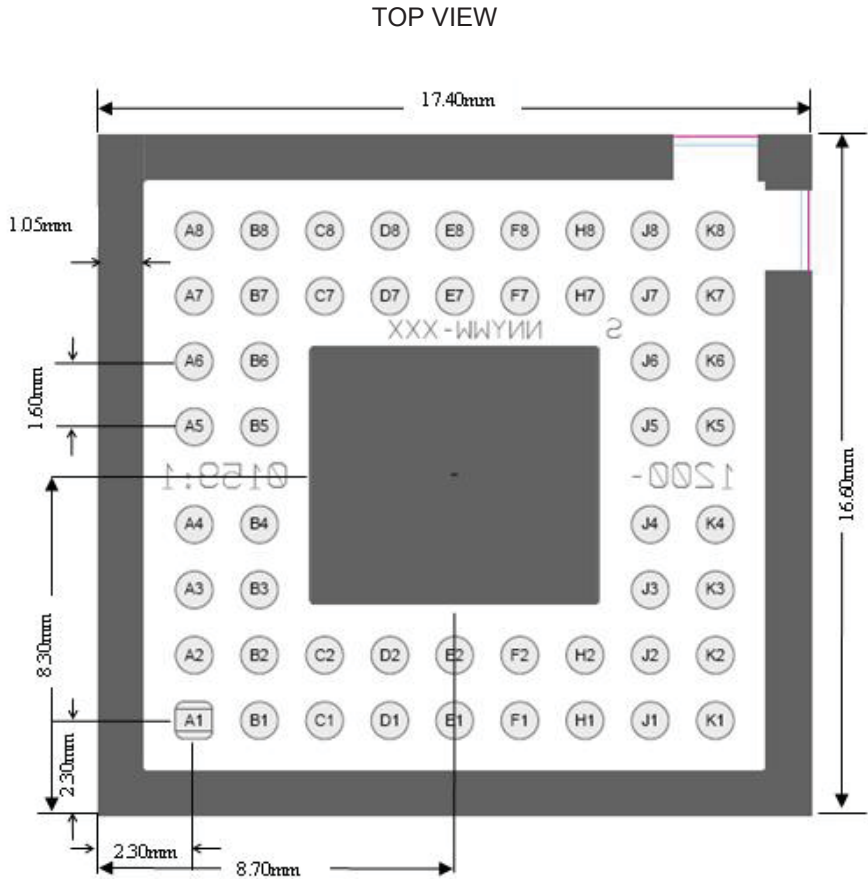
■ Dimension



■ Equivalent Circuit



N1200 GSM/GPRS/EDGE Radio Module Thor

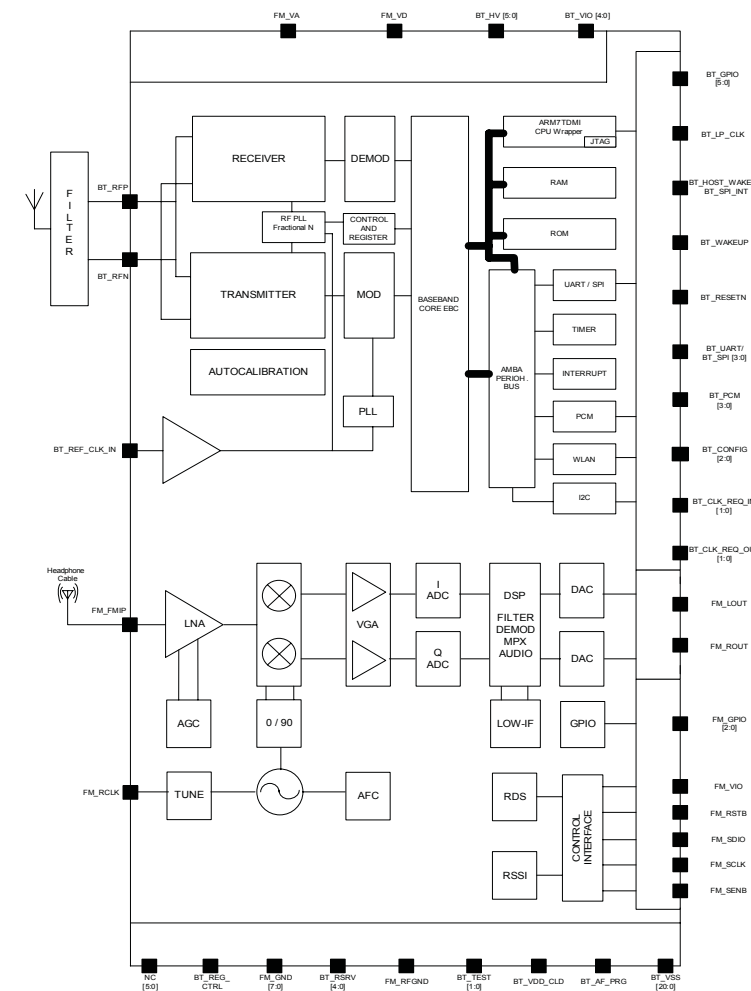


Pins / Signal cross-reference:

Pin name	Signal name
K2	AMP_LSB_FREQ_LSB
K8	ANTSTRIP
J8	ANTSW0
H7	ANTSW1
H8	ANTSW2
A5	ANTSW3
J1	DCLK_DATSTR
H1	IDATA_FREQ_MSB
F1	MCLK
H2	MCLKREQ
J2	QDATA_AMP_MSB
E2	RADCLK
C2	RADDAT
J4	RADSTR1
F2	TESTOUT
B5	VBAT
B6	VBAT
K7	WCDMA1900
K6	WCDMA2100
J7	WCDMA850
E1	WBCLK
K1	VDIGRAD_1V8
K3	VRADA_2V75
K4	GND
K5	GND
J3	GND
J5	GND
J6	GND
F7	GND
F8	GND
E7	GND
E8	GND
D1	GND
D2	GND
D7	GND
D8	GND
C1	GND
C7	GND
C8	GND
B1	GND
B2	GND
B3	GND
B4	GND
B7	GND
B8	GND
A1	GND
A2	GND
A3	GND
A4	GND
A6	GND
A7	GND
A8	GND
SH1	GND



### BLOCK DIAGRAM AND ELECTRICAL SCHEMATIC

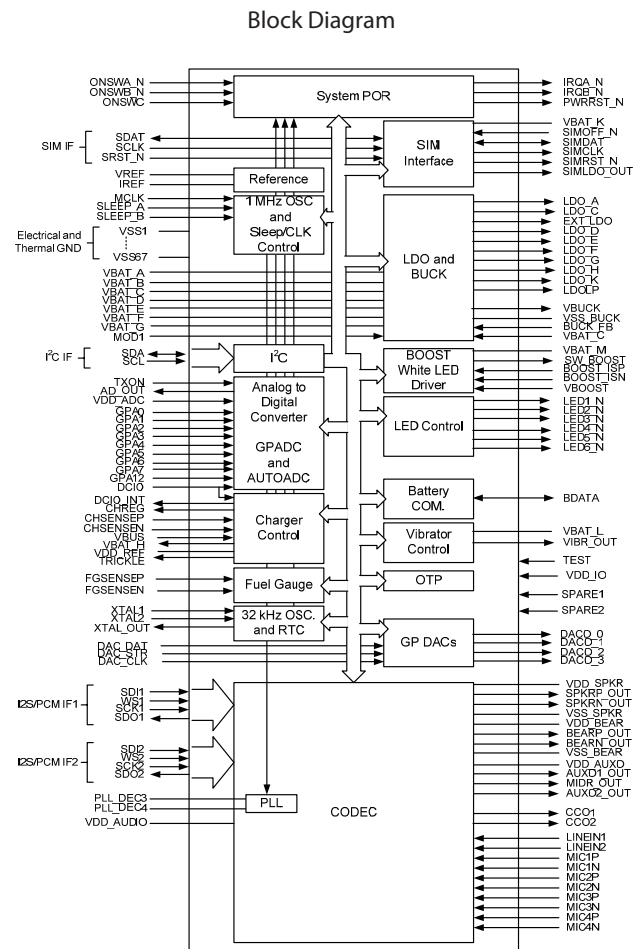
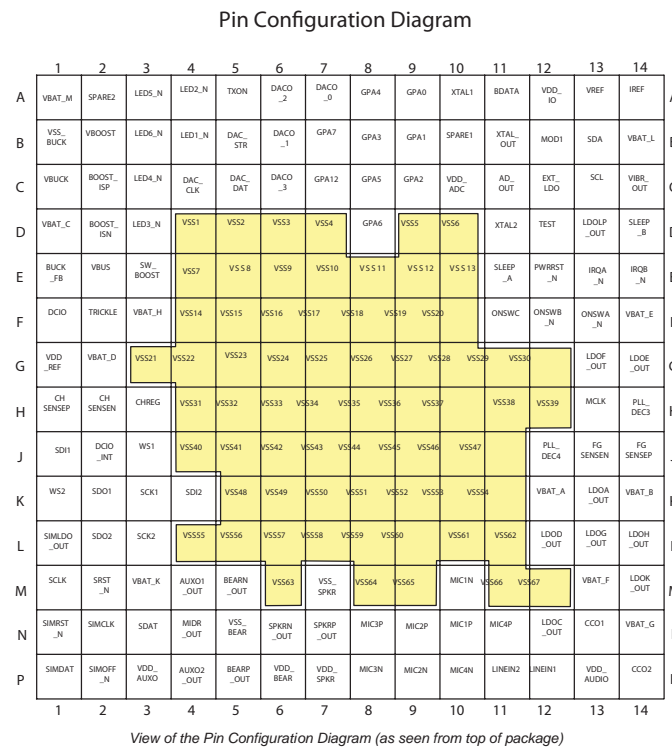


### Pinout Bottom View

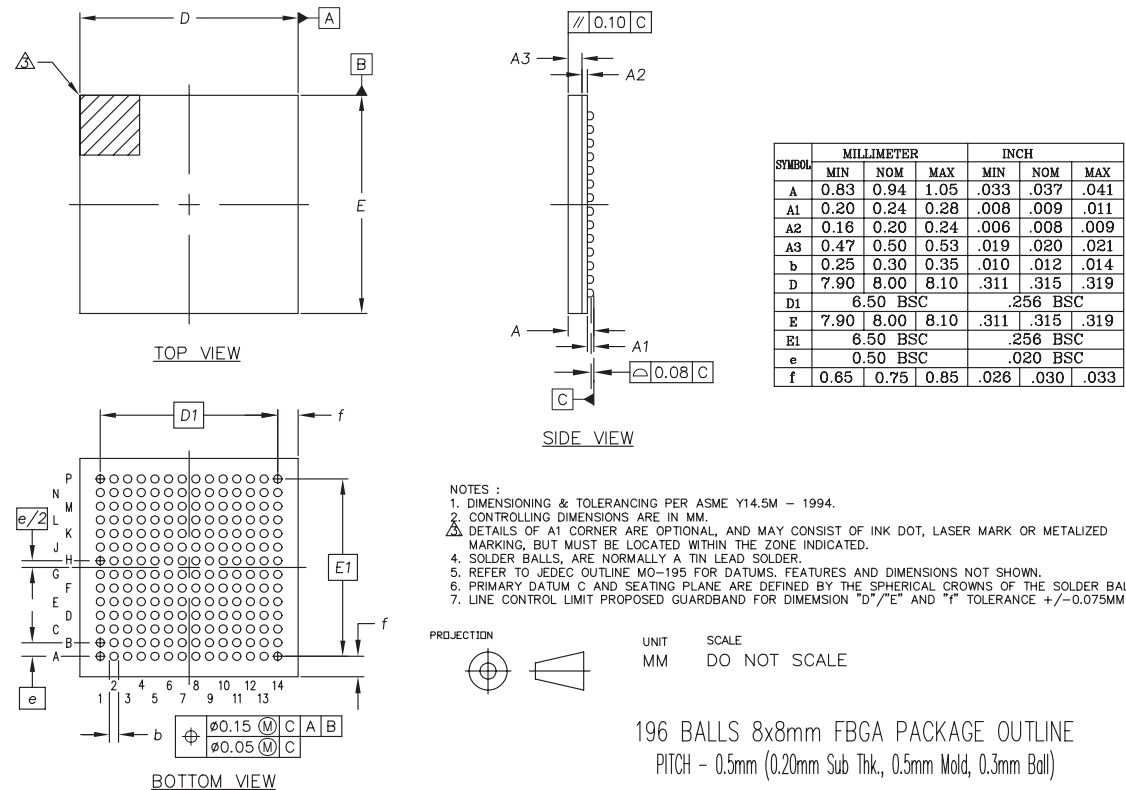
Pin Name	Signal Name
H8	GND
H7	GND
H6	GND
H5	GND
B5	GND
J6	GND
A4	GND
D9	GND
E9	GND
C9	GND
B9	GND
J8	GND
B3	GND
B4	GND
J9	GND
B6	GND
J1	GND
B7	GND
B8	GND
F9	GND
A3	GND
A2	GND
A1	GND
A6	GND
A5	GND
A10	GND
B10	GND
C10	GND
D10	GND
E10	GND
J10	GND
J7	GND
SLUG	GND

	1	2	3	4	5	6	7	8	9
A			FM_GND	FM_VA	FM_GPIO3	FM_GPIO2	FM_GPIO1		
B		BT_RSRV_CL	FM_VD	FM_GND	FM_LOUT	FM_GND	FM_GND	FM_FMP	
C	BT_RSRV_DSM	BT_RSRV_N	BT_RSRV_CL	FM_GND	FM_ROUT	FM_GND	FM_GND	FM_RFGND	FM_RSTB
D	BT_VSSANA	BT_VSSANA	BT_HVA	NC	FM_GND	FM_VIO	FM_RCLK	FM_SDIO	FM_SENB
E	BT_HVA	BT_HVA	BT_VSSANA	BT_HVA		BT_VDD_CLO	BT_CLK_REQ_IN1	BT_HOST_WAKEUP BT_SPI_INT	FM_SCLK
F	BT_VSSANA	BT_VSSANA	BT_VSSANA	BT_VSSANA		BT_REF_CLK_N	NC	NC	BT_CLK_REQ_IN
G	BT_VSSANA	BT_TEST2	BT_VSSANA	BT_VSSANA		BT_AF_PRG	BT_UART_TXD BT_SPI_DO	BT_VIO_E	BT_GPIO_0
H	BT_VSSRF	BT_TEST1	BT_VSSANA	BT_VSSANA		BT_VSSDIG	BT_VSSDIG	BT_VSSDIG	BT_UART_RXD BT_SPI_DI
J	BT_RFN	BT_VSSRF	BT_GPIO_16	BT_REG_CTRL		BT_UART_RTS BT_SPI_CS0	BT_CLK_REQ_OUT1	BT_CLK_REQ_OUT2	BT_VIO_B
K	BT_RFP	BT_VSSRF	BT_GPIO_11	BT_GPIO_10	BT_PCM_A	BT_UART_CTS BT_SPI_CLK	BT_RESETN	BT_VSSDIG	BT_LP_CLK
L	BT_VSSRF	BT_HVA	BT_GPIO_8	NC	NC	NC	BT_CONFIG_1	BT_VSSDIG	BT_WAKEUP
M		BT_RSRV_RF	BT_GPIO_9	BT_PCM_CLK	BT_PCM_B	BT_VIO_A	BT_CONFIG_2	BT_RSRV_D	
N			BT_VIO_C	BT_PCM_SYNC	BT_VIO_D	BT_CONFIG_3	BT_HVD		

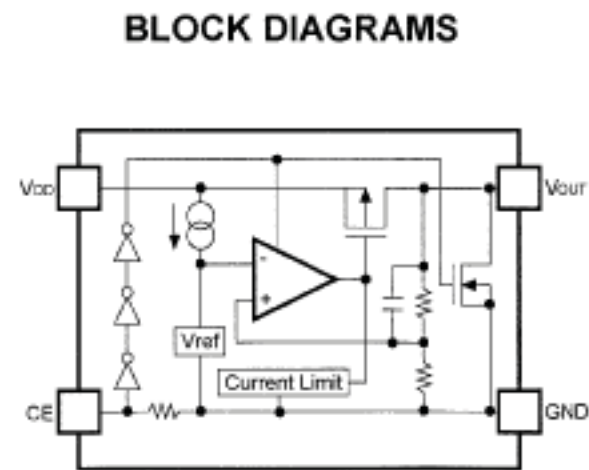
## N2000 ASIC Vera ROP1013106/1



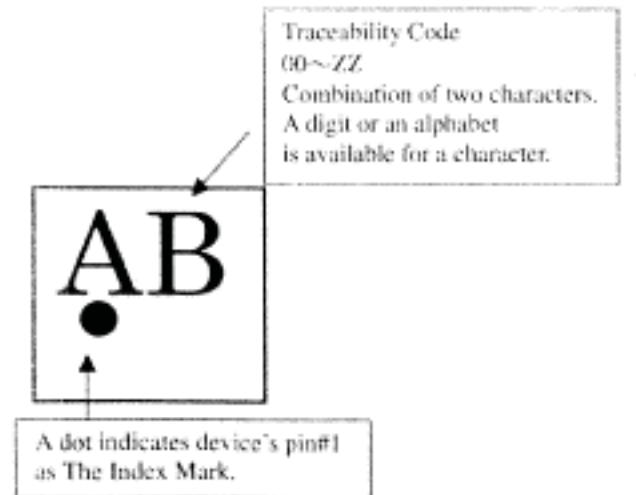
Functional Blocks of the Analog Baseband Controller



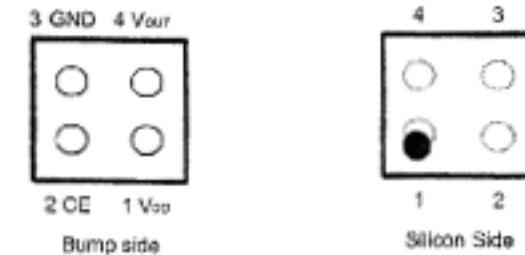
## N2201 IC Voltage Regulator 150mA LDO RYT113955/7



## Pin Orientation



## PIN CONFIGURATION

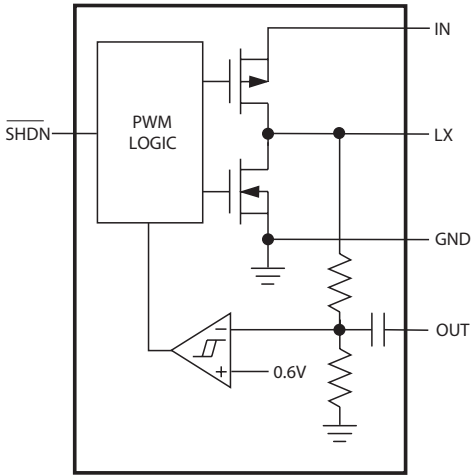
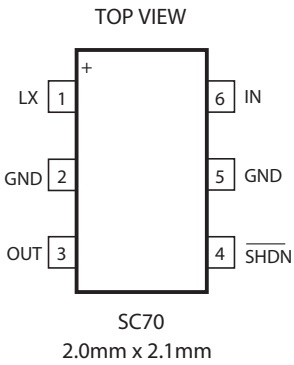


## PIN DESCRIPTIONS

Pin No.	Symbol	Description
1	V <sub>DD</sub>	Input Pin
2	CE	Chip Enable Pin
3	GND	Ground Pin
4	V <sub>OUT</sub>	Output pin

N2202 IC Voltage Regulator MAX8640, 1.8V 1200-6420

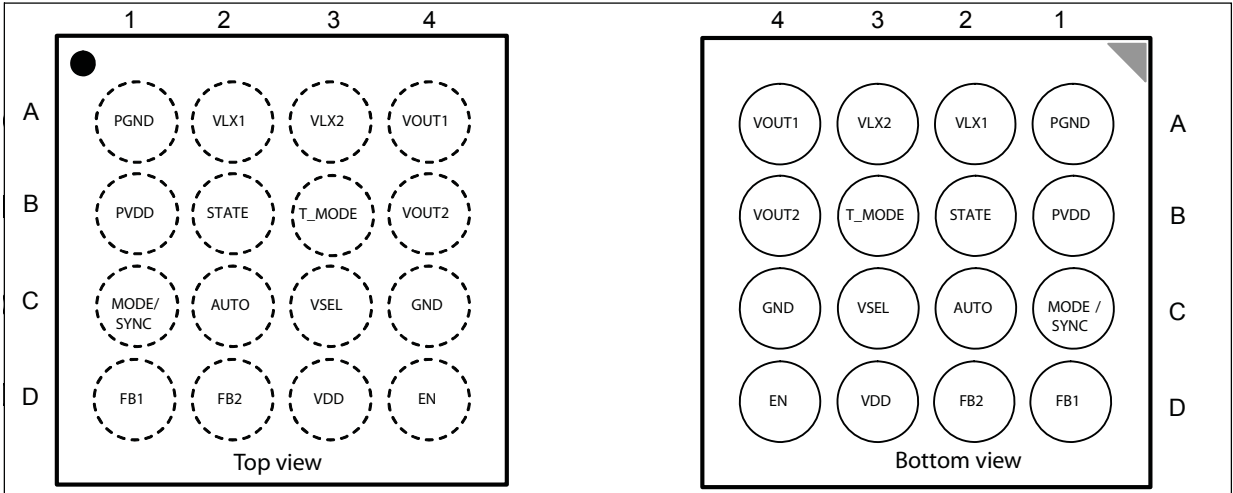
Pin Configurations



Simplified Functional Diagram

N2203 IC Voltage Regulator 1200-0110

Pin assignment in TFBGA 3x3 mm - 16 bumps 0.5 mm pitch

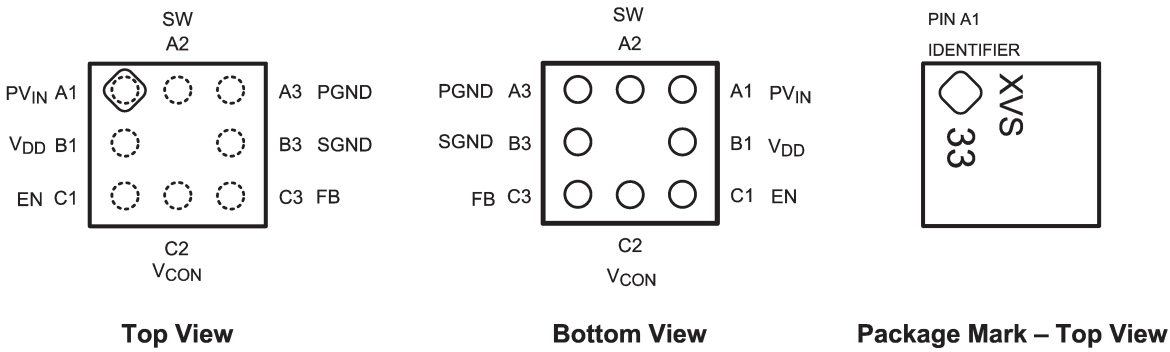


Pin description

Pin	Symbol	Description
A1	PGND	Power ground
B1	PVDD	Power supply voltage
C1	MODE/SYNC	MODE/SYNC = High to forced PWM mode MODE/SYNC = Low to forced PFM mode MODE/SYNC = 600 kHz - 1.5 MHz external clock synchronization in PWM
D1	FB1	Feedback 1
A2	VLX1	External inductor connection pin 1
B2	STATE	Output STATE pin allow the user to monitor operation mode of the product STATE = High - PFM mode STATE = Low - PWM mode If not used must be left unconnected.
C2	AUTO	PWM/PFM automatic switch control pin AUTO = High - PWM/PFM mode automatic switch ENABLED AUTO = Low - PWM/PFM mode automatic switch DISABLED PWM/PFM mode controlled by MODE/SYNC pin)
D2	FB2	Feedback 2
A3	VLX2	External inductor connection pin 2
B3	T_MODE	Input signal for test mode selection. This pin must be connected to GND.
C3	VSEL	Voltage selection input VSEL = High - VOUT1 = 1.8V, VOUT2 = 1.2V (valid for STA1) VSEL = Low - VOUT1 = 1.8V, VOUT2 = 1.0V (valid for STA1) (For other voltage options see <a href="#">Table 1: STw4141 ordering information</a> )
D3	VDD	Signal supply voltage
A4	VOUT1	Output voltage 1
B4	VOUT2	Output voltage 2
C4	GND	Signal ground
D4	EN	Enable Input: EN = Low - Device in shutdown mode, EN = High - Enable device This pin must be connected either to VDD or GND.

# N2205 IC Voltage Regulator 1200-0107

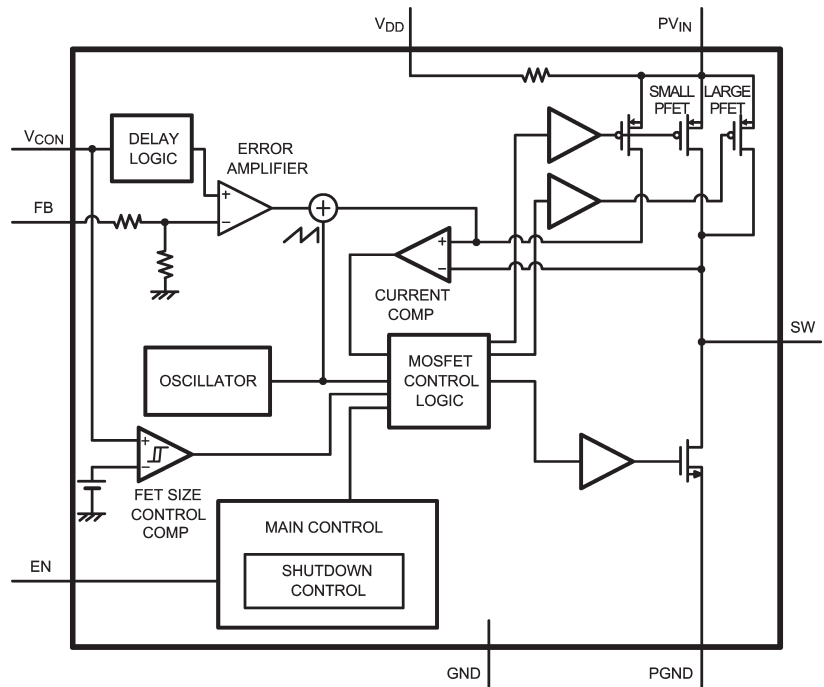
## Connection Diagrams



## Pin Descriptions

Pin #	Name	Description
A1	PV <sub>IN</sub>	Power Supply Voltage Input to the internal PFET switch.
B1	V <sub>DD</sub>	Analog Supply Input.
C1	EN	Enable Input. Set this digital input high for normal operation. For shutdown, set this pin low.
C2	V <sub>CON</sub>	Voltage Control Analog input. V <sub>CON</sub> controls V <sub>OUT</sub> in PWM mode.
C3	FB	Feedback Analog Input. Connect to the output at the output filter capacitor.
B3	SGND	Analog and Control Ground
A3	PGND	Power Ground
A2	SW	Switch node connection to the internal PFET switch and NFET synchronous rectifier. Connect to an inductor with a saturation current rating that exceeds the maximum Switch Peak Current Limit specification of the LM3208.

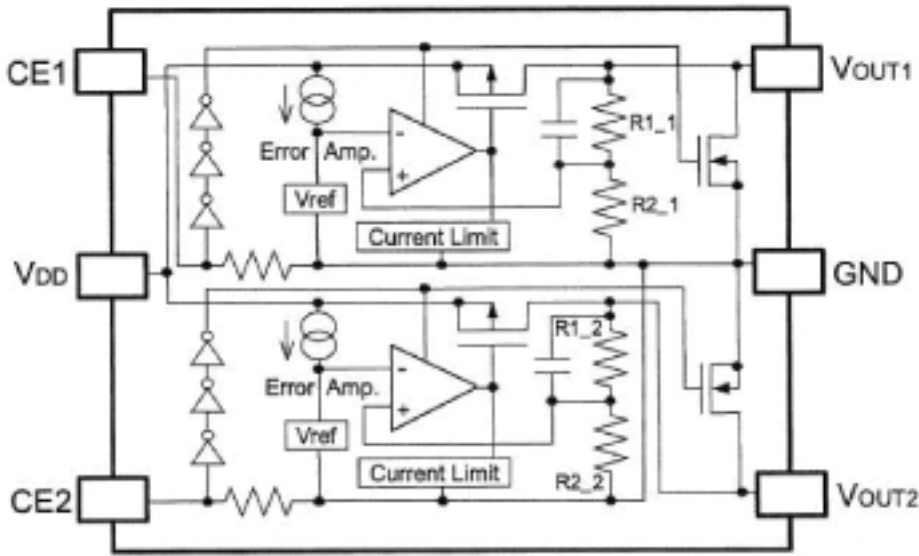
## Block Diagram



# N2208 IC Voltage Regulator RYT113997/4

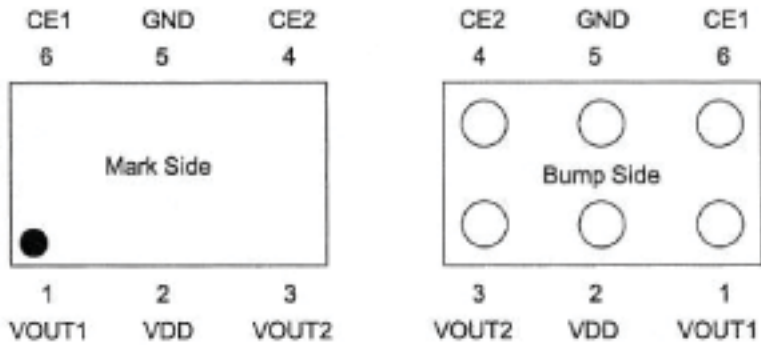
## Block Diagram

● R5323ZxxxB



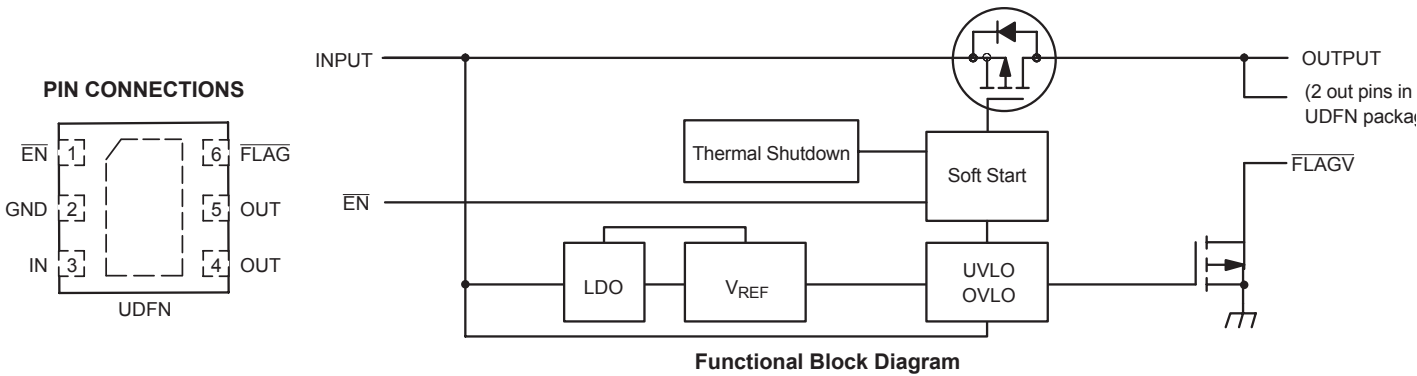
## Pin Description

Pin No.	Symbol	Pin description
1	VOUT1	Output Pin of Voltage Regulator 1 (VR1)
2	VDD	Power Supply Pin
3	VOUT2	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)

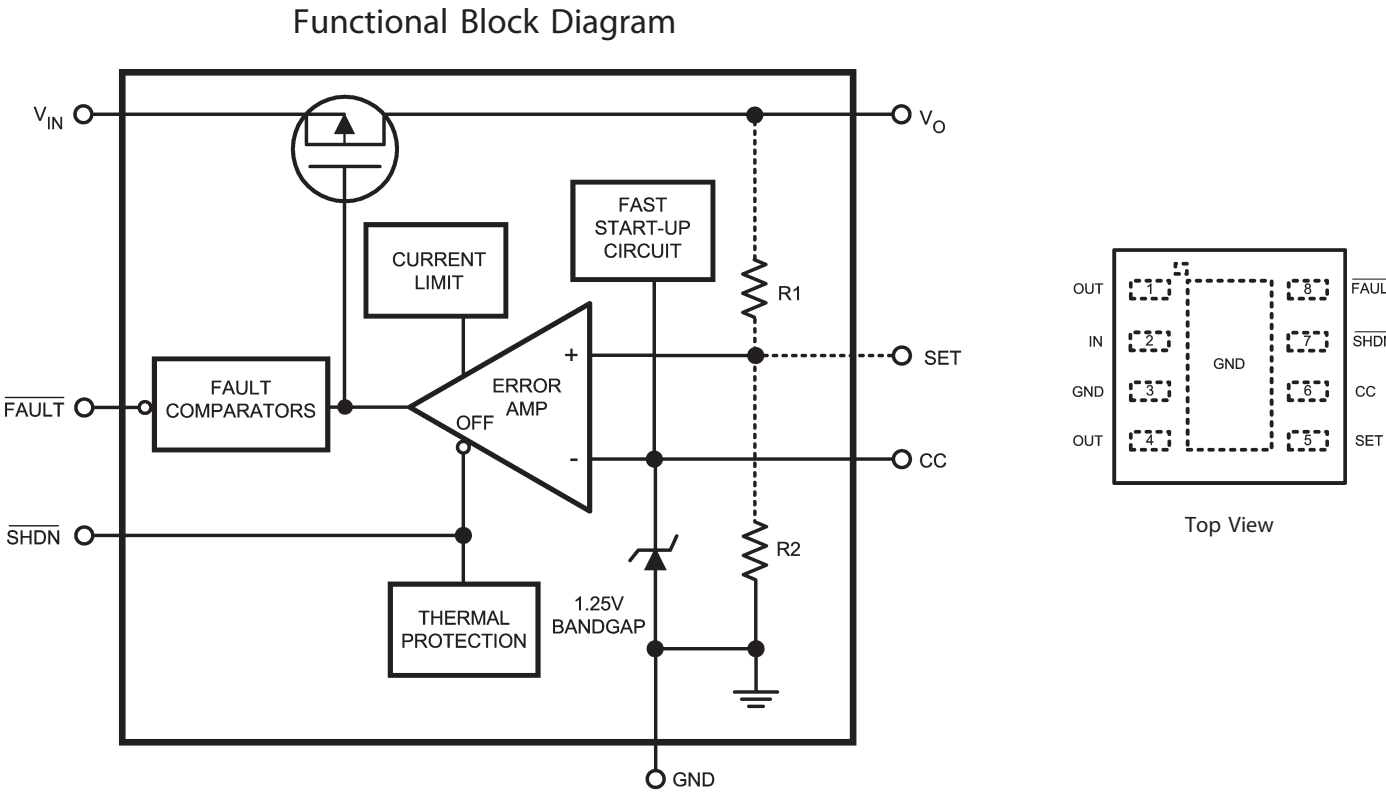


N2400 1-Bit Level Translator RYT109914/1

N2402 IC ESD Protection UDFN 6 2x2mm 1200-6309



N2500 IC Voltage Regulator 8-pin LLP 1200-2552



N2401 IC ESD Protection 1200-0454

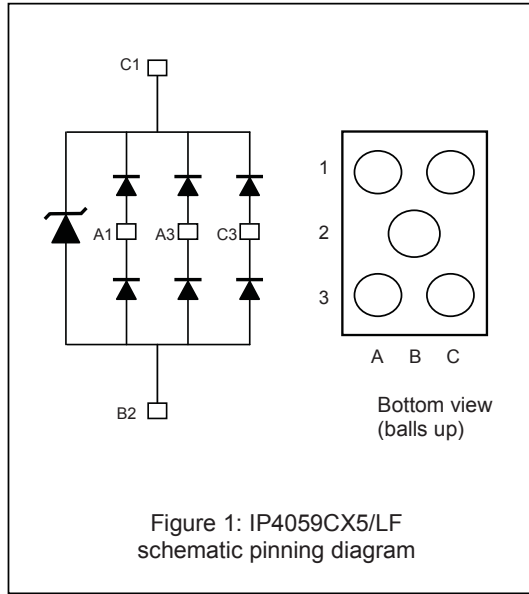


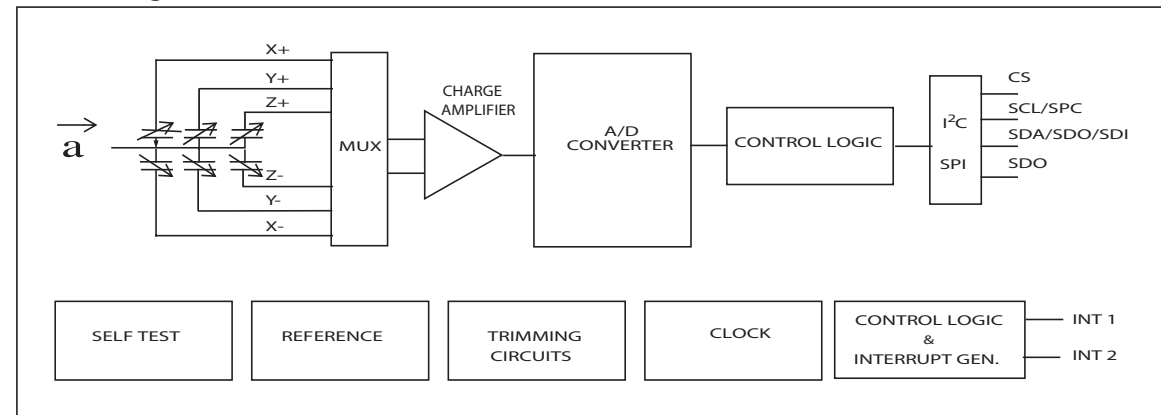
Figure 1: IP4059CX5/LF  
schematic pinning diagram

PIN	DESCRIPTION	PIN	DESCRIPTION	PIN	DESCRIPTION
A1	D-	B1	-	C1	Vbus
A2	-	B2	GND	C2	---
A3	D+	B3		C3	ID

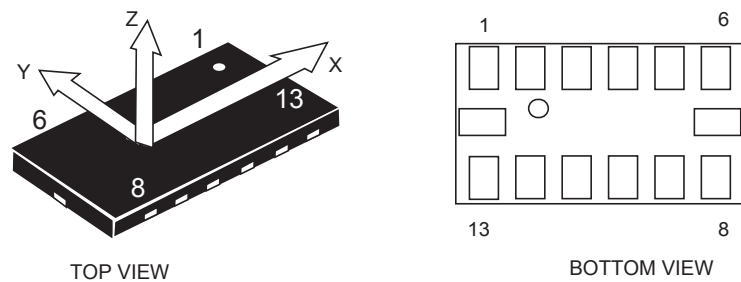


## N2525 ASIC 3-axis Accelerometer 1200-1223

Block Diagram



Pin Connection



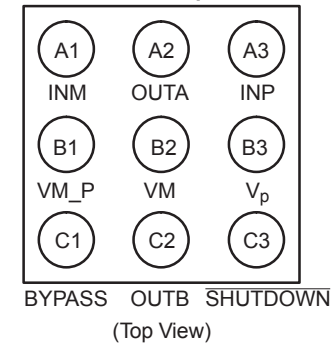
Pin description

Pin#	Name	Function
1	Vdd_IO	Power supply for I/O pins
2	GND	0V supply
3	Reserved	Connect to Vdd
4	GND	0V supply
5	GND	0V supply
6	Vdd	Power supply
7	CS	SPI enable I²C/SPI mode selection (1: I²C mode; 0: SPI enabled)
8	INT 1	Inertial interrupt 1
9	INT 2	Inertial interrupt 2
10	GND	0V supply
11	Reserved	Connect to Gnd
12	SDO	SPI Serial Data Output I²C less significant bit of the device address
13	SDA SDI SDO	I²C Serial Data (SDA) SPI Serial Data Input (SDI) 3-wire Interface Serial Data Output (SDO)
14	SCL SPC	I²C Serial Clock (SCL) SPI Serial Port Clock (SPC)

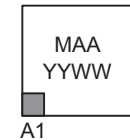
## N3100 OPAMP 1W Pb-Free RYT101947/2

PIN CONNECTIONS

Microbump-9



MARKING DIAGRAMS

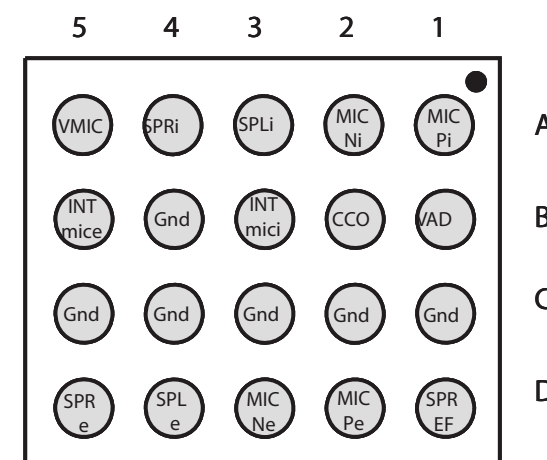


PIN DESCRIPTION

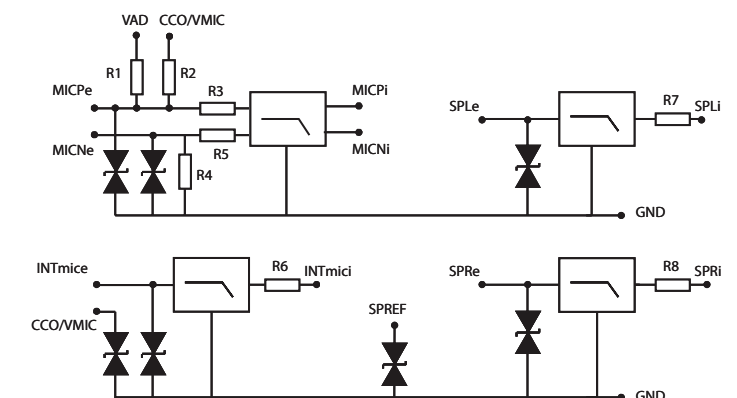
Microbump-9	Micro8	Type	Symbol	Description
A1	4	I	INM	Negative input of the first amplifier, receives the audio input signal. Connected to the feedback resistor Rf and to the input resistor Rin.
A2	5	O	OUTA	Negative output of the NCP2890. Connected to the load and to the feedback resistor Rf.
A3	3	I	INP	Positive input of the first amplifier, receives the common mode voltage.
B1	NA	I	VM_P	Power Analog Ground.
B2	7	I	VM	Core Analog Ground.
B3	6	I	Vp	Positive analog supply of the cell. Range: 2.5 V-5.5 V.
C1	2	I	BYPASS	Bypass capacitor pin which provides the common mode voltage (Vp/2).
C2	8	O	OUTB	Positive output of the NCP2890. Connected to the load.
C3	1	I	SHUTDOWN	The device enters in shutdown mode when a low level is applied on this pin.

## N3101 ASIC Tjatte 3 CSP20 ROP1013074/1

Pin configuration (Bump side)



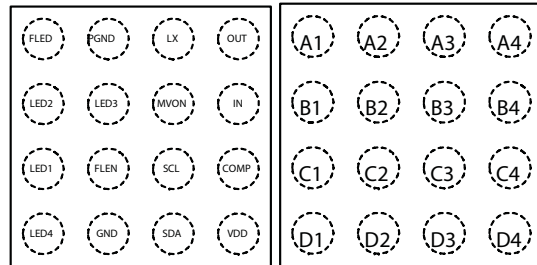
Electrical diagram





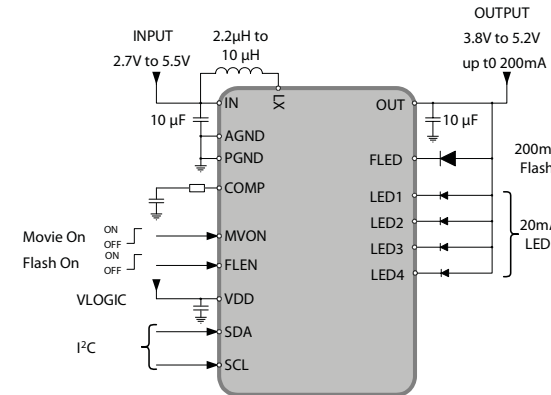
## N4101 IC Dri MAX8830 ES3 4x4 UCSP 1200-1922

### Pin configuration (Top View, Bump Side down)



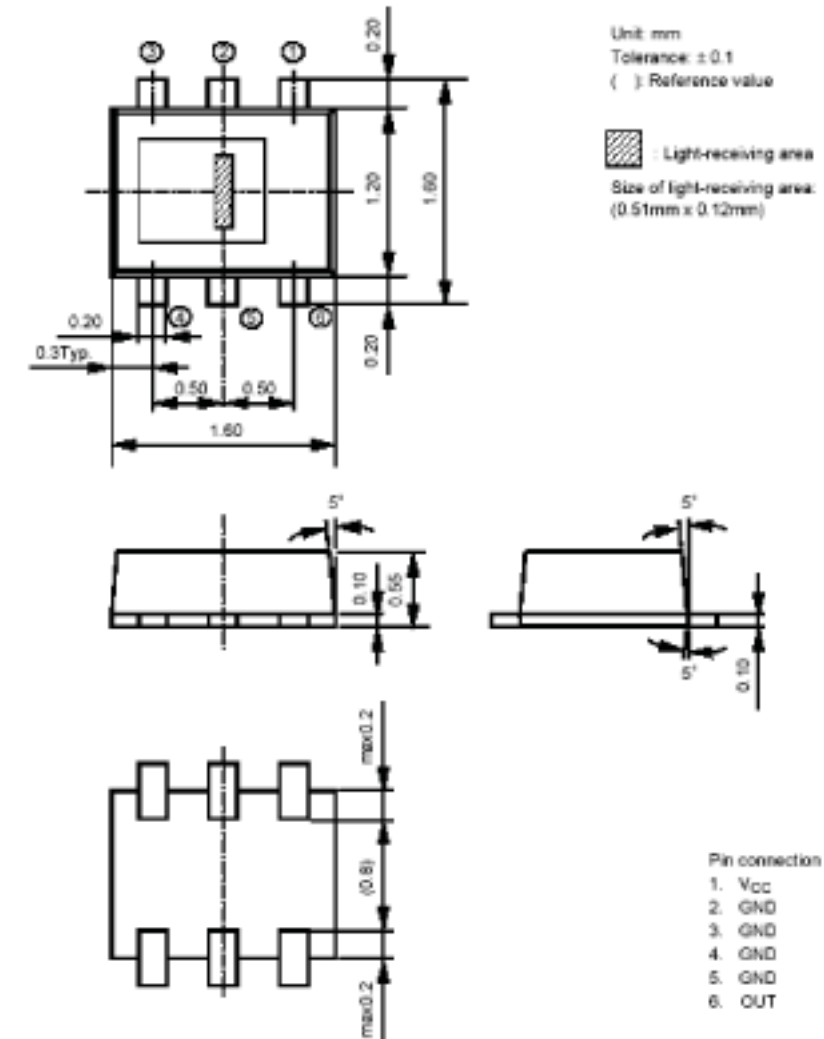
16-pin 2.5 x 2.5mm UCSP

### Simplified block diagram



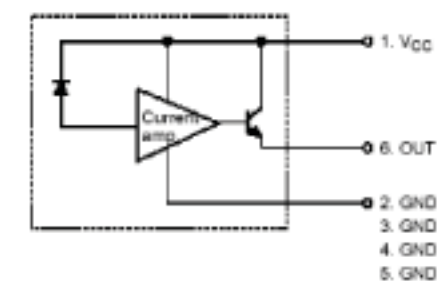
## N4200 Light Sensor RKZ433938/1

### Package Dimensions



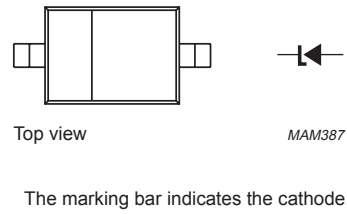
Weight: 0.003 g (typ.)

### Block Diagram





## V2420, V2421 Zener Diode Voltage Regulator 15V 5% RKZ223905/2

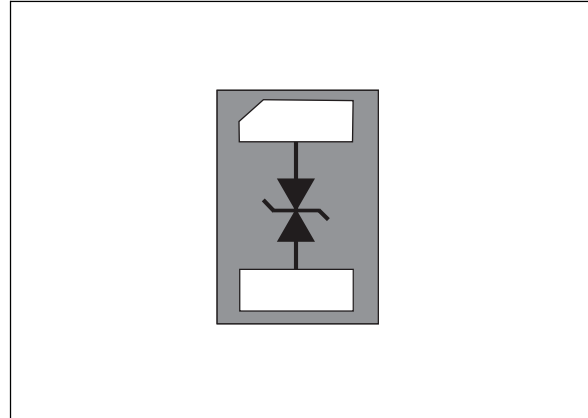


### PINNING

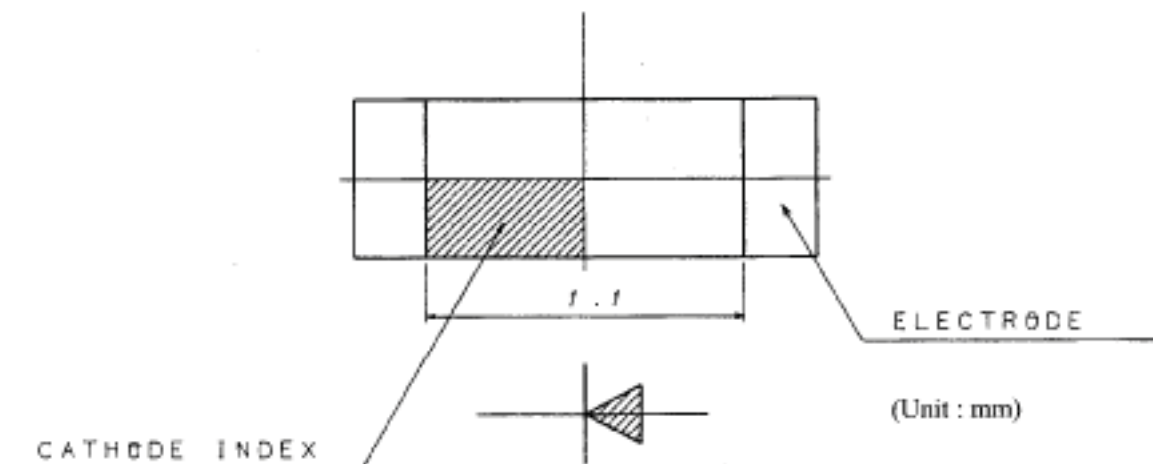
PIN	DESCRIPTION
1	cathode
2	anode

## V2425 Diode Protection 0.7V SOD-882 1201-2253

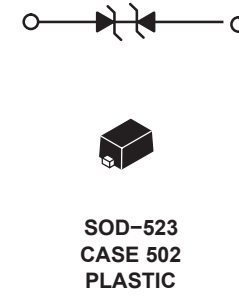
### Functional diagram



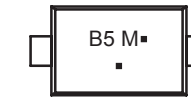
## V2428 LED Red RKZ433924/1



## V2477, V2478 Diode Protection 5.0V SOD-523 1201-0304



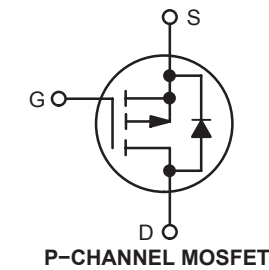
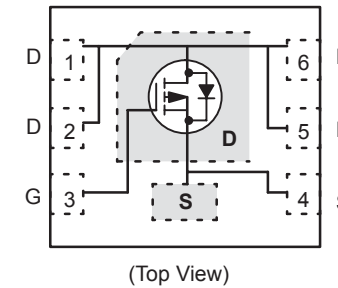
### MARKING DIAGRAM



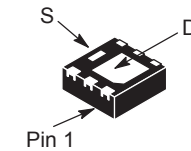
B5 = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

## V2500 Transistor P-channel FET WDFN6 1200-1780

### PIN CONNECTIONS



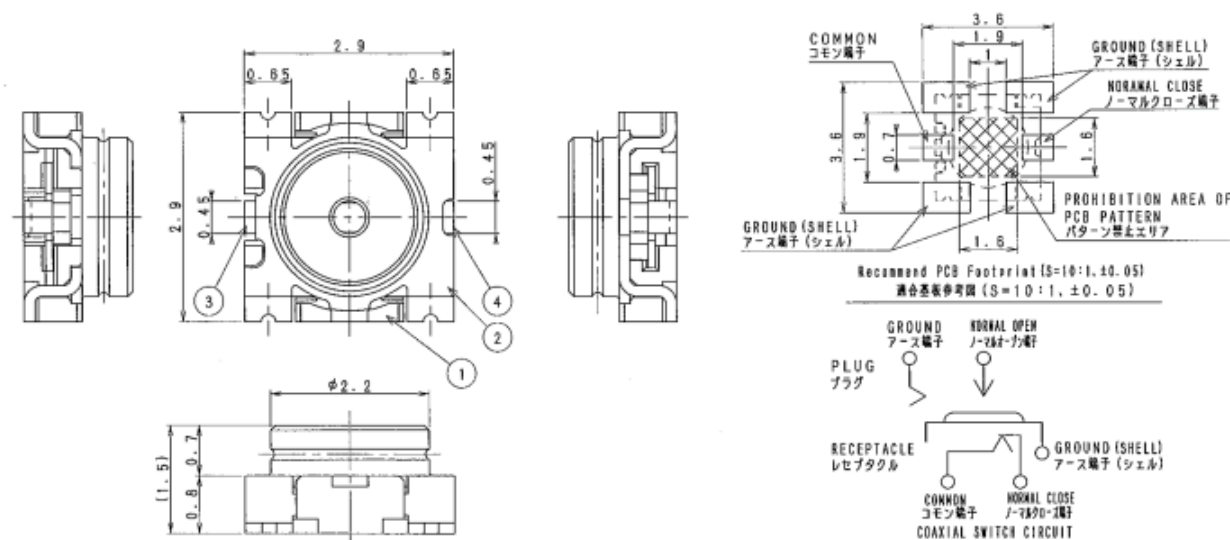
### MARKING DIAGRAM



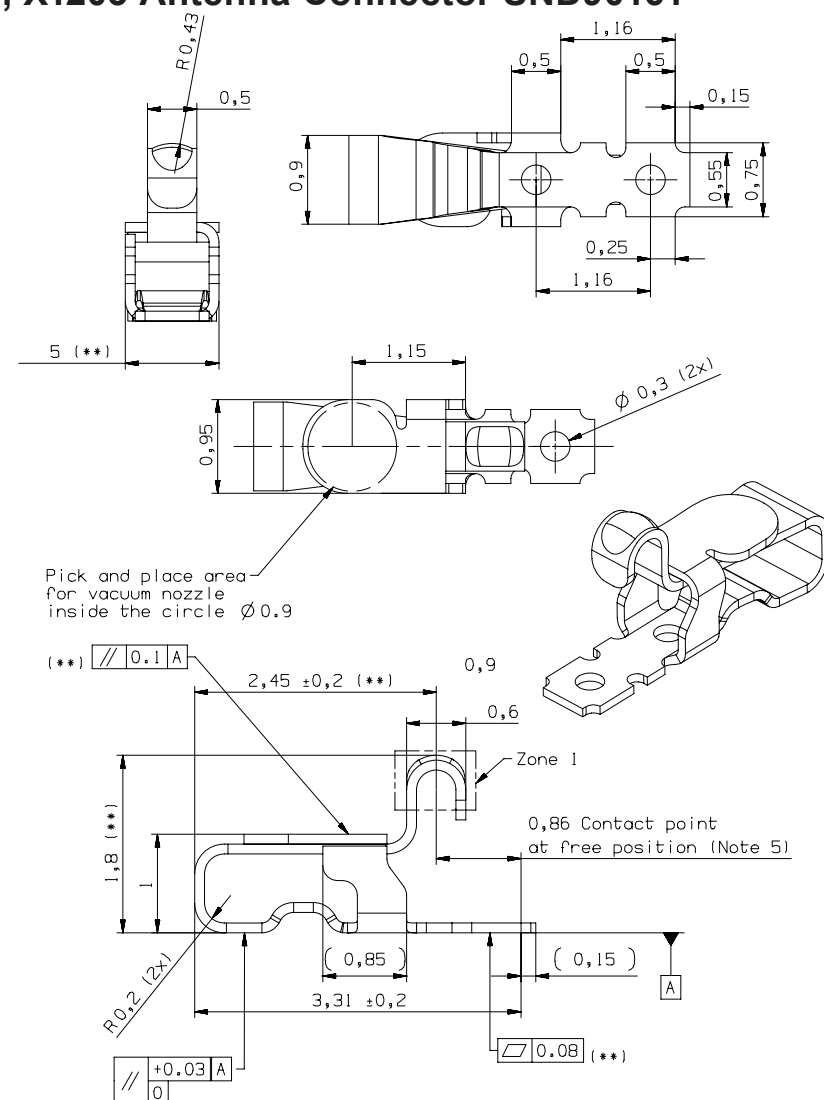
WDFN6  
CASE 506AP

J8 = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either locatic)

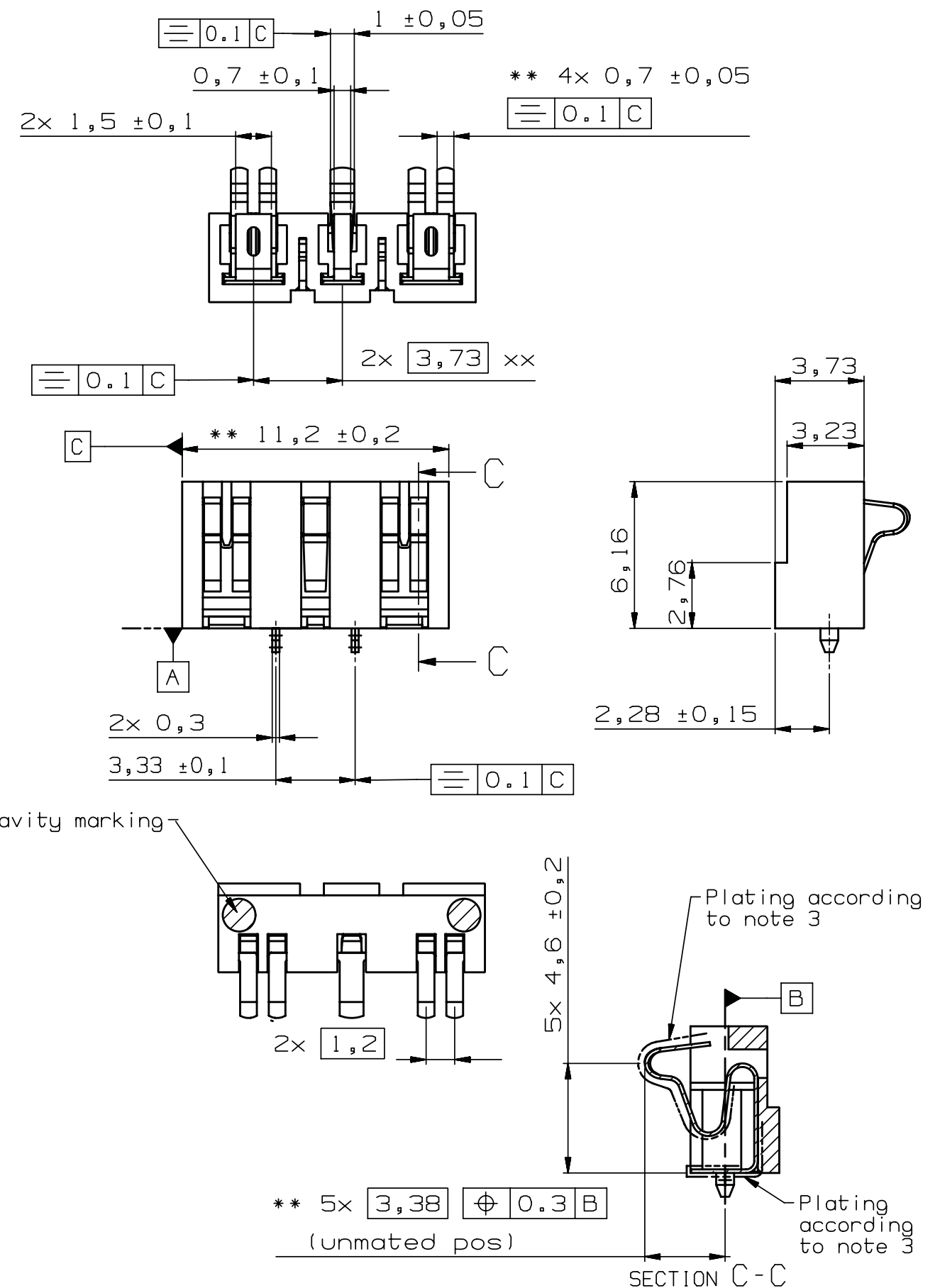
## X1200 Connector, RF Test RPT79947



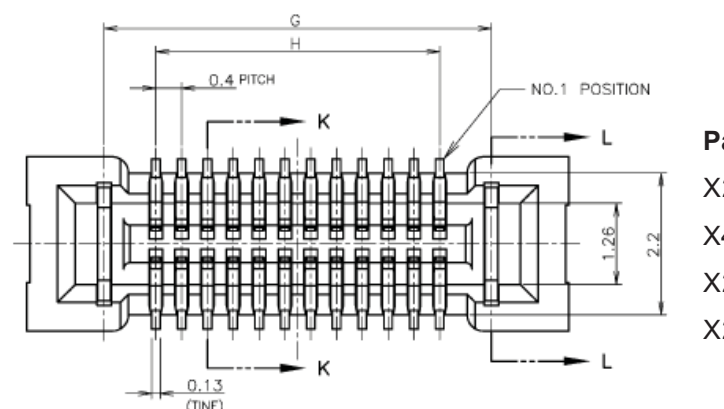
## X1201, X1202, X1203 Antenna Connector SND90161



## X2200 Battery Connector SND10622



## X3105 Microphone Connector 1200-2112



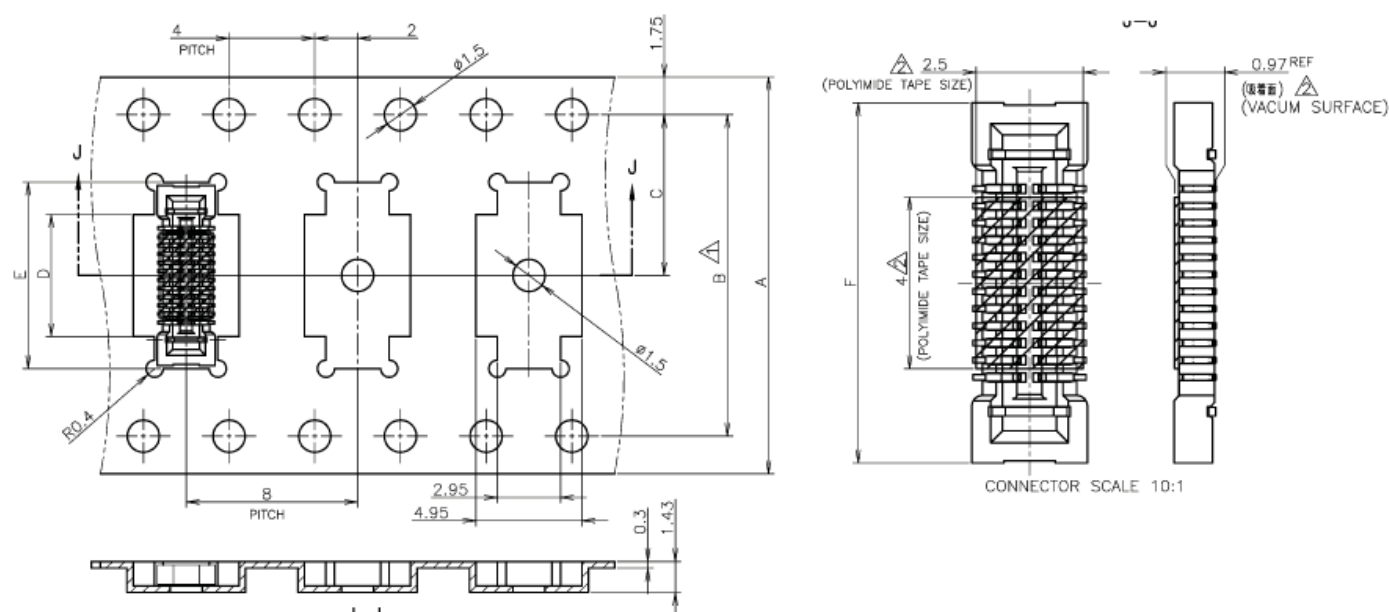
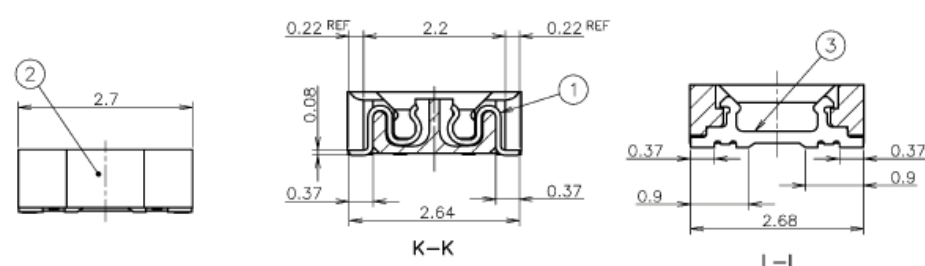
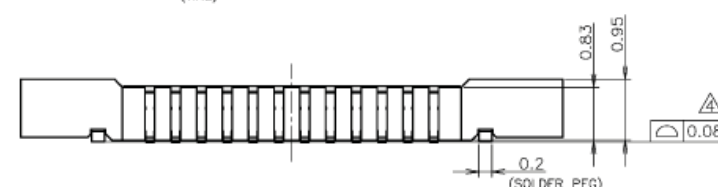
## Part numbers

X2409 22-pin RNV799045/22

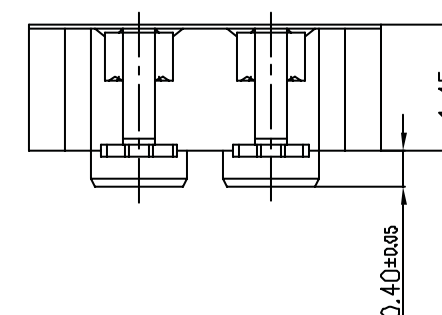
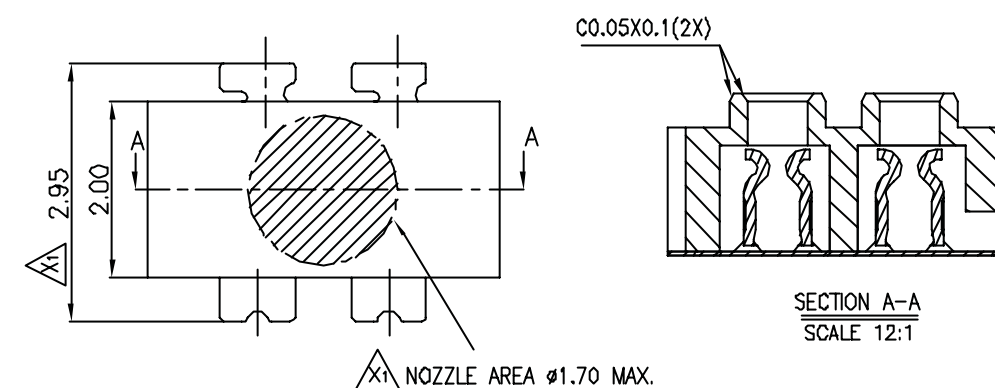
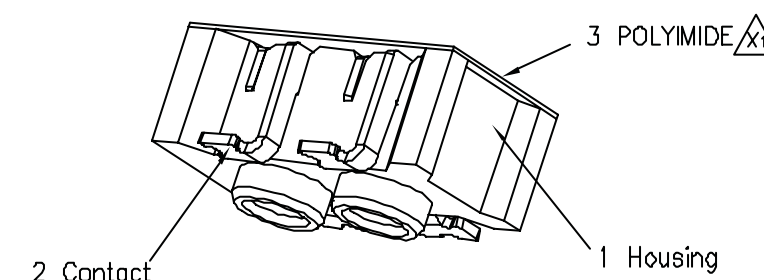
X4300 22-pin RNV799045/22

X2410 40-pin 1200-1735

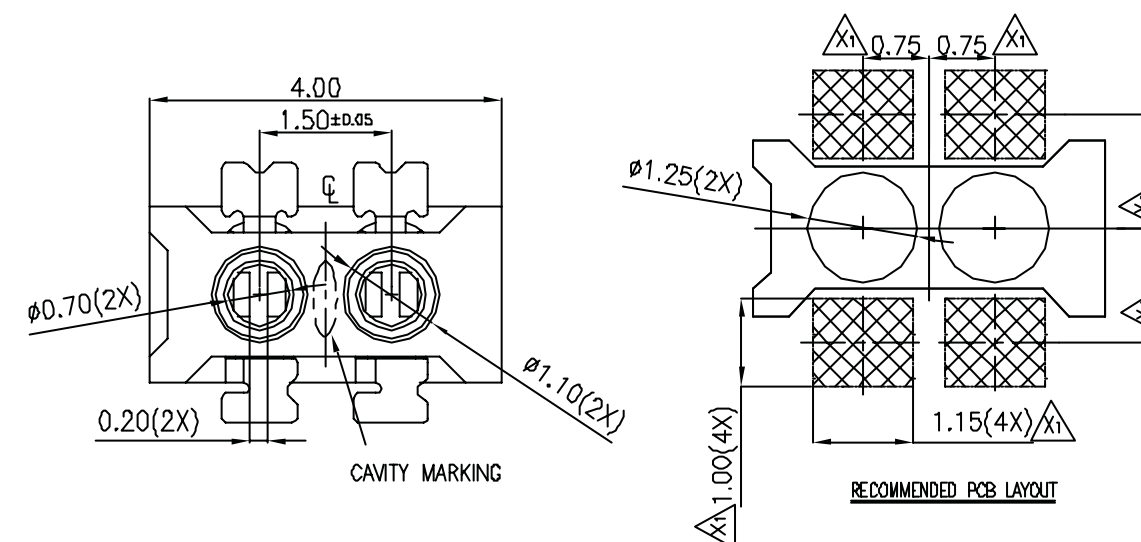
X2511 30-pin 1200-1733



8-1747769-0	38.4	32.4	0.0606	15.6	17.2	19.6	19.9	16.9	14.2	28.4	32	4000	8-2013134-0	80
7-1747769-0	30.4	24.4	0.0546	13.6	15.2	17.6	17.9	14.9	11.5	-	24		7-2013134-0	70
4-1747769-0	30.4	24.4	0.0366	7.6	9.2	11.6	11.9	8.9	11.5	-	24		4-2013134-0	40
3-1747769-0	30.4	24.4	0.0306	5.6	7.2	9.6	9.9	6.9	11.5	-	24		3-2013134-0	30
2-1747769-8	30.4	24.4	0.0294	5.2	6.8	9.2	9.5	6.5	7.5	-	16		2-2013134-8	28
2-1747769-4	22.4	16.4	0.0270	4.4	6.0	8.4	8.7	5.7	7.5	-	16		2-2013134-4	24
2-1747769-2	22.4	16.4	0.0258	4.0	5.6	8.0	8.3	5.3	7.5	-	16		2-2013134-2	22
2-1747769-0	22.4	16.4	0.0246	3.6	5.2	7.6	7.9	4.9	7.5	-	16		2-2013134-0	20
1-1747769-6	22.4	16.4	0.0222	3.6	4.4	6.8	7.1	4.1	7.5	-	16		1-2013134-6	16
W/O REFERENCE BAR CODE P/N	W2	W1	WEIGHT(g)	H	G	F	E	D	C	B	A	QTY/REEL	TAPING P/N	POS

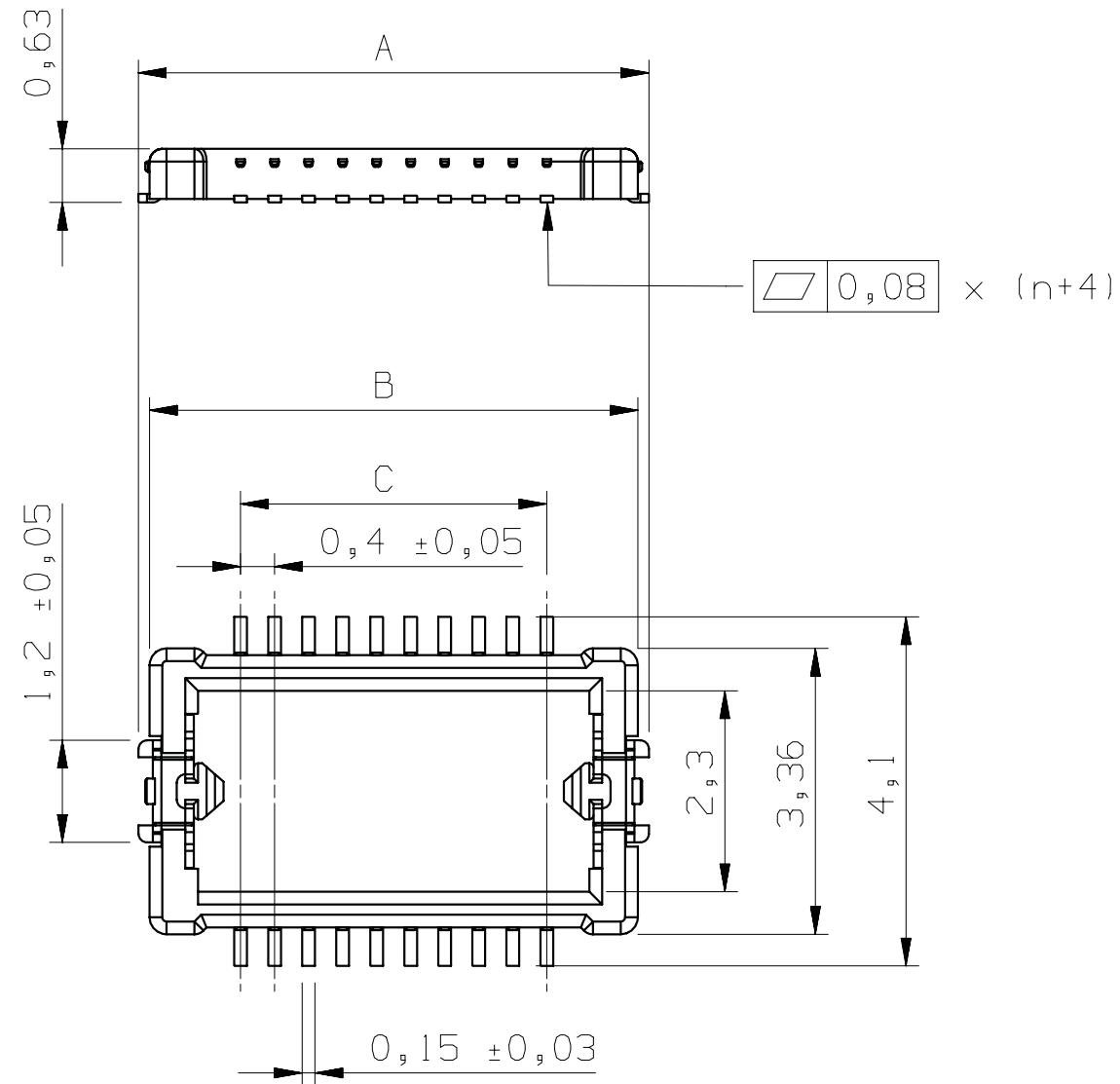


Coplanarity should be 0.08mm Max.  
from setting plane



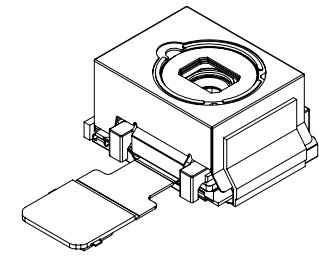
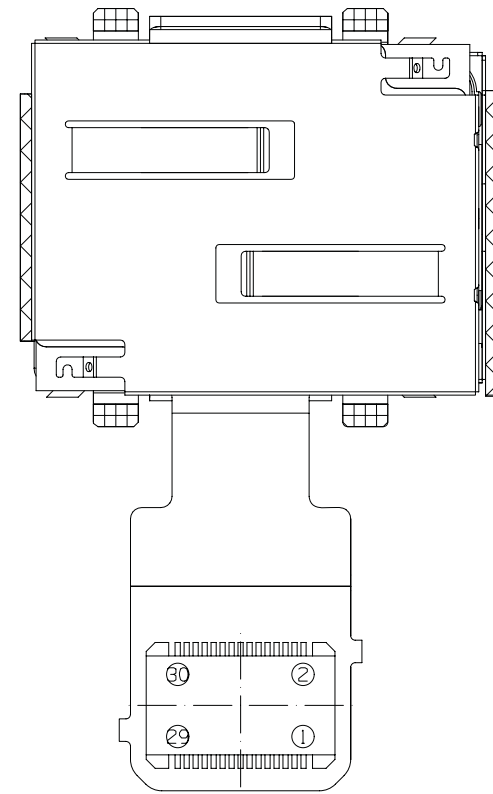


## X4301 30 Pin BtB, male (Camera) RNV79992



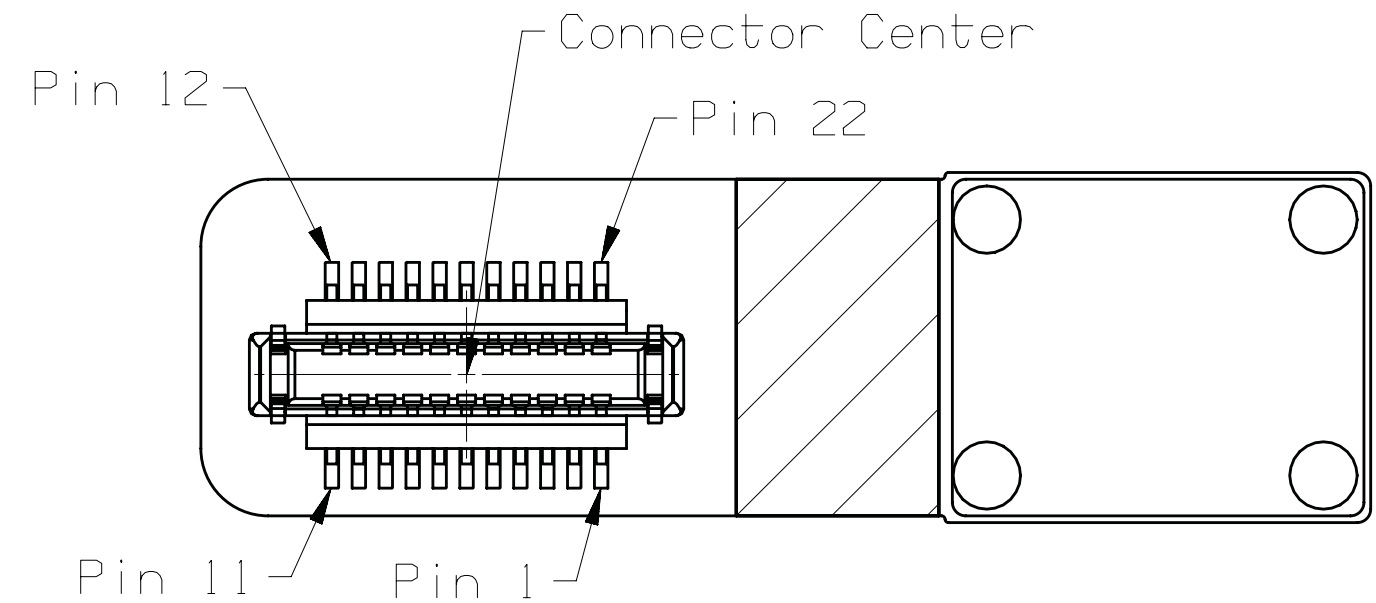
SEMC partnumber	Panasonic partnumber	Number of contacts/n	Corresponding part	A	B	C
RNV 799 72	AXK8L10125BG	10	RPV 799 44	4,0	3,74	1,6
RPV 799 61	AXK8L20125BG	20	RNV 799 009	6,0	5,74	3,6
RPV 799 36	AXK8L26125BG	26	RNV 799 94	7,2	6,94	4,8
RNV 799 92	AXK8L30125BG	30	RNV 799 93	8,0	7,74	5,6

## Camera Module 5 MPixel 1200-1425

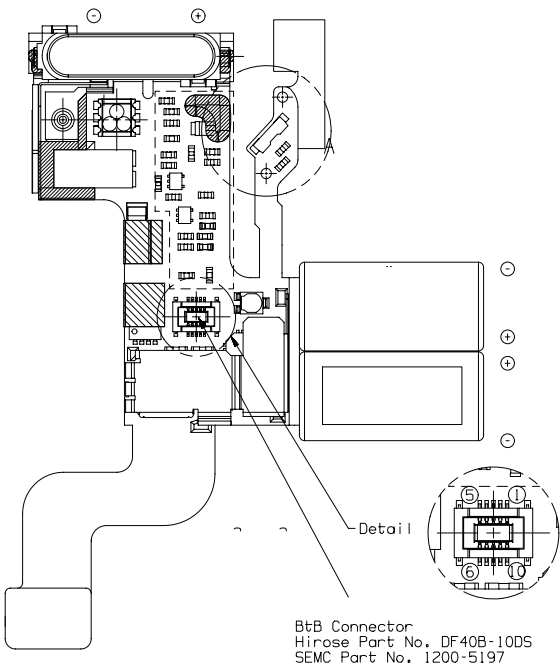


Pin No.	Symbol	Pin No.	Symbol
1	AF_GND	16	D(6)
2	GND	17	D(7)
3	VDD_AF	18	D(4)
4	SCL	19	D(5)
5	GND	20	D(2)
6	SDA	21	D(3)
7	VDD_SA	22	D(0)
8	VSYNC	23	D(1)
9	GND	24	GND
10	HSYNC	25	VDD_SD
11	VDD_I/O	26	MCK
12	XRST	27	DCK
13	TRIG	28	GND
14	STRB	29	GND
15	xSTL_EXP	30	VDD_L

## VGA Camera 1200-2184

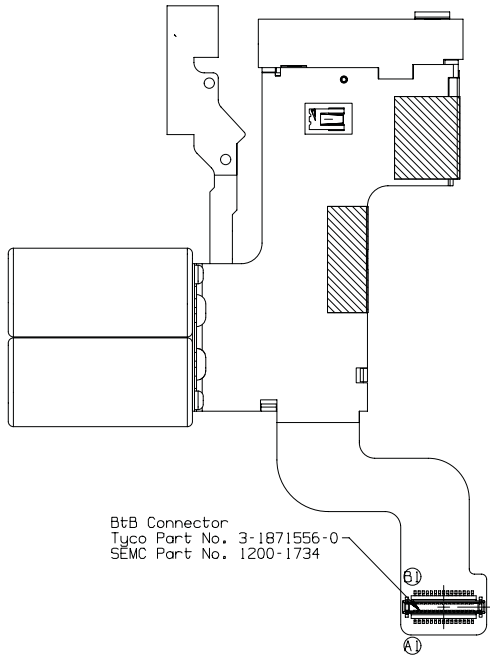


Xenon Flash Assembly 1200-1426



Connection Camera Cover - Flash Unit

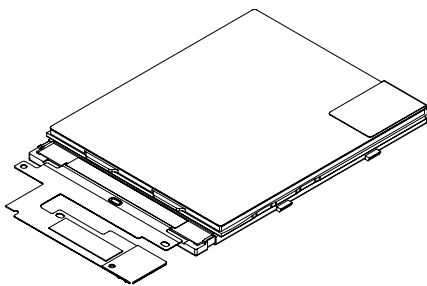
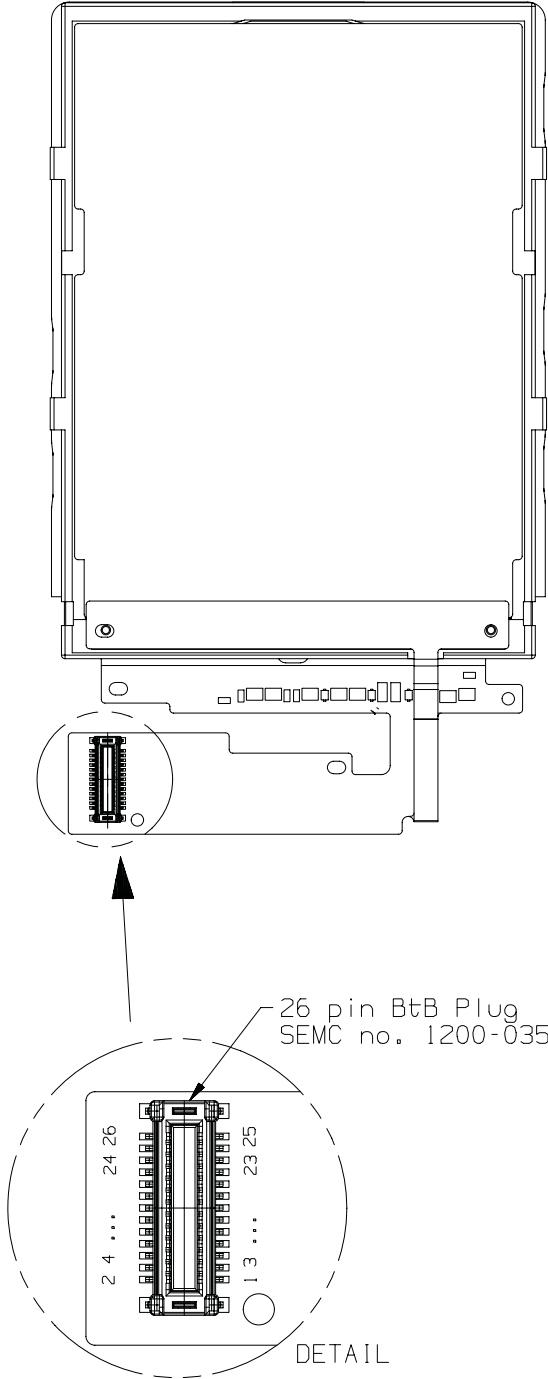
BtB Pin No.	Name	Connector Pin No.
1	LD	A2, B1
2	LD	A2, B1
3	No Connection	-
4	Close	A4
5	VC	A5
6	GND	A1, A10, A11, A12, A13, B3, B6, B7
7	VO	B5
8	OPEN	B4
9	LR	A3, B2
10	LR	A3, B2



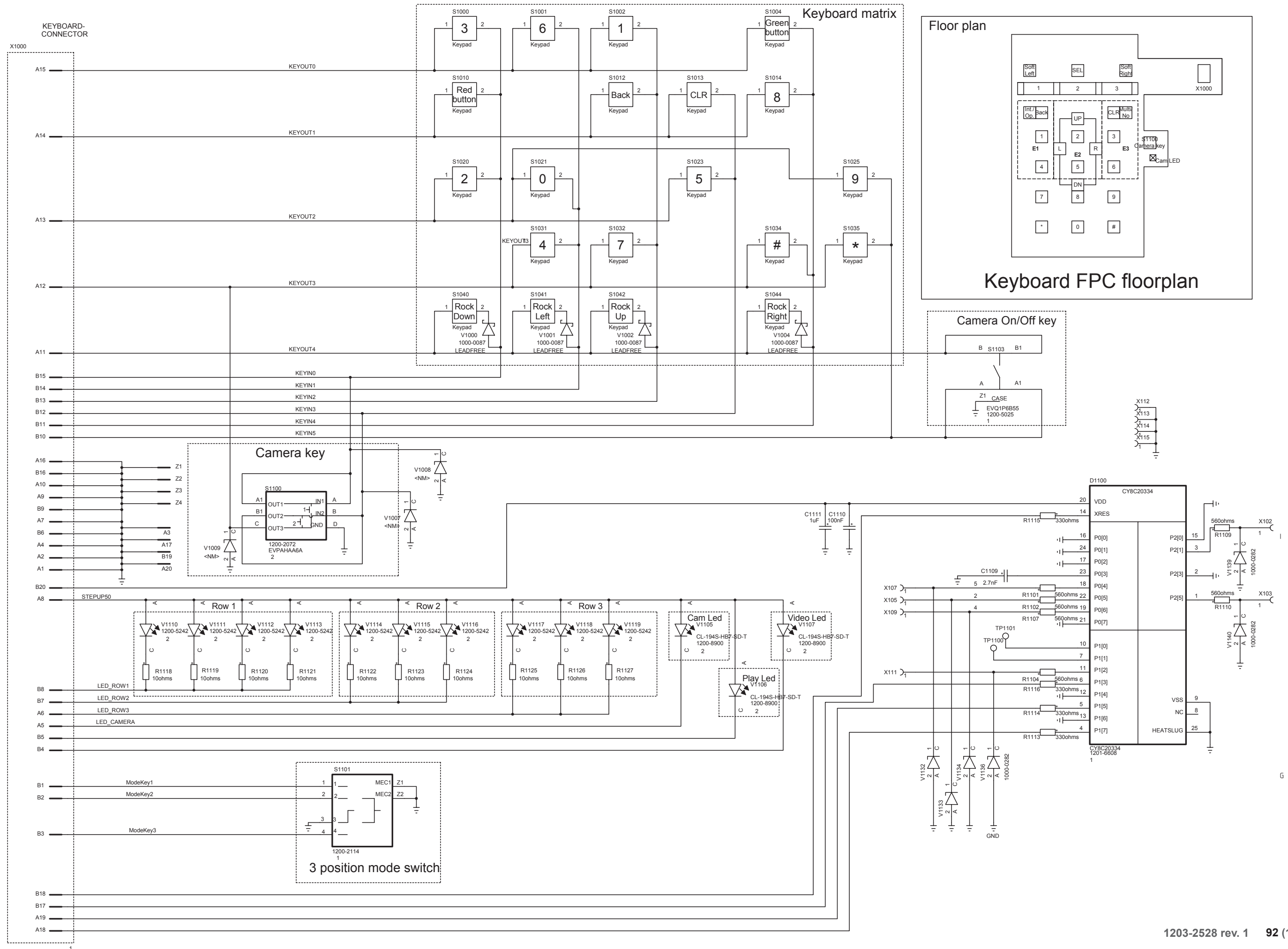
Connection Flash Unit - Main PCB

Pin No.	Name	Pin No.	Name
A1	GND	B1	CamD (1&2)
A2	Camd (1&2)	B2	CamD (9&10)
A3	CamD (9&10)	B3	GND
A4	CamD (4)	B4	CamD (8)
A5	CamD (5)	B5	CamD (7)
A6	Ornament LED (A)	B6	GND
A7	Ornament LED (K)	B7	GND
A8	SPD0	B8	SB
A9	TRIG	B9	VB
A10	GND	B10	VB
A11	GND	B11	VB
A12	GND	B12	VB
A13	GND	B13	COK
A14	CC	B14	SPD1
A15	AF_LED (K)	B15	AF_LED (A)

Display 1200-1603



PIN#	SIGNAL
1	D1
2	D2
3	D0
4	D3
5	VSS
6	D4
7	RD
8	D5
9	VSS
10	RES
11	WR
12	D6
13	RS
14	VSS
15	CS
16	D7
17	VSYNC
18	VSS
19	VSS
20	VSS
21	VI/O
22	ANODE
23	VDD
24	CATHODE
25	VDD
26	VSS



## Troubleshooting Software Documentation

### Introduction

Using this software you can control most parts and functions of all Sony Ericsson mobile phones. It is a GUI (Graphical User Interface) for the commands implemented in the ITP (Integrated Test Program). 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  $\pm 0.015$  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.

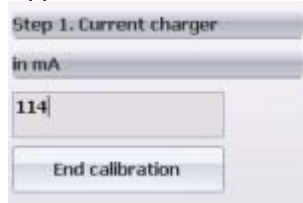
More information about the test limits can be found in the product specific Troubleshooting Manual and in the **Read Limits Table** in the **Battery and Current Calibration Test** document.

## 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 Troubleshooting Software application and try again

4.

**Command failed due to:**

**.... Error\_InvalidParameter, ERR**

**or**

**CERR: Error\_CommandDoesNotExist, ERR**

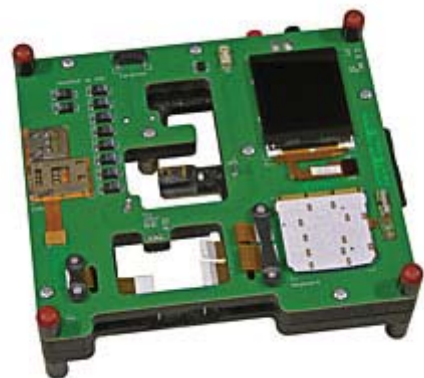
- Check if the correct Phone Project File is loaded
- Check if the phone has been flashed with the correct ITP version.



## Troubleshooting Fixture Setup Instructions

Front side overview of the TRS Fixture, see picture 1.

Picture 1



Backside overview of the TRS Fixture, see picture 2.

Picture 2



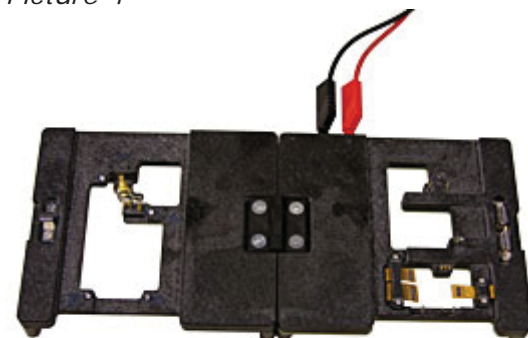
Open the TRS Fixture according to picture 3.

Picture 3



Connect Power Supply Channel 1 VBATT (Black and Red plugs) according to picture 4.

Picture 4



Place the PBA by using Guide Pin mounted inside the TRS Fixture according to picture 5.

Picture 5



Close the TRS Fixture according to picture 6 and 7.

Picture 6

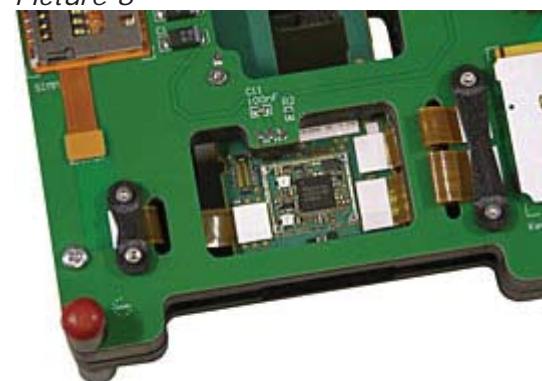


Picture 7



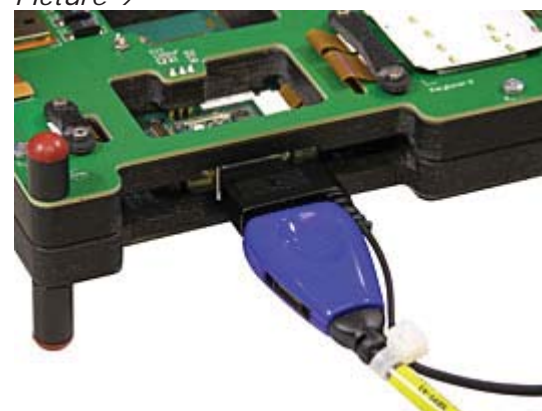
Connect the Flex Cables to the board-to-board connectors mounted on the PBA when Display, Keypad or Combo Reader is used, see picture 8.

Picture 8



Connect Power Supply Channel 2 DCIO/SEPI cable according to picture 9.

Picture 9



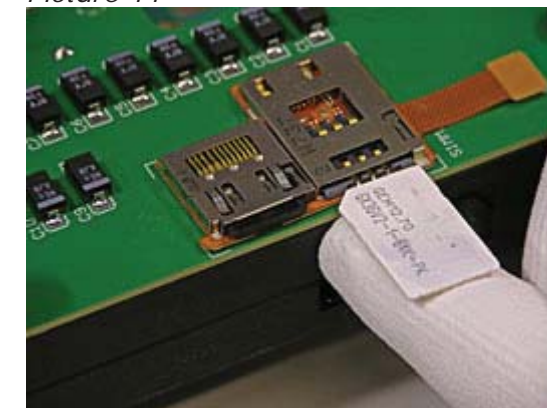
Insert Memory Card if needed according to picture 10.

Picture 10



Insert SIM Card if needed according to picture 11.

Picture 11



Connect RF Test Cable Flexible if needed according to picture 12.

Picture 12





Connect FM Radio Cable if needed according to picture 13.

Picture 13



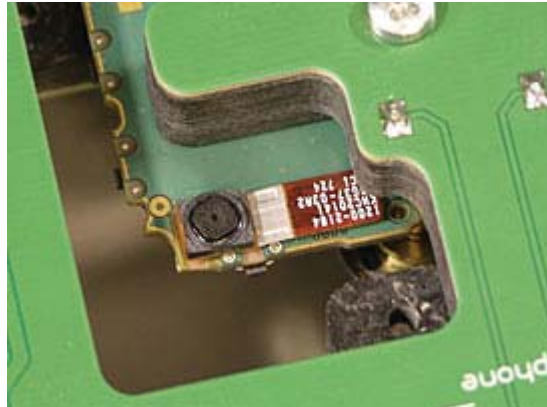
Connect Main Camera Module directly on the PBA if needed according to picture 14.

Picture 14



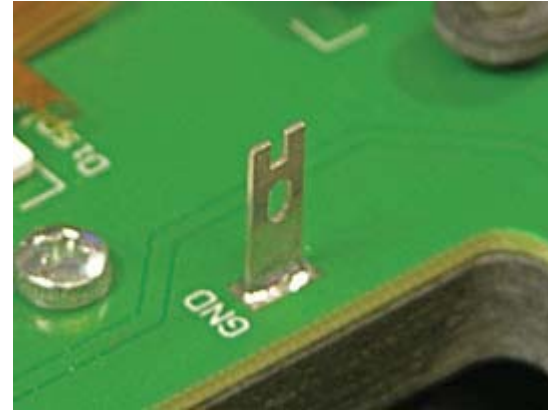
Connect VGA Camera Module directly on the PBA if needed according to picture 15.

Picture 15



The GND pin on the front side of the TRS Fixture can be used as MP TRS Fixture GND or as grounding for the oscilloscope probe, see picture 16.

Picture 16



The Guide Pin mounted inside of the TRS Fixture can be used as MP TRS Fixture GND or grounding for the oscilloscope probe, see picture 17.

Picture 17

