CCS Technical Documentation
NPD-4 Series Transceivers

Troubleshooting – BB

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Troubleshooting Overview

The baseband module of the NPD-4 transceiver is a CDMA dual mode engine. The baseband architecture is based on the NHP-2 phone, but includes some additional features, such as MIDI and gray-scale LCD.

The baseband consists of three ASICs: Universal Energy Management (UEM), Universal Phone Processor (UPP), and FLASH 64Megabit.

The baseband architecture supports a power-saving function called "sleep mode". This sleep mode shuts off the VCTCXO, which is used as system clock source for both RF and baseband. While in sleep mode, the system runs from a 32 kHz crystal and all the RF regulators (VR1A, VR1B, VR2, ... VR7) are off. The sleep time is determined by network parameters. Sleep mode is entered when both the MCU and the DSP are in standby mode and the normal VCTCXO clock is switched off. The phone is awakened by a timer running from this 32 kHz clock supply. The period of the sleep/wake up cycle (slotted cycle) is 1.28N seconds, where N= 0, 1, 2, depending on the slot cycle index.

NPD-4 supports standard Nokia two-wire and three-wire chargers (ACP-x and LCH-9). However, the three-wire chargers are treated as two-wire chargers. The PWM control signal for controlling the three-wire charger is ignored. Charging is controlled by UEM ASIC and EM SW.

BLC-2 Li-ion battery is used as main power source. BLC-2 has nominal capacity of 950 mAh.

NPD-4 supports Tomahawk accessories. The system connector for the NPD-4 phones is the 14-pin Tomahawk connector. The accessories supported include headset (HDB-4), loopset (LPS-4), basic handsfree car kit (BHF-1), advanced car kit (CARK-142), USB data cable (DKU-5), and data/flash cable (DKU-5F). The detection is based on the digital ID read from the accessories.

This service manual also contains a complete troubleshooting guide for GPS circuitry.

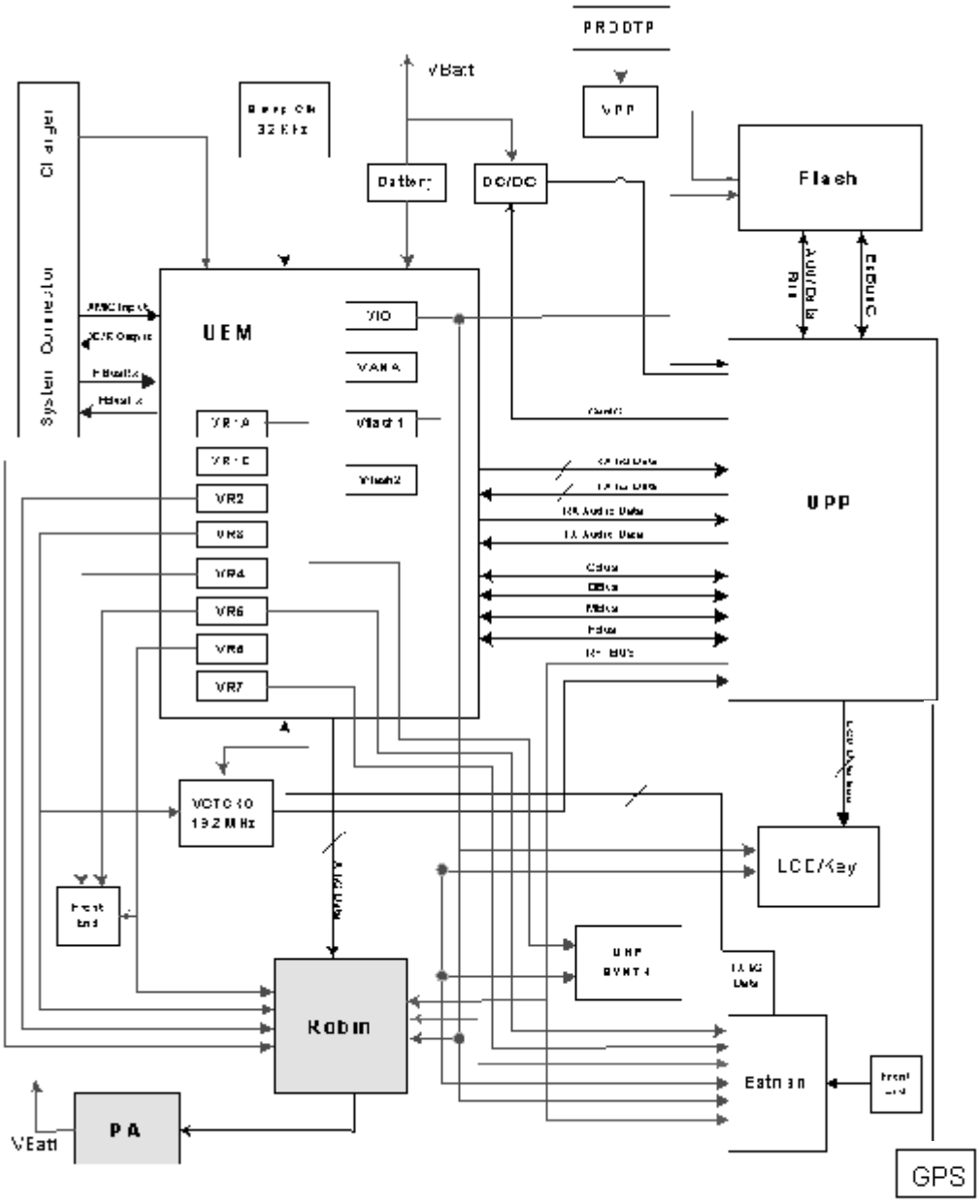


Figure 1: CDMA Block Diagram

Flash programming

Connections to Baseband

The flash programming equipment is connected to the baseband using test pads for galvanic connection. The test pads are allocated in such a way that they can be accessed when the phone is assembled. The flash programming interface uses the VPP, FBUSTX, FBUSRX, MBUS, and BSI connections for the connection to the baseband. The connection is through the UEM — which means that the logic levels correspond to 2.7V. Power is supplied using the battery contacts.

Baseband Power Up

The baseband power is controller by the flash prommer in production and in reprogramming situations. Applying supply voltage to the battery terminals, the baseband will power up. Once the baseband is powered, flash-programming indication is done as described in the following section.

Flash Programming Indication

Flash programming is indicated to the UPP using MBUSRX signal between UPP and UEM. The MBUS signal from the baseband to the flash prommer is used as clock for the synchronous communication. The flash prommer keeps the MBUS line low during UPP boot to indicate that the flash prommer is connected. If the UPP MBUSRX signal is low on UPP, the MCU enters flash programming mode. In order to avoid accidental entry to the flash-programming mode, the MCU only waits for a specified time to get input data from the flash prommer. If the timer expires without any data being received, the MCU will continue the boot sequence. The MBUS signal from UEM to the external connection is used as clock during flash programming. This means that flash-programming clock is supplied to UPP on the MBUSRX signal.

The flash prommer indicates the UEM that flash programming/reprogramming by writing an 8-bit password to the UEM. The data is transmitted on the FBUSRX line and the UEM clocks the data on the FBUSRX line into a shift register. When the 8 bits have been shifted in the register, the flash prommer generates a falling edge on the BSI line. This loads the shift register content in the UEM into a compare register. If the 8 bits in the compare registers match with the default value preset in the UEM. The flash prommer pulls the MBUS signal to UEM low in order to indicate to the MCU that the flash prommer is connected. The UEM reset state machine performs a reset to the system, PURX low for 20 ms. The UEM flash programming mode is valid until MCU sets a bit in the UEM register that indicates the end of flash programming. Setting this bit also clears the compare register in the UEM previously loaded at the falling edge of the BSI signal. During the flash programming mode, the UEM watchdogs are disabled. Setting the bit indicating end of flash programming enables and resets the UEM watchdog timer to its default value. Clearing the flash programming bit also causes the UEM to generate a reset to the UPP.

The BSI signal is used to load the value into the compare register. In order to avoid spurious loading of the register, the BSI signal will be gated during UEM master reset and during power on when PURX is active. The BSI signal should not change state during normal operation unless the battery is extracted; in this case, the BSI signal will be pulled high, note a falling edge is required to load the compare register.

Flashing

- Flash programming is done by using FBUSTX, FBUSRX, MBUS, and BSI lines.

- When phone is connected to the prommer, the prommer will first set BSI to "1" and then uses FBUSRX for writing and MBUS for clocking. The prommer will indicate to UEM that flash programming will take place by writing 8-bit password (*0xC9") to UEM after BSI is set to high. After the

password is checked, BSI is set back to "0". See the following figure.

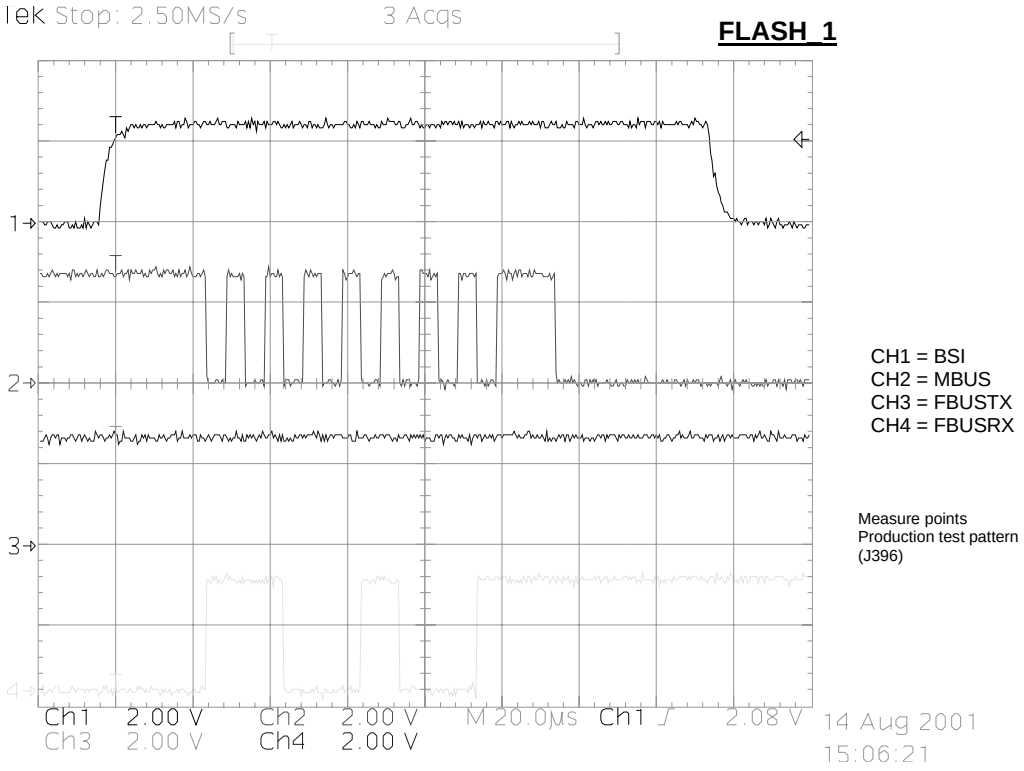


Figure 2: Flashing starts by BSI being pulled up and password being sent to UEM

MCU will indicate to prommer that it has been noticed, by using FBUSTX signal. After this, it reports UPP type ID and is ready to receive secondary boot code to its internal SRAM. (See the following figure.)

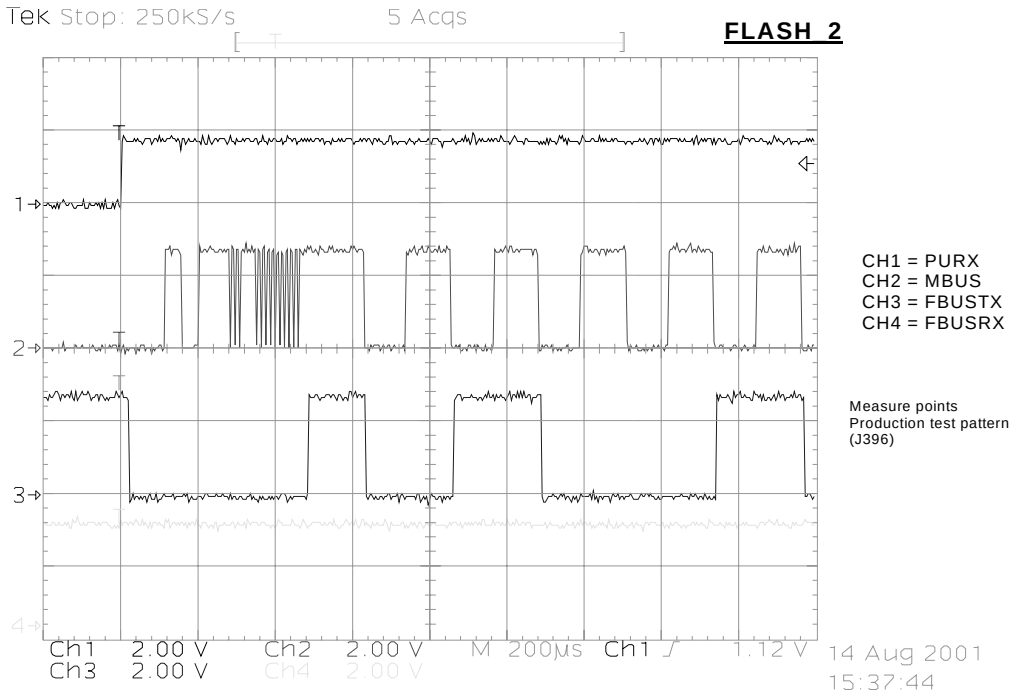


Figure 3: Flashing (2)

Ch1-> PURX
Ch2-> MBUS toggled three times for MCU initialization
Ch3-> FBUS_TX low, MCU indicates that prommer has been noticed
Ch4-> FBUS_RX

- This boot code asks MCU to report prommer phone's configuration information, including flash device type. Now prommer can select and send algorithm code to MCU SRAM (and SRAM/Flash self-tests can be executed). (See the following figure.)

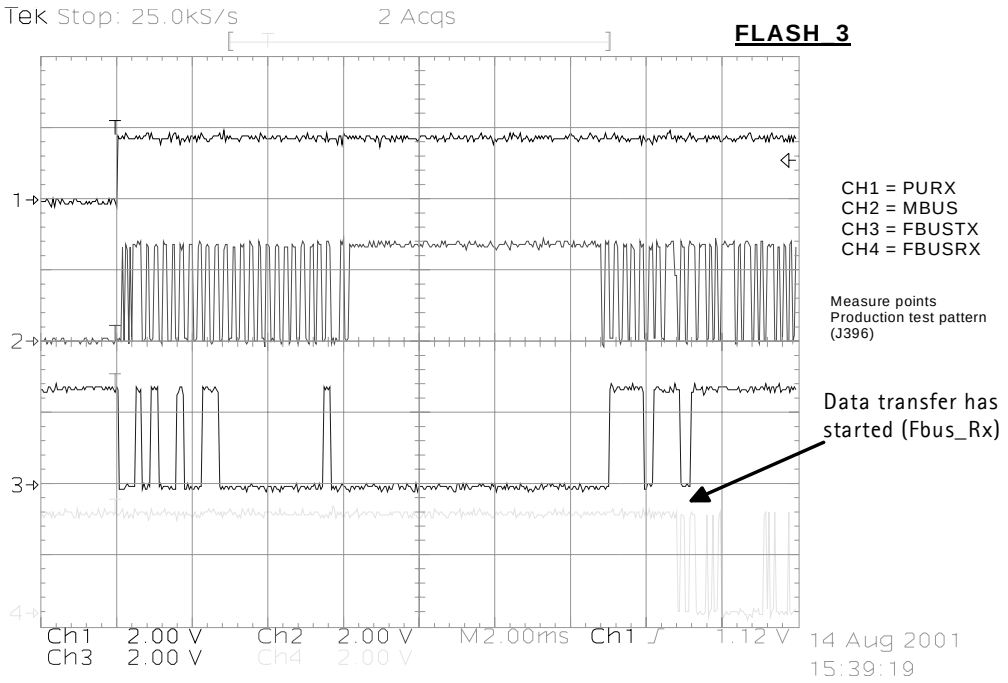


Figure 4: Flashing (continued)

Power Up and Reset

Power up and reset is controlled by the UEM ASIC. The baseband can be powered up in the following ways:

- By the Power button, which means grounding the PWRONX pin of the UEM
- By connecting the charger to the charger input
- By the RTC Alarm, when the RTC logic has been programmed to give an alarm

After receiving one of the above signals, the UEM counts a 20 ms delay and then enters its reset mode. The watchdog starts up, and if the battery voltage is greater than Vcoff+, a 200 ms delay is started to allow references and so on to settle. After this delay elapses, the VFLASH1 regulator is enabled. Then, 500 us later, VR3, VANA, VIO, and VCORE are enabled. Finally, the Power Up Reset (PURX) line is held low for 20 ms. This reset, PURX is sent to UPP and resets are generated for the MCU and the DSP. During this reset phase, the UEM forces the VCTCXO regulator on regardless of the status of the sleep control input signal to the UEM. The FLSRSTx from the UPP is used to reset the flash during power up and to put the flash in power down during sleep. All baseband regulators are switched on at the UEM power on—except for the SIM regulator and Vflash2. Vsim is not used this moment and Vflahs2 is used for active cover. The UEM internal watchdogs are running during the UEM reset state, with the longest watchdog time selected. If the watchdog expires, the UEM returns to power off state. The UEM watchdogs are internally

acknowledged at the rising edge of the PURX signal in order to always give the same watchdog response time to the MCU.

The following timing diagram represents UEM start-up sequence from reset to power-on mode.

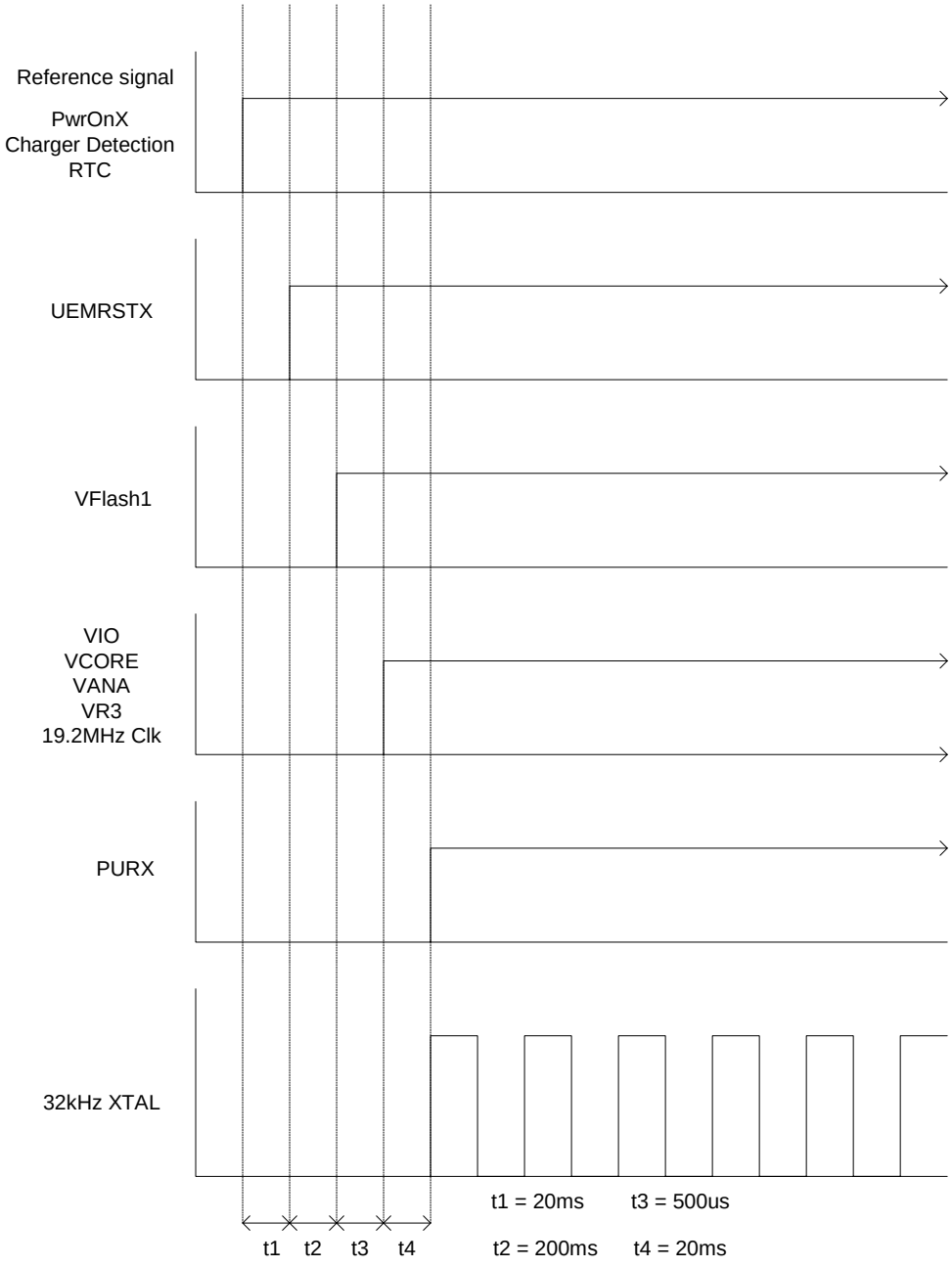


Figure 5: Power on sequence and timing

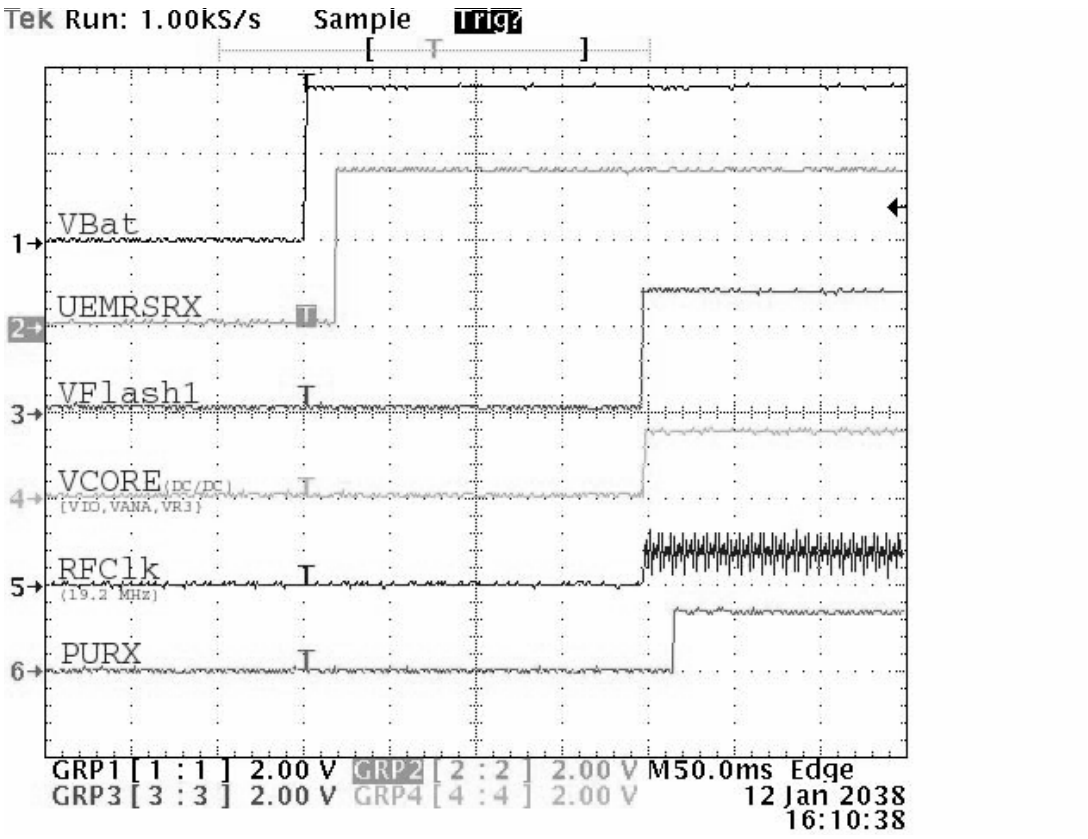


Figure 6: Measured power on sequence and timing

Power up with PWR key

When the Power on key is pressed, the UEM enters the power up sequence. Pressing the power key causes the PWRONX pin on the UEM to be grounded. The UEM PWRONX signal is not part of the keypad matrix. The power key is only connected to the UEM. This means that when pressing the power key, an interrupt is generated to the UPP that starts the MCU. The MCU then reads the UEM interrupt register and notices that it is a PWRONX interrupt. The MCU now reads the status of the PWRONX signal using the UEM control bus, CBUS. If the PWRONX signal stays low for a certain time, the MCU accepts this as a valid power-on state and continues with the SW initialization of the baseband. If the power on key does not indicate a valid power-on situation, the MCU powers off the baseband.

Power up when charger is connected

In order to be able to detect and start charging in a case where the main battery is fully discharged (empty) and hence UEM has no supply (NO_SUPPLY or BACKUP mode of UEM), charging is controlled by *START-UP CHARGING* circuitry.

Whenever VBAT level is detected to be below master reset threshold (V_{MSTR-}) charging is controlled by START_UP charge circuitry. Connecting a charger forces VCHAR input to rise above charger detection threshold, VCH_{DET+}. By detection, start-up charging is started. UEM generates 100 mA constant output current from the connected charger's

output voltage. As the battery charges, its voltage rises, and when VBAT voltage level is higher than master reset threshold limit (V_{MSTR+}) is detected START_UP charge is terminated.

Monitoring the VBAT voltage level is done by charge control block (CHACON). MSTRX='1' output reset signal (internal to UEM) is given to UEM's *RESET* block when VBAT>V_{MSTR+} and UEM enters into reset sequence.

If VBAT is detected to fall below V_{MSTR-} during start-up charging, charging is cancelled. It will restart if new rising edge on VCHAR input is detected (VCHAR rising above VCH_{DET+}).

RTC alarm power up

If phone is in POWER_OFF mode when RTC alarm occurs, the wake up procedure begins. After baseband is powered on, an interrupt is given to MCU. When RTC alarm occurs during ACTIVE mode, the interrupt for MCU is generated.

Power off

The baseband switches to power off mode if any of following occurs:

- Power key is pressed
- Battery voltage is too low (VBATT < 3.2 V)
- Watchdog timer register expires

The Power down procedure is controlled by the UEM.

Power Consumption and Operation modes

The power off mode, the power (VBAT) is supplied to UEM, MIDI PA, VIBRA, LED, PA, and PA drivers (Tomcat and Hornet).

In the sleep mode, both processors (MCU and DSP) are in stand-by mode. Sleep mode is controlled by both processors. When SLEEPX signal is detected low by the UEM, the phone enters SLEEP mode. VIO and VFLASH1 regulators are put into low quiescent current mode, VCORE (dc/dc) enters PFM or LDO mode—depending on LM2612 or NCP1500 respectively—and VANA and VFLASH2 regulators are disabled. All RF regulators are disabled during SLEEP mode. When SLEEPX signal is detected high by the UEM, the phone enters ACTIVE mode and all functions are activated.

The sleep mode is exited either by the expiration of a sleep clock counter in the UEM or by some external interrupt, generated by a charger connection, key press, headset connection, etc.

In sleep mode, VCTCXO is shut down and 32 kHz sleep clock oscillator is used as reference clock for the baseband.

The average current consumption of the phone in sleep mode can vary depending mainly on SW; however, on average is about 9 mA.

In the ACTIVE mode, the phone is in normal operation, scanning for channels, listening to a base station, transmitting and processing information. There are several sub-states in the active mode depending on the present state of the phone such as: burst reception, burst transmission, DSP working, etc.

In active mode, the RF regulators are controlled by SW writing into UEM's registers wanted settings: VR1A and VR1B can be enabled or disabled. VSIM can be enabled or disabled and its output voltage can be programmed to be 1.8 V or 3.3 V. VR2 and VR4 - VR7 can be enabled or disabled or forced into low quiescent current mode. VR3 is always enabled in active mode and disabled during Sleep mode and cannot be controlled by SW.

In the CHARGING mode, the charging can be performed in parallel with any other operating mode. The battery type/size is indicated by a BSI resistor inside the battery pack. The resistor value corresponds to a specific battery capacity. This capacity value is related to the battery technology.

The battery voltage, temperature, size, and charging current are measured by the UEM, and the charging software running in the UPP controls it.

The charging control circuitry (CHACON) inside the UEM controls the charging current delivered from the charger to the battery and phone. The battery voltage rise is limited by turning the UEM switch off when the battery voltage has reached 4.2 V. Charging current is monitored by measuring the voltage drop across a 220 mOhm resistor.

Power Distribution

In normal operation, the baseband is powered from the phone's battery. The battery consists of one Lithium-Ion cell capacity of 950 mAh.

The baseband contains components that control power distribution to whole phone—excluding the power amplifier (PA), which has a continuous power rail direct from the battery. The battery feeds power directly to the following parts of the system: UEM, DC/DC, PA, Vibra, MIDI PA, and LED driver.

The heart of the power distribution to the phone is the power control ASIC, which is part of the UEM. It includes all the voltage regulators and feeds the power to the whole system. UEM handles hardware functions of power up so that regulators are not powered and power up reset (PURX) are not released if battery voltage is less than 3 V.

The baseband is powered from UEM regulators (VANA, VIO, VFLASH1, and VFLASH2) and the core voltage VCORE is supplied by a DC/DC switching supply, which provides nominal voltages and currents (See Table 1.)

UEM supplies also voltages VR1A, VR1B, VR2, VR3, VR4, VR5, VR6, and VR7 for RF. (See Table 2).

Table 1: Baseband regulators

Regulator	Maximum current (mA)	Vout (v)	Notes
VCORE (dc/dc)	300	1.5	Output voltage selecta ble 1.0V/1.3V/1.5V/1.8V Power up default 1.5V
VIO	150	1.8	Enabled always except during power off mode
VFLASH1	70	2.78	Enabled always except during power off mode
VFLASH2	40	2.78	Enabled only when active cover is detected
VANA	80	2.78	Enabled only when the system is awake (off during Sleep and Power off modes)
VSIM	25	3.0	Enabled only when SIM card is used

Table 2: RF regulators

Regulator	Maximumcurrent (mA)	Vout (v)	Notes
VR1A	10	4.75	Enabled when the receiver is on
VR1B	10	4.75	Enabled when the transmitter is on
VR2	100	2.78	Enabled when the transmitter is on
VR3	20	2.78	Enabled when SleepX is high
VR4	50	2.78	Enabled when the receiver is on
VR5	50	2.78	Enabled when the receiver is on
VR6	50	2.78	Enabled when the transmitter is on
VR7	45	2.78	Enabled when the receiver is on

A charge pump used by VR1A is constructed around UEM. The charge pump works with a 1.2 MHz oscillator and gives a 4.75 V regulated output voltage to RF.

Clock Distribution

RFClk (19.2 MHz Analog)

The main clock signal for the baseband is generated from the voltage and temperature controlled crystal oscillator VCTCXO (G501). This 19.2 MHz sine wave clock signal is fed to RFCLK pin of UPP. (See Figure 7 for the waveform.)

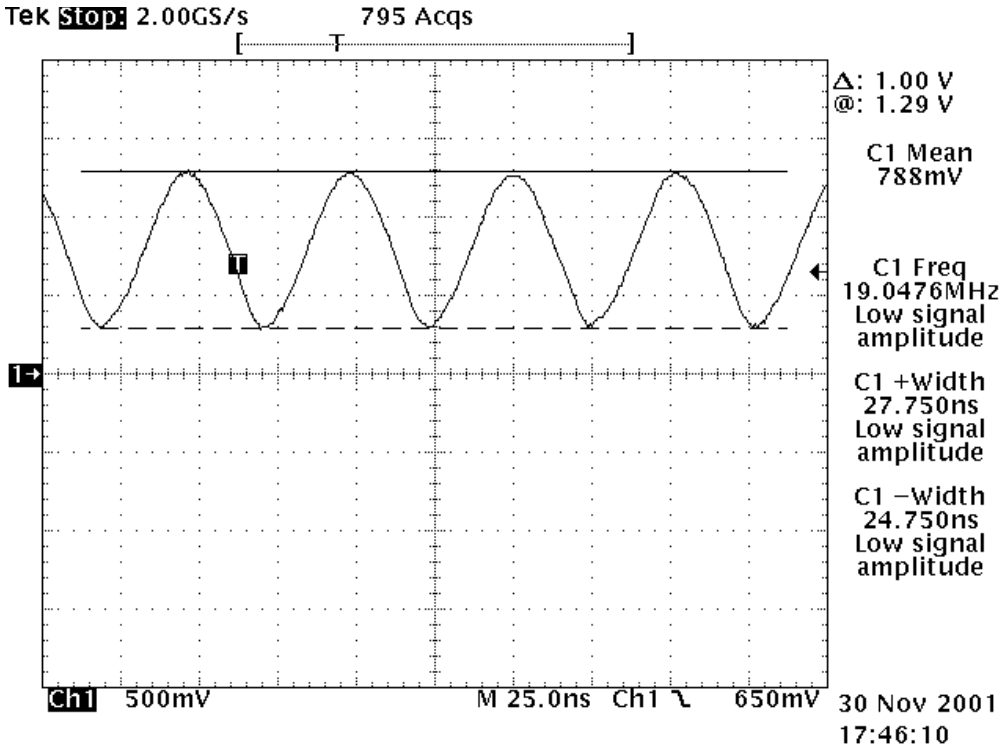


Figure 7: Waveform of 19.2MHz clock from RF to UPP

RFConvClk (19.2 MHz digital)

The UPP distributes the 19.2MHz internal clock to the DSP and MCU, where SW multiplies this clock by seven for the DSP and by two for the MCU. (See the following figure.)

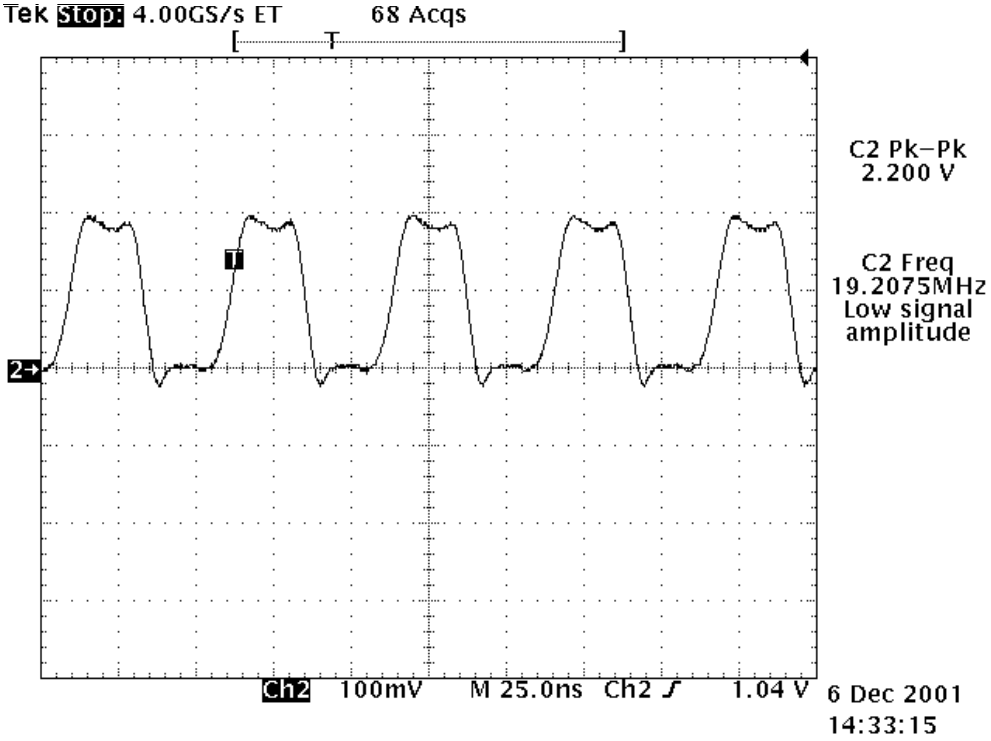


Figure 8: RF CovClk waveform

CBUSClk Interface

A 1.2 MHz clock signal is use for CBUS, which is used by the MCU to transfer data between UEM and UPP. (See figure below for Cbus data transfer.)

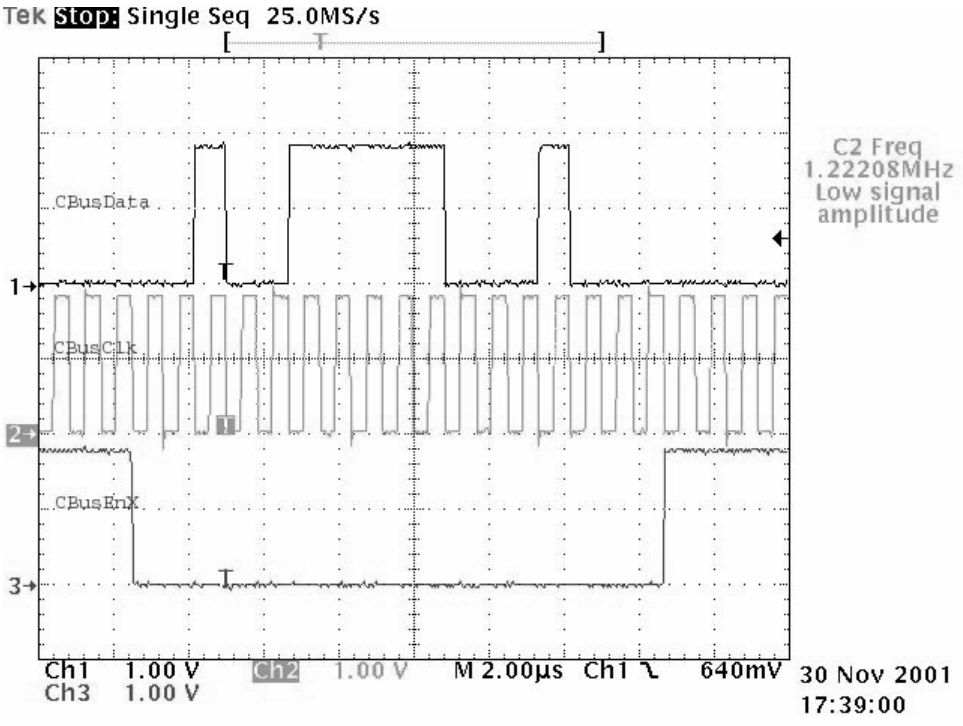


Figure 9: Cbus data transfer

DBUSClk Interface

A 9.6 MHz clock signal is used for DBUS, which is used by the DSP to transfer data between UEM and UPP. (See following figure.)

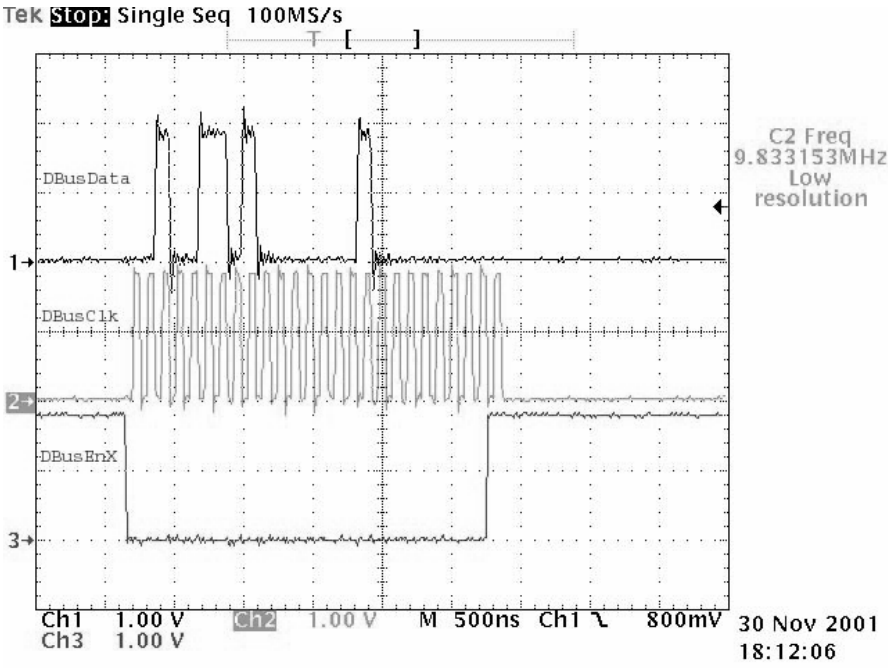


Figure 10: Dbus data transfer

The system clock is stopped during sleep mode by disabling the VCTCXO power supply (VR3) from the UEM regulator output by turning off the controlled output signal SleepX from UPP.

SLEEPClk (Digital)

The UEM provides a 32kHz sleep clock for internal use and to UPP, where it is used for the sleep mode timing. (See next figure.)

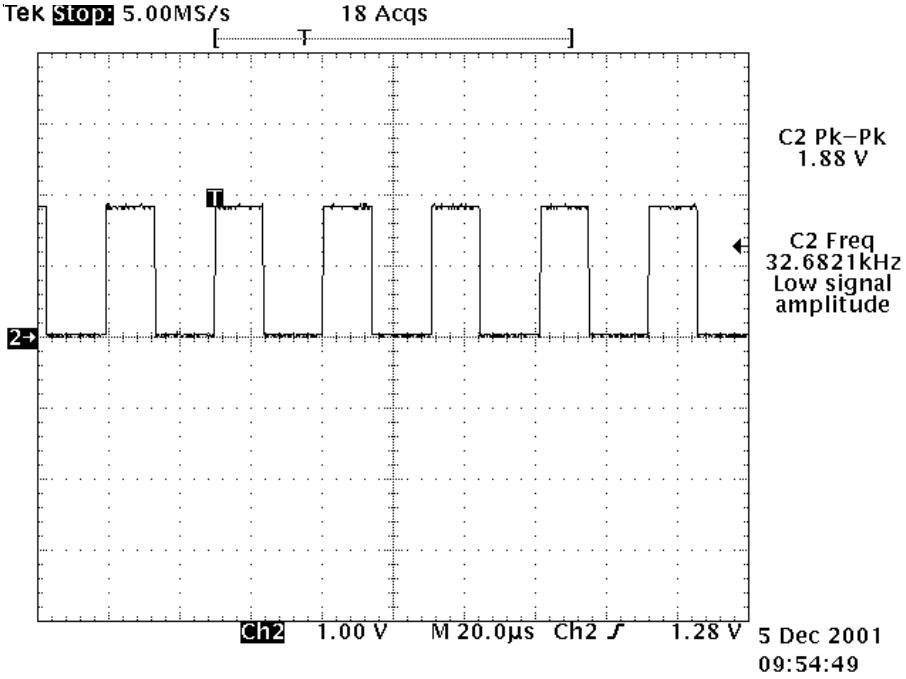


Figure 11: 32kHz Digital output from UEM

SLEEPClk (Analog)

When the system enters sleep mode or power off mode, the external 32KHz crystal provides a reference to the UEM RTC circuit to turn on the phone during power off or sleep mode. (See next figure.)

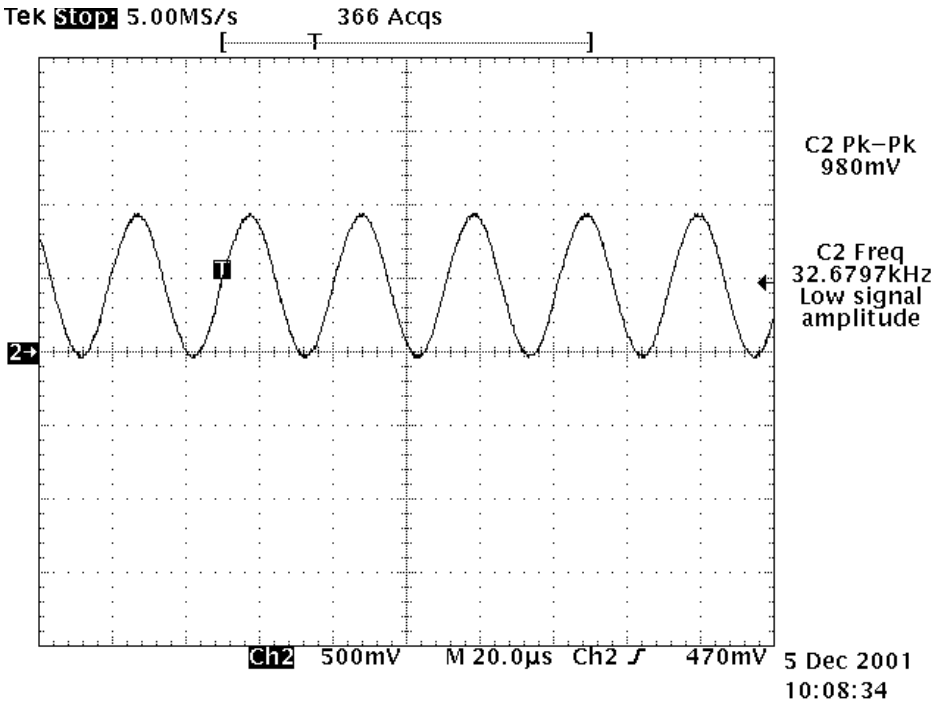


Figure 12: 32kHz analog waveform at 32KHz crystal input

Charging operation

Battery

A 950 mAh Lithium-Ion cell battery is used. Reading a resistor inside the battery pack on the BSI line indicates the battery size. NTC-resistor inside the battery measures the battery temperature on the BTEMP line.

Temperature and capacity information are needed for charge control. These resistors are connected to BSI and BTEMP pins of battery connector. Phone has 100 kΩ pull-up resistors for these lines so that they can be read by A/D inputs in the phone.

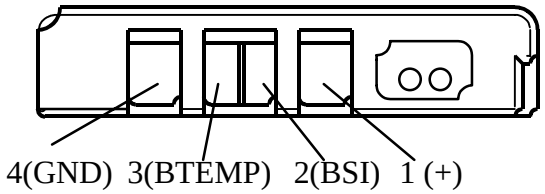


Figure 13: BLC-2 battery pack pin order

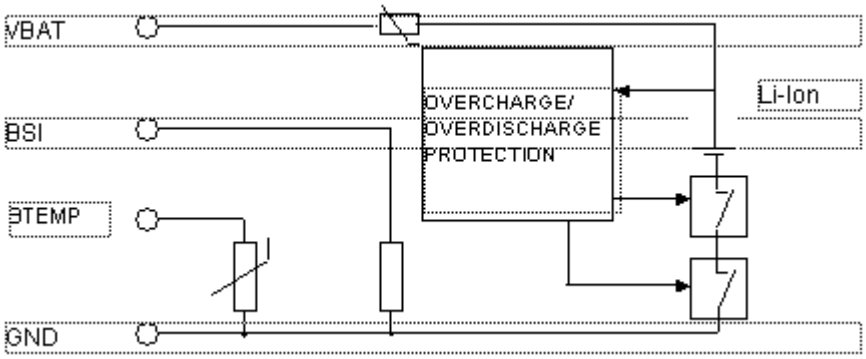


Figure 14: Interconnection diagram inside the battery pack

Charging circuitry

The UEM ASIC controls charging depending on the charger being used and the battery size. External components are needed for EMC, reverse polarity and transient protection of the input to the baseband module. The charger connection is through the system connector interface. The baseband supports DCT3 chargers from an electrical point of view. Both 2- and 3-wire type chargers are supported. For 3-wire charger, the control line is ignored. (See the following figure for details.)

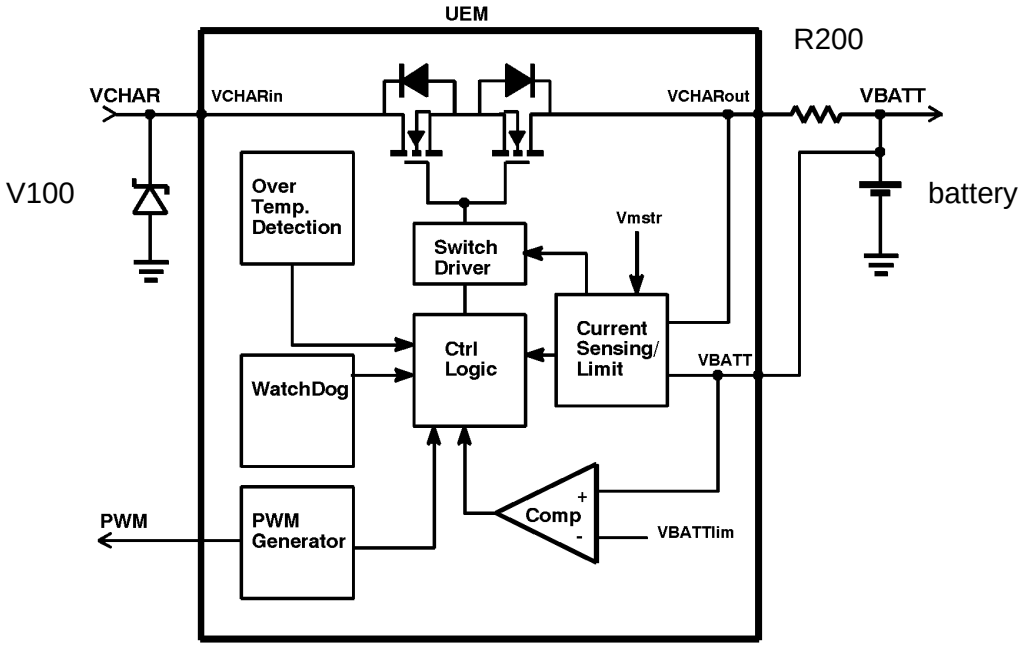


Figure 15: Charging circuitry

Charger Detection

Connecting a charger creates voltage on VCHAR input of the UEM. When VCHAR input voltage level is detected to rise above 2 V (VCHdet+ threshold) by UEM charging starts. VCHARDET signal is generated to indicate the presence of the charger for the SW. The charger identification/acceptance is controlled by EM SW.

The charger recognition is initiated when the EM SW receives a "charger connected" interrupt. The algorithm basically consists of the following three steps:

1 Check that the charger output (voltage and current) is within safety limits.

2 Identify the charger as a two-wire or three-wire charger.

3 Check that the charger is within the charger window (voltage and current).

If the charger is accepted and identified, the appropriate charging algorithm is initiated.

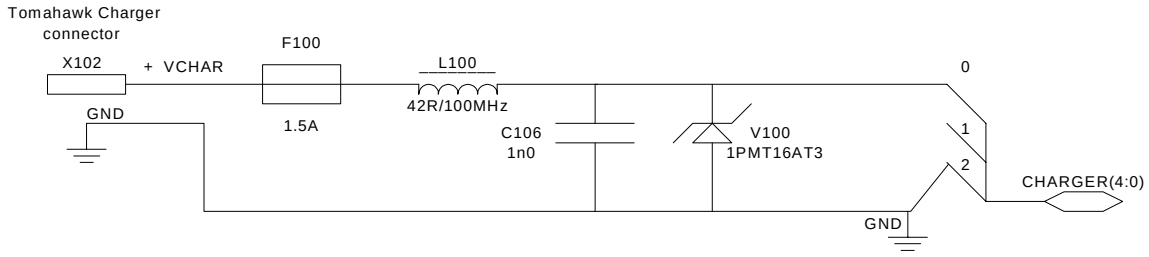


Figure 16: Charging circuit

Charge Control

In active mode, charging is controlled by UEM's digital part. Charging voltage and current monitoring is used to limit charging into safe area. For that reason, UEM has programmable charging cut-off limits:

VBATLim1=3.6 V (Default)
VBATLim2L=5.0 V and
VBATLim2H=5.25 V

VBATLim1, 2L, 2H are designed with hystereses. When the voltage rises above VBATLim1, 2L, 2H+ charging is stopped by turning charging switch OFF. No change in operational mode occurs. After voltage has decreased below VBATLim-, charging re-starts.

Two PWM frequencies are used, depending on the type of charger: two-wire charger uses a 1 Hz and three-wire charger uses a 32 Hz. Duty cycle range is 0% to 100%. Maximum charging current is limited to 1.2 A.

Audio

UEM handles the audio control and processing, including the audio codec. UPP, which contains the MCU and DSP blocks, handles and processes the audio data signals.

The baseband supports three microphone inputs and two earpiece outputs. The microphone inputs are MIC1, MIC,2 and MIC3. MIC1 input is used for the phone's internal microphone; MIC2 input is used for headsets (HDB-4, BHF-1, and CARK-142), and Loopset (LPS-4). MIC3 input is used for third-party accessories (2.5mm Jack). Every

microphone input can have either a differential or single-ended AC connection to UEM circuit. The internal microphone (MIC1) and MIC2 are differential and MIC3 microphone is single-ended. The microphone signals from different sources are connected to separate inputs at UEM. Inputs for the microphone signals are differential type. Also, MICBIAS1 is used for MIC1 and MICBIAS2 is used for MIC2 and MIC3.

The HF single-ended output is sent to the input of the MIDI audio amplifier. The amplifier can be enabled/disabled by GenIO(28). The gain of the amplifier is about 20dB.

Display and Keyboard

LEDs are used for LCD and keypad illumination. There are four LEDs for LCD and two LEDs for the keypad.

Gray-scale LCD is used. Interface uses 9-bit data transfer. The interface is quite similar to DCT3-type interface, except Command/Data information is transferred together with the data. D/C bit set during each transmitted byte by MCU SW.

The following figure is the waveform for LCD interface.

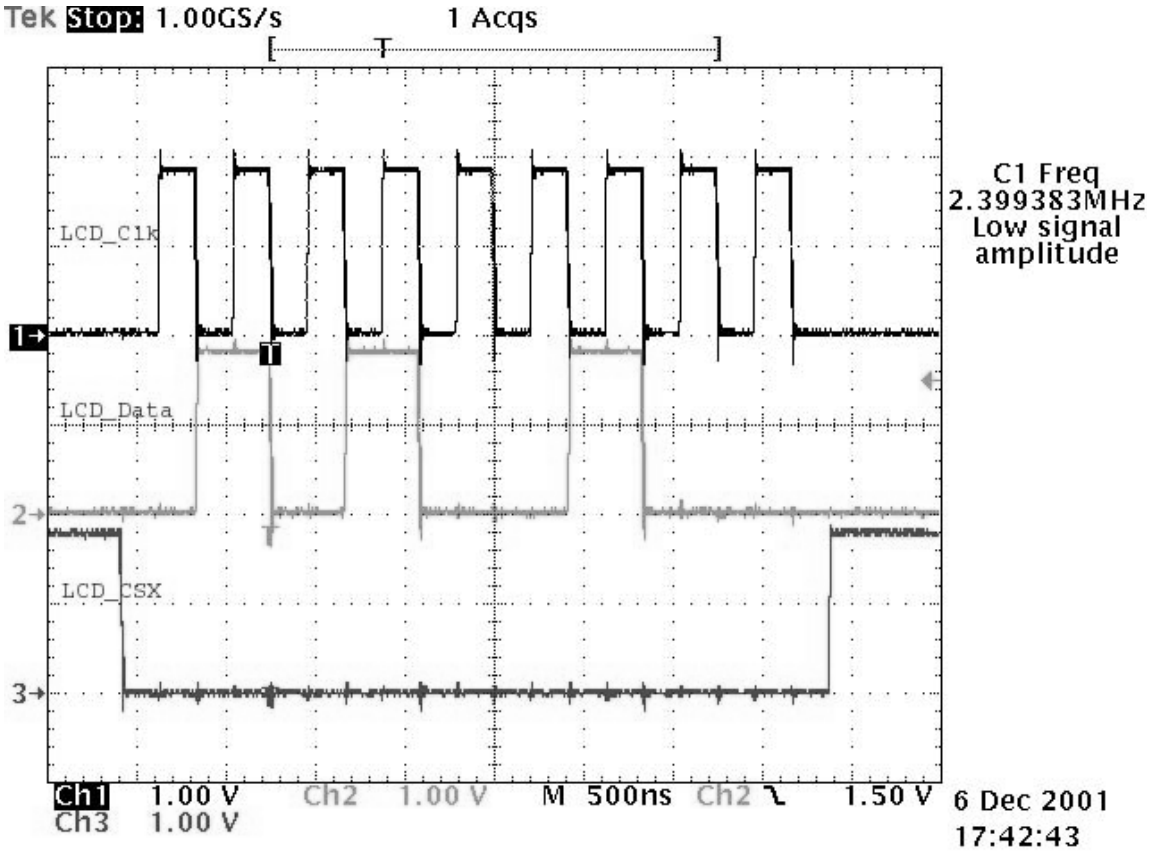


Figure 17: LCD Interface

Accessory

Differential-ended external audio accessory connection is supported. Headset and data

cables can be directly connected to system connector or 2.5mm jack supporting TTY/TDD or universal headset. Detection of the different accessories is based on the ACI code residing inside the accessories, except for basic headset (HDB-4) and universal headset. The UHJ is detected by the interrupt generated on GenIO(12). The basic headset is detected via ACI detection algorithm. However, the ACI pin is always grounded.

It is the end user's responsibility to set the phone for TTY/TDD since there are too many different TTY/TDD devices to be detected.

Active cover is detected by the A/D level on SLOWAD(4). There is 100k pull-up inside the and 330k pull down on the active cover side. Once the cover is detected, Vflash2 will be turned on to provide the power to the cover. The driving signal for the active cover is provided from the output of the MIDI audio amplifier. It is AC-coupled to the cover input.

Test Points

BB test points, regulators, and BB ASICs diagrams follow.

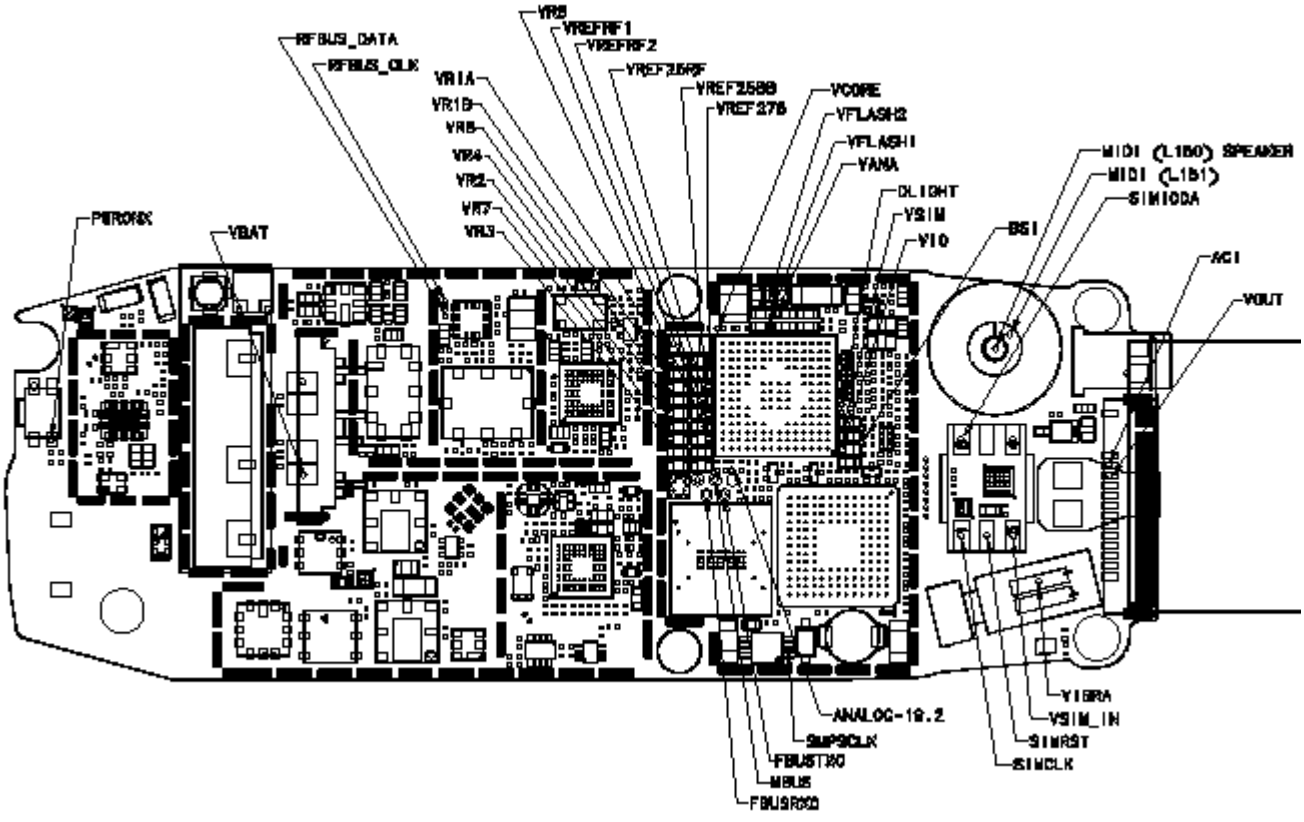


Figure 18: 3585i Test Points - Top

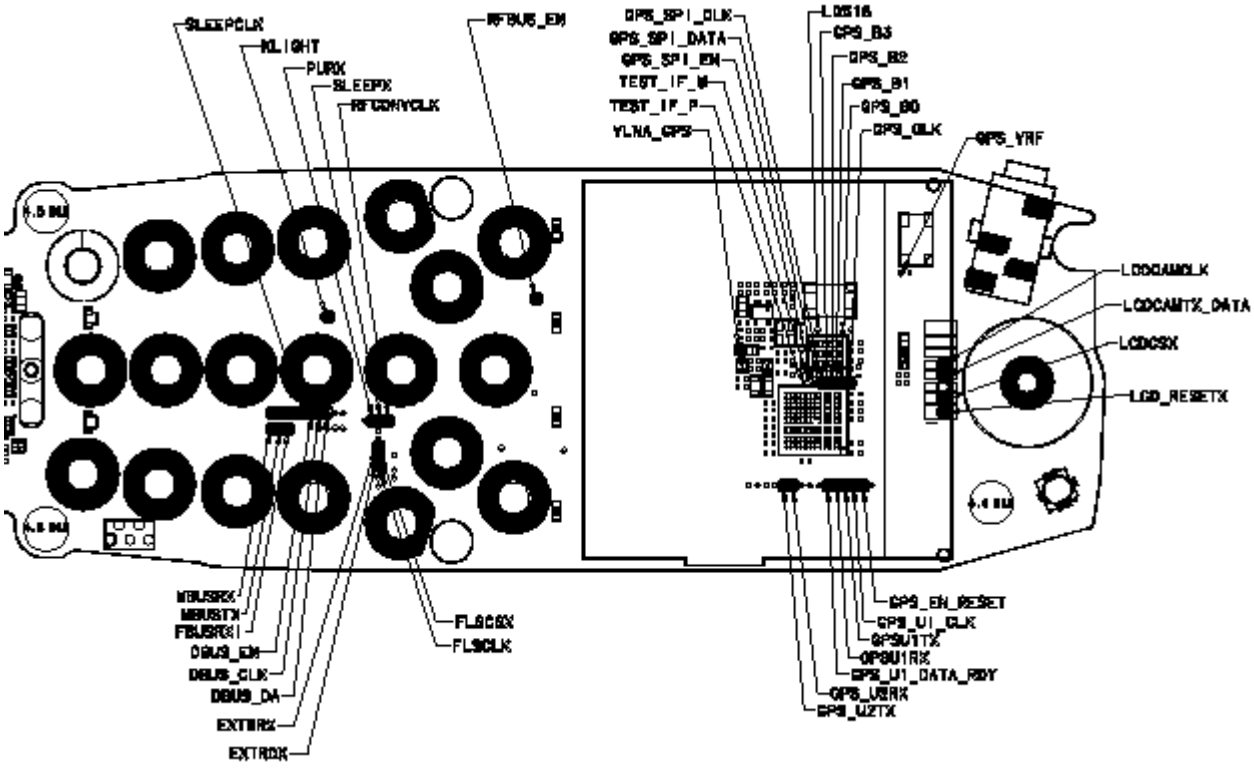


Figure 19: 3585i Test Points - bottom

Troubleshooting/Flowcharts

The following hints should help finding the cause of the problem when the circuitry seems to be faulty. The troubleshooting instructions are divided into the following sections.

1 Top troubleshooting map

2 Phone is totally dead

3 Power doesn't stay on or the phone is jammed

4 Flash programming doesn't work

5 Display is not working

6 Audio fault

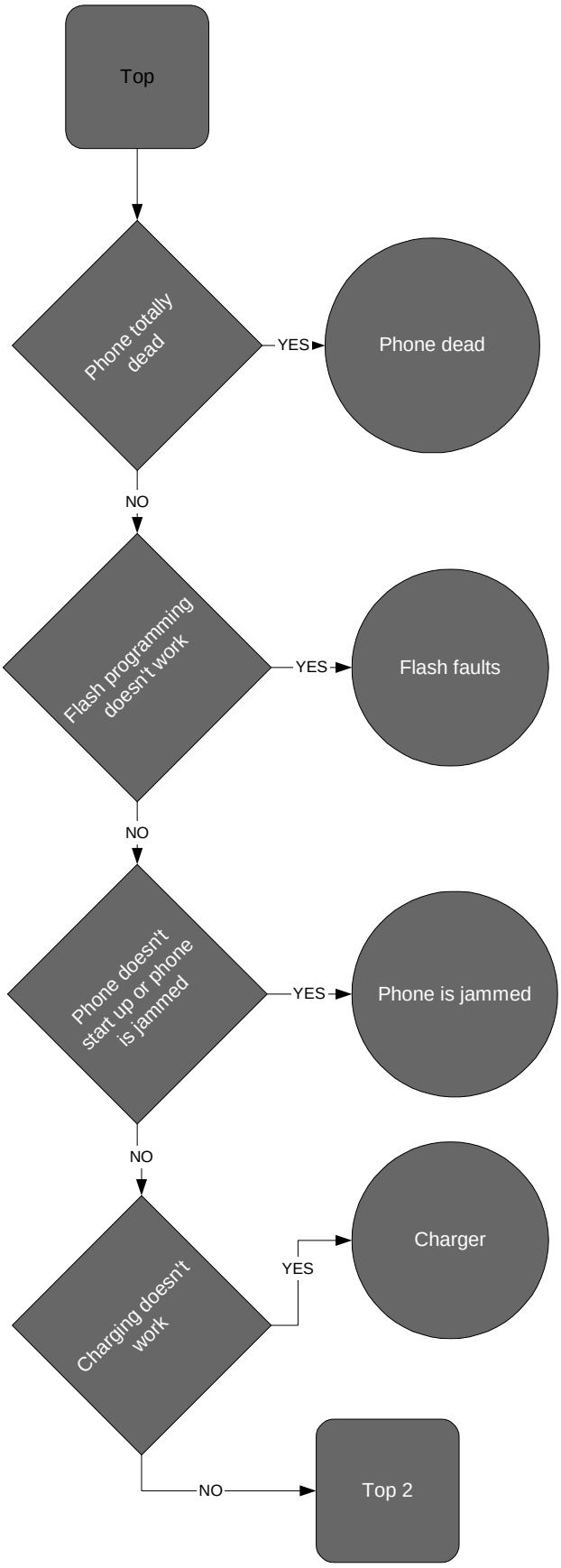
7 Charging fault

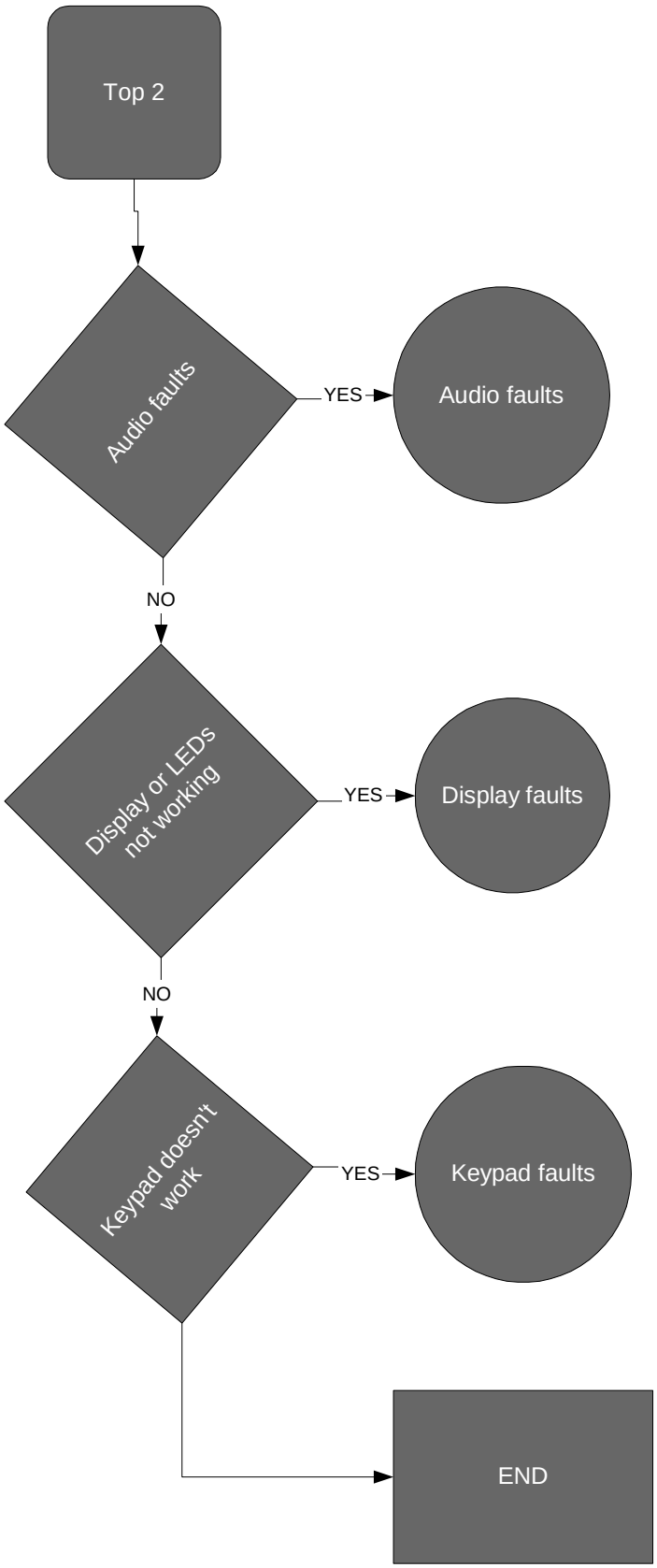
First, carry out a thorough visual check of the module. Ensure in particular that:

- there is no mechanical damage

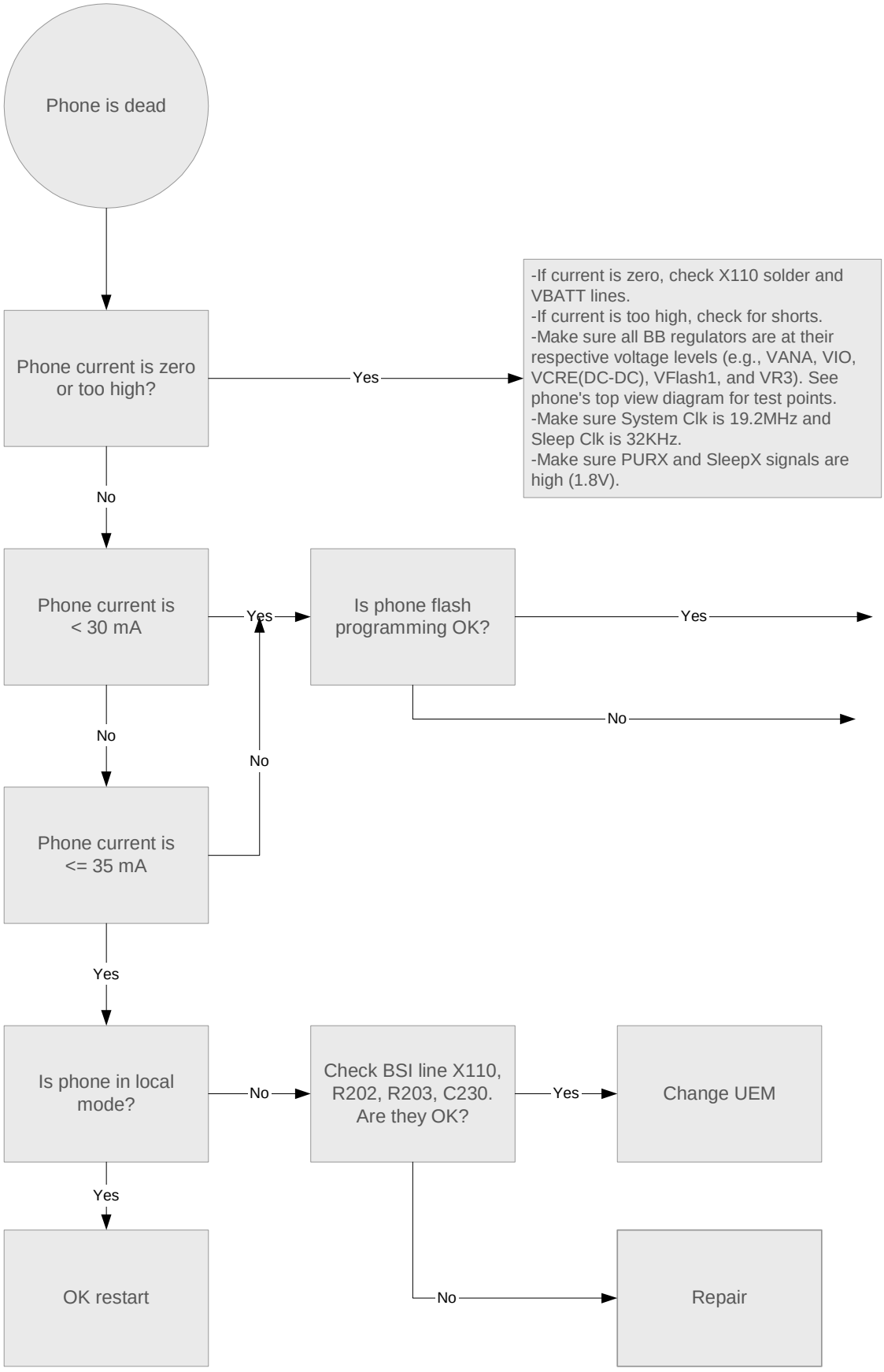
- soldered joints are OK
- ASIC orientations are OK

Top troubleshooting map

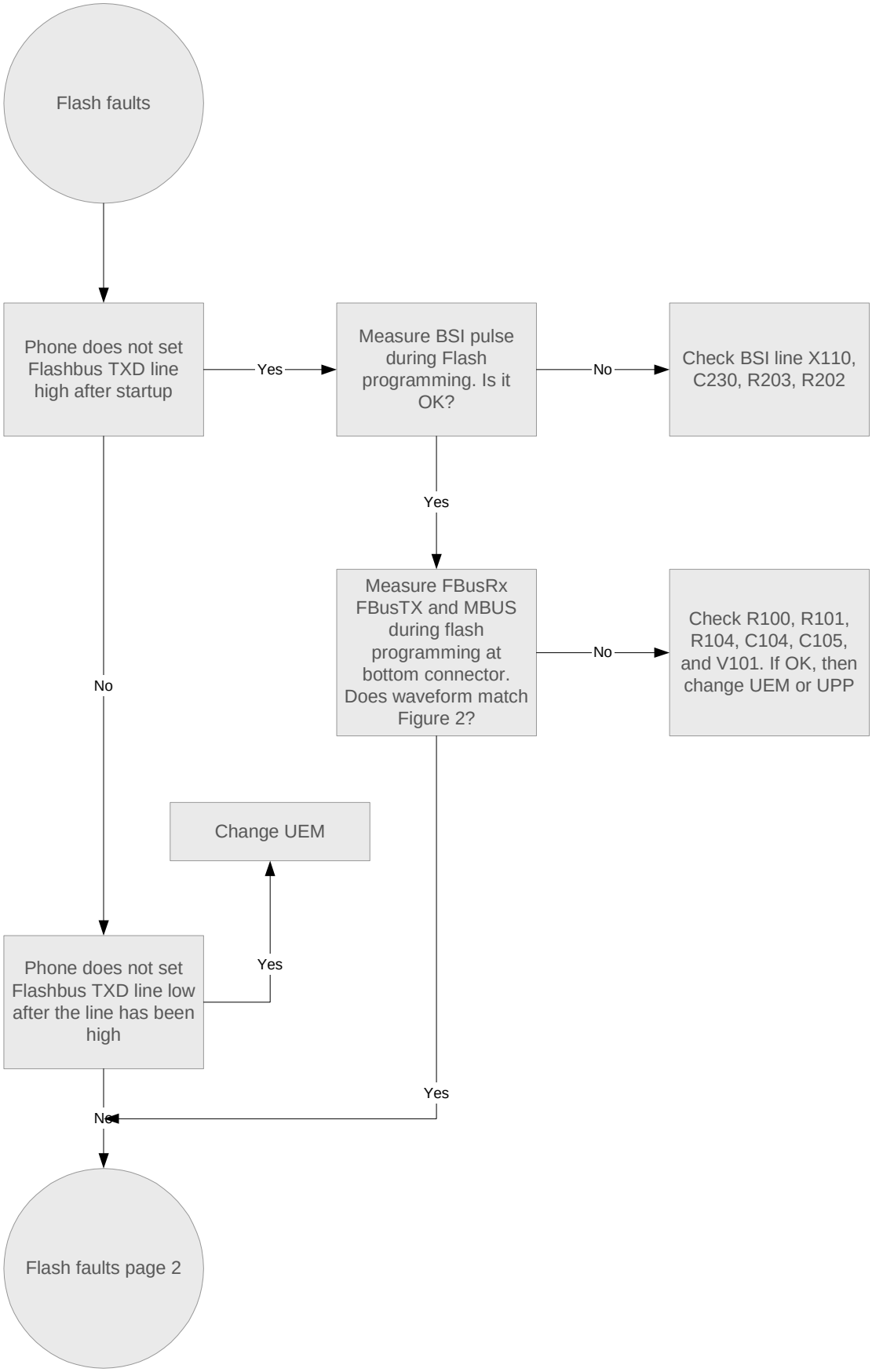



Top 2
Audio faults
YES
Audio faults
NO
Display or LEDs not working
YES
Display faults
NO
Keypad doesn't work
YES
Keypad faults
END

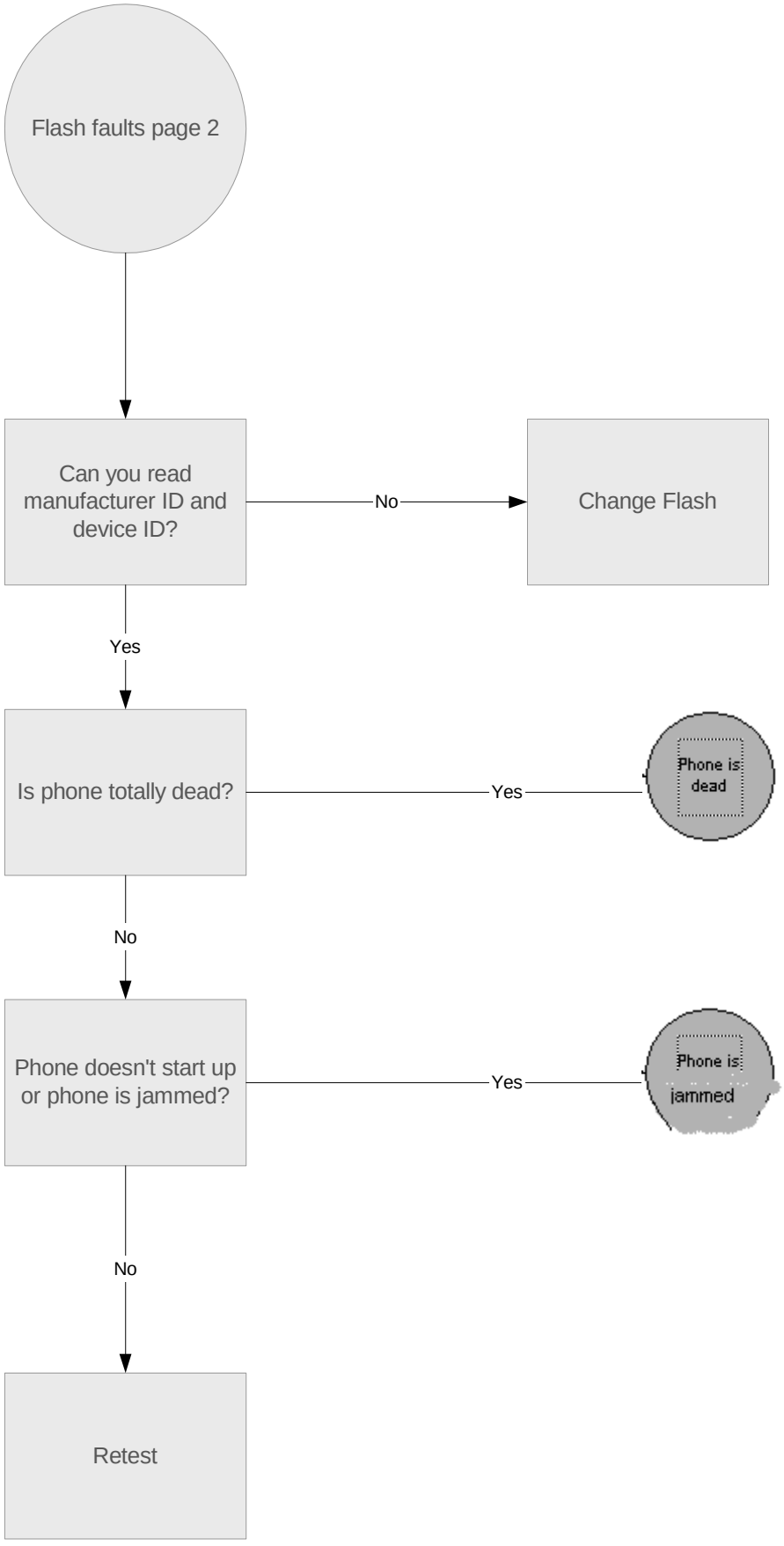
Phone is totally dead



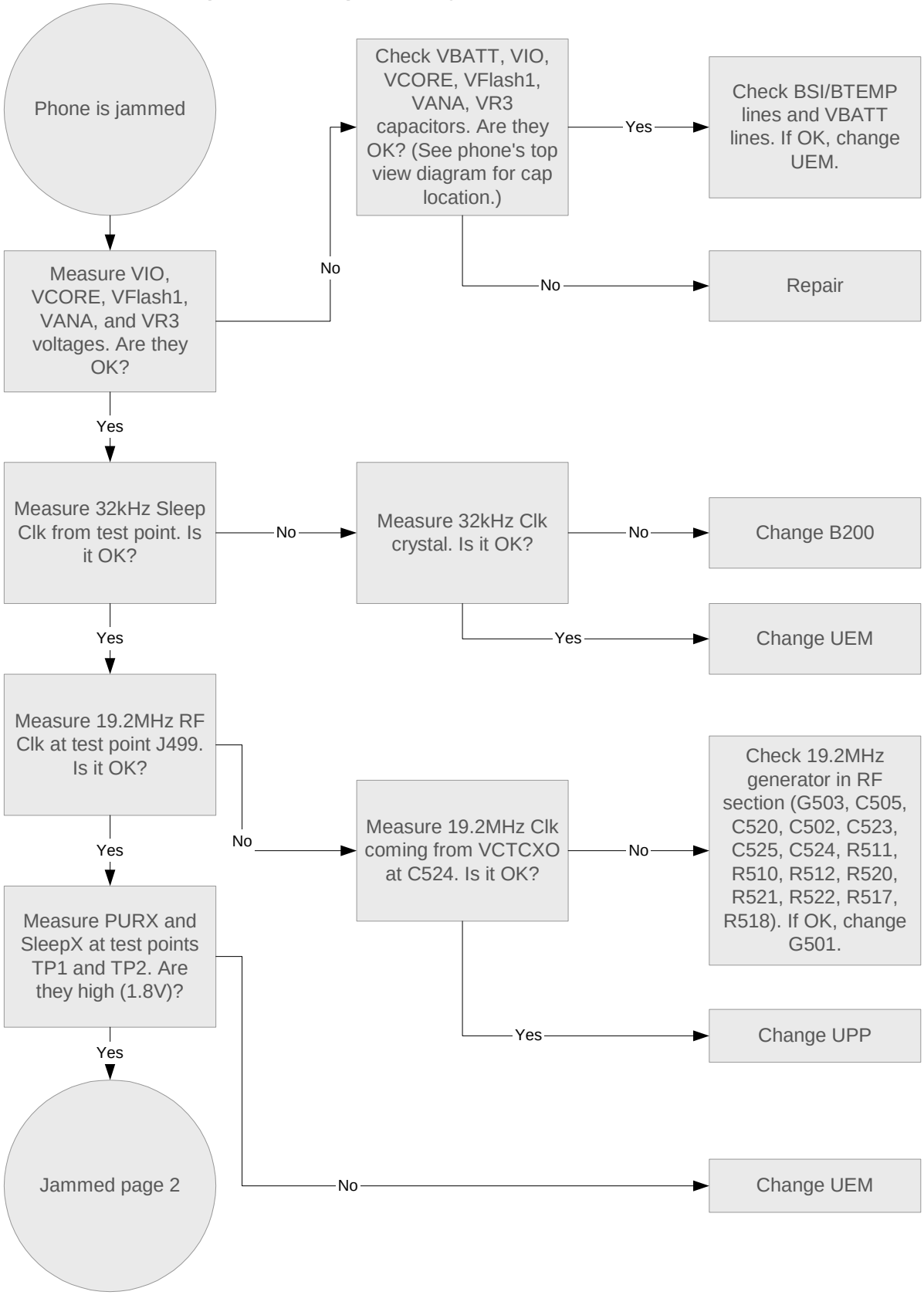
Flash programming doesn't work

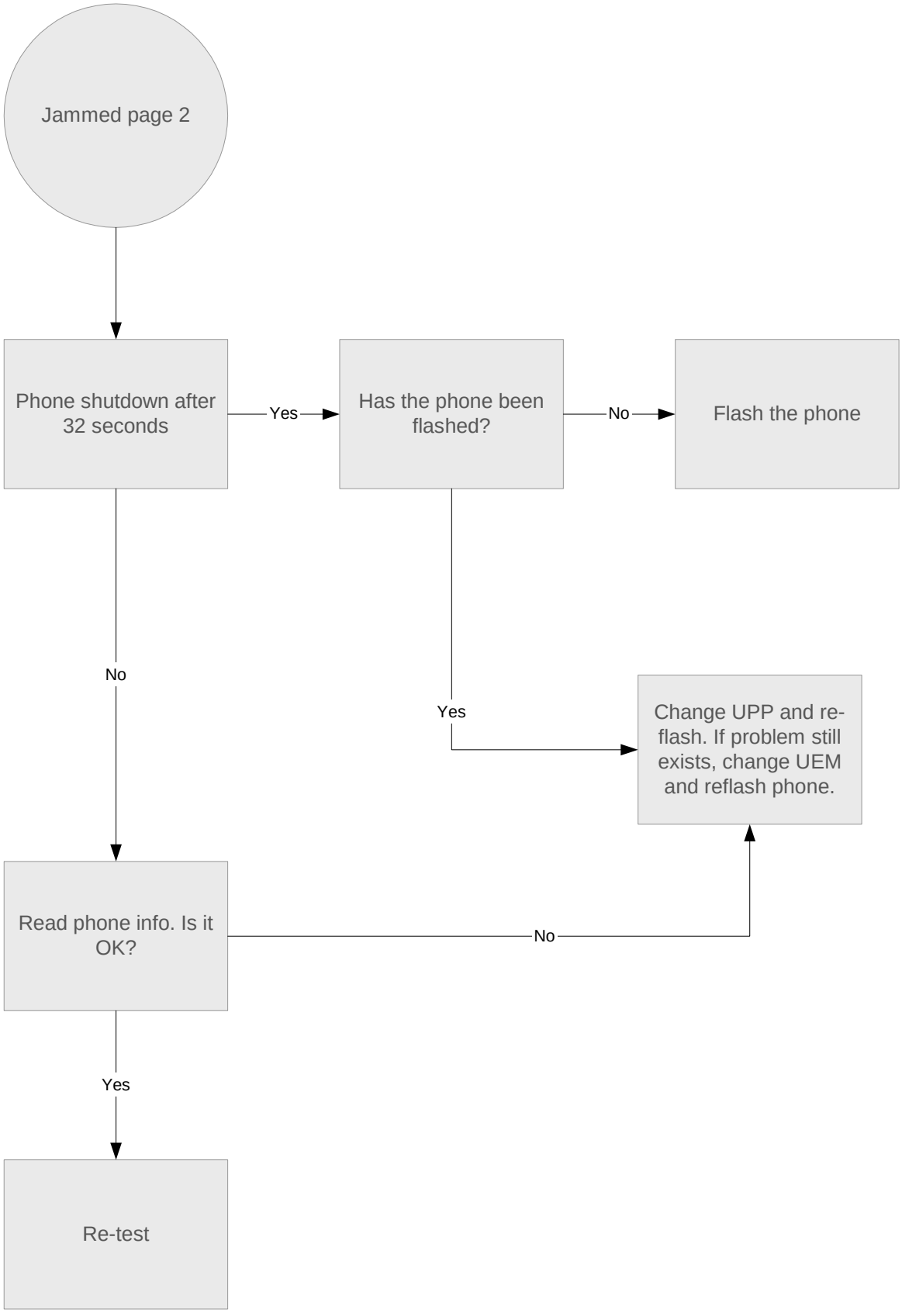


Phone is jammed

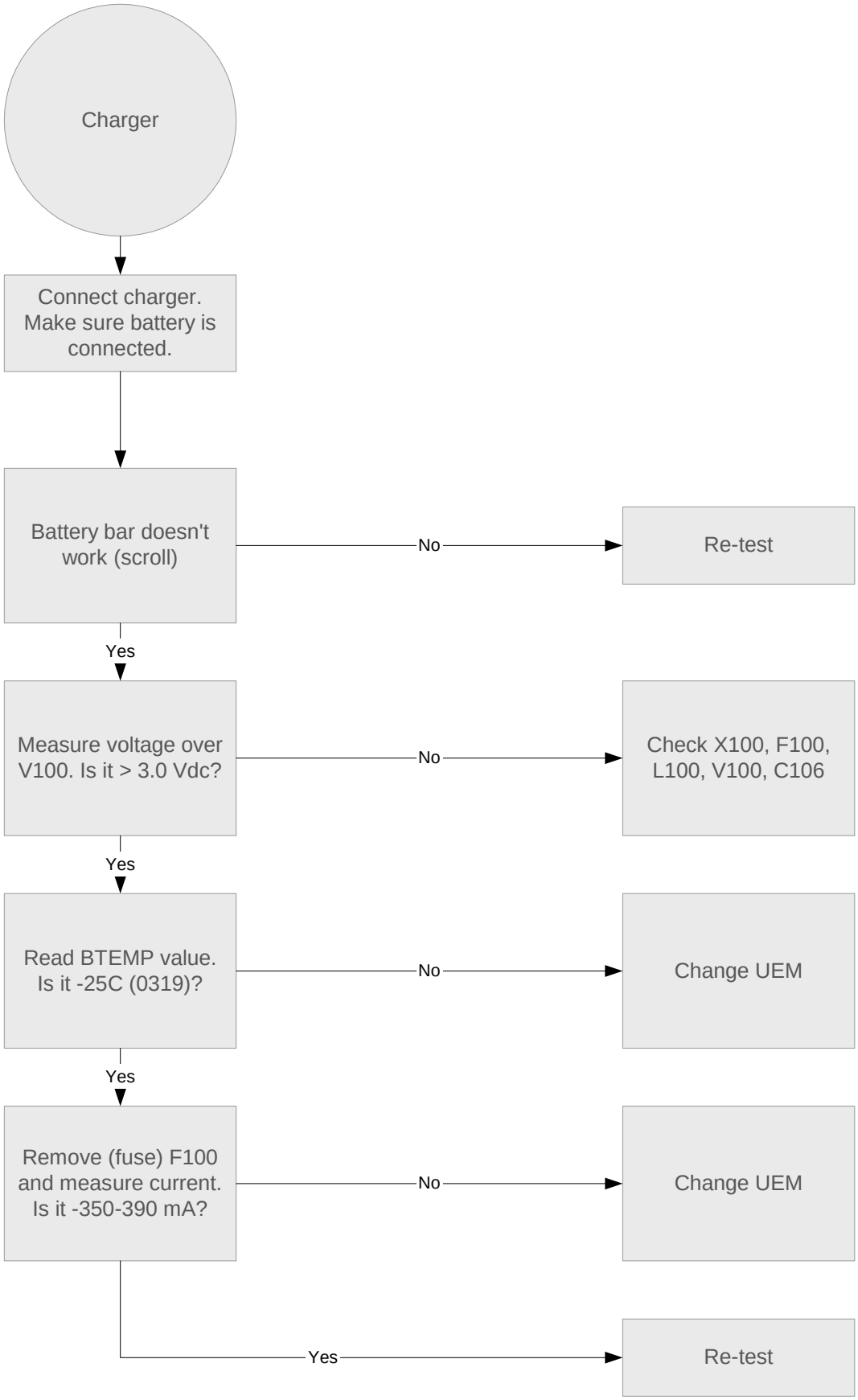


Power doesn't stay on or the phone is jammed



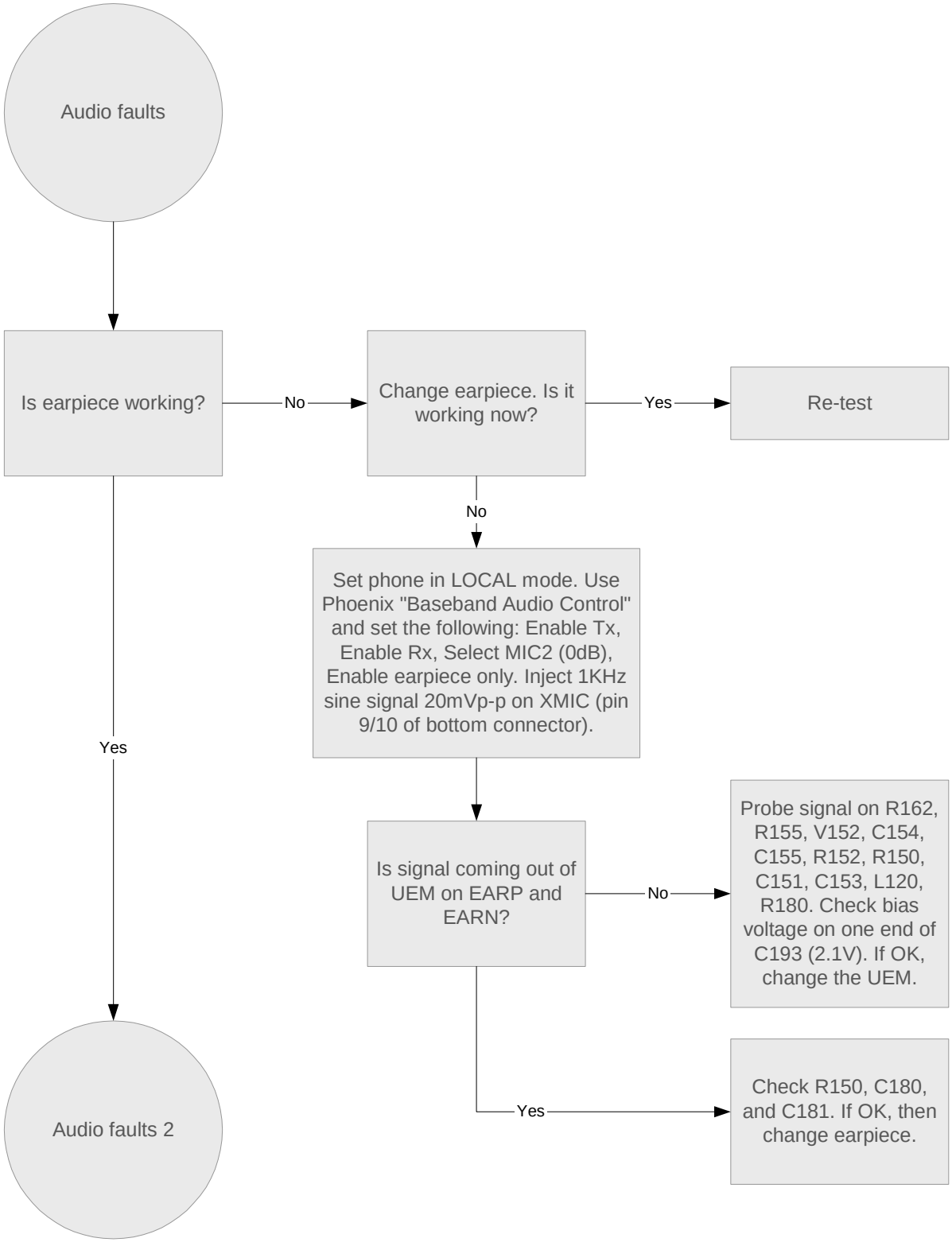

Jammed page 2
Phone shutdown after 32 seconds
Yes
Has the phone been flashed?
No
Flash the phone
No
Yes
Change UPP and re-flash. If problem still exists, change UEM and reflash phone.
Read phone info. Is it OK?
No
Yes
Re-test

Charger

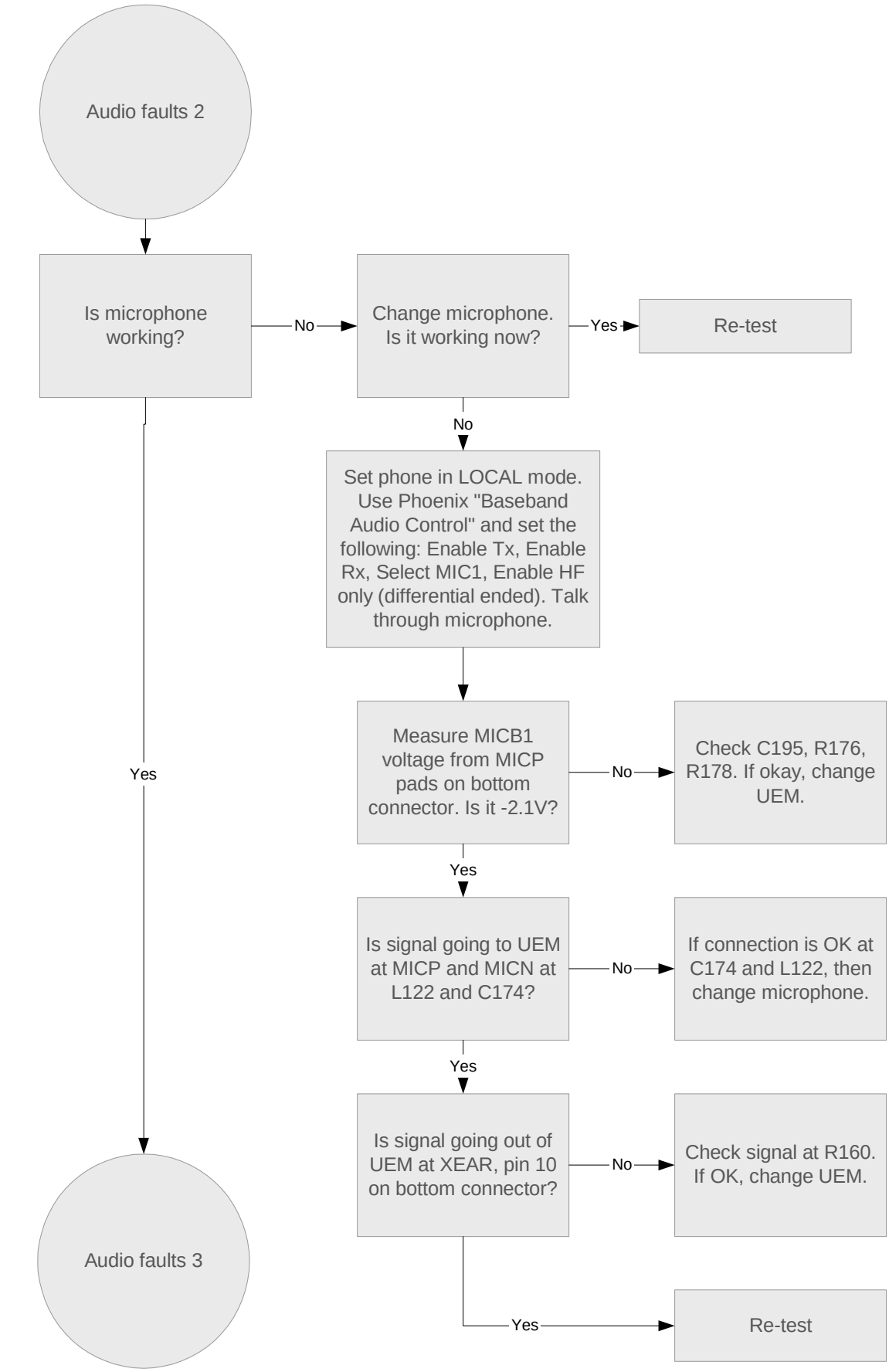

Charger
Connect charger. Make sure battery is connected.
Battery bar doesn't work (scroll)
No
Re-test
Yes
Measure voltage over V100. Is it > 3.0 Vdc?
No
Check X100, F100, L100, V100, C106
Yes
Read BTEMP value. Is it -25C (0319)?
No
Change UEM
Yes
Remove (fuse) F100 and measure current. Is it -350-390 mA?
No
Change UEM
Yes
Re-test

Audio faults

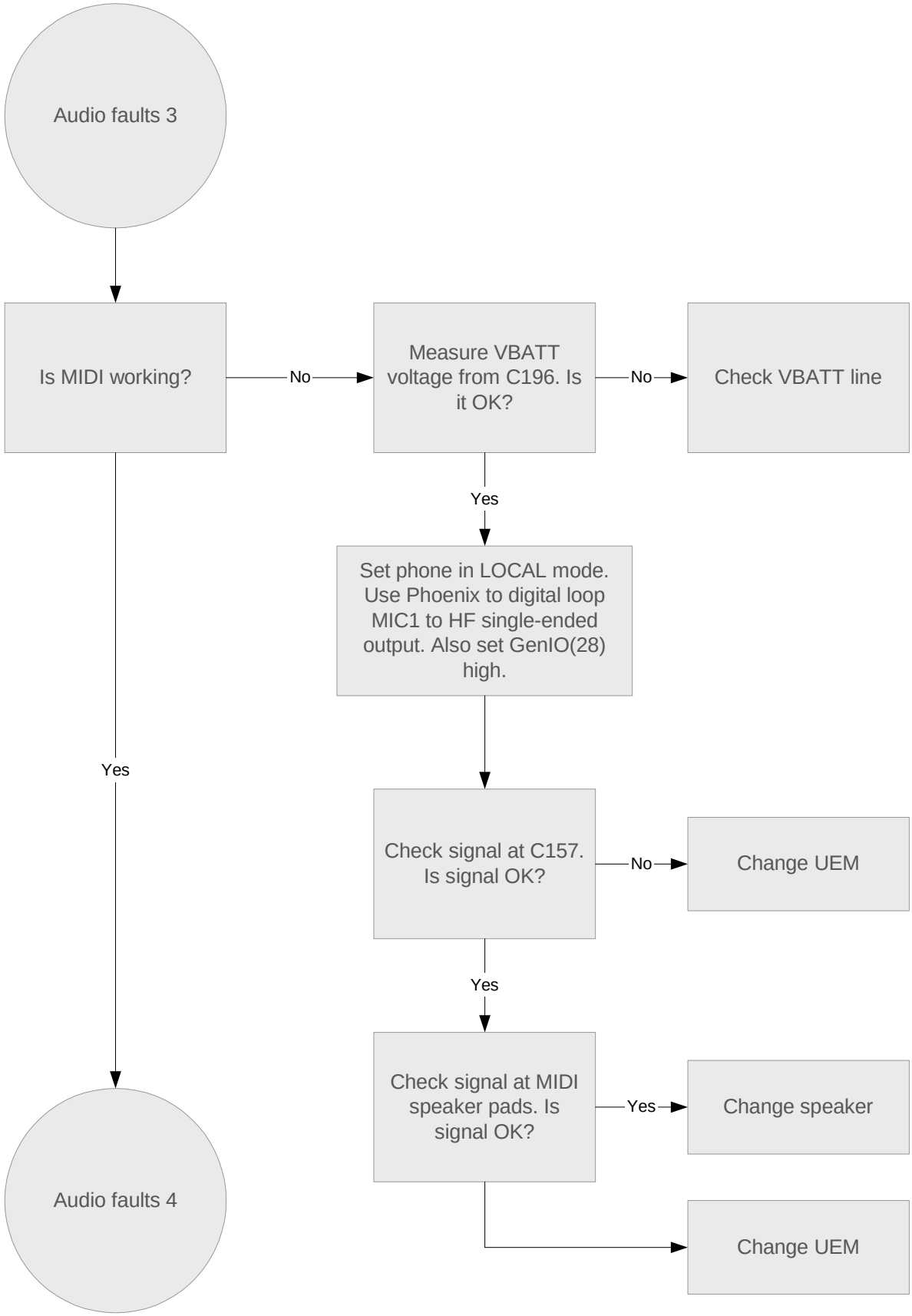
Earpiece



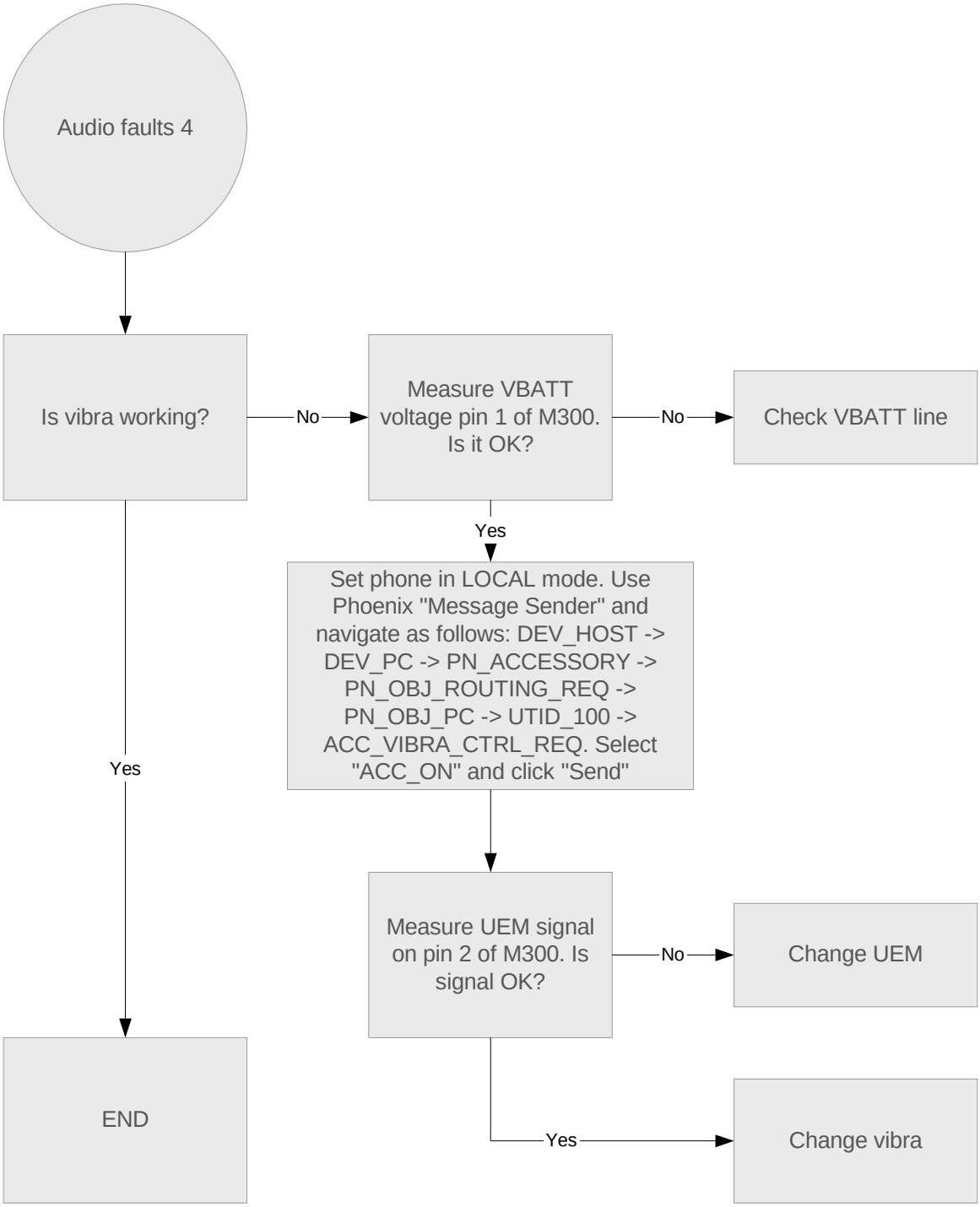
Microphone


Audio faults 2
Is microphone working?
No
Change microphone. Is it working now?
Yes
Re-test
No
Set phone in LOCAL mode. Use Phoenix "Baseband Audio Control" and set the following: Enable Tx, Enable Rx, Select MIC1, Enable HF only (differential ended). Talk through microphone.
Yes
Measure MICB1 voltage from MICP pads on bottom connector. Is it -2.1V?
No
Check C195, R176, R178. If okay, change UEM.
Yes
Is signal going to UEM at MICP and MICN at L122 and C174?
No
If connection is OK at C174 and L122, then change microphone.
Yes
Is signal going out of UEM at XEAR, pin 10 on bottom connector?
No
Check signal at R160. If OK, change UEM.
Yes
Re-test
Audio faults 3

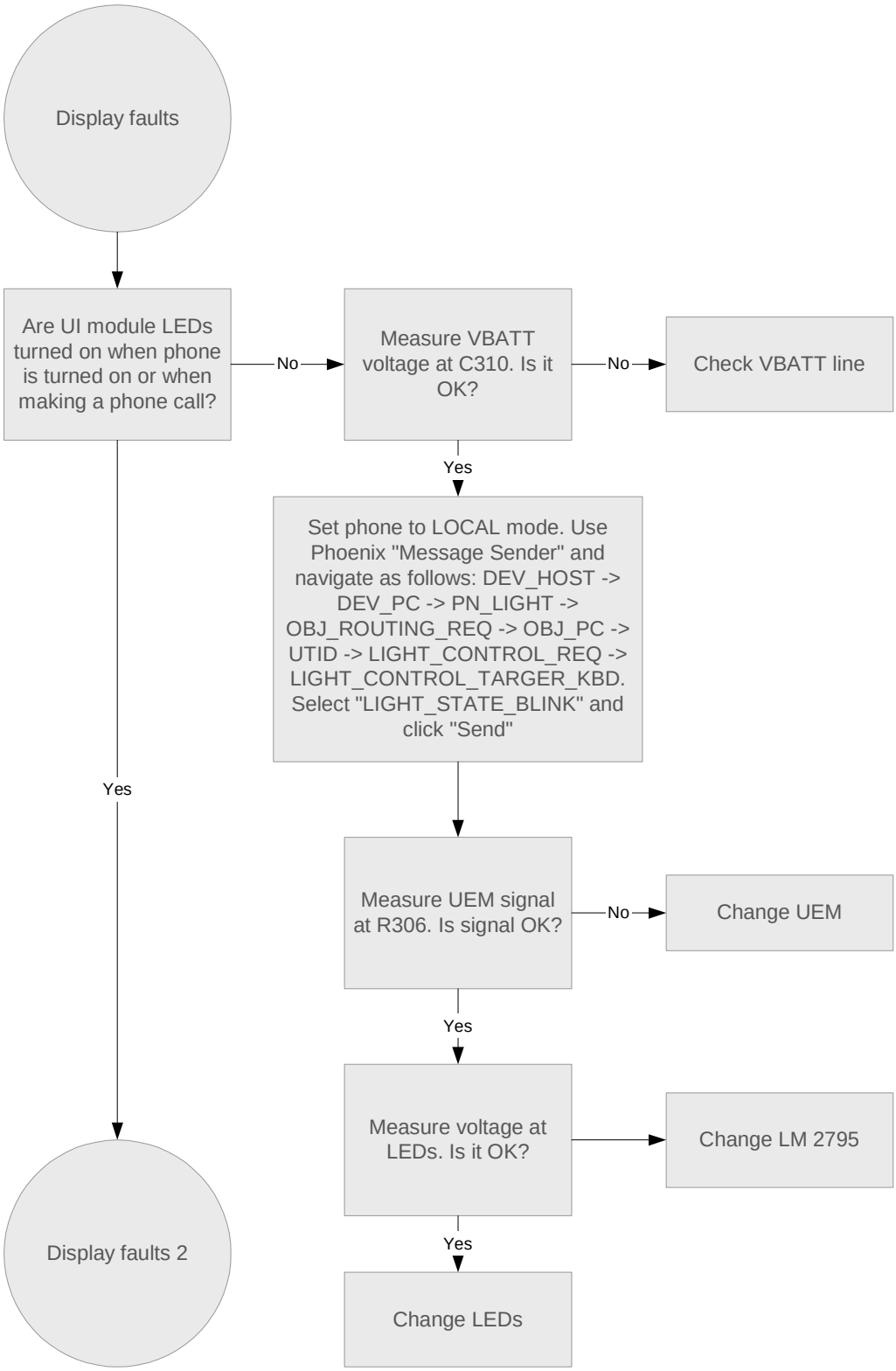
MIDI

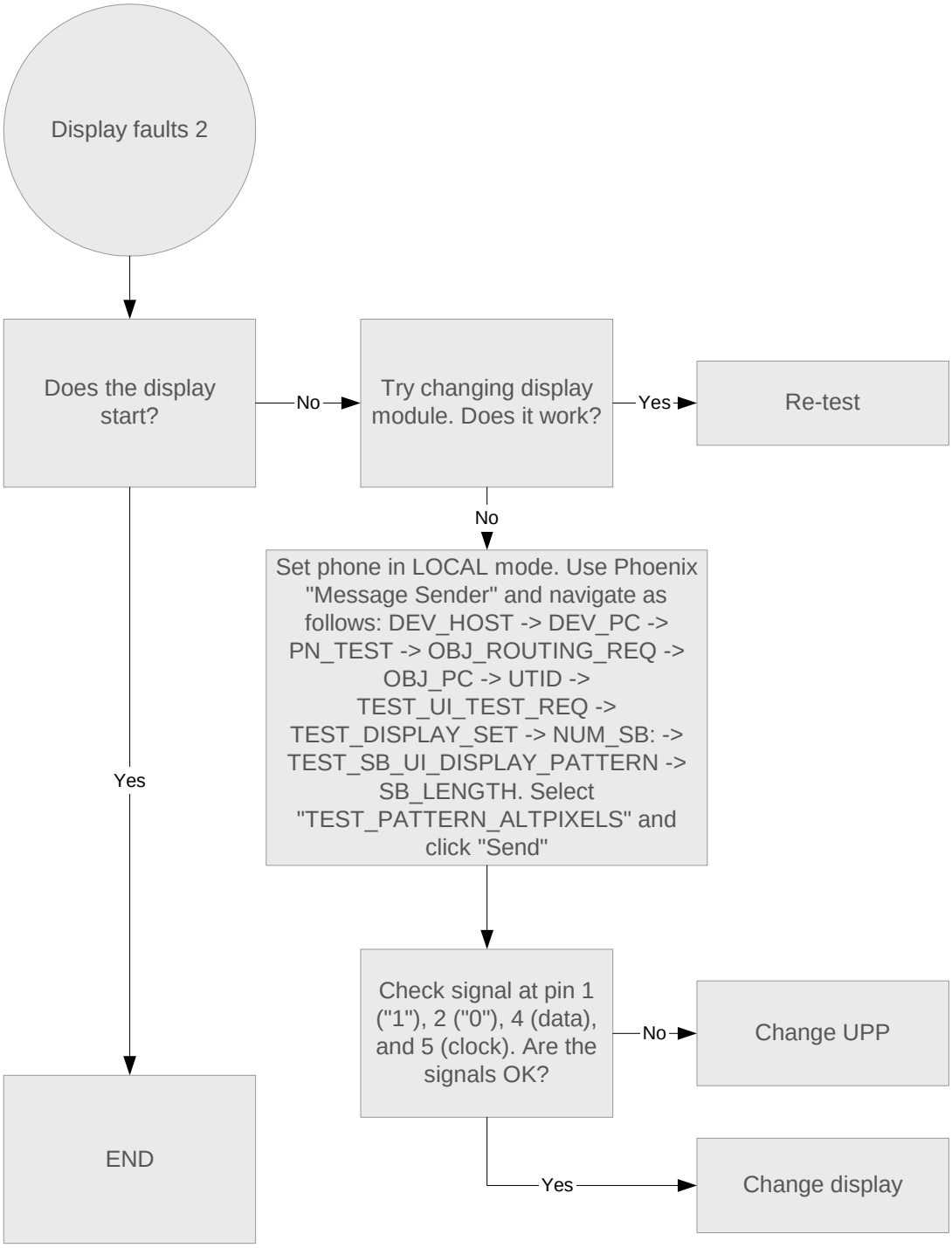

Audio faults 3
Is MIDI working?
No
Measure VBATT voltage from C196. Is it OK?
No
Check VBATT line
Yes
Set phone in LOCAL mode. Use Phoenix to digital loop MIC1 to HF single-ended output. Also set GenIO(28) high.
Yes
Check signal at C157. Is signal OK?
No
Change UEM
Yes
Check signal at MIDI speaker pads. Is signal OK?
Yes
Change speaker
Change UEM
Audio faults 4

Vibra


Audio faults 4
Is vibra working?
No
Measure VBATT voltage pin 1 of M300. Is it OK?
No
Check VBATT line
Yes
Set phone in LOCAL mode. Use Phoenix "Message Sender" and navigate as follows: DEV_HOST -> DEV_PC -> PN_ACCESSORY -> PN_OBJ_ROUTING_REQ -> PN_OBJ_PC -> UTID_100 -> ACC_VIBRA_CTRL_REQ. Select "ACC_ON" and click "Send"
Yes
Measure UEM signal on pin 2 of M300. Is signal OK?
No
Change UEM
END
Yes
Change vibra

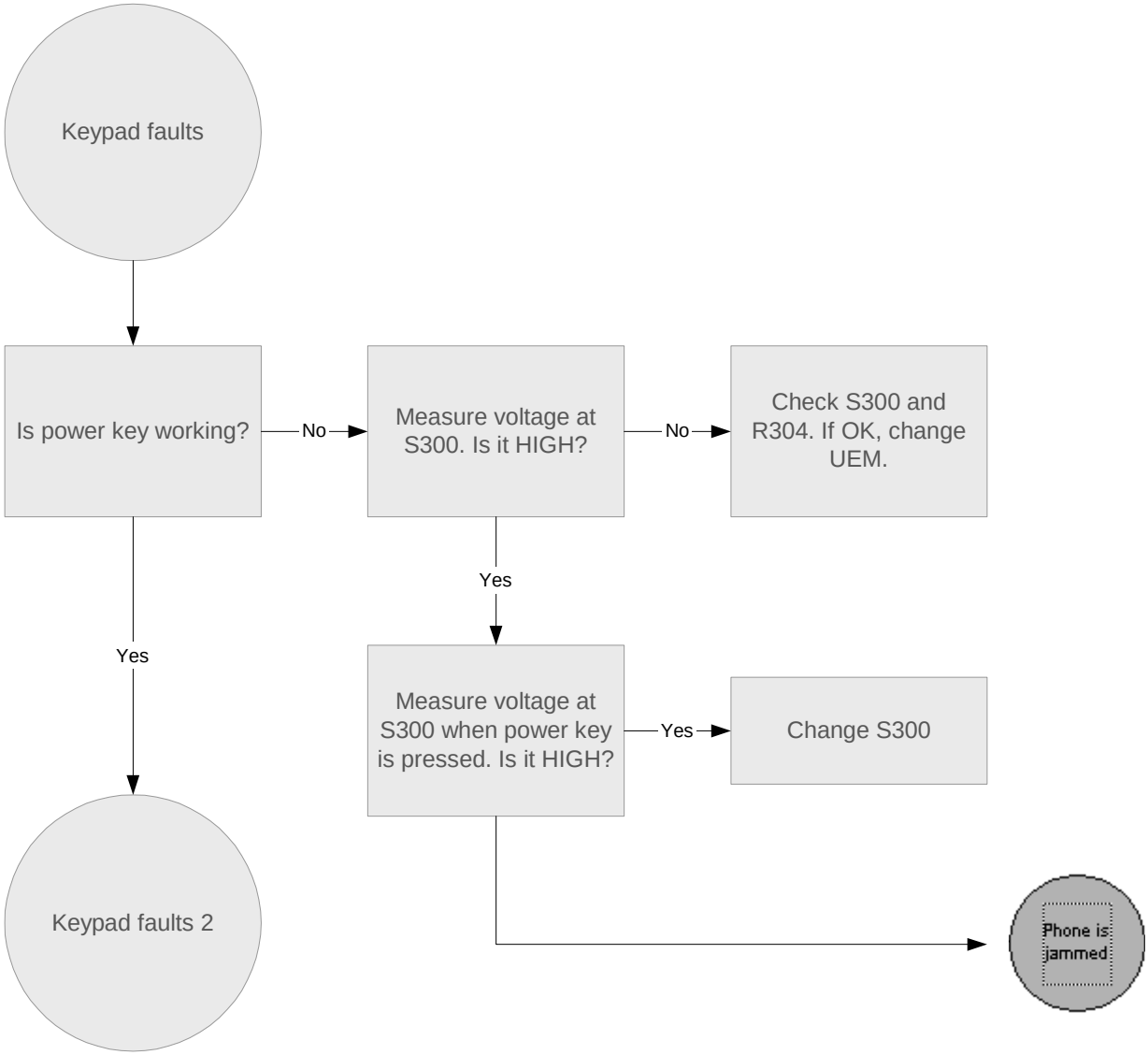
Display faults



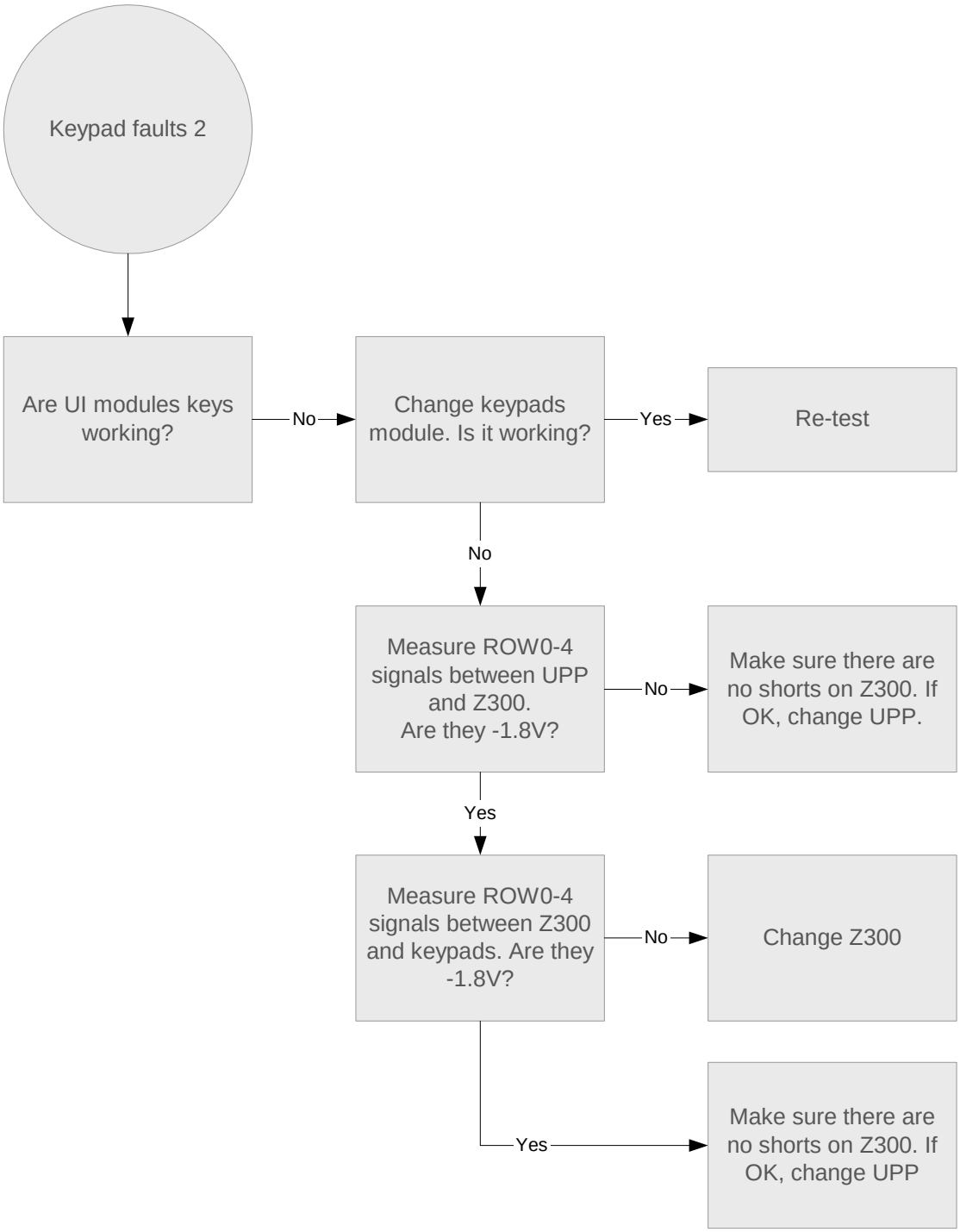

Display faults 2
Does the display start?
No
Try changing display module. Does it work?
Yes
Re-test
No
Set phone in LOCAL mode. Use Phoenix "Message Sender" and navigate as follows: DEV_HOST -> DEV_PC -> PN_TEST -> OBJ_ROUTING_REQ -> OBJ_PC -> UTID -> TEST_UI_TEST_REQ -> TEST_DISPLAY_SET -> NUM_SB: -> TEST_SB_UI_DISPLAY_PATTERN -> SB_LENGTH. Select "TEST_PATTERN_ALTPIXELS" and click "Send"
Yes
Check signal at pin 1 ("1"), 2 ("0"), 4 (data), and 5 (clock). Are the signals OK?
No
Change UPP
Yes
Change display
END

Keypad faults

Power key



UI modules


Keypad faults 2
Are UI modules keys working?
No
Change keypads module. Is it working?
Yes
Re-test
No
Measure ROW0-4 signals between UPP and Z300. Are they -1.8V?
No
Make sure there are no shorts on Z300. If OK, change UPP.
Yes
Measure ROW0-4 signals between Z300 and keypads. Are they -1.8V?
No
Change Z300
Yes
Make sure there are no shorts on Z300. If OK, change UPP