PAMS Technical Documentation
NSK–3 Series Transceivers

Troubleshooting Instructions

Issue 2 06/99

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Trouble Shooting

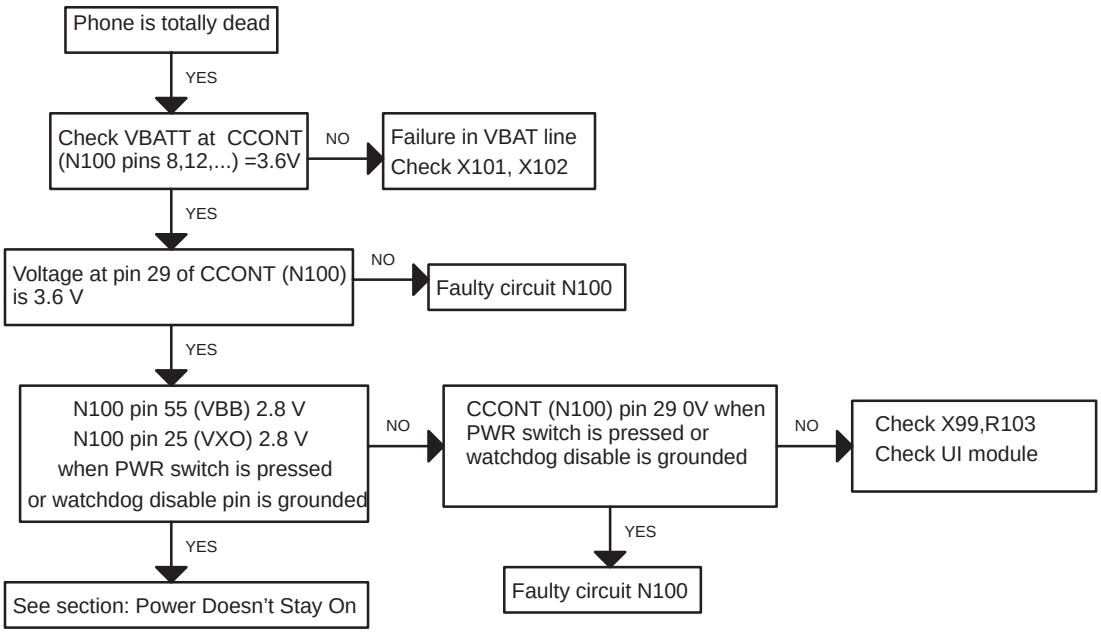
The following hints should facility finding the cause of the problem when the circuitry seems to be faulty. This trouble shooting instruction is divided following section.

1. Phone is totally dead
2. Flash programming doesn‘t work
3. Power doesn‘t stay on or the phone is jammed
4. Display information: Contact Service
5. Phone doesn‘t register to the network or phone doesn‘t make a call.
6. Plug in SIM card is out of order (insert SIM card or card rejected).
7. Audio fault.
8. Charging fault

The first thing to do is carry out a through visual check of the module. Ensure in particular that:
a) there are not any mechanical damages
b) soldered joints are OK

Phone is totally dead

This means that phone doesn't draw current at all when the power switch is pressed or when the watchdog disable is grounded (J113, J114 connected together).
Used battery voltage must be higher than 3.0 V. Otherwise the hardware of CCONT (N100) prevents totally to switch power on.



Flash programming doesn't work

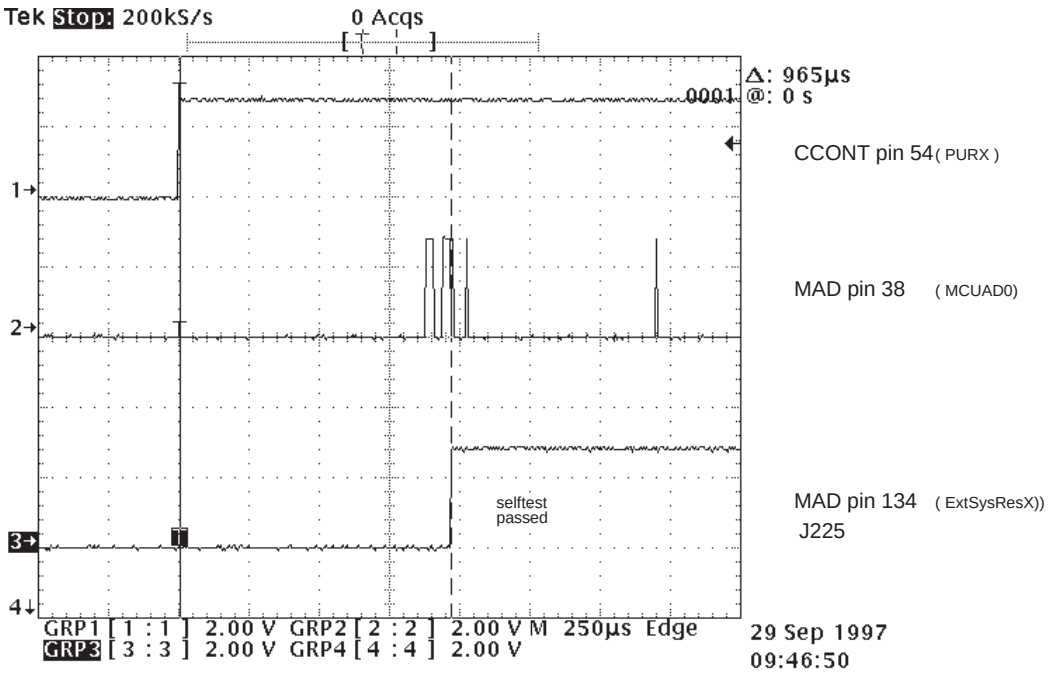
There is two possibilities to route programming voltage VPP.
– If regulator N200 is used the programming voltage comes from the regulator (VPPSW) via UI–connector to flash memory D210.
– Other way is to route Vpp from CCONT pin 36 to UI–connector and again to flash memory.

In flash programming error cases the flash prommer can give some information about a fault.
The fault information messages could be:
– MCU doesn't boot
– Serial clock line failure
– Serial data line failure
– External RAM fault
– Algorithm file or alias ID don't find
– MCU flash Vpp error

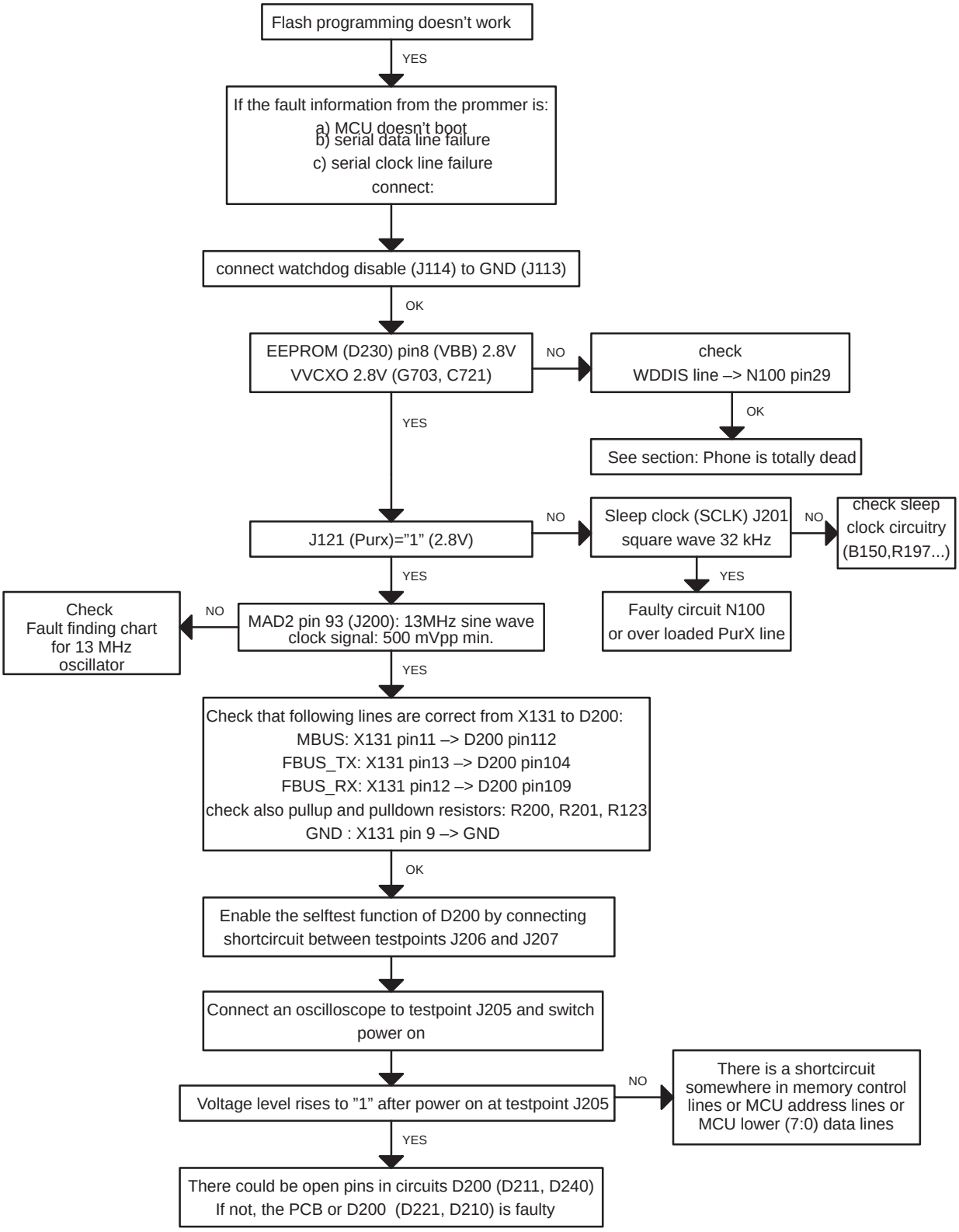
In cases that the flash programming doesn't succeed it is possible to check short circuits between the memories and the MCU (MAD2). This test is recommended, when the fault information is: MCU doesn't boot, Serial clock line failure or Serial data line failure.

The test procedure is following:
1. Connect the short circuit wire between the test points J206 and J207.
2. Switch power on
3. If the voltage level in testpoint J205 is 2.8 V (”1”), the interface is OK. If there is a short circuit, the voltage level in testpoint J205 stays low and 32kHz square wave signal can be seen in the lines which are already tested.

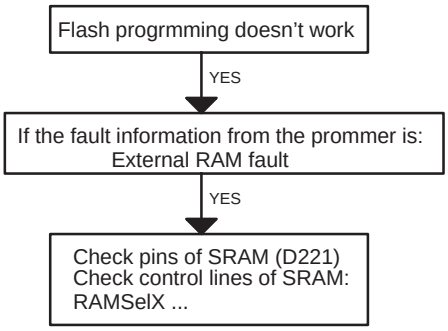
It must be remembered that this test can only be used to find short circuits, not open pins. Also upper data lines (15:8) of flash circuit D210 are not included to this test.

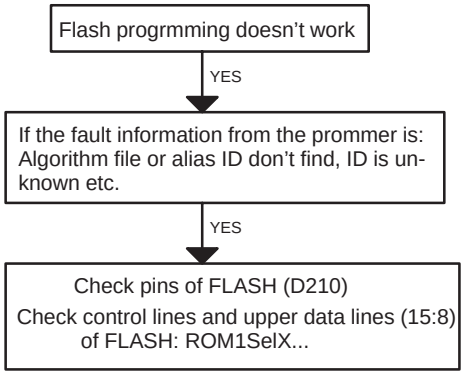


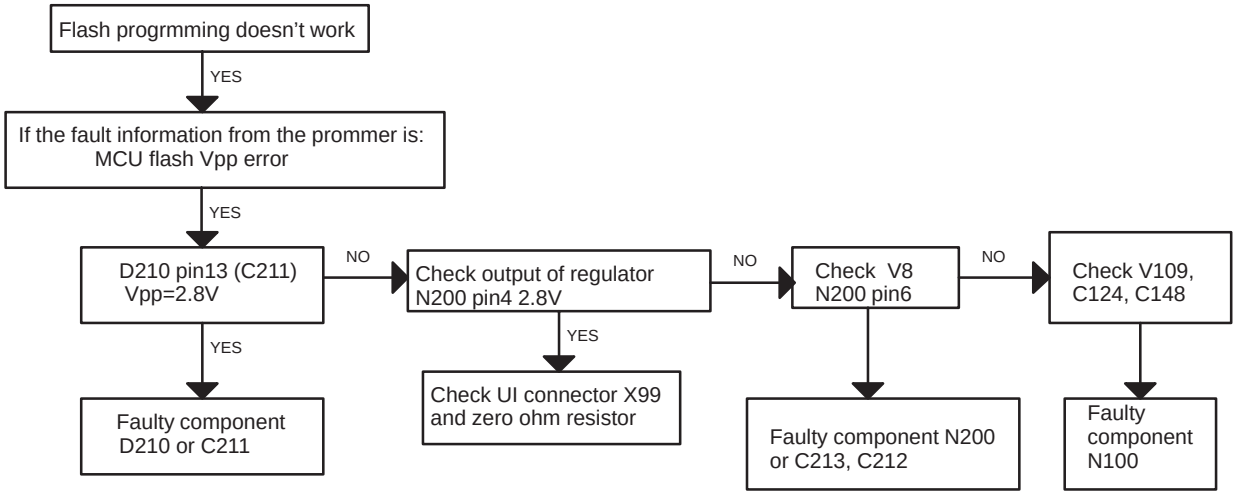
Flash Programming (1)



Flash Programming failure (2)





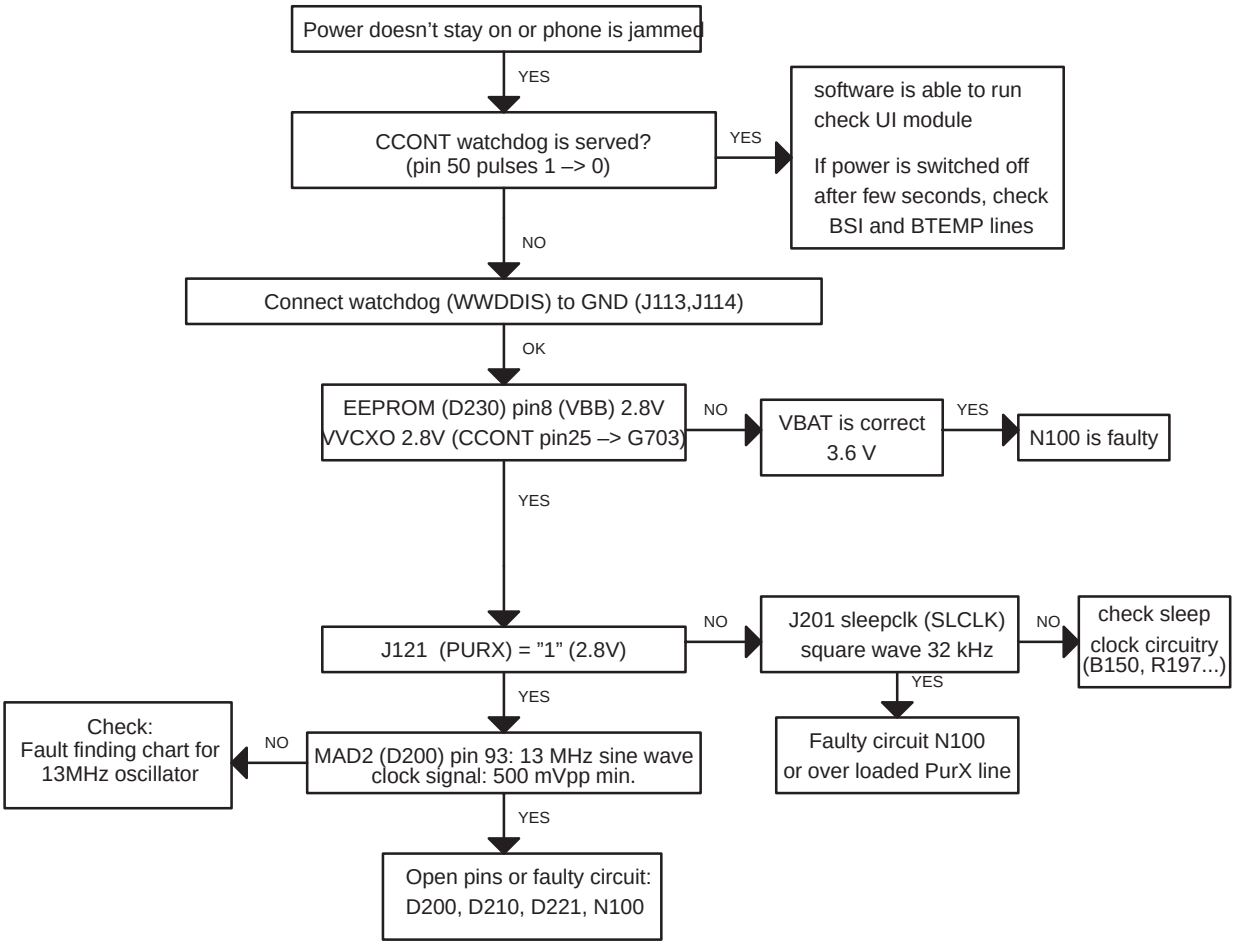


Power doesn’t stay on, or phone is jammed

If this kind of fault has come after flash programming, there are most probably open pins in ICs.
The soldered joints of ICs: D200 (MAD2), D210 (FLASH), N100 (CCONT), D221 (SRAM) are useful to check at first.

Normally the power will be switched of by CCONT (N100) after 30 seconds, if the watchdog of the CCONT can not be served by software.
The watchdog updating can be seen by oscilloscope at pin 50 (DataselX) of CCONT.
In normal case there is a short pulse from ”1” –> 0 every 8 seconds.

The power off function of CCONT can be prevented by connecting a short circuit wire from CCONT pin 29 to ground.



Display Information: Contact Service

This fault means that software is able to run and thus the watchog of CCONT (N100) can be served.
Selftest functions are run when power is switched on and software is started to excute from flash.
If any of selftests is failed, contact service information will be shown on display.

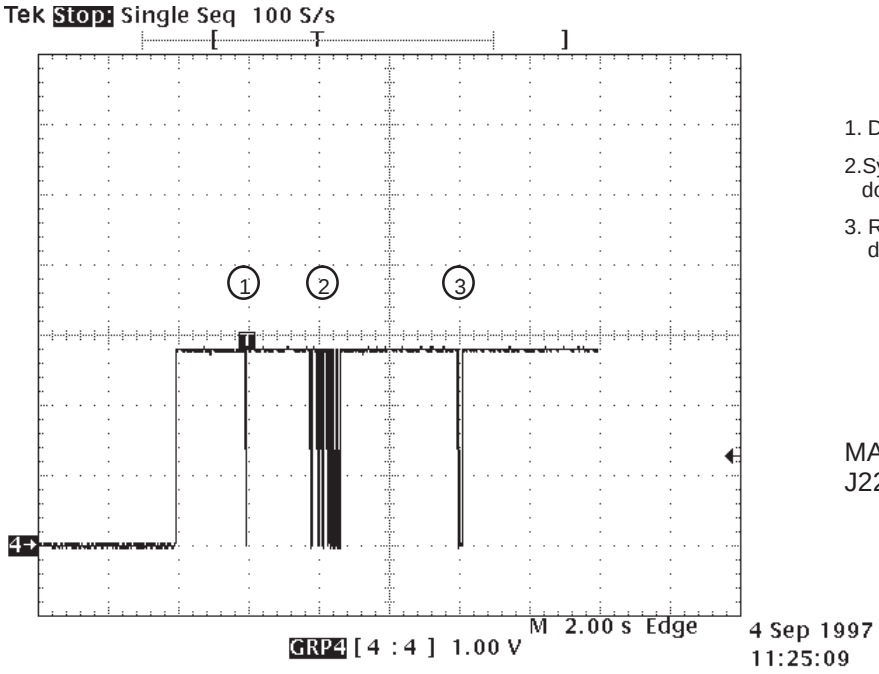
The phone doesn’t register to the network or phone doesn’t make a call

If the phone doesn’t register to the network or the phone doesn’t make a call, the reason could be either the baseband or the RF part.
The phone can be set to wanted mode by WinTesla service software and determinate if the fault is in RF or in baseband part (RF interface measurements).

The control lines for RF part are supplied both the System Asic (MAD2;D200) and the RFI (Cobba; N300). MAD2 handles digital control lines (like synthe, TxP etc.) and Cobba handles analog control lines (like AFC, TxC etc.).

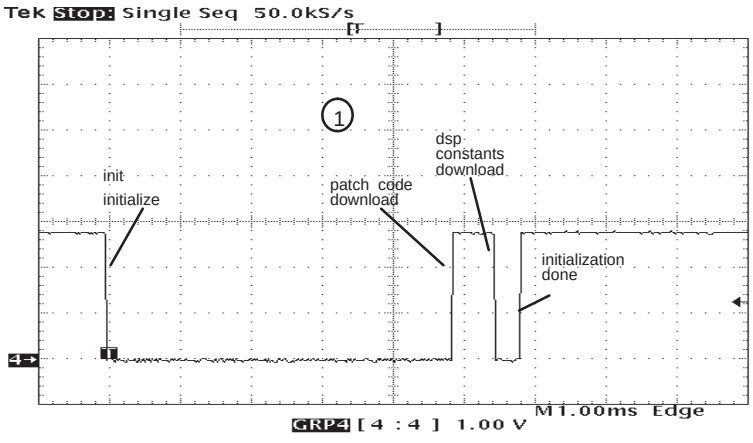
The DSP software is constructed so that operation states of DSP (MAD2) can be seen in external flag (DSPXF) output pin (D200 pin 91).

After power up, DSP signals all completed functions by changing the state of the XF pin (see figures 39 and 40).

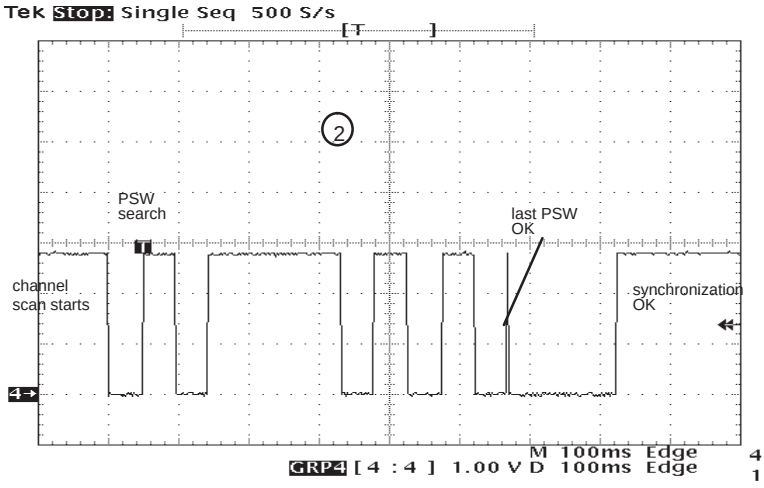


1. DSP initialization done
2. Synchronization to network done
3. Registrarition to network done.

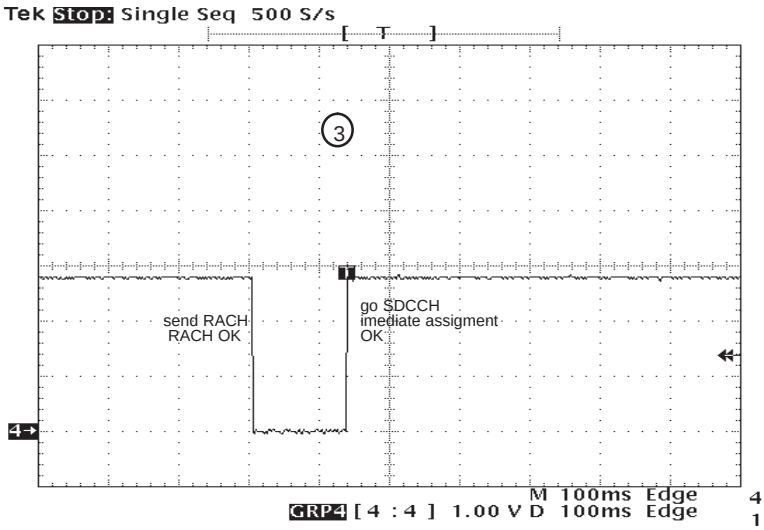
MAD2 pin 91 (DSPXF)
J222



MAD2 pin 91 (DSPXF)
J222

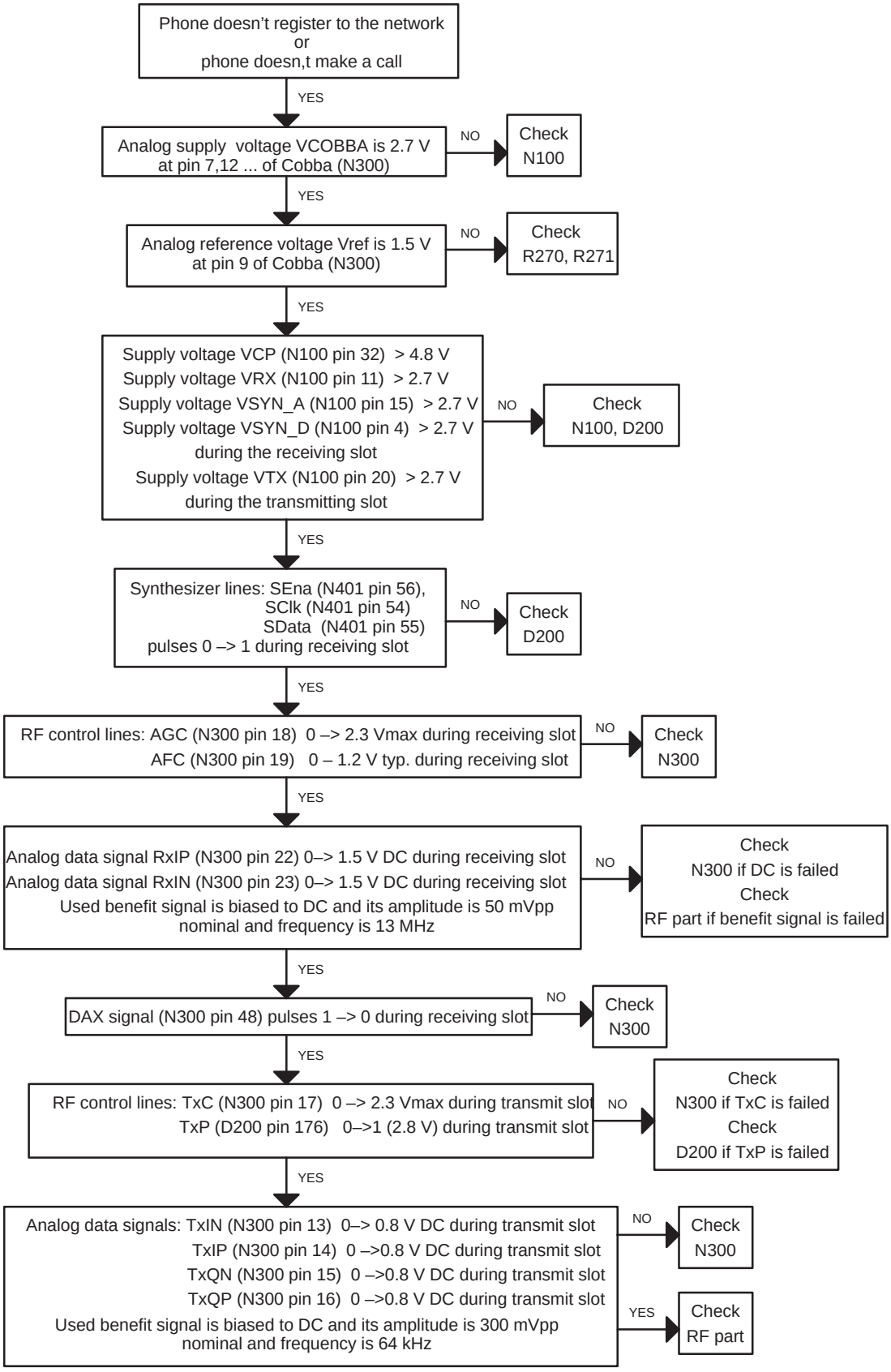


MAD2 pin 91 (DSPXF)
J222

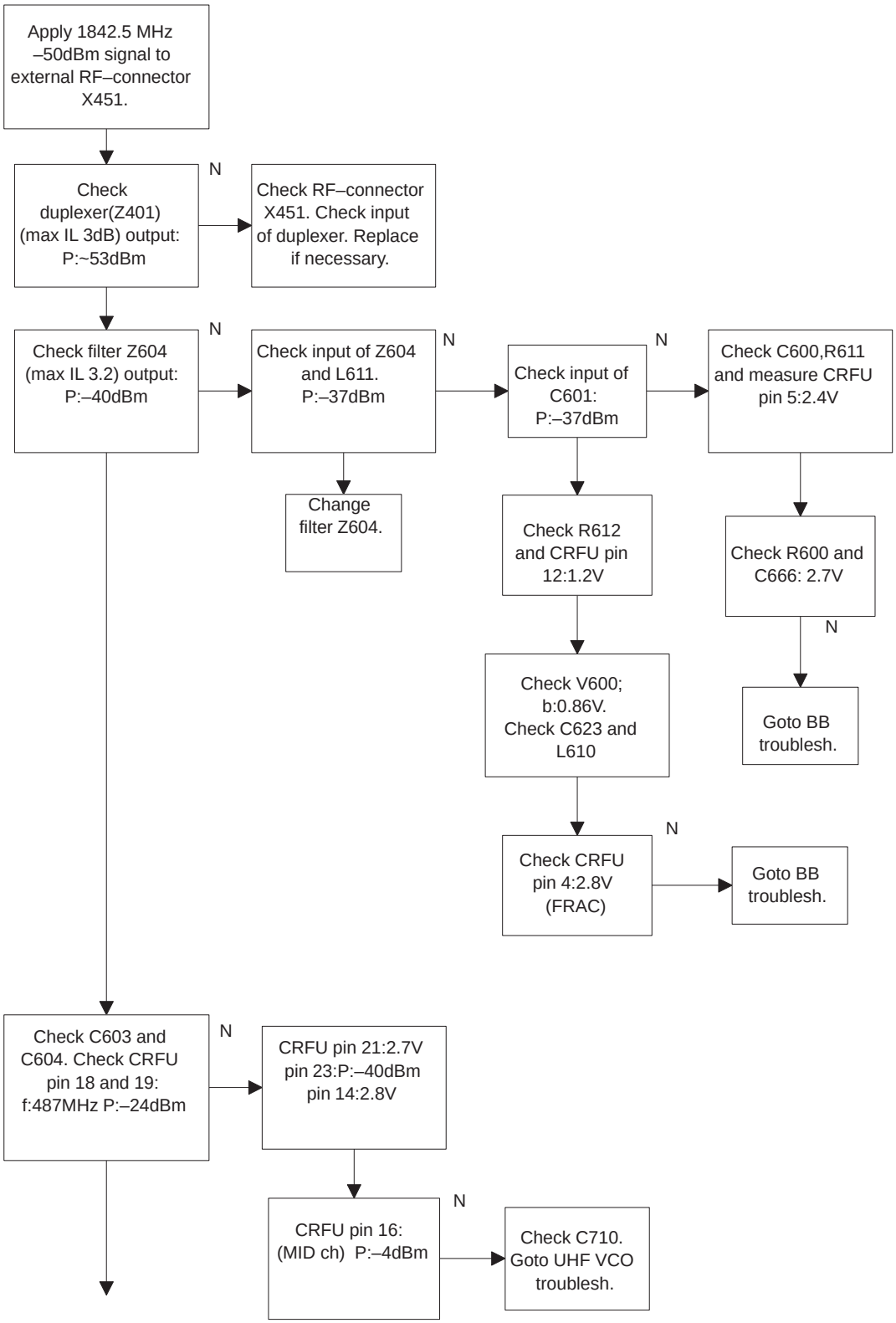


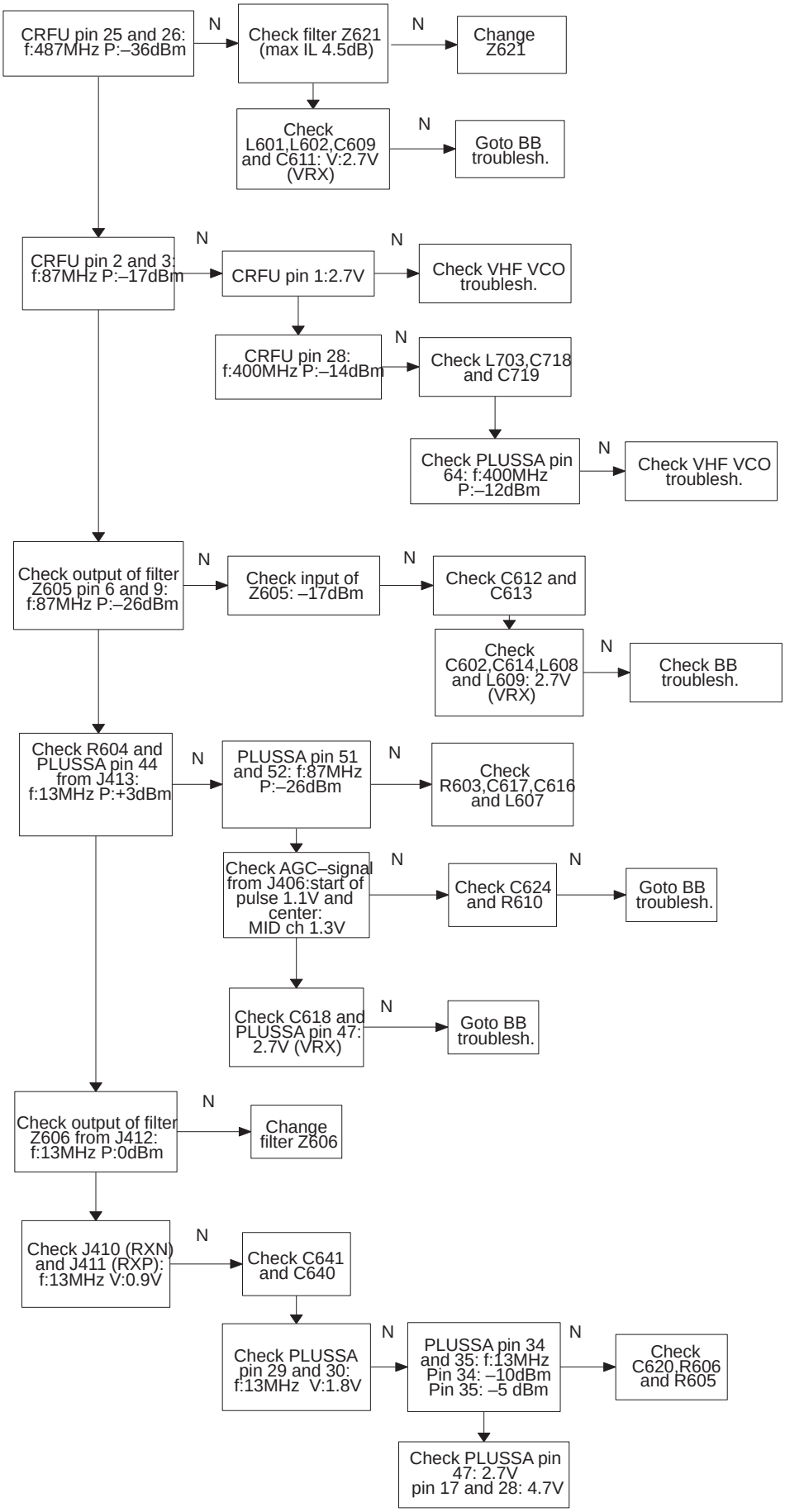
MAD2 pin 91 (DSPXF)
J222

Phone register failure

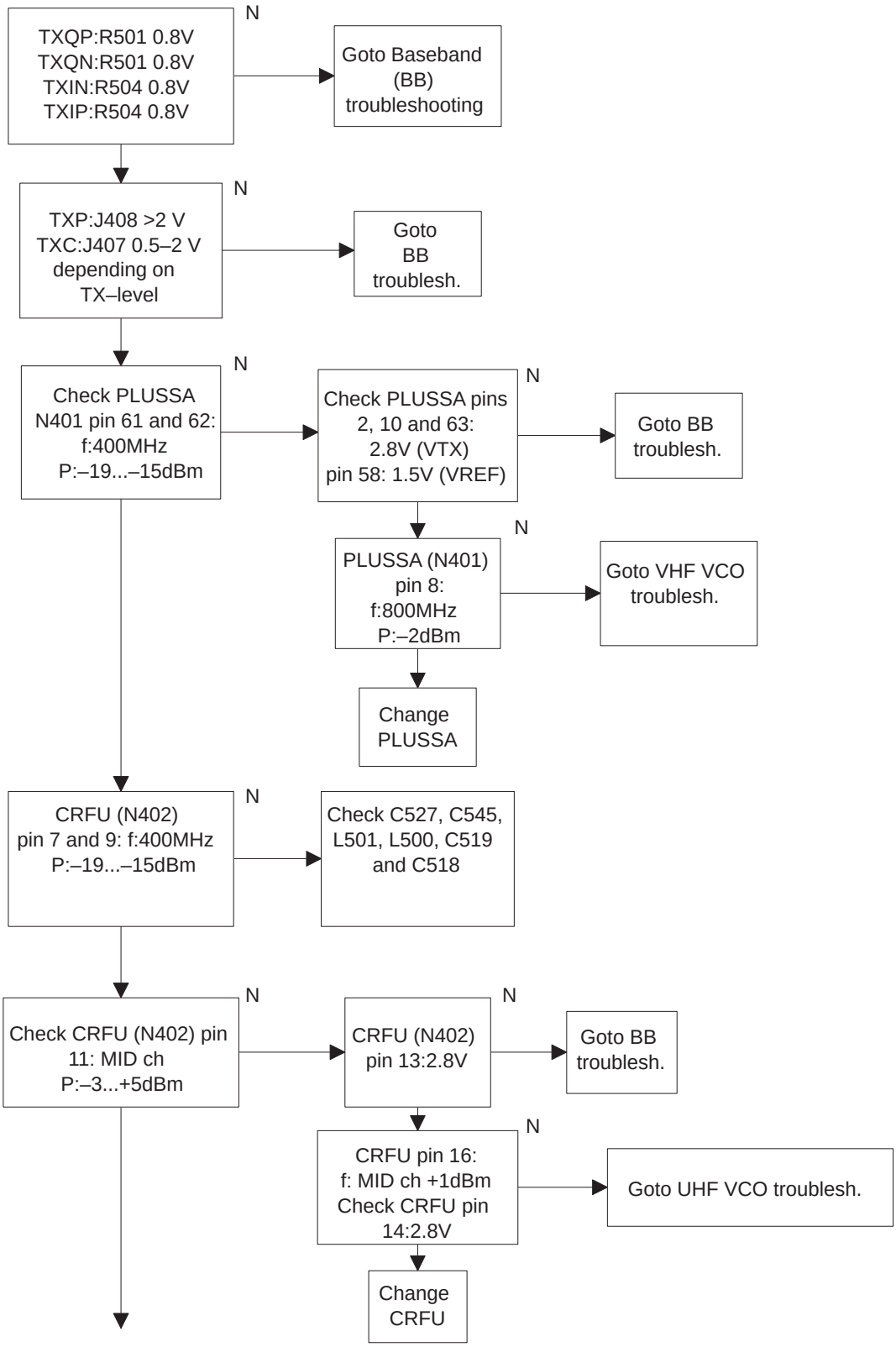


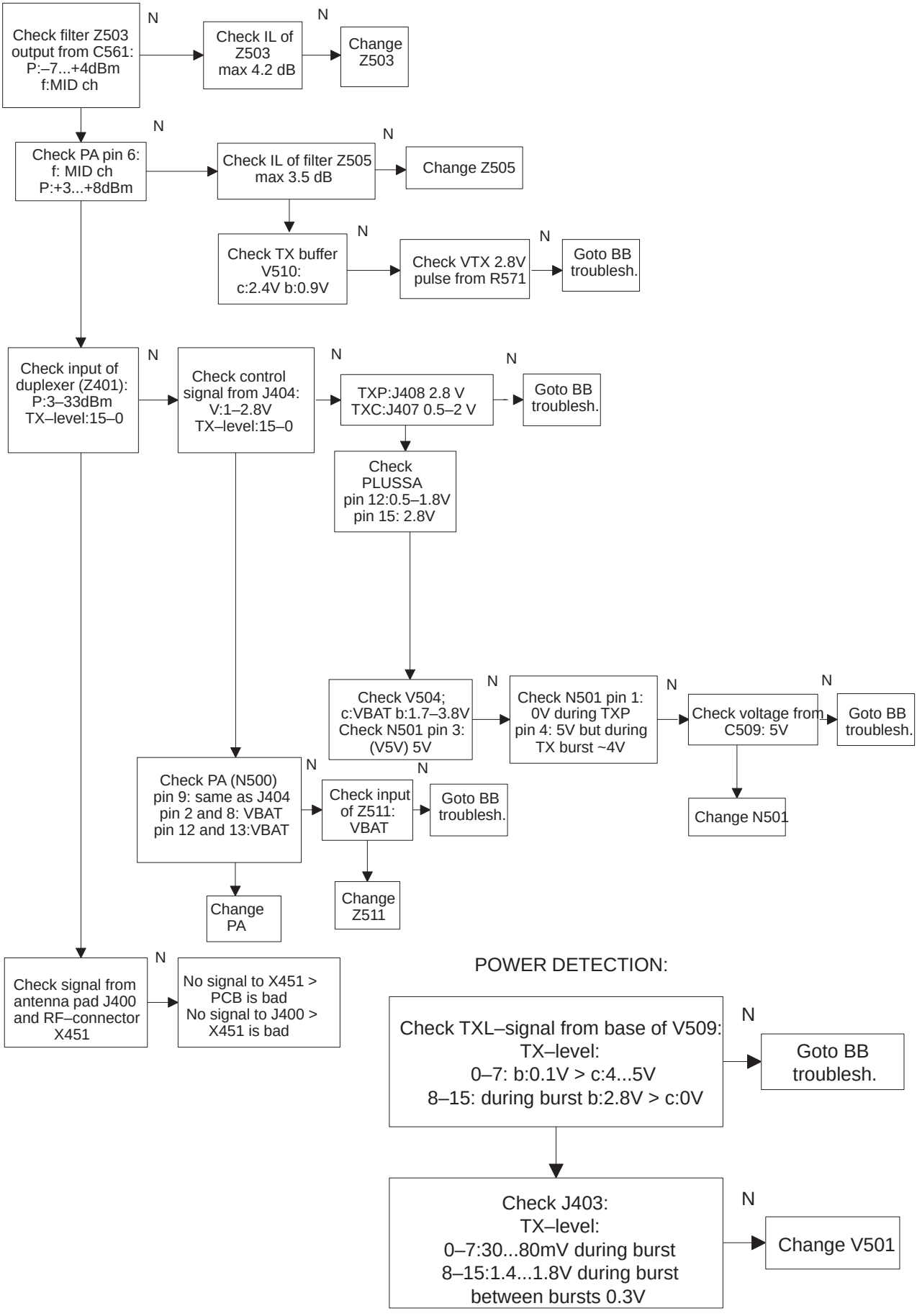
Instructions for RX troubleshooting



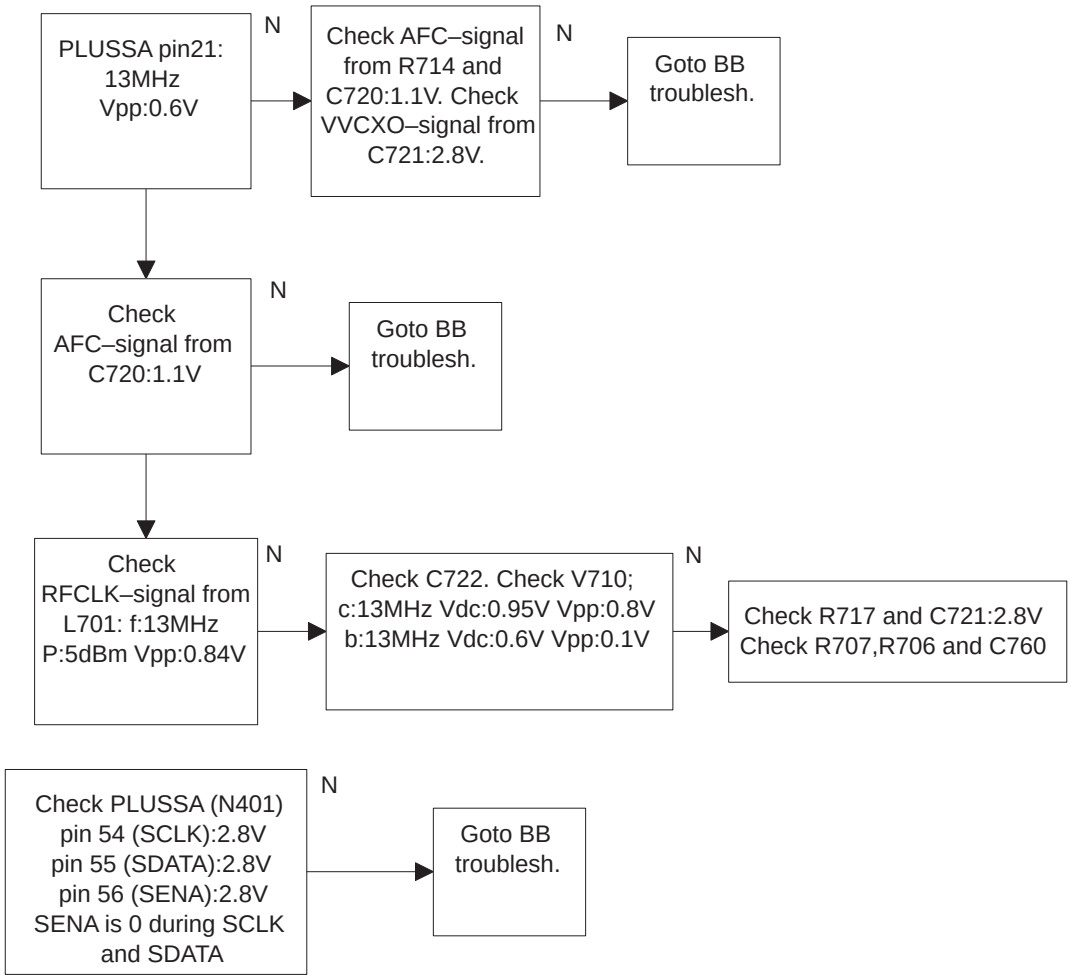

CRFU pin 25 and 26: f:487MHz P:–36dBm
N
Check filter Z621 (max IL 4.5dB)
N
Change Z621
Check L601,L602,C609 and C611: V:2.7V (VRX)
N
Goto BB troublesh.
CRFU pin 2 and 3: f:87MHz P:–17dBm
N
CRFU pin 1:2.7V
N
Check VHF VCO troublesh.
CRFU pin 28: f:400MHz P:–14dBm
N
Check L703,C718 and C719
Check PLUSSA pin 64: f:400MHz P:–12dBm
N
Check VHF VCO troublesh.
Check output of filter Z605 pin 6 and 9: f:87MHz P:–26dBm
N
Check input of Z605: –17dBm
N
Check C612 and C613
Check C602,C614,L608 and L609: 2.7V (VRX)
N
Check BB troublesh.
Check R604 and PLUSSA pin 44 from J413: f:13MHz P:+3dBm
N
PLUSSA pin 51 and 52: f:87MHz P:–26dBm
N
Check R603,C617,C616 and L607
Check AGC–signal from J406:start of pulse 1.1V and center: MID ch 1.3V
N
Check C624 and R610
N
Goto BB troublesh.
Check C618 and PLUSSA pin 47: 2.7V (VRX)
N
Goto BB troublesh.
Check output of filter Z606 from J412: f:13MHz P:0dBm
N
Change filter Z606
Check J410 (RXN) and J411 (RXP): f:13MHz V:0.9V
N
Check C641 and C640
Check PLUSSA pin 29 and 30: f:13MHz V:1.8V
N
PLUSSA pin 34 and 35: f:13MHz Pin 34: –10dBm Pin 35: –5 dBm
N
Check C620,R606 and R605
Check PLUSSA pin 47: 2.7V pin 17 and 28: 4.7V

Instructions for TX troubleshooting

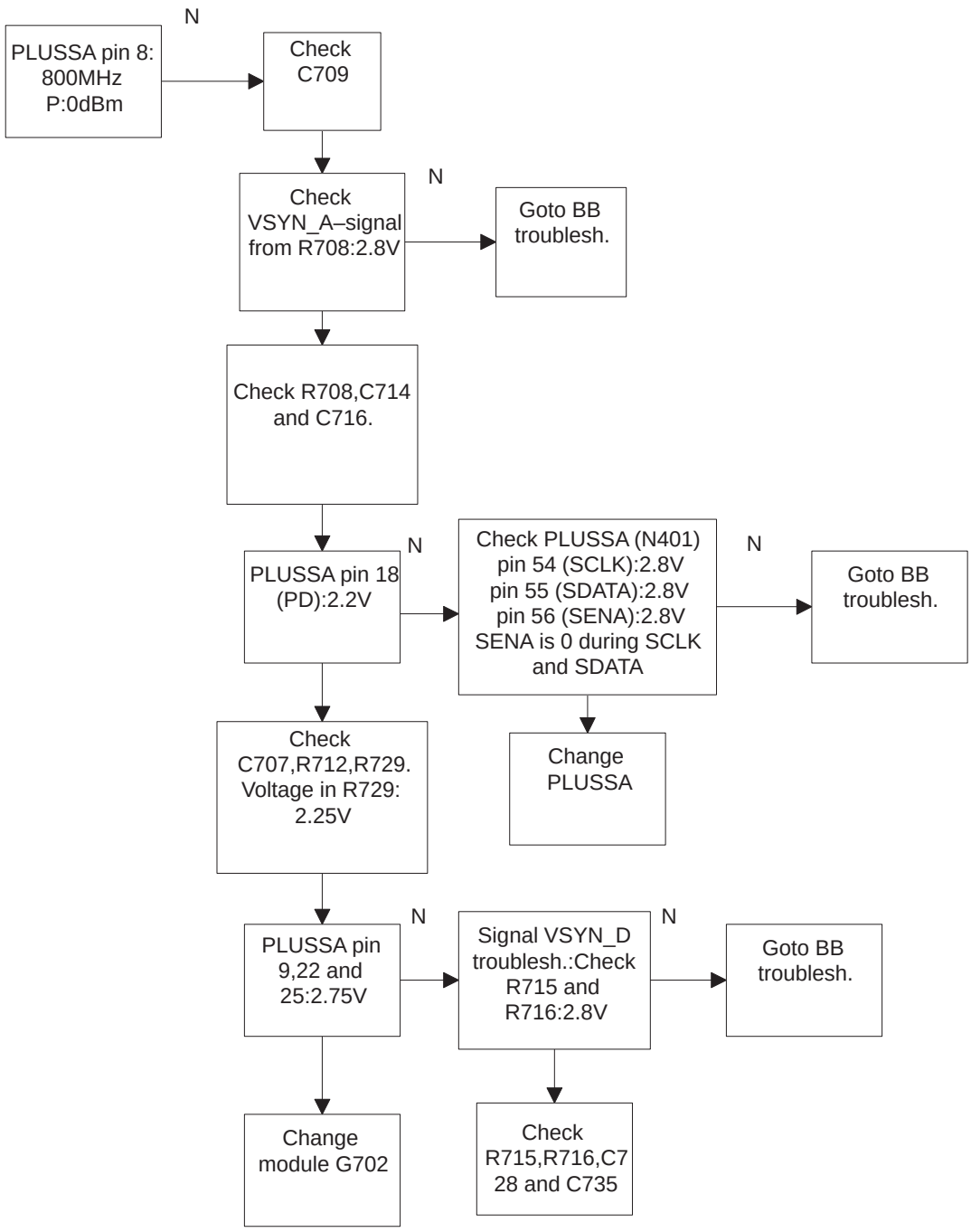



Check filter Z503 output from C561: P:–7...+4dBm f:MID ch
N
Check IL of Z503 max 4.2 dB
N
Change Z503
Check PA pin 6: f: MID ch P:+3...+8dBm
N
Check IL of filter Z505 max 3.5 dB
N
Change Z505
Check TX buffer V510: c:2.4V b:0.9V
N
Check VTX 2.8V pulse from R571
N
Goto BB troublesh.
Check input of duplexer (Z401): P:3–33dBm TX–level:15–0
N
Check control signal from J404: V:1–2.8V TX–level:15–0
N
TXP:J408 2.8 V TXC:J407 0.5–2 V
N
Goto BB troublesh.
Check PLUSSA pin 12:0.5–1.8V pin 15: 2.8V
Check V504; c:VBAT b:1.7–3.8V Check N501 pin 3: (V5V) 5V
N
Check N501 pin 1: 0V during TXP pin 4: 5V but during TX burst ~4V
N
Check voltage from C509: 5V
N
Goto BB troublesh.
Change N501
Check PA (N500) pin 9: same as J404 pin 2 and 8: VBAT pin 12 and 13:VBAT
N
Check input of Z511: VBAT
N
Goto BB troublesh.
Change PA
Change Z511
Check signal from antenna pad J400 and RF–connector X451
N
No signal to X451 > PCB is bad No signal to J400 > X451 is bad
POWER DETECTION:
Check TXL–signal from base of V509: TX–level: 0–7: b:0.1V > c:4...5V 8–15: during burst b:2.8V > c:0V
N
Goto BB troublesh.
Check J403: TX–level: 0–7:30...80mV during burst 8–15:1.4...1.8V during burst between bursts 0.3V
N
Change V501

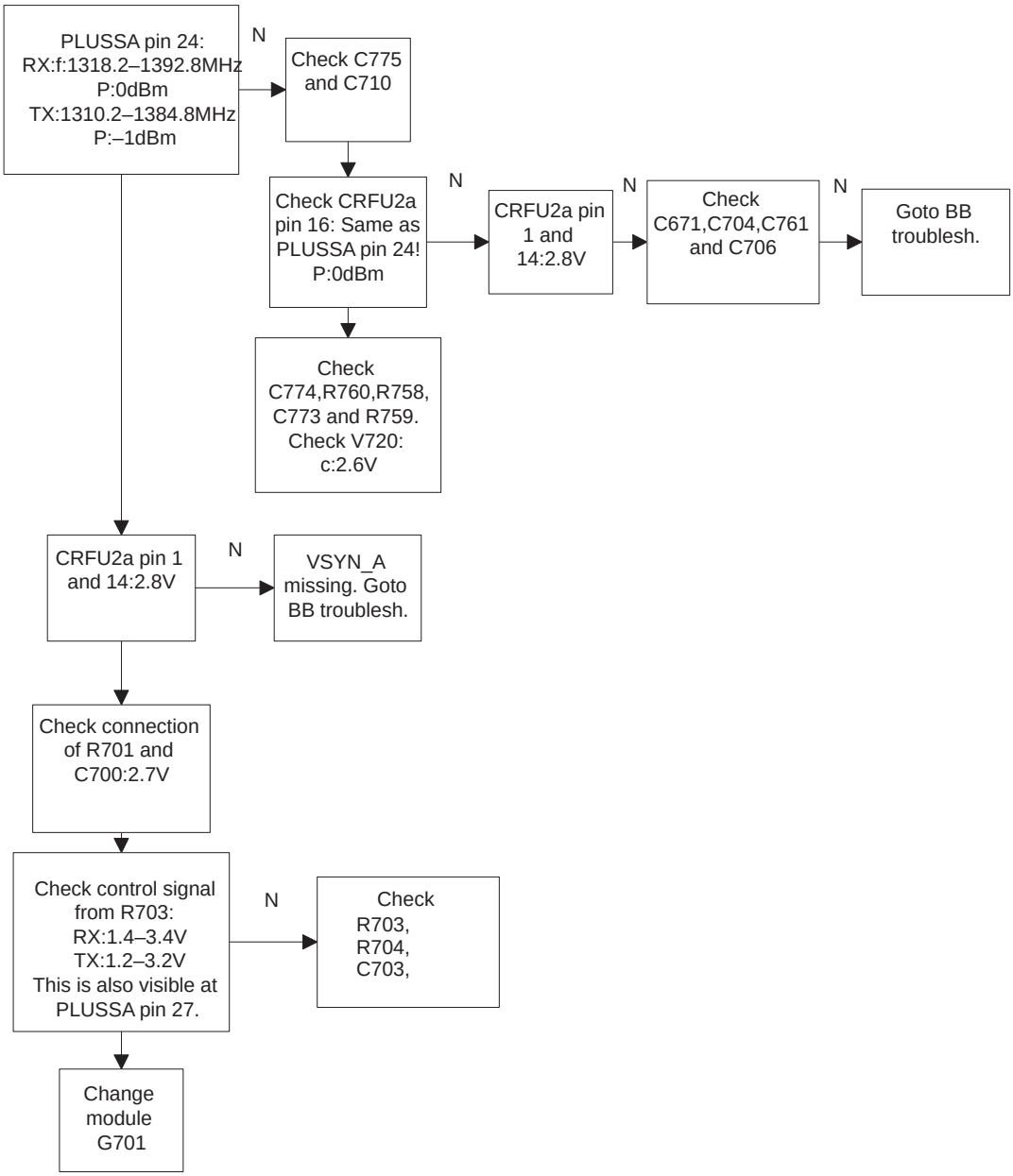
Fault finding chart for 13 MHz oscillator



Fault finding chart for VHF VCO



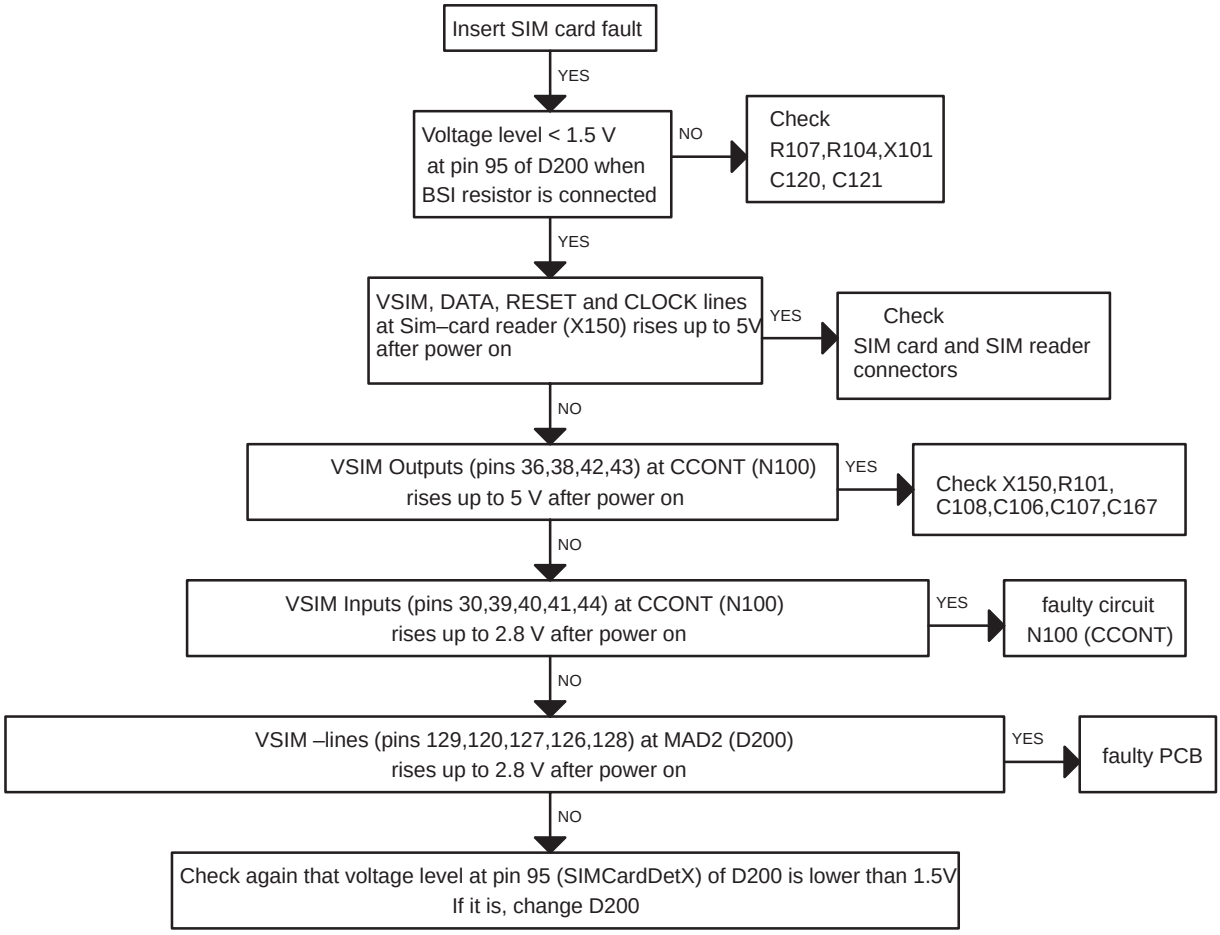
Fault finding chart for UHF VCO

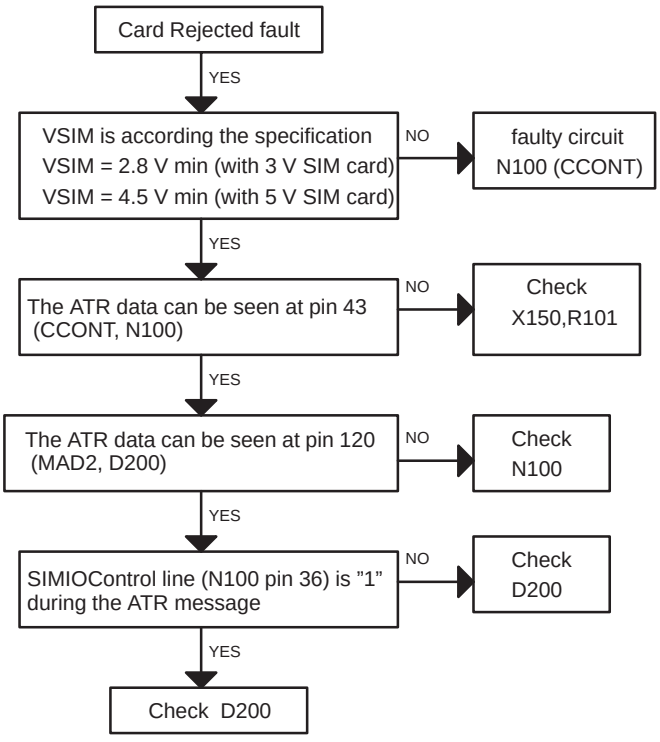


SIM card is out of order

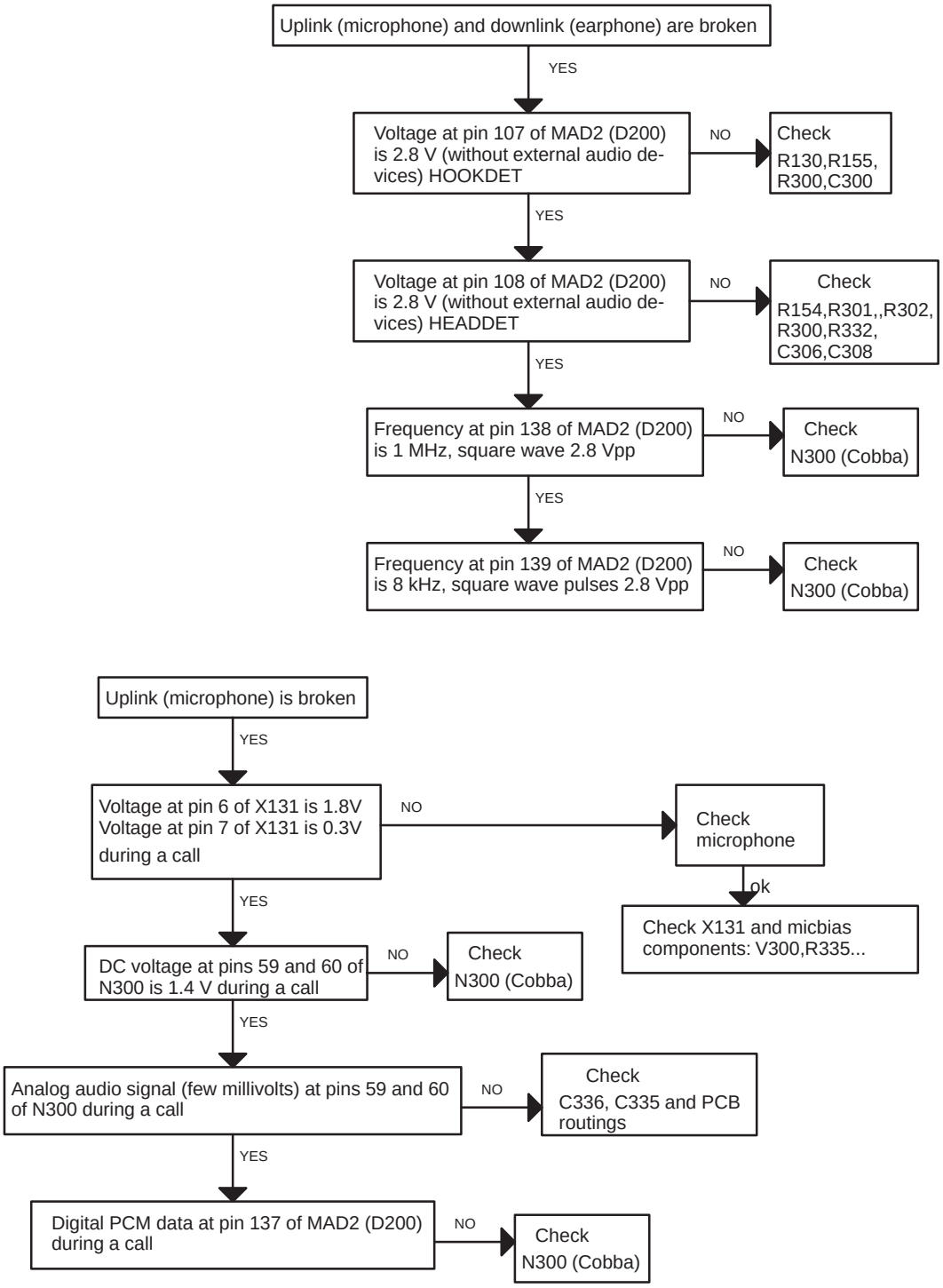
The hardware of the SIM interface from MAD2 (D200) to the SIM connector (X150) can be tested without SIM card.
When the power is switched on and if the BSI line (X101;1) is grounded by resistor, all the used lines (VSIM, RST, CLK, DATA) rises up four times. Thus ”Insert SIM card” faults can be found without SIM card.
The fault information ”Card rejected” means that ATR message (the first message is always sent from card to phone) is sent from card to phone but the message is somehow corrupted, data signal levels are wrong etc. or factory set values (stored to the EEPROM) are not correct.

SIM Card failure

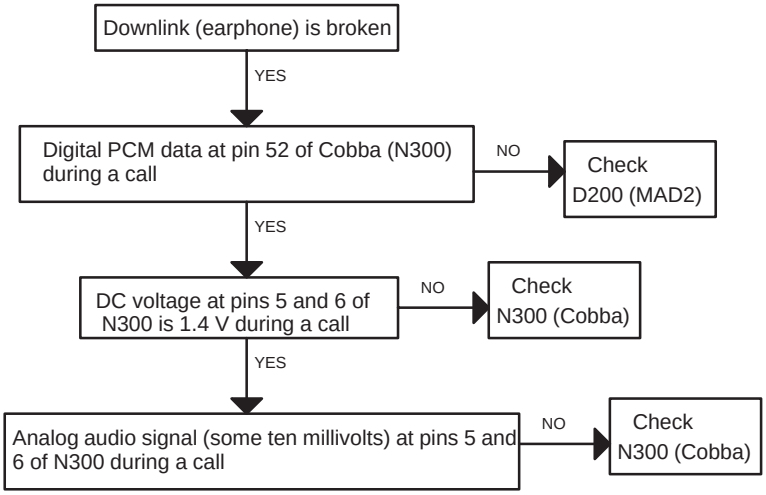




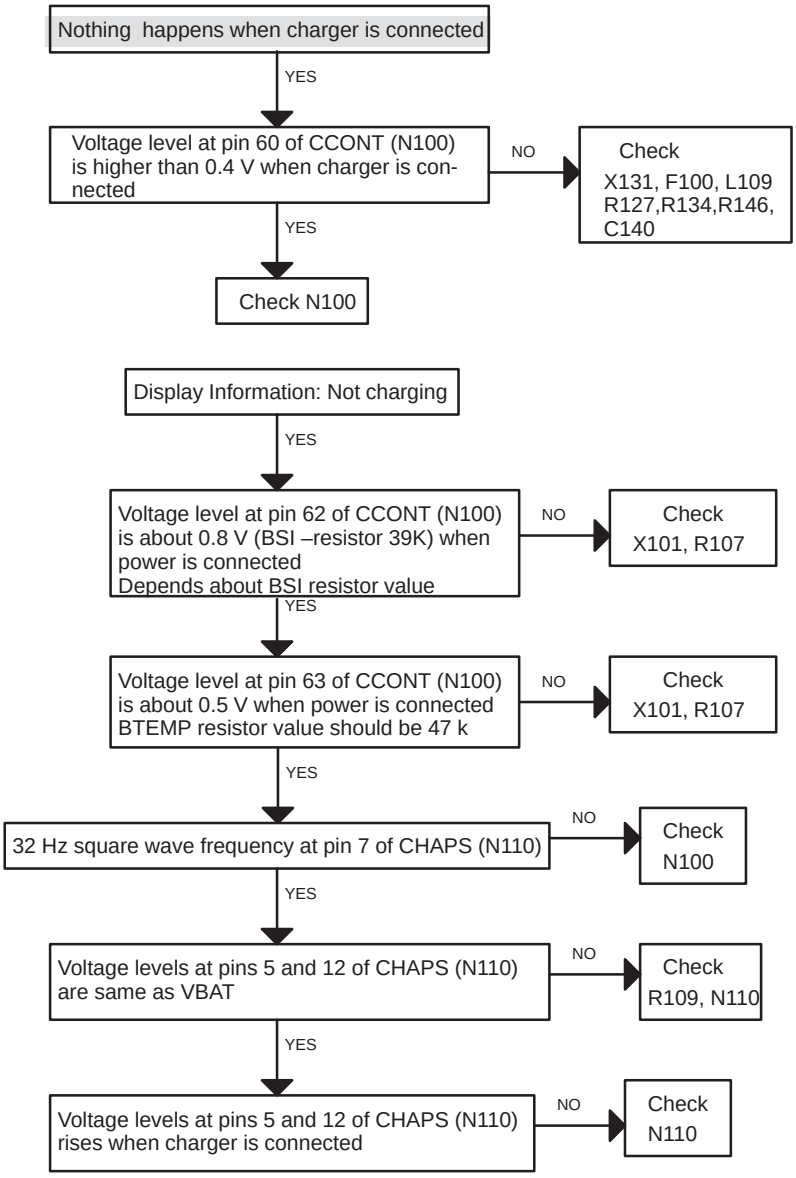
Audio failure (1)



Audio failure (2)



Charger failure



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