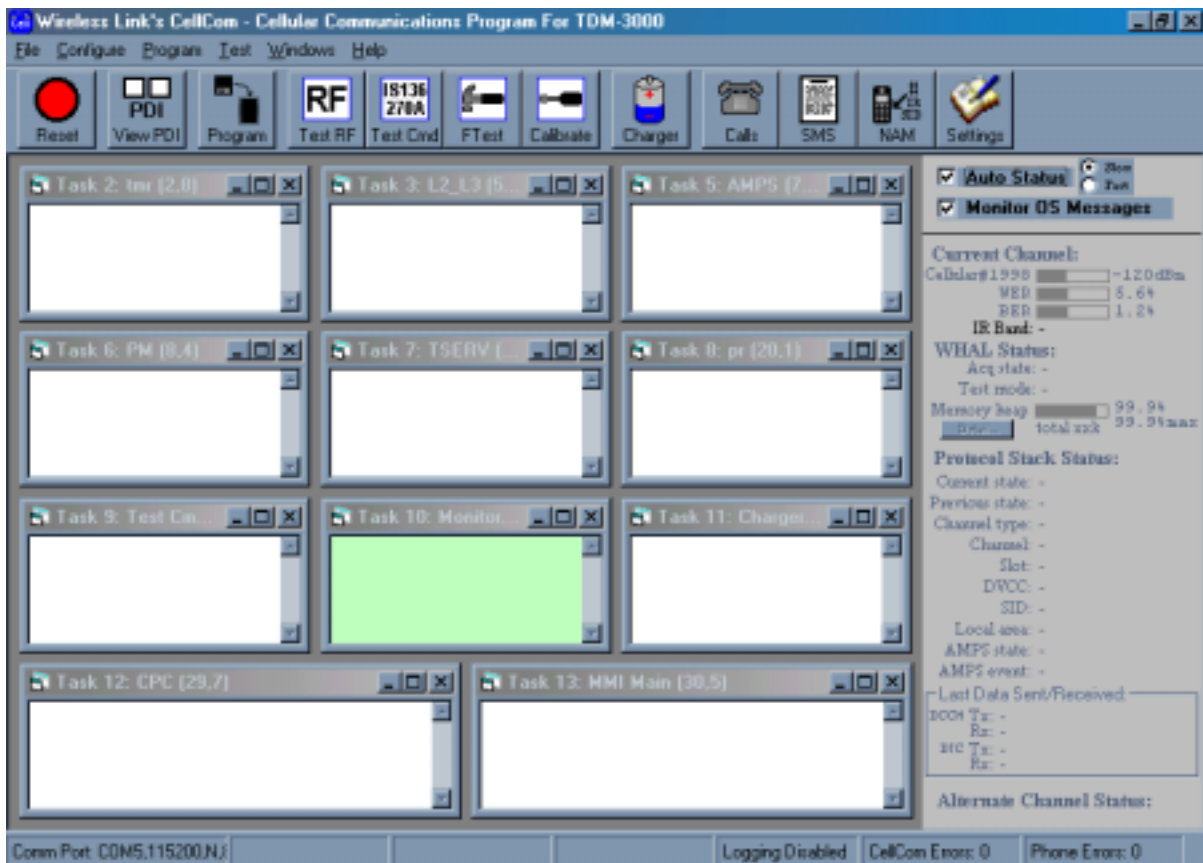
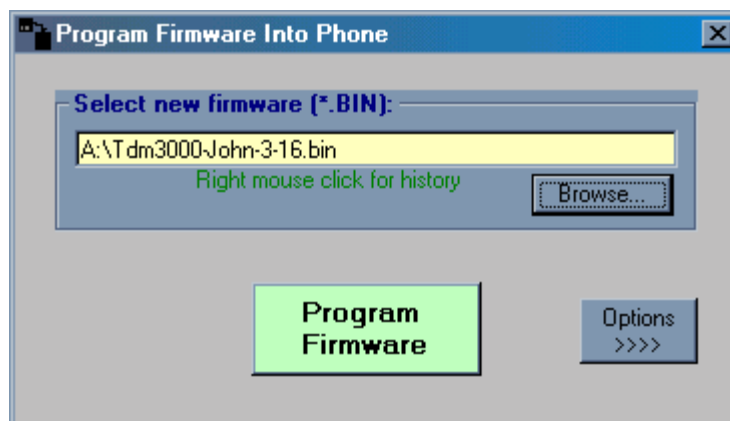


FIXED WIRELESS 3W TEST PROCEDURE.

- 1-Take a look at the board and make sure IC's are in right position.
- 2-Use a Multimeter and measure for a short on FL2 any side of it. Make sure is not shorted. If there is short remove FL2 and measure which side is short. It is usually on P.A side U62. Replaced the P.A.
- 3-Place the test board on top of the main board to be programmed and tested. Main board that I am using does not have any component on it. The main board has a connector hanging with five wires connected to board. Connector should be connected to the level shifter which from the other side is connected to computer. Also make sure the power for PA is connected to supply and if is not you have to put external wire from pin 1 of connector (+4V) to FL2. Use a thick wire.
- 4-Turn the Computer on. It should have CellCom software program installed in it. Latest CellCom version is 4.23. When you open the CellCom



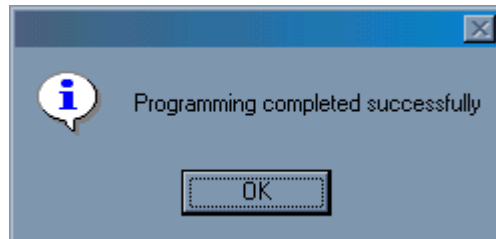
- on top left hand side is a configure logo. Use the mouse and click on it. There is option for comport. Select the comport and make sure your comport that is connected to interface box is configured as follow, speed 115200, data bit 8, parity none and stop bits 1.
- 5-After you set everything press OK, close the window to go back to main window.
- 6-For programming fixed TDMA you need a special loader in software to ignore RTS. Now we are ready to start programming the unit.
- 7-Select power Supply with 2.5A current limiting and set it to +4 volt.
- 8-There are two connector in back of level shifter, with symbols of GND for ground and + for positive voltage which should be connected to power supply.
- 9- Turn on the power Supply unit should be drawing around 60mA. If unit current is more than 200mA. We need to find which Regulator is shorted. U20 pin 5 should be 3 volt, U28 pin 5 should be 3.2 volt, U21 pin 5 should be 2.8 volt, U26 pin 5 should be 3 volt, U9 pin 8 should be 3 volt and U10 pin 8 should be 2.5 volt.
- 10-To program the unit we select the program Logo, is on top left hand side of CellCom window. After window open we can see the name of program in yellow section under New Firmware select. The program we looking for called Tdm3000-john-3-16.bin or the latest software. If there is another program in this window use Browse to find the right one then select it and open it, by selecting open. Now start programming by selecting program firmware on green section of window. Sometimes program will ask you to reset the unit then just turn off and back on the power Supply, and select OK.



- 11- If there is a problem with programming, using scope probe we have to check level of clock for controller. R89, TCXO2 (19.44MHZ) 1volt DC,

1 volt peak to peak. R88, TCXO, 2.2 volt DC, 180mV peak to peak and R204 TCXO1, 2volt DC, 800mV peak to peak, if there is no clock check VC1 Pin 2 for clock. If still there is no clock replace VC1.

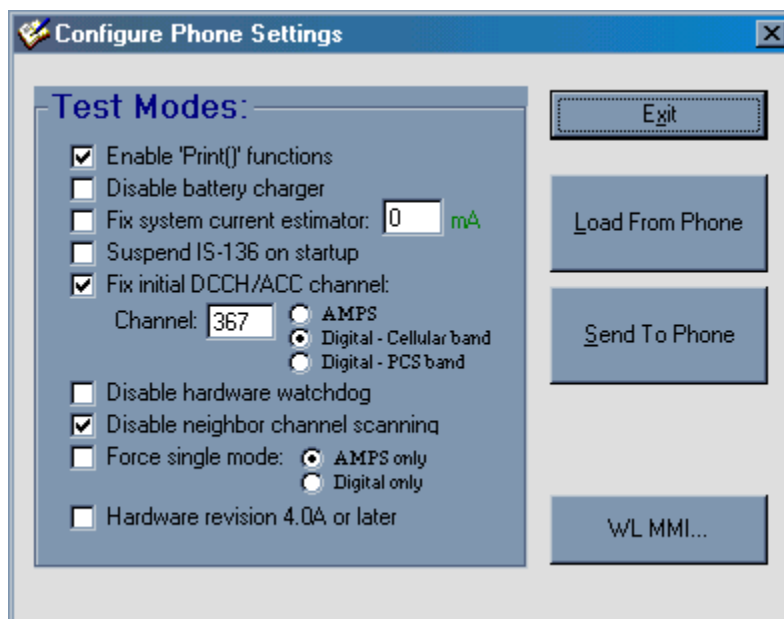
12- If unit get programmed and everything goes OK. You will see,



Press OK.

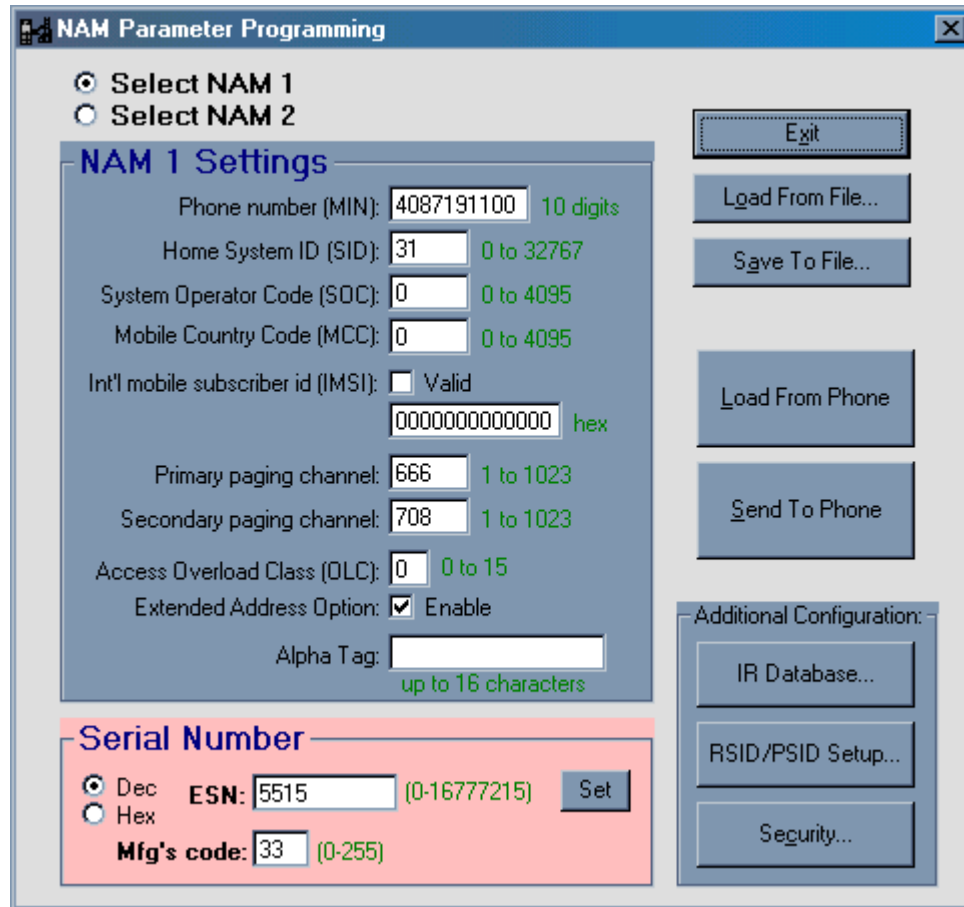
13-Now you can see all kind of activity on CellCom window. Unit should be drawing around 160 to 250mA. It depends if the radio transmit to some receiving signals.

14-To start testing the board we have to set frequency channel. We do this by selecting, setting on top right hand side of CellCom window and we set them to,



click on Send to phone, and exit.

15-Now we have to set the NAM, to select NAM go to top right hand side of CellCom and click on NAM and set NAM as follows,



NAM Parameter Programming

☒ Select NAM 1
☐ Select NAM 2

NAM 1 Settings

Phone number (MIN): 4087191100 10 digits
 Home System ID (SID): 31 0 to 32767
 System Operator Code (SOC): 0 0 to 4095
 Mobile Country Code (MCC): 0 0 to 4095
 Int'l mobile subscriber id (IMSI): ☐ Valid
 00000000000000 hex
 Primary paging channel: 666 1 to 1023
 Secondary paging channel: 708 1 to 1023
 Access Overload Class (OLC): 0 0 to 15
 Extended Address Option: ☒ Enable
 Alpha Tag: [text box] up to 16 characters

Serial Number

☒ Dec ESN: 5515 (0-16777215) Set
☐ Hex
 Mfg's code: 33 (0-255)

Exit
 Load From File...
 Save To File...
 Load From Phone
 Send To Phone
 Additional Configuration:
 IR Database...
 RSID/PSID Setup...
 Security...

put any 10 digit for phone number, SID set it to 31 and in bottom put any number for ESN and Mfg's code, click on set and then click on send to phone and exit. If you want to use HP8920B equipment for automated test make sure Primary paging channel is set to 333.

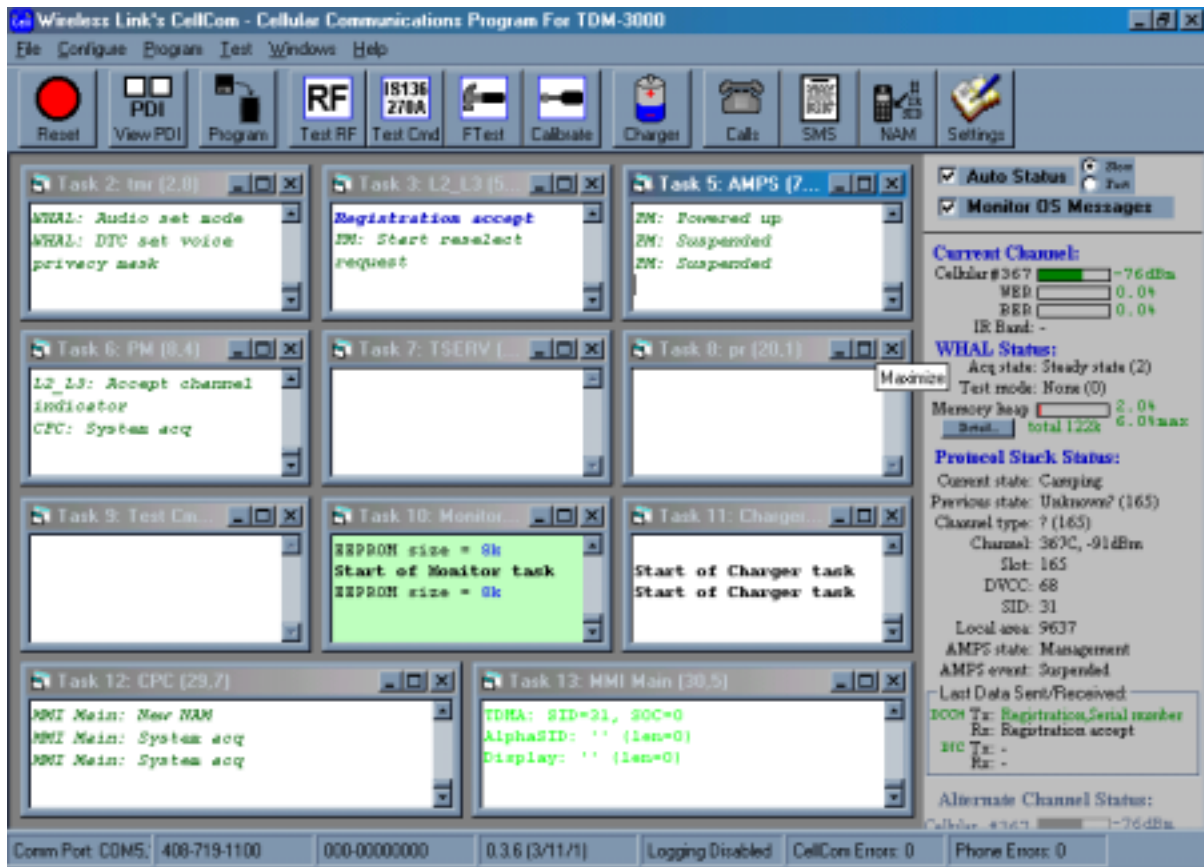
- 16-For testing we are going to use IFR 1900. We need a power splitter. From source of splitter connect to the unit(TDMA), one split goes to IFR and other split end with 20 dB Attenuation goes to Gigatronics 8651A power meter. Now we need to calibrate level that goes to the unit. Turn IFR ON, push RF GEN. on IFR set frequency to 881 MHZ at -10dBm, Deviation 0. Remove power meter and connect it to source side of splitter, terminate split side with 50 Ohm. See how much loss you have(it should be between 4 to 6 dB) from IFR side to radio this is for receive calibration write this down. Move the power meter back to splitting end and put a signal generator to the source of splitter at 836 MHZ, -10dBm and look from split end that goes to power meter with 20dB Attenuation how much loss you have(it should be around 4 to 6 dB loss). This is for transmit loss.
- 17-Now press DPLX key on IFR, select Sp tst(F5), 3 for DCCH Cell SITE SIMULATION, F1 for BROADCAST CHANNEL MESSAGE. Use arrow key to go to MSG TYPE, Turn the knob till you get to SYSTEM

IDENTITY, press ENTER key. Make sure SID is set to 31, If is not change it to 31. Push RET(F6) to go back. Press F3 for call processing. In this screen set Channel to 367, U8(for cellular band), RfLVL -65dBm, RATE full, Type digital, IDT 2, MIN ..(anything), CHAN 367 , slot 1, DMAC 6, DVCC 68, SB 0, TA 0, PV 0, DIC 1, VC 2ACELP, SIGAL PITCH MED, CADENCE 000001, and rest zero.

18-Connect back all the connectors to splitter, output of TDMA to source, one end of splitter to IFR and other end with 10dB attenuation to spectrum Analyzer.

19-Now if the unit is ON just do the RESET on top left hand side of CellCom. If unit is off, turn on the power supply. Reset the unit again.

20-Now If every thing is working we will see the screen bellow.



To be able to see every thing, make sure on left hand side of CellCom Auto Status and Monitor are checked on. If you have a green indication for the channel on left hand side of CellCom window, that means your receive side is working. Reduce the RF level on IFR to -105dBm, There should be no more than 3% to 4%BER indication on left hand side of CellCom window. If OK go to step 21. If there are more than 4% we have to check receive path. If the indication is red, this means you are not synch to

signal, we have to check with high frequency probe to make sure RX IF LO on pin 22 & 23 of U29(SATURN) is locked to 239.4MHZ. If is not locked look for cold solder joint on thank circuit or U29 pins. On both side of L19, pin 22 &23 you should have around 1.9 volt.

If you do not get any indication for receive. Check your main VCO at pin 2 of VCO2. It should be locked to 1000.65MHZ, level 0 to -5dBm. If is not we have to check the Loop component,R153 12k, C93 is 680pf, C15 is 22nf, R152 10k and C96 820pf.

- 21- Also there is indication for Transmit and that is on almost bottom left hand side of window under DCCH Tx, if it is green and say registration serial number transmit is working you can go to the next step 22. If there is no indication RESET the unit and if still the same, check the TX IF which is D5 on pin 30 & 31 of U47 with the high frequency probe it should be locked to 329.28 MHZ if is not look for cold solder and measure dc voltage on L42 should be around 1.5volt.
- 22- Now we are ready to make a call. In CellCom main window go to top and Click on call. When window opens put some number into Originate box and click on Originate

Call Processing

State: Load

Status:

Last Event: ☐ Enable auto-reports

Originate number Exit

Flash Hook number

Disconnect

Answer

Volume (0-7, 0=min) Up Down

Send DTMF:

1	2	3	A
4	5	6	B
7	8	9	C
*	0	#	D

If everything goes Ok, you will see IFR screen will change, push F4 for MoDAcc, next screen will show you the EVM. It should be between 6 to 9%. If you could not talk to IFR, RESET the unit and try again. If you get connection with IFR go to step 23. If you can not communicate with IFR.

Reset the unit and before Originate the number keep your eyes on current of power supply, Click on Originate see if the current goes up to 250mA or more this means your PA is getting enough input. If current is not changing, it means PA does not have enough input.

- 23- Now to Calibrate the output level of 3 watt fixed wireless, we use the power meter, considering the loss for Attenuation. Exit the call window and click on Calibrate on top of CellCom.

Calibration Control

Modify

☐ Analog PLC
☒ Digital PLC, cellular
☐ Digital PLC, PCS
☐ Modem, cellular
☐ Modem, PCS
☐ AMPS
☐ Battery Charger

Parameter: **Digital cellular PLC0 - DAC**

Value: **996** Range: 0 to 1023

Update Up +10 Down -10

☒ Update hardware

Current Settings - Used(Saved)

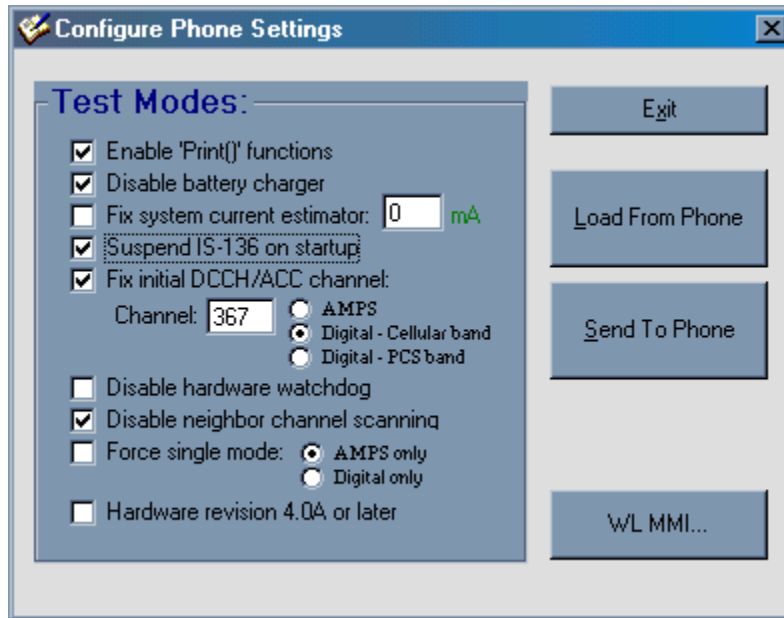
Digital PLC, cellular band:			
DAC-0	996 (996)	MAX2360-0	3 (3)
DAC-1	980 (980)	MAX2360-1	2 (2)
DAC-2	950 (950)	MAX2360-2	2 (2)
DAC-3	920 (920)	MAX2360-3	2 (2)
DAC-4	890 (890)	MAX2360-4	2 (2)
DAC-5	860 (860)	MAX2360-5	2 (2)
DAC-6	830 (830)	MAX2360-6	2 (2)
DAC-7	800 (800)	MAX2360-7	2 (2)
DAC-8	770 (770)	MAX2360-8	2 (2)
DAC-9	740 (740)	MAX2360-9	2 (2)
DAC-10	740 (740)	MAX2360-10	2 (2)

Buttons: Exit, Load From File..., Save To File..., Get From Unit, Save In Unit, Low Level Control...

Using power meter set the first Dac-0 for 34dBm(3 Watt), and every other step for 4dB less. Make sure your update hardware is marked so you can change to new value. After you finished click on save in unit. Check the IFR and make sure EVM is no more than 9% in Maximum power. While you are at MAX power set spectrum analyzer center frequency to 836.01MHZ, BW on spectrum analyzer to Auto, change the span to 100MHZ and put trace on MAX hold, make sure all other signals are at least -45dBc from Carrier(check the signal at 823.26MHZ). For linearity of signal when you are at MAX power and IFR is in MoDAcc window monitoring EVM press F6(More), press F4(ACPM) to look at Adjacent Channel response, press F1 to start.

You should see all other channels with in the limit lines. Now we are finished with TDMA mode we will do AMPS.

24-To do AMPS, EXIT calibration window and go to setting on left top side of CellCom window. Click on setting and set the suspend IS-136 on start



Now click on Send to Phone and exit the setting, reset the unit. Now unit is suspended. Go to top of CellCom and click on FTest and you will see,

Factory Test Functions

Enable Factory Tests **Disable Factory Tests**

Execute Factory Test:

Tx=836.01, Rx=881.01

Channel:

Level: (0 to 10)

Set Mode **Control Mode**

AFC

Power Levels

Compandor Comp On Comp Off

SAT

ST

WBD

DTMF

Mod Limiter

Expander Exp On Exp Off

AGC LNA On LNA On

RSSI Query dBm

Battery Charger

Low Level Tests:

Init

Acc Acquire Chnl:

Avc Acquire Chnl:

Carrier ☒ On ☐ Off

SAT ☒ On ☐ Off 6000Hz

ST ☒ On ☐ Off

WBD ☒ On ☐ Off

DTMF ☒ On ☐ Off 1

Tx Voice ☒ On ☐ Off

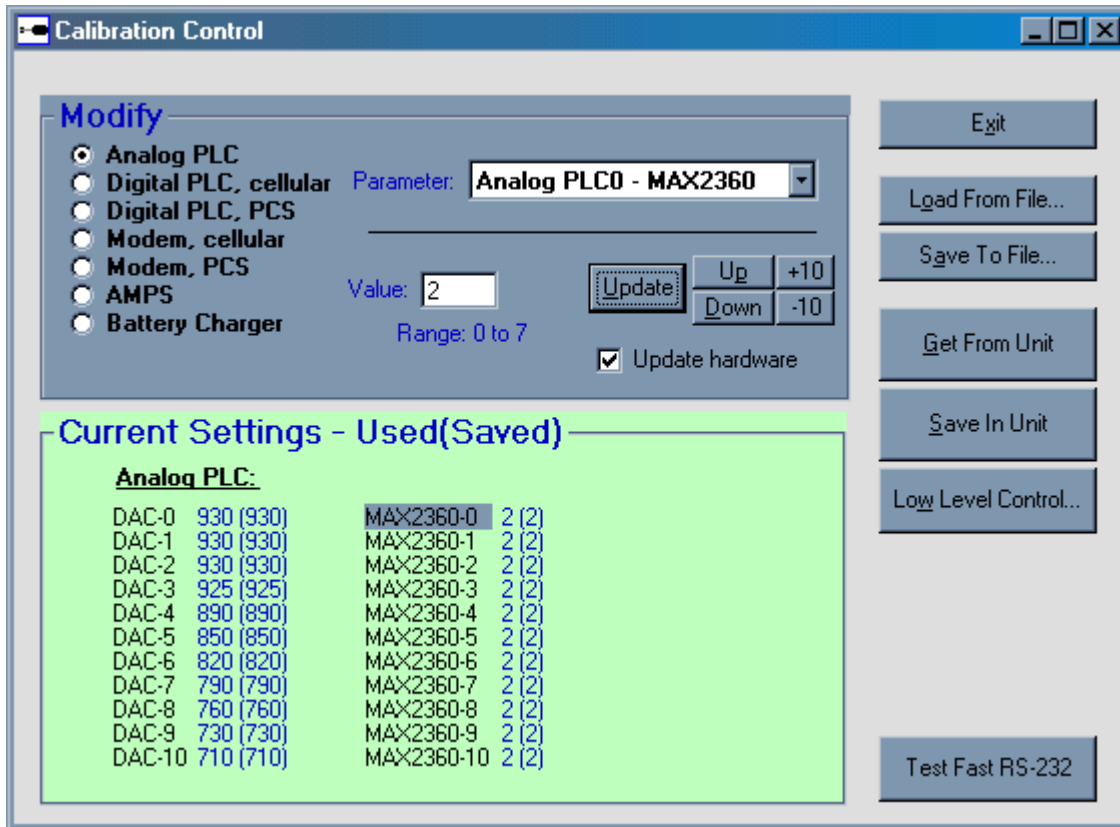
Rx Voice ☒ On ☐ Off

Channel ☒ AMPS ☐ Dig-Cell band ☐ Dig-PCS band

Power Level (0 to 10)

☐ Window always on top

Click on Enable factory test and then click on power levels. Now you should be able to see analog transmit on Spectrum Analyzer. Exit this window and go to calibration table again and select analog plc, for analog mode calibration. Use the power meter and calibrate the output power for first four level at +27.7dBm(600mW) and every other level 4dB less.



After calibration with power set to maximum increase the span on spectrum Analyzer to 100MHZ, BW Auto and make sure all other signals are at least -45dBc down. Set spectrum Analyzer Span to 100Khz. Exit the calibration window and go back to Ftest window and click on SAT, you should see 5KHZ tone on carrier. Click on ST and you should see 10KHZ tone on carrier. Now we will do calibration on Audio for compressor and expander.

TDM-3100 AFC & Audio Cal With 8920

Setup

- 1) Connect UUT to power supply and level shifter box.
- 2) Connect level shifter box to serial port of PC running CellCom program.
- 3) Connect UUT RF connector to 8920 RF IN/OUT connector.
- 4) Connect the UUT microphone input to the 8920 Audio Out connector.
- 5) Connect the UUT speaker output to the 8920 Audio In HI connector.
- 6) Press the TX button on the 8920 to select the TX TEST screen.
- 7) Make the following selections on the TX TEST screen:
 - a. Tune Mode – *Manual*
 - b. *836.01 MHz*

- c. Tx Power Meas – *Peak*
- d. Input Port – *RF In*
- e. IF Filter – *230 kHz*
- f. Ext Tx Key – *Off*
- g. AF Anal In – *FM Demod*
- h. Filter 1 – *50Hz HPF*
- i. Filter 2 – *15kHz LPF*
- j. De-Emphasis – *OFF*
- k. Detector – *RMS*SQRT2*
- l. AFGen1 Freq – *1 kHz*
- m. AFGen1 Lvl – *0 mV*

8) Power ON the UUT..

9) Verify PC is communicating with UUT.

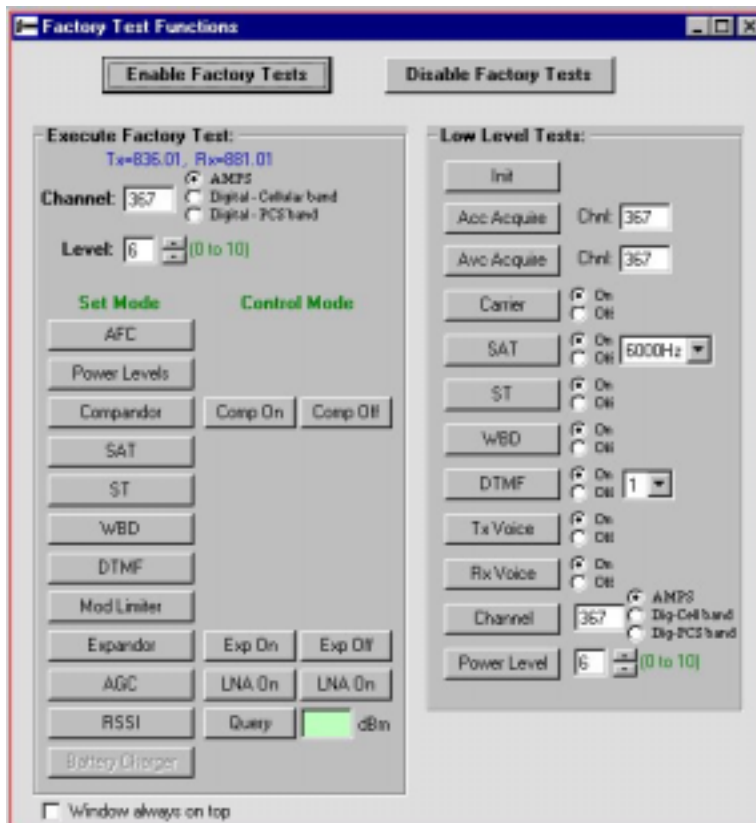


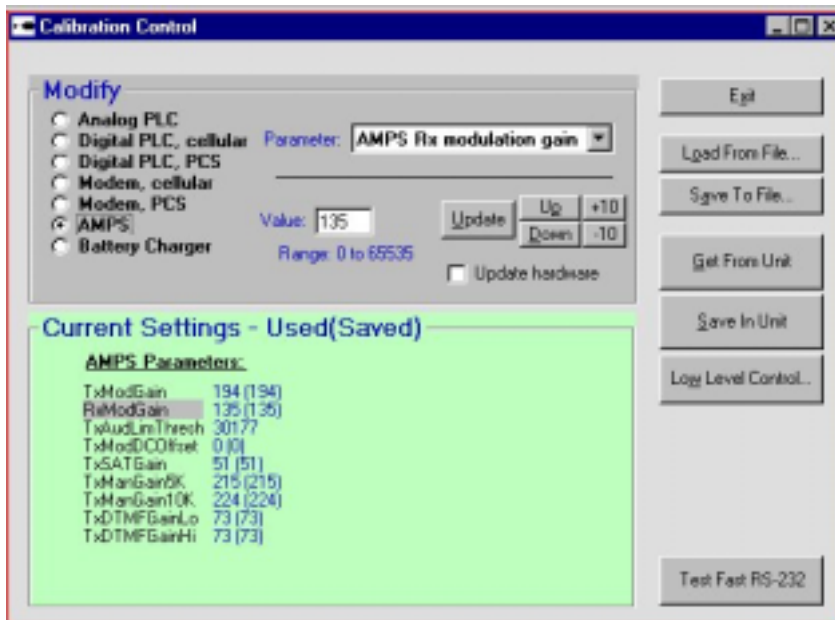
10) Click the *FTTest* button on the CellCom toolbar.

11) Click the *Enable Factory Fests* button the Factory Test Functions panel.



12) Click the *Calibrate* button on the CellCom toolbar.





CellCom Factory Test Functions & Calibration Control panels

Calibrate AFC

- 1) Click the **AFC** button on the Factory Test Functions panel.
- 2) Verify the **Update** hardware checkbox is checked (this should be checked throughout the calibration process) and **Modem, cellular** is selected on the Calibration panel.
- 3) Adjust AFC cal value while monitoring the *TX Freq Error* meter on the 8920. Adjust the cal until reading is 0 Hz +/- 100 Hz.

Calibrate Compandor Reference

- 1) Click the **Compandor** and **Comp Off** buttons on the Factory Test Functions panel.
- 2) Set the **AFGen Lvl** on the 8920 to 7 mV.
- 3) Check the value of the *FM Deviation* meter on the 8920.
- 4) Click the **Comp On** button on the Factory Test Functions panel and check the *FM Deviation* again.
If the deviation is higher than the deviation measured with the compandor off, increase the AFGEN Lvl. If the deviation is lower, decrease the AFGEN Lvl value.
- 5) Repeat the measurements and adjustments until the FM deviation reading is the same when the compandor is off and on. The difference between the deviation with compandor off and on should be no more than 100 Hz.
- 6) Once adjusted, set the compandor off.

Calibrate Tx Modulation

- 1) Adjust the *TxModGain* cal value on the CellCom calibration panel for a deviation reading of 2.9 kHz +/- 30Hz on the 8920.

Calibrate SAT Modulation

- 1) Click the **SAT** button on the Factory Test Functions panel.
- 2) Adjust the *TxSATGain* on the calibration panel until the FM deviation on the 8920 measures $2\text{ kHz} \pm 100\text{ Hz}$.

Calibrate ST Modulation

- 1) Click the **ST** button on the Factory Test Functions panel.
- 2) Adjust the *TxManGain10K* on the calibration panel until the FM deviation on the 8920 measures $8\text{ kHz} \pm 400\text{ Hz}$.

Calibrate WBD Modulation

- 1) Click the **WBD** button on the Factory Test Functions panel.
- 2) Adjust the *TxManGain5K* on the calibration panel until the FM deviation on the 8920 measures $8\text{ kHz} \pm 400\text{ Hz}$.

Calibrate Expander Reference

- 1) **Press the RX button on the 8920 to select the RX TEST screen.**
- 2) **Make the following selections on the RX TEST screen:**
 - a. **RF Gen Freq – 881.01 MHz**
 - b. **Amplitude - -50.0 dBm**
 - c. **Atten Hold – Off**
 - d. **Output Port – RF Out**
 - e. **AFGen1 Freq – 1 kHz**
 - f. **AFGen1 To – FM 2.9 kHz**
 - g. **AFGen2 Freq – any freq.**
 - h. **AFGen2 To – FM Off**
 - i. **Filter 1 – 50 Hz HPF**
 - j. **Filter 2 – 15 kHz LPF**
 - k. **Ext Load R – 8.00**
- 1) Click the **Expander** and **Exp Off** buttons on the Factory Test Functions panel and note the **AC Level** reading on the 8920.
- 2) Click the **Exp On** button and check the **AC Level**.
- 3) Adjust *RxModGain* on the calibration panel while repeating the measurements with Exp On and Exp Off until the AC Level readings are the same with expander on and with expander off.
Adjust until the difference in AC level is 0.1 dB max.

